

pH as an ecological factor

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pH is measured mathematically by, the negative logarithm of hydrogen ions concentration

$$\text{pH} = -\log_{10} [\text{H}^+]$$

Ph measures the concentration of hydrogen ions in water.

It indicates how much water is acidic or basic.

Ph directly influences the toxicity of ammonia and hydrogen sulphide.

Application of lime is the best way to counter the problem of water pH. Lime increases soil pH.

Calcium carbonate (Calcite), Dolomite, calcium hydroxide (Saked lime) and Calcium oxide (Quick Lime) are the conventional liming materials.

Agricultural Gypsum may be applied to correct alkaline pH.

pH

Recommended Range: 6.5 to max 9

Relevance to Production: Affects the solubility and chemical forms of various compounds some of which can be toxic.

What happens when Consistently below recommended Value?

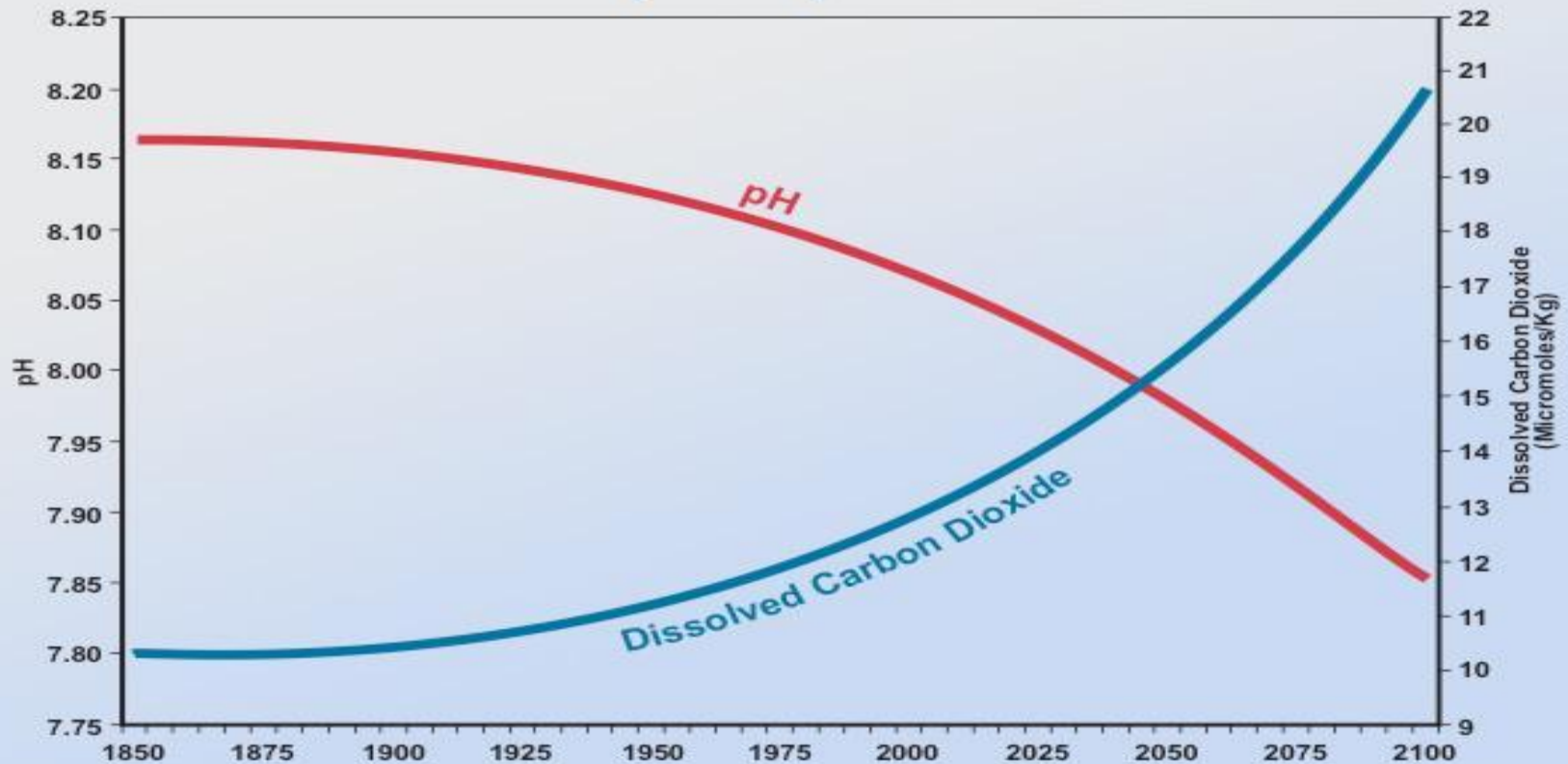
- Below 4, acid death point.
- 4 – 6.0. Survive but stressed, slow growth, reduced feed intake, higher FCRs.
- Higher proportion of Total Ammonium Nitrogen is in the form of ionized ammonia, which is less toxic for fish.
- Low pH indicates high levels of dissolved carbon-dioxide

What happens when consistently above recommended value?

- 9 – 11 Stressful for catfish, slow growth rate.
- Above 11 alkaline death point. All life, including bacteria in pond will die at this point.
- Higher proportion of Total Ammonium Nitrogen in the form of unionized ammonia in water, which is more toxic for the fish.

The pH of natural waters is greatly influenced by the concentration of carbon dioxide which is an acidic gas.

Historical & Projected pH & Dissolved CO₂



As the ocean concentration of carbon dioxide increases, so does acidity (causing pH to decline).

Source: Feely, Richard A., et al. (2006) Carbon Dioxide and Our Ocean Legacy. Pew Trust