

## A1. Title and Approval Sheet

### Quality Assurance Program Plan for Millecoquins River Watershed MiCorps Volunteer Stream Monitoring Program

Date: 9/15/09

Version # 1

Organization: Superior Watershed Partnership

QAPP Prepared by: Geraldine Larson

Title: Senior Planner

Signature: 

Other responsible individual: Carl Lindquist

Title: Executive Director

Signature: 

(Other signatures may be added as necessary)

MiCorps Staff Use	
Tracking Number: _____	
MiCorps Reviewer: _____	
<input type="checkbox"/> Approved	<input type="checkbox"/> Returned for modifications
Approved by Paul Steen on September 18, 2009	
Signature of reviewer	Date

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## SECTION A: PROGRAM DESCRIPTION AND QUALITY OBJECTIVES

### A3. Distribution List

- Ric Lawson, Huron River Watershed Council
- Geraldine Larson, Superior Watershed Partnership
- Dave Magno, Superior Watershed Partnership
- Vicki Baldini, Superior Watershed Partnership

### A4. Program Organization

#### 1. Management Responsibilities –

1) Geraldine Larson, Monitoring Coordinator, Superior Watershed Partnership, 1030 Wright Street, Marquette, MI, (906) 228-6095, [geri@superiorwatersheds.org](mailto:geri@superiorwatersheds.org)

Ms. Larson is the program manager. Her responsibilities include:

- Develop and implement a Quality Assurance Project Plan.
- Attend 8-hour training session provided by MiCorps.
- Promote volunteer stream monitoring activities and solicit volunteers and stream access permissions from local community.
- Research and purchase necessary equipment for performing stream monitoring activities.
- Coordinate and conduct volunteer stream monitoring training sessions.
- Coordinate volunteer stream monitoring field data collection sessions.
- Coordinate and implement macroinvertebrate identification sessions.
- Implement database development, data entry, and data analysis.
- Develop reports for local governments, special interest groups, lake/stream associations. Promote information on Superior Watershed Partnership web-pages.
- Provide copies of all products and deliverables in both hard copy and electronic formats.
- Evaluate the project.
- Prepare and submit quarterly narrative reports and final report.

2) Dave Magno, Field Technician, Superior Watershed Partnership, 1030 Wright Street, Marquette, MI (906) 228-6095.

Mr. Magno will assist with program management as needed. His responsibilities include:

- Assist with field activities including preparing for sampling events, ordering/maintaining equipment, etc.
- Assist with volunteer stream monitoring training sessions.
- Assist with volunteer stream monitoring field data collection events and macroinvertebrate identification sessions.
- Assist with data entry, analysis and reporting.

2) Vicki Baldini, Administrative Assistant, Superior Watershed Partnership, 1030 Wright Street, Marquette, MI (906) 228-6095.

Ms. Baldini will assist with program management when necessary. Her responsibilities include:

- Track all program expenses and assist with quarterly narrative and financial reports.
- Assist with development of a final report, following MiCorps guidance, at the end of the project.
- Assist with development of a release of claims statement at the end of the project.

**2. Field Responsibilities** – Field sampling will be performed by volunteers. Team leaders and collectors will receive training in field data collection methods by program leader Geraldine

Larson. Field Technician, Dave Magno will assist with volunteer training and annual (spring/fall) data collection and macroinvertebrate identification sessions. Volunteer roles include the following:

- 1) Team leaders will organize and coordinate stream monitoring efforts by individual teams. In the field, leaders will complete data sheets and communicate with the collector to ensure thorough biological sampling of the site. In addition, leaders will provide instruction and guidance to team pickers. After field days, leaders will be responsible for returning equipment, biological samples, and completed data sheets to the program leaders.
- 2) Collectors will sample all in-stream habitats that exist at the site and provide sample contents to pickers for processing.
- 3) Pickers will pick macroinvertebrate specimens from sample contents provided by the Collector and preserve them in alcohol for later identification.

**3. Laboratory Responsibilities** – Macroinvertebrate collections will be sorted and identified on the premises of the Hiawatha Sportsman's Club, N7269 Lake Blvd. Engadine, MI 49827 with assistance from the program leader and field technician. Macroinvertebrate identification will take place stream side or indoors depending on weather conditions and experience of volunteers. Samples will be retained for future identification, if needed.

**4. Corrective Action** – Geraldine Larson, program leader, will be responsible for initiating, developing, approving, implementing, and reporting corrective actions concerning data quality.

## **A5. Problem Definition/Background**

The Millecoquins River Watershed (65,084 acres) is located in the Lake Michigan basin of Michigan's Upper Peninsula in Mackinac County. The watershed has experienced impacts from historic and recent land uses such as logging, agriculture, and increasing development and recreational pressures. Local residents have also expressed concern about the potential impacts to aquatic communities as a result of regular chemical treatments of tributaries in the watershed to control sea lampreys (*Petromyzon marinus*).

During the fall of 2008, SWP Senior Planner, Geraldine Larson met with local residents and recreational users of the Millecoquins River Watershed who had expressed interest in starting a volunteer stream monitoring program. The SWP applied for a MiCorps Volunteer Stream Monitoring Program grant in February 2009 and received notice of an award in May of 2009.

During the spring of 2009, the SWP coordinated the first stream monitoring event using the MiCorps Volunteer Stream Monitoring Procedures and Datasheets (Latimore 2006). The first stream monitoring training and data collection event was held on June 22<sup>nd</sup> and 23<sup>rd</sup> 2009 prior to the new grant start date (July 1, 2009). Data was collected from six sites in the watershed by volunteers and experienced staff from the SWP who had received MiCorps training during 2007 as a part of the Central Upper Peninsula Volunteer Stream Monitoring Grant (# 3003-VSM2007-04).

## **A6. Program Description**

The overall goal of the volunteer monitoring program is to protect and improve the water quality of the Millecoquins River Watershed. The program will utilize the Michigan Clean Water Corps (MiCorps) Volunteer Stream Monitoring Procedures (Latimore 2006). The MiCorps program was created through an executive order by Governor Jennifer M. Granholm to assist the Michigan Department of Environmental Quality in collecting and sharing water quality data for use in water resources management and protection programs and provides standardized assessment

and data recording procedures that can be easily used by trained volunteers. Specific objectives of this project include collecting baseline data, characterizing stream ecosystems, identifying water quality problems, determining water quality trends, and informing and educating the public about water quality issues and aquatic ecology. Volunteer stream monitoring activities will continue to be supported by the Superior Watershed Partnership into the future.

Program staff and volunteers will conduct spring and fall monitoring events, monitoring a minimum of six (6) sites in the watershed. The procedures and data forms include two types of assessments: stream habitat assessment and macroinvertebrate sampling. The stream habitat assessment is a visual assessment of stream conditions and watershed characteristics. The macroinvertebrate sampling procedure will be used in conjunction with the stream habitat assessment and will provide a measure of stream health. The assessments will cover approximately 300 feet of stream at each site. The program will furnish the necessary equipment to sample benthic macroinvertebrates and conduct physical habitat assessments.

Macroinvertebrate communities will be sampled in the spring (mid April) and fall (mid September) for the first three years, after which the sites will be monitored at a frequency between 1 and 3 years. Aquatic macroinvertebrates will be collected, identified to the Order level and tallied to determine diversity in the benthic community and gauge the health of each stream reach. Sites will be monitored more frequently if a population appears to be changing. Habitat assessments will be conducted once annually in conjunction with the spring macroinvertebrate collection. The project is intended to continue indefinitely. New sites will be added as volunteer and community interest grows or problems are detected. Sites will be sampled during the same time frame each year to minimize seasonal variability in macroinvertebrate distribution or abundance.

Data will be entered into the MiCorps database and results will be analyzed using a statistical program (Microsoft Excel) and summarized for use by interested parties. The SWP will summarize and provide results to program volunteers to explain how to utilize the data to document water quality changes over time, measure impacts of nonpoint source pollution and influence policy and behavior changes. Program staff and volunteers will publicize the program by making presentations to organizations and publishing informational brochures, reports in newspapers, newsletters and local broadcast news.

## **A7. Data Quality Objectives**

**Precision/Accuracy:** The primary goal of this project is to gauge stream health by measuring the diversity and abundance of macroinvertebrate taxa. To ensure precision and accuracy, the program manager will accompany teams to observe their collection techniques and note any divergence from protocols. The following techniques will be reviewed during training and in retaining of team leaders every three years: 1) collecting style (must be thorough and vigorous), 2) habitat diversity (must include all habitats present and be thorough in each one), and 3) the transfer of collected macroinvertebrates from the net to the sample jars (thoroughness is critical).

Since there is inherent variability in accessing the less common taxa in any stream site and program resources do not allow program managers to perform independent (duplicate) collections of sampling sites, our goal for quality assurance is conservative. A given site's Stream Quality Index (SQI) score or total diversity (D) measure across macroinvertebrate taxa will be noted as "preliminary" until three spring sampling events and three fall sampling events have been completed. The resulting measures of D and SQI for each site will be compared to

the composite (median) results and each should be within two standard deviations of the median. Sample results that exceed those standards should be then noted as “outliers” and examined to determine if the results are likely due to sampling error or a true environmental variation. If sampling error is determined, the data point will be removed from the data record. Volunteer teams that generate more than one outlier will be observed by the program manager at the next sampling event and be considered for retraining.

The program manger and/or experienced team leaders will make the final identifications for each sample. MiCorps staff will conduct a method validation review with the designated program manger to ensure his or her expertise, preferably prior to the first training session held by the program manger. This will be conducted with each new program manager/expert added to a MiCorps monitoring program. This review will consist of a joint sampling event with MiCorps staff jointly collecting, sorting and identifying the macroinvertebrates with the program manger/expert. Any monitoring issues will be addressed on site. If no major concerns remain, the program manager/expert will be considered “certified” by MiCorps.

**Bias:** Sites will be sampled by different team leaders at least once every three years in each season (two events among six sampling events, if conducted twice per year) to examine the effects of bias in individual collection styles. The new measure should be within two standard deviations of the median of past measures. Sites not meeting this data quality objective will be evaluated as above by the program manager/expert.

**Completeness:** Following a QA review of all collected and analyzed data, data completeness will be assessed by dividing the number of measurements judged valid by the number of total measurements performed. The data quality objective for completeness for each parameter for each sampling event is 90%. If the program does not meet this standard, the program manager will consult with MiCorps staff to determine the main causes of data invalidation and develop a course of action to improve the completeness of future sampling events.

**Representativeness:** Study sites are selected to represent the full variety of stream habitat types available locally, emphasizing the inclusion of riffle habitat. All available habitats within the study site will be sampled and documented to ensure a thorough sampling of all of the organisms inhabiting the site. Resulting data from the monitoring program will be used to represent the ecological conditions of the contributing subwatershed. Since not enough resources are available to allow the program to cover the entire watershed, some subwatersheds will not initially be represented. Additional subwatershed sites will be added as resources and volunteers allow.

**Comparability:** To ensure data comparability, all volunteers in the watershed will follow the same sampling and site selection methods and use the same units of reporting. Program directors and trainers will learn the standard MiCorps monitoring methods at annual trainings by MiCorps staff and will train their volunteers to follow those methods to ensure comparability of results among all MiCorps programs. To the extent possible, the monitoring of all study sites will be completed on a single day.

## **A8. Special Training/Certifications**

The program manager will coordinate trainings and ensure that all program personnel and volunteers are properly trained. The program manager and two team leaders have received indoor and field training provided by MiCorps staff (June 2007 and June 2009 respectively). The program manager, team leaders and participating volunteers will also have a side-by-side field

training session with MiCorps staff in September of 2009, prior to completion of the fall 2009 sampling event. Since 2007, program manager, Geraldine Larson has coordinated and conducted training sessions and stream monitoring events with volunteers in several other Upper Peninsula watersheds including the Huron River Watershed (Baraga/Marquette Counties), the Two Hearted River Watershed (Luce/Alger Counties), and the Pilgrim River Watershed and Salmon Trout River Watershed (Houghton County).

An onsite training session will occur before each monitoring event. The program manager will maintain a database of all trained volunteers with the date and success of their training. Onsite training will include the following topics:

1. Goals of the monitoring program
2. Potential uses for the data
3. Safety protocols
4. Description and proper use of equipment
5. Explanation of MiCorps field data sheets
6. Onsite data collection methods
7. Stream habitat characteristics and assessment
8. Identification of benthic macroinvertebrates using a dichotomous key
9. Quality assurance practices

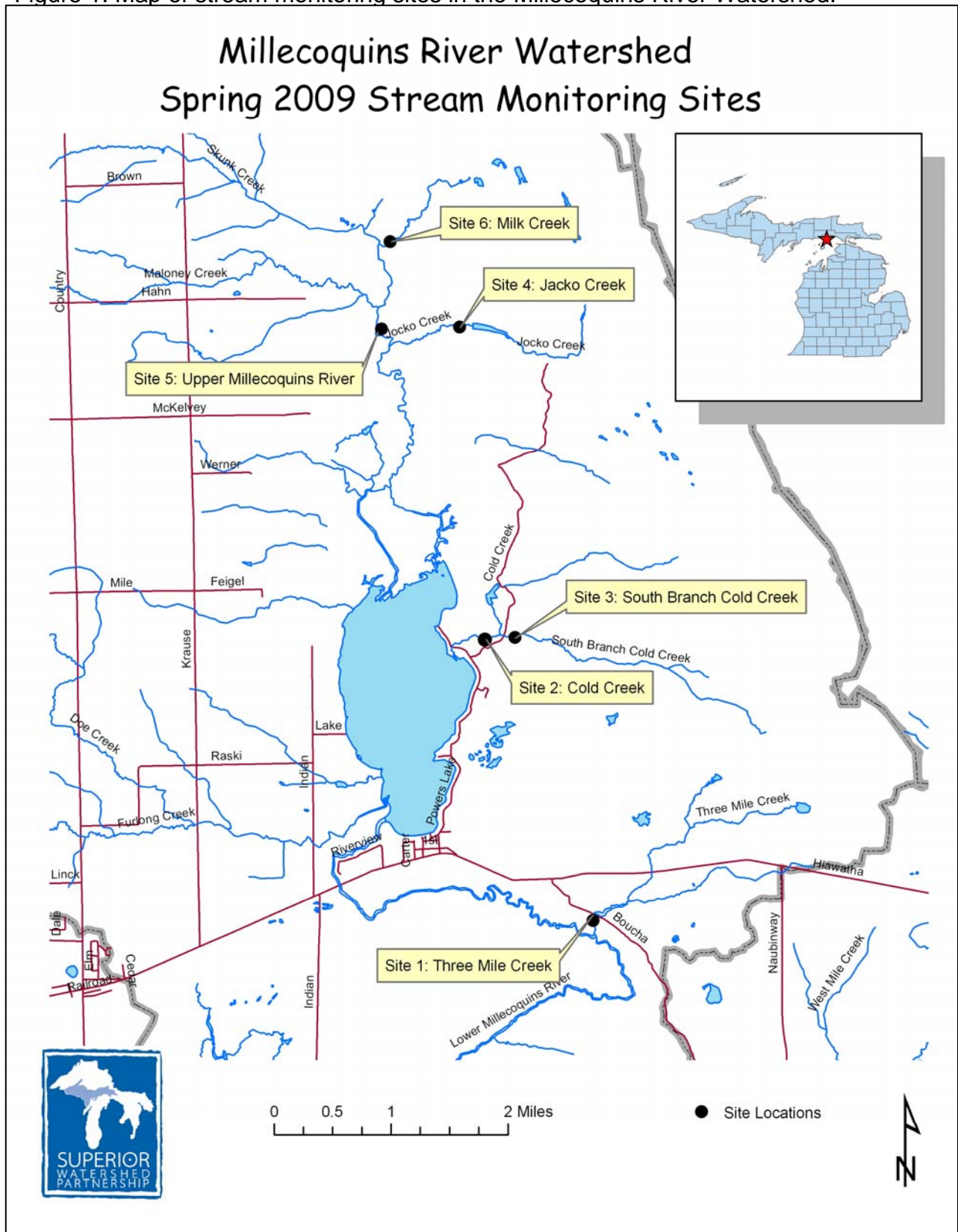
## **SECTION B: PROGRAM DESIGN AND PROCEDURES**

### **B1. Study Design & Methods**

**Frequency:** Macroinvertebrate communities will be sampled annually in the spring (before leaf out) and fall (after leaf drop) for the first three years, after which the sites will be monitored at a frequency between 1 and 3 years. Sites will be sampled during the same time frame each year to minimize seasonal variability in macroinvertebrate distribution or abundance. Sites will be monitored more frequently if a population appears to be changing. The project is intended to continue indefinitely. New sites will be added on an irregular basis, as volunteer and personal community interest grows or problems are detected. Each sampling event will be completed within the same two week period each year. If a site is temporarily inaccessible, due to factors such as prolonged high water, the monitoring time may be extended for two additional weeks. If the issue concerning inaccessibility is continued beyond the extended dates, then no monitoring data will be collected during that time and there will be a gap in the data. If a team is unable to monitor their site during the specified time, team leaders will contact the program manager as soon as possible and no later than the end of the first week in the sampling window in order for the managers to arrange for another team to complete the monitoring. If no team is available, the program manager will be responsible to see that the site is monitored unless sufficient redundancy has been included in the monitoring schedule that additional data is not needed.

**Study Locations:** Six (6) sample sites were chosen to assess water quality in areas of concern and to monitor the success of artificial habitat structures and the potential affects of chemical treatments for sea lamprey control. A map of the monitoring sites in the Millecoquins River Watershed is included in Figure 1 below.

Figure 1. Map of stream monitoring sites in the Millecoquins River Watershed.



A description of the sampling sites is provided below:

**#1: Three Mile Creek**

The site is located downstream from the outflow culvert for Three Mile pond, on the downstream side of Hiawatha Sportsman's Club (HSC) "G-trail" access road. This site is characterized by steep banks and fallen trees. Natural gravel and riffle habitats are present. This section of stream has not been treated for sea lampreys.

**#2: Cold Creek**

The site is located just below the access pad for an existing sand trap. The site is located downstream of the sand trap within a section of Cold Creek that has been treated for sea lampreys. Artificial habitat structures (wood/stone vanes) and gravel have been placed in this section of stream. No natural gravel substrate is present.

**#3: South Branch Cold Creek**

The site is located on the upstream side of the HSC "Cold Creek Trail" crossing of Cold Creek and is characterized by a soft and silty bottom. This section of stream has not been treated for sea lampreys. No natural gravel substrate is present.

**#4: Jocko Creek at B-Trail**

The site is located downstream from the outflow culvert for Jocko pond, on the downstream side of HSC "B-Trail" access road. Gravel has been placed in a small section of stream immediately downstream from the outflow culvert. This section of stream has not been treated for sea lampreys. No natural gravel substrate is present.

**#5: Upper Millecoquins River**

The site is located downstream from HSC "H-Trail" access road and the access site for an existing sand trap. Sampling was performed downstream from the sand trap and an artificial habitat structure. No natural gravel substrate is present. This section of stream has been treated for sea lampreys.

**#6: Milk Creek**

The site is located at the mouth of Milk Creek and accessed from HSC "J-Trail" access road. No natural gravel substrate is present. This section of stream has not been treated for sea lampreys.

**Methodology:**

Sampling the benthic community: Multiple collections will be taken from each habitat type present at the site, including riffle, rocks or other large objects, leaf packs, submerged vegetation or roots, and depositional areas, while wading and using a D-frame kicknet. The trained streamside leader will record the number of locations sampled within the monitored reach in each habitat type and note the locations sampled on a site map. The trained collector will transfer the material from the net into white pans. The remaining volunteers (pickers) will pick out samples of all different types of macroinvertebrates from the pans and place them into jars of 70% ethyl alcohol for later identification. The D-frame kicknet will be thoroughly rinsed at the site prior to proceeding to the next site to prevent contamination from sites previously sampled.

During the collection, the collector will provide information to the team leader in response to questions on the data sheet that review all habitats to be sampled, the state of the creek, and any changes in methodology or unusual observations. The leader will instruct and assist other

team members in detecting and collection macroinvertebrates in the sorting pans, including looking under bark and inside of constructions made of sticks or other substrates. Potential sources of variability such as weather/stream flow differences, season, and site characteristic differences will be noted for each event and discussed in study results. There are places on the data sheet to record unusual procedures or accidents, such as losing part of the collection by spilling. Any variations in procedure will be explained on the data sheet. At least once every three years in each season, the composition of field crews and roles will be changed to maintain objectivity and minimize individual bias.

Sample preservation and custody: All invertebrate sample jars receive labels written in pencil, stating the date, location, name of collector, and number of jars containing the collection from the site, which is placed inside the jar and on a label on the outside of the jar. The data sheet also states the number of jars containing the collection from the site. The team leader is responsible for labeling and securely closing the jars and returning all jars, data sheets and equipment. Before leaving the stream site, the collections are checked for labels, the data sheets are checked for completeness and for correct information on the number of jars containing the collection from the site and the jars are secured together with a rubber band and site label and placed together in one box.

Sample identification: For identification, volunteers sort all individuals from a single jar into look-a-like groups, and then are joined by an expert who confirms the sorting and provides identification of the taxa present. Samples will be identified to Order level using a Key to Macroinvertebrate Life in the River developed by University of Wisconsin-Extension in cooperation with the Wisconsin Department of Natural Resources; and University of Minnesota Guide to Aquatic Invertebrates of the Upper Midwest by R.W. Bouchard, Jr. These identifications are then verified by the program manager/expert. When identification of a sample is complete, the entire collection is placed in a single jar of fresh alcohol with a poly-seal cap and a printed label inside the jar and stored at the program office (Superior Watershed Partnership) indefinitely. The alcohol is carefully changed (to avoid losing small specimens) in the jars every five years. Sample identification may take place immediately after collection at the stream site if the program manager/expert is present on site and/or as volunteers become more proficient in identification of taxa.

Monitoring Equipment: Monitoring equipment was selected based on the recommendation of MiCorps and the suggested equipment needed for a successful program. Monitoring equipment includes D-frame collection nets, sorting trays, forceps, eye droppers, alcohol preservative, jars with poly-seal caps, measuring tape, folding yardsticks, clipboards, pencils, waders, and maps. Optional equipment may also include: camera, GPS unit, communication plan, insect repellent, first aid kit, sunscreen, water, string and stakes. All equipment will be stored at the Hiawatha Sportsman's Club (HSC) office and will be maintained by the HSC in cooperation with the Superior Watershed Partnership. Prior to field activities, equipment will be checked to make sure it is clean and in working order and not damaged.

Frequency of Quality Assurance Checks: Since our evaluation is based on the diversity in the community, we attempt to include a complete sample of the different groups present, rather than a random sub-sample. We do not assume that a single collection represents all the diversity in the community, but rather we consider our results reliable only after repeated collections spanning at least three years. Our results are compared with other locations in the same watershed that have been sampled in the same way. All collectors will attend an in-stream training session, and most sites will be sampled by different collectors at different times to diminish the effects of bias in individual collecting styles. Samples where the diversity measures

diverge substantially from past samples at the same site will become a high priority for the next scheduled collection. Field checks include checking all data sheets to make sure each habitat type available was sampled and examination of several picking trays to ensure that all present families have been collected. All identifications are re-checked by the program manager/expert before completing identification.

A summary of the parameters to be analyzed into the raw data of the monitoring program is provided below:

- Frequency and time frame of monitoring: Macroinvertebrate community will be monitored twice a year in the spring and fall; Habitat will be monitored once a year in conjunction with the spring macroinvertebrate sampling event
- Taxonomic level of macroinvertebrate identification: Order
- Literature and equipment used for identifying macroinvertebrates and analyzing samples: Key to Macroinvertebrate Life in the River developed by University of Wisconsin-Extension in cooperation with the Wisconsin Department of Natural Resources; and University of Minnesota Guide to Aquatic Invertebrates of the Upper Midwest by R.W. Bouchard, Jr. (free online in PDF format at [www.VSMP.org](http://www.VSMP.org))
- Metrics and statistical analyses used to analyze the aquatic community data: Statistical analysis of data will be performed to examine variation between sample sites and trends within sites over time.
- Description of the analytical method for each parameter:
  - Macroinvertebrates: diversity and abundance
- Sample disposal procedures: Macroinvertebrates samples will be preserved in 70% ethanol solution in perpetuity. Samples are checked yearly and solution changed every five years. Old ethanol will be diluted with water and emptied down the drain.
- Procedures for addressing failures: consult MiCorps staff and/or local experts.

## **B2. Instrument/Equipment Testing, Inspection, and Maintenance**

Monitoring supplies and equipment will be stored at the Hiawatha Sportsman's Club (HSC) office and will be maintained by the HSC in cooperation with the Superior Watershed Partnership. Equipment Quality Control includes the following:

1. Thermometers must be physically inspected for damage prior to use and immersed into both boiling and ice water to verify they are functioning correctly. If the thermometer is damaged or not working correctly, it will be disposed of and replaced with a new unit.
2. D-frame nets must be inspected for damage or holes and replaced if necessary.
3. All equipment must be cleaned, dried and stored securely after each sampling event.
4. Check the equipment that requires batteries and replace them if necessary.

## **B3. Inspection/Acceptance for Supplies and Consumables**

The following is a list of supplies and consumables:

- Monitoring procedures and field data sheets
- D-Frame collection nets (mesh size = 20x24 mesh/inch)
- Sorting trays
- Forceps
- Eye droppers
- Preservative (70% ethanol)
- Jars and lids
- Measuring tape
- Yardsticks
- Clipboards

- Pencils
- Waders
- Map
- Camera

Optional equipment may also include: GPS unit, communication plan, insect repellent, first aid kit, sunscreen, water, string and stakes. For inventory purposes, a list of monitoring supplies and consumables, including the date of purchase, date of usage, and projected date of replacement will be developed in a Microsoft Excel spreadsheet. Upon retrieval, volunteers will inspect the equipment for holes or damage. Any damaged or misused equipment will be noted to the program leader and replaced if necessary.

#### **B4. Non-direct Measurements:**

Outside data and information that may be used in conjunction with volunteer collected data, but not measured directly as a part of the program, includes water quality monitoring data conducted by the Michigan Department of Environmental Quality; fisheries assessments by the Michigan Department of Natural Resources Fisheries Division; U.S. Fish and Wildlife Service Sea Lamprey Management Program treatment schedules and special studies including macroinvertebrate studies before and after lampricide treatments using Hester Dendy sampling devices and other methods; and visual observations by volunteers and local residents.

#### **B5. Data Management:**

Data sheets along with collected specimens will be returned to program leader after each monitoring event. Raw data will be entered and managed in Microsoft Excel spreadsheets. All data is backed up weekly and tapes are kept offsite in a secure location. Electronic data will be entered into the online MiCorps database by the program manager or trained volunteer and stored and updated annually on the MiCorps database exchange system. Copies of data sheets will be retained along with sample jars at the Superior Watershed Partnership office for a period of at least five years.

##### Data Management Quality Control:

- Upon receiving data from volunteers, field records will be reviewed by a program leader to minimize errors before entering it into the MiCorps database.
- Calculations for diversity and other variables will be calculated through a computer formula and verified with manual calculations by a program leader.
- Data entered into the computer will be reviewed by comparing hard copy print outs with field data sheets.
- Data analysis methods will be reviewed by qualified professionals on a five year basis.

## **SECTION C: System Assessment, Correction and Reporting**

### **C1. System Audits and Response Actions**

A performance and system audit will be conducted following each spring and fall monitoring event to evaluate the capability and performance of the program. A systems audit will evaluate the process of the program including on-site reviews of field sites and facilities where data is processed and analyzed.

A performance audit will be used to evaluate how well people are doing their jobs of collecting and analyzing the data. The program manager and volunteer team leaders (trained by MiCorps) will ensure that quality assurance protocols are followed and report any issues possibly affecting data quality. In addition, the program manager will ensure that the total diversity reported by each team is equal to at least 70% of the diversity previously found at the same site. Sites with results less than 70% will be sampled by the program manager at the following scheduled event.

If deviation from the QAPP is noted at any point in the sampling or data management process, the affected samples may be deleted from the data set. Re-sampling will be conducted if warranted and feasible, given that the deviation is noted soon after occurrence and volunteers are available. Otherwise, a gap may be left in the monitoring record. All corrective actions, such as above, will be documented and communicated to MiCorps.

### **C2. Data Review, Verification, and Validation**

A standardized data-collection form will be used to facilitate spot-checking to ensure that forms are completely and correctly filled out. A program manager or a single trained volunteer will review data before it is stored in a computer or file cabinet. After data has been compiled and entered into a computer file, it will be verified with raw data from field survey forms. Biological monitoring results will be confirmed by identification from trained entomologists as needed.

Experts who will assist in macroinvertebrate identification quality control include:

1. Geri Larson, MS in Aquatic Ecology/Fisheries
2. TBD, Northern Michigan University

### **C3. Reconciliation with Data Quality Objectives**

Data quality objectives will be reviewed after each monitoring event to ensure that objectives are being met. Deviations from the data quality objectives will be reported to program leaders and MiCorps for assessment and corrective action. Also, data quality issues will be recorded as a separate item in the data base and provided to program leaders and data users. Response to and reconciliation of problems that occur in data quality are outline in Section A7.

### **C4. Reporting**

Throughout the duration of this program quality control reports will be included with quarterly project reports that are submitted. After, quality control reports will be generated as quality control issues occur and shared with program volunteers and MiCorps staff. Quality control reports will provide information regarding problems or issues arising in quality control of the program. These could include, but are not limited to: deviation from quality control methods outlined in this document relating to field data collection procedures, macroinvertebrate identification, data input, diversity calculations and analyses. Program staff will generate yearly reports sharing results of the program with volunteers, special interest groups, and local municipalities. Data and reports will be made available upon request via the Superior Watershed Partnership.