The Rain Events

June 2010

California Edition

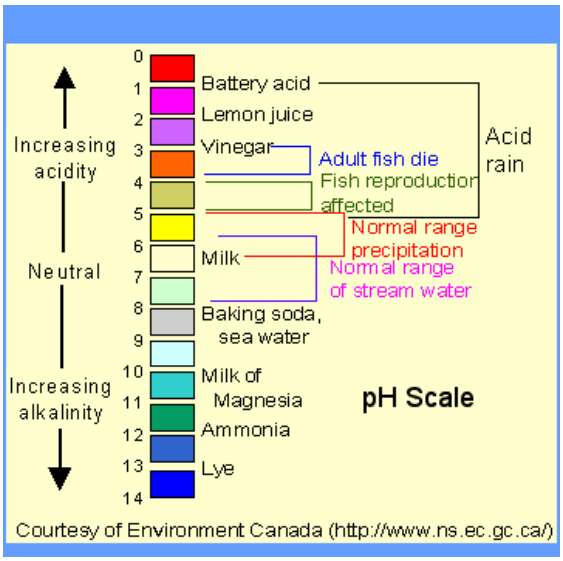
Basic or Acidic?

If you have been around storm water testing for any amount of time, you have had to test for pH. While most of us know that pH has to do with how acidic or basic the water is; we may be unsure of what pH is actually measuring and how the changes in pH affect storm water.

In this issue of *"The Rain Events"* we want to give you some basics on pH … what it is, what affects it, and how to measure it.

The pH scale measures how acidic or basic is the storm water sample. The pH scale ranges from 0 to 14. A pH of 7 is neutral. A pH less than 7 is acidic. A pH greater than 7 is basic (also referred to as caustic or alkaline).

The pH scale is logarithmic, which means each whole pH value below 7 is ten times more acidic than the higher value. For example, pH 5 is ten times more acidic than pH 6 and 100 times (10 times 10) more acidic than pH 7. It is also true for pH values above 7, each of which is ten times more basic than the next lower whole value. For example, pH 9 is ten times more basic than pH 8 and 100 times (10 times 10) more basic than pH 7.



Pure water is neutral. But when chemicals or pollutants are mixed with water, the water mixture can become either acidic or basic. Such is the case when storm water comes into contact with ammonia, sulfur, battery acids, lime, cement, wet or fresh concrete, and other pollutants. This mixing can happen on the ground with runoff, or can happen in the atmosphere with air pollutants, which is how we get “acid rain”.

When acid rain or pH impacted storm water runoff collect in streams and ponds, the pH of that water body is changed. Even slight pH changes in streams harm fish, especially sensitive juvenile fish and other organisms.

In storm water applications, prevention is the key. It is usually much easier to prevent pollutants from coming into contact with storm water than to try to adjust the pH of the runoff.

June's "To Do List"

- The Annual Comprehensive Site Compliance Evaluation (Form 5). If you need help, call WGR to schedule an appointment.
- Do the 4th Quarter Non-Storm Water Observations (Forms 2 & 3 by June 30th)
- Annual Report – Due to the State by **July 1st. Need Help? Call WGR.**

We Have a Winner !!!

Bill McCarty submitted the winning answer!

What is a good way to protect storm drain inlets during the non-rainy season?

Bill wrote:
Use urethane or neoprene protectors and covers over drains. Also conical plugs for round drains can be used.

Bill will be sent a $25 gift card to Lowe's for a new set of BBQ tools or something to get his summer off to a good start. Good job Bill!

Need a pH Instrument?

Now you can order a pH field instrument just like the ones the professionals at WGR use. We have used Oakton™ pH meters for years and have found them to be extremely reliable, durable, and affordable. For more information or to order online, go to our new retail website:

BMP bmpoutlet.com

www.bmpoutlet.com

Have you missed a Rain Events newsletter?

You can download past copies from www.wgr-sw.com .

The Chemistry of pH

At neutral pH (7.0), water molecules exist in equilibrium with hydrogen ions and hydroxide ions.

$$H_2O \rightleftharpoons H^+ + OH^-$$

Pure water has a perfect balance of H^+ and OH^- ions. When an acid is introduced to the water, it causes a surplus of H^+ ions and the pH value goes down. When a caustic is introduced to the water, it causes a surplus of OH^- ions and the pH goes up. Hydrogen ions in water can be written simply as H^+ or as hydronium (H_3O^+). The pH measurement approximates the negative logarithm (base 10) of the molar concentration of dissolved hydronium ions. A low pH indicates a high concentration of hydronium ions, while a high pH indicates a low concentration.

The approved USEPA method for testing storm water is 150.1 for laboratory and field testing and 150.2 for continuous testing. The USEPA states that samples should be tested as soon as possible. Most laboratories will flag a sample past its hold time when it is received 12 hours after it was collected. WGR has documented cases of pH degrading with time. We have observed storm water pH results to drop below the lower benchmark value (6.0) when the sample was sent to the laboratory, but to be found above the benchmark value when tested in the field.

So what causes the pH of the storm water runoff to be altered? Here is a list of some common pH altering pollutants:

Acidic Contributors	**Alkaline Contributors**
Sugars and Fruit Juices	Soaps and Detergents
Sulfur	Lime
Battery Acid	Cement / Fresh Concrete
Acid Rain	Native Soils
Native Soils	Ammonia
Cleaners and Degreasers	Water from Boilers and Cooling Towers
Municipal Water	Groundwater

A very important part of testing for pH is performing a calibration of the pH instrument. This is done by using buffer solutions having three different pH levels: 4.0, 7.0, and 10.0. The USEPA requires field instruments to be calibrated on a daily basis (when in use). For more information, see the following link for WGR's pH calibration training video:

www.wgr-sw.com/phpen.html

June's Storm Water Contest

By June 30, submit a response for the following:

What are the pH benchmark values?

All persons submitting correct answers will be placed in a drawing. The winner will receive a **$25** eGiftCard to Cabela's.

Please submit your entries to jteravskis@wgr-sw.com .

Please contact us if you have any questions …

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