# International Joint Commission

## 12th Biennial Report

on Great Lakes Water Quality

# Biological Integrity: Impacts of Pathogens

**Overview**

In the **Great Lakes Water Quality Agreement**, the governments of the United States and Canada agreed "to restore and maintain the chemical, physical, and biological integrity of the waters of the Great Lakes Basin Ecosystem." Under the terms of the Agreement, the two federal governments agreed "to make a maximum effort to develop programs, practices and technology necessary for a better understanding of the Great Lakes Basin Ecosystem and to eliminate or reduce to the maximum extent practicable the discharge of pollutants into the Great Lakes System."

The **International Joint Commission** (IJC) is directed to make a full assessment of the progress toward achieving the objectives of the Agreement every two years. The **Twelfth Biennial Report on Great Lakes Water Quality** is the Commission's most recent assessment of progress.

**The Twelfth Biennial Report on Great Lakes Water Quality**

In September 2004, the International Joint Commission released its *Twelfth Biennial Report on Great Lakes Water Quality*. The purpose of the report is to assess the the progress being made under the Agreement and highlighting issues we conclude need timely and focused attention.

The Commission does not report on all subjects of importance to the Great Lakes, but analyzes and makes eight specific recommendations regarding the Agreement's goals of physical, biological and chemical integrity leading to an ecosystem approach to ecological integrity.

**This information sheet is one of six that highlight important issues discussed in the report.**

**IMPACT OF PATHOGENS**

Many phenomena threaten the biological integrity of the Great Lakes. Documented outbreaks of gastrointestinal diseases, should serve as a warning that residents of the Great Lakes basin face serious, largely unacknowledged threats from an everyday substance we all tend to assume is safe - the water we depend on for recreation and drinking.

**Microbial Contamination**

The Commission remains concerned about microbial pollution in the Great Lakes basin. While major problems occur infrequently, the waterborne disease outbreaks in Milwaukee, Wisconsin and Walkerton, Ontario make it clear that the potential for tragedy remains if drinking water is inadequately treated or challenged by high pollution loads.

Microbial infectious disease outbreaks demonstrate the fragility of barriers designed to protect public health. Research suggests these outbreaks are only a fraction of the actual number of gastrointestinal illnesses caused by microbial pollution each year. The U.S. Centers for Disease Control have reported increasing incidents of waterborne infectious disease in the United States, and it's estimated that six to 40 percent of all gastrointestinal illness in the United States may be of waterborne origin.

**Where are the Pathogens Coming From?**

The Twelfth Biennial Report illustrates potential sources of gastrointestinal pathogens that find their way into recreational and drinking water, including: pet wastes, waste from land-based sludge applications, manure storage piles, and leaking septic tanks. When multiple, adjacent communities use waterways, as is the situation for most of the U.S. and Canadian Great Lakes region, sewage overflows can put downstream communities at risk from high concentrations of microbial pollution.

**Gaps in Pathogen Detection**

Even when waterborne illness occurs, detecting it can be difficult. As a result, instances of disease caused by pathogens in water are probably under-reported to public health officials. Most people afflicted by gastrointestinal illness caused by pathogens in water will experience flu-like symptoms several days after exposure, rarely suspecting the ingestion of contaminated water, and often assuming the illness is the result of food poisoning.

**The Emergence of New Pathogens**

Some experts believe that the massive and largely unregulated use of antibiotics in agriculture, coupled with the increasing number of antibiotic-resistant pathogens found in nature, may present the greatest risk to the aquatic environment and to public health. Antibiotic-resistant bacteria have been spread in the environment through the indiscriminate use of antibiotics in human and animal health. If antibiotic-resistant bacteria infect humans, finding appropriate remedies for the diseased individual will represent a much more difficult challenge to physicians.

**Conclusions**

Systems for waste collection and water treatment and distribution around the Great Lakes are inadequate, or in decline. Increasing pressures from agriculture, development, industry, population growth, and urban expansion will require coordinated actions by all those responsible for managing watersheds and water resources to fully protect ecosystem and public health. Coordination among jurisdictions, and the importance of jurisdictions to consider watersheds as the basic planning units are urged.

Improved, more efficient and more sensitive tools and methods are needed to monitor and model microbial risks to surface water and ground water. Watershed-wide risk reduction and management approaches that adequately protect the safety of water supplies are absolutely essential. Measures to detect, treat, and respond to multiple contaminants including microbial contaminants and their toxins, traditional pollutants, and emerging compounds of concern such as pharmaceuticals, antibiotics and personal care products are also needed.

**Recommendation**

All levels of governments should create and implement coordinated planning actions to fully protect drinking water sources from increased pressures from industry, urban expansion, aging infrastructure and agriculture, including ecosystem and human health protection from large-scale animal operations.

**Scheduled Review of the Great Lakes Water Quality Agreement**

This report triggers the much anticipated review of the historic Great Lakes Water Quality Agreement. The current Agreement was signed in 1978 and was amended in 1987. It has not been updated or changed in more than 17 years. During this time, technology and our scientific knowledge and understanding have grown immensely. We need to keep pace with what we know and review the Agreement with an eye toward a sustainable future.

**The International Joint Commission (IJC)**

IJC was established through the 1909 Boundary Waters Treaty of the United States and Canada. The Treaty recognizes that each country may be affected by the other?s actions in the lake and river systems along their common border; its purpose is to prevent and resolve disputes concerning these boundary waters.

**For More Information**

Additional information regarding IJC's *Twelfth Biennial Report on Great Lakes Water Quality* can be obtained by contacting an IJC office:

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**Information about the IJC and this report can be obtained from the IJC web page at www.ijc.org.**