Pəskehtəkʷok
Joining of the Branches

Photo: Martin Neptune

Winter 2005 ~ Issue 1

Penobscot Indian Nation
Department of Natural Resources

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HOW IS YOUR RIVER?

Students in the Indian Island middle school grades got a chance to begin answering this question in September. Through some hard work and lots of fun the students came to better understand the condition of their life source, the Penobscot River. A cooperative effort between the Water Resources Program, Native Studies class and the Game Wardens allowed the students to experience many aspects of what it takes to look after the Penobscot River. Lee Francis, Native Studies teacher, and Angie Reed, Water Resources Planner, were the primary organizers but they could not have pulled this off without the help of Dan Kusnierz, Jan Paul, Jason Mitchell, Rhonda Daigle and Jim Pardilla.

Back in the spring of this year Lee and Angie began discussing the possibility of this work. Together they developed three units, the first of which was this one focused on point-sources of pollution - which is pollution coming from one particular source, often out of the end of a pipe.

WATERSHEDS

To understand the reason why point sources of pollution are important to people living on Indian Island we had to talk about watersheds first. Because watersheds act like a bowl that collects the water flowing down hill and over the land, everything that happens upstream eventually flows by the Island. We used computer mapping technology to help the

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Can you identify the masked leader of these students who took over the Water Resources Laboratory?

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students visualize the boundary of the Penobscot River Watershed projected up on a screen and provided poster-size copies of the maps for their walls. They also had to use Issue 3 of the Summer 2005 DNR newsletter to complete their homework on watersheds.

POINT-SOURCES OF POLLUTION

From there we moved on to discussing two of the major types of point-source pollution - paper mills and wastewater treatment plants.

We discussed our every-day connection to both of these facilities by talking about the images surrounding this text. Just like watersheds show us, we are all connected to everything else.

We used maps, again, to locate all of these pollution sources within the Penobscot River Watershed. And after getting to know where they were, we talked about the different kinds of things that each of them dump (discharge) into the river or one of its tributaries. Students learned that anyone who discharges waste into the river is required to have a permit that they meet and that it is illegal to put dioxins in the river - although the methods used to measure compliance may still allow it.

Since we couldn't easily measure some of the more nasty things, like dioxin or lead, in the classroom we decided to show the students how to sample for and analyze two other aspects of water quality.

TOTAL SUSPENDED SOLIDS (TSS)

These are pretty much what you might expect - pieces of material that, instead of dissolving in the water, remain solid and are floating around in the water column (suspended). These materials include fine pieces of bark, silt and clay particles, sewage, and algae. Higher concentrations of suspended solids can serve as carriers of toxics, which readily cling to suspended particles. They can also affect water clarity by: a) decreasing the passage of light through the water, slowing photosynthesis by aquatic plants and b) making the water heat up more rapidly and hold more heat, adversely affecting aquatic life that has needs cooler water.

On our day in the field, we all boated from the Indian Island landing up the Penobscot to a spot near the outflow of the PIN Wastewater Treatment Plant. Here everyone learned how to rinse the TSS sample bottle and collect a sample. Ask one of the students whether or not they are supposed to touch the inside of the bottle or cover while taking the sample!

ESCHERICHIA COLI (FECAL BACTERIA)

E. coli for short. These are used as indicators of possible sewage contamination because they are specific to fecal material from humans and other warm-blooded animals. Although they are generally not harmful themselves, they indicate the possible presence of pathogenic (disease-causing) bacteria, viruses, and protozoans that also live in human and animal digestive systems. Therefore, their presence in streams suggests that pathogenic microorganisms might also be present and that swimming and eating shellfish might make people sick.

We also took samples for bacteria when we were out on the river. Each of the Water Resources staff in the boats showed their crew how much water to get in the Whirl-pak bags and how to whirl them around three times to get a good seal.

ANALYSIS AND RESULTS

Once we had all of our samples we were ready to begin the next phase. With actual laboratory equipment from the Water Resources Program, students were able to filter their samples. Everyone got to try their hand at placing their own filter, pouring their sample and running the vacuum pump. Angie filtered the samples taken from the Lincoln Paper and Tissue discharge pipe and the very yucky one taken from the Old Town Wastewater Treatment Plant BEFORE it was treated. Many twisted facial expressions were seen when everyone smelled the Lincoln water and saw all of the "floaties" in the sewage.

Can you guess which one of these filters is of the Lincoln sample?

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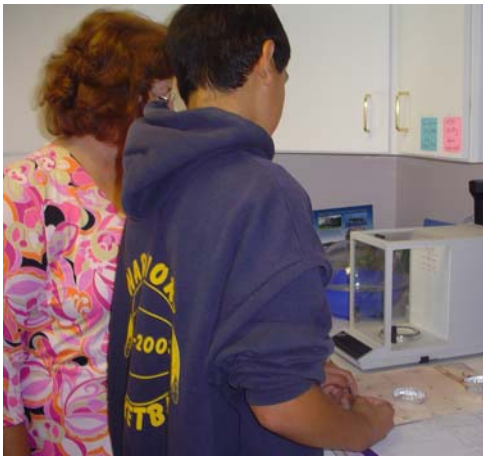

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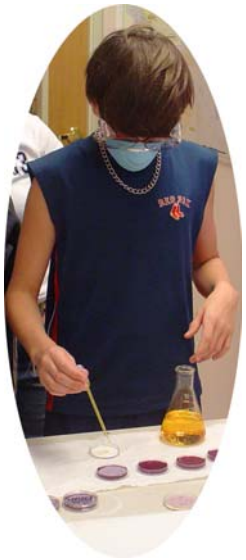
The grand finale was the trip over to the Water Resources laboratory! There we all put on the necessary safety equipment and performed the last steps in the analyses. We gave the bacteria some dye to absorb so that we could distinguish the different kinds and weighed the filters with the solids on them.



We learned that while the Lincoln sample looked and smelled really bad, the weight of the total suspended solids wasn't any more than the sample taken down here. But what other impacts could those solids have?

Lastly, there were more bacteria colonies on the plates from the samples that were taken when it started to rain. This led us to discuss the other potential sources of bacteria that might come from water running off the land. Can you think of some? Maybe one of the students could help you answer that question - especially after the next unit on non-point source pollution.

Art by James Francis

Winter Solstice

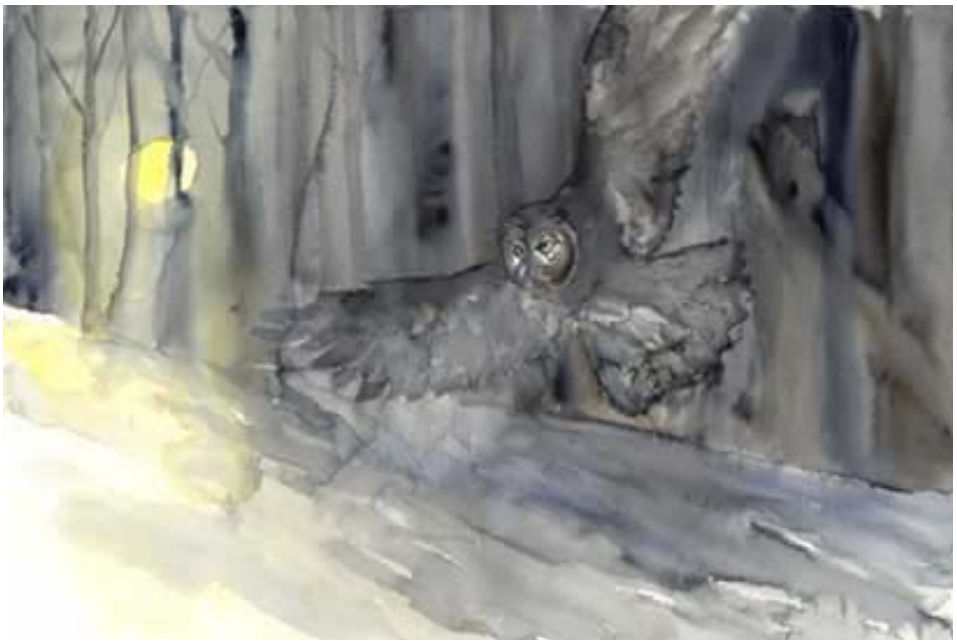
Even though the cold of winter is just settling in upon us, we can take time to celebrate the sun as the days begin to get longer again after December 21st. The Earth is actually nearer the sun in January than it is in June -- by three million miles -- but because the Earth leans slightly on its axis we have all the drama and poetry of our seasons. So Winter Solstice is when, because of the earth's tilt, our hemisphere is leaning farthest away from the sun, and therefore: the daylight is the shortest and the sun has its lowest arc in the sky.

Winter Solstice has been celebrated in cultures the world over for thousands of years. The start of the solar year is a celebration of Light and the rebirth of the Sun. What's important about all the similarities between the ancient beliefs and those of today is the core wisdom found in the stories:

- That all life is cyclical
- That the darkness and cold of Winter will always give way to the light and warmth of Spring
- That, indeed, the new life that emerges in Spring relies on the death of Winter

And it is not a death so much as it is a time of hibernation - for the new life to grow in the womb of the earth, until it is "kissed" by the radiance of the sun.

Winter Solstice is also a time of letting go of the past and going forward in the renewal of the light, when we can be stunned to stillness in order to remember who we are and why we are here.



Artwork by Rod MacIver ~ Heron Dance ~ www.herondance.org