Chemistry 12
KEY - ACID RAIN

146. A pH of 2.2 implies $[H_3O^+]$ = antilog(-2.2) = 6.3×10^{-3} M.

volume of water = $2.5 \times 10^5 m^2 \times 2.5 \times 10^{-2}$ m = $6.25 \times 10^3 m^3$ = $6.25 \times 10^3 m^3 \times \dfrac{10^3 \text{ L}}{1 \text{ m}^3}$ = 6.25×10^6 L

moles H_3O^+ = $6.3 \times 10^{-3} \dfrac{\text{mol}}{\text{L}} \times 6.25 \times 10^6$ L = 3.94×10^4 mol

mass $CaCO_3$ = 3.94×10^4 mol $H_3O^+ \times \dfrac{1 \text{ mol CaCO}_3}{2 \text{ mol H}_3O^+} \times \dfrac{100.1 \text{ g}}{1 \text{ mol CaCO}_3} \times \dfrac{1 \text{ kg}}{10^3 \text{ g}}$ = **2 × 10³ kg**

147. $Al(H_2O)_6^{3+}$ is a weak acid having $K_a = 1.4 \times 10^{-5}$; that is, a fairly "strong" weak acid.