Title and Approval Sheet

Quality Assurance Project Plan for Stream Leaders

Date: December 5, 2008
Version # 2
Organization: Friends of the St. Clair River Watershed

QAPP Prepared by: Kristen O. Jurs
Title: Storm Water Coordinator, St. Clair County Health Department

Signature:
_____

MiCorps Staff Use

Tracking Number:

MiCorps Reviewer: _____

☐ Approved ☐ Returned for modifications

Signature of reviewer Date

TABLE OF CONTENTS

Acronyms

ABW	Anchor Bay Watershed
Friends	Friends of the St. Clair River Watersheds
HD	Health Department
NEW	Northeastern Watersheds
QAPP	Quality Assurance Project Plan
SCC	St. Clair County
SC4	St. Clair County Community College
SCR	St. Clair River
SCRW	St. Clair River Watershed

PROGRAM DESCRIPTION AND QUALITY OBJECTIVES

Distribution List

This Quality Assurance Project Plan (QAPP) will be distributed to Paul Steen of the Huron River Watershed Council and to the Friends of the St. Clair River Watershed (*Friends*) board members. It will also be made available to the public via the *Friends*' website.

Program Organization

Kristen O. Jurs	Project Leader
Responsibilities:	• Provide overall leadership for the project • Primary responsibility for Quality Assurance • Project Expert for macroinvertebrate id. • Determine monitoring sites • Assist with volunteer training and certification. • Lead and coordinate data collection • Provide presentations on monitoring activities • Evaluation and corrective actions
Contact info	• St. Clair County (SCC) Health Department (HD) 3415 28th Street, Port Huron 48060 kojurs@stclaircounty.org W: 810 987 5306
Sheri Faust	Environmental Educator
Responsibilities:	• Develop Stream Leader certification workshop • Press releases/ outreach for monitoring events • Participate in staff training and monitoring events • Develop/ implement volunteer training/ certification. • Lead volunteer activities at one monitoring site
Contact info	• SCC Health Department 3415 28th Street, Port Huron 48060 sfaust@hd.stclaircounty.org W: 810 987 5306
Janice Littlefield	Program Manager
Responsibilities:	• Develop, maintain and update website • Provide program information and volunteer support • Participate in staff training and monitoring events. • Lead monitoring activities at one monitoring site
Contact info:	• 923 Michigan Ave. Port Huron Mi 48060 bythequay@comcast.net H: 810.985.4841 C: 810.941.2750
Dave Sheldon	Lab Manager, St. Clair County Community College (SC4)
Responsibilities:	• Sample/ equipment storage at SC4 • SC4 lab for identification of macroinvertebrates

Contact info:	• C: 810-989-5661 dsheldon@sc4.edu
Board Members	Friends of the St. Clair River Watershed (*Friends*)
Responsibilities:	• Training, conferences, monitoring event participation • "Stream Leader" and "Stream Bugger" certification • Lead monitoring activities at one monitoring site
Fox Edge Design	Website Development Subcontractor
Responsibilities	• Develop website • Provide technical support for website maintenance.
Contact info:	• Althea Fox, 25 Princess Drive, Batesville, AR 72501 (870) 376-4478

Problem Definition/Background

The purpose of this project is to: Engage the public in monitoring tributaries of the SCRW and support habitat restoration and protection efforts of SCC Watershed Advisory Groups (WAGs).

The SCCHD is the lead agency for Watershed Management Planning activities in SCC. As of 2008, Watershed Management Plans (WMPs) have been developed in the NEW and ABW, as well as the Remedial Action Plan for the SCR Remedial Action Plan (RAP). The SCCHD has plans to initiate WMP activities throughout SCC in the near future. Both current WMPs and the St. Clair River RAP have goals and objectives that aim to improve water and habitat quality of waterways. As of 2008, Macroinvertebrate data for SCC's waterways is only being collected periodically and very intermittently by the MDEQ.

Initiation of the Stream Leaders program will help the SCCHD, current and future WAGS, and the SCR BiNational Public Advisory Council understand the status of habitat and water quality in the SCRW as well as the improvements and protection that is needed. This program will also increase the participation and watershed knowledge by the general public.

Program Description

Goal 1:	Increase Monitoring of St. Clair River Watershed Tributaries
Objective 1.a.	Recruit and retain volunteers to monitor benthic macroinvertebrates in the SCRW.
Goal 2:	Support Habitat Restoration and Protection Activities of St. Clair County's Watershed Advisory Groups (WAGs) and the SCR Binational Public Advisory Council
Objective 2.a.	Increase the knowledge of habitat conditions and restoration needs in their respective subwatersheds of the SCRW.

Friends will accomplish these goals and objectives by means of the following nine (9) tasks briefly summarized:

Task 1 Provide Quality Assurance Program Plan (QAPP)
A QAPP will be developed by the Project Leader and submitted to MiCorps for approval. The Project Leader will also perform joint sampling with MiCorps staff to ensure techniques and program planning are in line with MiCorps procedures.

Task 2 Implement Staff Training
The Project Leader will attend a one-day MiCorps training session in June 2008. The Environmental Educator will attend a MiCorps training session at the 2008 MiCorps conference. The Project Leader will attend the 2009 MiCorps conference. Board members will be encouraged to attend these training sessions.

Task 3 Determine Monitoring Sites
The Project Leader will discuss potential monitoring sites with the SCC Drain Commissioner and WAG representatives, evaluate potential sites through field surveys, and determine seven (7) monitoring sites to start the Stream Leaders Program in the NEW and ABW of the SCRW.

Task 4 Recruit and Retain Volunteers
The Program Manager will work with a subcontractor to develop a website for *Friends*. The Program Manager will be responsible for the overall maintenance of the website which includes maintenance, communication with volunteers, and posting of monitoring events and results.

Task 5 Develop and Provide Volunteer Training
The Project Leader and the Environmental Educator will develop the “Stream Leader” and “Stream Bugger” certification exams. They will work together to develop and conduct training workshops.

Task 6 Conduct Monitoring Events
The Project Leader will be responsible for field preparation work each spring/ fall and the overall coordination of monitoring events.

Task 7 Annual Reporting and Outreach
The Project Leader will perform annual data analysis and evaluation, and provide information to the SCRW WAGs, and the St. Clair River Binational Public Advisory Council.

Task 8 Final Evaluation
The Project Leader will conduct all final evaluation for this project.

Task 9 Administration

Friends board members will be responsible for entering data into the MiCorps database. The Project Leader will work with the Environmental Educator, Program Manager, and Treasurer to develop and submit quarterly status and financial reports. The Project Leader will be responsible for developing and submitting a final report, products/ deliverables, all data in both hard and electronic format and release of claims statement.

Data Quality Objectives

Precision and Accuracy

The following activities will be implemented to ensure *Precision* and *Accuracy* in the quality of volunteer data collection activities.

1) Stream Leader Certification Training and Retraining

The following monitoring techniques will be reviewed during Stream Leader certification training and each Stream Leader will be reassessed for these techniques 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),
3. 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 the sampling sites for all sites, the goal for this program's quality assurance is conservative.

2) Stream Quality Index (SQI) score and total diversity (D) within two standard deviations

Generally, a given site's SQI or D scores will be noted as "preliminary" until three spring sampling events and three fall sampling events have been completed. Because St. Clair County is predominantly ancient lake plain, and has heavy clay soils and the majority of watersheds contain intense drainage practices, there may be some monitoring sites that will rarely have water during the fall season. These sites will be noted as preliminary until at least three spring events have been completed.

Once data has been collected over three years, the 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.

Sites not meeting this Data Quality Objective will be evaluated by the Project Leader as potentially "invalid". Duplicate monitoring data and/ or evaluation of the skills of the monitoring team or any unusual events or observations noted on stream data records will help the Project Leader make a final evaluation of

the data's validity. Data sheets must include the Stream Leader, volunteers of the monitoring team, the monitoring site location, and an area where unusual events or observations may be noted.

If sampling error is determined, the data point should be removed from the data record. Stream Leaders that generate more than one outlier will be observed by the Program Expert at the next sampling event and be considered for retraining.

3) MDEQ and MICORPS Sample Comparison

The Project Leader will seek opportunities to compare the volunteer monitoring results with duplicate samples from the Michigan Department of Environmental Quality (MDEQ). MDEQ data should be within two standard deviations of the median. If it is not, the volunteer data will be noted as "outliers" and examined to determine if the results are likely due to sampling error or a true environmental variation.

The Program Expert will make the final macroinvertebrate benthic identifications for each sample until volunteers have been certified as Stream Buggers and able to help the Program Expert with identifications. The Program Expert was certified through a joint sampling event with MiCorps staff in September 2008.

Bias

Stream Leaders may want to lead monitoring activities at a particular site over several years because they have a personal connection to that site. But, in order to prevent bias, once a Stream Leader has lead activities at one site for two years (4 events), the Stream Leader will, at a minimum, be changed for a different Stream Leader for a minimum of one year (two events) before the original Stream Leader may return to that site. If monitoring is only conducted at a site in the spring (because of low water levels in the fall), the alternation of Stream Leaders will still be done every two years (2 events). If the Stream Quality Index (SQI) and Diversity (D) scores for one year (2 events) of monitoring data are within 2 standard deviations of the two years' (4 events) median, the entire set will be judged as valid and unbiased.

Data Completeness

Data completeness will be assessed by dividing the number of measurements judged valid by the number of total measurements performed. The completeness data quality objective for each parameter for each sampling event is 90%. If the program does not meet this standard, the Project Leader 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

The first seven monitoring locations were selected to represent a variety of stream habitat types available in the SCC portion of the SCRW. Considerations include:

- volunteer access;
- public property;
- furthest downstream points in a subwatershed;
- local jurisdictions' ability and interest in restoring and protecting water resources;
- sites that may represent a range of subwatershed types; and
- locations that may represent a range of stream health.

The following table provides each monitoring site's stream habitat type and a description of its subwatershed drainage.

Site #	Creek Name	Address	Watershed	Description
1	***Silver***	7363 Jeddo Road, Grant Twp	Black River	Small stream, cobble/ sandy. Active agriculture
2	***Stocks***	3800 Lapeer Road, Port Huron Twp	Black River	Suburban and residential drainage, poor habitat, channelized, silt
3	***Birch***	State Rd. ¼ mile south of Jeddo, Burtchville Twp	Lake Huron	Active agricultural and low density residential drainage
4	***Bunce***	St. James, south of Ravenswood, Marysville	St. Clair River	High density urban drainage
5	***Cuttle***	Marysville Golf Course River Road, Marysville	St. Clair River	Riffle and pool habitat High density urban drainage
6	***Beaubien***	Starville Road, north of Angling Rd., Cottreville Twp.	Anchor Bay	Residential, vacant agricultural drainage. Riffle pool, good riparian
7	***Meldrum***	Short Cut Road, 1/8 mile east of Palms Rd, Ira Twp	Anchor Bay	Active and vacant ag and residential drainage

All available habitats within each 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 conservatively to represent the ecological conditions of the contributing subwatershed. Additional subwatershed sites will be added as resources and volunteers allow.

Comparability

The following procedures will be followed to provide confidence that this program's data sets and methods can be compared to those data sets and methods of MiCorps participants across the state of Michigan.

1. MiCorps Methodology:

To ensure data comparability, all volunteers in the watershed will follow the same sampling methods and use the same units of reporting. Volunteers will be certified to be "Stream Leaders" and "Stream Buggers" at biannual trainings by the Project Leader and Environmental Educator. The volunteers will learn the standard MiCorps monitoring methods and will direct their monitoring event volunteers to follow those methods. To the extent possible, the monitoring of all study sites will be completed on a single day. These actions will ensure comparability of results among our program and all other MiCorps program participants.

2. Two Week Sampling Period

For each sampling event that is not completed during a single monitoring day event, sampling will be completed within the same two week period by certified Stream Leaders or Project Leader and volunteers.

If a site is temporarily inaccessible, such as due to prolonged high water, the monitoring time may be extended for two additional weeks. If the site remains inaccessible during the two week extension period, then no monitoring data will be collected during that time and there will be a gap in the data.

Special Training/Certifications

Training Workshops

Training workshops will be conducted before fall and spring Monitoring Events. These workshops will be promoted to the public through website announcements and press releases developed by the SCCHD. All training workshops and certification exams will be based on MiCorps procedures and methodology and conducted by the SCCHD. Volunteers who receive "Stream Leader" and/or "Stream Bugger" certification will be entered into a volunteer database maintained at the SCCHD.

1. Fall – "Stream Leaders"

The fall training workshops will provide an overview of the Stream Leaders program and the sampling techniques that will be used for macroinvertebrate sampling and habitat discussion activities. The spring and fall of 2009 workshops will also include the opportunity to take a "Stream Leader" certification exam. Volunteers who pass the Stream Leader certification exam will be able to lead a volunteer group at a monitoring location.

2. Spring – "Stream Buggers"
Each year, the spring training workshop will cover macroinvertebrate identification and include the opportunity to take a "Stream Bugger" certification exam.

Friends of the St. Clair River Watershed Board Member Training

Environmental Educator
Because the current Environmental Educator has experience in macroinvertebrate monitoring and stream monitoring, the Project Leader will observe her monitoring techniques in the field and bug identification in the lab to certify her as a Stream Leader and Stream Bugger before the first monitoring event. Because of her expertise in environmental education, she will then assist the Project Leader in the development of the Training Workshop and certification exams.

FOSCRW Board Members
All FOSCRW board members will be encouraged to attend training workshops and receive certification to pass the Stream Leader certification. It is anticipated that two board members will receive MiCorps training at the 2008 and/or 2009 MiCorps conferences.

All training and certifications will be documented in quarterly reports and the final report for this project as well as the volunteer data base previously mentioned.

SECTION B: PROGRAM DESIGN AND PROCEDURES

Study Design and Methods

The week before the Monitoring Event in the spring and fall of each year, the Project Leader will be responsible for the following activities:

- Survey all sites for access and clear vegetation for easy volunteer access
- Measure and mark the 300 foot length of survey with survey tape
- Prepare aerial photographs and data sheets for distribution to Stream Leaders
- Check condition and inventory equipment

Monitoring Events will be conducted during the last weekend in September and the last weekend of May of each year. If monitoring cannot be conducted during these one day events, samples will be collected within a two week time period or not at all during that season.

A complete timeline of this project's activities is provided as Attachment A. A map of monitoring sites is provided as Attachment B.

The Project Leader will provide final identification of all Macroinvertebrate collections at the St. Clair County Community College laboratory with assistance from certified "Stream Buggers".

The following represents a monitoring team which at a minimum includes:

1. One Certified Stream Leader
2. One Record Keeper
3. One Picker (aka "Pickas")
4. One Shuttler (aka "Shuttlas")
5. One Kicker (aka "Kickas")

The methods and roles of each team member during the Habitat Discussion and Benthic Community Sampling are described as follows. These roles may be shifted during the course of the monitoring event to allow all team members a chance to perform each type of activity and remove bias.

Habitat Assessment

1. Stream Leader
    a. Facilitate the Habitat Assessment with volunteers and write answers to questions on the Habitat Assessment sheet.
2. Picker, Kicker, Record Keeper, and Shuttler
    a. Answer Habitat Assessment questions.

Benthic Community Sampling

1. Stream Leader
    a. Lead the entire benthic sampling effort.
    b. Ensure Kickers collect multiple samples from each habitat type present at the monitoring location and that each type is communicated and recorded by the Record Keeper.
    c. Ensure any changes in sampling methodology or unusual observations are recorded by the Record Keeper.
    d. Review data sheets for accuracy and completeness.
    e. Fill out a chain of custody report and transfer Benthic sample(s) to Project Leader within three days of the day collection occurred.
2. Record Keeper
    a. Draw the site map.
    b. Record the number of locations sampled and each habitat type, noting the locations sampled on a site map.
    c. Record and explain any unusual procedures, accidents or any variations in procedure on the data sheets.
    d. Assist team members in detecting and collecting macroinvertebrates in the sorting pans.
    e. Record the number of jars containing the collection from this site.
3. Kickers
    a. Clean net of all macroinvertebrates before sampling occurs.
    b. Obtain multiple collections from each habitat type present within the monitoring location, including riffle, rocks or other large objects, leaf packs, submerged vegetation or roots, and depositional areas, while wading and using a D-frame kicknet.
    c. Transfer samples into Picker's pans with the Shuttler's assistance.
    d. Ensure net is cleaned of all macroinvertebrates before giving the net back to the Stream Leader

4. Pickers
    a. Collect macroinvertebrates from sorting pans, including looking under bark and inside of constructions made of sticks or other substrates.
    b. Pick out all macroinvertebrates from the pans and place them into glass kill jars containing 70% ethyl alcohol.
    c. Once picking is complete place all macroinvertebrates from kill jars into plastic sample containers and ensure each container is properly labeled: the outside of sample containers will be labeled with permanent marker and indicate the monitoring date and location. Each sample container will also contain a label on the inside that is written in pencil and indicates the monitoring date, location, name of collector, and number of jars for the sampling event.
    d. Ensure all picking equipment is cleaned and returned to the team's monitoring equipment container.

5. Shuttlers
    a. Provide time record of at least ½ hour for macroinvertebrate collection.
    b. Shuttle or transfer bugs from the Kickers to the Pickers
    c. Spot check all data sheets to ensure they are completely and correctly filled out and sign off on data sheets.

Potential Sources of Variability

Potential sources of variability include weather/stream flow differences, seasonal differences, and site characteristic differences. This variability will be noted by the Project Leader for each event and discussed in the Annual and Final Project Evaluation Reports.

There are places on the data sheets to record unusual procedures or accidents, such as losing part of the collection by spilling. Any variations in procedure should be explained on the data sheets.

Chain of Custody

The Stream Leader for each monitoring site will be responsible for transfer of all habitat discussion and benthic monitoring data sheets, benthic community sample collections, and monitoring equipment to the Project Leader (or designated representative) within three days of the day monitoring occurred.

Upon receipt of sample collection, data sheets and monitoring equipment, the Project Leader (or designated representative) will check the following:

- Benthic collections for labels and the correct information regarding the number of jars containing the collection from the site.
- Data sheets for completeness
- Equipment for cleanliness and completeness

Once all sample collections, data sheets and equipment have been checked, the Stream Leader will attach a cover sheet to the data sheets and both the Stream Leader and Project Leader (or designated representative) will sign it and recognize the chain of custody transfer.

The Stream Leader (or designated representative) will then secure the labeled sample containers with a rubber band, and place them together in a box for transfer to the St. Clair County Community College laboratory.

Two copies of all data sheets will remain on file indefinitely. One copy will be stored at the St. Clair County Heath Department and one copy will be stored at the St. Clair County Community College with benthic sample collections.

Field Sorting and Labeling

Once samples are transferred to Pickers, they will pick the macroinvertebrates out of the sample and transfer them to kill jars. Once all macroinvertebrates have been picked out of samples and are in kill jars, they will be transferred to plastic sample containers. These plastic sample containers will be labeled with permanent marker on the outside indicating the monitoring date and location and contain a label on the inside written in pencil indicating the following information:

- monitoring date;
- location;
- name of collector(s); and
- number of jars from this site.

The Pickers are responsible for labeling and securely closing the plastic containers. All sample identification will be finalized in the lab by the Project Expert and/or certified Stream Buggers.

Lab Sorting and Final Identification

Before a Stream Bugger or Project Leader empties a sample container(s) into a white pan for sorting in the lab, he/ she must ensure that all the containers and only the containers from that collection are present. If any specimens are separated from the pan during identification, a site label accompanies them.

Final identification of macroinvertebrates to the order level of taxa will be done within a week of collection and the following literature references will be used for sample identification: Bouchard, R.W., Jr. 2004. Guide to Aquatic Invertebrates of the Upper Midwest.

Benthic Sample and Equipment Storage

After identification, the entire benthic collection from each site will be placed in a plastic water sample container(s) with fresh alcohol. The container(s) will receive inside and outside labeling with the same procedures as labeling is done in the field. These sample containers will be stored at the St. Clair County Community College (SC4) indefinitely. Alcohol will be added to all sample bottles every few years. Samples will only be disposed if determined to be invalid and will be disposed of in a SC4 laboratory sink which is connected to the City of Port Huron's sewer. All equipment for this monitoring program will be stored at the SC4, with the exception of monitoring equipment for one site which will be stored at the SCCHD to use for identification of new monitoring sites.

Analytical Method for each Parameter

1. Habitat Assessment

This project will not be using habitat data provided by volunteers for analysis. The Habitat Assessment will be used for educational and screening purposes only. The data sheet called "Friends of the St. Clair River Habitat Discussion" asks similar questions as MiCorps habitat assessment data sheet; but it has been converted into questions and themes of discussion. The Stream Leader

will facilitate this discussion and help volunteers understand the significance of the habitat on the health of the stream. Information about the site's habitat will be written onto the Habitat Discussion sheet and reviewed by the Project Leader for anything unusual. Unusual information may then be used to help explain unusual sampling results. The Friends Habitat Discussion sheet has been attached to this QAPP as Attachment C.

2. Macroinvertebrate Survey
This project will track the number of insects, taxa orders, and calculate a Stream Quality Index (SQI) according to MiCorps procedures.

Equipment Quality Control Check List
Ensure equipment is clean and in working order in March and August of each year which includes the following:

- √ Equipment is labeled with Friends of the St. Clair River Watershed
- √ Expiration date of chemical reagents
- √ Batteries are functioning in equipment that requires them

Field Procedures Quality Control

- A replicate Benthic Community Sample and identification will be conducted by the Project Leader at one site per year.

Control Limits and Exceedences
Since evaluation of the benthic samples is based on the diversity in the community, a complete sample of the different groups present will be attempted. It is not assumed that a single collection represents all the diversity in the community, but rather the results are considered reliable only after repeated collections spanning at least three years.

Results will also be compared with other locations in the same river system to provide perspective on the diversity found at a monitoring site.

Samples where the diversity measures diverge substantially from past samples at the same site, the site will be resampled by the Project Leader or a different Stream Leader within two weeks. If a change is confirmed, the site becomes a high priority for the next scheduled collection.

The Stream Leader will ensure sampling of each habitat type available at a location, and examine several picking trays before "dumping" to ensure that pickers are doing a thorough job picking the macroinvertebrates.

Instrument/Equipment Testing, Inspection, and Maintenance
The following two charts detail all equipment and consumables that are needed as part of this project.

The following chart provides a list of all equipment that will be stored outside of monitoring bins. This equipment will be stored in the same storage room as monitoring bins at SC4 and will be inventoried by the Stream Leader before each monitoring event. No equipment will need calibration for this project.

Quant.	Equipment	Supplier	Biannual Equipment Inspection
7	Aquatic D Frame Nets	Forestry Suppliers	Inspect nets for holes and secure attachment to pole.
14	Sample collection containers	Health Department (HD)	Present
1	Surveyor Tape	HD	Present
7	Waders	Gander Mt.	Clean and dry. Variety of sizes.
7	Yard sticks	Meier's	Present
14	Sorting Trays		Clean and not cracked
1	Gallon of Alcohol		Full
1	Box of rubber bands		Present
1	Box/ Bin (large enough to hold all samples collected for one monitoring event)		Present

The following provides a checklist of all equipment that should be in <u>each</u> monitoring site's bin and will be used by the Project Leader during inspection and maintenance of equipment before each monitoring event.

Quant.	Equipment	Supplier	Biannual Equipment Inspection
2	Illuminated Pocket microscopes	Forestry Suppliers	Check battery and bulb for potential replacement.
3	Kill Jars	HD	Ensure 3 per site
3	Sets of labels, permanent markers, pencils and tape	HD	Present; inside waterproof baggie
8	Plastic Medical Tweezers	FirstAidOnly.com	Present and unwrapped
1	Surveyor Tape	HD	Present
5	Sample bottles	HD	Present
70	1 cloth set of gloves and 5 sets of latex gloves	HD	Present and good condition
7	Reel style Tape Measures	Meier's	Clean and working order.
7	Containers for equipment		Clean and not cracked
3	Ice cube trays		Clean and not cracked
1	Clip Board		Clean and dry.
1	Hand Sanitizer		Full

1	Bug Spray	Meier's	Full
2	Squirt bottles		Clean and not cracked
2	16 oz. 70% Alcohol bottle		Full
1	Role of paper towels		Inside a plastic bag
2 of each	Pencils/pens/sharpies	HD	Present; markers and pens are functioning and pencils are sharp
1	Set of data sheets – 2 copies of each: macroinvertebrate, habitat discussion and site sketch	HD	Present – 2 of each inside plastic sleeve for protection
2	Laminated Macroinvertebrate identification charts	HD	Clean and legible
5	Rubber bands (to keep sample jars from one site banded together)	HD	Present
1	Box/ Container (large enough to hold all samples collected for one monitoring event)	Meier's	Present
1	Sand Card	Forestry Suppliers	Present
5	Plastic spoons	Meier's	Present
2	Garbage bags	Meier's	Present

SC4 microscopes used for macroinvertebrate sample identification will provide 30 – 100 x magnification.

Non-direct Measurements
All measurements will be direct in this project.

Data Management
Data Entry and Storage
The Project Leader will be responsible for raw data sheets. The original data sheets will be kept on file at the St. Clair County Health Department for a period of five years and a copy of them will be kept indefinitely with the benthic samples at the St. Clair County Community College.

The Project Leader is responsible for entering the raw data into Microsoft Excel. The board members and volunteers of *Friends* will be encouraged to voluntarily enter data into the MiCorps database but the responsibility for ensuring this task is completed is the SCCHD's. The Project Leader will provide training for data entry to any Board members or volunteers that wish to enter data. Only those

volunteers that have been certified as Stream Leaders and/ or Stream Buggers can be trained to enter data into the MiCorps data base.

All electronic Excel workbooks stored at the SCCHD is backed up by the St. Clair County server on a daily basis. Computer passwords provide data security.

Data Analysis

Data provided on the Habitat Discussion datasheets will be reviewed for notes regarding unusual events or conditions and will be used to try and explain outliers. This portion of the Stream Leaders program will primarily be used for educational and record purposes only. The Habitat Discussion datasheet is provided as Attachment C.

Data provided on the MiCorps Stream Macroinvertebrates Datasheet will be summarized for reporting into four metrics:

1. All taxa
2. All insects
3. EPT (Ephemeroptera + Plecoptera + Trichoptera)
4. Sensitive taxa.

Units of measure will be orders counted in each metric. A Stream Quality Index (SQI) will be computed and the method for calculating this metric is included in MiCorps procedures.

The MiCorps Site Sketch will be used by volunteers to draw a sketch of the 300 ft. stretch of stream where samples are collected. This datasheet is provided as Attachment D.

Quality Control

All calculations will be checked by the Project Leader and Environmental Educator. All computer entered data will be reviewed for errors by the person entering the data by comparing Excel workbook sheets to field data sheets befere data entry in the MiCorps database.

SECTION C: System Assessment, Correction and Reporting

System Audits and Response Actions
Assessments of the Stream Leaders Program goals and objectives will be performed by the Project Leader on an annual basis and approved by the FOSCRW board of directors.

The project will be evaluated by answering the following questions that are related to each goal's objective. If the Project Leader and board of Friends find that the goals are not being met, the Project Leader will contact MiCorps staff to discuss and implement corrective actions.

Objective	Question to be answered
Goal 1 Increase Monitoring of the St. Clair River Watershed Tributaries	
Objective 1.a Recruit and retain volunteers to monitor benthic macroinvertebrates in the SCRW.	Have volunteers been recruited to perform monitoring?
Goal 2 Support Habitat Restoration and Protection activities of St. Clair County's Watershed Advisory Groups and the SCR Binational Public Advisory Council	
2.a. Increase the knowledge of habitat conditions and restoration needs in their respective subwatersheds of the SCRW.	Has FOSCRW monitoring data been provided to the public, discussed at WAG meetings and/or at Binational Public Advisory Council meetings?

FOSCRW's stream monitoring activities will be audited externally, by the Michigan Clean Water Corps. Reports will be provided to Michigan Clean Water Corps on approximately a quarterly basis and the Project Leader will be responsible for any corrective actions that are requested by MiCorps. .

Data Quality Assessment Process
The total diversity reported by each team must equal at least 70% of the diversity previously found at the site. Sites with results less than 70% will be re-sampled by experts to verify or discard such unusual results, which could be the result of less-than-thorough sampling.

Corrective Actions
If deviation from the QAPP is noted at any point in the sampling or data management process, the affected samples may be deleted by the Project Leader from the data set. Re-sampling will be conducted by the Project Leader or certified Stream Leaders 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.

Data Review, Verification, and Validation
Much of the criteria and methods for review, verification and validation have already been discussed.

Draft and Final Reports
The Project Leader will develop the draft final report in February of 2010. The Project Leader will send the final report and deliverables to MiCorps by March 2010 as required, with all quality issued noted.

Reconciliation with Data Quality Objectives
Data will be assessed to meet Data Quality objectives within one week of Monitoring Events. If data from any one of the sites does not meet Data Quality Objectives, the site will be resampled within one week by a certified Stream Leader or considered invalid. All potential limitations to data will be identified by Stream Leaders and recorded on data sheets for the Project Manager to consider during the assessment.

Reporting
Quality control for reporting will consist of MiCorps review of quarterly reports.