Banks of the Delaware

I sit along the banks of the Delaware.
I stop..., I listen..., I stare....
You will see all kinds of nature that will take your breathe away.
Here is a list of a few things you can see in a day.
   An eagle nesting high in a tree.
   Fish swimming past, oops it splashed me.
   Ducks floating around looking for food.
It's sure to say; when you leave the Delaware River you'll be in a better mood.

By Alexa Sampson
Preston Area School

The Delaware River is home to many fish, microbes, insects, and birds that hunt for a side dish.
The less acid in the water, makes everything all the better.
Don’t pollute the water, keep it clean.
And we’ll have the neatest river to be seen.

By Mark White
Hancock Central School
Overview


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 is 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 21 through April 30, 2006

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

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.

“The Delaware River has many purposes. One purpose is animals drink out of it.”

*Sarah Evanitsky ~ Preston Area*
Damascus Elementary School – Damascus, PA
Results of sample testing performed by students of Mr. Smith’s and Mrs. Phillip’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 27, 2006

<table>
<thead>
<tr>
<th>Delaware River</th>
<th>Water Temp. (°C)</th>
<th>pH</th>
<th>Dissolved Oxygen (ppm)</th>
<th>Water Depth (meters)</th>
<th>Nitrate (ppm)</th>
<th>Phosphate (ppm)</th>
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<table>
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“Be a good steward and keep the Delaware River habitat safe! The animals are happy with no pollution in a happy, healthy ecosystem!”

_Bubby Lacey ~ Damascus Elementary_
Hancock Central School – Hancock, NY
Results of sample testing performed by students of Miss Charles’ and Mrs. White’s classes.

WEATHER CONDITIONS
Air Temp: 20°C  Description: SUNNY
Was there precipitation within the past 48 hours? YES

SAMPLING LOCATION – East Branch Delaware River

SAMPLING DATE – April 26, 2006

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“The Delaware River is your responsibility.”

Paul Warner ~ Hancock Central
Preston Area School – Lakewood, PA
Results of sample testing performed by students of Mr. Myers’ and Mrs. Dorohovech’s classes.

WEATHER CONDITIONS
Air Temp: 17°C Description: SUNNY
Was there precipitation within the past 48 hours? NO

SAMPLING LOCATION – Shehawken Creek
SAMPLING DATE – April 12, 2006

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<td><strong>Class Averages</strong></td>
<td><strong>14.1</strong></td>
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<td><strong>6.5</strong></td>
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</table>
As the rush of the water comes down to me,
I see fish, frogs, and turtles swimming to me.

    The clear water looks so refreshing.
    The smooth, cool water is nice.
    The reflection of the clouds is clear.
    A fish jumps, I get splashed.
    The hot sun shines on Sadie.

My dog can not resist, she jumps in a flash.
I get splashed too many times in one day.
The rush of the water in the Delaware River goes on.

As night fall comes we all leave.
But the Delaware will stay and still go on.

By Jessica Begeal
Hancock Central School