

Consortium for Scientific Assistance to Watersheds

Annual Report: January 1 – December 31, 2016

*Transferring knowledge and skills to watershed groups;
Building capacity to undertake watershed assessments and monitoring.*



The C-SAW program is funded by a Pennsylvania Department of Environmental Protection Growing Greener grant awarded to the Pocono Northeast Resource Conservation and Development Council in partnership with:

Alliance for Aquatic Resource Monitoring at Dickinson College
Conemaugh Valley Conservancy
Delaware Riverkeeper Network
Pennsylvania Lake Management Society
Stroud Water Research Center
United States Geological Survey

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Executive Summary

Hundreds of watershed associations, environmental organizations, and community groups in Pennsylvania devote their time, energy, and resources to protect and restore Pennsylvania's streams and lakes. The willingness of citizens to engage in efforts that improve stream and watershed health holds real promise for waterways throughout the Commonwealth. The Consortium for Scientific Assistance to Watersheds (C-SAW) is a program that provides technical and programmatic assistance to these entities to help them achieve their stream assessment and restoration goals. Since the conception of C-SAW in 2001, C-SAW Partners have helped over 330 groups in Pennsylvania and have built their capacity to research and improve their local streams and lakes. **In 2016, C-SAW Partners supported 55 groups and approximately 2,509 individuals.**

C-SAW Partners

There are six C-SAW Partners, located throughout Pennsylvania, that collaborate to implement the C-SAW program and provide support to organizations seeking assistance. The Partners include:

- Alliance for Aquatic Resource Monitoring at Dickinson College (ALLARM)
- Conemaugh Valley Conservancy (CVC)
- Delaware Riverkeeper Network (DRN)
- Pennsylvania Lake Management Society (PALMS)
- Stroud Water Research Center (SWRC)
- United States Geological Survey (USGS)

C-SAW Approach

Pennsylvania has long encouraged watershed associations to participate in efforts that improve and protect stream and lake health, and understand that they are uniquely positioned to lead these grassroots efforts. Financial support provided through the Growing Greener Stewardship Program and C-SAW program exemplify the Commonwealth's commitment to local watershed groups and its belief in their abilities to create positive change. The C-SAW partnership presents a model for other states to follow and the Partners have highlighted the approach in conversations and presentations at meetings and conferences.

C-SAW Partners strive to provide statewide coverage to new watershed organizations as well as existing groups as they evolve. The Consortium's ability to provide long-term support has come to define the C-SAW program. Although this approach requires an intensive dedication of time and resources initially, it increases the effectiveness of watershed groups over time and builds strong, knowledgeable organizations capable of completing scientific work independently.

Many of the organizations that apply for C-SAW assistance have only recently formed and require support with organizational development and program management before they can effectively proceed with watershed monitoring and assessment. C-SAW Partners work with new and existing organizations to build their capacity, confidence, and ownership to manage their organization and successfully implement stream monitoring and restoration projects. This approach sends ripples far beyond the individuals and organizations assisted, and helps to build stronger individuals, organizations, and communities. One can see the independence

gained by groups over time as they enhance their skills and begin new projects that build upon their increased capacity.

C-SAW Spotlight:

The **Alliance for Aquatic Resource Monitoring** helped the Big Spring Watershed Association develop and implement a summer monitoring program to investigate dissolved oxygen (DO) levels in Big Spring Creek. The group was concerned about the decline of trout reproducing in a section of the stream, and chose to design their study to determine if low oxygen levels were a factor in the decline. Volunteers monitored five sites along a section of the stream weekly, just before dawn, when dissolved oxygen levels were potentially at the lowest of the day. The findings suggest that although DO levels were lower than ideal conditions, other factors are contributing to the decline in trout reproduction. The group plans to investigate other potential causes such as accumulated sediment in the future.

C-SAW Assistance

The primary goal of C-SAW is to enhance the capacity of Pennsylvania watershed organizations to design and implement watershed protection and restoration programs that result in improving the water quality and function of Pennsylvania streams and lakes. To achieve this goal, C-SAW Partners draw upon their knowledge and skill sets to offer three types of assistance:

1. Watershed-Specific Technical Assistance (WSTA)

WSTA is designed to build the capacity of groups to answer specific questions they have about their local watershed. WSTA is targeted, short-term, and often provided as a workshop or series of meetings. Groups may request different types of WSTA over time to address their questions. Examples of WSTA include:

- Study design development
- Macroinvertebrate collection and identification methods
- Aquatic invasive species identification and management
- Data management, analysis, and interpretation

2. Mentoring (M)

Mentoring is often requested by groups implementing complex, long-term (2-5 years) projects. Mentoring is resource-intensive initially, but helps to ensure that projects are successful and produce useful results. Once the group's capacity is built, they are able to apply their new skills to undertake projects on their own.

3. Quality Control (QC)

For groups involved in stream monitoring and assessment, QC allows them to verify the quality of the data they are collecting. The following C-SAW Partners are set up to provide QC support to watershed groups throughout Pennsylvania:

- a. ALLARM – water quality parameters
- b. CVC – macroinvertebrate identification
- c. SWRC – macroinvertebrate identification

Continuing Need for Assistance

C-SAW Partners recognize that citizens, in order to be effective in their watershed protection and restoration efforts, must be informed, confident, and able to overcome the disappointments and frustrations they will invariably face. Many of C-SAW's mentored groups are new to watershed protection and require assistance not only with monitoring study design and methods, but also with organizational development. More established groups often require C-SAW assistance to keep their momentum strong as they enter the data interpretation and communication stages of their monitoring programs, or when new issues emerge within their watershed.

As the number of groups benefiting from C-SAW assistance grows, so does the program's exposure. Watershed organizations seek out experienced and knowledgeable support from C-SAW Partners who can train them, provide insights and expertise, and help overcome barriers. The motivation for citizens and watershed organizations to connect to their local environment continues to increase in Pennsylvania and across the country, which increases the demand for C-SAW's limited resources. C-SAW Partners help to spread dollars farther by contributing money and match time to support the program.

This annual report exemplifies the continuing success of the C-SAW program and its ability to provide the necessary programmatic and technical assistance needed for organizations to improve the health of their local streams and lakes and make Pennsylvania watersheds better and cleaner places to live.

C-SAW Spotlight:

In June, **Delaware Riverkeeper Network** assisted the Marcellus Biodiversity Team with macroinvertebrate and stream monitoring as part of the first-ever Loyalsock Bioblitz. As part of this effort, four stream stations were sampled by 30 participants. The team even documented a lovely timber rattlesnake crossing the forest road between two stream stations. The event was so successful that the group hopes to hold more formal and larger bioblitz's in the coming years to engage citizens in stream assessment and highlight the beauty and diversity of the area.

Summary of Assistance Provided

55

Groups

Organizations that received assistance (WSTA, mentoring, and QC) from C-SAW Partners.

71

Workshops

Hands-on, capacity-building event that is facilitated by a C-SAW Partner and is focused on learning a specific skill.

711

Consultations

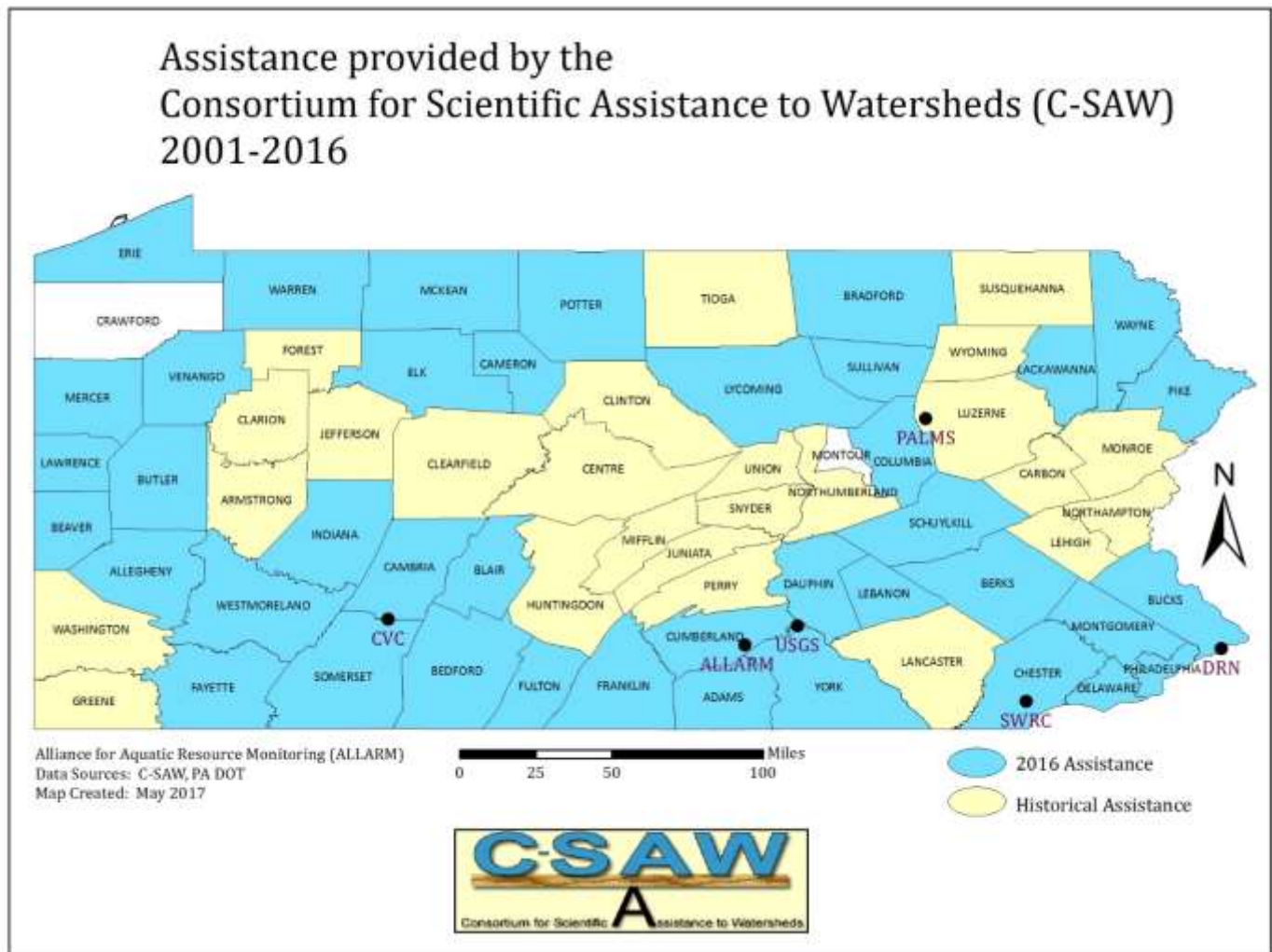
Meetings, events, phone calls, etc. a C-SAW Partner facilitates to provide assistance to an organization.

2,509

Individuals

People assisted through consultations and workshops. Members of an organization benefit from these activities as they interact with workshop participants.

The Assistance Reports and Quality Control Assistance in Appendices A – G summarize the support provided by each C-SAW Partner in 2016. The counties that received assistance are illustrated in the map below.



C-SAW Spotlight:

Every year, before students graduate from six grade and move onto the high school, Scottsdale Middle School students participate in an “Outdoor Day” at the Laurelville Mennonite Camp in Mount Pleasant. Nearly 150 students participate in six hour-long workshops that engage them in environmental topics from tree identification to watersheds. An evening program with live animals concludes the day. The **Conemaugh Valley Conservancy’s Kiski-Conemaugh Stream Team** leads the Water Study station. Students learn about Abandoned Mine Drainage and other pollution sources, test the pH of water samples collected from an abandoned mine discharge, up/down of the receiving stream, tap water, and the stream from which participants collect and identify macroinvertebrates. There’s not a dry boot by the end of the session!

Appendix A: Assistance Reports (ALLARM)

Antietam Watershed Association

Organization information:		Assistance information:	
New group?	No	Initial contact with group	6/30/2003
Group membership	80	Scoping meeting	N/A
Watershed	Antietam Creek	DEP approval	10/31/2003
Watershed size	94 mi ²	Assistance began	10/31/2003
County	Franklin	Assistance completed	Ongoing
In-kind match	N/A	Cost of assistance	\$4,558.12

Assistance provided by: Alliance for Aquatic Resource Monitoring (ALLARM)

Assistance type: Watershed-specific technical assistance, mentoring, and quality control

Consultations	53
Trainings/workshops	3
Individuals assisted	35
Stream miles improved	N/A

Assistance provided January 1 – March 31, 2016

ALLARM helped the Antietam Watershed Association interpret water quality data for a new monitoring site and then communicate the information to the Franklin County Watershed Specialist for follow-up. ALLARM met with the group and reviewed information on water quality parameters, including alkalinity and dissolved oxygen, answered questions, and helped monitors troubleshoot issues they were having with their monitoring kits.

Assistance provided April 1 – June 30, 2016

AWA monitors sent water samples to ALLARM for quality control analysis of duplicate samples for alkalinity, nitrate, pH, phosphate, and turbidity. The submission was successful in demonstrating that the monitors are collecting valid and useful data for the group. ALLARM also prepared for a macroinvertebrate monitoring workshop for new monitors on June 23, however the workshop was delayed until the next quarter due to weather.

Assistance provided July 1 – September 30, 2016

ALLARM provided AWA with recommendations for purchasing macroinvertebrate monitoring equipment and supplies for volunteers and educational programs. ALLARM also helped the group interpret the results from their QC event and prepared for a macroinvertebrate monitoring workshop (to take place on October 3).

Assistance provided October 1 – December 31, 2016

AWA stream monitors participated in an ALLARM macroinvertebrate monitoring workshop on October 3 where they learned how to collect and identify macroinvertebrates and then calculate a water quality score based on the number and variety of organisms they found. Two monitors also participated in a QC event for their water quality monitoring program.

Audubon Pennsylvania – Stream Studies Program

Organization information:		Assistance information:	
New group?	No	Initial contact with group	12/17/2014
Group membership	50	Scoping meeting	1/15/2015
Watershed	Letort Spring Run	DEP approval	5/1/2015
Watershed size	22 mi ²	Assistance began	1/15/2015
County	Cumberland	Assistance completed	Ongoing
In-kind match	N/A	Cost of assistance	\$10,922.28

Assistance provided by: Alliance for Aquatic Resource Monitoring (ALLARM)

Assistance type: Watershed-specific technical assistance and mentoring

Consultations	127
Trainings/workshops	6
Individuals assisted	430
Stream miles improved	N/A

Assistance provided January 1 – March 31, 2016

ALLARM met with Audubon PA to plan and develop a stream monitoring workshop, which was held on March 22 for the Carlisle Area School District science teachers. The workshop focused on watershed functions, water chemistry, macroinvertebrate monitoring, and visual assessment. The goal of the workshop was to prepare the teachers to teach over 400 students about watersheds and water quality in their classrooms as well as all-day field trips.

Assistance provided April 1 – June 30, 2016

ALLARM helped Audubon PA and the Carlisle Area School District develop and implement four stream monitoring workshops that focused on water quality. The hands-on, field-based workshops took place May 2 – 5, and over 400 students participated. ALLARM also held a one-day workshop for the science teachers on June 9 to debrief the May workshops and plan for the upcoming school year.

Assistance provided July 1 – September 30, 2016

ALLARM met with Audubon PA to develop a pre and post learning assessment to evaluate whether or not the students are learning from their stream monitoring experiences (classroom and field portions). ALLARM also met with the science teachers to review their stream monitoring plans for the 2016-2017 school year.

Assistance provided October 1 – December 31, 2016

ALLARM helped Audubon PA develop a pre and post learning evaluation to better understand which stream topics students need more exposure to prior to monitoring their local stream, the Letort Spring Run. Also helped to create a data sheet for students to record their observations and water quality results.

Beaver County Volunteer Monitors

Organization information:		Assistance information:	
New group?	No	Initial contact with group	7/18/2016
Group membership	4	Scoping meeting	7/18/2016
Watershed	Beaver/Upper Ohio	DEP approval	12/5/2016
Watershed size	470 mi ²	Assistance began	7/18/2016
County	Beaver	Assistance completed	Ongoing
In-kind match	N/A	Cost of assistance	\$430.01

Assistance provided by: Alliance for Aquatic Resource Monitoring (ALLARM)

Assistance type: Watershed-specific technical assistance and quality control

Consultations	5
Trainings/workshops	1
Individuals assisted	7
Stream miles improved	N/A

Assistance provided July 1 – September 30, 2016

Met with volunteer monitors to discuss new database, changes in local land-use and new data analysis initiative. Provided equipment and QA/QC analysis to volunteers.

Assistance provided October 1 – December 31, 2016

Spoke with monitors on the phone and through email, trained on new data analysis initiative.

Bethel EAC

Organization information:		Assistance information:	
New group?	No	Initial contact with group	4/23/2014
Group membership	20	Scoping meeting	9/30/2014
Watershed	Little Swatara Creek	DEP approval	10/14/2014
Watershed size	99 mi ²	Assistance began	9/30/2014
County	Berks	Assistance completed	Ongoing
In-kind match	N/A	Cost of assistance	\$1,118.03

Assistance provided by: Alliance for Aquatic Resource Monitoring (ALLARM)

Assistance type: Watershed-specific technical assistance and mentoring

Consultations	13
Trainings/workshops	1
Individuals assisted	20
Stream miles improved	N/A

Assistance provided January 1 – March 31, 2016

ALLARM helped the Bethel EAC plan and develop an agenda for a “Water Quality Education Day”. ALLARM held a stream monitoring workshop for the EAC last year, and members want to use the information they learned about water quality to educate their local community.

Assistance provided April 1 – June 30, 2016

ALLARM provided Bethel EAC with a refresher on stream monitoring and training materials in preparation for their “Water Quality Education Day”, an event they held on May 7 to educate their local community about water quality.

Assistance provided July 1 – September 30, 2016

No assistance provided this quarter.

Assistance provided October 1 – December 31, 2016

No assistance provided this quarter.

Big Spring Watershed Association

Organization information:		Assistance information:	
New group?	No	Initial contact with group	5/19/2015
Group membership	30	Scoping meeting	9/10/2015
Watershed	Big Spring Creek	DEP approval	6/3/2016
Watershed size	13 mi ²	Assistance began	9/10/2015
County	Cumberland	Assistance completed	Ongoing
In-kind match	N/A	Cost of assistance	\$3,440.09

Assistance provided by: Alliance for Aquatic Resource Monitoring (ALLARM)

Assistance type: Watershed-specific technical assistance, mentoring, and quality control

Consultations	40
Trainings/workshops	4
Individuals assisted	14
Stream miles improved	N/A

Assistance provided January 1 – March 31, 2016

ALLARM led a study design workshop for the Big Spring Watershed Association in January. The group is interested in beginning a stream monitoring program, and selected a subcommittee to help shape and make decisions about the program. At the workshop, the subcommittee identified that a monitoring program would benefit their group and community and discussed water quality concerns in their watershed. A second study design workshop is scheduled for next quarter.

Assistance provided April 1 – June 30, 2016

ALLARM met with the Big Spring Watershed Association on May 9 to finish creating the study design for their stream monitoring program. On June 8, ALLARM held a water quality monitoring workshop to teach the volunteers how to measure dissolved oxygen and water temperature and manage their data using field data sheets and an Excel spreadsheet customized for the group.

Assistance provided July 1 – September 30, 2016

ALLARM helped the Big Spring Watershed Association finalize their stream monitoring manual and developed a spreadsheet for them to manage their data. On July 25, ALLARM monitored alongside a BSWA volunteer as a QC check to validate that the group was following monitoring best practices and that their dissolved oxygen meter was working correctly.

Assistance provided October 1 – December 31, 2016

BSWA monitors participated in an ALLARM Data Analysis & Interpretation Workshop on December 19 to learn how to analyze and interpret their water quality data. The group also was able to apply the results to their initial monitoring questions and determine the additional information they need to fully answer their question about changes in water quality and trout reproduction. ALLARM also provided the group with assistance in data management.

Bradford County Stream Team

Organization information:		Assistance information:	
New group?	Yes	Initial contact with group	9/8/2015
Group membership	6	Scoping meeting	3/29/2016
Watershed	Chemung River	DEP approval	6/14/2016
Watershed size	3,644 mi ²	Assistance began	3/29/2016
County	Bradford	Assistance completed	Ongoing
In-kind match	N/A	Cost of assistance	\$774.02

Assistance provided by: Alliance for Aquatic Resource Monitoring (ALLARM)

Assistance type: Watershed-specific technical assistance and quality control

Consultations	9
Trainings/workshops	2
Individuals assisted	11
Stream miles improved	N/A

Assistance provided January 1 – March 31, 2016

ALLARM met with volunteers who were previously trained but had not been monitoring consistently in 2015. New and past monitoring locations were discussed, with several volunteers taking new monitoring locations. Data management was discussed as well as potential partner organizations for future workshops.

Assistance provided April 1 – June 30, 2016

Volunteer data were cleaned, compiled and uploaded to online database. Phone calls with monitor to discuss future monitoring locations and local developments occurred.

Assistance provided July 1 – September 30, 2016

Met with previously trained volunteers to discuss new data management and interpretation tools on online database, gave tutorial on using the database/entering data. Updated resources were provided to the group and new data sent from monitors was combined with historical data. Provided equipment to volunteers in attendance.

Assistance provided October 1 – December 31, 2016

Provided technical assistance to monitors, for both entering data into the database and for meter usage/general questions. Multiple phone calls with one volunteer about meter usage and possible new sites.

Butler County Stream Team

Organization information:		Assistance information:	
New group?	Yes	Initial contact with group	1/5/2016
Group membership	7	Scoping meeting	2/18/2016
Watershed	Connoquenessing River	DEP approval	6/14/2016
Watershed size	830 mi ²	Assistance began	2/18/2016
County	Butler	Assistance completed	Ongoing
In-kind match	N/A	Cost of assistance	\$86.00

Assistance provided by: Alliance for Aquatic Resource Monitoring (ALLARM)

Assistance type: Watershed-specific technical assistance and quality control

Consultations	1
Trainings/workshops	1
Individuals assisted	5
Stream miles improved	N/A

Assistance provided January 1 – March 31, 2016

ALLARM held a meeting to refresh monitoring techniques and collect QA/QC samples. Group was interested in new data management assistance and data interpretation.

Assistance provided April 1 – June 30, 2016

Volunteer data were cleaned, compiled, and uploaded to online database.

Assistance provided July 1 – September 30, 2016

No assistance provided this quarter.

Assistance provided October 1 – December 31, 2016

No assistance provided this quarter.

Conodoguinet Creek Watershed Association

Organization information:		Assistance information:	
New group?	No	Initial contact with group	2/16/2002
Group membership	100	Scoping meeting	N/A
Watershed	Conodoguinet Creek	DEP approval	4/1/2002
Watershed size	524 mi ²	Assistance began	4/1/2002
County	Cumberland & Franklin	Assistance completed	Ongoing
In-kind match	N/A	Cost of assistance	\$1,806.05

Assistance provided by: Alliance for Aquatic Resource Monitoring (ALLARM)

Assistance type: Watershed-specific technical assistance

Consultations	21
Trainings/workshops	1
Individuals assisted	27
Stream miles improved	N/A

Assistance provided January 1 – March 31, 2016

ALLARM helped the Conodoguinet Creek Watershed Association learn more about their watershed by creating GIS-based maps of different features within the watershed. The group plans to use the information to educate residents and leaders in the watershed about water quality concerns.

Assistance provided April 1 – June 30, 2016

ALLARM continued working with the CCWA to create maps for the group to use as educational materials.

Assistance provided July 1 – September 30, 2016

ALLARM provided the CCWA with maps and information about water users and wastewater treatment plants in their watershed. In July, ALLARM partnered with the Conodoguinet Creek Watershed Association to speak about the watershed and the Cumberland Valley to a group of teachers looking to incorporate lessons on watersheds and water quality into their classroom.

Assistance provided October 1 – December 31, 2016

ALLARM provided the group with information on aquatic vegetation in the Conodoguinet Creek and talked with CCWA members about their watershed questions and goals for monitoring and improving the watershed. ALLARM plans to continue these conversations with the group.

Corry Stream Team

Organization information:		Assistance information:	
New group?	No	Initial contact with group	2/25/2015
Group membership	11	Scoping meeting	3/6/2015
Watershed	French Creek Watershed	DEP approval	3/10/2015
Watershed size	1,236 mi ²	Assistance began	3/10/2015
County	Erie & Warren	Assistance completed	Ongoing
In-kind match	N/A	Cost of assistance	\$258.01

Assistance provided by: Alliance for Aquatic Resource Monitoring (ALLARM)

Assistance type: Watershed-specific technical assistance

Consultations	3
Trainings/workshops	1
Individuals assisted	8
Stream miles improved	N/A

Assistance provided January 1 – March 31, 2016

No assistance provided this quarter.

Assistance provided April 1 – June 30, 2016

No assistance provided this quarter.

Assistance provided July 1 – September 30, 2016

Met with monitors to discuss group's current and future data management strategies. Cleaned historical data and uploaded it to online database, fixed discrepancies in historical data.

Assistance provided October 1 – December 31, 2016

No assistance provided this quarter.

Delaware Riverkeeper Network

Organization information:		Assistance information:	
New group?	No	Initial contact with group	10/1/2009
Group membership	N/A	Scoping meeting	N/A
Watershed	Delaware River	DEP approval	9/13/2010
Watershed size	13,000 mi ²	Assistance began	9/13/2010
County	Multiple	Assistance completed	Ongoing
In-kind match	N/A	Cost of assistance	\$86.00

Assistance provided by: Alliance for Aquatic Resource Monitoring (ALLARM)

Assistance type: Quality control

Consultations	0
Trainings/workshops	1
Individuals assisted	0
Stream miles improved	N/A

Assistance provided January 1 – March 31, 2016

No assistance was provided this quarter.

Assistance provided April 1 – June 30, 2016

No assistance was provided this quarter.

Assistance provided July 1 – September 30, 2016

One monitor participated in ALLARM's Volunteer Quality Control Program this quarter.

Assistance provided October 1 – December 31, 2016

No assistance was provided this quarter.

Diakon Center Point Program

Organization information:		Assistance information:	
New group?	No	Initial contact with group	10/1/2014
Group membership	N/A	Scoping meeting	10/1/2014
Watershed	Multiple	DEP approval	11/14/2014
Watershed size	N/A	Assistance began	10/1/2014
County	Cumberland	Assistance completed	Ongoing
In-kind match	N/A	Cost of assistance	\$1,376.04

Assistance provided by: Alliance for Aquatic Resource Monitoring (ALLARM)

Assistance type: Watershed-specific technical assistance

Consultations	16
Trainings/workshops	1
Individuals assisted	40
Stream miles improved	N/A

Assistance provided January 1 – March 31, 2016

ALLARM worked with the Diakon Center to develop an outline and plan for a spring workshop that focuses on water quality monitoring.

Assistance provided April 1 – June 30, 2016

ALLARM held a stream monitoring workshop for the Diakon Center on May 4. During the workshop, Diakon staff and students learned how to evaluate the water quality of their campus stream. They collected and identified macroinvertebrates and measured alkalinity, conductivity, pH, transparency, and water temperature. They plan to use the information learned to continue monitoring the stream.

Assistance provided July 1 – September 30, 2016

ALLARM followed up with the Diakon Center about holding a stream monitoring workshop this fall, but decided that a spring workshop would be a better option due to the lack of rain.

Assistance provided October 1 – December 31, 2016

No assistance was provided this quarter.

Fayette County Stream Team

Organization information:		Assistance information:	
New group?	Yes	Initial contact with group	2/5/2016
Group membership	3	Scoping meeting	3/24/2016
Watershed	Youghiogheny River	DEP approval	6/14/2016
Watershed size	1715 square miles	Assistance began	3/24/2016
County	Fayette	Assistance completed	Ongoing
In-kind match	N/A	Cost of assistance	\$774.02

Assistance provided by: Alliance for Aquatic Resource Monitoring (ALLARM)

Assistance type: Watershed-specific technical assistance and quality control

Consultations	9
Trainings/workshops	2
Individuals assisted	7
Stream miles improved	N/A

Assistance provided January 1 – March 31, 2016

ALLARM met with two monitors in Fayette county to discuss current monitoring efforts and future partnerships in the area. Volunteers were shown new data management/interpretation tools for use with monitoring data.

Assistance provided April 1 – June 30, 2016

ALLARM began planning a workshop in collaboration with Izaak Walton League volunteers for Fayette and Greene Counties. Workshop is slated for September.

Assistance provided July 1 – September 30, 2016

Discussed possible workshop with Izaak Walton League, and discussed shale gas protocol, methods, and the data generated by volunteers with Izaak Walton League representative.

Assistance provided October 1 – December 31, 2016

Met with continuing volunteers, in addition to one new volunteer. Volunteers were trained on database and monitoring techniques. Conducted follow-up call with new monitor, and troubleshooting meter with continuing volunteers.

Friends of Tom's Creek

Organization information:		Assistance information:	
New group?	No	Initial contact with group	9/25/2013
Group membership	20	Scoping meeting	10/10/2013
Watershed	Toms Creek	DEP approval	10/24/2013
Watershed size	23 square miles	Assistance began	10/29/2013
County	Adams	Assistance completed	Ongoing
In-kind match	N/A	Cost of assistance	\$344.01

Assistance provided by: Alliance for Aquatic Resource Monitoring (ALLARM)

Assistance type: Watershed-specific technical assistance and mentoring

Consultations	4
Trainings/workshops	0
Individuals assisted	8
Stream miles improved	N/A

Assistance provided January 1 – March 31, 2016

No assistance provided this quarter.

Assistance provided April 1 – June 30, 2016

ALLARM provided the Friends of Tom's Creek with information on macroinvertebrates, particularly how and why they are used as an indicator for measuring water quality. ALLARM also created GIS-based maps for the group to educate residents about their watershed.

Assistance provided July 1 – September 30, 2016

No assistance provided this quarter.

Assistance provided October 1 – December 31, 2016

No assistance provided this quarter.

God's Country Waterdogs

Organization information:		Assistance information:	
New group?	No	Initial contact with group	3/22/2011
Group membership	50	Scoping meeting	N/A
Watershed	Multiple	DEP approval	6/2/2011
Watershed size	N/A	Assistance began	6/3/2011
County	Potter	Assistance completed	Ongoing
In-kind match	N/A	Cost of assistance	\$516.01

Assistance provided by: Alliance for Aquatic Resource Monitoring (ALLARM)

Assistance type: Watershed-specific technical assistance, mentoring, and quality control

Consultations	6
Trainings/workshops	3
Individuals assisted	18
Stream miles improved	N/A

Assistance provided January 1 – March 31, 2016

ALLARM continued to provide the God's Country Waterdogs with assistance on data management and analysis. Monitors were interested in exploring how to monitor streams that had developed baseline data.

Assistance provided April 1 – June 30, 2016

ALLARM met with volunteers on April 22 to discuss current monitoring efforts and future options. Group has well developed baseline data and is curious about next steps. Volunteer data were cleaned, compiled and uploaded to online database.

Assistance provided July 1 – September 30, 2016

Met with monitors to discuss new database/data management techniques, reviewed monitoring protocol and discussed future data interpretation projects.

Assistance provided October 1 – December 31, 2016

Provided assistance to volunteers on using the database and data analysis tools.

Lower Dauphin High School

Organization information:		Assistance information:	
New group?	No	Initial contact with group	N/A
Group membership	7	Scoping meeting	4/2/2014
Watershed	Swatara Creek	DEP approval	4/22/2014
Watershed size	N/A	Assistance began	4/2/2014
County	Dauphin	Assistance completed	Ongoing
In-kind match	N/A	Cost of assistance	\$1,806.05

Assistance provided by: Alliance for Aquatic Resource Monitoring (ALLARM)

Assistance type: Watershed-specific technical assistance

Consultations	21
Trainings/workshops	1
Individuals assisted	12
Stream miles improved	N/A

Assistance provided January 1 – March 31, 2016

ALLARM worked with the AP Environmental Science teacher at Lower Dauphin High School to plan a data interpretation and communication workshop where students will be able to analyze and interpret the stream monitoring data they have collected in the past six months.

Assistance provided April 1 – June 30, 2016

ALLARM led a data interpretation workshop on April 14 for students collected water quality information in the Swatara Creek Watershed. Students learned how to analyze their data and look at trends in the watershed using GIS. Finally, students used GIS to create watershed maps for their final project and presentation.

Assistance provided July 1 – September 30, 2016

No assistance provided this quarter.

Assistance provided October 1 – December 31, 2016

No assistance provided this quarter.

PA Council of Trout Unlimited

Organization information:		Assistance information:	
New group?	No	Initial contact with group	2/1/2010
Group membership	12,000	Scoping meeting	5/17/2010
Watershed	Multiple	DEP approval	2/24/2010
Watershed size	N/A	Assistance began	2/24/2010
County	Multiple	Assistance completed	Ongoing
In-kind match	N/A	Cost of assistance	\$9,804.25

Assistance provided by: Alliance for Aquatic Resource Monitoring (ALLARM)

Assistance type: Quality control

Consultations	114
Trainings/workshops	4
Individuals assisted	61
Stream miles improved	N/A

Assistance provided January 1 – March 31, 2016

ALLARM provided quality control assistance to PA Trout Unlimited.

Assistance provided April 1 – June 30, 2016

ALLARM provided quality control assistance to PA Trout Unlimited.

Assistance provided July 1 – September 30, 2016

ALLARM provided quality control assistance to 23 TU monitors.

Assistance provided October 1 – December 31, 2016

ALLARM provided quality control assistance to 16 TU monitors.

Ridge and Valley Streamkeepers

Organization information:		Assistance information:	
New group?	No	Initial contact with group	9/15/2003
Group membership	30	Scoping meeting	N/A
Watershed	Sideling Hill Creek & Town Creek	DEP approval	10/7/2003
Watershed size	252 mi ²	Assistance began	10/7/2003
County	Bedford & Fulton	Assistance completed	Ongoing
In-kind match	N/A	Cost of assistance	\$2,150.05

Assistance provided by: Alliance for Aquatic Resource Monitoring (ALLARM)

Assistance type: Watershed-specific technical assistance, mentoring, and quality control

Consultations	25
Trainings/workshops	1
Individuals assisted	27
Stream miles improved	N/A

Assistance provided January 1 – March 31, 2016

ALLARM helped the Ridge and Valley Streamkeepers troubleshoot issues they were having measuring pH and researched alternative options.

Assistance provided April 1 – June 30, 2016

ALLARM continued to investigate and test methods and equipment for measuring pH for the Ridge and Valley Streamkeepers.

Assistance provided July 1 – September 30, 2016

ALLARM shared preliminary findings on volunteer-friendly pH equipment with the Ridge and Valley Streamkeepers, since they are interested in purchasing new equipment. RVS participated in ALLARM's Volunteer Quality Control Program at the end of September.

Assistance provided October 1 – December 31, 2016

ALLARM sent RVS monitors their QC results and provided equipment recommendations to the group.

Roaring Creek Valley Conservation Association

Organization information:		Assistance information:	
New group?	No	Initial contact with group	5/28/2015
Group membership	25	Scoping meeting	6/1/2015
Watershed	Roaring Creek	DEP approval	6/24/2015
Watershed size	80 mi ²	Assistance began	6/1/2015
County	Columbia	Assistance completed	Ongoing
In-kind match	N/A	Cost of assistance	\$2,150.05

Assistance provided by: Alliance for Aquatic Resource Monitoring (ALLARM)

Assistance type: Watershed-specific technical assistance and mentoring

Consultations	25
Trainings/workshops	1
Individuals assisted	6
Stream miles improved	N/A

Assistance provided January 1 – March 31, 2016

ALLARM led a second study design workshop for the group on February 20. The group identified the questions they would like to answer through monitoring, analysis methods, equipment, and protocols they would use in their program. ALLARM will continue facilitating this step with the group next quarter.

Assistance provided April 1 – June 30, 2016

ALLARM continued to work with the Roaring Creek Valley Conservation Association on developing their stream monitoring study design.

Assistance provided July 1 – September 30, 2016

ALLARM continued to work with the Roaring Creek Valley Conservation Association on developing their stream monitoring study design.

Assistance provided October 1 – December 31, 2016

No assistance provided this quarter.

Venango PA Senior Environmental Corps

Organization information:		Assistance information:	
New group?	No	Initial contact with group	9/9/2015
Group membership	15	Scoping meeting	10/22/2015
Watershed	Allegheny River	DEP approval	10/28/2015
Watershed size	11,580 mi ²	Assistance began	10/28/2015
County	Venango	Assistance completed	Ongoing
In-kind match	N/A	Cost of assistance	\$602.02

Assistance provided by: Alliance for Aquatic Resource Monitoring (ALLARM)

Assistance type: Watershed-specific technical assistance and QA/QC

Consultations	7
Trainings/workshops	2
Individuals assisted	8
Stream miles improved	N/A

Assistance provided January 1 – March 31, 2016

No assistance provided this quarter.

Assistance provided April 1 – June 30, 2016

No assistance provided this quarter.

Assistance provided July 1 – September 30, 2016

Met with two returning and one new monitor to discuss new database usage, assist with monitoring location selection, discuss quality control measures and review monitoring protocol.

Assistance provided October 1 – December 31, 2016

Conducted follow-up conversations with new monitor on general water quality questions, monitoring techniques, and site selection. Answered questions from continuing volunteers on data analysis and database tools.

Westminster College

Organization information:		Assistance information:	
New group?	No	Initial contact with group	10/12/15
Group membership	15	Scoping meeting	10/29/2015
Watershed	Shenango River	DEP approval	12/1/2015
Watershed size	1,066 mi ²	Assistance began	12/1/2015
County	Lawrence & Mercer	Assistance completed	Ongoing
In-kind match	N/A	Cost of assistance	\$86.00

Assistance provided by: Alliance for Aquatic Resource Monitoring (ALLARM)

Assistance type: Watershed-specific technical assistance and quality control

Consultations	1
Trainings/workshops	1
Individuals assisted	1
Stream miles improved	N/A

Assistance provided January 1 – March 31, 2016

No assistance provided this quarter.

Assistance provided April 1 – June 30, 2016

ALLARM met with a monitor to discuss new data management tools from ALLARM that are available to volunteers. The group and will try out the new tools.

Assistance provided July 1 – September 30, 2016

No assistance provided this quarter.

Assistance provided October 1 – December 31, 2016

No assistance provided this quarter.

Westmoreland County Stream Team

Organization information:		Assistance information:	
New group?	Yes	Initial contact with group	7/20/2015
Group membership	15	Scoping meeting	3/24/2016
Watershed	Lower Allegheny River	DEP approval	6/3/2016
Watershed size	631 square miles	Assistance began	3/24/2016
County	Westmoreland	Assistance completed	Ongoing
In-kind match	N/A	Cost of assistance	\$1,290.03

Assistance provided by: Alliance for Aquatic Resource Monitoring (ALLARM)

Assistance type: Watershed-specific technical assistance and quality control

Consultations	15
Trainings/workshops	3
Individuals assisted	40
Stream miles improved	N/A

Assistance provided January 1 – March 31, 2016

Current and new monitors met with ALLARM to discuss new development in the watershed and future trainings. A future workshop for June was schedule and is being planned. Monitors were instructed on new data management techniques available to them.

Assistance provided April 1 – June 30, 2016

ALLARM conducted a water quality monitoring workshop with 11 attendees. Participants received supplies, found potential monitoring sites and received resources on weekly monitoring techniques. ALLARM will meet with these volunteers in July to receive QA/QC samples and answer follow-up questions.

Assistance provided July 1 – September 30, 2016

Assisted new monitors with quality control questions and sample submission, setting up new sites on the database and selecting monitoring locations. Met with new monitors to answer questions about protocol and collect quality control samples. Cleaned data and uploaded to database. Provided volunteers with monitoring equipment.

Assistance provided October 1 – December 31, 2016

Provided technical assistance to monitors, answered questions about quality control and general monitoring techniques. Assisted volunteers with accessing and using the database to submit data.

Appendix B: Assistance Reports (CVC)

APPLICANT: American Association of University Women (AAUW)

Applicant (new or continuing): continuing

River Basin: Ohio

Watershed: Conemaugh River

Watershed Size: 956 sq. miles

County: Cambria

Lead C-SAW Provider: Conemaugh Valley Conservancy

Type of Assistance Provided: Watershed-Specific Technical Assistance

Date of Initial Contact with Group: 11/1/14

DEP Approval to Proceed Date: 11/9/15

Date Assistance Began: 11/9/15

Date Assistance Completed: 1/31/16

Total Cost of Assistance: \$54.48

In-kind/Match Provided by Applicant Organization: \$30.96

Overview of Assistance:

Approximate Group Membership: 65

Total Number of Consultations Provided: 2

Total Number of Trainings/Workshops Provided:

Total Number of Individuals Assisted: 142

Size of Watershed Assisted: 956 sq. mi.

Total Number of Stream Miles Improved or BMP's Installed as a Result of C-SAW Assistance:

Assistance Provided January 1, 2016 – March 31, 2016

The Stream Team met with an AAUW representative to answer questions regarding DEP Environmental Education grant reporting requirements. AAUW received this grant to help support a STEM event in November 2015.

Assistance Provided April 1, 2016 – June 30, 2016

Assistance Provided July 1, 2016 – September 30, 2016

Assistance Provided October 1, 2016 – December 31, 2016

APPLICANT: Blackleggs Creek Watershed Association

Applicant (new or continuing): continuing

River Basin: Ohio

Watershed: Blackleggs Creek

Watershed Size: 45 sq. miles

County: Indiana

Lead C-SAW Provider: Conemaugh Valley Conservancy

Type of Assistance Provided: Watershed-Specific Technical Assistance, Mentoring

Date of Initial Contact with Group: 12/5/12

DEP Approval to Proceed Date: 12/14/12

Date Assistance Began: 12/5/12

Date Assistance Completed: Ongoing

Total Cost of Assistance: \$1,202.54

In-kind/Match Provided by Applicant Organization: \$1,205.10

Overview of Assistance:

Approximate Group Membership: 150

Total Number of Consultations Provided: 32

Total Number of Trainings/Workshops Provided: 0

Total Number of Individuals Assisted: 25

Size of Watershed Assisted: 45 sq. mi.

Total Number of Stream Miles Improved or BMP's Installed as a Result of C-SAW Assistance: 8

Assistance Provided January 1, 2016 – March 31, 2016

The Conemaugh Valley Conservancy's Kiski-Conemaugh Stream Team provided advice to BCWA and its representatives. BCWA has many questions regarding permits, water quality data, equipment calibration, pollution impacts to its waterways, especially Marshall Run, on which their trout cooperative lies, grant management, and communication.

Assistance Provided April 1, 2016 – June 30, 2016

The Blackleggs Creek Watershed Association, DEP, PFBC, CVC, and others met to discuss a fish kill at the BCWA's Trout Cooperative Nursery that occurred from a treatment pond spill at Rosebud Mining Company's Knob Creek mine, which is upstream of the Nursery. Past, present, and future water quality monitoring was discussed. CVC also provided advice to BCWA regarding questions had about grant reports and projects like the expansion of the Kolb AMD treatment system and the start of the Whisky Run AMD system.

Assistance Provided July 1, 2016 – September 30, 2016

Discussed the status of Marshall Run's condition and next steps with Art, DEP, and others.

Assistance Provided October 1, 2016 – December 31, 2016

Continued to provide monitoring guidance, calibrate equipment, evaluate mining impacts on Marshall Run, and discuss organizational needs and status of trout nursery.

APPLICANT: BOTTLE WORKS

Applicant (new or continuing): new

River Basin: Ohio

Watershed: Conemaugh

Watershed Size: 1372 sq. mi.

County: Cambria and Somerset

Lead C-SAW Provider: Conemaugh Valley Conservancy

Type of Assistance Provided: Watershed-Specific Technical Assistance

Date of Initial Contact with Group: 8/29/16

DEP Approval to Proceed Date: 9/28/16

Date Assistance Began: 8/29/16

Date Assistance Completed:

Total Cost of Assistance: \$309.70

In-kind/Match Provided by Applicant Organization: \$204.30

Overview of Assistance:

Approximate Group Membership: 100

Total Number of Consultations Provided: 7

Total Number of Trainings/Workshops Provided:

Total Number of Individuals Assisted: 6

Size of Watershed Assisted: 1372 sq. mi.

Assistance Provided July 1, 2016 – September 30, 2016

Ms. Sue Konvalinka, an active volunteer in the Johnstown community, is seeking to reinvigorate Wildlife Days, a “cabin-fever” event held in late winter that serves to connect participants with conservation and environmental groups and highlight restoration and outdoor recreation in the Johnstown region. BOTTLE WORKS provides opportunities for artists and audiences to promote and celebrate the Arts through exhibits, education, and participation. BOTTLE WORKS has installed a Green Roof on its ArtWorks building and is currently developing a Green Space with green infrastructure in a parking lot adjacent their building. The new event will be known as “NatureWorks” and will invite the public to network with conservation groups, learn about ongoing restoration work, especially the recovery of the rivers and the work yet to do, acquire information on outdoor recreation events and opportunities in the region, and perhaps get involved with these groups. Hands-on, educational activities will be available for children. Michael Reimer, an artist who does fish prints (Gyotaku) with fish caught from the Stonycreek River and other places, will be featured. This event will connect nicely with the Johnstown Vision 2025 initiative that is seeking to develop projects focused on 1) a strong sense of community; 2) a vibrant and open local economy; and 3) life-sustaining landscapes. The CVC has been asked to help connect event planners with conservation groups in the region who might participate in the event, scheduled for March 4, 2017, and to prepare an activity for participants at the event.

Assistance Provided October 1, 2016 – December 31, 2016

The Conemaugh Valley Conservancy’s Kiski-Conemaugh Stream Team Director met with Ms. Konvolinka to discuss this event, potential partners, outreach and more. This meeting was followed by preliminary discussions with tentative partners.

APPLICANT: Everett Area School District (Middle/High School)

Applicant (new or continuing): continuing

River Basin: Susquehanna

Watershed: Raystown Branch of the Juniata River

Watershed Size: 756 sq. miles

County: Bedford

Lead C-SAW Provider: Conemaugh Valley Conservancy

Type of Assistance Provided: Watershed-Specific Technical Assistance, Mentoring

Date of Initial Contact with Group: 8/1/15

DEP Approval to Proceed Date: 10/29/15

Date Assistance Began: 10/30/15

Date Assistance Completed: 10/1/16

Total Cost of Assistance: \$1,224.56

In-kind/Match Provided by Applicant Organization: \$3,154.03

Overview of Assistance:

Approximate Group Membership: 1300

Total Number of Consultations Provided: 10

Total Number of Trainings/Workshops Provided: 1

Total Number of Individuals Assisted: 200

Size of Watershed Assisted: 756 sq. mi.

Total Number of Stream Miles Improved or BMP's Installed as a Result of C-SAW Assistance:

Assistance Provided January 1, 2016 – March 31, 2016

CVC's Kristina Strosnider and Chris Turner, a Biology teacher and Kristina's main point of contact with Everett Area Middle/High School, worked together to submit a grant in mid-January to the Chesapeake Bay Trust's Environmental Education Grant Program (funded through NOAA). The project was selected and Everett will receive \$4,206 toward constructing a rain garden, watershed education walk and outdoor classroom area. Kristina contacted potential native plant nurseries to discuss availability and worked with Genie, a chemistry teacher who also runs the school's small greenhouse, to help plan student involvement in installing the gardens.

Assistance Provided April 1, 2016 – June 30, 2016

CVC provided guidance and technical assistance to the Everett Area Middle/High School for their *Sustainable School Grounds Project*, which included improvements to a rain garden, development of an interactive stormwater and watershed education feature, installation of a butterfly garden, species identification and improved wetland habitat. CVC provided three student workshops, helped with a grant application, and provided construction oversight while collaborating on a maintenance plan. The workshops engaged students in learning about the Chesapeake Bay watershed, stormwater management on a local and regional scale, developing design elements for the school's project, and native plants.

Assistance Provided July 1, 2016 – September 30, 2016

CVC's Natural Biodiversity program assisted with a phase 2 planting with Everett School. It involved procuring plants, calculating soil and mulch, organizing installation and then leading/overseeing installation with Everett students and teachers while educating about planting techniques, native plants, pollinators, etc.

Assistance Provided October 1, 2016 – December 31, 2016

Activity completed last quarter.

APPLICANT: Shanksville-Stonycreek Elementary School

Applicant (new or continuing): new

River Basin: Ohio

Watershed: Stonycreek River

Watershed Size: 466 sq. miles

County: Somerset

Lead C-SAW Provider: Conemaugh Valley Conservancy

Type of Assistance Provided: Watershed-Specific Technical Assistance

Date of Initial Contact with Group: 3/8/16

DEP Approval to Proceed Date: 3/14/16

Date Assistance Began: 3/8/16

Date Assistance Completed: 6/15/16

Total Cost of Assistance: \$491.89

In-kind/Match Provided by Applicant Organization: \$684.32

Overview of Assistance:

Approximate Group Membership: 50

Total Number of Consultations Provided: 4

Total Number of Trainings/Workshops Provided: 1

Total Number of Individuals Assisted: 50

Size of Watershed Assisted: 466 sq. mi.

Total Number of Stream Miles Improved or BMP's Installed as a Result of C-SAW Assistance:

Assistance Provided January 1, 2016 – March 31, 2016

Shanksville-Stonycreek Elementary School is requesting a Fish ID program from CVC for its third grade students who will participate in an "Outdoor Day" on June 1. CVC will discuss freshwater fish species, their habitats, anatomy, and threats to water quality as students practice Gyotaku – fish printing. Students will participate in a total of four "hands-on" workshops. Then, as a group, students will spin and/or fly fish at the Central City Sportsmen's Club pond with the assistance of Mountain Laurel Trout Unlimited and others.

Assistance Provided April 1, 2016 – June 30, 2016

As stated above, CVC led a fish identification, habitat, and printing activity and assisted with guided fishing for third grade students on June 1.

Assistance Provided July 1, 2016 – September 30, 2016

Assistance Provided October 1, 2016 – December 31, 2016

APPLICANT: Southmoreland Middle School

Applicant (new or continuing): new

River Basin: Ohio

Watershed: Jacobs Creek

Watershed Size: 98 sq. miles

County: Westmoreland

Lead C-SAW Provider: Conemaugh Valley Conservancy

Type of Assistance Provided: Watershed-Specific Technical Assistance

Date of Initial Contact with Group: 1/10/16

DEP Approval to Proceed Date: 1/12/16

Date Assistance Began: 1/12/16

Date Assistance Completed: 5/31/16

Total Cost of Assistance: \$520.86

In-kind/Match Provided by Applicant Organization: \$187.20

Overview of Assistance:

Approximate Group Membership: 150

Total Number of Consultations Provided: 5

Total Number of Trainings/Workshops Provided: 1

Total Number of Individuals Assisted: 150

Size of Watershed Assisted: 98 sq. mi.

Total Number of Stream Miles Improved or BMP's Installed as a Result of C-SAW Assistance:

Assistance Provided January 1, 2016 – March 31, 2016

Southmoreland Middle School submitted a C-SAW application requesting the CVC's Kiski-Conemaugh Stream Team lead a Water Study for its 6th grade students who will participate in the school's annual Outdoor Day in May.

Assistance Provided April 1, 2016 – June 30, 2016

As stated above, the CVC led a Water Study for sixth grade students on May 26. Students learned about AMD and other sources of pollution, tested the pH of water samples collected from an abandoned mine discharge, the receiving stream – both upstream and downstream of the discharge, tap water, and the stream from which we would then collect and identify macroinvertebrates.

Assistance Provided July 1, 2016 – September 30, 2016

Assistance Provided October 1, 2016 – December 31, 2016

APPLICANT: University of Pittsburgh at Johnstown

Applicant (new or continuing): new

River Basin: Ohio

Watershed: Stonycreek

Watershed Size: 466 sq. mi.

County: Cambria and Somerset

Lead C-SAW Provider: Conemaugh Valley Conservancy

Type of Assistance Provided: Watershed-Specific Technical Assistance

Date of Initial Contact with Group: 8/2/16

DEP Approval to Proceed Date: 8/11/16

Date Assistance Began: 8/11/16

Date Assistance Completed: 11/11/16

Total Cost of Assistance: \$174.24

In-kind/Match Provided by Applicant Organization: \$631.80

Overview of Assistance:

Approximate Group Membership: 12

Total Number of Consultations Provided: 7

Total Number of Trainings/Workshops Provided: 1

Total Number of Individuals Assisted: 10

Size of Watershed Assisted: 466 sq. mi.

Total Number of Stream Miles Improved or BMP's Installed as a Result of C-SAW Assistance:

Assistance Provided January 1, 2016 – March 31, 2016

Assistance Provided April 1, 2016 – June 30, 2016

Assistance Provided July 1, 2016 – September 30, 2016

A new professor at the University of Pittsburgh at Johnstown requested that CVC's Kiski-Conemaugh Stream Team lead a tour of the Rock Tunnel, an alkaline discharge, and the Oven Run D, an acidic discharge, treatment systems for students in a Wastewater and Water Supply class at UPJ. A November outing is planned.

Assistance Provided October 1, 2016 – December 31, 2016

The tour was conducted on November 3.

Appendix C: Assistance Reports (DRN)

APPLICANT: Berks – Pennsylvania Guild of Craftsmen

Applicant (new or continuing): Existing
River Basin: Delaware
Watershed: Schuylkill River
Watershed Size: 1,912 square miles
County: Berks
Lead C-SAW Provider: Delaware Riverkeeper Network
Type of Assistance Provided: WSTA
Date of Initial Contact with Group: 1/12/2016
DEP Approval to Proceed Date: 9/26/2016
Date Assistance Began: 9/23/2016
Date Assistance Completed: 10/4/2016
Total Cost of Assistance: \$579.31

Overview of Assistance:

Approximate Group Membership:
Total Number of Consultations Provided:
Total Number of Trainings/Workshops Provided: 1 presentation
Total Number of Individuals Assisted:
Size of Watershed Assisted:
Total Number of Stream Miles Improved or BMP's installed as a Result of C-SAW Assistance:

Background on CSAW Applicant: The Reading-Berks Guild of Craftsmen, a chapter of the Pennsylvania Guild of Craftsmen, was organized in 1945 and is the largest chapter in the state organization. Membership is open to anyone wishing to join. The group's purposes are:

- To promote and protect the interests of the craftsman.
- To encourage the study and practice of handcrafts.
- To uphold the best of traditional and contemporary crafts.
- To maintain standards of excellence in design and technique.

Background of request: On the first Tuesday of each month, the Guild holds meetings that are open to the public. Programs topics range from recently juried members presenting their craft techniques, to new business practices such as taking credit cards on your smart phone, to visiting a local artist studio. These programs are designed to educate, to motivate and to spark ideas and conversations. All programs give time for questions, one on one discussion, and to more closely examine the visuals the presenter brought with them. Specifically, the Guild has requested DRN present a program on the Schuylkill River cleanup for their meeting on October 4th, 2016, at the GoggleWorks in Reading at 7 PM.

Proposed C-SAW Assistance Requested:

- Present technical information at public meeting, including causes of pollution, environmental regulation, river restoration techniques.
- Provide educational materials including list or resources to read, brochures on streamside management, native plants, and restoration.

Assistance Provided October 1, 2016 – December 31, 2016

DRN presented to the Pennsylvania Guild of Craftsmen on October 4, 2016 at the GoggleWorks in Reading at 7PM. Chari Towne presented information including causes of pollution, environmental regulation, and river restoration techniques. Streamside riparian buffer management brochures and native plant brochures were provided to participants. Thirty five members and the public attended the presentation.

APPLICANT: Bryn Gweled Homesteads

River Basin: Delaware

Watershed: Burn Creek, tributary to Mill Creek (1010 Woods Road, Southampton PA

County: Bucks

Lead C-SAW Provider: Delaware Riverkeeper Network

Type of Assistance Provided: Mentoring

Date of Initial Contact with Group: 3/2015

DEP Approval to Proceed Date: 7/20/2015

Date Assistance Began: 4/7/2015

Date Assistance Completed: Ongoing

Total Cost of Assistance: \$ 1,131

Overview of Assistance:

Approximate Group Membership: 240

Total Number of Consultations Provided: 6

Total Number of Trainings/Workshops Provided: 1

Total Number of Individuals Assisted: 50

Assistance Provided Jan 1 to Mar 31, 2016

DRN attended environmental committee meetings during this quarter to review restoration measures and exotic invasive plant control options and share technical options with the homeowners association. Based on these meetings, DRN assisted with restoration sketches, development of details and plans for restoration projects that the community would like to pursue. DRN also provided some background on water quality questions.

APPLICANT: Bucks CCAP

River Basin: Delaware

Watershed: Multiple

County: Bucks

Lead C-SAW Provider: Delaware Riverkeeper Network

Type of Assistance Provided: WSTA

Date of Initial Contact with Group: 2/2015

DEP Approval to Proceed Date: 11/15/2015

Date Assistance Began: 11/15/2015

Date Assistance Completed: Ongoing

Total Cost of Assistance: \$ 853.76

Overview of Assistance:

Approximate Group Membership: 120

Total Number of Consultations Provided: 6

Total Number of Trainings/Workshops Provided: 0

Total Number of Individuals Assisted: 120

Assistance Provided Jan 1 – Mar 30, 2016

DRN provided various technical reports and statistics for the group to consider for the ecotourism brochure. The brochure was laid out and finalized this quarter. CCAP distributed brochures to over 20 local businesses in the Delaware River watershed, focusing on tackle shops, outdoor stores, cafes, and hunting stores as well as local parks. Brochures were produced through another grant CCAP had and 5,000 brochures were produced. Requests are being made by local community groups for handouts and CCAP distributed brochures at 4 different fairs and community outings so far to highlight the benefits of a clean and healthy watershed to tourism. CCAP has also requested a speaker at an upcoming sustainability fair planned with the Earth Guardians group next quarter.

Assistance April 1 – June 30, 2016

DRN provided various technical reports and statistics for the group to consider for the ecotourism brochure. The brochure was laid out and finalized this quarter. CCAP distributed brochures to over 20 local businesses in the Delaware River watershed, focusing on tackle shops, outdoor stores, cafes, and hunting stores as well as local parks. Brochures were produced through another grant CCAP had and 5,000 brochures were produced. Requests are being made by local community groups for handouts and CCAP distributed brochures at 4 different fairs and community outings so far to highlight the benefits of a clean and healthy watershed to tourism. CCAP has also requested a speaker at an upcoming sustainability fair planned with the Earth Guardians group next quarter.

APPLICANT: Friends of the John Heinz Refuge & Eastwick Neighbors Group

River Basin: Delaware

Watershed: Darby Creek

Watershed Size: 77 square miles

County: Delaware

Lead C-SAW Provider: Delaware Riverkeeper Network

Type of Assistance Provided: WSTA

Date of Initial Contact with Group: 5/10/2012

DEP Approval to Proceed Date: 5/23/2012

Date Assistance Began: 6/1/2012

Date Assistance Completed: Ongoing

Total Cost of Assistance: \$ 878.70

Overview of Assistance:

Approximate Group Membership: 400 residents and volunteers

Total Number of Consultations Provided: 12

Total Number of Trainings/Workshops Provided: 4

Total Number of Individuals Assisted: 300

Total Number of Stream Miles Improved or BMP's installed as a Result of C-SAW Assistance:

Assistance Provided Jan 1 to Mar 31, 2016

After the community victory last quarter to preserve threatened sensitive lands that EFNC has been focusing on the past two years. C-SAW continued assistance with the Friends of the Heinz Refuge and Eastwick Neighbors Committee with:

- Clearview landfill meetings and a technical review of DRBC floodplain study, research and development update, post remediation questions and presentations.
- Meeting house presentation and prep assistance for event

APPLICANT: The Lackawaxen River Conservancy

Watershed: Lackawaxen River

River Basin: Delaware River Watershed

County: Wayne, Pike, Lackawanna

Lead C-SAW Provider: DRN

DEP Approval to Proceed Date: 12/17/09

Date Assistance Began: 12/1/09

Type of Assistance Provided: Watershed-Specific Technical Assistance

Date Assistance Completed:

Approximate Group Membership: 120

Size of Watershed Assisted: 598 sq. miles

Total Cost of Assistance: \$ 116

Overview of Assistance:

Approximate Group Membership: 200

Total Number of Consultations Provided: 5

Total Number of Trainings/Workshops Provided: 1

Total Number of Individuals Assisted: 60

Size of Watershed Assisted: 598 sq miles

Total Number of Stream Miles Improved or BMP's Installed as a Result of C-SAW Assistance: NA

Background on CSAW Applicant: The Hay Creek Valley Historical Society (HCVHS) works to support and demonstrate, to foster interest in and appreciation for our local heritage, and to provide a living experience of Berks County's rich agricultural and technological past.

Background of Assistance: Every other month, HCVHS holds meetings for its members that are open to the public. HCVHS has requested a presentation from Chari Towne for members and to attract additional interest in the work HCVHA does.

Proposed C-SAW Assistance Requested:

- Present technical information at public meeting, including causes of pollution, environmental regulation, river restoration techniques.
- Provide educational materials including list or resources to read, brochures on streamside management, native plants, and restoration.

Assistance Provided Jan 1 to Mar 31, 2016

DRN assisted with follow up from the community meeting held by local community groups including TLRC on the proposed Orion Pipeline project. This new pipeline project would expand on the ROW that was built and expanded on along TGP's past 300 line just a few years earlier (much of this work is match). From this meeting, several other community groups and homeowners associations have reached out for technical assistance related to pipeline environmental impacts.

Assistance Provided Oct 1 to Dec 31, 2016

DRN presented a program on the Schuylkill River cleanup on November 20, 2016 at Joanna Furnace at 7pm. Chari Towne presented information including causes of pollution, environmental regulation, and river restoration techniques. Streamside riparian buffer management brochures and native plant brochures were provided to participants. Twenty members and the public attended the presentation.

APPLICANT: Lebanon and Schuylkill Pipeline Awareness

River Basin: Delaware

Watershed: Schuylkill River Basin

County: Schuylkill and Lebanon Counties

Lead C-SAW Provider: Delaware Riverkeeper Network

Type of Assistance Provided: Mentoring

Date of Initial Contact with Group: 10/20/14

DEP Approval to Proceed Date: 10/27/14

Date Assistance Began: 10/20/14

Date Assistance Completed: Ongoing

Total Cost of Assistance: \$ 522

Overview of Assistance:

Approximate Group Membership: 160

Total Number of Consultations Provided: 9

Total Number of Trainings/Workshops Provided: 1

Total Number of Individuals Assisted: 15

Assistance Provided Jan 1 to Mar 31, 2016

DRN assisted concerned landowners of SPA with information regarding reviewing aquatic resource reports by the pipeline company, obtaining information about the project on the FERC website and technical options to help map natural features along the proposed pipeline route. DRN also provided guidance regarding surveying options for volunteer monitors for the pipeline path.

APPLICANT: The Marcellus Biodiversity Project

Watershed: Loyalsock

River Basin: Susquehanna

County: Wayne, Pike

Lead C-SAW Provider: DRN

DEP Approval to Proceed Date: 12/17/09

Date Assistance Began: 12/1/09

Type of Assistance Provided: Watershed-Specific Technical Assistance

Date Assistance Completed:

Approximate Group Membership: 120

Size of Watershed Assisted: 598 sq. miles

Total Cost of Assistance: \$2,304

Overview of Assistance:

Approximate Group Membership: 200

Total Number of Consultations Provided: 12

Total Number of Trainings/Workshops Provided: 2

Total Number of Individuals Assisted: 120

Size of Watershed Assisted: 598 sq miles

Total Number of Stream Miles Improved or BMP's Installed as a Result of C-SAW Assistance: NA

Assistance Provided Oct 1 to Dec 31, 2016

DRN assisted with data analysis and presentations for the watershed groups. DRN continued assistance with development of a water chemistry report and analysis for 60 stream stations in the Upper Delaware Basin. DRN held 2 workshops and webinars during this quarter and coordinated QAQC monitoring through Ryder and ALLARM. DRN provided maps of the Orion Pipeline Project to Lackawaxen River Conservancy monitors.

APPLICANT: Morrisville Borough and Morrisville EAC

Applicant (new or continuing): New

River Basin: Delaware River Watershed

Watershed: Delaware River Main Stem

Watershed Size: 13,000 sq miles

County: Bucks

Lead C-SAW Provider: DRN

Type of Assistance Provided: WSTA

Date of Initial Contact with Group:

Date of Scoping Meeting: 2/15/2011

DEP Approval to Proceed Date: 3/1/2011

Date Assistance Began: 3/1/2011

Date Assistance Completed: ongoing

Total Cost of Assistance: \$ 580

Overview of Assistance:

Approximate Group Membership: 10,023

Total Number of Consultations Provided: 2

Total Number of Trainings/Workshops Provided: 0

Total Number of Individuals Assisted: 8

Size of Watershed Assisted: multiple

Total Number of Stream Miles Improved or BMP's Installed as a Result of C-SAW Assistance: 1 acre

Assistance Provided Jan 1 to Mar 31, 2016

Coordination with Morrisville EAC in October related to tree shelter clearing and maintenance and invasive species monitoring. The group is now doing their own maintenance days to maintain the restoration project. DRN provided research on native seed mixes that may compete with the invasive plants present on the site.

APPLICANT: Perkiomen Valley Trout Unlimited

River Basin: Delaware

Watershed: Schuylkill

County: Berks

Lead C-SAW Provider: Delaware Riverkeeper Network

Type of Assistance Provided: WSTA

Date of Initial Contact with Group: 2013

DEP Approval to Proceed Date: 9/2/15

Date Assistance Began: 9/1/15

Date Assistance Completed: Ongoing

Total Cost of Assistance: \$116

Overview of Assistance:

Approximate Group Membership: 500

Total Number of Consultations Provided: 1

Total Number of Trainings/Workshops Provided: 0

Total Number of Individuals Assisted: 30

Assistance Provided Jan 1 to Mar 31, 2016

DRN assisted the group with follow up work related to the Hosensack Creek stream upgrade petition and fish study.

**APPLICANT: Schuylkill Navy River Restoration & Stewards Committees;
University Barge Club**

Applicant (new or continuing): New

River Basin: Delaware

Watershed: Schuylkill River

Watershed Size: 1,912 square miles

County: Philadelphia

Lead C-SAW Provider: Delaware Riverkeeper Network

Type of Assistance Provided: Watershed Specific Technical Assistance

Date of Initial Contact with Group: 12/6/2016

DEP Approval to Proceed Date: 1/10/2017

Date Assistance Began: 12/6/2106

Date Assistance Completed:

Total Cost of Assistance: \$207.10

Overview of Assistance:

Approximate Group Membership:

Total Number of Consultations Provided: 7 emails, 1 phone call

Total Number of Trainings/Workshops Provided:

Total Number of Individuals Assisted: 2

Size of Watershed Assisted:

Total Number of Stream Miles Improved or BMP's installed as a Result of C-SAW Assistance:

Assistance Provided October 1, 2016 – December 31, 2016

Provided some background to the group and available technical assistance this quarter and submitted a request to CSAW for the new year.

APPLICANT: Silver Lake Nature Center/Heritage Conservancy

River Basin: Delaware

Watershed: Otter

Watershed Size:

County: Bucks

Lead C-SAW Provider: Delaware Riverkeeper Network

Type of Assistance Provided: WSTA

Date of Initial Contact with Group: 3/15/2011

DEP Approval to Proceed Date: 3/30/2011

Date Assistance Began: 3/15/2011

Date Assistance Completed: Ongoing

Total Cost of Assistance: \$ 58

Overview of Assistance:

Approximate Group Membership: Approx. 300

Total Number of Consultations Provided: 1

Total Number of Trainings/Workshops Provided: 0

Total Number of Individuals Assisted: 5

Size of Watershed Assisted:

Total Number of Stream Miles Improved or BMP's installed as a Result of C-SAW Assistance:

Assistance Provided Jan 1 to Mar 31, 2016

DRN assisted with pollution reporting related to a residual fuel spill that has been documented over time by one of the Silver Lake nature center volunteer monitors.

APPLICANT: The Tinicum Conservancy/Swamp Creek

River Basin: Delaware River Basin

Watershed: Swamp Creek - Roaring Rocks Watershed (State Water Plan 2D)

County: Bucks

Lead C-SAW Provider: Delaware Riverkeeper Network

Type of Assistance Provided: WSTA

DEP Approval to Proceed Date: 3/28/13

Date Assistance Began: 3/15/13

Date Assistance Completed: ongoing

Total Cost of Assistance: \$ 565.26

Overview of Assistance:

Approximate Group Membership: 2,300

Total Number of Consultations Provided: 3

Total Number of Trainings/Workshops Provided: 1

Total Number of Individuals Assisted: 5

Assistance Provided Jan 1 to Mar 31, 2016

Restoration planning was continued. Work was also conducted related to maintenance to care for planted trees specifically as it relates to vole damage. DRN also conducted a site visit with volunteers on March 17, 2016.

APPLICANT: Villanova University

River Basin: Delaware

Watershed: Multiple

County: Montgomery

Lead C-SAW Provider: Delaware Riverkeeper Network

Type of Assistance Provided: WSTA

Date of Initial Contact with Group: 1/10/2016

DEP Approval to Proceed Date: 1/19/2016

Date Assistance Began: 1/19/16

Date Assistance Completed: Ongoing

Total Cost of Assistance: \$ 58

Overview of Assistance:

Approximate Group Membership:

Total Number of Consultations Provided: 1

Total Number of Trainings/Workshops Provided: 0

Total Number of Individuals Assisted: 1

Background on CSAW Applicant: Founded in 1842 by the Order of St. Augustine, Villanova's Augustinian Catholic tradition is the cornerstone of an academic community where students learn to think critically, act compassionately, and succeed while serving others. Villanova prepares students to become ethical leaders who create positive change everywhere life takes them.

Background of project: The instructor for a course in Watershed Science and Sustainability at Villanova University has requested CSAW technical assistance to increase understanding among his students of the environmental history of the Schuylkill River watershed. Specifically, Steven Goldsmith has requested DRN present a program on the Schuylkill River cleanup for 18 – 20 students on April 4th, 2016.

Proposed C-SAW Assistance Requested:

- Present technical information at public meeting, including causes of pollution, environmental regulation, river restoration techniques.
- Provide educational materials including list or resources to read, brochures on streamside management, native plants, and restoration.

Assistance Provided Jan 1 – Mar 30, 2016

Coordination and planning with the professor this quarter.

Assistance Provided April 1, 2016 – June 30, 2016

DRN conducted a presentation this quarter on the history of the environmental clean up of the Schuylkill River. Twenty participants attended this session.

APPLICANT: West Wayne Preserve and Boy Scout Troop 284

River Basin: Delaware

Watershed: Schuylkill River Basin

County: Multiple (Delaware, Chester, Montg, Phila)

Lead C-SAW Provider: Delaware Riverkeeper Network

Type of Assistance Provided: WSTA

Date of Initial Contact with Group: 9/20/13

DEP Approval to Proceed Date: 3/1/14

Date Assistance Began: 3/11/14

Date Assistance Completed: Ongoing

Total Cost of Assistance: \$858.85

Overview of Assistance:

Approximate Group Membership: 30

Total Number of Consultations Provided: 5

Total Number of Trainings/Workshops Provided: 1

Total Number of Individuals Assisted: 40

Assistance Provided Assistance Provided Jan 1 to Mar 31, 2016

DRN assisted boyscout troop 284 and eagle scouts with Darby Creek watershed restoration projects. During this quarter – project planning and coordination with the scouts, site erosion repair and seeding, review and correspondence with scout leaders, and invasive species ID and treatment research was conducted.

Appendix D: Assistance Reports (PALMS)

APPLICANT: Clayton Park Recreational Area

Status: Continuing

Watershed: Lake Henry

Watershed size: 0.5 mi²

County: Wayne

Lead C-SAW Provider: PALMS

Assistance Type: WSTA

Initial contact with group: 3/2010

Scoping meeting: N/A

DEP approval: N/A

Assistance began: N/A

Assistance completed: 12/31/2015

Cost of assistance: N/A

Overview of Assistance:

Approximate group membership: 400

Consultations: 4

Trainings/workshops: 2

Individuals assisted: 4

Stream miles improved: N/A

Assistance provided January 1 – December 31 2015

Due to no additional communication from this group since April 2014, this request for assistance is completed/closed.

APPLICANT: Hanover Township (Lehigh County)

Status: Continuing

Watershed: Lehigh River

Watershed size: 4 acre lake

County: Lehigh

Lead C-SAW Provider: PALMS

Assistance Type:

Initial contact with group: 8/2013

Scoping meeting: N/A

DEP approval: 4/7/2014

Assistance began: 4/9/2015

Assistance completed: ongoing

Cost of assistance: N/A

Overview of Assistance:

Approximate group membership: municipality

Consultations:

Trainings/workshops:

Individuals assisted:

Stream miles improved: N/A

Assistance provided January 1 – December 31, 2015

Due to aquatic invasive treatment work and sinkhole problems, there was a delay to work with the group on water quality monitoring assistance.

Remaining assistance to be provided in 2016 includes: Assisting with development and training for a water quality monitoring program. Assisting with development and implementation of an invasive plant management program, including plant identification and mapping training. Assisting with lake and watershed management education materials for the Township to use in public education efforts, including brochures, newsletter articles, and signage for posting at the lake.

APPLICANT: Tobyhanna Creek/Tunkhannock Creek Watershed Association.

Status: Continuing

Watershed: Tobyhanna Creek

Watershed size: 129 mi²

County: Carbon, Monroe, Wayne

Lead C-SAW Provider: PALMS

Assistance Type: WSTA

Initial contact with group: 2/15/2011

Scoping meeting: N/A

DEP approval: 3/4/2011

Assistance began: 3/26/2011

Assistance completed: ongoing

Cost of assistance: N/A

Overview of Assistance:

Approximate group membership: 300

Consultations:

Trainings/workshops:

Individuals assisted:

Stream miles improved: N/A

Assistance provided January 1 – December 31, 2015

No billable assistance was provided in 2015. Plan is to provide a final report with management recommendations to the watershed group.

Appendix E: Assistance Reports (SWRC)

APPLICANT: Bureau of State Parks, Water Education Refresher/Stream School

Applicant (new or continuing): New

River Basin: statewide

Watershed:

Watershed Size (acreage or sq. miles):

County (multiple): statewide

Lead C-SAW Provider: Stroud Water Research Center

Type of Assistance Provided: Training/Monitoring advice for staff naturalists, chemical training

Date of Initial Contact with Organization: Fall 2015

DEP Approval to Proceed Date:

Date Assistance Began:

Date Assistance Completed: \$1803 staff time (4 SWRC staff teaching); 3 hrs Arscott, 3 hrs Hicks, \$200 for possibly Bill Anderson (10 hrs-incl. development time and teaching time), 2-days for Tara (prep, working with other instructors and day of workshop).

Total Cost of Assistance: \$1803

In-kind/Match Provided by Applicant Organization: yes -

Overview of Assistance:

Approximate Group Membership:

Total Number of Consultations Provided: 3 emails so far; 1 planning phone call (February 2016)

Total Number of Trainings/Workshops Provided:

Total Number of Individuals Assisted:

Size of Watershed Assisted:

Total Number of Stream Miles Improved or BMP's Installed as a result of C-SAW Assistance:

Project Summary

The Bureau of State Park's 'Watershed Education' Program,' in the Outdoor Programming Services Division seeks advanced training for their program staff who are trained in WE, for what is called their 'Outdoor Learning Series'. This includes further training in water quality monitoring methods, with also instruction on advancing their knowledge in the content area of stream ecology. The WE staff are leading stream studies and training the public, and are Environmental Education Specialists (EES).

Stroud's role will be to offer assistance in the form of training and knowledge on certain advanced topics in stream ecology and water quality monitoring. This would be ongoing assistance.

Included will be 2 days of Tara Muenz's time (coordination and assistance to presenters and attendees, preparation, workshop time as host), and 4 hrs of Dave Arscott's time (presentation development and presentation time), 4 hrs of Steve Hick's time (prep and presentation time) and 10 hrs of part-time educator, Bill Anderson (prep and presentation time).

Request: Instruction on advanced stream chemistry topics (nutrient cycling, how to monitor certain chemistries, review the chemistry testing and monitoring methods).

Assistance Provided-April 6, 2016 -advanced chemistry training

APPLICANT: Delaware Riverkeeper Network

Applicant (new or continuing): Continuing

River Basin: Delaware

Watershed: Schuylkill

Watershed Size (acreage or sq. miles):

County (multiple): Montgomery County

Lead C-SAW Provider: Stroud Water Research Center

Type of Assistance Provided: Workshop

Date of Initial Contact with Organization: December 10th, 2013

DEP Approval to Proceed Date: December 12th, 2013

Date Assistance Began: March 14th, 2015

Date Assistance Completed: ongoing

Total Cost of Assistance: <\$1500

In-kind/Match Provided by Applicant Organization:

Overview of Assistance:

Approximate Group Membership: 50

Total Number of Consultations Provided: one

Total Number of Trainings/Workshops Provided: one

Total Number of Individuals Assisted: +50

Size of Watershed Assisted:

Total Number of Stream Miles Improved or BMP's installed as a result of C-SAW Assistance: 0

Assistance Provided January 1 – March 31, 2016

Provided two separate one and a half hour seminar provided by Anthony K. Aufdenkampe, Steven Hicks, Dave B. Arscott, Sara Damiano, David Montgomery, Melinda Daniels, Tara Muenz at the Watershed Congress along the Schuylkill on March 12th, 2016. The titles and abstracts were as follows:

Do-It-Yourself, real-time, low cost environmental monitoring solutions and forum – EnviroDIY.org

Empowering people to monitor their environments and share their observations with the world can transform the way we protect environmental resources.

Steven Hicks, Anthony K. Aufdenkampe, and David B. Arscott
Stroud Water Research Center

Scientists and educators around the world have been building their own dataloggers and devices using a variety of open source electronics platforms like Arduino®. Here we introduce our approach to building custom datalogger boards that can form the core of your DIY freshwater or terrestrial monitoring system. This workshop will lead participants through the process of building a monitoring station that includes a solar-powered datalogger connected to radio telemetry that is flexible to connect to a wide variety of sensors. Examples of commercially available sensors for measuring water depth, temperature, specific conductivity, turbidity, dissolved oxygen, precipitation, soil moisture, and soil redox conditions will be shown/discussed. Various deployment options/strategies for stream-side installations will be presented. Participants will be introduced to an option for web-based data capture and live data streaming that can display graphs on custom web pages. Additionally, participants will be introduced to our EnviroDIY online community (<http://enviroDIY.org>) where members can share new ideas about open-source hardware and software solutions for observing our environment. EnviroDIY members can showcase their gadgets or describe their projects, ask questions, or follow along with helpful tutorials.

Steve Hicks has been developing, building and deploying environmental sensing devices since he received his B.S. in electrical engineering in 2000. Since Steve joined the Stroud Water Research Center in 2010, his focus

has been on developing environmental monitoring solutions using the open-source Arduino electronics platform. He is a co-founder and primary contributor of EnviroDIY.org.

Dr. Anthony Aufdenkampe is an Associate Research Scientist at the Stroud Water Research Center, in SE Pennsylvania. Aufdenkampe leads a research team understanding the feedbacks among water, mineral and carbon cycling processes on the structure and function of watersheds, including net carbon balance. Aufdenkampe has combined his interests in multidisciplinary synthesis, data integration and sustainability as the lead for a number of cyber-infrastructure projects that bring together research scientists, watershed protection professionals and citizen-scientists. These include the National Critical Zone Observatory (CZO) Data Integration project, WikiWatershed and it's Model My Watershed web application and the new EnviroDIY.org, an online community for Do-It-Yourself environmental science and monitoring.

Dr. David Arscott is the Assistant Director of the Stroud Water Research Center. His past research has focused on aquatic primary production, distribution and diversity of aquatic macroinvertebrates, ecohydrology, and the ecology of rivers and flood plains. Broad interests include riverine landscape ecology and dynamics, aquatic invertebrate, fish and algal ecology, aquatic food web structure and dynamics, habitat conservation, and land-water interactions. Arscott is presently focusing efforts on numerous citizen-science projects, including WikiWatershed and EnviroDIY.org.

Model My Watershed v2: An online professional toolkit for restoration in the Delaware River Basin

A hands-on tutorial for using the MMW2 web app for geospatial analysis and hydrological modeling of your watershed.

Anthony K. Aufdenkampe, Melinda Daniels, Tara Muenz
Stroud Water Research Center

The Model My Watershed version 2 (MMW2) web application has been developed to enable the public and watershed protection professionals alike the means to easily visualize maps of data and model outputs that are relevant to understanding effects of current and possible future land uses and watershed restorations on storm water runoff and stream water quality. MMW2 will offer a professionalgrade toolkit conservation practitioners, municipal decisionmakers and the public to be able to evaluate the impacts of current land use on water quantity and quality, target restoration efforts to the most critical locations, and predict how proposed restoration projects and other changes to land cover will affect or improve conditions in the Delaware River Basin. For this workshop, participants will be given a hands-on tutorial on how to use the MMW2 application. Participants are strongly urged to bring a laptop or tablet to explore the geospatial analysis functions and modeling capabilities of the MMW web app. Development of MMW2 has been funded by the William Penn Foundation.

Dr. Anthony Aufdenkampe is an Associate Research Scientist at the Stroud Water Research Center. Aufdenkampe leads a research team understanding the feedbacks among water, mineral and carbon cycling processes on the structure and function of watersheds, including net carbon balance. Aufdenkampe has combined his interests in multidisciplinary synthesis, data integration and sustainability as the lead for a number of cyber-infrastructure projects that bring together research scientists, watershed protection professionals and citizen-scientists. These include the National Critical Zone Observatory (CZO) Data Integration project, WikiWatershed and it's Model My Watershed web application and the new EnviroDIY.org, an online community for Do-It-Yourself environmental science and monitoring.

APPLICANT: Elk County Conservation District

Applicant (new or continuing): New

River Basin: Ohio

Watershed:

Watershed Size (acreage or sq. miles):

County (multiple): Elk, Potter, Cameron, McKean, and Warren

Lead C-SAW Provider: Stroud Water Research Center

Type of Assistance Provided: Training/presentation at workshop

Date of Initial Contact with Organization: January 2016

DEP Approval to Proceed Date:

Date Assistance Began:

Date Assistance Completed:

Total Cost of Assistance: \$1865 staff time, \$242 mileage, 1 night lodging (\$120), 1.5 days food @ \$86 (std federal rate) TOTAL: \$2310

In-kind/Match Provided by Applicant Organization: yes -

Overview of Assistance:

Approximate Group Membership:

Total Number of Consultations Provided: 3 emails so far; 1 planning phone call (to come)

Total Number of Trainings/Workshops Provided: 1

Total Number of Individuals Assisted:

Size of Watershed Assisted:

Total Number of Stream Miles Improved or BMP's Installed as a result of C-SAW Assistance:

Project Summary

The Elk County Conservation District is partnering with neighboring conservation districts (Potter, Cameron, McKean, and Warren) to put on this stream workshop. They would like to educate landowners, community members, and officials, about streams and important stream functions. Topics such as riparian buffers, stream biology, storm water management, stream restoration, hydrology are what they propose.

Recent floods in the region have caused an increase in phone calls to these districts about how to fix issues caused by streams. It is evident that many do not understand just how streams work. This workshop would benefit all that attend.

Stroud's role will be to present on stream restoration and the benefits of streamside forest buffers.

Included will be 1 day total of staff time for 1 Stroud staff, which will include 1 day of workshop and 1 day of travel, plus one night of hotel and 1.5 days of food and mileage.

Request: Instruction on streamside forest ecology and management.

APPLICANT: Land Conservancy for Southern Chester County – PA Master Naturalist Program

Applicant (new or continuing): Continuing
River Basin: Christina River Basin
Watershed: Delaware River Watershed
Watershed Size (acreage or sq. miles):
County (multiple): Chester
Lead C-SAW Provider: Stroud Water Research Center
Type of Assistance Provided: Workshop
Date of Initial Contact with Organization: August, 2013
DEP Approval to Proceed Date: 23 August, 2013
Date Assistance Began: September 2013
Date Assistance Completed: on going
Total Cost of Assistance: ~\$500 per program
In-kind/Match Provided by Applicant Organization: yes = \$927.54

Overview of Assistance:

Approximate Group Membership: 9
Total Number of Consultations Provided:
Total Number of Trainings/Workshops Provided: 2
Total Number of Individuals Assisted: 9
Size of Watershed Assisted:
Total Number of Stream Miles Improved or BMP's Installed
as a result of C-SAW Assistance:

Assistance Provided July 1 – September 30, 2016

In August (30th), Dr. Arscott provided workshop trainings to a PA Master Naturalists program held at The Land Conservancy for Southern Chester County and facilitated by The Land Conservancy for Southern Chester County. Topics included introduction to watershed hydrology, chemistry and aquatic biology, wetland ecology and restoration, stream ecology and biomonitoring. 4 hours was spent with the group and 2 hours were used to prepare the seminar/workshop.

In September (27th), Dr. Jackson provided a workshop on aquatic macroinvertebrate ecology, life history, and an introduction to identification to the PA Master Naturalists program held at TLCSCC.

APPLICANT: PA DCNR - Riparian Buffer Summit

Applicant (new or continuing): New

River Basin: statewide

Watershed:

Watershed Size (acreage or sq. miles):

County (multiple): statewide

Lead C-SAW Provider: Stroud Water Research Center

Type of Assistance Provided: Training/Monitoring

Date of Initial Contact with Organization: August 2016

DEP Approval to Proceed Date: 8/10/16

Date Assistance Began: 8/10/2016

Date Assistance Completed: 8/11/2016

Total Cost of Assistance: ~\$3,200

In-kind/Match Provided by Applicant Organization:

Overview of Assistance:

Approximate Group Membership: 120

Total Number of Consultations Provided:

Total Number of Trainings/Workshops Provided: 2 days

Total Number of Individuals Assisted: 80

Size of Watershed Assisted:

Total Number of Stream Miles Improved or BMP's installed as a result of C-SAW Assistance:

Project Summary:

Two day Riparian Buffer Summit hosted by PA DCNR at State College, PA:

Purpose was to provide information on the science of riparian forest buffers, share success stories and hear from partner organizations, and discuss how DCNR best engages in riparian forest buffer work. This 2-day buffer summit was organized for DCNR staff including Service Foresters who work at the county level and provide education, outreach, and technical assistance on a number of forestry topics. Participants not only included Service Foresters, but also field managers, staff from State Parks, the Bureau of Recreation and Conservation, and members of the DCNR Exec Staff. Approximately 80 people attended.

Stroud's role was to offer assistance in the form of technical presentations, exchanging knowledge, and in providing advice on how to best engage in this work. (two buffer specific presentations delivered by Dr. Sweeney and M. Ehrhart from the Stroud Center)

1. Sweeney presented "RFBs 101" to help set the stage—Why Buffers are important? How do they function? An overview of the latest science and other advice
2. Mr. Ehrhart presented an overview of Stroud Center's Farm Stewardship Program and lessons learned and advice

Assistance Provided- 8/10-/11/2016—approved for C-SAW monies 8/11/2016--**\$3,442**

APPLICANT: Pittsburgh Parks Macroinvertebrate Training

Applicant (new or continuing): New

River Basin: Ohio

Watershed:

Watershed Size (acreage or sq. miles):

County (multiple):

Lead C-SAW Provider: Stroud Water Research Center

Type of Assistance Provided: Training/Monitoring advice

Date of Initial Contact with Organization: August 2016

DEP Approval to Proceed Date: 9/16/2016

Date Assistance Began:

Date Assistance Completed:

Total Cost of Assistance: ~\$4,100

In-kind/Match Provided by Applicant Organization:

Overview of Assistance:

Approximate Group Membership:

Total Number of Consultations Provided:

Total Number of Trainings/Workshops Provided:

Total Number of Individuals Assisted:

Size of Watershed Assisted:

Total Number of Stream Miles Improved or BMP's installed as a result of C-SAW Assistance:

Project Summary

Purpose: to provide training in macroinvertebrate monitoring protocols for park staff and naturalists as well as other watershed groups in the area. Pittsburgh Parks will be the hosting site and they would like to offer training on biological monitoring and assessment techniques, as well as assistance on macroinvertebrate identification and biotic metric calculations. Participants not only included staff from Pittsburgh parks, but also other major watershed groups in the region including Western PA Conservancy, Nine Mile Run Watershed Association, Creek Connections, Allegheny Land Trust, Phipps Conservancy, Saw Mill Run and more . 24 people attended.

Stroud Center's staff roles were to provide presentations, technical assistance, training demonstration and evaluation, and macroinvertebrate identification assistance.

2 Stroud Center staff members provided the training: Tara Muenz and Dr. Steve Kerlin.

Assistance Provided- 15 and 16 November 2016

APPLICANT: Sustainable Business Network of Philadelphia – Green Stormwater Initiative

Applicant (new or continuing): New

River Basin: Schuylkill and Delaware

Watershed: Delaware

Watershed Size (acreage or sq. miles):

County (multiple): Delaware

Lead C-SAW Provider: Stroud Water Research Center

Type of Assistance Provided: Workshop

Date of Initial Contact with Organization: May, 2016

DEP Approval to Proceed Date: 17 May, 2016

Date Assistance Began: 19 May, 2016

Date Assistance Completed: Ongoing

Total Cost of Assistance: ~\$1,500

In-kind/Match Provided by Applicant Organization: yes, attached

Overview of Assistance:

Approximate Group Membership: +100

Total Number of Consultations Provided: 3 emails, multiple phone calls, two workshops so far

Total Number of Trainings/Workshops Provided: 19 May, 2016 and 25 June, 2016

Total Number of Individuals Assisted: 32 at first meeting; 11 at second

Size of Watershed Assisted:

Total Number of Stream Miles Improved or BMP's installed as a result of C-SAW Assistance:

Project Summary

Group: Sustainable Business Network of Philadelphia's Green Stormwater Initiative Partners
(<http://sbnphiladelphia.org/> and (http://www.sbnphiladelphia.org/initiatives/GSI_Partners/)

Request for workshop on green building solutions for managing stormwater, wastewater, and rainwater capture systems. A group of 20-40 will visit Stroud Water Research Center in May or June (date to be determined) for a workshop on physical infrastructure for stormwater management. D. Arscott will provide a hands-on workshop to introduce the building and operation and maintenance of rain gardens, infiltration trenches, level lip spreaders, riparian forest buffers, green roofs, rain barrel, pervious paving, composting and water-less toilets, etc...

The workshop will be preceded by a two hour lecture/discussion in Philadelphia prior to the field trip to Stroud

Estimate: \$1500 - staff time, travel, parking

APPLICANT: Temple University School of Landscape Architecture, Stream Monitoring Training

Applicant (new or continuing): New

River Basin: Delaware

Watershed: Crum Watershed, Crum Creek and Martin's Run

Watershed Size (acreage or sq. miles):

County (multiple): Delaware

Lead C-SAW Provider: Stroud Water Research Center

Type of Assistance Provided: Training/Monitoring advice for Hildacy Preserve Manager, staff and Temple students who will be involved with watershed restoration projects/monitoring.

Date of Initial Contact with Organization: Feb 2016

DEP Approval to Proceed Date: Approved 5/17/2016

Date Assistance Began: 5/20/2016

Date Assistance Completed:

Total Cost of Assistance: \$850.00

In-kind/Match Provided by Applicant Organization: mileage. Missed filling out mileage sheet at this time.

Overview of Assistance:

Approximate Group Membership:

Total Number of Consultations Provided: 3 emails so far; 1 planning phone call (February 2016),

Total Number of Trainings/Workshops Provided: 1, April 15, 2016 (Tara only)

Total Number of Individuals Assisted: 11

Size of Watershed Assisted:

Total Number of Stream Miles Improved or BMP's installed as a result of C-SAW Assistance:

Project Summary

Michael Coll, [Hildacy Preserve](#) Manager is asking for assistance to be trained in various stream monitoring protocols. He, as well as some of his staff at the preserve and students that will be monitoring from Temple University's Restoration Monitoring Techniques Course (part of the Landscape Architecture program) will be trained. The students are in the process of completing their capstone projects and this training aims to assist them to incorporate a monitoring plan into those projects. By exposing them to stream water monitoring techniques it is the intention that many of them will include such techniques in their capstones and/or incorporate stream monitoring into future projects that they work on, in addition to assisting with monitoring within the watershed with Mr. Coll. Stroud's role will be to offer assistance in the form of training and knowledge on certain advanced topics in stream ecology and water quality monitoring. Included will be 1 day of Tara Muenz's time (coordination and assistance to attendees, preparation, workshop time as host),

Request: Instruction on stream restoration monitoring techniques pertaining to monitoring restoration success.

In addition to the workshop course provided in April (2016), the Hildacy Preserve Manager wished for Stroud Center staff to come to the Preserve to provide monitoring advice for their tributaries and main branch of Crum creek that runs through the Natural Lands Trust property. Tara went to visit with Michael Coll on 8/12/2016, brought monitoring equipment and walked their portion of the watershed offering advice on the types of monitoring activities they could utilize. Michael expressed interest in Stroud coming out to do a macroinvertebrate survey of the streams, and there was interest in exploring the idea of a sensor station. Muenz will check-in with SWRC staff to figure out the next phase of support.

APPLICANT: Temple University School of Landscape Architecture, Stream Monitoring Training

Applicant (new or continuing): New

River Basin: Delaware

Watershed: Crum Watershed, Crum Creek and Martin's Run

Watershed Size (acreage or sq. miles):

County (multiple): Delaware

Lead C-SAW Provider: Stroud Water Research Center

Type of Assistance Provided: Training/Monitoring advice for Hildacy Preserve Manager, staff and Temple students who will be involved with watershed restoration projects/monitoring.

Date of Initial Contact with Organization: Feb 2016

DEP Approval to Proceed Date: Approved 5/17/2016

Date Assistance Began: 5/20/2016

Date Assistance Completed: ongoing – but this quarter was 8/11/2016

Total Cost of Assistance: ~\$550.00

In-kind/Match Provided by Applicant Organization:

Overview of Assistance:

Approximate Group Membership:

Total Number of Consultations Provided: email correspondences for consult/property scouting visit in August 2016

Total Number of Trainings/Workshops Provided: consult (T. Muenz only) on 8/11/2016

Total Number of Individuals Assisted: 11

Size of Watershed Assisted:

Total Number of Stream Miles Improved or BMP's installed as a result of C-SAW Assistance:

Project Summary

In addition to the workshop course provided in April (2016), the Hildacy Preserve Manager wished for Stroud Center staff to come to the Preserve to provide monitoring advice for their tributaries and main branch of Crum creek that runs through the Natural Lands Trust property. Tara went to visit with Michael Coll on 8/12/2016, brought monitoring equipment and walked their portion of the watershed offering advice on the types of monitoring activities they could utilize. Michael expressed interest in Stroud coming out to do a macroinvertebrate survey of the streams, and there was interest in exploring the idea of a sensor station. Muenz will check-in with SWRC staff to figure out the next phase of support.

APPLICANT: York County Master Watershed Stewards – Penn State Extension and York County Conservation District

Applicant (new or continuing): Continuing

River Basin: Susquehanna

Watershed: Susquehanna

Watershed Size (acreage or sq. miles):

County (multiple): York

Lead C-SAW Provider: Stroud Water Research Center

Type of Assistance Provided: Training/Monitoring workshop on water chemistry monitoring, macroinvertebrate ecology, and stormwater management

Date of Initial Contact with Organization: August 11, 2015

DEP Approval to Proceed Date: Sept, 2015

Date Assistance Began: 9 April, 2016

Date Assistance Completed: ongoing

Total Cost of Assistance: staff time (2 SWRC staff teaching); 6-10 hrs for Steve Kerlin and Dave Arscott (prep and time day of training). ~\$1,000.00

In-kind/Match Provided by Applicant Organization: yes -

Overview of Assistance:

Approximate Group Membership: 12

Total Number of Consultations Provided: multiple emails and phone calls, 1 workshop at Stroud Water Research Center (April 2016),

Total Number of Trainings/Workshops Provided: 1, April 9, 2016 (Dave and Steve)

Total Number of Individuals Assisted: 11

Size of Watershed Assisted:

Total Number of Stream Miles Improved or BMP's installed as a result of C-SAW Assistance:

Project Summary

Workshop at Stroud Water Research Center for Watershed Stewards focused on water quality/chemistry, macroinvertebrate sampling and ID, and stormwater management

Appendix F: Assistance Reports (USGS)

APPLICANT: Blair County Conservation District (BCCD), Little Juniata River Association (LJRA), and John Kennedy Trout Unlimited (JKTU)

Status: Continuing

Watershed: Little Juniata River

Watershed size: 240 mi²

County: Blair

Lead C-SAW Provider: USGS

Assistance Type: stormwater monitoring and management

Initial contact with group: 3/14/2016

Scoping meeting: N/A – outlined via telephone calls and emails

DEP approval: 3/17/2016

Assistance began: 4/12/2016

Assistance completed: ongoing

Cost of assistance: ~\$3,200

Overview of Assistance:

Approximate group membership: ~400+ (LJRA and JKTU)

Consultations: 3 (telephone calls and emails)

Trainings/workshops: 0

Individuals assisted: 1

Stream miles improved: N/A

Requested Assistance:

As a C-SAW partner, the U.S. Geological Survey (USGS) Pennsylvania Water Science Center has received a request to provide technical assistance to the Blair County Conservation District (District) operating in Blair County Pennsylvania. Their request for assistance includes:

The Blair County Conservation District; as well as our partners the Little Juniata River Association, Penn State University-Altoona Campus, and the John Kennedy Chapter of Trout Unlimited are requesting assistance from the United States Geological Survey to set-up, install and program an ISCO automated sampler on the Little Juniata River. The District and partners are currently putting together a water monitoring program which will look at base flow and storm flow characteristics of both the Little and Frankstown Branches of the Juniata River. The study includes water chemistry parameters, continuous instream monitoring, flow data as well as benthic invertebrate assemblages. The District would like for USGS to assist in the initial set-up and programming of the automated sampler since this will be the first used by the District or its partners.

The following C-SAW support is requested:

1. Demonstration and training for installation and programming of ISCO sampler.
2. Follow-up support after a storm event to ensure ISCO sampler performed as expected & provide assistance with any outstanding questions/concerns.

Assistance provided April 16, 2016 through July 15, 2016:

Please note that the description of technical assistance provided below actually occurred on 4/12/2016; however, the hours weren't administratively recognized until a later date.

On April 12, 2016, USGS staff drove to the Holidaysburg area to meet with a Blair County Conservation District representative and a volunteer. An ISCO water-quality sampler had been installed at a predetermined location along the Little Juniata River and the USGS staff member provided assistance and training with regard to programming of the ISCO sampler such that it could be triggered based on the desired threshold (in this case, river level).

APPLICANT: Tinicum Township (Bucks County) and Bridgeton-Nockamixon-Tinicum Groundwater Management Committee (BNT GWMC)

Status: New

Watershed: Delaware River Basin

Watershed size: N/A (groundwater assistance)

County: Bucks

Lead C-SAW Provider: USGS

Assistance Type: WSTA, M

Initial contact with group: 3/15/2015

Scoping meeting: N/A

DEP approval: 6/2/2015

Assistance began: 6/2015

Assistance completed: 1/2016

Cost of assistance: ~\$10,000

Overview of Assistance:

Approximate group membership: Tinicum Township pop 3,995

Consultations: multiple (meetings, phone calls, emails)

Trainings/workshops: 1

Individuals assisted: 8 (seven BNT-GWMC committee members and Tinicum Twp Mgr)

Stream miles improved: N/A

Requested Assistance:

C-SAW has received a request to provide technical assistance to Tinicum Township (Bucks County) Board of Supervisors. The Partner Organization is the Bridgeton – Nockamixon – Tinicum Groundwater Management Committee. The request for technical assistance includes:

1. Monitoring plan development, and
2. Data analysis and interpretation.

The joint Bridgeton – Nockamixon – Tinicum Groundwater Management Committee (BNT GWMC) has been monitoring groundwater levels and conducting other studies in the three-township area for approximately 12 years. Interpretation and analysis of the collected data, in conjunction with results of other studies, has been used by the three townships to develop planning information and ordinances for land-use planning and water-resource protection. One issue important to the BNT GWMC is the prediction of groundwater levels during drought conditions.

BNT GWMC has developed a draft modeling approach for analysis of groundwater-level data and prediction of water levels during drought. The BNT GWMC has requested technical assistance in the modeling methods and application for water-level forecasting under drought conditions. The BNT GWMC has also requested technical assistance for improving groundwater monitoring and other water-resources monitoring that can inform planning and development decisions in the three townships.

Assistance through C-SAW is requested to: 1) help document and possibly improve the groundwater-level modeling approach 2) identify changes to the monitoring program that could improve identification of trends and seasonality in water resources, and effects of withdrawals. Under this C-SAW request, the USGS would provide technical assistance for these two tasks. Subsequent to this assistance, BNT GWMC will prepare a report on the groundwater-level

monitoring approach and its application to collected data, and recommend changes in the monitoring program, using knowledge transferred from USGS.

Assistance provided January 15, 2016 through April 15, 2016:

USGS staff gave a presentation to Bridgeton-Nockamixon-Tinicum Groundwater Management Committee (BNT-BMC) providing input on the modeling approaches, and changes to the monitoring program that could improve identification of trends and seasonality in water resources, and effects of withdrawals. USGS also provided information about groundwater management efforts underway in Adams County that are similar to the programs in the BNT-BMC area. In response to BNT-BMC's request, the presentation was revised and approved for distribution, and was delivered to the BNT-BMC after approval. These activities completed the project.

Appendix G: Quality Control Assistance (ALLARM)

The following QC assistance was provided by the Alliance for Aquatic Resource Monitoring:

	Jan – Mar 2016	Apr – Jun 2016	Jul – Sep 2016	Oct – Dec 2016	Total
Groups assisted	4	5	7	5	12
Individuals assisted	12	33	37	26	108
Water samples processed	15	72	56	59	202
Tests performed	124	860	646	680	2,310

Month	Group	Parameters								# of Samples	# of Tests	
		Alkalinity	Chloride	Conductivity	Nitrate	pH	Phosphorus	Total Dissolved Solids	Turbidity	Other		
January	PA Council of Trout Unlimited			X		X		X			1	12
February	Butler County Stream Team			X				X			2	16
March	Bradford County Stream Team			X				X			3	24
March	Westmoreland County Stream Team			X				X			9	72
April	Bradford County Stream Team			X				X			2	16
April	Gods Country Waterdogs			X		X		X			9	108
April	PA Council of Trout Unlimited			X		X		X			14	168
April	Westmoreland County Stream Team			X				X			4	32
May	PA Council of Trout Unlimited			X		X		X			7	84
June	Antietam Watershed Association	X			X	X	X		X		5	80
June	PA Council of Trout Unlimited			X		X		X			31	372
July	Beaver County Volunteer Monitors			X				X			1	8
July	Big Spring Watershed Association	X		X	X	X	X	X		X	2	18
July	PA Council of Trout Unlimited			X		X		X			4	48
July	Westmoreland County Stream Team			X				X			8	64
September	Delaware Riverkeeper Network		X	X				X			4	40
September	Gods Country Waterdogs			X		X		X			7	84
September	PA Council of Trout Unlimited			X		X		X			23	276
September	Ridge and Valley Streamkeepers	X			X	X			X		6	96
September	Venango PA SEC			X		X		X			1	12
October	Antietam Watershed Association	X			X	X	X		X		1	16
October	PA Council of Trout Unlimited			X		X		X			39	468
October	Westmoreland County Stream Team			X				X			5	40
November	Fayette County Stream Team			X				X			1	8
November	PA Council of Trout Unlimited			X		X		X			10	120
November	Venango PA SEC			X		X		X			1	12
November	Westmoreland County Stream Team			X				X			2	16