



Black Earth Creek & Limnology Minifacts & Analysis Sheet 13



Water Hardness Amounts

Information on Water Hardness Amounts

1. What is hardness?

- A. Hardness is a measurement of the amount of minerals found in water. The minerals in largest quantities are: **calcium and magnesium**, although iron, strontium, and manganese may contribute.
- B. Hardness is usually reported as an equivalent quantity of calcium carbonate (CaCO_3). Generally, waters are classified according to degree of hardness as follows:

Concentration CaCO_3 (ppm)	Classification
< 75	Soft water
75 – 150	Moderately hard
150 – 300	Hard
> 300	Very hard

- C. These chemicals are found in the rocks and soil naturally. They cause harm to dishwashers or other household appliances using water. In order to control or neutralize the problems caused by hard water, a water softener is needed. The amount of plants around a watershed will also control the amount of hardness. They act like a sponge and “soak up” or prevent the runoff.

2. How does water get hard?

- A. Hardness is primarily due to the geology of the area with which the surface water is associated. Waters that run over limestone are prone to hard water. This is because rainfall, which is naturally acidic because it contains carbon dioxide gas, continually dissolves the rock and carries the dissolved minerals to the water system.

- B. Erosion is the greatest producer of hard water. Due to rains bringing soil containing the hardness chemicals into a lake, hardness, in part, is based on the amounts of erosion runoff in a watershed.

3. When is hardness a problem?

- A. Generally speaking, water is never too “soft.” Hardness becomes a problem and could be a limiting factor when these readings get too high. Drinking very “hard” water can cause intestinal difficulties in man and other animals.
- B. Currently there are no health standards for water hardness.
- C. A high level of hardness will cause an increase in the pH of a lake. This may double the amount of stress on aquatic organisms.
- D. The chart below illustrates some hardness measurements and the affect they have on organisms.

Hardness (in ppm)	Affect on Organisms
45 ppm – 200 ppm	Most Game fish live in this range
45 ppm – 500 ppm	Most Rough fish live in this range
Less than 45 ppm and greater than 500 ppm	Fish less productive -- don't reproduce
Greater than 350 ppm	Can be harmful to man