

WATER SNAPSHOT 2015

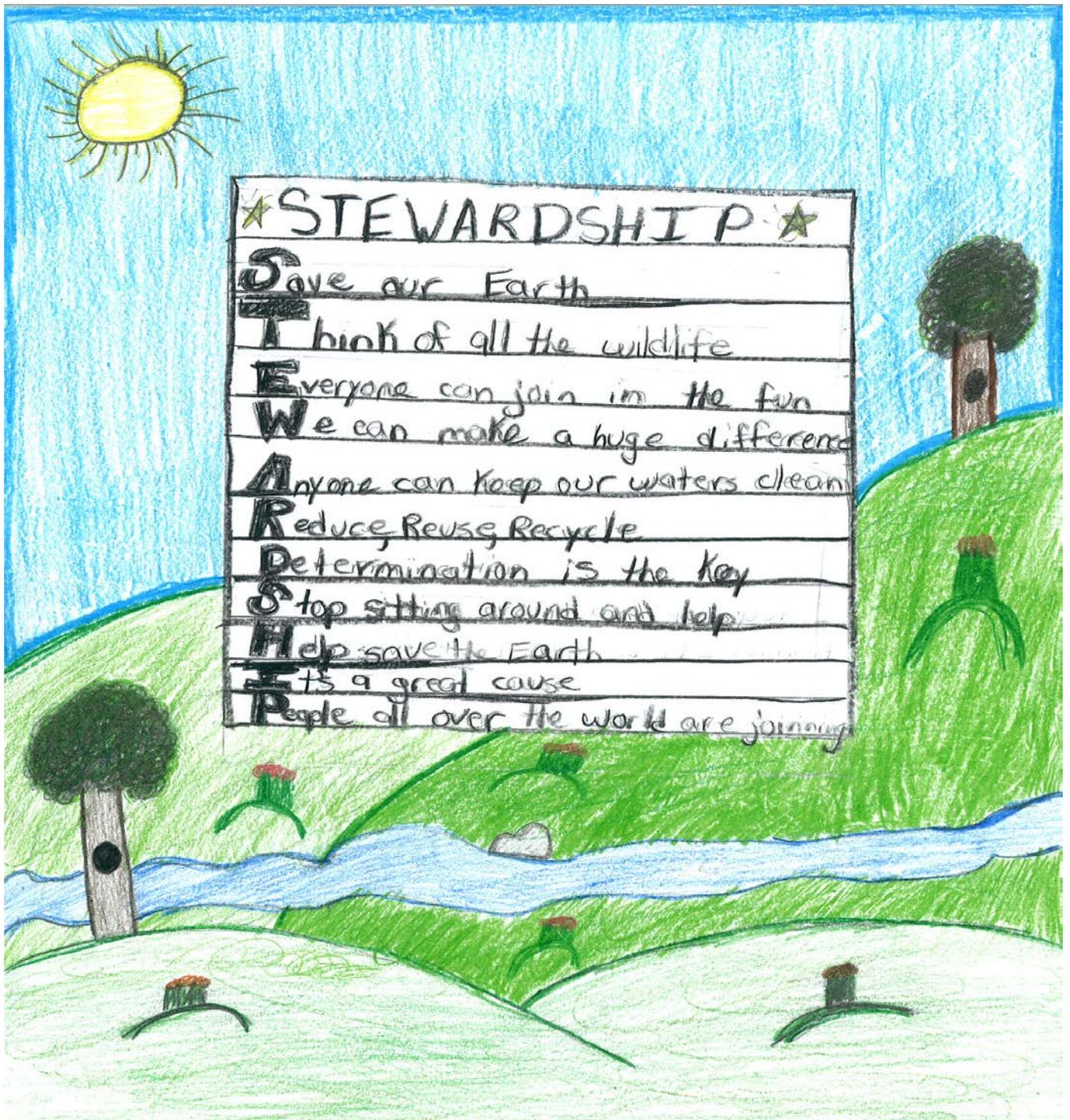
An Upper Delaware River Snapshot



Drawing by Emily Ruggles – Damascus Area School

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, Eldred Central School District's George Mackenzie Ross Elementary School, and the Hancock Central School in conjunction with National Park Ranger Jamie Myers, National Park Service Seasonal Park Rangers Susie Kaspar and Keith Gortowski and Fred Krasselt, National Park Service V.I.P.



Drawing by Annie Davis – George Mackenzie Ross Elementary

Overview

Who: Fifth Grade classes from Wayne-Highlands School District's Damascus Elementary School in Pennsylvania, Hancock Central School, George Mackenzie Ross and Sullivan West 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, 2015

Where: Students in the Upper Delaware River Valley were able to collect water samples from three different aquatic settings. This year 3 different tributaries of the Upper Delaware River 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.



Drawing by Kayla Kuta – Damascus Area School

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: 26°C

Description: Sunny

Was there precipitation within the past 48 hours? No

SAMPLING LOCATION – Delaware River & Beaverdam Creek, Damascus, PA

SAMPLING DATE – May 11, 2015

	Water Temp. (°C)	pH	Dissolved Oxygen (ppm)	Nitrate (ppm)	Phosphate (ppm)
Delaware River					
Hannah, Lars, Carter, Ray, Gabe	24	8	8	<5	1
Aubree, Gabe P., Gwen, Katie, Patience	24	7	4	<5	1
Mackenzie, Ethan, Nicole, William, Andrea	24	7	4	<5	1
Class Averages	24	7.3	5.3	<5	1
Beaverdam Creek					
Emily, Kylie, Abby, Jacelyn, Kayla, Chace	22	8	8	<5	2
Pauline, Noah, Ethan, Jacob, Ashley	22	8	8	<5	1
Class Averages	22	8	8	<5	1.5





Drawing by Lars Balthaser - Damascus Elementary

Hancock Central School – Hancock, NY

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

WEATHER CONDITIONS

Air Temp: 10°C

Description: Overcast

Was there precipitation within the past 48 hours? Yes

SAMPLING LOCATION – East Branch Delaware River, Hancock, NY

SAMPLING DATE – May 13, 2015

East Branch Delaware River	Water Temp. (°C)	pH	Dissolved Oxygen (ppm)	Nitrate (ppm)	Phosphate (ppm)
Madison, Hailie, Cheyenne, Shane, Nathan	18	8	4	<5	1
Gabe, Christian, Chris, Dakota,	18	7	4	<5	1
Nick, Desire, Donovan, Payton, Andrea	18	7	4	<5	1
Sarah, Lindsey, Karon, Aiden	16	7	0	<5	1
Jasmine, Wyatt, Shawna, Brennan, Joey	18	7	4	<5	1
Class Averages	17.6	7.2	3.2	<5	1



George Mackenzie Ross Elementary School – Glen Spey, NY

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

WEATHER CONDITIONS

Air Temp: 31°C

Description: Partly Cloudy

Was there precipitation within the past 48 hours? No

SAMPLING LOCATION – Delaware River, Lackawaxen, PA

SAMPLING DATE – May 05, 2015

Delaware River	Water Temp. (°C)	pH	Dissolved Oxygen (ppm)	Nitrate (ppm)	Phosphate (ppm)
Anisha, Kaitlyn, Zoe, Chip, Alex	23	7	4	<5	1
Adriana, Halie, Dana, Justin, Colin	22	6	0	<5	1
John, Donald, Andrew, Jaily	22	8	0	<5	1
Makenna, Madison, Owen, Dylan, Emily	24	7	4	<5	1
Geraint, Kyleigh, Lily, Emilia, Brandon	22	7	8	<5	1
Annie, Braeden, Naren, Aiden, Danielle	22	7	8	<5	1
Kate, Kyle, Audrianna, Sebastian	24	7	8	<5	1
Class Averages	22.7	7	4.6	<5	1



Sullivan West School – Jeffersonville, NY

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

WEATHER CONDITIONS

Air Temp: 11°C

Description: Sunny

Was there precipitation within the past 48 hours? No

SAMPLING LOCATION – Sullivan West Creek

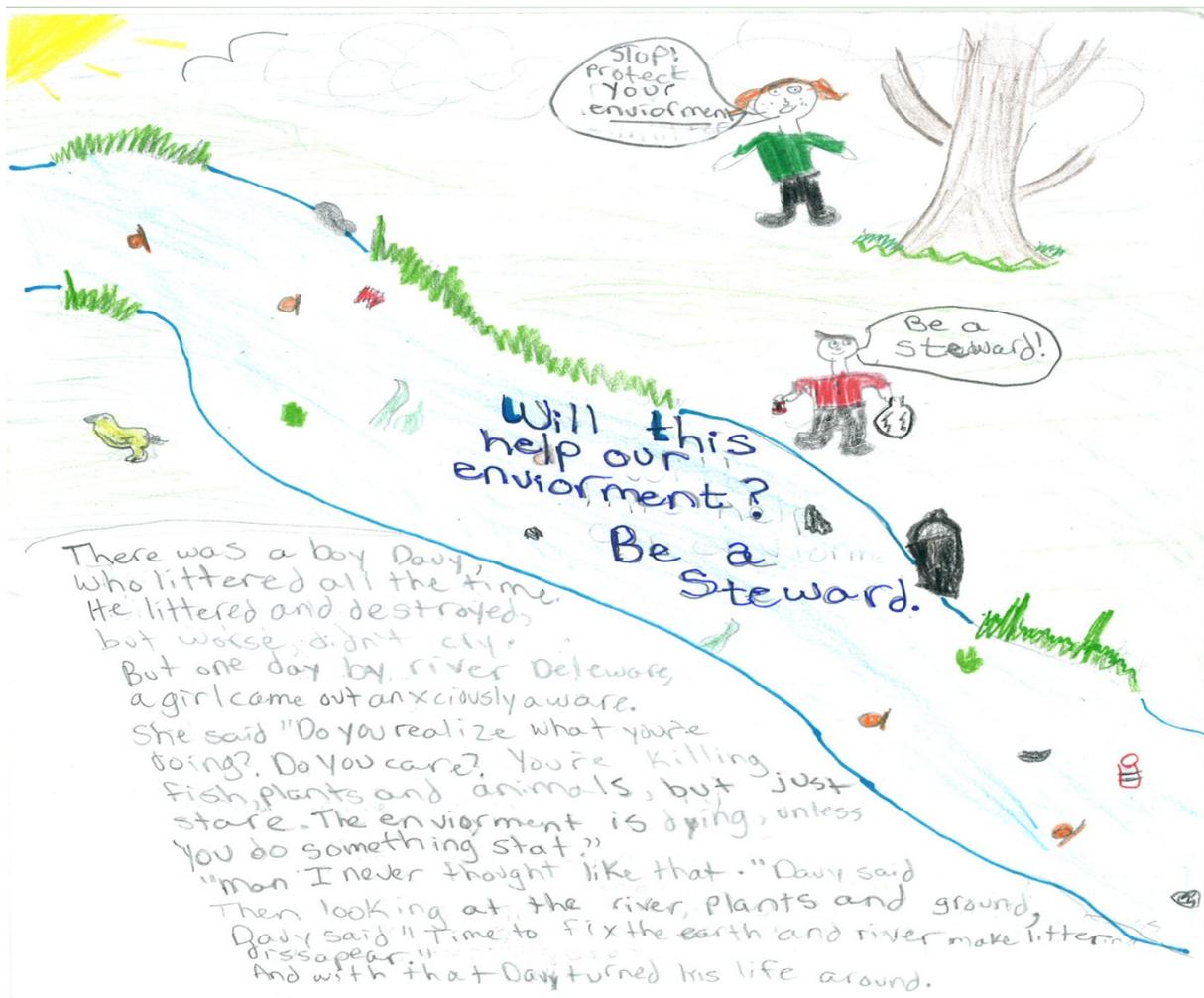
SAMPLING DATE – April 29, 2015

Sullivan West Creek	Water Temp (°C)	pH	Dissolved Oxygen (ppm)	Nitrate (ppm)	Phosphate (ppm)
Hunter, Stephano, Grace, Riley, Trista	18	7	4	<5	1
Amy, Ryan, Zach, Kevin	18	7	4	<5	1
Adriana, Gavin, Devin, Emily	18	7	2	<5	1
Syrena, Mason, Regan, Melissa, Thomas	18	7	4	<5	1
Annabelle, Jake, Dominic, Maya, Jack	18	7	4	<5	2
Alexis, Jay, Lyric	18	7	4	<5	1
Taylor, Ryan, Chris, Camille, Kathryn	18	7	0	<5	1
Abby, Sam, Jenna	14	7	0	<5	1
Callie, Alexis, Charlie, Sofia, Julia	14	7	0	<5	1
Charles, Riley, Jon, Nikolas, Ella	16	7	4	<5	1
Taylor, Chandler, Keegan, Justin	14	7	4	<5	1
Tyler, Hunter, Joseph, Mathew	14	7	4	<5	1
Emilee, Brandon, Anthony, Antony	14	7	4	<5	1
Connor, Chris, Henry, Paige, Mackenzie	14	7	4	<5	1
Alexis, Michael, Arianna, Hadia	14	7	4	<5	1
Dylan, Taria, Annika, Gabby, Kailyn	14	7	4	<5	1
Reece, Amber, Amanda, Trevor	14	7	0	<5	1
Class Averages	15.8	7	2.8	<5	1.1





Sullivan West School



Drawing and story by Sofia Seidl – Sullivan West Central School