

WATER SNAPSHOT 2009

An Upper Delaware Snapshot



Drawing by Liam Pietraszewski – Lakeside 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 Seasonal Ranger Susie Kaspar and Rich Egan, National Park Service V.I.P.



Love Our Earth

Trees and bees and other things too,
Live on this earth like me and you.
We need to keep it clean and bright,
So we can live on earth every day and night.
Our world is beautiful and deserves to be clean,
So make sure you are kind and gentle and don't be
selfish or mean.

We need to think of others who do so much,
Now let's follow in their footsteps and then keep it up!
So get to work you know what to do,
Plus don't forget to reduce, reuse, and recycle too!

By: Jessica N. Worzel
Preston Area School

Delighted river
Eagles flying over the river
Land is beautiful
Awesome scenery
Water is clean
Amazing sounds
Recycle your trash
Eels live in the river

Recreation areas are nice
Inviting to swim in
Very nice and relaxing place to go
Environmentally awesome
Respect the Delaware!

By: Tiffani Bird
Lakeside School

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. For the second year in a row 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 17 through April 30, 2009

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.

Care for the Delaware
so the water can be clean
and also for the fishes
who swim in between.

By: Samantha Pareago
Lakeside 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 Mr. Smith's and Mrs. Lang's classes.

WEATHER CONDITIONS

Air Temp: 18°C

Description: OVERCAST

Was there precipitation within the past 48 hours? YES

SAMPLING LOCATION – Delaware River & Beaverdam Creek

SAMPLING DATE – April 22, 2009

Delaware River	Water Temp. (°C)	pH	Dissolved Oxygen (ppm)	Nitrate (ppm)	Phos- phate (ppm)
Dylan, Jill, Janie, Chris, Michael	14	8	4	<5	<1
Melissa, Andrew, Denis, Ben, Leean	14	8	4	<5	<1
Roger, Elaina, Garrett, Rozalyn, Ryan, Stephen	14	8	4	<5	<1
Class Averages	14	8	4	<5	<1
Beaverdam Creek					
Jon, Adam, Justin, Zach, Nick	14	8	8	<5	<1
Jenna, Sam, Anika, BrieAnn, Zach, Dakota	14	8	8	<5	<1
Class Averages	14	8	8	<5	<1



Lakeside Elementary School – Honesdale, PA

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

WEATHER CONDITIONS

Air Temp: 16°C

Description: SUNNY

Was there precipitation within the past 48 hours? YES

SAMPLING LOCATION – Delaware River

SAMPLING DATE – April 24, 2009

Delaware River	Water Temp. (°C)	pH	Dissolved Oxygen (ppm)	Nitrate (ppm)	Phosphate (ppm)
Allurah, Olivia, Emily, Kim, Sam	14	8	4	5	1
Haley, Brittney, Laura, Maryah	26	8	4	5	<1
Nomi, Lauren, Amber, Faith	14	8	4	<5	<1
John, Alex, Herbert, Robert, Bobby	14	8	4	<5	<1
Julia, Addie, Taylor, Mackenzie, Kyla Rose	14	8	4	<5	<1
Emily, Kate, Frankie, Stephen, Rachel	<14	8	4	<5	<1
Dene, Alex, Dakota, Jordan	<14	8	8	<5	<1
Megan, Brianna, Olivia, Katie, Serena	14	8	4	<5	<1
Peter, Cory, Brandon, Caleb	14	8	4	5	<1
Timmy, Cody, Austin, Eli, Kyle, Brandon	14	7	8	<5	<1
Class Averages	15.2	7.9	4.4	<5	<1



Lakeside Elementary School – Honesdale, PA

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

WEATHER CONDITIONS

Air Temp: 28°C

Description: SUNNY

Was there precipitation within the past 48 hours? NO

SAMPLING LOCATION – Delaware River

SAMPLING DATE – April 27, 2009

Delaware River	Water Temp. (°C)	pH	Dissolved Oxygen (ppm)	Nitrate (ppm)	Phosphate (ppm)
Korah, Rachel, Emily, Lydia, Jasmine	24	8	4	<5	<1
Tiffani, Hannah, Sarah, Brittney	18	8	4	<5	<1
John, Dustin, Mitchell, Jayne, Ryan	18	8	8	<5	<1
Liam, Jack, Konnor, Tyler	20	8	4	<5	<1
Emily, Katie, Karli, Paige	18	8	8	<5	<1
Brett, Seth, Scott, Colorado	18	8	4	<5	<1
Cheyenne, Katelyn, Jaclyn, Mckenzie, Alyssa	20	8	8	<5	<1
Carley, Tiffany, Tanner, Emma, Jacob	16	7	8		
Nathaniel, Austin, Pierce, Surrey	20	8	4	5	1
Alec, Ryan, Miles, Brandon	20	8	8	<5	<1
Aleah, Mikayla, Olivia, Caroline	20	8	4	<5	<1
Class Averages	19.3	7.9	5.8	<5	<1



Preston Area School – Lakewood, PA

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

WEATHER CONDITIONS

Air Temp: 10°C

Description: SUNNY

Was there precipitation within the past 48 hours? YES

SAMPLING LOCATION – Shehawken Creek

SAMPLING DATE – April 17, 2009

	Water Temp. (°C)	pH	Dissolved Oxygen (ppm)	Nitrate (ppm)	Phosphate (ppm)
Ashley, Sara, Tyler, Julius	14	8	8	<5	<1
Jessica, Sage, Amanda, Noah	14	8	8	<5	<1
Melanie, Morgan, Jack	14	8	8	<5	<1
Skyler, Kelsey, Dakota, Amber	14	8	8	<5	<1
Alex, Logan, Alyssa, Cole	14	8	8	<5	<1
Tommy, Kym, Evan, Emily	14	8	8	<5	<1
Class Averages	14	8	8	<5	<1



Hancock Central School – Hancock, NY

Results of sample testing performed by students of Miss 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 – April 23, 2009

	Water Temp (°C)	pH	Dissolved Oxygen (ppm)	Nitrate (ppm)	Phosphate (ppm)
Kayleigh, Stephen G, Stephen D, Kayla, Paula	16	7	4	<5	<1
Ashley, Cassandra, Rachael, Allise	<14	7	4	<5	<1
Alyssa, Bobby, Nick, Cameron	<14	7	4	<5	<1
Wyal, Stephanie, Jessica, Shawna	<14	7	4	<5	<1
Sam, Ethan, Molly, Ross	<14	7	4	<5	<1
Sean, Cotton, Manuel, Joe	<14	7	4	<5	<1
Ethan, Trisha, Jason, Rachel	16	7	4	<5	<1
Andrew, Ryan, Ryan, Blaise	<14	7	8	<5	<1
Class Averages	14.5	7	4.5	<5	<1



Don't pollute the Delaware River, it's our treasure.

Stephanie Poborsky
Hancock Central School