

Chapter 4

Land Use

4.1 Annex 13 - Pollution from Nonpoint Sources

Annex 13 further details the Parties' Article VI commitments to abate and reduce pollution from land use activities. The Parties are required to identify land-based activities contributing to water quality problems in RAPs and LaMPs, as established under Annex 2, and to develop and implement watershed plans. The annex also provides for protection of threatened wetland areas, monitoring and surveillance, demonstration projects, and biennial reporting.

Agricultural Sector

Considerable progress has been achieved in the agricultural sector. (Great Lakes Commission 1996) Recent reports related to Annex 13 document the Parties' efforts to reduce nonpoint source pollution from agricultural sources, principally sediment, nutrients, and pesticides. A variety of policy initiatives now encourage the widespread adoption of conservation tillage, buffer strips, integrated pest management, and environmental farm plans. Progress on these issues continues to be made through ongoing extension advice and programs. Where atmospheric or groundwater pathways are critical, however, water quality can be adversely affected by nutrient and pesticide loadings caused by specific farm practices. There is also growing concern about the disposal of animal wastes generated by large-scale hog and beef production.

Urban Growth

Scientific understanding of pollution from land uses has changed considerably since the landmark final report from the Commission's Pollution from Land Use Activities Reference Group (PLUARG) in 1978². PLUARG focused on the impact of agricultural and



2 The IJC's Pollution from Land Use Activities Reference Group (PLUARG) was established under the 1972 Agreement to determine the cause and extent of pollution originating from land use activities, and to recommend appropriate actions. PLUARG reported its findings to the Commission in 1978, and the IJC forwarded a set of recommendations to the Parties in 1980. PLUARG confirmed two major pollution problems in the basin: eutrophication, due to elevated nutrient inputs, particularly in Lake Erie and Lake Ontario; and increasing contamination by toxic substances.

forestry practices. More recent studies have examined the effects of urban growth. In 1996, the State of the Lakes Ecosystem Conference (SOLEC) addressed these issues in the context of its theme, The Year of the Nearshore, and documented extensive threats from nonpoint source pollution affecting lakes Michigan, Erie, and Ontario. SOLEC concluded that a major source of stress to the Great Lakes ecosystem is growth and development, notably urban sprawl. SOLEC also concluded that changing land use in the Great Lakes basin, particularly the trend over the past 20 years toward greater urbanization, is accelerating and is producing profound negative effects. The SOLEC conclusions go well beyond the impacts initially assessed by PLUARG.

In 1998, the 20th anniversary of the final PLUARG report provided an opportunity to reassess Agreement progress and related scientific thinking about land-based pollution control. (Great Lakes Science Advisory Board 2000) This reassessment affirmed SOLEC '96 findings. Extensive urbanization in the basin creates more impervious surfaces, thus increasing runoff and impairing water quality in urban watersheds. The extent of such impervious surfaces is a key variable in predicting pollutant loads and flooding. Continued urban growth over the next two decades will result in increased pollutant loads to the lakes from urban nonpoint sources unless action is taken now to manage it.

The major pollutants in urban waterways are nutrients, pathogens, sediment, industrial chemicals, and pesticides (Table 1). These pollutants are often released intermittently. The short-term surges can produce greater deleterious effects than continuous low levels of exposure. When surges happen, the ambient water

Table 1 Urban Pollutant Sources

Pollutant Category	Probable Sources
Nutrients	<ul style="list-style-type: none"> • Atmospheric deposition and washout • Septic system effluent through groundwater or system overflows • Lawn fertilization
Pathogens	<ul style="list-style-type: none"> • Urban wildlife and domestic pets • Wastewater discharges
Sediment	<ul style="list-style-type: none"> • Channel erosion from increased storm water runoff due to impervious surfaces • Exposed soils at construction sites • Urban runoff (e.g. tire wear from city streets)
Industrial Chemicals and Pesticides	<ul style="list-style-type: none"> • Intermittent pulse exposures, often weather-related • Runoff and groundwater contamination from land-based sources, including waste disposal sites

conditions exceed the established water quality criteria. The primary management tools for reducing urban nonpoint source pollutants are storm water best management practices that detain, retain, and treat pollutant-laden runoff.

The commitment to develop and implement watershed plans in Annex 13 implies a community-based planning process to determine which tools are the most feasible, effective, and acceptable in achieving reduction targets. Key tools related to planning, regulation, and education have been identified (Schueler 1998). Planning tools include reducing impervious surfaces, implementing better site design, and incorporating natural hydrologic features to enhance storm water management. In addition, best management practices, such as stream buffers to control runoff and erosion, are essential to protect stream integrity. Regulatory measures exist as well, including ordinance and bylaw protection of significant natural features, such as floodplains, as well as regulations to ensure adequate erosion and sediment control during subdivision development. Regulatory tools can also be used to address failing or inadequate septic systems that are potentially significant sources of pathogens and nutrients. Finally, education and increased public awareness encouraging informed decision-making complete the tool kit.

A Role for the Parties in Urban Watersheds

The impact of nonpoint source pollution at the watershed and regional levels is broad in scope, even though it is usually perceived as primarily a local problem requiring a local solution. Thus, there is an essential role for senior governments. The Parties need to ensure that policy, data, and information tools are available to manage and mitigate the effects of myriad development decisions in urban watersheds over the long term as well as the increasing residential development in more rural areas. Currently, there is no linkage between local development decisions and the provisions of Annex 13. The trend to transfer responsibilities and programs to local governments, and the growing economic and political importance of metropolitan areas throughout the basin, has made this linkage more difficult.

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There is a need for a framework or guidance policy that will enable all levels of government to work cooperatively to achieve Annex 13 goals. A guidance policy needs to be developed for urban land use planning throughout the basin in partnership with the Great Lakes states and provinces. The potential of new “sustainable cities” concepts and “smart growth” strategies for the protection of ecosystem integrity should be evaluated and incorporated as appropriate. This guidance policy should apply to all activities and projects on federal lands, and to all other

areas that involve federal spending related to urban development. All jurisdictions in the basin responsible for land use should incorporate the guidance policy into their land use planning policies and decision-making.

Wetland Preservation

Land use changes have also significantly altered ecosystem structure and function — for example, through drainage of aquatic and wetland systems. Understanding these impacts provides valuable insight into the effect of land use changes on the basin ecosystem. SOLEC '98 recognized the importance of identifying and protecting basin wetlands, building on the original concept of Biodiversity Investment Areas as introduced at SOLEC '96 (Holland and Reid 1996).

SOLEC activities with regard to Biodiversity Investment Areas are leading to the creation of a geographic information system (GIS)-based inventory, a standard system for classification, and the identification of some of the most ecologically important areas to target for conservation. This represents significant progress under the Agreement related to wetland preservation as well as to the development of a broader understanding of the impacts of land use changes and nonpoint source pollution in the basin. Governments must now take steps to preserve these areas and, where necessary, rehabilitate them. The identification of Biodiversity Investment Areas constitutes an essential preface to the development of a binational policy and strategy for wetlands protection. It provides a sound foundation based on a comprehensive data and information system and assessment. A similar approach to identify and quantify nonpoint sources of pollution from land use activities is urgently required.

THE COMMISSION RECOMMENDS THAT:

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.