The Saginaw Bay Monitoring Consortium:
Addressing regional water quality information needs

THE CHALLENGE

Water is essential to life. It is also a dynamic resource, highly responsive to changes in weather patterns and land uses. Understanding the condition of a complex system like the Saginaw Bay Watershed, the largest in Michigan, requires robust, comprehensive data that captures trends in water quality over time.

Unfortunately, monitoring efforts for Saginaw Bay to date have been neither long-term nor coordinated, and the data that exists is not easily accessible. We know that water quality in Saginaw Bay is degraded—including elevated levels of nutrients (phosphorus and nitrogen)—but we lack a detailed, location-specific understanding of the management implications.

SAGINAW BAY AND ITS WATERSHED

A consortium of partners has come together to develop a coordinated monitoring framework and new ecosystem models for the Saginaw Bay Watershed to fill these data gaps and inform:

- Actions to reduce significant environmental damage (i.e. Beneficial Use Impairments, as identified by the International Joint Commission) in the Saginaw Bay "Area of Concern."

- Targets for reducing nutrient levels in Saginaw Bay, under Annex 4 of the Great Lakes Water Quality Agreement.

- Watershed restoration and management decision-making by watershed groups and municipal stormwater managers.

This effort builds on a successful framework developed for Western Lake Erie by Heidelberg University. Monitoring data will be made publicly available through an online dashboard so that all stakeholders can understand just how water quality is changing here—over time and at scale—and better align complementary efforts.

PROJECT STATUS

The coordinating team, in consultation with an advisory committee of academic, agency, and local experts, has completed planning and fundraising to cover monitoring activities through 2025 and began installing new stream gages in fall 2022. Continuing activities include installing remaining gages, collecting water samples in the tributaries and bay, and developing the data dashboard. We are also building partnerships with local organizations and will adaptively manage the initiative to best serve local communities and regional entities, address the uncertainties of climate change impacts, and ensure financial sustainability for the coming decade.
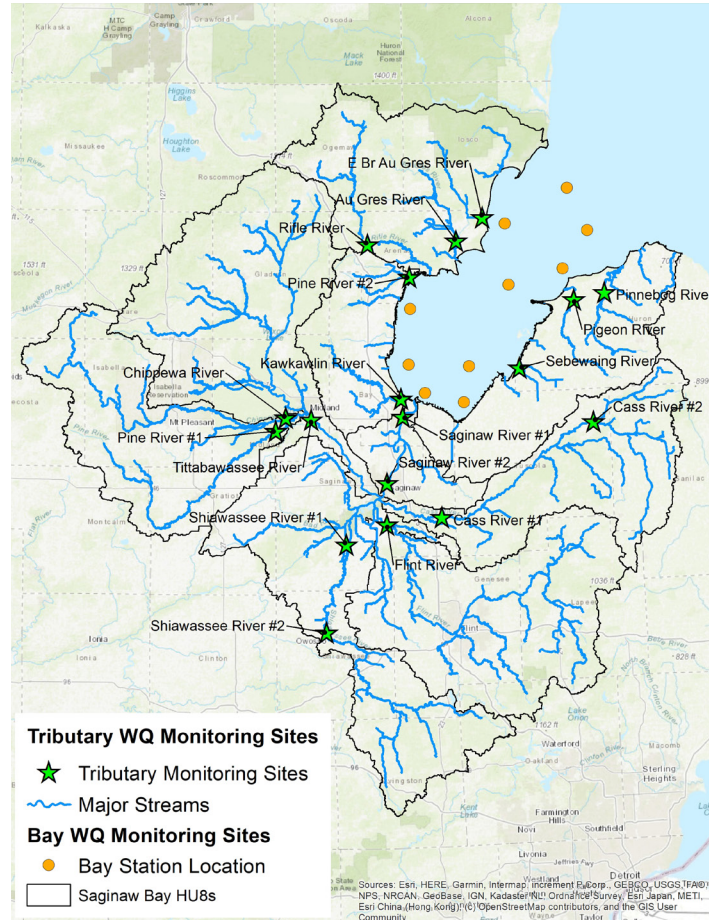
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PRIORITY METRICS

Informed by interested parties and water quality regulators, we have identified priority metrics for monitoring tributaries and the nearshore area of Saginaw Bay.

	Tributary Monitoring Sites	Bay Monitoring Sites
Stressor metrics	Total Phosphorus (TP) Dissolved Reactive Phosphorus (DRP) Nitrate (NO_3^-) Nitrite (NO_2^-) Ammonium (NH_4^+) Total Suspended Solids (TSS) Discharge (for loading)	Total Phosphorus (TP) Dissolved Reactive Phosphorus (DRP) Nitrate (NO_3^-) Nitrite (NO_2^-) Ammonium (NH_4^+) Total Suspended Solids (TSS)
Response metrics	Turbidity Dissolved Oxygen (DO)	Harmful Algal Blooms Chlorophyll Dissolved Oxygen (DO) Turbidity (Secchi)

MONITORING LOCATIONS

By end of summer 2023, we will have added 11 new stream gauges and 5 new bay monitoring sites, bringing the total to 18 stream and 10 bay monitoring locations.

Tributary WQ Monitoring Sites
★ Tributary Monitoring Sites
〜 Major Streams
Bay WQ Monitoring Sites
● Bay Station Location
☐ Saginaw Bay HU8s

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

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