

If we are going to look at where we are on the curve of sustainable development, we need to take the long view. Civilizations have been struggling with how to live within nature's envelope for thousands of years. Mesopotamia slid into decline some 4,000 years ago after faulty irrigation methods caused a loss in soil fertility. Deforestation and soil degradation have been unwanted side effects of unsustainable development around the world for at least as long.

With the Industrial Revolution some 300 years ago, we learned how to exploit nature even more efficiently, increasing many aspects of human well-being, but at a growing cost to natural resources and services. By the second half of the twentieth century we faced a rapidly growing list of environmental crises triggered by a growing human population coupled with greater demands and technological capacity. We responded with protests, non-government environment organizations, laws and the sustainable development concept that seeks to reorient development to live within nature's limits.

PRE-INDUSTRIAL REVOLUTION

More than one million years ago, humans begin to change their environment with stone tools and fire. There is a theory that hunting hastened the extinction of some species even during the Stone Age. The domestication of wild plants and animals, some 10,000 years ago in Asia, the Middle East and Central America marks the beginning of a profound shift from hunting and gathering to agriculture. This creates food surpluses that allow the development of cities and civilizations and the growth of human numbers.

There is no way of knowing for sure how many humans there were long ago, but there are estimates that we numbered about 4 to 5 million around the dawn of agriculture. By 2,000 years ago, the population has been estimated at about 300 million, a figure that grew slowly until the time of the industrial revolution, when it was probably just under 800 million. In the ensuing three centuries, human numbers have grown more than seven fold.

This degradation of natural resources is one of two great environmental problems caused by humans. Intensive cultivation, sometimes in combination with deforestation and irrigation from nearby rivers, led to land degradation and is associated with the decline of great civilizations in such places as China, Mesopotamia, Egypt, North Africa, Greece and Central America.

The second problem is pollution. Wastes from humans and their domestic animals have been a threat to drinking water for many thousands of years, when waste accumulation in any area outstripped nature's ability to safely detoxify the harmful organisms. Industrial wastes have been accumulating for thousands of years. Workers in lead and mercury mines and smelters during Roman times suffer severe health effects, as both metals are neurotoxins. Lead fallout from their smelting operations was so widespread that it is found in ice cores from Greenland glaciers 2,000 years later. Romans who sweeten their wine with lead acetate unknowingly harm their own health.

A natural climate shift sends Europe and the North Atlantic region into a warming period from about the years 600 to 1400. This allows Norse settlements on Iceland, Greenland, and Newfoundland. The Little Climatic Optimum, or Mediaeval Warm Period, is followed by the Little Ice Age from the mid 1400s to mid 1800s, when harsher winters drive out the Norse settlements.

In medieval Europe, the demand for wood grows so much that laws are passed in regions from Venice to England to protect some forests. Air pollution from wood and coal fires is severe enough to bring air pollution control regulations. There are records of royalty moving from one castle to another to escape dense wood smoke from fires. Edward I forbids coal

burning in London when Parliament is in session. In 1661, industrial emissions are recorded blowing across the English Channel between England and France, harming plants and people—an early record of what we now consider long-range air pollution.

INDUSTRIAL REVOLUTION TO THE MODERN AGE

The Industrial Revolution is a term applied to the widespread technological and economic changes that took place in first in Great Britain, and later in Western Europe, and the United States in the 18th and 19th centuries. It involved a centuries long shift from economies based largely on farmers, merchants and crafts people to those based more on industries. This introduces the large-scale use of fossil fuels, greater consumption of natural resources, and resulting pollution and resource depletion.

By the second half of the 19th century, over-hunting and habitat destruction are leading to the extinction of passenger pigeon and near extinction of plains bison in North America. Reaction to these impacts brings controls on hunting, and the creation of national parks, particularly in Canada and the United States.

1798. English political economist Thomas Malthus predicts that if population growth continues indefinitely, populations will outstrip food supplies.

1804. The world's population is estimated to have reached 1 billion.

1824. Jean Baptiste Joseph Fourier proposes that the sun's heat is partially trapped in the earth's atmosphere, which acts like a giant glass jar, the first scientific reference to the greenhouse effect.

1852. Chemist Robert Angus Smith writes of acid rain in and around Manchester, noting that sulphuric acid in city air damages fabrics and metals.

1864. George Perkins Marsh, U.S. diplomat, traveller and scholar, publishes *Man and Nature*, in which he says that humans are destroying nature to our own detriment.

1873. First of a series of killer fogs in London. Over 1,150 die in three days from severe air pollution from coal burning.

1885. Canada creates a reserve that later became Banff National Park, Canada's first national park.

Karl Benz builds the first successful gasoline-driven automobile.



Karl Benz with the world's first automobile powered by an internal combustion engine.

1896. Svante Arrhenius notes that carbon dioxide permits passage of short wavelength radiant heat from the sun, and traps reflected longer wave radiant heat emitted by Earth. This leads to an understanding of carbon dioxide as a greenhouse gas.

THE TWENTIETH CENTURY

1900. World population is 1.65 billion.

1908. The first continuous chlorination system in North America begins operating in Jersey City, starting a trend in drinking water disinfection to stop the ravages of cholera, typhoid and other diseases caused by water that is polluted by sewage discharges.

1909. The United Kingdom (on behalf of Canada) and the United States sign the Boundary Waters Treaty to prevent disputes over shared waters. This leads to the formation of the International Joint Commission and important agreements to reduce Great Lakes pollution.

1914. The last passenger pigeon dies in Cincinnati zoo. At one point, there were millions of these birds migrating in eastern North America.

1915. Canada's Commission on Conservation writes about the need to live within natural cycles saying: "Each generation is entitled to the interest on the natural capital, but the principal should be handed on unimpaired." This presages the concept of sustainable development.



Passenger pigeon

1918. The first International Joint Commission report speaks of chaotic, perilous and disgraceful water pollution in parts of the Great Lakes.

Canada and the United States sign the Migratory Birds Treaty to restrict hunting.

1919. Canada's federal and provincial governments hold the first cooperative session on wildlife and wilderness preservation.

PCBs are developed and put into service as liquid insulators and heat-transfer fluids. Decades later, they will found to be hazardous, widely distributed in the environment and building up in the food chain. They will be banned for use in North America.

CFCs are synthesized in mid-1920s and put into use in 1930s as refrigerants. They will later be found to destroy the stratospheric ozone layer, and be banned.

Tetraethyl lead is introduced as an anti-knock gasoline additive. It is later declared a health risk and gradually phased out.

A lawsuit begins that will find sulphur dioxide from a lead-zinc smelter in Trail, B.C. is damaging apple orchards and crops in Washington, and compensation must be paid. A tribunal rules that, "No state has the right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the territory of another, or to the persons or property therein, when the case is of serious consequence and the injury is established by clear and convincing evidence."

A combination of low rainfall combined with high winds, light soil and poor land conservation methods lead to Dust Bowl conditions in western Canada and the United States. Wind erosion blackens the sky with storms of a period known as the Dirty Thirties. This sparks a wide series of water management and soil conservation measures. It also leads to wide-scale irrigation, mainly in the United States, often based on pumping underground water faster than it is naturally replaced.

The United States Supreme Court sets limits on how much water can be drained out of Lake Michigan through the Chicago Diversion. The judges also impose water conservation measures

on the Chicago region, including closed loop industrial processes which re-use water once it is withdrawn, and meters for all water users.

The industrial boom created by production for the Second World War sets the scene for very large-scale industrialization in coming years. This period marks the popularization of many chemicals, including pesticides such as DDT, which will later be found to be environmentally harmful, and will be banned in some countries.

1945. The first atomic explosions begin, and over the next couple of decades they will release nuclear fallout, including radioactive iodine and strontium 90, over huge regions of the planet. The fallout will turn up in milk thousands of kilometres from nuclear test sites.

1948. The International Union for the Protection of Nature, later renamed the International Union for Conservation of Nature and Natural Resources (IUCN) and the World Conservation Union, is founded in France. It calls for the planet's natural resources to be used in a wise and equitable manner.

1949. The United Nations Scientific Conference on the Conservation and Utilization of Resources, held in Lake Success, New York, is the first major United Nations meeting on natural resource problems.

Atmospheric nuclear testing and nuclear accidents continue to release radiation. Increasing air pollution from coal burning leads to more killer smogs in Europe and the United States. Industrial discharges and human wastes are becoming a serious problem in the Great Lakes.

1950. World population is 2.52 billion.

The International Joint Commission reports major concern over the amount of pollution in the Niagara River. The report recognizes that sewage treatment has not kept up with population growth.

Smog has become a serious problem in Los Angeles.

1952. The infamous London smog kills 4,000. A year later, a New York smog kills about 200.

1956. Widespread mercury poisoning discovered in the Japanese fishing village of Minamata. Industrial discharges get into the food chain through fish, a staple food for Minamata Bay dwellers. The poisoning causes more than 100 deaths and several hundred cases of illness, including brain damage and birth defects. This experience will later raise concerns when mercury is found in some fish in the Great Lakes and nearby lakes and rivers.

1958. Antarctica is protected as a wildlife and scientific preserve by a treaty signed by representatives of 12 nations, the first continent to be protected.

The first United Nations Conference on the Law of the Sea approves draft environmental protection language.

Concerns about nuclear fallout and chemical pollution trigger the beginning of the modern environmental movement, with protests against nuclear weapons and chemical pollution. Acid rain is identified as a serious problem in Scandinavia while Lake Erie is said to be "dying" from excessive phosphorus pollution. Chemicals such as DDT and PCBs are found in wildlife. A series of major oil spills arouse public opinion.

1960. World population is 3 billion.

1961. Creation of the World Wildlife Fund to protect animals and plants threatened with extinction.

1962. U.S. biologist and ecologist Rachel Carson publishes *Silent Spring*, which warns of the harmful effects of pesticides, such as DDT. The book causes a huge public debate about chemical risks in general, and is often considered the start of the modern environmental era.



Rachel Carson

1963. Britain, United States and the Soviet Union sign the limited atmospheric nuclear test ban treaty.

1965. The Vietnam War heats up with major landings by U.S. troops. To protect its soldiers, the United States will spray massive amounts of the defoliant known as Agent Orange, which turns out to be contaminated with dioxin, a highly dangerous chemical associated with cancer and birth defects in animals. This leads to claims of health effects both by U.S. veterans and by Vietnamese.

Mink breeders in Michigan note reproductive failures in animals fed Great Lakes fish, leading to concerns that chemicals dumped in the environment enter the food chain and return to harm humans.

The International Joint Commission advises Canada and the United States to reduce phosphorus discharges to the Great Lakes to control eutrophication. This process of over-fertilization was causing massive blooms of algae that died and their decay sucked oxygen out of the water, creating dead zones on the bottom of the shallow Lake Erie. This leads to the phrase that Lake Erie is dying.

1966. The first photos of Earth from space bring the term “Spaceship Earth” and let people see the planet as a small oasis of life in a hostile solar environment.

1967. The oil tanker Torrey Canyon runs aground off the Sicily Isles, near the southwest coast of the UK, spilling 117,000 tones of oil into the sea. This massive damage leads to ship owners being held liable for such damage.

1968. Paul Ehrlich’s book, *The Population Bomb*, warning of ecological threats from a rapidly expanding human population, triggers an intense and ongoing debate about population, consumption and the relative impacts on the environment of rich and poor nations.

The Intergovernmental Conference of Experts on the Scientific Basis for Rational Use and Conservation of the Resources of the Biosphere is held by UNESCO. It helps put environmental issues on the global agenda and pave the way for a series of global meetings on the environment and what becomes known as sustainable development

1969. Pollution Probe is created by a small group of University of Toronto students assisted by some faculty. It draws widespread support by acting as a focal point for growing public concern about the environment.

A fire on the surface of the Cuyahoga River in downtown Cleveland dramatically shows the seriousness of pollution.

A blowout on an oil rig off Santa Barbara, California triggers a sharp rise in environmental consciousness in the trend-setting state.

Canada's Commission on International Development, chaired by former Prime Minister Lester B. Pearson, releases its report, *Partners in Development*, emphasized global interdependence, and promoting the practical virtues of multilateral cooperation. This leads to the founding in 1970 of the International Development Research Centre, an organization that stresses building the capacity of developing countries to identify and develop their own potential. Many IDRC projects focus on what would later be considered sustainable development.

A decade of more discoveries of serious pollution problems.

Canada and the United States sign two Great Lakes water quality agreements, and begin negotiations on acid rain controls.

Scientists raise concerns about the risks of chemicals to the ozone layer.

Chemicals leaking from Love Canal and other toxic waste dumps along the Niagara River trigger fears for drinking water safety.

The Stockholm Conference on the Human Environment marks the beginning of global discussions then negotiations on environmental protection and sustainable development. This decade brings the formation of a large number of environmental departments from the United Nations Environment Programme to national, state and provincial departments. It also sees the creation of many environmental non-government organizations, such as Greenpeace, the Canadian Institute for Environmental Law and Policy, Canadian Environmental Law Association, Sierra Legal Defense Fund, the International Institute for Environment and Development and Worldwatch Institute.

1970. World population is 3.7 billion.

Dangerous levels of mercury found in fish in parts of Ontario lead to some fish consumption bans and awaken Canadians to the dangers of pollution in the food chain.

The first Earth Day is held in the United States on April 22, attracting 20 million people and creating one of the largest organized demonstrations in U.S. history.

The tanker Arrow runs aground in Chedabucto Bay, N.S., spilling heavy bunker C oil that will foul over more than 100 kilometres of shoreline.

The United States creates the Environmental Protection Agency.

1971. Canada creates a Department of the Environment, combining a series of other federal organizations with environmental responsibilities.

The Founex Report on Development and Environment sets the scene for the Stockholm conference the next year and for the Brundtland commission more than a decade later by linking environment and economic development issues. However, it will take at least 15 years for the environment and development linkage to gain popular currency.

Fish consumption warnings are issued for Lake Michigan trout because of PCBs in the fish. This follows studies showing that ranch mink raised on such fish suffer reproductive problems.

Greenpeace is created by a small group of protestors sailing from Vancouver to protest against underground nuclear tests at Amchitka Island, Alaska.

The Organisation for Economic Co-operation and Development endorses the polluter pays principle, saying those causing pollution should pay the costs.

The International Institute for Environmental Affairs, later known as the International Institute for Environment and Development, is created to promote sustainable patterns of world development through collaborative research, policy studies, networking and knowledge dissemination.



Members of the Greenpeace expedition to Amchitka Island

The International Chamber of Commerce declares that “protecting the environment will be one of the greatest challenges for all countries in the closing decades of the twentieth century.”

Disasters such as the nuclear accident at Chernobyl, the chemical accident at Bhopal, in combination with more attention on long-term problems such as acid rain, the ozone layer, climate change, desertification, destruction of rain forests, garbage and toxic waste create a major focus on environment.

In Canada, the decade starts with acid rain identified as the culprit in the death of lakes and rivers in the eastern part of the country.

Around the Great Lakes, there is fear of toxic chemicals in the drinking water. On the west coast, it is protection of remaining temperate rain forests. On the east coast, the decade closes with the collapse of the cod fishery. During the decade, there are major droughts in the Sahelian region of Africa and in western North America. The latter raises concerns about water diversions from Canada to the United States. However, the decade also brings a sea change in attitude. In 1986, the Canadian Chemical Producers' Association launches the Responsible Care program. Governments pass a series of environmental protection regulations to deal with issues such as acid rain and protection of the ozone layer. Curbside recycling is introduced.

The Brundtland Commission publishes *Our Common Future*, and popularizes the term “sustainable development.” Canada has its own mini-Brundtland in the form of the National Task Force on Environment and Economy, setting a model for collaboration among government, industry and the non-government sector.

1980. World population is 4.45 billion.

The *World Conservation Strategy*, prepared by the International Union for the Conservation of Nature, United Nations Environment Program and the World Wildlife Fund, **promotes the idea of environmental protection in the self-interest of the human species. It warns that the destruction of natural resources eliminates future sources of food, medicines and industrial products. It encourages sustainable forms of development and the conservation of essential life processes for the benefit of humanity as well as other species.** It is another major step in launching a public debate about sustainable development.

The North-South Commission headed by former West German Chancellor Willy Brandt releases a report titled *North-South: A Programme for Survival* calling for wealthy countries to increase their development assistance to 0.7 per cent of GDP by 1985, a target that will not be reached by most rich nations.

The *Global 2000 Report to the President*, commissioned by U.S. President Jimmy Carter, projects what the world might be like if present trends continue, and calls for action to stop environmental degradation. Canada commissions a parallel report, *Global 2000: Implications for Canada*, which warns in 1981 that demands from growing world population may mean that "...Canada may face impossible demands to provide food, water and shelter."

Canada and the United States sign a memorandum of intent to curb acid rain and other air pollution problems, but it will take most of the decade to reach a formal agreement.

A federal government scientist announces that the highly toxic dioxin has been found in Lake Ontario herring gull eggs, raising fears that it is in the drinking water. Fortunately, this is not the case.

The United States introduces the Superfund law creating a fund to clean up abandoned toxic waste sites, including some on the border with Canada.

Canada, the United States, Sweden and Norway ban most aerosol uses of CFCs.

1981. Canadian residents protest against chemical waste dumping into the Niagara River

Formation of the Canadian Coalition on Acid Rain to lead a campaign to get controls on acid rain.

There are rising concerns that chemicals from leaking Niagara River chemical dumps and industrial discharges are a threat to drinking water drawn from the river and from Lake Ontario.

1982. Law of the Sea Convention includes provisions for preservation and protection of the marine environment.

The United Nations adopts the World Charter for Nature, prepared by the International Union for the Conservation of Nature and Natural Resources.

Development Alternatives is established in India to innovate and disseminate the means for creating sustainable livelihoods on a large scale. The goal is to mobilize widespread action to eradicate poverty and regenerate the environment.

1983. The United Nations, with the backing of Canada and a handful of other nations, votes to create a commission on the future of the environment.

A study by the U.S. Environmental Protection Agency and the National Academy of Sciences result in front page stories in the New York Times and Globe and Mail that launch the public debate about what was then known as the greenhouse effect and later called global warming and finally, climate change.

1984. The World Commission on Environment and Development is created, headed by **Dr. Gro Harlem Brundtland** of Norway. It includes two Canadians, Maurice Strong, who headed the 1972 Stockholm Conference and the United Nations Environment Programme, and Jim MacNeill, who is secretary-general to the new commission, as well as government, business and academic experts from around the world.



Gro Harlem Brundtland

The World Industry Council for the Environment is held on the initiative of the International Chamber of Commerce and the United Nations Environment Programme.

The International Conference on Environment and Economics concludes that the environment and economics should be reinforcing.

Seven eastern Canadian provinces agree with the federal government on a 50 per cent cut in the emissions of sulphur dioxide, which causes acid rain. This will require major cuts by nickel and copper smelters and by coal-burning power plants.

In Bhopal, India, an accident at a pesticide plant releases tonnes of methyl isocyanate, a lethal gas used in making insecticides. The toxic cloud kills more than 3,000 quickly, and thousands more die in following years, while tens of thousands more suffer health effects

1985. The hole in the Antarctic ozone layer is discovered by ground observations. It had existed for a decade, but earlier satellite data that showed the problem had been considered inaccurate and set aside.

The Vienna Convention for the Protection of the Ozone Layer is the first step in a long series of agreements to cut pollution that destroys the ozone layer.

A spill of PCBs from a transport truck in Northern Ontario becomes a flashpoint in a provincial election as people worry about the threat to health.

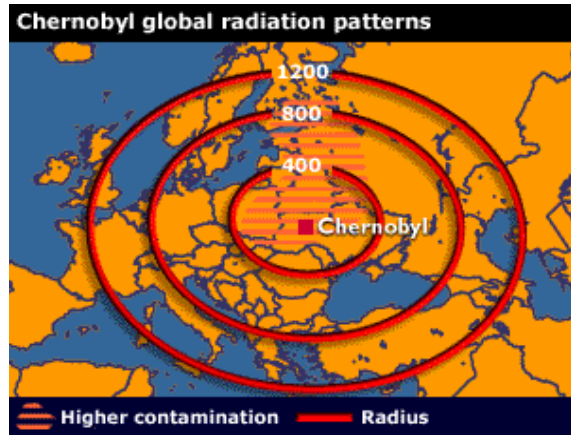
French secret agents sink the Greenpeace ship, Rainbow Warrior at dock in New Zealand, killing a photographer and triggering a worldwide outcry. Greenpeace had been using the ship to protest against French underground nuclear tests in the Pacific.

A "blob" of perchloroethylene (dry cleaning fluid) from a chemical spill is found on the bottom of the St. Clair River at Sarnia. This raises fears of possible widespread leaks of toxic chemicals in that region, known as Canada's chemical valley. Public concern helps push the chemical industry to even greater efforts at reducing spills and emissions.

The remaining uses of DDT in Canada are further limited, with a four-year phase out.

Canada releases a federal inquiry into water policy known as the Pearse Report. It finds that too much water is being wasted and polluted, and recommends more conservation and proper pricing of water.

1986. An explosion and fire in a nuclear reactor at Chernobyl in Ukraine ejects about seven tonnes of radioactive material into the atmosphere, causing the world's worst civilian nuclear accident. It kills thousands in the immediate region and in cleanup crews, and leaves many others with the effects of radiation poisoning. Radiation circles world in 11 days, and fallout contaminates food in parts of Europe. A large area around the nuclear plant is evacuated, but three other reactors in the complex are used for years more to generate electricity.



Canada releases its first national State of the Environment report.

The World Commission on Environment and Development visits Canada, sparking strong interest in the idea of shaping development to live within environmental capacity. The Canadian Council of Resource and Environment Ministers creates the National Task Force on Environment and Economy to develop a Canadian approach.

A global moratorium on commercial whaling is imposed as the population of the world's great whales declines.

The Canadian Chemical Producers' Association, reacting to growing concerns about the safety of chemicals, launches the Responsible Care program, in which the industry group sets rules to reduce its risks and impacts. The organization sets guiding principles to which companies must adhere as a condition of membership. This model is adopted by chemical industry groups in a number of countries.

Times Beach, Missouri is evacuated after dioxin levels 100 times the emergency level are found. The town is later cleaned up and turned into a park.

1987. The world population hits 5 billion, **doubling in less than 40 years.**

Conferences in Bellagio, Italy and Villach, Austria establish a scientific consensus on climate change.

The Mobro, a barge laden with Long Island garbage, travels nearly 10,000 kilometres unsuccessfully looking for a place to dump its trash and highlighting the growing resistance to new dumps.

The Brundtland Report, *Our Common Future*, by the World Commission on Environment and Development, popularizes the term "sustainable development." The report defined sustainable development this way: "Humanity has the ability to make development sustainable—to ensure that it meets the needs of the present without comprising the ability of future generations to meet their own needs." It says that development must be environmentally, economically and socially sustainable. The Brundtland Commission calls for "a new era of economic growth" in the poor nations, but adds that this "must be based on policies that sustain and expand the environmental resource base." **This report marks one of the most important turning points in modern environmental history, as the debate begins to shift from mainly identifying crises and demanding new laws to punish polluters (react and cure) to trying to design development itself to be less harmful to the environment (anticipate and prevent.)**

This brings industry into the environmental debate not just to defend its actions, but also to try to find long-term solutions. The Brundtland Commission chose the phrase “environment and development” to highlight the fact that much of the world lived in poverty and needed more development to allow people decent living standards. In the highly industrialized north, the debate is mainly about how to reduce impacts of current development.

Canada’s National Task Force on Environment and Economy, a group of 17 environment ministers, business leaders and environment experts, reports on what Canada needs to do to move toward sustainable development. Despite wide differences in background, they come to a common conclusion that society must evolve rapidly away from a pathway of environmental degradation. The task force makes 40 recommendations ranging from research into how to run an economy without running down the environment to educating young people on how to protect the environment. One of its key recommendations is for collaborative leadership from all sectors of society. This group paves the way for the round table movement not only in Canada, but also in other countries. This encourages the multistakeholder process that brings various sectors together in a collaborative manner to discuss problems and solutions.

Twenty-four nations sign the Montreal Protocol to control substances that deplete the ozone layer, the first action step in a global atmospheric protection agreement. It is also important because negotiations involved industry. The agreement begins the phase-out of CFCs and related chemicals.

Canada and the United States sign a Protocol to the Great Lakes Water Quality Agreement, broadening its scope.

1988. Canada holds the World Conference on the Changing Atmosphere (the Toronto Atmosphere Conference) publicizing the issue of climate change and bringing calls for major cuts in the emissions of greenhouse gases, such as carbon dioxide. The meeting recommends a 20 per cent initial cut by 2005. This conference is held at the start of a heat wave, drought and smog crisis that affects several parts of the world. The Mississippi River drops to its lowest recorded level, leading to calls for water diversions from the Great Lakes.

Later that year, the United Nations creates the **Intergovernmental Panel on Climate Change**, a group of world scientific experts who assess the state of knowledge on climate change.

A fire in a warehouse containing PCBs at St. Basile-le-Grand, near Montreal, forces the evacuation of over 3,300 people for three weeks and provokes heated discussions over how to safely dispose of these hazardous chemicals. There are calls for incinerators to burn the PCBs, but no one wants an incinerator near them. Resistance to incinerators and garbage dumps is described as the NIMBY (not in my backyard) syndrome.

Canada begins the formation of round tables on environment and economy, and promises an international centre to promote sustainable development.

The foreign minister of the then Soviet Union, which has been in a Cold War with western nations for decades, makes a historic declaration in the United Nations that arms spending should be cut to provide money for environmental protection.

The president of the World Bank says the world has “...a collective responsibility to break this vicious cycle of poverty and environmental degradation.”

Canada’s finance minister says that, “Environmentally sound development is no contradiction in terms. Indeed in the long run it may be the only sure foundation of better lives for everybody in the world.”

Scientists say that toxic chemical fallout is accumulating in the Arctic food chain because of weather patterns that carry it from far away. The levels are high enough to pose a health risk to people eating wild foods.

Francisco (Chico) Mendes, Brazilian rubber tapper and activist is killed by ranchers over his efforts to save the Amazon rain forest for sustainable long-term use rather than clear-cutting and burning them.



Chico Mendes

Canada adopts a new Environmental Protection Act.

1989. The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes seeks to control shipments of toxic wastes to poor nations that are not equipped to deal with them. The agreement was partly a response to complaints about shipments of hazardous wastes from rich countries to poor nations that were unable to safely handle them.

The decade begins with the environment very high on the public agenda, and with governments, corporations and many non-government organizations promoting the concept of sustainable development. **Early in the decade, the United Nations Conference on Environment and Development, also known as the Earth Summit, is held in Rio de Janeiro.** It convenes the largest-ever meeting of world leaders, and endorses a series of far-reaching statements and agreements on sustainable development. However, the momentum is stalled by an economic recession and the challenge of implementing and paying for the changes needed. There are major cutbacks in environmental spending by governments seeking to reduce deficits. The marketplace is touted by some as the forum for solving environmental issues, but by the end of the decade this approach faces a growing international anti-globalization movement, and the environment is rising again on the public agenda. New environmental issues arise, such as the question of risks from genetically modified organisms. The business community starts to take a more active role in some environmental issues, looking for ways to maintain production but also to reduce environmental impacts by using such approaches as Factor Four. During the decade, Canada faces its worst ever fishery crisis off the east coast as well as strong anti-logging protests on the west coast. Weather extremes, including droughts, floods and a devastating ice storm raise questions about climate change. Governments finally agree on modest cuts to greenhouse gas emissions by industrial nations.

1990. World population is 5.3 billion.

The second World Climate Conference hears first Intergovernmental Panel on Climate Change assessment. Governments acknowledge that they should negotiate a convention to protect climate from dangerous interference by human activity.

A fire in a pile of 14 million tires near the town of Hagersville in Southern Ontario provokes a debate on how to safely dispose of wastes.

The federal government releases an ambitious Green Plan for the country, promising billions of dollars in spending. It includes smog controls, a safe drinking water act, the virtual elimination of toxic wastes, cleaning up the Great Lakes, a 50 per cent cut in garbage, a packaging act as well as the completion of a national parks system by 2000.

The Canadian and Manitoba governments establish the International Institute for Sustainable Development in Winnipeg as a global centre of expertise.

The first GLOBE conference (Global Opportunities for Business and the Environment), an international environment industry trade fair and conference, is held in Vancouver. It becomes a biennial event.

The Canadian government promises to stabilize the country's emissions of greenhouse gases at 1990 levels by the year 2000.

The ozone layer over Canada is reported to be thinning. With the London Amendment to the Montreal Protocol, nations strengthen the commitments to protect the ozone layer, phasing out CFCs sooner and putting controls on other ozone depleting substances.

The United States passes a new Clean Air Act that will bring about major reductions in pollutants that cause acid rain across northeastern North America.

Nigeria's Movement for the Survival of the Ogoni People is founded by author and government administrator Ken Saro-Wiwa in reaction to extensive pollution in Niger River delta caused by oil companies.

1991. Canada's fisheries minister closes the northern cod fishery off Newfoundland. The ministry also stops the sockeye salmon fishery in the Fraser River for the rest of the year because of fish shortages.

The Gulf War leads to the world's largest oil spill as Iraqis retreating from Kuwait set fire to hundreds of oil wells. Soot lands as far away as the Himalayas.



The Canada-United States Air Quality Accord resolves the transboundary dispute over acid rain after more than a decade of negotiations.

Canada issues stringent new regulations to control discharges from pulp and paper mills.

A giant oil spill follows the Kuwaiti well fires

The International Union for the Conservation of Nature along with the United Nations Environment Program and the World Wildlife Fund issue *Caring for the Earth: A Strategy for Sustainable Living* as a sequel to their 1980 World Conservation Strategy.

1992. The binational International Joint Commission recommends that Canada and the United States sunset the use of chlorine and chlorine-containing compounds as industrial feedstocks.

The United Nations Conference on Environment and Development is held in Rio de Janeiro, Brazil. The conference, headed by Maurice Strong, includes the Earth Summit, the largest meeting of world leaders in history. The conference releases *Agenda 21*, a blueprint for making development socially, economically, and environmentally sustainable. The meeting also sees many governments sign the United Nations Framework Convention on Climate Change, which is to stabilize greenhouse



gases in the atmosphere at levels that will not dangerously upset the global climate system. They also sign the Convention On Biological Diversity, which requires countries to conserve the variety of living species, and ensure that the benefits from using biological diversity are equitably shared. The conference issues a statement on the sustainable use of forests and the Rio Declaration, which contains 27 principles that define the rights and responsibilities of nations as they pursue human development and well-being. The Earth Summit will mark the peak of environmental concern and government statements of action for many years. It is followed by a decline in interest caused by a severe recession and a lack of direction on how to implement promises for more sustainable development.

Hurricane Andrew levels parts of Florida and Louisiana, and Typhoon Itaki devastates Kauai Island in the Hawaiian chain, provoking concerns that climate change may be causing more severe weather.

ECO-ED, the World Congress for Education and Communication on Environment and Development, draws more than 2,000 to Toronto in the first major post-Rio conference.

The Copenhagen Amendment to the Montreal Protocol further strengthens controls on substances that deplete the ozone layer.

Canadian Elizabeth Dowdeswell named the third head of the United Nations Environment Programme.

Major new cuts in east coast fisheries lead to thousands more layoffs.

The World Scientists' Warning to Humanity is issued by some 1,700 of the world's leading scientists, including the majority of Nobel laureates in the sciences. It says human beings and the natural world are on a collision course.

In *Changing Course*, The Business Council for Sustainable Development uses the term **eco-efficiency to describe a process to produce goods and services while reducing the ecological impacts of production.**

In Canada, the Business Council on National Issues issues a paper, *Towards a Sustainable and Competitive Future*, saying, "The world's economy and the earth's ecology are one and indivisible. To ignore one is to jeopardize the other. This is the new reality of sustainable development." It says that producing more goods and services with fewer resources per unit of production is a source of competitive advantage.

The United Nations creates the Commission on Sustainable Development to follow up the work of the United Nations Conference on Environment and Development, and to report on implementation of the Earth Summit agreements.

1993. The worst flood in recorded history affects the Mississippi and Missouri Rivers.

British Columbia is hit by major protests against logging in old-growth forests. Protestors try to get purchasers to boycott products from such forests. The province will see both violent protests, and agreements on sustainable forestry involving loggers, environmental groups, citizens, native peoples and governments.

The federal government closes most of remaining Atlantic cod fishery and some other fisheries to conserve dwindling stocks. About 40,000 people are now out of work. Fishers struggle to find

other sources of income. Some turn to other fisheries, such as crab, while others move away from the region, seeking work in other parts of Canada.

1994. Canada, the United States and Mexico sign the North American Free Trade Agreement, lowering tariff barriers. They also sign an environmental side agreement, the North American Agreement for Environmental Cooperation. This leads to the creation of the Commission for Environmental Cooperation, based in Montreal. The environmental agreement and commission provide mechanisms for collaboration among the three nations on environmental and sustainable development issues, and provide a forum for citizens from the countries to hold governments accountable for the enforcement of environmental laws.

The London Convention against dumping radioactive material at sea comes into force.

The World Conservation Union issues a Red List of endangered and threatened species.

The United Nations Conference on Population and Development in Cairo sees huge disputes over attempts to deal with population issues but also agreement on a plan to stabilize and reduce population growth, particularly by emphasizing women's education and access to reproductive health care.

The Global Environment Facility, an organization created to finance actions to deal with biodiversity loss, climate change, degradation of international waters, and ozone depletion, is restructured after the Earth Summit in Rio to have a broader mandate.

1995. The Canadian Environmental Assessment Act comes into force with goal of promoting environmental assessment as a planning tool to protect and sustain a healthy environment. It requires environmental assessments of projects involving the federal government.

The World Business Council for Sustainable Development is created through a merger between the Business Council for Sustainable Development in Geneva and the World Industry Council for the Environment in Paris. Those organizations led the business response to the Earth Summit.

Canada and Spain wage the 'turbot war' in the Atlantic over who has the right to migrating fish stocks that move between Canada's waters and international waters. Canada seizes the Spanish trawler, the Estai at gunpoint during the dispute.

Canada creates the office of the Commissioner of the Environment and Sustainable Development under the Office of the Auditor General, with a mandate to produce an annual "green" report on the federal government. At the same time, federal departments and certain agencies are required to prepare sustainable development strategies and action plans.

Major budget cuts as part of deficit fighting reduce federal and provincial environment departments.

The World Trade Organization is created as the successor to the General Agreement on Tariffs and Trade (GATT), which was established in the wake of the Second World War to encourage freer trade.

A meeting of nations, called the Conference of Parties, is held in Berlin on the Climate Convention, but fails to reach agreement on how to control greenhouse gases. Countries agree to Joint Implementation by which developed countries would get credit for sponsoring emission reducing measures in developing countries.

Ken Saro-Wiwa and eight other Ogoni are hanged by the Nigerian government over their protests against environmental and human health impacts of oil extraction.

The Intergovernmental Panel on Climate Change issues a report stating, "the balance of evidence suggests a discernible human influence on global climate." It warns of social, economic, and environmental consequences unless there is a large reduction in greenhouse gas emissions.

The World Summit for Social Development in Copenhagen deals with poverty while the World Conference on Women in Beijing deals with the status of women.

1996. A ban on the production of CFCs in industrialized countries for use in those countries comes into force, but developing nations have a longer time to phase out.

In the Saguenay region of Quebec, torrential floods kill 10 people and drive thousands from their homes. Parts of Alberta, Manitoba, and Ontario are struck by floods, hail, and tornadoes, which cause widespread damage. In China, the worst floods in decades kill more than 1,500 and affected 20 million.

Concerns about endocrine disrupting chemicals are raised by the book, *Our Stolen Future* written by a team headed by scientist Theo Colborn. It warns of reproductive threats from massive amounts of chemicals, some of which mimic hormones that are released into the environment.

The International Organization for Standardization introduces the ISO 14000 standard for environmental management systems.

1997. A relatively modest progress meeting evaluates changes since the Earth Summit, and reports little progress on Agenda 21, the landmark report from Rio.

Canada and the United States dispute the shrinking salmon stocks on the west coast.

The Plastimet recycling plant fire in Hamilton burns 200 tonnes of PVC plastic over four days. Huge clouds of black smoke containing various chemicals, including dioxins roll over the region, provoking health concerns among residents and firefighters. It raises questions about the safe handling of recycled materials.

Huge forest fires on the Indonesian and Malaysian islands of Borneo and Sumatra blanket the region with choking smoke. They are caused by drought conditions and illegal burning to clear land for crops.

A study shows that despite cuts in acid gases, the eastern Canadian environment is still suffering damage, and pollution levels may need to be lowered further.

Countries negotiating greenhouse gas controls sign Kyoto Protocol, committing industrialized nations to cut their emissions by 5.2 per cent from 1990 levels by the period 2008-2012. Canada is to cut by 6 per cent. However, emissions continue to rise. The protocol is a far cry from the 20 per cent cut by 2005 that scientists suggested would be a good start to controlling climate change caused by humans.



Climate change negotiations in Kyoto

1998. The great ice storm of early January paralyzes a huge area from eastern Ontario through southern Quebec to the Maritimes and into the northeastern states. Up to three million people are left without power, some for over a month as hundreds of utility poles and even giant towers are pulled down by ice. This brings the largest peacetime mobilization of the military. This storm creates Canada's greatest insurance loss.

By spring and summer, dry conditions cause huge fires from Southeast Asia to the Amazon to Mexico and Florida to western Canada and Greece. By late summer, there is severe flooding in China. The fall brings severe hurricanes in the Caribbean. All this provokes more debate about climate change.

The hole in the ozone layer over Antarctica grows to more than 25 million square kilometres, more than twice the size of Canada.

1999. The federal government increases spending for the environment department for the first time in five years.

Atlantic salmon are reported spawning in the Credit River, marking a return to Lake Ontario for first time in more than a century.

Heavy winter rains cause floods in Central and South America, killing an estimated 20,000-50,000 making it one of the worst natural disasters in Latin America this century. Violent storms lash Western Europe uprooting millions of trees, some more than two centuries old.

Late in the year, the growing anti-globalization movement clashes with the World Trade Organization in the "Battle of Seattle." More than 30,000 demonstrators cause mass disruption that stops the trade talks. They protest against what they see as the growing power of multinational corporations and growing inequity among rich and poor nations.

Paul Hawken, Amory and L. Hunter Lovins publish *Natural Capitalism: Creating the Next Industrial Revolution*, which suggests a transformation of commerce and societal institutions by redesigning industry on biological models with closed loops and zero waste and reinvesting in the natural capital that is the basis of future prosperity.



The Dow Jones Sustainability Indexes group is launched, giving more credibility to companies and funds with a sustainability perspective

At the start of the twentieth century, there was already a significant environmental movement centered around the protection of wildlands and wildlife, but no one likely thought that humans could change the global environment. By the close of the century, humans had looked at the planet from space and seen it as a small and vulnerable to change. Science told us that we were altering the very atmosphere that supported life on earth. The world population keeps rising, though the rate of growth has started to decline a bit. The world is shifting from rural to urban, with about half of all people living in built-up areas. In Canada, about 80 per cent are urban dwellers. Citizens, governments and many corporations are now starting to change expectations and performance to try to live more within the environmental envelope. However, the race to make the shift remains, as put by Maurice Strong, "a race between our sense of survival and our more indulgent drives." After the post Rio slump, the environment is now starting to move up the public agenda, and is back in the media. The anti-globalization movement continues strong protests in Europe and North America. Nations struggle to deal with the challenge of meeting the terms of the Kyoto Protocol.

2000. World population is just over 6 billion.

Heavy rainfalls carry E. coli bacteria from farm wastes into a poorly protected drinking water well for the small, rural town of Walkerton, Ontario. The resulting outbreak of illnesses kills seven and leaves more than 2,300 ill. This triggers even more concerns about drinking water safety in Canada and raises concerns about the ability of governments to protect water quality.

The Second World Water Forum in the Netherlands attracts 114 cabinet ministers and 5,700 participants. It releases a *World Water Vision* for the sustainable management and use of water resources on Earth to provide water security in the 21st century.

The Biosafety Protocol to the Convention on Biological Diversity seeks to protect biological diversity from the risks posed by genetically modified organisms resulting from modern biotechnology. It requires that countries give informed consent to the import of such organisms, and calls for use of the precautionary approach.

2001. Cryptosporidium in the drinking water of North Battleford, Saskatchewan leaves many ill, and raises more questions about drinking water protection.

The Kyoto Protocol is saved by a last minute agreement among about 180 countries at a meeting in Bonn, Germany. Canada wins concessions on use of forests and farmland as sinks for greenhouse gases. Money is promised to help developing nations control emissions. In Marrakech, there is agreement on how the protocol will be implemented

The September 11 terrorist attack on the United States provokes a huge debate about security, making this the focus of much public and government debate and spending. **Some commentators say it shows the need to ensure that sustainable development reduces a sense of global disparity that can feed terrorist ideas.**

The Convention on Persistent Organic Pollutants sets goals to eliminate a dozen of the world's most dangerous chemicals, including DDT, dioxins and PCBs.

The fourth ministerial conference of the World Trade Organization includes a mandate to ensure that environmental issues are addressed in world trade talks.

Despite controls on chemicals, the hole in Antarctic ozone layer is the largest recorded.

The Intergovernmental Panel on Climate Change states that the global temperature is rising, and there is “new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities.” Given current trends, the global temperature is project to rise by 1.4—5.8 degrees Celsius over the next century.

2002. A 3,200 square kilometer section of the Larsen B ice shelf on the eastern side of the Antarctic Peninsula shatters and separates from the continent, raising questions about global warming.