

How Copper Levels in Creeks Affect Fish

Copper is one of the most useful metals in our world. It can also be harmful to the environment. When fish have been in water with high levels of copper for only a few hours, their sense of smell becomes weak. Fish that have been raised in a copper rich environment have little or no sense of smell. This is because copper particles collect in the fish's nose hairs and weakens incoming smells while also reducing how effectively the nose can send the scent messages on to the brain.

Copper can enter watersheds in several ways. One of the ways copper gets into watersheds is automobile brakes. As the panels stop the wheel spinning, copper comes off, and when storm water runoff comes along, it washes the copper into streams, lakes or ponds. When the copper is inhaled by the fish, their nose's effectiveness drops considerably. Copper can also enter waterways as run-off from mining activities. In some areas, where copper levels are extremely high, such as around mines, fish cannot even live. They have either leave or die.

With copper blocking the signals the nose hairs send to the brain, the fish cannot pick up warning scents, such as those given off when a fish is attacked. This means that when there is danger around, the fish does not take shelter and therefore fewer copper affected fish shall survive. It will also be next to impossible for an anadromous fish to find its way back to breeding ground. This means that over the years salmon populations will drop and may become extinct due to a small amount of copper. If the copper levels rise, then fish in urban areas may become extinct. This has already happened in areas around mines.

Testing copper levels at sites around our city will provide a baseline for copper levels. I hope to find areas that are clear of copper and thus find out that the water is good for fish. This will benefit us because fish play a crucial role in our lives. They give us meat to eat, entertainment, and business. If the fish are not healthy, then we are not healthy, and our economy will suffer even further.

So this project will give us an idea of the areas that have problems with water quality, and hopefully prompt Anchorage AWC officials into doing something if there is something wrong. I hope that our waterways are free of copper.

Materials:

- A LaMotte copper monitoring kit.
- 1 five-gallon bucket

Procedures:

- 1) Choose an urban area to be the test site.
- 2) Go to the test site and fill the bucket.
- 3) Fill the test tubes to the 10 ml mark with sample water from the bucket.
- 4) Put 5 drops of the copper reagent into 1 of the tubes.
- 5) Take 1 of the caps and put it onto the test tube that has the copper reagent in it.
- 6) Shake thoroughly.
- 7) Take off the cap and return it to the LaMotte copper monitoring kit.
- 8) Put the 3 test tubes, the tube with the reagent in the center of the tube, on the rack of the copper comparator, with light shining above it. It is important that the container of purified water is in the slot in front of the treated water, so that you are looking through it.
- 9) Then match the color of the resulting water with a color and number.
- 10) Record data.

Data:

Place	Date	Time	Copper Level
Lower Campbell Creek Upper sediment pond	10/9/08	1:33	0 ppm
Lower Campbell Creek Upper Sediment Pond	10/17/08	1:35	0 ppm
Lower Campbell creek Upper Sediment Pond	10/24/08	1:35	0 ppm
Campbell at Arctic just upstream of Arctic Bridge	11/17/08	8:30	0 ppm
S. Fork Chester Creek at outflow of University Lake	11/17/08	8:30	0 ppm

Conclusion:

According to my data, the sediment basins of Little Campbell Creek are interestingly clean of copper. I had predicted that there would at least be some copper in the sediment basins, but it seems as if that was an incorrect hypothesis. Everyday I tested at the same place, doing the same test, at the same time, but on every single one of those days my results were that there was either no copper in the basins, or the amount was too small to be detected. I also tested Campbell Creek 15 feet upstream of Arctic Bridge, and the S. Fork of Chester Creek at the outflow of University Lake at Bragaw.

One reason I can think of for the lack of copper may be that there is a chemical that dissipates the copper. But this is in serious doubt, as a colleague of mine tested the chemicals in the water and nothing harmful was found in the basins, however I do not know about the two other locations. The last two reasons I can think of for this lack of copper is that the surrounding neighborhoods are either taking measures to keep the water clean, or the water is running through a filter. This is excellent news for fish in Anchorage.