to the International Joint Commission

(IC), 2009. The Impact of Urban Areas on Great Lakes Water Quality, 2009. IC, Windsor, Ontario, Canada.

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The Boundary Waters Treaty of 1909 has provided the foundation for Canada and the United States to cooperate on the management of transboundary waters and to prevent and resolve disputes. While the Treaty prohibits pollution of the waters that would cause injury to health or property in the other country, it did not specifically recognize the linkage between land, water and air that is understood today. A major advance in the scientific understanding of the significance of land use impacts to Great Lakes water quality began in 1972 when the federal governments of Canada and the United States gave the International Joint Commission a reference to investigate the pollution of the Great Lakes from various land-use activities.

practices, but by the mid-1990s it was evident that the large, growing urban centers in the basin and their extensive suburbs had fundamentally changed the way land affected water quality in the Great Lakes basin. Vast, growing urban clusters

a significant impact on Great Lakes water quality through increased discharges of sediments and contaminants from urban watersheds, runoff from impervious surfaces and direct discharges from storm and wastewater treatment. Sprawling,

impervious surfaces such as rooftops that were found through scientific study to contribute significantly to water quality degradation.

From 1997 through 2005, the Commission's Great Lakes Science Advisory Board devoted part of the Commission's biennial Great Lakes priorities cycle to examining various aspects of urban land use and developed a total of 19 recommendations, which, for the convenience of the reader, are recalled on pages 8-12 of this report. These recommendations, in turn, were reflected in Commission's advice to governments submitted in its 10 and 12
Quality in 2000 and 2004, respectively.

This work culminated in the 2005–2007 priority cycle when several of the Commission's other advisory bodies[2] collaborated with the Science Advisory

1 See http://www.ic.org/en/publications/rpts_bi.htm

2 Great Lakes Water Quality Board, International Air Quality Advisory Board and Health Professionals Task Force.

Board to further the work on urban land use and produce this report, which includes four specialized annexes. Together, the groups identifed three major fndings and submited 12 recommendations for the Commission's consideration.

As the report notes, the impact of urban areas on Great Lakes water quality occurs at a basinwide scale and thus requires regional solutions. For this reason, the report proposes specifc recommendations to local governments as well as to the state, provincial and federal levels.

to sustainable-growth paterns, the Commission recognizes that the bulk of the responsibility for implementation lies with local governments, though funding may come from other levels. Through their ordinances, taxes and land-use planning, municipalities can directly refect and advance their community's values. Local decisions infuence where, what kind and what size of residential, commercial and industrial development will occur; where and how trafc will fow; how sewer systems will be used; and if or how brownfelds will be redeveloped.

refect frst and foremost why Great Lakes residents live in the basin: the quality of k fl

of sustainable land-use planning.

at the Commission and is pleased to confirm that it will respond by taking the following actions during the 2009-2011 priority cycle: (1) Direct its Nuisance and Harmful Algae

In the Visioning Session from the Science Advisory Board's "Expert Consultation on Emerging Issues in the Great Lakes in the 21 Century" held at Wingspread in 2003, the metaphor "retreat of the industrial glacier" was used to capture a contemporary urban philosophy and green design that is redefining the relationship of the city with nature. The Board concluded that an urban renaissance is underway based in part on the value

developed area (IC, 2003).

Participants at the meeting also identified that new research investments in aquatic science are necessary to ensure that costly restoration efforts are sustainable. In order to achieve success, they also concluded that, "If the prospects for greater coexistence for city and nature are to be beneficial in terms of maintaining and restoring the integrity of Great Lakes waters, it will be critical to include Great Lakes goals within an intergovernmental framework that encompasses the basin ecosystem in the decision-making process at all levels of government." This statement reaffirmed the need for greater cooperation between all levels of government previously identified by the International Joint Commission in Chapter 4 (land use) of its 10 Biennial Report. It also resonates with the emerging call for a "new deal" for cities that recognizes their important social and economic imperative within the federal systems of both countries. While this challenge

initiatives such as the Great Lakes Regional Collaboration have emerged to provide a

for the restoration, protection and sustainable use of the Great Lakes. Under the 2005 "Strategy to Restore and Protect the Great Lakes," principles and practices for sustainable development of land have been adopted as a component of the Great Lakes Regional Collaboration (Great Lakes Regional Collaboration, 2005).

The IC initiate discussions with its advisory boards and the Parties about the signifcance, sources, biology and pathways of microorganisms arising from non-point sources of pollution.

The IC urge the Parties to ensure that there are adequate monitoring and surveillance

effectiveness of specifc management actions for the identifcation of cause-and-effect relationships and for informed decision making about the control of non-point sources.

The IC request the Parties to increase funding for research and development of new technologies and techniques for the control of urban and rural non-point sources of pollution.

The IC urge the Parties to place special emphasis on urbanizing areas in transition from rural to urban uses. Such land-use changes represent opportunities for implementation of watershed management plans as defned by Annex 13, 2(b), as a condition of their development.

The IC request the Parties to report on their implementation of the recommendations for agricultural practices that were published in its Ninth Biennial Report on Great Lakes Water Quality.

Key Findings

- Non-point sources remain a signifcant source of pollution to the Great Lakes basin.
- Pollution from land-based activities continues to impose substantial costs, particularly in the Great Lakes basin with its rapid urbanization and intensive water use.
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  demands an understanding of the physical, chemical and biological characteristics of the land surface. In some cases, this means tailoring control measures to conditions at the feld level within a farm or in a particular residential lot.

Recommendations

- Four elements of urban form can reduce the quantity and improve the quality of urban runo f : compact development, mixed uses, short blocks and respect for naturalse

- Local e f orts to manage urban growth do require support, assistance and leadership from senior levels of government, for example, in the area of transportation policy.
- the growing threat to Great Lak מ Great Lakes. That the Parties undertake a majo

e f ects of urban and urbanizing development on Great Lakes water quality and develop a comprehensive response to these e f ects

Key Findings

- The principal obst ו it can convey. Compared to runo f from forested land, it h

  including leaked f uids, by-products of combustion and high concentrations of zinc and copper from brake and tire wear.
- On both sides of the border, the day-to-day business of land use planning should and will continue to rest with local governments. However, this planning should be

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th **Biennial Report**

The Governments should provide for a binational study of the e f ects of changes in land use on Great Lakes water quality to determine the measures that should be taken

(i) the e f ects of urban and residential growth
(ii) the e f ectiveness of existing policies and programs in controlling pollution from

(iii) the identi f cation of measures that should be taken by provincial and state

e f ects

The Governments should proceed with implementation of the SOLEC work on Biodiversity Investment Areas, emphasizing the preservation and rehabilitation of wetlands (I C, 2000).

th **Biennial Report**

- approaches are su f cient from an overall, basin-wide perspective. A comprehensive and binational assessment of the e f ectiveness of (land use) policies and programs from a basin-wide perspective could provide a broader context for local decisions, and at the same time advance achievement toward an ecosystem approach as envisioned by the Agreement.
- In the United States and Canada, land use decisions are generally regarded as the exclusive domain of local government, yet decisions cannot simply be viewed in isolation of other responsibilities at the provincial, state and federal levels. Because wise land use decisions and e f ective land management are

envisioned by the Great Lakes Water Quality Agreement, governments need

responsibilities and decisions between and among all orders of government (IJC, 2004).

Recommendations

The Parties take binational actions to address the impact of urban land use on Great Lakes water quality by:

- Evaluating under what circumstances best management practices are effective in managing urban runoff.
- Ensuring that information on urban best practices reaches local authorities and implementers.
- Assessing the cumulative effects of management actions to minimize the impacts of urbanization on the Great Lakes, using the Lake Erie basin as an example.

The Impacts of Changing Land Use was a major study authored by Steve Thorp, Ray Rivers and Victoria Pebbles and presented at the conference. The report identified "urban sprawl" to be a major stressor for the Great Lakes ecosystem and concluded that sprawl was perhaps accelerating in the basin. In a conclusions section of the report, the authors called for greater use of planning instruments that promote sustainable development and

the way forward in managing sprawl.

The 2005 – 2007 IC Great Lakes Priority description for the Urbanization priority is found in Appendix 1. This activity was undertaken as a multi-Board activity, involving the Water

Task Force. The activity was led by the Science Advisory Board's Work Group on Parties Implementation. At an initial meeting held in Toronto on November 9, 2005, key issues

approach that would be followed. It was agreed that the assessment template to be used for the work would address sustainable development, and in particular the DPSIR framework developed by the United Nations and the European Environment Agency would be used, which consists of five main components of analysis based on Driving forces, Pressures, State, Impacts and Responses. The DPSIR framework is described in the first of the major reports appended in Appendix 2 authored by Dr. Isobel Heathcote.

policy consideration within a wider societal context than the traditional assessment process of measuring impact alone.

Following the November 2005 planning meeting, two major events were sponsored to assist the Boards in their work. The first of these events took place at a special meeting of the Science Advisory Board held in Chicago on December 1 - 2, 2005. The meeting was organized by its Work Group on Parties Implementation, and there were expert

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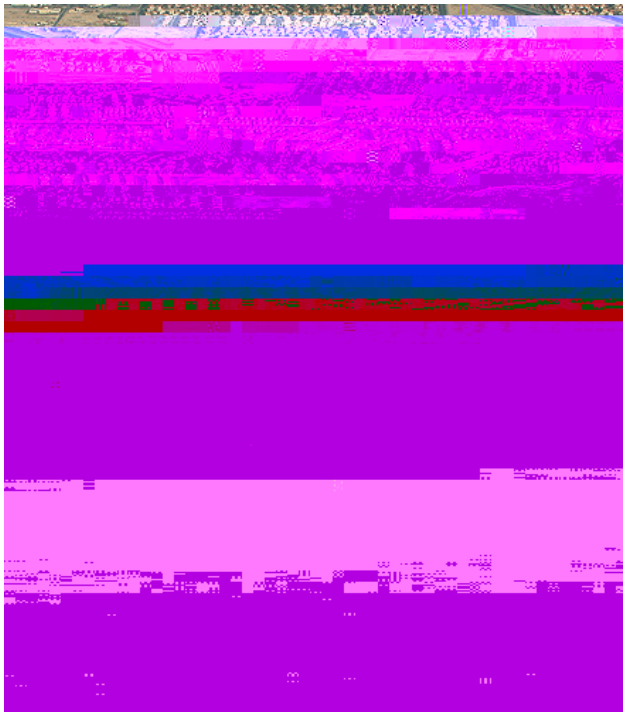
- Downstream Economic Benefits of Low-Impact Development
- Sustainable Redevelopment of Brownfield and RCRA Sites
- Leadership in Energy and Environmental Design

The second event took place on September 25 - 26, 2006 in Chicago, Illinois, and was entitled “International Symposium on Urban Impacts: Global Lessons for the Great Lakes Basin.” The symposium included international experts from Australia, Europe and North

individual success stories to be told. But

in Great Lakes protection and progress.



Following the conclusion of the expert

commissioned from Dr. Ray Tomalty (Appendix 1). This report summarizes

urbanization in the Great Lakes Basin and discusses the potential of “smart growth” to lead us toward a very di f erent future.

exists in smart growth policies throughout the basin, there are barriers to smart growth that reinforce the status quo and represent signi f cant challenges in moving forward to implementation. These include:

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- insu f cient development and building standards
- conventional zoning practices
- ine f ective municipal planning
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- imbalanced investment in highways and transit
- infrastructure f nancing mechanisms and taxation policies
- risk averse private f nancing
- decentralization of retail and employment
- appeal of suburban landscapes and car usage
- public resistance to smart growth proposals

According to Dr. Tomalty, each order of government has a role to play in implementing smart growth and achieving more sustainable cities. These roles are summarized as

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    - funding urban infrastructure from federal programs
    - improved transportation policy and infrastructure investment in public
    - federal spending authority directed to green expenditures
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    - taxation and research
- Provincial/State Governments
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    - revise building codes
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-
    -
    - link fscal planning instruments such as development charges, property taxes and other user fees to growth management
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    -
    -
    - adopt alternative development standards and best management practices
    - facilitate redevelopment of brownfeld sites
    -
    -

(1) Major Finding:

Urban and urbanizing areas within the Great Lakes basin have an adverse basin-wide impact on natural systems. This impact is exacerbated by location and urban form and results in water quality degradation and contributes to “impairment of beneficial use(s),” as defined in Annex 2 of the Great Lakes Water Quality Agreement. The impact from urban areas is caused directly and indirectly from urban run-off from impervious surfaces, inadequate urban infrastructure

Remedial Action Plans including Annex 13, and infrastructure funding, research and other incentives that support action and implementation.

- Set goals and targets with other orders of government to implement sustainable urban development and fund monitoring programs to track progress.

(1.3) State/Provincial Governments

- Review existing land use management and decision-making processes, policies and laws to identify opportunities to implement smart growth and sustainable practices.
- Integrate policy and planning e f orts for regional transportation, air, water and land management activities that implement smart growth and sustainable development goals and objectives.

(1.4) Local Governments

- Follow metropolitan-wide guidelines promoting smart growth and sustainable practices.
- Explore and advance local approaches that could contribute to reducing the environmental impact of cities.
- Adopt neighbourhood Leadership in Energy and Environmental Design

resources.

(2) Major Finding:

The impact of urban areas on Great Lakes water quality occurs at a basin-wide scale and thus requires regional solutions. Basin-wide coordination and cooperation with respect to land management implies multiple orders of government and binational management in order to achieve Great Lakes protection, restoration and management. An ecosystem approach by basin is needed to regionalize planning and development similar to the model of Ontario's Conservation Authorities but at a basin scale. However, in both Canada and the US land use decision making is primarily a local authority. All orders

governments must use their mandate over Great Lakes water quality to be advocates for the successful stewardship of major urban areas within the ecosystemic context of the Great Lakes. In general, measures intended to make cities more energy e f cient and water e f cient and to reduce their overall impact on the environment are also bene f cial to Great Lakes water quality. Also, developing, disseminating and promoting innovative

immediate interventions targeted at specifc causes of water quality degradation. Effective local and metropolitan solutions that address the impact of urban areas on Great Lakes water quality are available and need to be supported by senior levels of government in terms of:

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- implementing best management practices to manage stormwater to increase infltration and reduce runof
- restricting future land development beyond current urban boundaries
- ensuring that tax policy does not encourage urban sprawl by subsidizing suburban land use and greenfeld development
- adopting transportation, land use planning and fscal measures that deter urban sprawl, encourage more compact forms of urban development and support public

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  shorelines and groundwater recharge areas, signifcant habitat and agricultural lands from urban development

(3.1) International Joint Commission

- Speak out to governments at every opportunity to remind them of the basin-wide challenge that urban sprawl represents: particularly, IC Biennial Reports

  Governments and Commission public speaking engagements.
- Inform and educate major stakeholders including fnancial institutions, developers, local government officials and staf about the impacts of urban development and the opportunities available to modify existing practices.

(3.2) Federal Governments

- Ensure that infrastructure funding provided to local governments supports

  such as combined sewer overfow controls, sewer separation and improved sewage treatment.
- Review and adjust fscal, spending and regulatory policies and programs to provide incentives for sustainable urban development.
-

  government buildings.

(3.3) State/Provincial Governments

- Identify as a priority and strengthen infrastructure funding for the 10 major urban areas identified by the IJC in its 12th biennial report in consideration of the impact that these areas are having on the Great Lakes.
- Revise building codes to recognize sustainable building design.
- Provide guidance and assistance to local governments regarding best practices.
- Adopt intensification targets and water conservation goals applicable to local governments.
- Remove disincentives to brownfield redevelopment.
- Strengthen standards for wastewater pretreatment.

(3.4) Local Governments

- Take immediate action to require intensification of development within existing urban areas by limiting outward expansion, redeveloping brownfield sites and encouraging infill development.
- purpose of the Great Lakes Water Quality Agreement.
- Adopt innovative practices to strengthen existing urban environments and reduce sprawl, such as ensuring that property taxes and development charges do not

  incentives to encourage the redevelopment of brownfield sites and other infill projects.
- Revise zoning regulations to allow more multiple uses and transit-oriented compact development and reduce parking requirements in urban areas in

  development.
- Adopt best management practices for stormwater management.
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