# A COMPARATIVE STUDY OF THE OPINIONS OF THE GENERAL PUBLIC AND AN ENVIRONMENTAL CITIZEN GROUP TOWARDS POLLUTION

by

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ABSTRACT

Three broad trends have been noted in the political struggles involved in the allocation of environmental resources, the limited effectiveness of the individual citizen, reliance on the opinions of experts, and the emergence, proliferation, and growth of citizen groups which attempt to influence decisions. Three sets of inter-related questions are raised from consideration of these trends:

1) What role should, and do opinions of experts play in government decision making? More specifically, is there an over-reliance on expert opinion at the expense of public opinion and the opinions expressed by citizen groups?

2) What role should, and does public opinion play in decisions supposedly taken in the public interest? More specifically, how can public opinion be determined and incorporated in these decisions?

3) What role should and do the opinions of citizen groups play in governmental decision making? More specifically, how representative of public opinion are the opinions of citizen groups?

These issues are dramatically illustrated in most, if not all, of the current controversies over the environmental quality aspects of development.

In the first chapter, the nature of these three sets of issues in environmental decision making are examined with particular reference to the increasing concern over environmental quality on the part of the public and environmental citizen groups. Attention is focussed on a fundamental problem associated with public participation in the decision

making process--the difficulty of assessing how representative of the general public environmental citizen groups are in terms of both their socio-economic composition and opinions. This examination is supported by a review of the previous literature on public opinion about pollution and public participation in tackling environmental problems. Gaps in existing knowledge are highlighted and the following hypotheses are developed which this study is designed to investigate.

1) Members of an environmental citizen group are of higher socio-economic status than the population from which they are drawn.

2) People of higher socio-economic status are
   i. more concerned about pollution
   ii. more knowledgeable about pollution, and
   iii. more willing to take action against it than people of lower socio-economic status.

3) Members of an environmental citizen group are
   i. more concerned about pollution
   ii. more knowledgeable about pollution, and
   iii. more willing to take action against it than the general public and members of high socio-economic groups.

These hypotheses are tested by comparing the results of a public opinion questionnaire conducted on a randomly chosen sample of the general public in New Westminster, B.C., and a sample drawn from the membership of the New Westminster branch of the Canadian Scientific Pollution and Environmental Control Society (SPEC).

A description of the questionnaire survey and the data processing

procedures are outlined and an evaluation of the accuracy of the data is made in the second chapter. The third chapter consists of a detailed analysis of the specific findings. The results support the three sets of hypotheses, though the environmental citizen group was found to be more representative of the general public both in terms of its socio-economic composition and opinions about pollution than was originally supposed. General conclusions and implications are drawn in the fourth and final chapter. Topics requiring further research and appropriate methods of investigating them are then suggested.

DEDICATED TO SPEC

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# CHAPTER I

# INTRODUCTION, BACKGROUND AND OBJECTIVES

## 1.1 Introduction

> "The limited effectiveness of the individual in present-day American politics and government cannot be denied. This is a result of sheer numbers, of geographic expanse and cultural variation; of the complexity of society and the concomitant specialization in its organizing and functioning. Reliance on the expert even in making political decisions seems to be an inevitable result of the complexities of modern life and of the expanding and pervasive influence of government...
>
> This is, of course, the context in which organized groups have proliferated and group activity increased." (Wengert 1955, p. 8)

Wengert draws attention to three broad trends in the political struggles involved in the development of natural resources; namely, the limited effectiveness of the individual citizen, reliance on the opinions of experts and the emergence, proliferation and growth of groups. He goes on to define groups as "individuals acting together for more or less agreed upon purposes" and notes the deep suspicions individual citizens often harbour against them. Wengert's remarks are indicative of three sets of interrelated issues in environmental decision-making confronting economically advanced, non-totalitarian societies today. These issues can be expressed as three sets of interrelated questions:

1) What role should and do the opinions of experts play in governmental decision making? More specifically, is there an over-reliance on expert opinion at the expense of public opinion and the opinions expressed by citizen groups?

2) What role should and does public opinion play in decisions

supposedly taken in the public interest? More specifically, how can public opinion be determined and incorporated in these decisions?

3) What role should and do the opinions of citizen groups play in governmental decision making? More specifically, how representative of public opinion are the opinions of citizen groups?

These issues are dramatically illustrated in most, if not all, of the current controversies over the environmental quality aspects of development such as the flooding of valleys for hydro-electric power, the extraction of oil from tundra areas and its transportation by pipeline and tankers. A report by the Committee on Water of the National Research Council of the National Academy of Science (1966) has outlined the underlying causes of the conflict situations manifest in environmental quality controversies. In the past, resources have been developed as soon as the potential direct economic benefits were shown to exceed the direct economic costs in order to further economic growth. Planning was considered to be largely a matter of determing the potential direct economic benefits to be derived from the resource development and designing a scheme which would minimize the direct economic costs of the development. Decision makers were thus heavily reliant on the deliberations of certain types of technical experts, particularly economists and engineers. Little or no consideration was given to indirect costs associated with the project; for example, the loss of a sports fishery on construction of a power dam or the despoilation of the landscape by strip-mining. This was due, in part, to the intangible nature of many of these indirect costs, they could not be readily expressed in financial terms and were thus excluded from consideration in the dominant measuring device, cost-benefit analysis (Turvey 1966, Knesse 1968). Environmental quality was considered primarily, if

not exclusively, as a health matter and was thus placed firmly in the hands of another group of technical expert, public health officials (Romain 1967).

Somewhat ironically, increasing affluence, education, leisure time and mobility, themselves the products of economic growth, have led to a growing appreciation of values which were impaired and foregone in the process of economic growth. There has been a rapid growth in the demand for high quality environments not only for outdoor recreation but also for daily living and an increasing interest in environmental problems (Sewell and Burton 1967). For example, people are now demanding that the pervasive social costs associated with water and air pollution which were formerly regarded as the price of progress be reduced or at least internalized. Moreover, these problems are no longer regarded solely in terms of their hazard to health--aesthetic considerations have become increasingly important (Barker 1968). It would appear that people are becoming more prepared to pay for intangible values such as having clean water to fish in, and clear views of cities not only by means of financial sacrifices, but also in terms of time, effort and restrictions on individual freedoms.

The most vocal demands for higher quality environments are being made by environmental citizen groups[1] which have increased dramatically in number and size in recent years. Members of these groups have been amongst those who have questioned both the general practice of reliance on the

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[1] Henceforth, the term 'environmental citizen group' is used to denote groups whose membership is drawn from the general public and whose primary interest is the quality of the environment. This term can be considered to be synonymous with the more commonly-used term 'anti-pollution group'.

expertise of a technical elite and their specific technical deliberations. The credibility of technical experts seems to have been at least partially eroded. The study by Maas (1958), for example, casts considerable doubts on the procedures of the U.S. Army Corps of Engineers in water resource development.

More fundamentally, a serious dilemma has arisen in environmental decision-making, changing public values, especially the growing appreciation of environmental quality seems to have outstripped the ability of decision-makers to take them into account. When aired in public, the dilemma frequently appears to be reduced to a battle between the values of the public protagonists on the one side and the facts of the experts on the other. Pressure has thus mounted for consultation with the public as well as experts before decisions are reached and positions become entrenched. It is at this point that the fundamental questions associated with the relative roles of the opinions of experts, the public and citizen groups in environmental decision-making are raised.

## 1.2 Public Participation

Questions concerning the relative roles of the opinions of experts, the public and citizen groups are closely linked to what is probably the most fundamental issue in democratic societies--public participation in governmental decision-making. Ideally, all people should actively participate in all the government decisions which affect them (Styles 1971). In practice, however, the majority are generally passive and are not consulted on specific decisions which are taken by a small elite who are broadly responsive to the majority and can be replaced at election times (Hampton 1970). Under these circumstances, public recognition and

and appreciation of a problem serves as a necessary prerequisite for governmental action (Long 1966). Conversely, Caldwell (1967) has suggested that rather than serving as a guide to governmental decision-makers, knowledge of public opinion indicates where changes in public opinion are needed in order to gain sufficient support for essential programs. Public opinion polls can thus serve not only as a barometer of the political climate surrounding issues, but may also supply guidelines for planning effective public information programs.

Demands for greater opportunities for public participation than voting in an election have arisen, however, and are particularly prevalent today. This trend is closely associated with general changes that have occurred in the political decision-making process; namely, the centralization of political power, the establishment of specialized and compartmentalized government agencies, and the reliance on technical experts. People are concerned that decision-makers who are immersed in a bureaucratic structure may become isolated from the public and substitute their own attitudes and beliefs[1] for public opinion. White (1966) has suggested that this can occur in three distinct ways:

> "First, there are personal attitudes of the people sharing in the decision. Second are their opinions as to what others prefer. Third are their opinions as to what others should prefer." (pp. 108-109)

Marshall (1960) in fact views this process primarily as a function of self-identification of the individual with his immediate compartmentalized bureaucratic environment.

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[1] A distinction is sometimes made between attitudes and belief (Schiff 1970) although they are frequently used interchangeably. For the purposes of this study, they will be used interchangeably. The term 'opinion' is taken to include attitudes and/or beliefs.

> "The institutionalized individual develops a personal interest in organizational success and so identifies with organizational goals that in making decisions he takes into account only a limited set of values." (p. 41)

Sewell (1970), for example, has shown that both engineers and public health officials describe environmental qulaity problems in technical terms such as coliform counts and B.O.D. levels and hardly consider parameters typically used by members of the general public to describe pollution, such as color, smell, or taste. Sewell's study illustrates well the closed nature of the system in which their opinions develop and are perpetuated, their lack of consultation with the general public, and resistance to major changes in their practices such as canvassing public opinion before taking decisions which ultimately affect the public.

Current demands for greater public participation reflect, in particular, a dissatisfaction with existing channels for public consultation. White (1969) suggests that there are three major ways in which state and federal agencies identify public preferences: the scheduled public hearing; the commission hearing; and informal contacts. The scheduled public hearing at all levels of government tends to consist of a last-minute stand of concerned citizens against plans proposed by people such as planners, economists, engineers, politicians, and industrial representatives who have made little or no effort to assess public preferences during the planning process. Commission hearings are often similar, providing an opportunity for comments by interested groups on a project drawn up by experts and based on numerous, frequently untested, assumptions about public preferences. White has indicated that the third major method of sounding public opinion, namely informal contacts, is by far the most influential in the planning process.

> "There can be little doubt that the sources of public preferences on which planners place the greatest reliance are the informal expressions coming from professional associates and friends, the personal judgements of what citizens want and will reject, the intimate assessment of. . .what will please the dollar-minded municipal council while placating the wildlife enthsiasts. . .this sounding of preference goes far toward shaping the assumptions as to what the public wants." (White 1969, p.80)

The danger of reliance on this major method of 'identifying' public preferences is manifest in the increasing opposition to plans drawn up by technical experts on the part of citizen groups. Pleas for improved channels of communication have arisen from both sides. Some citizen groups have asked to be consulted at an early stage in planning, while planners have also urged early consultation, partly in the hope of reducing subsequent conflict. White (1971) has captured well the relationship between shifting public attitudes, the growth of citizen groups and the dilemma of planners, and the need for radical improvements in public participation.

> "When the values change rapidly the method of preparing for water development lag behind cultural norms, the daily procedures are placed under severe strain, new institutions are demanded, and the technical folk who draw up plans become confused, defensive and insecure. This was the case during the late 1960's and early 1970's.
>
> Water development was caught up in profound shifts among articulate sectors of the citizenry in the value placed upon environmental quality and the value assigned to community participation in public choice. Within half a dozen years the old and comfortable formulations were challenged and conventional means of channeling interaction proved inadequate. By early 1971 it seemed likely that radically different devices would be required to respond to the new and dynamic ordering of the nation's priorities in resource management."

The report of the Committee on Water of the National Research Council of the National Academy of Sciences (1966) has advocated a two-phase approach

to public participation that could improve present procedures considerably.

> "In the first phase, the public would be presented with a number of technically feasible alternatives for meeting particular objectives and related costs and benefits, both tangible and intangible; for each alternative. In the second phase, the course of action would be decided in the public arena." (p. 24)

Although this is a time-consuming process, it may lead to more efficient, equitable and acceptable decisions, and is certainly more in keeping with the theory of democratic government. As this report concludes:

> "Public discussions of alternatives, properly conducted, would tend to eliminate the problems that arise when the public belatedly realizes the consequences of a decision already made. It also should provide a health amelioration of the institutional hardening and the practice of dealing with a restricted or local clientele that characterize some public agencies. The difficulties of reconciling diverse aims would still be immense, but whatever reconciliation is possible would be effected in a more rational and democratic framework than at present." (p. 15)

## 1.3 Selected Problems in Public Participation

Although the discovery of public opinion and preferences and their incorporation into decisions is a worthwhile goal, substantial difficulties are encountered in actually achieving it.

The discovery of public opinion is based on the assumption that individual opinions and preferences exist and are identifiable. Lowenthal (1961) has stressed, however, that "many personal preferences are inchoate, diffuse, and irrational and can hardly be formulated even to ourselves." (p.129) Individual opinions vary both as the issue itself changes and as other factors alter; for example, coverage by the news media. A decision may actually have to be implemented before some people are able

to formulate their opinions on it. A crisis may radically alter both individual and public reaction to an issue. Even if conditions remain relatively constant, variations in an individual's moods may influence his opinions. When faced with a device for measuring their opinions, such as a questionnaire, certain people may be reluctant to express themselves. Different social groups may experience various problems in responding to a questionnaire; for example, people with little education may not understand the questions that are being asked or be able to make complex choices.

Although large numbers of individual opinions may be identified and aggregated, they may not constitute a distinct entity, public opinion. There is no one public opinion, but many. It may be more appropriate to consider public opinion as consisting of the opinions of a number of social groups as Doob (1948) has done.

> "Public opinion refers to people's attitudes on an issue when they are members of the same social group." (p. 35)

Although membership in a specific social group may not determine an individual's attitude as rigidly as Doob suggests, this could be an important factor since attitudes are believed to reflect to some degree the social environment in which they were learned. For example, some variation in attitudes towards pollution might be expected to correspond with membership in different socio-economic groups due to varying direct experience and indirect experience of this problem by the groups in relation to other problems encountered by them. White (1971), in fact, surmises that

> "Even if the central city resident is aware of the contribution of phosphates to a distant lake, he may feel that rat control and employment problems render detergent ordinances obsolete." (p. 4)

Gaffney (1966) even suggests that environmental quality be more aptly termed "pollution control and aesthetic uplift from the viewpoint of the upper middle classes" (p. 101).

Thorny problems are encountered in trying to incorporate divergent views into decisions which can be implemented. Given a limited public budget, people of higher socio-economic status may want a large proportion to be spent on pollution control while people of lower socio-economic status may want a large proportion to be spent on public housing. Whose preference should be taken as a guide to policy? As Wildawsky (1967) points out,

> "What turns out to be crucial is not merely a knowledge of preferences but a set of rules for putting them together so that policy decisions emerge." (p. 1120)

Rather than viewing public opinion in terms of the opinion of a number of social groups, White (1971) considers that it consists of the viewpoints of interest groups, at least in the case of environmental intervention.

> "At any given time, the public opinion about an environmental intervention is the aggregate of whatever interest groups regard themselves as affected." (p. 4).

Groups that have a particular interest in a certain issue might, by definition at least, be expected to have a greater homogeneity of opinion about the issue than the public as a whole or any particular socio-economic group since an interest group is "a shared attitude group that makes certain claims upon others in society" (Truman 1951, p. 37). Some of the most basic problems in environmental decision-making arise in fact from the competing claims made upon governmental decision-makers by various interest groups ranging from lumber companies to environmental citizen

groups, all of whom purport to work in 'the public interest'.

Faced with the difficulties of measuring public opinion and a confusing array of conflicting viewpoints from various interest groups, decision-makers may well be tempted to take the relatively clearly delineated opinions and preferences of environmental citizen groups as a surrogate for public opinion. There is almost an air of inevitability attached to this process.

> "It is commonplace to say that the next decade will bring answers to this, that, or the other problem... The answers it brings well come from the free expression of public opinion, speaking largely through private conservation groups" (Patterson 1967, p. 1033).

At the same time, however, there has been a reaction against environmental citizen groups not only from those politicians, businessmen, and government agencies whom they oppose but also members of the public. A frequent claim is that environmental citizen groups are highly unrepresentative of the general public. Derogatory terms such as 'eco-freaks' and the following excerpts from a recent letter to a Vancouver newspaper epitomise this feeling.

> "In this glorious democracy, we, the people are governed by elected representatives who are responsible to the wishes of the majority. I, for one, am tired of those damn individuals and minority groups ... who attempt to force their insular opinions and their desires on the will of the majority" (Vancouver Sun 14.4.71).

How representative of the general public are these groups in terms of their socio-economic status and opinions on environmental issues? Are the members' attitudes and beliefs about various aspects of environmental quality substantially stronger than those of the general public? Are

they more knowledgeable? Are they more willing to make personal sacrifices for improvements in environmental quality? Very little research has been conducted into these questions in spite of the fact that the growth and proliferation of citizen groups interested in the quality of the environment has been so striking in recent years. The 1970 Directory of Natural History, Conservation and Environment Organizations in Canada (Mosquin and Myres, 1971) lists forty-five main ones in British Columbia alone, the largest being the Canadian Scientific Pollution and Environmental Control Society[1] with its membership of 10,000 and ten regional branches.

Research into political participation (Milbrath 1965) has indicated that there are positive relationships between the intensity of an individual's preferences, the quality of information he receives, his sense of efficacy and his propensity to participate in political action. Substantial empirical evidence is cited by Milbrath which suggests that political participation is positively correlated with class, income, occupational status and education, and that men are more likely to participate in politics than women. A recent report (Kerr 1971) for example indicates that college graduates are not only more likely to vote and participate in community activities than people who have not attended college, but are also more informed about community, national and world affairs and are more concerned about aesthetic and cultural values.

Studies of public attitudes and preferences towards outdoor recreation and the attitudes, preferences and socio-economic composition of conservation groups probably constitute the most substantial research into this general area of public opinion on environmental quality and organized

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[1]Henceforth the common name of this environmental citizen group, S.P.E.C., will be employed.

groups' opinions and composition. Substantial differences have been discovered in public reactions and the opinions of different 'user' groups on various facets of outdoor recreation (Robinowitz and Couglin 1970, Lucas 1964 and O'Riordan 1969). Relatively little research has been conducted into variations in reactions and socio-economic status, although Hendee et al (1968) found that 'wildernism', the viewpoint that nature is to be appreciated and not altered is most characteristics of persons of upper-middle class occupations and is most closely associated with high education levels and that members of conservation and outdoor clubs are more 'wilderness-purist' oriented and make more and longer visits to wilderness areas than other wilderness users. Subsequent research (Harry et al 1969) discovered that members of one large, outdoor recreation and conservation club in the Pacific Northwest were predominantly from the upper-middle class. There are thus indications that members of conservation clubs are far from being representative of the general public in terms of both their attitudes towards outdoor recreation, wilderness areas and conservation and their socio-economic status.

How far do these results hold true for the environmental citizen groups which have emerged with the recent wave of interest in environmental quality?

> "Private conservation organizations ... must in the next few years, make themselves so large, so representative of all the people and so well spoken that politics will come to mean the implementation of much that is now thought to be impractical." (Patterson 1967, p. 1027)

The basic aim of this study is to test for the representativeness of one particular environmental citizen group by comparing the socio-economic composition and opinions on pollution of a sample of members of the

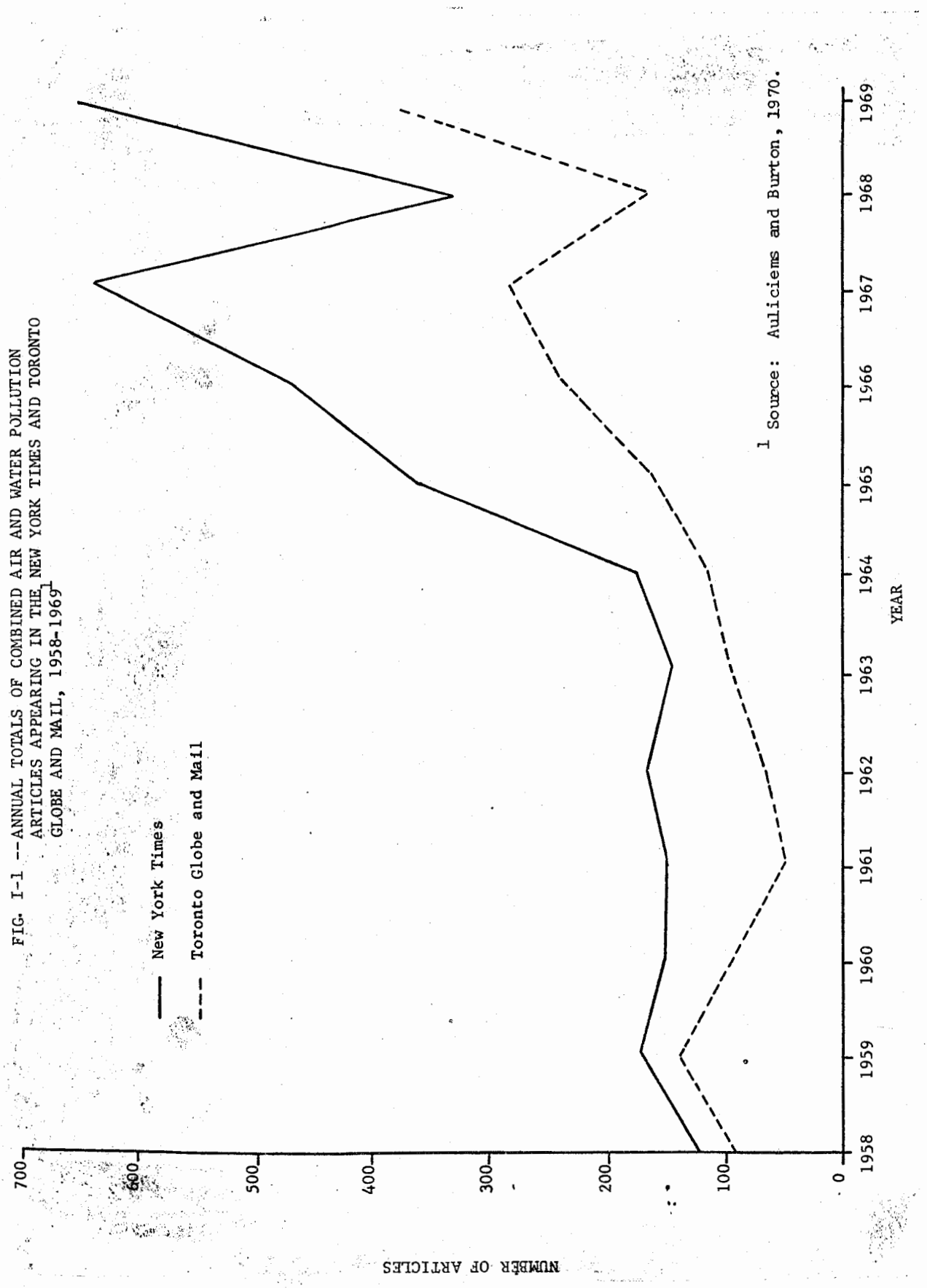


FIG. I-1 --ANNUAL TOTALS OF COMBINED AIR AND WATER POLLUTION ARTICLES APPEARING IN THE NEW YORK TIMES AND TORONTO GLOBE AND MAIL, 1958-1969[1]

[1] Source: Auliciems and Burton, 1970.

group to the socio-economic composition and opinions on pollution of a sample taken from the general public in the same area.

## 1.4 Public Opinion on Pollution

An appreciation of the nature of public opinion on pollution and the factors associated with variation in it is essential for both placing the present study into perspective in the context of previous research and understanding the implications of the results of this study.

Until relatively recently, the 'developed' countries appeared to be more concerned with the future availability of adequate supplies of traditional natural resources such as coal and timber than the scarcity of environmental resources such as clean water and air (Perloff 1969). Increases in public concern about water and air pollution seems to have been mainly elicited in the past by crises where the social side-effects have been tragically manifest; for example, during fatal air pollution episodes. More recently, however, there have been signs of a growing appreciation of environmental quality and an increased demand for high quality environments. Increasing interst in environmental problems is reflected in two main ways, changes in coverage of the topic by the news media and variations in the results of public opinion surveys over time.

An analysis of the annual totals of water and air pollution articles in two major North American newspapers between 1958 and 1969 (Fig. I-1) indicates a massive increase in coverage since 1964. These two newspapers are probably indicative of a similar trend in the media throughout North America. Thus, it appears that North Americans have become increasingly exposed to information about environmental problems through their daily newspapers, a tendency which has probably been closely paralleled by other

news media such as television.

Davies (1970) has agreed that exposure to information about pollution is a particularly important factor in the process of opinion formation about it.

> "People may have to be taught that air pollution is bad for their health. One may even have to be taught to consider air pollution aesthetically unattractive. Thus, unlike problems such as unemployment or crime or poor housing, perception of air pollution as a problem is heavily dependent upon exposure to channels of information." (p.80)

One study of reactions to air pollution in a pulp-mill town (Medalia and Finkner 1965) suggested in fact that concern over air pollution actually increased as air pollution levels decreased which indicates that concern is not simply a function of direct exposure to pollution. It is extremely important to distinguish between the roles of direct sensory experience or perception of pollution and indirect experience of pollution (e.g. exposure to news media coverage) in the formation of attitudes, beliefs and opinions about it. It seems highly unlikely that the rise of concern about pollution could be attributed solely to increases in actual pollution levels. The rapid growth in coverage of the topic by the media appears to be closely associated with this rise in concern and may be a dominant variable in explaining it.

The second method of tracing growing concern over environmental quality, the analysis of the results of public opinion surveys on the topic over time, are more problematic. Firstly, the surveys were conducted in different areas experiencing widely divergent pollution conditions so that it is difficult to determine whether any differences found in the results reflect local conditions or changes over time. It is conceivable, for example, that

FIG. I-2--THE RELATIVE IMPORTANCE OF POLLUTION AS A COMMUNITY ISSUE OVER TIME

| YEAR | LOCATION | POLLUTION ISSUE | PROBLEMS RANKED BEFORE POLLUTION |
|---|---|---|---|
| 1959 | Buffalo[1] | Air Pollution | 1. Unemployment<br>2. Delinquency<br>3. Car Accidents<br>4. Alcoholism |
| 1962 | Buffalo[1] | Air Pollution | 1. Unemployment<br>2. Delinquency<br>3. Communicable Diseases |
| 1963 | St. Louis[2] | Air Pollution | 1. Delinquency<br>2. Unemployment<br>3. Lack of Recreaction Programmes |
| 1967 | Syracuse[3] | Water Pollution | Urban: 1. Education; 2. Police Protection; 3. Unemployment; 4. Housing<br>Suburban: 1. Education; 2. Police Protection |
| 1967 | Toronto[4] | Air Pollution (Water Pollution) | Air Pollution: None<br>Water Pollution: 1. Air Pollution; 2. Traffic Congestion; 3. Delinquency; 4. Noise |
| 1969 | Toronto[4] | Pollution Control | None |
| 1970 | Vancouver[5] | Pollution, Environmental Quality | None |

[1]Degroot and Samuels 1962
[2]Schusky 1966
[3]Fredericksen and Magnas 1968
[4]Auliciems and Burton 1970
[5]Minghi et al 1971

greater concern might be expressed in one city in 1965 than was expressed in another city five years earlier, primarily because pollution was more marked in the former city at the later date. It would be difficult to take account of variations in pollution levels in a survey of one city over time, let alone to realistically consider this factor in a comparison of the results at different points in space and time. Secondly, the questions were phrased in different ways and asked to different groups of people under varying conditions. For example, respondents in a small industrial town might be asked to volunteer which community problems concerned them most in a survey of opinion on a variety of community issues, alternatively city and suburban residents elsewhere might be requested to rank water pollution amongst a list of community issues in a survey which was obviously designed to discover opinions on pollution. Bearing these two main difficulties in mind, the results of previous surveys are reviewed chronologically in the hope of not only identifying any trends but also factors commonly associated with various facets of opinion on pollution.

### 1.4.1 The relative importance of pollution as a community issue

A common method used to determine the relative importance of pollution as a community issue is to ask respondents to rank pollution amongst nine or ten other community problems. Fig. I-2 portrays responses to this type of question from seven surveys.

Although the method of soliciting responses was not identical for each survey; for example, the study conducted in Toronto in 1969 was based on reactions to nine issues in a telephone interview (Auliciems and Burton, 1970), a general trend can be seen. Between 1959 and 1967 water and air

pollution appear to be only of middle to upper-middle level of importance compared to other problems in a number of urban areas. Air pollution and pollution control were apparently the number one public issues, however, in Toronto in 1967 and 1970 respectively. Environmental quality was found to be the most prominent issue in the Vancouver civic election of 1970 (Minghi, Swain and Rumley 1971). The result is particularly striking because the study was not designed to probe public opinion on pollution, so bias in this respect was minimized, and respondents volunteered the information in replying to an open question[1] rather than being presented with a list of issues that might have influenced their responses. The result is particularly relevent to the present study since it is a recent finding from an area near New Westminster, the study area. Since responses were obtained from mailed questionnaires which are particularly prone to bias, the results should be viewed with caution, however.

## 14.2 Personal concern about pollution

Virtually all of the previous public opinion polls on pollution have contained some measure of the degree of seriousness attached to it by individuals while some studies have measured direct personal annoyance with the effects of pollution or a more general feeling of being 'bothered' by it. Although the differences in these terms makes comparison over time more difficult than in the previous case of the relative importance of pollution as a community issue and thus makes general conclusions more tentative, it seems as if there is a similar trend in the results.

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[1] Oral communication with D. Rumley, May 20, 1971 indicated that the open question was "What would you say were the major issues in this campaign?"

FIG. I-3--PERSONAL OPINIONS ON THE SERIOUSNESS OF POLLUTION OVER TIME

| YEAR | PLACE | PROBLEM | DESCRIPTION OF PROBLEM | PERCENTAGE OF RESPONDENTS |
|---|---|---|---|---|
| 1956 | California [1] | Air Pollution | "Bothered by" | 45 California<br>75 Los Angeles |
| 1959 | Nashville [2] | Air Pollution | "Bothered by" | 23 |
| 1959 | Buffalo [3] | Air Pollution | "Very serious + serious" | 44 |
| 1962 | Buffalo [3] | Air Pollution | "Very serious + serious" | 46 |
| 1963 | St. Louis [4] | Air Pollution | | St. Louis County / St. Louis City / Madison County / St. Clair County |
| | | | "Bothered somewhat" | 30 / 39 / 38 / 48.5 |
| | | | "Bothered quite a bit" | 5.5 / 9 / 12 / 14 |
| 1965 | Clarkston [5] Washington | Air Pollution | Undisturbed<br>Somewhat concerned<br>Moderately concerned<br>Very concerned | 20<br>12<br>18<br>50 |
| 1967 | Syracruse [6] | Water Pollution | "Pollution is a problem which does not affect me at all"<br>Strongly agree<br>Agree<br>Disagree<br>Strongly Disagree<br>Don't know | <br>3<br>10<br>52<br>28<br>7 |
| 1967 | Toronto 7 | Air Pollution (Water Pollution) | | Toronto A.P.* / Toronto W.P.** / Neighbourhood A.P. / Neighbourhood W.P. |
| | | | Moderately unsatisfactory problem | 42.5 / 12.5 / - / - |
| | | | Very unsatisfactory problem | 46.0 / 27.0 / - / - |
| | | | Moderately and very unsatisfactory problem | 88.5 / 39.5 / 60 / 18.5 |
| 1969 | U.S.A. National [8] | Pollution, Environmental Quality | "Somewhat and deeply concerned" | 86 |

[1] Breslow 1962
[2] Smith et al 1964
[3] Degroot and Samuels 1962
[4] Schusky 1966
[5] Modalia and Finkner 1965
[6] Fredericksen and Magnas 1968
[7] Auliciems and Burton 1970
[8] Cahn 1969

*Air Pollution **Water Pollution

Except for the results from the pulp mill town of Clarkston, Washington (Medalia and Finkner 1965), none of the surveys prior to 1967 found that a substantial majority expressed great concern about pollution problems. For example, only 23% of the sample from Nashville, Tennessee (Smith et al, 1964) said that they were bothered by air pollution when asked in 1959 whereas 88.5% of the respondents in a Toronto survey in 1967 indicated that air pollution was a moderately or very unsatisfactory problem in the city. (Fig. I-3)

Although there are dangers from generalizing from the results of these studies, they do seem to support evidence from newspaper coverage that there has been a substantial increase in public interest and concern over environmental quality.

### 1.4.3 Opinions on pollution and socio-economic status

Most of the surveys have indicated that public opinion on pollution at any one time and place is seldom unanimous, a range of opinion being normally found. As noted previously, variations in opinion on public issues may be closely associated with the socio-economic status of the respondents. A few of the previous studies have investigated this topic. Frederickson and Magnas (1968) discovered that suburban residents attached greater importance to water pollution than housing and employment compared to urban residents, which probably reflects in part the relative security of the former in housing and employment. This lends some support to the idea that environmental quality is an issue for the middle class in particular. This question was examined further by statistical analysis of the selection of water pollution as a priority in relation to the respondent's age, education and income levels. Only one statistically significant

relationship was found, however. People from higher income households tended to regard water pollution as a more important community problem than people from lower income households at the 0.05 confidence level. Younger respondents and those belonging to higher education and income groups were far more likely to feel directly affected by water pollution however, the differences between their responses and those of the older and lower education and income groups being statistically significant at the 0.001 level. This was attributed in part at least to the greater use made of local lakes by the younger, wealthier and more highly educated citizens. Medalia and Finkner (1965) discovered that respondents in the professional-managerial category were more concerned about the air pollution problem in Clarkston, Washington than respondents from other occupational groups. In addition, they found that the 50% of the respondents who were classified as being "most concerned" about air pollution were also more concerned about water pollution than the remaining 50% of the respondents and focussed more sharply on the pulp mill as the most important of several sources of disturbance. Thus there are indications from one study that socio-economic status, concern over pollution and the ability to pin-point causes of concern are positively correlated.

1.4.4 Opinions on personal responsibility and willingness to take action.

Although data on public attitudes towards responsibility and willingness to take action over pollution and their variation with socio-economic status are too scanty to allow trends over time to be traced, previous results on these topics are examined because these topics form an important component of the present study. Schusky (1966) found that most people said they would support government action through small tax increases and

that a substantial majority would be amenable to an increase in the cost of living created by industrial pollution control. The amount of the proposed tax increase ($1.00) was unrealistically low, however. Most people stated that they had never felt like complaining about pollution problems, although those of moderate educational levels wished to complain about air pollution to a greater extent than those of lower or higher educational standing. A similar study in Buffalo, New York (de Groot and Samuels 1962) found that very few respondents had ever complained to a government agency in spite of the fact that 43% of them thought it was a serious problem. Even in Clarkston (Medalia and Finkner 1965) where the pulp mill provided such an obvious source of pollution, only 10% of the respondents said that they had considered complaining and only 2% had actually done so. Thus there appears to be a discrepancy both between expressions of concern by people about pollution and their willingness to complain about it, and between their considering making a complaint and actually making one.

A recent study of the attitudes and coping strategies of high school students in Detroit (Swan 1970) is perhaps the only one to have examined attitudes towards responsibility and willingness to take action in any depth or detail. Swan was interested in the important relationships between:

a) visual awareness, knowledge and concern about air pollution
b) action taken to a specific air pollution problem in a gaming situation
c) race and socio-economic status, and
d) participation in community affairs.

He discovered that air pollution control was given the third highest priority in proposals for a community program, immediately after increasing

opportunities and improving police-community relations. Water pollution ranked only eighth. Visual awareness alone did not appear to motivate concern for air pollution, although subjects of lower socio-economic status were less aware of air pollution visually in a photo-slide test. Amongst those students who were most concerned about pollution and exhibited "explorative" tendencies, the black high school students seemed more interested and involved in the community than the white students. In spite of this fact, the white students exhibited far more interest in solving the air pollution problem in the gaming situation. Swan tentatively concluded that the white students were less involved in the community because there were no white or bi-racial organizations, and because the more community-orientated white students may have left the neighbourhood. The black students were more interested in tackling racial and related problems which affected them more directly. Swan's study illustrates well the complex nature of responses to environmental pollution.

## 1.5 Aim of the Study

Examination of the coverage of environmental problems by the news media and previous studies of public reaction to these problems has indicated an increase in public interest, recognition, and appreciation of environmental quality particularly during the last few years. While there is now a fairly substantial body of information about public opinion on various aspects of pollution, gaps still exist.

1) Although the relative importance of water pollution has been mentioned in passing in two air pollution studies (Auliciems and Burton 1970, Swan 1970), most research has dealt exclusively with either water or air pollution, no studies have examined their relative importance to

the general public and constituent socio-economic groups in any depth or detail.

2) Several studies have shown that people of higher socio-economic status tend to be more concerned about environmental problems. In general these results have not been conclusive, the results with regard to educational status being particularly flimsy.

3) Although several studies have considered personal responsibility and willingness to take action this question requires further examination.

4) Although the proliferation and growth of environmental citizen groups has been so marked in recent years and they have had an increasing impact on environmental decision-making, very little research has been conducted into them. Few, if any, studies have investigated the important issue of how representative of the general public are members of these groups in terms of both their socio-economic status and opinion on environmental pollution. If concern over pollution and willingness to do something about it are found to be positively correlated with socio-economic and if members of environmental citizen groups are of higher socio-economic status than the public as a whole, as has been suggested, how far can any differences in opinion between them be attributed simply to the socio-economic composition of the environmental citizen group?

The aim of this study is to fill in these information gaps by means of a questionnaire survey of the general public and members of an environmental action group from the same area, New Westminster, B. C. Specifically the study is designed to explore the nature and degree of divergence between the opinions of the general public, constituent education and income groups, and members of an environmental action group towards various aspects of both

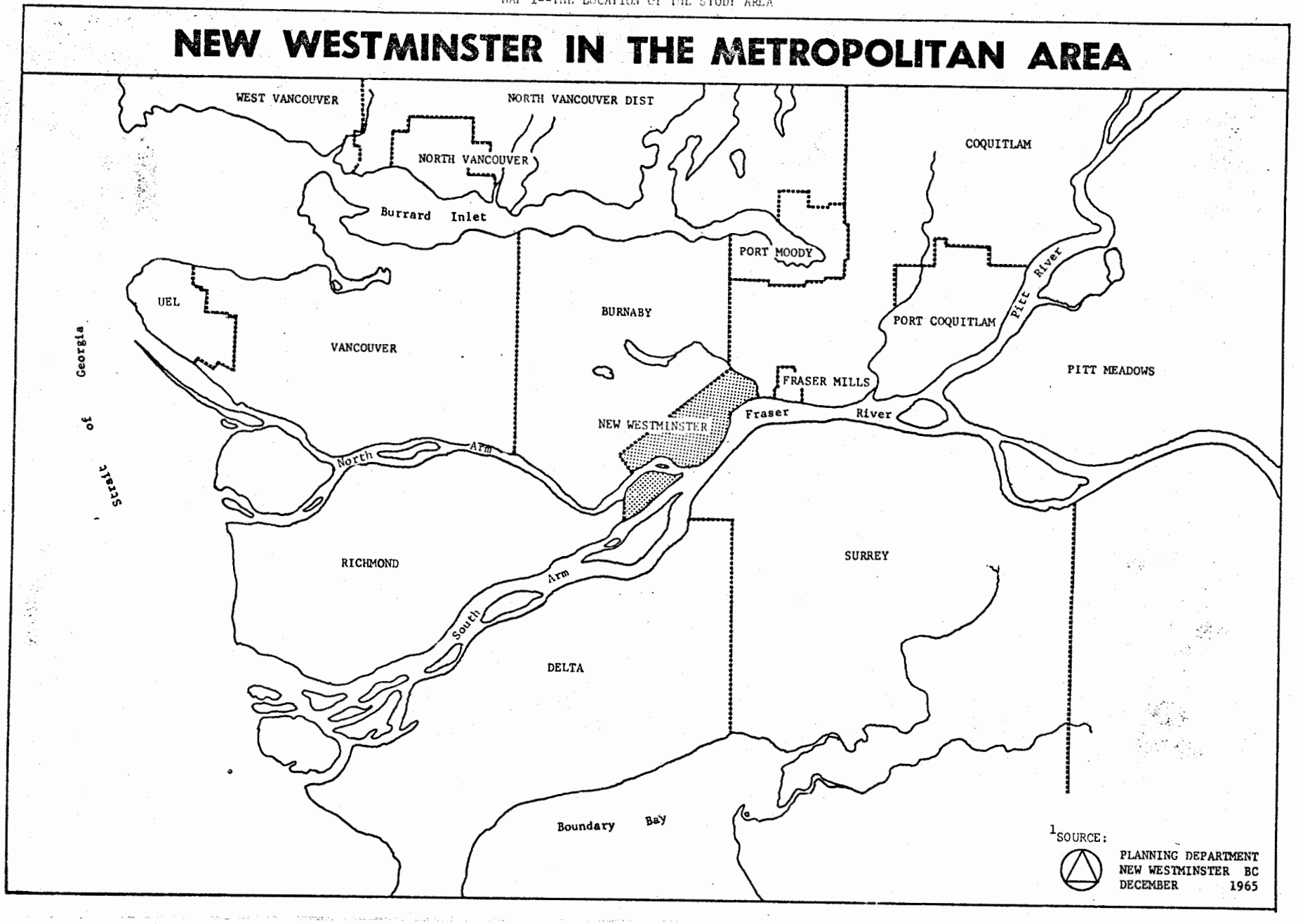
water and air pollution. The following hypotheses are investigated:

1) Members of an environmental citizen group are of higher socio-economic status than the population from which they are drawn.

2) People of higher socio-economic status are
   i. more concerned about pollution
   ii. more knowledgeable about pollution
   iii. more willing to take action against it than people of lower socio-economic status.

3) Members of an environmental citizen group are
   i. more concerned about pollution
   ii. more knowledgeable about pollution and
   iii. more willing to take action against it than the general public and members of high socio-economic groups.

MAP 1--THE LOCATION OF THE STUDY AREA[1]



# CHAPTER II
# THE STUDY AREA AND RESEARCH DESIGN

## 2.1 Pollution Levels and Publicity on Pollution in the Study Area

The study area chosen was the City of New Westminster which is part of the Vancouver metropolitan area, B. C. (Map 1). It is a major industrial area concentrating on food processing, forest products and chemical industries, acting as an important distributing, shopping, financial and business centre for much of the Lower Fraser Valley[1], and containing a population of 42,800[2] from a wide variety of socio-economic backgrounds[1]. Only very limited quantitative measurements of water and air pollution have been taken and are available for New Westminster. A general assessment of local air and water quality can be made, however, on the basis of reports on the pollution of the Fraser River (Goldie 1967) and air pollution in B. C. (B. C. Research Council 1970).

The water bodies bordering New Westminster are the main stream of the Fraser River which divides into a north and south arm (Map 1) and the Brunette River, a tributary of the Fraser River, which forms the eastern boundary of the city. After a detailed analysis of coliform count records, the Goldie Report (p. 51, 1967) concluded that "though not proven as to actual hazard, ... bacteriological conditions are today undesirably high in the lower River reaches." Although considerable care should be taken in drawing conclusions from a limited number of measurements, it is apparent that coliform counts for sample points in New Westminster noted in the Goldie Report were frequently in excess of the bathing standard

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[1] Chaster 1965.
[2] City of New Westminster Planning Department, 1970.

of 1,000 (M.P.N.)[1] per 100 ml and sometimes in excess of the figure of 2,400 coliforms per 100 ml which usually denotes visual evidence of raw sewage. Information on the industrial contribution to water pollution in this area was more limited than information on domestic sources. Although the report stated that riverside industries might easily surpass future estimated municipal effluent discharges in quantity, little data was presented on the present quality of their effluent.

The Fraser River was rated in the second highest category on a seven-point scale of Biochemical Oxygen Demand (B.O.D.) ranging from below 1 ppm to over 20 ppm five day B.O.D. of the river at 20°C.

> "The general statement may be made that the mainstream of the Fraser River is regarded as a 'clean stream' in terms of B.O.D. content" (Goldie 1967, p. 49).

No samples taken from the Fraser River approached 4 ppm, the point when nuisance (sic) problems may arise. In addition, the river had a dissolved oxygen well above the 5 ppm necessary for normal (sic) activities for fish, averaging 9 ppm in summer and rising to 13 ppm in winter. Similarly, the nitrate level of 0.5 ppm was considered to be acceptable for fish life. No sewage treatment is provided at present in New Westminster. The Goldie Report concluded by recommending primary sewage treatment for the lower Fraser River with secondary treatment on the North arm. Treatment facilities should be in operation by 1975.

There are two air pollution monitoring stations[2] in New Westminster

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[1] M.P.N. - most probable number.

[2] Information on the two monitoring stations was obtained in an interview with N. Clarkson, Health Inspector with the Public Health Department of New Westminster, July 1971.

which measure ambient air quality[1]. Micro-particles are monitored continuously by a smoke spot sampler while dustfall is monitored monthly. Intermediate-sized particulate matter is measured on 50 randomly chosen days per year as part of a national survey. Sulphur oxides are also monitored. Unfortunately, data obtained from these two monitoring stations will not be available until early in 1972 when they will form part of an extensive report[2]. Some indication of the relative magnitude of the air pollution problem in New Westminster can be obtained, however, from information on the air pollution situation in the Greater Vancouver Regional District (G.V.R.D.) of which the City of New Westminster is a member, and experience of local conditions.

The G.V.R.D. is by far the most populous of the twenty-nine regional districts of British Columbia (containing over a million of the province's population of two million), and formed one of the main study areas in a recent assessment of air quality in British Columbia (B. C. Research Council 1970). The report concluded that:

> "The Vancouver metropolitan area, because of population, climatology and geography, exhibits an air pollution problem similar to that of San Francisco and Los Angeles but not nearly so severe or continuous throughout the year" (p. vii).

Pollution sources were divided into two classes; those directly related to population density, for example motor vehicles, and those not directly related to population, such as manufacturing. The notable sources within these classes will be outlined briefly.

A previous report by the B. C. Research Council (1968) concluded that photochemical smog was far from being a serious problem in the

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[1]Ambient air quality refers to the general quality of the air in an area. Measurements are made away from specific major sources of air pollution e.g.smoke stacks, so that a general picture, unbiased by marked local variations can be obtained.

[2]Oral communication with A. Lynch, B. C. Research Council, July 1971.

Vancouver area, ambient air concentrations of hydrocarbons, oxidants and nitrogen oxides, the major product of automobile pollution, being well below those encountered in many other large North American cities. Inversions occur, however, especially in the winter months. During these periods, the view of neighbouring mountains is reduced considerably and a layer of smog is apparent from the mountains.

Space heating contributes more of certain other pollutants such as sulphur oxides than vehicles do in British Columbia. The emission rates of pollutants from domestic heating in the G. V. R. D. are lower than in comparable cities on the eastern seaboard, however, due to the milder west coast winters. The substitution of natural gas and oil for coal and wood furnaces has, in fact, led to a decline in dustfall figures for the City of Vancouver from 27.5 tons per square mile per month to 12.5 tons per square mile per month. In many urban areas, electric power generation from the combustion of fossil fuels can contribute up to 15% of the total pollutant levels in the area. The contribution of this source in the case of the Vancouver area is lower due to heavy reliance on hydroelectric power[1].

Although industrial activities might be expected to constitute an important source of air pollution in a metropolitan area of over one million people, quantitative measurements of their contribution are extremely limited. Perhaps the most noticeable sources of air pollution are provided by the Forest industry. Beehive burners were singled out in the report as being the chief source of air pollution in the lumber and plywood industry. Smoke from these burners can be seen in New

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[1]Ninety percent of the power in British Columbia is generated by hydroelectric power. Much of the thermal power of the province is, however, concentrated in the Vancouver area.

Westminster and across the Fraser River in the Municipality of Surrey. On a seasonal basis, slashburning after logging operations represents a highly visible form of air pollution.

In spite of the limitations imposed by lack of data, certain tentative general statements can be made about air quality in the Vancouver metropolitan area and study area. Although the Vancouver area experiences smog episodes, they are not as serious or as prolonged as in more intensely urban areas, such as San Francisco and Los Angeles with their more frequent inversion conditions, or in comparable eastern North American cities where electric power generation is primarily from fossil fuels and air pollution from domestic heating in winter is greater. Air pollution in the Lower Mainland, however, is high relative to most of the other areas of British Columbia. For example, automotive pollution in 27 of the 29 regional districts is less than 6% of the levels found in the G.V.R.D. In addition to sharing and contributing to Lower Mainland smog, New Westminster as an important industrial area contains some easily identifiable sources of air pollution. Its industrial activities and position in the Lower Fraser Valley results in air pollution levels that are probably higher than for many other areas in the Lower Mainland of British Columbia.

None of the previous studies on water and air pollution have shown simple relationships between actual levels of pollution and opinions towards it. Direct experience or perception of pollution may not be as important as indirect experience of it, through the news media for example. It is thus equally, if not more, important to provide some assessment of publicity about pollution at the time the study was conducted, as it is to give an assessment of the actual pollution situation in the study area.

Auliciems and Burton (1970) have traced the increase in newspaper coverage of water and air pollution between 1958 and 1969 and noted the dramatic upsurge since 1964, while Lefolii (1970) writing at the time the public questionnaire was implemented, stated that pollution was the number one issue in the media. The Sun and Province, the main newspapers for British Columbia, were certainly not atypical of this situation, providing extensive coverage of environmental problems prior to the opinion surveys. National, provincial and local pollution issues were also heavily featured in the local daily newspaper, the Columbian, which has a circulation of 35,000, 11,000 of which are taken in New Westminster.[1] Pollution problems in the New Westminster area and surrounding municipalities were mentioned every other day on average during the two months prior to the implementation of the public questionnaire. Of the 280 inches of print on local pollution problems during this period, approximately one-half was given to water pollution, one-quarter to air pollution, and one-quarter to general pollution problems. The material on air pollution was particularly concerned with efforts to restrict emissions from beehive burners in New Westminster and obstacles to a similar program on the south side of the river in Surrey. The material on water pollution included a one-page article on the Fraser River with particular reference to sewage disposal which was published one month before the questionnaire was conducted. (Wolf 1970) Having stressed the inevitability of increasing pollution of the Fraser River with further population and industrial growth, the writer went on to present information from two points of view, engineering and ecological. The engineering viewpoint was presented as the provision of primary treatment largely in response to public pressure

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[1]Oral communication with the editor of The Columbian newspaper, June 1971.

based on aesthetic considerations; the ecological viewpoint as a concern for the effects of untreated and primary treated sewage on aquatic life in particular. Although the article made no firm stand with regard to the discharge of untreated or primary treated sewage, it did pose doubts about the possible effects of the emission of large volumes of chlorinated wastes from a primary plant in one location. Thus this article, in particular, drew attention to local water pollution and helped to publicize the importance of domestic, as well as industrial, wastes as pollutants. In addition to these news items and articles, 114 inches of editorials on pollution were noted, two-thirds of which were concerned with water pollution. Thus there was quite a strong bias in the local newspaper towards discussion of water rather than air pollution.

## 2.2 The Environmental Citizen Group - S.P.E.C.

Just as striking as the upsurge in publicity on environmental pollution has been the even more recent growth in the numbers of environmental citizen groups and their memberships. SPEC originated in January 1969 amongst a small group of concerned citizens in Vancouver, B. C. A year later, six constituent sub-groups met to amend the general constitution to allow for the formation of branches. During the ensuing eight months, the membership grew dramatically and branches were established throughout British Columbia. In November 1970 twenty-four branches gathered for a Constitutional Convention which resulted in the formal establishment of a Provincial Federation Council consisting of a maximum of twenty-one individuals elected from the branches of the fourteen SPEC regions in British Columbia and a Vancouver-based Executive Committee that deals directly with the day-to-day execution of Federation Policy (Perspective,

November 1970)[1].

SPEC, with its present membership of 10,000 (1970) is now the largest single environmental citizen group in Canada. Its activities include public education, the presentation of briefs at public hearings on environmental issues, and the planning and administration of student work projects funded by industry and the Federal Government. The New Westminster branch was formed in November 1970 and consists of 110 members all of whom are residents of the City of New Westminster. It holds monthly meetings with an average attendance of approximately twenty people, most of whom are members, and has gained some local recognition primarily through a paper and bottle pick-up and re-cycling program conducted by a few of its members. The study area thus provided a readily accessible environmental citizen group as well as a population from a wide variety of socio-economic backgrounds having some direct and indirect experience of water and air pollution.

## 2.3 Research Design

The validity of the results of questionnaire studies are heavily dependent on the research design, especially the formulation of the questionnaire and the sampling and interview techniques associated with its implementation. Some of the limitations of previous studies can be attributed directly to the procedures used to obtain the data. This point is well illustrated in the following examples: Although great care was taken in the random selection of 2,835 households comprising 9,527 individuals in the study of public reaction to air pollution in Nashville,

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[1]Perspective is a monthly newsletter sent to all SPEC members.

Tennessee (Smith et al 1964), ninety-two percent of the respondents were women. This was partly due to the fact that most of the interviews were conducted in the daytime when only housewives were at home. In view of the heavy emphasis of the study on specific household soiling effects of air pollution, some doubts are cast on the validity of generalizations made about general public concern in Nashville from the data. Similarly substantial differences in the results of studies of public reaction to air pollution in Toronto in 1967 and 1969 were attributed not so much to the two-year time lapse between the studies, but to differences in the procedures used to gather the data.[1] In view of the problematic nature of the questionnaire approach to social science research, the methods employed and the validity of the results of this study are assessed in some detail.

### 2.3.1 Questionnaire Design

The design of a questionnaire should ideally facilitate the expression, collection and analysis of information without without itself influencing the responses. A copy of the questionnaire used in this study is provided (Appendix A) which may be consulted with reference to the following comments concerning its design features.

In view of the relatively large sample size needed to make valid inferences about the opinions of a population of 42,000, a highly structured questionnaire was designed which could be answered without the assistance of an interviewer. Although this format tends to constrain respondent's replies, or may suggest lines of thought which are not

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[1] The samples were selected differently and the interviewing situation and the format for asking questions varied considerably, a written questionnaire being used in 1967 and telephone interviews in 1969 (Auliciems and Burton 1970).

usually considered by the respondent, it does reduce some of the sources of bias inherent in face-to-face interview situations. For example, the tendency for respondents to express opinions which they feel they should hold rather than the ones they do hold may be more marked when the interviewer is present while the questionnaire is being completed then when the "interviewer" simply collects the completed questionnaire. The questionnaire administered to the public sample was designed to take approximately twenty minutes to complete, a reasonable attention span for the average person. The questionnaire answered by the SPEC respondents was identical, except for the addition of certain questions at the end (Appendix A-I).

The wording and order of questions is an important consideration in questionnaire design. The actual wording is "neutral" in the sense that strongly emotive words are avoided wherever possible. For example, the word "polluted" obviously has unfavourable connotations, and is replaced by phrases such as "fairly low quality" water and air (Q.5, Q.13). Similarly, the ordering of parts of questions as well as complete questions minimizes suggestion. For example, in a question designed to discover the importance of pollution as a local community issue (Q.1), the various types of pollution were interspersed with the other issues rather than presented as a block. In addition, questions concerning water pollution were generally separated from those concerned with air pollution in case respondents gave identical replies to similar questions for the simple reason that they wished to complete the questionnaire rapidly.

A sample of forty[1] New Westminster residents were chosen to pretest the questionnaire, each respondent being encouraged to give a critical appraisal of the questionnaire design. Only a few minor changes were

[1]Forty was felt to be a large enough pretest sample to give some indication of the trends in the responses of the population as a whole. Knowledge of these trends is valuable in the subsequent selection of the sample size.

necessary.

### 2.3.2 Selection of Sample Sizes

The 95% confidence level and an acceptable difference of ±5% from the population values were chosen. The pretest indicated that percentage responses could range from 10:90 to 50:50; for example, in one question 10% of the respondents might answer 'yes', 90% might answer 'no', while in another question equal percentages might answer 'yes' and 'no' respectively. Taking 50:50 as providing the most conservative estimate, the minimum sample size required to estimate population parameters within ±5% at the 95% confidence level for a population of 42,000 is approximately 400[1].

Since the size of the New Westminster SPEC population was only 110, the aim was to obtain as many respondents as possible by means of a questionnaire mailed to all of the members. Fifty-five respondents were in fact obtained. Although 50% is a substantial proportion and probably allows reasonable estimates of the opinions of the SPEC New Westminster population, this sample may not be truly representative of the SPEC population. The nature and degree of this possible bias is suggested subsequently.

### 2.3.3 Selection of the Samples

In order to make valid statements about a population from a sample, it is necessary to ensure that the sample is random, i.e. that each resident of New Westminster has an equal and independent chance of being chosen[2].

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[1]Blalock 1960, pp. 163-167.

[2]An arbitrary lower age limit of twelve years of age was chosen.

The main problem in obtaininga random sample in New Westminster was due to the marked variations in socio-economic characteristics both between and within various constituent areas (Chaster 1965). A particular problem was the concentration of apartment dwellers in certain areas. Since apartment dwellers are unlikely to be typical of the population as a whole[1] and since there is a danger that they may be over-sampled if areal sampling does not take account of variations in population density, particular care had to be exercised in the selection of the sample.

A fairly simple method of random sampling was devised. All non-residential land was excluded from consideration. This left three types of dwelling units:

a) Single household units

b) Double household units, and

c) Apartment blocks containing known numbers of apartment household units.

The residential land was divided into 285 prospective sample areas each containing 50 household units. Fifty sample areas were randomly selected. Each selected sample area was then stratified on the basis of its dwelling unit composition before twelve individual households were chosen at random, e.g. in an area containing an equal proportion of single family and apartment households, six of each type would be selected. Thus from fifty randomly selected sample areas, six hundred representative households were chosen[2].

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[1] "Multiple-family accommodation now being provided in the City caters generally to three groups: older people whose children have grown up and moved away from home ...; young married couples without children; and single persons" (City of New Westminster Planning Department 1968, p. 20).

[2] The use of a one-day sampling period made it necessary to ensure that the sample size would be over and above the minimum required to estimate population parameters within ±5% at the 95% confidence level, e.g. some of the data collected might be spoilt.

The questionnaire was conducted on a Saturday in order to reduce the oversampling of housewives that can occur with week-day sampling. Twenty-five carefully briefed interviewers were allotted two of the fifty sample areas each. Each interviewer then approached the twelve selected household units in each of his two areas and asked only one member of the household to participate. The interviewer was instructed to obtain an equal sex ratio and to try and obtain an age breakdown which approximated the known characteristics of his area. Having secured a respondent, the interviewer left the questionnaire with the respondent and arranged to collect it later. In the event of a 'no reply'or non-cooperation, the interviewer attempted to gain a respondent from an immediately adjacent household of the same type, i.e. single, double or apartment. A record was kept of the number of refusals; 66% of the people who were approached agreed to answer the questionnaire. Some of the interviewers did not manage to obtain their twenty-four respondents, however, so that the public sample consisted of 550 respondents, not 600 as originally planned.

The identical questionnaire with a few additional questions was subsequently mailed to the 110 members of the New Westminster branch of SPEC. Fifty-five of the members completed and returned the questionnaire. Thus, 50% of the SPEC members agreed to answer the questionnaire compared to 66% of the members of the public who were approached. This difference is attributed to the two different methods used to solicit participation, personal contact as opposed to a mailed questionnaire.

### 2.3.4 Data Handling and Analysis Procedures

The data for both samples was keypunched on to computer cards, the questionnaire having been previously arranged and coded for ease of punch-

ing and handling by the Simon Fraser University IBM System 360 Model 50 computer. Raw number responses of the public, members of each education and income group (as defined in the questionnaire, Appendix A), and SPEC members were then determined[1] since the aim of the study was to compare their responses. The data can be envisaged initially as thirteen sets of questionnaire responses: those of the public; four constituent education groups; seven constituent income groups; and members of SPEC. All of the raw figures were converted into percentages. Thus two types of data were available, raw figures for statistical analysis and percentages for comparative purposes. The sample size of each of the thirteen 'groups" and an example of responses expressed in percentage form are given in Fig. 2-1.

Chi-square ($\chi^2$) tests[2] were subsequently conducted to discover if there were any statistically significant[3] differences between the responses of:

1) the SPEC sample and the public sample
2) the education groups, and
3) the income groups.

Follow-up chi-square tests were conducted where necessary to discover if there were significant differences between the responses of SPEC members (and occasionally SPEC members who had attended or were attending university), and certain income and education groups[4].

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[1]Raw number responses were determined by means of the Simon Fraser University Contab program.

[2]Blalock 1960, pp. 212-221.

[3]The term 'significant' is subsequently employed to denote significance only in the statistical sense. A result was only considered to be significant when $p < 0.05$.

[4]All chi-square tests were carried out by means of the computer program SFU-Chi-Chi.

Some grouping of the data was necessary to ensure that no cell had an expected frequency of less than one and that fewer than 20% of the cells had an expected frequency of less than five (Seigel 1956). For example, the $15,000 - $18,000 and $18,000 per annum household income categories were combined because of the relatively small number of cases in each category and hence in certain cells. Cells were combined only when it was essential to do so and then in a logical manner. To take an extreme example, 'yes' responses would not be added to 'no' responses.

The number of degrees of freedom (df)[1] is a reflection of the number of cells in the contingency table and thus gives an indication of when grouping has occurred. The degrees of freedom are given in the presentation of statistically significant results. In the example given in Fig. 2-1 (r7 c2-3) there were two degrees of freedom, not the three that would be expected from a four-by-two contingency table. This was due to the necessary combination of the 'don't know' and 'non-response' figures. This combination was, in fact, commonly employed to allow the use of the chi-square test. Although 'don't know' and 'non-response' are not identical (non-response may indicate a lack of interest in the questionnaire rather than an inability to answer the question), they are close enough to combine for statistical purposes although they are treated separately in the comparison of percentage responses. The other common combinations were the amalgamation of 'less important' and 'least important', 'somewhat' and 'not at all', 'very high quality' and 'fairly high quality' and the combination of certain dollar categories in individual questions.

The results are usually illustrated in the following format (Fig. 2-1).

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[1] df = (r-1) (c-1) where r is the number of rows
c is the number of columns.

FIG. 2-1--FORMAT FOR THE PRESENTATION OF RESULTS

Columns (c)

| Rows (r) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SPEC | PUB | 12 | 12 | VC | Univ | 0-3 | 3-6 | 6-9 | 9-12 | 12-15 | 15+ |
| | | 55 | 550 | 143 | 149 | 47 | 110 | 39 | 91 | 115 | 97 | 48 | 31 [2] |
| | 2 Yes | 80 | 40 | 10 | 30 | 50 | 60 | 20 | 30 | 40 | 50 | 60 | 70 |
| | 3 No | 10 | 40 | | | | | | | | | | |
| | 4 DK | 6 | 10 | | | | | | | | | | |
| | 5 NR | 5 | 10 | | | | | | | | | | |
| | 6 TOTAL[1] | 101 | 100 | | | | | | | | | | |
| | 7 $\chi^2$ | $\chi^2_2$=17.137*** | | $\chi^2_{df}$ ** | | | | $\chi^2_{df}$ * | | | | | |
| | 8 $\chi^2$ SPEC ▼ | | | | | VC | Univ | | | | 9-12 | 12-15 | 15+ |
| | | | | | | $\chi^2_{df}$ ** | $\chi^2_{df}$ * | | | | $\chi^2_{df}$ ** | $\chi_{df}$ * | $\chi^2_{df}$ * |

Abbreviations:
SPEC = SPEC Sample
PUB = Public Sample

(Educational Level)
<12 = Less than Grade 12 education
12 = Grade 12 Education
VC = Vocational College (Non-University)
Univ = University or College

Household Income in Dollars per Annum:
0-3 = 0- 2,999
3-6 = 3,000- 5,999
6-9 = 6,000- 8,999
9-12 = 9,000-11,999
12-15 = 12,000-14,999
15+ = 15,000+

DK = Don't Know NR = Non-Response

| Symbol | Level of Significance |
|---|---|
| * | .05 |
| ** | .01 |
| *** | .001 |
| **** | .0001 |
| -- | No relationship |

$\chi^2_{df}$ $\chi^2$ = Chi-square[3]
df = Degrees of freedom[3]
e.g. $\chi^2_2$ = 17.137

[1]Total may not equal 100% due to rounding.

[2]Sample size for each group is given immediately below the group title (row 1, column 1-13)

[3]This information is provided only in cases where statistically significant differences in the responses between groups were found.

In this hypothetical example, 80% of the SPEC respondents answered 'yes' (r2 c2) while only 40% of the public sample replied in the affirmative (r2 c3). The differences in their responses were significant at the .001 level (r7 c2-3). Similarly there were differences between the responses of the education and between the income group responses which were significant at the .01 (r7 c4-7) and .05 (r7 c8-13) levels respectively. Although the higher education and income groups tended to be nearer to SPEC in their responses than lower education and income groups and the public as a whole, SPEC members were significantly different from them in their responses (r8 c6,7,11,12,13).

The education and income groups are treated independently in the analysis and presentation of the results. In reality they are intercorrelated, however, as illustrated below.

FIG. 2-2--THE RELATIONSHIP BETWEEN EDUCATION LEVELS AND INCOME LEVELS IN THE PUBLIC SAMPLE

Household Income Level ($ ,000)

| Educational Level % | 0-3 | 3-6 | 6-9 | 9-12 | 12-15 | 15+ |
|---|---|---|---|---|---|---|
| <12 | 17 | 23 | 32 | 15 | 9 | 4 |
| 12 | 6 | 21 | 28 | 31 | 8 | 6 |
| VC | 3 | 18 | 32 | 22 | 19 | 6 |
| Univ | 4 | 20 | 20 | 24 | 17 | 14 |

Taking the two extreme cases, while 40% of the less than grade 12 educated

group belong to households with an annual income of less than $6,000, only 24% of the university-educated group fall into this category. Conversely, only 13% of the respondents with less than grade 12 education have household incomes of $12,000$^{+}$ per annum compared to 31% in the university-educated group. The differences between the four education groups with respect to their income status are, in fact, significant at the .001 level. Although these two variables are not indepedent, it is important to attempt to differentiate them in order to discover if one variable is more closely associated with attitudinal differences than the other.

## 2.4 An Estimation of Sources and Degree of Bias

In spite of precautions taken to ensure that the sample was representative of the general public and its opinions, there were still opportunities for the sample to become biased. The very fact that the questionnaire was concerned with pollution may have encouraged some people to put down what they thought was expected of them, e.g. strong anti-pollution opinions. This source of bias can only be avoided in extremely long and complicated questionnaires covering a variety of issues in which the topic of interest is not obvious to respondents. Interviewers were instructed, however, to inform respondents that this was a serious and objective survey designed to discover what the public really felt.

The fact that 550 rather than 600 respondents were obtained because of the varying success of individual interviewers, probably resulted in a slight undersampling of certain areas.

Subsequent analysis of the results showed that varying proportions of the respondents did not reply to the questions. Non-respondents normally represented between 2% and 10% of all the respondents and were

frequently of lower educational and income status. This may reflect in part a weaker interest in the questionnaire itself by these groups rather than their lack of an opinion of the specific questions. Total non-response and its variation with educational and income status is provided in the results and is examined in some detail.

People who are most concerned about pollution might be expected to be more willing to answer a questionnaire about it. This would obviously result in an indication of greater levels of concern than actually exists in the population at large. Although one third of the members of the public who were approached refused to answer the questionnaire, it does not necessarily follow that all of those people were relatively unconcerned. Many of them were genuinely busy at the time and some may have neglected to mail completed questionnaires later. All the same, the higher acceptance of the questionnaire by those who are most concerned about pollution is probably the largest single source of bias. A similar bias probably exists in the SPEC data since half of those approached with the mailed questionnaire did not return it[1]. Thus, any bias resulting from refusals to answer should probably be in the same direction for the two samples.

It is difficult to assess the total extent of bias in the public sample. Some indication of the representativeness of the sample can be obtained by comparing the sex, age, education and socio-economic characteristics of the public sample to those of the population of New Westminster. There have been considerable changes in the characteristics of the population since the last full-scale census in 1961, and this com-

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[1]Again, it does not necessarily follow that all of these members were relatively unconcerned. Some may be unwilling to participate in questionnaire studies while others may not have had sufficient time to complete and return the questionnaire.

plicates comparison. The most basic change has involved the replacement of older single family dwellings by apartment blocks. Whereas in 1951, apartments represented only 9.6% of 165 housing starts in New Westminster, by 1967 the percentage had risen to 95.7% of 956 units. Since multiple family accommodation caters generally to older people whose children have left home, young married couples without children and single persons, there has been a concomitant relative decline in the twenty to forty-four year old age bracket in particular (New Westminster Planning Department, 1968). In spite of these changes, the use of the 1966 census data in conjunction with the 1961 data and a knowledge of current trends allowed some comparison between the public sample and the population at large to be made. The results of this comparison are summarized below. The comparative analysis and tables are provided in Appendix B.

The sex ratio of the public sample was approximately in keeping with the normal 50:50 ratio of the New Westminster population. There does appear to be a bias in the age distribution of the public sample, however, teenagers are probably under-represented while the twenty to forty-five year olds are probably over-represented, particularly those in the twenty to thirty year old bracket. The public sample is probably biased towards people with high educational levels and professional occupations and possibly contains a larger proportion of high income households than the population as a whole does. This probably reflects a greater tendency for people of higher socio-economic status to agree to answer the questionnaire. This possible bias towards higher socio-economic groups should be borne in mind when inferences about public opinion are drawn from the public sample and should be viewed in the light of any relationships subsequently discovered between responses and education and income levels.

The possible differences between the characteristics of the public sample and the population at large does not appear to be large enough, however, to prevent the responses of the public sample from being indicative of public opinion in New Westminster or to seriously detract from their utility in a comparative study of public and environmental citizen group opinion on water and air pollution.

# CHAPTER III
# RESULTS

This chapter consists of a comparative analysis of the results of the opinion surveys conducted amongst the general public and SPEC members of New Westminster, the results being analysed with reference to the hypotheses previously outlined.[1]

## 3.1 The Representativeness of the Environmental Citizen Group in Terms of Socio-Economic Status

The SPEC sample was found to differ significantly from the public sample in terms of both its education and income characteristics (Fig. 3-1 and Fig. 3-2).

FIG. 3-1--A COMPARISON OF THE EDUCATION LEVELS OF THE SPEC AND THE PUBLIC SAMPLES

| Education Level | SPEC % | Public % |
|---|---|---|
| <12 | 20 | 32 |
| 12 | 30 | 33 |
| VC | 4 | 10 |
| Univ. | 46 | 24 |
| TOTAL | 100 | 99 |
| NR (% of total response) | 5 | 18 |
| $\chi^2$ | $\chi^2_3 = 13.057^{**}$ | |

[1]The responses of the public and SPEC samples are provided in full in Appendix A.

FIG. 3-2--A COMPARISON OF THE INCOME LEVELS OF THE SPEC AND THE PUBLIC SAMPLES

| Household Income Levels $,000 Per Annum | SPEC % | Public % |
|---|---|---|
| 0-3 | 0 | 10 |
| 3-6 | 9 | 22 |
| 6-9 | 36 | 27 |
| 9-12 | 25 | 23 |
| 12-15 | 14 | 11 |
| 15-18 | 2 | 3 |
| $18^{+}$ | 14 | 4 |
| TOTAL | 100 | 100 |
| NR(% of total response) | 20 | 23 |
| $\chi^2$ | $\chi^2_5 = 21.848^{***}$ | |

The SPEC sample contains a substantially higher proportion of university (college educated) people and a lower proportion of people in the less than $6,000 per annum household income brackets. This tendency for SPEC members to have relatively high education and income levels is also reflected in the fact that 20% of the SPEC sample classified themselves as students and 22% as having professional occupations compared to only 14% and 11% respectively of the public sample[1].(Fig. 3-3).

[1]No significant differences were found between the two samples with regard to their sex and age structure.

FIG. 3-3--A COMPARISON OF THE OCCUPATIONAL STATUS OF SPEC AND THE PUBLIC

| Occupation | SPEC % | Public % |
|---|---|---|
| Professional | 22 | 14 |
| Managerial | 4 | 5 |
| Clerical | 4 | 7 |
| Sales | 2 | 5 |
| Public Service, Service Industry | 10 | 7 |
| Skilled Industrial Employer | 4 | 10 |
| Farming | 0 | 0 |
| Fishing, Lumbering, Mining | 2 | 3 |
| Transportation, Communications | 4 | 2 |
| Labourers | 4 | 3 |
| Students | 20 | 11 |
| Housewife | 20 | 21 |
| Retired | 2 | 10 |
| Unemployed | 4 | 2 |
| TOTAL | 102 | 100 |
| NR (% of total response) | 0 | 11 |

These findings appear to support the hypothesis that members of an environmental citizen group are of higher socio-economic status than the population from which they are drawn. There are some indications, however,

that members of environmental citizen groups are not as unrepresentative of the general public as members of conservation and outdoor recreation clubs seem to be. Harry et al (1969) discovered that 92% of the "conservationist"[1] and 87% of the "non-conservationist" members of a large outdoor recreation organization had completed over thirteen years of formal education and that 75% of the "conservationist" and 50% of the "non-conservationist" members were of high socio-economic status. Analysis of the characteristics of the SPEC sample, on the other hand, indicated that 50% of the sample had no university or college education and 45% belonged to households with an annual income of less than $9,000. Furthermore, the occupations of the members appear to indicate a fairly wide range of socio-economic status. Although conclusions based on limited data are of necessity tentative, it does appear that the recent environmental movement may have attracted a wider spectrum of people than the more traditional conservation and recreation organizations.

## 3.2 The Representativeness of the Opinions of the Environmental Citizen Group about Pollution

The representativeness of the SPEC sample with respect to the opinions on pollution was tested utilizing a number of criteria.

### 3.2.1 Reactions to Pollution as a Community Issue

The first criteria used were reactions to pollution as one of a number of community issues and one aspect of the pollution issue--sewage treatment.

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[1] "Individuals who claimed membership in a conservation association proper were labelled conservationists. Non-conservationists were those members who belonged to no conservation associations" (p. 250).

FIG. 3-4--THE RELATIVE IMPORTANCE OF POLLUTION AS A COMMUNITY ISSUE FROM Q1 "There are many problems of public concern today. For those listed below, please indicate how important they are in your community."

| Community Issues | SPEC Rank[1] | Public Rank[1] | SPEC % Most Important[2] | Public % Most Important[2] | $\chi^2$ SPEC vs. Public |
|---|---|---|---|---|---|
| Water Supply | 4 | 5 | 51 | 72 | $\chi^2_2 = 17.137^{***}$ |
| Sewage Disposal | 1 | 1 | 95 | 88 | ——— |
| Police Protection | 7 | 9 | 25 | 56 | $\chi^2_3 = 34.120^{****}$ |
| Education | 5 | 4 | 64 | 71 | ——— |
| Water Pollution | 3 | 2 | 93 | 87 | ——— |
| Housing | 8 | 10 | 24 | 44 | $\chi^2_3 = 18.210^{***}$ |
| Noise Pollution | 10 | 8 | 36 | 30 | ——— |
| Parks and Recreation | 9 | 7 | 40 | 33 | ——— |
| Air Pollution | 2 | 3 | 89 | 87 | ——— |
| Public Health | 6 | 6 | 45 | 70 | $\chi^2_3 = 23.998^{****}$ |
| Roads | 11 | 11 | 11 | 21 | $\chi^2_3 = 25.809^{****}$ |

[1]Rank is based on percentages of respondents marking "most important".

[2]Percentages of respondents marking "most important" rather than "less important", "least important" or not responding.

FIG. 3-5--THE RELATIVE IMPORTANCE OF ROADS AS A COMMUNITY ISSUE FROM Q1 "There are many problems of public concern facing most communities today. From those listed below, please indicate how important you think they are in your community."

| % Marking Roads | SPEC | PUB | <12 | 12 | VC | Univ | 0-3 | 3-6 | 6-9 | 9-12 | 12-15 | 15+ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Most Important | 11 | 21 | 27 | 20 | 25 | 8 | 30 | 24 | 24 | 15 | 12 | 16 |
| Less Important | 22 | 41 | 42 | 44 | 28 | 52 | 38 | 45 | 4 | 42 | 44 | 42 |
| Least Important | 64 | 30 | 27 | 29 | 43 | 35 | 25 | 24 | 31 | 41 | 37 | 35 |
| NR* | 4 | 8 | 4 | 7 | 4 | 5 | 5 | 7 | 4 | 1 | 6 | 6 |
| TOTAL | 101 | 100 | 100 | 100 | 100 | 100 | 98 | 100 | 99 | 99 | 99 | 99 |
| $\chi^2$ | $\chi^2_3=25.809^{****}$ | | $\chi^2_9$ 32.274** | | | | ——— | | | | | |
| $\chi^2$ SPEC v | | | | | VC | Univ | | | | 9-12 | 12-15 | 15+ |
| | | | | | $\chi^2_2=12.782^{**}$ | $\chi^2_2=14.635^{***}$ | | | | $\chi^2_2=8.334^{*}$ | $\chi^2_2=7.303^{*}$ | $\chi^2_2=6.156^{*}$ |

NB Henceforth, non-response is expressed as a sub-percentage within the total response as portrayed in Fig. 2-1 and not as a percentage of the total response.

There appears to be a high level of concern over water pollution, sewage disposal and air pollution not only on the part of SPEC members but also amongst the general public, these three environmental problems being considered the most important of eleven community issues (Fig. 3-4). This high level of public concern accords well with recent findings (Auliciems and Burton 1970, Minghi et al 1971). No significant differences were found between the responses of SPEC and the public to these three problems or two other environmental issues which were considered to be of less importance; noise pollution and parks and recreation.

Significant differences were found, however, between SPEC and the public with regard to the importance of all other "non-environmental" problems except education. Unlike the general public, SPEC differentiates sharply between the major environmental and "non-environmental" issues by downgrading the relative importance of the latter. This tendency is not restricted to SPEC members alone as indicated in differential responses to the relative importance of roads as a community issue (Fig. 3-5).

Comparing the "least important" cells for the Vocational College and University groups to those of the two lower education groups, and the same cells of the three highest income groups to these three lower income groups, it can be seen that the people of higher education and income status attach a lower importance to roads than those of lower education and income status, and indeed, than the public as a whole. In spite of the tendency for the more highly educated and income groups to approach SPEC in this regard, SPEC members are still significantly lower in their estimates of the importance of roads than members of these groups. Similar relationships were discovered with all of the other non-environmental problems, except education. Thus similarly high levels of concern were found over the three

FIG. 3-6--THE RELATIVE ADEQUACY OF ACTION ON COMMUNITY ISSUES FROM Q2 "Here is the same list again. Please indicate now how adequately you think they are being dealt with in your community."

| Community Issues | SPEC Rank[1] | Public Rank[1] | SPEC % Least Ade-quately[2] | Public % Least Ade-quately[2] | $\chi^2$ |
|---|---|---|---|---|---|
| Water Supply | 6 | 10 | 15 | 7 | ——— |
| Sewage Disposal | 2 | 3 | 73 | 44 | $\chi^2_3=18.520^{***}$ |
| Police Protection | 10 | 11 | 2 | 5 | ——— |
| Education | 5 | 6 | 20 | 10 | ——— |
| Water Pollution | 1 | 2 | 76 | 60 | ——— |
| Housing | 8 | 5 | 11 | 24 | $\chi^2_3= 8.722^{*}$ |
| Noise Pollution | 4 | 4 | 44 | 33 | ——— |
| Parks & Recreation | 7 | 9 | 15 | 7 | ——— |
| Air Pollution | 3 | 1 | 67 | 64 | ——— |
| Public Health | 9 | 7 | 7 | 9 | ——— |
| Roads | 11 | 8 | 2 | 8 | ——— |

[1]Rank is based on percentages of respondents marking "least adequately".

[2]Percentage of respondents marking "least adequately" rather than "less adequately" or "most adequately" or not responding.

most important environmental issues (air pollution, water pollution, sewage disposal) for both SPEC and the public, although SPEC members appear to attach greater relative importance to them.

In addition to being asked which problems they believed to be of local importance, respondents were asked to indicate how adequately they felt that these same problems are being dealt with in their community (Fig. 3-6).

Water pollution, sewage disposal and air pollution are cited as being "least adequately" dealt with to a greater extent than any other problems by both SPEC and the public. The importance attached to these problems (Fig. 3-5) is thus closely linked to beliefs about the inadequacy of their treatment (Fig. 3-6). This relationship does not hold for all of the problems, however. Noise pollution, for example,, ranked only eighth and tenth in importance for SPEC and the public respectively but ranked fourth for both samples with respect to adequacy of treatment. Thus, concern over noise pollution does not appear to be as nearly great as concern over water pollution, sewage disposal and air pollution in spite of the fact that both SPEC and the public are sceptical about the adequacy of steps taken to tackle it.

The only major difference between the responses of SPEC and the public to Q2 was on the adequacy of sewage treatment, 73% of the SPEC members stating that it was "least adequately" dealt with compared to only 44% of the public. The differences between their responses were, in fact, significant at the .001 level (Fig. 3-6).

The issue of the adequacy of sewage treatment was examined in more detail in a subsequent question (Q6) in which respondents were asked

FIG. 3-7--THE ADEQUACY OF SEWAGE TREATMENT FACILITIES IN NEW WESTMINSTER FROM Q6
"What do you think about sewage treatment facilities in New Westminster.."

| % | SPEC | Pub | < 12 | 12 | VC | Univ | 0-3 | 3-6 | 6-9 | 9-12 | 12-15 | 15+ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Adequate | 0 | 9 | 11 | 6 | 19 | 5 | 20 | 13 | 10 | 7 | 5 | 3 |
| Inadequate | 91 | 64 | 60 | 74 | 55 | 66 | 51 | 60 | 64 | 70 | 72 | 77 |
| DK - | 5 | 24 | 27 | 18 | 23 | 26 | 28 | 23 | 23 | 23 | 20 | 16 |
| NR | 4 | 3 | 2 | 1 | 2 | 3 | 0 | 3 | 2 | 0 | 2 | 3 |
| TOTAL | 100 | 100 | 100 | 100 | 100 | 100 | 99 | 99 | 99 | 100 | 99 | 99 |
| $\chi^2$ | $\chi^2_2 = 17.064^{***}$ | | $\chi^2_6 = 16.780^{*}$ | | | | | | | | | |

directly whether they considered the sewage treatment facilities in New Westminster to be adequate (Fig. 3-7).

Again the differences between the responses of SPEC and the public are significant at the .001 level. A much higher percentage of SPEC members stated that sewage facilities are inadequate. There is a tendency for this opinion to be shared by the higher education and income groups. A striking feature of responses of the public to this issue is the fairly large proportion who profess ignorance over the adequacy of the facilities, even a quarter of the university/college-educated group stating that they do not know. In contrast, only 5% of the SPEC members indicated that they did not know. Although this may in part reflect a tendency for SPEC members to avoid appearing ignorant on an environmental issue, it could be indicative of greater knowledge or awareness as well as concern on their part about the disposal of untreated sewage into the Fraser River from New Westminster.

Responses to questions on water and air pollution and sewage treatment as local community issues thus indicate that both SPEC and the public attach high importance to them. There is a tendency for SPEC members to place greater relative importance on these three issues, however, and a marked tendency for them to be more sceptical about the adequacy of local sewage treatment. These tendencies are shared to some extent by people of higher socio-economic status although knowledge or awareness about sewage treatment appears to be more limited on the part of members of all socio-economic groups compared to that of SPEC members. There are thus preliminary indications that members of environmental citizen groups are more concerned about pollution and are perhaps more knowledgeable about specific environmental issues than the public as a whole and higher education and income

FIG. 3-8--OPINIONS ON THE SERIOUSNESS OF WATER POLLUTION IN THE FRASER RIVER
FROM Q5 "How do you rate the quality of water in the Fraser River?"

| | SPEC | PUB | < 12 | 12 | VC | Univ | 0-3 | 3-6 | 6-9 | 9-12 | 12-15 | 15+ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Very & fairly high quality | 4 | 7 | 8 | 5 | 11 | 1 | 10 | 10 | 8 | 5 | 2 | 0 |
| Fairly low quality | 16 | 14 | 14 | 15 | 11 | 16 | 17 | 22 | 11 | 12 | 15 | 13 |
| Very low quality | 73 | 63 | 57 | 73 | 64 | 67 | 56 | 53 | 70 | 71 | 69 | 74 |
| DK | 4 | 12 | 16 | 6 | 13 | 11 | 12 | 14 | 8 | 8 | 15 | 6 |
| NR | 4 | 4 | 8 | 1 | 1 | 5 | 3 | 1 | 4 | 3 | 0 | 6 |
| TOTAL | 101 | 100 | 99 | 100 | 100 | 100 | 98 | 100 | 101 | 99 | 99 | 99 |
| $\chi^2$ | ——— | | $\chi^2_9 = 21.63^*$ | | | | ——— | | | | | |

FIG. 3-9--OPINIONS ON THE SERIOUSNESS OF AIR POLLUTION IN NEW WESTMINSTER FROM Q13 "In general, how do you rate the quality of air in this area?"

| | SPEC | PUB | < 12 | 12 | VC | Univ | 0-3 | 3-6 | 6-9 | 9-12 | 12-15 | 15+ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Very & fairly high | 15 | 29 | 34 | 28 | 25 | 25 | 30 | 33 | 24 | 32 | 23 | 9 |
| Fairly low | 47 | 39 | 33 | 40 | 43 | 45 | 33 | 38 | 42 | 45 | 33 | 52 |
| Very low quality | 36 | 25 | 25 | 27 | 28 | 29 | 20 | 15 | 30 | 23 | 42 | 32 |
| DK | 2 | 5 | 8 | 3 | 2 | 0 | 10 | 8 | 3 | 0 | 2 | 0 |
| NR | 0 | 2 | 1 | 1 | 0 | 2 | 5 | 4 | 0 | 0 | 0 | 6 |
| TOTAL | 100 | 100 | 101 | 99 | 98 | 101 | 98 | 98 | 99 | 100 | 100 | 99 |
| $\chi^2$ | $\chi^2_9 = 9.958^*$ | | ——— | | | | $\chi^2_{10} = 9.463^*$ | | | | | |

group. The high level of concern expressed by the pbulic is noteworthy, however, and reflects the currently high public interest in environmental problems.

### 3.2.2 Opinions on the Seriousness of Water and Air Pollution

Opinions on the seriousness of water and air pollution at the municipal and provincial scales were also used to test the representativeness of the opinions of SPEC members.

SPEC members appear to have a lower opinion of water quality in the Fraser River than the general public, 73% indicating that it is of very low quality compared to 63% of the public (Fig. 3-8). This is closely linked to a greater ability and/or willingness on the part of SPEC members to pass judgement on the Fraser River. "Don't knows" and non-responses constitute 16% of the public replies and only 8% of the SPEC responses. The differences in their responses to this question are not statistically significant, however. The higher education and income groups also appear to have a lower opinion of water than the lowest education and income groups, but again this is linked in part to their ability and/or willingness to express opinions on the topic. What is perhaps the most striking about replies to this question, however, is the general similarity of responses between many of the groups.

People were generally more able/willing to express an opinion about local air quality (Fig. 3-9). This is probably due to the more obvious nature of air pollution than water pollution. Smog and the smoke from factory chimneys in the Fraser Valley is more directly apparent to most people than the condition of the water in the Fraser River. Indeed, many of the respondents have probably never been nearer to the Fraser River at

FIG. 3-10--RESULTS OF THE CHI-SQUARE ANALYSIS ON RESPONSES TO Q5 "How do you rate the quality of water in the Fraser River?" AND Q13 "In general, how do you rate the quality of the air in this area?"[1]

| | SPEC | PUB | <12 | 12 | VC | Univ | 0-3 | 3-6 | 6-9 | 9-12 | 12-15 | 15+ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SPEC | $\chi^2_2=18.453^{***}$ | | | | | | | | | | | |
| PUB | | $\chi^2_5=256.004^{****}$ | | | | | | | | | | |
| <12 | | | $\chi^2_2=57.462^{****}$ | | | | | | | | | |
| 12 | | | | $\chi^2_3=73.403^{****}$ | | | | | | | | |
| VC | | | | | $\chi^2_3=23.095^{****}$ | | | | | | | |
| Univ | | | | | | $\chi^2_5=66.970^{****}$ | | | | | | |
| 0-3 | | | | | | | $\chi^2_3=12.333^{**}$ | | | | | |
| 3-6 | | | | | | | | $\chi^2=36.305^{****}$ | | | | |
| 6-9 | | | | | | | | | $\chi^2_3=55.681^{****}$ | | | |
| 9-12 | | | | | | | | | | $\chi^2_3=71.522^{****}$ | | |
| 12-15 | | | | | | | | | | | $\chi^2_2=14.703^{***}$ | |
| 15+ | | | | | | | | | | | | $\chi^2_2=10.398^{**}$ |

[1]Each chi-square value represents the differences found between the responses of any one "group" (e.g. the public) to these two questions.

New Westminster than on the bridges crossing it. SPEC and higher education and income groups have a lower opinion of air quality than the other groups. Although SPEC was significantly lower in its opinions than the public, and a significant difference was found between the income groups, the general similarity in responses for the various groups is perhaps more noteworthy.

The most striking feature of responses to these two questions is the lower opinion of water as opposed to air quality held by all groups. Visual comparison of Fig. 3-8 and Fig. 3-9 makes this finding readily apparent. For example, while 73% of SPEC and 63% of the public indicated that water in the Fraser River is of very low quality, the corresponding figures for local air quality were 36% and 25% respectively. Chi-square analysis showed that the responses to these two questions were significantly different for each group (Fig. 3-10).

Opinions on the seriousness of water pollution in British Columbia were even more uniform than opinions on the quality of the water in the Fraser River (Fig. 3-11). The responses for SPEC and the public were virtually identical, 76% of the members of both SPEC and the public considering water pollution to be a serious problem in the Province.

Close correspondence was also found between constituent education and income groups with respect to their opinions on the seriousness of air pollution in British Columbia (Fig. 3-12). Once again, there were no significant differences between the groups in this respect, although it is perhaps surprising that a lower percentage (53%) of SPEC members believe air pollution to be a serious problem than the public as a whole (66%) or any constituent group does. A visual comparison of Figs. 3-11 and 3-12 indicates that air pollution is considered to be less serious a

FIG. 3-11--OPINIONS ON THE SERIOUSNESS OF WATER POLLUTION IN BRITISH COLUMBIA FROM Q4 "How would you rate water pollution as problem in British Columbia?"

| % | SPEC | PUB | <12 | 12 | VC | Univ | 0-3 | 3-6 | 6-9 | 9-12 | 12-15 | 15+ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Serious | 76 | 76 | 77 | 77 | 76 | 84 | 84 | 73 | 80 | 76 | 83 | 84 |
| Important | 16 | 20 | 20 | 21 | 17 | 14 | 15 | 24 | 17 | 22 | 14 | 13 |
| No concern | 2 | 1 | 1 | 1 | 4 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| NR | 4 | 3 | 2 | 1 | 3 | 2 | 0 | 2 | 2 | 2 | 2 | 3 |
| TOTAL | 98 | 100 | 100 | 100 | 100 | 100 | 99 | 99 | 100 | 100 | 99 | 100 |
| $\chi^2$ | ——— | | ——— | | | | ——— | | | | | |

FIG. 3-12--OPINIONS ON THE SERIOUSNESS OF AIR POLLUTION IN BRITISH COLUMBIA FROM Q12 "How would you rate air pollution as a problem in British Columbia?"

| | SPEC | PUB | <12 | 12 | VC | Univ | 0-3 | 3-6 | 6-9 | 9-12 | 12-15 | 15+ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Serious | 53 | 66 | 76 | 67 | 67 | 68 | 71 | 63 | 71 | 66 | 80 | 71 |
| Important | 42 | 31 | 22 | 32 | 32 | 30 | 28 | 34 | 28 | 33 | 18 | 29 |
| No Concern | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 |
| NR | 4 | 2 | 1 | 0 | 0 | 2 | 0 | 1 | 1 | 0 | 0 | 0 |
| TOTAL | 101 | 100 | 100 | 100 | 99 | 100 | 99 | 99 | 100 | 99 | 100 | 100 |
| $\chi^2$ | ——— | | ——— | | | | ——— | | | | | |

problem than air pollution in British Columbia. For example, the percentages in each group who believe water pollution is a serious problem is always higher than the corresponding percentage for air pollution, often by as much as 10%. This tendency is particulary well marked in the case of SPEC members and the university/college educated group, the percentage differences being 23% and 16% respectively. Chi-square analysis showed that concern over water pollution is significantly higher than concern over air pollution in British Columbia for both SPEC and the public[1], although the differences between the responses to these two questions on the part of most of the constituent education and income groups are not statistically significant.

In summary, both SPEC and the public have a low opinion of the quality of water in the Fraser River. Although SPEC and the higher education and higher income groups have a somewhat lower opinion of it than the public as a whole does, opinions on this issue are not widely divergent. Similarly, opinions on the quality of local air are relatively close between SPEC and the public and constituent education and income groups. All groups have a significantly lower opinion of local water quality than local air quality. There were no significant differences between opinions on the seriousness of water pollution in British Columbia, a substantial majority of the members of SPEC, the public and the education and income groups considering it to be a serious problem. Air pollution is not generally considered to be as serious a problem as water pollution in British Columbia although the majority of the members of SPEC, the public and the education

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[1]The chi-square values for the differences between the responses of the SPEC and public samples to these two questions were, respectively:

$$\chi_1^2 = 6.990^{**} \qquad \chi_3^2 = 15.991^{***}$$

and income groups believe that it is a serious problem.

The fact that SPEC members are somewhat less inclined to rate air pollution as a serious problem in British Columbia than members of the public do and the general similarity in the opinions on these topics is perhaps surprising. Members of SPEC might reasonably be expected to express greater concern than the public about the seriousness of water and air pollution. These paradoxical findings are probably best interpreted in the light of the recent onslaught of publicity about environmental problems which seems to have helped create widespread concern or at least a propensity on the part of most individuals to express concern.

The general consistency in the greater seriousness attributed to water rather than air pollution is probably more difficult to explain. It is difficult to assess the relative seriousness of water and air pollution since their effects are difficult to compare. Water pollution in the Lower Mainland and elsewhere in the Province may effect respondents in more obvious ways than air pollution; for example, in restricting swimming and fishing opportunities. Differences in the degree and nature of publicity on water and air pollution probably go further than any other single factor in explaining differential responses to them, however. As noted previously, greater emphasis was placed on local water pollution than air pollution problems in the local newspapers during two months prior to the public survey. On a provincial scale, coverage of air pollution may be less dramatic than coverage of water pollution. Programs and articles dealing with fish kills and algae blooms in British Columbian rivers and lakes, for example, may well help to create the impression that water pollution is more serious than air pollution.

### 3.2.3 Sources and Indicators of Water and Air Pollution

There was widespread agreement between all of the groups over the relative importance of sources of water and air pollution. No significant differences were found in the responses of SPEC and the public to each of the possible activities which may affect water and air quality listed in Fig. 3-13 and Fig. 3-14 respectively.

FIG. 3-13--OPINIONS ON SOURCES OF WATER POLLUTION FROM Q7
"The following are possible activities that may affect water quality. Please check those which you think are more important or less important in their effect on the quality of water."

| Sources | SPEC | | Public | |
|---|---|---|---|---|
| | Rank[1] | % Most Important[2] | Rank[1] | % Most Important[2] |
| Septic Tanks | 5 | 27 | 5 | 37 |
| Industry | 2 | 89 | 1 | 84 |
| Municipal Sewage | 1 | 91 | 2 | 79 |
| Detergents | 3 | 64 | 3 | 67 |
| Agricultural Run-off (Chemical fertilizers and pesticides) | 4 | 60 | 4 | 66 |

[1] Rank is based on percentages of respondents marking "most important".

[2] Percentage of respondents marking "most important" rather than "less important," "least important" or not replying.

FIG. 3-14--OPINIONS ON SOURCES OF AIR POLLUTION FROM Q14

"The following are possible activities that may affect the quality of air. Please check those which you think are more important or less important in their effects on the quality of the air."

| Sources | SPEC | | Public | |
|---|---|---|---|---|
| | Rank[1] | % Most Important[2] | Rank[1] | % Most Important |
| Domestic Fires | 6 | 18 | 6 | 13 |
| Rubbish Burning | 5 | 31 | 5 | 34 |
| Cars | 2 | 89 | 3 | 76 |
| Trucks and Buses | 2 | 89 | 2 | 81 |
| Industry | 1 | 96 | 1 | 93 |
| Slash Burning | 4 | 36 | 4 | 41 |

[1]Rank is based on percentages of respondents marking "most important".

[2]Percentage of respondents marking "most important" rather than "less important", "least important" or not replying.

The only significant differences discovered upon more detailed analysis of responses to Q7 and Q14 concerned the importance attached to the two sources cited as being of least relative importance, septic tanks and domestic fires. The higher education groups attached significantly less importance to these two sources than the lower education groups[1]. A similar tendency was also

[1]Septic tanks $\chi^2_9 = 23.304^{**}$; domestic fires, $\chi^2_9 = 29.876^{***}$.

FIG. 3-15--INDICATORS OF WATER POLLUTION FROM Q3 "Water Pollution means different things to different people. Please check the appropriate box to indicate the importance of each of the factors listed below in helping you to identify water pollution."

| Indicator | SPEC | | Public | | $\chi^2$ SPEC vs Public |
|---|---|---|---|---|---|
| | Rank[1] | % Most Important[2] | Rank[1] | % Most Important[2] | |
| Smell | 4 | 51 | 4 | 62 | ——— |
| Taste | 7 | 47 | 3 | 64 | ——— |
| Oil | 1 | 84 | 1 | 73 | ——— |
| Floating Debris | 6 | 47 | 2 | 65 | $\chi^2_3 = 7.936^*$ |
| Weeds, Slime | 5 | 49 | 5 | 59 | ——— |
| Froth | 3 | 62 | 5 | 59 | ——— |
| Murkiness | 8 | 31 | 8 | 53 | $\chi^2_3 = 11.442^{**}$ |
| Algae | 2 | 69 | 7 | 57 | ——— |

[1]Rank is based on percentages of respondents marking "most important".

[2]Percentage of respondents marking "most important" rather than "less important","least important" or not replying.

noted in the percentage responses of the higher income groups. Although the responses of SPEC members were not found to be significantly different from those of the public in this regard, their responses were closely in keeping with the responses of the higher education and income groups. For example, the percentage of SPEC members marking "least important" for septic tanks and domestic fires were higher than corresponding percentages for virtually all of the education and income groups. Bearing in mind the fact that 50% of the SPEC members belong to the two lower education groups and 45% to the three lower income groups, the ability of SPEC members to differentiate between the relative importance of sources of air pollution seems to be somewhat higher than that of the public.

There is a fairly close correspondence between SPEC and the public on most of the types of indicators they use to identify water pollution (Fig. 3-15). There were significant differences, however, in their responses with respect to floating debris and murkiness, SPEC putting significantly less emphasis upon these. Since these two features are generally regarded as being relatively less important as indicators of pollution, a greater ability on the part of SPEC to differentiate between indicators is suggested. No significant differences were found, however, between the responses of SPEC and the public to indicators of air pollution (Fig. 3-16).

FIG. 3-16--INDICATORS OF AIR POLLUTION FROM Q11. "Please check the appropriate boxes to indicate the importance of each of the factors listed in helping you to identify air pollution."

| Indicator | SPEC | | Public | | |
|---|---|---|---|---|---|
| | Rank[1] | % Most Important[2] | Rank[1] | % Most Important | $\chi^2$ SPEC vs Public |
| Smell | 1 | 76 | 1 | 74 | — |
| Murkiness | 4 | 64 | 3 | 63 | — |
| Physical Discomfort | 3 | 67 | 4 | 57 | — |
| Airborne Particles | 2 | 73 | 2 | 70 | — |

[1]Rank is based on percentages of respondents marking "most important."

[2]Percentage of respondents marking "most important" rather than "less important," "least important" or not replying.

### 3.2.4 Opinions on Responsibility for Pollution Control and the Adequacy of Anti-Pollution Laws

Firstly, opinions on the feasibility of controlling pollution were examined by reference to Q20. The vast majority believe that pollution is controllable. No significant differences were found between the SPEC and public samples in this regard. The percentage indicating that it is uncontrollable varied between 3% and 20% for the different education and income groups, this feeling being particularly marked amongst the lower education and income groups. Significant differences were in fact

FIG. 3-17--OPINIONS ON RESPONSIBILITY FOR POLLUTION CONTROL FROM Q8 AND Q15 "Who do you think should be responsible for controlling water (air) pollution? How far do you think they should be responsible?"

| | WATER POLLUTION | | | | AIR POLLUTION | | | |
|---|---|---|---|---|---|---|---|---|
| | SPEC | | Public | | SPEC | | Public | |
| | rank[1] | % very much[2] | rank[1] | % very much[2] | rank[1] | % very much[2] | rank[1] | % very much[2] |
| Federal Government | 2 | 80 | 3 | 64 | 2 | 75 | 3 | 65 |
| Provincial Government | 1 | 87 | 1 | 79 | 1 | 80 | 1 | 78 |
| Greater Vancouver Regional District | 6 | 58 | 6 | 49 | 6 | 49 | 5 | 48 |
| Municipal Government | 4 | 67 | 7 | 54 | 4 | 60 | 4 | 56 |
| Local Industry | 3 | 71 | 2 | 69 | 3 | 67 | 2 | 74 |
| Greater Vancouver Sewage and Drainage District | 5 | 65 | 4 | 62 | ----- Not Applicable ----- | | | |
| Individual Citizen | 6 | 58 | 5 | 50 | 5 | 55 | 6 | 45 |

FIG. 3-18--OPINIONS ON THE RESPONSIBILITY OF THE GREATER VANCOUVER REGIONAL DISTRICT FOR WATER POLLUTION CONTROL FROM Q8 "Who do you think should be responsible for controlling water pollution? How far do you think they should be responsible . . . Greater Vancouver Regional District?"

| % | SPEC | Pub | <12 | 12 | VC | Univ | 0-3 | 3-6 | 6-9 | 9-12 | 12-15 | 15+ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Very much | 58 | 49 | 41 | 50 | 55 | 65 | 43 | 36 | 61 | 50 | 66 | 61 |
| Somewhat & Not at all | 24 | 31 | 31 | 36 | 31 | 24 | 28 | 39 | 27 | 37 | 19 | 16 |
| Don't know | 4 | 4 | 10 | 0 | 2 | 2 | 18 | 19 | 4 | 1 | 4 | 0 |
| No response | 14 | 17 | 19 | 14 | 11 | 10 | 10 | 5 | 9 | 13 | 10 | 23 |
| Total | 100 | 101 | 101 | 100 | 99 | 101 | 99 | 99 | 101 | 101 | 99 | 100 |
| $\chi^2$ | — | | $\chi^2_9 = 35.203^{***}$ | | | | $\chi^2_9 = 24.94^{**}$ | | | | | |

[1]Rank is based on percentages of respondents marking "very much."

[2]Percentage of respondents marking "very much," "somewhat," "not at all," "don't know" or not replying.

found between the responses of the different education groups to this question.[1]

There is generally close agreement between SPEC and the public on the degree of responsibility which should be assumed by different levels of government and corporations for controlling pollution, no significant differences being found between them in this regard. Pollution appears to be regarded as a Provincial matter with considerable Federal involvement. Local industry is also cited as having a heavy responsibility for pollution control. (Fig.3-17)

A general feeling exists that regional agencies should have a relatively low level of responsibility although there is some divergence of opinion on this issue. Analysis of responses to the Greater Vancouver Regional District (GVRD) for example indicates that their lower rankings are due in part to relatively low levels of knowledge about them. (Fig.3-18) "Don't Knows" range as high as 19% and "non-responses" reach 23%. Lack of knowledge and less willingness to express an opinion about them was particularly marked amongst the lower education and lower income groups. In addition to this factor, however, there is a distinct tendency for SPEC and the higher education and income groups to feel that the GVRD should be very much involved in water pollution control. There were in fact significant differences between the responses of the education and income groups to this question. Similar significant differences were also noted in responses to regional government involvement in air pollution control. This may reflect some appreciation on the part of SPEC and the higher

---

1 $\chi^2_3 = 12.114^{**}$

FIG. 3-19--OPINIONS ON INDIVIDUAL RESPONSIBILITY FOR AIR POLLUTION CONTROL FROM Q15 "Who do you think should be responsible for controlling air pollution? How far do you think they should be responsible?"

| % | SPEC | Pub | <12 | 12 | VC | Univ | 0-3 | 3-6 | 6-9 | 9-12 | 12-15 | 15+ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Very Much | 55 | 45 | 44 | 44 | 49 | 55 | 53 | 33 | 50 | 50 | 50 | 61 |
| Some-what & Not At All | 27 | 39 | 38 | 45 | 32 | 37 | 30 | 47 | 36 | 44 | 35 | 29 |
| Don't Know | 4 | 2 | 4 | 0 | 6 | 1 | 3 | 4 | 3 | 0 | 0 | 3 |
| No Res--ponse | 15 | 14 | 14 | 11 | 13 | 7 | 12 | 15 | 10 | 7 | 14 | 6 |
| Total | 101 | 100 | 100 | 100 | 100 | 100 | 98 | 99 | 99 | 101 | 99 | 99 |
| $\chi^2$ | $\chi^2_3=13.915^{***}$ | | $\chi^2_9 = 22.500^{**}$ | | | | | | | | | |
| $\chi^2$ SPEC v | | | <12 | 12 | VC | Univ | 0-3 | 3-6 | 6-9 | 9-12 | 12-15 | 15+ |
| | | | $\chi^2_2=11.576^{**}$ | $\chi^2_2=17.325^{***}$ | — | $\chi^2_2=12.834^{**}$ | — | $\chi^2_2=18.982^{***}$ | $\chi^2_2=11.576^{***}$ | $\chi^2_2=17.056^{***}$ | $\chi^2_2=7.025^{*}$ | — |

education and income groups, of the necessity for some regional jurisdiction over pollution problems in an urban area.

Compared to the emphasis on most levels of government and industry, individual responsibility for pollution control has a low rating. (Fig.3-17) In the case of air pollution significant differences were found between SPEC and the public and between the education groups on this issue, members of SPEC and the university/college group especially having a higher sense of individual responsibility. (Fig.3-19) Similar tendencies were noted with respect to water pollution but the differences in responses were not statistically significant.

Although substantial government involvement in pollution control is favoured, considerable scepticism exists over one of the main methods used by different levels of government to control pollution, anti-pollution laws. No more than 10% of SPEC or the public stated that Municipal, Provincial, or Federal laws are adequate in their responses to Q9, Q10, Q16, and Q17. There is a widespread lack of knowledge or indifference about them, approximately 20% of the public sample gave a "don't know" response to these questions. There was a tendency on the part of SPEC members and the higher education and income groups to express a more critical opinion on the water and air pollution laws of each level of government. An example is provided in the case of the adequacy of Provincial water pollution laws. SPEC members and the higher education and income groups gave higher "no" responses and lower "don't know" and "non-responses" than the lower education and income groups. The differences between the education groups and between the income groups are, in fact, significant at the .05 level.

FIG. 3-20--VARIATIONS IN OPINIONS ON THE ADEQUACY OF PROVINCIAL WATER POLLUTION LAWS FROM Q9 "Do you consider existing (Provincial) laws are adequate to deal with water pollution?"

| % | SPEC | Pub | <12 | 12 | VC | Univ | 0-3 | 3-6 | 6-9 | 9-12 | 12-15 | 15+ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Yes | 4 | 8 | 10 | 5 | 4 | 4 | 7 | 7 | 9 | 4 | 6 | 3 |
| No | 80 | 68 | 62 | 77 | 72 | 81 | 72 | 58 | 75 | 78 | 77 | 88 |
| DK | 16 | 18 | 22 | 14 | 17 | 14 | 17 | 27 | 13 | 15 | 17 | 4 |
| NR | 0 | 6 | 6 | 4 | 6 | 1 | 2 | 8 | 4 | 3 | 0 | 3 |
| Total | 100 | 100 | 100 | 100 | 99 | 100 | 98 | 100 | 101 | 100 | 100 | 98 |
| $\chi^2$ | —— | | $\chi^2_6 = 15.430^*$ | | | | $\chi^2_{10} = 19.294^*$ | | | | | |

Once again there is a fairly close correspondence between the opinions of SPEC and the public on aspects of pollution. Both of them appear to hold broadly similar views on the feasibility of pollution control, the responsibility of various levels of government and industry, and the adequacy and enforcement of anti-pollution laws. There are some indications however that SPEC members and people of higher socio-economic status have a somewhat greater knowledge and appreciation of the importance of regional agencies for pollution control and are more sceptical and perhaps slightly more knowledgeable about the adequacy and enforcement of anti-pollution laws. There are also preliminary indicators that SPEC members and members of the higher education and income groups have (or at least say they have) a stronger sense of personal responsibility for pollution control.

### 3.2.5 Willingness to Take Action to Control Pollution

The issue of individual responsibility was examined further in a series of questions designed to discover the willingness of people

FIG. 3-21--WILLINGNESS TO PAY HIGHER TAXES FOR POLLUTION CONTROL FROM Q18 "To control pollution in general would you be willing to pay higher taxes?"

| % | SPEC | Pub | <12 | 12 | VC | Univ | 0-3 | 3-6 | 6-9 | 9-12 | 12-15 | 15+ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Yes | 89 | 71 | 60 | 73 | 72 | 95 | 66 | 69 | 70 | 83 | 88 | 90 |
| No | 7 | 22 | 33 | 21 | 25 | 4 | 20 | 28 | 27 | 14 | 10 | 10 |
| NR | 4 | 7 | 7 | 5 | 2 | 1 | 12 | 2 | 4 | 2 | 0 | 0 |
| Total | 100 | 100 | 100 | 99 | 99 | 100 | 98 | 99 | 101 | 99 | 98 | 100 |
| $\chi^2$ - | $\chi^2_2 = 8.563^{*}$ | | $\chi^2_6 = 42.099^{****}$ | | | | $\chi^2_5 = 14.422^{*}$ | | | | | |
| $\chi^2$ SPEC v | | | <12 | 12 | VC | Univ | 0-3 | 3-6 | 6-9 | 9-12 | 12-15 | 15+ |
| | | | $\chi^2_2=15.724^{***}$ | $\chi^2_1=4.889^{*}$ | $\chi^2_1=4.954^{*}$ | — | — | $\chi^2_1=8.103^{**}$ | $\chi^2_1=7.704^{**}$ | — | — | — |

to pay for pollution control. (Fig.3-21)

Over 70% of the public as a whole are willing to pay higher taxes for pollution control, although there are substantial variations between the constituent education and income groups in this regard. The three highest education groups and three highest income groups are all above average in their willingness to pay higher taxes, the university educated and $12,000+ income groups being well above average. The difference noted between the education groups and between the income groups were statistically significant.

Eighty-nine per cent of SPEC members are willing to pay higher taxes, significantly more than the public as a whole and most of the education and income groups. Although 54% of the SPEC sample has below university/college education and 70% belong to households with an annual income of less than $12,000 per annum, SPEC is on a par with these groups, no significant differences being found between them with respect to willingness to pay higher taxes for pollution control.

Willingness to pay higher taxes was investigated further by means of a scale ranging from one dollar to over fifty dollars and increasing in units of ten dollars on which respondents who were willing to pay higher taxes and could stipulate an amount indicated how much they were willing to pay. This scale should be regarded not so much as a guide to the maximum amount people are willing to pay but rather as an indicator of willingness to pay to be used for comparative purposes. (Fig.3-22)

The amounts people are willing to pay in higher taxes were found to be closely related to their education and income levels. For example, whereas 19% of the public as a whole are willing to pay over $40 per

FIG. 3-22--THE AMOUNTS PEOPLE ARE WILLING TO PAY IN HIGHER TAXES FOR POLLUTION CONTROL FROM Q19 "If yes, how much would you be willing to pay in additional taxes per year?"

| Additional Taxes in $ Per Annum | SPEC | PUB | <12 | 12 | VC | Univ | 0-3 | 3-6 | 6-9 | 9-12 | 12-15 | 15+ | SPEC Univ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1-10 | 4 | 29 | 42 | 25 | 23 | 13 | 72 | 38 | 28 | 21 | 8 | 4 | 4 |
| 10-20 | 11 | 32 | 28 | 36 | 42 | 31 | 28 | 33 | 36 | 27 | 16 | 26 | 0 |
| 20-30 | 18 | 15 | 15 | 16 | 16 | 18 | 0 | 8 | 19 | 19 | 24 | 22 | 17 |
| 30-40 | 13 | 5 | 6 | 3 | 6 | 4 | 0 | 5 | 3 | 6 | 14 | 4 | 13 |
| 40-50 | 26 | 11 | 6 | 13 | 10 | 19 | 0 | 13 | 9 | 15 | 19 | 22 | 31 |
| 50+ | 26 | 8 | 3 | 7 | 3 | 16 | 0 | 3 | 5 | 11 | 19 | 22 | 35 |
| Total | 98 | 100 | 100 | 100 | 100 | 101 | 100 | 100 | 100 | 99 | 100 | 100 | 100 |
| $\chi^2$ | $\chi^2_3 = 39.369^{****}$ | | $\chi^2_9 = 28.582^{**}$ | | | | $\chi^2_{15} = 67.051^{****}$ | | | | | | |
| $\chi^2$ SPEC v | | | <12 | 12 | VC | Univ | 0-3 | 3-6 | 6-0 | 9-12 | 12+ | | |
| | | | $\chi^2_5 = 43.901^{****}$ | $\chi^2_5 = 31.196^{****}$ | $\chi^2_2 = 21.088^{**}$ | $\chi^2_5 = 13.067^{****}$ | $\chi^2_2 = 49.456^{****}$ | $\chi^2_5 = 34.649^{****}$ | $\chi^2_5 = 34.424^{****}$ | $\chi^2 = 15.407^{**}$ | ——— | | |
| SPEC Univ v | | | | | | $\chi^2_2 = 13.979^{**}$ | | | | | | | |

annum the corresponding figures for the less than grade twelve and university/college groups are 9% and 35% respectively. Similarly, whereas none of the $0 - 3,000 per annum group and only 16% of the $3,000-6,000 per annum group are willing to pay over $40 per annum, the corresponding figures for the two highest income groups are 38% and 44% respectively. The differences between the education groups and between the income groups are statistically significant.

Thus higher education and income groups are not only significantly more willing to pay higher rates, but are willing to pay significantly higher amounts than lower education and income groups. As might be expected, willingness to pay appears to be closely associated with ability to pay, although the greater willingness to pay on the part of higher education and income groups may also be associated with the greater concern over pollution and somewhat higher sense of personal responsibility expressed by these groups.

- SPEC is willing to pay significantly higher amounts in extra taxes than the public as a whole, over half of the members who answered this question, indicating that they are willing to pay over $40 per annum. SPEC is also willing to pay significantly higher amounts than each of the education groups, including the university group. In addition it was discovered that the SPEC university educated group is willing to pay significantly higher amounts than the directly comparable university group from the public sample. SPEC is also willing to pay significantly higher amounts than all of the income groups below $12,000 per annum. Although the differences between SPEC and the $12,000+ per annum group were not statistically significant, SPEC does rate higher than the

FIG. 3-23--WILLINGNESS TO PAY HIGHER PRICES FOR POLLUTION CONTROL FROM Q20 "To control pollution would you be willing to pay higher prices for manufactured goods?"

| % | SPEC | Pub | <12 | 12 | VC | Univ | 0-3 | 3-6 | 6-9 | 9-12 | 12-15 | 15+ | SPEC Univ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YES | 75 | 40 | 36 | 38 | 45 | 52 | 33 | 42 | 36 | 41 | 54 | 52 | 86 |
| NO | 22 | 51 | 56 | 57 | 49 | 45 | 53 | 54 | 63 | 55 | 42 | 39 | 10 |
| NR | 4 | 9 | 8 | 5 | 6 | 4 | 12 | 4 | 2 | 4 | 4 | 9 | 4 |
| Total | 101 | 100 | 100 | 100 | 100 | 101 | 98 | 100 | 101 | 100 | 100 | 100 | 100 |
| $\chi^2$ | $\chi^2_2 = 24.326^{****}$ | | ——— | | | | ——— | | | | | | |
| $\chi^2$ SPEC v - | | | 12 $\chi^2_2 = 23.380^{****}$ | 12 $\chi^2_1 = 19.922^{****}$ | VC $\chi^2_1 = 7.913^{**}$ | Univ $\chi^2_1 = 7.344^{**}$ | 0-3 $\chi^2_1 = 11.855^{***}$ | 3-6 $\chi^2_1 = 13.857^{***}$ | 6-9 $\chi^2_1 = 22.736^{****}$ | 9-12 $\chi^2_1 = 14.765^{***}$ | 12-15 $\chi^2_1 = 3.982^{*}$ | 15+ ——— | |
| SPEC Univ v | | | | | | $\chi^2_1 = 3.982^{*}$ | | | | | | | |

$12,000-15,000 and $15,000+ per annum groups on a percentage basis.

The divergence between SPEC and the public with respect to willingness to pay higher prices is even more striking than their differential willingness to pay higher taxes. (Fig.3-23) Whereas 75% of SPEC members are willing to pay higher prices, only 40% of the public are willing to do so, these differences being significant at the .0001 level. Although there are indications from the percentage responses that the higher education and higher income groups are more willing to pay higher prices than the lower education and income groups, these differences are not statistically significant.

SPEC members are significantly more willing to pay higher prices than virtually all of the education and income groups. Although no significant differences were found between SPEC and the $15,000+ group, the percentage responses of SPEC indicate a greater willingness to pay higher prices. The university/college educated group in SPEC are significantly more willing to pay higher prices than the comparable group from the general public.

SPEC was also willing to pay significantly higher amounts in higher prices than the public as a whole and virtually all of the constituent groups. (Fig. 3-24) Thirty-eight per cent of the SPEC members who answered this question indicated that they are willing to pay an increase of over 7% in the price of goods, compared to only 8% of the general public. Although there are indications that higher education and higher income groups are willing to pay greater price increases than lower education and income groups, these differences are not statistically significant.

FIG. 3-24--THE AMOUNTS PEOPLE ARE WILLING TO PAY IN HIGHER PRICES FOR POLLUTION CONTROL
FROM Q21 "If yes, how much would you be willing to pay in higher prices?"

| % | SPEC | PUB | 12 | <12 | VC | Univ | 0-3 | 3-6 | 6-9 | 9-12 | 12-15 | 15+ | SPEC Univ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1-3 | 34 | 65 | 73 | 59 | 65 | 62 | 87 | 59 | 73 | 68 | 63 | 50 | 26 |
| 4-6 | 37 | 27 | 24 | 29 | 35 | 30 | 7 | 35 | 17 | 27 | 29 | 44 | 48 |
| 7-9 | 9 | 3 | 2 | 4 | 0 | 2 | 7 | 0 | 2 | 0 | 0 | 6 | 10 |
| 9+ | 29 | 6 | 2 | 8 | 0 | 6 | 0 | 6 | 7 | 5 | 8 | 0 | 16 |
| Total | 99 | 100 | 99 | 100 | 100 | 100 | 101 | 100 | 99 | 100 | 100 | 100 | 100 |
| $\chi^2$ | $\chi^2_2 = 20.328^{***}$ | | ——— | | | | ——— | | | | | | |
| $\chi^2$ SPEC v - | | | 12 | <12 | VC | Univ | 0-3 | 3-6 | 6-9 | 9-12 | 12-15 | 15+ | |
| | | | $\chi^2_2 = 16.795^{***}$ | $\chi^2_2 = 6.091^{*}$ | $\chi^2_2 = 8.372^{*}$ | $\chi^2_2 = 9.393^{**}$ | $\chi^2_2 = 11.535^{**}$ | $\chi^2_2 = 8.225^{*}$ | $\chi^2_2 = 11.685^{**}$ | $\chi^2_2 = 10.245^{**}$ | — | — | |

Willingness to pay higher taxes appears to be greater than willingness to pay higher prices. For example, while 71% of the public indicated that they are willing to pay higher taxes, the corresponding figure for higher prices is only 40%. Chi-square analysis of the responses to Q18 and Q20 showed that significantly higher proportions of the public and each constituent education and income group are willing to pay higher taxes than prices. (Fig.3-25) The only exception is SPEC. Although the percentage of SPEC members willing to pay higher prices is somewhat lower than the percentage willing to pay higher taxes, these differences in the responses of SPEC to those two questions are not statistically significant.

The greater reluctance on the part of the public to accept higher prices as opposed to higher taxes is probably based to a large extent on a general feeling that industry should use its profits to control its own pollution and a specific fear that unwarranted price rises would be made in the name of pollution control. The greater acceptability of increased taxes may be due in part to the belief that they would be more open to public scrutiny and less open to abuse than increased prices. Many of the respondents when asked if they would be willing to pay higher taxes, did, in fact, note on the questionnaire that they would be willing if they knew that the money was to be used exclusively for pollution control. The greater acceptability of increased taxes may also reflect some recognition of the fact that taxes may be adjusted to take account of differences in income levels and differences in the use made of collective pollution control facilities.

The divergence between SPEC and the public with regard to these

FIG. 3-25--DIFFERENTIAL WILLINGNESS TO PAY HIGHER TAXES AS OPPOSED TO HIGHER PRICES FOR POLLUTION CONTROL FROM Q18 "To control pollution in general would you be willing to pay higher taxes?" AND Q20 "To control pollution would you be willing to pay higher prices for manufactured goods?"

| | SPEC | Pub | <12 | 12 | VC | Univ | 0-3 | 3-6 | 6-9 | 9-12 | 12-15 | 15+ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SPEC | — | | | | | | | | | | | |
| Pub | | $\chi^2_2=110.905^{****}$ | | | | | | | | | | |
| <12 | | | $\chi^2_2=16.999^{***}$ | | | | | | | | | |
| 12 | | | | $\chi^2_2=40295$ | | | | | | | | |
| VC | | | | | $\chi^2_1=5.434^{*}$ | | | | | | | |
| Univ | | | | | | $\chi^2_1=50.132^{****}$ | | | | | | |
| 0-3 | | | | | | | $\chi^2_1=8.658^{**}$ | | | | | |
| 3-6 | | | | | | | | $\chi^2_1 12.135^{***}$ | | | | |
| 6-9 | | | | | | | | | $\chi^2_1 27.452^{****}$ | | | |
| 9-12 | | | | | | | | | | $\chi^2_1=34.758^{****}$ | | |
| 12-15 | | | | | | | | | | | $\chi^2_1 11.139^{**}$ | |
| 15+ | | | | | | | | | | | | $\chi^2_1=6.882^{**}$ |

[1]Each chi-square value represents the differences found between the responses of any one "group" (e.g. the public) to these two questions.

questions dealing with willingness to pay is more clearly marked than divergence of opinion on any of the previous questions. While differences between the concern and knowledge of SPEC and the public over pollution appears relatively minor, the stated willingness of SPEC to make a personal sacrifice for pollution control is much stronger. This willingness seems to be much greater than any extra willingness that might be attributed to SPEC solely on the grounds of the socio-economic characteristics of its members.

The paying of taxes for pollution control is a relatively passive and collective form of action in the sense that the individual has to pay whether he is willing to or not. It requires little or no additional effort on his part relative to the effort of other citizens. A number of other forms of action involving individual initiative were examined however. (Fig.3-26)

FIG.3-26--OPINIONS ON DIFFERENT METHODS OF EXPRESSING FEELINGS ABOUT POLLUTION FROM Q24 "By expressing your feelings about pollution in the following ways do you feel you will get favourable action?"

| | YES % | | NO % | | NR % | | |
|---|---|---|---|---|---|---|---|
| METHOD | SPEC | Pub. | SPEC | Pub. | SPEC | Pub. | $\chi^2$SPEC v Public |
| Writing to Local Council | 31 | 31 | 42 | 38 | 27 | 31 | — |
| Writing to MLA | 44 | 39 | 27 | 31 | 29 | 30 | — |
| Writing to MP | 40 | 41 | 24 | 30 | 36 | 29 | — |
| Joining an Action Group | 75 | 54 | 4 | 17 | 22 | 29 | $\chi^2_2 = 10.254^{**}$ |
| Writing to Local Paper | 26 | 30 | 36 | 33 | 38 | 37 | — |
| Phoning Local Radio Station | 21 | 27 | 36 | 37 | 42 | 36 | — |
| Attending Public Meeting | 36 | 50 | 16 | 20 | 42 | 30 | — |

Firstly, SPEC and the public were asked which methods of expressing feelings about pollution did they believe would be effective. The responses between SPEC and the public proved to be remarkably similar in the main. Both were somewhat pessimistic about receiving a favourable response from their elected representatives, especially members of local council. Similarly contacting the local media was not deemed to be very effective, although attending public meetings was rated somewhat higher by both groups. Joining an action group was the most favoured approach for both groups in terms of their percentage responses, although SPEC was significantly higher in its estimation of the effectiveness of action groups than the public.

In spite of the fact that a substantial majority of SPEC members consider action groups to be relatively effective many of the members have not played an active role in their own organization. A quarter of the respondents indicated that they had never attended any kind of SPEC meeting while another quarter had only attended one meeting every three to six months. In addition nearly half of the respondents indicated that they had never been active in any kind of SPEC project. (Appendix A-I Q3 and Q4) These findings are particularly striking in view of the possible bias towards more active SPEC members inherent in responses to a mailed questionnaire. Observation of participation at meetings and in projects suggested, in fact, that only about 10% of the members of SPEC New Westminster played an active role in the organization on a regular basis.

In addition to questions about their role in their own organization, SPEC members were asked if they had ever used any of the methods mentioned previously, to express their opinions about pollution. (Fig.3-27)

Over 30% of them had written to their MLA and MP and 15% had written to their council. Thirteen per cent said that they had written to their local paper, while 11% had phoned their local radio station. These percentages correspond quite well to the relative effectiveness attributed to the use of those channels. (Fig.3-26) On the other hand, there was divergence between the percentage of SPEC members who had attended public meetings, 60%, and the smaller percentage, 36%, who deemed them effective.

FIG. 3-27--THE USE MADE OF DIFFERENT METHODS OF EXPRESSING FEELINGS ABOUT POLLUTION BY SPEC MEMBERS FROM RESPONSES TO THE QUESTION, "Have you ever expressed your feelings about pollution in any of the following ways?"

| METHOD | % | | | |
|---|---|---|---|---|
| | Yes | No | NR | Total |
| Letter to Local Council | 15 | 60 | 25 | 100 |
| Letter to MLA | 31 | 44 | 24 | 99 |
| Letter to MP | 31 | 44 | 24 | 99 |
| Joining Action Group | 84 | 7 | 9 | 100 |
| Letter to Local Paper | 13 | 56 | 31 | 100 |
| Phoning Local Radio | 11 | 58 | 31 | 100 |
| Attending Public Meetings | 60 | 22 | 18 | 100 |

Previous studies have shown that the proportion of the public who make complaints about pollution is extremely small, usually only about 2% (de Groot and Samuels 1962, Medalia and Finkner, 1968). Conversations with two New Westminster health inspectors[1] about the numbers of

[1]Oral communication. Mr. Clarkson and Mr. Webb, Health Inspectors for the City of New Westminster, July 1971.

complaints received directly by them, substantiated these findings. Complaints about air pollution vary considerably with local pollution conditions but rarely average more than five to ten a week, normally even less. Complaints about water pollution are even lower. Thus it seems that complaint rates from SPEC members are considerably higher than would be expected from the public at large. The fact that SPEC members are more likely to have taken action either as individual citizens or members of their group, reinforces the finding that they are more willing to take action against pollution. The major divergence between SPEC and the public is not found in their opinions about pollution but in their determination to do something about it.

# CHAPTER IV

# CONCLUSIONS, IMPLICATIONS, AND FURTHER RESEARCH

## 4.1. Conclusions

### 4.1.1 The Representativeness of the Environmental Citizen Group in terms of Socio-Economic Status

The SPEC sample was found to be significantly higher than the public sample in terms of both its education and income levels. These findings support the hypothesis that members of environmental citizen groups are of higher socio-economic status than the population from which they are drawn and are thus in accordance with the results of previous studies on the relationships between political participation and socio-economic status (Milbrath 1965).

Comparison of the findings with results from a previous study (Harry et al 1969) suggests that members of the environmental citizen group do not appear to be as unrepresentative of the general public as members of an outdoor recreation/conservation club. It seems as if the recent environmental movement may have attracted people from a wider variety of socio-economic backgrounds than conservation groups have done in the past.

### 4.1.2 The Representativeness of the Opinions of the Environmental Citizen Group about Pollution

a) Concern about Pollution

General public concern appears to be as great as that of SPEC members in many respects. Both SPEC and the public consider that water pollution, air pollution, and sewage disposal are not being adequately dealt with compared to other local problems and are the most important issues facing their community. Their opinions on the water quality

of the Fraser River, local air quality, and the seriousness of water and air pollution in the Province are not widely divergent. The extremely high level of public concern found in this study is in accordance with findings from other recent reports (Auliciems and Burton 1970, Minghi et al 1971) and is probably largely a reflection of intensive publicity about environmental problems.

In spite of this general similarity in expressed concern, there are some indications that SPEC members are more concerned about pollution issues than the general public. SPEC members place less relative emphasis on most "non-environmental" issues and are significantly more dissatisfied with the adequacy of local sewage treatment facilities. Although these tendencies are shared by people with high education and income levels they are not as marked as in the case of SPEC members.

There is thus some support for the hypotheses that people of high socio-economic status are more concerned about pollution than people of lower socio-economic status and that members of environmental citizen groups are more concerned than the general public and members of high socio-economic groups. The broad similarity in levels of concern is perhaps more noteworthy however.

b) Levels of Knowledge about Pollution

Although no direct measure for testing levels of knowledge were provided in the questionnaire (e.g. an environmental quiz), many of the responses are indicative of knowledge and awareness of pollution.

There are a number of indications that SPEC members have a greater appreciation of specific aspects of pollution and a higher discriminatory

ability than the average member of the public. SPEC members are more inclined to be sceptical about the adequacy of local sewage treatment. As noted previously, emissions of untreated sewage are considered to reach undesirably high levels in the lower Fraser on occasions (Goldie 1967). They differentiate between the relative importance of sources of pollution somewhat more clearly than the general public does. In some cases SPEC differentiates between indicators of pollution in closer accordance with what is scientifically accepted as being more indicative of pollution conditions. SPEC has slightly higher knowledge of regional districts and anti-pollution laws than the public as a whole does. Greater knowledge of specific aspects of pollution and greater discriminatory ability are shared by people with relatively high education and income levels but often these tendencies are not as marked as in the case of SPEC members.

There is some limited support for the hypotheses that people of higher socio-economic status are more knowledgeable about pollution than people of lower socio-economic status and that members of environmental citizen groups are more knowledgeable than the general public and members of high socio-economic groups. Once again however, the general similarities in responses between the public, constituent education and income groups and members of SPEC are more noteworthy than the differences.

c) Willingness to Take Action against Pollution

The major difference between SPEC and the public is in the willingness of SPEC to actually take individual action to control pollution. Although there are marked positive relationships between willingness to pay and the amounts to be paid in increased taxes, and education and

income levels, SPEC exceeds even the highest education and income groups in these respects. SPEC also has significantly less reservations than the public and all of the education and income groups about paying higher prices and is willing to pay higher amounts in higher prices for pollution control. In terms of actually having done something towards pollution control by individual effort such as letter writing or participating in anti-pollution projects, the average SPEC member seems to be more active than the average member of the public.

There is thus substantial support for the hypotheses that people of higher socio-economic status are more willing or at least more able to take action against pollution than people of lower socio-economic status and that members of environmental citizen groups are more willing to take action against it than the general public and members of high socio-economic groups.

## 4.2 Implications

A number of implications can be drawn from an examination of these general conclusions in relation to the three interconnected issues of the roles of the opinions of experts, the public and environmental citizen groups in environmental decision making. Implications drawn from one study are, of course, tentative.

Claims that the general membership of environmental citizen groups are highly unrepresentative of the public in terms of their socio-economic status and opinions on environmental issues would seem to be exaggerated. The results of this study suggest that the recent environmental movement has captured a fairly wide cross-section of concerned citizens who are broadly representative of the public viewpoint on many aspects of

pollution. In that the representativeness of a citizen group may be an important factor in its acceptance by decision makers and fellow citizens and hence the effectiveness of its voice (Patterson 1967), the lack of fundamental divergence from the public in terms of socio-economic composition and opinions on many aspects of pollution may represent an asset to the environmental citizen group.

The only major point of divergence between the environmental citizen group and the public seems to be in the greater personal commitment of the former to take action against pollution. Given that levels of expressed concern between the public and SPEC members are similar, it seems that there is little or no link between expressions of concern about the problem and willingness to take action, or experience of having taken action, towards solving it. This finding concurs with Rankin's (1969) remarks concerning the effectiveness of information campaigns about pollution:

> "While the public shows considerable awareness of pollution, such programs have not, for the most part, been effective in communicating actions which might help reduce the threat. Without such appropriate action-oriented suggestions, continued emphasis on the nature and scope of the threat may have little effect, and indeed, could be self-defeating in the long run." (p.569)

The apparent lack of congruence between expressions of general concern about pollution and willingness to take action to control it may well be a manifestation of a more pervasive situation that Riesman and Glazier (1949) have drawn attention to,

> "for most people in modern society, there is no direct relationship between responsibility for having an opinion and responsibility for action." (p. 635)

This suggests perhaps that little direct personal involvement in anti-

pollution action, for example by active participation in an environmental citizen group can be expected from the majority of citizens.

Lack of direct action does not necessarily preclude support for pollution control schemes however. The high levels of general concern expressed by the public could serve as a precondition for governmental action (Long 1966). There are some preliminary indications on the other hand that a wider appreciation of specific aspects of pollution such as sewage treatment and a stronger personal commitment (especially on the part of people of lower socio-economic status) may be necessary if extremely costly anti-pollution schemes are to gain widespread support.

Recent developments with regards to sewage treatment facilities in New Westminster have highlighted some important aspects of the issue of relative roles of the opinions of experts, the public and environmental citizen groups.

At the time the public opinion survey was conducted, Goldie, the pollution control engineer responsible for the report on the Fraser River (Goldie 1967), is reported to have stated that from a technical point of view it was difficult to justify any treatment of domestic sewage in the Fraser adding that the Pollution Control Branch recommended primary treatment not out of necessity, but in reaction to public pressure for some kind of action (Wolf 1970). As Goldie mentions in the postcript to his report,

> "Public interest in pollution is rapidly gaining momentum with the popular lay view that pollution in any form should not be tolerated. The standard technical viewpoint which accepts disposal by dilution is now being challenged by a demand that wastes should not be discharged without treatment." (p.52)

Goldie was somewhat sceptical however that cost considerations might

## THE QUESTIONS . . . THE ANSWERS

Q. **WHAT METHODS WERE CONSIDERED FOR FINANCING THE PROGRAM?**

A. Several methods were considered, including financing the entire program out of general revenue; financing it entirely by local improvement; by a combination of general revenue and local improvement; by a user charge (or tax); by a combination of the user tax and local improvement.

Q. **WHAT METHOD WAS SELECTED?**

A. A user charge, or tax, allowing for a reduction to those property owners who have already paid for sewers.

Q. **WHY WAS THIS METHOD SELECTED?**

A. It was concluded that sewer service should be considered a utility, like water. It is a continuing service and, in urban areas, a necessity. The user tax was considered the most equitable.

Q. **DOES THIS MEAN THAT THE TAX WILL BE LEVIED ON ALL PROPERTIES, EVEN IF THE OWNER HAS ALREADY PAID FOR SEWERS?**

A. Yes . . . all properties on the sewer system will now pay an annual charge, as they do for water. Properties not sewered will not pay a tax until they get sewers.

Q. **HOW WILL THE TAX BE COLLECTED?**

A. It will be collected quarterly, separate from the annual tax levy.

Q. **HOW MUCH WILL THE TAX BE?**

A. It depends on your type of residence and whether or not you now have sewer service.

### THE RATES

**Single Family Residence**

$37.50 per quarter year, with a $25 abatement for those who have already paid for their sewer. This leaves a net charge of $12.50 a quarter or $50 a year.

**Duplexes and Row Houses**

$25 quarterly for each unit with an abatement of $12.50 for those who have paid for sewers, leaving a net charge of $12.50 quarterly or $50 a year.

**Apartments**

$12 quarterly per suite with an abatement of $5 where applicable leaving a net charge of $7 quarterly or $28 a year per suite.

**Commercial and Industrial**

Charge based on quantity of water discharged into sewer system.

**Properties Presently Without Sewers**

No charge until sewers are installed, after which time they will pay the full charge, with no abatement, far a period of 20 years. After the 20-year period these properties will be eligible for the abatement.

A $22 million treatment plant similar to this one on Iona Island will be built on Annacis Island as part of the Greater Vancouver Sewerage and Drainage District's $43 million pragram to service its eastern area. New Westminster's share of the $43 million is $6.5 million.

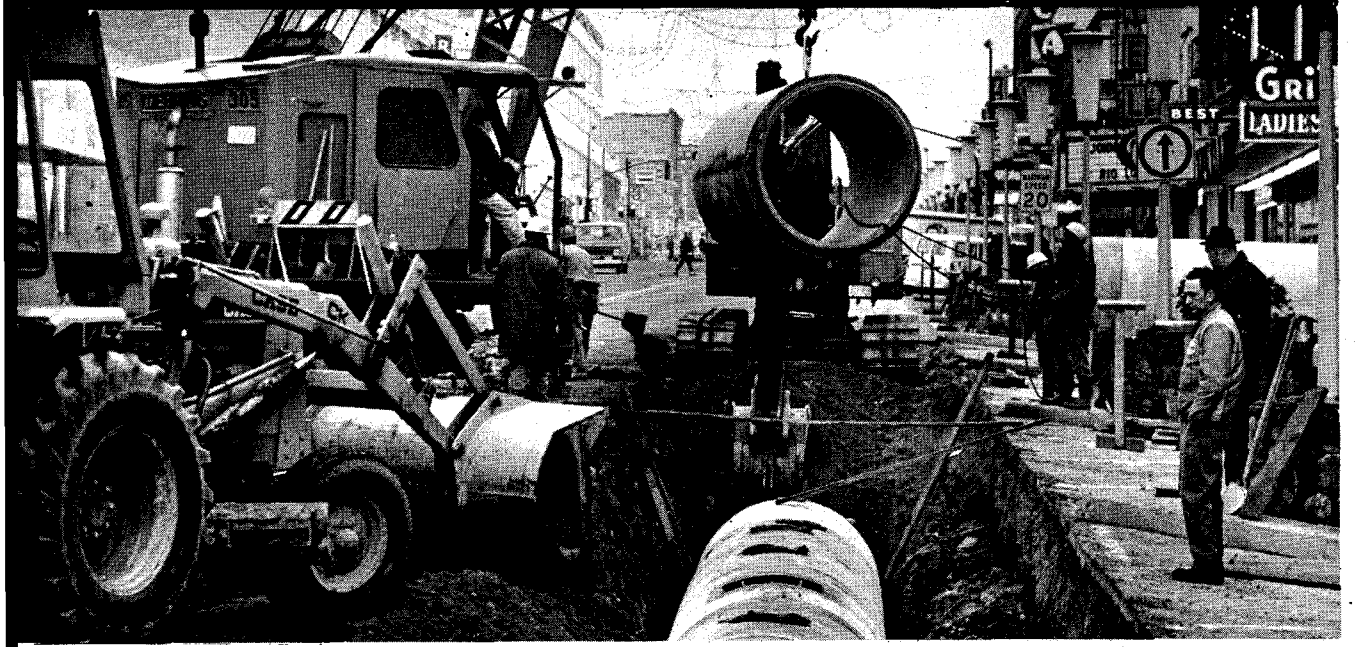


# YOUR FIGHT AGAINST WATER POLLUTION

PUBLISHED BY

## THE CITY OF NEW WESTMINSTER

# YOUR TAX DOLLARS AT WORK




Wark is underway on the Columbia Street interceptar, one of the first stages in the $6.5 million sewerage treatment program for the City of New Westminster.

Throughout North America cities are facing problems, and challenges, far exceeding anything even anticipated only 10 years ago. At the top of the list: Pollution.

In the last decade, citizens — with justification — have become increasingly conscious of all forms of pollution . . . water, air and land. Citizens and governments are demanding action to halt pollution where it now exists and to prevent it happening where it threatens.

Action is being taken in the Greater Vancouver region. Legislatian to control air pollution is being prepared. The fight against water pollution and land pollution has already started.

The Provincial Pollution Control Board has ruled that by January 1, 1975, no untreated sewage is to be discharged into the Fraser River. To meet this requirement, the Greater Vancouver Sewerage and Drainage District, of which New Westminster is a member, has embarked on a five-year, $80 million pollution control program.

It is building two more major treotment plants, installing miles of interceptors and building numerous pumping stations.

Sewage collection and treatment is desirable. But it is also expensive.

Of the Sewerage District's $80 million program, $43 million will be spent in the eastern half of the Greater Vancouver region. New Westminster is in this area. The City's share of the $43 million is $6.5 millian.

In addition, the City must carry out improvements to its local sewer system and provide sewers to several areas now on septic tanks.

The City has no logical alternative to participating in the regional plan. To build its own treatment plant, its own system of interceptors, its own pumping stations would, from the cost point of view, be prohibitive.

The regional plan, certainly, is costly enough. It can be argued that the senior governments, federal and provincial, should provide more financial assistance to local government in the provision of pollution control measures. But they haven't, ond we must finance these works with the resources we have at our disposal.

Yes, it's costly. But the war on pollution is one we cannot afford to lose.

# The Questions . . . the Answers

**Q. DOES LOCAL GOVERNMENT HAVE A PROGRAM FOR CONTROL OF WATER POLLUTION?**

A. Yes. The Greater Vancouver Sewerage and Drainage District is currently working on an $80 million sewage pollution control program.

**Q. WHAT IS THE GREATER VANCOUVER SEWERAGE AND DRAINAGE DISTRICT?**

A. It is a federation of 14 metropolitan area cities and district municipalities, including New Westminster, Vancouver, Burnaby, Surrey, Richmond, Coquitlam, West Vancauver, Narth Vancouver and others.

**Q. WHICH AREAS WILL BENEFIT FROM THE $80 MILLION PROGRAM?**

A. All areas in the region. The Provincial Pollution Control Board has ruled that by January 1, 1975, no untreated sewage is ta be discharged into the Fraser River. The cost to the eastern half of the Greater Vancouver Regional District is $43 million. New Westminster's share of the $43 million is $6.5 million.

**Q. IS NEW WESTMINSTER NOW DISCHARGING UNTREATED SEWAGE INTO THE FRASER RIVER?**

A. Yes, as are most municipalities on the Lower Mainland.

**Q. DID THE CITY OF NEW WESTMINSTER CONSIDER ITS OWN SEWAGE CONTROL PROGRAM INSTEAD OF GOING INTO THE REGIONAL PROGRAM?**

A. Yes, but it was found more practical and more economical to participate in the regional scheme.

**Q. HOW MUCH MONEY WILL NEW WESTMINSTER REQUIRE FOR SEWERAGE WORKS OVER THE NEXT 10 YEARS?**

A. An estimated $8.6 million.

**Q. IS THE ENTIRE $8.6 MILLION REQUIRED FOR THE CITY'S SHARE OF THE REGIONAL POLLUTION CONTROL PROGRAM?**

A. No. About $2.8 million is required to provide sewers in areas that do not now have them and about $950,000 is needed far renewal of aging installations.

(Continued next page)

tend to offset aesthetic considerations (Goldie 1967) although he did stress that the cost of $60,000 (amortization and maintenance) for a small primary plant to serve 20,000 people should be placed in perspective, i.e. $3 per capita per year. Certainly this figure appeared to be relatively insignificant to most people in 1970 (Fig.3-21 and Fig.3-22).

In 1971 a sewer user tax was passed in the City of New Westminster to pay for primary sewage treatment, sewers to areas not presently serviced, and sewer renewal. A brochure explaining the tax and its uses was distributed to every household in New Westminster. (Fig. 4-1) The tax represents an expenditure of $50 per annum for single family residence, duplexes and row houses, and $28 per annum for apartments, about 70% of these amounts actually to be spent on sewage treatment. The only negative reaction to this sewer tax received by the New Westminster mayor and council concerned the equity of the apportionment of costs between apartments and the housing units, and the higher charges levied against areas which have no sewer lines. (Columbian, 1-4-71)

The high level of concern about water pollution and sewage disposal apparent in this study was thus successfully capitalized upon. The brochure made a direct appeal to the concerned citizen and may have helped to reduce negative reaction to the sewer tax. The amounts of money to be raised are quite substantial. Although the scale of amounts people are willing to pay in increased taxes was intended primarily as a comparative device (Fig.3-22), it is interesting to note that $19 per annum is the average amount the 70% of the people who are willing to pay higher taxes, would pay. Even allowing for the fact that some households contain more than one person who would contribute towards a sewer tax, it

appears that the amounts people say they are willing to pay is somewhat less than the amounts they will pay in practice without opposition. The implication is that people are sufficiently concerned about pollution to accept the fact that they will have to pay quite substantial amounts for its control when they are faced with footing the bill, especially if it is in the form of an anti-pollution tax.

The apparent gulf between the maximum amounts of money that people say that they are willing to pay for pollution control and the actual amounts they will pay quite placidly in practice underlines a basic difficulty of assessing future behavior from expressed opinions--predicting deeds from words. It would be extremely difficult to assess, for example, whether the public would strenuously oppose the additional costs of secondary treatment that SPEC and other environmental citizen groups have been advocating. This example epitomizes the fundamental problems of analysing public opinion and preferences and incorporating them into environmental decision making, and the attendant problems of over-reliance on the opinions of experts and the representativeness of the opinions of environmental citizen groups.

## 4.3 Further Research

Since the increase in public interest in environmental quality and the growth of environmental action groups are such recent phenomena, relatively little research has been conducted on them and much remains to be learned. From the review of the broad issues surrounding the nature and roles of the public and environmental citizen group opinions in environmental decision making, and the specific findings and general

conclusions noted in this study, a number of avenues for further research can be defined and suitable vehicles for travelling along them suggested.

Research on public reaction to pollution to date has been almost exclusively concerned with gaining indications of the relative importance of pollution (especially air pollution) to people and their opinions on different aspects such as sources, indicators and willingness to pay by means of large scale highly structured questionnaire surveys. While individually these studies provide useful measures of the importance of pollution to the general public, their levels of knowledge about it and their commitment to control it, and collectively they allow trends in public reaction to be plotted, many questions remain unanswered.

A number of specific questions are raised from the analysis of public opinion in this study which warrant further investigation. Why is concern over water pollution consistently higher than concern about air pollution, although air pollution is probably more apparent to most people visually and perhaps represents a greater health hazard? An analysis of the reactions of small but representative groups of people towards water and air pollution slides and actual situations, and their perception of and attitudes towards health hazards as opposed to property damage and inconvenience, may shed light on this situation. In spite of the overall similarity in many of the public results it is apparent that it is somewhat unrealistic to view "the public" as a monolithic entity. An investigation of the underlying reasons for the marked differences in responses between the education and income groups may provide insight into the role of information in shaping opinions on pollution and

knowledge levels surrounding it. Studies of differential exposure and reaction to and retention of information about pollution conducted under real world and experimental conditions may provide valuable information on this topic.

The whole question of the representativeness of environmental action groups needs further consideration. Their representativeness in terms of socio-economic status could be investigated relatively easily with the cooperation of their members and the results of the 1971 census. Since there seems to be widespread agreement on general concern, further study of the representativeness of their opinions should be particularly oriented towards specific local environmental problems. Comparative analysis of the opinions of the general public, members of citizen groups, experts and politicians towards local environmental issues may well pinpoint areas where information is lacking and thus provide guidelines for improvements in communication.

Probably the most basic parameter which should be measured in surveys of public reaction to pollution is the intensity of people's reaction as evidenced by their willingness to substitute environmental quality for material possessions, time and effort (O'Riordan 1971). As indicated in this study, however, it is all too easy for people to express high concern without apparently being willing to make a substantial sacrifice to achieve increased environmental quality. It is perhaps even easier to express a willingness to take action without subsequently taking it. Deutscher (1966) has shown clearly, in fact, the dangers of using expressed attitudes as a guide to behavior. Accordingly more realistic measures of concern than expressed opinion

and willingness to pay will have to be developed. Again this will entail analysis of small groups, perhaps initially in a gaming situation where units of environmental quality can be traded off against a variety of the factors such as time, effort and material goods (O'Riordan 1971).

Further research into the discrepancy between concern and action is crucial. This research should involve a detailed examination of the personal, social, economic and political factors which help to create it. Case studies of attempts to achieve greater public participation in environmental decision making could be particularly valuable in identifying barriers to greater public involvement. Knowledge of the factors currently limiting widespread public participation is an essential prerequisite to instituting changes which will allow society to move nearer to the democratic ideal.

# APPENDIX A

## THE RESPONSES OF THE PUBLIC AND SPEC SAMPLES TO THE QUESTIONNAIRE

QUESTIONNAIRE

Responses are expressed in percentages. SPEC responses precede the public responses.

1. There are many problems of public concern facing most communities today. For those listed below, please indicate how important you think they are in your community.

| | Most Important | | Less Important | | Least Important | | NR | |
|---|---|---|---|---|---|---|---|---|
| Water Supply | 51 | 72 | 33 | 13 | 13 | 7 | 4 | 8 |
| Sewage disposal | 95 | 88 | 4 | 6 | 0 | 1 | 2 | 5 |
| Police protection | 25 | 56 | 42 | 28 | 27 | 7 | 5 | 9 |
| Education | 64 | 71 | 27 | 18 | 5 | 2 | 4 | 9 |
| Water pollution | 93 | 87 | 4 | 5 | 2 | 2 | 2 | 6 |
| Housing | 24 | 49 | 45 | 33 | 22 | 9 | 9 | 9 |
| Noise pollution | 36 | 30 | 45 | 41 | 9 | 20 | 9 | 9 |
| Parks and recreation | 40 | 33 | 44 | 44 | 7 | 13 | 9 | 10 |
| Air pollution | 89 | 87 | 7 | 6 | 0 | 1 | 4 | 6 |
| Public health | 45 | 70 | 44 | 18 | 5 | 3 | 5 | 9 |
| Roads | 11 | 21 | 22 | 41 | 64 | 30 | 4 | 8 |

2. Here is the same list again. Please indicate now how adequately you think they are being dealt with in your community.

| | Most Adequately | | Less Adequately | | Least Adequately | | NR | |
|---|---|---|---|---|---|---|---|---|
| Water supply | 58 | 64 | 20 | 20 | 15 | 7 | 7 | 9 |
| Sewage disposal | 4 | 17 | 16 | 31 | 73 | 44 | 7 | 8 |
| Police protection | 71 | 58 | 24 | 27 | 2 | 5 | 4 | 10 |
| Education | 38 | 39 | 36 | 41 | 20 | 10 | 5 | 10 |
| Water pollution | 7 | 6 | 13 | 24 | 76 | 60 | 4 | 10 |
| Housing | 29 | 16 | 51 | 50 | 11 | 24 | 9 | 10 |
| Noise pollution | 9 | 16 | 40 | 40 | 44 | 33 | 7 | 11 |
| Parks and recreation | 38 | 45 | 44 | 38 | 15 | 7 | 4 | 10 |
| Air pollution | 4 | 5 | 27 | 23 | 67 | 64 | 2 | 8 |
| Public health | 40 | 39 | 40 | 40 | 7 | 9 | 12 | 11 |
| Roads | 73 | 55 | 16 | 26 | 2 | 8 | 9 | 11 |

3. Water pollution means different things to different people. Please check the appropriate boxes to indicate the importance of each of the factors listed below in helping you to identify water pollution.

| | Most Important | | Less Important | | Least Important | | NR | |
|---|---|---|---|---|---|---|---|---|
| Smell | 51 | 62 | 33 | 21 | 7 | 8 | 9 | 9 |
| Taste | 47 | 64 | 24 | 16 | 13 | 8 | 16 | 12 |
| Oil | 84 | 73 | 7 | 12 | 0 | 3 | 9 | 12 |
| Floating debris | 47 | 65 | 25 | 18 | 15 | 7 | 13 | 10 |
| Weeds, slime | 49 | 59 | 31 | 20 | 9 | 7 | 9 | 14 |
| Froth | 62 | 59 | 20 | 21 | 4 | 6 | 15 | 14 |
| Murkiness | 31 | 53 | 38 | 25 | 15 | 7 | 16 | 15 |
| Algae | 69 | 57 | 16 | 18 | 4 | 9 | 11 | 16 |

4. How would you rate water pollution as a problem in B.C. Do you think it is:

| | | |
|---|---|---|
| Serious | 76 | 76 |
| Important but not serious | 16 | 20 |
| Nothing to be concerned about | 2 | 1 |
| NR | 4 | 3 |

5. How do you rate the quality of water in the Fraser River?

| | | |
|---|---|---|
| Very high quality | 0 | 2 |
| Fairly high quality | 4 | 5 |
| Fairly low quality | 16 | 14 |
| Very low quality | 73 | 63 |
| Don't know | 4 | 12 |
| NR | 4 | 4 |

6. What do you think about sewerage treatment facilities in New Westminster? Do you think they are:

| | | |
|---|---|---|
| Adequate | 0 | 9 |
| Inadequate | 91 | 64 |
| Don't know | 5 | 24 |
| NR | 4 | 3 |

7. The following are possible activities that may affect water quality. Please check those which you think are more important or less important. in their effect on the quality of water.

| | Most Important | | Less Important | | Least Important | | NR | |
|---|---|---|---|---|---|---|---|---|
| Septic tanks | 27 | 37 | 33 | 36 | 29 | 17 | 11 | 10 |
| Industry | 89 | 84 | 5 | 8 | 4 | 0 | 2 | 8 |
| Municipal sewerage | 91 | 79 | 5 | 12 | 2 | 1 | 2 | 8 |
| Detergents | 64 | 67 | 25 | 21 | 2 | 3 | 9 | 9 |
| Agricultural run-off (e.g. chemical fertilizers, pesticides) | 60 | 66 | 31 | 19 | 5 | 7 | 5 | 8 |

8. Who do you think should be responsible for controlling water pollution? How far do you think they should be responsible?

| | Very Much | | Somewhat | | Not at all | | Don't know | | NR | |
|---|---|---|---|---|---|---|---|---|---|---|
| Federal Government | 80 | 64 | 13 | 23 | 2 | 1 | 4 | 2 | 5 | 10 |
| Provincial Government | 87 | 79 | 4 | 13 | 0 | 0 | 2 | 1 | 7 | 7 |
| Greater Vancouver Regional District | 58 | 49 | 20 | 29 | 4 | 3 | 4 | 4 | 14 | 17 |
| Municipal Government | 67 | 54 | 22 | 26 | 0 | 3 | 2 | 2 | 9 | 15 |
| Local Industry | 71 | 69 | 11 | 13 | 7 | 3 | 2 | 1 | 9 | 14 |
| Greater Vancouver Sewerage and Drainage District | 65 | 62 | 20 | 18 | 2 | 1 | 2 | 4 | 11 | 15 |
| Individual Citizen | 58 | 50 | 20 | 30 | 5 | 5 | 5 | 2 | 11 | 13 |

9. Do you consider existing laws are adequate to deal with water pollution?

| | Yes | | No | | Don't know | | NR | |
|---|---|---|---|---|---|---|---|---|
| Municipal bylaws | 4 | 5 | 78 | 67 | 18 | 20 | 0 | 8 |
| Provincial laws | 4 | 8 | 80 | 68 | 16 | 18 | 0 | 6 |
| Federal laws | 9 | 5 | 75 | 65 | 16 | 21 | 0 | 9 |

10. Regardless of whether you consider them adequate or not, do you think that the existing laws controlling water pollution are being strictly enforced?

| | Yes | | No | | Don't know | | NR | |
|---|---|---|---|---|---|---|---|---|
| Municipal bylaws | 0 | 4 | 82 | 70 | 18 | 18 | 0 | 8 |
| Provincial laws | 0 | 4 | 83 | 72 | 16 | 17 | 0 | 7 |
| Federal laws | 6 | 3 | 75 | 67 | 20 | 22 | 0 | 8 |

11. Please check the appropriate boxes to indicate the importance of each of the factors listed in helping you to identify air pollution.

| | Most Important | | Less Important | | Least Important | | NR | |
|---|---|---|---|---|---|---|---|---|
| Smell | 76 | 74 | 16 | 15 | 4 | 3 | 4 | 8 |
| Murkiness | 64 | 63 | 25 | 23 | 5 | 3 | 5 | 11 |
| Physical discomfort | 67 | 57 | 18 | 25 | 7 | 7 | 7 | 11 |
| Airborne particles | 73 | 70 | 20 | 17 | 0 | 5 | 7 | 8 |

12. How would you rate air pollution as a problem in B.C.? Do you think it is:

| | | |
|---|---|---|
| Serious | 53 | 66 |
| Important but not serious | 42 | 31 |
| Nothing to be concerned about | 2 | 1 |
| NR | 4 | 2 |

13. In general, how do you rate the quality of the air in this area?

| | | |
|---|---|---|
| Very high quality | 2 | 2 |
| Fairly high quality | 13 | 27 |
| Fairly low quality | 47 | 39 |
| Very low quality | 36 | 25 |
| Don't know | 2 | 5 |
| NR | 0 | 2 |

14. The following are possible activities that may affect the quality of the air. Please check those which you think are more important or less important in their effect on the quality of the air.

| | Most Important | | Less Important | | Least Important | | NR | |
|---|---|---|---|---|---|---|---|---|
| Domestic fires | 18 | 13 | 31 | 42 | 44 | 34 | 7 | 11 |
| Rubbish burning | 31 | 34 | 47 | 43 | 11 | 12 | 10 | 11 |
| Cars | 89 | 76 | 7 | 16 | 2 | 3 | 2 | 5 |
| Trucks and buses | 89 | 81 | 9 | 13 | 2 | 0 | 0 | 5 |
| Industry | 96 | 93 | 4 | 2 | 0 | 1 | 0 | 4 |
| Slash burning | 36 | 41 | 51 | 35 | 7 | 12 | 4 | 12 |

15. Who do you think should be responsible for controlling air pollution? How far do you think they should be responsible?

| | Very Much | | Somewhat | | Not at all | | Don't know | | NR | |
|---|---|---|---|---|---|---|---|---|---|---|
| Federal Government | 75 | 65 | 10 | 21 | 2 | 2 | 4 | 2 | 9 | 10 |
| Provincial Government | 80 | 78 | 9 | 12 | 0 | 0 | 4 | 1 | 7 | 9 |
| Greater Vancouver Regional District | 49 | 48 | 24 | 27 | 4 | 3 | 7 | 4 | 16 | 19 |
| Municipal Government | 60 | 56 | 22 | 25 | 2 | 2 | 5 | 1 | 10 | 16 |
| Local Industry | 67 | 74 | 10 | 10 | 4 | 1 | 5 | 1 | 13 | 14 |
| Individual Citizen | 55 | 45 | 25 | 35 | 2 | 4 | 4 | 2 | 15 | 14 |

16. Do you consider existing laws are adequate to deal with air pollution?

| | Yes | | No | | Don't know | | NR | |
|---|---|---|---|---|---|---|---|---|
| Municipal bylaws | 4 | 8 | 75 | 66 | 20 | 18 | 2 | 8 |
| Provincial laws | 2 | 5 | 75 | 70 | 22 | 18 | 2 | 7 |
| Federal laws | 0 | 5 | 71 | 64 | 24 | 22 | 5 | 9 |

17. Regardless of whether you consider them adequate or not, do you think that the existing laws controlling air pollution are being strictly enforced?

| | Yes | | No | | Don't know | | NR | |
|---|---|---|---|---|---|---|---|---|
| Municipal bylaws | 2 | 7 | 89 | 70 | 7 | 16 | 2 | 7 |
| Provincial laws | 2 | 4 | 87 | 72 | 9 | 17 | 2 | 7 |
| Federal laws | 2 | 3 | 80 | 68 | 15 | 21 | 3 | 8 |

18. To control pollution in general would you be willing to pay higher taxes?

| | | | | | NR | |
|---|---|---|---|---|---|---|
| Yes | 89 | 71 | No | 7 | 22 | 4 7 |

19. If the answer to Question 18 is YES, how much would you be willing to pay in additional taxes per year?

| | | | NR | 18 | 36 |
|---|---|---|---|---|---|
| $1.00 to $10.00 | 4 | 29 | | | |
| $10.00 to $20.00 | 11 | 32 | | | |
| $20.00 to $30.00 | 18 | 15 | | | |
| $30.00 to $40.00 | 13 | 5 | | | |
| $40.00 to $50.00 | 26 | 11 | | | |
| Over $50.00 | 26 | 8 | | | |

If over $50.00 can you specify roughly how much? .....

20. To control pollution would you be willing to pay higher prices for manufactured goods?

| | | | | | NR | |
|---|---|---|---|---|---|---|
| Yes | 75 | 40 | No | 22 | 51 | 4 9 |

21. If the answer to Question 20 is YES, how much would you be willing to pay in higher prices?

| | | | NR | 36 | 62 |
|---|---|---|---|---|---|
| 1% to 3% more | 34 | 65 | | | |
| 4% to 6% more | 37 | 27 | | | |
| 7% to 9% more | 9 | 3 | | | |
| Over 9% more | 29 | 5 | | | |

If over 9% can you specify roghly how much?.....

22. Do you consider that industry in this area is sufficiently concerned about the quality of the environment?

| | | | | | NR | |
|---|---|---|---|---|---|---|
| Yes | 7 | 8 | No | 85 | 84 | 7 8 |

23. Do you think in general pollution is:

| | | |
|---|---|---|
| Not serious | 0 | 2 |
| Serious but controllable | 89 | 80 |
| Serious and uncontrollable | 9 | 12 |
| Don't know | 0 | 2 |
| NR | 2 | 4 |

24. By expressing your feelings about pollution in the following ways, do you feel you will get favorable action?

| | Yes | | No | | NR | |
|---|---|---|---|---|---|---|
| Writing to local council | 31 | 31 | 42 | 38 | 27 | 31 |
| Writing to MLA | 44 | 39 | 27 | 31 | 29 | 30 |
| Writing to MP | 40 | 41 | 24 | 30 | 36 | 29 |
| Joining an action group | 75 | 54 | 4 | 17 | 22 | 29 |
| Writing to a local paper | 26 | 30 | 36 | 33 | 38 | 37 |
| Phoning to local radio station | 21 | 27 | 36 | 37 | 42 | 36 |
| Attending public meetings | 36 | 50 | 16 | 20 | 42 | 30 |

Other Please specify .....

25. Are there any polluting activities in this area which particularly offend you? If yes, please name them below.

# PERSONAL INFORMATION

The information on this page is required so we can be sure that our total sample adequately represents the social characteristics of New Westminster as a whole.

1. Age

| | | |
|---|---|---|
| Under 15 | 5 | 2 |
| 16 - 20 | 15 | 9 |
| 21 - 30 | 24 | 20 |
| 31 - 45 | 16 | 23 |
| 46 - 60 | 29 | 21 |
| Over 60 | 9 | 13 |
| NR | 2 | 10 |

2. Sex

| | | |
|---|---|---|
| Male | 50 | 53 |
| Female | 50 | 47 |
| NR | 18 | 18 |

3. Education

| | | |
|---|---|---|
| Less than Grade 12 | 21 | 32 |
| Grade 12 | 30 | 33 |
| Vocational College/ Non University | 4 | 10 |
| University or College | 47 | 25 |
| NR | 2 | 18 |

4. Number of People in Household

| | |
|---|---|
| Adults | |
| Teenagers | |
| Children | |

5. Occupation

| | | |
|---|---|---|
| Professional | 22 | 14 |
| Managerial | 4 | 5 |
| Clerical | 4 | 7 |
| Sales | 2 | 5 |
| Public Service, Service Industry | 11 | 7 |
| Skilled Industrial Employee | 4 | 10 |
| Farming | 0 | 0 |
| Fishing, Lumbering, Mining | 2 | 3 |
| Transportation, Communications | 4 | 2 |
| Labourer | 4 | 3 |
| Student | 20 | 11 |
| Housewife | 20 | 21 |
| Retired | 2 | 10 |
| Unemployed | 4 | 2 |
| NR | 0 | 11 |

6. Income for the Household

| | | |
|---|---|---|
| 0 - $2,999 | 0 | 10 |
| $3,000 - $5,999 | 9 | 21 |
| $6,000 - $8,999 | 36 | 27 |
| $9,000 - $11,999 | 25 | 23 |
| $12,000 - $14,999 | 14 | 12 |
| $15,000 - $17,999 | 2 | 3 |
| $18,000 and over | 14 | 4 |
| NR | 20 | 23 |

# APPENDIX A - I

## THE RESPONSES OF THE SPEC SAMPLE TO ADDITIONAL QUESTIONS[1]

[1]Page seven replaced page seven, Appendix A; page nine and ten were additional pages.

24. Which of the following sources do you find to be most helpful, less helpful, least helpful, for informing you about local environmental issues.

| | Most helpful | Less helpful | Least helpful | NR |
|---|---|---|---|---|
| Books | 18 | 33 | 31 | 18 |
| Magazines | 36 | 38 | 15 | 11 |
| Newspapers | 64 | 25 | 5 | 5 |
| Television | 75 | 13 | 5 | 7 |
| Radio | 47 | 29 | 11 | 13 |
| Information from anti pollution groups | 65 | 30 | 4 | 11 |
| Friends, relations, acquaintances | 18 | 36 | 27 | 27 |
| Personal experience | 58 | 24 | 4 | 15 |
| Public meetings | 29 | 24 | 16 | 31 |

Any others? _____

25. Have you ever expressed your feelings about pollution in any of the following ways?

| | Yes | No | NR |
|---|---|---|---|
| Letter to local council | 15 | 60 | 25 |
| Letter to M.L.A. | 31 | 44 | 24 |
| Letter to M.P. | 31 | 44 | 24 |
| Joining an Action Group | 84 | 7 | 9 |
| Letter to local paper | 13 | 56 | 31 |
| Phoning to local radio station | 11 | 58 | 31 |
| Attending public meetings | 60 | 22 | 18 |

Other; Please specify _____

26. By expressing your feelings about pollution in the following ways, do you feel you will get a favourable action?

See Appendix A.

| | Yes | No |
|---|---|---|
| Writing to local council | | |
| Writing to M.L.A. | | |
| Letter to M.P. | | |
| Joining action group | | |
| Writing to local paper | | |
| Phoning to local radio station | | |
| Attending public meetings | | |

Other; Please specify _____

27. Are there any polluting activities in this area which particularly offend you? If yes, please name them below.

The following questions concerning your membership in S.P.E.C. are particularly important for the research project and we would appreciate your co-operation in answering them. Thank you.

1. How long have you been a member of SPEC?

| | |
|---|---|
| Less than 6 months | 15 |
| 6 - 12 months | 33 |
| 12 - 18 months | 22 |
| 18 - 24 months | 20 |
| Over 2 years | 5 |
| NR | 5 |

2. Do you think that you will still be a member of SPEC this time next year?

Yes [89] No [7] NR 4

Why? _____

_____

3. Since you joined SPEC, how often, on average, have you attended meetings? (Any kind of meetings; public, project, local branch etc.)

| | |
|---|---|
| Once a week | 4 |
| Once a week - one a month | 11 |
| Once a month - one every 3 months | 16 |
| Once every 3 months - once every 6 months | 24 |
| Never | 25 |
| NR | 20 |

Other; please specify _____

_____

4. Have you ever been active in a SPEC project of any kind?

Yes [42] No [47] NR 11

If yes, please indicate the nature of the project(s) _____

_____

5. Do you belong to any other organisations (local, regional or national) interested in the quality of the environment?

Yes [31] No [60] NR 9

Which organisations? _____

_____

6. Besides these environmental organisations, what other organisations do you belong to? Please indicate how active you are in them.

| | Very Active | Moderately Active | Relatively Inactive | NR |
|---|---|---|---|---|
| 1 | 13 | 13 | 11 | 63 |
| 2 | 9 | 13 | 4 | 74 |
| 3 | 9 | 13 | 7 | 80 |
| 4 | 0 | 2 | 4 | 94 |
| 5 | 0 | 2 | 0 | 98 |

Please continue if applicable 6 etc.

7. Do you think SPEC is an effective organisation?

Yes [45] Somewhat [44] No [2] NR 9

Why? _____

_____

8. Are you generally satisfied with SPEC's activities

Yes [44] Somewhat [40] No [5] NR 11

Why? _____

_____

9. Can you suggest any improvements? Please specify _____

_____

Thank you very much for participating

# APPENDIX B

## A COMPARISON OF THE SEX, AGE AND SOCIO-ECONOMIC CHARACTERISTICS OF THE PUBLIC SAMPLE AND NEW WESTMINSTER POPULATION

1) Sex Ratio

Of the 82% of the public sample who indicated their sex, 53% were male and 47% female compared to the normal ratio of 50:50 for the population of New Westminster as a whole In terms of sex, at least, the sample seems to be approximately representative of the population as a whole.

FIG. B-1--A COMPARISON OF THE AGE STRUCTURE OF THE NEW WESTMINSTER POPULATION FOR 1961 AND 1966 AND THE 1970 PUBLIC SAMPLE

| Census Age Classes | 1961* % | 1966* % | Trend 1961-66 | Question-naire Age Classes | Sample 1970 % | Sample 1970 vs 1966 Census |
|---|---|---|---|---|---|---|
| 10-14 | 10.7 | 10.1 | - | 12-15 | 3 | - |
| 15-19 | 9.8 | 10.6 | + | 16-20 | 9 | - |
| 20-24 | 9.1 | 12.1 | + | 21-30 | 30 | + |
| 25-34 | 14.5 | 13.2 | - | 31-45 | 23 | + |
| 35-44 | 15.6 | 13.5 | - | 46-60 | 22 | = (approx.) |
| 45-54 | 16.0 | 14.5 | - | 61+ | 13 | = (approx.) |
| 65+ | 13.3 | 14.1 | + | TOTAL | 100 | |
| TOTAL | 100.0 | 100.0 | | NR(% of Total Res-ponse) | 10 | |

*Adapted from the Dominion Bureau of Statistics, Canada Census 1961 and 1966.

2) Age Distribution

Direct comparison between the age structure of the population and the sample are complicated by differences between the age classes used in the census and those used in the questionnaire. In addition, the age characteristics of the area have changed since 1966, probably in the same direction as noted in the 1961-66 trends although further migration into the area may have influenced these trends differently. Thus, some variation between the sample and 1966 data is expected. All the same, the sample does not appear to be perfectly representative of the population in terms of its

age structure (B-1). The main divergences are the under-representation of teenagers and the other-representation of the twenty to thirty-year-old and thirty to forty-five categories, particularly the former.

FIG. B-2--A COMPARISON OF THE EDUCATION STATUS OF THE NEW WESTMINSTER POPULATION IN 1961 AND THE 1970 PUBLIC SAMPLE

| 1961 Attending School | %* | 1970 Sample Education Level | % |
|---|---|---|---|
| High School | 83 | Less than Grade 12 | 33 |
| University | 17 | Grade 12 | 33 |
| TOTAL | 100 | | |
| Not Attending School | | Vocational College/ non-University | 10 |
| High School | 89 | University or College | 24 |
| University | 11 | TOTAL | 100 |
| TOTAL | 100 | NR (% of total response) | 18 |

*Adapted from Dominion Bureau of Statistics, Canada Census, 1961.

3) Education Levels

Comparison by this criteria is even more difficult due to differences in the classification systems used in the Census, the fact that the most recent data available is from the 1961 Census, and the major changes that have occurred since then in the field of education. Of the 2,333 inhabitants of New Westminster who were attending high school or university in 1961, 391 of them were attending university, while of the 15,600

who had attended high school or university, 1,716 had attended university. Eighty-two percent of the sample indicated their level of education. Of these 34% were attending or had attended a vocational college, or university, or college. The remaining 66% were equally divided between those with less than Grade 12 and those with Grade 12 education. Of the 89% of the respondents who indicated their occupational status, 11% classified themselves as students.

Since 1961 the enrollment at the University of British Columbia has increased considerably and Simon Fraser University (enrollment 6,000) and several new colleges have opened. A larger proportion of people who are either attending or have attended university or college is thus expected in a sample taken in 1970. In spite of these changes, it seems likely that the sample is somewhat more educated than the population from which it was drawn, although the exact magnitude of this bias is extremely difficult to gauge. This probably indicates a greater tendency for more highly educated people to agree to complete the questionnaire. This possible bias should be borne in mind when responses for the public are analysed and viewed in the light of any relationships subsequently found between the responses and educational levels.

FIG. B-3--THE OCCUPATIONAL STATUS OF THE 1970 PUBLIC SAMPLE

| Occupation | % |
|---|---|
| Professional | 14 |
| Managerial | 5 |
| Clerical | 7 |
| Sales | 5 |
| Public Service, Service Industry | 7 |
| Skilled Industrial Employee | 10 |
| Farming | 0 |
| Fishing, Lumbering, Mining | 3 |
| Transportation, Communications | 2 |
| Labourer | 3 |
| Student | 11 |
| Housewife | 21 |
| Retired | 10 |
| Unemployed | 2 |
| TOTAL | 100 |
| NR (% of Total Response) | 11 |

FIG. B-4--A COMPARISON OF THE OCCUPATIONAL STATUS OF THE NEW WESTMINSTER POPULATION IN 1961 AND THE 1970 PUBLIC SAMPLE

| Occupation | 1961 %* | 1970 % |
|---|---|---|
| Professional (and Technical) | 13.3 | 24 |
| Managerial | 8.4 | 9 |
| Clerical | 13.3 | 13 |
| Sales | 7.8 | 9 |
| Service and Recreational (Public Service) | 15.8 | 12 |
| Transportation, Communications | 6.2 | 3 |
| Primary | 2.5 | 6 |
| Craftsmen, Production Process | 26.5 | |
| Skilled Industrial Employee | | 18 |
| Labourer | 6.2 | 6 |
| TOTAL | 100.0 | 100 |
| NR (% of total response) | | 11 |

*Adapted from Dominion Bureau of Statistics, Canada Census 1961.

4) Occupational Status

The occupational status of the public sample is shown in Fig. B-3; and Fig. B-4 indicates that the percentage of respondents in the professional category in the public sample is considerably higher than for the population in the 1961 Census. Although there may have been an increase in the proportion of the New Westminster labour force in this category since 1961, it appears that the professional class has been oversampled, probably due to differential acceptance of the questionnaire by various occupational

FIG. B-5--A COMPARISON OF THE INCOME LEVELS OF THE 1961 POPULATION OF NEW WESTMINSTER AND THE 1970 PUBLIC SAMPLE

| Income Categories Population 1961* Dollars Per Annum | 1961 Census | 1970 Sample | Income Categories Sample 1970 Dollars Per Annum Per Household |
|---|---|---|---|
| 0 - 2,999 | 38 | 10 | 0 - 2,999 |
| 3,000 - 5,999 | 52 | 21 | 3,000 - 5,999 |
| 6,000 - 9,999 | 8 | 27 | 6,000 - 8,999 |
| 10,000+ | 2 | 23 | 9,000 - 11,999 |
| TOTAL | 100 | 12 | 12,000 - 14,999 |
| | | 3 | 15,000 - 17,999 |
| | | 4 | 18,000+ |
| | | 100 | TOTAL |
| | | 23 | NR (% of total response) |

*Adapted from Dominion Bureau of Statistics, Canada Census 1961

A comparison of household income between the 1961 Census and the sample (Fig. B-5) is difficult for a number of reasons. Firstly, the 1961 figures used for comparative purposes here are based on percentages for the total male and female workers in each wage category, while the

questionnaire sample was based on household income which may include the earning of one, two, or more workers of the same or opposite sex. Secondly, there has obviously been a general increase in wage levels since 1961 and this necessitated the addition of several higher income categories.

An examination of the household income of the public sample indicates a considerable range with a fairly even spread between the three major income categories in the $3,000 to $12,000 per annum bracket. In 1961, the average family income for New Westminster was $5,510 per annum (City of New Westminster Planning Department 1968), while the average household income for the 77% of the public sample who responded to this question was approximately $8,075. Average weekly wages and salaries for all industries (sic) in Canada in July 1970 were $126.80 or approximately $6,600 per annum per wage earner. (Hamilton 1970) The public sample may be biased somewhat towards higher income groups but the extent of this possible bias is difficult to determine given limitations in statistics and the problem of comparing household income to income per wage earner.

Thus, the public sample appears to contain a disproportionate share of people in the twenty to forty-five age bracket, higher education and occupation groups and possibly higher income groups. In spite of these differences between the characteristics of the sample and the population of New Westminster, they are not considered to be sufficient to prevent the responses of the public sample from being indicative of public opinion in New Westminster or to seriously detract from their utility in a comparative study of public and environmental action group opinion on water and air pollution. The direction and degree of possible bias in the public

opinion poll results should be borne in mind, however, and viewed in the light of any relationships discovered between opinions about various facets of water and air pollution and education and income levels.

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