QUITTAPAHILLA WATERSHED ASSOCIATION
Meeting Minutes
Annville Town Hall and Remotely Via Zoom (Hybrid Meeting)
Tuesday, February 20, 2024

Present: Michael Schroeder (President), Alyssa Bellucci, Bob Connell, Joseph Connor, Kent Crawford, Karen Feather, Katie Hollen (LCCD), Kara Lubold, Paul Pyle

The meeting opened at 7:03 p.m.

1. **Minutes.** The minutes of the meeting of Jan. 16 were approved by consensus.

2. **Monitoring Program Updates**

   A. **Upcoming PA-DEP Audit.** A reminder was issued about our upcoming audit with Mark Hoger of PA-DEP, scheduled for Thurs. Feb. 22. Meet at Station Q1 (Garfield St. in Cleona) at 8:30 am. Slated for auditing are Katie Hollen & Lydia Mohn of the LCCD and QWA volunteers Bob Connell, Mike Schroeder, and Gary Zelinske. We will be audited on water sample collection and multi-parameter sonde calibration and use.

   B. **Equipment Updates & Action Items**

      1) **Automatic High-flow sampler.** Kent opened a discussion about the possibility of undertaking high-flow sampling with two Isco-brand automatic samplers that we can borrow, if we wish, from the Tobyhanna Creek / Tunkhannock Creek Watershed Association in Pocono Lake, PA (they've had them for many years and have not used them within the last decade). It was noted that sampling during high-flow events is important for our data collection but also potentially dangerous if volunteers have to get into the creek to collect samples. Discussion ensued on the question of whether we want to embark on this complex and time-consuming process. Steps will include picking up the samplers (each about the size of a 55-gallon drum) and clean, store, possibly fix, deploy, secure, use, and maintain them. Consensus emerged that yes, we should take the first steps and take it a step at a time. The first step will be to ask PA-DEP whether they will agree to analyze the samples we collect. We are especially interested in measuring nutrients and sediments during high-flow events. Kent agreed to put together a draft plan for using the automatic

samplers and circulate it in the QWA before sending it to PA-DEP for its consideration. Kara agreed to inquire with LVC about storing them there.

2) **Multi-Parameter Sondes.** Bob noted that the older sondes only work when being attended and can't be left behind to collect data unattended.

C. **Compiled Email Correspondence. See Appendix 1** to these minutes for a compilation of email correspondence since our last QWA meeting (covering the period from Jan. 18 to Feb. 19) on various aspects of our Monitoring Program.

3. **Grant Opportunities**

A. Mike reported on a Zoom conversation with Tali McArthur of POWR, Rocky Powell of Clear Creeks Consulting, Bob Connell of the QWA, and Bethany Canner of the Swatara Watershed Association earlier today regarding a NFWF Planning & Technical Assistance Grant. In the call, Mike identified five areas where we could use funding: (1) Equipment needs for our Monitoring Program; (2) Communications needs, especially technical assistance with a GIS-based story-map to make more widely accessible our summer interns' findings; (3) Recruitment campaign for new members; (4) Strategic planning consultant; and (5) Technical assistance with data management for our Monitoring Program. Tali indicated that she hoped to combine the ideas of several watershed associations to develop a compelling grant application. See https://www.nfwf.org/programs/chesapeake-bay-stewardship-fund/chesapeake-wild/chesapeake-watershed-investments-landscape-defense-wild-grants-2024-request-proposals

B. Discussion was held on this PA-American Water grant opportunity, but consensus was reached that the matching component and the relatively small monetary award make us disinclined to apply: https://www.amwater.com/corp/Customers-and-Communities/American-Water-Charitable-Foundation/apply-for-a-grant

4. **Project Updates.** Rocky Powell kindly provided the following updates by email before tonight's meeting:

A. Beck Creek 6 – Stream and Floodplain Restoration Project. Doc Fritchey Trout Unlimited was approached by PA-DEP regarding rolling the $271, 572 requested from Community and Economic Development into the 319 grant because more funding is available in that program. That would increase the 319 grant request to $766,021. Received verbal confirmation that the project will be funded through 319. However, the money will not be distributed until Spring 2025. Therefore construction will be Summer 2025.

B. Snitz Creek 2. All permits and approvals have been obtained. Will be applying for construction funding in 2024 with implementation planned for 2025.

C. Snitz Creek 3. All permits and approvals have been obtained. Will be applying for construction funding in 2024 with implementation planned for 2025.

D. Snitz Creek Project 4. DFTU received its contract with PADEP on October 10, 2023. Work on this project got underway on Monday December 4, 2023 with the site walk with our survey crew and representatives of the pipeline companies. Topographic survey complete, base maps in progress.

E. Killinger Creek Project. The Pre-Application Site Visit with PADEP, USACOE and LCCD was completed. Final Design and preparation of permit applications in progress with a planned submission date of December 15, 2023. LCCD Erosion and Sediment Control approval and Army Corps 404 permit obtained. PADEP 105 permit anticipated within two weeks.

F. Bachman Run. After the new landowner, Gary Horst agreed to a 15-foot buffer, he signed the Landowner-Grantee Agreement. Finalization of the Preliminary Design is in progress.

5. **Quittapahilla Mainstem – Spruce St. Project Update.** Kent reported that the PA Fish & Boat Commission has asked Doc Fritchey Trout Unlimited to undertake follow-up measurements of stream flow, stream depth, width, and velocity on the section where restoration work was recently completed. Some funds are being withheld until these measurements are made and submitted. Kent noted that he will circulate the results from the initial survey and that this follow-up effort needs to be undertaken.

6. **Lebanon County Stormwater Consortium.** Bryan Hoffman kindly provided the following update by email: "A brief update from the MS4 meeting earlier today. The major item of interest will be the new 5-year permit for the period 2025-2030. There has yet to be an official word from DEP as to the requirements of the new permit. However, information is starting to leak out that the new permit cycle will be centered on volume reduction, not sediment reduction. What that exactly means is very much up in the air. Such a change however, would have huge implications for the design work we already have underway for restoration of the next section of the Quitti. In addition, there is also information floating around that there would be some kind of allowance in project scope for municipalities with a large population of lower income individuals. Again, exactly what that means is very open to discussion. Would, for example, the city be required to do less, while a township, such as North Cornwall, be required to do more? I can say with certainty that the rest of 2024 will be interesting, awaiting the state's new requirements and attempting to find a way to satisfy them."

7. **Special Events**

A. "Annville Goes Green." See the flier below in **Appendix 2**. Especially notable here are two events:

1) Sat. April 20, 9:00 am—12 noon. Quittie Creek Nature Park Annual Day of Caring. Volunteers will meet at the Swingholm Pedestrian Bridge in Quittie Creek Nature Park in Annville and be divided into work crews to spread mulch, clear trails, remove invasive species, pick up trash, and in general spruce up the Nature Park for the coming summer. Work tools and work gloves will be provided. Please bring your own water, and, if desired, snacks. Long pants and sturdy footwear are recommended. DFTU will set up a canopy and serve food to volunteers after around 11:30 am.

2) Tues. April 9, 6:30 pm, Annville Free Library. "Swimming Upstream: The Work of the Quittapahilla Watershed Association, 1997-Present." In this talk, Quittapahilla Watershed Association President and LVC Professor Emeritus of History Michael Schroeder will discuss the QWA's efforts to improve the water quality of Quittapahilla Creek and its tributaries; to raise public awareness about the watershed's importance to the local quality of life and to the Chesapeake Bay watershed; and to encourage citizens, organizations & businesses in Lebanon County to help maintain the health & viability of the watershed's streams & ecosystems.

B. Lebanon Valley College Earth Days 2024. For the full list, see https://www.lvc.edu/about/sustainability-initiatives/earth-day/

C. Friday, April 26, 3-5 pm in South Hills Park in Lebanon – Arbor Day event organized by Lebanon County Clean Water Alliance and the Lebanon County Conservation District. Rain date Fri. May 3.

D. Envirothon 2024, from March 20 to May 10. Katie announced that volunteers are needed for this year's Envirothon events with elementary, middle school, and high school students. The full description and event schedule can be found on the LCCD website: https://www.lccd.org/envirothon

E. Sat. June 8, 9 am—2 pm, Historic Old Annville Day in downtown Annville. Mike reported that he will submit the requisite form and payment for a space for the QWA as in past years. The LCCD is warmly invited to join us.

8. LCCD Job Opportunities. Katie announced that the LCCD is hiring for two positions: (1) Environmental Grant Coordinator, and (2) Mosquito Control Technician. See https://www.lccd.org/job

The meeting adjourned at 8:02 pm.

Respectfully submitted,

Michael Schroeder, Secretary Pro Tem

Appendix 1. QWA email correspondence relating monitoring program January 18—February 19, 2024

Compiled by Michael Schroeder, QWA President
Feb. 19, 2024

SUBJECT: Stream stage response to rainfall
On Thu, Jan 18, 2024 at 7:46 PM Bob Connell wrote:

Hi Kent,

Thought this might interest you. In our meeting on Tuesday, you said it would be good to look at the stream stage data from our sensors relative to rainfall. The attached image file is such a plot. It is based on a portion of our data that I feel is reliable. I'm working on the other site's sensors to clean them up, so hopefully I can add them to the plot later on.

The rainfall data is 24 hr totals from the NWS for their Lebanon site. It is enough resolution to see the stream response to rainfall. What I get from this plot is that if we were planning to do any wet weather sampling, we'd want at least 1/2 inch of rain. Below that, the stream response is not very strong.

Bob

SUBJECT: Re: Stream stage response to rainfall

Kent Crawford
Sat, Jan 20, 8:29 PM
to Bob, Katie, Alyssa, Mike, Kara

Bob,

This is excellent. Thanks for pulling this together.

I see a couple of takeaways from the chart. First, our water level data show a very similar response at both Beck Creek and Bachman Run. This is exactly what we would hope for and it indicates that our pressure transducers at these two stations are working properly. There can be occasions where the two streams would show different flow patterns. For example, if there were to be a localized cloudburst that affected one stream, but not the other. This would be unusual for winter when rainfall is more regional, but not so much for summer when storms can pop up locally. And, in fact, check out the graph for August into September in 2022.There is a small peak for Beck Creek that does not show up for Bachman Run.

I agree that 1/2 inch of rain is needed for us to initiate high-flow sampling. High-flow sampling is difficult because it can be dangerous and it is very hard to capture. It requires that our crew keep an eye on the weather and be ready to go into action when the weather report indicates rain is coming. Even with this,we can expect false alarms. Frequently, the weather forecast calls for rain that bypasses us, goes south (or north) or just fizzles out. So, expect some dry runs and some frustration.

Also, these streams are small. They seem to respond quickly to rainfall. That is, they go up quickly and come back down quickly. This means a sampling team would need to get out there in a hurry to capture the high flow. Preparation ahead of time is key. And, perhaps we should target just one or two sampling sites for the high-flow sampling because it would be hard to sample all four tributaries in less than about six hours and by that time, the flow may have already subsided.

One option would be to install an automatic sampler. I think we could borrow an Icso (brand name) sampler from another watershed association up in the Poconos. The idea would be to set up the sampler at one location and pre-program it to start collecting samples when the water level goes up a certain amount (say four inches). Let me know if you would like for me to check on this option.

With regard to safety, I suggest that we institute a requirement that during high flow, everyone on the field team must wear a life jacket (PFD = Personal Flotation Device). I know this sounds silly for such small streams, but they can become roaring torrents at times. And when I say everyone, I include even the folks doing the recording and the filtrations, even if they are 100 percent on the shore. Who knows when a person collecting the sample in the stream says "Hold this bottle for me." and the person holding the bottle slips into the water.

Dr. J. Kent Crawford

SUBJECT: Streamflow Measurements
Kent Crawford to Mark Hoger, PA-DEP
Sat, Jan 20, 10:20 PM

to Mark, Mike, Kara, Bob, Alyssa, Katie

Mark,

Thanks again for all your support and for the backing of the Pennsylvania DEP. Without your support, our monitoring program would struggle to characterize the water quality of the Quittapahilla Watershed.

So, maybe you can help us with yet another issue. We feel certain that most pollutants and sediment have greater transport during high-flow events. Yet, we are not comfortable sending our volunteers out into the field to collect samples and take streamflow measurements during high flow. Is there a possibility that DEP staff could collect high-flow samples for our project?

If not, could you offer an alternative solution for this problem?

Does DEP have autosamplers available that could be used for high-flow sampling? An autosampler would allow us to get high-flow samples without actually being in the water. I know an autosampler collects lots of samples and we would need to be cautious about how many of those samples would actually be analyzed in the lab. But, if we selected samples judiciously, we could characterize the high-flow chemistry without breaking the bank at the lab. And, perhaps we could target only a couple of sampling stations for this high-flow sampling. For example, the station at Palmyra-Bellegrove Road is part of DEP's Water Quality Network (QWN). I am not sure what data are available from this location. But, if high-flow samples already exist from that location, then we would not need to duplicate that sampling.

Similarly, we need high-flow discharge measurements. Any thoughts on how to get these measurements without putting our volunteers at risk?

Please "reply to all" when answering this note.

Thanks,
Kent
Dr. J. Kent Crawford
Environmental Scientist
Hummelstown, PA

SUBJECT: Re: Stream stage response to rainfall
From Bob Connell
1:29 PM Monday, January 22, 2024
to Kent, Katie, Alyssa, Mike, Kara

Kent,

Thanks for the response. These sensors provide us with some valuable information for very little effort and expense. They just need some routine maintenance every few months, which I'm glad to help out with. I plan to calibrate their temperature sensors against a standardized thermometer this week so that we can have confidence in those readings as well.

Thanks for pointing out the winter/summer differences due to localized rainfall. It also seemed to me that the streams' response to the same level of rain was less in the summer than in the winter. I'm guessing that is due to summer vegetation.

I should have labeled the second y-axis as "24 hr Precipitation" instead of rainfall because some of the data points in the winter are snow, not rain. The large spike in water level in early February 2022 was due to rainfall, not snow. However, the reading of about 0.6" in January was actually snow, which probably explains the absence of response in water level in the two streams.

I agree that getting some stream samples under high-flow conditions would give us a much more complete picture of the pollutant loads from our watershed. It would be worth the effort even if we have some false starts due to weather forecast errors. Thank you very much for reaching out to Mark about the possibility of loaning us 1-2 ISCO autosamplers. With those and our data sondes, we could get most of our storm-related sampling without having to get in the swollen stream risking life and limb. If at all possible, I'd prefer that we get any storm event samples from the bridge at each of the sites we visit. PFD's are a good extra precaution too!

If the ISCO samplers are not available, maybe we could ask Mark if we could instead use a peristaltic pump to collect our samples. This is the same type of pump that the autosamplers use, but instead of it running automatically, we would have to be out there to run it. We just wouldn't need to be in the high-flow stream. We could use the pump from a bridge. We could have the pump rinse the line 3-times before collecting the sample, which I believe is the protocol for the autosamplers. As you said, getting out there quickly in advance of the storm impact will be key, and especially so if we're not using the autosamplers.

I feel that our biggest challenge will be getting the discharge measurements under high-flow conditions. If we pre-measured the stream bottom contour directly beneath one side of the bridge, could we make our discharge measurements from the bridge as well? At high flow, the stream width would not change with elevation due to the bridge walls. So the bottom contour should be all we need to get the cross-sectional area. Is there such a thing as a Pygmy meter with a heavy weight to hold it in the stream from a cable?

Bob

SUBJECT: Data logger temperature calibrations
From: Bob Connell
12:25 PM, Friday, January 26, 2024
2 Attachments

to Mike, Katie, Kent, Gary, Lydia, Kara, Alyssa

Hi everyone,

The Hobo data loggers have been checked for temperature accuracy. With Kara's help, I got the NIST thermometer and used it to standardize a digital thermometer (see below) that we can use for any routine checks of temperature either in the field or in the lab.

I also checked each of our data loggers and, as you can see below, their degree of accuracy varied. The best being the logger at Snitz Creek (-0.2 degree C difference) versus the worst being the logger at Q1 (-8.9 degrees C). The Q1 sensor was so off that I checked it multiple times, so we should use temperature readings from that one with a lot of caution. Unlike with water level, I don't think there is a way to reset the temperature calibration. I will talk with the Onset/Hobo tech staff about it.

The attached image shows two new items in our storage area at LVC: The standardized Taylor digital thermometer and a log book for our Quality Assurance readings. I could not remember if we had one already, so I added this just in case Make Hoger asks about it during our audit.

Bob

SUBJECT: RE: Streamflow Measurements
From: Hoger, Mark
12:50 PM, Friday, January 26, 2024
To Erika, Kent, Mike, Kara, Bob, Alyssa, Katie

Hi Kent,

We do not have the capacity to collect the samples, nor do we often collect this type of data ourselves. I also have some very real safety concerns about volunteers getting out in high flow conditions. I reached out to my supervisor, Erika Arnold, to get her input. See her response below.

We acknowledge your concerns. Pollutants and sediment could very well have greater transport during high flows. While DEP has some strategies to monitor at higher flows, they tend to be limited by safety, equipment costs, additional deployment considerations, etc. DEP does not often implement streamflow collections at high flow extremes. The simplest strategy

we implement is to leverage data by other agencies who may have the expertise and the more sophisticated equipment to collect at high flows. We often use open-sourced data like USGS gage data to begin to supplement our simpler efforts like taking water chemistries from a bridge using depth integrated samplers or a heavy bottle holder attached to a rope that would safely be lowered from a bridge to collect a water composite. (DEP can certainly provide you with a weighted bottle holder if you would like). We will use the chemistries we collect from these efforts, and pull data off of the USGS website, for example, to begin to understand and model the data. You mentioned in your email the WQN station at the Palmyra-Bellegrove, this just happens to be a station in which USGS collects gage data at (Quittapahilla Creek near Bellegrove, PA - USGS Water Data for the Nation). You folks may be able to leverage this data to investigate your concern. All data from USGS websites is downloadable, how to do this is pretty self-explanatory. Also all PADEP WQN data is uploaded to EPA's Water Quality Portal which you can access here Water Quality Data Home. You can search by county and coordinates.

On another note, we also talked to our Watershed Support Section regarding how they monitor to document water quality improvements in watersheds implementing Best Management Practices (BMP). As it relates to measuring effectiveness of different projects, often times, groups like yours use Model My Watershed to estimate reductions. The general monitoring strategy the Watershed Support Section is implementing to measure loads is to collect data under "typical conditions" which will be more representative of average reductions. To do this they implement streamflow measurements at low flow, baseflow, and closely following a small storm event that would allow for safe wading. We are mentioning this here to maybe ease your folk's minds that we do not have to get worse case scenarios to measure change or improvement. Whatever you all are capable of will likely tell a story.

We hope this helps and if you have any additional questions feel free to reach out.

Erika Arnold | Environmental Group Manager | Monitoring Section
Department of Environmental Protection | RCSOB
Bureau of Clean Water
400 Market Street | Harrisburg, PA 17101
Phone: 717.787.8189 | Fax: 717.783.2949
www.dep.pa.gov

SUBJECT: RE: Streamflow Measurements
From: Kent Crawford
2:22 PM, Friday, January 26, 2024
To Mark, erikarnold, Kara, Mike, Katie, Bob, Alyssa

Ms. Arnold,
Mark,

Thanks for your very thoughtful response to our questions about high-flow sampling in the Quittapahilla Creek Watershed. Your comments and suggestions are well-thought out and pertinent to our situation. We appreciate the time you took to provide such a reasoned answer.

At this point, the members of our monitoring group will need to put our heads together to craft a path forward. In fact, one of our team members has already suggested using "Model My Watershed" as a tool for our work, so that is likely in our future. I am well-pleased with our monitoring efforts to this point. We have a good foundation for our work and we are executing the monitoring program with more and more confidence as we continue to gain experience.

I still would like to explore the possibility of deploying an auto-sampler (Teledyne-ISCO brand, Global Water brand, YSI brand, or similar) for collecting high-flow samples. But, we would need laboratory support from DEP for the very large number of samples such a device would generate. We could easily pare the number of samples down to a manageable number. The idea would be to limit the samples to only one or two stations, and to select a limited number of samples over the duration of the hydrograph. Further, the TMDL for the Quittapahilla Creek Watershed states, "Excessive sediment and nutrient loads resulting from agricultural activities have been identified as one of the primary causes for impairments in the basin." (Pennsylvania Department of Environmental Protection, Southcentral Regional Office, Water Management Program, November 9, 2000) So, it would be reasonable to limit the lab analyses to the nutrient suite plus suspended sediment (total suspended solids).

There is a possibility that the Quittapahilla monitoring team can secure (borrow) an auto-sampler for this sampling, if we can be assured that our samples would be analyzed.

Again, thank you for your suggestions. Any further guidance would be greatly appreciated.

Regards,
Kent

SUBJECT: RE: Streamflow Measurements
From: Arnold, Erika <erikarnold@pa.gov>
2:57 PM, Friday, January 26, 2024
To Kent, Mark, Kara, Mike, Katie, Bob, Alyssa

Hi Kent, all is noted. We will have to get back to you regarding our capacity to take on the additional samples. We still have yet to complete an audit on your volunteers but are working towards that towards the end of the February. We need to have the audit done before we make any decisions. Also, you say below you would like to pursue ISCO sampling and acknowledge the very large number of samples. Could you give us an idea based off of your planning what that quantity might be? For example, you may target two storm events at two

sites where you collect a sample every 24hrs. That would be roughly 96 samples. Is that the plan you are going after or would you be targeting more (or less)? Just trying to understand what your specific proposal is as it is not quite clear. In addition you say you want the nutrient suite, would that be both total and dissolved you are after? These details are helpful for us to know.

Thank you,

Erika

Erika Arnold | Environmental Group Manager | Monitoring Section

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SUBJECT: RE: Data logger temperature calibrations
From Kent Crawford
5:59 PM, Friday, January 26, 2024
To Bob, Mike, Katie, Gary, Lydia, Kara, Alyssa

Bob,

Excellent work, but the results are a little disappointing. I will be curious to hear if Onset/Hobo can suggest a temperature adjustment.

It is excellent that you have initiated a logbook for quality assurance. Is it your intention that other QA/QC readings will be stored here in addition to the temperature readings?

We should check the temperature readings from the data loggers against the readings from the multi-parameter sondes during our field sampling.

I assume you did not check the sondes against the NIST thermometer, but that check would be interesting and important as well.

Thank you for your initiative.

Kent

SUBJECT: RE: Data logger temperature calibrations
From Bob Connell
Fri, Jan 26, 11:40 PM

to Kent, Mike, Katie, Gary, Lydia, Kara, Alyssa

Kent,
Yes, the results of the calibrations were disappointing. I will get in touch with Onset on Monday to see what advice they have. You are correct that I did not check the sondes for temperature yet. However, with the standardized digital thermometer at LVC, we can easily check them next time we calibrate them for pH, DO and conductivity.

When Mark does our audit, I'll ask him how DEP prefers that we handle QA records. If he wants a log book, we're all set. If not, no harm done. If he says we can keep them electronically, maybe a document on our Google Drive would do the job. Either way, there should probably be one place to keep all of our calibration records.

Bob

SUBJECT: RE: Data logger temperature calibrations
From Bob Connell
Jan. 29, 2024, 2:12 PM

to Kent, Mike, Katie, Gary, Lydia, Kara, Alyssa

I just spoke with Bill Farris of Onset, the manufacturer of our Hobo data loggers. Bill is their tech support for these devices. He said that there is no means to recalibrate temperature on the sensors. He felt that the problem with the sensor at Q1 is due to the lower unit - the part that goes in the water. They can service it for $160. Replacement would cost $420. I said that the Watershed Association would have to discuss it and that I'd get back to him after our next meeting.

He also cautioned about using that sensor for water level readings since temperature is used in the sensor's calculations to determine the water level (temperature affects the density of the water).

I wish that I had better news, but that is where it stands. In the meantime, we can take the calibrated digital thermometer with us when we sample and check the temperature calibrations in situ.

Bob

SUBJECT: RE: Data logger temperature calibrations
From Kent Crawford

Jan 29, 2024, 2:26 PM

to Bob, Mike, Katie, Gary, Lydia, Kara, Alyssa

Bob,

Good work, even if that is not the answer we were hoping for.

I think we need a little more information. What is the expected life of the sensor? If the sensor were to be serviced, would it be "good as new"? If that is the case, then I would opt to have the sensor refurbished, at the expense of the Watershed Association.

Kent

SUBJECT: Two Monitoring Issues
from Kent Crawford
Attachments
Thu, Feb 8, 10:18 AM

to Alyssa, Kara, Katie, Mike, Bob, Russ

There are two issues related to our monitoring program that need our discussion:

1. High-Flow Sampling

We know that water quality changes with flow. At higher flows, suspended sediment and contaminants that are attached to these sediments are in higher concentrations than during low flows. Similarly, contaminants that are dissolved in the water are in lower concentrations because they have been diluted by rainwater. I have been concerned that we are not getting samples at high flow and therefore not fully characterizing the water quality of the watershed. Further, I am reluctant to have our volunteers enter the water at high flow to collect samples. It is simply too dangerous, even for the small streams that are included in our sampling locations.

There is a possibility that we can borrow an automatic sampler (see attached pictures) from the Tobyhanna-Tunkhannock Watershed Association that will allow us to collect high-flow samples without actually entering the water. We simply position the sampler on the stream bank (or bridge or bridge abutment) and program it to collect our samples automatically while we are home doing something else. The sampler works by running an intake tube from the sampler to the stream. When the water level rises, the sampler automatically begins to pump water from the stream into sample bottles that are stored in the sampler. The sampler can be programmed to collect these samples on a schedule of our choosing.

The autosampler can collect a ton of samples -- too many to ask the Pennsylvania DEP lab to analyze. Here is where I need input from the leadership team and the QWA membership. We need to decide how many samples we wish to collect, at what locations, to be analyzed for what constituents.

At our meeting on February 20, I will offer a proposal for our high-flow sampling plan. I seek your discussion and consideration of my suggestions with the expectation of producing a workable plan by the end of the meeting.

2. Spruce Street Project

The stream restoration project on the Quittapahilla Creek immediately downstream from Spruce Street is complete. Part of our responsibility for this project was to prepare "before and after" habitat surveys of the remediated section of the stream. With that in mind, prior to this project, our volunteers conducted a survey of the steam section to determine stream width, stream depth, water velocities, and habitat structures. We need to re-do this work now that the project is complete. The Pennsylvania Fish and Boat Commission provided most of the funding for this work. Now, the Fish and Boat Commission is asking for "after" survey results. Part of the funding from the Fish and Boat Commission for the project is being held back until the post-survey is complete.

At our meeting on February 20, I will ask for someone in our organization to take the lead in accomplishing this task. The task involves picking a date for the work, assembling a team of volunteers to do the work, conducting cross-section surveys at three locations, measuring discharge at three locations, and taking photos to document the habitat improvements. I will be glad to prepare the final report to verify this work to submit to the Fish and Boat Commission. My report will build on an internal summary of our "before" survey (see attached).

Looking forward to your thoughts at our February 20 meeting.

Kent

ATTACHMENTS TO FEB 8 EMAIL
FROM KENT CRAWFORD

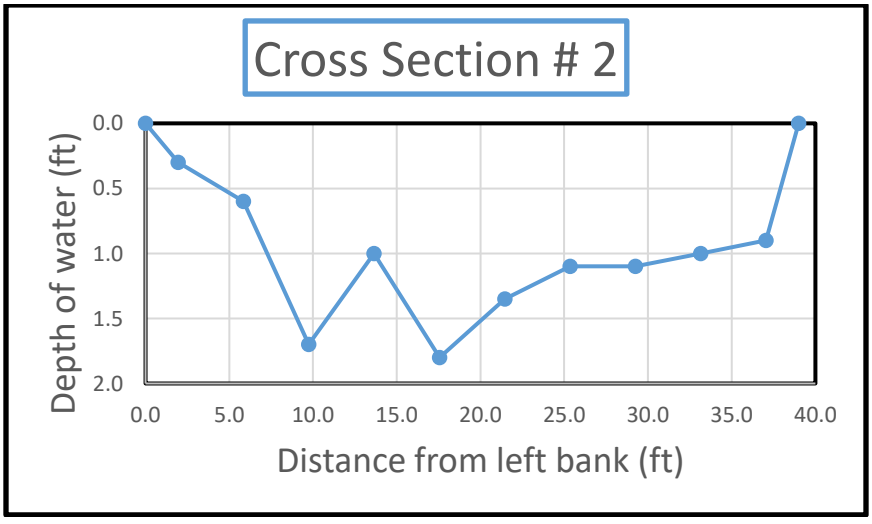
Quittapahilla Creek
Spruce Street Project
Cross Sections -- April 18, 2023

On April 18, 2023, a crew of volunteers from the Doc Fritchey Chapter of Trout Unlimited and the Quittapahilla Watershed Association, along with volunteer Shawn Jacobs, performed three cross-section surveys for the Quittapahilla Creek. The purpose of these surveys was to document existing physical conditions in the stream prior to a stream restoration project. These surveys were conducted in an approximately 800-feet reach downstream from the Spruce Street Bridge in Annville Township, Lebanon County, Pennsylvania. In addition, we executed photo documentation of existing conditions.

For each of the three cross sections, we measured width, depth, and velocity of the water. Once the stream restoration project is complete, we will repeat the cross-section surveys and compare the results of the "Before" and "After" characteristics. We anticipate that the restoration project will result in better fish habitat including narrower stream widths, deeper water, and higher velocities. In addition, our photo documentation will verify new habitat structures installed as part of the restoration project.

In the study reach, there were no observable inflows. Two input pipes were observed in the reach, but each pipe had zero flow. It is assumed that, in wet weather, these pipes carry stormwater runoff. Therefore, the streamflow at each of the three measured sections should be equal, assuming there are no intervening groundwater inputs and no loss to groundwater. The month of April, 2023 has been very dry in Lebanon County. The last day with more than a trace of rainfall was April 1, when just over a quarter inch of rain fell. Therefore, the streamflow on April 18 was quite low. We used cross sections and benchmarks established by our contractor, Aquatic Resource Restoration Company for our work.

The results of our work are shown in Figure 1. Once the project is complete, we will redo the surveys "After" and overlay the results on top of the charts in Figure 1 to make the comparison. To be comparable, these second surveys will need to be accomplished at the same streamflow as the April 18, 2023 surveys. Steve Vegoe checked the staff plate at our Garfield Street gauging station (Station Q1). The reading was 1.4 ft. So, we will target our "After" survey for a time when the staff plate at Garfield Street reads 1.4 ft.



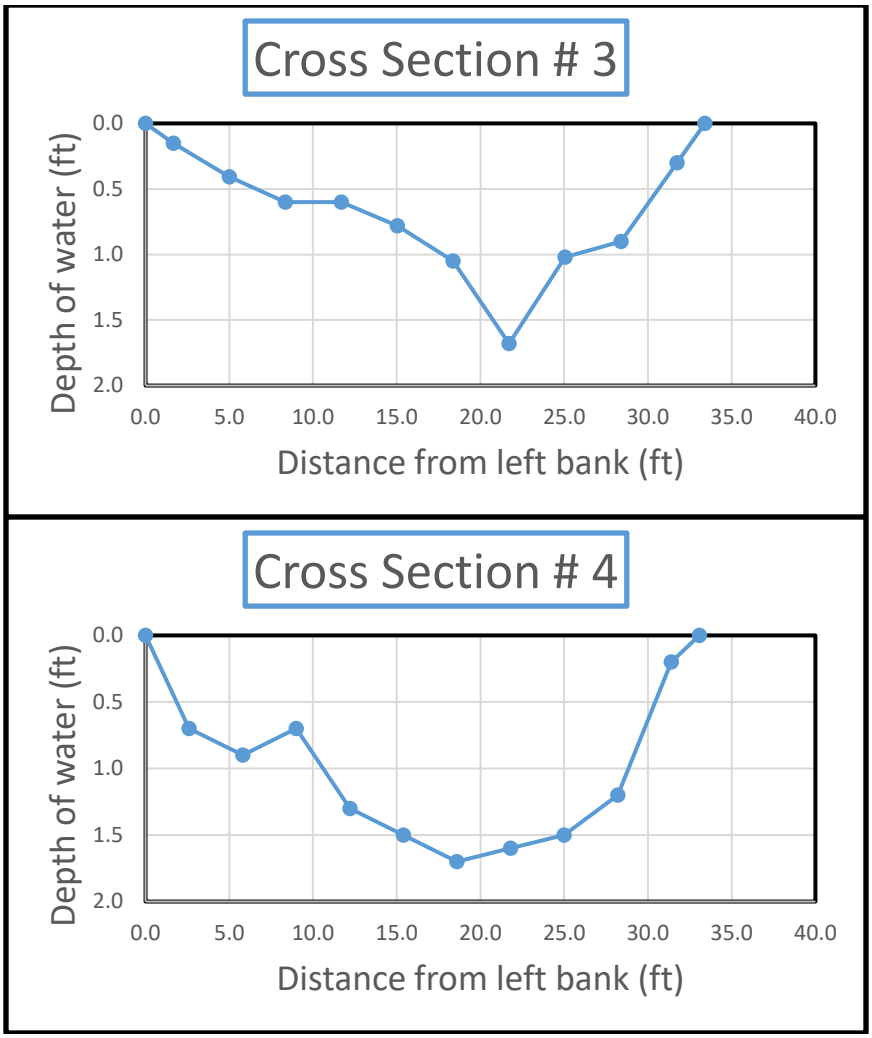


Figure 1. – Cross-sectional profiles for Quittapahilla Creek d/s from Spruce Street.

Appendix 2. "Annville Goes Green" Events Flier.