CCU Marine and Wetlands Center

Wednesday, April 19th
10am-12:30pm

Water Monitoring Volunteer Luncheon

Waccamaw River - Murrells Inlet - Surfside

AGENDA

10:00 AM	Check-in and coffee
10:15 AM	Welcome and Team Introductions
10:30 AM	Water Quality 101: Interpreting recent data from Murrells Inlet, Surfside Beach and the Waccamaw River
11:00 AM	Your Data in Action
11:30 AM	Updates on measurement techniques (new E. coli media)
12:00 PM	Lunch
12:30 PM	Closing

Introductions

- EQL
- Waccamaw River
- Murrells Inlet
- Surfside

Volunteer Water Monitoring Program

- Contacts
- FAQs
- Links
- Quality Assurance
- Parameters
- Waccamaw River
- Surfside Beach
- Murrells Inlet
- CCU Campus

Contact Us

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Parameters

- Alkalinity (Murrells Landing only)
- Chlorophyll (Murrells Landing only)
- Color (Murrells Landing only)
- Conductivity
- Dissolved Oxygen (DO)
- E.Coli
- Nitrate
- pH
- Phosphorus (pilot study)
- TDS
- Temperature
- Turbidity

Alkalinity is a measure of the acid buffering ability of a water sample. The main chemical agents responsible for buffering are carbonate (CO_3^{2-}) and bicarbonate (HCO_3^-). If acid (H^+) is put into the sample, the following buffering reactions occur:

First, $H^+ + CO_3^{2-} = HCO_3^-$

http://www.coastal.edu/intranet/wwa/vm/parameters.html

Temperature is a measure of the heat content of the water sample. Typical river values range from 5 to 28 °C. High temperatures are stressful to aquatic life and can be caused when water bodies are partially filled making them shallow and when shading vegetation is removed. The conductivity, pH and DO meters all have temperature sensors because of the need to make temperature corrections during the measurement of these parameters.

Conductivity is a measure of the amount of dissolved solids which are primarily ions. Meter detects the amount of electricity that is conducted by the water sample. The larger the amount of ions the greater the amount of electricity conducted and hence conductivity of the sample. Units are µΩ//cm or µS/cm. Values typically range from 40 to 140 in the river. Sites greatly impacted by stormwater (runoff which contains high levels of dissolved solids) have values as high as 600.

TDS is a measure of the total dissolved solids that are present in the water. Most of these solids are dissolved salts, such as sodium, potassium, calcium, magnesium, chloride, bicarbonate, and sulfate. It is computed from the conductivity measurement. High values are indicative of the presence of groundwater or mine drainage. Low values typically occur after rain flows freshwater into the river. There is no water quality standard for TDS.

Turbidity is a measure of the particle content of the water sample. Typical river water values range from 5 to 10. Values in excess of 10 indicate a soil erosion event. High particle concentrations are stressful to fish and filter feeding microorganisms because it clogs their gills. High particle concentrations also affect the bottom dwelling organisms as the particles settle out and blanket the river bottom. The turbidity meter used for the measurement detects the amount of light reflected by the particles. Results are reported as nephelometric turbidity units or NTUs.

pH is a measure of the acid content of the water sample. This meter also uses an oxidation-reduction reaction to detect the presence and amount of hydrogen ion (H^+) in the sample. Typical river water values range from 5 to 7. Sites with high conductivity often have a pH as high as 8.2. Acidification of natural waters is a result of acid rain entering waters with little buffering ability (see Alkalinity). Local industries and the power plant contribute to this as well. Fish experience stress at a pH below 5.

Nitrate. Typical river water nitrate (NO_3^-) values range from 0 to 0.2 mg N per liter of sample (or ppm N). Concentrations greater than 1 ppm N are usually the result of stormwater runoff associated with sewage or fertilizers. The degradation of sewage generates dissolved nitrogen as nitrate and fertilizers contain nitrogen as nitrate. High nitrate levels can stimulate algal growth and lead to eutrophication. Ammonium and nitrite are the other products of the nitrification. The simplest way to denote nitrification would be as follows: Dissolved organic matter nitrogen ==> Ammonium ==> Nitrite ==> Nitrate. Nitrite is the most unstable as compared to the other forms of nitrogen and therefore, reads zero in almost all of our field measurements.

Dissolved Oxygen (DO) is a measure of the amount of elemental oxygen which is the form required by animals and aerobic bacteria. The meter uses an oxidation-reduction reaction to detect the presence and quantity of oxygen. Units are parts per million (ppm) of O_2 or milligrams of O_2 per liter of sample. Dissolved oxygen values are extremely temperature dependent as solubility increases with decreasing temperature. Since the atmosphere is about 21% O_2, atmospheric O_2 is available to dissolve into surface waters to a level dictated by the temperature controlled solubility. O_2 concentrations less than this are observed when animals and aerobic bacteria are utilizing O_2 in large amounts during aerobic respiration of organic matter (and ammonium for nitrifying bacteria). O_2 concentrations greater than the solubility values are observed when plants are producing O_2 via photosynthesis. The concentration of O_2 relative to its solubility value is expressed as a percent saturation (O_2 concentration observed/O_2 solubility concentration x 100). River water values vary from 40% (4 ppm) in the summer to 80% (8 ppm) in the winter, reflecting the high concentration of dissolved organic matter which supports a lot of bacterial respiration year round. Waters with heavy algal growth (usually related to nutrient pollution) can have percent saturations as high as 200%! The state's DO limit is 5 ppm for the Waccamaw River. Values less than this are observed for most of the summer. Fish are said to experience stress at DO levels less than 6 ppm.

Photo Co
February 11th–

WINYAH RIVERS FOUNDATION'S
2017
PHOTOGRAPHY CONTEST

Awards Celebration
May 5th

Awards & Prizes:
Best In Show $150,
1st Place
All Categories $100,
Viewers Vote $50,
All 2nd and 3rd place
winners will be
awarded.

Categories:
Scenic, Wildlife,
Hurricane/ Flood &
Georgetown County

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RIVER WA
for the
April 22nd
Conwa

Come celebrate the important work b
Walk the Riverwalk or paddle alongside
local efforts to protect our rivers and wa

Free paddle boats! First come, firs

Kick-Off Cleanup- April 9th, 1PM at Pitch

River Walk—Paddle and Celebration c
beginning on the Conway Riverwalk e
available near Bonfire and on Laurel Stre

Cleanup Our Local Waterways is a biannu
Waccamaw RIVERKEEPER® Adopt-A-Lan
cleaning up communities that were hit b
10/16. For more information and details on these additional efforts, visit us at
www.WinyahRivers.org.

CHOOSE
CLEAN WATER
WINYAH RIVERS
FOUNDATION
ON MAY 2nd
24 hours of giving
www.PalmettoGivingDay.org

THANK YOU FOR ALL YOU DO TO PROTECT CLEAN WATER!