QUALITY ASSURANCE PROGRAM PLAN

Upper AuSable River Watershed
Water Quality Monitoring Project

Submitted to help fulfill requirements for a
MiCorps Volunteer Stream Water Quality Monitoring Grant for the
Gahagan Nature Preserve
Roscommon, Michigan

Submitted Aug. 13, 2008
Revision No. 2

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A3. Distribution List

Joan Martin, Huron River Watershed Council

Irene Borak, Upper AuSable River Watershed Project

Tom Dale, Marguerite Gahagan Nature Preserve

Brian Hutchins, Upper AuSable River Watershed Project

Pam Nuttall, Kirtland Community College

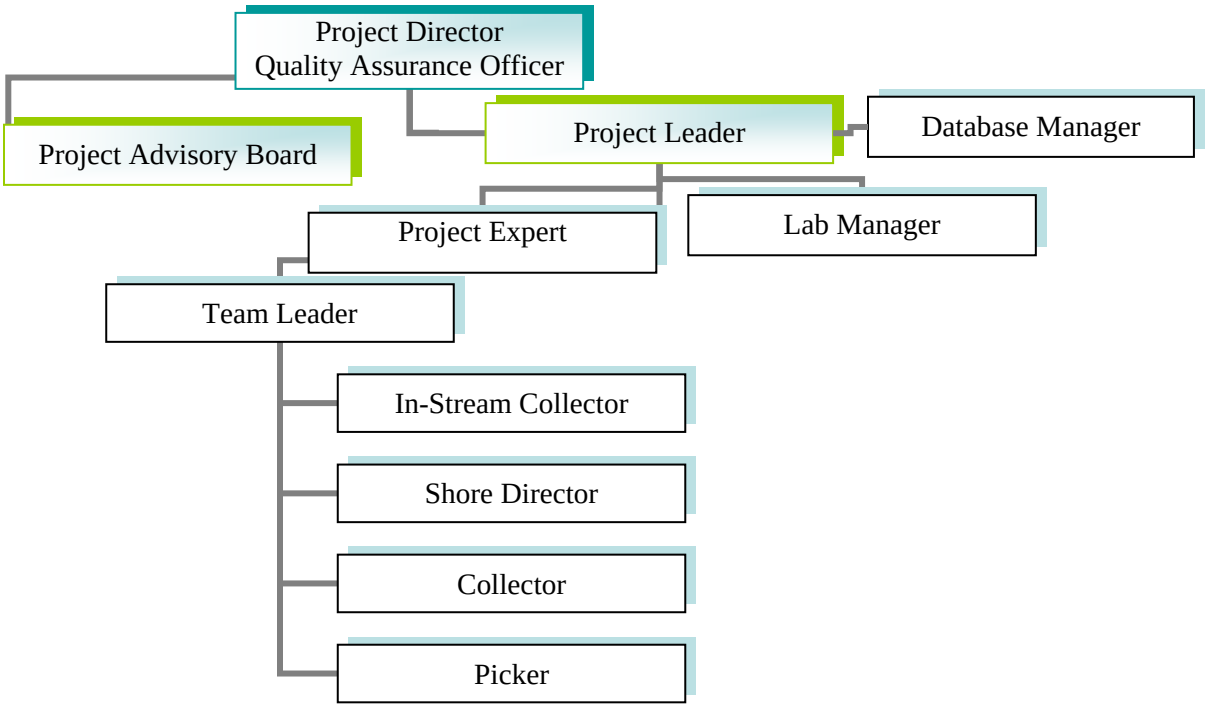
Bob Andrus, AuSable River Watershed Restoration Committee

Roger Fechner, AuSable North Branch Restoration Committee

A4. Program Organization

Key personnel: In addition to the project managers described below, the project maintains an advisory board that includes the project managers and members of the AuSable River Watershed Restoration Committee (Bob Andrus) and the AuSable North Branch Restoration Committee (Roger Fechner).

The organizational/communication chart for the project is as follows:



Management Responsibilities

MiCorps Grant Administrator, Joan Martin
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Upper AuSable River Watershed Project
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989-275-8206
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989-275-4658
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989-275-5000
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Project director. All reports and relevant communication will be directed to the project director. She will ultimately be responsible for organizing logistics and recruiting volunteers for training, collection and identification sessions, as well as assembling the necessary teams to implement the project. She will delegate these duties as needed. She will be responsible for updating and overseeing the implementation of the project's Quality Assurance Program Plan. She will report project results and make other reports to MiCorps personnel. The project director will also be responsible for planning and performing public relations and solicitation for the project. She will maintain clear and accurate records of the project budget and will be responsible for making sure reimbursements and payments from the budget are made in a timely manner. She will be responsible for purchasing, and maintaining all purchased or borrowed, equipment for the project, other than equipment owned by Kirtland Community College.

Project leader. The project leader is responsible for leading training sessions. He will also be responsible for selecting and field mapping sampling sites. He will reserve all meeting and laboratory space as needed. He will be the project liaison to the Gahagan Nature Preserve and will assist the project director where needed. He will be responsible for maintaining the project's permanent specimen collection.

Project expert. The project expert will be certified as such by MiCorops personnel to be an expert in the collection, identification and quality assurance techniques necessary for the project. He or she will assure the accuracy of all final identifications of samples.

Database manager. The database manager will establish and maintain the computer-based volunteer database for the project and is responsible for computer and GPS mapping of the project sites.

Lab manager. As an employee of Kirtland Community College, the lab manager will be responsible for keeping track of and maintaining any college-owned equipment used in the project, including waders and the college's science lab and lab equipment.

Field Responsibilities

Team Leaders – At least four team leaders will be trained and work as team leaders during the first year of the project. More team leaders will be trained and added as needed. They will be responsible for attending training and receiving team leader certification from the project leader. Prior to collection days, they will be responsible for making sure all of the equipment necessary to successfully sample their assigned sites is prepared and ready for use. On collection days, they will be responsible for assigning tasks and equipment to volunteers, assuring that QAPP guidelines are followed, documenting all collection data and all relevant variables, and making sure that all collected material and reports are properly labeled and delivered to the project director upon completion.

In-Stream Samplers - One in-stream sampler will be assigned by each team leader (this position may be filled by the team leader) on collection days. This person will have attended a training session to become certified in the position and will be familiar with the QAPP guidelines for sampling. He/she will be responsible for sampling the river on collection days, according to QAPP guidelines, and making sure that all specimens are given to a stream collector who will deliver the sample to shore.

Shore Director - One shore director will be assigned by each team leader (this position may be filled by the team leader) on collection days. The shore director will have attended training to become familiar with his or her duties. The shore director will be responsible for making any necessary adjustments to the prepared site map and for maintaining communication with the in-stream sampler to assure that all relevant habitats within the site are sampled. He or she will oversee stream-side picking and collecting activities, give direction to the sample collectors and document any relevant variables or circumstances.

Collectors - One or more stream collectors will be assigned by each team leader on collection days. They will be given direction on how to collect samples from the in-stream sampler and deliver them to the pickers, following QAPP guidelines.

Pickers - One or more stream-side pickers will be assigned by each team leader on collection days. Under the direction of the shore director, they will be responsible for retrieving all specimens from each sample and moving the specimens from the sample sorting dishes to the prepared collection bottles that will be provided to them by the team leader.

Laboratory Responsibilities

The biology laboratory at Kirtland Community College will be used throughout the project; when necessary for training activities, and for all specimen identification days. The lab manager will be responsible for making sure the lab is open and ready for use when needed. Irene Borak, Tom Dale and Pam Nuttall will be jointly responsible for overseeing specimen identification. This list may change as more knowledgeable individuals volunteer for the project and more project experts are trained and certified.

Corrective Action

The project's core steering committee members - Irene Borak, Tom Dale, Brian Hutchins, Bob Andrus, Patrick Ertel, Pam Nuttall and Roger Fechner - as a team will be responsible for initiating, developing, approving and implementing corrective actions as circumstances dictate.

A5. Problem Definition/Background

The AuSable River is a precious treasure – it is a world-renowned trout stream and tourist destination. Local economies benefit from the high property values along its main stream and tributaries. The river's watershed boasts numerous groups that share in the goal of protecting the resource, however, none have endeavored to collect consistent, verifiable data on the health of the watershed over the long term.

Many of these groups formed in response to potential threats to the resource, which include unchecked and/or inappropriate development within the watershed, oil and gas exploration and toxic waste runoff. Other threats include the routine entry of salt and other waste products at road

crossings, streambank impacts caused by the large numbers of canoers, and even the foot traffic of fishermen and hikers which can lead to streambank erosion, a recognized threat to fish habitat.

As a valuable natural resource, we feel the watershed's health should be actively monitored in order that it may continue to provide enjoyment and a natural setting for generations to come. Snapshots of the watershed's health have been taken by qualified agencies in the past, however, long-term, annual data is not currently being collected, creating a void of information that this project seeks to fill.

This lack of information makes the impact of current and future threats to the river hard to gauge in real and timely terms.

The primary goal of this project is to aid in protecting the water quality of the Upper AuSable River watershed. We will accomplish this by:

* Collecting quality-assured, long-term data on the state of the benthic macroinvertebrate communities of the river's upper Main Stream and its tributaries;
* Providing baseline information and documenting trends in water quality for the upper watershed;
* Disseminating this information in useful formats to those who need it, primarily the MDEQ;
* Educating watershed residents about how their actions or specific circumstances affect the river's benthic communities and the overall health of the river and motivating them to take corrective actions.
* Building a constituency of citizens to help us monitor the upper AuSable River watershed and building public support for protecting the water quality of the river.

The committee's primary objectives include identifying and drawing together all of the groups and individuals who share in this goal, then from this pool, drawing long-term financial and volunteer support to carry out the project.

Data collected will be electronically entered into the MiCorps data system and disseminated in the appropriate format to all relevant parties. The primary actions we envision taking based on monitoring results are to report the trends and conditions of the river sections studied. As clarified in other sections of this document, we will not present any results on the ecological conditions as "verified" until we have three years of benthic community data plus a habitat assessment. In the event that an extreme change in benthic macroinvertebrates and habitat is observed, we will notify the appropriate authorities about the unverified results immediately and stay in contact with them as they investigate the situation.

A6. Program Description

A steering committee has been formed to plan and implement the Upper AuSable River Watershed Water Quality Monitoring Project and to try to achieve the goal of aiding in the protection of the water quality of the Upper AuSable River watershed.

Support for the first two years of the project has already been achieved, through the assistance of MiCorps personnel and the grant program they offer, but also by successfully approaching groups within and adjacent to the watershed that are known to share the goals of this project. In order to maintain their continued support, the committee will need to successfully implement the project in the long term and produce useful, quality assured data.

To accomplish this, the committee will utilize the expertise and training opportunities offered by MiCorps to successfully implement twice-a-year collection of benthic macroinvertebrates on the Main Stream of the upper AuSable River and its tributaries. (For details, see Section B.)

During the first year of the study, seven sites along the watershed will be monitored by our trained personnel, with the assistance of untrained but interested volunteers. The guidelines within this QAPP will be strictly followed. It is anticipated that the number of monitoring sites will be boosted to 12 in the second year. Each site will be permanently marked and mapped.

The volunteers and trained personnel will sample the 300-foot monitoring sites for benthic macroinvertebrates, and perform a habitat assessment at each site, using protocol and data sheets approved by MiCorps. The samples will be sorted, identified and placed in a permanent collection. Identification of the collected specimens to the family level, if possible (minimum identification to order), will take place and a Stream Quality Score will be derived. Verified data and/or distinct anomalies in the data, will be presented to the appropriate authorities and reported as required on the MiCorps database.

By implementing a public relations plan that will be constructed by the project director, the community at large, and our support groups in particular, will be kept abreast of project activities and results, as well as progress toward the project goal.

To be successful at our goal of helping to protect the watershed, the project will be implemented beyond the two-year life of the MiCorps grant, in perpetuity, given that funding and manpower needs for the project continue to be met.

A7. Data Quality Objectives

The precision, bias, completeness, representativeness and comparability of the data collected in this study are discussed here. These criteria will be used to decide whether data are acceptable to use in program reporting and the MiCorps Data Exchange.

The parameters to be measured in this project are a stream quality score of benthic macroinvertebrates and habitat assessments at the monitoring sites. A value for the stream quality parameter will be derived from the identification of specimens collected and the relative abundance of each.

Precision
The following techniques will be reviewed during training and in retraining of team leaders every three years:

1. Collecting style (must be thorough and vigorous);
2. Habitat diversity (must include all habitats present and be thorough in each one);
3. The transfer of collected macroinvertebrates from the net to the sample jars (thoroughness is critical); and
4. Attention to reference criteria in habitat assessment.

Since there is inherent variability in accessing the less common taxa in any stream site and program resources do not allow the program director to perform independent (duplicate) collections of the sampling sites, our goal for quality assurance is conservative. A given site’s

Stream Quality Score across macroinvertebrate taxa will be noted as "preliminary" until three spring and three fall sampling events have been completed. At least two of these six measures will be collected by different volunteer teams. The resulting measure of stream quality for each site will be compared to the composite (median) results and each should be within two standard deviations of the median.

In addition, the project director will seek opportunities to compare results with those from an external sampling group, such as MDEQ. Every attempt will be made to collect duplicate samples in such a situation.

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

The project expert will make the final identifications for each sample. MiCorps staff will conduct a method validation review with the designated project expert to ensure his expertise, preferably prior to the first training session held by the project leader. This will be conducted with each new project expert added to the monitoring program. This review will consist of a joint sampling event, with MiCorps staff jointly collecting, sorting and identifying the macroinvertebrates with the project expert. Any monitoring issues will be addressed on site. If no major concerns remain, the project expert will be considered "certified" by MiCorps.

Bias

Sites will be sampled by different team leaders at least once every three years in each season (a fall and a spring sampling event among six sampling events) to examine the effects of bias in individual collection styles. The new measure should be within two standard deviations of the median of past measures. Sites not meeting this data quality objective will be evaluated as above by the project director.

Completeness

Following a quality assurance review of all collected and analyzed data, data completeness will be assessed by dividing the number of measurements judged valid by the number of total measurements performed. The data quality objective for completeness for each parameter for each sampling event is 90 percent. If the program does not meet this standard, the project director 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, emphasizing the inclusion of riffle habitat. 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. Since not enough resources are available to allow the program to cover the entire watershed, some subwatersheds will not initially be represented. Additional subwatershed sites will be added as resources and volunteers allow.

Comparability

To ensure data comparability, all volunteers in the watershed will follow the same sampling and site selection methods and use the same units of reporting. Program managers and trainers will

learn the standard MiCorps monitoring methods at annual training by MiCorps staff and will train their volunteers to follow those methods to ensure comparability of results among all MiCorps programs. To the extent possible, the monitoring of all study sites will be completed on a single day.

For each sampling event that is not completed on a single day, monitoring by volunteers will be completed within the same two-week period. If a site is temporarily inaccessible, such as due to prolonged high water, the monitoring time may be extended for two additional weeks. If the issue concerning inaccessibility is continued beyond the extended dates, then no monitoring data will be collected during that time and there will be a gap in the data. If a team is unable to monitor its site during the specified time for reasons other than inaccessibility, the team leader will contact the project director as soon as possible and no later than the end of the first week in the sampling window in order for the director to arrange for another team to complete the monitoring. If no team is available, the project director will, if feasible, sample the site. Otherwise, the site will go unmonitored for that season.

A8. Special Training/Certifications

Before the first monitoring event in fall 2008, the project director will schedule a “side-by-side” training session with MiCorps personnel in order to certify at least one project expert, and more if possible. If more project experts are added in subsequent years, MiCorps will be asked to certify them as well.

Team leaders will be encouraged to attend the MiCorps training. However, an additional training of team leaders will be given by the project leader before the fall 2008 monitoring event in order to certify team leaders. The project leader will take advantage of MiCorps training materials to accomplish this. That training session will also be used to train interested volunteers to be in-stream samplers, shore directors and in other monitoring procedures and to make them aware of quality assurance protocol. Additional training of this type will take place as deemed necessary by the project director.

Section B: Program Design and Procedures

B1. Study Design and Methods

See Appendix I for a watershed map denoting the initial seven monitoring site locations and for a sample site map.

See Appendix II for a Project Timeline.

The project will focus on the Upper AuSable River watershed in Roscommon, Crawford, Otsego and Oscoda counties. The upper watershed includes the South Branch of the AuSable River that begins in Lake St. Helen; the Main Branch that begins between Gaylord and Grayling and downstream to about Parmalee Bridge; the East Branch that begins in Hartwick Pines State Park; the North Branch that begins in southeastern Otsego County; and Big Creek that begins south of Luzerne in Oscoda County.

During the first year of the project, we will monitor one site on each of the South Branch, East Branch, Big Creek, North Branch, and on a tributary to the North Branch, and two sites on the Main Stream. During the first year of the study, these seven sites will be monitored, once in the fall (early September) and once in the spring (early June). It is anticipated that this site number will be boosted to 12 in the second year.

Methodology used to select sites: In general, sites have been selected using the criteria of accessibility and representativeness of the subwatershed. As the project gathers data and expertise, proximity to a known or suspected source of stream degradation will likely be added as a criterion. Future site selection will also take into account past monitoring efforts by other agencies.

The initial seven sites will be marked off as follows:

Main Stream – One site will be at what is known as Guide's Rest, a popular fishing access site upstream from Stephan Bridge, with access off North Down River Road. The second site will be immediately downstream from the confluence of Big Creek with the Main Stream, north of Luzerne.

South Branch – The study site on the South Branch is downstream from the Village of Roscommon, before Steckert Bridge, upstream from Water's Edge Canoe Livery. (Note: The village's practice of allowing stormwater runoff to enter the watershed unfiltered is of concern to the committee. Additional study sites will likely be added in year two of the study to test hypotheses about the effects of the village's system.)

North Branch – One site will begin at the Dam 4 access site and continue downstream (below the dam), while the second site will actually be on Big Creek (not the same Big Creek that feeds into the Main Stream near Luzerne) just upstream from where it feeds into the North Branch and upstream from the North Down River Road crossing. (Note: Accessibility on the North Branch is hampered by the high percentage of private ownership along the river.)

East Branch – This site will be located in the southeast corner of Hartwick Pines State Park, where the East Branch passes through the park.

Big Creek – This site will be located adjacent to the Randall Road crossing, north of Luzerne.

Habitat Assessment: Before the first monitoring event at any site, a thorough Habitat Assessment and map will be created for each site, coordinated by the project expert. MiCorps' three-page data sheet for Stream Habitat Assessment and Site Sketch form will be used (forms can be found at www.micorps.net/forms.html). An adequate number of pictures to document the site will also be taken at this time. The sites will each be logged into a global positioning unit to record longitude and latitude, and three half-inch capped PVC tubes will be pounded into the stream bank at 0, 150 and 300 feet to locate the site. Copies of the completed Habitat Assessment forms will be provided to the Team Leader for use on the day monitoring is performed so that changes may be noted. These forms will be returned to the project director along with the sample collection and will be used only in the context of the results of the benthic macroinvertebrate sampling and how the state of the habitat may affect the benthic communities.

Sampling the Benthic Community: On monitoring event days, a trained collector will make multiple collections 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 shore director will record the number of locations sampled within the monitored reach in each habitat type and note the locations sampled on a site map. The trained collector will transfer the material from the net into plastic lidded tubs and deliver the tubs to the stream bank where the sample will be transferred to white pans to aid in collecting specimens. The remaining volunteers (pickers) will pick out all of the macroinvertebrates from the pans and place them into properly labeled jars of 70 percent ethyl alcohol for later identification.

During the collection, the collector will provide information to the team shore director in response to questions on the Stream Macroinvertebrate Datasheet (provided by MiCorps) that review all habitats to be sampled, the state of the stream and any changes in methodology or unusual observations. The shore director will instruct and assist other team members in detecting and collecting macroinvertebrates in the collecting 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.

At the collecting site, all invertebrate sample jars receive a label written in pencil, stating date, location, name of collector and number of jars containing the collection from this site, which is placed inside the jar. A Site Collection Data Sheet (See Appendix III), to be filled out by the shore director, 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 for returning all jars and equipment.

Upon return to the project director, the collections are checked for labels, the data sheets are checked for completeness and for correct information on the number of jars containing the collection from the site, and the jars are secured together with a rubber band and site label and placed together in one box. They are stored in the Kirtland Community College science lab until they are examined and counted on the day of identification (within two weeks).

The data sheets are used on the identification day, after which they remain on file indefinitely. At the time of identifying the sample, the sample identifier checks the data sheet and jars to ensure

that all the jars, and only the jars, from that collection are present prior to emptying them into a white pan for sorting. If any specimens are separated from the pan during identification, a site label accompanies them. For identification, volunteers sort all individuals from a single jar into look-alike groups, and then are joined by an identification expert who confirms the sorting and provides identification of the families present. These identifications are then verified by the project expert.

When identification of a sample is complete, to the project expert's satisfaction, the samples are put in fresh alcohol, in vials separated by taxa, and printed label are placed inside the vials. The entire collection is stored at Kirtland Community College indefinitely. Sample bottles in the permanent collection will be inspected at a minimum once every three years and alcohol will be replaced as needed.

At this time the Identification and Assessment Sheet is completed and the Stream Quality Score is determined.

Since our evaluation is based on the diversity in the community, we attempt to include a complete sample of the different groups present, rather than a random sub-sample. We do not assume that a single collection represents all the diversity in the community, but rather we consider our results reliable only after repeated collections spanning at least three years. Our results are compared with other locations in the same river system that have been sampled in the same way. All collectors attend an in-stream training session, and most sites are sampled by different collectors at different times to diminish the effects of bias in individual collecting styles. Samples where the number of families found diverges substantially from past samples will be audited and action taken as is outlined in Section C1.

Monitoring parameters:
* Site additions to the project will be considered each summer, after the spring monitoring has been completed. The process of deciding whether to add sites and where will take into account any anomalies in the data that would benefit from additional sampling sites, further refinement of the study, and the status of volunteers and/or funding.
* A complete habitat re-assessment will be performed at each site at least every five years in the summer or fall. Changes to the habitat that are noted in the interim during monitoring events will be noted and attached to the official habitat assessment for each site as they are produced.
* The macroinvertebrate community will be monitored and identified to family level twice annually. Monitoring will take place in early June and early September, and identification will take place within two weeks of the monitoring event, if possible. A window of one month will be given for monitoring where extenuating circumstances exist.

Before each monitoring event, the following Equipment Quality Control will take place, with the responsible person listed in parentheses:
* Check to make sure equipment is in working order and not damaged (team leader)
* Clean equipment before and after taking it into the field (team leader)
* Check the batteries of all equipment that require them (team leader)
* Check supply and condition of ethyl alcohol (lab manager)
* Check to make sure enough collection and storage vials, and labels are ready (lab manager)

During field activities, the following quality control procedures will take place:
* At least once every three years in each season, change the composition of the field crews to maintain objectivity and minimize individual bias.
* Review filed records before submitting them for analysis to minimize errors.

* Check all data sheets to make sure each habitat type available was sampled, and the team leader will examine several picking trays to ensure that all present families have been collected.
* If more than one site will be sampled by the same team during any given monitoring event, the team leader will be responsible for rinsing the colleting net and pans in fresh (not river) water before moving on to the next site to avoid contaminating the next sample.

During data analysis, the following quality control procedures will take place:
* Group members sorting any given sample will complete the final identification and storage phase of the process before opening another sample.
* When the data results are substantially divergent from previous sampling(s), conduct repeat monitoring by a different field crew within two weeks.
* All lab sorting is rechecked by an expert before completing identification.
* All Identification and Assessment Sheets are rechecked for accuracy.

B2. Instrument/Equipment Testing, Inspection and Maintenance

Critical equipment for this project includes the following:

Bioquip long-handled D-shaped nets
Collection jars with poly-seal tops
Glass vials with caps adequate for permanent specimen storage
Plastic tubs, with tops, for collecting specimens from in-stream collector
White sorting pans
Forceps with tips that meet
Eye droppers suitable for handling very small specimens
Waders
Ethyl alcohol
Reel-type 200-foot measuring tape
Yard sticks
Data sheets
Taxanomic keys to macroinvertebrate families likely to be found
Petri dishes
Dissecting microscopes
Jar and vial labels
Pencils

With the exception of the waders, white sorting pans, petri dishes and the dissecting microscopes, all equipment for the project will be stored in the garage of the Gahagan Nature Preserve, a secure facility. The waders and lab equipment noted, which are being borrowed from Kirtland Community College, will be checked out from the college when needed. The college's biology lab technician (Pam Nuttall) is responsible for inventorying and inspecting this equipment before use and after use to make sure they are clean and the waders do not leak.

At least one week before each monitoring event, a team consisting of the project director, project expert and the team leaders will gather at the Gahagan Nature Preserve to inspect and inventory all other equipment. An Equipment Inventory/Inspection Sheet (see Section B3) is included in the inspection process. Damaged or missing pieces are replaced if necessary and the equipment shall be repaired prior to sampling.

The team will inspect each collecting net to make sure there are no holes in the net and the metal rings that attach the net to the metal D-ring are all in place and secure and that the D-ring is firmly attached to the pole. The team will inventory and visually inspect all collecting jars, specimen vials, forceps, eye droppers and sorting pans to make sure the stock is clean and complete. If cleaning of any equipment is necessary, it will be performed in the kitchen of the preserve's interpretive center. The project leader will be responsible for validating the Equipment Inventory/Inspection Sheet.

B3. Inspection/Acceptance for Supplies and Consumables

Upper AuSable River Watershed Water Quality Monitoring Project
Equipment Inventory/Inspection Sheet

Stored at Gahagan Nature Preserve:

____ 12 D-shaped, long-handled nets, Bioquip

____ 17 pocket magnifiers

____ 16 clipboards

____ 14 plastic collection pans with tops

____ 15 forceps

____ 15 yard sticks

____ 15 eye droppers

Above equipment on loan from Mershon Chapter Trout Unlimited, May 2008 - November 2010

____ 60 8-oz collecting jars, clean (May 29, 2008, from Mershon Chapt. TU)

____ 4 cases (120 per case) glass specimen vials (Date of purchase _____)

____ 2 cases (4 gallons per case) 100 percent ethyl alcohol (Date of purchase _____)

Inspect and count each collecting net to make sure there are no holes in the net and the metal rings that attach the net to the metal D-ring are all in place and secure and that the D-ring is firmly attached to the pole. Inventory and visually inspect all collecting jars, specimen vials, forceps, eye droppers and sorting pans to make sure the stock is clean and complete. If cleaning of any equipment is necessary, it will be performed in the kitchen of the Marguerite Gahagan Nature Preserve's interpretive center.

_____ Pre-monitoring event - I certify that the above
Signature/date of Project Expert inspections and inventory have been completed and that the above checked equipment is clean and complete.

_____ Post-monitoring event – I certify that the above
Signature/date of Project Expert inspections and inventory have been completed and that the above checked equipment is clean and complete.

Stored at Kirtland Community College

____ 12 white porcelain sorting pans

____ 12 pair insulated waders, free of holes, clean

Inspect and count above equipment to make sure all are clean and complete and the waders do not leak.

_____ Pre-monitoring event - I certify that the above
Signature/date of KCC Lab Tech. inspections and inventory have been completed and that the above checked equipment is clean and complete.

_____ Post-monitoring event – I certify that the above
Signature/date of KCC Lab Tech. inspections and inventory have been completed and that the above checked equipment is clean and complete.

B4. Non-direct Measurements

(Section not applicable*)*

B5. Data Management

The data forms listed below will be used for the project. The first three listed can be found at www.micorps.net/forms.html; the fourth is attached as Appendix III.

2-page Stream Macroinvertebrate Datasheet (MiCorps)
3-page Stream Habitat Assessment (MiCorps)
1-page Site Sketch (MiCorps)
1-page Site Collection Data Sheet

The project expert will be responsible for signing off on the complete Stream Habitat Assessment form. The team leader will be responsible for signing off on the complete Stream Macroinvertebrate Datasheet, the Site Collection Data Sheet, and for making any notes/changes on the Habitat Assessment form. All forms will be presented to the project director no more than one week after the monitoring event, preferably on the same day.

The project director will be responsible for collecting and making one copy of all data forms after each monitoring event. One copy will be kept on file in the office of the project director. The second copy will be kept on file at the Gahagan Nature Preserve. The completed forms will also be reproduced by the project director as PDF files and posted on the project Web site as public information. Any data summaries will also be posted, in the most easily readable format, on the Web site. Both hard copy and digital copies of the data sheets will be kept as long as the project lasts. All electronic formats of the project results will be copied to CD and kept both with the project director's files and at the Gahagan Nature Preserve. If the project is discontinued, all files will become the property of the Gahagan Nature Preserve.

The project director will also be responsible for reporting the certified monitoring results electronically to the MiCorps database per MiCorps specifications.

Data calculation for Stream Quality Score for each monitored site follows the directions on the Stream Macroinvertebrate Datasheet. All calculations will be checked at least twice, by the program director and the project expert. Hard copies of all computer-entered data will be reviewed for errors by the project director by comparing to field data sheets.

Section C: System Assessment, Correction and Reporting

C1. System Audits and Response Actions

Immediately after identifying the samples from each monitoring event and completing the data sheets and necessary calculations, the project director and project expert(s) will be responsible for reviewing all data sheets for completeness and discrepancies. Any unusual or highly variable data will be questioned. If problems with the date are identified, the following actions will take place in the order presented:

1. If an "outlier" is calculated, the data will be examined to determine if the results are likely due to sampling error or a true environmental variation. If sampling error is determined, the data point should be immediately resampled by a different team, if possible;

2. If resampling is not possible, the data point will be removed from the data record. Volunteer teams that generate more than one outlier should be observed by the project director at the next sampling event and be considered for retraining;

3. Other problems will be included in the results, but the problem will be noted; or

4. The data will be accepted as is.

If deviation from the QAPP is noted at any point in the sampling or data management process, the affected samples may be deleted from the data set. The project's core steering committee members – Irene Borak, Tom Dale, Brian Hutchins, Bob Andrus, Patrick Ertel, Pam Nuttall and Roger Fechner – as a team will be responsible for initiating, developing, approving and implementing corrective actions as circumstances dictate. Re-sampling will be conducted if warranted and feasible, given that the deviation is noted soon after occurrence and volunteers are available. Otherwise, a gap may be left in the monitoring record. All corrective actions, such as above, will be documented and communicated to MiCorps.

C2-3. Data Review, Verification and Validation/Reconciliation with Data Quality Objectives

All field and laboratory data are reviewed by the project expert(s) and project director to determine if the data meet QAPP and MiCorps specifications before posting to the project Web site and the MiCorps database. Decisions to reject or qualify data are made by the project director and project expert(s) collaboratively after review and evaluation of the data (as noted in other sections). Comparing the current monitoring event's results (stream quality score) with results from previous years is part of the verification process. Differences in results will be given the appropriate attention (as noted in other sections). If failure to meet project specifications is found to be unrelated to equipment, methods or sample error, specifications may be revised for the next sampling season and the QAPP will be updated.

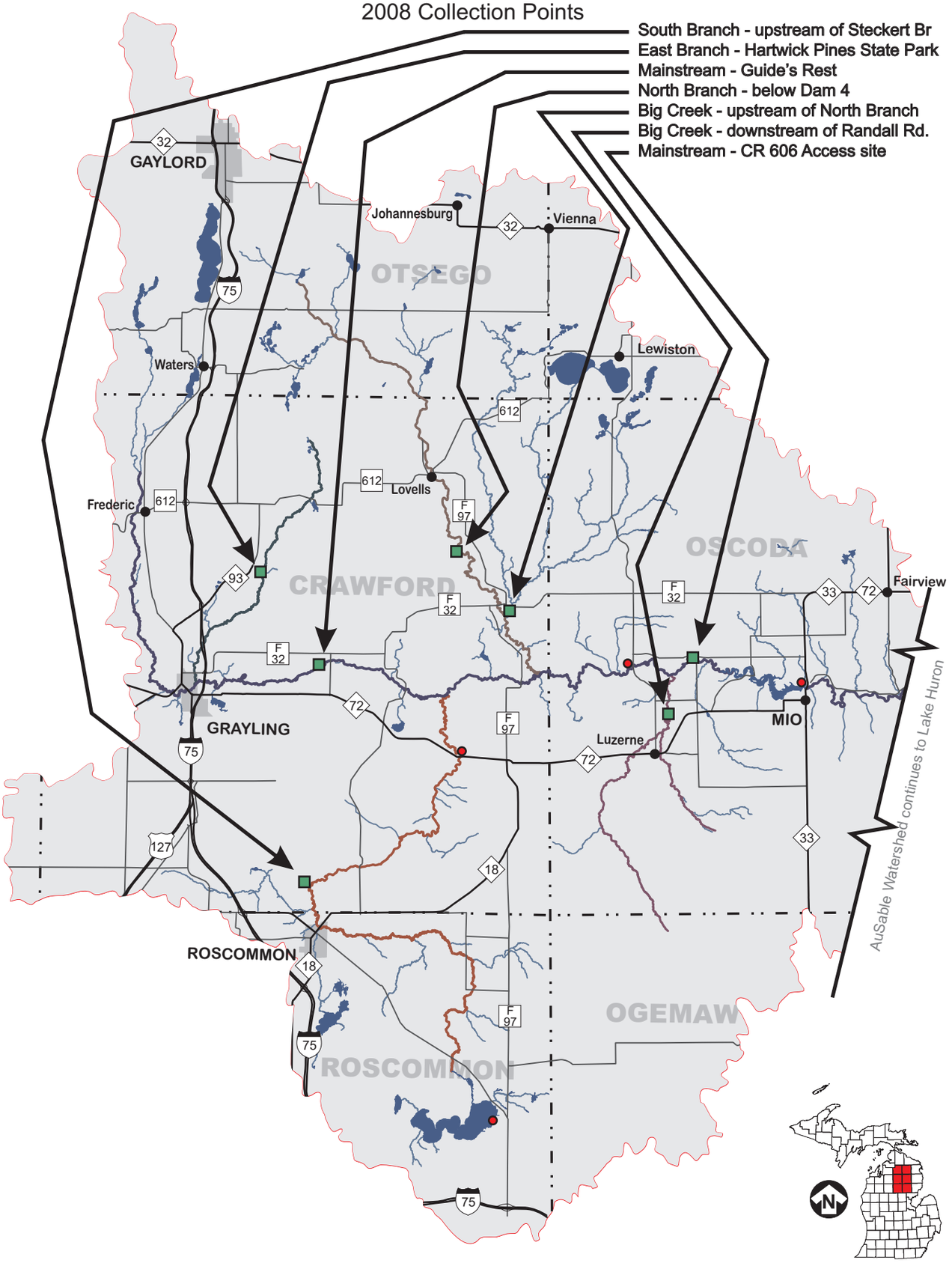
The project's public relations plan (not part of this document) will be used to further disseminate data and collect comments.

C4. Reporting

Any limitations on data use, corrective actions or quality control issues will be noted in the project director's quarterly reports to MiCorps, and other documentation as needed.

Upper AuSable River Water Quality Monitoring

2008 Collection Points



Timetable Upper AuSable River Watershed Stream Monitoring Project

		2009																			2010		
	Action	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Planning & Administration	Develop, submit and finalize QAPP	■	■																				
	Update QAPP if needed		■												■								
	Purchase equipment and supplies		■						■	■	■												
	Create public relations plan		■	■																			
	Develop and submit quarterly status and financial reports to MiCorps		■			■			■			■			■			■			■		■
	Submit data to the MiCorps Data Exchange Network			■			■									■			■				
	Evaluate need for more monitoring sites													■	■					■	■	■	
	Fundraising for future																			■	■	■	■
	Plan for years 3 & 4																		■	■	■	■	
	Maintain volunteer databse	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	Maintain project Web page	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	Develop and submit a final report															■	■	■					
	Submit a release of claims statement																						■
Training	Schedule & carry out side-by-side stream sampling with MiCorps		■												■								
	Train team leaders & volunteers			■									■			■							
	Attend one-day MiCorps training session	■												■									
	Participate in the annual MiCorps Conference					■												■					
Field & Scientific Work	Map and stake 7 monitoring sites		■																				
	Implement monitoring event				■									■			■						
	Identify specimens	■			■									■			■						
	Create/augment reference and permanent specimen collections		■	■		■	■								■			■					
	Map and stake additional monitoring sites if necessary														■								
Communicatio	Give presentations to relevant organizations and solicit volunteers			■	■						■	■				■	■			■	■	■	
	Implement public relations plan	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	Targeted reports to partners & community				■		■							■		■	■		■				

Appendix III

Upper AuSable River Watershed Water Quality Monitoring Project

Site Collection Data Sheet

MiCorps Site ID _____

Date _____

Team Leader _____
Collector _____
Other Team Members _____
_____

Number of jars containing the specimens from this site _____

Notes:

* Before signing form, team leader should check to make sure all lids are attached firmly and the correct number of jars is noted.

Signature/Date of Team Leader _____