

**PROGRAM DESCRIPTION AND QUALITY OBJECTIVES**

**A1. TITLE AND APPROVAL SHEET**

Quality Assurance Project Plan (QAPP) for the Paw Paw River and Black River Watersheds  
Volunteer Stream Monitoring Program

Date: April, 2023

Version #: 2

Organization: Van Buren Conservation District

QAPP Prepared by Alex Florian, Program Coordinator, Abigale Bristol, co-coordinator, Kalli  
Marshall, co-coordinator

Title: CISMA Coordinator, Van Buren Conservation District

Signature:

Date:

MiCorps Staff Use	
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Signature of Reviewer	Date

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### **A3. Distribution List**

- Dr. Paul Steen, Watershed Ecologist, Huron River Watershed Council  
117 North First Street Suite 100, Ann Arbor, MI, 48104  
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- Alex Florian, CISMA Coordinator, Van Buren Conservation District  
(VBCD) 1035 E. Michigan Ave. Paw Paw, MI 49079  
invasivesed@vanburencd.org
- Sam Ewbank, President, Two Rivers Coalition (TRC)  
1035 E. Michigan Ave. Paw Paw, MI 49079  
[g.l.ewbank@gmail.com](mailto:g.l.ewbank@gmail.com)

### **A4. Program Organization**

#### Program Advisors

#### **Project Officer and Advisor**

Dr. Paul Steen, Huron River Watershed Council  
1100 N. Main Street Ann Arbor, MI 48104  
734-769-5123 ext. 601  
psteen@hrwc.org

#### Management Responsibilities

#### **Program Manager (Quality Assurance Manager)**

Alex Florian, CISMA Coordinator, Van Buren Conservation District  
1035 E. Michigan Ave. Paw Paw, Michigan 49079  
269-657-4030, ext. 5  
invasivesed@vanburencd.org

Responsibilities include developing marketing materials, advertising the program, volunteer recruitment and management, overseeing staff and volunteer training, maintaining and storing all necessary equipment, maintaining all project data sheets, maintaining the QAPP, preparing and submitting all grant reports, entering data into the MiCorps reporting system, conducting program evaluations, overseeing sample collection and insect identification, securing and maintaining collection of macroinvertebrate specimens and developing a strategic plan to continue the VSMP beyond grant contract period.

#### **Program Assistant Managers**

Abigale Bristol, Strike Team Coordinator, Van Buren Conservation District  
1035 E. Michigan Ave. Paw Paw, MI 49079  
invasivesmgmt@vanburencd.org

Kalli Marshall, Recycling and Materials Management Coordinator, Van Buren Conservation District  
1035 E. Michigan Ave. Paw Paw, MI 49079  
resourcerecovery@vanburencd.org

Responsibilities include identifying sites to be monitored as well as developing a list of additional sites to be used as alternatives or additions to the original list, helping with the development of marketing materials, advertising the program, volunteer recruitment, overseeing sample collection and insect identification, maintaining communication with team leaders, volunteers and Two Rivers Coalition board members and developing a strategic plan to continue the VSMP program beyond grant contract period.

### **Financial Manager**

Kim Sinclair, Administrator, Van Buren Conservation District  
1035 E. Michigan Ave. Paw Paw, Michigan 49079  
269-657-4030, ext. 5  
kimberly.sinclair@mi.nacdnet.net

Responsibilities include ordering supplies, coordinating invoices and grant disbursements, and general oversight of the financial aspect of the program.

### **Technician**

Carlie Southland, Conservation Associate, Van Buren Conservation District  
1035 E. Michigan Ave. Paw Paw, Michigan 49079  
269-657-4030, ext. 5  
education@vanburencd.org

Responsibilities include assisting Program Manager to prepare for events, helping to recruit and train volunteers, maintaining communication between VBCD and TRC.

### Field Responsibilities

#### **Field Leaders/Team Leaders**

- Van Buren Conservation District staff members: Alex Florian, Abigale Bristol, Kalli Marshall
- Two Rivers Coalition board members: Kevin Haight, Sam Ewbank, Dan Burton
- Volunteers: Collectors, Transporters, Pickers, Note Takers, and eventually future Team Leaders.

Program Manager and Assistant Manager will identify Team Leaders for each collection and assign each Team Leader to a designated collection location(s). Program Manager and Assistant Manager will assign Volunteers to each Team Leader. The Program Manager will prepare all equipment, materials and supplies for each Team Leader and their location(s).

### Laboratory Responsibilities

Laboratory or location where collected macroinvertebrates will be sorted and identified is in

the Pokagon Band of Potawatomi Kowabdanawa odë kè offices, located at 32142 Edwards St. Dowagiac, MI 49047

### **Lab Leader/Expert Identifiers**

Professionally trained, Two Rivers Coalition board member; Grant Poole, Water Quality Specialist, Environmental Division of Pokagon Band of Potawatomi, Dowagiac, MI

Program Manager will set up lab equipment, materials, collected macroinvertebrates, reporting sheets and other resources needed to sort, identify and record species. Program Manager and Assistant Manager and other interested Team Leaders and Volunteers will assist in sorting, identifying and recording species. Lab Leader/Expert Identifiers will do the final assessment of identification.

### Corrective Action

The Program Manager and Assistant Manager will be responsible for initiating, developing, approving, and implementing any corrective actions. Team Leaders input and suggestions will be welcome.

## **A5. Problem Definition/Background**

The Volunteer Stream Monitoring Program (VSMP) in Van Buren County will focus monitoring mainly in the Paw Paw River Watershed and extend its monitoring efforts to include the Black River Watershed in the northern part of Van Buren County. While long considered a jewel of Southwest Michigan (the PPR was considered for Wild and Scenic status at one time), it is becoming increasingly apparent that the watershed is under stress and cannot be taken for granted. Threats exist to the health of the watershed in the form of plans for additional CAFO's, continued sediment load from agriculture not yet using best management practices (BMPs), and increased storm water run-off from development near its headwaters. Van Buren Conservation District (VBCD) and Two River Coalition (TRC) believe that collecting data on macro-invertebrates and river quality will be beneficial in numerous ways. To the extent that there are gaps in the data or territory currently being only occasionally (every five years) monitored by Michigan Environmental Great Lakes and Energy (EGLE), this proposed VSMP could help fill those gaps and provide more up-to-date data on particular problem areas. Importantly, it is anticipated that the further development of a VSMP will get larger numbers of people working on and thinking about water quality and river health issues.

The VBCD has many current grants that focus on agriculture; providing technical assistance to help landowners and agricultural producers reduce environmental risks on their farm, have emergency plans in place, and implement BMPs such as buffer strips, no-till and cover crops. BMPs such as these, if implemented, help with sediment erosion into nearby bodies of water and in turn affect benthic macroinvertebrate populations and stream habitat and health. The continuation of education about BMPs and the technical assistance to implement these programs are important to our water quality and benthic habitat in both watersheds. Data can also guide where outreach and education programs are most needed within the watershed. In

some locations, data on macroinvertebrate populations may also be used to assess the efficacy of BMPs that are being implemented nearby.

### Primary Goals

- Outreach to and educate residents of Van Buren County about water quality, current issues and the importance of healthy habitat and benthic macroinvertebrate populations in our local rivers and streams.
- Provide volunteers with an opportunity to become involved in a project, have hands-on experience which allows individuals to feel a sense of ownership in both a project in their community and a connection to water quality and our natural resources.
- Select site locations within the Paw Paw River and Black River Watersheds that will generate useful data for both EGLE, VBCD, local agencies and organizations. • Host well organized training and monitoring events (collection/identification). • Follow MiCorps protocol and standard operating procedures to ensure proper data is collected and entered into the MiCorps database to be used by EGLE as a monitoring screening tool at the local level.
- Develop a PowerPoint presentation of VSMP, data collected, an event summary and opportunities for the future which can be presented to the county commissions, municipalities, partnering organizations and agencies, schools, volunteers and at resident workshops or educational events.
- Recruit, train, manage and retain volunteers for future monitoring efforts and work to obtain resources that will support a long term Volunteer Stream Monitoring Program. • Coordination of initiative and use of data that can be utilized to further prioritize and target areas for BMP implementation work performed by the VBCD and to track BMP efficiency and progress in improved water quality.

### Long Term Goal

Continue to develop the program and explore the possibility to expand program into an “Adopt a Stream” Program where residents, landowners, schools, businesses, organizations can adopt a section of the river and/or streams here in Paw Paw River and Black River Watersheds. Monitoring benthic macroinvertebrates and stream habitat health along with any erosion areas, bankside habitat destruction, trash pickup needs, and identification of any point source pollution will be built into the program.

## **A6. Program Description**

The primary objective of this program is to establish a long-term Volunteer Stream Monitoring Program to track changes in water quality over time in the Paw Paw River and Black River Watersheds. Macroinvertebrate samples will be collected by Team Leaders and Volunteers at ten sampling locations within the Paw Paw River Watershed and two sampling locations within the Black River Watershed, twice each year, once in the spring and again in the fall. Collections will be stored at the Van Buren Conservation District (VBCD) for identification within two weeks of the sample collection. Habitat assessments will be completed at least once per year during the grant and then once every three to five years. Lab Leader/Expert Identifiers will

assist Team Leaders and Volunteers in sorting, identifying and counting species from each collection site. Data will be entered and maintained in hard copy and electronic format at the VBCD office. Data will be entered into the MiCorps database. Program reports will be completed and distributed to project partners and volunteers. Program reports will also be shared with the general public on VBCD's website. All information will be compiled into quarterly and final reports and will be submitted to MiCorps.

## **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 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.

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 conducts a method validation review (the "side-by-side" visit) with the Program Manager to ensure their expertise, preferable 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 September 9, 2015 with MiCorps Program Manager 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);
- 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.

**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 DQI 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 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 reevaluate 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).



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

**Comparability:**

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**

Program Manager, Alex Florian and Team Leader, Kalli Marshall from the Van Buren Conservation District and Program Assistant Manager, Kevin Haight from Two Rivers Coalition have all received MiCorps training. Project Manager and many of the Team Leaders have additional professional training and are in the field of water quality and environmental consulting. Project Managers will be in charge of coordinating training of all Team Leaders and Volunteers, and Team Leaders will assist in the hands-on Volunteer training. Initial training will be provided to volunteers prior to the first sampling event. Training will be repeated as necessary for new volunteers at subsequent sampling events. All volunteers will be required to attend program training at least once every five years. The Program Manager will keep an updated list of Volunteers and log participation of training sessions and events attended.

## **PROGRAM DESIGN AND PROCEDURES**

### **B1. Study Design and Methods**

The benthic macroinvertebrate community in the Paw Paw River and Black River Watersheds will be monitored twice per year, once in early May, and again in early October, following the MiCorps stream monitoring protocol, for the two years of the project. The chosen sites represent a variety of land types and uses, mainly from a native forested areas and agricultural, with a select few residential uses.

A watershed map showing all sampling locations in Appendix A. The twelve study site locations are as follows:

1. Eastman Creek on 62nd Street, Geneva Township, Michigan.  
42.380022, -86.148496
2. South Branch, Black River on CR 384/12th Ave., Geneva Township, Michigan.  
42.37443, -86.207991
3. Paw Paw River on M-140 in Hay's Park, Watervliet, Michigan.  
42.193136, -86.256717
4. Mill Creek on North Branch Road, Bainbridge Township, Michigan.  
42.143963 -86.226887
5. White Creek on CR 215, Hartford Township, Michigan.  
42.1493 -86.069702
6. Pine Creek on CR 362, Keeler Township, Michigan  
42.156876, -86.174175
7. Paw Paw River on 48<sup>th</sup> Avenue, Lawrence Township, Michigan.  
42.243251, -86.011589
8. Brush Creek on Red Arrow Hwy., Lawrence, Michigan.  
42.21914, -86.042514

9. North Branch, Paw Paw River on 35 1/2 Street, Waverly Township, Michigan .  
42.266537, -85.893285
10. Brandywine Creek on 37 1/2 Street, Waverly Township, Michigan.  
42.286298, -85.912258
11. South Branch of Paw Paw River on 72nd Ave., Decatur Township, Michigan.  
42.157012, -85.908471
12. Eagle Lake Drain on 39th Street, Paw Paw Township, Michigan.  
42.162702, -85.9267

Many of the identified sites are within sub-watersheds where the VBCD is currently or planning on focusing, depending on future grant funding opportunities, on outreach, education and implementation of Best Management Practices (BMPs) on farmlands. BMPs include cover crops, buffer strips and no-till which help with sediment and nutrient loading into nearby waterways that affect water quality and macroinvertebrate populations. The VBCD, TRC and local partners are interested in seeing whether macroinvertebrate populations change over time as BMPs are installed throughout Van Buren County.

Sites will be designated to a specific Team, example Team 1 will have Site A and Site B. Each team will be given a map of the location, specific directions of how to get to each location and specifics of where to collect at each site to ensure that teams are sampling in the correct locations and are consistent throughout each collection event. Example of site specifics can be found in Appendix B.

For each sampling event that is not completed in a single day, monitoring by volunteers will be completed within the same two week period. If a site is temporarily inaccessible, for example, prolonged high water, the monitoring time may be extended for two additional weeks or an additional site will be chosen. If the monitoring team is not able to monitor their site during the specified time, the Team Leader will contact the Program Manager as soon as possible so other arrangements may be made. An extra list of accessible sites will be identified by the Program Assistant to be used as alternative or additional sites.

### **Sampling the Benthic Community**

Multiple collections will be taken from each habitat type present at the site within a 40 minute period of time, including riffle, rocks or other large debris, leaf packs, submerged vegetation or roots, and depositional areas, while wading and using a D-frame kick net. 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 isopropyl alcohol or 70% ethyl alcohol for later identification. Once a specific species is considered a "common" species (10+ individuals) they are not collected into the isopropyl jars.

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. Collection will last for 40 minutes. 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 will be explained in detail on the MiCorps data sheet as found in Appendix C.

At the collecting site, all invertebrate sample jars receive a label written in pencil, 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 Team Leader is responsible for labeling and securely closing the jars, and is responsible for returning all jars and all equipment. Upon return to the Van Buren Conservation District (VBCD) office, the Program Manager receives the collections which are then 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 VBCD office until they are examined and counted or picked up by expert identifiers on the day of identification (or within two weeks). The data sheets are used on the identification day, after which they remain on file at the VBCD office for five years. At the time of identifying the sample, the expert identifiers, Team Leader and/or Volunteer 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 the identification expert who confirms the sorting and provides identification of the taxa present. These identifications are then verified by the Lab Leader/Expert Identifier. 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 VBCD office or storage facility until Project Officer/Advisor gives permission for proper disposal.

### **Decontamination**

Decontamination is of utmost importance in stopping the spread of invasive species and the transport of aquatic diseases. Team Leaders will ensure the following decontamination steps are completed:

- a. Conduct a visual inspection of gear before and after field work.
- b. If going to another monitoring site, thoroughly inspect and remove all plants, dirt and mud, and any other visible debris like seeds, shoots, animals, insects, and eggs from clothing and equipment. If going to another site on the same sampling day, disinfect with dilute bleach

and allow to sit for 10 minutes before rinsing with tap water and towel dry all equipment before leaving the site.

- c. Remove plant and debris from equipment and let it dry for at least 5 days.
- d. If necessary, Program Leaders should use high pressure hot washes to clean monitoring equipment if areas are known to be infected by invasive species.
- e. Be on the lookout for New Zealand mud snails.

#### *Parameters*

-Macroinvertebrate community will be monitored and identified to Order level at least twice a year. If the Lab Leader/Expert Identifier knows or is interested in further identifying down to the Family level those species will be noted.

#### *Timing*

-The benthic population is sampled within a two-week period in May, and then again within a two-week period in October of each year of the project.

#### *Equipment Quality Check*

- Check to make sure equipment is in working order and not damaged
- Clean equipment before and after taking it into the field
- Check the expiration date of chemical reagents prior to each use
- Replace any damaged, outdated or expired equipment/instruments

#### *Field Procedures Quality Control*

- Collect replicate samples as necessary
- Conduct repeat and/or side-by-side tests performed by separate field crews when necessary
- Change the composition of the field crews to maintain objectivity and minimize individual bias
- Field datasheets and labels will be verified by Team Leader in the field
- Review field records before submitting for analysis to minimize errors

#### *Data Analysis Quality Control*

- Field datasheets and labels will be verified by Program Manager when arriving to VBCD office
- Field datasheets and labels will be verified by Expert Identifiers or Volunteers in the laboratory
- Specimen identification will be completed by trained volunteers using referenced identification guides or Expert Identifiers
- Taxa identification will be verified by the Lab Leader/Expert Identifier
- Counts will be verified by at least two volunteers or the Expert Identifier
- Calculations will be completed by the Expert Identifiers or at least two volunteers and verified by the Program Manager
- Hard copies of all computer entered data will be reviewed for errors by comparing to field data sheets

The evaluation is based on the diversity in the community and will attempt to include a

complete sample of the different groups present. It will not be assumed that a single collection represents all the diversity in the community, but rather considered results reliable only after repeated collections spanning at least three years. All collectors attend an in-stream training session, and sites are sampled by different collectors at different times to diminish the effects of bias in individual collecting styles.

**B2. Instrument/Equipment Testing, Inspection, and Maintenance**

Equipment will be stored at the Van Buren Conservation District at 1035 E. Michigan Ave. Paw Paw, Michigan or at an official VBCD storage facility. Program Manager will inspect equipment before and after use, noting any discrepancies in the Equipment Inspection Checklist. The Program Manager will be responsible for needed repairs or replacement, both to be completed before the next sampling event. Financial Manager will order additional and replacement supplies, equipment and instruments as needed.

<i>Equipment/Instrument</i>	<i>Before use Inspection/Maintenance</i>	<i>After use Inspection/Maintenance</i>
Waders	Check that waders are clean, dry, and free of holes	Rinse waders thoroughly and hang to dry
D-Frame Nets	Check that nets are free of holes and are securely fastened to poles. Check that nets are clean and free of all sediment or organic matter.	Rinse nets thoroughly and dry completely before storing.
Specimen sorting trays	Check that trays are clean and clear of all substances and uncracked.	Clean thoroughly and dry completely before storing.
Specimen Storage Jars and Lids	Check that jars are clean and unused with polyseal tops that seal tightly.	Ensure that all used jars are labeled correctly and that lids are tightly sealed.  Unused jars and lids are returned to storage after ensuring that they are clean and free of any substances.

Preservative (70% ethyl alcohol)	Check that there is sufficient preservatives for storage jars for each site to be sampled and that preservative is not past the expiration date.	Check that there is enough preservative for the next sampling event and that it will not expire before that time.
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Forceps	Check that forceps are clean and functioning properly (i.e. tips meet)	Rinse forceps thoroughly and dry completely before storing.
Hand Lenses	Check that hand lenses are intact and free of smudges or debris.	Clean hand lenses of any smudges or debris. Dry completely before storing.
Pipettes	Check that pipettes are intact and clean of any sediment or organic matter.	Clean thoroughly and dry completely before storing.
Spray Bottles	Check that spray bottles function properly and are free of all sediment or organic matter.	Clean thoroughly and dry completely before storing.

Macroinvertebrates will be collected using D-frame kick nets that are firmly attached to poles and free of holes. Collectors may use waders that are clean, dry, and do not leak. The collected materials will be transferred into light colored pans. Macroinvertebrates will be extracted from the pans using forceps with tips that meet, eye droppers for very small specimens, and/or spoons with homemade nets, and placed in collection tubes (with poly seal tops) containing isopropyl alcohol.

For identification purposes, preserved specimens will be placed into pans and then sorted into ice cube trays using forceps.

Habitat assessments will be completed with the use of a tape measure and yard stick. Prior to sampling or sample identification, the Program Manager will inspect all equipment for damage or other problems. Any issues will be resolved by either repairing or replacing equipment. Problems encountered during field collection or laboratory analysis will be documented on the data sheets and resolved accordingly. Spare equipment will be kept on

hand in case of damage or improper operation during field or laboratory work. When not in use, all equipment will be stored at the Van Buren Conservation District office or official VBCD storage facility.

### **B3. Inspection/Acceptance for Supplies and Consumables**

A list will be prepared of supplies and equipment with dates of purchase and dates of expiration, if applicable. In the days prior to a monitoring and/or identification event, the Program Manager will check all equipment carefully. Supplies for each team will be put together including pans, nets, forceps, eye droppers, datasheets, sampling procedures, and specimen containers with 70% ethanol. All equipment will be cleaned, inspected and inventoried at the end of each monitoring and identification event. Equipment and supplies will be replaced if damaged, beyond repair, expired, or otherwise not able to serve its purpose. Equipment will be stored at the Van Buren Conservation District (VBCD) office in Paw Paw, Michigan or at an official VBCD storage facility.

### **B4. Non-Direct Measurements**

This section is not applicable to this project.

### **B5. Data Management**

Macroinvertebrate and will be entered by the Program Manager into MS Excel workbooks for long-term storage. After each sampling event is completed, all new data will be entered into the MiCorps data exchange system. Data sheets will be filed at the Van Buren Conservation District (VBCD) office for a period of at least five years. Data sheets will also be scanned and saved as digital files. Digital files, including any photographs, will be stored on VBCD's server and will also be sent to the Two Rivers Coalition Board President for offsite storage after every event.

Macroinvertebrates: Data is summarized for reporting into four metrics: all taxa, sensitive, somewhat sensitive, and tolerant taxa. Units of measure are orders counted in each metric. All calculations will be checked twice.

## **SYSTEM ASSESSMENT, CORRECTION AND REPORTING**

### **C1. System Audits and Response Actions**

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 verifying 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 identifications. During side-by-side sampling a team of volunteers and an outside expert sample the same stream. Agreement in sample composition between the two should be 60% or greater.

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, Program Assistant Manager and one or two active volunteers, and is a start to end review of the monitoring process and how things could be improved for the next event.

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

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

## **C2. Data Review, Verification, and Validation**

Standardized MiCorps data forms will be used by volunteers at every sampling event. Data sheets will be reviewed in the field for completeness and accuracy of data by the Team Leader. Project Manager will verify all sheets are completed and, if not, will contact Team Leader for clarification. During identification and metric calculation, metrics will be reviewed by at least one Expert Identifier, Volunteer, or Team Leader and verified by the program Lab Leader/Lead Identifier or Program Manager prior to data entry. Macroinvertebrate identification will be verified by the Lab Leader/Lead Identifier. Microscopes and dichotomous keys will be used when necessary to aid in positive identification. Such methods of identification will be noted on the data sheets. The total diversity reported by each team must be within 70% of the diversity previously found at the site (after a two year preliminary assessment period), as verified by the Program Manager. Sites with results greater than 70% deviations will be re-sampled by Program Manager and Assistant Program Manager to verify or discard such unusual results, which could be the result of less-than thorough sampling.

Data will be digitally saved to the VBCD drive for long-term storage by the Program Manager after data collection events and before the next event, and verified for accuracy by a volunteer or VBCD staff. Results will be summarized on the Van Buren Conservation District (VBCD) website and reported to project partners before the next data collection event. All data will be entered into the MiCorps online database after each event and before the next event, noting any data quality issues. Programmatic status reports and financial status reports will be submitted to MiCorps quarterly, with any quality issues noted.

### **C3. Reconciliation with Data Quality Objectives**

Precision of data collected will be determined based on comparing data from multiple collections from the same location, and also comparing new data to previous data collected at the same location by other entities. This evaluation will occur soon after data is collected when previous data is available. If previous data is not available, then an assessment will be made after at least three spring and three fall sampling events have been conducted. Measures of diversity and stream quality index for each site should be within 70% of the median results. In cases where the results are greater than 70% of the previous results, the site will be resampled or the data will be discarded.

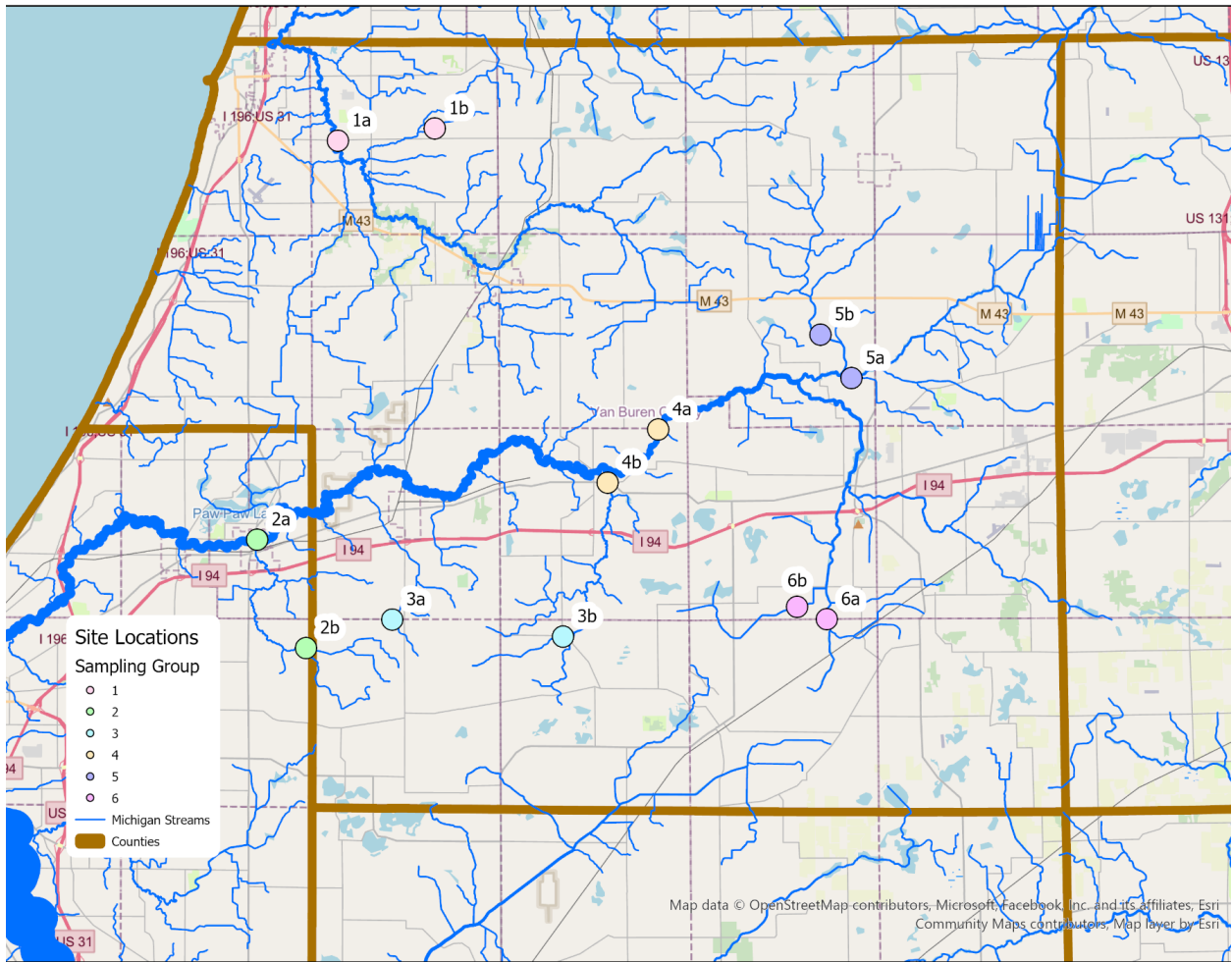
Each site Team Leader will ensure representativeness of sampling at that site during each event. Data comparability will be ensured by requiring all volunteers to be trained to use the same methods and procedures for sample collection, identification and calculations. Training will be provided as necessary to new volunteers, and procedures and protocols will be reviewed by all volunteers prior to each sampling event. To the extent possible, all sites will be sampled on the same day. If a site is not sampled on the same day as the other sites, then it must be sampled within two weeks of the original sampling. All data quality comparisons will be completed as soon as possible following data collection and analysis and any limitations in the data will be reported by the Program Manager to the MiCorps and all data users. Response to and reconciliation of problems that occur in data quality are outlined in Section A7.

### **C4. Reporting**

A VSMP Collection Event report will be completed by the Program Manager after each sampling event to provide a summary of the event, document volunteer participation, and provide a summary of the data, including pictures as appropriate. The report will be distributed to project partners and provided to MiCorps during quarterly reporting. Event reports will be made available via the VBCD's website. Quality Control reports will also be written by the Program Manager to verify that data quality objectives were met, document any problems or issues encountered, document any changes to process, deviation from quality control methods outlined in this document relating to field data collection procedures, indoor identification, data input, diversity calculations and statistical analyses. In addition, Team Leaders and Volunteers will be asked to complete a survey regarding the program progress and success. These surveys will take place after the events each year. The results will be summarized in a report. All reports will be written in the MiCorps reporting format, if available, and/or written in Word, Excel and Publisher and transferred into a pdf before submission. These reports will be included in the quarterly and final reporting to MiCorps and submitted by the Program Manager.



# Appendix A: Map of Locations



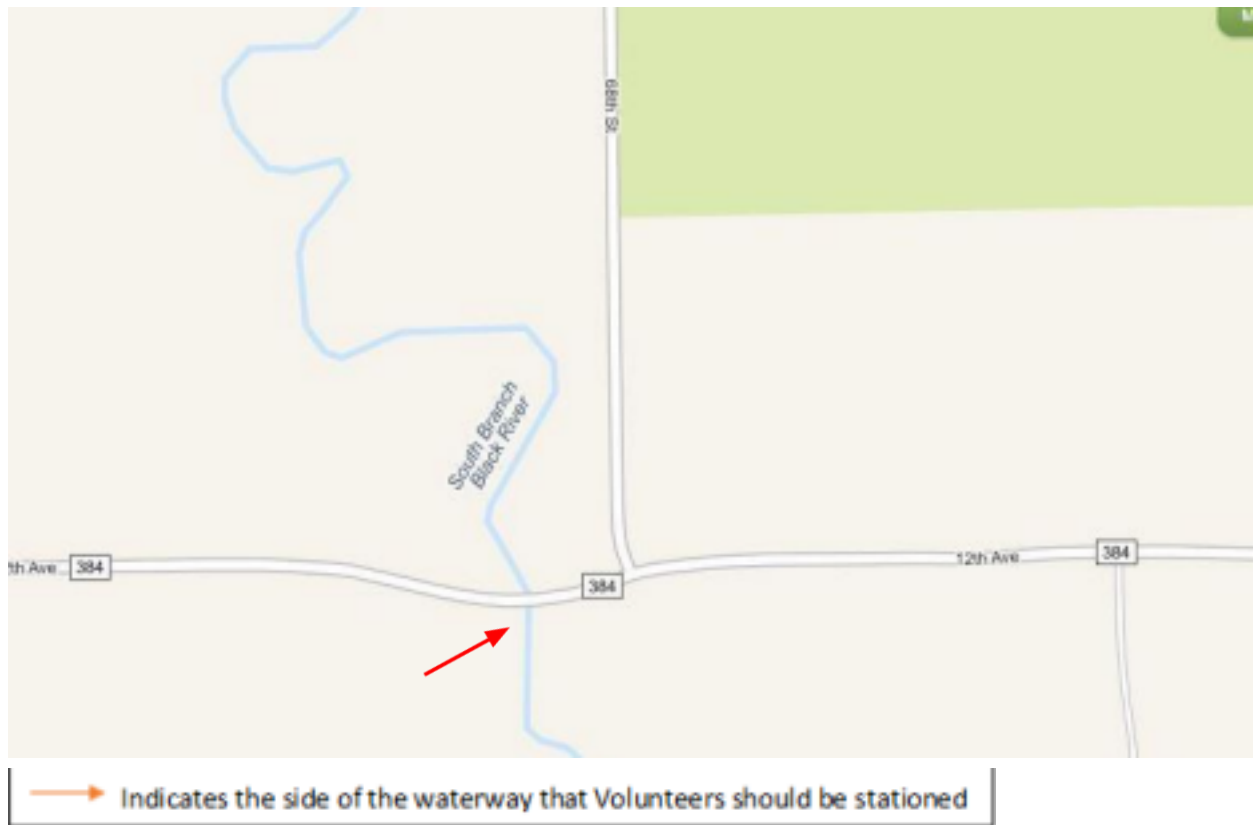
## Appendix B: Site Specific Directions, Map and Sampling Location Information

### Volunteer Stream Monitoring Program-Macroinvertebrate Collection Site

#### Team 1 - Site A: CR 384/12<sup>th</sup> Ave. Bridge, South Branch, Black River (Geneva Township)

Directions: From Lawrence River Park (N. Paw Paw Street)-Turn Right (South) towards main light in Lawrence (Red Arrow Highway/Saint Joseph Street). Take Red Arrow Highway/Saint Joseph Street (Right) West to CR 681/58th Street. Turn Right (North) on CR 681 and go all the way to Bangor. Turn Left (West) on to M-43 and go West out of town. Turn Right (North) on to CR 687. Turn Left (West) at 12<sup>th</sup> Ave/CR 384. Drive West on 12<sup>th</sup> Ave/CR 384, right past 68<sup>th</sup> Street. Park near B/SHHWTA Basic Family Canoe Access sign on North side of road. Be careful of traffic. Walk West across bridge. Prominently display River/Stream Study in Progress VBCD/TRC placard on dash.

#### Map:



Location of Sampling: Monitoring area is upstream to the South of the bridge. Walk thru the woods and avoid the area immediately South of the bridge where there are some downed trees/brush. Continue upstream to the spot where bank is lowest [still a couple of feet high] to set up. Stay away from bridge because of mucky and deep spots. Upstream of bridge the channel is wide, sandy and relatively easy to wade. Sampling habitat includes tree roots, undercut bank, submerged logs, some areas of accumulated muck/silt and some leaf packs.

Volunteer Stream Monitoring Program-Macroinvertebrate Collection Site

Team 1 - Site B: 62<sup>nd</sup> Street, Eastman Creek, Black River (Geneva Township)

Directions: From Site A-Turn around and head East on 12th Ave/CR 384. Turn Left (North) onto 62<sup>nd</sup> Street. Just North of Eastman Creek Culvert, on the top of the hill will provide better parking on the East side of the road and walk back down to the creek. Prominently display River/Stream Study in Progress VBCD/TRC placard on dash.

Map:



→ Indicates the side of the waterway that Volunteers should be stationed

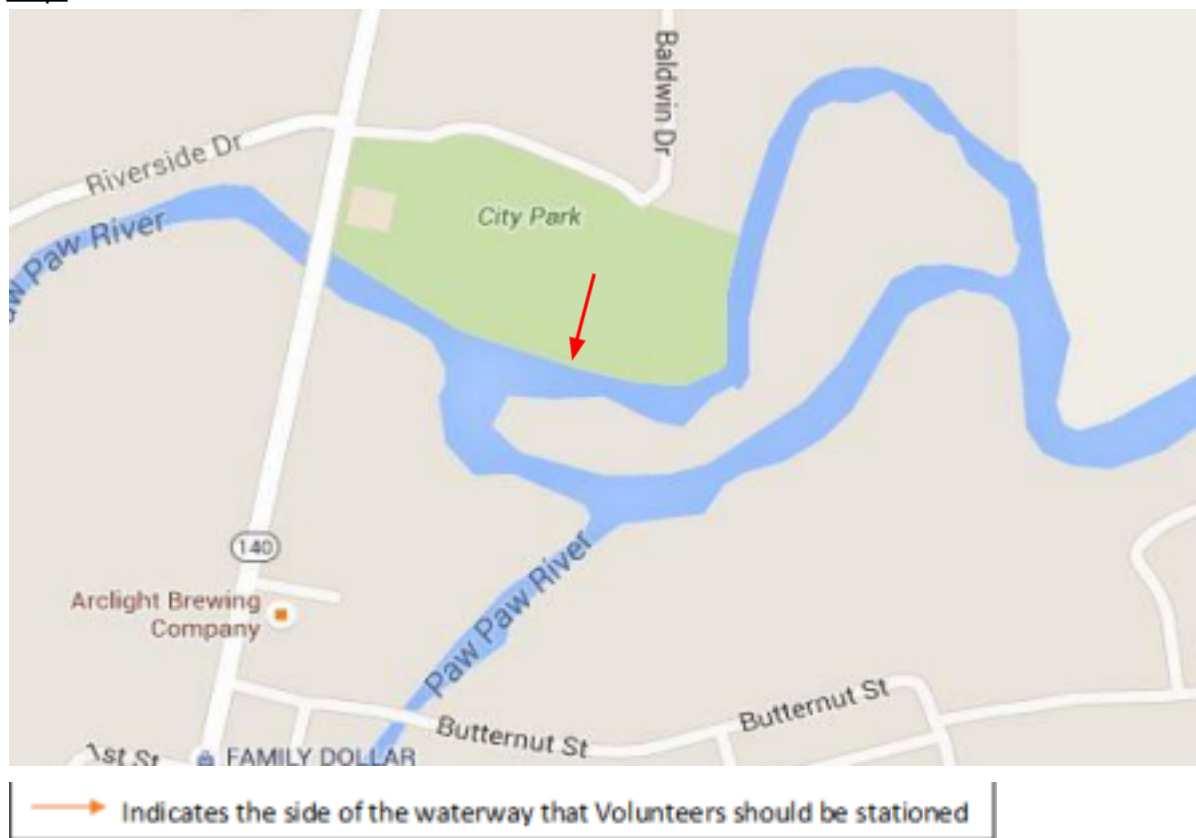
Location of Sampling Site: Sample upstream on the east side of the culvert.

## Volunteer Stream Monitoring Program-Macroinvertebrate Collection Site

### Team 2 - Site A: Hay's Park, M-140, Watervliet Dam Historic Channel, Paw Paw River (City of Watervliet)

Directions: From Lawrence River Park (N. Paw Paw Street/CR215 in Lawrence)-Turn Right (South) towards main light in Lawrence (Red Arrow Highway/Saint Joseph Street). Head straight through main light towards I-94. Enter on-ramp of I-94 heading West (towards Chicago). Exit off at Watervliet (Exit 41) and turn Right (North) on M-140/N. Main Street. Go over PPR Bridge then turn Right [East] into Hay's Park. Bear right on the circular drive. You will pass the floating fishing ramp/canoe access. Continue on and park near the sign that says "River Restoration in Progress". Prominently display River/Stream Study in Progress VBCD/TRC placard on dash.

### Map:



Location of Sampling: You will see a relatively shallow branch of the river coming from your left and joining a big eddy pool at the foot of the [now removed] spillway. The stream on your left is the historic channel that was revitalized a few years back when the diversion dam further upstream was removed. Sampling area is from the confluence of the historic channel /spillway channel upstream along the shallow and wade able historic channel. Note there is a constructed cobble riffle on the historic channel just before the eddy pool where you will want to start. Be careful not to trip and fall on the cobbles. Do not go out into the eddy pool. Sampling habitat includes cobble riffle, submerged logs, tree roots, maybe some leaf packs and possible areas of silt/muck.

Volunteer Stream Monitoring Program-Macroinvertebrate Collection Site

Team 2 - Site B: North Branch Road, Mill Creek, Paw Paw River (Bainbridge Township)

Directions: From Site A-Turn Left (South) out of Hay's Park. Follow M-140 South out of Watervliet to North Branch Road where you will turn Left [East]. Go East on North Branch, you will cross over a small culvert, keep going until the larger curve in the road and larger culvert over Mill Creek (approx.. ¼ mile West of County Line Rd/70<sup>th</sup> Ave.). Prominently display River/Stream Study in Progress VB/C/TC placard on dash.

Map:



Location of Sampling: Sampling area is upstream (East side) from bridge.

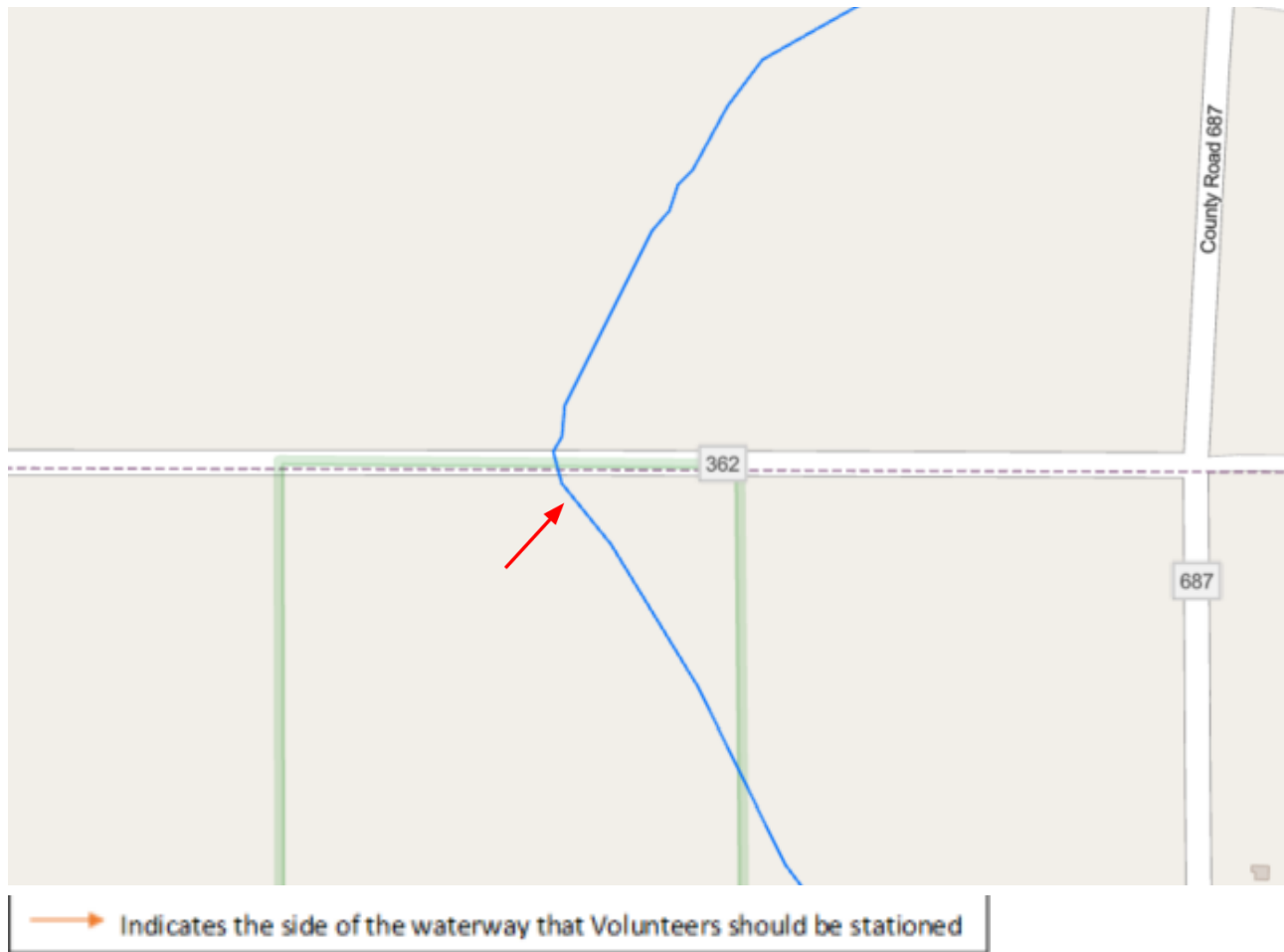


Volunteer Stream Monitoring Program-Macroinvertebrate Collection Site

Team 3 - Site A: Upper Pine Creek at Keeler State Game Area

Directions: From Lawrence River Park (N. Paw Paw Street/CR215 in Lawrence)-Turn Right onto CR 365. At the main light, turn right (West) onto W St. Joseph St. for about 5 miles. In downtown Hartford, take a left (south) onto S Center St./ CR 687 for about 3.5 miles. Turn right (West) onto CR362 for half a mile. The Keeler State Game area is on the left just after the Bridge over Pine Creek.

Map:



Location of Sampling: Head East from the parking lot about 150 feet till you reach Pine Creek. Start sampling just upstream of where it meets the drainage ditch along the road, and sampe upstream from that spot.

Volunteer Stream Monitoring Program-Macroinvertebrate Collection Site

Team 3 - Site B: Intersection of CR 215 and CR 360, White Creek (trib. Of Brush Creek) (Hamilton Township)

Directions: From Site A, head South on 59 ½ Street, back towards Red Arrow Highway. Turn left (East\_ onto Red Arrow Highway back towards Lawrence. Turn right (South) at the main light in Lawrence. At Acapulco Restaurant, turn Right (West) on CR 215. Follow CR 215 Southwest, then South for several miles. Continue South past intersection with 72nd Ave. Next road junction is with CR 360. Follow the road to Left and park just past a large new culvert. This is White Creek.

Map:



—→ Indicates the side of the waterway that Volunteers should be stationed

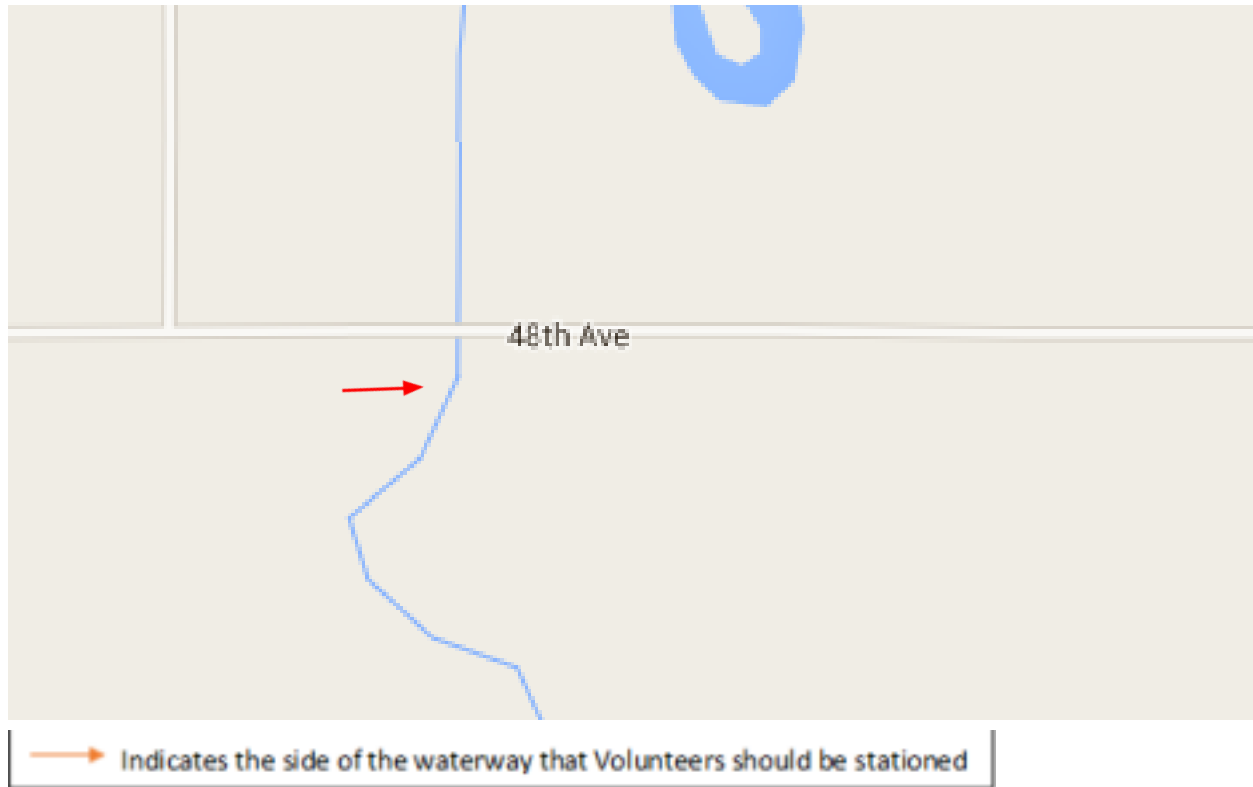
Location of Sampling: Sampling area is upstream.

## Volunteer Stream Monitoring Program-Macroinvertebrate Collection Site

### Team 4 - Site A: 48th Ave Bridge, Paw Paw River (Lawrence/Arlington Township Line)

Directions: From Lawrence River Park (N. Paw Paw Street)-Turn Left (North) heading out of Lawrence. Drive North on CR 673 and then turn Right (East) on 48th Ave. Follow 48<sup>th</sup> Ave. past 49<sup>th</sup> Street and 48<sup>th</sup> Street. Stop and park before bridge on the South side of road just before the metal guardrail begins. Prominently display River/Stream Study in Progress VBCD/TRC placard on dash.

#### Map:



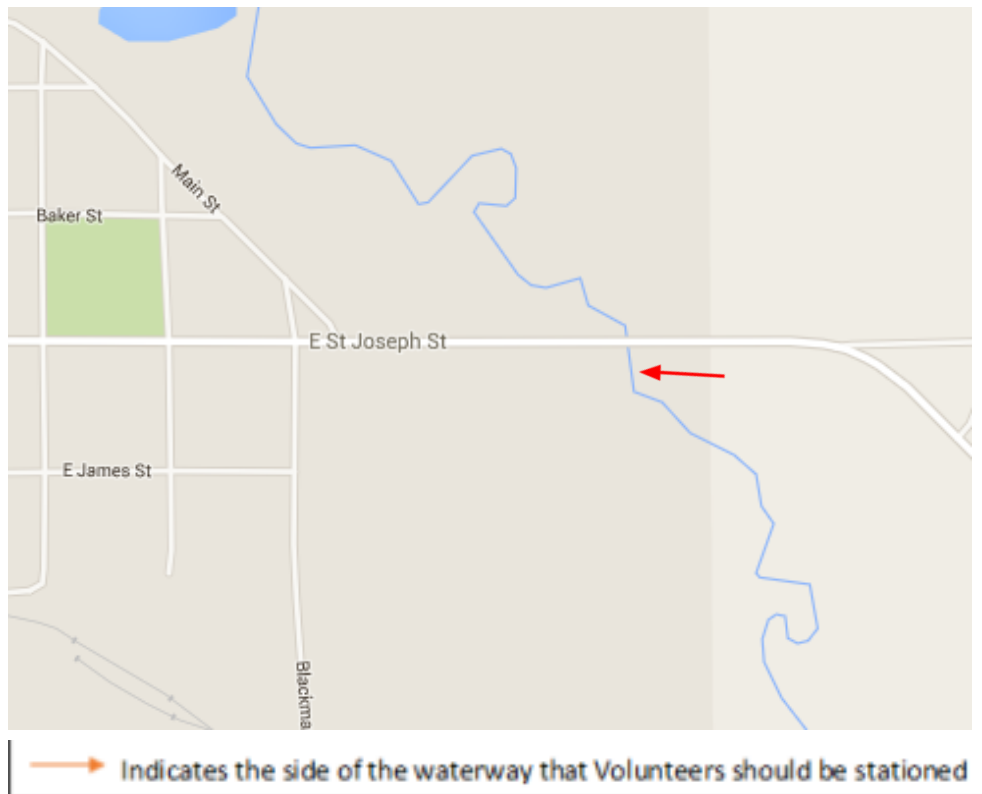
Location of Sampling: Sampling area is upstream South of bridge. Because of difficult access near bridge, it is best to go East of bridge 20-30 yards then walk due South into woods. After walking 20-30 yards through woods, then turn right (West) and walk over to creek. Sampling area begins at the large Sycamore tree on East bank approximately 20 yards South of bridge and extends 100 yards upstream. The creek will bend to the East and then bend again South. Sampling area ends at next big Sycamore tree on East bank. Beware of thick Honeysuckle bushes on bend. Pickers will have to go around these bushes to North and East to get back to creek. Note turtles, ducks, etc. in ox-bows on both sides of bridge.

## Volunteer Stream Monitoring Program-Macroinvertebrate Collection Site

### Team 4 - Site B: Red Arrow Highway, Brush Creek, Paw Paw River (Village of Lawrence)

Directions: From Site A-Turn around and drive back to CR 673, turn Left (South) and head back to Lawrence. At main light in Lawrence (E. St. Joseph St/Red Arrow Highway) turn Left (East) and drive to the bridge at East edge of town. Park on East side of bridge on South side of road. Prominently display River/Stream Study in Progress VBCD/TRC placard on dash.

#### Map:



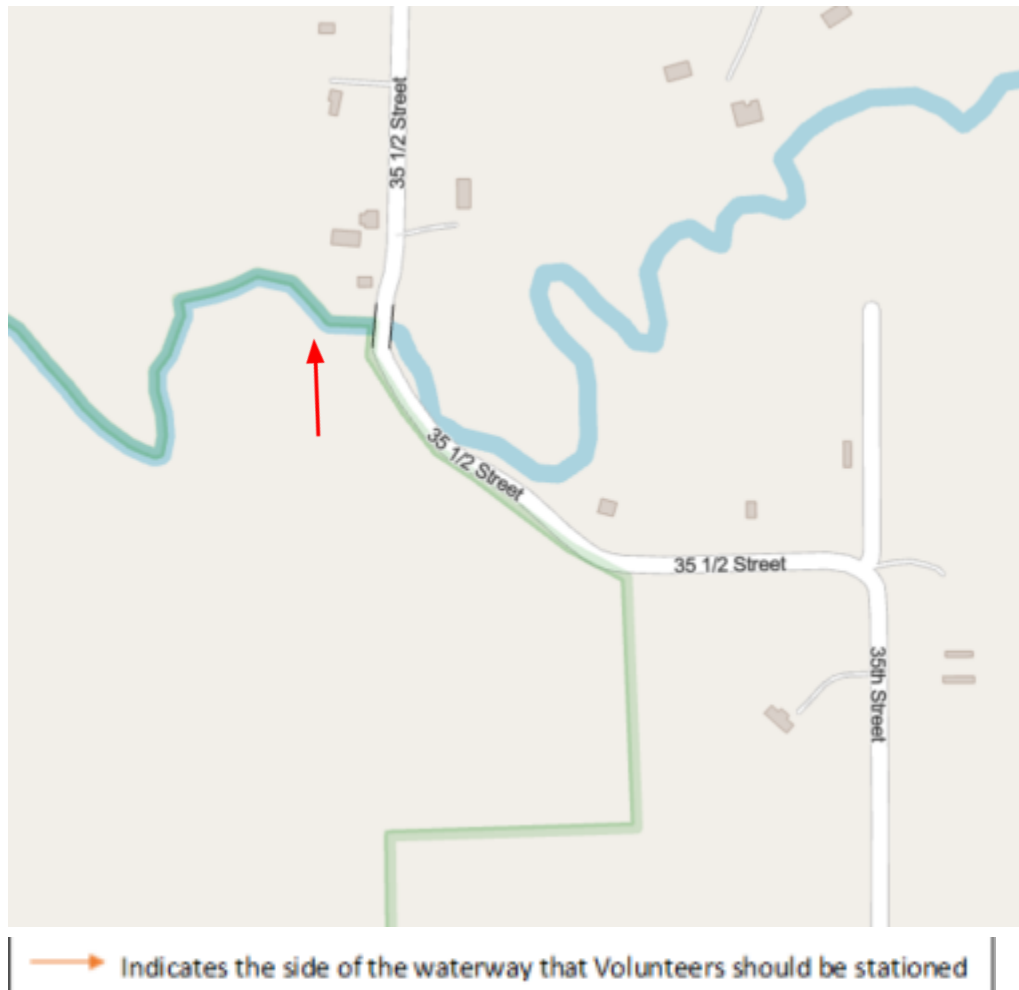
Location of Samples: Sample area is upstream South of bridge. Walk South through woods 20-30 yards then turn West and go over to Brush Creek. Sample 100 yard section of creek in woods South of bridge.  
\*Note Buckeye trees growing along edge of woods near parking spot.

Volunteer Stream Monitoring Program-Macroinvertebrate Collection Site

Team 5 - Site A: 35 ½ Street, North Branch, Paw Paw River (Waverly Township)

Directions: From Lawrence River Park (N. Paw Paw Street)-Turn Right (South) towards main light in Lawrence (Red Arrow Highway/Saint Joseph Street). Turn Left (East) onto Red Arrow Highway to Village of Paw Paw and turn Left (North) on M-40. Continue North on M-40 then turn Left (West) on 44th Ave. Go West on 44th Ave then turn Right (North) on 35th Street. Continue on 35th Street as it curves West. It becomes 35 ½ street as it curves North again. Park before the bridge (on the South side of bridge). Prominently display River/Stream Study in Progress VBCD/TRC placard on dash.

Map:



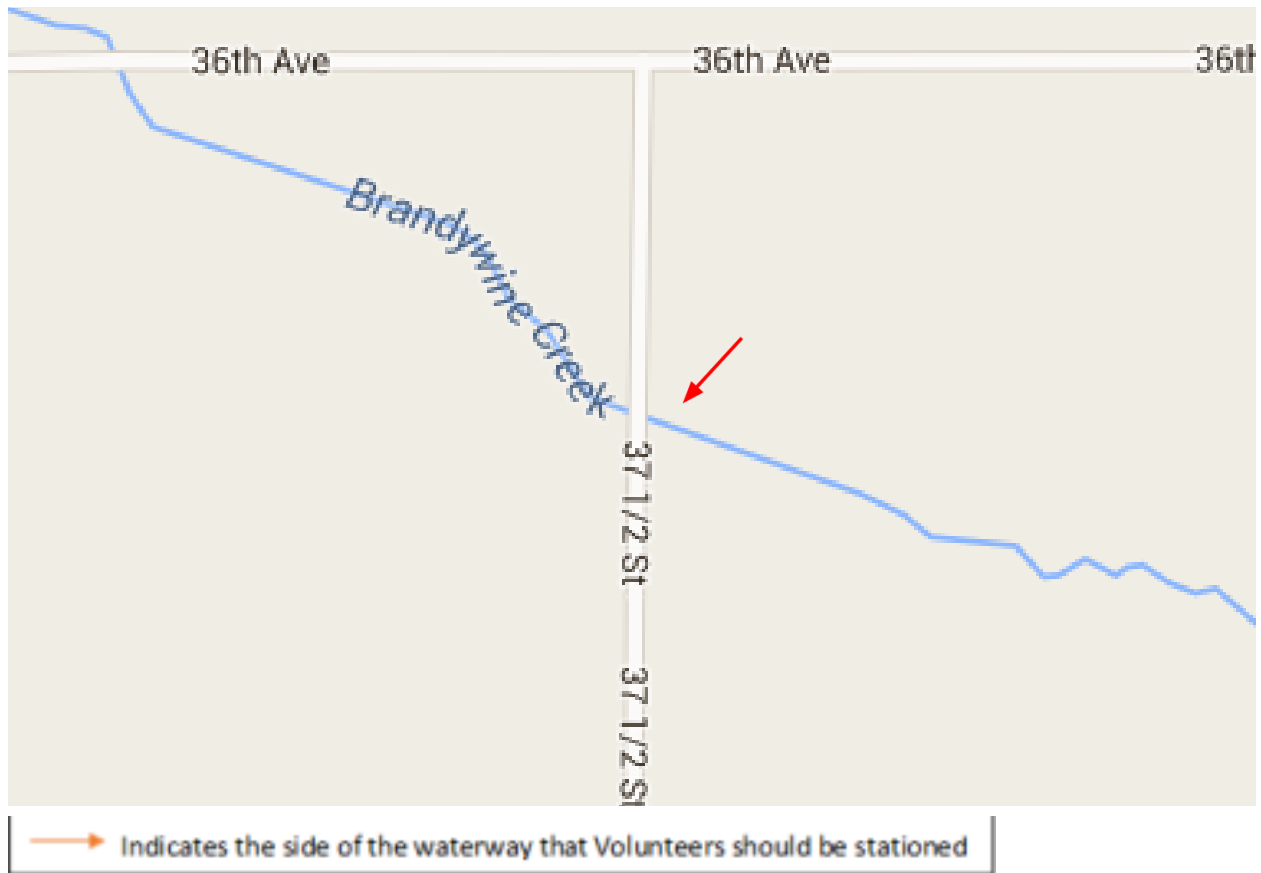
Location of Sampling: Sample area is downstream of bridge to the West on the South side of river. Walk along South bank. Sample area is downstream of large tree completely across river. Stay away from tree (and bridge) due to likely deep holes. Also some soft silt/muck areas. Sampling habitat includes submerged logs, tree roots, leaf packs, silt/muck areas and possibly some undercut banks. \*Be careful of barbed wire fence which you can safely go around at river's edge.

Volunteer Stream Monitoring Program-Macroinvertebrate Collection Site

Team 5 - Site B: 37 ½ Street, Brandywine Creek, Paw Paw River (Waverly Township)

Directions: From Site A-Continue North on 35 ½ Street. Turn Left (West) at 38th Ave and follow around curves to 37 ½ Street. Turn Right (North) on 37 ½ Street. Park North of bridge on East side of road. Display VBCD placard on dash. Prominently display River/Stream Study in Progress VBCD/TRC placard on dash.

Map:



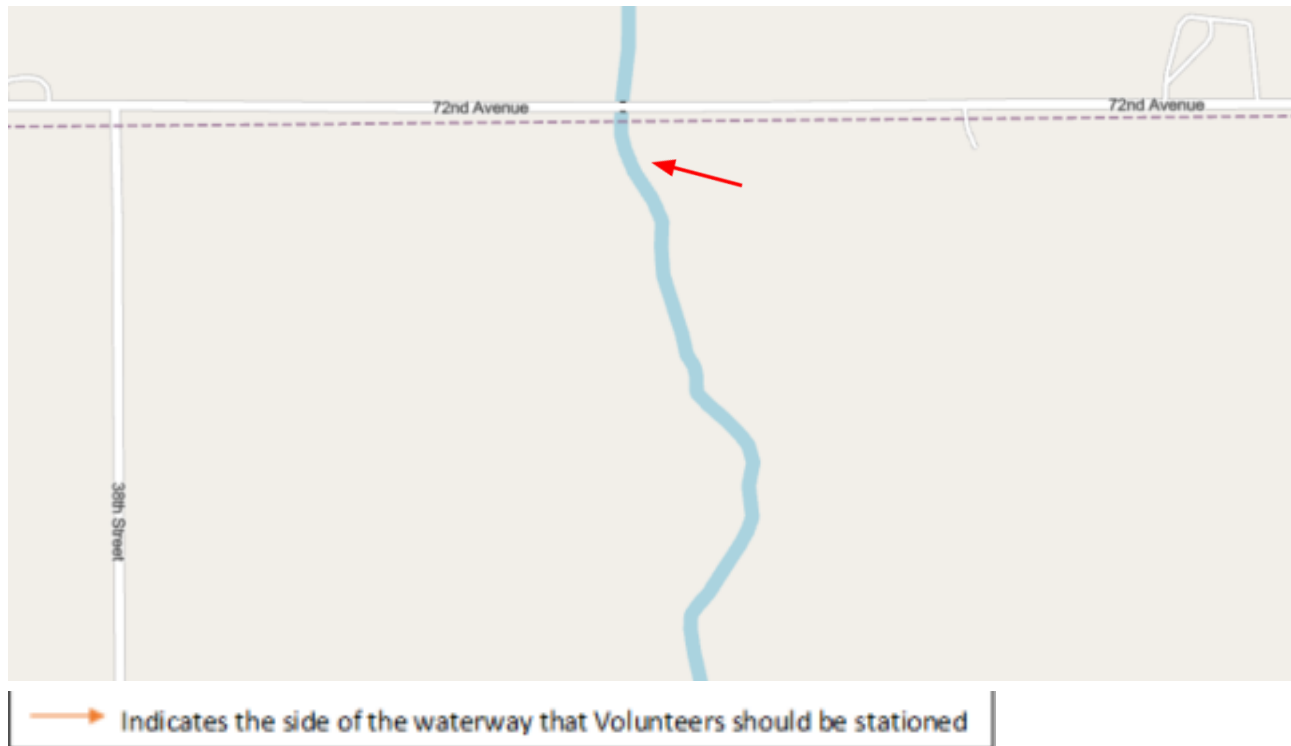
Location of Sampling: Sample area is downstream East of bridge. Pickers can set up on North bank.

## Volunteer Stream Monitoring Program-Macroinvertebrate Collection Site

### Team 6 - Site A: 72nd Ave. South Branch (labeled West), Paw Paw River (Paw Paw/Decatur Township Line)

Directions: From Lawrence River Park (N. Paw Paw Street)-Turn Right (South) towards main light in Lawrence (Red Arrow Highway/Saint Joseph Street). Turn Left onto Red Arrow Highway East to M-51. Turn Right (South) on M-51 and go South to 70th Ave./CR358. Turn Left (East) on 70th Ave/CR358. Turn Right (South) on 40th Street. Then turn Left (East) on 72nd Ave. Park across bridge on East side of bridge on South side of road. Prominently display River/Stream Study in Progress VBCD/TRC placard on dash.

### Map:



Location of Sampling: Sample area is upstream South of bridge. Use farm lane East of bridge to cross roadside ditch.

Volunteer Stream Monitoring Program-Macroinvertebrate Collection Site

Team 6 - Site B: 39th Street, Eagle Lake Drain (Paw Paw Township)

Directions: From Site A-Go West on 72nd Ave to 39th Street. Turn Right (North) on 39th Street. Park on North side of bridge on West side of road. Prominently display River/Stream Study in Progress VBCD/TRC placard on dash.

Map:



Location of Sampling: Sample area is upstream West of bridge. Careful of muddy areas and Multi-flora Rose.