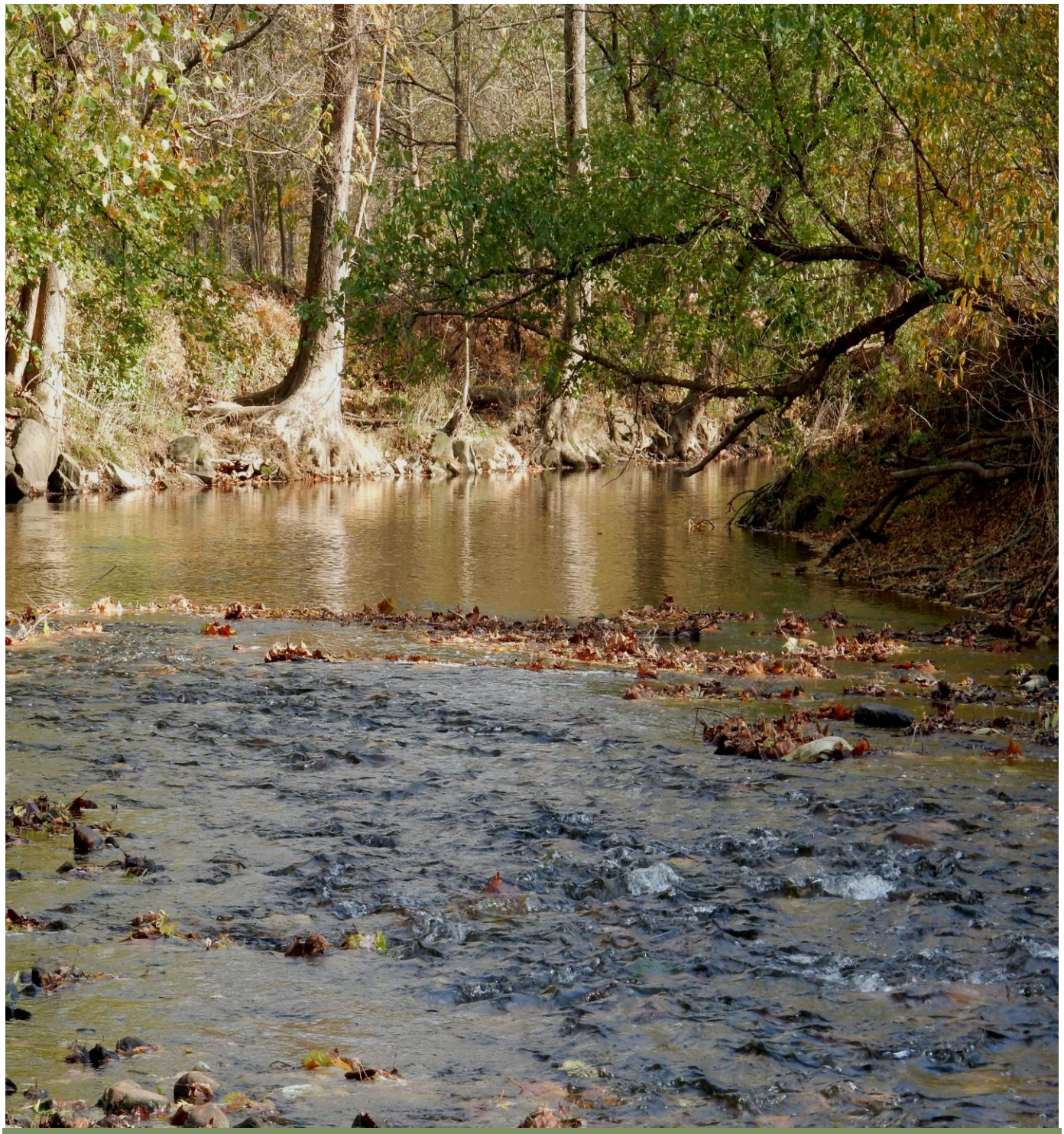


Delaware Stream Watch

Volunteer Data Summary

1994 – 2019

Prepared by Kevin Popowich

Delaware Nature Society

Delaware Stream Watch

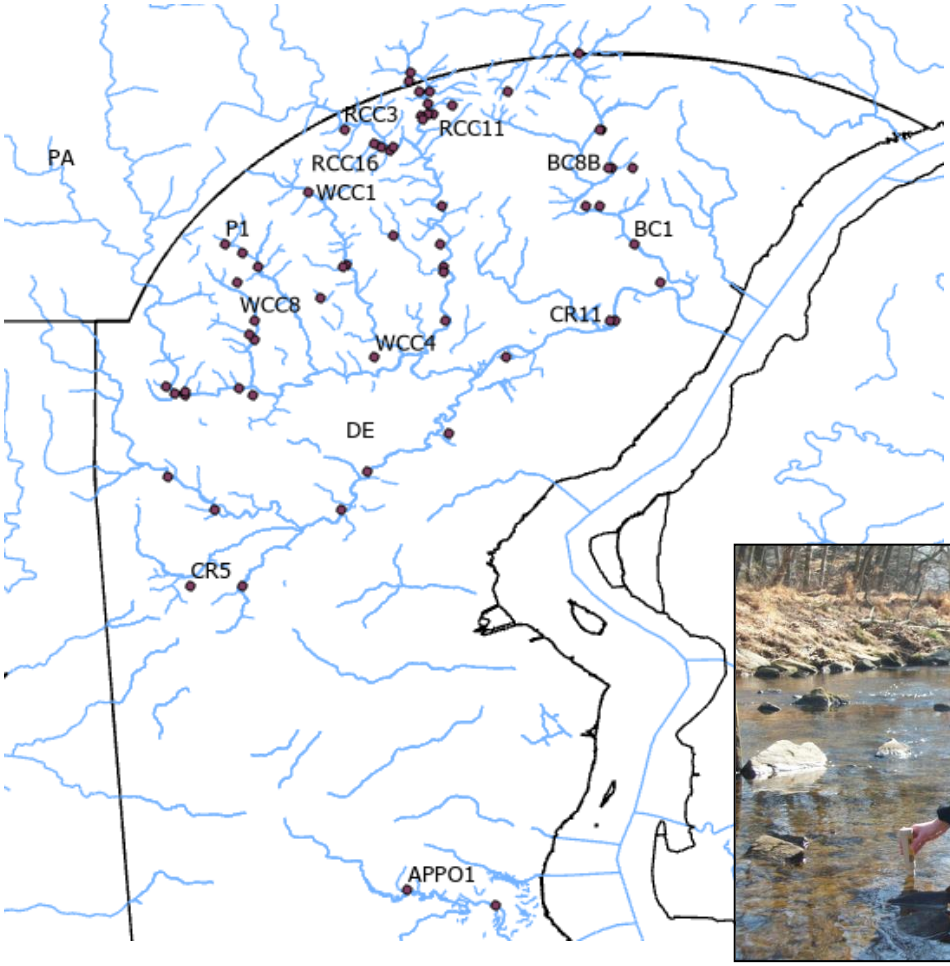
Data Summary 1994 - 2019

Delaware Stream Watch was established in 1992 to engage volunteers in providing baseline chemical and physical data on waterways primarily in the Christina Basin in Northern Delaware.

Volunteers in Delaware Stream Watch Technical Monitoring program monitor designated long-term monitoring sites on a monthly basis, testing for dissolved oxygen, pH, alkalinity, nitrate nitrogen, phosphates, conductivity, and temperature. Annual quality control helps to ensure consistency and control in sampling techniques. Data is collected through a combination of field test kits and meters.

Special thanks to the dedicated volunteers who take time out of their busy schedules to make a difference for our waterways!

Sampling Locations



Delaware Stream Watch

Delaware Stream Watch is a citizen science program, run by the Delaware Nature Society, that engages volunteers in monitoring the quality of local waters.

Data is shared on the Delaware Nature Society website and is used to inform watershed planning and outreach efforts.

Learn more & become involved:

Delnature.org/streamwatch

1994 – 2019 Stream Watch Data Averages

Appoquinimink River	Alkalinity (mg/L)	Dissolved Oxygen (mg/L)	Nitrate (mg/L)	pH	Phosphate (mg/L)	Conductivity (µS)
APP01: Deep Creek at Nature Area	49	8.6	3.5	6.7	0.21	276
APP02: S Branch Grears Corner Rd	81	8.7	5.4	6.7	0.12	312
APP03: Hangman's Run	34	7.1	6.0	6.2	0.19	203
APP04: Appoquinimink Twin Bridges	43	5.2	0.3	6.0	0.19	150
APP05: Vanburen Bridge	101	8.6	0.6	7.0	0.11	339

Brandywine Creek	Alkalinity (mg/L)	Dissolved Oxygen (mg/L)	Nitrate (mg/L)	pH	Phosphate (mg/L)	Conductivity (µS)
BC1: Mainstem Vanburen Bridge	63	8.7	2.2	7.6	0.19	307
BC2: Mainstem Hagley	62	8.4	2.3	7.6	0.19	312
BC3: Husbands Run	51	9.1	1.3	7.1	0.23	376
BC4: Wilson Run	42	9.3	0.9	7.1	0.11	203
BC5: Rocky Run	48	11.0	0.7	7.3	0.03	427
BC6: Beaver Run	65	10.9	1.4	7.4	0.07	414
BC7: Flint Woods	32	9.7	1.4	7.1	0.05	240
BC8A: DuPont Country Club	40	8.2	1.1	7.0	0.18	346
BC8B: Country Club Drive	53	7.7	0.6	7.0	0.11	424
BC8C: Willow Run South	48	8.1	1.6	7.2	0.36	419

Christina River	Alkalinity (mg/L)	Dissolved Oxygen (mg/L)	Nitrate (mg/L)	pH	Phosphate (mg/L)	Conductivity (µS)
CR1: Mainstem, Rt. 141	68	8.5	1.7	7.2	0.08	602
CR2: Mainstem, Churchmans	59	8.1	1.1	7.1	0.12	490
CR3: Mainstem, Samlleys Dam	43	8.9	0.7	6.9	0.11	313
CR4: Mainstem, Walther Road	43	8.7	0.9	6.9	0.17	258
CR5: Muddy Run, Rt. 896	35	8.2	1.0	6.6	0.1	350
CR6: Belltown Run, Rt. 40	32	8.9	1.4	6.6	0.12	256
CR7: Mainstem, Cooch's Bridge	40	9.5	1.0	7.1	0.06	350
CR8: Mainstem, Rittenhouse Park	41	9.6	1.1	7.1	0.11	297
CR9: Mainstem, Wilmington	71	10.0	1.5	6.9	0.23	339
CR10: Mainstem, Dravo Plaza	59	8.3	1.1	7.4	0.06	455
CR11: Tidal Gut, DEEC	56	9.0	0.6	7.0	0.09	420

Mispillion River	Alkalinity (mg/L)	Dissolved Oxygen (mg/L)	Nitrate (mg/L)	pH	Phosphate (mg/L)	Conductivity (µS)
MSP241: Tantrough Branch, County Line	27	9.0	10.3	6.4	0.08	157
MSP261: Johnson Branch, Rt. 36	21	7.7	3.3	6.5	0.11	133
MSP281: Casuseway Branch, Stratham Rd	43	5.9	0.2	6.3	0.03	541
MSP291: Fishing Branch, Rt. 1 & Rt. 113	49	6.7	2.0	6.9	0.13	1456
MSP301: Swan Creek, Rt. 124 Overpass	56	6.3	3.6	7.2	0.15	196

White Clay Creek	Alkalinity (mg/L)	Dissolved Oxygen (mg/L)	Nitrate (mg/L)	pH	Phosphate (mg/L)	Conductivity (µS)
P1: Pike Creek, Crossan footbridge	48	8.2	2.9	7.1	0.17	208
P2: Pike Creek, Beech Hill	48	8.5	3.1	7.2	0.18	260
P3: Pike Creek, 3 Little Bakers Golf Club	72	9.9	3.4	7.6	0.18	289
WCC1: Mill Creek, Hickory Hill Park	70	9.4	3.7	7.6	0.18	419
WCC2: Pike Creek, Independence School	47	10.0	3.4	7.3	0.11	244
WCC3: Middle Run, Possum Park	32	9.5	1.3	7.1	0.11	178
WCC4: Mill Creek, Old Capital Trail	46	9.6	1.8	7.4	0.14	310
WCC5: Middle Run, Paper Mill Park	44	8.1	0.7	7.0	0.23	186
WCC6: Mainstem, Paper Mill Rd	74	9.3	3.0	7.6	0.20	310
WCC8: Middle Run, Smith Mill	37	8.8	0.7	7.4	0.12	203
WCCDE29: Mill Creek @ North Pointe	-	-	2.5	7.0	-	453
WCCDE30: Mill Creek Trib @ NP	-	-	2.5	7.2	-	444
WCCDE31: Middle Run @ MRNA	-	-	2.5	6.8	-	191
WCCDE32: Middle Run-Trib @ MRNA	-	-	1.8	6.7	-	178
WCCDE37: Fairfield Run	-	-	2.5	6.6	-	438
WCCDE38: Blue Hen Creek	-	-	2.0	6.9	-	627
WCCDE39: Jenney's Run	-	-	2.0	6.9	-	349
WCCDE40: Mainstem @Capitol Trail	-	-	2.8	7.3	-	403
WCCDE42: Lower Pike Creek	-	-	2.0	6.9	-	359

Red Clay Creek	Alkalinity (mg/L)	Dissolved Oxygen (mg/L)	Nitrate (mg/L)	pH	Phosphate (mg/L)	Conductivity (µS)
RCC1: Burrows Run, State Line	69	11.1	2.0	7.5	0.16	247
RCC2: Burrows Run, Old Kennett Pike	57	10.2	1.5	7.5	0.08	241
RCC3: Mainstem, Benge Road	86	10.3	3.8	7.7	0.26	448
RCC4: Mainstem, Ashland	86	9.9	3.5	7.6	0.25	430
RCC5: Mainstem, Wooddale	73	9.5	3.1	7.7	0.24	374
RCC6: Mainstem, Kiamensi Rd	75	10.0	3.2	7.5	0.24	345
RCC7: Hyde Run	53	9.5	2.5	7.3	0.08	325
RCC8: Hoopes Reservoir Outfall	64	9.5	2.0	8.0	0.06	270
RCC11: Greenwalt Rill above pond	-	10.2	0.8	-	-	82
RCC11b: Greenwalt Rill @ Confluence	-	10.5	0.3	-	-	92
RCC12: Burrows Run by Old Kennett	-	11.3	-	-	-	274
RCC13: Burrows Run downstream	-	13.0	-	-	-	249
RCC14: Spring House Below CSA	-	10.9	-	-	-	107
RCC15: Indian Rill	-	-	1.0	-	-	258
RCC16: Wildflower	-	-	1.0	-	-	156
RCC17: Birch Run	-	-	-	-	-	280
RCC18: Main @ Brandywine Springs	-	-	2.6	8.0	-	399
RCC19: Brandywine Springs Park	-	-	2.3	7.9	-	440
RCC20: Mainstem @ Spar Hill	-	-	1.4	7.7	-	300
RCC21: Tributary @ Spar Hill	-	-	0.8	7.0	-	147

Total Dissolved Solids & Salinity Data

Recently, Total Dissolved Solids and Salinity were added at certain sites, in part, to monitor potential impact from road salt and urbanization. Moving forward, we hope to add these parameters at other sites to better characterize watershed trends.

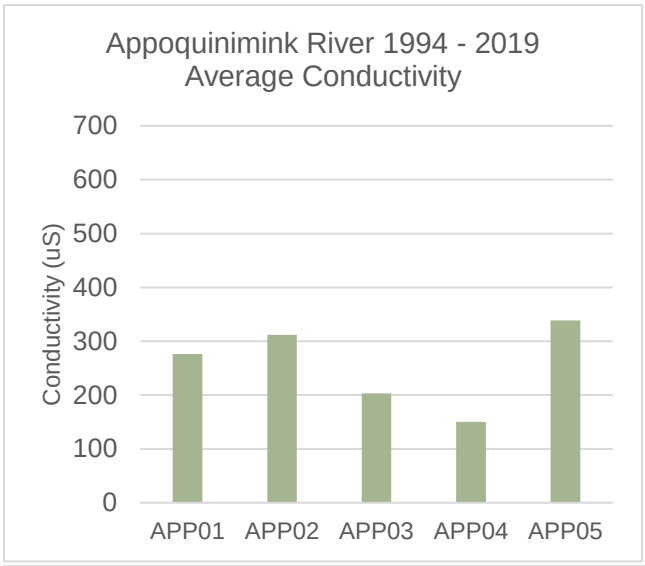
White Clay Creek	Salinity (ppm)	TDS (ppm)
WCCDE29: Mill Creek @ North Pointe	204	320
WCCDE30: Mill Creek Trib @ NP	201	322
WCCDE31: Middle Run @ MRNA	86	135
WCCDE32: Middle Run-Trib @ MRNA	80	126
WCCDE37: Fairfield Run	200	309
WCCDE38: Blue Hen Creek	290	445
WCCDE39: Jenney's Run	159	247
WCCDE40: Mainstem @Capitol Trail	183	286
WCCDE42: Lower Pike Creek	165	253

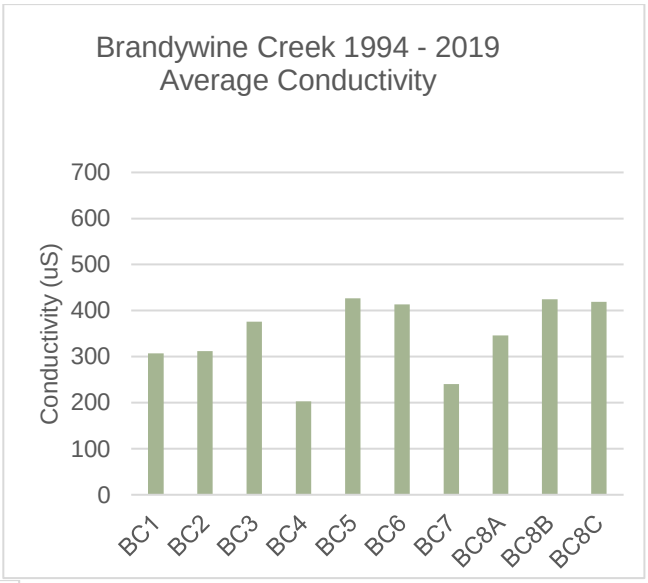
Red Clay Creek	TDS (ppm)	Salinity (ppm)
RCC4: Mainstem, Ashland	282	168
RCC11: Greenwalt Rill above pond	50	35
RCC11b: Greenwalt Rill @ Confluence	60	40
RCC12: Burrows Run by Old Kennett	180	130
RCC13: Burrows Run downstream	180	130
RCC14: Spring House Below CSA	70	50
RCC15: Indian Rill	159	97
RCC16: Wildflower	102	58
RCC17: Birch Run	178	106
RCC18: Main @ Brandywine Springs	276	176
RCC19: Brandywine Springs Park	301	191
RCC20: Mainstem @ Spar Hill	203	131
RCC21: Tributary @ Spar Hill	102	60

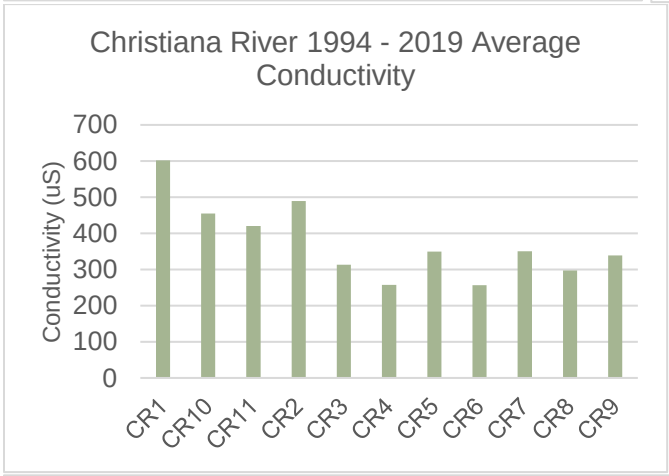
Conductivity

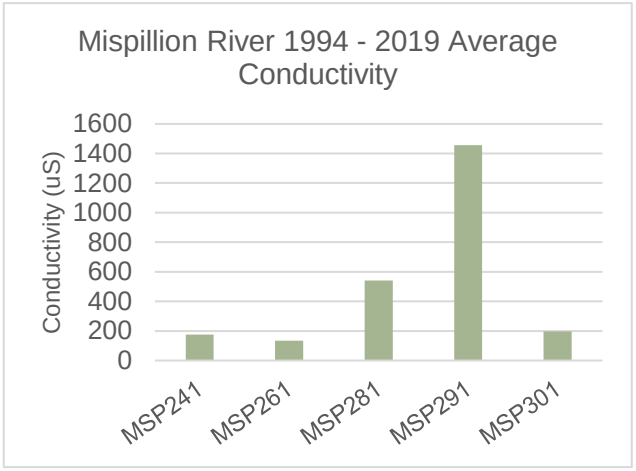
Measure of water's capability to pass electrical flow, directly related to the concentration of ions. These ions can come from dissolved salts and inorganic materials such as chlorides, sulfides and carbonate compounds. Geology naturally influences the conductivity level of streams. The application of road salt during winter, and runoff from urbanized areas can result in increased levels and trends over time.

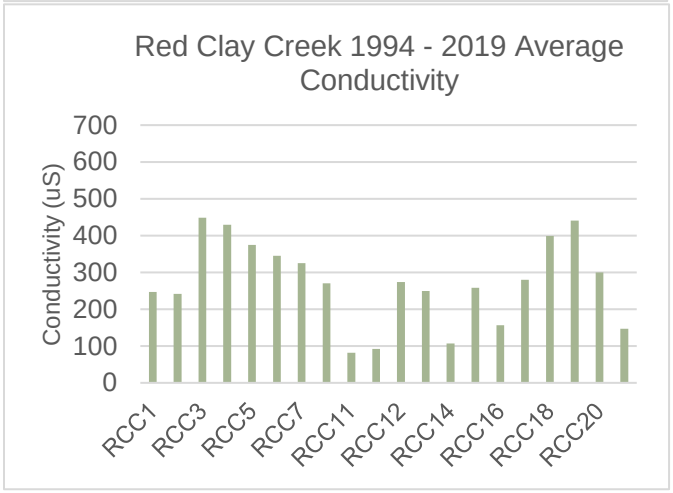
Differences between sites within a watershed may also be a factor of the stream volume and amount of impervious surface upstream.

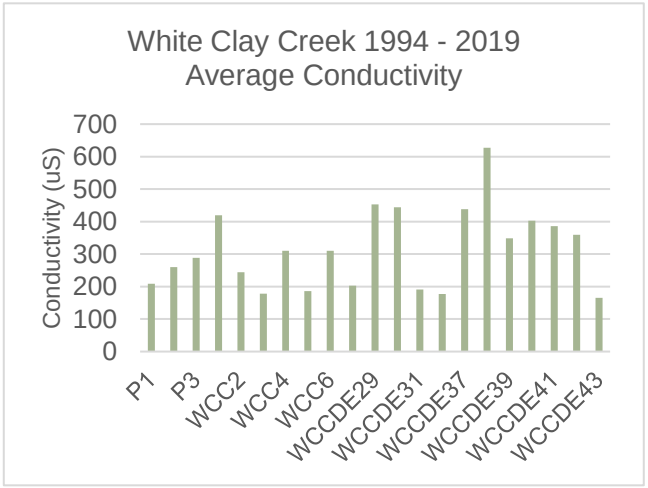








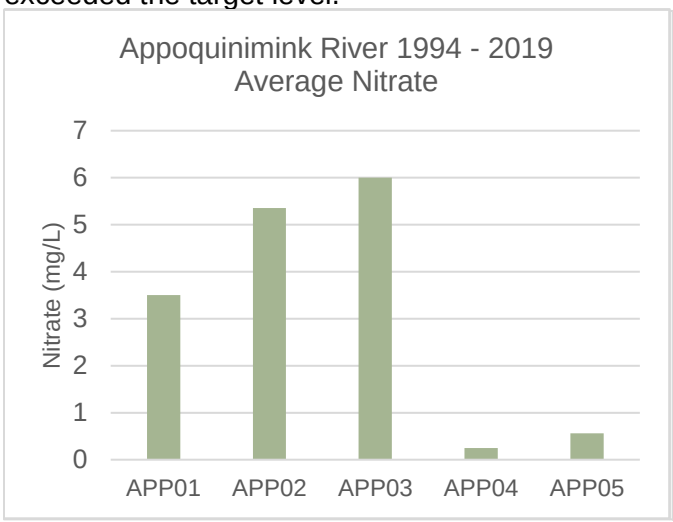


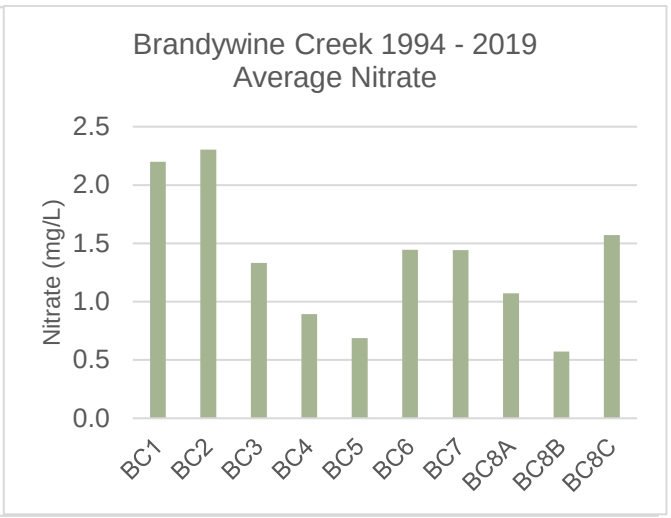


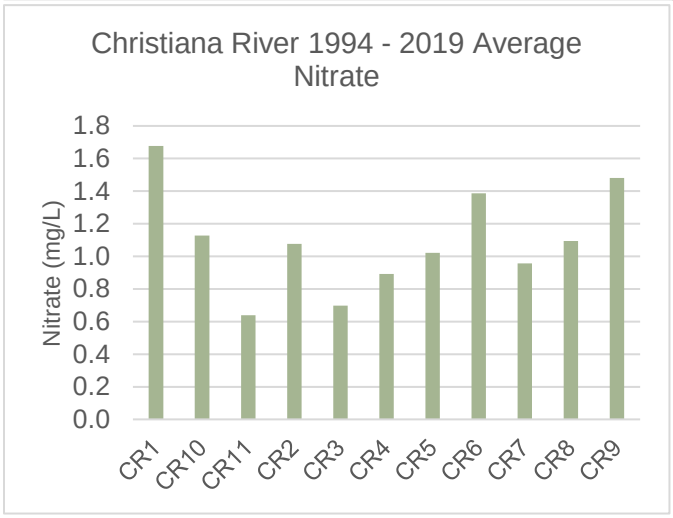
Nitrate

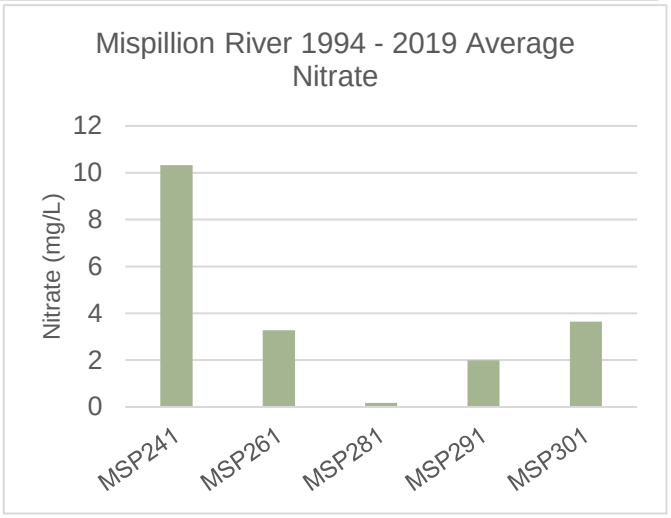
Low levels of nitrate are naturally found in water. Excess nitrates in water can come from fertilizer, septic systems, sewage treatment plants, livestock manure, industrial discharges and air pollution. The target level for total nitrogen (all forms of nitrogen combined) in Delaware freshwater is below 3.0 mg/L. Stream Watch volunteers measure nitrate-nitrogen, which is only one component of total nitrogen.

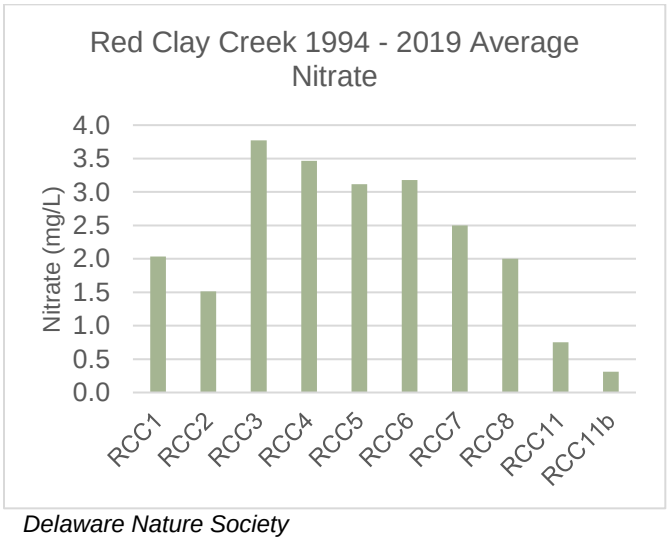
There are 15 sites within the White Clay, Red Clay, Appoquinimink, and Mispillion watersheds that exceeded the target level.

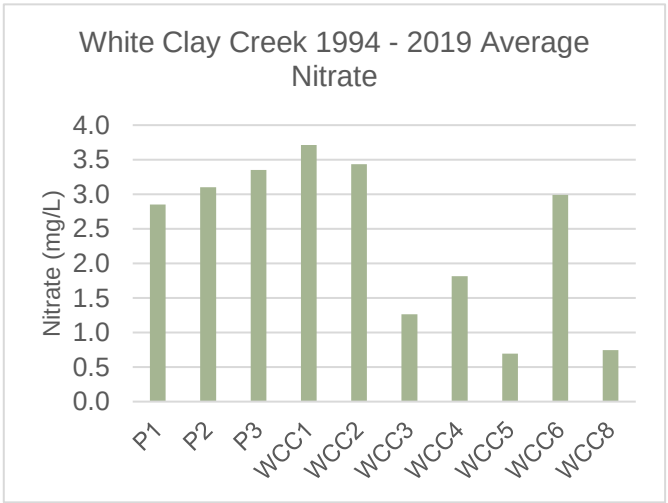








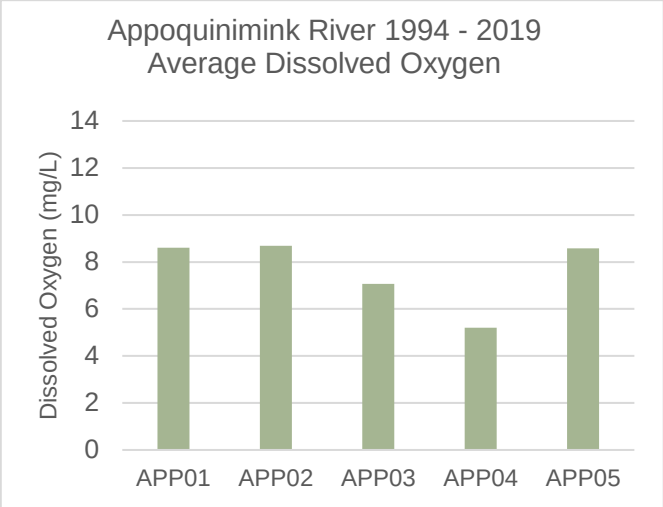


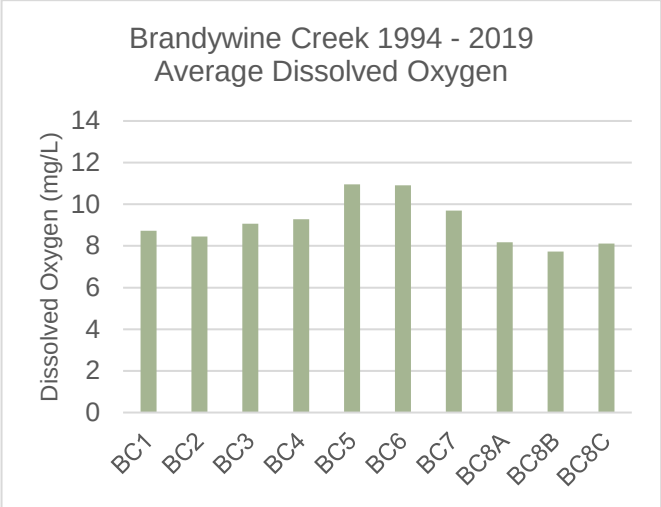


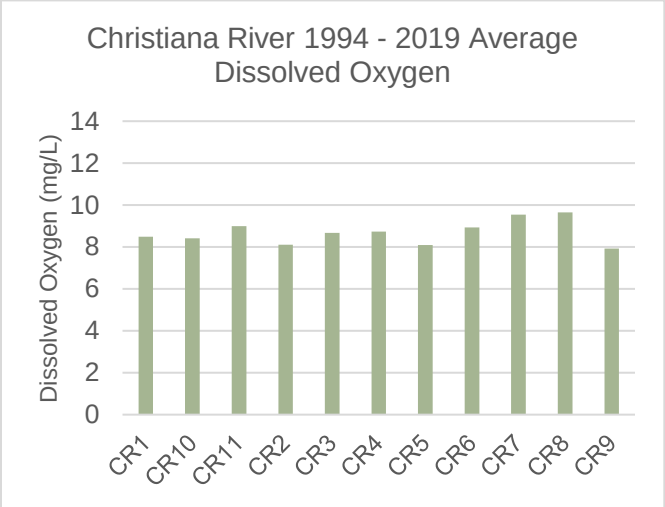
Dissolved Oxygen

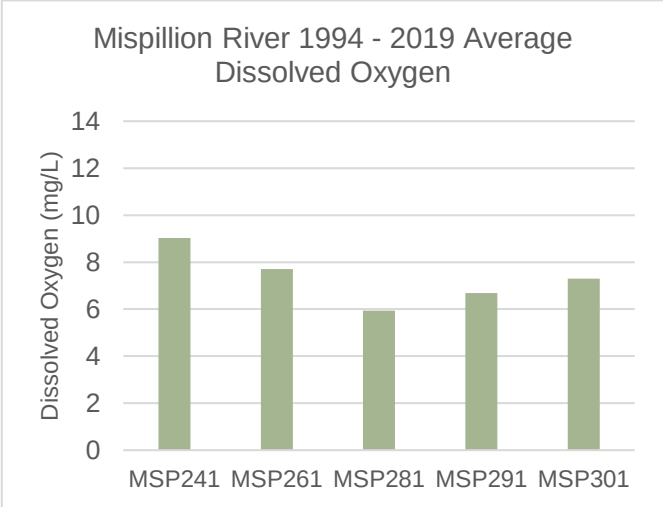
Dissolved oxygen (DO) is an important water quality indicator for aquatic life, such as fish. Temperature, turbulence and aquatic plants can all impact DO levels. DO levels below 3-5mg/L can harm or kill fish and other aquatic organisms.

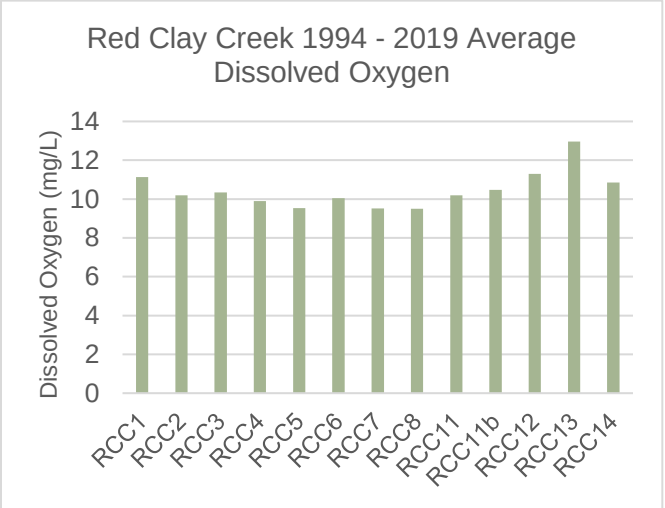
Dissolved oxygen levels have averaged at or above the Delaware State standard of 5.5 mg/L (daily average) although several sites, such as CR2 on the lower Christina, have measured values as low as 3 mg/L during summer months.

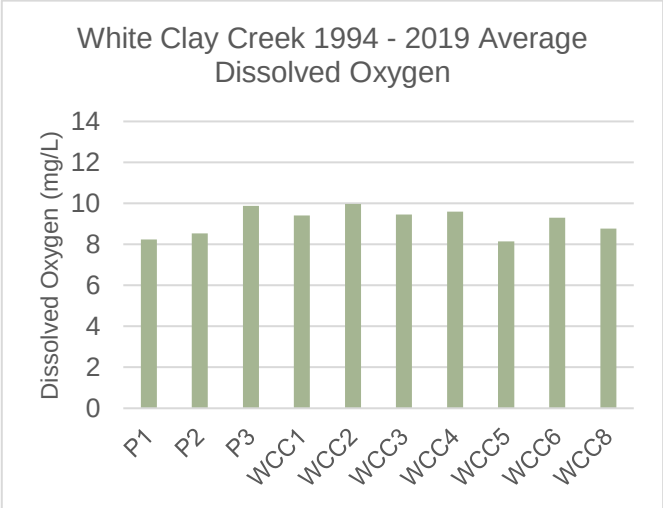








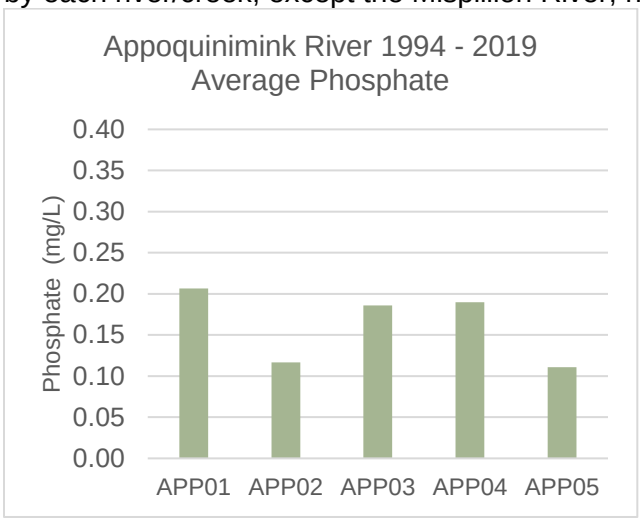


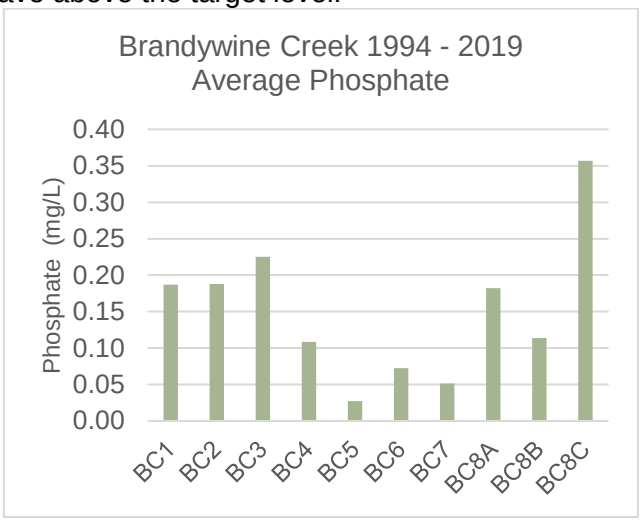


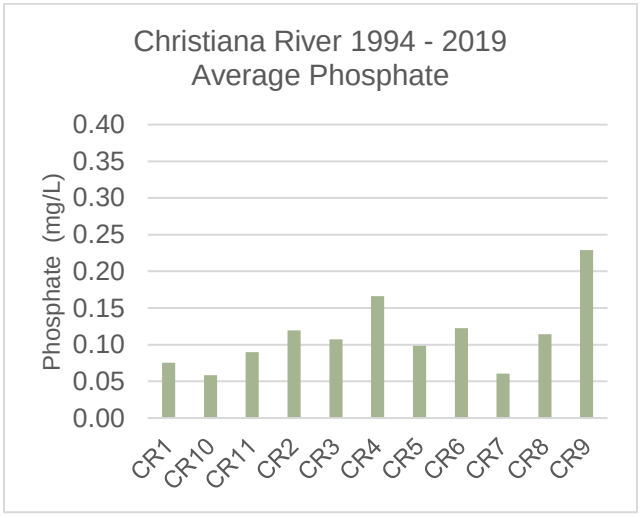
Phosphate

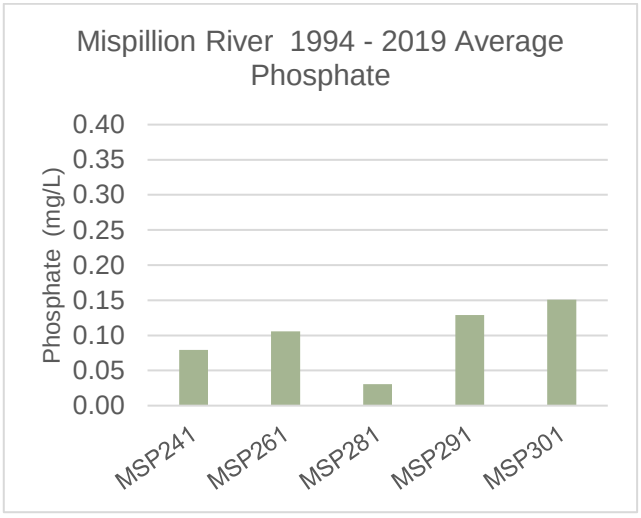
Delaware considers total phosphorus (which includes organic phosphorus) levels higher than 0.2 mg/L as a potential problem. DNS measures orthophosphate, the inorganic dissolved form of phosphate that is readily available to aquatic plants. As our results only measure a component of total phosphorus, values approaching 0.2 mg/L would be considered high and harmful to aquatic systems.

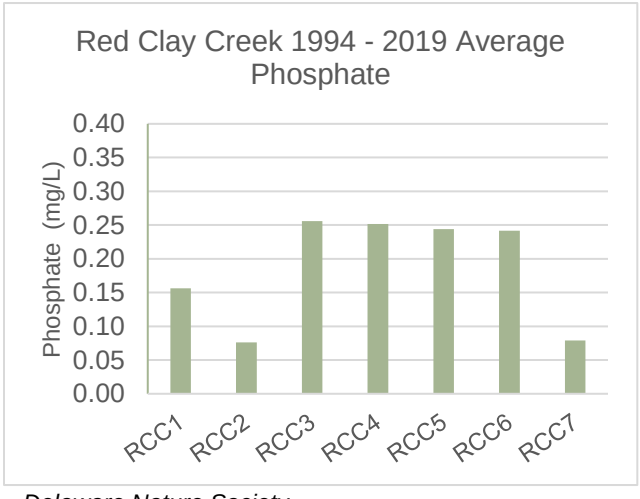
Delaware targets phosphate levels of 0.2 mg/L or higher as a potential problem. Nine sites represented by each river/creek, except the Mispillion River, have above the target level.

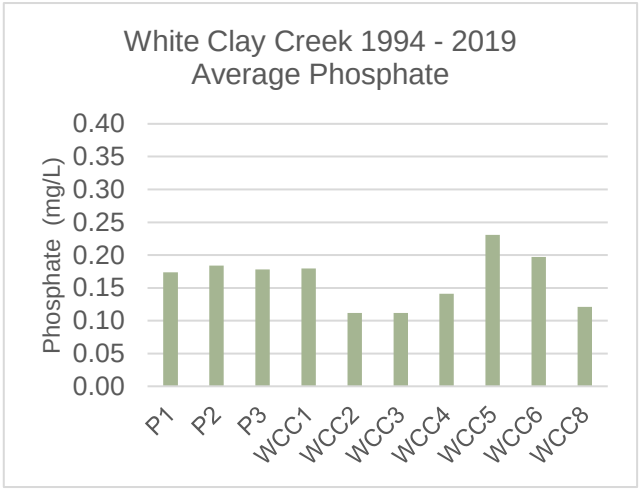








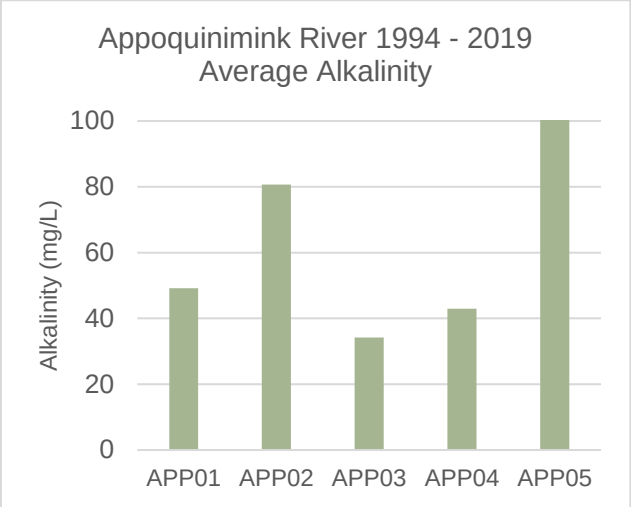


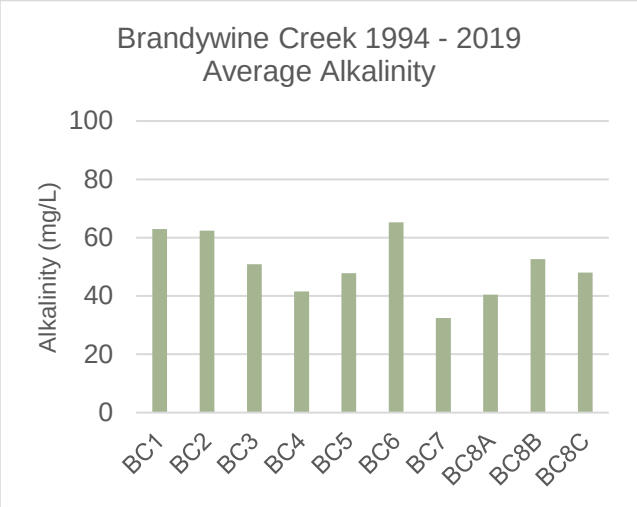


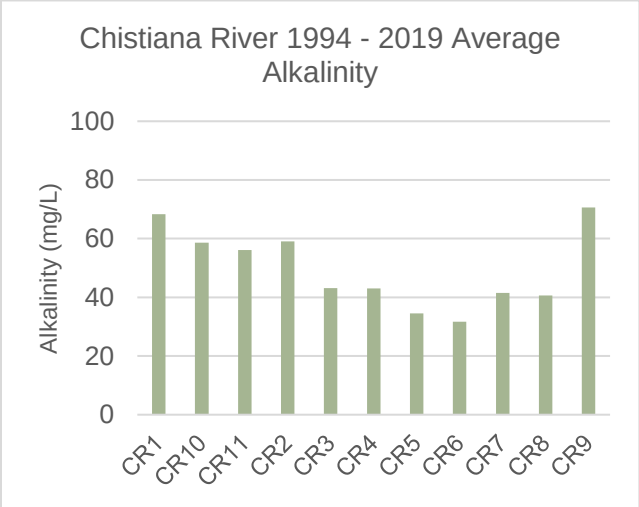
Alkalinity & pH

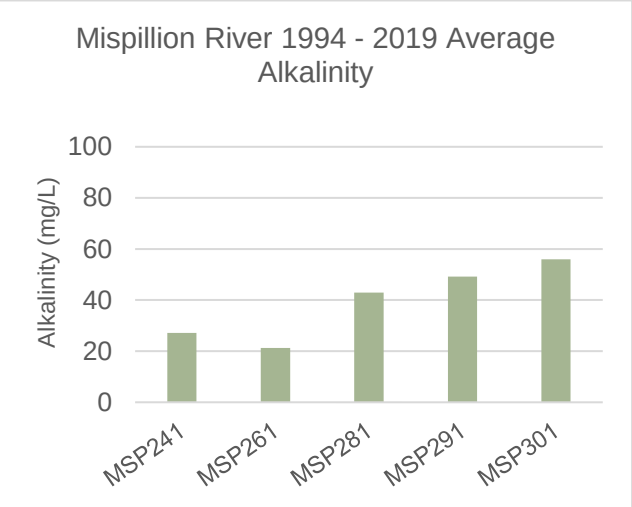
Alkalinity is an important measurement for aquatic life used to determine the waters ability to buffer harmful rapid changes of pH that may be from acid rain or other sources of contamination. Alkalinity can vary tremendously due to the amount of rainfall, season, as well as the watershed's geology.

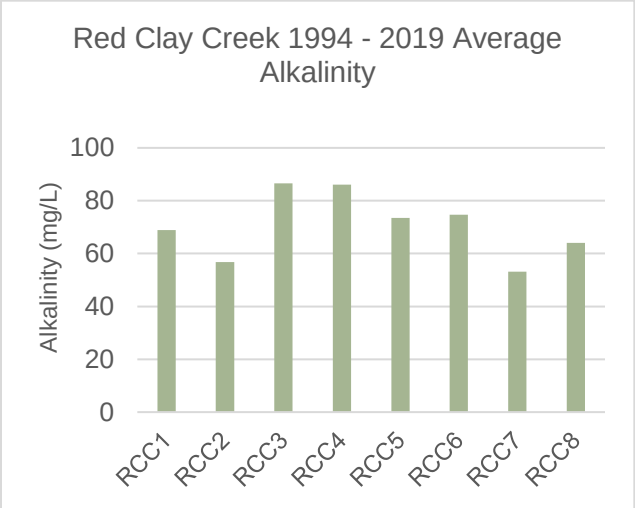
- Five sites represented by the Appoquinimink, Mispillion, and White Clay are below pH threshold; all of which contain the lowest alkalinity readings. Overall, pH values have consistently averaged in the acceptable range of 6.5 - 8.0 suggesting alkalinity levels are appropriately buffering stream waters.

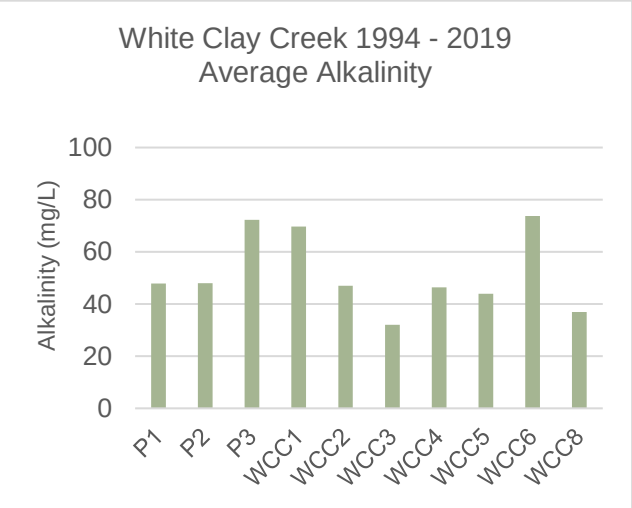








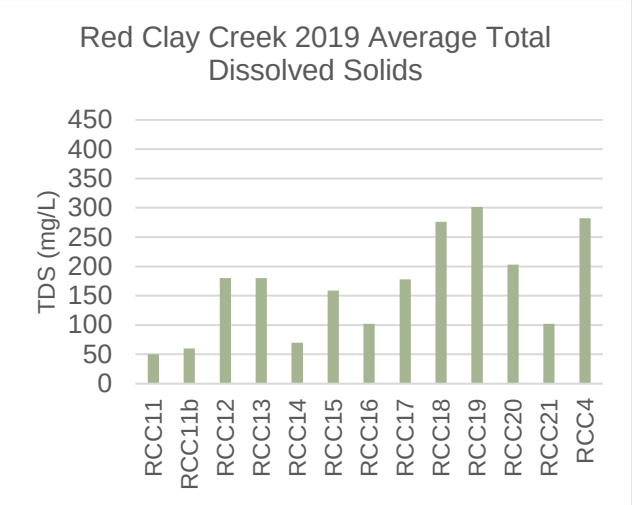


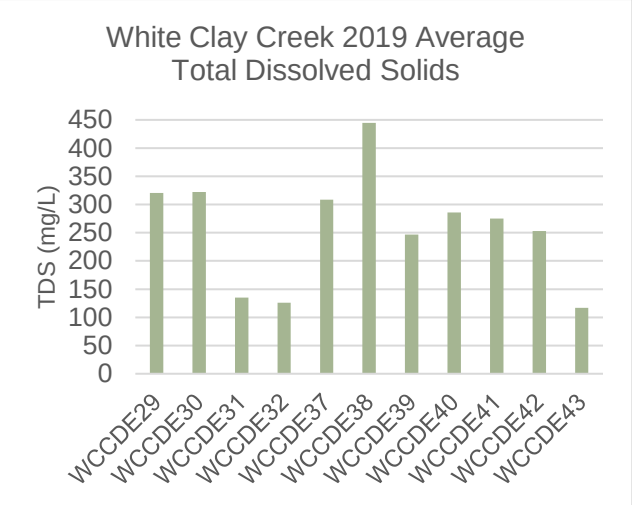


Total Dissolved Solids

Total Dissolved Solids or TDS is the total amount of dissolved materials in water. This can include inorganic salts and organic matter. These materials can be a result of natural processes like springs or human activity such as agriculture or wastewater discharge. TDS value for freshwater often range between 25-250 mg/L although results may naturally be much higher due to geology or vegetation.

Overall, the sites measured in 2019 were within normal ranges but more data is necessary to understand natural variation of time.

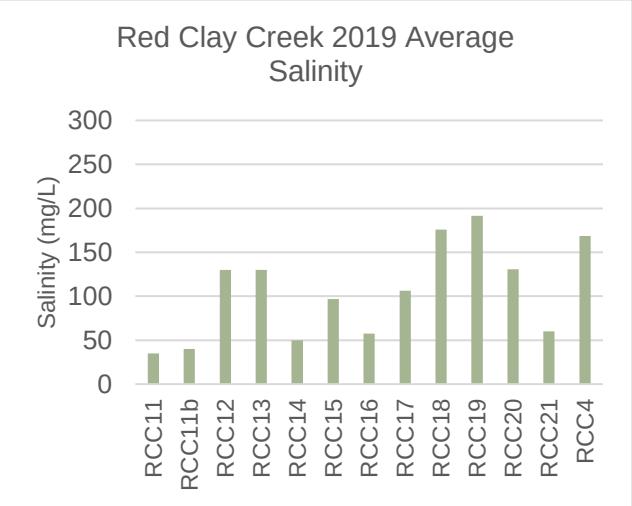


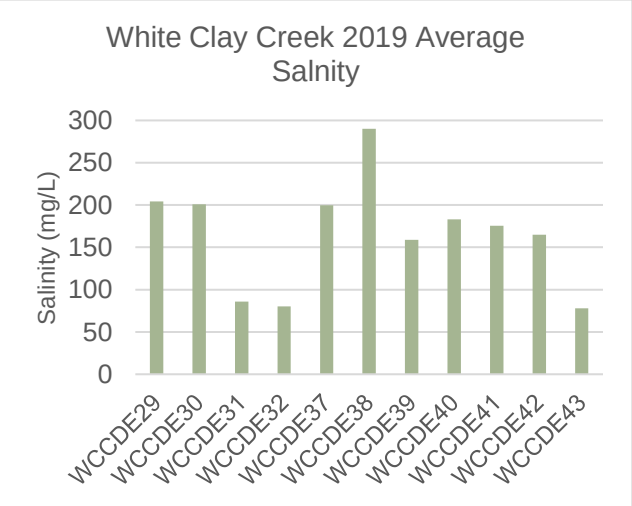


Salinity

The measure of dissolved salts in a given volume which is inversely related to dissolved oxygen levels. Salinity impacts survivability of aquatic life, particularly macroinvertebrates, which Stream Watch uses as a stream quality indicator in a separate survey and analysis. Aquatic and terrestrial plants are also impacted by salinity levels making it a diverse stream quality indicator that we hope to begin monitoring at more sites.

While average salinity levels all fall within acceptable levels, winter spikes following road salt applications and potential loading to shallow ground water are of concern and warrant future monitoring.





Data Summary by Sample Site

APP01: Deep Creek at Nature Area

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	28	200	7.1	6.5	2.0	0.04
Maximum	59	320	10.4	6.8	4.0	0.44
Average	49	276	8.6	6.7	3.5	0.21
Median	54	290	8.1	6.8	4.0	0.17
# Samples	6	5	5	6	6	6

APP02: S Branch Grears Corner Rd

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	28	240	6.0	6.0	0.25	0.01
Maximum	184	400	12.1	7.0	8.0	0.8
Average	81	312	8.7	6.7	5.4	0.12
Median	55	300	8.5	6.5	2.0	0.08
# Samples	12	12	11	12	12	12

APP03: Hangman's Run

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	20	190	6.5	6.0	5.0	0.01
Maximum	45	215	7.6	6.5	7.0	0.35
Average	34	203	7.1	6.2	6.0	0.19
Median	37	200	7.1	6.0	6.0	0.26
# Samples	5	5	3	5	5	5

APP04: Appoquinimink Twin Bridges

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	43	150	5.2	6.0	0.25	0.19
Maximum	43	150	5.2	6.0	0.25	0.19
Average	43	150	5.2	6.0	0.25	0.19
Median	43	150	5.2	6	0.25	0.19
# Samples	1	1	1	1	1	1

APP05: Vanburen Bridge

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	Nitrate (mg/L)	pH	Phosphates (mg/L)
Minimum	24	460	4.1	0.25	6.5	0.01
Maximum	324	1790	16	2.0	7.5	0.3
Average	101	339	8.6	0.6	7.0	0.11
Median	82	1770	8.1	0.3	7.0	0.1
# Samples	22	22	21	21	22	20

BC1: Mainstem Vanburen Bridge

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	40	63	3.8	6.5	0.13	0.01
Maximum	114	534	15	9.0	7.0	0.7
Average	63	307	8.7	7.6	2.2	0.19
Median	62	308	8.5	7.5	2.0	0.17
# Samples	214	205	206	213	213	179

BC2: Mainstem Hagley

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	40	61	2.6	6.3	0.25	0.02
Maximum	100	575	15	9.0	2.5	0.62
Average	62	312	8.4	7.6	2.3	0.19
Median	60	310	8.3	7.5	2.0	0.17
# Samples	211	203	202	212	211	177

BC3: Husbands Run

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	20	90	3.8	6.3	0.25	0.01
Maximum	82	2700	15.3	9.0	4.0	0.8
Average	51	376	9.1	7.1	1.3	0.23
Median	50	300	8.5	7.0	1.0	0.2
# Samples	135	122	129	135	132	101

BC4: Wilson Run

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	23	120	4.8	6.5	0.25	0.01
Maximum	72	410	14.5	8.0	5.0	0.58
Average	42	203	9.3	7.1	0.9	0.11
Median	40	200	8.475	7.0	1.0	0.1
# Samples	75	64	70	75	74	44

BC5: Rocky Run

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	29	104	6.6	6.3	0.13	0.01
Maximum	72	4120	16.7	8.0	3.0	0.75
Average	48	427	11.0	7.3	0.7	0.03
Median	47	283	10.8	7.3	0.5	0.01
# Samples	249	237	247	250	248	177

BC6: Beaver Run

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	40	197	5.5	6.8	0.13	0.01
Maximum	170	1890	16.7	8.0	3.0	9.0
Average	65	414	10.9	7.4	1.4	0.07
Median	64	360	10.7	7.5	1.0	0.01
# Samples	250	237	246	250	248	167

BC7: Flint Woods

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	18	85	5.9	6.5	0.13	0.01
Maximum	59	415	19	7.5	5.0	0.6
Average	32	240	9.7	7.1	1.4	0.05
Median	31	241	9.7	7.0	1.0	0.04
# Samples	162	161	155	163	160	121

BC8A: DuPont Country Club

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	24	120	4.4	6.8	0.15	0.01
Maximum	60	1170	14	7.5	3.0	0.54
Average	40	346	8.2	7.0	1.1	0.18
Median	42	250	8.1	7.0	0.8	0.2
# Samples	75	73	69	75	72	74

BC8B: Country Club Drive

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate mg/L)	Phosphates (mg/L)
Minimum	20	100	3.1	6.3	0.25	0.01
Maximum	74	2000	14.6	7.8	1.5	0.44
Average	53	424	7.7	7.0	0.6	0.11
Median	52	270	8.05	7.0	0.5	0.1
# Samples	78	73	72	77	73	77

BC8C: Willow Run South

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	24	100	2.5	6.8	0.25	0.01
Maximum	62	1710	14.3	7.8	4.0	1.0
Average	48	419	8.1	7.2	1.6	0.36
Median	48	340	8.2	7.0	1.5	0.4
# Samples	76	75	72	77	74	75

CR1: Mainstem, Rt. 141

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	40	190	3.9	6.5	0.13	0.01
Maximum	90	6000	14.2	9.0	3.5	1.0
Average	68	602	8.5	7.2	1.7	0.08
Median	68	360	8.3	7.3	2.0	0.1
# Samples	260	250	257	260	257	239

CR2: Mainstem, Churchmans

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	29	120	2.2	6.3	0.13	0.01
Maximum	93	5540	29.0	9.0	3.0	3.9
Average	59	490	8.1	7.1	1.1	0.12
Median	60	320	7.9	7.0	1.0	0.1
# Samples	264	254	256	263	261	204

CR3: Mainstem, Samlleys Dam

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	16	127	4.1	6.0	0.13	0.01
Maximum	104	1203	14.5	8.0	4.0	0.5
Average	43	313	8.7	6.9	0.7	0.11
Median	42	268	8.3	7.0	0.5	0.1
# Samples	140	121	135	140	137	80

CR4: Mainstem, Walther Road

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	19	117	5.1	6.5	0.13	0.01
Maximum	112	756	15.2	8.0	4.0	2.8
Average	43	258	8.7	6.9	0.9	0.17
Median	44	239	8.3	7.0	1.0	0.1
# Samples	115	95	115	114	114	32

CR5: Muddy Run, Rt. 896

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	16	111	3.3	6.0	0.13	0.01
Maximum	60	3100	14.3	7.3	4.0	0.24
Average	35	350	8.1	6.6	1.0	0.10
Median	34	270	8.0	6.5	0.8	0.1
# Samples	97	73	95	96	96	51

CR6: Belltown Run, Rt. 40

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	10	116	4.8	6.0	0.13	0.01
Maximum	72	630	13.9	7.3	5.0	0.3
Average	32	256	8.9	6.6	1.4	0.12
Median	32	250	8.4	6.5	1.0	0.1
# Samples	94	70	89	95	94	48

CR7: Mainstem, Cooch's Bridge

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	12	110	3.9	6.0	0.25	0.01
Maximum	88	1013	16.4	8.5	4.0	0.33
Average	41	350	9.5	7.1	1.0	0.06
Median	40	325	9.3	7.2	0.8	0.06
# Samples	118	98	116	126	124	113

CR8: Mainstem, Rittenhouse Park

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	18	26	3.3	5.5	0.13	0.01
Maximum	77	660	16.4	7.8	5.0	6.5
Average	41	297	9.7	7.1	1.1	0.11
Median	40	304	9.2	7.3	0.8	0.05
# Samples	134	118	126	147	148	130

CR9: Mainstem, Wilmington

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	6	120	1.8	7.3	0.13	0.01
Maximum	173	944	13	8.5	5.0	1.8
Average	71	339	7.9	6.9	15	0.23
Median	67	325	7.9	7.5	1.5	0.17
# Samples	28	23	23	22	27	28

CR10: Mainstem, Dravo Plaza

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	41	242	4.0	6.3	0.13	0.01
Maximum	76	1370	13.8	8.0	3.0	0.29
Average	59	455	8.4	7.4	1.1	0.06
Median	60	370	8.3	7.5	1.0	0.01
# Samples	44	42	41	44	42	35

CR11: Tidal Gut, DEEC

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	42	250	4.0	6.0	0.25	0.08
Maximum	66	800	12.6	8.0	2.0	0.1
Average	56	420	9.0	7.0	0.6	0.09
Median	58	378	10	7.0	0.5	0.09
# Samples	11	10	10	11	9	2

MSP241: Tantrough Branch, County Line

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	12	120	6.0	5.5	0.25	0.01
Maximum	64	260	12.0	7.0	18.0	3.0
Average	27	175	9.0	6.4	10.3	0.08
Median	26	180	9.1	6.5	10.0	0.01
# Samples	107	107	105	106	106	107

MSP261: Johnson Branch, Rt. 36

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	14	110	5.0	6.0	0.5	0.01
Maximum	40	170	10.5	7.0	14	0.6
Average	21	133	7.7	6.5	3.3	0.11
Median	20	130	7.5	6.5	3.0	0.1
# Samples	39	39	40	40	39	39

MSP281: Casuseway Branch, Stratham Rd

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	4	50	1.2	5.5	0.13	0.01
Maximum	136	1990	11.6	8.0	2.0	0.64
Average	43	541	5.9	6.3	0.2	0.03
Median	26	350	6.1	6.0	0.13	0.01
# Samples	53	35	51	52	26	53

MSP291: Fishing Branch, Rt. 1 & Rt. 113

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	16.5	230	2.5	6.5	0.25	0.01
Maximum	111	1990	12	8.0	9.0	0.96
Average	49	1456	6.7	6.9	2.0	0.13
Median	45.5	1900	6.6	7.0	2.0	0.1
# Samples	128	120	125	18	123	128

MSP301: Swan Creek, Rt. 124 Overpass

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	20	120	4.0	6.0	0.25	0.01
Maximum	120	270	14.0	9.0	9.0	0.76
Average	56	196	7.3	7.2	3.6	0.15
Median	40	195	7.4	7.0	3.5	0.08
# Samples	15	16	15	16	12	15

RCC1: Burrows Run, State Line

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	34	170	4.2	6.0	0.25	0.01
Maximum	98	450	8.9	10.0	4.0	5.5
Average	69	247	11.1	7.5	2.0	0.16
Median	68	250	9.3	7.5	2.0	0.06
# Samples	115	95	110	119	116	71

RCC2: Burrows Run, Old Kennett Pike

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	24	25	3.0	6.5	0.13	0.01
Maximum	85	490	15.5	8.5	7.0	0.3
Average	57	241	10.2	7.5	1.5	0.08
Median	58	235	10.0	7.5	1.5	0.06
# Samples	217	195	203	217	211	122

RCC3: Mainstem, Benge Road

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	52	294	6.2	7.0	0.13	0.01
Maximum	148	910	17.5	9.0	9.0	1.0
Average	87	448	10.3	7.7	3.8	0.26
Median	86	440	10.1	7.5	4.0	0.22
# Samples	250	229	248	256	251	178

RCC4: Mainstem, Ashland

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)	Salinity (ppm)	TDS (ppm)
Minimum	52	155	5.7	7.0	0.13	0.01	60	110
Maximum	152	860	15.5	8.5	8.0	0.98	240	340
Average	86	430	9.9	7.6	3.5	0.25	168	282
Median	86	430	9.5	7.5	3.0	0.2	170	290
# Samples	261	259	257	261	257	184	25	25

RCC5: Mainstem, Wooddale

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	42	9	3.3	7.0	0.13	0.01
Maximum	108	550	15.1	10	6.0	1.2
Average	73	374	9.5	7.7	3.1	0.24
Median	74	380	9.25	7.5	3.0	0.18
# Samples	234	213	224	234	233	175

RCC6: Mainstem, Kiamensi Rd

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	34	140	5.0	6.5	0.5	0.01
Maximum	103	1340	15.1	8.5	6.0	0.64
Average	75	345	10.0	7.5	3.2	0.24
Median	76	329	9.9	7.5	3.8	0.19
# Samples	74	57	70	76	76	17

RCC7: Hyde Run

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	27	53	2.4	6.5	0.13	0.01
Maximum	96	970	15.3	8.0	4.0	0.26
Average	53	325	9.5	7.3	2.5	0.08
Median	50	300	8.9	7.3	3.0	0.08
# Samples	100	89	94	100	100	50

RCC8: Hoopes Reservoir Outfall

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	34	123	4.8	6.5	0.13	0.01
Maximum	102	380	15.1	8.5	2.5	0.4
Average	65	229	8.7	7.3	0.3	0.06
Median	66	240	8.7	7.3	0.25	0.05
# Samples	220	204	213	221	216	165

RCC11: Greenwalt Rill above pond

	Conductivity (uS)	Diss Oxygen (mg/L)	Nitrate (mg/L)	Salinity (ppm)	TDS (ppm)
Minimum	77	9.2	0.5	30	50
Maximum	85	11.3	1.0	40	50
Average	82	10.2	0.8	35	50
Median	83	10.1	0.8	35	50
# Samples	4	3	4	2	2

RCC11b: Greenwalt Rill @ Confluence

	Conductivity (uS)	Diss Oxygen (mg/L)	Nitrate (mg/L)	Salinity (ppm)	TDS (ppm)
Minimum	90	10.4	0.25	40	60
Maximum	96	10.5	0.5	40	60
Average	92	10.5	0.3	40	60
Median	91	10.5	0.3	40	60
# Samples	4	3	4	2	2

RCC12: Burrows Run by Old Kennett

	Conductivity (uS)	Diss Oxygen (mg/L)	Salinity (ppm)	TDS (ppm)
Minimum	263	10.9	130	180
Maximum	281	12.0	130	180
Average	274	11.3	130	180
Median	275	11	130	180
# Samples	4	3	2	2

RCC13: Burrows Run downstream

	Conductivity (uS)	Diss Oxygen (mg/L)	Salinity (ppm)	TDS (ppm)
Minimum	210	10.8	130	180
Maximum	270	16.7	130	180
Average	249	13.0	130	180
Median	268	11.4	130	180
# Samples	3	3	1	1

RCC14: Spring House Below CSA

	Conductivity (uS)	Diss Oxygen (mg/L)	Salinity (ppm)	TDS (ppm)
Minimum	105	10.8	50	70
Maximum	109	10.9	50	70
Average	107	10.9	50	70
Median	109	10.9	50	70
# Samples	3	2	1	1

RCC15: Indian Rill

	Conductivity (uS)	Nitrate (mg/L)	Salinity (ppm)	TDS (ppm)
Minimum	233	1.0	80	110
Maximum	347	1.0	130	220
Average	258	1.0	98	157
Median	254	1.0	90	150
# Samples	27	1	27	27

RCC16: Wildflower

	Conductivity (uS)	Nitrate (mg/L)	Salinity (ppm)	TDS (ppm)
Minimum	146	1.0	40	90
Maximum	168	1.0	70	110
Average	156	1.0	58	102
Median	155	1.0	60	100
# Samples	25	1	26	26

RCC17: Birch Run

	Conductivity (uS)	Salinity (ppm)	TDS (ppm)
Minimum	258	90	150
Maximum	310	150	210
Average	280	108	179
Median	278	100	180
# Samples	27	27	27

RCC18: Main @ Brandywine Springs

	Conductivity (uS)	pH	Nitrate (mg/L)	Salinity (ppm)	TDS (ppm)
Minimum	213	8.0	0.25	90	150
Maximum	557	8.5	4.0	240	390
Average	399	8.0	2.6	176	276
Median	416	8.0	3.0	185	290
# Samples	15	15	14	14	15

RCC19: Brandywine Springs Park

	Conductivity (uS)	pH	Nitrate (mg/L)	Salinity (ppm)	TDS (ppm)
Minimum	261	7.5	0.25	110	180
Maximum	593	8.0	4.0	260	410
Average	440	7.9	2.3	191	301
Median	4560	8.0	2.0	205	315
# Samples	14	15	15	14	14

RCC20: Mainstem @ Spar Hill

	Conductivity (uS)	pH	Nitrate (mg/L)	Salinity (ppm)	TDS (ppm)
Minimum	275	7.5	0.25	120	190
Maximum	335	8.0	2.0	150	230
Average	300	7.7	1.4	131	203
Median	301	7.5	1.5	130	200
# Samples	13	13	13	13	13

RCC21: Tributary @ Spar Hill

	Conductivity (uS)	pH	Nitrate (mg/L)	Salinity (ppm)	TDS (ppm)
Minimum	115	7.0	0.25	50	70
Maximum	172	7.0	5.0	70	170
Average	147	7.0	0.8	60	102
Median	151	7.0	0.5	60	100
# Samples	13	13	13	13	13

P1: Pike Creek, Crossan footbridge

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	32	150	5.3	6.2	0.25	0.01
Maximum	68	380	14.2	7.5	6.0	5.0
Average	48	208	8.2	7.1	2.9	0.17
Median	47	210	8.0	7.0	3.0	0.11
# Samples	122	120	110	121	120	122

P2: Pike Creek, Beech Hill

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	36	180	1.1	6.7	0.3	0.01
Maximum	68	320	13.9	7.7	7.0	5.0
Average	48	260	8.5	7.2	3.1	0.18
Median	47	260	8.5	7.2	3.0	0.13
# Samples	100	88	73	100	98	100

P3: Pike Creek, 3 Little Bakers Golf Club

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	40	180	6.9	7.0	0.3	0.01
Maximum	110	370	12.9	8.5	7.0	4.0
Average	72	289	9.9	7.6	3.4	0.18
Median	67	290	9.7	7.5	4.0	0.07
# Samples	36	35	34	35	35	36

WCC1: Mill Creek, Hickory Hill Park

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	46	249	4.7	6.0	0.3	0.01
Maximum	94	249	4.7	9.0	7.0	1.0
Average	70	419	9.4	7.6	3.7	0.18
Median	70	390	9.3	7.5	4.0	0.1
# Samples	193	171	189	192	186	146

WCC2: Pike Creek, Independence School

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	32	190	6.2	6.1	1.0	0.01
Maximum	128	409	14.3	8.0	6.0	0.18
Average	47	244	10.0	7.3	3.4	0.11
Median	45	240	9.4	7.2	3.0	0.12
# Samples	122	98	118	122	122	76

WCC3: Middle Run, Possum Park

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	16	90	2.9	6.0	0.3	0.01
Maximum	72	330	14.6	7.5	4.0	0.48
Average	32	178	9.5	7.1	1.3	0.11
Median	28	180	9.3	7.0	1.0	0.1
# Samples	218	188	202	218	206	144

WCC4: Mill Creek, Old Capital Trail

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	20	130	4.9	6.0	0.13	0.01
Maximum	70	1728	14.5	9.0	5.0	0.88
Average	46	310	9.6	7.4	1.8	0.14
Median	46	290	9.25	7.5	2.0	0.14
# Samples	218	188	198	218	209	152

WCC5: Middle Run, Paper Mill Park

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	20	100	1.6	6.0	0.13	0.01
Maximum	84	315	14.5	10.0	4.0	6.5
Average	44	186	8.1	7.0	0.7	0.23
Median	42	182	8.0	7.0	0.3	0.15
# Samples	233	219	217	233	233	166

WCC6: Mainstem, Paper Mill Rd

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	36	143	1.3	6.7	0.13	0.01
Maximum	117	490	16.6	9.0	6.0	1.0
Average	74	310	9.3	7.6	3.0	0.20
Median	72	316	9.0	7.5	3.0	0.14
# Samples	225	214	215	224	224	150

WCC8: Middle Run, Smith Mill

	Alkalinity (mg/L)	Conductivity (uS)	Diss Oxygen (mg/L)	pH	Nitrate (mg/L)	Phosphates (mg/L)
Minimum	20	87	6.3	6.0	0.3	0.01
Maximum	58	322	12.7	8.0	2.0	0.5
Average	37	203	8.8	7.4	0.7	0.12
Median	40	208	8.5	7.5	0.8	0.1
# Samples	97	97	94	97	96	97

WCCDE29: Mill Creek @ North Pointe

	Conductivity (uS)	pH	Nitrate (mg/L)	Salinity (ppm)	TDS (ppm)
Minimum	390	6.8	2.0	182	275
Maximum	529	7.2	3.0	231	375
Average	453	7.0	2.5	204	320
Median	445	6.9	2.5	202	315
# Samples	4	4	2	4	4

WCCDE30: Mill Creek Trib @ NP

	Conductivity (uS)	pH	Nitrate (mg/L)	Salinity (ppm)	TDS (ppm)
Minimum	333	7.0	2.0	157	237
Maximum	631	7.3	3.0	278	477
Average	444	7.2	2.5	201	322
Median	405	7.2	2.5	184	287
# Samples	4	4	2	4	4

WCCDE31: Middle Run @ MRNA

	Conductivity (uS)	pH	Nitrate (mg/L)	Salinity (ppm)	TDS (ppm)
Minimum	180	6.5	2.0	84	127
Maximum	208	7.0	3.0	90	147
Average	191	6.8	2.5	86	135
Median	187	6.8	2.5	84	133
# Samples	4	3	2	4	4

WCCDE32: Middle Run-Trib @ MRNA

	Conductivity (uS)	pH	Nitrate (mg/L)	Salinity (ppm)	TDS (ppm)
Minimum	170	6.4	1.5	77	121
Maximum	183	7.0	2.0	83	130
Average	178	6.7	1.8	80	126
Median	178	6.7	1.8	80	126
# Samples	4	4	2	4	4

WCCDE37: Fairfield Run

	Conductivity (uS)	pH	Nitrate (mg/L)	Salinity (ppm)	TDS (ppm)
Minimum	420	6.5	2.0	191	298
Maximum	478	7.0	3.0	211	328
Average	438	6.6	2.5	200	309
Median	426	6.5	2.5	198	304
# Samples	4	4	2	4	4

WCCDE38: Blue Hen Creek

	Conductivity (uS)	pH	Nitrate (mg/L)	Salinity (ppm)	TDS (ppm)
Minimum	557	6.7	2.0	254	395
Maximum	683	7.1	2.0	321	482
Average	627	6.9	2.0	290	445
Median	634	6.8	2.0	293	450
# Samples	4	4	2	4	4

WCCDE39: Jenney's Run

	Conductivity (uS)	pH	Nitrate (mg/L)	Salinity (ppm)	TDS (ppm)
Minimum	330	6.6	2.0	149	234
Maximum	400	7.0	2.0	180	282
Average	349	6.9	2.0	159	247
Median	332	6.8	2.0	153.5	235
# Samples	4	4	2.0	4	4

WCCDE40: Mainstem @Capitol Trail

	Conductivity (uS)	pH	Nitrate (mg/L)	Salinity (ppm)	TDS (ppm)
Minimum	340	7.2	2.5	159	241
Maximum	522	7.4	3.0	235	372
Average	403	7.3	2.8	183	286
Median	375	7.3	2.8	170	266
# Samples	4	4	2	4	4

WCCDE42: Lower Pike Creek

	Conductivity (uS)	pH	Nitrate (mg/L)	Salinity (ppm)	TDS (ppm)
Minimum	359	6.9	2.0	165	253
Maximum	359	6.9	2.0	165	253
Average	359	6.9	2.0	165	253
Median	359	6.9	2.0	165	253
# Samples	1	1	1	1	1