A1. Title and Approval Sheet

Quality Assurance Project Plan for
Salmon-Trout River Volunteer Stream Monitoring Project

Date: 8/14/2012
Version # 1
Organization: Yellow Dog Watershed Preserve

QAPP Prepared by: Emily Whittaker
Title: Executive Director

Signature:

MiCorps Staff Use

Tracking Number:

MiCorps Reviewer: Paul J. Steen

☒ Approved ☐ Returned for modifications

Signature of reviewer 9-5-12 Date

A2. Table of Contents

A3. Distribution List

Chauncey Moran
Director of Water Quality/Yellow Dog Riverkeeper
Yellow Dog Watershed Preserve

Geri Grant
Land Use
Superior Watershed Partnership

Dr. Paul Steen
MiCorps
Huron River Watershed Council

A4. Project Organization

Key Personnel	Role	Affiliation	Contact: email	Phone
Emily Whittaker	Project Manager	YDWP	emily@yellowdogwatershed.org	906-345-9223
Christy Budnick	Project Assistant	YDWP	christy@yellowdogwatershed.org	906-345-9223
Chauncey Moran	Project Oversight	YDWP	criverwalkerr@aol.com	906-345-9223
Carla Champagne	Volunteer	CCBB	cchampa@maresa.org	906-345-9217
Geri Grant	Technical Oversight	SWP	geri@superiorwatersheds.org	906-228-6095
Volunteers	Volunteer Roles (collectors, pickers, etc.)	Trout Unlimited, Sierra Club, NMU		

Management Responsibilities

1. Chauncey Moran, Project Oversight: The Project Oversight reviews the Quality Assurance Project Plan, ensures the training of volunteers adheres to quality assurance standards, and provides experience in monitoring stream biota, habitat, and physical parameters in the Salmon-Trout River watershed.
2. Emily Whittaker, Project Manager. The Project Manager provides grant administration, program implementation, and personnel management. Whittaker is responsible for analysis and interpretation of these data for volunteers and stakeholders.
3. Christy Budnick, Project Assistant. The Project Assistant is responsible for assisting in the training of volunteers, coordinating sampling events, and volunteer management for the Salmon-Trout River project.
4. Geri Grant, Technical Oversight: Ms. Grant is a technical and scientific advisor for the volunteer stream monitoring project.

A5. Project Need

The Salmon-Trout River in located in the Dead-Kelsey watershed near Big Bay, MI. The Salmon-Trout River flows unimpeded into Lake Superior, with known populations of anadramous brook trout using the river for spawning. Presently the river is impacted mainly be excessive sedimentation, causing changes in aquatic habitats. Additionally, an increase in mining activity in the watershed poses potential harms to water quality. It is important to monitor the river in order to document present stream conditions and create a program that will continue monitoring for any changes that may occur.

Project Goals and Objectives

The goals of the volunteer stream monitoring project are to collect reliable data about the conditions of the coldwater stream, to use this information to determine conservation and restoration needs within the watershed, to carry out the steps necessary to address these needs, and educate community members and stakeholders about the health and needs of their streams. Potential future actions based on monitoring results are to report trends and conditions of streams studied to the MDNR, MDEQ, local townships, the Huron Mountain Club, and other local community groups. Once stream conditions have been

established, it is anticipated that we will evaluate conservation and restoration techniques that may help improve stream quality and minimize future degradation, with the ultimate goal being to maintain or improve stream quality.

A6. Program Description

The purpose of monitoring the Salmon-Trout River is to assess the condition of the stream and trends in its health. The method used to assess the health will be the survey of benthic macroinvertebrate communities and their habitats. Specific data that will be collected under this project include species type, diversity, and frequency. This information will be used to prioritize conservation and restoration needs for each section of stream, recommendations for protection and improvement will be provided to agencies, partners, and the community.

Volunteers will work in small teams led by trained leaders to monitor macroinvertebrate populations and stream habitat. The initial sampling will consist of 8 sites within the Salmon-Trout River watershed, representing each tributary as well as the main stream. All sites will be sampled within a two week period, rather than a single day, due to remoteness and limited accessibility to each site. It is intended that the sampling from year to year will take place during a consistent time period, with the realization that the actual dates will depend on weather and stream conditions. Ideally the sampling will take place from year to year during the same two week period surrounding target dates. Macroinvertebrate samples are stored in alcohol and identified in a laboratory. An aquatic biologist verifies all identifications. The habitat conditions at each site will be measured on a yearly basis at minimum. Information will be entered into an inhouse electronic database, as well as the MiCorps Data Exchange. Datasheets will be saved in paper files at the Yellow Dog Watershed Preserve office and will be retained in perpetuity.

Volunteers will be recruited in the weeks leading up to each training or sampling event, using email, online notifications, and press releases. A volunteer database will be maintained by staff at the Yellow Dog Watershed Preserve throughout the project.

A7. Data Quality Objectives for Measurement Data

Habitat Assessment:
Subjectivity is an issue in determining quantitative measures in the habitat assessment. Many of the measurements on the datasheet are estimates and leave room for personal interpretation. YDWP will train volunteers using pictorial examples as a way to reduce the subjectivity of this assessment. Data are reviewed by staff and any unusual information is discussed with the volunteer. All data are reviewed, entered, and interpreted by staff.

Analysis of measurements will consider long term data as opposed to reacting to a single outlier. This will ensure conclusions about priority restoration actions are based on a long term view of stream habitat over time.

Macroinvertebrate Monitoring:

The data quality objectives listed below are for aquatic macroinvertebrate collection and identification that will take place during this project. The data collected will lead to an understanding of the biodiversity and quality of the sampled stream reach. Quality will be inferred based on the diversity and quantity of species collected based on formulas presented in the MiCorps protocol.

Accuracy and Precision
The following techniques will be reviewed during training and in retraining of team leaders: [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).

Once a year, a single site will be selected to perform a duplicate sampling. Results will be compared to see if sampling techniques are adequate to reduce error. 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. At least two of these six sampling events will be collected by a different collector. 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.

All stream data records will include the personnel of the monitoring team and each type of habitat sampled. The Project Oversight or Project Manager will verify and correct all macroinvertebrate identifications made by the volunteer and staff.

Sample results that exceed these standards will be noted as "outliers" and examined to determine if the results are likely due to sampling error or true environmental variation. If sampling error is determined the data point shall be removed from the data record. Volunteer teams that generate more than one outlier will be observed by the Project Manager at the next sampling event and be considered for retraining.

The Project Manager will make the final identifications for each sample. MiCorps staff conducted a site visit with the Project Manager and other staff from YDWP on August 20, 2012 to ensure methods of collection were accurate. This will be conducted with each new Project Manager added to the MiCorps monitoring program. This review consisted of a joint sampling event, with MiCorps staff jointly collecting, sorting, and identifying the macroinvertebrates with the Project Manager. No major monitoring issues were noted but five smaller suggestions for ease were suggested. The Project Manager and other staff at YDWP are now considered certified by this program.

Bias
Each site will be sampled by different collectors at least once every two years 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. The Project Manager will review the results and address any potential bias observed through on site observation and retraining.

Completeness
Following a quality assurance review of 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 Project 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 a full variety of stream habitat types within the Salmon-Trout River. 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 entire waterbody, including main channel and tributaries. Additional stream sites will be added as resources and volunteers allow, if needed.

Comparability
To ensure comparability, all volunteers in the watershed will follow the same sampling and site selection methods and use the same units of reporting. All participants will learn the standard MiCorps monitoring methods and will train additional 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 in two week period.

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 issue concerning inaccessibility continues 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, the volunteers will contact the Project Manager as soon as possible and no later than the end of the first week in the sampling window in order for the Manager to arrange for another team to complete the monitoring. If no team is available, the Project Manager will, if feasible, sample the site. Otherwise, the site will go unmonitored for that season.

A8. Special Training/Certifications

The Project Oversight, Project Manager, and Project Assistant have had hands-on MiCorps training to witness and learn first-hand how a volunteer-based stream monitoring program is expected to work. In addition, the Project Oversight has been running an additional MiCorps Project on the Yellow Dog River since 2004.

Training will be provided to each volunteer participating in the project. When new volunteers join a sampling event they will be paired up with more experienced volunteers

so they can learn by "shadowing" volunteers with more experience. This technique will allow new volunteers to ask questions as they learn in a hands-on environment.

During sampling events, each sampling group will have an experienced streamside leader. This leader will be responsible for making sure data sheets are filled out properly, jars labeled, and reminding the collectors to cover all available habitats.

New volunteers typically start out as pickers. No training is required to be a picker. Pickers are responsible for sorting through the samples collected by the collectors, picking out the macroinvertebrates, and putting them in a collection jar.

Documentation
Training is documented with a volunteer database, which lists what training sessions a volunteer has participated in. The Project Manager is responsible for maintaining the database in house.

SECTION B: Measurements/Data Acquisition

B1. Study Design and Methods

Study Design
The benthic macroinvertebrate community in the Salmon-Trout River will be monitored twice a year, once in May/June and again in September/OctoberOctober, following MiCorps stream monitoring protocol. In stream and riparian habitat will be assessed during fall conditions on an annual basis (September to October) following MiCorps stream monitoring protocols.

Monitoring Task Schedule

March: Begin recruitment for volunteers for the spring sampling event.

April: Continue recruitment for spring sampling event. Prepare for the April sampling event by visiting each site and ensuring access is clear. Check that equipment is in good repair. Create small teams with experienced and inexperienced volunteers.

May/June: Retrain volunteers if needed. Hold sampling event over a two week period. Tell each group where they will be sampling. Conduct macroinvertebrate collection.

June: Verify identifications of benthic macroinvertebrates. Enter data about the volunteers and macroinvertebrates. Send a brief press release to media outlets regarding results and successes of the project, along with information about volunteering.

August: Begin recruiting volunteers for the September/October monitoring event. Visit each site and ensure access is clear. Retrain volunteers if needed. Check that equipment is in good repair.

September/October: Create teams with experienced and inexperienced volunteers. Tell each group when and where to begin. Conduct the collection of macroinvertebrates and stream habitat assessment.

November: Review and interpret data and make reports. Enter results into MiCorps data exchange.

Site Descriptions (see attached map)

Locating and Identifying Monitoring Sites

Monitoring sites are located within the Salmon-Trout River watershed. Monitoring site locations are described using the name of the county, the creek, and the road crossing or other distinctive landmark. Maps are provided to the collecting team as well as written directions. Permission to access property is obtained at least one week prior to the designated study date.

Monitoring Benthic Macroinvertebrates

Our monitoring is intended to characterize the condition of the Salmon-Trout River, while involving numerous groups and members of the community. We have designed our macroinvertebrate monitoring program so that there will be one to two training days inside of the two week collection period.

The macroinvertebrate community will be monitored and identified to order level twice per year, once in the spring and once in the fall. Samples will be saved to allow for the possibility of future identification to the family level. Equipment to be used for this process includes: 12" D-frame kicknets, forceps, white plastic sorting trays, sealable sample jars, ethanol, and a magnifier. Literature references used for identification are materials recommended and/or provided by MiCorps, such as the *Guide to Aquatic Invertebrates of the Upper Midwest.*

All sites are sampled within a two week period in the spring and fall. It is intended that the sampling from year to year will take place during a consistent time period, with the realization that the actual dates will depend on weather and stream conditions. If the site remains inaccessible for two weeks, or volunteers are not available to conduct the sampling at a different time, the site will not be sampled and there will be a gap in the data. Each team will sample one site. Each team then will bring their collection back to a central location.

Multiple collections will be taken from each habitat type present at the site, including riffle, rocks and other large objects, leaf packs, submerged vegetation or roots, pools, and

depositional areas, while wading using a D-frame kicknet. The trained Streamside Leader will record the types of sampled habitats within the monitored station. 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 a collective pan for identification. Once the macroinvertebrates have been identified and verified by the Team Leader, the representative sample will be placed into jars of rubbing alcohol for later verification. During the collection, the Collector will provide information to the team Streamside 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 Streamside Leader will instruct and assist other team members in detecting and collecting macroinvertebrates in the sorting pans, including looking under bark and inside constructions made of sticks and 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.

Prior to leaving each site, the net is thoroughly rinsed and examined to ensure that no creatures are carried in it to the next site.

At the collecting site, all invertebrate sample jars or buckets receive a label written in pencil, stating date, location, name of collector, and number of jars or buckets containing the collection from this site, which is placed inside the jar and on the lid. The data sheet also states the number of jars containing the collection from this site. The team leader is responsible for ensuring labeling occurs and for returning all jars and equipment. Upon return to the meeting location, 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.

Habitat

Habitat assessments will be conducted in the fall during a two week period. A descriptive procedure is provided to volunteers to guide them through the process. Photos are used to document areas of erosion, degradation, or concern. Habitat will be monitored at least once a year, during low flow in the fall. Monitoring procedures and methods will follow MiCorps guidelines. Data sheet is attached.

Equipment for measuring habitat quality includes a nylon tape measure and a wooden measuring stick, both marked in feet and tenths of feet.

Quality Control Checklists

Equipment Quality Control

- Check to make sure equipment is in working order and not damaged
- Clean equipment before and after taking it into the field
- Label equipment with their dates of purchase and dates of last usage

- Check the expiration date of chemical reagents prior to each use
- Check the batteries on all equipment that requires them
- Make sure all equipment is calibrated appropriately before conducting each test

Field Procedures Quality Control

- Conduct repeat and/or side-by-side tests performed by separate field crews
- At least once every three years in each season: change the composition of the field crews to maintain objectivity and minimize individual bias
- Review field records before submitting for analysis to minimize errors

Because our evaluation is based on the diversity in the community, we attempt to include a complete sample of 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 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 are re-sampled 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. All lab sorting is rechecked by an expert before completing identification.

B2. Instrument/Equipment Testing, Inspection, and Maintenance

In the days prior to a monitoring event, the Project Manager will check all equipment carefully. Supplies for each team will be put together including buckets, net, pans, forceps, datasheets, directors, and jars with alcohol. All equipment will be stored at the Yellow Dog Watershed Preserve office in Big Bay.

- **D-frame kick nets:** will be inspected before and after each sampling session to look for any defects or tears in the nets.
- **Collection jars** (with poly seal caps): each jar and lid will be inspected for cracks or defects before each use. After jars are in use they will be inspected for leaky tops, improper seals, cracks, and chips.
- **Forceps**: will be cleaned and inspected to make sure the tips meet before each sampling event.
- **Magnifiers/Dissection Scopes**: will be cleaned and inspected to make sure they are functioning properly before and after each identification event.

B3. Inspection/Acceptance for Supplies and Consumables

- **D-frame Kick Nets** – Purchased July 2012, replace when damaged beyond repair

- **Collection Jars** – Purchase August 2012, resupply when all are in use or broken
- **Forceps** – Purchased July 2012, replace when tips do not meet when squeezed
- **Magnifier/Dissection Scope** – Purchased in August 2012, replace when no longer functional
- **Ethanol** – Purchased August 2012, replace when all is consumed or past expiration date
- **Sorting Trays** – Purchased July 2012, replace when they no longer function as needed

Prior to a monitoring event, YDWP staff will make sure there are ample data sheets, labels, and that all equipment is in order.

B4. Non-direct Measurements

This section is not applicable to our project.

B5. Data Management

All data are recorded on original field and laboratory paper data sheets. These data sheets are stored in hard copy and electronically at the YDWP office. Raw data will be entered and managed in a Microsoft Excel database. All data is backed up before and after each sampling event's data has been entered.

Data will be entered by the data manager into the program's MS Excel database for long-term storage. Once a year, all new data will be exported to a MiCorps compatible format and sent to MiCorps for inclusion in their data exchange system. Data sheets will be filed with YDWP indefinitely.

Field data sheets are checked by the Project Manager upon return to YDWP. Any omissions or confusions are clarified as soon as possible. The Project Assistant will enter data into a database which is then used for both analysis and reporting. The final data tables are checked against the data sheets. The results of monitoring will then be posted on the YDWP website and in their newsletter, as well as distributed directly to other participating groups/community organizations.

Macroinvertebrates: A Stream Quality Index (SQI) is computed at each site. The method for calculating that metric can be found on the macroinvertebrate sampling data sheets.

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.

Section C: Data Validation and Reporting

C1. Assessment and Response Actions

Program effectiveness is gauged through pre and post-event surveys given to each participant. These surveys bring in good ideas and help identify any problems in methods, training, or with particular volunteers. Volunteers may be encouraged to repeat a training event if their work is of poor quality.

- Side-by-side sampling took place on August 20, 2012 during which the Project Manager and Project Assistant and Dr. Paul Steen sampled the stream. Dr. Steen watched the Project Manager for procedural problems and suggested remedies as necessary.
- Data sheets will incorporate essential QAPP procedures, such as the type of samples taken from each type of habitat.
- Volunteer team leaders trained by MiCorps will make sure that quality assurance protocols are followed and report any issues possibly affecting data quality to the Project Manager. All staff at YDWP will read and review the QAPP on an annual basis.

If deviation from the QAPP is noted at any point in the sampling or data management process, a deviation form will be filled out, reviewed by the Project Manager, and recorded. Re-sampling may 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, Validation, and Verification

For benthic macroinvertebrate collections, volunteer team leaders and collectors are trained in completing field data sheets thoroughly and accurately. All volunteers performing habitat assessments are also trained in this way. Benthic macroinvertebrate and habitat data sheets are double checked in the field. All data sheets are reviewed by YDWP staff for thoroughness and clarity. Data entered into the database will be checked against the respective hard copy of the data sheet.

If new data deviate from previous records beyond previously stated DQOs, these outliers will be identified, and the site can be re-sampled by the Project Manager or Project Assistant, or the data will be thrown out. The Project Manager has primary responsibility for identifying questionable data and taking corrective action.

C3. Reconciliation of data with Data Quality Objectives

In order to best determine if the data meets the DQOs set forth in section A7, we will assess our data within one week after sampling. If a sample deviates from the previously stated DQO's, the parameter will be re-sampled at the site in question if it is feasible to do so within a two week period. Because environmental change can cause substantial variation in a parameter from one sampling event to the next, re-sampling soon after the deviant data were recorded can confirm if those conditions truly exist, or if it resulted

from sampling error. If re-sampling suggests sampling error in the original data, those data will be rejected and replaced by the re-sampled data. If re-sampling is not possible within the two week period, then the original data are retained but flagged for comparison with future sampling events, and may be rejected if inconsistent with future data.

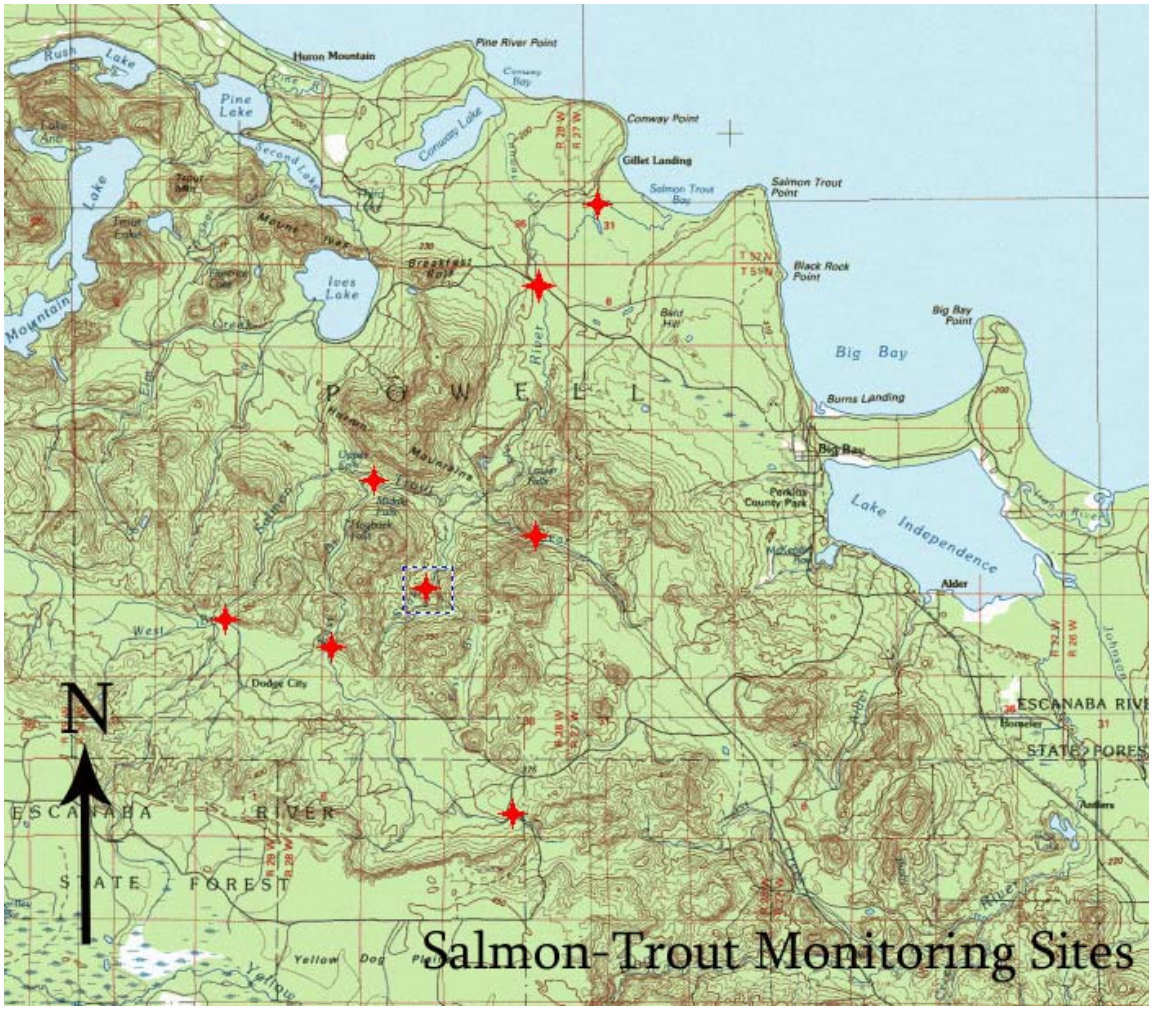
C4. Data Reporting

Reporting will be a key component to the success of this project. Many reports between volunteers and the project managers will be informal, and will be completed over email, telephone, or in person. These informal reports will help ensure the continued success of the sampling/identification events. The Project Manger will also report to the MiCorps program administrator in a more formal way on a regular basis.

Benthic macroinvertebrate and habitat assessment data summaries, with a number of calculated metrics including a Stream Quality Index, are reported with brief interpretations for the sampling sites on the YDWP website and in their newsletter.

Attachments

Attachment 1- Site Map of Salmon-Trout Volunteer Stream Monitoring Project Locations



Attachment 2- Macroinvertebrate Datasheets

MiCorps Site ID#:_____

Stream Macroinvertebrate Datasheet

Stream Name: _____

Location:_____ (Circle one: *Upstream* or *Downstream* of road?)

Date:_____ Collection Start Time:_____ (AM/PM)

Major Watershed:_____ HUC Code (if known):_____

Latitude:_____ Longitude:_____

Monitoring Team:

Name of Person Completing Datasheet:_____

Collector:_____

Other Team Members:_____

Stream Conditions: Average Water Depth:_____ feet

Is the substrate covered with excessive silt? ____ No ____ Yes (describe:_____)

Substrate Embeddedness in Riffles: ____ 0-25% ____ 25-50% _____ > 50% ____ Unsure

Did you observe any fish or wildlife? ( ) Yes ( ) No If so, please describe:_____

Macroinvertebrate Collection: Check the habitats that were sampled. Include as many as possible.

____ Riffles
____ Cobbles
____ Aquatic Plants
____ Runs
____ Stream Margins
____ Leaf Packs
____ Pools
____ Undercut banks/Overhanging Vegetation
____ Submerged Wood
____ Other (describe:_____ _____)

Did you see, but not collect, any **live crayfish**? (___ Yes ___ No), or **large clams**? (___ Yes ___ No)
"remember to include them in the assessment on the other side!"

Collection Finish Time:_____(AM/PM)

Datasheet checked for completeness by:_____ Datasheet version 10/08/05
Data entered into MiCorps database by:_____ Date:_____

MiCorps Site ID#:_____

Michigan Clean Water Corps

IDENTIFICATION AND ASSESSMENT

Use letter codes [**R** (rare) = 1-10, **C** (common) = 11 or more] to record the approximate numbers of organisms in each taxa found in the stream reach.

*** Do NOT count empty shells, pupae, or terrestrial macroinvertebrates***

Group 1: Sensitive

_____ Caddisfly larvae (Trichoptera)
EXCEPT Net-spinning caddis
_____ Hellgrammites (Megaloptera)
_____ Mayfly nymphs (Ephemeroptera)
_____ Gilled (right-handed) snails (Gastropoda)
_____ Stonefly nymphs (Plecoptera)
_____ Water penny (Coleoptera)
_____ Water snipe fly (Diptera)

Group 2: Somewhat-Sensitive

_____ Alderfly larvae (Megaloptera)
_____ Beetle adults (Coleoptera)
_____ Beetle larvae (Coleoptera)
_____ Black fly larvae (Diptera)
_____ Clams (Pelecypoda)
_____ Crane fly larvae (Diptera)
_____ Crayfish (Decapoda)
_____ Damselfly nymphs (Odonata)
_____ Dragonfly nymphs (Odonata)
_____ Net-spinning caddisfly larvae
(Hydropsychidae; Trichoptera)
_____ Scuds (Amphipoda)
_____ Sowbugs (Isopoda)

Group 3: Tolerant

_____ Aquatic worms (Oligochaeta)
_____ Leeches (Hirudinea)
_____ Midge larvae (Diptera)
_____ Pouch snails (Gastropoda)
_____ True bugs (Hemiptera)
_____ Other true flies (Diptera)

STREAM QUALITY SCORE

Group 1:
_____ # of R's * 5.0 = _____
_____ # of C's * 5.3 = _____
Group 1 Total = _____

Group 2:
_____ # of R's * 3.0 = _____
_____ # of C's * 3.2 = _____
Group 2 Total = _____

Group 3:
_____ # of R's * 1.1 = _____
_____ # of C's * 1.0 = _____
Group 3 Total = _____

Total Stream Quality Score = _____
(Sum of totals for groups 1-3; round to nearest whole number)

Check one:
_____ Excellent (>48)
_____ Good (34-48)
_____ Fair (19-33)
_____ Poor (<19)

Identifications made by:_____

Rate your confidence in these identifications: Quite confident 5 4 3 2 1 Not very confident

Datasheet checked for completeness by:_____ Datasheet version 10/06/05
Data entered into MiCorps database by:_____ Date:_____

Attachment 3- Habitat Assessment

MiCorps Site ID#:_____

Michigan Clean Water Corps

Stream Habitat Assessment

Stream Name:_____

Location:_____ (Circle one: *Upstream* or *Downstream* of road?)

Date:_____ Start Time:_____ (AM/PM)

Monitoring Team:

Name of Person Completing Datasheet: _____

Other Team Members:_____

_____

_____

Location Information:

Major Watershed:_____ HUC Code (if known):_____

County:_____ Township: _____ Sec T R ¼ ¼

Latitude: _____ Longitude: _____

Lat./Long. Coordinate Determination Method (check one):
___ GPS ___ GPS w/ DBR ___ Digital mapping software ___ Topographic map

___ Other (describe _____) Map Scale (if known _____)

Did you assess 300 feet of stream? _____ If not, how much? _____ Why?_____

Reminders:

Take photographs of the site as you work.
Left and right are determined as you are facing downstream.

MiCorps Site ID#:_____

PHYSICAL HABITAT

BACKGROUND INFORMATION

Storm Event Conditions noted at site?	None	Light	Moderate		Heavy
Days since Rain	≤ 1	2	≥ 3		Unknown
Water Temp./D.O./pH *					
Water Color	Clear	Gray	Brown	Black	Green
Water body Type-upstream	Stream	Lake	Impound		Wetland
Water body Type-downstream	Stream	Lake	Impound		Wetland
Stream Width (ft.)	<10	10-25	25-50		>50
Avg. Stream Depth (ft.)	<1	1-3	>3		Unknown
Water Velocity (ft/s) *					
Stream Flow Type	Dry	Stagnant	L	M	H

PHYSICAL APPEARANCE
(Circle all that apply)

Aquatic Plants	None	Present	Abundant
Floating Algae	None	Present	Abundant
Filamentous Algae	None	Present	Abundant
Bacterial Sheen/Slimes	None	Present	Abundant
Turbidity	None	Present	Abundant
Oil Sheen	None	Present	Abundant
Foam	None	Present	Abundant
Trash	None	Present	Abundant

SUBSTRATE (%)
(add to 100%)

Boulder – 10" diameter	
Cobble/Gravel – 0.08" to 10" diameter	
Sand – coarse grain	
Silt/Detritus/Muck - fine grain/organic matter	
Hardpan/Bedrock – solid clay/rock surface	
Artificial – manmade	
Unknown	

INSTREAM COVER
(circle one)

Undercut Banks	Yes	No
Overhanging Vegetation	Yes	No
Deep Pools	Yes	No
Boulders	Yes	No
Aquatic Plants	Yes	No
Logs or Woody Debris	Yes	No

RIVER MORPHOLOGY

Riffle	Present					Abundant
Pool	Present					Abundant
Channel	Natural		Recovering			Maintained
Designated Drain	?		Y			N
Highest Water Mark (ft)	?	<1	1-3	3-5	5-10	>10

STREAM CORRIDOR

Riparian Veg Width (feet - Left Bank)	<10	10-30	30-100	>100
Riparian Veg Width (feet - Right Bank)	<10	10-30	30-100	>100
Bank Erosion	0	L	M	H
Streamside Land Cover	Bare	Grass	Shrub	Trees
Stream Canopy %	<25	25-50		>50

Typical Stream Cross Section Sketch

Adjacent Land Uses Seen
(circle all that apply)

Wetlands	Left	Right
Shrub or Old Field	L	R
Forest	L	R
Pasture	L	R
Crop Residue	L	R
Row Crop	L	R
Residential Lawns, Parks	L	R
Impervious Surface	L	R
Disturbed Ground	L	R
No Vegetation	L	R

* Optional Data Item

Michigan Clean Water Corps

MiCorps Site ID#:_____

Stream Name:_____ Location:_____

POTENTIAL SOURCES OF STREAM DEGRADATION (Severity: S – slight; M – moderate; H – high) (Indicate all that apply)							
Crop Related Sources	S	M	H	Land Disposal	S	M	H
Grazing Related Sources	S	M	H	On-site Wastewater Systems	S	M	H
Intensive Animal Feeding Operations	S	M	H	Silviculture (Forestry NPS)	S	M	H
Highway/Road/Bridge Maintenance and Runoff (Transportation NPS)	S	M	H	Resource Extraction (Mining NPS)	S	M	H
Channelization	S	M	H	Recreational/Tourism Activities (general)	S	M	H
Dredging	S	M	H	• Golf Courses	S	M	H
Removal of Riparian Vegetation	S	M	H	• Marinas/Recreational Boating (water releases)	S	M	H
Bank and Shoreline Erosion/ Modification/Destruction	S	M	H	• Marinas/Recreational Boating (bank or shoreline erosion)	S	M	H
Flow Regulation/ Modification (Hydrology)	S	M	H	Debris in Water	S	M	H
Upstream Impoundment	S	M	H	Industrial Point Source	S	M	H
Construction: Highway, Road, Bridge, Culvert	S	M	H	Municipal Point Source	S	M	H
Construction: Land Development	S	M	H	Natural Sources	S	M	H
Urban Runoff (Residential/ Urban NPS)	S	M	H	Source(s) Unknown	S	M	H

Additional Comments:

Please use this space to make any additional comments about site conditions or this assessment process...

Finish Time: _____ (AM/PM)