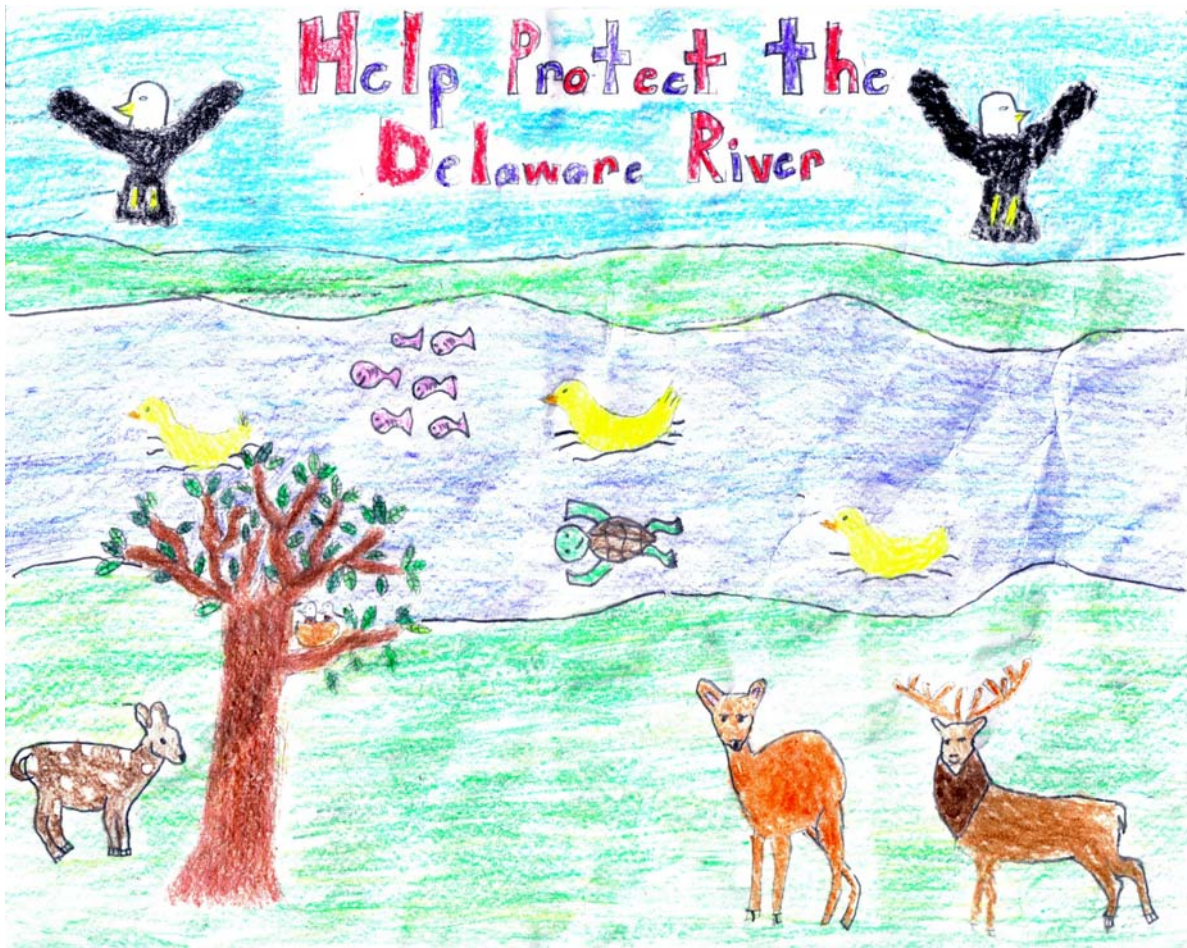


# WATER SNAPSHOT 2007

## An Upper Delaware Snapshot



Drawing by Erin Curtis- Preston Area School

### Upper Delaware Scenic & Recreational River

Compilation of results collected by students from Wayne Highlands School District's Damascus 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.

## Sitting by a Watershed

As I'm sitting by a watershed,  
Water laps happily at my feet,  
Yes, I'm sitting by a watershed.  
No, it's not a shed filled with water,  
But a place where water flows.  
It flows in the Delaware River,  
Supplying fresh new water  
So there is enough air for the fish.  
I'm sitting by a watershed,  
And watching the Delaware drink.

By: Heather Ritter  
Damascus Elementary School

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**D**ark outside, we get our poles

**E**els are running

**L**ike silver strings

**A** bucket, a lantern, a net

**W**orms, wriggling on a hook

**A** bite!

**R**eel it in quick

**E**els in the bucket

**R**iding along the river

**I** let my horse soak her feet

**V**ery cold water splashes my legs

**E**agles fly over us

**R**eady to canter home

By: Courtney Brock  
Hancock Central 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.

**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 20 through April 29, 2007

**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>**

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.

**Delightful**

**Exciting**

**Lovely**

**Awesome**

**Wilderness**

**Aqua**

**Rural**

**Energetic**

**Renewable**

**Inviting**

**Very cool**

**Entertaining**

**Raging**

**By: Peter Dayton**

**Hancock Central School**

## 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:* 20°C

*Description:* Partly Cloudy

*Was there precipitation within the past 48 hours?* YES

**SAMPLING LOCATION** – Delaware River & Beaverdam Creek

**SAMPLING DATE** – April 26, 2007

<b>Delaware River</b>	Water Temp. (°C)	pH	Dissolved Oxygen (ppm)	Water Depth (meters)	Nitrate (ppm)	Phosphate (ppm)
Heather, Tim, Kella, Aaron	14	8	4		<5	<1
Ben, Joey, Katie, J.J., Jessica	12	8	6	0.15	<5	<1
Kim, Mary, Greg, Jared	14	8	4	0.25	<5	1
Mikaela, Alec, David, Jordan	14	8	6	0.25	<5	<1
<b>Class Averages</b>	<b>13.5</b>	<b>8</b>	<b>5</b>	<b>0.22</b>	<b>&lt;5</b>	<b>&lt;1</b>
<b>Beaverdam Creek</b>						
Nicole, Logan, Clarence, Rober	14	8	6		<5	1
Mike, Juliet, Bret, Daniel	18	8	4		<5	2
Gabby, Lisa, Liam, Hunter	14	8	8	0.15	<5	1
Will, Brandon, Morgan, Lindsay	14	8	8	0.15	<5	2
Roberta, Mark, Devin, Maressa	14	8	8		<5	2
<b>Class Averages</b>	<b>14.8</b>	<b>8</b>	<b>5.8</b>	<b>0.15</b>	<b>&lt;5</b>	<b>1.6</b>



# Hancock Central School – Hancock, NY

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

## WEATHER CONDITIONS

*Air Temp:* 13°C

*Description:* PARTLY CLOUDY

*Was there precipitation within the past 48 hours?* YES

**SAMPLING LOCATION** – East Branch Delaware River

**SAMPLING DATE** – April 26, 2007

	Water Temp (°C)	pH	Dissolved Oxygen (ppm)	Nitrate (ppm)	Phosphate (ppm)
Stephanie, Lea, Caitlin, Ralph	8	8	4	<5	1
Theresa, Eli, Austen, Kelly, Lacey	8	7	6	1	<1
Will, David, Melanie, Kristy	14	8	8	<5	1
Renee, Meghan, Peter, Alissa	8	8	6	<5	<1
Jamie, Elizabeth, Courtney, Preston	14	8	4	<5	<1
Nick, Ali, Anthony, Maria	8	7	4	1	<1
Savanna, Cassie, Axel, Andrew, Kaysi	14	8	4	<5	<1
Kylee, Travis, Brooke, John	8	8	8	<5	<1
<b>Class Averages</b>	<b>10.25</b>	<b>7.8</b>	<b>5.5</b>	<b>&lt;4</b>	<b>&lt;1</b>



## Preston Area School – Lakewood, PA

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

### WEATHER CONDITIONS

*Air Temp:* 24°C

*Description:* SUNNY

*Was there precipitation within the past 48 hours?* NO

**SAMPLING LOCATION** – Shehawken Creek

**SAMPLING DATE** – April 23, 2007

	Water Temp. (°C)	pH	Dissolved Oxygen (ppm)	Nitrate (ppm)	Phosphate (ppm)
Joey, Baylee, Christina	16	8	8	<5	<1
Trevor, Hunter, Megan	16	8	4	<5	<1
Tiana, Harry, Emily	16	8	8	<5	<1
Brittany, Sierra, Ryan	16	8	8	<5	<1
Erin, Shawn, Tommy, Rebekah	16	8	8	<5	<1
Ryan, Anthony, Becky	16	8	8	<5	<1
<b>Class Averages</b>	<b>16</b>	<b>8</b>	<b>7.3</b>	<b>&lt;5</b>	<b>&lt;1</b>

## Delaware River

The Delaware River  
is a very healthy river  
So keep it clean  
It is a beautiful place and to see  
stunning miles in this lovely place  
Eagles, muskrats, minks, beavers,  
snapping turtles, white tailed deer, skunks,  
and porcupines all love its water  
because it is so clean.

By: Trevor VanLoan

Preston Area School



## **Delaware River**

I wake in the morning and hear the soft sound of the river near.  
Visitors come here each year for fishing and hunting deer.  
I live here so I know how the river looks in the snow.  
We love our river.  
It can be soft and calm, or high and strong.  
Anyone who spends some time wants to make the Delaware River  
area their home, like it's mine.

By: Alissa Young  
Hancock Central School

## **Delaware River**

**The Delaware River runs down to Philly.  
In the winter it gets might chilly!  
It builds up ice.  
And it looks real nice.  
Then comes summer and there's lots of sun.  
People come for some fun.  
The Delaware River draws lots of guests.  
Where eagles tend to build their nests.  
We can all get along.  
And watch the eagles raise their young.**

By: Gabby Schott  
Damascus Elementary School

Fishing on the Delaware  
Caught someone's underwear  
Please keep my river clean.  
Swimming on the Delaware  
Found someone's silverware  
Please keep my river clean.  
Canoeing on the Delaware  
Found someone's dead deer  
Please keep my river clean.

By: Travis Bolster  
Hancock Central School