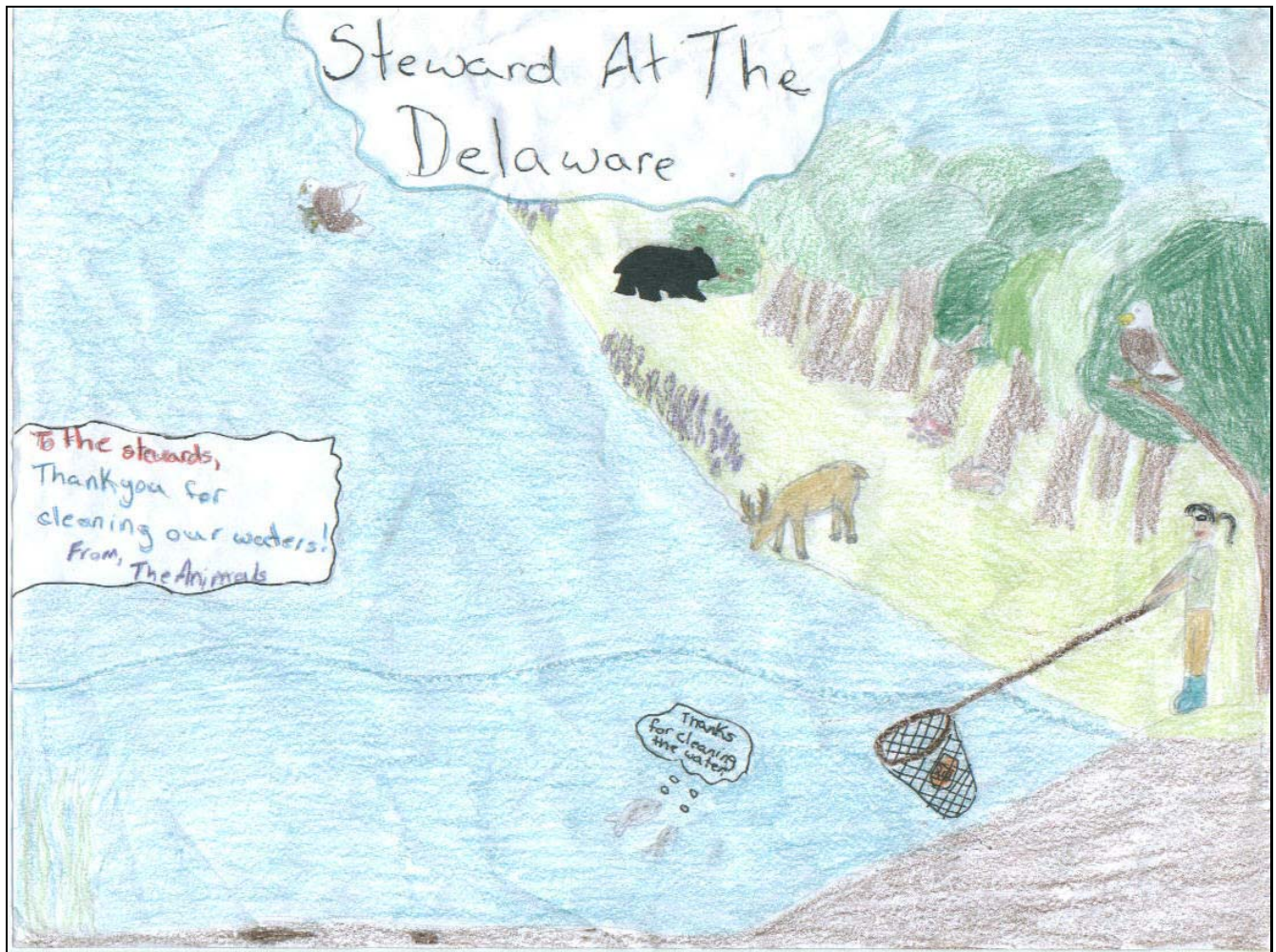


WATER SNAPSHOT 2003

An Upper Delaware Snapshot



Drawing by Angela Santiamago - Damascus Elementary School

Upper Delaware Scenic & Recreational River

Compilation of results collected by students from Sullivan West Central School District at Narrowsburg, Wayne Highlands School District's Damascus Elementary School, and the Homestead School in Glen Spey, NY in conjunction with National Park Service Rangers Rocci Aguirre and Jamie Myers.

THE DELAWARE RIVER

The Delaware River flows so quietly, quickly, peacefully.

Just as the peaceful water flows along the river quietly, quickly, peacefully.

The sun reflects on the clear water running along the shore glistening, shining,
sparkling.

The great Bald Eagle gracefully swoops down to catch a fish.

All these special things you can only find in one place,
The Delaware River.

By Audrey Schultheis
Sullivan West at Narrowsburg

EAGLES

Over the water,
Soaring over the trees,
She lands on an old tree branch.
The eagle swoops down,
Picks up an unwary trout.
She flies up to her twiggy nest where her
Babies await her.
Then she flies out into the reddish
Pink horizon
Is she beautiful?
Have you ever seen anything like it?

By Gage Klipper
The Homestead School

Overview

Who: Sixth Grade classes from Sullivan West Central School District at Narrowsburg in New York, and Wayne-Highlands School District's Damascus Elementary School in Pennsylvania.

For the first time in the Upper Delaware second grade students participated in Water Snapshot. The second grade students at the Homestead School in Glen Spey New York participated this year.

What: Water Snapshot is a popular, 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 to go to a portion of the Delaware River watershed, whether it be a tributary or the Delaware River itself, 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 22 through May 4, 2003

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

Be sure to check out the DRBC Water Snapshot
WebPage at:

<http://www.state.nj.us/drbc/snapshot.htm>

Each year Water Snapshot is supported by the Delaware River Basin Commission, Delaware Department of Natural Resources and Environmental Control, Delaware Estuary Program, Delaware Riverkeeper Network, National Park Service, New Jersey Department of Environmental Protection, New York Department of Environmental Conservation, Pennsylvania Department of Environmental Protection, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Environmental Council, Pocono Environmental Education Center, Upper Delaware Council, U.S. Environmental Protection Agency, and the U.S. Geological Survey.



EXPLANATION OF WATER QUALITY TERMINOLOGY USED DURING WATER SNAPSHOT

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.

Determining the optimum levels of nitrates and phosphates in water is extremely complex. Their levels often fluctuate considerably because they are constantly being taken up and released by aquatic life, being exchanged with stream bed sediments, and undergoing various other transformations.

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. Fish are cold-blooded animals, so they use more oxygen at higher temperatures when their metabolic rate increases.

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. Since pH is logarithmic, a one-notch change in pH (e.g., from 6 to 7) represents a 10-fold increase.

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.

The most accurate way to determine water's turbidity is with an electronic turbidimeter. The turbidimeter has a light source and a photoelectric cell that accurately measures the light scattered by suspended particles in a water sample. The results are reported in units called Nephelometric Turbidity Units or NTU's.

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.

"Make every day an earth day. Take care of nature and be a good steward."

Richard Greenwald ~ Damascus Elementary

Damascus School - Damascus, PA

Results of sample testing performed by students of Mrs. Alexander's, Mrs. Schott's, and Mrs. Box's classes.

WEATHER CONDITIONS

Air Temp: 6°C

Description: PARTLY CLOUDY/OVERCAST

Was there precipitation within the past 48 hours? YES

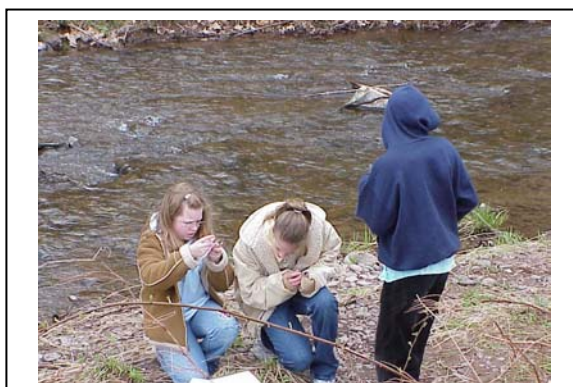
SAMPLING LOCATION - Beaverdam Creek

SAMPLING DATE - April 23, 2003

	Water Temp. (°C)	pH	Dissolved Oxygen (ppm)	Water Depth (meters)	Nitrate (ppm)	Phosphate (ppm)
Brenda, Misty, James, Richard		7	4		5	<1
Danielle, Ben, Samantha, Dennis	14	6.5	4		5	1
Abbey, Bryce, Josh, Brandon	18	9	4		<5	<1
John, Will, Mike, Katy		7.5	4		<5	<1
Troy, Phillip, Angela, Shayne, Tiffany	8	8	8	0.14	<5	1.5
Spencer, Jared, Vicky, Brian, Melanie	14	8	4		5	<1
Victor, Amanda, Tory, Amberley	8	5	4	0.16	<5	1
Kathleen, Lauren, Wyman, Ryan	18	8	0	0.14	<5	<1
Lindsey Wentz	15	8	4	0.33	<5	1
Brittany, Katherine, Justin, Stephan	15	8	4	0.33	<5	<1
Evan Padua	18	8	4		5	1
Turner, Hank, Shannon, Autumn	14	7.5	6		<5	<1
Class Averages	14.2	7.5	4.2	0.22	<5	1

AQUATIC LIFE OBSERVED: algae, rooted plants, invertebrates, fish, salamanders, caddisflies, signs of beavers, and amphibians.

WAS THE WATER CLOUDY? NO



Sullivan West at Narrowsburg - Narrowsburg, NY

Results of sample testing performed by students of Mr. Walsh's class.

WEATHER CONDITIONS

Air Temp: 17°C

Description: OVERCAST

Was there precipitation within the past 48 hours? NO

SAMPLING LOCATION - Delaware River at Darbytown Access Area

SAMPLING DATE - May 5, 2003

	Water Temp. (°C)	pH	Dissolved Oxygen (ppm)	Water Depth (meters)	Nitrate (ppm)	Phosphate (ppm)
Jennifer, David, Audrey, Sabrina	18	9	4	5	<5	<1
Jenna, Julianne, Eric, Vaughn, Phillip	14	6	2	1	<5	<1
Nicole, Bridget, Lisa, Catie	12	8	6	.08	<5	<1
Joe, Thomas, Christian, Mitchell	14	9	4		<5	<1
Justin, Travis, Roxanne, Shawna	12	8	4	.5	<5	<1
Class Averages	14	8	4	1.65	<5	<1

AQUATIC LIFE OBSERVED: algae, rooted plants, fish, crayfish, salamander ,and amphibians.

WAS THE WATER CLOUDY? NO



*The Delaware River is soft and sleek
The Delaware River is not small or meek
The Delaware River is a beautiful place
The Delaware River will sometimes race*

By Sabrina ~ Sullivan West at Narrowsburg

Homestead School - Glen Spey, NY

Results of sample testing performed by students of Mr. Comstock's, Mrs. Fedorick's, and Miss Frost's class.

WEATHER CONDITIONS

Air Temp: 16°C

Description: PARTLYCLOUDY/OVERCAST

Was there precipitation within the past 48 hours? NO

SAMPLING LOCATION - Tuttle Brook

SAMPLING DATE - May 5, 2003

	Water Temp. (°C)	pH	Dissolved Oxygen (ppm)	Water Depth (meters)	Nitrate (ppm)	Phosphate (ppm)
Lauren,Michelle,Cody,Peter,Elizabeth	<14	7	4	.3	<5	1
Erika,Darby,Austin,Kayla,Matt,Neela	14	8	4	.2	2	1
Skylar,Drew,Richard,Eli,Spencer,Gage	14	7	4	.2	<5	1.5
Peter,Katherine,Dustin,Mara,Taylor,Angelo	<14	8	4	.5	<5	<1
Katrina,Marcella,Sarah,Sophie,Wilson,Austin	11	7.8	4	.3	<5	1
Class Averages	13.4	7.56	4	.3	<4.4	1.1



"WATER SNAPSHOTS"



Drawing by Darby Smith - Homestead School



Drawing by Will Halstead - Damascus Elementary

"You can be a good steward by picking up litter and taking water samples of the river to make sure it is safe for wildlife."

Kathleen Rodriguez - Damascus Elementary