

**Environmental Justice in Canada: An Empirical Study and Analysis  
of the Demographics of Dumping in Nova Scotia**

by

Lori Anne Fryzuk

Submitted in partial fulfillment of the requirements  
for the degree of Master of Environmental Studies

at

School for Resource and Environmental Studies  
Dalhousie University  
Halifax, Nova Scotia  
December, 1996

© Copyright by Lori Anne Fryzuk, 1996



National Library  
of Canada

Acquisitions and  
Bibliographic Services

395 Wellington Street  
Ottawa ON K1A 0N4  
Canada

Bibliothèque nationale  
du Canada

Acquisitions et  
services bibliographiques

395, rue Wellington  
Ottawa ON K1A 0N4  
Canada

*Your file / Votre référence*

*Our file / Notre référence*

The author has granted a non-exclusive licence allowing the National Library of Canada to reproduce, loan, distribute or sell copies of this thesis in microform, paper or electronic formats.

The author retains ownership of the copyright in this thesis. Neither the thesis nor substantial extracts from it may be printed or otherwise reproduced without the author's permission.

L'auteur a accordé une licence non exclusive permettant à la Bibliothèque nationale du Canada de reproduire, prêter, distribuer ou vendre des copies de cette thèse sous la forme de microfiche/film, de reproduction sur papier ou sur format électronique.

L'auteur conserve la propriété du droit d'auteur qui protège cette thèse. Ni la thèse ni des extraits substantiels de celle-ci ne doivent être imprimés ou autrement reproduits sans son autorisation.

0-612-24966-2

**Canada**

## TABLE OF CONTENTS

List of Figures.....	vii
List of Tables.....	vii
Abstract.....	viii
Abbreviations and Symbols.....	ix
Acknowledgments.....	x

### CHAPTER ONE INTRODUCTION: ENVIRONMENTAL JUSTICE IN CANADA?

1.1 Introduction.....	1
1.2 Background.....	1
1.3 Environmental Racism in Canada.....	2
1.3.1 The East Lake Landfill Decision.....	4
1.3.2 Discrimination in Africville.....	7
1.4 Statement of Purpose.....	10
1.4.1 Research Question.....	10
1.4.2 Thesis Objectives.....	10
1.5 Research Approach.....	11
1.6 Organization of the Report.....	12

### CHAPTER TWO ENVIRONMENTAL JUSTICE: ORIGINS AND CURRENT LITERATURE

2.1 Introduction.....	14
2.2 Environmental Justice: Origins and Issues.....	14
2.2.1 Recognition of the Problem.....	15
2.3 Defining the Concepts.....	20
2.3.1 Environmental Racism.....	20
2.3.2 Environmental Equity.....	21
2.3.3 Environmental Justice.....	24
2.4 Factors Contributing to Environmental Discrimination.....	25
2.4.1 Poverty.....	26
2.4.2 Institutional and Systemic Racism.....	27
2.4.3 Lack of Political Power and Representation.....	28
2.4.4 Environmental Blackmail.....	29
2.4.5 Lack of Protection and Enforcement.....	30
2.5 Recent Initiatives Towards Environmental Justice in the United States.....	32
2.5.1 Environmental Justice Litigation.....	32
2.5.2 Environmental Protection and Equity Bills.....	36
2.5.3 The Rise of An Environmental Justice Movement.....	39
2.6 Conclusion.....	43

## **CHAPTER THREE RESEARCH METHODOLOGY**

3.1	Introduction.....	44
3.2	Defining the Study Area.....	45
3.3	Research Phases.....	45
3.3.1	Identifying and Defining Waste Disposal Sites.....	46
3.3.2	Statistical and Demographic Variables.....	47
3.3.3	Mapping the Results.....	48
3.3.4	Analysis of the Results.....	50
3.4	Study Limitations.....	51
3.4.1	Accuracy of Statistical Data.....	51
3.4.2	Physical Features.....	52
3.4.3	Size and Scope of Study Area.....	53
3.4.4	Defining Minority and “Poor” Communities.....	53
3.5	Conclusion.....	54

## **CHAPTER FOUR THE STATISTICAL RESULTS**

4.1	Introduction.....	55
4.2	Data Quality.....	55
4.2.1	Confidentiality.....	56
4.2.2	Area Suppression.....	56
4.2.3	Non-Identification and Under-Representation.....	57
4.3	Mapping Waste Disposal Sites and Demographic Characteristics.....	57
4.3.1	Locating Waste Disposal Facilities.....	58
4.3.2	Distribution of Waste Disposal Sites in Relation to the Demographic Variables.....	62
4.4	Statistical Summary for Nova Scotia’s Subdivisions.....	70
4.5	Statistical Summary for Nova Scotia’s Enumeration Areas.....	71
4.5.1	Host Enumeration Areas.....	73
4.5.2	Expanding the Analysis - the 5 km Impact Zone.....	74
4.6	Conclusions.....	75

## **CHAPTER FIVE INTERPRETING THE RESULTS**

5.1	Introduction.....	78
5.2	Analyzing the Results for Statistical Significance.....	78
5.2.1	Subdivision Analysis.....	79
5.2.2	Host EA Analysis.....	81
5.2.3	Impact Zone Analysis.....	82
5.2.4	Summarizing the Findings.....	83
5.3	Race Variables as Indicators of Discrimination?.....	84
5.3.1	% Black Population- Areas of Concern.....	85
5.3.2	% Native Population - Areas of Concern.....	92
5.3.3	Environmental Racism in Nova Scotia.....	97
5.4	Conclusion.....	98



## **CHAPTER SIX IMPLICATIONS FOR ENVIRONMENTAL LEGISLATION AND GRASSROOTS MOVEMENTS IN CANADA**

6.1	Introduction.....	100
6.2	Decision Making Procedures - The Waste Management Scenario.....	101
	6.2.1 Issues in Current Waste Disposal Siting Procedures.....	102
	6.2.2 Public Participation.....	105
	6.2.3 Impact Management and Compensation.....	108
6.3	Legal Remedies and Opportunities.....	111
	6.3.1 Civil Rights and Environmental Equality.....	111
	6.3.2 Entrenching Human Rights.....	122
6.4	Mobilizing The Grassroots.....	129
	6.4.1 Community Development and Environmental Justice.....	130
	6.4.2 Mobilizing Minority Communities in Nova Scotia.....	131
6.5	Conclusions.....	134

## **CHAPTER SEVEN CONCLUSIONS**

7.1	Future Challenges and Considerations.....	137
7.2	Lessons Learned.....	138
7.3	Concluding Remarks.....	140

## **APPENDICES**

Appendix A:	Environmental Justice Principles From the First National People of Colour Environmental Leadership Summit.....	141
Appendix B:	Statistical Databases for Nova Scotia's Counties and Subdivisions.....	143
Appendix C:	Waste Disposal Sites In Nova Scotia.....	148
Appendix D:	The Five Km Impact Zone for Waste Disposal Sites in Nova Scotia....	152
Appendix E:	Suppressed Census Divisions - Subdivisions and Enumeration Areas...	154
Appendix F:	Subdivision and EA Statistics for Waste Disposal Sites.....	156
Appendix G:	T-Test Results for Subdivision and Enumeration Area Statistics.....	175
Appendix H:	Comparing the Three Levels of Statistical Data for Waste Disposal Sites.....	179

<b>BIBLIOGRAPHY.....</b>	<b>184</b>
--------------------------	------------

## LIST OF FIGURES

Figure 1.	Identifying Appropriate Political Jurisdictions.....	p. 49
Figure 2.	Determining the Actual Distribution of Demographic Variables.....	p. 53
Figure 3.	Active Waste Disposal Sites in Nova Scotia 1991, by Census Subdiviisons.....	p. 61
Figure 4.	Distribution of Black Population 1991, by Census Subdivision.....	p. 63
Figure 5.	Distribution of Native Population 1991, by Census Subdivision.....	p. 64
Figure 6.	Distribution of Renter Occupied Dwellings 1991, by Census Subdivision.....	p. 65
Figure 7.	Distribution of Unemployment Rate 1991, by Census Subdivision.....	p. 66
Figure 8.	Distribution of Median Household Income 1991, by Census Subdivision.....	p. 67
Figure 9.	Distribution of Incidence of Low Income 1991, by Census Subdivision.....	p. 68
Figure 10.	Distribution of Government Transfers 1991, by Census Subdivision.....	p. 69
Figure 11.	Historically Black Communities in Nova Scotia.....	p. 87
Figure 12.	Waste Disposal Site Locations in Relation to Black Communities.....	p. 90
Figure 13.	Native Canadian Reserves in Nova Scotia.....	p. 93
Figure 14.	Waste Disposal Site Locations in Relation to Native Canadian Reserves.....	p. 95
Figure 15.	Approaches to Siting Waste Disposal Facilities .....	p. 10

## LIST OF TABLES

Table 1.	Studies Providing Systematic Empirical Evidence Regarding the Burden of Environmental Hazards by Income and Race .....	p. 16
Table 2.	Waste Disposal Facility Locations in Nova Scotia.....	p. 59
Table 3.	Statistical Summary of the Demographic Variables for All Subdivisions.....	p. 62
Table 4.	Distribution of Waste Sites in Relation to % of Black Population.....	p. 63
Table 5.	Distribution of Waste Sites in Relation to % of Native Population.....	p. 64
Table 6.	Distribution of Waste Sites in Relation to % of Renter Occupied Dwellings....	p. 65
Table 7.	Distribution of Waste Sites in Relation to Unemployment Rate.....	p. 66
Table 8.	Distribution of Waste Sites in Relation to Median Household Income.....	p. 67
Table 9.	Distribution of Waste Sites in Relation to Incidence of Low Income.....	p. 68
Table 10.	Distribution of Waste Sites in Relation to Government Transfers.....	p. 69
Table 11.	Summary of Subdivision Statistics: Subdivision's Hosting Waste Sites Compared With Other Subdivisons.....	p. 70
Table 12.	Statistical Summary of the Demographic Variables for All Enumeration Areas	p. 72
Table 13.	Summary of Enumeration Area Statistics: EA's Hosting Waste Sites Compared With Other EAs.....	p. 73
Table 14.	Summary of Enumeration Area Statistics: EA's Within 5km of A Waste Site Compared with those Greater than 5km.....	p. 74
Table 15.	Statistical Analysis for Difference of Means Tests Between Host Subdivisions and all Other Subdivisions.....	p. 80
Table 16.	Statistical Analysis for Difference of Means Tests Between Host EA's and all Other EA's.....	p. 81
Table 17.	Statistical Analysis for Difference of Means Tests Between EA's < 5km and EA's > 5km from Waste Sites.....	p. 83
Table 18.	Comparing % Black Population for Selected Waste Sites.....	p. 89
Table 19.	Comparing % Native Population for Selected Waste Sites.....	p. 94

## **ABSTRACT**

Despite the laws and regulations promoting equality and the elimination of discrimination in housing, education and employment policies or programs, governments have made few attempts to address discrimination in environmental practices. Evidence of environmental inequality originates from a variety of studies completed in the United States, demonstrating that environmental risks are not distributed equally among demographic groups in society. Recently, claims of environmental discrimination began to emerge in Nova Scotia.

In response to these claims, this thesis statistically investigated the demographic characteristics surrounding a sample of waste disposal facilities throughout Nova Scotia. The study focused on the relationship between the distribution of seven minority and low income variables and the location of these waste disposal sites. Statistics were analyzed on several geographic levels and a number of statistical tests were performed on each variable.

The results of this investigation indicated that a number of patterns and areas of concern do exist in Nova Scotia. Of the seven variables tested, the strongest relationships uncovered involved median household income and government transfer variables. As well, it was discovered that a large percentage of the waste sites included in this study, were located in or near areas with higher concentrations of black or native populations.

A number of recommendations were developed in an attempt to introduce the opportunities and potential for addressing environmental justice principles in Canadian and Nova Scotia policies and legislation. The recommendations focused on three areas including: waste management decision making processes; human rights legislation and community mobilization.

## **ABBREVIATIONS AND SYMBOLS**

AUBA	African United Baptist Association
CCHW	Citizen's Clearinghouse for Hazardous Waste
CCME	Canadian Council of Ministers of the Environment
CELRF	Canadian Environmental Law Research Foundation
CEPA	Canadian Environmental Protection Act
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
CRJ	Commission on Racial Justice (United Church of Christ's)
DOE	Department of the Environment
EA	Enumeration Area
EBR	Environmental Bill of Rights (Ontario's)
EPA	Environmental Protection Agency
GAIN	Global Action and Information Network
GAO	Government Accounting Office
GIS	Geographic Information System
H <sub>0</sub>	Hypothesis - null
H <sub>a</sub>	Hypothesis - alternative
HHRAC	Halifax Human Rights Advisory Committee
KM	Kilometres
LULU	Locally Unwanted Land Uses
NAMBY	Not-In-Anyone's-Backyard
NGO	Non-governmental Organization
NIMBY	Not-In-My-Backyard
NS	Nova Scotia
PIBBY	Place-In-Black's-Backyard
TEC	The Environmental Consortium for Minority Outreach
UCC	United Church of Christ's Commission
UN	United Nations
US	United States

## **ACKNOWLEDGMENTS**

I would like to begin by thanking my thesis committee - Phillip Saunders, Rocky Jones and Robert Boardman for their insight, expertise, and critical minds. I greatly appreciate all the time and effort each of you spent reading and editing draft after draft.

A very big thank you goes out to all of those people who helped me sort through my statistical nightmare. In particular: James Boxall and Geoff Brown at the Killam Library Map Collection for teaching me how to use the GIS mapping program and allowing me to take over their computer for days on end; Poh Chua at the Killam Computer Centre for answering my urgent plea for help extracting statistical data and saving me a considerable amount of time and money; and Dr. Peter Clark for pointing me in the right direction and teaching me how to analyze a “bunch of numbers”.

Most of all I wish to thank my parents and friends for their constant support and encouragement. “Idg”, “Bob”, Lisa and Alison whose timely phone calls, letters and e-mails kept me going through the long days and endless nights. Ann Dwire for your words of wisdom and support. And last but not least, the “core” who procrastinated, motivated and sympathized with me when I needed it most.

One final thanks goes to an act of nature beyond my control - Hurricane Hortense - for forcing me to read and take notes away from my computer - from chaos emerged clarity and the breakthrough that solved my statistical crisis.

## **CHAPTER ONE**

### **INTRODUCTION: ENVIRONMENTAL JUSTICE IN CANADA?**

#### **1.1 Introduction**

As concern grows with respect to the amount of waste generated by society and the problems associated with managing this waste increases, the question of who pays and who benefits will become central to any environmental decision-making framework. Landfill sites across Canada are approaching full capacity and new sites must be found or alternative technologies implemented to deal with the garbage disposal crisis. Despite provisions for increased public participation within the siting process, community groups have become aware of and concerned with procedural, geographic and social equality issues involved in siting procedures (Bullard, 1992; Mohai and Bryant, 1992). These concerns and questions have become a reality within the province of Nova Scotia and are introduced below to illustrate the need for further studies and investigations into environmental justice in Canada.

#### **1.2 Background**

What is environmental justice? The predominant themes and concerns presented in the recent environmental law and civil rights literature argue that the burdens of environmental hazards, risks and degradation are not carried equally within society. Environmental justice theorists, including Robert Bullard, Richard Lazarus and Dorceta Taylor, have argued that some populations are at greater risk than others within society

from environmental contamination. These populations tend to suffer more from hazardous environmental nuisances and are excluded from policy and decision making processes. This argument has been illustrated by examination of location of landfills and hazardous/toxic waste sites within the United States (CRJ, 1987; GAO, 1993). Although the generation of waste and pollution is directly related to per capita income, few waste disposal facilities are located in the urban suburbs (Bullard, 1993-a). Polluters do not absorb the direct costs of environmental degradation they create, and society as a whole does not confront, bear the burdens or solve the problems associated with environmental hazards.

Further research into whether the burdens of environmental hazards are shared equally among communities in Canada is needed, and this study will contribute to this important area. The challenge of this thesis is to examine whether certain populations within Nova Scotia communities suffer from environmental discrimination? More specifically, can legitimate cases of unequal environmental protection associated with *siting waste disposal facilities* be made on behalf of minority<sup>1</sup> communities in Nova Scotia?

### **1.3 Environmental Racism in Canada**

Although the scope of the current research has been limited to the United States, recent examples of discrimination and unequal protection from environmental hazards

---

<sup>1</sup> The concept "minority" for this paper, refers to any social category within a society that is set apart from the majority on the basis of presumed physical, cultural or behavioural difference. Their minority status is the result of systematic discrimination and their lack of access to power, privilege and prestige in relation to the white, upper-class "majority". (Kallen, 1989 p. 50)

within Canadian communities have begun to surface. The only known Canadian study that examined empirical relationships between the impacts of an environmental hazard and socioeconomic variables dates back to 1971. The study, *Income and Air Quality in Hamilton, Ontario*, was the first to conduct research linking socioeconomic variables to pollution levels in the province of Ontario (Handy, 1977). The city of Hamilton was selected due to its high proportion of heavy industry and the pre-existing air pollution problems (the Air Pollution Index exceeded the maximum levels 23 times within 1971). Correlations were calculated between the sulphation rate and dustfall and a number of socioeconomic variables, such as household average income, median value of owner occupied households, and cash rent of tenant occupied dwellings (Handy, 1977). An important finding of these correlations indicated that the higher the household's income, the lower the probable exposure to total dustfall and vice versa.

A number of conclusions were made by the author following this study. To begin with, although a correlation existed between levels of dustfall and household income, this did not imply that a cause-effect relationship also existed. Second, the results did not suggest that everyone who was poor, lived in an inexpensive house, or that everyone who paid low rent lived in a highly polluted area, or that all the rich lived in areas with desirable air quality (Handy, 1977). However, the results did imply that it was highly probable that a poor person in Hamilton was exposed to more pollution than a wealthy person. The results of a follow up study undertaken four years later (using 1975 pollution data and the same socioeconomic indicators) demonstrated that there was significant



deterioration in air quality and the impact on this change was felt more severely in the areas of low income (Handy, 1977).

In addition to air quality, examples of disproportionate impacts have surfaced as a result of siting “locally-unwanted-land-uses” (LULU’s) in Nova Scotia.

### **1.3.1 The East Lake Landfill Decision**

The issue of environmental racism surfaced in Halifax County during the summer of 1991 in the midst of a search for a new landfill site for the Metropolitan Region of Halifax and Dartmouth. The decision to locate a waste disposal site near a particular community has become increasingly difficult and even controversial. However, the task becomes even more contentious when race enters the decision-making process (LeBlanc and MacKeen, 1992). This is exactly what happened in 1991 when the Metropolitan Authority, the group appointed by the provincial government to oversee the disposal of waste within Metropolitan Halifax, identified 11 potential locations for the new Halifax landfill. Once this list was released, objections began to surface almost immediately from a number of communities throughout Halifax County. Although environmental grounds were the basis for most of the protests, complaints from several black communities emerged. The root of this concern centred around the fact that of the eleven sites selected, four (approximately one-third) were located near to historically black communities (the East Lake and Wood Lake sites were near the Preston area, the third was close to Beechville and a fourth was near Pockwock). The concern and opposition

intensified when the list was shortened to three and all three of the finalists were close to black communities.

The debate peaked in early 1992 when the Metropolitan Authority announced that East Lake had been selected to host the new landfill when the existing landfill in Sackville closed. In opposition to this decision, the community of Preston (both white and black residents) launched a formal challenge to the landfill site selection process, complaining of the lack of attention that had been placed on social, cultural and historical factors when identifying proposed locations. The primary argument that was put forth by the community of Preston was the fact that the East Lake area was of great historical significance for the African-Canadian community within Nova Scotia and Canada. Black residents from the Preston area argued that the community, including East Lake, was granted to the residents in the 1700s by the King of England as common land, giving them sole right to determine how it should be used (Jones, 1992). Another historical significance associated with the community was the fact that as one of the original black settlements in Nova Scotia it was possible that Preston was a terminal of the Underground Railroad for fugitive slaves (Saunders, 1993).

As a result of political and public pressure, the Metro Authority began several investigations into the historical significance of the area and whether the Preston claims were in fact true. One investigation was carried out by a engineering consultant firm, Porter Dillon (hired by the Metro Authority). The study found that there were no historical or archaeological resources at the East Lake site or in the community of Preston (Nicoll, 1993). A second investigation was requested by the then Multi-Culturalism

Minister, Gerry Weiner and was conducted by the Historic Sites and Monuments Board. Upon completion of its study, the Board ruled that East Lake did not “specifically” qualify as a national historic site (Hussy, 1992). However, the Board did recommend that the Nova Scotia Department of the Environment consider the cultural importance of East Lake during the environmental assessment of the selected site.

In response to this announcement, the community altered their fight strategy by filing a complaint with the Nova Scotia Human Rights Commission against the Metropolitan Authority, Nova Scotia Department of the Environment and the Provincial Government (Nichol, 1993b). The community alleged that systemic discrimination, in the form of *environmental discrimination*, factored into the selection of East Lake for a waste disposal site (Nicoll, 1993a). Following the complaint made by the residents of Preston and East Lake, a second complaint was filed by the black residents of Birchtown. The residents were represented by the Shelburne County Cultural Awareness Society which was formed to oppose the location of a landfill in Birchtown. In addition to the filing of two official Human Rights complaints, opposition against the Metro Authority increased as a number of community action and environmental groups joined the black community’s protest. These groups included: the Ecology Action Centre, the African United Baptist Association, the Lawrencetown Citizens Committee, Porters Lake-Myra Road Residents Against Site H and the Lake Echo-Mineville Group Opposed to Site H (Dunlop, 1993). As a result of growing community mobilization, it became clear that politically, the site was no longer viable and the Metro Authority voted to reverse their decision and eliminated East Lake as the site.

This case illustrated that minority communities are capable of forming powerful and effective voices within society. The response of the Preston area residents was extremely well organized and resulted in a successful campaign to defeat the siting of a waste disposal facility near their community. The strong political leadership also united the entire community - both white and black citizens who opposed the site - and attracted additional support from community and environmental groups.

### **1.3.2 Discrimination in Africville**

The Preston landfill case was not the first charge of environmental racism to be made in Nova Scotia. Of all the Nova Scotian black communities Africville has undoubtedly become the best known. Africville was an exceptional community and has become a symbol for the struggle against racism and segregation in Nova Scotia (Clairmont, 1992).

First settled in the mid-1800s by refugee blacks who came to Nova Scotia following the war of 1812, the community was located on the shore of the Bedford Basin. Although Africville was located within the municipality of Halifax, the city neglected to provide many essential services to the residents. "Paved roads ended where the community began and picked up again where the community ended. Similarly, sewer and water systems stopped at Africville and continued past Africville in Bedford" (Blackmore, 1993). As the city of Halifax began to grow, land was needed for expansion. Since the land surrounding Africville was considered to be valuable for industrial development, in 1947 the city rezoned Africville as industrial land (Blackmore, 1993).

In the years following this rezoning decision, the area quickly became the host for a number of environmental and social hazards. The facilities located within Africville included: a fertilizer plant, a slaughter house, a tar factory, a prison, two infectious disease hospitals, an open dump and an incinerator (Leblanc and MacKeen, 1992). The lives of the residents were negatively affected by this industrial development and by the City's unwillingness to provide services (Clairmont, 1992).

City officials began to urge residents to move in the 1960s, partly for health reasons but primarily to fulfill the goals of expansion and urbanization of the city. Two reports in particular translated the city's long-standing intent to permanently relocate Africville residents and to complete the transition to industrial land - the Stephenson Report of 1957 and the Development Department Report in July 1962 (Clairmont, 1992). Both of these reports focused on the poor living conditions and lack of services provided to Africville and were used as a means to rationalize the relocation of the residents of the community. By 1970, in an effort to solve "the long-standing problem of Africville", all of the residents were forced to relocate and the community was expropriated for industrial purposes (Clairmont, 1992). However, both reports failed to address a number of important issues that may have had an impact on the final decision to relocate the community. For example: (a) there was no examination into why essential services were never provided for Africville residents, (b) alternatives to relocation, such as housing and service upgrading were not considered and (c) the rich cultural/historical ties that residents had developed with their community were not taken into account (Wright,

1993). Instead, both reports focused on the legal machinery and used the poor living conditions as a means to rationalize relocating the entire community.

In a final attempt to save their community, residents established the Halifax Human Rights Advisory Committee (HHRAC). The HHRAC was created to perform two primary tasks: to assist the Africville group in their fight and to become active in advancing human rights legislation in employment and in housing (Clairmont, 1992). However, the decision to remove residents had already been made by the representatives from the city of Halifax and plans for compensation began without consultation with the community (Wright, 1993).

Despite the final outcome, the Africville case has several aspects in common with the recent East Lake landfill conflict. Both communities felt that there were discriminatory practices within the political decision-making process. There was little attempt from the political players (i.e. In the Preston case the Metro Authority and for Africville it was the Department of the Development) to promote public participation in the early stages of the decision making process from those directly affected by the final decision. As well, in order to adequately voice the concerns of the community, external groups or committees were brought in (The Ecology Action Centre and the HHRAC) to help represent the minority group's interests in the political processes.

These cases were included in this introductory chapter, in order to illustrate that environmental racism has existed within Canada. As well, both of these conflicts raise a number of important questions to be addressed throughout this thesis. For example, what remedies are currently available for alienated interest groups to participate in decision

making processes? How can minority or poor communities in Canada protect their culture and neighbourhoods from environmental hazards. What alternative methods may be used in order to gain the political power and voice within social, political and environmental decision making processes?

## 1.4 Statement of Purpose

The research interest of this study lies both in examining the *perception* of injustice regarding the distribution of waste disposal facilities and the *statistical relationship* between socio-economic variables and waste sites within Nova Scotia.

### 1.4.1 Research Question

*“Waste disposal sites in Nova Scotia are not randomly located across the province. What are the demographic characteristics surrounding these sites<sup>2</sup> and are there correlations between the placement of these sites and the location of disadvantaged communities?<sup>3</sup>”*

### 1.4.2 Thesis Objectives

In order to investigate the validity of the hypothesis stated above, several related questions will also be addressed and examined. The main objectives are as follows:

1. To determine and map the demographic characteristics of the communities within a five kilometre impact zone from the selected waste disposal facilities in Nova Scotia.

---

<sup>2</sup> Waste disposal sites included in the statistical phase of this study include: municipal landfills, incinerators and open burn disposal sites in operation as of 1991.

<sup>3</sup> Disadvantage communities have been defined by examining seven socio-economic variables, including: percentage of black and native population, median household income, renter occupied dwellings, government transfers, incidence of low income and unemployment rates.

2. To determine whether a correlation exists between the location of municipal waste disposal sites and the racial and socio-economic status of the surrounding communities.
3. To identify possible factors that may have contributed to the distribution patterns in waste disposal facility siting procedures.
4. To determine what changes are needed to the Nova Scotia waste management procedures in order to promote community participation in waste disposal siting decisions.
5. To investigate the impacts and influences the “5 *Environmental Justice Principles*” would have on current Nova Scotian environmental legislation and policies.
6. To provide the “host” or “target” communities, identified in this study, with evidence and resources to successfully participate in and influence future waste management decisions.

The most important objective of this thesis is to promote an awareness of discrimination in environmental decision making procedures and to develop positive recommendations that will focus on opportunities for equal environmental protection for all communities in Nova Scotia.

## 1.5 Research Approach

The scope of the thesis was narrowed in three respects. First, the *geographic* scale was limited to the province of Nova Scotia and focused on three census divisions (counties, subdivisions and enumeration areas) as defined by Statistics Canada. Second, the *variables* examined and analyzed within the study were confined to two specific categories based on information provided by the Nova Scotia Department of the Environment (DOE) and the 1991 statistical data available from Statistics Canada. The two categories are:

- *Waste Disposal Sites* that were in operation during 1991, including landfills, incinerators, and open burn disposal sites.



- *Demographic and Socio-economic Variables* - seven variables were selected in an attempt to identify black, native and poor communities. These variables are listed in note 2.

The third limitation applied to this study involved the temporal scale of the data and the waste disposal sites included in the scope of the research. The most recent demographic statistics were used (1991 Census) and therefore the study limited the waste sites to those in operation during this year. Facilities in operation and subsequently closed prior to 1991 were not considered in the statistical study.

## **1.6 Organization of the Report**

The thesis has been organized into seven chapters. Chapter two begins with an examination of American studies documenting cases of environmental racism and disproportionate siting of environmental hazards. After examining the factors contributing to environmental discrimination, Chapter two introduces the recent initiatives taken in the United States with respect to promoting equal environmental protection and the rise of grassroots movements. This provides the background for the investigation into the impact environmental justice principles would have on Nova Scotia environmental legislation and waste management decision-making procedures.

The third chapter provides a detailed outline of the research undertaken in order to complete this study. The five research phases are described, variables defined and limitations established for this study. In Chapter four, the results of the statistical and geographic research are presented for each of the variables.

Chapter five provides an analysis of the results and investigates the correlation between the location of the waste disposal sites and each of the socio-economic variables. A review of the historical significance of black communities, waste management procedures and environmental protection legislation provides some insight into the factors that may have played a role in the emerging patterns. Recommendations and directions for future studies are suggested in Chapter six. The final chapter provides a summary of the findings and recommendations of this thesis.

## **CHAPTER TWO**

### **ENVIRONMENTAL JUSTICE: ORIGINS AND CURRENT LITERATURE**

#### **2.1 Introduction**

This chapter will provide a general introduction to the relevant issues and concepts found throughout the environmental justice literature. The chapter begins with a review of the landmark studies that first brought to light the disproportionate burdens suffered by minority and poor communities within the United States. Following a discussion of the possible factors contributing to this discrimination, the important concepts and terms related to environmental justice are defined. The final section of this chapter, introduces recent environmental justice initiatives taken within the United States over the past ten years in an attempt to address the inadequate environmental protection.

#### **2.2 Environmental Justice: Origins and Issues**

Awareness and concern regarding the inequalities in the distribution of environmental hazards have been steadily increasing within the United States over the last decade. Despite attempts made by the “U.S. government to level the playing field, African American, Latino and Native American communities have borne a disproportionate share of environmental and health risks” (Bullard, 1993-d). The current

literature on environmental justice has raised a number of questions as to why some communities have suffered from environmental hazards more than others. The following discussion identifies the important events and studies which first brought attention to environmental racism, as well as the major factors that are thought to contribute to the inequalities.

### **2.2.1 Recognition of the Problem**

The landmark event which focused national attention on environmental injustice in the United States occurred in 1982 when officials in Warren County, North Carolina decided to locate a polychlorinated biphenyl (PCB) disposal landfill in a predominately black and poor community. The decision sparked heated local opposition, which culminated in a massive nonviolent civil disobedience demonstration. This brought in national media attention and led to more than 500 arrests (Lee, 1993). Although the demonstrations were unsuccessful in preventing the construction of the landfill, the protests marked the first time an African-American community mobilized in such broad opposition to what they defined as environmental racism. These protests also raised a concern with regard to how many other racial and ethnic communities were similarly harmed by hazardous or toxic waste disposal sites.

In the absence of detailed empirical research, the evidence supporting these protests and claims of discrimination remained unsubstantiated and the influence on policy was limited. As a result, several investigations and studies into this very question were commissioned by various parties and the necessary evidence of discrimination

began to surface. Table 1 summarizes the findings from sixteen environmental justice studies which looked at a variety of environmental hazards and the correlation between the distribution of hazards with two variables - race and income.

**Table 1. Studies Providing Systematic Empirical Evidence Regarding the Burden of Environmental Hazards by Income and Race**

Study	Hazard	Location	By Income?	By Race?	Important?
CEQ (1971)	Air pollution	Urban Area	Yes	N/A	N/A
Freeman (1972)	Air pollution	Urban Area	Yes	Yes	Race
Harrison (1975)	Air pollution	Urban Area Nation	Yes No	N/A N/A	N/A N/A
Kruvant (1975)	Air pollution	Urban Area	Yes	Yes	Income
Zupan (1975)	Air pollution	Urban Area	Yes	N/A	N/A
Burch (1976)	Air pollution	Urban Area	Yes	No	Income
Berry et al. (1977)	Air pollution	Urban Area	Yes	Yes	N/A
	Solid waste		Yes	Yes	N/A
	Noise		Yes	Yes	N/A
	Pesticide		Yes	Yes	N/A
	Poisoning		Yes	Yes	N/A
Handy (1977)	Rat Bite Risk	Urban Area	Yes	Yes	N/A
	Air Pollution		Yes	N/A	N/A
Asch & Seneca (1983)	Air Pollution	Urban Areas	Yes	Yes	Income
Gianessi et al (1979)	Air Pollution	Nation	No	Yes	Race
Bullard (1983)	Solid Waste	Urban Area	N/A	Yes	N/A
U.S. GAO (1983)	Hazardous Waste	Southern Region	Yes	Yes	N/A
CRJ (1987)	Hazardous Waste	Nation	Yes	Yes	Race
Gelobter (1987; 1992)	Air Pollution	Urban Area	Yes	Yes	Race
		Nation	No	Yes	Race
Mohai & Bryant (1992)	Hazardous Waste	Urban Area	Yes	Yes	Race
West et al. (1992)	Toxic Fish Consumption	State	No	Yes	Race

N/A - Not Applicable

Source: Paul Mohai & Bunyan Bryant, 1992 (p. 166.)

The first major attempt to provide empirical support for the environmental justice claims involving *waste disposal* was conducted by Robert D. Bullard in the early 1980s.

Bullard, a sociologist at the University of California, began examining population data for host communities for landfills and incinerators in Houston, Texas. His results demonstrated that, while African Americans made up only 28 percent of the city's population, six of its eight incinerators and fifteen of its seventeen landfills were located in predominately African-American neighbourhoods (Bullard, 1994-b). While limited in scope, Bullard's investigation helped shape the policy debate surrounding environmental justice and played a central role in one of the first class action lawsuits involving environmental discrimination - *Bean v. Southwestern Waste Management Corp.* (to be discussed in further detail later in this chapter).

The second study, entitled *Siting of Hazardous Waste Landfills and their Correlation with Racial and Economic Status of Surrounding Communities*, was prepared by the United States General Accounting Office (GAO) in 1983. The report examined the racial and socio-economic makeup of communities surrounding four hazardous waste landfills in the southeastern United States. A key finding was that African-Americans comprised the majority of the population in three of the four communities studied (US GAO, 1993). The GAO also discovered that at least "26 percent of the population in all four communities have incomes below the poverty level and most of this population is black" (Lazarus, 1993). However, this study was not designed to examine the issue on a national scale and critics have argued that the findings were only isolated incidents within the regional scope of the investigation.

The third study, which has become a landmark in the field of environmental justice and the most frequently cited analysis, was completed by an independent national

organization. In April of 1987, the United Church of Christ's Commission on Racial Justice (CRJ) released a report, *Toxic Wastes and Race in the United States*, on the discriminatory pattern of hazardous waste facilities. This study was the first to document the relationship between hazardous waste sitings and racial demographics, and determined that race was the most significant determinant of the location of hazardous waste facilities in the United States. The report indicated that:

- 3 out of 5 African Americans live in communities with abandoned toxic waste sites
- 60 percent of African Americans (15 million) live in communities with one or more abandoned toxic waste sites
- 3 of the 5 largest hazardous waste landfills are located either in African American or Latino communities and account for 40 percent of the nation's landfill capacity (Reilly, 1992).

These siting disparities were not unique to African American communities. In fact, it also became evident that communities with high environmental risk generally also have low incomes and low property values. The most important conclusion made by the CRJ report was that the disproportionate distribution of the nation's hazardous waste facilities could not possibly be by chance and that there must be underlying factors related to the location of these facilities.

Although the GAO and CRJ studies have become widely published and well known within the environmental justice community, particularly within American minority communities, they have also generated a considerable amount of controversy and academic inquiry (Lazarus, 1993). The most prominent response emerged from a conference held at in 1990 at the University of Michigan in which grassroots groups, academics and environmental justice activists presented and discussed papers concerning environmental justice (Mohai & Bryant, 1992). The *Conference on Race and the*

*Incidence of Environmental Hazards* and the pressure from the activists in attendance, prompted the Environmental Protection Agency (EPA) to create a “Work Group on Environmental Equity” comprised of professionals from within the Agency (Bullard, 1993; Hartley, 1995). The work group’s mandate was to “make certain that the consequences of environmental pollution are not be borne unequally by segments of the population. EPA has a responsibility to identify such risks and target our scarce resources to address them” (Reilly, 1992). Two years after its creation, the work group issued a two-volume “*Environmental Equity Report*” (EPA, 1992) which surveyed and evaluated existing data regarding the extent to which minorities may bear disproportionately high burdens from environmental pollution.

Even though the work group’s analysis was considerably more detailed and refined than those of earlier studies, their report confirmed that disturbing trends did exist. The conclusions demonstrated that (1) existing data showed differences in exposure to some environmental pollutants by socio-economic factors and race; and (2) there was clear evidence that there are differences for disease and death rates (Lazarus, 1993). However, because the EPA had not historically collected data on environmental health effects by race and income or the environmental contribution to diseases, the work group was not able to confirm that a causal relationship between the two findings existed. Nevertheless, the report acknowledged that minorities have disproportionately greater “observed and potential exposure” to environmental pollutants and made several recommendations to the EPA (EPA, 1992; Hartley, 1995). These recommendations focused on gathering racial and socio-economic data and incorporating it into risk



assessments; increasing efforts to identify high risk populations and target activities to reduce their environmental risks; improving communications with and participation by minority and low income communities and finally revising the permit/grant procedures to address potential disproportionate risks in racial minority and low income communities (Reilly, 1992; Hartley, 1995).

## 2.3 Defining the Concepts

Before continuing with this discussion, it is important to distinguish between three terms that are used repeatedly throughout the environmental justice literature. Environmental *racism*, environmental *equity* and environmental *justice* have all been adopted by authors, however each has a distinct definition and care must be taken not use them interchangeably.

### 2.3.1 Environmental Racism

The term *environmental racism*, was first introduced by Dr. Benjamin Chavis Jr. with the release of the CRJ study in 1987 and has come to be associated with the various studies discussed in the preceding sections. In March 1993, Dr. Chavis gave the following definition to a congressional committee investigating environmental justice:

“Environmental racism is defined as racial discrimination in environmental policy making and the unequal enforcement of environmental laws and regulations. It is the deliberate targeting of people of colour communities for toxic waste facilities and the official sanctioning of life-threatening presence of poisons and pollutants in people of color communities” (EPA Hearings, 1993).

However, the most frequently cited definition for environmental racism was developed by Robert Bullard. He states that environmental racism refers to:

[A]ny policy, practice or directive that differentially affects or disadvantages (whether intended or unintended) individuals, groups or communities based on race or colour. It also includes exclusionary and restrictive practices that limit participation by people of colour in decision making boards, commissions and regulatory bodies" (Bullard, 1993-a).

Both of these definitions involve two standards for measuring whether certain actions amount to environmental racism. The first standard involves the "discrimination" against a specific group within society and the second implies that there is an "unequal enforcement" of rules and regulations.

Although these two standards reappear throughout the literature on environmental justice, there are differing opinions on the need to demonstrate that the discrimination or unequal treatment was intentional or purposeful. "In general, those skeptical of the movement's claims or opposed to its demands insist that environmental racism does not exist absent a showing of intentional discrimination" (Fisher, 1995). Without such evidence, the charge of environmental racism is open to the counterargument that if a community was not predominantly minority at the time a siting decision was made, then the result - that the community then became minority - is not racist (Foster, 1993).

### **2.3.2 Environmental Equity**

*"Environmental equity"* refers to the need to challenge racial and social inequities as they are manifested in the environmental arena; i.e. disproportionate and inequitable distribution of environmental hazards, particularly in minority and poor communities in the United States (EPA Hearings, 1993). When addressing environmental equity

concerns, investigations should include three categories: procedural, geographic and social equity.

*Procedural equity* refers to fairness - that is, to the extent that governing rules, regulations, evaluation criteria and enforcement are applied in a nondiscriminatory way (Bullard, 1994-b). However, following from the studies and investigations linking environmental hazards with disadvantaged communities, procedural equity has not been applied to all groups within society. A recent study conducted by Marianne Lavelle and Marcia Coyle for *The National Law Journal* uncovered specific procedural inequities in the manner that EPA enforces the Superfund laws<sup>4</sup>. The report's key findings include:

- Penalties under hazardous waste laws [Resource Conservation and Recovery] at sites having the greatest white population were about 500 percent higher than penalties at sites with the greatest minority population.
- Penalties averaged \$335566 at sites in white areas, but only \$55318 at minority sites.
- Under the Superfund program, abandoned waste sites in minority areas take 20 percent longer to be placed on the national priority action list than in white areas.
- For all the federal environmental laws aimed at protecting citizens from air, water and waste pollution, penalties in white communities were 46 percent higher than in minority communities. (Lavelle & Coyle, 1992)

This study indicates that not only are minority communities differentially affected by industrial pollution but they are also receiving different treatment from the government.

The second area of concern - *geographic equity* - refers to the location and spatial configuration of communities and their proximity to environmental hazards and "locally unwanted land uses" (LULUs), such as waste disposal facilities, sewage treatment plants, refineries and other noxious facilities. As previously introduced, studies have demonstrated that LULU's are not randomly scattered across the United States. The

---

<sup>4</sup> Following the Love Canal crisis, the US Congress passed the 1980 Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Popularly called the "Superfund", it included an appropriation of \$1.6 billion to clean up the nation's worst abandoned hazardous and toxic waste sites (Rosebaum, 1995).

LULU has become the central, shared and sometimes the hidden subject of city and land use planning in the United States (Popper, 1985). LULUs strain a sense of fairness, since they tend to gravitate to disadvantaged areas (i.e. the poor, minority, sparsely populated or politically underrepresented communities) that cannot fight them off..

Environmental justice advocates have sought to persuade federal, state and local governments to adopt policies that address distributive impacts, concentration, enforcement and compliance concerns (Bullard, 1994). In the United States, a number of states have tried to implement a “fair share” approach in order to promote geographic equity. As an example, in 1990, New York introduced a “fair share” legislative model (AB 723/SB 555, 1995) designed to ensure that every borough and community bears its fair share of noxious facilities. If passed, the bill would “prohibit municipal solid and regulate medical waste incineration facilities from being located within five miles of another similar facility” (GAIN, 1996).

Finally, *social equity* refers to the role of sociological factors such as race, ethnicity, class, culture, lifestyles and political power in environmental decision making (Bullard, 1994). However, as illustrated in the studies previously discussed, there is a strong correlation between the location of the environmental hazards or LULUs and these sociological factors. People live near hazardous waste sites as a result of discriminatory social policies, inequitable distribution of resources and the lack of political power. Environmental issues are therefore closely related to relations of race, class, gender and power.

As well, some government actions have created and even encouraged inequity by driving hazardous facilities to find the path of least resistance - ending up in poor, overburdened communities. In the United States, the government of California even funded a study that justified targeting economically disenfranchised communities for dangerous facilities (Bullard, 1994-a). The consulting firm, Cerrell Associates Inc., advised the state that “ideally ... officials and companies should look for lower socioeconomic neighbourhoods that are also in a heavy industrial area with little, if any commercial activity” when siting waste facilities (Cerrell Associates Inc., 1984).

### **2.3.3 Environmental Justice**

Environmental justice is considered, by theorists and advocates, a much broader concept than environmental racism. While environmental racism focuses on the disproportionate impact of environmental hazards, environmental equity and justice focus on either ameliorating potentially life-threatening conditions or on improving the overall quality of life for the minority or poor communities (Bryant, 1995).

Environmental justice has been defined as:

“the pursuit of equal justice and the ensuring of equal protection under all environmental laws and regulations, without discrimination based on race, ethnicity, and/or socioeconomic class (Bullard, 1994-b).

In order to address and remedy unequal environmental protection, a new framework is needed that will promote the concepts of environmental equity and justice, as well as ensuring the equal distribution of benefits and burdens resulting from environmental decisions. What are the steps that must be taken in order to create environmental legislation and regulations that protect all communities equally? Robert

Bullard has argued that governments and legislators must adopt five “*environmental justice principles*” in order to promote equity and justice in environmental decision making. They include:

1. ***Right to protection:*** Every individual has a right to be protected from environmental degradation. Protecting this right will require the creation of “fair environmental protection” legislation. A number of bills have been introduced into the U.S. Congress and are discussed in detail in section 2.5.2.
2. ***Prevention of harm:*** This principle would involve the adoption of a public health model of prevention, i.e. eliminating the threat before harm occurs. Affected communities would no longer have to wait until causation or conclusive proof is established before preventive action is taken.
3. ***Burden of proof:*** Under the current system, individuals who challenge polluters must prove that they have been harmed, discriminated against or disproportionately impacted. The new principle would involve shifting the burden of proof to the “polluters” or parties applying for operating permits to demonstrate that their operations will not harm, discriminate against or disproportionately impact racial and ethnic minorities or other protected groups.
4. ***Proof of intent:*** Proving intentional or purposeful discrimination is nearly impossible (see section 2.5.1 for recent examples). Laws, instead, must allow disparate impact and statistical evidence to infer discrimination.
5. ***Redressing inequities:*** This strategy would target action and resources to areas where environmental and health problems are the greatest (Bullard, 1994).

These five principles have been adopted by environmental justice advocates for unequal environmental protection challenges and grassroots movements against environmental discrimination. The need for and the integration of these principles will be discussed in further detail in subsequent chapters.

## 2.4 Factors Contributing to Environmental Discrimination

Environmental justice advocates have uncovered several precipitating factors that underlie the disparities in exposure to environmental hazards and that have influenced

environmental decision making processes. Individually and collectively, the following factors have played a significant role in the distribution of environmental hazards and must be considered when tackling environmental justice issues.

#### **2.4.1 Poverty**

A question that has been raised by a number of authors is whether the bias in the distribution of environmental hazards is simply a function of poverty (Mohai & Bryant, 1992; see Table 1). That is, rather than race, could it be poverty that ultimately affects the distribution of these hazards? The 1990 report, *Playing with Fire*, conducted by Pat Costner and Joe Thornton for Greenpeace, found:

- “the average annual income in communities with existing incinerators is 15 percent less than the national average;
- property values in communities close to incinerators are 38 percent lower than the national average
- in communities where incinerators are proposed, average property values are 35 percent lower than the national average” (Costner & Thornton, 1990).

Due to limited income and wealth, the poor do not have the financial means to buy their way out of polluted neighbourhoods and into more environmentally desirable ones.

As well, because land values are lower in poor neighbourhoods, industries tend to be attracted to these areas in order to reduce the costs of doing business (Mohai & Bryant, 1992). Many waste managers attribute the selection of minority communities to sound economic decision-making, since they are choosing impoverished communities because they are already industrial wastelands (Mitchell, 1992). In addition to reducing operating costs, businesses are able to offer low paying and potentially hazardous jobs to residents

who are faced with high unemployment levels and no alternatives. This economic trade-off has been labeled “environmental blackmail” and is discussed below.

#### **2.4.2 Institutional and Systemic Racism**

Although impoverished communities have been targets for hazardous waste siting decisions, environmental inequities do not result solely from differences in social class. As illustrated in Table 1, a number of studies have assessed the relative influence of income and race on the distribution of pollution. Taken together, the findings provide evidence that both play crucial roles and are not mutually exclusive when discussing the causes and consequences of environmental discrimination.

The structural roots of environmental inequities are very likely the same as those that produce other forms of racially disproportionate impacts. In this regard, the authors of environmental justice articles and studies have concluded that unequal environmental protection is yet another expression of a larger, widespread phenomenon - *institutional and systemic racism*. Institutional and systemic racism are entrenched in the policies, practices and procedures of various institutions, which may directly or indirectly, consciously or unwittingly, promote or entrench differential advantages for certain groups (Henry et al., 1995). More specifically, institutional racism has been defined as:

“those established laws, customs and practices which systematically reflect and produce racial inequalities in [North] American society. If racist consequences accrue to institutional laws, customs or practices the institution is racist whether or not the individuals maintaining those practices have racist intentions” (Williams, 1985).

Systemic racism, although similar to institutional racism,

“refers more broadly to the laws, rules and norms woven into the social system that result in an unequal distribution of economic, political and social resources and rewards among various racial groups. It is the denial of access, participation and



equity to racial minorities for services such as education, employment and housing” (Henry et al., 1995)

These discriminatory practices exist in both government departments and nongovernmental organizations. Environmental institutions are no different. “Because a range of environmental decisions - from the prevention of lead poisoning to the siting of waste facilities - involve complex interactions among government, legal and commercial actors, institutional racism leads to environmental racism” (Bullard, 1993).

### **2.4.3 Lack of Political Power and Representation**

The root of the issue may simply be that since industries tend to take the path of least resistance, communities with little political power end up as targets for these “locally unwanted land uses” (LULUs). “In deciding both from where and to whom environmental risks should be reallocated in the treatment and prevention of pollution, lawmakers are necessarily more responsive to the demands of constituents who possess the greatest political influence” (Lazarus, 1993). This has been referred to as the “not-in-my-backyard” (NIMBY) syndrome. The NIMBY syndrome consists of public opposition from more vocal and politically powerful, middle and upper income communities to the siting of a toxic facility or other LULUs in their neighbourhood (Foster, 1993). As more affluent communities become increasingly vocal in their opposition, calling for the facilities to be sited “somewhere else”, private industries have shifted their siting efforts toward other communities. However, “somewhere else” often ends up in poor, powerless minority communities and the NIMBY phenomenon is replaced with the new “PIBBY” principle - “Place in Blacks’ Back Yards” (Bullard, 1992-b)

Since the waste facility siting process is inherently political at the local level and LULU's are controversial and difficult facilities to locate, the decision makers will most likely select communities where there is little political support or representation. Implementing NIMBY campaigns require vast amounts of time, money, political influence and access to a variety of resources - resources that are not readily available in all communities (Colquette & Robertson, 1991). Communities without political leadership and representation are less likely participate in the decision making process and residents tend to be unaware of policy decisions affecting them (Mohai & Bryant, 1992). Thus political participation is characterized by the exclusion of the lower socio-economic groups. This exclusion may explain why poor minority communities are so frequently targeted of hazardous waste sites and host a disproportionate share of the burdens (Colquette & Robertson, 1991).

#### **2.4.4 Environmental Blackmail**

Related to the NIMBY syndrome and associated with environmental justice issues is a practice known as "*environmental blackmail*". Environmental blackmail occurs when communities agreeing to host hazardous waste sites and other LULUs are promised compensation in an amount such that the perceived benefits outweigh the potential risks (Foster, 1993). These economic inducements serve as equalizers or tradeoffs for the host communities. The offer of new jobs for a community with high levels of unemployed workers inevitably outweigh the need for a clean and safe environment. "Companies offering economic incentives have frequently succeeded in convincing affected

communities that reforms in environmental policies and opposition to toxic facility sitings will result in plant closures, layoffs and economic dislocation” (Bullard, 1992b). The employees are led to believe that if they want to keep jobs in their communities, they must work under conditions which may be hazardous to them, their families and their community. Minority communities are vulnerable to this job blackmail because they are plagued with increasing unemployment, extreme poverty and decaying business infrastructures (Mitchell, 1992). However, this issue raises a broader moral question: should one part of society (the affluent) be permitted to pay another part of society (the disadvantaged) to accept the risks that others can afford to escape (Bullard, 1992-b).

#### **2.4.5 Lack of Protection and Enforcement**

Ultimately, it is the “success” of environmental protection laws and regulations that has led to the racially disparate outcomes in the distribution of environmental hazards. “Although environmental laws promise uniform protection from known environmental hazards, environmental justice advocates believe that governmental intervention aggravates the regressive distribution of such hazards” (Foster, 1993). This is especially true in the siting of waste disposal sites. Due to the procedural emphasis in many environmental laws, landfill siting decisions are often very closely related to and dependent on political decisions, which leaves many disadvantaged groups excluded from the decision making process (for reasons already discussed above).

Environmental protection policy has almost exclusively been concerned with two basic issues during the last several decades: what is an acceptable level of pollution and

what kinds of legal rules would be best suited for reducing pollution to that level (Lazarus, 1993). This has resulted in policy makers paying less attention to the distributional effects, including the potential for discrimination and unequal environmental protection.

Environmental protection laws inevitably award benefits and impose burdens on particular groups in various ways. In the event that these burdens are equally distributed among all groups within society, the legislation will provide each member with identical protection and discrimination will not be an issue. However, this scenario is rare and highly improbable since “hardly any laws provide pareto optimality in the classic sense of making everyone better off and no one worse off” (Lazarus, 1993). The environmental justice literature is most concerned with the burdens of environmental protection. These burdens generally take two forms: the economic costs of pollution control [increased taxes and prices for consumers] and the environmental risks [lead poisoning, contamination] redistributed by environmental protection laws (Lazarus, 1993). The fact that both of these burdens are not randomly distributed between all groups in society has been demonstrated in a number of studies (as discussed in section 2.2.1 of this chapter).

All five of the factors discussed above collectively impact the distribution of environmental hazards and LULUs across the United States. Attempts at addressing these factors have resulted in several positive initiatives that aim to promote increased awareness and action regarding environmental justice issues in the United States. These initiatives are introduced in the following section.

## 2.5 Recent Initiatives Towards Environmental Justice in the United States

Within the last decade, several important steps have been made in the United States to address the equity issues and charges of discrimination that were discussed in previous sections of this chapter. Three high profile environmental justice lawsuits have been filed under legal provisions designed to prevent discrimination and the US Congress has considered passing several new bills, including the 1993 *Environmental Justice Act*<sup>5</sup> and the *Environmental Equal Rights Act*<sup>6</sup> (Sarokin and Schulkin, 1994). However, a concern still remains as to how well these two separate initiatives will incorporate environmental justice principles. A third initiative has grown out of these concerns and has resulted in a new environmental movement which minorities have created in order to address the issues that impact their communities. All three of initiatives are introduced below and will be developed in greater detail with reference to the Canadian legal framework, in subsequent chapters.

### 2.5.1 Environmental Justice Litigation

The first option that may be taken to challenge environmental racism within the legal realm involves the court system. In the United States, two litigation strategies are available for a minority community:

- an administrative complaint may be filed on behalf of a minority group for the purpose of preventing the siting of an unwanted facility on the basis of noncompliance with an applicable environmental statute; or
- distributional inequities provide a basis for a lawsuit by supporting a civil rights cause of action. (Lazarus, 1993)

---

<sup>5</sup> H.R. 5326, 102d Cong., 2d Session (1992).

<sup>6</sup> H.R. 1924, 103d Cong., 1st Session (1993).

To date, minority plaintiffs in the United States have favoured the latter of the two approaches (Lazarus, 1993).

Unfortunately, these recent environmental justice lawsuits have been not been successful. This lack of success has largely been due to the 1976 U.S. Supreme Court ruling which made it considerably more difficult for civil rights plaintiffs to prevail on equal protection grounds. In order to win an equal protection challenge, “the person or groups bringing the suit must show, by factual evidence, admissible in court, that the government’s challenged action was done with a discriminatory intent or purpose” (Almanza et al., 1993). This ruling, commonly referred to as the *Arlington Heights Factor*, implies that the plaintiff must show that race has been a motivating factor in the final decision and that the decision-maker chose the course of action due to its adverse effect on the group (*Arlington Heights v. Metropolitan Housing Devel. Corp.*, 429 U.S. 252, 1977).<sup>7</sup>

Three American cases form the basis of the failed attempts to mount an equal protection challenge to the siting of waste disposal facilities. All three illustrate the difficulty communities have run into trying to prove the U.S. Supreme Court’s discriminatory intent requirement.

(a) *Bean v. South West Waste Management*

The first case following the Arlington Heights ruling, *Bean V. South West Waste Management* (482 F. Supp. 673 S.D. Tex., 1979), involved a plaintiff seeking

---

<sup>7</sup> This discriminatory purpose does not have to be the primary purpose of the action, however it must be shown that it does exist and is related to the actions of the defendant (Almaza et al., 1993)

to prohibit the siting of a solid waste disposal facility within their community in Houston, Texas. The claim was brought against both the state agency that issued a permit for the facility, and the operators themselves. The approved site for the waste disposal facility was within 1700 feet of the predominately black high school and residential neighbourhood. The plaintiff argued that the State agency's approval of the permit was part of a pattern of discriminating in the siting of solid waste sites and that, in the context of the historical practices of locating these sites, the approval constituted discrimination (Lazarus, 1994). The district court denied the plaintiff's motion for an injunction and the complaint was dismissed on the grounds that the plaintiff had failed to demonstrate intentional discrimination.

*(b) East Bibb Twiggs v. Macon Bibb County Planning and Zoning Commission*

Following *Bean*, a second minority plaintiff claim in Georgia met a similar fate in 1989. In *East Bibb Twiggs v. Macon Bibb County Planning and Zoning Commission* (706 F. Supp. 880 M.D. Ga. 1989), a federal district court ruled that a local planning commission's decision to locate a landfill in an approximately 60% black census tract was not motivated by racial discrimination. The court concluded that the plaintiff did not provide adequate evidence of a disparate impact since the only other existing landfill was located in an area that was approximately 76% white community (Lazarus, 1994). As well, the court rejected claims made with respect to the Commission's approval procedures itself. Despite the fact this claim was rejected, the case has provided several bases for future siting challenges.

(c) *R.I.S.E. v. Kay*

Finally, the most recent equal protection challenge to surface in the U.S. courts occurred in Virginia in 1991. In *R.I.S.E. v. Kay* (768 F. Supp. 1144 E.D. Va. 1991), a citizen's group challenged the development of a landfill within a predominantly black neighbourhood. The plaintiff's claim was based on the fact that three prior county landfills had been located within black communities (between 1969-1977) and that the county did not give equal consideration to property values and the health impacts of an additional landfill. The court agreed that the county's siting of landfills had had a disproportionate impact on the community, but ruled that the plaintiff had not provided adequate evidence that satisfied the *Arlington Heights* discriminatory intent factor.

As these three examples illustrate, the existing American case law does not give minority plaintiffs much reason to be optimistic about their likelihood for successfully challenging actions or decisions based on equal protection theories. "As commentators have long contended, the practical effect of the required 'discriminatory intent' element is devastating to most civil rights claims because of the inordinate difficulty of proving the subjective, motivating intent of a decisionmaker" (Lazarus, 1993). Since traditional equal protection claims have not been successful in the court system, other causes of action must be investigated. The following sections discuss alternative methods taken in the United States to address unequal environmental protection.



## 2.5.2 Environmental Protection and Equity Bills

In addition to the recent case law, there have been a number of federal and state environmental protection and equality bills introduced in the United States over the last five years. Although the Canadian and American legal systems are significantly different, the three federal bills introduced below provide a basis from which Canadian legislation may start to integrate the environmental justice principles.

### *(a) The Environmental Justice Act*

The *Environmental Justice Act* (see note 5) is perhaps the best known legislative initiative dealing with environmental justice, in part because of the overwhelming support it has amassed from prominent leaders such as Dr. Benjamin Chavis and the bill's original sponsor, then Senator, Vice President Al Gore, when it was first introduced in 1992. The Act was reintroduced in 1993 but as of September 1996 it had not been passed by the US Congress (GAIN, 1996).

In response to the concerns raised by the proposed *Environmental Justice Act*, President Clinton issued Executive Order 12898, officially titled "*Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations*".

According to the Order,

"each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies and activities on minority populations and low-income populations in the United States and its territories and possessions..." (Executive Order 12898 Section 1-101).

Also under the Order, the EPA is required to identify 100 counties - known as Environmental High Impact Areas - facing the greatest threats from toxic chemicals and

take steps to mitigate risks in these areas (Sarokin & Schulkin, 1994). Once identified as a High Impact Area, the county would merit special administrative and regulatory attention to determine if the activities conducted within the area impact the environment in detrimental manners. This Order introduces new and expanded requirements for the EPA and federal agencies who would be required to collect, maintain and analyze information on race, national origin, income level and other appropriate information for areas surrounding federal facilities (Executive Order, Section 3-302c).

*(b) The Environmental Equal Rights Act*

The *Environmental Equal Rights Act* (see note 6) is another significant piece of legislation that would provide communities with a forum for fighting discriminatory siting of hazardous facilities. The bill was first introduced in 1993 and proposed:

“a petition process before an administrative body allowing any citizen to prevent the issuance of an operating permit if the proposed facility would be located in an environmentally disadvantaged community and could be adversely affect the human health or environmental quality of that community” (GAIN, 1996).

If passed, it would create procedural rights for citizens addressing the siting of hazardous facilities in poor and minority communities that already have multiple sources of pollution. A petition denying the issuance of the permit must be granted unless the project proponent can show that no alternative location is available within the state that would pose fewer risks to human health and the environment (Boerner & Lambert, 1995). Although this bill creates an equitable forum and shifts the burden process for examining potential impacts, critics have argued that it should be expanded to include socio-economic impacts and cumulative risks on the community (Sarokin and Schulkin, 1994).

*(c) The Public Health Equity Act & The Environmental Health Equity Information Act*

The *Public Health Equity Act* (H.R. 1925, 103d Congress, S. 1841) was first bill introduced in the U.S. Senate with the intent to “prohibit discrimination on the basis of race, colour or national origin in programs and activities relating to occupational and other exposures to hazardous substances” (GAIN, 1996). As well, the act mandate that all federal actions and allocations of funds (especially those of the EPA) were carried out in a non-discriminatory manner. This bill was referred to the Committee on Labour and Human Resources in 1995 where it “died”.

The *Environmental Health Equity Information Act* (H.R. 1925, 103d Congress, S. 1841), officially titled “A bill to amend the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980”, was introduced in April of 1992. If passed this new bill would require the administrator of the Agency for Toxic Substance and Disease Registry to collect and maintain information on the race, age, gender, ethnic origin, income level and education level of persons living in communities adjacent to toxic substance contamination (GAIN, 1996). The basic intention was to determine whether toxic waste management and disposal sites are located in areas which affect certain economic, ethnic or racial groups more than others.

Although none of these proposed environmental justice legislation have been passed by the U.S. Congress, positive steps have been taken by the Federal Agencies and departments as well as at the state level. Since the introduction of Executive Order 12898, ten Cabinet Departments (including: Defense, Health and Human Services, Housing and Urban Development, Agriculture, Transportation, Energy, Justice, EPA,

Nuclear Regulatory Commission and the Council on Environmental Quality) have completed environmental justice strategy reports. The most impressive achievements have occurred at the state level where 18 states have introduced and passed environmental equity resolutions and bills. Arkansas, Florida, Louisiana, Michigan, Tennessee and Virginia all successfully passed acts relating to environmental equity and justice in 1994-95 (GAIN, 1996).

### **2.5.3 The Rise of An Environment Justice Movement**

In response to these barriers and shortcomings of the legal system, a third environmental justice response has emerged across the United States. Until recently the issues discussed throughout this chapter have been addressed through largely separate movements of civil rights and environmental activism. However, as more and more communities began to wake up to find themselves suffering from chronic exposures to toxins, communities also began to make connections between previously mysterious illnesses and environmental hazards. “The environmental disasters at Love Canal (New York), Triana (Alabama), Institute (West Virginia), Warren County (North Carolina) and Emelle (Alabama) - along with research linking race and poverty to the siting of hazardous facilities - spawned a whole new breed of environmental activists” (Taylor, 1993). This increased activism manifested itself in the call for environmental and social justice for minority and poor communities.

The new environmental movement has become known as the *Environmental Justice Movement* and has attracted support from minority groups and communities, as

well as traditionally mainstream<sup>8</sup> environmental organizations throughout the United States. The movement has been defined as:

“a sector in which blacks, whites, Native Americans, Hispanics and Asians from various social classes and ethnic groups united to fight a wide array of issues that affect humans, flora, fauna, and the physical environment locally, nationally, and internationally” (Taylor, 1992).

Members and activists within the movement recognize that injustices have occurred in the past stemming from racism and discrimination and seek remedies for these past injustices by promoting fairness and equal access in future environmental decision making processes.

The environmental justice movement was founded on the principles of fairness and justice through a commitment of building race and class coalitions within minority communities and society as a whole. “The movement provides the political space to articulate and work on the issues relevant to minority communities in ways that encourage and respect minority participation” (Taylor, 1992-a). As well, environmental justice organizations encourage minorities to take leadership roles within their community and all members are considered to be equal with other participants who are interested in and concerned with the same issues of environmental equity. A multiracial environmental movement also permits people of colour to initiate and produce their own research, as well as define the issues that are most pressing to them instead of being defined by others. By participating, minorities have been able to show how far most

---

<sup>8</sup> By the term “mainstream”, environmental justice advocates are primarily referring to the “Group of Ten” environmental organizations (e.g. Sierra Club, Greenpeace, The Audobon Society). which are national in scope, advocacy and membership. The “Group of Ten” label was first introduced by these groups - the United States’ ten largest traditional environmental groups in 1985 - please see Robert Gottlieb, *Earth Day Revisited*, *Tikkun*, 1990 (Cole, 1992).

traditional and well-established organizations have shifted from the grassroots and the environmental concerns they have (Taylor, 1992).

Over the past ten years, the Urban Environment Conference<sup>9</sup> and the Citizen Clearinghouse for Hazardous Wastes<sup>10</sup> have identified dozens of groups and organizations that have emerged in what has been labeled the new grassroots movement (Taylor, 1992-b). These groups have been responsible for bringing environmental justice concerns into the national public policy debate in the United States. In addition to journal and magazine articles, reports, and studies devoted to environmental justice issues, the movement has also been responsible for a number of landmark events resulting in increased government, media and public attention to the issues. In particular:

- *The Urban Environmental Health Conference* (1985) was the first forum to raise the issue of toxic exposures on the job as well as in the community and pointed out how poor people were being forced to choose between their sources of income and their health and safety (Taylor, 1993).
- *The Conference on Race and the Incidence of Environmental Hazards* held at the University of Michigan School of Natural Resources in 1991. This conference led to four separate workshops on environmental racism.
- Letters from the Michigan Coalition in 1991 prompted the federal EPA to form a Work group on Environmental Equity (see section 2.2.1 in this chapter). As well, a Hearing by the EPA Subcommittee on Legislation and National Security was conducted in April 1993 on *Environmental Equity Issues*.
- *The First National People of Colour Environmental Leadership* summit was held in Washington, D.C. in 1991. Attended by over 650 delegates from the United States, Puerto Rico, Mexico and Canada, the conference set forth a platform for the new movement and adopted a 17 point statement as the new Environmental Justice Principles (see Appendix A).

---

<sup>9</sup> An alliance of labour, minorities and environmental organizations concerned with improving the environment and health of minorities and working people.

<sup>10</sup> Based in Arlington, Virginia. An example of a national clearinghouse that provide direct aid and movement-building help like technical advice, legal services, research support, funding etc. to approximately 2000 citizen and minority action groups.

- Pressure from environmental justice groups and activists resulted in a number of federal and state bills introduced into Congress addressing environmental justice issues (see section 2.5.2).

The environmental justice movement that has evolved is one of the strongest forces for environmental reform to emerge in years. As well, in the larger environmental movements, minority participation has broadened the debate to include the issues that were previously ignored.

However, in order to successfully introduce legislation and achieve equal representation, environmental justice groups must build alliances with other sectors of the social justice and mainstream environmental movements. The powerful, mainstream environmental groups have begun to make attempts to address environmental justice issues and to promote diversity within their organizations. For example, *The Environmental Consortium for Minority Outreach* (TEC) was established by representatives from the Trust for Public Land, Human Environment Centre and the “Group of Ten” (Bullard, 1994b). TEC’s objectives included (1) establishing minority recruitment programs for staff and board members within mainstream environmental organizations; (2) enhancing training programs; (3) developing educational materials, sponsoring conferences and workshops to enhance knowledge on environmental justice issues; and finally, (4) encouraging and coordinating support for grassroots environmental activities within minority communities. Unfortunately, TEC was not directly accountable to the low-income, working class or minority communities it claimed to represent and it is no longer an active player in the environmental justice movement.

## 2.6 Conclusion

As illustrated throughout this chapter, the siting of environmental hazards and LULU's have become near impossible processes that result in negative distributional impacts regardless of the location selected or communities involved. There is growing concern that these impacts have not been distributed equally throughout the United States and that minority and low income communities have borne a disproportionate amount of the burdens of these decisions. The evidence supporting environmental discrimination and racism has increased over the past ten years and has served as a catalyst for a new environmental movement. Environmental justice advocates have succeeded in bringing the concerns and issues of minority populations to the attention of environmental decision makers and legislators. However, by integrating environmental justice principles into existing environmental decision making processes and by introducing new environmental protection legislation, the United States has only begun to address the real issues at the heart of environmental racism. Minority and low income communities will continue to receive unequal protection until systemic and institutional racism are eliminated from decision making processes completely.

Although the events and literature introduced in this chapter focused on recent developments in the United States, many of the same issues and concerns may be found all over the world. The following chapters will investigate the extent to which the concerns and issues outlined in this chapter can be found in Nova Scotia.



## CHAPTER THREE

### RESEARCH METHODOLOGY

#### 3.1 Introduction

While recent American environmental justice studies have been widely cited and applied by environmental justice advocates, there is a lack of Canadian information and case studies. As introduced in the preceding chapters, environmental racism and unequal environmental protection have become an issue in the siting of environmental hazards and LULU's in Nova Scotia and deserve closer examination.

In an attempt to determine whether there was a basis to the environmental racism claims made in 1991, this study examined the relationships and patterns between the location of waste disposal facilities and disadvantaged communities within Nova Scotia. Three main categories of variables were identified and were used to analyze the geographic and demographic patterns between the three. The categories included:

- (1) The geographic location of *waste disposal facilities* within Nova Scotia.
- (2) The geographic location of *minority communities* within Nova Scotia.
- (3) The *demographic characteristics* of areas surrounding identified waste disposal facilities within Nova Scotia.

These categories are defined in more detail in the following sections of this chapter. As well, this chapter outlines the research phases completed in order to collect and analyze the necessary data for this study.

### 3.2 Defining The Study Area

In any geographic analysis, one of the most important decisions that must be made is determining the appropriate area to be used as the unit of analysis. The size of the area may range from national, provincial, regional and community levels depending on the research questions to be examined. Ultimately, the area selected for analysis should reflect the objectives and the purpose of the study. For the research questions addressed in this study (see chapter one), the scope of the research was limited to the province of Nova Scotia. However, various smaller scale geographic units of analysis were also used in order to correspond to the available statistical data. The geographic boundaries for Nova Scotia's counties, subdivisions and enumeration areas as identified by Statistics Canada served as the basis of this study. These areas were defined as:

- *County (C)* - census divisions classified into various types according to official designations adopted by provincial or federal authorities. Nova Scotia has been divided into 18 counties.
- *Census Subdivision (CSD)* - refers to the general term applying to municipalities (as determined by provincial legislation) or their equivalent, e.g. Native reserves, settlements and unorganized territories.
- *Enumeration Areas (EAs)* - refers to the geographic area canvassed by one census representative. (Statistics Canada, 1992a)

These three specific geographic units enabled the author to investigate the presence of patterns (both geographically and statistically) within and between the various levels.

### 3.3 Research Phases

Several steps were taken in order to investigate the hypothesis that environmental burdens have not been shared equally within Nova Scotia and that waste disposal facilities have been predominately located in minority or poor communities. The study

was conducted in three phases of data collection, followed by an analysis of the results. Information was primarily collected through (a) review of literature, government documents and archival records; (b) statistical data from the 1991 Canadian Census; (c) geographic information systems mapping (GIS); and (d) personal interviews.

### **3.3.1 Identifying and Defining Waste Disposal Sites**

The first step taken was to identify and define the relevant municipal waste disposal sites within the province of Nova Scotia. For the purpose of this study, waste disposal facilities included municipal landfills, open dumps and incinerators active as of 1991. The Nova Scotia Department of the Environment (DOE) provided a list of the active solid waste disposal sites that were registered with the government department (please see chapter 4 or Appendix C for the complete list). Representatives from the public works and waste management departments for each of the eighteen counties were contacted in order to confirm the location and operating status of all sites the within their jurisdiction. A large number of the sites had recently been closed due to the new regulations, implemented by the Nova Scotia DOE, banning open pit burning as of April 1996 (NS DOE, 1996)<sup>11</sup>. It was decided to keep these sites in the study since they were active at the time of the 1991 Census.

Since it was not possible to use a comprehensive list of all the waste sites (active and abandoned) that have been located within the province, it was crucial to this study to limit the waste facilities to those which were in operation at the time of the 1991 Census.

---

<sup>11</sup> Schedule "A", Division II Disposal of Municipal Solid Waste (36) "On, from and after April 1, 1996, no person shall permit, carry out or be responsible for open burning of municipal solid waste which shall include open burning in an uncontrolled teepee, pit and silo burner".

Using this year as a target date allowed for a comparative analysis between the location of the facilities and the most recent demographic information for the host communities. Ultimately, it provided a recent and relevant database needed to determine the characteristics of the area surrounding the waste site and who would have been impacted while the facility was in operation.

### 3.3.2 Statistical and Demographic Variables

In order to explore the existence of inequality, the general population must be classified into subgroups according to some characteristics or criteria that are the focus of the equality analysis (Zimmerman, 1994). To determine the characteristics of the population in the immediate vicinity of the waste facilities in this study, a number of demographic statistics were selected. Although these variables provide only a limited characterization of area differences, they address the primary findings of prior research on environmental equity. As defined in Statistics Canada's *1991 Census Dictionary*, the seven variables include:

- ***Ethnic Origin*** - refers to the ethnic or cultural groups to which the respondent's ancestors belong. For the purposes of this study, the focus was on respondents of Black origins.
- ***Aboriginal Population*** - refers to those persons who reported at least one aboriginal ethnic origin, i.e. North American Indian, Metis or Inuit and/or reported being registered under the Indian Act of Canada.
- ***Unemployment Rate (%)*** - refers to the unemployed labour force (15 years of age and over) expressed as a percentage of the total labour force. Unemployed persons include: those actively looking for work in the four weeks prior to enumeration; were on layoff and expected to return to work; or had definite arrangements to start a new job or were available for work four weeks following enumeration.
- ***Median Household Income (%)*** - refers to that amount which divides a specified group of income units (households) income size distribution into two halves (i.e.

the incomes of the first half of the income units are below the median, while those of the second are above the median).

- ***Incidence of Low Income (%)*** - refers to the proportion or percentage of economic families in a given classification below the low income cut-offs. These cut-offs were calculated by Statistics Canada and are dependent on family size and the size of area or residence (chart may be found on p. 126 of the 1991 Profile of Census Divisions and Subdivisions in Nova Scotia - Part B).
- ***Government Transfers (% of total income)*** - refers to total income from all transfer payments received from federal, provincial or municipal governments in the calendar year 1990. This source includes social assistance payments, pension plans, unemployment insurance, family allowances, child tax credits.
- ***Rented Occupied Dwellings (% of total dwellings)*** - a dwelling is classified as rented even if it is provided without cash rent or at a reduced rent or if the dwelling is part of a co-operative. Percentage calculated from total occupied dwellings (including: owned, rented, band).

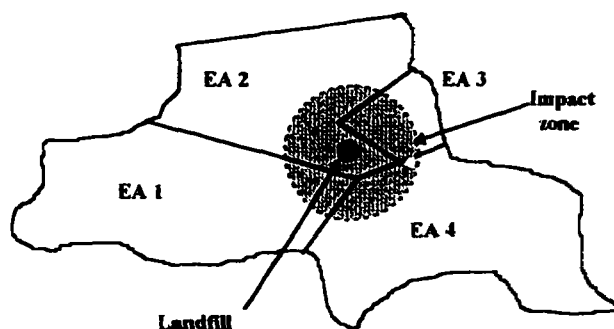
Although these variables were chosen to characterize minority and poor communities, conclusions must not be made that the entire population of an identified geographic area is "poor". Several factors played significant roles in the accuracy of the data for this study and every possible effort was taken in order to control or account for these factors (for more details please see section 3.4 of this chapter).

### 3.3.3 Mapping the Results

Using a geographic information system computer program (*Arcview 2.1 for Windows*), in conjunction with the 1991 Census data from Statistics Canada, the 65 waste disposal facilities were plotted on the provincial map of Nova Scotia within the appropriate and corresponding enumeration areas. Nova Scotia topographic maps (1:50 000), the Abandoned Waste Disposal Site Study maps (Nova Scotia DOE, 1987) and the Vaughan Engineering Ltd. Regional Solid Waste Study all aided in the plotting of these locations. Once these sites were plotted and the subpopulations were defined, the next

step in the analysis was to define the location of the subpopulations relative to the waste locations. Since many waste disposal facilities are sited at the outer boundaries of political jurisdictions, confining the analysis to the host jurisdiction would miss the impacts felt in adjacent communities. The map in Figure 1 illustrates the difficulty of assigning the political jurisdiction that most appropriately characterizes the landfill's location. Since impacts of a waste facility do not end at political boundaries a five km<sup>12</sup> "impact zone" was created around each of the 65 sites (see Appendix D). Therefore, all EA's falling entirely or partially within this "impact zone" were included in the study.

**Figure 1. Identifying Appropriate Political Jurisdictions**



A separate database, containing the statistical information for the selected demographic variables, was associated with each of the 65 sites and the corresponding EA's. A number of maps and charts were created to illustrate provincial, county and subdivision patterns for all of the selected variables (as seen in Chapters 4 and 5).

<sup>12</sup> 1993 GAO study recommended expanding the impact analysis to 3 miles from the landfill, therefore 5 km was selected for this study.

### 3.3.4 Analysis of the Results

Once the mapping of the municipal waste facilities and the demographic characteristics of host communities was completed, the next task was to investigate the relationships or patterns that emerged. All of the statistical data for each waste disposal site was compiled into charts and tables in order to determine whether correlations existed between the locations of these sites and the categories of variables selected to identify minority and low income communities.

Several statistical methods of analysis were employed to determine patterns and correlations. These included:

- *Frequency Tables* - pivot tables were created to summarize the frequency and ranges were selected to illustrate the distribution of waste disposal facilities in relation to each demographic variable throughout Nova Scotia's subdivisions.
- *Student T-Tests* - used to determine if the difference of means for two distinct samples is significant. Once the statistical data was separated into two samples (census divisions with waste sites and those without), t-tests were performed on the means for each variable at three levels of analysis:
  - (1) Subdivisions - with waste sites vs without
  - (2) EAs - with waste sites vs without
  - (3) EAs - within 5km impact zone vs outside the 5km impact zone

The formula to determine the statistic value  $t$  was<sup>13</sup>:

$$t = \frac{\bar{x}_1 - \bar{x}_2 - \Delta_0}{\sqrt{\frac{S_1^2}{m} + \frac{S_2^2}{n}}}$$

<sup>13</sup> From Microsoft Excel 5.0 User's Guide, 1994 p. 603.

Where:  $\bar{x}_1$  = mean of first sample;  $\bar{x}_2$  = mean of second sample;  $\Delta$  = the hypothesized difference in means;  
 $S$  = standard deviation;  $m$  = sample size;  $n$  = sample size;

The data collected was analyzed on all three geographic scales to investigate whether correlations could be made between these levels and to determine whether the level of analysis influenced the outcome of the results.

### **3.4 Study Limitations**

As previously mentioned, there were a number of limits and restrictions placed on this study from the start. Identifying and acknowledging them prior to the commencement of the study allowed the author to focus on the relationships and patterns that emerged within the set research boundaries.

#### **3.4.1 Accuracy of Statistical Data**

The first factor that limited this study involved the accuracy of the statistical information. The most recent and consistent demographic data available were those collected and released for the 1991 Canadian Census. Although these statistics were the most recent, they only reflected the characteristics of the area at the time of the Census - not the time of the siting. Therefore, the demographics of the surrounding community could have been different at the time of the siting. However, since the objective of this study was to determine the characteristics of the communities surrounding waste disposal facilities that were in operation in 1991, it was decided to restrict the statistical data to the 1991 Census results.

As well, there are calculation and collection errors associated with using Census information. Those pertaining to this study are discussed in detail in Chapter 4.



### **3.4.2 Physical Features**

Second, this study did not take into account the physical features that might play an important part in determining which communities are impacted (e.g. mountain ranges, wind patterns and watershed boundaries) by the waste site. For instance, wind direction and water currents will have stronger impacts on those communities located down wind or current than those in the opposite direction. As well, mountain ranges may act as barriers for communities to noise and smells emitted from landfills.

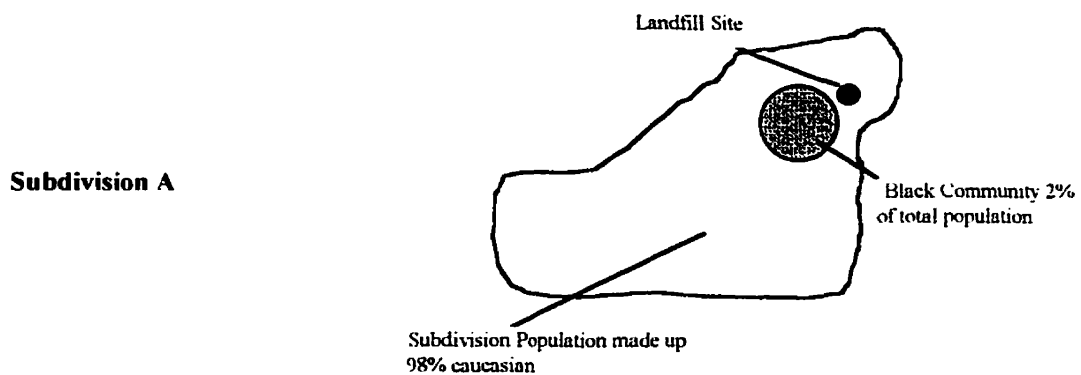
### **3.4.3 Size and Scope of Study Area**

The third, and perhaps the most important, limitation that was discovered during the course of this study was the impact that size and scope of the area of study had on the outcome of the results. The decision to use three levels of geographic units was made in an attempt to avoid generalizing the characteristics of an area. For example, although a county may have a median income level of \$30 000, this average may have been determined by two significantly large yet different demographic groups (one group averaging \$50 000 and the other \$10 000). By using smaller units of analysis, these discrepancies were minimized and the characteristics of communities within subdivisions or EAs were more accurately portrayed.

As well, using statistics at the subdivision level does not always accurately illustrate the demographic distribution in relation to the waste site. For example, the population statistics for Subdivision A stated that only 2% of the subdivision were

identified as black. This information alone would suggest that the impact of the landfill located in this subdivision on the black community would be very small. However, as illustrated in Figure 2 when the actual concentration of this 2% black population was located on a smaller scale the proximity and potential impacts of the landfill increased significantly.

**Figure 2. Determining the Actual Distribution of Demographic Variables**



Relying on the statistics for subdivisions did not reveal the concentration or proximity of the black community to the waste site. These patterns were only detected by taking the analysis one step further - to the enumeration level.

#### **3.4.4 Defining Minority and "Poor" Communities**

Relying on statistical data and enumeration counts in order to define a "minority" community resulted in a critical inadequacy. "Defining minority communities as any

area where the percentage of nonwhite residents exceeds the percentage found in the entire [Canadian] population means that a community may be considered ‘minority’ even if the vast majority of its residents are white” (Boerner and Lambert, 1995). For example, according to statistics collected by the 1991 Census - the black population represents only 1.21% of Nova Scotia’s population and only 0.83% of Canada’s entire population. Based on this methodology, counties or subdivisions where over 90% of its population are white are still considered to be minority. For this reason, the investigation was taken beyond a statistical review and examined the historical significance of the communities identified as “minority”.

### **3.5 Conclusion**

Due to time and logistical constraints it was not possible to undertake a complete historical study into the locations and distribution of waste disposal facilities within Nova Scotia. This study was intended to provide an introduction to the issue of environmental justice and ultimately spark a number of follow-up studies and investigations. Therefore, the following chapters have focused on the waste disposal facilities and statistical data falling within the limitations set out in this methodology.

## **CHAPTER FOUR**

### **STATISTICAL RESULTS**

#### **4.1 Introduction**

As outlined in chapter three, in order to investigate the claims of environmental discrimination in Nova Scotia, several levels of statistical analysis were required. The study began by identifying and mapping the waste disposal sites in Nova Scotia which met the specifications outlined in the methods chapter. In addition to locating waste sites, statistical data was also collected for the seven demographic variables at the Census subdivision and enumeration area levels. By comparing the distribution of these variables in relation to waste site locations, a number of patterns and relationships were identified. The results of this investigation are summarized below and provide the statistical background for analyzing significant relationships and areas of concern in the following chapter.

#### **4.2 Data Quality**

Before beginning the study, a number of data quality concerns needed to be acknowledged and addressed. The 1991 Census, as any large and complex statistical undertaking, was subject to a certain degree of error. These errors may have arisen at any stage of the process and may have been either random or systematic in nature. For census data in general, the main types of errors included:

- *coverage* - occur when dwellings and individuals are missed, incorrectly included or double counted.
- *non-response* - result when responses cannot be obtained from a small number of households or individuals

- *response* - occur when the respondent misunderstands a question and records incorrectly
- *processing* - occur during coding or when data is transferred
- *sampling* - occur when long form questions are weighted to represent a larger population but differ from the results if all households had responded.

(Statistics Canada Profiles, 1991)

The following shortcomings of using Census statistics were identified and must be taken into account when analyzing the results of this study.

#### **4.2.1 Confidentiality**

In order to prevent the possibility of associating statistical data with any individual, the statistical information was subjected to a confidentiality procedure called *random rounding*. Under this method, all figures were randomly rounded either up or down to a multiple of 5 or 10. Since totals were independently rounded, they did not necessarily equal the sum of individually rounded figures in distributions (Statistics Canada, 1992).

#### **4.2.2 Area Suppression**

Area suppression was also implemented to further protect the confidentiality of individual responses. This resulted in the deletion of all characteristic data for geographic areas with populations below 40 persons (Statistics Canada, 1992). There were a number of Census Subdivisions and Enumeration Areas for which data was not provided and which therefore had to be excluded from the study.

In addition, on some Native reserves and settlements, enumeration was not permitted or was interrupted before it was completed. These geographic areas are called

*"incompletely enumerated Indian reserves and settlements"* and since the 1991 data was unavailable for these areas they were not included in the tabulations for this study. The affected subdivisions and enumeration areas in Nova Scotia are listed in Appendix E).

#### **4.2.3 Non-Identification and Under-Representation**

The data collected for the 1991 Census was based on either a 100% basis or on a random "long form" sample of only 20% of the entire population. The information collected on the long forms was considerably more detailed and included questions on ethnic origin, employment and income characteristics. The information gathered from the long form was then weighted to provide estimates that were used to represent the entire population of the census area (Statistics Canada Profile, 1991). However, since only 1 in 5 households and/or individuals fill out a long form, the characteristics of the total population may significantly differ from those responses. In this case, one group may be underrepresented or missed entirely in this statistical account of a census area. This is especially important when dealing with ethnic minorities who make up such a small percentage of the total population to begin with. As well, alienated social groups may not accurately identify themselves as minority because of past discrimination leading to under-representation in the census statistics.

### **4.3 Mapping Waste Disposal Sites and Demographic Characteristics**

As outlined in chapter three of this thesis, several steps were required in order to collect all the necessary data for this study. The first research phase involved identifying

and mapping the waste disposal sites that were in operation in Nova Scotia during 1991. Once this information was collected, the second step required extracting statistical data for the seven demographic variables at the three census divisions previously selected (county<sup>14</sup>, subdivision and enumeration areas). The following discussion summarizes the findings and statistical relationships between these two sets of information at the subdivision level.

#### **4.3.1 Locating Waste Disposal Facilities**

The Nova Scotia Department of the Environment provided a list of the active waste disposal sites (including: landfills, incinerators, open burn disposal sites active in 1991) within the province. The locations and operating status were confirmed by the regional DOE offices, county Public Works departments, and the Abandoned Waste Disposal Site Study (NS DOE, 1987). The sample included 65 waste disposal sites and these sites were located within both the Census Subdivisions and Enumeration Area maps on the GIS program provided by Statistics Canada (*GEO Mapping and Statistics, 1996*). These waste facilities are illustrated in Figure 3 and the corresponding legend can be found in Table 2. As well, further details concerning facility operation (i.e. owner/operator, operating status, type of facility) have been summarized into a chart found in Appendix C.

---

<sup>14</sup> Although statistics were collected for the 18 counties in NS (see Appendix B), the size and scope of the counties were too large to provide a valid and significant statistical analysis. Therefore, the results in this chapter are only based on subdivision and EA level data.

Table 2. Waste Disposal Facility Locations in Nova Scotia

ANNAPOLIS	1	Crisp Road	Incinerator	
	2	Graywood	Incinerator	
	3	Joe Simon Road	Landfill	ash disposal site
	4	Torbrook	Disposal Site	Construction Debris
	5	Middleton	Town Dump	
ANTIGONISH	6	Beech Hill	Landfill	serves county
	7	James River	Landfill	closed June 1991
CAPE BRETON	8	Sydney/Glace Bay Highway	Incinerator & Landfill	
	9	Sydney	Landfill	
COLCHESTER	10	Portapique	Town Dump	
	11	Tatamagouche	Town Dump	
	12	Upper Stewiacke	Town Dump	closed June 1995
	13	Wittenberg	Landfill	closed June 1995
	14	Truro	Landfill	serves county
CUMBERLAND	15	Joggins/River Hibbert	Town Dump	closed - now a transfer st
	16	Advocate	Incinerator	closed April 1996
	17	Little Forks	Landfill	serves county
	18	Willamsdale	Town Dump	closed
	19	Port Howe	Town Dump	closed
	20	Greenville	Town Dump	closed - now a transfer str
	21	Pugwash	Town Dump	closed - now a transfer str
	22	Wallace	Landfill	closed - now a transfer str
	23	Wentworth	Town Dump	closed
	24	South Hampton	Town Dump	closed - now a transfer str
DIGBY	25	Oxford	Town Dump	closed - now a transfer str
	26	Parrsboro	Landfill	closed (1995) - transfer str
	27	Clare	Landfill	serves county
	28	Long Island	Open Burn	closed *
GUYSBOROUGH	29	Rossway	Open Burn	closed *
	30	Upper Cross	Open Burn	closed *
HALIFAX	31	Lincolnville	Landfill	serves county
	32	Gegogan Road	Incinerator	closed * -now transfer strn
HALIFAX	33	Sackville - Mount Uniacke	Landfill	
	34	Lake Charlotte	Town Dump	closed *
	35	Musquodoboit Hbr	Town Dump	closed *
	36	Necum Teuch	Town Dump	closed*
HANTS	37	Georgefield	Landfill	
	38	Cogmagun	Landfill	
INVERNESS	39	Pleasant Bay	Open Burning	closed
	40	Kenloch	Landfill	
	41	Big Brook	Landfill	
KINGS	42	Meadowview	Landfill	
LUNENBURG	43	Kaizer Meadow	Landfill	opened 1992
	44	New Ross	Town Dump	closed 1992
	45	Western Shore	Town Dump	closed 1992
	46	Simms Settlement	Town Dump	closed 1992
	47	Whynots Settlement	Incinerator	Incinerator replaced by **
	48	Mahone Bay	Town Dump	closed
PICTOU	49	Mount William	Landfill	
QUEENS	50	Ten Mile Lake	Landfill	



RICHMOND	51	Point Tupper	Landfill	private
	52	Port Malcolm	Landfill	private
	53	L'Ardiose	Open Burn	closed*
	54	West Arichat	Landfill	serves county
SHELBURNE	55	Barrington	Town Dump	no longer burn
	56	West Green Hbr	Incinerator	white metal incineration
	57	Shelburne	Town Dump	no longer burn
VICTORIA	58	Dingwall	Town Dump	closed *-now a transfer str
	59	Baddeck	Landfill	serves county
YARMOUTH	60	Pubnico	Open Burn	closed *-now temp landfill
	61	Abrams River	Open Burn	closed *-now temp landfill
	62	Wedgeport	Open Burn	closed *-now temp landfill
	63	Wellington	Open Burn	closed *
	64	Carleton	Open Burn	closed
	65	Brooklyn Road	Landfill	serves district of Yarmouth

\* All open burn waste disposal sites in Nova Scotia were banned by the DOE on April 1 1996 (Schedule "A" - Regulations respecting Solid Waste-Resource Management made by the Governor in Council pursuant to Section 102 of Chapter 1 of the Statutes of Nova Scotia 1994-95, the *Environment Act*).

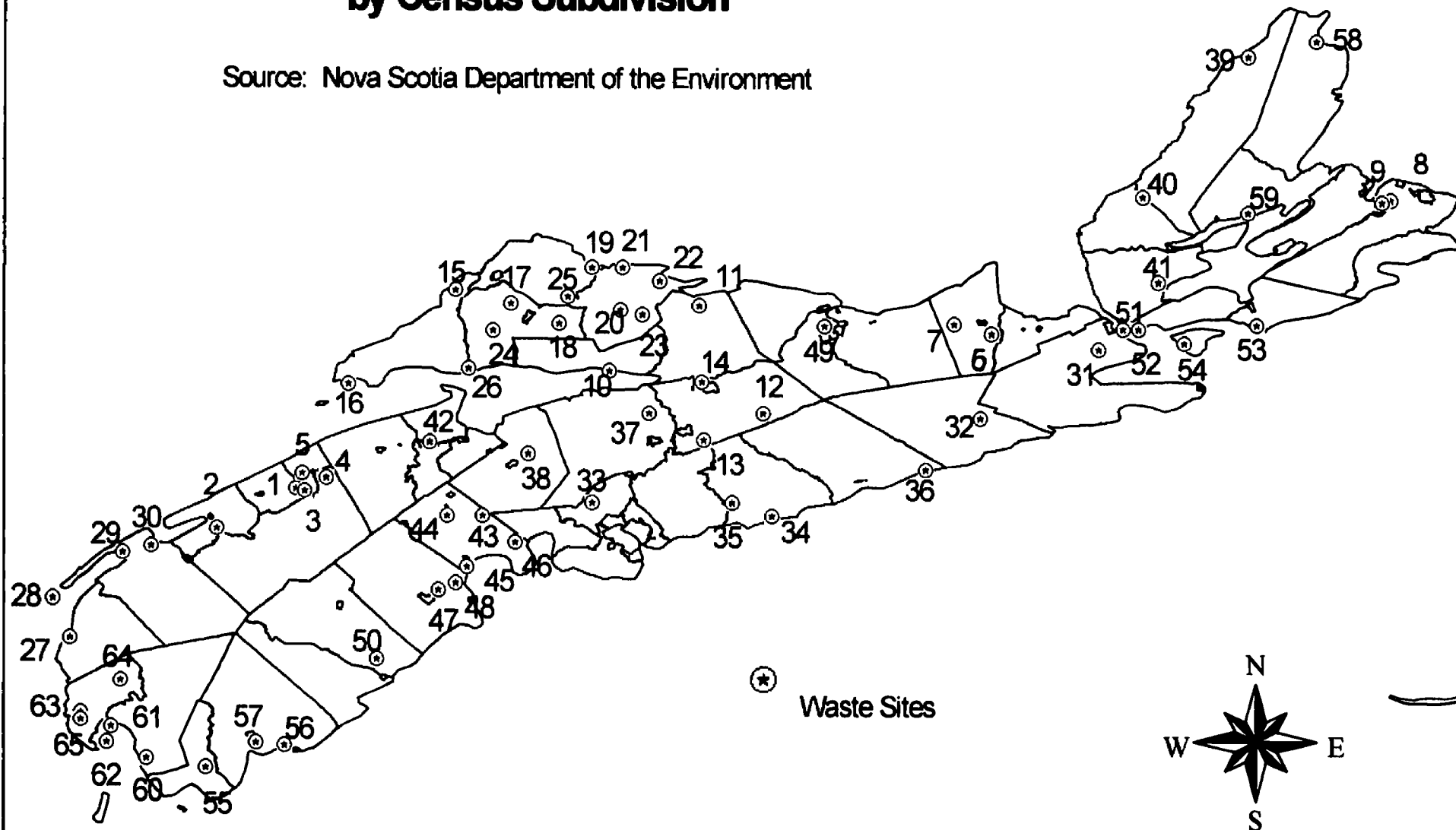
\*\* Regional Recycling and Composting Disposal Facility serves the Municipality of Lunenburg - including Bridgewater, Lunenburg, Mahone Bay.

After the facilities were mapped, each site was then associated with a corresponding code for all three of the census divisions - county, subdivision and enumeration area.<sup>15</sup> Once coded, the demographic characteristics were mapped and linked with waste site locations.

<sup>15</sup> Statistical databases for county, and subdivision are found in Appendix B. The enumeration area database was too large to include in this thesis but is available from Statistics Canada.

**Figure 3. Active Waste Disposal Sites in Nova Scotia 1991,  
by Census Subdivision**

Source: Nova Scotia Department of the Environment



### 4.3.2 Distribution of Waste Disposal Sites in Relation to the Demographic Variables

The next step in the mapping phase of this study involved compiling the statistical information for the seven demographic variables from Statistics Canada's databases. The statistical data for the subdivision level analysis was extracted from Part A and B of Statistics Canada's *Profile of Census Divisions and Subdivisions in Nova Scotia* and then compiled into a database for the 107 subdivisions.<sup>16</sup> Table 3 provides a summary of the mean, median and standard deviation for the variables in all of the subdivisions.

**Table 3. Statistical Summary of the Demographic Variables for All Subdivisions**

Variable	Sample Size	Mean	Median	Standard Deviation
% Black	107	0.7	0.2	1.4
% Native	107	8.4	0.2	24.9
% Renter Occup	107	20.6	15.4	14.7
Unempl (%)	107	18.2	15.0	10.9
Med Income \$	100*	30982	31307	7101
Low Income (%)	94*	13.5	12.8	5.04
Govt Trans (%)	101*	22.2	20.4	9.77

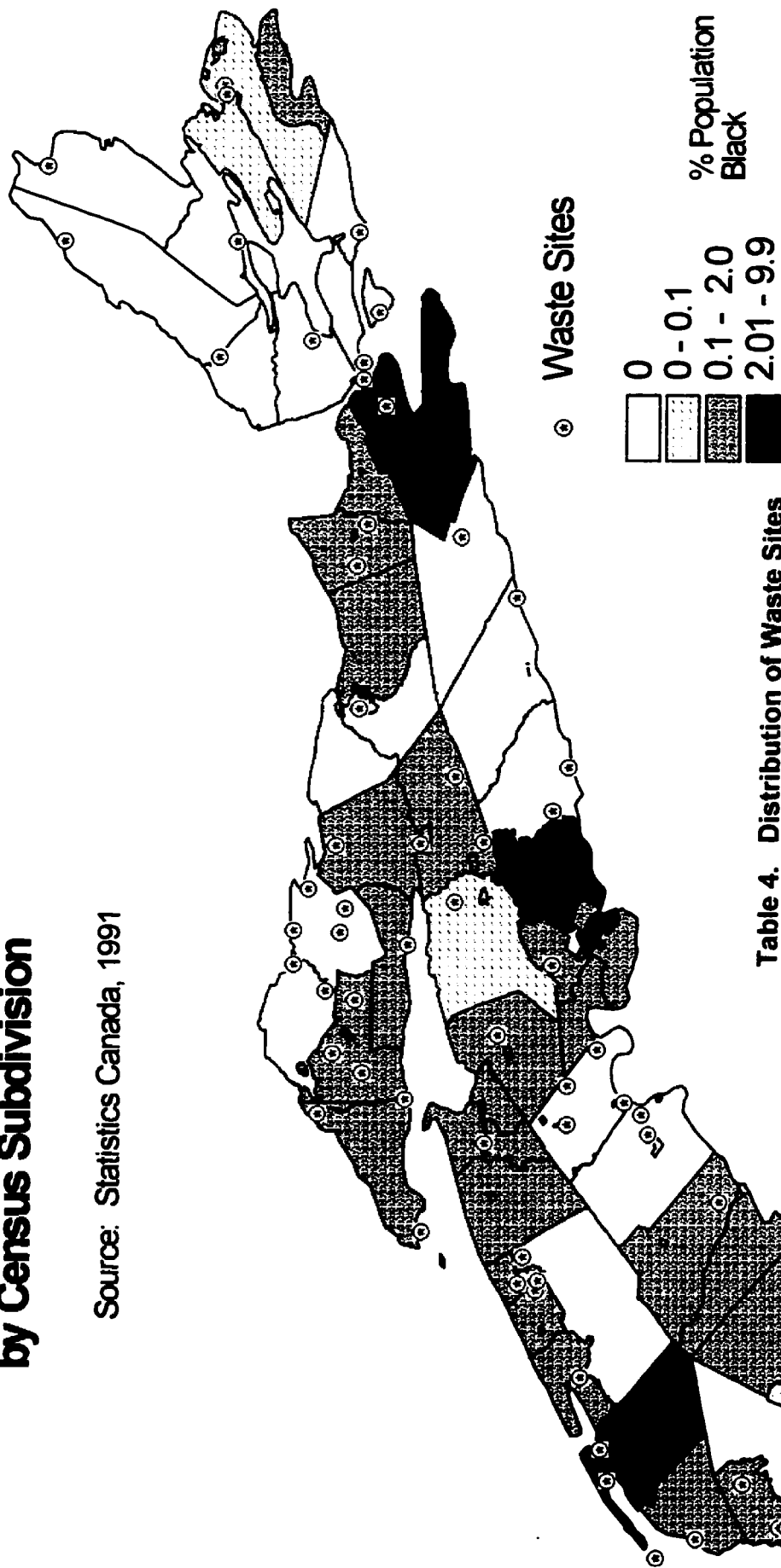
\* Sample size is lower because statistical data was not available for a number of subdivisions.

The following figures (4-10) and tables (4-10) illustrate the distribution of demographic variables in relation to waste disposal facilities in Nova Scotia. Patterns and relationships emerging from these maps are discussed in the following section of this chapter.

<sup>16</sup> Although Nova Scotia is divided into 131 Subdivisions Canada, the data for a number of the subdivisions was suppressed. Therefore, this study is based on 107 subdivisions for which published data was available.

**Figure 4. Distribution of Black Population 1991,  
by Census Subdivision**

Source: Statistics Canada, 1991



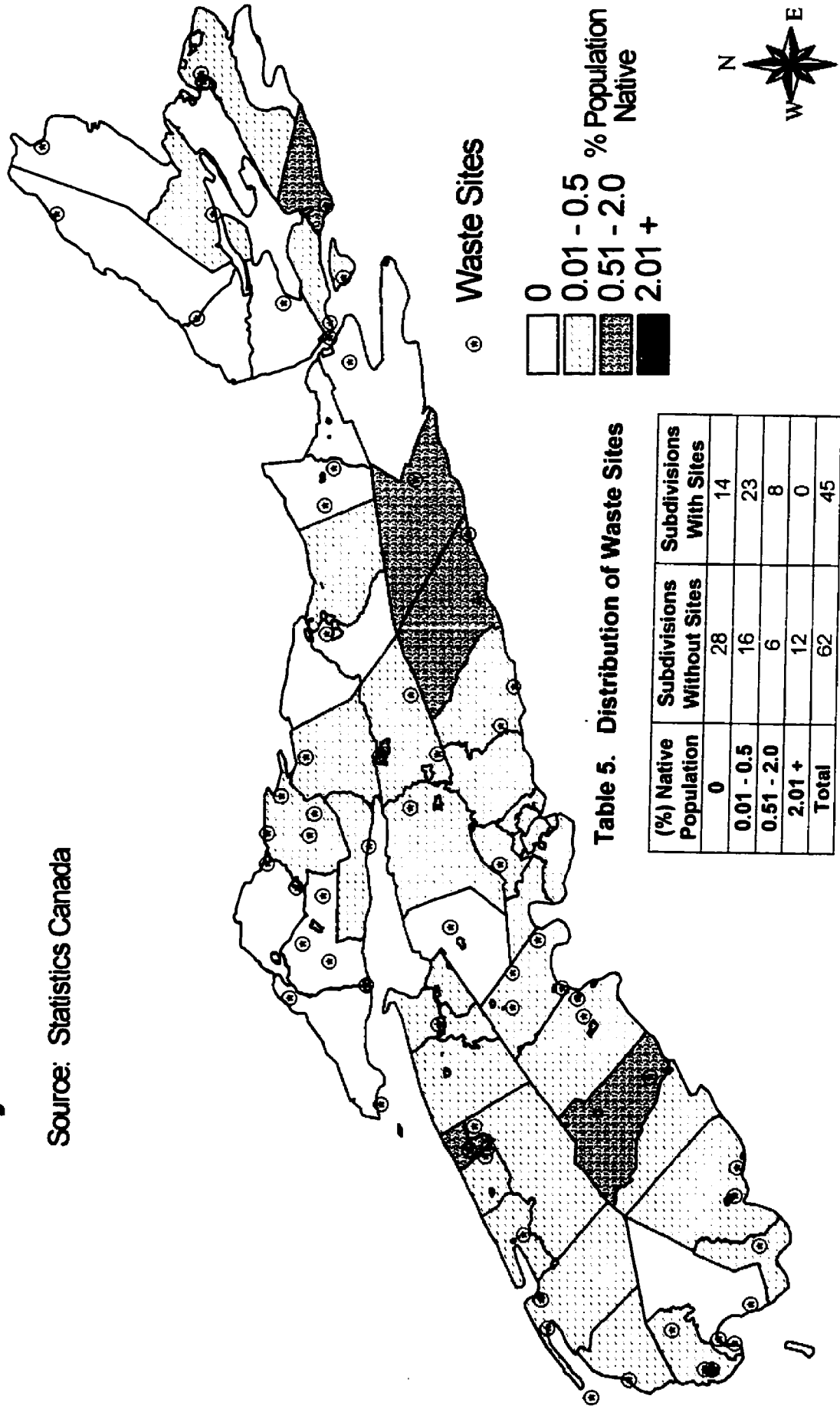
**Table 4. Distribution of Waste Sites**

% Black Population	Subdivisions Without Sites	Subdivisions With Sites
0	28	18
0.01-1.00	19	20
1.01-2.00	8	5
2.01-5.00	4	1
5.01+	3	1

62 0 62 124 Kilometers

**Figure 5. Distribution of Native Canadian Population 1991,  
by Census Subdivision**

Source: Statistics Canada

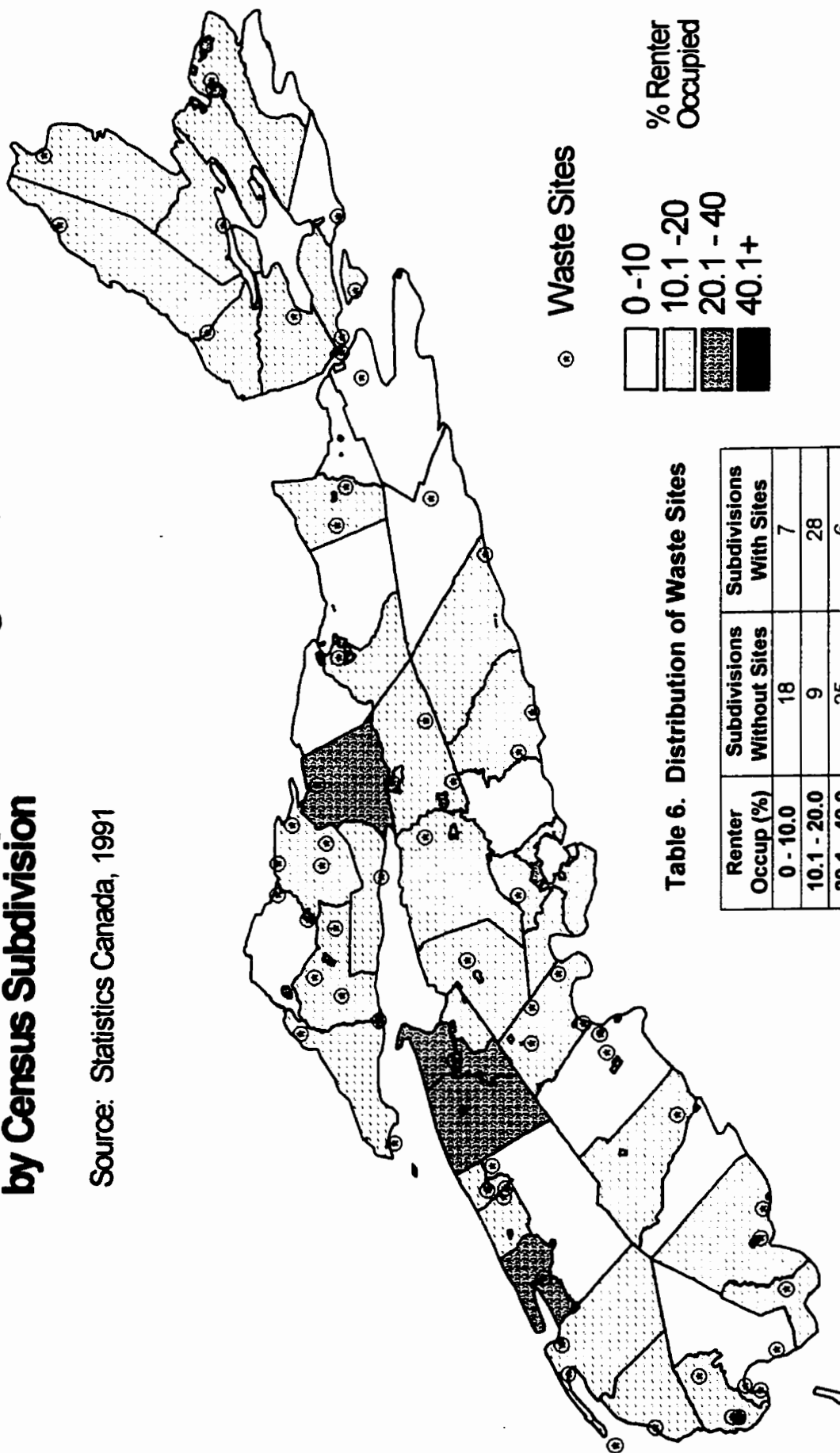


**Table 5. Distribution of Waste Sites**

(%) Native Population	Subdivisions Without Sites	Subdivisions With Sites
0	28	14
0.01 - 0.5	16	23
0.51 - 2.0	6	8
2.01 +	12	0
Total	62	45

**Figure 6. Distribution of Renter Occupied Housing 1991,  
by Census Subdivision**

Source: Statistics Canada, 1991



**Table 6. Distribution of Waste Sites**

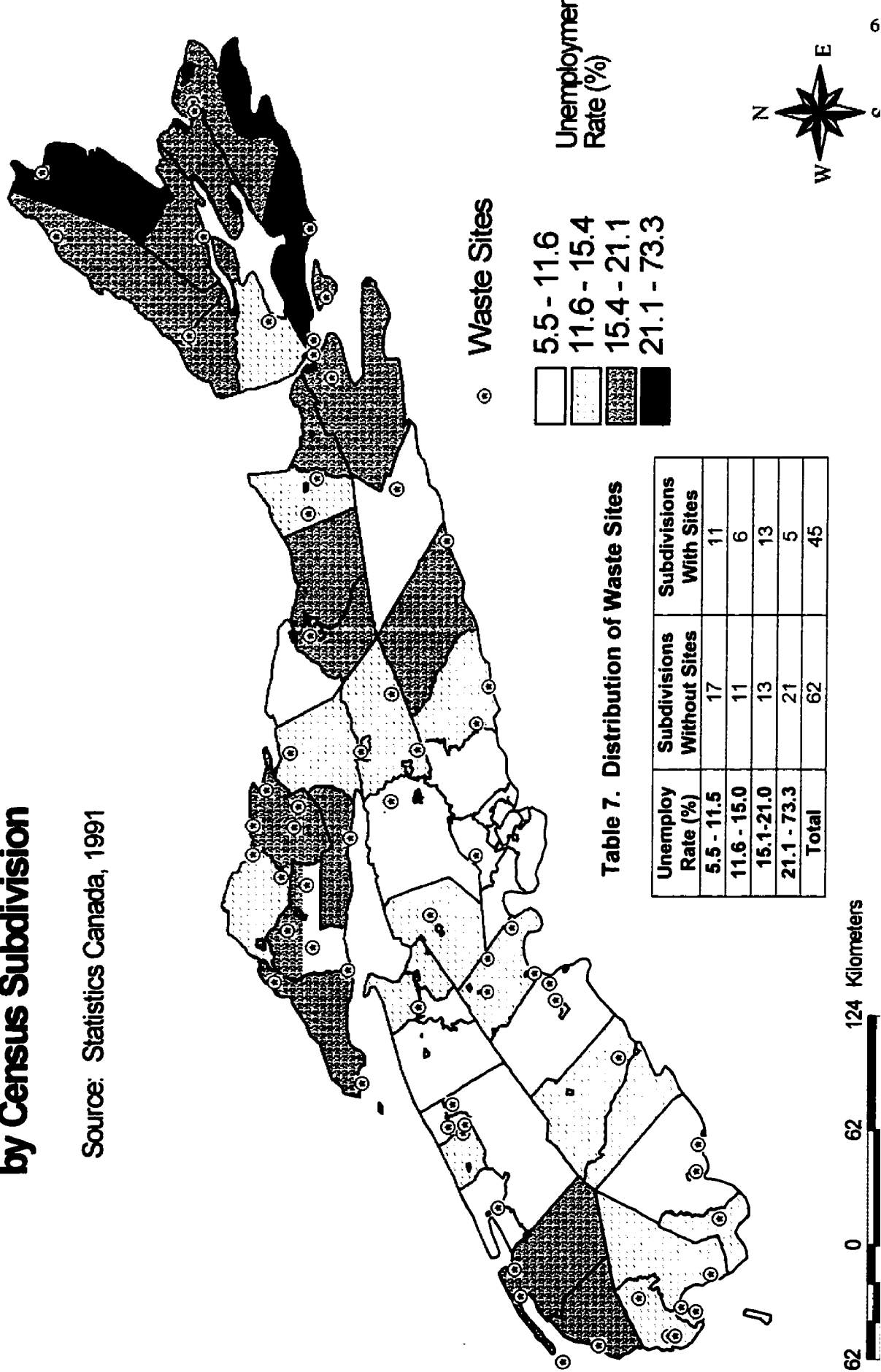
Renter Occup (%)	Subdivisions Without Sites	Subdivisions With Sites
0 - 10.0	18	7
10.1 - 20.0	9	28
20.1 - 40.0	25	6
40.1 +	10	3
<b>Total</b>	<b>62</b>	<b>45</b>

63 0 63 126 Kilometers



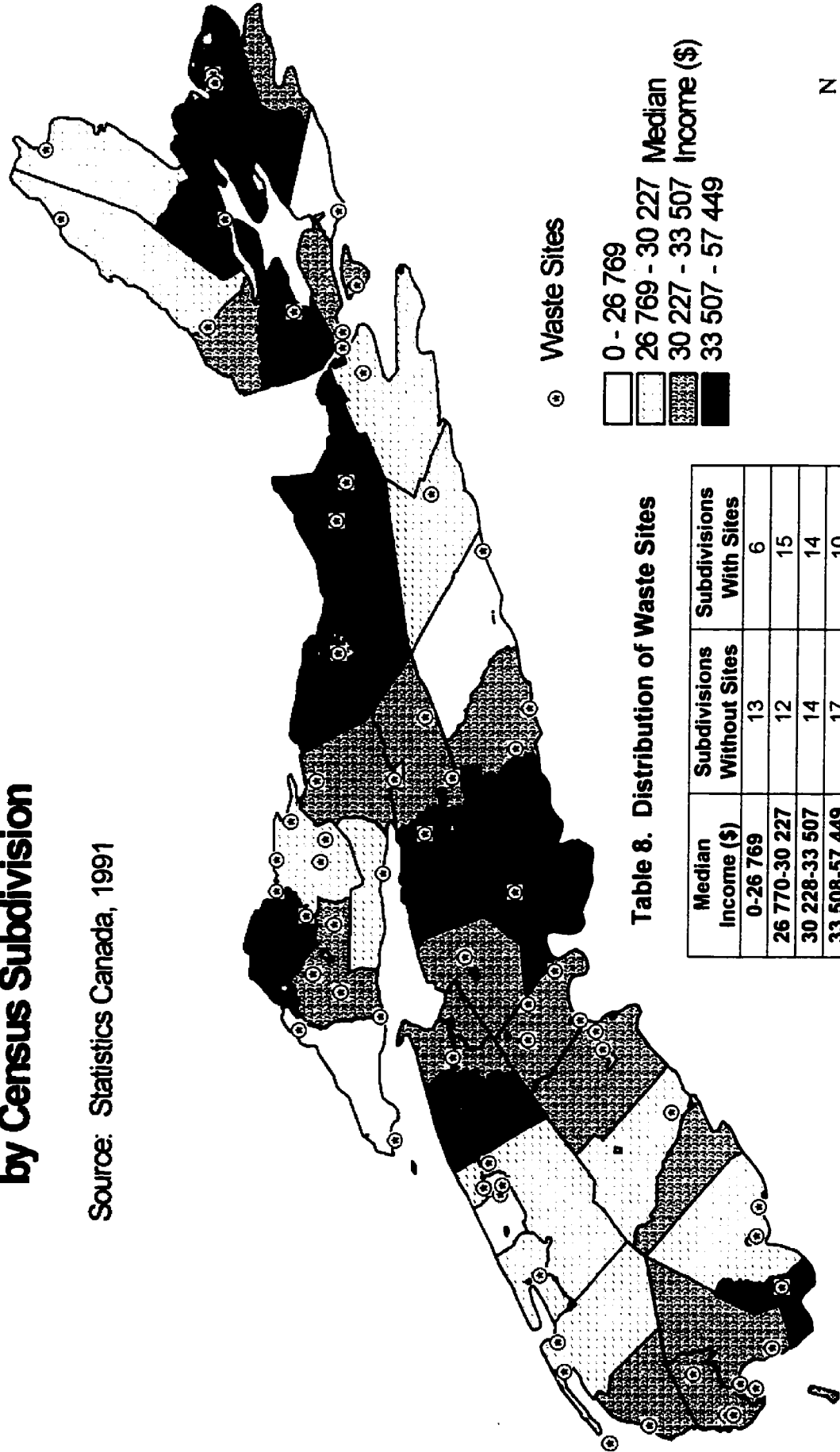
**Figure 7. Distribution of Unemployment Rate 1991,  
by Census Subdivision**

Source: Statistics Canada, 1991

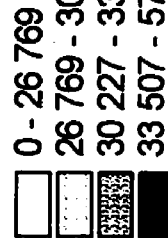


**Figure 8. Distribution of Median Household Income 1991,  
by Census Subdivision**

Source: Statistics Canada, 1991



○ Waste Sites



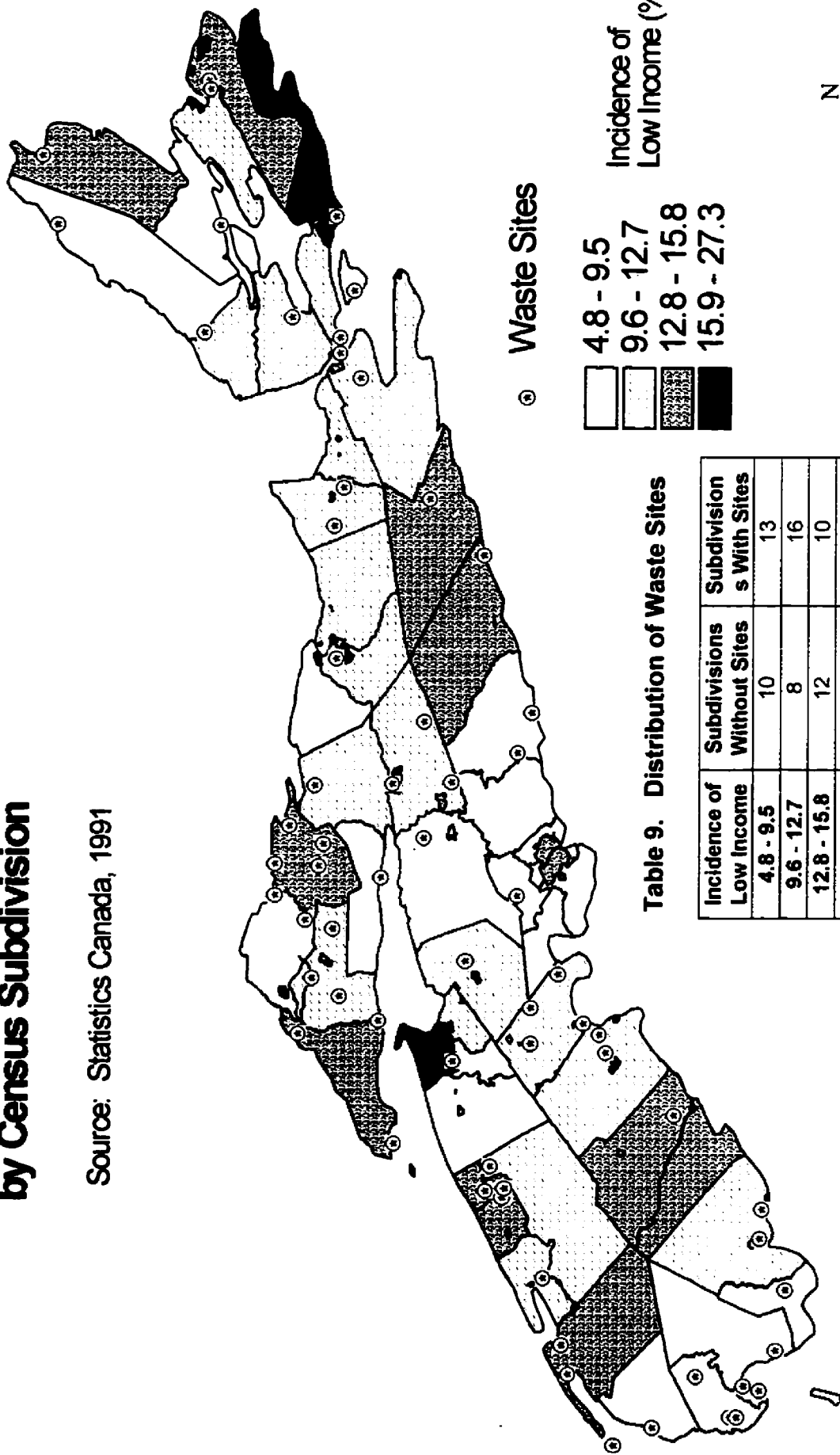
**Table 8. Distribution of Waste Sites**

Median Income (\$)	Subdivisions Without Sites	Subdivisions With Sites
0-26 769	13	6
26 770-30 227	12	15
30 228-33 507	14	14
33 508-57 449	17	10
n/a	6	0
<b>Total</b>	<b>62</b>	<b>45</b>



**Figure 9. Distribution of Incidence of Low Income 1991,  
by Census Subdivision**

Source: Statistics Canada, 1991



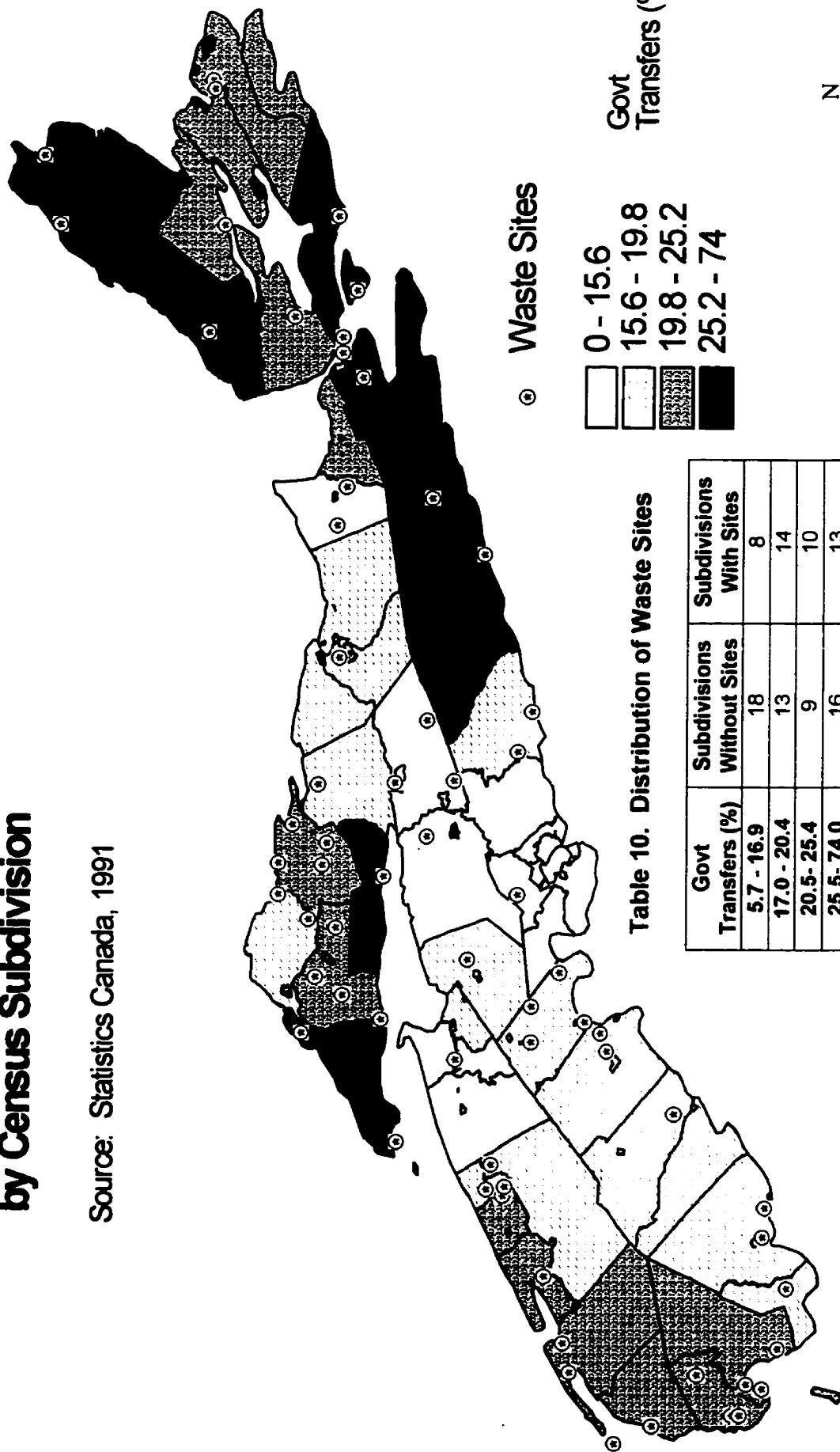
**Table 9. Distribution of Waste Sites**

Incidence of Low Income	Subdivisions Without Sites	Subdivisions With Sites
4.8 - 9.5	10	13
9.6 - 12.7	8	16
12.8 - 15.8	12	10
15.9 - 27.3	19	6
n/a	13	0
<b>Total</b>	<b>62</b>	<b>45</b>

63 0 63 126 Kilometers

# **Figure 10. Distribution of Government Transfers 1991, by Census Subdivision**

Source: Statistics Canada, 1991



**Table 10. Distribution of Waste Sites**

Govt Transfers (%)	Subdivisions Without Sites	Subdivisions With Sites
5.7 - 16.9	18	8
17.0 - 20.4	13	14
20.5 - 25.4	9	10
25.5 - 74.0	16	13
n/a	6	0
<b>Total</b>	<b>62</b>	<b>45</b>

62 0 62 124 Kilometers

N  
W E

#### 4.4 Statistical Summary for Nova Scotia's Subdivisions

The primary concern of this analysis was to determine how census subdivisions with at least one waste disposal site differed from those without waste sites. Therefore, in order to examine the relationship between the distribution of waste disposal sites and the demographic characteristics of subdivisions, the database was divided into two samples: (1) subdivisions with waste sites (hosts) and (2) subdivisions without waste sites (other).

**Table 11. Summary of Subdivision Statistics: Subdivision's Hosting Waste Sites Compared With Other Subdivisions**

	Sample Size		Sample Mean		Sample Std. Dev.		Sample Std. Err.	
	Host	Other	Host	Other	Host	Other	Host	Other
% Black	45	62	0.5	0.86	0.2	0.19	1.0	1.6
% Native	45	62	0.3	14.2	0.2	0.13	0.4	31.5
% Renter Occup	45	62	16.4	23.61	13.4	23.8	9.9	16.8
Unempl (%)	45	62	14.9	20.6	13.5	16.8	4.5	13.3
Med Income \$	45	56	31203	30757	31243	31295	5599	8106
Low Income (%)	45	49	12.2	14.8	11.9	14.2	3.8	5.7
Govt Trans (%)	45	56	21.7	22.7	21.0	20.3	6.2	11.9

Table 11 presents a comparison between the host and other subdivisions in terms of the mean, median and standard deviation for both samples. These statistics provide the opportunity to examine the average value or midpoint for each of the variables, as well as the degree of variance within and between each sample. This information also provides an initial look at the differences between host subdivisions and other subdivisions. For example, the percentage of government transfer payments in subdivisions with waste sites is approximately the same (21.7) as in subdivisions without

waste sites (22.7). However, in the case of the percentage of Native population there is a large difference between the host mean (0.3) and the mean for all other subdivisions (14.2). As well, the data for the standard deviation can be used to compare the variances within and between both of the samples (e.g. the standard deviation for renter occupied in host subdivisions was 9.9% while the variance in the “other” subdivisions was 16.8%).

However, relying solely on results from larger geographic units of analysis invites the possibility of reaching conclusions that do not hold true when the analysis is performed on smaller, more refined units (Anderton et al., 1994). Therefore, the following sections investigate the distribution of waste disposal facilities and the demographic characteristics at the smaller Enumeration Area (EA) level. Taking the analysis one step further resulted in dramatically different findings and also provided an additional, multi-level basis of comparison.

#### **4.5 Statistical Summary for Nova Scotia’s Enumeration Areas**

One of the limits that was discussed in the previous chapter, involved the geographic level of analysis (see section 3.4.3). Since many of the subdivisions are large areas and the majority of waste sites are located in rural areas, it was crucial to this study to examine the demographics of the communities closest to each of the sites. In order to adequately represent the demographic characteristics surrounding the waste disposal sites, statistical data for the seven variables was collected at the EA level. The statistical data has been summarized in Table 12 below.

**Table 12. Statistical Summary of the Demographic Variables for  
All Enumeration Areas**

% Black	1271	1.5	0.0	8.9
% Native	1271	1.2	0.0	6.9
% Renter Occup	1271	28.1	22.2	26.6
Unempl (%)	1271	1.2*	1.1*	0.85
Low Income (%)	1096	1.2*	1.0*	1.0
Govt Trans (%)	1101	1.8*	1.6*	0.95
Med Income (\$)	1096	35016	33191	11944

Before beginning the EA level analysis, a number of data quality concerns must be addressed. Since EAs are virtually smaller divisions of subdivisions, the total of all the EA data within a subdivision should add up to the subdivision total. However, when comparing the summary data for subdivisions (Table 3) with the EA data, there are a number of differences that must be clarified. The differences between the EA and subdivision data arise for a number of important reasons. To begin with, the size (in terms of geography and population) of an EA is considerably smaller than a subdivision and therefore subjected to confidentiality procedures that alter the actual statistical data of the EA. Therefore, the data for a number of EAs were suppressed and unavailable for this study. As well, the statistics for three of the variables (unemployment rate, low income and government transfers) were recorded as a portion of the total value for the subdivision. For example, if subdivision A had an aggregate unemployment rate of 5% and was comprised of four EAs, Statistics Canada would record the unemployment rate for these EAs as 1.5, 2.0, 0.5 and 1.0.

In order to determine whether the demographic characteristics differ significantly between EAs with waste sites and those without, the EA database was divided into two separate databases. The first database compared the statistical data for EA's hosting waste disposal sites against all other EAs. In addition to this analysis, for reasons discussed in chapter three, the analysis was expanded to include EAs that fell within a 5 km radius of each waste site. Results from both of these analysis are discussed in the next two sections.

#### 4.5.1 Host Enumeration Areas

The first investigation at the EA level involved a comparison between host EAs and those EA without waste sites. By dividing the database into two distinct samples, the variance and difference between the two can be tested and analyzed. The mean, median and standard deviation for both samples and the seven variables are summarized in the following table.

**Table 13. Summary of Enumeration Area Statistics: EA's Hosting Waste Sites Compared With Other EAs**

	Host Sites		Within 5 km		Within 5 km		Within 5 km	
	Host	Other	Host	Other	Host	Other	Host	Other
% Black	60	1211	0.8	1.55	0.0	0.0	2.43	7.08
% Native	60	1211	0.47	1.24	0.0	0.0	2.02	9.15
% Renter Occup	60	1211	28.7	28.1	28.6	22.2	26.5	26.6
Unempl (%)	60	1211	1.35	1.21	1.2	1.0	0.86	0.85
Med Income \$	54	1042	30221	35231	29093	33343	5660	12072
Low Income (%)	54	1042	1.39	1.21	1.3	1.0	0.74	1.01
Govt Trans (%)	54	1047	2.3	1.73	2.3	1.6	0.79	0.95

In contrast to the subdivision level analysis, Table 13 demonstrates a number of important differences in means and variances. To begin with, the average median household income for host EAs was considerably lower (\$30 221) than the mean for the “other” EAs (\$35231). As well, the mean values for government transfers, unemployment rate, and incidence of low income are all higher in the host EAs. However, the average of both the black (0.8%) and native (0.47%) populations within host EAs remained lower than those EAs without a waste disposal facility.

#### 4.5.2 Expanding the Analysis - The 5 km Impact Zone

As outlined in chapter three (section 3.3.3), confining the EA level investigation to the host EA would not provide the complete analysis. Since many waste disposal facilities are sited at the outer boundaries of political jurisdictions, limiting the impacts to just the host EA would miss the impacts felt in adjacent communities. Therefore, the analysis was expanded to include those EA's that fell within a 5km radius of each of the waste disposal sites. For the purpose of this study, the 5 km radius was referred to as the “impact zone”.

**Table 14. Summary of Enumeration Area Statistics: EA's Within 5km of A Waste Site Compared with those Greater than 5km.**

	Within 5km		Greater than 5km		Within 5km		Greater than 5km	
	5km	> 5km	5km	> 5km	5km	> 5km	5km	> 5km
% Black	432	840	1.23	1.7	0.0	0.0	5.79	7.47
% Native	432	840	0.95	1.3	0.0	0.0	7.26	9.69
% Renter Occup	432	840	31.4	26.4	28.6	19.3	27.4	25.99
Unemp Rate(%)	432	840	1.28	1.2	1.2	1.0	0.82	0.87
Med Income (\$)	373	724	31647	36688	30781	34726	7842	13174
Low Income (%)	373	724	1.26	1.19	1.1	0.9	0.85	1.07
Govt Trans (%)	373	729	2.04	1.6	2.0	1.5	0.82	0.97

Table 14 indicates that the mean percentage of black (1.23%) and native (0.95%) populations within 5km of waste disposal facilities is much greater than when the analysis only focused on the host EAs ( 0.8% and 0.47% respectively - from Table 13). However, both means are still lower than the average for the EAs falling outside the 5 km radius (1.7% and 1.3%). This is no longer true for the other five variables. As illustrated in Table 14, the mean and median values for unemployment rate, renter occupied, low income and government transfers are all higher for the 5 km sample than those outside the impact zone. Similarly, the means and medians for median income have decreased along with the increase in impact zone.

## **4.6 Conclusions**

From the results of the statistical and geographic investigation presented in this chapter, a number of patterns and areas of concern were discovered which deserve a closer examination. In addition to these patterns, several questions also emerged and must be addressed before making any conclusions or inferences of environmental racism in Nova Scotia. The results and questions stemming from this study are summarized below.

In order to determine whether waste sites have been located in communities with higher percentages of minority or low income populations, the mean, median and standard deviation for each of the variables were calculated for host and all other subdivisions. These calculations were first completed at the subdivision level (see Table 11) and the results did not support the hypothesis of discriminatory waste facility siting.



In fact, the statistics illustrated that there was a lower concentration of minority and low income indicators in host subdivisions in comparison to all other subdivisions.

However, when the investigation was taken down to a smaller scale of analysis, the enumeration area, a different scenario began to emerge. Following the same procedures as the subdivision analysis, the characteristics of EAs with waste sites were determined and compared with all other EAs in Nova Scotia. The results of these calculations indicated that host EAs had higher percentages of incidence of low income, unemployment rates and government transfers; as well as lower median household incomes (see Table 13). These patterns intensified when the study was expanded to include EAs falling within the 5 km impact zone around each of the waste sites. In addition to the three variables uncovered at the EA level, the percentage of renter occupied dwellings within the impact zone exceeded the percentage outside the zone.

Although these investigations illustrated a number of areas of concern in relation to four of the seven demographic variables, the most surprising result at all three levels of analysis were the outcomes for the black and native population variables. At all three levels, there were higher percentages of both black and native populations in the samples without waste disposal sites. From these results, can one conclude that waste sites are not located near or in minority communities in Nova Scotia?

Finally, despite pointing out patterns and relationships in the distribution of variables and waste sites, are these conclusions statistically valid? In other words, are the differences between the means large enough to be considered to be statistically significant? In order to answer these questions and to determine whether there is an

important correlation between the presence of waste sites and the demographic characteristics an additional statistical test was performed. The *Student T-test* was conducted for each of the variables in order to identify whether the differences between the means supported the hypothesis of this thesis and whether these differences were statistically significant. The procedures for performing the difference of means test and an analysis of the results are discussed in detail in the following chapter.

## **CHAPTER FIVE**

### **INTERPRETING THE RESULTS**

#### **5.1 Introduction**

While comparing the difference of means, medians and standard deviations for the three levels of analysis in chapter four, a number of patterns and trends emerged from the statistics. However, in order to determine if these distribution patterns provide significant evidence to support this study, additional statistical tests were required. The results of these tests are outlined in the first section in this chapter and have been calculated for each of the variables at all three levels of analysis. In addition to these statistical analyses, the results for the two ethnic minority variables - black and native populations - were isolated along with the waste disposal sites in an attempt to uncover patterns that did not emerge on the province-wide statistical analysis.

#### **5.2 Analyzing the Results for Statistical Significance**

Although the data summarized in the previous chapter indicated that there were differences between the means of host census divisions and those without waste sites (see Tables 11-14), conclusions could only be made once the *significance* of these differences were established. In order to determine the significance for each of the variables, a difference of means statistical test known as the *Student's T-test* was performed. This test involved testing two contradictory hypotheses - the null hypothesis ( $H_o$ ) and the alternative ( $H_a$ ). For this analysis these hypotheses were defined as:

$$H_o : \mu_1 - \mu_2 = 0 \text{ (or } \mu_1 = \mu_2 \text{)}$$

$$H_a : \mu_1 - \mu_2 > 0 \text{ (or } \mu_1 > \mu_2 \text{)}$$

Where:  $\mu_1$  = variable average for the sample with waste sites  
 $\mu_2$  = variable average for the sample without waste sites  
 $\mu_1 - \mu_2$  = the difference in the two averages

In other words, if the *null* hypothesis was accepted, there was no significant difference between the means of the two samples. However, if the null hypothesis was rejected, then there was a significant difference between the means and the alternative hypothesis was accepted.

For the purpose of this study, the *Student's T-Test* was conducted to determine (1) which variables supported the null hypothesis, and (2) the significance of the difference of means. To decide whether the results were significant or not, a level of significance was determined and the P value was calculated for each variable. The level of significance for this analysis was 0.05, therefore, any P value less than 0.05 was considered to be significant.<sup>16</sup>

### 5.2.1 Subdivision Analysis

The first stage in this statistical analysis involved examining the summary data for the variables at the subdivision level. As discussed in the previous chapter, the subdivision database was divided into two distinct samples based on the presence or absence of a waste disposal facility within each division. Although both samples' mean

---

<sup>16</sup> The output tables for all Student t-tests are included in Appendix G.

values have already been calculated and the general trends were discussed, in order to determine any significant patterns or relationships a difference of means test was performed. The results of the Student's t-test at the subdivision level are outlined in Table 15.

**Table 15. Statistical Analysis for Difference of Means Tests Between Host Subdivisions and all Other Subdivisions**

Variable	T-Stat	T-Critical Value (95% CI)	P-Value
% Black	-1.3174	1.98	0.191
% Native	-3.4829	1.99	0.001
% Renter Occup	-2.7805	1.98	0.006
Unemp Rate(%)	-3.1607	1.99	0.002
Med Income (\$)	-0.3258	1.98	0.745
Low Income (%)	-2.6159	1.98	0.011
Govt Trans (%)	-0.5606	1.98	0.577

\*  $p < 0.05$  confidence level

To interpret the results of these tests, the t-stat for each of the seven variables was compared to the t-critical value. Since the t-tests were conducted at a 95% level of confidence, the null hypothesis was rejected for variables with a t-stat greater than 1.98 and the difference of means was considered to be significant only for P values less than 0.05.

As indicated in Table 12 (chapter 4), all seven of the variables were considerably lower than the t-critical value and therefore did not support the hypothesis. However, these results do not imply that the alternative hypothesis was correct either. The fact that the t-stats were all negative integers indicates that the majority of the variables fell into the lower tail area of the normal curve. Instead, these findings demonstrated that it was

more likely to find waste sites in subdivisions characterized by: lower black and native populations; lower renter occupied dwellings, a lower incidence of low income, lower government transfers and higher median incomes.

An analysis based on these results could have lead to the conclusion that there was no foundation to environmental racism charges in Nova Scotia with respect to locations of waste sites. However, as discussed in chapter three, ending the analysis here did not provide a complete or accurate analysis. Therefore, the same statistical tests were performed on the enumeration level data.

### 5.2.2 Host EA Analysis

The two hypotheses used to test for significant relationships between the difference of means at the EA level of analysis remained the same as those employed at the subdivision level (see section 5.4.1). The results of the t-tests for the comparison between host EAs and all other EAs are listed in Table 16.

**Table 16. Statistical Analysis for Difference of Means Tests Between Host EA's and all Other EA's**

Variable	T-Statistic	T Critical Value (two-tailed)	P-Value*
% Black	-2.00	1.98	0.048
% Native	-2.06	1.97	0.040
% Renter Occup	0.18	1.99	0.856
Unemp Rate(%)	1.25	1.99	0.216
Med Income (\$)	5.89	1.99	8.3E-08
Low Income (%)	1.76	1.99	0.083
Govt Trans (%)	5.13	1.99	3.1E-06

\*p < 0.05

For the EA analysis, the Student's T-test was again performed to determine if the results supported the null hypothesis and whether the differences in the two means were significant. Table 16 outlines the results of the test, as well as the t-critical and P values for each of the variables. Once again, the t-stats for the % black (-2.00) and % native (-2.06) variables were negative values and indicated that there was an inverse relationship between the location of waste sites and the distribution of black or native populations. However, in contrast to the results for the subdivision level analysis, a number of important relationships began to emerge on the EA level. The most significant result from these t-tests involved median income (5.89) and government transfers (5.19). Both of the t-stats were greater than their respective t-critical values and therefore did not support the null hypothesis. In addition, since the p-values for median income and government transfers were significantly lower ( $8.3\text{E-}08$  and  $3.1\text{E-}06$ ) than the P values of 0.05, the alternative hypotheses were accepted for both variables.

### **5.2.3 Impact Zone Analysis**

As introduced in the previous chapter, when the analysis was expanded to include a 5 km impact zone, the results changed significantly. In this section, the original EA database was once again divided into two distinct samples, however the two samples were based on their proximity to a waste site. Although the end results for the two race variables remained the same, this level of analysis resulted in four variables that rejected the null hypothesis.

**Table 17. Statistical Analysis for Difference of Means Tests Between EA's < 5km and EA's > 5km from Waste Sites**

	t-stat	t-critical	p-value
% Black	-1.3691	1.96	0.171
% Native	-0.6077	1.96	0.543
% Renter Occup	3.2129	1.96	0.014
Unemp Rate(%)	2.0098	1.96	0.447
Med Income (\$)	8.1030	1.96	1.9E-15
Low Income (%)	1.2257	1.96	0.221
Govt Trans (%)	7.7894	1.96	1.9E-14

\*  $p < 0.05$

Again, the most significant and consistent differences were found in the median income (8.1) and government transfer payment variables (7.79). In addition to these two variables, the t-stats for renter occupied (3.21) and unemployment rate (2.01) were also greater than the t-critical value of 1.96. However, because the p value for the unemployment rate was not under 0.05, the difference was not significant enough to accept the alternative hypothesis. Therefore, when analyzing at the impact zone level the most significant relationships occurred between the variables: median income, government transfers, and renter occupied and the distribution of waste sites.

#### **5.2.4 Summarizing the Findings**

A number of conclusions can be made from the results produced by the Student T-tests. The first involves the variance in the results based upon the geographic level of analysis used. Since the analysis at the subdivision level relied on aggregated statistics on a larger scale, it was not surprising that results did not support the theory that waste sites are located in subdivisions with a higher concentration of minority and low income



variables. However, as the geographic scope of analysis was narrowed and the statistical information became more specific, the results began to change. At the most detailed level, three variables were found to have a significant relationship in support of the alternative hypothesis. In particular, the most significant trend involved two the demographic variables - median household income and government transfers. The t-stats for each of these variables rejected the null hypothesis at both the EA and Impact Zone levels of analysis. Finally, the most surprising finding was the insignificant role the two racial variables played at all three levels of analysis.

### **5.3 Race Variables as Indicators of Discrimination?**

The most unexpected conclusion to emerge from the statistical analysis was the insignificant and even inverse relationship that racial indicators had with waste facility locations. In fact, all three levels of analysis demonstrated the trend for waste sites to be located more predominantly in areas with lower percentages of black and native populations. Does this imply that race is not a valid indicator of environmental discrimination in Nova Scotia? On a province-wide statistical analysis, the answer to this question is a resounding yes. However, an important factor may have influenced these results and inadvertently masked the real circumstance.

This factor involves the historical distribution patterns of minorities in Nova Scotia. Unlike the white majority population, ethnic and racial minorities are not evenly distributed throughout the province and have been located in specific and concentrated areas. Due to these settlement or distribution patterns there are some subdivisions in

Nova Scotia with high concentrations of minorities, however there are also a number without any. Also, because of the large number of enumeration areas, the discrepancy between EAs with minority populations and those without becomes even more significant (as illustrated in the median values for black and native population - see Table 4 in chapter four). Therefore, when determining the means for the samples, the large number of EAs with entirely white populations would have overwhelmed the few concentrated populations of black and native communities - resulting in a lower than expected mean.

The following discussion examines the location of these concentrated areas of black and native populations with respect to the distribution of the waste disposal sites. When the demographic characteristics surrounding each of the 65 waste sites<sup>17</sup> were compared on the three levels of analysis, the results were significantly different than the province-wide analysis.

### **5.3.1 % Black Population - Areas of Concern**

With the black presence dating back to the 17th century, it is obvious that black residents have historical ties and roots with their communities in Nova Scotia. Records of black immigrants have been found as early as 1606, which qualifies them as one of the first four charter peoples in this region, along with the Aboriginal, French and English (Pachai, 1993). Immigration continued throughout the following centuries as free blacks subsequently entered the Maritimes in a number of waves. These included: (1) the Loyalist immigration of 1783-84; (2) the Maroons from Jamaica, in 1796; (3) Black

---

<sup>17</sup> The complete table outlining the statistical data for the Subdivision, EA and Impact Zone means for each waste sites can be found in Appendix H.

Refugees, during and immediately after the War of 1812; (4) the nineteenth century immigration from the US; and (5) the 20th century immigration mainly from the Caribbean, the US and Africa (Pachai, 1987).

Resulting from these immigration waves was the concentration of black settlement in several counties throughout Nova Scotia. According to the 1851 Census, black immigrants were primarily concentrated in communities within Halifax, Guysborough, Digby, Annapolis and Shelburne counties (Henry, 1973). Many of these communities were located near and around small towns, and on the fringes of urban areas and varied in size from a few families to larger communities. The original black communities and their population (1780s) have been identified by several authors and include:

• Birchtown	1521
• Brindley Town	211
• Shelburne	200
• Preston	300
• Annapolis	100
• Halifax	400
• Chedabucto (Canso)	350
• Tracadie	222
• Liverpool	50

(Henry, 1973; Pachai, 1990, 1992)

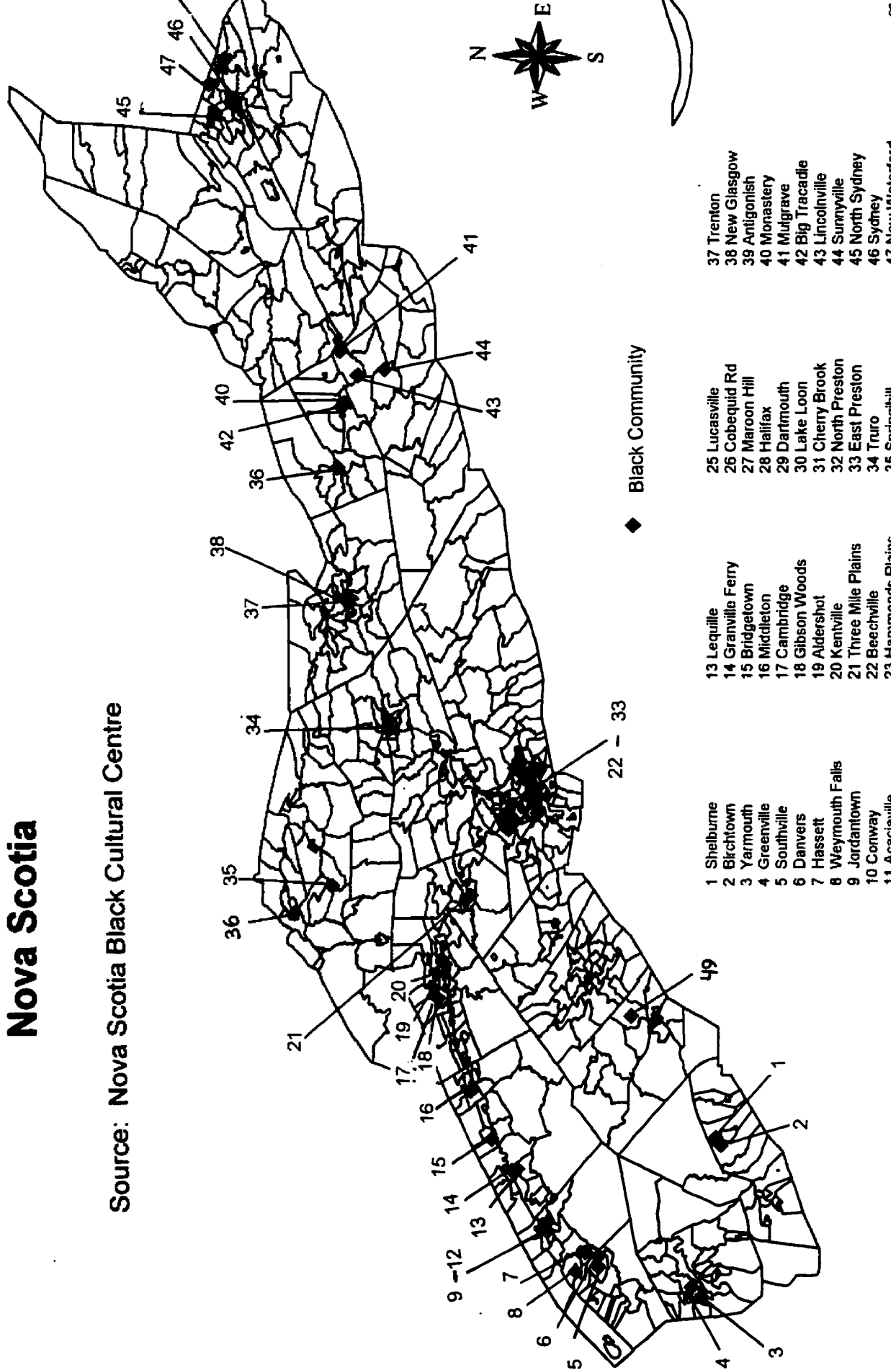
Today, the number of black communities in Nova Scotia has grown to 49 and these communities were recently mapped by the Black Cultural Centre in Halifax (as illustrated in Figure 11).<sup>18</sup>

---

<sup>18</sup> This map was recreated based on the map found on the Nova Scotia Black Cultural Centre's website at: <http://www.dal.ca/acswwww/afnscom.html>.

# Figure 11. Historically Black Communities in Nova Scotia

Source: Nova Scotia Black Cultural Centre



On a provincial scale Nova Scotia has always had a very high black population in relation to other Canadian provinces. For example, in 1961, Statistics Canada identified 11 900 people of black origin. This constituted 37% of Canada's total black population of 32 127. However, according to the 1991 Census this percentage dropped drastically over the thirty years. Although these statistics were based on single ethnic origin and several data quality issues (see chapter three) must be taken into consideration, Nova Scotia's black population (10 825) only made up 4.82% of Canada's total black population (224 620) in 1991. In terms of total population compositions, black residents only accounted for 1.2% of Nova Scotia's and only 0.83% of Canada's total populations..

For the purpose of this analysis, the black population of a subdivision or enumeration area was also represented as a percentage of the total population. Although the black population in a census division may not represent the majority of the ethnic composition of the total population, a high concentration was considered to be present when it exceeded the provincial (1.2%) or national (0.83%) averages. By using these percentages as targets and reexamining the host subdivisions, EAs and impact zones of the 65 waste sites, a number of patterns began to emerge

For each waste site, the demographic data had already been collected for its host subdivision, host EA and impact zone. This investigation was interested in comparing the variance between the percentage of black population within the three geographic scales of analysis. Although the statistical *difference of means* test indicated that there was no significance relationship between census divisions with waste sites and those

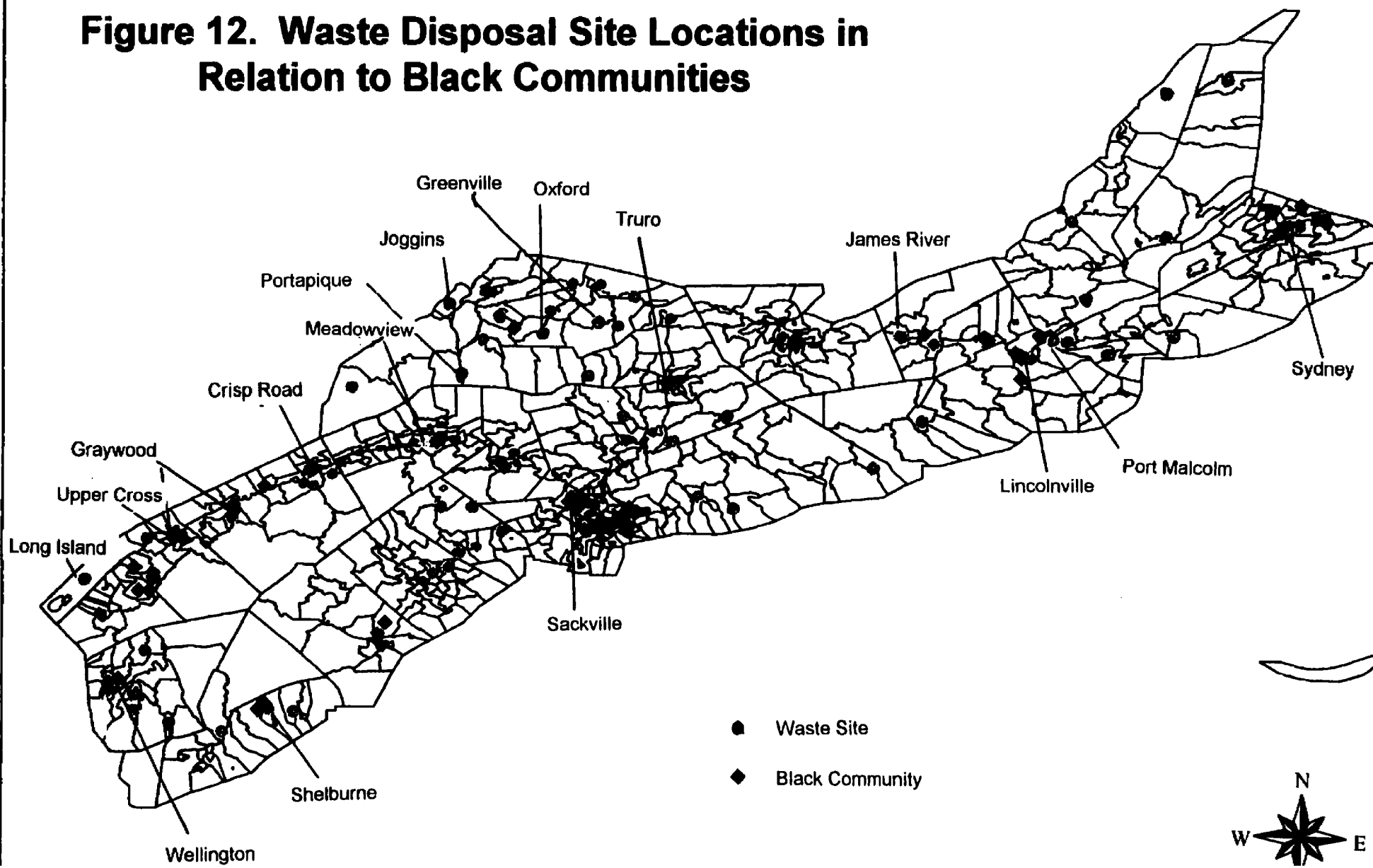
without for the black population variable, by examining the demographic characteristics surrounding each isolated waste site 16 areas of concern were identified (see Table 18).

**Table 18. Comparing % Black Population for Selected Waste Sites**

Waste Site	Black Pop. Area	Black Pop. Zone	Black Pop. Zone
Graywood	0.6	5.86	1.42
Crisp Road	0.7	0.0	1.45
James River	0.8	0.0	4.34
Sydney	1.5	8.84	1.11
Portapique	0.4	1.54	0.39
Truro	0.6	3.42	3.51
Oxford	1.8	2.59	0.71
Joggins	0.7	3.18	0.81
Long Island	2.7	0.0	1.86
Upper Cross	2.7	2.35	1.60
Lincolnville	5.8	0.0	22.7
Sackville	1.4	14.7	5.43
Meadowview	0.3	1.96	0.82
Port Malcolm	0.0	0.0	7.17
Shelburne	0.3	0.0	1.80
Wellington	0.7	4.66	0.93

Included in Table 18 are the waste sites that have been located in a subdivision, EA or impact zone with a black population exceeding 1.2% of the division's total population. Out of the 65 waste sites included in this study, 16 or 24.6% have been located in a black community or within 5 kilometres of a high concentration of black residents. The distribution of the waste sites in relation to the historically black communities is illustrated in Figure 12.

**Figure 12. Waste Disposal Site Locations in Relation to Black Communities**



91

A number of patterns and concerns emerged from these statistics. The first concern involved the total number of black residents who live within a host EA or an impact zone of a waste site. From the EA level data (see Appendix F) the total black population living in EAs with waste sites is 447. This translates into 4.13% of the total black population (10825). However, when the analysis was expanded to include the EAs falling within the 5 km impact zone, the percentage increased to 30.4% (3 285) of Nova Scotian's black population.

A second area of concern involved waste sites that were located in host EA's with a higher concentration of black population than the host subdivision. Nine of the sixteen cases included in Table 18 follow this pattern. For example, Graywood has a black population of 0.6% at the subdivision level, however the host EA for the waste site has a 5.9% black population. Also illustrating this trend, Sackville was located in an EA with 14.7% of its population comprised of black residents, while the subdivision percentage is only 1.4%. These nine cases also provide an example of discriminatory siting decisions - when a choice had to be made between an EA with a high black population and an EA with a lower or no black population, the EA with the higher percentage was selected.

Finally, the third concern emerged when the study area was expanded to include EAs within 5km of the waste site. Although the waste site in Lincolnville was located in a host EA with 0% black population, when the surrounding EAs were included in the analysis, this percentage jumped to 22.7%. As well, the Port Malcolm site was located in a subdivision and EA where there was no black population. By expanding the impact



area to include neighbouring EAs within other subdivisions, the presence of black residents increased to 7.2%.

Despite the outcome of the province-wide statistical analysis, after isolating the investigation to the demographics surrounding each of the waste disposal sites a number of patterns and areas of concern were uncovered. These 16 cases illustrate that there is a relationship between the locations of waste sites and a number black communities in Nova Scotia.

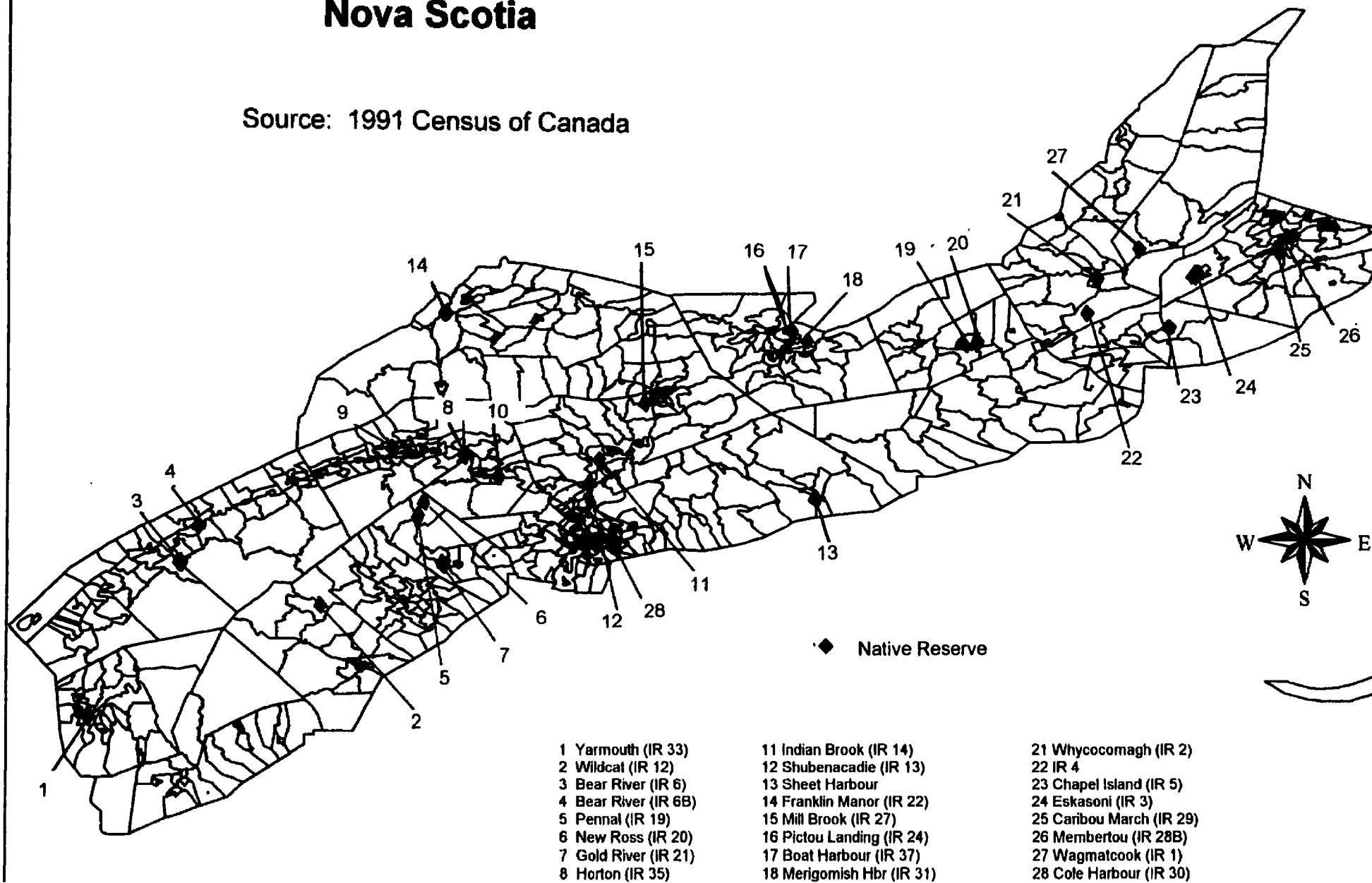
### **5.3.2 % Native Population - Areas of Concern**

Similar to the argument presented for the % black variable, there are a number of problem areas that have been identified with respect to the distribution of waste sites and the % of native variable.

As with the settlement patterns of black Nova Scotians, Native Canadians have also been concentrated into separate and segregated communities since the colonial days (Millward, 1981). In 1940, there were 38 occupied Native reserves in Nova Scotia. However, from 1940 until the mid-1950s, attempts were made to consolidate all of the natives into two reserves - Eskasoni in Cape Breton and the Shubenacadie reserve in East Hants - to create small urban industrial development centres -see Figure 13 for locations (Millward, 1981). This plan was eventually abandoned but the number of reserves was reduced to 15 by 1971 (Millward, 1981). As of 1991, Census Canada identified 28 native reserves within Nova Scotia and these are illustrated in Figure 13.

# Figure 13. Native Canadian Reserves In Nova Scotia

Source: 1991 Census of Canada



Although waste disposal facilities cannot be located within a Native Reserve or within an area designated as a land claim<sup>19</sup>, Table 19 illustrates examples of wastes sites that have been located in areas with high concentrations of Native populations.

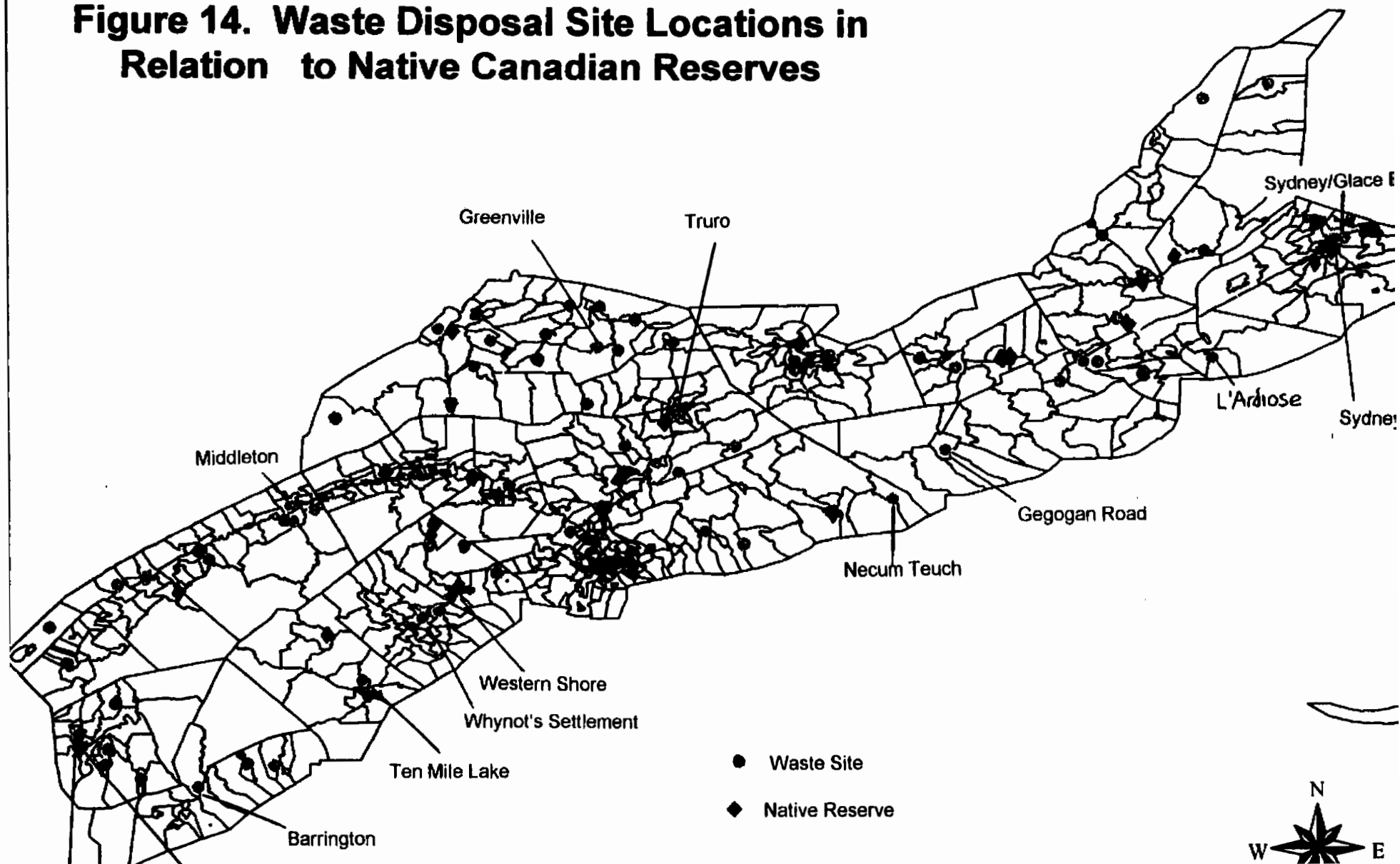
**Table 19. Comparing % Native Population for Selected Waste Sites**

Waste Site	Subdiv. Mean	Ind. EA Mean	Impact Zone Mean
Middleton	0.8	0.93	0.24
Sydney	0.2	0.0	2.33
Sydney/Glace Bay	0.4	1.91	0.18
Truro	0.6	0.0	3.74
Greenville	0.4	6.47	0.92
Gegogan Road	1.0	0.0	1.76
Necum Teuch	0.2	1.93	1.31
Western Shore	0.5	0.0	1.13
Whynot's Settlement	0.3	2.03	0.61
Ten Mile Lake	1.6	n/a	3.8
L'Ardiose	1.2	2.52	0.63
Barrington	0.1	15.2	3.3
Wellington	0.4	1.16	1.6
Brooklyn Road	0.3	1.57	1.69

According to the 1991 Census, the total number of Native Canadians within Nova Scotia was 7 530. Nationally, the native population in Nova Scotia made up 1.6% of Canada's total native population. However, as a percentage of the total population of the province, Native Canadians account for only 0.8% of all ethnic groups. Based on these statistics, the sites in Table 19 were isolated because they had been located in subdivisions, EAs or impact areas with a native population greater than 0.8%.

<sup>19</sup> NS Guidelines for Landfill Siting, (3.2.3) states " Certain physical features such as recorded .... Indian Reserves are documented and protected under provincial or national legislation (i.e. The Canada Indian Act).

**Figure 14. Waste Disposal Site Locations in Relation to Native Canadian Reserves**



The 14 waste sites outlined in the table above, illustrate a number of areas where landfills have been located in or near communities with higher percentages of native Canadians than the host subdivision. Since Census Canada collected data for native reserves separate from subdivisions and municipalities are prohibited from locating waste sites within reserves, the number of natives living in host subdivisions are relatively low (see Figure 5 in chapter four). However, when examining the total number of natives living in host EAs or within the impact zones, the numbers increase considerably. Although only 137 natives live within host EAs (1.8% of total native population), the total jumped to 1 945 within 5 km of a waste site. Therefore, even though natives make up a small percentage of the entire population of Nova Scotia, 25.8% of this native population live within an impact zone.

These statistical patterns were especially evident in the case of the Barrington waste site. Although Barrington was located in a subdivision where the total population was made up of only 0.1% native, the site itself is located in an EA where 15.2% of the population is native. As well, the native population in the host subdivision for Greenville was 0.6%, however when the statistics for the host EA were collected the native population increased to 6.47%.

These areas of concern increased when the investigation was expanded to include the demographic characteristics of the 5km impact zone. Of the 14 waste sites in Table 19, 10 had impact zones with average native populations greater than 0.8%. In particular, the population for Sydney and Truro's host EAs were comprised of no native Canadians however, when the impact area was expanded, the number of natives increased to 2.3%

and 3.3% respectively. All of the patterns discussed in this section are also illustrated in Figure 14.

### 5.3.3 Environmental Racism in Nova Scotia

Unlike the provincial-wide statistical analysis, the results uncovered while isolating the black and native population variables, indicate that environmental racism does exist in Nova Scotia. Taking both racial variables together, a total of 30 out of 65 waste sites (46.2%) have been located in enumeration areas with black and native populations higher than the provincial average. From the 18 355 black and native residents within Nova Scotia, 28.5% (5 230) live either within an EA hosting a waste site or within the five kilometre impact zone. As well, there were three cases in which waste sites were located in enumeration areas or impact zones with both high black and native populations. These waste sites were (see Figures 12 and 14 for locations):

• Truro	3.42 % black	2.33 % native
• Sydney	8.84 % black	3.74 % native
• Wellington	4.66 % black	1.60 % native

Unfortunately the scope of this study did not permit an examination into the historical trends of waste facility siting in relation to minority communities. Therefore, it can not adequately examine if the minority community was located prior to the waste site or vice versa. However, all three of the sites listed above were located in areas in which historically black and native communities were settled prior to the location of each of these waste sites. By conducting future studies and expanding the scope of the

investigation to include historical patterns of waste disposal siting, the trends and patterns are sure to increase

## **5.4 Conclusion**

The findings presented in this chapter uncovered a number of patterns, trends and relationships between and among variables at the various levels of analysis. To begin with, statistical analysis must be conducted on several levels in order to determine the characteristics of the communities directly impacted by waste disposal siting decisions. Statistical results varied significantly from the subdivision level to the enumeration area level in Nova Scotia. At the subdivision level, the results indicated that subdivisions with higher income variables and lower ethnic minorities were more likely to host waste sites. However, when the investigation was refined down to the enumeration areas the differences began to emerge. On this level, waste sites were predominantly found within EAs with lower median household incomes and higher averages of government transfers and renter occupied dwellings.

These conclusions were based on the province-wide “difference of means” statistical analysis performed for each of the seven variables. However, when the racial minority variables were isolated along with each of the waste sites, additional patterns were uncovered. High percentages of black population were found in host EAs or within the impact zone of 16 of the 65 waste sites included in this study. Similarly, 14 waste sites were located in areas with high percentages of native populations. Although blacks and natives only make up 1.2% and 0.8% of Nova Scotia’s total population, respectively,

46% of the waste sites have been located within EAs with black and native populations exceeding these percentages.

As illustrated in this investigation, provincial studies do not always tell the entire story. Minority communities face a difficult task of demonstrating discriminatory siting using statistical data. Nevertheless, by focusing on specific areas and communities, examples of environmental discrimination may be easier to demonstrate. The next chapter discusses additional opportunities for minority and disadvantaged communities to address environmental justice issues in Nova Scotia and Canada.



## CHAPTER SIX

# IMPLICATIONS FOR ENVIRONMENTAL LEGISLATION AND GRASSROOTS MOVEMENTS IN CANADA

### 6.1 Introduction

The evidence that emerges from the statistical investigation presented in the previous two chapters indicates that a number of waste sites in Nova Scotia have been located in areas characterized by low income and minority population variables. The results of this study confirmed the research statement posed at the beginning of this thesis that *“Waste sites in Nova Scotia are not randomly located across the province”*. Despite identifying and acknowledging these patterns, discrimination in decision-making processes and unequal environmental protection will continue unless the communities begin to take steps to protect their own neighbourhoods. What opportunities are available for these minority and low income communities in Nova Scotia to address present and prevent future environmental injustices?

The final three objectives of this thesis (outlined in chapter one) are concerned with identifying potential opportunities available for integrating environmental justice concepts and principles into Canadian environmental law and decision-making frameworks. The following discussion outlines a number of examples and directions which may be pursued to address these issues in Nova Scotia and Canada. The recommendations presented in this chapter are only an introduction to the possibilities and are not meant to be exhaustive. It is beyond the scope of this study to examine all the impacts environmental justice will have on Canadian processes and procedures.

Therefore, this chapter focuses on three general areas of concern to illustrate how Nova Scotian and Canadian decision/policy makers, lawyers and communities may address environmental discrimination. These areas include: waste management procedures, environmental protection and civil rights, and community mobilization. The examples outlined in each of these areas are only an introduction to the issues, barriers and opportunities that impacted communities may face when addressing environmental racism in Canada.

## **6.2 Decision Making Procedures - The Waste Management Scenario**

Siting waste management facilities has become a conflict-ridden process characterized by massive public opposition, disagreement over the environmental impacts of the facilities and a general lack of faith in the traditional approach to facility siting (MacLaren, 1995). Now, in addition to understanding NIMBY campaigns, municipal waste management planning teams must also address environmental justice concerns while structuring their siting processes.

The planning and site selection for waste disposal facilities are two areas in which municipalities can best address environmental justice issues and avoid disparate siting decisions. Following from the results of this study, it is clear that past waste disposal siting processes in Nova Scotia did not pay close attention to the demographic and social characteristics of the communities selected to host these facilities. The following discussion begins by introducing a number of concerns with waste management

procedures in general. It then outlines two important components that should be integrated into current procedures to help promote a fair and equitable process.

### **6.2.1 Issues in Current Waste Disposal Siting Procedures**

Relating to environmental justice issues, three main areas of concern have emerged from current waste disposal siting procedures. By addressing these concerns, waste managers will take an important step towards decreasing discriminatory and unequal siting decisions.

#### *(a) Public Distrust*

Due to the controversial nature of waste disposal siting procedures, overall public confidence and trust in waste management officials has declined significantly. Several factors have been defined to help explain this loss of trust and credibility. These include: (1) lack of citizen and community group involvement in solid waste management decisions; (2) inconsistent information regarding health risks and environmental impacts; (3) lack of adequate risk communication skills among those who communicate information to the public; and (4) lack of resources for risk assessment and management (Covello, 1991).

Decision makers must realize that opposition to a waste facility may be founded not only on the distrust of the message being distributed but also a fundamental distrust of the messenger. If the public is not provided with adequate information or assurance that they are not in danger from these decisions, confidence in the final decision and the

decision makers themselves is severely effected. The credibility and trustworthiness of political decision makers and their technical advisors is essential to achieving consensus with the public. (McGee, 1991)

*(b) Fairness and equity issues*

The concern with social inequity further complicates the siting process. Waste disposal sites are often located in “backyards” that are not responsible for the majority of the waste created (Bullard, 1992-a). This creates an inequitable shift in responsibilities away from the group that created the waste and the host community is left with the perception of intangible benefits and high disadvantages (McGee, 1991). To offset these concerns and reduce resulting NIMBY reactions, municipalities must actively search for a fairer distribution of benefits and risks. “The host community must believe that the waste management solutions proposed distribute the social and economic costs in an equitable manner throughout the population” (McGee, 1991). If people and communities feel that the selection process is voluntary, fair and organized, then concerns about risks are likely to be lower and their willingness to accept risks is likely to be higher (Covello, 1991).

*(b) Lack of control*

In addition to the perceived inequality associated with landfill siting, another important social concern for the public is the loss of control. When residents do not have a role in the decision making process, they feel they have nothing to lose by taking up an opposition (Griffiths Muecke Assoc., 1991). Most waste management planning processes

begin with the assumption that scientific and technical criteria are the most defensible basis for site selection (McGee, 1991). This total reliance on technical criteria and experts further alienates community groups from participating in the process.

In many cases, the community does not possess the necessary knowledge, power or resources to effectively participate in the process. The system is easily manipulated by those with “regulatory sophistication and access to lawyers and consultants, which will generally be those with some financial interest in siting a facility” (Harrington and Wiygul, 1993). If the siting decision becomes a function of technical factors, such as geological suitability and facility design, then the entire process inevitably becomes a technical dialogue between the expert panels and the applicant. Citizens are left out of the initial design and siting process and are forced to use what little resources they can muster to build an opposition against the final decision.

From these concerns, it is obvious that there is a need to improve site selection processes in terms of three essential considerations: siting criteria and evaluation; public participation and community acceptability. All three of these issues are intertwined within the planning and siting procedures. However, a focus on socio-economic criteria and increased public participation should be an integral part of the waste management process from the outset. Program planning should be conducted so that input from local sources is facilitated and all data are made accessible and understandable to the general public (CCME, 1991). As well, community acceptability may be addressed by expanding the criteria and impact assessment process to include social issues. All of these considerations are discussed in further detail below.

### 6.2.2 Public Participation

In order to address the concerns above, public participation programs must be an important component in facility siting and operation decisions. Decisions carried out with limited or no public involvement reduces the credibility of any process, undermines the public trust and serves as a catalyst for NIMBY.

People and communities have a right to participate in decisions that affect their lives, their property and the things they value (Covello, 1991). However, the traditional public consultation programs for waste management processes do not adequately inform or educate the public so that they can make informed decisions. The basic premise to good public consultation requires that the flow of information begin at the earliest stages in the development of a waste management solution (McGee, 1991). The importance of involving the public was recognized in the *NS Standards and Guidelines Manual for Landfills*. These guidelines recommended that “public participation programs should be designed to allow for timely exchange of information between the steering committee and the public in all stages of the solid waste management strategy development” (NS DOE, 1994). In addition to providing information to the public, this information must be available on a number of skill levels with respect to technical and scientific details. By producing an informed and educated public, waste managers will reduce misconceptions, distrust and opposition to the siting process.

Public dissatisfaction with traditional methods of facility siting has also led to the emergence of a new facility siting approach which emphasizes cooperation over conflict (MacLaren, 1995). The difference between these two approaches is that the traditional

approach aims to undertake a wide geographical search and select the site which best meets a set of technical criteria, regardless of whether the local community in which the site is located has expressed willingness to accept the site. On the other hand, the cooperative approach focuses on finding a willing host community in which there is at least one technically satisfactory site (MacLaren, 1995).

**Figure 15. Approaches to Siting Waste Disposal Facilities<sup>20</sup>**

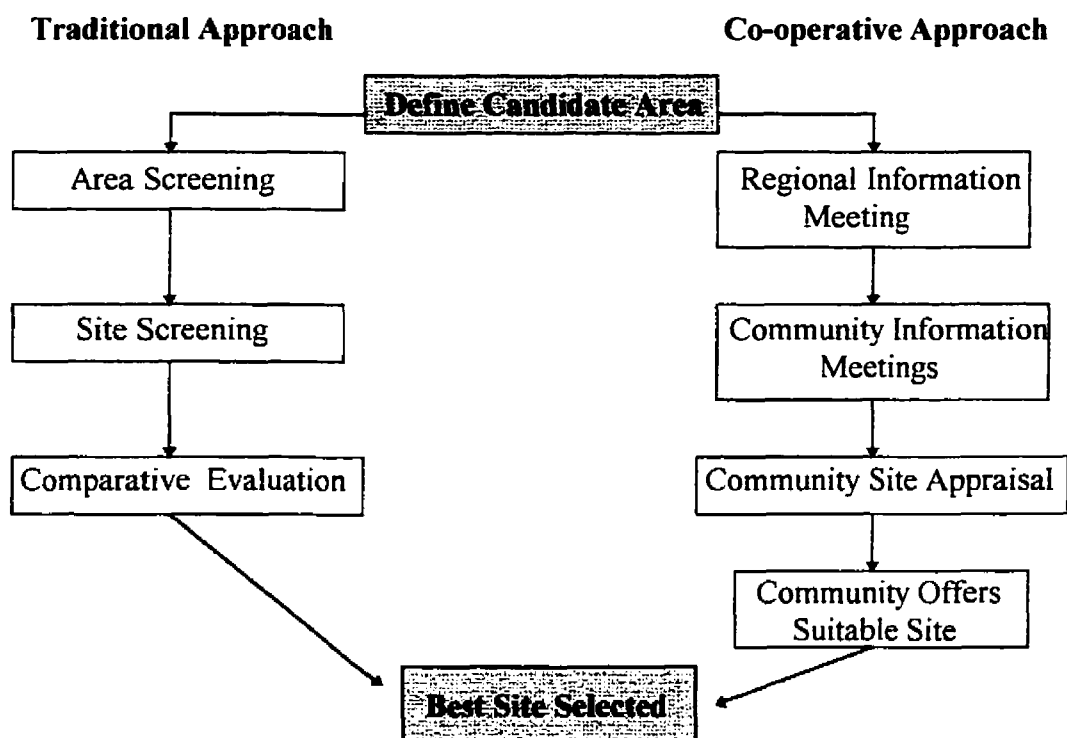


Figure 15 outlines the steps in both the traditional and cooperative facility siting approaches. Critics of the traditional approach have pointed out several flaws in the steps taken for selecting host sites. As discussed in the previous section, site selection relies heavily on scientific and technical criteria. The decisions as to what criteria to include,

<sup>20</sup> Developed by Virginia W. MacLaren, Department of Geography, University of Toronto, 1988 (see bibliography).

how to measure them and how the criteria are weighted in the siting process are all made by a panel of technical experts and scientists. The focus on scientific factors means that socioeconomic and psychological impacts (such as stress and life-style disruption) are given little, if any, consideration because they are difficult to measure (MacLaren, 1995). There is little input for the general public other than to react to the final decisions.

In contrast, the cooperative approach seeks public input and participation in order to locate a site in a voluntary rather than a resisting host community. The public becomes involved right from the beginning during the regional information meetings. These meetings seek to inform local communities about the characteristics of the proposed facility and the nature of the siting process (MacLaren, 1995). Community information meetings are then held in communities who express an interest in hearing more about the facility and process. If the community leaders vote to continue with this process, the search begins within the willing communities for potential locations. Community members must approve proposed sites in order for the community to become a potential host. "When the cooperative process produces more than a single potential host community, then the level of government responsible for finding a site must decide which of the sites being offered is the best one" (MacLaren, 1995).

Although the cooperative approach places more emphasis on public participation in the siting and approval process, MacLaren notes that there are a number of problems that restrict its application in practice. First, there is no guarantee that a community will volunteer to host the waste disposal facility. If this is the case, then the process reverts back to the traditional approach. As well, although the community has agreed to host the



site and has participated selecting the most appropriate site, some members of this host community will carry more of the negative burdens than others. This those who live nearest to the landfill will be more severely affected by the externalities associated with the landfill, such as odour, truck traffic, air emissions, noise and scavengers (McGee, 1991).

Finally, the third concern involves the types of communities that are most likely to volunteer to host waste disposal facilities. This process will ultimately attract those communities with the greatest need for the economic benefits associated with hosting a locally-unwanted-land-use. This could become an environmental blackmail situation that was discussed in chapter two. Poor communities are persuaded and encouraged to bear the negative environmental or health impacts in exchange for potential economic benefits.

In light of these concerns, increased public participation alone will not adequately address equity issues associated with the waste management processes.

### **6.2.3 Impact Management and Compensation**

In addition to promoting public participation in waste management processes, community opposition of siting decisions may also be reduced by offering compensation policies and siting agreements to host communities. However, do these policies and agreements address inequality in siting decisions?

Even with strict regulatory requirements and additional mitigation, all potential adverse effects of a waste facility cannot be eliminated. The objectives of impact management and compensation policies is to create a fairer resolution and to address the

unavoidable effects associated with waste disposal sites. More specifically, the policies and agreements may include provisions to assist community empowerment, to head off foreseeable conflicts, to establish procedures to respond to unforeseen problems, to address post-closure issues and to generally improve impact management (Griffiths Muecke Associates, 1991).

In order to respond to the public opposition, impact management addresses concerns at four stages during waste management siting processes (Zeiss, 1989-90).

These include:

- (1) ***Impact prevention*** - provides the earliest possible intervention designed to reduce the waste stream before it reaches the waste site.
- (2) ***Impact control*** - identifies and develops technical solutions to identified problems, as well as providing an opportunity to develop agreements with the host community (McGee, 1991). These agreements are designed to reduce the community's feeling of powerlessness. The host community is given the chance to negotiate a series of control options that results in direct involvement in the decision making process..
- (3) ***Impact mitigation*** - develops solutions to the environmental impacts resulting from the operation of the waste facility.
- (4) ***Compensation*** - attempts to provide a satisfactory replacement for the physical and social losses associated with the facility.

Even with effective and participatory impact prevention, control and mitigation measures, the host community will still bear a disproportionate burden on behalf of the larger municipality or county. Therefore, of the four stages of impact management, compensation is the only one that directly responds to the social equity concern (Griffiths Muecke Assoc., 1991).

With respect to environmental justice issues, compensating individuals for bearing external costs entails a number of advantages. First, and most importantly, compensation

approaches encourage those who benefit from a facility to provide compensation to host communities alleviating the fundamental injustice and achieves a fairer distribution of benefits and burdens (Boerner and Lambert, 1995). Also, by agreeing to host a LULU in exchange for compensating benefits, a community may be given the resources and funds necessary for improving the social situation of the community. These “host fees” may be paid into a community’s general revenue fund and then used to finance a variety of public projects, to create new economic opportunities and introduce improved health care services.

However, compensation for the loss of one type of benefit with another benefit (e.g. money payments for putting up with nuisances or increases in health risks) does not address the specific impacts but provides alternative benefits for the losses. “Therefore, unless the host community has some salient alternative need (employment), the provisions of alternative benefits for losses due to health risks, nuisance or social impacts are probably not going to be as effective as preventing the impacts in the first place” (Zeiss and Atwater, 1986).

Despite increasing public participation and impact management policies in waste management procedures, the concerns of social equality and disparate impacts on poor and minority communities remain. These communities need additional avenues to pursue equal protection. The next section investigates how recent environmental justice legal initiatives may be integrated into Canadian legal frameworks and whether these are viable options for communities.

## 6.3 Legal Remedies and Opportunities

As discussed in chapter two of this thesis, a number of environmental racism cases have begun to emerge in the United States. The majority of these lawsuits have based their claims on the “equal protection clause” of the US Constitution’s Fourteenth Amendment. This clause states:

Section 1... “No State shall make or enforce any law which shall abridge the privileges or immunities of citizens of the United States; nor shall any State deprive any person of life, liberty or property, without due process of law, nor deny to any person within its jurisdiction the equal protection of the laws”.

Unfortunately, these “equal protection” lawsuits have not been successful. These failed attempts at challenging environmental discrimination have been a result of the Supreme Court ruling, commonly referred to as the *Arlington Heights Factor*. This factor stipulated that the burden of proof was on the victim of unequal protection to demonstrate that the decisions were intentional acts of discrimination (see chapter two for more details). Despite the increasing evidence of discriminatory environmental decisions and disparate impacts from environmental hazards, communities and groups are still required to demonstrate that race was the motivating factor in the final decision. Since this discriminatory intent or motivation is extremely difficult to prove, environmental justice advocates have begun to look for alternative methods of remedying discrimination and unequal protection in environmental decision making.

### 6.3.1 Civil Rights and Environmental Equality

Traditionally, the civil rights movement did not address environmental degradation issues and their resulting health hazards. Rather, it focused on securing for racial

minorities the same basic rights to social goods, such as educational and employment opportunities, housing accommodations, economic development and political participation, as those shared by nonminorities (Lee, 1992; Foster, 1993). However, in recent years, environmentalists have increasingly recognized that one of the best ways to guarantee the enjoyment of communal environmental rights is by upholding the basic civil and political rights of the individual (Sachs, 1995). The following sections introduce a number of options for adopting American, Canadian and International civil rights models in order to address environmental justice issues.

*(a) The American Civil Rights Act*

In response to the lack of success on the equal protection litigation option, American civil rights advocates have begun to explore the possibility of applying *Title VI of the Civil Rights Act of 1964*<sup>21</sup> to environmental racism cases. *Title VI* provides that: “No person in the United States shall, on the ground of race, color or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance”.<sup>22</sup> Since the federal government provides funding for a wide range of activities, this provision could be of great use to environmental justice advocates. For example, virtually all of the US federal environmental laws, including those dealing with hazardous waste (CERCLA, 1990), toxic substances (Toxic Substance Control Acts, 15 U.S.C. 2627, 1988), water pollution control (Clean Water Act, 33 U.S.C. 1252, 1988) and clean air (Clean Air Act, 42 U.S.C.

---

<sup>21</sup> The Civil Rights Act of 1964 § 601, 42 U.S.C § 2000d to 2000d-4a (1988)

<sup>22</sup> 42 U.S.C § 2000d, 1988

7405, 1988) provide funding to state programs (Lazarus, 1993). Ultimately, the decision makers involved with these programs determine the distribution of benefits and burdens from environmental protection at the state and local levels. Given the significant federal financial assistance to the state environmental programs, the potential reach of *Title VI* becomes even more significant for environmental justice claims.

Although *Title VI* has yet to be applied to siting of waste disposal facilities, it has been an effective means of redressing distributional inequities in other related areas, including: federally financed highways, prisons, and hospitals (Lazarus, 1993). The main advantage of using *Title IV* lawsuits over equal protection is that the courts do not (yet) require proof of intentional discrimination (Lazarus, 1993). In fact, these claims shift the burden of proof to the proponent who must demonstrate a legitimate, nondiscriminatory reason for the siting decision.

The following section introduces some opportunities for addressing environmental justice issues within the Canadian civil/human rights framework.

#### *(b) Human Rights in Canada*

Although there may be additional opportunities for individuals or groups to address environmental discrimination within Canada's human rights framework, this discussion has been limited to the federal Charter of Rights and Freedoms and individual provincial Human Rights Acts. Prior to the enactment of the *Constitution Act of 1982*, Canada's Constitution did not contain an explicit prohibition of racial discrimination. Although the *Canadian Bill of Rights*<sup>23</sup> did prohibit racial discrimination,

---

<sup>23</sup> R.S.C. 1970, Appendix III.

it had two serious flaws: (1) it was enacted as a federal statute and therefore did not have constitutional status and (2) it was not applicable to provincial activities (Henry et al., 1995). Therefore, prior to 1982, constitutional issues of race and civil rights were resolved under the division-of-powers provisions of the then British North America Act (Henry et al, 1995). It wasn't until 1982, when the *Canadian Charter of Rights and Freedoms* became part of the Canadian Constitution by virtue of the enactment of the *Canada Act 1982*<sup>24</sup>, that rights and duties became a substantive right for all Canadians.

Section 15 of the Charter (the Equality Rights clause) is perhaps the most significant equality provision in the Charter. The equality rights clause is the Canadian equivalent to the equal protection clause of the US Constitution's Fourteenth Amendment. It states:

15 (1) Every individual is equal before and under the law and has the right to the equal protection and equal benefit of the law without discrimination and in particular, without discrimination based on race, national or ethnic origin, colour, religion, sex, age or mental or physical disability.

(2) Subsection (1) does not preclude any law, program or activity that has as its object the amelioration of conditions of disadvantaged individuals or groups, including those that are disadvantaged because of race, national or ethnic origin, colour, religion, sex, age or mental or physical disability.

While the Charter provides for equal protection and equal benefit of the law for all citizens, there is a serious flaw that may impact the success employing the equality rights clause in environmental racism claims. Although Section 15 outlaws discrimination on the basis of race, it does not provide a definition of either discrimination or race. The task of interpreting these definitions is ultimately left up to the courts (Henry et al, 1995). The

---

<sup>24</sup> Canada Act, 1982 (U.K.) c. 11, Sched. B. (Charter of Rights and Freedoms comprises ss. 1-34).

could result in a ruling similar to the Arlington Heights case in the United States requiring the plaintiff to demonstrate that the defendant's discriminatory actions were intentional.

However, in 1989 a new legal definition of discrimination was established in Canada which (in contrast to the Arlington Heights ruling in the US) was based on the concept of "adverse effect".

Discrimination may be described as a distinction, whether intentional or not, but based on grounds relating to personal characteristics of the individual or group, which has the effect of imposing burdens, obligations, or disadvantages on such individuals or group not imposed on others, or which withholds or limits access to opportunities, benefits and advantages available to other members of society<sup>25</sup>.

This development was largely in response to the ineffectiveness of anti-discrimination legislation where "proof of intent" had traditionally been held to be a necessary prerequisite to any finding of discrimination (Head and Clairmont, 1989). The intent to discriminate is now no longer a necessary element to demonstrate discrimination under Canadian law. "If the respondent is shown to have refused the complainant or differentiated on the basis of race, creed etc., it is immaterial what the respondent's motive may have been. It is not material that the discriminator has no personal prejudice" (Sopinka, 1992). Therefore, communities and groups attempting to demonstrate environmental discrimination, would be required to prove that the decision or policy has an adverse impact or effect in relation to other groups in society.

On the provincial scale, each province has enacted a Human Rights Act or Code with provisions for addressing discrimination and unequal protection cases. These provisions primarily involve Human Rights Commissions and are initiated through a written complaint made by the person claiming to be aggrieved (Tarnopolsky, 1992).

---

<sup>25</sup> Andrews v. Law Society of British Columbia, [1989] 1 S.C.R. 143.



Following the filing of a formal complaint, the administrating agency, (or Human Rights Commission), is charged with investigating and attempting to settle the issue. As introduced in the first chapter of this thesis, the potential for addressing environmental racism cases was recently explored by a minority community group in Nova Scotia.

Following a controversial landfill site decision, a group North Preston residents and a number of organizations, including the North Preston Ratepayers Association and the Ecology Action Centre, filed a complaint with the Nova Scotia Human Rights commission. The complaint alleged that systemic discrimination, in the form of environmental discrimination, factored into the final decision of the Metropolitan Authority's search for a new landfill site (Nichol, 1993). The complaint was filed against the Metropolitan Authority, Nova Scotia Department of the Environment and the Provincial Government of Nova Scotia. "The group was not accusing authority officials of being racist, but the effect of the decision was racist. When policies or standards have a harmful impact on a group of people based on colour or race it amounts to systemic discrimination" (Nichol, 1993). In this case, the location of the proposed waste site would have an adverse impact on the historical black community of Preston.

In a second complaint, residents of Birchtown, charged the municipalities of Shelburne County, Barrington, the town of Shelburne, Lockeport and Clark's Harbour with racial discrimination (Delaney, 1993). Birchtown, one of Nova Scotia's oldest black settlements was selected by these South Shore communities to host their new waste disposal facility. Similar to the North Preston complaint, this case also focused on the

process by which waste disposal sites have been and continue to be located in Nova Scotia.

In response to these charges, the NS Human Rights Commission set up a five member committee to review the Metro Authority and the County of Shelburne's decisions to locate waste disposal sites in East Lake and Birchtown. In the midst of this review, the Metropolitan Authority decided to eliminate East Lake as the proposed landfill site and began searching for an alternative location. However, the Human Rights Commission decided to proceed with their investigation and in May of 1994 announced that it had dismissed both of the charges of environmental discrimination. "The committee found that while historically there was a pattern of discrimination in choosing dump sites, this would not appear to be the case with the move towards regional sites" (Moar, 1994).

Although the communities were not successful in their human rights complaints, these cases brought to light issues of environmental racism that have been occurring over the past decades. As well, these communities illustrated that minority and poor communities are capable of creating broad based advocacy groups to represent their concerns and to fight unfair decisions. The issues associated with these claims of environmental discrimination united community and environmental groups from various areas throughout Nova Scotia.

### *(c) International Covenant on Civil and Political Rights*

In addition to domestic human rights legislation, environmentalists and human rights advocates have turned their attention to the United Nations (U.N.) in an effort to set

an official international standard of environmental justice. "The campaign to write environmental justice into international law is well under way, spearheaded by environmental lawyers and activists working in conjunction with the U.N.'s Sub-Commission on Prevention of Discrimination and Protection of Minorities" (Sachs, 1995). In 1989, a coalition of nongovernmental organizations (NGO's) led by the Sierra Club Legal Defense Fund convinced the Sub-Commission to appoint a rapporteur to complete an international study on the overlap between human rights and environmental issues. The study documented countless cases of environmental injustices occurring around the world and indicated the value of combining the ecological and human rights policy agendas (Ksentini, 1994). Along with this study, the coalition issued the *Draft Declaration of Principles on Human Rights and the Environment* which proclaimed the "universal human right to a secure, healthy, ecologically sound environment" (Aguilar and Popovic, 1994). These two documents illustrate the international concern with environmental justice issues and the need for an official convention safeguarding environmental human rights.

Although international human rights laws were created prior to the concern for environmental rights, a number of the existing covenants may be applied to environmental justice cases. Canada has participated in and ratified a number of international human rights and antidiscrimination covenants the United Nations - including the *Universal Declaration of Human Rights*<sup>26</sup> and the two subsequent Covenants. Both the *International Covenant on Civil and Political Rights*<sup>27</sup> and the *International Covenant on Economic,*

---

<sup>26</sup> G.A. Res. 217 (11), U.N. GAOR, 3d Sess., U.N. Doc. A/777 (1948).

<sup>27</sup> International Covenant on Civil and Political Rights, Dec 16, 1966, 999 U.N.T.S. 171, 6 I.L.M. 368 (in force Mar 23, 1976) - hereafter referred to as Political Covenant.

*Social and Cultural Rights*<sup>28</sup>, provide several opportunities to assess a nation's efforts to remedy environmental discrimination (Glick, 1995).

While neither the *Political* or *Social Covenant* specifically address environmental issues, they do protect environment-related rights that are derived from an aspect of the rights stated within each covenant. For instance, the *Political Covenant* guarantees the basic right to life and the *Social Covenant* guarantees the right to the highest attainable standard of health - both of which depend on a healthy environment (Sachs, 1995). By providing direct recourse to the UN, individuals and groups who have exhausted all legal avenues in their own country are, in some cases, able to state their case before the UN Human Rights Committee (Kallen, 1989).

The relevance of these covenants for promoting environmental rights has been investigated through a number of charges filed with the U.N. Human Rights Committee by minority and disadvantaged groups around the world. Two of these cases involved community groups in Canada who claimed that government actions were in violation of a right guaranteed by international human rights laws. The first case involved, Article 6 of the *Political Covenant* which states "Every human being has the inherent right to life. This right shall be protected by law. No one shall be arbitrarily deprived of his life" (see note 18). While this right does not expressly address environmental rights, it has been interpreted by the U.N. Human Rights Committee "to encompass some level of duty on the part of state parties to protect against environmental hazards that threaten health and longevity" (Glick, 1995). This interpretation emerged from a complaint filed with the

---

<sup>28</sup> International Covenant on Economic, Social and Cultural Rights, Dec. 16, 1966, 993 U.N.T.S. 3, 6 I.L.M. 360 (in force on Jan. 3 1976) - hereafter referred to as Social Covenant.

U.N. Human Rights Committee by the residents of Port Hope, Canada in 1982. In *E.H.P. v. Canada*<sup>29</sup>, citizens of Canada asserted that the government had stored 200 000 tonnes of radioactive waste in the town of Port Hope, and as a result residents were subjected to radiation emissions above the approved safety levels (Glick, 1995). Although the committee dismissed the petition for failure to exhaust domestic remedies, it did observe that the complaint “raised serious issues, with regard to the obligation of State parties to protect human life - Article 6 (1)” (U.N., 1988). In order to protect the right to life, nations must recognize the connection between the health of the environment and rights of citizens to enjoy a safe and clean environment.

The second Canadian case involving human and environmental rights was filed in 1987 by the Lubicon Lake Band of Indians. In the complaint to the Human Rights Committee, the complainants asserted that historical inequities and recent developments, such as oil and gas exploration, threatened the culture and way of life of the band (U.N., 1990). The Committee upheld the claim and ruled that the cultural threat was an admissible issue under Article 27 of the *Political Covenant*. Article 27 guarantees members of ethnic and linguistic minority groups the right “in community with the other members of their group, to enjoy their own culture, to profess and practice their own religion, or to use their own language” (see note 18). The federal government responded immediately by proposing to rectify the situation through measures deemed satisfactory to the Committee. At first glance this decision appeared to provide a powerful legal precedent, however its practical significance for the Lubicon has been minimal, as the

---

<sup>29</sup> See U.N. Communications No. 67/1980 (Oct. 27, 1982, 17th Sess).

Band continues to face pressure from companies eager to capitalize on its resources (Sachs, 1995).

The application of the *Political Covenant* has not been limited to these two cases. Perhaps the best opportunity for environmental justice claims may be found under the *Political Covenant*, Article 2(1). An Article 2(1) violation is demonstrated by first identifying a right protected by the *Political Covenant* and then illustrating disparate protection of that right on the basis of race, colour or other prohibited category (Glick, 1995). For example, a study conducted for the National Law Journal (cited in chapter two) found that the EPA failed to assess or remediate hazardous waste sites found in minority neighbourhoods as rapidly as those found in white neighbourhoods (Lavelle and Coyle, 1992). This discriminatory treatment and unequal protection should provide sufficient evidence to constitute an Article 2(1) violation.

The examples presented above are only a brief introduction to the potential for addressing environmental justice issues under international human rights covenants. The application of these covenants should not be used as a substitute for addressing environmental discrimination under domestic law. Instead, these examples provide additional tools with which environmental racism may be remedied after all domestic options have been exhausted. Together with international human rights laws, environmental rights mechanisms at the national and regional levels would also aid in the effort to establish substantive standards of environmental justice.

### **6.3.2 Entrenching Environmental Rights in Canada**

While no environmental or civil rights laws explicitly state that the public has a right to a healthful environment, public entitlement to a healthful environment has been implied in laws designed to protect the environment from socially unacceptable pollution and degradation of resources (Task Force, 1992). However, the ability of individuals or communities to take direct legal action to protect their entitlement to a healthful environment is limited under current law. Legal barriers often deny individuals access to the courts or decision making processes. As well, public participation in significant environmental decision making, while encouraged by government policy or practice, is not consistently provided as a right in law.

With the rise of environmental discrimination and unequal environmental protection concerns throughout North America, it has become obvious that there is a need for a set of principles and rules to outline citizens' rights with respect to the environment; the duties of governments pertaining to natural resource use and the prevention of environmental degradation; and the role of the public in environmental decision making (Estrin and Swaigen, 1993). As introduced in the previous section, environmental advocates are beginning to explore the possibility of adapting civil rights models to address these environmental issues. A number of initiatives and proposals have recently been introduced in Canada in an attempt to link environmental protection and civil rights. These developments fall into two general categories: substantive and procedural rights (Hughes, 1993).

*(a) Substantive Rights and Environmental Protection*

From the examples presented throughout this thesis, it can be concluded that there is a need to extend environmental protection beyond the right to participate. The cases of environmental racism illustrate that decision making processes do not promote equal participation or consultation for all communities. "If participants in the forum find that one party - [the party with the power, resources and influence] - consistently comes to forum armed with rights which compel a decision in his favour and against the environment, those without counterbalancing rights will become disillusioned and abandon the forum..." (Swaigen and Woods, 1981). This is exactly what has been occurring in environmental decision making processes and in order to promote equal environmental protection, steps must be taken beyond the right to participate.

"Perhaps this is the time to renew the search for a substantive right to environmental quality - one which ensures advocates of environmental quality more than a mere right to participate and entrenches environmental quality in the legal system as a value equivalent to private property rights and a fetter on government discretion to permit environmentally harmful activities..." (Swaigen and Woods, 1981).

Proposals of substantive environmental rights have argued that in order to protect individual rights, the health and protection of an individual's environment must also become a constitutional right. These rights are "framed as individual rights to environmental quality, violated either when human life, property or health are injured, or when a reasonable level of environmental quality is exceeded" (Hughes, 1993). According to the proponents, an effective substantive environmental right must include the following characteristics:

- It must clearly state that citizens have standing not only against the government but also against other citizens,



- To determine what levels of environmental quality are to be protected, the legislatures must specify a range of considerations, either setting standards or specifying the “rules of thumb” the courts must apply,
- Discretion left to the courts must be a discretion to impose more stringent standards than existing ones, but not less than stringents ones,
- In order to create a truly substantive right to environmental quality, the legislation must state that there is a substantive right which is equivalent to a property right. (Estrin and Swaigen, 1993)

Several environmental law experts have argued for a constitutional entrenchment of these environmental rights (Swaigen and Woods, 1981 and Gibson, 1988). Among these authors, an environmental rights framework was created by Dale Gibson that included a number of the requirements listed above. His framework focused on the right of all citizens to a beneficial environment and the duties that would be equally applicable to both governments and non-governmental organizations in order to protect these rights. One section in particular would have implications for protection against environmental racism.

15.1 (1) Everyone has the right to a beneficial environment, and to enjoy its use for recreational, aesthetic, scientific and economic purposes, to the extent reasonably consistent with: (a) the equivalent right of others; (b) the health and safety of others; and the preservation of a beneficial environment (Gibson, 1988).

Substantive or communal rights combine moral and scientific perspectives to uphold the protection of life; they serve the crucial purpose of laying out the things that all people should be able to expect from the environment - such as clean air and water (Sachs, 1996). When specifically applied to the environmental justice movement, it is this set of rights that would set the standards for a healthy environment and ultimately determine what constitutes environmental injustices.

There has only been one real attempt to include substantive environmental rights in Canada's constitution. This occurred in 1978, prior to the 1982 constitutional amendments, when the *Constitutional Amendment Act*<sup>30</sup> was introduced and included:

4. To these ends, the stated aims of the Canadian federation shall be: ... to pursue social justice and economic opportunity for all Canadians through the equitable sharing of the benefits and burdens of living in the vast land that is their common inheritance, through the commitment of all Canadians to the balanced development of the land of their common inheritance...

The constitutional guarantee would have given Canadians a right to environmental quality that would have prevailed over all federal and provincial legislation, and would have constrained government action (Douglas, 1991). However, the bill was not adopted and although environmentalists continued to lobby for entrenched rights to environmental quality, the following rounds of constitutional debate and consequent reforms in 1981 (resulting in the *Canadian Charter of Rights and Freedoms*) did not deal with these issues either (Hughes, 1993; Estrin and Swaigen, 1993).

#### *(b) Procedural Rights and Environmental Protection*

Despite the failure to entrench environmental rights in the Canadian Constitution, there have been a number of attempts over the past few decades to develop comprehensive environmental *procedural* reforms in legislation at both the federal and provincial levels. "These statutory reforms are designed to put in place a framework to define and articulate environmental rights, governmental environmental accountability and access to courts and tribunals, along with procedural and institutional mechanisms to

---

<sup>30</sup> Bill C-60, 3rd Sess., 30th Parl., Canada, 1978

back up these rights and obligations” (Estrin and Swaigen, 1993). The reforms recommend procedural changes to environmental protection legislation and have primarily involved creating statutory bills of rights - or *environmental bills of rights*.

The recent evolution of environmental bills of rights has been modelled on provincial human rights statutes that protect citizens from discrimination on the basis of race, creed etc. A number of attempts to create and implement environmental bills of rights have been made in Canada, beginning in the early 1970s (Douglas, 1991). At the federal level, only two initiatives have been proposed. In 1981, Charles Caccia introduced a private member’s motion, “Establishment of Environmental Bill of Rights” in the House of Commons<sup>31</sup>. Environment Canada commissioned the Canadian Environmental Law Research Foundation (CELRF) to complete a report on the possible components of a federal environmental rights bill, however no action was taken on CELRF’s findings (Estrin and Swaigen, 1993). The second proposal coincided with the development of the Canadian Environmental Protection Act (CEPA) in the mid-1980s. The federal minister at the time promised to include a version of the environmental bill rights within CEPA, however these provisions were not incorporated in the Act when it was finally introduced in 1987.

It has been at the provincial level where environmentalists have been successful at enacting environmental rights legislation. The first reference to environmental rights was made in the amendments to Quebec’s *Environmental Quality Act*<sup>32</sup> adopted by the provincial National Assembly in 1978. These amendments provided that:

---

<sup>31</sup> Canada, House of Commons, *Debates*, July 9, 1981, 11385-89.

<sup>32</sup> An Act to Amend the *Environmental Quality Act*, Bill 69, 1978 (31st Legislature, 3rd Session).

19a. Every person has a right to a healthy environment and to its protection, and to the protection of the living species inhabiting it, to the extent provided for by this act and the regulations, orders, approvals and authorizations issued under any such section.

Following these amendments, the first Canadian environmental rights legislation was enacted in 1990 with the passage of the Northwest Territories' *Environmental Rights Act*<sup>33</sup>. This was followed by the Yukon Territory's more comprehensive environmental legislation that also included a set of environmental rights - *The Environment Act*<sup>34</sup> and finally Ontario's the *Environmental Bill of Rights*<sup>35</sup> (EBR) which was passed on February 15, 1994.

The *Ontario EBR* has been defined as "a law that confers certain environmental rights on the people of Ontario and establishes certain governmental obligations" (Muldoon and Lindgren, 1995). Although it does not have any constitutional status, the EBR does set minimum rules for public participation with respect to government ministries and statutes subject to law. Unlike the previous provincial environmental bill of rights, the *EBR* does not expressly include an unqualified right to a *healthful* environment. Rather, the preamble recognizes that "the people of Ontario have a right to a healthful environment" and section 2(c) states that the purpose of the Act is "to protect the right of the present and future generations to a healthful environment" (see note 35). Therefore, it may be inferred that the law assumes that there is a right and then provides the means to enforce this right.

---

<sup>33</sup> S.N.W.T. 1990, c. 28.

<sup>34</sup> 2d Sess., 27th Leg. Yuk. Terr., 1991

<sup>35</sup> Environmental Bill of Rights 1993, S.O. 1993 c. 23 (Bill 26 1993) Royal Assent Dec. 14, 1993.

The primary focus of the act is to increase government accountability by way of increased public participation in environmental decision making. The framework created under the law attempts to ensure that all proposed government decisions that may significantly affect the environment are categorized as “statutes”, “policies”, “regulations” or “instruments” and are subject to varying levels of public notice and comment (Muldoon and Lindgren, 1995). It also provides a process for residents to request that existing laws, policies, regulations or approvals be reviewed or that new ones are developed in order to protect the environment.

Although this new direction for environmental protection does not explicitly protect individuals or communities from environmental discrimination, it does introduce a new vehicle that may be explored by environmental justice advocates. By entrenching the equal right to a healthy and clean environment, communities will be able to hold governments and NGOs accountable for their decisions impacting the environment. Any decisions that have an adverse impact on the environment will also effect the individuals living within that environment. Therefore, by protecting the integrity of the community’s environment, an environmental bill of rights will ultimately protect communities from environmental degradation. Increased involvement in decision making and expanded access to information will also help to develop an informed and active public willing to protect their own environments.

## **6.4 Mobilizing the Grassroots**

The evidence is clear that white, middle-class communities are not the only groups concerned about environmental issues. As introduced in chapter two, a new form of environmentalism has emerged in the United States combining the social and environmental movements. The environmental justice movement has grown considerably since it first began ten years ago. As the research and evidence has increased, national conferences have been held to discuss and debate issues concerning unequal environmental protection and discriminatory decision making processes. Notable among these conferences were the 1985 Urban Environmental Health Conference, the 1990 Race and the Incidence of Environmental Hazards Conference and the first National People of Colour Environmental Leadership Summit held in 1991 (Taylor, 1993).

However, the most vital element in the rise of this movement was the emergence of grassroots activists who, with little previous knowledge of environmental issues or political activism, have been motivated to become involved in protecting both their community and environment. Communities across the United States have begun to see that their government systems and traditional environmental organizations were unresponsive to the concerns and issues. With this realization, the grassroots environmental movement began to evolve into a social justice movement aimed at bringing real democracy and community back to the people (CCHW, 1993). Therefore, the third area in which environmental racism may be addressed in Canada is within community networks and organizations representing minority and low income groups.

### 6.4.1 Community Development and Environmental Justice

While examining the impacts and effects of environmental discrimination on a neighbourhood or community, it has become evident that rather than destroying the community, these impacts often reinforce the common bonds and help to develop grassroots support.

Grassroots participation develops because of a combination of occurrences that form a basis for at least temporary community consensus and cohesiveness: victims' normal lives are severely disrupted by the exposure incident, victims are isolated from their relational and institutional networks, individual families cannot solve their problems alone, and a group of proximate victims shares the same conditions (Edelstein, 1988).

The new grassroots organizations are often formed by people with little or no experience in organizing or waging a public campaign, or with no expressed interest in environmental issues. However, once individuals discover that the systemic and legal channels for participation and problem solving are ineffective or unresponsive to their particular needs, residents are forced to create new alternatives.

Grassroots organizations primarily grow out of spatial networks - a community group corresponding to the boundaries of a contamination or environmental hazard. "Unified by similar concerns and impacts, these residents develop a common identity, which implies feelings of similarity, interdependence maintained by mutual support and the sense that they are a part of a structure that is large and more stable than the individual can ever have in isolation" (Edelstein, 1988). As a source of collective power, community groups are able to take actions that they might not have been able to undertake individually. Groups are able to attract the resources, information, expert and legal advice needed to address the complex issues resulting from environmental discrimination (Edelstein, 1988).

#### 6.4.2 Mobilizing Minority Communities in Nova Scotia

Although the members of minority and low income communities may not have the experience in addressing environmental discrimination, may have been involved with or faced discrimination in other areas of society. Therefore, environmental groups in minority communities may emerge out of established social action organizations already set up to address discrimination in housing, employment or other areas of society. One author contends that the black community “possesses (1) certain basic resources, (2) social activists with strong ties to mass-based indigenous institutions, and (3) tactics and strategies that can be effectively employed against a system of dominance” (Morris, 1984). These established organizations have experience with opposing social injustice and racial discrimination. By linking institutional racism with the structure of resource allocation, social action groups have begun to adopt environmental justice as a civil rights issues.

The *1992 Peoples of Colour Environmental Groups Directory* profiled more than 205 minority groups from the United States, Puerto Rico and Canada (Bullard, 1992c). Included in this list were four groups from Nova Scotia with environmental justice/racism as part of their mandates. These included:

- The Black Cultural Society of Nova Scotia
- Africville Genealogy Society
- Cultural Awareness Group of Nova Scotia
- Native Council of Nova Scotia

Although these organizations and institutions were formed as a reaction to racism and deal primarily with social justice issues, communities throughout Nova Scotia have begun to



realize that they also play an important role in promoting environmental protection. Nova Scotia's minority and native communities are using established grassroots organizations to address decisions and hazards that are impacting the quality of life and the environment within their neighbourhoods. These groups have primarily focused on addressing environmental discrimination and unequal distribution relating to waste disposal and pulp and paper facilities. However, the scope of environmental issues will ultimately expand as more communities become aware of and concerned with environmental hazards affecting their neighbourhoods.

The importance of mobilizing community support along with grassroots environmental organizations was especially evident in 1991 during the search for the Halifax-Dartmouth regional landfill. As discussed in previous sections of this chapter, the East Lake location was selected to host the proposed landfill. As with all LULU siting decisions, community opposition to selected site was immense. However, the proximity to the historically black community of North Preston brought an additional slant to the opposition. The charge of environmental racism united the entire community of North Preston but it also attracted support from other organizations - both black and white. The residents were successful in forming their own advocacy group and eventually gained the support of local community groups (North Preston Ratepayers Association), mainstream environmental organizations (The Ecology Action Centre), other minority/cultural groups (Shelburne County Cultural Awareness Society) and even religious organizations (African United Baptist Association - A.U.B.A.).

The A.U.B.A., the largest African-Canadian organization in Canada, declared the support of the many African-Canadian communities of Nova Scotia, with the residents of Preston (Wright, 1992).

We certainly are united in the issue. We would like the people of Canada to realize we are not going to take this sitting down. The church is the organization that speaks for the majority of Black people in Nova Scotia. We are the heartbeat of our people and we are very, very sensitive to the concerns that our people are sharing in this issue (Cranston, 1992).

The basis for the A.U.B.A.'s support for the Preston fight, arose from the long standing historical role of the Baptist Church as an advocate for justice for African-Canadian people in Nova Scotia (Wright, 1992). With such a diversified support system, the community was able to bring to light and increase public awareness of the historical environmental discrimination minority communities have been facing over the years.

In addition to these community initiatives, environmental racism has also received an increasing amount of attention within educational programs in Nova Scotia. The Law Programme for Indigenous Blacks and Mi'kmaqs at Dalhousie University recently produced a compilation<sup>36</sup> of articles and papers from the United States on environmental justice and racism. The information included in the report introduces the issues and initiatives surrounding environmental justice as they pertain to the legal concepts and ideas taught in the environmental law course at Dalhousie University. The recognition that environmental racism is an most important issue facing minority and native communities was further emphasized when the Black Law Students of Canada selected environmental racism as the theme for their annual conference in 1997.

---

<sup>36</sup> "Environmental Racism", compiled by Alonzo Wright under the direction of Professor Carol Aylward at Dalhousie Law School (see bibliography).

Throughout this thesis it has been argued that environmental racism can not be adequately addressed by mainstream environmental organizations or policy makers who do not directly suffer from the effects or impacts of environmental hazards. These issues must be addressed by creating grassroots organizations and networks within the minority and disadvantaged communities. From these community organizations, local residents will gain the support, knowledge and resources to defend their own backyards and to develop a power base to influence future decisions. The development of community organizations tends to provide people with a sense of power in the midst of a situation that otherwise produces an overall sense of control (Edelstein, 1988). By forming a community group that speaks as a unified and organized group, individual residents will have a direction in which to channel their frustrations constructively and will no longer be viewed as the “paths of least resistance”.

## **6.5 Conclusions**

The recommendations introduced in this chapter have attempted to illustrate the opportunities and potential for addressing environmental justice principles in Canadian and Nova Scotian policies and legislation. Although this discussion focused its attention on waste management processes, human rights legislation and community mobilization, integrating equal environmental protection for all individuals and communities must not be isolated to these three areas. Policy makers and legislators must realize that burdens are not shared equally among all communities and that discrimination exists at all levels of decision making. Decisions can no longer be made in isolation or behind closed

doors without public involvement. Only a few groups in society possess the resources, knowledge and power necessary for participating in these decision making processes and this is what has resulted in an unequal distribution of environmental hazards. These processes must change in order to promote fair and equal access to the decision making procedures for all communities. However, the impetus for change must come from the communities who have been directly impacted by the discriminatory decisions and who have a vested interest in protecting the health of their environment and families.

## **CHAPTER SEVEN**

### **CONCLUSIONS**

**"In the end, environmental justice is such a powerful concept because it brings everyone to the same level - that of shared dependence on an intact, healthy environment". (Sachs, 1995)**

Throughout this thesis, a variety of issues and concerns have been addressed in relation to environmental racism in Nova Scotia. The primary objective of this study was to investigate the question of whether waste disposal sites have been randomly distributed throughout Nova Scotia. After examining the distribution of selected waste disposal sites in relation to a number of demographic variables, several disturbing patterns and relationships were uncovered. From the statistical analysis, it was concluded that the majority of waste sites included in this study were located in communities characterized by low income and minority variables.

However, the challenges facing minority and low income communities extend far beyond demonstrating patterns and trends in the distribution of environmental hazards. Although these results will provide these communities with empirical evidence of discrimination, they will continue to struggle to promote equal protection against environmental hazards. In addition to the gathering of statistical evidence, changes and reforms must be made to current environmental protection laws and decision making frameworks. The final sections of this thesis outline some of the challenges for future studies and summarize some of the lessons that may be learned from the environmental justice movement.

## **7.1 Future Challenges For Investigating Environmental Racism**

Although the findings of the statistical and geographic study demonstrated that environmental racism is a legitimate concern in Nova Scotia, the investigation into environmental discrimination must not be limited to this study. The statistical results and figures presented in this thesis provided a limited, uncontrolled comparison between areas with waste sites and those without. Additional patterns or trends may be found by expanding the scope of the analysis to include a wider range of variables and statistical tests. For example, this study focused on waste disposal sites that were in operation during 1991. By expanding the investigation to include sites that were in operation prior to 1991, historical trends in siting waste facilities could be determined. As well, in addition to landfills, incinerators and open burn sites, the study should be expanded to look at abandoned sites, hazardous/toxic waste sites and other LULUs that may have been located in minority or poor communities over the years.

Along with expanding the type and operational limits of the waste disposal facilities, changes to the number and type of demographic variables would also produce additional information. The seven variables used in this thesis were based on previous studies completed in the United States and focused primarily on income and two ethnic groups. These variables should be expanded to include educational information, employment characteristics and other ethnic groups besides black and native Canadians. Further statistical analyses are also recommended in order to examine the effect of combining the variables in a regression analysis (i.e. what impacts would median income combined with the racial variables have on the statistical relationships?).

As well as investigating historical trends and patterns of discrimination, additional studies should also be conducted on the impacts and issues resulting from current waste management and environmental decision making processes. Although relationships and patterns are beginning to emerge between locations of older waste sites and low income or minority communities, will the trends continue under future site selection processes? Will the increased community involvement and the expansion of selection criteria to include social, cultural and historical factors help to prevent the targeting of minority and low income communities?

Finally, future investigations into environmental racism in Nova Scotia should promote community involvement and participation in the studies. By isolating specific areas of concern, historical trends of discrimination and environmental impacts may be examined by the residents of the community. These communities have a stake in changing the status quo and should be recognized as experts with first hand knowledge of the impacts and threats that have been imposed on their neighbourhoods. Once areas of concern have been identified and significant evidence of discrimination uncovered, residents will be motivated to create or join an grassroots organization to remedy and/or prevent future discriminatory decisions.

## **7.2 Lessons Learned**

In addition to the recommendations discussed above, a number of lessons have emerged from this examination into distributional patterns and impacts of environmental decisions in Nova Scotia. The first lesson that emerged from the results and discussion

was the fact that public participation on its own will not be enough to redress or prevent environmental racism against minority or poor communities. Systemic and institutional racism has resulted in decades of unequal and unfair environmental decisions. Alienated individuals and communities no longer trust or believe that these formal procedures of policy or decision making will adequately address their needs or concerns. Therefore, serious consideration must be given to reforming the structure of environmental policy making to enhance minority access to relevant decision making processes. This would involve increasing access to information for all individuals and attracting minority representatives for positions in the government, NGOs and environmental organizations. This would result in a more diversified representation and help to expand the mandates of governments and organizations to include the specific issues that impact minority and low income communities.

Second, the proactive response of minority and low income communities to environmental racism illustrates that these communities are willing and able to protect the health and safety of their environment. "The evidence is clear and irrefutable that white middle-class communities do not have a monopoly on environmental concern nor are they the only groups moved to action when confronted with the threat of pollution" (Bullard, 1994-b). Minority and disadvantaged communities are capable of mounting environmental lawsuits and organizing movements to protect their environments. Examples from throughout the United States and now Canada, illustrate that communities have begun to form relationships and alliances with established social and environmental organizations. These broadbased movements have attracted minority and



low income minorities because they have an immediate and material stake in solving the environmental problems they confront.

The final lesson involves the relationship between equal environmental protection and the human or civil rights framework. These frameworks provide all individuals with a practical means of defending themselves against environmental degradation. Environmental justice advocates have begun to recognize this link and have interpreted these rights to mean that every individual and community has a right to a safe, clean and healthy environment. “If human rights activists and environmentalists choose to collaborate, and focus their efforts on the issues they share in common, and uphold the universal right to a healthy environment through the free exercising of civil and political rights, their power to change the status quo will likely increase dramatically” (Sachs, 1995).

### **7.3 Concluding Remarks**

The adoption of environmental justice principles, increased community involvement and a recognition of the equal right to a healthy environment are only a few of the necessary steps needed to ensure that all individuals are equally protected from environmental hazards within Canada. It is not enough to provide minorities with an opportunity to represent their own interests because correction of distributional equities is not, and should not be, the sole responsibility of racial minorities. All policy makers, regulators and citizens have a responsibility to work toward the fair distribution of environmental benefits and burdens for all individuals and groups within society.

## **APPENDIX A**

### **Environmental Justice Principles From the First National People of Colour Environmental Leadership Summit**

**PRINCIPLES OF ENVIRONMENTAL JUSTICE**  
**PREAMBLE**

WE, THE PEOPLE OF COLOR, gathered together at this multinational People of Color Environment Leadership Summit, to begin to build a national and international movement of all peoples of color to fight the destruction and taking of our lands and communities, hereby .... affirm and adopt the Environmental Justice Principles:

1. Affirms the sacredness of Mother Earth, ecological unity and the interdependence of all species, and the right to be free from ecological destruction.
2. Demands that public policy be based on mutual respect and justice for all, free from discrimination or bias.
3. Mandates the right to ethical, balanced and responsible uses of land and renewable resources in the interest of a sustainable planet for humans and other living things.
4. Calls for universal protection from nuclear testing and the extraction, production and disposal of toxic/hazardous wastes that threaten the fundamental right to clean air, land, water and food.
5. Affirms fundamental right to political, economic, cultural and environmental self-determination of all peoples.
6. Demands the cessation of the production of all toxins, hazardous wastes, and radioactive materials, and that all past and current producers be held strictly accountable to the people for detoxification and the containment at the point of production.
7. Demands the right to participate as equal partners at every level of decision-making including need assessment, planning, implementation, enforcement and evaluation.
8. Affirms the right of all workers to a safe and healthy work environment, without being forced to choose between an unsafe livelihood and unemployment.
9. Protects the right of victims of environmental injustice to receive full compensation and reparations for damages as well as quality health care.
10. Considers governmental acts of environmental injustice a violation of international law, the Universal Declaration On Human Rights and the United Nations Convention on Genocide.
11. Must recognize a special legal and natural relationship of Native Peoples to the US government through treaties, agreements, and covenants affirming sovereignty and self-determination.
12. Affirms the need for an urban and rural ecological policy to cleanup and rebuild our cities and rural areas in balance with nature, honoring the cultural integrity of all our communities.
13. Calls for the strict enforcement of principles of informed consent and a halt to the testing of experimental reproductive and medical procedures and vaccinations on people of color.
14. Opposes the destructive operations of multi-national corporations.
15. Opposes military occupation, repression and exploitation of lands, peoples and cultures and other life forms.
16. Calls for the education of present and future generations which emphasizes social and environmental issues based on our experience and an appreciation of our diverse culture.
17. Requires that we, as individuals, make personal and consumer choices to consume as little of Mother Earth's resources and to produce as little waste as possible, and make the decision to challenge and reprioritize our lifestyles to insure the health of the natural world for present and future generations.

## **APPENDIX B**

### **Statistical Databases for Nova Scotia's Counties and Subdivisions**

Nova Scotia County Statistics

County	Total Population	% Black Population	% Native Population	Renter (%)	Unemp Rate(%)	Median Income (\$)	Low Income (%)	Govt Trans (%)	Sites
Annapolis	23 640	0.76	0.32	21.2	11.7	28 304	13.9	20.3	5
Antigonish	19 225	0.11	0.83	19.5	13.9	36 014	10.4	17.4	2
Cape Breton	120 095	0.49	2.34	24.7	19.7	30 334	19.0	23.9	2
Colchester	47 680	0.63	1.08	25.7	13.9	31 031	12.5	17.4	5
Cumberland	34 285	0.82	0.22	21.7	16.6	27 936	13.8	22.4	12
Digby	21 250	1.62	0.52	17.3	17.4	27 609	12.4	23.8	4
Guysborough	11 720	3.40	0.26	11.7	18.3	28 620	13.4	29.5	2
Halifax	330 845	2.20	0.27	41.1	9.4	41 034	11.6	9.9	4
Hants	37 845	0.46	1.99	16.6	12.5	36 113	10.9	15.5	2
Inverness	21 620	0.04	2.00	17.9	19.1	32 522	11.4	24.1	3
Kings	56 320	0.49	0.37	8.0	10.1	33 754	11.2	14.4	1
Lunenburg	47 635	0.04	0.43	18.4	10.6	31 053	11.4	17.8	6
Pictou	49 650	0.60	0.74	22.0	14.9	32 464	13.2	19.1	1
Queens	12 925	0.31	1.28	15.8	12.6	30 984	13.6	18.8	1
Richmond	11 260	0.00	0.26	12.7	21.6	29 985	11.9	28.7	4
Shelburne	17 340	0.89	4.00	15.0	14.2	33 356	11.1	19.7	3
Victoria	8710	0.00	0.32	13.5	23.1	31 374	11.9	28.5	2
Yarmouth	27 890	0.59	0.32	24.3	12.9	30 003	13.7	20.9	6

Nova Scotia Subdivision Database

Subdivisions	Population	% Black	% Native	% Renter	Unempl Rate	Median Income	Low Income	Govt Trans	Sites
Annapolis Sub A	8 555	0.6	0.2	20.2	10.6	30022	11.9	20.2	1
Annapolis Sub B	4 080	0.7	0.4	16.8	14.6	25267	13.4	22.6	2
Annapolis Sub C	4 730	0.4	0.6	14.5	11.6	28921	13.7	17.7	1
Annapolis Sub D	2 795	0.0	0.5	9.6	10.6	28354	12.7	19.6	1
Annapolis Royal (T)	635	5.5	0.0	50.8	13.2	22418	24.2	28.4	0
Bridgetown (T)	1 025	1.0	0.0	62.5	10.3	27597	14.0	20.7	0
Middletown (T)	1 815	1.4	0.0	44.0	12.9	26436	23.6	20.4	0
Antigonish (T)	4 925	1.8	1.5	38.1	11.2	37490	9.8	16.0	0
Antigonish Subdiv A	7 225	0.8	0.0	15.3	12.5	35605	10.7	15.6	2
Antigonish Sub B	6 855	1.0	0.0	8.4	17.2	33829	10.6	20.5	0
Pomquet & Afton 23 (R)	230	0.0	93.5	0.0	25.0	n/a	n/a	n/a	0
Cape Breton Sub A	17 435	0.1	0.0	12.1	19.5	36676	11.3	20.4	0
Cape Breton Sub B	25 385	0.1	0.4	14.2	16.7	34279	13.1	21.0	1
Cape Breton Sub C	2 735	0.4	0.0	8.0	23.4	32834	17.7	24.9	0
Dominion (T)	2 515	0.0	0.0	21.1	25.8	28 49	20.9	27.0	0
Eskasoni 3 (R)	2 205	0.0	99.3	12.5	23.5	19552	n/a	48.1	0
Glace Bay (T)	19 500	0.6	0.0	26.9	22.3	27604	24.1	26.5	0
Louisbourg (T)	1 260	0.0	1.2	2.2	21.7	32679	7.6	28.3	0
Membertou (R)	490	0.0	0.0	7.1	48.4	17504	n/a	41.7	0
New Waterford (T)	7 695	0.8	0.0	24.8	20.9	24017	27.3	30.4	0
North Sydney (T)	7 260	0.0	0.0	32.3	18.6	26769	23.8	23.5	0
Sydney (C)	26 065	1.5	0.2	40.3	18.4	29023	20.8	21.9	1
Sydney Mines (T)	7 550	0.0	0.0	24.6	23.8	26017	26.4	30.1	0
Colchester Sub A	3 680	0.4	0.3	10.8	18.3	26886	8.0	27.8	1
Colchester Sub B	17 785	0.2	0.1	20.4	15.0	32529	12.3	16.8	1
Colchester Sub C	12 630	0.5	0.1	13.3	13.0	33250	10.4	15.4	2
Millbrook (R)	600	0.0	66.7	8.6	28.2	21056	n/a	34.5	0
Stewiacke (T)	1 310	1.5	0.0	24.5	14.3	33686	14.1	16.7	0
Truro (T)	11 680	0.6	0.6	47.6	11.7	28400	16.3	17.2	1
Amherst (T)	9 745	1.5	0.0	36.3	16.7	27754	17.1	20.2	0
Cumberland Sub A	2 855	0.7	0.0	12.8	19.1	22571	14.8	34.3	2
Cumberland Sub B	4 335	0.2	0.0	11.5	15.9	31389	11.0	22.1	3
Cumberland Sub C	5 200	0.0	0.0	9.1	12.8	33912	8.1	16.9	1
Cumberland Sub D	4 760	0.0	0.4	15.8	17.1	28177	14.4	24.5	4
Oxford (T)	1 385	1.8	0.0	22.9	8.5	31406	9.7	24.3	1
Parrsboro (T)	1 635	0.0	0.0	28.5	21.4	18287	20.6	25.4	1
Springhill (T)	4 375	0.7	0.4	23.0	20.4	26812	13.7	24.3	0
Bear River (R)	55	0.0	36.4	0.0	40.0	n/a	n/a	n/a	0
Clear (MD)	2 055	0.7	0.0	10.0	10.0	28 000	10.0	10.0	0

Nova Scotia Subdivision Database

Digby (T)	2 310	1.1	0.4	47.2	53.9	22660	20.3	23.4	0
Canso (T)	1 230	0.0	0.0	22.9	18.8	30954	18.1	26.1	0
Guysborough (MD)	6 515	5.8	0.0	9.3	18.6	27840	12.5	32.7	1
Mulgrave (T)	935	2.6	0.0	18.8	37.1	40394	14.2	14.4	0
St. Mary's (MD)	3 045	0.0	1.0	9.3	11.1	28661	13.3	30.2	1
Bedford (T)	11 615	0.0	0.2	30.2	7.9	57449	8.3	5.7	0
Dartmouth (T)	67 800	1.7	0.3	51.1	9.4	38791	14.5	10.6	0
Halifax (C)	114 455	2.3	0.4	60.3	9.6	35696	14.8	10.6	0
Halifax Sub A	10 815	0.2	0.2	11.9	7.7	49867	4.8	8.2	1
Halifax Sub B	14 610	1.0	0.1	13.6	10.5	42074	8.7	12.0	0
Halifax Sub C	45 665	1.4	0.1	16.0	8.7	48481	8.9	7.6	1
Halifax Sub D	37 285	2.3	0.1	18.5	8.0	50054	7.1	7.1	0
Halifax Sub E	18 210	9.9	0.1	8.7	11.1	43153	7.0	11.3	0
Halifax Sub F	6 130	0.0	0.2	13.8	13.5	33405	9.3	18.3	1
Halifax Sub G	4 160	0.0	1.3	11.3	17.0	25759	14.6	28.5	1
Sheet Harbour (R)	50	0.0	20.0	0.0	50.0	n/a	n/a	n/a	0
East Hants (MD)	18 560	0.1	0.2	13.4	11.5	39347	8.7	13.9	1
Hantsport (T)	1 270	0.0	0.8	25.0	10.2	31024	12.1	15.3	0
Indian Brook (R)	770	0.0	92.2	0.0	32.5	17344	n/a	43.0	0
West Hants (MD)	13 610	1.2	0.0	10.8	13.0	33100	12.3	17.1	1
Windsor (T)	3 625	0.4	0.0	48.9	14.9	36538	16.4	16.0	0
Inverness Sub A	6 945	0.0	0.0	14.8	21.1	30199	9.2	31.6	2
Inverness Sub B	6 350	0.0	0.0	18.8	18.8	32109	12.0	26.1	0
Inverness Sub C	3 905	0.0	0.0	10.3	13.7	33687	10.7	21.0	1
Port Hawkesbury (T)	3 990	0.4	0.4	31.8	16.9	37101	14.7	11.6	0
Whycocomagh (R)	425	0.0	98.8	0.0	73.3	10720	n/a	74.0	0
Berwick (T)	2 150	0.0	0.0	31.2	5.5	32039	9.7	17.3	0
Cambridge (R)	75	0.0	73.3	50.0	42.9	n/a	n/a	n/a	0
Kentville (T)	5 505	0.9	0.0	41.3	9.7	35680	13.1	13.9	0
Kings Sub A	21 255	0.2	0.4	28.7	8.7	35670	8.7	13.6	0
Kings Sub B	11 075	0.3	0.1	22.8	11.7	31655	16.5	15.5	1
Kings Sub C	7 495	0.9	0.3	26.2	9.4	33470	9.1	12.8	0
Kings Sub D	5 265	0.5	0.2	14.2	12.2	31371	10.0	17.5	0
Wolfville (T)	3 475	1.7	0.4	54.4	13.6	31507	13.3	14.0	0
Bridgewater (T)	7 245	0.1	1.2	39.5	9.8	30037	16.3	15.2	0
Chester (MD)	10 760	0.0	0.5	16.2	12.3	31243	10.4	17.9	4
Lunenburg (MD)	25 720	0.0	0.3	9.9	10.2	31934	9.9	17.9	1
Lunenburg (T)	2 785	0.0	0.0	35.5	9.3	28960	15.7	23.4	0
Mahone Bay (T)	1 100	0.0	0.0	34.4	9.2	30065	11.9	17.2	1

Nova Scotia Subdivision Database

Pictou (T)	4 135	0.0	0.0	0.0	31.6	15.6	26897	17.6	20.4	0
Pictou Sub A	6 840	0.0	0.0	0.0	9.4	11.3	36768	4.9	19.6	0
Pictou Sub B	6 600	0.0	0.0	0.0	11.5	16.8	34692	12.0	18.4	1
Pictou Sub C	9 505	0.2	0.1	10.0	30.1	11.8	29510	18.5	19.2	0
Stellarton (T)	5 240	0.2	0.0	21.7	22.3	16.8	30215	17.2	24.1	0
Trenton (T)	2 955	0.3	0.0	25.5	33.3	10.0	31384	15.9	17.2	0
Westville (T)	4 230	0.0	0.4	9.1	10.6	13.3	32062	12.9	19.8	0
Liverpool	3 110	0.0	1.1	6.7	11.8	20.0	17728	n/a	38.8	0
Queers Sub A	2 365	0.8	0.5	16.1	7.9	21.9	31645	11.7	25.8	2
Queers Sub B	6 530	0.2	1.6	11.8	32.8	13.7	21752	18.7	33.8	1
Chapel Island (R)	290	0.0	86.2	0.1	10.8	15.4	32741	8.5	29.1	1
Richmond Sub A	4 500	0.0	0.2	0.0	15.4	21.8	38130	8.4	19.5	1
Richmond Sub B	2 135	0.0	1.2	0.0	16.7	15.0	31218	7.4	22.1	0
Richmond Sub C	4 335	0.0	0.2	0.2	13.0	10.8	32751	9.5	17.5	0
Barrington (MD)	7 775	0.1	0.1	0.0	32.8	13.7	30227	10.1	19.8	2
Clark's Harbour (T)	1075	0.0	0.0	0.0	11.8	29.8	29092	26.0	19.8	0
Lockeport (T)	800	1.3	0.0	0.4	15.3	16.8	29419	15.8	32.3	1
Shelburne (MD)	5 450	0.3	0.2	0.0	0.0	43.8	33918	8.6	25.2	1
Shelburne (T)	2 245	5.3	0.9	88.0	0.0	13.0	13712	n/a	55.6	0
Victoria Sub A	8315	0.0	0.0	0.0	8.6	13.0	33507	9.4	21.5	3
Victoria Sub B	4525	0.0	0.4	0.0	13.4	13.1	32123	9.4	20.1	2
Wagmatcook (R)	375	0.0	0.0	0.0	54.0	12.8	25210	25.0	21.1	1
Argyle (MD)	9 215	0.0	0.0	0.0	0.0	40.0	n/a	n/a	n/a	0
Yarmouth (MD)	10 830	0.7	0.4	0.0	21.4					55
Yarmouth (T)	7 785	1.2	0.3							
Yarmouth (R)	70	0.0								



## **APPENDIX C**

### **Waste Disposal Sites In Nova Scotia**

Waste Disposal Facility Locations in Nova Scotia

County	Name/Location	Current Subdivision	Type	Description	Owner/Operator	Comments
ANAPOLIS	Crisp Road	Subdiv. B	Incinerator	Rural Municipality	on Inglisville Rd	
	Graywood	Subdiv. B	Incinerator	Rural Municipality		
	Joe Simon Road	Subdiv. A	Landfill	Rural Municipality	ash disposal site	
	Torbrook	Subdiv. D	Disposal Site		Construction & Demolition Debris	
	Middleton	Subdiv. C	Town Dump	Town		
	Beech Hill	Subdiv. A	Landfill	Rural Municipality	serves county	
	James River	Subdiv. A	Landfill	Rural Municipality	closed June 1991	
	Sydney/Glace Bay Highway	Subdiv. B	Incinerator & Landfill	Rural Municipality	located just outside of Sydney city limits in the "corridor"	
CAPE BRETON	Sydney	Sydney (C)	Landfill	City of Sydney		
	Portapique	Subdiv. A	Town Dump	Rural Municipality		
	Tatamagouche	Subdiv. B	Town Dump	Rural Municipality		
	Upper Stewiacke	Subdiv. C	Town Dump	Rural Municipality	closed June 1995	
COLCHESTER	Wittenberg	Subdiv. C	Landfill	Rural Municipality	closed June 1995 (Lanesville Corners)	
	Truro	Truro (T)	Landfill	Town	serves county	
	Joggins/River Hibbert	Subdiv. A	Town Dump	Rural Municipality	closed - now a transfer station	
	Advocate	Subdiv. A	Incinerator	Rural Municipality	closed April 1996	
CUMBERLAND	Little Forks	Subdiv. B	Landfill	Rural Municipality	serves county	
	Williamsdale	Subdiv. B	Town Dump	Rural Municipality	closed	
	Port Howe	Subdiv. C	Town Dump	Rural Municipality	closed - on Field Rd	
	Greenville	Subdiv. D	Town Dump	Rural Municipality	closed - now a transfer station	
	Pugwash	Subdiv. D	Town Dump	Rural Municipality	closed - now a transfer station on Irish Town Rd	
	Wallace	Subdiv. D	Landfill	Rural Municipality	closed - now a transfer station Coulter Rd 5km east	
ANTIGONISH	Crisp Road	Subdiv. B	Incinerator	Rural Municipality	on Inglisville Rd	
	Graywood	Subdiv. B	Incinerator	Rural Municipality		
	Joe Simon Road	Subdiv. A	Landfill	Rural Municipality	ash disposal site	
	Torbrook	Subdiv. D	Disposal Site		Construction & Demolition Debris	
	Middleton	Subdiv. C	Town Dump	Town		
	Beech Hill	Subdiv. A	Landfill	Rural Municipality	serves county	
	James River	Subdiv. A	Landfill	Rural Municipality	closed June 1991	
	Sydney/Glace Bay Highway	Subdiv. B	Incinerator & Landfill	Rural Municipality	located just outside of Sydney city limits in the "corridor"	
	Sydney	Sydney (C)	Landfill	City of Sydney		
	Portapique	Subdiv. A	Town Dump	Rural Municipality		

					of Wallace
	Wentworth	Subdiv. D	Town Dump	Rural Municipality	closed - Swallow Hill Road
	South Hampton	Subdiv. B	Town Dump	Rural Municipality	closed - now a transfer station (Atkinson Rd 2km SW of town)
	Oxford	Oxford (T)	Town Dump	Town - with Municipality	closed - now a transfer station - 3km NE of Oxford on Pugwash Rd Rte 321.
	Parrsboro	Parrsboro (T)	Landfill	Rural Municipality	closed in 1995 - replaced with transfer station off Rte 209 - Crossroads/Kirkhill.
<b>DIGBY</b>	Clare	Clare (MD)	Landfill	Rural Municipality	serves county - near Meteghen
	Long Island	Digby (MD)	Open Burn	Rural Municipality	closed *
	Rossway	Digby (MD)	Open Burn	Rural Municipality	closed *
	Upper Cross	Digby (MD)	Open Burn	Rural Municipality	closed *
<b>GUYSBOROUGH</b>	Lincolnville	Guysborough (MD)	Landfill	Rural Municipality	serves county
	Gegogan Road (Sherbrooke)	St. Mary's (MD)	Incinerator	Rural Municipality	closed * - now a transfer station
<b>HALIFAX</b>	Sackville - Mount Uniacke	Subdiv. C	Landfill	Rural Municipality	Sackville Landfill - to close in 199?
	Lake Charlotte	Subdiv. G	Town Dump	F Webber	closed *
	Musquodoboit Harbour	Subdiv. F	Town Dump	B Bayer	closed *
	Necum Teuch	Subdiv. A	Town Dump	L MacDonald	closed*
<b>HANTS</b>	Georgefield	East Hants (MD)	Landfill	Rural Municipality	
	Cogmagun	West Hants (MD)	Landfill	Rural Municipality	where Hwy 215 crosses the Kennatcook River
<b>INVERNESS</b>	Pleasant Bay	Subdiv. A	Open Burning	Rural Municipality	closed
	Kenlocn	Subdiv. B	Landfill	Rural Municipality	south of Strathlore Station on Lake Ainslie
	Big Brook	Subdiv. C	Landfill	Rural Municipality	
<b>KINGS</b>	Meadowview	Subdiv. B	Landfill	Rural Municipality	on Brooklyn Ave near Valley Regional Hospital
<b>LUNENBURG</b>	Kaizer Meadow	Chester MD	Landfill	District of Chester	opened 1992 - serves countv

					up from Chester on Hwy 14
	New Ross	Chester MD	Town Dump	Rural Municipality	closed 1992
	Western Shore	Chester MD	Town Dump	R Slaunwhite	closed 1992
	Simms Settlement	Chester MD	Town Dump	C Nauss	closed 1992
	Whynots Settlement	Lunenburg (MD)	Incinerator	Rural Municipality	Incinerator replaced by Regional centre <sup>†</sup>
	Mahone Bay	Mahone Bay (T)	Town Dump	Town	closed
<b>PICTOU</b>	Mount William	Subdiv. B	Landfill	Rural Municipality	
<b>QUEENS</b>	Ten Mile Lake	Subdiv. B	Landfill	Rural Municipality	
<b>RICHMOND</b>	Point Tupper	Subdiv. A	Landfill	NS Forest Ind	private
	Port Malcolm	Subdiv. A	Landfill	NS Forest Ind	private
	L'Ardoise	Subdiv. B	Open Burn	Rural Municipality	closed - on Hwy 247*
	West Arichat	Subdiv. C	Landfill	Rural Municipality	serves county
<b>SHELBURNE</b>	Barrington	Barrington (MD)	Town Dump	Rural Municipality	no longer burn
	West Green Harbour	Shelburne (MD)	Incinerator	Rural Municipality	white metal incineration
	Shelburne	Shelburne (MD)	Town Dump	Town	no longer burn
<b>VICTORIA</b>	Dingwall	Subdiv. A	Town Dump	Rural Municipality	closed * - now a transfer station
	Baddeck	Subdiv. B	Landfill	Rural Municipality	serves county
<b>YARMOUTH</b>	Pubnico	Argyle (MD)	Open Burn	Rural Municipality	closed * - now temporary landfill
	Abrams River	Argyle (MD)	Open Burn	Rural Municipality	closed * - now temporary landfill
	Wedgeport	Argyle (MD)	Open Burn	Rural Municipality	closed * - now temporary landfill
	Wellington	Yarmouth (MD)	Open Burn	Rural Municipality	closed *
	Carleton	Yarmouth (MD)	Open Burn	Rural Municipality	closed *
	Brooklyn Road	Yarmouth (T)	Landfill	Town	serves district of Yarmouth - on Hardscratch Road 4 miles from Yarmouth

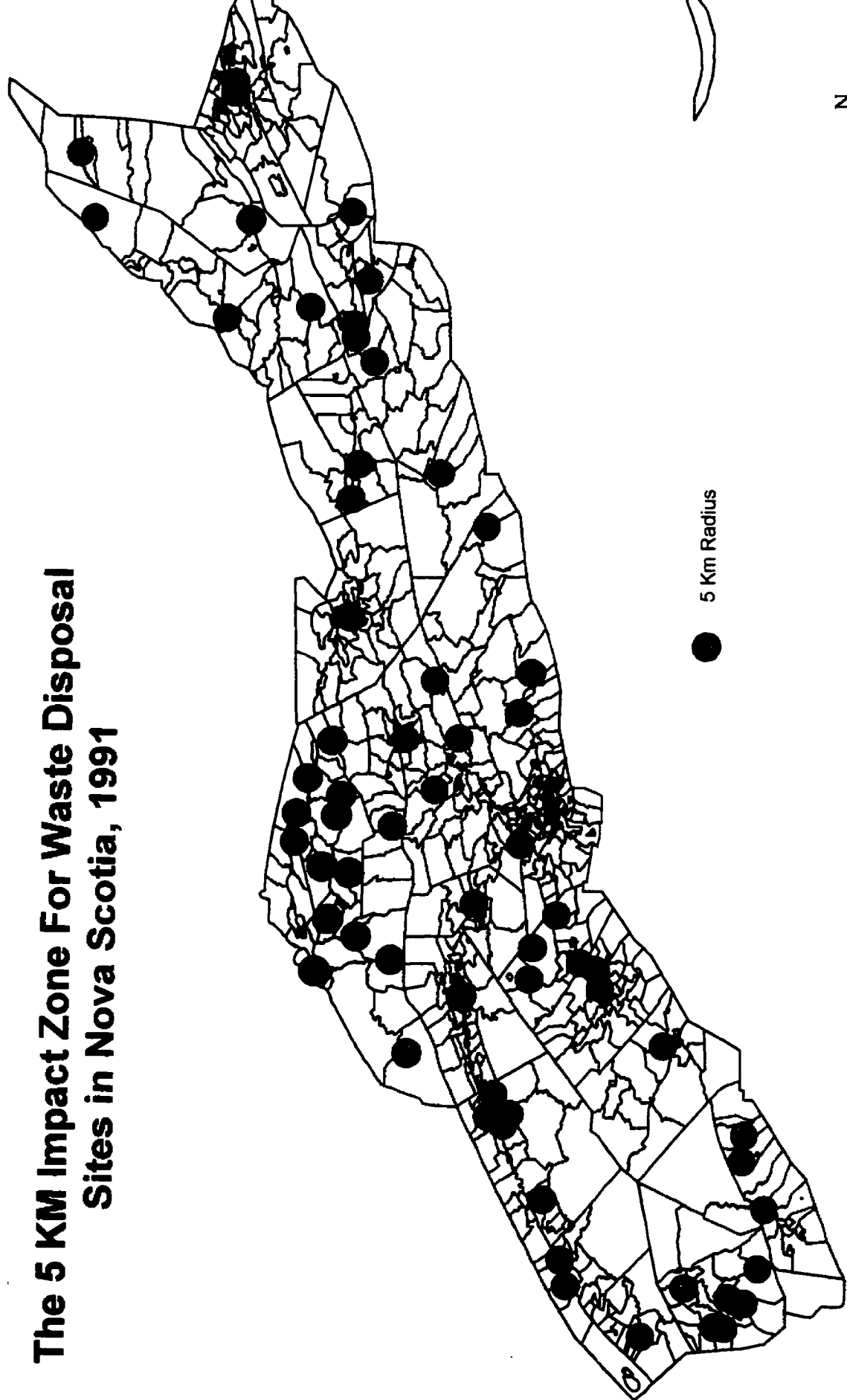
<sup>†</sup> Regional Recycling and Composting Disposal Facility serves the Municipality of Lunenburg - including Bridgewater, Lunenburg, Mahone Bay.

\* All open burn waste disposal sites in Nova Scotia were banned by the Department of the Environment on April 1 1996 (Schedule "A" - Regulations respecting Solid Waste-Resource Management made by the Governor in Council pursuant to Section 102 of Chapter 1 of the Statutes of Nova Scotia 1994-95, the *Environment Act*).

## **APPENDIX D**

### **The Five Km Impact Zone for Waste Disposal Sites in Nova Scotia**

# **The 5 KM Impact Zone For Waste Disposal Sites in Nova Scotia, 1991**



## **APPENDIX E**

### **Suppressed Census Divisions - Subdivisions and Enumeration Areas**

### Suppressed Subdivisions Missing From Nova Scotia Census Profiles Part A or B

Bear River (part) 6  
Gold River 21  
Merigomish Harbour 31  
Shubenacadie 13

Bear River 6B  
Halifax Subdiv. H  
New Ross 20  
Wildcat 12

Cole Harbour 60  
Horton 35  
Pennal 19

### Suppressed Census Enumeration Areas Falling Within The 5 km Impact Zones

County	Waste Site	Missing EA#
Annapolis	Torbrook	315
		358
		359
		360
Antigonish	Beech Hill	102
Cape Breton	Sydney/Glace Bay Hwy	110
		64
		61
		153
		173
		110
		64
		51
		58
		61
		173
		153
Colchester	Truro	19
		53
		56
		76
Cumberland	Joggins	113
		219
		211
		212
Digby	Clare	118
Inverness	Kenloch	265
Kings	Meadowview	219
Lunenburg	New Ross	320
	Western Shore	219
Queens	Ten Mile Lake	112
		121
Victoria	Baddeck	317
Yarmouth	Wellington	58
		63
		66
		69
		58
		63
		66
		69



## **APPENDIX F**

### **Subdivision and EA Statistics for Waste Disposal Sites**

### Subdivision Statistics For Waste Disposal Sites

County	Waste Site	Subdiv	Total Pop	Black (%)	Native (%)	Renter (%)	Unemp Rate	Med Income	Low Income	Govt Trans
Annapolis	Crisp Rd	Subdiv B	4 080	0.7	0.4	16.8	14.6	25 267	13.4	22.6
	Joe Simon	Subdiv B	4 080	0.7	0.4	16.8	14.6	25 267	13.4	22.6
	Graywood	Subdiv A	8 555	0.6	0.2	20.2	10.6	30 022	11.9	20.2
	Torbrook	Subdiv D	2 795	0.0	0.5	9.6	10.6	28 354	12.7	19.6
	Middleton	Subdiv C	4 730	0.4	0.6	14.5	11.6	28 921	13.7	17.7
Antigonish	Beech Hill	Subdiv A	7 225	0.8	0.0	15.3	12.5	35 605	10.7	15.6
	James River	Subdiv A	7 225	0.8	0.0	15.3	12.5	35 605	10.7	15.6
Cape Breton	Sydney/G Bay Hwy	Subdiv B	25 385	0.1	0.4	14.2	16.7	34 279	13.1	21
	Sydney	City	26 065	1.5	0.2	40.3	18.4	29 023	20.8	21.9
Colchester	Portapique	Subdiv A	3 680	0.4	0.3	10.8	18.3	26 886	8.0	27.8
	Tatamagouche	Subdiv B	17 785	0.2	0.1	20.4	15.0	32 529	12.3	16.8
	Upper Stewiacke	Subdiv C	12 630	0.5	0.1	13.3	13.0	33 250	10.4	15.4
	Wittenburg	Subdiv C	12 630	0.5	0.1	13.3	13.0	33 250	10.4	15.4
	Truro	Town	11 680	0.6	0.6	47.6	11.7	28 400	16.3	17.2
Cumberland	Joggins	Subdiv A	2 855	0.7	0.0	12.8	19.1	22 571	14.8	34.3
	Advocate	Subdiv A	2 855	0.7	0.0	12.8	19.1	22 571	14.8	34.3
	Little Forks	Subdiv B	4 335	0.2	0.0	11.5	15.9	31 389	11.0	22.1
	Williamsdale	Subdiv B	4 335	0.2	0.0	11.5	15.9	31 389	11.0	22.1
	Port Howe	Subdiv C	5 200	0.0	0.0	9.1	12.8	33 912	8.1	16.9
	Greenville	Subdiv D	4 760	0.0	0.4	15.8	17.1	28 177	14.4	24.5
	Pugwash	Subdiv D	4 760	0.0	0.4	15.8	17.1	28 177	14.4	24.5
	Wallace	Subdiv D	4 760	0.0	0.4	15.8	17.1	28 177	14.4	24.5
	Wentworth	Subdiv D	4 760	0.0	0.4	15.8	17.1	28 177	14.4	24.5
	South Hampton	Subdiv B	4 335	0.2	0.0	11.5	15.9	31 389	11.0	22.1
	Oxford	Town	1 385	1.8	0.0	22.9	8.5	31 406	9.7	24.3
	Parrsboro	Town	1 635	0.0	0.0	28.5	21.4	18 287	20.6	25.4
Digby	Clare	Clare MD	9 655	0.7	0.4	11.7	17.2	30 257	9.0	23.4
	Long Island	Digby MD	9 230	2.7	0.4	14.5	17.2	26 787	14.1	24.3
	Rossway	Digby MD	9 230	2.7	0.4	14.5	17.2	26 787	14.1	24.3
	Upper Cross	Digby MD	9 230	2.7	0.4	14.5	17.2	26 787	14.1	24.3
Guysborough	Lincolnvile	Guys MD	6 515	5.8	0.0	9.3	18.6	27 840	12.5	32.7
	Gegogan Rd	St Mary's	3 045	0.0	1.0	9.3	11.1	28 661	13.3	30.2
Halifax	Sackville	Subdiv C	45 665	1.4	0.1	16.0	8.7	48 481	8.9	7.6
	Lake Charlotte	Subdiv G	4 160	0.0	1.3	11.3	17.0	25 759	14.6	28.5
	Musquodoboit Hbr	Subdiv F	6 130	0.0	0.2	13.8	13.5	33 405	9.3	18.3
	Necum Teuch	Subdiv A	10 815	0.2	0.2	11.9	7.7	49 867	4.8	8.2
Hants	Georgefield	E Hants MD	18 560	0.1	0.2	13.4	11.5	39 347	8.7	13.9
	Cogmagun	W Hants MD	13 610	1.2	0.0	10.8	13.0	33 100	12.3	17.1
Inverness	Pleasant Bay	Subdiv A	6 945	0.0	0.0	14.8	21.1	30 199	9.2	31.6
	Kenlock	Subdiv A	6 945	0.0	0.0	14.8	21.1	30 199	9.2	31.6

### Subdivision Statistics For Waste Disposal Sites

<b>Kings</b>	Meadowview	Subdiv B	11 075	0.3	0.1	22.8	11.7	31 655	16.5	15.5
<b>Lunenburg</b>	Kaizer Meadow	Chester MD	10 760	0.0	0.5	16.2	12.3	31 243	10.4	17.9
	New Ross	Chester MD	10 760	0.0	0.5	16.2	12.3	31 243	10.4	17.9
	Western Shore	Chester MD	10 760	0.0	0.5	16.2	12.3	31 243	10.4	17.9
	Simms Settlement	Chester MD	10 760	0.0	0.5	16.2	12.3	31 243	10.4	17.9
	Whynot's Settlement	Lunenburg MD	25 720	0.0	0.3	9.9	10.2	31 934	9.9	17.9
	Mahone Bay	Town	1 100	0.0	0.0	34.4	9.2	30 065	11.9	17.2
<b>Pictou</b>	Mount William	Subdiv B	6 600	0.0	0.0	11.5	16.8	34 692	12.0	18.4
<b>Queens</b>	Ten Mile Lake	Subdiv B	6 320	0.2	1.6	10.6	13.3	30 203	13.0	19.1
<b>Richmond</b>	Point Tupper	Subdiv A	4 500	0.0	0.2	16.1	21.9	31 645	11.7	25.8
	Port Malcolm	Subdiv A	4 500	0.0	0.2	16.1	21.9	31 645	11.7	25.8
	L'Ardiose	Subdiv B	2 135	0.0	1.2	7.9	23.3	21 752	16.7	33.8
	West Archat	Subdiv C	4 335	0.0	0.2	11.8	19.9	32 741	6.5	29.1
<b>Shelburne</b>	Barrington	Barrington MD	7 775	0.1	0.1	10.8	15.4	38 130	6.4	19.5
	West Green Hbr	Shelburne MD	5 450	0.3	0.2	13.0	10.8	30 227	10.1	19.8
	Shelburne	Shelburne MD	5 450	0.3	0.2	13.0	10.8	30 227	10.1	19.8
<b>Victoria</b>	Dingwall	Subdiv A	8315	0.0	0.0	11.8	29.8	29 419	15.8	32.3
	Baddeck	Subdiv B	4525	0.0	0.4	15.3	16.8	33 918	6.6	25.2
<b>Yarmouth</b>	Pubnico	Argyle MD	9 215	0.0	0.0	8.6	13.0	33 507	9.4	21.5
	Abrams River	Argyle MD	9 215	0.0	0.0	8.6	13.0	33 507	9.4	21.5
	Wedgeport	Argyle MD	9 215	0.0	0.0	8.6	13.0	33 507	9.4	21.5
	Wellington	Yarmouth MD	10 830	0.7	0.4	13.4	13.1	32 123	9.4	20.1
	Carleton	Yarmouth MD	10 830	0.7	0.4	13.4	13.1	32 123	9.4	20.1
	Brooklyn Rd	Town	7 785	1.2	0.3	54.0	12.8	25 210	25.0	21.1

Enumeration Area Statistics For Waste Disposal Sites

Lunenburg	Kaizer Meadow	316	531	0.00	0.00	60.0	0.9	1.3	0.7	28324
	New Ross	318	378	0.00	0.00	40.0	0.7	2.2	0.0	28467
	Western Shore	310	563	0.00	0.00	0.0	1.4	2.2	2.2	32182
	Simms Settlement	304	869	0.00	0.00	55.0	0.9	1.9	1.0	29020
	Whynot's Settlement	203	493	0.00	2.03	0.0	1.6	1.4	1.2	32088
Pictou	Mahone Bay	209	848	0.00	0.00	0.0	0.8	1.9	1.4	31207
	Mount William	121	846	0.00	0.00	37.5	1.3	1.3	2.0	31655
Queens	Ten Mile Lake	112	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Richmond	Point Tupper	213	256	0.00	0.00	0.0	2.2	0.0	0.0	n/a
	Port Malcolm	213	256	0.00	0.00	0.0	2.2	0.0	0.0	n/a
	L'Ardiose	2	596	0.00	2.52	0.0	1.8	3.0	2.6	25553
	West Arichat	203	838	0.00	0.00	0.0	1.9	3.5	1.4	26208
Shelburne	Barrington	15	66	0.00	15.15	0.0	0.0	0.0	0.0	n/a
	West Green Hbr	54	678	0.00	0.00	42.9	1.3	3.3	2.0	19952
	Shelburne	58	450	0.00	0.00	19.4	0.0	0.9	1.4	41846
Victoria	Dingwall	215	756	0.00	0.00	30.0	3.0	3.4	2.3	28950
	Baddeck	304	670	0.00	0.00	62.5	2.0	2.7	1.6	34473
Yarmouth	Pubnico	3	957	0.00	0.00	42.9	1.8	2.3	0.5	33225
	Abrams River	9	740	0.00	0.00	54.5	0.6	2.4	1.1	28464
	Wedgeport	6	1029	0.00	0.97	28.6	0.9	2.7	1.0	29364
	Wellington	13	859	4.66	1.16	63.0	0.8	2.3	2.0	23155
	Carleton	104	783	1.45	1.45	64.3	1.7	1.6	1.1	30833
	Brooklyn Rd	59	957	0.00	1.57	19.2	0.9	2.2	1.7	24928

Enumeration Area Statistics For Waste Disposal Sites

County	Waste Site	EA	Population	% Black	% Native	% Rented	Unempl >25	Govt Trans	Low Income	Median Income
Annapolis	Crisp Rd	318	500	0.00	0.00	50.0	1.2	2.5	2.6	21302
	Joe Simon	318	500	0.00	0.00	50.0	1.2	2.5	2.6	21302
	Graywood	260	597	5.86	0.00	33.3	0.9	2.3	1.0	27870
	Torbrook	304	257	0.00	0.00	0.0	0.0	0.0	0.0	n/a
Antigonish	Middleton	307	1074	0.93	0.93	15.4	0.5	1.5	1.3	36917
	Beech Hill	60	883	0.00	0.00	25.0	2.5	2.1	1.2	36871
	James River	104	447	0.00	0.00	50.0	0.9	1.9	1.0	45626
	Sydney/G Bay Hwy	151	1045	0.00	1.91	50.0	1.7	1.7	1.0	39267
Cape Breton	Sydney	111	1188	8.84	0.00	20.0	2.2	3.0	3.9	27409
Colchester	Portaplique	163	650	1.54	0.00	46.7	1.2	2.3	0.4	28266
	Tatamagouche	159	647	0.00	0.00	64.7	1.9	3.0	1.0	28296
	Upper Stewiacke	1	500	0.00	0.00	0.0	2.2	2.6	0.2	29166
	Wittenburg	2	770	0.00	0.00	66.7	0.9	2.5	1.5	26882
Cumberland	Truro	51	876	3.42	0.00	31.4	0.2	1.4	0.7	34230
	Joggins	302	628	3.18	0.00	0.0	1.6	3.0	1.6	25373
	Advocate	262	448	0.00	0.00	0.0	2.4	3.0	0.9	24203
	Little Forks	305	787	0.00	0.00	35.7	1.0	2.6	1.5	33138
	Williamsdale	204	451	0.00	0.00	0.0	1.1	2.9	1.2	26832
	Port Howe	309	199	0.00	0.00	0.0	1.4	0.0	0.0	n/a
	Greenville	217	232	0.00	6.47	81.8	3.9	0.0	0.0	n/a
	Pugwash	207	662	0.00	0.00	85.7	1.1	2.5	2.2	27293
	Wallace	166	675	0.00	0.00	46.2	1.7	3.2	1.2	28000
	Wentworth	164	562	0.00	0.00	66.7	2.9	3.2	2.3	27052
	South Hampton	252	51	0.00	0.00	0.0	5.0	0.0	0.0	n/a
	Oxford	216	967	2.59	0.00	51.1	0.6	2.4	0.4	32997
	Parrsboro	264	840	0.00	0.00	0.0	1.6	2.0	1.5	20685
Digby	Clare	110	857	0.00	0.00	0.0	1.1	2.3	0.8	32360
	Long Island	162	331	0.00	0.00	70.0	1.1	0.0	0.0	26394
	Rossway	164	794	0.00	0.00	42.9	1.2	1.7	1.5	39087
	Upper Cross	213	637	2.35	0.00	0.0	0.7	2.4	1.4	27721
Guysborough	Lincolnton	152	602	0.00	0.00	0.0	1.3	3.0	1.0	27016
	Gegogan Rd	54	174	0.00	0.00	0.0	3.1	0.0	0.0	n/a
Halifax	Sackville	315	919	14.69	0.00	33.3	0.7	0.8	0.7	40599
	Lake Charlotte	56	802	0.00	0.00	0.0	0.8	2.0	0.8	32132
	Musquodoboit Hbr	60	1054	0.00	0.00	30.4	1.4	1.5	0.8	38044
	Necum Teuch	51	517	0.00	1.93	0.0	0.0	4.2	1.3	18420
Hants	Georgiefield	53	624	0.00	0.00	28.6	1.2	2.0	1.3	33804
	Cogmagun	61	513	0.00	0.00	0.0	1.1	1.8	2.1	34072
Inverness	Pleasant Bay	214	377	0.00	0.00	75.0	1.2	3.8	2.4	33284
	Kenlock	306	692	0.00	0.00	0.0	2.0	3.2	2.2	29886
	Big Brook	156	573	0.00	0.00	72.7	0.7	1.6	0.7	36668
Kings	Meadowview	257	511	1.00	0.00	55.6	0.7	1.6	0.7	36668

# EA Impact Zone Statistics For Waste Disposal Sites

County	Waste Site	Impact Zone EAs	Population	Black (%)	Native (%)	Renter (%)	Unemp Rate (%)	Govt Trans	Low Income	Med Income
Annapolis	Crisp Road	318	500	0.00	0.00	50.0	1.2	2.5	2.6	21302
		306	666	0.00	0.00	54.5	1.3	2.0	0.8	27086
		307	1074	0.93	0.93	15.4	0.5	1.5	1.3	36917
		302	397	0.00	0.00	80.0	1.2	1.7	1.0	25677
		317	677	0.00	0.00	18.2	1.9	2.5	1.0	19092
	Joe Simon	268	734	0.00	1.36	0.0	1.4	2.5	1.4	25620
		318	500	0.00	0.00	50.0	1.2	2.5	2.6	21302
		306	666	0.00	0.00	54.5	1.3	2.0	0.8	27086
		307	1074	0.93	0.93	15.4	0.5	1.5	1.3	36917
		302	397	0.00	0.00	80.0	1.2	1.7	1.0	25677
Graywood		268	734	0.00	1.36	0.0	1.4	2.5	1.4	25620
		303	271	0.00	0.00	0.0	0.0	0.0	0.0	20442
		260	597	5.86	0.00	33.3	0.9	2.3	1.0	27870
		203	886	0.00	0.00	33.3	1.0	2.2	1.4	26987
		201	684	0.00	0.00	47.1	1.2	2.4	1.9	24479
		202	381	0.00	0.00	62.5	0.0	1.4	1.5	31000
		210	633	5.53	0.00	0.0	1.0	2.8	2.4	22418
		261	218	0.00	0.00	0.0	0.0	0.0	0.0	n/a
		262	544	0.00	0.00	0.0	1.5	2.3	1.1	28352
		251	357	0.00	0.00	55.6	1.0	3.3	0.8	28967
Totbrook		304	257	0.00	0.00	0.0	0.0	0.0	0.0	n/a
		301	494	0.00	0.00	75.0	1.7	2.9	1.3	22381
		303	271	0.00	0.00	0.0	0.0	0.0	0.0	20442
		305	892	0.00	1.12	36.4	1.0	1.1	1.1	36453
		306	666	0.00	0.00	54.5	1.3	2.0	0.8	27086
		309	790	1.27	1.27	22.2	0.5	2.5	2.4	20169
		310	1034	0.00	0.00	54.2	0.9	1.4	1.4	37273
		312	179	0.00	0.00	0.0	2.8	0.0	0.0	n/a
		313	190	0.00	0.00	33.3	2.3	0.0	0.0	n/a
		319	124	0.00	0.00	0.0	0.0	0.0	0.0	n/a
Middleton		307	1074	0.93	0.93	15.4	0.5	1.5	1.3	36917
		311	737	1.36	0.00	61.1	1.7	2.3	1.5	26204
		312	179	0.00	0.00	0.0	2.8	n/a	n/a	n/a
		313	190	0.00	0.00	33.3	2.3	n/a	n/a	n/a
		315	696	0.00	0.00	22.0	1.0	2.3	2.1	30503
		316	902	2.22	0.00	0.0	1.4	1.8	3.2	16115
		318	500	0.00	0.00	50.0	1.2	2.5	2.6	21302
		319	124	0.00	0.00	0.0	0.0	n/a	n/a	n/a
		303	271	0.00	0.00	0.0	0.0	0.0	0.0	20442
		305	892	0.00	1.12	36.4	1.0	1.1	1.1	36453

# EA Impact Zone Statistics For Waste Disposal Sites

Antigonish	308	250	0.00	0.00	0.00	40.0	1.0	n/a	n/a	n/a
Beech Hill	268	734	0.00	0.00	1.36	0.0	1.4	2.5	1.4	25620
	269	658	0.00	0.00	0.00	63.6	1.3	2.5	1.7	25269
	60	883	0.00	0.00	0.00	25.0	2.5	2.1	1.2	36871
	57	827	0.00	0.00	0.00	0.0	0.6	1.4	0.2	46662
	58	964	0.00	0.00	0.00	36.4	1.6	2.0	1.4	32067
	59	1334	0.00	0.00	0.00	0.0	1.0	2.1	0.9	30416
	61	857	0.00	0.00	0.00	33.3	0.0	1.3	0.3	36080
	62	1073	0.00	0.00	0.00	0.0	0.8	1.1	1.0	42787
	101	817	0.00	0.00	0.00	30.0	1.0	1.1	0.8	39732
	106	433	2.31	0.00	0.00	0.0	1.5	2.0	0.8	17009
James River	107	884	2.26	0.00	0.00	5.6	0.5	1.6	1.9	34775
	111	443	0.00	0.00	0.00	0.0	0.0	1.3	0.0	37380
	104	447	0.00	0.00	0.00	50.0	0.9	1.9	1.0	45626
	103	1344	3.35	0.00	0.00	17.6	0.5	1.4	1.1	36038
	105	959	0.00	0.00	0.00	0.0	1.2	1.9	1.8	29413
	51	616	22.70	0.00	0.00	0.0	2.1	3.0	1.3	27362
	61	857	0.00	0.00	0.00	33.3	0.0	1.3	0.3	36080
	62	1073	0.00	0.00	0.00	0.0	0.8	1.1	1.0	42787
	151	1045	0.00	0.00	1.91	50.0	1.7	1.7	1.0	39267
	101	1041	0.00	0.00	0.00	6.5	1.2	3.1	2.2	19166
Cape Breton	102	1024	0.00	0.00	0.00	21.4	1.0	2.3	0.6	33953
	103	889	0.00	0.00	0.00	20.5	2.0	2.6	3.4	19697
	104	668	1.50	0.00	0.00	8.3	1.7	2.9	2.5	18154
	108	875	6.29	0.00	0.00	31.3	0.7	3.2	2.9	16382
	109	908	0.00	0.00	0.00	12.9	1.6	3.3	2.5	24833
	111	1188	8.84	0.00	0.00	20.0	2.2	3.0	3.9	27409
	112	526	20.91	0.00	0.00	0.0	1.3	2.9	1.8	28721
	113	388	3.87	0.00	0.00	20.0	1.8	3.3	0.0	19591
	114	987	1.01	0.00	0.00	11.8	2.5	3.8	3.6	23835
	115	1093	3.20	0.00	0.00	43.2	1.9	2.8	2.8	31722
Sydney/ G Bay Hwy	116	1133	0.00	0.00	0.00	8.3	1.7	2.7	1.9	29574
	61	1116	0.00	0.00	0.90	0.0	0.7	1.2	0.5	46686
	62	905	0.00	0.00	0.00	24.4	1.9	1.9	1.3	32029
	63	781	0.00	0.00	0.00	7.9	2.5	1.2	2.4	32487
	65	922	0.00	0.00	0.00	28.6	1.5	1.8	1.0	34259
	66	1089	0.00	0.00	0.00	5.9	1.0	2.6	3.0	28139
	67	920	0.00	0.00	0.00	43.5	0.5	1.2	0.9	47794
	68	1239	0.00	0.00	0.81	23.8	1.2	1.2	1.0	44743
	19	110	0.00	0.00	0.00	0.0	2.0	0.0	0.0	n/a
	20	741	0.00	0.00	0.00	50.0	1.2	0.0	0.0	n/a





EA Impact Zone Statistics For Waste Disposal Sites

		13	499	0.00	4.01	81.6	2.7	1.8	0.9	36777
		14	1091	0.00	0.00	70.0	1.0	1.0	0.2	54785
		17	1171	0.00	0.00	45.2	0.9	2.0	0.5	37710
		19	110	0.00	0.00	0.0	2.0	0.0	0.0	n/a
		20	241	0.00	0.00	50.0	1.2	0.0	0.0	n/a
		21	1218	0.52	0.00	16.4	1.4	2.3	1.0	31930
		59	740	0.00	0.00	33.3	1.0	2.1	0.9	38660
		60	872	0.00	0.00	50.0	1.1	2.8	2.6	29577
		62	910	0.00	0.00	50.0	0.6	1.6	0.0	41249
		151	1045	0.00	1.91	50.0	1.7	1.7	1.0	39267
		152	1016	0.98	0.00	63.2	1.1	2.5	1.0	32007
		154	432	0.00	0.00	0.0	2.9	3.2	2.0	46153
	Portaplique	163	650	1.54	0.00	46.7	1.2	2.3	0.4	28266
		201	478	0.00	0.00	72.2	0.9	3.3	0.0	24788
		53	624	0.00	0.00	28.6	1.2	2.0	1.3	33804
		54	725	0.00	0.00	33.3	1.4	3.3	1.9	25130
	Tatamagouche	159	647	0.00	0.00	64.7	1.9	3.0	1.0	28296
		155	491	0.00	0.00	40.0	2.1	2.9	0.5	23975
		156	231	0.00	0.00	55.6	0.0	0.0	0.0	n/a
		158	694	0.00	0.00	33.3	1.0	1.8	0.8	33058
		167	136	0.00	0.00	100.0	1.8	0.0	0.0	n/a
	Upper Steviak	1	500	0.00	0.00	0.0	2.2	2.6	0.2	29166
		2	770	0.00	0.00	66.7	0.9	2.5	1.5	26882
		7	496	0.00	0.00	60.0	2.3	1.6	0.8	28483
		103	536	0.00	1.87	77.8	2.4	2.2	1.3	31218
		104	478	0.00	0.00	70.0	1.5	3.0	1.9	26901
	Wittenburg	2	770	0.00	0.00	66.7	0.9	2.5	1.5	26882
		3	749	0.00	0.00	44.4	1.3	1.2	1.1	35657
		14	749	0.00	0.00	72.7	1.4	1.7	0.4	34920
		65	500	0.00	0.00	50.0	1.7	2.9	0.8	20811
	Truro	51	878	3.42	0.00	31.4	0.2	1.4	0.7	34230
		154	762	0.00	0.00	81.5	1.9	1.8	0.9	29814
		119	1159	0.00	0.00	72.4	1.0	1.6	0.9	38705
		116	971	0.00	0.00	42.1	1.6	1.8	1.0	29972
		101	972	0.00	0.00	52.9	1.2	1.5	1.2	32191
		118	1092	0.00	0.00	45.5	0.9	0.8	0.6	50073
		112	651	1.54	0.00	13.3	0.7	1.1	1.1	46428
		114	138	0.00	0.00	0.0	0.0	0.0	0.0	n/a
		115	63	0.00	0.00	0.0	0.0	0.0	0.0	
		107	328	0.00	0.00	76.9	0.8	0.0	0.0	35520
		111	861	0.00	1.16	22.2	1.5	2.1	2.7	21574

# EA Impact Zone Statistics For Waste Disposal Sites

		110	904	2.21	0.00	20.8	1.8	2.1	2.2	24928
		67	669	0.00	0.00	24.0	0.0	1.8	1.2	24566
		108	1017	0.00	0.00	48.1	1.2	1.2	1.9	33972
		109	836	0.00	0.00	10.5	2.1	1.9	2.3	23924
		122	338	0.00	0.00	18.2	1.3	3.3	2.3	24252
		123	136	0.00	0.00	22.2	0.0	0.0	0.0	n/a
		14	1483	0.00	0.00	43.9	0.8	1.6	1.0	33585
		62	571	0.00	0.00	15.0	1.5	2.7	1.2	18829
		77	59	59.10	0.00	0.0	0.0	0.0	0.0	n/a
		102	57	0.00	0.00	0.0	0.0	0.0	0.0	n/a
		66	805	0.00	0.00	22.2	1.0	1.5	0.9	28172
		103	943	0.00	0.00	52.4	1.1	1.8	1.5	33566
		74	58	0.00	0.00	0.0	0.0	0.0	0.0	n/a
		75	95	52.60	0.00	100.0	0.0	0.0	0.0	n/a
		63	604	0.00	0.00	11.3	1.2	2.6	1.8	18299
		61	787	0.00	0.00	5.5	1.5	2.8	2.9	20914
		65	695	2.16	1.44	27.5	0.9	1.4	0.3	29848
		104	1231	0.00	0.81	50.0	1.4	1.5	1.6	34926
		105	129	0.00	0.00	0.0	2.0	0.0	0.0	n/a
		59	660	1.52	0.00	20.0	0.6	2.1	2.1	25494
		70	162	0.00	18.50	0.0	1.7	0.0	0.0	n/a
		71	152	6.58	0.00	0.0	1.8	0.0	0.0	n/a
		72	93	16.10	0.00	100.0	0.0	0.0	0.0	n/a
		73	85	0.00	0.00	0.0	5.0	0.0	0.0	n/a
		60	848	0.00	0.00	33.3	0.8	2.1	2.0	34905
		64	291	0.00	0.00	11.1	0.8	1.3	0.0	22957
		55	865	1.73	1.16	26.8	1.2	2.4	2.5	26088
		57	568	4.40	0.00	20.5	2.0	1.6	3.2	22927
		58	845	7.10	0.00	30.0	1.0	1.7	1.4	31561
		68	96	0.00	0.00	0.0	1.7	0.0	0.0	n/a
		52	1094	0.00	0.00	63.6	0.4	0.5	0.5	58827
		69	249	4.02	4.02	50.0	1.1	0.0	0.0	n/a
		54	184	0.00	0.00	50.0	1.4	0.0	0.0	n/a
		18	222	4.50	60.80	100.0	2.3	0.0	0.0	n/a
		11	916	1.09	0.00	57.1	1.5	1.2	1.2	31094
		17	295	0.00	91.50	0.0	2.8	0.0	0.0	n/a
Cumberland	Joggins	302	628	3.18	0.00	0.0	1.6	3.0	1.6	25373
		303	707	0.00	0.00	38.1	1.5	4.1	2.0	20730
		304	640	0.00	0.00	80.0	2.2	2.1	1.2	
		312	825	0.00	0.00	52.0	1.6	1.5	0.7	40096
	Advocate	262	448	0.00	0.00	0.0	0.0	0.0	0.0	0.0

# EA Impact Zone Statistics For Waste Disposal Sites

	304	640	0.00	0.00	80.0	2.2	2.1	1.2	30132
	306	646	0.00	0.00	37.5	1.0	1.7	1.9	38325
	253	593	0.00	0.00	53.8	1.5	1.8	0.7	35570
Little Forks	204	451	0.00	0.00	0.0	1.1	2.9	1.2	28832
	205	602	1.66	0.00	81.8	0.8	1.9	0.5	38987
	202	353	0.00	0.00	66.7	2.4	3.7	1.5	23648
Williamsdale	309	199	0.00	0.00	0.0	1.4	0.0	0.0	n/a
	209	309	0.00	0.00	75.0	2.5	2.2	0.0	24394
	308	497	0.00	0.00	75.0	2.3	2.2	1.0	25053
Port Howe	217	232	0.00	6.47	81.8	3.9	0.0	0.0	n/a
	214	473	0.00	0.00	0.0	2.6	2.0	1.2	34718
	209	309	0.00	0.00	75.0	2.5	2.2	0.0	24394
	210	174	0.00	0.00	70.0	1.8	0.0	0.0	n/a
	207	662	0.00	0.00	85.7	1.1	2.5	2.2	27293
	213	544	0.00	0.00	19.0	0.0	2.0	0.4	26094
	218	44	0.00	0.00	100.0	0.0	0.0	0.0	n/a
Greenville	207	662	0.00	0.00	85.7	1.1	2.6	2.2	27293
	206	444	0.00	0.00	73.9	2.7	2.8	0.7	27526
Pugwash	166	675	0.00	0.00	46.2	1.7	3.2	1.2	28000
	164	562	0.00	0.00	66.7	2.9	3.2	2.3	27052
	214	473	0.00	0.00	0.0	2.6	2.0	1.2	34718
Wallace	164	562	0.00	0.00	66.7	2.9	3.2	2.3	27052
	206	444	0.00	0.00	73.9	2.7	2.8	0.7	27526
	207	662	0.00	0.00	85.7	1.1	2.5	2.2	27293
Wentworth	252	51	0.00	0.00	0.0	6.0	0.0	0.0	n/a
	304	640	0.00	0.00	80.0	2.2	2.1	1.2	29088
	251	567	1.75	0.00	0.0	2.8	2.5	0.9	35570
	253	593	0.00	0.00	53.8	1.5	1.8	0.7	32997
South Hampton	216	967	2.59	0.00	51.1	0.6	2.4	0.4	36887
	307	731	0.00	0.00	78.9	0.5	1.9	0.4	n/a
	208	315	0.00	3.17	33.3	1.0	0.0	0.0	29998
	215	417	0.00	0.00	81.0	0.7	2.6	2.3	26832
	204	451	0.00	0.00	0.0	1.1	2.9	1.2	38987
	205	602	1.66	0.00	81.8	0.8	1.9	0.5	20685
Oxford	264	840	0.00	0.00	0.0	1.6	2.0	1.5	29088
	251	567	1.76	0.00	0.0	2.8	2.5	0.9	22980
	260	371	0.00	0.00	50.0	2.0	3.6	1.6	17227
	263	794	0.00	0.00	27.3	2.5	3.1	2.6	32360
Clare	110	857	0.00	0.00	0.0	1.1	2.3	0.8	30963
	151	924	0.00	0.00	0.0	1.8	2.2	0.5	
Digby	152	834	0.00	0.00	0.0	1.8	2.2	0.5	

# EA Impact Zone Statistics For Waste Disposal Sites

		109	772	0.00	0.00	28.6	2.3	2.2	1.7	33346
	Long Island	111	893	0.00	0.00	37.5	1.0	2.4	0.2	33345
		162	331	0.00	0.00	70.0	1.1	0.0	0.0	26394
		220	219	0.00	0.00	0.0	2.3	0.0	0.0	n/a
		160	694	0.00	0.00	69.2	1.8	2.9	1.1	24910
		161	497	0.00	0.00	42.9	2.2	2.4	1.1	28676
		163	419	0.00	0.00	57.1	0.0	3.7	0.9	27559
		213	637	2.35	0.00	0.0	0.7	2.4	1.4	27721
		254	842	10.69	0.00	40.0	1.8	2.0	1.2	28883
	Rossway	164	794	0.00	0.00	42.9	1.2	1.7	1.5	39087
	Upper Cross	213	637	2.35	0.00	0.0	0.7	2.4	1.4	27721
		206	639	0.00	1.56	0.0	0.7	3.5	2.6	22955
		211	414	0.00	0.00	0.0	1.2	2.6	1.0	30054
		212	828	0.00	0.00	58.8	1.5	2.4	1.3	25041
		214	799	1.25	0.00	17.1	2.4	3.1	1.2	23210
		215	886	1.69	1.13	10.2	1.6	2.5	3.4	17967
		216	548	0.00	0.00	39.1	1.0	1.5	1.1	29628
		220	219	0.00	0.00	0.0	2.3	0.0	0.0	n/a
		253	318	0.00	0.00	90.5	0.0	2.6	0.9	25016
		254	842	10.69	0.00	40.0	1.8	2.0	1.2	28883
Guysborough	Lincolnville	152	602	0.00	0.00	0.0	1.3	3.0	1.0	27016
		151	311	0.00	0.00	72.7	3.7	2.1	0.0	35312
		154	132	68.20	0.00	0.0	0.0	0.0	0.0	n/a
	Gegogan Rd	54	174	0.00	0.00	0.0	3.1	0.0	0.0	n/a
		9	667	0.00	3.75	0.0	0.9	2.9	0.7	22773
		10	593	0.00	0.00	55.6	0.7	3.4	3.6	21239
		11	305	0.00	3.28	0.0	1.3	4.0	2.6	21095
Halifax	Sackville	315	919	14.69	0.00	33.3	0.7	0.8	0.7	40599
		1	883	0.00	1.13	0.0	1.2	0.8	0.8	42819
		2	1106	0.00	0.00	0.0	0.0	1.0	0.6	42526
		18	134	0.00	0.00	0.0	0.0	0.0	0.0	n/a
		260	1076	3.25	0.00	66.7	0.5	1.1	0.7	48654
		261	887	9.58	0.00	53.8	1.4	0.7	0.4	46019
		266	1384	0.72	0.00	78.6	0.8	0.6	0.2	54987
		270	1123	0.00	0.00	22.9	0.5	1.3	0.6	38961
		305	1163	0.00	0.00	36.4	0.4	0.8	1.8	41728
		310	1127	0.00	0.00	76.5	0.8	1.0	0.5	43290
		311	1151	0.87	1.30	81.5	0.5	0.8	0.6	45055
		313	256	37.11	0.00	0.0	1.0	0.0	0.0	n/a
		320	688	4.36	0.00	50.0	0.7	0.8	0.2	51158
	Lake Charlotte	56	802	0.00	0.00	0.0	0.8	2.0	0.8	32132

EA Impact Zone Statistics For Waste Disposal Sites

	Musquodoboit Hbr	60	1054	0.00	0.00	30.4	1.4	1.5	0.8	38044
		5	846	0.00	0.00	50.0	1.1	1.2	1.3	42564
		57	634	0.00	0.00	30.0	1.2	2.0	0.8	30210
		58	762	0.00	0.00	0.0	1.7	1.6	0.9	31720
		59	549	0.00	0.00	41.7	1.0	0.8	0.0	45556
		61	608	0.00	0.00	50.0	0.9	1.9	0.8	33614
	Necum Teuch	51	517	0.00	1.93	0.0	0.0	4.2	1.3	18420
		12	428	0.00	0.00	40.0	0.0	4.3	0.0	22516
		52	499	0.00	2.00	83.3	0.9	2.8	2.4	19111
Hants	Georgefield	53	624	0.00	0.00	28.6	1.2	2.0	1.3	33604
		51	591	0.00	0.00	0.0	0.4	1.2	0.9	34132
		52	830	0.00	1.20	55.6	1.6	2.0	1.6	27370
	Cognagun	61	513	0.00	0.00	0.0	1.1	1.8	2.1	34072
		60	833	0.00	0.00	50.0	1.4	2.1	0.8	28224
		62	302	0.00	0.00	0.0	1.0	0.0	0.0	26522
		63	814	0.00	0.00	33.3	1.2	2.1	1.4	31115
		103	360	0.00	0.00	0.0	1.2	1.7	0.8	39765
		104	414	0.00	0.00	0.0	0.5	1.2	0.0	41991
		105	791	0.00	1.28	0.0	0.9	1.2	0.8	41169
		106	996	7.53	0.00	25.0	1.4	1.7	1.8	25728
		107	595	0.00	0.00	0.0	2.1	1.8	1.1	32121
		114	720	1.39	0.00	17.5	1.6	1.8	3.1	31906
Inverness	Pleasant Bay	214	377	0.00	0.00	75.0	1.2	3.8	2.4	33284
	Kenloch	306	692	0.00	0.00	0.0	2.0	3.2	2.2	29886
		255	529	0.00	0.00	50.0	1.0	2.2	1.7	31697
		260	622	0.00	0.00	0.0	1.4	1.6	0.8	47416
		261	745	0.00	0.00	44.4	1.8	2.8	0.8	28426
		262	150	0.00	0.00	0.0	1.8	0.0	0.0	n/a
		264	981	0.00	0.00	33.3	1.9	3.1	2.1	29225
		266	745	0.00	0.00	21.7	1.4	3.3	1.0	22443
		305	372	0.00	0.00	0.0	1.2	2.8	0.5	27075
	Big Brook	156	573	0.00	0.00	72.7	0.7	1.6	0.7	36668
		157	740	0.00	0.00	73.7	0.8	1.8	1.3	40730
		158	559	0.00	0.00	69.2	1.5	2.0	0.3	37008
Kings	Meadowview	257	511	1.96	0.00	20.0	1.4	2.2	2.7	23154
		202	673	0.00	0.00	57.1	0.9	1.3	1.9	30102
		203	1070	0.00	1.87	27.8	0.4	0.7	0.2	38112
		206	657	6.09	0.00	33.3	0.9	1.6	1.8	31002
		207	1213	0.82	0.00	20.8	0.5	1.1	1.2	41113
		208	849	0.00	0.00	0.0	1.3	1.8	1.2	25666
		209	612	0.00	0.00	4.1	0.7	0.4	0.0	0.000

# EA Impact Zone Statistics For Waste Disposal Sites

		211	1037	1.45	0.00	13.6	1.0	1.3	2.2	34194
		212	730	2.05	0.00	14.3	0.9	1.4	1.2	36276
		213	888	0.00	0.00	19.7	0.9	2.1	1.3	33058
		214	783	0.00	0.00	17.8	1.3	1.6	1.9	29370
		215	1236	0.00	0.00	0.0	0.7	1.0	0.7	42151
		217	174	0.00	0.00	0.0	0.0	0.0	0.0	n/a
		218	270	0.00	0.00	50.0	0.8	0.0	0.0	n/a
		254	551	0.00	0.00	0.0	0.0	1.1	1.1	32971
		255	1291	0.00	0.77	12.2	0.9	1.4	1.7	34277
		256	1044	0.00	0.00	18.5	1.5	2.1	2.4	24276
		259	558	0.00	0.00	0.0	0.9	1.1	1.9	35199
		260	404	2.48	0.00	40.0	0.6	1.4	1.3	37900
		261	854	0.00	0.00	0.0	0.5	1.1	1.0	40224
		262	741	1.35	0.00	30.0	1.0	1.2	1.1	34094
		268	1083	0.00	0.00	60.0	0.3	1.4	0.9	33051
		302	543	0.00	0.00	0.0	1.5	1.4	0.8	32070
		324	719	3.48	0.00	66.7	1.0	0.9	0.0	51732
		325	243	0.00	0.00	0.0	0.0	0.0	0.0	n/a
		351	617	0.00	0.00	42.9	0.9	1.5	1.6	30047
Lunenburg	Kaizer Meadow	316	531	0.00	0.00	60.0	0.9	1.3	0.7	28324
		210	952	0.00	1.05	7.8	0.7	1.6	1.2	23538
		318	378	0.00	0.00	40.0	0.7	2.2	0.0	28467
	New Ross	318	378	0.00	0.00	40.0	0.7	2.2	0.0	28467
		316	531	0.00	0.00	60.0	0.9	1.3	0.7	28324
		317	603	0.00	0.00	0.0	1.6	2.7	0.7	28247
		251	438	0.00	0.00	0.0	0.7	2.4	0.6	22875
	Western Shore	310	563	0.00	0.00	0.0	1.4	2.2	2.2	32182
		156	856	0.00	0.00	0.0	1.1	1.5	1.3	30001
		204	867	0.00	0.00	36.4	1.0	2.1	1.0	29259
		205	555	0.00	0.00	0.0	0.4	1.4	1.7	26106
		311	901	1.11	0.00	25.0	1.3	2.7	2.5	25636
		312	259	0.00	7.72	0.0	3.7	0.0	0.0	n/a
		313	720	0.00	0.00	45.5	1.0	1.7	0.6	37741
		314	490	0.00	0.00	0.0	1.6	1.4	0.0	32391
		315	852	0.00	2.35	40.0	1.5	1.5	0.8	30698
		305	791	0.00	1.26	36.4	1.2	1.5	0.7	32682
	Simms Settlement	304	869	0.00	0.00	55.0	0.9	1.9	1.0	29020
		302	831	0.00	0.00	65.4	1.5	1.6	1.8	36853
		303	264	0.00	0.00	12.5	0.0	0.0	0.0	n/a
		305	791	0.00	1.26	36.4	1.2	1.5	0.7	32682

# EA Impact Zone Statistics For Waste Disposal Sites

		16	1076	0.00	0.00	0.00	58.4	2.6	2.2	0.7	31218
Whynot's Settlement		203	493	0.00	0.00	2.03	0.0	1.6	1.4	1.2	32068
		201	626	0.00	0.00	0.00	33.3	0.0	1.5	2.0	32990
		202	916	0.00	0.00	0.00	0.0	0.4	1.6	0.5	32200
		204	867	0.00	0.00	0.00	36.4	1.0	2.1	1.0	29259
		205	555	0.00	0.00	0.00	0.0	0.4	1.4	1.7	26106
		206	1044	0.00	0.00	0.00	0.0	1.2	1.8	0.9	36904
		207	737	0.00	0.00	0.00	25.0	0.6	1.3	1.3	36219
		210	952	0.00	0.00	1.05	7.8	0.7	1.6	1.2	23538
		211	895	0.00	0.00	0.00	0.0	0.6	1.3	1.6	29982
		217	620	0.00	0.00	4.84	0.0	1.2	1.7	0.7	28801
		218	814	0.00	0.00	1.23	5.0	0.5	2.2	2.2	21117
		219	174	0.00	0.00	0.00	0.0	0.0	0.0	0.0	n/a
		159	770	0.00	0.00	0.00	66.7	0.4	1.5	1.5	36425
		161	445	0.00	0.00	0.00	33.3	1.4	1.4	0.0	30994
		162	976	0.00	0.00	0.00	33.3	0.5	1.2	0.2	41101
Mahone Bay		209	848	0.00	0.00	0.00	0.0	0.8	1.9	1.4	31207
		203	493	0.00	0.00	2.03	0.0	1.6	1.4	1.2	32088
		204	867	0.00	0.00	0.00	36.4	1.0	2.1	1.0	29259
		205	555	0.00	0.00	0.00	0.0	0.4	1.4	1.7	26106
		208	248	0.00	0.00	0.00	44.4	0.9	0.0	0.0	24102
		201	626	0.00	0.00	0.00	33.3	0.0	1.5	2.0	32990
		310	563	0.00	0.00	0.00	0.0	1.4	2.2	2.2	32182
		155	847	0.00	0.00	0.00	41.7	0.0	1.4	0.6	41896
		156	856	0.00	0.00	0.00	0.0	1.1	1.5	1.3	30001
		121	846	0.00	0.00	0.00	37.5	1.3	1.3	2.0	37655
		118	973	0.00	0.00	0.00	86.5	1.9	1.2	1.1	42090
		119	595	0.00	0.00	0.00	28.6	2.5	2.1	0.3	35681
		120	631	0.00	0.00	0.00	64.5	1.2	1.8	0.6	37454
		210	803	0.00	0.00	0.00	35.6	1.0	1.2	0.5	41888
		211	989	0.00	0.00	0.00	9.1	0.8	1.6	0.3	42911
Mount William		212	309	0.00	0.00	0.00	4.0	1.0	0.0	1.1	44846
		213	1345	0.00	0.00	0.00	4.2	0.9	0.8	1.2	54568
		214	979	1.02	0.00	0.00	44.4	3.2	2.9	2.8	24303
		216	1017	0.00	0.00	0.00	51.4	1.8	2.4	1.2	25626
		203	809	1.85	0.00	0.00	17.6	0.8	2.6	1.2	26064
		152	897	0.00	0.00	0.00	61.9	0.5	1.1	0.6	40532
		153	928	0.00	0.00	0.00	37.8	1.4	2.6	1.7	28262
		154	976	0.00	0.00	0.00	48.3	0.7	1.4	1.0	41739
		155	858	0.00	0.00	0.00	21.6	1.0	2.2	1.3	28049
Pictou		16	1076	0.00	0.00	0.00	58.4	2.6	2.2	0.7	31218
		203	493	0.00	0.00	2.03	0.0	1.6	1.4	1.2	32068
		201	626	0.00	0.00	0.00	33.3	0.0	1.5	2.0	32990
		202	916	0.00	0.00	0.00	0.0	0.4	1.6	0.5	32200
		204	867	0.00	0.00	0.00	36.4	1.0	2.1	1.0	29259
		205	555	0.00	0.00	0.00	0.0	0.4	1.4	1.7	26106
		206	1044	0.00	0.00	0.00	0.0	1.2	1.8	0.9	36904
		207	737	0.00	0.00	0.00	25.0	0.6	1.3	1.3	36219
		210	952	0.00	0.00	1.05	7.8	0.7	1.6	1.2	23538
		211	895	0.00	0.00	0.00	0.0	0.6	1.3	1.6	29982
		217	620	0.00	0.00	4.84	0.0	1.2	1.7	0.7	28801
		218	814	0.00	0.00	1.23	5.0	0.5	2.2	2.2	21117
		219	174	0.00	0.00	0.00	0.0	0.0	0.0	0.0	n/a
		159	770	0.00	0.00	0.00	66.7	0.4	1.5	1.5	36425
		161	445	0.00	0.00	0.00	33.3	1.4	1.4	0.0	30994
		162	976	0.00	0.00	0.00	33.3	0.5	1.2	0.2	41101





# EA Impact Zone Statistics For Waste Disposal Sites

Shelburne	Barrington	211	0.00	0.00	0.00	0.0	1.8	2.7	0.5	33282
		15	0.00	15.15	0.0	0.0	0.0	0.0	0.0	n/a
		1	0.00	0.00	68.8	1.4	1.4	2.4	1.9	28109
		2	0.00	1.34	0.0	2.9	2.9	1.8	0.4	37331
		14	1.84	0.00	66.7	0.9	0.9	1.5	0.3	34457
		17	0.00	0.00	78.4	0.9	0.9	2.0	0.7	34769
	West Green Hbr	54	0.00	0.00	42.9	1.3	1.3	3.3	2.0	19952
		52	2.92	0.00	0.0	0.9	0.9	2.8	1.6	27920
		53	0.00	0.00	40.0	3.0	3.0	3.9	0.0	16996
		55	0.00	0.00	54.5	1.3	1.3	1.6	0.1	30283
		56	0.00	0.00	100.0	0.0	0.0	0.0	0.0	n/a
	Shelburne	58	0.00	0.00	19.4	0.0	0.0	0.9	1.4	41846
		55	0.00	0.00	54.5	1.3	1.3	1.6	0.1	30293
		57	0.00	0.00	50.0	0.9	0.9	1.1	0.5	38212
		61	9.76	0.00	31.3	1.4	1.4	2.2	3.4	24866
		62	3.12	2.60	34.8	0.7	0.7	1.9	2.2	30979
		63	0.00	0.00	28.6	0.7	0.7	2.0	1.7	29028
		18	0.00	0.00	84.2	1.3	1.3	2.3	1.2	24781
Victoria	Dingwall	215	0.00	0.00	30.0	3.0	3.0	3.4	2.3	28950
		213	0.00	0.00	0.0	2.8	2.8	3.7	1.3	31933
		216	0.00	0.00	0.0	1.7	1.7	4.0	2.4	28589
	Baddeck	304	0.00	0.00	62.5	2.0	2.0	2.7	1.6	34473
		301	0.00	0.00	54.5	1.9	1.9	3.2	1.3	26830
		302	0.00	0.00	14.3	1.8	1.8	2.2	1.0	32047
		303	0.00	0.00	66.7	1.7	1.7	1.9	0.3	38013
		251	0.00	1.74	28.6	2.0	2.0	3.1	0.5	27706
Yarmouth	Pubnico	3	0.00	0.00	42.9	1.8	1.8	2.3	0.5	33225
		1	0.00	0.00	58.3	0.6	0.6	1.9	1.0	44111
		2	0.00	0.00	0.0	0.5	0.5	1.5	0.2	50241
		4	0.00	0.00	0.0	2.9	2.9	4.0	0.0	21331
		11	0.00	0.00	58.3	1.1	1.1	1.9	1.2	35279
	Abrams River	9	0.00	0.00	54.5	0.6	0.6	2.4	1.1	28464
		8	0.00	0.00	90.0	1.0	1.0	2.2	0.9	29663
		10	0.00	0.00	0.0	1.2	1.2	2.2	1.0	32049
		14	4.66	1.16	44.4	0.8	0.8	2.3	2.0	23155
		101	0.00	0.00	63.2	1.4	1.4	1.9	1.2	38958
		102	1.45	1.45	68.2	0.8	0.8	2.4	0.8	29835
		4	0.00	0.00	0.0	2.9	2.9	4.0	0.0	21331
		5	0.00	0.00	40.0	2.1	2.1	2.4	1.4	30084
		6	0.00	0.97	28.6	0.9	0.9	2.7	1.0	29364
		7	0.00	0.00	0.0	0.0	0.0	1.1	0.0	17451

# EA Impact Zone Statistics For Waste Disposal Sites

	Wedgeport	6	1029	0.00	0.97	28.6	0.9	2.7	1.0	29364
		4	299	0.00	0.00	0.0	2.9	4.0	0.0	21331
		5	682	0.00	0.00	40.0	2.1	2.4	1.4	30084
		7	295	0.00	0.00	0.0	0.0	1.1	0.0	47494
		8	690	0.00	0.00	90.0	1.0	2.2	0.9	29663
		9	740	0.00	0.00	54.5	0.6	2.4	1.1	28464
		14	859	4.66	1.16	44.4	0.8	2.3	2.0	23155
		17	365	0.00	0.00	0.0	1.7	3.7	0.0	22088
	Wellington	13	859	4.66	1.16	63.0	0.8	2.3	2.0	23155
		14	859	4.66	1.16	44.4	0.8	2.3	2.0	23155
		15	879	0.00	1.71	57.1	0.7	1.9	1.1	32109
		16	68	0.00	22.06	0.0	0.0	0.0	0.0	n/a
		51	590	0.00	0.00	60.0	2.4	2.2	0.6	33191
		52	578	0.00	1.73	28.0	2.3	1.4	0.2	37011
		53	362	0.00	0.00	28.6	1.6	1.5	0.0	40236
		54	1129	5.31	0.00	33.3	1.7	2.4	3.0	25245
		56	958	1.04	1.04	12.5	1.6	3.5	3.8	14776
		57	356	0.00	0.00	20.0	1.0	2.6	3.5	22678
		59	957	0.00	1.57	19.2	0.9	2.2	1.7	24928
		60	1038	0.00	0.00	11.6	0.3	1.7	1.3	34841
		61	427	0.00	0.00	7.4	0.9	2.2	2.4	24990
		62	1062	0.00	0.00	28.3	0.8	1.2	1.1	42612
		64	1015	0.00	0.00	68.6	1.0	2.1	1.0	31132
		65	254	0.00	0.00	81.8	0.9	0.0	0.0	n/a
		67	887	0.00	0.00	27.6	0.7	2.1	1.2	27772
		68	957	2.09	0.00	71.4	1.4	2.2	0.5	33203
		105	803	0.00	0.00	85.2	0.9	1.6	1.3	32109
	Carteton	104	783	1.45	1.45	64.3	1.7	1.6	1.1	30833
		102	689	0.00	0.00	68.2	0.8	2.4	0.8	29835
		103	209	0.00	0.00	83.3	1.5	0.0	0.0	n/a
		105	803	0.00	0.00	85.2	0.9	1.6	1.3	32109
	Brooklyn Rd	59	957	0.00	1.57	19.2	0.9	2.2	1.7	24928
		13	859	4.66	1.16	63.0	0.8	2.3	2.0	23155
		14	859	4.66	1.16	44.4	0.8	2.3	2.0	23155
		15	879	0.00	1.71	57.1	0.7	1.9	1.1	32109
		16	68	0.00	22.06	0.0	0.0	0.0	0.0	n/a
		51	590	0.00	0.00	60.0	2.4	2.2	0.6	33191
		52	578	0.00	1.73	28.0	2.3	1.4	0.2	37011
		53	362	0.00	0.00	28.6	1.6	1.5	0.0	40236
		54	1129	5.31	0.00	33.3	1.7	2.4	3.0	25245

# EA Impact Zone Statistics For Waste Disposal Sites

60	1038	0.00	0.00	0.00	11.6	0.3	1.7	1.3	34841
61	427	0.00	0.00	0.00	7.4	0.9	2.2	2.4	24980
62	1062	0.00	0.00	0.00	28.3	0.8	1.2	1.1	42612
64	1015	0.00	0.00	0.00	68.6	1.0	2.1	1.0	31132
65	254	0.00	0.00	0.00	81.8	0.9	0.0	0.0	n/a
67	887	0.00	0.00	0.00	27.6	0.7	2.1	1.2	27772
68	957	2.09	0.00	0.00	71.4	1.4	2.2	0.5	33203

## **APPENDIX G**

### **T-Test Results for Subdivision and Enumeration Area Statistics**

# T-Test Results for Subdivisions With Waste Sites vs Subdivisions Without Waste Sites

T-Test: Two-Sample Assuming Unequal Variances														
	% Black With	% Black Without	% Native With	% Native Without	% Renter With	% Renter Without	Unempl Rate With	Unempl Without	Govt Trans With	Govt Trans Without	Low Income With	Low Income Without	Median Income With	Median Income Without
Mean	0.52022	0.85548	0.29089	14.2442	16.4167	23.6148	14.8533	20.5806	21.6511	22.6839	12.1911	14.7939	31202.9	30757.48
Variance	0.98704	2.65530	0.13427	994.9174	98.1611	280.283	19.8248	176.261	38.0453	142.705	14.8217	32.3718	31344885	65710796
Observations	45	62	45	62	45	62	45	62	45	56	45	49	45	56
Hypothesized Mean Difference	0		0		0		0		0		0		0	
df	102		61		101		79		86		85		97	
t Stat	-1.3174		-3.4829		-2.78047		-3.16071		-0.5606		-2.6158		0.32575	
P(T<=t) one-tail	0.09532		0.0005		0.00324		0.00112		0.28825		0.00527		0.37266	
t Critical one-tail	1.65993		1.6702		1.66008		1.66437		1.66277		1.66298		1.66071	
P(T<=t) two-tail	0.19065		0.0009		0.00648		0.00223		0.57650		0.01053		0.74532	
t Critical two-tail	1.98349		1.9996		1.98373		1.99045		1.98793		1.98827		1.98472	

**T-Test Results for EAs With Waste Sites vs EAs Without Waste Sites**

<b>t-Test: Two-Sample Assuming Unequal Variances</b>														
	<i>Black With</i>	<i>Black Without</i>	<i>Native With</i>	<i>Native Without</i>	<i>Renter With</i>	<i>Renter Without</i>	<i>Unempl Rate With</i>	<i>Unempl Rate Without</i>	<i>Govt Trans With</i>	<i>Govt Trans Without</i>	<i>Low Income With</i>	<i>Low Income Without</i>	<i>Median Income With</i>	<i>Median Income Without</i>
Mean	0.81	1.56056	0.47	1.2342	28.683	28.043	1.35	1.20809	2.3019	1.73	1.3907	1.20509	30221.2	35264
Variance	5.9448	50.2042	4.0859	83.784	716.43	707.12	0.7378	0.73013	0.624	0.8934	0.5488	1.02498	3.2E+07	1E+08
Observations	60	1211	60	1211	59	1211	60	1211	54	1047	54	1042	54	1041
Hypothesized Mean Differ	0		0		0		0		0		0		0	
df	118		228		64		65		61		64		81	
t Stat	-2.002		-2.062		0.1795		1.2494		5.1338		1.7585		5.89369	
P(T<=t) one-tail	0.0238		0.0201		0.4291		0.108		2E-06		0.0417		4.2E-08	
t Critical one-tail	1.6579		1.6516		1.669		1.6686		1.6702		1.669		1.66388	
P(T<=t) two-tail	0.0476		0.0403		0.8581		0.216		3E-06		0.0834		8.3E-08	
t Critical two-tail	1.9803		1.9704		1.9977		1.9971		1.9996		1.9977		1.98969	

T-Test Results for EAs < 5km vs EAs > 5km from Waste Sites

t-Test: Two-Sample Assuming Unequal Variances														
	Black <5km	Black >5km	Native <5km	Native >5km	Renter < 5km	Renter > 5km	Unempl <5km	Unempl <5km	Govt Trans <5km	Govt Trans > 5km	Low Income <5km	Low Income >5km	Median Income <5km	Median Income > 5km
Mean	0.58767	1.6995	0.245	1.298	31.51	26.36	1.1083	1.1802	1.74259	1.60989	1.213	1.186	33893	36787
Variance	2.02474	55.883	0.52286	93.801	758.14	675.9	0.4601	0.756	0.55494	0.93872	0.5728	1.1356	5E+07	2E+08
Observations	60	840	60	840	430	840	60	840	54	728	54	723	54	722
Hypothesized Mean Differ	0		0		0		0		0		0		0	
df	409		897		822		74		67		70		82	
t Stat	-3.5113		-3.0349		3.2129		-0.7768		1.23391		0.244		2.6333	
P(T<=t) one-tail	0.00025		0.00124		0.0007		0.2199		0.11077		0.404		0.0051	
t Critical one-tail	1.64859		1.64655		1.6467		1.6657		1.66792		1.6669		1.6636	
P(T<=t) two-tail	0.0005		0.00248		0.0014		0.4398		0.22155		0.8079		0.0101	
t Critical two-tail	1.96578		1.96261		1.9629		1.9925		1.99601		1.9944		1.9893	

## **APPENDIX H**

### **Comparing the Three Levels of Statistical Data for Waste Disposal Sites**



## Subdivision, EA and Impact Zone Statistics For Waste Sites

Waste Site	% Black	% Native	% Rented	Unempl Rate	Govt Trans	Low Income	Median Income
<b>Middleton</b>	0.4	0.6	14.5	11.6	17.7	13.7	28 921
Host EA	0.93	0.93	15.4	0.50	1.50	1.30	36917
Impact Zone Mean	0.32	0.24	26.90	1.21	1.85	1.57	26591
<b>Torbrook</b>	0.0	0.5	9.6	10.6	19.6	12.7	28 354
Host EA	0.00	0.00	0.00	0.00	0.00	0.00	n/a
Impact Zone Mean	0.13	0.24	27.60	1.05	0.99	0.70	27301
<b>Graywood</b>	0.6	0.2	20.2	10.6	20.2	11.9	30 022
Host EA	5.86	0.00	33.30	0.90	2.30	1.00	27870
Impact Zone Mean	1.42	0.00	29.00	0.83	2.09	1.26	27153
<b>Crisp Road</b>	0.7	0.4	16.8	14.6	22.6	13.4	25 267
Host EA	0.00	0.00	50.00	1.20	2.50	2.60	21302
Impact Zone Mean	1.45	0.13	36.40	4.86	8.45	5.14	25906
<b>Joe Simon</b>	0.7	0.4	16.8	14.6	22.6	13.4	25 267
Host EA	0.00	0.00	50.00	1.20	2.50	2.60	21302
Impact Zone Mean	0.16	0.38	33.30	0.93	1.70	1.18	26174
<b>Beech Hill</b>	0.8	0.0	15.3	12.5	15.6	10.7	35 605
Host EA	0.00	0.00	25.00	2.50	2.10	1.20	36871
Impact Zone Mean	0.46	0.00	13.00	0.95	1.60	0.85	35379
<b>James River</b>	0.8	0.0	15.3	12.5	15.6	10.7	35 605
Host EA	0.00	0.00	50.00	0.90	1.90	1.00	45626
Impact Zone Mean	4.34	0.00	16.80	0.92	1.77	1.08	36218
<b>Sydney</b>	1.5	0.2	40.3	18.4	21.9	20.8	29 023
Host EA	8.84	0.00	20.00	2.20	3.00	3.90	27409
Impact Zone Mean	1.11	2.33	24.50	1.58	2.16	1.53	32465
<b>Sydney/Glace Bay</b>	0.1	0.4	14.2	16.7	21	13.1	34 279
Host EA	0.00	1.91	50.00	1.7	1.7	1.0	39267
Impact Zone Mean	0.25	0.18	26.20	1.42	1.80	1.25	36150
<b>Tatamagouche</b>	0.2	0.1	20.4	15.0	16.8	12.3	32 529
Host EA	0.00	0.00	64.70	1.90	3.00	1.00	28296
Impact Zone Mean	0.00	0.00	58.70	1.36	1.54	0.46	28443
<b>Portapique</b>	0.4	0.3	10.8	18.3	27.8	8.0	26 886
Host EA	1.54	0.00	46.70	1.20	2.30	0.40	28266
Impact Zone Mean	0.39	0.00	45.20	1.18	2.73	0.90	27997
<b>Wittenburg</b>	0.5	0.1	13.3	13.0	15.4	10.4	33 250
Host EA	0.00	0.00	66.70	0.90	2.50	1.50	26882
Impact Zone Mean	0.00	0.00	58.50	1.33	2.08	0.95	29568
<b>Upper Stewiacke</b>	0.5	0.1	13.3	13.0	15.4	10.4	33 250
Host EA	0.00	0.00	0.00	2.20	2.60	0.20	29166
Impact Zone Mean	0.00	0.37	0.37	1.86	2.38	1.14	28530
<b>Truro</b>	0.6	0.6	47.6	11.7	17.2	16.3	28.4
Host EA	3.42	0.00	31.40	0.20	1.40	0.70	34230
Impact Zone Mean	3.50	3.74	30.70	1.14	1.09	0.92	30923
<b>Wallace</b>	0.0	0.4	15.8	17.1	24.5	14.4	28 177
Host EA	0.00	0.00	46.20	1.70	3.20	1.20	28000
Impact Zone Mean	0.00	0.00	37.60	2.40	2.80	1.57	29923
<b>Greenville</b>	0.0	0.4	15.8	17.1	24.5	14.4	28 177
Host EA	0.00	6.47	81.80	3.9	0.0	0.0	n/a
Impact Zone Mean	0.00	0.92	58.30	1.70	1.24	0.54	28125
<b>Port Howe</b>	0.0	0.0	9.1	12.8	16.9	8.1	33 912
Host EA	0.00	0.00	0.00	1.40	0.00	0.00	n/a
Impact Zone Mean	0.00	0.00	50.00	2.07	1.47	0.33	24724

<b>Wentworth</b>	<b>0.0</b>	<b>0.4</b>	<b>15.8</b>	<b>17.1</b>	<b>24.5</b>	<b>14.4</b>	<b>28 177</b>
Host EA	0.00	0.00	66.70	2.90	3.20	2.30	27052
Impact Zone Mean	0.00	0.00	75.40	2.23	2.83	1.73	27290
<b>Pugwash</b>	<b>0.0</b>	<b>0.4</b>	<b>15.8</b>	<b>17.1</b>	<b>24.5</b>	<b>14.4</b>	<b>28 177</b>
Host EA	0.00	0.00	85.70	1.10	2.50	2.20	27293
Impact Zone Mean	0.00	0.00	79.80	1.90	2.65	1.45	27410
<b>Oxford</b>	<b>1.8</b>	<b>0.0</b>	<b>22.9</b>	<b>8.5</b>	<b>24.3</b>	<b>9.7</b>	<b>31 406</b>
Host EA	2.59	0.00	51.10	0.60	2.40	0.40	32997
Impact Zone Mean	0.71	0.53	54.40	0.78	1.95	0.80	33140
<b>Williamsdale</b>	<b>0.2</b>	<b>0.0</b>	<b>11.5</b>	<b>15.9</b>	<b>22.1</b>	<b>11.0</b>	<b>31 389</b>
Host EA	0.00	0.00	0.00	1.10	2.90	1.20	26832
Impact Zone Mean	0.55	0.00	49.50	1.43	2.83	1.07	29822
<b>Little Forks</b>	<b>0.2</b>	<b>0.0</b>	<b>11.5</b>	<b>15.9</b>	<b>22.1</b>	<b>11.0</b>	<b>31 389</b>
Host EA	0.00	0.00	35.70	1.00	2.60	1.50	33138
Impact Zone Mean	0.00	0.00	51.80	1.43	2.05	1.33	34291
<b>South Hampton</b>	<b>0.2</b>	<b>0.0</b>	<b>11.5</b>	<b>15.9</b>	<b>22.1</b>	<b>11.0</b>	<b>31 389</b>
Host EA	0.00	0.00	0.00	5.00	0.00	0.00	n/a
Impact Zone Mean	0.44	0.00	33.50	2.88	1.60	0.70	32329
<b>Joggins</b>	<b>0.7</b>	<b>0.0</b>	<b>12.8</b>	<b>19.1</b>	<b>34.3</b>	<b>14.8</b>	<b>22 571</b>
Host EA	3.18	0.00	0.00	1.60	3.00	1.60	25373
Impact Zone Mean	0.80	0.00	42.00	1.73	2.68	1.38	28733
<b>Parrsboro</b>	<b>0.0</b>	<b>0.0</b>	<b>28.5</b>	<b>21.4</b>	<b>25.4</b>	<b>20.6</b>	<b>18 287</b>
Host EA	0.00	0.00	0.00	1.60	2.00	1.50	20685
Impact Zone Mean	0.44	0.00	19.30	2.2	2.8	1.7	22495
<b>Advocate</b>	<b>0.7</b>	<b>0.0</b>	<b>12.8</b>	<b>19.1</b>	<b>34.3</b>	<b>14.8</b>	<b>22 571</b>
Host EA	0.00	0.00	0.00	2.40	3.00	0.90	24203
Same							
<b>Rossway</b>	<b>2.7</b>	<b>0.4</b>	<b>14.5</b>	<b>17.2</b>	<b>24.3</b>	<b>14.1</b>	<b>26 787</b>
Host EA	0.00	0.00	42.90	1.20	1.70	1.50	39087
Same							
<b>Clare</b>	<b>0.7</b>	<b>0.4</b>	<b>11.7</b>	<b>17.2</b>	<b>23.4</b>	<b>9.0</b>	<b>30 257</b>
Host EA	0.00	0.00	0.00	1.10	2.30	0.80	32360
Impact Zone EA	0.00	0.00	37.50	1.67	2.18	0.68	33630
<b>Long Island</b>	<b>2.7</b>	<b>0.4</b>	<b>14.5</b>	<b>17.2</b>	<b>24.3</b>	<b>14.1</b>	<b>26 787</b>
Host EA	0.00	0.00	70.00	1.10	0.00	0.00	26394
Impact Zone Mean	1.86	0.41	39.90	1.41	1.91	0.81	27357
<b>Upper Cross</b>	<b>2.7</b>	<b>0.4</b>	<b>14.5</b>	<b>17.2</b>	<b>24.3</b>	<b>14.1</b>	<b>26 787</b>
Host EA	2.35	0.00	0.00	0.70	2.40	1.40	27721
Impact Zone Mean	1.60	0.27	25.60	1.32	2.26	1.41	25608
<b>Lincolnvile</b>	<b>5.8</b>	<b>0.0</b>	<b>9.3</b>	<b>18.6</b>	<b>32.7</b>	<b>12.5</b>	<b>27 840</b>
Host EA	0.00	0.00	0.00	1.30	3.00	1.00	27016
Impact Zone Mean	22.73	0.00	24.20	1.67	1.70	0.33	31164
<b>Gegogan Road</b>	<b>0.0</b>	<b>1.0</b>	<b>9.3</b>	<b>11.1</b>	<b>30.2</b>	<b>13.3</b>	<b>28 661</b>
Host EA	0.00	0.00	0.00	3.10	0.00	0.00	n/a
Impact Zone Mean	0.00	1.76	13.90	1.50	2.58	1.73	21702
<b>Sackville</b>	<b>1.4</b>	<b>0.1</b>	<b>16.0</b>	<b>8.7</b>	<b>7.6</b>	<b>8.9</b>	<b>48 481</b>
Host EA	14.69	0.00	33.30	0.70	0.80	0.70	40599
Impact Zone Mean	5.43	0.19	38.40	0.65	0.75	0.55	45091
<b>Musquodoboit Harbour</b>	<b>0.0</b>	<b>0.2</b>	<b>13.8</b>	<b>13.5</b>	<b>18.3</b>	<b>9.3</b>	<b>33 405</b>
Host EA	0.00	0.00	30.40	1.40	1.50	0.80	38044
Impact Zone Mean	0.00	0.00	33.70	1.22	1.50	0.77	36951
<b>Lake Charlotte</b>	<b>0.0</b>	<b>1.3</b>	<b>11.3</b>	<b>17.0</b>	<b>28.5</b>	<b>14.6</b>	<b>25 759</b>
Host EA	0.00	0.00	0.00	0.80	2.00	0.80	32132

## Subdivision, EA and Impact Zone Statistics For Waste Sites

Impact Zone Mean	0.00	0.00	15.00	1.00	2.00	0.80	31171
<b>Necum Teuch</b>	<b>0.2</b>	<b>0.2</b>	<b>11.9</b>	<b>7.7</b>	<b>8.2</b>	<b>4.8</b>	<b>49 867</b>
Host EA	0.00	1.93	0.00	0.00	4.20	1.30	18420
Impact Zone Mean	0.00	1.31	41.10	0.30	3.77	1.23	20016
<b>Cogmagun</b>	<b>1.2</b>	<b>0.0</b>	<b>10.8</b>	<b>13.0</b>	<b>17.1</b>	<b>12.3</b>	<b>33 100</b>
Host EA	0.00	0.00	0.00	1.10	1.80	2.10	34072
Impact Zone Mean	0.89	0.13	12.60	1.24	1.54	1.19	33261
<b>Georgefield</b>	<b>0.1</b>	<b>0.2</b>	<b>13.4</b>	<b>11.5</b>	<b>13.9</b>	<b>8.7</b>	<b>39 347</b>
Host EA	0.00	0.00	28.60	1.20	2.00	1.30	33804
Impact Zone Mean	0.00	0.40	28.10	1.07	1.73	1.27	31769
<b>Pleasant Bay</b>	<b>0.0</b>	<b>0.0</b>	<b>14.8</b>	<b>21.1</b>	<b>31.6</b>	<b>9.2</b>	<b>30 199</b>
Host EA	0.00	0.00	75.00	1.20	3.80	2.40	33284
Same							
<b>Big Brook</b>	<b>0.0</b>	<b>0.0</b>	<b>10.3</b>	<b>13.7</b>	<b>21</b>	<b>10.7</b>	<b>33 687</b>
Host EA	0.00	0.00	72.70	0.70	1.60	0.70	36668
Impact Zone Mean	0.00	0.00	71.90	1.00	1.80	0.77	38135
<b>Kenloch</b>	<b>0.0</b>	<b>0.0</b>	<b>14.8</b>	<b>21.1</b>	<b>31.6</b>	<b>9.2</b>	<b>30 199</b>
Host EA	0.00	0.00	0.00	2.00	3.20	2.20	29886
Impact Zone Mean	0.00	0.00	18.70	1.56	2.38	1.14	30881
<b>Meadowview</b>	<b>0.3</b>	<b>0.1</b>	<b>22.8</b>	<b>11.7</b>	<b>15.5</b>	<b>16.5</b>	<b>31 655</b>
Host EA	1.96	0.00	20.00	1.40	2.20	2.70	23154
Impact Zone Mean	0.82	0.10	20.90	0.80	1.27	1.14	33799
<b>Simms Settlement</b>	<b>0.0</b>	<b>0.5</b>	<b>16.2</b>	<b>12.3</b>	<b>17.9</b>	<b>10.4</b>	<b>31 243</b>
Host EA	0.00	0.00	55.00	0.90	1.90	1.00	29020
Impact Zone Mean	0.00	0.18	48.20	1.11	1.53	0.70	31094
<b>Western Shore</b>	<b>0.0</b>	<b>0.5</b>	<b>16.2</b>	<b>12.3</b>	<b>17.9</b>	<b>10.4</b>	<b>31 243</b>
Host EA	0.00	0.00	0.00	1.40	2.20	2.20	32182
Impact Zone Mean	0.11	1.13	18.30	1.42	1.60	1.08	30744
<b>New Ross</b>	<b>0.0</b>	<b>0.5</b>	<b>16.2</b>	<b>12.3</b>	<b>17.9</b>	<b>10.4</b>	<b>31 243</b>
Host EA	0.00	0.00	40.00	0.70	2.20	0.00	28467
Impact Zone Mean	0.00	0.00	25.00	0.98	2.15	0.50	26978
<b>Mahone Bay</b>	<b>0.0</b>	<b>0.0</b>	<b>34.4</b>	<b>9.2</b>	<b>17.2</b>	<b>11.9</b>	<b>30 065</b>
Host EA	0.00	0.00	0.00	0.80	1.90	1.40	31207
Impact Zone Mean	0.00	0.23	17.30	0.80	1.49	1.27	31092
<b>Whynot's Settlement</b>	<b>0.0</b>	<b>0.3</b>	<b>9.9</b>	<b>10.2</b>	<b>17.9</b>	<b>9.9</b>	<b>31 934</b>
Host EA	0.00	2.03	0.00	1.60	1.40	1.20	32088
Impact Zone Mean	0.00	0.61	16.10	0.70	1.47	1.07	31266
<b>Kaizer Meadow</b>	<b>0.0</b>	<b>0.5</b>	<b>16.2</b>	<b>12.3</b>	<b>17.9</b>	<b>10.4</b>	<b>31 243</b>
Host EA	0.00	0.00	60.00	0.90	1.30	0.70	28324
Impact Zone Mean	0.00	0.35	35.90	0.77	1.70	0.63	26776
<b>Mount William</b>	<b>0.0</b>	<b>0.0</b>	<b>11.5</b>	<b>16.8</b>	<b>18.4</b>	<b>12.0</b>	<b>34 692</b>
Host EA	0.00	0.00	37.50	1.30	1.30	2.00	31655
Impact Zone Mean	0.15	0.04	38.20	1.44	1.81	1.39	33783
<b>Ten Mile Lake</b>	<b>0.2</b>	<b>1.6</b>	<b>10.6</b>	<b>13.3</b>	<b>19.1</b>	<b>13</b>	<b>30203.0</b>
Host EA	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Impact Zone Mean	0.00	3.80	56.80	0.87	1.00	0.60	29988
<b>L'Ardiose</b>	<b>0.0</b>	<b>1.2</b>	<b>7.9</b>	<b>23.3</b>	<b>33.8</b>	<b>18.7</b>	<b>21 752</b>
Host EA	0.00	2.52	0.00	1.80	3.00	2.60	25553
Impact Zone Mean	0.00	0.63	21.90	2.30	3.30	1.38	23127
<b>Point Tupper</b>	<b>0.0</b>	<b>0.2</b>	<b>16.1</b>	<b>21.9</b>	<b>25.8</b>	<b>11.7</b>	<b>31 645</b>
Host EA	0.00	0.00	0.00	2.20	0.00	0.00	n/a
Impact Zone Mean	0.00	0.00	23.10	2.23	1.41	0.53	31107
<b>Port Malcolm</b>	<b>0.0</b>	<b>0.2</b>	<b>16.1</b>	<b>21.9</b>	<b>25.8</b>	<b>11.7</b>	<b>31 645</b>

Host EA	0.00	0.00	0.00	2.20	0.00	0.00	n/a
Impact Zone Mean	7.17	0.07	20.60	1.70	1.05	0.80	38104
<b>West Arichat</b>	<b>0.0</b>	<b>0.2</b>	<b>11.8</b>	<b>19.9</b>	<b>29.1</b>	<b>8.5</b>	<b>32 741</b>
Host EA	0.00	0.00	0.00	1.90	3.50	1.40	26208
Impact Zone Mean	0.00	0.00	0.00	8.3	10.1	3.8	31806
<b>Barrington</b>	<b>0.1</b>	<b>0.1</b>	<b>10.8</b>	<b>15.4</b>	<b>19.5</b>	<b>8.4</b>	<b>38 130</b>
Host EA	0.00	15.15	0.00	0.00	0.00	0.00	n/a
Impact Zone Mean	0.37	3.30	42.80	1.22	1.54	0.66	33667
<b>West Green Harbour</b>	<b>0.3</b>	<b>0.2</b>	<b>13.0</b>	<b>10.8</b>	<b>19.8</b>	<b>10.1</b>	<b>30 227</b>
Host EA	0.00	0.00	42.90	1.30	3.30	2.00	19952
Impact Zone Mean	0.58	0.00	47.50	1.30	2.32	0.74	23790
<b>Shelburne</b>	<b>0.3</b>	<b>0.2</b>	<b>13.0</b>	<b>10.8</b>	<b>19.8</b>	<b>10.1</b>	<b>30 227</b>
Host EA	0.00	0.00	19.40	0.00	0.90	1.40	41846
Impact Zone Mean	1.84	0.37	43.30	0.90	1.71	1.50	31429
<b>Dingwall</b>	<b>0.0</b>	<b>0.0</b>	<b>11.8</b>	<b>29.8</b>	<b>32.3</b>	<b>15.8</b>	<b>29 419</b>
Host EA	0.00	0.00	30.00	3.00	3.40	2.30	28950
Impact Zone Mean	0.00	0.00	10.00	2.50	3.70	2.00	29824
<b>Baddeck</b>	<b>0.0</b>	<b>0.4</b>	<b>15.3</b>	<b>16.8</b>	<b>25.2</b>	<b>8.6</b>	<b>33 918</b>
Host EA	0.00	0.00	62.50	2.00	2.70	1.60	34473
Impact Zone Mean	0.00	0.35	45.30	1.88	2.62	0.94	31814
<b>Wedgeport</b>	<b>0.0</b>	<b>0.0</b>	<b>8.6</b>	<b>13.0</b>	<b>21.5</b>	<b>9.4</b>	<b>33 507</b>
Host EA	0.00	0.97	28.60	0.90	2.70	1.00	29364
Impact Zone Mean	0.58	0.27	32.20	1.25	2.60	0.80	28955
<b>Abrams River</b>	<b>0.0</b>	<b>0.0</b>	<b>8.6</b>	<b>13.0</b>	<b>21.5</b>	<b>9.4</b>	<b>33 507</b>
Host EA	0.00	0.00	54.50	0.60	2.40	1.10	28464
Impact Zone Mean	0.56	0.33	35.40	1.22	2.48	0.85	30226
<b>Wellington</b>	<b>0.7</b>	<b>0.4</b>	<b>13.4</b>	<b>13.1</b>	<b>20.1</b>	<b>9.4</b>	<b>32 123</b>
Host EA	4.66	1.16	63.00	0.80	2.30	2.00	23155
Impact Zone Mean	0.93	1.60	39.40	1.09	1.86	1.41	29597
<b>Brooklyn Rd</b>	<b>1.2</b>	<b>0.3</b>	<b>54.0</b>	<b>12.8</b>	<b>21.1</b>	<b>25.0</b>	<b>25 210</b>
Host EA	0.00	1.57	19.20	0.90	2.20	1.70	24928
Impact Zone Mean	0.99	1.69	36.80	1.10	1.88	1.41	29440
<b>Pubnico</b>	<b>0.0</b>	<b>0.0</b>	<b>8.6</b>	<b>13.0</b>	<b>21.5</b>	<b>9.4</b>	<b>33 507</b>
Host EA	0.00	0.00	42.90	1.80	2.30	0.50	33225
Impact Zone Mean	0.00	0.00	31.90	1.38	2.32	0.58	36837
<b>Carleton</b>	<b>0.7</b>	<b>0.4</b>	<b>13.4</b>	<b>13.1</b>	<b>20.1</b>	<b>9.4</b>	<b>32 123</b>
Host EA	0.00	0.00	64.30	1.70	1.60	1.10	30833
Impact Zone Mean	0.00	0.00	75.30	1.23	1.40	0.80	30926

## BIBLIOGRAPHY

- Aguilar, Adriana Fabra and Neil A. E. Popovic, "Lawmaking in the United Nations: The UN Study on Human Rights and the Environment", *Reciel*, vol. 3, no. 4, 1994.
- Almanza, Susana R. et al., *Toxics In Texas and Their Impact on Communities of Color*, Texas Network for Environmental and Economic Justice, Austin: Texas Centre for Policy Studies, March 1993.
- Anderton, Douglas L. et.al., "Environmental Equity: The Demographics of Dumping", *Demography*, vol. 31, no. 2, May 1994, p. 229-248.
- Blackmore, Gordon W., *Tort Law and its Role in the fight Against Racial Discrimination*, Dalhousie University Law School, 1993.
- Boerner, Christopher and Thomas Lambert, "Environmental Injustice", *The Public Interest*, Winter 1995, p. 61-82.
- Bryant, Bunyan, *Introduction* in Bunyan Bryant (ed.), Environmental Justice: Issues, Policies and Solutions, Washington: Island Press, 1995.
- Bullard, Robert D. , "Solid Waste Sites and the Black Houston Community", *Sociological Inquiry*, Vol. 53, no. 2/3, Spring 1983. p. 273-288.
- , "Ecological Inequities and the New South: Black Communities Under Siege", *The Journal of Ethnic Studies*, vol. 17, no. 4, Winter 1990. P. 101-114
- , "Not in Our Backyards: Minority Communities Get Most of the Dumps", *EPA Journal*, March/April, 1992. pp. 11-12 (a).
- , "Environmental Blackmail in Minority Communities", in Mohai and Bryant (eds.), Race and the Incidence of Environmental Hazards: A Time for Discourse, Boulder: Westview Press, 1992. (b)
- , People of Colour Environmental Groups Directory 1992, Flint, Michigan: Charles Stewart Mott Foundation, 1992. (c)
- , "The Threat of Environmental Racism." *Natural Resources and Environment*, Winter 1993 (a)
- , *Environmentalism with Justice, Confronting Environmental Racism: Voices from the Grassroots*, ed. Robert Bullard, Boston: Southend Press 1993 (b).

- , “Anatomy of Environmental Racism” in Richard Hofrichter (ed.) Toxic Struggles: The Theory and Practice of Environmental Justice, Philadelphia: New Society Publishers, 1993 (c).
- , Race and Environmental Justice in the United States, *Yale Journal of International Law*, Vol. 18:319, 1993 (d).
- , Overcoming Racism in Environmental Decision Making, *Environment* May 1994 (a).
- , Dumping In Dixie: Race, Class and Environmental Quality, Colorado: Westview Press, Inc. 1994 (b).
- Bullard, Robert D. and Beverly H. Wright, “Environmentalism and the Politics of Equity: Emergent Trends in the Black Community, *Mid-American Review Society*, Vol. 12 Winter 1987.
- , “The Quest for Environmental Equity: Mobilizing the African-American Community for Social Change”, *Society and Natural Resources*, Volume 3, 1990.
- Canadian Council of Ministers of the Environment (CCME), *National Guidelines for the Landfilling of Hazardous Waste*, Report CCME-WM/TRE-028E, April 1991.
- Cerrell Associates, Inc., *Political Difficulties Facing Waste-To-Energy Conversion Plant Siting*, Los Angeles: California Waste Management Board, 1984.
- Citizen Clearinghouse for Hazardous Waste (CCHW), Ten Years of Triumph: 10 Year Anniversary of the Grassroots Movement for Environmental Justice, CCHW Convention, 1993.
- Clairmont, Donald, “Moving People: Relocation and Urban Renewal” The Africville Genealogical Society (ed.) The Spirit of Africville, Halifax: Formac Publishing Company Limited, 1992.
- Cole, Luke W., “Remedies for Environmental Racism: A View from the Field”, *Michigan Law Review*, vol. 90, 1991.
- , “Empowerment as the Key to Environmental Protection: The Need for Environmental Poverty Law”, *Ecology Law Quarterly*, vol. 19, no 611, 1992.
- Colquette, Kelly Michele and Elizabeth Henry Robertson, “Environmental Racism: The Causes, Consequences and Commendations”, *Tulane Environmental Law Journal*, vol. 5, 1991. p. 153- 207

- Commission for Racial Justice (CRJ), United Church of Christ, *Toxic Wastes and Race in the United States: A National Report on the Racial and Socioeconomic Characteristics of Communities with Hazardous Waste Sites*, New York: United Church of Christ.
- Connor, Desmond and Ann C. Svendsen, *Overcoming the Barriers to Public Acceptance of Waste Management Facilities*, in Environment Canada's 8th Canadian Waste Management Conference, Halifax: Minister of Supply and Services, Sept. 1986.
- Costner, Pat and Joe Thornton, *Playing With Fire*, Washington, D.C.: Greenpeace, 1990.
- Covello, Vincent T., *Risk Communication and Solid Waste Management: Principles and Guidelines for Communicating Risk and Uncertainty*, in Murray E. Haight (ed.) Municipal Solid Waste Management: Making Decisions in the Face of Uncertainty, Waterloo: University of Waterloo Press, 1991.
- Cranston, Marla, "Church Group Enters Landfill Fray", *The Daily News*, Halifax, March 15, 1992.
- Delaney, Gordon, "Environmental Racism Complaint Proceeds", June 24, 1993, The Chronicle Herald, Halifax, Nova Scotia.
- , "Environmental Racism Charged in Complaint to Human Rights Body", March 16, 1993, The Chronicle Herald, Halifax, Nova Scotia.
- Douglas, Kristen, *An Environmental Bill of Rights for Canada*, Research Branch of the Library of Parliament, Background Paper, Ottawa: Minister of Supply and Services, 1992.
- Downing, Douglas and Jeff Clark, Statistics The Easy Way, second edition, New York: Barrons Educational Services Inc., 1989
- Dunlop, Malcolm, "East Lake dump proposed deal", June 23, 1993, The Mail Star, Halifax, Nova Scotia.
- Edelstein, Michael R. Contaminated Communities: The Social and Psychological Impacts of Residential Toxic Exposure, Boulder: Westview Press, 1988.
- EPA Environmental Equity Work Group, *Environmental Equity: Reducing Risk for All Communities*, Washington: Office of Policy, Planning and Evaluation, U.S. Environmental Protection Agency, 1992.
- EPA, *Environmental Racism: Hearings Before the House Subcommittee on Civil and Constitutional Rights*, 103d Congress, 1st Session, March 3, 1993. (Testimony of Dr. Benjamin F. Chavis Jr.).

Estrin, David and John Swaigen, *Environment on Trial: A Guide to Ontario Environmental Law and Policy*, third edition, Toronto: Emond Montgomery Publications Limited, 1993.

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations" 59 Fed Rg 7629 U.S. Congress Feb 16, 1994

Federer, Walter T., *Statistics and Society: Data Collection and Interpretation*, New York: Marcel Dekker, Inc, second edition, 1991.

Ferris, Deoohn, "Testimony Before the Subcommittee on Legislation & National Security Committee on Government Affairs", *Environmental Protection Agency Cabinet Elevation - Environmental Equity Issues*, U.S. House of Representatives, April 28, 1993.

Fisher, Michael, "Environmental Racism Claims Brought Under Title IV of the Civil Rights Act", *Environmental Law*, vol. 25, 1995. P. 285-334.

Foster, Sheila, "Race(ial) Matters: The Quest For Environmental Justice", *Ecology Law Quarterly*, vol. 20. 1993. P. 721-753.

General Accounting Office (GAO), *Siting of Hazardous Waste Landfills and their Correlation with Racial and Socioeconomic Status of Surrounding Communities*, Washington, D.C.: GAO, 1983.

-----, (GAO), *Hazardous and Nonhazardous Waste: Demographics of People Living Near Waste Facilities*, Report to Congressional Registers, June 1995.

Gibson, Dale, "Constitutional Entrenchment of Environmental Rights" in N. Duple (ed.) *Le Droit a la Qualite de L'Environnement*, Montreal: Quebec Amerique, 1988.

Glick, Richard D., "Environmental Justice in the United States: Implications of the International Covenant on Civil and Political Rights" in *Harvard Environmental Law Review*, vol. 19, no. 69, 1995, p. 69-111.

Global Action and Information Network (GAIN), *GAIN Report: Environmental Justice Executive Order 12898 Strategy Reports*, Santa Cruz: EcoNet Environmental Justice Desk (ejdesk@igc.apc.org), August 30, 1996.

-----, *GAIN Report: Environmental Justice Executive Order 12898*, Santa Cruz: EcoNet Environmental Justice Desk (ejdesk@igc.apc.org), August 30, 1996.



- , *GAIN Report: Environmental Justice Legislation Past, Present and Future*, Santa Cruz: EcoNet Environmental Justice Desk (ejdesk@igc.apc.org), August 30, 1996.
- Government of Canada, Census of Canada 1961, Dominion Bureau of Statistics: Census Division, Report AP-7 92-521, Ottawa: Census Division, 1961.
- , Census of Canada 1870-71, vol. 1, Ottawa: I.B. Taylor, 1873.
- Griffiths Muecke Associates, *Impact Management: Mitigation and Compensation Policies and the Use of Siting Agreements*, A Background Paper # 8 prepared for Metropolitan Authority, Dec. 16, 1991.
- Grossman, Karl, "Environmental Racism", *The Crisis*, vol. 98, no. 4, April 1991, p. 39-44.
- , "From Toxic Racism to Environmental Justice", *E: The Environmental Magazine*, vol. 3, no 3., May/June 1992, p. 28-35.
- Handy, F., "Income and Air Quality in Hamilton, Ontario", *Alternatives*, vol. 6, no. 3, 1977, p. 18-24.
- Harrington, S.C. and R.B. Wiygul, "Part One: RCRA, Communities and Environmental Justice", in *West Virginia Law Review*, vol. 96, 1993-1994.
- Hartley, Troy, "Environmental Justice: An Environmental Civil Rights Value Acceptable to All World Views", *Environmental Ethics*, vol. 17, Fall 1995.
- Head, Wilson A. and Donald Clairmont, Discrimination Against Blacks in Nova Scotia: The Criminal Justice System, Halifax: The Royal Commission on the Donald Marshall Jr. Prosecution, Feb., 1989.
- Hemphill, Thomas A., "The Ungreen Corporation and People of Color", *Business and Society Review*, Fall 1994, no. 91, p. 74-77.
- Henry, Frances, Forgotten Canadians: The Blacks in Nova Scotia, Don Mills: Longman Canada Limited, 1973.
- Henry, Frances et al., The Colour of Democracy: Racism in Canadian Society, Toronto: Harcourt Brace & Company Canada, Ltd., 1995.
- Hofrichter, Richard, *Introduction*, in Hofrichter (ed.), Toxic Struggles: The Theory and Practice of Environmental Justice, Philadelphia: New Society Publishers, 1993.

Hughes, Elaine L., "Civil Rights to Environmental Quality" in Environmental Law and Policy, Elaine L. Hughes, Alastair R. Lucas & William Tilleman II (eds.), Toronto: Emond Montgomery Publications Limited, 1993.

Hussy, Tiffany, "Ottawa Urges Cultural Slant to Dump Review", The Daily News, Nova Scotia, June 12, 1992.

Jones, Randy, "Racism Charged in dump choice: Preston residents say landfill will 'wreck' the area's future", The Chronicle Herald, March 11, 1992.

Kallen, Evelyn, Label Me Human: Minority Rights of Stigmatized Canadians, Toronto: University of Toronto Press, 1989.

Ksentini, Fatma Zohra, *Human Rights and the Environment: Final Report*, prepared for the Commission on Human Rights, Sub-Commission on Prevention of Discrimination and Protection of Minorities, 46 session, item 4, July 6, 1994.

Lazarus Richard J. "Pursuing 'Environmental Justice': The Distributional Effects of Environmental Protection" in *Northwestern University Law Review*, vol. 87, no. 3, 1993.

Lavelle, Marianne and Marcia Coyle, "The Racial Divide in Environmental Law" in *The National Law Journal*, September 21, 1992.

LeBlanc, Susan and Cameron MacKeen. "Racism and the Landfill" in the Weekend Journal of The Chronicle Herald, Saturday, March 7, 1992. Page B1.

Lee, Charles, *Beyond Toxic Wastes and Race in The United States*, in Mohai and Bryant (eds.), Race and the Incidence of Environmental Hazards: A Time for Discourse, Boulder: Westview Press, 1992.

-----, *Beyond Toxic Wastes and Race*, in Robert Bullard (ed), Confronting Environmental Racism: Voices from the Grassroots, Boston: Southend Press 1993.

MacDonald, Doug, The Politics of Pollution, Toronto: McClelland & Stewart, 1991.

MacLaren, Virginia W., *Waste Management: Current Crisis and Future Challenge*, in Bruce Mitchell (ed.) Resource and Environmental Management in Canada: Addressing Conflict and Uncertainty, Oxford University Press, 1995.

McDonald, Norris. "Grass-Roots Groundswell: An Introduction", *EPA Journal*, March/April 1992.

- McGee, Kelly D., *Overcoming NIMBY in Waste Management Planning*, in Murray E. Haight (ed.) Municipal Solid Waste Management: Making Decisions in the Face of Uncertainty, Waterloo: University of Waterloo Press, 1991.
- Mitchell, Carolyn M., "Environmental Racism: Race as a Primary Factor in the Selection of Hazardous Waste Sites", *National Black Law Journal*, v. 12, 1992 p. 176.
- Millward, Hugh A., *Regional Patterns of Ethnicity in Nova Scotia: A Geographical Study*, vol. VI, Halifax: International Education Centre, Saint Mary's University, 1981.
- Moar, Kim, "East Lake dump site not racist - rights board", Halifax: The Daily News, May 14, 1994.
- Mohai, Paul and Bunyan Bryant, "Black Environmentalism", *Social Science Quarterly*, vol. 71, no. 4, December 1990, p. 744-765.
- , "Race, Poverty and the Environment: The Disadvantaged Face Greater Risks", *EPA Journal*, March/April 1992. pp. 6-8.
- , Environmental Racism: Reviewing the Evidence, in Mohai and Bryant (eds.), Race and the Incidence of Environmental Hazards: A Time for Discourse, Boulder: Westview Press, 1992.
- , "Environmental Injustice: Weighing Race and Class as Factors in the Distribution of Environmental Hazards", *University of Colorado Law Review*, 1993.
- Morris, D.E., The Origins of the Civil Rights Movement: Black Communities Organizing for Change, New York: The Free Press, 1984.
- Muldoon, Paul and Richard Lindgren, The Environmental Bill of Rights: A Practical Guide, Toronto: Emond Montgomery Publications Limited, 1995.
- Nicoll, Cathy, "Study supports controversial East Lake dump site", April 28, 1993, The Daily News, Dartmouth, Nova Scotia (a).
- , "Effects of dump choice is racist group charges", March 16, 1993, The Daily News, Dartmouth, Nova Scotia (b).
- Nova Scotia Department of the Environment (DOE), Abandoned Waste Disposal Site Study, prepared by Terrance J. MacPherson, Waste Management Section, Halifax, Nova Scotia, July 1987.
- , *Solid Waste-Resource Management Regulations*, Amendments to the Nova Scotia Environment Act, April 1996.

———, *Nova Scotia Standards and Guidelines Manual for Landfills*, July 1994.

Pachai, Bridglal, Blacks, Tantallon Nova Scotia: Four East Publications, 1987

———, Beneath the Clouds of The Promised Land: The Survival of Nova Scotia's Blacks, Volume II: 1800-1989, Hantsport: The Black Educators Association, 1990.

———, *Before Africville: Nova Scotia's Black Settlers*, in The Africville Genealogical Society (ed.) The Spirit of Africville, Halifax: Formac Publishing Company Limited, 1992.

Popper, Frank J. "The Environmentalist and the LULU" in *Environment*, vol. 27, no. 2, March 1985, p. 7 - 11, 37.

Porter Dillon Ltd, *The Next Landfill: The Siting Process and Siting Criteria*, Discussion Paper #5.1, prepared for Metropolitan Authority, March 28, 1991.

Reilly, William K., "Environmental Equity: EPA's Position", in *EPA Journal*, March/April 1992.

Rosenbaum, Walter A. Environmental Politics and Policy, third edition, Washington, D.C.: Congressional Quarterly Inc., 1995.

Sachs, Aaron, Eco-Justice: Linking Human Rights and the Environment, Worldwatch Paper 127, Washington, D.C.: Worldwatch Institute, 1995.

———, "Upholding Human Rights and Environmental Justice", in *The Humanist*, March/April, 1996.

Sarokin, David J. and Jay Schulkin, "Environmental Justice: Co-evolution of Environmental Concerns and Social Justice", *The Environmentalist*, Volume 14, no. 2, 1994.

Saunders, Charles, "What a Waste", *The Daily News*, Sunday June 27, 1993 p. 19.

Sopinka, John, "Proving Discrimination in Boards of Inquiry Under Ontario Human Rights Codes", in Bridglal Pachai (ed.), Nova Scotia Human Rights Commission: 25th Anniversary 1967-1992, A History, Halifax: Province of Nova Scotia, 1992.

Statistics Canada, 1991 Census Dictionary, Ottawa: Minister of Industry, Science and Technology, January 1992.

- , Profile of Census Divisions and Subdivisions in Nova Scotia - Part A and Part B, Ottawa: Minister of Industry, Science and Technology, November 1992.
- Swaigen, John and Richard E. Woods, "A Substantive Right to Environmental Quality" in John Swaigen (ed.) Environmental Rights in Canada, Toronto: Canadian Environmental Law Research Foundation, 1981.
- Tarnopolsky, Walter, "The Iron Hand in the Velvet Glove: Administration and Enforcement of Human Rights Legislation in Canada", in Bridglal Pachai (ed.), Nova Scotia Human Rights Commission: 25th Anniversary 1967-1992, A History, Halifax: Province of Nova Scotia, 1992.
- Task Force on the Ontario Environmental Bill of Rights, Report of the Task Force on the Ontario Environmental Bill of Rights, Ministry of the Environment, Ontario: Queen's Printer, 1992.
- Taylor, Dorceta, "The Environmental Justice Movement". *EPA Journal*, March/April 1992-a.
- , Attracting and Maintaining the Support of Minorities, in Mohai and Bryant (eds.), Race and the Incidence of Environmental Hazards: A Time for Discourse, Boulder: Westview Press, 1992-b.
- , Environmentalism and the Politics of Inclusion, Confronting Environmental Racism: Voices from the Grassroots, ed. Robert Bullard, Boston: Southend Press 1993.
- United Nations, *Selected Decisions of the Human Rights Committee*, vol. 2, Oct. 1982-Apr. 1988. No. E. 89. XIV.1
- , *Communication No. 167/1984*, U.N. GAOR, Human Rights Committee, 45th Session. Supp. No. 40, vol. 2, Annex 9A, 1990
- Vaughn Engineering Associates Limited, Regional Solid Waste Study, January, 16, 1993.
- , Halifax County Municipality Regional Solid Waste Management Project: Documentation Report for the Residuals Disposal Facility Siting Process, July 20, 1995.
- Williams, J. "Redefining Institutional Racism", *Ethnic and Racial Studies*, vol. 8 no. 3, July 1985 p. 323-347.
- Wright, Alonzo C., Africville: The Upheaval and Destruction of a Community, Dalhousie Law School, Legal Research paper, 1992.

-----, *Environmental Racism*, Dalhousie University Law School, Halifax, research compiled for the Curriculum Review Project, May 1994.

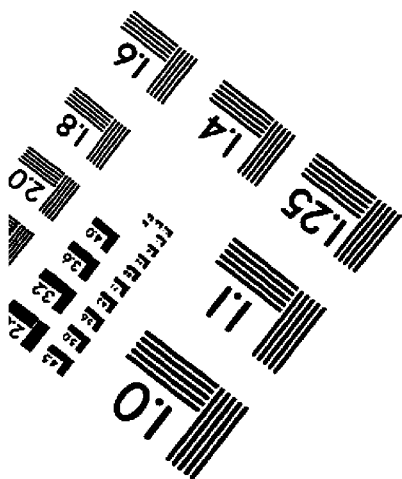
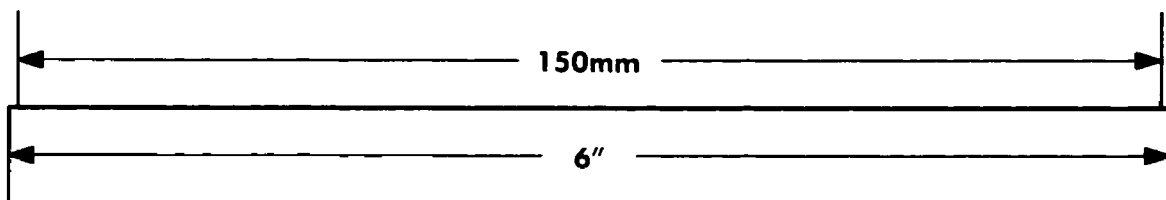
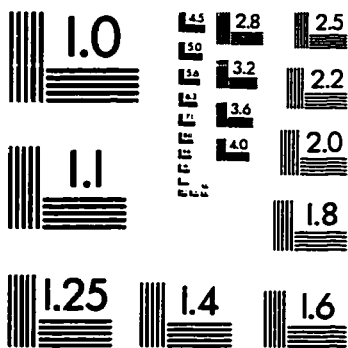
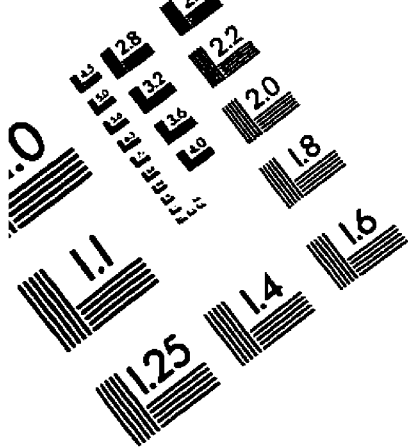
Yogis, John, Canadian Law Dictionary, adapted from Law Dictionary by Steven H. Gifis, Barrons' Educational Series, Inc., 1990.

Zeiss, Chris and James Atwater, *The Impacts of Waste Disposal Facility on Residential Communities: A Perspective for Research*, in Environment Canada's 8th Canadian Waste Management Conference, Halifax: Minister of Supply and Services, Sept. 1986.

Zeiss, Chris, "Impact Management Priorities at Waste Facilities: Differences Between Host Community Residents' and Technical Decision-Makers' Values", *Environmental Systems*, vol. 19, no. 1, 1989-90, p. 1-23.

Zimmerman, Rae, "Issues of Classification in Environmental Equity: How We Manage Is How We Measure", in *Fordham Urban Law Journal*, vol. XXI, no. 3, 1994, p. 633-669.

# TEST TARGET (QA-3)



APPLIED IMAGE, Inc  
1653 East Main Street  
Rochester, NY 14609 USA  
Phone: 716/482-0300  
Fax: 716/288-5989

© 1993, Applied Image, Inc., All Rights Reserved

