**Environmental Priorities for
the District of Columbia:
A Report to the Summit Fund**

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Abstract

This paper examines and ranks the District of Columbia's environmental problems. Four criteria are used to determine each problem's severity: public opinion of the problem, health effects, the number of people affected, and ecological and welfare effects. Public opinion is measured via 345 city resident and 23 stakeholder interviews. Stakeholders included environmental experts familiar with issues in the District. Health and ecological effects are captured by analyzing both the EPA's and District of Columbia's environmental data. The results show that the top four problems facing the city, in order of importance, are: drinking water, air pollution, the Anacostia River, and lead poisoning. Several recommendations for resolving the District's problems are offered and including creating a separate D.C. Environmental Agency, applying for EPA grant monies, publishing a D.C. environmental report, fostering community cooperation, and increasing education about the environment.

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PREFACE

In May 1996, the Summit Fund asked the Center for Risk Management at Resources for the Future (RFF) to examine the universe of environmental problems in the District of Columbia, analyze what should be the priorities among these problems, and make some suggestions about possible initiatives to help address the District's environmental problems. The report was to be ready for the Fund's board meeting in early September.

This study was therefore completed in less than four months and on a very small budget. RFF contributed half the funding for the study because of the importance we attach to the subject. Completion of the project was facilitated by the availability of two reports that compiled much of the information we needed: *Our Unfair Share: A Survey of Pollution Sources in Our Nation's Capital*, a study conducted by a coalition of environmental and other groups in the District, and *A Scientific Foundation for Setting an Environmental Agenda*, a study done for EPA Region III by the consulting firm Versar Inc.

We are grateful to a number of people who assisted us in this study. Linda Howard of the Summit Fund provided good advice, good cheer, and constant support. Kate Probst of RFF and C.A. Pilling, formerly with RFF, helped to initiate the study. Kieran McCarthy assisted in the research and wrote the chapter on "Governance in the District." Stan Laskowski and Dominique Lueckenhoff of EPA Region III helped us in a variety of ways. We also thank all of the people we interviewed, many of whom gave us a generous amount of their time. Finally, we thank Roger and Vicki Sant and the Summit Fund for making the study possible.

Established in 1993 as a supporting organization of the Foundation for the National Capital Region, the Summit Fund of Washington encourages, supports and funds innovative approaches and activities that can lead to systemic change in the Washington, DC community—change that will enhance the lives of the citizens of our area and the environment in which we live. This report was prepared at their request, but does not necessarily represents the Fund's views.

EXECUTIVE SUMMARY

This report identifies the universe of environmental problems in the District of Columbia, assesses priorities among these problems based on their health and ecological effects and the views of DC residents, and makes a few recommendations aimed at improving the environmental policy process in the District.

There is no "scientific" method for establishing environmental priorities. Data, information, and science of the type covered by this report are highly relevant to setting priorities, but any process that results in a set of priorities is inevitably dominated by values or politics or both. In short, priority setting is a value process informed by science, not a scientific process informed by values. Our priority rankings for DC are given in the following table.

Priorities Among DC Environmental Problems

Problem	Severity of Health Effects	# People Affected	Ecological and Welfare Effects	Public Ranking	Overall Ranking
1. Drinking Water	H	H	H	H	H
2. Air Pollution	H	H	L	H	H
3. Water-Anacostia	M	H	H	M	M+
4. Lead	H	H	L	M	M+
5. Trash	L	H	M	M	M
6. Water-Potomac	L	M	M	M	M
7. Hazardous Waste	L	M	L	M	M–
8. Parks	L	L	H	L	L+

H = High; M = Medium; L = Low

The report does not make recommendations to directly improve environmental conditions in DC since this was beyond the scope of the study. However, we make several suggestions for improving the policy process.

A DC Environmental Agency

When examining DC environmental problems, one of the first questions is "where is the District's environmental agency?" There isn't one. Most of the environmental functions are contained in the Department of Consumer and Regulatory Affairs, although other environmental functions are carried out by the Department of Public Works and other DC agencies (see Chapter 2).

The lack of a separate environmental agency partially reflects the fact that the District faces problems it considers more serious than environmental problems. If the leadership of the District or the general public were asked to name the District's most important problems, environment would not be among them. Nevertheless, the District's environmental problems are important enough to warrant a separate identifiable agency that could provide leadership and that could be held accountable for dealing with DC's numerous environmental challenges.

Grant for Ranking Priorities

The U.S. Federal Environmental Protection Agency (EPA) provides grants to states and a few localities to fund a process for considering environmental priorities. We think the District should apply for such a grant, and we have reason to be optimistic that EPA would respond positively.

The purpose of the grant would only in part be the identification of priorities. As this report demonstrates, it does not take a major effort to analyze and identify priorities. What is needed, and what could be done with the EPA grant, is to marshall a political consensus behind a set of priorities so that action is taken to address the problems identified.

Institutional Cooperation

One major reason that the effort described above would be beneficial for the District is that the DC institutions that could potentially be an important part of solving environmental problems generally do not cooperate or even communicate with each other. While the Summit Fund supports efforts to bring the environmental groups together informally, this effort needs

to be strengthened. Other groups, especially the District's educational institutions, need to be involved, and the whole effort needs to be strengthened and given focus.

A DC Environmental Report

When tackling environmental problems it is always helpful to have factual information about the severity of the problems and about whether the problems are getting better or worse. EPA will soon issue a report, written by Versar Inc., which contains baseline information on the District's problems. It would be relatively easy to update the report annually or biennially. Such a report would facilitate the priority-setting effort described above and could help to foster institutional cooperation.

Environmental Education

Educating both adults and children about environmental problems is important both to foster an appreciation of the significance of environmental problems and to provide a realistic perspective on the relative importance of different environmental problems. The fact that 12 percent of those questioned in our survey could not name a single environmental problem indicates the need for more environmental education. We do not want to further burden the overtaxed DC school system, but some private initiatives could be very useful in providing environmental education.

The above recommendations will not solve the District's environmental problems. We think that they would make it easier to identify and implement solutions. Implementing any recommendations will be difficult because of the institutional and managerial limitations of the DC government.

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1: SETTING ENVIRONMENTAL PRIORITIES

1.0 Introduction

There are several different ways that environmental priorities for an area can be established. Each has advantages and disadvantages, and in reality some combination of the various approaches is usually used. The approaches can be classified as: 1) political; 2) scientific; and 3) social values.

1.1 The Political Approach

Typically, environmental priorities are established like most other priorities through the political process. In democratic polities legislatures enact budgets, and budgets are the most important indicator of priorities. Thus priorities are subject to the give-and-take of legislative politics. Similarly, to the extent that budgets are initially formulated in executive agencies or that budgeted funds are further allocated by an agency, the budget is subject to the bureaucratic politics of negotiation, log-rolling, and the exercise of power.

In a democracy priorities should be established through the political process. The question is whether the political process can be improved by additional information and analysis. The political process is rarely a matter solely of power or of exchanging favors. Usually there is some component of knowledge, information, and analysis, although the component may be large or small and may sometimes be based on misinformation. Efforts to improve the information component of priority setting brings us to the scientific and social values approaches.

1.2 The Scientific Approach

Priorities are inherently a matter of relative values and therefore, strictly speaking, a scientific approach to priority setting is impossible. Science tells us what is, whereas priority setting deals with what should be. Science can help us to forecast what will happen if certain actions are taken but, by definition, science cannot tell us what actions we should take. However, scientific information can be an important determinant in setting priorities because once the value criteria have been established (e.g. the goal is to save lives) then science may be able to tell us how best to achieve the goal (e.g. controlling air pollution will save the most number of lives).

The two types of scientific information that are most useful in environmental priority setting are information on health effects and on ecological effects. For both kinds of information the state of scientific knowledge is severely limited.

There is some information about the effects of some pollutants that is based on epidemiological studies (studies of the relationship between human exposure to some environmental agent and adverse health effects). For example, a recent study by the Harvard School of Public Health and the American Lung Association estimated that ozone air pollution may be responsible for as many as 50,000 hospital emergency room visits nationwide every year and that during the severe smog season of the summer of 1994 ozone may have caused 600 hospital admissions in the Washington metropolitan area.[1] This kind of information is available only for a few major pollutants and for a few environmental problems that produce unique outcomes, such as the type of lung disease caused by asbestos.

The health information that is used most often in priority setting is information based on the cancer rates induced in laboratory rats or mice exposed to a particular environmental pollutant. This information, while better than nothing, is based on a number of assumptions that are often unverifiable (i.e. there is no way of telling whether its results accord with what happens in the real world). Also only cancer risk is tested, yet even this information is not

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[1] Lee, Gary. "Hospitalizations Tied to Ozone Pollution," *Washington Post*, p. A6, (June 21, 1996).

available for many pollutants. Much of the health information collected and analyzed by government regulatory agencies is designed to establish a "safe" level of a pollutant but cannot be used to estimate the magnitude of the health effects caused by the pollutant.

Our knowledge of ecological effects is generally even poorer than our knowledge of health effects. Ecology is a young science with relatively few researchers. Also, for health effects it is usually clear which effects are adverse and which ones are beneficial, but with respect to ecological effects, even when we can estimate the effects, it often is not clear whether the effect is good or bad, desirable or undesirable. Taking undeveloped land and converting it to agriculture radically changes the ecology but whether this is good or bad often is unclear.

Despite the severe limitations on scientific knowledge relevant to environmental priorities, the factual basis for defining reality is determined by science. The only way we have of knowing whether a problem is a major threat or an insignificant nuisance is through scientific knowledge. Thus efforts to establish priorities should incorporate scientific information to the maximum extent possible while at the same time recognizing both the limitations on the science and the important role played by values.

1.3 The Social Values Approach

The political process, especially when it comes to priority-setting, may not be a perfect mirror of public opinion or societal values. It does capture them better than the scientific approach, but it is important to consider the role of social values apart from the importance of the democratic political process.

Social values include such things as the value of individual human lives (as contrasted with anonymous statistical lives), being free from involuntary risks, and being willing to undergo more risk for significant benefits than for insignificant ones. Such values have an important effect on the priorities that most people would assign to environmental and other risks. Almost anyone would spend more resources to rescue a real child who has fallen down a well than to increase the number of diagnostic medical exams necessary to save an additional

hypothetical statistical life. Yet the two situations would have equal priority under a strictly scientific approach. Our view is that social values are important to consider in setting priorities and should be used in addition to scientific information.

1.4 Additional Criteria

Each of the above approaches are based on certain criteria for setting priorities. The political approach is based on public opinion and political power, the scientific approach on the degree of health or ecological risk, the social values approach on values widely held in society. There are additional criteria that can be used.

Efficiency is the key criterion for economists, and, especially in a jurisdiction as tightly strapped for money as DC, it is a consideration that must be taken into account. However, efficiency is a criterion that is applicable to environmental solutions or programs, not to environmental problems. Environmental problems can be more or less serious, they cannot be more or less efficient. Efficiency, by definition, involves a ratio between inputs and outputs or between costs and benefits. Environmental problems or risks are only one side of such equations and therefore the idea of a ratio is inapplicable.

Like efficiency, the concept of leverage is quite relevant to the District, but it is relevant to programs or solutions, not to ranking problems. Leverage in this context means the extent to which steps taken to deal with an environmental problem also facilitate the solution of other DC problems. Leverage is important because in the view of most DC residents other problems are more important than environmental problems. Given this view, to the extent that environmental solutions can also ease the city's problems with crime, finance, schools, or other matters it increases the priority of the environmental measure.

A third important criterion is environmental justice. Some have argued that environmental justice should be the overriding criterion for evaluating environmental problems and solutions.[2] We think it is more appropriately viewed as a constraint. It is a constraint in

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[2] See Finkel, Adam & Dominic Golding. *Worst Things First?*, Resources for the Future, Washington, DC, pp. 237-274 (1994).

the sense that no environmental solution should make disadvantaged populations any worse off. As a criterion, it is a good criterion for anti-poverty or civil rights initiatives, but not for environmental ones. To the extent that environmental justice is the most important criterion, risk will be greater than it would otherwise be, and in our view risk reduction is more relevant to environmental improvement than is environmental justice.

In addition to the theoretical argument, it is also true that examples of environmental injustice are difficult to find in the District. The Northwest section of the city, which is the most affluent, also has the most number of pollution sources.[3] Lead paint poisoning and pollution of the Anacostia, however, do impact lower income households and African Americans disproportionately. It is also important to note that residents with lower incomes are less able to take defensive measures, such as purchasing bottled water.

1.5 Approach Taken in this Study

This study covers the political and governmental institutions, the health and ecological risks in DC, and the public's perceptions of priorities. We then try to combine the different elements to provide a very rough ranking of environmental problems. Our ranking is not in any way "scientific." It is intended primarily to provoke some thought and relevant questions. We conclude by making some recommendations based on our analysis.

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[3] See African American Environmentalist Association, et al. *Our Unfair Share, A survey of Pollution Sources in Our Nation's Capital*, p. 52-59, (June 1994).

2: GOVERNANCE IN THE DISTRICT: WHO'S IN CHARGE?

2.0 Introduction/Background

The District of Columbia is a unique city in that its government functions as city, county, and state. In addition to providing traditional municipal services such as mass transit, police protection, and education, the District must develop its own environmental protection programs without state support or expertise. Moreover, the District's population has declined from 638,000 in 1980 to an estimated 559,000 in 1995.[1] This loss of population means the District's tax base has decreased, making it more difficult for the DC government to provide services. These realities, combined with the District's financial troubles and uncoordinated environmental structure, make it difficult for the DC government to meet the District's environmental needs.

Over a century ago the District of Columbia first enacted laws designed to protect the public health and welfare of the nation's capital. Since then, the laws have been updated, changed, and honed frequently. The result of the evolution of DC's environmental laws is the creation of seven major environmental program areas designed to restore and protect the natural resources of the District. The seven program areas are: water quality, hazardous waste management, soil resources management, pesticides control, underground storage tank management, air quality control, and solid waste management.

2.1 Who's in Charge of Administering DC's Environmental Programs?

Three administrations have the primary responsibility for administering the District's environmental programs. They are the Environmental Regulation Administration (ERA) of the Department of Consumer & Regulatory Affairs (DCRA) and the Solid Waste Management Administration (SWMA) and the Water and Sewer Utility Administration (WASUA) of the Department of Public Works (DPW).

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[1] Federal Bureau of the Census (1996).

2.1.1 Environmental Regulation Administration (ERA)

Within DCRA's ERA there are 4 divisions which administer six of these program areas. The four divisions are the Air Resources Management Division, the Pesticides, Hazardous Waste, and Underground Storage Tank Division, the Water Resources Management Division, and the Soil Resources Management Division. ERA is one of seven administrations within DCRA. In FY 95, ERA received $6.02 million in funds and was staffed by 107 Full-Time Equivalents (FTEs). This was 18 percent of DCRA's entire FY 95 budget of $33.42 million. [2] EPA's budget represents 0.1 percent of the District's entire FY 95 Operating Expenses of $4.99 billion.[3] ERA's FY 96 budget is slightly lower (see Figure 1).

Comparison of DCRA's and ERA's Budget, Figure 1

FY	DCRA	ERA
FY93	43.3	5.32
FY94	38.6	5.66
FY95	33.4	6.02
FY96 (proj)	35.5	6

Dollars (millions)
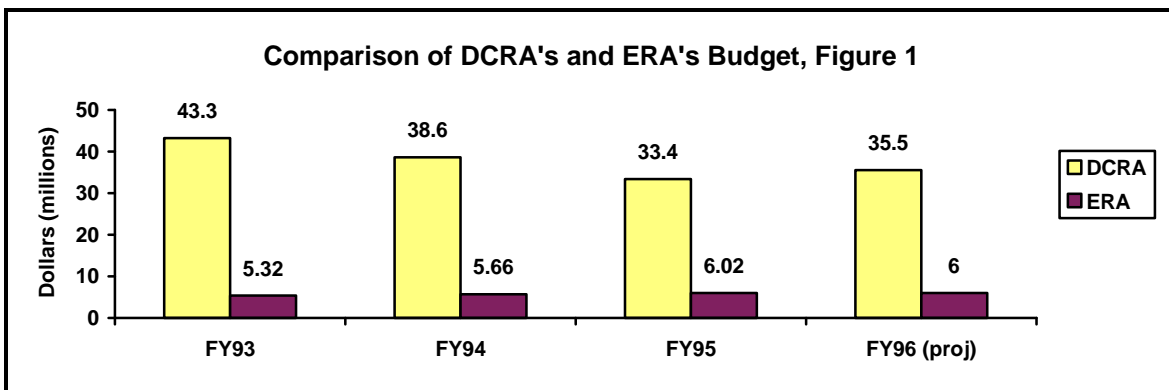
Source: DC Budgets for FY 94 - FY 97

As part of the Barry Administration's reorganization of the District government, the environmental and health regulation functions of DCRA will be moved to Comprehensive Health Business, perhaps as early as next year.[4] Already, DCRA's business regulation has

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[2] District of Columbia Government. *District of Columbia FY 97 Budget and Financial Plan,* p. 33, (June 1996).

[3] Ibid, p. 35.

[4] Comprehensive Health Business is in fact the name of this new branch of the District government. It is <u>not</u> the Comprehensive Health Business Administration or the Comprehensive Health Business Division.

moved to Business Services and Economic Development. This reorganization accounts for DCRA's much lower FY 97 budget of $14 million.

2.1.2 Solid Waste Management Administration (SWMA)

As previously mentioned, DPW has two administrations which play an environmental role: the Solid Waste Management Administration and the Water and Sewer Utility Administration. These administrations are just two of the many offices and administrations within DPW. SWMA is responsible for collecting trash from all residential buildings with three or fewer dwelling units. SWMA's actual budget for FY 95 was $36.7 million and included 445 FTEs.[5] This is 29 percent of DPW's FY 95 budget of $127 million and 0.7 percent of DC's entire FY 95 operating budget.[6] It is the largest program operated by DPW.

2.1.3 Water and Sewer Utility Administration (WASUA)

WASUA, though part of DPW, is different in that it is funded through an enterprise fund, the Water and Sewer Enterprise Fund. An enterprise fund is not supported by general revenues. Rather, it finances its activities through user charges, much like a private business. WASUA generates revenue for its enterprise fund through the sale of water and sewer services. WASUA's mission is to provide the District's citizens with drinking water and to collect, treat, and dispose of wastewater for the District, as well as a large portion of neighboring jurisdictions, in an environmentally safe manner that protects DC's waterways.

WASUA is comprised of a water distribution system that consists of 3 water pumping stations and 1,286 miles of water mains, a sewer collection system consisting of approximately 1,800 miles of sanitary/combined sewers, 600 miles of storm sewers, and 25 sewer pumping stations. It also includes the Blue Plains Wastewater Treatment Plant, which is the WASUA's single greatest investment. Blue Plains is the largest tertiary wastewater facility in the world.

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[5] District of Columbia Government. *District of Columbia FY 97 Budget and Financial Plan,* p. 33, (June 1996).

[6] Ibid, p. 35.

WASUA spent $166 million and employed 1,181 FTEs in FY 95, as seen in Figure 2. WASUA's proposed FY 97 budget is $200 million.[7] It expects to employ approximately the same number of FTEs in FY 97 as in FY 95. District legislation was recently passed authorizing the creation of the District of Columbia Water and Sewer Authority (WASA) to replace WASUA. WASA will assume treasury, procurement, and personnel functions previously performed by the District. WASA will be a government agency operated and financed much like a private business.

The amount of money required to fund all of DC's environmental programs (ERA, WASUA, SWMA) for FY 95 was about $227 million, approximately 4.5 percent of the District's operating expenses for FY 95. The District's operating expenses include moneys from the District's general fund and enterprise funds. Seventy-three percent of this environmental spending in FY 95 went to WASUA's wastewater treatment program alone. Under 3 percent went toward air quality, soil resource, pesticide, underground storage tank, and hazardous waste programs.
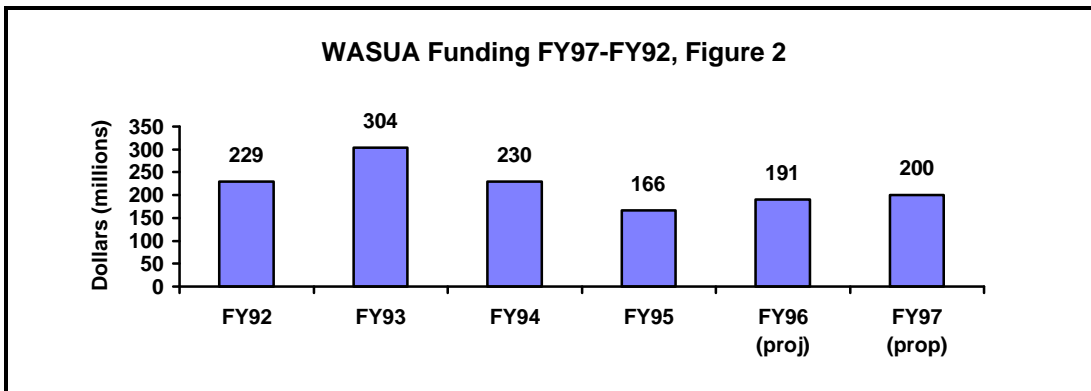
Source: DC Budgets FY 93 - FY 97

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[7] Ibid, p. 35

2.1.4 Other DC Offices and Departments

Other offices and departments within the District, such as the Energy Office, Office of Mass Transit, the Department of Human Services (which contains DC's Lead Poisoning Prevention Program), and the Department of Public Works and Recreation, administer programs which affect DC's environmental conditions. However, these organizations are not part of DC's core environmental program areas.

2.2 Federal and Regional Efforts

2.2.1 Washington Aqueduct (WA)

Washington Aqueduct, a division of the U.S. Army Engineer District in Baltimore, is charged with the responsibility of collecting, purifying, and pumping an adequate supply of potable water for the District of Columbia, Arlington County, and Falls Church. WASUA distributes the drinking water supplied by Washington Aqueduct. The District purchases drinking water from Washington Aqueduct through its Water and Sewer Enterprise Fund. The U.S. Army Corps of Engineers operates Washington Aqueduct. In FY 95, the District spent $18 million to purchase water from Washington Aqueduct, while the District projects to spend $25.7 million in FY 97.

2.2.2 Washington Metropolitan Council of Governments (MWCOG)

Since environmental problems frequently cross the borders of the District, DC participates in an organization called the Metropolitan Washington Council of Governments to address and resolve problems which require a collective solution. MWCOG is a regional organization of Washington area local governments. It is composed of 18 local governments surrounding the nation's capital, plus area members of the Virginia and Maryland legislatures, the U.S. Senate, and the U.S. House of Representatives. MWCOG studies regional environmental problems as well as regional non-environmental issues such as affordable housing, economic development, health and family concerns, public safety, and transportation.

Given that the District's environmental problems are largely regional in nature, MWCOG is a logical vehicle to address these problems. MWCOG has been reluctant, however, to act on many environmental problems. The Virginia representatives of MWCOG, in particular, have been sympathetic to business opposition to environmental measures and thus have blocked a number of environmental initiatives.

2.2.3 National Capital Region of the National Park Service

The National Capital Region of the National Park Service administers most public parks within Washington DC. It is one of ten regional offices of the National Park Service. It administers approximately 8,845 acres within the District's borders.[8] This acreage dwarfs the 681 acres of open space under the purview of the District government.

2.2.4 The Federal Government

In addition to owning a considerable amount of parkland within DC, the federal government owns a large amount of District land in general. Federal lands account for 40 percent of the total District land.[9] Bolling Air Force Base, Fort McNair, Fort Lincoln, the Washington Navy Yard, and all the Federal buildings are just a few of the federal facilities located within DC's borders. The federal government is also DC's largest single employer, providing over 200,000 of DC's 640,000 jobs in 1995.[10] Because the federal government is such a pervasive presence in DC, its activities have a significant impact on DC's environment. Thus, the District government's environmental programs may have a limited impact on DC's environmental quality. The District's environmental quality is dependent on the federal government's environmental performance.

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[8] National Park Services, *Background: Parks of the Nation's Capital*, URL:
    `http://www.nps.gov/ncro/ncr.wp5.html`, (search executed August 22, 1996).

[9] Environmental Protection Agency. *EPA Progress Report on the Anacostia Ecosystem Initiative, Chesapeake Bay Program*, p. 4, (July 23, 1996).

[10] District of Columbia Government, *District of Columbia FY 1997 Budget and Financial Plan,* p. 8, (June 1996)

2.3 Conclusion

The District's environmental program structure needs to be more integrated. It is difficult to have a coordinated environmental strategy if relevant departments are scattered about the DC government. Reorganizing ERA, WASUA, and SWMA into a single Department of the Environment is an initial step in the right direction.

3: THE UNIVERSE OF ENVIRONMENTAL PROBLEMS

3.0 Introduction

This chapter assesses the environmental problems facing the District of Columbia. It defines each natural resource condition that affects both the human and ecological environment. We have omitted from our analysis, however, such issues as crime and economic development. These problems, while obviously significant, are beyond the scope of our analysis.

In this chapter we divide the District of Columbia's environmental problems into seven categories: air pollution, drinking water, surface water pollution, solid waste, land use, toxics, and transportation. Later, in Chapter 6, land use is limited to national and local parks and transportation is mostly reflected in the category of air pollution. This is partly because the boundary between each of these categories is not clearly defined. For example, air quality is inherently related to transportation and transportation is dependent on land use. Also, when considering social values and public perceptions, we found that most people do not consider environmental problems in broad categories such as transportation and land use.

Other issues also confound our task. One of the greatest difficulties we faced was obtaining information on the District's environmental condition. We found that the data availability for each environmental issue varies greatly. For some problems, historical trends can be shown and the current environmental condition is well known. For other problems, however, historical data is non-existent and the current condition is uncertain. In each section we note instances where data are limited or of questionable quality.

3.1 Air Pollution

The quality of the District's air affects every resident. The city's air quality also affects the thousands of non-resident commuters and tourists that travel to the city each day. The general quality of the District's air is satisfactory. EPA ranks the District among the top one-

third U.S. cities (out of 110 total) with respect to ambient air quality.[1,2] The District's

relatively clean air is due, in part, to the lack of significant industrial activity. The city does

experience, however, periodic exceedances of the national standards for ozone and carbon

monoxide.[3] As a result, the District is classified as a non-attainment area for both pollutants.

Ozone is the area's primary air pollution problem. The District's ozone levels are

highly volatile and vary with weather conditions such as wind and heat. Ozone in the District

is highest in the summer when the temperature climbs and when there is little wind. The

District's hot and muggy whether, combined with numerous heat-retaining surfaces (such as

roads, parking lots, and rooftops) creates stagnant air and contributes to the summer ozone

levels.[4] EPA considers the District's ozone levels serious, but not severe.[5]

Ozone levels have decreased in the past two decades. In 1980, the District exceeded

EPA's health standard 13 times, while in 1991 it exceeded it once.[6] Between 1992 and 1993,

the District's ozone remained within the standard of 0.120 ppm.[7] More recently, though, the

city's ozone levels exceeded EPA's health standard. In 1994 and 1995, the District exceeded

the standard on 4 occasions.[8] To date, there are no ozone exceedances in 1996.[9]

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[1] World Resources Institute. *The 1993 Information Please Environmental Almanac*, New York: World Resources Institute, (1993).

[2] This estimate is based on the EPA's Pollutant Standards Index (PSI). The index provides information about daily levels of air pollution. EPA uses the PSI to compare air quality for metropolitan areas. The PSI is based on daily emissions of sulfur dioxide, nitrogen oxides, particulates, carbon dioxide, and ozone. PSI levels that exceed 100 compromise human health.

[3] District of Columbia, Air Resources Management Division (DC ARMD). *Ambient Air Quality Monitoring Network Description: A brief Overview of Ambient Air Quality in DC, 1980-1993*, (1996).

[4] African American Environmentalist Association, National Association of Neighborhoods, and National Wildlife Federation. *Our Unfair Share, A survey of Pollution Sources in Our Nation's Capital*, (June 1994).

[5] Day, Robert, District of Columbia Air Resources Management Division, telephone interview (Aug. 26, 1996).

[6] Ibid.

[7] District of Columbia, Air Resources Management Division (DC ARMD). *Ambient Air Quality Monitoring Network Description: A brief Overview of Ambient Air Quality in DC, 1980-1993*, (1996).

[8] Day, Robert, District of Columbia Air Resources Management Division, telephone interview (Aug. 26, 1996).

[9] Ibid.

There are two types of pollution sources that affect the District's air quality: point and non-point sources. Point sources are stationary and are typically permitted sources that are identified by a single origin, such as a factory or a pipe. Conversely, the District's primary non-point sources are non-stationary, unpermitted polluters. Motor vehicles are an example of a non-point source. Non-point sources have the greatest affect on the District's air quality.

3.1.1 Air Pollution Non-point Sources

Non-point sources are the most significant generators of air pollution in the District. Motor vehicle emissions account for about 70 percent of the District's ozone precursors.[10] Motor vehicles also generate carbon monoxide, lead, particulates, and other chemicals that affect the District's air quality. The use of paint and other solvents also contributes to increased ozone in the District, although significantly less than do automobiles.

The District's non-attainment status for ozone requires the city to complete a rate-of-progress plan to EPA. The report will show the how the city plans to reduce its ozone precursors between 1996 and 1999. The plan also will outline the city's enforceable commitments for attainment. The Clean Air Act required that the plan be submitted to EPA at the end of 1995. The city failed to submit its plan, however, and faces an 18-month interim period before penalties are imposed.[11] If the District does not submit its plan by January 1998, it faces sanctions that require new or modified sources to achieve a 2-1 emissions reductions ratio to increased emissions.[12] If the city fails to submit the rate-of-progress plan by July 1998, it may also face loss of federal highway funds.

Other contaminants, such as carbon monoxide, also affect the District's air quality. Since 1980, carbon monoxide levels have improved. Between 1980 and 1993, the District's carbon monoxide levels decreased by 35 percent. The number of standard violations in the

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[10] Ibid.

[11] *Environmental Reporter*, "10 States Warned of Possible Sanctions For Not Submitting Rate of Progress Plans," 27, p. 557-558, (July 12, 1996).

[12] Ibid.

District fell from 19 in 1980 to zero in 1991.[13] Higher levels of carbon monoxide occur in Fall and Winter than in Spring and Summer.[14]

Since the early 1980s, nitrogen dioxide, sulfur dioxide, and lead in air have also decreased significantly.[15] These pollutants meet the national standards and do not pose a significant health threat to District residents. Since the 1970s, the District's air particulates have also been within EPA's health standards.[16] Particulates in air such as dust, smoke, and aerosols are also generally low (49 percent of the annual standard and 20 percent of the 24-hour standard).[17] Between 1980 and 1987, particulate levels fluctuated but have experienced an overall net decrease of 17 percent.[18] In 1988, however, the particulate sampling methods changed and a new trend has not been established.

3.1.2 Air Pollution Point Sources

Large industrial point sources, such as power plants, account for about 3 percent of the emissions that contribute to ozone formation.[19] In 1994, EPA regulated 267 point sources (facilities) under the Federal Clean Air Act. Of these facilities, monitoring data are available for 11 of the largest stationary sources that release pollutants into the District's air. The remaining 256 facilities are classified as minor facilities (parking lots, gas stations, dry cleaners, etc.). No monitoring data are available for minor facilities because individually as their releases

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[13]District of Columbia, Air Resources Management Division (DC ARMD). *Ambient Air Quality Monitoring Network Description: A brief Overview of Ambient Air Quality in DC, 1980-1993*, (1996).

[14] Ibid.

[15] Ibid.

[16] Day, Robert, District of Columbia Air Resources Management Division, telephone interview (Aug. 26, 1996).

[17] District of Columbia, Air Resources Management Division (DC ARMD). *Ambient Air Quality Monitoring Network Description: A brief Overview of Ambient Air Quality in DC, 1980-1993*, (1996).

[18] Ibid.

[19] Versar. *A Scientific Foundation for Setting an Environmental Agenda, An Environmental Characterization of the District of Columbia*, report prepared for U.S. EPA Region 3, p. ii (April 1996).

are below the reporting threshold required under the Clean Air Act.[20] The extent of their cumulative impact on the District's air quality is not known.

Table 3-1: Facilities with Air Permits in the District of Columbia Ranked by Toxicity[21]

Facility Name	Pounds per Year				
	TSP	CO	SO_2	NO_2	VOC
PEPCO-Benning Rd. Generating Station	123,346	90,390	1,464,964	1,053,187	11,825
St. Elizabeth's Hospital	33,957	24,255	713,097	97,020	1,649
GSA Central Heating Plant	2,929	49,485	167,722	559,104	2,822
GSA West Heating Plant	16,147	58,857	324,945	258,261	6,695
U.S. Soldiers and Airmen's Home	20,220	8,510	267,238	93,610	1,923
Howard University	7,490	5,350	157,290	24,150	364
Capital Power Plant	40,848	159,215	160,427	796,765	5,419
Georgetown University Power Plant	5,030	16,240	70,210	238,445	2,381
PEPCO-Buzzard Pt. Generating Station	3,485	10,734	76,112	47,256	3,325
U.S. Bureau of Engraving & Printing	NR	NR	NR	NR	251,760
U.S. Government Printing Office	NR	NR	NR	NR	145,442

NR = not reported.

A study by Versar (1996) compared the risks associated with each of the 11 permitted facilities in the District.[22] It considered each of the five regulated chemicals under their permits and determined their relative toxic weighting factors. The higher the toxic weighting factor, the greater the human health risk. The PEPCO Benning Road Generating Station has the highest toxic weighting factor of the permitted facilities, as seen in Table 3-1. While data are not available for the U.S. Bureau of Engraving and Printing and the U.S. Government Printing Office, Versar notes that these facilities have the highest volatile organic compound (VOC) emissions. As such, they are the largest single point sources that contribute to existing ozone levels in the District.

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[20] Ibid, p. 3-26.

[21] Ibid, p. 3-27 to 3-30, 3-34.

[22] Ibid, p. 3-32, 3-33.

3.2 Drinking Water

The District's drinking water supply serves as the primary source for drinking water for both households and businesses. The District's source for drinking water is the Potomac River. There are no wells (public or private) in the city that serve as a drinking water source.[23] Approximately 63 percent of the city's population (about 364,200 residents) rely on the public drinking water system as their primary source of drinking water; the remaining 37 percent of the DC population (about 213,800 residents) use bottled water.[24] The quality of the city's drinking water also affects non-residents, however, as the area employs thousands of commuters who also consume the city's drinking water.

The city's drinking water is treated by the U.S. Army Corps of Engineers (COE). COE maintains the treatment plant's operation and the DC Department of Public Works, Water and Sewer Utility Administration, distributes the water to city residents. This unique collaborative effort of separate treater and distributor complicates the process to modify and improve the system because of multiple authorities and jurisdiction.[25]

The quality of the District's drinking water is a serious public health concern. Since 1993, the city has issued several "boil water alerts," to maintain public health.[26] The city issued the alerts because officials detected unsafe levels of coliform bacteria in the drinking water system. Other contaminants in the District's drinking water include heavy metals such as lead from older pipes and trihalomethanes, which are byproducts of chlorine disinfection.

The city's drinking water also suffers from turbidity. Turbidity is cloudiness in water and results from ineffective water filtration. Parasites typically resist chlorine disinfection and can only be removed through filtration processes. An ineffective filtration system allows

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[23] Baker Environmental. *Final Preliminary Assessment, Washington Navy Yard*, Washington, DC, 2(1), (1993).

[24] Center for Disease Control. "Assessment of Inadequately Filtered Public Drinking Water--Washington DC," *Morbidity and Mortality Weekly Report*, 43(36), (September 16, 1994).

[25] Versar. *A Scientific Foundation for Setting an Environmental Agenda, An Environmental Characterization of the District of Columbia*, report prepared for U.S. EPA Region 3, (April 1996).

[26] Ibid, p. 4-6.

parasites to enter into the drinking water supply.[27] Cryptosporidium and giardia are two parasites that live in the District's raw water sources and may affect the city's drinking water quality if filtration is compromised. In 1995, the District's drinking water violated EPA's health standards on three occasions for bacteria and for turbidity.[28,29]

In May 1996, the city's drinking water violated EPA standards for coliform bacteria. The city-wide "boil water alerts," as well the more recent incidents involving elevated levels of bacteria/turbidity, caused EPA to take a more active role in the District's drinking water distribution. In July 1996, EPA requested that the District produce a plan to improve the quality of its drinking water system within 60 days. The District agreed to flush and disinfect its pipes, improve storage tank maintenance, prevent sewage leaks into water pipes, and improve public involvement.[30] After the city released its plan, it began flushing the drinking water system with chlorine to eliminate the bacterial contamination.

On August 7, 1996, the city reduced its chlorine levels slightly, but they were still above the normal level.[31] Then on August 20, 1996, the city's drinking water again failed inspection; for the third month in a row unhealthy levels of bacteria were detected in the District's public drinking water supply.

EPA states that in order to control the harmful bacteria in the District's drinking water system, chlorine disinfection will continue and the system should be cleaned and upgraded.[32] District officials estimate that it will cost between $200 million and $400 million to modernize

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[27] Olson, Erik D. *The Troubled D.C. Drinking Water Supply: A Preliminary Review of Problems*, Natural Resources Defense Council, p. 3-4, (December 1995).

[28] Cohn, D'Vera and Goldstein, Amy. *The Washington Post*, "High Price Put on Repairing Water System," B1, (July 13, 1996).

[29] Olson, Erik D. *The Troubled D.C. Drinking Water Supply: A Preliminary Review of Problems*, Natural Resources Defense Council, p. 3, (December 1995).

[30] Cohn, D'Vera and Goldstein, Amy. *The Washington Post*, "High Price Put on Repairing Water System," B1, (July 13, 1996).

[31] EPA's Water Quality Hotline, August 9, 1996.

[32] Ibid.

its drinking water system over the next six years.[33,34] Discussions are underway to create a new city agency that will take charge of the District's entire drinking water system.

3.3 Surface Water Pollution

Two primary rivers flow through the District: the Anacostia and the Potomac. The Anacostia River runs through the District's southeastern area and the Potomac River flows along the District's western boundary. The Anacostia drains into the Potomac.

The District also has 4 secondary water sources that flow through the city. They are Rock Creek, The Washington Channel, Little River Branch, and Piney River. These water sources are smaller surface waters and carry much less water than do the Anacostia and Potomac Rivers.

As with air pollution, there are two types of pollution sources that affect the city's surface waters: point and non-point sources. Point sources are stationary and typically identified by a specific origin, such as a factory. Conversely, non-point sources typically have multiple origins. Stormwater runoff is an example of a non-point source. Non-point sources have the greatest effect on the District's surface waters.

3.3.1 Surface Water Non-Point Sources

There are two major sources of non-point surface water pollution in the District: storm water runoff and combined sewers. The sources are closely related. During rain, storm water runoff is channeled into one of two areas; it either goes into the city's storm water drains or into the city's combined sewers. The city's storm water drains discharge runoff into the District's surface waters. In the Federal Triangle area, however, storm water runoff is directed into the city's sewage system where the stormwater and sewage are combined and sent to Blue Plains Wastewater Plant for treatment.

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[33] Cohn, D'Vera and Goldstein, Amy. *The Washington Post*, "High Price Put on Repairing Water System," B1, (July 13, 1996).

[34] Ibid.

Storm water runoff is affected by the District's land which consists mainly of paved surfaces and buildings that are impervious to water. During rains, storm water travels across these surfaces, carrying with it typical roadway contaminants such as oil, grease, heavy metals, nutrients, bacteria, toxic chemicals, sediments, and salts. These pollutants come from urban sources such as lawn fertilizers, automobile exhaust, exterior paints, animal droppings, and litter.[35]

The runoff that is not combined with the city sewage flows directly into the District's surface waters. Because of the District's topography, rain water flows towards the southern portion of the District.[36] Thus the Anacostia River receives a significant portion of the city's storm water runoff.

Two studies analyze the effects of storm water runoff on the District's surface waters. The first examines runoff effects on the Anacostia River.[37] Its results show that the Anacostia River receives higher concentrations of cadmium, chlordane, hydrocarbons, lead, PCBs, zinc, and other contaminants, than were found in both the Potomac River and the Washington Ship Channel.

The second study analyzed the quantities of toxics carried in runoff on all surface waters in the District between January and October 1989.[38] It showed that storm water runoff accounts for approximately 400,000 pounds of zinc, 94,000 pounds of copper, and 22,000 pounds of lead in the city's rivers and creeks. In contrast, the total zinc releases for Maryland and Virginia *combined* are about one third less; also, the District's copper and lead levels are equal to the sum of both Maryland's and Virginia's releases. In addition, the study also compared the pollution from storm water runoff to Blue Plains Wastewater Treatment Plant

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[35] African American Environmentalist Association, National Association of Neighborhoods, and National Wildlife Federation. *Our Unfair Share, A survey of Pollution Sources in Our Nation's Capital*, (June 1994).

[36] Ibid p. 20.

[37] Interstate Commission on the Potomac River Basin, "ICPRB Study Assesses Anacostia Sediment Pollution," *Potomac Basin Reporter*, 49(1), (January 1993).

[38] Natural Resources Defense Council. *Poison Runoff: A Guide to State and Local Control of Non-point Source Water Pollution*, Washington DC, (1989).

releases. In the first 10 months of 1989, storm water runoff contained about 9 times more phosphorous, two-thirds as much nitrogen, and 18 times more biological oxygen demand (BOD--microbial degradation of organic matter that depletes oxygen needed to support aquatic life) than did all of Blue Plains' 1987 wastewater discharges.[39]

In 1996, EPA initiated a voluntary agreement with federal facilities to reduce storm water runoff. Federal lands account for 40 percent of the land in the District and contribute to the storm water runoff problem. [40] The agreement focuses on nutrient reductions and is the first effort in the District that involves all federal landholders.[41]

The second major non-point source of surface water pollution is combined sewers. During severe storms, the quantity of combined runoff and sewer water flowing to Blue Plains exceeds its capacity. When overflow occurs, the raw sewage (that would otherwise be treated) and runoff are diverted to 60 overflow drains.[42] The drains empty directly into the city's surface waters.

A 1992 study by the National Wildlife Federation showed that the Blue Plains Wastewater Treatment Plant experiences about 60 overflows per year with an average of 40 million gallons of sewage discharged per overflow.[43,44] The annual overflow volume is thus about 2,400 million gallons. Typical overflows consist of raw sewage and all the stormwater contaminants already noted.

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[39] These findings are also reported in African American Environmentalist Association, National Association of Neighborhoods, and National Wildlife Federation. *Our Unfair Share, A survey of Pollution Sources in Our Nation's Capital*, (June 1994).

[40] Environmental Protection Agency. *EPA Progress Report on the Anacostia Ecosystem Initiative*, Chesapeake Bay Program, p. 4, (July 23, 1996).

[41] Ibid.

[42] National Wildlife Federation. *Combined Sewer Overflow*, Washington DC, p. 8, (1992).

[43] Ibid.

[44] These findings are also reported in African American Environmentalist Association, National Association of Neighborhoods, and National Wildlife Federation. *Our Unfair Share, A survey of Pollution Sources in Our Nation's Capital*, (June 1994).

The city's combined sewer overflows (CSOs) account for 70,000 pounds of nitrogen, 20,000 pounds of phosphorous, 3 million pounds of suspended solids, and 6 million pounds of BOD in the District's surface waters. CSOs are also the main source of bacterial pollution in its surface waters.[45] After rainfall, the Anacostia River regularly exceeds public health standards for coliform bacteria which is typically associated with raw sewage.[46] It also consistently exceeds the established limits for dissolved oxygen.[47] The Anacostia River's most contaminated portions are adjacent to outfall drains of the city's combined sewer drains.[48] The Anacostia receives about 60 percent (36 total) of the Districts' combined sewers.[49]

The Anacostia River's hydrological characteristics exacerbate the affect of both storm water runoff and CSOs on its ecological health. The Anacostia has very little surface slope which creates a slow current.[50] The Anacostia River's slow flow allows pollutants to accumulate and have a more lasting effect.[51]

The Potomac River is also characterized by oxygen deficits as well as high algae concentrations, although improvements have been made in recent years. While the dissolved oxygen levels in Rock Creek are adequate, its water suffers from elevated coliform bacteria levels that are typically associated with raw sewage contamination.[52]

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[45] National Wildlife Federation. *Combined Sewer Overflow*, Washington DC, p. 8, (1992).

[46] Ibid.

[47] African American Environmentalist Association, National Association of Neighborhoods, and National Wildlife Federation. *Our Unfair Share, A survey of Pollution Sources in Our Nation's Capital*, p. 20, (June 1994).

[48] These findings are also reported in African American Environmentalist Association, National Association of Neighborhoods, and National Wildlife Federation. *Our Unfair Share, A survey of Pollution Sources in Our Nation's Capital*, (June 1994).

[49] National Wildlife Federation. *Combined Sewer Overflow*, Washington DC, p. 8, (1992).

[50] Graber, B.P., and C.J. Graber. "Rehabilitation of Urban River Ecosystems. Lessons from the Anacostia and Potomac," in *Ecosystem Rehabilitation Vol. 2: Ecosystem Analysis and Synthesis*, SPB Academic Publishing by The Hague: The Netherlands p. 353, (1992).

[51] African American Environmentalist Association, National Association of Neighborhoods, and National Wildlife Federation. *Our Unfair Share, A survey of Pollution Sources in Our Nation's Capital*, p. 20, (June 1994).

[52] African American Environmentalist Association, National Association of Neighborhoods, and National Wildlife Federation. *Our Unfair Share, A survey of Pollution Sources in Our Nation's Capital*, p. 20, (June 1994).

3.3.2 Surface Water Point Sources

The District has thirteen permitted point sources (facilities) that discharge pollutants into the city's surface waters. These facilities are both publicly and privately owned facilities and are listed in Table 3-2.

Table 3-2: District Facilities with Active Wastewater Discharge Permits[53]

Facility Name	Industrial Classification	Discharge Type	Receiving Waters
1. Blue Plains Wastewater Treatment Plant, DC Dept. of Public Works	Sewerage System	Major	Potomac, Anacostia, Piney Rivers
2. Dalecarlia Treatment Plant, Washington	Water Supply	Major	Potomac River
3. PEPCO--Benning Road Facility	Electrical Services	Major	Anacostia River
4. PEPCO--Buzzard Point Facility	Electrical Services	Major	Potomac River
5. Amerada Hess Washington Terminal	Petroleum Bulk Station and Terminal	Minor	Anacostia
6. Barney Circle Freeway Modification Project	Inspection and Fixed Facility	Minor	Anacostia River
7. Commonwealth of Virginia DOT (Rosslyn Metro)	Regulations Admin. of Transportation Programs	Minor	Potomac River, Little River Branch
8. DC Materials, Inc.	Ready-Mix Concrete	Minor	Anacostia River
9. Goose Bay Aggregates, Inc.	Construction Sand and Gravel	Minor	Anacostia River
10. GSA West Heating Plant	Stream and Air Conditioning Supply	Minor	Rock Creek
11. JFK Center for Performing Arts	Performing Center	Minor	Potomac River
12. National Gallery of Art	Museums and Art Galleries	Minor	Washington Channel
13. Super Concrete Corporation	Ready-Mix Concrete	Minor	Anacostia River

Of the 13 facilities, there are 4 major dischargers and 9 minor dischargers. Major facilities are a greater threat to human health and the environment because of the quantity and toxicity of their releases. As such, these facilities must report to EPA their monthly discharges and concentrations.

The Dalecarlia Water Treatment Plant and Blue Plains Wastewater Treatment Plant pose the greatest risks to human health and the environment.[54] Blue Plains releases high quantities of potentially-harmful pollutants. It contributes 95 percent of the nitrogen and 53

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[53] Versar. *A Scientific Foundation for Setting an Environmental Agenda, An Environmental Characterization of the District of Columbia*, report prepared for U.S. EPA Region 3, p. 3-7, 3-8, (April 1996).

[54] Ibid, p. 3-25.

percent of the phosphorous loadings in the District.[55] The Blue Plains Plant also has

numerous permit violations.[56,57]

Blue Plains is operated by the District of Columbia and serves the District and portions

of Maryland and Virginia. It handles about 70 percent of the municipal sewage generated in the

immediate metropolitan Washington area.[58] The plant provides tertiary treatment for about 309

million gallons per day and primary treatment and disinfection for an additional 289 million

gallons per day of stormwater.[59]

Since the 1970s, Blue Plains has expanded and upgraded its operations. The result was

a dramatic improvement in water quality.[60] But the expanding population in portions of

Maryland and Virginia has again stressed the facility. In addition, the plant is faced with

financial problems that interfere with its ability to function.

In April 1996, EPA discovered that the city diverted $80 million from the fund that

supports Blue Plains' infrastructure improvements to pay for other municipal debts. Shortly

thereafter, EPA intervened and urged the District government to upgrade Blue Plains. In April

1996, the city agreed to spend approximately $20 million on overdue rehabilitation, operation,

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[55] Chesapeake Bay Research Consortium. *Special Tributary Strategy for Federal Lands in Washington, DC*.
Third Draft, (September 27, 1995).

[56] Versar. *A Scientific Foundation for Setting an Environmental Agenda, An Environmental Characterization
of the District of Columbia*, report prepared for U.S. EPA Region 3, p. 3-25, (April 1996).

[57] Other facilities having a high number of violations are PEPCO Benning Road, National Gallery of Art,
PEPCO Buzzard Point, and Super Concrete Corporation.

[58] Environmental Protection Agency. "Blue Plains: Saga of a Treatment Plant," *EPA Journal*, 20(1-2), EPA
175-N-94-002, (Summer 1994).

[59] Ibid.

[60] Moffatt, Jeff. *Natural Resources in the Potomac Watershed*, Alliance for the Chesapeake Bay for the Potomac
Visions Project, URL: http://web.gmu.edu/bios/potomac/visions/rept/factsht2.htm, (1996).

and maintenance of the facility.[61] The upgrades will focus on the plant's basins, chemical storage areas, and the primary sludge train.[62]

3.3.3 Fishing in the District's Surface Waters

Some of the hazardous contaminants found in the District's surface waters include arsenic, beryllium, chlordane, chromium, DDTs, mercury, nickel, PCBs, pesticides, and selenium.[63] These pollutants have a significant affect on the quality of the District's surface waters. For example, since 1989 the city has been under a public health advisory for the consumption of channel catfish, eel, and carp caught in the portions of the Potomac and Anacostia Rivers that are in the District, after elevated levels of PCBs and chlordane were detected in fish.[64] Contamination is generally highest in bottom-feeding fish such as catfish, eel, and carp. The Anacostia and the Potomac Rivers have higher contaminant concentrations than the do other water sources in the District.[65]

In 1994, the city issued new warnings against consuming all types of fish in the District's surface waters after contaminants were detected in fish other than bottom-feeders. The advisory cautions against the consumption of more than 1/2 pound per month of largemouth bass or 1/2 pound per week of sunfish or other fish. It also discourages the consumption of larger and older fish of legal size. In addition, the advisory offers cooking recommendations to reduce the fat content in cooked fish, such as removing the skin, grilling, broiling, and discarding oils or broth, thereby minimizing consumption of toxics that are stored in fatty tissues of fish.

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[61] "Washington D.C. Signs Accord on Blue Plains," *Engineering News-Record*, 236(15), p. 15, (April 15, 1996).

[62] Ibid.

[63] Versar. *A Scientific Foundation for Setting an Environmental Agenda, An Environmental Characterization of the District of Columbia*, report prepared for U.S. EPA Region 3, p. 4-13, (April 1996).

[64] Department of Consumer and Regulatory Affairs, *The District of Columbia Water Quality Assessment*, Environmental Regulation Administration, 1994 Report to the U.S. Environmental Protection Agency and U.S. Congress Pursuant to Section 305(b) Clean Water Act (P.L.97-117), (1994).

In 1993, the District sold 12,916 fishing licenses; of these, residents purchased 7,613.[66]

Two surveys in 1994 show that anglers along the Anacostia and Potomac Rivers harvested

over 86 percent of their catch for the purpose of consumption by themselves and others.[67,68]

These anglers supplemented their diets with catfish, eel, carp, bass, and perch. The typical

shoreline angler was African American male and a District resident, as seen in Table 3-3.

**Table 3-3: Profile of District Shoreline Anglers on the Anacostia and
Potomac Rivers, 1994[69,70]**

Racial/Ethnic Background	Percent of Sample	Area of Residence	Percent of Sample	Area of Residence within DC	Percent of Sample
African American	85%	DC	65%	Northwest	39%
Hispanic	7%	Maryland	25%	Southeast	34%
Caucasian	4%	Virginia	10%	Northeast	25%
Other	4%			Southwest	1%

In a similar study, Virginia State University conducted interviews with shoreline anglers

along the Anacostia River. Its results showed that most anglers were African American (68

percent). In addition, 80 percent of the anglers consumed fish weekly, as seen in Table 3-4. Of

[65] Velinsky, D.J. and Cummins, J.D. *Distribution of Chemical Contaminants in Wild Fish Species in the Washington DC Area.* Final Draft Report for District of Columbia, Department of Consumer and Regulatory Affairs, Water Quality Control Branch, Report #94-1, (1994).

[66] Department of Consumer and Regulatory Affairs, Environmental Regulation Administration. *Habitat Monitoring--1993, Submerged Aquatic Vegetation Survey of the Potomac and Anacostia Rivers Within the District of Columbia*, (1994).

[67] Ibid.

[68] These results are also reported in Versar. *A Scientific Foundation for Setting an Environmental Agenda, An Environmental Characterization of the District of Columbia*, report prepared for U.S. EPA Region 3, p. 4-15 to 4-18, (April 1996).

[69] Department of Consumer and Regulatory Affairs, Environmental Regulation Administration. *Habitat Monitoring--1993, Submerged Aquatic Vegetation Survey of the Potomac and Anacostia Rivers Within the District of Columbia*, (1994).

[70]These results are also reported in Versar. *A Scientific Foundation for Setting an Environmental Agenda, An Environmental Characterization of the District of Columbia*, report prepared for U.S. EPA Region 3, chapter 4, (April 1996).

the subjects surveyed, a significant portion were not aware of the city's 1994 fish advisory. The average annual household income for 70 percent of the anglers was less than $15,500. Thus many Anacostia River anglers may be subsistence fishers. The study did not report its sample size.

Table 3-4: Profile of Anacostia River Anglers in 1994[71,72]

Racial/Ethnic Background	Percent of Sample	Fish Consumption per Week	Percent of Sample	Type of Fish Consumed	Percent of Sample
African American	68%	1-3 Fish	52%	Catfish	60%
Asian American	10%	4-6 Fish	16%	Bass	14%
Hispanic	8%	7-9 Fish	6%	Carp	8%
Native American	2%	> 9 Fish	6%	Other	18%
Other	10%	At least 1 fish/week	80%		

Since the release of Virginia State University's findings, the city erected warning signs along the Anacostia and Potomac River banks that caution shoreline anglers against fish consumption and encourage catch-and-release practices.

3.4 Solid Waste

There are both point and non-point solid waste generators in the District. Solid waste point sources include permitted generators such as industrial facilities, whereas non-point sources include non-permitted generators such as households. It is uncertain which source is a greater problem in the District. Thus, the order in which they are presented below do not indicate relative importance.

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[71] Virginia State University. *The Forgotten River: A Preliminary Survey of the Anacostia River*, prepared for the Environmental Protection Agency, Office of Water, (1994).

[72] These results are also reported in Versar. *A Scientific Foundation for Setting an Environmental Agenda, An Environmental Characterization of the District of Columbia*, report prepared for U.S. EPA Region 3, chapter 4, (April 1996).

3.4.1 Solid Waste Point Sources

The city permits fifteen point sources to generate hazardous solid waste in the District. They are identified in Table 3-5. Private permitted facilities are the largest producers of hazardous waste, as seen in Table 3-6. The PEPCO Benning Road Generating Station generates 34 percent of all permitted hazardous waste. Federal facilities generate about 39 percent of all hazardous waste in the District.

Table 3-5: Permitted Hazardous Waste Generators in the District of Columbia[73]

Facility Name	Annual Tons of Hazardous Waste Managed	Type of Hazardous Waste
1. PEPCO Benning Road Facility	220.45	ICRT[*], spent solvents, discarded CCP[**]
2. Bureau of Engraving and Printing	134.58	lab pack, ICRT, spent cyanide, WW treatment sludge, solvent wash
3. Washington Metropolitan Area Transit Authority-26th Street	69.01	ignitable, corrosive, spent solvent, toxic
4. Washington Metropolitan Area Transit Authority--T Street	40.24	ignitable, corrosive, spent solvent, toxic
5. Bolling Air Force Base	27.72	ICRT, spent solvents, discarded CCP
6. Washington Gas and Light Co.	23.95	ignitable, toxic
7. Food and Drug Administration	21.51	ICRT, spent solvents, discarded CCP, production waste
8. Washington Post	19.38	ignitable, corrosive, spent solvent, toxic, discarded CCP
9. Walter Reed Army Medical Center	17.36	ICRT, spent solvents, discarded CCP
10. Architect of the Capital	16.54	ignitable, corrosive, spent solvent, toxic, discarded CCP
11. Government Printing Office	15.78	ignitable, corrosive, spent solvent, toxic
12. Naval Research Laboratory	14.70	ICRT, spent solvents, discarded CCP
13. Washington Post-Southeast Plant	14.22	ignitable
14. Naval District	2.92	ignitable, corrosive, spent solvent, toxic
15. Catholic University	2.88	lab packs, ICRT, spent solvents, discarded CCP
TOTAL	*641.24*	

[*] ICRT = ignitable, corrosive, reactive, toxic

[**] CCP = commercial chemical products

Table 3-6: Ownership of Permitted Hazardous Waste Generators in the District

Ownership	Percent of Total
• Private facilities (4)	40%
• Federal facilities (8)	39%
• City facilities (3)	21%
Total	100%

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[73] Versar. *A Scientific Foundation for Setting an Environmental Agenda, An Environmental Characterization of the District of Columbia*, report prepared for U.S. EPA Region 3, p. 3-36, (April 1996).

These data are limited, however, as they only capture hazardous waste information on large industrial facilities. Cumulatively, smaller firms may have a significant affect on the District's natural environment. The impact of smaller firms is unknown as EPA does not require smaller firms to report their releases. One study estimates, however, that smaller, unpermitted facilities generate as much hazardous waste as the 15 permitted facilities above.[74]

Abandoned or uncontrolled hazardous waste is tracked in EPA's Comprehensive Environmental Response, Compensation and Liability Information System, (CERCLIS). EPA documents each CERCLIS site to determine whether contamination exceeds public health standards for exposure and whether remediation is necessary. There are 32 CERCLIS sites in the District, as seen in Table 3-7. The risk data available for each CERCLIS site is limited and it is uncertain which sites pose greater health threats.

To date, none of the District's CERCLIS sites are on the National Priorities List (NPL) for cleanup. In July 1996, however, EPA requested the concurrence of city officials to list the Washington Naval Shipyard on the Superfund NPL.[75] A requirement of the current Superfund legislation specifies that EPA may not list a new site without state concurrence. EPA's Draft Preliminary Assessment for the Shipyard indicates that based on suspected releases to surface waters, ground water contamination, and the presence of a primary fishery and sensitive environments, it qualifies for the NPL.[76] EPA is also seeking to include the entire Anacostia River on the NPL as part of the Naval Shipyard contamination because the site abuts the river and contamination from soil into the surface water is likely. The actual listing of this site could take 6-9 additional months to complete. There are no other sites that are being considered for NPL classification.

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[74] Ibid, p. 3-38.

[75] Environmental Protection Agency. *EPA Progress Report on the Anacostia Ecosystem Initiative*, Chesapeake Bay Program, (July 23, 1996).

[76] Ibid.

Table 3-7: District of Columbia CERCLIS Sites[77]

Anacostia Drum Site	New Post Office
Anacostia Naval Station	Soapstone Creek
Anacostia Park Sections E and F	Soldiers and Airmen's Home
Bladensburg Road Site	St. Elizabeth's Hospital
Bureau of Printing and Engraving	Tuxedo Valet
Cuthbert St. Medical Waste	USA FT. McNair
Custom's Field Office	USDA National Arboretum
Dalecarlia WTP/Wash Aqueduct Division	USAF Bolling Air Force Base
Fenwick Road Trailers	USN Naval Security Station
Food and Drug Administration	USN Naval Research Lab Bldg. A-11
Fort Lincoln	Walter Reed Army Medical Center
GSA Washington Office	James T. Warring & Sons Inc.
Hubert H. Humphry Building	Washington Chemical Munitions
International Transmission	Washington Gas and Light Site
National Archives & Records Administration	Washington Navy Shipyard
PEPCO--Benning Road Facility	Washington Plating

3.4.2 Solid Waste Non-point Sources

Residential sources are the District's most significant non-point source of solid waste. The District collects residential solid waste once per week. Residential solid waste is transported to a landfill in Lorton, Virginia. Prior to 1996, solid waste collection occurred twice per week. The reduction in waste collection was due to lack of municipal funding, rather than a reduction in the rate of household waste generated.

Prior to 1995, the city collected residential recyclables twice per week. Then in April 1995, the city canceled the program because it was no longer economically viable.[78] After the Sierra Club sued the city to force it to reinstitute curbside recycling, the city signed a one-year contract with Eagle Maintenance in March 1996 to collect and process the District's

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[77] Environmental Protection Agency. *Hazardous Waste Sites--Washington DC*, Office of Emergency and Remedial Response, URL:
  `http://www.epa.gov/superfund/oerr/impm/products/cursites/cdcwaswa.htm`, (May 2, 1996).

[78] *Recycling Times*, April 18, 1995.

recyclables every two weeks.[79] When the contract expires, the District's City Council hopes to institute new regulations aimed at restoring funds to the District's recycling program. For example, the City Council wants to impose a $2-per-ton recycling surcharge on the city's waste haulers. The proceeds of the surcharge would fund the District's recycling program.[80] Bulk recyclables, such as refrigerators, radiators, and air conditioning units, have not been collected since 1995.

Illegal dumping is another non-point source of pollution in the District. One study estimates that the city contains more than 200 illegal dumps.[81] These dumps are primarily located in the north/south east portions of the city and in areas that are more economically stressed.[82] Illegal dumps affect community morale and neighborhood aesthetics. They can also affect public health. In 1995, one illegal dump resulted in the evacuation of three apartment buildings in a public housing development.[83] The dump was a repository for toxic chemicals. Aggregate information on the quantity and toxicity of the District's illegal dump sites is unavailable.

There are no hazardous waste data available on non-point sources, such as automobiles or stormwater runoff. As noted earlier, both of these types of sources may be significant contributors of hazardous waste.

3.5 Land Use

Eighty percent of the District's land is urban and developed. The remaining 20 percent of the city's land is parkland. The city has one of the highest percentages of parks in the

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[79] Egan, Katherine. "Washington, D.C., Continues to Collect City's Recyclables on Revised Biweekly Schedule," *Waste Age's Recycling Times*, p. 6, (May 14, 1996).

[80] Ibid.

[81] African American Environmentalist Association, National Association of Neighborhoods, and National Wildlife Federation. *Our Unfair Share, A survey of Pollution Sources in Our Nation's Capital*, p. 23, (June 1994).

[82] Ibid.

[83] Environmental Protection Agency. *Enforcement and Compliance Assurance for a Cleaner Environment*, Office of Enforcement and Compliance Assurance, EPA 300-N95-003, (August 1995).

nation.[84] The District's parkland supports resident and non-resident recreationists and wildlife. Federal lands account for 40 percent of the total District lands.

National Park Service lands are the most significant source of parklands in the District. There are 27 National Parks in the District, listed alphabetically in Table 3-8. These parks account for 8,845 acres in the District.[85] The National Park Capital Area Parks does not maintain an inventory of the individual park sizes.[86]

Table 3-8: District of Columbia Federal Parks

Anacostia Park	National Mall
Chesapeake & Ohio Canal National Historical Park*	Old Post Office Tower
Constitution Gardens	Pennsylvania Avenue National Historic Site
Ford's Theatre National Historic Site & The House Where Lincoln Died	Potomac Heritage Trail*
Fort Dupont Park	President's Park
Frederick Douglas National Historic Site	Rock Creek Park
Kahlil Gibran Memorial Garden	Sewall-Belmont House
Kenilworth Aquatic Gardens	Theodore Roosevelt Island
Lincoln Memorial	Thomas Jefferson Memorial
Lyndon B. Johnson Memorial Grove	United States Navy Memorial
Mary McLeod Bethune Council House National Historic Site	Vietnam Veterans Memorial
Mary McLeod Bethune Memorial	Washington Monument
National Capital Parks	The White House
National Law Enforcement Officers Memorial	

*Only a portion of this park lies within the District of Columbia.

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[84] World Resources Institute. *The 1993 Information Please Environmental Almanac*, New York: World Resources Institute, (1993).

[85] National Park Service, *Background PARKS OF THE NATION'S CAPITAL*, URL: `http://www.nps.gov/ncro/ncr.wp5.html`, (search executed August 22, 1996).

[86] Cook, Joe, National Capital Area Parks, telephone interview (August 21, 1996).

The District's parkland supports both resident use and use by non-resident recreationists from nearby Maryland and Virginia. In addition, thousands of tourists also visit the District's parks each year. The National Park Service estimates park use by calculating recreation visitor days. One recreation visitor day equals 12 hours of park use (one person for 12 hours or 12 people for 1 hour or any combination thereof). Table 3-9 shows the District's National Park annual visitor days in 1995.

Table 3-9: Ranking of District of Columbia's Federal Parks by 1995 Visitors[87]

National Park	Annual Visitor Days
1. National Capital Parks[88] (includes Anacostia NP, Constitution Gardens, Fort Dupont Park, Kenilworth Aquatic Gardens, National Mall, Old Post Office Tower, President's Park)	5,513,000
2. Rock Creek Park	2,049,100
3. Chesapeake & Ohio Canal National Historical Park	1,624,000
4. Lincoln Memorial	1,291,600
5. Vietnam Veterans Memorial	1,221,700
6. The White House	1,120,900
7. Ford's Theatre National Historic Site & The House Where Lincoln Died	1,026,000
8. Washington Monument	943,100
9. Lyndon B. Johnson Memorial Grove	625,300
10. Theodore Roosevelt Island	588,100
11. Pennsylvania Avenue National Historic Site	212,300
12. Frederick Douglas National Historic Site	53,300

City parks are another significant source of parklands in the District, although they account for one-twelfth the acreage of federal parks. The DC Department of Recreation and Parks maintains an inventory of its parks. There are over 500 parks that account for about 680 acres in the District. The city classifies its parks into 5 categories: (1) small triangular parks,

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[87] Division of Education and Interpretation, National Capital Field Area of the National Park Service, (August 23, 1996).

[88] The Division of Education and Interpretation classifies these parks as National Capital Parks for administrative purposes. There are no data available on annual recreation visitor days for each park within the National Capital Parks.

(2) median strips, (3) road side, (4) facilities, (5) school based centers. The quality of these parks, however, is questionable as median strips and road sides do not offer many recreational opportunities or much wildlife habitat. The city operates 30 parks that are over 5 acres and 510 that are less than 5 acres, as seen in Table 3-10.

Table 3-10: District of Columbia City Parks and Recreation Facilities

Park Size	Number of Parks	Total Acres	Average Park Size
≤ 1.0 acre	419	182.0	0.4
Between 1.1 and 5.0 acres	61	171.9	2.8
Between 5.1 and 10.0 acres	17	125.4	7.4
Between 10.1 and 15.0 acres	8	98.5	12.3
Between 15.1 and 20.0 acres	1	19.3	19.3
Between 20.1 and 25.0 acres	1	22.0	22.0
> 25 acres	3	185.7	61.9
Total Acres	507	681.2	1.3

Other types of land use in the District are a function of national and regional economic forces. New jobs in the Washington metropolitan region have increased resident movement. In recent years, Maryland and Virginia have increased their residential base. At the same time, District residents moved away from the city. The movement is due, in part, to the increased cost of living in the city and the general difficulty of transacting business in the District. The movement towards the suburban areas has placed increased demands on auto travel, road extensions, sewers and utilities to outlying sites, road repair, and congestion.

Landuse developments along the District's surface waters also contribute to increased sedimentation. The Anacostia River's main sources of sedimentation occur from soil erosion due to construction.[89] Deforestation also contributes to increased sedimentation in surface waters and removes habitat for wildlife.

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[89] Graber, B.P., and C.J. Graber. "Rehabilitation of Urban River Ecosystems. Lessons from the Anacostia and Potomac," in *Ecosystem Rehabilitation Vol. 2: Ecosystem Analysis and Synthesis*, SPB Academic Publishing by The Hague: The Netherlands p. 349-378, (1992).

3.6 Toxics

Industrial toxic releases in the District, as reported in the Toxic Release Inventory (TRI), are among the lowest amounts for any metropolitan area.[90] Since 1985, toxic releases have varied greatly but generally have ranged between 500 and 25,000 tons per year.[91] The District's toxic waste generators are listed in Table 3-11. Five of the six TRI reporting facilities are federally owned facilities.

TRI data for the District show that permitted facilities released over 23,000 pounds of toxic waste in 1994, as seen in Table 3-12.[92,93] Because TRI data are aggregated by state, it is not possible to compare the DC's releases to cities with similar characteristics. American Samoa is the only state that had fewer TRI releases than the District in 1994.[94]

Table 3-11: TRI Emitting Facilities in the District of Columbia in 1994[95]

Facility Name	Toxic Chemicals Emitted
Airforce--Bolling AFB	hydroquinone
Army Corps of Engineers--Dalecarlia WTP Aqueduct	chlorine
Army Corps of Engineers--McMillan WTP Aqueduct	chlorine, copper compounds
Bureau of Engraving	glycol ethers, nickel, sulfuric acid
Capital Printing Ink Co., Inc.	copper compounds, phosphoric acid
Secret Service	lead

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[90] World Resources Institute. *The 1993 Information Please Environmental Almanac*, New York: World Resources Institute, (1993).

[91] Ibid.

[92] TRI data have a two year lag on public release. Thus 1994 is the most recent year for toxic releases available.

[93] The most recent toxic release data are for 1994.

[94] Environmental Protection Agency. *1994 Toxic Release Inventory, Public Data Release*, Office of Pollution Prevention and Toxics, Washington DC, EPA 645-R-96-002, p. 21, (June 1996).

[95] Environmental Protection Agency. Toxic Release Inventory System Query, URL: http://www.epa.gov/cgi-bin/enviro/dm4_tris, (July 29, 1996).

Table 3-12: Total TRI Releases in the District of Columbia in 1994[96]

Type of TRI Releases	Pounds
▪ Releases to land	17,300
▪ Air emissions	4,891
▪ Surface water discharges	1,600
▪ Underground injection	0
Total Releases	*23,791*

TRI reporting facilities are typically larger companies. Cumulatively, smaller firms may also have a significant affect on the District's natural environment. The impact of smaller firms is unknown as EPA does not require smaller firms to report their releases. In addition, federal law excludes does not require utility plants, such as those operated by PEPCO, from the requirement to publicly report their toxic releases. These facilities may also be a significant source of toxic releases.

Other toxics, such as lead, are found in air, drinking water, homes, soil, and surface water. The data on the District's lead contamination sources are limited to one 1980 study on soil contamination. The study examined community garden soils throughout the District. Its results showed that soil near homes painted with lead-based paints and near roads and factories have greater lead contamination.[97] The study also showed that lead found in the District's community gardens are primarily from three sources: lead based paint, sewage sludge, and automobile exhaust.[98] The study tested for numerous metals and lead was the most prevalent toxic. Contamination was also more prevalent near the District's downtown area. Lead does

[96] Environmental Protection Agency. *1994 Toxic Release Inventory, Public Data Release*, Office of Pollution Prevention and Toxics, Washington DC, EPA 645-R-96-002, p. 21, (June 1996).

[97] Andrews, Sandra, *Lead and Our Environment*, assistant professor, food science and human nutrition, URL: http//www.msue.msu.edu/msue/imp/modac/e2416092.html, p. 3, (no date given).

[98] Preer, J.R.; H.S. Sekhon; J. Weeks, Jr.; and B.R. Stephens. "Heavy Metals in Garden Soil and Vegetables in Washington, DC," *Trace Substances in Environmental Health--XIV*, Conference Paper, University of Missouri, Columbia, MO, (1980).

not decay or biodegrade and will remain in soils for many years.[99] So, while this study is dated and the amount of lead-based products used in gasoline and paint has decreased, its results may still be valid.

Lead is also found in the District's drinking water. In 1993, the District announced that 25 percent of its taps tested contained lead amounts greater than the EPA standard.[100] Lead pipes and copper pipes with lead solder are the primary sources of lead contamination in drinking water. The Department of Public Works estimates that 28,000 lead service lines connect the city's water mains with private property.[101] In 1987, the District began replacing lines containing lead to reduce the public's lead exposure. As of 1992, 882 lines of the 28,000 were completed.[102]

While lead-based paint use became obsolete in 1978, approximately 75 percent of existing housing units in the District were built prior to 1978.[103] Much of the leaded paint in these homes remains today.[104] As the leaded paint deteriorates and cracks, lead becomes airborne and is inhaled. Scraping or sanding painted walls or woodwork increases the risk of inhalation. The lead-based paint is often contained by coating it with a non-toxic paint. It is uncertain how many District homes contain exposed lead-based surfaces. There is a greater

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[99] Andrews, Sandra, *Lead and Our Environment*, assistant professor, food science and human nutrition, URL: http//www.msue.msu.edu/msue/imp/modac/e2416092.html, p. 3, (no date given).

[100] Olson, Erik, Natural Resources Defense Council, Senior Attorney. Testimony before the Water Resources and Environment Subcommittee of the Committee on Public Works and Transportation, United States House of Representatives, p. 3, (December 20, 1993).

[101] African American Environmentalist Association, National Association of Neighborhoods, and National Wild-life Federation. *Our Unfair Share, A survey of Pollution Sources in Our Nation's Capital*, p. 23, (June 1994).

[102] Olson, Erik, Natural Resources Defense Council, Senior Attorney. Testimony before the Water Resources and Environment Subcommittee of the Committee on Public Works and Transportation, United States House of Representatives, p. 3, (December 20, 1993).

[103] District of Columbia Department of Human Services, *What Everyone Should Know About Lead Poisoning*, Childhood Lead Poisoning Prevention Program, Washington, DC, (1992).

[104] Andrews, Sandra, *Lead and Our Environment*, assistant professor, food science and human nutrition, URL: http//www.msue.msu.edu/msue/imp/modac/e2416092.html, p. 2, (no date given).

likelihood, however, that residential units inhabited by lower income dwellers have not sufficiently contained the lead in their homes.

HUD's Lead Abatement Program offers federal funding to cities so that they can mitigate their lead contamination. The District may qualify for this grant. To date, however, the city has not applied for the federal funding. Volunteers at Georgetown University's Law Center in the Environmental Law Clinic have assisted the city government in completing its lead-grant application.

3.7 Transportation

The District's transportation infrastructure occupies a significant portion (22 percent) of the city's land.[105] In 1991, the Department of Public Works (DPW) estimated that the District registered 243,000 motor vehicles. Non-residents also rely on the city's roadways. DPW estimates that about 800,000 vehicles enter the city each weekday. Thus the District's transportation system is a multi-jurisdictional concern.

The cumulative affect of vehicle use in the Washington area (which includes portions of Maryland and Virginia) is significant. There are approximately 2.8 million registered vehicles that release 369 tons of hydrocarbons, 1,693 tons of carbon monoxide, and 161 tons of nitrogen oxides each day.[106] The availability of public transportation has not reduced the increasing demand for vehicle transportation, even though the District's METRO system has the second highest use rates in the nation.[107] The Washington Metropolitan Council of Governments estimates that if the region continues to grow at the same rate as in previous years, by the year 2020 there will be a 70 percent increase in the vehicle miles traveled.[108] As

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[105] District of Columbia Office of Policy and Evaluation. *Indices: A Statistical Index to the District of Columbia Services*, p. 283-286, (1992).

[106] Metropolitan Washington Council of Governments. *Pollution Prevention Project: Identification and Quantification of Vehicular Wastes in the Metropolitan Washington Area*, Washington DC, p. 1, (1992).

[107] Versar. *A Scientific Foundation for Setting an Environmental Agenda, An Environmental Characterization of the District of Columbia*, report prepared for U.S. EPA Region 3, p. 2-8, (April 1996).

[108] Desjardin, Paul. Metropolitan Washington Council of Governments, Telephone interview (Aug. 22, 1996).

the congestion increases, vehicle operators also increase their demand for wider roads and new road construction which affects land use.

The increasing demands on the city's transportation infrastructure currently exceed the city's ability to maintain its operation. Residents and District commuters are faced with pot holes, non-functioning traffic lights, and inadequate snow removal. To the extent that such problems encourage use of public transportation, they may actually have a beneficial environmental effect. However, these problems may discourage location of employment sources and residents within the District and erode the city's economic viability.

4: PRIORITIES BASED ON HEALTH IMPACT

4.0 Introduction

Humans are exposed to environmental health risks through three major routes: dermal contact, ingestion, and inhalation, as seen in Table 4-1.

Table 4-1: Methods of Health Risk Exposure[1]

Risk Exposure Type	Exposure Method
• Dermal	Pollutants contacting the surface of the skin
• Ingestion	Eating or drinking contaminated foods and water
• Inhalation	Breathing in pollutants from the air

4.1 Air Pollution

Overall, the air quality in the District is relatively good.[2] Ozone continues to be a problem, however, and contributes to respiratory problems, eye irritation, and reduced lung function. The Harvard School of Public Health and the American Lung Association estimated that in the summer of 1994, high levels of ozone in city's air caused 600 hospital admissions in the District.[3] Individuals at particular risk are those with pulmonary diseases, such as asthma or emphysema. Thousands of otherwise healthy people may also experience adverse health affects, however, when concentrations of pollutants (such as ozone) are high.

Within each of the three exposure routes, an individual may be exposed to health risks through numerous sources. Typical exposure sources include contact with contaminated soils from playgrounds, polluted drinking water from treatment chemicals, and outdoor air emissions from automobiles, as seen in Table 4-2.

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[1] Versar. *Scientific Foundation for Setting an Environmental Agenda, An Environmental Characterization of the District of Columbia*, report prepared for U.S. EPA Region 3, p. 4-1, 4-2, (April 1996).

[2] Ibid, p. 4-31.

Table 4-2: Examples of Health Risk Exposure[4]

Risk Exposure Type	Exposure Media	Examples of Exposure Sources
Dermal	Contact with contaminated waters and sediments	▪ Swimming ▪ Boating ▪ Wading ▪ Skiing
	Contact with contaminated soils	▪ Gardening ▪ Playgrounds
	Use of household products	▪ Cleaners ▪ Treated Fabrics
	Fallout of pollutants from air	
Ingestion	Eating Contaminated Foods	▪ Vegetables (root crops--carrots, onions, beets, etc.) ▪ Fruits and vegetables treated with pesticides ▪ Fruits and vegetables contaminated from air pollutants that fall on the exposed plant or dissolve in rainwater or irrigation water ▪ Meats that have been stored improperly or if animals eat contaminated soil, or feed crops ▪ Fish/shellfish that was caught from contaminated water
	Ingesting Contaminated Soils	▪ Children that eat soils contaminated with lead, PCBs, or pesticides
	Drinking Contaminated Water	▪ Ground and surface water contaminated from runoff ▪ Unintentional ingestion while swimming ▪ Leaching of substances from water pipes--ex. Lead ▪ Water treatment chemicals ▪ Bottled Water
Inhalation	Outdoor Air	▪ Automobile emissions ▪ Airplane emissions ▪ Power plant emissions ▪ Emissions from factories
	Indoor Air	▪ Tobacco smoke ▪ Kerosene heaters ▪ Aerosol sprays ▪ Carpets ▪ Household cleaners ▪ Cosmetics (hairsprays) ▪ Interior paints ▪ Molds

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[3] Lee, Gary. *The Washington Post*, "Hospitalizations Tied to Ozone Pollution," A3, (June 21, 1996).

[4] Ibid, p. 4-1, 4-2.

The following sections describe the major environmental health risks in the District of Columbia. They are: air quality, drinking water, water quality, and toxics. While these four areas do not account for all health risks, they do account for the most significant risks to humans because of their high exposure rates and toxicity.

There are no data available on the total population of high risk individuals within the District. One study, however, estimates the at-risk populations in the DC metropolitan area (which includes portions of Virginia and Maryland). The results show that those individuals at particularly high risk are:[5]

- Any of the estimated 210,000 metropolitan residents who have serious, permanent, or chronic lung disease, such as bronchitis or emphysema;
- Any of the 736,400 children under the age of 13 who live in the DC metropolitan region;
- Any of the 225,700 asthmatics residing in the metropolitan area, including 53,200 children and 108,500 adults;[6]
- Any of the 336,000 metropolitan residents over the age of 65.

Residents who are otherwise healthy and exercise outdoors may also be at higher risk for health damage during the summers (which are characterized by higher ozone levels). One study by the Cornell Medical Center examined the intake of air pollutants and concluded that running in a typical urban area for 30 minutes on high-pollution days can be the equivalent of

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[5] Versar. *A Scientific Foundation for Setting an Environmental Agenda, An Environmental Characterization of the District of Columbia*, report prepared for U.S. EPA Region 3, p. 4-31, (April 1996).

[6] We recognize that 108,500 adults added to 53,200 children does not equal 225,700, but 161,700. At least one of the three estimates is incorrectly reported.

smoking a pack of cigarettes.[7] The higher risk is due primarily to a 10 fold exposure increase from elevated breathing.[8]

While the District meets the EPA standards for air particulates, a study by the Natural Resources Defense Council (NRDC) determined that particulates affect human health in the Washington area. The study estimates that air particulates contribute to 588 deaths each year in the Washington metropolitan area.[9,10] When compared to other U.S. cities, however, the Washington area has relatively few deaths attributable to air particulate inhalation. The study showed that the District ranks 198th out of 239 cities with respect rates of deaths attributable to air quality.[11]

Indoor air quality may also compromise human health for some District residents. Because most people spend 90 percent of their time indoors, and because levels of most pollutants are higher indoors than out, indoor air contamination has the potential of significantly impacting human health.[12] Indoor air pollutants include bacteria, molds, tobacco smoke, carbon monoxide, radon, asbestos, and others.

Data that assess the quality of the District's indoor air are limited. Nationally, we know that environmental tobacco smoke (ETS) is a significant health risk, however. ETS is responsible for lung cancer in adults, low birth weight babies, increased ear and upper respiratory disorders among children, and increased severity of asthma in children and adults.[13] While the vast majority of those exposed to environmental tobacco smoke experience only eye,

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[7] Erikson, Kurt G., American Lung Association of Northern Virginia, "When Exercise Can Be Harmful to Your Health," *The Washington Post*, (August 18, 1996).

[8] Ibid.

[9] These estimates also include the Maryland and Virginia suburbs.

[10] Lee, G. "Air Pollution Tied to 64,000 Premature U.S. Deaths," *Washington Post*, A4, (May 9, 1996).

[11] Ibid.

[12] Environmental Protection Agency. *Environmental Progress and Challenges: EPA's Update*, Office of Policy, Planning, and Evaluation, (EPA-230-07-033), (1988).

[13] Center for the Environment. *A Report on the Findings of the Technical Advisory Committees of The Regional Environmental Priorities Project*, Regional Priorities Project, Case Western Reserve University, p. 38 (1995).

nose, and throat irritation, some sub-populations, such as children and adults with pre-existing disease, are at risk for serious health effects.[14]

Local data on indoor air quality indicate that carbon monoxide may also be a health risk for city residents. One study showed that District residents are exposed to greater levels of carbon monoxide than are those living in the suburbs.[15] Also, carbon monoxide levels appear to be lower in the northwestern section than in the south/north eastern sections. Higher levels of carbon monoxide may be attributed to greater traffic flow, increased use of gas stoves, and greater numbers of residence smokers.[16] There are other factors, however, that contribute to the higher carbon monoxide level and remain unexplained.

4.2 Drinking Water

The quality of the District's drinking water is a serious public health concern. It serves as the primary source for drinking water for the city's households and businesses. Sixty-three percent of the District's residents rely on the city's drinking water system as their primary source of drinking water.[17] The presence of bacteria, parasites, lead, and trihalomethanes all affect human health.

Bacterial growth in the city's drinking water has several health implications. Coliform bacteria may indicate the presence pathogens, such as cholera, typhoid, and paratyphoid in the public drinking water. Chlorination typically kills these bacteria. However, the city's recent attempts to disinfect the pipes that carry the drinking water supply with chlorine doses had no effect. The District's bacteria levels in its drinking water supply exceed EPA's health standards and have since May 1996. It is uncertain how many residents, if any, have been affected by the bacteria in the drinking water supply.

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[14] Ibid.

[15] Schwab, M. "An Examination of the Intra-SMA Distribution of Carbon Monoxide Exposure," *Journal of Air Waste Management Association*, 40, p. 331-336, (1990).

[16] Ibid.

The city's drinking water filtration system is also a serious health concern. Cryptosporidium and giardia are two parasites that live in the city's raw drinking water supply. Under satisfactory conditions, the city's filtration system removes these parasites from the treated drinking water. In 1995, however, the city failed EPA tests that indicate the possible presence of parasites in the drinking water supply.[18] Both cryptosporidium and giardia affect human digestive tracts and induce temporarily debilitating diarrheal disease.[19] Although the acute stage generally lasts about 3 to 4 days, untreated intestinal parasites often cause chronic infection, characterized by recurrent periods of acute illness lasting several days.[20] This stage may last for months. If these parasites enter the District's drinking water, the health effects could be severe. For example, in Milwaukee, ineffective filtration allowed the passage of cryptosporidium into its drinking water. The parasite sickened 400,000 people and killed over 100 people.[21]

Additional contaminants in the city's drinking water, such as lead, may also affect public health. Children can absorb more than 50 percent of the lead found in water. Adults absorb between 30 percent and 50 percent of lead from water.[22] It is likely that those populations most affected by lead in the public drinking water system live in households that do not have the means to purchase bottled water. Thus socioeconomic status may be a determinant for those at greatest risk. The extent that lead in the city's drinking water affects the health of its residents is uncertain.

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[17] Centers for Disease Control. "Assessment of Inadequately Filtered Public Drinking Water--Washington, DC, December 1993," *Morbidity and Mortality Weekly*, 43(36), (September 16, 1994).

[18] The city failed 3 tests for turbidity which indicates poor filtration integrity.

[19] Wolfe, M.S. "Managing the Patient with Giardiasis: Clinical, Diagnostic and Therapeutic Aspects," in *Waterborne Transmission of Giardiasis*, (W. Jakubowski and J.C. Hoff, Eds.), Prepared for Environmental Protection Agency, Health Effects Research Laboratory and Municipal Environmental Research Laboratory, Cincinnati, HO (available from National Technical Information Service, Springfield, VA, PB 299-265), (1979).

[20] Harrington, Winston, Alan J. Krupnick, and Walter O. Spofford, Jr. "The Economic Losses of a Waterborne Disease Outbreak," *Journal of Urban Economics*, 25, p. 24 (1989).

[21] Olson, Erik D. *The Troubled D.C. Drinking Water Supply: A Preliminary Review of Problems*, Natural Resources Defense Council, p. 4, (December 1995).

[22] Andrews, Sandra, *Lead and Our Environment*, assistant professor, food science and human nutrition, URL: http//www.msue.msu.edu/msue/imp/modac/e2416092.html, p. 3, (no date given).

Other contaminants in the District's drinking water that may affect human health are trihalomethanes. The chlorine disinfection produces trihalomethanes that include chloroform and other cancer-causing materials.[23] Trihalomethanes have been detected in the drinking water at levels above 200 ppb. The average levels, however, are less than 100 ppb and are considered safe by EPA.[24]

Despite the city's problems, EPA states that the District's drinking water is usually safe for consumption and is not a widespread threat to public health.[25,26] The Agency recommends that only those individuals having weakened or suppressed immune systems need take precautions (consult their physicians and/or boil the water) before consuming the drinking water.[27]

4.3 Water Pollution

The quality of the District's surface waters affects numerous residents including individuals living adjacent to the city's waterways and residents who recreate in or near surface waters. Those residents at greatest risk, however, are individuals that consume the fish living in the District's polluted waters. Human exposure to chemical contaminants through fish consumption are a function of both the amount of fish consumed and the concentration of contaminants in the fish. Human populations most affected are subsistence anglers who obtain a large portion of their diet from fish that they harvest.[28]

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[23] Olson, Erik D. *The Troubled D.C. Drinking Water Supply: A Preliminary Review of Problems*, Natural Resources Defense Council, (December 1995).

[24] Ibid, p. 5.

[25] Environmental Protection Agency. *Fact Sheet. Direct Implementation of the Public Water System Supervision Program in the District of Columbia*, EPA Region 3, (1996).

[26] EPA's Water Quality Hotline, August 9, 1996.

[27] Ibid.

[28] Environmental Protection Agency. *Consumption Surveys for Fish and Shellfish. A Review and Analysis of Survey Methods*, Office of Water, 822/R-92-001, (1992).

The data on the quantitative risk affects of fish consumption are limited. What is known, however, is that most (78 percent) of shoreline anglers eat their catch.[29] In addition, shoreline anglers typically consume carp, eel, and catfish--the very types of fish the District's fishing advisory warns against.

Preliminary risk data indicate that carcinogens such as PCBs and chlordane are two contaminants humans ingest when consuming fish from the District's surface waters.[30] Besides subsistence anglers, those at greatest risk due to fish consumption are pregnant women, women who are breast feeding, women who expect to bear children, and children under 15 years old who consume fish from District water.[31]

4.4 Toxics

Limited data exists on the health risks associated with the District's urban toxics. For common toxics, such as lead, however, general exposure information is well documented. Lead contributes to developmental problems in children. Health risk is highest for the fetus. Children are also at greater risk because of their increased likelihood of contact with soil. As noted earlier, children also have a greater ability to absorb lead in their systems, which also puts them at higher risk. Children with low intakes of iron, calcium, protein, or zinc experience enhanced lead absorption.[32]

A study by Rafia, et al. shows that the District's inner-city children may be at especially high risk for lead poisoning. The study showed that in 1993 lead levels in blood were 60 percent higher for the District's inner-city children than for children of similar ages in suburban

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[29] Department of Consumer and Regulatory Affairs, Environmental Regulation Administration (1994), Virginia State University (1994), Versar (April 1996).

[30] Velinsky, D.J. and Cummins, J.D. *Distribution of Chemical Contaminants in Wild Fish Species in the Washington DC Area.* Final Draft Report for District of Columbia, Department of Consumer and Regulatory Affairs, Water Quality Control Branch, Report #94-1, (1994).

[31] Versar. *A Scientific Foundation for Setting an Environmental Agenda, An Environmental Characterization of the District of Columbia*, report prepared for U.S. EPA Region 3, p. 4-21, (April 1996).

[32] Andrews, Sandra, *Lead and Our Environment*, assistant professor, food science and human nutrition, URL: http//www.msue.msu.edu/msue/imp/modac/e2416092.html, p. 1, (no date given).

and rural areas.[33] In addition, the study found that 85 percent of the District's inner-city children had no Medicaid or no medical insurance and are thus less likely to receive medical treatment for lead poisoning.[34] Conversely, children from suburban areas were more likely to have medical insurance and receive medical treatment. Thus socioeconomic status may be a risk factor for inner-city children with respect to lead-blood contamination.[35]

The District of Columbia's Lead Poisoning Prevention Program performs blood lead level screening annually for the District's children. Blood lead data for children in 1993, however, show that 18 percent of inner-city children were outside the CDC's acceptable range for lead.[36,37] Demographic information is not available for the children tested and trends cannot be shown with respect to geographic location, income, race or ethnicity.[38]

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[33] Rafia, N.; G. Cohen; M. Wolf; L. Cohen; C. Fraser; et al. "Incidence of Lead Poisoning in Young Children From Inner-City, Suburban, and Rural Communities," *Therapeutic Drug Monitoring*, 15, p. 71-74, (1993).

[34] Ibid.

[35] Ibid.

[36] Versar. *A Scientific Foundation for Setting an Environmental Agenda, An Environmental Characterization of the District of Columbia*, report prepared for U.S. EPA Region 3, 4-38, (April 1996).

[37] We tried to verify these results with Ella Witherspoon the District of Columbia Lead Poisoning Prevention Program on August 23, 1996. She was not able to provide the data, however.

[38] Witherspoon, Ella. District of Columbia Lead Poisoning Prevention Program, telephone interview (August 23, 1996).

5: PRIORITIES BASED ON ECOLOGICAL IMPACT AND QUALITY OF LIFE

5.0 Introduction

The quality of the District's environment affects the health of its vegetation and wildlife. The term "wildlife" implies not just animals such as deer, squirrels, or raccoons, but the whole interactive ecological community. For example, microorganisms in soil, invertebrates such as worms and insects, and vertebrates such as amphibians and birds are all part of wildlife.

Ecological health contributes to human welfare. For example, wetlands reduce flooding, filter water of toxins or sediment, and serve as tourist attractions. The quality of the environment also affects resident lifestyles and satisfaction with their surroundings. The District's environmental priorities based on ecological impacts and on residents' quality of life are described below.

5.1 Ecological Impact

The most significant ecological priority in the District is the quality of its surface waters. Three major pollutants continue to affect the surface waters' ecological health; they are nutrients, suspended sediments, and toxins.[1] Of these, nutrients are the largest problem. Nutrients reduce oxygen levels in water and promote noxious algae growth.[2] Excessive algae growth decreases the oxygen content in surface waters. The result is a diminished population of aquatic life.

Sedimentation also affects ecological health. Storm water runoff, combined sewer overflows, and land development all contribute to sedimentation. Other contaminants such as suspended solids and eroded soil carried by streams and waterways, also harm the river's

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[1] Moffatt, Jeff. *Natural Resources in the Potomac Watershed*, Alliance for the Chesapeake Bay for the Potomac Visions Project, URL: http://web.gmu.edu/bios/potomac/visions/rept/factsht2.htm, (1996).

[2] Ibid.

ecological system. These pollutants cloud the rivers' waters and block sunlight, thereby causing excessive algae growth.

In the Anacostia River, toxics contribute to tumor development in fish populations. Fish are exposed to chemicals from the water, sediment, and food which accumulate in their tissues. Chemical concentrations are especially higher in fatty tissues, liver, and bone.[3] Concentrations of many contaminants, such as PCBs, are greatest in the American eel and channel catfish.[4] Wildlife that rely on the District's surface waters for life support may be affected. For example, these toxins could potentially affect carnivorous bird populations that live along the District's surface waters, such as the bald eagles that were released along portions of the Anacostia River. The toxics also affect plant life. Plants typically absorb the contaminants in soils and concentrate them in their leaves. When these plants are consumed by wildlife, they too, may be affected.

While the Potomac River's water quality is much better than the Anacostia's, this has not always been the case. In 1970, the Potomac was characterized by acid spoil from mines, storm water runoff, and untreated sewage.[5] It also suffered from loss of aquatic life due to diminished levels of dissolved oxygen. A major factor in the Potomac's recovery was a $1.6 billion investment in upgrades to the Blue Plains Wastewater Treatment Plant in the 1970s.[6] The upgrades substantially reduced the river's organic material, suspended solids, and

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[3] Versar. *A Scientific Foundation for Setting an Environmental Agenda, An Environmental Characterization of the District of Columbia*, report prepared for U.S. EPA Region 3, p. 4-13, (April 1996).

[4] Velinsky, D.J. and Cummins, J.D. *Distribution of Chemical Contaminants in Wild Fish Species in the Washington DC Area*. Final Draft Report for District of Columbia, Department of Consumer and Regulatory Affairs, Water Quality Control Branch, Report #94-1, (1994).

[5] Graber, B.P., and C.J. Graber. "Rehabilitation of Urban River Ecosystems. Lessons from the Anacostia and Potomac," in *Ecosystem Rehabilitation Vol. 2: Ecosystem Analysis and Synthesis*, SPB Academic Publishing by The Hague: The Netherlands p. 350, (1992).

[6] Uman, Myron F. "Blue Plains: Saga of a Treatment Plant," *EPA Journal*, 20(1-2), p. 21, (1994).

phosphorus loadings.[7] As a result there are over 65 species of fish within the portion of the Potomac that runs through the District today.[8]

The Potomac River is not completely restored, however. The river is still under fishing advisories. Fishery declines in the lower Potomac are also an ecological concern. The Potomac is historically a source of commercial catches of rockfish, shad, oysters, perch, and other species which are now in decline. Nutrient overloads may be the cause of the fish declines.[9]

Air pollution may also affect the District's ecological environment, although, data are not available to show the extent of its impact.

5.2 Quality of Life

The District's natural environment also affects the quality of life of District residents. The city's livability is a function of its air and surface water quality, drinking water, green space, and transportation. Each of these issues are described below.

Air pollution affects some residents more than others. Those residents with respiratory problems are most affected. During air quality alerts, however, when ozone levels are unsafe, all residents are advised to remain indoors as much as possible and in air conditioned environments.[10] Also, during air quality alerts District residents are recommended to avoid heavy exertion from all outdoor activities.

Surface water pollution also affects the quality of life of DC residents. Poor water quality has eliminated swimming, wading, and other water activities that involve dermal

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[7] Graber, B.P., and C.J. Graber. "Rehabilitation of Urban River Ecosystems. Lessons from the Anacostia and Potomac," in *Ecosystem Rehabilitation Vol. 2: Ecosystem Analysis and Synthesis*, SPB Academic Publishing by The Hague: The Netherlands p. 350, (1992).

[8] Ibid.

[9] Moffatt, Jeff. *Natural Resources in the Potomac Watershed*, Alliance for the Chesapeake Bay for the Potomac Visions Project, URL: http://web.gmu.edu/bios/potomac/visions/rept/factsht2.htm, (1996).

[10] Versar. *A Scientific Foundation for Setting an Environmental Agenda, An Environmental Characterization of the District of Columbia*, report prepared for U.S. EPA Region 3, p. 4-32, (April 1996).

contact in the District rivers.[11] Water pollution may also deter anglers from supplementing their diets with fish. Those individuals most affected are the lower economic households that continue to consume the District's fish, regardless of its risk. The cumulative affect of ingesting the surface water contaminants (that accumulate in fish tissues) may impact an angler's quality of life, although it is uncertain to what extent.

The quality of the city's drinking water supply also affects the District's livability. Numerous cautions by EPA against consuming the District's drinking water has many residents questioning the ability of the city government to supply safe drinking water. As a result, 213,800 residents are consuming bottled water. [12]

The cost borne by residents who purchase bottled water is substantial. A calculation using the purchase price for bottled water and consumption quantity is the most basic demonstration of how much residents pay for bottled water annually.[13] For example, the price for domestic bottled water typically ranges between $1.00 and $1.75 per gallon.[14] An average individual consumes about one-half gallon of water per day. Residents may also use bottled water for other purposes besides drinking, however. Some residents use bottled water for cooking, teeth cleaning, and making ice, etc. Assuming that average daily consumption is between one-half gallon and 2 gallons, District residents may spend between $183 and $1,278 per year on bottled water, as seen in Table 5-1. Aggregated over the entire population that purchases bottled water, residents may spend up to $273 million annually on bottled water.

When public drinking water systems fail, residents may incur additional loss due to medical costs, loss of work, and productivity and leisure time. One study estimated these costs to Luzerne County, Pennsylvania residents when it experienced an outbreak of Giardiasis in

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[11] Boating is still allowed, however.

[12] Center for Disease Control. "Assessment of Inadequately Filtered Public Drinking Water--Washington DC," *Morbidity and Mortality Weekly Report*, 43(36), (September 16, 1994).

[13] This estimate is crude and does not consider resident expenditures on home filtration and purification systems, home or office bulk delivery services, transportation to and from the purchase point, bottled water purchases by non-resident commuters, etc.

[14] The price of imported bottled water, however, is about $1.50 per quart or $5.00 per gallon.

1984.[15] The parasite was carried through the public drinking water system and affected about 9.5 percent of the county residents (6,000 cases). The study showed the single outbreak cost residents between $12.1 to $38.5 million.[16] The cost in today's dollars for such an outbreak would be between $18.9 million and $60.2 million.[17]

Table 5-1: Cost per Resident and Total Costs for Bottled Water Consumption in the District of Columbia

Gallons Consumed	Annual Cost per Resident			
	$1.00 per gal.	$1.25 per gal.	$1.50 per gal.	$1.75 per gal.
1/2	$183	$228	$274	$319
1	$365	$456	$548	$639
2	$730	$913	$1,095	$1,278

Gallons Consumed	Total Annual Cost			
	$1.00 per gal.	$1.25 per gal.	$1.50 per gal.	$1.75 per gal.
1/2	$39,018,500	$48,773,125	$58,527,750	$68,282,375
1	$78,037,000	$97,546,250	$117,055,500	$136,564,750
2	$156,074,000	$195,092,500	$234,111,000	$273,129,500

Another issue that affects residents' quality of life is illegal dumping and trash accumulation. Both affect community pride and morale. The livability is diminished for communities that are continuously littered with unsightly debris. Often times excess solid waste accumulation leads to resident apathy which exacerbates the problem.

Natural parks and green space are tracts of land that provide habitat for wildlife and/or for human enjoyment or use. The District's parklands affect the quality of life for many residents. They are a source for recreation, sport, tourism, and economic development. Because the District is almost completely urbanized, quality open spaces affect the city's livability and resident

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[15] Harrington, Winston, Alan J. Krupnick, and Walter O. Spofford, Jr. "The Economic Losses of a Waterborne Disease Outbreak," *Journal of Urban Economics*, 25, (1989).

[16] Ibid p. 132-133.

satisfaction. About 20 percent of the city's land is parkland which is one of the highest percentages of green space in the nation.[18] The quality of many of these parks is good and visitor use is high.

Finally, noise pollution may affect the quality of life for District residents. Residents living near Washington National Airport or highways with heavy truck traffic experience high levels of noise exposure. In addition, residents living near the city's center are likely to experience greater exposure to traffic noise and noise from building construction. Health effects such as hearing loss and high blood pressure, have not been documented locally and national data are not definitive.[19] The local data that examine the areas of greatest noise in the District are limited.

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[17] Assuming an annual 3.5 percent rate of inflation.

[18] World Resources Institute. *The 1993 Information Please Environmental Almanac*, New York: World Resources Institute, (1993).

[19] Center for the Environment. *A Report on the Findings of the Technical Advisory Committees of the Regional Environmental Priorities Project*, Regional Priorities Project, Case Western Reserve University (1995).

6: PRIORITIES BASED ON PUBLIC PERCEPTIONS

6.0 Introduction

Scientific data often point to an environmental need that the public does not feel is a priority. Conversely, public perceptions may identify concerns that federal and/or local governments dismiss because the data show no significant affect on human or ecological health. Our study used two methodologies to identify the public's perception of the District's environmental problems. The first was a series of stakeholder interviews. The second method was a telephone survey of city residents. Both are described below.

6.1 Stakeholder Perceptions

Stakeholder interviews provided us with expert information on environmental issues in the District. We identified key stakeholders via the DC Environmental Liaison List and interviewed eleven of these environmental specialists were interviewed. In addition, we interviewed 8 stakeholders representing the federal and local government, such as the White House, EPA, the Department of Policy and Planning, and City Council. After we began our interviews, several stakeholders recommended that we speak with 4 other specialists in the environmental field that were also included in the interview process. We interviewed a total of 23 stakeholders via the telephone or personal contact, as seen in the Appendix.[1] Each stakeholder answered the 5 questions, shown in Table 6-1.

Table 6-1: Stakeholder Questions

1. What do you believe are the most important environmental problems facing the District? Why?	4. What institutions & organizations can be most helpful to address the District's environmental problems?
2. How would you prioritize your list of environmental issues?	5. What would be needed for the institutions you just mentioned to work together to relieve these problems?
3. What are some possible ways to remedy these problems?	

[1] Some potential interviewees refused to be interviewed and others we were unable to contact.

The results of these interviews should be regarded with caution as our sample was not intended to be statistically representative. The interview results are useful for a preliminary analysis. They identify common themes among the expert stakeholder responses.

We first asked stakeholders to identify the universe of the District's environmental problems. Next, we asked them to narrow their focus to the District's immediate priorities. Common issues identified in the District's universe of environmental problems included air pollution, environmental equity, drinking water quality, surface water pollution, toxic contaminants, and the need for more environmental education. Stakeholders believed that the District's most compelling issues, however, were its drinking water, surface water, and air quality, as seen in Table 6-2.

Table 6-2: Stakeholder Perceptions of DC's Universe of Environmental Problems and Ranking of Environmental Priorities

Problem	Number of Respondents Citing Problem	Number of Respondents Citing Problem as a Priority
1. Drinking water	17	14
2. Surface water	23	14
3. Air quality (outdoor)	18	10
4. Land use--sprawl, air, water, LULUs, transportation	8	6
5. Solid waste	9	5
6. Education and community involvement	12	4
7. Toxics	12	4
8. Quality of life--living in polluted area / morale	6	3
9. Political--DC govt. structure, jurisdiction	10	3
10. Baseline environmental data	2	2
11. Green space	7	2
12. Environmental equity	10	2
13. Air quality (indoor)	2	-
14. Conservation	4	-

 - indicates no respondents

Table 6-3: Stakeholder Suggested Remedies to DC's Environmental Problems

Remedies	Frequency
Education and Outreach	
▪ general public education	10
▪ community involvement / responsibility	8
▪ involve the children	4
▪ neighborhood environmental watch groups	2
▪ adopt-a-tree or adopt-a-block programs	1
▪ environmental satellite offices--located in different areas in the District to educate the public and enforce the environmental laws	1
▪ reward activity	1
▪ teacher training	1
Political	
▪ political pressure / increased media attn.	9
▪ economic incentives / taxes / user fees	7
▪ accountability of public officials	6
▪ enforcement	5
▪ restructure DC environmental departments	5
▪ citizen suits	3
▪ economic development	3
▪ designate Navy yard as Superfund site	2
▪ hire quality city enviro. specialists	2
▪ public transportation expansion	2
▪ bottle bill	1
▪ DC long-range plan	1
Other	
Gates on Maryland rivers to catch the debris	1

The stakeholders offered numerous suggestions and remedies to relieve the District's environmental problems. The suggestions fell into two major categories: (1) education and community outreach and (2) political action, as seen in Table 6-3. The most common suggested remedy was public education. Many stakeholders felt that residents often do not understand (especially children) how small lifestyle changes can make significant changes in the quality of their environment.[2] Other respondents noted that community involvement is a necessary element to relieve the District's environmental stressors. As with any public

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[2] One stakeholder noted that however, that a recent survey by the DC Coalition of Environmental Justice, *Troubled Waters, A Survey of Ward 7 and 8 Voters on Environmental Issues*, Washington DC, (April 1996)

involvement process, environmental actions must take into account the community culture and its needs. Also, if community members believe in the goals of an environmental program, they are more likely to support it. In addition, stakeholders largely believed that fundamental changes must take place in the neighborhoods and that the communities must support and lead the programs in order for them to be effective.

Political remedies included suggestions for increased political pressure as a means to remedy the city's environmental problems. They expressed a need for increased attention from national environmental groups that operate in the District to focus their efforts on the city. Since 1995, some groups, such as the Natural Resources Defense Council and the Sierra Club, have initiated law suits against the city to address some of its environmental problems. Stakeholders noted that more legal actions need to occur and increased media attention must be part of the total environmental agenda.

Stakeholders also suggested increased economic incentives (taxes or user fees) to change resident and non-resident behaviors. Suggestions included commuter taxes, removal of free federal and commercial parking, and increased fees on commercial parking garages. These stakeholders believe that economic incentives are more likely to induce behavioral changes. They also noted, however, that because of jurisdictional problems, economic policies are difficult to enact.

The interviews showed that numerous institutions may be able to address the District's urban environment. Congress, the Department of Defense, the Environmental Protection Agency, and grass roots and national environmental groups may be key organizations and groups to engage. Stakeholder responses largely ignored the city government as an institution that is able to address the District's urban environment. Many felt that the city's environmental offices hinder environmental progress, rather than help it. Stakeholders cited the lack of funding and poor organization as reasons why the city government is incapable of addressing the District's environmental problems on its own.

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indicates that District voters in Ward's 7 and 8 may be very well educated about the city's environmental problems.

Numerous stakeholders noted that coalitions between local and national groups are the most effective types of groups that can address the District's environmental problems. These respondents noted that national level groups have the technology, resources, and membership to mobilize quickly and increase political pressure, whereas, local groups have the understanding and support of their communities to accept and promote action from their neighborhood residents. This combination of expertise and support may be very effective.

When asked about what elements are necessary for the various institutions to work together, respondents overwhelmingly pointed to leadership and funding, as seen in Table 6-4. Other stakeholders specifically noted the need for a diverse leadership base that represents the District's multi-cultural and multi-ethnic population. These respondents felt that inclusiveness should be a priority when funding and planning any environmental project in the District.

Table 6-4: Stakeholder Recommended Elements Necessary for Institutions to Work Together to Address DC's Environmental Problems

Determinants of Success	Frequency
General	
▪ general leadership	11
▪ funding	7
▪ diverse leadership base--local groups and individuals that represent DC's multicultural population	5
▪ partnership of local and national groups	4
▪ vision	4
▪ education	3
▪ information technologies / media strategies	3
▪ regional focus	1
▪ trust	1
Political	
▪ DC government commitment	5
▪ coalition of federal and state govts.	2
▪ Congressional support	2
▪ White House support	2
▪ EPA	1
▪ new political environment	1

6.2 Resident Perceptions

The second methodology used to identify perceptions of the District's environmental problems was a survey of city residents. Greater Washington Consumer Survey, Inc., a subsidiary of the Greater Washington Research Center, conducted the survey. The survey solicited answers to two questions: (1) What do you think is the single most important environmental issue facing the District of Columbia today? (2) How serious is this issue? Would you consider it very serious, somewhat serious, or not at all serious? The survey collected responses from 345 District residents, 175 in July and 170 in August. It also collected 20 demographic items for each respondent, including their age, sex, race, etc.

The data were gathered via telephone interviews on weekdays from 10 AM to 9 PM, and on weekends, from 11 AM to 4 PM. Random digit dialing was used whereby resident's telephone numbers were selected completely at random. Both listed and unlisted telephone numbers were polled which is important because 27 percent of the phone numbers in the Washington area are now unlisted.

There are two shortcoming of this approach. First, our sample size was small which limited our ability to make causal inferences. The problem of a small sample size is confounded by the large number of environmental concerns that respondents identified. Thus, when doing a cross-tabulation of resident characteristics to environmental concerns, the statistical accuracy declines.

A second problem with our survey is that because of resource constraints, we could not stratify our sample such that all Washington residents were proportionately represented in our sample. For example, the District's racial and ethnic composition is about 65 percent African American, 30 percent Caucasian, 3 percent Asian and Pacific Islander, and 2 percent from all other ethnic origins. In our sample, African Americans represented 54 percent, Caucasians represented 43 percent, Asian and Pacific Islanders represented 2 percent, and other populations represented 1 percent of those surveyed. Thus our sample may not reflect the District's true population. Thus, while the sample error is plus or minus 5 percent, this estimate should be treated with caution.

The survey results show that of the residents interviewed the top 3 environmental concerns in the District are its drinking water, air pollution, and trash. The majority of respondents (67 percent) felt that the District's most important environmental problem is its drinking water system, as seen in Table 6-5. These residents overwhelmingly believe (89 percent) that the drinking water problem is a serious problem; 11 percent believe that the problem is somewhat serious. One respondent felt that the drinking water problem is not serious.

Table 6-5: Respondent's Perceptions on District of Columbia's Environmental Priorities

Environmental Problem	Most Important Issue	Severity of Problem		
		Very Serious	Somewhat Serious	Not Serious
▪ Drinking water	67%	89%	11%	1%
▪ Air pollution	10%	76%	24%	-
▪ Trash	7%	69%	31%	-
▪ Rivers/streams	3%	75%	25%	-
▪ Hazardous waste	2%	33%	67%	-
▪ Sewers	1%	67%	33%	-
▪ Parks	1%	50%	50%	-
▪ Lead	1%	33%	67%	-
▪ Rock Creek Park	0%	-	-	100%
▪ Other	8%	76%	24%	-
Total	*100%*	*82%*	*17%*	*1%*

- indicates no respondents

Respondents identified air pollution as the District's next environmental priority, although it received much less support than did drinking water. Ten percent of those surveyed felt that it is the District's most pressing environmental issue. Of these respondents, 76 percent of felt that the District's air quality is a serious problem. The survey results show that respondents feel that trash is third environmental priority in the District.

Only Caucasian respondents perceived lead contamination to be a problem in the District, as seen in Table 6-6. This is not a reliable indicator of community views, though, as only 1 percent of the sample (3 people) identified lead as an environmental problem.

Table 6-6: Respondent's Perceptions on District of Columbia's Environmental Priorities By Race and Ethnicity[3]

Environmental Problem	Most Important Issue	Respondent Characteristics			
		African Amer.	Caucasian	Asian Amer.	Other
▪ Drinking water	67%	58%	41%	1%	-
▪ Air pollution	10%	53%	43%	-	3%
▪ Trash	7%	60%	27%	7%	7%
▪ Rivers/streams	3%	50%	50%	-	1%
▪ Lead	2%	-	100%	-	-
▪ Hazardous waste	1%	50%	50%	-	-
▪ Sewers	1%	33%	67%	-	-
▪ Parks	1%	-	100%	-	-
▪ Rock Creek Park	0%	-	100%	-	-
▪ Other	8%	41%	55%	3%	-
Total	*100%*	*54%*	*43%*	*2%*	*1%*

- indicates no respondents

Most respondents believe that the District's problems are very serious, as seen in Table 6-7. Eighty-seven percent of African American respondents believe that the city's problems are very serious, as did 75 percent of Caucasian respondents. Only 2 respondents felt that the District's environmental problems were not serious.

Table 6-7: Respondent's Perceptions on the Severity of the District of Columbia's Environmental Problems By Race and Ethnicity

Severity of Environmental Problem	Respondent Characteristics			
	African Amer.	Caucasian	Asian Amer.	Other
▪ Very serious	87%	75%	75%	67%
▪ Somewhat serious	13%	23%	25%	33%
▪ Not serious	-	2%	-	-
Total	*100% N=148*	*100% N=118*	*100% N=4*	*100% N=3*

- indicates no respondents

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[3] Percentages may not add to 100 percent due to rounding.

Differences between respondent's perceptions towards the severity of the District's environmental problems do not change much across ages, as seen in Table 6-8. The general trend is that older respondents find the environmental problems more severe. The statistical reliability of this trend, however, is questionable given that our margin of error is between 9 and 17 percent.

Table 6-8: Respondent's Perceptions on the Severity of the District of Columbia's Environmental Problems By Age[4]

Severity of Environmental Problem	Respondent Characteristics			
	< 25	**25-44**	**45-64**	**> 64**
▪ Very serious	78%	76%	89%	85%
▪ Somewhat serious	22%	22%	11%	15%
▪ Not serious	-	2%	-	-
Total	*100% N=23*	*100% N=127*	*100% N=82*	*100% N=34*

- indicates no respondents

Twelve percent of all individuals surveyed did not have any views about the District's environmental priorities. Twelve percent "don't knows" is large and may indicate that either many District residents do not have a clear understanding of the environmental issues in the District or they do not think about the environment in which they live. While these results may be discouraging, they also offer valuable information and support the need for greater environmental education. As noted earlier, the stakeholder interviews also showed support for greater environmental education, especially for young people.

A recent study by the DC Coalition for Environmental Justice also evaluates residents' perceptions of the environmental problems facing the District.[5] Many of its findings support our own analysis and offer additional information about resident perceptions. For example, our survey under-sampled the African American population in the District as only 54 percent

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[4] Ibid.

[5] DC Coalition on Environmental Justice. *Troubled Waters, A Survey of Ward 7 and 8 Voters on Environmental Issues*, Washington DC, (April 1996).

of the respondents were African American whereas the general population is about 65 percent. The Coalition's survey captures the perceptions of 404 registered voters in the District of Columbia that live East of the Anacostia River (in Wards 7 and 8) which are predominantly inhabited by African Americans. Thus, the DC Coalition's study may capture some of the views that were not captured in our own survey.

The results of the Coalition's study are shown in Table 6-9. They show that the majority of registered voters sampled in Wards 7 and 8 support stronger environmental programs for the Anacostia River, drinking water, illegal dumping. These issues also received support from the respondents in our survey. The Coalition's findings also show that Ward 7 and 8 voters support stronger environmental programs for air pollution, asbestos, and lead-based paint.

Table 6-9: Support for Stronger Environmental Programs by Voters in Ward 7 and 8[6]

Environmental Program	Percentage of Respondent Support
▪ Anacostia River cleanup	74%
▪ Drinking water cleanup	71%
▪ Trash dumping control	58%
▪ Air pollution from motor vehicles	50%
▪ Asbestos cleanup	41%
▪ Lead paint cleanup	40%

The survey also asked how serious residents believed the pollution problem is in the Anacostia River. The results show that 61 percent of voters in Wards 7 and 8 believe that the problem is serious and 22 percent believed that it is somewhat of a problem.

Other survey results are described in Table 6-10. They indicate that younger voters in the community are more concerned about the health risks associated with the District's environmental problems. During our stakeholder interviews, many respondents believed that young people may be more likely to get involved in their communities and address the District's environmental concerns. The greater concern by younger voters in the Coalition's survey may support this view.

Table 6-10: Overall Beliefs of Ward 7 and 8 Voters[7]

Environmental Issue	Percent of Respondents that Agree
▪ Government efforts to control dumping in the Anacostia River are too weak	73%
▪ Government efforts to control sewage overflows into the Anacostia River are too weak	72%
▪ Government efforts to control indoor environmental quality (from lead and asbestos) is about right	36%
▪ Government efforts to control indoor environmental quality (from lead and asbestos) is too weak	34%
▪ A health problem that was caused or worsened by pollution	20%
▪ A health problem that was caused or worsened by pollution (women responses)	25%
▪ The community faces high health risk because of pollution (voters between the age of 18-34 responses)	70%
▪ The community faces high health risk because of pollution (voters over 65 yr. of age)	43%

An initial concern with both our stakeholder interviews and the telephone surveys was the time period during which they were conducted. The interviews occurred shortly after the District's drinking water problems received wide-spread publicity in July 1996. We believed our results might be skewed towards increased concern for the city's drinking water quality. The results of the DC Coalition on Environmental Justice's study, however, show that resident concern existed prior to EPA's involvement in the District's drinking water problems which, in part, validates our survey findings.

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[6] Ibid p. 10.

[7] Ibid p. 8-9.

7: CONCLUSIONS AND RECOMMENDATIONS

7.0 Introduction

This chapter pulls together the information relevant to setting priorities and then makes a few recommendations to improve the process for addressing environmental problems in the District. It is doubtful that having more time or resources would make any significant difference in our discussion of priorities. The same cannot be said with regard to policy recommendations. Policy recommendations were not the main focus of this study, and the ones we make are, largely, by-products of our primary effort to analyze priorities.

7.1 Priorities

As we noted in the first chapter, there is no "scientific" method for establishing environmental priorities. Data, information, and science of the type covered by this report are highly relevant to setting priorities, but any process that results in a set of priorities is inevitably dominated by values or politics or both. In short, priority setting is a value process informed by science, <u>not</u> a scientific process informed by values. The values described in this report are those of residents of the District of Columbia.

Table 7-1 is our summary of the available data on the major environmental problems facing the District. It is somewhat subjective, but it is based on the information provided in the body of the report.

Several explanatory points need to be made about Table 7-1. First, it reduces the information about the environmental problems to just four categories: severity of health effects, number of people affected by the health effects, ecological and welfare effects, and how the DC public (residents) ranks the problem. Having just four categories means that a category may contain different kinds of information. For example, ecological and welfare effects are rated high for drinking water because of the cost to District residents of buying bottled water, the nuisance of having to boil water or take other precautions, and the general anxiety connected to the problem of potentially unsafe drinking water. In contrast, ecological and welfare effects are

rated high for parks because of the importance of parks for wildlife, aesthetics, and recreation. Having just four categories also means that a number of criteria, especially those related to social values, are not separately identified. Our hope is that most of these values are captured in the public ranking.

Table 7-1. Characteristics of DC Environmental Problems

Problem	Severity of Health Effects	# People Affected	Ecological and Welfare Effects	Public Ranking	Overall Ranking
1. Drinking Water	H	H	H	H	H
2. Air Pollution	H	H	L	H	H
3. Water-Anacostia	M	H	H	M	M+
4. Lead	H	H	L	M	M+
5. Trash	L	H	M	M	M
6. Water-Potomac	L	M	M	M	M
7. Hazardous Waste	L	M	L	M	M–
8. Parks	L	L	H	L	L+

H = High; M = Medium; L = Low

A second point is that we also limited the number of problem categories. When asked to identify the universe of environmental problems in the District, our informants named over thirty different problems. However, we think that the eight problems named here capture most of the concerns of DC residents.

A final explanatory point is that our overall ranking implicitly weights each of the four categories of characteristics equally. In other words, we counted the importance of public opinion the same as the importance of ecological and welfare effects. We did give health effects, however, twice the importance of ecological effects by counting the severity of the health effect and the number of people affected as two separate categories. If someone disagrees with the weighting given to these categories, all we can say is that it is quite legitimate to do so. Hopefully our report provides enough information to allow those who would use a different weighting scheme to draw their own conclusions.

The actual priorities, by our analysis, divide roughly into three groups. Drinking water and air pollution are clearly at the top of the list. The Anacostia River and lead poisoning are in the second rank. Trash, the Potomac River, hazardous waste, and parks are in the third category of importance.

Both drinking water and air pollution represent both a health threat and a nuisance to all residents of the District. Drinking water is probably the more serious threat in terms of health, but it is also more easily fixed. The District's air pollution problems have improved significantly in the past decade, but they are likely to continue to be a problem for the foreseeable future. In contrast, it is not hard to imagine that, given political commitment and managerial competence, a decade from now drinking water will no longer be a concern.

Water pollution in the Anacostia and lead poisoning are both serious health problems, but affect only a portion of the District's population. Lead is probably the more serious human health problem, but the pollution of the Anacostia is a health problem (because of consumption of contaminated fish), an ecological problem, and an aesthetic problem.

Trash, pollution of the Potomac, hazardous waste, and parks are all important, and their lower ranking should not be interpreted to mean that they are not important. By our criteria, however, they are less important than some other problems.

As mentioned earlier, the public ranking category in Table 7-1 incorporates how important the DC public (residents) value each environmental problem. These rankings are based on our survey of general public opinion. t is important to note, however, that our expert stakeholders had somewhat different values on the relative importance of each of these issues. he most significant difference is that the expert stakeholders ranked Anacostia River water pollution higher than air pollution. Most stakeholders felt that both drinking water and the Anacostia River are the city's top priority. Air pollution decreases in level of importance and becomes a middle ranking priority. Trash, lead, hazardous waste, the Potomac River, and parks are in the third category of importance with trash and lead contamination being slightly more important than are hazardous waste, the Potomac River and parks.

Finally, the interrelatedness of each of these environmental problems needs to be kept in mind. Our list of problems did not include some broad categories like land use or transportation, in part because the public usually does not think of environmental problems this way. In addition, broad categories often encompass many issues such as air and water quality, and we tried to avoid overlap. The underlying causes and the interrelatedness of problems are important, however, when considering solutions.

7.2 Recommendations

When we first thought about criteria for ranking the District's environmental priorities, we anticipated a criterion which we labeled "leverage." We envisioned this criterion as the ability of solutions for an environmental problem to help in remedying other, non-environmental, problems faced by DC. In the end we did not use this criterion because we concluded that the District's major current problem is a lack of institutional and managerial competence. We repeatedly came across instances where the District had, or could have had, the money to address a problem, but lacked the ability to obtain or spend the money. The financial constraints on the District are severe, but until the institutional and managerial problems are solved the financial problems are secondary.

The recommendations suggested below are primarily process recommendations. They are not intended to solve the problems identified in our report. We did not have the time or resources that would be necessary to formulate and evaluate solutions for DC's drinking water or air pollution problems. The recommendations focus on process because of our concern about the District's managerial and institutional problems.

7.2.1 A DC Environmental Agency

When examining DC environmental problems, one of the first questions is "where is the District's environmental agency?" There isn't one. Most of the environmental functions are contained in the Department of Consumer and Regulatory Affairs, although other

environmental functions are carried out by the Department of Public Works and other DC agencies (see Chapter 2).

The lack of a separate environmental agency partially reflects the fact that the District faces problems it considers more serious than environmental problems. If the leadership of the District or the general public were asked to name the District's most important problems, environment would not be among them. Nevertheless, the District's environmental problems are important enough to warrant a separate identifiable agency that could provide leadership and that could be held accountable for dealing with DC's numerous environmental challenges.

7.2.2 Grant for Ranking Priorities

The U.S. Federal Environmental Protection Agency (EPA) provides grants to states and a few localities to fund a process for considering environmental priorities. We think the District should apply for such a grant, and we have reason to be optimistic that EPA would respond positively.

The purpose of the grant would only in part be the identification of priorities. As this report demonstrates, it does not take a major effort to analyze and identify priorities. What is needed, and what could be done with the EPA grant, is to marshall a political consensus behind a set of priorities so that action is taken to address the problems identified. The EPA grants served this function in a number of places. They have served as a catalyst to bring together the political, educational, voluntary, and philanthropic institutions of a community to agree on the most important environmental problems and then to set to work solving them. The District needs this kind of effort.

7.2.3 Institutional Cooperation

One major reason that the effort described above would be beneficial for the District is that the DC institutions that could potentially be an important part of solving environmental problems generally do not cooperate or even communicate with each other. While the Summit Fund supports efforts to bring the environmental groups together informally, this effort needs

to be strengthened. Other groups, especially the District's educational institutions, need to be involved, and the whole effort needs to be strengthened and given focus.

Cooperation is necessary in part because of the weakness of the formal governmental institutions dealing with environmental problems. Cooperation is also desirable when different segments of the population have very different views about environment and everything else. Working to deal with environmental problems can help to unify communities and could lay the groundwork for cooperation on other problems.

7.2.4 A DC Environmental Report

When tackling environmental problems it is always helpful to have factual information about the severity of the problems and about whether the problems are getting better or worse. EPA will soon issue a report, written by Versar Inc., which contains baseline information on the District's problems. It would be relatively easy to update the report annually or biennially. Such a report would facilitate the priority-setting effort described above and could help to foster institutional cooperation.

7.2.5 Environmental Education

Educating both adults and children about environmental problems is important both to foster an appreciation of the significance of environmental problems and to provide a realistic perspective on the relative importance of different environmental problems. The fact that 12 percent of those questioned in our survey could not name a single environmental problem indicates the need for more environmental education. We do not want to further burden the overtaxed DC school system, but some private initiatives could be very useful in providing environmental education.

The above recommendations will not solve the District's environmental problems. We think that they would make it easier to identify and implement solutions. We hope that they also will make the District a better place in which to live and work.

APPENDIX: STAKEHOLDERS INTERVIEWED

1. Derry Allen, EPA Washington Office

2. Hope Babcock, Environmental Law Clinic, Georgetown University

3. Beverly Baker, EPA Chesapeake Bay Program Office

4. Brent Blackwelder, Friends of the Earth

5. Robert Boone, Anacostia Watershed Society

6. Jim Dougherty, Sierra Club, New Columbia Chapter

7. Frances Dubrowski, DC Coalition of Environmental Justice

8. Neal Fitzpatrick, Audubon Naturalist Society

9. Carolyn Johns Gray, Frederick Douglas Community Improvement Council

10. Ted Howard, Consultant, Global Environment Facility, United Nations Development Fund

11. Marilyn Kats, EPA Washington Office

12. Ken Laden, Office of Policy and Planning, Department of Public Works

13. Joe Libertelli, Metro DC Environmental Network

14. Paul Locke, Environmental Law Institute

15. Mary Marra, National Wildlife Federation

16. Norris McDonald, African American Environmentalist Association

17. Jim Nathanson, Former Ward 3 Councilmember

18. Kristen Pauley, Chesapeake Bay Foundation

19. Tony Robertson, Executive Assistant to Councilmember Kevin Chavous, Ward 7

20. Rick Rybeck, Staff Attorney for Councilmember-at-Large Hilda Mason

21. Carol Thompson-Cole, White House Liaison, D.C. Task Force

22. Tom Whitley, Washington Regional Network

23. Josh Wyner, DC Appleseed Center