

Toxic Algae Plagues Klamath Reservoirs  
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We all know that the dams play a major role in the decline of salmon. The dams deny access to over 350 miles of historical spawning grounds, act as 'heat sinks' as shallow reservoirs warm to temperatures lethal to salmon, and degrade water quality. All this you know by now.

What you may not know is that the reservoirs are toxic to humans too.

This summer, in an effort to better understand and describe the water quality problems the dams create, Karuk Water Quality staff began sampling the reservoirs to learn more about the blue-green algal blooms that occur each summer. We they found could lead to the closure of the reservoirs.

Blue-green algae, or cyanobacteria, come in many varieties-some benign, some toxic. The toxic varieties typically fall into two categories- those that secrete neurotoxins and those that secrete liver toxins. What the Water Quality Crew has found is called *microcystis aeruginosa*, which secretes a cyclic polypeptide called microcystin. Microcystin is a liver toxin and proven tumor promoter.

Although the United States EPA does not have guidelines for acceptable levels of microcystin, the World Health Organization (WHO) does. According to the WHO, algal levels of 100,000 cells/milliliter of water represent a moderate health risk for recreational users. The Tribe found sample sites with over 11 million cells/ml-110 times greater than the WHO moderate risk levels! Although the WHO does not give specific numbers for a high health risk, it notes that visible blue-green scum on the water's surface is considered a high health risk and should be avoided.

At this level of toxicity, an adult would only have to ingest about half a cup of the water to exceed the WHO Tolerable Daily Intake (TDI) by 28 fold. A child ingesting a quarter cup of water would exceed the TDI by 228 fold.

The symptoms of microcystin poisoning include: skin rash, eye irritation, nausea, vomiting, diarrhea, mouth ulcers, liver damage, kidney damage, and in extreme cases, liver failure and death.

The Tribe is now sampling sites in the river downstream of the reservoirs as is the Fish and Wildlife Service and the Yurok Tribe. As daytime temperatures drop, the blooms will subside until next year. Using the data collected this year, we hope to convince Siskiyou County to set firm standards for closing the reservoirs to recreational use when toxic blooms erupt in the future.

Studies suggest that the toxin can accumulate in the flesh of fish, however the Tribe has not determined whether or not the toxin is present in Klamath salmon.