# Dissolved Oxygen (DO) *Dissolved Oxygen Requirements by Fish Community*

**Cold Water Fishes:** 6 mg/l and above **Warm Water Fishes:** 5 mg/l

## *Solubility of Dissolved Oxygen*

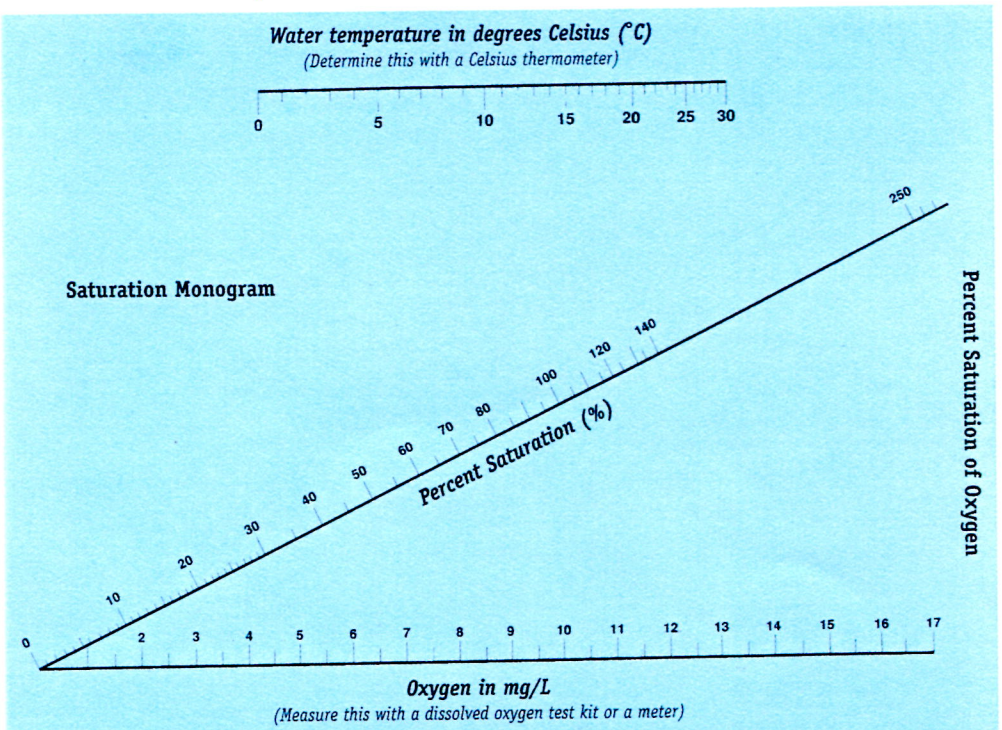
Solubility: Amount of dissolved oxygen that distilled water can hold at given temperature

| Temperature (C*): | Solubility (mg/l) |
|---|---|
| 0: | 14.6 |
| 1: | 14.2 |
| 2: | 13.8 |
| 3: | 13.5 |
| 4: | 13.1 |
| 5: | 12.8 |
| 6: | 12.5 |
| 7: | 12.2 |
| 8: | 11.9 |
| 9: | 11.6 |
| 10: | 11.3 |
| 11: | 11.1 |
| 12: | 10.9 |
| 13: | 10.6 |
| 14: | 10.4 |
| 15: | 10.2 |
| 16: | 10.0 |
| 17: | 9.8 |
| 18: | 9.6 |
| 19: | 9.4 |
| 20: | 9.2 |
| 21: | 9.0 |
| 22: | 8.9 |
| 23: | 8.7 |
| 24: | 8.6 |
| 25: | 8.4 |
| 26: | 8.2 |
| 27: | 8.1 |
| 28: | 7.9 |
| 29: | 7.8 |
| 30: | 7.7 |

## *Dissolved Oxygen Percent Saturation*

**Directions**

1. Determine water temperature in degrees C, and find that value on upper (temperature) scale. *To convert F to C: [(F-32) x 5]/9= C
2. Determine dissolved oxygen and find that value on the lower (DO) scale.
3. Using a straight edge (ruler, piece of paper), draw a line from the temperature value to the dissolved oxygen value. The point at which the line crosses the middle (saturation) scale is the percent saturation of oxygen.



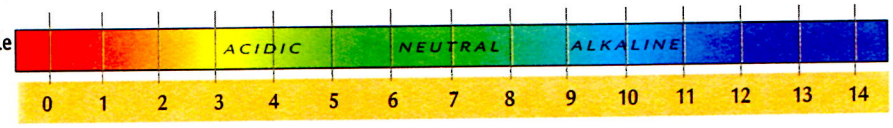

**Example:**
Water sample at 15 C containing 11 gm/l of DO would be 110% saturated.

**% Saturation Values & What They Mean**

125% and greater: Too high, may be dangerous to fish
80-124%: Excellent 60-79%: Okay Below 60%: Poor

*Adapted from:* Water, Water Everywhere: Water Quality Factors Reference Unit, *HACH, Inc., Loveland CO, 800-227-4224.*

# pH and Aquatic Organisms




## *Tolerant ranges for certain species*

| | | | | | |
|---|---|---|---|---|---|
| Mayfly | 5.5 to 7.5 | Brown trout | 5.0 to 9.5 | Carp | 5.0 to 9.0 |
| Caddisfly | 5.5 to 7.5 | Brook trout | 4.5 to 7.5 | Catfish | 5.0 to 9.0 |
| Stonefly | 5.5 to 7.5 | Yellow perch | 4.5 to 7.5 | Bullfrog | 4.5 to 7.5 |
| Snails, clams, mussels | 6.0 to 9.0 | Smallmouth bass | 5.5 to 7.5 | Wood frog | 4.0 to 7.5 |
| Crayfish | 5.5 to 7.5 | Pumpkinseed | 5.0 to 7.5 | American toad | 4.5 to 7.5 |
| Rainbow trout | 5.5 to 9.5 | Fathead minnow | 6.0 to 7.5 | Spotted salamander | 5.0 to 7.5 |

# Alkalinity

(Calcium carbonate:)CaCo3

**Freestone Streams**
10 mg/l or less: Very sensitive to acid precipitation
10-20: Somewhat sensitive to acid precipitation
20mg/l or greater: Not sensitive to acid precipitation

**Limestone Streams**
75 mg/l or greater