Monitoring and Surveillance of Per- and Polyfluoroalkyl Substances (PFAS) in the Great Lakes

Chesapeake Bay Program Office
Science and Technical Advisory Committee Workshop
May 17, 2022

GLRI Action Plan III

Focus Area 1 – Toxic Substances and Areas of Concern

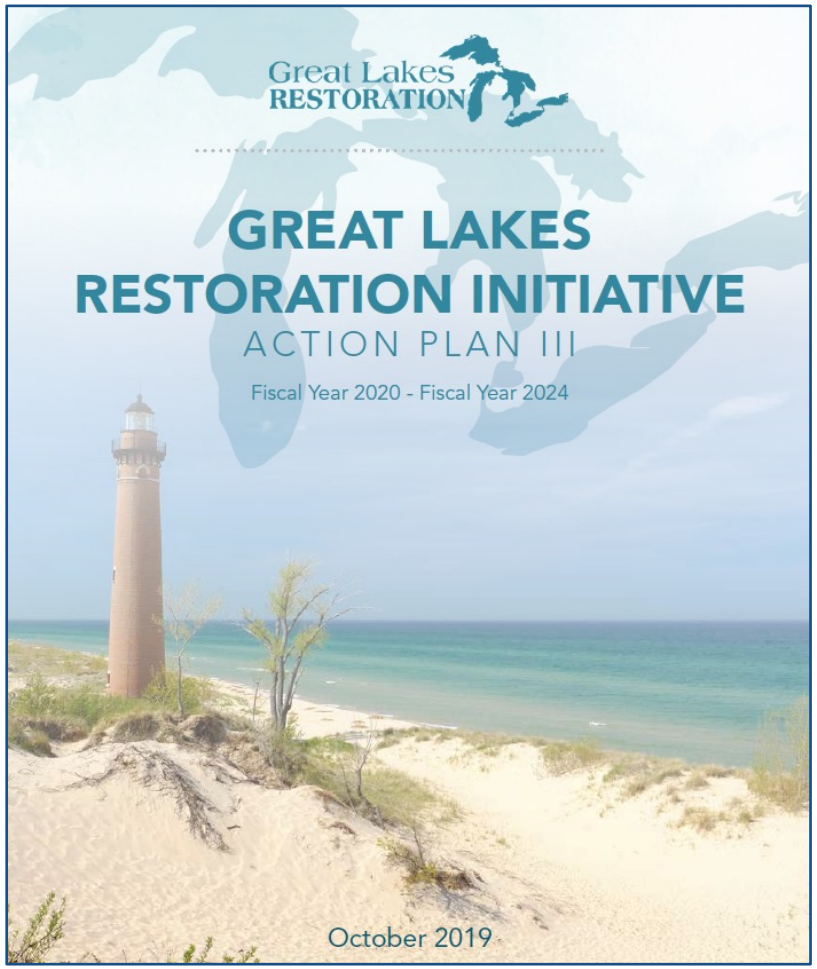
- FA 1.3 – Chemicals of Mutual Concern
  - Hexabromocyclododecane (HBCD), Long-chain Perfluorinated carboxylic acids (LC-PFCAs), Mercury, PFOA, PFOS, PBDEs, PCBs, SCCPs.

Focus Area 5 – Foundations for Future Restoration Actions

- FA 5.2 – Assess overall health of the Great Lakes

EPA's PFAS Action Plan (2019)

- Understanding and Addressing PFAS Toxicity and Occurrence
  - Test for PFAS in media other than drinking water



GLNPO Base Monitoring and Surveillance Programs (GLRI Focus Area 5)

- **Statutory mandate under Section 118 under CWA and obligations under Great Lakes Water Quality Agreement to monitor for toxic pollutants**

- **Great Lakes Fish Monitoring and Surveillance Program**
  - Whole fish tissue, water and various food web components

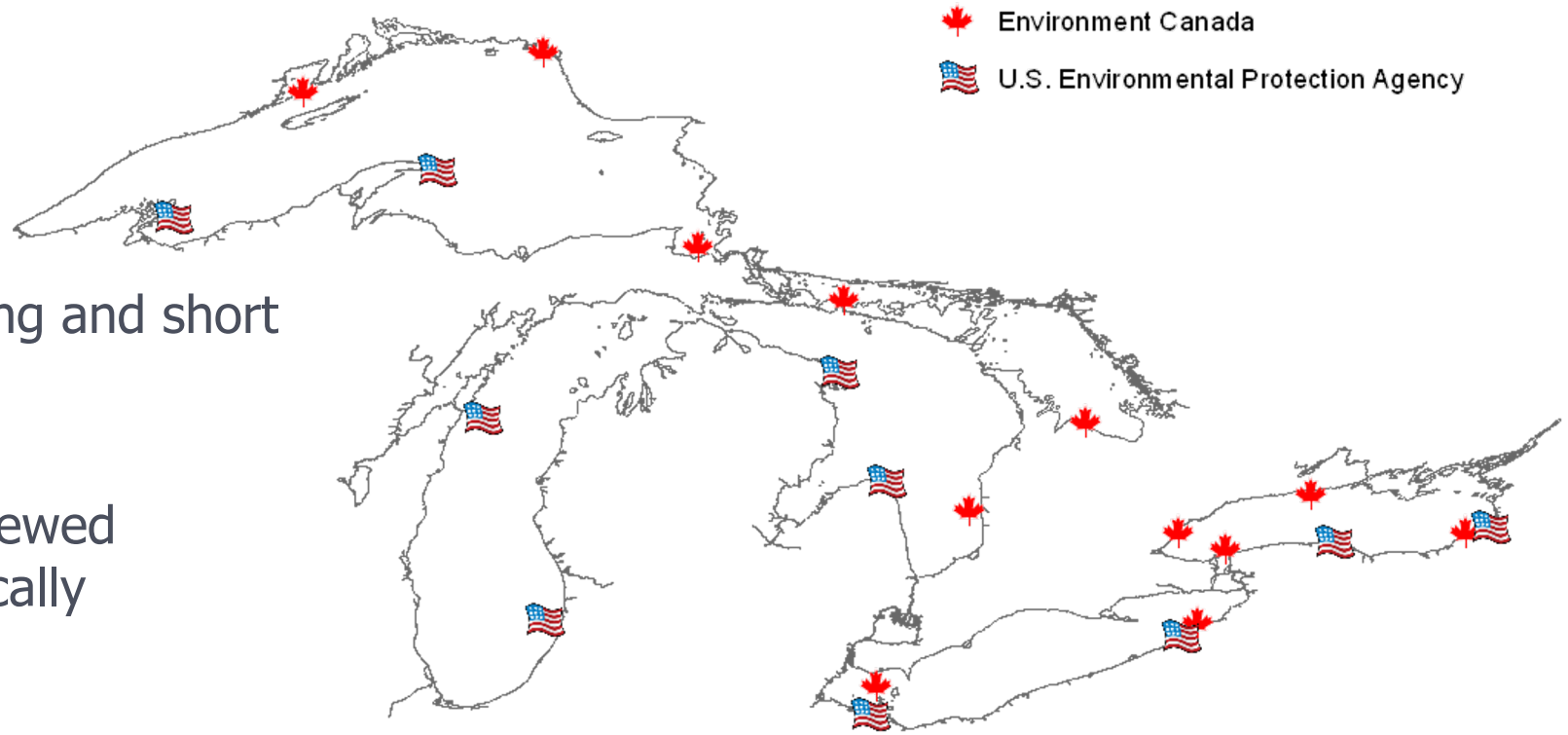
- **Integrated Atmospheric Deposition Network**
  - Precipitation, vapor and particle phases
  - Method in development

- **Great Lakes Sediment Surveillance Program**
  - Surface and Sediment Cores

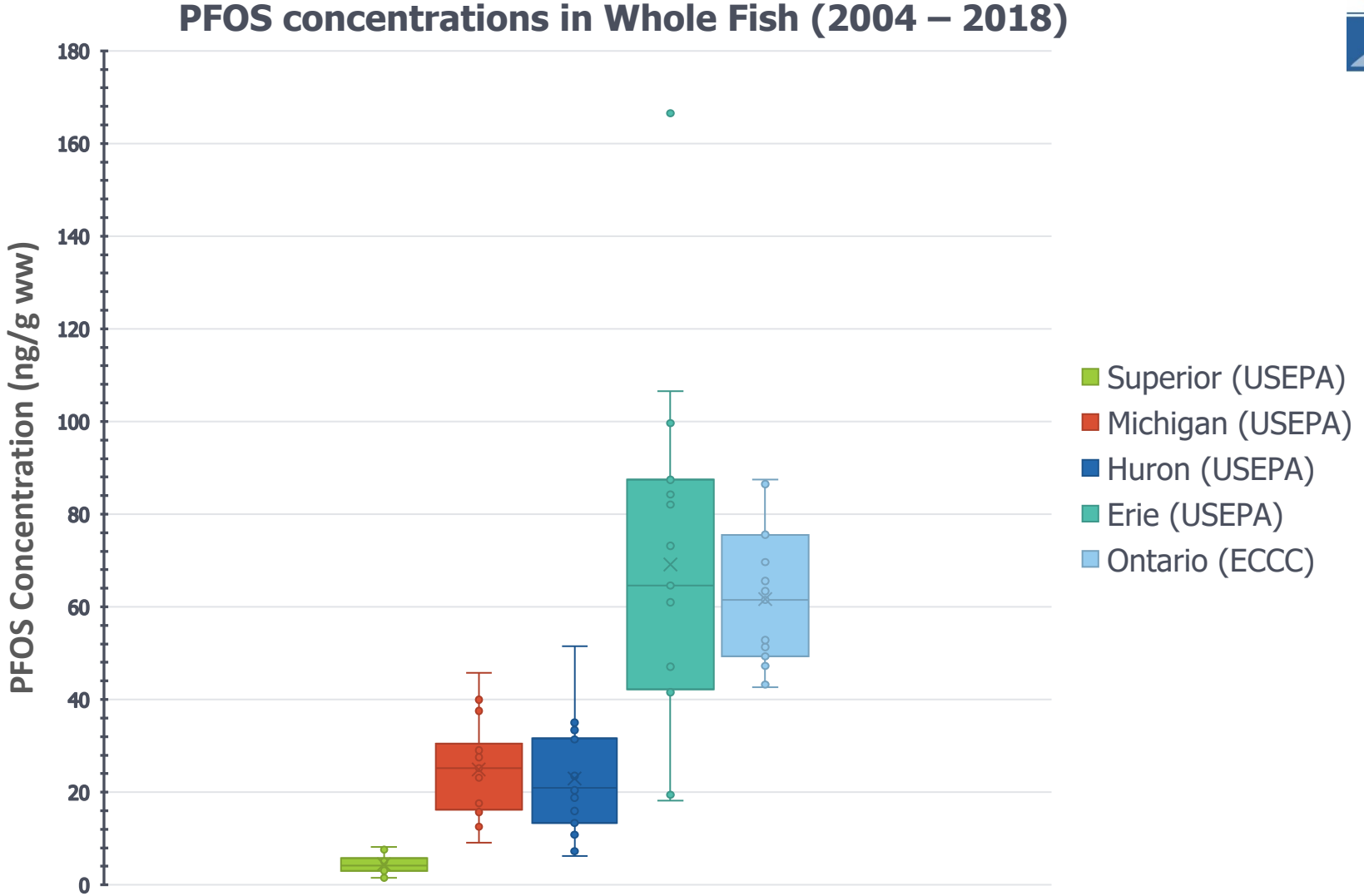
PFC and PFAS terminology used interchangeably from here on out due to older publications, etc.

Great Lakes Fish Monitoring and Surveillance Program

- Long term Chemical Monitoring and Surveillance Program
  - 1970 - present
- Partner with ECCC
- Whole Fish – ecosystem health
- Legacy and emerging chemicals
- PFAS in whole fish
  - Analyze approximately 16 long and short chain PFAS
  - Isotope dilution method
  - Results reported in peer reviewed literature and data are publically available

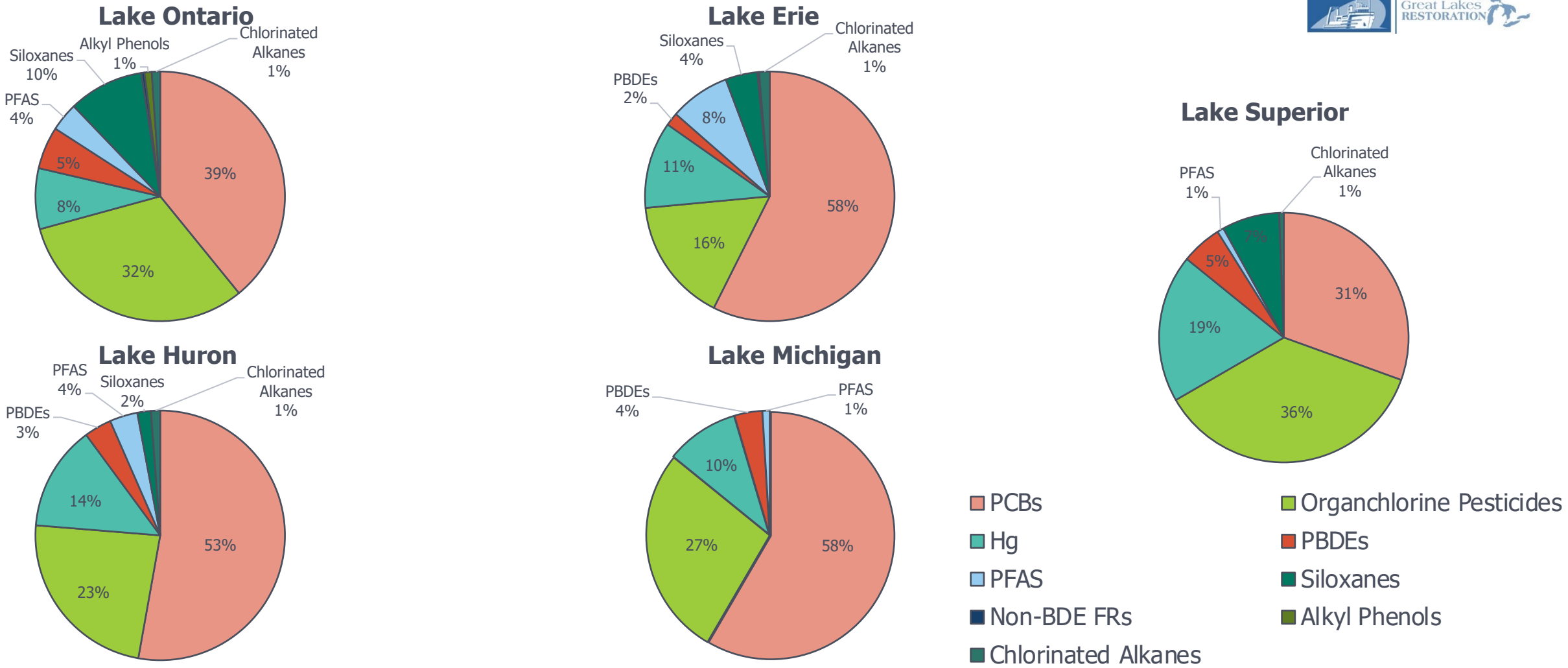


Great Lakes Fish Monitoring and Surveillance Program



Great Lakes Fish Monitoring and Surveillance Program

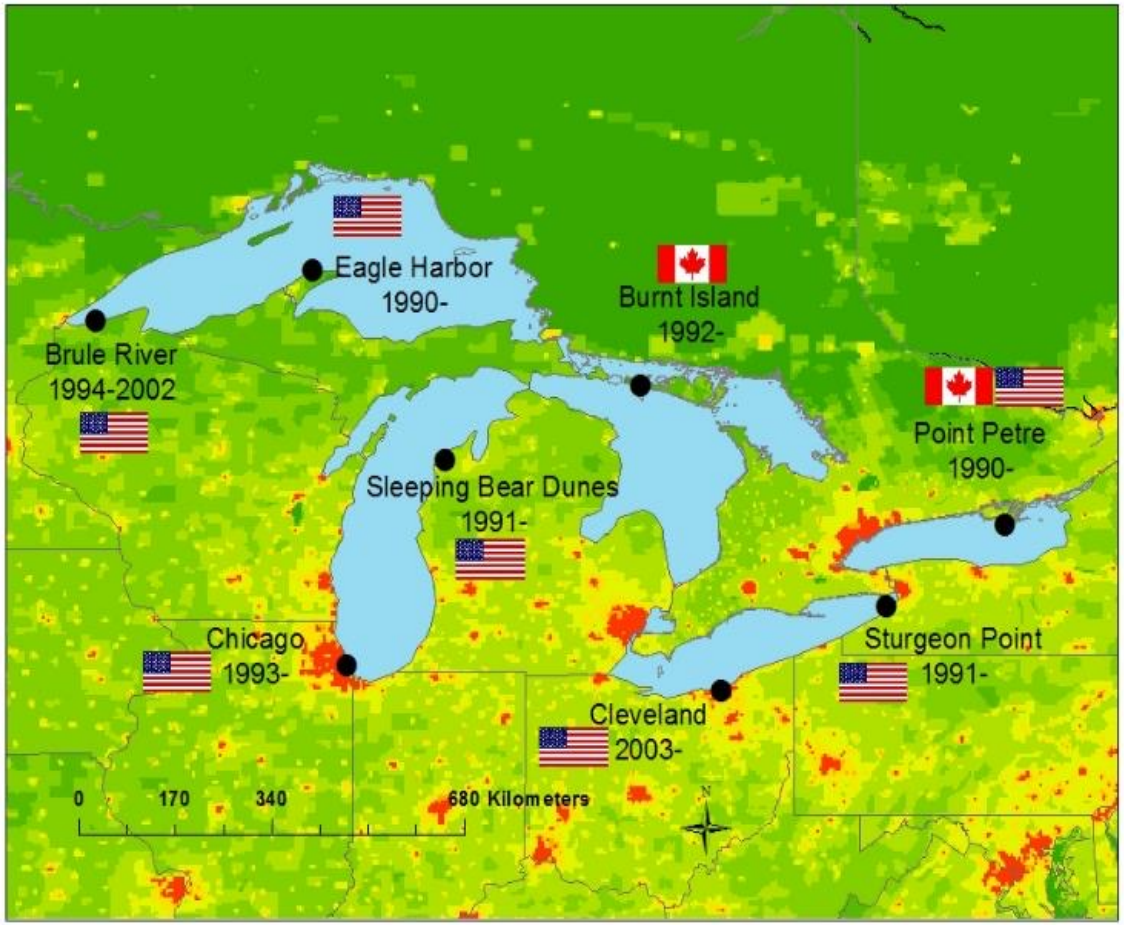
Contaminant distribution (% by weight) in GLFMSP whole fish (2008 – 2012)



D.J. McGoldrick, E.W. Murphy / Environmental Pollution 217 (2016) 85e96

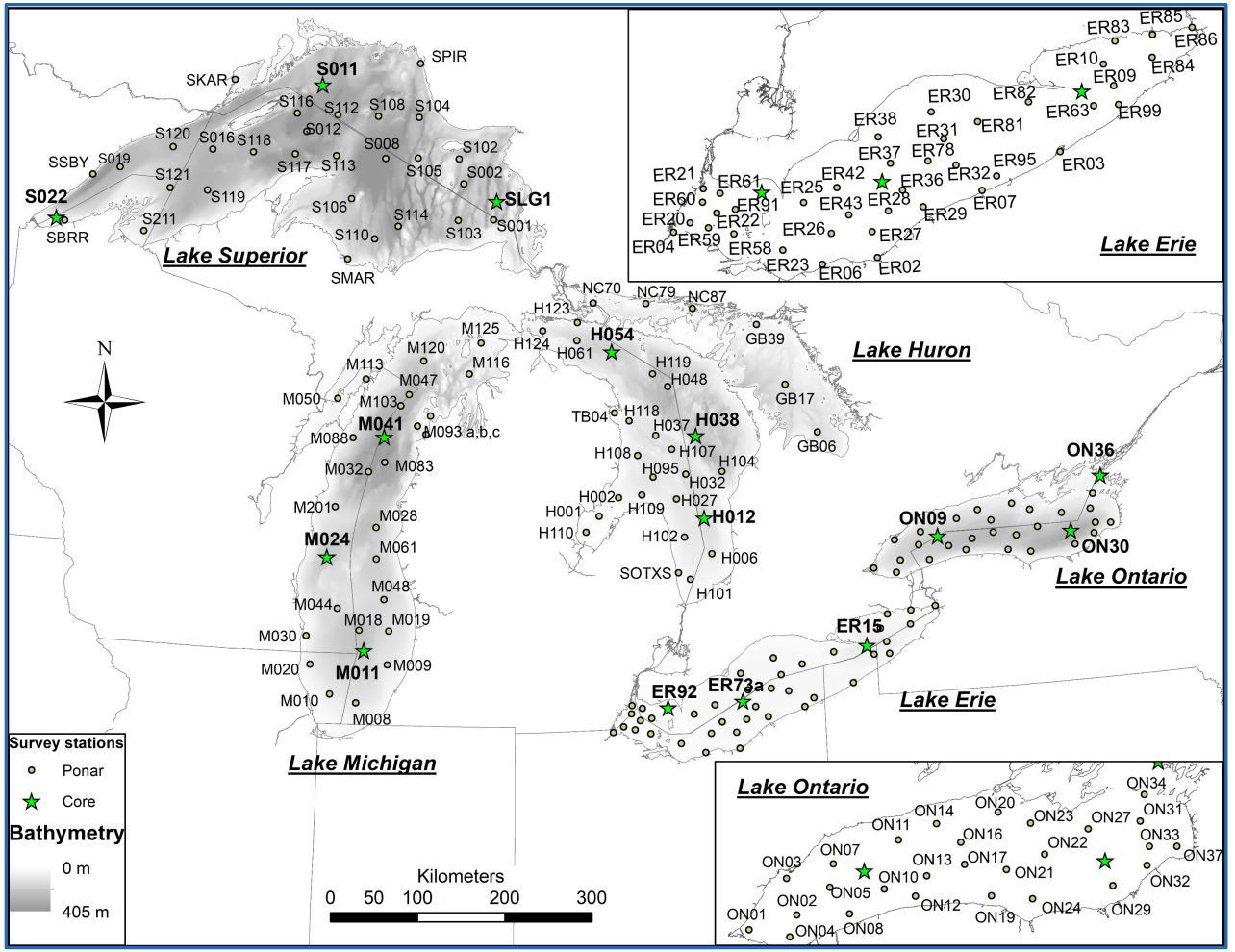
Integrated Atmospheric Deposition Network

- Long-term Air Monitoring
  - 1990 – present
  - Collaborative program with ECCC
  - Collects vapor, particles, and precipitation samples
  - Estimates atmospheric loadings
- PFAS method in development
  - Sample collectors have been installed summer 2020
  - Assessing best sampling methods including LC-MS (Liquid Chromatography – Mass Spectrometry)
  - Can analyze approx 22 long and short chain PFAS

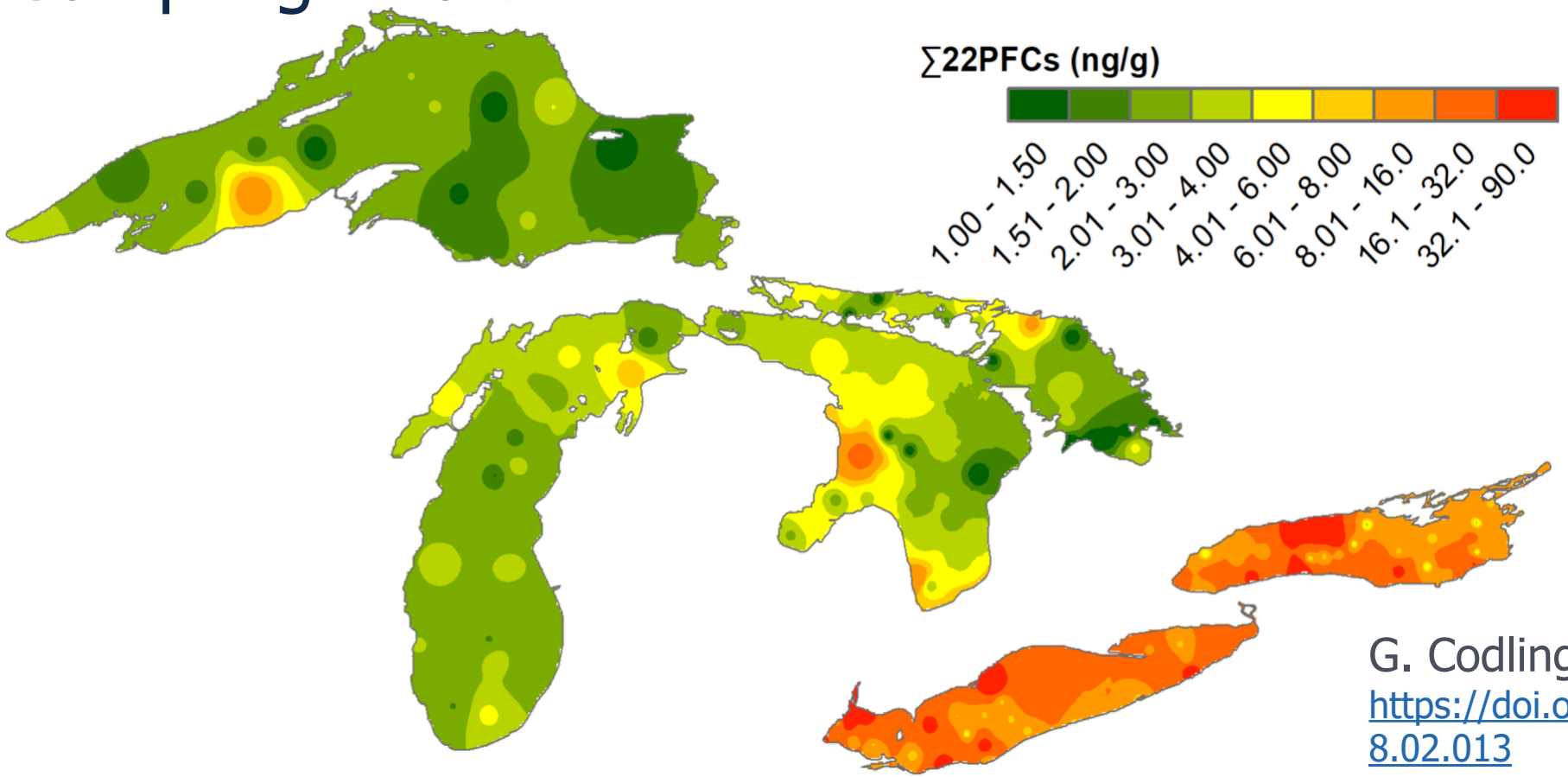


Great Lakes Sediment Surveillance Program

- Started in 2010
- One lake / year / decade
- Monitoring work began again in 2021 starting with Lake Superior.
  - Partnered through cooperative agreement and an IA with U. Minnesota Duluth and USGS, respectively.
- Collections
  - Sediment surface grab (ponar)
  - Sediment core
- Determine loading of chemicals to lakes
- Identify if sediments are a sink or a source



Surface PFAS Concentrations in Ponar Grabs: 2010-2015 Sampling Effort



G. Codling et al., 2018
https://doi.org/10.1016/j.envpol.2018.02.013

Lower Lakes (> 40 ng/g dw): ER06, ER21, ER27, ER38, ER60, ER61, ER99, ON12, ON14, ON16.
Upper Lakes (> 6 ng/g dw): H108, SOTs, GB39, M116, S119,

GLRI Project Funding and Partner Monitoring

- **Tributary water and sediment monitoring by USGS and U.S. EPA ORD**
- **Wildlife monitoring**
  - **USGS monitoring of PFAS in tree swallows at Great Lakes Areas of Concern**
  - **USFWS study of PFAS effects on survival of endangered native freshwater mussels**
- **Assessing ecological risks of PFAS to fish and wildlife – U.S. EPA ORD**
- **Fish consumption advisory monitoring grants for Great Lakes States**

QUESTIONS?

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