

QUITTAPAHILLA WATERSHED ASSOCIATION
Meeting Minutes
Annville Town Hall and Remotely Via Zoom (Hybrid Meeting)
September 19, 2023

Present: Michael Schroeder (President), Karen Feather, Katie Hollen (LCCD), Lauren Rius, Joe Connor, Kent Crawford (via Zoom), Kara Lubold (TLVC, via Zoom)

The meeting opened at 7:01 p.m.

- 1. Project & grant updates.** Mike reported the following project updates, kindly provided by Rocky Powell before the meeting. For context, this meeting's Sept. 19 updates are preceded below by the updates provided at our Aug. 15 meeting:
 - A. Beck Creek Project 6.** Stream and Floodplain Restoration Project. On June 16, 2023 the QWA submitted on behalf of Doc Fritchey Trout Unlimited (DFTU) a grant proposal written by Rocky Powell to PA-DEP's Growing Greener Plus program for \$494,449.00. On June 15, 2023 the Lebanon County Conservation District Board voted to approve an Agriculture Conservation Assistance Program (ACAP) grant for \$173,100 to support this \$934,146 project. A PDF file of the application is housed on the Studies & Documents page of the QWA website. **SEPT. 19 UPDATE:** waiting to hear on application, expected in December or early in 2024.
 - B. Snitz Creek Project 3.** With the exception of the USACOE 404 Permit, all permits and approvals have been obtained. **SEPT. 19 UPDATE:** Still waiting to hear from US Army Corps of Engineers – been more than a year.
 - C. Snitz Creek Project 4.** DFTU is wrapping up the paperwork needed to finalize their contract with PADEP. It is anticipated that work on this project will get underway the beginning of September. **SEPT. 19 UPDATE:** Still waiting on contract with PADEP.
 - D. Killinger Creek Project.** After both landowners approved the Preliminary Design. Rocky Powell requested a Pre-Application Site Visit with PADEP, USACOE and LCCD. Because the PADEP reviewer is not available until September, the Site Visit could not be scheduled until September 7th. This put the project schedule at risk of not meeting the October 28, 2023 grant deadline. Russ Collins requested an extension of the deadline to December 31, 2023, which was approved. **SEPT. 19 UPDATE:** Pre-application site visit Sept 7 went well, met with USCOE, DEP, LCCD's Karl Kerchner, Rocky Powell. Rocky is developing the application.
 - E. Bachman Run Project.** Preliminary channel alignment and buffer design was approved by landowners. Preliminary Design moving forward. We were made aware that Mrs. B. had put her property up for sale. Rocky Powell contacted Mr. H. the largest landowner along the project area. He confirmed that Mrs. B's property sold at a public auction on June 24, 2023. He indicated that his brother G.H. was the new owner. On June 30, 2023, Russ Collins and Rocky Powell met with G.H. to discuss the Preliminary Design and provide him with a Landowner-Grantee Agreement for his signature. He indicated he did not like the proposed 35-foot buffer shown on the

plans or the idea of having an overgrown area along the stream. He indicated he would discuss it with his wife and get back to us. We aren't sure how this will affect the overall project if they decide not to participate. We did alert our PADEP 319 Grant Advisor of the situation. Follow-up – Russ Collins left a message for G.H. hoping to determine his decision on accepting the project. Waiting to hear back from him. **SEPT. 19 UPDATE:** After a lot of back & forth between Rocky and property owner G.H., the new alignment was accepted and the riparian buffer reduced to 15 feet. Project is moving forward.

- F. Snitz Creek Project 2. SEPT. 19 UPDATE.** Completely permitted, construction expected to begin in 2024.
- G. Quittie Mainstem Restoration Project Downstream of Spruce St. Bridge in Annville.** Mike reported that this project is expected to commence this fall. Documents describing the project are housed on the Studies & Documents page of the QWA website.
- H. Lebanon County Stormwater Consortium Quittapahilla Creek Floodplain Restoration Project.** Mike reported that this major project is well underway in the area just downstream of the Hazel Dike to the 22nd St. bridge in North Cornwall Township. He further reported that there seems to be a great deal of public interest in this project, judging from the more than 300 "likes" and dozens of comments and shares of his Facebook post on the "Lebanon PA Happenings" Facebook page earlier in September. That post, with accompanying photos, is reproduced below in [Appendix 1](#).

- 2. 2023 Student Interns Update.** Mike reported that student Interns Hannah Horengic and Ilyssa McLaughlin completed their work on Killinger Creek, Gingrich Run, and Snitz Creek. Rocky reports he is very pleased with the results of their work. The interns also noted that Kara Lubold at TLVC was great to work with, and Kara noted that she very much enjoyed working with the interns. Interns will drop off binder with field notes with Katie Doster at LCCD and have a final meeting with Rocky sometime in the next month. Interns will offer a 10-minute remote Zoom presentation at QWA's Oct 17 meeting. Mike suggested drafting a press release highlighting our 2023 Summer Internship Program and the collaboration among TLVC, the LCCD, Lebanon Valley College, Rocky Powell, and the QWA.
- 3. Monitoring Program Update.** As of August 31, Kent has stepped down from his role leading our Monitoring Program. Over the past month, much has happened and a great deal has been communicated via email regarding our Monitoring Program. To avoid cluttering up these minutes, those developments and communications are pasted below into [Appendix 2](#).

Action Items: After discussion, Kent and Mike agreed that in order to continue effectively, our Monitoring Program needs to fill four key positions:

- 1) **Data Manager** (to manage and store the mountains of data we expect to be collecting)

- 2) **Communications Manager** (to communicate among fellow volunteers and with the wider public; Mike agreed to fill this position)
- 3) **Fieldwork Coordinator** (to coordinate our fieldwork efforts, as Kent has been doing till now)
- 4) **Equipment Manager** (to coordinate with LVC and others to manage the needed monitoring equipment)

It was agreed that efforts to recruit people for these positions should take place in two phases. First, Kent will issue a blanket call for volunteers, focusing on DFTU members. To follow up, Kent and Mike will send out targeted invitations to specific individuals soliciting their help. Mike agreed to reach out to Mike Sherman and Jineen Boyle, both former DEP employees. Meantime Katie Hollen agreed to coordinate our water sampling efforts in October.

4. **Grant Opportunity.** Kent noted that the Susquehanna River Basin Commission (SRBC) has announced a grant program with \$150K available, with a \$5K cap on individual proposals. Deadline is Nov. 30. Mike suggested a grant proposal focusing on signage for both sides of every bridge in the watershed under which a waterway flows (e.g., "Beck Creek," "Bachman Run," etc.). It was agreed that this would be an excellent proposal. Link to the grant application materials: <https://www.srbc.net/our-work/grants/stream-watershed-enhancement-grant.html> and <https://www.srbc.net/our-work/grants/docs/stream-watershed-enhancement-grant-guidelines.pdf>
5. **Upcoming Special Events.** Katie reported on the following upcoming special events. Fliers for these events are included here in [Appendix 3](#):
 - A. **Sat. Sept. 23, 9-11 am.** The LCCD is hosting a riparian landowner workshop at Levitz Park in Grantville. The QWA is invited to participate in this event. See the LCCD website, at <https://www.lccd.org/events>
 - B. **Tues. Oct. 17, 10 am—12 noon.** Swatara Creek Water Quality Field Day, Boathouse Park, Hershey PA, sponsored by the LCCD, the USGS, and the NRCS, "discussing the real-time 24-hour super gage water quality monitor recently installed along the Swatara Creek. Learn more about water quality sampling, techniques and monitoring during this interactive event."
 - C. **Sat. Nov. 4, 8:30 am—12 noon.** Lancaster/Lebanon Watershed Forum, Lancaster Farm & Home Center, 1383 Arcadia Rd., Lancaster, PA 17601. Sponsored by the LCCD, the Lancaster County Conservation District, and Lancaster Clean Water Partners. "Presentation topics include dam removal projects, water quality monitoring, and a stream restoration case study."
 - D. **Tree Planting Volunteers Needed.** Ongoing this fall with the LCCD. Goal is to plant 1,000 trees in Lebanon County. To sign up, visit <https://khollen.wufoo.com/forms/s1xexwgr0adgquj/>
 - E. **Social event / mixer with nearby watershed associations.** It was suggested that we organize such an event in the future.

The meeting adjourned at 7:55 p.m.

Respectfully submitted,

Michael Schroeder, Secretary Pro Tem

Appendix 1. Mike's Facebook Post on the Lebanon County Stormwater Consortium's Project Downstream of the Hazel Dike to the 22nd St. Bridge

The following post on the "Lebanon PA, Happenings" Facebook page on Sept. 2 yielded over 300 "likes" and scores of comments and shares. There is clearly a great deal of public interest in this project:

I've heard a lot of folks express concerns about all the trees cut down and heavy equipment and digging along Quittie Creek just downstream of the Hazel Dike down to the 22nd St. bridge along Chestnut St in North Cornwall Township. People are wondering what's going on.

So, on behalf of the Quittapahilla Watershed Association, for which I serve as President – an organization "Dedicated to cleaner water flowing from the Quittie to the Swatara to the Susquehanna to the Chesapeake Bay to the Atlantic & beyond," let me say:

We are totally in favor of this project.

Why? Because it promises to improve the ecology of that section of the creek, to improve the quality of the water flowing downstream, and to mitigate the worst effects of flooding downstream.

This long-envisioned restoration project, being undertaken by the Lebanon County Stormwater Consortium, has removed thousands of tons of "legacy sediment" that's built up over the past 3-4 centuries. The goal is to create a floodplain much like what existed before European settlers began streaming into this area in the early 18th century.

For a detailed explanation of the project, see the Studies & Documents page of the QWA website [which I built and maintain, at <http://www.quittiecreek.org/documents.html>]. Scroll down the page and back in time to Sept 2021, "Lebanon County Stormwater Consortium's Quittapahilla Creek Floodplain Restoration Design Update" [direct link to the

15-pg PDF file here:

http://www.quittiecreek.org/documents/210921_QuittapahillaRestorationUpdate.pdf

I know the floodplain looks like a wasteland now, but trees and native plants are being planted as we speak and it'll bounce back before you know it. In future floods, this restored floodplain will act as a kind of sponge or shock-absorber, allowing the floodwaters to fill the basin, slow the water down, and mitigate the worst effects of flooding downstream.

Remember Tropical Storm Lee in Sept. 2011? I sure do. My whole block in Annville was devastated. Lee in 2011, Agnes in 1972— floodwaters shooting out of the Hazel Dike like a firehose.

That kind of flooding WILL happen again. This project will help to mitigate its worst effects. It won't solve anything, but it will help. And it will improve the ecology of this little section of the creek. And points downstream. All the way to the Chesapeake Bay.

I knew those woods well. Many times I went garbage-artifact hunting in this section, along both banks, collecting museum-quality artifacts for the Quittapahilla Creek Garbage Museum—most recently, this past spring. I have tons of pics of what this area used to look like. Mainly it looked unhealthy as an ecosystem. It felt sick. This project promises to make it light-years better.

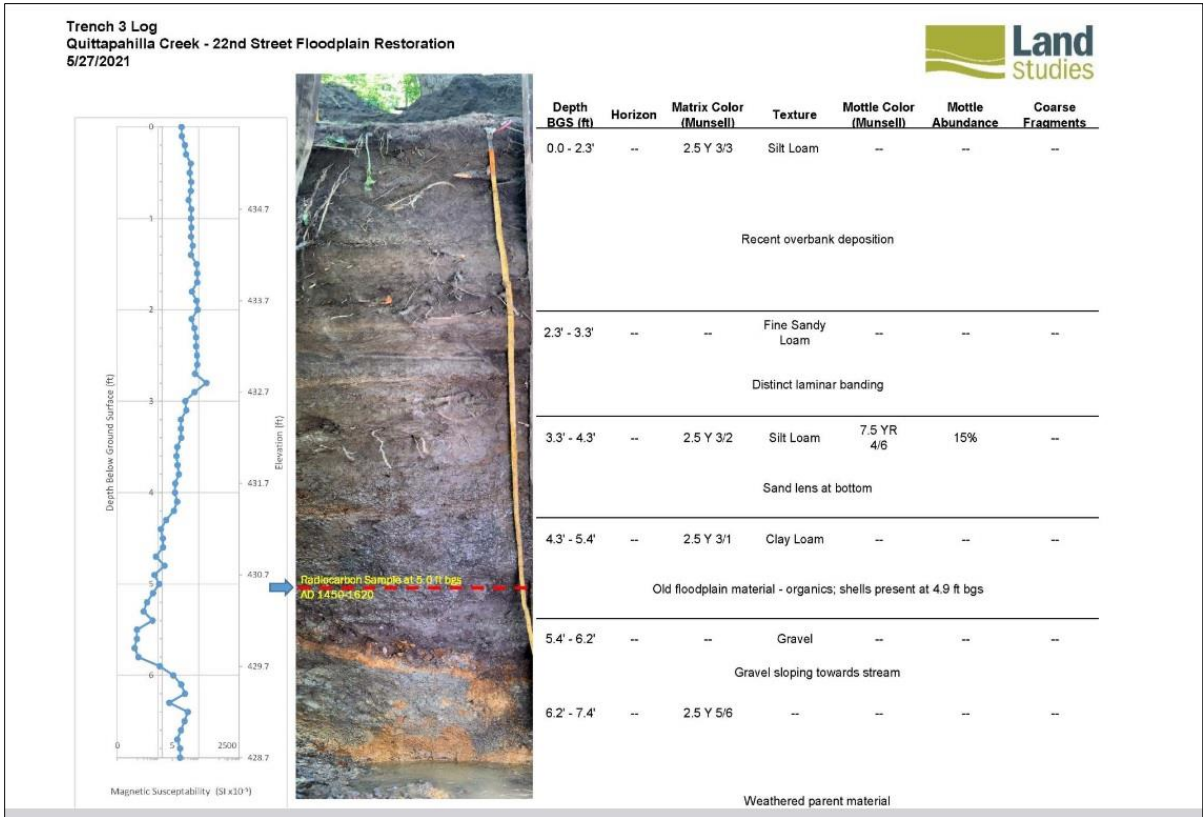
SHORT VERSION: This is a good project worth supporting.





Above: Looking downstream toward the 22nd St. Bridge. Below: Looking upstream toward the Hazel Dike. Selfies by QWA President Michael Schroeder.





Above: Screenshot of LandStudies PowerPoint slide showing more than 500 years of legacy sediment, with ground level at the top and the creek at the bottom. Below: Detail of above.



Appendix 2. Monitoring Program Activities and Communications

Monday, Aug. 28, 2023, 2:47 PM

Kent Crawford Email to Volunteers

Subject: Long-Term Water-Quality Monitor Deployment

Hello Volunteer Monitoring Team,

As you know, the Quittapahilla Creek is a stocked trout stream, but few if any of the stocked trout survive through the summer. We suspect that in the summer, either the temperature is too hot or the dissolved oxygen (DO) is too low for their survival. We know that the hottest part of the day is mid to late afternoon. And we know that the lowest DO occurs at night when there is no photosynthesis to produce oxygen but the organisms in the creek are still respiring and taking oxygen out of the water. So, in lieu of having someone taking repetitive samples throughout the day and all night, we can use our multi-parameter water-quality instruments (sondes) to take the temperature and DO readings for us.

So, our plan is to deploy two sondes in the Quittapahilla Creek and leave them there for a week or two. They will measure temperature, pH, dissolved oxygen, and specific conductance for the duration of the deployment and store the readings in the memory of the sonde. We plan to place one sonde just downstream from the city of Lebanon and one sonde farther downstream, probably at the Palmyra-Bellegrove Road. Critical for this deployment is to anchor the sondes so that an unexpected high-flow event would not wash them away. Also, we need to take steps to deter vandalism and/or theft as the sondes are very expensive.

Willie Bixler, Katie Hollen, and I have agreed to do this work on the morning of Thursday, August 31. The three of us can handle the tasks, but additional help would be greatly appreciated. Willie and I will work at his home on Thursday morning at 8:30 a.m. to prepare anchors and security for the sondes. Then, we will meet Katie at 9:00 on Thursday morning at the rear of Neidig-Garber Science Center on the campus of Lebanon Valley College to pick up pH buffers and specific conductance standards for calibration of the instruments.

If you can join us, meet us in the Annville municipal parking lot at the rear of Neidig-Garber Science Center (corner of North White Oak Street and East Lebanon Street) at 9:00 a.m. on Thursday. Your help will be greatly appreciated and we need to have others trained in the calibration and deployment of the sondes.

Let me know if you can help.

Kent

Sunday, Sept. 3, 2023, 9:57 AM

Kent Crawford Email to Prof. Becky Urban and Monitoring Volunteers

Subject: Temperature Data

Hi Becky,

We talked briefly about a study you are planning relative to a need for temperature data. As I understand, your plan is to use Hobo Tidbit temperature loggers to monitor temperature in streams and the project would involve other colleges and universities across the northeastern U.S. Without knowing the details of what you are planning and what the objectives will be, I think this could be an excellent student project. I indicated that stream temperature data already exist that may be helpful. So, here are a couple of sources for data that are available on the web:

Here is a link to a USGS web page that posts near real-time temperature data from Pennsylvania streams. Similar data exist for streams in every other state in the US. So, this could be helpful for other colleges involved in the study.

https://waterdata.usgs.gov/pa/nwis/current/?type=temp&group_key=basin_cd

Here is a link to data monitored by the Susquehanna River Basin Commission. These data are limited to the Susquehanna River Basin, but remember that the Susquehanna Basin extends into the State of New York.

<https://storymaps.arcgis.com/stories/31b7c09d2cba43cd9e5333752b6e1b62>

Still another source of continuous temperature data is the Pennsylvania DEP. Here is a link to their data. You will note that these data cover mostly locations in southeastern Pennsylvania.

<https://www.dep.pa.gov/Business/Water/CleanWater/WaterQuality/Pages/CIMReports.aspx>

I might add that the Quittapahilla Watershed Association and Doc Fritchey Chapter of Trout Unlimited have five temperature monitoring stations in the Quittapahilla Creek Watershed. At this point, these data are not well organized and not available on the web. But, if there were a specific request, we could produce temperature information from these sites for the past year and a half or two years. Here are the locations of these stations. And, these stations are currently active and operational.

- Quittapahilla Creek at Garfield Street
- Snitz Creek at Dairy Road
- Beck Creek at Bricker lane
- Bachman Run at Louser Road
- Killinger Creek at Killinger Road

You will note that these locations are the same as the locations where we have collected invertebrate samples for the past three years.

Hope this helps. If we can assist, let us know.

Kent

Monday, Sept. 4, 2023, 10:15 PM
Kent Crawford Email to Monitoring Volunteers
Subject: Perfect Weather

High temperatures in the mid 90s. Perfect!!

You may ask, "Are you sure?"

Yes, perfect for the deployment of our two multi-parameter water quality monitoring instruments (sondes). Let me explain. As part of our Quittapahilla Creek Watershed monitoring, we are interested in exactly how hot the stream gets in the heat of the summer and this current stretch of hot weather provides a perfect time for that study. We think that the Quittapahilla Creek, a stocked trout stream, gets too warm in the summer to have the stocked fish carry over to the next season. If that is the case, then we may wish to target our remediation efforts to address this hot water.

How can we do this? By continuing to implement stream restoration projects just like we have been doing. These restoration projects accomplish several things that address water temperature. The restoration projects:

1. Narrow the stream (less surface area for sunlight to hit)
2. Make the water deeper (the deeper water attenuates the rays of the sun)
3. Speed up the velocity of water (shorter time for sunlight to warm the water)
4. Add riparian vegetation (shade for the stream)

So, let's acknowledge the efforts of Rocky Powell, Russ Collins, and Mike Schroeder for their work to obtain grants for remediation projects and to implement those projects. Each project is making an incremental difference in the temperature of the stream. In addition these projects provide in-stream cover, improve invertebrate habitat, reduce erosion, take up nutrients, and improve the aesthetic character of the stream.

Currently, the summertime temperature of the Quittapahilla is too warm, but not much too warm. I feel that if we could make the water just a few degrees cooler, the stream would be

much more suitable for trout survival. So, it is possible that just a little improvement can make a significant difference.

A group of us deployed the sondes on Thursday, August 31. There were a few challenges to get this done, but in the end, we accomplished our mission. The sondes will remain in place for an unspecified period of time -- maybe a week or two weeks. And they will measure and record water temperatures every half hour for the duration of the deployment. Then we will go back and retrieve the sondes and download the stored data. The results should be very interesting.

We had an excellent field crew on Thursday for the sonde deployments and a big "Thank you" goes to each of them. They are (in reverse alphabetical order):

Gary Zelinske
Steve Vegoe
Mike Schroeder
Katie Hollen
Bob Connell
Willie Bixler

I couldn't ask for a better group of workers.

Kent

Sunday, Sept. 10, 9:10 PM
Kent Crawford Email to Monitoring Volunteers
Subject: Sonde Retrieval

Monitoring Team,

At this point, we have two sondes in the water, measuring and recording data for us. This is exactly what we want. The next step is to return to the field and retrieve the sondes along with the data they have collected. Once that is done, we can evaluate and interpret the data for our use.

When we deployed the sondes, we calibrated each one so we know that, at the time of deployment, the sondes were reading correctly. But, it is likely that the probes will become fouled to some extent during their deployment. Sediment can accumulate and interfere with the readings. Algal and/or bacterial growth is almost a sure thing. In addition, there will be drift in the ability of the probes to measure their parameters. So, we need to account for these potential anomalies.

The most straightforward approach to account for fouling and drift is to compare readings from the deployed sonde with readings from a second sonde (not deployed) that has been recently calibrated. Fortunately, we have a sonde available for this comparison.

So, the brief procedure for sonde retrieval is:

- 1) Calibrate a different meter (monitor, sonde).
- 2) Do not disturb the deployed sonde.
- 3) Place the freshly calibrated sonde along-side the deployed sonde.
- 4) Take a reading from the freshly calibrated sonde.
- 5) Remove both the freshly calibrated sonde and the deployed sonde.
- 6) Connect the deployed sonde to a handheld device.
- 7) Stop the data collection for the deployed sonde.
- 8) Download the data from the deployed sonde.

Once this is done, we can compare the readings from the two sondes. Adjustments can be made to all the data from the deployed sonde, if needed.

When we examine the data, there are a couple of options, depending on what the data look like. First, we would examine for obvious errors. An obvious error would be a ridiculously high pH reading, perhaps 18.2. Then we would look for sudden jumps in the readings, for no apparent reason. Then, suppose we find that the deployed sonde was reading a dissolved-oxygen concentration of 8.0 mg/L but the freshly calibrated sonde was reading 8.2 mg/L. We can apply a correction factor to the sonde readings over the course of the deployment.

The Pennsylvania DEP has prepared comprehensive guidelines for water-quality monitoring, including a detailed protocol for continuous data collection. These guidelines are posted online at:

https://files.dep.state.pa.us/Water/Drinking%20Water%20and%20Facility%20Regulation/WaterQualityPortalFiles/Technical%20Documentation/MONITORING_BOOK.pdf

All the monitoring we do in the Quittapahilla Creek Watershed should conform as closely as possible to these guidelines. In fact, our water-quality sampling procedures and our macroinvertebrate collections attempt to follow the DEP protocols as outlined in the MONITORING BOOK.

The section of the "MONITORING BOOK" dealing with continuous instream data collection (sonde deployment) is almost 70 pages long. I encourage each of you to take a look at this section, and other sections as well. But, for our upcoming sonde retrieval, I have extracted some excerpts from the MONITORING BOOK that are particularly relevant and they are included in the attached Microsoft Word file.

Please follow these guidelines as closely as possible.

Thanks,
Kent

Sept. 10, 2023

Sonde Retrieval: Brief Guidelines

Kent Crawford, Word document circulated via email to Monitoring Volunteers

Always keep this in mind for all our work. We do not use daylight savings time.

“To avoid confusion when comparing continuous data and discrete samples, DEP does not recognize daylight saving time when working with its continuous data. All sondes are set to record in EST (UTC-05:00) and all associated measurement.”

We have been woefully inadequate in making notes in the field. Here are recommendations from DEP:

Field Notes and Instrument Logs

Logs and field notes are essential for accurate and efficient record processing. Field-note requirements for instream monitors include:

1. Station name
2. Date and time of measurements
3. Name(s) of data collector(s)
4. Serial number of field meters and monitor
5. Lot numbers and expiration of dates of standard solutions (optional for Quittie work)
6. Location description and picture of monitor in the stream
7. Name of file downloaded from the monitor
8. Monitor values, field meter values, and corresponding time for cleaning checks (for fouling), calibration checks, calibrations/recalibrations, and final readings
9. Battery voltage of monitor at departure and if the batteries were replaced, name of new file, and start time of logging
10. Notes on sensor/monitor changes or replacements, and other comments that facilitate processing of the record
11. Cross-section survey data (locations of points, measured values, and corresponding times), and monitor values before and after the cross-section survey (Hoger 2020)
12. Measured flow or gage-height data.

We must account for sediment deposition, algal growth on the probes, and drift.

“In streams characterized by high sediment deposition, monitors can quickly become buried if deployed on the stream bottom. Even when monitors are equipped with wipers, sediment accumulation can quickly lead to erratic readings that usually render data unusable.”

Here are the DEP recommendations (partial) for sonde retrieval. I have shortened the process for our purposes and removed several steps needed if the monitor (sonde) is to be re-deployed. But the entire process is explained in the MONITORING BOOK, beginning on page 4-44:

The standard protocol for servicing instream monitors is described below:

1. Obtain a discrete measurement from a clean, calibrated field meter at the sonde location
2. Remove sonde from the monitoring location being careful to minimize disturbance.
3. Connect monitor to field instrument (i.e., computer or handheld device)
 - a. If monitor is to be submerged during read-out, ensure the cable is designed to operate under water
 - b. Stop unattended monitoring
 - c. Upload data
 - d. Do a quick review of data to detect any data abnormalities or defects in probes
 - e. Record any significant fouling observed during monitor removal
4. Conduct before-cleaning, initial monitor inspection
 - a. Record time, readings, and monitor conditions
 - b. With an independent field meter, record instream readings and time near the monitor (This is the same as number 1 above.)

Here are some tips on cleaning the sensors, also from DEP’s MONITORING BOOK

Sensor Field Cleaning

During the cleaning process, care should be taken to ensure that the electrical connections are kept clean and dry. Water on the connector pins can cause erratic readings. For this reason, a container of compressed air is useful. Procedures for cleaning specific sensors, as described below, are general guidelines and should not replace manufacturer’s instructions. Most commercial thermistors can be cleaned with a soft-bristle brush and rinsed with deionized water (Wilde 2004).

Rinse specific conductance sensors thoroughly with de-ionized water before and after making a measurement. Oily residue or other chemical residues (salts) can be removed by using a detergent solution. Specific conductance sensors can soak in detergent solution for many hours without damage. Carbon and stainless-steel sensors can be cleaned with a soft brush, but platinum-coated sensors should never be cleaned with a brush (Radtke et al. 2005). Platinum-coated sensors may be cleaned with a cotton swab.

The pH electrode must be kept clean in order to produce accurate pH values. The body of the electrode should be thoroughly rinsed with de-ionized water before and after use. In general, this is the only routine cleaning needed for pH electrodes; however, in cases of extreme fouling or contamination, the manufacturer's cleaning instructions must be followed (Ritz and Collins 2008).

Optical DO sensors are cleaned with a soft bristle brush and rinsed with deionized water. If the optical DO sensor is equipped with a wiper, ensure the motor is operating properly and parking in the correct position. Also, ensure that the wiping mechanism (pad or brush) is in good condition and clean. The black membrane is sometimes scratched off by coarse debris caught in the wiper. The membrane should be replaced if over half of the surface has been worn off.

Routine cleaning of polarographic DO sensors involves using a soft-bristle brush to remove silt from the outside of the sensor, wiping the membrane with a damp, lint-free cotton swab (available at local electronics stores), and rinsing with de-ionized water. The sensor usually is covered with a permeable membrane and filled with a potassium chloride solution. The membrane is fouled easily and typically will need to be replaced every 2 to 4 weeks. When the membrane is replaced, the potassium chloride solution must be rinsed out of the sensor with de-ionized water followed by several rinses with potassium chloride solution before the sensor is refilled. The membrane must be replaced with care so that the surface of the membrane is not damaged or contaminated with grease, and no bubbles are trapped beneath the membrane. The surface of the membrane should be smooth, and the membrane should be secured tightly with the retaining ring. The sensor must be stored in water for a minimum of 2 to 4 hours, preferably longer, to relax the membrane before installation and calibration. Because of the time required to relax the membrane, replacement of a membrane during a field visit would require having a pre-relaxed membrane on hand to allow for immediate calibration, otherwise it would be necessary to revisit the site after replacing the membrane waiting the required amount of time before calibration. The retaining ring must be replaced annually or more frequently to prevent loss of electrolytes. Replacing the retaining ring when membranes are changed ensures a tight seal. The gold cathode of the DO sensor also can be fouled with silver over an extended period of time, and a special abrasive tool usually is required to recondition the sensor. A fouled anode, usually indicated by the white silver electrode turning gray or black, can prevent successful calibration. As with the cathode, the sensor anode usually can be reconditioned following the manufacturer's instructions. Following reconditioning, the sensor cup must be rinsed, refilled with fresh potassium chloride solution, and a new membrane installed (Rounds et al. 2013).

Turbidity sensors are extremely susceptible to fouling; thus, frequent maintenance trips may be necessary to prevent fouling of the turbidity sensor in a benthic environment high in fine sediment, algae accumulation, or other biological or chemical debris. In environments that cause severe algal fouling, however, algae can accumulate on the

wiper pad preventing complete removal of debris from the optical lens, resulting in 4-48 erratic turbidity data. If the turbidity sensor is not equipped with a mechanical cleaning device that removes solids accumulation or a shutter that prevents accumulation on the lens before readings are recorded, reliable data collection is very difficult. Sensors first should be inspected for damage, ensuring that the optical surfaces of the probe are in good condition. The wiper pad or other cleaning device should be inspected for wear and cleaned or replaced if necessary. Before placing the turbidity sensor in standards, the optic lens should be carefully cleaned with alcohol by using a soft cloth to prevent scratching (or as recommended by the manufacturer), rinsed three times with turbidity-free water, and carefully dried. If the readings are unusually high or erratic during the sensor inspection, entrained air bubbles may be present on the optic lens and must be removed (Anderson 2005).

Again, a much more detailed and complete guidance is provided in the DEP MONITORING BOOK

Sept. 11, 2023, 7:17 PM
Bob Connell Email to Monitoring Volunteers
Subject: Sonde Retrieval

Monitoring Team,

Today, Katie, Gary and I set out to retrieve the water quality sondes that QWA deployed a couple weeks ago. To see if the deployed sondes held their calibration, we calibrated a third sonde (the newer EXO) in the lab today. This would be compared to their measurements to see if their calibration drifted during deployment.

Unfortunately, when we retrieve the deployed sondes, we were unable to locate or view the data files that should contain the measurements made over the last couple of weeks. There are two possible reasons for this. The first is that without the manuals for these older probes we were unsure of the steps needed to download the data. We have since obtained the manual (see attached) and will review it to determine what that procedure is. If the sondes did collect data, it is still stored in their memory and will be retrieved once we have the procedure down.

The second way this could've happened is if the sonde was incorrectly programmed and, as a result, did not make any recordings. I noticed today that there are two menu options to start logging data. If I chose the wrong option in setting the sonde up for logging, it could have resulted in no data being collected. Now that we have the manual for the handheld unit (also attached), we can determine what happened and avoid having it happen again.

Before deploying the sondes again, I recommend that we spend some time in the lab programming the sondes to log data for just a short test - say 10 or 15 minutes of logging at a 2 minute interval. Then, after that, try to retrieve the data file that is generated. Once we can do both of those successfully in the lab, then I think we're ready to deploy the sondes again. We should also read the information in the link and attachment in Kent's recent email (PA DEP's Monitoring Book) and possibly develop some forms to record the information that PA DEP wants to accompany the sonde readings.

These instruments will be very beneficial to QWA's work. We just need to get more familiar with their use, calibration and care - making it second nature to our field operations.

Bob Connell

Thursday, Sept. 14, 2023, 10:51 AM
Kent Crawford Email to Mike Schroeder and Monitoring Volunteers
Subject: Water-Quality Data

Mike,

As requested, five files are attached providing lab results for our samples from August, 2023. Results from the sixth sample have not been returned from the lab. Will send this sixth file later. Also, results from the May samples are in; I will send those to you within a day or two.

I am copying all the members of our monitoring team on this because they will be interested as well.

[NOTE: These five PDF files are housed on the Studies & Documents page of the QWA website.]

Sept. 11, 2023, 9:19 PM
Kent Crawford Email Response to Bob Connell, with Monitoring Volunteers Copied
Subject: Sonde Retrieval

Thanks for the update, Bob. I am sorry the upload did not work. But, let's face it, this is not easy.

Your inclusion of the manual for the YSI handheld device (YSI 650) is appreciated. Section 4.3.3 (page 29) of this manual gives brief instructions for uploading files from the sonde to the handheld device. But, a more comprehensive explanation is provided in Section 7, beginning

on page 55. If you can follow these instructions and find no data file, then the sonde was not properly set up to record the data.

Your idea to get some practice in the lab prior to a field deployment is excellent. You may remember that at the time of deployment, we used the term "trial run." We were hoping for good data, but if no data, then we were getting good experience.

In the meantime, I have not been successful in getting the fourth sonde operational. You will remember that Gary installed a new pH probe when we were in the field on August 31. We didn't go any further at that point because we were waiting for a new DO sensor cap to arrive. Sure enough, the cap arrived at about 9:00 p.m. on August 31, after our field trip was well over. So, I downloaded the Kor software needed to operate these newer EXO sonde models. I followed all the precautions and installed the new cap as the instructions called for. But when I wanted to check it out, I could not get the Kor software to "find" the sonde. This is supposed to be a bluetooth connection, but it did not work for me. I will keep trying.

You are right that these instruments can be very beneficial for our Quittapahilla monitoring. I can see a number of "studies" where they will be useful. The kind of temperature and DO monitoring that we were attempting beginning on August 1 is most obvious. But, I think other uses will include deploying a sonde when a storm is predicted and getting water-quality data over the duration of the storm. How about deploying a sonde when a snowfall is predicted. We could determine the change in specific conductance as the snow melts and the road salt washes into the creek. Also, we could deploy our sondes upstream and downstream of a proposed activity such as a stream restoration project. Similarly, we could deploy upstream and downstream of a WWTP effluent, or any other effluent. And, one of the most beneficial uses will be for spot monitoring, rather than long-term deployment.

At this point, we are learning. We will get there, eventually.

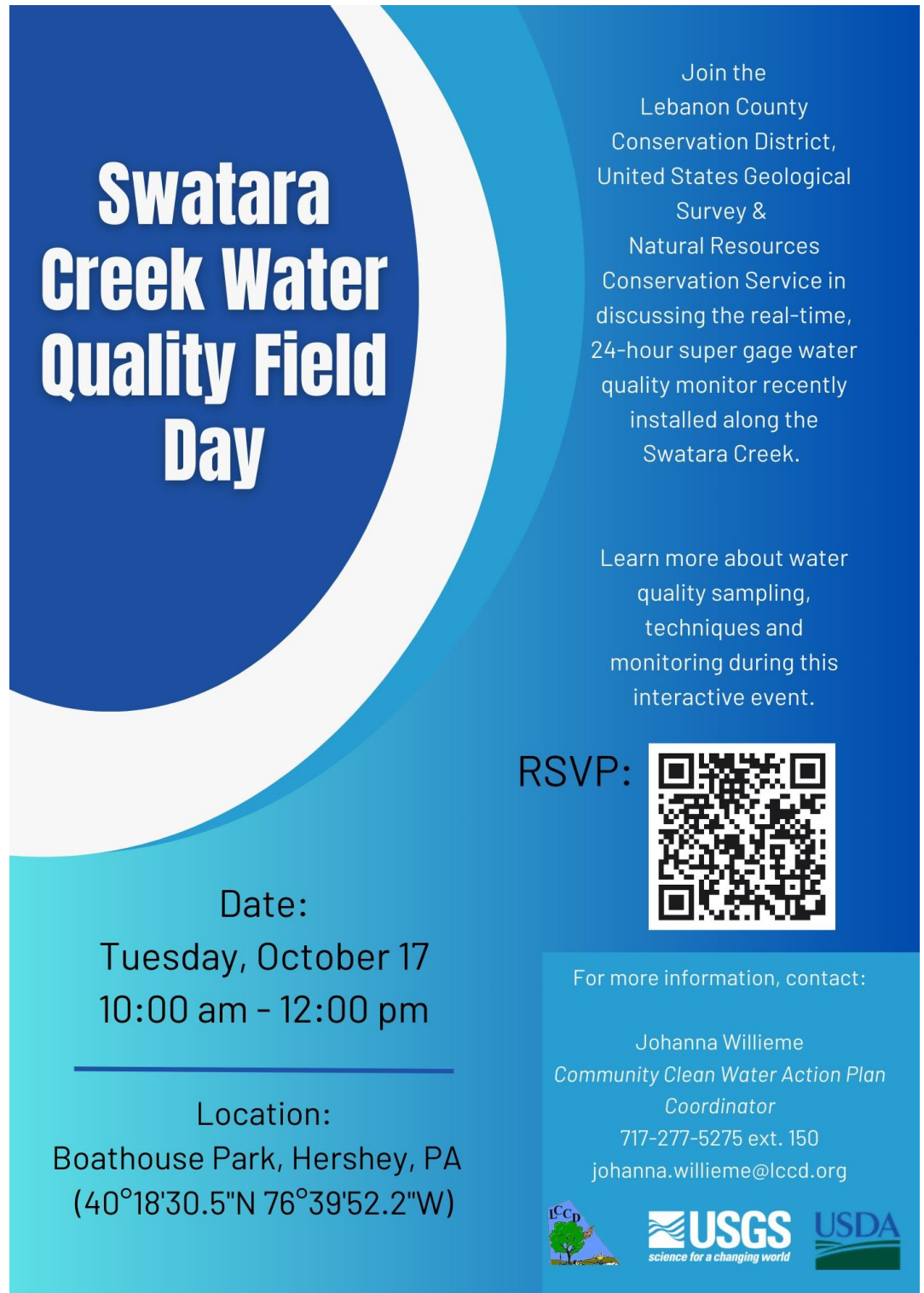
Kent

Sept. 15, 2023, 10:55 AM
Kent Crawford Email to Monitoring Volunteers
Subject: Latitude Longitude for Quittapahilla Stations

**Quittapahilla Creek Watershed
Sampling Stations**

Station number	Station name	Latitude (Deg., Min., Sec.)	Longitude (Deg., Min., Sec.)	Latitude (Decimal deg.)	Longitude (Decimal deg.)	USGS Station Number
Mainstem stations						
Q1	Quittapahilla Creek at Garfield Street	40° 19' 57"	-76° 28' 12"	40.33265	-76.47007	None
Q2	Quittapahilla Creek at Palmyra-Bellegrave Road	40° 20' 33.4"	-76° 33' 42.8"	40.34262	-76.56187	01573160
Tributary stations						
S1	Snitz Creek at Dairy Road	40° 20' 7.66"	-76° 27' 46.0"	40.33546	-76.46285	None
BK1	Beck Creek at Bricker Lane	40° 19' 24"	-76° 29' 00"	40.32366	-76.48331	01573086
BM1	Bachman Run at Louser Road	40° 18' 58"	-76° 30' 58"	40.31639	-76.51589	01573095
K1	Killinger Creek at Killinger Road	40° 18' 43"	-76° 33' 12"	40.31217	-76.55297	401843076331201


Appendix 3. Fliers for Upcoming Special Events



**Swatara
Creek Water
Quality Field
Day**

Join the
Lebanon County
Conservation District,
United States Geological
Survey &
Natural Resources
Conservation Service in
discussing the real-time,
24-hour super gage water
quality monitor recently
installed along the
Swatara Creek.




Learn more about water
quality sampling,
techniques and
monitoring during this
interactive event.

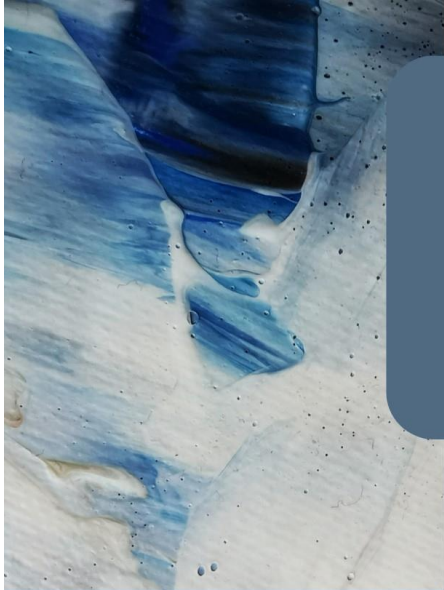
RSVP: 

Date:
Tuesday, October 17
10:00 am - 12:00 pm

Location:
Boathouse Park, Hershey, PA
(40°18'30.5"N 76°39'52.2"W)

For more information, contact:
Johanna Willieme
Community Clean Water Action Plan
Coordinator
717-277-5275 ext. 150
johanna.willieme@lccd.org





SAVE THE DATE

Lancaster/Lebanon Watershed Forum

Collaborate, learn, and network with fellow watershed associations!

This forum is intended to support new & existing members and anyone interested in grassroots watershed protection!



Lancaster Farm & Home Center
1383 Arcadia Rd.,
Lancaster, PA 17601



Saturday, November 4
8:30 AM - 12 Noon

Presentation topics include dam removal projects, water quality monitoring, and a stream restoration case study.

Register by Oct. 29 at:



See you there!



VOLUNTEERS NEEDED!

We are looking for volunteers
to help plant over 1000 trees
in Lebanon County this fall!

Scan the QR code or call
717-277-5275 to sign up!



Join Us!

