Environment Canada
Environnement Canada

Environment Update

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Featuring: Water

Uses

Quality

Northern Water

Canada

Environment Update

Over the years Environment Canada has become increasingly aware of its responsibility towards its diverse publics. The aim of *Environment Update* is to inform interested people about the programs and activities of our department. We recognize the value of working cooperatively with Canadian citizens and our colleagues outside of government. We are in fact, creating links. These links will allow us to meet our objective along with those who share our concern for a better environment.

Each publication features a specific issue and includes articles on other topics from across Canada reflecting the full spectrum of services of Environment Canada.

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Minister's message:

Water management: a priority issue

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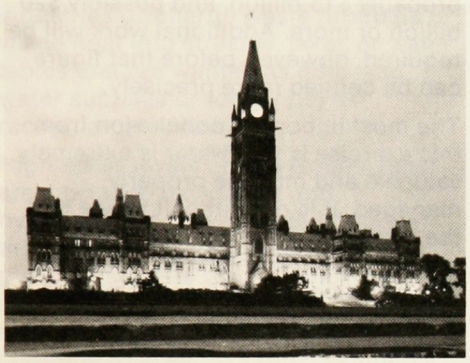


Canadians are blessed with more water than any other country in the world. Consequently, we have become complacent with regard to this essential resource. Many of us see no cause for concern over its supply and view water management (as being of no relevance to Canada) in academic terms . . . if we think of it at all.

Others, however, have long been very conscious of the impact of water on our lives. Ask a farmer about drought or a commercial fisherman about water pollution. Ask a cottager about the effects of acid rain on the lakes or someone whose drinking water comes from a well about the threat of contamination from sewage and toxic wastes.

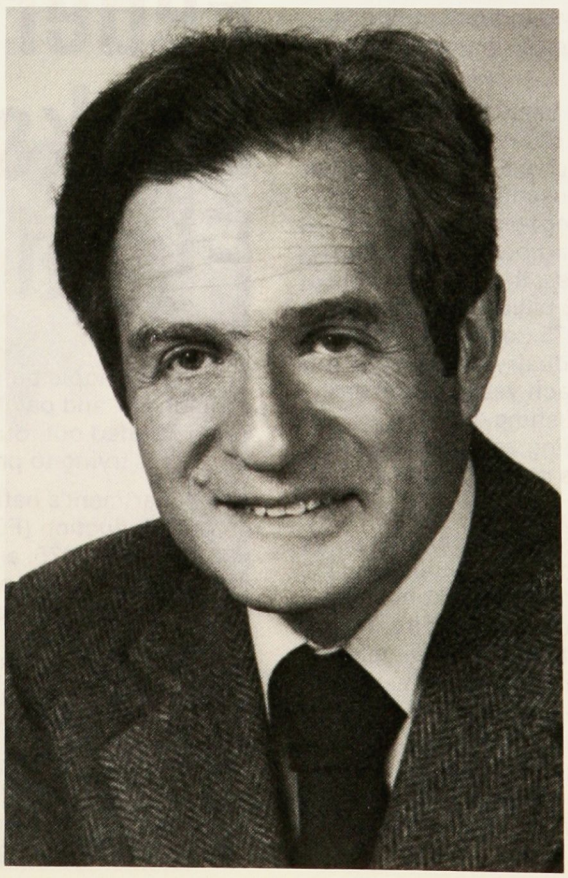
In communities all across Canada, water has become big news. Headlines have focused on the pollution of the Niagara River by chemical wastes. We read about the threat to Canadian waters from the proposed Garrison diversion in North Dakota. We've learned of pollution problems in the Saint John River, and of potential threats to Prince Edward Island's reserves of groundwater.

Canadians are becoming increasingly sensitive to wasteful use and pollution of our water resulting from both public and private development. For example, a recent Gallup poll revealed that 66 percent of all Canadians view the cleanup of the Great Lakes as a "critical concern."

It has only been within the last decade, however, that we have begun to look more closely at the demand for water as well as the supply. We have learned to build environmental safeguards into plans for resource development.

We now seek assistance, through public consultations, in diagnosing and finding solutions to water-related problems. A problem demanding immediate attention is the imbalance between water supply and demand, especially on the prairies. We must also take steps to develop our groundwater resources. We must come to grips with acid rain and the threat from toxic wastes. And we must pay attention to the increasing demand, from people beyond our borders, for food, energy, forest products and other goods, which will in turn put a greater burden on our water resource.

No one can solve these problems alone. Industry, commerce, labor, private researchers, environmental groups, private citizens, as well as government, all have a part to play. The successful management of Canada's water resources will depend on our ability to turn our concern into cooperative action.



What's Water Worth?

When persistently high supplies to a water body affect the level, widely-spread damage to shoreline property can occur.

Traditionally, water has been considered a free good, and charges for its use have not reflected its true value. Often, the worth of a safe and dependable water supply is taken for granted. At other times, the values added by water developments are attributed to energy, navigation or other benefits. That has made it difficult to establish the true economic value of water, and indirect methods have been adopted to estimate its value.

One method has been to assign to water the values of production in industries in which water is a large and vital input — for example, in agriculture, fishing, mining, manufacturing and power generation. In those industries, the value added totaled some $58 billion in 1975 and $67 billion (in 1975 dollars) by 1980. In the recreation industry, at least $8 billion is spent each year on activities associated with fishing, boating, swimming, camping and other events with waterscapes as an integral part of their setting.

Expenditures for water management by governments and private industry amount to about $4 billion annually. Those truly immense expenditures reflect the importance of activities dependent on, or supported by, water. They include the costs of all factors of production, however, and thus overstate the value of water. The "next best alternative" is perhaps a better approach, since it places a value on the actual water use.

In hydroelectric production, water is the primary input. Without that means of power production, Canada would have to rely solely on the next best alternative, thermal generation. If Canada's hydroelectric power in 1980 had to be produced in oil fired plants, the costs for fuel alone would have ranged between $9 billion and $12 billion, depending on whether domestic or world oil prices are considered.

Until a better method of evaluating water is developed, on the basis of available statistics one can say that water is worth at least $12 billion, probably $15 billion, and possibly $20 billion or more. Additional work will be required, however, before that figure can be defined more precisely.

The most important conclusion from this exercise is that water is extremely valuable and must be properly managed. It is not difficult to see that the level of management of this resource should be commensurate with its value. Water management is receiving much attention, and the articles in this issue of *Environment Update* highlight some water issues that have to be faced. They also deal with some of the management programs developed to meet those responsibilities.

Federal Program Seeks to Prevent Flood Damage

Too many people build where they shouldn't — and pay for the mistake by being flooded out. But Environment Canada is trying to prevent this.

The department's national flood damage reduction (FDR) program, introduced in 1975, aims primarily at discouraging development in urban areas vulnerable to flooding. Where existing development warrants, it provides for a wide range of structural and nonstructural measures to reduce possible flood damages.

The program is carried out under agreements already signed with six provinces and the Northwest Territories. Similar agreements are

Rising water levels of Gatineau River flood town of Maniwaki, Québec.

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Competing Water Uses Pose Serious Problem

Among the challenges of resource management is the problem of competing water uses. Conflicts in water use arise when two or more potential uses are incompatible. Conflicts arise, for example, when industries discharge waste products or waste heat into streams, lakes or water tables that are wanted as domestic water supplies or for fishing or recreation purposes.

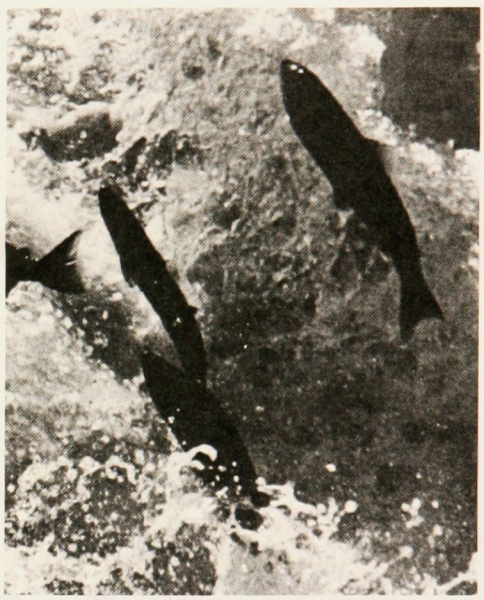
High water levels on the Great Lakes are a boon to navigation and hydroelelctric power production, but the bane of cottage owners and pleasure seekers whose sandy beaches are flooded. With increasing demands for water use, such conflicts will continue to arise. In British Columbia, there is competition between two important sectors of the province's economy — fishing and hydroelectric development.

Water as a source of power is the key to British Columbia's industrial and residential growth. Over 90 percent of BC's electricity is generated by hydro plants, compared with 68 percent for Canada as a whole. Most of the province's developed hydroelectric sites are close to the populous lower mainland, but there is still considerable potential in more remote areas.

While fresh water provides much of the province's electrical requirements, it also provides essential habitat and spawning grounds to a multimillion-dollar fishing industry. In 1982, the landed value of the Pacific salmon fishery was about $235 million — 25 percent of the total landed value for all fishery products in Canada. Moreover, the salmon fishery provides thousands of jobs in the fishing and processing sectors, as well as millions of dollars annually to the tourist industry.

Although fish and hydro both depend on water, construction of a dam on a free-flowing river can significantly affect the fishery. Dams affect salmon by blocking migration routes, by flooding spawning grounds within the reservoir, and by alternately baring and flooding spawning grounds below the dam. Salmon are also affected indirectly by changes in the speed and flow of currents, as well as changes in water quality and temperature.

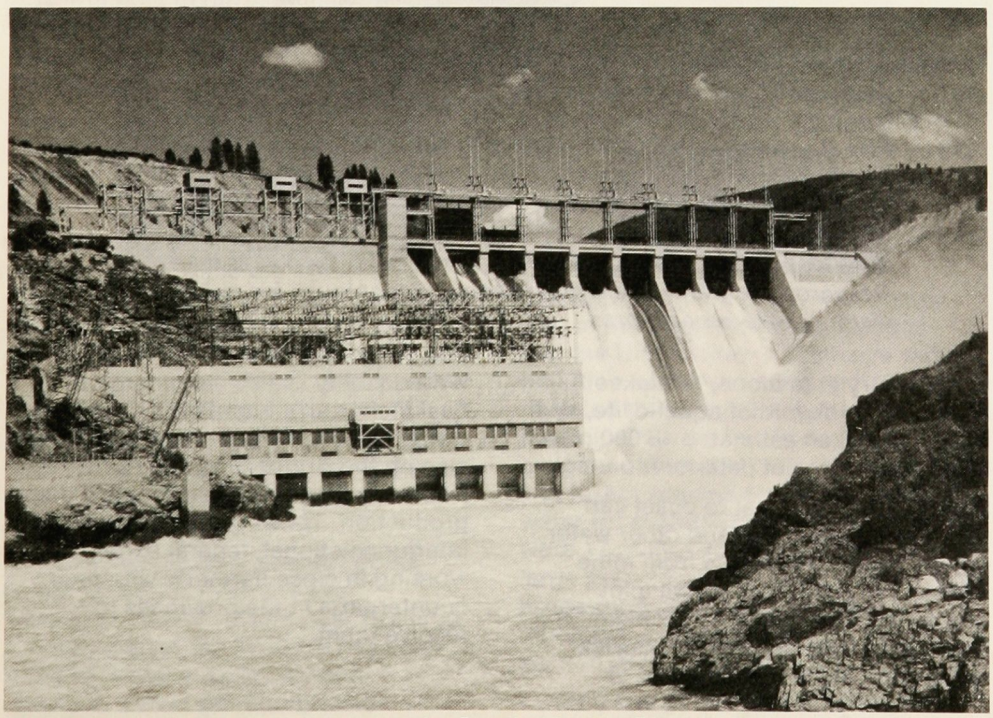
On the other hand, dam construction can sometimes benefit the fisheries. For example, multiple-level outlets in a dam allow releases of water from specific levels, decreasing the changes in downstream temperature and turbidity. The timing of the releases also reduces the scouring of the river bed in spawning areas.



Reduced flow in a river channel can seriously affect the fish in the river.

Then, too, the continuous water flow provided by a dam during normally dry months can maintain fisheries in streams where none existed under natural streamflow conditions. Artificial spawning channels can compensate for the loss of natural spawning areas; and hatchery operations, fish passage facilities and spillway and turbine modifications all help to attenuate the adverse effects of large dams on fisheries.

Those two competing water uses require tradeoffs: a conscious choice between energy in some cases and fish in others. The British Columbia Energy Board excluded some potential sites on the main channel of the Fraser River because of the impact hydroelectric development would have on the spawning run. At those sites, water was considered less crucial to hydroelectricity than it was to the fisheries.



Waneta power station and dam on the Pend d'Oreille River in British Columbia.

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Threat to Water Quality Taints our Future

The quality of Canada's water is a continuing and urgent concern of Environment Canada. The quality of water is just as important as the amount available. And water quality in Canada is seriously affected by its use in industry, agriculture and the home, and also in recreation.

Water has traditionally been regarded as a free good, with no price attached to its use. Consequently, because of its assimilative capacity, it is used as the least expensive vehicle to carry away wastes. This is rational behavior from the viewpoint of the private polluter, even though the social costs of such overuse often exceed any private advantage gained.

Population growth, industrialization, agricultural development and progressive urbanization have all placed strains on our freshwater supply. Nowhere is that more apparent than in the Great Lakes basin. There, in the 1960s and 1970s, vast quantities of nutrient-laden materials were discharged into the lakes, resulting in extensive aquatic plant growth and the deterioration of water quality.

In 1972, Canada joined forces with the United States to reduce the amount of nutrients such as nitrogen and phosphates entering the Great Lakes. Today, algal bloom from those excess nutrients has been reduced, and it is no longer a worrisome problem.

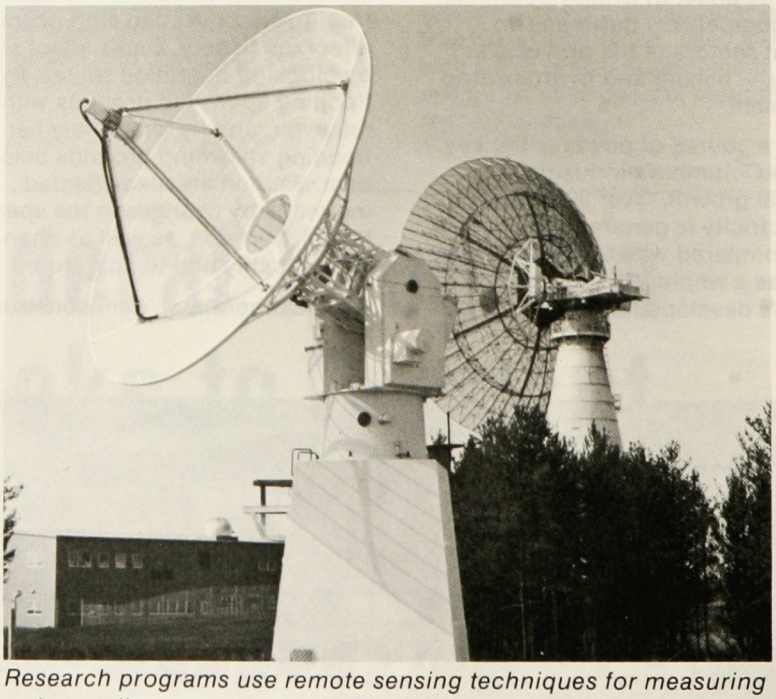
Ours is a chemical society. Chemicals are used to treat food and make fertilizers, cosmetics, pharmaceuticals and industrial products. Those chemicals are plowed into our fields, released into the air and flushed into our rivers and lakes. In North America, over four million chemical compounds have been registered, of which about 32 000 are in commercial use. More than 75 billion kilograms of synthetic chemicals are produced yearly, and this amount increases by about 7 percent each year.

Various organic pollutants can break down biologically or chemically, reducing the amount of oxygen in the water and causing undesirable tastes and odors in water supplies or fish. The main substances of environmental concern, however, do not readily degrade innocuously. Some of them may concentrate or accumulate in aquatic organisms, or may be directly toxic to aquatic life or to consumers of aquatic life. Consequently, the unregulated use of chemicals, or the spread of chemicals from water dumps, could mean serious problems in the future.

Another water quality issue is acid rain. This affects all aspects of environmental management, but its impact on water can be truly devastating. Problems result from increased acidity in lakes and rivers, particularly those of the Precambrian Shield which lack sufficent natural bicarbonates to neutralize the acid. In the Sudbury area alone, 140 lakes appear to be devoid of aquatic life, and in all Ontario an estimated 48 000 other lakes show signs of deterioration.

Canadians from coast to coast can readily relate to these and other water quality issues. Seepages from mine wastes, particularly uranium mine wastes, are a widespread problem. The Saint John River in New Brunswick faces other problems because of hydroelectric developments and wastes from the food processing industry. Municipal discharges are affecting the St. François River in Quebec and the St. Croix River in Nova Scotia.

The Niagara River has special toxic chemical problems resulting from the leaching of chemical waste dumps on the United States side and the production of persistent toxic compounds on both sides of the border. In western Canada, the Garrison Diversion scheme in the United States could produce an invasion by undesirable foreign organisms, causing serious and irreversible damage to the multimillion-dollar Manitoba fishery.



Research programs use remote sensing techniques for measuring water quality parameters.

Water quality is also a concern on Saskatchewan's East Poplar River, owing to power plant construction, and also on the British Columbia's Kootenay River because of wood pulp production. Those problems being interjurisdictional, federal experts are working in close harmony with their counterparts in the provinces to resolve them.

The Great Lakes Basin: Whose Needs Should they Meet?

Environment Canada is wary of proposals to divert more water from the Great Lakes basin. Such proposals, along with rapidly climbing water consumption, are causing concern to water managers in government agencies all around the lakes.

Diversions of water from one drainage basin to another are sometimes suggested as a remedy for water shortages. Such diversions can result in other problems, however. A recent study concluded that total water consumption in the Great Lakes basin could increase three to seven times over the next 50 years--mostly in the United States. That would significantly lower the levels of Lakes Michigan, Huron and Erie, and reduce the flow in the St. Lawrence River by some 10 percent.

These reductions in lake levels and flows are expected to have detrimental impacts on Great Lakes navigation, hydroelectric power generation, municipal water supplies, and fish and other aquatic animals and plants. Consequently, the governors and premiers of the eight states and two provinces in the Great Lakes-St. Lawrence River basin have requested their respective federal governments to develop mechanisms to monitor water consumption and to study control measures to reduce the consumption of Great Lakes water.

Water diversions into and out of the Great Lakes basin have long been the subject of local and international controversy.

Environment Canada officials closely monitor water transfers in the Great Lakes basin. There now are two major water diversions into the basin from the Hudson Bay drainage area, at Long Lac and Ogoki, north of Lake Superior. The diversions were initiated in the early 1940s, to increase Canadian hydroelectric power production during World War II; they have been continued since that time.

The only major diversion out of the Great Lakes basin enters the Mississippi River system near Chicago. Constructed in the 1800s, it has been used for water supply, sewage disposal, power generation and navigation.

There are no new diversion plans currently sponsored or approved by senior governments in either Canada or the United States, although a number of suggestions have been made for using water from the Great Lakes outside the basin. One ambitious proposal calls for diverting water from Lake Superior to the Missouri River, to replace rapidly diminishing groundwater supplies for agricultural irrigation in the midwestern states.

Special interest groups have proposed at least three other interbasin water transfers in the upper Great Lakes area. One would provide water for a coal slurry pipeline linking Wyoming and Wisconsin; another would provide additional municipal water for suburban Chicago from Lake Michigan; the third would divert additional water into the Great Lakes basin from the Hudson Bay watershed for power generation. No formal requests have been made for approval of any of those diversions, but basin residents have two major interrelated concerns about such proposals.

First, they would like evidence that there is water available which is

(Continued on Page 10)

Upper Saint John River Brought Back to Life

A 10-year joint Canada-United States effort has dramatically reduced pollution on the upper section of the Saint John River, making it once again suitable for fishing and swimming. Recent water quality surveys have revealed the best results in over 20 years.

The upper section of the river forms part of the border between Canada and the United States. Intensive water pollution surveys in 1960 and 1969 revealed that industrial wastes and municipal sewage were depleting oxygen in the water, killing certain fish and insect species and spoiling the water for swimming. In the 1960s, there were 17 potato starch factories, two large pulp and paper mills, several food processing plants and several municipal sewage outlets on that section of the river.

In 1972, the governments of Canada and the United States established a formal working group, the Canada-United States Committee on Water Quality in the Saint John River, bringing federal, provincial and state officials together. Their work resulted in the installation of special treatment equipment in the mills and plants, and the construction or expansion of municipal sewage treatment facilities.

In 1981, and for the first time in at least 20 years, the ratio of dissolved oxygen in the water reached adequate levels for salmon and trout.

Not all the water quality problems in that stretch of the Saint John River have been solved, but the committee's work shows how countries and different levels of government can work together to restore polluted rivers.

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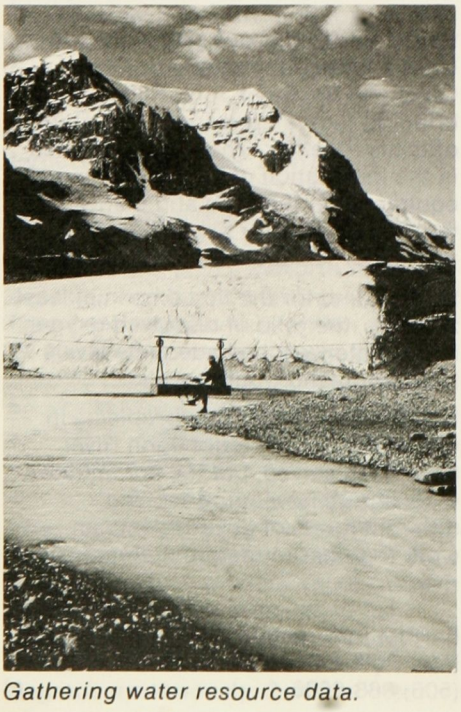
Water Survey, 75, Beeps its Way into the Future

Collecting water resource data to support water management programs.

The Water Survey of Canada is celebrating the 75th anniversary of a program that is more important than ever to our prosperity and well being.

In 1908, Parliament authorized a $10 000 expenditure to install 16 water level gauges to determine water supplies in southern Alberta and Saskatchewan. From that humble start, the programs has grown into a nationwide effort costing $19 million annually. Today more than 3000 stations provide basic data on water levels and discharges, water temperature, sediment content and other such things, to help in the management of Canada's water resources.

Water survey work is conducted under cost sharing agreements with all 10 provinces and the Department of Indian and Northern Affairs on behalf of the territories. The monitoring of surface waters is accomplished by combining office expertise with field service ingenuity. Data are gathered on a continuous, year round basis using many forms of transport and technical equipment. Field personnel are required to travel and work in all kinds of terrain and weather.



Gathering water resource data.

The Water Survey of Canada uses the latest technology available to improve the collection and storage of data and provide better service to the public. The experimental use of satellite transmission over the past 11 years marks a new era in data collection in remote areas.

Automated data collection and broadcasting equipment can now be installed at uninhabited locations in the north. When set to the transmission frequency of existing satellites, it can transmit such data as water levels and temperatures to the satellite, which in turn transmits the data to a master ground station. From there, it is easy to access the data on a real-time basis (literally, at the same time it is transmitted from the satellite) using existing telecommunications equipment.

The Water Survey of Canada is currently embarking on a program to build a network of 400 such stations across Canada by 1988.

Computerized data processing systems make it possible to store or retrieve and manipulate massive amounts of data.

This structure, with its own power supply, is equipped to transmit hydrometeorological data from remote regions to satellites overhead.

Prairie Water Supply Hit by Summer Heat

Last summer's hot, dry weather underscored some old and persistent problems in Canada's prairie provinces.

Because of their lower rainfall and higher rate of evaporation, watersheds in the southern prairies have lower runoff than other river basins in Canada. Last summer's parching heat aggravated those conditions, exacerbating familiar imbalances of water supply and demand.

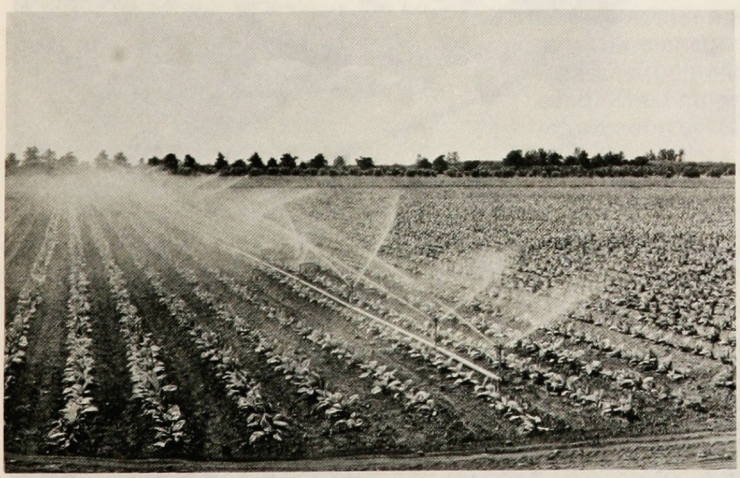
High demand from both urban residents and farmers coincided with maximum evaporation from surface waters, minimum streamflows, and the consequent reduction of water quality. At such times, the demand for large volumes of good quality water exceeds the available supply, either because streamflows are low or because treatment plants do not have enough capacity. To meet increasing demands, streams have been dammed to store water during high flows, and water has been directed from areas of greater supply. Such efforts were once sufficient to confine supply-and-demand imbalances to severe droughts. But now the imbalance occurs more often, because of heavy demands from industry and irrigation.

In earlier years, a major constraint on managing prairie waters was the problem of divided political jurisdiction, particularly so in the Saskatchewan-Nelson basin, which covers a large part of the settled area of all three provinces. The difficulty was eased in 1948, when the Prairie Provinces Water Board was created to determine the best uses of the basin's water. In 1969, prairie provinces agreed on apportionment of eastward flowing waters and assigned the board responsibility for monitoring the agreement.

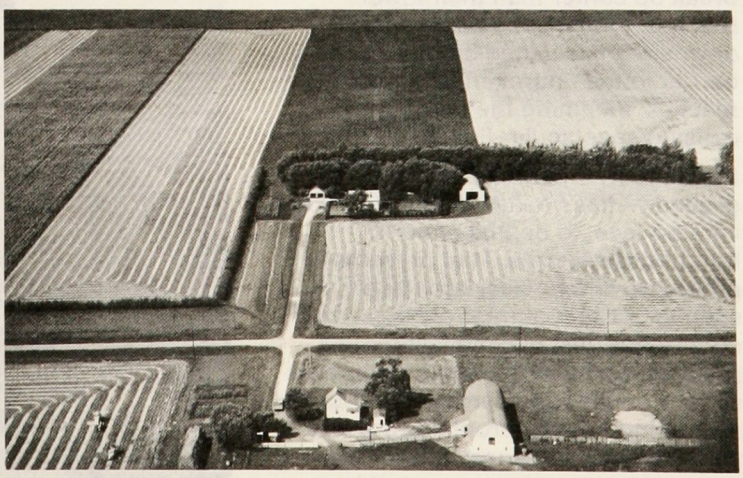
The prairie provinces periodically experience prolonged dry spells as a normal characteristic fo their climate.

A recent board study on water use and consumption in the Saskatchewan-Nelson basin shows that, by 1978, water use had increased threefold over 1951 levels. The largest demand was for water to generate electricity in thermal and hydroelectric stations. (Municipal use was relatively small.) Water consumption has increased substantially because of irrigation and evaporation. The irrigation area trebled between 1951 and 1978, while the amount of water consumed quadrupled. Considerable water was also lost by evaporation from artificial storage and irrigation reservoirs, most of which were built in the last 50 years.

Water demand is expected to go on increasing, especially for irrigation, hydro power and industrial uses. To help plan future projects and ensure adequate and sustainable water supplies, forecasts of future water use could indicate those areas where supply-and-demand imbalances are probable. Effective management may require improved techniques and programs to decrease demand and increase supply through appropriate conservation practices and water supply projects such as dams and diversions.

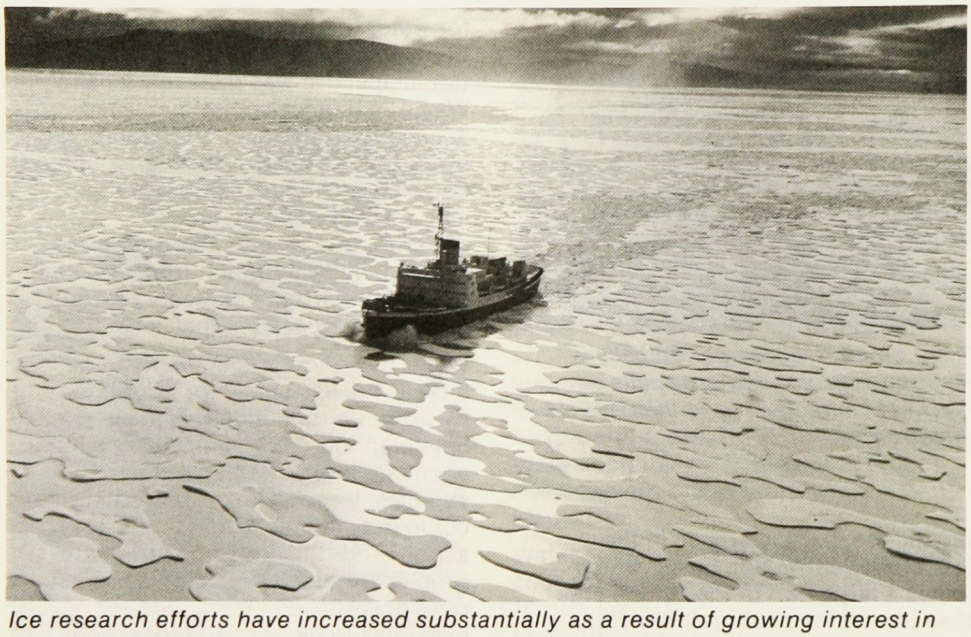


Careful management is necessary to ensure that adequate water supplies are available to fulfill irrigation requirements.



The rich soils and gentle undulations of the interior plains are ideally suited for agriculture.

Untainted Northern Waters: A Treasure to Save for Tomorrow



Ice research efforts have increased substantially as a result of growing interest in northern resources.

About half of Canada's land area is north of the 60th parallel, much of it covered by myriad lakes. Its climate and remoteness make waters in the north more difficult to manage than those of southern Canada, and have restricted industrial development.

The northern climate is marked by winters of low snowfall and light streamflow, but thick ice forms on lakes and rivers. During the spring, ice jamming becomes a serious problem, particularly on northward flowing rivers whose southern headwaters break up earlier than their lower reaches. Floating ice carried downstream is halted by the solid ice barrier in the unbroken northern reaches, damming the rivers and causing spectacular floods.

Permafrost — permanently frozen ground — lies beneath half of Canada's land surface, to depths of up to hundreds of metres. That presents problems with no easy technical solution. Where permafrost is continuous, just making water available and distributing it becomes a serious challenge. Where permafrost is discontinuous, the problems are less formidable, but the annual cycle of freezing and thawing can result in major heaving at the earth's surface and have profound effects on water movement.

By southern standards, the amount of water used is small, for there are few industrial operations and there is almost no agriculture. On the other hand, many people depend on fishing, hunting and trapping and the sustaining water resource for their livelihood.

Most of the larger communities in the north are located along the two principal waterways: the Mackenzie and Yukon rivers. They afford ready access to plentiful water supplies for domestic, municipal and industrial needs. Historically, the Mackenzie and Yukon rivers have been major transportation routes, and barges continue to supply goods to Mackenzie valley communities.

With the increasing promotion of tourism and expansion of the national parks system, recreational demands on the water resource are growing. Although water temperatures are generally too cool for activities such as swimming, there is still a great potential for other activities such as sport fishing, boating and canoeing. Proposed large-scale hydroelectric developments could have significant impacts on water quantity and quality, and also on the fish and wildlife that depend upon the water. The challenge will be to manage the water in a way that will sustain fish and wildlife populations while accommodating other water uses.

Collecting data on glaciers in Canada.

Groundwater: The Menace and the Promise

Groundwater provides about 10 percent of the water supplied by municipal water systems in Canada but, in some regions, its importance is considerably greater. For example, in the Atlantic provinces groundwater supplies more than half the total domestic water used. Prince Edward Island residents rely on groundwater for their entire water supply.

In much of the Atlantic region, economic development will depend on a thorough understanding of the nature and extent of the groundwater resource.

Its quality may be affected along the coasts by intrusion of salt water into water-bearing rocks, sand or gravel, known technically as aquifers. It may be affected by arsenic and uranium contamination in Nova Scotia and New Brunswick, or by pollution from chemical wastes, oil and gas development and storage facilities, and from road salting.

The conservation of groundwater is especially important where alternative water sources are limited. For example, in Prince Edward Island's Winter River basin, the withdrawal of groundwater to supply Charlottetown may significantly exceed recharge to the underground source or aquifer. If so, and if this situation continued, it could permantly reduce the aquifer's ability to meet the city's needs.

Groundwater can be exploited for its thermal energy. Groundwater heat pumps have been installed extensively in Atlantic Canada and have led not only to reduced imports of foreign oil into eastern Canada, but also to considerably lower heating costs. Despite valuable federal and provincial groundwater studies in the Atlantic region, there remain large gaps in our understanding of that resource. We need more information on shallow and deep regional aquifers, their thickness and extent, and the quality of the waters they contain. We must develop strategic plans for groundwater use that are based on adequate knowledge of the resource and an understanding of its flow and quality.

Environment Canada and other federal and provincial agencies all have a role to play in developing the knowledge essential for rational management of groundwater resources.

Great Lakes Booklet

An attractive new booklet takes a look at some of the urgent problems facing our most precious water resource. Entitled *Freshwater Seas — the Legacy of the Great Lakes,* it is published by the Canada-Ontario Review Board on the 1971 Great Lakes Water Quality Agreement.

The booklet is also available in a French-language version, *Les mers douces — le don des Grands lacs.* Copies of both versions may be obtained free of charge from Environment Canada or the Ontario Ministry of the Environment.

Electronic wizardry is Water Managers' Modern-day Magic Wand

The computer age has given a new tool to water managers and researchers. And Environment Canada has established numerous data and information systems in support of their activities.

- WATDOC, the water resource document reference centre, gives nationwide direct on-line access, by computer terminal, to an inventory of published water related papers and reports. This reference system was recently broadened to cover environmental baseline data in general.
- NAQUADAT, the national water quality monitoring program's data bank, was designed to store and retrieve chemical, physical, bacteriological, biological and related data for surface waters, groundwaters, wastewaters and sediments.
- STAR handles limnological data from Great Lakes monitoring cruises.
- WATENIS, the water effluent national information system, provides an inventory of industrial and municipal water pollution sources, including data on physical, chemical and toxicological characteristics of effluents and information on water effluent regulations and guidelines.

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Competing Water

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There are promising opportunities for joint use of the water resource, however. Alcan's Kemano hydroelectric development, built in the 1950s, was just such an opportunity. The development, on a tributary of the Fraser River, has fostered the establishment of the major aluminum industry in the province. Because it was built on a tributary, it has become a major source of electric power, while it causes minimum damage to the fishery industry in the basin. Now Alcan proposes to extend the Kemano development, but its original extension plans have been scaled down to ensure preservation of the fish habitat.

In the production of water power, there are evidently important environmental concerns to be evaluated. Not all the effects on the fishery resource can be fully mitigated, but there is a growing awareness of the potential impacts — along with efforts to increase our understanding of them.

Competition for the water resource is increasing; exclusive use of a river for one purpose is no longer acceptable. Instead, managers and scientists are striving to maximize the value of the water resource by accommodating all its uses to the greatest degree possible.

Electronic Wizardry

(Continued from Page 9)

- MUNDAT, covering municipal waterworks and wastewater systems from coast to coast, includes data on federal facilities. It was developed in close cooperation with the provincial governments and the Federation of Associations on the Canadian Environment (FACE).
- HYDAT, a national surface water data bank, has been developed to store and retrieve information on streamflow, water levels, and sediment transport.
- The GLACIER DATA and INFORMATION SYSTEM contains a compilation of the physical dimensions of Canadian glaciers and a bibliography of Canadian glacier documents.
- CHOMS provides an inventory and summary description of selected operational techniques and procedures used to collect, process and manipulate hydrologic data in water resources studies.

The Great Lakes Basin

(Continued from Page 5)

surplus to their own needs and those of the environment within the watershed. Many people in drier regions in the United States view the Great Lakes as a vast storehouse of water "wastefully" running out to the ocean; but residents of the Great Lakes basin believe they need all the water they have. The projected increases in water consumption within the basin, and resultant future water shortages, must be taken fully into account before any diversion can be considered.

Secondly, residents want to know the environmental, social and economic impacts that would result from interbasin diversions and increased consumption in the Great Lakes area. A permanent drop in levels of the Great Lakes could cause severe environmental damage throughout the lakes and along their shorelines.

Decreased levels would hurt both commercial and recreational navigation interests, and a decrease in lake outflows would significantly reduce hydroelectric power generation. All the suggested diversions out of the basin, and most of the increased consumptive uses, would be for the benefit of private interests in the United States, but the Canadian public would suffer much of the resultant damage.

The issue of increased diversions and consumptive uses in the Great Lakes region will grow more prominent and important over the next few years. That is why the International Joint Commission held public meetings last June in seven cities in the United States and Canada, to sound out public opinion on those and related issues.

Canadians must be vigilant to see that their concerns about potential economic, social and environmental repercussions are fully considered.

Federal Program

(Continued from Page 2)

being negotiated with British Columbia, Alberta and the Yukon. (Prince Edward Island is not vulnerable to flooding.)

The program is most developed in Quebec. A five-year flood risk mapping agreement was signed with Quebec in 1976 to designate flood risk areas in 180 municipalities. The agreement will be renewed, and the mapping program extended until 1987, so that eventually more than 360 municipalities will be covered.

The agreement also outlines policies that will apply in the designated areas until 1992, five years after the mapping program is completed. These include commitments by both governments:

- to refrain from building or financing projects liable to flood damage in the designated areas
- to encourage zoning authorities to use the flood risk maps for zoning purposes
- to withhold flood relief payments for damaged structures built after the area was officially designated.

Since the original agreement was signed, nine joint designations have been made covering some 170 municipalities in the Montreal and Quebec City regions and elsewhere in Quebec.

Based on effectiveness, cost, associated benefits and environmental impact, other agreements may be signed to provide flood protection to existing development. Under these agreements, the federal government pays 45 percent of the cost. The province pays the other 55 percent, and recovers a portion of it from the local municipality.

Over $16 million has been spent on building dikes in the Montreal region and on two studies aimed at increasing storage capacities on the Ottawa River and regulating flows in the Mille Iles River.

The two governments are now negotiating for construction of the flood control dam at the mouth of the Milles Iles River. Another agreement provides $833 000 for remedial works to offset ice damage on the St. Charles and du Berger rivers in Quebec City. In the Richmond area, the possibility of constructing similar works on the St. François River is being studied.

Le calendrier des travaux relatifs à la qualité de l'environnement du SPE

En décembre 1982, en conformité avec sa politique d'informer le public sur ses activités, le Service de la protection de l'environnement (SPE) a publié le Calendrier sommaire des mesures de protection dans *Environnement à la une*. Puis, en mai 1983, la première édition de l'État des projets de réglementation du ministère a paru dans la partie I de la Gazette du Canada. Or, dorénavant, dans *Environnement à la une*, il y aura un résumé des projets de réglementation ainsi que des évaluations de problèmes. Ce nouveau résumé, qui paraîtra sous forme de deux tableaux, sera intitulé le Calendrier des travaux relatifs à la qualité de l'environnement; celui-ci sera publié deux fois par an.

C'est en conformité avec son mandat que le SPE entreprend des évaluations de problèmes afin de déterminer les incidences environnementales des activités humaines ou des répercussions de celles-ci sur la santé des individus. Le tableau des évaluations de problèmes, qui fait partie du calendrier, renfermera les progrès des évaluations et il y sera précisé une date déterminée ou prévue pour l'achèvement de chaque évaluation.

Dans plusieurs cas, les évaluations soulignent la nécessité d'élaborer et de faire des recherches poussées sur des mesures de contrôle pouvant résoudre le problème. Ces mesures comprennent les règlements, lignes directrices, normes et codes de recommandations techniques. Une fois que le SPE aura pris la décision de procéder à l'étape de la considération des possibilités de contrôle, le processus de réglementation du SPE sera mis en marche. Tous les projets de réglementation paraîtront deux fois par an dans l'État des projets de réglementation du ministère et seront également publiés, de façon sommaire, dans le tableau des projets de réglementation faisant partie du Calendrier des travaux relatifs à la qualité de l'environnement, qui paraîtra, lui aussi, deux fois par an dans *Environnement à la une*.

Le processus de réglementation du SPE

Le processus de réglementation du SPE est constitué de quatre étapes principales. Ce qui caractérise les deux premières étapes, c'est que chacune donne lieu à un rapport qui est rendu public.

Étape I — Possibilités de contrôle

Il y est question d'identifier les possibilités de contrôle au sein du service et, au besoin, les possibilités en dehors du SPE. Le rapport sur les possibilités de contrôle décrit chacune des solutions envisagées pour résoudre le problème et il traite de leurs aspects techniques, socio-économiques, administratifs et juridiques.

Étape II — Mesure possible

Une fois une solution retenue, une mesure corrective sera élaborée; il pourrait par exemple s'agir d'un règlement, d'un code de recommandations techniques ou d'une ligne directrice. Un rapport exposant la mesure possible sera publié et sera accompagné d'une note explicative où l'on décrit la solution retenue ainsi que ses répercussions socio-économiques. De plus, la note peut renfermer la teneur des rapports antérieurs et les observations reçues des personnes intéressées.

Étape III — Mesure proposée

Cette étape consiste en la publication préalable de la mesure proposée. On procédera à cette étape lorsqu'il est envisagé d'en faire l'annonce dans la partie I de la Gazette du Canada.

Étape IV — Mesure adoptée

Il s'agit de l'annonce formelle de la mesure adoptée, soit par la publication dans la partie I de la Gazette du Canada, soit par d'autres moyens appropriés.

Chaque étape du processus est indépendante des autres; et à la fin de chacune, le SPE peut user de sa discrétion, c'est-à-dire décider de passer à l'étape suivante, revenir en arrière ou encore de mettre fin au projet. Il y a de la consultation du public à chaque étape. Dans certains cas, le SPE peut intégrer les différentes étapes.

Les répercussions socio-économiques seront prises en considération à toutes les étapes, mais une analyse d'impact socio-économique (AISE), prévue dans le Manuel administratif du gouvernement du Canada, ne sera entreprise que lorsque la mesure proposée consistera en un règlement ou en une modification à un règlement existant. L'AISE sera publiée en même temps que le règlement proposé, afin d'inviter les commentaires des personnes intéressées.

Pour de plus amples renseignements, contacter M. R.J. Powell, Chef, Division des programmes connexes, Service de la protection de l'environnement, Ministère de l'Environnement, Ottawa (Ontario) K1A 1C8, téléphone : (819) 997-2070.

Le calendrier des travaux relatifs à la qualité de l'environnement du SPE

Projets de réglementation*

Titre et numéro d'entrée	Dates des étapes (déterminées ou prévues)				Personne-ressource
	Étape I Rapport sur les possibilités de contrôle	Étape II Rapport sur les mesures possibles	Étape III Mesure adoptée	Étape IV Mesure proposée annoncée	
Réduction graduelle de la teneur en plomb des essences à moteur (EC/SPE-83-1-1-11)	3/83				M. M.E. Rivers, (819) 994 2975.
Nouvelles normes de dégagement pour les véhicules automobiles concernant les NOx, HC, CO (EC/SPE-83-1-1-12)			p.r.-83/84		M. V. Shantora, (819) 997-1612.
Règlement sur le transport des marchandises dangereuses (Déchets) (EC/SPE-83-1-1-13)			Éléments II & III : p.-83/84	Élément I : p.-83	M. D.S. Hay, (819) 997-3352.
Règlement no 2 sur les PBC (Produits) (EC/SPE-83-1-1-14)			p.-12/83		M. J.A. Armstrong, (819) 997-1640.
Règlement no 3 sur les BPC (Rejets) (EC/SPE-83-1-1-15)			p.-12/83		M. J.A. Armstrong, (819) 997-1640.
Émissions d'arsenic par les installations de grillage des minerals aurifères (EC/SPE-83-1-1-16)	Révision terminée : p.r.-3/84		10/79		M. L. Buffa, (819) 997-2270.
Révision du règlement sur les effluents liquides des mines de métaux (EC/SPE-83-1-1-17)	p.-3.84				M. L. Buffa, (819) 997-2270.
Révision du règlement sur les effluents des fabriques de pâtes et papiers (EC/SPE-83-1-1-18)	Révision terminée : p.-84				M. J.L. Betts, (819) 997-3060.
Lignes directrices sur les véhicules automobiles en service (EC/SPE-83-2-1-32)			p.-12/83		M. V. Shantora, (819) 997-1612.
Code de recommandations pour le transport du charbon par convois ferroviaires (EC/SPE-83-2-1-33)	p.r.-10/83			p.-4/84	M. D. Cope, (819) 997-1612.
Lignes directrices sur les déchets provenant des établissements publics (EC/SPE-83-2-1-34)		p.-4/84			M. I.J. McColgan, (819) 994-0284.
Lignes directrices pour la mise en décharge sûre des déchets dangereux (EC/SPE-83-2-1-35)	p.-2/84				M. A.E. Burgess, (819) 994-0284.
Élaboration d'une stratégie pour l'élimination graduelle des BPC (EC/SPE-83-2-1-36)	p.-12/84				M. J.A. Armstrong, (819) 997-1640.
Lignes directrices pour la gestion des déchets contenant des BPC (EC/SPE-83-2-1-37)			2e avant-projet : p.-12/83		M. I.J. McColgan, (819) 994-0284.
Code de recommandations techniques pour les centrales à vapeur (EC/SPE-83-2-1-38)		phase du design : p.r.-84 choix de l'emplacement : p.-84 phase de la construction : p.-85 phase de l'exploitation : p.-84			M. D.W. Draper, (819) 997-1220.

*Pour de plus amples renseignements, contacter la personne-ressource indiquée ou consulter l'État des projets des réglementation du ministère de l'Environnement de novembre 1983 (disponible à un coût annuel de 5 $ du Centre d'édition du gouvernement Canada, Ottawa, Ontario, K1A 0S9).

Évaluation des problèmes*

Titre	Description	Rapport d'évaluation du problème (date déterminée ou prévue)	Personne-resource
1. Industries pétrochimiques et chimique organique	Ces industries peuvent rejeter divers produits et composés toxiques. Leurs émissions peuvent aboutir à la formation d'oxydants par réaction photochimique des hydrocarbures. Leurs effluents liquides et leurs déchets solides peuvent contenir, entre autres, des hydrocarbures aromatiques polycycliques (HAP), du benzène, des phénols et des métaux lourds, qui peuvent causer des dommages dans l'environnement.	p.-AF 85/86	M. D.W. Bisset, (819) 997-3713.
2. Émissions de dioxinnes des procédés d'incinération	On a découvert qu'il se formait des dioxinnes chlorées, certaines réputées extrêmement toxiques, lors de la combustion et on en a trouvé dans les gaz produits par l'incinération. Les émissions attribuables à ces sources peuvent présenter un risque pour la santé, mais elles n'ont pas encore été bien caractérisées.	p.-AF 83/84	M. F. Vena, (819) 994-3127.
3. Industrie des engrais chimiques	Les procédés de l'industrie des engrais azotés et phosphatés peuvent entraîner le rejet (dans l'air, dans l'eau et sous forme de déchets solides) de métaux toxiques et d'autres composés pouvant causer des dommages dans l'environnement.	p.-6/84	M. D.W. Bisset, (819) 997-3713.
4. Industrie du tannage	Il se peut que les agents de tannage contiennent des produits chimiques potentiellement toxiques, et les rejets (atmosphériques, liquides et solides) pourraient causer de graves dommages dans l'environnement.	p.-7/84	M. D.W. Bisset, (819) 997-3713.
5. Industrie du chlore	L'industrie peut rejeter des produits chimiques toxiques, notamment du mercure, de l'amiante, du plomb et des composés chlorés.	p.-12/83	M. D.W. Bisset, (819) 997-3713.
6. Émission de polluants atmosphériques des raffineries de pétrole	Les raffineries émettent des polluants atmosphériques comme le dioxyde de soufre, les oxydes d'azote, le monoxyde de carbone et des hydrocarbures qui peuvent causer divers problèmes environnementaux.	p.-12/84	M. J. Labuda, (819) 997-1220.
7. Émissions de polluants atmosphériques des usines d'épuration du gaz naturel	Ces usines sont une source importante d'émissions de dioxyde de soufre dans l'Ouest; ce dioxyde est la principale cause des pluies acides. Elles émettent également d'autres polluants qui pourraient nuire à l'environnement.	f.-12/83	M. J. Labuda, (819) 997-1220.
8. Utilisation, par l'industrie, des égouts municipaux	Certains rejets de déchets dans les égouts municipaux y engendrent des problèmes, perturbent ou empêchent l'épuration, réussissent à passer dans les eaux réceptrices ou encore, contaminent les boues, réduisant ainsi les possibilités d'élimination ou d'utilisation des résidus. Les industries et les commerces sont souvent la source de ces rejets.	p.-AF 83/84	M. D.J. Hay, (819) 997-3060.
9. Industrie du traitement des surfaces métalliques	On sait que les usines de cette industrie notamment celles qui font l'électroplastie, rejettent beaucoup de métaux lourds dans les égouts, émettent des solvants dans l'air et produisent des déchets. En 1977, le ministère a publié des lignes directrices pour restreindre le rejet de certains métaux dans les cours d'eau.	p.-6/84	M. D.W. Bisset, (819) 997-3713.
10. Industrie de la peinture, des pigments et des produits connexes	Cette industrie peut rejeter du mercure, de l'amiante, du cuivre, du plomb, du chrome, du zinc, du sélénium, du cadmium, de l'arsenic, des cyanures, des pesticides organiques et de nombreux hydrocarbures halogénés.	p.-3/85	M. D.W. Bisset, (819) 997-3713.
11. Rejets de substances toxiques ou dangereuses par les raffineries de pétrole	On sait que les déchets des raffineries contiennent des substances toxiques ou dangereuses, notamment le benzène et des hydrocarbures aromatiques polycycliques. On ne connaît pas encore précisément le devenir ultime de ces contaminants, non plus que la conception et les conditions de fonctionnement des installations d'épuration, pour que l'élimination des composés dangereux soit maximale.	p.-85	M. J. Labuda, (819) 997-1220.
12. Industrie de la préservation du bois	On sait que le pentachlophénol (PCP), très utilisé pour la préservation du bois, contient divers contaminants, y compris des dibenzodioxinnes polychlorées qui sont extrêmement dangereuses. Leur présence comme impuretés dans ce produit est une cause d'inquiétudes.	p.-12/84	M. J.L. Betts, (819) 997-3060.

*Dans chaque cas, un rapport d'évaluation du problème sera publié et on invitera les commentaires des intéressés. Un projet de réglementation ne sera entrepris que lorsque, dans un rapport d'évaluation, on recommande l'élaboration des mesures de contrôle.

Légende

p. - prévision
p.r. - prévision révisée
s.o. - sans objet
t. - projet terminé
AF - année financière

PROCESSUS D'ÉVALUATION DES PROBLÈMES DU SPE*

PROCESSUS DE RÉGLEMENTATION DU SPE*

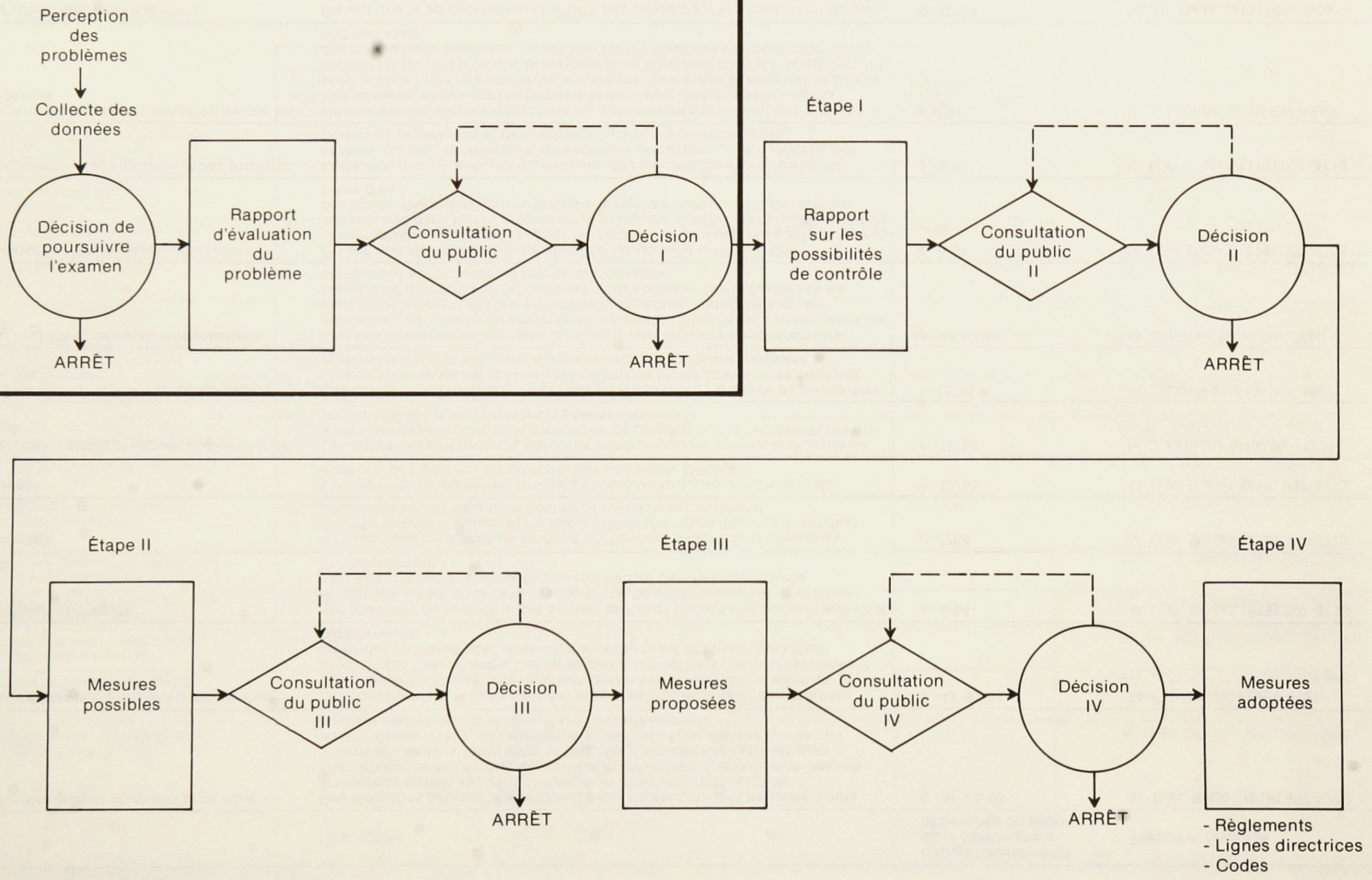

*Schéma seulement, possibilité d'intégrer les différentes étapes.