



Photo: Martin Neptune

Penobscot Indian Nation

Pəskehtək^wok

Joining of the Branches

Summer 2004 ~ Issue 3

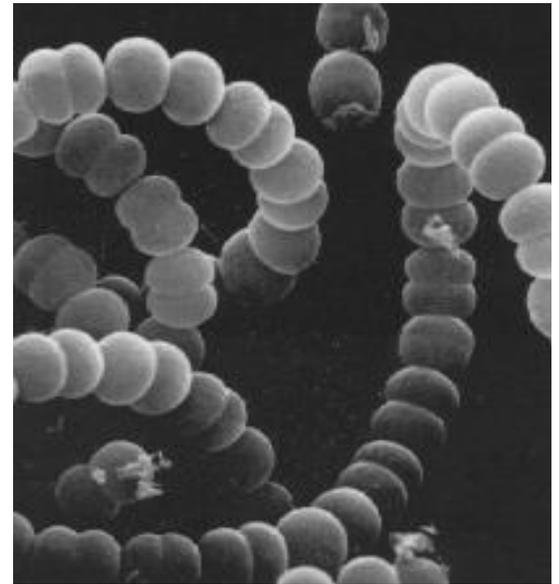
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Air Technician	7340
David Almenas, Forest Technician	7335
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John Banks, DNR Director	7330
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What Is That Smell?

If you have noticed an earthy or musty smell coming from the river in the past few weeks here is the explanation! We are experiencing what is called a "bloom" of a particular kind of cyanobacteria named *Anabaena*. A bloom is the commonly used word to describe times of high concentrations of these organisms in the water—sometimes forming thick layers or scum on the surface. The highest concentrations are up in Dolby Pond in Millinocket and at Weldon Dam. However our aerial surveys and water quality monitoring show that it extends well past Indian Island. While you may not have seen the river around Indian Island turn an intense blue-green color, **it is down here.**

The water resources staff are working hard on sampling and analyzing many aspects of this bloom! Some species of cyanobacteria produce toxins - but preliminary results have shown that the one we have in the river is not one of them. However, we are continuing to collect samples and work with the Wright State University laboratory to get a confirmed identification of each



Greatly magnified photo of *Anabaena* species from the web site of Dr. Wayne Carmichael's laboratory www.wright.edu/biology/faculty/carmichael/labhome/research-r.htm

species present and determine whether there are any toxins in the water. We should have more results this week. For more information about cyanobacteria, read on!

CYANOBACTERIA DEFINITION

But what are cyanobacteria you ask? Well, cyanobacteria are members of a group known as eubacteria or true bacteria. They also have the distinction of being the oldest known fossils—

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CAUTION ~ CAUTION

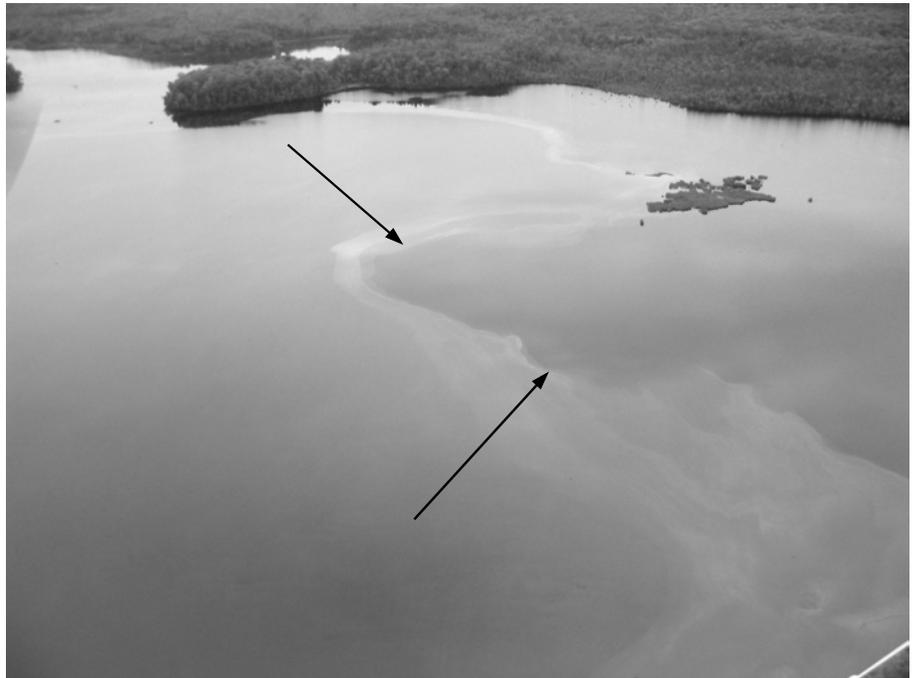
As a precaution, we recommend that you and your pets DO NOT ingest any river water at this time - especially near or in areas of large accumulations that look very blue-green in color.

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more than 3.5 billion years old, in fact!

For a long time they were not recognized as bacteria, more often being referred to as blue-green algae. But all bacteria belong to a group of organisms known as prokaryotes, a Latin word meaning 'before nucleus.' Bacteria have no organized nucleus. Cyanobacteria are classified as bacteria, not algae, since their genetic material is not organized in a membrane-bound nucleus.

Cyanobacteria get their name from the bluish pigment phycocyanin, which they use to capture light for photosynthesis. However, unlike other bacteria, they also have chlorophyll a - the same photosynthetic pigment that plants use as an energy source. They are often referred to as 'blue-greens', since the first cyanobacteria identified were blueish-green in color. However, not all members are this color. Some are olive or dark green, and others are even purplish in color.



Arrows point to the boundary of the cyanobacteria bloom in Dolby Pond - higher concentrations in the lighter areas on the left. The main flow of the West Branch of Penobscot comes in from the right - providing one of the largest sources of nutrients (phosphorous) that is feeding the cyanobacteria.

Cyanobacteria are one of very few groups of organisms that can convert inert atmospheric nitrogen into a more available organic form, such as nitrate or ammonia. This function gives them one more competitive advantage over other species when it comes to forming blooms.

If you have any questions about this bloom please call Angie Reed at 817-7360 or Dan Kusznerz at 817-7361. We will keep you posted on our progress.



REMINDER

Mountain Brook, in the Mattamiscontis Lake area, is getting a new bridge NOW! Beginning Monday August 16 the bridge will closed for about a week and there will be signs posted.



Arrow points to the boundary of the cyanobacteria bloom in the main stem of the Penobscot River - higher concentrations in the lighter areas on the left. The Mattawamkeag River comes in just upriver of here - where there is no apparent bloom - providing the contrast in the color of the water.

James Francis

Monitoring The Air We Breathe ~ By Eric Nicolar

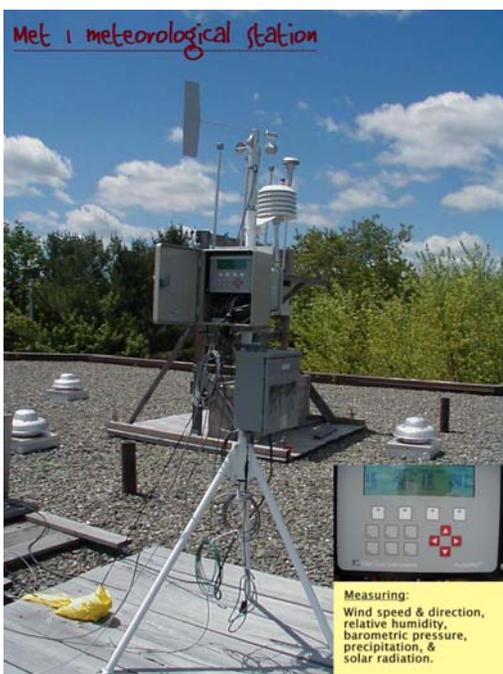
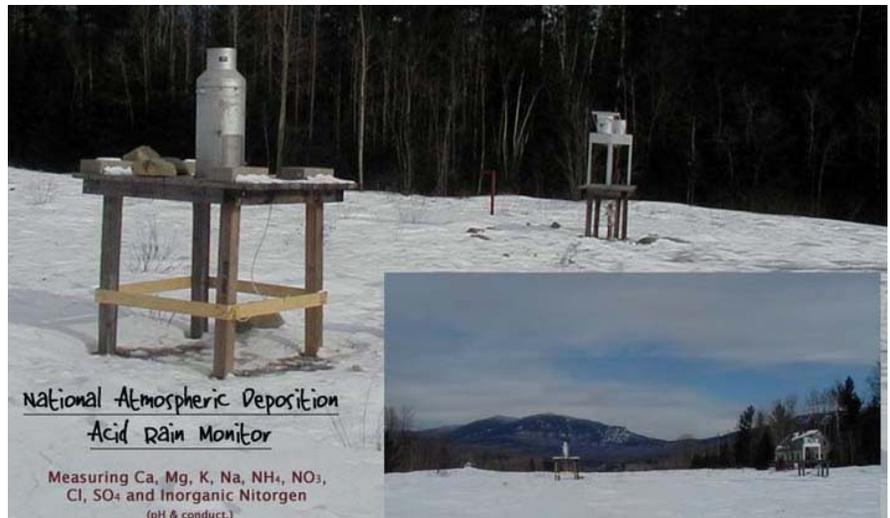
The Penobscot Nation Air Quality monitoring network includes an Interagency Monitoring of Protected Visual Environments (IMPROVE) monitor, a National Atmospheric Deposition Monitor (NADP) Acid Rain monitor, a MET One weather station, two Air-Metrics Portable Minivolä (MiniVol) Samplers, a Thermo-Environmental (TECO) 49C Ozone (O₃) and a TECO SO₂ monitor.

The IMPROVE monitor, located on top of the Marsh Island Apartments in Old Town, has run successfully for three years. The monitor is at one of the highest accessible points in the area. The Air Manager completes weekly filter media changes, and periodic equipment maintenance, throughout the year. This IMPROVE protocol site runs three PM_{2.5} and one PM₁₀ modules. Along with PM mass though, the IMPROVE tracks visibility influencing "particulate" air tracers, such as nitrates and sulfates (SO₂). As you know NO_x and SO_x are criteria pollutants. One module takes some chloride measures. Organic and elemental carbons are measured as well, but for visibility purposes as well. Two modules extract Particle Induced X-Ray Emission (PIXE) XRF: X-Ray Fluorescence, including Na, Mg, Al, Si, P, S, Cl, K, Ca, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, As, Se, Br, Rb, Sr, Zr, Mo, Pb. Our site, #OLTO01, went through a successful audit by the folks at the Crocker Nuclear Lab / UC-Davis in July. Successful data capture was at 92%. OLTO01 was an "outstanding site," meaning 100% data collection, for three of the four quarters of the year. The Air Manager finalized a Tribal QAPP for the IMPROVE at the end of the year as well.



The IMPROVE monitor at Marsh Island apartments

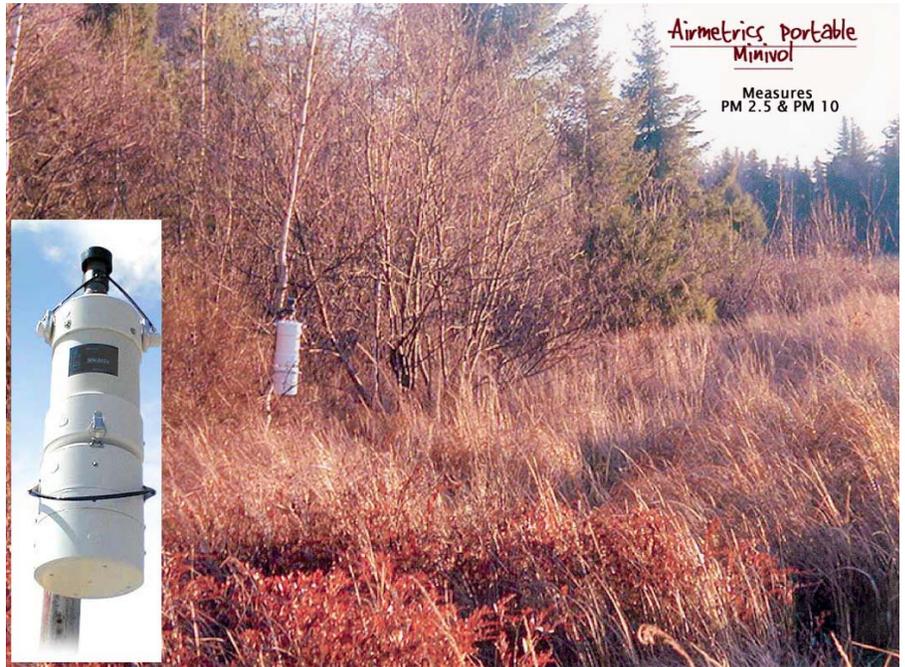
The NADP Acid Rain monitor in Carrabasset Valley has been fully operational for two years. This collects weekly precipitation samples and tests for hydrogen (acidity as pH), sulfate, nitrate, ammonium, chloride, and base cations (such as calcium, magnesium, potassium and sodium). The NADP covers an important monitoring gap for the state and national trends network. The Air



Manager travels on average of twice a week to maintain monitor success and sample collection. All weekly samples have been successfully completed for the past 18 months with some schedule deviations due to Air Manager travel. We are planning to follow Ammonia and Sulfate trends from this monitor for our Alder Stream Trust lands. We also plan to acquire other NADP site data around other Penobscot lands and evaluate the impact of acid rain and its associated compounds on Penobscot natural resources. A long term goal is to install another NADP for the reservation islands. We have planned to add the Mercury Deposition component to the site this year.

The MET One weather station is located on top of the Marsh Island Apartments as well. Data was still being manually downloaded this past year. Plans are in the works to tap into the station through an existing external modem port at the site and eventually make this monitor real time with an analog line to our PAP Tribal Air website.

The Minivols were used again this year to identify PM₁₀ problem areas on Penobscot lands. The focus of the PM₁₀ saturation study was specifically on fugitive dust from tribal trust land roads. The program is working to identify local PM_{2.5} sources through a similar study using a PM fine. Sampling with these portable monitors is done 2-3 times a week around all our trust lands. Filters are pre-weighed, post-weighed after sampling, and run through formula calculations to record ug/M³ levels. Time management and constraints requires the AQM to run these monitors periodically and over parts of weekends. This data is important to evaluate and respond to the PM_{2.5} attainment designations made by Region I EPA and will be incorporated into our comments due in November of this year.



Airmetrics portable Minivol

Measures PM 2.5 & PM 10

We added a new TECO 49C & Calibrator O₃ monitor to the network in August 2003. The O₃ is located in the DNR building. This addition was a result of the program's concerns about rising O₃ numbers these past three O₃ seasons. The Air Manager submitted comments to Region's "attainment" recommendation stressing that recent trends showed

a potential rising number of O₃ violations. It was stressed that the available data was insufficient to make a proper analysis and thus region came through with the TECO monitor. This past summer was mild, and contrary to recent patterns, but we're ready to collect necessary data for next year, and respond appropriately to O₃ related issues.

A TECO 43A Sulfur Dioxide monitor has just been added to our network. This will be co-located with the O₃ monitor, because it requires similar climate control conditions. We should have it up in running in the near future. If you have any questions please feel free to contact me at 817-7336 or cleanair@penobscotnation.org.



- 1. PC logger interface
- 2. TECO 49 Analyzer
- 3. ESC 8832 Logger
- 4. TECO 49S Calibrator
- 5. Zero-Air Supply
- 6. Bumblebee in spiffy MACH IV.

