

# **Integrating Cumulative Effects Assessment with Regional Planning**

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## ABSTRACT

This report explores how **regional** planning, which supported the management of cumulative effects in **urbanized** regions, would differ from existing planning practice. Twelve normative principles related to three areas of planning, regional governance, planning goals, and the form of planning practice, are synthesized from the literature. Then these principles are used as a heuristic in examining a case study of regional planning in the Greater Vancouver region of British Columbia. Overall, the case study rates fair in demonstrating the principles of governance and poor in terms of setting relevant policy goals. In terms of planning practice, the region was good in some areas, especially strategic planning, but poor in others, especially in being adaptive and comprehensive. Therefore, current approaches to regional planning would have to change substantially to support the management of cumulative effects. Several institutional constraints and lack of relevant training for planners stand in the way of making the necessary changes. Nevertheless, because regional planning is a suitable forum for linking local action with global issues, it has potential to provide an appropriate institutional context for the management of cumulative effects.

## **CHAPTER ONE: INTRODUCTION**

Regional planning in Canada currently plays a minor role in managing the cumulative effects of multiple environmental impacts. Cumulative effects result when “insignificant” impacts from many human activities combine synergistically or additively through time and space to create “significant” effects. Regional planning originally began as a response to cumulative environmental and social effects of **industrialization** and urbanization (Sussman 1976). During the 1950s and 60s, the discipline began to focus on facilitating economic growth through industrial development. Now with the resurgence of interest in protecting and maintaining environmental quality, the original intention of regional planning is being rediscovered. Researchers in environmental assessment suggest that regional planning could provide an appropriate institutional context for CEA (Sonntag et al. 1987 and Peterson et al. 1987). This conclusion leads to the following research question:

How would regional planning, which supported the management of cumulative effects, differ from existing planning, in terms of, for example: regional governance, the goals of planning, and the form of planning practice?

A case study of regional planning in the Greater Vancouver region is undertaken here to address this question. This region is suitable as a case study for several reasons.

- This region has many similarities with other urban-centred regions in Canada: population size, large number of municipal jurisdictions, overlapping provincial and federal jurisdictions, and cumulative effects such as deteriorating air quality as well as conflicts between developers and interest groups over land use decisions.
- The Greater Vancouver region has over four decades of experience in attempting to deal with the environmental consequences of urban development through regional planning.
- Regional planning in this area has gone through several phases from having authority for land use planning to the current situation of having no legislated authority for

regional planning. Thus, it is possible to assess if having authority for regional planning has any impact on its effectiveness.

- The Greater Vancouver region has many physical limitations (e.g., ocean, international border, mountains) which constrain the extent of urban development. In this respect, the case study foreshadows the future for regions such as Metro Toronto and Montreal, which currently have fewer physical constraints to development.

Specific research questions to be addressed by evaluating the case study include:

- Has regional planning contributed to the management of cumulative effects in the Greater Vancouver region?
- If so, in what ways has regional planning made a contribution? If not, what are the constraints?

These questions are related to CEARC's research interests in evaluating institutional effectiveness in addressing cumulative effects (CEARC 1988).

### **An Opportunity to Redefine Regional Planning**

Over the past forty to fifty years, governments have used regional planning to facilitate urbanization and industrialization, thereby encouraging economic growth. This purpose of regional planning is increasingly coming under question, however, as the values and goals of society change (Boothroyd 1989). Economic growth as the goal of development is being replaced by multiple goals which include maintaining ecological integrity, greater attention to social equity, and more emphasis on self-determination (Friedmann and Weaver 1979). In addition, political trends towards regionalization are confronting trends towards global economic integration. As a consequence, the practice of regional planning is under pressure to change. Simply applying input/output analysis or growth centre theories for the purposes of economic development is no longer adequate given the serious issues now facing society.



Ideally, to maintain ecological integrity, regional planning could provide an area-wide, comprehensive process for evaluating and regulating land-use activities, thereby reducing or mitigating the negative environmental impacts from development. However, deficiencies in the current practice of regional planning restrict its usefulness in environmental management. Sonntag et al. (1987) identified the following deficiencies, for example: lack of a planning framework for integrating scientific and public concerns; planners not trained in available methods of assessment; inability of current planning approaches to deal with linkages between complex social, economic, and ecological systems; and lack of explicit consideration of cumulative effects.

This dissatisfaction with the current practice of regional planning is really an opportunity to redefine the purpose of planning at a regional scale. Some indication of the future direction is already evident. For example, Holling (1978) proposes applying an adaptive environmental assessment and management approach to regional economic development planning.

But it is obvious that at least regional economic systems can be treated in the same way and integrated with the ecological and environmental system. .. it is possible to achieve designs that work with rather than against natural forces. In so doing, more opportunity is provided for less costly and intrusive economic developments and even for the enhancement of natural systems rather than simply for their protection. (Holling 1978: 14)

Similar proposals for redefining regional planning have included consideration of cumulative effects assessment. As noted by Roots (1986), undertaking cumulative effects assessment can increase public demand for adaptive regional planning. Rees (1988) also points out how cumulative effects assessment can inform regional planning processes. He suggests that comprehensive regional monitoring be undertaken to estimate how close a region is to reaching the development limits specified by local carrying capacity.

While regional planning will have to fulfil many purposes in the future, managing the ecological integrity of a region will probably become a central goal. This is the point at

which cumulative effects assessment and regional planning practice overlap. Regional planning is looking for new goals while the emerging field of cumulative effects assessment is looking for an appropriate context. The integration of these two areas is an important component in a national or provincial sustainable development strategy.

### **The Urban Environment as Focus**

This report focuses on environmental management in urban areas because that is where the environmental crisis is manifest most clearly (Kahn 1986). Urban environmental issues are largely a result of the cumulative impacts from seemingly insignificant urban-based activities. An individual driving to work contributes to smog. Each flush of the toilet leads to an incremental decrease in water quality. The construction of much needed family housing eliminates nesting habitat for yet another species of birds.

Most federal and provincial environmental policies focus on resource extraction activities (e.g., mining and forestry), industrial processes, and wilderness preservation, ignoring the cumulative environmental consequences of urbanization. In the absence of senior government interest in urban environmental quality, local governments have been struggling with various strategies to reduce the impacts of urbanization, thereby improving the quality of life for their citizens. These efforts have met with limited success.

We understand little about how urban growth occurs, how urban systems change in the process of growth, how urban development needs can be balanced with environmental and other concerns, or how specific techniques to manage change actually work. (Brower, Godschalk, and Porter 1989: vi).

Assessing the environmental impacts of urbanization has previously been approached from the perspective of environmental assessment. In the U.S., research into cumulative effects began in the late 1970s because urbanization was not amenable to project-specific environmental assessment. Examples include an urbanization assessment method, prepared for the Environmental Protection Agency (Jameson 1976); carrying capacity as a

planning tool (Schneider et al. 1978); and an **areawide** environmental assessment procedure, developed for the U.S. Department of Housing and Development (Skidmore, Owings, and Merrill 1981). Although the **areawide** assessment procedure purported to be "fundamentally" concerned with cumulative impacts, the methodology for identifying and addressing such issues was poorly defined. It is likely due to ill-defined methodologies that none of these procedures evolved into regular practice.

Therefore, to address the lack of attention to this critical issue, this report focuses on planning for environmental management in urban-centred regions. The region, rather than a municipality, is the chosen unit of study because, at the regional scale, concerns regarding cumulative effects and urban planning coincide. As noted by Odum (1982), regional problems are highly vulnerable to the incremental decisions which lead to cumulative effects.

## **Definitions**

Cumulative effects and regional planning are defined in this section to clarify their meaning as intended in this report.

### ***Cumulative Effects and Related Concepts***

The concept of cumulative effects is best explained by examples: the gradual loss of wetlands through infilling and lowering of water tables, the incremental decrease in water quality through overland drainage from heavily fertilized croplands, and the synergistic effects of air pollutants to create smog. While all cumulative effects are based in local actions, some effects eventually lead to global problems. The buildup of greenhouse gases in the upper atmosphere, primarily as a result of fossil fuel combustion, is a case in point.

Cumulative effects assessment (CEA) refers to scientific techniques for identifying and predicting the cumulative impacts of development.<sup>1</sup> Questions that are beyond the usual

scope of environmental assessment, such as the role of comprehensive environmental objectives and, more generally, the role of science in planning, will be considered part of cumulative effects management. Additional issues of concern to cumulative effects management include the appropriate scale for management and institutional arrangements.

It is important to indicate the relationship between cumulative effects and sustainable development. Recognition by media, interest groups, and government of the extent and seriousness of cumulative effects, is largely responsible for the growing interest in sustainable development. As defined by the World Commission on Environment and Development, sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs (WCED 1987: 43). The challenge of sustainable development is to find forms of development which do not exceed the short or long term ecological capacity of the planet. In an ideal world, cumulative environmental impacts from development would be **minimized**. Therefore, efforts to manage cumulative effects will be a major step towards developing a sustainable society.

### *Regional Planning*

Regional planning in Canada takes place over several spatial scales. Nationally, the federal government has directed much effort at resolving the inter-regional disparities between industrialized, prosperous Central Canada and less-developed regions such as Atlantic Canada. At a provincial level, BC and Quebec have **used** mega-projects to open up the vast northern regions to development. Finally, at the smallest scale, regional planning takes place within urbanized areas such as Winnipeg, Metropolitan Toronto, and Greater Vancouver. It is this last scale which is the focus of this report.

In terms of process, regional planning is a tool for directing resources and people's activities towards a common goal, be that economic development or improving the quality

of life or both. The first goal is usually associated with federal initiatives for regional development. The latter goal, improving the quality of life, is usually associated with provincial and **local** government efforts to resolve rural-urban conflicts (**Hodge 1986**). Regional planning differs from urban planning in that the former is concerned with the general location of activities and resource development, rather than the specific allocation of space among various land uses (**Hodge 1986**).

Traditionally, the term regional planning is limited in a metropolitan context to land use planning. For the purposes of this report, regional planning also includes efforts to manage waste, transportation, open space, and resources at a regional scale. When the traditional view of regional planning is intended, it will be referred to as regional land use planning.

## Methodology

Literature on cumulative effects assessment (primarily reports from the Canadian Environmental Assessment and Research Council) as well as environmental management (e.g., Lester 1989; IUCN 1980) urban development (e.g., Gerecke 1976), and regional planning were reviewed to provide a historical context for the research. From this literature, some normative principles for regional planning in the context of managing cumulative effects were synthesized. These theoretical principles were then used as a heuristic to analyze regional planning in the Greater Vancouver region.

This case study focuses on the evolution of regional planning in relation to the protection of environmental quality. Major documents from the Greater Vancouver Regional District (GVRD), starting with its precursor the Lower Mainland Regional Planning Board, were reviewed to determine the historical attributes of regional planning in this area

## **Scope**

The normative principles for regional planning presented in this report are intended for general discussion purposes only. They are not intended as a recipe for effective regional planning.

The report focuses on the environmental aspects of sustainable development, particularly cumulative effects. Although the social and economic aspects of sustainable development are integrally related to the environmental aspects they are beyond the scope of this report.

## **Organization of Report**

This introductory chapter has stated the research questions and indicated how regional planning can provide a decision making context for cumulative effects assessment, while the management of cumulative effects can become a new focus for regional planning. Chapter Two begins with an alternate **typology** of cumulative effects, where the sources of effects are linked with major issues. Then, some normative principles under which regional planning could provide an appropriate context for cumulative effects assessment are identified. The principles fall into three categories; governance, planning goals, and planning practice. The practice of regional land use planning and environmental management in the Greater Vancouver region is then compared with the normative principles of planning in Chapter Three. The purpose of this comparison is to determine to what extent regional planning currently supports the management of cumulative effects. The difference between the practice and normative principles helps determine where efforts for change can be directed. In Chapter Four, some conclusions about the future directions for regional planning are drawn from the case study. In addition, the major public policy implications regarding the governance of urban-centred regions in the context of cumulative effects assessment are discussed.

## **CHAPTER TWO: NORMATIVE PRINCIPLES TO INTEGRATE CEA WITH REGIONAL PLANNING**

The lack of an appropriate institutional framework for environmental assessments, and CEA in particular, is problematic. It means assessments can only make marginal contributions to environmental policies in a decision making environment that currently favours unrestrained economic development. Tinkering with present systems of governance and planning are not bringing about the desired changes in environmental quality. But then, why should they? As queried by Berman (1981), how can the viewpoint that got us into trouble in the first place, somehow resolve the problems it has created?

Viewing cumulative effects from an alternative view could provide the means of gaining new insights into this issue, and thus new options for its resolution. Therefore, an alternative **typology** of cumulative effects is presented. This **typology** is meant to complement the description of ecosystems affected by cumulative effects presented by Lane et al. (1988: Table 7-2). It helps to focus attention on the sources, rather than the consequences, of cumulative effects and thus puts the remaining discussion of regional planning into a management perspective.

### **A Typology of the Sources of Cumulative Effects**

In this typology, Orians' (1986: 1-2) description of the sources of changes in the physical environment (column 1) is taken as a starting point.<sup>2</sup> Using his description of sources, the primary human activities connected to those sources and examples of relevant materials or activities are identified in Table 1 (columns 2 and 3, respectively). This table shows that the addition of chemicals can be attributed to pollution and the removal of materials can be attributed to resource harvesting, urbanization, and converting raw resources to more usable forms.

Table 1.  
Sources of change and human activities leading to cumulative effects.

Source of Change	Human Activities		Examples
<b>Addition of materials</b>			
- chemicals	pollution	-fossil fuels ( <b>ff</b> ) -inert (in) <b>-toxics</b> (tx) -synergistic (sy) -nutrient (nu) -thermal (th)	CO <sub>2</sub> <b>CFCs, particulates</b> <b>DDT, PCBs</b> dioxins, ozone, smog phosphates
<b>Removal of materials</b>			
- harvesting individual species	resource harvesting ( <b>RH</b> )		agriculture, fisheries, forestry
- altering habitats	urbanization (urban) resource conversion ( <b>RC</b> )		industrial processing, manufacturing, energy production

Based on Orians (1988).

The abbreviations in the middle column are then used again in Figure 1, where the list of significant cumulative effects issues from Peterson et al. (1987: 45-46) are compared with the human activities identified in Table 1.

Although Figure 1 is simplistic, it helps to guide the discussion of cumulative effects in a different direction. For example, would agricultural activities lead to groundwater depletion if carried out at a different scale or with different technology? If the collection and disposal of toxic chemicals were carefully controlled, what would be the impacts on environmental quality?

Figure 1 shows two general grouping of issues: those associated with pollution and those associated with the processes of industrialization and urbanization. Specifically, the first three issues are a result of the accumulation of atmospheric pollution from fossil fuel combustion and toxic fumes. This observation is equally as important to management decisions as knowing which ecosystems are affected for each cumulative effects issue (see



Lane et al. 1988, Table 7-2). The use of toxic chemicals is the source of six out of thirteen issues. Again, this observation has many management implications.

	PRIMARY SOURCES								
	<u>pollution</u>						RH	urban	RC
<u>CUMULATIVE EFFECTS ISSUES</u>	ff	in	tx	sy	nu	th			
long range transport of <b>air pollutants</b>	.		•	.					
<b>urban air</b> quality and <b>airshed</b> saturation	•	•	•	.					
cumulative effects associated with climatic modifications	•	•	•	.					
<b>mobilization</b> of persistent or <b>bio-</b> accumulated substances		•	•	.					
effects of use of agricultural, <b>silvi-</b> cultural,and horticultural chemicals		•	•	.		•			
long-term containment and disposal of toxic wastes		•	•	.					
occupation of land by man-made features							•	•	•
habitat alienation							•	•	•
habitat fragmentation							•	•	•
losses of soil quality and quantity							•	•	•
reduction of groundwater supplies and groundwater contamination							•	•	•
increased sediment, chemical, and thermal loading of freshwater and marine habitats	•	•	•	•	•	•	•	•	•
accelerating rates of renewable resource harvesting							.		

Adapted from Peterson et al. (1987).

Figure 1.  
A typology of human activities leading to cumulative effects.

## **Rationale for Regional Planning**

The connection between regional planning and cumulative effects management is becoming much stronger as societal concern for environmental quality increases. The requirements for improved processes for environmental management, regional planning instead of urban planning, and stronger forms of local governance are coinciding in a new model of regional planning, especially in urbanized regions. The points listed below are central themes in the rationale for a regional approach to environmental management.

The primary reason for moving to a model of regional planning relates to the ecological impacts of development. Regions are highly vulnerable to the small decisions that are characteristic of cumulative effects (Odum 1982). Therefore, such effects are best addressed at the level at which they occur. A regional approach to managing cumulative effects, for ecological reasons, is also proposed by Rees (1988), Peterson et al. (1987), and Sonntag et al. (1987).

From a planning perspective, Mumford (1938) observed how planning at a regional scale forces the integration of environmental management and economic development.<sup>3</sup> A regional planning process, as proposed by Mumford, provides people with opportunities to take account of the natural landscape of which they are a part. A similar approach to managing urban development is now gaining greater acceptance within the planning community in Britain at least (Gould 1990 and TCPA Strategic Planning Group 1990).

The focus on regional planning and governance also compliments the trend to decision making at lower levels as a reaction to the centralizing forces in society (Bookchin 1987). A regional scale of governance, rather than provincial or federal scale, brings government closer to the people who are affected by government policies. Bookchin also feels a greater degree of decision-making at the regional level will encourage more participation in politics and help build a sense of community. As a precursor to creating an ecological society,

Bookchin (1987: 265) calls for the development of a local political culture where there is a "... revival of citizenship, popular civic institutions, a new kind of economy, and a countervailing dual power [between region and nation], confederally networked. ...". He sees local involvement in politics as absolutely necessary so people can engage in face to face dialogue about issues such as toxic wastes and the meaning of environmental quality.

## **Principles for Regional Planning**

The previous discussion of an alternative view of cumulative effects and the emerging rationale for regional planning provides the context from which proposed principles for regional planning are selected. These principles have been selected with the management of an urban-based region in mind.

The twelve principles fall into three categories: 1) governance and institutional concerns, 2) planning goals, and 3) planning practice. A summary of these principles is listed in Table 2. **The** next sections provide brief descriptions of the rationale for selecting the principles.

### ***Governance and Institutional Concerns***

The test of having effective policy is not solely in the development of policy papers, but also in government's ability to **implement** policy. "Political support is more important in practice than legislation" (TCPA Strategic Planning Group 1990: 241). Many well-intended policies have fallen by the wayside, lacking political support for implementation in the way of operational funding or support for enforcement activities. The principles for governance at the regional level concern three conditions which support both the development and implementation of policy: clear lines of authority to implement and enforce plans, the fiscal capacity to provide resources for planning, and having decision-makers directly accountable to voters.

Table 2.

Principles to integrate regional planning and cumulative effects assessment.

<p><u><i>Governance and Institutional Concerns</i></u></p> <ol style="list-style-type: none"> <li>1) Authority to implement decisions</li> <li>2) Capacity to implement decisions</li> <li>3) Accountability</li> </ol>
<p><u><i>Planning Goals</i></u></p> <ol style="list-style-type: none"> <li>4) Maintain ecological integrity</li> <li>5) <b>Minimize</b> resource and energy throughput</li> <li>6) Minimize waste</li> </ol>
<p><u><i>Planning Process</i></u></p> <ol style="list-style-type: none"> <li>7) Strategic</li> <li>8) Comprehensive</li> <li>9) Adaptive</li> <li>10) Systems oriented</li> <li>11) Learning based</li> <li>12) Participatory and consultative</li> </ol>

### *Planning Goals*

As indicated in the introduction, economic growth is rapidly losing its place as the central goal of regional planning. Society is beginning to embrace a wider set of goals where maintaining ecological integrity equals or is more important than economic growth. Given the emergence of these new goals, the central focus of regional planning will likely shift to managing the ecological integrity of a region by minimizing resource and energy throughput as well as minimizing waste. These principles were identified by Daly (1973)

in his description of a steady-state economy, Schumacher (1974) in his description of a more humanistic economy, and repeated more recently in Daly and Cobb (1990).

The approach of using carrying capacity to manage the ecological integrity of a region was rejected for present purposes for several reasons. Carrying capacity, with reference to human populations, is defined as "... the maximum rate of resource consumption and waste discharge that can be sustained indefinitely in a defined planning region without progressively impairing biological productivity and ecological integrity" (Rees 1990: 20). While it is useful to get people thinking about ecological limits to development, in practice using carry capacity to guide decisions about development would be difficult to monitor and may result in some unexpected results.

Through international and national trade, urban areas are using carrying capacity from other regions. Rees (1988) has suggested using regional trade accounts to track these exchanges. While this approach would provide a useful educational function, in practice, such accounts may be used as a confusing numbers game, rather than as a source of valuable information about rates of resource consumption.

People may use carrying capacity in the same way as maximum sustained yield is used in fisheries. Managing ecosystems to the maximum that can be sustained can result in unexpected collapses in populations that are key to the functioning of the ecosystem (Holling 1986). This form of management can increase the risk of surprises, creating even more management problems.

Another problem with using carrying capacity as a guide to development decisions is that carrying capacity gives the appearance of being based on scientifically defensible information. Unfortunately, not enough is known about most ecosystems to define what rate of pollution discharge can be "sustained indefinitely". Because the definition of

“maximum rate” is subject to individual bias, scientific consensus on the definition would be difficult to obtain.

For these reasons, the principles of minimizing resource throughput and minimizing waste are suggested as more realistic means to maintain ecological integrity until more is known about human carrying capacity. What is meant by minimum levels is to keep renewable resource consumption within limits defined by the interest not the stock of resources. Non-renewable resources, such as petroleum and minerals, as well as soil building and atmospheric maintenance (Rees 1990) must be used in a way to maintain stocks for future generations. With this approach to resource exploitation, efficiency of use becomes a primary consideration.

### ***Principles for Planning Practice***

The means through which any type of planning becomes reality is by developing policies which translate planning concepts into action.<sup>4</sup> Since the 1940s, the dominant form of this process in Canada and the United States has been experts using a rational, synoptic policy model to define and analyze options, with politicians making decisions. People are becoming disenchanted with this model of policy development, however (Torgenson 1986).

The emerging model for regional planning practice where cumulative effects assessment and regional planning can be integrated has six key characteristics. One, strategic planning, is becoming more commonplace in government bureaucracies: it provides a vision (TCPA Strategic Planning Group 1990), is proactive and long-term (Gardner 1988), and provides a context for local decision-making (TCPA Strategic Planning Group 1990). Two, comprehensive planning is especially relevant to the management of cumulative effects because of its emphasis on the integration of information (Sonntag et al. 1987). Three, an adaptive planning approach means, in particular, that environmental assessment is

integrated with the design of projects and policies at the beginning of a planning process (Holling 1978). Four, switching to a systems orientation in planning means working with change rather than managing stability (Gardner 1988; Holling 1978). It also means increased emphasis on monitoring and feedback mechanisms, such as those proposed by Sutton (1979). Five, a learning-based approach to planning aims to actively involve a wide range of people in problem solving. This is the most effective way of changing people's behaviour (Vickers 1987), especially those activities which contribute to environmental degradation. Six, having participatory and consultative planning processes will help bring diverse values to bear in the resolution of issues, increasing the likelihood of successfully implementing new environmental policies (Gardner 1988; Rees 1989; and Creighton, Chalmers, and Branch 1980).

### **Comparing Approaches to Regional Planning**

The foregoing description of normative principles for regional planning is quite different than current regional planning practice in metropolitan areas. To summarize these differences, a comparison of existing conditions versus proposed conditions is given in Table 3. In terms of the overall doctrine or paradigm within which regional planning takes place, sustainable development would replace economic development (Hall 1990, Richardson 1989). Regions are currently defined by administrative boundaries which ignore ecological, cultural, and economic processes. The emerging definition of region would evolve through practice as ecological and cultural "boundaries" are incorporated into management processes (Alexander 1990). The particular focus of regional planning would also be unique to each region, depending on its needs (Richardson 1989). The current emphasis on extending urban planning practice to the region would be replaced by Mumford's original concept of regional planning where urban and regional planning are integrated (Sussman 1976). Finally, planning practice would no longer be limited to

experts with their limited technical or economic agendas but be opened up to be strategic, responsive, and accessible to the public.

Table 3.

A comparison of existing and proposed conditions for regional governance.

	<i>Existing Conditions</i>	<i>Proposed Conditions</i>
development paradigm	economic development	sustainable development
definition of region	administrative	functional
mode of planning	regional analysis & urban planning	integrated regional planning
mode of policy analysis	rational, expert	strategic, participatory



## CHAPTER THREE: CASE STUDY AND EVALUATION

In this chapter, the twelve principles of regional planning will be applied as a heuristic to the case study to determine in what ways, if any, regional planning in the Greater Vancouver region of B.C. has supported the management of cumulative effects. A brief description of the study area will be given followed by a summary of major planning activities over the past 40 years. Then a summary of the results will be presented.

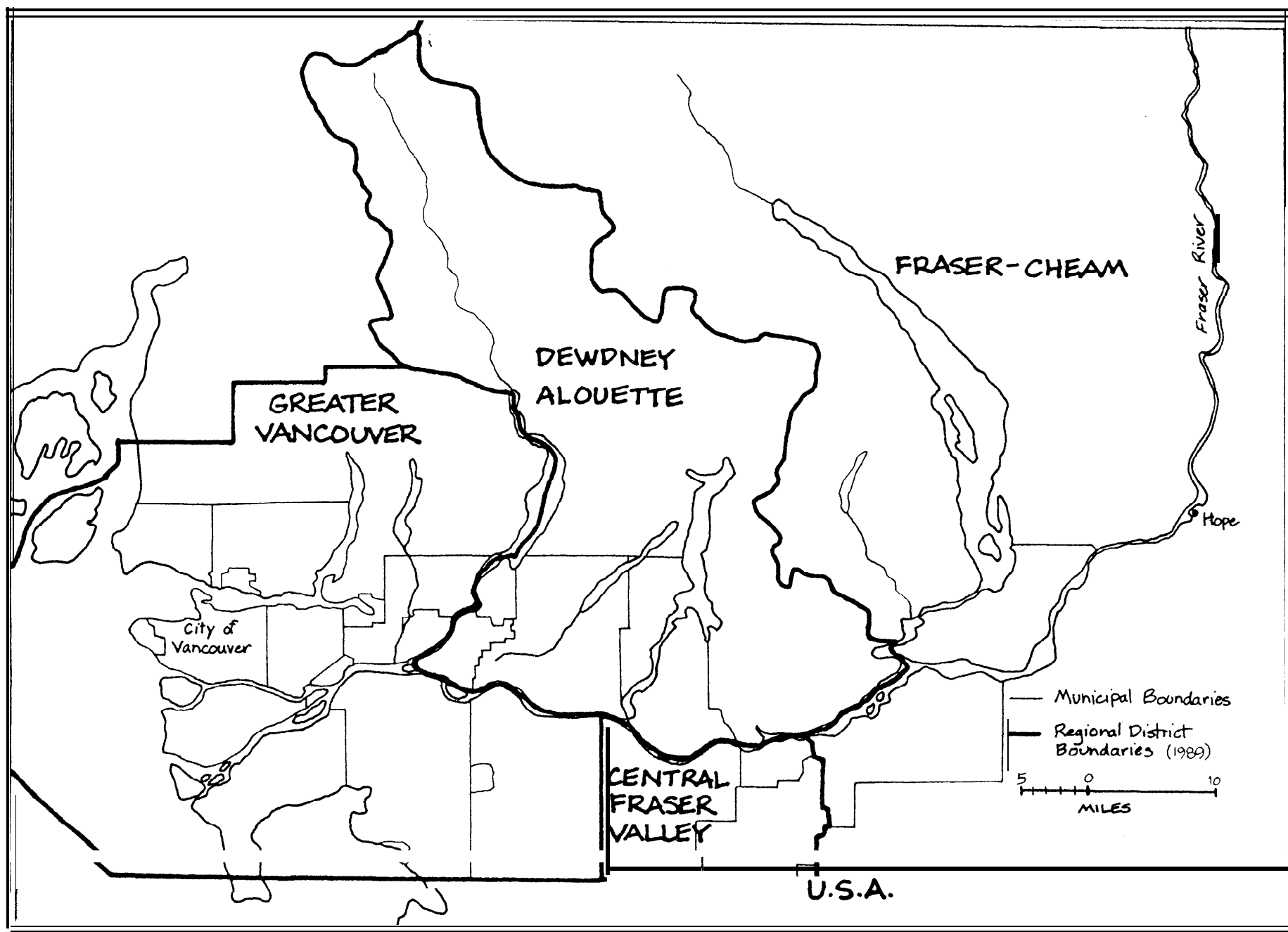
### Case Study Description

The Lower Mainland, the largest urbanized area in B.C., is overlaid by the jurisdictions of four regional districts and many municipalities and includes some unorganized territory. This case study focuses primarily on the planning activities of the Greater Vancouver Regional District (GVRD), as indicated in Map 1, but also takes into account significant planning activities in the *Lower Mainland*. Hereafter, the term Greater Vancouver refers to the regional district and not the larger area.

Close to half the population of B.C., 1.49 million people (1989 est.)<sup>5</sup> live in the GVRD which is comprised of 18 municipalities and three electoral areas. By 2011, the population is expected to be just over 2.1 million.

### *Cumulative Effects of Urbanization*

Greater Vancouver is world renowned for the physical beauty of its location and significance of wildlife habitat. The wetlands of Boundary Bay to the south support the highest density of wintering water-fowls, shorebirds, and raptors in Canada (Kennett and McPhee 1988). Millions of salmon pass through the Fraser estuary each year on the way to their spawning grounds in the interior of B.C.



Map 1.  
Boundaries of the Greater Vancouver Regional District in relation to the Lower Mainland.

Like any urban area around the world, the development of Greater Vancouver has given rise to environmental impacts: loss of agricultural land, loss of natural habitat, and air and water pollution. These effects are cumulative, where each impact is relatively small but when compounded over time, and concentrated within a geographic region, becomes very significant. Impacts in urban areas are not only aggregate, they are also synergistic. For example, water pollution and loss of nesting habitat to development have both contributed to a decline in the heron population south of Vancouver.

Cumulative effects are difficult to manage, as evidenced by the continuation of these issues despite a number of management initiatives over the years. Recently, there has been a renewed interest in addressing environmental issues in the context of creating a “livable region”. Before summarizing the region’s history of responses to these issues, the regional governance system will be outlined.

#### *Regional Governance in the GVRD*

Regional districts were established throughout B.C. in 1965 by amendments to the *Municipal Act*. Regional districts are partnerships of municipalities and electoral areas (unorganized territories) incorporated through letters patent. The purpose of regional districts is to provide and coordinate services in urban and rural areas. The services provided are dependent upon the needs of the members. Typical services are sewage, water supply, and building inspection.

Regional districts are governed by a Board of Directors who are appointed from municipal councils or directly elected in electoral areas. The appointments are for one year terms; elected positions are three year terms. Each director has one vote for every 20,000 population. Because no one director can hold more than five votes, areas with large populations appoint more than one director. Each year, the Board elects a chairperson and

deputy and appoints standing committees. Every regional district has an administrative staff to carry out specific functions.

### *Highlights From the Case Study*

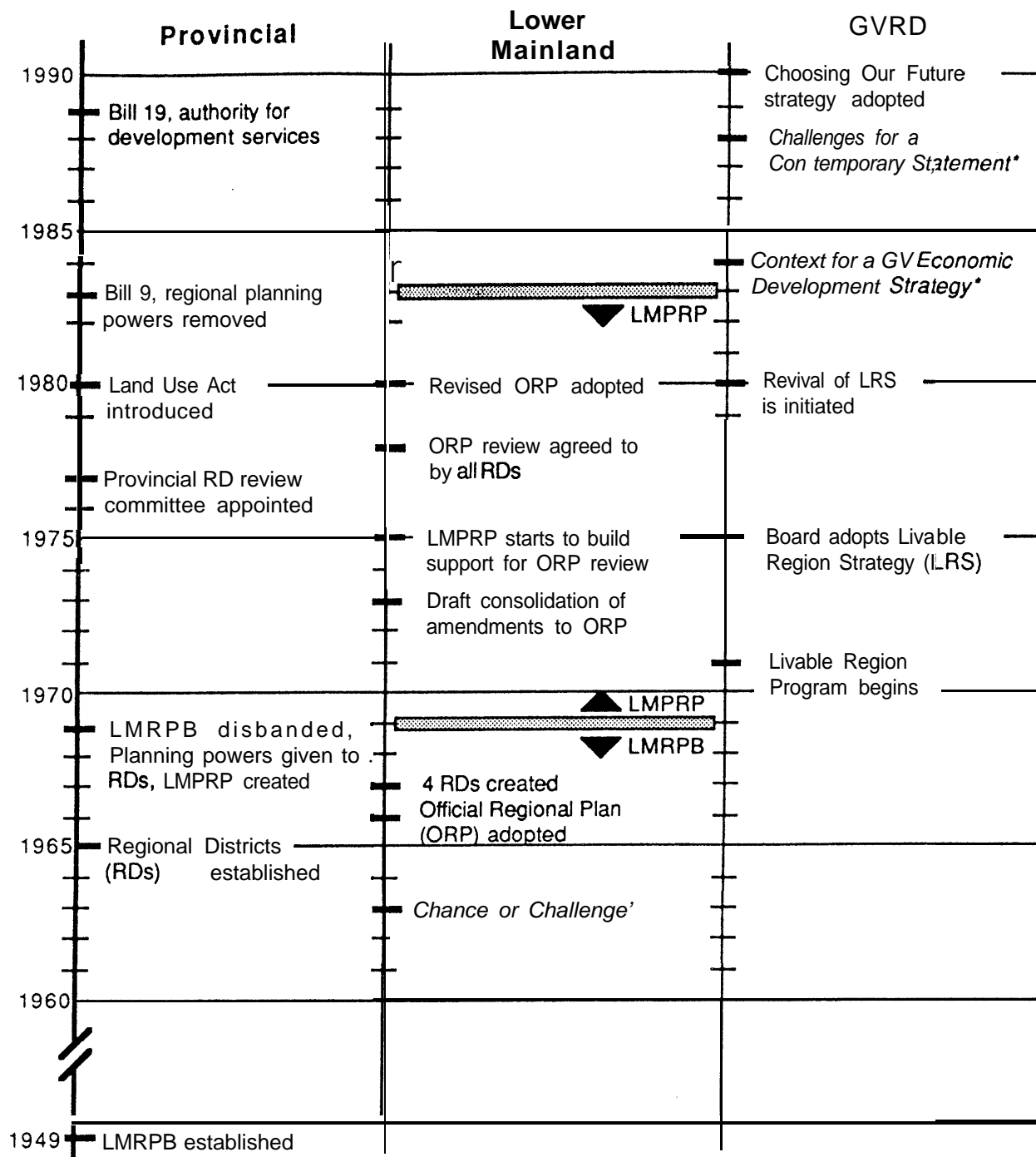
The review of regional planning in the GVRD will concentrate on three areas: the evolution of authority for regional planning, major regional planning efforts, and efforts to manage cumulative effects from urbanization. Highlights from these chronologies are presented in Figures 2 and 3<sup>6</sup>.

In Figure 2, provincial actions regarding the changing authority for regional planning are listed in column 1. Planning activities for the Lower Mainland and the GVRD are listed in columns 2 and 3, respectively. The Livable Region Strategy and Choosing Our Future are regional growth management strategies which incorporate some environmental protection goals. Both planning processes involved public consultations.

Figure 3 presents major actions taken by the provincial, regional, and local governments (columns 1, 2, and 3, respectively) to address cumulative effects and environmental issues. Although the GVRD has taken many diverse actions in these areas, they are not presently linked in a strategic plan.

### **Evaluation**

Over the past four decades, the primary purpose of regional planning in the Greater Vancouver region has been to manage urban growth and change. Important secondary goals have been to protect and maintain the **landbase** and unique environmental qualities of the region. In a sense, the region has indirectly been attempting to manage cumulative effects: the gradual loss of farmlands, deteriorating water and air quality, and **ever-**increasing volumes of garbage.



\* These are reports

LMRPB - Lower Mainland Regional Planning Board

LMPRP - Lower Mainland Planning Review Panel

Figure 2. Major planning activities of the provincial government, Lower Mainland, and Greater Vancouver Regional District.

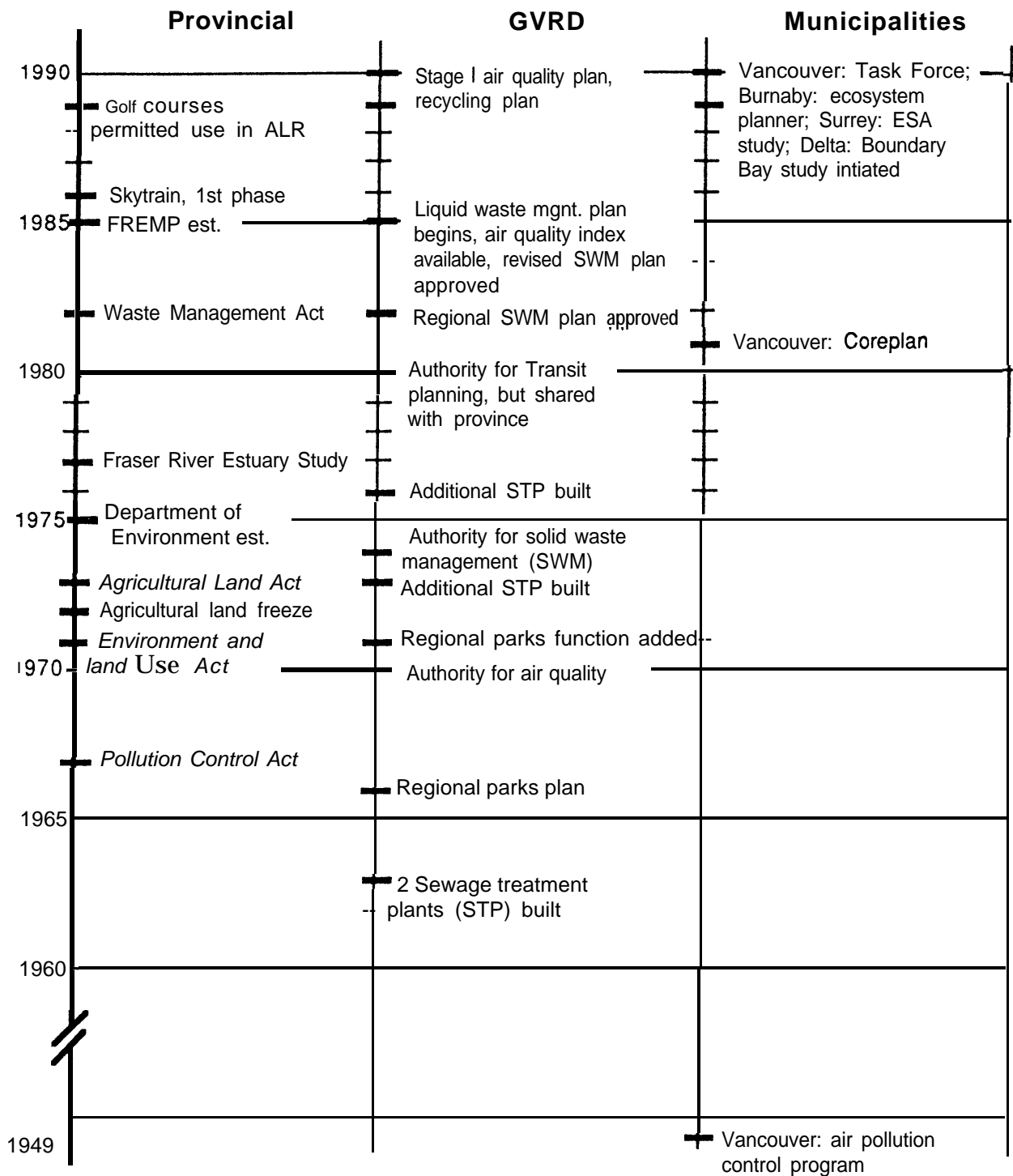


Figure 3. Major activities by provincial, regional, and local governments to manage cumulative effects in the Greater Vancouver region.

In the following section, the evaluation of regional planning experience of the Greater Vancouver region, in terms of the twelve principles for ideal planning identified in the previous chapter, is summarized. Then, based on this evaluation, the following questions are addressed in Chapter Four.

Has regional planning contributed to the management of cumulative effects in the Greater Vancouver region?

If so, how? If not, what are the constraints?

The question of whether regional planning has contributed to the management of cumulative effects in the Greater Vancouver region cannot be answered with a simple yes or no. While the region has taken some significant steps to manage cumulative effects, many problems remain.

### ***Successful Application of Regional Planning Principles***

In terms of the normative planning principles, regional planning has been most effective when authority for management is explicit, clearly defined, and not shared with other levels of government. This is the case for air quality management.

Regarding the three goals of planning, the region has been most successful in moving to reduce waste, although there is still much to be done.

Regional planning practice is fairly strong in the principles of being strategic, learning-based, as well as participatory and consultative. The vision of the Greater Vancouver region as “cities in a sea of green” has been consistent throughout the past four decades. Planning has tended towards strategic process plans rather than plans which rigidly define land use.

The process of developing regional development strategies has provided a public forum for identifying environmental concerns and putting these concerns on political agendas. The

political agendas which have emerged from regional planning processes have then provided a broad-based decision-making context for local and provincial governments. (The degree to which the regional agenda has been respected is a different matter, however).

Regional planning in the broadest application has also provided opportunities for getting information about environmental issues out to the public, thereby building political support for actions to deal with these issues. Lastly, applying a planning process to resolving issues of air, solid, and liquid waste management has encouraged people to think long-term and to start to consider alternatives other than capital-intensive projects.

### *Unsuccessful Application of Regional Planning Principles*

In practice, the region compares poorly in terms of the principles of governance and planning goals. Authority over land-based issues--the traditional domain of regional planning--is currently non-existent. The consequence is that the new regional strategy is very conceptual and fragmented to avoid interfering with municipal jurisdictions. The mismatch of boundaries between agencies as well as between administrative jurisdictions and ecological boundaries is also problematic.

Continuing with the principles associated with governance, the region has limited capacity to implement decisions in support of cumulative effects management. The system of governance has an inherent bias to develop land to generate taxes. This situation favours development over no development decisions. An inherent bias also exists towards capital projects, stemming from the regional mandate to provide services, which historically have been physical (e.g., sewers, water supply, hospital construction, etc.). Planners and bureaucrats have a poor record in breaking down programs into their component parts to determine costs; therefore, funding is not secured and plans are not implemented.



Accountability goes together with authority: some municipal governments are still not ready to commit to a regional government with authority over land use. As long as regional directors are not directly accountable to the public, this situation will likely remain.

The region has a poor record in setting goals related to environmental concerns. As demonstrated by the most recent regional strategy, the biophysical environment is still seen as window dressing for economic development, not an integral component of development. There continues to be a bias towards anthropocentric issues.

Although the practice of regional planning has demonstrated several of the principles which could support cumulative effects management, it is weak in some critical areas. The continued existence of cumulative effects indicates that management activities are not effective. There are many reasons for this. Planning in general has not been comprehensive but **compartmentalized** according to traditional administrative responsibilities. Engineers work on waste management problems, planners work on land based issues, and transportation engineers look at transportation problems. There is a lack of integration of issues which has only recently been **recognized**, and only in some areas (e.g., air quality and transportation).

The principles of being adaptive and systems-oriented are not well reflected in practice. The root causes of problems are rarely identified; people who could contribute to solutions have not been involved; tools for management are not well-defined; and few, if any, feedback mechanisms are in place to monitor the effectiveness of management actions. The systems approach of the Livable Region Strategy is not evident in the 1990 strategy. Lastly, while regional planning practice in the past exhibited the principles of being learning-based as well as participatory, current practice appears to treat public input in a more superficial manner.

### ***Summary of the Comparison***

Overall, in comparison with the normative principles of regional planning, the case study of the Greater Vancouver region rates as follows.

- fair, in terms of demonstrating the three principles of governance,
- poor, in terms of setting relevant planning goals, and
- while practice is good in some areas, notably strategic, learning-based, and participatory, it is weak in the remaining areas, especially in being adaptive and comprehensive. Table 4 provides a summary of this evaluation.

Table 4.  
Summarizing the comparison between the case study and the normative principles of regional planning.

Principle	Rating	Comments
Authority	$\pm$	<b>best</b> when authority is clear, worst when authority is split and concerns Land-based issues
Capacity	-	bias towards development to raise taxes; political and bureaucratic bias towards capital development projects
Accountability	-	some municipalities are still reluctant to commit to a regional government
Maintain ecological integrity	-	continue to see the environment as support for economic development
Minimize resource and energy throughput	-	energy is not mentioned in newest regional strategy
Minimize waste	+	are developing plans for solid & liquid wastes and air quality
Strategic	+	regional growth management plans are strategic
Comprehensive	-	integration of information between environment and economy is poor
Adaptive	-	regional monitoring is limited to economic activities; environmental consequences of economic strategy are not explicitly considered
Systems-oriented	$\pm$	Livable Region Strategy used systems approach to evaluate management strategies; this is missing in new regional strategy
Learning-based	$\pm$	tending to be less learning-based
Participatory and consultative	$\pm$	tending to be less participatory and more consultative

## **CHAPTER FOUR: CONCLUSIONS**

In this chapter, some conclusions are drawn, based on the previous evaluation, regarding how the current practice of regional planning in the Greater Vancouver region would change to better support the management of cumulative effects. Recommendations are also made about research implications from this study.

This report has explored the potential of regional planning to provide a context for cumulative effects assessment in urban-centred regions. A major premise underlying this exploration is that the practice of regional planning and cumulative effects assessment are both ready for change.

Regional planning in the Greater Vancouver region has always been concerned with protecting the quality of the natural environment. It is no wonder: the metropolitan area is situated in the midst of tremendous natural diversity in landscape, flora, and fauna. The planning emphasis has been on maintaining open space through regional and local park systems and delivering services to ‘clean-up’ the environment. Residents and politicians of the GVRD are beginning to recognize this is not enough. More aggressive management of environmental issues at a regional level is required.

Moving from a passive role of environmental management to actively managing the cumulative impacts of urbanization is a big step. The magnitude of this step was illustrated through comparing current practice with some normative planning principles. Taking this step would require substantial changes in current approaches to land use and environmental planning in the Greater Vancouver region. Governance, particularly related to the ability of regional governments to implement plans, would certainly need to be improved. Planning goals relevant to the management of cumulative effects would have to be defined for the region because none currently exist. The practice of regional planning compares more favourably with the normative principles but significant changes would still be necessary.

### *Constraints to Changing the Approach to Regional Planning*

Over the next decade, all levels of government will be concerned with how to best resolve environmental issues stemming from urban development in the Greater Vancouver region. Although a stronger regional voice in decision making could go a long way to resolving some issues, the authority for regional planning, especially in land-based matters, will be especially difficult to obtain. This aspect of governance is highly political and totally reliant on the will of local and provincial politicians to implement enabling legislation. The scientific rationale to support management of cumulative effects at a regional level does not yet have enough support to overcome the political, and especially economic, interests in maintaining the status quo.

Another institutional constraint to moving ahead with stronger regional governance is the ongoing contest for power between levels of government, be it in the form of federal-provincial, provincial-regional, or regional-local debates. The governance of resources will probably always exhibit a dynamic tension between these entities, especially in B.C. The challenge is to find new ways of forming linkages and working relationships between governments to overcome the tendency towards conflict and inertia.

A major constraint to supporting cumulative effects management is the lack of relevant goals for regional planning. Goals which link urban development with environmental issues are uncommon in practice. Unless efforts are made to explicitly address cumulative effects issues in the Greater Vancouver region, these issues could lead to ecological surprises like the recently discovered thinning of the ozone layer over southern Ontario. When environmental goals are mentioned they are still treated separately from economic issues. The concept of integrating environmental and economic issues is still poorly understood. For example, the loss of agricultural lands and wetlands continues because most “protection” measures do not address basic concerns which include the power of market forces to induce land conversion at urban fringes; the long time frame over which

agriculture is “productive” versus the short time frame for development decisions; and the role of social values with regards to farming and self-sufficiency.

Changing the practice of regional planning to support cumulative effects management is constrained by many factors. One is the lack of trained people to *work* on these problems. Regional planners know little about cumulative environmental effects and environmental assessment practitioners tend to avoid political and urban issues. These two groups of “experts” need to find ways of working together, and learning from each other, as they can each contribute only half the solution.

The lack of training is related to other constraints. Tools and techniques to deal with many of these issues are either not well known or simply not developed. Land use zoning and population projections--traditional tools of urban planning--are inappropriate for dealing with the complex, value-laden issues facing regions. Another aspect of planning where inappropriate approaches are used is in public participation processes. Currently, planners are relying on a public relations approach rather than building social learning into their programs.

With many cumulative effects issues, no one agency can take a comprehensive approach to defining and resolving the issue because their mandate is limited by fragmented jurisdictions. In the case of most natural resources, such as water and land suitable for agriculture, authority for management is shared among levels of government. Therefore any one level of government, and any one agency within that government, is limited in the range of the programs it can develop and implement. Of course intergovernmental cooperation is possible, as demonstrated by FREMP, but such arrangements take years to evolve. Jurisdiction over the urbanized area is also shared among many municipal governments who are reluctant to cooperate at the regional level.

Even if authority was given to one agency, problems would still emerge in the management of that resource because so many issues involve multiple media. For example, air pollution from the GVRD reduces the photosynthetic capability of crops in the Central Fraser Valley adversely affecting productivity and consequently reducing the income of farmers. Again, the constraint is the lack of means to work cooperatively to resolve complex problems.

### ***Reaching for the Ideal***

The current practice of regional planning, as illustrated by the case study, appears to be far removed from the ideal which would support the management of cumulative effects.

Currently, regional planning is directed much more at facilitating economic development than it is at resolving critical environmental issues, which are ultimately connected to global change.

Many of the problems and constraints that were identified are not limited to regional government. These are issues concerning all levels of government in countries with similar economic and political institutions.

The issues basically reduce to a version of the chicken and egg problem. Do we first improve our economic situation so we can afford to pay for the environmental protection measures which are necessary to improve our quality of life? Or do we improve the quality of the environment as a way of creating a better life for everyone? The concept of sustainable development, as defined by the Brundtland Commission, favours the first viewpoint (WCED 1987). Alternative definitions, such as that developed by Rees (1989), insist that the second viewpoint is the only rational course to take.

Is there a third way? Can scientific rationality help us cut through this quagmire of values and opinions? Unfortunately not entirely. Scientific analysis has been very useful in helping us understand the linkages between human activity and the quality of the natural

environment. It has also brought us the image of a beautiful planet floating in space, **reliant** on the conscious will of people to protect life as we know it. This is not a matter of science, it is a matter of faith and goodwill. The challenges are not simply finding better tools for analysis but also finding better ways of living together on this planet.

Regional planning can play a special role in this regard. Suspended between local action and global issues, regional governments can take strategic actions on important issues. As noted by Weaver (1978: 407), "...**regional** planning is above all an ethical-political question."

### **Implications for Further Research**

The primary direction for further research suggested by this report concerns the integration of cumulative effects assessment with regional planning. As noted by Sonntag et al. (1987: 27), there has been "little cross-fertilization of ideas or methods" between practitioners in planning and environmental assessment. This thesis has indicated that regional planning can, in theory, provide a supportive context for the management of cumulative effects in **urbanized** regions. More detailed studies can provide direction for how to bring the current practice of regional planning closer to the ideal.

A good place to start would be to initiate pilot projects with regional governments for monitoring programs to track cumulative effects. This type of project has a secondary benefit of bringing regional planners and practitioners of environmental assessment together in working relationships.

With a monitoring program in place, regional planners could then work with social scientists to develop strategies for consulting with the public about cumulative effects issues. Getting the public involved in resolving these issues is a key factor in developing sustainability. Curbside recycling programs and turning off lights is only the beginning of the effort required to improve environmental quality. The greater challenges will be



moving people out of their cars and developing local economic development strategies which are environmentally sustainable.

The emphasis on integrating regional planning and cumulative effects assessment leads to the question of developing appropriate methods for planning and assessment. The reference guide developed by Lane et al. (1988) is deficient in defining the context in which CEA would occur. Therefore, the suggested techniques of checklists, matrices, and overlays are quite limited in their application. When considered from a resource management or regional planning context, this list of techniques could be greatly expanded. Much could be learnt from case study descriptions of interactive GIS (geographic information systems) applications, intergovernmental programs such as FREMP, and extensive public consultation programs such as the Livable Region Strategy.

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## FOOTNOTES

- <sup>1</sup> The recent emergence of cumulative effects assessment as a research topic resulted from a growing awareness of the inadequacies of traditional environmental assessments. Most notably, project-specific assessments are unable to take account of the additive impacts of ongoing development in an area and tend to ignore the dynamic response of ecosystems to increasing perturbations (CEARC and USNRC 1986). Thus, research into cumulative effects assessment aims to develop techniques to overcome these and other shortcomings of environmental assessment.
- <sup>2</sup> I have left out 'introduction of species' under 'addition of materials' because it seems to be a **special case**.
- <sup>3</sup> Bioregions are often suggested as the logical unit of administration but this definition contains an ecological bias. The concept of region suggested by Mumford (1938) is more in keeping with the principles of sustainable development. In his view, the region is both a unit of geography and a cultural expression of will and purpose. It is a complex of geographic, economic, and cultural elements. The boundaries of such regions are graded and in a state of flux through linkages with other regions and the national state.
- <sup>4</sup> **Recognizing** that the choice of using regional planning is a policy decision itself at another level.
- <sup>5</sup> From *GVRD News*, **May/June** 1990. page 3.
- <sup>6</sup> The detailed work of Pawsey (1987) was a valuable reference in determining this chronology.

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