

BE ON THE TEAM TO THINK DOWNSTREAM: PH

WHAT IS THE PARAMETER?

Potential hydrogen (or pH) is a measure of hydrogen ion concentration in water. This indicates how acidic or basic aqueous solutions are on a scale from 0 to 14, with 7 being neutral. Less than 7 on the pH scale is acidic conditions, while above 7 indicates basic conditions. This can be a good indicator of water impairments and environmental hazards.

Mineralized soil profiles for constructed ponds can increase pH during weather events. Photo by M.P. Hayes



WHAT AFFECTS THE PARAMETER?

Many different factors impact the pH of water including rocks, minerals in soils, decomposition of organic matter, industrial discharge, rain events and runoff of fertilizers and pesticides. Depending on the source, the pH impairment can be present at a higher or lower

value than typically seen in environmental systems. For instance, alkaline geology and soils can cause watersheds to be more basic, while caustic industrial discharge can create more acidic conditions.

WHERE DOES IT COME FROM BROADLY AND SPECIFICALLY TO LOUISIANA?

In Louisiana, the impairments associated with pH are largely due to natural sources. The diverse landscape of the state provides mineral depositions and silviculture activities that lead to pH impairments. While most cases are attributed to natural processes such as geological formations, soil composition and the presence of organic matter, there are some cases impacted by human activities, including industrial discharges, mining and acid rain. The Louisiana Department of Environmental Quality uses the Water Quality Integrated Report to identify impairments and sources. The following sources were identified as causing pH impairments around the state:

- Natural sources
- Transfer from outside watersheds
- Silviculture harvesting
- Non-native organisms (accidental or intentional)
- Naturally occurring organic acids
- Golf courses
- New construction areas

HOW DOES IT AFFECT THE SURROUNDING ENVIRONMENT?

The major impacts of pH are associated with extreme high or low values, which can be harmful to aquatic organisms, affecting reproductive rates, metabolic processes and overall health. Changes in pH can

disrupt ecosystems leading to shifts in species composition and biodiversity. It can also affect the solubility and toxicity of chemicals, heavy metals and other impairments in the water.

WHAT ARE TRADITIONAL MANAGEMENT PRACTICES?

Managing watersheds where operations are highly acidic or basic will reduce the impact of pH in waterways. At silviculture operations, watersheds and runoff should be analyzed before harvesting to understand water input. In some settings, vegetative buffer zones reduce runoff and stabilize the pH levels

of the runoff around crop fields and industrial sites. Additionally, mixing water, lime or other neutralizing agents with acidic water can increase pH to be less extreme. In this case, it is best to consult regulations for wastewater discharge.

RESOURCES

<https://www.epa.gov/caddis/ph>

<https://www.usgs.gov/special-topics/water-science-school/science/ph-and-water>

<http://www.deq.louisiana.gov/page/louisiana-water-quality-integrated-report>

AUTHORS

M.P. Hayes, Assistant Professor in the School of Plant, Environmental and Soil Science and Louisiana Sea Grant
Edward Bush, Professor in the School of Plant, Environmental and Soil Science
Ruth Nolan, Undergraduate Student at LSU College of Agriculture



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