

## Persistent Toxic Substances Problem Statement

### I. Impacts

#### A. Historical Persistent Toxic Substances (PTSs)<sup>1</sup>

The concentrations of monitored PTS in Great Lakes fish have declined significantly following a ban on most PCB manufacturing uses, canceling or suspension of some particularly harmful pesticides, pollution prevention measures, and the significant improvements made in wastewater treatment facilities in the 1970s and '80s. Nonetheless, concentrations of PCBs, dioxin, some canceled pesticides, and mercury still necessitate the issuance of fish consumption advisories. This threatens the food supply and culture of indigenous and subsistence fishers as well as the sport and commercial fishing industry, regardless of whether native or stocked fish are harvested. Also, toxicity effects to aquatic populations continue to be observed at various locations around the Great Lakes basin.

#### B. Chemicals of Emerging Concern

Researchers have recently documented the presence of additional chemicals, routinely used in daily activities, in air, water, and fish and human tissue in the Great Lakes, which may pose threats to human and ecological health. These include surfactants, flame retardants, pesticides, pharmaceuticals, personal care products, natural and synthetic hormones, and combustion by-products, to name a few. The acute and chronic toxicities through direct exposure to these substances may be known, but sources, fate and transport, food web bioaccumulation, and toxicity including teratogenicity and impaired reproduction are not fully understood.

### II. Sources and Pathways

PTSs enter the Great Lakes ecosystem primarily from anthropogenic sources. PTSs do not recognize geopolitical boundaries while transported as gases or attached to particles in the air, over the ground and into streams, and through groundwater. Eventually PTSs may become incorporated into the food web or induce direct toxic effects via many different exposure pathways. The Great Lakes are especially vulnerable to PTSs because of their long hydraulic retention times, large surface area, and proximity to large population centers. It is necessary to quantitatively understand the importance of various source - exposure pathways in the lakes in order to best establish programs for reduction of risks to human health and the environment from PTSs.

### III. Current and Future Considerations

Past research, monitoring, and modeling programs have taught us a great deal about the sources, fate, transport, and effects of historical PTSs in the Great Lakes. Existing programs for source control and remediation focus primarily on historical PTSs. For future consideration it will be necessary to expand these programs to include chemicals of emerging concern that are found to be most threatening to human and ecological health in the Great Lakes. Current

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<sup>1</sup> PTSs include substances that are continuously released to the Great Lakes basin environment in amounts sufficient to cause harm to humans and wildlife, however PTSs do not include those substances which cause harm primarily through the inhalation pathway (e.g., criteria pollutants, VOCs, etc.)

regulatory and remediation programs, aimed at preventing materials from entering commerce through the Toxic Substances Control Act and the Federal Insecticide, Fungicide, and Rodenticide Act, provide mixed success to address the problem. These programs are limited by the ability to screen new or proposed chemicals for their source-receptor pathways within the Great Lakes, and possible limitations on certain types of toxicity testing. Standardized endocrine disruption tests are still in development.