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Deposition of Air Pollutants to the Great Waters - Fact Sheet

GREAT WATERS THIRD REPORT TO CONGRESS TODAY'S ACTION

- The U.S. Environmental Protection Agency (EPA) is issuing the third in a series of Reports to Congress titled *Deposition of Air Pollutants to the Great Waters*. The report discusses atmospheric deposition and its contribution to pollution in the Great Waters.
- The report provides an update based on scientific data available since publication of the earlier Reports to Congress, in 1994 and 1997.
- The Great Waters include the Great Lakes, Lake Champlain, Chesapeake Bay and many U.S. coastal estuaries.
- The report focuses on deposition of 15 pollutants of concern, which include mercury, dioxins, furans, polycyclic organic matter, polychlorinated biphenyls (PCBs) and several banned or restricted pesticides, such as chlordane and DDT.
- The report also discusses the many programs EPA, states, tribes and others are implementing to address the pollutants of concern to the Great Waters. EPA is committed to continuing to address air deposition of pollutants into the nation's waters. Beginning this year, the Agency will develop a detailed work plan for implementing the many related tasks outlined in the Great Waters report; the work plan will be updated every two years.

REPORT FINDINGS

- The report issued today confirms and adds support for the findings of EPA's previous reports to Congress on this issue.
- In addition, the report finds:
- Several pollutants of concern continue to enter the Great Waters primarily through atmospheric deposition. However, overall deposition rates of the 15 pollutants of concern have declined slightly or remained constant in recent years -- in large part due to pollution-reduction efforts.
- Concentrations of some pollutants of concern in the water, sediments, plants and animals have declined.
- Concentrations of most of the pollutants still pose potential ecological and human health risks and many of these pollutants are expected to

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remain in the water, sediments, and plants and animals years after deposition declines.

- Based on current trends, EPA expects atmospheric deposition to remain a significant source of several pollutants of concern to the Great Waters for the foreseeable future.
- Recent data indicate that surface water quality guidance and criteria are being exceeded in some of the Great Waters. However, the pollutants of concern are not exceeding standards in place for Great Waters drinking water supplies.
- There has been substantial progress in research activities relevant to the Great Waters program since EPA issued the *Second Report to Congress* on this subject in 1997. However, important information gaps remain, and there are critical limitations to current atmospheric monitoring and modeling capabilities.

BACKGROUND & DEFINITIONS

- The Clean Air Act requires EPA to assess the impact of atmospheric deposition of air toxics (and any other air pollutants of concern) on the Great Waters.
 - *Air toxics*, also known as hazardous air pollutants, are pollutants that are known or suspected to cause cancer or other human health problems (such as birth defects or reproductive effects), or environmental damage.
 - *Atmospheric deposition* occurs when pollutants fall out of the air (in the form of rain, snow or microscopic particles, for example) and settle on land or in waterbodies. Over time, the concentrations of persistent pollutants can accumulate and can damage ecosystems.
 - *Persistent pollutants* have a tendency to accumulate in the tissues of plants and animals, and to biomagnify through the food web. When a pollutant *biomagnifies*, it increases in concentration in tissues as it moves through the food chain, from algae or sediments to shellfish to fish to fish-eating birds and mammals.
- The current list of 15 Great Waters pollutants of concern consists chiefly of air toxics.
- The toxic pollutants of concern to the Great Waters are: mercury; cadmium and lead (and their compounds); dioxins; furans; polycyclic organic matter; polychlorinated biphenyls (PCBs); and the pesticides chlordane, DDT/DDE, dieldrin, hexachlorobenzene, alpha-hexachlorocyclohexane, lindane and toxaphene.
 - Nitrogen compounds such as nitrogen oxides and ammonia are also pollutants of concern. In estuaries and coastal waters, excess nitrogen can cause excessive algal growth. Over time, this excessive algal growth can contribute to reduced oxygen levels in the water (eutrophication), which can harm fish or shellfish. Excess algae can also decrease light available to submerged aquatic vegetation or to corals.

- EPA released the first and second Reports to Congress in 1994 and 1997. Among other things, those reports found that:
- Atmospheric deposition can be a significant contributor of toxic chemicals and nitrogen compounds to the Great Waters;
- Airborne emissions from both local and distant sources, including U.S. and foreign sources, contribute to pollutant loadings to waters through atmospheric deposition.
- Determining the relative contributions of local, regional, national, and global sources of atmospheric deposition to specific waterbodies is complex, requiring careful monitoring, modeling and other analysis.

HEALTH AND ENVIRONMENT

- The contribution of atmospheric deposition to overall pollutant loadings varies by pollutant and location.
- The pollutants of concern are associated with damage to many organs in humans and animals, including the liver, kidneys, nervous system, endocrine system, reproductive organs and immunological system. (Research since the second report provides additional evidence that some of the pollutants may interfere with the action of hormones in wildlife and humans.)
- At current levels of contamination, pollutants of concern in the Great Waters pose potentially the greatest health risks to individuals who consume fish from contaminated waters.
- For mercury in particular, exposures do not appear to pose a health risk to people consuming average amounts of fish. However, sensitive groups with higher-than-average typical fish consumption may be at risk. Those groups include young children and pregnant women and their developing fetuses. People who eat large amounts of fish for cultural or economic reasons are also at risk. The extent of risk for these groups depends on the amount of fish consumed and the mercury concentrations present in the fish.
- While a number of assessments suggest that environmental conditions in the Great Waters are generally improving, the current concentrations of pollutants of concern continue to impair the ecological health of many of the Great Waters. Because of long-range atmospheric transport and certain chemical properties, these pollutants may contribute to ecological impairment far from known emissions sources and long after releases.
- EPA's Chesapeake Bay Program has identified eutrophication as a major problem affecting the overall health of the bay system, and eutrophication also affects other important coastal estuaries. Atmospheric deposition of nitrogen compounds to estuaries and their watersheds often accounts for a significant portion of total nitrogen concentration in these waterbodies.

RECENT & ANTICIPATED TRENDS

- Where trends information exists, it shows that atmospheric deposition of pollutants of concern to the Great Waters has declined or remained relatively constant in recent years. Deposition of lead, cadmium, polycyclic organic materials, PCBs and some banned or restricted-use pesticides has declined in the Great Lakes. Similar trends are seen in some other Great Waters. Deposition of nitrogen in the U.S. has remained fairly constant.
- The trends estimates are uncertain because of limited monitoring capability, technological barriers, and variable collection and analysis methods. Also, not all Great Waters waterbodies are included for all pollutants of concern. For instance, there is only limited trends information about the pollutants of concern in coastal estuaries other than the Chesapeake Bay.
- Atmospheric deposition is a significant contributor of mercury to the Great Waters -- despite a downward trend of mercury emissions since 1990 (due chiefly to the phase-out of mercury in many products). At EPA's current reference dose for mercury, levels in some lakes and streams remain sufficiently high to pose human health and ecological risks.
- Sediment analysis in the Great Lakes region show that dioxin and furan inputs have declined since the 1970s. Also, long-term monitoring data indicate that dioxin and furan concentrations in plants and fish in many Great Waters have declined over time.
- EPA expects that additional reductions in nitrogen oxide emissions will result in a net decreasing trend in nitrogen oxide emissions through 2005.
- However, both current and anticipated nitrogen deposition rates are significantly greater than natural rates. When combined with nitrogen runoff from farms and cities, nitrogen has the potential to overwhelm the capacities of surface waters to assimilate it.

WHAT'S BEING DONE - AND WHAT'S NEXT

- More than 60 programs now under way - from local to international levels - directly or indirectly contribute to reducing atmospheric deposition of pollution to the Great Waters or to understanding its effects. EPA leads or supports many of these programs, which often use multimedia and cross-program approaches to control pollution. (The pulp and paper "cluster" rule is one example.) Other federal agencies, state and tribal organizations, industry groups and the Canadian government also have initiated and implemented many important activities.
- By summer 2000, EPA expects to develop a work plan to assess atmospheric deposition on a regional basis. That work plan would include: targeting water bodies identified by states as impaired; examining what rules or activities are in place to address impairment caused by atmospheric deposition; and determining what, if any, additional actions are necessary to address that impairment, EPA

expects to revise the work plan every two years, based on updated scientific information and stakeholder input.

- EPA also anticipates further controlling emissions of a number of pollutants through rules scheduled to take effect in the coming years. Those pollutants include: mercury; nitrogen oxides; polycyclic organic materials; dioxins and furans; cadmium; lead; and hexachlorobenzene.
- In addition, actions taken to voluntarily reduce chemical use, implement pollution prevention initiatives, advance technology, and implement pollution control laws issued by states and other nations will further reduce pollutant loadings to the Great Waters.
- EPA has developed six recommendations that will assist in meeting the objectives and requirements of the Clean Air Act related to the Great Waters program:
 - EPA will continue to support the maintenance and expansion of efforts to monitor Great Waters pollutants of concern in order to evaluate the relative contributions of local, regional, and long-range transport to deposition in the U.S., as well as natural versus human-made sources;
 - EPA will continue to develop and implement regulations and pollution prevention programs regionally and nationally, including multimedia programs, in order to reduce the impact of sources of Great Waters pollutants of concern within the U.S.;
 - for Great Waters pollutants emitted by sources outside the U.S., EPA will work within international frameworks to reduce sources of these pollutants;
 - EPA will support model development and research that establish and clarify the linkages from emissions to atmospheric deposition to waterbody loadings to adverse public health and the environmental effects in order to enable effective risk management decisions;
 - EPA will encourage and support the establishment of common baselines and measures of progress in order to better assess trends and health of Great Waters and other waterbodies affected by atmospheric deposition; and
 - EPA will work to increase public awareness of risks of exposure to Great Waters pollutants.

FOR MORE INFORMATION

- The full report is available on EPA's World Wide Web site at (<http://www.epa.gov/oar/oaqps/gr8water/>).
- For technical questions on the report, call Gail Lacy or Dale Evarts of EPA's Office of Air Quality Planning and Standards at (919) 541-5261 and (919) 541-5535, respectively.

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