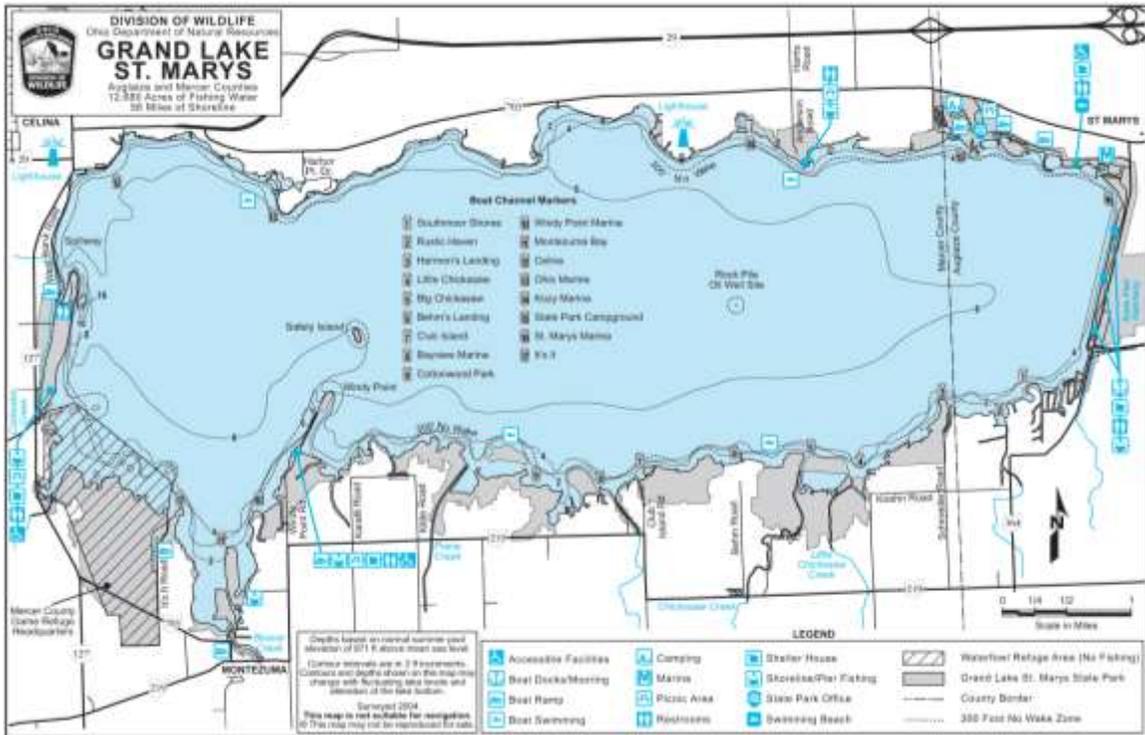


GRAND LAKE ST. MARYS 2014 STUDY PLAN

Hydrologic Unit Code: 05120101-02-04



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INTRODUCTION

During the 2014 field season the Ohio EPA Division of Surface Water will conduct physical and chemical water quality sampling at Grand Lake St. Marys. This manmade lake is located in west-central Ohio on the Mercer/Auglaize county line. It's the largest inland lake in the state and covers a surface area of about 12,700 mi². Water depths are shallow and generally average about 6 ft. across most of the lake.

SAMPLING METHODS/QUALITY ASSURANCE

Sampling Objective

Grand Lake St. Marys has been sampled annually by Ohio EPA since 2010 and the objective of this study is to continue to monitor trends in lake water quality.

Field Measurements

Physical water quality will be continuously measured in the lake using a YSI[®] Model 6600v2 datasonde at approximately 0.5 meter depth. The probe is secured inside a flow through tube mounted to a wooden piling and powered by a solar charged battery. The unit activates every 15 minutes and measures depth (m), temperature (°C), pH (SU), conductivity (µS/cm), dissolved oxygen concentration (mg/L) and turbidity (NTU) and calculates dissolved oxygen saturation (%) and specific conductivity (µS/cm). Data is transmitted via telemetry and managed on a private website provided by the manufacturer. Data will be routinely monitored for drift to indicate when cleaning and calibration is needed. Past experience indicates that this is necessary about every 3-4 weeks.

Physical water quality will also be measured in the lake using a multi-parameter probe when water chemistry grab samples are collected. Data will be logged using an internal file system and recorded on the laboratory sample submission form. Logged data will be uploaded to the Ohio EPA EA3 data management system using software obtained from the manufacturer and the *Division of Surface Water Field Data Uploading Application Instruction Manual* (Ohio EPA, 2009).

Water Chemistry Sampling

Water Chemistry samples will be collected once in May, July and September and analyzed for the parameters listed in Table 1. Samples will be collected as grabs from a depth of 0.5m using a "Van Dorn" style sampling bottle and placed in collapsible 1L low density polyethylene (LDPE) containers. Samples will also be collected at the 0.5 meter depth for phytoplankton enumeration at station L1 only. The sampling locations and their geographical coordinates are listed below.

Station Name	Station ID #	North Latitude	West Longitude
L-2	203758	40°31'34"	84°33'21"
L-1	203761	40°31'41"	84°29'16"
L-3	203764	40°31'48"	84°25'54"

Tributary samples will not be collected by Ohio EPA in 2014 since USGS and Heidelberg University's National Center for Water Quality Research will be monitoring the two largest contributing streams (Chickasaw and Coldwater), and potentially the outlet.

Quality Control

Field duplicates will be collected at a frequency of 5 percent. Field blanks and equipment blanks combined will also be collected at a frequency of 5 percent. An acid blank will be run on new lots of acids used to preserve samples. Field meters will be calibrated daily using manufacturer guidelines. All field practices will follow guidelines in the *Ohio EPA Surface Water Field Sampling Manual* (Ohio EPA 2013).

Table 1. List of parameters to be analyzed in water samples collected from Grand Lake St. Marys.

Parameter	Method	Reporting Limit	Container	Preservative
Alkalinity	US EPA 310.1	5 mg/L	1 L LDPE	cool to 4°C
Bicarbonate	SM 2320 B	5 mg/L		
Total Dissolved Solids	SM 2540 C	10 mg/L		
Total Suspended Solids	SM 2540 D	5 mg/L		
Total Volatile Suspended Solids	SM 2540 D/E	5 mg/L		
Chloride	US EPA 325.1	5 mg/L		
Turbidity	US EPA 180.1	0.05 NTU		
Sulfate	US EPA 375.2	5 mg/L		
Total Ammonia (as N)	US EPA 350.1	0.05 mg/L	1L LDPE	2 ml H ₂ SO ₄ cool to 4°C
Total Nitrate+Nitrite (as N)	US EPA 350.1	0.1 mg/L		
Total Nitrite (as N)	US EPA 353.2	0.02 mg/L		
Total Kjeldahl Nitrogen (as N)	US EPA 351.2	0.2 mg/L		
Total Organic Carbon	SM 5310 B	2 mg/L		
Total Phosphorus (as P)	US EPA 365.4	0.01 mg/L	1L LDPE	filter, cool to 4°C
Orthophosphate (as P)	US EPA 365.1	0.01 mg/L		
Chlorophyll a	US EPA 445.0	0.05 µg/L	GF/C filter	MgCO ₃ , freeze

REFERENCES

Ohio EPA. 2009. DSW Field Data Uploading Application Instruction Manual. Division of Surface Water. Columbus, Ohio.

Ohio EPA. 2013. Surface Water Field Sampling Manual, Version 4.0. Division of Surface Water, Columbus, Ohio. http://epa.ohio.gov/Portals/35/documents/SW_SamplingManual.pdf