QUALITY ASSURANCE PROJECT PLAN

WISCONSIN LAKE MICHIGAN TRIBUTARY PHOSPHORUS LOADING STUDY

Prepared for: Wisconsin Department of Natural Resources (WDNR)

Prepared by: Erin Hanson, Water Resources Management Specialist

Date: July 16, 2010

Version: 2

Approved by:

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Date:

WDNR SWIMS File Manager
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Abbreviations and Acronyms

GBMSD	Green Bay Metropolitan Sewerage District
LDES	Laboratory Data Entry System
LTT	Long term trend
MMSD	Milwaukee Metropolitan Sewerage District
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
SWIMS	Surface Water Integrated Monitoring System
WDNR	Wisconsin Department of Natural Resources
WSLH	Wisconsin State Laboratory of Hygiene
US EPA	United States Environmental Protection Agency

A.3 Distribution List

This document will be distributed electronically to the following team members involved in this project. The final, approved version of this document and any future revisions will be archived in the WDNR Surface Water Integrated Monitoring System (SWIMS) for permanent storage with the monitoring data.

Greg Searle
WDNR Natural Resources Program Manager

Stephen Galarneau
WDNR Office of Great Lakes Director

Julie Sauer
WDNR Quality Assurance Coordinator

Lisa Helmuth
WDNR SWIMS File Manager

WDNR Water Resources Management Specialists:
- **Marsha Burzynski**, Milwaukee
- **Mary Gansberg**, Green Bay
- **Erin Hanson**, Green Bay
- **John Masterson**, Sheboygan
- **Greg Sevener**, Peshtigo
- **Glenna (Jo) Temte**, Madison

Ronald Arneson
WDNR Science Services Chemist

Susan Hill
WSLH EHD Quality Assurance Coordinator/Advanced Chemist

A.4 Project / Task Organization

This Quality Assurance Project Plan (QAPP) outlines the project organization, data objectives, and specific quality assurance and quality control (QA/QC) activities for a long term study of water quality in five tributaries to Lake Michigan in Wisconsin conducted by WDNR.

The majority of the funds for this monitoring project are from the WDNR state-funded Great Lakes Shore Monitoring segregated account. A portion of the project in 2010 is funded by US EPA through the American Recovery and Reinvestment Act of 2009 under grant 2P-00E73201 to WDNR. The key project personnel with QA/QC responsibilities are listed below:

WDNR Natural Resources Program Manager

Greg Searle has overall responsibility for ensuring US EPA's quality standards and reporting requirements are met. He is responsible for final review and approval of this QAPP on behalf of US EPA Water Division.

WDNR Interim Director Office of Great Lakes

Steve Galarneau is currently responsible for administrating the Great Lakes Program's obligations which include general oversight of the Lake Michigan Tributary Phosphorus Loading Study.

WDNR Quality Assurance Coordinator

Julie Sauer is responsible for coordinating with WDNR program managers to ensure quality is integrated into all projects, from planning through implementation and assessment, using WDNR's Quality Management Plan and project-specific QAPPs. She is independent from the Watershed Management program personnel and managers responsible for this water quality monitoring project.

WDNR Watershed Biologists

The following biologists are responsible for collecting the water samples: Marsha Burzynski (Milwaukee River), Mary Gansberg (Manitowoc River), John Masterson (Sheboygan River), and Greg Sevener (Menominee River). The Fox River biologist position is currently vacant.

WDNR Phosphorus Loading Study Project Coordinator (project coordinator)

Jo Temte assists with overall project coordination and annual data review. She is responsible for maintaining the project QAPP and ensuring revisions are recorded and distributed appropriately.

WDNR SWIMS File Manager

Lisa Helmuth is responsible for the Surface Water Integrated Monitoring System (SWIMS) and provides support for the transmittal and archiving of monitoring data and the approved QAPP into SWIMS.

WDNR Science Services Chemist

Ronald Arneson provides oversight of contract and laboratory details with the Wisconsin State Laboratory of Hygiene (WSLH).

WSLH QA Coordinator

Susan Hill is responsible for all inorganic laboratory quality assurance activities, including but not limited to: performing internal audits, managing proficiency evaluation samples, managing the bottle check procedure, assisting staff with the resolution of quality assurance problems, acquiring laboratory certification for environmental analyses, working with outside certification auditors to assure compliance, maintaining the SOPs

and the QA Manual, documentation of employee training. The WSLH is a subcontractor to WDNR and will conduct all laboratory water analysis.

A.5 Problem Definition/Background

The primary objective for this tributary monitoring project is to identify long term trends for phosphorus, nitrogen, and suspended solids loading to Lake Michigan from major tributaries. This will provide an early warning of rising trends, and information for management issues that may arise. The principal water quality parameter of interest is total phosphorus, which is typically the limiting nutrient that affects aquatic plant growth and recreational water uses.

Data collected for this project may also be used in the future to support the following Clean Water Act objectives:

- Determining water quality standards attainment
- Identifying causes and sources of water quality impairments
- Supporting the implementation of water management programs
- Supporting the evaluation of program effectiveness

This project is not part of a regulatory program and not subject to specific action limits or criteria.

A.6 Project/Task Description

WDNR selected five tributaries to Lake Michigan to be representative of the largest drainage area, largest sources of phosphorus, and streambed sediment type in Wisconsin:

1. Menominee River
2. Fox River
3. Manitowoc River
4. Sheboygan River
5. Milwaukee River

Collectively these watersheds represent approximately 65% of Wisconsin's land area draining to Lake Michigan (Figure 1). Biologists collect approximately 25 water samples annually from stations near the mouth of each tributary for analysis of nutrients and suspended solids at WSLH.

This monitoring project is intended to be a long term supplement to existing and ongoing monitoring, the results of which will be used in the future to estimate annual tributary loads of nutrients and sediments to Lake Michigan. Sampling for this project at all rivers except the Fox is being conducted in conjunction with current WDNR Long Term Trend monitoring. Additionally, WDNR plans to incorporate data into future load calculations for the Milwaukee and Fox Rivers that is collected by the Milwaukee Metropolitan Sewage District (MMSD) and Green Bay Metropolitan Sewerage District (GBMSD) respectively. In this way WDNR avoids duplication of monitoring effort and ensures sufficient samples are collected to provide data for future load calculations.

In the future WDNR will seek funding to contract for the load analysis portion of this project. This QAPP only addresses data generation and not calculation of tributary loads.

A.7 Quality Objectives and Criteria

The data collected by this project will be used to quantify nutrient and sediment loads to Lake Michigan from five tributaries along Wisconsin's Lake Michigan shoreline. The overall quality assurance objective for this project is to ensure that the water quality data collected are of known and acceptable quality for calculation of these loads. To achieve this objective, the sampling has been designed to characterize water quality over the range of flow conditions in each tributary

using a combination of proportional flow, monthly, and event samples to capture the range of conditions throughout each year.

WDNR and WSLH standard sample collection, handling, analysis and data handling procedures were selected for this project to ensure data accuracy, precision, and comparability with other WDNR program data and limits are detailed in Table 3 and Section B.5.

A.8 Special Training/Certification

All WDNR biologists are trained in the proper collection and handling of samples and use their professional judgment to collect water samples that are representative of river conditions at the time of sampling. No special certification is required for this project.

A.9 Documentation and Records

The project coordinator is responsible for ensuring the appropriate personnel listed in section A3 of this QAPP have the most current approved version of the QAPP. The most recent version of the QAPP will be included as an attachment to an annual email sent to remind staff of changes in lab account and time activity codes at the end of WDNR's fiscal year.

SWIMS is the central repository for all water chemistry data and project documents related to sampling and analysis for this project. The SWIMS file manager ensures that water chemistry results are entered into SWIMS upon receipt from the WSLH. The project coordinator is responsible for uploading an annual report / data summary to the "Lake Michigan Phosphorus Loading" project in SWIMS for long term storage.

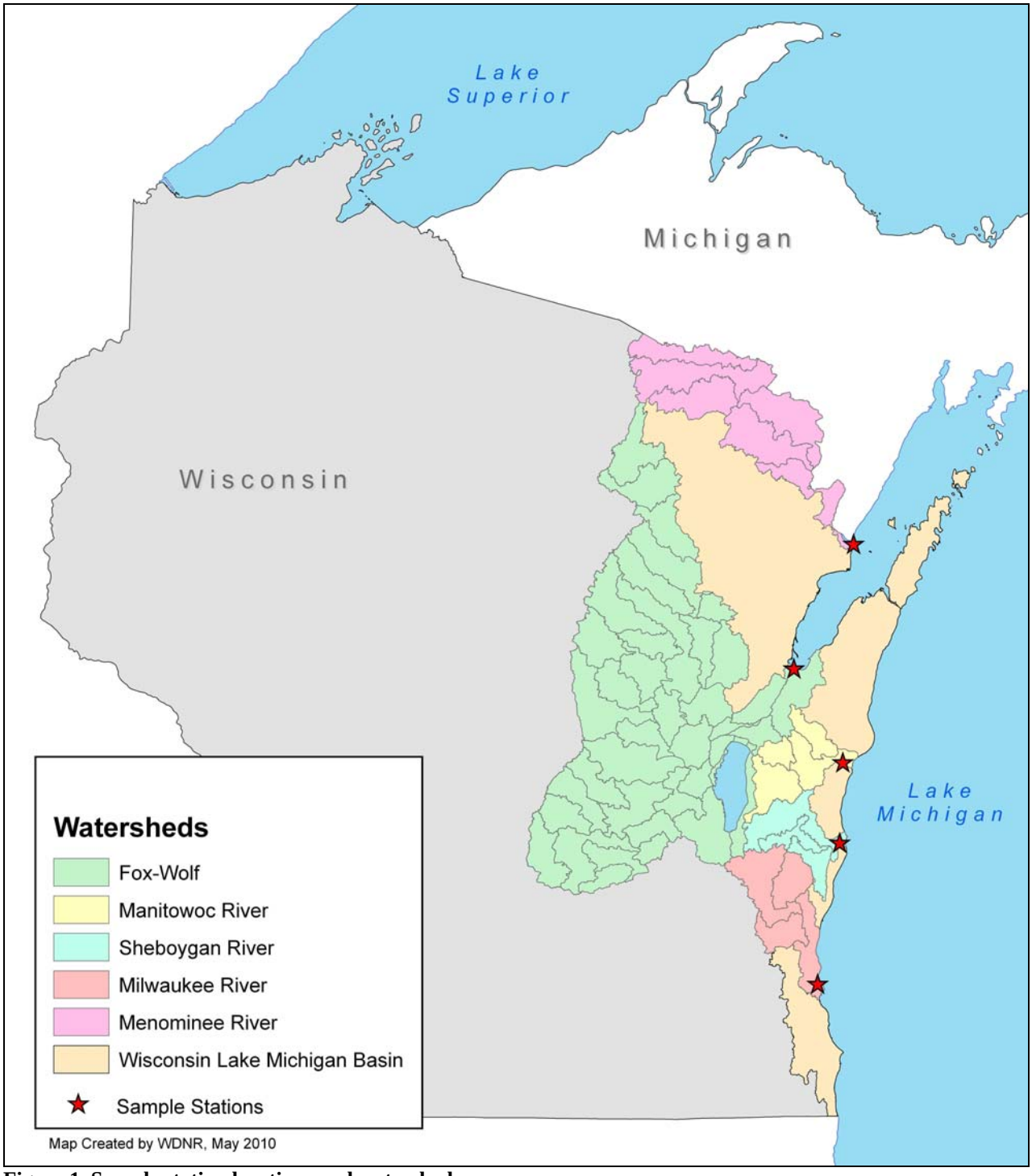

Figure 1 Sample station locations and watershed area.

Section B - Data Generation and Acquisition

B.1 Sampling Process Design

The five tributaries to Lake Michigan selected by WDNR staff to be representative of the largest drainage area, largest sources of phosphorus, and streambed sediment type in Wisconsin also coincided with permanent USGS stream gauging stations (Table 1). This was essential since discharge data will be required for future load calculations.

WDNR biologists collect water quality samples from each of the five tributaries at the established stations near the mouth of each river, listed in Table 1. The SWIMS database maintains a geospatial reference for each WDNR Station. The Menominee River LTT station is approximately 20 miles upstream from the phosphorus loading station. There is no LTT monitoring station near the mouth of the Fox River. The three stations on the Manitowoc, Sheboygan and Milwaukee Rivers are also designated as WDNR Long Term Trend (LTT) monitoring stations.

Table 1 USGS gage stations and WDNR sample stations for phosphorus loading study.

Watershed	USGS Gage Station	WDNR Station ID (water quality samples)	WDNR Biologist
Menominee River (phosphorus loading study)	–	383021 (Menominee River at Marinette, Ogden St)	Greg Sevener
Menominee River (long term trend monitoring)	USGS 04067500 (Menominee River near McAllister)	383088 (Menominee River at CTH JJ)	Greg Sevener
Fox River	USGS 040851385 (Fox River at Oil Tank Depot, Green Bay)	053222 (Fox River at Green Bay Yacht Club)	Vacant
Manitowoc River	USGS 04085427 (Manitowoc River at Manitowoc)	363069 (Manitowoc River at CTH JJ/Michigan Ave)	Mary Gansberg
Sheboygan River	USGS 04086000 (Sheboygan River at Sheboygan)	603095 (Sheboygan River at SH28/Esslingen Park)	John Masterson
Milwaukee River	USGS 04087000 (Milwaukee River at Milwaukee)	413640 (Milwaukee River at Estabrook Park)	Marsha Burzynski

Sampling for this monitoring program began in 2006 and has been ongoing since that time. The study design uses a combination of a flow proportional sampling protocol and monthly sampling for a total of approximately 25 samples per station each year. The schedule listed in Table 2 outlines the proposed number of samples for each month; however access to the Fox and Milwaukee rivers during the winter months occasionally prohibits sample collection.

In additional to the regularly scheduled monthly samples, biologists collect event samples at their discretion once discharge has exceeded the threshold listed in Table 2. Two or three of these event samples are collected each calendar year to capture high flows that would otherwise be missed by the monthly samples. Field duplicates are also collected at the biologist's discretion at a rate of 1/10 samples collected for the phosphorus loading study (excluding long term trend samples, Table 2).

Table 2 Annual flow-based sample schedule by month.

Month	Number of samples collected each month in each river.						
	1. Menominee	2. Fox		3. Manitowoc	4. Sheboygan	5. Milwaukee	
		WDNR	GBMSD			WDNR	MMSD
January	1	1		1	1	1	
February	1	1		1	1	1	
March	2	3		4	4	2	2
April	4	3		4	4	2	2
May	4		3	3	3	1	2
June	2		3	3	3	1	2
July	2		2	1	2	-	2
August	2		2	1	1	-	2
September	2		2	1	1	-	2
October	2	2		1	1	-	2
November	1	2		1	1	-	2
December	1	1		1	1	1	
Subtotal	24	13	12	22	23	9	18
Event Samples	2 – 3	2 – 3		2 – 3	2 – 3	2 – 3	
Field Duplicates	3	2		2	2	1	
Total WDNR	29	17		26	27	12	
Discharge Threshold (cfs) for high flow event samples							
	4000 – 5000	6,000 – 7,000		300	300	700	

Note:

1. Four of the samples (1 per quarter) from the Menominee River are part of the long term trends study.
2. GBMSD collects samples from May through September (shaded). WDNR only collects samples October – April, to supplement GBMSD's data. There is no long-term trend monitoring station on the Fox River.
3. Four of the samples (1 per quarter) from the Manitowoc River are part of the long term trends study.
4. Twelve of the samples (1 per month) from the Sheboygan River are part of the long term trends study.
5. MMSD collects 2 samples per month from the Milwaukee River in March – November (shaded). WDNR collects samples December – February and additional samples March – June as noted above to supplement MMSD's data. Four of the samples (1 per quarter) collected by WDNR are part of the long term trends study.

B.2 Sampling Methods

All water samples are collected by WDNR biologists according to the WDNR Field Procedures Manual (WDNR 1998) to ensure samples are properly collected, preserved, and shipped to the WSLH for analysis.

To initiate the sampling event biologists generate an Inorganic Test Request Form, known as a 'lab slip', in SWIMS that identifies the sample location using a SWIMS station ID, field ID (optional), and the parameters to be analyzed (Appendix A). Three new plastic bottles of varying sizes provided by WSLH are labeled with the SWIMS station ID and/or field ID and the sample location (Table 3). Bottles are filled with river water either using a Van Dorn sampler or directly by hand, depending on access at each station. If samples are not collected directly in the bottles the biologist rinses the sample collection container several times with river water. If the sample station is at a bridge, the biologist collects the water samples upstream of the bridge to avoid contamination from birds or runoff from the bridge. The 250 ml bottle is marked as a nutrient bottle and immediately chemically preserved with sulfuric acid from a premeasured vial provided by WSLH. The water pH is verified with a test strip and the preservation noted on the bottle and lab slip.

Between 1 and 3 field duplicates are collected by the biologists each calendar year (Table 2). These duplicates are collected sequentially at a site (i.e. two bottles filled with water) resulting in a second, discrete set of water samples for that sampling event. Biologists are responsible for selecting when to collect these duplicate samples and generating a second 'lab slip' in SWIMS. Field duplicates are identified in the upper right of the lab slip using a check in the duplicate box next to "Field QC Sample" (Appendix A).

B.3 Sample Handling & Custody

Water samples are shipped on ice by priority, overnight mail to the WSLH with the lab slip to document sample origin. A chain of custody form is not required since no regulatory action is part of this project.

B.4 Analytical Methods

The WSLH analyzes each water sample for the following parameters: total phosphorus, total suspended solids, total Kjeldahl nitrogen, NO_2 + NO_3 as nitrogen, and dissolved orthophosphate according to the methods listed in Table 3. Specific concentration cut-off limits to determine whether low or high level limits are used in the analysis were established by the WSLH based on sample history and are reported in Table 3.

B.5 Quality Control

The following sections briefly address indicators of data quality and how they will be evaluated to ensure the data generated in the field are scientifically defensible and meet the project needs. The WSLH also has a quality control program that is followed to ensure the reliability and validity of the laboratory analyses performed. Those procedures are not included here, but are documented in the WSLH QA EHD manual (WSLH 2009).

<u>Precision</u>
Precision is a measure of the repeatability of the data and will be evaluated by comparing the variability in the results of field duplicate samples. Field duplicate collection and analysis will be

initiated in July 2010, and continued in subsequent years. Duplicate samples will be collected at a minimum rate of 10% of all samples, resulting in approximately 1-3 duplicate samples at each site each calendar year (Table 2).

At the end of each calendar year, the relative percent difference between each pair of field duplicate sample results will be calculated and evaluated. "Non-detect" results will not be included in evaluation of data precision. It is expected that relative percent difference will not exceed 10% for samples; results exceeding this threshold will be reviewed and may be used to inform subsequent sampling design. The results of field duplicate samples may also be used in the future to assist with error estimation associated with future tributary load calculations.

Accuracy

Accuracy is a measure of how closely the reported result is to the real result. Internal, routine WSLH QA/QC procedures (including matrix spike analyses of investigative samples and laboratory or matrix spike duplicates) will be considered sufficient to ensure accurate data are reported and will meet the limits established in Table 3. To the extent possible the QA objectives are consistent with method capabilities as described in the WSLH EHD Quality Assurance Manual (WSLH 2009) and Standard Methods for the Examination of Water and Wastewater (APHA 1998). If the QA objectives identified in the laboratory QA manuals are not met, the steps described under Assessments and Response Actions (Section C1) will be taken.

Completeness

From previous WDNR and WSLH water quality sampling experience, valid samples (e.g. sufficient volume, no contamination problems, and lab validated data) are expected to be collected from 95% or more of samples collected.

The project coordinator will review completeness of the field sampling at the end of each calendar year using a query of the SWIMS database to obtain both the long term trend and phosphorus loading project records. Provisional discharge data for each river will also be downloaded from the USGS website (http://nwis.waterdata.usgs.gov/wi/nwis/nwis) for a general overview of sample collection relative to river discharge. Future loading calculations should be completed using verified discharge data from USGS. The annual summary is emailed to the biologists for review of completeness and necessary corrections made before the annual summary file is uploaded to the SWIMS database. The phosphorus loading project coordinator will initiate any necessary adjustments to the sample schedule at the time of the annual review.

Representativeness and Comparability

This project uses standardized techniques and analytical procedures to ensure the data are representative and comparable with other WDNR and external partner (GBMSD and MMSD) data sets and for future loading analysis. These methods are considered typical by other researchers and results will be expressed in units typically used by contemporary scientists in this field. By using a well designed and documented (QAPP & field procedures manual) sampling program WDNR ensures that the samples collected are representative of general water quality conditions in each river.

B.6 Instrument/Equipment Testing, Inspection, and Maintenance

The only field activity for this project is filling clean bottles provided by WSLH. There are no instruments or equipment to test, inspect or maintain.

All applicable preventive maintenance protocols for laboratory equipment are contained in the WSLH's EHD Quality Assurance Manual (WSLH 2009). All laboratory instruments will be maintained in accordance with manufacturer's specifications.

B.7 Instrument/Equipment Calibration and Frequency

The only field activity for this project is filling clean bottles provided by WSLH. There are no instruments to calibrate.

Each laboratory instrument will be calibrated prior to use as a measurement device to establish the instrumental response to known reference materials. All sample measurements will be made within the calibrated range of the instrument. Preparation of reference materials used for calibration and the process for and frequency of calibration by the WSLH is established in the WSLH EHD Quality Assurance Manual (WSLH 2009).

B.8 Inspection/Acceptance of Supplies & Consumables

All sample bottles and acid preservatives are supplied by the WSLH. The lab checks representative sample collection bottles and acid preservative vials before they are sent to the field for use. They are not shipped unless they pass set criteria for levels of contamination that will not affect their use.

B.9 Data Acquisition Requirements for Non-Direct Measurements

Future calculation of tributary phosphorus loads will require obtaining river discharge data from USGS gaging stations and water quality data from GBMSD and MMSD. Final, validated data should be obtained from these organizations. The project manager should ensure that data are of suitable quality for the calculations and analysis initiated at that time, including a review of the detection limits and comparability of the methods used to analyze the water quality, and a review of the associated data qualifiers.

B.10 Data Management

The project coordinator established a monitoring project in SWIMS that included the following critical fields:

- Project description including purpose, objective(s), intended outcome, and budget
- People and their roles in the project
- Monitoring stations
- Parameters to be analyzed
- Account codes

Fieldwork events and associated labslips for water analyses are generated by the biologists prior to each sampling event.

The following documents will be attached to the SWIMS project:

- link to website for Field Procedures manual
- the original, approved QAPP and any subsequent revisions
- annual data summaries.

Once the analyses are complete and have passed WSLH QA/QC, the data is entered into the WSLH database and then transmitted to WDNR's Laboratory Data Entry System (LDES). Biologists are notified by email that the electronic results are available in LDES and provided a link to access the data. Once all samples are marked "complete' by the SWIMS file manager the dataset is electronically migrated into SWIMS where it is available online to DNR and non-DNR partners and where it is associated with the project details. All data must have a station ID to be included in the system and a project ID and sequence number to ensure that results are appropriately associated with the project.

SWIMS incorporates the data from LDES daily if the station numbers and unique SWIMS ID number on the lab slip match. Data with mismatched identifiers are rejected until the project coordinator works with the SWIMS file manager to resolve discrepancies and marks the data as suitable for inclusion in the database. It is the responsibility of the project coordinator to ensure that the field results are appropriately documented and archived with the electronic project in SWIMS.

Table 3 Sample containers, holding time, and detection limits.

Parameter	Container	Holding Time	Lab Method	Low level dup conc cut-off (mg/L)	Low level dup limits (absol diff)	High level dup limits (% rel diff)	Sp limits (% rec)
Total Phosphorus	250 ml nutrients bottle acidified with sulfuric acid	28 days	EPA 365.1	0.05	0.005	6.1	92.6 – 110
NO_2 + NO_3 as Nitrogen			EPA 353.2	0.2	0.019	5	90 – 110
Total Kjeldahl Nitrogen			EPA 351.2	1.4	0.245	16	90 – 110
Dissolved orthophosphate	60 ml bottle, no preservative	48 hours	SM 4500 PE	0.02	0.002	8.4	85 – 115
Total Suspended Solids	Quart bottle, no preservative	7 days	SM 2540 D	50	2	15.8	No limits

Section C - Assessment and Oversight

C.1 Assessments and Response Actions

Field Collections
WDNR biologists are professionals trained in the proper collection of water samples and standard procedures used by the Watershed Management program to maintain professional staff are considered sufficient for this project. Technical field audits are not standard procedure for WDNR water monitoring activities and will not be a part of this project.

Laboratory Activities
Laboratory assessments are standard practice for the WSLH and it is certified by WDNR following the standards established in Wisconsin Administrative Code NR 149. The WSLH is certified by the US EPA for drinking water and NELAC (http://www.slh.wisc.edu/dotAsset/14615.pdf). The WSLH is responsible for ensuring that appropriate QA/QC procedures are followed and all results reported by the WSLH are subject to an internal, independent peer review. Audits of the WSLH are conducted on a routine basis and will be considered sufficient for this project.

The SLOH inorganic chemistry section analyzes performance evaluation samples semiannually. Internal reference samples are analyzed at least quarterly. These samples are purchased from a private company. As outlined in the SLOH EHD Quality Assurance Manual (SLOH 2009), the SLOH participates in a variety of inter- and intra-laboratory quality assurance programs.

WDNR system audits of SLOH are performed as part of WDNR's laboratory certification program. External audits are also conducted by the state of Florida for compliance with NELAC standards, and the USEPA for drinking waters. Internal system audits at SLOH are addressed in the laboratory's QA manuals.

SWIMS database
The project coordinator is responsible for ensuring that all results and documents related to this project are available in SWIMS. This database is web-based and accessible to all WDNR staff and external partners, so assigning the project coordinator responsibility for specific data coordination for the project ensures data integrity and accessibility in the database.

Suitability of data for future loading calculations
The project coordinator will assess the data during the life of the project to ensure that they continue to be of sufficient quality and quantity to meet the project goals; specifically calculation of nutrient and sediment loads from Wisconsin's tributaries to Lake Michigan. Every 5 years, depending on available staff time and funding, the project coordinator will consult with WDNR and USGS experts on nutrient loading calculations to ensure that the sampling schedule and data collected are still sufficient for this use. Such a review might consider evaluation of the:

- proportion flow schedule, including a review of the tributary hydrographs to determine if the sampling schedule is consistent with the timing of flows,
- number and seasonal timing of event samples collected, and
- variability in sample results to determine if sufficient samples are being collected.

Any limitations in the data will be noted, the project adjusted accordingly, and the QAPP modified to include any changes.

C.2 Reports to Management

A final report of data collections funded by ARRA will be provided to US EPA, via the WDNR/US EPA liaison officer. The report will include project status, assessments of the data and quality assurance issues and is the responsibility of the project coordinator. Regional water quality specialists may also receive copies of the report upon request.

Section D - Data Validation and Usability

D.1 Data Review, Verification, and Validation and

D.2 Verification and Validation Methods

This section addresses laboratory's procedures for reviewing and validating the data collected in this study. The laboratory has specific procedures for data reduction, validation and reporting. The laboratory only reports data that fall within quality control limits, unless qualified. If a quality control is exceeded or interference is present, the sample will be re-run provided that sufficient sample is available. Data are saved to a computer and the laboratory is provided a print out for records.

The WSLH will perform in-house analytical data reduction and validation to check whether project and laboratory QA criteria have been met. The WSLH data quality review procedures and information flow, data retrieval, and storage are contained in the WSLH EHD Quality Assurance Manual (WSLH 2009). Samples are logged into the computer immediately upon receipt and worklists are generated. Results are automatically calculated, printed out, and then reviewed by the chemist. Standard curves and calculations are described within each analytical method. Each analytical run of sample data is subject to a peer review audit and signed.

WSLH will provide WDNR with the analytical results for the parameters identified in the applicable methods. WSLH will provide validated data and exception reports (including qualified data indicated by data flags and comments) for any data points which do not meet all appropriate project and laboratory QA objectives.

The project manager will be the custodian of validated analytical data received from the WSLH. Data quality control summary reports will reside in WSLH. The project data set will be available for controlled access by the project manager.

D.3 Reconciliation with User Requirements

Future calculation of tributary loading of nutrients and sediment should include a thorough evaluation of the data, including any data qualifiers provided by the lab that could impact the data’s use for that purpose.

References

American Public Health Association, 1998. Standard Methods for the Examination of Water and Wastewater, 20th Edition. American Public Health Association, Washington, D.C.

WDNR. 1998. Field Procedures Manual, Version IV - Intranet Edition. Available at: http://intranet/int/es/science/ls/fpm/. Accessed May 2010.

WSLH. 2009. Wisconsin State Laboratory of Hygiene Environmental Health Division Quality Assurance Manual, Revision 7. University of Wisconsin, Madison. October 2009

Appendix A – Sample Inorganic Test Request Form

State of Wisconsin
Department of Natural Resources
and Laboratory of Hygiene

Inorganic Test Request
Form 4800-015 (R 2/09) Page 1 of 2

ID, License, Permit or STORET Number	Point or Outfall Number	Field Number	County No.	Program Code	Region
363069	36820550		36	WT	NER

Waterbody Number	Sample Address or Location
71000	MANITOWOC RIVER AT CTH JJ(MICHIGAN AVE)

Sample Point Description / Sampling Device

Send Report To

DNR User ID	Date Results Needed (mm/dd/yyyy)
HANSOEE	

Name (Last, First): HANSON, ERIN

Address: 2984 SHAWANO AV

City	State	Zip
GREEN BAY	WI	54313

Account Number	Collected By
WT120	ERIN E HANSON

Lakes Grant or Project Number	Telephone Number
GL_Phosphorus	

Begin or Grab Date (mm/dd/yyyy)	Begin Time (24-hr clock)
07/16/2010	

End Date - For Composite Samples Only (mm/dd/yyyy)	End Time (24-hr clock) - For Composite Samples Only
07/16/2010	

Enforcement? ☐ Yes ☐ No If yes, include chain of custody form.

If Field QC Sample (select one): ☐ Duplicate ☐ Blank ☐ _____

Sample Type (select one)

- [X] SU Surface Water
- [ ] NP Storm Water
- [ ] E Public Drinking Entry Point
- [ ] W Public Drinking Well/Source
- [ ] D Public Drinking Distribution
- [ ] PO Private Well
- [ ] X Non-Potable Well
- [ ] _____
- [ ] EF Effluent (Treated Wastewater)
- [ ] IF Influent (Untreated Wastewater)
- [ ] MW Monitoring Well
- [ ] SE Sediment
- [ ] SL Sludge
- [ ] SO Soil
- [ ] TI Tissue
- [ ] OW Waste

For Lab Use: Priority

Sample Reason (Drinking Water - select one)

- [ ] N New Well
- [ ] I Investigation
- [ ] W Raw Water
- [ ] C Confirmation
- [ ] D Compliance

Depth of Sample (feet or meters) _____ F or M

Is Sample Disinfected? ☐ Yes ☐ No If Yes, how? _____

If field filtered, indicate by checking the box on this sheet and noting on the lid of the sample bottle.

Plastic Quart (946 ml) Bottles (No Chemical Preservation)

☐ Sample field filtered? (Check box if yes)

- [ ] Total Solids
- [ ] Volatile Total Solids
- [X] Suspended Solids (500 ml needed)
- [ ] Vol. Susp. Solids
- [ ] Total Dissolved Solids
- [ ] CBODs Total (carbonaceous)
- [ ] BODs Total (900 ml needed)

BOD Estimate Required: _____ mg/l

- [ ] BODs Dissolved
- [ ] Chlorophyl A (if Field Filtered, give ml_____ filtered)
- [ ] Alkalinity, pH, & Conductivity
- [ ] pH only **(non-Waste or non-Compliance)**
- [ ] Chloride
- [ ] Color
- [ ] Fluoride
- [ ] Sulfate
- [ ] Turbidity
- [ ] MBAs Screening
- [ ] _____
- [ ] _____

250 ml Bottle (add NaOH to pH > 12)

- [ ] Cyanide, Total
- [ ] Cyanide, Amenable to Chlorination

60 ml Bottle (No Chemical Preservation)

☐ Sample field filtered? (Check box if yes)

- [ ] $NO_2 + NO_3$ as Nitrogen (Drinking Water)
- [ ] Nitrite (NO_2) as Nitrogen
- [X] Diss.-Orthophosphate
- [ ] Diss. Silica

Quart Mason Jar (Also TCLP Metals)

- [ ] Oil & Grease (3 qts) (Acidify w/ Sulfuric Acid)
- [ ] pH (Waste Samples Only)

250 ml Bottle for Nutrients or Metals - Check each of the boxes that apply

Metals Bottle 250 ml **(Acidify W/Nitric Acid)**

☐ Sample field filtered? (Check box if yes)

- [ ] Low Level Metals (e.g., clean sampling)
- [ ] TCLP (Toxicity Characteristic Leaching Procedure) (*TC Regulated Metals)(Use Mason Jar)

Note: Special Bottles & Acid Needed +

For non-drinking waters, total recoverable metals will be run unless otherwise instructed.

- [ ] Antimony +
- [ ] Arsenic* +
- [ ] Barium* +
- [ ] Beryllium +
- [ ] Cadmium* +
- [ ] Calcium
- [ ] Chromium, Total*
- [ ] Chromium, Hexavalent
- [ ] Copper +
- [ ] Hardness-as $CaCO_3$
- [ ] Iron
- [ ] Lead* +
- [ ] Magnesium
- [ ] Manganese +
- [ ] Mercury* +
- [ ] Nickel +
- [ ] Selenium* +
- [ ] Silver* +
- [ ] Sodium
- [ ] Thallium +
- [ ] Zinc +
- [ ] _____
- [ ] _____
- [ ] _____

Nutrients Bottle 250 ml **(Acidify W/Sulfuric Acid)**

☐ Sample field filtered? (Check box if yes)

- [X] Tot.-Phosphorus
- [X] $NO_2 + NO_3$ as Nitrogen
- [X] Total Kjeldahl-N
- [ ] Ammonia-N
- [ ] Chemical Oxygen Demand (COD)
- [ ] Tot. Dis. Phosphorus **(filter, then acid preserve in 60 ml bottle)**

Where required, has sample been chemically preserved and has pH been checked? ☐ Yes ☐ No

Initials _____ Date _____