

Quality Assurance Project Plan

For

Level 2

Of the

Citizen Based Stream Monitoring Program

Prepared by:

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Prepared for:

U.S. Environmental Protection Agency Region V

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Level 2
Of the
Citizen Based Stream Monitoring Program

Signature / Approval Page

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Table of Contents

Title and Approval Page	Page 2
Table of Contents	Page 3
Distribution List	Page 4
Project Organization	Page 4
Project Background and Description	Page 6
Problem Definition / Background	Page 6
Project / Task Description	Page 6
Volunteer Selection and Requirements	Page 8
Training Requirements	Page 8
Documentation and Records	Page 9
Sampling Site Selection and Documentation	Page 9
Monitoring Process Design, Methods and Protocols	Page 10
Quality Control Requirements	Page 11
Equipment Testing, Maintenance and Use Protocols	Page 12
Instrument Calibration and Frequency	Page 12
Inspection / Acceptance Requirement for Supplies	Page 12
Data Management	Page 13
Assessment and Response Actions	Page 13
Reports	Page 13
Data Review, Validation and Verification Requirements	Page 13
Validation and Verification Methods	Page 13
Reconciliation with Data Quality Objectives	Page 14
Appendices	Page 15

Appendix A: Volunteer Standard Operating Procedures (i.e. Volunteer Manual)

Appendix B: Data Manager Standard Operating Procedures

Appendix C: Citizen-Based Water Monitoring Network Proposal (i.e. Appendix A of Water Resources Monitoring Strategy for Wisconsin)

Appendix D: Level 2 Program Forms

Distribution List

The following individuals will receive electronic copies of the approved Quality Assurance Project Plan (QAPP) and subsequent revisions:

WDNR Citizen Water Monitoring Sub-team Members (See page 6)
WDNR Monitoring & Management Section Chief, Greg Searle
WDNR Quality Assurance Coordinator, Barb Zellmer
WDNR Water Evaluation Section Chief, Robert Masnado
WDNR Watershed Management Bureau Director, Russ Rasmussen
WDNR Water Division Administrator, Todd Ambbs
WDNR Citizen Based Stream Monitoring Program staff (See page 6)
WDNR SWIMS File Manager for Rivers, Lisa Helmuth
US EPA Region V Quality Assurance Manager, Al Alwan

Project Organization

Level 2 of the Citizen Based Stream Monitoring (CBSM) Program is administered by the Wisconsin Department of Natural Resources (DNR), River Alliance of Wisconsin, and the University of Wisconsin-Extension. Funding is provided by a US Environmental Protection Agency (EPA) Supplemental 106 Grant via the Wisconsin DNR. Federal funding for this program totaled \$140,000 during fiscal years (FY) 2009 and 2010. During FY06 – FY08, the Level 2 program was funded through a combination of a US EPA Supplemental 106 Grant and the River Alliance of Wisconsin.

The individuals participating in the program and their specific roles and responsibilities are discussed below. In addition to the program coordinators, the program receives technical support from staff persons in the Watershed Bureau of DNR and in the Environmental Resource Center of University of Wisconsin-Extension.

CBSM Level 2 Program Coordinator

Wisconsin DNR, Madison, WI

This person shall manage the Level 2 program and oversee day-to-day program activities. Specifically, he/she will:

- Oversee the Level 2 stream monitoring program; including budgeting, providing support to volunteers, assuring data quality, and working to keep the program aligned with goals laid out in Wisconsin DNR's Water Resources Monitoring Strategy.
- Collaborate with the Volunteer Stream Monitoring Coordinator on all CBSM Program activities.
- Oversee the work of the CBSM Data Manager while working with him/her to ensure quality assurance and provide sufficient data management support to volunteers.
- Plan and provide training sessions with new and experienced volunteers.
- Work closely with citizen monitors to understand their monitoring goals, assess their skills and commitment levels, determine equipment needs, track progress, and provide appropriate levels of support.
- Report data results, quality assurance, and the use of Level 2 data to citizens, local watershed groups, and DNR biologists.
- Promote citizen based monitoring, in general, and specific activities of the CBSM Program to DNR staff, potential new volunteers, local watershed groups, and governmental agencies via outreach activities.
- Work with DNR and UW-Extension staff to assess and report progress of CBSM Program; including but not limited to quality assurance, monitoring protocols, budgeting, training, and equipment needs.

Volunteer Stream Monitoring Coordinator:

UW-Extension / WDNR, Madison, WI

This person shall manage the Citizen Based Stream Monitoring Program as well as liaison to the greater Wisconsin Water Monitoring Network. Specifically, he/she will:

- Coordinate Level 1 of the CBSM Program.
- Act as the stream monitoring program's liaison to the Wisconsin Water Monitoring Network.
- Act as liaison between Wisconsin DNR management and CBSM Program staff.
- Act as chair of DNR's Citizen Based Water Monitoring Subteam.
- Help with overall program development and long-term planning.

CBSM Data Manager:

Wisconsin DNR, Madison, WI

This person shall manage the data systems for the CBSM Program. Specifically, he/she will:

- Assist in assuring data quality.
- Oversee the support provided to volunteers for all data collection and database matters.
- Maintain the database for participating volunteers.
- Upload all continuous temperature data into the database.

Citizen Based Water Monitoring Team:

Tom Aartila, Wisconsin DNR, Park Falls, WI

Jeff Bode, Wisconsin DNR, Madison, WI

Jim Congdon, Wisconsin DNR, Horicon, WI

Steve Galarnreau, Wisconsin DNR, Plymouth, WI

Greg Searle, Wisconsin DNR, Madison, WI

Dan Hesel, Wisconsin DNR, Black River Falls, WI

Laura Herman, UW-Extension, Stevens Point, WI

Jennifer Filbert, Wisconsin DNR, Madison, WI

Cindy Koperski, Wisconsin DNR, La Crosse, WI

Lori Grant, River Alliance of Wisconsin, Madison, WI

Kris Stepenuck, UW-Extension and Wisconsin DNR, Madison, WI

Chris Clayton, River Alliance of Wisconsin and Wisconsin DNR, Madison, WI

This team is charged with developing a Citizen Water Monitoring Network.

- Provide input and decision-making to issues of program growth and development.

Project Background and Description

To help preserve and protect Wisconsin's 84,000 miles of streams and rivers, it is important to first understand how they function and then take note of their status. Only with greater amounts of data can we understand the status and trends of our water resources and take more effective action. The Citizen Based Stream Monitoring Program offers citizens multiple opportunities to be part of this process to learn about, monitor, and protect our state's rivers.

The Program includes three levels to accommodate the varied interests and time availability of citizens. Almost everyone begins their participation in the introductory, educational level, or Level 1. Afterward, citizens can choose to participate in Level 2 (status and trends) or Level 3 (research and special) projects. (Note: This document focuses on Level 2 volunteer monitoring.)

Water quality and habitat assessment are high priority activities that the DNR undertakes to document and monitor the status and trends of water resources of the state. Accomplishing this objective is an enormous task because of the magnitude of the state's water resources, limited number of staff and financial resources. Citizen monitors can assist this effort by providing not only valuable data about waters in Wisconsin but also providing an essential role in helping to protect Wisconsin's natural resources as advocates for streams.

Volunteer participation in Level 2 will provide valuable data to the DNR to supplement monitoring being conducted by DNR staff at other locations. Volunteers use DNR methods and DNR equipment to monitor streams around the state. Citizen monitors generate high quality data by carefully following DNR methods and the quality assurance procedures contained in this document. As a result, Level 2 citizen monitors enter their data directly into the DNR's database.

Goals of the Citizen Based Stream Monitoring Program include:

- Educate citizens about the status of Wisconsin's surface and groundwater resources
- Build a network of informed citizen advocates for management and protection of Wisconsin's water resources
- Obtain water resource data useful for DNR decision-making

Problem Definition / Background

The Citizen Based Stream Monitoring Program provides numerous monitoring activities and parameters for which citizens can safely and accurately monitor. See Appendix C: Citizen-Based Water Monitoring Network Proposal of the Water Resources Monitoring Strategy for Wisconsin, for a full account of problem definition and background.

This document, the Quality Assurance Project Plan, establishes a process by which volunteers can collect data which meet various quality objectives, thus making them eligible for use in the DNR.

Project / Task Description

From May 1 to September 30, trained citizen monitors will take monthly surface water quality measurements, according to the procedures included in this document. Data will be entered in DNR's water quality database (i.e. SWIMS or Surface Water Integrated Management System) and used as described below.

Data Use Goals

As stated in the Water Resources Monitoring Strategy for Wisconsin, “If citizens follow defined methodology and quality assurance procedures their data will be stored in a Department database and used in the same manner as any Department-collected data for status and trends monitoring defined in the Strategy.”

Monitoring objectives mirror the monitoring objectives laid out in the DNR’s Water Resources Monitoring Strategy for Wisconsin. Level 2 stream monitoring data may be used to:

- Characterize the stream or watershed of interest
- Provide broader spatial and temporal coverage in stream water quality
- Characterize a reference monitoring site
- Assess water quality trends
- Support decision-making by individuals and agencies other than DNR, such as in preparing County Land and Water Resource Plans
- Contribute to the following Clean Water Act Objectives:
 - Establish, review, and revise water quality standards
 - Identify impaired waters
 - Evaluate project and management (i.e. protection / restoration) effectiveness
 - Monitor water quality conditions to support TMDL development, 303d listing, and 305b reports

Level 2 stream monitors will collect the same type of data, in the same fashion as specified by DNR’s guidance for Tier 1 statewide baseline monitoring. It is understood that this arrangement will ensure sufficient type and quantity of data to inform management decisions.

Data Quality Objectives

The system described by this document will provide data for the uses listed above. This Quality Assurance Project Plan establishes proper:

- Instrument calibration
- Sampling methods
- Sampling protocol
- Documentation
- Quality control requirements
- Data review, validation, and verification requirements

All data which meet requirements will be determined to be of good, sound quality.

Water Quality Parameter, Measurement Range, and Accuracy

Parameter	Measurement Range	Accuracy	Instrument
pH	0-14	+/-0.2	Oakton Acorn pH 5
Dissolved Oxygen, concentration	0-20 mg/L	+/-0.3 or +/-2% of reading, whichever is greater	YSI 550A
Dissolved Oxygen, percent saturation	0-200%	+/-2% of air saturation or +/-2% of reading, whichever is greater	YSI 550A
Temperature	-5 to +45 °C	+/-0.3 °C	YSI 550A
Temperature	-20 to +30 °C	+/-0.2 °C over 0-30 °C	Onset Corp. TidbiT v2 or HOBO Water Temp Pro v2
Transparency	0-120 cm	NA	Transparency tube

Data Representativeness

Data representativeness is achieved by carefully selecting sampling locations and using standardized sampling protocols. During training, Level 2 volunteers are instructed to select in-stream monitoring stations in well mixed water, thus ensuring that samples collected are representative of the water body.

Comparability

Level 2 volunteers use the same standardized methods as DNR staff to ensure that data collected by these two entities can be compared.

Completeness

CBSM staff requires that each monitoring site be sampled monthly from May through September. Some volunteers choose monitor more frequently. The number of monitoring sites assigned to each individual or monitoring team is left to them to determine.

Volunteer Selection and Requirements

Volunteer Qualifications

- Must have one season of monitoring experience (e.g. with Water Action Volunteers).
- No science background is needed, training will be provided to those who are interested and able to meet the defined responsibilities.
- Ability to walk along river banks and enter the water to access a monitoring site.
- Enjoyment of the outdoors.

Volunteer Monitor Responsibilities

Volunteers who are new participants of the program must:

- Attend a 4-6 hour training session in its entirety each spring (usually a Saturday in April or May). Trainings will have both field and classroom components. Trainings will, whenever possible, be held locally to the groups that are participating. In some instances, volunteers may need to travel a significant distance to attend a training session.
- Collect dissolved oxygen, air and water temperature, pH and transparency on a monthly basis between May and September using WDNR methods (including calibration of equipment and proper record keeping of those processes).
- Adhere to a predetermined monitoring schedule.
- Share equipment (that is provided free of charge) with other participating groups, including driving to exchange equipment.
- Enter the data to an online database after each site visit and mail completed data sheets to the Level 2 Program Coordinator in a timely fashion.
- Return equipment to the Level 2 Coordinator in the fall for maintenance or if you stop participating in the program.

Training Requirements

All volunteers are required to complete a training session which typically occurs during a one-day workshop hosted by the Level 2 Program Coordinator and, when applicable, the lead contact for a monitoring group (e.g. watershed organization, university, nature center, etc.). This training provides

sufficient information for volunteers to follow DNR stream monitoring methods and protocols to complete monthly monitoring over one field season. Since Level 2 volunteers come into the program with a basic understanding of and some experience with monitoring, training sessions reinforce knowledge in stream ecology, monitoring procedures, data documentation, and data reporting. Trainings include both classroom and field components which provide a setting to achieve the following tasks:

- Introduce volunteers to the CBSM Program and explain the purpose of the Level 2 program
- Communicate the data use goals and data quality objectives
- Provide information on basic stream ecology and then explain the “why” behind the program’s water quality parameters
- Summarize and interpret data collected by citizens during previous years
- Review the Volunteer Manual
- Explain the use of the SWIMS (i.e. Surface Water Integrated Monitoring Systems) database
- Calibrate meters
- Teach DNR monitoring methods in the field, having the volunteers monitor and collect data in small groups
- Review the results, answer any questions, and thank them for volunteering

Training sessions may provide more in-depth coverage on any one of these tasks, depending on the group’s interests and previous experience with stream monitoring. Training sessions conducted with experienced Level 2 volunteers may be pared down to focus on aspects of the training that most suit their needs, while still providing the basic requirements needed to ensure collection of high quality data. Additional instruction will target volunteers with less monitoring experience or volunteers who request first-time assistance for side-by-side sampling (see section on Assessment and Response Actions).

Train the Trainer

Regional trainers receive additional training so that they may be entrusted with the primary responsibility of training new Level 2 volunteers. Guidelines for the “train the trainer” model will include:

- Only those trainers trained by the Level 2 Program Coordinator can train new volunteers.
- Regional trainers will notify the Program Coordinator of trainings and gather all necessary information described in the Documentation and Records section of this document.
- Only those volunteers who complete an official training session will be allowed to enter data into SWIMS.
- Regional trainers will conduct side-by-side sampling with first and second year volunteers. (See the section on Side-by-Side Sampling on page 12.)

Documentation and Records

During the training session, Level 2 volunteers fill out a form which includes contact information, a photo release statement, and a liability waiver. Each year, location descriptions for each new monitoring station will be sent to the Level 2 Data Manager before the start of the monitoring season (i.e. May 1).

Level 2 volunteers are instructed to complete one data sheet per monitoring event at each station. The format of the data sheet mirrors the organization of data forms in the DNR’s SWIMS database. When volunteers complete their monitoring, they submit data to the password-protected, internet-accessible database. Only trained volunteers are given permission to submit data to SWIMS. Volunteers are also instructed to complete three other forms. Two forms document the calibration of monitoring instruments: 1) pH Meter Calibration Log and 2) DO Meter Calibration Log. In addition, the Thermistor Log, documents the date and time of temperature logger deployments and retrievals. Volunteers retain paper copies of these forms for their records and send either hard copies or electronic copies of the forms to the Program Coordinator at the end of each sampling season.

All documents are kept on file at the DNR. Data sheets can be discarded after it is confirmed that the data has been entered correctly. (See QC Requirements: Database Reports on page 12.)

Sampling Site Selection and Documentation

Data use is considered prior to selection of sample stations. Volunteers are free to choose stream sites they wish to monitor. However, volunteers are asked to consider requests made by DNR biologists, county staff, or other agency staff persons. Data collected at locations suggested by natural resource managers should be useful to the DNR and/or other agencies.

Where agency staff persons might choose to have volunteers monitor depends on both short-term and long-term monitoring goals. Sometimes, long-term (8-10 years) data collecting at set locations will be most useful to ongoing work, and in other cases, biologists will request that the volunteer change locations frequently to complement short-term (1-3 years) studies.

Prior to sample collection, volunteers are asked to provide the geographic information necessary to allow the Data Manager to assign a monitoring station ID in the database. Volunteers can contact the Data Manager directly or can send the required information using the following online form: <http://dnr.wi.gov/org/water/fhp/storet/requestnew.asp>

Monitoring Process Design, Methods and Protocols

Level 2 Sampling Plan

The Level 2 stream monitoring sampling plan is consistent with statewide baseline monitoring guidelines laid out in the DNR's Water Resources Monitoring Strategy for Wisconsin.

- DNR or county staff recommends sites that could be useful to have monitored based on needs to acquire status or trends information, or other types of monitoring that is priority.
- Volunteers are asked to monitor, at least, from May through September (preferably between 10 AM and 2 PM, but other times are ok).
- Volunteers choose primary (P) and secondary (S) sampling dates in advance and note on their data sheets on which of those dates they monitored.
- Volunteers are asked to sample on the primary date unless there are safety concerns about being at the stream site (e.g., tornado, lightning, dangerously high flows) or a family emergency.
- The goal is to monitor at the same time each month, preferably 30 days apart from the last monitoring visit.
- Volunteers are instructed to enter data by the end of each month.
- The Data Manager is responsible for answering questions volunteers have about entering data into the database. DNR liaisons will direct questions they or the volunteers have to the Program Coordinator.
- At the end of each monitoring season, all data are entered into the database by October 1.
- Citizens will return their equipment to the Program Coordinator at the end of each season. (Some equipment is made available to volunteers from October through April. Inquiries from volunteers should be dealt with by the Program Coordinator on a case-by-case basis.)

Water Quality Parameters

The sampling of all water quality parameters will conform to accepted DNR methodology using equipment approved by the Citizen Based Water Monitoring Subteam, unless equivalent and pre-approved monitoring instruments are provided by other means.

Level 2 volunteers collect information for the following parameters:

- Dissolved oxygen (concentration)
- Dissolved oxygen (saturation)
- Transparency
- Temperature (instantaneous and continuous measurements)
- pH

Equipment

After completing the training session, volunteers are provided a set of Level 2 monitoring equipment.

One monitoring kit includes the following:

- YSI 550A dissolved oxygen meter
- Oakton Acorn 5 pH meter
- pH 7 & 10 buffer solutions
- Extra pH storage solution
- Bottle for distilled water
- 120 centimeter transparency tube
- Temperature logger (specifically, Onset Corporation's Tidbit v2 Temp Logger or HOBO Water Temp Pro v2)

Establishing Use of Additional Water Quality Parameters and Use of Sampling Methods

The Program Coordinator should be fully aware of the monitoring activities of the DNR's Watershed Bureau to identify further opportunities for the use of Level 2 stream monitoring data. The addition of new water quality parameters to the Level 2 program must be approved by the Citizen Based Water Monitoring Subteam.

Sampling methods for use by volunteers were developed by the Subteam from existing DNR sampling methods for statewide baseline monitoring¹. The Program Coordinator will work with the Subteam to finalize any additional sampling methods proposed for use by volunteers.

Level 2 Sampling Methods

Volunteers sample all parameters at each monitoring station. During the training, volunteers are instructed not to sample any parameter in water that has been disturbed while sampling other parameters. Level 2 sampling methods can be found in Appendix A: The Volunteer Manual.

Sampling Protocol

Volunteers are instructed to calibrate instruments prior to each monitoring event, to follow all methods while monitoring, and to complete all required documentation. They are provided expected data ranges in the volunteer manual. If data results fall outside expected ranges, then volunteers are instructed to go through the following process:

1. Repeat the sampling process
2. If data results are still outside expected ranges, recalibrate and repeat the sampling process

¹ Sources include: Guidelines and Standard Procedures for Continuous Temperature Monitoring, Version 1; May 2006. Water Resources Monitoring Strategy for Wisconsin, Version 1: 2-4-2005.

3. If data results are still outside expected ranges, record value and potential reasons for the extreme value (for example, any changes in water color, odor, or adjacent land use) and call the Program Coordinator and/or local DNR stream biologist. A listing of local biologists is available at: <http://watermonitoring.uwex.edu/ctymap/index.html>

Quality Control Requirements

Addressing Abnormal Results

Water quality monitoring results are influenced by multiple factors that can challenge the volunteer's understanding of stream systems and water quality measurements. During the training session, volunteers are instructed on applicable water quality criteria and provided information on expected data ranges. Therefore, if volunteers observe and record values falling outside expected ranges or exceeding statewide water quality criteria, then they are instructed to follow the Sampling Protocol, as listed in the preceding section.

Volunteers are encouraged to keep the following concepts in mind when monitoring:

- Dissolved oxygen, temperature, and pH all fluctuate seasonally and diurnally.
- Some water quality parameters – transparency and dissolved oxygen especially – can vary significantly following rain events.
- Several factors can lead to abnormal results. It is the volunteer's responsibility to rule out factors such as calibration and instrument errors. Once volunteers rule out calibration and instrument errors, the Program Coordinator and DNR staff can then assist in determining whether abnormal results are due to physical, chemical, and/or biological factors in-stream.

Side-by-Side Sampling

The Program Coordinator or other designated staff visits each first or second-year volunteer citizen monitor in the field to conduct side-by-side sampling. (Note: As the program has grown, this task has taken a significant amount of the Program Coordinator's time each summer. It is suggested that a "train the trainer" model be implemented to help complete trainings and visits with volunteers. For more information on train the trainer, see the section on "Train the Trainer" on page 9.) During this visit, the Program Coordinator samples dissolved oxygen and pH, using his/her own meter, alongside the volunteer. The purpose of side-by-side sampling is to check that volunteers are properly calibrating meters and following methods.

The Program Coordinator will keep annual records on the results of side-by-side sampling and report the results to the Citizen Based Water Monitoring Subteam. All data collected by staff during side-by-side sampling will be entered into the database.

Database Reports

The Data Manager will run database queries to evaluate the quality of data entered into the database and follow-up with volunteers to address anomalies that are identified, where necessary. Queries will be run monthly to check that data is being entered in a timely fashion and to check for outliers. Volunteers who have entered data outside of expected data ranges will be contacted immediately to check the accuracy of the data. At the end of each monitoring season, the data manager will check all data again for completeness and outliers. Once checks on the data are completed and errors are identified, the Data Manager will leave comments in the fieldwork, project, or person's file in SWIMS, depending on the issue. Data sheets can be discarded after it is confirmed that the data has been entered correctly. (See Appendix B of this document for more details on running database queries.)

Equipment Testing, Maintenance and Use Protocols

For a complete description of equipment testing, maintenance, and use protocols, see the official operations manuals for each of the following instruments:

- YSI 550A dissolved oxygen meter
- Oakton Acorn 5 pH meter
- Temperature logger (specifically, Onset Corporation's Tidbit v2 Temp Logger or HOBO Water Temp Pro v2)

Equipment is collected from volunteers each fall so that the program coordinator can perform routine maintenance over the winter. During this time, each set of equipment should be inspected so that necessary repairs and purchases can be made prior to the start of the new season.

Instrument Calibration and Frequency

Volunteers calibrate all instruments at the beginning of each monitoring day, prior to sampling. Therefore, all instruments are calibrated monthly, and many cases more frequently, depending on how many people share each set of equipment. Forms are provided to each volunteer to record specific calibration details for each meter. Volunteers return the calibration forms, along with the equipment, at the end of the season. Directions for Level 2 instrument calibrations can be found in Appendix A: The Volunteer Manual.

Inspection / Acceptance Requirement for Supplies

All equipment and supplies are delivered to volunteers in good working order. Prior to use, all equipment and supplies are inspected and, if applicable, calibrated.

Data Management

All data management responsibilities ultimately fall to the program's Data Manager. Data management will occur in a manner that facilitates the collection and storage of quality data by citizens in SWIMS, the DNR's database. Also, data management activities will contribute to the interpretation and understanding of data by Level 2 volunteers via products such as the automated data report (in SWIMS), seasonal temperature graphs, and presentations on data interpretation given to monitoring groups statewide. (See Appendix B of this document for a detailed description of data management activities.)

Assessment and Response Actions

Level 2 training participants will have the opportunity to evaluate their training session and the program, as a whole. Annual results of completed evaluations will be reported to the Citizen Based Water Monitoring Subteam so that appropriate actions can be taken to revise and/or further develop support given to volunteer stream monitors.

Reports

The DNR's SWIMS database automatically generates both individual monitoring station and regional data summary reports. Statistical analyses of sample size, maximum, minimum, and median values are done any time a report is generated. This assures that all data reports (regardless of the time of year they are run) include the most up-to-date information.

Volunteers are provided instructions to produce individual monitoring station reports, and annually, following the monitoring season, automated regional data summary reports are produced and posted on both Wisconsin's Citizen Based Water Monitoring Network² and DNR's³ websites. Each year, volunteers, DNR biologists, members of the Citizen Based Water Monitoring Subteam, and statewide watershed organization members are notified of the location of the data summary reports.

Data Review, Validation and Verification Requirements

Data collected by Level 2 volunteers are reviewed by Citizen Based Stream Monitoring Program staff to determine if the data meet the QAPP data quality objectives and data use goals (see pages 6-8). If particular volunteers do not meet the expectations laid out in the program, then it is left to the discretion of the Program Coordinator and other program staff to consider further training for the volunteer or to ask that the volunteer continue to monitor under the Level 1 program. This document establishes basic requirements regarding instrument calibration, sampling methods and protocol, documentation, and side-by-side sampling. If those requirements are not met by a volunteer, a decision can be made to reject their data. Decisions to reject or qualify data are made by the Level 2 Data Manager, Level 2 Program Coordinator, and the SWIMS File Manager for Rivers.

Validation and Verification Methods

Volunteers who obtain monitoring results outside the normal range of values are instructed to follow Sampling Protocol as stated in the: 1) Monitoring Process Design, Methods and Protocols (pages 10-11), and 2) Quality Control Requirements (page 12) sections of this document. Level 2 volunteers are instructed to double check their data before submitting it to the online SWIMS database. After data are entered into the database, the Data Manager looks for data completeness and outlying values by running queries on the data and searching for outliers. (See Appendix B for instructions on running queries on the data.)

Reconciliation with Data Quality Objectives

Data that do not meet quality objectives outlined in the Data Quality Objectives section of this document will be flagged in the database by the Data Manager or Program Coordinator. If extreme problems present themselves in regards to the data entries of an individual or group, then the Data Manager and Program Coordinator, together, maintain the discretion to recommend discarding egregious data. Recommendations of this type must be made to the SWIMS File Manager for Rivers. If the failure to meet quality objectives is due to equipment malfunctions, then the equipment will be replaced and repaired immediately. If the failure to meet the quality objectives is due to volunteer error, then the volunteer can be retrained prior to his/her next sampling date.

² <http://watermonitoring.uwex.edu/level2/level2reports.html>

³ <http://dnr.wi.gov/org/water/swims/cbsm/reportsanddata/index.htm>

Appendices

Appendix A: Volunteer Manual (see additional document)

Appendix B: Data Management Standard Operating Procedures (SOP)

Appendix C: Citizen-Based Water Monitoring Network Proposal (i.e. Appendix A of Water Resources Monitoring Strategy for Wisconsin)

Appendix D: Level 2 Program Forms (see additional documents)

Appendix B:

**CBSM Data Manager Standard Operating Procedure Manual
2009 Field Season (8/4/2009)**

CBSM Data Manager Standard Operating Procedure Manual	16
2009 Field Season (8/4/2009)	16
1. Gain Access (Log In) to SWIMS.....	17
2. Find Existing Monitoring Station before Establishing New Station.	18
3. Surface Water Data Viewer Interactive Map Application	18
4. Establish New SWIMS Monitoring Station	19
5. Edit Existing CBSM Project in SWIMS	20
6. Add One or More Projects to an existing Volunteer.....	21
7. Create New CBSM Project.....	21
7.4.14. Configure Newly Created CBSM Project	22
8. Add One or More People to an existing CBSM Project.....	22
9. Edit Existing CBSM Volunteer Information	22
10. Add New CBSM Volunteers	23
11. Troubleshoot Volunteer Data Entry Problems.....	24
11.1. Make sure that the volunteer exists and is set up correctly in SWIMS	25
11.2. Check that the project is setup correctly in SWIMS.....	25
12. Enter Trainer (Coordinator) QA CHECK data in SWIMS	25
13. Upload Thermistor Data into SWIMS	26
14. Run QA Queries to find known issues with volunteer data	26

1. Gain Access (Log In) to SWIMS

It is necessary to log in to the **Surface Water Integrated Monitoring System (SWIMS)** database application to perform most of the data management tasks related to Citizen Based Stream Monitoring. You will need a **SWIMS** User ID and Password combination to login. Your supervisor will be able to get this information for you and set up your account so that you have the necessary permissions to perform edits and create new users, monitoring stations, and CBSM projects.

1.1. Get Oracle User ID and Password

Request the following from your Supervisor and/or IT department.

1.1.1. Oracle User ID: _____

1.1.2. Password: _____

1.2. Install Embedded Locator Tool (ELT)

The Embedded Locator Tool (ELT) is required to be able to create new Monitoring Stations in SWIMS. Contact current SWIMS support personnel (currently Lisa Helmuth lisa.helmuth@wisconsin.gov or Jennifer Filbert Jennifer.filbert@wisconsin.gov) to get this tool installed if you have trouble creating new stations in SWIMS.

1.3. Get a SWIMS Account

Ask a **SWIMS** data manager to create a **SWIMS** account for you. Make sure that your Oracle User ID is entered in the Authenticated User ID field.

1.4. Add Data Management Roles to SWIMS user account.

Ask your supervisor or other data manager to add the following roles to your **SWIMS** user account.

1.4.1. APP_SWIMS_DATA_MANAGER

1.4.2. APP_SWIMS_IP_EDIT

1.4.3. APP_SWIMS_ELT_EDIT

1.4.4. APP_SWIMS_PROJECT_COORD

1.4.5. APP_SWIMS_DNR_STAFF

1.4.6. APP_SWIMS_EXTERNAL_EDIT (all CBSM volunteers have this)

1.5. Sign In to SWIMS

1.5.1. Start Internet Explorer (Firefox also works)

1.5.2. Navigate to DNR Intranet Site: <http://intranet.dnr.state.wi.us/>

1.5.3. Click **DNR Tasks**

1.5.4. Click **Next** to see the next list of links.

1.5.5. Click the **SWIMS** link to get to **SWIMS** Log In screen.

1.5.6. Enter your Oracle User ID and the corresponding password in the form fields.

1.5.7. Click the **Sign In** button.

2. Find Existing Monitoring Station before Establishing New Station.

Each CBSM monitoring location is known in **SWIMS** as a monitoring station. Each monitoring station has been assigned to a CBSM Project to allow people, methods, forms, etc to be linked with this station.

There are many stream monitoring stations already established for many different purposes all across the state of Wisconsin. It is important to search for an existing station before establishing a new station for citizen based monitoring. For example, there may be a station already established in **SWIMS** for a fisheries or other type of program. If the monitoring is performed at the same location along the stream, then only one monitoring station record is needed and desired. Remember or record the Station ID number on a piece of scratch paper once you find the station you are seeking. Searching for the Station ID number is the easiest way to find the station again.

3. Open the Surface Water Data Viewer Interactive Map Application

The Surface Water Data Viewer (SWDV) is an interactive map of the state of Wisconsin that can be used to find many types of monitoring stations or other DNR work across the state. Use the Surface Water Data Viewer application to view existing stations on Wisconsin waterways and to find the precise location and any data available at that monitoring station.

3.1. Open the **SWDV**

3.1.1. from DNR Intranet Site: <http://intranet.dnr.state.wi.us/>

3.1.1.1. Click the **DNR Tasks** link

3.1.1.2. Click on the **WT Webviewer** link

3.1.2. from **SWIMS**

3.1.2.1. Click on the REPORTS, MAPS, DOCUMENTS tab

3.1.2.2. Click on the **Intranet-Surface Water Data Viewer** link.

3.2. View location of the monitoring site.

To view the location of existing monitoring stations, it is necessary to zoom in to a scale of at least 1:450000 and turn on the layer that shows **SWIMS Station Points**. Click the **Layers** link and click the **Monitoring Stations & Data** icon, and then select **SWIMS Station Points** to turn on this layer. Results are best at 1:10000.

There are several ways to find an existing monitoring station depending upon what you know about the monitoring location.

3.2.1. Use Latitude and Longitude

Use this technique when you know the latitude and longitude of the monitoring station.

3.2.1.1. Click Find Location link

3.2.1.2. Click Latitude/Longitude Coordinate (DMS or DD)

3.2.1.3. Enter the Latitude and Longitude

3.2.1.4. Click OK

3.2.2. Use Zoom In tool

Use this technique when you have actually been to the monitoring site and know exactly where it is based on a map of the available roadways across the state.

3.2.2.1. Click Zoom In button.

3.2.2.2. Click and drag to create a rectangle around the location

3.2.2.3. Repeat previous step until sufficiently zoomed in to 1:10000 or better.

3.2.3. Find by Stream Name

Use this technique when you don't know where in Wisconsin the stream is located.

3.2.3.1. Click Find Location link

3.2.3.2. Click Waterbody and County link

3.2.3.3. Click Rivers and Streams

3.2.3.4. If possible, enter the county

3.2.3.5. Enter the stream name

3.2.3.6. Click Go!

3.2.3.7. Select the desired stream from the results

3.2.3.8. Zoom In until scale is 1:10000 or less.

3.3. Turn on Monitoring Station Layer

3.3.1. Click Layers

3.3.2. Expand folder named: Standards, Monitoring & Assessment Data

3.3.3. Expand folder named: Monitoring Stations and Data

3.3.4. Check box next to SWIMS Station Points

3.4. Identify all nearby stations and determine usability for CBSM

3.4.1. Click Identify button

3.4.2. Click the icon for any stations near the monitoring site.

3.4.3. If the station identified is a match

3.4.3.1. Record the Station ID

3.4.3.2. Record the Station Name

3.4.4. If there is no station nearby

3.4.4.1. Record the Latitude

3.4.4.2. Record the Longitude

3.4.4.3. Complete the steps to Establish a New Monitoring Station

4. Establish New SWIMS Monitoring Station

If there is no suitable monitoring station (see previous step) at the monitoring location, then it is necessary to create a new monitoring station in the SWIMS database. You will need the exact

location (latitude and longitude are most helpful) to be able to complete the creation of a new monitoring station.

- 4.1. Get Latitude and Longitude from volunteer or SWDV (see above). Volunteer should request to register a new monitoring station by going to:
<http://dnr.wi.gov/org/water/fhp/stroet/requestnew.asp>
- 4.2. Log In to SWIMS
- 4.3. Click the Stations Tab
- 4.4. Click Establish New Monitoring Station
- 4.5. Click YES to accept that there is a risk to running ActiveX scripts.
- 4.6. Enter Station Name
- 4.7. Name the station with the Stream Name and directions from nearest road. For example, Searles Creek at Park Rd. (Use abbreviations like, Rd, Ln, Dr, Ave, St, CTH A, STH 13, I-94, etc.)
- 4.8. Set Station Type: **Rivers/Streams**
- 4.9. Use Quick Find to identify the person requesting this station. Choose the organizations contact person in most cases.
- 4.10. Choose Format (DD or DMS for finding location)
- 4.11. Click the checkbox for the "Snap" field.
- 4.12. Click Create Point
- 4.13. Confirm location on the map
- 4.14. Click Save Point
- 4.15. Click Save Feature
- 4.16. Click Yes to complete ActiveX script
- 4.17. Record the Station ID number and Name on scratch paper for future reference when creating the CBSM Project record.

5. Edit Existing CBSM Project in SWIMS

- 5.1. Log In to SWIMS
- 5.2. Click the Manage Data Tab
- 5.3. Click the Projects link
- 5.4. Enter a portion of the Project Name (i.e. Token) or Project ID (i.e. CBSM-133427)
- 5.5. Click Submit
- 5.6. Confirm the Edit Project screen information
 - 5.6.1. Project Name: (Token Creek – At Portage Rd)
 - 5.6.2. Project ID: (CBSM-133427)
 - 5.6.3. Project Type: (Targeted Monitoring)
 - 5.6.4. Project Subtype: (Volunteer Monitoring)
 - 5.6.5. Project Status: (Active)
 - 5.6.6. Status Date: enter current date
 - 5.6.7. Start Date: enter date that project was first used in CBSM Level 2

- 5.6.8. End Date: (12/31/2099)
 - 5.6.9. DNR Staff Implement Flag: (N)
 - 5.6.10. Volunteer Implement Flag: (Y)
 - 5.6.11. Comments: Any special comments about the need or use of this site
- 5.7. Click Save. Note: The Save and Return button only saves (doesn't return anywhere).

6. Add One or More Projects to an existing Volunteer

A good first task for the CBSM data manager is to add each of the CBSM region project records: (CBSM_NER, CBSM_NOR, CBSM_SCR, CBSM_SER, CBSM_WCR) to their person record. This will allow you to easily find each region and then add new sub projects to each of the regions as needed.

- 6.1. Log In to SWIMS
- 6.2. Click the Manage Data Tab
- 6.3. Click the People link
- 6.4. Click edit (pencil) icon next to your name
- 6.5. Check your contact information and correct as necessary,
- 6.6. Click Save to save any changes you made
- 6.7. For each project that needs to be added to this person's record:
 - 6.7.1. Click the Add Project (paper) icon in the Projects section
 - 6.7.2. Click the Search Projects button to open up the project search screen
 - 6.7.3. Type the Project ID (CBSM_NER, CBSM_NOR, CBSM_SER, CBSM_SCR, CBSM_WCR)
Search for desired projects using whichever criteria you know to find the project.
 - 6.7.4. Click Submit
 - 6.7.5. Click the white arrow to return and set the Project Seq No field
 - 6.7.6. Select Role: (DATA_ENTRY or TEAM_MEMBER usually)
 - 6.7.7. Select Status: (ACTIVE)
 - 6.7.8. Enter Start Date: current date or earlier (if person has been on the project)
 - 6.7.9. Click Save and Return.

7. Create New CBSM Project

- 7.1. Log In to SWIMS
- 7.2. Click the My Projects Tab
- 7.3. Click the Edit Projects link for the CBSM region that needs a new project
- 7.4. For each new project (in this region)
 - 7.4.1. Click the Add Link (paper) in the Child Projects section
 - 7.4.2. Enter the Project Name: (Searles Creek – At Park Rd)
 - 7.4.3. Enter the Project ID: (CBSM-10009048)
 - 7.4.4. Enter the Project Type: (Targeted Monitoring) or (Baseline Monitoring)
 - 7.4.5. Enter the Project Subtype: (Volunteer Monitoring)

- 7.4.6. Enter the Project Status: (ACTIVE)
- 7.4.7. Enter the Status Date: current date
- 7.4.8. Enter the Start Date: date the project started
- 7.4.9. Enter the End Date: leave blank
- 7.4.10. Enter the DNR Staff Implement Flag: (N)
- 7.4.11. Enter the Volunteer Implement Flag: (Y)
- 7.4.12. Enter and Comments that may be useful to other SWIMS users
- 7.4.13. Click Save and Return

7.4.14. Configure Newly Created CBSM Project

- 7.4.14.1. Click the edit (pencil) icon to edit the newly created project. Once that is done, you can add components to the project by clicking the paper icon in the upper corner of each section (i.e. people, stations, methods, forms).
- 7.4.14.2. Add One or More People.
- 7.4.14.3. Add the Station to the project.
- 7.4.14.4. Add the CBSM_PP_FIELD_METHODS to the Methods section.
- 7.4.14.5. Add the VOL_RIVER form to the Forms section.

8. Add One or More People to an existing CBSM Project

- 8.1. Log In to SWIMS
- 8.2. Click the Manage Data Tab
- 8.3. Click the Projects link
- 8.4. Enter Project Name (i.e. Token) or Project ID (i.e. CBSM-133427)
- 8.5. Click Submit
- 8.6. Click the edit (pencil) icon to edit the desired project.
- 8.7. For each team member on this project
 - 8.7.1. Click the Add Link in the People section
 - 8.7.2. Type the Last name in the Quick Find by Name field
 - 8.7.3. Select from the Quick Find list
 - 8.7.4. Select the Role: (TEAM_MEMBER, LEAD_EQUIPMENT, PROJECT_LEAD, DATA_ENTRY)
 - 8.7.5. Select the Status: (ACTIVE)
 - 8.7.6. Enter the Start Date: current date or earlier
 - 8.7.7. Enter the Comments: if any
 - 8.7.8. Click Save and Return

9. Edit Existing CBSM Volunteer Information

- 9.1. Log In to SWIMS
- 9.2. Click the Manage Data Tab
- 9.3. Click the People link

- 9.4. Enter the volunteer's last name.
- 9.5. [If more than one volunteer with that last name] Enter the volunteer's first name.
- 9.6. Click the Submit button.
- 9.7. Click edit (pencil) icon next to the volunteer's name
- 9.8. Check each of the following items (if that person is entering data in SWIMS)
 - 9.8.1. Authenticated User ID
 - 9.8.2. Role: APP_SWIMS_EXTERNAL_EDIT
 - 9.8.3. List of projects that are linked with the volunteer.
- 9.9. Click the Add Link (paper) in any section to add an item in that section
- 9.10. Click the remove (trash can) next to any item that must be removed
- 9.11. Click Save and Return

10. Add New CBSM Volunteers

- 10.1. Log In to SWIMS
- 10.2. Click the Manage Data Tab
- 10.3. Click the People link
- 10.4. Click the Add link
- 10.5. Enter the volunteer's information for each of these fields in the left column.
 - 10.5.1. Last Name
 - 10.5.2. First Name
 - 10.5.3. Select ACTIVE Status Code
 - 10.5.4. Organization Name
 - 10.5.5. Primary Email
 - 10.5.6. Authenticated User ID.
Enter the volunteer's WAMS ID here in ALL CAPS if available. If the volunteer does not have a WAMS ID, they will not be able to enter data in SWIMS. They will, however, be able to be selected as data collectors on data entered by other volunteers.
- 10.6. Add the following items to each section in the rest of the screen.
 - Click the Add Link (paper) in any section to add an item in that section
 - Click the remove (trash can) next to any item that must be removed
 - 10.6.1. Add one or more Addresses
 - 10.6.2. Add one or more Contact Phone Numbers
 - 10.6.3. Add any existing projects that this volunteer will be monitoring.
If the projects have not yet been created, you will need to add this volunteer to those projects when you create them.
 - 10.6.4. Add the SWIMS edit role(s) for the volunteer
 - 10.6.4.1. Select APPLICATION in the Role Categories field

- 10.6.4.2. Select APP_SWIMS_EXTERNAL_EDIT in the Available Roles field
- 10.6.4.3. Click ADD to add this role for this volunteer.
- 10.6.5. Add any available training information.
 - 10.6.5.1. Enter the date of the training
 - 10.6.5.2. Select “In person hands on training” in the Method Code field.
 - 10.6.5.3. Select “Rivers Volunteer Program”
 - 10.6.5.4. Select “TRAINING – CBSM_CERTIFICATION”, “TRAINING – CBSM_ORIENTATION” or “TRAINING – CBSM_TRAINING” as appropriate for this volunteer’s CBSM training.
(Note: If volunteer has completed a full training and been deemed ready to monitor, then use TRAINING – CBSM_CERTIFICATION. If a volunteer has completed only part of a training session or attended a training session for a second time, then use TRAINING – CBSM_TRAINING. If a volunteer was present at an orientation session, then use TRAINING – CBSM_ORIENTATION.)
- 10.6.6. Click the Save and Return button.
Do not click the “Check Name” button! This will attempt to create an additional volunteer record and will produce a “Unique” error.
- 10.7. Click Save and Return

11. Troubleshoot Volunteer Data Entry Problems

See DSOP Troubleshoot Guide document. Most data entry problems stem from one or more pieces connecting volunteers to projects being entered in error or missing altogether.

11.1. Make sure that the volunteer exists and is set up correctly in SWIMS

- 11.1.1. The WAMS ID must be entered in the Authenticated User ID field.
- 11.1.2. The APP_SWIMS_EXTERNAL_EDIT role must be in the Roles section.
- 11.1.3. The status code must be ACTIVE.
- 11.1.4. The desired Project(s) must be listed in the Project section
- 11.1.5. Each Project must be ACTIVE for this volunteer
 - 11.1.5.1. Click the Edit icon (pencil) for the project
 - 11.1.5.2. Confirm that ACTIVE is selected
 - 11.1.5.3. Click Save and Return.

11.2. Check that the project is setup correctly in SWIMS

Click the "Project Name" to go to the Project Edit screen

- 11.2.1. Check each of these settings
 - 11.2.1.1. The Project's Status must be ACTIVE
 - 11.2.1.2. The Volunteer's Status on that project must be ACTIVE
 - 11.2.1.3. The Project's Start Date must be in the past
 - 11.2.1.4. The Project's End Date must be in the future
- 11.2.2. The Correct Station must be listed in the Stations section
 - Add the correct station (and remove any incorrect stations) from this section.
- 11.2.3. CBSM_PP_FIELD_METHODS in the Methods section.
 - Add the CBSM_PP_FIELD_METHODS method to the Methods section if it not listed.
- 11.2.4. VOL_RIVER in the Forms section.
 - Add the VOL_RIVER form to the Forms section if it not listed.

12. Enter Trainer (Coordinator) QA CHECK data in SWIMS

Currently, the CBSM Coordinator schedules a time to meet with teams and sample the same parameters as the project team. This QA check (also known as side-by-side sampling) should be done for all first-year volunteers; plus with enough experienced volunteers to have a QA check done on at least 10% of all volunteers. This is a duplicate sample but will be distinguished from the DUP_SAMPLE that the Lakes volunteer program uses because the sample is being performed by the coordinator or other more skilled person.

Currently, we mark the Sample Field No field for the fieldwork event that is created as **QA CHECK**. Eventually, there will be a drop down box that can be marked to indicate the type of fieldwork sample.

- 12.1. Login to SWIMS
- 12.2. Click *Submit Data*
- 12.3. Click *Add New*
- 12.4. Find the desired project
 - 12.4.1. Click the **Search All Projects** Icon (binoculars after Project field)

- 12.4.2. Type the search criteria for your project (e.g. Project Name, Station ID)
- 12.4.3. Use either the Project ID or Project Name field to find the project for this data. It is best if you know the station number. For example, enter CBSM-133427 in the Project ID field to find the Token Creek – At Portage Road project. Or, enter 'Token Creek' in the Name field to find the same project.
- 12.4.4. Click the **Submit** button to complete the search
- 12.4.5. Click the **Select And Return** icon (white left arrow) to choose the correct project from the search results.
- 12.5. Confirm that the desired project is listed on the right side of the screen in the **Selected Project** and **Selected Station** fields.
- 12.6. Enter the trainer's name in the Data Collector field.
 - 12.6.1. Click the **Search All Projects** Icon (binoculars after Project field).
 - 12.6.2. Click Show All People button.
 - 12.6.3. Click the letter of the last name of the person who completed the QA check to limit the list to of volunteers
 - 12.6.4. Select the name of the person who did the QA check from the Collectors list
 - 12.6.5. Click Add to add this person to the group
 - 12.6.6. Click Submit to select this group and return to the field work screen.
- 12.7. Enter the date the sample was taken in the Start Date field.
- 12.8. Enter the time (and AM or PM) that the samples were taken.
- 12.9. Enter QA CHECK and the list of volunteers checked at this site/date/time in the Comments field.
- 12.10. Click Next.
- 12.11. Complete the Parameter Results screen
 - 12.11.1. Enter *OTHER* for the **Primary/Safety/Other date**.
 - 12.11.2. Enter the **H2O Temp (°C)**
 - 12.11.3. Enter the **Dissolved Oxygen (mg/L)**
 - 12.11.4. Enter the **% Saturation**
 - 12.11.5. Enter the **pH**
 - 12.11.6. [optional] Enter **Transparency Rep** readings.
 - 12.11.7. Select the appropriate option for **Weather**
 - 12.11.8. Select the appropriate option for **Water Level**
 - 12.11.9. Select the appropriate option for **Water Clarity**
 - 12.11.10. Click **Save and Return to List**.

13. Upload Thermistor Data into SWIMS

See DSOP Upload Thermistor Data document.

14. Run QA Queries to find known issues with volunteer data

See the **DSOP_QA_DATA_QUERIES_GUIDE** document.

***If any problems occur while maneuvering through SWIMS, contact the SWIMS File Manager, Lisa Helmuth.**