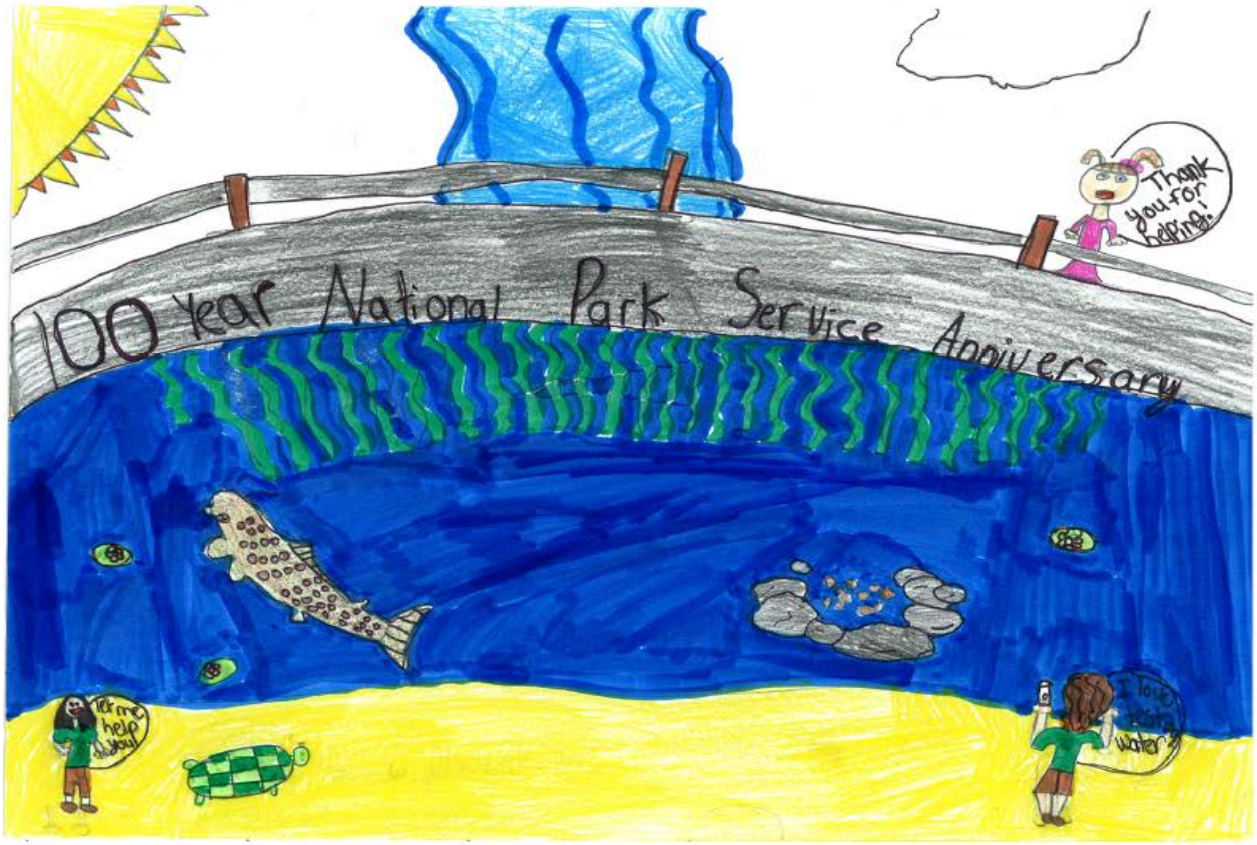
WATER SNAPSHOT 2016

An Upper Delaware Snapshot



Drawing by Anabella Wagner – Sullivan West Elementary

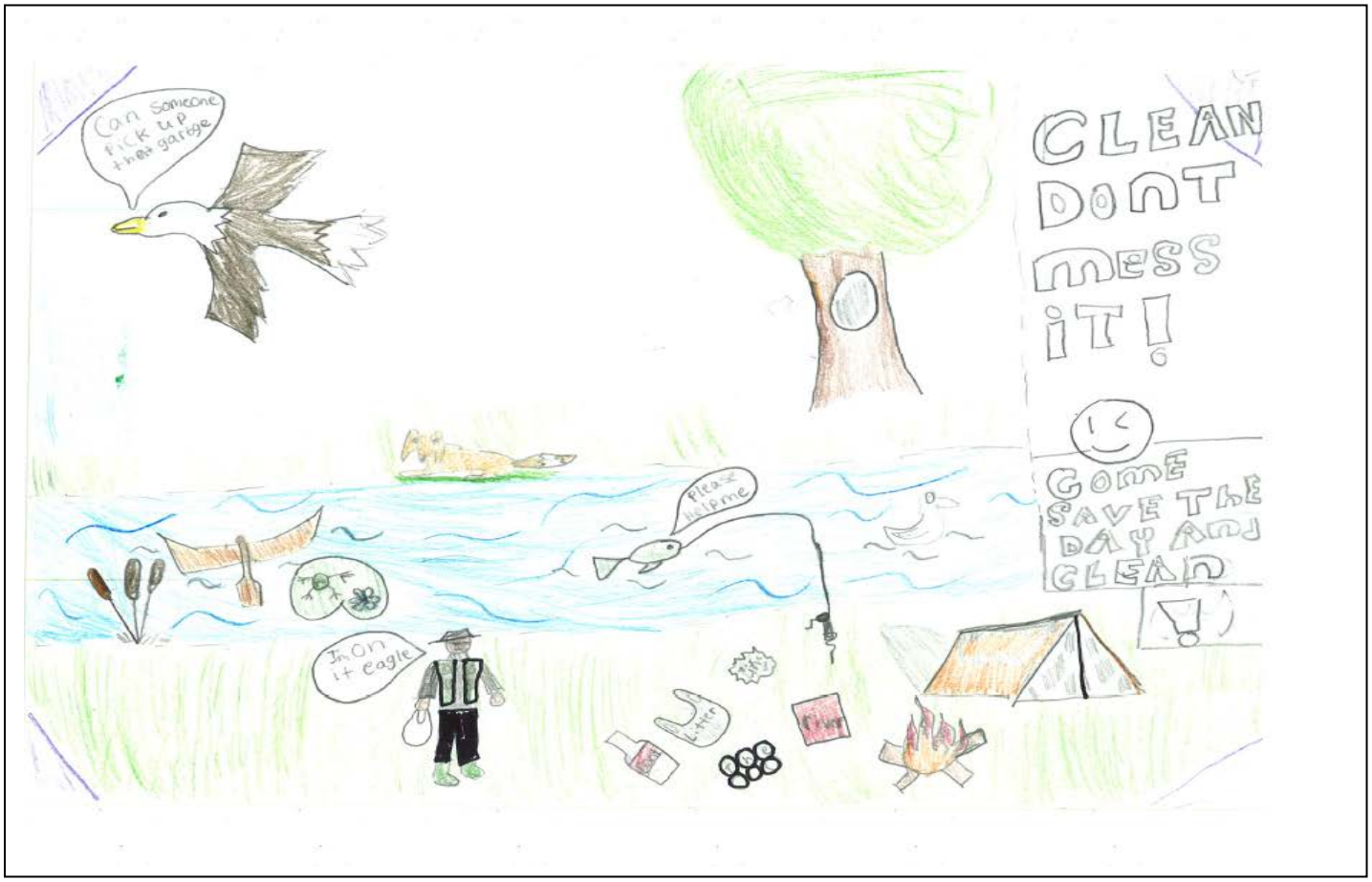
Upper Delaware Scenic & Recreational River

Compilation of results collected by students of Wayne Highlands School District's Damascus Elementary School as well as Sullivan West Central School, the George Ross MacKenzie School, and Hancock Central School and in conjunction with National Park Ranger Jamie Myers, and National Park Service Seasonal Rangers Susie Kaspar and Lindsay Matuszewski

Environment

Fresh shiny grass,
river clear as the blue sky,
trees waving in the air,
animals very peaceful,
the fresh pine smell.

By: Paddy
George Ross MacKenzie School



By Seni Freire – Hancock Central School

Overview

Who: Fifth Grade classes from Wayne-Highlands School District's Damascus Elementary School in Pennsylvania, as well as George Ross MacKenzie School, Hancock Central School, and Sullivan West Central School in New York.

What: Water Snapshot is a basin-wide water quality sampling event that takes a "snapshot" of the health of the entire Delaware River Basin, starting from the confluence of its headwaters and ending in the Delaware River Estuary that empties into the Atlantic Ocean.

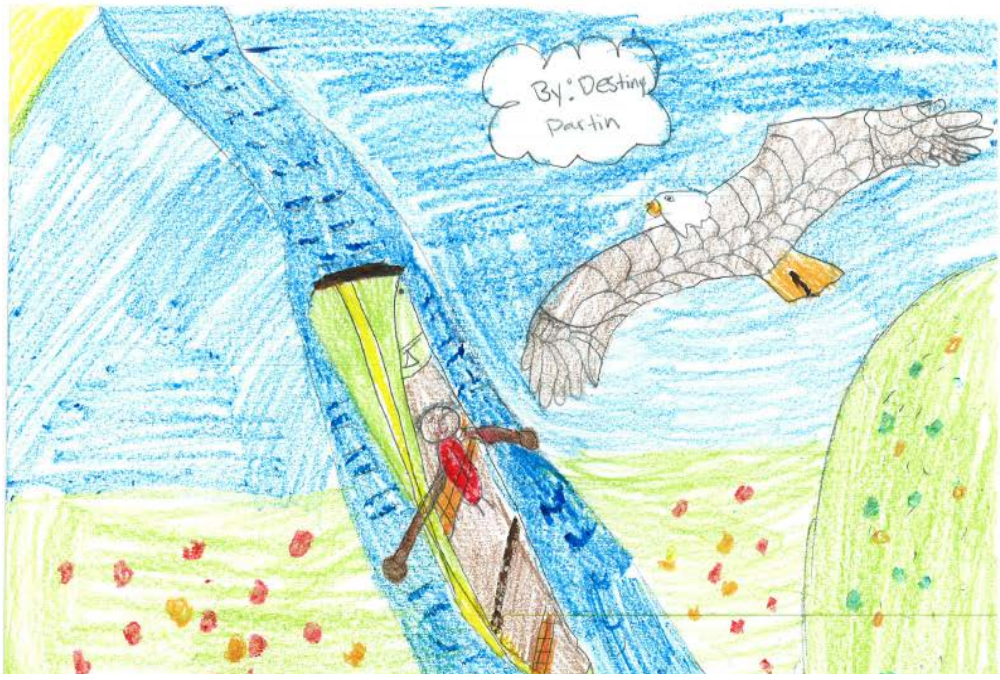
It is an opportunity for people of all ages and experience levels, and especially students to visit a portion of the Delaware River watershed. Whether it is a tributary or the Delaware River itself, students have an opportunity to observe their surroundings and collect water quality information.

Why: In order to create an awareness of local watersheds and the valuable role they play in all of our lives. Students will gain an appreciation of the health and high quality of water in their own backyards, or next to their own schools.

When: April and May, 2016

Where: Students in the Upper Delaware River Valley were able to collect water samples from three different aquatic settings. This year two different tributaries of the Upper Delaware were sampled along with the main stem Delaware River and the East Branch Delaware River. Because each of these areas is unique from each other, a comparison of results between each aquatic setting is encouraged.

By Destiny Paitin – George Ross MacKenzie



WATER SNAPSHOT WATER QUALITY TERMINOLOGY

Nitrate and Phosphate - Nitrate and phosphate are necessary for aquatic plant growth, which supports the rest of the aquatic food chain. Both of these nutrients are derived from a variety of natural and artificial sources, including decomposition of plant and animal materials, man-made fertilizers, and sewage. Rainfall also can be a significant source of nitrates. While excessive nutrients might cause undesirable plant growth with their deleterious impacts on water quality, an appropriate level of nutrients is one of the driving forces of the aquatic ecosystem.

Natural nitrate concentrations rarely exceed 10 milligrams per liter (mg/l). Most are less than 1 mg/l, especially during periods of high plant production. Concentrations greater than 20 mg/l may pose a health hazard to small mammals, causing a problem where the blood's hemoglobin cannot transport oxygen.

In natural unpolluted water, phosphate levels are generally very low. Phosphorus, which combines with oxygen to form phosphate, is most often the limiting factor for plant production in streams.

Oxygen - Dissolved - Dissolved oxygen (DO, pronounced dee-oh) is oxygen that is dissolved in water. It gets there by diffusion from the surrounding air; aeration of water that has tumbled over falls and rapids; and as a product of photosynthesis. The amount of dissolved oxygen present is affected by temperature. Cold water generally contains more DO than warm water. If water is too warm, there may not be enough oxygen in it. When there are too many bacteria or aquatic animals in the area, they may overpopulate, using DO in great amounts.

Oxygen levels also can be reduced through over fertilization of water plants by run-off from farm fields containing phosphates and nitrates (the ingredients in fertilizers). Under these conditions, the numbers and size of water plants increase a great deal. Then, if the weather becomes cloudy for several days, respiring plants will use much of the available DO. When these plants die, they become food for bacteria, which in turn multiply and use large amounts of oxygen.

How much DO an aquatic organism needs depends upon its species, its physical state, water temperature, pollutants present, and other factors. For example, at 5 °C (41 °F), trout use about 50-60 milligrams (mg) of oxygen per hour; at 25 °C (77 °F), they may need five or six times that amount. Numerous scientific studies suggest that 4-5 parts per million (ppm) of DO is the minimum amount that will support a large, diverse fish population. The DO level in good fishing waters generally averages about 9.0 parts per million (ppm).

pH - pH is a measure of the acid/alkaline relationship in a water body. pH values range on a scale of zero to 14, with 7 being neutral.

A pH of about 6 to 9 is generally favored by aquatic life, especially fish. Algae and rooted plants in a stream modify pH levels through the photosynthesis and respiration processes. If plants are active, wide swings in pH levels can be observed over a 24-hour period, with low values experienced at night and high values experienced at midday. In-stream pH levels can also be impacted by acid and alkaline chemicals from industry, mining, acid rain, and other man-made sources, as well as by natural sources such as limestone deposits (bedrock) and tannic acid (produced by certain vegetation).

Turbidity - The American Public Health Association (APHA) defines turbidity as "the optical property of a water sample that causes light to be scattered and absorbed rather than transmitted in straight lines through the sample. In simple terms, turbidity answers the question, "How cloudy is the water?"

Light's ability to pass through water depends on how much suspended material is present. Turbidity may be caused when light is blocked by large amounts of silt, microorganisms, plant fibers, sawdust, wood ashes, chemicals, and coal dust. Any substance that makes water cloudy will cause turbidity. The most frequent causes of turbidity in lakes and rivers are plankton and soil erosion from storm water runoff.

Water Temperature - Water temperature is an important environmental factor for fish and other aquatic life, with many species needing specific temperature ranges to thrive. Temperature affects the concentrations of dissolved oxygen in water, with higher concentrations occurring with colder temperatures.

Damascus Elementary School – Damascus, PA

Results of sample testing performed by students of Mrs. Hazen's and Ms. Jeffer's classes.

WEATHER CONDITIONS

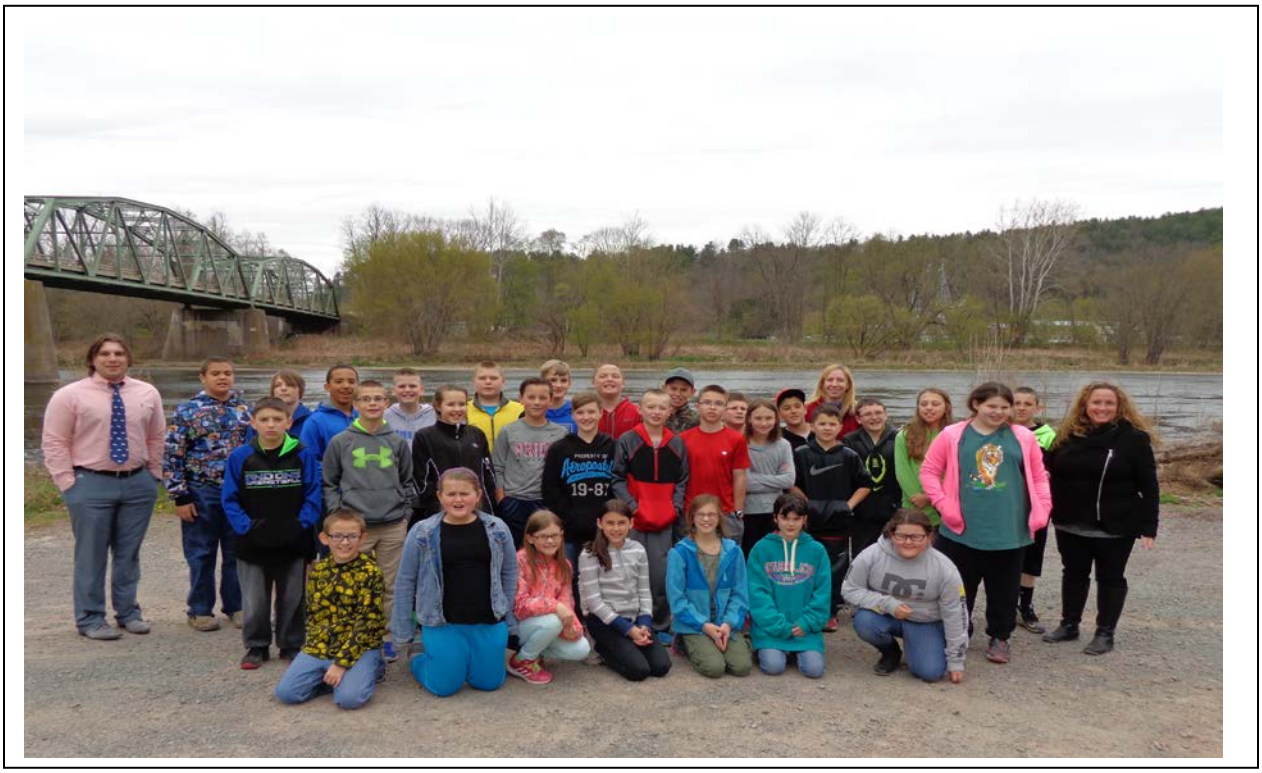
Air Temp: 12°C *Description*: PARTLY CLOUDY

Was there precipitation within the past 48 hours? YES

SAMPLING LOCATION – Delaware River & Beaverdam Creek

SAMPLING DATE – April 29, 2016

Delaware River	Water Temp. (°C)	pH	Dissolved Oxygen (ppm)	Nitrate (ppm)	Phos-phate (ppm)
Lydia, Kate, Conlan, Owen, Charles	14	7	4	<5	1
Rocco, Ivy, Katie, Bennett	18	8	2	<5	1
Joe, Sam, Kaitlyn, Aidan	24	8	4	<5	1
Trent, Josh, Lake, Andrew, Ryanne	15	8	4	<5	1
Class Averages	**18**	**8**	**4**	**<5**	**1**
Beaverdam Creek					
Eddie, Aaron, Erik, Madison	14	8	4	5	2
Christian, Buddy, Anthony, Madison, Carly	14	8	4	<5	<2
Hannah, Mike, Maggie, Camden	14	8	4	<5	1
Class Averages	**14**	**8**	**4**	**<5**	**2**



George Ross MacKenzie School – Glen Spey, NY

Results of sample testing performed by students of Mr. Dunker's and Mrs. Nealon's classes.

WEATHER CONDITIONS

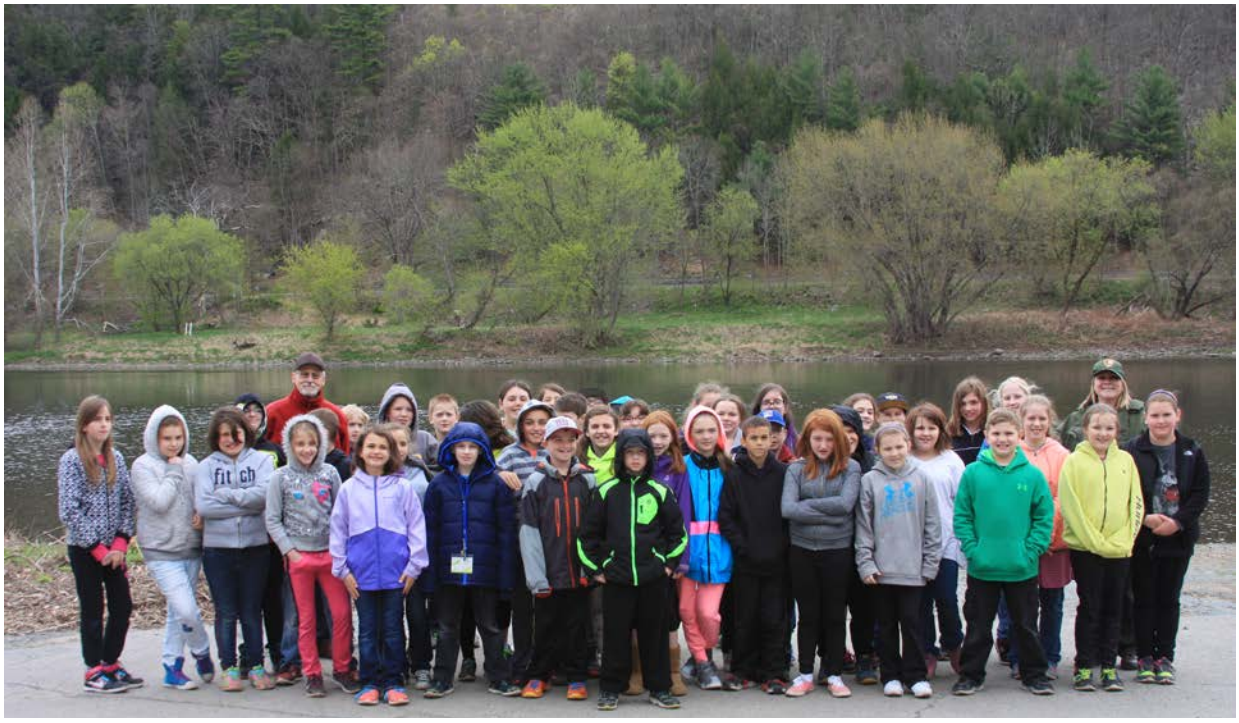
Air Temp: 8°C *Description:* PARTLY CLOUDY/OVERCAST

Was there precipitation within the past 48 hours? Yes

SAMPLING LOCATION –Delaware River

SAMPLING DATE – April 29, 2016

Delaware River	Water Temp. (°C)	pH	Dissolved Oxygen (ppm)	Nitrate (ppm)	Phos-phate (ppm)
Ema, Dillan, Matthew, Cassie, Madysin, Kayla	14	7	0	<5	1
Cailey, Brianna, Mikayla, Peter, Patrick	14	7	0	<5	<1
Molly, Leslie, Frankie, Kenzie, Adriana	14	7	0	<5	<1
Cadence, Angie, Shalynn, Destiny, Reuben, Tristan	14	7	8	<5	1
Molly, Nick, Bryn, Samantha, Alexis	14	7	0	<5	1
Jeffery, Ethan, Dominick, Hailey, Grace	15	7	0	<5	<1
Kristen, Justin, Hope, Emma, Natalie	14	7	4	<5	<1
Sean, Maddison, Mary, Elizabeth, Pearl	18	7	4	<5	<1
Class Averages	**15**	**7**	**2**	**<5**	**<1**



Hancock Central School – Hancock, NY

Results of sample testing performed by students of Ms. Charles' and Mrs. White's classes.

WEATHER CONDITIONS

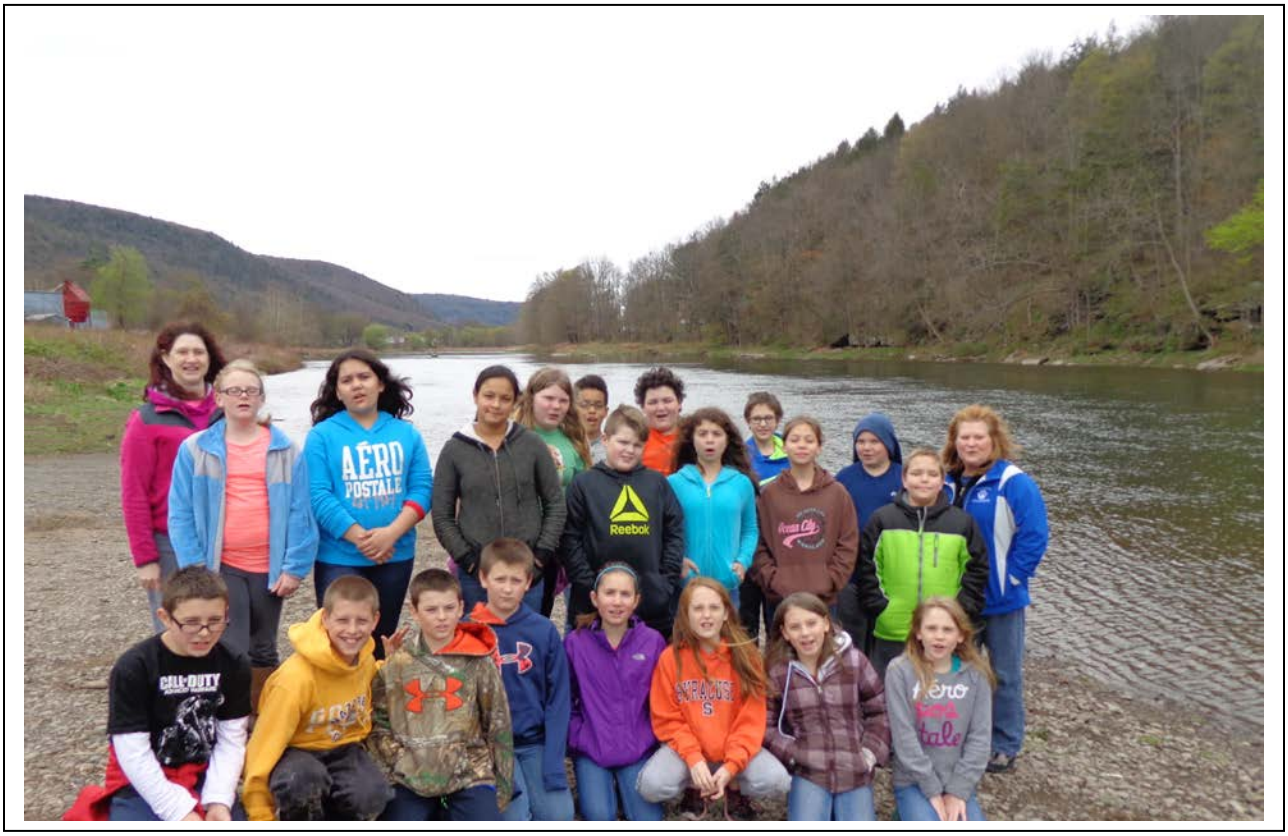
Air Temp: 14°C *Description:* OVERCAST

Was there precipitation within the past 48 hours? Yes

SAMPLING LOCATION – East Branch Delaware River

SAMPLING DATE – May 5, 2016

East Branch Delaware River	Water Temp. (°C)	pH	Dissolved Oxygen (ppm)	Nitrate (ppm)	Phos-phate (ppm)
Peyton, Shamus, Hailie, Kaelin	14	7	4	<5	<1
Jeremiah, Kate, Regan, Clarissa	14	6	0	<5	<1
Grace, MaKiryn, Kaden, Alicia	14	5	4	<5	2
Ethan, Noah, Seni, Amaria	16	7	4	<5	<1
Alexis, Anton, Ronnie, Zaire	14	7	4	<5	1
Class Averages	**14**	**6**	**4**	**<5**	**1**



Sullivan West Elementary School – Jeffersonville, NY

Results of sample testing performed by students of Mrs. Sedlack's, Mrs. Hawkins' and Mrs. Jahrling's classes.

WEATHER CONDITIONS

Air Temp: 11.6°C *Description:* PARTLY CLOUDY

Was there precipitation within the past 48 hours? NO

SAMPLING LOCATION – Sullivan West Creek

SAMPLING DATE – May 2, 2016

Sullivan West Creek	Water Temp. (°C)	pH	Dissolved Oxygen (ppm)	Nitrate (ppm)	Phos-phate (ppm)
Alexis, Nick, Luckas, Hannah, Caeron, Isabella	14	7	0	<4	2
Paige, Collin, Kember, Azalia, Mathew	14	7	4	<4	2
Alyssa, Beth, Xaira, Michael, Colin	14	7	4	<4	2
Anabella, Mikayla, Hayley, Max, Rebecca, Rose-lynn	14	7	0	<4	1
Will, Dom, Christian, Jasmine, Isannah, Anna, Elainie	14	7	0	<5	2
Andrew, Rae-Lynn, Dillan, Dom, Cheyenne, Caitlynn	16	7	0	<5	1
Savannah, Autumn, Jillian, Brandon, Baily, Robert	16	7	0	<5	2
Emily, Georgeanne, James, Lucas, Adrianna, Kimberly	16	7	0	<5	1
Jordan, Kaylee, Will, George, Alex	16	7	8	<5	1
Suani, Lily, Nathan, Germy, Matthew, Flosity	16	7	0	<5	1
Class Averages	**15**	**7**	**2**	**<5**	**2**