

A1. Title and Approval Sheet

Quality Assurance Project Plan for the Eaton County Collaborative Stream Monitoring Program

Date: September 30, 2022

Version #1

Organizations: Olivet College and Eaton Conservation District

QAPP Prepared by: Erin Pavloski

Title: Assistant Professor of Environmental Science, Olivet College

Other responsible individual: Sue Spagnuolo

Title: Executive Director, Eaton Conservation District

Signature upon approval:

MiCorps Reviewer: Paul Steen

10/4/2022

Signature of reviewer

Date

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

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A3. Distribution List

The following organizations and individuals will receive a copy of the QAPP:

- Michigan Clean Water Corps: Dr. Paul Steen
- Olivet College: Erin Pavloski and Dr. Susanne Lewis
- Eaton Conservation District: Sue Spagnuolo
- Any future additional volunteer leads or hired program Environmental Outreach Coordinator/ interns

A4. Program Organization

1. Management Responsibilities:

Olivet College is the grantee for the program. Erin Pavloski (epavloski@olivetcollege.edu) is the program and quality assurance manager for the Eaton County Stream Monitoring Program. Erin is responsible for the following:

- Finalize, implement, and adhere to the Quality Assurance Project Plan
- Perform program promotion and assist in volunteer recruitment
- Purchase (with Dr. Susanne Lewis, Department Chair) necessary equipment for performing stream monitoring activities
- Coordinate and conduct volunteer stream monitoring training (with Sue Spagnuolo)
- Coordinate and implement volunteer stream monitoring field data collection events (with Sue Spagnuolo)
- Coordinate indoor macroinvertebrate identification sessions (with Sue Spagnuolo)
- Catalog and store collected specimens
- Perform equipment quality control
- Perform data entry and data analysis until an Environmental Outreach Coordinator is hired
- Write reports and update website on an annual basis to share information with volunteers and the general public
- Report deliverables to MiCorps; all data collected will be uploaded to the MiCorps database
- Development and submission of status and financial reports following MiCorps guidance on a quarterly basis
- Administration and accounting of grant funds including budget oversight
- Project evaluation and submission of final report
- Update the QAPP every two years, and submit to MiCorps Quality Assurance Manager

Eaton Conservation District (ECD) is a subcontractor for the program. Erin will work with Sue Spagnuolo, Executive Director (sue.spagnuolo@macd.org) as an

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Advisor for management, field, and reporting activities. The ECD Executive Director is responsible for the following:

- Review and assist with QAPP
- Advise the Project Manager on tasks
- Assist to coordinate and conduct volunteer stream monitoring training
- Assist to coordinate and implement volunteer stream monitoring field data collection events
- Assist to coordinate indoor macroinvertebrate identification sessions
- Serve as a Team Leader for one of the volunteer teams
- Recruit and train volunteers
- Provide guidance on data reporting

ECD employs an Environmental Outreach Coordinator, Rachel Cuschieri-Murray (rachel.cuschieri-murray@macd.org) that has the following responsibilities:

- Attend MiCorps training session
- Perform program promotion and recruit volunteers
- Coordinate monitoring events with the Program Manager
- Serve as a Team Leader for one of the volunteer teams
- Confirm identification of collected samples
- Perform data quality control
- Perform data entry and data analysis
- Update website on an annual basis to share information with volunteers and the general public
- Assist the Program Manager with deliverables to MiCorps; all data collected will be uploaded to the MiCorps database
- Assist in updating the QAPP every two years
- Oversee at least one Olivet College student environmental outreach internship in both fall and spring semesters, formal for credit or for Service Learning, as approved by Olivet College and ECD.

2. Field Responsibilities:

Field sampling is performed by program volunteers. These volunteers will be trained in field data collection methods by the Program Manager, Environmental Outreach Coordinator, and/or Advisor. Volunteers are assigned one of the following roles:

- Team Leaders - Organize a stream monitoring strategy and delegate monitoring roles for each team. In the field, Team Leaders completely fill out data sheets, explain sampling of the site, enforce the time guidelines, collection directions, and any other responsibilities
- Collectors - Sample all in-stream habitats present and provide the Pickers the samples to be identified

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- Pickers - Sort at the site picking out the macroinvertebrates from the sorting trays, putting them in a collection jar, and preserving them in 70% alcohol for later identification

3. **Laboratory Responsibilities:**

Volunteers and ECD staff will take part in collection and identification events. The identification events will be held on the Olivet College campus, using a department lab and microscopes. These dates and locations will be coordinated between Erin Pavloski and Dr. Susanne Lewis as Department Chair. Any sample identification that cannot be completed during the scheduled time will be completed by the Environmental Outreach Coordinator, Erin Pavloski, or other Olivet College faculty.

4. **Corrective Action:**

The Program Manager is the primary person responsible for initiating, developing, approving, implementing and reporting corrective actions concerning data quality, with any necessary assistance by the Advisor.

A5. Problem Definition/ Background

The purpose of this project is to support an on-going stream monitoring program within the Thornapple River watershed in Eaton County. This watershed is important to monitor as it is a subbasin of the second largest drainage system in the state, the Grand River watershed.¹ The Thornapple River watershed has an approved management plan that identified multiple stream quality issues, including: sedimentation, nutrient (high levels of nitrate) and pollutant inputs, and channelization.¹ These issues reduce the watershed's ability to support coldwater fisheries and other aquatic life, inhibit aquatic recreation, and support weed and algae growth.

The Thornapple River Watershed Management Plan noted locations within the watershed that "have insufficient information regarding support of the other indigenous aquatic life and wildlife use," and the need for future studies.¹ Beyond this data gap, the plan is now six years old and is based on macroinvertebrate collection data from 2006-2009.¹

The Eaton County Collaborative Stream Monitoring Program and this project will address the data gaps in the watershed and provide information to local and state

¹ Barry Conservation District. Thornapple River Watershed Management Plan. Barrycd.org. 2016 [accessed 2021 Feb 13]. <http://www.barrycd.org/home/wp-content/uploads/2016/05/TRWMP-1.pdf>

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organizations and agencies for potential updates to the watershed plan and other special stream or habitat improvement projects.

A6. Program Description

The monitoring program currently consists of 10 sites, with the goal of 12 total sites in Eaton County within the Upper Thornapple River watershed, including locations in the impaired waters of the Fish Creek, Milbourn, Allen & Crane Drain, and Thornapple Drain subwatersheds, as well as the Darken & Boyer Drain subwatershed that has insufficient macroinvertebrate data. The program staff can also consult with other organizations to select additional specific sites that could be helpful in assessing current or future watershed improvement efforts.

This collaborative stream monitoring program operates in partnership between Olivet College and Eaton Conservation District. The design of the monitoring program is an expansion beyond a traditional one-day collection event, focusing on cooperative learning and building relationships between community citizen scientists and students. Through this collaborative structure, the program is designed for ongoing engagement of volunteers and longevity in collecting macroinvertebrate data throughout the county each fall and spring, and aims to achieve the following outcomes:

1. Provide new and continuous macroinvertebrate collection and habitat assessment data that will assist in assessing the success of any restoration projects and updating the watershed management plan;
2. Educate and collaboratively engage Eaton County residents, students, and other stakeholders in monitoring, upholding quality, and protecting water resources; and
3. Identify or verify problem areas where degradation has occurred and where future remediation efforts or best management practices can be implemented

Olivet College is unique in that it offers a three-week Intensive Learning Term (ILT) each May where students can enroll in one course for credit. In these three weeks, the students will learn the field and safety skills first, then host and assist community citizen scientists on Community Collection Days held on two Fridays during the ILT. There is also an opportunity for local community citizen scientists to join in a macroinvertebrate identification session.

Volunteers for the program are recruited from the pool of adult community members by the Eaton Conservation District (past river cleanup volunteers, etc.), which will be known as citizen scientists, and college students enrolled in an annual Stream Monitoring Intensive Learning Term (ILT) course at Olivet College. The college also has

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a commuter population and many students live in the surrounding area. Commuter students enrolled in the ILT course can invite family members and friends to volunteer in the Community Collection Days, and this provides an additional recruitment opportunity for establishing recurring volunteers from the local community, along with Eaton Conservation District's recruitment efforts.

A7. Data Quality Objectives

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 and any hired Environmental Outreach Coordinator 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/Environmental Outreach Coordinator to ensure their expertise, preferably prior to the first volunteer leader training session. This review consists of supervising the Program Manager and Environmental Outreach Coordinator'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 September 12, 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 upon 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);

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- 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/Environmental Outreach Coordinator. 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.

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 total diversity (D) and Water Quality Rating (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:

$RPD = [(X_m - X_v) / (\text{mean of } X_m \text{ and } X_v)] \times 100$, where X_m is the Program Manager or Environmental Outreach Coordinator measurement and X_v 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.

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It is also possible that the Program Manager or Environmental Outreach Coordinator 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).

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.

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.).

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 and/or Environmental Outreach Coordinator 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 within a two-week time frame.

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If a Program Manager or Environmental Outreach Coordinator leaves the position and a new Program Manager or Environmental Outreach Coordinator is established, the new manager will attend the next available training given by MiCorps staff.

A8. Special Training/ Certifications

The Program Manager and Advisor have attended MiCorps training with additional in-the-field macroinvertebrate collection practice with the ICD Stream Team in Ingham County. Volunteer Team Leaders will be trained by the Program Manager for tasks specific to leading a collection team. All other community scientist volunteers will be trained by the Program Manager, Environmental Outreach Coordinator, and/or Advisor for Collector and Picker roles, as well as trained to use microscopes on identification day.

SECTION B: PROGRAM DESIGN AND PROCEDURES

B1. Study Design and Methods

Sites were considered throughout Eaton County in the Upper Thornapple Watershed and assessed by the Program Manager and Advisor for access and safety. The following sites were selected:

Site	Name	Subwatershed	Latitude	Longitude	MiCorps/DEQ Report Site #
1	Church Drain @ Stewart Rd.	Butternut Creek	42.6172	-84.7684	36 (2008)
2	Lacey Creek @ Lamie Hwy.	Lacey Creek	42.611666	-84.96222	MiCorps - Barry-167
3	Thornapple River @ Kinsel Hwy.	Milbourne, Allen & Crane Drain	42.59653	-84.71504	1 (2013)
4	Unnamed Trib to Butternut @ Stewart Rd.	Milbourne, Allen & Crane Drain	42.62	-84.768	37 (2008)
5	Darken & Boyer @ W. Needmore Hwy.	Darken & Boyer Drain	42.6831	-84.9071	Referred by M. Rippe
6	Scipio Creek @ Vermontville Hwy.	Scipio Creek	42.63528	-85.05276	10 (2013)
7	Shanty Brook @ Valley Hwy.	Shanty Creek	42.5813888	-85.021666	8 (2013)
8	Little Thornapple River @ Lamie Hwy.	Thornapple Drain	42.61172	-84.898439	MiCorps - Barry-159
9	Thornapple River @ M-50	Thompson Creek	42.67	-84.926	9 (2008)
10	Fish Creek @ Kinsel Hwy	Fish Creek	42.597073	-84.870936	-
11	Fish Creek @ Valley and Stine	Fish Creek	42.582735	-84.895108	-
12	Nye and Eaton Drain @ Shaytown	Fish Creek	42.576912	-84.974965	-

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A map of these sites throughout the Upper Thornapple River watershed is included in Appendix A.

After the pilot collection for the program in Spring 2022, it has been decided and confirmed with the MiCorps Coordinator that Sites 6 and 8 will be replaced with new, safer locations. Once selected and confirmed with the EGLE biologist, these new locations will be updated in this QAPP document.

Volunteers are guided to the sites with a packet that includes the site latitude and longitude, a Google Maps driving path, as well as a satellite view of the site from Google Maps. On each sheet, there is also a QR code to scan that will open up Google Maps and guide them from the meeting site (Olivet College) to the sampling site. This is also included in Appendix A.

Macroinvertebrate Collection - Collection will occur at each program site twice annually. The benthic population is sampled within a 2-week period in early-May and mid-October. All equipment to be used for this sampling is listed in Appendix B, and the standard operating procedures (SOPs) for the program volunteers are given in Appendix C. The datasheets used for macroinvertebrate collection and ID are in Appendix D.

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 Stream 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 Stream 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.)

After monitoring is done at any site, the equipment is inspected, cleaned, and sanitized with a dilute bleach solution or 409 prior to reusing.

At the collecting site, all invertebrate sample jars receive a label written in pencil, waterproof pen, or printed with a laser printer, starting date, location, subwatershed, and number of jars containing the collection from this site, which is placed on the jar. The

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data sheet also states the number of jars containing the collection from this site. The Stream 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 at Olivet College 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.

Macroinvertebrate Identification - 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 site collection into look-alike groups, identify specimens to the order level, and complete the identification sheet (Appendix D). Identification work is then checked by peers with a peer-review sheet (Appendix D). After the initial and peer review identifications, they 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 Manager/Environmental Outreach Coordinator per section A7. The identification data is transferred to the MiCorps datasheet. When identification of a sample is complete, the entire collection is placed in a single jar of fresh 70% ethanol with a label on the jar and stored at the program office at Olivet College indefinitely. The ethanol is carefully changed (to avoid losing small specimens) in the jars every few years.

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 subsample. 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 - Stream Leaders and Collectors, with Pickers assisting as well, will complete a Habitat Assessment at sites at least once every three years during the summer or fall season immediately following the macroinvertebrate sampling or at least within two weeks of the sampling event. The Habitat Assessment will follow the

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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, Stream leaders will have on hand a copy of MiCorps Stream Monitoring Procedures, which details the qualitative criteria, and helps clarify questions. Stream 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 Stream 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/Environmental Outreach Coordinator. All final Habitat Assessment data sheets will be reviewed by the Project Manager/Environmental Outreach Coordinator 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/Environmental Outreach Coordinator and appropriate action will be taken to resolve and/or address noted concerns including informing appropriate authorities.

Program Materials List

- sampling directions for volunteers
- MiCorps data sheets
- waders
- buckets (2)
- nets (2)
- labeled sample bottles with ethanol
- reel measuring tape
- forceps/tweezers
- pipettes
- spoons
- pencils
- wader brushes
- diluted bleach solution spray bottle
- rinse water spray bottle
- tarps
- life jacket for deep sites
- ice cube trays (at least 2)
- sorting trays
- first aid kit
- trash bags
- bug spray

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sunscreen
ID guides
paper towels
poison ivy wipes
lint roller
wader repair kit
hand sanitizer
A Guide to Freshwater Invertebrates by Voshell
dissecting microscope

Equipment Quality Control - The Project Manager and Environmental Outreach Coordinator will ensure the quality of monitoring equipment by following the protocols listed below:

- Check to make sure equipment is in working order and not damaged
- Clean equipment after taking it into the field (Decontamination Procedures recommended: <https://www.hrwc.org/volunteer/decontaminate/>)
- 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 of all equipment that requires them
- Make sure equipment is calibrated appropriately before conducting each test

B2. Instrument/Equipment Testing, Inspection, and Maintenance

Stream monitoring equipment is stored in the Mott 101 suite at Olivet College. The Program Manager and/or Environmental Outreach Coordinator will test, inspect and maintain the equipment. For macroinvertebrate monitoring, the critical equipment maintenance includes checking nets, that they are firmly attached to poles and free of holes, the collection jars do not leak, the forceps have tips that meet, and waders are clean, dry and do not leak. Microscopes used by the program are owned by Olivet College and are on a regular maintenance and upkeep schedule through the Natural Sciences and Mathematics Department.

Any deficiencies in equipment will be reported to the Program Manager, and a list maintained by the Program Manager. Any equipment that needs to be replaced will be purchased, if funding is available.

Decontamination materials include: tarps, boot brushes, lint rollers, diluted bleach spray bottle, rinse water spray bottle, and hand sanitizer.

The bleach spray bottle is prepared to 0.05% bleach solution the morning of each sampling date, and the rinse water spray bottle is filled.

Program instructions for decontamination include:

1. Rinse the equipment with the stream water to wash away any collected material, mud, etc.

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2. Inspect all clothing and equipment for any additional mud and plant material and remove it at the site. Boot brushes and a lint roller are in the bin.
3. Once everything is rinsed and inspected, and material has been removed, set a tarp away from the stream in a safe place away from traffic, and place equipment on the tarp.
4. Disinfect the equipment (buckets, trays, nets, waders, etc.) by using the spray bottle of diluted bleach. Once sprayed, let it sit for 10 minutes.
 - a. As you wait, you can look at the area for trash and collect it in the trash bag in the bin.
5. Once the 10 minutes has elapsed for the bleach solution to disinfect the equipment, you can spray it all down with the tap water spray bottles.
6. Make sure all team members use hand sanitizer to clean their hands. It is recommended that they wash their hands when they return to the classroom/home.

B3. Inspection/Acceptance for Supplies and Consumables

Monitoring supplies details:

Supply	Acceptable Condition	Last Purchased	Storage/Person Responsible
Waders	Dry, no holes, clean	Fall 2022	Olivet College/ Erin Pavloski
Buckets	Dry, no cracks	Spring 2022	Olivet College/ Erin Pavloski
Nets	No holes in nets, firmly attached to poles	Spring 2022	Olivet College/ Erin Pavloski
Forceps/Tweezers	Tips touch	Fall 2022	Olivet College/ Erin Pavloski
Pipettes	Clean	Fall 2022	Olivet College/ Erin Pavloski
Spoons	Clean	Fall 2022	Olivet College/ Erin Pavloski
Pencils	Sharpened, erasers function	Fall 2022	Olivet College/ Erin Pavloski
Labeled Bottles	Bottles don't leak, labels applied	Fall 2022	Olivet College/ Erin Pavloski
70% Ethanol	Stored properly in chemistry lab storage	Fall 2022	Olivet College/ Dr. Susanne Lewis
Wader Brushes	Clean	Fall 2022	Olivet College/ Erin Pavloski
Diluted Bleach Solution Spray Bottle	Refilled day of sampling with 0.05% solution	Spring 2022	Olivet College/ Erin Pavloski
Rinse Water Spray	Refilled day of sampling	Spring 2022	Olivet College/ Erin Pavloski

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Bottle			
Tarps	Debris removed, dry	Fall 2022	Olivet College/ Erin Pavloski
Life Jacket For Deep Sites	Clean	Fall 2022	Olivet College/ Erin Pavloski
Ice Cube Trays	Clean	Fall 2022	Olivet College/ Erin Pavloski
Sorting Trays	Clean	Fall 2022	Olivet College/ Erin Pavloski
First Aid Kit	Stocked	Fall 2022	Olivet College/ Erin Pavloski
Trash Bags	At least three in bin, no holes	Fall 2022	Olivet College/ Erin Pavloski
Bug Spray	Adequate amount left	Fall 2022	Olivet College/ Erin Pavloski
Sunscreen	Adequate amount left	Fall 2022	Olivet College/ Erin Pavloski
ID Guide	Legible, no water damage	Fall 2022	Olivet College/ Erin Pavloski
Paper Towels	Adequate amount left	Fall 2022	Olivet College/ Erin Pavloski
Reel Measuring Tape	Reel functions	Fall 2022	Olivet College/ Erin Pavloski
Poison Ivy Wipes	Adequate amount left, not dried out	Spring 2022	Olivet College/ Erin Pavloski
Lint Roller	Adequate amount left, not dried out	Spring 2022	Olivet College/ Erin Pavloski
Wader Repair Kit	Present in bin	Fall 2022	Olivet College/ Erin Pavloski
Hand Sanitizer	Adequate amount left	Fall 2022	Olivet College/ Erin Pavloski
ID Books	Legible, no water damage	Spring 2022	Olivet College/ Erin Pavloski

B4. Non-Direct Measurements

This program and any associated project does not use non-direct measurements at this time.

B5. Data Management

Data Entry and Records - Raw data will be entered and managed in Google Sheets/Microsoft Excel workbooks. Data will be entered into the MiCorps Data Exchange (MDE) within a month of the collection data by the Program Manager or Environmental Outreach Coordinator. All data is backed up after data submission and a flash drive is kept off premises. Computer passwords provide data security.

Data will be entered from Excel data sheets directly into the online MiCorps database by the Program Manager or Environmental Outreach Coordinator for storage within the

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MiCorps data exchange system. Data sheets will be filed at Olivet College with the Program Manager for a period of at least five years.

Metrics and Measures - 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.

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 program will ensure quality control through:

- Checking all calculations twice
- Reviewing computer entered data by comparing to field data sheets

SECTION C: SYSTEM ASSESSMENT, CORRECTION AND REPORTING

C1. System Audits and Response Actions

Volunteer Team Leaders trained by the Program Manager/Environmental Outreach Coordinator 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.

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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

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 is made available via the MiCorps website.

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