

STRATEGY #4: COORDINATE SCIENCE, RESEARCH AND MONITORING

Key actions under this strategy include:

- Enhance in-lake monitoring of algae and hypoxic conditions and research on the factors contributing to these conditions;
- Improve monitoring of phosphorus loads in tributaries and watersheds;
- Invest in research and demonstration initiatives to improve knowledge and understanding of the effectiveness of BMPs, particularly BMPs to control soluble reactive phosphorus;
- Conduct research on factors driving toxicity in harmful algal blooms, including the role of nitrogen; and
- Apply ecosystem models to improve our ability to predict future ecosystem conditions.

A top binational priority is to conduct the necessary research, monitoring and modeling necessary to assess the effectiveness of phosphorus reduction actions on improving algae and hypoxia conditions in Lake Erie and track progress towards achievement of the phosphorus reduction targets and Lake Erie Objectives. Collaboration is needed by scientists from across the basin to assess conditions, identify science gaps and identify the research needed to fill those gaps. Furthermore, research and monitoring of nuisance benthic algae (*Cladophora*) must be coordinated to support the development of phosphorus reduction targets in eastern Lake Erie.

RELATED INVESTMENTS

INVESTMENT

UNITED STATES: ARS EDGE OF FIELD WATER QUALITY RESEARCH

Updated on: September 23 2019

The Agricultural Research Service (ARS) of the USDA works to determine the effectiveness of various conservation practices by monitoring changes in nutrient losses from fields over time. This type of research is often referred to as "edge-of-field" monitoring since it characterizes nutrients, including phosphorus, leaving the field. The ARS participates in [Conservation Effects Assessment Project \(CEAP\)](#) and, as an extension of CEAP, operates an extensive network of edge-of-field monitoring sites.

LEARN MORE ABOUT UNITED STATES: ARS EDGE OF FIELD WATER QUALITY RESEARCH

INVESTMENT

UNITED STATES: CONSERVATION EFFECTS ASSESSMENT PROJECT (CEAP)

Updated on: January 21 2020

The [Conservation Effects Assessment Project \(CEAP\)](#) is a multi-agency effort, led by USDA's Natural Resources Conservation Service (NRCS), to quantify the environmental effects of conservation practices and programs and develop the science base for managing the agricultural landscape for environmental quality.

LEARN MORE ABOUT UNITED STATES: CONSERVATION EFFECTS ASSESSMENT PROJECT (CEAP)

INVESTMENT

UNITED STATES: EDGE-OF-FIELD BMP MONITORING IN GLRI PRIORITY WATERSHEDS

Updated on: December 4 2019

The U.S. Geological Survey (USGS) conducts [edge-of-field monitoring](#) in Great Lakes Restoration Initiative (GLRI) priority watersheds, including the Maumee River basin, to analyze the effects of GLRI-funded best management practices (BMPs) on sediment and nutrient losses from fields.

LEARN MORE ABOUT UNITED STATES: EDGE-OF-FIELD BMP MONITORING IN GLRI PRIORITY WATERSHEDS

INVESTMENT

UNITED STATES: GREAT LAKES TRIBUTARY MONITORING PROGRAM

Updated on: December 9 2019

The United States Geological Survey (USGS) conducts monitoring to track changes and identify long-term trends in nutrient and sediment loads to the Great Lakes in 26 major tributaries across the basin. Eight of these tributaries drain directly to Lake Erie, and two others drain to the St. Clair – Detroit River System.

LEARN MORE ABOUT UNITED STATES: GREAT LAKES TRIBUTARY MONITORING PROGRAM

INVESTMENT

UNITED STATES: IN-LAKE MONITORING

Updated on: September 23 2019

The U.S. EPA and National Oceanic and Atmospheric Administration (NOAA) are working on a variety of activities to monitor and assess water quality, while also working to develop tools to forecast harmful algal blooms in Lake Erie.

LEARN MORE ABOUT UNITED STATES: IN-LAKE MONITORING

INVESTMENT

UNITED STATES: LINKING SOIL HEALTH ASSESSMENT TO EDGE OF FIELD WATER QUALITY IN THE GREAT LAKES BASIN

Updated on: September 23 2019

This is a partnership among USDA's Natural Resources Conservation Service (NRCS) and the Great Lakes Restoration Initiative (GLRI), the University of Wisconsin-Green Bay Department of Natural & Applied Sciences, Purdue University's Department of Agronomy, and the U.S. Geological Survey's (USGS) Water Science Centers in New York and Wisconsin. The partners will conduct soil health assessments in conjunction with edge-of-field (EoF) water quality monitoring projects established in the GLRI Priority

LEARN MORE ABOUT UNITED STATES: LINKING SOIL HEALTH ASSESSMENT TO EDGE OF FIELD WATER QUALITY IN THE GREAT LAKES BASIN

INVESTMENT

OHIO: EDGE-OF-FIELD MONITORING AND RESEARCH

Updated on: September 23 2019

The Ohio Department of Agriculture (ODA) continues to support edge-of-field monitoring efforts and research coming out of the Ohio State University and USDA's Agricultural Research Service (ARS) and Natural Resources Conservation Service (NRCS).

LEARN MORE ABOUT OHIO: EDGE-OF-FIELD MONITORING AND RESEARCH

INVESTMENT

OHIO: WATER QUALITY MONITORING NETWORK

Updated on: March 5 2020

The Ohio Environmental Protection Agency (Ohio EPA) has assisted in the establishing a comprehensive/continuous water quality monitoring network specific to tracking progress toward meeting the Ohio Domestic Action Plan and Annex 4 goals.

LEARN MORE ABOUT OHIO: WATER QUALITY MONITORING NETWORK

OHIO: OPEN WATER MONITORING SYSTEM

Updated on: September 24 2019

Existing monitoring funds will be used to implement an open water monitoring system in western Lake Erie.

LEARN MORE ABOUT OHIO: OPEN
WATER MONITORING SYSTEM

INVESTMENT

**PENNSYLVANIA: PROVIDE GREATER ASSURANCE OF PENNSYLVANIA PHOSPHORUS
LOADING ESTIMATIONS**

Updated on: September 23 2019

The estimated phosphorus loading contributions to the central Lake Erie basin from Pennsylvania tributaries – and the statistical confidence in those loading estimations – require additional focus and effort to assure accuracy.

LEARN MORE ABOUT
PENNSYLVANIA: PROVIDE
GREATER ASSURANCE OF
PENNSYLVANIA PHOSPHORUS
LOADING ESTIMATIONS

INVESTMENT

NEW YORK: NUISANCE AND HARMFUL ALGAL BLOOM RESEARCH

Updated on: June 3 2020

New York State's Water Quality Rapid Response Team, national experts and local stakeholders collaboratively developed Harmful Algal Bloom (HAB) Action Plans for twelve priority lakes that are vulnerable to HABs. These twelve lakes represent a wide range of conditions and the lessons learned will be applied to other impacted waterbodies in the state.

LEARN MORE ABOUT NEW YORK:
NUISANCE AND HARMFUL ALGAL
BLOOM RESEARCH

INVESTMENT

INDIANA: ST. MARYS RIVER WATERSHED INITIATIVE

Updated on: September 23 2019

The St. Marys River Watershed Initiative is a paired watershed monitoring and soil health monitoring project.

LEARN MORE ABOUT INDIANA: ST.
MARYS RIVER WATERSHED
INITIATIVE

INVESTMENT

**MICHIGAN: IDENTIFY PRIORITY AREAS AND ACTIONS IN MICHIGAN'S PORTION OF THE
MAUMEE RIVER WATERSHED FOR PHOSPHORUS REDUCTIONS**

Updated on: November 8 2019

Only a small portion (about 7 percent) of the Maumee watershed lies within Michigan's borders. Michigan is partnering with Indiana, Ohio, the U.S. EPA, and the U.S. Geological Survey to ensure appropriate monitoring of the watershed. Though continued monitoring is needed, initial monitoring and analysis has revealed that certain parts of the Maumee watershed in Michigan have higher phosphorus concentrations than others.

LEARN MORE ABOUT MICHIGAN:
IDENTIFY PRIORITY AREAS AND
ACTIONS IN MICHIGAN'S PORTION
OF THE MAUMEE RIVER
WATERSHED FOR PHOSPHORUS
REDUCTIONS

STRATEGY

UNITED STATES: PHOSPHORUS-OPTIMAL WETLANDS

Updated on: June 6 2019

U.S. Army Corps of Engineers (USACE) is working in collaboration with other Great Lakes stakeholders interested in using wetlands for phosphorus reduction, including The Nature Conservancy, Ducks Unlimited, academic institutions, and other federal agencies. Research and an engineering evaluation will inform decision-making about the potential for treatment wetlands to be a significant part of controlling phosphorus from agricultural runoff in the Great Lakes.

LEARN MORE ABOUT UNITED
STATES: PHOSPHORUS-OPTIMAL
WETLANDS

INVESTMENT

NEW YORK: LAKE ERIE TRIBUTARY MONITORING

Updated on: June 3 2020

The Lake Erie watershed has been identified through New York State Department of Environmental Conservation's Clean Water Planning Initiative as a high priority for water quality improvement, and Lake Erie is currently the focus of binational efforts under Annex 4 (Nutrients) of the Great Lakes Water Quality Agreement (GLWQA) to assess and reduce nutrient loadings. The objectives of this project are:

LEARN MORE ABOUT NEW YORK:
LAKE ERIE TRIBUTARY
MONITORING

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