CAN WE EAT THE FISH?
Atmospheric Deposition

The Issue: Chemical pollution that may result in fish consumption advisories can enter the Great Lakes from sources close to, as well as very distant from the Great Lakes.

- Contaminants such as PCBs, DDT, and PAHs can enter the Great Lakes from the atmosphere as a result of rain or other atmospheric processes.
- A significant portion of the contaminants found in the Great Lakes may have been used in other parts of the world and then transferred to the Lakes via the atmosphere. However, nearby sources in the Great Lakes basin can also contribute greatly.
- Contaminants transferred to the Lakes through atmospheric deposition contribute to elevated contaminant levels in fish tissue, and consequently, determine whether or not we can eat the fish.

The Indicator - SOGL 2003

Contaminant transfer from the air to the earth's surface is known as atmospheric deposition. The United States and Canada are working together to measure the levels of toxic chemicals in the air and precipitation in the Great Lakes basin through the Integrated Atmospheric Deposition Network (IADN). IADN consists of five major sampling sites, one near each of the Great Lakes, and several smaller stations.

Air monitoring helps us better estimate atmospheric loadings---the amount of a pollutant entering any of the Great Lakes from the air. Once particular contaminants are in the system, they are ingested by fish and stored in their tissue. As these fish are ingested by other fish, the contaminants accumulate at increasingly higher concentrations. Large fish, the types most often desired for human consumption, are often those carrying the largest amount of contaminants.

The Assessment

IADN measures many toxic substances in air and precipitation. Most of the chemicals measured in the IADN program fall under three main groups: polychlorinated biphenyls (PCBs), chlorinated pesticides (DDT, lindane), and polycyclic aromatic hydrocarbons (PAHs).

Polychlorinated Biphenyls (PCBs)

PCBs are a man-made mixture of chemicals most commonly used as coolants and lubricants, and in electrical equipment. PCB levels and loadings to the Great Lakes have generally decreased since production was banned in 1979. PCB concentrations are still relatively high in urban areas such as Chicago, Illinois (Figure 1).

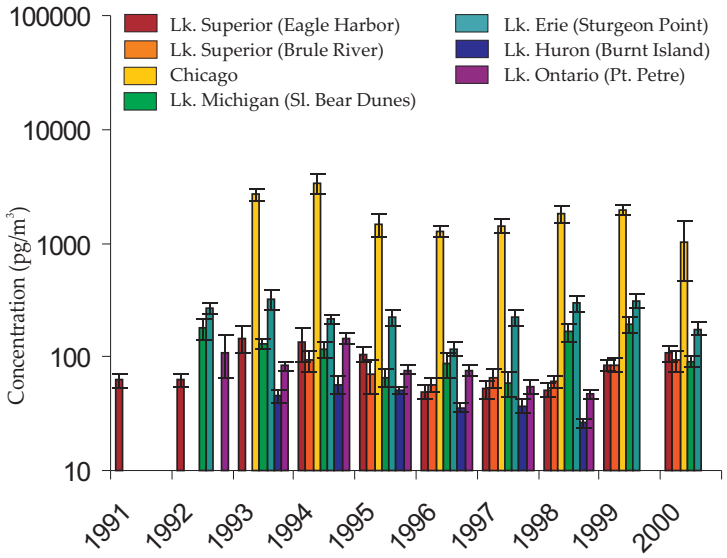

Figure 1. PCB levels measured at IADN stations.

Chlorinated Pesticides

Many extensively used chlorinated pesticides were banned in the late 1970s and early 1980s over concerns for human and ecological health. DDT, one of the most commonly applied pesticides, was linked to severe reproductive and physiological abnormalities such as the crossed-bill syndrome seen in many bird populations. Overall, the atmospheric levels and loadings of chlorinated pesticides have decreased over time as a result of banning their use decades ago.

PAHs

Certain types of PAHs, such as benzo(a)pyrene (BaP), are linked to an increased incidence of cancer in exposed individuals. These contaminants escape into the atmosphere after the incomplete burning of almost any fuel. The BaP concentrations measured in the atmosphere today have remained consistent over the last decade and are relatively high near major population centers.

The Outlook

Atmospheric deposition of contaminants will affect the Great Lakes for decades to come. Over the last 30 years, we have made significant progress by banning the most toxic and persistent chemicals, but residual sources are still found in the environment and some chemicals are still used in other parts of the world. For example, PCBs are still found in many urban areas, but Canada and the United States are currently investigating the significance of the remaining source areas and are also working to encourage the decommissioning of remaining PCB-containing electrical equipment.

The effects of some currently used chemicals are not yet fully understood and require continued research. Focused monitoring programs are crucial to track changes in the system and better understand how these changes may affect the Great Lakes ecosystem.

For More Information...

Visit the web site, **www.binational.net**, to access the ***State of the Great Lakes 2003*** and other references reporting on the state of the Great Lakes.