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ATTACHMENTS

A. MiCorps Sampling Sites
B. Stream Macroinvertebrate Datasheet
C. Friends of the St. Clair River Habitat Discussion
D. Site Sketch

SECTION A: PROGRAM DESCRIPTION AND QUALITY OBJECTIVES

A3. 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 (Friends) stakeholders, including board, staff and volunteers. It will be made available to the public via the Friends' website at www.scriver.org.

A4. Program Organization

Sheri J. Faust	Project Manager
Responsibilities:	• Provide overall leadership for the project • QA Manager, provide primary QA oversight • Develop media releases for events and trainings • Determine monitoring sites • Assist with volunteer training and certification • Provide presentations on monitoring activities • Evaluation and corrective actions
Reports to:	Friends of the St. Clair River Board of Directors, and Dr. Paul Steen, VSMP Manager, HRWC
Contact info:	Environmental Educator, St. Clair County Health Department 3415 28th Street, Port Huron, MI 48060 Sfaust@stclaircounty.org; (810) 987-5306
Amy M. Taylor	Field Personnel, Staff
Responsibilities:	• Serve as liaison w/ volunteers, leaders and property owners • Project expert for macroinvertebrate id • Participate in trainings and monitoring events • Develop/ implement volunteer training/ certification • Lead volunteer activities at monitoring sites • Provide program information and volunteer support • Lead and coordinate data collection
Reports to:	Project Manager
Contact info:	Environmental Educator, Friends of the St. Clair River P.O. Box 611496, Port Huron, MI 48061 education@scriver.org, (586) 381-0555
Stream Leaders	Field Personnel, Volunteers
Responsibilities:	Identify and preserve collections on the day
Reports to:	Project Manager, Field Personnel Staff
Carrie Dollar	Lab Coordinator
Responsibilities:	• Sample/ equipment storage at SC4 • Provide equipment and tools for macroinvertebrate id
Contact info:	SC4, 323 Erie Street, Port Huron, MI 48060 cdollar@sc4.edu, (586) 996-9811
Reports to:	Project Manager

A5. Problem Definition/Background

The purpose of this project is to support volunteer training and macroinvertebrate data collection for the purpose of assessing water quality that help state and local efforts protect and manage water resources; provide reliable data about the conditions of the entire St. Clair River watershed, educate watershed residents about what the river needs from them and engage residents and communities in actions to protect the watershed; engage the public in monitoring streams within the St. Clair River watershed. Our goals are to assist in removing causes of stream deterioration and support fish and wildlife habitat restoration and protection efforts of the St. Clair River Area of Concern Binational Public Advisory Council. The Fish and Wildlife Beneficial Use Impairment for the St. Clair River Area of Concern was

restored in 2018 with a boost of $21M in federal funding, but monitoring and maintenance of the terrestrial project sites is ongoing and continues to be an issue.

This project aims to revitalize and expand the St. Clair County Health Department's (SCCHD) and Friends of the St. Clair River's (Friends) MiCorp program in St. Clair County. These two partners successfully collaborated from 2008-2011 during the original MiCorps grant.

The SCCHD is the lead agency for watershed planning and stormwater management activities in St. Clair County and Friends is the lead environmental nonprofit for habitat stewardship, volunteer coordination and environmental education in St. Clair County. Watershed Management Plans have been developed for the Black River, St. Clair River and Lake Huron (collectively the Northeastern Watersheds), Anchor Bay, and Belle River, as well as the Remedial Action Plan for the St. Clair River. All these plans identify goals and objectives to improve recreational, ecological and environmental healthy of waterways.

The St. Clair River subwatershed encompasses 15,788 acres and contains two tributaries that drain directly to the St. Clair River: Bunce Creek and Cuttle Creek. The majority of the tributaries are enclosed and heavily impacted by urbanization although there are some headwater tributaries that are surrounded by fallow fields and/or light residential development. Overall, the majority of tributaries in the immediate coastal areas of the St. Clair River shoreline face similar degradation, but many tributaries outside the dense urban areas are only moderately degraded. Many of these tributaries suffer from the effects of agricultural drainage or light residential developments.

Continuation of the Stream Leaders program will help the SCCHD, watershed advisory group members, and the SCR Binational Public Advisory Council understand the status of habitat and water quality within the watershed as well as the improvements and protection that is needed. This program will also increase the participation and watershed knowledge by the general public.

A6. Program Description

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

Friends will accomplish these goals and objectives by means of the following tasks:

Task 1 Provide Quality Assurance Program Plan (QAPP)

A QAPP will be developed by the Project Manager and submitted to MiCorps for approval.

Task 2 Implement Staff Training

Field Staff will attend a MiCorps conference/training. Field volunteers will be encouraged to attend training sessions and/or conferences.

Task 3 Determine Monitoring Sites

The Project Manager will evaluate and determine potential monitoring sites through previous studies and field surveys.

Task 4 Develop and Provide Volunteer Training

The Project Manager and Field Staff will work together to develop and conduct volunteer training workshops.

Task 5 Conduct Monitoring Events

Field Staff will be responsible for field preparation work each spring/ fall and the overall coordination of monitoring events.

Task 6 Annual Reporting and Outreach
The Project Manager and Field Staff will perform annual data analysis and evaluation, and provide information to key personnel and stakeholders.

Task 7 Final Evaluation
The Project Manager will conduct all final evaluations for this project.

Task 8 Administration
Field Staff will be responsible for entering data into the MiCorps database. The Project Manager will work with Key Personnel to develop and submit quarterly status and financial reports. The Project Manager will be responsible for developing and submitting a final report, products/ deliverables and all data.

A7. 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.

Volunteer Training
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 sampling (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.

Bias
At every sample site, a different team will sample there at least once every three years to examine the effects of bias in individual collection styles. Measures of diversity (D) and Stream Quality Index (SQI) for these samples will be compared to the median results from the past three years and each should be within two standard deviations of the median. 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. If the sample falls outside this range, the Program Manager and Field Staff will conduct a more thorough investigation to determine which team or individuals is likely at fault. The Program Manager will accompany teams to observe their collection techniques and note any divergence from protocols. The Program Manager may also perform an independent collection (duplicate sample) no less than a week after the team's original collection and no more than two weeks after.

The following describes the analysis used for the Program Manager's duplicate sampling:

Resulting diversity measures by teams are compared to Program Manager's results and each should have a relative percent difference (RPD) of less than 40%. This statistic is measured using the following formula:

RPD = [(Xm - Xv) / (mean of Xm and Xv)] x 100, where Xm is the Program Manager measurement and Xv is the volunteer measurement for each parameter.

Teams that do not meet quality standards are retrained in the relevant methods and the Program Manager will re-evaluate their collection during the subsequent sampling event. It is also possible that the Program Manager can conclude that all sampling was valid and the discrepancy between samples is due to natural variation (such as the site changing over time or unrepresentative sampling conditions).

Data Completeness
Completeness, expressed as a percentage, is a measure of the amount of valid data actually obtained versus the amount expected to be obtained as a specified in the original sampling design. Following a quality assurance review of all collected and analyzed data, data completeness is 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 develops 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, in addition to ease and safety of access for volunteers, public property status, previous monitoring data, a municipality's ability and interest in water resource protection, and diverse stream health. 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 watershed. Sampling after extreme weather conditions may result in samples not being representative of the normal stream conditions. The Program Manager will compare suspect samples to the long term record as follows:

> Measures of D and SQI for every sample will be compared to the median results from the past three years and each should be within two standard deviations of the median. If the sample falls outside this range, it can be excluded from the long-term data record (though can be included in an "outlier" database.).

Comparability

To ensure data comparability, all volunteers participating in the monitoring program follow the same sampling methods and use the same units of reporting. The methods for sampling and reporting are based on MiCorps standards that are taught at annual trainings by MiCorps staff. The Field Staff will train volunteers to follow those same methods to ensure comparability of monitoring results among other MiCorps programs. To the extent possible, the monitoring of all study sites will be completed on a single day, and within a two-week time frame. 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.

If the Program Manager leaves the position and a new Program Manager is hired, the new hire will attend the next available training given by MiCorps.

A8. Special Training/Certifications

Key Personnel will attend and/or participate in MiCorps trainings, conferences or equivalent. Volunteer team leaders will be trained for macroinvertebrate and habitat assessment by the Program Manager or Field Staff. Trainings will be conducted before fall and spring Monitoring Events. All trainings will be based on MiCorps procedures and methodology. The Field Staff will assist the Manager in the development of the training workshops.

SECTION B: PROGRAM DESIGN AND PROCEDURES

B1. Study Design and Methods

The week before the Monitoring Events in the spring and fall of each year, the Field Staff will be responsible for the following activities:

- Visit all sites for access for easy, safe volunteer access
- Measure and mark the 300' length with survey tape
- Prepare data sheets for Stream Leaders
- Check equipment condition and inventory supplies

The benthic population is sampled within a 2-week period the last weekend in September and the first weekend of May of each year. A map of monitoring sites is provided as Attachment A.

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

1. One Leader

2. One Record Keeper
3. One Picker
4. One Shuttler
5. One Kicker

Macroinvertebrate Collection

To sample 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 Collector will transfer the material from the net into buckets while in the stream and then into white pans on shore. 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. 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 stream, and any changes in methodology or unusual observations. The Leader will instruct and assist other team members in detecting and collecting 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 should be explained on the data sheet. (See appended data sheet.)

At the collecting site, all invertebrate sample jars receive a label written in permanent marker, stating date, location, name of collector, and number of jars containing the collection from this site, which is placed inside the jar. The data sheet also states the number of jars containing the collection from this site. The Leader is responsible for labeling and securely closing the jars, and returning all jars and all equipment to the Field Staff. Upon return to the Program building (SCCHD), 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 plastic bag. They are stored in the Program building until they are examined and counted on the day of identification (held within one month). The data sheets are used on the identification day, after which they remain on file indefinitely. At the time of identifying the sample, the sample identifier checks the data sheet and jars to ensure that all the jars, and only the jars, from that collection are present prior to emptying them into a white pan for sorting. If any specimens are separated from the pan during identification, a site label accompanies them. For identification, volunteers sort all individuals from a single jar into look-alike groups, and then are joined by an identification expert who confirms the sorting and provides identification of the taxa present. These identifications are then verified by the Program Managers per section A7. 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 permanent marker on the outside of the jar and stored at the program building indefinitely. The alcohol is carefully changed (to avoid losing small specimens) in the jars every few years.

Since 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 river system that have been sampled in the same way. All collectors attend an in-stream training session, and a different team will be sent to a site at least once every two years at a minimum, but when possible collectors will be sent to different sites every collection event to diminish the effects of bias in individual collecting styles. Samples where the diversity measures diverge substantially (using the criteria in A7) from past samples at the same site are resampled by a new team within two weeks. If a change is confirmed, the site becomes 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 the team leader examines several picking trays to ensure that all present families have been collected.

Habitat Analysis

Leaders and Collectors, with Pickers assisting as well, will complete a Habitat Assessment once a year during the spring season during a monitoring event. The Habitat Assessment will follow the procedure and datasheet (see appended Habitat Assessment). A site sketch will accompany the assessment. The Habitat Assessment is a critical piece of the monitoring process and will be used to monitor changes in stream habitat over time, which may result in changes in water quality and corresponding macroinvertebrate diversity. Any concerns noted in the data sheet will be reviewed by the Project Manager and appropriate action will be taken to resolve and/or address noted concerns including informing appropriate authorities.

As many of the parameters within the Habitat Assessment are qualitative, personal bias is inherent. To account for bias and personal discrepancies, Leaders will have on hand a copy of MiCorps Stream Monitoring Procedures, which details the qualitative criteria, and helps clarify questions. Leaders will read questions aloud to the group and form consensus on question answers. Since the information reviewed in the Habitat Assessment hold considerable educational value for volunteers and the goals of the MiCorps program, it is important that Stream Leaders inform group members of the purpose of the Assessment and encourage feedback from the group. However, final decisions on the scoring remains the responsibility of only those team members who have undergone a volunteer training. All final Habitat Assessment data sheets will be reviewed by the Project Manager for correctness and completeness. There are places on the data sheet to record unusual procedures or accidents. Any variation in procedure should be explained on the data sheet.

The Project Manager and/or Field Staff will provide final identification of all macroinvertebrate collections within one month of the monitoring event at the St. Clair County Community College laboratory with Key Personnel.

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. 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. Leader
    a. Lead the 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 Field Staff within one week 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; keep track of time
    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 Shuttlers buckets and then into Picker's pans with the Shuttler's assistance.
d. Ensure net is cleaned of all macroinvertebrates before giving the net back to the 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.
   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.

Chain of Custody

The 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 Field Staff (or designated representative) within one week of the monitoring event.

Upon receipt of sample collection, data sheets and monitoring equipment, the Field Staff (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 decontamination

Once all sample collections, data sheets and equipment have been checked, the Leader will attach a cover sheet to the data sheets and both the Leader and Project Manager (or designated representative) will sign it and recognize the chain of custody transfer. Two copies of all data sheets will remain on file indefinitely. One copy will be stored on Friends hard drive and one copy will be stored at the SCCHD with benthic sample collections.

Final identification of macroinvertebrates to the order level of taxa will be done within one month 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 SCCHD indefinitely. Alcohol will be added to all sample bottles every few years.

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

Equipment Quality Control

Ensure equipment is clean and in working order and not damaged in March and August of each year. Decontamination Procedures will be followed from HRWC's "Preventing the Spread of Aquatic Invasive Species: DECONTAMINATION STEPS FOR FIELD EQUIPMENT" module focusing on decontaminating field equipment and vehicles to reduce the risk of spreading aquatic invasive species. Steps taken will include following recommended practices for prevention and decontamination steps:

1. Assess the risk of AIS contamination to determine the appropriate decontamination steps
2. Inspect and Remove Plants, Dirt, Mud, and Debris
3. Remove Invasive Materials From Equipment and Clothing
4. Rinse and Dry Equipment
5. Additional equipment quality control measures include:
   - √ Equipment is labeled with Friends of the St. Clair River
   - √ Expiration date of chemical reagents
   - √ Batteries are functioning in equipment that requires them
   - √ Label equipment with their dates or purchase and dates of last usage
   - √ Calibrate equipment before conducting each test

.

Site ID	Creek Name	Address	Lat/Long	Watershed	Frequency	Selection Methodology	Location Tool	Description
Mill Crk 01	**Mill Creek**	7 Park Drive, Yale	43.13111, -82.80115	Black River	2x/year; spring and fall	Yale High School teacher	Map	cobble/ sandy, public park; active agriculture
Bnc Crk 01	**Bunce Creek**	St. James, south of Ravenswood, Marysville	42.93338, -82.46677	St. Clair River	2x/year; spring and fall	Previous MiCorp monitoring site; currently monitored	Map	High density urban drainage; SCC Drain Office
CuttleCrk01	**Cuttle Creek**	2080 River Road, Marysville	42.89236, -82.47525	St. Clair River	2x/year; spring and fall	St. Clair River Area of Concern restoration site; previous MiCorp monitoring site	Map	Riffle and pool habitat; High density urban drainage; AOC site
Pine01	**Pine River, South Branch**	2585 Castor Road, Goodells	42.9784, -82.64607	St. Clair River	2x/year; spring and fall	Proposed in EGLE NPS watershed management plan development	Map	Residential, active agricultural; Riffle/pool/cobble, good riparian
Meldrum01	**Meldrum Drain**	7085 Meldrum Rd, Fair Haven	42.69269, -82.66792	Anchor Bay	2x/year; spring and fall	Ira Twp Recreation Department; previous MiCorp monitoring site	Map	Public park; active & vacant ag; residential drainage; SCC Drain Office

B2. Instrument/Equipment Testing, Inspection, and Maintenance

All equipment for this monitoring program will be stored at SCCHD. 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 SCCHD and will be inventoried by the Field Staff and Leader before each monitoring event. No equipment will need calibration for this project. SC4 microscopes used for macroinvertebrate sample identification will provide 30 – 100 x magnification.

Quantity	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	Gander Mt.	Present
7	Waders	Gander Mt.	Clean and dry and do not leak Variety of sizes.
14	Sorting Trays	Staples	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 each monitoring site's bin and will be used by the Project Leader (or representative) 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	Staples	Present; inside waterproof baggie
8	Plastic Medical Tweezers	FirstAidOnly.com	Present and unwrapped
1	Surveyor Tape	Gander Mt	Present
5	Sample bottles	HD	Present
70	1 cloth set of gloves and 5 sets of latex gloves	Staples	Present and good condition
7	Reel style Tape Measures	Meier	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

B3. Non-direct Measurements
All measurements will be direct in this project.

B4. Data Management
Data Entry and Storage
Field Staff will be responsible for raw data entered and managed in Microsoft Excel workbooks. Data will be entered from data sheets directly into the online MiCorp database by Field Staff or a single, trained volunteer for storage within the MiCorps data exchange system. The original data sheets will be kept on file at the SCCHD for a period of at least five year, on Friends hard drive indefinitely and a copy will be kept for a period of at least five years with the benthic samples at the SCCHD. Files on Friends hard drive are backed up on cloud server daily. Computer passwords provide data security.

Macroinvertebrates:
Data are summarized for reporting into four metrics: all taxa, insects, EPT (Ephemeroptera + Plecoptera + Trichoptera), and sensitive taxa. Units of measure are families counted in each metric. The Stream Quality Index (SQI) from the MiCorps datasheet is also computed. The method for calculating that metric is included in Appendix X

Habitat:
specific measures are used from habitat surveys to investigate problem areas at each site. The percentage of stream bed composed of fines (sand and smaller particles) is calculated and changes are tracked over time as an indicator of sediment deposition.

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

All calculations will be checked twice by the Project Manager and Field Staff. All computer entered data will be reviewed for errors by the person entering the data by comparing Excel workbook sheets to field data sheets before data entry in the MiCorps database. Qualified professionals will review our data analysis methods and results periodically.

SECTION C: System Assessment, Correction and Reporting

C1. System Audits and Response Actions

Volunteer Team Leaders trained by the Program Manager ensure that quality assurance protocols are followed and report any issues possibly affecting data quality. When significant issues are reported, the Program Manager may accompany groups in the field to perform side-by-side sampling and verify the quality of work by the volunteer team. In the event that a group is determined to have done a poor job sampling, a performance audit to evaluate how people are doing their jobs of collecting and analyzing the data is accomplished through side-by-side sampling and identification. During side-by-side sampling a team of volunteers and an outside expert sample the same stream. The statistic for checking this side-by-side sample is given in the Bias section (A7).

A system audit is conducted following each spring and fall monitoring event to evaluate the process of the project. The system audit consists of the Program Manager, any other program leader, and one or two active volunteers, and is a start to end review of the monitoring process and how things could be improved for the next event.

If deviation from the QAPP is noted at any point in the sampling or data management process, the affected samples will be flagged and brought to the attention of the Program Manager and the team that collected the sample. Re-sampling is conducted as long as the deviation is noted soon after occurrence and volunteers are available (two week window). Otherwise, a gap must be left in the monitoring record and the cause noted. All corrective actions are documented and communicated to MiCorps staff.

Details of the process for assessing data quality are outlined in section A7. Response to quality control problems is also included in section A7.

C2. Data Review, Verification, and Validation

A standardized data-collection form is used to facilitate spot-checking to ensure that forms are completely and correctly filled out. The Program Manager or a single trained volunteer reviews the data forms before they are stored in a computer or file cabinet. After data has been compiled and entered into a computer file, it is verified with raw data from field survey forms.

C3. Reconciliation with Data Quality Objectives

Data quality objectives are reviewed annually to ensure that objectives are being met. Deviations from the data quality objectives are reported to the Program Manager and MiCorps staff for assessment and corrective action. Also, data quality issues are recorded as a separate item in the database and are provided to the Program Manager and data users. Response to and reconciliation of problems that occur in data quality are outlined in Section A7.

C4. Reporting

As required by the grant, a quality control report will be included with the annual fact sheet and submitted to MiCorps. Quality control reports provide information regarding problems or issues arising in quality control of the project. These could include, but are not limited to: deviation from quality control methods outlined in this document relating to field data collection procedures, indoor identification, data input, diversity calculations and statistical analyses. Program Manager will create an annual fact sheet sharing results of the program with volunteers, special interest groups, local municipalities, and relevant state agencies. Data and reports are made available via Friend's web page.