

SKWC

SAW KILL WATERSHED COMMUNITY

Quality Assurance Project Plan

2019

Bard College

**Project Manager: M. Elias Dueker, Assistant Professor of Biology and
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PROJECT MANAGEMENT



M. Elias Dueker, Ph.D. Project Manager
Bard College

5/20/19

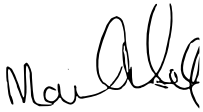
Date



Karen Schneller-McDonald,
Chair, Saw Kill Watershed Community

5/20/19

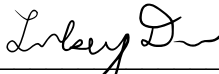
Date



Maureen O'Callaghan-Scholl Bard College
Biology Laboratory Manager

5/20/19

Date



Lindsey Drew
Bard Water Lab Manager

5/20/19

Date

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Distribution List

The following individuals must receive a copy of the approved QAPP in order to complete their role in this project.

Name	Title	Organization	Document Type
M. Elias Dueker	Project Manager/Project Investigator	Bard College	Electronic
Karen Schneller-McDonald	Chair, Saw Kill Watershed Community	SKWC	Electronic
Maureen O’Callaghan-Scholl	Biology Lab Manager	Bard College	Electronic
Lindsey Drew	Bard Water Lab Manager	Bard College	Electronic
Volunteers	Citizen Scientists	Bard College	Electronic

Problem Definition and Background

The Saw Kill Watershed Community unites area residents who are interested in protecting their water by maintaining the health of the Saw Kill and its watershed for: clean drinking water, flood protection, water supply, recreation, and ecological resources. The Saw Kill watershed is both a valuable water source and a thriving home to a diverse array of species. Through our research, we hope to gather a more complete understanding of the health of the waterway and establish measures to maintain and improve it.

In order to establish baseline information about the health of the Saw Kill waterway, the SKWC along with Riverkeeper and the Red Hook CAC is re-booting a comprehensive water quality monitoring program first conducted in the late 1970's. The Saw Kill Monitoring Program, powered by community scientists, samples at 14 sites in the Saw Kill watershed. Monitoring sewage indicating bacteria, nutrient levels, turbidity, water temperature, conductivity, and other water quality variables. Samples will be processed and analyzed at the new Bard Water Lab. Dr. Eli Dueker at Bard College heads research on the quality of the Saw Kill as both a habitat for wildlife and a drinking water resource, and will be facilitating the analysis of the samples from the Saw Kill watershed.

Special Training/Certification

In order to maintain consistent lab work, staff, faculty, and students must be trained in lab safety and all protocols before participating on sampling days. This training occurs regularly in the Bard Biology Labs, and all are required to engage in training annually. Maureen O'Callaghan-Scholl and Lindsey Drew provide these trainings on a regular basis, and participants are tracked by the Biology Program. The Project Manager will work closely with Maureen O'Callaghan-Scholl and Lindsey Drew to ensure that all staff and students involved in this project are trained to the extent necessary.

DATA GENERATION AND ACQUISITION

Sampling Process Design (Experimental Design)

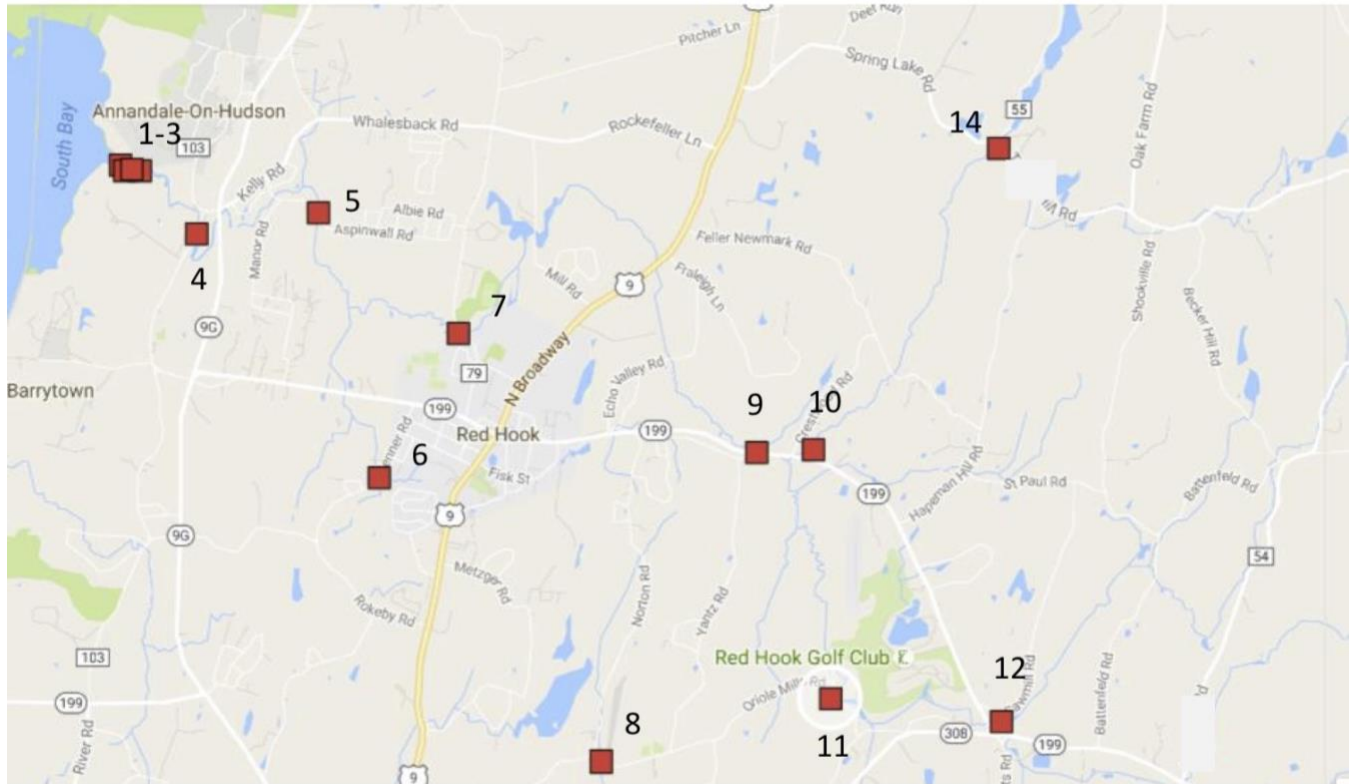
The Bard Water Lab collaborates with the Saw Kill Watershed Community to perform a monthly sampling of 14 sites along the Saw Kill that are identified using GPS. In all, about 120 total samples (12 months) will be processed. This will allow for a full-year look at the shifts in concentration and identity of conductivity, turbidity, enterococci, coliforms, nutrients, temperature, the presence of phycocyanin, chlorophyll, optical brighteners, and color dissolved organic materials in Saw Kill waters.

These sites span the entire waterway, from headwaters to the mouth at Tivoli South Bay, which allows for a comprehensive look at the water quality. Because sampling methods allow for sampling under most weather conditions, except for iced-over or drought, samples should be available from most sites. In the case of ice-over or drought (the site is dry), those sites will be continually monitored over time until sampling is possible again. Sample collection order: samples are collected upstream to downstream, according to sampling zone.

Table 1. Saw Kill Site Descriptions

Site	Site Name	GPS Coordinates	Site Description
1	Red Hook (T)-tidal mouth	42.017584, -73.917405	Tivoli South Bay. Located at the mouth of the Saw Kill near Bard College Field station.
2	Red Hook (T)-near Montgomery Place kiosk	42.016984, -73.917019	First non-tidal site at the mouth of the Saw Kill. Located just below the last set of falls where conductivity sensor is located.
3	Red Hook (T)-Bard campus below first dam	42.01713, -73.91501	Below dam with DEC, Eel ladder, monitoring station and above outflow pipe. Sample just past white water.
4	Red Hook (T)-below Montgomery Place dam	42.012027, -73.90757	Rocky step-down beside the bridge on downstream side. Park in front of red building with mustard colored trim. This site is located in the Town of Red Hook Zone but is still on Bard College property.
5	Red Hook (T)-Aspinwall Rd near Linden Acres	42.013862, -73.895269	Sample from the bridge with a bucket. Sample on the downstream side of the bridge. Drive west down Aspinwall rd after driving by one bridge the next bridge will be the location of the sample site. Pull off and park in a safe location.
6	Red Hook (T)-below Red Hook Commons	42.003679, -73.879994	Culvert under Benner Rd near 67 Benner Rd residence. Sample on downstream side of culvert. Using the images the downstream side of the culvert is located on the right hand side of the road when traveling from the village.
7	Red Hook (T)-near Recreation Park	42.00367, -73.87992	Bridge with recent construction near the recreation park.
8	Rhinebeck (T)-below old landfill	41.968091, -73.863926	Below landfill. Across from the airport. Sample on the upstream side of culvert in front of Town Speed Limit sign. Park in a safe location and be aware of traffic.
9	Red Hook (T)-Lakes Kill tributary at trees for tribs site	41.993344, -73.842992	On 199 bridge immediately past Crestwood Road. Sample off bridge on the upstream side of Lakeskill. Beware of traffic.
10	Red Hook (T)-Route 199	41.993414, -73.846811	This site is located on the bridge before site nine. This site will need a bucket. Sample on the downstream side of the bridge.
11	Red Hook (T)-near Golf Club	41.97341, -73.838723	Beautiful site, pretty falls on the right as you walk down to the river. Located at Camp Rising Sun.
12	Milan (T)- Rock City	41.971477, -73.820119	Sample off of bridge dipper might be required or a bucket. Downstream side of bridge.
14	Red Hook (T)-Turkey Hill Rd below SPDES outfall	42.01903, -73.820333	Sample on the downstream side of bridge easy access. Downstream of SPDES outflow. Sample with bucket off of bridge.

Figure 1. Map of Saw Kill Sites



Sampling Methods

Samples are collected by gathering sub-surface waters using a long-handled dipper (cleaned before use and rinsed repeatedly downstream of the collection site before gathering sample) and placing water in a sterile (acid-washed and autoclaved) 2L sampling bottle. The 2L bottle is then stored on ice in a cooler backpack and transported to the Bard Water Lab within 2 hours of sample collection. Upon receipt of the 2L sample bottle, the Bard Water Lab manager extracts the aliquots into sterile centrifuge tubes and sterile 250 mL bottles that are used for further analyses. Any deviation from these procedures is reported to the Project Manager/Project Investigator and noted in data logs, field notes, and data spreadsheets. In the field temperature and conductivity values are recorded. Conductivity is recorded uncompensated in micro-Siemens per centimeter. Temperature is recorded in degrees Celsius. Physical observations are also recorded.

Water Sampling Protocol

TO BEGIN:

- **YOU MUST WEAR GLOVES and use a new pair at each site.**
- **During the process, maintain sterile conditions and use aseptic technique – do not leave caps off for any period of time, work quickly and carefully.**
- **Never go sampling alone**

1. Fill out site sheet for the current site location.
2. Use aseptic technique. Wearing a new pair of gloves for each site. Take out the sampling bottle for the correlating site.
3. Rinse sampling bottle with site water 3 times. Fill the bottle 1/3 of the way with water. Recap and shake to rinse. Dump “used” water on side of stream or grass to avoid mixing sediment into the water column.
4. On the fourth time fill bottle, try to fill all the way leaving minimal air space.
5. If you are using a dipper or bucket they should be rinsed 3 times as well before collecting the sample.
6. Close the bottle tightly and place into the cooler backpack with icepacks. Keep it out of direct sunlight and high temperatures for the duration of the field work.
7. Use the YSI probe to measure the conductivity and the temperature of the water and record the results. The probe should be placed into the water up to the base where the cord is connected. After approximately 30 seconds, press Enter and record the data set number on the screen.
8. Return the water samples to the Bard Water Lab as soon as possible after collection. This is important for ensuring optimal data and reliable results.

Sample Handling and Custody

In the field, sample bottles are clearly labeled with site number, and samplers record time, date, and their names on the data sheet for that site (Figure 2). Once the bottles are transported to the Bard Water Lab, samplers fill out chain of custody forms (Figure 3). Data entry occurs at the Bard Water Lab, the procedure can be referred to in the Bard Water Lab QAPP.




Figure 2. Site Sheet Front and Back

Zone: Bard College

Site Number: 1

Site Name: **Red Hook (T)- tidal mouth**

GPS Coordinates: **42.017584, -73.917405**

Description of Site: **Tivoli North Bay. Located at the mouth of the Saw Kill.**

Directions: **Drive down Bay Rd. towards the Bard College Field station. Take the trail down to the mouth of the river. Take the steep trail (on right) down to the river mouth. Identify paver marked "1" as site marker.**

Notes and Observations

Sampler name _____ Site number: _____

YSI Number: _____

Obstructions or changes to site (Litter, erosion, etc.): _____

Conductivity (mS/cm) _____

Water Level Changes: _____

Temperature (°C) _____

How's the water? (Cloudy, Foamy, Bubbly, etc.) _____

How's the weather? (Cloudy, Rainy, Sunny, etc.) _____

General observations: (Flora, Fauna, Soil, etc.) _____

Date sampled: _____

Time sampling began: _____

Time sampling finished: _____

Take multiple photos of sampling!

Send images to: bardwaterlab@gmail.com

Figure 3. Chain of Custody Form

Bard Water Lab

Water Sample Chain of Custody

Sample Number	Sample Name	Sample Source (SKMP or RJMP, etc.)	Sampler(s) (who got the sample?)	Date of Sampling	Time of Sampling	Time received at Bard Water Lab	Processor(s) (who processed the sample in the lab?)

Instrument/Equipment Testing, Inspection, and Maintenance

Field Instruments and Equipment:

- long-handled dippers
- bucket with rope
- Calibrated YSI 2030 Environmental Probe- calibrated the week prior to sampling
- sterile (autoclaved and acid-washed) 2L sample bottles
- insulated cooler backpacks
- ice packs
- Nitrile gloves

All supplies and equipment will be maintained, cleaned, and tracked by the Bard Water Lab Manager. The Bard Water has three extra dippers, at least 20 back-up sample bottles, several extra backpacks and at least 20 extra ice packs for use in the field.

Data Generation and Acquisition

Refer to the Bard Water Lab QAPP for information regarding lab analyses.