Water Quality Monitoring in the White Clay Creek Wild & Scenic River Watershed

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Purpose

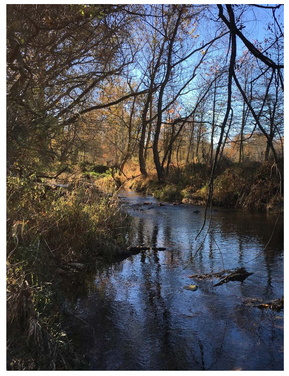
UDWRC water research interns have sampled the White Clay Creek, where turbidity levels have been rising. Data was gathered in order to create a comprehensive plan of action to improve water quality by helping to narrow nonpoint source pollution locations in White Clay Creek National Wild and Scenic River Watershed, which provides drinking water to about 200,000 people in Delaware and Pennsylvania.

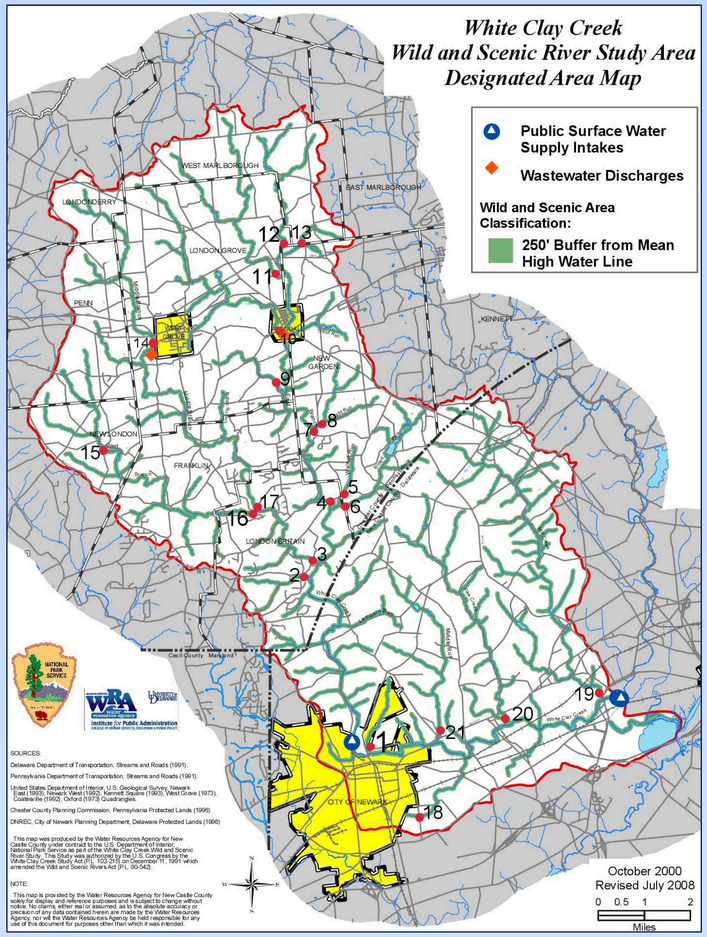
Introduction

The White Clay Creek watershed is protected by the Federal Government by its designation under the National Wild and Scenic Rivers Act by the National Park Service. Working together to protect and preserve the creek are the White Clay Creek State Park, located in Delaware's New Castle County, and White Clay Creek Preserve, located in Pennsylvania's Chester County. While these sections of the White Clay Watershed are protected, other nearby locations are commercially, residentially, and agriculturally developed, which impacts the water quality.

Methods

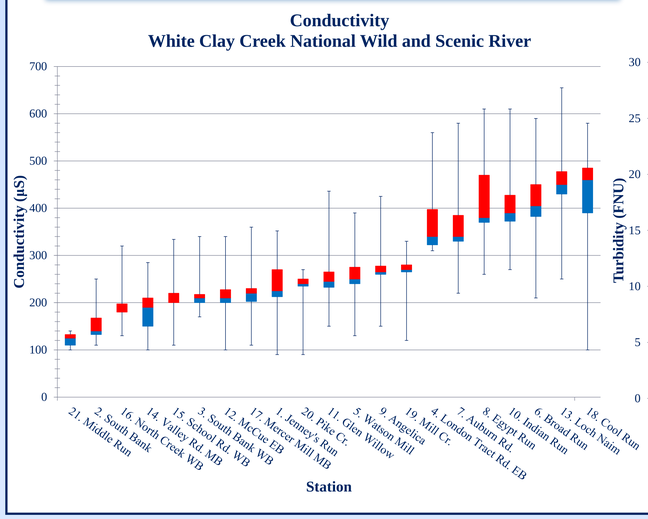
1. Delineate and characterize the White Clay Creek watershed based on land use, soils, geology, and vegetation.
2. Identify 21 sampling stations that representative of tributaries flowing into White Clay Creek.
3. Measure conductivity and turbidity at each site during 2016 using water quality probes (Figure 1).
4. Analyze the health of the tributaries based on the measured results and surrounding watershed.
5. Recommend future actions to improve water quality at sites which showed concern.

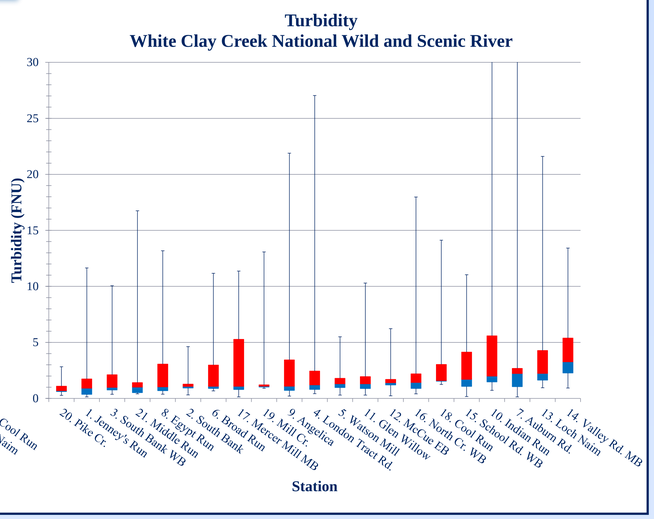




Site	WQ Station
1	Jenney's Run
2	South Bank
3	South Bank WB
4	London Tract Rd. EB
5	Watson Mill
6	Broad Run
7	Auburn Rd.
8	Egypt Run
9	Angelica
10	Indian Run
11	Glen Willow
12	McCue EB
13	Loch Naim
14	Valley Rd. MB
15	School Rd. WB
16	North Cr. WB
17	Mercer Mill MB
18	Cool Run
19	Mill Cr.
20	Pike Cr.
21	Middle Run

Results





Discussion

Water quality standards for the parameters tested:

Parameter	Unit	Water Quality Standard
Turbidity	FNU	Cannot exceed natural levels by more than 10 FNU
Electrical Conductivity (EC)	µS	Should be between 150-500 µS

Measurements of conductivity at most sampling sites show little to no impairments and turbidity measurements showed potential implications.

The two sites with the highest median values for electrical conductivity are Cool Run, which is near a residential area, and Loch Naim, which is adjacent to a golf course and also showed high turbidity. While their medians remain within the ideal range, the sampled values were consistently high, which is an indicator of pollution.

Middle Run showed consistently low conductivity readings, a suggestion of low nutrient levels, which poses health risks to aquatic life. South Bank also displayed median conductivity levels below 150µS.

The highest median turbidity value was at Valley Rd. MB, which is near a mushroom composting facility, and the highest turbidity was at Indian Run, which is located near a wastewater treatment plant.

Conclusion

In conclusion, we found that there is some reason for concern that chemical impairments exist in certain areas within the White Clay Creek watershed. Examples of lower water quality that were seen are likely a result of the environment surrounding the sampling site, such as being adjacent to a commercial, residential, or agricultural area. To improve the water quality of the tributaries mentioned above, native plants could be planted along the roadways where there is not enough of a buffer zone between the stream and the more developed surroundings. Reforestation along stream banks is a method that helps to prevent further degradation. It is important to work with farmers and developers to limit commercial and agricultural runoff into the waterways, leading to a decrease in ecosystem health.

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