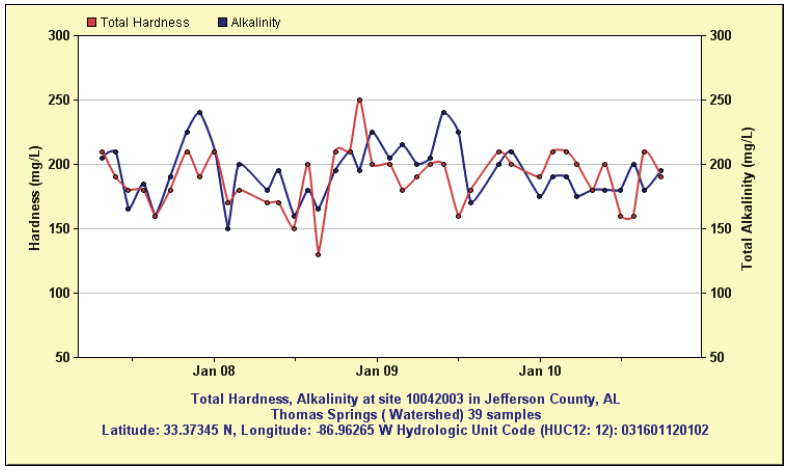
Alkalinity: Principles

Alkalinity is a measure of the **buffering capacity** of water. Higher alkalinity provides a "buffer" against changes in pH, making it more stable for aquatic life. The chemical name of limestone is calcium carbonate ($CaCO_3$) or magnesium carbonate ($MgCO_3$). The carbonate (CO_3) and bicarbonate (HCO_3) ions in dissolved limestone are a natural source of alkalinity.

- If a waterbody has low alkalinity, it is susceptible to rapid changes in pH when acids or bases enter the water.
- Measurements of Total Alkalinity and Total Hardness from water in areas with no industrial impact tend to have similar values.
- Water where Total Alkalinity measurements are high usually has a high pH.

Water Alkalinity as $CaCO_3$	
0 – 10 mg/L	Very Low
11 – 50 mg/L	Low
51 – 150 mg/L	Moderate
151 – 300 mg/L	High
> 300 mg/L	Very High

- Total Alkalinity values in waters across Alabama range from 10 mg/L or less in parts of the Coastal Plain to 200 mg/L and more in regions with limestone formations and outcrops, such as in the Upper Coosa River Basin, the Black Belt and the Interior Plateau (Limestone County area).
- Brackish water or seawater typically has Total Alkalinity of 100 to 125 mg/L.



Similar values of Total Alkalinity and Total Hardness are shown in the graph above from Thomas Springs in Jefferson County, Alabama (AWW Site Code 10042003).