

# **Environmental Indicators for Canada and the United States**

*by Boris DeWiel, Steve Hayward, Laura Jones,  
and M. Danielle Smith*

## **Contents**

<b>4</b>	<b>List of figures</b>
<b>5</b>	<b>List of tables</b>
<b>5</b>	<b>About the authors</b>
<b>6</b>	<b>Acknowledgments</b>
<b>7</b>	<b>Introduction</b>
<b>10</b>	<b>Primary environmental indicators</b>
10	<i>Air quality</i>
22	<i>Water quality</i>
33	<i>Natural resource use</i>
40	<i>Land use and condition</i>
45	<i>Solid waste</i>
<b>51</b>	<b>Secondary environmental indicators</b>
51	<i>Carbon dioxide emissions</i>
52	<i>Oil spills</i>
52	<i>Pesticides</i>
55	<i>Toxic releases</i>
55	<i>Wildlife</i>
<b>60</b>	<b>Index of environmental indicators</b>
60	<i>Methodology</i>
60	<i>Results</i>
62	<i>Conclusion</i>
<b>66</b>	<b>References</b>

## List of figures

---

### Primary environmental indicators

#### *Air quality*

- 1 Sulphur Dioxide (Ambient Levels)
- 2 Sulphur Dioxide (Emissions Estimates)
- 3 Nitrogen Dioxide (Ambient Levels)
- 4 Nitrogen Oxide (Emissions Estimates)
- 5 Ozone (Ambient Levels)
- 6 Hydrocarbons and Volatile Organic Compounds (Emissions Estimates)
- 7 Carbon Monoxide (Ambient Levels)
- 8 Carbon Monoxide (Emissions Estimates)
- 9 Suspended Particulates (Ambient Levels)
- 10 Suspended Particulates (Emissions Estimates)
- 11 Lead (Ambient Levels)
- 12 Lead (Emissions Estimates)
- 13 Urban Air Quality in Selected American Cities
- 14 Urban Air Quality in Selected Canadian Cities

#### *Water quality*

- 15 Water Quality in the United States
- 16 Water Quality in Canada
- 17 Water Quality in the Great Lakes (Nitrogen)
- 18 Water Quality in the Great Lakes (Phosphorus)
- 19 Industrial Discharge of Phosphorus into the Great Lakes
- 20 DDE Levels in Herring Gull Eggs in the Great Lakes
- 21 PCB Levels in Herring Gull Eggs in the Great Lakes
- 22 HCB Levels in Herring Gull Eggs in Lake Ontario

#### *Natural resources use*

- 23 Forest Harvest and Growth in the United States
- 24 Forest Harvest and Growth in Canada
- 25 Freshwater Withdrawals in the United States
- 26 Freshwater Withdrawals in Canada
- 27 Withdrawals as a Percentage of Renewable Freshwater Resources
- 28 Total Annual Consumption of Energy
- 29 Per Capita Annual Consumption of Energy

- 30 Consumption of Energy as a Percentage of Production

#### *Land use and condition*

- 31 Land Cover in the United States (1987)
- 32 Land Cover in Canada (1989)
- 33 Wetlands
- 34 Land Uses in the United States
- 35 Land Uses in Canada
- 36 Protected Areas as a Percentage of Urban and Agricultural Areas
- 37 Soil Erosion from Cropland

#### *Solid waste*

- 38 Total Municipal Solid Waste Generated in the United States and Canada
- 39 Per-Capita Municipal Solid Waste Generated in the United States and Canada
- 40 Recycling Rates in the United States
- 41 Recycling Rates in Canada

### Secondary environmental indicators

- 42 GDP Compared to CO<sub>2</sub> Emissions: Trends in the United States
- 43 GDP Compared to CO<sub>2</sub> Emissions: Trends in Canada
- 44 Oil Spills in and around American Waters (by volume)
- 45 Significant Spills in and around Canadian Waters (by volume)
- 46 Pesticide Use
- 47 Toxic Waste Releases
- 48 Wildlife at Risk in the United States
- 49 Wildlife at Risk in Canada
- 50 Species at Risk in the United States
- 51 Species at Risk in Canada

### Index of environmental indicators

- 52 Relative Severity of Environmental Problems in the United States
- 53 Relative Severity of Environmental Problems in Canada
- 54 Relative Severity of Environmental Problems in the United States and Canada

## List of tables

---

### Primary environmental indicators

- 1 Sulphur Dioxide (Ambient Levels)
- 2 Nitrogen Dioxide (Ambient Levels)
- 3 Ozone (Ambient Levels)
- 4 Carbon Monoxide (Ambient Levels)
- 5 Suspended Particulates (Ambient Levels)
- 6 Summary of Air Quality as Environmental Indicator
- 7 United States National Water Quality Inventory (1990)
- 8 Summary of Water Quality as Environmental Indicator
- 9 Summary of Natural Resource Use as Environmental Indicator
- 10 Summary of Land Use and Condition as Environmental Indicator

- 11 Summary of Solid Waste as Environmental Indicator

### Secondary environmental indicators

- 12 Summary of CO<sub>2</sub> Emissions and Oil Spills as Environmental Indicators
- 13 Summary of Pesticide Use and Toxic Release as Environmental Indicators
- 14 Summary of Wildlife as Environmental Indicator

### Index of environmental indicators

- 15 Relative Severity of Environmental Problems in the United States
- 16 Relative Severity of Environmental Problems in Canada

## About the authors

---

**BORIS DEWIEL** is a Doctoral Candidate in Political Science at the University of Calgary. He has a Master's Degree in Environmental Science from the University of Calgary and held a joint internship at The Fraser Institute and The Pacific Research Institute in 1996. He has published articles in history, political theory and Canadian politics.

**STEVE HAYWARD** is vice-president of research for the Pacific Research Institute. He has written on politics, economics, public policy, law, and environmental issues for scholarly and popular journals including *National Review*, *Modern Age*, *First Things*, *Policy Review*, *The Intercollegiate Review*, and the *California Journal*. He is a contributing editor for *Reason* magazine, a contributing author for the forthcoming *Encyclopedia of the American Right*, and his columns have appeared in many newspapers. He holds an MA in Government from Claremont Graduate School, and is currently completing his PhD in American Studies at Claremont Graduate School. In 1990 and 1992, he was an Olive Garvey Fellow of the Mont Pelerin Society; he was recently appointed to a two-year term as a Henry Salvatori Fellow of the Heritage Foundation in Washington, DC.

**LAURA JONES** is the Environment Economist at The Fraser Institute. She joined The Fraser Institute in 1996 to develop the Institute's policy on the environment and has recently organized a series of conferences on mining, forestry and fishing in British Columbia. She received her BA in Economics from Mount Holyoke College in Massachusetts, and her MA in Economics from Simon Fraser University in British Columbia. Prior to joining the Institute she taught economics at various colleges throughout the Lower Mainland of British Columbia, and is currently teaching *Economic Issues* at the British Columbia Institute of Technology.

**M. DANIELLE SMITH** is a research assistant at The Fraser Institute. She became involved with The Fraser Institute in 1992 when president of a conservative political association at the University of Calgary and took part in the Fraser Institute Student Leaders' Colloquium in 1996. She did the research for the Environmental Indicators project while a student intern at The Fraser Institute during the summer of 1996, has written articles in the *Canadian Student Review*, and co-authored two other studies to be published by The Fraser Institute early in 1997. She will receive a BA in Economics and English from the University of Calgary in April 1997.

## **Acknowledgments**

---

The Fraser Institute and the Pacific Research Institute wish to thank the Donner Canadian Foundation for providing the funding for student internships for Boris DeWiel and M. Danielle Smith in summer 1996.

## Introduction

---

“Most people in rich countries believe their environment is continuing to deteriorate.”

—Francis Cairncross, *Costing the Earth*

### Public opinion and the environment

Several years ago the sociologist Robert Nisbet wrote: “It is entirely possible that when the history of the 20th century is finally written, the single most important social movement of the period will be judged to be environmentalism.”<sup>1</sup> Evidence supporting this sentiment is abundant. According to a 1993 poll conducted in the United States, 75 percent of Americans believe that “problems regarding pollution and the environment will get significantly worse during [their] lifetime[s].”<sup>2</sup> Moreover, results of another poll indicate that 77.6 percent of Americans and 77.2 percent of Canadians believe that “within the next ten years, there will be a large increase in ill-health in [their] nation’s cities as a result of air pollution caused by cars.”<sup>3</sup> Over three-quarters of respondents in both nations agreed that “government should pass laws to make ordinary people protect the environment, even if it interferes with people’s rights to make their own decisions” and over 90 percent think that government should pass similar laws interfering with the rights of businesses.<sup>4</sup> Consistent majorities of poll respondents agree: “Protecting the environment is so important that requirements and standards cannot be too high, and continuing environmental improvements must be made regardless of cost.” The issue is more complicated than this evidence would sug-

gest, however, as over 80 percent of respondents *do not agree* that “economic growth should be sacrificed for environmental quality.”<sup>5</sup>

### The gap between public opinion and observable fact

On the basis of the evidence reviewed, we have found that there have been significant improvements in the condition of many areas of the environment since the first Earth Day was held in 1970 to raise public awareness about environmental problems. The public, however, continues to believe that environmental quality is deteriorating rapidly. This trend in public opinion can be observed at the national as well as local level. In Canada, for example, 93 percent of survey respondents are concerned about national air quality even though across the country air quality is improving and, in most cases, meets the most stringent health standards.<sup>6</sup>

Why is there this divergence between opinion and fact? Toxic accidents like the incidents on Love Canal and Times Beach, and oil spills like that involving the *Exxon Valdez* receive prominent and dramatic media coverage that leads to exaggerated negative perceptions about overall environmental quality. While bad news receives feature coverage, critical information about the environment is either underreported or not reported at all.<sup>7</sup> For example, substandard regional air quality is usually front-page news but, when regions achieve the federal standard, the news seldom receives prominent

---

1 Nisbet, *Prejudices*, 1982, p. 101.

2 Wirthlin Group, *The Wirthlin Report*, 1993, p. 1.

3 International Social Survey Program, “Beliefs about the Environment 1993,” 1996.

4 *Ibid.*

5 Wirthlin, *Wirthlin Report*, 1993, p. 1.

6 Gallup Canada, “Water Quality Tops List of Environmental Concerns”, *The Gallup Poll*, July 11, 1994.

7 Television reporting of environmental issues exhibits this tendency. Morrison, “Cancer and Health: TV Attention to the Environmental Causes of Cancer,” 1992. See also Miljan, “Network Coverage of the Environment: Objectivity or Advocacy?” 1989.

media coverage. When San Francisco, for example, met the federal ozone standard in 1992, *The San Francisco Chronicle* reported the news on page 16. In addition, environmentalists and politicians who seek publicity and opportunities for legislative accomplishment make headlines by emphasizing bad news. US Vice-President Al Gore, in his best selling book *Earth in the Balance*, portrays environmental issues as moral and even metaphysical problems. Because of concern about the condition of the environment, Gore writes "many people have lost faith in the future."<sup>8</sup> There are hundreds of environmental organizations spending millions of dollars a year for lobbying, litigation, and public relations.<sup>9</sup> These organizations have a vested interest in bad news. A feature series in the *New York Times* on environmentalism observed that environmental organizations "might be in danger of becoming the green equivalent of the military lobby, more interested in sowing fear and protecting wasteful programs than in devising a new course."<sup>10</sup>

### Haphazard spending on the environment

The increase in expenditure both by government and industry to reduce the number of low-risk pollutants reflects public alarm over the state of the environment. The rate of increase in environmental expenditures in the last 20 years has exceeded the rate of economic growth, but the increases in spending are not bringing about dramatic reductions in pollution. In several areas of environmental policy, increasingly large sums are being spent to gain very small improvements in environmental quality.<sup>11</sup> Recent legislation, for example, demands that firms reduce the amount of sulphur dioxide they release into the air even though, since at least the early 1980s, measured levels have been *too low to cause harm to either human health or to the environment*. (See the Air Quality section in this report for more information on this topic.)

Given the amount of money spent on the environment, there is a surprising lack of data of consistent quality. In part, this is because the science of environmental assessment is in its infancy and is still evolving. The lack of good data can also be attributed to inadequate monitoring programs and the lack of a statistics division specifically responsible for collecting environmental data for either the Environmental Protection Agency (EPA) or Environment Canada. A recent EPA report concluded that its budget and staff resources are not allocated on the basis of how much risk the pollutants present to the environment. Consequently, more than 80 percent of the EPA's resources are spent regulating pollutants considered to be relatively low risks by federal scientists.<sup>12</sup> This is not a trivial issue. Spending priorities must be set because, with scarce financial resources, spending on one area of the environment means not spending on another area. Spending money to reduce already low levels of sulphur dioxide, for example, means that less money can be spent cleaning up heavily polluted rivers, investing in declining fish stocks, or addressing other pressing environmental problems.

### State of the environment: things are improving

To separate the facts from alarmist misinformation and to bring balance to the environmental debate, The Fraser Institute and the Pacific Research Institute for Public Policy have developed *Environmental Indicators for Canada and the United States*. The indicators are designed to help the public assess more accurately the state of the environment in several key areas: air quality, water quality, natural resources, land use and condition, solid wastes, energy, pesticides, toxic releases, and wildlife.

This report finds that, contrary to public opinion, in most instances objectives for protecting human

8 Gore, *Earth in the Balance*, 1992, p. 2.

9 Greenpeace alone, on the wave of antinuclear and antiwhaling protests, grew from 12 members and US\$18,000 in 1971 to a peak of 4.3 million members around the globe and US\$179 million in 1990. Membership and income declined during four consecutive years after 1990. See Thomas, "Greenpeace at 25," 1996, p. 27.

10 Schneider, "New View Calls Environmental Policy Misguided," 1993, section 1, p. 1.

11 Professor Bill Stanbury of UBC notes that the 1992 regulations placed onerous costs on the pulp and paper industry (about CDN\$5.4 billion) even though governments did not perform any cost-benefit analysis. See Stanbury, "Regulating Water Pollution in the Pulp and Paper Industry in Canada," 1993.

12 Smolonsky, Dickson, and Caplan, *Annual Review of the US Environmental Protection Agency*, 1993, p. 1.

health and the environment are being met, pollution and wastes are being controlled, and resources and land are being sustainably and effectively managed. Environmental quality in both Canada and the United States is *improving*, not deteriorating. Following are some salient points.

- Overall, environmental quality improved 15.6 percent in Canada and 16.3 percent in the United States relative to conditions in 1980.
- Air pollution from sulphur dioxide, nitrogen dioxide, carbon monoxide, particulates, and lead has decreased considerably in both the Canada and the United States.
- The ambient level of sulphur dioxide decreased by 54.5 percent in Canada and 50.3 percent in the United States between 1975 and 1993.
- Ambient lead concentration fell 96.9 percent in Canada and 97.1 percent in the United States between 1975 and 1992.
- In 1990, 82 percent of the lakes tested in the United States met swimmable objectives.
- In 1994, Alberta and Saskatchewan met their water quality goals over 90 percent of the time; British Columbia and New Brunswick met their goals over 85 percent of the time; Manitoba met its goals over 70 percent of the time.
- DDE concentrations fell almost 85 percent in both Lake Ontario and Lake Superior from peak levels in 1975.
- Forests are increasing as growth exceeds the harvesting of trees both in Canada and in the United States.
- The amount of land set aside for parks, wilderness, and wildlife is increasing in both Canada and the United States.

- The amounts of toxic chemicals exposed to the environment is decreasing.
- Critical wetland habitat is not declining.

### Objectives of the study

This document is designed to give the reader an overview of national environmental quality in Canada and the United States. While the indicators include many local or regional environmental issues, such as the air quality of selected cities, the goal of this study is to provide a “big picture” of general, nationwide environmental trends in both countries. It does not attempt to develop indicators for global controversies such as tropical rainforest deforestation, climate change, and bio-diversity.

Most of the data in this report come from the Organisation for Economic Cooperation and Development (OECD) Environmental Data Compendium 1995. Where OECD survey results were unavailable, data were supplemented by information from the Environmental Protection Agency (EPA), Environment Canada, or other official government sources.

The indicators are divided into primary and secondary categories. Within each category, there are several subsections. Primary environmental indicators include information about air quality, water quality, natural resources, land use and condition, and solid wastes. These indicators provide direct information about environmental quality. The secondary indicators include often cited environmental measures such as carbon-dioxide emissions, oil spills, numbers of wildlife species, use of pesticides, and toxic releases. These indicators are considered “secondary” since they provide only indirect information about environmental quality. In the final section of the report, the trend in environmental performance for the primary environmental indicators is compiled into an index. The index shows considerable improvement in the environmental performance of both Canada and the United States.