

A. Project Description

The Long Term Trends (LTT) Rivers monitoring program is a baseline monitoring activity conducted by the Wisconsin DNR Water Quality Bureau. The LTT Rivers program was developed to track and analyze water quality trends over time in Wisconsin's rivers. The current version of the LTT Rivers water quality-monitoring network, initiated in 2001, consists of 42 sites, with a minimum of one site per major river basin, generally located near the mouth of each river (Figure X and Table 2). An additional site on the Grant River in SW Wisconsin will be added to the network in 2014 to increase the site total to 43. Most of these sites are part of an earlier trend monitoring efforts that contribute historic record of water quality data tracing back to the 1970s and 80s.

B. Project History

Wisconsin has had a variety of water quality monitoring networks over the past 40 years that have contributed to the current selection of sites and current status of the LTT Rivers network. In 1979, the initial network consisted of 29 National Ambient Stations (EPA) and 18 other stations for a total of 47 sites. In 2000, the state water quality monitoring network consisted of 24 stations operated by the Wisconsin Department of Natural Resources (WDNR) and 16 stations operated by United States Geological Survey (USGS) and other agencies. As many as 70 stations previously monitored by WDNR have substantial periods of record (Wis. Water Resources Center, 1998). The primary criteria for site selection for LTT Rivers typically included: broad spatial coverage, representation of a range of land coverage and ecotypes, historic long-term trend sampling locations, and availability of continuous flow data (preferably from a nearby USGS station).

A report on the status of the LTT Rivers network was completed in 2006 by the Bureau of Watershed Management's River Long Term Trend Work Group. In 2013-2014 a second version of the Long Term Trend Rivers Work Group was formed by the Bureau of Water Quality to review the success of previous efforts and make new recommendations for the monitoring program. Much of the substance of the LTT Rivers QAPP was developed from the work of these two groups.

C. Project Locations

There 43 LTT Rivers sites located throughout the State of Wisconsin that are generally located at the mouth of larger rivers within and bordering the State. Some sites are located upstream from the mouth on some of the larger rivers (i.e. Wisconsin River) as one location at these rivers would not adequately capture the general condition of those rivers. See Figure 1 for spatial locations of all sites in the LTT Rivers network.

D. Day and Time of Monitoring

Sampling dates should be scheduled at least one week in advance on monitoring to avoid bias from weather conditions. Samples should be collected during the second week of the month for the monthly and quarterly scheduled sampling locations. Monthly samples should be collected at roughly 30 day intervals to the best extent possible. For sites that are scheduled to be monitored quarterly sampling should occur in January, April, July and October in order to roughly coincide with seasonality

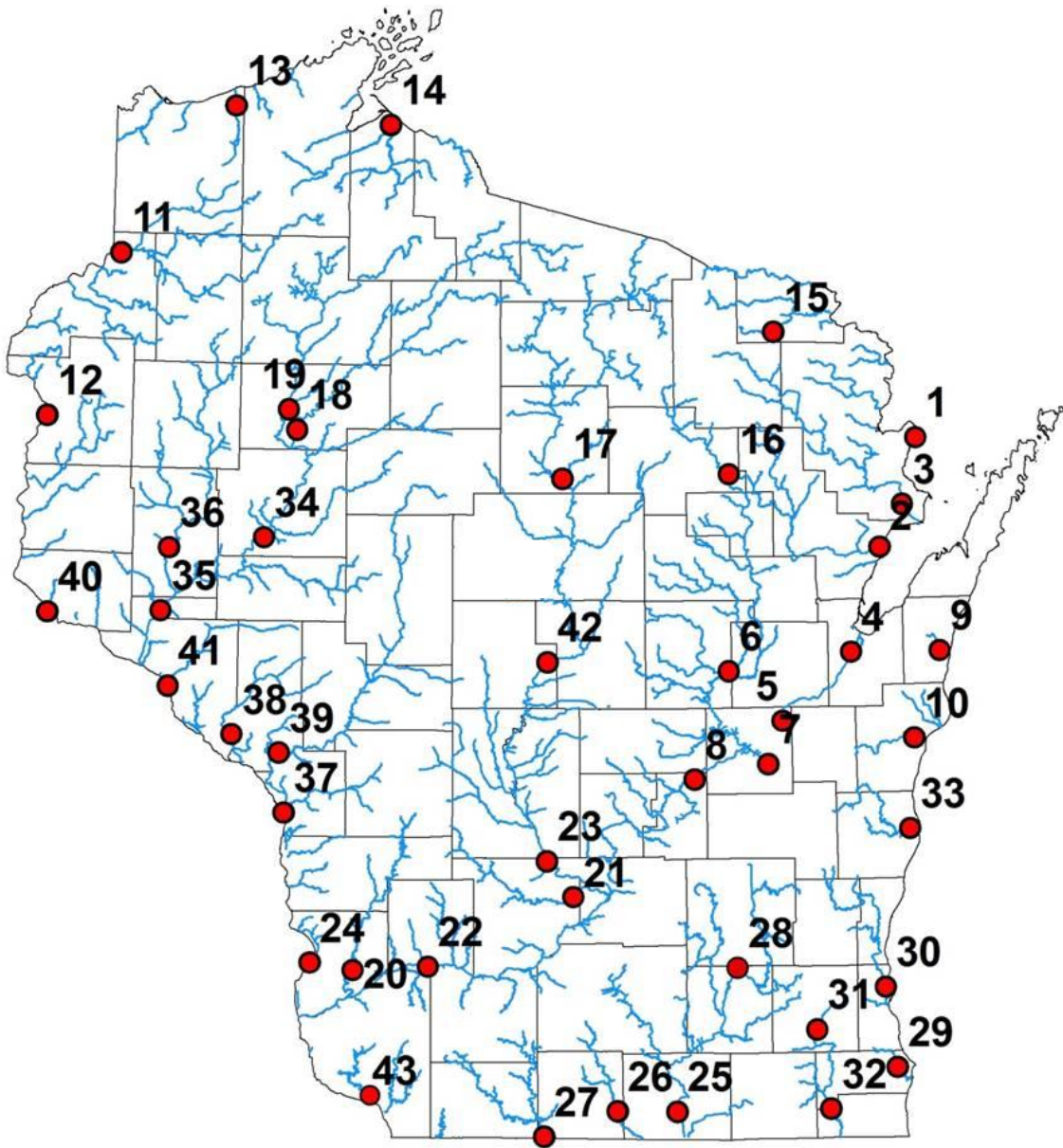


Figure 1. Spatial Location of all sites in the Long Term Trends network. Symbol value represents LTT Site Number located in Table 2.

E. Project Organization Roles and Responsibilities

Central organization of the LTT network is conducted by the Water Quality Monitoring Section in the Central Office. This includes organization of yearly sampling activities, communicating changes in the monitoring program and data management. Regional leadership for field sampling activities is organized through District Coordinators that communicate monitoring needs to affected field staff and supervisors. The District Coordinators were chosen from volunteers from the stream and rivers monitoring program and are all staff conducting field monitoring themselves. See Table 1 for project organizational roles and current staff assigned to those roles.

Table 1. List of current Long Term Trend Rivers monitoring program organization and current contacts.

Monitoring Section Chief	Tim Asplund
Rivers Monitoring Lead	Mike Shupryt
Office of Great Lakes Monitoring Coordinator	Andy Fayram
SWIMS Database Coordinator	Molli MacDonald
Eastern District LTT Regional Coordinator (North)	Mary Gansberg
Eastern District LTT Regional Coordinator (South)	Craig Helker
Northern District LTT Regional Coordinator	Jim Klosiewski
Southern District LTT Regional Coordinator	Jim Amrhein
Western District LTT Regional Coordinator	Mark Hazuga
Mississippi River Unit LTT Coordinator	John Sullivan

F. Field Activities

Field sampling for the LTT Rivers occurs on a monthly basis for ~3/4 of the sites and quarterly at ~1/4 of the sites (See Table 2). Sampling for this program consists solely on water quality parameters including chemistry grabs and field measurements. Some water quality parameters at select sites are collected on a sub-monthly/quarterly frequency. Major constituents that are collected monthly and sub-monthly/quarterly are listed below as well as in Table 2:

1. Collected every sampling event:

- a. Field Data – Dissolved Oxygen, Temperature, pH, Conductivity and Transparency Tube
- b. Nutrients – Ammonia, Nitrate + Nitrite, Total Kjeldahl Nitrogen, Total Phosphorus and Dissolved Ortho Phosphorus
- c. Sediments – Total Suspended Solids, Turbidity
- d. Algae – Suspended Chlorophyll a

- e. Other – Chloride and Alkalinity

2. Collected at a subset of sampling events:

- a. E. coli – March through November only
- b. Low Level Metals – Cadmium, Copper and Mercury, select sites quarterly
- c. Hardness – Only with low level metals samples
- d. Dissolved Silica – Select sites only
- e. Triazine – At all monthly sites in June only

G. SOPs

The Long Term Trend Rivers program samples more water chemistry parameters than other current baseline monitoring program. Therefore, some of these sampling techniques may be unfamiliar or infrequently practiced by field staff so following protocol is essential. Field sampling SOPs needed for LTT Rivers sampling are attached in the appendices of this document. Staff should make themselves familiar with the necessary SOPs for monitoring including:

1. Chemistry Grab Samples

- a. Nutrients
- b. Sediments (not yet updated)
- c. Chlorophyll a (not yet updated)
- d. Chloride/Dissolved Silica (not yet updated)
- e. E. coli (not yet updated)
- f. Low Level Metals
- g. Triazine (not yet updated)

2. Field Measurements

- a. Dissolved Oxygen, Temperature and Conductivity probes (not yet updated)
- b. Transparency Tube (not yet updated)

H. QAQC

In general parameter specific QAQC measures can be found in the parameter specific SOPs. If no QAQC procedure is listed in this section specific to the LTT Trend Rivers program, the generic QAQC protocol should be followed. All QAQC measures listed below in this QAPP shall super cede the generic QAQCs listed in the parameter specific SOPs.

1. Low Level Metals

The LTT Rivers monitoring program requires that field blanks are collected for low level metals (Cd, Cu and Hg) are taken every two years at each site metals are routinely collected. At the same time a field duplicate should be taken using the same protocols as the original sample. This will result in one field blank and one duplicate every 8 samples which falls within the Stat Lab of Hygiene's recommended frequency of one field blank at 10% of total samples. Low Level metals field blanks will be collected every other October at all sites across the State. Half of the sites will collect QA/QC samples every odd year and half every even year. QA/QC schedules will be distributed to the affected staff September of every year by Central Office staff.

2. Total Phosphorus

The LTT Rivers program requires a duplicate sample taken once a year from monthly frequency sites and every other year from quarterly frequency sites. This will result in 30 duplicate samples per year which is nearly 10% of all samples. All duplicate samples will be taken in August and QA/QC schedules will be distributed to the affected staff September of every year by Central Office staff. If duplicate samples are returning significantly different from each other trip blanks or additional laboratory QA/QC procedures will be required to determine the source of the discrepancy.

3. Other Parameters

All other chemical parameters will have QA/QC samples taken on an as needed basis as determined by the SLOH Lab Manager, SWIMS Database Manager or LTT Workgroup representatives. As none of the other chemical parameters are processed in the field (i.e. field filtered) the chance of sample contamination is low.

4. Field Instruments

Staff use field instruments to capture grab samples for water temperature, dissolved oxygen concentration, water temperature, specific conductivity and pH at each of the sites. The instruments shall be operated, calibrated and maintained according to the manufacturer's specifications for the particular model and individual probes. Hard copies of calibration records should be kept by staff. Data from instruments shall be recorded on the SLOH lab slip and turned in with the water chemistry grab samples. Field staff may choose to retain a hard copy for their records however; the SLOH will enter parameters recorded onto the lab slip into SWIMS.

I. Safety

Safety precautions of a general nature should be recognized. Life jackets should be worn if sampling from a boat or in areas of swift current or deep water. Collecting samples in cold weather, especially around cold waterbodies, carries the risk of hypothermia, and collecting samples in extremely hot and humid weather carries the risk of dehydration and heat stroke. When sampling during ice cover two staff should be present and extreme caution should be used when traveling on ice. (This is really important as this project has winter sampling— we should link to a Bureau/Division wide safety SOP)

J. Data Management

All data collected as part of the LTT Rivers monitoring program is to be stored in SWIMS. In most cases all data will be entered into SWIMS by the SLOH upon analysis. Field staff must be sure to properly print and record lab slips including any field measurements that were taken at the site (i.e. dissolved oxygen, specific conductivity, water temperature, etc.). As field measurements are hand entered by SLOH employees it is recommended that field staff take the time to review the field measurements against hard copies they have retained occasionally throughout the year.

As of the 2014 field season the Bureau of Water Quality and the Office of Great Lakes will be collaborating at five (5) sampling sites where the LTT Rivers program and the Lake Michigan or Lake Superior Phosphorus Loading program overlap. At these sites (listed below) SLOH samples will be paid for by the Office of Great Lakes. Field staff must record the budget code for the Phosphorus Loading study (GL020) but add the LTT Rivers and a secondary project. Follow the directions in Appendix A for directions of how to do this in SWIMS.

K. QAPP Updates and Tracking

Version Number	Date	Sections	Name	Approval
2.2	03/05/14	All	LTT Rivers Workgroup 2013	
2.3	03/04/16	Table 2, updates from OGL P Loading Study analysis	Shupryt	

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Table 2. All sites in the LTT network and sample frequency for each parameter at each site.

LTT Site #	Site Description	Number of Samples														
		pH & Alkalinity	Turb	TKN	NO2+3	NH3	TP	Ortho P	TSS	Chla	E-coli	Cl	Hardness	Metals (Cd, Cu and Hg)	Triazine	Diss Silica
1	Menominee R. at McAllister	4	4	4	4	4	4	4	4	4	3	4	0	0	0	0
2	Oconto R. at Oconto	4	4	4	4	4	4	4	4	4	3	4	0	0	0	0
3	Peshtigo R. at Peshtigo	4	4	4	4	4	4	4	4	4	3	4	0	0	0	0
4	Fox R. at DePere	12	12	12	12	12	12	12	12	12	9	12	4	4	1	12
5	Fox R. at Neenah and Menasha	12	12	12	12	12	12	12	12	12	9	12	0	0	1	12
6	Wolf R. at New London	12	12	12	12	12	12	12	12	12	9	12	4	4	1	12
7	Fox R. at Oshkosh	12	12	12	12	12	12	12	12	12	9	12	0	0	1	12
8	Fox R. at Berlin	4	4	4	4	4	4	4	4	4	3	4	0	0	0	0
9	Kewaunee R. at Kewaunee	4	4	4	4	4	4	4	4	4	3	4	0	0	0	0
10	Manitowoc R. at Manitowoc**	12	12	12	12	12	12	12	12	12	9	12	0	0	0	0
11	St. Croix R. at Danbury	4	4	4	4	4	4	4	4	4	3	4	0	0	0	0
12	St. Croix R. at St. Croix Falls	4	4	4	4	4	4	4	4	4	3	4	4	4	0	0
13	Bois Brule R. at Brule**	12	12	12	12	12	12	12	12	12	9	12	0	0	0	0
14	Bad R. at Odanah**	12	12	12	12	12	12	12	12	12	9	12	0	0	0	0
15	Popple R. at Fence	12	12	12	12	12	12	12	12	12	9	12	4	4	1	12
16	Wolf R. at Langlade	12	12	12	12	12	12	12	12	12	9	12	0	0	1	12
17	Wisconsin R. at Merrill	12	12	12	12	12	12	12	12	12	9	12	0	0	1	12
18	Flambeau R. at Bruce	4	4	4	4	4	4	4	4	4	3	4	0	0	0	0
19	Chippewa R. at Bruce	4	4	4	4	4	4	4	4	4	3	4	0	0	0	0
20	Kickapoo R. at Stueben	12	12	12	12	12	12	12	12	12	9	12	0	0	1	0
21	Baraboo R. at Rowley Creek	12	12	12	12	12	12	12	12	12	9	12	0	0	1	0
22	Wisconsin R. at Muscoda	12	12	12	12	12	12	12	12	12	9	12	0	0	1	0
23	Wisconsin R. at Wisconsin Dells	12	12	12	12	12	12	12	12	12	9	12	4	4	1	0
24	Mississippi R. at LD 9	12	12	12	12	12	12	12	12	12	9	12	0	0	1	0
25	Rock R. at Afton	12	12	12	12	12	12	12	12	12	9	12	4	4	1	0
26	Sugar R. at Broadhead	12	12	12	12	12	12	12	12	12	9	12	0	0	1	0
27	Pecatonica R. at Martintown	12	12	12	12	12	12	12	12	12	9	12	0	0	1	0
28	Rock R. at Watertown	12	12	12	12	12	12	12	12	12	9	12	0	0	1	0
29	Root R. at Johnson Park	12	12	12	12	12	12	12	12	12	9	12	0	0	1	12
30	Milwaukee R. at Estabrook Park***1	4	4	4	4	4	4	4	4	4	1	4	4	4	0	4
31	Fox (IL) R. below Waukesha	4	4	4	4	4	4	4	4	4	3	4	0	0	0	0
32	Fox (IL) R. near New Munster	12	12	12	12	12	12	12	12	12	9	12	0	0	1	0
33	Sheboygan R. at Esslingen Park**	12	12	12	12	12	12	12	12	12	9	12	4	4	1	12
34	Chippewa R. at Chippewa Falls	4	4	4	4	4	4	4	4	4	3	4	0	0	0	0
35	Chippewa R. at Durand	12	12	12	12	12	12	12	12	12	9	12	4	4	1	12
36	Red Cedar R. at Menomonie	12	12	12	12	12	12	12	12	12	9	12	0	0	1	12
37	La Crosse R. near Mouth	12	12	12	12	12	12	12	12	12	9	12	0	0	1	0
38	Trempealeau R. at Dodge	12	12	12	12	12	12	12	12	12	9	12	0	0	1	12
39	Black R. at Galesville (Hwy 53)	12	12	12	12	12	12	12	12	12	9	12	4	4	1	12
40	Mississippi R. at Above LD *	12	12	12	12	12	12	12	12	12	9	12	4	4	1	0
41	Mississippi R. at Above LD 4 *	12	12	12	12	12	12	12	12	12	9	12	4	4	1	0
42	Wisconsin R. at Biron	12	12	12	12	12	12	12	12	12	9	12	0	0	0	0
43	Grant River at Burton	12	12	12	12	12	12	12	12	12	9	12	0	0	1	0

* Samples are collected by Minnesota Metropolitan except for low level metals which are collected by the WDNR Mississippi River Unit.

** Samples charged to the Office of Great Lakes Phosphorus Loading budget code starting 2014.

1 - Sampling is conducting bimonthly by MMSD in growing season

Appendix A

Associating a labslip (fieldwork event) to more than one project

Generate Labslip

Enter Project, Station, Collector, Date, Parameters...

After you click Save and Print, Print out the Labslip and you will see the screen below. Click on Projects.

The screenshot shows the 'Edit Fieldwork Event' form. On the left, there are input fields for dates, collectors, station information, and a description. On the right, there are four tables for 'Field Results', 'Lab Results', 'Summary Results', and 'Habitat Results', each showing 'No data available in table'. At the bottom left, a breadcrumb trail includes 'Projects', which is highlighted with a red box.

You will see that the labslip is connected to the project you chose. If you would like it to also show up in another project, click on the white piece of paper in the upper right corner or if you do not see the paper, click Enable Edit in lower left corner (see below).

This screenshot is similar to the previous one but shows the 'Projects' table populated with one entry: 'Regional Special Projects' with a start date of 07/01/2005 and an end date of 06/30/2010. In the breadcrumb trail at the bottom left, the 'Disable Edit' link is highlighted with a red box.

Appendix A Continued

Search (you must search, you can't type in the box even though it looks like you can) for the additional project and hit submit.

Home -> Add New Fieldwork Event to Project Link
Fields denoted with an asterisk (*) are REQUIRED.

Project * Search Projects

Purpose * Collected for Project ▼

Comments

Save and Return

[Back](#)

Backfill it by hitting the black arrow and Save & Return. Note – the Project ID should be LLT_RIVERS to associate LLT Rivers projects with the OGL project ID LM Phosphorus Load (Lake Michigan) or LS_P_Load (Lake Superior) .

Home -> Project

Project Information

Previous 1-1 of 1 Next Order By Project Name ▼ Search | Show All

	Project Id	Project Name	Project Type	Status	Parent Project Name
↶ Download	Rivers_Annual	Annual Rivers 2005-2012 (aka non-wadeable Watershed Rotation Sites)	Baseline Monitoring	Active	Tier I Rivers Projects

Appendix A Continued

Now the fieldwork event is associated with 2 projects.

The screenshot shows a web application interface for editing a fieldwork event. On the left, there is a form with fields for 'Fieldwork Start Date' (01/01/2001), 'Fieldwork End Date' (01/01/2001), 'Data Collectors' (MOLLI MACDONALD), 'Fieldwork Event Status' (Scheduled), 'Station Org.' (21WIS), and 'Station ID' (553171). On the right, a table titled 'Projects' is displayed, which is highlighted with a red box. The table has columns for Project ID, Project Name, Project Start, Project End, Status, Purpose, and Comments. Two projects are listed: 'Regional Special Projects' and 'Rivers_Annual'.

Project ID	Project Name	Project Start	Project End	Status	Purpose	Comments
Regional Special Projects	Regional Special Projects	07/01/2005	06/30/2010	ACTIVE	Collected for Project	
Rivers_Annual	Annual Rivers 2005-2012 (aka non-wadeable Watershed Rotation Sites)	07/01/2005	10/01/2012	ACTIVE	Collected for Project	

Click on Save and Return.

You can actually also do this later on in the fieldwork's life, but it is easier to remember to do it at this step. Contact the SWIMS database manager if you are having issues with associated two projects with a sample.