AQUETONG WATERSHED ASSOCIATION

Final Report to Lower Delaware Wild and Scenic River Management Council

2021 Aquetong Creek Volunteer Water Monitoring Program
November 5, 2021

I. Project Description:

With funding from the Lower Delaware Wild and Scenic River Management Council and the US National Park Service, and US Fish and Wildlife Service, the Aquetong Watershed Association, an all-volunteer 501(c)3 non-profit membership organization (https://www.aquetongwatershed.org/) expanded its watershed monitoring program with the purchase of in-stream water quality data monitoring equipment.

The Aquetong watershed has a drainage area of 8.4 square miles and has approximately 23 stream miles (Figure 1). Aquetong Creek and its tributaries discharge directly into the Delaware River near the Bucks County Playhouse in New Hope Borough. There are over 3,000 residences and businesses in the Aquetong watershed. About 30% of the watershed, primarily in the upper reaches, is protected by conservation easements. The lower portion has seen extensive development in the last thirty years. The entire population of the watershed and of Solebury Township and New Hope Borough depend upon groundwater wells for their drinking water.

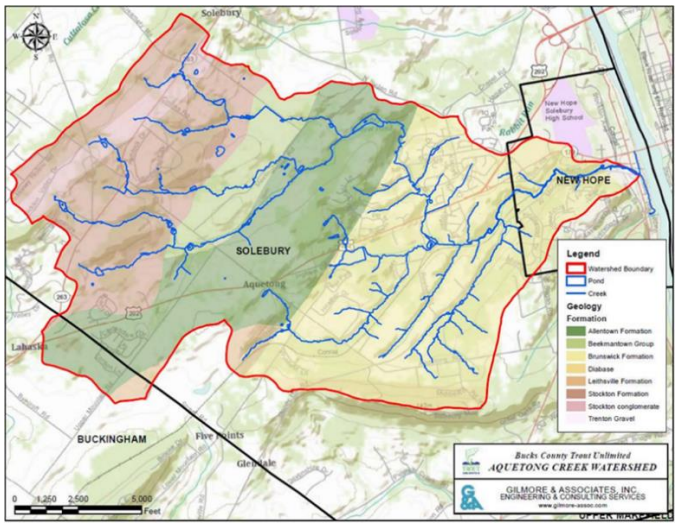


Figure 1: The Aquetong Watershed

The AWA has been monitoring water quality in Aquetong Creek since 2010. The overall goal of this program is to assess and monitor existing water quality conditions along the main stem of Aquetong Creek and ensure this waterway remains designated as HQ-CWF. The monitoring program helps identify any sources of disturbances within the watershed that may pose risk to its classification. Furthermore, this program helps track longitudinal changes in water quality that may arise from changes in land use or land management policy. The AWA maintains a long-term monitoring database and provides data to its partners accordingly. Data can be used to identify stream and riparian restoration opportunities, inform land management decisions, or catalyzing deeper investigations.

I. Project Description (con't):

The AWA Aquetong Creek Volunteer Water Monitoring Program includes both an intensive stream bio-survey and in-situ water quality measurements. The intensive stream bio-survey is based on the habitat assessment and macroinvertebrate sampling approach developed by EPA in its Rapid Bioassessment Protocols for Streams and Rivers (Protocol II) and adapted by volunteer monitoring programs. In-situ water quality measures will be performed by a suite of aquatic data logging instruments (https://www.onsetcomp.com/) deployed into the stream for prolonged intervals.

The overall goals of the AWA Watershed Monitoring Program are as follows:

- Annually monitor water quality at multiple locations along the main stem of Aquetong Creek (Figure 2).
- Identify any spatial and/or temporal gradients in water quality moving downstream from the headwaters of the Aquetong.
- Monitor and identify longitudinal changes in water quality as the Traditional Neighborhood Commercial Zone within Solebury Township (Rt 202 Corridor) is improved and developed.

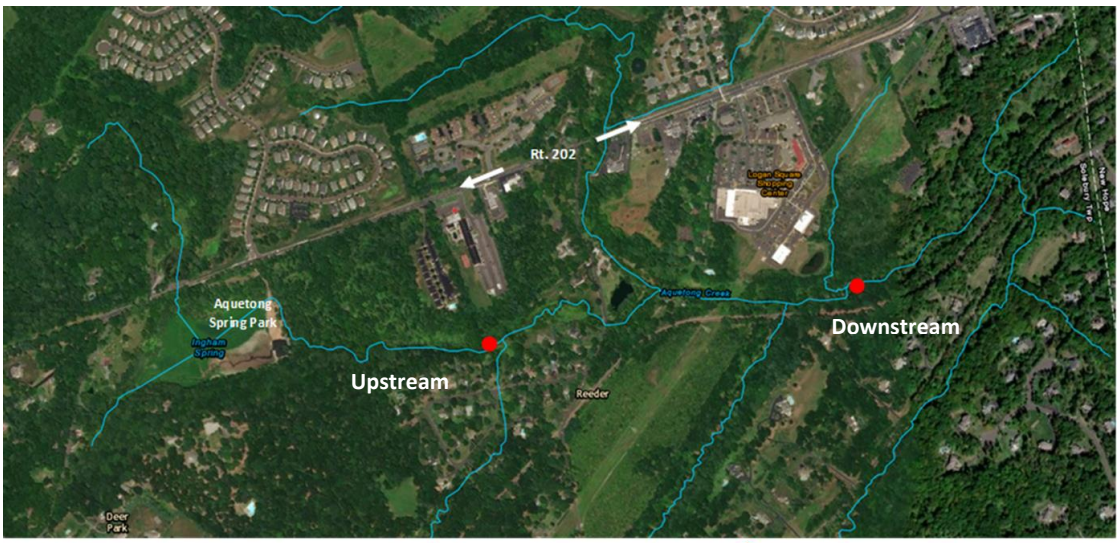


Figure 2: Aquetong Creek Sampling Sites ● Sampling Sites

The water quality parameters measured in the field with in-stream data loggers included the following:

- Temperature
- Dissolved Oxygen
- Conductivity
- pH

Biological date included:

- Macroinvertebrate Biodiversity
- Habitat Assessment
- Biotic Indices (Stream Health)

The AWA Volunteer Water Monitoring Programs developed and subsequently follows its Quality Assurance Project Plan, submitted to the LDWS Management Council in July of 2021.

II. 2021 Water Quality Data:

Figure 3: Annual results of seasonal Rapid Bio-Assessment surveys for upstream site only between 2015 and 2021

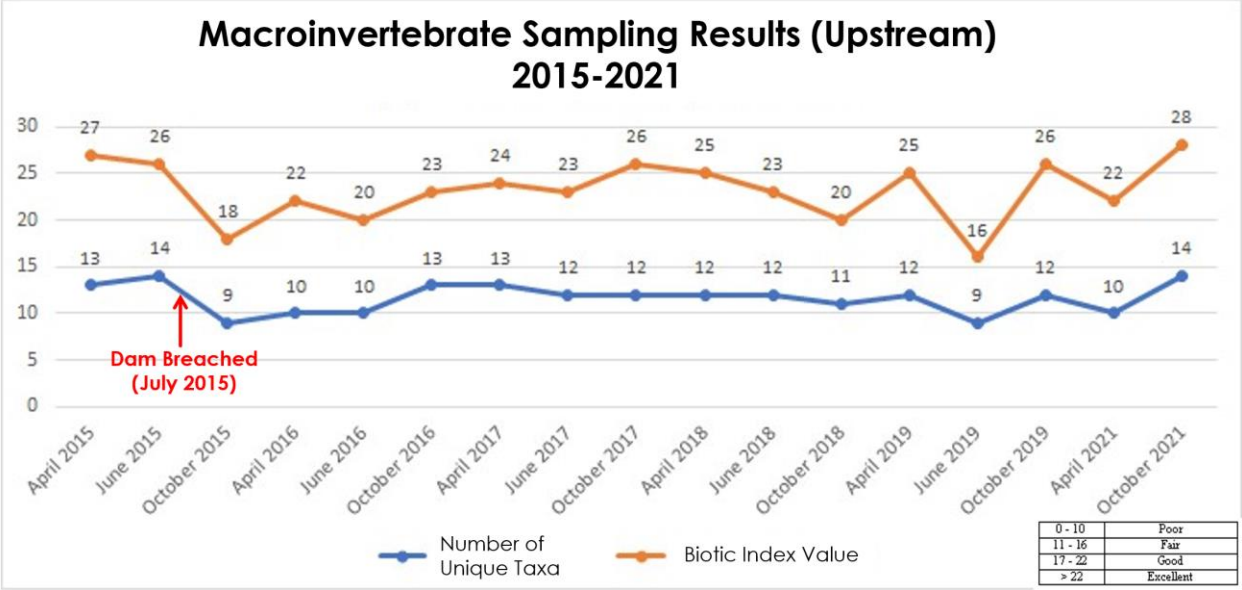


Figure 4: Annual results of season in-stream temperature monitoring of Aquetong Creek between 2010 and 2021 (Error bars represent high and low monthly water temperatures).

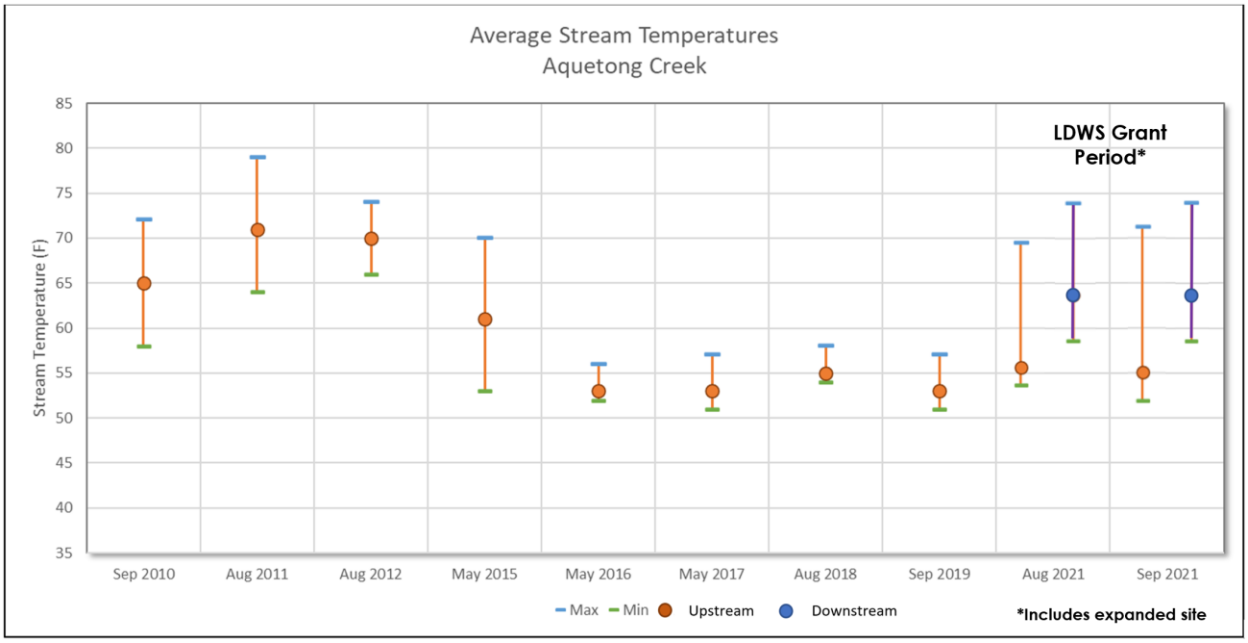
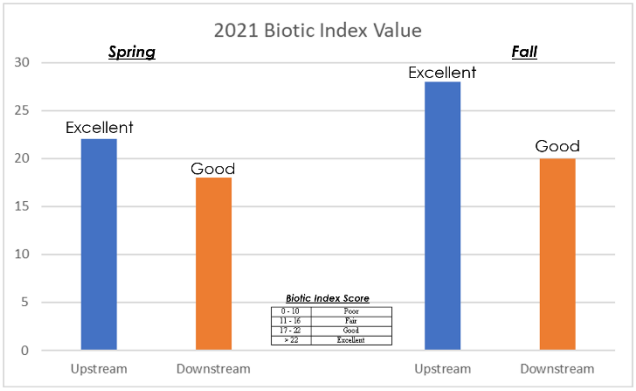


Figure 5: Results (graphical and raw) from 2021 Rapid Bio-Assessment with expanded site under LDSW grant period



	4/24/2021 Upstream	4/24/2021 Downstream	10/2/2021 Upstream	10/2/2021 Downstream
Total Organsims in Sample	**100**	**100**	**100**	**42**
Number of Taxa	**10**	**9**	**14**	**9**
Biotic index value	**22**	**18**	**28**	**20**
Biotic index score	**excellent**	**good**	**excellent**	**good**
EPT Index	**52**	**36**	**26**	**26**
Fish observed?	no	yes	yes	yes
Salamander observed?	yes	yes	yes	yes
Water temp (F)	53	53	54	55

Figure 6: Results from in-stream data loggers (included 2021 data with expanded site under LDWS grant period)

Year	Season	Location	Mean Temp (C/F)	pH	DO (mg/L)	Conductivity (µ Siemens)
2010	Summer	Upstream	18.6 / 65.4	8.4	8.7	399
2011	Fall	Upstream	21.8 / 71.2	8.22	8.6	320
2012	Summer	Upstream	21.3 / 70.3	8.4	8.2	
2013						
2014						
2015	Spring	Upstream	14.4 / 57.9	8.6	10.7	396
2016	Spring	Upstream	11.5 / 52.7	8.4	11.23	319
2017	Spring	Upstream	12.1 / 53.7	8.3		442
2018	Summer	Upstream	13.4 / 56.1	8.4	10.3	454
2019	Fall	Upstream	12.0 /53.6	8.2		221
2020						
2021 (LDSW Grant Period)	Summer	Upstream	13.1 / 55.6	7.9	10.6	344
		Downstream	17.3 / 63.1	7.9	9.2	276
	Fall	Upstream	12.1 / 53.8	7.9	10.9	338
		Downstream	15.0 / 59.1	8	9.2	

III. Project Photos

Figure 7: Upstream (left) and Downstream (right) sampling sites in Aquetong Creek

Figure 8: Deployed In-Stream Data Logging Equipment purchased with mini-grant funding

IV. Future Work

To better assess surface water quality throughout the entire watershed, the AWA plans to seek additional funding to expand is monitoring program further. With over 8.4 square miles of surface area, and secondary and tertiary drainage basins, measuring water quality throughout the watershed is imperative for our organization to achieve its mission.

V. Acknowledgement

On behalf of the board and volunteers for the Aquetong Watershed Association we are grateful to be a recipient of the 2021 Wild and Scenic mini-grant award. This final report describes the work accomplished under this award during 2021. The generous funding from the LDWS has allowed the AWA to continue supporting its mission to conserve, preserve, and protect the natural resources of the Aquetong Watershed, part of the greater Lower Delaware River Valley and Watershed.