

# Quality Assurance Project Plan:

## WAVE

(Water Assessment by Volunteer Evaluators)

New York State  
Department of Environmental Conservation

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\_\_\_\_\_  
External Data Coordinator: Alene Onion, NYS DEC

Date \_\_\_\_\_

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QA Officer: Jason Fagel, NYS DEC

Date \_\_\_\_\_

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2) Distribution List

The following individuals must receive a copy of the approved QAPP in order to complete their role in this project. Note if copy will be electronic or hard copy.

Name	Title	Organization	Document type
Margaret Novak	Project Manager	NYSDEC	Electronic
Jason Fagel	QA Officer	NYSDEC	Electronic
Alexander Smith	Biomonitoring Unit Coordinator	NYSDEC	Electronic
Alene Onion	External Data Coordinator	NYSDEC	Electronic

3) Project/Task Organization and Responsibilities

a. Responsibilities and Qualifications of Participants

**Project Manager**

The Project Manager supervises the Biomonitoring Unit Coordinator and the External Data Coordinator.

**Quality Assurance Officer**

The QA Officer will review and approve this QAPP and all associated SOP documents which are part of the NYSDEC ambient water quality and biological monitoring program.

**Biomonitoring Unit Coordinator**

The Biomonitoring Unit Coordinator will supervise the External Data Coordinator on work related to the implementation of the External Data Collection Project.

**External Data Coordinator**

The External Data Coordinator will implement the WAVE project as part of the larger External Data Collection Project. This includes but is not limited to training citizen monitors, reviewing and approving sites selected by the citizen monitors, maintaining and loaning a limited number of kick nets and sample vials to citizen monitors, maintaining all documentation and records for the department, and managing and analyzing resulting data for the department.

The External Data Coordinator is a half time position. No additional funding is available at this time for this purpose.

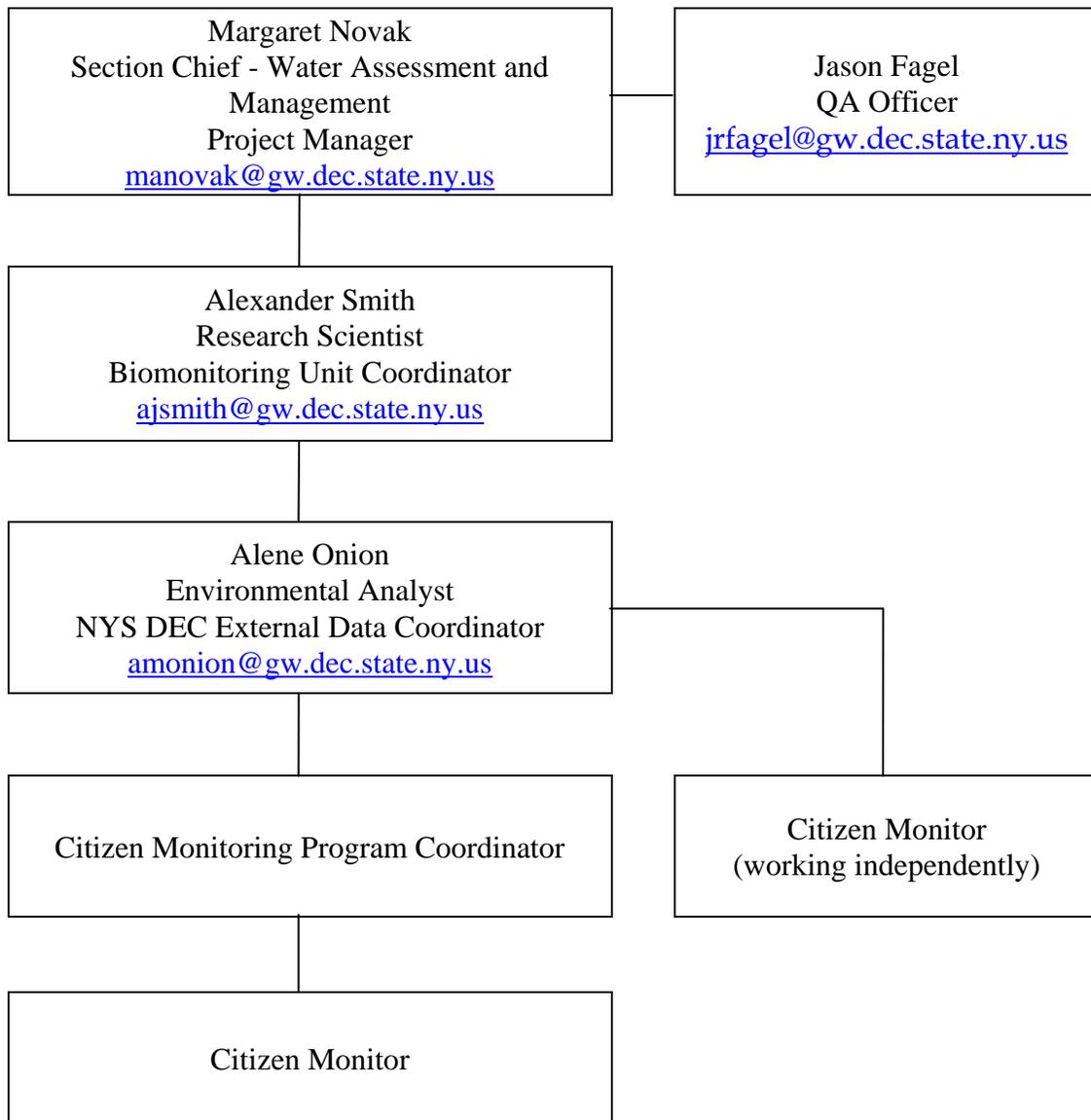
**Citizen Monitoring Program Coordinator**

The Citizen Monitoring Program Coordinator is a local leader who trains and coordinates a self-identified group of Citizen Monitors such as a watershed organization, an education program, or other similar group. The Citizen Monitoring Program Coordinator is responsible for attending training, submitting sampling sites to the External Data Coordinator for approval, educating all participating Citizen Monitors in sampling technique, ensuring all citizen monitors have the necessary supplies, coordinating sampling efforts, and submitting all Data Sheets and Voucher Collections to the External Data Coordinator.

### Citizen Monitor

The Citizen Monitors are responsible for collecting samples, completing Data Sheets and assembling Voucher Collections for every site. Not every Citizen Monitor is led by a Citizen Monitoring Program Coordinator. Those Citizen Monitors acting independently are responsible for attending training, submitting sampling sites to the External Data Coordinator for approval, ensuring they have the necessary supplies, and submitting all Data Sheets and Voucher Collections to the External Data Coordinator.

#### b. Organizational Chart



c. Communication Pathways

All communications are handled electronically via e-mail whenever possible. The heart of the above communication pathway is between the NYS DEC External Data Coordinator and the Citizen Monitoring Program Coordinator or with the Citizen Monitors directly if they are working independently.

d. Modifications to the Approved QAPP

Any real-time changes to sampling effort or location are made in consultation with the NYS DEC External Data Coordinator. If such changes are necessary they are to be made in such a manner as to not jeopardize the validity and comparability of the macroinvertebrate community data. If a change is made, the change is documented and distributed via the above pathway

e. Special Training Needs

All Citizen Monitoring Program Coordinators and Citizen Monitors who are working independently must attend a training session held by the External Data Coordinator less than four years prior to sample collection. Citizen Monitors who are collecting samples for a Citizen Monitoring Program Coordinator are not required to attend a training session. Each session will be limited to 20 people. In 2014, training sessions will be held in the Mohawk River and Niagara River Watersheds.

The NYS DEC External Data Coordinator, Alene Onion, will conduct all training sessions. Alene Onion developed all project materials and methodology with peer review from the NYS DEC Stream Biomonitoring unit.

Training sessions consist of descriptive presentations followed by field experience with the methods. Presentations are standardized and presented in Microsoft Power Point format. In the field, every participant will complete a User Perception Survey (Appendix C), a Habitat Assessment (Appendix D), a five minute kick sample, a field Data Sheet (Appendix B), and will assemble an example Voucher Collection. The entire training will be completed in one day.

All Citizen Monitors and Citizen Monitoring Program Coordinators must complete the Release of All Claims Form (Appendix H) and submit this form to the External Data Coordinator before sampling begins.

#### 4) Problem Definition

The biological monitoring program for the State of New York was initiated in May 1972 as mandated by the Federal Water Pollution Control Act Amendments of 1972 (Public Law 92-500). This program evaluates the relative biological health of the State's surface waters through the collection and analysis of macroinvertebrate communities.

There is a large potential for Citizen Monitors to augment NYS DEC efforts. Without professional certification and experience, however, it is not possible for Citizen Monitors to conduct assessments that are equivalent to NYS DEC's biological monitoring program. Instead, we have developed this limited, yet valuable, analysis that does not require professional qualifications.

The goals of this project are as follows:

- ❖ Identify stream segments with “No Known Impact”. This assessment corresponds to the highest quality category assigned to stream segments in the NY State Waterbody Inventory and the NYSDEC trend reports. The WAVE metrics for identifying stream segments with No Known Impact are very robust and we have high confidence in these data.
- ❖ Identify stream segments that are possibly impaired. Impaired stream segments are those that do not support aquatic life and include waterbodies with moderate and severe impacts. Unfortunately, the WAVE metrics for impaired stream segments have a high risk of false positives so a follow up investigation at the professional level would be necessary to identify the level of impact if any.

WAVE assessments that meet QA/QC requirements of this project may be used for the following DEC Activities:

- ❖ Waterbody Inventory and Clean Water Act Section 305 (b) reporting  
No Known Impact sites identified by the WAVE project will be included in the Waterbody Inventory and 305(b) reporting. Sites that fail unimpaired criteria will not be included.
- ❖ Trend Monitoring Reports (10 year intervals)  
Long term WAVE monitoring sites provide a historical record which may be included in the Trend Monitoring Reports.
- ❖ Rotating Integrated Basin Studies (RIBS)  
WAVE assessments will be used as a screening tool to influence the selection of waterbodies for intensive RIBS monitoring.
- ❖ Department personnel working on non point source discharges  
WAVE assessments will provide basic background information on water quality conditions.

The WAVE method is very robust to sampling errors. As a result, we are able to implement a “train the trainer” model without introducing unwanted error into the data set. Trained Citizen Monitor Coordinators are able to train and coordinate a local group of Citizen Monitors. This train the trainer

model will be implemented for the first time in 2014 and should allow the project to grow more rapidly compared to previous years.

## 5) Project Description and Schedule

### a. Project Overview

Under the “train the trainer” model, Citizen Monitors can participate in one of two ways. Citizen Monitors can join a local WAVE group lead by a trained Citizen Monitoring Program Coordinator OR they can work independently.

Citizen Monitoring Program Coordinators select their sampling locations and submit them for approval to the NYS DEC External Data Coordinator. Once site selections have been approved, they may register for a 7hr training session where they are given background information on the project and hands-on experience with the collection methods. Citizen Monitoring Program Coordinators train and coordinate the Citizen Monitors in their organization.

Citizen Monitors working independently submit their own sampling locations for review and attend a 4hr training session where they are given a brief overview of the project and hands-on experience with the methods.

Sampling is conducted in July - September. At every sampling site, Citizen Monitors conduct a User Perception Survey (Appendix C), a Habitat Assessment (Appendix D), and macroinvertebrate collection. Results of the macroinvertebrate collection are recorded on a Data Sheet (Appendix B). The Data Sheet must be corroborated by a Voucher Collection containing a representative specimen from each macroinvertebrate type identified. All Voucher Collections, Data Sheets, Habitat Assessments and User Perception Surveys are submitted to the NYS DEC External Data Coordinator.

The Data Sheet (Appendix B) lists 45 macroinvertebrate types sorted into three categories: Most Wanted, Least Wanted and Other. A voucher collection containing six or more Most Wanted macroinvertebrates defines the stream segment as having “No Known Impact”. This analysis is very robust and we have high confidence in these data. A voucher collection containing four or more Least Wanted macroinvertebrates defines the stream segment as “Possibly Impaired”. Unfortunately, this analysis is not robust; 52% of NY streams that contain four or more Least Wanted organisms are actually healthy. This assessment is still valuable, however, as a red flag for sites that might deserve further investigation at the professional level. In the rare occasion a voucher collection contains six or more Most Wanted and four or more Least Wanted organisms, the stream segment will be defined as having “No Known Impact.” The voucher collection is considered the primary data source. If the voucher collection and the data sheet do not match in any way, the contents of the voucher collection will be used as the final data set.

The WAVE project was piloted in the Hudson River Basin in 2012 and expanded to other basins in the state in 2013. Training sessions are rotated throughout the state’s 17 major drainage basins on a five year schedule, targeting those basins that will be sampled by the NYSDEC Stream Biomonitoring Unit in the following year (see the professional monitoring schedule here: <http://www.dec.ny.gov/chemical/29576.html>).

b. Schedule

The following table provides a schedule of the project activities for a typical collection season. The schedule is based on a calendar year. Initial planning activities occur during the spring prior to sampling (year A) and data assessment occurs following data entry and validation but prior to initial planning activities for the next sampling (year B).

**Table 1:** Schedule

<b>Task</b>	<b>Date</b>
Site Selection	Spring of year A
Scheduled Training Sessions	Spring of year A
Benthic community sampling	July - September of year A
All samples and Data Sheets submitted to the External Data Coordinator	November 1 of year A
Data entry/validation	November-December of year A
Data Evaluation/Assessment	January-March of year B
Data Reporting	April of year B

6) Quality Objectives and Criteria

We acknowledge that Citizen Monitors will perform sampling methods at varying levels of quality. For this reason, we have constructed this method to be very robust and able to provide valuable data even if sampling methods are not adhered to exactly.

a. Project Quality Objectives

The Data Sheet (Appendix B) offers 45 macroinvertebrate types sorted into three categories: Most Wanted, Least Wanted and Other. A voucher collection containing six or more macroinvertebrate types from the Most Wanted category defines the stream segment as having “No Known Impact.” A voucher collection containing four or more macroinvertebrate types from the Least Wanted category defines the stream segment as “*Possibly Impaired*.”

These assessments are not of equal quality. The “No Known Impact” assessment is a stronger conclusion than the “*Possibly Impaired*” assessment. To demonstrate this, we applied both criteria to the NYS DEC Stream Biomonitoring database containing over 2000 professional assessments of unique stream sites. The No Known Impact – WAVE assessment was very successful; sites containing six or more Most Wanted organisms were **never** defined as impaired by the paired professional assessment. The *Possibly Impaired* – WAVE assessment was much less successful; 52% of the sites containing four or more Least Wanted organisms were actually defined unimpaired

by the professional assessment. The Possibly Impaired - WAVE assessment is still valuable, however, as a red flag for sites that might deserve further investigation at the professional level.

In the rare occasion a voucher collection contains six or more of the “Most Wanted” and four or more of the “Least Wanted” organisms, the stream segment will be designated ”No Known Impact.”

b. Measurement Performance Criteria

i. Precision & Accuracy

This project strives for precision and accuracy for both sample collection and identification.

To strive for precise and accurate sampling techniques, Citizen Monitors are trained to collect a five minute kick net sample according to Standard Operating Procedure: Biological Monitoring of Surface Waters in New York State (SOP 208-14). We cannot be certain, however, that they will follow these instructions.

If Citizen Monitors fail to follow proper sampling techniques, they will fail the criteria of this method and the sample will give no conclusion. For example, if participants did not sample all available habitat, if they did not examine their sample closely, or if they failed to distinguish between two different organisms, then their sample would give “no conclusion” even if a conclusion was possible. This is inefficient but not damaging to the precision or accuracy of the data set.

To assess the efficiency of the Citizen Monitors’ field sampling techniques, the External Data Coordinator will assess 10% of the total proposed Citizen Monitor sites from each basin: Hudson, Delaware, Genesee, Mohawk and Niagara. The External Data Coordinator will perform these assessments according to the methods described in this project plan and within two weeks of the assessment by the Citizen Monitor. The percent consistency between these assessments will serve as a measure of the precision and accuracy of the Citizen Monitors’ sampling techniques.

To ensure the precision and accuracy of the macroinvertebrate identification, Citizen Monitors are required to submit a Voucher Collection for every sampled site. Voucher collections include an example specimen from each macroinvertebrate type identified at that site. The External Data Coordinator will compare each Data Sheet with its accompanying Voucher Collection. Any Macroinvertebrate Type that is on the Data Sheet but not in the Voucher Collection will be deleted from the Data Sheet. Any macroinvertebrate type that is found in the Voucher Collection but is not reported on the Data Sheet will be added to the Data Sheet.

ii. Data Representativeness

Basin wide representativeness is not a goal of this project. We will strive for site representativeness in two steps.

In Step one: Citizen Monitors submit sampling sites for review by the External Data Coordinator. In addition to the site coordinates, Citizen Monitors also indicate approximately when they will sample the site (within one week). All sites are accepted as long as they are not in headwater streams,

wetlands, downstream of an impoundment, or in slow moving water. The External Data Coordinator uses the Waterbody Inventory as well as aerial photography to assess each site submission. Citizen Monitors are warned that sites can pass this review but still be inappropriate because of onsite conditions.

In Step two: Citizen Monitors are trained to identify prime riffle habitats within their sampling sites. They are instructed to walk as far as 1000 feet upstream and downstream from their primary location to identify the best habitat. We cannot be certain, however, that they will follow these instructions.

The WAVE method for identifying stream segments with No Known Impact has been designed to be very robust (see 6.a.). If Citizen Monitors fail to identify prime sampling habitat, they will fail the criteria of this method. The opposite is true for identifying possibly impaired stream segments; the risk of false positives is high (see 6.a.). If Citizen Monitors fail to identify prime sampling habitat, they could falsely identify the site as possibly impaired according to the WAVE metrics.

iii. Comparability

Citizen Monitors will be trained to use consistent sampling methods according to SOP 208-14. We cannot be certain, however, that they will do as they are trained.

Sites that are determined to have “No Known Impact” according to the WAVE metrics are comparable to professional assessments. The opposite is true for possibly impaired stream segments; the risk of false positives is very high (see 6a). For this reason, sites defined as possibly impaired by the WAVE metrics are not comparable to professional assessment and must be corroborated by a professional assessment before comparisons may be made.

iv. Completeness

The goal of this project is that at least 75% of the citizen monitors submit acceptable samples. To be considered an acceptable sample, data must meet all the requirements set forth in this quality assurance project plan.

7) Non-direct Measurements

No secondary data will be used for this project.

## 8) Field Monitoring Requirements

### *Sampling Process Design*

Sites are selected in the spring and summer by the Citizen Monitoring Program Coordinator (or Citizen Monitor working independently) and must be approved by the NYS DEC External Data Coordinator using criteria defined in SOP #208-14.

In order to participate in sampling, Citizen Monitoring Program Coordinators or Citizen Monitors working independently must submit sampling sites and dates/times for review by the External Data Coordinator, complete the Release of All Claims Form (Appendix H) and attend a training session. Citizen Monitors working under a Citizen Monitoring Program Coordinator must be trained by their coordinator and complete the Release of All Claims Form before sampling begins.

Sampling is conducted July – September by the Citizen Monitors. At every site, Citizen Monitors conduct a User Perception Survey (Appendix C), a Habitat Assessment (Appendix D), and traveling kick macroinvertebrate collection according to the WAVE Instructions (Appendix E).

Results of the macroinvertebrate collection are recorded on a Data Sheet (Appendix B). The Data Sheet must be corroborated by a Voucher Collection containing a representative specimen from each macroinvertebrate type identified.

The Data Sheet lists 45 macroinvertebrate types sorted into three categories: Most Wanted, Least Wanted, and Other. A voucher collection containing six or more Most Wanted macroinvertebrates defines the stream segment as having “No Known Impact”. A voucher collection containing four or more Least Wanted macroinvertebrates defines the stream segment as “Possibly Impaired”. In the rare occasion a voucher collection contains six or more Most Wanted and four or more Least Wanted organisms, the stream segment will be defined as having “No Known Impact.”

All Data Sheets, Habitat Assessments, User Perception Surveys, and Voucher Collections must be submitted to the NYS DEC External Data Coordinator by November.

Table 2: Sample Design Logistics

Category	Type of Sample	Number of Samples	Sampling Frequency	Sampling Period
Macroinvertebrate community	Traveling kick	One sample per year will be collected for every site from the Hudson, Delaware, Genesee, Niagara, and Mohawk watersheds.	annually	July - September

### *Sampling Procedure*

A separate document titled “WAVE Instructions” (Appendix E) has been prepared for Citizen Monitors to describe the sampling methods of the WAVE project. We do not expect Citizen Monitors to read this QAPP in detail although it will be publically available.

The following steps describe the Sampling Procedure

- **STEP A: Selecting Sampling Sites**  
Citizen Monitoring Program Coordinators or Citizen Monitors working independently submit possible sampling sites to the External Data Coordinator BEFORE attending a training session. All sites are accepted as long as they are not in headwater streams, wetlands, downstream of an impoundment, or in slow moving water. Participants are warned that sites can pass this review but still be inappropriate because of onsite conditions.
  
- **STEP B: License to Collect or Possess / Release of All Claims Form**  
The External Data Coordinator holds a license to collect or possess from all regional offices and is required to report a sampling date/time and location at least 72 hours in advance. For this reason, all Citizen Monitors are required to report sampling date/times and locations at least 2 weeks in advance.  
All Citizen Monitors must complete the Release of All Claims Form (Appendix H) and submit this form to the External Data Coordinator before sampling begins.
  
- **STEP C: Training**  
All Citizen Monitoring Program Coordinators or Citizen Monitors working independently must attend a training session less than four years prior to sampling to be qualified to submit data to NYS DEC. Each NYSDEC training session will be limited to 20 people and will be held regionally across the major basins to be sampled throughout the summer (May – July). The entire training can be completed in one day and consists of a descriptive presentation followed by field experience with the methods. Citizen monitors who wish to sample but do not wish to serve as a local coordinator may attend the field portion only which is the final four hours of each training session.
  - The presentation describes the history, sampling methods, and data applications of the WAVE Project as well as a brief summary of safety precautions.
  - In the field, every participant will complete a User Perception Survey (Appendix C), a Habitat Assessment (Appendix D), a five minute kick sample (according to the WAVE Instructions, Appendix E), a field Data Sheet (Appendix B), and will assemble an example Voucher Collection.
  - A limited number of kick nets and sample vials are available for Citizen Monitors to borrow. These will be distributed at the Training by the External Data Coordinator.Citizen Monitoring Program Coordinators are responsible for training any participating Citizen Monitors in their group. The External Data Coordinator provides each Citizen Monitoring Program Coordinator with electronic copies of all the training materials (Appendix A-D).
  
- **Step D: Sampling**  
The sampling procedures used by Citizen Monitors are described in detail in Appendix E: WAVE Instructions.
  
- **Step E: Receiving Data**  
The External Data Coordinator coordinates with Citizen Monitoring Program Coordinators and Citizen Monitors working independently to collect data and specimens before the end of November 2014. These facilities have agreed to hold samples from local Citizen Monitors until

the External Data Coordinator is able to retrieve them (locations for the Niagara Basin are not yet confirmed):

1. Kathy Czajkowski – NYS DEC Region 4 Office, 1130 North Westcott Road, Schenectady, NY. Office Hours: Tuesday-Friday 8:30am-4pm.
2. Alene Onion – USGS Office, 425 Jordan Road, Troy, NY. Office Hours: Monday-Friday 7am-4:30pm. Drop off box labeled “WAVE” is just inside the front door to the left.
3. Sherri Mackey – NYSDEC Region 3 Office, 21 South Putt Corners Road, New Paltz, NY. Office Hours: Tuesday – Friday 11am-4pm.
4. Cornelia Harris – Cary Institute of Ecosystem Studies, 2801 Sharon Turnpike, Millbrook, NY. Office Hours: Monday-Friday 8:30am-4:30pm.
5. Jack Caldwell – Black Rock Forest Science Center Office, 235 Reservoir Road, Cornwall, NY (Jack wants us to note: “!!NOT the 129 Continental Road address!! Please be cautious driving on the dirt entry road; there is always the possibility of meeting other vehicles and people on this single lane road”). Office hours: Monday-Friday 9am-4pm.
6. Craig Jackson – Region 8 NYSDEC Office, 6274 Avon-Lima Road, Avon, NY. Office hours: Monday-Friday 8:30am-4:45pm.
7. Meg Janis – Letchworth State Park Office, 1 Letchworth State Park, Castile, NY. Office hours: open 7 days a week 9-5pm.
8. Ellen Baker – Angelica Free Library, 55 W Main Street, Angelica, NY. Office hours: Tuesday 1-8pm, Thursday 11am-8pm, Saturdays 9:30am-1:30pm.
9. Park Manager – Oquaga State Park Office, 5995 County Road 20, Bainbridge, NY. Office hours: 8:30-4:45pm.
10. Erin Phelan – Catskill Flyfishing Center, 1031 Old Route 17, Livingston Manor, NY. Office hours: 10am-4pm.
11. Bill Bovoza – Brandwein Nature Preserve Manager, 19 E. Main Street, Port Jervis, NY. Office hours: Monday-Thursday 9am-5pm, Friday 9am-2pm.

The NYS DEC External Data Coordinator reviews all data before it is accepted. Data will only be accepted if they meet the following conditions:

- Voucher Collections must have a label inside each sample vial with the stream name, collection date, time, site location, town, state, and collector written in pencil.
- Site information must be sufficiently complete so that we can return to the location.
- Site locations must be approved before sampling by the External Data Coordinator according to this quality assurance plan.
- Data sheets must be accompanied by a Voucher Collection
- User Perception Surveys and Habitat Assessments must be complete.
- Any data that are suspect for reasons not described above may be rejected by the External Data Coordinator.

c. Cleaning and decontamination of equipment

A limited number of kick nets are available for Citizen Monitors to borrow from the NYS DEC. These nets are distributed at the Training sessions by the External Data Coordinator. At the same time, Citizen Monitors are given NYSDEC's invasive aquatic species brochure. Citizen Monitors must disinfect the net according to instructions given in this brochure if they plan to sample more than one location to prevent the spread of invasive species. When the nets are returned to the NYS DEC, the External Data Coordinator cleans the nets according to NYS DEC Standard Operating Procedure: Invasive Species Disinfection for Sampling Equipment (*SOP 106-10 IN DEVELOPMENT*).

9) Analytical Method Requirements

There are no analytical methods involved with this project.

10) Sample Handling and Custody Requirements

Proper sample handling will be addressed at the training and will include a discussion of timely submission. Citizen Monitors will be instructed to store voucher collections at 70 degrees or cooler temperatures until they are able to submit them. Voucher collections must not be mailed due to shipping restrictions for alcohol. Citizen Monitors will be instructed to submit all Data Sheets, Voucher Collections, Habitat Assessments, and User Perception Surveys in person to one of the drop off locations described in Section 8E before November 30 2014.

NYS DEC External Data Coordinator logs each accepted sample into a Microsoft Access database at the NYS DEC office headquarters. Staff with the SBU generate station identification numbers using a four to five letter identifying code which is an abbreviation for the stream or river name. For example "Lower Hudson River" would be given a four letter identifier of "LHUD." The NYSDEC maintains a list of previous sampled locations throughout NYS. This list of stations should be consulted during the selection process to not duplicate station identification numbers. When multiple stations are sited on the same stream or river, stations are given a new name after a distance of approximately twenty times the stream wetted width upstream or downstream of the previous location. Station numbers (two-digit) are given to each location starting with 00 as the station located highest in the watershed. Station numbers increase with distance further downstream. Station letters may be given in addition to station numbers to signify a station "above" (A) or "below" (B) a discharge.

11) Testing, Inspection, Maintenance of Equipment

A limited number of kick nets are available for Citizen Monitors to borrow from the NYS DEC. These nets are distributed at the Training sessions by the External Data Coordinator.

Most of the equipment required for this project is not provided by the NYS DEC. Table 3 lists all required equipment, sources for these equipment, and maintenance requirements for NYS DEC.

Table 3: Field Equipment Maintenance

<b>Equipment Type</b>	<b>Source</b>	<b>Maintenance Requirements for NYS DEC</b>
Kick Net	A limited number of kick nets are available to borrow from the NYS DEC. Otherwise, it is the responsibility of the Citizen Monitor.	Citizen Monitors should rinse nets in stream water after every sample. Once the net is returned to the NYS DEC, the External Data Coordinator cleans each net according to NYSDEC SOP 206-10
appropriate footwear for wading in stream riffles	Citizen Monitor	N/A
stop watch	Citizen Monitor	N/A
ice cube tray	Citizen Monitor	N/A
2 sorting trays	Citizen Monitor	N/A
tweezers	Citizen Monitor	N/A
magnifying glass	Citizen Monitor	N/A
seltzer water	Citizen Monitor	N/A
WAVE Identification Guide	Appendix A	N/A
WAVE Data Sheet	Appendix B	N/A
WAVE User Perception Survey	Appendix C	N/A
WAVE Habitat Assessment	Appendix D	N/A

## 12) Data Management

The final products are a Voucher Collection and digital copies, photocopies or originals of the field Data Sheet (Appendix B), User Perception Survey (Appendix C), and Habitat Assessment from each sample location.

The External Data Coordinator retains electronic copies of all accepted Data Sheets and User Perception Surveys on a secure NYS DEC server. Any documents that are submitted in paper form are scanned and retained electronically.

The NYS DEC External Data Coordinator enters all accepted data into the custom built Microsoft Access relational database described in NYSDEC SOP 208-14. All data from the WAVE program are identified in the field, "Data Source".

## 13) Assessments/Oversight

### a) Planned Assessments

The External Data Coordinator will not perform an audit of every Citizen Monitor participating in WAVE. The reason for this is that the WAVE method is robust to poor sampling techniques. Very

poor sampling technique will result in a sample that fails both of the WAVE metrics and will be excluded from the WAVE dataset. This would be uninformative and inefficient but not damaging. However, it would be inefficient if a large percentage of participating Citizen Monitors performed poor sampling technique and submitted data that could not be used. To assess this inefficiency, the External Data Coordinator will assess 10% of all the proposed Citizen Monitor sites from each basin: Hudson River, Genesee River, Delaware River, Mohawk River and Niagara River. The External Data Coordinator will perform these assessments according to the methods described in this project plan and within two weeks of the assessment by the Citizen Monitor. Since data sheets are unlikely to be submitted within 2 weeks of sampling, the External Data Coordinator usually performs this assessment without having seen the results of the Citizen Monitor sampling. The percent consistency between these assessments will measure the inefficiency (if any) of the WAVE project (section 6.b).

#### b) Assessment Findings and Corrective Actions

The primary data product for this project is the voucher collection. If the data sheet does not agree with the voucher collection, the data sheet will be corrected by the External Data Coordinator to accurately reflect the contents of the voucher sample.

If a Citizen Monitor knowingly submits false data they will be excluded from the WAVE program indefinitely. False data includes but is not limited to falsified user perceptions surveys, habitat assessments or data sheets and, most significantly, voucher specimens collected from any stream other than what is indicated on the label.

To estimate inefficiency, the External Data Coordinator will compare the side-by-side samples described in 13a. Specifically, a pair will be considered different if they are given a different designation: No Known Impact, Possibly Impaired or no conclusion. If more than 20% out of the total pairs in the study are different from each other, then the WAVE training must be modified to improve Citizen Sampling techniques in future years.

#### 14) Data Review, Verification, Validation and Usability

##### Location Data Validation

All data sheets are scanned and entered into the database manually. We use this opportunity to error check the site location information. If the site description and the latitude/longitude location are inconsistent, then the External Data Coordinator will contact the Citizen Monitor for clarification.

##### Identification Check

Ten percent (10%) of all the WAVE samples are identified a second time by another member of the NYSDEC Stream Biomonitoring Unit. The identifications must be at least an 80% match to be considered acceptable.

#### 15) Reports to Management, Documentation, Records

After the above QC examinations have been performed for all media, the results will be summarized in an annual summary report. This report is written by the External Data Coordinator and summarizes assessment results for each sampling location. If this project extends for multiple

years, longer-term evaluations can occur. The annual summary report will also include a discussion and summary and assessment of data quality and method efficiency.

WAVE assessments will be used for the following DEC Activities:

- ❖ Waterbody Inventory and Clean Water Act Section 305 (b) reporting  
Unimpaired sites identified by the WAVE project will be included in the Waterbody Inventory and 305(b) reporting. Sites that fail unimpaired criteria will not be included.
- ❖ Trend Monitoring Reports (10 year intervals)  
Long term Wave monitoring sites provide a historical record which may be included in the Trend Monitoring Reports.
- ❖ Rotating Integrated Basin Studies (RIBS)  
WAVE assessments will be used as a screening tool to influence the selection of more intensive RIBS monitoring.
- ❖ Department personnel working on non point source discharges  
WAVE assessments will provide basic background information on water quality conditions.

## 16) References

1. EPA's QAPP guidance for Citizen Monitoring:  
[http://water.epa.gov/type/rsl/monitoring/upload/2002\\_08\\_02\\_monitoring\\_volunteer\\_qapp\\_vol\\_qapp-2.pdf](http://water.epa.gov/type/rsl/monitoring/upload/2002_08_02_monitoring_volunteer_qapp_vol_qapp-2.pdf)
2. EPA's Citizen Monitoring QAPP Checklist (Reg. 2 Guide & G-5):  
[http://www.epa.gov/region02/monitor/volun/vol\\_mon\\_qapp\\_checklist.pdf](http://www.epa.gov/region02/monitor/volun/vol_mon_qapp_checklist.pdf)
3. Connecticut DEP Bureau of Water Management Planning and Standards Division Rapid Bioassessment in Water Streams and Rivers by Citizen Monitors Quality Assurance Project Plan 2003
4. NYSDEC 2008. Consolidated Assessment and Listing Methodology. New York State Department of Environmental Conservation, Division of Water, Albany, NY
5. NYSDEC 2014. Quality Assurance Management Plan: Statewide Waters Monitoring Program April 1, 2014 – March 31, 2019
6. NYSDEC 2014. Division of Water Rotating Integrated Basin Studies (RIBS) 2014-2016 Quality Assurance Project Plan
7. NYSDEC SOP 208-14. 2014. NYS DEC Division of Water Standard Operating Procedure: Biological Monitoring of Surface Waters in NY State
8. NYS DEC *SOP 106-10 IN DEVELOPMENT*. 2012. NYS DEC Division of Water Standard Operating Procedure: Invasive Species Disinfection for Sampling Equipment
9. OAC Chapter 3745-4 Credible Data Rules – 3745-4-03 Qualified Data Collectors:  
<http://www.epa.state.oh.us/portals/35/rules/04-03.pdf>