

Executive Summary (Draft)

Public Health Implications of Hazardous Substances in the Twenty-Six U.S. Great Lakes Areas of Concern

This report was developed by the Agency for Toxic Substances and Disease Registry (ATSDR) in response to a request by the International Joint Commission (IJC) regarding the public health implications of hazardous substances found at the U.S. Areas of Concern (AOCs). This report should not be construed as a traditional analytic epidemiologic evaluation. Instead, it should be viewed as an assessment to identify the co-occurrence of elevated patterns of morbidity and mortality and environmental contamination that may merit further hypothesis-based epidemiologic study.

Despite limitations, this report provides a comprehensive evaluation of patterns of environmental contamination and the demographics of vulnerable populations in the 26 AOCs.

ATSDR identified waste sites, their hazard categories, relevant demographic information on populations at risk, and IJC critical pollutants with completed exposure pathways in the 26 U.S. AOCs. Data from about 108 hazardous waste sites where ATSDR has been involved were reviewed for 54 counties. County-wide health outcome data and U.S. Environmental Protection Agency Toxic Release Inventory (TRI) and National Pollution Discharge Elimination System (NPDES) data were retrieved and reviewed for all 26 AOCs. Geographic Information System (GIS) maps were developed showing the hazardous waste site locations, TRI and NPDES reporting facilities, and vulnerable populations. These data were subsequently compiled into this report.

With the exception of the Manistigou River AOC (Lake Michigan), all AOCs continue to be impacted by the release of IJC pollutants as determined from both the TRI and NPDES data. Lake Michigan AOCs (Mukkegon Lake, Grand Calumet, Kalamazoo River, Lower Green Bay and Fox River, Milwaukee Estuary, Sheboygan River, and Waukegan Harbor) continue to have contaminant problems, generally from polychlorinated biphenyls (PCBs) in fish and/or sediments. Lake Erie's AOC (Ashtabula River) has been remediated but contamination problems still remain in the Buffalo River, Presque Isle, Cuyahoga River, Black River, Rouge River, and Cuyahoga River AOCs and in the River Raisin AOC. Lake Superior's AOC (St. Louis River and Bay) has heavy soil and sediment contamination with polyaromatic hydrocarbons (PAHs). Lake Ontario has no U.S. AOCs of high concern. Lake Huron has only one U.S. AOC (Saginaw River and Bay AOC) that continues to be affected by the release of IJC critical pollutants as indicated by TRI and NPDES data.

Data presented in this report demonstrate that many of the hazardous waste sites that, in the past, had contributed to human exposure or the environmental burden of the IJC critical pollutants and other contaminants were found to be remediated. The U.S. AOCs within Lake Ontario do not appear to be significantly impacted by the continuing presence and release of contaminants from waste sites assessed by ATSDR. The only AOC within Lake Huron (Saginaw River and Bay) has five hazardous waste sites that continue to release IJC critical pollutants.

Of the 108 hazardous waste sites included in the 25 AOCs, 71 sites were identified as having a potential human health impact. Of this number, 2 are classified as *urgent public health hazards*, 29 are identified as *public health hazards*, and 40 are listed as *indeterminant public health hazards* as defined by the ATSDR Public Health Assessment Manual. Vulnerable populations (i.e., children less than 6 years of age, reproductive age women, and older adults) living within a one-mile radius from the AOC hazardous waste sites included approximately 5,000 residents for the Lake Superior AOCs, over 200,000 persons for Lake Michigan AOCs, approximately 2,000 persons in the Lake Ontario AOCs, and over 7,000 residents for the Lakes Erie and Huron AOCs, respectively. These figures indicate that the total number of individuals within vulnerable populations residing within one mile of AOC hazardous waste sites totals an estimated 230,000. According to analysis of ATSDR's HazDat database for 2003, there were over 15,000 instances where contaminants of concern were found at levels above health-based screening values in a variety of media (i.e., water, air, and soil).

This report indicates that there are 25 AOCs which have not been remediating and that over 9 million residents are living within these AOC counties. The AOC county health measures (health status indicators) that compare unfavorably with the median of the peer counties and also with the U.S. population data merit further attention. Differences between the peer counties, the U.S. population data, and the U.S. AOC counties indicate elevated rates of disease beyond the norm (norm being the peer counties and the U.S. population data). While no causal inferences or associations are made in this report, of the 25 AOCs, elevated rates were observed for infant mortality in 21 AOCs, low birth weight in 6 AOCs, and premature births in 4 AOCs. Elevated cancer mortality was also seen for breast cancer in 17 AOCs, colon cancer in 16 AOCs, and lung cancer in 12 AOCs.

Future studies investigating the associations between potential exposures to contaminants found within the AOCs and health outcomes should consider examination of smaller, targeted areas near waste sites and/or other sources of contamination. These prospective analytic epidemiologic studies should address sensitive health outcomes (e.g., functional deficits in cognition, immune function, and fertility), confounding factors, critical exposure periods and disease latency, and the effect of mixtures of chemicals. Ecological studies are not being proposed. The proposed studies would use actual exposure data. Current insights derived from this study regarding the potential for such health effects are summarized in peer reviewed literature and the Expert Panel Report (Appendix).