

ACADIA NP • APPALACHIAN NST • BOSTON HARBOR ISLANDS NRA • MARSH-BILLINGS-ROCKEFELLER NHP • MINUTE MAN NHP
MORRISTOWN NHP • ROOSEVELT-VANDERBILT NHS • SAINT-GAUDENS NHS • SAUGUS IRON WORKS NHS • SARATOGA NHP • WEIR FARM NHS

A Torrent of Water Quality Monitoring Data Flowing Your Way...

Going from a drop in the bucket to the whole dang pail

The freshwater resources of NETN's parks are subjected to natural and human-caused impacts and alterations, which can have negative, neutral, or positive implications with regards to ecosystem health. NETN's long-term water quality monitoring program documents changes in baseline conditions and helps natural resource managers identify and address potential stresses to park waters.

For the past 8 years, NETN's water quality monitoring program has consisted of water technicians visiting each monitoring site once a month to collect data. Over the course of a monitoring season, these brief snapshots work well enough to give parks some idea of what direction the health of their water resources may be headed, but leave large gaps in the knowledge of what's happening to park ponds and streams between visits. This limited monitoring schedule also potentially misses the impacts of intermittent weather-related or human events (nearby construction projects, agricultural runoff after a large rainstorm, etc.). Enter: continuous water monitoring.

Painting a more complete picture

During the next several monitoring seasons, NETN is working on installing semi-permanent data collection instruments that will collect selected water quality parameters in network streams and ponds. Soon, parks will be able to complement the standard monthly data gathered by water quality techs with conductivity, dissolved oxygen, water level, and temperature data gathered automatically at half-hour (streams) and hourly (ponds and lakes) intervals. You don't



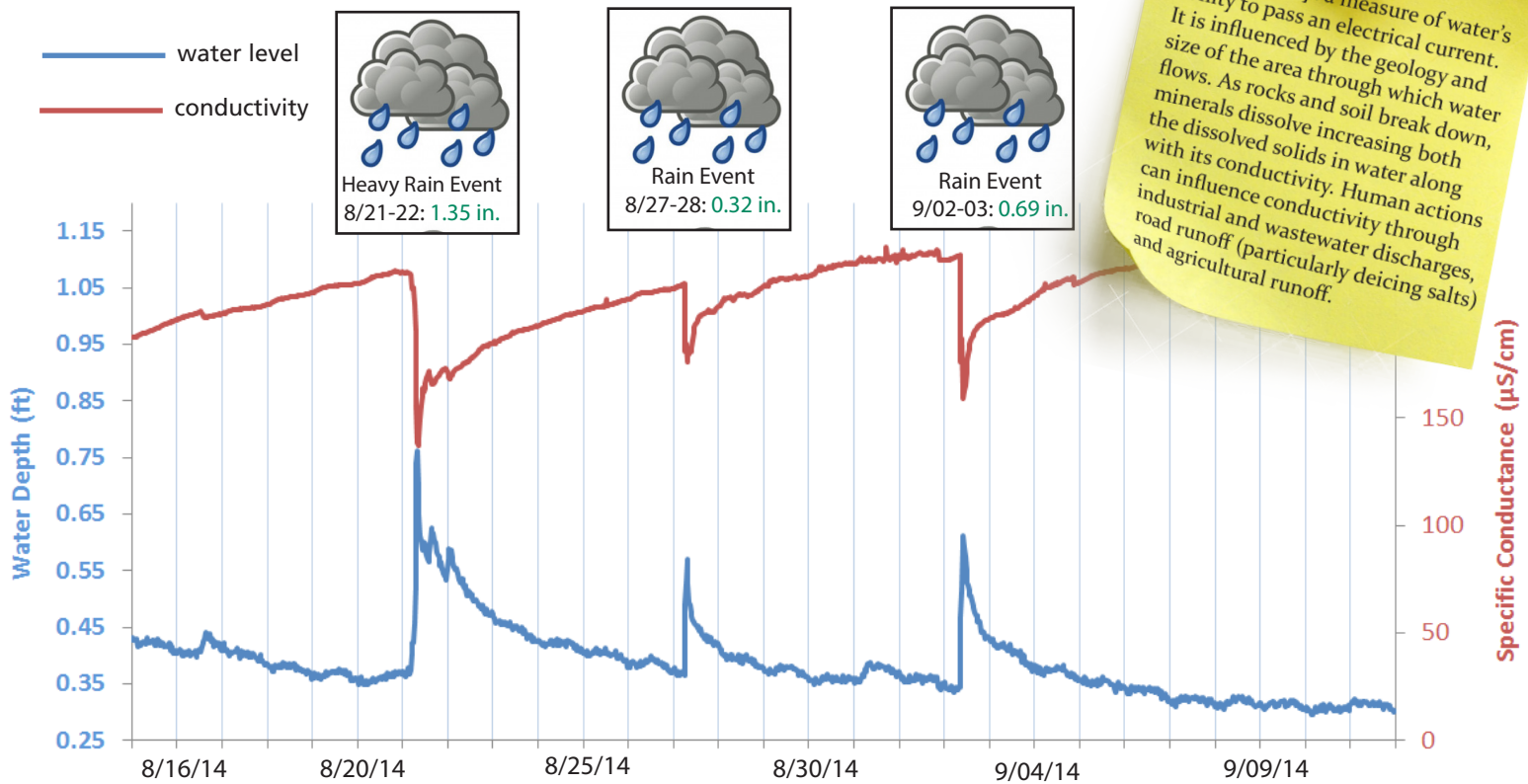
NETN Water quality monitoring intern Liza Mcelroy sets up continuous data loggers in Marsh-Billings-Rockefeller NHP's Pogue Brook. NPS photo.

need to be a math whizz to see that this means orders-of-magnitude more information for parks to draw from to better understand the dynamics of how water quality may be impacted by natural and/or man-made events.

A tale of two ponds

Two ponds with recent or upcoming examples of how this extra information can help park managers are Marsh-Billings-Rockefeller NHP's Pogue pond and Saint-Gaudens NHS's Blow-Me-Down Pond. The Pogue experienced a large fish die-off at the end of the winter of 2014 with visitors reporting dozens of dead large-mouth bass on the pond shore after ice out. Winter fish-kills are not uncommon and can occur when ice and snow covers a water body for a prolonged period of time, inhibiting

Conductivity & Water Levels in Pogue Brook



Conductivity: a measure of water's ability to pass an electrical current. It is influenced by the geology and size of the area through which water flows. As rocks and soil break down, minerals dissolve increasing both the dissolved solids in water along with its conductivity. Human actions can influence conductivity through industrial and wastewater discharges, road runoff (particularly deicing salts) and agricultural runoff.

This graph represents one of the datalogical stories, when coupled with climate data, that can be told through continuous monitoring. The red line represents conductivity, and the blue line water level. For Pogue Brook, heavy rainfall (as shown by the August 22nd event) tends to significantly decrease conductivity because it dilutes salts and other dissolved solids in the stream water. This is not always the case for all NETN waterbodies however, as runoff from smaller rain events or from large events leading to flooding can have different effects on conductivity depending upon the landscape surrounding a waterbody. If a floodplain contains nutrient-rich or mineralized soil, salt ions can enter into solution as it is flooded, raising the conductivity of water. Nearby farms will also usually raise conductivity since agricultural runoff is not only high in nutrients, but often has a higher concentration of dissolved solids. The Pogue brook watershed is heavily forested, and as the above graph clearly shows, the runoff from all rain storms tends to lower conductivity.

photosynthesis and causing a drop in the dissolved oxygen that fish need to survive. This is a best guess scenario of what took place in the Pogue during the winter, but had continuous monitoring equipment been installed, data would have shown if and when the dissolved oxygen content of the water began to peter out.

At Saint-Gaudens NHS, Blow-Me-Down Pond will be dramatically changed in the coming years when some major dam restoration and dredging work takes place. Having continuous monitoring equipment in place to study the pond prior to and after the project is completed will give park managers a better understanding of the effects it will have on the pond ecosystem.

NETN hopes to have all other network parks hooked up with continuous monitoring equipment sometime

within the next few years. When installed, the vast amount of information all parks will have at their fingertips will have the benefit of helping them better understand the influences that natural and human-made events are having on the health of their water resources.

For more information:

For protocols, annual reports, and briefs:

NETN website

Lake, Pond, and Stream monitoring: <http://science.nature.nps.gov/im/units/netn/monitor/programs/lakesPonds/lakesPonds.cfm>

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