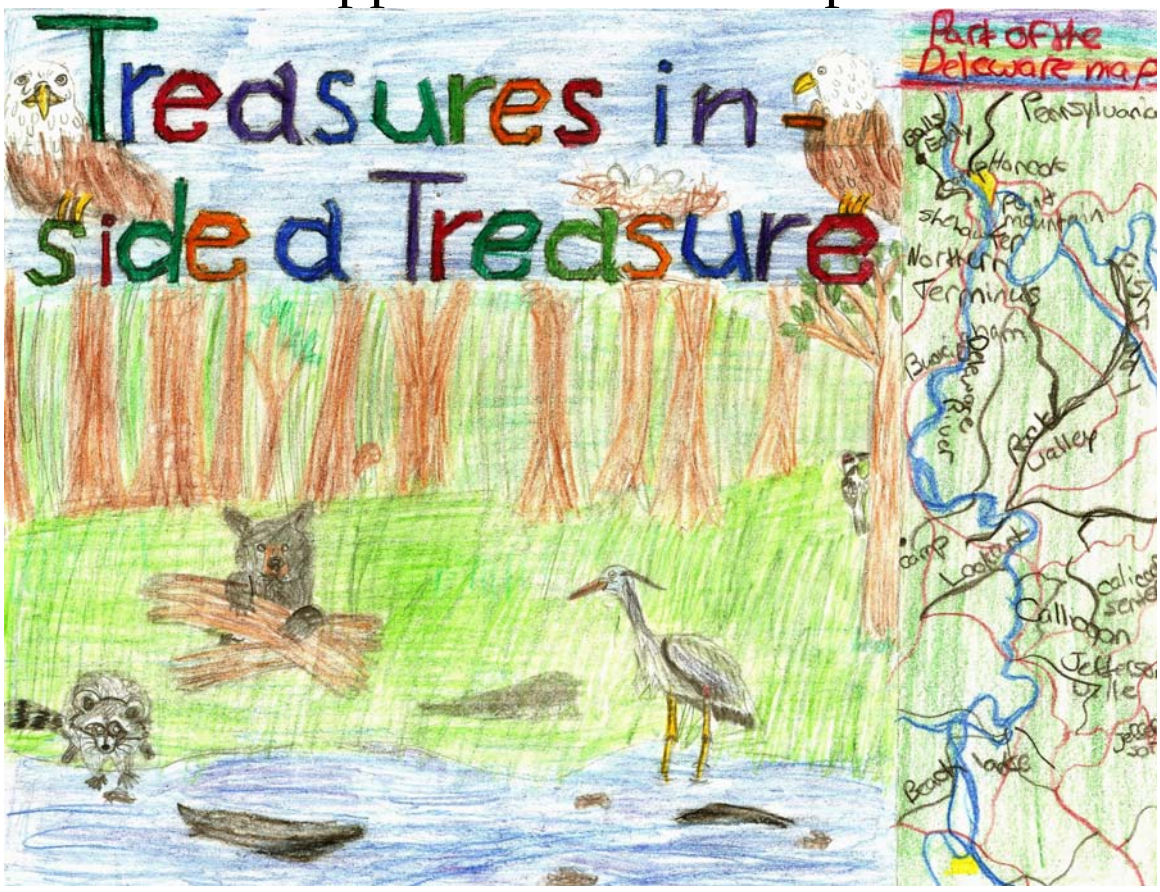
WATER SNAPSHOT 2008

An Upper Delaware Snapshot



Drawing by Alexa Meyer – Damascus Elementary School

Upper Delaware Scenic & Recreational River

Compilation of results collected by students of Wayne Highlands School District's Damascus Elementary School, Lakeside Elementary School, Preston Area School and the Hancock Central School in conjunction with National Park Service Ranger Jamie Myers and Rich Egan, National Park Service V.I.P.

Eagles, Eagles

Eagles, eagles so brave and strong
To pollute the river would be wrong.
We don't want our river filled with tar
Because the eagles fly so far.
Eagles, eagles soar so low
In search of fish they will not go
We don't want our river filled with waste.
HURRY NOW WE CANNOT HASTE!!!

By: Olivia Meyer
Damascus Elementary

I heard a bird chirping high in a tree.
Down by the river I heard the water flow.
The water flowed quiet and gracefully.
But it did not flow too slowly.

By: Megan Hunter
Hancock Central

Water

The water is clean,
The water is healthy.

The water streams to make the animals healthy.

By: Carley Riefler
Lakeside Elementary

Overview

Who: Fifth Grade classes from Wayne-Highlands School District's Damascus Elementary School, and Preston Area School in Pennsylvania and Hancock Central School in New York. This year fourth grade students from Wayne-Highlands School District's Lakeside Elementary School also participated.

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 21 through April 28, 2008

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.

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

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

Delaware River Basin Commission

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.

Damascus Elementary School – Damascus, PA

Results of sample testing performed by students of Mr. Smith's and Mrs. Lang's classes.

WEATHER CONDITIONS

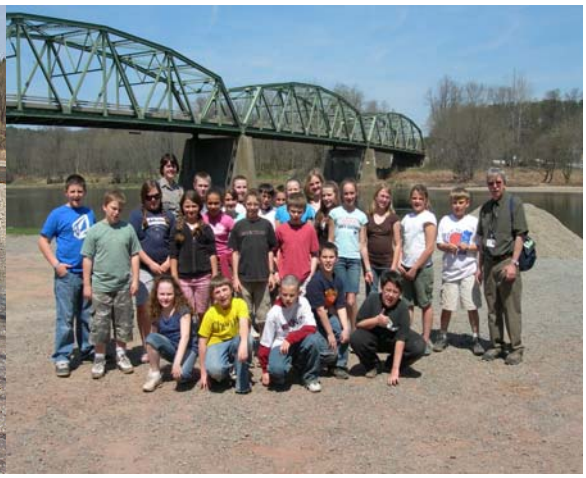
Air Temp: 28°C *Description*: SUNNY

Was there precipitation within the past 48 hours? NO

SAMPLING LOCATION – Delaware River & Beaverdam Creek

SAMPLING DATE – April 22, 2008

Delaware River	Water Temp. (°C)	pH	Dissolved Oxygen (ppm)	Nitrate (ppm)	Phos-phate (ppm)
Jorden, Alexa, Marissa, Tate, Dakota	16	8	8	<5	<1
Cali, Molly, Danny, Griff, Kenny	16	8	4	<5	<1
Sully, Alec, Casey, Maggie, Alex	14	8	8	<5	1
Olivia, Henry, David, Katie, Brittany	16	8	4	<5	<1
Dan, Ryan, Alli, Aaron, Alex	14	8	X	<5	X
Class Averages	**15.2**	**8**	**6**	**<5**	**<1**
Beaverdam Creek					
Sky, Sam, Lauren, Jacob	18	8	8	<5	<1
Nicole, Justin, Scott, Olivia, Kyle	16	8	8	<5	<1
Cody, Logan, Hailey, Alexis	16	8	8	5	1
Megan, Nic, Logan, Chris, Katie	16	8	8	<5	<1
Taylor, Shannon, Kayley, Brooke	16	7	8	<5	<1
Class Averages	**16.4**	**7.8**	**8**	**<5**	**<1**



Don't pollute the Delaware River. It shows bad stewardship. If you like to fish in the Delaware River and catch fish, not garbage, don't pollute.

By: Danny Koop

Damascus Elementary

Lakeside Elementary School – Honesdale, PA

Results of sample testing performed by students of Mrs. Hutchinson's and Mrs. Lathrop's classes.

WEATHER CONDITIONS

Air Temp: 20°C *Description*: PARTLY CLOUDY

Was there precipitation within the past 48 hours? NO

SAMPLING LOCATION – Delaware River

SAMPLING DATE – April 25, 2008

Delaware River	Water Temp. (°C)	pH	Dissolved Oxygen (ppm)	Nitrate (ppm)	Phos-phate (ppm)
Malise, Jillian, Ben, Tanner, Kyle, Sean	14	8	4	<5	<1
Emily, Molly, Kamryn, Mike, Dylan, Ian	14	8	4	5	1
Brandon, Breanna, Anna, Sara, Jordan, Michelle	16	8	4	5	2
Nichole, Rie-Ann, Karli, Katy, Rex, Matt	14	8	4	<5	<1
Carley, Lizzie, Zoey, Collin, Julia	14	8	8	<5	<1
Sam, Trent, Kai, Travis, Christian	14	8	4	<5	<1
Stephen, Nick, Chris, Mason, Daniel	14	8	4	<5	<1
Marina, Amanda, Kody, Joe, Destiny, Nicole	16	8	8	<5	<1
Tim, Jessica, Steven, Chey, Lindsey	14	8	8	<5	<1
Class Averages	**14.4**	**8**	**4.9**	**<5**	**<1**

We should take care of our RIVERS!

By: Mason Carmody
Lakeside Elementary

Preston Area School – Lakewood, PA

Results of sample testing performed by students of Mrs. Dorohovech's class.

WEATHER CONDITIONS
Air Temp: 5°C *Description:* PARTLY CLOUDY
Was there precipitation within the past 48 hours? YES

SAMPLING LOCATION – Shehawken Creek

SAMPLING DATE – April 14, 2008

	Water Temp. (°C)	pH	Dissolved Oxygen (ppm)	Nitrate (ppm)	Phos-phate (ppm)
Alexandra, Autumn, Mike	14	8	8	<1	<1
Kayla, Alex, Jonathan	14	8	8	<5	<1
Caitlyn, Lewis, Kyle	14	8	8	<5	<1
Baily, Colin, Zack	14	8	4	<1	<1
James, Sara, Trevor	14	7	4	<1	<1
Chris, Billy, Cirsten	13.5	8	8	<1	<1
Class Averages	**13.9**	**7.8**	**6.6**	**<2**	**<1**

Keep the river clean to keep animals safe and healthy.

By: Ava Slifko
Preston Area School

Hancock Central School – Hancock, NY

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

WEATHER CONDITIONS

Air Temp: 24°C *Description:* SUNNY

Was there precipitation within the past 48 hours? YES

SAMPLING LOCATION – East Branch Delaware River

SAMPLING DATE – April 24, 2008

	Water Temp. (°C)	pH	Dissolved Oxygen (ppm)	Nitrate (ppm)	Phos-phate (ppm)
Kaeli, Emily, Stash, Nick, Faith	14	7	4	<5	<1
David, Cynthia, Heidi, Nick, Paula	14	7	4	<5	<1
Shannon, Preston, Marian, Riley	16	7	4	<5	<1
Ralph, Dan, Tim, Megen, Louis	14	7	4	<5	<1
Jennifer, Megan, Joey, Felicity, Travis	15	7	4	<5	<1
Sara, Jazzy, Hope, AJ, Terry	20	7	4	<5	<1
Class Averages	**15.5**	**7**	**4**	**<5**	**<1**