Five-year Review

of

The Canada-Wide Acid Rain Strategy for Post-2000

Federal/Provincial/Territorial Ministers of Energy and Environment

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Introduction

October 2003 marked the five-year anniversary of the signing, by Energy and Environment Ministers, of *The Canada-Wide Acid Rain Strategy for Post-2000* (hereafter referred to as *The Strategy*). *The Strategy* provides federal, provincial and territorial governments with a framework for:

- addressing the remaining acid rain problem in eastern Canada;
- ensuring that new acid rain problems do not occur elsewhere in Canada; and
- ensuring that Canada meets its international emission reduction commitments on acid rain.

More specifically, it calls for a number of actions towards achieving the critical loads, including to establish new sulphur dioxide (SO_2) emission reduction targets in eastern Canada and to pursue further emission reduction commitments from the United States.

Although not a commitment under *The Strategy*, conducting a five-year review is an opportunity to determine if *The Strategy* remains an effective instrument to address acid rain. The review follows a commitment by commitment approach. The output of the review, this report, includes an update on where we are with respect to the recommendations from the "1999 Review of Acid Rain Science Programs in Canada". The concluding section on "Next Steps" describes a multi-stakeholder consultation workshop held in February 2005 at which stakeholders expressed their views on things to consider for improving *The Strategy*. The reader is directed to the report of that workshop for further information.

Meeting critical loads

As a framework for dealing with acidifying pollutants, *The Strategy* set a long-term goal "to meet the environmental threshold of critical loads for acid deposition across Canada". Critical loads are an effects-based measure designed to identify areas of concern based on current knowledge. At the time of *The Strategy*'s inception, critical loads were defined as the level of wet sulphate deposition that would maintain a pH of 6 in 95% of lakes (as described in the 1997 Canadian Acid Rain Assessment). These critical load values were available for 21 regions of southeastern Canada.

Although the 1997 Assessment expressed critical loads for aquatic ecosystems in terms of sulphate deposition only, the role of nitrogen as an acidifying agent was implicitly acknowledged and (with some observational justification) assumed to be of minor significance. These sulphur critical loads were also expressed as wet sulphate deposition. This approach was used because wet deposition was the most accurately measured regional response to SO_2 emissions (dry deposition estimates were considered highly uncertain) and models used to simulate the effect of emission reductions produced output in terms of wet deposition. Hence, specifying a target in units of wet deposition made the design of national or regional emission reduction programs (the ultimate reason for specifying critical loads) simpler.

Since the inception of *The Strategy*, the science of critical loads and the measurements that support them have evolved. The uncertainties associated with estimating dry deposition have become much more manageable so that it is now more reasonable to report aquatic critical loads in terms of total (wet + dry) deposition. New science has lead to the development of critical load values for terrestrial (i.e. upland forest soil) ecosystems and these critical loads are reported as total deposition (wet + dry). The nitrogen component of acid deposition cannot be dismissed for terrestrial ecosystems; hence, terrestrial critical loads are reported in terms of total deposition of sulphur and nitrogen.

With the development of critical loads for terrestrial ecosystems, the opportunity has emerged to develop "ecosystem" critical load maps (i.e. combine aquatic and terrestrial critical load maps). To produce these maps, critical loads for both terrestrial and aquatic ecosystems must be expressed in terms of the sum of sulphur and nitrogen in the wet and dry forms. Since sulphur and nitrogen have different atomic weights, it is impossible to report combined critical load values on a mass basis (e.g., kg/ha/yr); instead, total acid deposition critical loads must be reported on a charge equivalency basis (e.g., eq/ha/yr). In order to alleviate some of the confusion that will no doubt arise from the shift in critical load units to the "new normal" of equivalency units, Table 1 provides unit conversion factors for various sulphur and nitrogen species.

Table 1: Relationships among the units for atmospheric deposition used in this Assessment to quantify critical loads and exceedances. Multiply or divide by the appropriate factor to convert from one unit to another.

Chemical Species	kg/ha/yr	eq/ha/yr	meq/m^2/yr
SO_4^{2-}	1.00	20.8	2.08
S	1.00	62.4	6.24
NO_3^-	1.00	16.1	1.61
NH_4^+	1.00	55.4	5.54
N	1.00	71.4	7.14

Although the science of acid deposition and critical loads has evolved since the inception of *The Strategy*, the spatial coverage of this work has remained focussed on eastern Canada. The provinces of Alberta and Saskatchewan continue to assess acid deposition using a different definition of critical load that includes wet and dry deposition of sulphur, nitrogen and base cations. In recent years however, levels of acidifying emissions have increased in western Canada and concerns have been raised about the potential impacts of these emissions on western Canadian ecosystems. In order to fully assess the impact and/or potential impact of acidifying emissions on western Canadian ecosystems, two measures are needed: 1) an improved understanding of levels of acid deposition in the region, and 2) critical loads for the region that are comparable to those in eastern Canada.

Status in reducing acidifying emissions

Emission reductions in the Ontario, Quebec, New Brunswick, & Nova Scotia and the SOMA

> Targets and schedules for further SO_2 emission reductions in Ontario, Quebec, New Brunswick and Nova Scotia will be established by each jurisdiction in consultation with stakeholders. Concurrently, the four above provinces will also work cooperatively to develop targets and time-lines for the designated area (SOMA). These, when combined with comparable further U.S. emission reductions, will move towards achieving critical loads for wet sulphate deposition in eastern Canada. They will report on progress to Energy and Environment Ministers in 1999.

The four provinces established new provincial targets for SO_2 emissions in 2000 and 2001. The following table shows these new targets and the schedules for their achievement. Previous commitments (emission caps) under the Eastern Canada Acid rain Program are provided for comparison.

Table 2: SO_2 reduction targets for Ontario, Quebec, New Brunswick and Nova Scotia

Province	Former Eastern Canada Acid Rain Program Caps	New targets under The Canada-Wide Acid Rain Strategy (kilotonnes)	Timelines for new targets
Ontario	885 kt	▪ 442.5 (50% reduction)	2015[a]
Quebec	500 kt	▪ 300 (40% reduction) ▪ 250 (50% reduction)	2002 2010
New Brunswick	175 kt	▪ 122.5 (30% reduction) ▪ 87.5 (50% reduction)	2005 2010
Nova Scotia	189 kt	▪ 142 (25% reduction) ▪ 94.5 (50% cumulative reduction goal)[b]	2005 2010

[a] Ontario has proposed and is consulting on the proposal to advance this timeline to 2010.

[b] Ninety-four and a half kilotonnes is a reduction target and not a cap. Nova Scotia's commitment is to reduce SO_2 emissions by 25% from the existing cap by 2005 and to further reduce emissions to achieve a cumulative reduction goal of 50% by 2010 from existing sources.

One action that will be required in the future is the development of targets and timelines for the designated Sulphur Oxide Management Area as part of the United Nations Economic Commission for Europe Protocol on Acidification, Eutrophication and Ground-level Ozone. Canada has signed this protocol; to ratify it, Canada will need to specify its emissions ceilings in the Pollutant Emission Management Area (PEMA) for SO_2, nitrogen oxides (NO_X) and volatile organic compounds (VOC). Since it is may not be possible to establish specific numeric pollutant emission targets for 2010 for all the pollutants covered at this time, Canada will continue to investigate how best to develop a package of provisions for ratification.

Update on various issues which could impact the ability of jurisdictions to meet their emission reduction commitments

Nova Scotia has committed to emission reduction targets for SO_2 and NO_X in its Energy Strategy (2001). These commitments have been included in the provincial Green Plan, Towards a Sustainable Environment (2003). Activities and proposals such as possible development of domestic coal reserves will be expected to observe these criteria. The emission reductions in the Energy Strategy were established with a view to enabling new development without compromising the environment.

The province has proposed amendments to its Air Quality Regulations to implement SO_2 and NO_X reduction commitments announced in the Energy Strategy. The new regulations will reduce the existing provincial SO_2 cap by 25% to 141,750 tonnes beginning in 2005. Also proposed is a corresponding 25% cap reduction for the province's largest SO_2 emitter (Nova Scotia Power, NSPI).

The Energy Strategy sets out a target 50% reduction in SO_2 emissions from existing sources (to 94,500 tonnes) by 2010. The draft Air Quality Regulation amendments will establish a further 25% reduction in NSPI's SO_2 emission cap in 2010, and the submission of SO_2 emission reduction plans by large industrial emitters. These measures will form the basis for implementing the 2010 emission reduction commitment.

The Energy Strategy additionally includes a commitment to reduce NO_X emissions by 20% from 2000 levels by 2009. The regulatory amendments set a limit on NSPI's NO_X emissions, capping emissions 21,365 tonnes annually in 2009.

Nova Scotia is also participating in national initiatives to reduce emissions (including acidifying emissions) from several industrial sectors.

New Brunswick anticipates meeting its SO_2 emission caps despite the uncertainty of various power generating stations, such as Pt Lepreau, Grand Lake and Coleson Cove. At this time, the future of the Pt. Lepreau Generating Station is undecided. In May 2004, NB Power began conducting an analysis of the options for the generating station; upon completion of the analysis in early 2005, the NB Power Board of Directors will present its recommendations to the provincial government for a final decision. The coal fired Grand Lake Generating Station will either be closed or refurbished with new pollution control equipment by 2010. Uncertainty remains with respect to the supply of Orimulsion fuel to the Coleson Cove thermal generating station, NB's largest source of electrical generation. However, regardless of the nature of the fuel source at Colson Cove, NB Power is expected to realize the reductions in emissions of SO_2 of 77% by 2005 from this facility as originally proposed.

In New Brunswick, the approvals process is the mechanism for controlling major industrial point sources of air emissions; approvals are normally renewed on a 5-year cycle. These approvals are considered by applying a multi-pollutant management approach to maximize emission reduction opportunities. New SO_2 emissions caps are being applied to many existing facilities as these approvals are renewed, to fulfill New Brunswick's commitment to new SO_2 emission reduction targets. Any new fossil fired power generation in New Brunswick would be required to meet provincial SO_2 emission limits.

As of 2002, SO_2 emissions in Quebec were below the provincial cap of 250 kilotonnes (kt) per year. Efforts will now focus on maintaining levels at or below this level.

Ontario is committed to reducing its emissions of SO_2 by 50 percent from its Countdown Aid Rain Cap of 885 kt per year by 2015. By 2000, Ontario had reduced its SO_2 by 33 percent from this base line. Since 2000, Ontario has implemented a number of key regulatory initiatives to achieve further reductions, for example:

- Ontario's Emissions Trading regulation (O. Reg. 397/01) establishes SO_2 and NO_X emission caps from Ontario Power Generation's fossil plants and the electricity sector;
- The coal-fired Lakeview Generating Station in Mississauga will have to cease burning coal by April 2005 (O. Reg. 396/01);
- The Ontario government is also committed to phasing out Ontario's coal-fired power stations by 2007;
- Through provincial Orders, INCO and Falconbridge are required to reduce their allowable SO_2 emissions by 34 percent, effective 2007;
- Ontario Reg. 212/02 requires manufacturers, importers and blenders of gasoline for sale or use in Ontario to submit quarterly public reports on the sulphur content of their gasoline. These reports are available on the Ministry's website to help customers make informed purchase decisions. The sulphur content of Ontario's gasoline has decreased over time;
- In June 2004, Ontario announced a Five-Point Plan for Cleaner Air that included the release of an industrial emissions reduction plan that outlines the details of a proposed regulation that would set tough new NO_X and SO_2 emissions limits on 30 facilities in seven industry sectors;
- GO Transit, Ontario's major public transit rail system in the Golden Horseshoe area of Lake Ontario, has moved to the use of low-sulphur diesel fuels year-round in its bus fleet. During the traditional smog season from May through September, the rail fleet also uses low sulphur diesel fuels.

For other initiatives being undertaken by Ontario to reduce emissions of SO_2 and NO_X, please refer to Ontario's Clean Air Plan of June 21, 2004 at http://www.ene.gov.on.ca/envision/air/airquality/clap.htm and in particular, the Clean Air Action Plan at http://www.ene.gov.on.ca/programs/4708e.pdf.

Further SO_2 reductions in key areas of the U.S. and incorporation of these commitments into the Canada–U.S. Air Quality Agreement

> The federal government, with support from the provinces and territories, will aggressively pursue further SO_2 emission reduction commitments in key areas of the United States and the incorporation of these commitments into the Canada-United States Plan of Action for Addressing Transboundary Air Pollution and/or the Canada-United States Air Quality Agreement, and will report on progress to Energy and Environment Ministers in 1999

Canada is committed to aggressively seeking further emission reduction commitments from the U.S. with the assistance of the provinces.

The 1991 Canada–U.S. Air Quality Agreement is a multi-party agreement initially negotiated to reduce acidifying emissions, SO_2 and NO_X. In December 2000, Canada signed an Ozone Annex to the Agreement that commits each nation to reduce its emissions of ozone-forming substances (NO_X and VOC). The predicted reductions in transboundary NO_X emissions, an acidifying pollutant, are expected to lead to reductions in nitrogen deposition.

In January 2003, Canada committed to work with the U.S. to further improve air quality and work for a healthy environment. Together, Canada and the U.S. launched three major pilot projects in June 2003 under the Border Air Quality Strategy. These projects serve as the foundation for developing new strategies to improve air quality and address transboundary air pollution of concern to Canadians and Americans.

Also in 2003, Canada and the U.S. agreed on a path forward to address transboundary particulate matter (PM), which will have co-benefits in terms of further reducing acidifying pollutants. In 2004, Minister Dion and U.S. Environmental Protection Agency Administrator Leavitt endorsed a recommendation to consider a future negotiation of an annex to the Agreement to address transboundary PM and its precursors. The incorporation of new emission reduction commitments to the Air Quality Agreement to address secondary fine particle formation will inevitably include further reducing SO_2 and NO_X emissions; this will have substantial benefits to acid deposition reduction because these are the same pollutants that cause acid deposition.

Finally, Canada has taken the opportunity to submit comments to the U.S. when they have made amendments to legislation to reduce air pollution where appropriate and when the comment period allowed the federal government the opportunity to convey the potential impact of any amendments to Canadian air quality and acid deposition.

Keeping clean areas clean

> In areas where acid deposition is below critical loads, governments will take steps to minimize growth in emissions of SO_2 and nitrogen oxides (NO_X), and will seek opportunities for improvements where possible.

Measures put in place by various jurisdictions to minimize growth in emissions and control acid deposition include, for example, the use of permitting procedures to control emissions from new and existing sources, inter-provincial cooperation to assess and limit the transboundary flows of pollutants, the use of low-sulphur fuels, and other measures.

The management approach in the case of issues such as acid deposition involves reducing their precursor emissions, namely SO_2 and NO_X, whenever possible. Many jurisdictions are taking a multi-pollutant approach, recognizing that it is more efficient to deal with a suite of pollutants and several air quality issues simultaneously rather than one at a time or issue-by-issue. Taking action against ground-level ozone and PM also involves reducing the precursor emissions (SO_2, NO_X, VOC and NH4). For many jurisdictions, this is done in conjunction with concerted regional control efforts, since the majority of air pollutant problems, especially in Atlantic Canada, originate outside the provincial or international boundaries.

Most jurisdictions signed the Canada-Wide Standards (CWS) for PM2.5 and ozone, which commits them to a variety of actions, including emission control measures, aimed at achieving compliance with these standards by 2010. For example, efforts to reduce NO_X emissions can simultaneously help to reduce ground level ozone, acid deposition, and PM. The CWS includes provisions for continuous improvement (CI) and keeping clean areas clean (KCAC). Pollution prevention and KCAC actions in support of *The Strategy* are being identified through jurisdictional implementation planning under the PM and ozone CWS process. The latter program is evolving nationally. Under the Joint Action Implementation Coordinating Committee (JAICC), a multi-stakeholder Continuous Improvement/Keeping Clean Areas Clean Task Group has finished their technical work on developing a national guidance document. They are forwarding it to JAICC for jurisdictional policy review and finalisation.

Nova Scotia's draft Implementation Plan for the CWS for PM and Ozone sets out several air quality management activities relating to SO_2 and NO_X emissions. Attendant measures will be incorporated into the provincial implementation plan in accordance with the national Guidance Document which is currently being developed.

In addition to prescribed emissions reductions, the Nova Scotia Energy Strategy specifies several other measures for improving environmental performance and preventing pollution. These include requirements for best available technologies for new and upgrading facilities, improving information for assessing the effectiveness of emission reduction initiatives, maintaining a regulatory framework that encourages the use of cleaner and alternative fuels, and a 2% sulphur content limit on heavy fuel oil, which will be included in the new Air Quality Regulations.

Ontario is part of the CWS process developing the Guidance Document on Continuous Improvement and Keeping-Clean Areas Clean. Ontario's current CWS-related actions have the co-benefit of improving air quality in areas of the province which currently comply with the CWS thereby contributing towards meeting the CI/KCAC objectives.

Ontario also has a number of other province-wide initiatives which contribute to CI/KCAC, for example: retail sales tax rebate programs for solar energy systems, vehicles powered by alternative fuels, and other renewable energy technologies.

Alberta has a provincial acidifying emissions and acid deposition management framework that has been implemented since 1998 to ensure that acid deposition will be maintained below target and critical load levels. In Alberta, the target load is lower than the critical load. A number of programs have been implemented to successfully reduce SO_2 emissions; examples are the Alberta Energy and Utilities Board's De-grandfathering program, coupled with the Sulphur Recovery Guidelines, and the Clean Air Strategic Alliance's (CASA) Flaring Reduction.

Alberta adopted the management framework for air pollutant emissions from the electricity power sector as recommended by the CASA in 2004. The proposed actions in the framework will result in substantial reductions in SO_2 (46%), NO_X (32%), PM (51%) and mercury (50%)

emissions. Alberta also accepted the CASA recommended framework for implementing the CWS for PM and ozone. It requires a regional "trigger level" approach to ensure achievement of the CWS in all Alberta. Once a specific trigger level is exceeded, a management plan will be designed and implemented to prevent exceedance of, or reduce air quality to below, the CWS levels.

To address the projected increase of emissions in northeast Alberta due to increased oil sands development activities, the Cumulative Environmental Management Association (a non-profit multi-stakeholder organization that includes government, industry, and environmental organizations and First Nation representatives and endorsed by Alberta Environment and Alberta Energy and Utilities Board) has developed a management system for acidifying emissions. The management system was accepted by the Alberta government and will be implemented in the region.

Pollution prevention

> Consistent with the CCME National Commitment on Pollution Prevention, jurisdictions will ensure, to the extent possible, that new sources of SO_2 and NO_X emissions in all parts of Canada, including government facilities, use processes, practices, materials, products and energy that avoid or minimize creation of these pollutants and, where appropriate, apply similar provisions to existing sources.

Jurisdictions are committed to implementing this commitment as it recognises that pollution prevention is the preferred strategy for protecting the environment. This strategy applies to all jurisdictions, from coast to coast, and needs to be applied to all new sources in order to prevent new acid deposition problems from developing, or in areas where they already exist, from being aggravated. Measures put in place by jurisdictions include the development of pollution prevention plans for key emitting facilities and pollution prevention outreach and awareness in key sectors.

Nova Scotia, through its Department of Energy, is promoting energy conservation as the preferred means of reducing the demand for both fossil fuels and electricity (which is mainly produced by fossil fuel combustion). The province is also setting a target for electricity produced from renewable sources. Both initiatives are expected to reduce SO_2 and NO_X emissions.

Nova Scotia is also continuing to develop its Green Plan, which will serve as both an internal commitment to reduce energy demand by improving government building and transportation efficiency through enhanced design and procurement, and as an external model to the industrial/commercial sectors and the general public.

New Brunswick regulates new sources of SO_2 and NO_X through the approvals process. In the province, designated emission sources, including new sources, must receive an air quality approval that specifies operating conditions and emission limits. New sources must also meet new source pollution prevention standards. An approval can be in effect for up to five years, at which time a review takes place, with public participation for large sources, and any changes in operating conditions and emission limits are made before a new operating approval is issued.

Ontario, the federal government and the City of Toronto, through the Ontario Centre for Environmental Technology Advancement, co-fund a multi-year Toronto Region Sustainability Program for small to medium sized enterprises (SMEs) and health care facilities in the areas of sustainable development and environmental performance, through pollution prevention planning. The program focuses on Greenhouse Gas and Smog Reduction Initiatives by providing subsidized pollution prevention or eco-efficiency assessments.

In addition, the Government of Ontario, along with the Government of Canada and the City of Toronto, announced in March 2004 a one billion dollar funding package in municipal transit. This agreement will average $70 million per year from each government over five years to improve, modernize and expand the Toronto Transit Commission (TTC) system and help provide better transit service to the TTC's 1.3 million daily riders.

Alberta Environment works with industry to practice pollution prevention to reduce or eliminate pollution, environmental disturbance or waste at the source through the approvals process. Existing emission sources in the oil sands industry have significantly reduced or plan to reduce SO_2 emissions in their operations. New emission sources must incorporate pollution prevention and CI in their operation and production design.

Acid Deposition Science & Monitoring

Assessing the role of nitrogen

> The federal government will maintain an active role in acid rain science and monitoring in cooperation with provincial and territorial governments, and federal/provincial/territorial governments will cooperate (while respecting the resources and capabilities of different governments) in assessing the role of nitrogen in acidification.

Over the last five years, the Acid Rain Working Group and subsequently, the Acid Rain Task Group[1], has supported several projects to assess the role of nitrogen in acidification. These projects have contributed to our understanding of the transport and fate of nitrogen in terrestrial ecosystems, the capacity of terrestrial ecosystems to utilize nitrogen and the role of forest harvesting in nitrogen dynamics. All of this work has supported the development of critical loads for terrestrial ecosystems as described in the previous section on critical loads. Several individual jurisdictions have done some focused work on nitrogen pollution, as described in the following paragraphs.

[1] Acid Rain Task Group was established by the National Air Issues Coordinating Committee to ensure progress in implementing *The Strategy*. The group is composed of federal and provincial/territorial government representatives and stakeholders.

Ontario carries out regional scale atmospheric modelling to assess the impact of emission reduction scenarios and it provides integrated results for ozone, PM and potentially for acid deposition.

Critical loads of acidity have been estimated for approximately 1,500 lakes in five regions in south-central Ontario using lake survey information and deposition (nitrates and sulphates) estimates, and working with scientists from Trent University and the Norwegian Institute for Water Research. Long-term lake monitoring data generated at Dorset and in the greater Sudbury area have also enabled an assessment of the recovery of aquatic systems resulting from emission reductions, both locally and in eastern North America.

In Alberta, as part of the acidifying emissions management system in the Athabasca Oil Sands region, dynamic simulation models are under development for soil and aquatic ecosystems. Monitoring and modeling will be conducted in the region. A five-year research program will address the role of nitrogen in acidification and eutrophication.

Responses to the recommendations in the 1999 report on the adequacy of acid rain science programs in Canada

> With the goal of ensuring the capability to assess both the degree of environmental improvement achieved and the adequacy of the control programs, federal/provincial/territorial governments (each determining its own level of involvement) will review the adequacy of acid rain science and monitoring programs and report, with recommendations, to Energy and Environment Ministers in 1999.

In 1999, following the adoption of *The Strategy*, federal, provincial and territorial scientists reviewed Canada's acid deposition science and monitoring programs. The objective of the review was to ensure that there was an existing "capability to assess both the degree of environmental improvement achieved and the adequacy of the [emission] control programs". The review, entitled the *1999 Review of Acid Rain Science Programs in Canada* (The Review), described the status of science and monitoring programs in Canada, and included a list of both general and specific recommendations to address gaps in the capacity of these programs.

As part of the five year review of *The Strategy*, the Acid Rain Science Coordination Group (science sub-group) of the Acid Rain Task Group reviewed progress by federal and provincial governments in implementing the recommendations in The Review. Current members of the science sub-group, from New Brunswick, Quebec, Ontario, Saskatchewan, Alberta, British Columbia, Natural Resources Canada (NRCaN) and Environment Canada (EC), provided information for this update.

General recommendations

1) Maintain the monitoring components of the existing program, and not subject them to further cuts.

Air and precipitation monitoring:

The backbone of the federal/provincial air monitoring networks in Canada has been EC's Canadian Air and Precipitation Monitoring Network (CAPMoN). In 1999, this network consisted of 19 "precipitation only" and "air and precipitation" stations. As of 2004, this network had expanded to 22 stations. These stations include "precipitation monitoring only" stations in Ontario (Bonner Lake, Pickle Lake and Warsaw Caves), Quebec (LG4 and Mingan), New Brunswick (Harcourt), Nova Scotia (Jackson), and Newfoundland and Labrador (Goose Bay and Bay d'Espoir); and, "air and precipitation" stations in the Northwest Territories (Snare Rapids2), British Columbia (Saturna), Alberta (Esther, Bratt's Lake), Ontario (ELA, Algoma, Longwoods, Sprucedale, Egbert and Chalk River), Quebec (Frelighsburg, Lac Eduoard and Chapais) and Nova Scotia (Kejimkujik). Since 1999, one "precipitation only" and one "air and precipitation" station was added in Ontario and Quebec, respectively. The Sutton, Quebec site was moved to Frelighsburg, Quebec. No CAPMoN sites have closed since 1999.

Several provincial precipitation monitoring networks have closed in the last decade, leaving large gaps in our understanding of the levels of acid deposition across the country. Prior to 1999, Manitoba and British Columbia closed their networks. Since 1999, Newfoundland and Labrador and Ontario have closed their networks.

Provincial governments that continue to operate precipitation monitoring networks include the following:

Nova Scotia continues to operate one precipitation monitoring station at Sherbrooke in cooperation with EC. The province also collected weekly precipitation samples as part of a multi-partner study at Pockwock Lake near Halifax until December 2003.

In New Brunwick, the Department of the Environment and Local Government (DELG) maintains an acid precipitation monitoring network with 13 sites located around the province. There is no ambient air monitoring in New Brunswick specifically for the purpose of acid deposition monitoring. There are several networks that measure SO_2 and NO_X and sites that measure ozone and PM but most of these sites are urban or located around major point sources.

Prince Edward Island continues to operate one precipitation monitoring site at Cardigan, for which EC provides lab analysis.

In Quebec, the Ministry of the Environment (MENVQ) maintains two networks to monitor air and precipitation. One is le Réseau d'échantillonnage des précipitations du Québec (REPQ), an acid deposition network with 34 sampling sites in operation. The second network is the Air Quality Monitoring Network which consists of 80 stations to measure gaseous pollutants and PM.

[2] The Snare Rapids site is operated in partnership with the NWT's Environmental Protection Service.

Alberta Environment continues to operate two networks: a network of nine wet deposition monitoring stations (Precipitation Quality and Monitoring Program) and an ambient air quality monitoring network.

All of the other provinces monitor ambient air quality only. For example, the Ontario Ministry of the Environment (OME) operates an ambient air quality monitoring network that consists of 45 stations. Gaseous pollutants (SO_2, NO_X, ozone, carbon monoxide, total reduced sulphur compounds) and PM2.5 are monitored at these stations.

Lake monitoring:

a) Large-scale surveys

No national or regional surveys of aquatic chemistry and/or biology have been carried out since the 1980s. Some provincial surveys have been conducted by Quebec and New Brunswick (in conjunction with EC).

b) Temporal networks

As part of the National Lake Monitoring Program, EC has conducted semi-annual sampling at 10 lakes in New Brunswick, 80 lakes in Nova Scotia and 30 lakes in Newfoundland. In cooperation with the NB-DELG, EC has periodically sampled approximately 100 lakes (the last survey was done in 2001).

In Quebec, EC continues to run the Acid Rain Quebec Network Lakes. Forty-six lakes, all on Boreal Shield (from Témiscaminque to North Coast region) are sampled twice a year. Lake monitoring efforts by the MENVQ were oriented towards spot surveys of lakes on a five-year cycle but stopping in1990 due to lack of funding.

In Ontario, EC continues to run the Acid Rain Biomonitoring Program. Twenty-two chemical parameters are measured in 88 lakes in Algoma (out of 224 lakes), 86 in Muskoka (out of 219 lakes), and 93 in Sudbury (out of 141 lakes) on a three year rotational basis.

OME monitors streams and lakes plus forest health to monitor the effects of acid deposition and recovery as emissions are reduced.

c) Intensive monitoring sites

In Ontario, EC continues to monitor water chemistry and stream export year-round at the Turkey Lakes Watershed (TLW) site (four lakes sampled bi-weekly, and six streams sampled weekly). EC conducts directed chemical and biological sampling at 62 core food chain lakes and at 50 large lakes (> 20 ha) annually under the Acid Rain Biomonitoring Program.

In Québec, the Ministry of Natural Resources, Wildlife and Parks (MNRWP) with EC's collaboration continue to monitor water chemistry and stream export year-round at Lake Laflamme Watershed. MNRWP also monitor, on a weekly basis, two other lakes in Quebec

(Lake Clair and Lake Tirasse). EC conducts biological sampling at 24 core food chain lakes as part of the EC-Quebec Region Acid Rain Biomonitoring network.

EC has conducted intensive, weekly monitoring at three watersheds in or near Kejimkujik National Park since 1982. The sites are co-located with the Kejimkujik CAPMoN site.

Until 2003, the Nova Scotia Department of Environment and Labour collected lake water samples four times per year at a water quality monitoring station at Pockwock Lake near Halifax as part of a multi-partner study. About 30 lakes were monitored in Nova Scotia through the combined efforts of partners in the Water Quality Monitoring Work Group of the New England Governors and Eastern Canadian Premiers (NEG/ECP).

In British Columbia, lakes are sampled at spring overturn at a number of trend sites on Vancouver Island. The Greater Vancouver Regional District (GVRD) monitors Seymour Lake (north of Vancouver).

2) Put in place a small team of scientists with the expertise required to assess the role of nitrogen on surface water acidification and forest productivity in Canada.

No scientific team has been officially established; nevertheless, these experts are working together in informal teams.

Scientists from EC, NRCaN, Fisheries and Oceans Canada (DFO), provincial governments and universities have conducted surface water acidification studies in intensive research sites in Muskoka-Haliburton, TLW, Kejimkujik National Park and the Experimental Lakes Area (ELA).

In 2001, MENVQ produced a paper on the state of science related to nitrogen in surface waters on behalf of the NEG/ECP. Work on surface waters is mostly being done under the NEG/ECP Acid Rain Action Plan. The Quebec MNRWP is conducting studies on the role of nitrogen on forest growth and productivity.

As part of a multi-partner study at Pockwock Lake, Nova Scotia, nutrient cycling in a forest ecosystem which includes nutrient input from precipitation was investigated.

A project is underway to develop critical loads for nitrogen and sulphur for surface waters (including marine estuaries) and forests in the Georgia Basin, British Columbia. For this purpose, a critical load working group with participants from all levels of government and academia has been recently formed with EC (Pacific and Yukon Region) as the lead. The project is being funded by the Georgia Basin Action Plan.

Critical loads for sulphur and nitrogen are being developed for terrestrial and aquatic ecosystems by researchers from EC in collaboration with the eastern Canadian provinces (via NEG/ECP) and academia.

3) Maintain the core funding of ecological monitoring sites that will host many of the more specific science research activities (nitrogen, base cation depletion, geochemical pathways, etc.); these sites are required for research on nitrogen cycling.

Core funding has been maintained for the ecological monitoring sites in eastern Canada, which are Kejimkujik (Nova Scotia), Lac Laflamme (Quebec), TLW (Ontario), Muskoka-Haliburton (Ontario), and ELA (Ontario).

The Quebec MNRWP conducts intensive research at three forested watersheds.

The University of British Columbia (UBC) operates experimental forest sites in Vancouver, Shawnigan Lake and Flume Creek for the evaluation of nutrient supply and demand.

4) Investigate important processes that regulate the acidification and recovery of terrestrial ecosystems, including the release of sulphur stored in soils and/or wetland, and the loss of base cations from ecosystems; ecological monitoring sites provide a major contribution to this research.

In Quebec and Nova Scotia, EC has conducted an assessment of the capacity of soils and wetlands to store sulphur and the flux of base cations in soils in 22 watersheds (part of the Acid Rain Quebec Network Lakes); Quebec MNRWP and Trent University collaborated on this research. EC has also developed the use of dynamic acidification modelling to predict how water chemistry of acidified waters will change with time-dependent changes in deposition.

In conjunction with the eastern Canadian provinces and EC, researchers at the University of New Brunswick are studying the effects of acid deposition on forest productivity using a dynamic model. This research examines the rate of ecosystem acidification in response to different emission control scenarios.

Quebec MNRWP is conducting acid deposition studies at three forested watersheds.

5) Investigate the relationships and synergies between global changes factors such as acid deposition, mercury, climate warming, etc. Assess the co-benefits of SO_2*, mercury and greenhouse gases controls on acidification and contamination recovery.*

EC, in conjunction with academia, has conducted research on the influence of drought (global warming implication) on sulphate export from Ontario and Quebec lakes and drought induced episodic acidification in Ontario lakes.

EC has conducted studies on the relationship between acid deposition and mercury concentrations in the blood of highly contaminated adult and young common loons, loon eggs and their fish prey at Kejimkujik National Park in Nova Scotia.

EC has assessed linkages and co-benefits of acid deposition and other environmental issues such as eutrophication and climate change.

New Brunswick is working on a provincial Climate Change Action Plan and has a provincial Mercury Action Plan. New Brunswick and EC are working to develop a mercury survey of the region that will be implemented in the fall of 2004. This will also be used to enhance the acid rain survey database.

Quebec is a partner in the OURANOS consortium (Consortium on the Regional Climatology and Adaptation to Climate Change). The MENV monitors more than 200 climatology sites in Quebec.

6) Re-establish a science and monitoring coordinating committee, similar to the Federal/Provincial Research and Monitoring Coordinating Committee in the 1980's, to improve overall coordination between jurisdictions and collaboration between scientists.

No science and monitoring coordinating committee has been officially re-established although some provinces have expressed interest in participating on such a committee.

7) Upgrade the Integrated Assessment Model (IAM) in order to include nitrogen species and to include the most up-to-date information.

Funding was provided to upgrade the Integrated Assessment Model.

8) Reinstate the LRTAP round-robin interlaboratory comparison quality assurance program.

Funding has not been reinstated to carry out this type of program. Those governments supporting acid deposition monitoring networks participate in their own quality assurance programs.

9) Maintain a strong partnership with the NEG/ECP stakeholders to share information and resources.

Newfoundland, Nova Scotia, New Brunswick, Quebec and EC are involved in the implementation of the NEC/ECP Acid Rain Action Plan. Currently, an employee from NB-DELG is the co-chair of the NEG/ECP Acid Rain Steering Committee.

Specific science and monitoring activities needed to address knowledge gaps

1. Deposition

Science needs:

i) Implement suitable methods of estimating nitrogen deposition.

EC examined and assessed suitable methods of estimating the contribution of various nitrogen species to total nitrogen deposition. At this time, EC is using a combined measurement/modelling technique known as inferential dry deposition method.

ii) Investigate whether combined use of Lagrangian models and data analysis provides a useful tool for improving deposition analyses.

EC has compared the outputs of Lagrangian with Eulerian models for determining acid deposition loadings.

iii) Investigate whether passive sensors provide useful information on deposition in western Canada where, in contrast to eastern Canada, dry deposition is an important factor.

EC has examined the capability of passive sensors to provide deposition information in western Canada.

iv) Review the CAPMON-AIR dry deposition network to ensure adequate regional coverage.

In the past five years, EC developed a new inferential dry deposition model for estimating dry deposition velocities at CAPMoN sites. The model output, daily-average dry deposition velocities, times the ambient concentrations of gases and particles measured at CAPMoN sites, calculates dry deposition fluxes of gases and particles.

<u>Monitoring needs:</u>

i) Review the process of environmental reporting, i.e. the means by which observed data and analyses are reported in order to accelerate the process and improve information outreach.

Although no review was actually conducted, steps have been taken to accelerate the reporting process and improve information outreach.

New Brunswick-DELG has a new acid rain database, which will speed up data access and reporting and will also reduce the delay in providing data to the Canadian National Atmospheric Chemistry Database (NatChem).

Quebec publishes technical reports and documents for the public and NEG/ECP on a regular basis.

EC has an acid rain website to disseminate acid rain science and publishes occasional reports in order to disseminate information and data.

ii) Add three monitoring sites to better assess deposition and trends at the northern edge of the geographical regions most affected by acid deposition, i.e. Northern Ontario, Northern Quebec and Nova Scotia.

Precipitation monitoring sites were added to Northern Ontario (Pickle Lake) and Northern Quebec (LG4).

iii) Establish a station in northern Saskatchewan in order to determine deposition trends in that sensitive area of western Canada, and determine whether that site compensates for the closure of the Island Lake station (Manitoba).

A northern Saskatchewan site has not been established; however, the possibility of adding such a site is currently being discussed. This site would address regional issues associated with emissions from oil sand developments but it would not compensate for the loss of the Island Lake station in Manitoba.

iv) Develop an inventory for emissions of base cations.

EC continues to work on developing a base cation emissions inventory.

v) Install fog water collectors in coastal areas or at high elevation sites.

No fog water collectors have been installed; however, University of New Brunswick is involved in the Collaborative Mercury Research Network (COMERN) project, which has portable fog collectors operated by volunteers.

2. Surface waters

<u>Science needs:</u>

i) Assess the impact of nitrogen and nitrogen saturation on surface water acidification and eutrophication.

EC has examined provincial/territorial data sets to assess the impact of nitrogen on surface water acidification.

Researchers at Queen's University and Trent University, with help from EC, are examining Trends in Eutrophication and Acidification in the Maritimes (T.E.A.M.). They have been granted a 5-year NSERC Strategic Grant to study the development and application of water quality assessment tools in New Brunswick and southern Nova Scotia using paleoecological and modelling techniques.

Quebec conducted a literature review on this subject for the NEG/ECP in 2001. The matter was also addressed in the Rouyn-Noranda study published by MENV in 2003.

In British Columbia, there is research underway to determine the sensitivity of surface waters in the Georgia Basin to eutrophication and acidification. This is being carried out under a project to develop critical loads for the Georgia Basin.

ii) Research the causes and effects of base cation depletion in surface waters, and its relevance to lake and river recovery from acidification.

EC has conducted studies on base cation depletion and chemical recovery in lakes in Sudbury, Ontario, at the TLW, Ontario, and in 22 watersheds (soils and surface water) in Quebec (the 22 lakes are part of the Acid Rain Quebec Network Lake).

Researchers from Laurentian University have examined calcium decline and chemical status in northeastern Ontario lakes.

Researchers from University of New Brunswick are examining base cation depletion through forest effects and productivity projects in Nova Scotia as well as across other regions of eastern Canada.

The Quebec MENV addressed causes and effects of base cation depletion in surface waters and recovery from acidification in the 2004 Rouyn-Noranda study published by MENV.

iii) Develop acidification models, or modify existing ones, that can provide critical load estimates for both sulphate and nitrogen (nitrates).

The Steady-State Mass Balance (SMB) model was used to develop sulphate and nitrogen critical loads for terrestrial ecosystems in Newfoundland and Labrador, Nova Scotia, New Brunswick, Quebec and Ontario. Similarly, Henriksen's Steady-State Water Balance model (SSWC) model has been applied to develop sulphate and nitrogen critical loads for surface waters. Both projects were conducted for the NEG/ECP Acid Rain Steering Committee.

The dynamic "Model of Acidification of Groundwaters in Catchments – MAGIC" is being used by EC and partners at Trent University to predict long-term changes in water chemistry in eastern Canadian lakes. MAGIC still needs to be further improved however, to better include nitrogen dynamics and to link these to ecological recovery.

British Columbia has recently initiated a project to develop critical loads for the Georgia Basin. Scoping and review for model development is in progress.

iv) Assess the geochemical pathways of sulphur- and nitrogen-induced acidification at the watershed level through calibrated watershed studies.

Watershed calibrated studies are being conducted by the Quebec MNRWP at three forested watersheds.

In New Brunswick, the Fundy Model Forest maintained several catchment studies at Hayward Brook. Also, the University of New Brunswick Groundwater studies group and DFO operate studies at Catamaran Brook and the University of New Brunswick Forestry group conducts sub-catchment studies in northwestern New Brunswick.

v) Evaluate costs and options to determine whether aquatic biota are responding to emission decreases and lake chemical recovery in areas where surface water chemistry has changed.

EC is currently involved in an evaluation of costs and options to conduct various acid deposition research and monitoring activities. An estimate of the costs of conducting work to determine biotic responses to emission decreases and chemical recovery is available.

vi) Evaluate the relationship between acid pulses and fish kills in salmon rivers of Atlantic Canada.

Currently, the relationship between these phenomena is not being evaluated.

vii) Initiate research and monitoring of "brown-water" systems in order to estimate their role in surface water acidification and their critical loads. Such ecologically-rich ecosystems are of great importance for Saskatchewan and several areas of Eastern Canada.

No "brown water" systems research and monitoring are being conducted with respect to acidification.

<u>Monitoring needs:</u>

i) The most urgent task is to ensure that lake and river monitoring, i.e. sampling of sites included in the "temporal" networks, be carried out in year 2000. This sampling, traditionally carried out by EC, has been seriously threatened by underfunding in the past few years. Emergency funding was provided to carry out a sampling campaign during the 1999 season. The Review Team is particularly concerned that multi-year time series of surface water chemistry measurements may be broken unless adequate resources are available for the next sampling season, i.e. in the spring of 2000. The Review Team considers it of critical importance that this component of the aquatic program be continued without interruption.

Monitoring at "temporal" acid deposition network sites in Newfoundland and Labrador, Nova Scotia, New Brunswick, Quebec and Ontario was conducted in 2000, 2001, 2002 and 2003. The Newfoundland and Labrador, Nova Scotia, New Brunswick and Quebec data were collected within regional monitoring programs of EC. The Ontario information was also from EC monitoring programs, but supplemented by monitoring data collected by Fisheries and Oceans Canada and the Ontario Ministry of Environment.

Quebec Ministry of Environment (MENVQ) no longer has a lake temporal monitoring program, but the province is involved with the NEG/ECP's WARNING lake trend network.

British Columbia and EC maintain a network of about 30 stations throughout British Columbia that is sampled about every two weeks. The network is reviewed periodically and, if no trends are identified in the data after a minimum of ten years, stations are removed from the network. These stations are re-instituted after about five years for a one-year period to confirm that no trend is apparent.

ii) Temporal sites need to be added in ecologically sensitive areas that are currently covered by the temporal network, e.g. surface waters in southern and central New Brunswick, western

Quebec, the Parry Sound area of Ontario, sensitive lakes in northern Saskatchewan and salmon spawning rivers in the southern uplands of Nova Scotia.

No temporal sites have been added in the sensitive locations mentioned above. Temporal sites were added in 2000 in southwestern New Brunswick.

In the past five years, the British Columbia federal-provincial temporal network has added seven new stations in coastal British Columbia (the most acid-sensitive area).

iii) The ecologically-sensitive portion of spatial lake and river surveys conducted in the 80's should be done again to quantify the benefits of emission reduction programs in North America.

Some lake surveys have been repeated over time but in ways that make them unsuitable for the type of non-parametric test procedures used in trend analysis. Nevertheless, they still provide information on how lake chemistry has changed through time.

New Brunswick and EC periodically sample approximately 100 lakes in the southwestern and north-central part of the province. The lakes have been sampled up to four times since 80s, with the last complete survey conducted in 2001.

In Quebec, the Rouyn-Noranda water quality survey was conducted for the fourth time in 2001 (third time since the 80s). A new survey will be conducted in 2006 on 50 acidic and transition lakes previously visited between 1986-1990 through the Quebec Lake Survey. MENV does not have the necessary budget to revisit the 1253 lakes sampled as part of the QLS between 1986-1990.

3. Forests and soils

<u>Science needs:</u>

i) Support and participate in the forest mapping initiative promoted by eastern provinces and New England states. This project involves a two-ways approach (site specific and ecological areas interpolation) to the development and adaptation of the SMB model for critical loads calculation of nitrogen and sulphur in forest ecosystems. The main goal is the production of critical load maps and exceedances map for forested areas of northeastern Canada.

EC and various provincial government and university researchers from the eastern provinces are directly (Quebec and New Brunswick) or indirectly (Ontario) involved with the Forest Mapping Work Group of the NEG/ECP. This group has been charged with producing a Combined Forest Sensitivity Map to Atmospheric Deposition for southeastern Canada and the northeastern U.S. which was finalized in the fall of 2004.

ii) Assess the role of acidic deposition (both nitrogen and sulphur deposition), and resulting base cation depletion on forest fertility and productivity. Evaluate the environmental and economic risk factor to Canadian forests and forest exploitation.

Scientists at the University of New Brunswick and the Canadian Forestry Service in the Atlantic Region have been investigating the potential for acid-rain induced base cation depletion in forest soils and the effect on overall forest health and growth. They have been quantifying the potential rates of base cation depletion and replacement costs and the overall effects on forest-based economics.

The Quebec MRNWP is also conducting studies on this subject.

Manitoba maintains several monitoring sites near Flin Flon and Thompson to investigate the effects of smelter emissions on forest health. As well, the province operates four vegetation and soil monitoring sites. These are located on the Canadian Shield in the northern and southeastern areas of the province at considerable distance from point sources. Collection and analysis of data from these sites to assess potential impacts of acidic deposition (e.g. base cation depletion) is on-going.

In British Columbia, there is ongoing research with experimental forests to assess sensitivity of coastal forests to acid deposition. Coastal forests are not expected to be sensitive given their large capacity to immobilize nutrients.

The development of critical loads for the Georgia Basin is in progress.

4. Materials

<u>Science needs:</u>

i) Continue Canada's involvement in the International cooperative program on effects of air pollution on materials, including historic and cultural monuments carried out under the aegis of the UN-ECE Convention on Long Range Transboundary Air Pollution.

EC operated the only Canadian exposure site (Dorset) in the UN-ECE International Co-operative Program (ICP)'s Multi-Pollutants Multi-Effects Study. Jean-Jacques Hechler will continue to act as the Canadian representative at the ICP-Materials working group annual meeting and will also provide expert advice to EC on this topic. He will also be completing Canada's participation in the Multi-Pollutants Multi-Effects experiment.

ii) Apply some of the results in the Canadian context, e.g. produce a map of corrosion rates for parts of Canada.

Jean-Jacques Hechler, in collaboration with scientists from EC, has completed work that indicates that, for most of the materials covered by the eight-year study, the ICP DRFs accurately predict corrosion rates in Canada. A thorough inventory of the materials at risk of damages from acid deposition in Canada, broken down by census district and by type of use, has also been developed. EC has completed corrosion maps for affected areas in Canada and is currently coordinating work to determine the repair and replacement costs of key materials affected by acid deposition, and on determining when and why these repairs and replacements are undertaken. Once this work is complete, EC will have all the necessary information to develop thorough estimates of most of the damages caused by corrosion due to acid deposition in Canada.

5. Human Health

i) Mechanics must be in place in order to improve cooperation and foster collaborative studies and assessments.

Health Canada has written a chapter on the effects of acid deposition on human health to be included in the 2004 Canadian Acid Deposition Science Assessment.

The Quebec Ministry of the Environment (MENVQ) and health agencies are involved in several health issues (smog, air quality, PM2.5) as part of provincial outreach programs and the NEG/ECP action plan. Quebec hosted an international Symposium on health effects in 2002 on behalf of the NEG/ECP.

Reporting and Communications to Decision-Makers and the Public

The federal government will annually review compliance with international commitments on SO_2 and NO_X emissions.

Starting in 1999, federal/ provincial/ territorial governments will report annually on SO_2 and NO_X emissions and forecasts and progress in implementing *The Strategy* to Energy and Environment Ministers.

Each year, beginning in 1991, the Acid Rain Work Group and now the Acid Rain Task Group has published an annual report on Canada's compliance with international emission reduction commitments, SO_2 and NO_X emissions and forecasts and progress in implementing *The Strategy*. These reports are available electronically on the CCME website at http://www.ccme.ca/initiatives/climate.html?category_id=31#192, or the EC website at http://www.ec.gc.ca/acidrain/index.html.

Stakeholder Recommendations Based Upon Outcomes in the Science Assessment and it's Implications for *The Canada-Wide Acid Rain Strategy for Post-2000*

On February 23-24, 2005 the Acid Rain Task Group hosted a workshop to present the major conclusions of the 2004 Canadian Acid Deposition Science Assessment, discuss and identify the implications of the latest science to *The Strategy* and obtain input on next steps to address acid rain. The workshop, "Taking Stock and Next Steps on Acid Rain", was attended by 90 participants representing industry, NGOs and provincial and federal scientists and policy-makers. Participants spent the first day learning about the current status of the acid rain issue in Canada and the second day giving insightful comments on what the new science tells us about what needs to be done to address acid rain and providing their perspectives on opportunities for improving *The Strategy*.

The outcome of the workshop, a series of recommendations on where to take *The Strategy* next, was captured in the report "Acid Rain Task Group Workshop – Discussion Highlights". Some of the key recommendations include: moving to biennial rather than annual reporting, greater and continuing need to support monitoring (effects and deposition), improve communication, amongst scientists and between governments; make information more accessible to the public, increase recognition and linkages with other compounds (PM, ozone, climate change); begin now to establish new emission reduction targets for SO_2 post-2010 and NO_X post 2005; and expand efforts to western Canada. Attendees participated enthusiastically in the workshop and iterated their continued interest and concern about this chronic environmental problem.

Next Steps

The Task Group will review and consider the information contained in this report on what jurisdictions are doing on acid rain and the suggestions from stakeholders for improving *The Strategy* as part of their continued work towards solving the acid rain problem in eastern Canada and preventing acidification in western and northern Canada..