

2010

State of the Environment



2010 State of the Environment  
Published by the Prince Edward Island  
Department of Environment, Energy and Forestry  
February 2011

Cover Photo: Pownal, Prince Edward Island  
Cover Photography: Airscapes Prince Edward Island

The leaves depicted on the cover and throughout the report are from the Red Oak which was adopted as the provincial tree emblem in 1987.  
At one time, the Red Oak was more common than it is today.

## MESSAGE FROM THE PREMIER



My fellow Islanders,

We are blessed to live in a province of outstanding natural beauty and rich resources. Prince Edward Island's fertile soils and productive waters have nurtured and fed generations of its people. The rolling hills, sweeping dunes and lazy rivers provide enjoyment to all who visit and live here.

This Island is our legacy to protect and to pass on to future generations. Our commitment as a government is seen in the dedication and hard work of all our staff and the broad sweep of legislation which has been enacted since the last State of the Environment Report.

By measuring key environmental indicators and by taking a "reading" of the health of our Island home, the present State of the Environment Report can help all Islanders make informed decisions about our province and how to work together to assure its environmental sustainability in the years to come.

We all share this home province, we all have a say in its protection, and we are all responsible to look after this outstandingly beautiful and fragile place.

I am pleased to present this update of the State of the Environment Report.



A stylized, handwritten signature of Robert Ghiz.

Robert Ghiz, Premier  
Prince Edward Island

## MESSAGE FROM THE MINISTER

To Prince Edward Islanders,

For centuries, Prince Edward Island has prospered from clean air, pristine water, healthy forests, productive soil and abundant wildlife. The Island has provided for all who have made safe passage to its shores. We are fortunate to live with such a wealth of natural capital.

Today our land is more densely populated and more intensively farmed than ever. Our rivers, coastlines and woodlands are still rich and healthy but they are no longer part of an untouched, untilled and unworked landscape.

All Islanders enjoy and rely upon the natural wealth of this province and all Islanders must share in the responsibility of safeguarding our natural resources.

This State of the Environment Report is a report to the people of Prince Edward Island on the health of our ecosystems. It also documents those places where human activity may be having an adverse effect on the environment.

Government is providing strong leadership on the environment. Through new and ongoing initiatives, we are creating a shared responsibility for sustaining and enhancing our environment, not only for ourselves, but also for future generations.

Every effort has been made to select the most useful indicators and tools so that meaningful trend data can be collected. We continue to search for better tools and indicators to monitor the state of our environment. By taking long-term measurements of critical environmental indicators from across the province, Islanders can make informed decisions on how to best protect their Island home.



*Richard Brown*

Richard Brown, Minister  
Environment, Energy and Forestry



## TABLE OF CONTENTS

Introduction.....	3
Roles and Responsibilities in Environmental Stewardship .....	5
Highlights .....	8
What Are Indicators?.....	11
Criteria for Indicators.....	11
Using the Report.....	12
Summary of Indicators.....	13
Drinking Water.....	15
Nitrate in Private Well Water .....	16
<i>Escherichia coli</i> ( <i>E. coli</i> ) in Private Wells.....	18
Water and Wastewater Central Servicing for Prince Edward Island .....	19
Pesticide Occurrence in Groundwater .....	20
Surface Water .....	21
Anoxic Events in Estuaries.....	22
Nitrate Concentration in Surface Water .....	24
pH in Surface Water.....	26
Shellfish Closures .....	28
Siltation of Watercourses and Wetlands.....	30
Climate Change .....	31
Greenhouse Gas Emissions.....	32
Rise in Sea Level.....	34
Energy Use.....	36
Household Electrical Use .....	38
Gasoline Consumption .....	39
Wood Burned for Residential Heating.....	40
Air Quality.....	41
Acid Rain .....	42
Particulate Matter.....	43
Ground Level Ozone .....	45
Biodiversity .....	46
Forest Communities.....	47
Forest Coverture .....	49
Protected Land Area .....	50
Species Number .....	52

## TABLE OF CONTENTS

Pesticides.....	53
Fish Kills.....	54
Pesticide Sales.....	55
Waste Management.....	57
Solid Waste Diverted Away From Disposal by Burial and Incineration ....	58
Environmental Stewardship.....	59
Home Heating Oil Tank Compliance .....	60
Community Watershed Planning .....	62
People Taking Public Transportation .....	63
Participation in Angling, Hunting and Trapping .....	64
Soil Quality.....	66
Frequency of Row Crops.....	67
Area Under Soil Conservation Management Structures .....	68
Soil Organic Matter .....	69
Organic Agriculture .....	70
Land Use.....	71
Environmental Farm Plans (EFP).....	72
Land Area in Agricultural Crop Production.....	73
Forest Conversions .....	75
Feedback Form.....	77
Appendix – Legislation, Policy and Program Initiatives .....	79



## INTRODUCTION

The health and well-being of Prince Edward Islanders depends upon the quality of our environment. Our economic prosperity is also closely tied to clean air and water and well-managed soil resources. Responsible environmental stewardship today will ensure a healthy environment tomorrow.

This State of the Environment Report is the second progress report to the citizens of Prince Edward Island.

The State of the Environment Report belongs to all Islanders and is essential in promoting shared stewardship and shared solutions. The intent is to establish periodic, objective reporting on the health of the environment that will give governments, organizations, businesses and individuals a picture of where we stand managing and protecting our environment.

We are all accountable for the environmental impacts of our actions. To strengthen our shared commitment, Government is creating partnerships with Islanders to meet the challenge of living and working in a sustainable manner.

Key stakeholders, farmers, industry, organizations, governments, communities and individuals are participating in new measures to protect our natural resources and lessen our environmental impact.

Our collective record on the environment is strong.

While we can be proud of our shared achievements, protecting the environment is an ongoing commitment for everyone.

We are making significant progress in a number of areas.

- Government has adopted all the recommendations of the 2008 Report of the Commission on Nitrates in Groundwater which was established to address the issue of nitrate contamination in our groundwater. Since that time, we have initiated a number of recommendations and have developed a five-year plan to guide implementation of all the recommendations.
- Government has increased support to local watershed groups who are engaging residents in the protection and restoration of water resources. A strategic plan is currently underway to develop a common vision and goals for all watershed groups. Community involvement in watershed planning and management is an example of shared responsibility at its best.

## INTRODUCTION

- To encourage farmers to protect environmentally sensitive areas, government adopted the Alternative Land Use Program (ALUS). ALUS is a very successful, incentive-based program that rewards landowners for retiring environmentally sensitive areas of farmland. In addition, the *Lands Protection Act* has been amended to allow for the exclusion of environmentally sensitive areas from aggregate land holding limits.
- Buffer zones have been expanded to protect water resources and valuable wildlife habitats.
- A three-year funding partnership with Ducks Unlimited Canada will protect and restore wetlands across the province.
- To reduce the use of harmful lawn-care pesticides, changes were made to the *Pesticide Control Act* that bans the sale and use of many lawn-care pesticide products.
- To conserve biodiversity and protect ecologically significant sites such as wetlands, forests, sand dunes and other habitats, government is increasing the amount of public and private land protected under the *Natural Areas Protection Act*.
- The province is partnering with the Federal Government and regional governments on the Atlantic Regional Adaptation Collaborative, a series of projects to help PEI communities prepare for the impacts of climate change.
- Government is pursuing the development of wind energy as a source of reliable, low-cost energy that is not dependent on fossil fuels.

Partnerships play a vital role building awareness of our shared responsibility for the environment. Government will continue to work closely with Islanders to protect the resources that sustain the high quality of life we enjoy in Prince Edward Island.

The State of the Environment Report is a progress report on how everyone is meeting that challenge.



## ROLES AND RESPONSIBILITIES

## ROLES AND RESPONSIBILITIES IN ENVIRONMENTAL STEWARDSHIP

## Present Situation

All Islanders share responsibility for stewardship of our environment. Prince Edward Island is unique in its very high proportion of privately owned land – almost 90 per cent of the total. This means that, far more than in any other province in Canada, the quality of our water, air and soil depends on the choices made by families and individuals, by businesses, by volunteer organizations, and by communities – choices by every Islander about home energy and water use, transportation, consumption, recreation and recycling – choices by businesses about production techniques – choices by community and volunteer organizations about their activities and priorities – choices by communities about sewer and water infrastructure, land use planning and energy use.

Over time, these choices are evolving toward more positive environmental outcomes, reducing adverse impacts, and protecting and enhancing our environmental resources. Government works on many fronts to encourage this positive trend, including the following approaches:

- Awareness and education are being advanced through means such as the Watercourse Alteration Manual, safe hunting including a course to serve new Chinese immigrants, forest management standards, chainsaw use, citizen science and a diverse range of web-based publications.
- Government's environmentally responsible management of the Island's public lands – about 10 per cent of the total land mass – is protecting their natural capital value as a resource for all Islanders, and providing leadership in environmental stewardship through model approaches and innovation.
- Incentives such as the Alternative Land Use Services program, soil conservation, waste management, private land forests, energy efficiency and watershed planning are assisting individuals and businesses with the cost of measures that benefit all Islanders.
- Technical services such as soil engineering services and geographic information systems provide the specialized information that groups and individuals may not possess or cannot afford on their own.
- Collaborative approaches, such as the Commission on Land and Local Governance, biomass-based energy, watershed management planning and development of the recreational fishing policy, are fostering agreement on goals and approaches, and supporting shared efforts to attain those goals.

## ROLES AND RESPONSIBILITIES

- Other tools, such as voluntary natural areas, restrictive covenants and assigning a compliance officer to work with farmers, are also increasing environmental stewardship on specific issues.
- At the end of this continuum, legislation, regulations and policies provide the foundation of standards to protect and enhance our environment. The appendix provides a list of the environmental legislation, policy and program measures in recent years, and Government is responsible to administer and, where necessary, to enforce these rules.

Most landowners willingly implement sound stewardship actions. When regulations are broken, accidentally or otherwise, a resulting dialogue often influences better decision-making. In some cases, compliance actions such as orders, warnings or charges are necessary to discourage inappropriate activities. Conservation groups and the public have called for better compliance so that everyone is operating under the same rules.

Public complaints about the environment may be referred to the appropriate department or are given directly to a conservation officer. The Department of Environment, Energy and Forestry hosts a 24/7 environmental emergency line. Enforcement officers investigate complaints which may turn out to be valid, or may involve a legitimate activity. Where complaints are found to be valid, investigation may result in Environmental Protection Orders, Emergency Field Orders, written warnings or charges. In some cases, a lack of evidence or other reasons may prevent the case from proceeding.

The Department of Environment, Energy and Forestry has a Complaint Management System (CMS) designed to identify the nature of the complaint and the personnel assigned to respond to it. As the CMS does not identify all the potential outcomes, complete outcomes-based statistical data are not available; however, it is estimated that:

- approximately 40 per cent of investigations arise from public complaints, primarily from the central area of the province; and
- approximately 60 to 70 per cent of those public complaints are resolved without needing to resort to enforcement.

Prior to the 2003 State of the Environment Report, many individuals and conservation groups requested better enforcement of legislation. Consequently, the number of violations under environmental legislation was one of the indicators included in the 2003 State of the Environment. This indicator, however, is not comparable over time as it is influenced by many factors, including changes in legislation (e.g., new or changed provisions), ability to observe the activity, level of effort and complexity of the investigation. Special enforcement initiatives, such as increased resources in 2008 to address inappropriate use of all-terrain vehicles on trails and dunes, can also result in year-over-year fluctuations in the number and type of charges.

## ROLES AND RESPONSIBILITIES

In 2009, enforcement officers issued 163 warnings and 142 tickets; and in 2010, the Department of Environment, Energy and Forestry began releasing the statistics on environmental warnings and charges by conservation officers.

**W h a t   C a n   B e   E x p e c t e d ?**

Non-legislative compliance tools will continue to be developed. Incentives will be structured to encourage outcomes at ecosystem and watershed levels.

Provincial conservation officers and certain other provincial and federal officers will continue to deliver environmental legislation and bylaws on Prince Edward Island.

As recommended by New Foundations: Report of the Commission on Land and Local Governance, the Environmental Advisory Committee has been asked to undertake the development of a new conservation strategy for Prince Edward Island. This initiative will build on and advance the progress that Prince Edward Island has made in fostering environmental stewardship among all sectors of society and in all regions of our One Island Community.

## H I G H L I G H T S

**Drinking Water**

Prince Edward Island is totally dependent on groundwater for its drinking water. The water supply is generally good. Average nitrate levels in groundwater increased from the mid-1980s to 2007. In 2009, the province-wide average for nitrate levels in groundwater tested at 3.2 mg/L. However, 3.8 per cent of wells tested exceeded the 10 mg/L nitrate guideline in the Guidelines for Canadian Drinking Water Quality. Recent mathematical models predict that, under current land use practices, nitrate levels in well water will continue to rise.

Climate change will reduce water quality further, impacting water availability. Initial modelling conducted on a province-wide basis suggests that the amount of groundwater recharge may decline as a consequence of climate change, with implications for the management of groundwater withdrawals and salt-water intrusion into our Island aquifers in some coastal areas.

Between 1998 and 2005, central servicing of the water supply and waste water treatment increased by 14.3 per cent and 6.3 per cent respectively. Since 2005, over \$138 million has been invested in further improvements. Water sourced through central systems has had a lower incidence of positive tests for harmful bacteria than water from private wells.

**Surface Water**

Streams, ponds and estuaries on the Island continue to be adversely impacted by land use practices. The effects on aquatic life have been significant; negative impacts from siltation continue. Nitrate concentrations continue to rise above the safe guidelines for aquatic life and have more than doubled in the last 30 years. The number of shellfish growing areas closed to direct harvesting has remained stable.

**Climate Change**

As of 2008, the province's greenhouse gas emissions were one per cent below the 1990 levels.

Prince Edward Island is taking steps to reduce emissions through the development of large- and small-scale renewable energy programs, energy efficiency strategies and partnerships, and agricultural, forestry and waste management practices. The Government of Prince Edward Island has released a climate change plan that is focusing on actions which government and Islanders can take to reduce waste, minimize greenhouse gas emissions and ensure that natural resources are sustained for future generations.

Climate change will impact Prince Edward Island significantly. Sea levels have risen more than 32 centimetres since 1911, a rate in excess of the global average and of particular concern considering the highly erodible nature of our shores. The frequency and severity of hurricanes and storm surges have increased in recent years, with eight notable events in the last 10 years.

## H I G H L I G H T S

**Energy Use**

The province continues to depend on imported petroleum products. There has been an increase in the use of renewable energy, mainly due to higher consumption of fuelwood in the residential sector. The development of wind generated energy projects has increased the amount of electricity derived from renewable energy. A combination of public and private developments has enabled the province to access more than 18 per cent of its electricity from renewable sources.

In November 2010, the Provincial Government released the PEI Energy Accord which announced its intention to increase the province's use of wind energy to 33 per cent of the Island's electricity energy requirements by 2013.

**Air Quality**

Prince Edward Island has three air monitoring stations – part of the National Air Pollution Surveillance Network. Air quality in Prince Edward Island is considered very good. Sulphur dioxide, fine particulate matter and ground level ozone levels are all better than national standards require.

**Biodiversity**

By 2010, just over 7,141 hectares of land had been set aside as protected land under the *Natural Areas Protection Act*. The total area protected is below the seven per cent committed to by the province. The goal is to eventually protect 12,479 hectares of our Island land mass. The area protected under the *Natural Areas Protection Act* (NAPA) includes wetlands (bogs, fresh marshes, salt marshes and ponds), sand dunes, forests, offshore islands and coastal cliffs. Although the majority of these protected areas are held in public trust, important ecological sites are also owned by the Island Nature Trust and by a number of private landowners.

**Pesticides**

New pesticide regulations for farmers, greenhouse owners, commercial applicators, domestic vendors, and golf course owners mean that Prince Edward Island has some of the strictest pesticide use legislation in Canada. To ensure that new regulations are followed, monitoring, inspection and enforcement activities are being increased accordingly. In 2010, changes were made to the *Pesticide Control Act* that ban the sale and use of many lawn-care pesticide products.

**Waste Management**

Since 2002, Prince Edward Island has become a Canadian leader in the diversion of solid waste from landfill burial and incineration. Islanders currently divert over 60 per cent of household and business refuse into the Waste Watch separation, composting and recycling system. To further improve recycling efforts, the provincial Beverage Container Management System was launched in 2008.

## H I G H L I G H T S

The Atlantic Canada Electronics Stewardship program commenced in 2010. Future goals for waste handling include the separation and processing of paint and household hazardous materials.

**Environmental Stewardship**

In 2009, six community based watershed management plans had been developed. These represent approximately eight per cent of the land base within the province.

**Soil Quality**

The area of row crops under engineered soil conservation management increased 188 per cent from 7,490 hectares in 1995 to over 21,587 hectares in 2008. Agronomic techniques, such as practicing good crop rotations, using conservation tillage and/or establishing winter cover crops, are becoming more common, either in combination with engineered techniques or alone.

In 2009, there were 59 farmers practicing organic agriculture with 2,000 hectares under organic management.

**Land Use**

In 2006, there were 1,700 farms on Prince Edward Island accounting for 250,859 hectares of land under agriculture. Sixty-eight per cent of this land (171,296 hectares) was under crop production.

Between 1990 and 2000 approximately 5,655 hectares of new forest were created and 16,432 hectares were converted for other uses. The most common reasons for deforestation were the conversion of land to agricultural (10,547 hectares), residential (1,369 hectares) and industrial (652 hectares) purposes.



## INDICATORS

## WHAT ARE INDICATORS?

Indicators are pieces of information which reflect the workings of large complex systems. They can be symptoms, trends, warnings or simply unanalyzed measurements. They don't tell us everything but they should provide enough information to tell a credible story and help in making good decisions. For example, a fever indicates that the body is fighting an infection. Having this information enables that person to decide the best course of action. By monitoring the health of our environment we can understand how policies, programs and individual decisions are contributing to environmental sustainability. Indicators provide a baseline of information which will allow us to judge whether decisions need to be reassessed.

## CRITERIA FOR INDICATORS

A good indicator must meet a number of criteria. It must be:

- related to economic and social concerns and benefits;
- relevant especially to policy decisions and to the values and familiar issues in the population;
- understandable and easy to interpret by the target audience;
- accurate whether based on scientific, community or traditional knowledge;
- long term and derived from information that is collected in a comparable manner from year to year and which will be available in the future; and
- outcome based and measurable where possible.

These criteria guided the selection of the indicators in this report. Many of the indicators recommended in the report of the Round Table on Resource Land Use and Stewardship (September 1997) meet these criteria and many are included in this report.

## USING THE REPORT

The indicators are grouped according to a resource (e.g., air, soil, water) or other category (e.g., pesticides, waste management). The relevance of each indicator is explained and then data, current and in some cases historical, are reported to indicate a trend. The sources of the data are referenced and can be accessed through the appropriate agency.

In selecting indicators and looking for data, it was tempting to limit the process to the availability of data. There are certainly plenty of data available on the environment but much does not meet the criteria necessary to be selected as a trustworthy indicator. Sometimes survey data are used in lieu of 'real' data sets; and in other cases, proxy measures are reported. For example, numbers of species is a proxy indicator for total ecosystem biodiversity.

This publication is part of a series of reports on the state of Prince Edward Island's environment. It is important to recognize that this report uses both quantitative and qualitative indicators to measure environmental health. This report should challenge the public, the academic community, the business community and Government to determine better ways to assess the environmental impact of our choices and actions. This will enable Islanders to work together in order to devise ways to reduce our negative impact on the natural capital\* that sustains us.

Please take a moment to fill out the feedback form at the back of the report or go to our online version at [www.gov.pe.ca/soe](http://www.gov.pe.ca/soe)

\* **Natural capital** comprises those natural resources, biological systems and the physical environment that provide life. It includes all the familiar resources used by humans (air, water, soil, plants, animals, minerals, oils, etc.) and includes all living habitats, the cycles that drive them, and the biological services they provide.

## SUMMARY OF INDICATORS

**Drinking Water Quality**

Measured as the concentration of nitrate and the presence of *E. coli* bacteria in private water wells, as well as the number of homes serviced by central water and wastewater systems and pesticides occurrence in groundwater.

**Surface Water Quality**

Measured as the number of anoxic events in estuaries, the amount of nitrate in four test rivers, the pH of surface water, the percentage of total classified shellfish growing areas that are not open for harvest and siltation in surface waters.

**Climate Change**

Measured as the amount of greenhouse gas emissions produced in the province and the rise in sea level at Charlottetown.

**Energy Use**

Measured as the average monthly household use of electricity, gasoline consumption and the round wood consumption for residential heating.

**Air Quality**

Measured as the acidity of rain, particulate matter content and ozone level.

**Biodiversity**

Measured as the change in forest communities, the change in forest covertypes, the amount of land protected under the *Natural Areas Protection Act* and the number of species in Prince Edward Island.

**Pesticides**

Measured as the number of reported fish kills in rivers and amount of pesticide sold.

**Waste Management**

Measured as the percentage of solid waste diverted from disposal by burial or incineration.

**Environmental Stewardship**

Measured as compliance with regulations requiring inspection and tagging of home oil tanks, the number of community watershed planning projects completed or in development, the number of passengers using the public transit in Charlottetown and participation in fishing, hunting and trapping.

## SUMMARY OF INDICATORS

**Soil Quality**

Measured as the frequency of row crops, the area of row crops under engineered soil conservation management structures, the organic matter in soil and the area of land in certified organic production.

**Land Use**

Measured by the area of land and number of farms with valid Environmental Farm Plans, the percentage of agricultural land cultivated for crop production and the area of forest converted to non-forest uses.

## D R I N K I N G   W A T E R

## P R E S E N T   S I T U A T I O N

Prince Edward Island is totally dependent on groundwater for drinking water.

In general, the quality of groundwater in Prince Edward Island is very good, and most drinking water supplies sourced from groundwater require no treatment.

Human activity can influence groundwater quality. Problems that have arisen in the past include bacterial contamination, elevated nitrate levels and high salt levels from road salt sources or marine salt water intrusion.

Bacterial contamination is the most common drinking water problem, although incidents of contaminated well water are declining.

Nitrate contamination of drinking water continues to be a concern.

Pesticides have been detected in drinking water, though never at levels above current drinking water guidelines. Monitoring for the presence of these compounds continues. New compounds are added to the formal list of pesticides screened as research warrants.

## W H A T   C A N   B E   E X P E C T E D ?

Human activity can adversely influence water quality. The presence of elevated nitrate levels or *E. coli* (*Escherichia coli*) bacteria in drinking water is a cause for concern.

Bacterial contamination in well water is usually a consequence of localized events (such as cross-contamination from septic systems) and does not mean there is a decline in overall groundwater quality.

Reducing nitrate levels is a long-term commitment that will involve the development and implementation of comprehensive nutrient management plans and measures, focused primarily on modifying conventional agricultural and turf management practices; however, it is important to appreciate that domestic sources of nitrogen also play a role in nitrate contamination of groundwater.

The Report of the Commission on Nitrates in Groundwater (July 2008) sets out a comprehensive plan for reducing the nitrate content of Prince Edward Island's groundwater, all of which have been accepted by Government. Significant progress has been made on these recommendations with 10 being completed and progress being made on 10 more.

Drinking Water and Wastewater Facility Operating Regulations now list the requirements for mandatory certification for operators of water and wastewater utilities, monitoring and public reporting for central water and wastewater systems, and well field protection planning for municipal water supplies.

## DRINKING WATER

**INDICATOR:****Nitrate in Private Well Water****Description:**

Average nitrate concentration in private wells measured in milligrams per litre nitrate nitrogen (mg/L NO<sub>3</sub>-N) and the per cent of private wells with nitrate concentrations exceeding the drinking water guideline of 10 milligrams per litre nitrate nitrogen (mg/L NO<sub>3</sub>-N).

**Importance:**

Nitrate is the dominant form of nitrogen in groundwater. Sources of nitrate include the atmosphere, sewage, manure and fertilizer. Elevated nitrate levels in drinking water can be a potential health concern, mainly in relation to “blue baby syndrome” – a condition in infants where the blood’s ability to carry oxygen is decreased, resulting in a bluish discoloration of the skin. The drinking water guideline for nitrate was established to protect infants less than three months of age; however, because of some evidence of other health effects, the guideline is intended to apply to both infants and adults. About 55 per cent of the Island population (the highest proportion in Canada) depend on private wells. These wells are tested on a voluntary basis.

**Objective:**

To have an average nitrate concentration of 3 mg/L or less (province-wide) and no wells exceeding the maximum 10 mg/L guideline recommended by the Guidelines for Canadian Drinking Water Quality.

**Interpretation:**

Nitrate concentrations indicating ‘pristine’ water conditions are typically in the range of 0.5 to 1.0 mg/L. The average nitrate concentrations for private wells over the past four years peaked at 4.1 mg/L in 2007, then declined to 3.2 mg/L in 2009.

In 2009, 3.8 per cent of wells exceeded the 10 mg/L guideline recommended by the Guidelines for Canadian Drinking Water Quality. Nitrate may be present in water due to decay of vegetation, manure and sewage, but the dominant source is from fertilizer. Because of the extensive use of fertilizers and manure in association with agricultural activity, elevated nitrate levels are most common in areas of intensive agriculture.

**Status and Trends:**

Year	Number of Wells Tested	Average Nitrate Level (mg/L)	Percentage of Wells Exceeding 10 mg/L
1984/85	NA	3.2*	NA
1995/96	NA	3.5*	NA
2000	2,410	4.5**	3.5
2001	3,367	3.7	4.9
2002	3,191	3.8	5.3
2003	3,096	3.9	5.3
2004	2,414	3.5	3.5
2005	1,899	3.6	4.2
2006	1,825	3.6	4.3
2007	2,428	4.1	4.0
2008	1,976	3.5	4.1
2009	1,660	3.2	3.8

NA – Data not available

\* Number represents the two-year average

\*\* Was reported as 3.6 in the State of the Environment (2003)

**Note:** Because of differences in the manner in which the data were assembled, the figures presented here for the years 2001 and 2002 vary slightly from those that appeared in the 2003 State of the Environment report.





## D R I N K I N G   W A T E R

**Response:**

To reduce nitrate levels in groundwater, initiatives such as Environmental Farm Plans, nutrient management plans and municipal wellfield protection guidelines have been put in place. In 2007, Government appointed the Commission on Nitrates in Groundwater to develop a strategy to reduce nitrate concentrations in ground and surface water. The commission's report, released in 2008, has been adopted by government. An action plan was prepared and significant progress has been made on these recommendations with 10 being completed and progress being made on 10 more. The objective of an average nitrate concentration in groundwater of 3 mg/L or less is based on the understanding that nitrate is a naturally occurring component of groundwater with concentrations typically in the range of 1 mg/L or less. Even with the best available technology, it is not possible to completely eliminate human sources of nitrate.

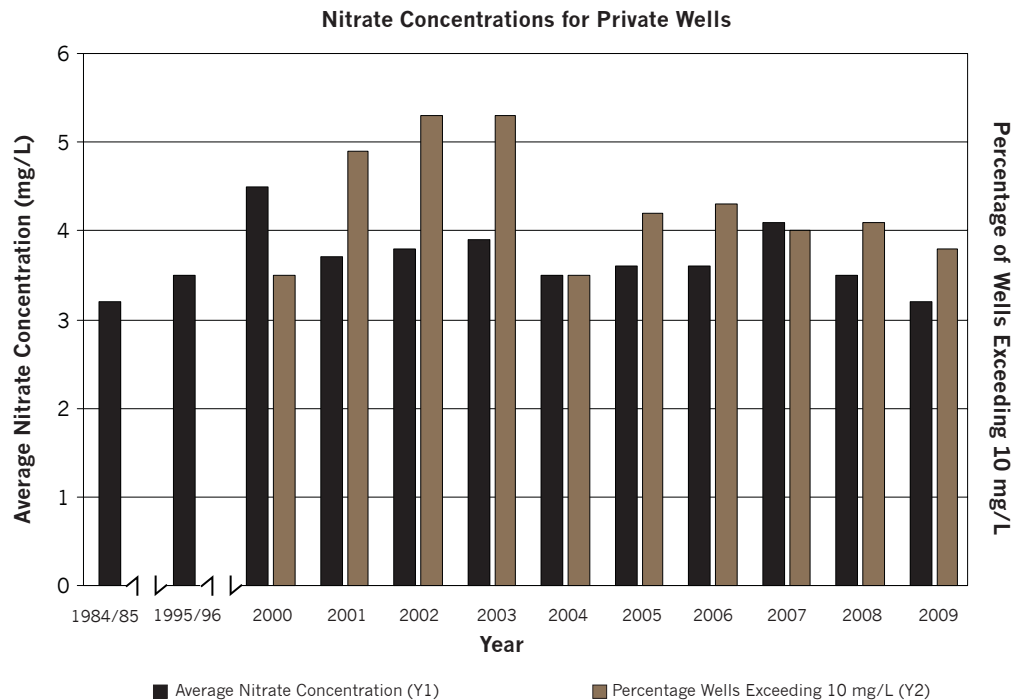
It is recognized that the objective of having no wells with nitrate concentrations exceeding 10 mg/L may not be feasible, but reflects the importance of protecting public health by striving for the best drinking water quality possible. Research continues to better understand the links between the various nitrogen sources and levels of nitrate in groundwater.

**Data Sources:**

Department of Environment, Energy and Forestry

Consequences of climatic changes on contamination of drinking water by nitrate on Prince Edward Island. Peer reviewed project report A881/A843, edited by Martine M. Savard & George Somers, available at: [http://adaptation.nrcan.gc.ca/projdb/pdf/109\\_e.pdf](http://adaptation.nrcan.gc.ca/projdb/pdf/109_e.pdf)

Report of the Commission on Nitrates in Groundwater (July 2008)



## DRINKING WATER

**INDICATOR:***Escherichia coli* (*E. coli*) in Private Wells**Description:**The presence of *E. coli* bacteria in private wells**Importance:**

The presence of *E. coli* in water is an indicator of bacterial contamination by sewage or manure. There are more than 100 different strains of *E. coli*, of which a small number are harmful to humans. The presence of this bacterial species indicates the potential for serious illness or even death. Finding *E. coli* in well water indicates the possible presence of a range of other potentially harmful human pathogens.

**Objective:**To have no wells testing positive for *E. coli*.**Status and Trends:**

Year	Number of Wells Sampled	Percentage of Wells with <i>E. coli</i> Detected
2000	5,139	4.2
2001	8,427	2.5
2002	9,370	3.7
2003	7,565	2.5
2004	6,038	1.9
2005	5,760	2.1
2006	5,614	1.9
2007	5,767	1.1
2008	5,436	1.7
2009	5,305	2.0

**Note:**

Due to differences in the manner in which the data have been assembled, the figures presented here for the years 2001 and 2002 vary slightly from those that appeared in the State of the Environment (2003) report.

**Interpretation:**

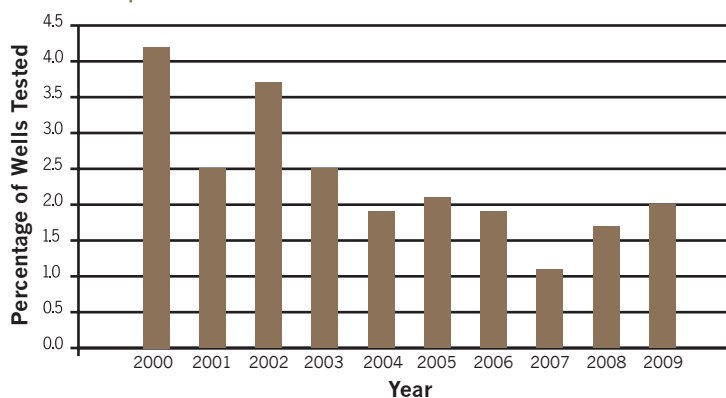
The detection of *E. coli* is a measure of the integrity of drinking water and sewer systems rather than the quality of the overall groundwater resource. The percentage of wells testing positive for *E. coli* has decreased from the levels in the early 2000s. In 2009, two per cent of private wells tested positive for *E. coli*. Bacteria levels in contaminated wells can fluctuate widely even over short periods of time, often in response to specific weather events. Consequently, the frequency of detection of *E. coli* is used as an index, rather than a measure of its concentration.

**Response:**

Improvements in the standards for well construction and design, and installation of sewage disposal systems, should result in continued reduction in the number of *E. coli* contaminated wells. It is recognized that the objective of having no wells testing positive for *E. coli* may not be feasible, but reflects the importance of protecting public health by striving for the best drinking water quality possible.

**Data Source:**

Department of Environment, Energy and Forestry

**Private Wells Testing Positive for *E. coli***

## DRINKING WATER

**INDICATOR:****Water and Wastewater Central Servicing for Prince Edward Island****Description:**

The percentage of single family homes that are serviced by a central water supply system and a central wastewater collection and treatment system

**Importance:**

Water provided through central water supply systems is safer (lower rate of bacterial contaminants) than water provided through private water supply systems. With the move to wastewater collection and treatment systems, the incidence of groundwater contamination in centrally serviced areas has also decreased. Water and wastewater systems are now managed, operated and maintained by licensed professionals. Central water and wastewater servicing allows for more efficient land use in urban and suburban settings by permitting smaller lot sizes.

**Objective:**

To increase the number of homes with central servicing in urban and suburban areas of the province.

**Status and Trends:**

Year	1998	2002	2005
Percentage of homes serviced by central water	49	53	56
Percentage of homes serviced by central wastewater collection and treatment	63	66	67

**Note:**

While the objective is to increase the number of homes with central servicing in urban and suburban areas, the percentages above refer to total number of homes throughout the province.

**Interpretation:**

The share of homes serviced by central water and wastewater systems up to 2005 increased by 14.3 and 6.3 per cent respectively since 1998. This increase translates into more consistent drinking water quality for these homes. More recent numbers for central water and wastewater systems are not available as these data are not available for all communities.

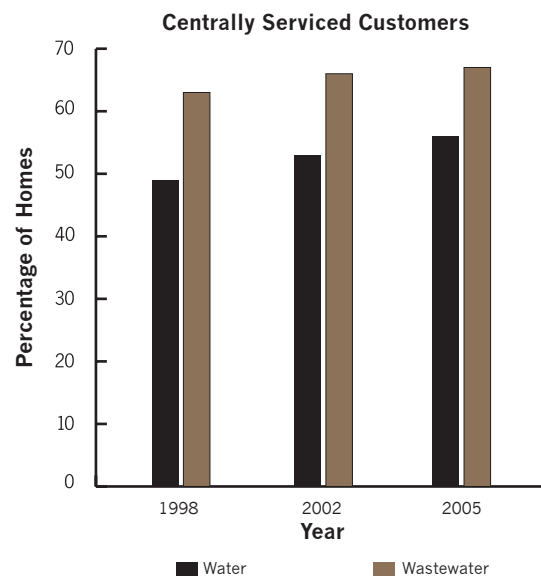
**Response:**

The shared municipal infrastructure investment by municipal, provincial and federal partners in central water and wastewater systems from 2003 to 2010 was \$167.5 million. The Government of Prince Edward Island will continue to work with the federal and municipal governments to provide funding for water and wastewater central servicing.

**Data Sources:**

Department of Environment, Energy and Forestry

Island Regulatory and Appeals Commission



## DRINKING WATER

**INDICATOR:**

## Pesticide Occurrence in Groundwater

**Description:**

Pesticides represent a broad range of compounds used to control plant or animal pests, and include herbicides, insecticides, fungicides, fumigants and wood preservatives. They are used extensively in agricultural production, as well as in domestic and commercial settings, such as insect control. Methods of detecting pesticides have improved in the past decade.

**Importance:**

Pesticides are intended to control specific “target” pests, but can also pose risks to people. Awareness has grown of the potential for pesticides migrating to groundwater which is the primary source of drinking water in Prince Edward Island. The effects of long-term exposure to low levels of pesticides are hard to define. However, it is preferable to prevent pesticides from entering the ground water reserves.

**Objective:**

To minimize the presence of pesticides in groundwater, and to ensure that where detected, pesticide concentrations remain at concentrations which are not detrimental to human health.

**Status and Trends:**

Year	Number of Wells Tested	Percentage of Wells with Detections	Percentage of Detections Above Health-based Recommendations for Drinking Water
2004	107	7	0
2005	106	11	0
2006	96	15	0
2007	107	16	0
2008	102	10	0
2009	94	16	0

**Interpretation:**

Pesticide detections in groundwater, when observed, have been well below health-based recommendations for maximum concentrations in drinking water, however, the percentage of wells where pesticides have been detected increased from seven per cent in 2004 to 16 per cent in 2007, back down to 10 per cent in 2008, and up to 16 per cent in 2009. Since 2003, approximately 100 drinking water wells from across the Island have been sampled annually. These wells are from private homeowners, schools, municipal drinking water supplies and seniors housing facilities. With only a limited data set available, it is not possible to establish firm trends regarding pesticide occurrence in our groundwater.

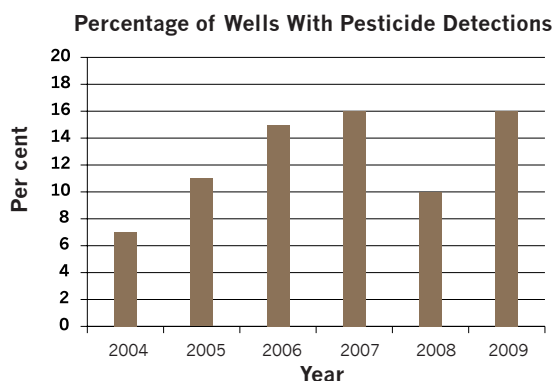
**Response:**

Government is continuing to monitor the levels of various pesticides in Prince Edward Island’s groundwater through a survey of a representative number of drinking water wells. The Department of Environment, Energy and Forestry has implemented new regulations under the *Pesticides Control Act* improving the training requirements and certification standards for pesticides applicators, creating more stringent regulations for the transport and storage of pesticides and banning the sale and use of many lawn-care pesticide products.

**Data Sources:**

Department of Environment, Energy and Forestry

Additional data are available at <http://www.gov.pe.ca/envengfor/index.php3?number=1023896&lang=E>



## SURFACE WATER

## PRESENT SITUATION

Siltation of watercourses and wetlands remains a serious problem for aquatic life. It fills in streams, ponds and estuaries, degrading much of the watercourse and estuarine habitat. There have been significant improvements in erosion control measures since 2003. Recent legislative changes have strengthened buffer zone regulations and extended buffer zones around waterways. Expansion of the ALUS program and amendments to the *Lands Protection Act* have encouraged the creation of features which should further reduce erosion.

Despite these measures, it will take the efforts of all landowners to fully address siltation control. Nutrient enrichment of aquatic systems is worsening especially in the upper parts of estuaries. Many estuaries already exhibit symptoms of nutrient excess, such as anoxia – the depletion of dissolved oxygen in water. Nitrate levels in streams discharging into estuaries also continue to increase.

Bacterial contamination in estuaries is also of concern, and leads to the closure of shellfish beds and restrictions on shellfish harvest.

Soils without well developed vegetative cover in Prince Edward Island are highly erodible. Government's efforts to reduce siltation from its own operations and to implement measures to address erosion control will continue. Efforts have commenced at identifying a cost effective indicator for siltation in Prince Edward Island.

## WHAT CAN BE EXPECTED?

Algal blooms, and the subsequent anoxia that follows, will continue to worsen if nutrient enrichment in the catchment basin increases.

These events will become more frequent and last longer.

If significant decreases in nutrient losses occur, it would take approximately five years before land management changes result in improvements in the health of rivers and estuaries.

## SURFACE WATER

**INDICATOR:****Anoxic Events in Estuaries****Description:**

In an anoxic event, oxygen is depleted as a result of the decay of large amounts of plant material previously growing in the water. The decay process can result in milky white or cloudy green discoloration of the water as well as the release of gases with rotten egg type odours.

**Importance:**

Short-term exposure to anoxic waters will result in the death of fish, shellfish and most other aquatic life. Anoxic waters also lose their aesthetic appeal to local residents, tourists and recreational users.

**Objective:**

To see a continuous decrease in the number of anoxic events in estuaries.

**Interpretation:**

Increased instances of anoxic events are generally an indicator of declining water quality. Yearly differences between the number of annual anoxic events are attributed to differing tide and weather conditions. Areas with higher tides and a greater tidal range record fewer anoxic estuary events. Certain weather conditions (such as heavy rains) can mask anoxic events.

The principal cause of anoxic events in Island estuaries is excess nutrient loading caused by some current land management practices. There are several factors which determine the susceptibility of each estuary to nutrient enrichment including natural restrictions of tidal flow, the physical properties of the estuary (depth, width and length), stratification of water (the presence of deep, poorly mixed areas) and small tidal ranges, especially on the north (Gulf of St. Lawrence) shore.

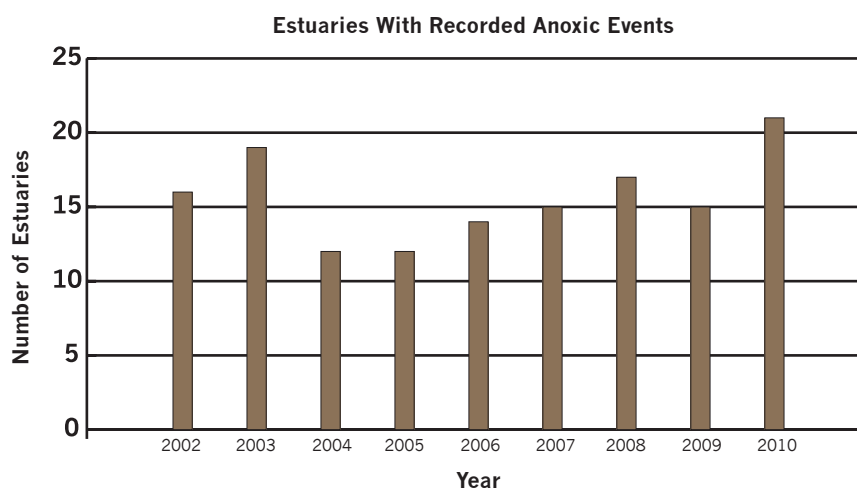
Streams in PEI are primarily spring fed. It takes a number of years for nitrates near the surface to move down far enough in the soil column for the nitrates to make their way into spring water. Thus, nutrient management measures, once adopted, take time to reduce nutrient impacts in the estuaries.

**Status and Trends:**

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010
Anoxic Events	16	19	12	12	14	15	17	15	21

**Note:**

The numbers of anoxic events in the State of the Environment (2003) report is slightly different as certain estuary complexes are now being considered as a single estuary.





## SURFACE WATER

**Response:**

The Report of the Commission on Nitrates in Groundwater <sup>1</sup> has outlined a strategy to deal with nutrient enrichment of surface water in the province. The strategy involves implementing land-use and nutrient management systems.

Nutrient management is still in its early stages in Prince Edward Island. Marked improvement will only occur with the implementation of land and nutrient management techniques designed to reduce losses of nitrate into ground and surface water. Landowners are at various stages in the nutrient management planning process.<sup>2</sup> In some watersheds nutrient loads are so high it is not clear that nutrient management alone will resolve the problem.

Steps are currently being taken to address the gaps in reporting anoxic events in Island estuaries. If these efforts are successful, the result may be an overall increase in the number of anoxic estuaries recorded annually over the next few years.

**Data Source:**

Department of Environment, Energy and Forestry

<sup>1</sup> Report of the Commission on Nitrates in Groundwater (June 2008) – [www.gov.pe.ca/photos/original/cofNitrates.pdf](http://www.gov.pe.ca/photos/original/cofNitrates.pdf)

<sup>2</sup> A nutrient management plan is a written site-specific plan indicating how the major plant nutrients (nitrogen, phosphorus, and potassium) are to be annually managed for agronomic crop production and for the protection of water quality. The plan takes into account: nutrient levels in the soil and nutrients applied; realistic expected yields; other normal farming practices related to expected yield and/or efficient nutrient utilization, (e.g., liming, pest control, practiced crop rotation and proper harvest) and potential impacts on ground and surface waters, with particular emphasis on environmentally sensitive areas.  
[www.elibrary.dep.state.pa.us/dsweb/Get/Rendition-489949/Section4.pdf](http://www.elibrary.dep.state.pa.us/dsweb/Get/Rendition-489949/Section4.pdf)

## SURFACE WATER

**INDICATOR:****Nitrate Concentration in Surface Water****Description:**

Average nitrate concentration in four test rivers, measured in milligrams/litre (mg/L)

**Importance:**

Fertilizers and animal and human waste can influence nitrate levels in the aquatic environment, resulting in concentrations that may be several times greater than natural background levels. The current Canadian Water Quality Guideline for the Protection of Aquatic Life for nitrate is 2.9 mg/L. While direct toxic effects may be possible above this level, a more subtle but equally serious effect is nutrient enrichment of surface waters. Nutrient enrichment of estuaries results in increased productivity often characterized by excessive amounts of algae (such as sea lettuce) and plankton blooms. This can lead to eutrophication<sup>3</sup> and subsequent poor water quality conditions and the occurrence of anoxic events.

**Objective:**

To maintain nitrate concentration below the Canadian Aquatic Life Guideline of 2.9 mg/L.<sup>4</sup>

**Status and Trends:****Nitrate Concentration in Four Test Rivers (mg/L)**

Period	Mill River	Dunk River	Wilmot River	Morell River
1971-1975	0.77	1.46	NA	NA
1976-1980	0.77	NA	NA	0.24
1981-1985	1.23	2.24	NA	0.29
1986-1990	1.26	2.26	NA	0.37
1991-1995	1.43	2.32	3.6	0.44
1996-2000	1.67	3.4	5.08	NA
2001-2005	2.72	4.16	6.7	0.97

NA – Data not available

**Interpretation:**

The long-term trends show nitrate levels increasing in all four test rivers and averages in three (Mill, Dunk and Wilmot) are routinely above the Canadian Aquatic Life Guideline. The nitrate concentrations recorded correspond closely with the acreage of cleared land in each watershed and the acreage under row crop production.

Nitrate has been measured in the Mill, Dunk and Morell Rivers for more than 30 years, and for the Wilmot River since 1991. Average nitrate values for the Wilmot River in 2008/2009 exceeded 7.1 mg/L, while the values for the Dunk River exceeded 4.5 mg/L and those for Mill River approached 3.0 mg/L. Nitrate concentrations in the Wilmot, Mill and Dunk Rivers are high enough to promote eutrophication.

Marked improvement will only occur with the implementation of land and nutrient management techniques designed to reduce losses of nitrate into ground and surface water.

<sup>3</sup> **Eutrophication** is a process whereby water bodies, such as lakes, estuaries or slow-moving streams, receive excess nutrients that stimulate excessive plant growth (algae, attached algae and nuisance plants). This enhanced plant growth, often called an algal bloom, reduces dissolved oxygen in the water (anoxia) as dead plant material decomposes. This can result in the death of other organisms.

<sup>4</sup> While direct toxic effects may be possible above this level, a more subtle and damaging effect can occur below levels that cause anoxic events.

## SURFACE WATER

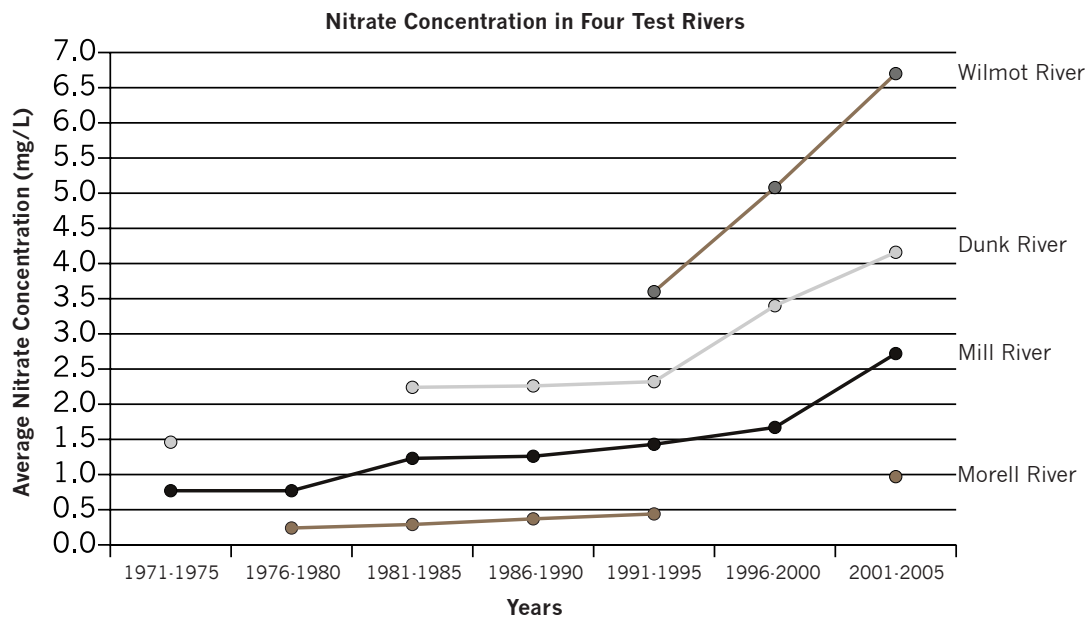
**Response:**

For these trends to be slowed or reversed, the majority of landowners must accept nutrient management techniques as a necessary and viable production practice. The Report of the Commission on Nitrates in Groundwater (June 2008) has outlined a strategy to move toward this goal and thus to deal with nutrient enrichment of surface water in the province. Significant progress has been made on these recommendations with ten being completed and progress being made on ten more.

**Data Sources:**

Environment Canada

Department of Environment, Energy and Forestry



## SURFACE WATER

**INDICATOR:****pH in Surface Water****Description:**

Average pH in four test rivers, measured in pH units

**Importance:**

pH is a measurement of how acidic or alkaline a body of water is. The lower the pH value the more acidic the water, the higher the pH the more alkaline it is. A pH value of seven is considered to be neutral.<sup>5</sup>

One of the chief concerns regarding pH in streams and rivers is the effect of acid precipitation (acid rain). Another contributory factor is the impact of certain land use practices. While young fish and insect larvae are sensitive to a low pH (acid), extreme values on either end of the pH scale can be lethal to most organisms. Normal levels are considered to lie between pH 6.5 to pH 9.0.

**Objective:**

To maintain pH concentrations in Island streams within the Canadian Water Quality Guideline for the Protection of Aquatic Life for pH of between 6.5 and 9.0.

**Status and Trends:**

Period	Mill River	Dunk River	Wilmot River	Morell River
1976-1980	7.8	NA	NA	7.7
1981-1985	7.8	7.9	NA	7.6
1986-1990	7.8	7.9	NA	7.7
1991-1995	7.7	7.9	7.7	8.0
1996-2000	7.7	8.0	7.9	NA
2001-2005	8.0	8.0	8.0	7.9
2006-2008	8.0	8.1	8.0	8.0

Average pH in four test rivers, measured in pH units

**Interpretation:**

The long-term trends and averages for the four test rivers show a slight increase in pH values over the period of record. The Mill and Morell Rivers show an increase of about 0.3 pH units over nearly four decades, while the Dunk River has a 0.2 unit increase over three decades and the Wilmot River about 0.3 units over two decades. Current pH values for PEI's surface waters fall within acceptable ranges and there is not a problem with acidification.

There is virtually no difference between the pH of streams under different types of land use; the Morell River has the highest proportion of forested land and lowest proportion of agricultural land and the Wilmot River the lowest proportion of forest and highest proportion of agricultural land. Only a small proportion of the values recorded were outside the Canadian Aquatic Life Guideline. These values were below pH 6.5 and recorded prior to 1992.

**Response:**

pH will continue to be monitored in Island rivers.

NA – Data not available

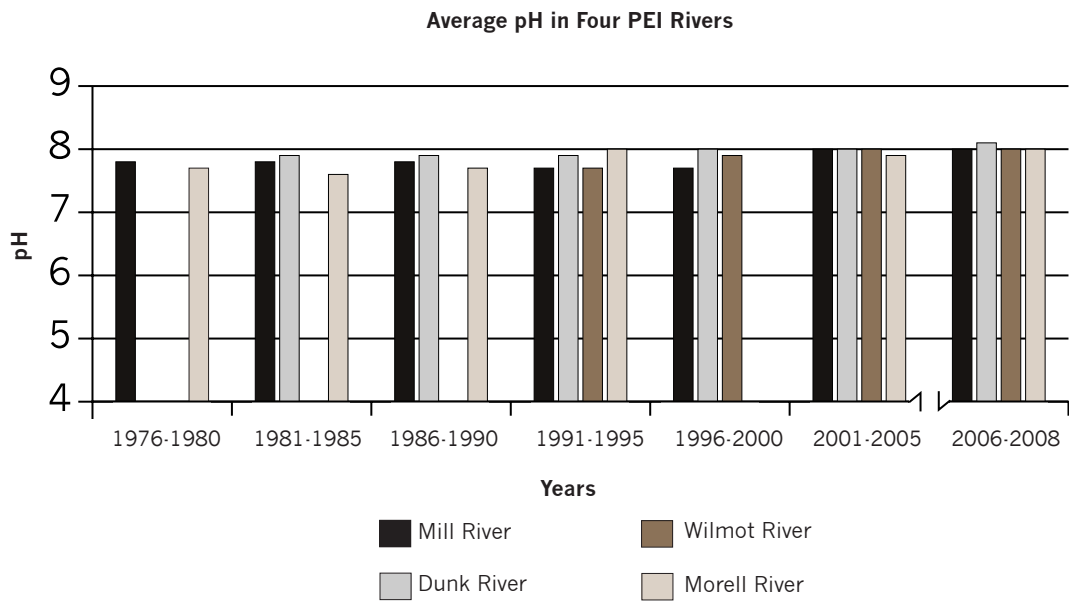
**Data Sources:**

Environment Canada

Department of Environment, Energy and Forestry

<sup>5</sup> The pH scale is logarithmic and, as a result, each whole pH value below seven is 10 times more acidic than the next higher value. For example, pH 4 is 10 times more acidic than pH 5 and is 100 times (10 times 10) more acidic than pH 6.

## SURFACE WATER



## SURFACE WATER

**INDICATOR:**  
Shellfish Closures**Description:**

Percentage of total shellfish growing areas classified as approved (open), closed or conditional. Classification is determined by the levels of faecal coliform bacteria in the water.

**Importance:**

Increasingly, closures in shellfish growing areas have impacted the province economically by reducing the area available for harvesting shellfish. An increasing trend in percentage of total area closed can indicate worsening water quality, while a decreasing trend may indicate improving water quality.

**Objective:**

To reduce the areas closed to shellfish harvesting.

**Interpretation:**

Since the State of the Environment (2003) report, the relative percentage of approved area has remained relatively the same, with an increase of 0.4 per cent overall since 2000. This did not meet the objective of a one per cent increase in approved area contained in the last report, however the total area classified has increased by 150.7 km<sup>2</sup>.

Small increases in the percentage of approved area between 1998 and 2002 were due to the classification of additional areas rather than changes in existing classifications. Several new closures or expansion of existing closed areas occurred in 2003. In some cases, these closures were linked to land use issues, in others the presence of waterfowl, marine mammals and others to water exchange issues. The percentage of area managed as a conditional opening has been steadily declining since 1998, reflecting the overall move away from this type of classification as a management tool. Increases in the size

**Status and Trends:**

Year	Approved Area (km <sup>2</sup> )	Per Cent Approved	Closed Area (km <sup>2</sup> )	Per Cent Closed	Conditional Area (km <sup>2</sup> )	Per Cent Conditional
1998	537.3	81.0	111.5	16.8	14.9	2.2
1999	573.3	81.9	112.0	16.0	14.9	2.1
2000	631.0	82.6	117.4	15.4	15.1	2.0
2001	629.7	82.4	119.7	15.7	14.6	1.9
2002	771.3	85.0	122.0	13.4	14.6	1.6
2003	754.5	82.9	141.5	15.5	14.5	1.6
2004	758.5	83.2	140.9	15.5	12.3	1.3
2005	785.5	83.5	142.4	15.1	12.3	1.3
2006	784.0	83.4	144.5	15.4	11.7	1.2
2007	781.4	83.1	145.9	15.5	12.9	1.4
2008	781.7	83.0	147.6	15.7	12.9	1.4



## SURFACE WATER

of closures and the necessity of new closures in some areas of the province were partially offset by increases in classified area in other areas during 2006.

Periodic or temporary closures caused by the bacterial contamination of shellfish or water, or by other factors such as the presence of toxins, are not reflected here.

**Response:**

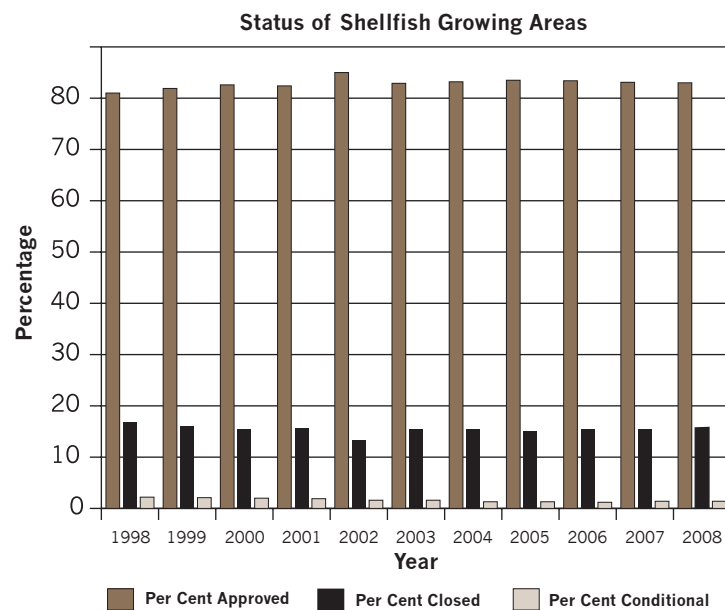
Activities such as the addition of buffer zones along waterways, improvements to wastewater treatment facilities and the restrictions on cattle access to waterways help reduce the likelihood of bacterial contamination from land use and management. In some cases, however, faecal coliform contamination can result from the presence of wildlife such as migratory birds and marine mammals in the immediate area.

Beginning in 2009, a new Canadian Shellfish Sanitation Program for shellfish growing areas was adopted.

These two classification schemes are not directly comparable and therefore it will be necessary to shift to a new indicator in future reports.

**Data Source:**

Environment Canada



## SURFACE WATER

**INDICATOR:****Siltation of Watercourses and Wetlands****Description:**

An accurate measuring tool has yet to be found for the siltation of watercourses and wetlands which continues to be a significant concern.

**Importance:**

Deposition of silt carried by runoff or wind into freshwater streams and wetlands has significant negative effects on a variety of wildlife including trout, salmon and other species.

**Objective:**

To reduce the deposition of silt in watercourses and wetlands.

**Status and Trends:****Interpretation:**

Most soils on Prince Edward Island are prone to water and wind erosion when their covering vegetation is removed. Siltation of streams, wetlands and estuaries has been documented since at least the 1880s in Prince Edward Island. It causes in-filling of deeper water areas such as ponds and pools, degrades wetlands, covers gravel in streams and shell in estuaries, changes in-stream channel configuration, enables the movement of chemicals carried in soil and causes other effects.

There was no indicator for siltation of watercourses and wetlands in the 2003 report. The principal cause of siltation is water borne erosion of soil from agriculture, road construction, urban development, forestry operations and other activities where land is disturbed. Increased deposition of silt into watercourses and wetlands is an indicator of declining habitat or reduced habitat quality.

**Response:**

Activities such as stream enhancement projects, creation of holistic community watershed plans, establishment of incentive programs to encourage better stewardship (e.g., ALUS - Alternative Land Use Services Program), establishment of buffer zones, engineering of high slope agricultural lands, imposition of construction standards for roads and developments near watercourses and wetlands, creation of a wetland policy, installation and maintenance of silt traps in ditches and silt fences, and other measures have helped reduce the amount of siltation.

**Data Source:**

Department of Environment, Energy and Forestry

The top image shows the water borne silt just after a July 2009 rain storm downstream from Carragher's Pond in Emyvale, Prince Edward Island. The lower image shows the silt removed from Carragher's Pond and placed pond side by an excavator in 2009.

(Top photo courtesy of Daryl Guignon and lower photo courtesy of Alan McLennan.)

## CLIMATE CHANGE

## PRESENT SITUATION

Our global climate patterns are changing. In the last 100 years, global temperature rose by almost 1°C. Conservative estimates suggest that global sea levels have risen by 12 to 22 centimetres.<sup>6</sup> Heavy precipitation events have increased across North America, while mountain glaciers have retreated and snow cover diminished worldwide.

Human activity, primarily from the burning of fossil fuels for heating, passenger transport and electricity generation, is generally considered to be causing greenhouse gases to build up in the atmosphere. This is prompting global climatic instability and change. In 2008, Prince Edward Island generated 1.966 million tonnes of greenhouse gases, the equivalent of 14.1 tonnes per Islander.

Prince Edward Island is particularly sensitive to climate change as it has vulnerable coastlines and a significant economic reliance on weather sensitive natural resources. While our contribution to greenhouse gas emissions is a tiny fraction compared to the rest of Canada, we can still minimize our contribution to global climate change.

## WHAT CAN BE EXPECTED?

Without significant action, global temperatures are predicted to rise by 1.8° to 4.0°C this century. Glaciers and ice caps will continue to melt causing sea levels to rise by as much as 59 centimetres. Extreme precipitation and storm events will also increase in frequency and intensity.

Temperatures in Prince Edward Island are predicted to increase, on average, by 2 to 3°C by the year 2050. Precipitation may increase by as much as 10 per cent by 2050, with less snow falling. Precipitation occurrence will also change with more intense events over fewer days and longer periods of dry spells between rain events.

Warmer and wetter conditions may improve the productivity of our agricultural crops and forests because of the longer growing season, and new crops may be able to be grown. However, climate change may also result in more crop losses resulting from extreme heat conditions, insect and weed infestation, disease outbreaks, forest fires, storm activity and soil erosion. Our forests, in particular, will face unique challenges if the viability of traditional native species declines. Similarly, our coastline will be subject to accelerating erosion and flooding of coastal freshwater marshes.

<sup>6</sup> Current sea level rise has occurred at a mean rate of 1.8 mm per year for the past century. Douglas, B.C. (1977). Global Sea Rise: A Redetermination. Surveys in Geophysics 18: 279-292.

## CLIMATE CHANGE

**INDICATOR:****Greenhouse Gas (GHG) Emissions****Description:**

Greenhouse gas emissions are measured in metric kilotonnes (kt)<sup>7</sup> of carbon dioxide equivalents (CO<sub>2</sub>e).

**Importance:**

Gases, such as carbon dioxide, nitrous oxide and methane are called greenhouse gases. They act like glass panes in a greenhouse, trapping heat from the sun and warming the earth. Human activity is causing sharp increases in greenhouse gases in the planet's atmosphere. As a result, too much heat is being trapped, warming the earth and changing weather patterns. The result is more frequent and more extreme weather events, and a rise in sea level.

**Objective:**

To reduce greenhouse gas emissions to 1990 levels (1,981 kt CO<sub>2</sub>e) by 2010 as per the target set in the Climate Change Action Plan of the New England Governors/ Eastern Canadian Premiers.

Prince Edward Island is also determined to reduce its greenhouse gas emissions to 75 to 85 per cent below 2001 levels by 2050 (Resolution 31-1, NEG/ECP).<sup>8</sup>

**Status and Trends:**

Year	1990	1996	1997	1998	1999	2000	2001
GHG (kt) CO <sub>2</sub> e	1,981	2,010	2,040	2,000	2,000	2,150	2,060

Year	2002	2003	2004	2005	2006	2007	2008
GHG (kt) CO <sub>2</sub> e	2,133	2,242	2,274	2,205	2,089	2,091	1,966

**Interpretation:**

In 2008, Prince Edward Island generated 1,966 kilotonnes of carbon dioxide equivalents (CO<sub>2</sub>e) – down almost one per cent from 1990 levels. This is a fraction of Canada's total GHG emissions of 747,000 kilotonnes. Greenhouse gas emissions from homes and buildings have gone down 124 kt (23 per cent), as have emissions from electricity generation (103 kt or 100 per cent) due to investments in wind energy. In recent years, emissions from the agriculture industry have also declined. Transportation emissions continue to increase each year and are up 23 per cent above 1990 levels with road transportation increasing 106 kt (20 per cent) and other transportation (civil aviation, marine navigation and off road) increasing 46 kt (29 per cent).

<sup>7</sup> A kilotonne is a thousand tonnes.

<sup>8</sup> Prince Edward Island and Climate Change: A Strategy for Reducing the Impacts of Global Warming (2008), p.8.

## CLIMATE CHANGE

**Response:**

The Prince Edward Island Government continues to implement action items identified in Prince Edward Island and Climate Change: A Strategy for Reducing the Impacts of Global Warming (2008). The PEI Office of Energy Efficiency is delivering programs that are helping the residential and commercial sector reduce emissions. The province is developing and implementing plans to examine alternate energy sources, and increase energy efficiency through its wind and energy strategies.<sup>9</sup> In November 2010, the Provincial Government released the PEI Energy Accord. This accord announced the government's intention to increase the province's use of wind energy to 33 per cent of the Island's electrical energy requirements by 2013. In addition, forest biomass heating systems are being installed in five Government buildings.

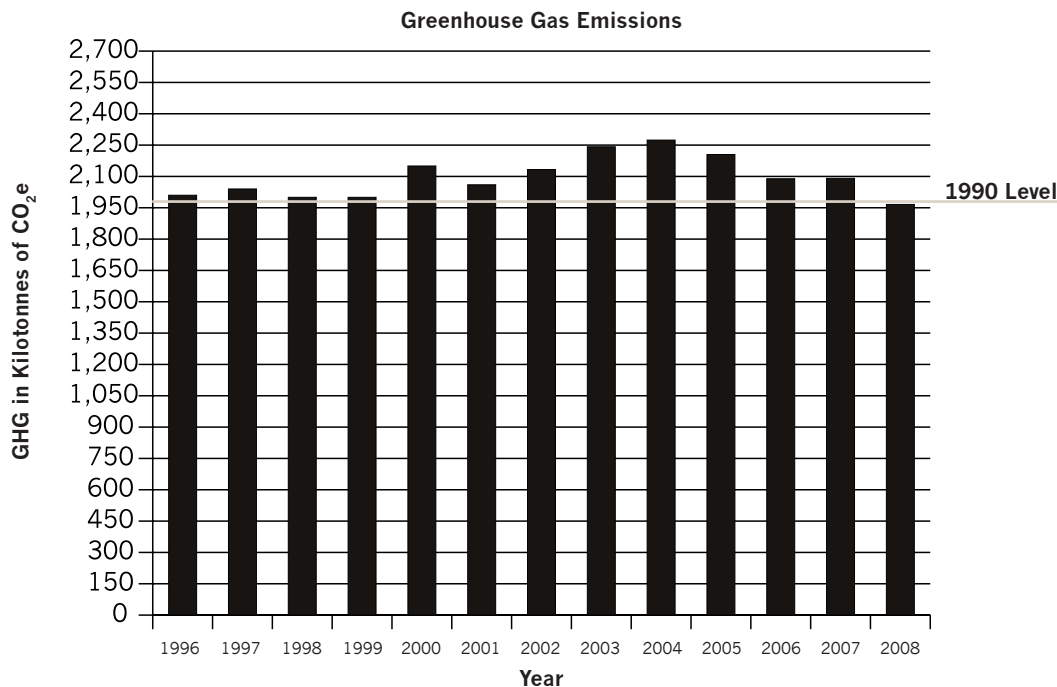
**Data Sources:**

Prince Edward Island and Climate Change: A Strategy for Reducing the Impacts of Global Warming (2008)

Environment Canada, National Inventory Report 1990-2008

New England Governors/Eastern Canadian Premiers Climate Change Action Plan (2001)  
[http://www.gov.pe.ca/photos/original/ceef\\_climate2001.pdf](http://www.gov.pe.ca/photos/original/ceef_climate2001.pdf)

Prince Edward Island State of the Environment Report (2003)



<sup>9</sup> Island Wind Energy Securing Our Future: The 10 Point Plan (2008); Prince Edward Island Energy Strategy Securing Our Future: Energy, Conservation and Renewables (2008)

## CLIMATE CHANGE

**INDICATOR:****Rise in Sea Level****Description:**

The sea level has been measured at Charlottetown for almost a century. Sea level is reported as the annual mean (in centimetres) above chart datum. Chart datum refers to the lowest predicted sea water level averaged over several years.

Global sea level rise projections, from the most recent report of the International Panel on Climate Change, along with other published reports by local experts, provide a basis for comparison to actual sea level rise.

**Importance:**

Rising sea level is recognized as a result of climate warming. As an Island province our communities will be adversely impacted by sea level rise and associated storm surges.

**Objective:**

To monitor, adapt and prepare for sea level rise as the result of climate change.

**Interpretation:**

The mean sea level at Charlottetown has risen approximately 32 cm since 1911. Evidence indicates that the relative sea level rise has increased from a rate of approximately two millimetres per year in previous millennia to 3.2 millimetres per year since 1911.

By the end of 2099, climate warming coupled with a post-glacial subsidence of the earth's crust will result in a sea level rise of 38 to 79 cm. It must be noted that these projected values are conservative as they do not consider recent freshwater melt from the Greenland ice sheet nor potential ice sheet failure in Antarctica.

**Response:**

The province continues to work through the New England Governors and Eastern Canadian Premiers on a Climate Change Action Plan.

Prince Edward Island, along with the Atlantic Provinces and the Government of Canada, has joined the Regional Adaptation Collaborative (RAC) to study our vulnerability to sea level rise and develop adaptation strategies.

The Prince Edward Island Government continues to implement action items identified in the document entitled Prince Edward Island and Climate Change: A Strategy for Reducing the Impacts of Global Warming. A digital elevation model has been developed to accurately assess vulnerability to sea level rise and storm surge.

**Status and Trends:**

Year	1911	1931	1943	1955	1967	1983	1995	2009
Sea level above chart datum (cm) at Charlottetown	147	153	155	166	165	170	170	180

## CLIMATE CHANGE

**Data Sources:**

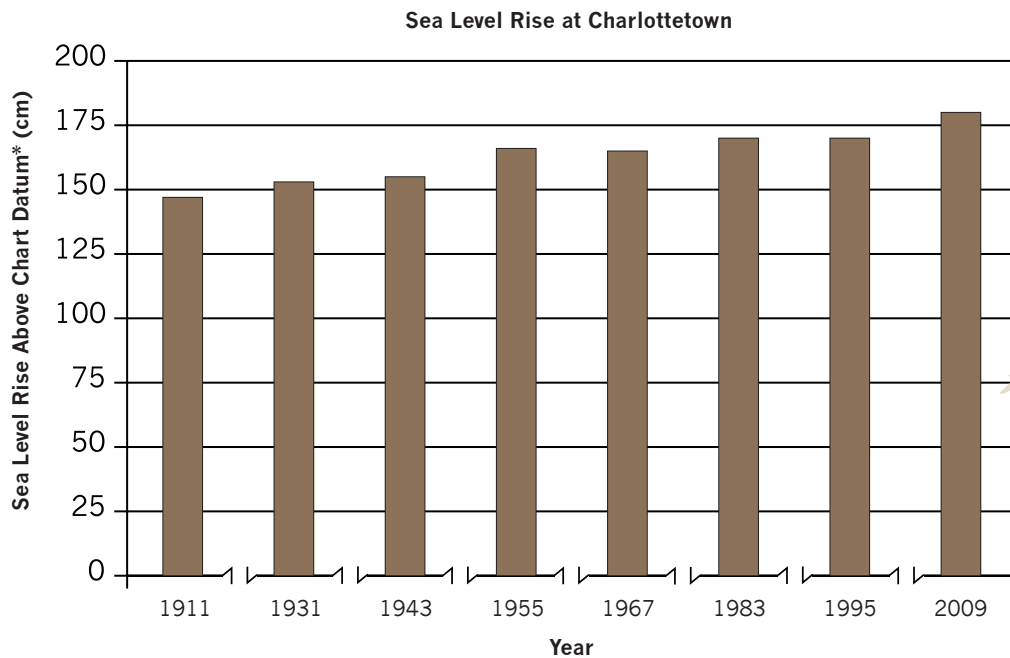
Fisheries and Oceans Canada – Integrated Science Data Management (ISDM) Canadian Tides and Water Levels Data Archive

State of Environment Report (2003)

International Panel on Climate Change AR4 (2007)

Prince Edward Island and Climate Change: A Strategy for Reducing the Impacts of Global Warming (2008)

Koohzare, A., Vaníček, P. and Santos, M. (2005)  
Compilation of a map of vertical crustal movements in Eastern Canada using spline polynomials. Extended abstract. Elements 32(2): 30-33



\*Chart datum refers to the lowest predicted sea water level averaged over several years.

## ENERGY USE

## PRESENT SITUATION

Prince Edward Island is reliant on imported petroleum products for transportation, fuels and heating. In 2008, imported oil accounted for 76 per cent of Prince Edward Island's total energy supply, with 46 per cent on transportation fuels and 30 per cent on petroleum-based heating fuels.

The province's reliance on imported energy is significant with over \$400 million being spent on off-Island energy resources annually. This cost will continue to climb if energy consumption and energy prices increase.

At present, renewable energy constitutes 11 to 13 per cent of the province's energy supply. Most of this energy is derived from biomass and wind farms. Provincial developments at North Cape and in Eastern Kings have the potential to supply about 11 per cent of the province's electrical needs from renewable sources. These publically owned facilities, along with the nine megawatt wind farm at Norway, the Vestas V-90 prototype at North Cape and a municipal wind farm operated by the City of Summerside and some of the production from a merchant facility, are supplying approximately 18 per cent of the Island's electricity needs.

A doubling in the price of home heating oil has resulted in increased usage of wood and wood pellets for domestic heating. Approximately 120,000 cords of round wood were being used for home heating in the 2009-2010 heating season. Biomass, which includes wood fuel, represents almost 10 per cent of the province's energy mix. In 2010, the province completed a request for proposals for the supply of biomass heat for five Government-operated facilities. As well, the Office of Energy Efficiency helped 4,000 Island homes make energy efficiency improvements. In the first two years, these improvements led to an average 18 per cent energy reduction.

## WHAT CAN BE EXPECTED?

The province will continue to develop renewable fuel supplies to help meet its energy needs. It is envisioned that, by 2013, biomass will provide 15 per cent of the province's energy mix. Development of a liquid biofuels industry is expected to contribute five per cent to the Island's energy mix within the same time frame. The Provincial Government has established an Interdepartmental Biofuels Committee to lead this initiative.



## ENERGY USE

The introduction of a public transit system for Charlottetown and neighbouring communities provides some Islanders with the option to leave their automobiles at home.

A combination of public and private developments will eventually enable wind energy to meet more than 18 per cent of the province's electricity needs. In November 2010, the Provincial Government released the PEI Energy Accord which included a commitment to develop 30 additional megawatts of publicly owned wind power by 2013 and a further ten megawatts through the Wind Energy Institute of Canada – increasing use of on-Island renewable energy to one-third of total electricity requirements.

Energy efficiency is considered to be the least costly, most reliable, energy resource with the greatest potential to reduce greenhouse gas (GHG) emissions and protect the environment. Energy efficiency can generally be bought more cheaply than producing or purchasing energy.

Improving efficiency in the way energy is consumed on the Island will have direct benefits to individuals, businesses, governments, institutions and the environment. Beginning in March 2011, the Office of Energy Efficiency will assume responsibility for energy conservation programs for both the Government and Maritime Electric and will expand its programming.

## ENERGY USE

**INDICATOR:****Household Electrical Use****Description:**

The average amount of electricity used per household in a month is expressed in kilowatt hours (kWh).

**Importance:**

Electricity is a primary form of energy used in households across the province. Prince Edward Island's electricity is mainly purchased from New Brunswick, but bunker oil and diesel fuel are used for electrical generation at the Maritime Electric plant in Charlottetown on a back-up basis. Production of electricity from fossil fuels contributes to global warming.

**Objective:**

To reduce the amount of electricity consumed by Islanders and to generate more of the Island's electricity from alternate sources.

**Status and Trends:**

for the transportation and industrial/agricultural sectors. Beginning in March 2011, the OEE will assume responsibility for energy conservation programs for both the Government and Maritime Electric and will expand its programming.

The Prince Edward Island Energy Corporation currently owns and operates two wind farms at North Cape and East Point – a total combined production of 41 megawatts. These wind farms, along with the nine-megawatt farm at Norway and the Vestas V-90 prototype, are supplying approximately 18 per cent of the Island's electricity needs. Recently, Summerside established a 12-megawatt wind farm. In November 2010, the Provincial Government released the PEI Energy Accord. This accord announced the Government's intention to increase the province's use of wind energy to 33 per cent of the Island's electrical energy requirements by 2013.

**Data Sources:**

Maritime Electric

Department of Environment, Energy and Forestry

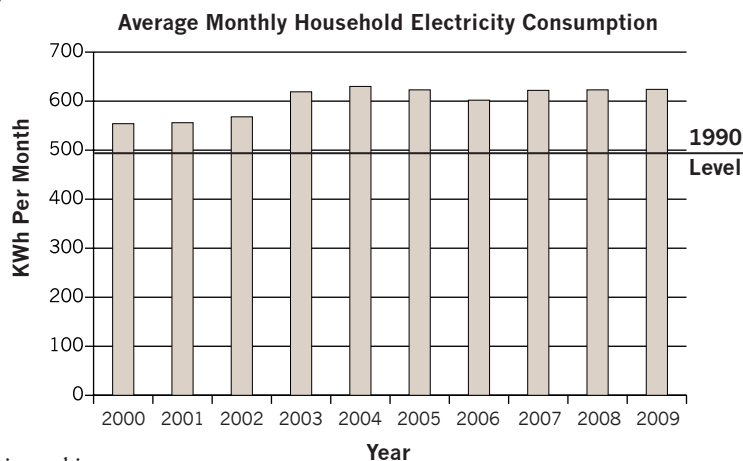
Year	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Average kWh per month	497	554	556	568	619	630	623	602	622	623	624

**Interpretation:**

The average monthly amount of electricity used per household increased 25 per cent from 1995 to 2003 and levelled off between 2003 and 2009. While increased use of electrical appliances per household is one contributing factor, another appears to be the increase in electric heat use in new homes and businesses.

**Response:**

The Office of Energy Efficiency (OEE) was established in 2007 with the goal of reducing energy consumption in all sectors in Prince Edward Island. The OEE offers a range of programs for residential and commercial sectors and is working to develop energy reduction initiatives



## ENERGY USE

**INDICATOR:****Gasoline Consumption****Description:**

The total amount of gasoline consumed in the province is measured in 1,000s of kilolitres (million litres) per year.

**Importance:**

Gasoline is a major contributor to greenhouse gas production, and consequently to climate change.

**Objective:**

To reduce the amount of gasoline consumed.

**Interpretation:**

The amount of gasoline consumed in the province increased 40 per cent from 1965 to 2008. There was a decrease in the amount of gasoline consumption in the mid-1980s due to the development and sale of more energy efficient vehicle engines; however, gasoline consumption increased again due to an increase in vehicle ownership and use.

**Response:**

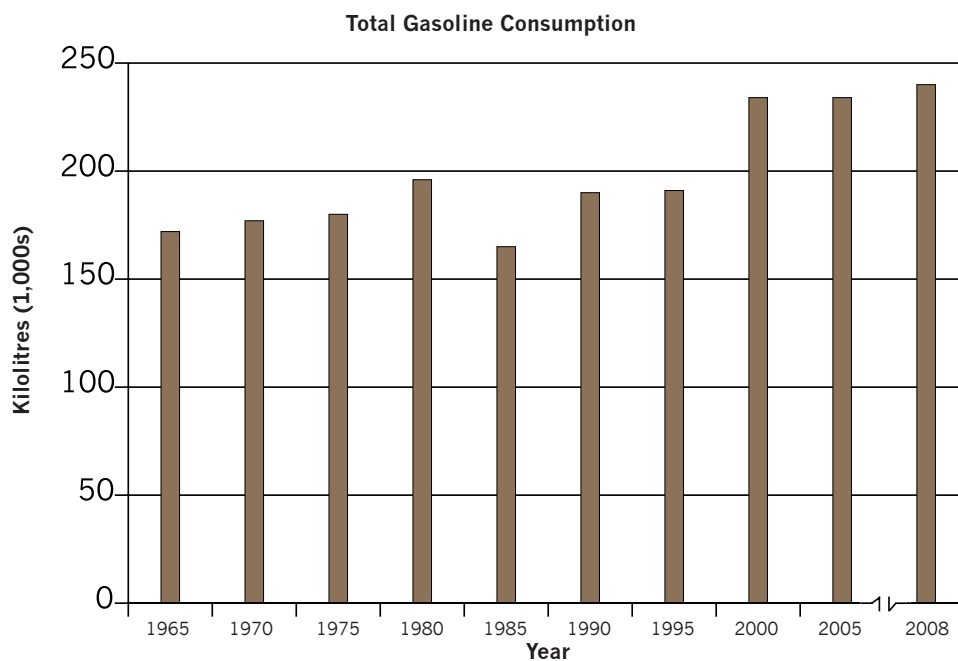
The City of Charlottetown, with assistance from the Provincial and Federal Governments, has implemented a regional public transit system serving the capital and the outlying communities of Stratford and Cornwall. The province of Prince Edward Island implemented a Provincial Sales Tax Rebate on the sale of new, hybrid vehicles.

**Status and Trends:**

Year	1965	1970	1975	1980	1985	1990	1995	2000	2005	2008
Kilolitres in 1,000s	172	177	180	196	165	190	191	234	234	240

**Data Source:**

Statistics Canada



## ENERGY USE

**INDICATOR:****Wood Burned for Residential Heating****Description:**

Firewood consumption is described in oven-dried tonnes (1,000s per year). An oven-dried tonne is approximately equal to one cord (2.2 cubic metres) of dry wood.

**Importance:**

Wood is a long-term renewable resource and typically displaces the use of non-renewable resources, such as imported oil, for heating purposes. Burning firewood is considered to be carbon neutral, providing harvested trees are replaced one for one. In 2010, 38 per cent of Island households used wood to meet at least some of their heating requirements.

**Status and Trends:****Interpretation:**

During the past 37 years there have been dramatic fluctuations in the annual amount of wood burned for residential heating. A resurgence of wood burning in the residential sector was reported in the latest survey and is considered to be a response to the sharp increase in the price of fuel oil.

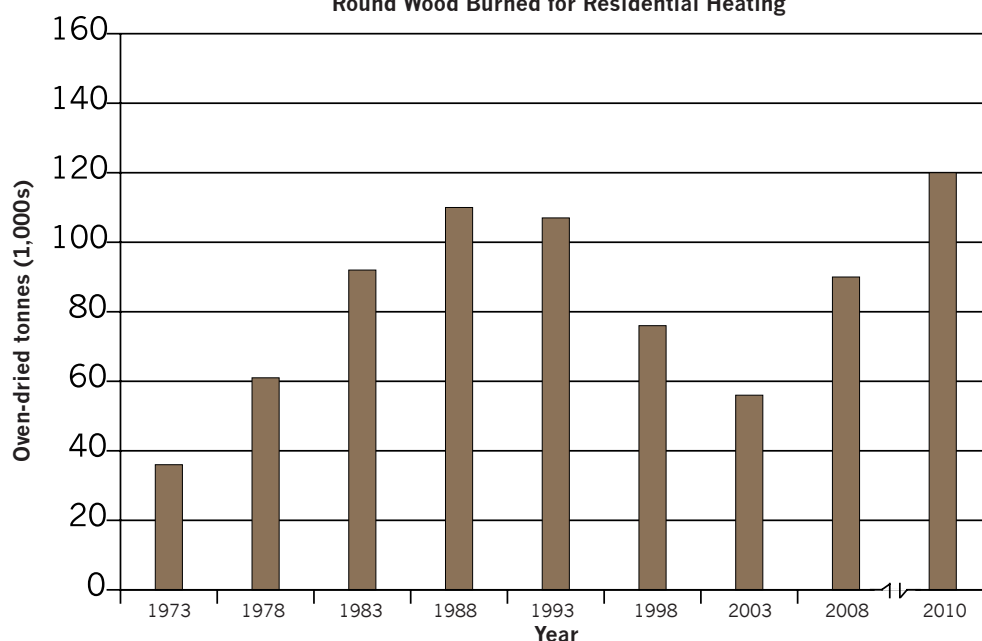
**Response:**

The Department of Environment, Energy and Forestry promotes the use of the techniques in the Ecosystem-based Forest Management Standards Manual and the Forest Wildlife Manual so that fuelwood can be harvested in a sustainable manner i.e. one which meets the needs of the present without compromising the ability of future generations to meet their own needs.

**Data Source:**

Department of Environment, Energy and Forestry

Year	1973	1978	1983	1988	1993	1998	2003	2008	2010
Oven-dried Tonnes (in 1,000s)	36	61	92	110	107	76	56	90	120

**Round Wood Burned for Residential Heating**

## A I R Q U A L I T Y

## P R E S E N T S I T U A T I O N

The air quality in Prince Edward Island is affected by the long-range transport of pollutants from the northeastern United States and eastern Canada, as well as by emissions generated locally. Local emitters include incinerators, large heavy oil-burning facilities, asphalt plants, motor vehicles, residential oil furnaces/boilers and wood-burning appliances.

Prince Edward Island has adopted the Canada-wide Standards<sup>10</sup> for particulate matter and ozone, and mercury and dioxins/furans from incinerators. Air quality in Prince Edward Island is considered to be good and consistently better than the Canada-wide Standards.

To assess local air quality, the province maintains monitoring stations at Charlottetown, Southampton and Wellington (one station for each county). The three stations are part of the National Air Pollution Surveillance Network. Ozone levels, fine particulate matter, sulphur dioxide, nitrogen oxides, mercury and acid precipitation are monitored.

With the exception of motor vehicles, residential oil or gas heating units and wood-burning appliances, local sources of air pollution are all regulated. Fuel quality standards, hours of operation, pollution control equipment and stack emissions testing are applied to reduce the release of air contaminants and ensure that large scale facilities meet national emissions maximums.

## W H A T C A N B E E X P E C T E D ?

Increasing industrial development and energy demands have the potential to adversely affect the province's air quality.

To minimize these impacts, the Provincial Government is working with the Acid Rain and Air Quality Steering Committee, and the Climate Change Steering Committee of the New England Governors/Eastern Canadian Premiers to reduce emissions in the region. It is expected that air quality across the country will improve as jurisdictions implement the requirements of the Canada-wide Standards. The availability of lower emission vehicles and cleaner fuels will also help to reduce emissions in the transportation sector.

To gauge the success of these efforts, Prince Edward Island's air quality monitoring network continues to upgrade its service with the addition of modern, new equipment.

<sup>10</sup> Canada-wide Standards can include qualitative or quantitative standards, guidelines, objectives and criteria for protecting the environment and reducing risks to human health. The levels or concentrations contained in the standards are generally those that provide protection for the environment and human health and are technologically and economically achievable. For more information visit the Environment Canada website: [www.ec.gc.ca/ceparegistry/agreements/cws.cfm](http://www.ec.gc.ca/ceparegistry/agreements/cws.cfm)

## A I R Q U A L I T Y

**INDICATOR:****Acid Rain****Description:**

The acidity of rain in Prince Edward Island is measured in pH. pH is a measurement of how acidic or alkaline a water is. The lower the pH value the more acidic the water, the higher the pH value, the more alkaline it is. A pH value of 7 is considered to be neutral.

**Importance:**

High levels of acidity in rain can harm tree growth, acidify lakes and streams, and cause metals to leach from soil into water. It can eventually impair the ability of water bodies to support life, and cause the deterioration of building materials such as cement, brick and stone.

**Objective:**

To maintain or improve upon the current acidity (pH 4.8) of rain and move toward a pH of 5.6 which is the acidity of “clean” rain.

**Status and Trends:****Interpretation:**

From 1994 to 2009, there was some variability in pH values in Prince Edward Island, with the rain becoming slightly more acidic in the late 1990s. In 2004, the pH reached 4.8 and it has remained essentially the same since that time.

**Response:**

As acid rain is a regional issue, Prince Edward Island works in cooperation with other jurisdictions to address the acid rain issue.<sup>11</sup> In recent decades, individual jurisdictions have taken action to reduce emissions that cause acid rain by closing old coal-fired plants, installing pollution control equipment, mandating lower sulphur fuels, and implementing renewable energy technologies. Canadian and American governments are working under the Canada-United States Air Quality Agreement to reduce SO<sub>2</sub> (sulphur dioxide) and NO<sub>x</sub> (nitrogen oxides) emissions – the primary causes of acid rain.

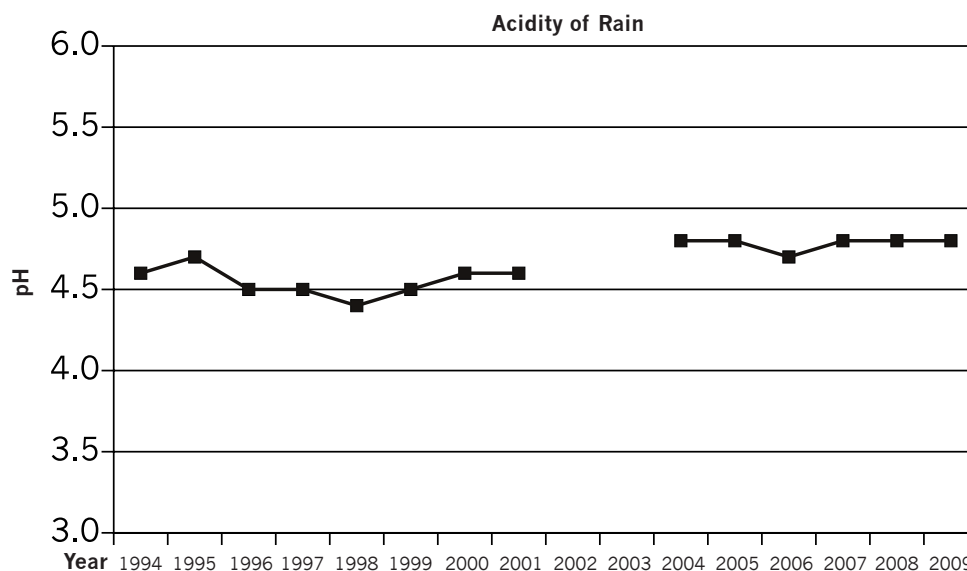
**Data Source:**

Department of Environment, Energy and Forestry

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
pH	4.6	4.7	4.5	4.5	4.4	4.5	4.6	4.6	NA	NA	4.8*	4.8	4.7	4.8	4.8	4.8

\* Covers the period July 12 to December 28, 2004.

NA – Data not available



<sup>11</sup> Air quality groups to which Prince Edward Island is a party include the Conference of the New England Governors and the Eastern Canadian Premiers, and federal/provincial initiatives such as the CCME Canada-wide Acid Rain Strategy for Post 2000, managed by the Acid Rain Task Group – [www.ccme.ca/assets/pdf/artg\\_long\\_term\\_stratplan\\_e.pdf](http://www.ccme.ca/assets/pdf/artg_long_term_stratplan_e.pdf)

## A I R Q U A L I T Y

**INDICATOR:**

## Particulate Matter

**Description:**

Particulate matter consists of a combination of combustion related particles, pollen, road dust, and sea salt. The average  $PM_{Total}$  (total particulate matter) concentration in micrograms per cubic metre ( $\mu\text{g}/\text{m}^3$ ) was measured in Charlottetown until the end of 2002. The average  $PM_{10}$  (particles which are 10 micrometres in diameter or less) concentration in Charlottetown was measured until the end of 2004. The national focus has now shifted to even finer particulate matter which is considered a more significant health issue. Older instruments were retired and new equipment installed to determine  $PM_{2.5}$  (particles that are 2.5 micrometres in diameter or less) levels.

**Importance:**

Airborne particles small enough to be inhaled can significantly affect health. Of greatest concern are the very fine particles that penetrate deep into lung tissue and which have been linked to increases in asthma and breathing difficulties resulting in hospital admissions and premature death.

**Status and Trends:****Objective:**

To remain under the Canada-wide Standard objective for particulate matter ( $PM_{2.5}$ ) of  $30 \mu\text{g}$  per  $\text{m}^3$  averaged over 24 hours.

**Interpretation:**

Prince Edward Island's total particulate matter and  $PM_{10}$  numbers have always been very low.  $PM_{2.5}$  levels are similarly low. Achievement of the Canada-wide Standard is based on an average value derived over three consecutive years.

**Response:**

Data are currently collected in Charlottetown, Southampton and Wellington using instruments that run continuously and generate real-time information. Local combustion, road dust, farm field dust, pollen and sea salt do contribute to overall levels of particulate matter in the air; however, the majority of the province's particulate matter comes from the northeastern United States and from provinces to the west. While there is little that the province can do to directly affect this, Prince Edward Island continues to work for air quality improvements through regional and national fora.

**Data Source:**

Department of Environment, Energy and Forestry

	Location	1994	1995	1996	1997	1998	1999	2000	2001
$PM_{Total}$ ( $\mu\text{g}/\text{m}^3$ )	Charlottetown	18	20	17	20	16	19	14	16
$PM_{10}$ ( $\mu\text{g}/\text{m}^3$ )	Charlottetown	NI	NI	NI	9	9	13	12	12

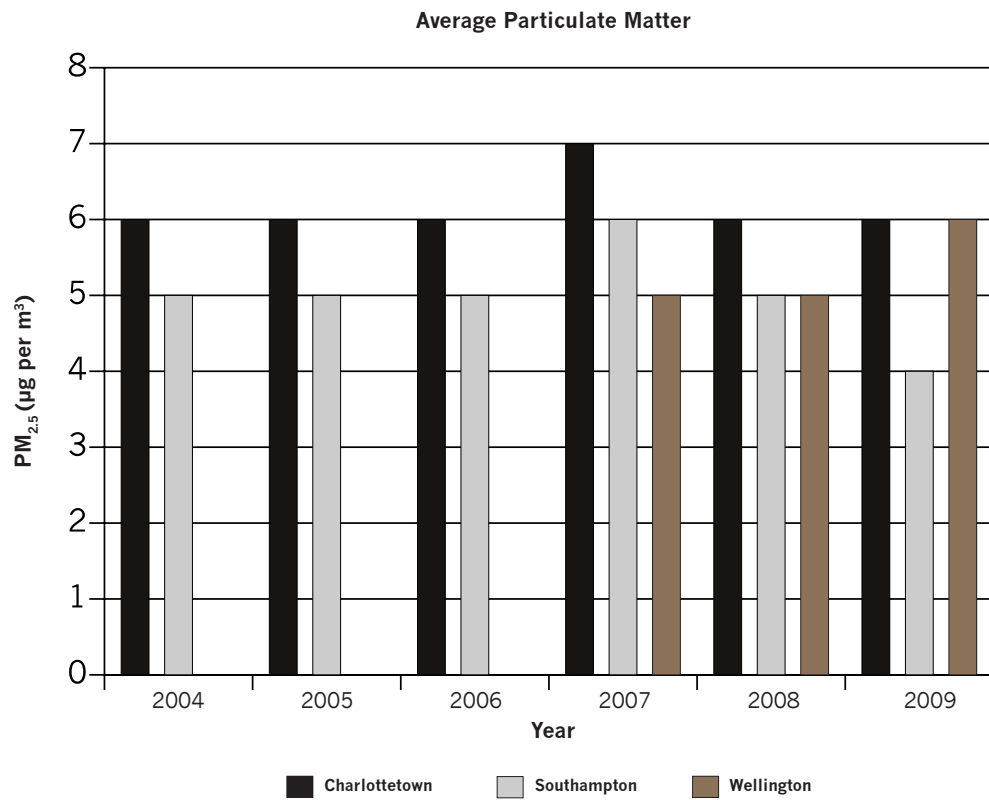
	Location	2002	2003	2004	2005	2006	2007	2008	2009
$PM_{Total}$ ( $\mu\text{g}/\text{m}^3$ )	Charlottetown	12	NI	NI	NI	NI	NI	NI	NI
$PM_{10}$ ( $\mu\text{g}/\text{m}^3$ )	Charlottetown	NA	NA	11	9	NI	NI	NI	NI
$PM_{2.5}$ ( $\mu\text{g}/\text{m}^3$ )	Charlottetown	NI	NI	6	6	6	7	6	6
	Southampton	NI	NI	5	5	5	6	5	4
	Wellington	NI	NI	NI	NI	NI*	5	5	6

NI - No instrument

NA - Data not available

\* Data collection started in late 2006

## AIR QUALITY





## AIR QUALITY

**INDICATOR:****Ground Level Ozone****Description:**

Ground level ozone (O<sub>3</sub>) concentrations in Charlottetown, Southampton and Wellington are measured in parts per billion (ppb) on a continuous basis.

**Importance:**

Ozone, along with airborne particles, is a key component of smog. Exposure to elevated ozone levels can increase breathing problems for people with asthma and other pre-existing respiratory conditions.

**Objective:**

To continue to be below the Canada-wide Standard objective for ozone of 65 ppb (parts per billion).

**Status and Trends:****Interpretation:**

From 2001 through 2009, the average ozone concentrations in Prince Edward Island remained relatively constant, with levels higher in the western part of the province. The average ozone level in Charlottetown from 2003-2009 was 26.7 ppb. From 2004-2009 it was 25.5 ppb in Southampton. From 2001-2009 it was 27 ppb at the Wellington site. All of these values are below the maximum allowable limit of 65 ppb.

**Response:**

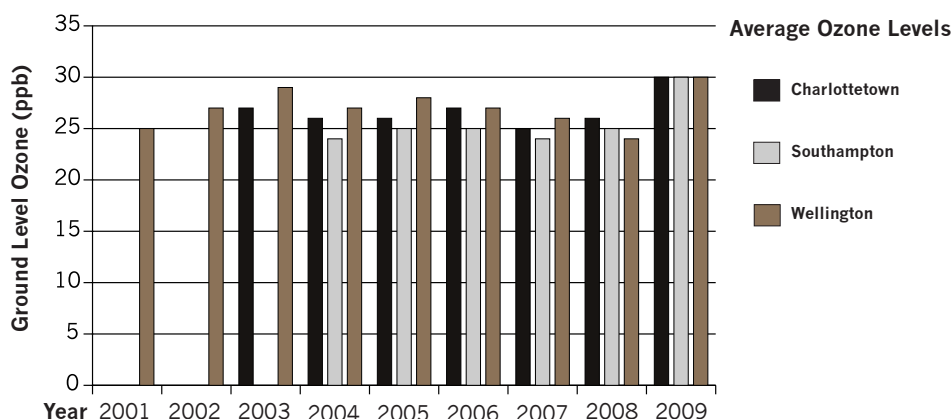
Much of our ozone comes from the northeastern United States and from provinces to the west of us. Ozone is measured at the air quality stations in Wellington, Charlottetown and Southampton. Levels in the province rarely exceed 65 ppb and generally only during the summer months.

**Data Source:**

Department of Environment, Energy and Forestry

Location	Ozone (ppb)	2001	2002	2003	2004	2005	2006	2007	2008	2009
Charlottetown	Average	NI	NI	27	26	26	27	25	26	30
	Maximum	NI	NI	83	64	70	72	74	65	72
	Exceedances	NI	NI	14	0	4	4	3	3	2
Southampton	Average	NI	NA	NA	24	25	25	24	25	30
	Maximum	NI	NA	NA	67	71	66	67	56	64
	Exceedances	NI	NA	NA	3	5	2	1	0	0
Wellington	Average	25	27	29	27	28	27	26	24	30
	Maximum	82	69	88	66	63	69	68	59	74
	Exceedances	17	8	32	1	0	1	1	0	6

NI – No instrument  
NA – Data not available  
Exceedances – The number of hours that ozone levels exceeded the Canada-wide Standard of 65 ppb.



## B I O D I V E R S I T Y

## P R E S E N T S I T U A T I O N

Biodiversity (natural variability) is more than just a count of species. It encompasses the genetic diversity within species, their relative abundance, as well as the diversity of habitats in the landscape. 'Healthy' habitats can have many species (like older forests) or few species (like sand dunes). The health of a habitat is defined by its ability to resist and recover from natural threats such as fire or disease, and not the number of species present. Biodiversity serves as the base of our Island's natural capital.

The province's long history of settlement and land clearing has resulted in the loss of natural biodiversity at all levels. Habitat loss and invasive species are the two greatest threats to biodiversity.

## W H A T C A N B E E X P E C T E D ?

As our impact on the Island's landscape grows, the stress on local habitats and the native species they support will increase.

Land management practices which better maintain natural biodiversity and focus on habitat restoration are essential if we are to maintain the natural checks and balances that ensure our ecosystems are healthy, resilient and abundant with life.





## B I O D I V E R S I T Y

**INDICATOR:**

## Forest Communities

**Description:**

A forest community can be defined by the types of trees, ground plants, mosses, lichens, fungi and animals present.

**Importance:**

Forests vary in ecological and economic value according to their community structure and complexity.

**Objective:**

No loss of “natural” forest communities.

**Status and Trends:**

Between 1990 and 2000, the area of the province’s natural and more biologically diverse forest communities – upland forest, rich wet forest and black spruce forest – decreased, while the more “disturbed” forest communities increased.<sup>12</sup>

**Interpretation:**

Interpreting the contribution of forests to biodiversity must go beyond the traditional statistics of softwood or hardwood cover type. Age and species composition and community type are critical.

Upland forest, wet rich forest and black spruce forest are communities growing on land that has never been cleared and farmed. These areas are important reservoirs of soil, species and genetic diversity, complex ecological interactions and carbon. For example, these communities:

- have the only remaining associated forest soil biodiversity (e.g., insects, bacteria, fungi) in Prince Edward Island;
- are home to many hundreds of native plant species, including many that are important for ecological or economic reasons, and that are not found in other Island forest communities; and
- are better able to resist disturbances such as disease, fire and insects because they are comprised of a diversity of species and ages.

**Response:**

Realizing the environmental as well as the economic value of forests will require different approaches to forest management. The Moving to Restore a Balance in Island Forests: Prince Edward Island Forest Policy (October 2006) envisions the province as a place with healthy Acadian Forests that provide a range of economic, social and environmental values to Islanders. It aims for a better balance between traditional softwood production and alternative types of forest management, including management for non-timber and other forest values. Eighty-seven per cent of Island forests are privately owned (with management decisions made by private landowners). Government policies and programs are increasingly designed to support those landowners who maintain and enhance their forest communities.

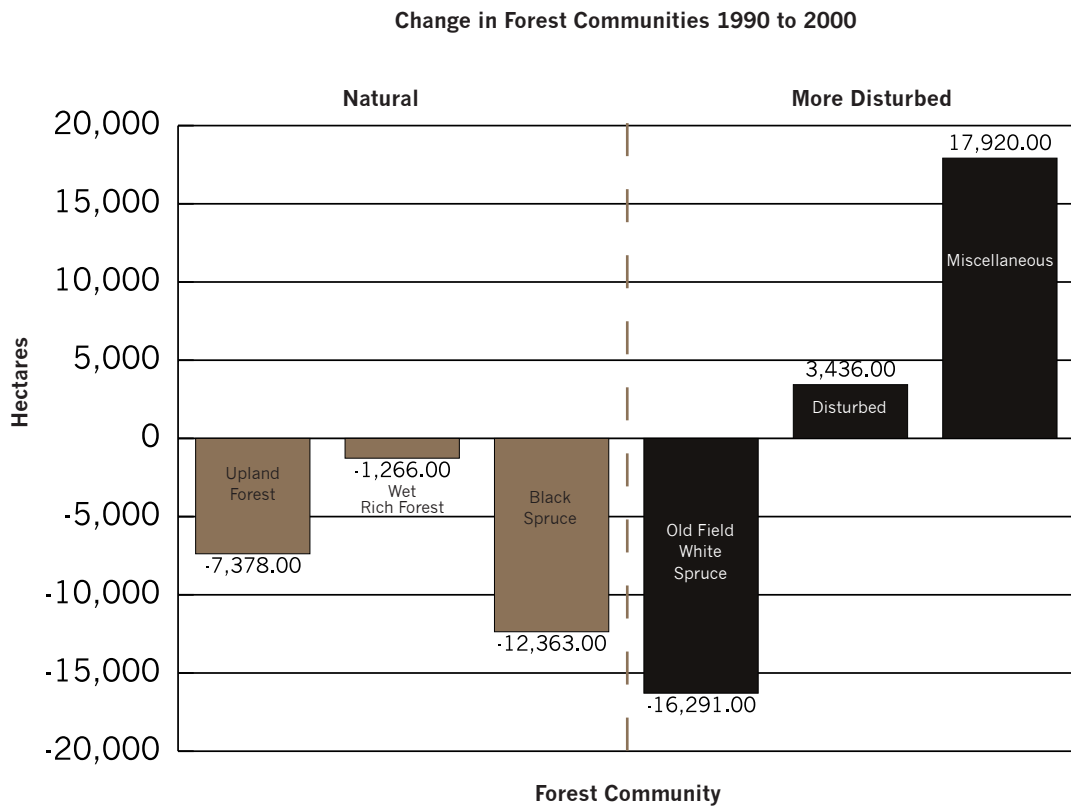
**Data Source:**

Department of Environment, Energy and Forestry

**Note:** Work on the next forest inventory has commenced and is scheduled to be completed in 2012.

<sup>12</sup> **Upland Forest** is defined by the presence of Sugar Maple, American Beech, Yellow Birch and Eastern Hemlock. **Wet Rich Forest** includes Red Maple, American Elm, White Ash and Eastern White Cedar. **Black Spruce** includes this tree on both wet and dry sites. **Old Field White Spruce** is former agricultural land that is regenerating in white spruce. **Miscellaneous Forests** include clear cuts, plantations, alders, burned areas and windfalls. **Disturbed Forests** are those that do not fall into any other category.

## BIODIVERSITY





## B I O D I V E R S I T Y

## INDICATOR: Forest Covertypes

### Description:

Covertypes refers to whether the forest is predominantly softwood, hardwood or a mixture of both.

### Importance:

Forests can vary in their ecological and economic value according to covertypes, species composition, density, structure and age of the tree stand.

### Status and Trends:

There have been significant changes in the covertypes of Island forests over the past three decades. In 2000, 61 per cent of the forest was dominated by hardwoods. New data on forest covertypes will be available in 2012.

### Interpretation:

Interpreting the contribution of forests to biodiversity involves more than determining age, class and species composition. The increase in hardwood dominance may seem to be positive for the environment, but much of

this new growth is attributable to Red Maple and Poplar regeneration at harvested sites. Hardwood volume has decreased as has the area of our more natural hardwood communities.

From the standpoint of biodiversity, a variety of covertypes within an uneven age stand is preferable.

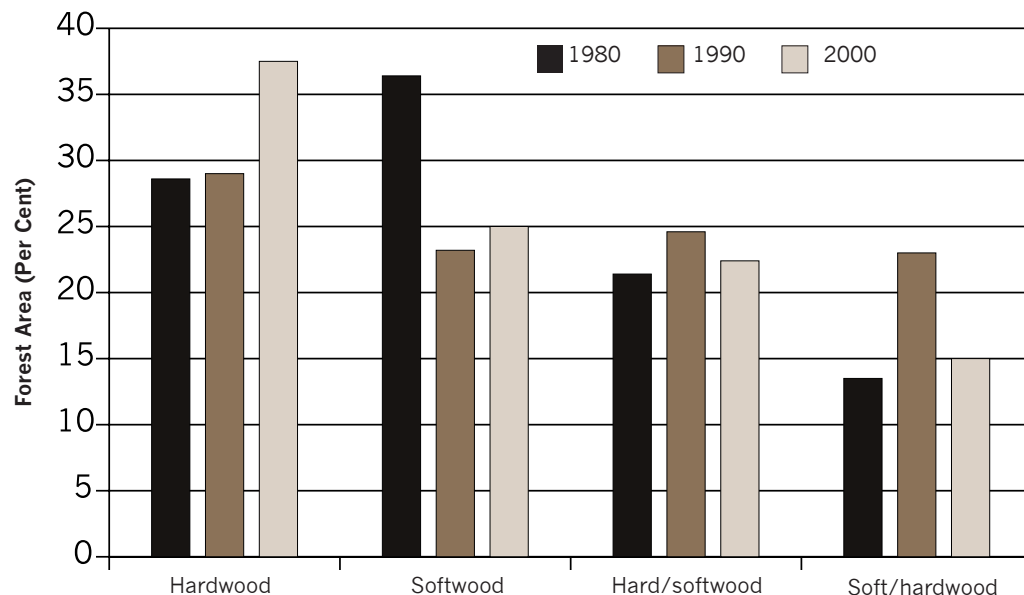
### Response:

This indicator is no longer considered the best indicator of forest diversity, and will be replaced by the indicator 'Forest Communities,' which better reflects the economic, societal and environmental values of forest lands.

### Data Source:

Department of Environment, Energy and Forestry

Forest Covertypes Changes



## B I O D I V E R S I T Y

**INDICATOR:**

Protected Land Area (hectares)

**Description:**

Area of land designated under the *Natural Areas Protection Act* measured in hectares (ha)

**Importance:**

Natural areas are protected from various types of development and are therefore more likely to maintain biodiversity than land devoted to residential, agricultural or industrial uses.

**Objective:**

To protect seven per cent of PEI's land mass comprised of habitat types that are representative of the natural areas found in the province.

**Status and Trends:**

Year	1991	1993	1995	1997	1999	2001	2004	2008	2010
Hectares	500	3,400	4,600	5,500	5,900	6,152	6,260	6,401	7,141

**Interpretation:**

The target area of 12,479 hectares identified for protection under the *Natural Areas Protection Act* represents seven per cent of PEI's land mass and includes representative wetlands (bogs, fresh marshes, salt marshes and ponds), sand dunes, forests, offshore islands and coastal cliffs. Although the majority of the land currently protected is public land, it also includes important ecological sites owned and protected by Island Nature Trust, Nature Conservancy of Canada, and private landowners. As of 2010, the total area protected in Prince Edward Island represented four per cent of its land mass – below the nationally accepted target of seven per cent.

**Response:**

There are other provincial lands counted as 'protected areas' which include Wildlife Management Areas, some Provincial Parks and the Prince Edward Island National Park of Canada.<sup>13</sup> In addition to these public lands, watercourses and streamside buffer zones are afforded a degree of protection by the *Environmental Protection Act* and Prince Edward Island Wetland Policy. The province has given property tax relief to owners of private sites designated under the *Natural Areas Protection Act* and *Wildlife Conservation Act*.

In 2005, the *Natural Areas Protection Act* was amended to allow de-designation of public lands, and to provide for public consultation before either designation or de-designation of these sites. Through the Moving to Restore a Balance in Island Forests: Prince Edward Island Forest Policy released in 2006, Government committed to reviewing public lands and identifying any areas of

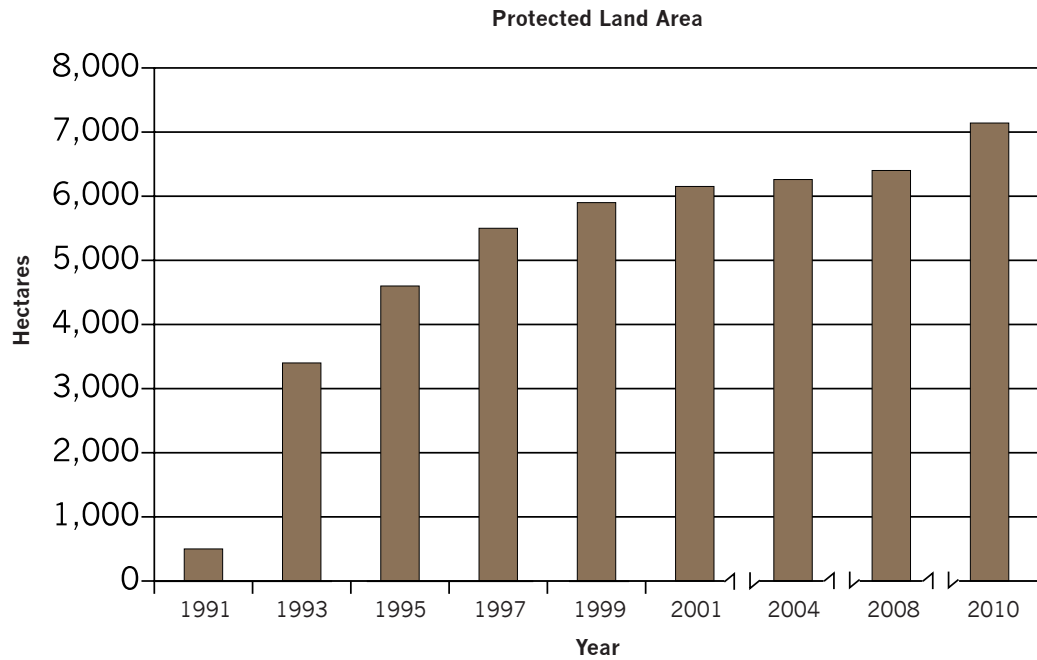
ecological significance that should be protected under the *Natural Areas Protection Act*. In response to this review, 258 ha of upland tolerant hardwood forest designations took place in 2010. Changes to the *Lands Protection Act*'s aggregate land holdings limit also excluded natural areas and environmentally significant lands.

**Data Source:**

Department of Environment, Energy and Forestry

<sup>13</sup> In 2006, the Department of Environment, Energy and Forestry released a Public Lands Atlas ([www.gov.pe.ca/gis/](http://www.gov.pe.ca/gis/)) to encourage Islanders to enjoy compatible outdoor activities in these areas.

## BIODIVERSITY



## B I O D I V E R S I T Y

**INDICATOR:**

## Species Number

**Description:**

Number of species in Prince Edward Island

**Importance:**

Species number is the simplest component of biodiversity. Other important (but more difficult to measure) components include genetic diversity, ecosystem diversity and interactions among various species and ecosystems.

**Status and Trends:****Response:**

Prince Edward Island will continue to participate in the Wildspecies.ca program and support the work of the Atlantic Canada Conservation Data Centre with funds and expertise. A comprehensive Flora of Prince Edward Island is being researched and will increase our knowledge of the flowering plants present in the province.

**Data Sources:**

Department of Environment, Energy and Forestry

Atlantic Canada Conservation Data Centre

*Wildspecies.ca*

Field Checklist of Birds of Prince Edward Island

Wildlife Group	Total 2003	Native 2007	Exotic* 2007	Extirpated** 2007	Total 2007
Flowering plants	1,627	640	367	13	1,016
Mosses					175
Amphibians	10	10	0	Unidentified	10
Reptiles	3	3	0	Unidentified	3
Birds	342	181	7	2	342
Mammals	37	31	4	7	35
Freshwater fish	25	21	4	Unidentified	25
Dragonflies and damselflies				Unidentified	71
Tiger beetles		5	0	Unidentified	5

**Interpretation:**

Species number is a very simple measure of biodiversity and should be used with caution. For example, the province's salt marshes have low plant diversity, but are among our most important and productive habitats. A cutover forest can have high plant diversity, but many plants will be exotic species or common generalists that can survive anywhere. Additionally, the number of species we know to be on Prince Edward Island can be an indication of how much effort has gone into looking for them. For lesser-known groups – lichens, mosses or insects, for example – new species can be found when experts spend time in the field.

**Note:**

The 2003 plant number includes subspecies while the 2007 number does not. 2007 totals do not include extirpated species. There are also other categories that are not included in the 2007 list columns.

\* Exotic means species that have been moved beyond their natural range as a result of human activity.

\*\* Extirpated means species that are no longer present in a given geographic area but occur in other areas.



## P E S T I C I D E S

## P R E S E N T S I T U A T I O N

Public concern over pesticide use continues. Major amendments made to the *Pesticides Control Act* Regulations (2005) introduced tighter controls on the sale and use of non-domestic pesticide products. New restrictions are now in place regarding the sale and storage of domestic pesticide products to reduce public exposure to pesticides and to decrease the impact of pesticide products on the natural environment. In 2010, changes were made to the *Pesticides Control Act* that ban the sale and use of many lawn-care pesticide products.

## W H A T C A N B E E X P E C T E D ?

In 2003, the province, together with Environment Canada, began monitoring the presence of pesticide products in groundwater, surface water, watercourse sediments, fish and air. This work will continue.

A realignment of the Enforcement Section of the Department of Environment, Energy and Forestry has increased the ability of the province to monitor pesticide application and storage operations.

Integrated pest management, sustainable agriculture and organic farming practices are being actively promoted by the Department of Agriculture.

Stronger emphasis on the training and education of pesticide vendors and applicators will result in improved pesticide use practices, including a move to less toxic products and a reduction in product use.

## P E S T I C I D E S

**INDICATOR:**  
Fish Kills**Description:**

Number of pesticide-related fish kills in Prince Edward Island watercourses

**Importance:**

Although pesticides are not the only possible cause of fish kills in watercourses, there is overwhelming evidence that they are the primary cause.

**Objective:**

To have no pesticide-related fish kills.

**Status and Trends:**

kill fish and other aquatic life. Weather also plays a role. Summers with heavy rainfall events tend to result in more fish kills, as contaminated water from fields ends up in streams and rivers. It is difficult however, to correlate weather records directly with fish kills because in some cases a sudden, localized rainstorm can be a contributing factor. Such localized rainfall events may not show up in data from Island weather stations.

**Response:**

In 2003, Government hired a freshwater fisheries biologist to provide an ecological perspective on these incidents. Use of azinphos-methyl, an insecticide implicated in many of the fish kills, has now been restricted in the province. In 2004, Canada's Pest Management Regulatory Agency (PMRA) announced

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Number of pesticide-related fish kills	1	1	1	0	1	8	4	0	8	0	1	1	0	2	0	0	1

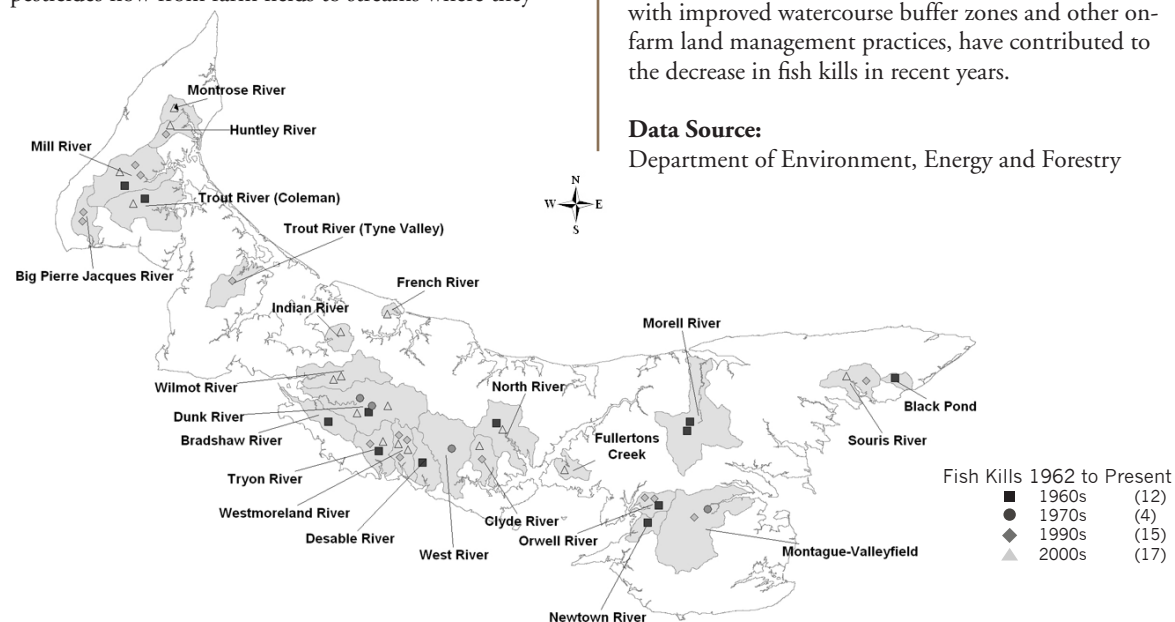
**Interpretation:**

Most fish kills in Prince Edward Island are linked to land use practices in the agricultural sector. In some cases, pesticides flow from farm fields to streams where they

that all uses of this pesticide were to be phased out by the end of 2006. This is a very water-soluble pesticide that can be readily transported by rainfall or other runoff. Phasing out the use of this chemical, coupled with improved watercourse buffer zones and other on-farm land management practices, have contributed to the decrease in fish kills in recent years.

**Data Source:**

Department of Environment, Energy and Forestry



## P E S T I C I D E S

**INDICATOR:**

## Pesticide Sales

**Description:**

Kilograms (kg) <sup>14</sup> of active ingredient (ai)

**Importance:**

The majority of pesticides sold in the province are used on row crops (primarily potatoes). Pesticides can have a negative effect on the environment and on human health and safety.

**Objective:**

To encourage the responsible use of pesticides and, in particular, to support the use of more environmentally friendly lower-risk products.

**Response:**

The Department of Environment, Energy and Forestry has implemented new regulations under the *Pesticides Control Act* lowering the maximum wind speeds during which pesticides may be applied to reduce spray drift, improving the training requirements and certification standards for pesticide applicators and creating more stringent regulations for the transport and storage of pesticides.

The province is developing an integrated management plan for potatoes in association with the Pest Management Regulatory Agency (Health Canada). The PMRA is constantly reassessing pesticide products and phasing out those that are particularly harmful to the environment.

**Status and Trends:**

Year	1993	1995	1996	1997	1999	2000	2001	2002	2006	2007	2008
Insecticides kg/ai	108,000	88,000	58,400	58,677	86,220	60,899	43,489	35,004	48,032	30,609	27,779
Herbicides kg/ai	104,000	103,000	101,900	106,789	119,945	129,552	119,951	111,237	82,526	82,515	96,003
Fungicides kg/ai	390,000	515,000	893,600	722,502	848,340	899,658	667,862	605,829	605,829	517,158	556,769
Total	602,000	706,000	1,053,900	886,218	1,054,505	1,090,109	814,103	736,387	736,387	630,282	680,551

**Interpretation:**

Variability in the amount of pesticide used each year is dependent on disease pressure, weather conditions and the amount of land under crop production. Warm, wet seasons encourage rapid crop growth and the development of crop diseases. Producers respond by increasing the number of applications of pesticides to protect their crops.

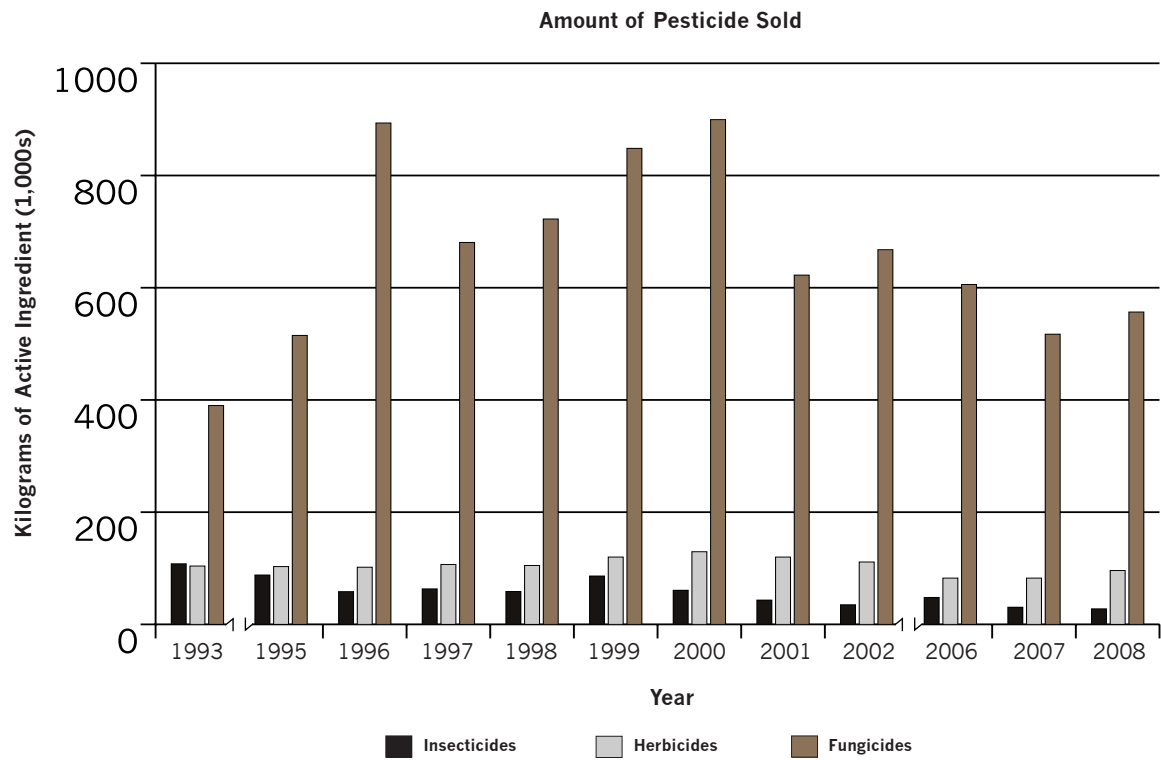
**Data Sources:**

Department of Environment, Energy and Forestry

Statistics Canada (PEI Annual Handbook Tables  
Statistics Canada, Census of Agriculture)

<sup>14</sup> 1 kg equals 2.2 pounds

## P E S T I C I D E S



## WASTE MANAGEMENT

## PRESENT SITUATION

Prince Edward Island is a Canadian leader in the diversion of solid waste away from burial and incineration, with a diversion rate over 60 per cent. This has been accomplished with the assistance of a mandatory source separation program called Waste Watch operating since 2002 for all residential, industrial, commercial and institutional waste generated in the province.

Energy from the waste incinerator, although not considered diverted, supplies the district heating system in Charlottetown, displacing 15 million litres of fossil fuels that would have been required to heat buildings.

The province also requires all compostable waste from fish processing operations to be composted or applied directly to land as a soil amendment. In 2010, the electronic waste program was implemented and a pilot project to recycle non-refillable glass containers into aggregate for use in road and sidewalk construction was initiated.

## WHAT CAN BE EXPECTED?

The regional (Atlantic Environment Ministers) and national (Canadian Council of Ministers of the Environment) arms of Government continue to work toward extending producer responsibility and enhanced product stewardship by those who manufacture and distribute commercial goods.

The planned outcome of this work is a reduction in the amount of packaging waste and an increased acceptance of responsibility by manufacturers for the recovery of their waste materials.

The province will continue to work toward enhanced recovery systems for product items such as paint, plastic bags and used oil, oil filters and oil containers.

## WASTE MANAGEMENT

**INDICATOR:****Solid Waste Diverted Away From Disposal by Burial and Incineration****Description:**

Percentage of solid waste diverted away from disposal by burial and incineration

**Importance:**

Responsible management of waste resources helps us protect our water, soil and air quality. Waste diversion encourages the recovery and recycling of resources, making waste disposal safer. It also ensures that waste for disposal is treated as close as possible to its source, and decouples resource use and waste generation from the rate of economic growth. The amount of waste reused, recycled, or composted, as compared to the total amount of solid waste generated by Islanders, is an indicator of the amount of waste diverted from burial and incineration.

**Status and Trends:**

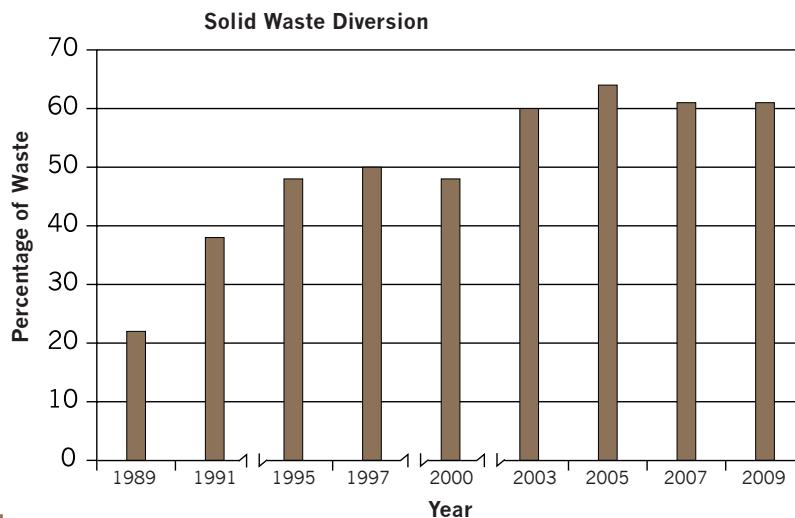
Year	1989	1991	1995	1997	2000	2003	2005	2007	2009
Per Cent Waste Diverted From Burial and Incineration	22	38	48	50	48	60	64	61	61

**Interpretation:**

In 1995 the province's waste reduction program, Waste Watch, was implemented. By 2003, Waste Watch was implemented Island-wide for both residents and businesses, and the central compost facility was fully operational. This increased the provincial waste diversion rate to 60 per cent. Since 2003, minor improvements, such as the addition of more recyclable items to the program, are helping to increase diversion rates further. In 2010, the electronic waste program was implemented and a pilot project to recycle non-refillable glass containers into aggregate for use in road and sidewalk construction was initiated.

**Response:**

The Island Waste Management Corporation continues to work on improving the Waste Watch system to increase the number of items that can be recycled or composted, and to improve the sorting accuracy of residents and tourists. The Department of Environment, Energy and Forestry and the Island Waste Management Corporation are also working toward stewardship programs that will further reduce the amount of waste that is sent to landfills.

**Data Sources:**

Island Waste Management Corporation

Department of Environment, Energy and Forestry

## ENVIRONMENTAL STEWARDSHIP

## PRESENT SITUATION

Islanders continue to take steps to become more involved in the protection of their natural environment.

Watershed groups are one of the most effective ways that Islanders can organize to protect and improve their environment. By 2009, 27 watershed groups had received provincial financial support and six had already developed community approved watershed management plans.

All Island homes have complied with legislated requirements to have home heating oil tanks inspected for safety.

In Charlottetown, Cornwall and Stratford, a new public transit system has a growing ridership. In late 2008, a privately run service began offering commuter routes between Summerside and Charlottetown. Public transit is gaining in public acceptance and support, as indicated by the recent vote by UPEI students strongly favouring a continued student fee for bus passes.

Legislation has been developed to better protect people and the environment, including the *Environmental Protection Act*, *Pesticides Control Act*, *Agricultural Crop Rotation Act*, *Wildlife Conservation Act*, *Off-Highway Vehicle Act* and the *Natural Areas Protection Act*.

## WHAT CAN BE EXPECTED?

It is anticipated that Islanders will continue to increase their commitment to environmental stewardship through a range of responsible behaviours and attitudes.

As described in the Roles and Responsibilities section earlier in this report, Government will continue to work on many fronts to foster, encourage and support this positive trend.

## ENVIRONMENTAL STEWARDSHIP

**INDICATOR:****Home Heat Oil Tank Compliance****Description:**

Compliance with the regulations requiring home heat oil tanks to be inspected and tagged in 2007 with a Prince Edward Island Aboveground Oil Tank ID Tag

**Importance:**

Oil spills are one of the most common causes of groundwater contamination. Just one litre of spilled oil can contaminate one million litres of drinking water. New regulations are helping eliminate the most common preventable causes of spills – improper installation and internal corrosion of tanks that have become too old. Compliance with the tank regulations is 100 per cent.

**Objective:**

Continue to maintain 100 per cent compliance with home heat tank regulations.

**Status and Trends:**

Year	2002	2003	2004	2005	2006	2007	2008
Number of tanks	2,552	9,268	15,795	25,942	36,600	44,974	45,881

**Interpretation:**

At the end of 2008, 45,881 tanks were tagged, of which 17,262 were replacements. Oil spills from home heat tank system failures and fuel oil delivery spills have decreased since the new regulations were implemented. Spills over five litres dropped 71 per cent, from 262 spills reported in 2001 to 75 in 2008. In addition, another 81 spills under five litres occurred in 2008, for a total of 156 that year (spills under five litres were not reported prior to 2001).

Of the 108 home heat tank system failures in 2008, 68 per cent were from line failures. Failures were mainly due to line leaks inside the home (37) and line failures outside the home (36). The remainder were outside tank corrosion failures (23) and inside tank corrosion failures (12). In the State of the Environment (2003) report, this indicator measured compliance with provincial standards for proper tank installation using data from a random

survey sample. For the 2008 report, the indicator measured tanks that were tagged, and therefore in compliance with the regulations. Data are based on inspection reports that oil tank installers and inspectors are required to submit to the department.

**Response:**

The Department of Environment, Energy and Forestry worked with industry to ensure homeowners had their oil tanks inspected and tagged before the 2007 deadline. A home heat tank program survey was sent out to contractors in July 2008. Survey results were used to help determine the need for possible changes to the provincial Home Heat Tank Program.

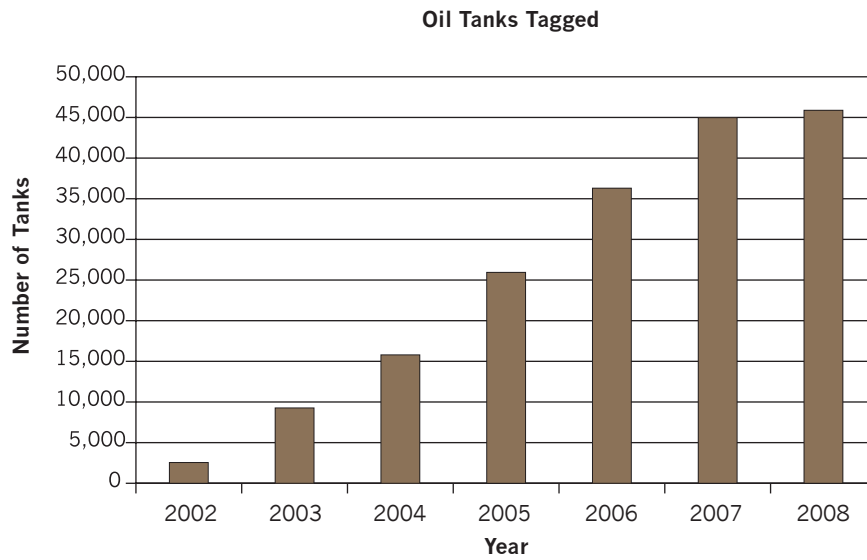
New amendments to the regulations will focus on increasing the quality of home heat tank materials including the tanks themselves, tank valves and filters.

**Data Source:**

Department of Environment, Energy and Forestry



## ENVIRONMENTAL STEWARDSHIP



## ENVIRONMENTAL STEWARDSHIP

**INDICATOR:****Community Watershed Planning****Description:**

This indicator identifies the number of holistic community watershed plans in Prince Edward Island. Holistic watershed planning is an inclusive process of community decision-making which involves all stakeholders who work, live and/or have an interest in a particular watershed. Following community discussion, a watershed management plan is developed that reflects the collective input of watershed residents. The plan gives the watershed group and community a clear strategy, timelines and resource requirements to tackle the environmental issues for which corrective actions are needed.

**Importance:**

Community watershed groups can be an effective resource to manage water quality and wildlife habitat issues in a watershed area. Decisions made at the local level are more likely to be implemented. Self-directed local groups are also more effective at monitoring their own plans.

**Objective:**

To have 40 per cent of the province's land base under holistic community watershed plans by 2013.

**Status and Trends:**

As of December 2009, six watershed areas have holistic, community-based watershed management plans which have received community approval. This represents approximately eight per cent of the land base within the province.

**Interpretation:**

In 2010, most of the over 30 watershed groups in Prince Edward Island were actively engaged in the planning process. It is hoped that in the next two to three years, many of these groups will have plans completed and approved by the community.

Watershed groups are often involved in wildlife enhancement projects for some time to enable them to garner broad support and credibility within their community. There is clearly a desire for increased watershed planning, but watershed organizations need experience, resources and improved capacity to successfully move forward.

**Response:**

The province remains committed to community watershed management and is actively encouraging both habitat restoration projects and the development of watershed management plans. The Watershed Management Fund (WMF) continues to provide grants to fund community organizations. Provincial funding from the WMF has increased from approximately \$120,000 in 2006 to \$737,000 in 2009.

**Data Source:**

Department of Environment, Energy and Forestry

## ENVIRONMENTAL STEWARDSHIP

**INDICATOR:****People Taking Public Transportation****Description:**

Public transit is an excellent means of reducing the province's carbon footprint. The City of Charlottetown has had a public transit system since 2005.

**Importance:**

By reducing the number of personal vehicles on the road we can reduce the amount of automobile exhaust and so reduce the amount of greenhouse gases entering the environment.

**Objective:**

To increase the number of people using public transit and to reduce greenhouse gas emissions.

**Status and Trends:**

Year	2005	2006	2007	2008	2009
Number of passengers	18,034	110,538	141,688	180,977	285,677

**Interpretation:**

Service commenced in October 2005 and expanded to include Stratford in September 2008 and Cornwall in January 2009. There have been strong annual increases in the number of passengers on the Charlottetown public transit system since its introduction in 2005.

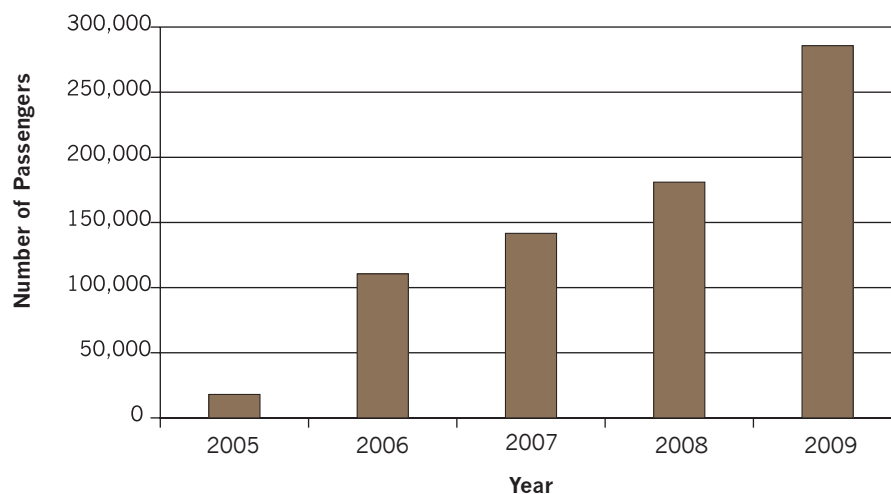
In the first six months of 2010 compared to the first six months of 2009, the number of passengers increased by 22 per cent. At UPEI, students shifted from initially opposing a fee for a bus pass to very strong support in the most recent referendum.

**Response:**

The City of Charlottetown and the province continue to promote the use of this urban public transit system thereby reducing greenhouse gas emissions and traffic congestion, while improving local air quality.

**Data Source:**

Charlottetown Transit Authority

**Charlottetown Transit System Usage**

## ENVIRONMENTAL STEWARDSHIP

**INDICATOR:****Participation in Angling, Hunting and Trapping****Description:**

The number of people who participate in these activities annually

**Importance:**

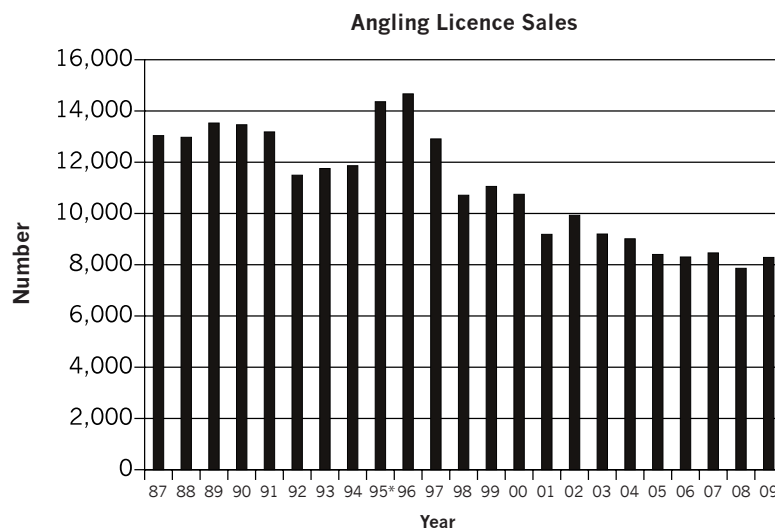
Hunters, anglers and trappers were some of the first to voice concern about habitat loss and its effect on wildlife in North America, and thus began the conservation movement. As eyes and ears in the field, anglers, hunters and trappers are often the first to see and take action on issues and are important environmental stewards.

**Objective:**

To increase participation in angling, hunting and trapping.

**Status and Trends:****Interpretation:**

Fishers, hunters and trappers must contribute to the Wildlife Conservation Fund and these funds support all Islanders. Sales of angling, hunting and trapping licences have been declining over the past many years. Licence sales in 2009 and projected sales in 2010 show an increase. Reasons for this are believed to be a combination of social, environmental and regulatory factors. Today's families have many more options for their free time than did previous generations. Some people feel that declining habitat quality and/or wildlife numbers have degraded the fishing, hunting or trapping experience. Others are deterred by the cost or effort of obtaining angling licences, or the training required for hunting or trapping licences. Fur prices are a further factor influencing trapping licence sales.



\*The increase in 1995 was due to the addition of the farmer/fisher category of licence. Before this date, farmers and commercial fishers did not need a hunting licence.

## ENVIRONMENTAL STEWARDSHIP

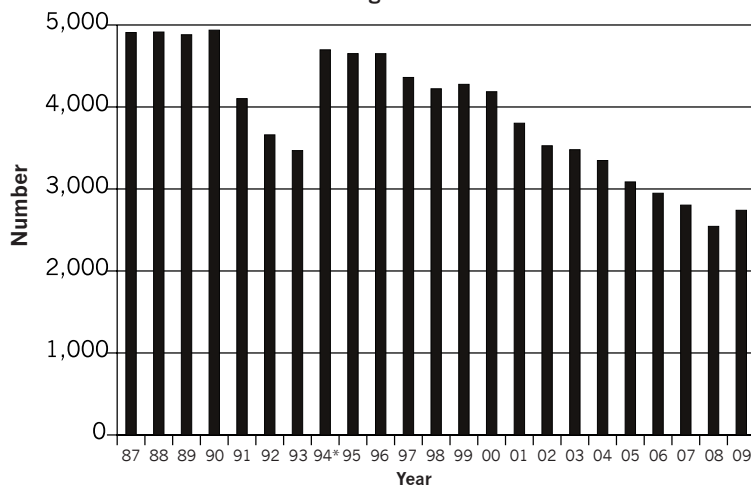
**Response:**

The Department of Environment, Energy and Forestry has been exploring ways to address perceived barriers to participation in angling, hunting and trapping. Online options now exist to make purchasing licences and completing the classroom component of hunter safety training easier. A five-day family fishing licence has been introduced at a reduced cost, and work is underway to establish new opportunities, such as a white-perch ice fishery. Ongoing educational work is important. The Department of Environment, Energy

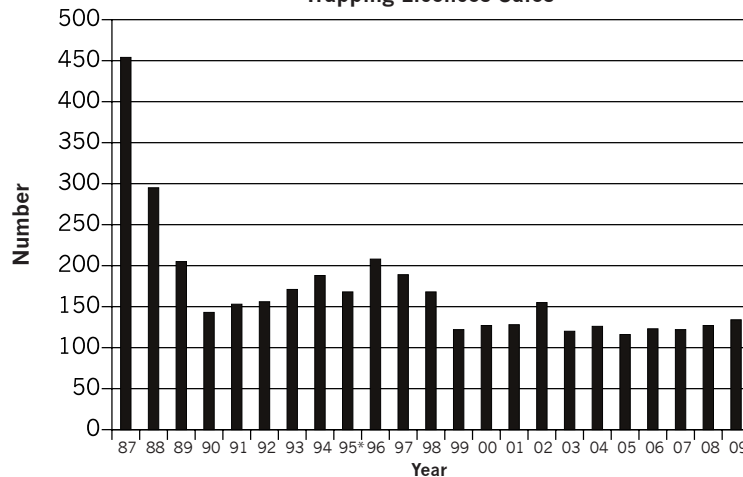
and Forestry and non-governmental groups such as Delta Waterfowl, Ducks Unlimited, Ruffed Grouse Society, Prince Edward Island Trappers Association, Red Rock Retrievers Club and Charlottetown Trap and Skeet Club assisted with programs including Youth Waterfowl, Hunter Education and Novice Hunter Workshops. In 2009, the department revived the Becoming an Outdoors Woman Program and there has been strong public participation in it.

**Data Source:**

Department of Environment, Energy and Forestry

**Hunting Licence Sales**

\*The increase in 1994 was due to the addition of the farmer/fisher category of licence. Before this date, farmers and commercial fishers did not need a hunting licence.

**Trapping Licences Sales**

## SOIL QUALITY

## PRESENT SITUATION

Soil is a fundamental resource and a critical component for all the key natural, mineral, water and gaseous cycles upon which life depends. Despite its importance, it is a highly fragile resource, and very susceptible to human mismanagement.

Prince Edward Island soils are not inherently fertile; however, they possess some characteristics, which under skillful management, allow them to be productive and to support a variety of valuable crops.

One major environmental issue in Prince Edward Island is soil erosion. Healthy, resilient soils rely on good land stewardship to keep them that way. When they are over-worked they become less able to accommodate the demands of modern agricultural farm practices, can lose their structure and simply wash or be blown away.

The Government's contribution to soil and water conservation programs for the period of 2002 to 2010 was more than \$9 million.

## WHAT CAN BE EXPECTED?

Crop rotation, cover crops, fall mulching, strip cropping, cross-slope ploughing, and terraces all have a place in good land stewardship. Enhanced Environmental Farm Plans help farmers identify actions they can take to improve and protect the on-farm environment, including soil quality.

Organic agriculture and forestry best management practices contribute to soil quality.

The amount of land under soil conservation management will increase with financial and technical assistance from the Canada-Prince Edward Island Agricultural Stewardship Program, financial incentives from the Alternative Land Use Services Program and by allowing producers to exempt land under soil conservation structures from their allowable land holding limits under the *Lands Protection Act*.

There will be greater public demand for certified organically grown products, both for local consumption and for export.

## SOIL QUALITY

**INDICATOR:**

## Frequency of Row Crops

**Description:**

To ensure that row crops are not grown on farmland more frequently than once in every three years

**Importance:**

Growing row crops, such as potatoes, no more frequently than once every three years is generally considered to be the minimum acceptable crop rotation to help maintain soil quality. The alternate years of the rotation should include cereals and forages.

**Objective:**

To only permit row crops<sup>15</sup> to be grown on land one year in every three or equivalent soil conservation practices.

**Status and Trends:**

Crop Land Under a Three-Year Potato Rotation

Time Period	Per Cent Land
1997 to 1999 inclusive	82
2006 to 2008 inclusive	89.6

**Interpretation:**

Potatoes are a measure of annual row crop production in Prince Edward Island – the most important row crop grown in the province. Potato production reached its peak in the late 1990s and early 2000s due to increased processing capacity. In recent years, due to high input costs and lower market demand, production has fallen. The reduced annual production has been the major reason for better potato rotations. Potatoes were produced on approximately 43,700 hectares in 1996, on 39,300 hectares in 2006 and on 34,600 hectares in 2010.

**Response:**

Progress has been slower than anticipated. Government continues to support sustainable soil management rotations where row crops are grown no more frequently than once in every three years or where a soil management plan, approved by a management specialist, is in place.

**Data Sources:**

Department of Environment, Energy and Forestry

Statistics Canada



<sup>15</sup> Agricultural crops that are grown in rows are considered row crops, for example, potatoes and corn.

## SOIL QUALITY

**INDICATOR:****Area Under Soil Conservation Management Structures****Description:**

Area of row cropped land under engineered soil conservation structures

**Importance:**

Soil conservation structures such as terraces, grassed waterways and farmable berms, when combined with strip cropping, can complement good agricultural practices and reduce soil erosion to acceptable levels on excessively long or steep slopes. It is estimated that approximately 60,000 hectares of row cropped land in the province requires erosion control structures and or strip cropping.

**Objective:**

To work toward adding a further 7,000 hectares of row cropped land under engineered soil conservation structures by 2014.

**Interpretation:**

The data for this indicator refer to engineered soil conservation techniques only. Agricultural practices, which include good crop rotations, conservation and or reduced tillage, spring versus fall tillage and the use of cover crops, are essential management techniques that should be used on all land to control the rate of soil erosion.

**Response:**

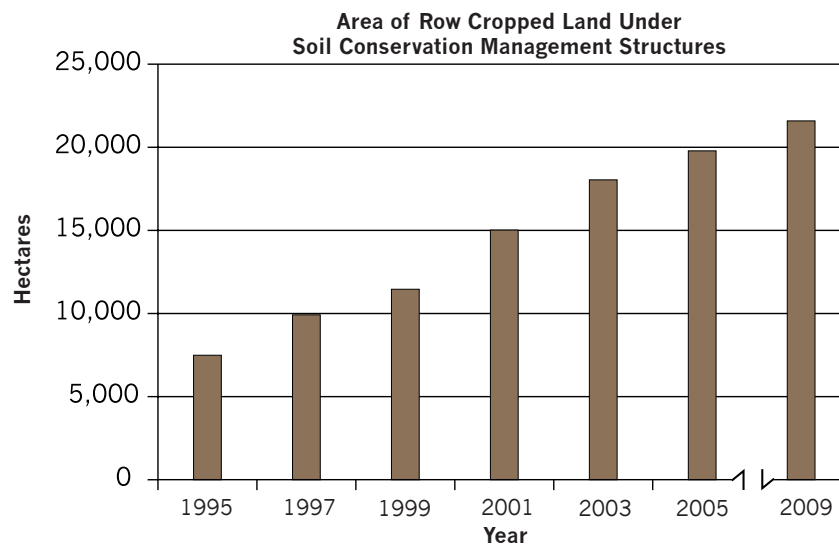
The Department of Agriculture offers technical and financial assistance to landowners who are interested in controlling erosion with soil conservation structures and or strip cropping through the Canada-Prince Edward Island Agriculture Stewardship Program. Incentives are also available through the Alternative Land Use Services Program to compensate landowners for land that is lost as a consequence of the establishment of soil conservation structures.

**Data Source:**

Department of Agriculture

**Status and Trends:**

Year	1995	1997	1999	2001	2003	2005	2009
Area (ha)	7,490	9,920	11,460	15,020	18,041	19,785	21,587





## SOIL QUALITY

**INDICATOR:****Soil Organic Matter****Description:**

Per cent soil organic matter as measured by standard soil testing methods

**Importance:**

Organic matter is a key indicator of the capacity to support plant growth. It is important for maintaining soil structure, helps with water infiltration and aids in resisting erosion.

**Objective:**

To see a positive trend in soil organic matter levels.

**Status and Trends:**

Percentage Soil Organic Matter	Per Cent of Test Sites 1999-2001	Per Cent of Test Sites 2006-2008
1.5 - 2.0	2	7
2.0 - 2.5	8	19
2.5 - 3.0	21	26
3.0 - 3.5	25	27
3.5 - 4.0	18	11
> 4.0	25	10

**Note:**

The data in the table were collected from 625 agricultural sites across the province that are part of the Soil Quality Monitoring Project. Individual sites are sampled on a three-year interval.

**Interpretation:**

In 1999-2001, 68 per cent of samples had an organic matter content of three per cent or greater. In the 2006-2008 sampling period (on the same sites) this figure decreased to 48 per cent. Where potatoes were grown more frequently than once every three years in the crop rotation, soil organic matter levels dropped to below three per cent.<sup>16</sup> When potatoes were grown once in every three years, and forages or cereals were incorporated into that rotation cycle, soil organic matter levels remained above three per cent. Soil organic matter levels are decreasing province-wide. This trend can be reversed if fewer potatoes are grown, or if forages, cereals or oilseed crops are included in the three-year crop cycle.

**Response:**

Government and producer organizations continue to actively promote soil conservation and management practices that will lead to positive trends in soil organic matter.

**Data Sources:**

Department of Agriculture

Department of Environment, Energy and Forestry

<sup>16</sup> Based on statistical analysis of the Prince Edward Island Soil Quality Monitoring Project.



## SOIL QUALITY

## INDICATOR: Organic Agriculture

### Description:

Area of farmland in certified organic production and the number of farmers who are either certified organic producers or are in transition from conventional to organic production methods

### Importance:

Organic production techniques maintain and strive to improve soil quality. Since habitat diversity is a criterion for organic certification, farms under organic agriculture may be used as an indirect, though subjective, indicator of "good" biodiversity.

### Objective:

To have a minimum target of 2,500 organically managed hectares and 60 farmers involved in organic production by 2010.

### Status and Trends:

Year	2001	2003	2005	2007	2009
Hectares under organic production	607	655	586	1,100	2,000
Number of organic producers	30	28	34	56	59

### Interpretation:

Like much of North America, the Prince Edward Island organic produce market has seen double digit growth.<sup>17</sup> This growth can be attributed to the growing demand by consumers for products produced using more environmentally friendly methods of crop production.

In 2006, the Provincial Government announced a five-year \$4.5 million Organic Industry Development Program to accelerate adoption of organic production practices. The Department of Agriculture continues to reimburse producers for 75 per cent of the cost of organic certification.

### Response:

The Department of Agriculture continues to provide support staff and financial assistance to organic producers.

### Data Sources:

Statistics Canada

Canada Organic Growers

Department of Agriculture

<sup>17</sup> There are some variances between the Statistic Canada data and the industry figures, as smaller growers are not reflected in the national census information.

## LAND USE

## PRESENT SITUATION

Prince Edward Island's current land use patterns reflect a history of European settlement. Modern roadways, fields, hedgerows, land usage and communities all echo Samuel Holland's 1764-66 survey of the province and the decades of settlement and land clearing that followed.

In 2000, about 45 per cent of the province was forested. Agriculture accounted for 42 per cent of land (crop lands as well as hedgerows and farmsteads). Urban, recreational, residential and transportation development, accounted for seven per cent of land use. The remaining six per cent was sand dune and wetlands.

Land is a finite resource that is necessary for a wide range of purposes including agriculture, industrial development, forestry, energy production, settlement, recreation, water catchment and storage, and fish and wildlife habitat.

Land use patterns reflect the constant adaptation of land managers to changing social, economic and environmental circumstances. While some land can only be used for a limited range of purposes, other land can accommodate often-competing needs. The amount of land used for each purpose is constantly changing. In December 2009, the Report on the Commission on Land and Local Governance was released.

## WHAT CAN BE EXPECTED?

The environment (including soil type and drainage, climate, topography and biological factors) limits how land can be used.

Land-use and land-cover change as property rights change. *The Lands Protection Act* influences access to, or control over, land.

The economics of property values, capital costs, markets and interest rates favour some types of land use over others. Societal demands (such as clean air and water), as well as population distribution, play an important role in how land is used and developed.

Government is committing resources to address the recommendations of the Report on the Commission on Land and Local Governance.

## LAND USE

**INDICATOR:****Environmental Farm Plans (EFP)****Description:**

Area of agricultural land and number of farms with a valid environmental farm plan

**Importance:**

Environmental farm plans identify priority areas for actions to improve environmental performance on farms. Agriculture producers must have an EFP that has been completed or updated within the past five years in order for it to be deemed valid. Producers with a valid EFP are eligible for financial assistance under a number of Government programs

**Objective:**

To have 60 per cent of the agricultural land base in Prince Edward Island with a valid EFP.

**Status and Trends:**

Prince Edward Island started environmental farm planning in 1996. In 2009, over 800 farms and 133,014 hectares – owned by agriculture producers – were under a valid environmental farm plan.

Years	1996-2004	2004-2009
Hectares of agricultural land under an EFP	169,798	133,014
Per cent of all agricultural land under an EFP	49.2	40.9
Number of farms with an EFP	1,100	806

**Interpretation:**

Progress in developing and implementing EFPs has been slower than anticipated and fewer farms have a valid EFP than before. This is due to a decline in the number of Island farms. Furthermore, only those farms that are interested in participating in the financial incentive programs – which are tied to the EFP process – completed an EFP. Most participating farms do not include their leased land when completing/updating their EFP. Since a significant area of agriculture land is leased, land under a valid EFP has dropped. The EFP

program has taken a new direction over the past few years. In addition to the constant updating of individual EFPs, group planning is now underway on a watershed basis to deal with the nitrate pollution issue in the province.

**Response:**

The Government supports the industry driven process of environmental farm planning.

**Data Sources:**

Department of Environment, Energy and Forestry

Prince Edward Island Federation of Agriculture

## LAND USE

**INDICATOR:****Land Area in Agricultural Crop Production****Description:**

Percentage of total agricultural land cultivated for crop production

**Importance:**

Cultivation of land for crop production has implications for soil health, soil resilience<sup>18</sup> water quality and erosion.

**Status and Trends:**

Year	1981	1986	1991	1996	2001	2006
Hectares in agricultural use	283,145	272,549	258,985	265,330	261,594	250,859
Hectares in crop production	158,347 (56%)	156,656 (57%)	154,168 (59%)	170,434 (64%)	175,563 (67%)	171,296 (68%)
Hectares in potato production*	NA	25,988	31,488	43,770	43,256	39,512
Number of farms	NA	2,833	2,361	2,217	1,845	1,700

\*In the table above, the number of hectares in crop production includes those hectares in potato production.

NA – Data not available

**Interpretation:**

The amount of land in agriculture has declined slightly over the past 25 years but the proportion of agricultural land that is cultivated for crop production increased from 56 per cent in 1981 to 68 per cent in 2006. In other words, less land is being farmed, but the remaining farm land is being put under more intensive cultivation.

Cultivation of land for crop production has implications for soil and water quality since cultivated land is more susceptible to soil erosion. Land in permanent forage or pasture, or perennial crops, may not be as lucrative in economic terms, but such a practice is beneficial to the agricultural ecosystem and its health.

<sup>18</sup> Soil quality can be defined as the capacity of a soil to sustain biological production, maintain environmental quality, and promote plant and animal health. Soil resilience refers to a soil's ability to return to its natural structural and functional state following cultivation.

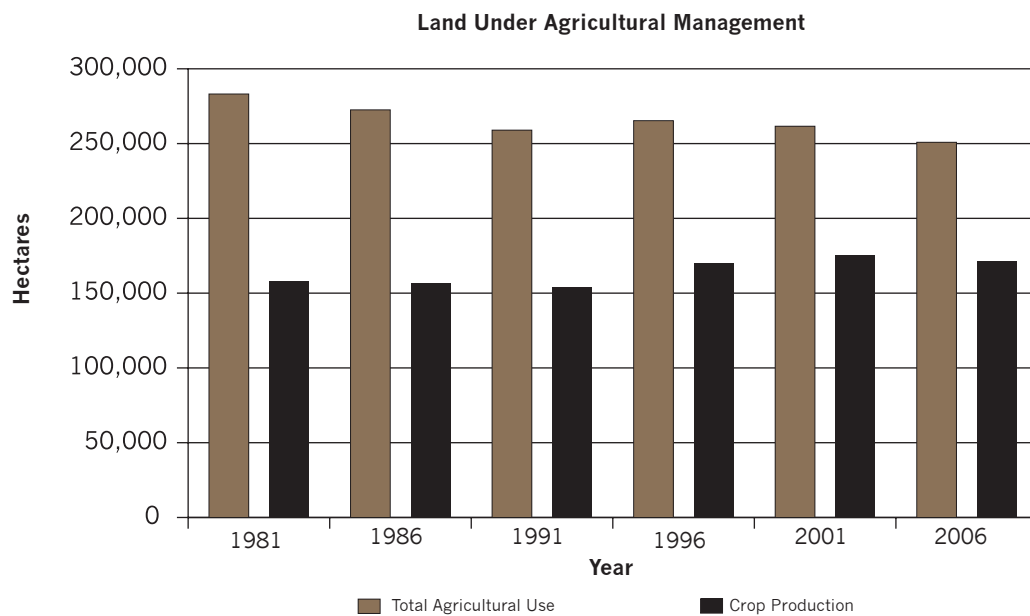
## LAND USE

**Response:**

Environmental Farm Plans promote practices which protect soil and increase biodiversity. Government recommends and supports crop production practices which minimize soil erosion and manage nutrient inputs. The Canada-PEI Agriculture Stewardship Program and the Alternate Land Use Services program have been providing support to Island farmers in support of sustainable agriculture. The *Lands Protection Act* was amended to exclude natural areas and environmentally significant lands from aggregate land holding limits.

**Data Source:**

Statistics Canada.



## LAND USE

**INDICATOR:****Forest Conversions****Description:**

Area of forest converted to non-forest uses

**Importance:**

Loss of forest has negative implications for the plants and animals that depend on these habitats, as well as for the ecological goods and services forests provide to all of us.

**Objective:**

To have no net loss of forest area.

**Status and Trends:**

Forest Converted Between 1990 and 2000	Area (hectares)
Agriculture	10,547
Residential	1,369
Industrial	652
Recreational	492
Urban	339
Transportation	255
Commercial	73
Institutional	16
Not evident*	2,689
<b>Total Forest Converted to Other Use</b>	<b>16,432</b>
<b>Total Forest Created</b>	<b>5,655</b>
<b>Net Change in Forest Area (Loss of Hectares)</b>	<b>10,777</b>

\* Not evident refers to land that could not be categorized. It includes abandoned farmland and cleared land that had not yet regrown naturally, or been developed into one of the other categories.

**Interpretation:**

From 1900 to 1990, the area of Prince Edward Island under forest has increased from 31 to 49 per cent and subsequently decreased to 45 per cent in 2000. Between 1990 and 2000, more than 16,400 hectares of forest were converted to non-forest uses, while 5,655 hectares of new forest were recorded. Of the area converted, 10,500 hectares went into agricultural production. The remaining forest conversion included land selected for residential, recreational, industrial and highway development. Most of this conversion occurred on private lands, where landowners make the management decisions.

The area of forest created during the same period included 830 hectares of new tree plantations and cleared land allowed to regenerate naturally. The latter would have begun its succession to forest before 1990 and would have been classified as cleared at that time.

**Response:**

Government recognizes the importance of forest cover to the environment. It released a new forest policy in 2006 that gave a commitment to identifying incentives to encourage good forest management.

Work is underway to complete a new forest inventory in 2012.

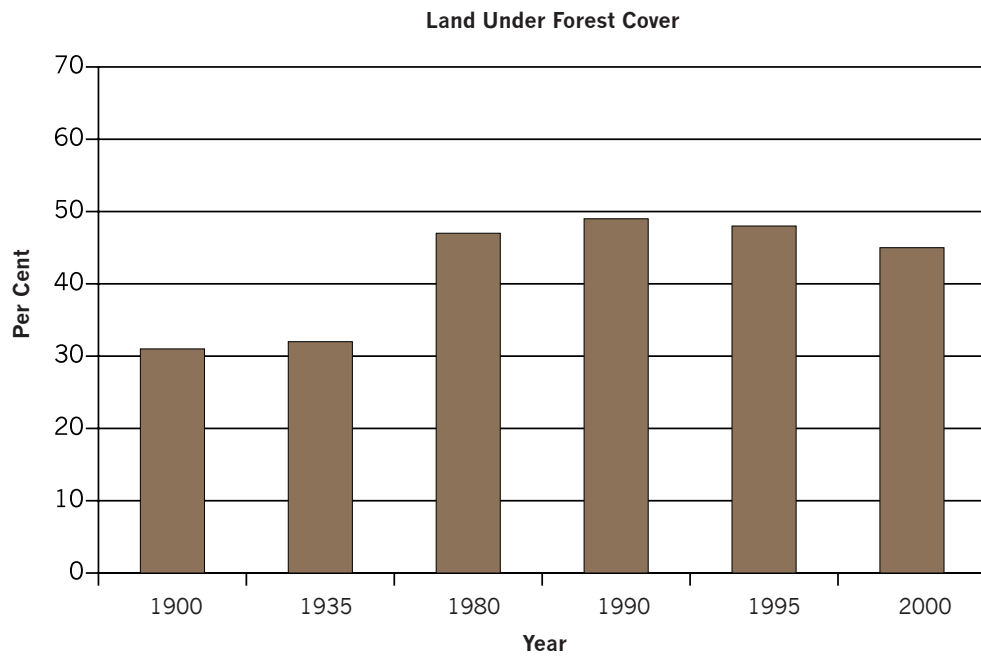
**Data Source:**

Department of Environment, Energy and Forestry

**Land Under Forest Cover**

Year	1900	1935	1980	1990/92	1994/97	2000
Hectares	177,903	186,283	268,804	280,017	275,471	263,225

## LAND USE





## F E E D B A C K F O R M

**The Department of Environment, Energy and Forestry invites your comments.**

	Agree	Neither Agree Nor Disagree	Disagree
This report is easy to understand.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It provides the right level of details.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please comment on how well you think the selected indicators provide information about the health of the Island's environment.

---



---

How could the report be improved? What changes should be made if a similar report was published?

---



---

Are there specific actions that should be taken as a result of some findings in this report?

---



---

Optional: Your name and contact information, including email address.

---



---

Return to: **Communications Officer**  
**Department of Environment, Energy and Forestry**  
**PO Box 2000, Charlottetown, Prince Edward Island, Canada C1A 7N8**  
**Fax: (902) 368-5830**  
**Email: [environment@gov.pe.ca](mailto:environment@gov.pe.ca)**



NOTES



## A P P E N D I X

## 2003 TO 2010 LIST OF LEGISLATION, POLICY AND PROGRAM INITIATIVES

**Forests, Fish and Wildlife Division****Legislation/Regulation**

- 2003 *Agriculture Crop Rotation Act*
- 2005 *Trespass to Property Act* amended to require permission for trapping or snaring on private land
- 2005 *Natural Areas Protection Act* amended to allow de-designation of public lands
- 2005 Hunting Guide Regulations
- 2006 Ground Hemlock Regulations
- 2009 5-day Family Fishing licence
- 2009 *Lands Protection Act* amendments to exclude natural areas and environmentally significant lands
- 2010 *Wildlife Conservation Act* amended to grant authority for conservation officer appointments that previously were appointed under the old *Police Act*.

**Policy**

- 2003 Sustainable Resource Policy
- 2003 Acquisition of new Muskeg Bombardier off-road forest fire tanker
- 2003 Launch of the Kensington Public Forest
- 2004 Prince Edward Island signed Canada Forest Accord (2003-2008)
- 2004 Discontinuation of herbicide use on public land managed by the division
- 2005 Licence agreement with ECOPEI
- 2005 Full administration of Wildlife Conservation Fund assigned to the WCF committee
- 2005 Prince Edward Island signed Canada Wildland Fire Strategy Declaration
- 2005 Prince Edward Island supported designation of Basin Head Lagoon under the *Federal Oceans Act*
- 2005 Discontinuation of use of exotic species in public and private land reforestation
- 2006 Moving to Restore a Balance in Island Forests: Prince Edward Island Forest Policy released
- 2006 Introduction of Impoundment Capital Fund
- 2007 Public consultations into a Recreational Fishery Policy for Prince Edward Island
- 2008 Combination of Forest Enhancement Program and Forest Renewal Program
- 2008 Launch of Ecosystem-based Forest Management Standards Manual
- 2008 Launch of online purchasing system for hunting and angling licences
- 2008 Higher resolution topographic mapping program implemented (LIDAR)
- 2009 Approval to develop a Recreational Fish policy
- 2010 2010 Forest Inventory and Orthographic Mapping project commenced

## APPENDIX

**Program**

- 2003 Greening Spaces Program launched
- 2003 State of the Forest Report released
- 2003 CIFFC Mutual Aid Resource Sharing Agreement – forest firefighters dispatched to B.C.
- 2004 Canadian Breast Cancer Network “Giving Trees....Giving Hope” campaign launched
- 2009 Hunter Education Course Online released
- 2009 Becoming an Outdoors Woman (BOW) was revived
- 2009 Public Land Management Plans for individual properties were made available online

**Pollution Prevention Division****Legislation/Regulation**

- 2004 Contaminated Site Registry Regulations under *Environmental Protection Act*
- 2004 Air Quality Regulations – established fee structure based on a facility’s emission levels
- 2004 Ozone Depleting Substances Regulations
- 2005 Excavation Pit Regulations amendments
- 2007 Petroleum Storage Tank Regulations – removal of all sections applicable to home heat
- 2007 Home Heat Tank Regulations
- 2007 *Beverage Containers Act* – deposit/return system for non-refillable beverage containers
- 2009 *Pesticides Control Act* amended to restrict lawn care products
- 2009 Waste Resource Management Regulations – amended to expand setback distances required for C&D sites
- 2010 *Pesticides Control Act* Regulations amendments on lawn care products
- 2010 Materials Recycling Regulations – new regulations that regulate the recycling of materials including electronic waste, lead acid batteries, etc.

**Program**

- 2010 Atlantic Climate Adaptation Solutions federal/provincial agreement to address community coastal and inland land use risk and vulnerability assessments and to enhance capacity
- 2010 Atlantic Canada Electronics Stewardship (recycling program)
- 2010 Online Water Data Access

**Energy and Minerals Section****Legislation/Regulation**

- 2004 *Electric Power Act*
- 2004 *Electric Power Act* City of Summerside Electric Utility Exemption Regulations



## A P P E N D I X

- 2005 *Renewable Energy Act* Net-Metering System Regulations
- 2005 *Renewable Energy Act* Designated Areas Regulation
- 2005 *Renewable Energy Act* Minimum Purchase
- 2009 *Oil and Natural Gas Act* amendments to Permit, Lease and Survey System Regulations

**Policy**

- 2004 Energy Framework and Renewable Energy Strategy
- 2007 Office of Energy Efficiency (OEE) opened
- 2008 Island Energy Strategy Securing our Future: Energy, Conservation and Renewables
- 2008 Island Wind Energy Securing our Future: The 10 Point Plan
- 2010 PEI Energy Accord

**Program**

- 2005 Residential Energy Low-Interest Loan Program (November 2005 to March 31, 2006)
- 2005 Residential Energy Assistance Program (December 2005 to March 31, 2007)
- 2007 School Compact Fluorescent Light Bulb Fund Raising Initiative
- 2008 Home Energy Low-Income Program – administered through the OEE
- 2008 Prince Edward Island Existing Homes Program – administered through the OEE
- 2008 Prince Edward Island Low-Income Existing Homes Program – administered through the OEE
- 2008 Prince Edward Island Residential Energy Efficiency Program – administered through the OEE
- 2008 Prince Edward Island Energy Efficiency Rebate Program

**Drinking Water Management Section****Legislation/Regulation**

- 2004 Drinking Water and Wastewater Facility Operating Regulations

**Policy**

- 2006 Site suitability assessments for on-site sewage disposal systems
- 2006 Biosolids Strategy: Amendments to legislation in this regard are in progress

**Program**

- 2007 On-site sewage disposal system pilot program (Ongoing)
- 2007 Nitrate Clinics (Ongoing)

## APPENDIX

**Watershed Management Section****Legislation/Regulation**

- 2006 Watercourse Alteration Guidelines – guidelines were substantially revised
- 2009 Watercourse and Wetland Protection Regulations – New regulations encompassing watercourses, wetlands, buffer zones, high sloped areas and perimeter coastline

**Program**

- 2003 Watershed Management Program – Formerly the Wildlife Habitat Improvement Program (WHIP), it was reorganized to focus on holistic watershed planning and management
- 2004 Watershed Management Fund – A fund created from the WHIP fund to support watershed planning and management
- 2008 First province-wide Alternative Land Use Services Program (ALUS) initiated in Canada

**Environmental Advisory Council**

- 2004 Recommendations for regulation of pesticides in Prince Edward Island
- 2005 Recommendations for the regulation of construction and demolition debris sites in Prince Edward Island
- 2007 We are all downstream We are all upstream We are all part of a watershed. A report on the public consultations on managing land and water on a watershed basis

**Environmental Advisory Council and Public Forest Council Joint Working Group**

- 2010 Biomass heat on Prince Edward Island: A pathway forward

**Commission Reports and Other Documents**

- 2009 Report on the Commission on Land and Local Governance
- 2010 Rural Action Plan: A Rural Economic Development Strategy for Prince Edward Island
- 2010 CCME Three-Year National Water Strategy
- 2010 Prince Edward Island and Climate Change: A Strategy for Reducing the Impacts of Global Warming – 2010 Status Report



Contains 10% Post-Consumer Waste

Design and Printing: Communications PEI  
2011



Department of Environment, Energy and Forestry  
PO Box 2000, Charlottetown, Prince Edward Island  
Canada C1A 7N8  
Phone: (902) 368-5000 Fax: (902) 368-5830  
Email: [environment@gov.pe.ca](mailto:environment@gov.pe.ca)

