SAGINAW BAY OPTIMIZATION DECISION TOOL: LINKING MANAGEMENT ACTIONS TO MULTIPLE ECOLOGICAL BENEFITS VIA INTEGRATED MODELING

The U-M Water Center engages researchers, practitioners, policymakers, and non-profit groups with the goal of supporting, integrating, and improving current and future restoration and protection efforts.

The grants program is an important part of the Water Center's efforts to enhance restoration and protection activities by engaging exceptional multi-sector teams in advancing evaluation and assessment of restoration projects.

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PROJECT SUMMARY

Land use has significantly impacted the water quality of Saginaw Bay, and it is designated as an Area of Concern by the U.S. Environmental Protection Agency under the *Great Lakes Water Quality Agreement.* There have been significant investments in Saginaw Bay restoration activities, including the allocation of millions of dollars via the Great Lakes Restoration Initiative (GLRI) for the implementation of best management practices (BMP) to reduce nutrient inputs to the Bay. Similarly, the Michigan Agriculture Environmental Assurance Program (MAEAP) encourages voluntary BMP implementation. There remains, however, a large gap in knowledge for how land based conservation actions affect riverine and Saginaw Bay ecosystems. In addition, there is no overarching strategy to guide and evaluate restoration efforts.

The goal of this project is to develop a science-based, system-wide integrated framework to help guide investments in nutrient management practices and restoration projects. Phase I of the project includes the development of an Optimization Decision Model (ODM) for strategically allocating resources and conservation practices to benefit multiple ecological and socioeconomic endpoints. The ODM includes both an idealized version, and a realized (or functional) version of the model based on actual data availability. Using the realized ODM, Phase II involves a retrospective assessment of GLRI and MAEAP funded projects within the Kawkawlin River and Pigeon/Pinnebog River sub-watersheds. Phase III includes the development of an optimized set of nested priorities to guide conservation practice selection and location to most efficiently achieve multiple sets of ecological and socioeconomic goals. Stakeholder engagement will be a key component of the project throughout all phases.

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