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Canada's Response To The Recommendations In The Tenth Biennial Report Of The International Joint Commission

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Introduction

The Government of Canada welcomes the recommendations contained in the *Tenth Biennial Report* of the International Joint Commission (IJC). Canada remains strongly committed to the *Great Lakes Water Quality Agreement* (GLWQA) and appreciates the ongoing work of the IJC, its views on progress under the GLWQA, and its advice on opportunities to improve the performance and effectiveness of government programs designed to accelerate progress on cleaning up the Great Lakes.

The Great Lakes Action Plan, launched in 1989, formalized the Canadian government's actions to clean up and protect the Great Lakes ecosystem and to fulfill Canada's international obligations under the GLWQA. The program was renewed in 1994 as the Great Lakes 2000 initiative, a six-year partnership among seven federal departments. In 2000, the Canadian government announced that an additional \$40 million would be dedicated to completing federal actions required to remediate Canadian Areas of Concern (AOCs). This initiative is part of the Great Lakes Basin 2020 Action Plan, which provides the framework for the coordination of the efforts of eight federal departments to restore, conserve, and protect the Great Lakes basin over the next five years.

The Governments of Canada and Ontario are currently renegotiating the *Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystem* (COA) - the fifth such federal-provincial arrangement since 1971. The COA affirms the commitment of both governments to fulfill Canada's obligations under the GLWQA; the COA also establishes a strategic framework for coordinating shared federal-provincial responsibilities in relation to the Great Lakes basin ecosystem. The Canadian and Ontario governments look forward to signing a new COA by the end of summer 2001.

The responses to the recommendations of the IJC's *Tenth Biennial Report* reflect the input of several of the federal and provincial agencies that contribute to the overall Canadian program on the Great Lakes. These agencies include Environment Canada, Health Canada, Fisheries and Oceans Canada, Agriculture and Agri-food Canada, Canadian Heritage, Transport Canada, Public Works and Government Services Canada, Natural Resources Canada, the Ontario Ministry of the Environment, the Ontario Ministry of Natural Resources, and the Ontario Ministry of Agriculture, Food & Rural Affairs. The progress that has been made in the Great Lakes over the last 50 years, however, cannot be attributed to governments alone. The achievements of the program would not have

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been possible without the substantial contribution of our partners - industry, municipalities, environmental and conservation interest groups, conservation authorities, First Nations, and private citizens - who all help to deliver, in their own right, significant environmental results.

The IJC correctly asserts that many challenges lie ahead. The major tasks include continuing the cleanup in AOCs; controlling, and preventing the further introduction of, exotic species; mitigating the impact of rapid urban growth on environmental conditions throughout the basin; and reducing contaminants transported in the atmosphere over long distances to the Great Lakes. The Canadian and Ontario governments and their partners remain committed to continuing to restore and maintain the chemical, physical, and biological integrity of the Great Lakes basin ecosystem, and ensuring that it has a healthy, prosperous, and sustainable future.

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Remedial Action Plans

IJC Recommendation

"Given the public's right to know the achievements in each AOC and what actions to expect in the future, the Parties should prepare a consolidated report on RAP progress that lists the accomplishments to date, funds expended, what remains to be done and the funds and timing required to finish the necessary work. Governments must clearly state what role they will be playing with each AOC and what resources they will be dedicating to restoring the impaired beneficial uses."

Response to Recommendation

The Canadian and Ontario governments recognize that communicating progress in the AOCs is important; however, the level of reporting required under Annex 2 of the GLWQA does not fully meet this need. Many additional mechanisms can be used to disseminate information to the public and obtain feedback on program priorities and decision making. These include the following:

- agency participation and liaison with local implementation leaders;
- local public advisory committee involvement and other community-based participation on implementation teams;
- consultation with communities on specific implementation actions such as the development of Natural Heritage Strategies and Sediment Management Strategies;
- Remedial Action Plan (RAP) newsletters highlighting progress (e.g., in Hamilton and Quinte), distributed within the AOC and beyond;
- information-sharing and technology transfer sessions on RAP issues, sponsored by Environment Canada's Great Lakes Sustainability Fund (GLSF, formerly Cleanup Fund) and Ontario;
- regular Project Summaries Reports of the GLSF;
- maintenance of RAP Web sites for all Ontario's AOCs;
- RAP progress updates on a lakewide basis through LaMP reporting, annually for Lake Ontario and every two years for Lakes Erie and Superior.

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AOC specific workplans are critical for identifying what remains to be done to complete RAP implementation, which will ultimately lead to the recovery of the impaired beneficial uses. As Canada and Ontario establish a renewed agreement for the Great Lakes (COA), representatives of the two governments are reviewing the status of RAPs and developing work plans that will outline the required implementation actions and monitoring needs. The federal and provincial governments' roles and specific commitments to implement such actions will be specified in the new COA. Through this review process Canada and Ontario will consolidate information on the actions that will be expected in the future and the accomplishments that have been made to date.

The federal government's 2000 budget made a clear commitment of resources dedicated to restoring impaired beneficial uses. This has ensured the continuation of the Great Lakes program. The budget allocated \$40 million over the next five years, which includes a new \$30-million implementation fund^{3/4} the Great Lakes Sustainability Fund (GLSF 2020) which will fund federal implementation actions in the AOCs. Partnerships are important for the successful implementation of RAP activities and are being actively sought through the federal program and the Great Lakes Sustainability Fund. As effective partnerships and proposals are developed, the resources dedicated to individual projects are announced to the public. Ontario is also committed to working with communities to ensure that they apply voluntary and regulatory instruments to implement RAPs.

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Threat to Human Health

IJC Recommendation

"Governments should require that:

(i) sport fish consumption advisories state plainly that eating Great Lakes sport fish may lead to birth anomalies and other serious health problems for children and women of child-bearing age. These advisories should be addressed and distributed directly to women, in addition to their general distribution,

(ii) consumption advisories clearly identify fish to be totally avoided in light of the precautionary approach, and preparation methods for any that may be consumed, and

(iii) consumption advisories are supported by culturally appropriate community education programs directed to those who are likely to consume these fish."

IJC Concern

"Sport fish consumption advisories state plainly that eating GL fish may lead to birth anomalies and other serious health problems for children and women of child-bearing age."

Response to Recommendation

Fish consumption advisories for Canadians are based on guidelines developed by Health Canada. These guidelines specify safe consumption doses, also known as the tolerable daily intake, for a number of contaminants. The proportion of the tolerable daily intake, including fish consumption, that can come from each of the environmental pathways (i.e., air, water, food) is also specified. The Ontario Ministry of the Environment (MOE) carries out estimates and calculations to determine whether fish are suitable for consumption. The Ontario government's *2001- 2002 Guide to Eating Ontario Sport Fish* explains the

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basis for the fish consumption advisories, how to use the guide, what the sport fish contaminant monitoring program entails, and details the range of contaminants tested for in Ontario.

Health Canada regularly reviews toxicological information and revises its guidelines as required. It has recently lowered the tolerable daily intakes for mercury and mirex/photomirex to further protect the most sensitive individuals, such as women of child-bearing age and children under 15.

The *Guide to Eating Ontario Sport Fish* contains important advice specifically for women of child-bearing age (women who are breast feeding, are pregnant, or intend to become pregnant) and for children under 15. This information is covered in various sections of the booklet to ensure that this special group of consumers is properly informed. The advisory recommends that women of child-bearing age and children under 15 consume no more than four meals per month of fish that are identified as having very low contaminant levels; it further recommends that this group of individuals not consume fish from any other category. The advisory also takes into account the consumption of certain species of commercial fish that tend to contain higher levels of mercury¾ such as swordfish, tuna (excluding canned tuna), and shark¾ by recommending minimal consumption of such fish to these individuals.

The *Guide* is updated regularly to incorporate new analyses and methods. Methodology is currently being developed for the detection and reporting of dioxin-like PCBs. Changes to the *Guide* are planned to further reinforce the importance of the consumption information for women of child-bearing age and children.

Sport fishing offers both nutritional and social benefits, and anglers and their families can safely continue to enjoy fishing and eating their catch if they follow the local fish consumption advisories and the advice found in the *2001- 2002 Guide to Eating Ontario Sport Fish*.

IJC Concern

"Consumption advisories clearly identify fish to be totally avoided in light of the precautionary approach, and preparation methods for any that may be consumed."

Response to Recommendation

The consumption advice provided in the *2001- 2002 Guide to Eating Ontario Sport Fish* is intended for anglers and their families who consume moderate quantities of fish. This advice will protect individuals who follow the guide and consume no more than eight meals (four meals for women of child-bearing age and children under 15) per month of the fish (with very low contaminant levels) they catch. The advisory contains five different fish consumption symbols, which are based on Health Canada's guidelines for the intake of various contaminants tested in sport fish. The symbols represent a consumption range from a maximum of eight meals per month to zero consumption.

Consumption guidelines are based on laboratory analyses that use only the lean dorsal, skinless, and boneless muscle tissue of the fish. The advisory recommends that only skinless, boneless fillets of sport fish be consumed because other parts of the fish¾ steaks, belly fat, or other parts of the whole fish¾ may contain higher concentrations of organic contaminants. The advisory also contains a section on preserving and preparing fish for consumption.

It is important to consider the health benefits of eating sport fish. A number of species contain high levels of beneficial fatty acids (Omega-3), proteins, and certain essential vitamins (e.g., vitamin D) and minerals (e.g., selenium).

IJC Concern

"Advisories should be addressed and distributed directly to women, in addition to their general distribution; consumption advisories are supported by appropriate community education programs directed to fish eaters."

Response to Recommendation

The *Guide to Eating Ontario Sport Fish* is generally known and used by anglers; the response from users has been positive overall. More than 350,000 copies of the 1999-2000 *Guide* were distributed.

The *Guide* is also distributed, available, or advertised as follows:

1. on the Ontario Ministry of the Environment Web site (www.ene.gov.on.ca);
2. to all Ontario Medical Officers of Health, along with information on mercury;
3. at the time of publication, as a news release to major newspapers and radio stations;
4. in Ministry of Natural Resources Fishing Regulations;
5. to various cultural associations that have opted to print summaries of the *Guide* in their respective languages, either through local newspapers or related media; and
6. in the Chinese community newspaper in Toronto.

In addition, Health Canada, through its Great Lakes Health Effects Unit, has prepared and distributed a handout that explains the *Guide to Eating Ontario Sport Fish* at Areas of Concern. The handout is available in 12 different languages. (Note that the MOE, with the assistance of Health Canada, hopes to update and redistribute the handout in 2001).

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Contaminated Sediment

IJC Recommendation

"Governments should immediately develop a comprehensive, binational program to address the full scope of the contaminated sediments problem over the long term, setting appropriate priorities and defining the resources required for completion. As part of this comprehensive program, governments should ensure that:

(i) programs and cost estimates are in place and made public for fully addressing contaminated sediments in Areas of Concern,

(ii) timetables for fully implementing those programs are established and made public,

(iii) resources are provided to fully implement the programs in accordance with the established timetables, and

(iv) progress reports are issued at least biennially."

Response to Recommendation

The IJC, in the preamble to its recommendation on contaminated sediment, has outlined the significance of persistent toxic substances in sediment in restoring environmental conditions in AOCs. In addition, the IJC noted some of the Parties' efforts as well as its own (with the Parties' support), to respond to this issue. The Governments of Canada and Ontario fully appreciate the needs expressed in the recommendation above and have been working cooperatively with industrial stakeholders and other private and public sector interests in AOCs to identify and implement the necessary sediment remedial actions.

The IJC expressed some concern with the application of the site-specific approaches taken by the Parties, as manifested in the apparent contradictions in the cleanup goals to be attained. The example of polycyclic aromatic hydrocarbons (PAHs) in the Black River

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(U.S.) and Hamilton Harbour (Canada) was cited. The Randle Reef project in Hamilton Harbour is a proposed targeted intervention at a specific hotspot of contamination, and the PAH level specified is used to delineate the hotspot. It should not be construed as an overall cleanup goal for Hamilton Harbour. The effort at Randle Reef follows an overall sediment remediation strategy that has been developed for Hamilton Harbour by a RAP Technical Team and endorsed by the RAP stakeholders (*1995 Update to the Hamilton Harbour Remedial Action Plan stage 2 Report*, December 1995, ISBN 0-7778-4897-X). The strategy designates zones for active intervention (i.e., hotspots where sediment is acutely toxic to benthos), supports experimentation with techniques such as capping to evaluate potential remedial measures, and calls for monitoring and research to evaluate results. The approach taken in this strategy is consistent with the advice of the IJC's Sediment Priority Action Committee, which called for an incremental approach to the management of contaminated sediments and restoration of beneficial uses.

The IJC has also presented additional information to illustrate what it believes to be the outstanding requirement for sediment remediation. More specifically, it noted that in Canada only 0.2 percent of sediment contamination has been remediated. The basis for this figure was not presented, and Canada sought supporting information from the IJC, which was subsequently provided to the Parties. We believe the assumptions and calculations made by the IJC are misleading because they presuppose that evidence of contamination must lead to some form of direct intervention with a remediation project. While chemical criteria are often used to spatially delineate areas of sediment contamination, decisions on intervention integrate additional information on toxicity, field biological assessment, and environmental benefits, including linkages to the restoration of use impairments. In addition, sediment remediation interventions must be technically and economically achievable. We can illustrate the point as follows. The IJC in its calculations has identified 600,000 cubic metres in the St. Clair River as requiring remediation. Substantial work has been undertaken to assess sediment contamination in the St. Clair River; and analysis of potential remediation needs have focused on projects involving substantially less than this figure. While further assessments are being done to define remediation needs, we believe that the IJC's figure exaggerates the requirement.

To avoid possible confusion, Canada will provide more detailed status reports on sediment-related work in the AOCs, including projected remediation needs.

With respect to the specific recommendation brought forward by the IJC, Canada responds as follows:

Canada, in consultation with the United States, does not support the development of a binational program to address contaminated sediments. The Parties believe that the response to sediment management needs (including program definition, resourcing, timetables, and progress reporting) legitimately falls under the authority and responsibility of the domestic programs in Canada and the United States. The appropriate jurisdictions and agencies responsible for fulfilling these commitments in the AOCs are to be accountable.

As noted above, Canada will undertake, as part of its progress reporting, to provide more detail on its sediment program and activities in order to be more responsive to the IJC's recommendations. Canada further notes that at the binational level, considerable scientific and technical interchange exists to advance sediment assessment methodologies and technology development for sediment treatment. In addition, under the Great Lakes Binational Toxics Strategy, the Parties have initiated work to enhance progress reporting on sediment-related activities and associated priority toxic substances and to support joint efforts (such as the April 2001 workshop on contaminated sediment-treatment technologies). Sediment-related matters are also discussed by the Parties under the Lakewide Management Plans (LaMPs), the Canadian Review Panel for Massena (St.

Lawrence River) Superfund Sites, and the Four Party Agreement for the Detroit/St. Clair and St. Marys Rivers and Lake St. Clair. These efforts, together with others, contribute to a substantive binational dialogue on contaminated sediment and support the commitments under Annex 14 of the GLWQA.

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Airborne Toxic Substances

IJC Recommendation

"The Parties should take the following measures to deal with airborne pollutants:

(i) identify both in-basin and out-of-basin sources of atmospheric deposition of persistent toxic substances to the Great Lakes, quantify their contribution to the total burden of these substances to the lakes, and use this information to formulate and implement appropriate prevention and control measures; and

(ii) adopt a source-receptor computer model, improve emissions inventory information, and add dioxin and mercury to the Integrated Atmospheric Deposition Network to improve the data bases for these two substances."

Response to Recommendation

The IJC calls for the identification and quantification of the atmospheric sources of pollutants entering the Great Lakes. The Government of Canada supports the measures recommended by the IJC and is satisfying the recommendation through meeting existing obligations. Specifically, Annex 15 - Air Borne Toxic Substances - of the GLWQA calls on the Parties to develop models of the intermediate and long-range movement and transformation of toxic substances. The purpose of the models is (1) to determine the significance of atmospheric loadings to the Great Lakes system relative to other pathways and (2) to determine the sources of such substances from outside the Great Lakes system. Canada has been developing source-receptor models, in keeping with the IJC recommendation, and has applied them to address the issue of the contribution from in-basin and out-of-basin sources. Canada will continue to use these and other models to deal with this concern.

The Government of Canada agrees with the IJC that it is desirable to improve knowledge about air emissions of substances targeted by the Binational Toxics Strategy. Not only is such information needed to formulate control measures, but it is critical for the application of the source-receptor models discussed above.

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One test of the effectiveness of prevention and control measures to address substances of concern is whether environmental levels show changes in concert with changes in emissions. The U.S./Canada Integrated Atmospheric Deposition Network (IADN) is well placed to address this question. Measures to reduce mercury and dioxins emissions are discussed in the Great Lakes Binational Toxics Strategy. In order to measure the environmental response, Canada has been monitoring atmospheric mercury (the vapour phase) at the two Canadian IADN master stations since 1997; with the recent purchase of the necessary equipment, Canada will begin routine measurements of mercury in precipitation in fiscal year 2001- 2002. Dioxins and furans have been measured at one IADN master station since 1996, and additional measurements are planned. The results of these measurements will significantly assist in quantifying the deposition of these substances in the Great Lakes.

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Great Lakes Binational Toxics Strategy

IJC Recommendation

"The Parties should strengthen the Great Lakes Binational Toxics Strategy by fully addressing all sources of persistent toxic substances, such as atmospheric transport and deposition and *in situ* contaminants in sediments. In order to include the air pathway the Parties should:

i) establish an inventory of baseline air emissions for toxics for all of the United States and Canada;

ii) undertake a complete analysis of emission reduction scenarios for key source regions and determine their effectiveness in reducing contamination of the Great Lakes from the air.

The Parties should ensure that the Strategy is truly both strategic and binational by strengthening the integration and priority-setting component and establishing a full-time binational secretariat."

Response to Recommendation

The Great Lakes Binational Toxics Strategy (GLBTS) is an action-oriented process that provides a forum for stakeholders to exchange information on a set of quantitative challenges for certain persistent toxic substances. The shared information empowers stakeholders to take responsible and best practice actions that go beyond compliance and encourage pollution prevention. The GLBTS focuses on the virtual elimination of anthropogenic environmental releases of persistent toxic substances in a step-by-step process. The GLBTS is not a regulatory process but rather complements federal, state, and provincial activities. The strategy itself is not time-bounded. The GLBTS has provisions to revisit both the reduction timelines and the targets for all Level I substances. The strategy has additional provisions to allow the Parties to elevate Level II substances to Level I and add new substances that threaten the Great Lakes basin ecosystem.

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IJC Concern

"The Parties should strengthen the Binational Toxics Strategy by fully addressing all sources of persistent toxic substances, such as atmospheric transport and deposition and *in situ* contamination in sediments. In order to include the air pathway the Parties should:

- i. establish an inventory of baseline air emissions for toxics for all of the United States and Canada."**

Response to Recommendation

An inventory of air toxics (COA Tier 1 and 2 substances) exists for the Great Lakes basin. It is maintained and updated jointly by Environment Canada and the Ontario Ministry of Environment. Reporting to this inventory is voluntary, and source coverage has not been satisfactory. On January 24, 2000, Ontario proposed a mandatory emission-reporting regulation for 358 substances, including all COA air toxic substances. This regulation is expected to come into effect this year, and Ontario facilities that meet the reporting criteria will submit emission reports beginning in June 2002. In setting emission thresholds for facilities, Ontario is aiming for 80% of the total emissions in Ontario to be reported under the proposed regulation. With respect to *in situ* contamination in sediments, the GLBTS will report annually to track sediment remediation activities taking place within the Great Lakes basin beginning with the base year of 1997. This reporting attempts to track both the volumes of contaminated sediments removed in a given year and the mass of GLBTS substances associated with those volumes, where this information is available.

IJC Concern

"ii) undertake a complete analysis of emission reduction scenarios for key source regions and determine their effectiveness in reducing contamination of the Great Lakes from the air."

Response to Recommendation

Environment Canada and others are investigating and testing several mathematical models for predicting ambient air concentrations of particulate matter, ozone, and their precursor substances with a view to analyzing emission reduction and other policy scenarios (including domestic and transboundary air pollution flow scenarios) for these substances in key source regions. Through this activity, we should be able to estimate the effectiveness of emission-reduction policy scenarios on air quality improvements and measure the attainment of Canada-wide standards for particulate matter and ozone. The information resulting from these models may also be useful to atmospheric deposition and water quality activities in the Great Lakes basin.

The GLBTS adopts a multimedia approach with respect to reduction scenarios for substances of concern, with the goal of improving air and water quality, and protecting ecosystem health and the environment, including reducing lake water contamination by reducing atmospheric deposition.

IJC Concern

"The Parties should ensure that the Binational Toxics Strategy is truly both strategic and binational by strengthening the integration and priority-setting

component and establishing a full-time binational secretariat."

Response to Recommendation

The Integration Workgroup was established by the Parties on June 19, 1998 in Romulus, Michigan. This workgroup was open to a broad membership of interested stakeholders and was charged with advising the Parties on the best way of dealing with (1) cross-cutting issues (such as addressing all sources of persistent toxic substances from atmospheric transport and deposition and *in situ* contamination in sediments) that affected several substance workgroups and (2) unresolved concerns of individual substance workgroups. Priority setting, however, rests with the Parties alone.

The Parties have established a Canadian and U.S. cosecretariat. On the Canadian side, this responsibility falls to the Great Lakes Manager within the Environmental Protection Branch of Environment Canada.

In addition to responding to the IJC's recommendations on the GLBTS, Canada would like to offer its perspective on comments in the *Tenth Biennial Report* on the breadth of actions to address (1) deposition of mercury and (2) PCBs as environmental contaminants.

IJC Comment

"After three years, however, no workgroup has entirely completed the four step process. For example, the PCB Workgroup is currently focusing on steps 3 and 4, but has only documented actions for the reduction of PCB inventories currently in use or in storage. This initiative does not address PCBs in sediments or the deposition of PCBs from long-range sources via the atmosphere. Although PCBs in use and in storage may constitute a potential long-term threat, PCBs circulating in biota cause the greatest immediate harm to Great Lakes fish, wildlife and humans."

Government Perspective

The targets for PCBs under the GLBTS relate specifically to PCB equipment. Hence, the PCB Workgroup has focused on mobilizing stakeholders to achieve this target. The workgroup's primary focus has been the decommissioning and destruction of PCB equipment and associated wastes.

The PCB Workgroup has completed step 3 (identifying options for reducing PCBs). Step 4 of the four-step process deals with implementation and is an ongoing activity within the workgroup.

In-use and stored high-level PCBs, especially in equipment, have been shown to be a source for airborne deposition of PCBs. By directly targeting a noted contributor of airborne PCBs^{3/4} namely, PCBs in equipment^{3/4} the Government of Canada is working toward abating a sizable source of airborne PCBs. Concurrent with encouraging stakeholders to destroy PCB equipment, the government is also undertaking regulatory amendments that will mandate the destruction of PCBs in use and in storage by 2010, thereby further helping to significantly reduce a source of airborne PCBs.

IJC Comment

"Progress in environmental control of mercury has occurred despite the fact that IADN does not include mercury in its program. If IADN included mercury, the

Workgroup could estimate loadings of mercury to the Lakes, thereby assessing the ecosystem effects of its reduction efforts."

Government Perspective

As mentioned in the response to the recommendation concerning airborne toxic substances, Canada has been monitoring atmospheric mercury (the vapour phase) at the two Canadian IADN master stations since 1997, and routine measurements of mercury in precipitation will begin shortly. These measurements are the first step in quantifying the contribution of these substances to the total burden in the Great Lakes.

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Land Use

IJC Recommendation

"The Governments should provide for a binational study of the effects of changes in land use on Great Lakes water quality to determine the measures that should be taken to address these changes, including:

- (i) the effects of urban and residential growth,
- (ii) the effectiveness of existing policies and programs in controlling pollution from land use in all sectors, and
- (iii) the identification of measures that should be taken by provincial and state governments, with appropriate assistance from the Parties, to prevent adverse effects.

Governments should proceed with implementation of the SOLEC work on Biodiversity Investment Areas, emphasizing the preservation and rehabilitation of wetlands."

Response to Recommendation

The Government of Canada agrees that changing land use is one of the dominant long-term threats facing the Great Lakes basin ecosystem. Over the next 20 years, the Great Lakes basin is expected to account for one-half of total population growth in Canada. By 2020, it is estimated that the number of Canadians in the basin will have increased by more than 2 million - a growth rate of 22%. Most of this growth will occur along the western end of Lake Ontario in what is referred to as the Golden Horseshoe region (extending from Niagara Falls to Oshawa) - the third most rapidly growing population centre in North America.

Urban land use pressures are being explicitly dealt with in the two largest AOCs - Toronto and Region, and Hamilton Harbour - both of which are located in the centre of Ontario's

rapidly growing urban area. Both of these AOCs have made linkages with local and regional land use planning processes. Land use issues are also being addressed in the development of LaMPs. In addition to Toronto and Region, and Hamilton Harbour, both the previous Great Lakes Cleanup Fund and its successor, the Great Lakes Sustainability Fund, have put a high priority on funding Natural Heritage Strategies, which deal with urban and rural land use issues in Areas of Concern. Specifically, they have worked with Severn Sound, St. Clair River, Detroit River, Wheatley Harbour, Niagara River, Hamilton Harbour, and Toronto and Region to complete Natural Heritage Strategies. Natural Heritage Strategies covering the whole Bay of Quinte are almost complete. Many local governments have incorporated these strategies into regional and municipal Official Plans, including Severn Sound, St. Clair River, and Bay of Quinte. Work is continuing with Hamilton Harbour and Toronto municipalities to incorporate Natural Heritage Strategies into their Official Plans.

The influence of land use on the Great Lakes basin ecosystem, including its water quality, air quality, habitat, and biodiversity, was a major theme at the State of the Lake Ecosystem Conferences (SOLEC) of 1996 and 1998; land use was again noted as a significant stress at the 2000 conference.

There are some forthcoming opportunities in Ontario to influence local land use decision making in the Great Lakes. The Provincial Policy Statement on land use is scheduled for a statutory five-year review this year, and this may provide the opportunity to influence province-wide policies and identify measures that should be taken to prevent adverse effects, as called for in the IJC recommendation. In addition, as part of the Ontario government's Operation Clean Water strategy, the Minister of Agriculture, Food and Rural Affairs introduced the first reading of the *Nutrient Management Act* on June 13, 2001. Under the proposed act, clear new standards will be developed for nutrient management on farms and all land-applied materials containing nutrients relating to agriculture, including livestock manure, commercial fertilizer, municipal biosolids, septage, and industrial pulp and paper sludge. The proposed legislation would provide authority for regulations governing several areas, including the following:

- mandatory Nutrient Management Plans (NMPs);
- certification of commercial land applicators of materials containing nutrients;
- distance requirements for the application of manure and biosolids near wells and waterways;
- banning the land application of untreated septage over a five-year period;
- establishing and delivering associated education, training, and certification programs;
- establishing a database system to record land application of materials containing nutrients, with an initial focus on biosolids and manure; and
- establishing minimum quality and application standards for land-applied nutrients.

The proposed legislation would provide for a framework to phase in standards over time, depending on the size of operations and the kinds of practices that are carried out.

The province has also announced a temporary development freeze for the Oak Ridges Moraine, a significant headwater source for the Greater Toronto bioregion.

However, a major binational study of the effects of changes in land use on Great Lakes water quality conditions - as called for in the IJC recommendation - would likely be too broad and take too long to capture the opportunities that currently exist to influence land use policy in Ontario. While there may be some opportunity for a smaller-scale, domestic land use study, the federal and provincial governments have relatively little influence over local land use planning and decision making. (Provincial policy can, however, influence the municipal planning process and guide land use decisions on Crown lands - for

example, forest management planning). Therefore, the most effective way, at present, to deal with the land use impact mentioned in the IJC's *Tenth Biennial Report* is to

- review provincial policy;
- maintain a strong emphasis on integrating land use changes and pressures into RAPs and LaMPs;
- maintain a strong emphasis on integrating land use considerations into the development of SOLEC indicators; and
- ensure that urban and rural land use issues remain a major funding priority of the Great Lakes Sustainability Fund.

Canada agrees in principle with the importance of conserving and protecting ecologically sensitive areas. A range of government and non-government initiatives already achieve this objective in some measure. The principles underlying the Biodiversity Investment Areas (BIA) concept are important and merit continued commitment and support. However, before embarking on the implementation of a new initiative or concept, the Parties need to take stock of existing protection and conservation initiatives, and the extent to which these important principles are being met. Canada's approach will be to work toward one set of shared ecologically sensitive features or areas. In so doing, we will prevent duplication or reinvention, and build upon and add value to existing initiatives; utilize existing working relationships, partnerships, and partners; and where necessary fill any missing links and gaps in our protection and conservation of ecologically sensitive areas.

The path forward will require further discussion with other government and non-government groups who share these principles but who may not have been engaged in SOLEC to date. SOLEC has proceeded as far as it can in focusing attention on the science underlying biodiversity investment areas and in developing the BIA concept. The Canadian Wildlife Service - Ontario Region is intensifying its focus on wetland science and indicators. Canada views ecologically significant areas as components of the broader ecosystem approach of LaMPs. To proceed further with a shared investment in ecologically sensitive areas, natural resource agencies, including Environment Canada and non-government interests, will need to consider how to ensure that these principles are put into practice, with the necessary focus on science and indicator monitoring. In this regard, a future SOLEC may consider looking at monitoring indicators in ecologically significant areas as reference sites.

Ontario recently announced a four-year, \$102-million commitment to help implement the Living Legacy program through new protected areas and the Great Lakes Heritage Coast signature site. A part of this initiative could directly complement the implementation of the concept of biodiversity investment in ecologically significant areas. Canada supports this initiative and the range of similar initiatives and programs, and is prepared to offer its assistance, through COA and Canadian Wildlife Service's national and international programs, in the protection and conservation of ecologically significant Great Lakes sites.

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Alien Invasive Species

IJC Recommendation

"The Parties should take the following measures to deal with alien invasive species:

(i) adopt and implement the binational ballast water research strategy and plan described in the 1996-1997 Binational Progress Report on Protection of Great Lakes Water Quality,

(ii) give a Reference to the Commission to develop:

(a) binational standards that should be applied to discharges of ballast water, and

(b) recommendations on the most appropriate methods for implementing those standards including, for example, the possibility of on-board treatment of ballast water and residual ballast sediment and the possibility of establishing ballast water and residual ballast sediment treatment facilities in the lower St. Lawrence River."

Response to Recommendation

Binational Research Strategy

The *Tenth Biennial Report* notes that the IJC has not received a response to a November 1998 letter sent to both Parties on the adoption of the ballast water research strategy and plan as outlined in the IJC's 1996-7 report on protection of Great Lakes water quality. In fact, the binational research strategy has been adopted in one form or another by a number of organizations.

Both countries have developed mechanisms to make progress on this issue. The United

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States has established the Great Lakes Panel of the Aquatic Nuisance Species Task Force (set up under the authority of the *Nonindigenous Aquatic Nuisance Prevention and Control Act* of 1990). The Great Lakes Panel formally adopted a slightly abbreviated form of the strategy in February 1998. In March 2001, the panel released a policy statement on ballast water management that makes recommendations with respect to standards, coordination, and technological research needs for the Great Lakes basin. The Canadian federal government and the Province of Ontario are represented on the Great Lakes Panel.

In Canada, the binational research strategy was presented to the National Working Group of the Canadian Marine Advisory Council (CMAC) in November 1997 and at subsequent meetings, and has been supported by that group. Additionally, this research strategy has been presented to both subgroups of the CMAC Great Lakes Ballast Water Working Group (GL and St. Lawrence).

In practice, this means that the various funding agencies have considered the strategy in a fairly broad context when making grants specific to the ballast water vector. Thus, since 1998 the U.S. Coast Guard (USCG) and the National Oceanic and Atmospheric Administration (NOAA) Seagrant funding has in fact gone to projects that examine the tenets of the strategy. Representatives of the Parties also sit on these grant-evaluation committees. Studies have examined, for example, both the efficacy of ballast water exchange with respect to safety and the field tests and protocols that confirm ballast exchange has taken place at sea. While many of the studies have not been specific to the Great Lakes, the results are fully applicable to them. In its statement of requirements, the NOAA Seagrant program has specifically required a focus on both the Great Lakes and Chesapeake Bay.

In Canada, representatives of the Department of Fisheries and Oceans (DFO) and Transport Canada (TC) provided data and information to Lloyds Register for its study of the safety of sequential exchange. They also assisted in communicating the study's findings in North America to CMAC and the Tenth Annual Aquatic Nuisance Species Conference in Toronto in February 2000, as well as to the International Maritime Organization.

The pathogen- human health issue was examined both by the Phase II studies of the Great Lakes Demonstration Project and more recently by researchers at the Smithsonian Institute. The results were published in the periodical *Nature* and in the *Globe and Mail [Toronto]*, and were broadcast by CNN and CTV News.

The "no ballast on board" (NOBOB) issue is being examined by a number of agencies and forums. The issue of sediment/mud is currently being investigated by a binational study involving the Great Lakes Environmental Research Lab (GLERL), the University of Windsor, and Canadian experts. The DFO has funded a national ballast water project from the Environmental Science Strategic Research Fund. It has also supported type testing of Hydrocyclone/UV technology that could be applied to mitigate ballast water uptake in ships.

Biocide studies currently underway at the University of Michigan (gluteraldehyde) and the Michigan Department of Environmental Quality (chlorine) are both expected to result in pilot projects in the upcoming year. Federal Commerce and Navigation Ltd. has cooperated fully and has offered ship access and time for these studies. The DFO has supported studies into organic acids (juglone/periacetic acid/hydrogen peroxide) as has NOAA Seagrant.

Ongoing research as outlined in the strategy has been supported. The Great Lakes Demonstration Project has been relocated for logistical reasons to a facility in Duluth, and

testing took place on secondary treatment options (UV and Hydrocyclone /UV) this season. Representatives of the Parties sit on the Steering and Technical Committees for the project. They have also been very involved with the various forums chaired by the Michigan Department of Environmental Quality that are examining operational possibilities for NOBOBs and biocides. Representatives of the Parties have acted as Chairs of the Research Committee of the Great Lakes Panel of the Aquatic Nuisance Task Force.

To date, one area that has not had any significant follow-up has been the further examination of heat as a biocide (shoreside or shipboard). Australian studies are continuing and a number of engine manufacturers^¾ notably Wartsila^¾ are looking at the issue; but there has been little progress specific to the Great Lakes.

IJC Reference

Canada recognizes the value of having the IJC assume a coordinating role to deal with alien invasive species in the Great Lakes, but does not support the concept of an IJC reference at this time.

Canada's support is tempered, first, by the need to prioritize funding for IJC studies and references and, second, by the fact that the Canadian and U.S. governments are already working closely in this area and believe that progress is being made. Canada has stated its intention to develop ballast water management regulations for the Great Lakes and St. Lawrence River in 2002. These proposed regulations are being developed in consultation with the USCG so that they will be harmonized with U.S. requirements. Furthermore, both Canada and the United States are working through the International Maritime Organization to develop international regulations and standards. Again, progress is being made.

Both Parties have supported the need for standards with respect to the discharge of ballast water. Indeed a number of forums hosted by the Parties (USCG Ballast Water and Shipping Committee; Standards Forum^¾ Tenth ANS Conference Toronto) have examined how such standards could be applied.

There is considerable debate by experts on both sides of the border not only about the standards that could be applied, but also about the form that they would take and the way they could be applied physically and legally. Some experts (e.g., Great Lakes Fishery Commission and DFO Science) advocate biologically based discharge standards. Others (USCG Standards Committee and the shipping industry in general) favour standards based on "best available technology."

DFO Science is reviewing the economic, technological, and policy considerations of establishing, in the coming months, a facility to treat ships located in the St. Lawrence. An Environment Canada/Transport Canada study will examine the impact of ballast water treatment both on the shipping industry of the Great Lakes and on the environment. It is assumed that the outcome of these studies will be useful in answering the IJC's concerns on this issue.

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Information and Data Management

IJC Recommendation

"The Parties should develop and maintain the full range of monitoring and surveillance programs necessary to enable them to fulfill their commitments under the Great Lakes Water Quality Agreement.

The Parties should provide adequate access to data while protecting confidentiality agreements and waiving cost recovery policies that contradict the intent of Article IX of the Great Lakes Water Quality Agreement.

The Parties should correct existing problems with the collection, analyses and reporting of data, including establishing sampling protocols, filling data gaps and ensuring the quality of data.

The Parties should, within two years, develop and implement a binational information policy employing advanced technology to support implementation of the Great Lakes Water Quality Agreement. This policy should include provision for:

- (i) accessibility of data and information,
- (ii) organization and management of data bases,
- (iii) protocols to ensure compatibility and comparability of data for weight of evidence and ecosystem integrity analysis,
- (iv) support of indicator development, and particularly indicators that support the goals of drinkability, swimmability, and edibility of fish, and
- (v) principles for evaluating information for decision-making."

Response to Recommendation

The Government of Canada acknowledges the essential role of monitoring and surveillance programs in fulfilling its commitments under the GLWQA. Canada, in concert with the relevant provincial and U.S. agencies, is determined to continue pursuing mechanisms to optimize and streamline Great Lakes monitoring and surveillance activities to derive maximum benefits from available resources. The Canadian and Ontario governments are committed, under a renegotiated COA, to set up federal-provincial mechanisms to ensure the development, coordination, and maintenance of the required monitoring and surveillance programs necessary to fulfill Canada's commitment under the GLWQA.

Canada provides, upon request and at no cost, Great Lakes water quality program data directly to the IJC Regional Office, as per Article IX of the Agreement.

The Government of Canada is also committed to the collection of valid, good quality data and the timely analysis and reporting of the collected information. Canada is committed to following the best management practices that are appropriate to the program needs and consistent with international standards, in the operation and management of its analytical laboratories. For example, all the water quality data generated by the operational laboratories of Environment Canada meet international standards of accreditation (ISO Guide 25, Canadian Standard CAN/CSA-Z753-95) granted through the Standards Council of Canada. In addition, the Environment Canada National Laboratory for Environmental Testing (NLET) undergoes biennial five-day audits by the other three parties (i.e., U.S. EPA, NYS DEC, and MOE) to the Niagara River Toxics Management Plan/Declaration of Intent. The last audit was conducted from October 23 to 27, 2000.

The Government of Canada notes the IJC's recommendation for the development and implementation of a binational information policy within two years, to support implementation of the GLWQA. It is prepared to work with the U.S. government to this end. The Parties have recognized the value of a binational database for improved data accessibility and reporting, and have adopted such an approach to manage the information collected by the Canada/ U.S. Integrated Atmospheric Deposition Network (IADN) under Annex 15. In addition, advanced technology in the form of a computerized quality assurance protocol is used to ensure compatibility and comparability of data collected by all parties to IADN. The success of this initiative may serve as a model for a comprehensive binational information policy.

Environment Canada is currently developing an Information Management and Information Technology (IM/IT) Strategy to deal with a wide variety of issues in the coming three to five years. This project includes a review of current management practices associated with program information that is created, used, or transferred to or from the department. The strategy will promote the use of IM/IT standards and protocols and is expected to provide further direction on Great Lakes data and information management practices.

Environment Canada is also exploring the development of a federal Canadian Information System for the Environment (CISE). A task force has been assigned the job of designing an integrated knowledge management system for environmental information. The task force will be considering the following elements: monitoring and data collection, information management and information technology, research tools and networks, and communication needs and opportunities. The scope of this project is largely restricted to the natural environment although links to other knowledge systems, such as the Health Information System (managed by the Canadian Institute for Health Information), will be made.

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SOLEC and Indicators

IJC Recommendation

"The Parties should report on indicators for the three **Desired Outcomes** of drinkability, swimmability and fish edibility beginning with the SOLEC 2000 conference and biennially thereafter.

The Parties should report on indicators for the **Desired Outcome** of virtual elimination of inputs of persistent toxic substances beginning with the SOLEC 2002 conference and biennially thereafter.

The Parties should develop and report on three specific indicators for the **Desired Outcome** of physical environment integrity beginning with the SOLEC 2002 conference and biennially thereafter."

Response to Recommendation

At SOLEC 2000, the Parties reported on indicators of human health such as beach closures, fish consumption advisories, and drinking water quality at a limited number of water treatment plants that take and treat Great Lakes surface waters. The Parties intend to expand on the database supporting these indicators for SOLEC 2002, so that a more comprehensive picture of these indicators can be given at that time.

At SOLEC 2000, Canada and the United States reported on a number of indicators relating to persistent toxic chemicals. These indicators provide information on the trends in contaminant levels in the ambient environment, including fish, wildlife, and water. The Parties believe that through such reporting, progress toward the virtual elimination of persistent toxic substances can be measured through the reduction of contaminant levels in the environment.

Finally, the Parties have been developing a proposal for a SOLEC multiyear plan. This plan sets out a framework for reporting on biological, chemical, and physical integrity. The proposal suggests that the focus of SOLEC 2002 should be on biological integrity, and

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that future SOLECs deal with physical and chemical integrity.

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