ABSTRACT

RIVER VALLEY LANDS IN SOUTHWESTERN ONTARIO

by Edward J. Weber

Rivers and their valleys were often the site and focal point of newly developing communities during the early days of settlement in Southern Ontario. As the province developed, however, new functional orientations evolved, obliterating the old, and, as a consequence river valleys lost their earlier importance. Today, their wooded slopes and relatively undeveloped nature have a new value, that of open space in a rapidly urbanizing area. This paper is concerned with the problem of assuring protection of this open space along river valleys and its proper development for public enjoyment.

This study presents a method whereby river valley lands can be quickly, conveniently and clearly defined and then integrated into the planning structure of Ontario. This procedure utilizes air photo interpretation, land use mapping, landscape analysis and various other techniques and approaches used by geographers in areal studies. As a result of this areal survey and analysis boundaries can be drawn along both sides of river valleys, defining a schematic environmental corridor which should be protected in the immediate future. More detailed valley development and land use would come later with further, more intensive study in specific locations.

The present study examines and demonstrates the value of river valley lands in Southwestern Ontario and presents a method by which they can be protected and developed to afford their optimum beneficial use by the people of Ontario.

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IN SOUTHWESTERN ONTARIO

By

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CHAPTER I

INTRODUCTION

Rivers were often the front door of newly developing communities during the early days of settlement in Southern Ontario. They provided power, transportation, water, and in their valleys, convenient building sites. With increasing population and development over the years, this original orientation became relatively less important. The forests were removed to make way for farms, electric power replaced water power and the construction of roads and railroads resulted in transportation and settlement patterns away from the rivers. Forgotten, except when they overran their banks at floodtime, the rivers were doomed to the ignominious function of carrying unwanted wastes away from one community into the back yard of the next. They flowed now at the back door of established communities, unwanted, unwatched and desecrated; their banks a place to dump garbage and fill; their valleys abused.

Today, more attention is being given to rivers and their valleys as they take on a new value. Potentially, these river valleys are important aspects of the Ontario landscape which should be protected and developed as areas where the community can maintain its contact with nature, obtain the healthful benefit of outdoor recreation or just experience the feeling of unrestricted freedom which comes from adequate open space. The present study is concerned with the problem of assuring the protection of this open space along river valleys and its proper development for public enjoyment. To deal properly and adequately with this concern, a greater basic knowledge of the areas in question is a necessity. Problem areas must be identified and analysed. On this basis of fact, uninformed guessing can be

minimized in planning for maximum resource use, and remedies for the problem situations can be sought and put into action.

In today's complicated urban society man can no longer afford to be casual about the many land use problems which face him. In a discussion of present day needs for proper controls to assure optimum land resource use, a planner suggests:

> Our plans need to be realistic and practical, yet they must be made with vision, knowledge and imagination if we are not to barter future health and happiness for any easy solution to some present problem.[1]

In order to comply with this suggestion, basic land uses must be studied and mapped. The present location of each category of land use must be ascertained, and from this basis the future land use pattern can be determined.

A basic assumption in the development and thinking of this study is the fact that open space where man can come in contact with and feel a part of nature is a necessary component of his environment. There is substantial evidence to show that this assumption is valid and most authorities--planners, recreationists, educators and psychologists--would agree with it even though they might have a wide variety of opinions concerning the actual amounts, uses and activities related to this open space. Many reports have been prepared which consider the question of open space and affiliated problems and many articles have been published which extol its virtues in a very general way. The United States Government is vitally concerned with the provision of adequate opportunity for all its citizens to enjoy outdoor recreation in one

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[1]W. A. Rowlands, "Today's Need for Planning and Zoning," Journal of Soil and Water Conservation Vol. 17, No. 2 (March-April, 1962), p. 62.

form or another. This fact can be witnessed by the voluminous reports compiled on the subject and all its related aspects by the Outdoor Recreation Resources Review Commission of the Federal Government. In Canada the same concern is expressed in a number of papers presented at the Resources for Tomorrow Conference held in Montreal in 1961.

A brief look at some physical and demographic aspects of Ontario shows a growing demand for the provision of this open space in certain areas. Eighty-eight per cent of the population lives in Southern Ontario which comprises only seven per cent of the total land area of the province. Of this seven per cent, a large part is on the unproductive and relatively unpopulated Canadian Shield concentrating the population in the more favored areas between the Great Lakes. Population is growing rapidly for, during the period 1951 to 1961, net population growth in the province was over half a million, a rate of almost 38 percent or nearly seven per cent higher than the national rate of growth.[1] This growth took place almost entirely in the urbanized areas adding to the 80 per cent of the population of Southern Ontario which lives in towns or cities of more than 5000 inhabitants. Along with this urban growth there has been a net decrease in rural population as a result of the current trend to specialization and mechanization in agriculture. The population pattern of Ontario seems generally set, then, with the great majority of future increases likely to concentrate even more in the rapidly expanding cities, particularly Metropolitan Toronto.

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[1]P. Camu, E. P. Weeks, and Z. W. Sametz, Economic Geography of (Toronto: McMillan of Canada, 1964), p. 79.

The concentration of Ontario's population into one small corner of its areal expanse creates real problems in providing adequate open space. Only five per cent of the province's park area is located here to serve the 88 per cent of the resident population who may wish to use it on a regular basis. In addition, the future structure of Ontario cities will be quite different from the sprawling megalopolis of the past 20 years.[1] There is a definite trend toward downtown living and the high density patterns of high rise apartments accentuates the need for adequate open areas throughout a city adjacent to where people live.

In 1960, Ontario's population figure stood at slightly over six million and it is estimated that, by the year 2000, this figure will double to over twelve million. Planners suggest that a minimum of ten acres of readily available parkland should be provided for each 1000 population. The most critical area of Southern Ontario is the Oshawa to Niagara Falls triangle around the western end of Lake Ontario where the total parkland available publicly in 1960 was about 3000 acres. Today it should have 42,000 acres of parkland and by the year 2000, 96,000 acres should be provided.[2] These are the minimum figures for publicly developed parkland and do not take into account the further recommendation that an additional ten acres of undeveloped open space lands be provided per 1000 population. It is readily apparent that if these needs are to be met some basic research and planning must be done immediately into means by which they can be satisfied.

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[1]Camu, p. 64.

[2]The Conservation Council of Ontario, A report on Land use (Toronto, Sept. 1, 1960), p. 24.

It is not difficult to reserve large parks on isolated Crown Lands in the forested wilds of Northern Ontario where little or no cost is involved and alternative uses are limited. Where population is more dense, however, the competition from other uses is great making resources of land and water scarce and expensive. As a result, public park development as well as reservation of conservation lands and open space is lagging. A large part of the conflict normally comes with the demand for development of park type land for private residential uses. As an example, there is almost no public land or parks available along the Western end of Lake Ontario between Oshawa and St. Catharines, exactly the area where it is most needed.

Unfortunately, the value of open space is not recognized by many people who are influential in developing the urban landscape and who use as their pragmatic guide the sign of the dollar. Great pressure is often brought to bear on those seeking to preserve open space to give up this space to "useful" purposes. The intimation here, of course, is that open space is unused space and, therefore, wasted space. In most of these battles the open space proponents are hard put to defend their argument because it is extremely difficult to assess the value of their particular use for the land while their pragmatic antagonists are usually dealing with developments to which a high monetary value can be imputed. The intrinsic values of the land are often outweighed by more concrete, man-made extrinsic ones. More definite plans and clearer, firmer economic benefits than those of open space and parkland are usually offered by many other land uses.

The discussion thus far leads to the conclusion that the use of open space has not been well planned or its area delineated and that long range plans for its protection are needed. In many cases, the lands most amenable to open space uses and recreation developments are not well suited to other uses.

Examples of these lands are river valley lands which include flood plains, steep slopes, low lying wetlands, and valley sides. Lands of this kind can be found along the river valleys of Southwestern Ontario in linear patterns and interconnected networks which could well provide the basis for a good deal of the open space needed. An evaluation and study of these lands delineating areas for public development and protection as well as determining means of bringing this objective about is badly needed. The present study is addressed to this end.

This study has begun with the discussion of a specific problem; a need in a Southern Ontario setting. Before going on to the analysis of river valley lands as open space and an application of the findings to a particular study area, it may be well to pause and consider what tools, techniques and insights geography can lend to such a study.

CHAPTER II

GEOGRAPHY AND PLANNING

Geography from its very beginning has been concerned with space: space in which to live, space in which to work, space to be exploited or conquered, space and its content. It has developed and upheld a concern to interpret and understand, through areal studies, the use of space on the earth's surface. Man has been able to use this knowledge in guiding the further use and development of the natural resources he has at hand.

Before any kind of planning can be done, a solid base of facts is necessary on which to build a plan. Inventory studies are often essential in gaining these facts and may include analysis of the relationships among various phenomena that go to make up what may be called a landscape. Such inventory studies have been an important part of geographical work since the days of exploration. Today they still retain a central position in work done by geographers but the focus of the study, the methods utilized and the end results have become infinitely more complex and detailed.

Originally, inventories merely recorded what the geographer thought he saw basically consisting of a description of various phenomena and a simple map. There was little concern for analysis or integration. Such inventories were performed on a very generalized scale and helped man satisfy his curiosity about what lay beyond the next mountain range or around a river bend. This orientation was prevalent in the days of exploration when broad expanses of unknown territory had to be covered and was a useful method of gaining a conception of the total picture.

As more and more people settled the wide open spaces of the North American continent and population grew, problems of land use developed in many forms. Probably one of the most significant of these problems in early days was the agricultural exploitation of land. It is difficult, if not impossible, to solve a problem if little is known about its component parts. The early soil surveys and the land capability classifications based on the surveys provided an answer to the agricultural land use problem. After inventory and analysis of a particular situation, these studies went on to show how the various soils could be used for optimum benefit.

The same observations can be made in relation to urban studies and planning. Here a more intense, more detailed analysis was needed to ascertain the basis on which future development could be planned. As urban problems became more complex, more sophisticated means of dealing with the data gathered were necessary. As a result, complicated statistical analysis has become a part of the set of tools which can be used by the geographer in his attempts to understand and explain the total reality of an area. Further still, some contemporary geographers are developing models to explain integrated and functional relationships and various occupance and development patterns. Through these models they can better understand spatial problems and try to predict future areal patterns in order to plan adequately for them.

Descriptive inventory is not enough if a problem calls for detailed analysis. On the other hand, a very detailed quantitative approach is not needed for a simpler, less complicated study. This is the case in the present concern with river valley lands, which is based on a qualitative evaluation and

inventory. Quantification of the various phenomena would not make evaluation more exact or objective since it would still have to be based on an initial subjective evaluation. Only in making comparisons between various areas and in ranking them would quantification be an aid.

The purpose here has been to show how geographical work provides a substantial background on which planners can base their planning. At present, geographers are applying their knowledge and techniques to the study of the increasingly complex nature of the environment in which we live and its development. Professor Ralph Krueger at the University of Waterloo suggests that geography and planning can be viewed as parts of a continuum with "pure geography" at one pole and planning at the other.[1] The extreme poles of this continuum are likely to be theoretical in nature but somewhere in between they grade into each other as the actual work done by each is carried out. But the direction of travel is from geography which provides the basis for the action planning carries out.

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[1]From personal conversation with Dr. Krueger at the University of Waterloo, Feb. 11, 1966.

CHAPTER III

A SURVEY METHOD FOR RIVER VALLEY LANDS

The map is the geographers primary tool in understanding and compiling the multitude of data encountered in areal studies. The reason for this is inherent in the essential character of a map, a representation of reality at a generalized and reduced scale which can be readily handled and comprehended. It can also be used to show relationships between phenomena mapped and provide a basis for analysis and evaluation of the importance and meaning of those relationships. Indeed, mapping, analysis and conclusions are so closely allied in the procedure of mapping that all three are likely to be carried out simultaneously in the process.

The map is thus an analytical tool and it stands to reason that it should not be a simple mechanized compilation of various categorized phenomena. It takes imaginative interpretation to show spatial interrelations adequately and correctly. To do this Ullman suggests that mapping must be geared to concepts.[1] This means that the categories and regions used in mapping must be determined by the purpose of the study to be undertaken so that the final product will show what is intended. If it is to be of value for more than inventory, it must show or provide information for both estimating the location and extent of major land uses and the comparison of present use with the assessed capability of the land.[2] The geographer who would use this tool must continually be on guard lest it become a stereotyped procedure not

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[1]E. L. Ullman, "Human Geography and Area Research," Annals of the Association of American Geographers Vol. 43, (1953), p. 57.

[2]J. B. McClellan, "The Land-Use sector of the Canada Land Inventory," Geographical Bulletin Vol. 7, No. 2, (1965), p. 74.

necessarily suited to his purposes.

The Concept

The basic concept employed in providing a classification for the mapping of river valley lands in this study is affiliated with the idea of open space protection and development and the proper use of all natural resources along the valley. It views valley lands as linear patterns on the landscape which form "environmental corridors"[1] that can help integrate and tie the whole landscape together into meaningful and variegated whole. The final result should be part of a plan for the development of an optimum total land use pattern across the Southern Ontario peninsula.

Within the river valleys and along their slopes further local patterns may be found. These local patterns and the relationships between the various phenomena of which they are composed can also be analysed as part of the overall pattern. In planning for the use of river valley lands, the following problems encountered within the valleys must be considered and taken into account in the compilation of categories for valley land use mapping.

1. Protection of life and property on floodplains.
2. Protection of scenic lands for aesthetic appeal.
3. Improvement of public health, welfare, and well-being by providing recreational opportunities and a good environment.
4. Improvement of eroding slopes and river banks.
5. Protection and utilization of economic resources.

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[1]P. H. Lewis, Jr. and R. W. Oertel, "Landscape Planning for Regional Recreation," Focus on Resource Conservation: I, Outdoor Recreation: Its Impact Today, (Ankeny, Iowa: Soil Conservation Society of America, 1964), p. 19.

Under each one of these points a number of questions may be asked to help in evaluating the significance of the problem or the beneficial aspects of the feature or features under consideration. In many cases, if not most, the answers to these questions may be obvious. In spite of this, they must be asked to determine if there are some hidden or not so obvious relationships inherent in the situation which might suggest further questions, investigation and analysis.

Protection of Life and Property on Floodplains

-- What areas are subject to flooding?

-- How frequently does flooding take place?

-- How severe is flood damage liable to be as a result of various flood intensities?

-- Does present land use accentuate the severity of flooding and invite an increased damage toll?

-- Are there advantages to locating on floodplain lands?

-- Do these advantages offset the liabilities of such locations?

-- Are there any technological answers to reducing the liability?

Protection of Scenic Lands for Aesthetic Appeal

-- What and where are these scenic lands?

-- What are the components of the landscape which make it appealing?

-- How do the above components fit into the overall landscape?

-- In terms of land use, why are these components where they are and is there a reason for their present use?

-- Are the present uses compatible with the natural physical features and with each other?

-- Could better use or more intensive use be made of the areas in question?

-- By what means can these lands be protected?

It is well accepted that parks, open space and recreation facilities are important for the welfare, well-being and general health of the public. The questions then arise:

-- Where should these facilities be located?

-- What natural features of the landscape are available--e. g. topography, water, vegetation patterns, etc. --which might contribute to the development of these amenities?

-- What facilities might be provided?

-- Where do various recreation uses fit in with other land uses?

Improvement of Eroding Slopes and River Banks

Eroding slopes, some of them very high and steep, are common along many rivers in Southwestern Ontario, especially in the hilly morainic belts. Their protection and improvement is imperative to prevent loss of property, property damage, silting of river channels downstream and water pollution due to heavy silt loads.

-- Where are the eroding slopes located?

-- How fast are they eroding back?

-- Are buildings likely to be endangered?

-- Is there any activity above, below or adjacent to the slope which might aggravate the situation?

-- What measures can be taken to stabilize or reduce the erosion process?

-- What are the economics involved in the situation?

Protection and Utilization of Economic Resources

-- What are these resources?

-- Where are they located?

-- Is there a market presently or the possibility of one in the future for these resources?

-- Could these resources be lost in the future because of improper planning and development?

-- Could exploitation of these resources in an improper way be deleterious to the general public interest?

-- What controls or protection should be considered to assure proper exploitation of these resources?

The foregoing are the main concepts to be kept in mind and some of the questions to be asked in analysing and studying river valley lands. As a basis for finding answers to these questions, it is necessary to start from the present land use pattern and here a properly devised map can become a useful tool. The map used in this study is intended to provide a basis for delineating valley and conservation lands in a clear and distinct manner based on the justification provided by the results of the analysis set forth above.

It is now necessary to consider the answers to some of the above questions in order to arrive at a land use classification system which will depict the significant features of the landscape in terms of the basic intention of this study.

Defining the Landscape Components

Landscapes offering a potential for recreation in its broadest terms usually include certain unique features which appeal to the emotions. They must offer more than mere space for activity or a dull, featureless open area. Objects should be available with which the individual can identify in some conscious or subconscious way. Such landscapes almost invariably include water in some form as a basic resource. Accentuated topography and varied vegetation patterns are usually in evidence as well. It is the components of these patterns which can be used in preparing a map for the delineation of

lands for recreational purposes. A consideration of these components and how man perceives them should lead to the development of the generalized land use categories necessary for the construction of maps.

What is there about a landscape, a view or a nature scene, which pleases or repels people of various backgrounds and inclinations? The appreciation of a landscape or view of any kind is usually more an emotional, spiritual experience than it is an intellectual one. For most people, it is not the scene before them which generates the pleasing or repulsive emotions: rather, a whole congeries of feelings is called up related to what the particular person is and thinks. These feelings are the result of subconscious, idealistic imaginings and impressions which are intimately related to that person's experiences in the past. No matter how "natural" landscapes may look, most have been greatly altered by man. Thus, when for instance, a person views a wilderness landscape, he is likely to be aware of the feelings that his concept of "wilderness" brings to his mind and not of the actual landscape which lies before him. He talks about a "sublime" or "lovely" view because that is the feeling he experiences as he surveys it.[1] This discussion can only be a very cursory introduction to an obviously involved psychological phenomenon but it does shed some light on the problem of landscape analysis.

The components of a landscape which contribute to perceptual quality and which are most commonly sought by people for a recreational environment are composed of both natural and man-made features. Table 1 lists

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[1]D. Lowenthal, "Not Every Prospect Pleases: What is Our Criterion for Scenic Beauty?", Landscape Vol. 12, No. 2, (Winter 1962-63), P. 19.

these landscape values and indicates what some of their uses may be. The table is divided into two columns showing (a) Natural resources possessing intrinsic values and (b) Man-made resources possessing extrinsic values. The latter are often affiliated with and dependent on the former. In the following paragraphs, lines, texture, topography, openness, water, man-made features and qualities of the landscape will be discussed in an attempt to evaluate their contribution to the overall view.

TABLE 1. Landscape Values, Natural and Man-Made[1]

A. Natural Resources (Possessing intrinsic values)	B. Man-Made Resources (Possessing extrinsic values)
WATER RESOURCES	
Waterfalls	Access roads and paths
Rapids, white waters	Swimming facilities
Boating waters	Boating facilities (docks, ramps, cranes)
Bathing beaches	Portages, haul-overs, boathouses
Natural springs and artesian flows	Repair shops, fuel stations, supply stores, concession stands
Canoe routes	Harbors of refuge, marinas
Islands	Beach houses, campsites
Fish habitat	Canals, levees, locks
	Dams, fishways, drainage ways, reservoirs
	Millponds, fish spawning areas
	Pumping installations
	Fish hatcheries (public and private)
	Ice-skating accommodations
WETLAND RESOURCES	
Good, fair, poor (drainable and undrainable)	Observation platforms
Pothole	Wetland projects
Fresh meadow	Wildlife preserves
Shallow marsh, deep marsh	Hunting preserves
Shrub swamp, timber swamp	
Bog	
TOPOGRAPHY	
Soils	Ski trails (cross-country)
Steep slopes, bluffs, ridges, chasms	Aerial trams, ski slope structures
Unique geological formations	Snow-play areas
Observation points	Overlook structures

TABLE 1 Continued

	Hiking, riding, or nature trails
	Shelters, picnic areas
	Campgrounds--public and private (water, hot water, firewood, toilets, showers, tent platforms, trailer areas, drinking fountains)
	Golf courses
	Youth, day, or nature camps
	Lodges, cabins
VEGETATION	
Main types	Fire towers
Virgin stands or rare remnants	Fire trails and breaks
Fall coloring	Nature trails
Scientific, ecological features	Natural preserves
Unusual crops (orchards, flowers, gardens, blooming trees)	Reforestation projects
WILDLIFE HABITAT	
Small game (upland birds, upland animals)	Overlooks
Marsh and shore birds	Created habitats
Waterfowl	Shooting preserves
Big game	Game farms
Furbearers	Fur and animal farms
Song-bird concentration	Wildlife management areas
Main migration areas	
HISTORICAL AND CULTURAL	
	Buildings (blacksmith shops, trading posts, old mills, dams taverns, mines, pioneer churches
	Sites (old forts, bridges, barracks, ghost towns, lumber camps, battle fields)
	Historical markers, museums
	Prehistoric archeological sites (burial grounds, villages)
	Native handcrafts
	Local celebrations
	Modern mines, power plants, mills
	Commercial fishing
WEATHER	
VISUAL QUALITY OF SPACE	

[1]Based on Lewis and Oertel, p. 20.

The lines on a landscape are a significant part of any view whether they are observed consciously or not. These are the more abrupt and definite outlines which form the basis for a variety of patterns and focus the attention on interesting features. Many parts of features of a valley landscape can create these lines of muted curves; bold decisive differentiations; wavy, indefinite wanderings; discordant paths cutting across all other features; or, shadowy indistinct ridges. It may be a river or stream curving around a flat open floodplain and out of sight beyond an undercut embankment. Fence lines, often lined with trees or shrubs, terraces along a valley side, the break between woods and open fields, roads and railroads, all add to the defining lines on the landscape.

The texture and color of a landscape are most often a result of the land use pattern and various types of vegetation cover. There is a significant difference, for instance, between an upland hardwood stand and a cedar swamp, or a reed grass flat and a cultivated field. Where parts of a valley may be cultivated as on large floodplains, various types of crops contribute to the varying texture of a landscape. Even topography has its effect by creating shadows and a gross land surface texture.

Topography provides heights, ridges, chasms, bluffs and geological formations which can be impressive from various vantage points. Different impressions may be gained when viewing a height from a distance, close by, below or above. A view from a high bluff might induce in the viewer a feeling of awe at the broad expanse lying like a vast domain below his feet. A view from below, on the other hand, may be overwhelming with the mass towering overhead dwarfing the individual. It could also present a challenge to reach the top and overcome the obstacle. From a distance the same height of land

may be a crest across the horizon. Trees can add to this height increasing the illusion of a wall in the background adding depth and character to the view.

A certain amount of openness is essential and adds to the patterns of the landscape, particularly those related to agriculture. The unrestricted feeling experienced from an open area may be gained from a height overlooking a broad expanse or panorama below. It may also be gained from a break in the homogeneity of a land use pattern such as urban development or woodland which restricts the area viewed to immediate surroundings. In areas such as flood-plain lands to be developed for recreation, some openness is a benefit but too much may leave a person feeling vulnerable and isolated.

Water contributes to a further significant feeling to be considered in assessing the constituents of a landscape. In a river valley, of course, the water is a relatively narrow band flowing by. It may be moving swiftly and have white rapids or be very quiet and reflect the color and shapes of its surroundings. Water is one of the most desired features for almost all types of outdoor recreation areas and forms an important part of the scene in invoking feelings of well-being.

Man-made features add their part to landscapes, indeed, in the sample area to be discussed later in this report the whole landscape can be considered man-made. Many of these features have already been mentioned in discussing the various lines on a landscape. Included here as well are historical and other cultural features such as the urban patterns which have become so much a part of the landscape today.

Some qualities of the various features mentioned so far are important as additional stimulators. Color, provided by vegetation, water, earth and

sky, is probably the most important. Movement and sound have their effect and may be provided by such things as birds, wildlife, the wind rustling in the trees or water gurgling over stones. Grass in a meadow or debris on the forest floor can provide a carpet underfoot which further adds to the feeling of well-being and identification with nature experienced in such a setting.

The point of this section is not to provide an exhaustive list and analysis of what qualities of a landscape may move an individual and how, but rather to isolate in a general way certain tangible components which can be used in mapping, analysing and describing lands along river valleys in Southwestern Ontario.

Mapping the Results

In attempting to map river valley lands, two decisions have to be made before the actual mapping can begin. First, the categories necessary to provide the framework for the study must be set out and, second, the manner in which these categories are to be shown should be clearly planned. If the final product is to be easily understood and clear, it must be simple and uncomplicated which, in turn, means a minimum number of categories on any one map. The following very broad general classification scheme has been developed in keeping with these precepts and incorporates the landscape components discussed in the preceding section.

Four main categories have been developed consisting of:

1. Agricultural Lands and Grasslands.
2. Woodlands.
3. Swamplands.
4. Urbanized Areas.

To this basic framework are added the further details of the landscape: roads, field boundaries, the break in slope above the valleys, limestone bluffs, gravel excavations, farmsteads, parks, etc.

Three of the main categories are essentially based on types of vegetation cover since the predominant use of lands in the river valleys is related to this factor. With the exception of topography, all the other landscape components are related to, or inherent in, these categories and the pattern they describe. The first category, for instance, includes field boundaries which define the pattern of land use in agricultural areas. It also encompasses all open areas, including floodplains, where there is no tree cover or urban development. Wooded areas are an important part of the texture of the landscape and the second two categories are related to the covered areas of valley lands. The river is the water feature and the most significant man-made features are included in the fourth category, urbanized areas, as well as by roads, railroads and excavations etc. Topography is not shown as such since the ridges and valley slopes parallel the river. However, the upper edge or break in slope above the valley is shown by a hachured line.

The mapping in the case study included in this report is done from air photographs at a scale of 1000 feet to the inch. The main features and categories of the classification are traced from the photographs on a sheet of acetate in the form of an uncontrolled mosaic map. Further study of the photographs under a stereoscope is then undertaken to analyse the features of the valley lands. The break in slope at the upper crest of the valley can also be interpreted at this time and marked on the acetate map.

Once the land use maps showing the general aspects of the landscape are completed, further analysis and the resulting delineation of open space

areas can be carried out. Where there are questions which cannot be answered or understood from the stereoscopic study of the photographs, field checking is necessary and, in some cases, interviews as well. All this activity should be augmented by a general background knowledge of the area gained from reports, planners, and conservation people working in the area.

The basic line or boundary on the map delineating areas for protection as open space with limited development, interprets "conservation lands" or areas of open space control. This line is demarcated one or two field widths back of the break in slope along the upper crest of the valley sides. It follows conspicuous cultural features and lines on the landscape such as field boundaries, roads or railroads so easy reference can be made to them either in the field or from air photographs. A larger area may be included where a suitable feature for identification purposes is available only at a greater distance from the valley edge. Unique or special features of the landscape adjacent to the river valley may also be reason to include a larger area in this area of control.

A second major line on the map is that of the regional or maximum flood. This line is interpolated from large scale floodline maps and represents the level floodwaters could be expected to reach were a storm of the intensity of Tropical Hurricane Hazel, 1954, centered directly over the Grand River Watershed. This line describes the maximum limits of floodplain lands which should be protected from the encroachment of any permanent type development or structure even though the yearly level of flooding may not reach this high.

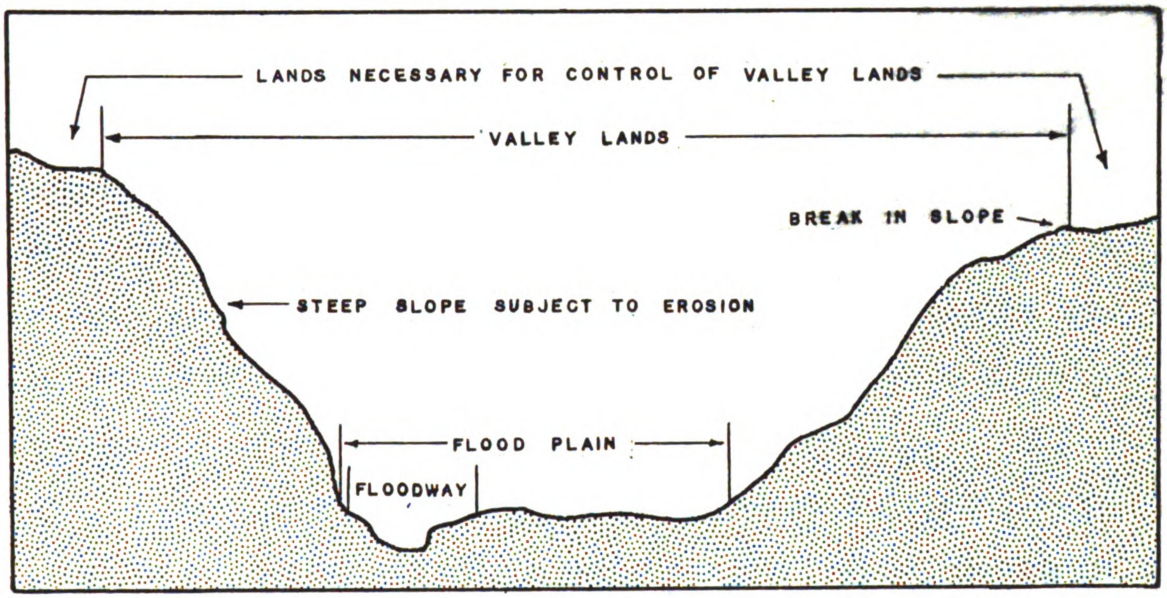
In some areas of Southwestern Ontario the break in slope above the immediate river valley will not be as conspicuous as in the hilly sections of

the central parts. This is especially true of the clay and sand plains bordering the Great Lakes. Here it may be difficult to interpret a definite crest and consideration of the land use and cultural features will aid in delineating the conservation lands.

The categories included in the term "conservation lands" may be set down as follows:

1. Lands subject to periodical flooding.
2. Steep banks subject to erosion.
3. Lands necessary to the management, conservation and development of those in 1 and 2 above.
4. Wooded areas with scenic value, e. g. river valley slopes and adjacent lands.
5. Swampland areas.
6. Scenic lookouts.
7. Parklands.

Conservation lands, then, are all lands included in the main river valley from one break in slope or crest to the opposite one containing the foregoing features. Included as well are any additional lands adjacent to and beyond the break in slope which may be necessary for the control and protection of valley land features. Figure 1 shows a cross section of a typical river valley illustrating graphically the extent of conservation lands. As a result of further study, inventory, or analysis, other areas may be delineated within the area defined as conservation lands. These areas are public and privately operated recreation facilities and lands recommended for public acquisition and development.



Conservation Lands

Figure 1. Schematic cross-section of a typical river valley showing the lands included in "conservation lands."

CHAPTER IV

OPEN SPACE PROTECTION IN SOUTHERN ONTARIO: THE POLITICAL FRAMEWORK

Conservation has been a concern of the people living in the province of Ontario for a long time. Originally this concern was oriented solely to the protection of the large forests in Northern Ontario which have been an important source of revenue for the province. Later, through the recognition of further problems, adjuncts to forest protection were developed relating to wildlife management and the protection of the source areas of rivers and streams. In Southern Ontario action was taken in the form of reforestation projects on unsuitable agricultural lands which had been cleared and in woodlot management. These activities were then broadened to include flood control, water conservation, improved land use, and very recently, the development of regional recreation facilities.

Initially, most conservation projects were begun and carried out by provincial government departments. More recently, however, the idea of personal responsibility and obligation on the part of local private individuals has been stressed especially in the matters of land use problems, small reforestation projects and farm ponds. Projects of a larger nature such as flood control, increased summer flow in streams and rivers, large reforestation projects and park developments are left to the local community collectively--in this case, a river drainage basin. Beside this local organization, there are four other Ontario Government departments involved in various phases of natural resources management and conservation activitites. These four departments and their general focus of activity might be briefly mentioned at this

point.

The Department of Lands and Forests administers the large forest tracts of Northern Ontario and deals with problems of timber management, fire protection, reforestation, forest research, fish and wildlife, and recreation. In Southern Ontario they manage reforestation tracts and other publicly owned woodlots, some of them owned by Conservation Authorities, under long-term forest management agreements. They are becoming increasingly involved in recreation and park developments as well and operate several large provincial parks.

Soil management and drainage, farm planning, crop improvement and numerous other problems related to the conservation of Ontario's agricultural resources are under the administration of the Ontario Department of Agriculture. Large dam building projects in the northern hinterlands calculated to maintain lake levels, regulate summer flow and provide power are the responsibility of the Department of Public Works. Finally, the Ontario Water Resources Commission in the Department of Municipal Affairs has wide powers in the study and control of water problems and is actively involved in finding solutions for sewage disposal, water pollution and municipal water supply problems.

With so wide a range of conservation activities already covered by these four government bodies, the question, whether a further body was necessary, may readily be asked. The answer seems to be inherent in the particular approach taken to relatively local conservation problems and activities. This approach provides for considerable local autonomy and initiative in specific and detailed planning for the best use of natural resources.

It was initiated by the establishment of the Conservation Authorities Branch of the Ontario Department of Commerce and Development in 1944 which proceeded to organize local Authorities across Southern Ontario. This Branch is now part of a new Department of Energy and Resources Management, formed in 1963 and is charged with the responsibility of organizing conservation work in Southern Ontario on the basis of drainage basins with all the municipalities (townships, towns, villages and cities) in each basin participating as partners.

The scope of work to be undertaken by the Conservation Authorities is set out in the Conservation Authorities Act, 1946. By the terms of this Act the Branch is restricted to working with municipalities after they decide to carry out conservation programs within their watersheds; however, the municipalities may be given initial encouragement and help from the Branch in setting up an Authority and in developing a plan of action. The Branch, therefore, is primarily a planning and coordinating arm of the Ontario Government to aid local people and communities with specific conservation problems.

To complicate the situation still further the Municipal Planning Act (1946) administered by the Ontario Municipal Board also provides for local action in developing plans for the wise use and development of environmental resources. Municipal planning boards are set up on local initiative in much the same manner as Conservation Authorities are created and discharge an important duty in the preparation and administration of long range land use plans. The Conservation Authority contributes to the development of these plans by indicating what lands it deems best left as open space, greenbelt or park.

Once plans are made, the problem of how to administer them arises. Since a good deal of this activity is passive, guiding and controlling development, rather than active, a high degree of co-operation is essential if the pressures for indiscriminate development of land resources are to be contained. The planning and development with which this study is concerned relies heavily on municipal councils to act on guidelines and plans prepared for them by their Planning Boards and the Conservation Authority of their watershed. They do this by means of powers made available to them through the Planning Act. The Conservation Authority also has certain powers of control through the Conservation Authorities Act. Consideration will be given those parts of these two acts which are directly relevant to the preservation of river valley lands.

Under the Planning Act, a duly constituted Planning Board has powers to determine the future use of lands under its jurisdiction and it does this by two means. These are:

1. The Official Plan.
2. Zoning By-Laws.

The official plan is a general planning outline, which, when adopted by the council of a municipality, indicates the general plan of development desired in the area. By including conservation lands as a part of this plan such lands are assured a place in the program or policy of development for the community.

Zoning by-laws are another method of designating and protecting river valley lands for open space. This control is more specific and detailed than the former and because it is more rigid once set, it does not allow as great a latitude of possible developments and uses. While the official plan is often to be preferred for its flexibility, zoning by-laws passed by Municipal Councils

can be a very important factor in maintaining conservation lands as open space in heavily built-up areas where pressure for other uses is great.

Conservation lands do not have to be indicated as open space or greenbelt in all cases to accomplish the desired result. They may be designated on the Official Plan or zoned for other uses compatible with conservation and open space purposes. Much of the area back of the slopes and within the river valleys in rural areas may be designated agricultural to prevent unplanned and chaotic landscapes with strung out cottage and home developments.

The Conservation Authority is also in a position to carry out a program of conserving conservation lands, particularly where no Planning Board or Official plan exists. This can be done under the following section of the Conservation Authorities Act.

> Section 20 (1).
>
> Subject to the approval of the Minister, an Authority may make regulations applicable in the area under its jurisdiction:
>
> (d) prohibiting or regulating the construction of any building or structure in or on a pond or swamp, or on any area below the high water mark of a lake, river, creek or stream;
>
> (e) prohibiting or regulating the placing or dumping of fill of any kind in any defined part of the area over which the Authority has jurisdiction in which in the opinion of the Authority the control of flooding or pollution or the conservation of land may be affected by the placing or dumping of fill. [1]

Conservation lands as defined and designated in this study can be considered in part as coming within the jurisdiction of this section of the act. The use of these regualtions ensures control of building in valley lands along with

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[1]Revised Statutes of Ontario, 1960, Chapter 62, Sec. 20 (1).

keeping the portion of a river valley subject to flood open. It does not provide for public access or use of these lands.

Outright purchase of desirable lands for conservation purposes may be the simplest way of developing a plan if money is available to proceed in this manner. It is also the least troublesome method of controlling desirable lands and assures complete jurisdiction of the property to the purchaser whether it be an individual municipality or a Conservation Authority. Acquisition of suitable conservation lands which may be lost for appropriate development in the future is provided for in both the Planning Act and the Conservation Authorities Act. If conservation lands are included in the Official Plan for a municipality or planning area, the municipality may, with the approval of the minister, acquire such lands when necessary or desirable. An Authority may also purchase lands it has designated as conservation lands either for a "scheme" involving two or more municipalities or for its own conservation program based on the whole watershed. The ability to acquire such conservation lands is an important factor in validating the control of lands where no development should be allowed since owners who are prevented from developing their property in certain ways may demand that such properties then be purchased by the public body involved.

There are other means of controlling land development which could be effective in Ontario for specified uses. Usually they result in more complicated legal problems but experience in the United States and in a few cases in Canada has shown that these methods can be useful in some instances. Some of these methods are as follows:

1. Acquisition of rights and or easements for access or specified uses.

2. The leasing of certain properties or rights of use.

3. Options to purchase in the future. This is a very short term control measure which, in effect, stabilizes prices on the particular property and assures the interested party of first opportunity to purchase in the future.

This discussion would not be complete without a brief indication of a few of the weaknesses and problems experienced under the present legislation. The powers given to the Conservation Authorities are weak and thus they are forced to achieve their goals through the municipalities they represent and who do not have the same broad viewpoint an Authority is expected to have. It is particularly frustrating for Authority personnel who must solicit often grudging co-operation to achieve many of their objectives. Urban versus rural area frictions can figure largely in these problems.

It is here suggested that the lands designated as conservation lands along river valleys by this study should come under the control and jurisdiction of the Conservation Authorities to give them powers over a wider area than they presently enjoy. In this manner, an Authority could more easily control lands and development in a co-ordinated overall manner. This is particularly necessary where no Planning Boards are now functioning. It would also speed up certain planning and development processes which now depend on considerable co-operation by all municipalities involved whether they are interested or not.

An additional problem is related to the growing urban centers of the province which render many of the small municipal governments in their vicinity superfluous and out of date. During the next 20 years a gradual switch to a regional type of government will be seen. This movement is now under way but will require more time to evolve and materialize. When

it does, however, the Conservation Authorities will also change and hopefully they will be granted the powers which could make their work more effective.

CHAPTER V

BACKGROUND ON THE STUDY AREA

The Southern Ontario Peninsula

The region to which the results of this study will be applied is that section of the Ontario peninsula known as Southwestern and Southcentral Ontario. For purposes of this report the whole area will be referred to simply as Southwestern Ontario. In extent it reaches from the Canadian Shield in the north and the limestone plains in the east to the clay plains of the Lake Huron shore and the Windsor area in the west. The many lakes, abundant forest, and substantially different type of landscape on the Canadian Shield and the limestone plains along the St. Lawrence River would require other survey methods and classifications than have been developed here. In the areas just mentioned the population density is very low and much less land has been cleared of trees for agricultural purposes. The land along the river valleys in the east will be less in demand and less important for open space and outdoor recreation than in the valleys further west where there is much more pressure for development and outdoor recreation resources are more limited. Figure 2 shows the physiographic divisions of Southwestern Ontario.

In general, the area covered by this study is one of glacial till and moraine topography surrounded by clay and sand plains along the margins of the Great Lakes. To the north and east, as already mentioned are the Canadian or Precambrian Shield and the limestone plains. A variety of drainage patterns and features are evident throughout the area. One of the main patterns of interest to this study is that of the glacial spillways cut substantially below the level of the surrounding countryside. As discussed in

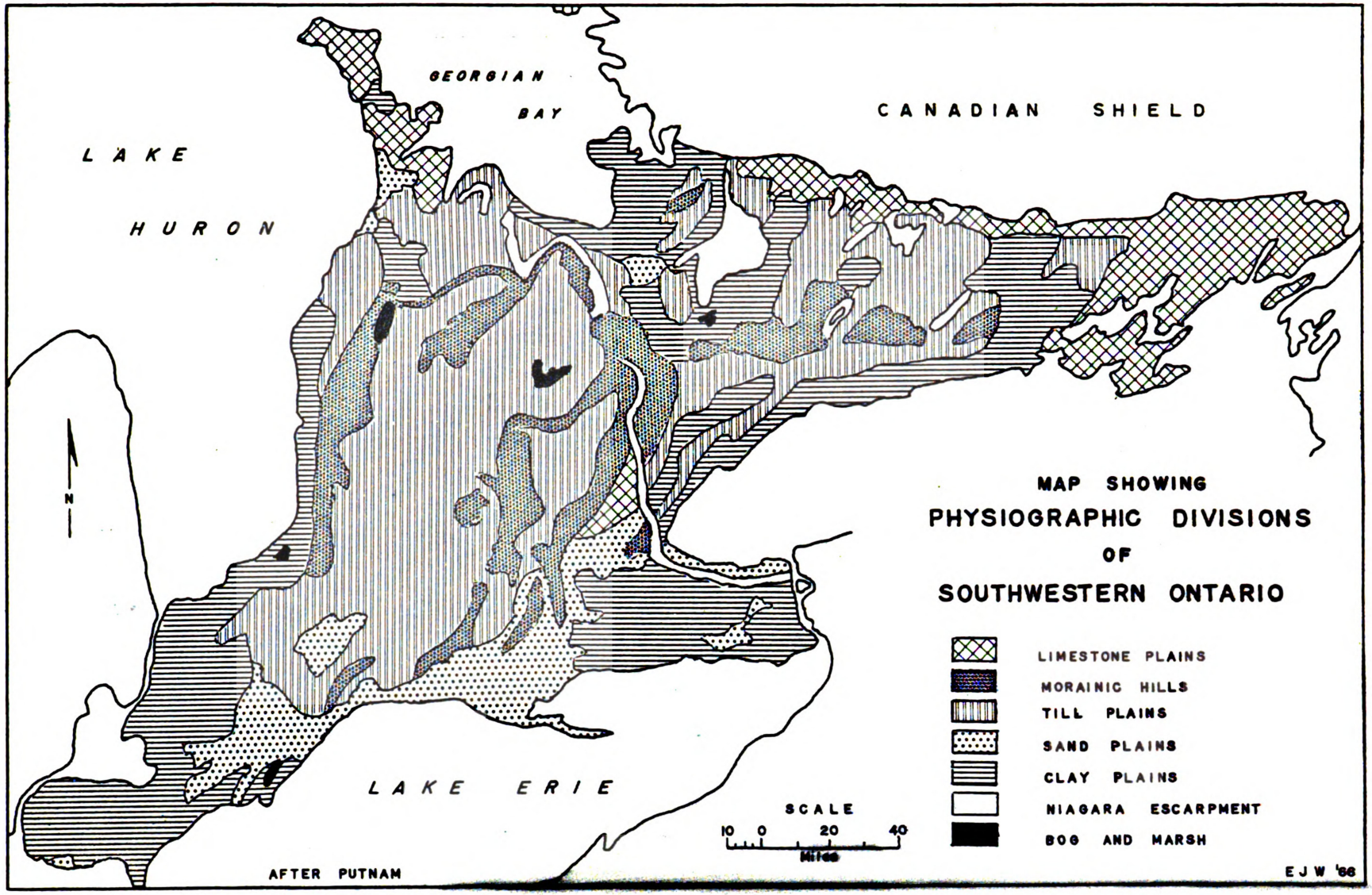
GEORGIAN BAY
CANADIAN SHIELD
LAKE HURON
LAKE ERIE
N
MAP SHOWING
PHYSIOGRAPHIC DIVISIONS
OF
SOUTHWESTERN ONTARIO
LIMESTONE PLAINS
MORAINIC HILLS
TILL PLAINS
SAND PLAINS
CLAY PLAINS
NIAGARA ESCARPMENT
BOG AND MARSH
SCALE
10 0 20 40
Miles
AFTER PUTNAM
EJW '66

Figure 2

the preceding chapter, the whole area in question here is divided up on the basis of river drainage basins, or watersheds, for purposes of the conservation and natural resource management duties carried out by the Conservation Authorities. The largest of these conservation districts, the Grand River watershed, will supply the case study area for this report. Before turning to the Grand, however, a general description of the gross physiographic features of Southern Ontario seems in order.

Basically, the Southern Ontario Peninsula is underlain by two major geological structures. These are the Canadian Shield, with its rock knob uplands, and the Paleozoic sedimentaries of the Great Lakes and St. Lawrence lowlands. These sedimentaries, limestones, sandstones and shales, are the main formations underlying the study area. Since the time when these rocks were formed on the bottom of prehistoric seas, they have been covered by a comparatively thin mantle of unconsolidated material. It is this mantle which forms a majority of the topographic features in Southwestern Ontario. Bedrock may appear at the surface in many sections, notably, along the Niagara Escarpment, on the limestone plains where the mantle is very thin, and where streams have cut down and into rock ridges to form picturesque gorges and waterfalls.

The most unusual feature of the Southwestern Ontario landscape is the Niagara Escarpment which provides an imposing array of outdoor recreation resources right across the province. The Escarpment owes its origin to the particular rock formations of the area: a hard, resistant dolomitic limestone cap over erodible, soft red shales. The edge of this formation forms a sharp ridge which varies from 200 feet to 1000 feet above the topography at its base.

In places, streams plunge over the edge of this ridge in picturesque waterfalls. Much of the area at the base and along the ridge of the escarpment is wooded. Several large reentrants have been carved back into the escarpment forming wide deep valleys which contain abundant resources for outdoor activities. The largest of these, the Beaver Valley, is located south of Georgian Bay just two hours drive from the most densely populated parts of the province.

The mantle which covers most of the rest of the area is composed of unconsolidated materials left by the retreating glaciers many years ago. Ground moraine or till, laid down under the ice, is the most predominant of these glacial deposits. Composed of an unsorted mixture of sand, clay and stones, these deposits are spread out to form a slightly undulating blanket over the bedrock. Drumlins are a common feature on these till plains and break the otherwise monotonous slight relief. All told, there are about 7000 of these elongated hills scattered in clusters about the till-covered areas of the province. The most extensive area of till plain is found in the upland section of Central Ontario. Exclusive of the Canadian Shield, a third of Southern Ontario is covered by ground moraine deposits.

In other areas the till is heaped up in long irregular ridges and may be covered with sand and gravel. These moraines, as they are called, are common in the central and western parts of Southern Ontario where the glacier ice made temporary halts or readvances during its retreat. Other features left by the ice sheet are long sinuous ridges of sand and gravel known as eskers and irregularly shaped gravel and sand hills called kames. This complex pattern of landforms may often exhibit considerable relief. Crossing the moraines and sometimes running between them are conspicuously entrenched and enlarged spillways that once carried the voluminous flows of glacial

meltwaters. Today, these over-sized valleys still provide drainage channels for the area but the streams which flow in them are obviously underfit.

Surrounding the till and morainic deposits of the central core of the area are flat plains of sands, silts and clays. These deposits were laid down as the ice front of the continental glaciers dammed up the meltwaters in the depressions of the present Great Lakes to levels much higher than those of today. As a result large areas along the shores of the present lakes were inundated and deposits of sand, silt and clay were laid down to form flat plains as opposed to the undulating surface of the glacial drift features. When the ice dam across the St. Lawrence outlet disintegrated, the water level was lowered and the sand and clay plains emerged as a border to the central uplands of the Southern Ontario peninsula. The clay plains provide the richest soils of the province and, accompanied by suitable climate, form one of its best agricultural areas. The sand plains are chiefly the result of deltaic deposits at the mouths of glacial streams which poured meltwaters into the glacial lakes. They are not as productive as the clay plains and vary greatly in texture.

The original vegetation cover of Southern Ontario has been almost completely removed in order to provide for agriculture and lumbering. To the east and north, on the Shield and limestone plains, large tracts of uncleared forest still remain. In most townships in the area covered by this study, however, the wooded lands have been reduced to about 10 per cent of the total area.[1] Most of the stream and river valley bottoms, especially the large spillways, are still covered with trees, scrub trees and bushes. Much land was cleared

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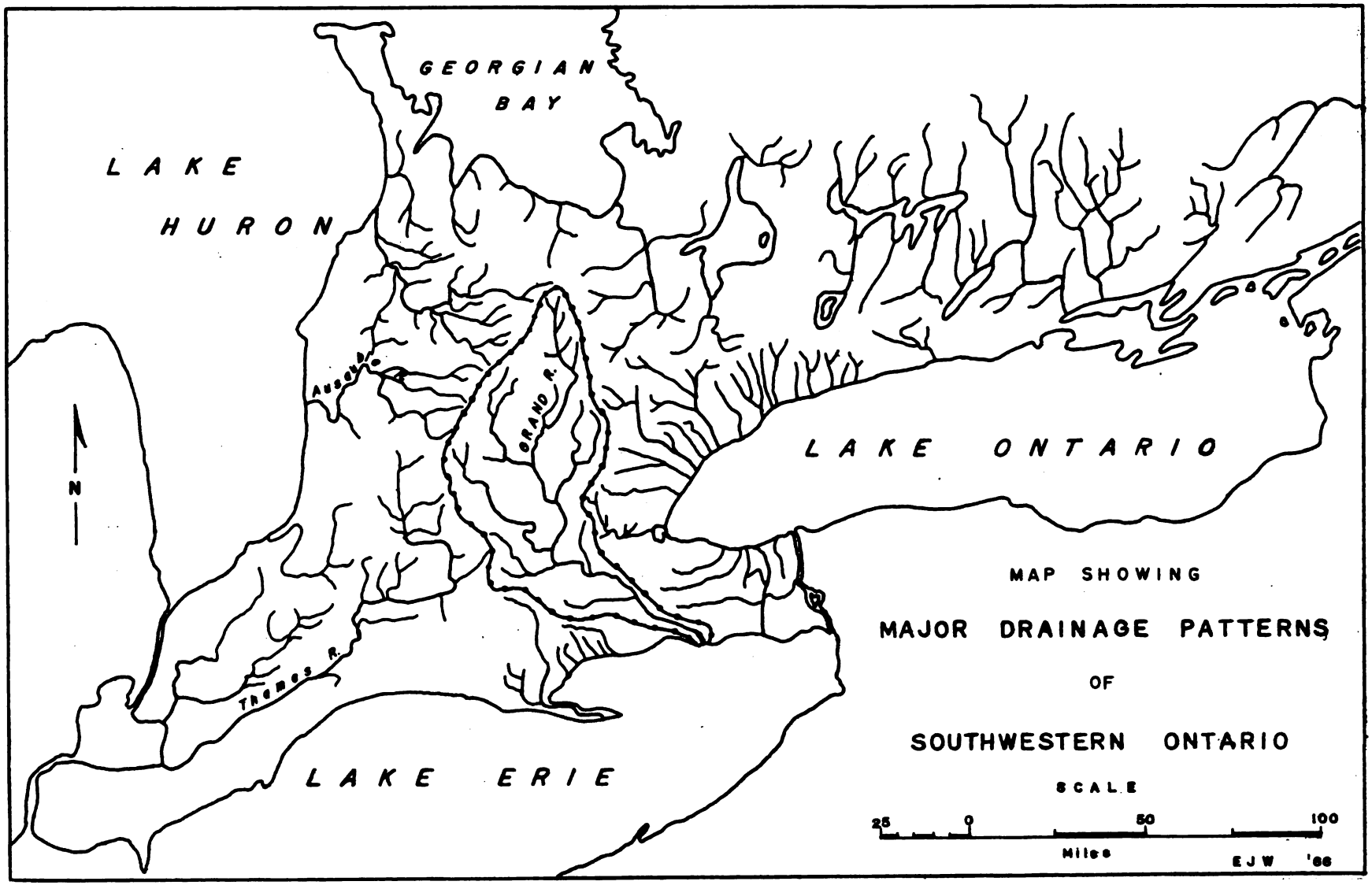
[1]D. F. Putnam, Canadian Regions (Toronto: J. M. Dent and Sons (Canada) Limited, 1957), p. 225.

which was not suitable for agriculture but has not subsequently been reforested and hence lies waste. These waste areas are to be found, for the most part, on the steep slopes of the hilly belts and the poorly drained areas of the more northerly plains.

From the foregoing discussion it can be seen that the river valleys, especially the glacial spillways, provide some of the most desirable features for the development of outdoor recreation facilities and the provision of open space. All the perceptual quality components--water, tree cover, accentuated topography, special features, etc.--are to be found here in combinations forming unique natural surroundings. The main river patterns of Southwestern Ontario can be seen in Figure 3 as well as an outline of the largest watershed of the area, the Grand. Figure 4, shows the major drainage pattern and population centers of the Grand Watershed. As further background, a brief survey of the general features of the Grand Watershed is also necessary at this point.

The Grand River Watershed

The Grand River is the only large stream in Southwestern Ontario flowing into Lake Erie. Bounded on the north and east by the Niagara Cuesta, the Grand River and its tributaries drain a part of the dip slope of this feature over a large area. The river rises near the highest point of the escarpment, near Georgian Bay, and flows 165 miles draining 2600 square miles of territory before it reaches the lake. Its flow is notoriously irregular as spring floods may carry up to 500 times the volume of the low water stage. Several large dams have been constructed to remedy this situation and further dams and flood control measures are presently planned and being engineered. The lower course of the river was once navigable to the city of Brantford, a


GEORGIAN BAY
LAKE HURON
LAKE ONTARIO
LAKE ERIE
AUGUSTA
GRAND R.
THAMES R.
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MAP SHOWING
MAJOR DRAINAGE PATTERNS
OF
SOUTHWESTERN ONTARIO
SCALE
25 0 50 100
Miles
EJW '66

Figure 3

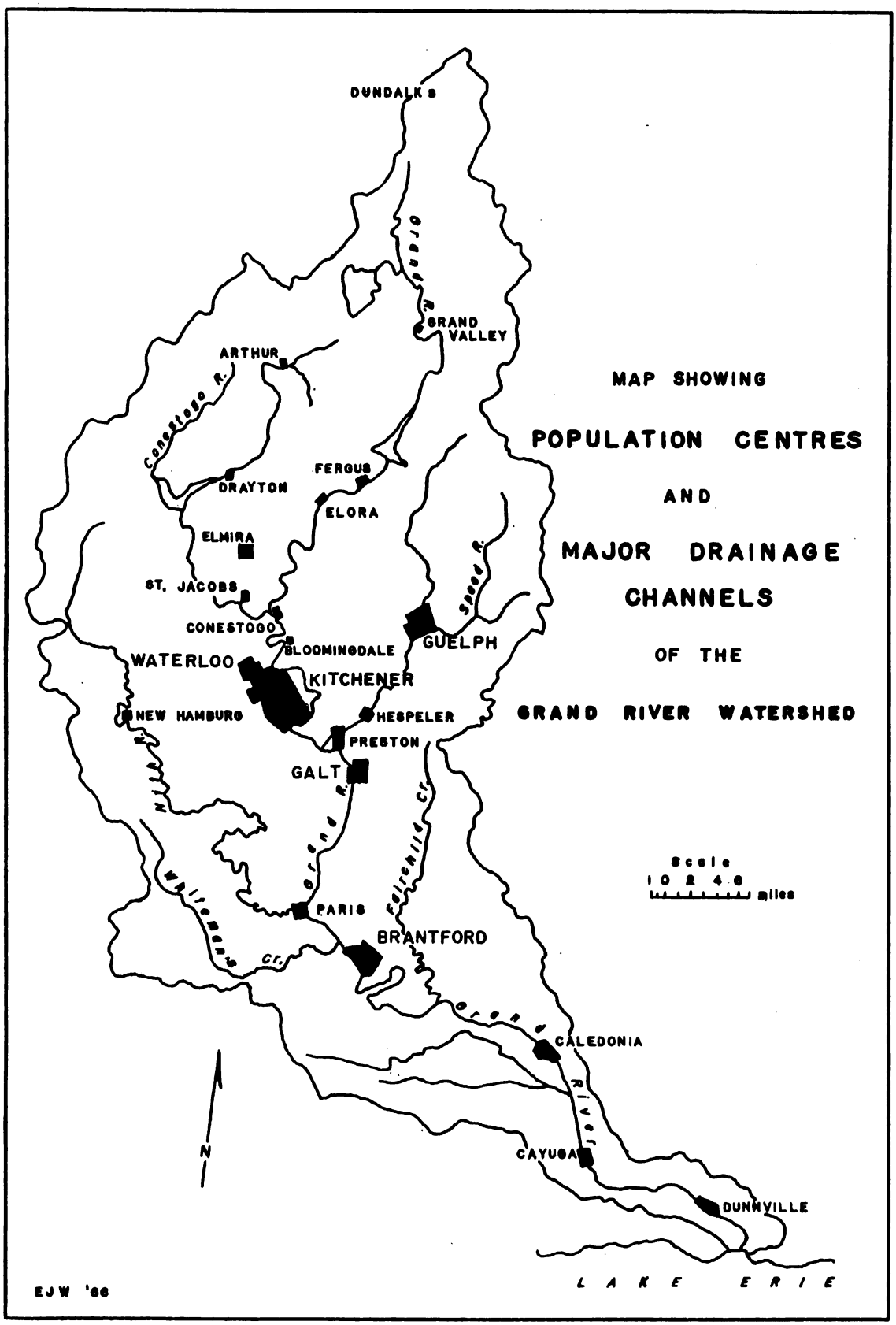
MAP SHOWING
POPULATION CENTRES
AND
MAJOR DRAINAGE
CHANNELS
OF THE
GRAND RIVER WATERSHED
DUNDALK
GRAND VALLEY
ARTHUR
Conestogo R.
DRAYTON
FERGUS
ELORA
ELMIRA
ST. JACOBS
CONESTOGO
BLOOMINGDALE
GUELPH
Speed R.
WATERLOO
KITCHENER
NEW HAMBURG
HESPELER
PRESTON
GALT
Nith R.
Grand R.
Fairchild Cr.
Whitemans Cr.
PARIS
BRANTFORD
Grand River
CALEDONIA
CAYUGA
DUNNVILLE
LAKE ERIE
N
Scale
1 0 2 4 6
miles
EJW '66

Figure 4

distance of thirty miles or more, but at present, the old locks and canals necessary for navigation in several sections are no longer serviceable. The Grand also once supplied water to a feeder canal of the old Welland canal system.

The valley of the Grand comprises 4.9 per cent of the total area of Southern Ontario. A variety of landscape types and features are evident throughout its extent, many of them amenable to outdoor recreation and open space needs. The whole watershed can be divided into three physiographic regions for purposes of evaluating and discussing the physical basis for satisfying these needs.[1] These divisions and their segments can be seen from the map in Figure 5 and the following discussion is keyed to the letters and numbers on that map.

A. Flat Northern Plains

The first major region of the Grand watershed to be discussed embraces about 30 per cent of the total watershed area. This level region is a part of the larger Dundalk Plains. Substantial areas of bog and swamp are a common feature and a good deal of the area is wooded. Divides between the Grand and adjacent watersheds are indistinct, often with drainage going in two directions. The largest area of swamp is the Luther Marsh which covers an area of 10,000 acres. In this marsh a large but shallow reservoir has been constructed.

Regional elevation rises gently from the southwest to the northern edge of the watershed and stream gradients here are low. The whole area is poorly

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[1]Department of Planning and Development, Grand Valley Conservation Report, 1954, (Toronto, Ontario), p. 6.

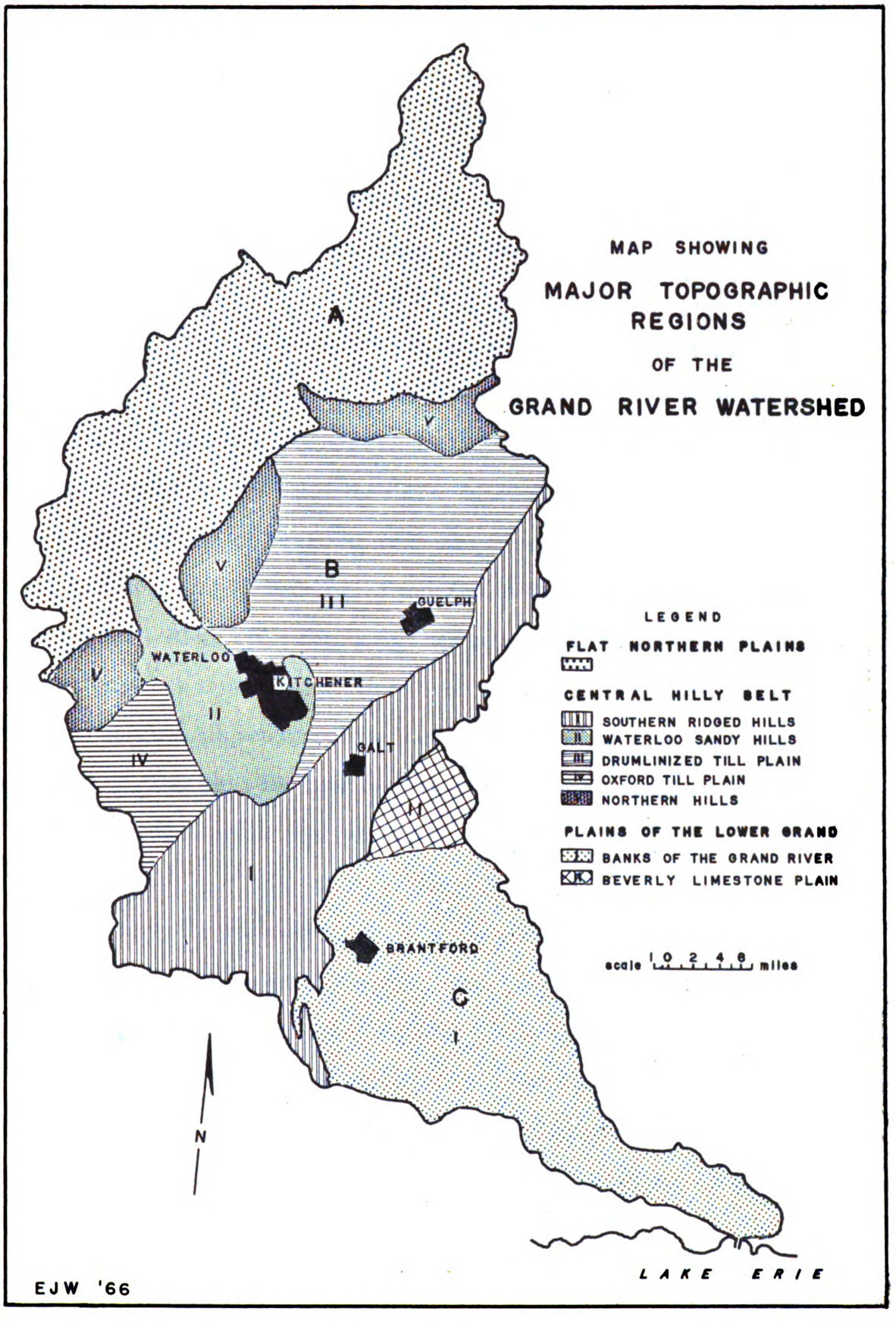
MAP SHOWING
MAJOR TOPOGRAPHIC REGIONS
OF THE
GRAND RIVER WATERSHED
A
B
III
V
V
V
II
IV
I
III
C
I
GUELPH
WATERLOO
KITCHENER
GALT
BRANTFORD
LEGEND
FLAT NORTHERN PLAINS
CENTRAL HILLY BELT
SOUTHERN RIDGED HILLS
WATERLOO SANDY HILLS
DRUMLINIZED TILL PLAIN
OXFORD TILL PLAIN
NORTHERN HILLS
PLAINS OF THE LOWER GRAND
BANKS OF THE GRAND RIVER
BEVERLY LIMESTONE PLAIN
scale 1 0 2 4 6 miles
N
LAKE ERIE
EJW '66

Figure 5

drained and the clay soils are often waterlogged; hence, they provide poor prospects for agriculture. Many streams and drainage ditches crisscross the area leading to the main channel of the Grand in the east and to its tributaries, the Nith and the Conestogo, in the west.

The outdoor recreation value of the area is confined to the valleys of the Grand and Conestogo Rivers which have entrenched themselves some 50 to 75 feet below the level of the surrounding plains. In some locations a scenic rolling landscape has been formed by the dissection of the river valley walls and stands in contrast to the rather bleak plains which stretch away on either side. Where the Grand River enters the central hilly belt, its bed is controlled by limestone bedrock. From Grand Valley to Elora, a distance of approximately 20 miles, a deep gorge has been cut by the Grand as well as by another tributary stream, the Irvine River. These gorges provide some of the most spectacular scenery of the entire watershed. Just below Elora, an excellent regional park has been created by the Grand River Conservation Authority to capitalize on this valuable asset.

B. Central Hilly Belt

Probably the greatest potential for open space and outdoor recreation facilities is found in the central section of the watershed. This section contains 48 per cent of the watershed area and it rises gently from the south to the north while exhibiting great variations in local relief. Such variety is a welcome change from the more monotonous southern and northern plains. This section also contains the five cities of the watershed and by far the highest density of population.

In this section of the valley the Grand River meanders over alluvial plains within a deep valley often up to several miles wide. From the north as

Figure 6. The Northern Plains. The Grand River has entrenched itself below the level of the surrounding flat Northern Plains.

Figure 7. The Elora Gorge. For a distance of twenty miles north of the town of Elora the Grand flows in a deep gorge.

Figure 8. Rocks of the Elora Gorge. Some of the most spectacular scenery of the watershed can be seen in the Elora Gorge.

Figure 9. Gap in the Paris Moraines. The Grand River as it cuts through the Paris Moraines.

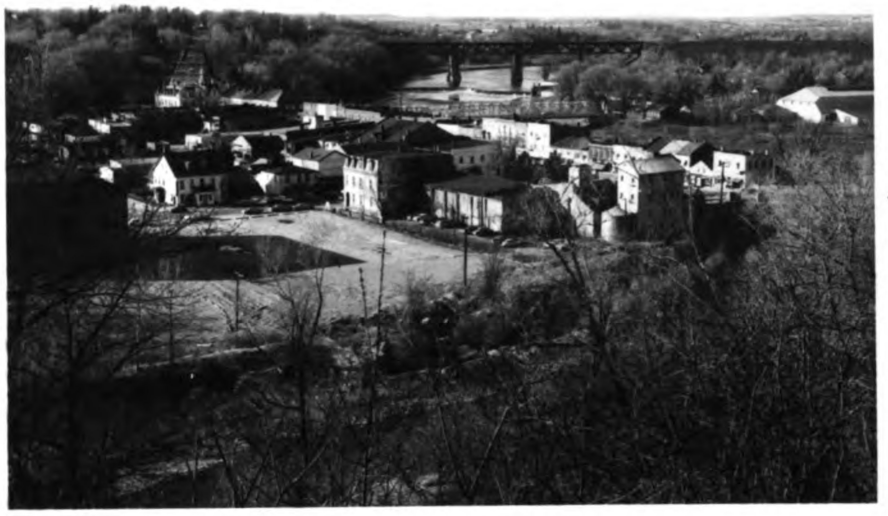

Figure 10. Confluence of the Nith and Grand Rivers at Paris. The Nith River, foreground, is deeply entrenched in an old glacial spillway where it enters the Grand River at Paris, Ontario.

Figure 11. Severe Erosion. Severely eroding slopes along the Grand River south of Brantford. Note slumping in the foreground.

it leaves the Elora gorge, the river flows in a wide winding valley of alluvial gravels or till. By the time it reaches Paris in the south, it is flowing in a valley 75 to 100 feet deep. Several miles further on, where it cuts through a gap in the Paris moraines, the river is flowing in a valley 150 feet deep. Great volumes of sand and gravel have been deposited here and several major mining operations are exploiting this valuable resource. The major tributaries of the Grand, the Nith, the Conestogo, and the Speed rivers all join it in this central belt. All are deeply entrenched in the same fashion as the Grand, the Speed following an old glacial spillway. This region can be divided into five sub-regions for purposes of discussion of its major features and the evaluation of its outdoor recreation potential.

1. Southern Ridged Hills

A chain of linear morainic ridges crosses the southern section of this area. This chain is part of a larger system of similar hills known as the Horseshoe Moraines of Southwestern Ontario. The Grand River and its tributaries have carved many steep-sided scenic valleys through parts of these hills providing some excellent parkland resources. Several regional recreation facilities have been developed on the northern edge of these moraines by the Grand River Conservation Authority and also by private developers.

Much of this area is unsuitable for agriculture because of bouldery soils and steep, hummocky slopes. Since erosion and gullying have taken place on many of the steeper slopes which have been cleared, much of the area should be retired from agriculture and be reforested. In some cases, outdoor recreation could well be planned and combined with reforestation.

2. Waterloo Sandy Hills

A broad area of tumbled sandy hills is located in the western part of

Waterloo County close to the urban conglomeration of Kitchener-Waterloo. The main Grand River skirts the edge of these hills on the east presenting excellent scenery and outdoor recreation possibilities. In only a short time this section of the river will be within the Kitchener city boundary. To the west several clear and warm lakes are found in depressions between the sand hills and these have become popular picnic, summer camp and cottage locations. Unfortunately, many of the most desirable areas around these lakes are already privately owned and developed and little chance of public acquisition and development remains. In several locations ski trails have been developed and draw enthusiastic support from area residents.

Most of the streams flowing in the central section of these sand hills are shallow and intermittent due to the porosity of the soil. As a result, they are a negligible asset for recreational development. To the west, the Nith River, a tributary of the Grand, cuts through the hills in a wide floodplain. The floodplain is so wide, in fact, that the more spectacular vertical aspect of scenery is lacking. Still, there are suitable locations for outdoor recreation facilities adjacent to the river and one of these, near the village of New Hamburg, is under consideration for that purpose by the Authority at the present time.

3. Drumlinized Till Plain

This sub-region lies to the east of the Grand River and extends northeast to the watershed boundary. The topography is rolling in nature with whaleback shaped drumlins breaking the ordinarily undulating surface of the till plain and forming broad valleys between them. Most of the upland area is high quality farmland but the lower lying valleys carry many streams which

could provide a good outdoor recreation resource base. The variable rolling and hilly topography is pleasing to the eye, and excellent views across a landscape of well appointed farmlands, wooded hills and valleys are common from many of the higher drumlins and the valley sides.

4. Oxford Till Plain

This section is almost entirely agricultural land. In general it is a flat to rolling plain traversed by small tributary streams of the Nith River, a branch of the Grand.

5. Northern Hills

The fifth sub-region of the Central Hilly Belt is formed by a rim of dispersed and often separated morainic hills. The eastern section of this sub-region, the Hillsburgh sand hills, contains the headwaters of the Speed and Eramosa rivers but there is nothing unique or exceptional in the area for outdoor recreation developments. Reforestation is needed on many of the hills.

C. Plains of the Lower Grand

The remaining fifth of the Grand Watershed stretches north from the Lake Erie shoreline to just north of Brantford on the edge of the moraines of the southern ridged hills. For the most part, it is a level sand and clay plain with a few limestone and sandstone outcrops. At the northeast corner of the area the Beverly limestone plain contains an extensive area of swamp and possesses only a very thin covering of soil. The larger area rises gently from Lake Erie at the rate of 150 feet in 40 miles. Part of this rise is accounted for by the Dunville dam making the gradient of the river even less in its lower portions. In its lower 27 miles the Grand maintains the image of

a broad tranquil stretch of water flowing majestically through the adjoining flat plains.

In the northern part of this section the river cuts more deeply into the surrounding plain than in the south. Erosion in the silts and clays are a serious problem in several areas just south of Brantford and high, steep eroded bluffs occur. At Newport the valley shoulder is approximately 75 feet above the level of the river but this height decreases gradually until, south of Cayuga, the plain is only a few feet above the river. In the area above Cayuga, the Grand and its tributary streams are bordered by steep-cut banks and a ribbon of attractive rolling to hilly topography. The valley course here provides excellent natural surroundings for hiking, picnicking and relaxation as well as for some cottage sites. Below Dunville the banks of the Grand are low and marshy and large areas of reeds grow along its margins. The present demand for cottage sites along this part of the river will increase greatly in the future but this use should be strictly controlled to avoid strung out developments along the river banks. Such development excludes the public from a limited natural resource; it may be endangered by flooding; it detracts from the beauty of the landscape and can add to the pollution of the stream. This is not to indicate that cottages should be excluded completely but rather that they be relegated to specific areas and come under subdivision control.

The Grand Valley as Open Space

Earlier in this report reference was made to some of the findings of the Ontario Conservation Council in its 1960 land use report. To recapitulate a few figures, the report showed that population in Ontario can be ex-

Figure 12. The Paris Area. The Grand River is entrenched in a deep valley as it cuts through the Southern Ridged Hills of the Central Hilly Belt. The house in the foreground gives perspective to the height of the valley side. Paris can be seen in the background, upstream.

Figure 13. Scene Along the Lower Grand.

pected to reach 12.5 million by the year 2000--double the 1960 figures--and that acquisition of parklands must be drastically stepped up if an adequate supply is to be available. The 1960 total acreage of rural parklands was 3000 acres while 42,000 acres was the amount recommended as adequate according to present standards. By the year 2000, 96,000 acres of readily accessible parkland--under 50 miles--should be provided. Where is all this land to come from and how can it be obtained or protected for future public use?

A brief glance at the population density map in Figure 14 shows the most critical area to be located in a rim around the western end of Lake Ontario from Oshawa to Niagara Falls and stretching north from Metropolitan Toronto to Lake Simcoe. Since almost no public land is available along the Ontario lakeshore in this area, it has been suggested by the Conservation Council that two features to the west of this huge conglomeration are important areas for parkland acquisition. These are the Niagara Escarpment belt from Niagara Falls to Caledon and the Grand River watershed.[1] Considerable private cottage development and interest by people from the Toronto area has been experienced in the eastern part of the Grand watershed and a large section of the escarpment in the area mentioned.

Further investigation of the population density map shows that a fair-sized portion of the Grand watershed, outlined on the map, is the scene of another population concentration. This concentration is already behind in supplying its own needs for open space and recreation so that, if it is to contribute at all to needs beyond its boundaries, large areas will have to be preserved and protected immediately. The population of the whole

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[1]Conservation Council, p. 24.

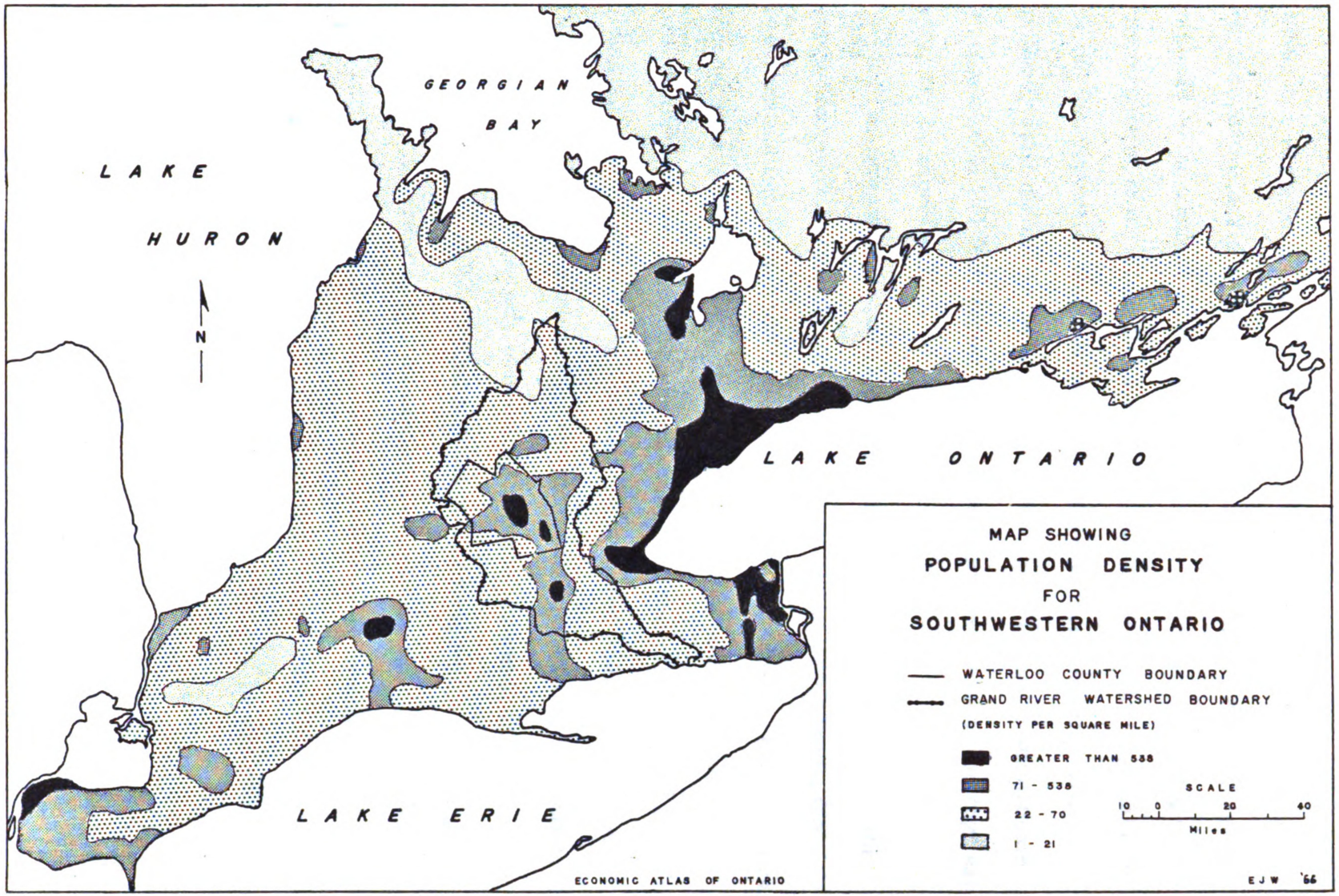
GEORGIAN BAY
LAKE HURON
N
LAKE ONTARIO
LAKE ERIE
MAP SHOWING
POPULATION DENSITY
FOR
SOUTHWESTERN ONTARIO
WATERLOO COUNTY BOUNDARY
GRAND RIVER WATERSHED BOUNDARY
(DENSITY PER SQUARE MILE)
GREATER THAN 538
71 - 538
22 - 70
1 - 21
SCALE
10 0 20 40
Miles
ECONOMIC ATLAS OF ONTARIO
EJW '66

Figure 14

watershed is approximately 350,000 at present but the five cities in the central portion are growing very rapidly. The County of Waterloo, again outlined on the population density map, contains the most densely populated portion of the watershed and by the year 2000, a major regional city of 600,000 population incorporating seven present municipalities will probably exist there. Projections for the remainder of the county indicate a population of 500,000 people, mostly in smaller towns around the regional city, can be expected.[1]

The foregoing has been a cursory investigation of the nature of the population pressures which are causing a demand for greatly increased opportunities for outdoor recreation and areas of open space. Other factors influencing and contributing to this problem might be cited but would add little to the development of the present study. To solve the problem of providing for open space needs, a plan must be prepared which in turn must be based on an overall evaluation of the potential of the whole river valley. The final object of this study is to set out a method by which a Conservation Authority, the only local political body which has jurisdiction over all the people and municipalities in a watershed, can evaluate and control desirable areas of river valley land. This method is based on an inventory study of present land use in the valleys. The following chapter deals with a sample area along the Grand River and indicates what can be done on the basis of a general survey designed specifically for the purpose.

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[1]W. E. Thomson, Kitchener 2000 and a Plan of Action, A report prepared by the Planning Department of the city of Kitchener, (July, 1964).

CHAPTER VI

THE BRANTFORD AREA: A CASE STUDY

In this chapter the ideas and analysis explained in earlier chapters of this study are applied to a particular section of the Grand River valley. The section chosen, it is felt, exhibits a fairly broad variety of characteristics to be found along the entire length of the Grand. The map included here, Figure 15, covers the area along the southern edge of the Central Hilly Belt where the river breaks through the Paris moraines in a deeply cut valley. A large urban center, Brantford, is shown spreading into the valley and onto a broad floodplain. Still further downstream the river is not as deeply entrenched, the valley is narrower, slopes and valley crest are less distinct. The four chief categories used in mapping the land use of the valley, along with the break in slope and various other individual features, depict the basic character of the landscape in a general way. These patterns and the appropriate mapping symbols can be seen on the map and its legend.

The following commentary is an inventory description of present outdoor recreation land use and potential areas for future development on the Brantford Section map of the Grand River. Numbers are used to key descriptions of presently developed recreation facilities to the appropriate area on the map. Captial letters designate areas recommended as having potential for future development. It should be kept in mind that the whole valley between the lines indicating conservation lands is to be protected as open space and developments here are to be rigidly controlled.

PARIS
SOUTH DUMFRIES TP
BRANT TP
HWY NO. 2
HWY NO. 5
L.E.&N.
C.N.R.
WHITEMAN'S CREEK
FUTURE LOCATION OF HIGHWAY 403
GOLF COURSE
WATERWORKS
BRANTFORD
HWY NO. 53
HWY NO. 24
MOHAWK LAKE
CAINSVILLE
NEWPORT
BRANTFORD TP
ONONDAGA TP
BRANTFORD TP
TUSCARORA TP
INDIAN RESERVATION
MAP 4
BRANTFORD SECTION
LEGEND
AGRICULTURAL LANDS AND GRASSLANDS
FIELD BOUNDARY
WOODLANDS
SWAMPLANDS
MAJOR BREAK IN SLOPE
LIMESTONE BLUFFS
GRAVEL PITS AND LIMESTONE QUARRIES
ERODED AREAS
URBANIZED AREA
FARMSTEAD
RURAL HOUSES AND COTTAGES
PUBLIC RECREATION DEVELOPMENT BOUNDARIES
PRIVATE RECREATION DEVELOPMENT BOUNDARIES
BOAT DOCKS
DAM
RAILROAD
ABANDONED RAIL LINE
ROAD
RIVER, STREAM
REGIONAL FLOOD LINE
CONSERVATION LANDS-AREAS OF CONTROL
AREAS RECOMMENDED FOR PUBLIC ACQUISITION AND DEVELOPMENT
POLITICAL BOUNDARIES
SCALE-FEET
1000 500 0 1000 2000 3000 4000 5000
CONSERVATION AUTHORITIES BRANCH, Dep't E & R.M., W.J.C. 1966

Figure 15

Presently Developed Areas

1. Brantford Civic Park -- A park within the City of Brantford established on floodplain land and protected by a dike. It consists mainly of a broad open playing field, a baseball park with permanent bleachers and a maintenance and office building for the Park Board. This is a compatible use for this particular piece of floodplain land.

2. The Bell Homestead -- For some years the family of Alexander Graham Bell lived on a high bank overlooking the Grand River south of Brantford and their old homestead has been preserved as an historical site. A small park with a few picnic tables located alongside the house is open to the public. The whole area is administered by the Parks and Recreation Board of the City of Brantford. Erosion is slowly eating into the bank behind the house and eventually may threaten its safety. Steps are being taken to move the house to a safer location should this be necessary.

3. Mohawk Park -- This park is managed as a municipal facility by the Brantford Parks and Recreation Board. It overlooks Mohawk Lake, is well wooded and provides the activities and facilities generally expected in a city park. There is boating on the lake but no swimming is allowed since the water is badly polluted by effluent from the nearby industrial basin. Located on a high wooded bank overlooking the man-made lake below, the site is aesthetically pleasing, but the park has not been as popular as anticipated. Maintenance could be improved.

4. Street's Boat Launching Ramp -- This small but well-tended privately developed area is located at the upper margin of unobstructed navigation for small power boats on the Grand River. It is possible to pro-

Figure 16. The Bell Homestead. The home of Alexander Graham Bell's family has been preserved as an historical site.

Figure 17. Brantford Dikes. A large portion of the City of Brantford is built on floodplain land protected by extensive diking along the Grand River.

Figure 18. Potential Park. The section of the Grand River Valley between Paris and Brantford possesses a great deal of potential for a regional park. This wooded slope is part of the area recommended for a regional park.

Figure 19. Brantford Floodplain. The broad floodplain beyond the eroding slope is used for market crop production. Brantford can be seen in the background on the far side of the river valley.

ceed for several miles further upstream if the proper channels are followed. Passage, however, is hazardous for the uninitiated. The ramp is solidly constructed but due to its steepness and the strong current in the river at this point boat launching and loading is difficult. Picnic tables and drinking water are available but shade is lacking.

Recommended Future Developments

A. Brantford-Paris Regional Park -- The section of the Grand River between Brantford and Paris is one of the most scenic of the river's entire length. In terms of topography, wooded slopes and pleasant natural surroundings, this area possesses a great deal of potential for a regional park. Pressure for many kinds of development which would spoil this natural beauty spot is presently being experienced. Urban growth, transportation facilities, industrial development and gravel mining operations are all taking their toll. In order to assure the preservation and development of this area on both sides of the river as a regional conservation area park, this section of the valley should be acquired by the Conservation Authority and adjoining municipalities as soon as possible.

The central portion of the park would be adjacent to the location where Highway 403, a new freeway across Southern Ontario, will cross the river. While the highway would cut through the park area, dividing it in two, joining the sections would not be difficult since the bridges would be high and permit park traffic beneath. Access from the highway to the park would be relatively easy for those who might wish to rest on their journey or camp for several days while touring the area. Above the valley slope there is excellent potential for roadside parks and picnic grounds which might be developed by the Ontario

Department of Highways. This point provides a pleasant scenic view across and along the river valley.

Lands along both sides of the river have been blocked out as part of a large potential park area which might eventually consist of several thousand acres. Camping, sports fields, hiking and riding trails, nature trails, canoeing on the river, and picnic grounds could all be accommodated in scattered areas. Swimming could be provided with the construction of artificial ponds or lakes since the main river is too badly polluted for such activity. One site to develop for swimming would be the mouth of Whiteman's Creek which joins the Grand from the west in this section but at present, this area is owned privately by a church organization and operated as a campground.

Initially, most of the development would probably be on the northeast side of the river where the valley side is more precipitous and wooded. By controlling the whole valley, however, a green and pleasant view could be provided all around despite the proximity of a large urban center. All the main ingredients for a popular regional recreation facility are available in this particular location: a variety of suitable landscape features, including water and wilderness; easy access from a large area by means of the new freeway; and proximity to large concentrations of population. There are few areas possessing the potential found here in such an advantageous location.

B. Brantford City Greenbelt -- A greenbelt area along the Grand River through the City of Brantford would be a real asset to the community. In the most heavily developed areas of the city this belt may only be a narrow stretch of grass but on the larger floodplains much wider areas should be provided. Unfortunately, a fair-sized section of the city was built on the

floodplains and is subject to flooding, necessitating the construction of extensive dikes along the river. Any further dike construction should be well back from the permanent channel of the river so flood flows will not be constricted causing greater flooding and erosion problems downstream.

The remaining floodplain lands, which are extensive, should be zoned as conservation lands, greenbelt or open space and left as such. Agriculture, open parklands, or a golf course could be compatible uses. Building should not be allowed here. At present the city operates a sanitary fill project on floodplain lands but this use is not a good one since leaching from the garbage fill can be the source of pollutants entering the river. During time of flood, this could create an even greater danger of pollution.

C. Brantford Waterworks Park -- The Brantford waterworks plant is situated on approximately 260 acres of floodplain land adjacent to the southeastern end of the suggested regional park. At present this area is being used by the city Recreation Board for day camps in the summer but much more extensive use could be made of the area if it was opened to the public and more facilities provided. Trees have been planted throughout the area but it is not developed in any way as a park or for recreational use.

A canal from a dam across the Grand River at the upstream edge of the waterworks property leads for almost a mile to the inlet of the water treatment plant. Much of the area along this canal is wooded and provides an excellent environment for walking paths, park benches and, on the canal itself, canoeing.

D. Bell Homestead Lookout -- An interesting panorama can be viewed from the top of the eroding bluff beyond the Bell Homestead. The view over -

looks a substantial section of floodplain which is used for market crop production by a large packing firm. Beyond this wide plain the city of Brantford can be seen in the distance. Since this slope is actively eroding no buildings should be allowed close to its edge. Tutela Heights Road which runs near the edge of the bluff is presently threatened by the slumping along the slope and is to be moved back from its present location. The wooded area along the top of the bank could be utilized as an attractive picnic spot and lookout point.

E. Mohawk Lake Floodplain Area -- Adjacent to Mohawk Lake a much larger park could be developed in conjunction with the present Mohawk Park. This area includes a pleasant wooded ravine reaching several blocks into the residential section of the city nearby. It is likely that any development here would be carried out by the city of Brantford and include playground facilities, sports fields and picnic facilities. The broad floodplain would provide a large area of open space for hiking, riding and other outdoor activities requiring a large area with a minimum of development.

F. The Ox-bow -- The Ox-bow is a large meander in the Grand River which isolates a considerable piece of land on the southern edge of Brantford. This area could provide excellent surroundings for larger estate type residential development and, in special areas overlooking the river, high rise apartment complexes in a park type setting. Since a great deal of the outer end of the Ox-bow is subject to flooding, no building or development of a permanent nature should be allowed there. The present agricultural use on this flood land could be continued for some years to come or even be zoned to remain in agriculture permanently and still provide the impression of expansive open space within the city. Eroding slopes along the northwest

slopes of the Ox-bow should be protected and stabilized and building prohibited close to their edge.

CHAPTER VII

CONCLUSION

This study has been concerned with the provision of open space and the protection of areas across Southwestern Ontario which offer valuable natural resources for outdoor recreation. The need for more and more land of this type is slowly gaining recognition in government circles both high and low, but the pressures from other types of development are often still stronger. Somehow suitable lands must be protected and developed in a manner which will allow the ever increasing urban population to escape their artificial environment long enough to make contact with nature and enjoy the out-of-doors. When such suitable lands are identified and set apart, they must become an integral part of a land use plan and be protected from the incursion of incompatible uses.

Open space resources have not been well-planned or delineated in Southern Ontario, in fact, very little in the way of preparing an over-all plan has been done. River valleys across Southwestern Ontario form a convenient pattern and seem a likely source for some of this land for open space and outdoor activity. Certainly these valleys will not provide all the space and resources required, but their delineation, protection and development for this use could provide a good beginning. As the Southern Ontario landscape evolves and denser patterns of population are concentrated in certain areas, the river and stream valleys can become corridors of natural environment throughout the urban patterns. They can act as both connecting links and as barriers, joining parks, nature trails, and wooded areas in continuous passages, or dividing subdivisions and structures which tend to spread over the land in sprawling nondescript patterns.

It would be ideal for the preservation of valley lands if there was one plan and one planning agency operating right across the province of Ontario. This is not the case, however, so some means of delineating and protecting these lands must be devised which will work within the present political and administrative framework. The present planning boards for each municipality must be sold on the ideas of open space protection and then take action to assure that goal. The one political body in a favorable position to do this is the Conservation Authority of each river watershed. Again, ideally, the Conservation Authorities should have more power at their disposal to effect and administer the development of valley lands, but, since they do not have this power at present, they will be forced to work through each individual municipality to achieve the whole by bits and pieces. Someday, with the advent of regional government, the Authorities will hopefully be given the powers they need to be more effective than they are at present.

The main contribution of this study to the planning of open space and recreational land use is the development of a method whereby river valley lands can be conveniently, quickly and clearly delineated by the Conservation Authorities in Southwestern Ontario so that they can be integrated as part of each municipality's official plan. This method utilizes air photo interpretation, mapping, landscape analysis, and various other ideas and procedures to determine boundary lines on each side of the river delineating lands to be protected as conservation lands. In doing this the planner is, in fact, carrying out what geographers regard as an areal study since it is concerned with the integration and evaluation of many kinds of information about the areas studied

in order to arrive at a general understanding of their function and importance.

From the areal survey of present uses and functions, the geographer or planner can proceed to indicate a preferred pattern of development or use for the future. Such an indication need not be an extremely detailed one in order to be effective in this initial stage of planning. The general type of survey suggested here will serve in defining the environmental corridors already recommended in a schematic way to provide for immediate protection. The details of valley development and use can be worked out at a later date after further extensive study has been done.

Ontario can no longer afford to be casual as it once was about its land and space and water resources. The abundant supply is running short. What was once free and readily available is now becoming scarce and expensive. The present study has examined and demonstrated the value of river valley lands, and presented a method by which they can be protected and developed for the optimum beneficial use by the people of Ontario.

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