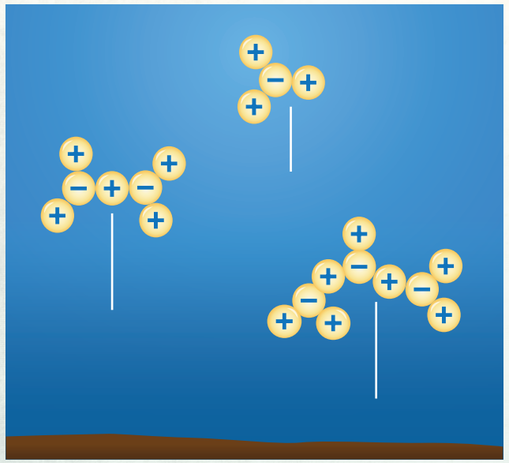
Enhanced Solids Fe Removal

Achieving total metal concentrations of less than 2.0 mg/L can be very challenging at mine drainage treatment sites. An extremely effective strategy is to use a **pond followed by a wetland to enhance solids removal**. This treatment strategy can achieve total suspended metal concentrations of less than 2 mg/L.

The pond-wetland treatment system on memorial grounds treats a 1,200 gallon-per-minute discharge to a total iron concentration of less than 1.0 mg/L.

TYPICAL METHODS OF TREATMENT



Historically, low total metal concentrations in the effluent have been achieved by using a high treatment pH or the use of flocculants (shown to the left).

Flocculants provide the negatively charged particles that attract the positively charged iron particles.

Both treatment strategies result in increased treatment costs and additional labor to ensure proper dose.

Enhanced
Solids Fe removal & Passive Mn removal
at Circumneutral pH

U.S. Department of the Interior
Office of Surface Mining Reclamation and Enforcement

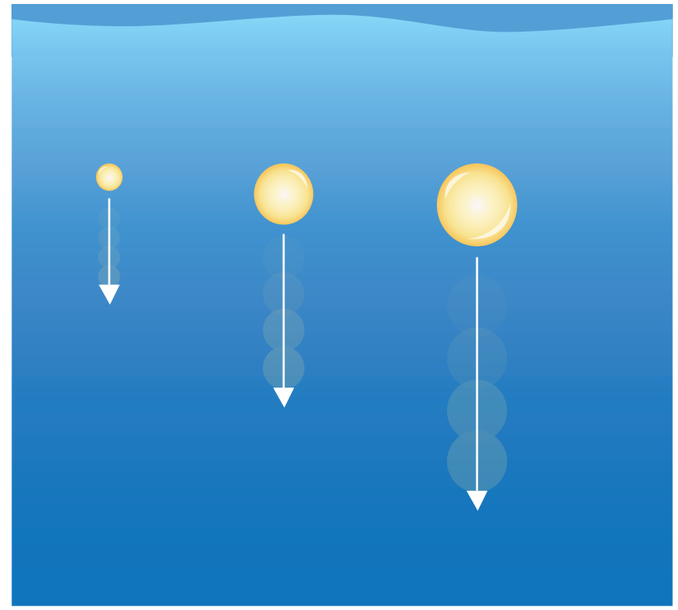


FIGURE 1
Stokes Law - larger particles settle faster.

FIGURE 2
Colloidal particles, clay sized and smaller, remain suspended. When the surface potentials are high, repulsion is strong, and particles do not collide.

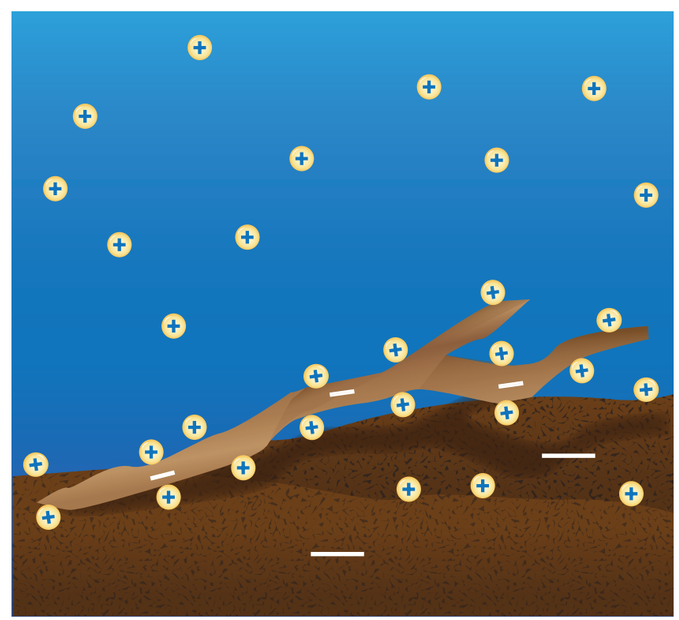


FIGURE 3
The finest particles within the ponds are only removed if they touch the bottom or any debris lying on the bottom.

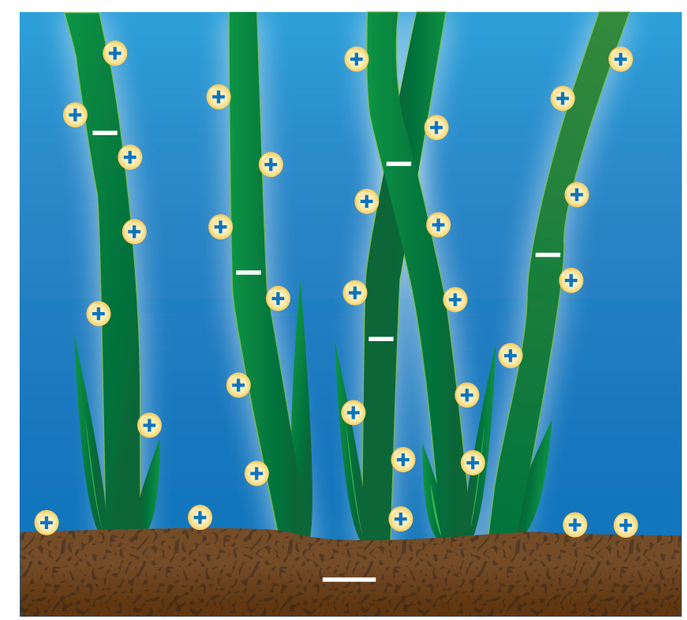


FIGURE 4
Particles collect on vegetation surfaces in wetlands resulting in total iron effluent concentrations of less than 1.0 mg/L.