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E N V I R O N M E N T

Update

Volume 10, Number 2, Winter 1990-1991



Canada

Word from the Editor

What better time than the dark days of winter to think green? Canadians were prompted to do so by the release last December of *Canada's Green Plan for a healthy environment*. This issue of *Environment Update* examines the Green Plan, providing a broad overview of the initiative as well as listing some of its specific provisions.

The Green Plan is a comprehensive, long-term approach to the broad range of environmental issues facing Canada. Public consultation played a major role in shaping it and will continue to be an essential factor in its implementation. The Plan contains clear targets and schedules that can be used to measure its success. It provides \$3 billion in new funding for the environment. Finally, it offers all Canadians the opportunity to take part in making the Plan a reality.

The Plan's real value will be judged by the results it produces. However, many people in Canada and abroad have already hailed it as a significant step. The San Francisco *Examiner*, for example, has called it "the most complete, big-picture strategy ever proposed by any nation," adding that "other nations, including the United States, will follow [this lead]."

One of the most important areas targeted for action under the Green Plan is the discharge of persistent toxic substances into the environment. In the summer of 1988, the PCB fire at Saint-Basile-le-Grand in Quebec alerted Canadians to the dangers presented by these substances even after they have been retired from use. The December 1988 issue of *Environment Update* reported on tough new measures adopted by the federal and provincial governments to phase out and destroy PCBs.

As the Saint-Basile fire showed, storing dangerous chemicals does not solve the problem; the goal should instead be to eliminate them. Our current issue looks at incineration as a method of destroying PCBs. During the first seven months of 1990, a mobile incinerator in Goose Bay, Labrador, destroyed roughly 40 per cent of the federal inventory of PCBs. Its success will do much to allay Canadians' reluctance to accept mobile incinerators in their communities. The result should be easier, cheaper destruction of these toxic substances.

Another major goal of the Green Plan is to expand Canada's national parks system. A welcome step toward achieving that goal was taken in 1990 with the establishment of the Saguenay Marine Park in Quebec. This park will protect the most characteristic marine area of the St. Lawrence River estuary.

The Saguenay Fiord is a relic of the last Ice Age, harbouring an Arctic ecosystem in temperate latitudes. In its icy, saline waters thrive many kinds of whale, attracting tens of thousands of visitors each year from Canada and abroad. Now we can be confident that the riches of this hidden kingdom will be preserved for coming generations.

The real hope for the environment lies in changing attitudes, particularly of the people who will bear the responsibility for protecting the environment in future. For this reason, the Green Plan places great emphasis on education. Among other measures, it calls for the development of learning materials designed to promote understanding and motivate informed decision making.

Canadians are already working to develop such materials. One innovative example is a video called **The Harmony Puzzle** produced in Alberta with the participation of schoolchildren. In an entertaining way, it presents the link between economy and environment for children in grades 4 to 8. This prize-winning video has enjoyed wide popularity; a sequel has already been released.

Indispensable to the success of the Green Plan is not only understanding but action on the part of all Canadians. In October 1990, the Canadian Environmental Network held its annual national conference in Montreal. Representatives of many environmental and other groups from across the country gathered to find common ground in the fight to protect the environment. Their meeting was an excellent example of the kind of public participation called for in the Green Plan—participation that will help achieve our national goal of a healthy environment and a prosperous economy.

Think Recycling!



Pensez à recycler!

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Cover: Canada's Green Plan was released in December 1990.

Environment Update

Environment Canada was created by the Parliament of Canada in 1971. The department's Atmospheric Environment Service, Conservation and Protection Service, and Canadian Parks Service work to preserve and enhance the quality of Canada's environment.

Environment Update publishes a variety of articles on environmental and heritage issues relating to the mandate and work of Environment Canada.

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Readers may address comments and enquiries to: The Editor, *Environment Update*, Communications Directorate, Environment Canada, Hull, Quebec K1A 0H3.

Environment News

Canada Supports Global Warming Fund

Canada will provide \$1 million to a new international fund for detecting and monitoring changes in the earth's atmosphere.

The contribution to the Special Fund for Atmospheric and Climate Studies is the largest of any country to date. The Fund will be used to help improve global knowledge and understanding of climate, and to foster technical capabilities for climate change detection in developing countries. Among the initiatives supported by the fund will be the Climate Change Detection Project, which will gather and analyze information collected by an expanded global network of measuring stations.

The fund was established in 1989 by the World Meteorological Organization, the United Nations agency advising on global atmosphere and climate.

Montreal Headquarters for Protocol Multilateral Fund

Montreal has been chosen as the site for the United Nations Secretariat that will administer a Multilateral Fund set up under the Montreal Protocol to protect the ozone layer.

The fund will provide up to US\$240 million over the next three years to help developing countries fulfil international environmental obligations. Canada is contributing approximately \$10 million. The money will be used to identify and meet the scientific and technical needs of developing nations through technological transfer, training and information.

The fund was established in London last June at a meeting to strengthen the Montreal Protocol.

Progress in Protecting the Ozone Layer

Canada is setting the pace for world action on protecting the ozone layer.

In June 1990, Canada played a leading role at a meeting in London to strengthen the Montreal Protocol, and was the first nation to ratify the amendments emerging from that meeting.

These amendments include an accelerated phase-out timetable for the five types of CFCs already controlled under the Protocol. Instead of a 50-per-cent cut by the year 2000, the goal is 100-per-cent elimination by that date. Canada and 12 other nations will try to reach that goal still earlier, in 1997.

The London meeting also decided on a 70-per-cent reduction in the use of another ozone-depleting chemical, methyl chloroform, by the year 2000, and its full phase-out by the year 2005. Canada intends to achieve elimination by the end of the decade, five years ahead of schedule.

From July 1989 to June 1990, Canada cut its use of CFCs controlled under the Protocol by 19 per cent—well ahead of its commitment, as a signatory nation, to a 20-per-cent cut by 1993.

Over the next five years, Environment Canada intends to ban the use of CFCs in automobile air conditioners and foam as well as in solvents and hospital sterilants.

Finally, in co-operation with the provinces, the federal government is developing a National Action Plan to set up recovery and recycling programs for CFCs, and will make such programs mandatory in federal facilities.

St. Lawrence Action Plan Achieving Results

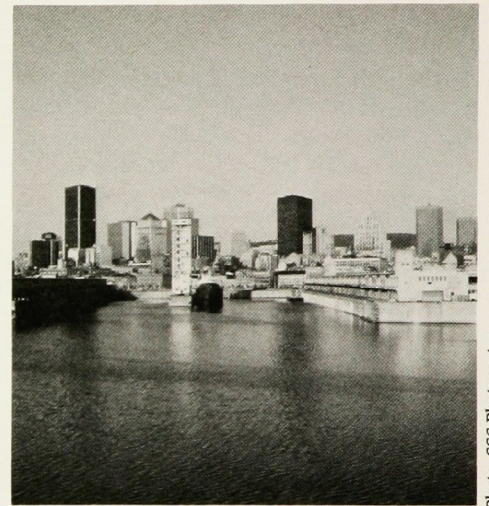


Photo: SSC Photocentre

The Port of Montreal will be cleaned up as part of the program to improve water quality in the St. Lawrence River.

The 50 biggest polluters of the St. Lawrence River now release significantly less liquid toxic waste into the waterway than they did in 1988.

Estimates indicate that it will be possible to achieve a 90-per-cent reduction in the discharge by 1993—one of the goals of the St. Lawrence Action Plan. Some 40 per cent of the plants targeted by the Action Plan have undertaken clean-up programs, while 20 per cent have already completed clean-up work.

The governments of Canada and Quebec have made notable progress in other areas of the five-year, \$173-million plan. For example, they agreed to create the unique Saguenay Marine Park last April, and have established joint priorities for the protection of habitats and endangered species in the area of the St. Lawrence. Since the Plan began, the federal government has also acquired a total of 500 hectares of land along the river for wildlife habitat.

New Institute of Environmental Science in Montreal

The Université du Québec à Montréal (UQAM) recently opened a new Institute of Environmental Science. The Institute will offer master's and doctoral programs, and will also house eight environmental research groups. The university, Hydro-Québec and the federal Natural Sciences and Engineering Research Council have provided funding for a Chair of Environmental Research. The Institute will also feature an environmental toxicology research laboratory and an applied geology research team.

UQAM's environmental research program attracts participants from many places in Canada and abroad. Three quarters of the students in the program are graduates of universities other than UQAM.

Canada and Germany to Co-operate on Environment

Canada and Germany have signed a Memorandum of Understanding to increase environmental co-operation between the two countries.

The agreement establishes a framework for new policy, program and research initiatives, and provides for the bilateral exchange of personnel and information. It will extend scientific and technical co-operation on such issues as climate change, environment and energy, sustainable development and environmental protection.

The Memorandum of Understanding covers a period of four years, after which it will be renewed automatically.

Environmental Centre for Central and Eastern Europe

The federal government will contribute \$1.5 million over the next three years to the Regional Environmental Centre for Central and Eastern Europe, which opened in Budapest, Hungary, last September.

The Centre is an independent, non-profit organization established to help individuals, non-government organizations, the private sector and government agencies develop solutions to environmental problems in central and eastern Europe. It will gather and disseminate environmental information and promote education and health programs. The Centre will also develop institutional capabilities in the areas of technology transfer and research.

Alberta Rivers under Investigation

Environment Canada and Alberta Environment are teaming up to study the impact of development on the Peace, Athabasca and Slave rivers in northern Alberta.

The project carries out a key recommendation of the Alberta-Pacific Environmental Impact Assessment Review Board. Expected to cost \$10 million, it will examine water quality, plant and animal life as well as human use of the rivers. It will also study fish distribution and habitat in the rivers and their tributaries.

Other participants in the program are Alberta Forestry, Lands and Wildlife; the Government of the Northwest Territories; and the federal departments of Fisheries and Oceans, and Indian and Northern Affairs. The study will be fully under way by April 1991 and will take approximately three years to complete.

Groundwater Study Launched in Atlantic Canada

Environment Canada, in co-operation with Agriculture Canada, is undertaking a five-year study to examine the effect of pesticides and fertilizers on groundwater in the Atlantic provinces.

The information thus gathered will help to establish new guidelines for the registration of pesticides in Canada. The study will also help identify non-contaminating practices, pesticides and fertilizers.

Urban Air Improving

The air in 59 Canadian cities is getting cleaner, according to a national study on urban air quality from 1978 to 1987. The study was released by Environment Canada in July 1990.

Data gathered at 120 monitoring sites across Canada show that levels of major pollutants decreased dramatically during the study period. Reductions in concentrations ranged from 27 per cent for nitrogen dioxide to 76 per cent for lead.

Much of this improvement is the result of federal and provincial actions, including tighter restrictions on industrial pollution and vehicle emissions. Of the pollutants measured, only ground-level ozone (smog) had a national average level above the acceptable range. The federal and provincial governments, environmental groups and industry are preparing an action plan to tackle this problem.



Heritage Railway Stations Protected



The railway station at Dauphin, Manitoba

Environment Canada is preserving a vital chapter in Canada's history under the *Heritage Railway Stations Protection Act*, proclaimed in August 1990.

On the recommendation of the Historic Sites and Monuments Board of Canada, 18 buildings have been designated heritage stations. Among them are Toronto's imposing Union Station, the large Chateau-style station at McAdam, New Brunswick, and the station built to serve the farming community of Dauphin, Manitoba.

Stations are chosen for their historical and architectural importance. Under the terms of the Act, no railway company may remove, destroy, alter or dispose of a heritage station under its control.

Leeches and Mussels Detect Pollution

Aquatic scientists at Environment Canada's National Water Research Institute in Burlington, Ontario, are using leeches and mussels to detect water pollution.

Chlorophenols are chemicals commonly found in pulp mill effluents. Ordinarily, scientists use water or sediment analysis to check for such chemicals in the area of a mill. Leeches, however, can serve as indicators of the presence of chlorophenols at concentrations that escape conventional methods of detection and at distances of up to 100 kilometres from a mill. This sensitivity could be put to work in monitoring the effectiveness of pulp and paper effluent regulations.

Freshwater mussels are being used to identify sources of water pollution and their impact zones. Mussels collected from the St. Lawrence River have indicated that Lake Ontario is a source of Mirex and DDT derivatives, while the Grass River in New York State is a major source of PCBs.

Lead Shot for Hunting Banned in Certain Regions

For the first time ever, the use of lead shot for hunting waterfowl has been banned in two regions of British Columbia and one region of Ontario.

Waterfowl that feed in heavily hunted areas may suffer lead poisoning if they ingest lead shotgun pellets along with food and grit.

Environment Canada's Canadian Wildlife Service is holding consultations to identify other zones where non-toxic shot should be used. The aim is to regulate the use of lead shot in all problem areas across Canada by 1992.

More EcoLogo Products on the Market

Several new products have been certified to carry the EcoLogo symbol of the federal Environmental Choice Program. They include re-refined motor oil, products made from recycled plastic, fine paper made from recycled paper, and reduced-pollution, water-based paint.

Forty-one companies now offer products certified to bear the EcoLogo, which identifies them as less harmful to the environment.

To date, the Environmental Choice Program has established certification criteria for 14 types of products: cloth diapers, fine paper made from recycled paper, miscellaneous products made from recycled paper, newsprint, re-refined motor oil, ethanol-blended gasoline, water-based paint, solvent-based paint, zinc-air batteries, heat-recovery ventilators, composting systems, re-usable shopping bags, products made from recycled plastic, and insulation made from recycled cellulose fibre.

Canada-B.C. Agreement to Clean Up Contaminated Sites

In November 1990, Canada and British Columbia signed a \$29.2-million agreement to clean up contaminated sites in the province.

The federal and B.C. governments will each contribute up to \$2.9 million for technology development and demonstration, and up to \$11.7 million to clean up "orphan" sites—high-risk contaminated sites where the responsible



Gros Morne National Park, Newfoundland

parties cannot be identified or cannot pay for clean-up.

The former location of Expo 86 in Vancouver will be the first site for which new remediation technologies will be developed and demonstrated. At the same time, clean-up will continue at several other sites in British Columbia.

This is the first agreement between Canada and a province to be signed under the five-year, \$250-million National Contaminated Sites Remediation Program, funded equally by the federal and provincial governments.

CANWARN Network Proves its Worth

Thanks to Environment Canada's CANWARN Weather Watcher Network in southwestern Ontario, a tornado warning was issued well before tornadoes touched down in Middlesex and Elgin counties one day late last August. Property was damaged in several villages, but there were few injuries and no deaths.

CANWARN consists of volunteer ham radio operators who have been trained to watch for signs of severe weather and report immediately to a network controller stationed at the local weather office. The network was first established in southwestern Ontario in 1988, and has been extended over the past two years. It is an effective partnership among volunteer members of the public, Environment Canada, and the local media that transmit weather warnings to area residents.

Gros Morne Park Inspires Orchestral Work

For its thousands of visitors, Gros Morne National Park in Newfoundland offers an unforgettable experience. This World Heritage Site features flat-topped mountains, fiords, waterfalls, narrow lakes and pearly beaches. Now these beauties are celebrated in an orchestral tone poem by Newfoundland composer Brian Sexton.

Gros Morne: An Earth Portrait was premiered last October by the Newfoundland Symphony Orchestra. The work is divided into three sections and draws on original folk tunes in its

opening and closing; these represent the human presence at Gros Morne.

The core of the work, however, is the second movement. According to Sexton, "It expresses with slow, intense music the tremendous size, weight, hardness, aloofness and static energy of the mountain range which is the essence of Gros Morne."

Born in 1953 in Corner Brook, Newfoundland, Brian Sexton began composing at the age of 14 and has completed more than 40 works for orchestra, chorus and instrumental ensembles. His music has been played throughout Canada as well as in the United States and Europe. His celebration of Gros Morne was commissioned by the Newfoundland Symphony with the support of the Canada Council.

Do Something Every Day!

The French-language radio station CBOF in Ottawa and Hull has been holding a contest on an environmental theme. Listeners to a Saturday-morning program that carries an environmental report were invited to invent a slogan saying what daily action we should take to improve our environment.

Some 114 entries were received. The prizes ranged from a gift certificate at a local environmental bookstore to a one-week stay at an outdoor camp in the Gatineau River Valley. In January, a team of four judges met to select the slogan of their choice. And the winner was:

Agir de temps en temps donne
bonne conscience.
La vraie conscience est d'agir
quotidiennement.

In English that's:

Doing something now and then
may salve your conscience;
but to be really conscientious,
do something every day. ■



Canada's Green Plan: An Investment in Our Future



On December 11, 1990, Environment Minister Robert R. de Cotret tabled in the House of Commons *Canada's Green Plan for a healthy environment*. This document's release is an important milestone in Canada's efforts to protect and enhance our environment.

The Green Plan sets a national agenda for our environmental actions over the coming years. It contains more than 100 new initiatives to tackle a wide range of issues, and will provide \$3 billion in new funding.

This is, first of all, a comprehensive plan. It offers new policies, programs and standards for Canada's land, water and air; our North; parks and wildlife; waste management; the handling of toxic chemicals; and many other areas of concern. The Green Plan deals with large-scale international issues such as climate change and acid rain. It also promotes small-scale, local actions such as community tree planting and consumer information programs.

Second, the Plan is based on public consultation. Between April and August 1990, 41 information sessions were held across Canada, as well as 17 consultation sessions. More than 10,000 Canadians participated in these events.

A wrap-up meeting in August put forward a list of over 500 recommendations condensed from the input provided at earlier sessions. More than 80 per cent of these recommendations have been integrated into the Plan.

Public input will continue to be an essential factor during the Plan's implementation. In each policy area, the Plan sets forth clear targets as well as schedules for achieving them. In many cases, *how* to achieve them will be determined by further discussion with all stakeholders: the provinces, territories and municipalities; industry and unions; environmental groups, schools and universities; and individual Canadians from coast to coast.

The targets and schedules will provide a yardstick for measuring the success of the Green Plan. The government is committed to living up to these, or to being held accountable for any changes to them. The Minister of the Environment will report annually on the Plan's progress.

Another outstanding feature of the Plan is that it charts a long-term strategy. The threats to Canada's environment have developed over decades or longer; a one- or two-year quick fix cannot solve them. That is why the Green Plan specifies initiatives to be undertaken within the coming six years. But at the end of that time, the Plan will continue. At the end of year one, the government will examine and discuss with all concerned Canadians what we should be doing in year seven. After year two, we will plan and discuss actions for year eight, and so on.

This "rolling" plan will help ensure a consistent, progressive approach to environmental planning.

Because spending on the environment is an investment in our health and economic future, the Green Plan contains a clear funding commitment. The \$3-billion budget for the Plan is in addition to the \$1.3 billion that the government already spends every year on environmental protection.

GREEN PLAN RESOURCES

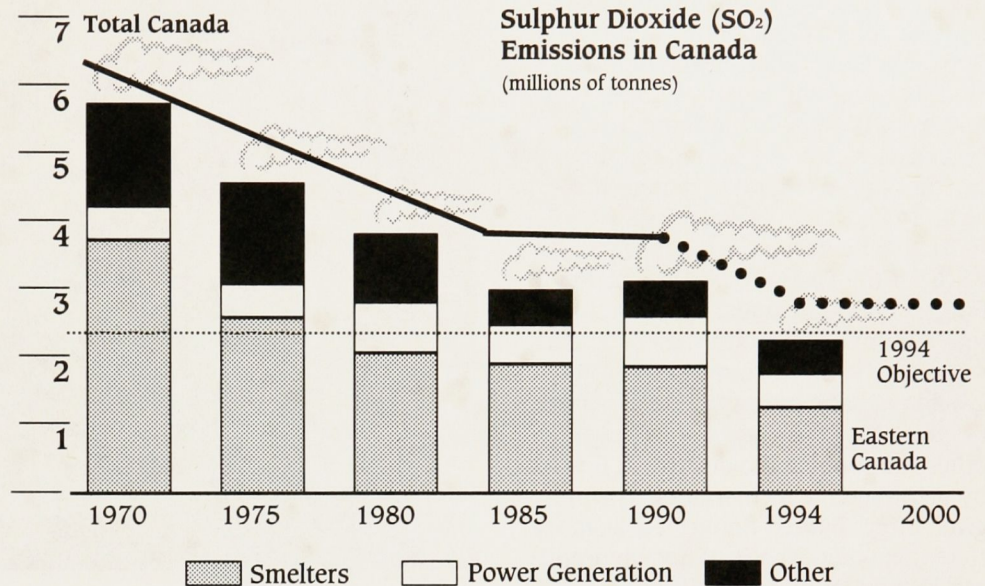
I	Life's Three Essentials: Clean Air, Water and Land	\$850 million
II	Sustaining Our Renewable Resources	\$350 million
III	Our Special Spaces and Species	\$175 million
IV	Canada's Unique Stewardship: The Arctic	\$100 million
V	Global Environmental Security	\$575 million
VI	Environmentally Responsible Decision Making	\$500 million
VII	Starting in our Own House	\$275 million
VIII	Emergency Preparedness	\$175 million
	Total	\$3 billion

From Canada's Green Plan

Finally, all Canadians have a part to play in making this plan a reality. Canada's Green Plan is not aimed simply at government or business—although it spells out clear roles and obligations for both. Rather, the Plan calls for the participation of communities, non-government organizations, universities, native peoples, youth groups and anyone else who wants to get involved.

For example, the Green Plan offers programs that will help consumers make environmentally safe purchases, use energy more efficiently, take part in environmental assessments and generally improve their environmental knowledge.

To all Canadians, the Green Plan opens exciting opportunities for sharing in the vital task of cleaning up our environment and preserving it for future generations. ■



From Canada's Green Plan

Goals and Targets of the Green Plan

"Canada's Green Plan sets a core objective for Canadians: to secure for current and future generations a safe and healthy environment and a sound and prosperous economy. In other words, our broad goal is nothing less than making sustainable development a practical reality in Canada," states Robert R. de Cotret.

More specifically, the Plan includes provisions to:

- ensure the clean air, water and land essential to sustaining human health and the environment;
- protect and enhance water quality and promote the wise and efficient use of water;
- eliminate the discharge of persistent toxic substances into the environment;
- reduce concentrations of ground-level ozone (smog) throughout Canada to below health-threatening levels;
- halve Canada's solid waste generation by the year 2000;
- shift the management of Canada's forests from sustained yield to sustainable development;

- maintain and enhance the natural resources used in agriculture or affected by it;
- ensure the long-term sustainability of our fisheries;
- set aside 12 per cent of Canada's area as protected space;
- maintain and enhance the health and diversity of our wild animals and plants;
- commemorate and protect important elements of Canada's historical heritage;
- preserve and enhance our Arctic ecosystems;
- stabilize national emissions of carbon dioxide and other greenhouse gases at 1990 levels by the year 2000;
- phase out the use of chlorofluorocarbons (CFCs) by 1997, and of other major ozone-depleting substances by the year 2000;
- cap acid-rain-causing emissions in eastern Canada beyond 1994, and throughout the country by the year 2000;
- accelerate international co-operation on environmental issues;

- strengthen existing environmental partnerships within Canada and build new ones;
- provide timely, accurate and accessible environmental information to Canadians;
- equip Canadians with the knowledge, skills and values necessary for environmental action;
- strengthen the nation's environmental science and technology;
- balance strong and effective environmental laws with market-based approaches to environmental protection;
- ensure that all federal government operations meet or exceed national targets and schedules;
- respond quickly and effectively to pollution emergencies caused by human actions, as well as to naturally occurring environmental emergencies.

These provisions touch virtually every aspect of our environment and our lives. Implementing them is therefore a task in which all Canadians can and should join.



The Federal PCB Destruction Program: A Lesson in Social Engineering

In January 1990, a mobile incinerator began destroying PCB-contaminated material at the Canadian Forces Base in Goose Bay, Labrador. Seven months later, the unit had destroyed 3,500 tonnes of PCB (polychlorinated biphenyl) waste—including roughly 40 per cent of the federal inventory by weight.

That achievement is a major step forward for the Federal PCB Destruction Program because it marks the first time that a mobile incinerator has been used to destroy PCBs in Canada. Environment Canada is hoping that the success of the Goose Bay operation will encourage other communities to destroy PCB waste by using mobile incinerators. The program offers limited financial assistance to regions requiring it. Where appropriate, federal lands can serve as temporary incineration sites.

We will have to find a Canadian solution to the problem.

"People see it as a means of removing a problem—we go into a community for five or six months, and the problem disappears," says Steve Hart, Director of the Waste Management Branch at Environment Canada's Conservation and Protection Service (C&P). "And you don't need to transport the waste long distances, so there's less chance for accidents."

Public misconceptions about available technology have proved a major roadblock to establishing permanent hazardous waste treatment facilities in Canada. According to a 1989 Environmental Monitor survey, a majority of Canadians do not believe that existing



Stack emissions were regularly checked to make sure that incineration was effective.

incineration technology can destroy PCBs safely. Of those questioned, most were in favour of destroying PCBs using the best available technology, but roughly half expressed reluctance or opposition to having an incinerator located in their community.

As a result, Canada has only one permanent PCB incineration facility—the Special Waste Treatment Centre at Swan Hills, Alberta—and this does not accept out-of-province waste. Ontario has spent ten years searching for a publicly acceptable integrated hazardous waste treatment site, so far without success. A provincially sponsored mobile incinerator, however, has now been sited at Smithville, Ontario, to destroy that municipality's PCB wastes.

Allaying Canadians' fears means working more closely with citizens' groups, municipalities, regions and provinces, and investing time and money in public education. For example, beginning in 1987, the Department of National Defence carried out public consultations on the Goose Bay project. Site studies were conducted and the local citizens' committee was flown to Alaska to examine a PCB incineration system.

"The citizens' group in Goose Bay has become quite well educated on the subject of PCB incineration," says John Hilborn, research manager of C&P's PCB Technology Division. "If you give people the facts, they will make educated decisions. You appreciate the value of being open and honest in a project like this."

Last July, the federal government banned overseas export of PCB wastes. That step made it clear that we will have to find a Canadian solution to the problem. Hart stresses that the public must accept this responsibility.

At the same time, he says, "No municipality will be forced to have a PCB destruction facility—you have to let things move at their own pace. The population must, at all times, be in control of its own destiny. People must have the right to shut down a project if necessary."

PCBs were introduced commercially in Canada in 1929. Although never manufactured in this country, they were imported and widely used here for nearly half a century—as dielectric fluids in

transformers and capacitors, heat transfer fluids, additives in carbon paper and printing ink, and extenders and plasticizers in sealants, floor coverings and even lipstick.

Over the years, inadequate disposal practices and accidents gradually allowed these chemicals to enter and be dispersed into the environment. PCBs do not decompose easily, and become progressively more concentrated in animal species that are higher on the food chain. The result is that all Canadians have at least some accumulation of PCBs in their body fat—mainly from food but also from exposure to air and water. Some studies have indicated that prolonged exposure to high levels of PCBs impairs the functioning of the immune system, weakens muscles and reduces fetal size. However, workers who regularly handled PCBs showed only average rates of cancer or other PCB-related illnesses.

In 1977, manufacture, import and most non-electrical uses of PCBs were banned in North America. Since 1985, the Canadian Council of Ministers of the Environment (CCME) has directed Canada's efforts to manage PCB-contaminated waste.

In September 1988, a fire at a PCB storage warehouse in Saint-Basile-le-Grand, Quebec, ignited widespread public concern over PCBs. Within weeks, the federal government had announced its PCB Destruction Program, and allocated \$6 million to lease a mobile incinerator for Goose Bay and \$15 million for a second incinerator to destroy other PCB waste in Canada. The government also pledged to decontaminate all low-level PCB-contaminated mineral oil in the federal inventory and to develop mobile PCB treatment and destruction regulations under the *Canadian Environmental Protection Act* (CEPA).



Environment Canada's Hugh Dibbs (Chief, PCB Technology Division), Steve Hart, and Stephanie Hunt

In the meantime, an interim order was issued under CEPA, creating stringent and legally enforceable requirements for PCB waste storage. Environment Canada began the task of creating a computerized national inventory of PCBs in use or stored as waste in Canada. The inventory showed relatively small quantities of PCBs in storage at roughly 3,000 sites across the country.

In October 1989, Environment Canada reoriented its Federal PCB Destruction Program. The emphasis shifted from storage to destruction, and the federal offer of financial assistance for use of mobile incinerators was expanded to include any regions in Canada with sufficient volumes of waste. The federal and provincial governments also announced that they would phase out the use of PCBs in sensitive locations such as schools and hospitals by November 1991.

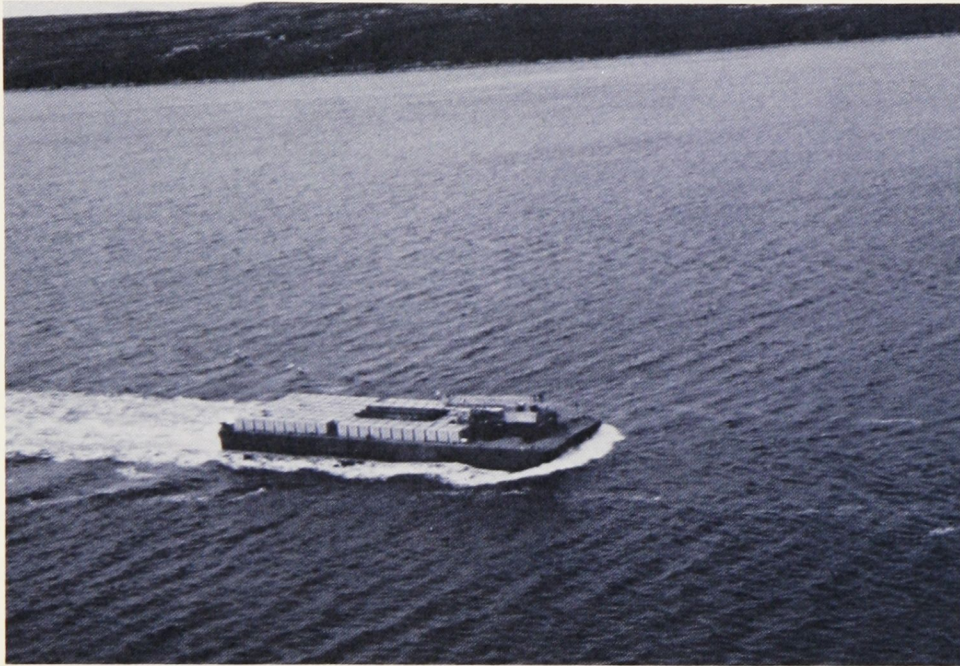
Two effective PCB treatment and destruction technologies have been developed since the 1960s: chemical treatment for low-level PCB-contaminated waste such as mineral oil, and thermal destruction, or incineration, for high-level PCB-contaminated waste such as askarel. The first generally permits the mineral oil to be re-used, and

has been applied to decontaminate 112,000 litres of Canada's federal inventory of low-level PCB-contaminated mineral oil as of June 1990. The second, incineration, destroys both liquid and solid high-level PCB-contaminated waste, but public resistance in Canada has limited its applications.

"I believe the general public is increasingly in favour of incineration as a solution to the PCB problem," says Stephanie Hunt, Chief of the Waste Management Branch's Program Management Division. "However, most people do not want this to occur where they live."

In fact, the process is safe and is capable of meeting strict regulations under the *Canadian Environmental Protection Act* governing the treatment and destruction of PCBs. Mobile incineration systems must show a minimum PCB destruction and removal efficiency of 99.9999 per cent in order to qualify for use in Canada. Newfoundland and Ontario have similar regulations in place for mobile incineration systems.





Barge transporting contaminated wastes to Goose Bay

The incinerator used at Goose Bay was operated by OHM Corporation, an American company that has offered on-site incineration services since 1986. The incinerator uses infrared energy to vaporize PCBs in contaminated soil at temperatures of up to 870°C. The vaporized contaminants are then routed to a secondary combustion chamber, which operates at temperatures of more than 1090°C to destroy any hazardous components. The exhaust gases enter a wet scrubber where any particulate matter and acid gas are removed. As for the remaining ash, it is cooled, tested to ensure it meets discharge criteria and ultimately can be used as landfill.

"We have the equipment, legislation and regulation that we need. The next steps are more social than technical engineering," says Hart. "We want to make people aware that it is not only possible but also safe to destroy PCBs."

The Goose Bay project has certainly heightened awareness of the Federal PCB Destruction Program. In May 1990, a coalition of citizens from London, Ontario, known as Operation LEAP (Londoners for the Safe Elimination of All PCBs) approached Environment Canada for more information about mobile incinerators. The department funded a visit by representatives from the group to the PCB incinerator in Goose Bay and to Swan Hills. Environment Canada is also providing support for LEAP's community involvement program as well as its technology selection and siting program.

"The London PCB inventory is mainly non-federal, so the cost of destroying it will be paid by the users," says Hart. "The actual cost depends on the type and quantity of PCBs and distance to the incinerator, but it's generally \$1,500 to \$4,000 per tonne."

In August 1990, federal Environment Minister Robert R. de Cotret signed a Memorandum of Understanding with the environment ministers of the four

Atlantic provinces to site a mobile PCB incineration unit in the Atlantic region. More than one million litres of low-level PCB waste have been decontaminated in the region since 1986. But still in storage and needing to be incinerated are approximately 350,000 litres of high-level PCB wastes. Environment Canada will help to cover the overhead and start-up costs of the project.

"We must understand and accept our responsibility as citizens of Canada and of the world," says Nova Scotia's Environment Minister, John Leefe. "We have to deal with this in our own way and clean up our own house."

On other fronts, Environment Canada is involved in preliminary negotiations with Hydro-Québec and Quebec's Ministry of the Environment on a co-operative program to site a mobile incinerator in that province. The CCME has established a task force to develop a hazardous waste management action plan for western and northern Canada.

The government's commitment to deal safely with PCBs was reaffirmed in *Canada's Green Plan*. The Plan pledges to destroy, by 1996, all PCBs under federal jurisdiction by establishing mobile destruction facilities in Atlantic Canada, Ontario and Quebec. Once such facilities are sited in those regions of Canada, non-government PCB wastes can be destroyed on a cost-recovery basis.

"The PCB issue in Canada has come to represent the overall hazardous waste problem in this country," says Stephanie Hunt. "This chemical has become a focus for all the fears that the public has about toxic substances. But it's just one of many problems we will have to deal with if we are to safeguard the health of Canadians and their environment." ■



The Harmony Puzzle: Educating Tomorrow's Decision-Makers

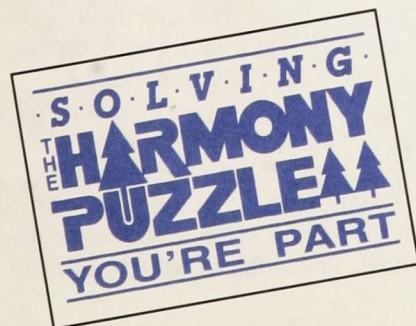
Learning to fit in with the environment. Taking a peek without disturbing the natural order of things. Being a part of the solution, not just the problem.

These are some of the concepts that Bruce Thompson, a senior adviser with Environment Canada's Environmental Protection Program in the Alberta District, had in mind when he came up with the idea for **The Harmony Puzzle**—a 15-minute video that introduces the link between economy and environment to elementary schoolchildren. Three years and several awards later, *The Harmony Puzzle Parts I and II* are among Alberta's leading educational videos and have drawn attention from environmental committees, interest groups and educators across North America.

"If you want to attain a high level of environmental quality as a country, you have to train the people who are making everyday decisions," says Thompson. "It's important that we make environmental concepts understandable to our schoolchildren because they're the decision-makers of tomorrow."

Thompson got the idea of producing the video after delivering a talk to his son's grade 4 class at Ronald Harvey Elementary School in St. Albert, Alberta, in 1987.

"There was tremendous interest from the kids—they were curious and enthusiastic about the environment," says Thompson. "The level of questions they asked was far beyond what I had expected. They were eager to hear more."



Teacher Wayne Flaska and student actors show the Harmony Puzzle video.

Thompson scoured the province in search of audio-visual material to open his talks, but found nothing available to audiences in grades 4 to 8 on the themes of environmental degradation and sustainable development. So, on the advice of Debbie Griff in the Western and Northern Region's Communications Branch, he took his idea to Access Network—a provincial Crown corporation that produces audio-visual learning materials for educational systems in Alberta.

"The concept of *The Harmony Puzzle* interested me because it didn't fit into anything the schools had been teaching to that point," says producer and co-writer Bruce Murphy, of Access. "It gave us the opportunity to lead the curriculum to some degree instead of responding to it."

Environment Canada agreed to provide \$15,000 in funding to the project, while Access contributed facilities and human resources. The cast of the film was chosen from two grade 5 classes at

Ronald Harvey School, where teacher Wayne Flaska had recently begun giving environment lessons to his students. After a brief discussion about the topics that would be tackled in the video, the nine excited co-stars were ready for their debut.

"We wanted kids in the video, and we wanted them to speak for themselves. The program design flowed out of that," says Murphy. "The key is that the kids are believable. That gives them a power the narrator doesn't have."

The video was shot at Hawrelak Park in Edmonton, with the cast munching happily on a picnic lunch between takes. Murphy chose the park over a traditional classroom setting because he felt it "would allow the kids to look more intimately at the topic they were discussing."

The students' comments are simple but straightforward: "When we pollute the air and water, we're not in harmony. But if we chop down a tree and then replace it, we're in harmony." Their observations are punctuated by sharply contrasting images of the world of nature and the world that people have made. The camera cuts from a tranquil forest scene to a bulldozer riding over a mountain of garbage. Reinforcing the visual cues are alternately peaceful and ominous musical themes. The narrator gives examples of the impact that economic priorities have on our resources and offers some solutions for consideration.

"We're not trying to load the kids with information, we're trying to raise sensitivity," says Thompson. "The film was deliberately kept at a general level to stimulate questions."

"When we pollute the air and water, we're not in harmony. But if we chop down a tree and then replace it, we're in harmony."

Another unique feature of the video is the 20-page guide that comes with it. The booklet not only explains the film's major concepts and suggests topics for research assignments and reports, it also comes with instructions and playing pieces for an environmental game—a classroom project that challenges students to create a resource-based economy and to plan sustainable development strategies for that resource.



Environment Canada's Bruce Thompson

The Harmony Puzzle was released in 1988 and previewed—not surprisingly—at a lunch-hour pizza party at Ronald Harvey.

"The kids had a ball, and they learned a lot about the environment and what goes into making a video," says Flaska, who had a cameo appearance in the film. "It was a super experience—one that will stay with them for life."

Once it was released, The Harmony Puzzle drew an impressive array of accolades. Requests for the video came from such diverse sources as *Owl Magazine*, the University of Guelph, the Manitoba Recycling Council and the International Joint Commission on the Great Lakes, which added the film to its list of audio-visual material. In 1989, it won an Award of Merit from the Children's Broadcast Institute.

"I originally looked at the video as an icebreaker that could be used to open a classroom discussion," says Thompson. "But the reaction we got was so positive we immediately started thinking about making a sequel."

The Harmony Puzzle Part II was developed in 1989 to address the final question posed in the first video: "What can we do to help?" It picked up literally where the last film left off—with the image of a stack of disposable plates being dumped into a trash can.

"The only major criticism we heard about the first video was the way it ended—so we decided to use that to our advantage," says Thompson. "That's why Part II opens with the garbage can exploding. We wanted to turn people's attention to the power of the choices they could make as consumers to protect the environment."

Although The Harmony Puzzle II was to have a different look from its predecessor, the videos have a common element: the opinions and ideas held by children of elementary school age. Students from Flaska's new grade 5 class spent three days taping the sequel, which involved a series of complex studio shots. The children were briefed on



the concept of environmentally selective consumerism and were taped while they wandered through supermarkets reading labels and speaking to store managers about excess packaging.

"Kids watching the video will learn that there are many environmental problems, but there are also ways of solving them," says Thompson. "You have to hit the right tone between scaring the daylighters out of them and saying 'Don't worry, we have everything under control.'"

The Harmony Puzzle II was a finalist for both the Children's Broadcast Institute Award of Merit and the Alberta Motion Picture Industry Award in 1990. First View, a consortium of educational boards that reviews videos and films for use in American schools, rated the series fifth overall.

"Kids watching the video will learn that there are many environmental problems, but there are also ways of solving them."

Access, which distributes both videos through its Media Resource Centre, says the Harmony series is one of its ten bestsellers. Both videos have been shown on Alberta's provincial network and incorporated into the province's outdoor education curriculum for grades 5 and 6. The first one has already been translated into French.

"I'm very pleased with the acceptance we've gotten," says Thompson. "But most of all, I'm pleased to see how easily the kids are absorbing the ideas."

Thompson has spent the past two years harvesting the fruit of his labours by showing the film to students himself.

The lively question-and-answer periods following each showing are proof positive that the videos get their messages across. His latest strategy is to promote the films at teachers' conventions.

"There has been a radical change in public awareness over the past few years, and the series has followed that evolution," says Thompson. "Four or five years ago people were asking what kind of weed-killer they should use on their dandelions. Three years ago they wanted to know what the greenhouse effect was. Two years ago people started asking what they could do to help."

Growing interest in community projects, such as tree planting days and "blue box" programs, has Thompson thinking about ideas for a third video in the series. The Harmony Puzzle III would focus on what he calls "community activation" by exploring the ways in which communities can act locally to help solve global environmental problems.

In school as well as the community, the Harmony Puzzle series has helped to heighten public awareness of environmental issues.

"Interest here has really mushroomed," says Flaska. "We have environment awards every week; some of the classes are recycling materials for art; a couple have composting projects; others go out in the schoolyard and pick up litter."

Church groups, senior citizens' committees and other interested parties have used the videos to inspire environmental debates. The series was recently shown to kick off the first meeting of an environmental action committee in rural Alberta that wants to paint its town "green." Thompson is optimistic about the changes going on around him.

"I think there's more respect for other systems, other species and other countries than there has ever been," he says. "But we haven't reached the peak yet." ■

Environmental Video for Quebec Schools

In Quebec as well, videos are being used to make young people more aware of the environment.

The Centrale de l'enseignement du Québec [Quebec Teachers' Corporation] has produced a 50-minute French-language video called **Et si Gaia venait jouer avec moi** [Imagine that Gaia Came to Play with Me]. This is the story of a 12-year-old boy suffering from leukemia who realizes that the earth, too, is afflicted by the cancer of pollution and waste. The boy resolves to fight both diseases.

The video, sponsored by the Fonds québécois de récupération (Quebec Waste Recovery Fund), is part of a teaching package that includes activities for students, music and a play. Some 300 copies have been distributed, mainly to schools. It is available from the Centrale's Audio-Visual Centre, in Quebec City, at (418) 627-8888. For more information, contact Patrice Vézina at the same number.



The New Saguenay Marine Park

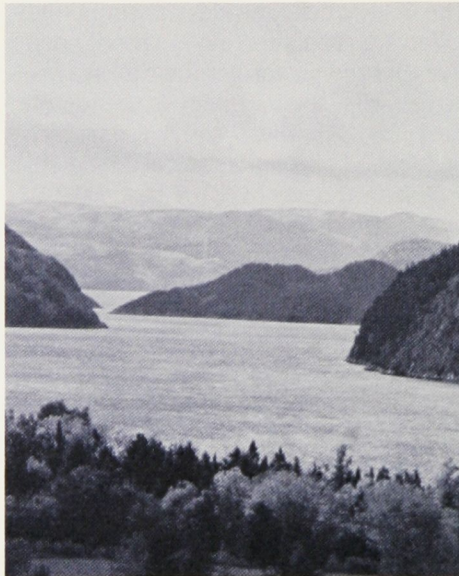
A breathtaking physical setting, a wealth of flora and fauna—these are some of the assets that grace each of Canada's national parks. The Saguenay Marine Park has all these and more.

Created under the St. Lawrence Action Plan, Saguenay ranks with such world-renowned marine parks as Australia's Great Barrier Reef and Ecuador's Galapagos Islands. It complements an existing land-based park—that established by Quebec on the banks of the Saguenay River. The new park will protect the most characteristic marine area of the St. Lawrence River estuary.

The Saguenay Marine Park is the outcome of an agreement signed in April 1990 between the federal and Quebec governments. In July, the Canadian Parks Service's Quebec Region opened a temporary administrative office for the park in Tadoussac. In December, public consultations were held on the area to be included in the park. When the findings of these consultations have been reviewed, the federal Minister of the Environment and the Quebec Minister of Recreation, Fish and Game will announce the exact boundaries of the new park.

Canada and Quebec will also adopt new legislation and regulations to set up and manage the marine park. In addition, a joint committee will work to ensure the smooth interaction of the two levels of government.

The confluence of the Saguenay and St. Lawrence rivers is a region of extraordinary richness and diversity. Here fresh and salt water meet, tides are strong, the riverbed is deep and the shoreline is varied. Nowhere else in the world do so many species of marine mammals live in such a small area: the waters shelter not only the beluga but also minke whales, finbacks and blue whales. Last summer, these attracted nearly 125,000 visitors from five continents.



In his journal, Jacques Cartier commented on the cliffs that line the Saguenay Fiord.

Jacques Cartier discovered the Saguenay on his second voyage to New France in 1535-36. The Iroquois of Stadacona told him that the river led to a hidden kingdom abounding in wealth and resources. His appetite whetted, Cartier decided to explore the area, hoping to find a northern El Dorado.

That hope turned out to be a mirage, to Cartier's disappointment. He wrote in his journal, "This river flows between high mountains of naked rock with very little earth. However, a large quantity of trees grow there, of various kinds." Trees, unfortunately, were a poor substitute for the gold and silver he was seeking.

But the Kingdom of the Saguenay has riches that escaped the eye of Cartier. Those who make the trip there are welcomed by a majestic river flowing between imposing cliffs. And hidden below the waterline are two completely independent realms within the river: separate from the fresh water of the surface is a deeper layer of salt water much like that found in the Arctic. This layer constitutes a little enclave that reproduces, far to the south, the marine conditions of the high North. Scientists have called it a survival from a past climatic era.

Fiords are generally found in polar regions. The Saguenay Fiord, one of the twenty largest in the world, is also one of the most southerly, being located on the 48th parallel. It has more fresh water than any other fiord, and its waters are unusually cold. Each day it receives a rich inflow from the St. Lawrence River; the waters in its lower basin are completely changed every three days. These characteristics make the Saguenay Fiord a complex ecosystem that is probably unique in the world. It well deserves to be included in the new Saguenay Marine Park.

The year 1991-92 will be the second in the development of the park. Actual operations will start in spring 1993 after a second round of public consultations on the park's management plan.

In the meantime, the park's administrative staff are continuing to gather data on the region with the help of scientists in Canada and abroad.

By 1993, nearly \$2 million will be allocated for scientific and cultural studies to improve our knowledge of the area of the park. These studies will contribute to the protection and enhancement of the area for our benefit and that of future generations.

At the same time, the administrative office is working with local tourist bodies to attract visitors from within and outside Canada. A priority is to set up a strong communications and marketing program. Developing communications channels, creating means for promoting the park, organizing conferences and workshops—these are only some of the tasks facing the Parks team in the next two years. All these activities will, of course, be undertaken jointly with the other partners in this project.

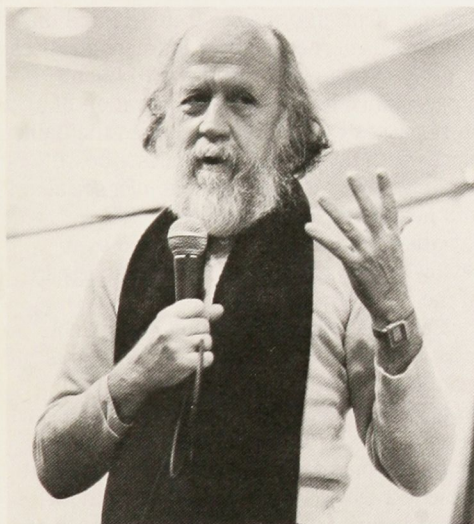
For more information, write to Saguenay Marine Park, 3 Buade Street, P.O. Box 6060, Québec, Québec G1R 4V7, or call (418) 648-4296. ■



One Earth 1990: Environmental Groups Face the Future

Astrophysicists like Hubert Reeves think on a cosmic scale. The environmental problems that we face on earth, the Quebec-born scientist and best-selling author suggests, may have confronted intelligent forms of life elsewhere in the universe. The power of the human mind can destroy our planet or save it; the choice is ours.

Reeves made his remarks as one of the keynote speakers at the "One Earth 1990" conference of the Canadian Environmental Network. This non-profit, non-government organization links 1,800 environmental groups across Canada. Its yearly meeting offers a unique opportunity for environmentalists from all parts of the country to share information and develop national strategies.



Hubert Reeves addressing the conference

The 1990 conference was held in Montreal from October 12 to 14. Some 250 delegates participated from 100 Canadian groups. They included the Valhalla Society of New Denver in British Columbia, Quebec's Société pour vaincre la pollution (the Society to Conquer Pollution), Greenpeace and the Ottawa-based Cultural Survival (Canada). Representatives of aboriginal

peoples, business, government and academia also attended.

On the program were lectures, panel discussions, displays of green products and services, a poster exhibition, a film festival, an "eco-tour" of Old Montreal and even a paint-in and auction by Quebec artists.

Along with Reeves, Lois Corbett of Halifax's Ecology Action Centre addressed the opening session of the meeting. She spoke of how she first became aware of environmental problems: after a walk through a strangely silent wood, she realized that insecticides had stilled the birdsong. Later she visited a frozen foods plant in New Brunswick and saw the discomfort caused by chemicals to the women working there.

Corbett insisted that it is not enough simply to amass and analyze statistics on pollution; environmental groups must also fight alongside other community groups for justice. "Environmental safety depends on economic justice," she said.

Justice and the environment was the theme of one of five public workshops held during the meeting. Participants raised the question whether we can demand better treatment for the environment without considering how people treat each other. Environmental rights, they suggested, must go hand in hand with human rights.

Another workshop focused on business and the environment. Panelists examined whether the greening of Canadian industry is a cosmetic change or a real transformation. They noted the practical steps taken by many companies rushing to meet the booming demand for green products and services. They also called for integration of environmental factors into all phases of manufacturing, from the choice of raw materials through research and development to production methods and disposal. Finally, some participants suggested that industry should do more to foster public awareness, either directly or by supporting environmental groups.



Federal Environment Minister Robert R. de Cotret (right) at the "One Earth 1990" Conference.

Other workshops examined the performance of Canadian governments, the environment in international affairs and co-operation among environmental groups.

One common theme sounded by all groups was the need for more information, education and dialogue on the environment. Only by these means, they felt, can we establish the consensus to tackle the problems we now face. At the same time, participants stressed the importance of individual efforts and local action to achieve real change.

Despite the seriousness of the problems, many delegates expressed hope that we can solve them. Lois Corbett pointed to the rapidly growing number of local, national and international groups that are working to increase environmental literacy and are demanding action from governments and industry.

"To save Spaceship Earth, human beings must join together and forget their quarrels," said Hubert Reeves. He believes that the will exists to do so. "I am an incurable optimist," he declared. ■



Update Reviews

A New Magazine on Environment and Policy

April will mark the premier appearance of *EcoDecision*, a quarterly magazine on environmental science and policy.

First announced in 1989 by Prime Minister Brian Mulroney and Quebec Premier Robert Bourassa, *EcoDecision* will be directed at senior officials and policy-makers in government and industry. It will focus on concrete, practical solutions to the environmental problems facing developed and developing nations.

Contributors to the magazine will include leading scientists, economists and other authorities on sound environmental management and sustainable development. Articles will appear in either French or English, with a summary in the other language. Full translations of articles will be available on request.

EcoDecision will be published by the Environment and Policy Society, a new corporation established under the Royal Society of Canada. For further information, contact the editor-in-chief at (514) 284-3033 (telephone) or (514) 284-3045 (fax), or write to: *EcoDecision*, Environment and Policy Society, 276 Saint-Jacques Street West, Suite 924, Montreal, Quebec H2Y 1N3.

Canadian Perspectives on Air Pollution

A recent Decima Research survey indicates that air pollution is the top environmental concern of most Canadians. Environment Canada recently released *Canadian Perspectives on Air Pollution*, a State of the Environment Report examining the causes and consequences of this problem.

Much of the pollution, we know, results from energy production and consumption, particularly fossil fuel combustion. Other factors are industrial production of chemicals and minerals, the manufacture and use of consumer products, agricultural and forestry practices, and waste treatment and disposal. These activities produce common air pollutants such as sulphur dioxide, carbon monoxide and nitrogen oxides. They also produce toxic air pollutants such as pesticides, PCBs and lead. Finally, there are air pollutants that do not belong in either category—for example, carbon dioxide, which contributes to the greenhouse effect, or chlorofluorocarbons, which deplete the stratospheric ozone layer.

According to the report, contaminants in air can have short-term effects on human health, such as asthma and decreased lung function. Longer-term effects may include chronic obstructive pulmonary disease and lung cancer. Air pollution also damages plants and forests, harms animal life and habitat, and triggers climate change. In addition, it causes deterioration of materials used in buildings, statues and paintings. Less tangible economic costs are incurred by lost productivity, diminishing natural resources, and social disruption.

Air pollution problems present major challenges to future policy-makers. When setting environmental objectives and drafting legislation, they will have to find a way to take into account the various sources, types and effects of air pollutants. The *Canadian Environmental Protection Act*, proclaimed in 1988, demonstrates one possible approach: this wide-ranging act deals with protection of both human health and the environment.

Policy-makers as well as ordinary Canadians can be helped to understand and act on environmental problems through information provided by State of the Environment (SOE) reporting. The information takes many forms: fact sheets, reports on specific topics,

newsletters, a data base, environmental indicators and a five-year national report. The second national report will be published in 1991. For further details, write to State of the Environment Reporting, Environment Canada, Ottawa, Ontario K1A 0H3. ■

Correction

A layout error disrupted two paragraphs on pages 8-9 of our last issue's English article on the Success Stories Bank. The paragraphs in question should read as follows:

The bank is constantly on the lookout for "deposits"—examples of innovation and ingenuity in the realm of sustainable development. To qualify, an initiative must show economic as well as environmental benefits. Initiatives can vary widely in the type of action involved (conservation, protection, enhancement, information transfer) and the methods used (new equipment, new practices or programs, preventative action), but all projects must be currently in operation. If a story passes preliminary screening, the Bank works with the contributor to describe in detail the environmental, economic, social and health benefits of the initiative. Eventually the stories are approved by a review and advisory board and become part of the Bank's holdings....

Each week the Imagination Market collects bits and pieces left over from various manufacturing processes—cast-offs that would normally go to landfill sites. These bits of wire, plastic, vinyl, leather, wood and so on fill the bins at the association's store and provide a ready supply of raw material for the imagination. Customers can purchase an empty bag and then help themselves to whatever they want. The Market also conducts workshops at schools, shopping malls and community events to increase environmental awareness and show how these cast-offs can be transformed into space-ships, masks, costumes, and other playthings. The Imagination Market even has a mail-order service, called "Junque Mail," for customers outside of Vancouver.



