NOAA Great Lakes Fish Habitat Restoration Partnership Project Grant
Wigwam Bay Coastal Wetland Restoration Project

Monitoring and Data Management Plan

Monitoring Plan

Project Goals and Objectives

The overarching goal of the project is to identify opportunities for ecological enhancement at Wigwam Bay SWA. Wigwam Bay SWA spans approximately 3,500 acres and consists of 3,137 acres of coastal wetlands, about 900 acres of which is impounded, adjacent to Saginaw Bay of Lake Huron. AGL has partnered with MDNR and the GLFC to develop a feasibility study to assess existing conditions including current hydrologic and geotechnical conditions, barriers to fish passage, infrastructure modifications, nutrient dynamics, water level control, and habitat management to develop recommendations for wetland and habitat restoration. This project represents Phase I of a multi-phase restoration effort to enhance ecological function and resilience within the Wigwam Bay SWA. The feasibility study will provide the foundation for subsequent phases of the project including full engineering design, anticipated permitting considerations, and order-of-magnitude cost estimates for implementation of restorative measures. The overall project goal is to allow for seasonal (or other) movement of fish and other aquatic biota into and out of the wetland complex while restoring functional hemi-marsh and open-water conditions that benefit species such as the black tern, least bittern, Blanding's turtle, and secretive marsh birds, and address nutrient and water quality impairments. Anticipated benefits of the project include:

- Water level management that allows flow of water through the wetland complex allowing pass-through of sediment and nutrients as well as increased dissolved oxygen levels;
- Hydrologic reconnection, either active or passive, to Saginaw Bay that can allow fish to enter the marsh while limiting common carp;
- Habitat improvements for anurans, including the potential for basking logs and reptile/amphibian hibernacula;
- Management of non-native cattail and restoration of plant communities such as Great Lakes marsh and hemi-marsh that can provide various habitat types for wildlife and will function at both high and low Lake Huron water levels
- Woody habitat structures such as inverted root wads, which can create predator-free island-like conditions needed for nesting by birds such as the black tern;
- Water quality management to improve water quality in the impoundment and/or minimize impacts to Saginaw Bay, if needed based on water quality and sediment sampling.

Implementation Monitoring Metrics

Site-passability

Method: Pre-construction topographic/bathymetric survey, topographic ground survey, and parcel survey of the 900 acre impoundment at Wigwam Bay and immediate adjacent land will be performed by ROWE. Fixed Wing Aerial LiDAR Flight, topographic ground surveys, and bathymetric surveys along the historic Rifle River channel, relocated channel, and Big Creek Drain will be conducted to create a comprehensive base map of the impoundment and surrounding area. The Fixed Wing Aerial LiDAR survey flight will be conducted at an altitude of 4,520 feet at an average of 62 points per square meter with a vertical accuracy of ± 0.25 feet. Due to the shallow water and soft bottom, ROWE will use a Single Beam Echo Sounder (SBES) to collect cross sections of the historic river channel through the project site and the relocated channel along the west berm every ±400 feet in 2026 and every ±100 feet in 2027. Additional cross sections will be collected 500 feet upstream of the north berm and 500 feet downstream of the east berm in 2026 and 2027. In the event that SBES data collection is not feasible due to site conditions, elevations will have to be collected manually. Each cross section will include the top of bank, inner berm (if applicable), bottom of bank, centerline of channel (thalweg), top of sediment, hard pan bottom and water surface. Two cross sections in 2026 and six cross sections in 2027 will be collected along Big Creek Drain at the northeast corner of the site. A topographic field survey of the project site will be conducted to locate and verify all culverts, buildings, gates and other features, water level elevation observations, and site photos. Horizontal control points and vertical benchmarks will be collected at culvert areas A through G per 2018 MDNR survey for future construction staking. Critical manmade objects including the existing berm and water control structures will be located and shown on the drawings. Physical structures and utilities within the potential project area will be depicted on the survey drawings. Contours, at one-foot intervals, will be shown throughout the site. Field surveys will also be conducted to determine the west parcel boundary and south parcel boundary lines common to the adjacent privately owned parcels. ROWE will prepare and record PA132 Certified Survey of said boundary lines and record Land Corner Certificates as necessary.

A post-construction survey will be conducted using techniques consistent with the pre-construction survey, following substantial completion of the Project. Resulting channel slopes, channel widths, and jump heights will be determined from the as-built post-construction survey and compared to the design target measurements and dimensions for these metrics and values calculated from pre-construction survey data. The as-built survey will be conducted by a contractor or partner.

Schedule: The pre-construction surveys will be conducted between October 2026 and June 2027. Post-construction surveys will be conducted after an alternative is selected and construction is substantially complete

Metric Target:
As-built surveys are consistent with design plans.

Estimated Cost:
Year 1 - $57,450 as contracted through ROWE for pre-construction surveys.

Presence of Target Fish Species

Method: Fish community assessments will be conducted by Grand Valley State University, consistent with the Coastal Wetland Monitoring Program protocols. Fish will be sampled using passive sampling equipment (fyke nets) set up in targeted locations and "fished" overnight. Nets will be checked to verify that air breathing animals (e.g. turtles) are released, if captured. Fish will be identified to species, counted, measured (minimum of 25 per species at age category), and released alive.

Schedule: Pre-construction fish community surveys will occur in July-September 2026 and April-September 2027.

Metric Target:
Increased presence, size structure, and relative abundance of walleye, lake sturgeon, and northern pike.

Pre-construction estimated costs
Years 1-2 - $50,992 for pre-construction biological surveys of birds, macroinvertebrates, and fish.

Operation and Maintenance Costs

This portion of the project will not have Operation or Maintenance costs given funding is for the feasibility study and concept design completion.

Schedule:
None

Metric Target:
None

Estimated Cost:
None

Public Safety

There are no expected public safety improvements associated with this project.

Schedule:
None

Metric Target:
None

Estimated Cost:
None

Data Management Plan

The Wigwam Bay Coastal Wetland Restoration Project will generate pre- and post-Project environmental data from engineering and fish surveys. These data will be used to identify opportunities for ecological enhancement at Wigwam Bay SWA. Wigwam Bay SWA spans approximately 3,500 acres and consists of 3,137 acres of coastal wetlands, about 900 acres of which is impounded, adjacent to Saginaw Bay of Lake Huron. Environmental and monitoring data will be made available on the GLFC website and will be updated as new information is received. No specific data sharing is planned for this Project, however the data will be retained by Audubon Great Lakes and Michigan DNR and made available upon request. No technical publications are planned for the data. All future sub-awardees not identified in this plan will have acceptance as a condition of their contract of this data sharing plan. Any additional data sharing stipulations for future sub-awardees may be outlined at that time and described in their contract.

The following environmental data will be collected for the Project, with costs referenced in the Monitoring Plan:

- Pre-construction topographic/bathymetric and fish survey data. Pre-construction engineering surveys will be included on the GLFC website within 2 years of collection.

- While not funded at this point, post-construction topographic and fish survey data will be included on the GLFC website within 2 years of collection, if an alternative is advanced and funding is available.

- Photographic Monitoring: Photographic monitoring stations will be established Audubon Great Lakes and MDNR at various locations at the restoration site based upon design plans. Photographs will be taken on a regular basis prior to construction, during construction and after construction. All photographs will be retained by Audubon Great Lakes and MDNR. Though not a Tier 1 monitoring requirement, monitoring photographs will be provided to meet the Outreach and Communication Special Award Condition for this NOAA award and will be provided on the GLFC website within 2 years of collection.

- Progress Reports: Tier 1 data and derived information from the pre-construction phase of the project will be shared on a semi-annual basis as part of the NOAA progress reporting system.

- Details regarding how data will be collected, including sampling frequency and collection methodologies, the standards to be used for data/metadata format and content, including a quality control process, and the approximate total volume of data to be collected will be developed for the QAPP and updated in the Monitoring plan and Data Management Plan once the QAPP is complete.