Quality Assurance Project Plan

West Michigan Environmental Action Council's Adopt-a-Stream

A1. Title and Approval Sheet

Quality Assurance Project Plan for

WMEAC Adopt-a-Stream

Date: Sept 23, 2022

Version # 1

Organization: West Michigan Environmental Action Council

QAPP Prepared by: Carlos Calderon

Title: Water Programs Manager

Signature: _____

Other responsible individual: Kyle Hart

Title: Environmental Education Manager

Signature: _____

Signature upon approval:

MiCorps Reviewer: _____Paul Steen_____

Signature of reviewer Date

QAPP is approved for two years after the signature date given; afterwards it must be reapproved.

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Distribution List

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SECTION A: Program Information

A4. Program Organization

WMEAC's Adopt-a-Stream Program is overseen by the Water Programs Manager: Carlos Calderon, with program support from the Education Programs Manager: Kyle Hart. Carlos will serve as lead program coordinator, facilitating volunteer training and managing the quality assurance of data collection, including updating the QAPP on a biannual basis and quarterly reporting. Kyle will be the secondary contact for the program, and assist with volunteer recruitment and communications, aid in-field data collection and quality control, along with assisting in maintenance and inventory for equipment and samples. The Crane Endowed Water Fellow will also assist the Water Programs Manager with data management and quality assurance, upon hiring and training in the procedures. The WMEAC office (1007 Lake Dr. SE, Grand Rapids, MI 49506) will serve as the laboratory for sample sorting and identification of macroinvertebrates. No chemical laboratory testing is currently being conducted as part of this program. Corrective Actions will be overseen by Carlos, with input from Kyle and volunteer leads as they present themselves.

The current community partners (volunteers) include the Friends of Buck Creek, Plaster Creek Stewards and the Grand Rapids Water Protectors, as well as businesses enrolled in the current Adopt-a-Stream program. These volunteers will be trained in the MiCorps Stream Monitoring Data Collection protocols and be responsible for compiling their findings with assistance from WMEAC staff. Ideally, the groups will self-select which specific activities they would like to be involved in, either collectors, pickers or both.

A5. Problem Definition/Background

The Lower Grand River Watershed consists of several tributaries that are impacted by human development and land-use, with subwatersheds spanning from rural to dense urban areas. The two streams of interest of this project are Plaster and Buck Creeks, the former is one of the most impacted streams in the region (impairments range from total and partial body contact to degraded fish and macroinvertebrate communities due to a variety of pollution sources), while the other has experienced rapid growth and development of residential and commercial spaces. Environmental organizations are actively working to aid in the remediation of these impairments, promoting low-impact development practices, providing watershed education and implementing restoration projects.

The primary goals of the WMEAC Adopt-A-Stream Program of volunteer monitoring are to provide reliable data about the conditions of the entire river system, educate the watershed residents about what the streams need from them and engage residents and communities in actions to protect the river system. The primary actions we envision taking based on monitoring results are to report the trends and conditions of the stream sections studied. As clarified in other sections of this document, we do not present any results on the ecological conditions until we have three years of benthic community data plus a habitat assessment and one season of temperature measurements. In the event that an extreme change in benthic macroinvertebrates and habitat is observed (such as oil in the sediment and a degraded community), we will notify the appropriate authorities about the unverified results immediately and stay in contact with them as they investigate the situation. Our goal is to assist in identifying concerns and providing solutions of stream deterioration.

A6. Program Description

WMEAC and its community partners will be investigating the current water quality conditions of two tributaries of the Grand River, Plaster Creek and Buck Creek. Our volunteers will be collecting aquatic macroinvertebrate samples from their respective streams twice per year, and habitat surveys every year.

Both streams are physically accessible to the public throughout the watershed at sites that include parks, schools, and public trails. Despite this, these streams are not truly accessible due to safety advisories for drinking water, swimming, fishing, and other uses resulting from water quality impairments from the sediment, pathogen, and nutrient pollution. Both streams have legacies of degradation, as well as contemporary restoration efforts, which makes them prime candidates for our monitoring program. The watersheds have each experienced a significant change in land use of the long-term. Prior to European settlement in the 1820s, these tributaries were home to vast forests, wetlands, and savanna. By the 1890s most of the land had been cleared and converted to developed and working lands. Much of this change has caused an increase of non-point source pollution.

The long-term goals as outlined in the Buck Creek and Plaster Creek watershed management plan's (WMP) include improvement and restoration of the coldwater & warmwater fisheries and other habitats for indigenous aquatic life and wildlife. Pathological hazards, such as high levels of *E. coli*, are present throughout each watershed, impairing recreational uses such as swimming and fishing. The monitoring of these streams would allow current water quality to be assessed and to determine the progress of these goals. As restoration efforts continue to be implemented in both streams, monitoring is vital to track whether these restoration measures are effective.

A7. Data Quality Objectives

A7.1 Precision/Accuracy: Accuracy is the degree of agreement between the sampling result and the true value of the parameter or condition being measured. Accuracy is most affected by the equipment and the procedure used to measure the parameter. Precision refers to how well you are able to reproduce the result on the same sample, regardless of accuracy.

The purpose of this project is to gauge stream health by measuring the total diversity of macroinvertebrate taxa. 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 multiple independent (duplicate) collections of the sampling sites, our goal for precision and accuracy is conservative. A given site's Water Quality Rating (WQR) 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.

Precision and accuracy will be maintained through following standardized MiCorps procedures. The Program Manager must be trained in MiCorps procedures at the annual MiCorps training led by MiCorps staff. MiCorps staff also conduct a method validation review (the "side-by-side" visit) with the Program Manager to ensure their expertise, preferably prior to the first volunteer leader training session. This review consists of supervising the Program Manager's macroinvertebrate sampling and sorting methodology to ensure that they are consistent with MiCorps protocol. All cases of collecting

deficiencies are promptly followed (during that visit) by additional training in the deficient tasks and a subsequent method validation review may be scheduled for the following collecting season. Upon request, MiCorps staff may also verify the accuracy of the program's macroinvertebrate identification. If a problem arises with a subset of macroinvertebrates, a thorough check may be requested. (The side-by-side visit was held on Friday, September 23rd, 2022 with MiCorps VSMP Manager Dr. Paul Steen).

Precision and accuracy will be maintained by conducting consistent volunteer team leader training. Volunteer team leaders will be trained up joining the program, and retrained every three years (at a minimum). Techniques under review shall include:

- collecting style (must be thorough and vigorous);
- habitat diversity (must include all available habitats and be thorough in each one);
- picking style (must be able to pick thoroughly through all materials collected and pick all sizes and types of macroinvertebrates);
- variety and quantity of organisms (must ensure that diversity and abundance at site is represented in sample);
- transfer of collected macroinvertebrates from the net to the sample jars (specimens must be properly handled and jars correctly labeled).

Precision and accuracy will be maintained through careful macroinvertebrate identification. Volunteers may identify macroinvertebrates in the field, but these identifications and counts are not official. All macroinvertebrate samples are stored in alcohol to be identified at a later identification session. Volunteers can be designated as identification experts as determined by the judgment of the Program Manager. All field identifications and counts will be checked by an expert with access to a scope, keys, and field guides. The Program Manager will check at least 10% of the specimens processed by experts to verify results (with a concentration on hard to identify taxa). If more than 10% of specimens checked were misidentified, then the Program Manager will review all the specimens processed by that expert and reassess if that person should be considered an expert for future sampling events.

A7.2 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 D and WQR 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. If the sample falls outside this range, then the Program Manager needs to 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).

A7.3 Completeness: Completeness is a measure of the amount of valid data actually obtained versus the amount expected to be obtained as specified in the original sampling design. It is usually expressed as a percentage. For example, if 100 samples were scheduled but volunteers sampled only 90 times due to bad weather or broken equipment, the completeness record would be 90%.

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 develop a course of action to improve the completeness of future sampling events.

A7.4 Representativeness: Study sites are selected to represent the full variety of stream habitat types available locally. 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 WQR 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.).

A7.5 Comparability: Comparability represents how well data from one stream or study site can be compared to data from another. 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 training sessions by MiCorps staff. The Program Manager 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 certainly within a two-week time frame.

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

A8. Special Training/Certifications

Lead program staff from WMEAC have attended and are well-versed in the stream sampling procedures required by the MiCorps VMSP. Volunteers involved in data collection will attend one training session to learn and demonstrate in-stream sampling for macroinvertebrates, this in-field training will also include the habitat survey. Additionally, an identification training will be offered to volunteers that self-select to participate in the data processing portion of the program.

WMEAC staff will host a separate training session that covers macroinvertebrate identification procedures. Volunteers that go through the macroinvertebrate identification training and adequately demonstrate functional knowledge of identifying organisms will receive a certificate of completion and be allowed to complete ID without the assistance of WMEAC staff.

SECTION B: Program Design & Procedures

B1. Study Design and Methods

Initially, the WMEAC Adopt-a-Stream program will conduct stream monitoring in two streams, Plaster and Buck Creeks. Future plans will expand to other tributaries of the Grand River and/or Lake Michigan. As part of the proposal process, we reached out to the watershed groups that steward these streams to inquire about potential monitoring sites. The sites listed below were chosen on the basis of ease of access, areas of interest and sites downstream/upstream of past or proposed restoration projects. A map of the sites for both watersheds can be found in Appendix A.

<u>Buck Creek Monitoring Sites (HUC: 4050006-0510):</u>

BC001: Wedgwood Park (42°54'7.84" N, 85°45'52.07" W)

- Address: 3391 Wilson Ave SW, Grandville, MI 49418

BC002: Lemery Park (42°53'23.22" N, 85°43'17.86" W)

- Address: 4050 Byron Center Ave SW, Wyoming, MI 49519

BC003: Douglas Walker Park (42°48'56.90" N, 85°41'27.58" W)

- Address: 1195 84th St SW, Byron Center, MI 49315

BC004: Prairie Wolf Park (Sharps Creek) (42°48'22.75" N, 85°37'35.16" W)

- Address: 8555 Kalamazoo Ave SE, Caledonia, MI 49316

<u>Plaster Creek Monitoring Sites (HUC: 4050006-[0505/0506]):</u>

PC001: Grand Rapids Bike Park (42°55'28.04" N, 85°40'46.46" W)

- Address: 550 Kirtland St SW, Grand Rapids, MI 49507

PC002: Ken-o-Sha Park (42°54'19.25" N, 85°37'59.96" W)

- Address: 1353 Van Auken St SE, Grand Rapids, MI 49508

PC003: Calvin Ave Basin (Silver Creek Drain) (42°56'9.68" N, 85°38'11.36" W)

- Address: 1471 Calvin Ave SE, Grand Rapids, MI 49507

PC004: Shadyside Park (42°49'52.56" N, 85°34'39.40" W)

- Address: 7343 Hammond Ave Dutton, MI 49316

The benthic population is sampled within a 2-week period in mid-April and mid- October. All equipment to be used for this sampling is listed in Appendix B and the SOPs are given in Appendix C.

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 white pans. The remaining volunteers (Pickers) will pick out samples of all different types of macroinvertebrates from the pans and place them into jars of 70% ethyl alcohol for later identification. 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 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 pencil or printed with a laser printer, starting 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 Streamside Leader is responsible for labeling and securely closing the jars, and returning all jars and all equipment to the Program Manager. Upon return to the Program building, the collections are checked for labels, the data sheets are checked for completeness and for correct information on the number of jars containing the collection from the site, and the jars are secured together with a rubber band and site label and placed together in one box. They are stored in the central office until they are examined and counted on the day of identification (one or two weeks later). 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 printed label inside the jar and stored at the program office indefinitely. The alcohol is carefully changed (to avoid losing small specimens) in the jars every few years.

After monitoring is done at any site, the equipment is inspected, cleaned, and sanitized with a dilute bleach prior to reusing.

Since our evaluation is based on the diversity in the community, we attempt to include a complete sample of the different groups present, rather than a random sub-sample. We do not assume that a single collection represents all the diversity in the community, but rather we consider our results reliable only after repeated collections spanning at least three years. Our results are compared with other locations in the same 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.

Streamside Leaders and Collectors, with Pickers assisting as well, will complete a Habitat Assessment once a year during the fall season immediately following the macroinvertebrate sampling or at least within two weeks of the sample event. The Habitat Assessment will follow the procedure and datasheet given in Appendix D. 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.

As many of the parameters within the Habitat Assessment are qualitative, personal bias is inherent. To account for bias and personal discrepancies, Streamside leaders will have on hand a copy of MiCorps Stream Monitoring Procedures, which details the qualitative criteria, and helps clarify questions. Streamside leaders will read questions aloud to their group and form consensus on question answers. Since the information reviewed in the Habitat Assessment holds considerable educational value for volunteers and the goals of the MiCorps program, it is important that Streamside Leaders inform other 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 the volunteer training and have been certified by the Program Manager. 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.

As a critical role of the Habitat Assessment is to inform us of any areas of habitat degradation that could impact water quality, 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.

B2. Instrument/Equipment Testing, Inspection and Maintenance

All equipment will be inspected by Streamside Leaders after each use. If any repairs/replacements need to be made, the Program Manager will be informed and corrections will be made prior to additional use. Streamside Leaders are asked to rinse all personal equipment (waders) used at the monitoring site and again, at home using a freshwater source (preferably on the lawn) to prevent transfer of any species or contaminants. Additionally a dilute bleach mixture will be utilized on all equipment returned to WMEAC before storage or additional use in the field. In addition, WMEAC staff will inspect all equipment at the end of each monitoring season and prior to subsequent monitoring seasons or if damage is reported.

B3. Inspection/Acceptance for Equipment and Supplies

Equipment Type	Inspection & Acceptable Condition	Storage and Maintenance	Purchase Date & Replacement Date	Staff Assigned
Waders	Look for visible tears, put on and wet to test for leaks before and after repair if damage suspected	Disinfect before winterizing, use neoprene strips and glue for mending; replace as needed if beyond repair	9/25/2022 | 7/1/2025	Carlos Calderon & Kyle Hart
D-nets	Free of holes and canvas net firmly attached, depth markings clear-1, 2, 3ft, WMEAC clearly labeled	Disinfect before winterizing; several replacement nets on hand in storage. Replace handles and metal frames as needed	9/25/2022 | 7/1/2025	Carlos Calderon & Kyle Hart
Five gallon buckets	Clean, no cracks, WMEAC label	Wash or replace as needed	5/10/2021 | 7/1/2024	Kyle Hart
Data clipboards	Clean, no cracks	Replace as needed	6/20/2022 | 7/1/2025	Kyle Hart
Picking tray	Clean, no cracks, WMEAC label	Replace & wash as needed	9/25/2022 | 7/1/2025	Kyle Hart
Ice cube trays	Clean, no cracks, WMEAC label	Replace & wash as needed	3/1/2018 | 7/1/2025	Kyle Hart
Squirt bottle	Clean, make sure lid works, WMEAC label	Replace & wash as needed	9/25/2022 | 7/1/2025	Kyle Hart
Droppers	Clean, no leaks, flagging tape tied to handle	Replace tape as needed & replace droppers as needed	3/1/2018 | 7/1/2025	Kyle Hart
Forceps	Clean, tips come together, flagging tape tied to handle	Replace tape as needed & replace forceps as needed	3/1/2018 | 3/1/2025	Kyle Hart
Counter	Reset to zero, make sure it advances correctly, WMEAC label	Re-label as needed & replace as needed	9/25/2022 | 7/1/2027	Kyle Hart
Stopwatch	Reset clock to zero, no water damage, WMEAC label	Re-label as needed & replace batteries as needed	7/1/2022 | 7/1/2027	Kyle Hart
Meter stick	Clean, no cracks, readable, WMEAC label	Replace as needed	9/1/2022 | 7/1/2025	Kyle Hart

Reel tape measure	Clean, reel works correctly, WMEAC label	Re-label as needed & replace as needed	3/1/2017 | 7/1/2027	Kyle Hart
Preservation jars	Clean, blank labels, no cracks	Replace empty preservation jars in kit after each sampling outing	9/25/2022 | 3/1/2025	Kyle Hart
Hand towels	Check at least 2 clean towels are in kit	Wash as needed & replace as needed	3/1/2021 | 7/1/2025	Kyle Hart
Laminated SOPS	Clean, no water damage	Re-print and laminated replacement as needed	9/25/2022 | 7/1/2023	Kyle Hart
Storage tub	Clean, not broken, WMEAC label	Re-label as needed & replace as needed	3/1/2020 | 7/1/2025	Kyle Hart
Data sheets	Clean, no water damage, blank	Restock as needed after sampling	9/25/2022 | 3/1/2023	Kyle Hart
Pencils	Check lead supply and erasers	Replace as needed	9/25/2022 | 3/1/2023	Kyle Hart
Hand sanitizer	Check at least ½ full	Restock as needed	9/1/2022 | 9/1/2023	Kyle Hart
First aid kit	Kit isn't damaged, stocked	Restock as needed or replace if water damaged	9/1/2022 | 9/1/2023	Kyle Hart
Trash bags	Check at least 3 bags are in kit	Restock as needed	9/1/2022 | 9/1/2025	Kyle Hart
Vinyl gloves	Check at least 5 pairs are in kit	Restock as needed	9/1/2022 | 9/1/2025	Kyle Hart

B4. Non-direct Measurements

No non-direct measurements will be conducted this program year.

B5. Data Management

Raw data will be entered and managed in Google Sheet workbooks by Kyle Hart or the Crane Endowed Water Fellow and cross referenced by Kyle Hart or Carlos Calderon with the paper data sheets received from volunteers. The original data sheets will be filed securely at the WMEAC office for at least 5 years and all digital data records are backed up to the Cloud. Access to the Google Sheet workbook will only be granted to the Program Manager, Program Support, and the Crane Endowed Water Fellow. Computer and email passwords provide data security. Data will be entered into the MDE within a month of the identification event by Kyle Hart or Carlos Calderon.

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 Water Quality Rating (WQR) from the MiCorps datasheet is also computed. The method for calculating that metric is included in Appendix D.

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: System Assessment, Correction and Reporting

C1. System Audits and Response Actions

Volunteer Team Leaders trained by the Program Managers 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 section Data Quality Objectives (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 the section Data Quality Objectives (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 the section Data Quality Objectives (B1).

C4. Reporting

Throughout the duration of this program, quality control reports are included with quarterly project reports that are 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 staff generates annual reports sharing results of the program with volunteers, special interest groups, local municipalities, and relevant state agencies. Data and reports are made available via the organization's web page.

Appendix A: Site Map for Plaster and Buck Creek Watersheds

See: Attachment A

Appendix B: Equipment and Supplies

Every year prior to monitoring, all equipment will be inspected and checked to ensure proper working condition. All reusable equipment will be cleaned prior to use in the field. All consumable materials will be restocked as needed. It will be the responsibility of the Program Support and the Crane Endowed Water Fellow to ensure sample collection supplies are in sufficient supply and appropriate condition prior to every monitoring season.

Equipment may be defined as objects used in monitoring activities that are reused from year to year. The equipment readily utilized in the WMEAC Adopt-a-Stream Program includes:

Equipment Type	Quantity per kit	Purpose	Storage and Maintenance
Waders	2	Macroinvertebrate and habitat assessment	Disinfect before winterizing, use neoprene strips and glue for mending; replace as needed if beyond repair
D-nets	2	Macroinvertebrate collection	Disinfect before winterizing; several replacement nets on hand in storage. Replace handles and metal frames as needed
5-gallon buckets	2	Macroinvertebrate collection	Wash or replace as needed
Data clipboards	2	Macroinvertebrate and habitat assessment	Replace as needed
Picking tray	2	Macroinvertebrate inventory	Replace & wash as needed
Ice cube trays	4	Macroinvertebrate inventory	Replace & wash as needed
Squirt bottle	1	Macroinvertebrate inventory	Replace & wash as needed
Droppers	2	Macroinvertebrate inventory	Replace tape as needed & replace droppers as needed
Forceps	2	Macroinvertebrate inventory	Replace tape as needed & replace forceps as needed
Counter	1	Macroinvertebrate inventory	Re-label as needed & replace as needed

Stopwatch	1	Macroinvertebrate inventory	Re-label as needed & replace batteries as needed
Meter stick	1	Habitat assessment	Replace as needed
Reel tape measure	1	Habitat assessment	Re-label as needed & replace as needed
Hand towels	2 towels per kit	Cleaning spills and drying equipment	Wash as needed & replace as needed
Laminated SOPS	2 sets of SOPS	Inform volunteers during events	Re-print and laminated replacement as needed
Storage tub	2	Storing all other equipment for events	Re-label as needed & replace as needed

Equipment Type	**Quantity**	**Purpose**	**Storage and Maintenance**
Stereomicroscope	2	Macroinvertebrate identification	Clean after identification event
Guide to Freshwater Invertebrates of N. America Voshell, J. Reese Jr. 2002	2	Macroinvertebrate identification	Replace if water damaged
Dichotomous keys	2	Macroinvertebrate identification	Clean after identification event, replace if water damaged
Task lights	5	Macroinvertebrate identification	Clean after identification event

Supplies may be defined as objects used in monitoring activities that are replaced on an annual basis. The supplies readily utilized in the WMEAC Adopt-a-Stream Program include:

Supply Type	**Quantity per kit**	**Purpose**	**Storage and Maintenance**
Data sheets	2 sets per outing	Data recording	Restock as needed after sampling
Pencils	5	Data recording	Replace as needed
Preservation jars	5	Final collection of macroinvertebrates	Replace empty preservation jars in kit after each sampling outing
70% ethanol	1 bottle	Preserving macroinvertebrates	Restock as needed
Hand sanitizer	1 bottle	Sanitation after sampling	Restock as needed
First aid kit	1	Basic first aid	Restock as needed or replace if water damaged

Trash bags	3	Optional trash removal during sampling	Restock as needed
Vinyl gloves	3 pairs	Optional trash removal during sampling	Restock as needed

Equipment Type	**Quantity**	**Purpose**	**Storage and Maintenance**
Dilute bleach	1	Disinfect waders, nets, sampling equipment after each monitoring event	Restock as needed

Appendix C: Standard Operating Procedures

SEE: Attachment B

Appendix D: Monitoring Forms for Macroinvertebrates and Habitat Assessment

SEE: Attachment C