Waterwatch Australia National Technical Manual
Module 4 - Physical and Chemical Parameters
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Teachers' Resource Sheet - pH

What is it and why does it matter?

pH: a measure of acidity (or alkalinity). Pure water has a pH of 7, acidic solutions have lower pH values and alkaline solutions have higher values. Values of pH range from 0 (highly acidic) to 14 (highly alkaline). Where water has no net alkalinity or acidity it is said to be neutral and has a pH of 7. pH can be a little misleading unless you remember that one pH unit represents a ten-fold change. So if the pH of a water sample falls from pH 7 to pH 6, that is equivalent to a 10-fold increase in acidity. Figure 4.8 shows the pH of some common liquids. Many compounds are more soluble in acidic waters than in neutral or alkaline waters. The pH of the wet area around roots affects nutrient uptake by the plants; pH also affects the solubility of heavy metals in water and the concentrations of total dissolved solids in rivers. All animals and plants are adapted to specific pH ranges, generally between 6.5 and 8.0. If the pH of a waterway or water body is outside the normal range for an organism it can cause stress or even death to that organism.

What factors affect pH?

A wide variety of factors may have an effect on the pH of water. These include:

- source of the water
- rainfall
- time of day
- water temperature
- amount of algal or plant growth in the water
- geology and soils, e.g. acid sulphate soils
- discharges of industrial wastes
- disturbance of acid sulphate soils due to agriculture, urban development or mining
- atmospheric deposition (acid rain, dry particle deposition)
- burning of fossil fuels by cars, factories and smelters
- photosynthesis and respiration
- salinity

The pH of a water body varies during the course of the day as the balance between photosynthesis and respiration changes with the light intensity and temperature. Inflowing water may affect the pH of the water body as well: rainfall is naturally slightly acidic because of carbon dioxide dissolved in it; water running off limestone areas has relatively high pH. On the other hand, streams and lakes in coastal dune areas may have very low pH (sometimes less than 5) due to the presence of naturally-occurring humic acids.

Figure 4.8: pH scale and pH of selected liquids

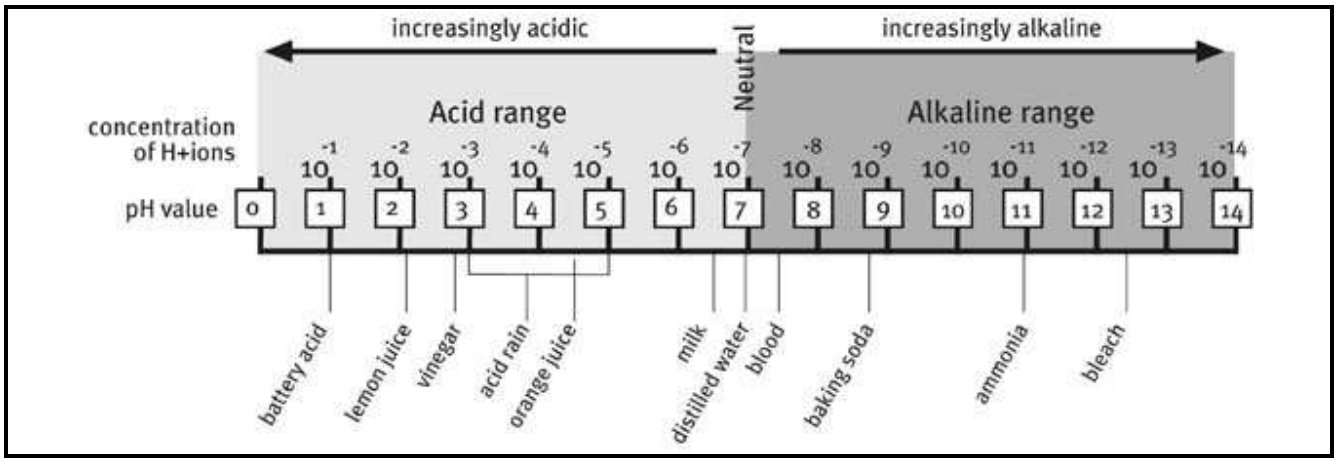

Table 4.5: Guidelines for water quality as it affects rivers

pH range

Excellent	6.0-7.5
Good	5.5-6 or <8.0
Fair	5.0-5.5 or 8.5-9.0
Poor	8.0-8.5
Degraded	<5.0 or >9.0