Dissolved Oxygen Fact Sheet

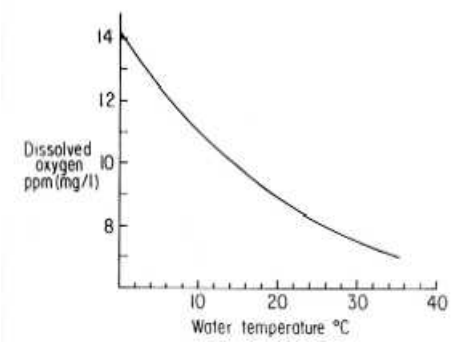
Definition: Microscopic oxygen (O_2) molecules that are mixed within water...dissolved oxygen is found in thespaces between water (H_2O) molecules.

Background:

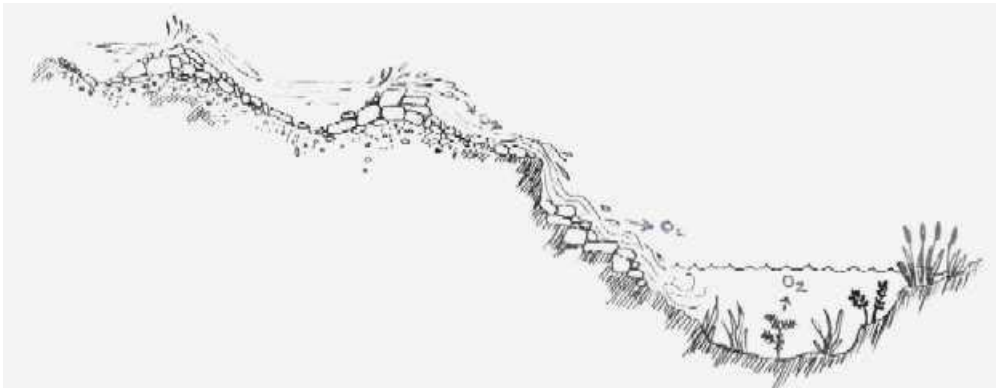
- Aquatic animals and aerobic bacteria need O_2 for respiration...*without* dissolved oxygen, fish would drown!
- Presence of dissolved oxygen is a positive sign, while its absence is a signal of severe pollution.

Physical Influences:

- Temperature - dissolved O_2 is normally greatest during the winter because cold water can hold more O_2...(as temperatures drop, water molecules are spaced farther apart)



- Wet weather or melting snow increases flow, which results in greater mixing of atmospheric oxygen.



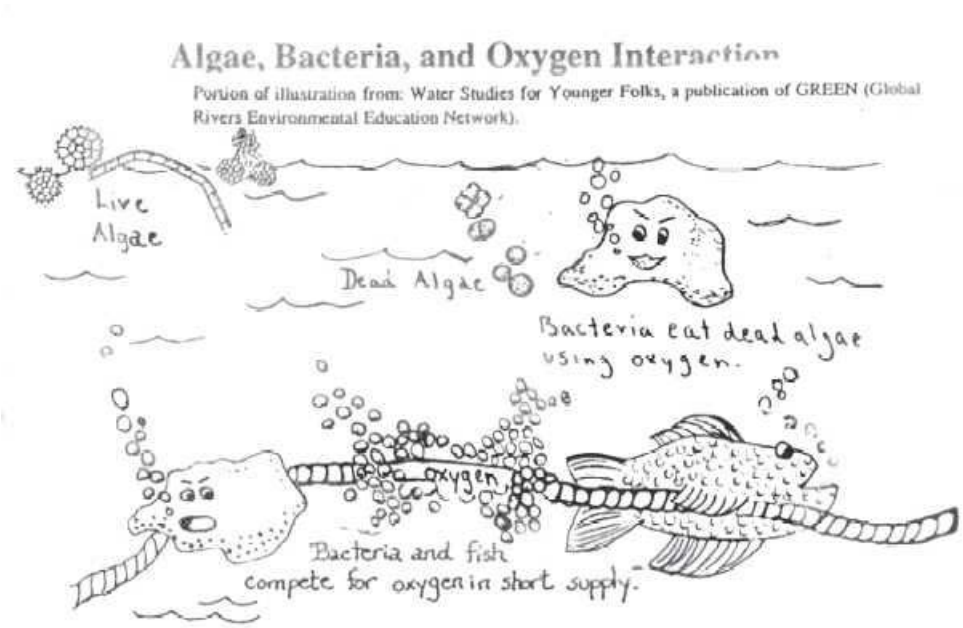
Dissolved oxygen added to water through aeration and photosynthesis

Aquatic Life Influences

- Algae and aquatic plants deliver O_2 to water through photosynthesis.
- Respiration/decomposition removes dissolved O_2.
- During growing seasons, dissolved O_2 is highest in early afternoon when aquatic photosynthesis is maximal.

Environmental Impacts:

- Temperature changes - any actions that change the temperature of the stream affect dissolved oxygen.
- Nutrient additions - from fertilizers encourage excessive plant growth (algal blooms), which eventually die and need to be decomposed by aerobic (oxygen using) bacteria. DO levels drop. This is **eutrophication**.



- Organic waste additions (anything once part of a living plant or animal) enters waterways through death of aquatic plants, sewage, urban & agricultural runoff and discharge of food processing plants. Aerobic bacteria also consume organic waste, depleting oxygen levels. This use of oxygen is called **biological oxygen demand.**
- Turbulent water released from a dam can have such a high DO level that it can be toxic to organisms.

Water Quality:

- The U.S. Environmental Protection Agency considers healthy water to have 5 mg/L dissolved oxygen, below 4 mg/L water quality is considered poor.