



# The Monitor

The Newsletter of the APNEP Citizens' Monitoring Network

Summer-Fall 2010

## Greetings!

Hello everyone... it's been a while since our last newsletter. I would like to catch everyone up with news and events that have been happening over the summer and fall of last year, new monitors, and some new features that will be added to the CMN website.

## Volunteer Status and Contact Information

Please contact me through phone or e-mail if you plan to discontinue monitoring or your contact information has changed. I would like to maintain an accurate list of all 2011 volunteers.

## Monitoring Sessions

I would like to remind all volunteers of the suggested monitoring schedule:

April 1 – September 30: Once a week  
October 1 – March 31: Once every two weeks

If you find this monitoring schedule too arduous, sampling once every two weeks year-round is adequate. Remember, consistency with data collection is important for a better interpretation of the data. It is also imperative that you monitor at the same time of day; water quality changes as the day progresses. If you monitor in the early morning hours, you may get different readings if you decided to monitor in the afternoon. **It is also important that you complete the entire data sheet.** If you have any questions about the tests, please contact me.

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## APNEP-CMN Welcomes New Monitors!

Benji Cartee is a 6<sup>th</sup> grade student at Dream Weaver Home School and is currently working on becoming a Junior Ranger at Goose Creek State Park in Washington, NC. Benji is focusing on an ecology-based project to learn about water quality and how it is related to the ecosystem of the park. Benji also hopes to share his newly gained knowledge with others in hope that they become more aware about their environmental surroundings. Benji is monitoring two locations, Goose and Flatty Creeks (Tar-Pamlico).

Jamie Wheeler is a junior at East Carolina University where she is majoring in Environmental Geography with a minor in Urban & Regional Planning. Jamie lives with her fiancé Frank and their two children, Katelyn (11) and Kylie (6). Jamie's hobbies include gardening, fishing, bike riding, hiking, kayaking, and swimming. Jamie joined APNEP-CMN as a way to give back and help the environment. She believes we all have a deep connection with nature and that we need to practice sustainability so that we can continue to receive the valuable ecosystem services that a healthy river provides.



Images (left to right): Benji Cartee, Jamie Wheeler, and Keith Schwizer, new APNEP-CMN monitors.

Keith Schwizer and his wife, Leah, have been looking for volunteer opportunities in conservation efforts around the area. They both graduated from James Madison University in 2007 with degrees in Geographical Sciences and a concentration in Environmental Studies. They have previously volunteered at Umstead State Park using GPS to

update their trail system. Keith is currently an Environmental Scientist with a small consulting firm based out of Ellicott City, MD and Leah is a consultant working with GIS for Booz Allen Hamilton. In their spare time they enjoy doing anything outdoors and visiting Falls Lake/Neuse River. They will be monitoring the Neuse River at a public access point just below the Falls of Neuse Dam in Raleigh, NC.

### Web Publication of CMN Data

This summer, APNEP-CMN plans to release water quality data to the CMN website so that public access of the data is easier. All data has been previously available to the public but was sent to users based on requests. The web transfer process will take some time to organize as data for all monitoring locations are currently separated by year. Datasets will be created in Microsoft Excel and uploaded to the CMN website gradually over time. Priority will be given to active monitoring sites and will include all data for each location. Active datasets will be updated each year as new data is collected.

APNEP-CMN is also interested in adding inactive monitoring locations to Google Maps. Active monitoring locations are now labeled on Google Maps, which can be viewed on the CMN website. The datasets will also be linked to Google Maps.

### Water Quality Report: Little Contentnea Creek by Sam Christensen

Hi, my name is Sam Christensen, I am currently a freshman in high school, and I have been volunteering with APNEP-CMN for two years. I have always been interested in water quality, and have been volunteering to help monitor creeks and streams since I was 8 years old when I lived in central New York. Recently, I have done science projects for the North Carolina Student Academy of Science competition regarding water quality in local streams. In 2009, I decided to investigate if a hog farm was having any detrimental effects on Little Contentnea Creek during storm events.

Little Contentnea Creek is located within the Neuse river basin near Ayden, bordering land owned by a local science center. I first became aware of the possibility of fecal runoff from the hog farm when one of the owners complained about how much she could smell the hog farm after a large storm event. I selected two sites on Little Contentnea at which to take samples, one was located upstream of the hog

farm, and the other was located downstream of the farm. I collected samples at the two sites in alternate storm, or non-storm conditions. On each sample, I tested the amount of microbes, as well as their resistance to antibiotics. I also monitored such variables as Nitrate, Ortho-phosphate, pH, and Dissolved Oxygen. Over the course of a month, I collected four samples from each site, and found some very interesting and unsettling results.



Image: Sam Christensen along Little Contentnea Creek

Table one shows the percentage of resistance for each antibiotic. I considered a colony had survived an antibiotic if it had grown as much as a control. The amount of resistance shown to these antibiotics is definitely unsettling; 97% of colonies were resistant to Ampicillin, which is in the same class of antibiotics as penicillin. This is especially unsettling because it shows that there is selection for the gene that enables a bacterium to render Ampicillin ineffective.

Table 1. Percentage of colonies that was resistant to each antibiotic.

<b>Antibiotic Resistance</b>	
<b>Name of Antibiotic</b>	<b>% of Colonies Resistant</b>
<b>Ampicillin</b>	97
<b>Kanamyacin</b>	16
<b>Tetracycline</b>	8
<b>Streptomycin</b>	6
<b>Chloramphenicol</b>	2

Figures 1 and 2 show interesting results; both the amount of coli-forms observed and the amount of gram-negative bacteria rose during storm events. A possible explanation for this is that fecal matter was washing into the creek at both sites. However, this is purely an educated guess and there is no direct evidence implicating the hog farm or any other farm along the creek. More data needs to be collected to be able to say definitively whether or not fecal matter is entering the creek during storm events.

My data suggests that Little Contentnea Creek does have some problems, including the large amount of antibiotic resistance, and it is classed as a nutrient sensitive waterway by the DWQ. But during my testing period it looks generally healthy. There are things that I believe still need to be investigated, such as the antibiotic resistant bacteria and the possibility of fecal runoff. But I think considering the amount of farm land in the Little Contentnea's area, it is doing fairly well. Thank you to APNEP-CMN for their help in this study.

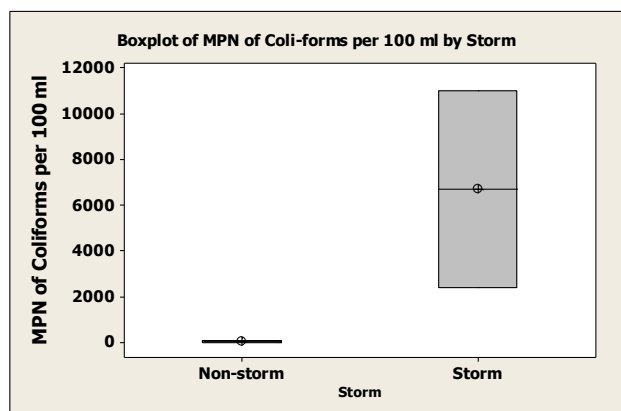


Figure 1. A box plot of coli-forms per 100ml in storm vs. non-storm events.

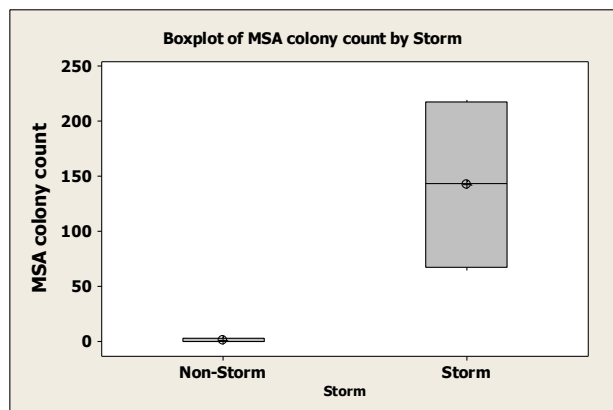


Figure 2. A box plot of gram-negative bacteria observed during storm vs. non-storm events.

### APNEP Website

Over the past year, the APNEP website has been under a redesign to offer visitors new features and improved navigation; I encourage monitors to visit the website to read about other programs and initiatives of APNEP. There is a wealth of information that covers past and ongoing projects, grant applications, workshops/resources, and management updates that may be helpful for educators. Here are a few pieces of information

that I pulled directly from the APNEP website that may be of interest to some of you:

*"A-P estuary designated one of America's Great Waters"*

The Albemarle-Pamlico Estuary was selected as one of America's "Great Waters" by the National Wildlife Federation's Great Waters Coalition.

The North Carolina Coastal Federation and the Albemarle-Pamlico National Estuary Program applied for this designation. With its selection, the Albemarle-Pamlico estuary joins other notable national waters including the Great Lakes, the Puget Sound, Chesapeake Bay, and the Everglades.

Selection as a Great Water is dependent on a number of factors. As the second largest estuarine system in America, the selection committee noted the Albemarle-Pamlico estuary's significant size, uniqueness, and productivity. It also recognized the system's importance to society and its sensitivity to national and interstate policy. The presence of several comprehensive restoration plans for the region was highlighted, including APNEP's Comprehensive Conservation and Management Plan. Finally, sustained cooperation on restoration activities throughout the region by dozens of stakeholder groups was a key factor in the selection.

*"Shad in the Classroom"*

Shad in the Schools is a collaborative project that provides students with an understanding of the science process, inspiration for careers in science, and a desire to protect our waterways. This project allows students to gain hands-on experience raising American shad from egg to releasable fry. This effort is a collaboration led by the US Fish and Wildlife Service, with further support from APNEP, the North Carolina Museum of Natural Sciences, Partnership for the Sounds, NC State University, the NC Wildlife Resources Commission, the NC Division of Water Quality, and the NC Chapter of the American Fisheries Society. The objective of this project is to build an understanding of the life history of shad and an appreciation of our natural world.

North Carolina's rivers in the APNEP region and their floodplain habitat are important spawning grounds for anadromous fish, including the American shad. American shad populations are well below historic levels. Factors affecting the decline of American shad in its historical range include dam construction, overfishing, and water pollution. Shad runs no longer exist in areas where they used to

thrive, and they are an important food source for many species both in the coastal and estuarine systems. A fisheries management plan is in place that seeks to restore American shad populations to sustainable levels.

Shad in the Schools has three major components. First, elementary school classrooms are equipped with the materials to raise shad, which include aquariums and shad eggs. Next, teachers are provided with training to facilitate the program, which includes a one-day training session on the process of raising shad and an overnight canoe workshop on the Roanoke River to learn about the estuarine ecosystem. Finally, teachers are provided with multimedia presentations and high definition movies which can be used to complement instruction.

*"Opportunities available for environmental educators"*

The North Carolina Outdoor Classroom Symposium will take place in Chapel Hill, NC on April 8, 2011, with supplementary activities occurring April 7 and 9. The symposium focuses on techniques for creating, maintaining and using outdoor classrooms and strategies for integrating outdoor learning into the curriculum. It features sessions on how to create specific types of school gardens and natural areas, how to start farm-to-school programs, and how to design and use school grounds to enhance learning across the curriculum.

The Sound Learning Teacher Institute will be held at the Trinity Center in Salter Path, NC from July 10-15, 2011. The theme of this year's institute, which is open to K-5 educators, is "At the Water's Edge: exploring wetlands, wildlife, and water."

To view these news briefs in full and other programs, please visit the APNEP website at **[www.apnep.org](http://www.apnep.org)**.

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As always, thank you for your time and dedication to APNEP-CMN. Please let me know if you have any questions, concerns/suggestions, and/or need supplies. Happy monitoring!

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