

DATA SUBMISSION FORM

PART 1. Identification of Waterbody

Waterbody Name: White Clay Creek Watershed.

Tributary to: White Clay Creek/Brandywine - Christina River Basin County: Chester

Purpose of Study: To collect baseline stream data and follow trends over time. Additional research being conducted to determine primary sources.

Please include a map of the waterbody and the coordinates of the sampling site(s).

PART 2. Investigator(s) Information

Name of group/individual which collected the data: White Clay Creek Watershed Association/Wild and Scenic River Program.

Contact Person(s) for Questions regarding the data: Shane Morgan

Phone #: (484) 716-6836

PART 3. Data Submission Content

What type(s) of data is/are being submitted? (Check all that apply)

Water Chemistry: Bacteriological: Macroinvertebrate: Fish:

Was a PADEP sampling method used? Yes No

If yes, what method(s): PA DEP Bacteriological Data Collection Protocol - we were initially trained on site on the recreational bacteria field sampling protocol by Megan Bradburn (2012-2014) Please see Appendix G of our monitoring plan (<https://docs.google.com/document/d/1NfuCTM8DM35kF7xWj7zvirJ9xOIsoygF6tQ9d7p3ZpQ/edit#heading=h.d7893oemomwp>)

PART 4. Quality Assurance/Quality Control (QA/QC) Information

Was the data being submitted collected under a program with either a written study design completed in accordance with DEP's "Monitoring Book", a written quality assurance project plan completed in accordance with EPA's "The Volunteer Monitors Guide to Quality Assurance Project Plans" or a standard QA/QC protocol?

Yes No If yes, please submit a copy of the study design, QAPP or QA/QC protocol.

Please see our monitoring plan and protocols at this link: <https://docs.google.com/document/d/1NfuCTM8DM35kF7xWj7zvirJ9xOIsoygF6tQ9d7p3ZpQ/edit#heading=h.o06uuu6vdt3>

Was the data collected under a program that adhered to a quality control plan that included external quality control checks such as split samples analyzed by an outside lab?

Yes No If yes, please submit a copy of the outside lab analysis for review.

Is the submitted data incorporated into a finalized report, document, or journal article?

Yes No If yes, please include a copy with this submission form. No but we are hoping to publish our bacteria data and research in 2022. This will include MST testing as well.

If the data submitted is biological data, who is/are the source(s) of the taxonomic expertise? NA

Did this person(s) perform all the taxonomic work? Yes: No:

If no, did they supervise? Yes: No:

What are their credentials? Bacteria samples were analyzed by Laura Zgleszewski and Jinjun Kan at Stroud Water Research Center. Chemical analysis (CL, NO3N, OP, and TSS) were performed by Brandywine Science Center (a DEP accredited lab.)

PART 5. Comments

Please provide any additional comments that might assist in DEP's evaluation of your data. For example, possible impairment sources (i.e. agriculture, municipal sewer outfall, etc.) and causes (sediment, habitat alterations, nutrients, etc.):

Possible impairment sources include multiple non-point source pollution from failing septic agricultural lands, mushroom grower operations, municipal roads, and suburban lands. We also believe wildlife such as Canadian Geese to be a contributing to bacterial sources. For the bacteria study we are working with Stroud Water Research Center (Dr. Jinjun Kan) to do microbial source tracking- a publish report on collected data from 2016-2020 should be completed in 2022.

Please submit this form and all supporting documentation to:

By mail:

**Bureau of Clean Water
Water Quality Division
Attn: Heidi Biggs
P. O. Box 8774
Harrisburg, PA 17105-8774**

By e-mail:

RA-epwater@pa.gov

Place "Integrated Report Data Submission" in subject line.

Data should be in a usable, electronic format such as Excel. Anyone with questions regarding the completion of this form or the 303(d) listing process in general, may contact:

Dustin Shull, Environmental Group Manager
Water Quality Division
(717) 787-9637
RA-epwater@pa.gov

White Clay Wild and Scenic River Stream Watch Monitoring Program
Water Quality Report submitted to PADEP September 30, 2021

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White Clay Wild and Scenic River Stream Watch Monitoring Program

Pennsylvania Active Site List

Site ID	Latitude	Longitude	Site Name	HUC 12	Continuous Monitoring Present
WCCPA01	39.744946	-75.77296	Strickersville Main near USGS gage Upper WCC	20402050306	
WCCPA03	39.75007	-75.77084	Sharpless Bridge Middle Branch Upper WCC	20402050306	
WCCPA05	39.76904	-75.76556	Good Hope East Branch	20402050303	
WCCPA06	39.76725	-75.75883	Watson's Mill East Branch	20402050303	SL109
WCCPA06_B	39.7824936	-75.74086632	Somerset out, East Branch	20402050303	
WCCPA06_C	39.7893159	-75.73597397	Somerset in, East Branch	20402050303	
WCCPA07	39.7935	-75.76832	Egypt Run East Branch	20402050303	SL110 (removed 5/2021)
WCCPA07_B	39.80548	-75.75781	Pelham East Branch	20402050303	
WCCPA08	39.79826	-75.7828	Clay Creek East Branch	20402050303	
WCCPA09	39.80254	-75.83334	Guernsey Middle Branch	20402050301	
WCCPA11	39.76513	-75.80669	Flint Hill West Branch	20402050302	
WCCPA12	39.78705	-75.81936	Wickerton Middle Branch	20402050301	
WCCPA13	39.82166	-75.78487	Avondale WWTP East Branch	20402050303	
WCCPA15	39.82788	-75.78041	Avondale Playground East Branch	20402050303	
WCCPA16	39.85735	-75.8037	ELG East Branch	20402050303	
WCCPA18	39.78219	-75.77154	Laurel Woods East Branch	20402050303	
WCCPA19	39.84882	-75.82509	Loyd Road East Branch	20402050303	
WCCPA20	39.85348	-75.82561	WLG East Branch	20402050303	
WCCPA24	39.766494	-75.79496	Mercer Mill on Middle Branch Upper WCC	20402050306	
WCCPA43	39.822251	-75.821078	Welcome and Rosehill East Branch	20402050303	SL272 (removed 5/2021)



Stream Monitoring Sites in the White Clay Creek Watershed



Map produced by the University of Delaware Water Resources Center, Dec. 2019.

Ours to Enjoy. Ours to Protect.

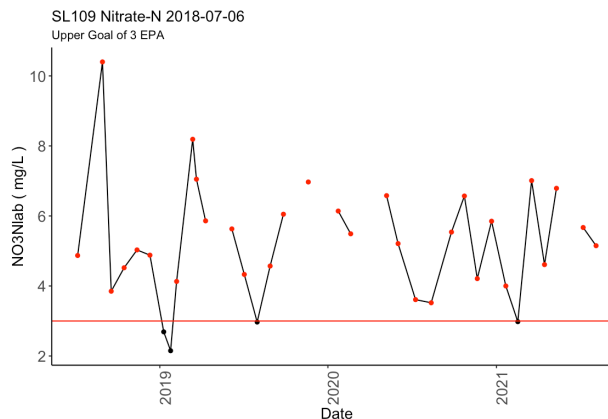
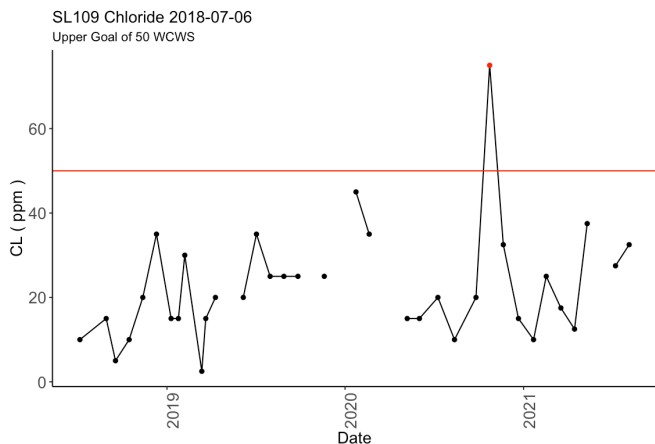
White Clay Wild and Scenic River Stream Watch Monitoring Program

Graphic presentation of all data points for Chlorides (CL), Nitrates (NO3N), Orthophosphate (OP), Total Suspended Solids (TSS) at baseflow (baseflow defined as <0.25" rain in 48 hour period).

Date Range 7/6/2018-8/05/2021

Exceedance of standards (red line) indicates impairment.

Broad Run at Watson's Mill Road (SL109)

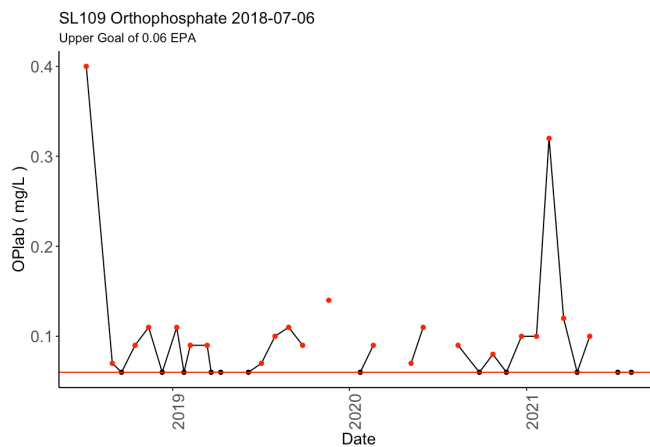
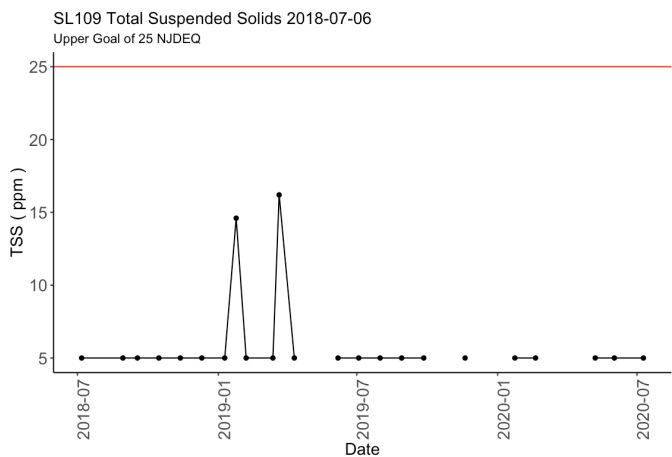


Annual Averages of CL during Base Flow Sampling (note 2018 and 2021 do include a full years worth of data)

Site	Parameter	Date	Reading
SL109	CL_Y	7-6- 2018 to 12-31-2018	15.83
SL109	CL_Y	1-1-2019 to 12-31-2019	21.04
SL109	CL_Y	1-1-2020 to 12-31-21	28.25
SL109	CL_Y	1-1-2021 to 8-5-2021	23.21

Annual Averages of NO3N during Base Flow Sampling (note 2018 and 2021 do not include a full years worth of data)

Site	Parameter	Date	Reading
SL109	NO3Nlab_Y	7-6- 2018 to 12-31-2018	5.59
SL109	NO3Nlab_Y	1-1-2019 to 12-31-2019	5.05
SL109	NO3Nlab_Y	1-1-2020 to 12-31-21	5.27
SL109	NO3Nlab_Y	1-1-2021 to 8-5-2021	5.17



Annual Averages of TSS during Base Flow Sampling (note 2018 and 2020 do not include a full years worth of data)

Site	Parameter	Date	Reading
SL109	TSS_Y	7-6- 2018 to 12-31-2018	5.00
SL109	TSS_Y	1-1-2019 to 12-31-2019	6.73
SL109	TSS_Y	1-1-2020 to 7-9-2020	5.00

Annual Averages of OP during Base Flow Sampling (note 2018 and 2021 do not include a full years worth of data)

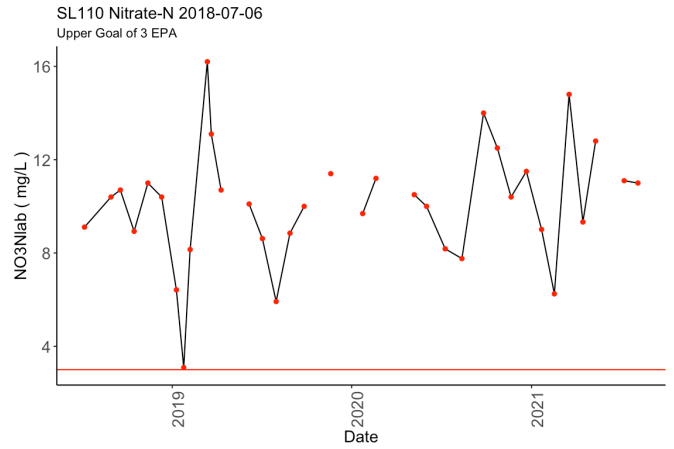
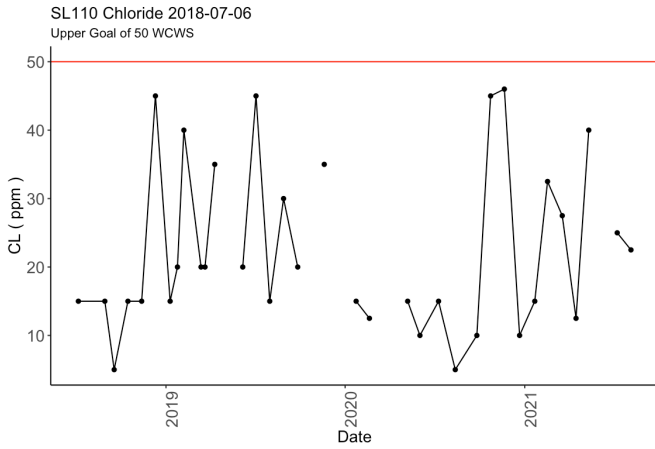
Site	Parameter	Date	Reading
SL109	OPlab_Y	7-6- 2018 to 12-31-2018	0.13
SL109	OPlab_Y	1-1-2019 to 12-31-2019	0.09
SL109	OPlab_Y	1-1-2020 to 12-31-21	0.08
SL109	OPlab_Y	1-1-2021 to 8-5-2021	0.12

White Clay Wild and Scenic River Stream Watch Monitoring Program

Graphic presentation of all data points for Chlorides (CL), Nitrates (NO3N), Orthophosphate (OP), Total Suspended Solids (TSS) at baseflow (baseflow defined as <0.25" rain in 48 hour period).

Date Range 7/6/2018-08/05/2021 Exceedance of standards (red line) indicates impairment.

Egypt Run at Egypt Run Road (SL110)

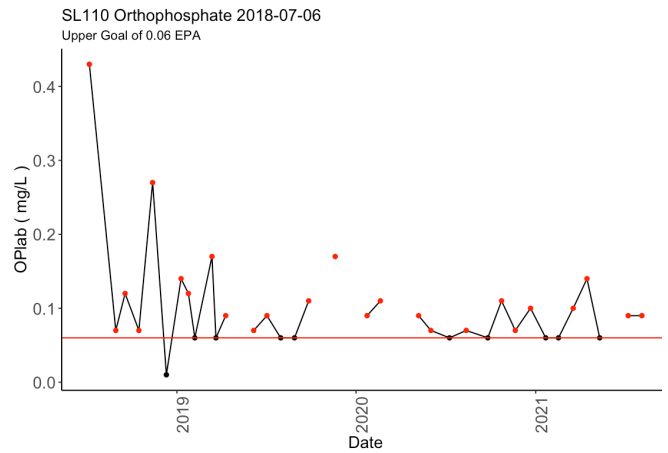
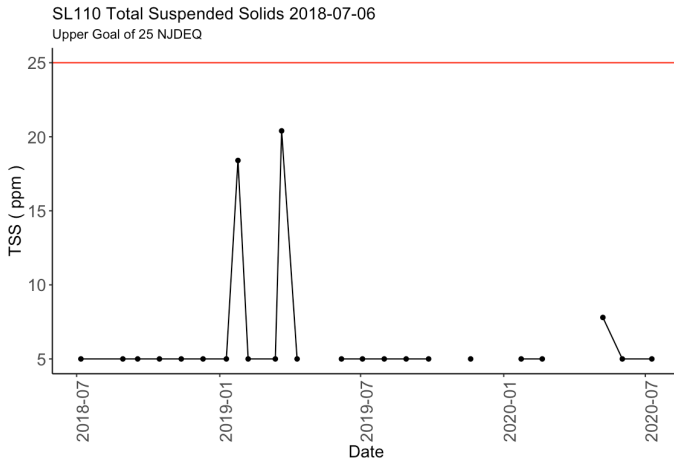


Annual Averages of CL during Base Flow Sampling (note 2018 and 2021 do not include a full years worth of data)

Site	Parame	Date	Reading
SL110	CL_Y	7-6-2018 to 12-31-2018	18.33
SL110	CL_Y	1-1-2019 to 12-31-2019	26.25
SL110	CL_Y	1-1-2020 to 12-31-2020	18.35
SL110	CL_Y	1-1-2021 to 8-5-2021	25.00

Annual Averages of NO3N during Base Flow Sampling (note 2018 and 2021 do not include a full years worth of data)

Site	Parameter	Date	Reading
SL110	NO3Nlab_Y	7-6-2018 to 12-31-2018	10.09
SL110	NO3Nlab_Y	1-1-2019 to 12-31-2019	9.38
SL110	NO3Nlab_Y	1-1-2020 to 12-31-2020	10.57
SL110	NO3Nlab_Y	1-1-2021 to 8-5-2021	10.61



Annual Averages of TSS during Base Flow Sampling (note 2018 and 2020 do not include a full years worth of data)

Site	Parameter	Date	Reading
SL110	TSS_Y	7-6-2018 to 12-31-2018	5.00
SL110	TSS_Y	1-1-2019 to 12-31-2019	7.40
SL110	TSS_Y	1-1-2020 to 7-9-2020	5.56

Annual Averages of OP during Base Flow Sampling (note 2018 and 2021 do not include a full years worth of data)

Site	Parameter	Date	Reading
SL110	OPlab_Y	7-6-2018 to 12-31-2018	0.16
SL110	OPlab_Y	1-1-2019 to 12-31-2019	0.10
SL110	OPlab_Y	1-1-2020 to 12-31-2020	0.08
SL110	OPlab_Y	1-1-2021 to 8-5-2021	0.09

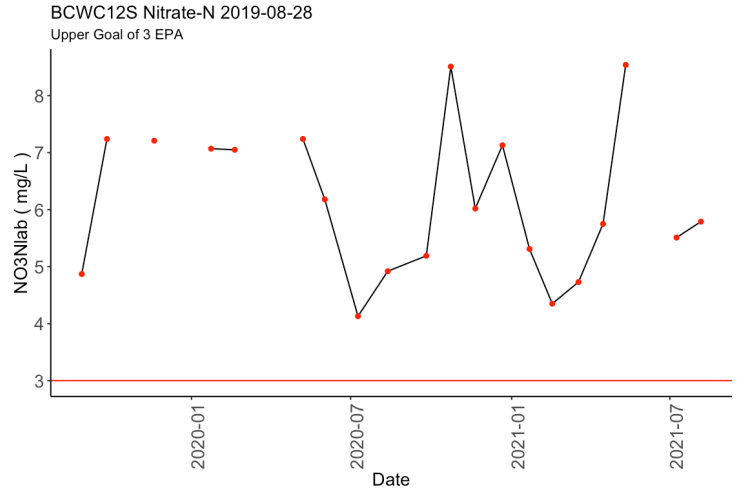
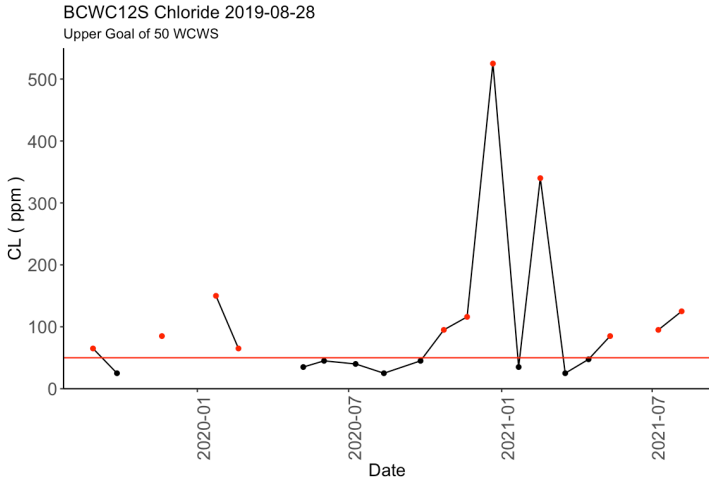
White Clay Wild and Scenic River Stream Watch Monitoring Program

Graphic presentation of all data points for Chlorides (CL), Nitrates (NO3N), Orthophosphate (OP), Total Suspended Solids (TSS) at baseflow (baseflow defined as <0.25" rain in 48 hour period).

Date Range 7/6/2018-8/05/2021

Exceedance of standards (red line) indicates impairment.

Unnamed Tributary to the East Branch at Rosehill Road Welcome Ave (SL272)

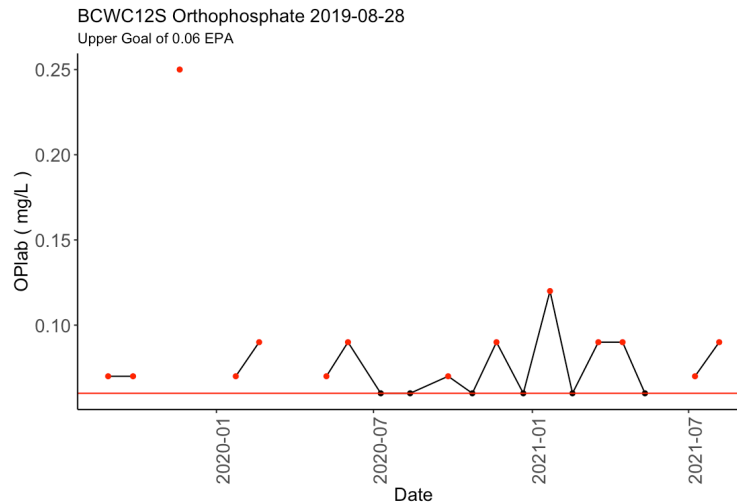
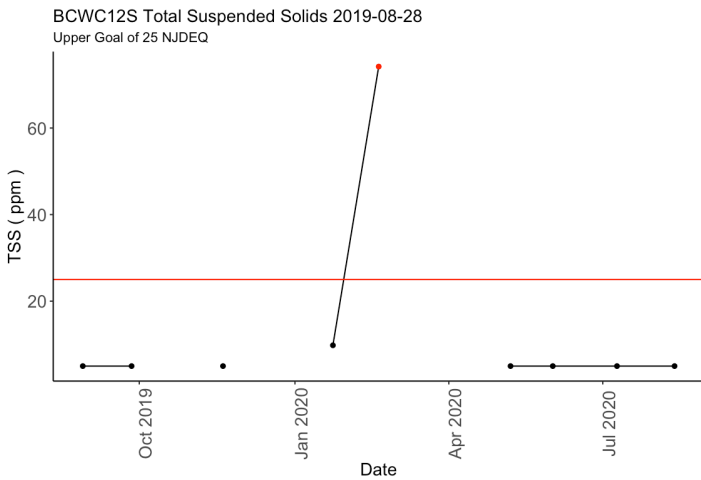


Annual Averages of CL during Base Flow Sampling (note 2018 and 2021 do not include a full years worth of data)

Site	Parameter	Date	Reading
SL272	CL_Y	8-28-2019 to 12-31-2019	58.33
SL272	CL_Y	1-1-2020 to 12-31-2020	114.10
SL272	CL_Y	1-1-2021 to 8-05-2021	107.50

Annual Averages of NO3N during Base Flow Sampling (note 2018 and 2021 do not include a full years worth of data)

Site	Parameter	Date	Reading
SL272	NO3Nlab_Y	8-28-2019 to 12-31-2019	6.44
SL272	NO3Nlab_Y	1-1-2020 to 12-31-2020	6.34
SL272	NO3Nlab_Y	1-1-2021 to 8-05-2021	5.71



Annual Averages of TSS during Base Flow Sampling (note 2019 and 2020 do not include a full years worth of data)

Site	Parameter	Date	Reading
SL272	TSS_Y	8-28-2019 to 12-31-2019	5.00
SL272	TSS_Y	1-1-2020 to 8-2-2020	17.33

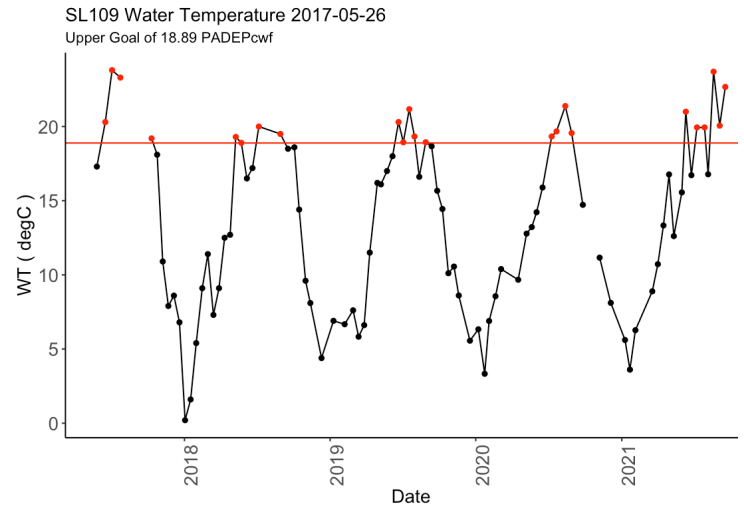
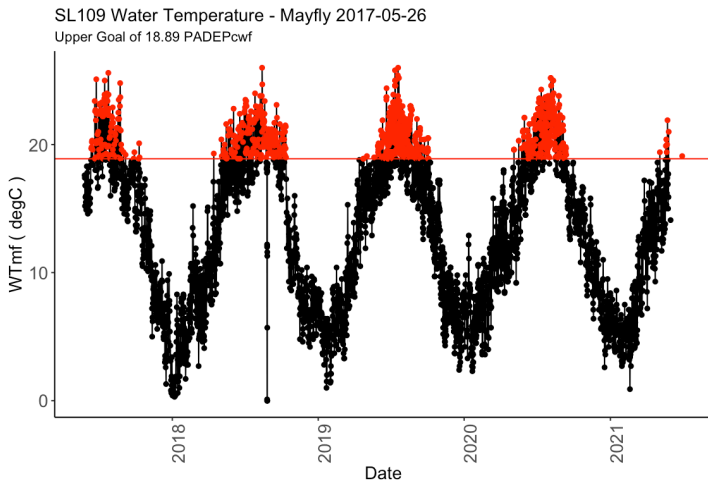
Annual Averages of OP during Base Flow Sampling (note 2021 doesn't include a full years worth of data)

Site	Parameter	Date	Reading
SL272	OPlab_Y	8-28-2019 to 12-31-2019	0.13
SL272	OPlab_Y	1-1-2020 to 12-31-2020	0.07
SL272	OPlab_Y	1-1-2021 to 8-05-2021	0.08

White Clay Wild and Scenic River Stream Watch Monitoring Program

Graphic presentation of Conductivity and Water Temperature taken by in-stream continuous data loggers (left) and hand measurements (right). Date Range 5/15/2017-9/17/2021.

Watson's Mill on East Branch Water Temperature Sensor Readings (30 min averages) (left) and Bimonthly Field Readings (right) (WCCPA06, SL109)



Monthly Average Water Temperature (mayfly continuous sensor readings)

Site	Parameter	Date	Reading
SL109	WTmf_M	2017-05-15	16.50
SL109	WTmf_M	2017-06-15	18.50
SL109	WTmf_M	2017-07-15	20.70
SL109	WTmf_M	2017-08-15	19.20
SL109	WTmf_M	2017-09-15	17.20
SL109	WTmf_M	2017-10-15	14.60
SL109	WTmf_M	2017-11-15	9.30
SL109	WTmf_M	2017-12-15	5.40
SL109	WTmf_M	2018-01-15	3.90
SL109	WTmf_M	2018-02-15	6.90
SL109	WTmf_M	2018-03-15	7.60
SL109	WTmf_M	2018-04-15	11.60
SL109	WTmf_M	2018-05-15	17.30
SL109	WTmf_M	2018-06-15	18.30
SL109	WTmf_M	2018-07-15	19.80
SL109	WTmf_M	2018-08-15	20.70
SL109	WTmf_M	2018-09-15	19.50
SL109	WTmf_M	2018-10-15	14.80
SL109	WTmf_M	2018-11-15	9.20
SL109	WTmf_M	2018-12-15	7.10
SL109	WTmf_M	2019-01-15	5.60
SL109	WTmf_M	2019-02-15	6.00
SL109	WTmf_M	2019-03-15	8.40
SL109	WTmf_M	2019-04-15	14.10
SL109	WTmf_M	2019-05-15	16.60
SL109	WTmf_M	2019-06-15	19.10
SL109	WTmf_M	2019-07-15	20.80
SL109	WTmf_M	2019-08-15	19.20
SL109	WTmf_M	2019-09-15	17.40
SL109	WTmf_M	2019-10-15	14.40
SL109	WTmf_M	2019-11-15	8.30
SL109	WTmf_M	2020-01-15	6.40
SL109	WTmf_M	2020-02-15	7.50

Monthly Water Temperature (hand held readings)

Site	Parameter	Date	Reading
SL109	WT	2017-05-26	17.30
SL109	WT	2017-06-16	20.30
SL109	WT	2017-07-03	23.80
SL109	WT	2017-07-24	23.30
SL109	WT	2017-10-10	19.20
SL109	WT	2017-10-24	18.10
SL109	WT	2017-11-07	10.90
SL109	WT	2017-11-21	7.90
SL109	WT	2017-12-05	8.60
SL109	WT	2017-12-19	6.80
SL109	WT	2018-01-02	0.20
SL109	WT	2018-01-16	1.60
SL109	WT	2018-01-30	5.40
SL109	WT	2018-02-14	9.10
SL109	WT	2018-02-28	11.40
SL109	WT	2018-03-14	7.30
SL109	WT	2018-03-28	9.10
SL109	WT	2018-04-11	12.50
SL109	WT	2018-04-25	12.70
SL109	WT	2018-05-09	19.30
SL109	WT	2018-05-23	18.90
SL109	WT	2018-06-06	16.50
SL109	WT	2018-06-20	17.20
SL109	WT	2018-07-06	20.00
SL109	WT	2018-08-29	19.50
SL109	WT	2018-09-17	18.50
SL109	WT	2018-10-03	18.60
SL109	WT	2018-10-15	14.40
SL109	WT	2018-10-31	9.60
SL109	WT	2018-11-12	8.10
SL109	WT	2018-12-10	4.39
SL109	WT	2019-01-09	6.90
SL109	WT	2019-02-06	6.67
SL109	WT	2019-02-27	7.61

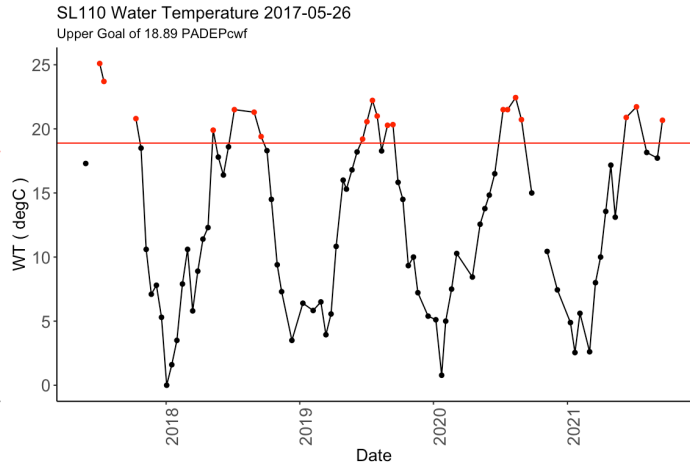
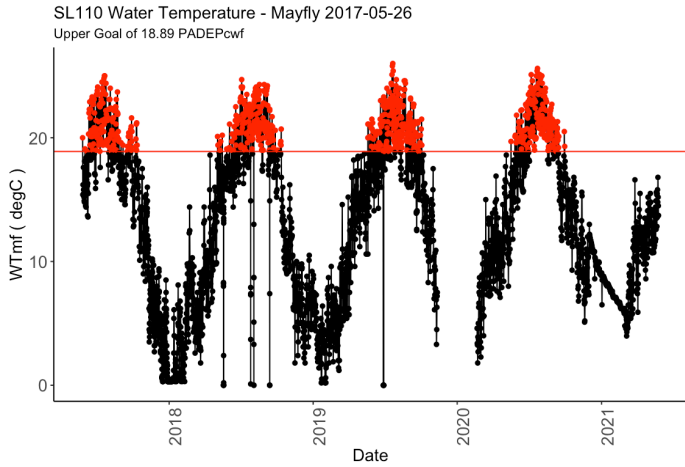
SL109	WTmf_M	2020-03-15	10.30
SL109	WTmf_M	2020-04-15	12.10
SL109	WTmf_M	2020-05-15	15.40
SL109	WTmf_M	2020-06-15	18.70
SL109	WTmf_M	2020-07-15	20.80
SL109	WTmf_M	2020-08-15	21.20
SL109	WTmf_M	2020-09-15	17.30
SL109	WTmf_M	2020-10-15	14.30
SL109	WTmf_M	2020-11-15	10.70
SL109	WTmf_M	2020-12-15	6.80
SL109	WTmf_M	2021-01-15	5.80
SL109	WTmf_M	2021-02-15	5.00
SL109	WTmf_M	2021-03-15	9.30
SL109	WTmf_M	2021-04-15	13.20
SL109	WTmf_M	2021-05-15	15.60
SL109	WTmf_M	2021-06-15	18.50
SL109	WTmf_M	2021-07-15	17.60
SL109	WTmf_M	2021-08-15	16.80

SL109	WT	2019-03-13	5.83
SL109	WT	2019-03-27	6.61
SL109	WT	2019-04-10	11.50
SL109	WT	2019-04-29	16.20
SL109	WT	2019-05-08	16.10
SL109	WT	2019-05-23	17.00
SL109	WT	2019-06-06	18.00
SL109	WT	2019-06-21	20.30
SL109	WT	2019-07-03	18.94
SL109	WT	2019-07-18	21.17
SL109	WT	2019-07-31	19.33
SL109	WT	2019-08-12	16.61
SL109	WT	2019-08-28	18.94
SL109	WT	2019-09-12	18.67
SL109	WT	2019-09-26	15.67
SL109	WT	2019-10-09	14.44
SL109	WT	2019-10-24	10.11
SL109	WT	2019-11-07	10.56
SL109	WT	2019-11-19	8.61
SL109	WT	2019-12-17	5.56
SL109	WT	2020-01-07	6.33
SL109	WT	2020-01-23	3.33
SL109	WT	2020-02-03	6.89
SL109	WT	2020-02-19	8.56
SL109	WT	2020-03-04	10.39
SL109	WT	2020-04-16	9.67
SL109	WT	2020-05-07	12.78
SL109	WT	2020-05-20	13.22
SL109	WT	2020-06-01	14.22
SL109	WT	2020-06-16	15.89
SL109	WT	2020-07-09	19.33
SL109	WT	2020-07-21	19.67
SL109	WT	2020-08-12	21.38
SL109	WT	2020-08-28	19.56
SL109	WT	2020-09-25	14.72
SL109	WT	2020-10-09	13.89
SL109	WT	2020-11-06	11.16
SL109	WT	2020-12-04	8.11
SL109	WT	2021-01-09	5.61
SL109	WT	2021-01-21	3.61
SL109	WT	2021-02-04	6.27
SL109	WT	2021-03-18	8.89
SL109	WT	2021-04-01	10.72
SL109	WT	2021-04-15	13.33
SL109	WT	2021-04-29	16.77
SL109	WT	2021-05-11	12.61
SL109	WT	2021-05-31	15.56
SL109	WT	2021-06-10	21.00
SL109	WT	2021-06-24	16.72
SL109	WT	2021-07-08	19.94
SL109	WT	2021-07-27	19.94
SL109	WT	2021-08-05	16.78
SL109	WT	2021-08-19	23.70
SL109	WT	2021-09-03	20.06
SL109	WT	2021-09-17	22.67

White Clay Wild and Scenic River Stream Watch Monitoring Program

Graphic presentation of Conductivity and Water Temperature taken by in-stream continuous data loggers (left) and hand measurements (right). Date Range 5/15/2017-9/17/2021.

Egypt Run on East Branch Water Temperature Sensor Readings (30 min averages) (left) and Bimonthly Field Readings (right) (WCCPA07, SL110)



Monthly Average Water Temperature (mayfly continuous sensor readings)

Site	Parameter	Date	Reading
SL110	WTmf_M	2017-05-15	15.80
SL110	WTmf_M	2017-06-15	18.70
SL110	WTmf_M	2017-07-15	21.20
SL110	WTmf_M	2017-08-15	19.90
SL110	WTmf_M	2017-09-15	17.80
SL110	WTmf_M	2017-10-15	14.80
SL110	WTmf_M	2017-11-15	7.90
SL110	WTmf_M	2017-12-15	3.60
SL110	WTmf_M	2018-01-15	5.80
SL110	WTmf_M	2018-02-15	10.30
SL110	WTmf_M	2018-03-15	16.20
SL110	WTmf_M	2018-04-15	18.10
SL110	WTmf_M	2018-05-15	2.00
SL110	WTmf_M	2018-06-15	5.50
SL110	WTmf_M	2018-07-15	20.50
SL110	WTmf_M	2018-08-15	21.50
SL110	WTmf_M	2018-09-15	19.70
SL110	WTmf_M	2018-10-15	13.50
SL110	WTmf_M	2018-11-15	8.40
SL110	WTmf_M	2018-12-15	6.20
SL110	WTmf_M	2019-01-15	4.30
SL110	WTmf_M	2019-02-15	4.60
SL110	WTmf_M	2019-03-15	7.00
SL110	WTmf_M	2019-04-15	13.20
SL110	WTmf_M	2019-05-15	15.80
SL110	WTmf_M	2019-06-15	18.30
SL110	WTmf_M	2019-07-15	21.50
SL110	WTmf_M	2019-08-15	20.40
SL110	WTmf_M	2019-09-15	18.30
SL110	WTmf_M	2019-10-15	14.20
SL110	WTmf_M	2019-11-15	8.60
SL110	WTmf_M	2020-03-15	8.90
SL110	WTmf_M	2020-04-15	10.90
SL110	WTmf_M	2020-05-15	14.70
SL110	WTmf_M	2020-06-15	18.80

Monthly Water Temperature (hand held readings)

Site	Parameter	Date	Reading
SL110	WT	2017-05-26	17.30
SL110	WT	2017-07-03	25.10
SL110	WT	2017-07-15	23.70
SL110	WT	2017-10-10	20.80
SL110	WT	2017-10-24	18.50
SL110	WT	2017-11-07	10.60
SL110	WT	2017-11-21	7.10
SL110	WT	2017-12-05	7.80
SL110	WT	2017-12-19	5.30
SL110	WT	2018-01-02	0.00
SL110	WT	2018-01-16	1.60
SL110	WT	2018-01-30	3.50
SL110	WT	2018-02-14	7.90
SL110	WT	2018-02-28	10.60
SL110	WT	2018-03-14	5.80
SL110	WT	2018-03-28	8.90
SL110	WT	2018-04-11	11.40
SL110	WT	2018-04-25	12.30
SL110	WT	2018-05-09	19.90
SL110	WT	2018-05-23	17.80
SL110	WT	2018-06-06	16.40
SL110	WT	2018-06-20	18.60
SL110	WT	2018-07-06	21.50
SL110	WT	2018-08-29	21.30
SL110	WT	2018-09-17	19.40
SL110	WT	2018-10-03	18.30
SL110	WT	2018-10-15	14.50
SL110	WT	2018-10-31	9.40
SL110	WT	2018-11-12	7.30
SL110	WT	2018-12-10	3.50
SL110	WT	2019-01-09	6.40
SL110	WT	2019-02-06	5.83
SL110	WT	2019-02-27	6.50
SL110	WT	2019-03-13	3.94
SL110	WT	2019-03-27	5.56
SL110	WT	2019-04-10	10.83

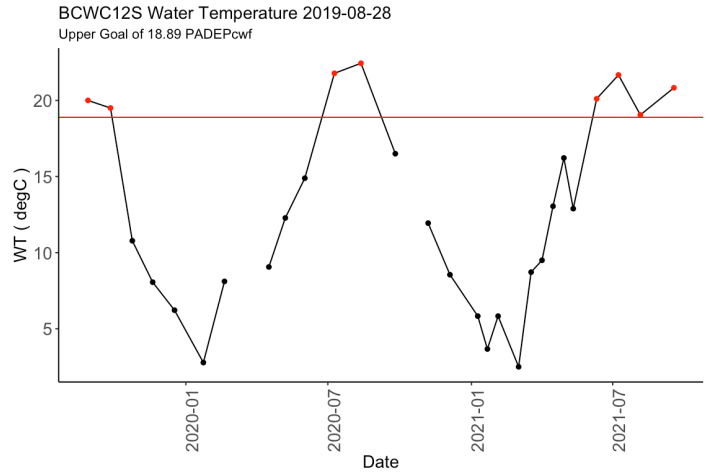
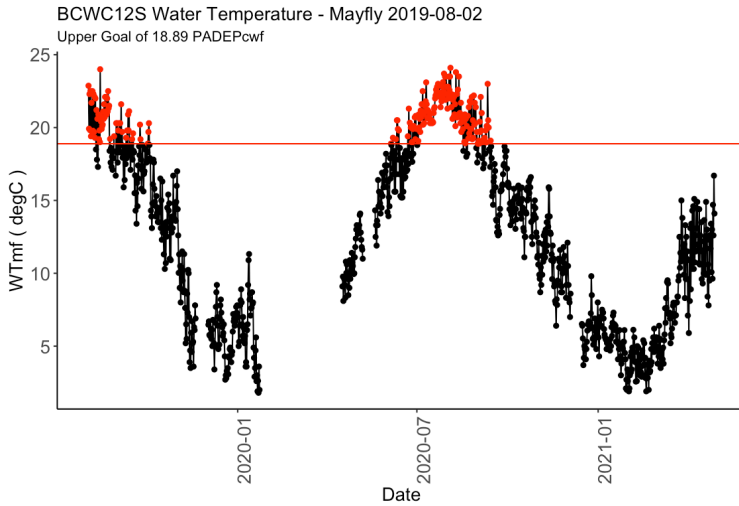
SL110	WTmf_M	2020-07-15	21.90
SL110	WTmf_M	2020-08-15	21.40
SL110	WTmf_M	2020-09-15	17.70
SL110	WTmf_M	2020-10-15	13.90
SL110	WTmf_M	2020-11-15	9.80
SL110	WTmf_M	2020-12-15	10.30
SL110	WTmf_M	2021-01-15	8.00
SL110	WTmf_M	2021-02-15	6.50
SL110	WTmf_M	2021-03-15	8.10
SL110	WTmf_M	2021-04-15	11.30
SL110	WTmf_M	2021-05-15	13.30

SL110	WT	2019-04-29	16.00
SL110	WT	2019-05-08	15.30
SL110	WT	2019-05-23	16.80
SL110	WT	2019-06-06	18.20
SL110	WT	2019-06-21	19.20
SL110	WT	2019-07-03	20.56
SL110	WT	2019-07-18	22.22
SL110	WT	2019-07-31	21.00
SL110	WT	2019-08-12	18.28
SL110	WT	2019-08-28	20.28
SL110	WT	2019-09-12	20.33
SL110	WT	2019-09-26	15.83
SL110	WT	2019-10-09	14.50
SL110	WT	2019-10-24	9.33
SL110	WT	2019-11-07	10.00
SL110	WT	2019-11-19	7.22
SL110	WT	2019-12-17	5.39
SL110	WT	2020-01-07	5.11
SL110	WT	2020-01-23	0.78
SL110	WT	2020-02-03	5.00
SL110	WT	2020-02-19	7.50
SL110	WT	2020-03-04	10.28
SL110	WT	2020-04-16	8.44
SL110	WT	2020-05-07	12.56
SL110	WT	2020-05-20	13.78
SL110	WT	2020-06-01	14.83
SL110	WT	2020-06-16	16.50
SL110	WT	2020-07-09	21.50
SL110	WT	2020-07-21	21.50
SL110	WT	2020-08-12	22.44
SL110	WT	2020-08-28	20.72
SL110	WT	2020-09-25	15.00
SL110	WT	2020-10-09	14.44
SL110	WT	2020-11-06	10.44
SL110	WT	2020-12-04	7.44
SL110	WT	2021-01-09	4.89
SL110	WT	2021-01-21	2.55
SL110	WT	2021-02-04	5.61
SL110	WT	2021-03-02	2.61
SL110	WT	2021-03-18	8.00
SL110	WT	2021-04-01	10.00
SL110	WT	2021-04-15	13.56
SL110	WT	2021-04-29	17.17
SL110	WT	2021-05-11	13.11
SL110	WT	2021-06-10	20.89
SL110	WT	2021-07-08	21.72
SL110	WT	2021-08-05	18.16
SL110	WT	2021-09-03	17.72
SL110	WT	2021-09-17	20.67

White Clay Wild and Scenic River Stream Watch Monitoring Program

Graphic presentation of Conductivity and Water Temperature taken by in-stream continuous data loggers (left) and hand measurements (right). Date Range 6/1/2017-9/17/2021.

Welcome and Rosehill on UT East Branch Water Temperature Sensor Readings (30 min averages) (left) and Bimonthly Field Readings (right) (BCWC12S, SL272)



Monthly Average Water Temperature (mayfly continuous sensor readings)

Site	Parameter	Date	Reading
SL272	WTmf_M	2019-08-15	19.90
SL272	WTmf_M	2019-09-15	18.20
SL272	WTmf_M	2019-10-15	14.40
SL272	WTmf_M	2019-11-15	7.90
SL272	WTmf_M	2019-12-15	5.80
SL272	WTmf_M	2020-01-15	5.80
SL272	WTmf_M	2020-04-15	10.40
SL272	WTmf_M	2020-05-15	14.30
SL272	WTmf_M	2020-06-15	18.00
SL272	WTmf_M	2020-07-15	21.50
SL272	WTmf_M	2020-08-15	20.80
SL272	WTmf_M	2020-09-15	17.60
SL272	WTmf_M	2020-10-15	14.30
SL272	WTmf_M	2020-11-15	10.80
SL272	WTmf_M	2020-12-15	6.50
SL272	WTmf_M	2021-01-15	5.30
SL272	WTmf_M	2021-02-15	4.00
SL272	WTmf_M	2021-03-15	7.90
SL272	WTmf_M	2021-04-15	11.30

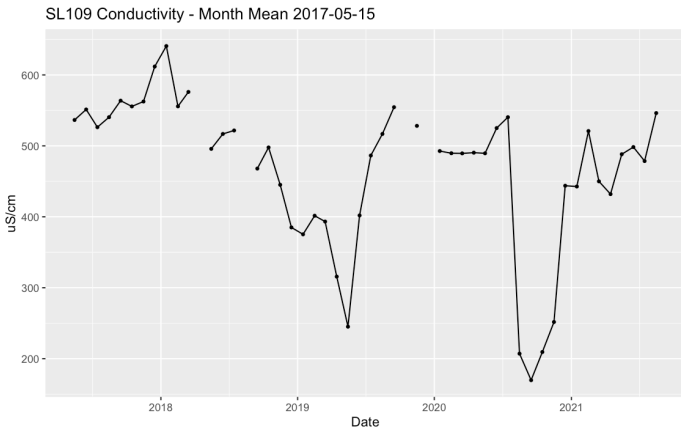
Monthly Water Temperature (hand held readings)

Site	Parameter	Date	Time	Reading
SL272	WT	2019-08-28	14:40	20.00
SL272	WT	2019-09-26	11:01	19.50
SL272	WT	2019-10-24	10:16	10.78
SL272	WT	2019-11-19	10:57	8.06
SL272	WT	2019-12-17	10:47	6.22
SL272	WT	2020-01-23	10:24	2.78
SL272	WT	2020-02-19	12:08	8.11
SL272	WT	2020-04-16	9:45	9.06
SL272	WT	2020-05-07	11:10	12.28
SL272	WT	2020-06-01	10:50	14.89
SL272	WT	2020-07-09	9:37	21.78
SL272	WT	2020-08-12	10:18	22.44
SL272	WT	2020-09-25	11:10	16.50
SL272	WT	2020-10-09		15.00
SL272	WT	2020-11-06	11:07	11.94
SL272	WT	2020-12-04	10:15	8.55
SL272	WT	2021-01-09	1:55	5.83
SL272	WT	2021-01-21	9:50	3.67
SL272	WT	2021-02-04	2:25	5.83
SL272	WT	2021-03-02	10:35	2.50
SL272	WT	2021-03-18	10:55	8.72
SL272	WT	2021-04-01	10:11	9.50
SL272	WT	2021-04-15	12:40	13.05
SL272	WT	2021-04-29	10:56	16.22
SL272	WT	2021-05-11	10:45	12.89
SL272	WT	2021-06-10	11:35	20.11
SL272	WT	2021-07-08	10:30	21.67
SL272	WT	2021-08-05	10:39	19.05
SL272	WT	2021-09-17	10:50	20.83

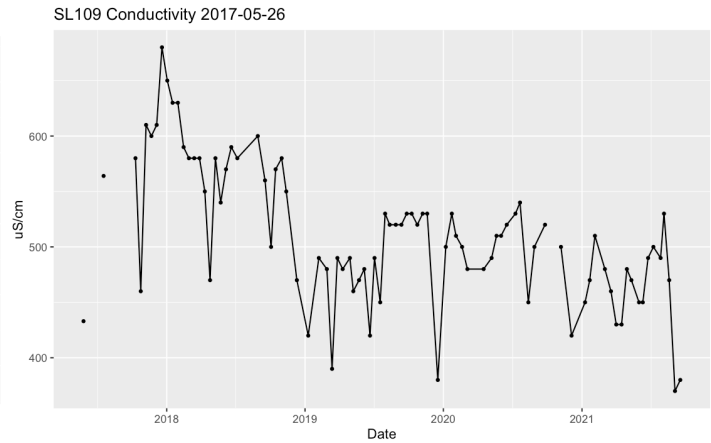
White Clay Wild and Scenic River Stream Watch Monitoring Program

Graphic presentation of Conductivity and Water Temperature taken by in-stream continuous data loggers (left) and hand measurements (right). Date Range 6/1/2017-9/17/2021.

Watson's Mill on East Branch Daily Mean Conductivity Sensor Readings (left) and Bimonthly Hand Readings (right) (WCCPA06, SL109)



SL109 CNDmf_M Conductivity - Month Mean, 2017-05-15



SL109 CND Conductivity, 2017-05-26

Monthly Average Conductivity from mayfly continuous sensor readings

Site	Parameter	Date	Reading
SL109	CNDmf_M	2017-05-15	536.50
SL109	CNDmf_M	2017-06-15	551.30
SL109	CNDmf_M	2017-07-15	526.30
SL109	CNDmf_M	2017-08-15	540.40
SL109	CNDmf_M	2017-09-15	563.70
SL109	CNDmf_M	2017-10-15	555.60
SL109	CNDmf_M	2017-11-15	562.50
SL109	CNDmf_M	2017-12-15	611.80
SL109	CNDmf_M	2018-01-15	640.70
SL109	CNDmf_M	2018-02-15	555.70
SL109	CNDmf_M	2018-03-15	576.00
SL109	CNDmf_M	2018-05-15	495.80
SL109	CNDmf_M	2018-06-15	516.80
SL109	CNDmf_M	2018-07-15	521.70
SL109	CNDmf_M	2018-09-15	468.00
SL109	CNDmf_M	2018-10-15	497.80
SL109	CNDmf_M	2018-11-15	445.10
SL109	CNDmf_M	2018-12-15	385.00
SL109	CNDmf_M	2019-01-15	375.30
SL109	CNDmf_M	2019-02-15	401.50
SL109	CNDmf_M	2019-03-15	393.30
SL109	CNDmf_M	2019-04-15	315.70
SL109	CNDmf_M	2019-05-15	245.10
SL109	CNDmf_M	2019-06-15	401.90
SL109	CNDmf_M	2019-07-15	486.40
SL109	CNDmf_M	2019-08-15	516.80
SL109	CNDmf_M	2019-09-15	554.50
SL109	CNDmf_M	2019-11-15	528.20
SL109	CNDmf_M	2020-01-15	492.70
SL109	CNDmf_M	2020-02-15	489.60
SL109	CNDmf_M	2020-03-15	489.40

Monthly hand held readings of Conductivity

Site	Parameter	Date	Reading
SL109	CND	2017-05-26	433.00
SL109	CND	2017-07-18	564.00
SL109	CND	2017-10-10	580.00
SL109	CND	2017-10-24	460.00
SL109	CND	2017-11-07	610.00
SL109	CND	2017-11-21	600.00
SL109	CND	2017-12-05	610.00
SL109	CND	2017-12-19	680.00
SL109	CND	2018-01-02	650.00
SL109	CND	2018-01-16	630.00
SL109	CND	2018-01-30	630.00
SL109	CND	2018-02-14	590.00
SL109	CND	2018-02-28	580.00
SL109	CND	2018-03-14	580.00
SL109	CND	2018-03-28	580.00
SL109	CND	2018-04-11	550.00
SL109	CND	2018-04-25	470.00
SL109	CND	2018-05-09	580.00
SL109	CND	2018-05-23	540.00
SL109	CND	2018-06-06	570.00
SL109	CND	2018-06-20	590.00
SL109	CND	2018-07-06	580.00
SL109	CND	2018-08-29	600.00
SL109	CND	2018-09-17	560.00
SL109	CND	2018-10-03	500.00
SL109	CND	2018-10-15	570.00
SL109	CND	2018-10-31	580.00
SL109	CND	2018-11-12	550.00
SL109	CND	2018-12-10	470.00
SL109	CND	2019-01-09	420.00
SL109	CND	2019-02-06	490.00
SL109	CND	2019-02-27	480.00
SL109	CND	2019-03-13	390.00
SL109	CND	2019-03-27	490.00

SL109	CNDmf_M	2020-04-15	490.40
SL109	CNDmf_M	2020-05-15	489.50
SL109	CNDmf_M	2020-06-15	525.10
SL109	CNDmf_M	2020-07-15	540.40
SL109	CNDmf_M	2020-08-15	207.10
SL109	CNDmf_M	2020-09-15	169.70
SL109	CNDmf_M	2020-10-15	209.40
SL109	CNDmf_M	2020-11-15	251.70
SL109	CNDmf_M	2020-12-15	443.80
SL109	CNDmf_M	2021-01-15	442.70
SL109	CNDmf_M	2021-02-15	520.90
SL109	CNDmf_M	2021-03-15	450.00
SL109	CNDmf_M	2021-04-15	432.00
SL109	CNDmf_M	2021-05-15	488.20
SL109	CNDmf_M	2021-06-15	498.30
SL109	CNDmf_M	2021-07-15	478.60
SL109	CNDmf_M	2021-08-15	546.20

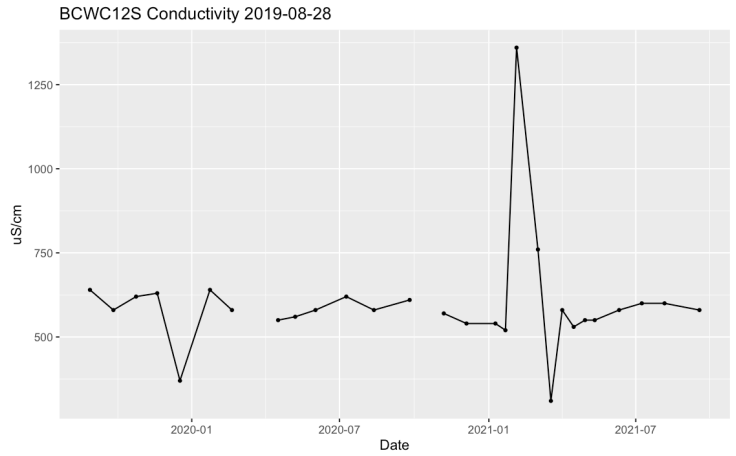
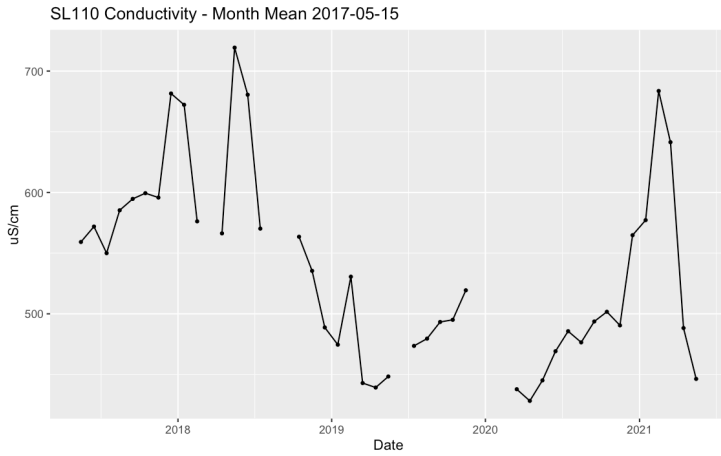
Note: Mayfly Continuous Data may not be accurate due to issues with sedimentation constantly burying the in -situ probes. Discrepancies were noticed when compared to the hand held meters.

SL109	CND	2019-04-10	480.00
SL109	CND	2019-04-29	490.00
SL109	CND	2019-05-08	460.00
SL109	CND	2019-05-23	470.00
SL109	CND	2019-06-06	480.00
SL109	CND	2019-06-21	420.00
SL109	CND	2019-07-03	490.00
SL109	CND	2019-07-18	450.00
SL109	CND	2019-07-31	530.00
SL109	CND	2019-08-12	520.00
SL109	CND	2019-08-28	520.00
SL109	CND	2019-09-12	520.00
SL109	CND	2019-09-26	530.00
SL109	CND	2019-10-09	530.00
SL109	CND	2019-10-24	520.00
SL109	CND	2019-11-07	530.00
SL109	CND	2019-11-19	530.00
SL109	CND	2019-12-17	380.00
SL109	CND	2020-01-07	500.00
SL109	CND	2020-01-23	530.00
SL109	CND	2020-02-03	510.00
SL109	CND	2020-02-19	500.00
SL109	CND	2020-03-04	480.00
SL109	CND	2020-04-16	480.00
SL109	CND	2020-05-07	490.00
SL109	CND	2020-05-20	510.00
SL109	CND	2020-06-01	510.00
SL109	CND	2020-06-16	520.00
SL109	CND	2020-07-09	530.00
SL109	CND	2020-07-21	540.00
SL109	CND	2020-08-12	450.00
SL109	CND	2020-08-28	500.00
SL109	CND	2020-09-25	520.00
SL109	CND	2020-10-09	520.00
SL109	CND	2020-11-06	500.00
SL109	CND	2020-12-04	420.00
SL109	CND	2021-01-09	450.00
SL109	CND	2021-01-21	470.00
SL109	CND	2021-02-04	510.00
SL109	CND	2021-03-02	480.00
SL109	CND	2021-03-18	460.00
SL109	CND	2021-04-01	430.00
SL109	CND	2021-04-15	430.00
SL109	CND	2021-04-29	480.00
SL109	CND	2021-05-11	470.00
SL109	CND	2021-05-31	450.00
SL109	CND	2021-06-10	450.00
SL109	CND	2021-06-24	490.00
SL109	CND	2021-07-08	500.00
SL109	CND	2021-07-27	490.00
SL109	CND	2021-08-05	530.00
SL109	CND	2021-08-19	470.00
SL109	CND	2021-09-03	370.00
SL109	CND	2021-09-17	380.00

White Clay Wild and Scenic River Stream Watch Monitoring Program

Graphic presentation of Conductivity and Water Temperature taken by in-stream continuous data loggers (left) and hand measurements (right). Date Range 5/15/2017-9/17/2021.

Egypt Run on East Branch Daily Mean Conductivity Sensor Readings (left) and Bimonthly Hand Readings (right) (BCWC12S, WCCPA07, SL110)



SL110 CNDmf_M Conductivity - Month Mean, 2017-05-15

BCWC12S CND Conductivity, 2019-08-28

Monthly Average Conductivity from mayfly continuous

Monthly hand held readings of Conductivity

Site	Parameter	Date	Reading
SL110	CNDmf_M	2017-05-15	559.20
SL110	CNDmf_M	2017-06-15	571.90
SL110	CNDmf_M	2017-07-15	550.00
SL110	CNDmf_M	2017-08-15	585.30
SL110	CNDmf_M	2017-09-15	594.70
SL110	CNDmf_M	2017-10-15	599.40
SL110	CNDmf_M	2017-11-15	595.80
SL110	CNDmf_M	2017-12-15	681.50
SL110	CNDmf_M	2018-01-15	672.20
SL110	CNDmf_M	2018-02-15	576.20
SL110	CNDmf_M	2018-04-15	566.30
SL110	CNDmf_M	2018-05-15	719.30
SL110	CNDmf_M	2018-06-15	680.50
SL110	CNDmf_M	2018-07-15	570.20
SL110	CNDmf_M	2018-10-15	563.50
SL110	CNDmf_M	2018-11-15	535.40
SL110	CNDmf_M	2018-12-15	488.80
SL110	CNDmf_M	2019-01-15	474.60
SL110	CNDmf_M	2019-02-15	530.60
SL110	CNDmf_M	2019-03-15	443.00
SL110	CNDmf_M	2019-04-15	439.30
SL110	CNDmf_M	2019-05-15	448.40
SL110	CNDmf_M	2019-07-15	473.60
SL110	CNDmf_M	2019-08-15	479.60
SL110	CNDmf_M	2019-09-15	493.30
SL110	CNDmf_M	2019-10-15	495.10
SL110	CNDmf_M	2019-11-15	519.40
SL110	CNDmf_M	2020-03-15	437.90
SL110	CNDmf_M	2020-04-15	428.30
SL110	CNDmf_M	2020-05-15	445.20
SL110	CNDmf_M	2020-06-15	469.20
SL110	CNDmf_M	2020-07-15	485.70
SL110	CNDmf_M	2020-08-15	476.50
SL110	CNDmf_M	2020-09-15	493.70
SL110	CNDmf_M	2020-10-15	501.70
SL110	CNDmf_M	2020-11-15	490.50

Site	Parameter	Date	Reading
SL110	CND	2017-05-26	525.00
SL110	CND	2017-05-31	546.00
SL110	CND	2017-06-13	553.00
SL110	CND	2017-07-18	554.00
SL110	CND	2017-10-10	620.00
SL110	CND	2017-10-24	440.00
SL110	CND	2017-11-07	610.00
SL110	CND	2017-11-21	610.00
SL110	CND	2017-12-05	600.00
SL110	CND	2017-12-19	770.00
SL110	CND	2018-01-02	670.00
SL110	CND	2018-01-16	660.00
SL110	CND	2018-01-30	720.00
SL110	CND	2018-02-14	630.00
SL110	CND	2018-02-25	576.00
SL110	CND	2018-02-28	610.00
SL110	CND	2018-03-02	576.00
SL110	CND	2018-03-14	620.00
SL110	CND	2018-03-28	600.00
SL110	CND	2018-04-11	560.00
SL110	CND	2018-04-25	580.00
SL110	CND	2018-05-09	560.00
SL110	CND	2018-05-23	590.00
SL110	CND	2018-06-06	580.00
SL110	CND	2018-06-20	560.00
SL110	CND	2018-07-06	540.00
SL110	CND	2018-08-29	580.00
SL110	CND	2018-09-17	580.00
SL110	CND	2018-10-03	580.00
SL110	CND	2018-10-15	580.00
SL110	CND	2018-10-31	570.00
SL110	CND	2018-11-12	560.00
SL110	CND	2018-12-10	490.00

SL110	CNDmf_M	2020-12-15	564.80
SL110	CNDmf_M	2021-01-15	577.20
SL110	CNDmf_M	2021-02-15	683.60
SL110	CNDmf_M	2021-03-15	641.40
SL110	CNDmf_M	2021-04-15	488.30
SL110	CNDmf_M	2021-05-15	446.40

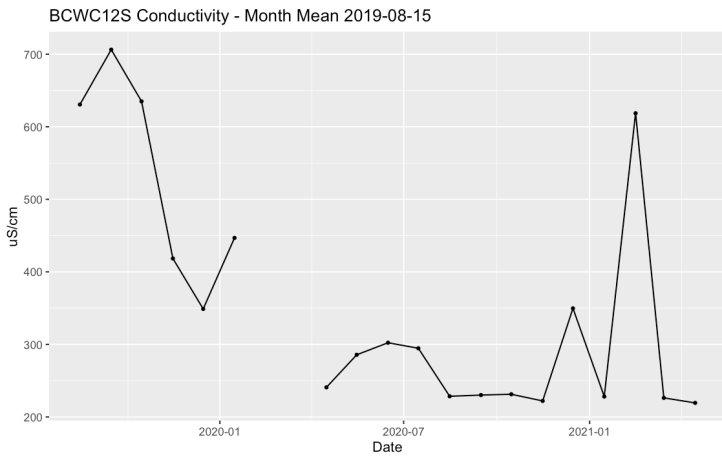
Note: Mayfly Continuous Data may not be accurate due to issues with sedimentation constantly burying the in -situ probes. Discrepancies were noticed when compared to the hand held meters.

SL110	CND	2019-01-09	480.00
SL110	CND	2019-02-06	460.00
SL110	CND	2019-02-27	510.00
SL110	CND	2019-03-13	200.00
SL110	CND	2019-03-27	500.00
SL110	CND	2019-04-10	470.00
SL110	CND	2019-04-29	470.00
SL110	CND	2019-05-08	430.00
SL110	CND	2019-05-23	460.00
SL110	CND	2019-06-06	480.00
SL110	CND	2019-06-21	490.00
SL110	CND	2019-07-03	480.00
SL110	CND	2019-07-18	480.00
SL110	CND	2019-07-31	490.00
SL110	CND	2019-08-12	490.00
SL110	CND	2019-08-28	250.00
SL110	CND	2019-09-12	500.00
SL110	CND	2019-09-26	520.00
SL110	CND	2019-10-09	510.00
SL110	CND	2019-10-24	530.00
SL110	CND	2019-11-07	530.00
SL110	CND	2019-11-19	520.00
SL110	CND	2019-12-17	380.00
SL110	CND	2020-01-07	500.00
SL110	CND	2020-01-23	500.00
SL110	CND	2020-02-03	490.00
SL110	CND	2020-02-19	490.00
SL110	CND	2020-03-04	460.00
SL110	CND	2020-04-16	460.00
SL110	CND	2020-05-07	480.00
SL110	CND	2020-05-20	470.00
SL110	CND	2020-06-01	480.00
SL110	CND	2020-06-16	490.00
SL110	CND	2020-07-09	490.00
SL110	CND	2020-07-21	500.00
SL110	CND	2020-08-12	490.00
SL110	CND	2020-08-28	500.00
SL110	CND	2020-09-25	500.00
SL110	CND	2020-10-09	500.00
SL110	CND	2020-11-06	500.00
SL110	CND	2020-12-04	470.00
SL110	CND	2021-01-09	480.00
SL110	CND	2021-01-21	480.00
SL110	CND	2021-02-04	550.00
SL110	CND	2021-03-02	490.00
SL110	CND	2021-03-18	450.00
SL110	CND	2021-04-01	490.00
SL110	CND	2021-04-15	460.00
SL110	CND	2021-04-29	450.00
SL110	CND	2021-05-11	460.00
SL110	CND	2021-06-10	460.00
SL110	CND	2021-07-08	490.00

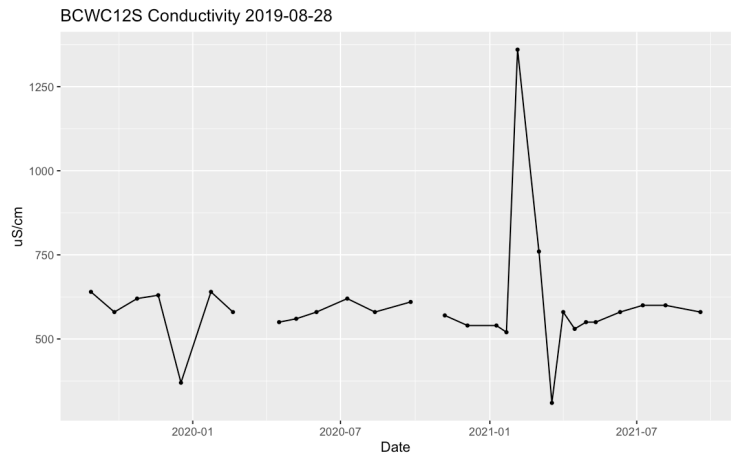
White Clay Wild and Scenic River Stream Watch Monitoring Program

Graphic presentation of Conductivity and Water Temperature taken by in-stream continuous data loggers (left) and hand measurements (right). Date Range 6/1/2017-9/17/2021.

Welcome and Rosehill on UT East Branch Daily Mean Conductivity Sensor Readings (left) and Bimonthly Hand Readings (right) (BCWC12S, SL272)



BCWC12S CNDmf_M Conductivity - Month Mean, 2019-08-15



BCWC12S CND Conductivity, 2019-08-28

Monthly Average Conductivity from mayfly continuous sensor readings

Site	Parameter	Date	Reading
SL272	CNDmf_M	2019-08-15	630.60
SL272	CNDmf_M	2019-09-15	706.30
SL272	CNDmf_M	2019-10-15	635.00
SL272	CNDmf_M	2019-11-15	418.40
SL272	CNDmf_M	2019-12-15	348.90
SL272	CNDmf_M	2020-01-15	446.80
SL272	CNDmf_M	2020-04-15	240.80
SL272	CNDmf_M	2020-05-15	285.70
SL272	CNDmf_M	2020-06-15	302.30
SL272	CNDmf_M	2020-07-15	294.70
SL272	CNDmf_M	2020-08-15	228.50
SL272	CNDmf_M	2020-09-15	230.20
SL272	CNDmf_M	2020-10-15	231.30
SL272	CNDmf_M	2020-11-15	222.10
SL272	CNDmf_M	2020-12-15	349.70
SL272	CNDmf_M	2021-01-15	228.10
SL272	CNDmf_M	2021-02-15	618.60
SL272	CNDmf_M	2021-03-15	226.30
SL272	CNDmf_M	2021-04-15	219.40

Monthly hand held readings of Conductivity

Site	Parameter	Date	Time	Reading
SL272	CND	2019-08-28	14:40	640.00
SL272	CND	2019-09-26	11:01	580.00
SL272	CND	2019-10-24	10:16	620.00
SL272	CND	2019-11-19	10:57	630.00
SL272	CND	2019-12-17	10:47	370.00
SL272	CND	2020-01-23	10:24	640.00
SL272	CND	2020-02-19	12:08	580.00
SL272	CND	2020-04-16	9:45	550.00
SL272	CND	2020-05-07	11:10	560.00
SL272	CND	2020-06-01	10:50	580.00
SL272	CND	2020-07-09	9:37	620.00
SL272	CND	2020-08-12	10:18	580.00
SL272	CND	2020-09-25	11:10	610.00
SL272	CND	2020-10-09	NA	590.00
SL272	CND	2020-11-06	11:07	570.00
SL272	CND	2020-12-04	10:15	540.00
SL272	CND	2021-01-09	1:55	540.00
SL272	CND	2021-01-21	9:50	520.00
SL272	CND	2021-02-04	2:25	1360.00
SL272	CND	2021-03-02	10:35	760.00
SL272	CND	2021-03-18	10:55	310.00
SL272	CND	2021-04-01	10:11	580.00
SL272	CND	2021-04-15	12:40	530.00
SL272	CND	2021-04-29	10:56	550.00
SL272	CND	2021-05-11	10:45	550.00
SL272	CND	2021-06-10	11:35	580.00
SL272	CND	2021-07-08	10:30	600.00
SL272	CND	2021-08-05	10:39	600.00
SL272	CND	2021-09-17	10:50	580.00

Note: Mayfly Continuous Data may not be accurate due to issues with sedimentation constantly burying the in-situ probes. Discrepancies were noticed when compared to the hand held meters.

White Clay Wild and Scenic River Stream Watch Monitoring Program

Statistics for Bacteria Enterococcus (ENT) and E. Coli (ECOLI) during the summer recreational season at baseflow (baseflow defined as <0.25" rain in 48 hour period) . Five samples were collect at each site within a 30 day period during the summer season (2015-2020). Note Enterococcus samples were taken to provide comparison to Delaware Standards across the watershed.

Fecal bacteria geometric means averaged over the entire sampling period. Exceedances of standards noted in red indicate impairment.

SiteID	Site Description	Sampling Years	Samples Taken	Enterococcus GeoMean (MPN)	DNREC Standard for Primary Contact ENT (MPN)	E coli GeoMean (MPN)	PADEP Standard for Primary Contact ECOLI (MPN)
WCCPA01	Strickersville Main near USGS gage	2015-2020	25	156	100	231	126
WCCPA03	Sharpless Bridge West Branch	2015-2020	25, 35	132	100	229	126
WCCPA05	Good Hope East Branch	2015-2020	25, 35	205	100	501	126
WCCPA06	Watson's Mill	2015-2020	25, 35	406	100	561	126
WCCPA06_B	Somerset out	2017-2020	20	146	100	86	126
WCCPA06_C	Somerset in	2017-2020	20	642	100	472	126
WCCPA07	Egypt Run	2015-2020	25, 40	486	100	437	126
WCCPA07_B	Pelham	2017-2020	20	1682	100	1067	126
WCCPA08	Clay Creek east branch	2015-2020	25, 35	349	100	721	126
WCCPA09	Guernsey Middle Branch	2015-2020	25, 35	139	100	233	126
WCCPA11	Flint Hill West branch	2015-2020	25, 35	157	100	331	126
WCCPA12	Wickerton middle branch	2016-2020	25	131	100	199	126
WCCPA13	Avondale WWTP East	2015-2020	25, 35	174	100	766	126
WCCPA15	Avondale Playground East	2015-2020	25, 35	281	100	482	126
WCCPA16	ELG west fork upper east	2016-2020	25	407	100	500	126
WCCPA18	Laurel Woods East	2016-2020	25	513	100	347	126
WCCPA19	Loyd Road Upper East SUEZ Stroud site	2017-2020	20	745	100	39886	126
WCCPA20	WLG SUEZ Stroud site	2017-2020	20	599	100	499	126
WCCPA23	WCC Stroud Lab	2016-2017	10	418	100	296	126
WCCPA24	Mercer Mill on Middle Branch	2018-2020	15	103	100	128	126
WCCPA43	Welcome and Rosehill	2019-2020	10	531	100	336	126

Fecal Bacteria Annual Geometric Means. Exceedances of standards noted in red indicate impairment.

Statistics for Bacteria Enterococcus (ENT) and E. Coli (ECOLI) during the summer recreational season at baseflow (baseflow defined as <0.25" rain in 48 hour period) . Five samples were collect at each site within a 30 day period during the summer season (2013-2020)

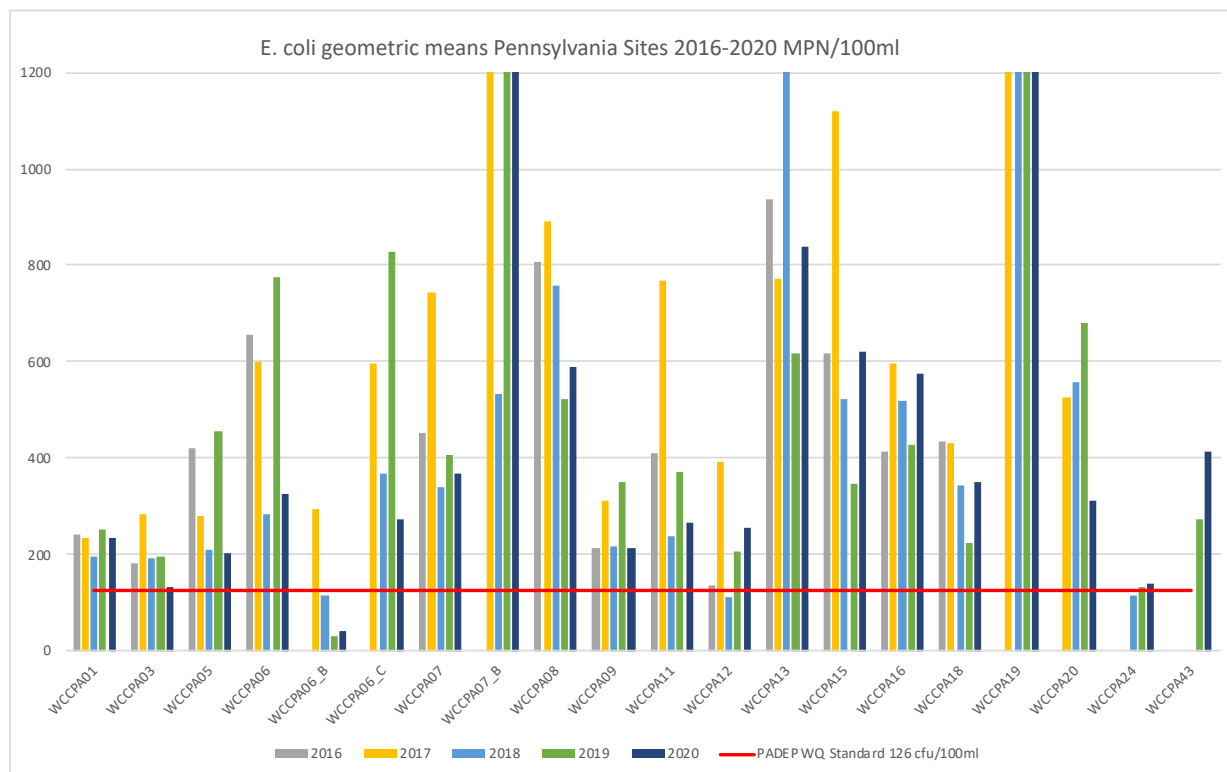
SiteID	Site Description	Sampling Month	Samples Taken	Enterococcus GeoMean (MPN)	DNREC Standard for Primary Contact ENT (MPN)	E coli GeoMean (MPN)	PADEP Standard for Primary Contact ECOLI (MPN)
WCCPA01	Strickersville Main near USGS gage	2013-07-30	5	NA	100	86.5	126
WCCPA01	Strickersville Main near USGS gage	2016 -07-18	5	104.3	100	242.9	126
WCCPA01	Strickersville Main near USGS gage	2017-07-12	5	160.50	100	235.2	126
WCCPA01	Strickersville Main near USGS gage	2018-08-08	5	67.50	100	195.7	126
WCCPA01	Strickersville Main near USGS gage	2019-07-26	5	324.50	100	252.1	126
WCCPA01	Strickersville Main near USGS gage	2020-07-27	5	252.30	100	235.60	126
WCCPA03	Sharpless Bridge West Branch	2013-07-30	5	NA	100	45.7	126
WCCPA03	Sharpless Bridge West Branch	2014-08-21	5	NA	100	130.6	126
WCCPA03	Sharpless Bridge West Branch	2015-07-20	5	NA	100	355.4	126
WCCPA03	Sharpless Bridge West Branch	2015-08-05	5	NA	100	365.4	126
WCCPA03	Sharpless Bridge West Branch	2016-07-12	5	63.5	100	182.6	126
WCCPA03	Sharpless Bridge West Branch	2017-07-12	5	267.2	100	280.4	126
WCCPA03	Sharpless Bridge West Branch	2018-08-08	5	81.7	100	192.4	126
WCCPA03	Sharpless Bridge West Branch	2019-07-26	5	169.1	100	194.8	126
WCCPA03	Sharpless Bridge West Branch	2020-07-27	5	173.70	100	131.20	126
WCCPA05	Good Hope East Branch	2013-07-30	5	NA	100	291.6	126
WCCPA05	Good Hope East Branch	2014-08-21	5	NA	100	555.3	126
WCCPA05	Good Hope East Branch	2015-07-20	5	NA	100	1667.9	126
WCCPA05	Good Hope East Branch	2015-08-05	5	NA	100	858.2	126
WCCPA05	Good Hope East Branch	2016-07-12	5	129.5	100	421.5	126
WCCPA05	Good Hope East Branch	2017-07-12	5	142.6	100	274.3	126

WCCPA05	Good Hope East Branch	2018-08-08	5	129.7	100	209.1	126
WCCPA05	Good Hope East Branch	2019-07-26	5	519.4	100	456.7	126
WCCPA05	Good Hope East Branch	2020-07-27	5	290.8	100	203	126
WCCPA06	Watson's Mill	2013-07-30	5	NA	100	448.8	126
WCCPA06	Watson's Mill	2014-08-21	5	NA	100	383.2	126
WCCPA06	Watson's Mill	2015-07-20	5	NA	100	860.5	126
WCCPA06	Watson's Mill	2015-08-05	5	NA	100	644.3	126
WCCPA06	Watson's Mill	2016-07-12	5	356.6	100	654.9	126
WCCPA06	Watson's Mill	2017-07-12	5	458.6	100	596.8	126
WCCPA06	Watson's Mill	2018-08-08	5	236.8	100	282.7	126
WCCPA06	Watson's Mill	2019-07-26	5	284.5	100	776.2	126
WCCPA06	Watson's Mill	2020-07-27	6	996.56	100	366.27	126
WCCPA06_A	Broad Run	2017-07-12	5	383.4	100	527.9	126
WCCPA06_B	Somerset out	2017-07-12	5	129.3	100	306.1	126
WCCPA06_B	Somerset out	2018-08-08	5	131.3	100	115.9	126
WCCPA06_B	Somerset out	2019-07-26	6	83.9	100	28.9	126
WCCPA06_B	Somerset out	2020-07-27	6	322.40	100	52.98	126
WCCPA06_C	Somerset in	2017-07-12	5	732	100	594.3	126
WCCPA06_C	Somerset in	2018-08-08	5	405.7	100	366.8	126
WCCPA06_C	Somerset in	2019-07-26	5	480.8	100	827.5	126
WCCPA06_C	Somerset in	2020-07-27	5	1188.21	100	274	126
WCCPA07	Egypt Run	2013-08-05	5	NA	100	405.5	126
WCCPA07	Egypt Run	2013-08-23	5	NA	100	501.5	126
WCCPA07	Egypt Run	2014-08-21	5	NA	100	184.2	126
WCCPA07	Egypt Run	2015-07-20	5	NA	100	571.6	126
WCCPA07	Egypt Run	2015-08-05	5	NA	100	258.7	126
WCCPA07	Egypt Run	2016-07-12	5	395.9	100	452.6	126
WCCPA07	Egypt Run	2017-07-12	5	635.3	100	744.5	126
WCCPA07	Egypt Run	2018-08-08	5	327.4	100	341	126
WCCPA07	Egypt Run	2019-07-26	5	395.9	100	407.5	126
WCCPA07	Egypt Run	2020-07-27	5	831	100	367.32	126
WCCPA07_B	Pelham	2017-07-12	5	1902.5	100	1572.3	126
WCCPA07_B	Pelham	2018-08-08	5	1031	100	531.8	126
WCCPA07_B	Pelham	2019-07-26	5	1129.3	100	1244.1	126
WCCPA07_B	Pelham	2020-07-27	5	3616	100	1246.10	126
WCCPA08	Clay Creek east branch	2013-08-05	5	NA	100	176.9	126
WCCPA08	Clay Creek east branch	2013-08-23	5	NA	100	594.9	126
WCCPA08	Clay Creek east branch	2014-08-21	5	NA	100	162	126
WCCPA08	Clay Creek east branch	2015-07-20	5	NA	100	938.3	126
WCCPA08	Clay Creek east branch	2015-08-05	5	NA	100	645.6	126
WCCPA08	Clay Creek east branch	2016-07-12	5	206.4	100	808.2	126
WCCPA08	Clay Creek east branch	2017-07-12	5	585.3	100	889.6	126
WCCPA08	Clay Creek east branch	2018-08-08	5	402.3	100	757	126
WCCPA08	Clay Creek east branch	2019-07-26	5	466.1	100	520.8	126
WCCPA08	Clay Creek east branch	2020-07-27	5	228.6	100	587.5	126
WCCPA09	Guernsey Middle Branch	2013-08-05	5	NA	100	71	126
WCCPA09	Guernsey Middle Branch	2013-08-23	5	NA	100	122.4	126
WCCPA09	Guernsey Middle Branch	2014-08-21	5	NA	100	118.5	126
WCCPA09	Guernsey Middle Branch	2015-07-20	5	NA	100	327.8	126
WCCPA09	Guernsey Middle Branch	2015-08-05	5	NA	100	108.1	126
WCCPA09	Guernsey Middle Branch	2016-07-12	5	103.9	100	211.4	126
WCCPA09	Guernsey Middle Branch	2017-07-12	5	181.8	100	310.1	126
WCCPA09	Guernsey Middle Branch	2018-08-08	5	80.6	100	215.9	126
WCCPA09	Guernsey Middle Branch	2019-07-26	5	146.4	100	349	126
WCCPA09	Guernsey Middle Branch	2020-07-27	5	229.7	100	214.1	126
WCCPA11	Flint Hill West branch	2013-08-05	5	NA	100	93.6	126
WCCPA11	Flint Hill West branch	2013-08-23	5	NA	100	163.6	126

WCCPA11	Flint Hill West branch	2014-08-21	5	NA	100	98	126
WCCPA11	Flint Hill West branch	2015-07-20	5	NA	100	272.5	126
WCCPA11	Flint Hill West branch	2015-08-05	5	NA	100	214.1	126
WCCPA11	Flint Hill West branch	2016-07-12	5	149.5	100	418.5	126
WCCPA11	Flint Hill West branch	2017-07-12	5	286.1	100	764	126
WCCPA11	Flint Hill West branch	2018-08-08	5	73.1	100	237.1	126
WCCPA11	Flint Hill West branch	2019-07-26	5	123.4	100	372.4	126
WCCPA11	Flint Hill West branch	2020-07-27	5	246.5	100	265.5	126
WCCPA12	Wickerton middle branch	2014-08-21	5	NA	100	87.4	126
WCCPA12	Wickerton middle branch	2016-07-12	5	89.8	100	136.2	126
WCCPA12	Wickerton middle branch	2017-07-12	5	178.2	100	396.4	126
WCCPA12	Wickerton middle branch	2018-08-08	5	73.5	100	110.9	126
WCCPA12	Wickerton middle branch	2019-07-26	5	155.9	100	206.7	126
WCCPA12	Wickerton middle branch	2020-07-27	5	213.3	100	253.8	126
WCCPA13	Avondale WWTP East	2014-08-21	5	NA	100	364.2	126
WCCPA13	Avondale WWTP East	2015-07-20	5	NA	100	487.7	126
WCCPA13	Avondale WWTP East	2015-08-05	5	NA	100	593.8	126
WCCPA13	Avondale WWTP East	2016-07-12	5	252	100	938.2	126
WCCPA13	Avondale WWTP East	2017-07-12	5	342.2	100	730.6	126
WCCPA13	Avondale WWTP East	2018-08-08	5	64	100	1498.5	126
WCCPA13	Avondale WWTP East	2019-07-26	5	170.6	100	618.4	126
WCCPA13	Avondale WWTP East	2020-07-27	5	170.2	100	838.8	126
WCCPA15	Avondale Playground East	2014-08-21	5	NA	100	204.7	126
WCCPA15	Avondale Playground East	2015-07-20	5	NA	100	279.2	126
WCCPA15	Avondale Playground East	2015-08-05	5	NA	100	399.7	126
WCCPA15	Avondale Playground East	2016-07-12	5	346.1	100	616.7	126
WCCPA15	Avondale Playground East	2017-07-12	5	255.9	100	998.0	126
WCCPA15	Avondale Playground East	2018-08-08	5	80.3	100	523.1	126
WCCPA15	Avondale Playground East	2019-07-26	5	491.9	100	348.3	126
WCCPA15	Avondale Playground East	2020-07-27	5	499.8	100	620.20	126
WCCPA16	ELG west fork upper east	2014-08-21	5	NA	100	87.1	126
WCCPA16	ELG west fork upper east	2016-07-12	5	459.4	100	414.2	126
WCCPA16	ELG west fork upper east	2017-07-12	5	568	100	589.1	126
WCCPA16	ELG west fork upper east	2018-08-08	5	228.3	100	517.4	126
WCCPA16	ELG west fork upper east	2019-07-26	5	317.4	100	428.6	126
WCCPA16	ELG west fork upper east	2020-07-27	5	588.10	100	576	126
WCCPA18	Laurel Woods East	2016-07-12	5	361.4	100	436	126
WCCPA18	Laurel Woods East	2017-07-12	5	755.8	100	433.6	126
WCCPA18	Laurel Woods East	2018-08-08	5	366.6	100	343.8	126
WCCPA18	Laurel Woods East	2019-07-26	5	360.7	100	222.6	126
WCCPA18	Laurel Woods East	2020-07-27	5	986.30	100	350.9	126
WCCPA19	Loyd Road Upper East SUEZ Stroud site	2017-07-12	5	895.7	100	24738.6	126
WCCPA19	Loyd Road Upper East SUEZ Stroud site	2018-08-08	5	352.6	100	51369.8	126
WCCPA19	Loyd Road Upper East SUEZ Stroud site	2019-07-26	5	460.5	100	18587.3	126
WCCPA19	Loyd Road Upper East SUEZ Stroud site	2020-07-27	5	2114.7	100	107152.2	126
WCCPA20	WLG SUEZ Stroud site	2017-07-12	5	569.2	100	525.3	126
WCCPA20	WLG SUEZ Stroud site	2018-08-08	5	447.5	100	557.3	126
WCCPA20	WLG SUEZ Stroud site	2019-07-26	5	715.5	100	678.7	126
WCCPA20	WLG SUEZ Stroud site	2020-07-27	5	706.9	100	312.6	126
WCCPA23	WCC Stroud Lab	2016-07-12	5	412.8	100	437	126
WCCPA23	WCC Stroud Lab	2017-07-05	5	422.7	100	519.1	126
WCCPA24	Mercer Mill on Middle Branch	2018-08-08	5	56.3	100	114.1	126
WCCPA24	Mercer Mill on Middle Branch	2019-07-26	5	116.8	100	131.3	126
WCCPA24	Mercer Mill on Middle Branch	2020-07-27	5	166.6	100	139	126
WCCPA43	Welcome and Rosehill	2019-07-26	5	311	100	272.4	126
WCCPA43	Welcome and Rosehill	2020-07-27	5	906	100	413.3	126

White Clay Wild and Scenic River Stream Watch Monitoring Program

Graphical presentation of fecal bacteria concentrations, *Escherichia coli* (ECOL) during summer recreational seasons (2016-2020) at base flow (baseflow defined as <0.25" rain in 48 hour period) . A minimum of five samples were collected at each site within a 30 day period during the summer season and geometric means were recorded. Exceedence of standards (red line) indicates impairment. All samples were processed at Stroud Water Research Center using the Idexx method.



Recreational Bacteria (Escherichia coli) Geometric Means MPN/100ml 2016-2020

Site Name	Site ID	2016	2017	2018	2019	2020
Strickersville	WCCPA01	242.9	235.2	195.7	252.1	235.6
Sharpless	WCCPA03	182.7	284.5	192.4	194.8	131.2
Good Hope	WCCPA05	421.5	278.6	209.1	457	203
Watsons Mill	WCCPA06	654.9	600.4	282.7	776.2	325
Somerset Out	WCCPA06_B	NA	294.9	115.9	28.9	41.2
Somerset In	WCCPA06_C	NA	594.3	366.8	827.5	274
Egypt Run	WCCPA07	452.6	744.5	341	407.5	367.3
Pelham	WCCPA07_B	NA	1572.3	531.8	1244.1	1246.1
Clay Creek	WCCPA08	808.2	889.6	757	520.8	587.5
Guernsey	WCCPA09	211.4	310.1	215.9	349	214.1
Flint Hill	WCCPA11	408.3	768.5	237.1	372.4	265.5
Wickerton	WCCPA12	136.2	392.4	110.9	206.7	253.8
Avondale WWTP	WCCPA13	938.2	771.4	1498.5	618.4	838.8
Avondale PG	WCCPA15	616.7	1120.1	523.1	348.3	620.2
ELG	WCCPA16	414.2	597.6	517.4	428.6	576
Laurel	WCCPA18	436	429.4	343.8	222.6	350.9
Loyd	WCCPA19	NA	24738.6	51375.3	18587.3	107152.2
WLG	WCCPA20	NA	525.3	557.3	678.7	312.6
Mercer Mill	WCCPA24	NA	NA	114.1	131.3	139
Welcome and Rosehill	WCCPA43	NA	NA	NA	272.4	413.3

Bacteria Sampling Procedure

Equipment for field sampling

- Instructions
- 125-ml sample bottles (1 per site unless taking replicate or blank) or 1000ml Whirlpack bags if using Stroud Lab.
- Cooler and ice packs
- Field Data Sheets (One per site)
- Chain of Custody Form (All samples collected on same day can be placed on one chain of custody sheet.) Most private labs will require this, Stroud does not for bacteria sampling.
- Ball point pen, pencil
- Sharpie (permanent marker in clipboard)
- Extra bottle/bag at sampling site where replicates ~~and blanks~~ are performed and a small backpack or pouch for storing the extra bottles.
- Waders, boots or old sneakers that can get wet.
- Rubber or non-powdered latex/plastic gloves (optional)
- ~~- Distilled water (This is essentially purified water, free of any bacteria. You will need one for every 10 samples.~~
- Hand sanitizer (optional)

Before sampling

Check Precipitation. We are looking for less than .25 inches in the previous 48 hours. Visit: <http://www.deos.udel.edu/>

Data>current conditions AND

Data>daily summaries

I look at data for Hockessin VFC (there are two do not use the Mt Cuba station) and Newark White Clay Creek

Plan to sample the furthest downstream site first and then move to the upstream sites.

1. Fill out the Field Data Sheet, including weather information. There will be one Field Data Sheet for all of the sampling sites. Please add DO (dissolved Oxygen), Temperature, and Conductivity measurements to each Field Sheet.
2. Fill out the Lab Form. You can place ALL samples collected that day on ONE lab form.
3. Make sure that sample bottle is labeled with a black indelible ink pen BEFORE getting it wet. For example,

Name of responsible organization:

WCWA

Test(s) to be run:

E. coli, NO3N, etc.

Stream Name:

White Clay Creek

Date:

08082012

Site ID:

SL157

Time (military time):

1320

Samplers Name:

Kelly Jacobs

Collecting the sample:

1. Try to sample mid-channel, mid-depth. Avoid stagnant water and eddies. Face upstream.

2. Do not disturb the bottom sediment. Do not collect sediment in your stream sample. If sediment is disturbed, stand in the stream and wait a period of time for the sediment to wash downstream.
3. Remove the caps from the bottle just before filling with stream water. **Make sure nothing – including your fingers – comes into contact with the inside surfaces of the bottle or cap.** Wear gloves if necessary.
4. DO NOT rinse the 125-ml bottles! (When you receive the bottles they already contain a small amount of chemical fixative that needs to stay in the sample. For this reason, the bottles cannot be rinsed.) If the bottle have a pill at the bottom, leave that in the bottle when you sample.
5. Hold the uncapped bottle near the base with the **opening facing directly downward at the water**. Then plunge the bottle, open end first, below the water surface and collect the water sample from 8-12” beneath the surface, but not against the substrate. If the stream is not that deep, collect the sample at mid-depth, if possible. Do this by turning the submerged bottle into the current and away from you, in an upstream dipping motion.
6. Try to leave a little air space in the bottle, but not more than one inch. If the bottle comes up completely full, simply pour off the excess water to about the shoulder or the bottom of the threads on the neck.
7. Recap the bottle and immediately place it into the cooler with ice.

Collecting Blanks and Replicates

For every 10 water samples you collect and send to a lab for analysis, you will also need to collect one “replicate” ~~plus one “blank” sample~~ at a site. (If you sample all sites in one day there should be one blank and one replicate) Only indicate the fact that the sample is a blank or replicate on the field sheet.

For our sampling the number 15 was chosen for the blank and 16 was chosen for the replicate. Note only the field sheet which site the replicate was taken at.

Submitting a Blank:

- ~~1. At the sampling site write "B" on label of bottle and label the bottle for **Test: E. coli** and the field/lab sheets after the date (for example: 05022012-B)~~
- ~~2. **Fill the sample bottle with the sterile water provided by the lab in the sterile water bottle. Do not simply label and submit the sterile water bottle!** Discard empty sterile water bottle.~~
- ~~3. Indicate on the Field Data Sheet if the sample is a blank.~~

Submitting a Replicate:

1. At the sampling site write "R" on the label and field/lab sheets for Replicate after unique site ID letter (for example: 05022012-R), Indicate on the Field Data Sheet that this is a replicate and note **which site the replicate was taken at**. For this example, the replicate was collected at Site 12. Label one additional 125 mL bottle with the code (05022012-R) for the replicate E. coli sample.
2. Take both the sample bottle and the bottle for the replicate to the place in the stream where you will be sampling (mid-channel). It is helpful to have a pocket or small pack/pouch to store the extra bottle while filling each sample, avoiding any contamination.
3. Follow procedure above for taking a sample (steps 1-7) but fill both bottles.

ALL samples need to go on ice immediately and should be brought to the lab within 6 hours from sampling time.

If using Brandywine Science Center:

Take the samples with the Lab sheet to: Brandywine Science Center located at: 204 Line Road in Kennett Square Pennsylvania. 610-444-9850

Lab Hours: M-F 9am-5pm

Sign the Chain of Custody sheet and have the person taking the samples at the lab sign the sheet also.

Leave the Chain of Custody sheet with the samples at the lab. Please provide my email (mpc@whiteclay.org) to the lab.

INVOICING: All tests should be invoiced to White Clay Creek Watershed Association care of Shane Morgan, 182 Sawmill Road, Landenberg, PA 19350 – they can be emailed to mpc@whiteclay.org. Have them call me with any questions: 484-716-6836.

Return the Field sheets to me or scan and send to:

mpc@whiteclay.org

****Remember to get replacement 125-ml sterile sampling bottles when you bring the first samples into lab if using DEP lab. Stroud and DNS will accept sterile 1000ml whirlpack bags for their testing, all other procedures should be followed.**

NOTE: in 2016 we discontinued blanks and only do replicates for quality control.