THE UNIVERSITY OF MANITOBA

THE RECREATIONAL POTENTIAL OF URBAN CORRIDORS

by

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CHAPTER I

INTRODUCTION

A. Organization

This study determines a desirable technique to evaluate the recreational potential of urban corridors. Chapter I outlines some primary objectives and indicates the reasons for demands on outdoor recreation areas. In Chapter II the writer examines a set of land classification systems and compares the identification of recreation characteristics. Chapter III introduces a methodology for evaluating recreational potential or urban corridors. Chapter IV provides an analysis of the results and an analysis of the methodology. The summary, conclusions, and recommendations are contained in Chapter V.

B. Objectives

The concerns of modern urban planning demands that planners not rely on a traditional viewpoint of the aesthetics in evaluating the recreational potential of urban land and water areas. Rather, the planner must be drawn into a bioecological approach which underlies the philosophy of the conservationalist, and with concomitant socio-economic ingredients, the planner can evolve a sound planning policy for the development of urban open space. In the past, land and water units in urban areas have not been developed to the fullest extent, particularly for recreational use. During the last decade, however, there have been significant developments in an attempt to quantify the

environment. For instance, a land capability classification system has been published recently under the Agricultural Rehabilitation Development Act for six primary land uses and a host of recreational activities; unfortunately, it has failed to include land capabilities in urban centers.[1] It is the purpose of this study to investigate these primary objectives:

(1) to investigate and evaluate recreation classification systems previously developed.

(2) to develop a methodology which contains a desirable set of elements for classifying outdoor recreational activities and areas.

(3) to evaluate the recreational potential of land and water units in an urban area using the City of Winnipeg as a model.

(4) to discuss problems related to urban waterways and adjacent land units, and provide recommendations for sound planning policies.

C. Basic Definitions

Corridor. A combination of soil, rock, air, water, fauna and flora in a natural environment incorporating urban waterways and adjacent land units. A corridor is the integrated sum of corridor units.

Corridor Unit. A discrete area of land and water units featuring relatively homogeneous physical and cultural features.

Inventory item. A value measure devised to assess a key element.

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[1] Infra, p. 23

Key elements. A set of control factors designed to evaluate the recreational potential of a corridor unit.

Outdoor recreational activity. An activity enjoyed by individuals which takes place due to the innate quality of the outdoor environment.

Reach. An area which exhibits fairly consistent characteristics from one end to another, with no abrupt changes in geologic setting, slope, cross-sections, boundary materials, and channel pattern.

Recreation. A set of voluntary activities sought by individuals, in order to derive pleasure, personal satisfaction, or self improvement.

Recreational demand. The amount of recreational use (measured in visits, visitor days, etc.) that will be made of a corridor unit.

Recreational feature. An inherent quality in a corridor unit which provides the opportunity for outdoor activities.

Recreational potential. A value which measures the capability of a corridor to provide the opportunity for outdoor recreational activities.

Right of way. The horizontal extent of land from the normal summer mark of an urban waterway.

Urban waterway. A river or creek which flows through, or adjacent to, a metropolitan area.

Water recreational activity. A water oriented recreational activity utilizing an urban corridor.

D. Outdoor Recreational Resources and Land Use Planning

Outdoor recreational resources are facing pressures of supply and demand, particularly when the resources are located in close proximity to urban areas. Moreover, with population rising sharply and with an equally marked acceleration in the urban trend, thereby thinning the rural population, intensified pressures on outdoor recreational resources have also increased. Participation in outdoor recreation has increased substantially during the past decade (Table 1). Virtually every outdoor recreation area in the country has experienced mounting attendance; in some instances, many areas have become so crowded that the pleasures in their use have been reduced, or are in danger of becoming so.

Recreation is extremely vital in the complex and highly productive economy and culture in which we live. Almost everything points to mounting recreational demand. One significant factor is population. Among the many facets of population phenomena, three are of direct interest for their effect upon outdoor recreation: changes in total numbers of people, changes in their age distribution, and shifts in population. Figure 1 shows that from 1955 to 1985, the population increase in the United States will be 75 percent over a 30 year period assuming no devastating global war. Since World War II, Canada's population has increased two-fold. The key point is evident: total

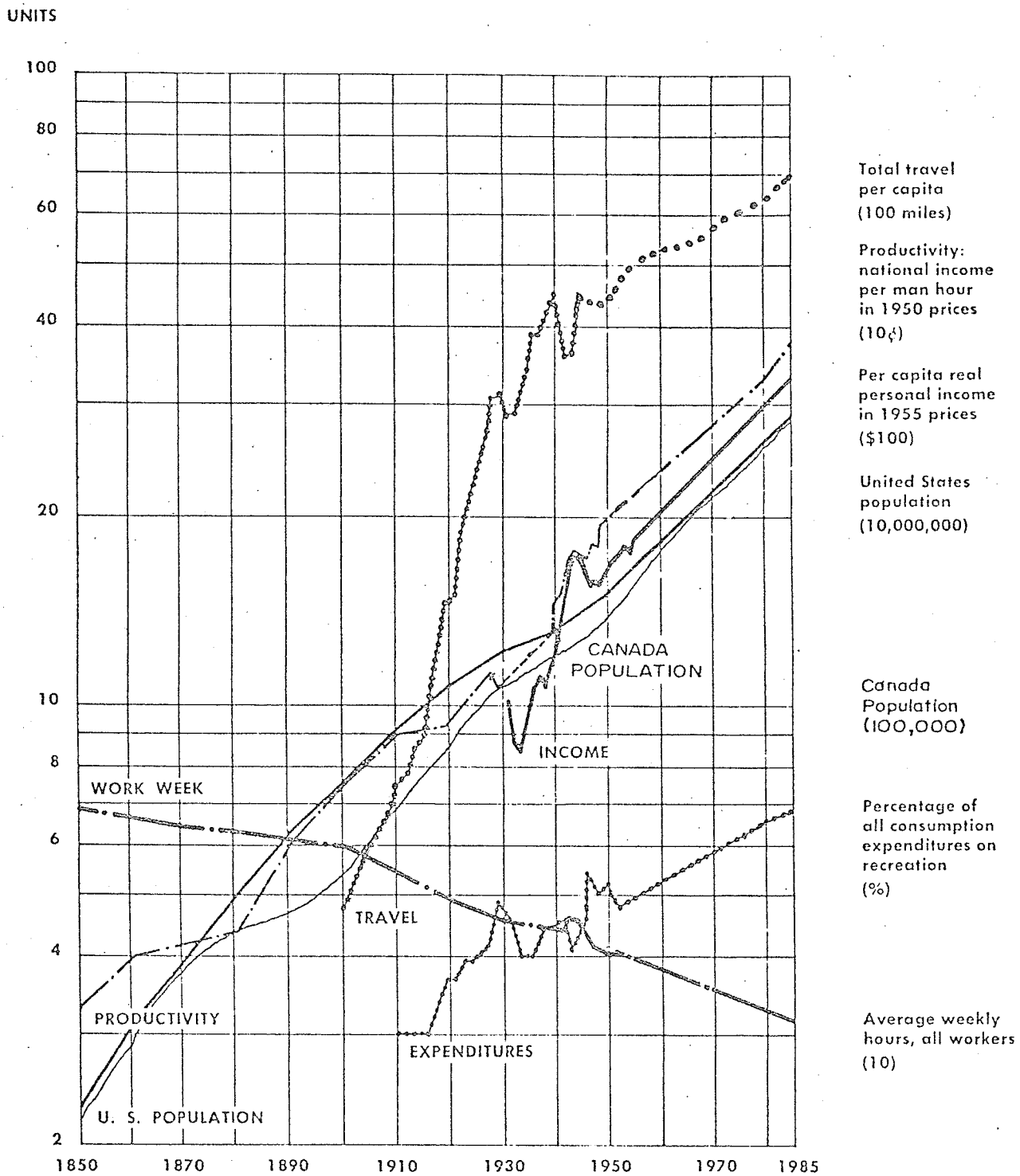
TABLE 1

SUMMARY OF PARTICIPATION IN SELECTED LEISURE ACTIVITIES 1968

% who participated at least once	TOTAL		BRITISH COLUMBIA		PRAIRIES CITIES		PRAIRIES (OTHER THAN CITIES)		TORONTO AND GOLDEN HORSESHOE		NORTH AND EAST ONTARIO		REST OF ONTARIO		MONTREAL		QUEBEC (OTHER THAN MONTREAL)		ATLANTIC PROVINCES	
	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.
	1027	100	93	100	98	100	91	100	162	100	87	100	111	100	130	100	150	100	105	100
Pleasure drive of 1 or 2 hours	62		71		59		72		51		70		75		33		64		79	
Visit a local park	58		77		75		67		54		59		66		39		44		59	
Pleasure drive of 3, 4, 5 hours	54		63		46		50		39		57		61		42		63		73	
Swimming	53		62		46		42		57		52		53		51		61		47	
Pleasure walk of less than 1 hour	52		53		50		47		52		54		49		49		51		61	
Visit zoo	52		68		80		54		46		38		49		42		55		42	
Picnic	49		59		48		70		40		51		63		18		51		52	
Pleasure walk of more than 1 hour	39		49		37		30		30		34		37		39		42		43	
Fishing	36		46		22		53		28		46		30		31		41		33	
Sports (summer/ winter - outdoor)	33		27		38		45		31		34		37		30		32		23	
Water sports	28		43		26		41		29		33		30		15		25		18	
Hunting	17		15		8		31		8		25		8		17		21		19	

Source: The Leisure Needs and Leisure Activities of Canadians, Ben W. Crow & Associates Ltd.

HISTORY OF FACTORS INFLUENCING RECREATION DEMAND



Source: Clawson, Marion. The Dynamics of Park Demand (New York: Regional Plan Association, Inc., Apr. 1960)

FIGURE 1

population will grow significantly and so will the demand for public services, including outdoor recreation areas.

Accompanying the increase in total population, nationally and regionally, has been a shift towards older ages in the population due to a declining death rate. It is important to realize that recreation requirements of younger and older persons differ and the recreational demand by the latter group must be considered in the total analysis.

The third major population change of significance for outdoor recreation has been the strong trend toward the growth of metropolitan areas. The United States and Canada are urban nations; two-thirds of our people live in urban areas, and a roughly equal percentage of all jobs and physical wealth are contained in these centers.

Per capita income is the second major factor affecting the demand for outdoor recreation. An expanding urbanized population has acquired a general level of wealth which has enabled them to bid for recreational space more intensively; also, as purchasing power increases, recreation expenditures will mount even faster than other expenditures. Table 2 gives a breakdown of personal expenditures for recreation in Canada. The outlook is for continued rise in the national average personal income and it is suggested regions will surely show a similar trend. Interesting too, is a general leveling up of incomes, so that there is a considerably more uniform distribution among the income classes and less of a concentration of lower incomes. In general, people will be able to bear the direct costs of recreation better; they will have other conveniences of a more prosperous life including bicycles, boats, campers,

TABLE 2

AVERAGE EXPENDITURE PER FAMILY ON ITEMS RELATED TO TRAVEL, TOURISM, AND OUTDOOR RECREATION

Characteristics of families	Canada	Newfoundland	Prince Edward Island	Nova Scotia	New Brunswick	Québec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
Estimated number of families in population '000	5,882	111	27	205	151	1,546	2,198	282	282	444	635
Percentage distribution (weights) %	100.0	1.9	0.5	3.5	2.6	26.3	37.3	4.8	4.8	7.5	10.8
Number of families in sample	15,140	1,012	269	1,419	986	2,959	3,460	969	1,105	1,480	1,469
Average family size	3.28	4.18	3.65	3.44	3.75	3.54	3.18	3.13	3.01	3.12	2.93
Net income before taxes $	8,026.5	5,701.7	5,530.8	6,389.6	6,282.8	7,789.6	8,987.5	7,244.3	5,994.0	7,916.4	8,059.4
	Average expenditure in dollars										
Items of expenditure											
Total expenditure	8,161.1	5,792.0	5,784.3	6,623.8	6,510.9	7,977.7	9,112.2	7,281.9	6,208.2	8,183.2	8,058.4
Total current consumption	6,465.4	4,900.9	4,937.1	5,411.0	5,174.5	6,414.2	7,129.1	5,729.4	4,964.8	6,447.1	6,366.6
Total expenditure on items below	1,138.8	734.9	840.2	985.3	996.8	989.7	1,320.6	1,076.9	919.5	1,287.4	1,250.0
Travel and transportation:											
Automobiles and trucks for private use:											
Purchase	410.2	248.7	293.8	413.0	382.7	355.0	459.3	369.4	331.7	491.2	408.6
Operation	471.6	331.3	430.4	410.6	401.0	425.9	515.0	494.4	401.5	443.5	495.8
Motorcycles, purchase and operation	3.0	0.1	2.6	2.9	5.0	3.2	2.3	2.3	1.0	6.9	3.0
Services beyond the city:											
Train	6.9	2.4	5.9	7.5	7.2	4.2	8.9	7.4	5.6	6.3	6.9
Highway bus	6.2	4.8	2.0	2.4	1.5	7.4	5.6	5.3	8.2	7.0	7.5
Air travel	40.2	22.4	9.5	27.2	19.7	21.2	52.8	49.4	23.0	45.2	54.4
Other (including boat, steamship, ferry, etc.)	2.8	4.6	5.0	2.2	0.8	1.2	2.2	2.4	1.2	1.5	11.0
Vacation:											
Shelter:											
Owned vacation home	14.2	1.2	7.5	6.5	7.0	16.5	18.5	7.4	5.6	12.1	9.3
Rented vacation home	5.7	1.1	2.0	1.2	2.9	7.6	7.9	3.2	1.3	2.6	2.0
Lodging on holiday, excluding package tours	26.0	8.6	13.7	16.2	10.0	16.0	35.1	22.5	18.7	29.9	31.7
Food, vacation:											
In Canada	19.4	14.9	11.2	13.9	12.9	12.1	23.3	20.3	16.0	26.7	24.3
In United States	11.2	1.8	4.6	3.4	4.8	11.1	13.6	3.1	5.2	10.4	14.3
In other countries	6.7	1.1	-	1.5	1.3	3.5	11.3	6.2	4.0	5.9	4.8
Package holiday trip	22.8	10.7	0.9	3.4	6.1	17.5	33.0	16.6	7.5	20.4	24.8
Other holiday expenses	8.3	3.8	4.0	2.2	7.7	4.8	12.2	5.6	5.2	9.5	9.5
Outdoor recreation:											
Purchase of:											
Snowmobiles	13.9	5.9	5.6	7.6	16.6	22.9	12.5	9.0	7.4	9.1	8.5
Utility or camping trailers	13.1	8.0	3.3	12.0	12.8	8.1	12.7	6.2	13.1	17.0	23.6
Boats	8.3	1.6	4.9	1.5	0.7	3.5	12.1	7.2	5.1	9.0	13.9
Outboard motors	2.6	3.6	0.8	1.7	0.3	1.1	2.9	4.5	2.3	1.6	5.8
Boating and other water sports	5.6	2.6	2.8	3.9	3.5	4.7	5.7	4.5	5.6	5.1	10.3
Camping equipment	4.7	2.9	2.9	2.4	4.2	5.5	4.8	2.7	2.7	4.6	5.6
Equipment for other sports, games, n.e.s.	11.9	4.3	6.6	8.6	7.5	9.8	13.7	8.6	8.6	15.9	14.1
Fees, licences and dues for games and sports	20.2	6.7	12.9	14.1	12.5	11.0	25.9	20.8	18.4	25.2	26.3
Cameras and projectors	7.3	3.6	2.4	4.1	3.0	6.1	8.7	5.7	3.9	9.0	9.2
Other photographic expenses	15.1	8.0	9.2	10.9	9.0	9.4	18.6	16.2	12.2	20.1	18.2
Binoculars and telescopes	0.9	0.2	0.7	0.7	0.3	0.4	1.0	0.8	1.1	1.7	1.3

Source: Prices Division, Family Expenditure Section, Statistics Canada

cars and other vehicles which will make outdoor recreation more accessible; and they will have the means to pay higher taxes to support more outdoor recreational facilities. With improved income, the recreational demand for more facilities will increase (Table 3).

Leisure time in the near future will be greatly enhanced. By 1985, the work schedule will be in the order of a 6½ hour day, a 4 day week, with a 2 to 3 month vacation (or some combination of these). Increase in leisure time will result from a change in any of these three factors. Furthermore, the fact that automation makes work less physically exhausting, the average individual has more energy for recreational pursuits, and these pursuits require many acres of land and water surface per participant. However, already there are significant deficiencies in open space acreage. As an example, Table 4 shows that in the overall picture for the City of Winnipeg there needs to be approximately twenty-five percent more acreage to meet the standard of eight acres of park area per thousand population. With increase in leisure time during the working week, acquisition of park and recreational areas within a reasonable travel time in the urban core is imperative.

The fourth socio-economic change affecting outdoor recreation is travel and population mobility (Table 5). A majority of the population are willing to move to those areas where total living conditions are best. The opportunity for adequate recreational facilities is considered to be a significant factor in the total attractiveness of different regions. More-so, the tourism industry is an increasingly important aspect in the economy of an urban area with limited resources

TABLE 3

EXPORT, IMPORT, AND RETAIL SALES OF SELECTED ITEMS OF OUTDOOR RECREATION EQUIPMENT, 1966 - 1970

Item – Article		1966	1967	1968	1969	1970
Hunting and fishing equipment and supplies – Équipement et articles de chasse et de pêche:						
Shipments – Expéditions :						
Fishing nets and netting – Filets de pêche	$'000	218	271	234	..	..
Fishing tackle and accessories – Agrès et accessoires de pêche	"	4,842	5,139	5,875	..	..
Exports – Exportations:						
Fishing rod, tackle and parts, n.e.s., sportsmen – Cannes à pêche, agrès et pièces, n.d.a., sport	"	291	298	279	252	270
Imports – Importations:						
Hunting equipment parts excluding firearms ammunition – Équipement de chasse, sauf les munitions	"	248	274	367	596	49[illegible]
Fishing rods and parts – Cannes à pêche et pièces	"	556	596	756	788	78[illegible]
	No.	120,699	..	216,518	229,129	376,25[illegible]
Fishing tackle and parts, n.e.s., sportsmen – Agrès de pêche et pièces, n.d.a., sport	$'000	1,410	5,256	5,598	6,727	6,55[illegible]
Fish nets – Filets de pêche	"	3,058	4,031	3,313	3,038	3,10[illegible]
Retail sales – Ventes au détail	"	..	..	33,359	..	..
Camping equipment and supplies – Équipement et articles de camping:						
Shipments (sleeping bags only) – Expéditions (sacs de couchage seulement)	"	3,431	3,813	4,061	5,958	7,84[illegible]
	No.	422,587	373,882	495,421	633,650	801,31[illegible]
Retail sales – Ventes au détail	$'000	..	..	36,648	..	..
Ski equipment and supplies – Équipement et articles de ski:						
Shipments (skis only) – Expéditions (skis seulement)	"	241	663	..	705	6[illegible]
	No.	14,269	..	..	40,783	30,35[illegible]
Imports (skis only) – Importations (skis seulement)	$'000	2,219	3,526	4,185	5,159	5,41[illegible]
	No.	201,681	237,635	271,335	340,472	316,27[illegible]
Retail sales – Ventes au détail	$'000	..	..	22,691	..	..
Golf equipment and supplies – Équipement et articles de golf:						
Shipments – Expéditions :						
Golf clubs – Bâtons de golf	"	4,973	5,073	6,285	6,740	6,68[illegible]
	No.	770,525	731,235	909,647	1,075,739	1,033,50[illegible]
Golf supplies (including golf bags, carts, etc.) – Articles de golf (y compris sacs, chariots, etc.)	$'000	2,443	1,743	1,972	..	.
Imports – Importations:						
Golf balls – Balles de golf	"	1,085	1,142	1,239	1,463	1,48[illegible]
	No.	250,756	287,716	332,298	401,628	417,03[illegible]
Golf clubs and finished parts – Bâtons de golf et pièces finies	$'000	908	896	1,174	991	1,20[illegible]
Other golf equipment and parts – Autre matériel et pièces de golf	"	1,343	1,591	2,025	2,521	2,76[illegible]
Retail sales – Ventes au détail	"	..	..	11,119	..	..
Boats – Embarcations:						
Shipments – Expéditions :						
Parts and accessories – Pièces et accessoires	"	987	825	948	..	..
Sails – Voiles	"	345	366	390	..	..
	No.	82,622	88,065	88,445	..	..
Oars and paddles – Rames et avirons	$'000	101	129	452	..	..
Boat trailers – Remorques pour bateaux	"	1,885	2,031	2,215	2,385	1,381
Exports – Exportations:						
Parts and accessories for ships and boats, n.e.s. – Pièces et accessoires pour bateaux et embarcations, n.d.a.	"	10,466	7,617	16,658	8,559	17,313
Imports – Importations:						
Parts and accessories for ships and boats, n.e.s. – Pièces et accessoires pour bateaux et embarcations, n.d.a.	"	13,434	13,366	17,070	15,813	13,566
Sails – Voiles	"	199	260	299	334	263

Source: Catalogue 66-202, Statistics Canada

TABLE 4

SUPPLY OF IN-USE AND NON-USE PARK AND SCHOOL SITES, AND DEFICIENCIES (PRESENT, 1971 and 1986) BY MUNICIPALITY

MUNICIPALITY (ACR. NEEDED)	IN-USE SITES			NON-USE SITES			TOTALS	DEFICIENCIES (open space requirements)					
	Park	School	Total	Park	School	Total		Present		1971		1986	
Assiniboia (155)	38.70	37.36	76.06	321.62	68.35	389.97	466.03	(155)	-	(240)	-	(616)	149.97
Charleswood (58)	--	--	--	23.44	43.26	66.70	66.70	(58)	-	(105)	38.30	(320)	253.30
** East Kildonan (232)	61.12	23.58	84.70	18.15	33.38	51.53	136.23	(232)	95.77	(240)	103.77	(256)	119.77
Fort Garry (168)	102.63	59.83	162.46	133.11	70.09	203.20	365.66	(168)	-	(222)	-	(440)	14.34
North Kildonan (96)	10.02	32.96	42.98	9.46	51.37	60.83	103.81	(96)	-	(140)	36.19	(348)	244.19
Old Kildonan (11)	--	--	--	2.54	9.86	12.40	12.40	(11)	-	(32)	19.60	(120)	107.60
** St. Boniface (344)	117.32	19.14	136.46	51.86	69.95	121.81	258.27	(344)	85.73	(400)	141.73	(525)	266.73
St. James (344)	180.29	27.68	207.97	84.83	75.59	170.42	378.39	(344)	-	(386)	7.61	(410)	31.61
St. Vital (236)	385.12	13.73	398.85	163.20	88.01	251.21	650.06	(236)	-	(320)	-	(520)	-
** Transcona (160)	68.62	11.10	79.72	11.40	64.33	75.73	155.45	(160)	4.55	(216)	60.55	(360)	204.55
Tuxedo (20)	.85	11.54	12.39	21.44	33.66	55.10	67.49	(20)	-	(32)	-	(200)	132.51
** West Kildonan (178)	43.22	14.35	57.57	34.83	18.01	52.84	110.41	(178)	67.59	(192)	81.59	(208)	97.59
** Winnipeg (2,056)	825.17	127.89	953.06	24.82	201.39	226.21	1,179.27	(2,056)	876.73	(2,056)	876.73	(2,056)	876.73
TOTAL (4,058)	1,833.06	379.16	2,212.22	900.70	827.25	1,737.45	3,950.17		1,080.37		1,366.07		2,553.89

** Would not meet or surpass present needs if all unused school and park sites were used.

Source: Metropolitan Winnipeg Parks Systems & Standards Study, Problems Research Ltd.

TABLE 5

Five-Year Internal Migration Ratios for the Census Metropolitan Areas as a Group, by Age Group and Sex, Canada, 1956-61

Reporting population	In-migration ratio	Out-migration ratio	Net migration ratio
	All metropolitan areas		
Age five and over	6.6	4.7	2.0
Males	6.5	4.7	1.9
Females	6.6	4.6	2.1
Age 20-34	10.5	7.4	3.4
Males	10.3	7.3	3.3
Females	10.6	7.5	3.4
	All non-metropolitan areas		
Age five and over	3.6	5.1	-1.6
Males	3.5	4.9	-1.4
Females	3.7	5.4	-1.8
Age 20-34	6.5	9.2	-3.1
Males	6.1	8.8	-2.9
Females	6.8	9.7	-3.2

Source: Statistics Canada, unpublished migration tabulation from the 1961 Census Population Sample.

or industry. Mobility of population has been demonstrated statistically; 20 percent of the population change residences annually in Canada, and, as a result, the nation's outdoor recreation areas are increasingly in competition with one another.

Four major demand factors including total population, per capita income, leisure, and travel are operating toward a greater demand for outdoor recreation. As a result, with the population moving into urban centers, land use planning for urban outdoor recreation requires action which will dedicate available recreational resources for outdoor recreational uses. Untapped sources which will provide the recreational demand are urban corridors. It is to note that these corridors contain four distinct surfaces including (1) water; (2) wetlands; (3) flood plains; and (4) forest and some of these have been appealing to land developers. It is suffice to mention that a few indiscriminate developers have totally degraded these natural areas much to the worriment of the public. When the demand for outdoor recreation has been shown to be ever-increasing and competitive, can government afford not to protect urban corridors?

A comprehensive plan of growth and land use for any regional community is of great importance. However, a lack of basic information confronts planners. It is of utmost importance that an inventory of resource characteristics be undertaken to ensure that sound land use decisions are correct, explicit, complete and unbiased. Only after such an inventory is analyzed and evaluated can efficient and effective resource use decisions result.

CHAPTER II

A REVIEW OF OUTDOOR RECREATION CLASSIFICATION SYSTEMS

A. Analytical Systems for Urban Planning

This chapter is devoted to providing an inventory of outdoor recreation classification systems which have been devised in North America. Only classification systems which can be applicable to urban corridors have been reviewed.

Carhart Classification System[1]

Wildland planning units can be categorized under recreational zones. Table 6 lists seven possible recreation zones or belts arranged in sequential order starting from the prime zone (the wilderness) which is farthest away from a city, and moving in progression to the semi-suburban zone which circumlocutes an urban center. The zones and utilitarian purposes are listed on the following page.

The evaluation of the recreational use of the wildland planning units can be measured by either of two approaches: (1) a simple check mark in an appropriate column indicates which zone a wildlife planning unit should be placed; (2) the unit can be weighted on the basis of 10 to 100 points for the factors listed in the Table.

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[1] Arthur Carhart, Planning for America's Wildlands, Harrisburg, Pennsylvania: The Telegraph Press, 1961, pp. 68-92.

TABLE 6

CARHART CLASSIFICATION

FACTORS / ZONE	Topography	Existing Trunk Highways	Potential Accessibility	Other Existing High Priority Uses	Nearness of Mass Population - Demand Pressures	Non-Motorized Transportation Potentials -- Trails, Canoe Routes, etc.	Size of Planning Unit - Its Suitability for Indicated Recreation Use
A. Wilderness							
B. Wilderness Buffer							
C. Primitive Camping							
D. Dude Ranch							
E. Resident Tourist							
F. Week End Camps and Resorts							
G. Semi-Suburban							

Source: Arthur Carhart, Planning For America's Wildlands, (Harrisburg, pennsylvania: The Telegraph Press, 1961), p. 66

Zone	Utilitarian Purpose
A. Wilderness	a landscape in which undisturbed natural laws operate
B. Wilderness Buffer	utilize natural resources, temporary roads and residences
C. Primitive Camping	roads and residences of a more permanent nature
D. Dude Ranch	ranches, back country resorts
E. Resident Tourist	cottages and cabins serving weekend use and vacations
F. Weekend Camps and Resorts	villages and resort enterprises
G. Semi-urban	picnicking and overnight camping

L. M. Reid Classification System[1]

Twenty four recreation areas have been classified by each of three criteria: (1) by the physical resources; (2) by the predominant recreation activity; and (3) by the administrative agency under which the area falls. Moreover, to evaluate the potential of outdoor recreational sites, a field inventory program has been developed as shown in Table 7.

Craighead River Systems Recreational Classification System[2]

A system to inventory, evaluate and classify recreational resources related to river systems has been proposed. Only three forms of outdoor recreation have been investigated: (1) hunting; (2) fishing; and (3) boating. The inventory schedule, prepared from the N.F.R.S. system[3], has

[1]Leslie M. Reid, Outdoor Recreation Preferences - A Nationwide Study of User Desires, (East Lansing, Michigan: Department of Resources Development, Michigan State University, June, 1963), pp. 59-66

[2]Frank C. Craighead, jr. and John J. Craighead, "River Systems: Recreational Classification, Inventory, and Evaluation," Naturalist, Vol. 13, No. 2. (Summer, 1962), pp. 2-19.

[3]Infra, p.19

TABLE 7

REID CLASSIFICATION

THE AREA RECONNAISSANCE SCHEDULE

Date_____
Examined by_____

Field Inventory Sheet #1

ORRRC Site Number_____
Administrative Agency_____
Administrative Unit_____
Location: State:_____ County_____
P.O. Address_____
Supervisor's Name_____
Name of Developed Area_____
Year Established_____ Season: from _____ to: _____
Size: Total acres_____: Developed area,_____ acres.
Reason for establishment:_____ Scientific _____ Strategic
Main Attraction: ( )Scenic ( )Botanic ( )Geologic ( )Historic
( )Recreational
Chief Use: ( )Recreational ( )Picnicking ( )Camping
( )Sightseeing ( )Nature-oriented ( )Water-oriented
Changes in use patterns since establishment:_____

Similar Public Recreation Areas or Sites Nearby (Describe)_____

Similar Private Developments Nearby: ( )Highly Developed
( )Poorly Developed
Describe:_____

Literature Obtained:_____ General description: ____ Map
____ Specialized Information

Attendance figures available: ( )Yes ( )No

Source: Leslie M. Reid, Outdoor Recreation Preferences - A Nationwide Study Of User Desires, (East Lansing, Michigan: Department of Resources Development, Michigan State University, June, 1963), pp. 193-194.

TABLE 7 (continued)

Date_____
Examined by_____

Field Inventory Sheet #2

ORRRC Site Number_____
ACCESS: ____Excellent ____Good ____Fair ____Poor
Roads: ( )Concrete ( )Macadam ( )Gravel ( )Earth
Well-marked: ( )yes ( )no Easy to get to: ( )yes ( )no
Closest community service-center: Name_____miles distant____
Quality of Access Roads: Good ( ) Average ( ) Poor (need repair) ( )
Development: ( )Much development ( )Little development
( )Motels ( )Hotels ( )Restaurants ( )Gas stations
( )Gift & novelties
Other:_____
Remarks:_____
MAIN ATTRACTION: (describe) ____Excellent ____Good ____Fair ____Poor
Scenery:_____
Live Water:_____
Geologic:_____
Historic:_____
Botanic:_____
Recreational:_____
ACTIVITIES: ____Excellent ____Good ____Fair ____Poor

( )Sightseeing	( )Swimming	( )Fishing	( )Snow Skiing
( )Walking/Hiking	( )Wading	( )Sports	( )Skating
( )Picnicking	( )Sunning	( )Mt. Climbing	( )Sliding/ tobagganing
( )Camping	( )Water-skiing	( )Guided tours	( )Iceboating
( )Nature study	( )Skin diving	( )Int. programs	( )Icefishing
( )Horseback riding	( )Surf-boarding	( )Relaxing	( )Other
( )Sailing	( )Motor-boating	( )Other	
( )Canoeing	( )Row-boating		

User Origin: ( )Local ( )State & Regional ( )National
Type of Use: ( )Ind. & Small Group ( )Mass Use ( )Day ( )Overnite & Resident
Maximum Use: (number at one time)

Site Quality	Excellent	Good	Fair	Poor
Area Environment				
Shade				
Cover				
Soil				
Developed Facil.				
Natural Features				
Climate				

been modified to provide an adjustment for some minor quality criteria and to propose a four class final rating scale set up as (1) excellent; (2) good; (3) fair; and (4) poor.

United States National Forest Recreation Survey (N.F.R.S.) Classification System[1]

To determine the kind, quality, location, and potential of recreation resources, lands are classified under one of two categories: (1) development sites; and (2) dispersed-recreation areas. The former category is divided into five classes including: (1) occupancy sites; (2) boating sites; (3) swimming sites; (4) winter-sports sites; and (5) observation sites. The latter category is divided into the following areas: (1) wilderness, wild and roadless areas; (2) virgin areas; (3) scenic areas; (4) archeological areas; (5) geological areas; (6) mountain climbing areas; (7) historical areas; (8) fishing waters; (9) hiking and riding areas; (10) boating areas; (11) roadside, trailside, waterfront, and buffer zones; and (12) hunting habitats. An inventory schedule is shown in Appendix A for rating sites and areas. The resulting classification for a site or area is described as either (1) outstanding; (2) good; or (3) fair. Those sites and areas failing to meet the "fair" standard are deemed unsuitable for recreational use or development.

Development sites are examined intensively by employing aerial

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[1] U.S. Forest Service, Work Plan for the National Forest Recreation Survey - A Review of the Outdoor Recreation Resources of the National Forests, Division of Recreation, Forest Service, Department of Agriculture, (August, 1959).

photographs and maps. Recreation areas are examined only to determine the facts not available; as a result, field examination is not as intensive and maps portray the areal boundaries for the type of area under examination.

United States Bureau of Land Management (B.L.M.) Classification System[1]

Recreation areas and recreation sites have been inventoried and evaluated. A recreation area is considered to be one of several thousand acres where recreation and wildlife will continue to be the primary use. A recreation site is considered to be a tract of land less than 500 acres, where existing potential public recreational use of the land is its prime value. A general inventory of desirable and undesirable landscape features provide information on the quality of scenic resources. Appendix B displays the inventory schedules.

G. D. Taylor Outdoor Recreation Classification System[2]

A simple approach for evaluating people-intensive/extensive recreation, and special recreational activities was devised. People-intensive recreation sites include campgrounds, picnic sites, swimming beaches, organization camps, resorts and so on, where people receive considerable user satisfaction from a relatively small area of land. People-extensive

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[1] U.S. Department of the Interior, Bureau of Land Management Manual: Recreation Management, (Washington, D.C., July 3, 1963).

[2] Gordon D. Taylor, "An Approach to the Inventory of Recreational Lands," Canadian Geographer, Vol. 9, No. 2 (1965), pp. 84-91.

recreation activities include wilderness travel, hunting, fishing, and others, where relatively few people are involved on larger areas of land. Special recreational activities such as winter sports, and specific water uses including surfing, skin-diving, and water-skiing complete the third broad category for recreation.

Five criteria have been defined as essential to a people-intensive recreation area and these are listed below.

Criteria	Quality	Present (+)	Absent (-)
Attraction	historic, relief		
Cover	suitable vegetation cover		
Terrain	suitable terrain or slope		
Size	suitable for development		
Drinking Water	availability		

The rating system for an area is graded on a scale which extends from "highly suitable," on one hand, to "not suitable," on the other. A "highly suitable" area is one which has an attraction and plus signs in each of the other four categories; a "good" area is one which has an attraction but lacks one of the other criteria; a "fair" area is one which lacks an attraction and one other criterion; an "unsuitable" area lacks an attraction and two or more other criteria.

The rating scales for people-extensive areas and special recreational activities would be applied in the same manner, although a change in the suggested criteria would be imminent.

Taylor and Thomson Outdoor Recreation Classification System[1]

A system for classifying land for recreational use was proposed considering these objectives: (1) to suggest a simple system of inventory which would indicate the physical landscape for recreational land use; and (2) to suggest an approach which would be flexible.

A four stage approach was suggested. The first stage outlined the recreational potential for large units of landscape and was based on the general criteria of vegetation, water, slope, and relief. Due to physical assets, certain areas would be readily identifiable, and would warrant closer scrutiny. A seven class rating system was devised for "type areas" based on areal physical limitations and the probability of locating recreation sites without physical limitations. The various combinations are shown below.

Type Areas	Probability of Locating a Recreation Site	Physical Limitations which May Exist
A	Excellent	None
B	Good	Little
C	Fair	Moderate
D	Fair	Moderate
E	Fair	Moderate
F	Poor	Severe
G	Poor	Severe

[1]Gordon D. Taylor and Clarke W. Thomson, "Proposed Methodology for an Inventory and Classification of Land for Recreational Use," The Forestry Chronicle, Vol. 42, No. 2, (June, 1966), pp. 153-159.

Having determined those areas which require closer scrutiny, a more detailed examination would be investigated at this point. The second state involved identifying smaller areas, within the larger ones, to test their suitability for parks or recreation purposes by inventorying and analyzing predetermined physical criteria.

The third stage of investigation provided detailed analysis of the selected recreational sites.

Organizing the acquired data into a classification system completed the final stage. Valuations are placed on criteria which have decreasing quality in turn land capability for recreation also decreases.

This classification procedure indicated areas of highest priority and, by doing so, resources could be allocated to those areas under extreme pressure for recreational use.

A.R.D.A. Outdoor Recreation Land Capability Classification System[1]

The A.R.D.A. Outdoor Recreation Land Capability Classification System was developed in 1965 for use in the Canadian Land Inventory. The C.L.I. was a comprehensive land capability survey of the settled areas of Canada covering approximately one million square miles, and administered under the Agriculture and Rural Development Act.

The objectives of this survey were: (1) to provide a reliable and authentic overview of the quality, quantity, and distribution of

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[1]Agricultural Rehabilitation and Development Administration (A.R.D.A.), Department of Regional Economic Expansion. Land capability classification for outdoor recreation, the Canada Land Inventory Report No. 6. Ottawa; Queen's Printer for Canada, 1970.

natural recreational resources within the settled parts of Canada; (2) to indicate comparative levels of recreational capability for non-urban lands, based on present popular preferences; (3) to indicate the type of recreation to which land is best suited; (4) to identify lands or features possessing outstanding or unique recreational features; (5) to provide basic information to aid governments in the functions of promotion, development and regulation of lands for recreation; and (6) to provide a mapping framework within which provinces may gather and record data concerning recreational resources.[1]

A summary of the classification system and governing conditions appear in Appendix C, however, two important points should be emphasized. Firstly, the basis of classification is the quantity of recreation which an area can generate and maintain. It is thereby implied that an area suitable for an "intensive" recreational activity (one in which a large number of people may engage per unit area, e.g. swimming) will be classified higher than an area suitable for a "dispersed" form of recreational activity (one in which fewer people per unit area can be active, e.g. hunting). Secondly, it is stated "land presently committed to intensive urban or industrial use is normally not classified".[2]

There were two major forms of output from the survey. The first was a 1:50,000 map series intended for use by the planners; the second was a 1:250,000 map series intended for publication purposes. On the inventory

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[1] Department of Regional Economic Expansion. Land Capability Classification for Outdoor Recreation - the Canada Land Inventory Report No. 6. Ottawa: Queen's Printer, 1969.

[2] Ibid, p. 9

maps, each classified land unit was assigned a symbolic notation to designate the capability class whether shoreland (S) or upland (U), and up to three recreation subclasses were listed in order of importance.

National Association of Soil and Water Conservation Districts (N.A.C.D.) Outdoor Recreation Classification System[1]

Recreational potential was evaluated for twelve types of areas or enterprises including: (1) camping grounds; (2) vacation cabins, cottages and homesites; (3) hunting areas; (4) natural scenic and historic areas; (5) golf courses; (6) riding stables; (7) shooting preserves; (8) fishing waters; (9) picnic and field sports areas; (10) vacation farms and ranches; (11) water sports areas; and (12) winter sports areas. Although each of the twelve types of areas or enterprises was evaluated for an area the size of a county or small group of counties, appraisals for individual recreation sites were not attempted.

To determine the potential for each recreational area or enterprise, criteria termed key elements were devised. The key elements were selected as being significant factors for the rating; for each area or enterprise, key elements were inventoried, and then evaluated on a 1 to 10 rating scale. A weighting value was established to indicate the significance of a particular element in comparison with other elements. The ratings for key elements were multiplied by weighting values and a final rating score was taken as the sum of all products for a particular area or enterprise. The final score represented the potential for recreation development and was to be

[1]Soil Conservation Service, U.S. Department of Agriculture, Guide to Making Appraisals of Potentials for Outdoor Recreation Development (July, 1966).

regarded as low, medium or high potential.

For natural, scenic, historic areas, and existing water and potential impoundment sites, inventories were employed to record the identity, size, location, present use, and water body or site under scrutiny.

A summarizing narrative accompanied each evaluation of potential development and included the following information:

(1) To specifically identify sites in a county where the potential development exists.

(2) To provide information regarding the co-existence of potential developments with other developments namely, highways, industries, and dams.

(3) To suggest control measures for the maintainance of pollution-free waters, the enactment of rules and regulations, and the reduction of air pollution.

The aesthetic factor was evaluated in the inventory on a group-judgment basis.

Hills or Ontario Recreation Land Inventory System[1]

The Ontario system is a method of classifying and ranking landscapes for recreation. The standard approach to the system is to describe, to classify and to rank an area for recreation use. The area under consideration is called a landscape unit, a relatively homogeneous area of land and/or water used as a convenient planning and management size. To evaluate a landscape unit, nuclear or smaller units which

[1]Ontario Department of Lands and Forests, Methodology For Ontario Recreation Land Inventory, May, 1971.

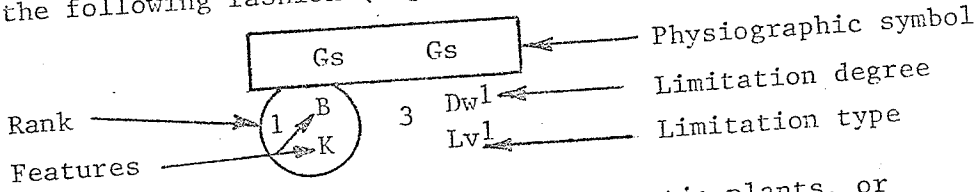
lie within the lanscape unit are evaluated. Nuclear units are designated as: (1) shoreland units; (2) water units; (3) land units; and (4) special or specific features. Nuclear units are classified for a small group of related activities and are ranked on a scale from 1 to 7. Degree of limitation is also devised as a negative scoring method to determine rank.

Rank	Level of Capability	Level of Limitation	Degree of Limitation
		Insignificant	0
1	Very high	Slight	1
2	High	Medium	2
3	Moderately high	Severe	4
4	Moderate	Very severe	6
5	Moderately low	Extremely severe	8
6	Low	Most severe	10
7	Very low		

The evaluation for particular recreation features is based on a separate ranking table. A list of recreation features is shown in Table 8.

Shoreline units are important components of recreation land in Ontario and receive the most attention. Having delineated shoreline unit boundaries from aerial photographs, shoreline units can be classified on two map scales, 4 inches = 1 mile, or 1:50,000. Information on physical features is derived from three sources: (1) aerial photograph interpretation; (2) inspection by low flying aircraft; and (3) field inspection (Table 9).

The physical features are described on an inventory map (4 in. = 1 mile) in the following fashion (Figures 2 and 3):



Also, symbols for locating cliffs, banks, aquatic plants, or nuisances, can be placed on the inventory map.

TABLE 8

ONTARIO SYSTEM RECREATION FEATURES

A Angling Water

B Bathing Beach

C Canoe Route

D Deep Shore Water

E Unique Vegetation

F Waterfalls or Rapids

G Grounds for Parking

H Historic Site

I Unique Wildlife Habitat

J Collecting and Gathering Area

K Campsite

L Lodging or Cottage Site

M Pattern of Small Lakes or Streams

N Natural Landform or Topography of Special Interest

P Pattern of Land Use

Q Miscellaneous

R Rock Formation - cave, cliff, canyon, etc.

S Ski Hill

T Travelling and Viewing Area

U Upland Game Site

V Viewpoint

W Wetland Wildlife Site

X Small Craft Boating Water

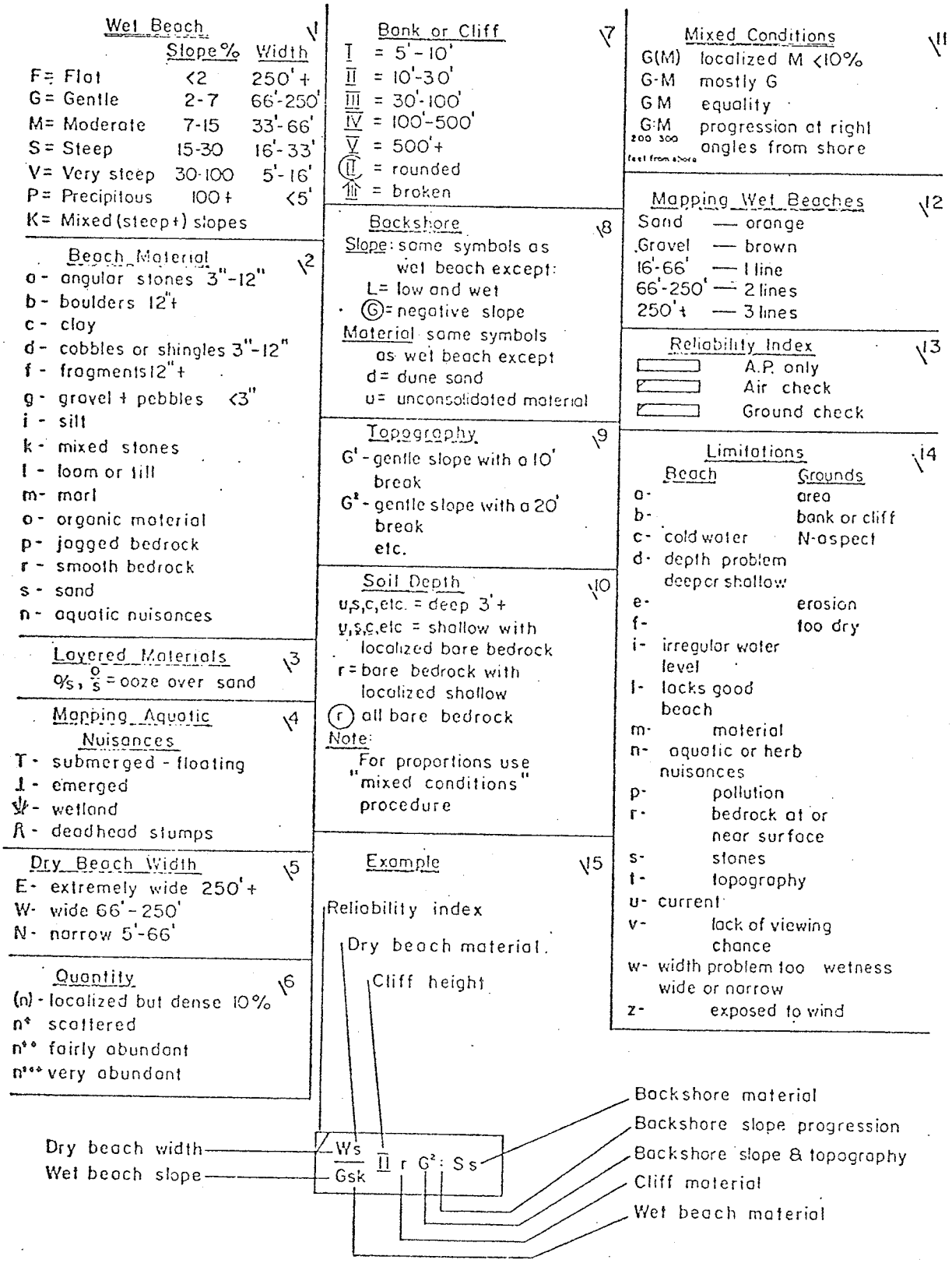
Y Yachting Water or Yacht Harbour

Z Man-Made Feature

Source: Ontario Department of Lands and Forests, Methodology for Ontario Recreation Land Inventory (May 1971)

TABLE 9

ONTARIO SYSTEM SHORELINE DESCRIPTION

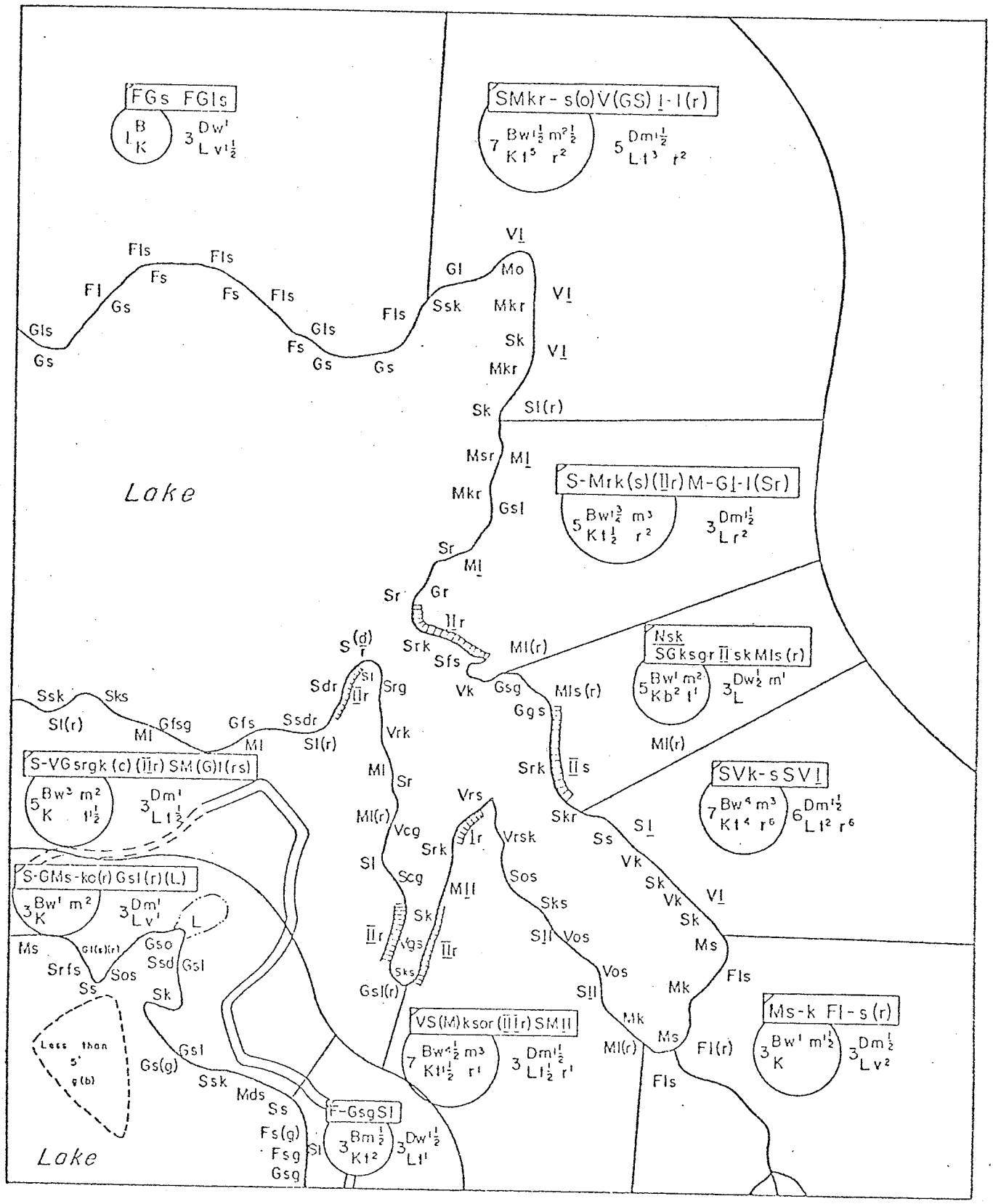


Source: Ontario Department of Lands and Forests, Methodology for Ontario Recreation Land Inventory (May 1971)

ONTARIO SYSTEM RECREATION LAND INVENTORY OF SHORELAND

STANDARD DETAIL

Scale: 4 inches = 1 mile



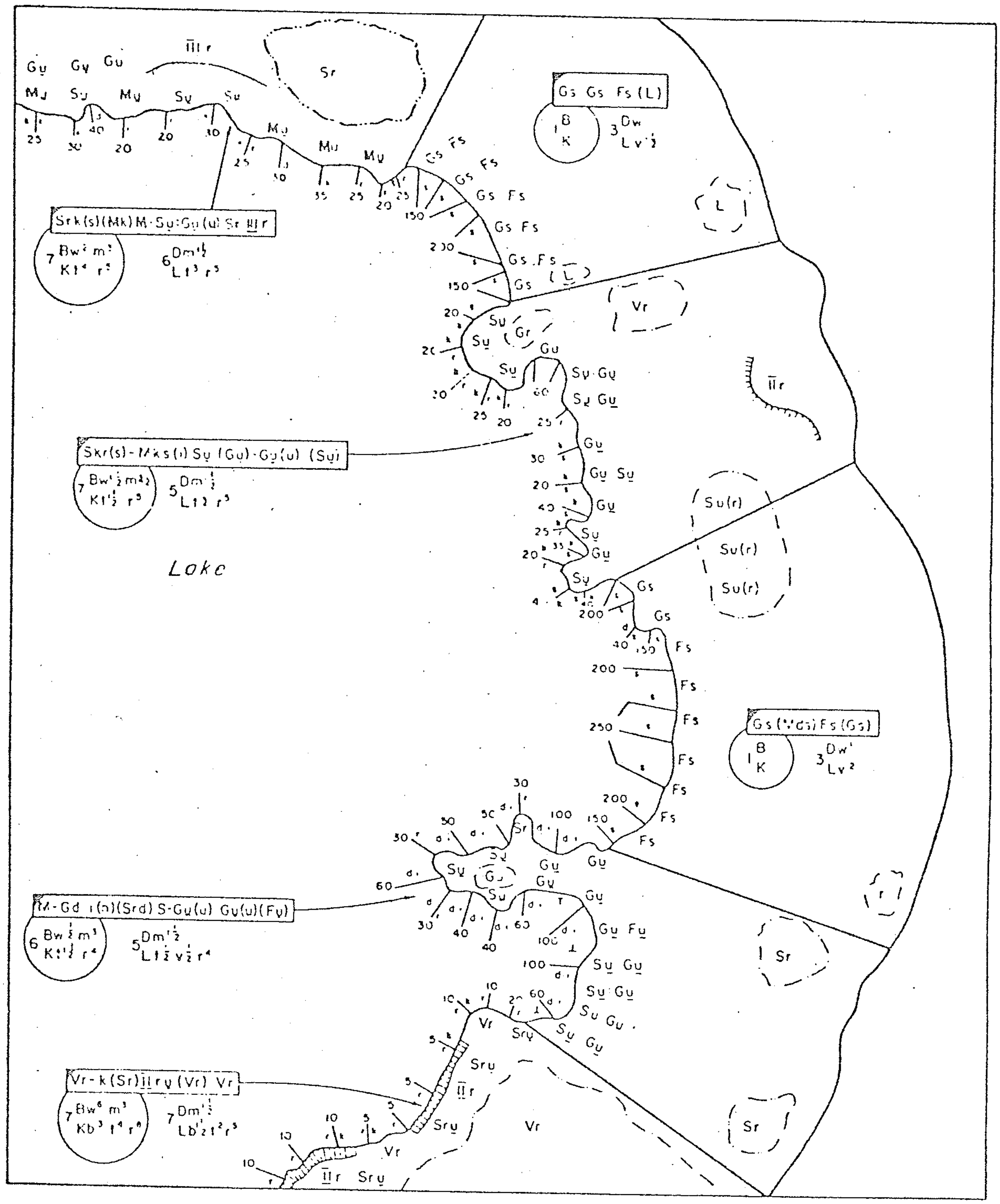
Source: Ontario Department of Lands and Forests, Methodology for Ontario Recreation Land Inventory (May 1971)

FIGURE 2

ONTARIO SYSTEM RECREATION LAND INVENTORY OF SHORELAND

STANDARD DETAIL

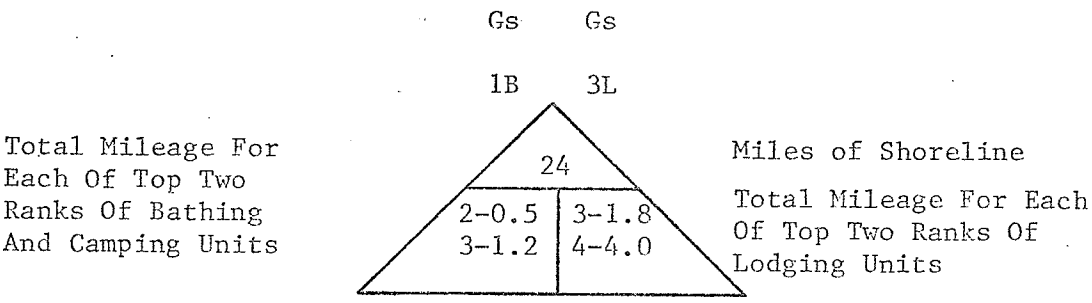
Scale: 4 inches = 1 mile



Source: Ontario Department of Lands and Forests, Methodology for Ontario Recreation Land Inventory (May 1971)

FIGURE 3

The physical features are described in the following fashion on a 1:50,000 inventory map (Figure 4).



Shoreland units are designated and ranked in two ways: (1) for bathing (B) and camping (K); and (2) for lodging (L) or cottaging. To classify the rank of a shoreline unit, the limitations of a unit for a particular recreational activity are summed (Table 10). The shoreland ranking is restricted to lakes and rivers navigable by small craft.

The recreational capability of a landscape unit is determined from the combined rankings of nuclear units within a landscape unit. Based on a I to VII scale, the landscape unit is ranked as a representative measure of the recreational significance of the whole unit. A committee ranks a unit on the following basis: (1) the ranking scores for particular recreational features within the landscape unit; (2) the significance of features to attract and to sustain intensive recreation use; and (3) the significance of a unique feature on a national or provincial scale of reference.

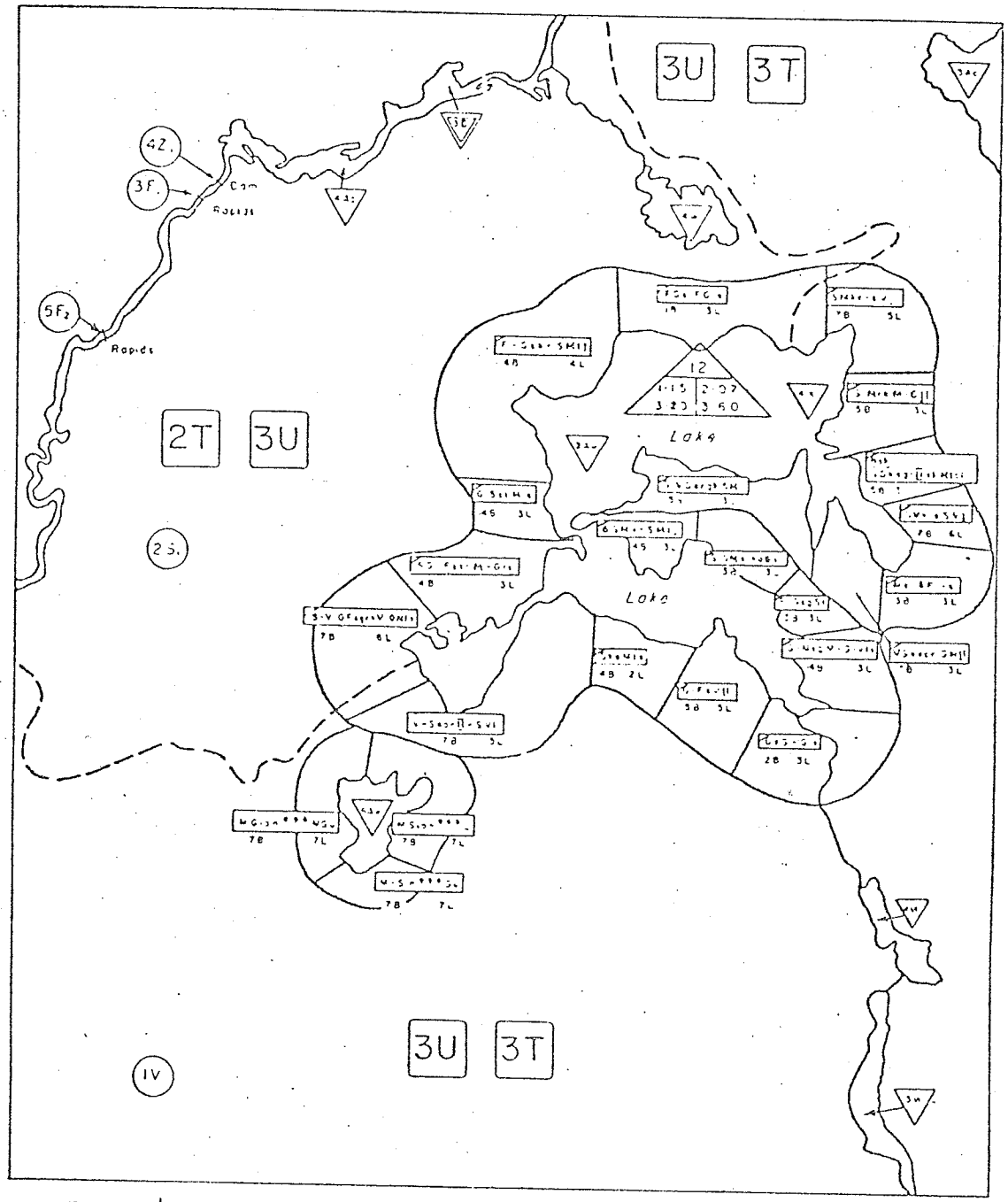
Landscape features and unit rank are mapped as follows:

II	The Rank
BX1a	The Features

The aesthetic factor is considered in particular recreation features and an attempt is made to objectively measure scenic quality (Table 11).

ONTARIO SYSTEM RECREATION LAND INVENTORY OF SHORELAND

STANDARD DETAIL
Scale 1:50,000



F - 30' falls at dam
F - 10' falls
Z - Ontario Government Dam
S - 400' ski hill

T - travelling and viewing
U - upland game hunting or viewing

Source: Ontario Department of Lands and Forests, Methodology for Ontario Recreation Land Inventory (May 1971)

FIGURE 4

TABLE 10

ONTARIO SYSTEM RANKING TABLE FOR SHORELINES

Bathing and Camping

Index	Degree of Limit	BEACH (w) Slope, width	BEACH (m) Material	BANK (b)	BACKSHORE Slope (t)	BACKSHORE Material Type (m)	BACKSHORE Depth (r)
1	0	G 66'-250' F 250'+	Sand		F G	Loam Sand	60%+ deep <10% r
2	1	M 33'-66'	Gravel		M	Clay Gravel	40-60% deep <10% r
3	2	S 16'-33'	Smooth r Cobbles Loam	I	S		10-40% deep <10% r
4	4		k, clay, silt Boulders	II		Wetness limitations could range from 1-10	10% deep <10% r
5	6	V 5'-16'	Jagged bedrock Angular stones		V		all shallow <10% r
6	8		Fragments	III			shallow & bare <90% r
7	10	P <5'	Deep ooze	IV	P		100% bare

Cottaging or Lodging

**** BEACH Slope, width (w)	Material (m)	BANK (b)	BACKSHORE Slope view	BACKSHORE Material Type (m)	BACKSHORE Depth (r)
M, S, or V 5'-66'	Sand Gravel Smooth rock		M 4 tiers G (v¹) 100% view	Loam Sand	60%+ deep <10% r
G 66'-250' (w)	Cobbles Loam	I	S (v¹) 2 tiers	Clay	40-60% deep <10% r
P 0-5' (d) F 250'+ (w)	k, clay, silt Boulders	II	F (v²)		10-40% deep <10% r
All too deep 10'+ (d)	Jagged bedrock Angular stones		V (v⁴)	Wetness limitations could range from 1-10	10% deep <10% r
All too (d) shallow 3'-5'	Fragments	III			all shallow <10% r
	Deep ooze	IV	P (v⁸)		shallow & bare <90% r
<3' water (d)		V			100% bare

* 1 Above limitations are for both hard and soft cliffs at waters edge If dry beach is present reduce degree of limitation up to 2, for a narrow dry beach and up to 4 for a wide dry beach

** 2 Add topographic limitations (if any) to slope limitation, e.g. S' = I³ for camping.

*** 3 For soil depth use soil type symbol where known, e.g. s, l, c, etc., otherwise use u.

4 Circled letters above indicate the limitation symbol to use, e.g. (w) (l)

**** 5 First rank lodging sites require 4 chains of wide sand wet beach or equivalent (e.g. 8 chains of narrow sand wet beach) per 20 chains of shore units

6. First rank lodging sites require excellent viewing - 2 miles plus variety Excellent viewing can upgrade any shore unit up to 2 degrees of limitation

Source: Ontario Department of Lands and Forests, Methodology for Ontario Recreation Land Inventory (May 1971)

TABLE 11

ONTARIO SYSTEM CLASSIFICATION FOR VIEWPOINTS

Limitation	Distance (miles)	Variety*	Angle	Grounds (within 1/10 mile)
0	10	4 with water	180°	3 acres
1	5	3 with water	90°	1 acre
2	2	3 no water		½ acre
4	1	2		
6		1		

Note:

*1. Variety - Water, fields, forests, hills, improvements, cities, villages, or other points of special interest.

2. Eyesores - e.g. junkyards, add up to 2 degrees of limitation.

3. Mapping Method - (2V)

Source: Ontario Department of Lands and Forests, Methodology for Ontario Recreation Land Inventory (May 1971).

B. An Evaluation of Outdoor Recreation Classification Systems

This section presents an evaluation of the classification systems previously discussed. At this time, it is advantageous to list a set of desirable characteristics of a system which will evaluate the recreational potential of an urban corridor. These include:

(1) identification of individual forms of outdoor recreation.

(2) measurement of the potential of an area to hold recreational activities.

(3) designation of the areal extent of corridor units.

(4) identification of criteria which play a role in encouraging seasonal, water-oriented recreational activities.

(5) reduction of subjectivity and bias.

(6) development of inventory analysis, and evaluation procedures.

(7) flexibility in the classification system.

(8) procedure to quantify scenic criteria.

(1) Identification of Individual Forms of Outdoor Recreation.

A scrutiny of the public interest in participating in individual forms of outdoor recreational activities aids the planner in his attempt to maximize the fulfillment of outdoor recreational activities insofar as an optimum arrangement of land and water uses can be found. However, there are conflicts associated with the variety of recreational forms and the alternative ways of fulfilling them. These conflict situations include:

(1) limited supply and unlimited demand.

(2) recreation activities which occur simultaneously in a locality.

(3) power and jurisdiction rivalry.

(4) allocation of land and water resources use and locale for recreation.

(5) conflicts between special interests.

Since there are conflicting interests, the recognition and allocation of a recreational resource must lie in some balance which does not sacrifice or exploit the real interest of any individual or group.

(2) Measurement of the Potential of an Area to Hold Recreational Activities.

Recreational use planning should be an optimizing process. An optimizing process, in this context, is the simultaneous maximization of all relevant innate elements so that the elements re-inforce one another to provide a high value fulfillment. Without the determination of an optimum use, decision making processes become invalid. Only by measuring the recreational potential of an area can a planner resolve conflict in outdoor recreation land use, and put forward a plan which is produced from a wide frame of reference.

(3) Designation of the Areal Extent of a Corridor Unit.

Aerial photographs can be employed to select a corridor unit. An adjustment of the location of a unit can be made to suit identifiable points along the corridor unit. The final location should be designated by a field crew using field experience, maps, and aerial photos. The size and boundaries of corridor units will vary.

(4) Identification of Criteria Which Play a Role in Encouraging Seasonal Water-oriented Recreational Activities.

Criteria exhibiting both physical and non-physical values are

necessary to evaluate a corridor unit. It is emphasized, however, that physical quality criteria provides a more precise measurement of the environment and also will stand a better chance of being correct over time and space. The environment is ephemeral by nature - the less non-physical criteria incorporated into the system the less chance that the system will be outdated. Some non-physical criteria should be incorporated into the methodology, but reviews of these changeable criteria should be encouraged (within the working confines of a study this is not always possible). Most important, criteria which assess the remnants of the original natural environment, those which measure socio-economic values - all these criteria and others, which provide characteristics of recreational resources and inadvertently provide the basis for recreational activities, should be provided as relevant factors for the informational requirements of recreation planning.

(5) Reduction of Subjectivity and Bias.

To reduce subjectivity and individual bias, the following concepts should be incorporated into the methodology.

(a) specific and explicit description of quality criteria.

(b) systematic recording of quality criteria.

(c) evaluation and rating of criteria done by a group of experts.

(d) objective considerations of actual field conditions.

(6) Development of Inventory, Analysis, and Evaluation Procedures.

In order to put forward a scheme for quantitative description, a systematic approach must be implemented. A methodology must be developed incorporating three phases: inventory, analysis and evaluation.

(a) Inventory phase. The prime objective of the inventory phase is to collect and record all pertinent data on a study area. The inventory items should be easily identifiable on inventory field sheets. The use of inventory sheets is especially useful in cases of uncertainties for particular criteria. Furthermore, reliability and accuracy of recordings are more likely. Inventory procedures in the enumeration stage not only provide specific information, but also, can aid in recording any additional information the enumerator deems worthwhile. Still another advantage, is that an enumerator can record specific information which is applicable to the evaluation methodology, as generalizations or lengthy narratives can lead to inefficiency and ineffectiveness.

Inventory field sheets should be convenient to use. Field criteria should be explicit and space should be provided for comments. A convenient sheet size is recommended (8½ x 11 inches). Fastened to a clipboard, the field sheets are easily handled and transported.

Accompanying the field sheets, enumerators should carry a set of field maps, which show the tentative boundaries of a corridor unit as derived from aerial photos and topographic maps. In the field, the boundaries for each unit can be checked and adjusted if necessary.

(b) Analysis phase. As the field data is brought into the field office, the assimilation of information begins. It is suggested that computer techniques be employed for storing specific input data. The degree of precision in the development of the methodology depends to a large extent on the recording of explicit and correct information.

(c) Evaluation phase. This phase establishes numerical rating values and assigns them to each criterion. The rating values should be

weighted in proportion to its relative significance as contributive factors for outdoor recreational activities. The rating values and weights should be as explicit and objective as possible. The ultimate goal of this phase should be a measurement of the potential or capability of a corridor unit to hold recreational activities for which it is best suited, and to evaluate the extent and quality of scenic, historical and natural resources within each unit.

(7) Flexibility in the Classification System. To incorporate any new information, or to make alterations to any previous information, the methodology for devising a classification system must be flexible. A flexible system has the following advantages:

(a) alterations can be made to criteria value ratings and weightings.

(b) new information can be easily included.

(c) the data is updated and accurate.

(d) the system can be applied regionally.

(e) the system can be modified for other uses.

(8) Procedure to Quantify Scenic Criteria. A procedure to incorporate scenic criteria into the methodology should provide greater insight into the quality of the recreational area. It is suggested that scenic areas can be evaluated in the same fashion as recreational activities. The scenic quality of an area can be measured numerically by assigning ratings and weightings to scenic criteria, a set of characteristics perceived to be desirable for outdoor recreational activities. Most important, the criteria should be explicit, objective and flexible. The measurement of the aesthetic factor is necessary when land use plans are being prepared. This concludes an outline of a

set of desirable characteristics to be employed in the evaluation process.

Table 12 shows a rating of characteristics for the evaluation of recreational land classification systems previously discussed. Desirable characteristics for each system are ranked as good, fair or poor. Although none of the systems reviewed display "good" ratings for all desirable characteristics, the following systems can be considered as the basis for the development of a methodology which will evaluate the recreational potential of land and water units in an urban area: N.A.C.D., Ontario, A.R.D.A., B.L.M., and N.F.R.S. On the basis of further investigation, it was decided that the Ontario and N.A.C.D. systems would provide the best possible sources for developing a methodology to evaluate the outdoor recreational potential of urban corridors.

TABLE 12

AN EVALUATION OF RECREATIONAL LAND CLASSIFICATION SYSTEMS

SYSTEM	DESIRABLE CHARACTERISTICS							
	Identify Forms of Recreation	Measure the Potential of an Area	Areal Extent	Identify Recreational Criteria	Objectivity	Inventory Analysis Evaluation	Flexible System	Quantify Scenic Criteria
CARHART	good	poor	fair	fair	fair	fair	good	poor
REID	good	poor	fair	fair	fair	good	fair	poor
CRAIGHEAD	poor	poor	good	fair	fair	good	fair	poor
N.F.R.S.	good	poor	good	fair	fair	good	good	poor
B.L.M.	good	poor	good	fair	fair	good	fair	poor
TAYLOR	good	poor	fair	poor	poor	fair	fair	poor
TAYLOR AND THOMPSON	good	fair	good	good	fair	good	fair	poor
A.R.D.A.	good	poor	fair	fair	good	good	fair	poor
N.A.C.D.	good	poor	fair	fair	fair	good	good	poor
ONTARIO	good	poor	good	fair	fair	good	good	fair

CHAPTER III

METHODOLOGY FOR EVALUATING OUTDOOR RECREATIONAL POTENTIAL OF URBAN CORRIDORS

A. Introduction

This chapter is devoted to outlining a methodology which measures the outdoor recreational potential of urban waterways and adjacent land termed - an urban corridor. The methodology is an extension of previous attempts to objectively evaluate the recreational potential of small naturalistic suburban streams as developed by the U.S. Soil Conservation Service[1], and to a larger extent, by Dr. J. A. Dearinger[2], Associate Professor, the University of Kentucky.

After developing a methodology to apply to urban corridors, case studies were researched and tested to verify the procedure. The research is limited to rivers and creeks which lie within a 15 mile radius (arbitrarily selected) from the centre of a metropolitan area. Five waterways which offer recreational potential to the City of Winnipeg were selected on the basis of physical and cultural characteristics. Other urban creeks were not investigated; these had a smaller drainage area, discontinuous flow, and were greatly altered by urbanization.

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[1] Guide to Making Appraisals of Potentials for Outdoor Recreation Developments, U. S. Department of Agriculture, Soil Conservation Service, Washington, D.C. July, 1966.

[2] Dearinger, J. A., "Evaluating Recreational Potential of Small Streams", Journal of the Urban Planning and Development Division, A.S.C.E. Vol. 98, No. UP1, July 1972, pp. 85-102.

The methodology is divided into three distinct phases: (1) inventory; (2) analysis; and (3) evaluation.

In the inventory phase, a field crew accumulates relevant data on each corridor unit by utilizing inventory schedules, maps, and aerial photographs. The intent of the analysis phase is to objectively interpret and categorize all accumulated data. Finally, an evaluation phase attempts to measure the potential of a corridor unit for a specific recreational activity, and to measure the quality of its historic, natural, and scenic resources.

The tables which appear in the following sections reveal the criteria, or key elements, employed to research an urban corridor. The key elements are composed of value items each of which contributes, in part, to the rating process. To weight these value items, a group of experts independently assign weighting values to the key elements for a given recreational activity. The experts include: two water resource engineers, an environmental engineer, a landscape architect, and a soils engineer.

To aid in the numerical solution of the research, a computer program has been developed for the evaluation process and is shown in Appendix D.

B. The Inventory Phase

(1) Water Units and Land Units

Since the corridor unit is the ultimate area to be inventoried, analyzed, and evaluated, water and land units which comprise the corridor unit are not rated as separate entities. It is the corridor unit which has been delineated and used as a convenient

planning and management unit. It is recognized that it is the innate characteristics of land and water units, or a corridor unit, which forms the basis for potential recreational use. The areal extent and boundaries for each corridor unit is chosen by two primary considerations: (1) homogenity of physical features; and (2) socio-economic requirements.

Corridor units are, for the most part, selected as homogeneous integral parts of an urban corridor. Selection is made by considering the physiography of land units adjacent to a waterway and by examining the changes in the morphology of a waterway - size, depth of water, and shoreline regularity. The corridor unit, then, being homogeneous, is recognized for its intrinsic suitability.

Human occupation modifies the natural processes in the environment and adds its own contribution. Such being the case, a recognition of social values, and economic precepts is important in prescribing the utilization for a natural resource. For example, areas of high scenic value and diversity have a high social value for conservation, however, at the same time, they are desirable for urban land developments. On the other hand, a flat well drained tract of land is well-suited for industrial development, as it is for intensive recreation. The preceding argument reveals that multiple uses for urban corridors exist, and social and economic aspects must be considered in establishing artificial boundaries.

The corridor units are identified at first by employing topographic maps and air photographs. The 1:50,000 topographic map is regarded as the general working map; however, a map of larger scale (1" = 2000') showing the urban area and identifying

specific features adds to the efficiency in commencing a field survey. Moreover, a map of this scale permits the transposition of field descriptions and data directly on to the map for future reference.

An extremely useful tool in delineating corridor units and securing valuable information before a gound survey commences, is aerial photograph interpretation. Aerial photographs, in particular 1" = 4 miles, make it possible to spot singular objects, and aggregate many similar objects into a wider picture of land use types. Seven identifiers - shape, size, shadow, location, pattern, texture, and tone - can reveal information under a stereoscope which can be very time-consuming to collect in the field. Moreover, the aerial photographs usually indicate with high accuracy the aerial extent and boundaries of the corridor unit. In the field, all information secured from the aerial photos can be readily checked and verified. Most important, the fact that aerial photos and the interpretating equipment can be carried in a portable container, the effectiveness and efficiency of collecting information is greatly increased. In many instances, uncertainty is reduced.

(2) Identifying Outdoor Recreational Activities and Areas

Outdoor recreation activities are recognized as those which lend themselves to short participation periods (day and overnight use), are economically feasible, are appropriate to an urban corridor, and show high recreational demand. The approach in examining the large number of individual determinants for outdoor

recreational activities is one adopted from the U.S. Outdoor Recreation Resources Review Commission. In July 1972, a large number of interviews were conducted in the City of Winnipeg from a widely representative sample of families, to record information on factors such as outdoor recreation participation rates, socio-economic trends, and forms of desirable outdoor recreation.[1] Upon compiling the survey information, intensive and extensive forms of outdoor recreation which utilize urban corridors were recognized, and a measure of the participation rate in individual forms of outdoor recreation was recorded. From the results of this survey a schedule of outdoor recreational activities is proposed for urban corridors. Extensive and intensive activities are grouped under two broad categories: (1) the summer period; and (2) the winter period. Outdoor recreational activities which take place in below freezing temperatures are appropriately classified under the winter period; outdoor recreational activities which have greater participation rates during warmer temperatures and generally take place in warmer months are classified under the summer period.

The existence and degree of excellence of three distinct areas directly contributes to the quality, the recreational demand, and the recreational use of an urban corridor. These areas include: natural areas, historic areas, and scenic areas.

The natural area is the sum of dynamic physical and biological processes. The areas, possessing intrinsic values and constraints, provides a source of open space in the metropolitan confines. In these areas, we find discrete natural processes, having both value and intolerance to recreation use. Lastly, a natural area may

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[1] F. Curtis, D. Gill, A New Park For Sturgeon Creek, (Sept. 1972).

or may not be scenic.

The scenic area is examined in terms of the essential genius of the landscape, the beauty and attractiveness of the landscape, and the total uniqueness of its character. A scenic area concedes neither superiority nor inferiority.

The historic area attracts people to seek knowledge about modern and historical events, and to learn more about their heritage. The historic area constitutes a social value and has intrinsic suitability for certain recreational uses.

(3) Natural and Cultural Process Values.

Key elements, the set of controlling factors used to evaluate the outdoor recreational potential of an urban corridor, are codified under two categories: natural-process values, and cultural-process values. Each key element is broken down into a set of value items; each item has a varying degree of relevance for each recreational activity considered.

(a) Natural Process Values.

In an urban corridor, there are natural phenomena which exist in a sometimes modified natural environment. These natural phenomena are dynamic interacting processes which offer opportunities and limitations to recreational use. In areas which become victims of inchoate urbanization, it is important to insure preservation of a precious inheritance. A discussion of the natural process values (key element inventory items are derived from natural process values) and the inventory procedure follows.

Climate. The occurrence of favourable seasonal climatic conditions influences the form of outdoor recreation. Local weather bureau data is investigated.

Hydrology. Five urban waterways are selected as test cases. The stream order and lengths are obtained from topographic maps.

(i) Water width and depth. The water surface width is measured with a 100 ft. tape at representative cross-sections and air photo measurements are verified. The water depth is measured at four stations in the cross-section and the average taken.

(ii) Velocity. The average water velocity is measured by chaining off a 10-30 foot distance, and timing the travel of a wooden buoy. Backwater effects from the junction of two urban waterways are noted. This method of measuring velocity is substantiated by using a Price Current Meter in waterways with higher velocities and greater depths.

(iii) Flow variability. The flood stage water mark, bed material placement, debris on the backshore, severe bank erosion - all these indicators are recognized as evidence that an urban waterway has high flow variability.

(iv) Bed material and bank material. At selected cross-sections, bed and bank material samples are obtained, analyzed, and recorded. A sieve analysis is performed in a Soils Material Laboratory.

(v) Geomorphic processes. Stability of the channel, bed, and banks are investigated by use of aerial photographs and by field observation.

Physiography. Aerial photographs and field examination outline relevant land and water units in an urban corridor. Figure 5 shows the general features of a typical cross-section of a corridor unit.

(i) Average backshore width and slope. At least three values are determined from aerial photos and checked in the field at selected cross-sections.

(ii) Drainage area. The drainage basin for each corridor is planimetered from topo maps within the confines of a 15 mile radius, extending from the center of the metropolitan area.

(iii) Average valley height-width ratio. The average valley height is measured by stadia measurement from a water surface to the top of a valley wall. The valley width is measured accurately and efficiency by a Hewlett Packard Distomat.

Geology. Soils, rocks, and geologic values are identified by the field investigation.

Vegetation. Aerial photographs provide the aerial measurement and delineation of forested areas and abandoned fields. Density of tree growth is estimated from aerial photos by counting tree crowns in sample areas along a corridor unit. Species are identified in the field.

Wildlife, flora, and fauna. Species are identified in the field.

(b) Cultural Process Values

The second category of significant features in assessing the nature of present and future recreational demand and use is grouped under

FEATURES OF A CORRIDOR UNIT

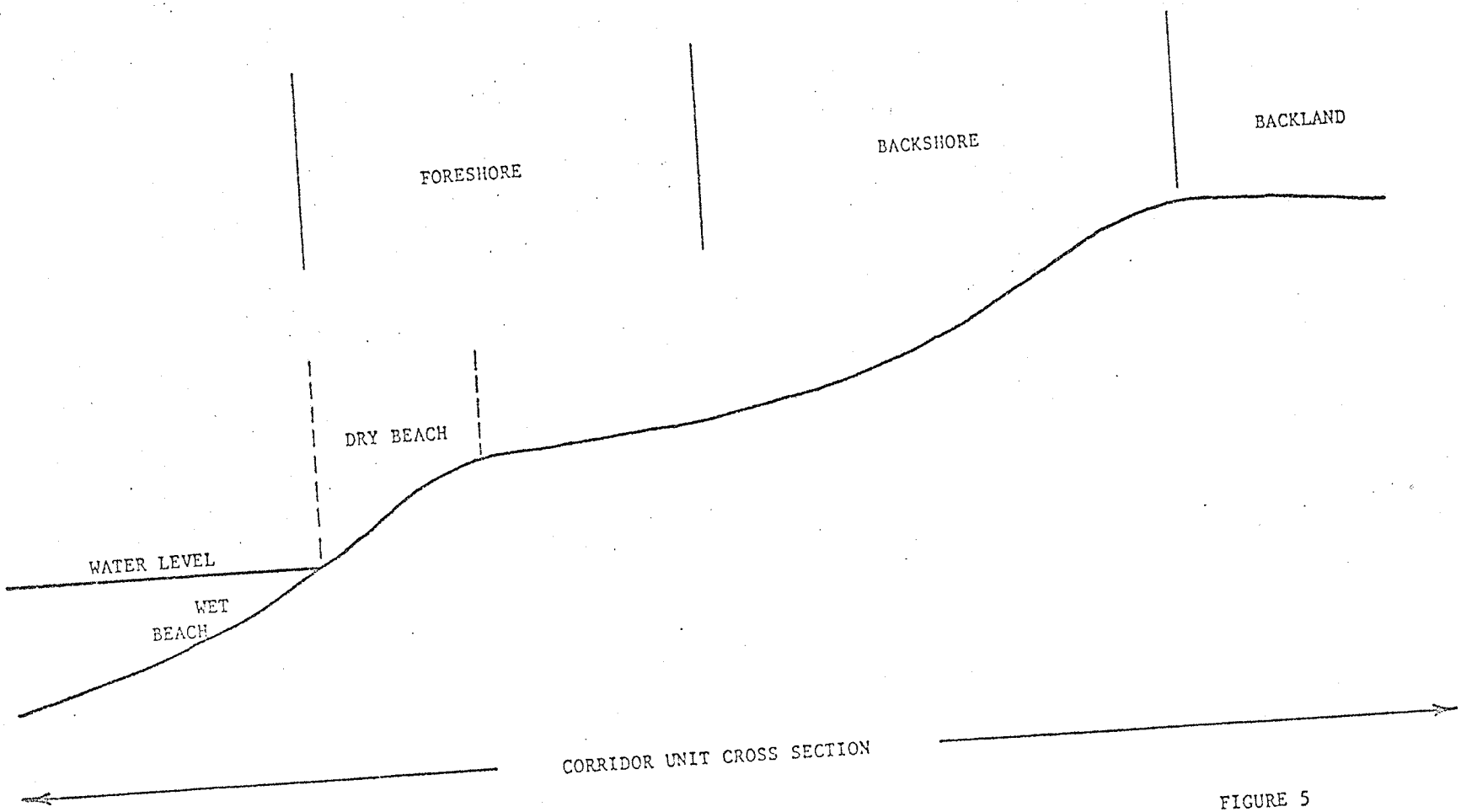

FIGURE 5

cultural process values. These values include man-made or man-modified features existing within an urban corridor, and also incorporates socio-economic, demographic, and governmental processes. Recreational planning responds to the operation of cultural process values, although the values may vary from corridor to corridor.

Water quality and quantity. Measurements are taken during low flow periods when conditions are critical for prime water activities (Table 13).

(i) Dissolved oxygen. Water samples are collected in the field, and brought immediately to a laboratory where D.O. tests (and other water quality tests) are confirmed. A high D.O. level indicates a healthy waterway, and likely the diversity of species will be large. On the other hand, a low D.O. concentration indicates a polluted waterway, and the diversity of species will be smaller. Obtaining the D.O. concentration indirectly measures natural reaeration and algal photosynthesis.

(ii) Coliform bacteria. The most probable number of total coliform organisms (M.P.N.) is that bacterial density which if it had been actually present in a water sample, would more frequently have given the observed analytical results. The determination of M.P.N. is done by standard methods.

(iii) pH. The pH of a water sample is determined in the lab using methyl orange indicator. Most species of aquatic organisms require a neutral (7.0) water environment to survive. Only a few species can tolerate a high or low pH.

(iv) Sedimentation. Total suspended solids are determined in the

TABLE 13

AN EXAMPLE OF A RIVER ANALYSIS REPORT

Date: July 3, 1973

Location	Temp. °C	pH	Total Solids mg/l	Susp. Solids mg/l	Turb. J.T.U.	Diss. Oxygen mg/l	BOD mg/l	Phenols mg/l	Organic Nitrogen	Phosphate mg/l	Coliform MPN	TOC mg/l
RED RIVER												
Floodway Cont.	21	8.8	610	59		7.8					240	18
S. Per. Bridge	21	8.7				7.8					430	14
Norwood Bridge	20.4	8.3				6.3					46,000	10
Redwood Bridge	21.1	8.2				5.7					46,000	18
N. Per. Bridge	20	8.3				5.8					110,000	14
Lockport Bridge	20	8.3	512	16		6.4					4,600	18
ASSINIBOINE RIVER												
Headingley	20	8.7	800	13		7.4					460	16
W. Per. Bridge	21.5	8.8				9.5					930	12
Main St. Bridge	20.9	8.7	706	25		6.9					46,000	12

Flow: Maximum _____ Minimum _____ C.F.S. in Red River at _____

Maximum _____ Minimum _____ C.F.S. in Assiniboine River at _____

lab (expressed as total volatile and non-volatile solids). High sediment transport can give an indication of bed and bank instability, and of pollution sources.

(v) Turbidity. The opacity of water is measured in J.T.U.'s (Jackson Turbidity Units). Excessive turbidity prevents sunlight from penetrating the bottom of a waterway, and this condition can have disasterous effects on benthic organisms, algae, and other forms of life utilizing sunlight for photosynthesis.

(vi) Temperature. A Fahrenheit thermometer is immersed into the water and the lowest temperature is recorded. It is to note that the warmer the water temperature, the less dissolved oxygen the water is able to contain, and diversity of species becomes less.

(vii) Floating substances. Visual pollution sources and hindrances are recorded in the field.

(viii) Discharge. At selected sites, metering is performed by government agencies.

(ix) Pollution sources. Diversity of aquatic life is an excellent indicator of water quality. Certain indiginous species which are found only in unpolluted water can be observed in the field. These include: minnows, game fish, caddis fly, and the may fly. Other species are indicators of polluted waters including: sludge and blood worms, sewage fly larvae, and rat-tailed maggots.

Historical values. A review of the significance and influence of urban corridors on the history of the metropolitan area is researched through library sources and local historical societies.

Land use. Present and future land uses, legalities, and zoning by-laws involving urban corridors are examined.

Accessibility. The transportation network surrounding a corridor (railroads, roads, walkways, bicycle paths, power lines, aqueducts, and others) are analyzed from aerial photographs, and planning reports.

Socio-economics and demography. Outdoor recreation requires consideration of cenus data and other factors in viewing the impact of urban growth and change. These include, personal income distribution, age distribution, level of educational attainment, land value, and the location and usage of existing recreational areas and facilities.

Negative features. As expected in any urbanized area, there are evidences of man's disregard for the environment. An urban corridor is confronted with asphalt, glass, steel, bricks, concrete, lumber, pipes, coiled, wire, signs, plastics and, of course, billboards. Deals are made and contracts let, permitting the cancorous growth called progress to spread its smear on unspoiled and fragile areas. As a result, rural slums, commercial and industrial developments abuse urban corridors rather than enhancing the recreational potential. These negative features are recognized as disvalues.

(4) The Rating of Key Elements.

Using the values concept to rate applicable key elements for each recreational activity and recreational area, a number, which is representative of a quantitative result or a qualitative judgement, is associated with an inventory item.

Value ratings for key elements are based on the following:

A. CLIMATE. Ratings for all activities are based on the following inventory items.

(1) Length of season for a given activity.

(a) Summer period.

Length of season, in months	Rating
1	1
2	2
3	3
4	3
5	4
6	5
7	6
8	7
9	8
10	8
11	9
12	10

(b) Winter period. Same as 1(a).

(2) Average seasonal temperature.

(a) Summer period.

Temperature in °F	Rating
30	3
35	4
40	5
45	6
50	7
55	8
60	9
65	10
70	9
75	8
80	7
85	6
90	5
95	4
100	3
110	2
115	1

(b) Winter period.

Temperature in °F	Rating
< (-10)	0
(-10) - (-7)	1
(- 6) - (-3)	2
(- 3) - (0)	3
0 - 3	5
4 - 6	6
7 - 10	7
11 - 14	8
15 - 18	9
18 - 20	10
20 - 23	9
24 - 27	7
28 - 30	3
> 30	0

(3) Average seasonal percentage of clear days.

(a) Summer period.

Percentage	Rating
10	1
20	2
30	3
40	4
50	6
60	8
70	10
80	5
90	3
100	1

(b) Winter period. Same as 3(a).

(4) Average seasonal snowfall.

Inches of Snow	Rating
< 12	0
12 - 18	2
19 - 24	4
25 - 30	6
31 - 36	8
37 - 42	10
43 - 48	8
49 - 54	6
55 - 60	4
> 60	2

(5) The occurrence and significance of favorable microclimates.

Rating of microclimates considers humidity and temperature conditions along corridors which are better suited for recreational activities during extremes in summer or winter weather. The rating is given as:

no difference	0
little difference	1 - 4
some difference	5 - 8
considerable difference	9,10

(6) The average wind velocity.

Rating of wind velocity considers which are better suited to human comfort.

Wind Velocity (m.p.h.)	Rating
0	7
1	8
2	9
3	10
4	9
5	8
6	6
7	5
8	4
9	3
10	2
> 10	0

B. SCENERY. It is readily admitted by most individuals that recreational potential of a resource depends on the quality and quantity of scenic elements. One definition for scenery is a picturesque view or landscape. However, what appears to be picturesque to one observer may not necessarily appear picturesque to another. As a result, it is difficult to rate the criteria which comprise the scenery key element and often, from past experience, a subjective approach has been used. In classifying the criteria, an attempt must be made to exclude subjectiveness

and bias; the evaluation of the scenery key element must remain objective. It is suggested that the criteria which are employed to inventory scenery should include those factors which evaluate scenic quality on an areal basis and those which inventory the characteristics of views as seen by an observer from a vantage point. A likely set of scenic criteria would include: (1) landscape features; (2) measure of land use; (3) degree of tree cover along a corridor; (4) diversity of scene; and (5) special views. Scenery is rated accordingly:

(1) The occurrence and quality of landform scenery along a corridor. Add points from (a) and (b).

(a)

Average valley height/width	Rating
< 5	1
1	2
2 - 3	3
3 - 5	4
> 5	5

(b)

Channel Pattern	Rating
straight	1
regular meander	2
tortuous meander	5
irregular meander	3

(2) Fractions of total corridor in land use capability classes. Multiply each rating by fractions and sum products.

Class	Rating
industrial	1
commercial	2
public utilities use	3
community services use	4
schools and universities	5
multiple family housing	6
single family housing	7
agricultural use	8
park	9
wilderness	10

(3) Percentage of total corridor treed along the right of way; allow one point for each 10%.

(4) Diversity of scene is measured by distance of view and angle of vision. Add ratings from (a) and (b).

(a) Average valley width (ft.)

	Rating
< 100	1
100 - 300	2
300 - 500	3
500 - 1000	4
> 1000	5

(b) Angle of Vision

	Rating
confined	0
single geomorphic form	1
nearby scene	2
vista (views up to 90°)	3
prospect (views 90° -180°)	4
panoroma (views 180°-360°)	5

(5) Special views. In many cases surface qualities can enhance the visual aesthetic experience and these are readily identifiable. These include: forms and materials.

(a) Forms

(i) Self-contained forms significant because of their qualities as individual objects: man-made, architectural.

(ii) Forms interrelated to their surroundings: architectural, geographic, hydrographic, floral.

(b) Materials

The visual characteristics of materials are the most stable and easiest to preserve. Enhancing the visual experience are: colour, texture, pattern, rhythm, shape. Allocate one point for each surface quality in the corridor up to 10.

C. NATURAL ENVIRONMENT. In rating this element, emphasis is placed on present and potential quality of a corridor unit as a natural habitat for plants and wildlife. The natural environment is rated according to the following:

(1) Percentage of corridor length in tree cover; allow one point for each 5% up to a maximum of 50%.

(2) Percentage of the corridor length in abandoned fields; allow one point for each 5% up to a maximum of 50%.

(3) Percentage of corridor length in land use capability classes designated for park use and natural areas; allow one point for each 10%.

(4) Occurrence and relative abundance of various species of trees, shrubs, wildflowers, ferns, mosses or other vegetation, where:

(a) the environment is severely urban, 0.
(b) the environment is natural but sparsely populated and shows little variety, 1-4.
(c) the environment is natural, contains average populations and moderate variety, 5-7.
(d) the environment is natural, contains average populations and great variety, 8.
(e) the environment is natural, contains abundant populations and great variety, 9,10.

(5) Occurrence and relative abundance of various species of wildlife (other than fishes) including birds, mammals, reptiles, and insects, where:

(a) wildlife forms are non-existent, 0.
(b) wildlife forms are scarce, and not readily seen and enjoyed, 1.
(c) sparsely populated and little variety, 2-4.
(d) average populations and varieties, 5-8.
(e) abundant and balanced population seen and enjoyed, 9,10.

(6) Occurrences of unusual, unique or rare natural species or habitats or both; add one point for each species or habitat up to 10.

D. HISTORICAL VALUES. Rate from 1 to 10 according to the occurrence and quality of historic sites, structures, or landmarks, which possess the following criteria:

(1) The corridor contains exceptional or very significant sites, structures, or landmarks which exemplify the cultural, economic, military, political, or social history, providing insight into our Canadian heritage.

(2) The corridor contains structures or sites associated with a period of history or an important personage.

(3) The corridor contains sites or structures commemorating an event.

(4) The corridor contains a living museum of flora which mantled the earth many years ago.

Historical values are categorized under (a), (b), or (c) and ranked according to:

(1) Local significance, poor, 0-4; good, 5-8; excellent, 9,10.

(2) Regional significance, poor, 0-4; good, 5-8; excellent, 9,10.

(3) National significance, poor, 0-4; good, 5-8; excellent, 9,10.

E. PHYSIOGRAPHY. The physical structure of a corridor is described and rated under the following headings:

(1) The average slope from the shore to a 5 ft. water depth:

> 25%, 0; 21% - 25%, 2; 15% - 20%, 4; 10% - 14%, 6; 5% - 9%, 8; < 5%, 10.

(2) Width of dry foreshore.

non-existent, 0; narrow, 4; wide, 8; very wide, 10.

(3) Dry foreshore material.

nuisances, 1; jagged bedrock, 3; mixed stones, 5; gravel and pebbles, 7; silt-clay, 9; sand, 10.

(4) Wet foreshore material is described from the shore to a 5 ft. water depth.

nuisances, 1; jagged bedrock, 3; mixed stones, 5; gravel and pebbles, 7; silt-clay, 9; sand, 10.

(5) Average backshore width.

5-10 (ft.), 1; 11-30 (ft.), 3; 31-50 (ft.), 5; 51-100 (ft.), 7,8; > 100 (ft.), 9,10.

(6) Average slope of backshore.

Description	Slope (%)	Schedule (a)	Schedule (b)
precipitous	100	0	0
very steep	31-99	2	10
steep	15-30	4	8
moderate	7-14	6	6
gentle	2- 6	8	3
flat	< 2	10	1

Schedule (b) is to be applied to particular recreational activities where backshore slope is of prime concern, e.g., skiing, tobogganing, hiking.

(7) Backshore material.

The estimated probability of encountering soil conditions favourable for the construction and maintainance of roads, trails, walkways and small buildings; allow one point for each 10% probability.

(8) Geomorphic processes change the character of a corridor, and the corridor can be described as being stable, 5-10, or unstable 0-5. The identification of processes includes: undercutting, deposition, meandering, bank erosion, frost heave, bed movement, bank instability, wind action and others.

F. WATER QUALITY. Measures of value used to estimate water quality rating are those which pertain to the aesthetics and quality of the aquatic habitat. Water quality is rated according to surface water sampling standards.

(1) Dissolved oxygen in mg/1: <3.0, 0-2; 3.0 - 4.0, 3-5; and 5.0 - 10.0, 5-10.

(2) Coliform bacteria in MPN: >2400, 0-2; <2400 >1500, 3-4; <1500 <240, 5-8; and <240, 9,10.

(3) pH: <6.5, 0-4; 6.5 - 7.0, 5-9; 7.0 - 8.0, 9-10; 8.0 - 8.3, 5-9; >8.3, 0-4.

(4) Pollutants affecting colour, temperature, taste and odour affecting primary contact recreation waters. Clarity should be such that a Secchi disc is visible. .5' Depth, 0; 1', 1; 2', 4; 3', 6; 4', 8; 5', 9; 5' +, 10.

(5) Occurrenceof floating material, suspended solids, settleable solids, oil, and other evidences of pollution: frequent visible occurrence attributable to various permanent pollution sources, 0-2; infrequent visible occurrences attributable to accidental or intermittent pollution sources, 3, 4; none readily visible but pollutant sources exist, 5-8; none, 9,10.

(6) Water temperature F: Assign a value of 10 to a range of water temperature 32°F - 85°F; >85°F, 3.

G. WATER QUANTITY. The low and high flow conditions are an important consideration for water oriented activities. Water quantity is rated according to:

1. There will be enough water in the waterway to maintain a continuous visible flow taking into account runoff, natural

springs, and storm sewers; allow one point for each 10% probability. Include hydrograph.

(2) Within any 1 year, specific recreational areas or fish habitats along the waterway will not be damaged by flood levels exceeding those created by a flood with a recurrence interval of 1 in 25 years. Allow one point for each 10% probability.

(3) Consider the average water surface width in the reach and rate as: < 3 (ft.), 1; 3' - 10', 3; 10' - 30', 5; 30' - 50', 7; 50' - 75', 8; 75' - 100', 9; >100', 10.

(4) Consider the mid-channel water depth in the summer season and rate as:

Schedule (a)	Rating	Schedule (b)	Rating
< 0.5'	0	< 5'	0
0.5' - 1'	1	6'	5
1' - 2'	5	7'	7
3' - 5'	8	8'	8
> 5'	9,10	9'	9
		> 9'	10

Schedule (b) is to be applied to those recreational activities in which water depth is a significant criterion, e.g., boating.

(5) Flow variability and velocity: add points from (a) and (b).

(a) Flow variability	Rating
large variation	1
ephemeral	2
intermittent	3
normal	4
little variation	5

(b) Velocity (ft./sec.)	Rating
> 8	0
4 - 8	2
2 - 4	5
1 - 2	3
< 1	1

H. FISH POPULATIONS. Fish populations are rated in accordance with the occurrence and relative abundance of sport and coarser fish species and the management possibilities prevalent due to the physical character of the waterway and corridor.

(1) Coarse fish species: rare, 0-2; infrequent, 3-5; frequent, 6-8 and abundant, 9,10.

(2) Sport fish species: rare, 0-2; infrequent, 3-5; frequent, 6-8; and abundant, 9,10.

(3) The occurrence of permanent pools in waterway segments. Number per mile: 0 - 0; 1 - 5; 2 or more 10.

(4) Management: (a) Fish management information is scientifically and periodically gathered including data on fish production and survival, growth rates, stocking, and harvesting, 10. (b) Fish management information is gathered unsystematically, 5. (c) Fish management information is not gathered, 0.

I. POPULATION CHARACTERISTICS. Age, Education, and Income Level. Results by the Government of Canada on leisure needs and activities of Canadians show that, within a given population, the characteristics of age, education level and income level are important determinants for participation in many kinds of outdoor recreational activities.

(1) Age. Add or deduct 1 point for each 1% by which the percentage of the mean local population between the ages of 15 and 54 is above or below the national percentage. The national percentage is assigned a rating of 5.

(2) Education Level. Add or deduct 1 point for each 1% of the local population which has attended an institution for higher learning and is above or below the national average. The national average percentage is assigned a rating of 5.

(3) Income Level. Add or deduct one point for each $500 by which the local median income is above or below the national median income. The national median income is assigned a rating of five.

J. ACCESS. (1) Local Roads. Accessibility is rated according to a qualitative appraisal of road network and classification data accummulated in the inventory phase. Key factors in the appraisal include:

(a) directness of travel to recreation sites
(b) Adequacy of road surface
(c) geometrics

Local roads are rated as: poor, 0-4; good, 5-8; and excellent, 9,10.

(2) Accessibility to corridor. Consider paths, walkways, roads, barriers leading directly to the corridor:

(a) no access, 0.
(b) one access route, 3.
(c) two or more access routes, 5.
(d) accessible, some barriers, 7.
(e) easily accessible, no barriers, 10.

K. DISVALUES. Disvalues detract from the enjoyment of a recreational activity or the preservation and maintainance of a natural, scenic or historic area. Disvalues are given negative ratings and are rated qualitatively as: little or no detraction, (-) 0 - 4; moderate detraction, (-) 5 - 8; and severe detraction, (-) 9,10. Disvalues can be assigned to obnoxious odour, irritating noise above 85 decibels, and unsightliness. Disvalues can be termed negative landscape features. Another method of evaluating disvalues is to allocate a rating of (-1) for each negative landscape feature up to 10. Negative landscape features include (1) power transmission lines; (b) sewage outfalls; (c) scarred landscape (devegetation); (d) landscape anomalies (dumping); (e) abandoned structures.

5. Recreational Activities

It has been pointed out previously that a major objective of urban planners should be to provide a variety of outdoor recreation use opportunities utilizing urban corridors commensurate with public needs and resource potentials, and consistent with a quality environment. Three areas and twenty individual forms of recreation have been recognized for this study, although many more have been excluded[1]. The activities have been grouped into seven broad categories: camping, fishing, trail system, aesthetic enjoyment, water recreational activities, winter recreation, and areas. Those areas and activities which offer some confusion in interpretation are defined as follows:

Transient camping. An overnight stay in temporary quarters inside a developed campground.

Fishing. Lawful attempts to take fish. The activity includes harvest for hobby purposes of pan and rough fish, and game fish prevalent to an urban waterway.

Picknicking. Day use activities related to an excursion or outing where food is usually provided and consumed at a recreational site (developed or undeveloped).

Sightseeing. The intentional or inadvertent observation of the urban corridor or the attractions and resources thereon.

Nature interpretation. The intentional or inadvertent observation of the urban corridor for purposes of identifying and enjoying biological phenomena.

Water recreational activities. The participation in water-oriented outdoor recreation including swimming, canoeing and boating.

Boating. A water recreational activity which includes water travel

[1] Supra, p. 47

by means of a non-powered boat on smaller waterways and water travel by means of non-powered boats and powered boats on larger waterways.

Winter recreation. Participation in outdoor recreation involving snow, ice, or similar winter phenomena.

Natural area. A natural, wild, and relatively undeveloped area essentially unscathed from the effects of civilization.

Historic area. An area possessing a site associated with a significant event, an important, person, or a cultural activity of the past. Historic in most cases is 50 years old or older, except in unusual instances.

Scenic area. An area which possess an inherent quality of landscape which enhances the overall experience of an observer.

6. The Study Areas

Figure 6 shows the divisions of corridor units within an urban corridor. Five corridors were selected for research purposes including: The Red River, The Assiniboine River, Sturgeon Creek, Lasalle River, and the Seine River. The corridors lie within a 15 mile radius from the centre of the City of Winnipeg. Corridor units were determined during preliminary aerial photograph interpretation and reconfirmed in the field. Corridor units show homogeneous features. The corridor units are designated by an abbreviation of the waterway and by reach numbers which increase downstream.

7. Field Inventory Technique

Inventory sites were chosen during aerial photo examination as being representative in a corridor unit. The sites were plotted on a map and together with aerial photos provided the source of field

THE STUDY AREAS BY REACHES

FIGURE 6

scheduling. The following equipment was used in the field: level, rod, chain, current meter, wooden block, stopwatch, thermometer, Hewlet Packard Distomat, camera, sediment sampler, sieve jars, water jars, and miscellaneous implements. The field inventory was performed largely by shoreline observations and hiking, although in some areas a canoe was used. At each site inventory sheets (Appendix E) were used to record and evaluate the field data. A clipboard provided a suitable method of carrying the inventory sheets. Pictures were taken at most observation sites with an Asahi Pentax camera. Selected prints for each urban corridor appear at the end of Chapter IV. The field inventory was carried out in June 1973.

C. The Analysis Phase

In this phase of the study, the inventoried data is assimilated and verified in the field office. Additions and corrections are made to the collected information if necessary.

For each corridor unit, the key elements are assigned weighting factors or multipliers by a group of experts. The weighting factors indicate the significance of a particular element for an individual form of outdoor recreational activity or area. The multipliers are based on objective considerations of the significance of the key element to each recreational activity/area, and absence of a multiplier indicates that the element has little, if any, significance. The multipliers range from 1 to 5, running from low to high. Table 14 lists recreational activities/areas, key elements, and multipliers.

The second part of this procedure involves assigning numerical ratings to each inventory or value item. The value items, comprising

all key elements, are ranked by a group of experts. The numerical ratins are awarded from either of two scales. The primary scale runs from 1-10 (0-2, "very poor"; 3-4, poor; 5-6, fair; 7-8, good; 9-10, excellent). The secondary scale runs from 1-5 and is only used when an inventory item is broken down into two sub-groupings (0-1, very poor; 2, poor; 3, fair; 4, good; 5, excellent). For the most part, the qualitative descriptions for inventory items are representative of standards and theory which reflect quality the quantitative measures. The absence of a numerical rating indicates that the item has little, if any, significance for a particular recreational activity. The final rating for a key element is a weighted average of value items, the sum of the weights being 10. Table 15 shows the numerical ratings for the key element inventory items, weighted in proportion to their importance.

D. The Evaluation Phase.

The computation of the relative potential in an urban corridor for a particular recreational activity or as a natural, historical, or scenic area has been adopted from previous research applied to suburban streams in Kentucky[1]. Three major steps are involved in the evaluation process. The first step consists of multiplying a row vector composed of value ratings determined for the key element inventory items for recreational activities and areas, by a column vector containing assigned weights for the key element inventory items (Table 15). After performing the matrix multiplication, the product is divided by 10 and the quotient is rounded off to the nearest whole number. Diagrammatically, the operation appears on the following page.

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[1] Ibid, p.43

$$\left[\text{VALUE RATINGS}\right] \quad X \quad \left[\begin{matrix}W\\E\\I\\G\\H\\T\\S\end{matrix}\right] \quad = \quad \text{ELEMENT RATING}$$

$$\frac{\text{ELEMENT RATING}}{10} \quad \text{(Round Off)} \quad = \quad \text{KEY ELEMENT RATING}$$

After each of the Key Element Ratings is calculated the Score for the recreational activity or area is computed by multiplying a row vector of Key Element Ratings by the corresponding column of Element Multipliers (Table 14). Diagrammatically the procedure follows:

$$\left[\text{KEY ELEMENT RATINGS}\right] \quad \left[\begin{matrix}&M\\&U\\E&L\\L&T\\E&I\\M&P\\E&L\\N&I\\T&E\\&R\\&S\end{matrix}\right] \quad = \quad \text{SCORE}$$

The third step calculates the recreational potential of an urban corridor. The numerical value of a perfect score varies from one activity to another. The highest possible score for each recreational activity and area is calculated by multiplying a row vector of maximum Key Element Rating values - each value is 10 - by the corresponding column vector of Element Multipliers. The final Potential is expressed as a percentage of Score divided by the Highest Possible Score.

$$\left[\text{MAX. VALUE KEY ELEMENT RATING}\right] \quad X \quad \left[\begin{matrix}&M\\&U\\E&L\\L&T\\E&I\\M&P\\E&L\\N&I\\T&E\\&R\\&S\end{matrix}\right] \quad = \quad \text{HIGHEST POSSIBLE SCORE}$$

$$\text{POTENTIAL} = \frac{\text{SCORE}}{\text{HIGHEST POSSIBLE SCORE}} \times 100\%$$

The relative degrees of Potential are assumed to be:

LOW POTENTIAL:	0% - 33%
MEDIUM-LOW POTENTIAL:	34% - 50%
MEDIUM-HIGH POTENTIAL:	51% - 66%
HIGH POTENTIAL:	67% - 83%
VERY HIGH POTENTIAL:	84% - 100%

As an example, consider the computation of the picknicking potential for the Red River, Reach 1. The related key elements are climate, scenery, natural environment, physiography, water quality, wanter quantity, population, access, and disvalues. The calculation of the Element Rating for climate involves assigning value ratings to appropriate inventory items and multiplying the ratings by the assigned matrix of weights. The operation is shown below.

$$\begin{bmatrix} 6 & 4 & 8 & 8 & 6 & 5 & 9 & 5 & 0 \end{bmatrix} \times \begin{bmatrix} 1 \\ 0 \\ 3 \\ 0 \\ 3 \\ 0 \\ 0 \\ 1 \\ 2 \end{bmatrix} = 53$$

$$\frac{53}{10} = 5 \text{ (rounded off)} = \text{CLIMATE KEY ELEMENT RATING}$$

Similar arithmetic yields Key Element Ratings of 6 8 6 4 10 10 9 0. The Score is computed by multiplying the row of Key Element Ratings by the corresponding row of Element Multipliers as shown below.

$$\begin{bmatrix} 5 & 6 & 8 & 0 & 6 & 4 & 10 & 0 & 10 & 9 & 0 \end{bmatrix} \times \begin{bmatrix} 1 \\ 2 \\ 1 \\ 0 \\ 1 \\ 1 \\ 1 \\ 0 \\ 1 \\ 3 \\ 2 \end{bmatrix} = 82 = \text{SCORE}$$

The Highest Possible Score is found by multiplying the Maximum Value Key Element Ratings matrix by the corresponding Element Multipliers matrix.

$$\begin{bmatrix} 10 & 10 & 10 & 10 & 10 & 10 & 10 & 10 & 10 & 0 \end{bmatrix} \times \begin{bmatrix} 1 \\ 2 \\ 1 \\ 0 \\ 1 \\ 1 \\ 1 \\ 0 \\ 1 \\ 3 \\ 2 \end{bmatrix} = 110 = \text{HIGHEST POSSIBLE SCORE}$$

The Potential for picknicking is calculated as:

$$\frac{82}{110} \times 100\% = \underline{75\%} = \text{POTENTIAL}$$

The relative degree of the picknicking potential for the Red River Reach 1 is High.

TABLE 14

WEIGHTS FOR 23 KINDS OF RECREATIONAL ACTIVITIES

CAMPING: RESIDENT

CLIMATE									SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY								WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6	1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
1	0	3	0	4	0	0	1	1	1	3	4	1	1	3	3	2	1	1	0	0	0	0	0	0	0	0	3	4	0	3	0	0	2	0	4	4	0

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
4	0	3	3	0	0	0	0	0	0	6	4	0	4	6	4	3	3

CAMPING: TRANSIENT

CLIMATE									SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY								WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6	1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
1	0	3	0	4	0	0	1	1	0	3	5	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3	4	0	3	0	1	2	1	3	3	0

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
4	0	3	3	0	0	0	0	0	0	0	0	0	6	4	4	3	3

FISHING: PAN AND BRUSH

CLIMATE									SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY								WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6	1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
3	0	2	0	2	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	4	0	0	0	0	0	3	0	2	3	2	0

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
3	3	1	3	0	0	4	0	6	0	1	0	0	5	5	4	3	3

FISHING: GAME

CLIMATE									SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY								WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6	1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
3	0	2	0	2	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	4	0	0	0	0	0	4	0	1	3	2	0

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
3	3	1	3	0	0	0	3	6	1	0	5	5	5	5	4	3	3

PICNICKING

CLIMATE									SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY								WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6	1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
1	0	3	0	3	0	0	1	2	1	3	3	2	1	3	1	3	1	1	1	0	0	0	0	0	0	0	3	3	0	3	1	0	0	0	5	5	0

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
3	0	3	3	0	0	0	0	0	0	0	0	0	5	5	4	3	3

TABLE 14

WEIGHTS FOR 23 KINDS OF RECREATIONAL ACTIVITIES

TRAIL SYSTEM: HIKING

CLIMATE									SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY								WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6	1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
1	0	2	0	4	0	0	3	0	1	3	3	2	1	3	2	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
0	0	0	0	0	0	0	0	0	0	5	5	0	3	7	4	3	3

TRAIL SYSTEM: HORSEBACK RIDING

CLIMATE									SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY								WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6	1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
2	0	3	0	4	0	0	1	0	1	3	2	2	2	5	5	0	0	0	0	0	0	0	0	2	1	0	2	2	0	2	1	0	0	0	0	0	0

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
0	0	0	0	0	0	0	0	0	0	2	3	5	3	7	4	3	3

TRAIL SYSTEM: BICYCLING

CLIMATE									SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY								WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6	1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
1	0	3	0	4	0	0	1	1	1	3	2	2	2	5	5	0	0	0	0	0	0	0	0	2	1	0	2	2	0	2	1	0	0	0	0	0	0

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
0	0	0	0	0	0	0	0	0	0	3	4	3	4	6	3	3	4

TRAIL SYSTEM: DRIVING FOR PLEASURE

CLIMATE									SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY								WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6	1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
1	0	4	0	4	0	0	1	0	2	1	1	3	3	4	0	1	2	2	1	3	3	4	0	0	0	0	3	3	0	3	1	0	0	0	0	0	0

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
0	0	0	0	0	0	0	0	0	0	6	0	0	7	3	2	2	6

AESTHETIC ENJOYMENT: SIGHTSEEING

CLIMATE									SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY								WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6	1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
2	0	3	0	4	0	0	1	0	1	1	2	2	3	0	0	0	5	5	5	3	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
0	0	0	0	0	0	0	0	0	0	6	0	0	7	3	2	2	6

TABLE 14

WEIGHTS FOR 23 KINDS OF RECREATIONAL ACTIVITIES

AESTHETIC ENJOYMENT: NATURE INTERPRETATION

CLIMATE									SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY								WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6	1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
1	0	2	0	4	0	0	3	0	1	3	4	2	1	1	1	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
0	0	0	0	6	0	0	6	0	0	0	10	0	3	7	4	3	3

AESTHETIC ENJOYMENT: WALKING FOR PLEASURE

CLIMATE									SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY								WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6	1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
1	0	2	0	4	0	0	3	0	1	0	4	4	1	4	4	2	0	0	0	0	0	0	0	1	3	0	0	2	0	3	1	0	0	0	0	0	0

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
0	0	0	0	0	0	0	0	0	0	0	10	0	3	7	4	3	3

WATER RECREATION: BOATING

CLIMATE									SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY								WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6	1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
2	0	2	0	3	0	0	2	1	2	2	2	2	2	1	1	2	3	3	0	0	0	0	0	1	3	4	0	0	0	2	0	0	3	0	3	4	0

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
1	0	6	0	3	0	0	0	0	0	2	5	3	6	4	2	3	5

WATER RECREATION: CANOEING

CLIMATE									SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY								WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6	1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
2	0	2	0	3	0	0	2	1	2	2	2	2	2	1	1	2	3	3	0	0	0	0	0	1	3	4	0	0	0	0	2	0	0	0	5	5	0

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
3	0	3	3	0	1	0	0	0	0	4	4	2	4	6	3	3	4

WATER RECREATION: SWIMMING

CLIMATE									SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY								WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6	1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
1	0	2	0	4	0	0	2	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	3	2	2	3	0	0	0	0	0	0	2	0	2	3	3

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
3	1	2	2	1	3	1	1	1	1	1	1	1	2	0	3	3	4

TABLE 14

WEIGHTS FOR 23 KINDS OF RECREATIONAL ACTIVITIES

WINTER RECREATION: SNOWSHOEING

CLIMATE									SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY								WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6	1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
0	1	0	3	0	0	3	1	2	2	1	2	3	2	2	2	2	3	1	0	0	0	0	0	0	0	0	4	6	0	0	0	0	0	0	0	0	0

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
0	0	0	0	0	0	0	0	0	0	5	5	0	5	5	4	3	3

WINTER RECREATION: TOBOGGANING

CLIMATE									SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY								WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6	1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
0	1	0	3	0	0	3	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	6	0	0	0	0	0	0	0	0

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0	0	0

WINTER RECREATION: CROSS-COUNTRY SKIING

CLIMATE									SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY								WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6	1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
0	1	0	3	0	0	3	1	2	2	2	1	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0	0	0	0	0	0	0	0	0

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
0	1	0	0	0	0	0	0	0	0	0	6	4	3	7	4	3	3

WINTER RECREATION: SNOWMOBILING

CLIMATE									SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY								WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6	1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
0	1	0	3	0	0	3	1	2	0	3	4	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0	0	0	0	0	0	0	0	0

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
0	0	0	0	0	0	0	0	0	0	4	2	4	3	7	0	0	0

WINTER RECREATION: SKATING

CLIMATE									SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY								WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6	1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
0	1	0	4	1	0	0	1	3	1	3	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
5	0	5	0	0	0	0	0	0	0	0	10	0	3	7	0	0	0

TABLE 14

WEIGHTS FOR 23 KINDS OF RECREATIONAL ACTIVITIES

AREAS: NATURAL

CLIMATE									SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY								WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6	1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	3	0	2	3	2	0

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
3	2	2	2	1	0	1	3	5	1	0	0	0	5	5	4	3	3

AREAS: HISTORIC

CLIMATE									SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY								WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6	1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0	0	0

AREAS: SCENIC

CLIMATE									SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY								WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6	1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
0	0	0	0	0	0	0	0	0	2	2	2	2	2	3	0	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	3	3	4

TABLE 15

KEY ELEMENT VALUE RATINGS

STURGEON CREEK PROVINCIAL HIGHWAY 101 TO SASKATCHEWAN AVENUE

CLIMATE									SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY								WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6	1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
6	4	8	8	6	5	9	5	0	2	9	0	7	2	0	10	10	4	7	0	7	0	0	0	8	9	3	9	6	6	8	5	10	4	3	10	7	10

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
10	9	4	8	0	5	3	1	10	0	6	1	5	7	10	-1	-1	0

STURGEON CREEK SASKATCHEWAN AVENUE TO STURGEON ROAD

CLIMATE									SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY								WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6	1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
6	4	8	8	6	5	9	5	0	2	9	0	7	3	0	10	9	3	3	0	0	0	0	0	10	9	1	10	6	6	8	4	10	4	3	10	8	10

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
10	9	5	5	0	5	2	1	10	0	6	3	4	10	5	-2	0	0

STURGEON CREEK STURGEON ROAD TO JUNCTION WITH ASSINIBOINE RIVER

CLIMATE									SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY								WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6	1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
6	4	8	8	6	5	9	5	0	2	9	1	8	4	2	10	10	8	5	0	0	0	0	0	8	9	2	10	8	3	9	8	10	4	3	10	6	10

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
10	9	5	8	0	5	3	1	10	0	8	7	6	10	10	0	-1	0

RED RIVER PROVINCIAL HIGHWAY 100 TO SPRINGSIDE AVENUE.

CLIMATE									SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY								WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6	1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
6	4	8	8	6	5	9	5	0	6	7	6	8	2	10	8	10	7	7	0	0	0	0	0	0	0	9	8	4	8	8	4	10	4	8	0	8	10

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
10	9	10	10	10	5	8	4	10	0	7	10	6	10	7	0	-1	0

RED RIVER SPRINGSIDE AVENUE TO MAIN STREET.

CLIMATE									SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY								WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6	1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
6	4	8	8	6	5	9	5	0	6	4	5	0	3	10	10	8	5	6	0	0	0	0	4	2	1	8	10	6	6	8	5	9	0	8	0	8	10

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
10	9	10	10	10	5	8	4	10	0	5	9	6	10	8	-1	-2	0

TABLE 15

KEY ELEMENT VALUE RATINGS

RED RIVER MAIN STREET TO DISRAELI FREEWAY.

CLIMATE									SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY							WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6	1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
6	4	8	8	6	5	9	5	0	6	0	8	8	4	10	4	7	5	5	0	6	4	1	0	3	1	8	9	2	10	8	5	9	0	9	0	1	10

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
10	9	10	10	10	5	8	4	10	0	5	3	4	10	5	-6	-5	0

RED RIVER DISRAELI FREEWAY TO JOHN BLACK AVENUE.

CLIMATE									SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY							WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6	1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
6	4	8	8	6	5	9	5	0	6	5	9	7	3	10	2	10	7	8	0	5	3	1	0	0	0	8	10	2	10	6	1	9	0	7	0	8	10

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
10	9	10	10	10	5	8	4	10	0	2	6	5	10	5	0	0	0

RED RIVER JOHN BLACK AVENUE TO PROVINCIAL HIGHWAY 101.

CLIMATE									SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY							WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6	1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
6	4	8	8	6	5	9	5	0	6	7	10	9	2	10	2	10	7	8	0	0	0	0	0	2	2	8	10	4	8	8	5	9	0	7	0	8	10

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
10	9	10	10	10	5	8	4	10	0	8	3	5	10	8	0	0	0

LA SALLE RIVER LA BARRIERE PARK TO PROVINCIAL HIGHWAY 75.

CLIMATE									SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY							WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6	1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
6	4	8	8	6	5	9	5	0	3	10	9	6	10	10	2	10	8	8	0	0	0	0	2	5	9	8	10	6	6	9	5	10	3	6	4	8	10

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
10	8	8	10	6	5	4	2	10	0	8	9	6	8	8	0	0	0

LA SALLE RIVER PROVINCIAL HIGHWAY 75 TO JUNCTION WITH RED RIVER.

CLIMATE									SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY							WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6	1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
6	4	8	8	6	5	9	5	0	3	7	5	6	5	10	10	10	8	6	0	3	1	0	0	8	2	2	10	8	3	8	5	10	3	6	1	8	10

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
10	8	9	10	6	5	6	2	10	0	8	9	6	10	7	-2	-1	0

TABLE 15

KEY ELEMENT VALUE RATINGS

ASSINIBOINE RIVER PROVINCIAL HIGHWAY 100 TO ASSINIBOINE PARK

CLIMATE									SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY								WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6	1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
6	4	8	8	6	5	9	5	0	6	7	7	7	5	10	6	10	6	9	0	0	0	0	6	3	1	3	10	4	8	8	10	10	7	4	0	8	10

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
10	7	10	8	0	9	5	5	10	0	7	8	6	10	7	-2	0	0

ASSINIBOINE RIVER ASSINIBOINE PARK TO MADISON STREET.

CLIMATE									SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY								WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6	1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
6	4	8	8	6	5	9	5	0	6	7	9	7	3	10	2	8	7	7	0	0	0	0	4	2	1	6	10	8	3	8	10	10	7	4	0	7	10

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
10	7	10	8	0	8	5	5	10	0	5	10	7	10	5	-3	-1	0

ASSINIBOINE RIVER MADISON STREET TO MARYLAND STREET.

CLIMATE									SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY								WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6	1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
6	4	8	8	6	5	9	5	0	6	5	9	6	4	10	2	10	7	7	0	0	0	0	3	2	1	1	10	4	8	8	10	10	7	4	0	4	10

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
10	7	10	10	6	7	6	5	10	0	4	10	6	10	6	-2	-2	0

ASSINIBOINE RIVER MARYLAND STREET TO MAIN STREET.

CLIMATE									SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY								WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6	1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
6	4	8	8	6	5	9	5	0	6	2	7	6	2	10	6	8	5	7	0	0	0	0	0	0	0	5	10	4	8	8	8	10	7	4	0	7	10

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
10	7	10	10	8	5	6	5	10	0	10	9	6	10	5	-1	-2	0

ASSINIBOINE RIVER MAIN STREET TO JUNCTION WITH RED RIVER.

CLIMATE									SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY								WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6	1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
6	4	8	8	6	5	9	5	0	6	0	5	6	1	10	10	10	6	7	0	0	0	0	0	2	1	2	10	2	10	8	10	10	0	5	0	2	10

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
10	7	10	10	9	5	7	5	10	0	5	3	4	6	3	-5	-3	-3

TABLE 15

KEY ELEMENT VALUE RATINGS

SEINE RIVER — GREATER WINNIPEG FLOODWAY TO JOHN BRUCE ROAD.

CLIMATE											SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY								WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6		1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
6	4	8	8	6	5	9	5	0		4	9	10	6	6	10	0	10	8	8	0	8	8	5	0	8	1	2	10	6	6	8	5	6	0	8	0	2	10

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
8	10	5	8	0	5	3	1	10	0	4	5	5	5	7	0	-5	0

SEINE RIVER — JOHN BRUCE ROAD TO TRANS-CANADA HIGHWAY EAST.

CLIMATE											SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY								WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6		1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
6	4	8	8	6	5	9	5	0		4	7	8	5	8	10	4	7	9	9	0	0	0	0	0	8	1	2	10	6	6	8	5	6	0	8	0	2	10

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
8	10	6	9	0	5	3	1	10	0	10	4	6	9	5	-1	-4	0

SEINE RIVER — TRANS-CANADA HIGHWAY EAST TO MARION STREET.

CLIMATE											SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY								WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6		1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
6	4	8	8	6	5	9	5	0		4	6	9	6	7	10	2	4	6	6	0	0	0	0	0	6	1	2	10	8	4	8	5	6	0	8	0	2	10

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
8	10	5	10	5	6	3	1	10	0	6	3	5	10	6	-2	-5	0

SEINE RIVER — MARION STREET TO PROVENCHER STREET.

CLIMATE											SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY								WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6		1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
6	4	8	8	6	5	9	5	0		4	1	5	6	1	10	10	0	3	3	0	0	0	0	0	4	1	2	10	4	8	8	4	6	0	8	0	2	10

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
9	10	7	9	5	5	3	1	10	0	8	4	5	10	6	-9	-10	-8

SEINE RIVER — PROVENCHER STREET TO JUNCTION WITH RED RIVER.

CLIMATE											SCENERY					NAT. ENVIRNT.						HISTORICAL			PHYSIOGRAPHY								WATER QUALITY					
1A	1B	2A	2B	3A	3B	4	5	6		1	2	3	4	5	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6A	6B	7	8	1	2	3	4	5	6
6	4	8	8	6	5	9	5	0		4	0	3	6	5	6	10	0	3	2	0	0	0	0	0	4	1	2	10	10	2	8	5	6	0	8	0	0	10

WATER QUANTITY						FISH POP.				POPULATION			ACCESS		DISVALUES		
1	2	3	4A	4B	5	1	2	3	4	1	2	3	1	2	1A	1B	1C
10	10	8	10	9	4	5	1	10	0	5	6	5	9	7	-7	-10	-3

TABLE 16

KEY ELEMENTS AND THEIR MULTIPLIERS

ACTIVITY	CLIMATE	SCENERY	NATURAL ENVIRONMENT	HISTORIC VALUE	PHYSIOGRAPHY	WATER QUALITY	WATER QUANTITY	FISH	POPULATION	ACCESS	DISVALUES
CAMPING:											
RESIDENT	2	2	1	0	4	2	1	0	1	2	2
TRANSIENT	1	1	0	0	3	1	1	0	0	5	1
FISHING:											
PAN AND BRUSH	1	0	0	0	1	2	3	4	1	1	1
GAME	1	0	0	0	1	3	3	3	1	1	1
PICNICKING	1	2	1	0	1	1	1	0	1	3	2
TRAIL SYSTEM:											
HIKING	3	2	2	0	0	0	0	0	1	1	3
HORSEBACK RIDING	2	2	2	0	2	0	0	0	2	2	1
BICYCLING	2	2	2	0	2	0	0	0	1	2	1
DRIVING FOR PLEASURE	1	3	3	2	2	0	0	0	0	4	2
AESTHETIC ENJOYMENT:											
SIGHTSEEING	2	2	3	3	0	0	0	0	0	4	3
NATURE INTERPRETATION	1	1	5	0	0	0	0	0	1	1	2
WALKING FOR PLEASURE	1	2	4	0	1	0	0	0	1	2	1
WATER RECREATIONAL ACTIVITIES:											
BOATING	1	1	1	0	1	1	5	0	1	3	2
CANOEING	2	2	2	0	1	2	3	0	1	2	2
SWIMMING	2	0	0	0	2	5	3	0	0	2	2
WINTER RECREATION:											
SNOWSHOEING	2	2	1	0	1	0	0	0	1	1	1
TOBOGGANING	2	0	0	0	4	0	0	0	0	2	0
CROSS-COUNTRY SKIING	2	2	0	0	2	0	0	0	1	1	1
SNOWMOBILING	2	1	0	0	3	0	0	0	1	3	0
SKATING	2	1	0	0	0	0	1	0	1	2	0
AREAS:											
NATURAL	0	2	5	0	0	3	1	1	0	2	4
HISTORIC	0	0	0	5	0	0	0	0	0	1	0
SCENIC	0	5	2	0	0	1	0	0	0	2	3

CHAPTER IV

ANALYSIS OF THE RESULTS AND THE METHODOLOGY

A. Analysis of the Results

An analysis of the potential scores for recreational activities and areas, and an examination of the methodology producing the results are included in this chapter. The potential scores applicable to five urban corridors are summarized in Tables 17 and 18. Table 17 shows the potentials obtained when the key element, Disvalues, is included in the rating process; Table 18 shows the potentials obtained when the key element, Disvalues, is excluded from the rating process.

(1) Recreational Activity and Area Potentials.

A discussion follows considering (1) potential scores with disvalues; (2) reasons for particular high and low potentials; and (3) potential scores without disvalues.

Sturgeon Creek, Reach 1.

The potential scores generally fall within the medium-high range for the selected activities and areas. The highest potentials are those for fishing, apparently relating to the high quality of the aquatic habitat existing in the waterway, and the high accessibility to the corridor unit. Other activities and areas falling in the high range include tobogganing, snowmobiling, transient camping, and swimming, as the physiography and access elements rate well in the reach. Activities and areas falling in the medium-high potential range include, in order of highest to lowest potentials: canoeing; natural areas; horseback riding; bicycling; picknicking; cross-country skiing; skating; walking

for pleasure; snowshoeing, and hiking; and finally, driving for pleasure and scenic areas. The lowest potential is associated with historic areas. There are very few disvalues in this corridor unit.

Sturgeon Creek, Reach 2.

The potential scores generally fall within the medium-high range for the selected activities and areas. The highest potentials are those for (1) tobogganing, apparently relating to the quality of the topography; (2) transient camping, relating to the quality of topography, and accessibility to the corridor unit; and (3) fishing, relating to the high quality of the aquatic habitat existing in the waterway, and the high accessibility to the corridor unit. Activities and areas falling in the medium-high potential range include, in order of highest to lowest potentials: snowmobiling; resident camping and swimming; picknicking; canoeing; natural areas, cross-country skiing; horseback riding and bicycling; skating; snowshoeing; boating; hiking; and finally driving for pleasure. The lowest potential is associated with historic areas. There are very few disvalues in this corridor unit.

Sturgeon Creek, Reach 3.

The potential scores generally fall within the high range for the selected activities and areas. The highest potentials are those associated with transient camping and snowmobiling, apparently relating to the high quality of topography and access. Most Key elements rate well in this reach. Activities and areas falling in the medium-high potential range include, in order of highest to lowest potentials: hiking; nature interpretation; scenic areas and boating; driving for pleasure; and finally, sightseeing. The lowest potential is associated with historic areas. All other activities and areas fall within the high

range. Disvalues do not affect the ratings.

LaSalle River, Reach 1.

Almost all potential scores fall within the high range for the selected activities and areas. All key elements rate well in this reach. The highest potentials are those associated with (1) fishing, apparently relating to the high quality of the aquatic habitat existing in the waterway; and (2) transient camping, relating to the high quality of accessibility and topography. Those activities falling in the medium-high range include: (1) driving for pleasure, relating to the absence of historical values and average scenery; and (2) sightseeing, relating to the absence of historical values and average accessbility to the corridor unit. The lowest potential is associated with historic areas. All other activities and areas displayed high potentials. Moreover, this corridor unit scored the highest of all those considered in the study. Disvalues do not affect the ratings.

LaSalle River, Reach 2.

Almost all potential scores fall within the high range for the selected activities and areas. All key elements rate well in this reach. The highest potentials are those associated with (1) transient camping, apparently related to the high quality of topography and accessibility; and (2) walking for pleasure, related to the high quality of the natural environment and accessibility. Those activities falling in the medium-high range include: (1) sightseeing and (2) driving for pleasure, relating to the average scenery and the low historical value; and (3) swimming, relating to water quality. The lowest potential is associated with historic areas. All other activities and areas fall in the high potential range. This corridor

unit scored well in the study. Disvalues are minimal.

Seine River, Reach 1.

The potential scores generally fall within the medium-high range for the selected activities and areas. The highest potentials are those associated with: (1) tobogganing and (2) snowmobiling, apparently relating to the high quality of topography, climate, and accessibility; and (3) historic areas, relating to the occurrence of Louis Riel's house in this reach. Those activities and areas falling in the medium-high range include, in order of highest to lowest scoring: driving for pleasure; cross-country skiing; snowshoeing and transient camping; horseback riding; hiking and bicycling; skating; pan fishing and resident camping; scenic areas, walking for pleasure, nature interpretation, and picknicking; game fishing and sightseeing; canoeing and finally, natural areas. The lowest potential is associated with boating, relating to the average rating of water quantity and access. Disvalues are significant in this reach.

Seine River, Reach 2.

The potential scores generally fall within the medium-high range for the selected activities and areas. The highest potentials are those for tobogganning and snowmobiling, apparently relating to the high quality of topography and accessibility to the corridor unit. Activities or areas falling in the medium-high range include, in order of highest to lowest potentials: transient camping and pan fishing; snowshoeing, horseback riding, and bicycling; driving for pleasure; resident camping; hiking and cross-country skiing; walking for pleasure; game fishing; skating and picknicking; nature interpretation and natural areas; and finally, scenic areas and canoeing. The lowest potential is

associated with historic areas. Disvalues are significant in this reach.

Seine River, Reach 3.

The potential scores generally fall within the medium-high range for the selected activities and areas. The highest potentials are those for transient camping and snowmobiling, apparently relating to the high quality of topography and accessibility to the corridor unit. Activities and areas falling in the medium-high range include, in order of highest to lowest potentials: bicycling, and toboganning; cross-country skiing, driving for pleasure, and pan fishing; resident camping, horseback riding, and snowshoeing; pickmicking and skating; walking for pleasure and game fishing; hiking; canoeing; scenic areas: and finally, boating and natural areas. The lowest potential is associated with historic areas. Disvalues are significant in this reach.

Seine River, Reach 4.

The potential scores generally fall in the medium-low range for the selected activities and areas. The highest potential is that for tobogganing, apparently relating to the quality of the topography and accessibility to the corridor unit. Activities falling in the medium-high range include, in order of highest to lowest potentials: snowmobiling; transient camping and pan fishing; bicycling; skating and horseback riding; walking for pleasure; and finally, game fishing. The lowest potentials are associated with historic and scenic areas. That the reach is located in an industrial area contributes to the low rating. Without existing disvalues, the potentials in the reach would improve on the average 30%.

Seine River, Reach 5.

The potential scores generally fall in the medium-low range for the selected activities and areas. The highest potential is associated with snowmobiling, apparently relating to the quality of the topography and the accessibility to the corridor unit. Activities and areas falling in the medium-high range include, in order of highest to lowest potentials: transient camping; skating and pan fishing; tobogganing; cross-country skiing; horseback riding; bicycling; boating; game fishing and walking for pleasure; and finally snowshoeing. The lowest potential is associated with historic areas. Disvalues are very significant in this reach.

Assiniboine River, Reach 1.

The potential scores generally fall within the high range for the selected activities and areas. The highest potentials are those associated with tobogganing and transient camping, apparently reflecting the quality of the topography and the accessibility to the corridor unit. Other activities in the high range include, in order of highest to lowest potentials: picknicking; walking for pleasure; skating; pan and game fishing; horseback riding; snowmobiling; hiking; bicycling; nature interpretation; boating; swimming; resident camping; and finally, snowshoeing. The high rating is associated with the natural quality of the corridor unit. Other activities and areas falling within the medium-high range include, in order of highest to lowest potentials: driving for pleasure; canoeing; cross-country skiing; natural areas; and finally, scenic areas. The lowest potential is associated with historic areas. There are very few disvalues in the corridor unit.

Assiniboine River, Reach 2.

The potential scores generally fall within the medium-high range for the selected activities and areas. The highest potential is associated with transient camping, apparently reflecting the quality of topography and accessibility to the corridor unit. Other activities falling in the high range include, in order of highest to lowest potentials: snowmobiling; skating; game fishing; picknicking; cross-country skiing; resident camping; and finally, pan fishing, horseback riding, and showshoeing. The high rating reflects the gentle topography and natural quality of the corridor unit. Other activities and areas within the medium-high range include, in order of highest to lowest potentials: driving for pleasure and boating; bicycling and swimming; walking for pleasure, canoeing; and tobogganing; nature interpretation; hiking and scenic areas; and finally, natural areas. The lowest potential is associated with historic areas. The corridor unit has few disvalues.

Assiniboine River, Reach 3.

The potential scores generally fall within the medium-high range for the selected activities and areas. The highest potentials are those associated with tobogganing and transient camping, apparently relating to the quality of the topography and accessibility to the corridor unit. Other activities in the high range include, in order of highest to lowest potentials: boating; skating; picknicking; walking for pleasure; and finally, game fishing. The high rating indicates the quality of the topography, accessibility, and water habitat. Activities and areas falling within the medium-high range include, in order of highest to lowest potentials: pan fishing and snowmobiling; driving

for pleasure; resident camping and cross-country skiing; natural areas, snowshoeing, canoeing, bicycling, and horseback riding; hiking; and finally scenic areas and swimming. The lowest potential is associated with historic areas. Disvalues are relatively few in the corridor unit.

Assiniboine River, Reach 4.

The potential scores generally fall within the medium-high range for the selected activities and areas. The highest potentials are those associated with: (1) tobogganing and (2) transient camping, apparently relating to the quality of the topography and the accessibility to the corridor unit; (3) boating and (3) fishing, relating to the aquatic habitat and accessibility to the corridor unit; and (3) walking for pleasure, relating to the high quality of the natural environment and scenery. Activities and areas falling within the medium-high range include, in order of highest to lowest potentials: snowmobiling, skating, and picknicking; canoeing; resident camping and snowshoeing; hiking and horseback riding; swimming, cross-country skiing and natural areas; driving for pleasure, bicycling and nature interpretation; and finally, scenic areas. The lowest potential is associated with historic areas. Disvalues are relatively minimal in the corridor unit.

Assiniboine River, Reach 5.

The potential scores generally fall within the medium-low range for the selected activities and areas. The highest potential is associated with tobogganing, apparently reflecting the quality of the topography and the accessibility to the corridor unit. Activities falling within the medium-high range include, in order of highest to lowest potentials: pan fishing; walking for pleasure, game fishing, and boating; and finally, horseback riding and bicycling. The high disvalues

the low quality of scenery and natural environment reflect the poorer ratings. The lowest potentials are associated with historic areas and sightseeing. Disvalues significantly lower the recreational potentials in the corridor unit.

Red River, Reach 1.

The potential scores generally fall within the high range for the selected activities and areas. The highest potentials are associated with (1) boating, apparently reflecting the more than adequate water quantity, the quality of scenery and the accessibility to the corridor unit; (2) pan fishing, reflecting the quality of the aquatic habitat and accessibility to the corridor unit; (3) walking for pleasure, reflecting the high quality of scenery and natural environment; (4) transient camping and (5) tobogganing, reflecting the quality of the topography and the accessibility to the corridor unit. Other activities falling within the high range include, in order of highest to lowest potentials: picknicking and natural areas; game fishing and skating; nature interpretation; hiking; canoeing; snowshoeing; scenic areas, snowmobiling, and finally, horseback riding. All key elements rate well in the corridor unit. Activities and areas falling within the medium-high range include, in order of highest to lowest potentials: bicycling; resident camping; driving for pleasure and cross-country skiing; and finally, sightseeing. The lowest potential is associated with historic areas. Disvalues do not affect the ratings in the corridor unit.

Red River, Reach 2.

The potential scores generally fall within the high range for the selected activities and areas. The highest potential is associated with walking for pleasure, apparently relating to the high quality of

the scenery and natural environment. Other activities and areas in the high range include, in order of highest to lowest potentials: transient camping, pan fishing, and tobogganing; boating; snowmobiling; skating; game fishing and horseback riding; picknicking; bicycling; cross-country skiing; snowshoeing; and finally, resident camping and canoeing. Activities and areas falling within the medium-high range include, in order of highest to lowest potentials: natural areas; hiking; nature interpretation; driving for pleasure; swimming; and scenic areas. The lowest potential is associated with historic areas. Disvalues do not affect the ratings in the corridor unit.

Red River, Reach 3.

The potential scores generally fall in the medium-high range for the selected activities and areas. The highest potentials are associated with (1) tobogganing, apparently reflecting the quality of the topography and accessibility to the corridor unit; and (2) pan fishing, relating to the quality of aquatic habitat existing in the waterway and the accessibility to the corridor unit. Activities and areas falling within the medium-high range include, in order of highest to lowest potentials: boating; game fishing; transient camping and driving for pleasure; snowmobiling; skating; walking for pleasure; horseback riding, bicycling, and canoeing; picknicking; and finally, natural areas. The natural and scenic qualities of the reach are relatively low. The lowest potential is associated with historic areas. Disvalues significantly lower the potentials.

Red River, Reach 4.

The potentials generally fall within the medium-high range for the selected activities and areas. The highest potential is that

associated with tobogganing, apparently relating to the quality of the scenery, quantity of water and accessibility to the corridor unit. Other activities falling with the high potential include, in order of highest to lowest potentials: pan fishing; transient camping and game fishing: picknicking and natural areas; and finally driving for pleasure. The high rating reflects the quality of the natural environment and water. Activities falling within the medium-high range include, in order of highest to lowest potentials: horseback riding; canoeing, skating, and scenic areas; walking for pleasure; nature interpretation and snowmobiling; resident camping and cross-country skiing; snowshoeing; horseback riding and sightseeing; and finally, bicycling and swimming. The lowest potential is associated with historic areas. Disvalues are relatively few in the corridor unit.

Red River, Reach 5.

The potential scores generally fall within the high range for the selected activities and areas. The highest potentials are associated with: (1) tobogganing, apparently reflecting the quality of the topography; (2) pan fishing, relating to the quality of the aquatic habitat; and (3) boating, relating to the quantity of water. Other activities in the high range include, in order of highest to lowest potentials: transient camping; snowmobiling; picknicking, natural areas and scenic areas; hiking and canoeing; game fishing; and finally, resident camping, walking for pleasure, and skating. The high ratings reflect the quality of the scenery and natural environment. Activities falling in the medium-high range include, in order of highest to lowest potentials: snowshoeing; horseback riding; bicycling, driving for pleasure and cross-country skiing; nature interpretation; swimming; and

finally, sightseeing. The lowest potential is associated with historic areas. Disvalues do not affect the ratings in the corridor unit.

(2) An Analysis of High and Low Potentials.

In general, the potential scores are in the ranges expected. Based on the results in Table 17, urban corridors excluding the Seine River corridor, possess high potentials for camping, fishing, winter recreation, picknicking, the development of trail systems, and some forms of aesthetic enjoyment. For fishing, there is very little difference in the scores between game and rough fish - attributed to the overall high ratings for water quality. The proximity of access routes to the corridor unit has particular importance to the high scores for transient camping, picknicking, snowmobiling, and fishing. A few corridor units show a high potential for natural, scenic, or historic areas. The scores for scenic and natural areas are highly sensitive to areal percentages of trees, scenery, and land use. That there is, to a large extent, physical similarity in the study areas, the nearly identical scores for many of the activities and areas are realized. Disvalues and lower quality natural environment resulting from the location of a corridor unit in an industrial area, tends to reduce recreational potentials. It is to note that the success of the devised system depends on receiving reliable results, and a few examples will be discussed to show that the system is reliable.

The Red River is used as a primary navigation route, and the results show that the Red River, in comparison with other urban water, has the highest potential for boating. The fact that Sturgeon Creek Reach 3, is in a park-like setting, the corridor unit scores higher in comparison to other units on Sturgeon Creek. The high potential for recreational

activities in Sturgeon Creek Reach 1, has been recognized by the Kinsmen: this organization is constructing a multi-recreational park along this corridor unit. Snowmobiling shows high potential on most corridor units, and, in fact, more people each year are using urban corridors on which to run their machines. The Lasalle River Reach 1 is primarily a park-like area and Reach 2 is relatively underdeveloped and untouched by urban despoliation; as such, this urban corridor possess a high potential for almost all recreational activities and areas. Disvalues greatly lower the recreational potentials along the Seine River. This urban corridor exemplifies the lack of foresight by urban planners in establishing guidelines and policies to protect a most precious urban corridor; instead, an inexorable urban growth has spread a smear of low-grade urban tissue along the urban corridor and has expunged the richness and value which once existed. Had foresight been applied, this urban corridor would have ranked high among the splendid recreational resources for the city population. Another alarming revelation is the low potential for historic areas, especially when urban waterways are so saturated in the history of Winnipeg. The fact that historic evidences are almost completely foresaken by urban planners, contributes to the low ratings. From a Manitoba scrapbook, the following precis reveals an abandoned heritage.

> "Long before the coming of the white men, the Red River was accorded a special place in the regard of the Indians. They never feared the river gods as they did those responsible for the wild and turbulent Winnipeg River. . . Normally, the Red River was a shallow placid stream - but on occasion it could rise in anger, and spill over its banks, inundating vast areas of the level plain. These periodic floods had an incalcuable effect in shaping the physical foundation of the Red River colony,

> forerunner of the present province. . . The Cree Indians appear to have associated the river with the colour of blood. Their designation for the river was MIKWAKUMEW sepe. . . This Red River supported an area teaming with wildlife. The waters supported many fish, with sturgeon, gold-eye, catfish, and pike being the most numerous. At the Forks, pigeons were in great numbers, the trees, every moment were filled with them. . . After the flood in 1861, a sprinkling of business men, such as the youthful proprietors of the first newspaper, had come to share in the development of a new frontier. Their buildings were erected on the east side of the river, opposite the Hudson's Bay Company fort, but dintinct from the buildings clustered around Bishop Provencher's frontier cathedral.
>
> "Forty years ago", says Dr. A. Baird an old timer of the district, "Colony Creek was so deep a bridge was built. My children learned to skate on the creek.
>
> Winnipeg has ghosts of other old creeks left to tell tales. Omand's creek used to be a treacherous place for wagons and settlers goind west. Mrs. J. B. Calloway recalled in the early 80's when she came here, how she and her husband went out at nights with lanterns to guide the wagon trains."[1]

B. Analysis of the Methodology

(1) The Specific Approach.

From a perusal of the results, it is suggested that the methodology provides an objective method for evaluating recreational potential of urban corridors for outdoor recreational activities and areas. The objective method is attributed to the systematic approach underlying the methodology, such that, the role of each key element inventory item is specific and contributes to the final rating of a corridor unit. As an example, in evaluating the pan and rough fishing

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[1] Manitoba Historical Scrapbook #M7: 317, 318.

potential of a corridor unit, each inventory item is accorded an individual rating based on a predetermined rating scale. Under other systems, ratings for individual criteria are not made; instead, water quantity, fish populations and the aesthetic quality of the environment are considered together in deriving a final classification. The outcome is a lack of precision and much ambiguity with respect to the role of each quality criterion in contributing to the final evaluation. In providing an objective method of evaluating urban corridors, the methodology is consistent and reliable over space and time.

The methodology provides general and specific information for each individual key element. Specific and general information is provided through the use of inventory data schedules employed as a means of storing and evaluating key element inventory items. The information is keyed to a definite location on a study area map. In comparison, a few systems (A.R.D.A.[1], for example) provide a lengthy narrative which may accompany a large inventory map.

By providing ratings for each inventory item, an indication of problem(s) or limitation(s) is readily identifiable. For example, in reference to the swimming key element inventory items, a rating of "1" allocated to the key element inventory item, coliform organisms, provides an indication of a specific problem or limitation for human use in a particular corridor unit.

The provision of specific information has the added usefulness of differentiating between two corridor units which have received equal final potential scores for the equivalent outdoor recreational

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[1]Agricultural and Rehabilitation Administration (A.R.D.A.) op. cit., p.23

activity or area. For example. the transient camping activity for the Red River Reach 2, and the Assiniboine River Reach 2 shows a potential of 78. By referring to Table 14, it can be seen that the two corridor units differ with respect to the key element value ratings. Under other systems, specific differentiations between two or more land/water units are not presented.

The methodology is found to be advantageous for identifying the quality of recreation resources for individual forms of outdoor activities which characterize an urban corridor. Moreover, previous systems have not been specific as to the capabilities of land or water units for individual recreation activities. Often, primary and secondary recreational activities are identified but there is some vagueness as to the specific nature of the secondary activity. More often, the secondary recreation activity is really a landscape feature, as a waterfall or a cave, for example. In comparison, the methodology reveals the capability, or potential, for a whole gamut of specific recreational activities and areas.

In the inventory phase, land and water units are considered separately in identifying the criteria for recreational activities and areas. However, it is evident that the recreational value of water units accrues to the adjacent land units. As a result, the potential for a water-oriented activity is not evaluated for a water unit, but rather for a land/water unit, designated as a corridor unit. The corridor unit, unlike previous classification systems, is chosen as a relatively distinct area of land and water units featuring relatively homogeneous physical and socio-economic features. Many forms of outdoor recreation require a certain type of topography, and the

methodology recognizing this fact, provides an appropriate method for rating the features in a corridor unit. The designation of the areal extent of a unit corridor results in an efficient and effective method of utilizing the working resources in relation to the amount and type of information sought.

The recreation features identified in the field do not incorporate landscape features in the rating process. That is, topographic pattern is associated with hiking, bicycling, camping, and other activities, but the interpretation of rock formations provides valueless information, for all intents and purposes. Identifying a rock formation and designating it on a map provides information which is very general and unspecific as to the capability of a corridor unit for hiking, for example. Landscape features are recognized on the inventory schedule, but are not employed in the evaluation process.

(2) A Comparison of the Methodology With Other Outdoor Recreation Classification Systems in Reviewing the Set of Desirable Characteristics.

The purpose of this section is to review the desirable characteristics of an outdoor recreational classification system and to show that the system developed in this study, in comparison to other systems, is superior. The set of desirable characteristics can be referred to in Table 12.

(i) Identification of Individual Forms of Outdoor Recreation.

Twenty-three individual forms of outdoor recreational activities and areas, relatively free from conflicting interests, have been identified in a random survey. The Ontario[1] and the A.R.D.A.[2] systems classify for

[1] Supra, Chap. II, p. 28

[2] Supra, Chap. II, p. 27

individual forms of outdoor recreation; however, some of the so-called "recreation features" are, for all intents and purposes, landscape features - landscape features are not forms of outdoor recreation. The N.A.C.D.[1] system classifies for individual forms of outdoor recreation as recreation areas or enterprises. Other systems, such as the Reid[2] system, provide an indication of the forms of outdoor recreation but do not provide a specific classification for individual forms of outdoor recreation.

(ii) Measurement of the Potential of an Area to Hold Recreational Activities.

The methodology development is an optimizing process, in that, the simultaneous maximization of all relevant key elements re-inforce one another to provide a high value fulfillment, explicitly shown as a high potential for a particular recreational activity or area. The determination of the potential for recreational activities and areas is based on a previous attempt by the N.A.C.D. system. Other systems do not employ this concept.

(iii) Designation of the Areal Extent of a Corridor Unit.

Specific information is provided on a recreational resource by inventorying criteria applicable to land and water units. The unit boundaries, identified initially by aerial photographs, can be adjusted to suit particular reference points in the field. The corridor units are chosen as relatively homogeneous areas, considering physical and non-physical criteria. The corridor unit can be broken down into

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[1] Supra, Chap. II, p. 25

[2] Supra, Chap. II, p. 18

smaller units termed corridor sub-units, and the methodology will provide even more specific information regarding recreational potentials. Corridor sub-units can ultimately be broken down into recreation sites. The N.A.C.D. system classifies for water units as well as for land units, however, the selection of classified units the size of a county are too large for providing specific information as to the capabilities for forms of outdoor recreation within the county. The Ontario system classifies for land/water units and designates the areal extent of the units. The A.R.D.A. system classifies for land units only; however, the areal extent of the units is loosely delineated.

(iv) Identification of Criteria Which Play a Role in Encouraging Seasonal Water-oriented Recreational Activities.

Quality criteria termed key elements have been selected to provide a precise measurement of the physical and cultural environment. Key elements, in assessing the characteristics of recreational resources, inadvertently provide the basis for recreational activites and areas. Moreso, key elements as quality criteria, bear a direct relationship to the success or failure of recreational activities and areas to persist in a corridor unit. As an example. climatic conditions play an important role in determining the recreational potential of boating, which is very much affected by such factors as chilly winds, length of seasonal use and uncomfortable or hazardous climatic conditions.

Although the methodology assesses both physical and non-physical criteria, for the most-part, explicit physical criteria are sought to keep the final evaluation accurate over a longer period of time. The removal of non-physical criteria from the methodology (fish management and scenery form and materials, in particular) can be considered as

being subject to change over a shorter period of time and can be removed, if desired, from the inventory phase. Deficiencies in relevant physical criteria are prevalent in all systems previously discussed. A decision by planners in the inventory phase can be made as to the relevant quality criteria which best provides the informational requirements for recreational planning.

(v) Reduction of Subjectivity and Bias.

Subjectivity in recording and storing information can be reduced by providing specific and explicit descriptions of the role of individual quality criteria employed in the methodology. Inventory schedules, photographic slides, maps and other tools, are means for systematically recording and storing information. The selection and rating of quality criteria by a group of experts have the advantages of removing personal bias, and increasing the accuracy of the classification. The methodology developed in this study recognizes that only objective considerations of actual field conditions can provide accurate and reliable information. The Reid, Carhart, and U.S. Bureau of Land Management Systems make some specific information available by utilizing inventory schedules; however, the reliability of the information, due to the subjectivity in the classification, is questionable. The Ontario system, on the other hand, provides specific information, selected by a team of experts, by thoroughly detailing the physical description of shoreland units. Taylor and Thomson stated that "judgements will always play an important role in classification, but the more precise limits that can be placed upon the criteria, the less variation due to individual bias there should be in the results."[1]

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[1] Taylor and Thomson, op. cit., p. 22

(vi) Development of Inventory, Analysis, and Evaluation Procedures.

It has been pointed out earlier, that the primary objective of the inventory phase is to collect all pertinent data from a corridor unit. Aerial photographs, topographic maps, inventory schedules, and slides - all these tools aid in effectively and efficiently securing required information. By field observation, it becomes apparent that within a corridor unit there exists a set of values which can be identified and used to estimate its potential for recreational uses. The devised inventory schedule has the following advantages:

(a) the schedule is formulated for all activities and areas.

(b) it is explicit and simple to use.

(c) space is provided for information peculiar to a corridor unit in addition to the inventory items.

(d) it has advantages in cost, availability and handling.

(e) it discourages lengthy narratives.

The value of the inventory schedules has been recognized in particular by the N.F.R.S., N.A.C.D. and Ontario systems.

In the analysis phase all inventoried data is assimilated and verified. Precise and explicit measurement scales are devised, and numerical ratings for key elements are weighted in relation to their significance as factors contributing to the evaluation process. The weighted value is explicit in the form of a multiplier. Upon perusal of the results, it is found that quality criteria which are in accordance with their contribution to a particular activity or area have a direct relationship to activities and areas. For example, the potential for fishing bears a direct relationship to the key element, fish populations;

as such, the rating value for the key element fish population is awarded more weight than the weighting values for other criteria. If fishing scores a high potential, then fish populations are significant. Weightings are awarded for individual key elements in relation to their significance for the forms of outdoor recreational activities and areas.

Rating values for quality criteria are rarely encountered with other systems; the N.A.C.D. system is the exception. More often, the rating process takes the form of poor, fair, and excellent.

In the evaluation phase, the potentials for particular recreational activities and areas are calculated by matrix multiplication processes. The primary advantage in employing this system is removing judgment values as to whether the recreational capabilities of a corridor unit are low, medium or high. It is readily apparent, however, that during the analysis phase some form of subjective judgement is required in arriving at the value weightings. The evaluation process does not require subjective or quasi-subjective judgments. A computer program performs operations automatically, and the potentials printed out are essentially obtained by an averaging process. The utilization of computer techniques in the evaluation phase has been incorporated from the A.R.D.A. system.

(vii) Flexibility in the Classification System.

The inventory, analysis and evaluation phases show that by being explicit and specific in the classified information, flexibility is provided. The Ontario and N.A.C.D. systems are also flexible in their method of classification, but, in general, most systems have limited flexibility.

The devised system is flexible for many reasons. In the analysis

phase, it is necessary to update some information and incorporate new information. In providing for systematic additions and modifications, the system is precise with respect to the method employed in the methodology. The description of the key elements and the measurement scale is explicit, so alterations to quality criteria or to numerical rating values are simple. It is evident, then that by making modifications, the system is current and accurate. As the requirements of users change, new forms of outdoor recreational activities and areas can be implemented, and the system is flexible to keep up with new recreational requirements. The system is not limited as to the quantity of information it can absorb; by utilizing the computer program, more information and more details can be incorporated than with any previous system. The system allows for variations in delineating the size and boundaries of corridor units. Relatively large units can be designated (although the final potentials are relatively meaningless), and small units can be designated. It has already been mentioned that corridor units can be broken down into corridor sub-units and these in turn can be broken down into recreational sites. In all cases, the system works, and the final results can be provided in a form which meets the information requirements for planning decisions at the national, regional, or local level of government. Finally, this system can be applied to any area or region.

(viii) Procedure to Quantify Scenic Criteria.

In selecting quality criteria for forms of recreational activities and areas, it becomes apparent that a better picture of recreational resources is provided when the quantity and quality of scenic resources is considered. For the classification of scenic

resources, criteria which lend themselves to objective measurement at viewing locations are employed. Furthermore, in previous research, it has been shown that view distance, landscape features, and angle of vision are important in contributing to scenic quality, and these items have been incorporated in the system. Other characteristics of a scenic resource including form and materials, have been inventoried as an exercise in objective perception. It is suggested that because the perception of these particular characteristics is variable from person to person, these inventory items are difficult to objectively inventory, and are not considered desirable contributors to the system. To keep the scenic quality comparable, characteristics of views which are variable over short periods of time, such as colour, are omitted.

The scenic quality of an area is measured on an areal basis, and as a view as seen from vantage points in the field. In this way, it is felt that a more appropriate evaluation of the scenic quality peculiar to an urban corridor can be made, as quality considerations between foreshore and backshore areas are more difficult because two different types of landscape are being compared. Few systems attempt to classify scenery.

TABLE 17

THE RECREATIONAL POTENTIAL OF SEINE RIVER (IN PERCENT)

	REACH 1	REACH 2	REACH 3	REACH 4	REACH 5
CAMPING:					
RESIDENT	59	62	63	45	50
TRANSIENT	63	67	74	60	66
FISHING:					
PAN AND POUGH	59	67	64	60	63
GAME	55	58	58	53	55
PICNICKING	58	57	59	40	44
TRAIL SYSTEM:					
HIKING	61	61	56	27	28
HORSEBACK RIDING	62	65	63	56	58
BICYCLING	61	65	65	57	57
DRIVING FOR PLEASURE	67	63	64	44	45
AESTHETIC ENJOYMENT					
SIGHTSEEING	55	48	46	25	30
NATURE INTERPRETATION	58	56	44	20	27
WALKING FOR PLEASURE	58	59	58	55	55
WATER RECREATIONAL ACTIVITIES:					
BOATING	46	50	51	45	56
CANOEING	54	55	55	39	43
SWIMMING	48	46	48	38	41
WINTER RECREATION:					
SNOWSHOEING	63	65	63	45	51
TOBOGGANING	70	73	65	80	60
CROSS-COUNTRY SKIING	64	61	64	45	59
SNOWMOBILING	68	68	72	64	74
SKATING	60	57	59	56	63
AREAS:					
NATURAL	52	56	51	26	29
HISTORIC	68	12	13	13	13
SCENIC	58	55	53	13	24

REACH 1: GREATER WINNIPEG FLOODWAY TO JOHN BRUCE ROAD.

REACH 2: JOHN BRUCE ROAD TO TRANS-CANADA HIGHWAY EAST.

REACH 3: TRANS-CANADA HIGHWAY EAST TO MARION STREET.

REACH 4: MARION STREET TO PROVENCHER STREET.

REACH 5: PROVENCHER STREET TO JUNCTION WITH RED RIVER.

TABLE 17

THE RECREATIONAL POTENTIAL OF ASSINIBOINE RIVER (IN PERCENT)

	REACH 1	REACH 2	REACH 3	REACH 4	REACH 5
CAMPING:					
RESIDENT	68	69	65	65	45
TRANSIENT	77	78	73	72	50
FISHING:					
PAN AND ROUGH	71	68	67	72	65
GAME	71	72	68	71	61
PICNICKING	74	71	70	67	43
TRAIL SYSTEM:					
HIKING	70	61	63	64	42
HORSEBACK RIDING	71	68	64	64	53
BICYCLING	69	66	64	61	53
DRIVING FOR PLEASURE	67	67	66	61	47
AESTHETIC ENJOYMENT					
SIGHTSEEING	49	49	49	46	26
NATURE INTERPRETATION	69	63	64	61	49
WALKING FOR PLEASURE	73	65	69	69	61
WATER RECREATIONAL ACTIVITIES:					
BOATING	69	67	72	73	61
CANOEING	67	65	64	66	50
SWIMMING	69	66	61	63	44
WINTER RECREATION:					
SNOWSHOEING	68	68	64	65	49
TOBOGGANING	83	66	80	80	78
CROSS-COUNTRY SKIING	65	70	65	63	44
SNOWMOBILING	71	75	67	67	50
SKATING	73	73	71	67	49
AREAS:					
NATURAL	65	57	64	63	50
HISTORIC	15	13	13	13	8
SCENIC	65	61	61	56	35

REACH 1: PROVINCIAL HIGHWAY 100 TO ASSINIBOINE PARK

REACH 2: ASSINIBOINE PARK TO MADISON STREET.

REACH 3: MADISON STREET TO MARYLAND STREET.

REACH 4: MARYLAND STREET TO MAIN STREET.

REACH 5: MAIN STREET TO JUNCTION WITH RED RIVER.

TABLE 17

THE RECREATIONAL POTENTIAL OF LA SALLE RIVER (IN PERCENT)

	REACH 1	REACH 2
CAMPING:		
RESIDENT	75	73
TRANSIENT	78	82
FISHING:		
PAN AND ROUGH	79	74
GAME	76	72
PICNICKING	77	74
TRAIL SYSTEM:		
HIKING	74	69
HORSEBACK RIDING	72	76
BICYCLING	71	75
DRIVING FOR PLEASURE	67	65
AESTHETIC ENJOYMENT		
SIGHTSEEING	51	51
NATURE INTERPRETATION	69	69
WALKING FOR PLEASURE	74	78
WATER RECREATIONAL ACTIVITIES:		
BOATING	76	71
CANOEING	76	67
SWIMMING	71	61
WINTER RECREATION:		
SNOWSHOEING	74	71
TOBOGGANING	75	68
CROSS-COUNTRY SKIING	73	69
SNOWMOBILING	75	76
SKATING	74	73
AREAS:		
NATURAL	74	69
HISTORIC	13	23
SCENIC	78	61

REACH 1: LA BARRIERE PARK TO PROVINCIAL HIGHWAY 75.

REACH 2: PROVINCIAL HIGHWAY 75 TO JUNCTION WITH RED RIVER.

TABLE 17

THE RECREATIONAL POTENTIAL OF STURGEON CREEK (IN PERCENT)

	REACH 1	REACH 2	REACH 3
CAMPING:			
RESIDENT	68	65	77
TRANSIENT	73	73	85
FISHING:			
PAN AND ROUGH	75	72	78
GAME	73	71	78
PICNICKING	63	62	75
TRAIL SYSTEM:			
HIKING	56	52	67
HORSEBACK RIDING	63	59	75
BICYCLING	63	59	74
DRIVING FOR PLEASURE	52	51	61
AESTHETIC ENJOYMENT			
SIGHTSEEING	44	42	53
NATURE INTERPRETATION	49	43	64
WALKING FOR PLEASURE	56	55	71
WATER RECREATIONAL ACTIVITIES:			
BOATING	49	54	63
CANOEING	65	61	71
SWIMMING	69	65	72
WINTER RECREATION:			
SNOWSHOEING	56	56	70
TOBOGGANING	73	75	70
CROSS-COUNTRY SKIING	61	59	74
SNOWMOBILING	73	67	82
SKATING	59	57	73
AREAS:			
NATURAL	64	59	73
HISTORIC	32	13	17
SCENIC	52	48	63

REACH 1: PROVINCIAL HIGHWAY 101 TO SASKATCHEWAN AVENUE

REACH 2: SASKATCHEWAN AVENUE TO STURGEON ROAD

REACH 3: STURGEON ROAD TO JUNCTION WITH ASSINIBOINE RIVER

TABLE 17

THE RECREATIONAL POTENTIAL OF RED RIVER (IN PERCENT)

	REACH 1	REACH 2	REACH 3	REACH 4	REACH 5
CAMPING:					
RESIDENT	66	68	49	61	69
TRANSIENT	75	78	64	71	78
FISHING:					
PAN AND ROUGH	80	78	73	75	81
GAME	74	73	65	71	71
PICNICKING	75	72	53	70	73
TRAIL SYSTEM:					
HIKING	72	66	46	66	72
HORSEBACK RIDING	68	73	55	58	67
BICYCLING	67	71	55	57	66
DRIVING FOR PLEASURE	65	62	64	69	66
AESTHETIC ENJOYMENT					
SIGHTSEEING	51	47	49	58	53
NATURE INTERPRETATION	73	64	43	62	63
WALKING FOR PLEASURE	76	81	59	64	69
WATER RECREATIONAL ACTIVITIES:					
BOATING	81	77	67	76	80
CANOEING	71	68	55	66	72
SWIMMING	65	61	47	57	61
WINTER RECREATION:					
SNOWSHOEING	70	69	54	60	68
TOBOGGANING	78	78	85	85	83
CROSS-COUNTRY SKIING	65	70	50	61	66
SNOWMOBILING	68	75	61	62	75
SKATING	74	74	60	66	69
AREAS:					
NATURAL	75	67	51	70	73
HISTORIC	15	15	38	38	15
SCENIC	68	58	45	66	73

REACH 1: PROVINCIAL HIGHWAY 100 TO SPRINGSIDE AVENUE.

REACH 2: SPRINGSIDE AVENUE TO MAIN STREET.

REACH 3: MAIN STREET TO DISRAELI FREEWAY.

REACH 4: DISRAELI FREEWAY TO JOHN BLACK AVENUE.

REACH 5: JOHN BLACK AVENUE TO PROVINCIAL HIGHWAY 101.

TABLE 18

THE RECREATIONAL POTENTIAL OF STURGEON CREEK (IN PERCENT)
WITHOUT DISVALUES

	REACH 1	REACH 2	REACH 3
CAMPING:			
RESIDENT	69	66	77
TRANSIENT	74	74	85
FISHING:			
PAN AND ROUGH	75	72	78
GAME	74	72	78
PICNICKING	65	64	75
TRAIL SYSTEM:			
HIKING	59	56	67
HORSEBACK RIDING	63	60	75
BICYCLING	64	61	74
DRIVING FOR PLEASURE	52	51	61
AESTHETIC ENJOYMENT			
SIGHTSEEING	46	44	53
NATURE INTERPRETATION	51	46	64
WALKING FOR PLEASURE	57	55	71
WATER RECREATIONAL ACTIVITIES:			
BOATING	51	54	63
CANOEING	66	61	71
SWIMMING	71	66	72
WINTER RECREATION:			
SNOWSHOEING	58	58	70
TOBOGGANING	73	75	70
CROSS-COUNTRY SKIING	63	60	74
SNOWMOBILING	73	67	82
SKATING	59	57	73
AREAS:			
NATURAL	66	61	73
HISTORIC	32	13	17
SCENIC	55	51	63

REACH 1: PROVINCIAL HIGHWAY 101 TO SASKATCHEWAN AVENUE

REACH 2: SASKATCHEWAN AVENUE TO STURGEON ROAD

REACH 3: STURGEON ROAD TO JUNCTION WITH ASSINIBOINE RIVER

TABLE 10

THE RECREATIONAL POTENTIAL OF RED RIVER (IN PERCENT)
WITHOUT DISVALUES

	REACH 1	REACH 2	REACH 3	REACH 4	REACH 5
CAMPING:					
RESIDENT	66	69	54	61	69
TRANSIENT	75	78	68	71	78
FISHING:					
PAN AND ROUGH	80	78	76	75	81
GAME	74	74	68	71	71
PICNICKING	75	74	69	70	73
TRAIL SYSTEM:					
HIKING	72	69	59	66	72
HORSEBACK RIDING	68	73	58	58	67
BICYCLING	67	72	58	57	66
DRIVING FOR PLEASURE	65	63	67	69	66
AESTHETIC ENJOYMENT					
SIGHTSEEING	51	49	56	58	53
NATURE INTERPRETATION	73	67	52	62	63
WALKING FOR PLEASURE	76	82	63	64	69
WATER RECREATIONAL ACTIVITIES:					
BOATING	81	79	71	76	80
CANOEING	71	69	59	66	72
SWIMMING	65	63	51	57	61
WINTER RECREATION:					
SNOWSHOEING	70	70	59	60	68
TOBOGGANING	78	78	65	85	83
CROSS-COUNTRY SKIING	65	71	55	61	66
SNOWMOBILING	68	75	61	62	75
SKATING	74	74	60	66	69
AREAS:					
NATURAL	75	70	63	70	73
HISTORIC	15	15	39	38	15
SCENIC	68	61	54	66	73

REACH 1: PROVINCIAL HIGHWAY 101 TO SPRINGSIDE AVENUE.

REACH 2: SPRINGSIDE AVENUE TO MAIN STREET.

REACH 3: MAIN STREET TO DISRAELI FREEWAY.

REACH 4: DISRAELI FREEWAY TO JOHN BLACK AVENUE.

REACH 5: JOHN BLACK AVENUE TO PROVINCIAL HIGHWAY 101.

TABLE 18

THE RECREATIONAL POTENTIAL OF LA SALLE RIVER (IN PERCENT)
WITHOUT DISVALUES

	REACH 1	REACH 2
CAMPING:		
RESIDENT	75	74
TRANSIENT	78	83
FISHING:		
PAN AND ROUGH	79	75
GAME	76	73
PICNICKING	77	75
TRAIL SYSTEM:		
HIKING	74	72
HORSEBACK RIDING	72	77
BICYCLING	71	76
DRIVING FOR PLEASURE	67	67
AESTHETIC ENJOYMENT		
SIGHTSEEING	51	54
NATURE INTERPRETATION	69	71
WALKING FOR PLEASURE	74	79
WATER RECREATIONAL ACTIVITIES:		
BOATING	76	73
CANOEING	76	68
SWIMMING	71	63
WINTER RECREATION:		
SNOWSHOEING	74	73
TOBOGGANING	75	68
CROSS-COUNTRY SKIING	73	74
SNOWMOBILING	75	76
SKATING	74	73
AREAS:		
NATURAL	74	72
HISTORIC	13	23
SCENIC	78	64

REACH 1: LA PRAIRIE PARK TO PROVINCIAL HIGHWAY 75.

REACH 2: PROVINCIAL HIGHWAY 75 TO JUNCTION WITH RED RIVER.

TABLE 18

THE RECREATIONAL POTENTIAL OF ASSINIBOINE RIVER (IN PERCENT)
WITHOUT DISVALUES

	REACH 1	REACH 2	REACH 3	REACH 4	REACH 5
CAMPING:					
RESIDENT	69	71	66	67	50
TRANSIENT	78	79	73	73	53
FISHING:					
PAN AND ROUGH	72	70	68	73	68
GAME	72	73	68	72	64
PICNICKING	75	75	72	69	50
TRAIL SYSTEM:					
HIKING	72	68	67	68	56
HORSEBACK RIDING	72	70	65	65	57
BICYCLING	70	67	65	62	56
DRIVING FOR PLEASURE	67	69	67	62	51
AESTHETIC ENJOYMENT					
SIGHTSEEING	51	51	51	48	35
NATURE INTERPRETATION	71	68	67	63	58
WALKING FOR PLEASURE	74	67	70	70	65
WATER RECREATIONAL ACTIVITIES:					
BOATING	69	69	74	74	65
CANOEING	68	66	65	67	55
SWIMMING	70	67	62	64	49
WINTER RECREATION:					
SNOWSHOEING	69	70	65	66	54
TOBOGGANING	83	65	80	80	78
CROSS-COUNTRY SKIING	66	73	66	64	49
SNOWMOBILING	71	75	67	67	50
SKATING	73	73	71	67	49
AREAS:					
NATURAL	68	63	67	66	61
HISTORIC	15	13	13	13	8
SCENIC	68	64	64	59	47

REACH 1: PROVINCIAL HIGHWAY 100 TO ASSINIBOINE PARK

REACH 2: ASSINIBOINE PARK TO MADISON STREET.

REACH 3: MADISON STREET TO MARYLAND STREET.

REACH 4: MARYLAND STREET TO MAIN STREET.

REACH 5: MAIN STREET TO JUNCTION WITH RED RIVER.

TABLE 18

THE RECREATIONAL POTENTIAL OF SEINE RIVER (IN PERCENT)
WITHOUT DISVALUES

	REACH 1	REACH 2	REACH 3	REACH 4	REACH 5
CAMPING:					
RESIDENT	61	65	66	57	59
TRANSIENT	65	68	76	68	72
FISHING:					
PAN AND ROUGH	61	68	65	67	68
GAME	57	60	59	60	61
PICNICKING	62	61	63	56	56
TRAIL SYSTEM:					
HIKING	68	68	62	57	51
HORSEBACK RIDING	65	67	65	63	63
BICYCLING	63	67	66	65	63
DRIVING FOR PLEASURE	69	65	65	56	52
AESTHETIC ENJOYMENT					
SIGHTSEEING	58	52	51	44	43
NATURE INTERPRETATION	62	60	49	40	42
WALKING FOR PLEASURE	60	61	60	64	62
WATER RECREATIONAL ACTIVITIES:					
BOATING	49	51	54	59	65
CANOEING	57	58	57	51	51
SWIMMING	51	49	51	51	49
WINTER RECREATION:					
SNOWSHOEING	65	68	65	56	60
TOBOGGANING	70	73	65	80	60
CROSS-COUNTRY SKIING	66	64	66	56	68
SNOWMOBILING	68	68	72	64	74
SKATING	60	57	59	56	63
AREAS:					
NATURAL	58	61	56	52	49
HISTORIC	68	12	13	13	13
SCENIC	64	61	59	40	42

REACH 1: GREATER WINNIPEG FLOODWAY TO JOHN BRUCE ROAD.

REACH 2: JOHN BRUCE ROAD TO TRANS-CANADA HIGHWAY EAST.

REACH 3: TRANS-CANADA HIGHWAY EAST TO MARION STREET.

REACH 4: MARION STREET TO PROVENCHER STREET.

REACH 5: PROVENCHER STREET TO JUNCTION WITH RED RIVER.

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CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

(A) SUMMARY

(1) Scope.

Present trends show that by the year 2000, nearly 85 per cent of the North American population will be concentrated in urban areas. The combined effect of increases in population growth, leisure time, personal income, and population mobility has created an ever growing pressure on existing outdoor recreation facilities. Nowhere are the requirements for more recreational facilities more acute than in metropolitan areas. In the U.S., 5 acres of land a minute are converted into concrete or asphalt; unfortunately, much of this inchoate growth is opportunistic and poorly planned. The need for open space and the provision of opportunities for outdoor recreational enjoyment is imperative. Open space resources that have often been neglected by urban planners are urban corridors. Waterways and land adjacent to waterways are important elements in open space design. The fate of most urban corridors, as they have been ecompassed by a growing city, has been a gradual conversion into a combination sewer, a dumping ground, and a general eyesore. However, some foresight in urban planning have included the "green belt" originated by Ebenezer Howard[1] and exemplified by Cleveland's "emerald necklace" and the "greenwedge" as described by

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[1] Gruen, Victor: The Heart of Our Cities. New York: Simon and Schuster, 1964, pp. 272-273.

Tankel[1]. An example of the latter urban design is Toronto's open space plan, based on a series of stream valleys and parkways that penetrate the urban area.

(2) Purpose.

The primary purpose of this study is to develop a methodology for evaluating the recreational potential of urban corridors. In order to propose a methodology, an investigation of related research is undertaken in order to seek out a set of desirable characteristics which are incorporated in the devised system.

(3) Methodology.

(a) Inventory Phase.

The objective of the inventory phase is to collect all relevant data and information on selected study areas. The methodology emphasizes the use of all available information sources including: maps, air photo interpretation, inventory schedules, photographs, and technical and non-technical literature. The procedure is developed and tested through case studies on five urban corridors, which are divided into homogeneous reaches called corridor units. Features inventoried in corridor units are grouped under two broad categories as natural and cultural process values. The natural process values include climate, hydrology, physiography, geology, vegetation, and wildlife, flora and fauna.

This inventoried data is based on the premise that in an urban

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[1] Tankel, Stanley B.: "The Importance of Open Space in the Urban Pattern". Cities and Space, the Future Use of Urban Land. Ed. London Wingo, Jr. Baltimore: John Hopkins Press, 1963, pp. 57-71.

corridor, the existence of naturalistic conditions is equivalent to high outdoor recreational potential.

Cultural process values include water quality and quantity, historical values, land use, accessibility, demographic and socio-economic factors, and disvalues. These criteria determine the effects of man's past and present occupancy on an urban corridor, and the extent to which he has enhanced, preserved or damaged the quality of the corridor, in the light of social change and urban growth.

Quality criteria called key elements are devised as the determinants for twenty recreational activities and three recreational areas. In the field, inventory schedules explicitly describe the data to be collected, referred to as key element inventory items. Values ratings are assigned by a group of experts to inventory items as being representative of a quantitative result or a qualitative judgement.

(b) Analysis Phase.

In the second phase of the methodology, the inventoried data is verified and, if necessary, modified. Key element multipliers are assigned to key elements and represent the relative importance of each key element to a given activity or area. To express the significance of the key element inventory items for a particular recreational activity or area, weights are assigned to the quality criteria from a scale of measurement which reduces subjective judgment.

(c) Evaluation Phase.

The evaluation of the relative potential of outdoor recreational activities and areas is computed in three steps. The first step consists of multiplying a row vector composed of value ratings determined for the key element inventory items for recreational activities

and areas, by a column vector containing assigned weights for the key element inventory items. After the matrix multiplication, the Key Element Rating is divided by ten and the quotient is rounded off to the nearest whole number. After each of the Key Element Ratings is calculated, the Score is computed by multiplying a row vector of Key Element Ratings by the corresponding column of Element Multipliers. Finally, the Potential expressed as a percentage as determined by dividing the Score by the Highest Possible Score. The relative degrees of Potentials are grouped under five categories running from low to very high potential.

(4) Results.

In general, the potential scores obtained from the methodology are in ranged expected. It is found that the scores for transient camping, fishing, picknicking, winter recreation, the development of trail systems and some forms of aesthetic enjoyment show high ratings in many corridor units. Disvalues and a lower quality natural environment tend to reduce the recreational potential in a few corridor units. The preservation and delineation of historic areas has been neglected. From a perusal of the results, it is suggested that the methodology provides a systematic approach for evaluating the recreational potential of urban corridors.

(B) CONCLUSIONS

The following conclusions are reached as a result of this study:

(1) When outdoor recreational resources are facing pressures of supply and demand, urban corridors can offer relief to existing recreational resources and can provide new sources for outdoor recreational activities and areas.

(2) In developing a system which will evaluate the recreational potential of urban corridors, there is a set of desirable characteristics which can be incorporated as the basis for the methodology.

(3) There are quality criteria within the boundaries of a relatively homogeneous corridor unit which can be identified and objectively rated to evaluate the potential of a corridor unit for a set of outdoor recreational activities and areas.

(4) Maps, aerial photographs, colour photographs, inventory schedules, and technical and non-technical reports are useful tools in the execution of field investigations.

(5) Many corridor units possess high potential for camping, fishing, picknicking, the development of trail systems, and some forms of aesthetic enjoyment.

(6) A system has been proposed which is cognizant of the informational requirements for the outdoor recreational planning of urban corridors.

(7) Urban corridors all contain irreplacable natural, scenic, and historical values which should be protected and preserved.

(C) RECOMMENDATIONS FOR FURTHER RESEARCH

(1) Perform additional tests of the methodology and apply it to (1) corridor sub-units, (2) recreation sites and (3) all of the above in other urban centres.

(2) Devise a preference survey or study which will be useful in justifying the preservation of urban corridors. It is equally important to find out whether the public desires to have urban corridors developed as recreational resources.

(3) Collect and analyze visitation, participation and economic

benefit data to develop predictive methods for planning urban recreation areas.

(4) As a result of the growing demand for water-based recreation, many political, social and legal problems have arisen. An investigation studying special problems of recreation in urban corridors should be undertaken to find answers to the following questions: (i) Can a license be securred to divert or use water which decreases the aesthetic and recreational potential of an urban corridor? (ii) What government agency should have jurisdiction over an urban corridor? (iii) What rights should the public have to the use of an urban corridor where the banks are in private ownership? (iv) What public controls should be enforced over riverbank acquisition, development and despoliation? (v) Do federal and provincial statutes serve to protect urban corridors, and are they clear-cut, current and effective? (vi) Can the public participate in planning and policy formulation processes involving urban corridors?

(5) It is recommended that the City of Winnipeg augment its efforts to acquire urban corridors which possess high potential for recreation by land banking and by establishing a regional Land Bank Commission.

(6) It is recommended that all rivers and creeks be classified primarily as recreational, natural, scenic, or other use (specify). Secondary uses can also be designated.

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APPENDIX A

UNITED STATES NATIONAL FORESTS RECREATION SURVEY FIELD INVENTORY SCHEDULES

RATING SCHEDULE FOR OCCUPANCY AND OBSERVATION DEVELOPMENT SITES [1]

Rating Procedure For Quality Criteria

A. ATTRACTION (Accessible to and within reasonable distance of) :

Ocean, bay, lake or reservoir (10 acres or larger).....1

River or other major stream.....2

Small live stream.....3

Pond or pool less than 10 acres..4

Intermittent stream or spring (flows ½ season or more).....5

Not accessible to or within reasonable distance of above.....6

Unusual scenery or other recreation feature outstanding.....1

Park, grove, or meadow.....2

Scenery or other recreation feature locally common.....3

Not accessible to or within reasonable distance of above.....4

Rated single scale ____ Rated combined scale ____

B. CLIMATIC RELIEF (Average temperature differential during use season) :

More than 15 degrees F.....1
11 degrees - 15 degrees F.....2
6 degrees - 10 degrees F.....3
0 degrees - 5 degrees F.....4
Negative.....5

C. FOREST ENVIRONMENT :

Excellent, practically without environmental detractions.....1
Well preserved, not more than minor detractions.....2
Not outstanding. Detractions substantial but acceptable.....3
Detractions serious, but suitable for some form of recreation.....4
Unacceptable for recreation. Correction feasible.....5
Unacceptable or unsafe (e.g. floods, slides). Correction not feasible..6

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[1] Taken from - U.S. Forest Service, Work Plan For The National Forest Recreation Survey - A Review of the Outdoor Recreation Resources of the National Forests, Division of Recreation, Forest Service, Department of Agriculture (August, 1959), Form 17.

D. TERRAIN :

Regular	-	Slopes 0 to 10% 1
Rolling	-	Slopes 10 to 20% 2
Irregular	-	Slopes 20 to 30% 3
Abrupt	-	Slopes over 30% 4

E. SOIL :

	Good	Fair	Poor	Score	
Fertility -	3	2	1	11-12	1
Stability -	3	2	1	9-10	2
Depth -	3	2	1	7-8	3
Permeability -	3	2	1	4-6	4
Damp, poorly drained, bog or swamp					5

F. SHADE OR SHELTER :

High shade - 50-100% = 1, 25-50% = 3, 10-25% = 5
Low shade - 50-100% = 2, 25-50% = 4, 10-25% = 6
High and low shade less than 10% = 7

OR: Direct shelter rating ( ) : Constructed rating ( )

G. COVER (Compositon and Density) :

	Composition	Density	Score	
Excellent	1	1	2-3	1
Good	2	2	4-6	2
Fair	3	3	5-6	3
Score above 6, but correction feasible at moderate cost				4
Unsatisfactory	5	5	7-10	5

H. DOMESTIC WATER :

Adequate supply can be developed at a low cost 1
Adequate supply can be developed at a moderate cost 2
Adequate supply can be developed at a high cost 3
Not feasible to develop adequate supply 4

RATING SCHEDULE FOR WATERFRONT DEVELOPMENT SITES[1]

Rating Procedure For Quality Criteria

A. WATER TEMPERATURE (Average during use season) :

73 degrees F plus 1	60 degrees - 67 degrees F 3
68 degrees - 73 degrees F 2	Less than 60 degrees F 4

B. SHORELINE OR FLOW FLUCTUATION (During recreation season) :

Little or none 1	*Major - detracts less than ½ season ...3
Moderate or immaterial ...2	*Major - detracts more than ½ season ...4

(*May include small but hazardous fluctuations where streamflow is regulated by hydroelectric developments.)

C. SHORELINE - First 50 feet above water :

Sand	1
Gravel	2
Timbered	3
Soil-mud	4
Rock	5

D. BOTTOM - Below waterline to 5 foot depth :

	Swimming	Boating
Sand	1	1
Gravel	2	2
Rock	3	5
Mud	4	4
Vegetation	5	3

E. DISTANCE - Shoreline to 5 foot depth :

	Swimming	Boating
Average 100 feet or more	1	4
50 feet - 100 feet	2	3
25 feet - 50 feet	3	2
0 feet - 25 feet	4	1

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[1] Ibid., Form 18.

F. INDUSTRIAL OR DOMESTIC POLLUTION :

Uncontaminated 1	Light Pollution 3
Contaminated 2	Heavy Pollution 4

G. COLOUR AND TURBIDITY :

Clear	- Objects distinguishable 24 inches below surface 1
Cloudy to Murky	- Objects recognized more than 8 inches, but less than 24 inches below surface 2
Muddy	- Objects unrecognizable when covered with 8 inches of water 3

H. WIND VELOCITY AND CONSTANCY :

Favourable full season 1
Favourable more than ½ season 2
Unfavourable more than ½ season 3
Unfavourable full season 4

I. CLASSIFICATION OF WATER :

National Forest 1	Other Public 3
Navigable 2	Private 4

RATING SCHEDULE FOR WILDERNESS, WILD AND ROADLESS AREAS[1]

Rating Procedure For Quality Criteria

1. (a) The environment is natural, and/or inspirational, unique, spectacular, highly scenic (of exceptional beauty, physiography or vegetative cover) 5

(b) The environment is natural, but not unique nor highly scenic, though small portions may be so 3

(c) The environment is natural, but somewhat monotonous as compared to (a) and (b) 2

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2. (a) The area provides physical opportunities for unusual adventure, excitement, challenges, self-reliance 6

(b) The area provides some opportunity for adventure, excitement, challenges, self-reliance 3

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3. (a) Potential wilderness camp sites for back packers, trail riders or boat voyagers are numerous and well distributed throughout the area 3

(b) Potential wilderness camp sites are rather limited and/or concentrated along a few streams, lakes or main trails 2

(c) Potential wilderness camp sites are both limited in number, poorly dispersed and one or more requirements of a good camp site are in short supply 1

---

4. (a) The area contains numerous and well dispersed fishing waters that rate good to excellent, as rated on the Fishing Waters evaluation form 3

(b) The area is moderately well supplied in number and distribution with good fishing waters 2

(c) Fishing waters are limited and not a major wilderness attraction 1

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[1] Ibid., Form 20.

B. VERTICAL RISE OF SLOPES :

3000 feet or more 1
2500-3000 feet 2
2000-2500 feet 3
1500-2000 feet 4
1000-1500 feet 5
500-1000 feet 6
300-500 feet 7
Less than 300 feet 8

C. STEEPNESS OF SLOPE :

(Novice = 10-20%; Intermediate = 20-30%; Advanced = over 35%)
(Guideline : On an optimum winter sports site, about 15% of slopes would be Novice, 50% Intermediate and 35% Advanced.)

40% to 60% of usable slope area is intermediate with adequate novice and advanced slopes 1
Majority of usable slope are intermediate, but with adequate novice slopes and some advanced slopes 2
Majority of usable slopes are intermediate, with adquate novice slopes and no advanced slopes 3
Most of usable slopes are novice 4
Most of usable slopes are advanced 5

D. ASPECT OF SLOPES :

General aspect of slopes is north 1
General aspect of slopes is east or west 2
General aspect of slopes is south 3

E. WIND CONDITIONS :

Very slight winds 1
Occasional winds causing drifting 2
Occasional high winds 3
Frequent high winds 4

F. TEMPERATURES :

Day temperature above (generally) 0 degrees F 1
Day temperature above 0 degrees F. on majority of days 2
Day temperature below 0 degrees F. on majority of days 3

G. AVALANCHE POSSIBILITIES :

No avalanche problems 1
Occasional avalanche possibilities but little hazard to life or property 2
Frequent avalanche possibilities but life and property are safe with planned avalanche control 3
With intensive avalanche control site is safe and satisfactory for use for a majority of the use season 4
Site unsafe or unsatisfactory for use due to avalanches at least one-half of the season even with intensive avalanche control 5

H. SLOPE PROTECTION :

Adequate protection for all slopes 1
Adequate protection for most slopes 2
Inadequate protection for most slopes 3
Inadequate protection for all slopes 4

I. COST OF SLOPE CLEARING :

Slope clearing costs low 1
Slope clearing costs moderate 2
Slope clearing costs high 3

J. GROUND SURFACE CONDITIONS :

No surface work needed 1
Some surface work needed 2
Moderate surface work needed 3
Heavy surface work needed 4

K. AVAILABILITY OF ELECTRIC POWER :

Commercial electric power at site 1
Commercial electric power available at moderate cost 2
Commercial electric power available at high cost 3
Commercial electric power not available 4

L. PARKING DEVELOPMENT COSTS :

Parking development costs low 1
Parking development costs moderate 2
Parking development costs high 3

M. CONVENIENCE OF PARKING LOCATION :

Parking on-site and within easy walking distance to slopes and facilities 1
Parking on-site but at some distance from facilities 2
Parking off-site and requiring long walk or other means of transportation to reach facilities 3

N. APPURTENANT SERVICE DEVELOPMENT POSSIBILITIES :

Adequate room and easy development chance for shelters, sanitation, water, etc. 1
Moderate amount of room and moderate development chance for appurtenant service facilities 2
Little room and difficult chance for appurtenant facilities 3

O. YEARLONG OR SEASONAL RECREATION :

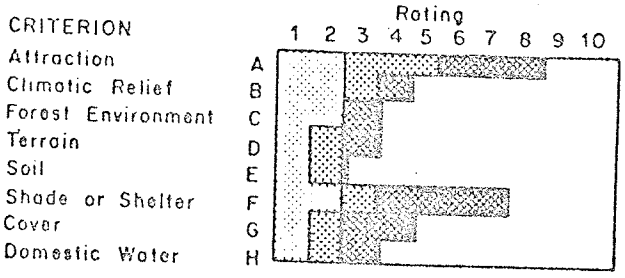
Site has as much or more summer recreation potential as winter 1
Site offers some summer recreation potential 2
Site offers no summer recreation potential 3

P. DAMAGE TO AESTHETIC VIEW :

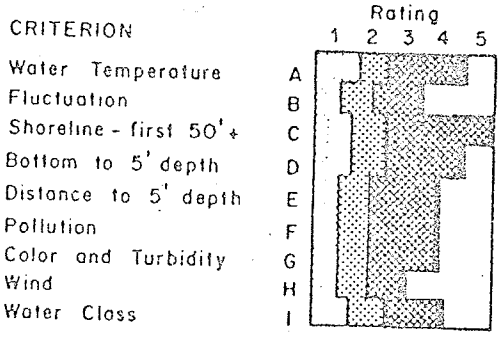
Slope clearing and developments will not mar the landscape or will not be seen from main routes of travel or centers of population 1
Slope clearing and developments will not seriously mar the landscape or will not be readily seen from main routes of travel or centers of population 2
Slope clearing and developments will seriously mar the landscape and will be readily seen from main routes of travel or centers of population 3

N.F.R.S. GRAPHIC FRAME OF REFERENCE FOR THE FINAL CLASSIFICATION OF DEVELOPMENT SITES

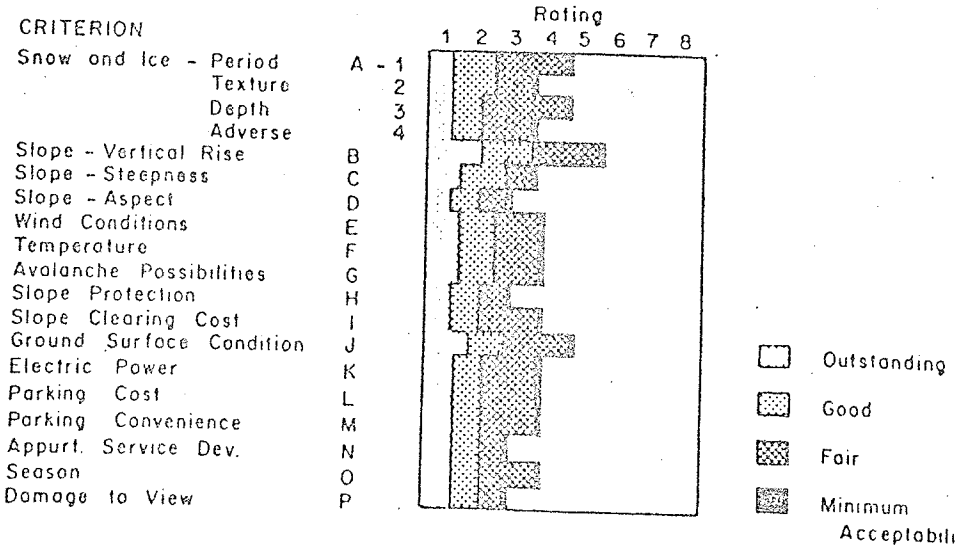
OCCUPANCY AND OBSERVATION DEVELOPMENT



WATERFRONT DEVELOPMENT SITES (BOATING SITE)



WINTER SPORTS DEVELOPMENT SITES (SKIING)



Source U S Forest Service, Work Plan For the National Forest Recreation Survey - A Review of the Outdoor Recreation Resources of the National Forests, Division of Recreation, Forest Service, Department of Agriculture (August, 1959), pp. 106 - 108.

RATING SCHEDULE FOR WILDERNESS, WILD AND ROADLESS AREAS[1]

Rating Procedure For Quality Criteria

1. (a) The environment is natural, and/or inspirational, unique, spectacular, highly scenic (of exceptional beauty, physiography or vegetative cover) 5

(b) The environment is natural, but not unique nor highly scenic, though small portions may be so 3

(c) The environment is natural, but somewhat monotonous as compared to (a) and (b) 2

---

2. (a) The area provides physical opportunities for unusual adventure, excitement, challenges, self-reliance 6

(b) The area provides some opportunity for adventure, excitement, challenges, self-reliance 3

---

3. (a) Potential wilderness camp sites for back packers, trail riders or boat voyagers are numerous and well distributed throughout the area 3

(b) Potential wilderness camp sites are rather limited and/or concentrated along a few streams, lakes or main trails 2

(c) Potential wilderness camp sites are both limited in number, poorly dispersed and one or more requirements of a good camp site are in short supply 1

---

4. (a) The area contains numerous and well dispersed fishing waters that rate good to excellent, as rated on the Fishing Waters evaluation form 3

(b) The area is moderately well supplied in number and distribution with good fishing waters 2

(c) Fishing waters are limited and not a major wilderness attraction 1

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[1] Ibid., Form 20.

5. (a) Wildlife populations including game species, rodents, song birds, reptiles are varied and/or one or more species abundant 3

(b) Wildlife populations are not particularly abundant and varied 2

(c) Wildlife forms are scarce and/or not readily seen and enjoyed 1

---

6. (a) The wilderness area provides excellent hunting as rated on the Hunting Habitat evaluation form 3

(b) Provides good hunting 2

(c) Provides fair hunting 1

---

7. (a) The resources and incentives for informal outdoor education and for both formal and informal scientific study are unusual 3

(b) The resources and incentives for informal outdoor education and for both formal and informal scientific study are good but not unusual 2

---

8. (a) The range of various outdoor activities and opportunities is great - for example (mountain climbing, ski touring, canoeing, varied fishing and hunting, boating, river rafting, back packing, horse packing, hiking, photography, etc.) 3

(b) The range of outdoor activities is limited primarily to wilderness travel and camping accompanied by a few other activities 2

---

9. (a) The wilderness environment is such that users can experience a wide range of intangible values - feeling of solitude, inspiration, elation, sense of wonder, sense of freedom, beauty, spirit-of-adventure and excitement, refreshment, spiritual awareness, serenity, self-reliance. (Intangible values arise from man's interaction with an outdoor (wilderness) environment and as such vary with the individuals and with the environment. Some environments contribute to more of these values and to a greater degree than do others.) 5

(b) The range and degree of intangible values that may be experienced is influenced by limited opportunities and limited wilderness resources 3

10. (a) The area is ecologically stable and can absorb considerable human and other use without abuse 2

(b) The area is all or in large part ecologically fragile and cannot withstand considerable use without rapid deterioration..1

---

11. (a) The area provides climatic changes and conditions that are not in abundant supply throughout the country or region 2

(b) The area does not provide climatic changes and conditions that are relatively scarce 1

---

12. (a) The area is free of present or potential land-use conflicts that are or may be deleterious to wilderness-type use and recreation. These include poorly managed private holdings, Federal Power Commission and Reclamation withdrawals, large expanses of high quality timber on productive sites 3

(b) The area is relatively free of land-use conflicts - perhaps one or two small private holdings 2

(c) One or more serious conflicts of the above type exist 1

---

13. (a) Management practices are such that wilderness area values are not impaired 5

(b) Management practices are such that some activities or conditions are deleterious and/or not in the best interest of wilderness recreation. (Example - excessive livestock grazing, over-population of big game, excessive and/or road-like trails.).....2

---

14. (a) The size of the area is much larger than the minimum acreage required by definition for the wilderness-type area being considered 3

(b) The size of the area ranges between the minimum for the wilderness-type area being considered and approximately five times this size 2

(c) The area barely meets the minimum size requirements 1

Final Classification - Minimum Outstanding 38
Minimum Good 28
Minimum Fair 21

RATING SCHEDULE FOR VIRGIN AREAS[1]

Rating Procedure For Quality Criteria

1. The area provides opportunities for the enjoyment of recreational activities related to outdoor education, scientific hobbies, natural history studies and observation, plant and wildlife photography 5

---

2. The area is a forest vegetative type not hitherto represented or at least not well represented in such scientific and protective categories as natural areas or nature sanctuaries and thus provides rather unique study possibilities 5

---

3. The area has special scientific study values in that it is a good and representative example of a particular forest vegetative type or types 3

---

4. (a) The area shows no man-made disturbances of the vegetation and reflects little influence of man and his activities 2

   (b) The area has virtually no man-made disturbances of the vegetation but some influence of man and his activities are evident 1

Highest possible rating - 15

Final Classification - Minimum Outstanding 13
Minimum Good 10
Minimum Fair 7

[1] Ibid., Form 21.

RATING SCHEDULE FOR SCENIC AREAS[1]

Rating Procedure For Quality Criteria

1. The area has most of the following components - physiography and earth contours; geological, rock and soil formations; trees and other vegetation; water; sky, skyline and clouds in various combinations and variously affected by the elements.

   (a) The components and combinations are striking 5

   (b) The components and combinations demand notice 3

---

2. The area has the visual or perceptual aspects listed above in such arrangement and combinations that a pleasurable feeling is induced in the observer. This feeling of pleasure or aesthetic appreciation is :

   (a) Strong, unique, exhilarating, and remains vivid in memory.....5

   (b) Moderate but still unusual 3

   (c) Apparent but not unusual 1

Highest possible rating - 10

Final Classification - Minimum Outstanding 8
Minimum Good 6
Minimum Fair 4

[1] Ibid., Form 22.

RATING SCHEDULE FOR HISTORICAL AREAS[1]

Rating Procedure For Quality Criteria

1. (a) The area contains exceptional or very significant sites, structures or landmarks exemplifying cultural, military, political, economic or social history that provide insight into our American Heritage, or commemorate an important historical event. 5

   (b) The area contains sites, structures or landmarks exemplifying or commemorating historical places and events. 2

---

2. (a) The structures or sites are associated with the lives of outstanding or important personages. 3

   (b) The structures or sites are associated with the lives of interesting or colourful personages or events. 1

---

3. (a) The area contains structures representative of a period or movement, or structures that exemplify an unusual or lost skill or art. 3

   (b) The area contains no such structures. 0

---

4. (a) No doubts exist as to the authenticity of the area, sites or structures. 5

   (b) Some doubt exists as to the authenticity of the area, sites or structures. 2

Highest possible rating - 16

Final Classification - Minimum Outstanding 14
Minimum Good 11
Minimum Fair 5

[1] Ibid., Form 25.

RATING SCHEDULE FOR HUNTING HABITATS[1]

Rating Procedure For Quality Criteria

1. (a) Supports high game populations of one or more species, and moderate to low populations of a number of other species. 6

   (b) Supports a high to moderate game population of at least one species; or moderate population densities of a varied number of species. 4

   (c) Supports moderate to low game populations of one or more species. 2

   (d) Game is scarce. 1

2A. (a) Provides either high hunter success per visit or satisfaction. If satisfaction, rate 2B. Do not rate both. 4

   (b) Provides good hunter success or good expectation of success....3

   (c) Provides fair hunter success or reasonable expectation of success. 2

   (d) Provides poor hunter success. 1

2B. (a) Provides high hunter satisfaction per visit. 4

   (b) Provides good hunter satisfaction per visit. 3

   (c) Provides fair hunter satisfaction per visit. 2

   (d) Provides poor hunter satisfaction per visit. 1

---

3. (a) The environment is spectacular, stimulating, challenging or unusual. 4

   (b) The environment is pleasing, interesting, and scenic. 3

   (c) The environment is not as above but either drab, ordinary, uninteresting or quite artificial. 2

---

[1] Ibid., Form 26.

4. (a) Accessibility to the hunting area or areas by road, trail, or afoot is fitting or appropriate to the activity. 3

(b) Accessibility is inadequate. 2

(c) Accessibility is excessive. 1

---

5. (a) The area is large enough to accomodate considerable use - comparable in size to a State hunting district, unit, county, and large waterfowl concentration. 4

(b) The area is intermediate in size between (a) and (c). 3

(c) The hunting area is small - locales such as wooded butte, stream bottom, marsh, etc. 2

---

6. (a) With present use crowded hunting conditions and hunter conflict do not exist. 2

(b) Crowded hunting conditions and hunter conflict exist in some parts of the area (close to roads and trails). 1

(c) Crowding and conflict are general throughout the area. 0

---

7. (a) Information is scientifically and periodically gathered and used for management purposes. Such information includes data on game populations and trends, hunter harvest, hunter success, weights and general condition of game, condition and trend of habitat or range. 3

(b) Some game management information is gathered, but not regularly or systematically. 2

(c) Game management information is not gathered. 1

(d) Game management information is gathered but not applied. 1

---

8. (a) Habitat requirements of food, water, cover, space, etc., for the game species considered are near optimum with no indicators of a depletion trend. 5

(b) The habitat is in good condition but there are indicators of depletion trend in some requirements. 3

(c) The habitat is in poor condition and the trend is very definitely downward. The limiting factors for different species can be altered through management practices. 1

(d) The habitat is poor; the trend is not downward but factors that limit populations are not readily altered by management. 1

---

9. (a) The terrain, vegetative cover and other barriers to unmechanized travel are not formidable or forbidding. (Extensive thickets, windfall, thorny vegetation, deserts, unfordable streams). 3

(b) Some parts present formidable obstacles to travel (rimrock, box canyons, extensive thickets, windfall, thorny vegetation, deserts, bogs, unfordable streams, numerous lakes and ponds). 2

(c) Most of the area presents formidable obstacles to travel. 1

---

10. (a) Seasons are favourable, being well-timed and sufficiently long as to provide reasonable choices of hunting days or weekends and to provide adequate harvest. 2

(b) Seasons are not favourable. 1

---

11. (a) The climate during the season of use is favourable - not so extreme as to produce major discomfort or to interfere with proper care of game. 2

(b) Climate is unfavourable. 1

Highest possible rating - 38

Final Classification - Minimum Outstanding 32
Minimum Good 24
Minimum Fair 16
Unsatisfactory ..... Below 16

RATING SCHEDULE FOR FISHING WATERS[1]

Rating Procedure For Quality Criteria

1. (a) Supports high fish populations in good condition of one or more species of the better warm water or cold water game fish; or a moderate population of an unusual and sporting fish such as the steelhead. 5

   (b) Supports moderate fish populations of one or more better game species or; a high population of fish generally considered as less desirable game species. 4

   (c) Supports low populations of game species or high to moderate populations of less desirable species. 1

   (d) Supports low fish populations of all kinds. 0

---

2. (a) The environment (including both water and land) is spectacular, inspirational, unique, highly scenic. 5

   (b) The environment is either pleasing, stimulating, scenic, interesting, relaxing; and not obviously artificial. 2

   (c) The environment is not as above but either drab, uninteresting, or quite artificial. 1

---

3. (a) The fishing water is large enough to accomodate considerable use and can withstand fishing pressure. (River, large stream, or good sized lake). 5

   (b) The fishing waters are small (small creek, brook, pond, small lake) and/or cannot withstand much fishing pressure due to lack of cover, short growing season, shallow waters, etc. 2

---

4. (a) The water is clean with no pollution or siltation. 4

   (b) There is no industrial pollution, little or no domestic pollution, but water may at times be turbid or muddy. 3

   (c) There is silting or excessive organic decomposition and/or some domestic or industrial pollution. 1

---

[1] Ibid., Form 27.

5. (a) The water and watershed reflect good land and fish-water management so that there is little or no man-made or natural drawdown, flooding or turbidity during the main season of use. Included here are power surges and power and irrigation fluctuations. 3

(b) The water and watersheds are not managed for optimum fishing conditions - the stream or lake environment being subject to both natural and man-made flooding, drawdown, turbidity, most of which occurs during the season of least use. 1

(c) The conditions in (b) occur during season of heaviest use. 0

---

6. (a) There are few if any recreation uses that conflict with fishing. 3

(b) Use of motorboats and water skiing conflict with fishing but are regulated. 1

(c) Excessive and unregulated use of motorboats and water skiing conflict with fishing. 0

---

7. (a) Seasons for waters being evaluated are long and favourable. Fishing is year-round or near-year-round by virtue of a combination of seasons (for example, trout in warm weather, whitefish continuing through winter) or due to no need for a closed season (for example, bass and bluegills in warm water lakes). 3

(b) The open season is fitting and moderately long. 2

(c) Seasons are short and/or unfavourable in that they do not reflect up-to-date management practices. 1

---

8. (a) The waters provide high fisherman success per visit as indicated by creel counts, fish taken per unit of time, pounds of fish, etc., or excellent expectation of success. 3

(b) Waters provide good fishing success or good expectation of success. 2

(c) Waters provide fair fishing success or reasonable expectation of success. 1

---

9. (a) Accessibility to fishing waters by road, trail or afoot is fitting or appropriate. 3

(b) Accessibility is inadequate, as for example, lack of boat ramps or access roads and parking areas at large reservoirs. 1

(c) Accessibility is excessive such as a highway or road along both sides of a stream, a road completely around and close to the edge of a lake. 1

(d) If accessibility along a river or big lake is both (b) and (c). 1

---

10. (a) The existing use is such that crowded fishing conditions do not exist and there is opportunity to get off by oneself. ...3

(b) Fishing is crowded at certain times or places. 2

(c) Crowded fishing conditions and conflict between fishermen exist. 1

---

11. (a) Information is scientifically and periodically gathered for management purposes. Such information includes data on fish reproduction and survival, growth rates, results of creel censuses, and percent of harvesting. 3

(b) Some fish management information is gathered but not regularly or systematically. 2

(c) Fish management information is not gathered. 1

---

12. (a) Natural propogation maintains the fish population, but some hatchery stocking may be required, or has been required. 2

(b) Natural propogation slight or non-existant, largely hatchery stocked. 1

---

13. (a) Size limits and creel limits conform to good fish management practices. 2

(b) Size limits and creel limits do not conform to good fish management practices. 1

Highest possible rating - 44

Final Classification - Minimum Outstanding 36
Minimum Good 26
Minimum Fair 14
Unsatisfactory ..... Below 14

RATING SCHEDULE FOR BOATING WATERS[1]

Rating Procedure For Quality Criteria

1. (a) The water is clear and clean with no pollution. 5

   (b) The water is somewhat contaminated and sometimes muddy or turbid. 4

   (c) The water is lightly polluted and often muddy or turbid. 3

   (d) The water is highly polluted. 1

---

2. (a) The water is appropriately accessible for the type of boating being rated. 3

   (b) The water is not sufficiently accessible for the boating use being rated. 2

   (c) The water is too accessible. 1

---

3. (a) The environment (including water, land, and wildlife) is spectacular, inspirational, unique, highly scenic or challenging. 5

   (b) The environment is either pleasing, stimulating, scenic, interesting and/or relaxing. 3

   (c) The environment is not as above but either drab, ordinary, uninteresting, spoiled or quite artificial in appearance. 1

---

4. (a) The water is "white water" or rapids that provide unusual boating adventure, challenge, isolation, and experiencing of numerous intangible values. 5

   (b) The water is "still", expansive, isolated, unusual, providing for extensive journeys and the experiencing of numerous intangible values. 5

   (c) The water is not as above or only partially so. 1-3

---

[1] Ibid., Form 28.

5. (a) During the season of use there are few, if any, obstacles and hazards (rocks, mud flats, sand bars, floating and submerged logs or vegetation, strong winds, etc.) interferring with the activities checked. 4

(b) There are hazards and obstacles such as rapids, currents, rocks, low water or cold water that enhance the activity checked. 4

(c) There are obstacles and hazards that detract from the pleasure and/or safety of boating. 3

(d) Obstacles and hazards very definitely interfere with boating. ..1

---

6. (a) The boating season is long and favourable throughout. 5

(b) The boating season is moderately long and favourable. 3

(c) The boating season is short and/or erratic and unfavourable due to early winters, adverse climatic or water temperatures, seasonal winds, low water or water drawdown, floods, etc. 1

---

7. (a) Boating is not crowded. 3

(b) Boating is crowded in some areas and/or at times of peak use. ..2

(c) General crowded boating conditions exist. 1

---

8. (a) There are few, if any, recreation or other uses that conflict with the boating activity checked. 3

(b) Swimming, fishing, water skiing, other forms of boating or other uses conflict somewhat with the boating activity checked. 2

(c) Other recreation activities and other uses definitely conflict with the boating activity checked. 1

---

9. (a) The boating water is large enough in area, or length, width, and volume of water to accomodate considerable use. 5

(b) The boating water is intermediate in size. 3

(c) The boating water is small for the activity checked. 1

---

10. (a) Shoreline land providing good undeveloped or developed camp and picnic sites and opportunities for varied recreation activities is plentiful. 5

(b) Such shoreline recreation land with accompanying recreation opportunities is rather limited or of only fair quality. 3

(c) Shoreline recreation land or opportunities are scarce or lacking, poor or spoiled. 1

11. (a) Fishing rates excellent. 3

(b) Fishing rates good to fair. 2

(c) Fishing is inconsequential or poor. 1

Highest possible rating - 46

Final Classification - Minimum Outstanding 40
Minimum Good 27
Minimum Fair 17

APPENDIX B

QUALITY EVALUATION OF RECREATION USE OPPORTUNITIES

Resource Data Needed To Complete Quality Evaluations

RESOURCE DATA NEEDED TO COMPLETE QUALITY EVALUATIONS

x Essential Data
o Desirable Data

MAJOR RECREATION ACTIVITIES	FISHING	HUNTING	WINTER SPORTS		WATER SPORTS				COLLECTING	SIGHT SEEING							SPECIALIZED ACTIVITIES	PRIMITIVE VALUES	
SUB-ACTIVITIES / RESOURCES			SKIING	SNOWPLAY	POWER BOATING	SAILING	FLOAT BOATING	SWIMMING		SCENERY	HISTORICAL	ARCHEOLOGICAL	OTHER CULTURAL	GEOLOGIC	BOTANIC	ZOOLOGIC	MOTORIZED RECREATION VEHICLES	PRIMITIVE	BACK COUNTRY
SOIL																			
Texture								x							o		x		
Stability								o							x		x		
Surface Character	o	x	x	x				x	o	x	o	o	o	o	o		x	x	x
Fertility															x		o		
GEOLOGY																			
Features							x							x				x	x
Collectables							x		x					x				x	x
TOPOGRAPHY																			
Slope	o	x	x	x	x	x	x	x	o	x	o	o	o	o	o		x	x	x
Aspect		x	x	x				o							o		x	x	x
Elevation		x	x	x	x	x	x	x	o						o		x	x	x
WILDLIFE																			
Type	x	x					x											x	x
Density	x	x					x											x	x
Size	x	x					x											x	x
CULTURAL																			
Archeologic							x			x		x					o	x	x
Historic							x			x	x						o	x	x
Other							x			x			x				x	x	x
WATER																			
Temperature	o				x	o	o	x										o	o
Fluctuation	x				x	x	x	x	o									x	x
Pollution	x				x	x	x	x								o	o	x	x
Turbidity	x	x			x	x	x	x		x								x	x
Depth	x	x			x	x	x	x	o							o		x	x
Size	x	x			x	x	x	x	o	x						o	o	x	x
Flow	x	x			x	x	x	x	o	x						o	o	x	x
CLIMATE																			
Temperature	o	o	x	x	o	o	o	x	o	o	o	o	o	o	o	o	o	o	o
Precipitation	o	o	x	x	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
Wind	o	o	x	x	x	x	o	x	o	o	o	o	o	o	o	o	o	o	o
SNOW																			
Duration	o	x	x	x					o	x							x	o	o
Texture			x	x													x	o	o
Depth	o	x	x	x													x	o	o
VEGETATION																			
Type	x	x	x	x	x	x	x	x	o	x	o			o	x	o	x	x	x
Density	x	x	x	x	x	x	x	x	o	x	o			o	x	o	x	x	x

QUALITY EVALUATION OF RECREATION USE OPPORTUNITIES

Example of How Rating Areas, Code Designations, Scores, and Quality Ratings Are Plotted on Overlays

A rating area may be plotted as:

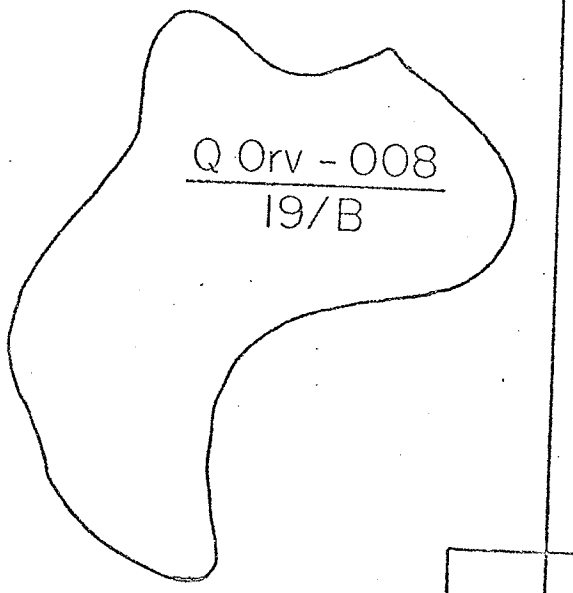


figure 1: an area

Q = Quality Evaluation
O = Specialized Activities
rv = Off-Road Vehicles
008 = Rating Area Number
19 = Score
B = Quality Rating

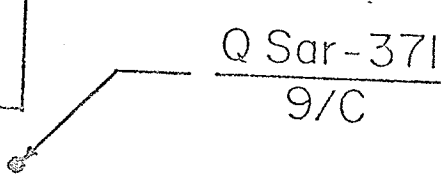


figure 2: a point

Q = Quality Evaluation
F = Fishing
st = Stream
061 = Rating Area Number
11 = Score
A = Quality Rating

Q = Quality Evaluation
S = Sightseeing
ar = Archeological
371 = Rating Area (site) Number
9 = Score
C = Quality Rating

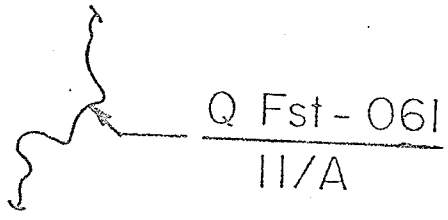


figure 3: a line

Note: See 6110, Illustration 1 for coding instructions.

QUALITY EVALUATION OF RECREATION USE OPPORTUNITIES

Quality Evaluation Scoresheet

1. Date: 5-27-71
2. Rater: J.Q. Public
3. State: 04
4. District: 06
5. Plan Unit: 06

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

QUALITY EVALUATION SCORESHEET

6. Recreation Activity: Sightseeing - Scenery

CLASS	SCORE RANGE
A	15-24
B	10-14
C	1-9

8. KEY FACTORS

9. RATING AREA NO. (a)	9. RATING AREA NAME (b)	Land Form (4)	Color (4)	Water (4)	Vegetation (4)	Uniqueness (6)	Adjacent Scenery (2)			11. TOTAL SCORE	12. CLASS	13. REMARKS
001	East Mesa	1	1	1	1	1	2			7	C	
002	Imperial And Dunes	2	1	1	1	6	2			13	B	The extraordinary shape of form made this area unique.
003	West Desert	1	1	1	2	1	1			7	C	
004	Cargo Muchacho Mtns.	2	2	1	1	1	1			8	C	
005	Black Mtn Area	2	4	1	2	2	2			13	B	
006	Picacho Peak Area	4	4	1	2	2	2			15	A	
007	Picacho Wash Area	2	4	1	2	1	1			11	B	
008	Senator Wash Area	2	1	1	2	1	1			8	C	
009	Colo. River Area	1	2	4	4	6	1			18	A	Wash vegetation & water combination is unique. Unique was factor the same as 009.
010	Laguna Dam Area	1	2	2	4	6	4			11	B	
011	Upper Gila Wash	2	1	1	2	1	2			9	C	

QUALITY EVALUATION OF RECREATION USE OPPORTUNITIES

Quality Evaluation Scoresheet

GENERAL INSTRUCTIONS

District Office prepares and maintains one (1) copy in file for each recreation activity or subactivity within a planning or inventory unit. (See BLM Manual 6111)

SPECIFIC INSTRUCTIONS

(Items not shown are self-explanatory)

Item

6 *Recreation Activity* – Enter major recreation and, if appropriate, the subactivity.

7 *Class & Score Range* – Enter range of scores for *each* class from quality evaluation chart.

8 *Key Factors* – Enter key factors from quality evaluation chart.

9 *Rating Area*
(a) *Number* – Enter numerical identifier.
(b) *Name* – Enter name which generally describes area.

10 *Point Maximum* – Enter maximum points for *each* key factor from quality evaluation chart.

11 *Total Score* – Enter summation of points given *each* key factor.

12 *Class* – Enter class within which total score falls. (See Item 7, above)

13 *Remarks* – Use this column to describe any unique or different situation.

QUALITY EVALUATION OF RECREATION USE OPPORTUNITIES

Quality Evaluation Chart for Winter Sports - Skiing

Quality Evaluation Chart

SKIING

KEY FACTORS	RATING CRITERIA AND SCORE			
(1) LENGTH OF SEASON	6 Months 6	5 Months 5	4 Months 4	3 Months 3
SNOW DEPTH (2)	+ 4 feet 6	3-4 feet 4	2-3 feet 2	1-2 feet 1
(3) SNOW TEXTURE* (Dry snow)	3/4 season 4	½ season 3	¼ season 2	Wet whole season 1
VERTICAL RISE	2500' + 6	1500-2500' 4	500-1500' 2	150-500' 1
(4) STEEPNESS	(5) Excellent Variety 4	(6) Good Variety 3	(7) Fair Variety 2	(8) Poor Variety 1
(9) TEMPERATURES	Above 30° most of season 3	Between 0°-20° most of season 2	Below 0° most of season 1	
WIND (10)	Slight 4	Occasional 3	Occasional high 2	Frequent 1

*Disregard this factor when rating area west of Pacific Coast Crest.
For areas west of Pacific Crest use a score range of: A=25-29, B= 18-24 & C-7-17.

A = 29-33 B = 21-28 C = 8-20

INSTRUCTIONS

(1) Length of Season. The number of months the average snow depth is 12 inches or greater.

(2) Depth. The average snow depth during the use season.

(3) Texture. The period that snow is considered dry (cannot make a snowball).

(4) Steepness. The most desirable slope is one with a variety of challenges. Consider the following as adequate:

a. Novice slopes - 10 to 20% grade (15-25% of area).
b. Intermediate slopes - 20 to 35% grade (25-40% of area).
c. Advanced slopes - 35 to 65% grade (30-40% of area)

(5) Excellent variety. About half of usable slope is intermediate with adequate novice and advanced slopes.

(6) Good variety. Most of usable slope is intermediate with adequate novice and some advanced slopes.

(7) Fair variety. Most slopes are intermediate. Adequate novice slopes and no advanced slopes or the reverse (i.e. adequate advanced and no novice).

(8) Poor variety. Most slopes are novice. Inadequate intermediate and no advanced, or the reverse (i.e., majority of slopes are advanced, etc.).

(9) Temperature. Maximum daytime temperatures during the season of use in degrees Fahrenheit.

(10) Wind. In selecting the rating level, consider the effect that wind has on personal comfort, snow quality, and surface quality.

Purpose: To rate the quality of experience a skier can expect while skiing in a given area.

How to Identify Skiing Values: (See minimum suitability requirements below).

How to Determine Minimum Suitability: An area is considered suitable for evaluation if it meets the following minimum criteria:

1. The snow season (with 12 inches or more of snow) is greater than 3 months.
2. Most slopes are not southwest aspect.
3. Most slopes are between 25-40% grade.
4. Any one of the following conditions:
   a. The area has a vertical rise of 150-500 feet, and is within 1/2 hour driving time of a population center of 10,000 or more.
   b. The area has a vertical rise of 500-1,500 feet, and is within 1½ hours driving time of a population of 50,000 or more.
   c. The area has a vertical rise of 1,500 to 2,500 feet, and is within 4 hours driving time of a population center of 50,000 or more.
   d. The area has a vertical rise of 2,500 or more.
5. A minimum of 5 acres is suitable for support facilities.
6. The exposure index is above a -30° most of the use season.

How to Delineate Rating Areas: Break the areas out by logical management units (i.e., provide adequate space in each rating area for complete economical unit including base areas, slopes, tow facilities, etc.).

QUALITY EVALUATION OF RECREATION USE OPPORTUNITIES

Quality Evaluation Chart - Hunting

Quality Evaluation Chart

HUNTING

KEY FACTORS	RATING CRITERIA AND SCORE		
(1) GAME POPULATIONS	(2) High 8	(3) Moderate 4	(4) Low 2
(5) EASE OF MOVEMENT	(6) Excellent 3	(7) Good 2	(8) Poor 1
(9) SHOOTING OPPORTUNITIES	Excellent 3	Good 2	Poor 1

A = 12 - 14 B = 9 - 11 C = 4 - 8

EXPLANATION OF RATING CRITERIA

(1) Game Population. All game species within the rating area are rated as a composite. Use a two-step process as follows:

- First, determine the relative population (i.e., high, moderate or low) of each game species.

- Second, looking at all these species in composite, determine if the composite population is high, moderate, or low.

Population level, (high, moderate, low) is a relative factor which varies from region to region. Select an area which has a high population for the region and use this as a baseline for judging high, moderate, or low.

(2) High. Supports a high population of one or more of the better game species or a moderate population of an unusual game species such as moose, big horn sheep, javelina, etc., or a moderate population of several (4 or more) common game species.

(3) Moderate. Supports a moderate population of one or more of the better game species or a high population of less desirable species, i.e., rabbits, squirrels, etc.

(4) Low. Supports a low population of one or more of the better game species or a moderate population of the less desirable species.

(5) Ease of Movement. This criteria refers to the ease with which a hunter can move around within the area. Consider dense vegetation, marshy conditions, steep mountainous conditions, or other features that could create obstacles to hunter movement.

(6) Excellent. Minimum restriction on hunter movement throughout the entire area.

(7) Good. Minimum restriction to hunter movement over most of the area.

(8) Poor. Serious restriction to hunter movement over most of the area.

(9) Shooting Opportunities. This refers to the likelihood of a hunter getting a good shot(s) at the game once it has been flushed.

Purpose: To rate the quality of experience a hunter can expect while hunting in a given area.

How to Identify Hunting Values: Identify to the extent possible the relative density and location of game species (during the hunting season).

How to Determine Minimum Suitability: Complete evaluations only for areas where legal game species exist in huntable quantities. Legal game species are interpreted as those species for which State law allows hunting either with or without a license. Determining what represents huntable quantities must be done on an area-by-area basis. What represents huntable quantities in one part of the country would not necessarily apply in another.

How to Delineate Rating Areas: Consider the following factors in delineating rating areas:

1. Areas of high concentration of a single species or a grouping of species such as upland game, big game, water fowl, etc.
2. Natural breaks in habitat.
3. Natural features such as lakes, rivers, canyons, etc.
4. Manmade features such as highways, canals, etc.

QUALITY EVALUATION OF RECREATION USE OPPORTUNITIES

Quality Evaluation Chart - Fishing

Quality Evaluation Chart

FISHING

KEY FACTOR	RATING CRITERIA AND SCORE		
WATER FLUCTUATION	(1) Good 3	(2) Fair 2	(3) Poor 1
CONTAMINATION	(4) Uncontaminated and clear 3	(5) Lightly contaminated or murky 2	(6) Polluted or muddy 1
(7) FISH POPULATION	(8) High 3	(9) Moderate 2	(10) Low 1
PROPAGATION	Natural Propagation 3	Supplemented hatchery stocking required 2	Put and take operation 1

A = 11-12 B = 8-10 C = 4-7

EXPLANATION OF RATING CRITERIA

(1) Good. Stream or lake is stable. There is little drawdown or flooding during the use season.

(2) Fair. Not managed for optimum fishing conditions. The stream or lake is subject to flooding or drawdown, mostly during season of light use.

(3) Poor. Subject to flooding or drawdown during heavy use season.

(4) Uncontaminated. Free from harmful chemicals and bacteria. Objects are distinguishable 24" below the surface.

(5) Contaminated. Contains a limited amount of undesirable chemicals or bacteria but not sufficient to affect the eatability of the fish. Objects can be recognized between 8-24" from surface.

(6) Polluted... to the point where it is questionable if the fish are eatable. Objects are not distinguishable below 8".

(7) Fish Population. The number and type of fish are both considered in this criteria. The higher quality type fish includes all trout species, bass, pike, and others as determined on a local basis. Lesser species include herring, catfish, bluegill, carp, sucker, others.

(8) High. Supports a high population of one or more species of the better warm or cold water game fish, or a moderate population of an unusual sporting fish such as steelhead, or a moderate population of very large "trophy" fish. A "high population" is a relative factor that must be determined on the local level. The rater should identify an area which he considers high and use this as a base.

(9) Moderate. Supports a moderate population of one or more of the better game species or a high population of less desirable species.

(10) Low. Supports a low population of large fish or a large population of very small fish.

Purpose: To rate the quality of experience a fisherman can expect while fishing in a given body of water.

How to Identify Fishing Values: Consider all water bodies having the capability of sustaining fish.

How to Determine Minimum Suitability: Rate all water bodies and stream segments having access from BLM lands except sterile bodies of water such as Great Salt Lake.

How to Delineate Rating Areas: Consider the following factors:

a. Similarity of stream or lake conditions.
b. Similarity of fish populations and species.
c. Similarity of habitat. There may be portions of lakes or reservoirs where habitat conditions are dissimilar enough to be rated as a separate unit. For example, a shallow finger of a reservoir that has a large number of partially submerged stumps which make it ideal habitat could be delineated as a separate rating area.

QUALITY EVALUATION OF RECREATION USE OPPORTUNITIES

Quality Evaluation Chart for Water Sports - Power Boating/Water Skiing and Sailing

Quality Evaluation Chart

POWER BOATING/WATER SKIING AND SAILING

KEY FACTORS	RATING CRITERIA AND SCORE		
WATER QUALITY	(1) Uncontaminated and clear — 5	(2) Contaminated or murky — 4	(3) *Polluted or muddy — 1
(4) HAZARDS	None — 5	(5) Some but easily controllable — 3	Several but feasible to control. — 1
(6) SIZE (5' or more in depth)	600 acres or more — 6	400 - 600 acres — 3	200 - 400 acres — 1
WIND (7) A-Power Boating B-Sailing (8)	Favorable full season — 3	Favorable most of the season — 2	Unfavorable most of the season — 1

*Water-skiing automatically eliminated.

A = 16-19 B = 12-15 C = 8-11

EXPLANATION OF RATING CRITERIA

(1) Uncontaminated and Clear. Free from harmful chemicals and bacteria. Fit for human consumption. Objects distinguishable 24" below the surface.

(2) Contaminated and Murky. Contains undesirable chemicals or bacteria. Not safe for human consumption but meets minimum health standards for swimming. Objects are recognizable between 8-24" below the surface.

(3) Polluted and Muddy. Does not meet minimum health standards. Unsafe for water contact sports. Objects are unrecognizable when covered with 8" of water.

(4) Hazards. All hazards to safety or comfort, including those that are exposed by fluctuation in the water level during the use season.

(5) Controllable Hazards. Those where it is economically and technically feasible to control use so as to maintain an acceptable safety level.

(6) Size. Estimate the surface acres which are 5 feet or more in depth. Use an average for reservoirs which fluctuate during the use season.

(7) Powerboating and Waterskiing. Winds which create wave action precluding or discouraging water skiing are considered unfavorable.

(8) Sailing. The following wind condition are considered unfavorable for sailing

- Winds less than 5 knots.
- Winds more than 25 knots.
- Consistent gusty conditions.

Purpose: To rate the quality of experience a power boater/water skier or sail boater can expect on a given body of water. Note: Power boating/water skiing and sail boating are rated separately (two different evaluations).

How to Identify Power Boating/Water Skiing and Sailing Values: Consider all water bodies accessible from BLM lands.

How to Determine Minimum Suitability: A water body must meet or surpass the following minimum criteria to be considered for further evaluation and rating:

1. Must have a minimum of 200 surface acres with a water depth of 5 feet or greater.
2. Most of the area must be free from serious hazards making boating or water skiing dangerous (likely to cause serious or fatal injuries).
3. The quality of the water must meet or be above State standards for water contact sports.

How to Delineate Rating Areas: Consider the following factors in delineating rating areas:

1. Similarity of water conditions (i.e., wind action, flow, turbidity, pollution, etc.).
2. The size and shape of the water body. (A large reservoir with several arms may be delineated into several rating areas.)

QUALITY EVALUATION OF RECREATION USE OPPORTUNITIES

Quality Evaluation Chart - Swimming

Quality Evaluation Chart

SWIMMING

KEY FACTOR	RATING CRITERIA AND SCORE		
WATER QUALITY	(1) Uncontaminated 5	(2) Contaminated 4	Polluted (See minimum suitability criteria)
HAZARDS	None 5	(3) Some - but controllable 4	Several - but controllable 1
WATER TEMPERATURE	72° F. or over 5	67° - 72° F. 4	Under 67° F. 1
COLOR AND TURBIDITY	(4) Clear 3	(5) Cloudy or murky 2	(6) Muddy 1
WIND	(7) Favorable full season 3	Favorable - more than ½ season 2	Favorable - less than ½ season. 1
(8) DROP-OFF (Shoreline to 5' depth)	100 ' or more 3	50' - 100' 2	30' - 50' 1
(9) BEACH (Up to 50' back from waterline)	(10) Natural or good potential 5	(11) Fair potential 4	(12) Poor potential 1

A = 26-29 B = 21-25 C = 13-20

EXPLANATION OF RATING CRITERIA

(1) Uncontaminated. Free of harmful chemicals and bacteria. Fit for human consumption.

(2) Contaminated. Contains undesirable bacteria or chemicals. Not safe for human consumption. Meets minimum health standards for swimming.

(3) Controllable Hazard...are those which can be controlled by marking, removal or by barriers.

(4) Clear. Objects distinguishable 24" below surface.

(5) Cloudy or Murky. Objects recognizable more than between 8-24" below the surface.

(6) Muddy. Objects unrecognizable when covered with 8" of water.

(7) Favorable Winds. Definition of "favorable wind" will be determined on a local basis.

(8) Drop-off. Use the Average during the use season for water bodies which fluctuate.

(9) Beach. This rating is based on the relative ease of constructing a beach rather than the natural condition.

(10) Good Potential. Favorable slope (less than 10%), firm, smooth surface condition, few obstacles would have to be removed.

(11) Fair Potential. Would require a moderate amount of grading, and/or obstacle removal.

(12) Poor Potential. Would require extensive grading and/or obstacle removal

Purpose: To rate the quality of experience a swimmer can expect while swimming, or participating in activities related to swimming such as beach and water play activities.

How to Identify Swimming Values: Consider all areas which have water and topographic conditions favorable to swimming. It is assumed that in most cases the beach area will have to be graded and sanded. Soil type is not considered in the evaluation.

How to Determine Minimum Suitability: A beach area is considered unsuitable for swimming if any one of the following conditions exist:

1. The pollution level of the water is below the minimum State health standards for water contact sports.
2. Serious hazards exist, such as swift currents, undertows, sharp drop-offs, etc., which are not controllable and would make the area unsafe for swimming.
3. The distance from the shoreline to a depth of 5 feet is less than 30 feet.
4. Shallow water with a soft bottom, such as the mud flats at the inlets to reservoirs.
5. The slope from the shoreline back 50 feet is in excess of 30% grade.
6. The area is too small to justify intensive management as a swimming area (i.e., not large enough to justify lifeguards, protective facilities, etc.).

How to Delineate Rating Areas: Areas having similar physiographic characteristics are delineated as separate rating areas. For example:

1. Similarity of slope.
2. Similarity of soil type and surface character.
3. Similarity of water conditions.

QUALITY EVALUATION OF RECREATION USE OPPORTUNITIES

Quality Evaluation Chart for Sightseeing - Scenery

Quality Evaluation Chart

SCENERY

KEY FACTORS	RATING CRITERIA AND SCORE		
(1) LAND FORM	Vertical or near vertical cliffs, spires, highly eroded formations, massive rock outcrops, severe surface variation. 4	Steep canyon walls, mesas, interesting erosional patterns, variety in size & shape of land forms. 2	Rolling hills, foothills, flat valley bottoms. 1
(2) COLOR	Rich color combinations variety or vivid contrasts in the color of soil, rocks, vegetation or water. 4	Some variety in colors and contrast of the soil, rocks & vegetation, but not dominant. 2	Subtle color variations, little contrast, generally mute tones. Nothing really eye-catching. 1
(3) WATER	Still, chance for reflections or cascading white water, a dominant factor in the landscape. 4	Moving and in view or still but not dominant. 2	Absent or present but seldom seen. 1
(4) VEGETATION	A harmonious variation in form, texture, pattern, and type. 4	Some variation in pattern and texture, but only one or two major types. 2	Little or no variation, contrast lacking. 1
(5) UNIQUENESS	One of a kind or very rare within region. 6	Unusual but similar to others within the region. 2	Interesting in its setting, but fairly common within the region. 1
(6) INTRUSIONS	Free from aesthetically undesirable or discordant sights and influences. 2	Scenic quality is somewhat depreciated by inharmoneous intrusions but not so extensive that the scenic qualities are entirely negated. 1	Intrusions are so extensive that scenic qualities are for the most part nullified. -4

A = 15-24 B = 10-14 C = 1-9

EXPLANATION OF RATING CRITERIA

(1) Land Form or topography becomes more interesting as it gets steeper and more massive. Examples of outstanding land forms are found in Grand Canyon, the Sawtooth Mountain Range in Idaho, the Wrangle Mountain Range in Alaska, Rocky Mountain National Park, etc.

(2) Color. Consider the overall color of the basic components of the landscape (i.e., soil, rocks, vegetation, etc.) as they appear during the high use season. Key factors to consider in rating "color" are variety, contrast, and harmony.

(3) Water is that ingredient which adds movement or serenity to a scene. The degree to which water dominates the scene is the primary consideration in selecting the rating score.

(4) Vegetation. Give primary consideration to the variety of patterns, forms, and texture created by the vegetation.

(5) Uniqueness. This factor provides an opportunity to give added importance to one or all of the scenic features that appear to be relatively unique within any one physiographic region. There may also be cases where a separate evaluation of each of the key factors does not give a true picture of the overall scenic quality of an area. Often it is a number of not so spectacular elements in the proper combination that produces the most pleasing scenery -- the uniqueness factor can be used to recognize this type of area and give it the added emphasis it needs.

(6) Intrusions. Consider the impact of man-made improvements on the aesthetic quality. These intrusions can have a positive or negative aesthetic impact. Rate accordingly.

Purpose: To rate the aesthetic quality of the scenic resource on all BLM lands.

How to Identify Scenery Value: All Bureau lands have scenic value.

How to Determine Minimum Suitability: All BLM lands are rated for scenic values. Also rate adjacent or intermingling non-BLM lands.

How to Delineate Rating Areas: Consider the following factors when delineating rating areas:

1. Like physiographic characteristics (i.e., land form, vegetation, etc.
2. Similar visual patterns, texture, color, variety, etc.
3. Areas which have a similar impact from intrusions (i.e., roads, structures, mining operations, or other surface disturbances).

QUALITY EVALUATION OF RECREATION USE OPPORTUNITIES

Quality Evaluation Chart for Sightseeing - Historical

Quality Evaluation Chart

HISTORICAL

KEY FACTORS	RATING CRITERIA AND SCORE			
(1) FREQUENCY OF OCCURRENCE	(2) Unique 4+	Rare 3	Uncommon 2	Common 1
(3) EXTENT	Very large 4	Large 3	Medium 2	Small 1
(4) PRESERVATION	Complete 4	3/4 Complete 3	1/2 Complete 2	1/4 Complete or less 1
(5) REPRESENTATIVE TYPE	Excellent (Type site) 4	Good 3	Fair 2	Poor 1
(6) AUTHENTICITY	Fully documented 4	Well documented 3	Some documentation 2	No documentation. 1

A = 20-16 B = 15-11 C = 10-5

EXPLANATION OF RATING CRITERIA

(1) Frequency of Occurrence. The relativ occurrence of the feature within the region.

(2) Unique. A feature may be unique in a region but still not have great visit appeal. On the other hand, a feature may rate out low in one or more of th key factors but in combination it may be unique and have outstanding visitor appeal. The rater has the option to add whatever points in this area he feels are necessary to give a feature a valid rating. Any score beyond 4 must be explained in the remarks column of the Rating Score Sheet.

(3) Extent. The area covered, the density height, breadth, mass, or overall size.

(4) Preservation. The amount of the original site or building which is left.

(5) Representative Type. Deals with how well a site illustrates the phase or period in history it represents. A "type site" is rare and is where the phase or period was first identified and described or where the site is the most classic example of its kind.

(6) Authenticity. The degree of documentation - is there enough known about the site to accurately interpret it to the public.

Purpose: To rate the quality of experience a sightseer can expect while viewing a given historic site.

How to Identify Historical Values: Consider any place or thing associated with a significant event, an important person, or a cultural activity of the past. Historic in most cases is 50 years old or older except for rare instances where exceptional events have taken place, such as the site of the first atomic bomb detonation.

How to Determine Minimum Suitability for Rating: Rate all historic sites. Sites located on adjacent non-BLM lands may be rated if they form a logical management unit with similar opportunities available on Bureau lands.

How to Delineate Rating Areas: An historic site rating area may be any of the following:

1. An individual feature such as a building.
2. A group of structures or features unified by past events such as a ranch headquarters, an early settlement, etc.
3. An historic district such as South Pass Historic Mining District in Wyoming which includes several ghost towns and all the mining operations, transportation network, military camp, etc. associated with this early mining venture.
4. An entire historic route or segment thereof.

Other Considerations: Consider only the recreation values of the site. Scientific values are considered only for the part they play in enhancing the human interest value.

QUALITY EVALUATION OF RECREATION USE OPPORTUNITIES

Quality Evaluation Chart for Specialized Equipment - Off-Road Vehicle Use

Quality Evaluation Chart

OFF-ROAD VEHICLE USE

KEY FACTORS	RATING CRITERIA AND SCORE			
USEABLE TERRAIN FEATURES (1)	Excellent variety (unique) (2) 8	Good variety 6	Fair variety 4	Poor variety 2
(3) SOIL OR SNOW *A - CYCLE (4) & 4 WD	Preponderance of heavily consolidated soils. Minimum dust problem.	Preponderance of moderately consolidated soils or heavily consolidated soils w/tendency to powder up.	Preponderance of loosely consolidated soils-alluvial material, decomposed, granite, etc.	Preponderance of silt sand or soils with a severe dust problem.
(5) *b - DUNE BUGGY (Sand)	80-100% of area active sand dunes (6)	60-80% of area active sand dunes	40-60% of area active sand dunes	Less than 40% of area active sand dunes
(7) *C - SNOWMOBILE (Snow)	+ 4 months 8	3 - 4 months 6	2 - 3 months 4	1 - 2 months 2
(8) SIZE	+ 10,000 acres 4	5000-10000 acres 3	1000-5000 acres 2	500-1000 acres 1
(9) HAZARDS AND RESTRICTIONS		No major hazards or restrictions 3	Some - but controllable 2	Several - but controllable 1

* Rate one only

A = 24-21 B = 20-16 C = 15-4

EXPLANATION OF RATING CRITERIA

(1) Useable Terrain Features. Includes all BLM lands except those where the surface character precludes ORV use such as solid boulder fields, dense vegetation, extreme marshy conditions or slopes in excess of 60% grade. Consider the following characteristics of terrain features in completing this rating:

- Variety and challenge in the steepness and length of slopes.
- Variety and challenge in surface character, i.e., hard, smooth, rocky, sandy, etc.
- Variety and challenge in natural bowls, U-shaped valleys and ridges, etc.
- Variety and challenge in potential jumps, hill climb opportunities, speed courses, etc.

(2) Unique. If there is some particular feature unique to this location and highly desirable for ORV use, the option is left open to add whatever additional points the rater feels is necessary to give the area a valid rating. Any score beyond 8 points must be explained in the remarks column of the Rating Score Sheet.

(3) Soil or Snow. Use the set of criteria corresponding with the primary vehicle likely to use the area.

(4) Cycle and 4 WD. The ideal situation is a variety of soil types with the preponderance being heavily consolidated with a low dust factor.

(5) Dune Buggy. Includes all vehicles specially equipped to operate on sand including 4 wd vehicles.

(6) Active Sand Dune. A dune which is not vegetated and is exposed to, and is consistently changing as a result of, wind conditions.

(7) Snowmobile. The number of months with a useable snow pack of 12" or more.

(8) Size. For purposes of this evaluation, the minimum manageable size of an ORV area is 500 acres. Anything smaller is not evaluated.

(9) Hazards and Restrictions. If there were no hazards, there would be no challenge; therefore, only those hazards likely to result in serious injury should be considered, such as:

-sheer cliffs -quick sand
-open mine shafts -flash flood
-artillery duds conditions
-poisonous plants and animals

Purpose: To rate the quality of the experience an off-road vehicle operator could expect while operating the vehicle in a given area. The experience being measured is the thrill or satisfaction coming from operating the vehicle. The quality of other experiences that are by-products of using ORV's such as sightseeing, hunting, fishing, rockhounding, etc. are evaluated separately under other sections.

How to Identify Areas Valuable for Off-Road Recreation-Vehicle Use: All areas are considered valuable for ORV use except those where the surface character would preclude such use.

How to Determine Minimum Suitability for Rating: All Bureau lands will be rated.

How to Delineate Rating Areas: Delineate areas having similar physiographic characteristics as separate rating areas. For example, areas having similar terrain, soil, and surface characteristics (i.e., vegetation, rock outcroppings, etc.) are grouped into separate rating units. It is permissible to use cultural features for boundaries such as highways, canals, urban, or agricultural areas, property lines, etc. if such boundaries form a logical management unit.

Note: This section does not provide the criteria for evaluating areas for ORV racing or other competitive events involving ORV's.

APPENDIX C

A.R.D.A. CLASSIFICATION SYSTEM

SUMMARY OF
LAND CAPABILITY CLASSIFICATION FOR RECREATION

Seven classes of land are differentiated on the basis of the intensity of outdoor recreational use, or the quantity of outdoor recreation which may be generated and sustained per unit area of land per annum under perfect market conditions.

"Quantity" may be measured by visitor days, a visitor day being any reasonable portion of a 24 hour period during which an individual person uses a unit of land for recreation.

"Perfect market conditions" implies uniform demand and accessibility for all areas, which means that location relative to population centres and to present access do not affect the classification.

"Intensive and dispersed activities" are recognized. "Intensive activities" are those in which relatively large numbers of people may be accommodated per unit area, while "dispersed activities" are those which normally require a relatively larger area per person.

Important factors affecting the classification are:

- The purpose of the inventory is to provide a reliable assessment of the quality, quantity and distribution of the natural recreation resources within settled parts of Canada.
- The inventory is essentially of a reconnaissance nature, based on interpretation of aerial photographs, field checks, and available records. The finished maps should be interpreted accordingly.

- The inventory classification is designed in accordance with present popular preferences in non-urban outdoor recreation. Urban areas (generally over 1,000 population with permanent urban character), as well as some non-urban industrial areas, are not classified.
- Land is ranked according to natural capability under existing conditions, whether in natural or modified state. But no assumptions are made concerning its capability if it is given further major artificial modifications.
- Sound recreation land management and development practices are assumed for all areas in practical relation to the natural capability of each area.
- Water bodies are not directly classified. Their recreational values accrue to the adjoining shoreland or land unit.
- Opportunities for recreation afforded by the presence in an area of wildlife and sports fish are indicated in instances where reliable information was available. But the ranking does not reflect the biological productivity of the area; wildlife capability is indicated in a companion series of maps.

CLASSES

1 - LANDS IN THIS CLASS HAVE VERY HIGH CAPABILITY FOR OUTDOOR RECREATION

Class 1 lands have natural capability to engender and sustain very high annual use based on one or more recreational activities of an intensive nature.

Class 1 land units should be able to generate and sustain a level of use comparable to that evident at an outstanding and large bathing beach or a nationally known ski slope.

2 - LANDS IN THIS CLASS HAVE A HIGH CAPABILITY FOR OUTDOOR RECREATION

Class 2 lands have natural capability to engender and sustain high annual use based on one or more recreational activities of an intensive nature.

3 - LANDS IN THIS CLASS HAVE A MODERATELY HIGH CAPABILITY FOR OUTDOOR RECREATION

Class 3 lands have natural capability to engender and sustain moderately high annual use based usually on intensive or moderately intensive activities.

4 - LANDS IN THIS CLASS HAVE MODERATE CAPABILITY FOR OUTDOOR RECREATION

Class 4 lands have natural capability to engender and sustain moderate annual use based usually on dispersed activities.

5 - LANDS IN THIS CLASS HAVE MODERATELY LOW CAPABILITY FOR OUTDOOR RECREATION

Class 5 lands have natural capability to engender and sustain a moderately low total annual use based on dispersed activities.

6 - LANDS IN THIS CLASS HAVE LOW CAPABILITY FOR OUTDOOR RECREATION

Class 6 lands lack the natural quality and significant features to rate higher, but have the natural capability to engender and sustain low annual use based on dispersed activities.

7 - LANDS IN THIS CLASS HAVE VERY LOW CAPABILITY FOR OUTDOOR RECREATION

Class 7 lands have practically no capability for any popular types of recreation activity, but there may be some capability for very specialized activities with recreation aspects, or they may simply provide open space.

SUBCLASSES

Subclasses indicate the kinds of features which provide opportunity for recreation. They are, therefore, positive aspects of land and do not indicate limitations to use. Features may be omitted from a unit, either because of the imposed three-feature limit, or because their presence was unknown or unconfirmed.

The degree to which these features are judged capable, collectively, of generating and sustaining use for recreation determines the

class. The sequence in which they are listed indicates the order of their significance. Subordinate features may be relatively insignificant and the class of a unit should not be interpreted to indicate the capability of a second or third use.

The subclasses are:

A - land providing access to water affording opportunity for angling or viewing of sports fish;

B - shoreland capable of supporting family beach activities. In high class units this includes family bathing. In Classes 4 and 5, the activities may preclude bathing due to water temperature or other limitations;

C - land fronting on and providing direct access to waterways with significant capability for canoe tripping;

D - shoreland with deeper inshore water suitable for swimming, or boat mooring, or launching;

E - land with vegetation possessing recreational value;

F - waterfall or rapids;

G - significant glacier view or similar experience;

H - historic or pre-historic site;

J - area offering particular opportunities for gathering and collecting items of popular interest;

K - shoreland or upland suited to organized camping. This subclass is usually associated with other features;

L - interesting landform features other than rock formations;

M - frequent small water bodies, or continuous streams occuring in upland areas;

N - land (usually shoreland) suited to family or other recreation lodging use;

O - land which affords an opportunity for viewing of upland wildlife;

P - areas exhibiting cultural landscape patterns of agricultural, industrial or social interest;

Q - areas exhibiting variety, in topography or land and water relationships, which enhances opportunities for general outdoor recreation such as hiking and nature study or for aesthetic appreciation of the area;

R - interesting rock formations;

S - a combination of slopes, snow conditions and climate providing downhill skiing opportunities;

T - thermal springs;

U - shoreland fronting water accommodating yachting or deep water boat tripping;

V - a vantage point or area which offers a superior view relative to the class of the unit(s) which contain it, or a corridor or other area which provides frequent viewing opportunities;

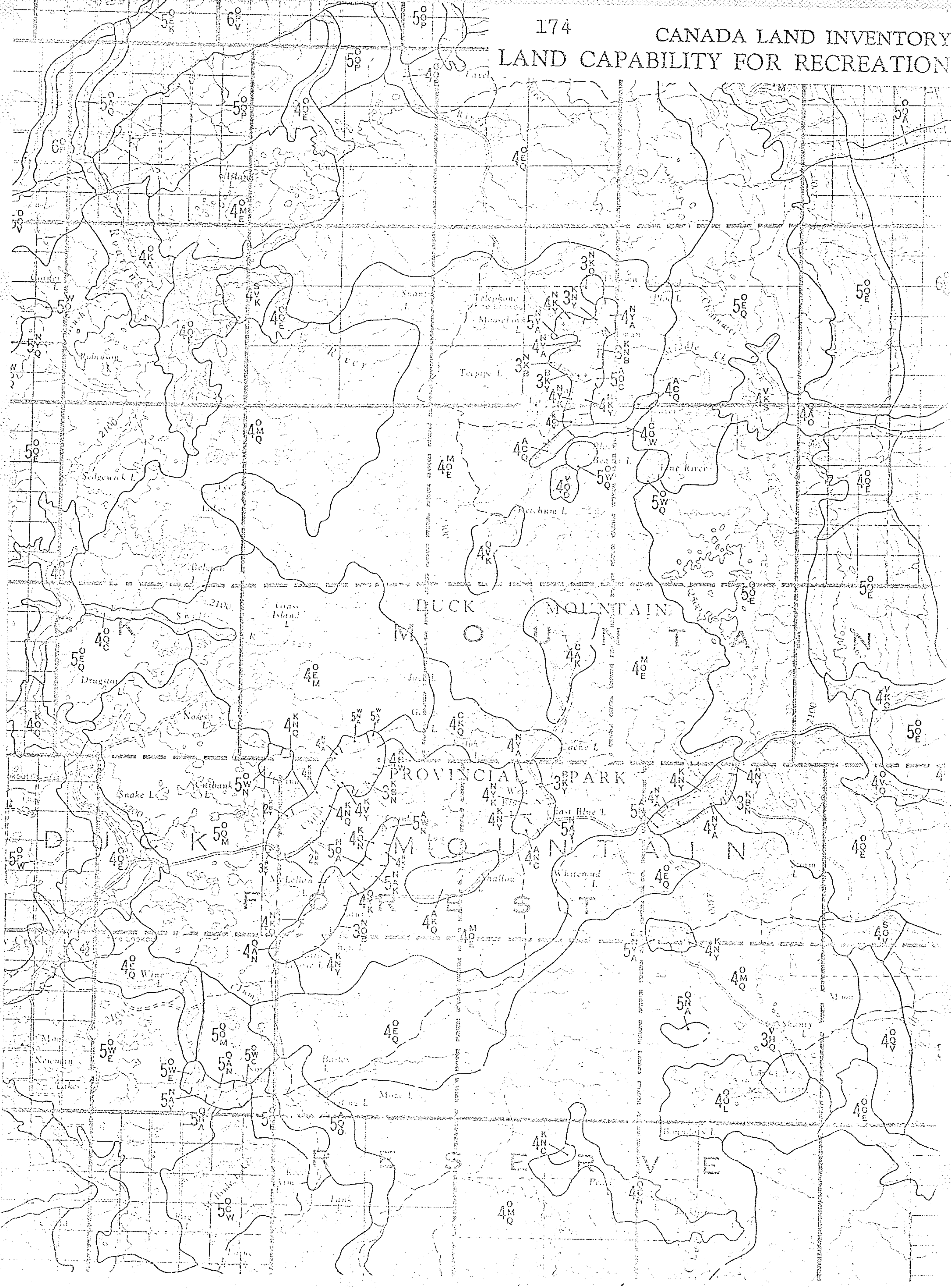
W - land affording opportunity for viewing of wetland wildlife;

X - miscellaneous features with recreational capability;

Y - shoreland providing access to water suitable for popular forms of family boating;

Z - areas exhibiting major, permanent, non-urban man-made structures of recreational interest.

CANADA LAND INVENTORY
LAND CAPABILITY FOR RECREATION



APPENDIX D

URBAN CORRIDOR RECREATIONAL EVALUATION PROGRAMS

User's Manual

Program Names: Rec1, Rec2, Rec3

Program Descriptions:

A. Rec1: Corridor Unit Edit Program.

This program lists corridor unit evaluation cards for manual checking. An example of output is given in Table 15.

B. Rec2: Key Element Weight Edit Program.

This program reads key element weight cards and produces two edit listings for manual checking:

(a) A key element weight list (e.g., Table 14).

(b) A key element multiplier list (e.g., Table 16).

C. Rec3: Recreational Potential Evaluation Program.

This program reads key element weight cards and corridor unit evaluation cards and produces a listing of recreational potential percentages by corridor unit within corridor. See Table 17 for an example of output.

Operating Instructions:

A. REC1

1) Punch corridor unit evaluation cards according to input format given.

2) Sort as follows: Corridor (major); Corridor unit (minor); card number (minor).

3) Run with program Rec1 and check output for errors.

NOTE: "Corridor" field of corridor units in the same corridor must be identical. Rec1 does not sequence - check input.

B. REC2

1) Puch key element weight cards according to input format given.

2) Sort as follows: Activity (major); card number (minor).

3) Run with program REC2 and check output for errors.

NOTE: Although the activities will print in input sequence, the activity grouping is program-controlled. Thus if changes are to be made to the activity sequence, program changes are required.

C. REC3

1) Using corrected input, assemble as follows: REC3, key element weight cards, corridor unit evaluation cards.

2) Run assembled job.

NOTE: REC3 does not check input sequence. Ensure sequence is correct, as an out-of-sequence condition will cause non-program-detected errors.

```
//REC1 JOB '0099,XXXX,,T=30,I=10,L=5,R=120',          ,MSGLEVEL=(1,1)    JOB 681
//STEP1 EXEC PL1LFCG,PARM.PL1='ATR,XREF,SORMGIN=(2,80),STMT',
//          PARM.GO='SIZE=61440',SIZE=120K
XXPL1FCG  PROC SIZE=52K,CSIZE=112K                                        00010001
XXPL1     EXEC  PGM=IEMAA,REGION=&CSIZE                                   00020001
IEF653I SUBSTITUTION JCL - PGM=IEMAA,REGION=112K
XXSYSLIN   DD  DSNAME=&&LOADSET,DISP=(MOD,PASS),UNIT=SYSDA,              *00030001
XX             SPACE=(TRK,(40,20)),DCB=(RECFM=FB,LRECL=80,BLKSIZE=1600) 00040001
XXSYSPRINT DD  SYSOUT=A                                                   00050001
XXSYSUT1   DD  UNIT=SYSDA,SPACE=(TRK,(40,20),,CONTIG),                   *00060001
XX             DCB=BLKSIZE=1024                                           00070001
XXSYSUT3   DD  UNIT=SYSDA,SPACE=(TRK,(40,20)),DCB=BLKSIZE=80              00080001
//PL1.SYSIN DD *
IEF236I ALLOC. FOR REC1     PL1       STEP1
IEF237I 333   ALLOCATED TO SYSLIN
IEF237I 42A   ALLOCATED TO SYSPRINT
IEF237I 334   ALLOCATED TO SYSUT1
IEF237I 336   ALLOCATED TO SYSUT3
IEF237I 403   ALLOCATED TO SYSIN
IEF142I - STEP WAS EXECUTED - COND CODE 0004
IEF285I   SYS73204.T155235.RV000.REC1.LOADSET          PASSED
IEF285I   VOL SER NOS= UM1439.
IEF285I   SYS73204.T155235.RV000.REC1.R0000466         DELETED
IEF285I   VOL SER NOS= INVIR3.
IEF285I   SYS73204.T155235.RV000.REC1.R0000467         DELETED
IEF285I   VOL SER NOS= INVIR4.
IEF373I STEP /PL1     / START 73204.1651
IEF374I STEP /PL1     / STOP  73204.1652 CPU    0MIN 09.12SEC MAIN 112K LCS    OK
PL1          54.32 SEC EXEC TIME     9.12 SEC CPU TIME      384 I/O COUNTS 112K REGION 112K USED

XXGO  EXEC  PGM=LOADER,COND=(9,LT,PL1),REGION=&SIZE                       00090001
IEF653I SUBSTITUTION JCL - PGM=LOADER,COND=(9,LT,PL1),REGION=120K
XXSYSLIB   DD  DSNAME=SYS1.PL1LIB,DISP=SHR                                00100001
XXSYSLIN   DD  DSNAME=*.PL1.SYSLIN,DISP=(OLD,DELETE)                      00110001
XXSYSLOUT DD SYSOUT=A                                                     00120001
XXSYSPRINT DD  SYSOUT=A                                                   00130001
//GO.OUTPT DD SYSOUT=A
//GO.INPT DD *
//
IEF236I ALLOC. FOR REC1     GO        STEP1
IEF237I 238   ALLOCATED TO SYSLIB
IEF237I 333   ALLOCATED TO SYSLIN
IEF237I 425   ALLOCATED TO SYSLOUT
IEF237I 426   ALLOCATED TO SYSPRINT
IEF237I 427   ALLOCATED TO OUTPT
IEF237I 404   ALLOCATED TO INPT
IEF142I - STEP WAS EXECUTED - COND CODE 0000
IEF285I   SYS1.PL1LIB                                  KEPT
IEF285I   VOL SER NOS= UM1421.
IEF285I   SYS73204.T155235.RV000.REC1.LOADSET          DELETED
IEF285I   VOL SER NOS= UM1439.
IEF373I STEP /GO      / START 73204.1652
IEF374I STEP /GO      / STOP  73204.1653 CPU    0MIN 02.29SEC MAIN  84K LCS    OK
GO           78.78 SEC EXEC TIME     2.29 SEC CPU TIME      273 I/O COUNTS 120K REGION  84K USED

IEF375I  JOB /REC1    / START 73204.1651
IEF376I  JOB /REC1    / STOP  73204.1653 CPU    0MIN 11.41SEC
REC1         133.10 SEC EXEC TIME    11.41 SEC CPU TIME       DATE 73.204 UNIVERSITY OF MANITOBA
```

PL/I F COMPILER OPTIONS SPECIFIED ARE AS FOLLOWS--

```
     ATR,XREF,SORMGIN=(2,80),STMT
```

THE COMPLETE LIST OF OPTIONS USED DURING THIS COMPILATION IS--

```
  EBCDIC
  CHAR60
NOMACRO
  SOURCE2
NOMACDCK
  COMP
  SOURCE
  ATR
  XREF
NOEXTREF
NOLIST
  LOAD
NODECK
  FLAGW
  STMT
  SIZE=0108784
  LINECNT=060
  OPT=00
  SORMGIN=(002,080)
NOEXTDIC
NONEST
  OPLIST
  SYNCHKT
```

```
*OPTIONS IN EFFECT*     EBCDIC,CHAR60,NOMACRO,SOURCE2,NOMACDCK,COMP,SOURCE,ATR,XREF,NOEXTREF,NOLIST,LOAD,
*OPTIONS IN EFFECT*     NODECK,FLAGW,STMT,SIZE=0108784,LINECNT=060,OPT=00,SORMGIN=(002,080),NOEXTDIC,
*OPTIONS IN EFFECT*     NONEST,OPLIST,SYNCHKT
```

```
1               REC1:PROCEDURE OPTIONS (MAIN);
2                   DCL INPT FILE RECORD INPUT SEQUENTIAL ENV(F(80,80));
3                    DCL INA CHAR (80),
                         INB CHAR (80),
                         INC CHAR (80);
4                   DCL 1 DTA DEFINED INA,
                            2 RVR_IN CHAR (20),
                            2 REACH_IN CHAR (55),
                            2 FIL CHAR (5);
5                   DCL  1 ACTB DEFINED INB,
                            2 CLIMATE_IN (9) PIC '99',
                            2 FIL1 CHAR (1),
                            2 SCENERY_IN (5) PIC '99',
                            2 FIL2 CHAR (1),
                            2 NAT_ENV_IN (6) PIC '99',
                            2 FIL3 CHAR (1),
                            2 HISTORY_IN (3) PIC '99',
                            2 FIL4 CHAR (1),
                            2 TOPO_IN (9) PIC '99',
                            2 FIL5 CHAR (12);
6                   DCL 1 ACTC DEFINED INC,
                            2 QUAL_IN (6) PIC '99',
                            2 FIL1 CHAR (1),
                            2 QUANT_IN (6) PIC '99',
                            2 FIL2 CHAR (1),
                            2 FISH_IN (4) PIC '99',
                            2 FIL3 CHAR (1),
                            2 POPULATION_IN (3) PIC '99',
                            2 FIL5 CHAR (1),
                            2 ACCESS_IN (2) PIC '99',
                            2 FIL6 CHAR (1),
                            2 DISVALUES_IN (3) PIC 'R9',
                            2 FIL7 CHAR (27);
7                   DCL OUTPT FILE RECORD OUTPUT ENV (F(133,133) CTLASA);
8                   DCL (B,P,X) BIN FIXED (15);
9                   DCL 1 TITLE,
                            2 CCTL CHAR (1) INIT ('1'),
                         2 FIL1 CHAR (62) INIT (' '),
                         2 FIL2 CHAR (8) INIT ('TABLE 15'),
                         2 FIL3 CHAR (62) INIT (' ');
10                  DCL 1 EDITD,
                         2 CCTL CHAR (1) INIT ('-'),
                            2 FIL1 CHAR (54) INIT (' '),
                            2 FIL2 CHAR (25) INIT ('KEY ELEMENT VALUE RATINGS'),
                            2 FIL3 CHAR (53) INIT (' ');
11                  DCL 1 EDITST,
                            2 CCTL CHAR (1) INIT ('-'),
                            2 MAJOR CHAR (23),
                            2 MINOR CHAR (109);
12                  DCL 1 EDITS1,
                            2 CCTL CHAR (1) INIT ('0'),
                            2 FIL1 CHAR (30) INIT ('        CLIMATE              '),
                            2 FIL2 CHAR (30) INIT ('    SCENERY          NAT. ENVIR'),
                            2 FIL3 CHAR (30) INIT ('NT.    HISTORICAL        PHYSI'),
                            2 FIL4 CHAR (30) INIT ('OGRAPHY              WATER QUALI'),
                            2 FIL5 CHAR (2) INIT ('TY'),
                            2 FIL6 CHAR (10) INIT (' ');
```

```
13                DCL 1 EDITS2,
                        2 CCTL CHAR (1) INIT (' '),
                        2 FIL1 CHAR (2) INIT (' '),
                        2 FI1 (9) CHAR (3) INIT ('1A','1B','2A','2B','3A','3B','4',
                           '5','6'),
                        2 FI2 CHAR (2) INIT (' '),
                        2 FI3 (5) CHAR (3) INIT ('1','2','3','4','5'),
                        2 FI4 CHAR (2) INIT (' '),
                        2 FI5 (6) CHAR (3) INIT ('1','2','3','4','5','6'),
                        2 FI6 CHAR (2) INIT (' '),
                        2 FI7 (3) CHAR (3) INIT ('1','2','3'),
                        2 FI8 CHAR (2) INIT (' '),
                        2 FI9 (9) CHAR (3) INIT ('1','2','3','4','5','6A',
                           '6B','7','8'),
                        2 FI10 CHAR (2) INIT (' '),
                        2 FI11 (6) CHAR (3) INIT ('1','2','3','4','5','6'),
                        2 FI12 CHAR (6) INIT (' ');
14                DCL 1 EDITS3,
                        2 CCTL CHAR (1) INIT ('0'),
                        2 FIL1 CHAR (30) INIT ('   WATER QUANTITY     FISH POP'),
                        2 FIL2 CHAR (30) INIT ('.   POPULATION  ACCESS  DISVAL'),
                        2 FIL3 CHAR (3)  INIT ('UES'),
                        2 FIL4 CHAR (69) INIT (' ');
15                DCL 1 EDITS4,
                        2 CCTL CHAR (1) INIT (' '),
                        2 FIL1 CHAR (2) INIT (' '),
                        2 F1 (6) CHAR (3) INIT ('1','2','3','4A','4B','5'),
                        2 F2 CHAR (2) INIT (' '),
                        2 F3 (4) CHAR (3) INIT ('1','2','3','4'),
                        2 F4 CHAR (2) INIT (' '),
                        2 F5 (3) CHAR (3) INIT ('1','2','3'),
                        2 F6 CHAR (2) INIT (' '),
                        2 F7 (2) CHAR (3) INIT ('1','2'),
                        2 F8 CHAR (2) INIT (' '),
                        2 F9 (3) CHAR (3) INIT ('1A','1B','1C'),
                        2 F10 CHAR (68) INIT (' ');
16                DCL 1 DTLA,
                        2 CCTL CHAR (1) INIT (' '),
                        2 OCL (9) PIC 'BZ9',
                        2 FIL1 CHAR (2) INIT (' '),
                        2 CSC (5) PIC 'BZ9',
                        2 FIL2 CHAR (2) INIT (' '),
                        2 ONA (6) PIC 'BZ9',
                        2 FIL3 CHAR (2) INIT (' '),
                        2 OHI (3) PIC 'BZ9',
                        2 FIL4 CHAR (2) INIT (' '),
                        2 CTO (9) PIC 'BZ9',
                        2 FIL5 CHAR (2) INIT (' '),
                        2 OCL (6) PIC 'BZ9',
                        2 FIL6 CHAR (8) INIT (' ');
17                DCL 1 DTLB ,
                        2 CCTL CHAR (1) INIT (' '),
                        2 OCN (6) PIC 'BZ9',
                        2 FIL1 CHAR (2) INIT (' '),
                        2 CFI (4) PIC 'BZ9',
                        2 FIL2 CHAR (2) INIT (' '),
                        2 OPO (3) PIC 'BZ9',
```

```
REC1:PROCEDURE OPTIONS (MAIN);

                        2 FIL3 CHAR (2) INIT (' '),
                        2 CAC (2) PIC 'BZ9',
                        2 FIL4 CHAR (2) INIT (' '),
                        2 CDI (3) PIC '--9',
                        2 FIL5 CHAR (70) INIT (' ');
     OPEN FILE (INPT), FILE (OUTPT);
18   ON ENDFILE (INPT) GOTO EOJ;
19   P = 4;
21 L1: READ FILE (INPT) INTO (INA);
22   READ FILE (INPT) INTO (INB);
23   READ FILE (INPT) INTO (INC);
24   IF P = 4 THEN CALL DTITLE;
25   ELSE P = P + 1;
27   MAJOR = RVR_IN;
28   MINOR = REACH_IN;
29   OCL (*) = CLIMATE_IN (*);
30   OSC (*) = SCENERY_IN (*);
31   ONA (*) = NAT_ENV_IN (*);
32   OHI (*) = HISTORY_IN (*);
33   OTO (*) = TOPO_IN (*);
34   OQL (*) = QUAL_IN (*);
35   OQN (*) = QUANT_IN (*);
36   OFI (*) = FISH_IN (*);
37   OPO (*) = POPULATION_IN (*);
38   OAC (*) = ACCESS_IN (*);
39   ODI (*) = DISVALUES_IN (*);
40   WRITE FILE (OUTPT) FROM (EDITST);
41   WRITE FILE (OUTPT) FROM (EDITS1);
42   WRITE FILE (OUTPT) FROM (EDITS2);
43   WRITE FILE (OUTPT) FROM (OTLA);
44   WRITE FILE (OUTPT) FROM (EDITS3);
45   WRITE FILE (OUTPT) FROM (EDITS4);
46   WRITE FILE (OUTPT) FROM (OTLB);
47   GOTO L1;
48 DTITLE:PROC;
49   WRITE FILE (OUTPT) FROM (TITLE);
50   WRITE FILE (OUTPT) FROM (EDITD);
51   P = 0;
52   END;
53 EOJ:CLOSE FILE (INPT), FILE (OUTPT);
54   END;
55
```

```
//REC2 JOB '0999,XXXX,,T=30,I=10,L=5,K=120','F CURTIS',MSGLEVEL=(1,1)     JOB 215
//STEP1 EXEC PL1LFCG,PARM.PL1='ATR,XREF,SOURCE=(2,80),STMT',
//         PARM.GL='SIZE=61440',SIZE=120K
XXPL1FCG  PROC SIZE=52K,CSIZE=112K                                      00010001
XXPL1     EXEC  PGM=IEMAA,REGION=&CSIZE                                 00020001
IEF653I SUBSTITUTION JCL - PGM=IEMAA,REGION=112K
XXSYSLIN   DD  DSNAME=&&LOADSET,DISP=(MOD,PASS),UNIT=SYSDA,           *00030001
XX             SPACE=(TRK,(40,20)),DCB=(RECFM=FB,LRECL=80,BLKSIZE=1600) 00040001
XXSYSPRINT DD  SYSOUT=A                                                 00050001
XXSYSUT1   DD  UNIT=SYSDA,SPACE=(TRK,(40,20),,CONTIG),                *00060001
XX             DCB=BLKSIZE=1024                                         00070001
XXSYSUT3   DD  UNIT=SYSDA,SPACE=(TRK,(40,20)),DCB=BLKSIZE=80            00080001
//PL1.SYSIN DD *
IEF236I ALLOC. FOR REC2     PL1       STEP1
IEF237I 313   ALLOCATED TO SYSLIN
IEF237I 422   ALLOCATED TO SYSPRINT
IEF237I 334   ALLOCATED TO SYSUT1
IEF237I 336   ALLOCATED TO SYSUT3
IEF237I 405   ALLOCATED TO SYSIN
IEF142I - STEP WAS EXECUTED - COND CODE 0004
IEF285I   SYS73206.T161547.RV001.REC2.LOADSET          PASSED
IEF285I   VOL SER NOS= UN1439.
IEF285I   SYS73206.T161547.RV001.REC2.R0000984         DELETED
IEF285I   VOL SER NOS= UN0001.
IEF285I   SYS73206.T161547.RV001.REC2.R0000985         DELETED
IEF285I   VOL SER NOS= INVIR4.
IEF373I STEP /PL1      / START 73206.1839
IEF374I STEP /PL1      / STOP  73206.1841 CPU    0MIN 14.10SEC MAIN 112K LCS    0K
PL1          76.62 SEC EXEC TIME     14.10 SEC CPU TIME      373 I/O COUNTS 112K REGION 112K USED

XXGO  EXEC  PGM=LOADER,COND=(9,LT,PL1),REGION=&SIZE                     00090001
IEF653I SUBSTITUTION JCL - PGM=LOADER,COND=(9,LT,PL1),REGION=120K
XXSYSLIB   DD  DSNAME=SYS1.PL1LIB,DISP=SHR                              00100001
XXSYSLIN   DD  DSNAME=*.PL1.SYSLIN,DISP=(OLD,DELETE)                    00110001
XXSYSLOUT DD SYSOUT=A                                                   00120001
XXSYSPRINT DD  SYSOUT=A                                                 00130001
//GO.OUTPT DD SYSOUT=A
//GO.INPT DD *
//
IEF236I ALLOC. FOR REC2     GO        STEP1
IEF237I 238   ALLOCATED TO SYSLIB
IEF237I 333   ALLOCATED TO SYSLIN
IEF237I 422   ALLOCATED TO SYSLOUT
IEF237I 427   ALLOCATED TO SYSPRINT
IEF237I 429   ALLOCATED TO OUTPT
IEF237I 408   ALLOCATED TO INPT
IEF142I - STEP WAS EXECUTED - COND CODE 0000
IEF285I   SYS1.PL1LIB                                  KEPT
IEF285I   VOL SER NOS= UN1421.
IEF285I   SYS73206.T161547.RV001.REC2.LOADSET          DELETED
IEF285I   VOL SER NOS= UN1439.
IEF373I STEP /GO       / START 73206.1841
IEF374I STEP /GO       / STOP  73206.1841 CPU    0MIN 02.67SEC MAIN  84K LCS    0K
GO           76.25 SEC EXEC TIME      2.67 SEC CPU TIME      274 I/O COUNTS 120K REGION  84K USED

IEF373I  JOB /REC2     / START 73206.1839
IEF376I  JOB /REC2     / STOP  73206.1841 CPU    0MIN 16.77SEC
REC2         152.87 SEC EXEC TIME     16.77 SEC CPU TIME       DATE 73.206 UNIVERSITY OF MANITOBA
```

PL/I F COMPILER OPTIONS SPECIFIED ARE AS FOLLOWS--

ATR,XREF,SORMGIN=(2,80),STMT

THE COMPLETE LIST OF OPTIONS USED DURING THIS COMPILATION IS--
EBCDIC
CHAR60
NOMACRO
SOURCE2
NOMACDCK
COMP
SOURCE
ATR
XREF
NOEXTREF
NOLIST
LOAD
NODECK
FLAGW
STMT
SIZE=0130784
LINECNT=060
OPT=00
SORMGIN=(002,080)
NOEXTDIC
NONEST
OPLIST
SYNCHKT

OPTIONS IN EFFECT EBCDIC,CHAR60,NOMACRO,SOURCE2,NOMACDCK,COMP,SOURCE,ATR,XREF,NOEXTREF,NOLIST,LOAD,
OPTIONS IN EFFECT NODECK,FLAGW,STMT,SIZE=0130784,LINECNT=060,OPT=00,SORMGIN=(002,080),NOEXTDIC,
OPTIONS IN EFFECT NONEST,OPLIST,SYNCHKT

```
1               REC2:PROCEDURE OPTIONS (MAIN);
2                   DCL INPT FILE RECORD INPUT SEQUENTIAL ENV(F(80,80));
3                    DCL INA CHAR (80),
                         INB CHAR (80),
                         INC CHAR (80);
4                   DCL 1 ACTA DEFINED INA,
                            2 ACT_IN CHAR (21),
                            2 KEY_IN (11) PIC '9',
                            2 FILL CHAR (1),
                            2 MAX_IN PIC '999V',
                            2 FIL2 CHAR (44);
5                   DCL  1 ACTB DEFINED INB,
                            2 CLIMATE_IN (9) PIC '99',
                            2 FIL1 CHAR (1),
                            2 SCENERY_IN (5) PIC '99',
                            2 FIL2 CHAR (1),
                            2 NAT_ENV_IN (6) PIC '99',
                            2 FIL3 CHAR (1),
                            2 HISTORY_IN (3) PIC '99',
                            2 FIL4 CHAR (1),
                            2 TOT_IN (9) PIC '99',
                            2 FIL5 CHAR (12);
6                   DCL 1 ACTC DEFINED INC,
                            2 QUAL_IN (6) PIC '99',
                            2 FILL CHAR (1),
                            2 QUANT_IN (6) PIC '99',
                            2 FIL2 CHAR (1),
                            2 FISH_IN (4) PIC '99',
                            2 FIL3 CHAR (1),
                            2 POPULATION_IN (3) PIC '99',
                            2 FIL5 CHAR (1),
                            2 ACCESS_IN (2) PIC '99',
                            2 FIL6 CHAR (1),
                            2 DISVALUES_IN (3) PIC '89',
                            2 FIL7 CHAR (27);
7                   DCL OUTPT FILE RECORD OUTPUT ENV (F(133,133) CTLASA);
8                   DCL 1 SUBTL,
                            2 CTL CHAR (1) INIT ('0'),
                            2 SUB CHAR (32) INIT (' '),
                            2 FIL CHAR (100) INIT (' ');
9                   DCL (A,B,D,S,X) BIN FIXED (15);
10                  DCL ACTIVITY (24) CHAR (21);
11                  DCL KEY (24,11) PIC '9';
12                  DCL BLANK CHAR (133) INIT (' ');
13                  DCL 1 TITLEA,
                            2 CCTL CHAR (1) INIT ('1'),
                         2 FIL1 CHAR (62) INIT (' '),
                         2 FIL2 CHAR (9) INIT ('TABLE 16'),
                         2 FIL3 CHAR (62) INIT (' ');
14                  DCL 1 FL_TIT1,
                          2 CCTL CHAR (1) INIT ('-'),
                            2 FIL1 CHAR (49) INIT (' '),
                            2 FIL2 CHAR (33) INIT ('KEY ELEMENTS AND THEIR MULTIPL'),
                            2 FIL3 CHAR (4) INIT ('IER'),
                            2 FIL4 CHAR (49) INIT (' ');
15                  DCL 1 FL_TIT2,
                            2 CCTL CHAR (1) INIT ('-'),
```

```
                        2 FIL1 CHAR (43) INIT (' '),
                        2 FIL2 CHAR (7) INIT ('NATURAL'),
                        2 FIL3 CHAR (82) INIT (' ');
16                  DCL 1 RL_TIT3,
                        2 CCTL CHAR (1) INIT (' '),
                        2 FIL1 CHAR (43) INIT (' '),
                        2 FIL2 CHAR (33) INIT ('ENVIRON-  HISTORIC   PHYSI-   '),
                        2 FIL3 CHAR (16) INIT (' WATER     WATER'),
                        2 FIL4 CHAR (43) INIT (' ');
17                  DCL 1 RL_TIT4,
                        2 CCTL CHAR (1) INIT (' '),
                        2 FIL1 CHAR (21) INIT ('      ACTIVITY       '),
                        2 FIL2 CHAR (33) INIT ('  CLIMATE   SCENERY    MENT   '),
                        2 FIL3 CHAR (33) INIT ('   VALUE    OGRAPHY   QUALITY '),
                        2 FIL4 CHAR (33) INIT ('  QUANTITY    FISH  POPULATION'),
                        2 FIL5 CHAR (21) INIT ('  ACCESS  DISVALUES ');
18                  DCL 1 RL_CTL,
                        2 CCTL CHAR (1) INIT (' '),
                        2 RL_ACT CHAR (21),
                        2 KEY_RL (11) PIC '(8)9',
                        2 FIL CHAR (1) INIT (' ');
19                  DCL 1 TITLE8,
                        2 CCTL CHAR (1) INIT ('1'),
                      2 FIL1 CHAR (62) INIT (' '),
                      2 FIL2 CHAR (8) INIT ('TABLE 14'),
                      2 FIL3 CHAR (62) INIT (' ');
20                  DCL 1 EDITA,
                      2 CCTL CHAR (1) INIT ('-'),
                        2 FIL1 CHAR (42) INIT (' '),
                        2 FIL2 CHAR (30) INIT ('WEIGHTS FOR 23 KINDS OF RECREA'),
                        2 FIL3 CHAR (17) INIT ('TIONAL ACTIVITIES'),
                        2 FIL4 CHAR (43) INIT (' ');
21                  DCL 1 EDITST,
                        2 CCTL CHAR (1) INIT ('-'),
                        2 MAJOR CHAR (23),
                        2 MINOR CHAR (109);
22                  DCL 1 EDITS1,
                        2 CCTL CHAR (1) INIT ('0'),
                        2 FIL1 CHAR (36) INIT ('       CLIMATE              '),
                        2 FIL2 CHAR (33) INIT ('  SCENERY        NAT. ENVIR'),
                        2 FIL3 CHAR (33) INIT ('NT.    HISTORICAL        PHYSI'),
                        2 FIL4 CHAR (33) INIT ('OGRAPHY             WATER QUALI'),
                        2 FIL5 CHAR (2) INIT ('TY'),
                        2 FIL6 CHAR (10) INIT (' ');
23                  DCL 1 EDITS2,
                        2 CCTL CHAR (1) INIT (' '),
                        2 FIL1 CHAR (2) INIT (' '),
                        2 FI1 (5) CHAR (3) INIT ('1A','1B','2A','2B','3A','3B','4',
                            '5','6'),
                        2 FI2 CHAR (2) INIT (' '),
                        2 FI3 (5) CHAR (3) INIT ('1','2','3','4','5'),
                        2 FI4 CHAR (2) INIT (' '),
                        2 FI5 (6) CHAR (3) INIT ('1','2','3','4','5','6'),
                        2 FI6 CHAR (2) INIT (' '),
                        2 FI7 (3) CHAR (3) INIT ('1','2','3'),
                        2 FI8 CHAR (2) INIT (' '),
                        2 FI9 (9) CHAR (3) INIT ('1','2','3','4','5','6A',
```

```
RIC2:PROCEDURE OPTIONS (MAIN);

                    '6','7','8'),
                  2 FIL6 CHAR (2) INIT (' '),
                  2 FIL1 (6) CHAR (3) INIT ('1','2','3','4','5','6'),
                  2 FIL7 CHAR (6) INIT (' ');
24          DCL 1 EDIT3,
                  2 CCTL CHAR (1) INIT ('0'),
                  2 FIL1 CHAR (30) INIT ('   WATER QUANTITY     FISH POP'),
                  2 FIL2 CHAR (30) INIT ('.   POPULATION  ACCESS  DISVAL'),
                  2 FIL3 CHAR (3)  INIT ('QES'),
                  2 FIL4 CHAR (69) INIT (' ');
25          DCL 1 EDIT4,
                  2 CCTL CHAR (1) INIT (' '),
                  2 FIL1 CHAR (2) INIT (' '),
                  2 F1 (6) CHAR (3) INIT ('1','2','3','4A','4B','5'),
                  2 F2 CHAR (2) INIT (' '),
                  2 F3 (4) CHAR (3) INIT ('1','2','3','4'),
                  2 F4 CHAR (2) INIT (' '),
                  2 F5 (3) CHAR (3) INIT ('1','2','3'),
                  2 F6 CHAR (2) INIT (' '),
                  2 F7 (2) CHAR (3) INIT ('1','2'),
                  2 F8 CHAR (2) INIT (' '),
                  2 F9 (3) CHAR (3) INIT ('1A','1B','1C'),
                  2 F1* CHAR (69) INIT (' ');
26          DCL 1 DTLA,
                  2 CCTL CHAR (1) INIT (' '),
                  2 DCL (6) PIC '$Z9',
                  2 FIL1 CHAR (2) INIT (' '),
                  2 CSC (6) PIC '$Z9',
                  2 FIL2 CHAR (2) INIT (' '),
                  2 CNA (6) PIC '$Z9',
                  2 FIL3 CHAR (2) INIT (' '),
                  2 CHI (3) PIC '$Z9',
                  2 FIL4 CHAR (2) INIT (' '),
                  2 CTO (6) PIC '$Z9',
                  2 FIL5 CHAR (2) INIT (' '),
                  2 DCL (6) PIC '$Z9',
                  2 FIL6 CHAR (8) INIT (' ');
27          DCL 1 DTLB,
                  2 CCTL CHAR (1) INIT (' '),
                  2 CCN (6) PIC '$Z9',
                  2 FIL1 CHAR (2) INIT (' '),
                  2 CFI (4) PIC '$Z9',
                  2 FIL2 CHAR (2) INIT (' '),
                  2 CRO (2) PIC '$Z9',
                  2 FIL3 CHAR (2) INIT (' '),
                  2 CAC (2) PIC '$Z9',
                  2 FIL4 CHAR (2) INIT (' '),
                  2 CPI (3) PIC '--9',
                  2 FIL5 CHAR (72) INIT (' ');
28          OPEN FILE (INPT), FILE (OUTPT);
29          ON ENDFILE (INPT) GOTO END;
31          CALL ATTYLE;
32          MAJOR = 'CAMPING:';
33          DO I = 1 TO 2;
34               CALL FEET;
35               END;
36          MAJOR = 'FISHING:';
```

```
                DO B = 3 TO 4;
                    CALL ADET;
                    END;
                MAJOR = ' ';
                DO B = 5;
                    CALL ADET;
                    END;
                MAJOR = 'TRAIL SYSTEM:';
                DO B = 6 TO 9;
                    CALL ADET;
                    END;
                MAJOR = 'AESTHETIC ENJOYMENT:';
                DO B = 10 TO 12;
                    CALL ADET;
                    END;
                MAJOR = 'WATER RECREATION:';
                DO B = 13 TO 15;
                    CALL ADET;
                    END;
                MAJOR = 'WINTER RECREATION:';
                DO B = 16 TO 20;
                    CALL ADET;
                    END;
                MAJOR = 'AREAS:';
                DO B = 21 TO 22;
                    CALL ADET;
                    END;
                WRITE FILE (OUTPT) FROM (TITLEA);
                WRITE FILE (OUTPT) FROM (EL_TIT1);
                WRITE FILE (OUTPT) FROM (EL_TIT2);
                WRITE FILE (OUTPT) FROM (EL_TIT3);
                WRITE FILE (OUTPT) FROM (EL_TIT4);
                SUB = 'CAMPING:';
                WRITE FILE (OUTPT) FROM (SUBTL);
                DO B = 1 TO 2;
                    CALL PRT;
                    END;
                SUB = 'FISHING:';
                WRITE FILE (OUTPT) FROM (SUBTL);
                DO B = 3 TO 4;
                    CALL PRT;
                    END;
                WRITE FILE (OUTPT) FROM (BLANK);
                B = 5;
                    CALL PRT;
                SUB = 'TRAIL SYSTEM:';
                WRITE FILE (OUTPT) FROM (SUBTL);
                DO B = 6 TO 9;
                    CALL PRT;
                    END;
                SUB = 'AESTHETIC ENJOYMENT:';
                WRITE FILE (OUTPT) FROM (SUBTL);
                DO B = 10 TO 12;
                    CALL PRT;
                    END;
                SUB = 'WATER RECREATIONAL ACTIVITIES:';
                WRITE FILE (OUTPT) FROM (SUBTL);
```

```
                DO R = 13 TO 19;
                    CALL PRT;
                    END;
                SUB = 'WINTER RECREATION:';
                WRITE FILE (OUTPT) FROM (SUBTL);
                DO R = 16 TO 20;
                    CALL PRT;
                    END;
                SUB = 'AREAS:';
                WRITE FILE (OUTPT) FROM (SUBTL);
                DO R = 21 TO 2;
                    CALL PRT;
                    END;
            ACCT:PROC;
                READ FILE (INPT) INTO (INA);
                READ FILE (INPT) INTO (INB);
                READ FILE (INPT) INTO (INC);
                ACTIVITY (R) = ACT_IN;
                KEY (R,*) = KEY_IN (*);
                MINIB = ACT_IN;
                CCL (*) = CLIMATE_IN (*);
                CSC (*) = SCENERY_IN (*);
                CNA (*) = NAT_CAM_IN (*);
                CHI (*) = HISTORY_IN (*);
                CTO (*) = TOPO_IN (*);
                CQL (*) = QUAL_IN (*);
                CQN (*) = QUANT_IN (*);
                CFI (*) = FISH_IN (*);
                CPO (*) = POPULATION_IN (*);
                CAC (*) = ACCESS_IN (*);
                CDI (*) = DISVALUES_IN (*);
                WRITE FILE (OUTPT) FROM (SUITST);
                WRITE FILE (OUTPT) FROM (SUITS1);
                WRITE FILE (OUTPT) FROM (SUITS2);
                WRITE FILE (OUTPT) FROM (CTLA);
                WRITE FILE (OUTPT) FROM (SUITS3);
                WRITE FILE (OUTPT) FROM (SUITS4);
                WRITE FILE (OUTPT) FROM (CTLB);
                IF R = 4 THEN CALL ATITLE;
                ELSE R = R + 1;
                END;
            ATITLE:PROC;
                WRITE FILE (OUTPT) FROM (TITLEB);
                WRITE FILE (OUTPT) FROM (SUITA);
                R = 3;
                END;
            PRT:PROC;
                FL_ACT = ACTIVITY (R);
                KEY_FL (*) = KEY (1,*);
                WRITE FILE (OUTPT) FROM (FL_DTL);
                END;
            EOJ:CLOSE FILE (INPT), FILE (OUTPT);
                END;
```

```
//REC3 JOB '0099,XXXX,,T=20,I=1,L=5,P=12.',*E CURTIS',MSGLEVEL=(1,1)    JOB 213
//STEP1 EXEC PL1LFCG,PARM.PL1='ATR,XREF,SOURCE,INCLUDE',STMT',
//         PARM.GO='SIZE=61440',SIZE=112K
XXPL1FCG  PROC SIZE=92K,CSIZE=112K                                    00010001
XXPL1     EXEC  PGM=IEMAA,REGION=CSIZE                                00020001
IEF653I SUBSTITUTION JCL - PGM=IEMAA,REGION=112K
XXSYSLIN  DD  DSNAME=&&LOADSET,DISP=(MOD,PASS),UNIT=SYSDA,          A  00030001
XX            SPACE=(TRK,(40,20)),DCB=(RECFM=FB,LRECL=80,BLKSIZE=1600) 00040001
XXSYSPRINT DD  SYSOUT=A                                               00050001
XXSYSUT1  DD  UNIT=SYSDA,SPACE=(TRK,(40,20),,CONTIG),               *00060001
XX            DCB=BLKSIZE=1024                                        00070001
XXSYSUT3  DD  UNIT=SYSDA,SPACE=(TRK,(40,20)),DCB=BLKSIZE=80           00080001
//PL1.SYSIN DD *
IEF236I ALLOC. FOR REC3     PL1       STEP1
IEF237I 333   ALLOCATED TO SYSLIN
IEF237I 427   ALLOCATED TO SYSPRINT
IEF237I 334   ALLOCATED TO SYSUT1
IEF237I 336   ALLOCATED TO SYSUT3
IEF237I 426   ALLOCATED TO SYSIN
IEF142I - STEP WAS EXECUTED - COND CODE 0004
IEF285I   SYS73206.T161547.RV000.REC3.LOADSET          PASSED
IEF285I   VOL SER NOS= UM1429.
IEF285I   SYS73206.T161547.RV000.REC3.R0000876         DELETED
IEF285I   VOL SER NOS= CMCC01.
IEF285I   SYS73206.T161547.RV000.REC3.R0000377         DELETED
IEF285I   VOL SER NOS= UM1404.
IEF373I STEP /PL1     / START 73206.1039
IEF374I STEP /PL1     / STOP  73206.1039 CPU    0MIN 14.17SEC MAIN 112K LCS   0K
PL1          72.21 SEC EXEC TIME     14.17 SEC CPU TIME      342 I/O COUNTS 112K REGION 112K USED

XXGO  EXEC  PGM=LOADER,COND=(9,LT,PL1),REGION=SIZE                    00090001
IEF653I SUBSTITUTION JCL - PGM=LOADER,COND=(9,LT,PL1),REGION=120K
XXSYSLIB   DD  DSNAME=SYS1.PL1LIB,DISP=SHR                            00100001
XXSYSLIN   DD  DSNAME=&&.PL1.SYSLIN,DISP=(OLD,DELETE)                 00110001
XXSYSLOUT DD SYSOUT=A                                                 00120001
XXSYSPRINT DD  SYSOUT=A                                               00130001
//GO.OUTPT DD SYSOUT=A
//GO.INPT DD *
//
IEF236I ALLOC. FOR REC3     GO        STEP1
IEF237I 239   ALLOCATED TO SYSLIB
IEF237I 333   ALLOCATED TO SYSLIN
IEF237I 427   ALLOCATED TO SYSLOUT
IEF237I 429   ALLOCATED TO SYSPRINT
IEF237I 42A   ALLOCATED TO OUTPT
IEF237I 417   ALLOCATED TO INPT
IEF142I - STEP WAS EXECUTED - COND CODE 0000
IEF285I   SYS1.PL1LIB                                  KEPT
IEF285I   VOL SER NOS= UM1421.
IEF285I   SYS73206.T161547.RV000.REC3.LOADSET          DELETED
IEF285I   VOL SER NOS= UM1429.
IEF373I STEP /GO      / START 73206.1039
IEF374I STEP /GO      / STOP  73206.1043 CPU    0MIN 06.45SEC MAIN  84K LCS   0K
GO           37.78 SEC EXEC TIME      6.45 SEC CPU TIME      297 I/O COUNTS 120K REGION  84K USED

IEF375I  JOB /REC3    / START 73206.1039
IEF376I  JOB /REC3    / STOP  73206.1043 CPU    0MIN 21.62SEC
REC3         1:09.98 SEC EXEC TIME     21.62 SEC CPU TIME       DATE 73.206 UNIVERSITY OF MANITOBA
```

PL/I F COMPILER OPTIONS SPECIFIED ARE AS FOLLOWS--

```
      ATR,XREF,SORMGIN=(2,80),STMT

THE COMPLETE LIST OF OPTIONS USED DURING THIS COMPILATION IS--   EBCDIC
                                                                CHAR60
                                                              NOMACRO
                                                                SOURCE2
                                                              NOMACDCK
                                                                COMP
                                                                SOURCE
                                                                ATR
                                                                XREF
                                                              NOEXTREF
                                                              NOLIST
                                                                LOAD
                                                              NODECK
                                                                FLAGW
                                                                STMT
                                                                SIZE=0100784
                                                                LINECNT=060
                                                                OPT=00
                                                                SORMGIN=(002,080)
                                                              NOEXTDIC
                                                              NONEST
                                                                OPLIST
                                                                SYNCHKT

*OPTIONS IN EFFECT*     EBCDIC,CHAR60,NOMACRO,SOURCE2,NOMACDCK,COMP,SOURCE,ATR,XREF,NOEXTREF,NOLIST,LOAD,
*OPTIONS IN EFFECT*     NODECK,FLAGW,STMT,SIZE=0100784,LINECNT=060,OPT=00,SORMGIN=(002,080),NOEXTDIC,
*OPTIONS IN EFFECT*     NONEST,OPLIST,SYNCHKT
```

```
1               REC3:PROCEDURE OPTIONS (MAIN);
2                   DCL INPT FILE RECORD INPUT SEQUENTIAL ENV(F(80,80));
3                    DCL INA CHAR (80),
                         INB CHAR (80),
                         INC CHAR (80);
4                   DCL 1 ACTA DEFINED INA,
                            2 ACT_IN CHAR (21),
                            2 KEY_IN (11) PIC '9',
                            2 FIL1 CHAR (1),
                            2 MAX_IN PIC '999V',
                            2 FIL2 CHAR (44);
5                   DCL  1 ACTB DEFINED INB,
                            2 CLIMATE_IN (9) PIC '99',
                            2 FIL1 CHAR (1),
                            2 SCENERY_IN (5) PIC '99',
                            2 FIL2 CHAR (1),
                            2 NAT_ENV_IN (6) PIC '99',
                            2 FIL3 CHAR (1),
                            2 HISTORY_IN (3) PIC '99',
                            2 FIL4 CHAR (1),
                            2 TOPL_IN (9) PIC '99',
                            2 FIL5 CHAR (12);
6                   DCL 1 ACTC DEFINED INC,
                            2 QUAL_IN (6) PIC '99',
                            2 FIL1 CHAR (1),
                            2 QUANT_IN (6) PIC '99',
                            2 FIL2 CHAR (1),
                            2 FIL4_IN (4) PIC '99',
                            2 FIL3 CHAR (1),
                            2 POPULATION_IN (3) PIC '99',
                            2 FIL5 CHAR (1),
                            2 ACCESS_IN (2) PIC '99',
                            2 FIL6 CHAR (1),
                            2 DISVALUES_IN (3) PIC '89',
                            2 FIL7 CHAR (27);
7                   DCL 1 OTA DEFINED INA,
                            2 RVR_IN CHAR (20),
                            2 BEACH_IN CHAR (55),
                            2 FIL CHAR (5);
8                   DCL OUTPT FILE RECORD OUTPUT ENV (F(133,133) CTLASA);
9                   DCL 1 TITL,
                            2 CTL CHAR (1) INIT ('1'),
                         2 FIL1 CHAR (62) INIT (' '),
                         2 FIL2 CHAR (3) INIT ('TABLE 17'),
                         2 FIL3 CHAR (62) INIT (' ');
10                  DCL 1 TITL2,
                         2 CCTL CHAR (1) INIT ('-'),
                            2 FIL1 CHAR (46) INIT (' '),
                             2 FIL2 CHAR (33) INIT ('THE RECREATIONAL POTENTIAL OF '),
                            2 RVR_OUT CHAR (20),
                             2 FIL3 CHAR (13) INIT (' (IN PERCENT)'),
                             2 FIL4 CHAR (23) INIT (' ');
11                  DCL 1 TITL3,
                            2 CTL CHAR (1) INIT ('-'),
                            2 FIL1 CHAR (18) INIT (' '),
                            2 FIL2 CHAR (8) INIT ('ACTIVITY'),
                            2 FIL3 CHAR (11) INIT (' '),
```

```
NPC3:PROCEDURE OPTIONS (MAIN);                                          PAGE    3

                    2 TS (8) CHAR (11),
                    2 FIL4 CHAR (8)  INIT (' ');
12                  DCL T (8) CHAR (11) INIT ('REACH 1','REACH 2','REACH 3','REACH 4',
                      'REACH 5','REACH 6','REACH 7','REACH 8');
13                  DCL TITL2 CHAR (132) DEFINED TITLE2 POSITION (2);
14                  DCL BLANK CHAR (133) INIT (' '),
                        1 BLANK2,
                          2 CTL CHAR (1) INIT ('0'),
                          2 FIL CHAR (132) INIT (' ');
15                  DCL 1 DETAIL,
                          2 CTL CHAR (1) INIT (' '),
                          2 FIL1 CHAR (11) INIT (' '),
                          2 ACT_OUT CHAR (21),
                          2 FIL2 CHAR (4) INIT (' '),
                          2 REACH (8) CHAR (11) INIT (' '),
                          2 FIL3 CHAR (6) INIT (' ');
16                  DCL 1 RCH,
                          2 CTL CHAR (1) INIT ('0'),
                          2 FILL CHAR (12) INIT (' '),
                          2 FIL2 CHAR (6) INIT ('REACH '),
                          2 REACH_NO PIC '9',
                          2 FIL3 CHAR (3) INIT (':  '),
                          2 REACH_OUT CHAR (55),
                          2 FIL4 CHAR (55) INIT (' ');
17                  DCL 1 SUBTL,
                          2 CTL CHAR (1) INIT ('0'),
                          2 SUB CHAR (33) INIT (' '),
                          2 FIL CHAR (100) INIT (' ');
18                  DCL RIVER (55) CHAR (21) INIT (' ');
19                  DCL REACH (55) CHAR (55) INIT (' ');
20                  DCL (A,B,C,ENT,R,X) BIN FIXED (15);
21                  DCL WORK DEC FIXED (5,1);
22                  DCL  ACTIVITY (24) CHAR (21),
                         KEY (24,11) PIC '99',
                         MAX (24) DEC FIXED (3),
                         CLIMATE (1:24,9) PIC '99',
                         SCENERY (1:24,5) PIC '99',
                         NAT_ENV (1:24,6) PIC '99',
                         HIST (1:24,3) PIC '99',
                         TOPOGRAPHY (1:24,2) PIC '99',
                         WATER_QUAL (1:24,4) PIC '99',
                         WATER_QUANT (1:24,6) PIC '99',
                         FISH (1:24,4) PIC '99',
                         POPULATION (1:24,3) PIC '99',
                         ACCESS (1:24,2) PIC '99',
                         DISVALUES (1:24,3) PIC '99';
23                  DCL EL (11) DEC FIXED (2),
                         VALUE (1:11,24) PIC 'Z9';
24                  RIVER (*) = ' ';
25                  OPEN FILE (INPT), FILE (OUTPT);
26                  ON ENDFILE (INPT) GOTO START;
28                       DO A=1 TO 24;
29                          READ FILE (INPT) INTO (INA);
30                          READ FILE (INPT) INTO (INB);
31                          READ FILE (INPT) INTO (INC);
32                          ACTIVITY (A) = ACT_IN;
33                          KEY (A,*) = KEY_IN (*);
```

```
                    MAX (A) = MAX_IN;
                    CLIMATE (A,*) = CLIMATE_IN (*);
                    SCENERY (A,*) = SCENERY_IN (*);
                    NAT_ENV (A,*) = NAT_ENV_IN (*);
                    HIST (A,*) = HISTORY_IN (*);
                    TOPOGRAPHY (A,*) = TOPO_IN (*);
                    WATER_QUAL (A,*) = QUAL_IN (*);
                    WATER_QUANT (A,*) = QUANT_IN (*);
                    FISH (A,*) = FISH_IN (*);
                    POPULATION (A,*) = POPULATION_IN (*);
                    ACCESS (A,*) = ACCESS_IN (*);
                    DISVALUES (A,*) = DISVALUES_IN (*);
                    END;
               DO A = 1 TO 10;
                  READ FILE (INPT) INTO (INA);
                  READ FILE (INPT) INTO (INB);
                  READ FILE (INPT) INTO (INC);
                  RIVER (A) = RVR_IN;
                  REACH (A) = REACH_IN;
                  DO B= 1 TO 23;
                     WORK = 0;
                     DO C=1 TO 9;
                          WORK = WORK + (CLIMATE_IN (C) * CLIMATE (B,C));
                          END;
                     WORK = WORK / 10;
                     CL (1) = ROUND (WORK,0);
                     WORK = 0;
                     DO C=1 TO 5;
                          WORK = WORK + (SCENERY_IN (C) * SCENERY (B,C));
                          END;
                     WORK = WORK / 10;
                     CL (2) = ROUND (WORK,0);
                     WORK = 0;
                     DO C = 1 TO 6;
                          WORK = WORK + (NAT_ENV_IN (C) * NAT_ENV (B,C));
                          END;
                     WORK= WORK / 10;
                     CL (3) = ROUND (WORK,0);
                     WORK = 0;
                     DO C = 1 TO 3;
                          WORK = WORK + (HISTORY_IN (C) * HIST (B,C));
                          END;
                     WORK= WORK / 10;
                     CL (4) = ROUND (WORK,0);
                     WORK = 0;
                     DO C = 1 TO 9;
                          WORK = WORK + (TOPO_IN (C) * TOPOGRAPHY (B,C));
                          END;
                     WORK= WORK / 10;
                     CL (5) = ROUND (WORK,0);
                     WORK = 0;
                     DO C = 1 TO 5;
                          WORK = WORK + (QUAL_IN (C) * WATER_QUAL (B,C));
                          END;
                     WORK= WORK / 10;
                     CL (6) = ROUND (WORK,0);
                     WORK = 0;
```

```
                    DO C = 1 TO 6;
                        WORK = WORK + (QUANT_IN (C) * WATER_QUANT (B,C));
                        END;
                    WORK= WORK / 10;
                    EL (7) = ROUND (WORK,0);
                    WORK = 0;
                    DO C=1 TO 4;
                    WORK = WORK + (FISH_IN (C) * FISH (B,C));
                        END;
                    WORK= WORK / 10;
                    EL (8) = ROUND (WORK,0);
                    WORK = 0;
                    DO C=1 TO 3;
                        WORK = WORK + (POPULATION_IN (C) * POPULATION (B,C));
                        END;
                    WORK = WORK / 10;
                    EL (9) = ROUND (WORK,0);
                    WORK = 0;
                    DO C=1 TO 2;
                        WORK = WORK + (ACCESS_IN (C) * ACCESS (B,C));
                        END;
                    WORK= WORK / 10;
                    EL (10)= ROUND (WORK,0);
                    WORK = 0;
                    DO C=1 TO 3;
                        WORK = WORK + (DISVALUES_IN (C) * DISVALUES (B,C));
                        END;
                    WORK= WORK / 10;
                    EL (11)= ROUND (WORK,0);
            WORK = 0;
                    DO C = 1 TO 11;
                        WORK = WORK + ( EL (C) * KEY (B,C));
                        END;
                    WORK = WORK * 100 / MAX (B);
                    VALUE (A,B) = ROUND (WORK,0);
                    END;
                END;
        START:A=1;
            CNT = 1;
        CONT:DO C=1 TO 50;
                IF RIVER (CNT) = ' ' THEN GOTO EOJ;
                ELSE IF RIVER (CNT) ^= RIVER (CNT + 1) THEN GOTO TITLE;
                ELSE;
                CNT = CNT +1;
                END;
        TITLE: B = A;
            RIVER_OUT = RIVER (CNT);
            WRITE FILE (OUTPT ) FROM (TITL);
            WRITE FILE (OUTPT ) FROM (TITLE1);
            X = 1;
            CHIT2 = ' ';
            DO A = B TO CNT;
                TR(X) = T (X);
                X = X + 1;
                END;
            WRITE FILE (OUTPT) FROM (TITLE2);
            WRITE FILE (OUTPT) FROM (BLANK);
```

```
150                SUB = 'CAMPING:';
151                WRITE FILE (OUTPT) FROM (SUBTL);
152                DO B = 1 TO 2;
153                    CALL PRT;
154                    END;
155                SUB = 'FISHING:';
156                WRITE FILE (OUTPT) FROM (SUBTL);
157                DO B = 3 TO 4;
158                    CALL PRT;
159                    END;
160                WRITE FILE (OUTPT) FROM (BLANK);
161                B = 5;
162                    CALL PRT;
163                SUB = 'TRAIL SYSTEM:';
164                WRITE FILE (OUTPT) FROM (SUBTL);
165                DO B = 6 TO 9;
166                    CALL PRT;
167                    END;
168                SUB = 'AESTHETIC ENJOYMENT';
169                WRITE FILE (OUTPT) FROM (SUBTL);
172                DO B = 10 TO 12;
171                    CALL PRT;
172                    END;
173                SUB = 'WATER RECREATIONAL ACTIVITIES:';
174                WRITE FILE (OUTPT) FROM (SUBTL);
175                DO B = 13 TO 15;
176                    CALL PRT;
177                    END;
178                SUB = 'WINTER RECREATION:';
179                WRITE FILE (OUTPT) FROM (SUBTL);
180                DO B = 16 TO 20;
181                    CALL PRT;
182                    END;
183                SUB = 'AREAS:';
184                WRITE FILE (OUTPT) FROM (SUBTL);
185                DO B = 21 TO 23;
186                    CALL PRT;
187                    END;
188                WRITE FILE (OUTPT) FROM (BLANK2);
189                WRITE FILE (OUTPT) FROM (BLANK2);
190                B = 1;
191                DO A = B TO CNT;
192                    BEACH_OUT = BEACH (A);
193                    BEACH_NO = B;
194                    WRITE FILE (OUTPT) FROM (ECH);
195                    B = B + 1 ;
196                    END;
197                CNT = CNT + 1;
198                GOTO CONT;
199            EOJ:CLOSE FILE (INPT), FILE (OUTPT);
200            PRT:PROC;
201                ACT_OUT = ACTIVITY (B);
202                A = B;
203                DO X = 1 TO 8;
204                    BEGH (X) = ' ';
205                    END;
206                DO X = 1 TO 8;
```

```
207                     NEXT (X) = VALUE (A,B);
208                     IF A = CAT THEN GOTO WRITE;
209                     ELSE A = A+1;
210                     END;
211             WRITE:WRITE FILE (OUTPT) FROM (DETAIL);
212                FIN:
213                END;
```

APPENDIX E

INVENTORY SCHEDULE

RIVER

_____

RIVER

_____

REACH

_____

CORRIDOR UNIT CODE

REACH

DATE: _____

FIELD CREW:

_____

_____

_____

A. CLIMATE

(1) LENGTH OF SEASON FOR GIVEN ACTIVITY.

LENGTH OF SEASON, IN MOS.	RATING
1	1
2	2
3	3
4	3
5	4
6	5
7	6
8	7
9	8
10	8
11	9
12	10

(2) AVERAGE SEASONAL TEMPERATURE.

(a) SUMMER PERIOD.

TEMPERATURE IN °F	RATING
30	3
35	4
40	5
45	6
50	7
55	8
60	9
65	10
70	9
75	8
80	7
85	6
90	5
95	4
100	3
110	2
115	1

(b) WINTER PERIOD.

TEMPERATURE IN °F	RATING
<(-10)	0
(-10)-(-7)	1
(-6)-(-3)	2
(-3)-(0)	3
0 - 3	5
4 - 6	6
7 - 10	7
11 - 14	8
15 - 18	9
19 - 21	10

21 - 23	9
24 - 27	7
28 - 30	3
>30	0

(3) AVERAGE PERCENTAGE OF CLEAR DAYS.

PERCENTAGE	RATING
10	1
20	2
30	3
40	4
50	6
60	8
70	10
80	5
90	3
100	1

(4) AVERAGE SEASONAL SNOWFALL.

INCHES OF SNOW	RATING
<12	0
12 - 18	2
19 - 24	4
25 - 30	6
31 - 36	8
37 - 42	10
43 - 48	8
49 - 54	6
55 - 60	4
>60	2

(5) MICROCLIMATES.

	RATING
NO DIFFERENCE	0
LITTLE DIFFERENCE	1 - 4
SOME DIFFERENCE	5 - 8
CONSIDERABLE DIFFERENCE	9, 10

(6) WIND VELOCITY.

WIND VELOCITY (M.P.H.)	RATING
0	7
1	8
2	9
3	10
4	9
5	8
6	6
7	5
8	4

9	3
10	2
>10	0

B. SCENERY

(1) LANDFORM SCENERY (SUM (a) AND (b)).

(a) AVERAGE HEIGHT/WIDTH

	RATING
.5	1
1	2
2 - 3	3
3 - 5	4
>5	5

(b) CHANNEL PATTERN

	RATING
STRAIGHT	1
REGULAR MEANDER	2
TORTUOUS MEANDER	5
IRREGULAR MEANDER	3

RATING: _____

(2) LAND USE CAPABILITY CLASSES.

CLASS	RATING
INDUSTRIAL	1
COMMERCIAL	2
PUBLIC UTILITIES	3
COMMUNITY SERVICES	4
SCHOOLS AND UNIVERSITIES	5
MULTIPLE FAMILY HOUSING	6
SINGLE FAMILY HOUSING	7
AGRICULTURAL	8
PARK	9
WILDERNESS	10

(3) PERCENTAGE OF CORRIDOR TREED ALONG RIGHT OF WAY. RATING:-

1 POINT FOR EACH 10%.

(a) PERCENTAGE TREE COVER. %_____

(b) PERCENTAGE OTHER AND SPECIFY. %_____

(c) SPECIES.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

RATING:_____

(4) DIVERSITY OF SCENE. RATING:- ADD POINTS FROM (a) AND (b).

(a) AVERAGE VALLEY WIDTH (FT.)	RATING
>100	1
100 - 300	2
300 - 500	3
500 - 1000	4
71000	5

(b) ANGLE OF VISION — RATING

CONFINED	0
SINGLE GEOMORPHIC FORM	1
NEARBY SCENE	2
VISTA (VIEWS UP TO 90°)	3
PROSPECT (VIEWS 90° - 180°)	4
PANORAMA (VIEWS 180° - 360°)	5

RATING:

(5) SPECIAL VIEWS. RATING:- 1 POINT FOR EACH FORM AND MATERIAL UP TO 10.

FORM:

MATERIAL:

RATING:

C. NATURAL ENVIRONMENT

(1) % CORRIDOR LENGTH IN TREE COVER. RATING:- 1 POINT FOR EACH 5% UP TO 50%._____

(2) % CORRIDOR LENGTH IN FIELDS. RATING:- 1 POINT FOR EACH 5% UP TO 50%._____

(3) % CORRIDOR LENGTH IN PARK USE AND NATURAL AREA. RATING:- 1 POINT FOR EACH 10%._____

(4) VEGETATION OCCURRENCE AND ABUNDANCE. RATING:- SEVERELY URBAN, 0; SPARSELY POPULATED, LITTLE VARIETY, 1 - 4; AVERAGE POPULATION, MODERATE VARIETY, 5 - 7; AVERAGE POPULATIONS,GREAT VARIETY, 8; ABUNDANT POPULATIONS, GREAT VARIETY, 9, 10.

TREES AND SHRUBS: _____

WILDFLOWERS: _____

FERNS AND MOSSES: _____

OTHER VEGETATION: _____

_____

_____

RATING: _____

(5) WILDLIFE SPECIES ABUNDANCE AND OCCURRENCE. (OTHER THAN FISHES) RATING:- AS ABOVE (4).

_____

BIRDS: _____

_____

MAMMALS: _____

_____

REPTILES: _____

_____

INSECTS: _____

_____

OTHER FORMS: _____

RATING: _____

(6) UNUSUAL, UNIQUE, OR RARE SPECIES/HABITATS. RATING:- ONE POINT FOR EACH SPECIES OR HABITAT UP TO 10.

RATING:

D. HISTORICAL VALUES

(1) ABUNDANCE AND OCCURRENCE HISTORIC SITES, STRUCTURES, LANDMARKS.

RATING:

(a) LOCAL SIGNIFICANCE, POOR, 0 - 4, GOOD, 5 - 8, EXCELLENT, 9, 10.

(b) REGIONAL SIGNIFICANCE, POOR, 0 - 4, GOOD, 5 - 8, EXCELLENT, 9, 10.

(c) NATIONAL SIGNIFICANCE, POOR, 0 - 4, GOOD, 5 - 8, EXCELLENT, 9, 10.

STRUCTURES:

SITES:

LAND LANDMARKS: _____

_____

_____

_____

LIVING MUSEUMS: _____

_____

OTHER, SPECIFY: _____

_____

E. PHYSIOGRAPHY

(1) BED-SLOPE. THE SLOPE FROM THE SHORE TO A 5' WATER DEPTH IS RATED AS

725%	0
21% - 25%	2
15% - 20%	4
10% - 14%	6
5% - 9%	8
<5%	10

RATING: _____

(2) DRY FORESHORE WIDTH.

NON-EXISTENT	0
NARROW	4
WIDE	8
VERY WIDE	10

RATING: _____

(3) DRY FORESHORE MATERIAL.

*AQUATIC NUISANCES	1
MUD	2
JAGGED BEDROCK	3
MIXED STONES	5
GRAVEL AND PEBBLES	7
SILT, CLAY	9
SAND	10

*STUMPS, ROCKS, VEGETATION

RATING: _____

RATING: _____

F. WATER QUALITY

(1) D.O. mg/l.

<3.0	0 - 2
3.0 - 4.0	3 - 5
5.0 - 10.0	5 - 10

RATING: _____

(2) COLIFROM BACTERIA IN M.P.N.

≥2400	0 - 2
>1500<2400	3 - 4
>240<1500	5 - 8
<240	9, 10

RATING: _____

(3) pH.

<6.5	0 - 4
6.5 - 7.0	5 - 9
7.0 - 8.0	9 - 10
8.0 - 8.3	5 - 9
78.3	0 - 4

(4) CLARITY.

.5'	0
1'	1
2'	2
3'	4
4'	6
5'	8
5'+	10

RATING: _____

(5) OCCURRENCE OF FLOATING MATERIAL, SUSPENDED, AND SETTABLE SOLIDS, OIL AND OTHER EVIDENCES OF POLLUTION.

VISIBLE, ATTRIBUTABLE TO PERMANENT POLLUTION SOURCE.	0 - 2
INFREQUENT VISIBLE OCCURRENCES, ATTRIBUTABLE TO INTERMITTENT SOURCE	3,4
NONE VISIBLE, POLLUTION SOURCE EXISTS	5,8
NONE	9,10

TYPE: _____

_____

_____

_____

_____

RATING: _____

(6) WATER TEMPERATURE. RATING:- ASSIGN A VALUE OF 10 TO A RANGE OF WATER TEMPERATURES 32°F - 85°F. ABOVE 85°F, 3.

TEMPERATURE: _____ °F

RATING: _____

G. WATER QUANTITY

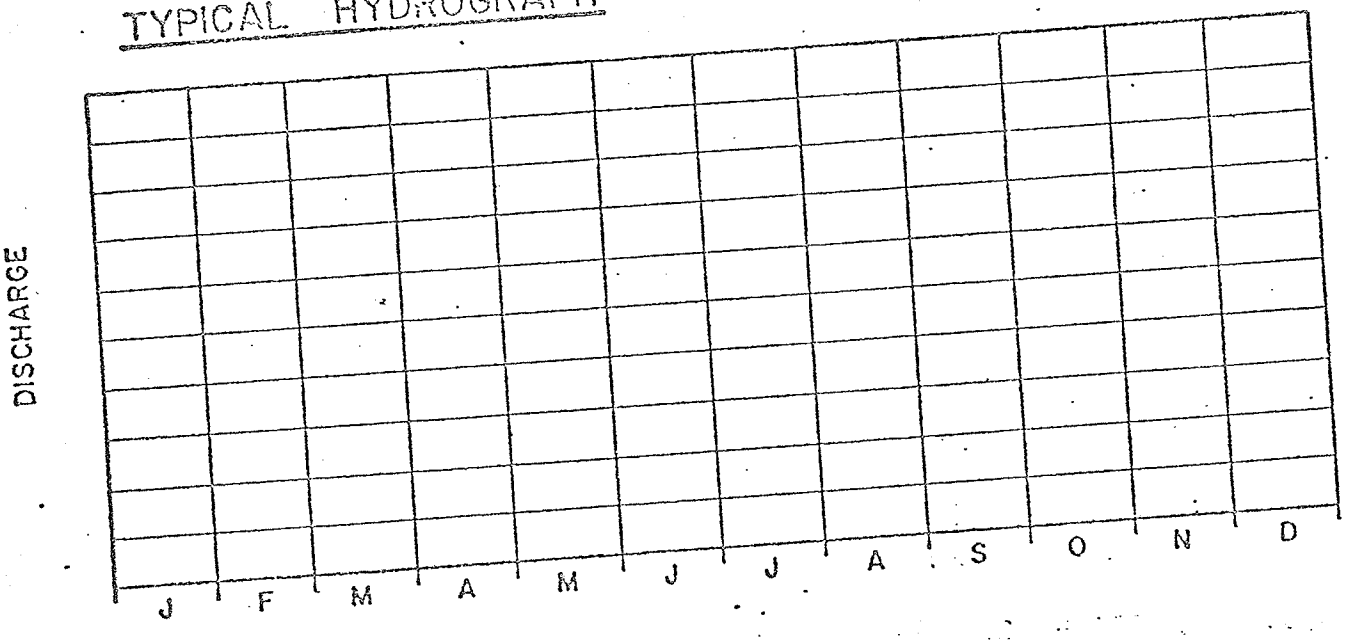
(1) PROBABILITY OF MAINTAINING A CONTINUOUS VISIBLE FLOW. RATING: - 1 POINT FOR EACH 10% PROBABILITY. INCLUDE HYDROGRAPH.

RUNOFF IN ACRE FT.	_____ ACRE FT.
NO. OF NATURAL SPRINGS	
NO. OF STORM SEWERS	_____ FLOW c.f.s.
GROUND WATER TABLE DEPTH	_____ FT.

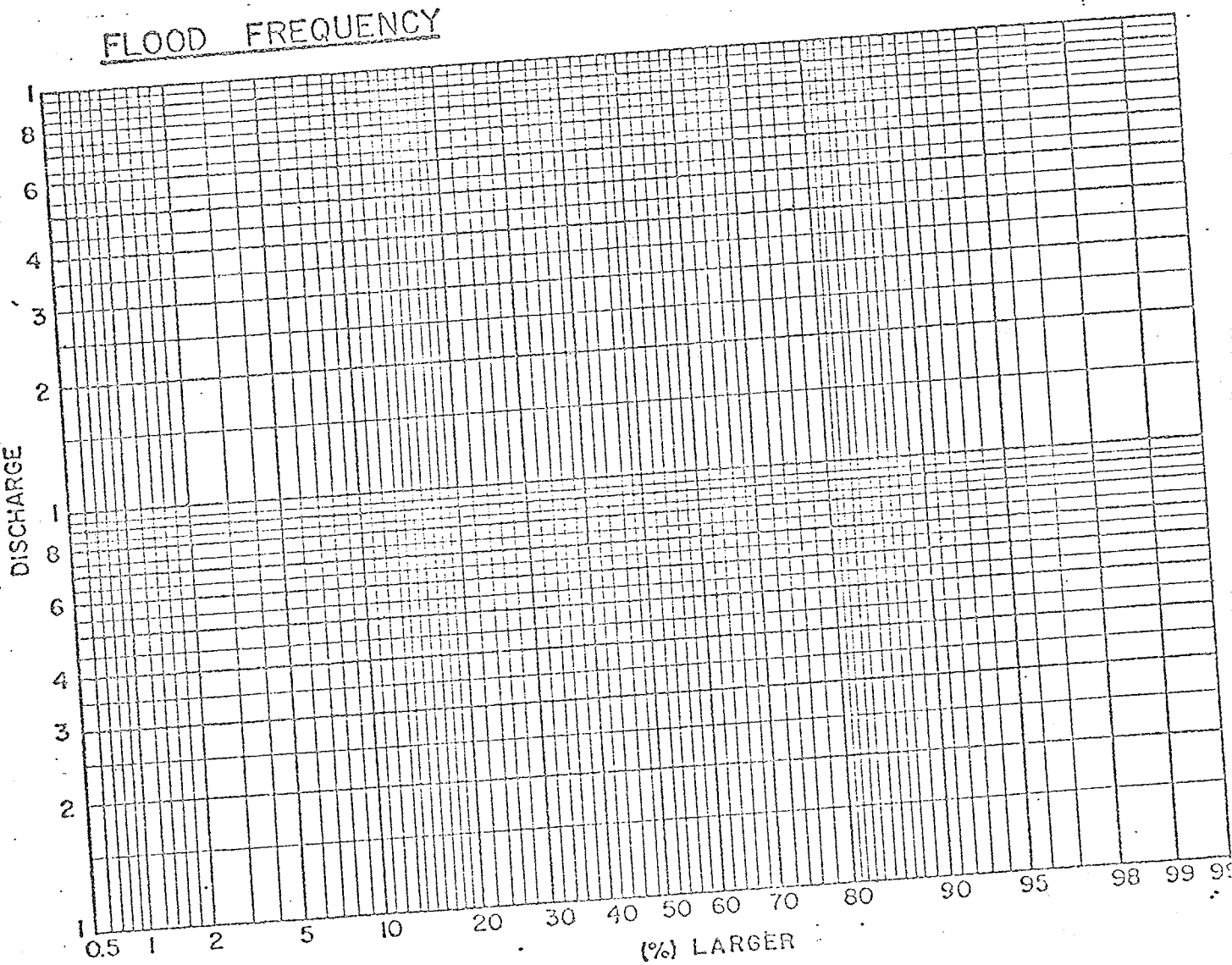
RATING: _____

(2) FREQUENCE CURVE. - RATING - SELECT 1:25 YR. FLOOD. ALLOW 1 POINT FOR EACH 10% PROBABILITY.

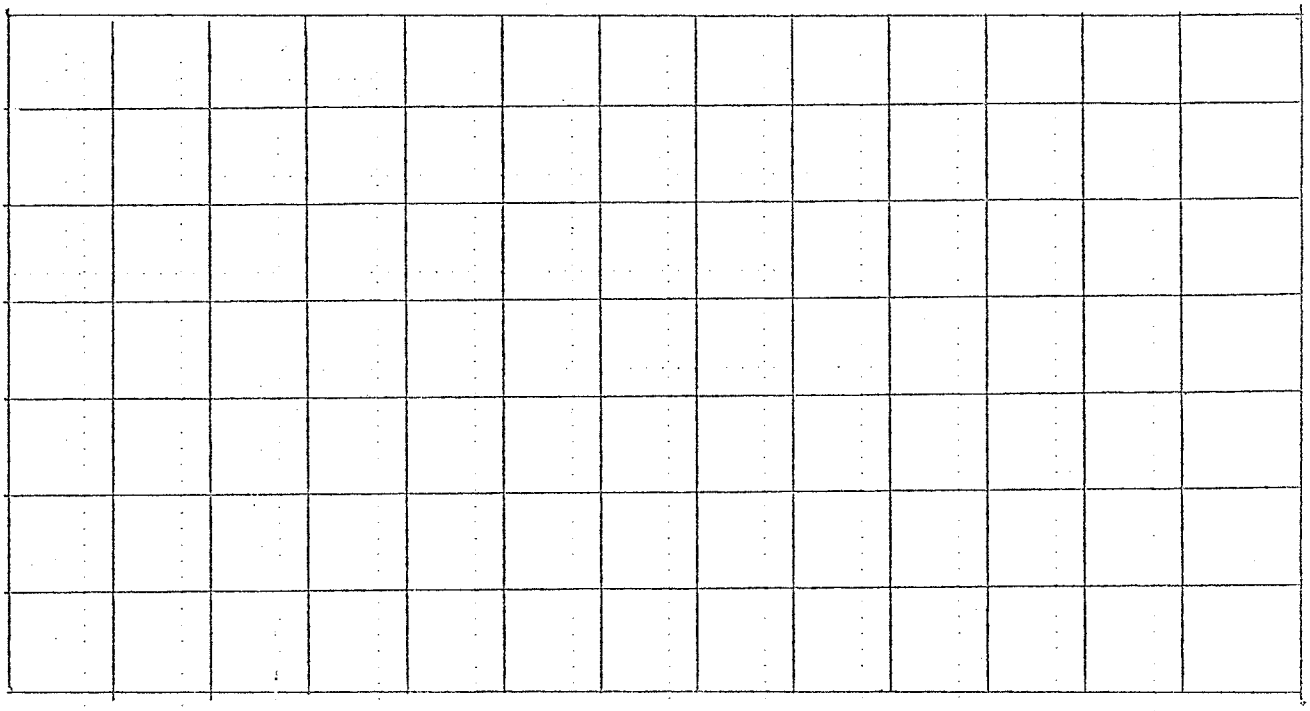
TYPICAL HYDROGRAPH



FLOOD FREQUENCY



RATING CURVE



(3) WATER SURFACE WIDTH (FT.)

<3	1
3 - 10	3
11 - 30	5
31 - 50	7
51 - 75	8
76 - 100	9
>100	10

RATING: _____

(4) MID-CHANNEL WATER DEPTH (FT.). SCHEDULE (a)

<.5	0
.5 - 1	1
1 - 2	5
2 - 5	8
>5	9, 10

RATING: _____

SCHEDULE (b) USE FOR BOATING ONLY.

DEPTH IN FEET	RATING
<5	0
6	5
7	7
8	8
9	9
>9	10

RATING: _____

(5) FLOW VARIABILITY AND VELOCITY. RATING:- ADD POINTS FROM (a) and (b).

(a)

FLOW VARIABILITY	RATING
LARGE VARIATION	1
EPHEMERAL	2
INTERMITTENT	3
NORMAL	4
LITTLE VARIATION	5

(b)

VELOCITY (FT./SEC.)	RATING
>8	0
4 - 8	2
2 - 4	5
1 - 2	3
<1	1

RATING: _____

H. FISH POPULATIONS

(1) ABUNDANCE AND OCCURRENCE OF COARSE FISH SPECIES.

ABUNDANT	0
FREQUENT	3 - 5
INFREQUENT	6 - 8
RARE	9, 10

SPECIES: _____

_____

_____

_____

_____

RATING: _____

(2) THE OCCURRENCE AND ABUNDANCE OF SPORT FISH SPECIES.

RARE	0 - 2
INFREQUENT	3 - 5
FREQUENT	6 - 8
ABUNDANT	9, 10

SPECIES: _____

_____

_____

_____

_____

RATING: _____

(3) THE OCCURRENCE OF PERMANENT POOLS IN WATERWAY SEGMENTS.

RATING:- 1 - 5; 2 OR MORE 10.

NUMBER PER MILE

RATING: _____

(4) FISH MANAGEMENT: RATE UNDER (i), (ii), (iii).

(i) FISH MANAGEMENT INFORMATION IS SCIENTIFICALLY AND PERIODICALLY GATHERED (GROWTH, SURVIVAL, ETC.)	10
(ii) INFORMATION IS GATHERED UNSYSTEMATICALLY.	5
(iii) INFORMATION IS UNAVAILABLE.	0

RATING: _____

I. POPULATION CHARACTERISTICS

(1) AGE. RATING:- ADD OR DEDUCT 1 POINT FOR EACH 1% BY WHICH THE % OF THE MEAN POPULATION IS ABOVE OR BELOW THE NATIONAL PERCENTAGE. THE NATIONAL PERCENTAGE IS RATED 5.

RATING: _____

(2) EDUCATION LEVEL - ADD OR DEDUCT ONE POINT FOR EACH 1% OF THE LOCAL POPULATION WHICH HAS ATTENDED AN INSTITUTION FOR HIGHER LEARNING AND IS ABOVE OR BELOW THE NATIONAL AVERAGE. THE NATIONAL AVERAGE IS ASSIGNED A RATING OF 5. NATIONAL AVERAGE _____ %

RATING: _____

(3) INCOME LEVEL - ADD OR DEDUCT ONE POINT FOR EACH $500 BY WHICH THE LOCAL AVERAGE INCOME IS ABOVE OR BELOW THE NATIONAL AVERAGE. THE NATIONAL AVERAGE IS ASSIGNED A RATING OF 5. NATIONAL AVERAGE:$ _____

RATING: _____

J. ACCESSIBILITY

(1) LOCAL ROADS. RATING:- APPRAISE THE ROAD NETWORK UNDER BELOW CATEGORIES AND RATE ROADS AS: POOR, 0 - 4, GOOD, 5 - 8, EXCELLENT, 9,10.

(a) DIRECTIONS OF TRAVEL TO RECREATION SITES.

_____

_____

(b) ADEQUACY OF ROAD SURFACE.

_____

_____

(c) GEOMETRICS.

_____

_____

RATING: _____

(2) ACCESSIBILITY TO CORRIDOR.

(a)	NO ACCESS TO CORRIDOR,	0
(b)	I ACCESS ROUTE TO CORRIDOR,	3
(c)	TWO OR MORE ACCESS ROUTES TO CORRIDOR	5
(d)	SOME BARRIERS, ACCESSIBLE,	7
(e)	NO BARRIERS, EASILY ACCESSIBLE,	10

RATING: _____

K. DISVALUES

(1) DISVALUES WHICH DETRACT FROM THE ENJOYMENT OF A RECREATIONAL ACTIVITY OR THE MAINTENANCE OR PRESERVATION OF A NATURAL, SCENIC OR HISTORIC AREA. IDENTIFY AND ASSIGN A NEGATIVE VALUE AS: LITTLE OR NO DETRACTION, (-) 0 - 4; MODERATE DETRACTION, (-) 5 - 8; AND SEVERE DETRACTION (-) 9, 10.

(a) NOISE: _____

_____

(b) SMELL: _____

_____

(c) VISUAL: _____

_____

(d) NEGATIVE LANDSCAPE FEATURES: _____

_____

_____

_____

_____

RATING: _____