COMMUNITY RESPONSE TO ENVIRONMENTAL CHANGE: A CASE STUDY OF MONTREAL'S WEST ISLAND 1981-1991

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ABSTRACT

The Burton, Kates and White model of community response to environmental change is used to study a rapidly developing suburb of Montreal. Between 1973 and 1988, 11 376 single family dwellings were built in the 'West Island'. A geographic information system (GIS) analysis shows 40 percent of vacant land was developed between 1983 and 1989, over half this was for low density housing. A study of citizens' perceptions of the changes shows 72 percent of residents felt local environmental conditions were the same or better than when they first moved to the area (average 14 years) and 71 percent felt the quality of the community was the same or better. The condition of wooded areas was the largest determinant of perception of local environmental conditions and "friendliness" was most closely related to evaluations of community quality. A history of environmental activism describes a sector of the population as having crossed a "threshold of tolerance" and taken action to protect valued natural assets of the community.

RÉSUMÉ

Le modèle de réponse communautaire envers le changement environnemental par Burton, Kates et White est utilisé pour l'étude d'une banlieue de Montréal en voie de développement rapide. Entre 1973 et 1988, 11 376 maisons unifamiliales furent construites dans le 'West Island'. Une analyse par un système d'information géographique (SIG) montre que 40 pourcent du terrain vacant fut développé entre 1983 et 1989, dont plus de la moitié fût pour des habitations de basses densités. Une étude sur la perception des citoyens face au changements démontre que 72 pourcent des résidents voyaient les conditions environnementales comme étant les mêmes ou meilleures comparativement à leur arrivée dans le quartier (14 ans en moyenne) et 71 pourcent evaluaient la qualité de la communauté pareille ou meilleure. La condition des boisés été la plus grande déterminante par rapport à la perception des gens face aux conditions environnemental locaux et la "vie communautaire" primait en ce qui a trait à l'évaluation de la qualité de la communauté. Une histoire de l'activisme écologique démontre q'un secteur de la population a atteint un "seuil de tolérance" et a prit des actions pour protéger des aspects naturels de la communauté.

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DEDICATION

To Eric

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CHAPTER 1

THE HUMAN DIMENSIONS OF ENVIRONMENTAL CHANGE

INTRODUCTION

> Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs . (it) requires meeting the basic needs of all and extending to all the opportunity to satisfy their aspirations for a better life. (World Commission on Environment and Development 1987, 43-44)

> ...the adaptive system of greatest significance for ecological matters can be called the growth-oriented system...It is this system that has posed a major (maladaptive) threat to the environment, while at the same time seeming to satisfy human needs (adaptive) on an increasing scale. (Bennett 1976, 262)

> ...our understandable wish to preserve the planet must somehow be reduced to our scale of competence - that is, to the wish to preserve all of its humble households and neighbourhoods. (Berry quoted in Boychuk 1991)

It is not at all certain, with human population increasing and human technology being ever more significant in its environmental impacts, that a life threatening ecological crisis of planetary scale can be avoided. In response to these concerns, the World Commission on Environment and Development (WCED) (1987) called for new strategies for managing human relations with the environment. The system based on unlimited

economic growth has lead to unsustainable environmental destruction. For sustainable development to succeed, profound changes in present-day values and perceptions that influence individual and group decisions have to occur.

There is little doubt that more people are aware of the issues of sustainable development now than ever before but how abstract or concrete this awareness is remains unclear. In the abstract, this awareness may merely translate to irrelevant or ineffective "save the world" attitudes and actions (or inaction). If it is concrete, it may be integrated into the real relationships people have with their community environment. The popular saying 'think globally, act locally' captures this need for concrete action.

Part of the challenge of sustainable development is to generate awareness that the net human impact on the earth is the aggregate of individual impact. In essence, it is a process of learning how "our understandable wish to preserve the planet" can be reduced to "our scale of competence". If every person sees environmental problems everywhere except where they live and in what they do, there is little hope that the aggregate of human impact will change.

This thesis addresses the three items illustrated by the opening quotations:(1) that a new "sustainable" development ethic is required, (2) that the penchant for or tolerance of inexorable growth is inevitably a cause of environmental non-sustainability; and (3) that for significant change to arise, action must be taken at a manageable scale. Evidence of new attitudes is most critical where people have choices, that is, where conditions afford opportunity for innovation in environmental relations. Therefore, the question this thesis asks must be addressed to areas where people have the material well being to allow

freedom from day to day preoccupations with mere survival. Through the research I hope to determine whether there is evidence of a willingness to adopt new attitudes and behaviours that are more compatible with ecological stability and "sustainable development".

The area chosen for study is a relatively affluent suburban area of the Island of Montreal. The issue is the degree of acceptance of continued community growth where it conflicts with the protection of nature and the preservation of community character.

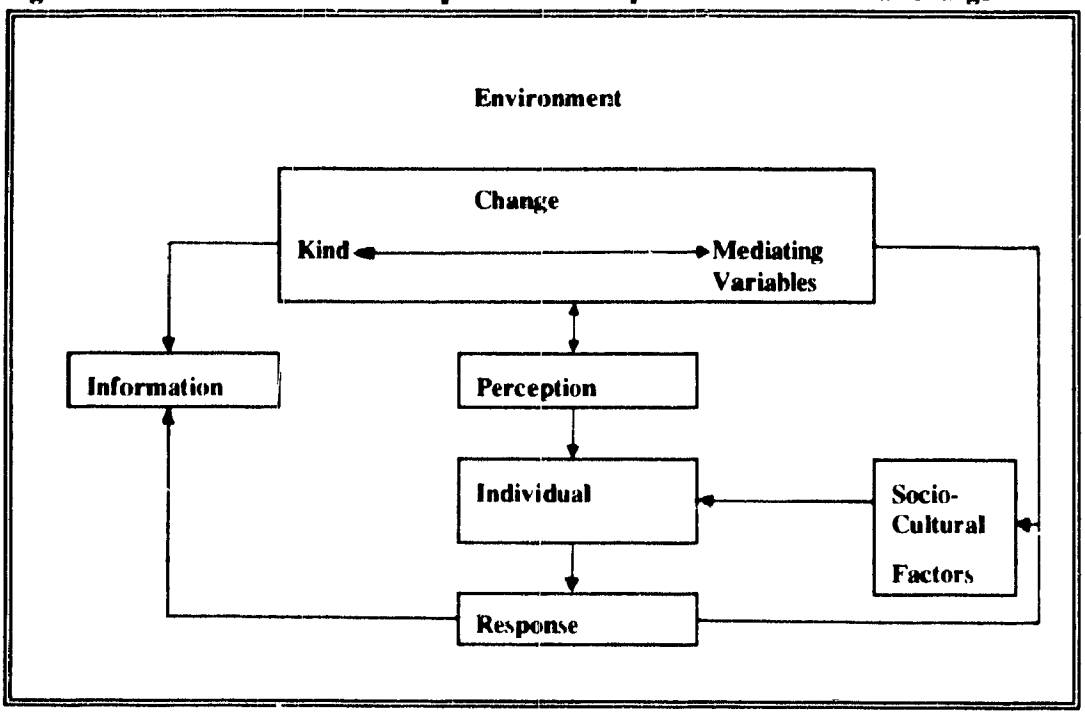
Culture / Environment

> Each culture divides, analyses, and defines its environment in a particular manner, it perceives and understands the landscape according to its own vision.. The perceptions are, in fact, non-transferable; they represent cultural/environmental relations that cannot be directly transposed from one population to another .It is not too soon to admit, with all its consequences, that there are as many "natures" as "cultures". (Bugnicourt 1989, 97 and 104)

The relationship between people and the environment has long been the concern of geographers. This interest has gained new urgency in the context of environmental protection and sustainable development discussions. Not only is it necessary to understand human-environment relations, but we must also acquire predictive and prescriptive abilities. In the search for strategies for sustainable development, both cultural and environmental contexts are important. One model that incorporates these and shows human experience to be a product of both contexts is that presented by Zube and Sell (1986)(Figure 1.1). This model makes clear that environmental change can lead to responses in the human population. They also show that perception is a critical link based

not only on available information but also on social and cultural background factors.

Figure 1.1 Process Model of the Perception of and Response to Environmental Change



Source: Zube and Sell 1986.

The process of social response to deleterious environmental change is the subject of Burton, Kates and White's (1978) study. The physical environment is seen to provide resources but also constraints within which people must adapt and cope. Culture is seen to define the modes people have available to them for coping with the environment. In the face of environmental change, individual and community responses, the chosen means of coping, are part of an adaptive process.

Change will be made to optimize living conditions, that is, to make improvement or avoid deterioration. In this way, a culture group receives signals and interprets them

in light of "quality of life" concerns. Beyond basic human needs, these determinants of quality of life are largely subjective and, as Bugnicourt notes, culturally determined.

In times of increasingly rapid and pervasive environmental change, better understanding of this process of adaptation and the concept of quality of life may enhance our ability to cope with change. The Zube and Sell model and that of Burton, Kates and White are used to explore community responses to changes in the West Island

What People Value

A component of overall well being, or of a high quality of life, is economic well being. Prosperity implies flexibility and an ability to respond to new opportunities and evade potential hazards. But in the modern world the importance of economic determinants has eclipsed non-economic determinants of quality of life (Daly and Cobb 1989). There has been a call for value based national resource accounting in which changes in natural capital stocks are recognized (MacNeill 1991). Failure to do so results in systems which "treat the earth as if it were a business in liquidation" (Daly cited in Brown et al. 1991, 8).

In order to put a value on natural capital stocks, Pearce (1990) proposes an addition of use values and existence (non use) values. The use value can be considered in terms of the gains from the use to which the resource is put or the costs of destruction of the resource. The existence value can be regarded as the intrinsic worth of the natural resource itself. In this study of human environment relations, the question of how the

concepts of 'use and existence values' factor into the way people understand their own community environment is of particular interest.

The Case Study

The case study is concerned with environmental transformations and social responses at "our scale of competence". It looks to the "humble households and neighbourhoods" of a rapidly developing suburb of Montreal for insights into the implications of environmental change. Empirical research is presented in three chapters: Chapter Two, Measures of Environmental Change; Chapter Three, Survey of "Average" Citizens; and Chapter Four, Community Indicators of Response. Through the case study, the sustainability of contemporary environmental relations is examined. To establish the context for the case study, literature dealing with the two central themes is reviewed.

LITERATURE REVIEW

The review of literature is divided into two parts. "Quality of Life and the Environment" examines how research in the quality of life field may serve as the basis for studies of community response to environmental change. The second section, "Response to Environmental Change" reviews environmental perception and behavioral literature for approaches relevant to this study.

Quality of Life and the Environment

In conditions of increasingly limited resources and environmental stress, the setting of goals and priorities in management strategies is perhaps more crucial than ever. Ultimately, community goals are to enhance the quality of life of its members. The concept of quality of life was examined as were methods for measuring it and the current applications of the concept in research. Relevance of a quality of life approach to studying responses to environmental change was considered.

Defining "Quality of Life"

Quality of life came into the public vocabulary in the 1960s during a time of shifting societal values. Material goals were being challenged and Western societal aspirations began to look beyond material well-being for "the good life". Public and private interest in quality of life was not born in the sixties but the increased public voice on the subject translated into demands on governments to take greater responsibility for enhancing quality of life.

Academics and professionals from many fields turned their interest to exploring the concept of quality of life theoretically and empirically. It is recognized that no single discipline can deal effectively with questions about quality of life (Hill et al. 1973)

The way in which one defines quality of life determines what is studied, how it is studied, and how research is applied. As well, the concept holds very different

meanings at different scales. In relation to the individual, quality of life may have as many definitions as there are people. In this sense, it is defined as experiential, personal, internal, more subjective than objective, and unmeasurable (Helburn 1982).

Quality of life takes on other meanings when considered at the community level. Some researchers consider it in an objective manner, measuring the degree to which the necessary conditions for well-being in a given society have been obtained (McCall 1975; Boyer and Savageau 1981; Helburn 1982; Rogerson et al. 1989a). Others see it in a normative sense, looking at the extent to which people consider themselves in a position to live in accordance with what they think is "good and right in life" (Olsen and Merwin 1977; Cutter 1985; Naess and Rothenberg 1989).

Recently, the term has come to mean "livability", and is approached as a subjective concept relating to values and the experience of objective conditions (Campbell 1981; Wish 1986a; Ferris 1988). Dowell Myers explicitly defines the term in this widely used sense: "A community's quality of life is constructed of the shared characteristics residents experience in places (for example, air and water quality, traffic, or recreational opportunities), and the subjective evaluations residents make of those conditions" (Myers 1987, 108).

Quality of life definitions that place emphasis on societal goals and values are useful to policy development and land use decision making. Definitions that take into account the personal variability in the perception of quality of life are the most meaningful for research on community change. The goal of this thesis is to relate objective measures of community change to individuals' personal or subjective sense of

quality of life.

Measuring "Quality of Life"

As elusive as the concept of quality of life may be, there is a pressing need to understand and use the concept for achieving societal goals. One of the original authors of The Limits to Growth, Donella Meadows argues in reference to quality of life that:

> ... you cannot recognize the loss of quality unless you have a sense of what quality is ( ) it follows that if a society aims for quality, if it rewards quality, discusses quality, takes determined and effective actions to restore any absence of quality, identifies itself openly and constantly with quality, it will almost certainly get quality (Meadows 1988, 344)

Quality of life may indeed be difficult to recognize let alone measure, but as the ultimate goal of much recent policy is to improve quality of life, some indices of progress must be agreed upon.

There is extensive debate as to how to measure quality of life (Adams, in press) Though there is recognition that quality of life is essentially a subjective experience (Andrews and Crandall 1976; Pacione 1982; Beesley and Russwurm 1989) most research has concentrated on objective measurement of conditions because of the difficulties of collecting subjective data (Cutter 1985). A prominent thrust in recent research is towards the integration of objective and subjective data. Examples of integrative studies include Dahmann (1983); Glatzer and Hohr (1985); Bentham (1986); Oppong et al (1988). Several of the authors stress the need to include perception and evaluation studies (Cutter 1985; Wish 1986a; Rogerson et al. 1989b).

Many studies stress comparisons among cities or countries using standardized data (e.g. Liu 76; Boyer and Savageau 1981; Park 1985). This approach is perhaps valuable for shopping for new locations or developing national policies but they relate poorly to actual people living in changing environments. Myers argues that "the crucial information need is for locally specific, longitudinal measurement of quality of life" (Myers 1988, 109). Myers calls for greater community relevance, with closer attention payed to the collective formulation of quality of life in a particular community. Following Myers, this thesis takes a community oriented approach in the collection and interpretation of quality of life data and uses both objective and subjective parameters.

Response to Environmental Change

In reviewing the literature in the areas of perception and response to environmental change, one finds there has been surprisingly little systematic investigation of the experience of change in urban environments and rural settings. Some exceptions are in the extensive literature of migration, post-construction evaluation and hazard research. For reviews see Hsieh and Liu (1983) concerning migration, Myers (1988) and Ladwig et al. (1980) regarding residential satisfaction, and Zube et al. (1986) on hazard studies.

In hazard research, the strength of the paradigm adopted by the majority of researchers during the last decade has led to an orderly and logical development of

theories and research methods through empirical work. In the 1960s, Gilbert White, Ian Burton and Robert Kates (1968) set forth a paradigm that became a unifying influence in the field of hazard research. The paradigm sought to:

1) assess the extent of human occupance in hazard zones
2) identify the full range of possible human adjustments to the hazard
3) study how people perceive and estimate the occurrence of the hazard
4) describe the process of adoption of damage reducing adjustments in their social context
5) estimate the optimal set of adjustments in terms of anticipated social consequences

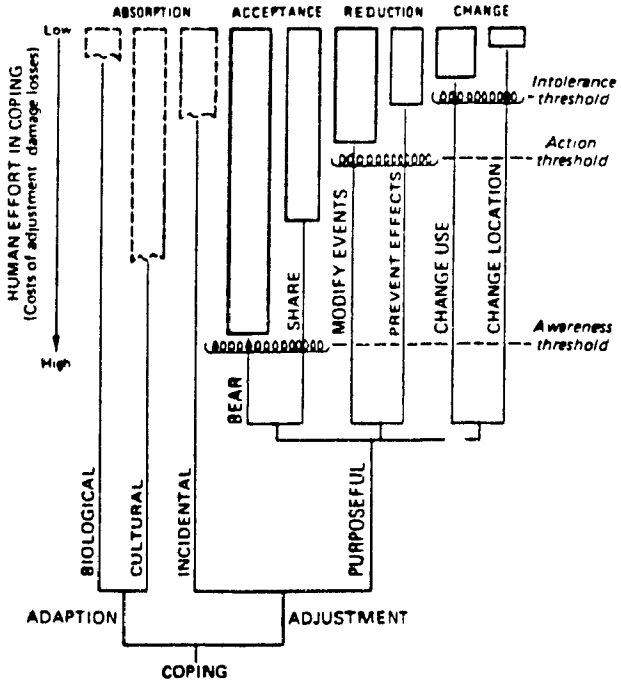
(Gold 1980, 213)

The question arises as to whether or not this, with minor modification, can act equally well as a unifying influence for the broad range of human response to environmental change studies.

A Theory of Response

Burton, Kates and White (1978) propose a theory of human resource use in the context of natural hazards that has been used extensively to explain environmental perception and behaviour patterns in extreme natural events (e.g. Kasperson et al. 1991, Jaeger 1988.) . The theory holds that "in using physical resources, people engage in behaviour that combines adaptation to extreme events with both purposeful and incidental adjustment" (Burton et al. 1978, 203). The authors define four modes of coping including absorption, acceptance, reduction and change of use or location. These are separated by three recognizable threshold levels: awareness, action, and intolerance (Figure 1.2).

Figure 1.2 Modes of Coping With Natural Hazards



Four major modes of coping with natural hazards involve loss absorption, acceptance, reduction, and change of use and livelihood. Moving from one mode to another involves crossing a significant threshold of awareness, action, or intolerance. In a rough, impressionistic global average, the adjustments are scaled in the amount of human effort committed to each.

Source: Burton, Kates and White 1978, 205.

The mix of adjustments chosen collectively or individually are effected by a variety of factors, the most important being the event characteristics, human experience, resource use and material wealth. This theory provides modes of coping to encompass all possibilities of response and has been applied to explain human adaptation to extreme environmental change. The pending question is whether or not this theory applies to the experience of less dramatic environmental change.

A Model of the Human-Environment Relationship

Explicit in the literature of hazard research is the concept of interdependence in the human-environment relationship. The environment affects people and people affect the environment. Natural hazards are not considered independently of the individuals and the groups they affect. A useful model that expands on this concept is the transactional approach first proposed by John Dewey and A.F. Bentley (1949) and recently applied to a number of perception/response studies of environmental change (Zube et al 1982, Sell et al. 1986, Aitken 1990). The model provides a framework for an examination of community response to environmental change in Montreal's West Island.

The transactional model is one in which persons, processes, and environments are conceived of as aspects of a whole. It has been developed from Dewey and Bentley's transactional approach to the pursuit of knowledge and Ittelson and Cantril's subsequent use of it in environmental psychology (Altman et al. 1987, Ittelson and Cantril 1954). Zube et al. (1982) used a simple transactional model in which perception is considered as a function of the interaction of humans and the landscape.

Zube and Sell further developed and applied the transactional model in their reviews of environmental change literature (Zube and Sell 1986, Sell and Zube 1986) and subsequent empirical work (Zube et al. 1986, Sell et al. 1988, Zube et al. 1989). Aitken also demonstrated the value of this model in a study of San Diego neighbourhood change (1990). The schematic representation of the Zube and Sell model was shown earlier in Figure 1.1.

This conceptual model of the process of perceiving and responding to environmental change presents major elements in the transactions between humans and environments. Physical environmental change is the first operative element in the model in which the kind of change and mediating variables such as proximity, magnitude, rate of change and obtrusiveness influence and shape one's perceptions and responses. Perceptions can be seen as having affective qualities ranging from good to bad, important to unimportant, beneficial to costly and as such, will influence individual response to change. The information mediums through which people become aware of changes must also be considered as well as individual characteristics such as value orientation or susceptibility to change. Individual perceptions are also influenced by the socio-cultural factors of social status, stage in life cycle, lifestyle and participation in community organizations. A final component of the model is that of response.

Zube et al. (1986) propose that at the simplest level, responses can be categorized as the following: denying the existence of change; accepting the physical change with no change in behaviour; resisting the change to try to modify it in a way that would make it more compatible with one's own value system; or adapting to the change by changing personal behaviour or personal environment to avoid or mitigate the disturbing changes. These categories evidently correspond to White's modes of coping: absorption; acceptance; reduction; and change. Translated to behaviour, people can live with change, encourage it, oppose it or retreat from it.

This review of environmental perception and behavioral research as well as the

review of quality of life literature provide the basis for further empirical work to more fully understand the implications or "costs" of environmental degradation of the communities we live in. Based on this literature, the following general thesis and hypothesis were developed for the case study of community response to environmental change in Montreal's West Island.

GENERAL THESIS

Societal orientation towards growth, the "growth imperative", is manifest locally in the continual growth and transformation of the communities we live in. If new attitudes are required to break the global dependency on or the blind acceptance of continual growth, then this change of attitude should also be evident at the scale of the communities. This is a scale at which individuals alone or in groups can make a difference to how the landscape evolves.

HYPOTHESIS

Evidence of awareness of environmental change should be visible in a community undergoing rapid "development". The degree of awareness should be interpretable in term of Burton, Kates and White's thresholds of perception. Development in this sense is understood as involving significant loss of natural environmental amenities and loss of rural or "country" characteristics.

STRUCTURE OF THE THESIS

Change is the object of study in this research with the main question being: What is the relationship between physical environmental change and people's perception of and response to change. With the use of a case study of the West Island, this study will apply a transactional model of the people-in-environment context to better understand how environmental change is experienced. The three specific objectives of the West Island case study are:(1) to measure physical changes in the landscape (Chapter Two);(2) to assess resident's perceptions of and response to change in their community landscape (Chapters Three and Four); (3) to assess the implications of these perceptions and responses in light of the goals of sustainable development strategies (Chapter Five).

CHAPTER 2

MEASURES OF ENVIRONMENTAL CHANGE: A CASE STUDY OF MONTREAL'S WEST ISLAND

INTRODUCTION

For decades, the suburbs of North American cities have been environments facing dramatic, human induced, change. As urban development overtakes the natural landscapes within and around urban centres, the lives of people living in these communities become more urban. In this study of community environment relations, it is necessary to know something about the community and about how it is changing. This chapter presents, in two parts, the findings of a study of recent changes experienced by residents of the developing West Island suburban area of Montreal.

First is a socio-economic profile of the study area which examines the heterogeneity of the West Island community as well as the diversity and changing features of its landscape. This section begins with a general description of the study area and continues with a more detailed description of the social characteristics of the population. It concludes with a discussion of population growth in the study area in relation to changes in housing stock. This gives an indication of the impact growth has had on the landscape.

The second part of the chapter, entitled "Land Use Change Analysis", is a study

of recent land use change. It presents results of a study that measures recent land use change as portrayed in a sequence of land use maps. This gives an objective measure of actual changes in the landscape.

2.1 SOCIO-ECONOMIC CONTEXT

Study Area

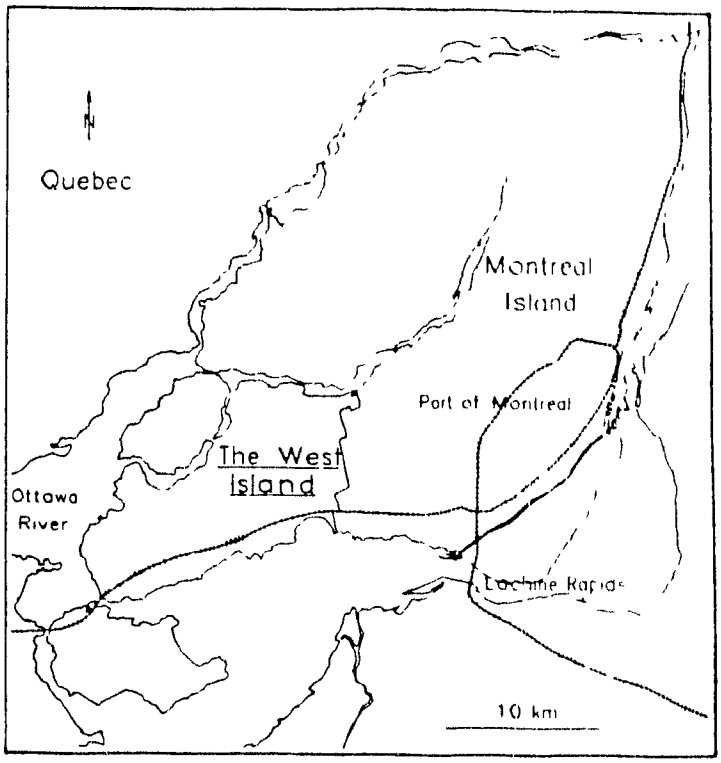
The area of interest in this study is the western portion of Montreal Island known as the "West Island" (Map 2.1a). The ten municipalities included in the study lie between the eastern boundaries of Pierrefonds and Pointe-Claire, and the western boundaries of Ste-Anne-de-Bellevue and Senneville (Map 2.1b). The territory covers approximately 11,000 hectares and in 1986 it had a population of 157,885 (Statistics Canada 1991).

In its early history, the West Island was settled mostly as farms with some settlement along the waterfront. In the post war period, dormitory communities grew up along the rail line with most development occurring very close to the waterfront. The central regions of the West Island remained very rural with largely agricultural or undeveloped land uses, even until the 1960s.

In the 1960s, the pace of urban development strongly increased in the West Island causing rapid change in community character. Development brought improvements in

MAP 2 1a

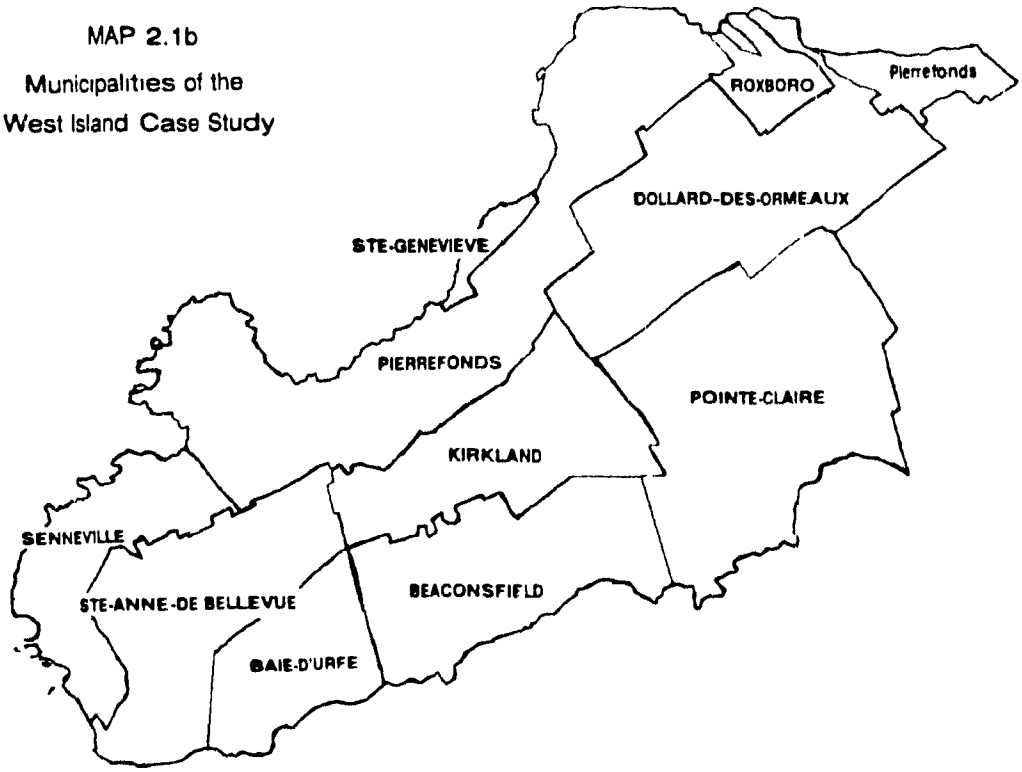
Location of Montreal's 'West Island'



Map by J Adams using AGIS
Source Base map Perly 1989 Montreal

MAP 2.1b

Municipalities of the West Island Case Study



Map By J Adams on GRASS Source Base information from 1989 MUC Land Use Map

transportation and services as well as integration into the community of Greater Montreal.

Examples of increased services and accessibility are numerous. The Trans-Canada Highway was built in 1961, becoming the central east-west transportation axis. Industrial and business parks began to appear along this corridor. The area's first mall, the Fairview Shopping Centre, opened in 1965 as did the Lakeshore General Hospital. In central West Island, the town of Kirkland was incorporated in 1961. New town services such as a pool, arena, and recreation centre followed in 1972, 1975 and 1985 respectively.

In 1970, a regional administrative agency was created through a provincial order to link all of the municipalities of the Island of Montreal. This was known (in English) as the Montreal Urban Community (MUC). Police units of the West Island were integrated into the regional police force of the MUC in 1972. In 1978, bus service to the West Island was integrated into the Montreal Urban Community Transportation Commission (MUCTC) and in 1982 the CN-CP rail line was linked with the MUCTC.

Regional considerations became more important in West Island planning activities. With the creation of the MUC, the new Planning Department was given the mandate of developing a regional urban plan and each municipality was obliged to produce an urban plan in accordance with the MUC regional plan. Piecemeal planning and development however were not curtailed with this obligation. As late as September 1990, one third of the municipalities of the MUC were still not yet integrated in the region's master plan (MUC 1991).

Increased access and development brought changes to the once rural character of the West Island communities. This can be seen in both the landscape and indicators of community life. Today, as discussed in detail below, natural and agricultural landscape attributes no longer dominate the environment of the West Island and rural community attributes have generally been replaced with those characteristic of urban communities. Some changes are planned and generally contribute to improved living conditions: better access to schools, hospitals, shopping areas for example. Other changes are unplanned and are clearly inimical to high quality of life. An example of this order of change is the decrease in public safety as suburban development continued. Police records indicate a general increase in crime in the West Island in recent years (Table 2.1). Break ins increased by roughly 300 percent from 1972 while population increased roughly 30 percent (see Table 2.2).

Table 2.1 Incidence of Crime in the West Island *

Year	Break-Ins	Vehicle Theft	Assault & Battery
1972	624	176	77
1976	1577	469	213
1981	1912	430	281
1986	1853	420	420
1989	N/A	862	688

*Data correspond to Stations 24,25 and 37 for 1972 and to Stations 11 and 12 for the more recent years
Source: MUC Police 1982 and 1989.

West Island communities have proportionately more green space per capita than other municipalities in the MUC but overall, there is an extreme shortage of public green space across the Island of Montreal. Until 1990, Montreal Island had a total of only 900

hectares of green space for its 1.8 million habitants, or approximately one half hectare per 1 000 habitants (MUC 1990). Acquisitions in 1990 increased this to 2.3 hectares, well below the 4 hectares cited in the MUC planning document, The CUM... Naturally (MUC 1990) as an internationally accepted goal.

Today, West Island land use ranges from relatively unaltered natural areas and low density housing to intensive use in transportation and industry. The area is trisected by two main transportation routes running east to west and is further divided by three commercial boulevards running north-south. A corridor of light industrial and business development lies along the central east-west transportation axis. Urban land uses are least developed in the western sector of the study area where large tracts of agricultural lands and forested areas are interspersed with low density residential uses.

Age and Family Characteristics

The suburban communities of the West Island are generally made up of families with children. In 1986, two-thirds of the families had children living at home and 35 percent of the population was under 25 years of age (Statistics Canada 1991). A few West Island cities have older populations with fewer children still living at home. Over 25 percent of the population of Ste-Anne was over 65 in 1986 and 45 percent of families did not have children (Statistics Canada 1991). Pointe-Claire, Senneville and Ste-Genevieve also had higher than the West Island average of ten percent of their populations over 65 (Statistics Canada 1991). The communities of Kirkland, Dollard and

Beaconsfield are particularly family oriented with young populations and proportionately high numbers of families with two or more children.

Language & Ethnic Characteristics

The West Island has been predominantly English speaking throughout its history. Generally it still is, although the declining English speaking population reflects the political situation in the province. English was the mother tongue of 60 percent of the population in 1976, but by 1986 this had decreased to 55 percent (Statistics Canada 1979 and 1991). In 1986, Baie d'Urfe, Beaconsfield, Pointe-Claire, Kirkland, Dollard and Senneville remained the most English with over 60 percent of the population having English as their mother tongue (Statistics Canada 1991). Ste-Genevieve had the highest proportion of French speakers in 1986 with French being the mother tongue of 76 percent of the population (Statistics Canada 1991). Pierrefonds and Ste-Anne were also predominantly French speaking.

Education and Employment Characteristics

In the 1986 census, the level of education of West Island residents was high with an average of 57 percent of the population having attained some post secondary education (Statistics Canada 1991). In Beaconsfield, Dollard, Kirkland, Pointe-Claire, and Senneville, an average of over 60 percent of the population had post secondary education

(Statistics Canada 1991).

Income levels in the West Island were generally upper-middle class with 40 percent of households earning over $50 000 per year (Statistics Canada 1991). More than half the households in Baie d'Urfe, Beaconsfield, Kirkland and Senneville were in this income bracket but less than 20 percent of Ste-Anne and Ste-Genevieve's households were this well off (Statistics Canada 1991).

Women's participation in the workforce was high in all the communities ranging from 52 percent in Roxboro to 62 percent in Dollard (Statistics Canada 1991). On average over 30 percent of the West Island workforce was employed in white collar work. Ste-Genevieve and Pierrefonds were the exceptions with below average numbers employed in white collar jobs. Pink and grey collar work employed close to 50 percent of the workforce in all of 10 cities and blue collar jobs were held by only 13 percent of the workforce as a whole (Statistics Canada 1991). Ste-Genevieve, Roxboro, Pierrefonds, and Ste-Anne were above the West Island average in the number of people employed in blue collar jobs.

Population Growth and Changing Population Densities

Municipalities of the West Island range in size from 3,500 to 43,000 people (Table 2.2). The early 1970s was a time of population growth in the West Island due in large measure to new families moving into newly built residential developments. Overall, the population increased 18 percent from 1971 to 1976 (Statistics Canada 1979). With

extensive new development, Kirkland's population increased 157 percent and Dollard's nearly doubled in this time period. Pierrefonds and Beaconsfield also grew in population size.

Table 2.2 Population of West Island Municipalities 1971-1986

	Year / Population			
Municipality	1971	1976	1981	1986
Baie D'Urfe	3 855	3 955	3 674	3 557
Beaconsfield	19 385	20 417	19 613	19 188
Dollard-des-Ormeaux	25 515	36 837	39 940	43 100
Kirkland	2 915	7 476	10 476	13 375
Pierrefonds	33 010	35 402	38 390	39 515
Pointe-Claire	27 300	25 917	24 571	25 940
Roxboro	7 640	7 106	6 292	6 140
Ste-Anne-de-Bellevue	4 970	3 738	3 981	3 380
Ste-Genevieve	2 845	2 869	2 605	2 590
Senneville	1 415	1 333	1 221	1 100
West Island Overall	128 880	145 050	150 763	157 885

Source: Statistics Canada 1979 and 1991

Since the mid 1970s, the population has grown more slowly despite the fact that there has been continuous expansion of the housing stock. This reflects an aging population, "empty nests", and smaller families so that in municipalities such as Baie d'Urfe, even though many new houses were built, the total population declined. In other municipalities, such as Kirkland, the addition of more new houses more than compensated for aging in the population and population levels continued to increase rapidly.

Overall, the West Island is approximately four times less densely populated than

central Montreal (Table 2.3). There is great variation between the municipalities ranging from 150 to 2890 people per square kilometre (Statistics Canada 1991). The most densely populated municipalities are Ste-Genevieve, Dollard and Roxboro, followed by Beaconsfield, Kirkland, Pierrefonds and Pointe-Claire. The municipalities of lowest density are Senneville, Ste-Anne and Baie d'Urfe.

Housing developments in Kirkland, Dollard and Pierrefonds have dramatically increased gross population densities from what they were in the early 1970s. Kirkland had only 300 people per square kilometre in 1971 and by 1986, density increased almost five fold.

Table 2.3 Density of West Island Municipalities

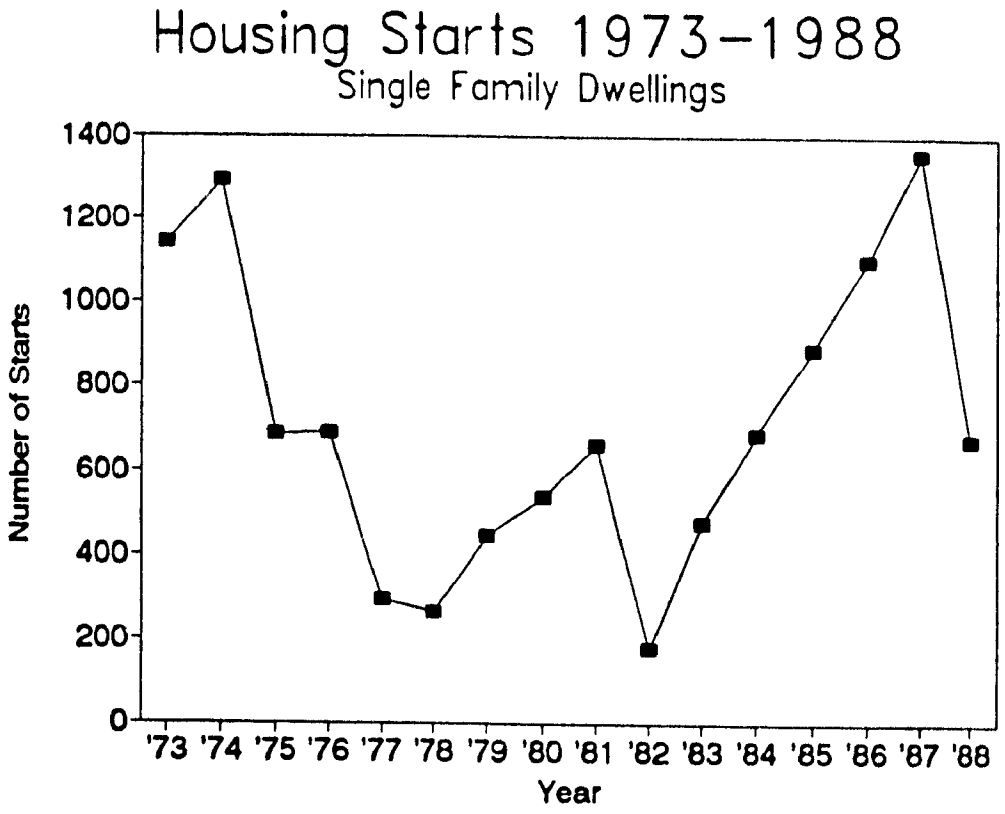
Municipality/Gross Population Density	1986 pop/km2	1981 pop/km2	1976 pop/km2	1971 pop/km2
Baie D'Urfe	580	590	640	630
Beaconsfield	1 730	1 770	1 840	1 750
Dollard-des-Ormeaux	2 890	2 680	2 470	1 710
Kirkland	1 400	1 100	780	300
Pierrefonds	1 570	1 520	1 400	1 310
Pointe-Claire	1 350	1 280	1 350	1 420
Roxboro	2 870	2 930	3 320	3 570
Ste-Anne-de-Bellevue	340	400	380	500
Ste-Genevieve	3 030	3 050	3 360	3 330
Senneville	150	160	180	190
West Island Overall	1 483	1 416	1 362	1 210

Source. Statistics Canada 1971, 1976, 1981, 1986.

Housing Characteristics and Development

Housing in the West Island is strongly oriented towards single, detached family dwellings. Over 70 percent of housing is this type with similarly high levels of home ownership (Statistics Canada 1991). Records of recent housing starts show the strong commitment of these communities to development of low density housing (Figure 2.1). From 1973 to 1988, there were 11 376 single family housing starts over the West Island (Canada Mortgage and Housing Corporation 1989). Nearly half of this development occurred in the six year period between 1983 to 1988.

Figure 2.1



Source: Canada Mortgage and Housing Corporation 1989

At the same time the socio-economic character, demographics and housing of the West Island have changed, the landscape of the area has dramatically changed. Changes in land use patterns are assessed below.

2.2 LAND USE CHANGE ANALYSIS

> Land use is one of the most direct ways to examine changes in environmental quality. Changes measured over various time periods can indicate the extent to which (humans have) modified the basic land resource. (Organization for Economic Cooperation and Development 1988)

The major intent of this study is to relate individuals' subjective perception of change to objective change in both social and physical circumstances. This section of the thesis describes patterns of change in land use as a background to interpreting subjective responses discussed in the next chapter.

A detailed study was carried out to determine the rate, scale and nature of recent land use change in the suburban communities of Montreal's West Island. GRASS4, a geographic information system (GIS) was used for the land use analysis. Land use patterns over the six year period between 1983 and 1989 were examined. The methods used for this study and results of the analysis are reported below.

Methodology

This study is based on three land use maps published by the MUC for 1983, 1987 and 1989. There are some constraints associated with this procedure in studying

environmental change. For example, classification is made at the level of cadastral units or survey ordinance and shows only land uses greater than one hectare in area. The result is a generalized picture of the area. A parcel of land that is wooded and/or park-like but is the site of light manufacturing is classed as "industrial". Likewise, institutional land is classified as such regardless of the amount of open, wooded, or recreational space that might surround the institutional buildings. In some cases of industrial or institutional classification, only a small percentage of land is actually built on, and the rest of the land is lawned or wooded. As such, these parcels may be similar to golf courses with a club house or parks with interpretive centres or service buildings in terms of how built up they are. The categories of derelict land ("Vacant") and fallow agricultural land ("Agricultural") may be physically indistinguishable from each other. For these reasons, land use maps can be taken as only a crude indicator of the visual character of a neighbourhood.

Nonetheless, there is a general correspondence between use, physical and visual attributes, and degree of public access. As changes in land use over time indicate the rate and nature of trends in conservation and development, the MUC land use maps were thought to be a reasonable base for studies of the nature of the West Island. The maps were assumed to be sufficiently accurate for the study and no attempt was made to ground-truth.

The MUC maps show 19 categories of land use (Appendix 1). Some of these uses cover small portions of the study area and some uses are sufficiently similar (e.g. categories of commercial land uses) to be combined. The number of categories was

reduced to 14 for this analysis (see Appendix 1 for correspondence).

Part of the purpose of the study is to report the loss of landscape attributes that are commonly associated with or evocative of rural environments and the increase in those that are urban. In later analysis an attempt is made to categorize land use changes according to the extent to which they contribute to an open, natural or semi-natural landscape or to a landscape that looks urban, suburban, commercial or industrial. For this purpose, two groups of categories were made and the MUC categories were forced into one or other grouping on this basis. One grouping is entitled "Open Environment" which includes land uses in which the landscape remains in a relatively natural, biologically productive state and includes the following land uses: vacant, agricultural, regional park, municipal park, cemetery, golf, nature reserve, and a special institutional use of agricultural research and instruction. The other grouping, "Built Environment", includes the following categories: residential, institutional, commercial, industrial, quarry and landfill, and public utility.

Due to variation within land use categories, as noted above, some land uses could fit into either grouping. For example, while parks are features of urban space and they can be wooded, grassed or asphalt covered, in this study they are taken as intending to preserve something of the rural or natural landscape. In selecting a grouping, the overall contribution of the land use category to the landscape character was considered. Accordingly, use of results is restricted to interpreting general trends in land use change in the West Island.

The GIS Analysis

The basic data analysis techniques employed for land use change dynamics detection are overlaying and binary masking (Pilon et al., 1988). This study used much of the procedure of overlay analysis outlined in Lo and Shipman (1990). In this procedure, computer maps are compared through a GIS program. The program subtracts various "maps" or layers of digital land use information from each other. The result is a new map showing areas that have undergone land use change and details of the new and former types of land uses. Results are produced in the form of new maps and tables of land use change.

In this study, a series of three land use maps were manually digitized to produce digital data of land use in the study area (Maps 2.2-2.4). The base maps used were obtained from the planning department of the Montreal Urban Community. These were compiled in September 1983, July 1987 and July 1989. Creation of the digital data base took approximately 80 percent of the total time required for this GIS project.

The digital base maps were used to produce a series of maps of general land use change (Maps 2.5 and 2.6). Digital data for 1983 was subtracted from its corresponding area on the 1987 map and the 1987 data was subtracted from the 1989 map (Figure 2.2). Results of these arithmetic operations were used to create binary masks of areas of land use change. The masks of change between 1983 and 1987 and change between 1987 and 1989 were applied to the land use maps of each year. The resulting maps show only areas in which change took place. The masked 1983 map, Map 2.5a, indicates the spatial

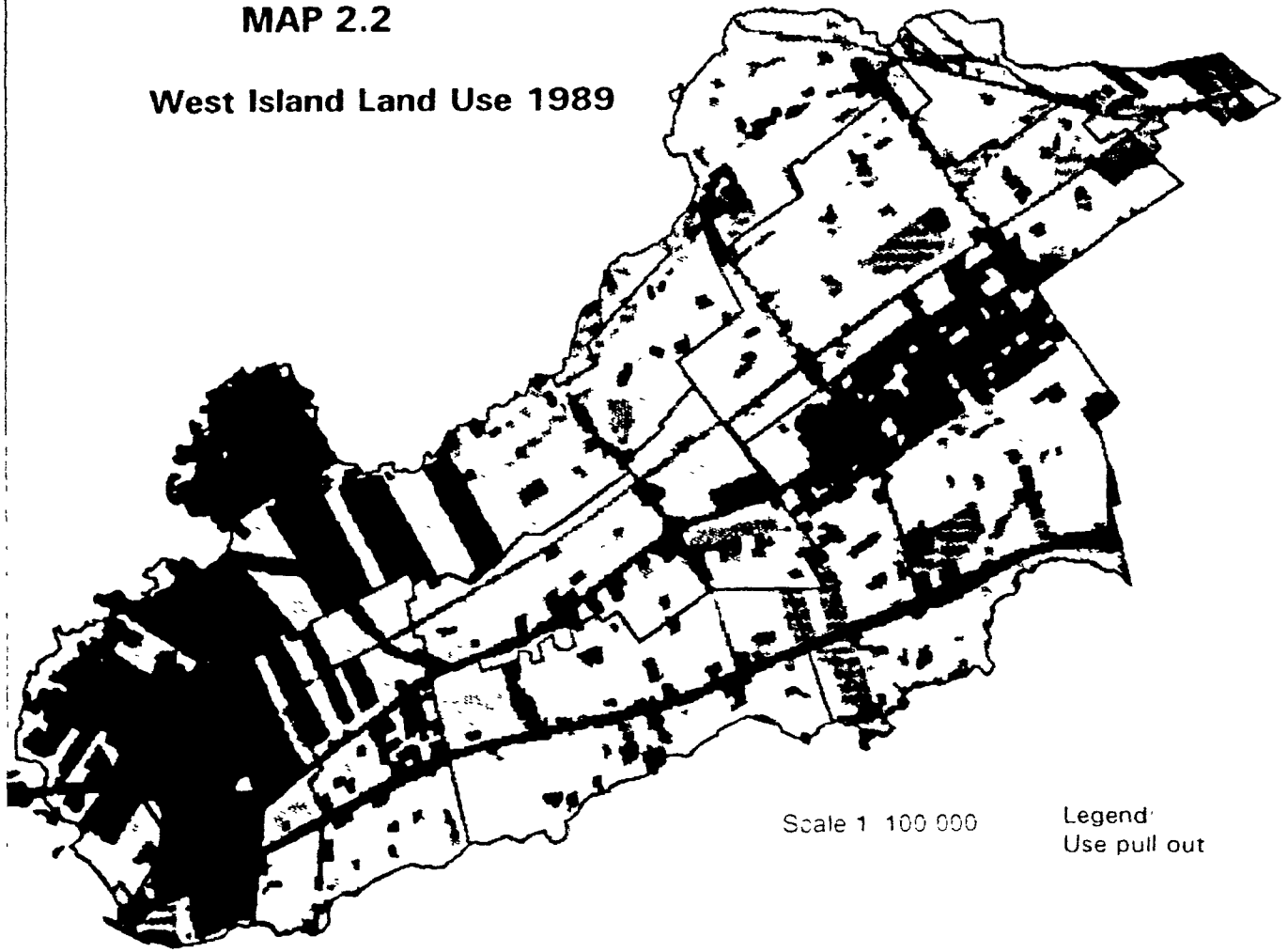
Pull Out Colour Key for Land Use Maps 2.2 to 2.6

1		Public utility
2		Quarry and landfill
3		Industrial
4		Commercial
5		Institutional
6		Medium and high density residential
7		Low density residential
8a		Municipal park
8b		Nature reserve
8c		Golf
9		Cemetary
10		Regional Park
11		Agricultural
12		Vacant

Note:
See Appendix 1 for definitions of land use categories.

MAP 2.2

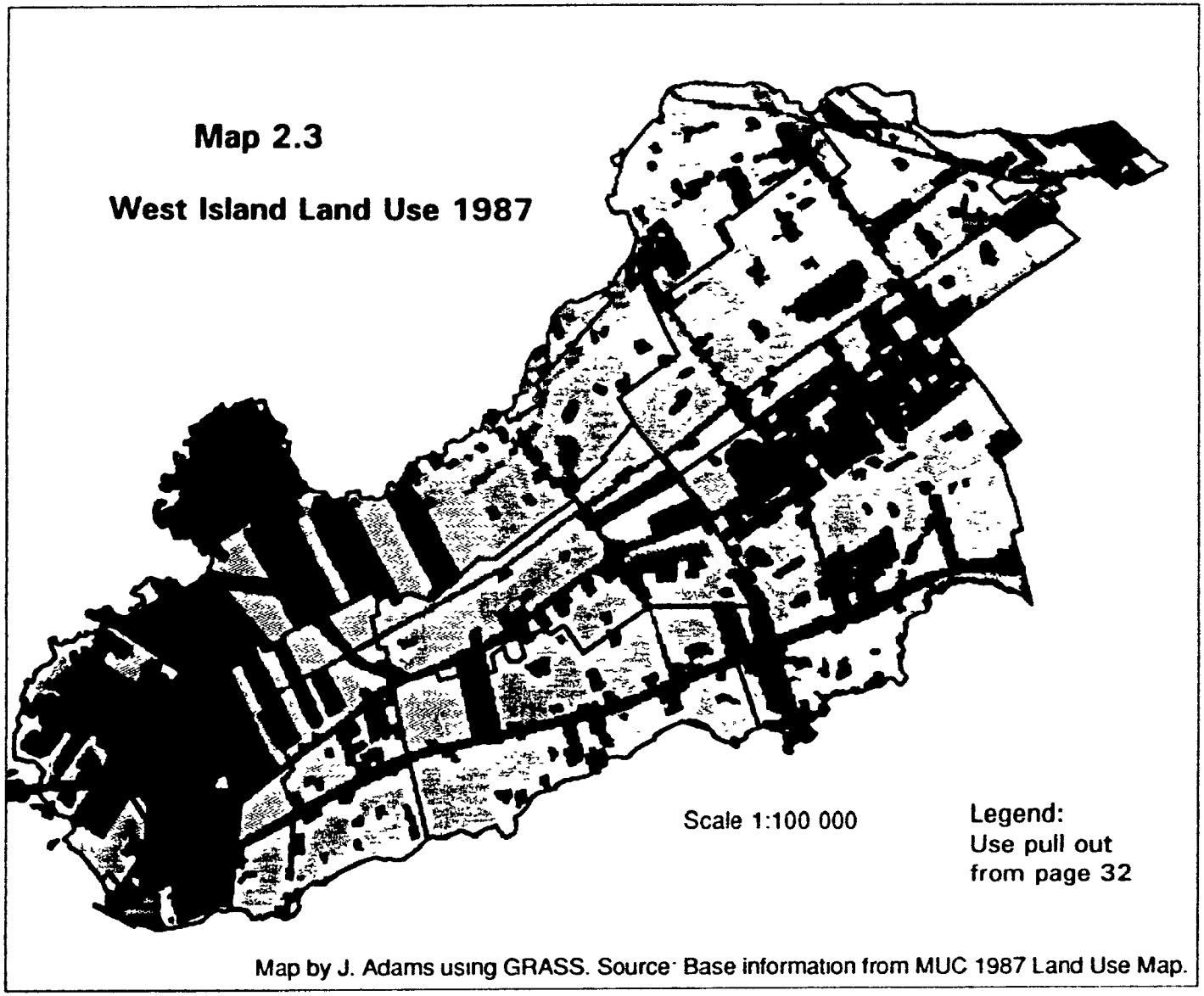
West Island Land Use 1989



Scale 1 100 000

Legend
Use pull out

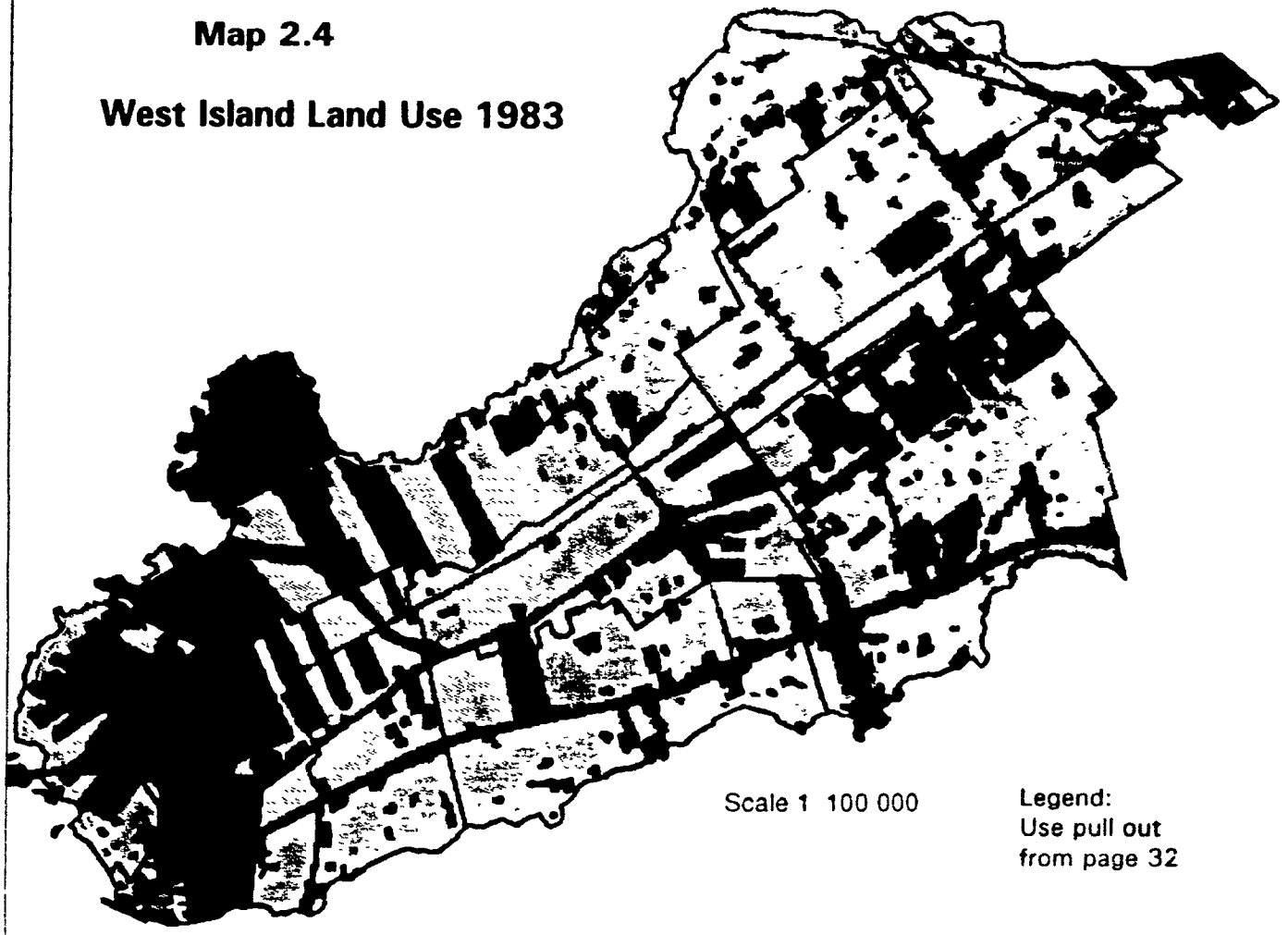
Map by J Adams using GRASS Source Base information from MUC 1989 Land Use Map



Map by J. Adams using GRASS. Source: Base information from MUC 1987 Land Use Map.

Map 2.4

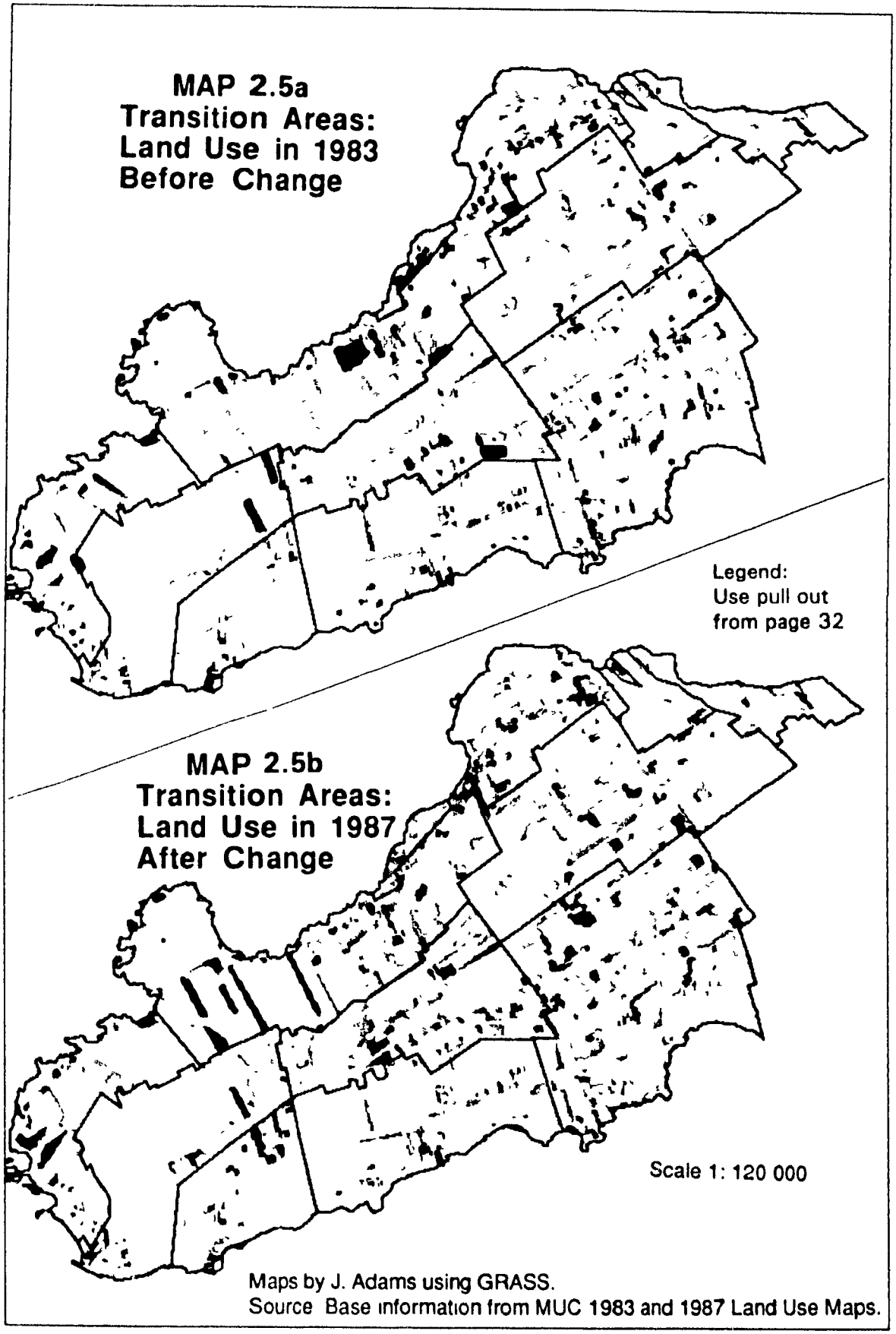
West Island Land Use 1983



Scale 1 100 000

Legend:
Use pull out
from page 32

Map by J Adams using GRASS Source Base information from MUC 1983 Land Use Map



Maps by J. Adams using GRASS.
Source Base information from MUC 1983 and 1987 Land Use Maps.

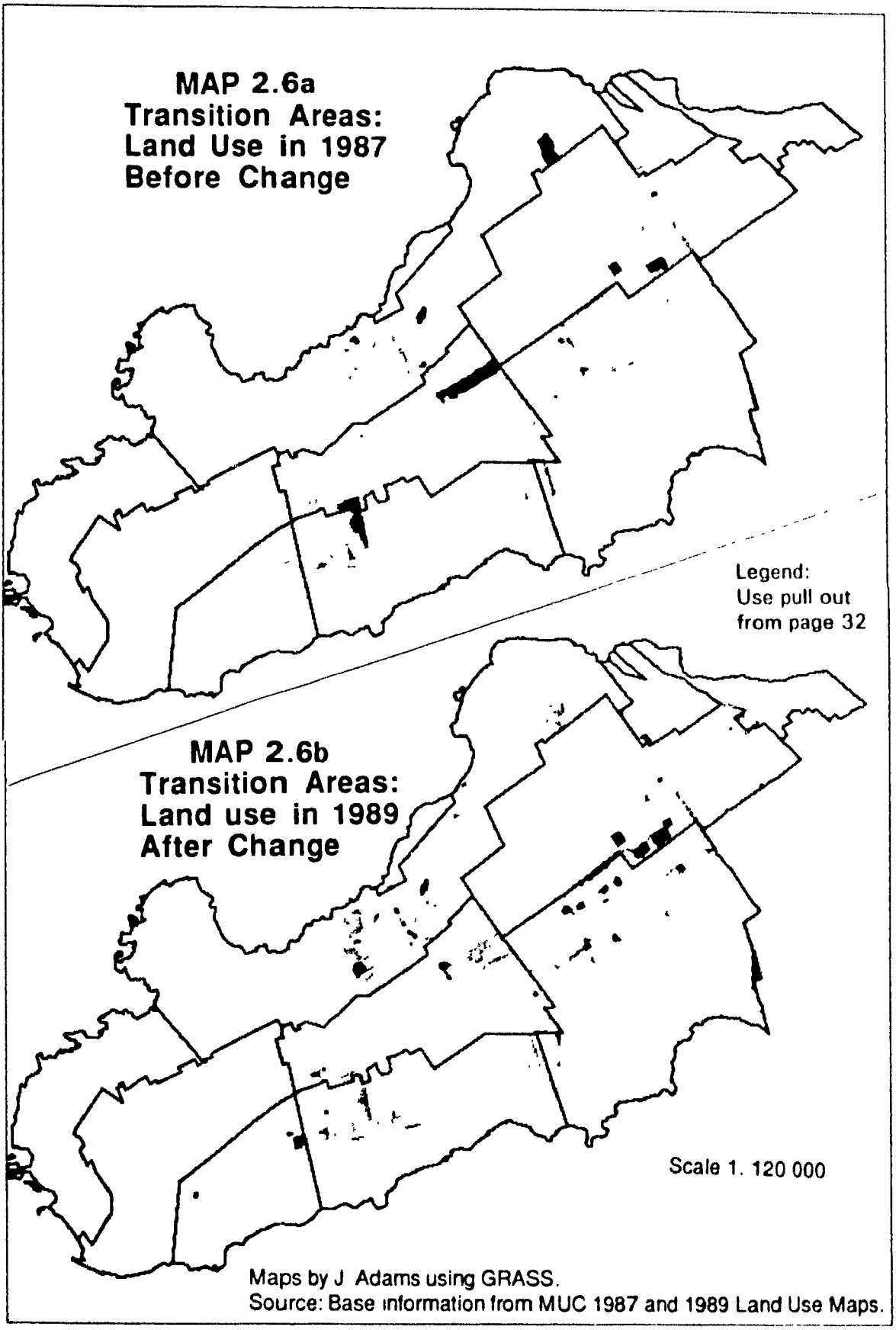
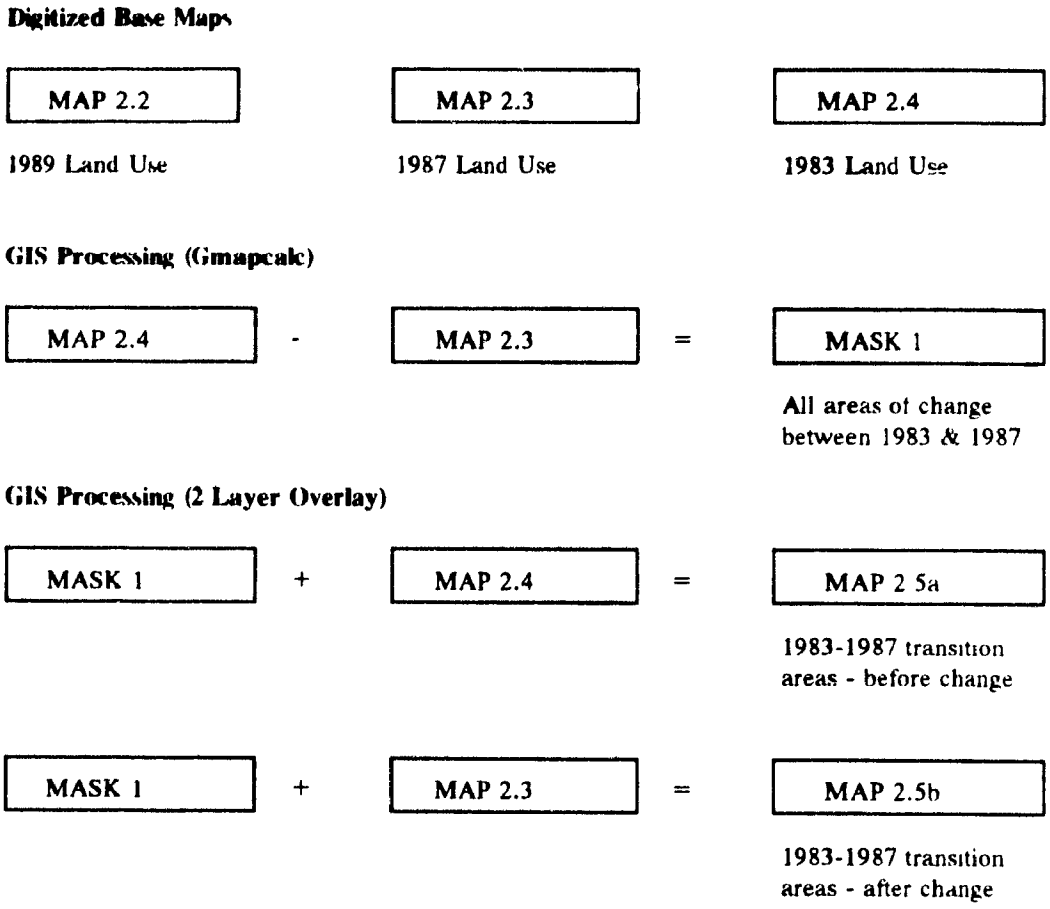

MAP 2.6a
Transition Areas:
Land Use in 1987
Before Change
Legend:
Use pull out
from page 32
MAP 2.6b
Transition Areas:
Land use in 1989
After Change
Scale 1. 120 000
Maps by J Adams using GRASS.
Source: Base information from MUC 1987 and 1989 Land Use Maps.

Figure 2.2 Creation of Maps 2.5a and b: Transition Areas

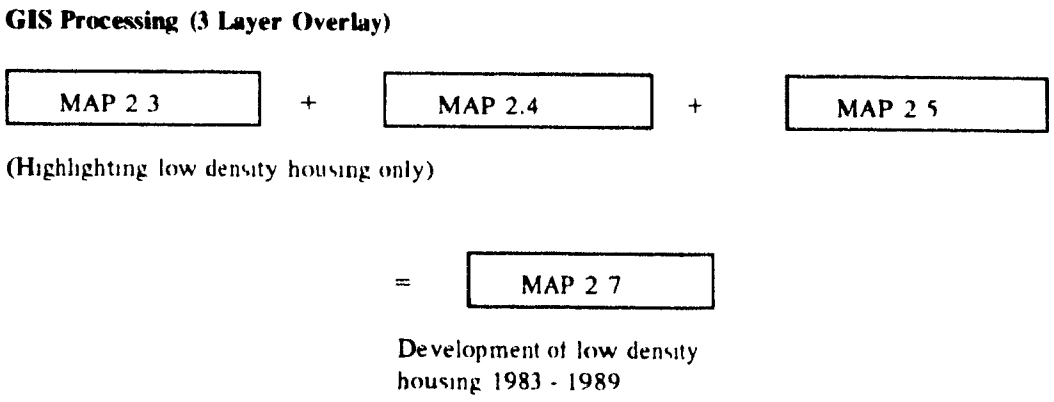


location of land uses that were lost to development and the 1987 map, Map 2.5b, indicates the new land uses in these areas in 1987. The mask of more recent change was similarly applied to the 1987 and 1989 maps to produce Maps 2.6a and 2.6b. Coincidence reports were created for the two time periods, specifying the area and type of land use change (Appendix 2).

Using the resulting series of "before" and "after" maps and coincidence reports, the types of land uses with the greatest proportion of change were identified. For these areas (low density housing and vacant land), a GIS analysis was used to produce a map

of change from 1983 to 1989. A series of masking and overlay operations was used (Figure 2.3). The resulting three layers were overlaid to produce a map showing progressive change. The same procedure was used to show change in the groupings of the "Open Environment" and the "Built Environment".

Figure 2.3 Creation of Map 2.7 Housing Development



Analysis Accuracy and Procedural Error

Perhaps the manual nature of traditional cartography precluded some abuses. Numbers in a data base create an illusion of accuracy and the computer opens new ways of potential abuses (Chrisman 1984). Consideration of accuracy and error in GIS is important for evaluating the proper use of the final products. Taking into account both inherent and operational sources of error (Appendix 3), resulting maps and areal calculations of this study can be used appropriately to make general assumptions about spatial patterns and trends rather than for site-specific applications.

RESULTS AND CONCLUSIONS

An examination of resulting maps and land use change reports reveals the types and scale of changes that have occurred in the area. The predominant land use changes throughout the study period are those of increased low density residential use through development of vacant land. Specific maps of the development of low density housing and conversion of "Open Environment" to "Built Environment" show the progressive infilling of built-up areas and consequent shrinking of accessible natural areas.

Major Land Use Changes: Vacant Land & Low Density Housing

Over the six year period between 1983 and 1989, the area of land used for low density housing increased approximately fourteen percent and the net amount of vacant land in the area decreased 27 percent. Further analysis revealed the specific character of development . Of all the areas that underwent land use change between 1983 and 1987, approximately 40 percent was land that was converted to low density residential use (Table 2.1 and Appendix 2). Approximately half of all the vacant land that changed to other uses over this period went to the development of low density housing. Another twenty percent went to commercial and industrial land uses.

Table 2.1 Development of Low Density Housing and Vacant Land

Time Period/ Land Use Change (ha)	Total Land Use Change	New Low Density Housing	Vacant Land Developed	Low Density Housing on Vacant Land
1983 to 1987	1746.09	732.87	801.54	423.18
1987 to 1989	273.42	105.75	129.42	61.11

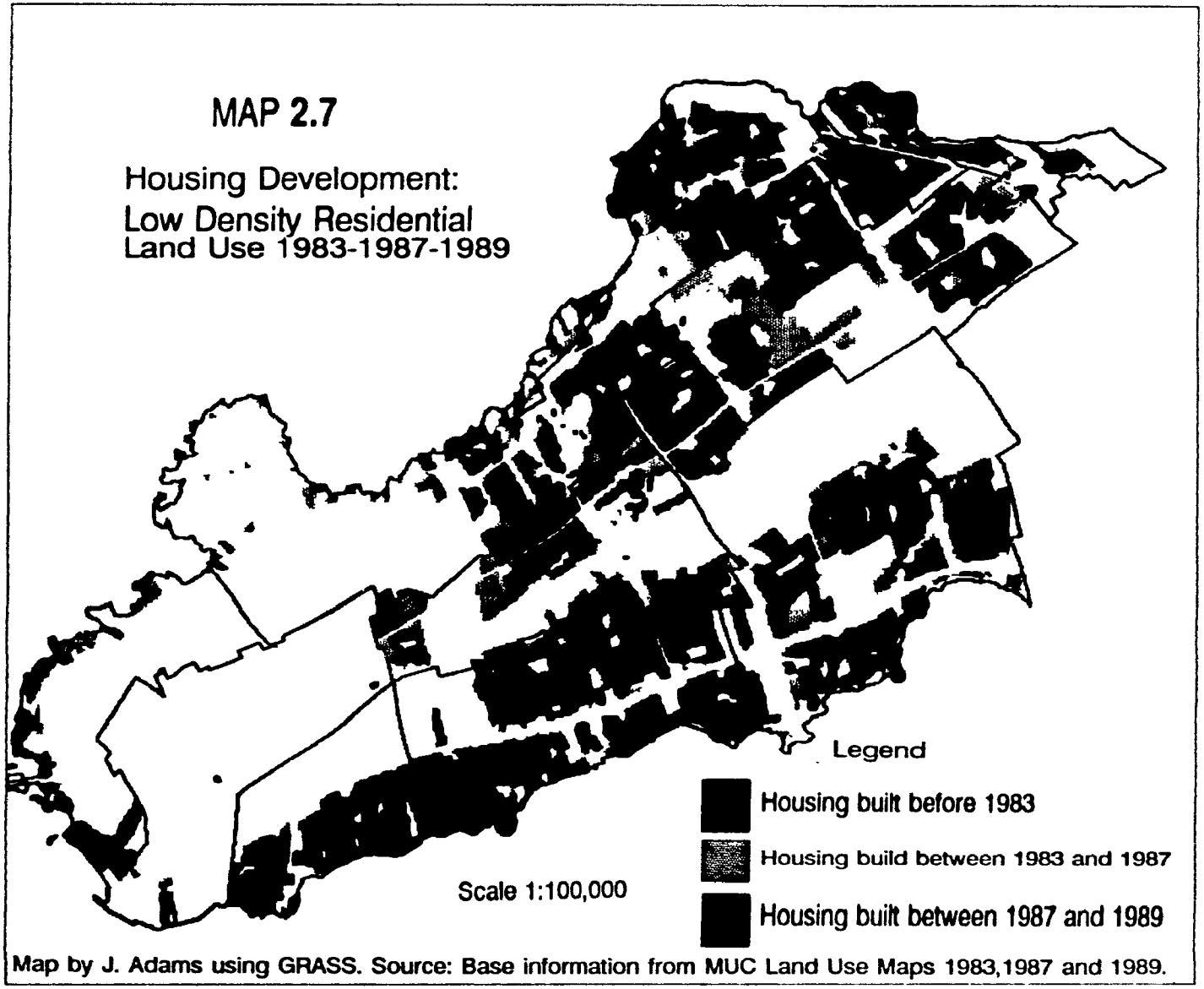
Source: GIS data analysis, coincidence report (Appendix 2)

Between 1987 and 1989, approximately 273 hectares of land underwent change. Again, the development of vacant land was the most significant of all land use change with nearly half of the area of change being of this type. Half of the vacant land that changed uses went to low density housing and another quarter went to industrial uses.

Development of Low Density Housing

An analysis of low density housing over the six year period shows the spatial expansion of residential development and the increasing dominance of this land use in the landscape (Map 2.7). This three layer overlay has a higher probability of error than the maps discussed above but has the advantage of showing the general trends of housing development over the full period of study. In 1983, low density housing occupied approximately 36 percent of the total area of the West Island. By 1989, this had risen to approximately 42 percent. The majority of new housing has been located in large new developments but virtually no area of housing built before 1983 is without some new housing.

Large tracts of recently built housing are evident, particularly in the central and



Map by J. Adams using GRASS. Source: Base information from MUC Land Use Maps 1983,1987 and 1989.

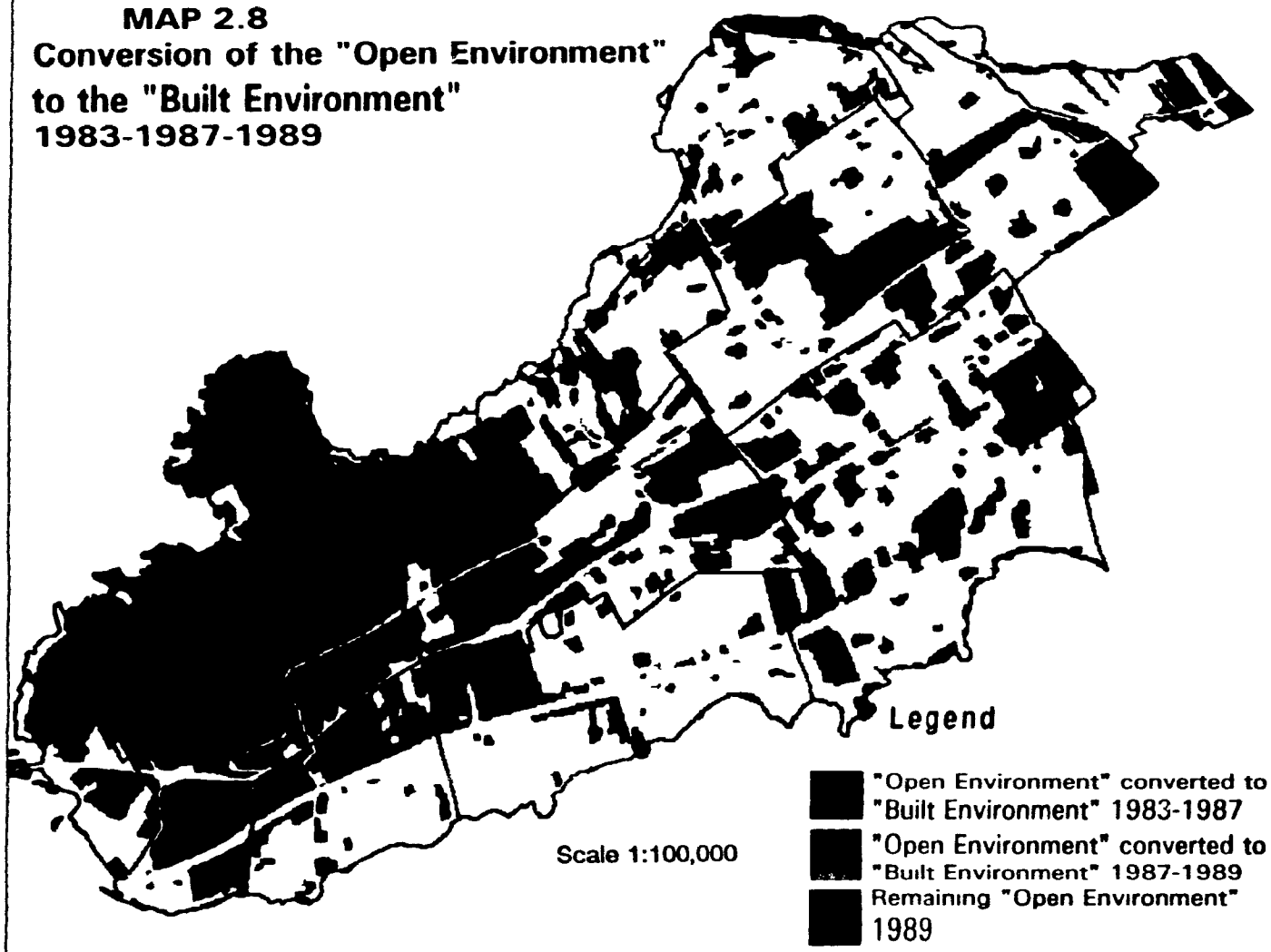
north eastern areas of the West Island. The spatial impact of the large population increases noted earlier in the municipalities of Kirkland, Dollard, and Pierrefonds, are made apparent in this GIS analysis. An examination of the maps of transition show most of these areas of new housing as vacant land and some as agricultural land in the earlier map of the time period. The open, rural character of the landscape in these areas of expansive development has been dramatically affected. In its place, Map 2 7 shows nearly continuous low density residential land use over much of the eastern half and south western portion of the West Island.

The infilling of established neighbourhoods through the construction of low density housing is also evident in Map 2.7. Small areas of new housing are scattered in and around the areas of housing built before 1983. All of the older communities located along the southern lakeshore have spots of new housing scattered throughout the long established residential areas.

Loss of the "Open Environment"

To contrast the image of low density housing development, the urbanization of relatively natural land was analyzed (Map 2.8). The very large areas of new housing development shown earlier in the central and north eastern portion of the West Island are equally evident in the expanses of "Open Environment" developed between 1983 and 1989. These large tracts of recently developed land are the most obvious, but in this time more than one hundred small parcels of land that were relatively unaltered until 1983 also became part of the increasingly urban landscape of the West Island.

MAP 2.8
Conversion of the "Open Environment" to the "Built Environment" 1983-1987-1989



Map by J. Adams using GRASS. Source: Base information from MUC Land Use Maps 1983, 1987 and 1989.

Another feature of land use change in the West Island made visually apparent by map 2.8, is the dramatic westward expansion of development. A relatively large portion of the western part of the West Island is continuous farms, fields and wooded land. Virtually the entire eastern edge of this area is marked with a broad border of large, new developments. This "green" section of the island is evidently shrinking.

The current importance of the built environment in the previously open, largely rural landscape is shown in Map 2.9, The Extent of the "Built Environment" and the "Open Environment" in the West Island Landscape of 1989. The coincidence tables of land use change (Appendix 2) indicate a reduction of land use categories classified as "Open Environment" from 41 percent of the study area in 1983 to 35 percent by 1989 (Table 2.2).

Table 2.2 The "Built Environment" and the "Open Environment"

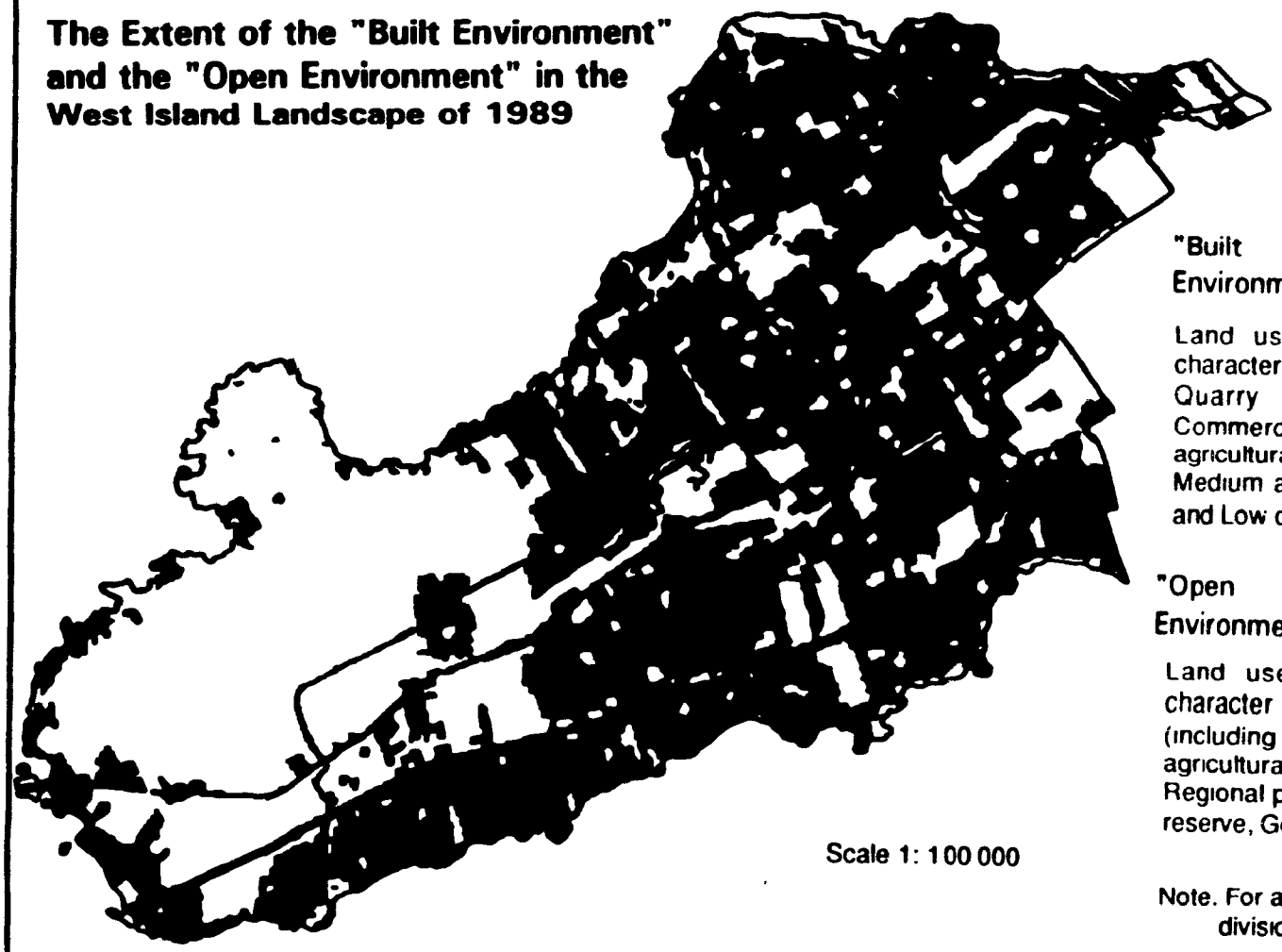
	1983 (ha)	Percent of Total Area	1989 (ha)	Percent of Total Area
"Open Environment" (Categories 8-12)	4390.74	41	3847.14	35
"Built Environment" (Categories 1-7)	6337.53	59	6886.98	65

Source: GIS data analysis, coincidence report (Appendix 2)

Maps 2.7 to 2.9 show the amount of "Open Environment" diminished significantly over the study period. This means that many residents who had lived adjacent to or near a wooded or open area had reduced access to what may have been important landscape components.

MAP 2.9

The Extent of the "Built Environment" and the "Open Environment" in the West Island Landscape of 1989



"Built Environment"

Land uses of a generally urban character They include Public utility, Quarry and landfill, Industrial, Commercial, Institutional (excluding agricultural research and instruction), Medium and high density residential, and Low density residential

"Open Environment":

Land uses of a generally rural character These include Agricultural (including special institutional use in agricultural research and instruction), Regional park, Municipal park, Nature reserve, Golf, Cemetary, and Vacant

Note. For a detailed discussion of this division of land uses see Chapter 2

Scale 1: 100 000

Map by Jennifer Adams. Based on 1989 MUC Land Use Map.

The above examples demonstrate general trends of urban development in the West Island. The rate and scale of recent change, particularly with the development of low density housing and the loss of natural areas, has significantly altered the landscape of the West Island.

The changes in land use imply a change in environmental quality as noted in the OECD comment. The face of the West Island has changed significantly in recent years in both the landscape and culture. The next chapter turns to the individual to examine how these changes are perceived and what kind of responses they are stimulating amongst residents of the area.

CHAPTER 3

SURVEY OF NEIGHBOURHOODS FACING RECENT ENVIRONMENTAL CHANGE

INTRODUCTION

The objective of this chapter is to explore individual perceptions of and responses to local environmental change. The findings reported earlier of wide spread land use change due to low density housing development across the West Island provide the basis for this stage of research. Questions as to how aware people are of such changes and how individuals may be responding to these changes were pursued. Residents of older, established neighbourhoods which have had new housing development occur in nearby areas were the focus of study.

METHODOLOGY

The main tool used in this stage of research was that of questionnaire surveys. This method was preferred over in-person interview surveys as it provides better coverage of the population because of higher completion rates (Feitelson 1991). Questionnaire design, site selection and data analysis are described below.

Development of Questionnaire

A twelve page questionnaire booklet was developed with the use of Dillman's Total Design Method (TDM) (Dillman 1978) (Appendix 3). The survey is divided into five sections. The first section poses questions about personal use of local natural areas, individual awareness of environmental change, and response to change. This is followed by a section concerning community amenities and resident values of these attributes. Both sections contain questions about attitudes towards community growth. The third section deals with personal activities and involvement in the community and a fourth section asks specific questions about personal and community satisfaction. The final set of questions concern the socio-economic status of participants in the survey.

Pilot Survey

A pilot survey was conducted in March 1991 in order to test the feasibility of this research method and the appropriateness of the questions. An area located in Pointe-Claire was selected under the criteria of being next to a recent housing development. Forty-eight questionnaires were distributed on five streets adjacent to the development. Twenty-four were personally delivered with a brief explanation of the project and the other half were delivered without personal contact. The booklets were distributed in a self-addressed, stamped envelope. A follow-up letter was sent to residents from whom no response was received within two weeks in order to test this method of improving the

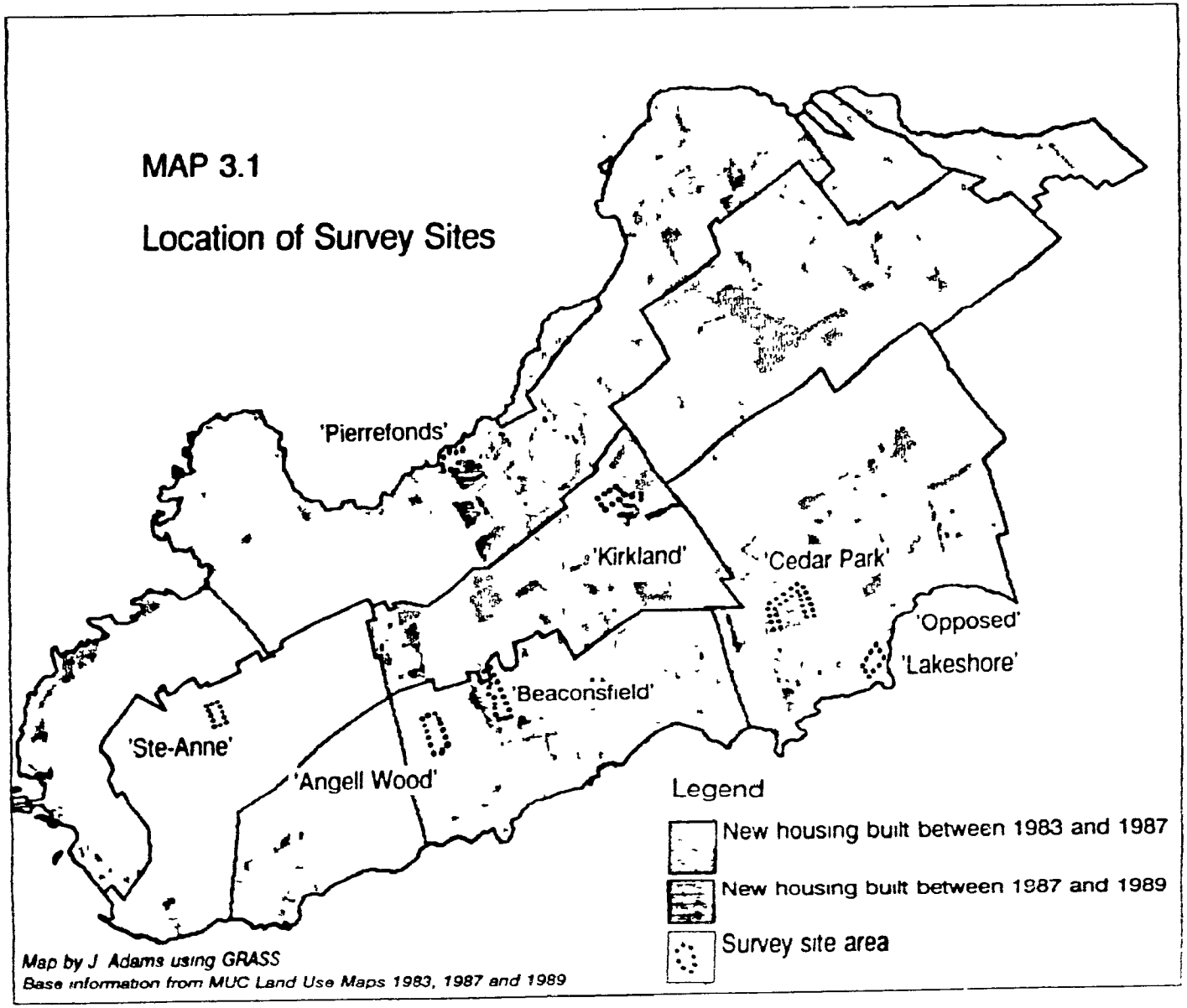
response rate.

Responses to the pilot study were satisfactory both in number and quality. Fifty five percent of the booklets were returned and most questions were answered consistently enough to indicate they were generally well understood. Personally delivered questionnaires obtained approximately 40 percent more responses than those delivered without explanation and the follow-up letter increased the response rate approximately ten percent.

Given the results of the pilot study, a larger distribution of a slightly modified questionnaire were made and a French version of the booklet was produced.

Site Selection

Given the extensive development of the West Island in recent years, a great many people live within a few blocks of new developments. Selecting sample sites for survey distribution was necessary. A combination of maps including the land use change maps produced for this case study, municipal planning maps, and road maps, were used to identify neighbourhoods to survey. Six sites were chosen for their proximity to new housing developments and their distribution across the West Island municipalities (Map 3.1).


MAP 3.1
Location of Survey Sites
'Pierrefonds'
'Kirkland'
'Cedar Park'
'Opposed'
'Lakeshore'
'Beaconsfield'
'Ste-Anne'
'Angell Wood'
Legend
New housing built between 1983 and 1987
New housing built between 1987 and 1989
Survey site area
Map by J. Adams using GRASS
Base information from MUC Land Use Maps 1983, 1987 and 1989

Main Distribution of Questionnaires

In June and July of 1991, approximately 800 questionnaires were delivered to residences in six study sites. Houses were visited between six and nine o'clock on week nights. Booklets were distributed to consenting participants. The language of the booklets distributed was chosen based on the language residents used in contacting the distributors.

Distribution to Interest Groups

For the purposes of comparative study, two interest groups representing opposing opinions were sought. One group which had publicly supported the protection of a local green space was included in the West Island surveys as well as one which had publicly opposed municipal acquisition of such property. Responses of each group were compared to those of the other respondents in order to better understand the range of opinions in the study area.

These two groups were determined on the basis of the opinions they had expressed in local petitions. Copies of petitions were obtained from city halls of the West Island municipalities. Questionnaires were then distributed to addresses listed in the petitions and phone surveys were carried out to the available phone numbers. Responses of the phone surveys were compared with those of mail questionnaires to determine if the phone survey methodology obtained different responses to mail surveys. Since the differences were not found to be statistically significant, the phone surveys were included

in the overall results. Results of these surveys are reported under the headings "Angell Woods", for those supportive of public green space and "Opposed", for those who opposed green space acquisition.

Testing For Bias

One of the main problems in survey research is that of non-response bias. This can be defined as the "amount of error that occurs when inferences made about a population are based upon a nonrepresentative sample that is in turn, due to low and unrepresentative survey response" (Shultz and Luloff 1990, 105) The opinions and personal characteristics of people who respond to a survey may be very different from those people who chose not to respond and therefore conclusions drawn from results may be biased.

In order to evaluate the level of non-response bias that may have resulted in the main distribution of surveys, a parallel survey was carried out in streets adjacent to a main survey area in Pointe-Claire. Sixty-two houses were selected for comparative study and rather than having respondents return the booklets by business return mail, arrangements were made for the personal collection of the completed forms in an effort to achieve a 100 percent response rate. Residences were visited up to three times

In cases in which residents refused participation in the survey, a single question was posed verbally to determine how refusals may bias results. The question was worded " I wonder if you could just tell me whether, in general, you favour attempts to preserve

green space on the West Island or do you feel that more development is what we need?"

Results of this survey were compared with responses obtained from other West Island surveys to establish the level of bias that may have occurred in the main collection of survey data.

Data Analysis and Interpretation

Results of the surveys were codified and tabulated using the Quattro Pro spreadsheet program. Quantitative data in the spreadsheet were then imported to the Systat data analysis package.

SUMMARY OF SURVEY RESULTS

This section reports on the raw results of the survey. It is followed by the section "Statistical Analysis of Results and Interpretation" which assesses the relationships between variables and categories of respondents.

Questionnaire Distribution

In distributing questionnaires, 76 percent of the study site residences were contacted (Table 3.1). Overall, 42 percent of those receiving questionnaires completed

and returned them. Less than three percent of people contacted refused participation.

Table 3.1 Summary of Questionnaire Distribution and Returns

	Total # Houses	Distri-buted	Refused	Returned	Response Rate (%)
Angel Woods	56	39	5	27	69%
Beaconsfield Freshmeadows	120	89	1	32	36%
Cedar Park Pointe-Claire	164	126	1	63	50%
Kirkland	163	114	3	43	38%
Lakeshore Pointe-Claire	166	122	2	47	39%
Opposed Pointe-Claire	44	31	1	20	65%
Pierrefonds	120	83	4	31	37%
Ste-Anne	116	64	2	19	30%
Summary	902	668	19	281	42%

Part A of Questionnaire: The Environment

Evaluations of Local Environmental Conditions-Present and Future.

The first section of the questionnaire was designed to solicit public opinion on the state of the local environment. Residents were asked to evaluate the quality of the environment and to describe their use of local natural areas. Levels of awareness of environmental changes and opinions concerning these changes were also sought.

Many people indicated that they perceived little change in their local environment in recent years (Table 3.2). In the cases of local parks and rivers, more people reported improvements than any other single option. Only regarding wooded areas and fishing did

more people report deteriorations. Expectations for the future were more negative than evaluations of the present, particularly for wooded areas and open spaces.

Table 3.2 Opinion on Local Environmental Conditions. Present (P) Conditions as Compared to When People First Moved to Their Area, and Expectations for the Future (F), Ten years from Now.

The Environment	Better (%)		Same (%)		Worse (%)		Response Rate (%)	
	P	F	P	F	P	F	P	F
Air Quality	5	27	71	40	24	33	76	75
Birds	30	15	52	48	18	37	68	73
Open spaces	22	15	41	39	37	46	93	92
Local parks	51	36	40	51	9	13	98	97
River pollution	43	54	33	23	24	23	70	70
Wooded areas	19	14	34	31	47	55	90	90
Local fishing	9	27	43	39	48	34	36	63

N=281.

Use of Local Natural Areas

The majority of respondents indicated they did have some "special natural place" they visited (Table 3.3a). Only a third reported they had lost such a place to development. For those people who indicated they had a special place, over 80 percent felt conditions were the same or better now than when they first started going there (Table 3.3b).

Table 3.3a Local Natural Places.

	No (%)	Yes (%)	Response Rate (%)
Have a local place	17	83	96
Have lost local place	66	34	84

N=281.

Table 3.3b Condition of Local Natural Places Compared to When People First Started Going.

Better (%)	Same (%)	Worse (%)	Response Rate (%)
46	37	16	92

N=224.

Local Development

Surveys sites were selected because they were in areas where there had been recent local development on vacant land. A considerable number of people polled indicated they were neither aware of recent development nor development proposals for their area (Table 3.4a). For the people who were aware, the development meant the loss of an area many used for recreation (Table 3.4b). As well, people who were aware had generally not welcomed the development in their area.

Table 3.4a Awareness of Development or Development Proposals.

Aware (%)	Unaware (%)	Response Rate (%)
71	29	93

N=281.

Table 3.4b Use of Development Site for Recreation and Response to Development.

Site used for recreation		Response	Development Welcome		Response
Yes (%)	No (%)	Rate (%)	Yes (%)	No (%)	Rate (%)
63	37	88	30	70	100

N=186

Asked why they did **not welcome** the project, over 80 percent felt it would have reduced access to green space and 60 percent said increased traffic was a factor. Some felt it would have: increased noise pollution, increased taxes, made the area busy,

destroyed trees, overloaded city services, or changed the neighbourhood character.

For those who **welcomed** the project, half said they expected it would have reduced property taxes, 41 percent felt it would have improved services, and a third said it would have cleaned up the area. Some people in this group felt the development would have: increased safety in the area, provided homes, improved road access, increased house value, or improved the area.

Part B and C of the Questionnaire: The Community and Personal Well-being

Conditions of the Community-Present and Future

The second and third sections of the questionnaire were set up to solicit opinion about the quality of social aspects of the community and attributes residents value most. Conditions were generally perceived to be unchanged or even improved since people had moved to their area (Table 3.5). Crime and taxes were the exceptions with most people indicating these aspects of the community had deteriorated and will continue to deteriorate.

Table 3.5 Evaluations of Present (P) Community Conditions Compared to When People First Moved to the Area, and Expectations for the Ten Years in the Future (F).

The Community	Better (%)		Same (%)		Worse (%)		Resp Rate (%)	
	P	F	P	F	P	F	P	F
Friendliness	14	9	74	67	12	22	95	94
Education	24	27	67	48	10	25	84	84
Employment	30	30	48	44	22	26	81	85
Community control	22	15	59	60	19	24	75	76
Sports & cultural facilities	56	37	42	60	2	3	95	94
Health services	51	37	44	37	13	26	85	85
Local taxes	4	4	29	17	67	79	93	95
Petty crime	4	4	34	25	62	71	93	94

N=281.

Overall Conditions - Present and Future

In these first sections of the questionnaire, people were asked to assess the present overall environmental and social conditions of the community and to indicate how they expect conditions will be in the future (Table 3.6). Opinions about the environment were very similar to those of community conditions. In both cases, many people felt conditions were unchanged since they had moved in and many felt they would remain as they are over the next ten years. Concerning the environment, roughly as many people felt present conditions had improved as felt they had deteriorated. Relatively few people felt community conditions were worse than in the past. Opinion was roughly evenly divided between those who expect improvements and people who anticipate deteriorations in future conditions of both the environment and community.

Table 3.6 Evaluations of Overall Conditions-Present Compared to When People First Moved to the Area and Ten Years in the Future.

Overall conditions		Better (%)	Same (%)	Worse (%)	Response Rate (%)
Present	environment	30	42	28	91
	community	30	57	13	95
Future	environment	28	38	34	86
	community	23	48	29	94

N=281

Improvements and Deteriorations

Opinions about community growth were sought in both sections pertaining to conditions of the local area. People were asked two forced choice questions to understand what they attribute improvements or deteriorations in the local environment and community to. The first question asked if reported improvements were only possible because of community growth. The second asked whether or not changes for the worse were a necessary result of community growth (Table 3.7). Community growth is apparently seen as a positive process. Improvements in both the local environment and social conditions were generally linked to growth but deteriorations were seen as avoidable even with community growth.

Table 3.7 Attitudes Toward Community Growth.

Improvements·	were only possible with growth (%)	would have occurred regardless of growth (%)	Response rate (%)
Environment	62	38	68
Community	76	24	67
Deteriorations·	were a necessary result of growth (%)	could have been avoided even with growth (%)	Response rate (%)
Environment	37	63	65
Community	44	56	74

N=281.

Valued aspects of the community

Asked what they like best about their community, many attributes characteristic of rural or country environments were commonly noted. Qualities that would describe quiet, green surroundings are clearly traits of the country-side. Of all the responses, "quietness" and "services and convenience" were the most common followed by "friendliness" and "green space". The next most common responses were "a good place to raise children" and "safety".

A similar question asked people to rank a list of reasons why people might live in the area and to name the factor that was most important to them (Table 3.8) Again, rural or country-like characteristics were among the most important reasons Over 70 percent of respondents ranked "a good place to raise children", "neighbourhood character", "housing is good" and " close to nature" as being extremely important or quite important. A "good place to raise children", "neighbourhood character", and "close to nature" topped the list most often.

Table 3.8 Ranking of Reasons People Might Live in Study Areas.

REASONS / IMPORTANCE	Extremely (%)	Quite (%)	Less (%)	Response rate (%)	Most important (%) *
Good place to raise children	66	30	4	75	33
Neighbourhood character	54	43	3	84	27
Good housing	47	49	3	82	2
Close to nature	43	44	13	83	17
Recreational opportunities	36	48	17	81	5
Taxes are reasonable	29	55	15	65	3
Convenient for work	26	53	21	69	6
Job opportunity	25	31	44	43	2
Friends are mostly here	19	46	35	44	2
Born in this community	16	27	57	21	2
Family are mostly here	14	35	51	30	1
Business devel opportunity	11	36	53	33	.5
Other	61	39	0	9	.5

N=281. *For "Most Important", overall response rate = 86%.

The Choice of the Suburbs

A number of questions in the survey were designed to help understand people's attitudes to suburban living (Table 3.9). On average, people in the survey have lived in their area for 14 years with some having been there as long as 50 years. Very few people moved from the country to their present home with most having moved from an urban setting. Most people were satisfied with where they live.

A number of questions in this section further empasize people's preference for ruralness in their surroundings. Given the choice, very few people indicated they would

like to live closer to the city , but a considerable proportion would prefer to live closer to the countryside. When asked whether respondents would accept a job requiring them to live close to the centre of a city, average opinion fell between "probably not" and "maybe" on a scale from "definitely not" to "yes definitely". A key question that was found to divide respondents almost equally was whether people expect to enjoy living in the community more or less as it grows.

Table 3.9 Selected Questions About Living in the Community.

				Response Rate (%)
Previous place of residence:	suburbs 52%	city 44%	country 4%	72
Would make the same choice now	yes 87%	no 13%		82
Given the choice, would live.	same place 69%	closer to country 24%	closer to city 2%	84
Offered a job requiring a move to the city--would _____accept it.	Definitely not 31% Probably not 22% Maybe 27% Yes Probably 13% Definitely 7%			93
Expectations for future enjoyment in community as it grows:	more 53%	less 47%		86

N=281.

Municipal Tax Spending

People were asked how a $1000 tax surplus should be spent in a hypothetical scenario where the municipality had a budgetary surplus. Second to a tax refund, the area allotted most funds by the most people was towards environmental clean-up followed by spending to increase green space (Table 3.10).

Table 3.10 Spending of $1000 Per Capita Municipal Budget Surplus

	Average of non-zeros	Proportion of sum	Response Rate (%)
Tax refund	$453 ± 301	$274	61
Environmental clean-up	$306 ± 205	$173	56
Increasing green space	$257 ± 192	$131	51
Improving roads	$236 ± 184	$119	50
Improving policing	$230 ± 177	$113	49
Improving health services	$232 ± 163	$102	44
Improving recreation facilities	$134 ± 87	$48	36
Other	$271 ± 267	$40 Total=$1000	15

N=281, overall response rate = 85%.

Regarding existing green space, people were asked how much they would like to see preserved and how well they felt these views were represented by local politicians (Table 3.11). Responses clearly showed a majority of people wanted most existing green space preserved. In contrast, most people thought their political representatives would like to see considerably smaller amounts preserved.

Table 3.11 Preservation of Existing Green Space.

		Resp. Rate (%)
Green space people would like to see preserved	Average 90% ± 17%	96
Green space people think politicians want to preserve	Average 51% ± 27%	88

N = 281.

Part D of the Questionnaire: Evaluations of Satisfaction and Happiness

A series of questions were included in the survey to determine how satisfied people feel and what is important for their happiness. (Table 3.12). Almost everyone reported feeling satisfied or fairly satisfied with life and were fairly or very happy. Few people indicated they expect to be less satisfied in the future.

Table 3.12 Outlook on Life

Satisfaction				Response
Satisfied (%)	Fairly (%)	Not very (%)	Not at all(%)	rate (%)
47	47	6	5	95
Happiness				
Very	Fairly	Not too		
40	56	3		85
Future satisfaction				
More	Same	Less		
48	47	5		94

N=281

Determinants of Happiness

On average, "getting along well with one's **family**" and "having a successful **married life**" were ranked highest in importance for personal happiness (Table 3.13). Overall, the lowest rating was given to "feeling close to nature" with opinion varying most on this factor.

Table 3.13 Determinants of Happiness	Average *
Getting along well with your family	9.3 ± 1.4
Having a successful married life	9.3 ± 1.7
Having financial security	8.8 ± 1.4
Being physically fit	8.7 ± 1.8
Getting along well with friends	8.4 ± 1.6
Doing interesting things	8.1 ± 1.6
Feeling useful to others	7.8 ± 1.8
Having enough leisure time	7.5 ± 1.9
Having a successful career	7.3 ± 2.3
Feeling close to nature	7.0 ± 2.2

*On a scale of 1-10, 1 = Not important, 10 = Extremely important
Response rate = 85%.

Part E of the Questionnaire: Socio-economic status

In a final section, people were asked to provide information about their socio-economic status (Table 3.14). Responses were equally divided between men and women. Most people surveyed had children. As well, the residents were found to have upper-middle-class incomes and were generally an older population. A high proportion of respondents were English speaking. These findings generally follow the socio-economic profile outlined in the previous chapter.

Table 3.14 Socio-Economic Data

				Response Rate (%)
Sex				
Male: 52%		Female: 48%		98
Age				
Over 65 years: 12%	46-65 years: 36%	26-45 years 46%	15-25 years 6%	95
Children				
None: 3%	18 & under: 47%	Over 18 50%		79
Income				
Under $25000: 7%	$25000-$40000 46%	$40000-$80000 46%	Over $80000 31%	76
Language				
English: 75%		French 25%		*

N=281. *Based on language of booklet.

SUMMARY OF RESULTS

Some preliminary conclusions can be drawn from the reported survey results. The levels of awareness of changes in local environmental conditions are relatively low Considering all areas surveyed faced recent development of vacant land, a large proportion of respondents were unaware of these changes in their area. The generally positive evaluations of the conditions of open spaces would also seem to indicate development of land in the study areas has proceeded unnoticed.

Changes in environmental conditions of the study areas have not been perceived negatively. Only the degradation of wooded areas has been generally noticed but a majority perceives other aspects of the environment as having improved or remaining

unchanged. Despite considerable development activity in the study areas, the areas of natural landscape that most people use for outdoor activities remain undeveloped for urban uses and are even in better condition than in past years according to many.

Social aspects of the communities have also fared well in recent years according to most people. Other than taxes and petty crime, conditions are seen to be about the same or better than they have been. The communities are generally seen to be as friendly, and services and employment are considered to be as good or better than they were in the past.

Community growth is seen as a positive process in the eyes of most people poled. It is generally linked directly to improvements in both the local physical and social environment but deteriorations are not attributed to growth.

STATISTICAL ANALYSIS OF RESULTS AND INTERPRETATION

An examination of relationships between people's responses to different survey questions brings to light some possible explanations for the range of observed responses.

Evaluations of Overall Environmental Conditions in Relation to Specific Aspects of the Local Environment

In the "results" section, it was reported that many people felt overall environmental conditions were better now than they had been. While some aspects of the

environment such as local parks had improved, others such as wooded areas were seen to have deteriorated. A better understanding of what a person meant when they said overall conditions were worse or better may be found in a look at how they evaluated specific aspects of the environment. What aspects of the environment are most important to people when evaluating overall conditions of their local environment? How closely related are people's perceptions of overall environmental conditions and those of conditions of specific types of green spaces? A significant relationship may be an indication that a feature is important to people in making an overall assessment of local environmental conditions.

Relationships between evaluations of specific aspects of the local environment and overall conditions were examined using logit step-wise regression (Table 3.15) The strongest relationship was found to be with the condition of **wooded areas** followed by air quality, rivers, and open spaces.

Table 3.15 Determinants of Present Overall Environmental Conditions.

Step	Variable	Odds ratio	T-ratio	P-value
1	Wooded areas	15 4	4 043	0 000
2	Air quality	18 2	3 073	0 002
3	River pollution	7 2	3 194	0 001
4	Open Spaces	4.7	2 939	0 003

N=111, variables not significantly related local parks, local fishing and birds

Note: Statistics of Significance

The odds-ratio is the amount by which the odds change when the independent variable increases by one unit on the variable's scale. For example in this situation, if a person evaluated the conditions of wooded areas as being worse now than they were when they first moved in, odds are almost fifteen times greater that they would also judge overall environmental conditions as being worse rather than better In the final results of the model, the odds ratio may appear to be higher than the step-wise ranking of the variable's importance due to a high standard error and large confidence interval

As in the case of present conditions, people's expectations for future overall environmental conditions were found to be most closely related to their evaluation of **future conditions of wooded areas** (Table 3.16). Other factors of future conditions of local fishing and open spaces were found to be significantly related to estimates of future overall conditions.

Table 3.16 Determinants of Future Overall Environmental Conditions

Step	Variable	Odds ratio	T-ratio	P-value
1	Future wooded areas	40.9	2.515	.012
2	Future fishing	49.4	3.499	.000
3	Future open spaces	17.3	2.365	.018

N = 109, variables not significantly related: rivers, air, birds, local parks.

Over 85 percent of those who felt overall environmental conditions were worse now than they were also felt wooded areas were worse. The fact people evaluated overall conditions of their local environment very much the same way they rated local wooded areas may indicate wooded areas are perceived as an important part of the local environment. Air quality, river pollution and open spaces were also evaluated similarly to overall conditions of the environment. Aspects of the environment that were evaluated differently may play less of a role in general assessments.

The strength of the relationship between people's evaluations of overall environmental conditions and those of local wooded areas brings particular interest to the state of wooded areas. Results indicate: if people think wooded areas are in better condition, they likely think overall conditions are also in better condition; if they think

wooded areas have deteriorated, they likely think overall conditions have deteriorated.

Whether people's attitudes about the condition local wooded areas are based more on experience of their environment or rather on the environmental issues raised in the media, are questions that arise but cannot be answered from data collected for this study. The local issue of woodland conservation is discussed in the next chapter.

Since people evaluate wooded areas very much the same way they evaluate overall environmental conditions, wooded areas may be mostly what people think of when they are asked about their local environment. Deteriorations of wooded areas may affect people's perceptions of their local environment more than deteriorations in other aspects of the environment. For example, the development of open spaces could affect people's attitudes towards local environmental quality less than the destruction of local wooded areas.

This relationship might also be evidence that the changes local wooded areas have undergone in recent years may be significant enough to stimulate higher levels of awareness of their condition and/or their value. As noted earlier, 47 percent of respondents indicated wooded areas have deteriorated. More than any other aspect of the local environment, wooded areas were perceived to be deteriorating.

Evaluations of Overall Community Conditions in Relation to Specific Aspects of the Community

To better understand people's assessments of overall community conditions, responses were examined in relation to specific aspects of the community (Table 3.17). **Community friendliness** was found to be most closely related to people's overall assessments of community conditions. Petty crime and vandalism, education, and taxes were also found to be closely related. Only five percent of the people who thought overall conditions were better now than they had been, felt the community was less friendly. No one who felt overall conditions were worse, thought friendliness was better.

Table 3.17 Determinants of Overall Community Conditions

Step	Variable	Odds ratio	T-value	P-value
1	Friendliness	17.3	3.643	0.000
2	Petty crime	17.7	2.641	0.008
3	Education	8.6	2.743	0.006
4	Taxes	18.4	2 020	0.043

N = 90, variables not significantly related in model: health facilities, and employment opportunities.

Education was found to be most closely related to estimates of future overall conditions (Table 3.18). **Friendliness** was selected in the second step but in the final estimation the T-value was higher than the first variable and the odds ratio was very high, indicating this may be a particularly important variable. No one thought overall

conditions would be better but friendliness would be worse and only one percent of those who thought conditions would be worse, expected friendliness to be better. Health care and expectations for employment opportunity were other variables similarly rated to overall community conditions.

Table 3.18 Determinants of Future Overall Community Conditions

Step	Variable	Odds ratio	T-value	P-value
1	Future education	5.4	2.127	0.033
2	Future friendliness	1864.7	3.534	0.000
3	Future health care	12.8	2.581	0.010
4	Future employment	11.0	2.725	0.006

N = 114, variables not in model include sports and cultural facilities, petty crime and taxes

For a subset of the population who chose to evaluate community control of development, the ranking of closely related variables differed. When added to the model, step-wise regression initially selected community control of development as the most closely related variable to present overall conditions. But in the final model, no variable had significant t-ratios or probabilities. Expectations for employment, friendliness and health care facilities in the future were found to be most closely related to future expectation of overall conditions when community control of development was added to the model. Friendliness had the highest T-ratio (2.728), probability (0.006) and odds (637.3). This may be more evidence of the importance of friendliness in the process of evaluating overall community conditions.

From these results, it is clear that people's attitudes towards the friendliness of their community is very closely related to how they feel about overall conditions of the

community. It would appear that, of all the aspects of community life, people take friendliness into account most when making an evaluation of overall conditions.

These findings point to the value of evaluations of community friendliness as an indicator of community well-being. Ongoing monitoring of people's attitudes toward friendliness would give rich information about the state of community life.

The importance of community friendliness also underlines the need for development plans and activities to take into account the possible impacts they might have on friendliness. Encouraging and enhancing human interaction in the community becomes an obvious goal of municipal planning, both in the physical and social aspects of the community. As reported results show, many people expect a decline in community friendliness in the future. This may indicate that current trends in development are not achieving this goal in the opinion of an increasing number of people.

Attitudes Toward Growth

As has been reported in the results section, people appear to have generally positive attitudes toward growth in terms of this process bringing improvements to the environmental and social aspects of their area. In order to see more specifically the degree to which people attribute growth to local environmental and community change, ratings of local conditions were matched with answers as to why changes had come about (Tables 3.19 a & b).

Consistently more people attributed improvements to community growth than to

other factors. Three out of every four people who assessed overall environmental conditions as better now than they were, also felt improvements were only possible because of growth. Conversely, nearly three out of every four people who assessed overall conditions of the environment as being worse at present felt changes for the worse could have been avoided even with community growth

Table 3.19a Attributing Local Environmental Change to Growth.

	Better		Worse	
	possible because of growth	regard-less of growth	necessary result of growth	avoidable with growth
Overall	56 (3 1 1)	18	18	52 (2 8 1)
Local Parks	98 (3.1 1)	32	4	18 (4 5 1)
River	46 (1.2 1)	40	14	42 (3 1)
Birds	28 (1.1)	28	9	20 (2 2 1)
Wooded areas	37 (4 6·1)	8	45	67 (1 5 1)
Open spaces	40 (2 5 1)	16	42	50 (1 2 1)
Air	6 (1 2 1)	5	20	39 (2 0 1)
Fish	5 (1 7.1)	3	15	32 (2 1 1)

Values in numbers of responses and ratios between response options

Understanding attitudes toward community growth was further pursued in relation to social aspects of the community. Similar ratios to those of environmental quality were found (Table 3.19b). People generally felt improvements were due to growth and deteriorations were avoidable even with community growth The areas of health care, employment, education, sports and cultural facilities and community control of development were most commonly perceived as having improved and improvements were felt to be due to growth. In contrast, taxes and petty crime and vandalism were seen as

being worse and most often, people felt these deteriorations could have been avoided ever as the community grew.

Table 3.19b Attributing Community Changes to Growth or Other Factors.

	Better		Worse	
	possible because of growth	regardless of growth	necessary result of growth	avoidable with growth
Overall	60 (3 5 1)	17	10	23 (2.3.1)
Health care	92 (3 8 1)	24	4	7 (1.8.1)
Education	47 (7 8 1)	6	6	11 (1.8.1)
Employment	58 (8 3.1)	7	14	26 (1.9.1)
Sport & culture	115 (4 4 1)	26	3 (3.1)	1
Community control	32 (2 5 1)	13	8	28 (3.5:1)
Taxes	7 (2 3:1)	3	62	99 (1 6·1)
Petty crime	4	6 (1.1.5)	66	82 (1 2 1)
Friendliness	21 (1.4 1)	15	16 (1 2:1)	13

Values in number of responses and ratios of response options.

The importance of community friendliness in assessing present and future community conditions was shown earlier and is of particular interest in light of this question of growth. Of all the various aspects of the community, friendliness was perceived to be most negatively affected by growth. Many people felt their community was less friendly as a result of community growth. The earlier conclusion that current trends in development are not conducive to community friendliness is further supported in these findings on growth.

Assessments of Overall Conditions and Expectations of Enjoying the Community in the Future

Are people's attitudes toward living in the community in the future as the community grows related to their evaluations of present and future environmental and community conditions? Answers to these questions may shed more light on the nature of attitudes toward growth. To this end, cross tabs between whether people expect to enjoy living in the community more or less as the community grows and their evaluations of future community conditions and present environmental conditions were examined (Table 3.20).

Table 3.20 **Cross-tabs: Future Enjoyment with Future Community Conditions and Present Environmental Conditions.**

		future community			present environment		
		better (%)	worse (%)	N	better (%)	worse (%)	N
future	more	75	25	60	78	22	68
	less	14	86	63	27	73	67
		Chi-sq = 15 8,p = 000			Chi-sq 35 3,p 000		

Generally, people who were optimistic about their future in the community had positive expectations for community conditions in the future and were positive in their evaluations of present environmental conditions. Those who expect to enjoy living in the community less as it grows had poor expectations for the conditions of the community and felt overall environmental conditions were worse now than they were

These results support the conclusion that community growth was interpreted in

divergent ways. For some people, community growth is associated with improving overall conditions in the community and the local environment. These people expect to enjoy living in the community more as it grows. In general, this group found local environmental conditions had improved since they first moved to the area and they also expect overall conditions in the community will improve over the next ten years.

The other group associates community growth with deteriorating conditions in the community and the local environment. These people expect to enjoy living in their community less as it grows. In general, this group expects community conditions will deteriorate in the future and they also felt local environmental conditions are generally worse than they were in the past.

Attitudes Toward Development

The question arises as to how people's perceptions of overall environmental and social conditions might be related to their attitudes toward development. People who perceived local environmental conditions or community conditions as being worse were expected to be clearly less welcoming of development. This was not found to be the case. Step-wise regression did not show any significant relationships between responses to these questions and leaves open the question of what people's attitudes toward development are related to.

One would expect attitudes toward development would be influenced by particular use of areas under development pressure. Recreational use of a natural area might

increase resistance to development of that area. This relationship was examined in the survey results and found to be significant (Table 3.21). A particularly high proportion of those people who used the developed or threatened sites for recreation did not welcome development of the site.

Table 3.21 Use of Site for Recreation and Response to Development.

	Not welcome (%)	Welcome (%)	N
Use for recreation	80	20	101
Don't use for recreation	62	38	58

Chi-squared = 6.23, p = .013.

Women and Development

Results gave some evidence that women responded more negatively to local development than men (Table 3.22). Fifteen percent more women than men had not welcomed development in their area.

Table 3.22 Responses to Development on Gender Lines.

	Development		
	Not welcome (%)	Welcome (%)	N
Women	78	22	81
Men	63	37	105

Chi-squared = 4.79, p = .029

Income and Development

There is no conclusive evidence from the survey results that any one income group was more or less welcoming of local development than another. The group surveyed was fairly homogeneous in terms of income but the reported differences did not differentiate the group with respect to response to development.

These findings are supported by the research of David Pearce et al. According to these authors, evidence that "the demand for environmental quality rises more than proportionately as income grows - is inconclusive" (Pearce et al. 1990, 12). They also suggest that "the gross benefits of environmental improvements are not systematically related to incomes" (ibid, 13).

Protection of green space and development

In an initial examination of results, overall averages showed a considerable difference in the amount of green space people would like to see preserved and the amount they think their politicians would like to see preserved. By relating individual responses to these two questions, this difference can be clarified (Table 3.23). This analysis shows very few people felt their views on green space preservation were shared by their politicians.

Table 3.23 Difference in the Amount of Present Green Space People Would Like to See Preserved and How Much They Think Their Politicians Would Like to Preserve.

Difference: (More or less than politicians	% of responses
More than 50% more	23
10-50% more	60
The same	15
Less than	2

N=281, response rate = 88%

Further analysis shows people who thought their politicians would like to see less green space preserved than they themselves would like to see preserved generally did not welcome the development project (Table 3.24). In contrast, those who felt their local politicians would like to see as much or more green space preserved than they would often did welcome the development project in their area.

Table 3.24 Differences in the Amount of Green Space Two Groups Want Preserved and What They Think Their Politicians Want- Those Who Had and Those Who Had Not Welcomed Development.

Preserve green space	Not welcome (%)	Welcome (%)	N
Over 50% more than politicians	83	17	48
10-50% more than politicians	71	29	99
Same as politicians	43	57	21
Less than politicians	40	60	5

N=173, Chi-squared = 13.58, p= 004.

Perceptions and Opinions of Two Selected Interest Groups

Two interest groups, one supporting and one opposing acquisition of public green space, were included in the West Island survey. In the following report, responses of

these two groups were compared to other West Island results. The "Angell Woods" group from Beaconsfield supported the purchase of green space and the "Opposed" group from Pointe-Claire was against the municipal purchase of available green space. In the analyses, each group was compared to the aggregate of West Island responses ie. all responses excluding the one group being compared.

The apparent similarities between responses of the selected groups and those of the other respondents were as instructive as their differences. These findings bring a greater understanding of the range of responses people may have to environmental change.

Selection Criteria

As described earlier, petitions from Beaconsfield and Pointe-Claire were used to contact people in the West Island survey. The selection criteria successfully resulted in distinguishing two subsets of respondents. Opinions were particularly different in response to local development. Angell Woods respondents were significantly less welcoming of development than other people in the West Island surveys (Table 3.25). In contrast, a remarkably high proportion of people in the Opposed group said they had welcomed development in their area.

Table 3.25 Significantly Different Responses to Local Development of Selected Groups Relative to the Aggregate of other West Island Responses

Groups	Not Welcome (%)	Welcome (%)	N	Chi-sq/prob.
Angell Woods	87	13	23	3.83
Aggregate *	67	33	166	0.050
Opposed	25	75	16	16.13
Aggregate *	73	27	173	0.001

*Aggregate = all responses excluding the one group being compared.

The differences in opinions of these two groups in comparison with other West Island respondents are brought out further in examining results to the questions regarding green space preservation. According to results, the majority of respondents from the Angell Woods area felt local political leaders would like to see 50 to 100 percent less of the present green space preserved than they themselves would.

There is apparently less discrepancy between the amount of green space respondents of the Opposed group would like to see preserved and how much they think their politicians would like preserved. Forty percent of this group felt their politicians would like to see as much or more of present green space preserved than they would while only 15 percent of other West Island respondents felt this way.

Table 2.26 Results of Selected Groups Compared to the Aggregate of Other West Island Responses: Difference Between Amount of Green Space People Would Like to See Preserved and How Much They Think Local Politicians Would Like

Groups	< 0%	0%	10-50%	> 50%	N
Angell W.	0	9	29	62	21
Aggregate	2	15	63	19	226
Opposed	7	33	40	20	15
Aggregate	2	13	62	23	232

Perception of Local Environmental Conditions

Differences in how these two groups may perceive the conditions of the local environment compared to other respondents from the West Island were examined. Responses from the Opposed group were found to be more representative of the overall West Island results than responses from the Angell Woods group (Table 3.27).

Table 3.27 Significantly Different Evaluations Between Selected Groups and the Aggregate of Other West Island Responses: Local Environmental Conditions Compared to When People First Moved to the Area

Variable	Groups	Better (%)	Same (%)	Worse (%)	N	Chi-squared /probability
Open Spaces	Angell W.	0	39	61	23	9.61
	Aggregate	24	41	33	238	0.008
Wooded Areas	Angell W.	0	30	70	23	7.55
	Aggregate	20	35	45	45	0.023
Local Parks	Angell W.	22	67	11	27	10.32
	Aggregate	54	37	9	247	0.006
	Opposed	25	75	0	20	11.29
	Aggregate	54	37	9	254	0.004
Overall Envir.	Angell W.	0	35	65	23	20.43
	Aggregate	33	42	24	234	0.000

Respondents from Angell Woods were relatively negative in their outlook. The majority of respondents from Angell Woods felt conditions of both open spaces and wooded areas had deteriorated since they moved to the area. No respondents from this area felt open spaces or wooded areas had improved. In contrast, the Opposed group was not significantly different from other West Island respondents in evaluating conditions

of open spaces and wooded areas.

The o. e area in which evaluations of the Opposed group were found to be significantly different from other West Island respondents was that of local park conditions. More people in the Opposed group felt conditions of local parks had not changed since they moved to the area and no one felt local parks were in worse condition. In fact, the lake shore in close proximity to the residences of this group has undergone considerable park development in recent years. Since these people expressed their opposition to expanding the amount of green space in the community, it would appear that they are satisfied with available parks or are not park users. It may be that people who indicated conditions of local parks were unchanged, were not aware of conditions or had no opinion about them.

More people from Angell Woods than other areas also felt conditions of local parks were the same as they had been and fewer felt they were better. For people living in the Angell Woods area, the most accessible local park is approximately the size of one lot and has some playground equipment for children. It is likely people in this area based their opinion about local parks on this particular one. Since no major alterations of this park have occurred in recent years, responses concerning local park conditions would appear to reflect the status of this park.

The encroaching development in the surroundings of the Angell Woods area appears to have affected residents more than in other areas surveyed. The Angell Woods group had significantly different evaluations of overall conditions of the local environment compared to other respondents. Generally, people in the Angell Woods

group felt local environmental conditions had deteriorated and a notable 74 percent of this group expect environmental conditions will deteriorate in the next ten years Responses from the Opposed group were not significantly different from other West Island results concerning present or future conditions of the local environment.

Perceptions of Local Community Conditions

The perceptions of local community conditions of the two groups were also compared with other West Island results. Again, the Angell Woods group was found to be more negative in their perspective than other respondents (Table3.28). Responses of the Opposed group were generally consistent with other results but this group was more positive about the prospects for overall community conditions in the future than other respondents.

Table 3.28 Significantly Different Responses of Selected Groups Relative to Other West Island Respondents: Community Conditions Compared to When People First Moved in and Expectations for Conditions in Ten Years

Variable	Groups	Better (%)	Same (%)	Worse (%)	N	Chi-sq /prob
Community Friendliness	Angell W.	4	51	45	22	9 06
	Aggregate	10	70	20	241	0 011
Overall Community	Angell W.	9	61	31	23	9 51
	Aggregate	31	57	12	243	0.009
Future Overall Community Conditions	Angell W.	10	30	60	20	10 30
	Aggregate	24	50	26	243	0.006
	Opposed	37	58	5	19	6 12
	Aggregate	22	48	31	244	0.047

In regards to conditions of petty crime and vandalism, education, and health facilities, evaluations of the two groups followed similar patterns of responses to other groups surveyed.

A significantly high proportion of Angell Woods respondents indicated their community was not as friendly as it was in the past and overall, conditions in the community had deteriorated. A majority of the Angell Woods group felt overall conditions of the community would be worse in ten years but only 26 percent of other respondents felt this would be the case.

Perspective on Living in the Community in the Future

As shown earlier, responses regarding development distinguished the two survey groups from other West Island respondents. Results on the question of whether people expect to enjoy living in their community more or less as it grows, further set the two groups apart from other West Island respondents (Table 3.29). It would appear these two groups hold opinions at opposite poles regarding growth. For the Angell Woods group, current trends in development apparently hold very bleak prospects for the future quality of life in their community. In contrast, results from the Opposed group show a strong belief in growth improving the quality of life in their community.

Table 3.29 Significantly Different Responses of the Two Selected Groups Compared to the Aggregate of Other West Island Responses: Whether People Expect to Enjoy Living in Their Community More or Less as it Grows

Groups	More (%)	Less (%)	N	Chi-sq/prob
Angell Woods	5	95	20	19 87
Aggregate	57	43	223	0 000
Opposed	89	11	18	10 22
Aggregate	50	50	225	0 001

A number of questions regarding general satisfaction in life and people's choices of residence did not differentiate the two selected groups from other West Island respondents. In the question of whether people expect to be more or less satisfied in the future, responses of both groups followed the same pattern of response made by other West Island respondents ie. approximately half more and half less. Asked whether people would accept a job offer requiring them to live closer to the centre of a city, responses were not significantly different for these two groups as for other respondents. As well, answers regarding whether people would like to live closer to the city, the countryside, or where they live now, were also similar to other responses from the West Island.

Socio-Economic Status

Responses regarding socio-economic status generally did not set people from the Angell Woods area or the Opposed group apart from other West Island respondents. In terms of age, income, home ownership or language, response patterns were similar for the two groups compared to other respondents.

Testing for Bias: Comparison of Test Site Survey With Other West Island Results

In order to test for bias, a high return rate on the parallel survey was necessary. The personal collection of booklets resulted in a considerably higher response rate than the mail return method used in the main distribution of questionnaires (Table 3.30).

Table 3.30 Results of Test Site Survey

Contact	71%	not home	29%	N=62
Responses	82%	unable	5%	N=44
		refused	13%	

Bias from Refusals

In the 6 cases in which respondents were able but unwilling to participate, half responded in favour of green space preservation and half refused to comment. Bias was not expected to be in favour of conservation but rather of development. People who feel their views are well represented may likely feel less inclined to answer a questionnaire of public opinion. This was not found to be the case. Equal numbers of people who favour conservation of local green spaces and people with no opinion or opposing views refused to participate in the test site survey. Bias from refusals would appear to be balanced between the two groups although this can only be a tentative conclusion based on the size of the sample.

Comparison of Results

Results of the test site survey were compared with responses obtained from the aggregate of West Island surveys (Tables 3.31a-b and Tables 3.32a-d). Overall results had indicated people generally felt the conditions of wooded areas were unchanged or they had deteriorated since people moved to the area In the test site survey, an even greater proportion felt conditions were unchanged and very few people indicated conditions had improved Results of the test site survey also showed stronger consensus in responses towards local development. A significantly larger proportion of the test site respondents had not welcomed development, emphasizing the earlier conclusion that the majority of residents did not welcome development in their area

Assessments of overall conditions of the community and people's expectations for the future were more negatively skewed in the test site survey than in the aggregate of other West Island responses. Proportionately more people in the test site survey felt conditions were worse than they had been and also more people felt conditions would deteriorate in the future. But similar to the aggregate, most people in the test site survey felt conditions were unchanged since they had moved in and most indicated they expect conditions will stay much the same in the future.

Table 3.31a Table of Test Site Responses Which Were Not Significantly Different (to 95% probability) from Responses of the Aggregate.

Variable		N
Overall condition of the environment	better (21 %),same (48 %), worse (31%)	35
Condition of open spaces	better (22 %), same (39 %, worse (39%)	36
Condition of wooded areas in future	better (5 %), same (42 %), worse (53%)	36
Condition of "special natural place"	better (30 %), same (37 %), worse (33%)	30
Petty crime and vandalism in future	better (3 %), same (14 %). worse (83%)	36
Community friendliness	better (11 %), same (67 %), worse (22%)	36
Community friendliness in future	better (11 %), same (61 %), worse (27%)	36
Enjoyment of community in future	more (35 %), less (65 %)	34
Satisfaction in future	more (45 %), same (53 %), less (3 %)	33
Move to city if offered a job	definitely not to yes definitely scale 1-5 (average 2.51)	36
Sex	female (57 %), male (43 %)	35
Age	over 65 (11 %),46-65 (49 %),26-45 (49%),15-25(6%)	35
Income	under $25 000(6%),$25-40 000(19 %), $40-80 000(48%), over $80 000(26%)	31

Table 3.31b Table of Test Site Responses Which Were Not Significantly Different (to 95%) From the Aggregate: Amount of Green Space to Preserve and Amount Politicians Would Like to See Preserved

Variable	Group	Mean	S.D.	t	D.F.	N
Amount of green space to preserve	Aggregate	89.4	17 4	-1.59	50	269
	Test Site	93.6	14.3			36
Politicians wish to preserve green	Aggregate	51.5	27 3	0.61	42	247
	Test Site	48.1	32.8			36

Table 3.32a Significant Differences in Responses Between Test Site and Aggregate: Condition of Wooded Areas

Variable	Group	Better (%)	Same (%)	Worse (%)	N
Condition of wooded areas	Aggregate	18 6	34 4	47 0	253
	Test Site	3.1	53 1	43 8	32

Chi-squared = 6.826, p = 0.033

Table 3.32b Significant Differences in Responses Between Test Site and Aggregate: Responses to Local Development

Variable	Group	Yes (%)	No (%)	N
Welcomed development	Aggregate	30 3	69 7	189
	Test Site	4 2	95 8	24

Chi-squared = 7.179, 0 006

Table 3.32c Significant Differences in Responses Between Test Site and Aggregate: Evaluations of Overall Community Conditions Compared to When People First Moved to the Area

Variable	Group	Better (%)	Same (%)	Worse (%)	N
Overall community conditions	Aggregate	29 7	57 1	13 2	266
	Test Site	13 7	58 3	27 8	36

Chi-squared = 7.406, p = 0 025

Table 3.32d Significant Differences in Responses Between Test Site and Aggregate: Expectations of Overall Community Conditions in Ten Years

Variable	Group	Better (%)	Same (%)	Worse (%)	N
Future community conditions	Aggregate	22 8	48.3	28 9	263
	Test Site	2 9	55 9	41 2	34

Chi-squared = 7.406, p = 0.025.

DISCUSSION

EVIDENCE OF VALUE-FROM QUESTIONNAIRE RESULTS

How do residents value green spaces? What evidence is there of **use values** of green spaces? What evidence is there of **existence values** of green spaces? Establishing

the values placed on local green space is an important step in understanding how the community is responding to changes in these spaces.

Survey results point to many ways green spaces are valued by residents of the suburban study area. While "feeling close to nature" was not ranked as highly as other possible factors of personal happiness, it was very important in "why you chose this community".

What People Like Best About Their Community

One of the most straight forward indicators of the value people put on green space is in the number of people who simply said it was what they liked best about their community. Green space, although not as widely cited as friendliness and accessibility, was among the most commonly named attributes people like best about their community.

The quiet, peaceful qualities of the communities surveyed were found to be greatly appreciated by even more residents than those naming green space as what they like best. Street and lot size may largely create quiet neighbourhoods but green space plays a similar role here. Simply reducing population density is one way green space makes for quiet communities but other physical and psychological influences of natural landscape on neighbourhood tranquillity are also important. To the extent that green spaces help in creating quiet, peaceful communities, they are valued for this purpose.

City Living

Results of how attractive country atmosphere is for residents and how unattractive

city living is, may be evidence of the value of green space As noted in the results section, almost none of the respondents felt they would like to live closer to a city and only 20 percent would definitely or probably move closer to a city centre if a job they were offered required it. In contrast, a quarter of respondents said they would like to live closer to the country if given the choice To the extent that green space helps to create a country-like atmosphere, it is valued.

Important Reasons People Live in the Study Areas

Green space and qualities promoted by the presence of green space were also highly ranked as reasons why people live in the study areas. Eighty-seven percent of respondents felt close to nature was extremely or quite important, leaving little doubt that local green space is a valued feature of the study communities

The reason most people ranked as extremely important for choosing to live in their community was it being a good place to raise children For some people, it is likely local green space is part of what makes the community so suitable for children Local access to nature provides children with diverse learning and play opportunities. For others, green spaces may not be seen as safe places for children and therefore would not be counted among the assets of the community that make it a good place to raise children.

Another aspect of the community deemed as extremely important was the neighbourhood character. Again, for some people green space is likely an integral part

of this character but for others, it may be unimportant. To the degree that green space creates the type of character these people appreciate about their community, it is valued.

Green space also plays a part in the local provision of recreational opportunities. Recreational opportunity was another reason more than 80 percent of respondents ranked as extremely or quite important in their choice of residence. The different forms recreational opportunities can take are extremely diverse but for many, local green spaces are seen as places for leisure activities. For others, facilities such as the local arena or sailing club are the recreational resources they particularly enjoy. The extent to which green spaces are valued for the recreational opportunities they provide is not equal across the population but for many this makes green spaces a valuable asset of their community.

Special Natural Place

More evidence of the value of local green spaces is the large numbers of respondents who have a special natural place they visit. As noted earlier, over 80 percent of residents have some local place they go to for outdoor recreation. The use of local green spaces is widespread and clearly shows the use value of green spaces for residents of the study communities. Further evidence of value in green spaces is in the 63 percent of respondents who said they used developed or threatened sites of vacant land in their area for recreation.

Municipal Budget Spending

Some relative estimates of the value of local green space can be derived from survey results concerning the spending of a municipal budget surplus. The number of people who would allot some money to green space acquisition was greater than other areas such as policing, health services, or recreational facilities. The average amount people designated for green space was also higher than any of these other areas at $275 of the $1000 budget. Only a tax refund or spending on cleaning up the local environment were allotted more money on average and by more people.

Preservation of Existing Green Space

More evidence of how local green space is valued is found in responses to the question of how much existing green space people would like to see preserved On average, people noted they would like to see 90 percent of present green space preserved. Evidently, for most people, there is not an excess of green space in their community and preserving what green space there is, is of greater value than the other potential developed uses of the land. The common desire to see what green space exists preserved may also be further portrayed in the 83 percent of respondents who indicated they think local politicians are not willing to preserve as much green space as they would like.

Urban Development

The values of local green spaces that were threatened with development are evident in people's attitudes toward the development of these sites. Seventy percent of respondents did not favour the development and for most people, this opposition was based on the value of the green space to be lost in the land use change. Eighty percent of respondents noted reduced access to green space as a main reason for opposing the development.

Even though a large proportion of people who opposed the development of local vacant land used the site for recreation, many people had other reasons for not wanting the development. The proportion opposing development was smaller than among those who used the site for recreation but still, 62 percent of people who did not use the site for recreation had not favoured the development of the site.

Green space in the study areas is valued not only for what it is and what it provides but also for what it is not. Responses as to why people did not welcome the development of a local area of vacant land tell of how the proposed alternatives to green space were perceived. For those who did not welcome the local development, the new urban use of the land was expected to increase traffic and noise pollution, increase taxes and overload city services, destroy trees and change the neighbourhood character. Preserving the green space meant these changes could be avoided.

EVIDENCE OF RESPONSE TO ENVIRONMENTAL CHANGE FROM QUESTIONNAIRE

Are changes taking place without being noticed and in this way, are people unconsciously adapting to change? Is there evidence that shows communities are responding passively to the changes they face or are there indications of active, purposeful response? Evidence from questionnaire results may indicate many people are absorbing the losses of valued natural assets in their communities and adapting to the changes.

Absorbing the Losses, Adapting to the Changes?

Some evidence favours the conclusion that people are not responding radically to changes they have experienced in their area. According to survey results, 69 percent of respondents would choose to live in the same place if given the choice. Obviously the changes are not perceived as intolerable. Most people appear to be satisfied with the place they live.

Development seems to be taking place without strong objection from much of the population. One third of respondents said they were unaware of any recent developments or proposed projects in their area. As well, two thirds of respondents indicated they have not lost a special natural place they use for recreation.

The fact that 80 percent of respondents felt conditions of the special natural place

they use for recreation are better or the same as they have been in past years would seem to indicate areas which matter most to people for contact with nature are intact or even enhanced for recreational use. Given this, these special natural places are probably parks. Areas of vacant land which have been developed may not have been particularly important for recreational use. Consequently, loss of these natural areas may not have stimulated active community responses.

Evidence from questionnaire responses concerning the spending of a municipal budget surplus may point to a lack of concern for changes facing the areas. A tax return was the most common area of spending selected by respondents. People would appear to feel overtaxed and any concerns they may have for the changes in their community are lower on their list of priorities than having more disposable income. They may also lack confidence in their local government's ability to effectively deal with their concerns.

Growth is seen very positively, and this in itself may be an indication of low levels of response to changes. Growth has been the norm and is apparently still given responsibility for improvements but not deteriorations in the community. Regarding local environmental conditions, three out of every four people felt improvements were due to community growth and almost three out of every four felt deteriorations were avoidable even with community growth. Similar proportions of responses were found regarding community conditions. This belief in growth is also shown in the 53 percent of respondents who indicated they expect to enjoy living in the community more as the community grows.

Crossing Thresholds of Awareness? Taking Action to Reduce Losses?

Are there signs that people are aware of the changes in their local environment? Are conscious adjustments being made? Is there evidence that would indicate people are actively responding to changes in their area?

Results of the survey indicate that many people, though not a solid majority, perceived deterioration in the condition of wooded areas and open spaces. as noted earlier, fifty-five percent of respondents felt wooded areas would be in worse condition in ten years and 47 percent indicated conditions of these areas are worse now than when they first moved to the area. Similarly, 46 percent of respondents felt conditions of open spaces would be worse in the future and 37 percent saw deterioration since they moved to the area.

Regarding local development, a majority of respondents indicated they were aware of either present or proposed new development in their area. Given all survey sites were chosen on the basis of recent development, the 70 percent awareness level is perhaps not as high as one would expect but it is significant none the less The fact that most people were aware of development in their area is particularly important in relation to the negative manner in which development was generally perceived

Seventy percent of those who were aware of local development did not welcome the project or proposed development. As well, one of the main reasons for opposing the development was reduced access to green space From this evidence, it would appear that environmental change in the study area is spawning adverse reaction.

The high priority people put on environmental clean-up and green space acquisition in municipal spending may be evidence that perception of environmental change is reaching a threshold of action. Next to a tax refund, these two areas of spending were allotted more money by more people than any other. This level of commitment of municipal funds may be an indication of action.

The strong community consensus for preserving most of the remaining green space would seem to support the idea of people reaching an action threshold to protect the natural attributes of their community. The disparity between how much green space people would like to preserve and how much they think their politicians would like to preserve may also indicate people are approaching or crossing an action threshold.

This chapter described average perception and opinion of environmental change and quality of life in the study sites. Given these apparent community values and the level of environmental change perceived by "average" people in the community, is there a basis for action in a concerned segment of the population? The following chapter contains results of a case study which explored the extent to which the West Island population has mobilized to protect natural amenities.

CHAPTER 4

COMMUNITY INDICATORS OF RESPONSE--CASE STUDY OF ENVIRONMENTAL ACTIVISM IN MONTREAL'S WEST ISLAND

INTRODUCTION

Having assessed both changes residents of the West Island experienced in recent years and residents' perceptions of and responses to change, this chapter continues the inquiry into implications of environmental change. The focus here is on a segment of the population which apparently crossed the "threshold of action" described in Chapter One. People in this groups are distinguished from others through the concrete measures they took to reduce losses of valued natural amenities of their local environment. Results of a case study of environmental activism in Montreal's West Island are reported. The study is concerned with the dynamic of the mobilization process, the relation between real and perceived environmental change and the variations within a community in environmental values, awareness and willingness-to-act.

A history of recent environmental activism in the West Island was developed from media sources, contact with activists and municipal employees, and attendance of events in which local environmental groups were involved The focus was on local scale environmental change and community concern about natural landscape attributes. Situations were followed in which some actual or proposed development initiative was seen by the community as being a threat to the local environment and some form of

community protest or resistance was mounted.

The Burton, Kates and White (1978, and Kasperson et al. 1991) theory of perception and response to environmental change and the Sell and Zube (1986) model of environmental perception introduced in Chapter One, provide the conceptual basis for this case study. The operating assumption is that community mobilization in reaction to real or proposed environmental change is both an indicator of thresholds of perception of change and a statement of value.

Many of the cases studied may at first seem trivial -- the protection of a park, a stream or a pocket of forest -- but if this community-scale mobilization in support of quality-of-life values proves to be a challenge to the dominant paradigm of continued land conversion and unsustainable economic expansion, its long range implications may be profound.

THE CASE STUDY

At the centre of this case study of environmental activism in Montreal's West Island is an alliance of environmental groups that coalesced to protect threatened local green space. The umbrella group is called the Green Coalition. The case of the Green Coalition concerns the landscape of a suburban Montreal area that will be permanently altered because of the intervention of concerned citizens who (a) perceived a threat to the quality of their local environment and (b) were prepared to take action, to bear personal expenses, to have tax dollars spent and future tax revenues foregone in order to protect

the character of their community. This case study is particularly interesting because it reveals a complex interplay involving spontaneous public concern, local media attention, civil service aspirations and municipal political will.

THE MONTREAL URBAN COMMUNITY

As described in Chapter Two, development of metropolitan Montreal lead to the creation of its regional administrative agency (the MUC) in the '70s. Since the inception of the MUC the piecemeal development and shortages of green space noted in Chapter Two have been the concern of the Planning Department. Of particular interest to this case study is the Planning Department's task of developing and implementing a master plan, including a linked network of parks across the island.

Recent events indicate the Planning Department had an ambitions vision of an extensive park system. In September of 1989, the people of Montreal learned just how ambitious the department was with its recommendation that $500 million be put towards the acquisition and development of green spaces in the region.

Originally, the Planning Department proposed that the MUC purchase fifteen large pieces of undeveloped land located across the island in order to lay the foundations of a regional park system. This proposal was based on a series of public consultations carried out in 1987, a 1989 satellite study of the island's biomass commissioned by the Planning Department, a series of ecological inventories, and a financial assessment of the properties of interest across the island. It was established that a $500 million investment

by the MUC would secure the areas of greatest ecological and recreational importance for the island.

The proposal by the Planning Department provided a basis upon which political decisions could be made. The political bodies holding voting power over the territory are the Council of the MUC, the Planning Commission, and the Council of Suburban Mayors. Any financial commitment to the regional plan requires the support of these bodies Among these decision makers, acceptance of the need for public green space was far from universal. Not all of the Planning Commissioners were as convinced of the need for a large scale green space plan and many of the members of the suburban mayors' council, who ultimately had the decision-making powers over any proposed plans, were less than enthusiastic. One West Island mayor said the plan was "totally absurd and irresponsible" while another claimed that green space should not be the responsibility of governments (Mayors reaction mixed to plan, 1989).

MONTREAL'S GRASSROOTS ENVIRONMENTAL MOVEMENT

In the context of conflict over planning for green space and increasing concern for environmental degradation in the 1980's, Montreal's grassroots environmental movement developed rapidly. Community groups were formed to fight developments threatening their local natural environment. Dozens of organizations sprang up throughout the region, building networks of concerned citizens who challenged the decisions that were adversely affecting their neighbourhoods. In the West Island, Sylvia Oljemark, a

citizen leader struggling to save a local forest from being replaced by apartment buildings, formed the Saraguay Citizens Group in 1977. Interaction Pointe-Claire was founded in 1988, following an unsuccessful attempt by citizens to persuade the city to buy a lakeshore property for parkland instead of allowing condominiums to be built there. Preservation Environment Pierrefonds was established in 1987 to fight zoning changes leading to the loss of agricultural lands. These are a few examples among many of groups that mushroomed during the last decade and came together as Montreal's Green Coalition.

The most common problem bringing citizens together was the threat to local green space posed by development. These organizations generally formed over single issues and worked within social networks that did not extend beyond the area affected by those issues. As the groups developed and formulated their arguments, they were given good coverage in the local media. Headline stories often described the basic green space issues and the political machinations they spawned. This attention appeared to have the effect of prompting other citizens to examine the situation in their own communities. During this time individual groups approached municipal councils, the MUC, and provincial governments with their concerns. The Saraguay Citizens Group, expanding its concerns, collected 12 000 signatures on a general petition in 1987, appealing to governments to save the forests and waters of the West Island.

THE SEEDS OF A COALITION

Widespread concern for threatened green space pointed to the need for a regional approach to the problem-- exactly what the MUC Planning Department was undertaking. In March of 1988, a conversation took place between activist Sylvia Oljemark and a member of the MUC Executive Committee. While on a tour of a threatened woods adjacent to a recently established park, the two discussed the need for a regional conservation plan and the opposition by several suburban mayors to this idea. Oljemark took the position that, contrary to the opinion of these mayors, there was significant public support for such a plan. The MUC Executive Committee member challenged her to prove it, and the seed was planted for citizens groups to come together in a coalition that could address environmental problems with a regional approach.

In the spring of 1988, a campaign was launched by a number of environmental organizations to build support for an MUC green space plan. A coalition called Green Environment West Island (GEWI) formed in April 1988 to carry out this task. In May, 3000 people participated in West Island's Green Day and over 100 letters of support by businesses and organizations were gathered. The letter campaign continued and in February 1989, 300 letters were presented to the MUC in a council meeting with over 100 activists attending the meeting.

An extensive network of activists continued to develop (Table 4.1) and in one year GEWI grew from 10 to 30 groups. In March 1989 the group changed its name to the Green Coalition and claimed that more than 40 organizations were represented under the umbrella of the newly named coalition.

Table 4.1 Local Environmental Groups Active in Montreal's West Island: Dates of Creation, Membership, Impetus to Form Group, Impact of Group

*Indicates group participation in Green Coalition activities in 1989-1990
**Indicates group continues to participate in the Coalition's activities in 1991-1992

GROUP NAME	FOUNDING YEAR	NUMBER OF MEMBERS	IMPETUS TO FORM GROUP IMPACT OF GROUP
*Allons Vert	1988	8 people	A perceived need for environmental education Environment Canada grant to produce greeting cards of children's art on environmental issues
*Association des espaces verts de Pointe- Claire	1987	30	Save the property known as "Glenaladale" from development Became Interaction Pointe-Claire in 1988
Association pour l'arboretum Morgan	1952	2800	Conservation of Morgan Arboretum Public awareness of environmental issues conservation,acid rain
*Citizens' Advisory for a Safe Environment (C.A.S E)	Summer 1988	Approx. 20	Inform and advise community on the hazards of pesticide use Lobby local councils for pesticide by laws March 1990-Councils of Baie D'Urfe and Beaconsfield voted to form committees to study use Summer '90-Beaconsfield discontinued use on city property
*Citizens Against the Unnecessary Spraying in the Environment (C.A.U.S.E.)	1986	100	Concern over use of pesticides in the community City of DdO ceased to use pesticides in 1987 and began cutting ragweed rather than spraying Municipal sign law for pesticided use passed in DdO
**Citizens for the Bois Franc	1987	800	Preservation of 45 ha wooded area as an expansion of a regional park Oct 11,1989 City council meeting convinced mayor to support preservation of Bois Franc Apr 18,1990 MUC voted in favour of purchasing 31 ha of the Bois Franc-$14 9M

**Citizens for Ste-Anne's Forests	July 1989	Approx. 100	May 10, '89. City requested the MUC lift protection of Bylaw 65 from woods #3 for residential development Protection of woods #4,5,7 was also at issue
			June 20,1990 MUC voted to purchase 44 ha of woods #3 for $8M
**Conservation Pledge Canada (now Conservation Canada)	1974	non member	Lobbying and fundraising for conservation initiatives
**Comite de l'environment Syndicat Cols-Bleu de Mtl et CUM	1989	5000+	Promote sustainable practices in municipal affairs involving and affecting blue collar workers
D-Trois Pierres	1985	35	Promote the transformation of society from consummer to conservation values
			Operation of small organic farm in Regional Park Cap St Jacques
**Eco Care	1987	Approx 80	Promote sustainable practices in Montreal West
			Recycling depot,leaf recycling, pesticide ban Local by-laws supporting the acquisition of Meadowbrook Golf Course
**Ecological Agriculture Projects	1974	Newsletter sent to 100	Promote sustainable agriculture
			Established resource centre Promotion of public awareness
**Environment St.Laurent	Nov. 1989	Approx 50	Originally established to promote local recyling. Mobilize citizens to stop construction of a cement plant that would damage the ecology of regional park Bois de Liesse
			Jan.9,1990. With more than 1500 names on city register, St Laurent withdrew an amendment to a bylaw that would allow a cement plant to locate on proposed site
**Environment Plus	1987	60	Fear of groundwater contamination from private dumping site on Notre Dame de l'Ile Perrot. Concern for unregulated tree cutting on private property and land-filling of marshes

			Petition of 1600 citizens resulting in study of dumping by the Quebec Minstry of the Environment 1990 Brought in permit requirements for cutting trees of over 10 cm in diameter Hired a student '90 to study flora and fauna
**Guard Our Local Face (G.O.L.F.)	Summer 1989	Approx. 150	Protection of 57 ha Meadowbrook Golf Course in Ville St Pierre and Cote St Luc. Zoned for high density housing
			11,000 signature petition Nov '89 Cote St Luc passed resolution for preservation Jan '90
**Greenspace Beaconsfield	August 1989	Approx 60	Protection of 142 ha of "Angell Woods" forest in city's northwest sector
			Petition of 3200 citizens of Beaconsfield Oct '89 Council passed 2 resolutions supporting the aquisition of the NortWest sector by the MUC but Angell Woods still excluded by the MUC in its acquistions. April '90 - Tree cutting by-law
**Ile Bizard Environment Committee	1987	200	Protection of 209 ha of forest on Ile Bizard and protection of agricultural zoning
			April 1990 MUC announced it would spend $13 5M to purchase 127 ha of forest
**Interaction Pointe- Claire	1988	200	Refusal of council to hold referendum for the purchase of 8 26 acres of lakeshore property
			Purchase of Edgewater property $1 5M as compensation for Glenaladale Members of Beaconsfield golfcourse voted to stay in present location Aug '89 Now Onging, non-confrontational participation in council decisions
**Loisirs-Ville	1979	100	Promote conservation of natural areas for recreational use
**Montreal Lakeshore Women's Club Environment Group	1988	Approx.30	Environmental education of members and community

**Pierrefonds Citizens Committee	1987	150	In response to the city spending $2.8M on cultural centre
			Blocked 2 versions of urban plan that would allow extention of Highway 440 & loss of Agricultural Zoning
**Preservation Environment Pierrefonds(P.E.P.)	1987	25	Threat of rezoning agricultural lands for development
			City plan modified due to pressure in 1988 (374ha agricultural land not to be rezoned as high density residential
**Saraguay Citizens Group	1977	200	Threatened wooded area for apartment development
			1988-Joint study MUC and Que. Environment Department- 3 major creeks, 50 companies identified as polluters- monitoring is now ongoing with measures being taken to reduce pollution levels
**Senneville Environment Committee	1987	Approx. 30	Concern for pesticide use in community
			1989-council adopted the 1st pesticide by-law in the West Island.June 1990-MUC voted to purchase 190 ha of Senneville farmland for agricultural park.
**Shomray Adamah (Guardians of the Earth)	1987	400	Environmental education
*Societe d'animation du jardin et de l'institut botanique	1975	1000	Participation in developing management plans of regional parks
**Societe d'horticulture et d'ecologie de Pierrefonds	1987	Approx. 20	Environmental education of members
Terra Cotta Conservation Society Pointe-Claire	1980	Approx. 20	Threatened development of area now established as Terra Cotta municipal park
**WE ACT - Westmount Environment Action Group	1988	Approx. 50	Environmental education and sustainable practices in municipal affairs
			1990 council resolution on sustainable development
**West Islanders for Nuclear Disarmament (W.I.N.D.)	1982	Approx. 30	Peace activism Interests evolved to support conservation efforts of other groups.

*YWCA Environment Group Pointe-Claire	1987	Approx 50	Environmental education

Note: Other groups of the Green Coalition involved in activities outside the West Island were not listed Information was derived from multiple sources including. Media documentation, personal contact with members of groups and employees of the MUC, and attendance of Green Coalition events and activities

Throughout the short history of the Green Coalition, individual activists and the groups have received tremendous support from the MUC Planning Department and the Chairperson of the MUC Planning Commission, Hubert Simard. The need to influence the political will of the Commission by demonstrating public support for a conservation plan was continually emphasized by Mr Simard. The Green Coalition was seen as the embodiment of the support needed to shape the political will of the Commissioners, who were the decision-makers, in favour of such ambitious plans.

Individuals in the Green Coalition collected technical information on municipal and regional regulations, on government structures and on the ecological and economic value of specific properties, and shared this among the groups. These citizens built a significant knowledge and resource base to support their conservation efforts. The Chairperson of the Planning Commission and MUC planners provided information wherever possible and advice as to how their efforts could best aid the Planning Department in reaching its objectives.

THE IMPACT OF THE GREEN COALITION

With the degree of public support demonstrated, it was possible to influence the political will of elected officials. Through the combined efforts of the Planning

Department and citizens lobbying, considerable support for the regional conservation plan was created and the Planning Department was given the go-ahead to implement a regional green space policy.

The original proposal was scaled down but the final financial agreement remained large at $294 million and the main lines of the strategy proposed by the Planning Department were accepted. This was a notable victory and the success of the program will be permanently manifest in the landscape of the West Island as well as in the quality-of-life of West Island residents (Tables 4.2a and 4.2b). The net amount of land actually sequestered (Map 4.1) is disappointing, but the fact that some was saved and that a coordinated management plan was accepted does represent an improvement.

Table 4.2a: Expenditures on Green Space Development Since 1985.

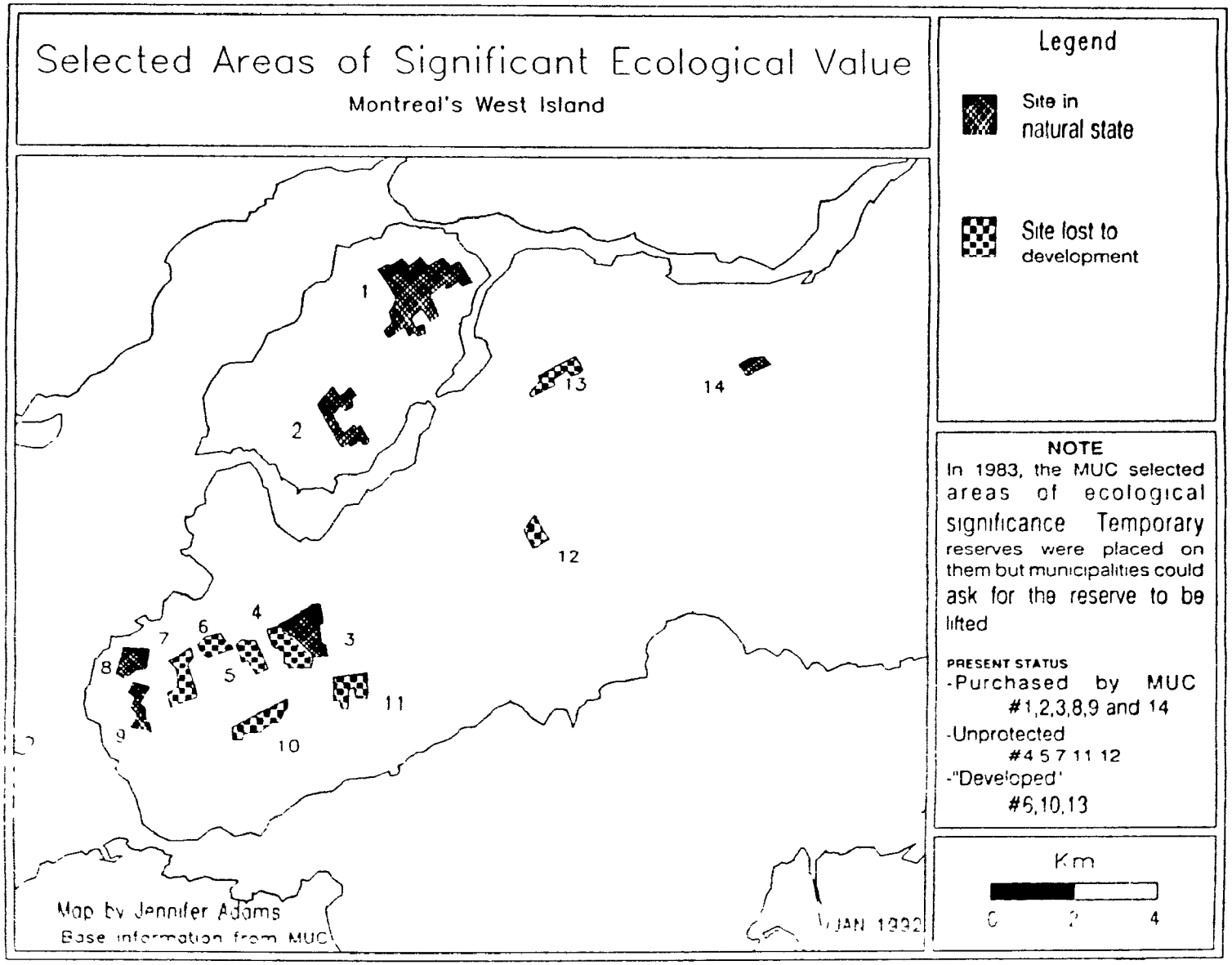
Time period	Dollars Spent	Percentage of Total Development Spending
1985-1988	$5,247,900	42%
1988	$2,124,150	17%
1989	$2,623,950	21%
1990	$2,499,000	20%
Total.5 Years	Total $12,495,000	Total: 100%

Table 4.2b: Expenditures on Green Space Acquisition since 1980.

Time Period	Dollars spent	Percentage of Total Aquistion Spending
1980-1982	$29,122,800	40%
1983-1989	$13,105,260	18%
1990	$30,578,940	42%
Total:10 Years	Total:$72,807,000	Total:100%

Source:"Strategy For Action" MUC,1990.

MAP 4.1


Selected Areas of Significant Ecological Value
Montreal's West Island
Legend
Site in natural state
Site lost to development
NOTE
In 1983, the MUC selected areas of ecological significance Temporary reserves were placed on them but municipalities could ask for the reserve to be lifted
PRESENT STATUS
-Purchased by MUC
#1,2,3,8,9 and 14
-Unprotected
#4 5 7 11 12
-"Developed"
#6,10,13
Km
0 2 4
1
2
3
4
5
6
7
8
9
10
11
12
13
14
Map by Jennifer Adams
Base information from MUC
JAN 1992

A resolution adopted by the Conference of Suburban Mayors on May 13, 1992 risks the permanent loss of some sites planned for acquisition. If adopted, the resolution would freeze acquisitions for three years as well as cancel all reserves and end expropriation proceedings where legally possible (Green spaces 1992). This has, as expected, tempered the sense of success and continues to provide the impetus to mobilize the communities.

CONCLUSIONS

The grassroots mobilization described in this chapter indicates that urban development at the expense of natural amenities in the study area has not gone unnoticed. To the contrary, considerable desire evidently exists amongst West Islanders to protect environmental quality and community character.

It is clear that the achievement of conservation goals was derived in part from the liaison of citizens and planners of the MUC. It was certainly not simply a case of citizen militancy triumphing. To the extent that civil servants ultimately reflect the will of elected officials, and elected officials must respond to public aspirations, it is clear that citizens groups can shift political agendas. Attentive, active, organized and articulate citizens groups can seize opportunities for effective development of local resources. The extent to which this example involves educated and empowered people may presage significant change in social values and motivation.

CHAPTER 5

DISCUSSION AND IMPLICATIONS

> Don't it always seem to go, you don't know what you've got 'till it's gone. They paved paradise and put up a parking lot. (Joni Mitchell, Big Yellow Taxi 1974)

INTRODUCTION

Empirical research in Montreal's West Island has made evident many of the complex interactions that shape both the West Island environment and also the perceptions these people have of their surroundings. The purpose of this chapter is to assess the implications of these responses and perceptions in light of the objectives of sustainable development.

DISCUSSION AND IMPLICATIONS

In summary, this study of the West Island found that:(1) recent development of the area has resulted in great attrition of rural or natural landscape and community features in the West Island area;(2) these attributes are, by and large, what attracted residents to the area, and;(3) there is some measure of resistance to the incremental loss of local natural amenities.

The way West Islanders saw the changes in their area come about and how they responded to them varied. There was a range of opinion on the desirability of change and

also in willingness to act to protect natural amenities and slow the rate of change.

At one end of the spectrum, a very visible segment of the community has crossed Burton Kates and White's "threshold of action". Some people have apparently seen changes in their area with some degree of alarm and have taken measures to reduce losses of valued natural features of their area. Collective concerns for these changes and the need for action are evident in the activities of community activist groups.

At the other end of the spectrum, some community members may be absorbing the losses entailed in adverse changes in the physical environment and community character. Residents apparently value the qualities of the countryside but are not necessarily aware of losses of local open or wooded areas or rural features. This may be a manifestation of what Joni Mitchell expresses in song: "You don't know what you've got 'till it's gone". Without awareness there is no action.

People take actions to try to protect or improve their life quality based on values of what they think is good or right. The values that drive people to involve themselves in citizen activism are clearly not economic for the most part. Although some members of the community felt more development would mean a larger tax base and therefore a lower per capita burden, most were not convinced of this argument or these economic values were eclipsed by non economic values. The "use values" derived from recreational opportunities of green space were determined to be very important. It is also evident that "existence value" is important to people. The value of having wooded sites on the West Island, whether they are seen or used by respondents, was enough to cause some people to support the forest protection initiatives.

There is no doubt that the culture of the community has changed and with it the perception of the environment. One of the most distinctive vestiges of rural West Island is the 142 hectare "Angell Woods" in Beaconsfield's northwest sector. Residents living close to this wood were very hostile to change. Their neighbourhood is a quiet, friendly cluster of relatively old houses and almost everyone there would like to see it stay that way. In other areas, where the landscape is more urban, there was less resistance to more development. It may be that as more people perceive the community as an expanse of urban landscape, there will be less sense of potential loss and therefore less inducement to cross the "action threshold". This suggests a sliding scale system characteristic of what ecologists call positive feedback. It is a process in which more change leads to less resistance to further change. This process destabilizes and is certainly inimical to sustainability.

Perhaps the most surprising results of the study pertain to the perceptions of the relationship between growth and negative or positive change Survey results showed people consistently see growth as the purveyor of community and environmental improvement but do not link growth to deteriorations. This illustrates the irony of the growth paradigm noted in the opening quotation of John Bennett, such that it poses "a major threat to the environment while seeming to satisfy human needs on an increasing scale". The prospects of improvements through growth are perhaps seductive and evidently, the negative consequences of growth have not proved to be a successful deterent. In this way, people are enticed into acceptace of growth with the promise of community improvement and the idea that possible negative consequences can be mitigated. Until more people recognize the causality of deteriorations in their community

and local environment, growth, in its present consumptive form, will persist.

What are the implications of this in terms of the global scale debate on sustainable development? In the global arena, the West Island in itself is virtually inconsequential. The patterns of response and values upon which responses are based may, however, be important if the patterns are abundantly replicated and if the values are widely shared.

The study findings suggest an acceptance of growth in the community, as either inevitable or advantageous. A growing community with new housing, roads, commerce etc. is the small local manifestation of a "prosperous", growing national economy. Acceptance of local growth suggest that people do not see a link between local growth and aggregate growth. If this is the case, any wish to save the planet will remain a reality far outside our reach.

Other evidence from the study sheds a more hopeful light on the path to sustainability. The level of concern and commitment to action of some members of the community in support of environmental conservation and community quality of life is heartening. These activists play a vital role in generating awareness of local environmental problems and assuring the consideration of established resident interests in the development process. For those members of the community who are tetering on the edge of the action threshold, the activities of community groups provide an accessible option for "doing something about it". In the political realm, actions of the groups promotes citizen participation in the planning and decisions-making process. The more recognized and overt their role becomes, the greater sense of ownership, and thus stewardship, community members will hold. This is certainly a basis for a more sustainable future.

In terms of the specific definition of "sustainable development", it appears that West Island residents are drawn to the area to enjoy benefits that they are largely not prepared to act to save for future users of the space. This implies, at a very local scale, (and in a residential rather that ecological assessment) the process of West Island development is not sustainable. This may be of little importance. What is of vital importance is the extent to which the thought paradigms and patterns of behaviour of these local community members are characteristic of attitudes, perceptions, motivations etc. of people in the greater community. The degree of respect or disregard held for future generations and people's willingness to cross the "threshold of action" to make the development process sustainable are significant if widely shared. In this sense, the situation is bleek although there is a glimour of hope. If people are unwilling to act to make regions, nations or the planet sustainable, then there is little evidence that the message of the Bruntland report is getting through.

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Appendix 1

Definition of Terms of MUC Land Use Maps and Correspondence With Land Use Maps Produced in this Study

Residential (low density): detached single family dwelling; semi-detached housing; row-housing; duplex. (Corresponds to Category 7: Low Density Residential).

Residential (medium density): continuous two and three story (eg. Montreal); appartment block. (Corresponds to Category 6: Medium and High Density Residential).

Residential (high density): four stories and more; all other. (Corresponds to Category 6: Medium and High Density Residential).

Retail: includes land used for retail sales of all products, restaurants, lodging, amusements and personal, professional and socio-cultural services. (Corresponds to Category 4: Commercial).

Shopping Centres: shopping centres; shopping malls. (Corresponds to Category 4: Commercial).

Office Buildings: four stories or more. (Corresponds to Category 4: Commercial).

Light Industry: includes land used for industries causing no significant nuisance. (Corresponds to Category 3: Industrial).

Heavy Industry: includes land used for industries causing a high level of noise, dust pollution, heat and vibration likely to significantly affect the quality of life of the neighbourhood. (Corresponds to Category 3: Industrial).

Quarries: includes land used for open pit extraction of construction materials (stone, rock).(Corresponds to Category 2: Quarry and Landfill).

Santitary Land Fill: includes land used to receive and bury waste. (Corresponds to Category 2: Quarry and Landfill).

Institutional: school; church; hospital; government and municipal buildings; sports and cultural facilities. (Corresponds to Category 5: Institutional).

Public Utilities: transportation; electrical and communication infrastructure; national defence; national ports; road maintenance; police station. (Corresponds to Category 1: Public Utility).

Urban Parks: includes lands designated for recreational use at a regional, sub-regional or neighbourhood level. (Corresponds to Category 8: Municipal Park, Nature Reserve, and Golf).

Regional Parks: includes lands designated for conservation or recreational uses which are under the jurisdiction of the M.U.C. (Corresponds to Category 10: Regional Park).

Nature Reserves: includes lands designated for conservation or recreational use at a regional level.(Corresponds to Category 8: Municipal Park, Nature Reserve, and Golf).

Golf: includes land designated for playing golf. (Corresponds to Category 8: Municipal Park, Nature Reserve, and Golf).

Cemitaries: includes lands of significant size designated to human burial and cremation. (Corresponds to Category 9: Cemetary).

Agricultural: includes lands designated for cultivation of the soil, silviculture or raising livestock. (Corresponds to Category 11: Agricultural).

Note: The category entitled "Vacant" (corresponding to Category 12: Vacant) is not listed among the terms defined by the MUC. For the most part, this category is derelict agricultural land or woodland.

Source: Translated from MUC document (1992).

Appendix 2: Coincidence Reports

The following two tables contain areal data of land use change over the time periods of 1983-1987 and 1987-1989. The numeric data correspond to maps 2.5 and 2.6.

The category numbers in the tables correspond to the following land use categories in the land use maps:

cat 1 : public utility
cat 2 : quarry and landfill
cat 3 : industrial
cat 4 : commercial
cat 5 : institutional
cat 6 : medium and high density residential
cat 7 : low density
cat 8 : municipal park, nature reserve and golf
cat 9 : cemetery
cat 10: regional park
cat 11: agricultural
cat 12: vacant

Note: Units in hectares.

Appendix 2

		l	a	n	d		u	s	e
		cat 1	cat 2	cat 3	cat 4	cat 5	cat 6	cat 7	cat 8
l	cat 1	685.89	0.00	0.36	3.69	3.87	0.27	5.13	1.80
a	cat 2	0.00	9.63	0 00	0.00	0.00	0 00	0.54	0.00
n	cat 3	1.26	0.00	356.58	4 05	5.13	1.98	11.79	1.98
d	cat 4	2.70	0.00	5.31	242 55	5.85	8 91	37.71	3.06
.u	cat 5	3.60	0.00	0.81	3.60	623.88	4.23	67.86	23.31
s	cat 6	2.61	0.00	0.54	7.92	4.41	130.59	50 58	3.87
e	cat 7	3.87	0 09	1.35	26.64	37.17	16.56	3647 34	82.80
8	cat 8	2 34	2.43	0.27	2.07	18.99	2.34	90.90	622.89
3	cat 9	0.27	0.00	0.00	0.00	0.00	0 00	1.80	0.00
	cat 10	0 00	0.00	0.00	0.81	0.81	0.00	5.40	0.00
	cat 11	0.18	28.26	0.00	4.32	0.18	3.24	37.98	1.89
	cat 12	18.27	2.16	104.94	49.32	22.05	32.22	423.18	38.70
	total	720.99	42.57	470.16	344 97	722.34	200.34	4380.21	780.30
	change	35.10	32.94	113.58	102.42	98.46	69.75	732.87	157.41

u		e		1	9	8		7
cat 5	cat 6	cat 7	cat 8	cat 9	cat 10	cat 11	cat 12	total
3.87	0.27	5.13	1.80	0 00	0.00	0.36	3.51	704 88
0.00	0 00	0.54	0.00	0.00	0.00	0.00	2.25	12.42
5.13	1.98	11.79	1.98	0 00	0 00	0 45	55.53	438.75
5.85	8 91	37.71	3.06	0 00	0.00	2 52	15.39	324 00
623.88	4.23	67.86	23.31	0 00	4.05	2.70	10.62	744 66
4.41	130.59	50 58	3.87	0 00	0.00	0 18	9.72	210 42
37.17	16.56	3647 34	82.80	0.00	5.13	13 77	67.68	3902.40
18.99	2.34	90.90	622.89	3.78	0 00	1.62	13.14	760 77
0.00	0 00	1.80	0.00	58 86	0 00	0.00	2.61	63 54
0.81	0.00	5.40	0.00	0.00	405.99	7 20	0 45	420.66
0.18	3.24	37.98	1.89	0 00	1.71	602.19	68 22	748 17
22.05	32.22	423.18	38.70	4 05	2.52	104.13	1596 06	2397 60
722.34	200.34	4380.21	780.30	66.69	419.40	735.12	1845.18	10728.27
98.46	69.75	732.87	157.41	7.83	13.41	132.93	249.39	1746.09

Appendix 2 (continued)

		l a n d u s e							
		cat 1	cat 2	cat 3	cat 4	cat 5	cat 6	cat 7	cat 8
l	cat 1	706 95	0.00	0 81	6 48	2 97	0.00	2 88	0 0
a	cat 2	0 00	42 57	0 00	0 00	0 00	0 00	0 00	0 0
n	cat 3	0 27	0 00	469 44	0 00	0 00	0 00	0.00	0.0
d	cat 4	0 81	0 00	10 26	332.10	0 00	1 89	1.17	0 0
u	cat 5	0 00	0.00	0 27	0.00	721 98	0 09	0 00	0.0
s	cat 6	0.00	0 00	0 00	0 00	0 09	199 08	1.17	0.0
e	cat 7	8.10	0 00	3.42	0 81	0.09	8.82	4351 50	3 2
8	cat 8	0.63	0.00	0.00	0 00	0 00	0 00	18 81	752.7
7	cat 9	0 00	0 00	0 00	0 00	0 00	0 00	6.21	0.0
	cat 10	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 0
	cat 11	0.00	0 00	0 00	1.71	3.78	0.00	14 40	0.0
	cat 12	1 98	0.00	38.70	6.21	4 77	6 75	61.11	9 9
	total	718.74	42 57	522.90	347.31	733.68	216 63	4457.25	765.9
	change	11.79	0 00	53.46	15.21	11.70	17 00	105.75	13.1

u	s	e		1	9	8	9
at 5	cat 6	cat 7	cat 8	cat 9	cat 10	cat 11	cat 12	total
2 97	0.00	2 88	0 00	0 00	0 00	0 00	0 81	720 90
0 00	0 00	0 00	0 00	0 00	0 00	0.00	0 00	42 57
0 00	0 00	0.00	0.00	0 00	0 00	0 00	0 45	470 16
0 00	1 89	1.17	0 00	0 00	0 00	0 00	0 27	346 50
721 98	0 09	0 00	0.00	0 00	0 00	0 00	0 81	723 15
0 09	199 08	1.17	0.00	0 00	0 00	0 00	0 00	200 34
0.09	8.82	4351 50	3 24	1 98	0 00	0 00	5 40	4383 36
0 00	0 00	18 81	752.70	0 00	0 00	0 00	8 28	780 48
0 00	0 00	6.21	0.00	60 48	0 00	0.00	0 00	66 69
0 00	0 00	0 00	0 00	0 00	419 40	0.00	0 00	419 40
3.78	0.00	14 40	0.00	0 00	0 00	690 39	24 84	735 12
4 77	6 75	61.11	9 90	0 00	0 00	0 00	1716 03	1845 45
733.68	216 63	4457.25	765.90	62 46	419 40	690.39	1756 89	10734 12
11.70	17 00	105.75	13.14	1 98	1 98	0 00	40 86	272 87

Appendix 3

Sources and Reduction of Error in GIS Analysis

Two sources of error, inherent and operational contribute to reduction of accuracy of the products that are generated by GIS Inherent error is based upon the map construction techniques, projection and symbolization (Walsh et al 1987) Operational error is introduced during data entry, data manipulation, data extraction, and data comparison within the GIS and may be categorized as positional errors and identification errors (Newcomer and Szajgin 1984) Positional errors stem from inaccuracies in the horizontal placement of boundaries Identification errors occur when there is a mislabelling of areas on thematic maps Additional possible sources of operational errors include human error in digitizing boundaries, GIS algorithm inaccuracies and human bias

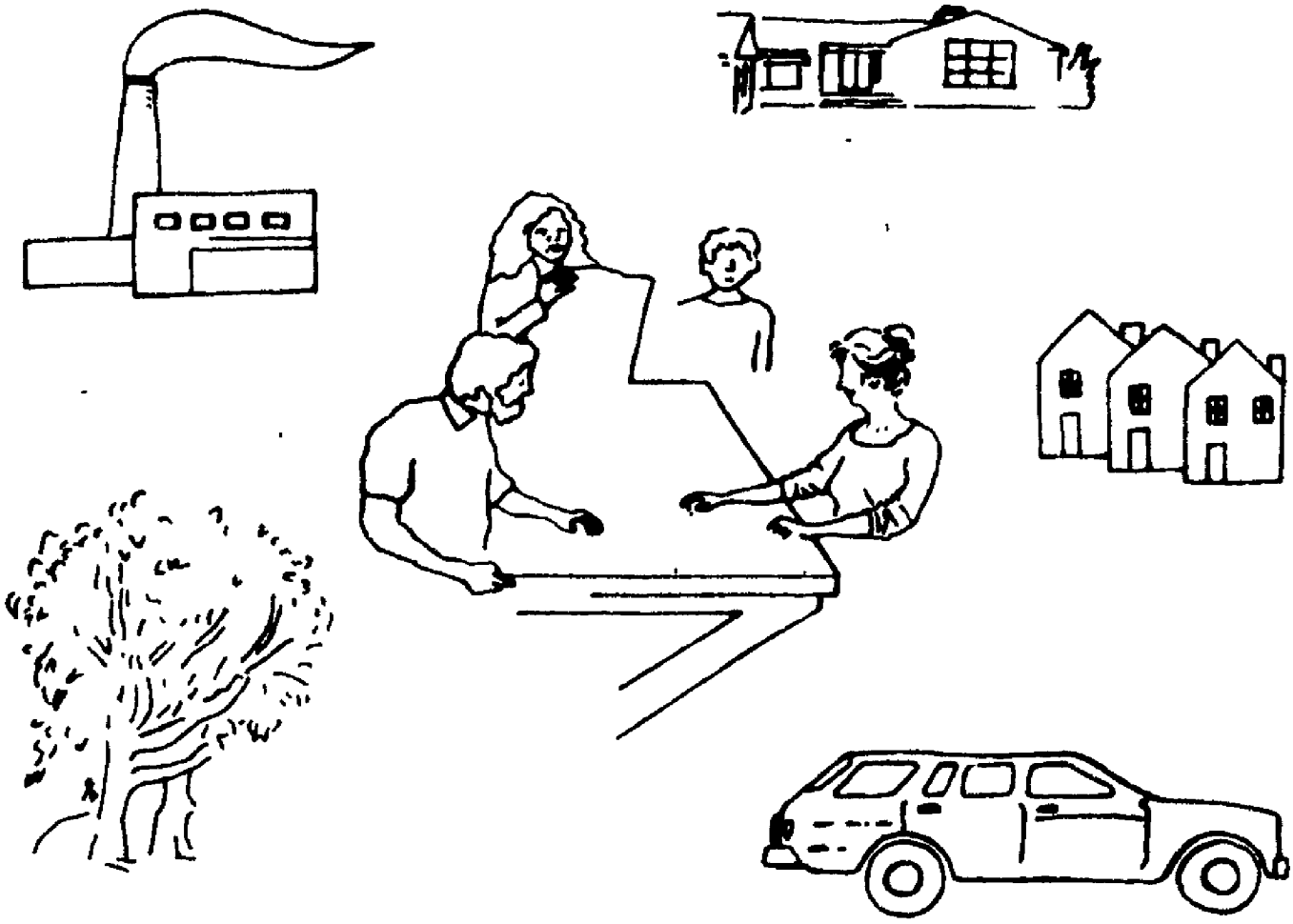
Efforts to reduce error such as templating (see Dangermond (1988),and using a small grid size (Burrough 1986) were made and problems of overlay were recognized Newcomer and Szajgin (1984) assert that the highest accuracy of any GIS output product can only be as accurate as the least accurate data plane of information involved in the analysis. The final product will be less accurate than any of the individual layers utilized This project is subject to significant accumulation of error because of the use of overlays The base maps used in this project do not have a given probability of accuracy but through personal communication with the producer of the maps, users of the maps have found a high level of accuracy Field sampling could be used to determined a more precise measure The example given in Newcomer and Szajgin shows that given base maps of 95 percent accuracy, a two layer overlay would have an upper bound of 94 percent and lower bound of 91 percent probability of accuracy The use of three layers in some of the analyses of Maps 2 7 and 2 8 have a higher probability of error than this

Appendix 4

Sample Survey

QUALITY OF LIFE / ENVIRONMENTAL QUALITY

Your neighbourhood is part of a national study of community development. We would like to know what changes you have seen in your community in recent years and what your opinion of these changes is. Please answer all of the questions. If you wish to comment on any questions or qualify your answers, please use the margins or the back of this booklet.



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H3A 2K6

QUALITY OF LIFE / QUALITY OF ENVIRONMENT

Your town is one that has grown significantly in recent decades. The intent of this booklet is to ask your assistance in determining how much the community and the local environment have changed since you first arrived here. We would like to know *what you think* about the changes, and *what you think* the causes of those changes are. Your neighbourhood is part of a national study of similar communities.

Responses are anonymous and all individual information will be treated confidentially. Only overall average results will be made public.

Thanks for your participation

PART A: THE ENVIRONMENT

We are interested in environmental change in your area.

A-1 For each of the following, tell us whether you think the overall conditions now are better, the same, or worse than when you first came to this area. (Please check one box for each question)

	BETTER	SAME	WORSE	NO OPINION
LOCAL AIR QUALITY	[ ]	[ ]	[ ]	[ ]
RIVER POLLUTION	[ ]	[ ]	[ ]	[ ]
LOCAL PARKS	[ ]	[ ]	[ ]	[ ]
LOCAL WOODED AREAS	[ ]	[ ]	[ ]	[ ]
ACCESS TO OPEN SPACES	[ ]	[ ]	[ ]	[ ]
NUMBER AND VARIETY OF BIRDS	[ ]	[ ]	[ ]	[ ]
LOCAL FISHING	[ ]	[ ]	[ ]	[ ]
OVERALL CONDITIONS	[ ]	[ ]	[ ]	[ ]

A-2 For things you marked as BETTER, would you say, in general. (Check one)

THE IMPROVEMENTS
[ ] WERE ONLY POSSIBLE BECAUSE OF COMMUNITY GROWTH.
or [ ] WOULD HAVE OCCURRED WHETHER THE COMMUNITY HAD GROWN OR NOT

For the things you marked as WORSE, would you say, in general (Check one)

THE CHANGES FOR THE WORSE
[ ] WERE A NECESSARY RESULT OF COMMUNITY GROWTH.
or [ ] COULD HAVE BEEN AVOIDED EVEN AS THE COMMUNITY GREW.

A-3 When you think about how the area is changing, do you think the things listed are likely to be better or worse in ten years from now (Please check one box for each question)

	BETTER	SAME	WORSE
LOCAL AIR QUALITY	[ ]	[ ]	[ ]
RIVER POLLUTION	[ ]	[ ]	[ ]
LOCAL PARKS	[ ]	[ ]	[ ]
LOCAL WOODED AREAS	[ ]	[ ]	[ ]
ACCESS TO OPEN SPACES	[ ]	[ ]	[ ]
NUMBER AND VARIETY OF BIRDS	[ ]	[ ]	[ ]
LOCAL FISHING	[ ]	[ ]	[ ]
OVERALL CONDITIONS	[ ]	[ ]	[ ]

A-4 Many people have special local natural places that they particularly appreciate for some activity like walking, cross country skiing, picnics or just for visiting. Do you have such a place in this area?
(Check one) NO [ ] *If you answered no, skip to A-5*
YES [ ] *Please answer the following*

How do you get there? [ ] ON FOOT
[ ] BY CAR
OTHER _____

How far is it? _____ MINUTES

How often do you go there? _____ TIMES PER MONTH.

When did you first start going there? _____ (YEAR).

When you think about the condition of that place as compared to when you first started going there, would you say it is better, the same or worse?
[ ] BETTER
[ ] SAME
[ ] WORSE

A-5 When you first moved to this area, did you have a local place or places as described above (see A-4) that no longer exists or that you no longer go to?
NO [ ] *If you answered no, skip to A-6*
YES [ ] *Please answer the following*

How did you go there? [ ] ON FOOT
[ ] BY CAR
OTHER _____

How long did it take? _____ MINUTES

When did you first start going there? _____ (YEAR)

How often did you go there? _____ TIMES PER MONTH.

In a few words, why did you stop going there?

_____

A-6 Has there recently been housing or commercial development on vacant land in your area that used to be open to the public?

YES [ ] *If you answered yes, please skip to A-7*
NO [ ] *Please answer the following*

Have there recently been proposals for housing or commercial development on vacant land in your area that is now open to the public?

YES [ ] *If you answered yes, please answer the following*
NO [ ] *Please skip to Part B*

A-7 In a few words can you describe the development project

_____

Did you (or do you) ever go to this undeveloped site for recreation?

NO [ ]
YES [ ] What activities?_____

How did you find out about the development project? (Check one)

LOCAL NEWSPAPER [ ]
POSTED NOTICES [ ]
NEIGHBOURS [ ]
COMMUNITY ORGANIZATIONS (Specify)_____
CONSTRUCTION STARTED [ ]
OTHER (Specify)_____

Did you welcome the project? (Check one)

NO [ ] If you answered no, please answer (a).
YES [ ] If you answered yes, please answer (b).

(a) I didn't welcome the project because I expected it would

REDUCE ACCESS TO GREENSPACE [ ]
INCREASE TRAFFIC [ ]
INCREASE NOISE POLLUTION [ ]
OTHER_____

(b) I welcomed the project because I expected it would

REDUCE PROPERTY TAXES [ ]
IMPROVE SERVICES [ ]
CLEAN UP THE AREA [ ]
INCREASE SAFETY [ ]
OTHER (Specify)_____

A-1 When you found out about the project, did you do any of the following?

SEEK INFORMATION [ ]
WRITE TO CITY HALL [ ]
ATTEND COMMUNITY MEETINGS [ ]
SIGN PETITIONS [ ]
JOIN A COMMUNITY GROUP [ ] Which one?
CONSIDER MOVING [ ]
NOTHING [ ] Why?_____

Briefly, how effective do you feel any of your actions were?

_____

A-2 Were you approached to do any of the following?

WRITE TO CITY HALL [ ]
ATTEND COMMUNITY MEETINGS [ ]
SIGN PETITIONS [ ]
JOIN A COMMUNITY GROUP [ ]

PART B: THE COMMUNITY.

Now we would like to know a little bit about why you chose to live in this area and what you think of how the community has changed. We think this will help us understand what it is about this place that you particularly value.

B-1 For each of the following, tell us whether you think overall conditions now are better or worse than when you first came to this area.

	BETTER	SAME	WORSE
HEALTH CARE	[ ]	[ ]	[ ]
EDUCATION	[ ]	[ ]	[ ]
EMPLOYMENT OPPORTUNITIES	[ ]	[ ]	[ ]
SPORTS AND CULTURAL FACILITIES	[ ]	[ ]	[ ]
LOCAL TAXES	[ ]	[ ]	[ ]
PETTY CRIME AND VANDALISM	[ ]	[ ]	[ ]
COMMUNITY FRIENDLINESS	[ ]	[ ]	[ ]
COMMUNITY CONTROL OF DEVELOPMENT	[ ]	[ ]	[ ]
OVERALL CONDITIONS	[ ]	[ ]	[ ]

B-2 For things you marked as BETTER, would you say, in general

THE IMPROVEMENTS.
[ ] WERE ONLY POSSIBLE BECAUSE OF COMMUNITY GROWTH.
or [ ] THE IMPROVEMENTS WOULD HAVE OCCURRED WHETHER THE COMMUNITY GREW OR NOT

For things you marked as WORSE, would you say, in general.

THE CHANGES FOR THE WORSE.
[ ] WERE A NECESSARY RESULT OF COMMUNITY GROWTH.
or [ ] COULD HAVE BEEN AVOIDED EVEN AS THE COMMUNITY GREW

B-3 When you think about how the community is changing now, do you think the things on the list are likely to be better or worse in ten years.

	BETTER	SAME	WORSE
HEALTH CARE	[ ]	[ ]	[ ]
EDUCATION	[ ]	[ ]	[ ]
EMPLOYMENT OPPORTUNITIES	[ ]	[ ]	[ ]
SPORTS AND CULTURAL FACILITIES	[ ]	[ ]	[ ]
LOCAL TAXES	[ ]	[ ]	[ ]
PETTY CRIME AND VANDALISM	[ ]	[ ]	[ ]
COMMUNITY FRIENDLINESS	[ ]	[ ]	[ ]
COMMUNITY CONTROL OF DEVELOPMENT	[ ]	[ ]	[ ]
OVERALL CONDITIONS	[ ]	[ ]	[ ]

B-4 Many people have certain things that they particularly appreciate about their community. What would you say was the one thing you like best about this community?

_____

_____

B-5 Has this changed since you first came to the community?

[ ] BETTER
[ ] SAME
[ ] WORSE

B-6 Here is a list of reasons why people might live here Please tell us which ones are very important to you and which ones are less important

	EXTREMELY IMPORTANT	QUITE IMPORTANT	LESS IMPORTANT	NOT A FACTOR
JOB OPPORTUNITIES	[ ]	[ ]	[ ]	[ ]
CONVENIENT FOR WORK	[ ]	[ ]	[ ]	[ ]
BUSINESS DEVELOPMENT OPPORTUNITIES	[ ]	[ ]	[ ]	[ ]
NEIGHBOURHOOD CHARACTER	[ ]	[ ]	[ ]	[ ]
CLOSE TO NATURE	[ ]	[ ]	[ ]	[ ]
BORN IN THIS COMMUNITY	[ ]	[ ]	[ ]	[ ]
FAMILY ARE MOSTLY HERE	[ ]	[ ]	[ ]	[ ]
FRIENDS ARE MOSTLY HERE	[ ]	[ ]	[ ]	[ ]
A GOOD PLACE TO RAISE CHILDREN	[ ]	[ ]	[ ]	[ ]
RECREATIONAL OPPORTUNITIES	[ ]	[ ]	[ ]	[ ]
HOUSING IS GOOD	[ ]	[ ]	[ ]	[ ]
TAXES AR : REASONABLE	[ ]	[ ]	[ ]	[ ]
OTHER_____	[ ]	[ ]	[ ]	[ ]
OTHER_____	[ ]	[ ]	[ ]	[ ]

B-7 Which of these aspects is the most important? _____

B-8 How long have you lived here? _____ YEARS

B-9 If you moved here, where did you live before ? (Check one)

[ ] IN THE CITY
[ ] IN THE SUBURBS
[ ] IN THE COUNTRY

B-10 What actually prompted you to move here? (In a few words)

_____

B-11 Would you make the same choice now?

NO [ ] Why?_____

YES [ ] Why?_____

B-12 If you had the choice to make now, would you like to live

[ ] WHERE YOU LIVE NOW
[ ] CLOSER TO THE CITY
[ ] CLOSER TO THE COUNTRYSIDE

B-13 If you were offered a job that required you to live close to the centre of a city, would you accept it? (circle one)

DEFINITELY NOT	PROBABLY NOT	MAYBE	YES PROBABLY	YES DEFINITELY

B-14 In general, as this community grows, do you think you will enjoy living here more or less?

[ ] MORE
[ ] LESS

B-15 When you go on holidays outside the area, where do you most like to go? To places that are

[ ] IN OR NEAR CITIES
[ ] TOURIST RESORTS
[ ] IN THE COUNTRYSIDE
[ ] WILDERNESS AREAS

B-16 If your municipal government had a budget surplus equivalent to $1000 per household how would you like it to be spent? (Indicate amount you would spend on each of the following)

		EXAMPLES
$____	TAX REFUND	
$____	IMPROVING RECREATION FACILITIES	
$____	IMPROVING POLICING	
$____	IMPROVING ROADS	
$____	IMPROVING HEALTH SERVICES	
$____	INCREASING GREENSPACE	
$____	ENVIRONMENTAL CLEAN UP	
$____	OTHER	
____		
$1000	TOTAL	

PART C: ACTIVITIES IN THE COMMUNITY.

Now, to help us understand a bit about how people's views differ, we would like to know a little about your activities in the community. In the following table, please indicate roughly how much time on average you would say you spend on various leisure activities

ACTIVITIES	ROUGHLY HOW MUCH TIME SPENT
OUTDOOR RECREATION IN THE SUMMER (WHAT ACTIVITIES ARE THESE? ACTIVITIES	_____ HRS/WK
OUTDOOR RECREATION IN THE WINTER (WHAT ACTIVITIES ARE THESE? ACTIVITIES	_____ HRS/WK
SERVICE CLUBS, COMMUNITY ORGANIZATIONS OR CHURCH GROUPS (WHAT GROUPS ARE THESE) NAMES	_____ HRS/WK
SOCIAL ACTIVITIES WITH PEOPLE IN YOUR COMMUNITY (VISITS, MEALS, PARTIES ETC)	_____ HRS/WK
READING AT HOME	_____ HRS/WK
WATCHING T.V AT HOME	_____ HRS/WK
OTHER (PLEASE SPECIFY)	_____ HRS/WK

PART D: A COMPARISON.

Finally, we would like to ask five questions that have been asked in European studies of this kind for almost 20 years.

D-1 **On the whole, when you think about the life you lead, are you**

[ ] SATISFIED
[ ] FAIRLY SATISFIED
[ ] NOT VERY SATISFIED
[ ] NOT AT ALL SATISFIED

D-2 **Taking all things together, would you say these days you are**

[ ] VERY HAPPY
or [ ] FAIRLY HAPPY
[ ] NOT TOO HAPPY

D-3 **When you think about happiness, how important is each of the following? 1 is not important 10 is extremely important (Circle your choice)**

	NOT IMPORTANT>>EXTREMELY IMPORTANT
GETTING ALONG WELL WITH YOUR FAMILY	1—2—3—4—5—6—7—8—9—10
GETTING ALONG WELL WITH FRIENDS	1—2—3—4—5—6—7—8—9—10
HAVING FINANCIAL SECURITY	1—2—3—4—5—6—7—8—9—10
HAVING ENOUGH LEISURE TIME	1—2—3—4—5—6—7—8—9—10
HAVING A SUCCESSFUL CAREER	1—2—3—4—5—6—7—8—9—10
FEELING THAT YOU ARE USEFUL TO OTHERS	1—2—3—4—5—6—7—8—9—10
FEELING CLOSE TO NATURE	1—2—3—4—5—6—7—8—9—10
DOING INTERESTING THINGS	1—2—3—4—5—6—7—8—9—10
HAVING A SUCCESSFUL MARRIED LIFE	1—2—3—4—5—6—7—8—9—10
BEING PHYSICALLY FIT	1—2—3—4—5—6—7—8—9—10

D-4 **On the whole, when you think about your future, do you expect that you will be more satisfied, about the same, or less satisfied than you are now?**

[ ] MORE
[ ] SAME
[ ] LESS

Answer the following questions by circling a number on the line

D.5 When you think of the future of your community, indicate how much of the present greenspace you would like to see preserved

100% 90% 80% 70% 60% 50% 40% 30% 20% 10% 0%

PROTECTION OF ALL THE GREENSPACE THAT THERE IS NOW

PROTECTION OF HALF THE GREENSPACE THAT THERE IS NOW AND DEVELOPMENT OF HALF

DEVELOPMENT FOR HOUSING OR COMMERCIAL USE ON ALL OF THE PRESENT GREENSPACE

D.6 How much greenspace do you think the political leaders of your community would like to see preserved?

100% 90% 80% 70% 60% 50% 40% 30% 20% 10% 0%

PROTECTION OF ALL THE GREENSPACE THAT THERE IS NOW

PROTECTION OF HALF THE GREENSPACE THAT THERE IS NOW AND DEVELOPMENT OF HALF

DEVELOPMENT FOR HOUSING OR COMMERCIAL USE ON ALL OF THE PRESENT GREENSPACE

PART E: FOR INTERPRETATION.

You may wish to leave out some of the following questions but by answering this section you will help us to determine how representative our sample is

E.1 You are. [ ] FEMALE
[ ] MALE

E-2 Your age is [ ] OVER 65
[ ] 46-65
[ ] 26-45
[ ] 15-25

E-3 Number of children in this family (if none, write "0")

_____ UNDER 5 YEARS OF AGE
_____ 5-13
_____ 14-18
_____ 19-24
_____ 25 AND OVER

E-4 Number of people 20 years and older living in this house is._____ADULTS.

E-5 You own your home [ ] NO
[ ] YES

E-6 Your gross family income is [ ] UNDER $25,000
[ ] $25,001 TO $40,000
[ ] $40,001 TO $60,000
[ ] OVER $60,000

E-7 Overall, which national political party do you feel has opinions which are most often close to your own?

_____ PARTY

Thanks again

This space is for anything else you would like to tell us about the changes you have seen in your community and your quality of life as a resident of this neighbourhood. Also, any comments you wish to make that you think may help us in future efforts to understand what people want from their communities will be appreciated, either here or in a separate letter

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Your contribution to this effort is very greatly appreciated. The results of the study will be printed in the local media but if you would like to be sent a summary, please print your name and address on the back of the return envelope (Not on this booklet). We will see that you get it.