Bulk Modulus/Compressibility

\[ B = \frac{-V \cdot \Delta P}{\Delta V} \]

\[ \alpha = \frac{-\Delta V}{V \cdot \Delta P} \quad \Rightarrow \quad \alpha = \frac{1}{B} \]

\[ \alpha_{\text{H}_2\text{O}} = 0.0000034 \text{ lb} \text{/ in}^2 \]
Aquifer Parameters

Water

\[ p, u, B \]

\[ \uparrow \]

\[ \text{Compressibility} \]

\[ \text{Density} \]

\[ \text{Viscosity} \]

Sediments

\[ n, k, \alpha \] \text{Medium Compressibility}

\[ \uparrow \]

\[ \text{Porosity} \quad \text{Permeability} \]
Hydraulic Head

Water Table rises

1. Hydraulic head ↑
   - Fluid pressure in aquifer ↑
2. Aquifer skeleton expands η ↑
3. Volume of water ↓ due to B
   - Adding water creates room for additional water
Water Table Drops

1. Hydraulic head ↓
   - Fluid pressure in aquifer ↓

2. Aquifer skeleton contracts \( \nearrow \) ↓

3. Volume of water ↑ due to
   - removing water
   - creates less room for the remaining water
Storativity

- Volume of water that an aquifer will absorb or expell per change in hydraulic head

\[ S = \frac{\text{Vol of water}}{\text{L} \cdot \text{Area}} \]

\[ \Delta \text{hydraulic head \ of aquifer} \]