Chapter 2 Examples: Chemistry of Surface Waters

**Example 1: Carbonate system**  A river has a pH of 5.8. If the river water is in equilibrium with atmospheric carbon dioxide, which has a pressure $P_{CO_2}$ of approximately $10^{-3.5}$ atm, what are the concentrations of the carbonate species in the water?

**Example 2: Alkalinity-pH**  A lake water has an alkalinity of $6 \times 10^{-4}$ eq/L. In the early morning, a monitoring team measures the lake pH as part of an acid rain study and finds the pH to be 7.5.

   a) What is the $C_T$ in the lake water at this time?

   b) The survey team returns after lunch to recheck their data. By this time, algae and green plants have depleted the $C_T$ of the lake to half of its morning value. What pH does the team find now?

**Example 3: Oxidation states**

   a) What is the oxidation state of nitrogen in nitrate, $NO_3$?

   b) What is the oxidation state of carbon in hexane, $C_6H_{14}$?