

Chemical Contaminants in the Lake Simcoe Watershed

LSRCA Board of Directors

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Lake Simcoe Region
conservation authority



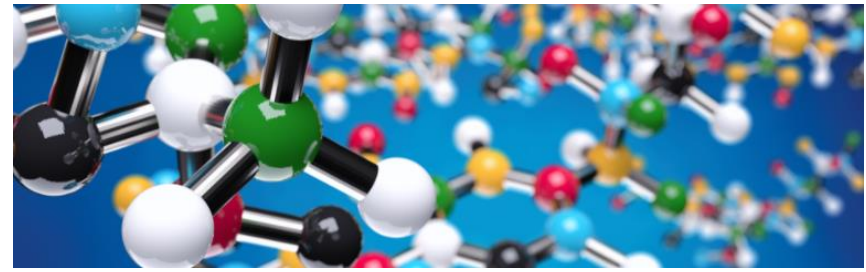
Member of Conservation Ontario

LSRCA Strategic Plan Goal

Identify existing and emerging contaminants in water bodies through targeted sampling every 5 years.



Existing vs emerging contaminants



- Existing Contaminants
 - Legacy (source no longer exists) & existing contaminants
 - Impacts generally understood and guidelines exist
 - E.g. Petroleum hydrocarbons (oil and gas), pesticides
- Emerging Contaminants
 - Largely in the research realm
 - No guidelines or poor understanding of impacts
 - Costly or unconventional analysis / no analytical method
 - E.g. Pharmaceuticals and Personal Care Products, Microplastics



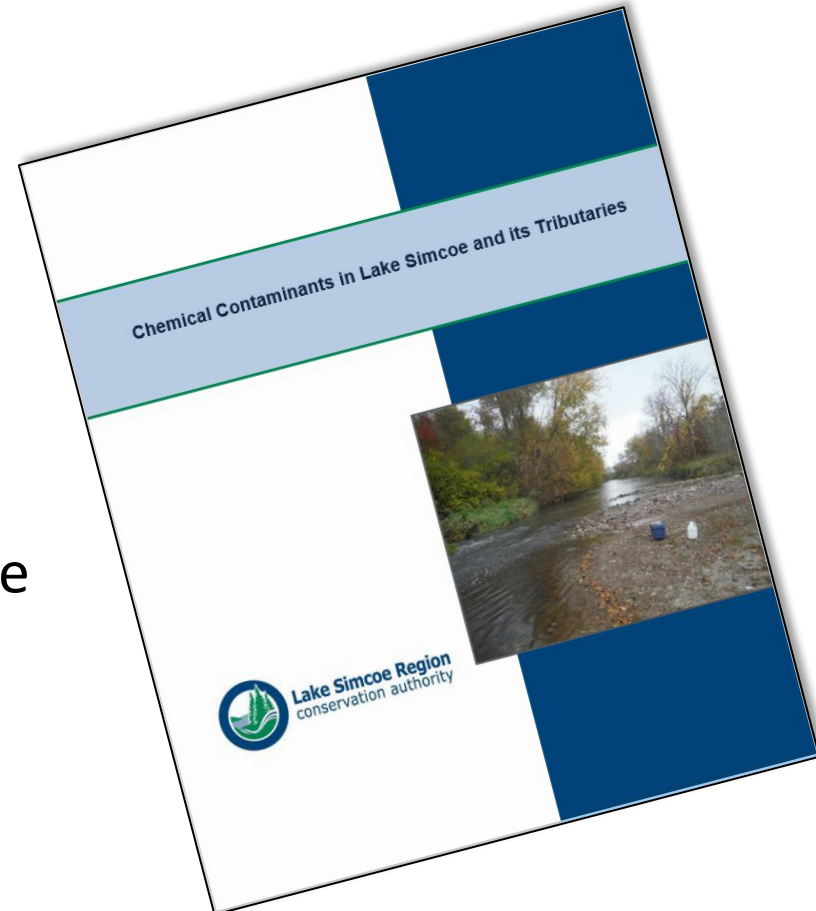
Implementing the Strategic Plan Goal

1. Existing Contaminants

- Continue to monitor and report on existing contaminants
- 2015 results now published

2. Emerging Contaminants

- Web-based summary of available research and monitoring
- Provide understandable and current information



LSRCA Chemical Contaminants Web Page

Contaminant Groups

- Contemporary Pesticides
- Flame Retardants
- Microplastics
- Perfluoroalkyl Substances
- Petroleum Hydrocarbons
- Pharmaceuticals and Personal Care Products
- Phenols
- Polychlorinated Naphthalenes

The screenshot shows the Lake Simcoe Region Conservation Authority website. The header includes the LSRCA logo, navigation links (Home, Contact Us, Media Room), and a search bar. The main navigation menu lists: COVID-19 UPDATES, ENJOY THE OUTDOORS, PLANNING & PERMITS, FUNDING & EXPERTISE, EDUCATION, WATERSHED HEALTH, and ABOUT US. The page title is "Chemical Contaminants" under the "Watershed Health" section. The content includes an introductory paragraph, a breadcrumb trail, and two sub-sections: "Contemporary Pesticides" with an image of a leaf and a small insect, and "Flame Retardants" with an image of a fire. A sidebar on the right contains contact information for Integrated Watershed Management and a list of chemical contaminants: Contemporary Pesticides, Flame Retardants, Microplastics, Perfluoroalkyl Substances (PFASs), Petroleum Hydrocarbons (PHCs), Pharmaceuticals and Personal Care Products, Phenols, and Polychlorinated Naphthalenes (PCNs). A "New Report" section mentions a study on chemical contaminants in Lake Simcoe and its tributaries.

Pharmaceuticals and Personal Care Products

What are they?

- Prescription / non prescription drugs, fragrances, detergents, steroids, reproductive hormone drugs...



Environmental Exposure?

- Enter the environment through wastewater
- Water Pollution Control plants can remove some compounds



Impact to Lake Simcoe?

- Studies in Lake Simcoe conclude low levels of pharmaceuticals that are not a threat to aquatic health



Microplastics



What are they?

- Small plastic pieces from industrial production or waste, additives to personal care products, breakdown of larger plastic products (water bottle) or fabrics

Environmental Exposure?

- Litter, wastewater, spills
- Microplastics can be very mobile, Great Pacific Garbage Patch

Impact to Lake Simcoe?

- Unclear what the impact of microplastics on inland aquatic ecosystems may be
- Initial water quality sampling found very low levels in Lake Simcoe

Existing / Legacy Contaminant Lake / Tributary Sampling Program

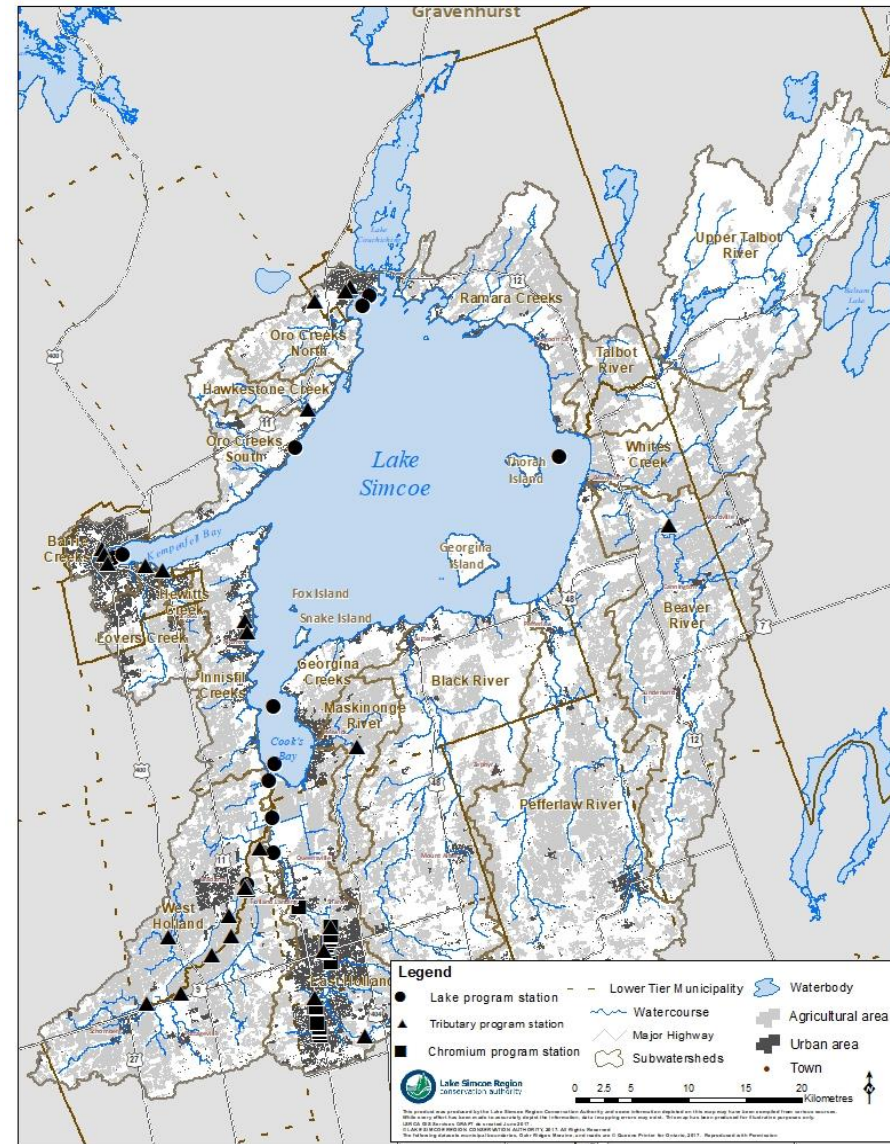
Contaminant Groups Sampled:

- Petroleum Hydrocarbons
 - Polycyclic Aromatic Hydrocarbons
 - Phenols
 - Metals
 - Organochlorine Pesticides
 - Neutral Chlorinated Compounds
 - Polychlorinated Biphenyls (PCBs)
- This equals 135 individual contaminants analyzed
 - 114 water and sediment samples collected
 - A total of 4,139 data points!



Key Results from 2015 Sampling

- Legacy contaminants (DDT and Chromium) continue to be a localized issue
- Hydrocarbons are widespread issue in urban areas
- Metals detected mainly associated with urban areas



Organochlorine Pesticides



What are they?

- herbicides, insecticides, and fungicides such as Aldrin, Endosulfan and DDT

Environmental Exposure?

- Widely used in Canada from the 1940s until 1970s when they were banned or highly restricted
- Concentrations of organochlorine pesticides persist today primarily in soil and sediments
- Organochlorine pesticides are persistent and biomagnify in the food chain

Impact to Lake Simcoe?

- DDT concentrations exceed guidelines at all 7 polder sites
- High ratio of DDT metabolites indicates legacy contamination
- Polder soils may be acting to slow biodegradation of DDT



Chromium



What is it?

- A metal with a number of industrial uses; production of stainless steel, chrome plating, leather tanning

Environmental Exposure?

- Improper liquid or solid waste disposal

Impact to Lake Simcoe?

- Predominately a legacy contamination issue in East Holland River
 - Collis Leather in Aurora (1910-1988)
 - Davis Leather in Newmarket (1905-1962)
- Highest concentrations associated with the former tannery sites.
- Chromium concentration found throughout East Holland River to Holland Landing



Summary and Next Steps

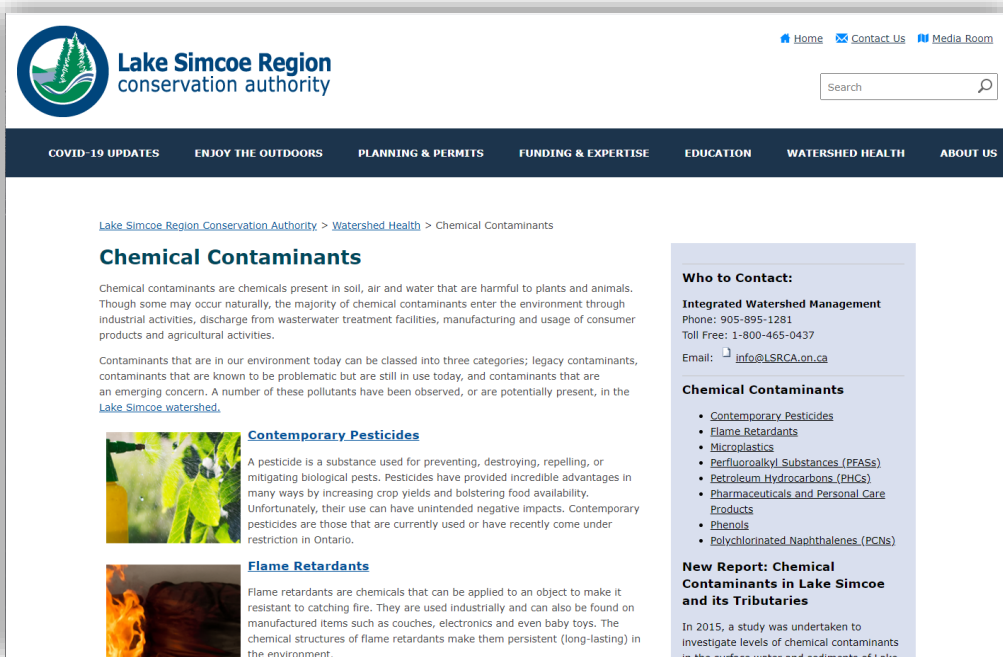


- Legacy / Existing Contaminants
 - Hydrocarbons are a prevalent existing contaminant
 - Legacy use contaminants persist and may be having impacts
- Emerging Contaminants
 - no immediate threat emerging
- Existing / Legacy sampling every ~5 years
- Continue to stay on top of research findings
- Update monitoring program and website as new research, analytical methods, and guidelines are developed



More Information :

lsrca.on.ca/watershed-health/chemical-contaminants



The screenshot shows the website for the Lake Simcoe Region Conservation Authority. The header includes the organization's logo and name, navigation links (Home, Contact Us, Media Room), and a search bar. A dark blue navigation bar contains menu items: COVID-19 UPDATES, ENJOY THE OUTDOORS, PLANNING & PERMITS, FUNDING & EXPERTISE, EDUCATION, WATERSHED HEALTH, and ABOUT US. The main content area features a breadcrumb trail: Lake Simcoe Region Conservation Authority > Watershed Health > Chemical Contaminants. The title is "Chemical Contaminants". The text explains that chemical contaminants are harmful to plants and animals, often from industrial or consumer products. It categorizes them into legacy, current, and emerging. Three sub-sections are visible: "Contemporary Pesticides" (with a photo of green leaves), "Flame Retardants" (with a photo of a fire), and "Who to Contact:" (Integrated Watershed Management, phone: 905-895-1281, toll free: 1-800-465-0437, email: info@LSRCA.on.ca). A "New Report" section is also present, titled "Chemical Contaminants in Lake Simcoe and its Tributaries", with a brief description of a 2015 study.

