



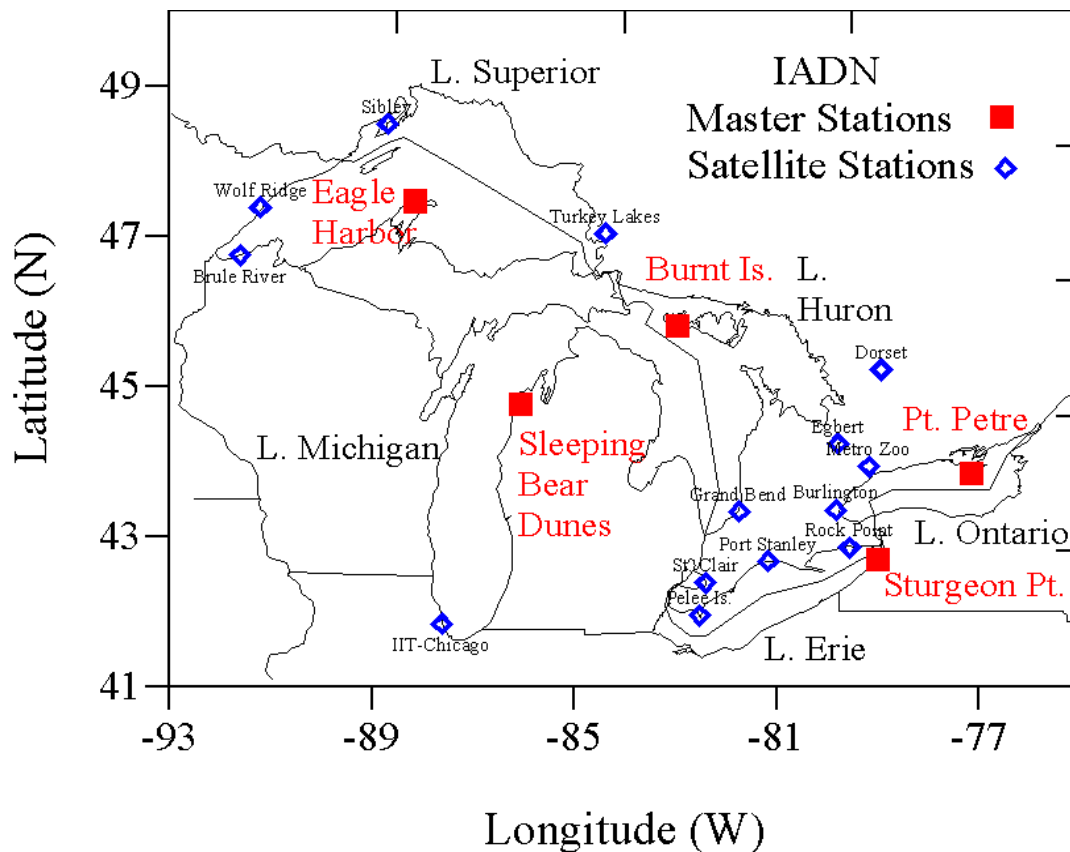
COOPERATING TO IMPLEMENT THE GREAT LAKES WATER QUALITY AGREEMENT
 MISE EN OEUVRE DE L'ACCORD SUR LA QUALITÉ DE L'EAU DES GRANDS LACS

INTEGRATED ATMOSPHERIC DEPOSITION NETWORK

What is IADN?

IADN, the Integrated Atmospheric Deposition Network, is a system of monitoring stations created under the Canada-U.S. Great Lakes Water Quality Agreement. Its goals are to identify airborne toxic substances and their sources, to track their movements, and to define trends in their atmospheric deposition to the Lakes.

The IADN monitoring stations are located at the sites shown on the accompanying map. Several instruments are grouped together at each site to collect air and rain samples. Combining the measured levels of toxic substances in those samples with other environmental information allows IADN scientists to assess atmospheric deposition.





COOPERATING TO IMPLEMENT THE GREAT LAKES WATER QUALITY AGREEMENT
MISE EN OEUVRE DE L'ACCORD SUR LA QUALITÉ DE L'EAU DES GRANDS LACS

INTEGRATED ATMOSPHERIC DEPOSITION NETWORK

What is atmospheric deposition? How is it measured?

Atmospheric deposition is the name given to a group of processes responsible for the transfer of pollutants from the air to the Earth's surface.

wet deposition - the amount of substance delivered to ground level through precipitation; measured by collecting rain and snow, and then determining the quantity of precipitation and the amount of toxic substance in the collected water

dry deposition - the amount of substance delivered to ground level by the settling of airborne particles; measured by collecting particles, determining the amount of toxic substance they contain, and combining those data with particle settling rates

gas exchange - the amount of gaseous contaminant absorbed by, or volatilised from, the lake; more complex to assess than deposition, gas exchange is calculated after measuring many environmental parameters including substance concentrations in air and water

The net atmospheric deposition of any substance (expressed as kilograms of substance deposited per year) is calculated by adding the contributions made by each of the processes described above.

What chemicals are measured at IADN sites?

Many toxic substances are measured in air and precipitation at IADN sites. These include

- banned or restricted pesticides such as DDT
- current-use pesticides such as endosulphan
- trace elements and metals such as lead
- combustion products such as benzo[a]pyrene, a commonly measured PAH (polycyclic aromatic hydrocarbon)
- industrial chemicals such as PCBs.

The need for information is constantly evolving, and substances that are proposed as additions to the regular IADN roster of chemicals include

- atrazine and other triazine herbicides
- toxaphene, an organochlorine pesticide
- mercury and other trace elements
- dioxins and furans
- an expanded PAH list

Modifications to the substance lists will be discussed by IADN scientists in 1998.





COOPERATING TO IMPLEMENT THE GREAT LAKES WATER QUALITY AGREEMENT
MISE EN OEUVRE DE L'ACCORD SUR LA QUALITÉ DE L'EAU DES GRANDS LACS

INTEGRATED ATMOSPHERIC DEPOSITION NETWORK

What does IADN tell us about the levels of these chemicals in the Great Lakes?

The goal of toxic substance management is to reduce pollution levels. The assessment of progress towards such a goal can be represented by the following series of questions.

- Are pollution levels acceptable?
- If not, are pollution inputs decreasing?
- If not, how can pollution inputs be diminished? (Where is the pollution coming from?)

Networks such as IADN are integral to the management of toxic substances in the Great Lakes region. The information generated through IADN provides answers to all three questions noted above, either directly through the measurement of pollution levels and atmospheric deposition, or indirectly as data used in research aimed at identifying pollution sources and potential control options.

Are pollution levels acceptable? Agreements such as the Great Lakes Binational Toxics Strategy seek to virtually eliminate persistent toxic substances from the Great Lakes. In practical terms, virtual elimination is said to be achieved when environmental levels are so low that they are not measurable. Using such a criterion, levels of many IADN substances are unacceptable due to the fact that they are still detectable in the Lakes. Current IADN estimates predict that the virtual elimination of many of these substances will occur by the middle of the next century if restrictions on their use continue.

Are pollution inputs decreasing? IADN data show that many of the measured persistent toxics are still being introduced to the Lakes from the atmosphere. Levels in air and precipitation appear stable for current-use pesticides such as endosulphan, but levels for most other pesticides, PCBs and lead are decreasing. Gas absorption appears to be the dominant deposition process for delivering semi-volatile compounds to Lake surfaces, while wet and dry deposition dominate for the trace elements and heavier PAHs. For some IADN substances, like dieldrin and PCBs, the waters themselves are behaving like a source since the amount that is volatilising from the water is greater than the amount being deposited to the water.

Where is the pollution coming from? Although used in other parts of the world, many substances measured by IADN are no longer used in Canada or the U.S. IADN data have shown that these substances are nonetheless transported through the air to the Great Lakes from areas where they are currently used, as well as from areas where they have not been used for many years but where residues still exist in soils. IADN data have also shown that the Great Lakes receive pollutants from the emissions of local industry, agriculture, incineration, and automobiles and other combustion sources.



COOPERATING TO IMPLEMENT THE GREAT LAKES WATER QUALITY AGREEMENT
MISE EN OEUVRE DE L'ACCORD SUR LA QUALITÉ DE L'EAU DES GRANDS LACS

INTEGRATED ATMOSPHERIC DEPOSITION NETWORK

What is planned for the next phase of IADN?

The work conducted during the first phase of IADN, which spanned from 1990 to 1996, was reviewed by a panel of independent experts in 1997. In its report, the panel referred to the Network as “a leading international effort in the assessment of the role of the atmospheric impacts of persistent, toxic substances on aquatic systems”.

The second phase of IADN is scheduled to run until 2004. No major changes to the Network are anticipated, although potential modifications will be discussed in relation to

- placement of satellite stations for improved assessment of urban inputs and air-water gas exchange
- criteria for changes to the IADN chemicals list
- coordination between IADN operations and other science activities
- quality assurance of IADN operations
- availability and communication of Network results

How can I get more information about IADN?

You can get more detailed information about the first phase of the program in the comprehensive document entitled “Technical Summary of Progress under the Integrated Atmospheric Deposition Program 1990-1996”. For details on the second phase of IADN, please consult the “Second Implementation Plan for the Integrated Atmospheric Deposition Network 1998-2004”. These documents are available at the IADN websites, <http://airquality.tor.ec.gc.ca/IADN/> or <http://www.epa.gov/glnpo/air/iadndocs.html>, where you'll also find links to other IADN publications.

If you do not have access to the Internet, please contact:

AES Communications
Environment Canada
4905 Dufferin Street
Downsview, ON
Canada
M3H 5T4

Atmospheric Program Coordinator
Great Lakes National Program Office
U.S. Environmental Protection Agency
77 West Jackson Boulevard
Chicago, IL
United States of America
60604

IADN Factsheet

Last updated July 21, 1998



Environment Canada
Environnement Canada

PAGE 4

