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EGR 361B

Prof. Symons

Water Dogs

During hot summer months, Lake Billy Chinook and its child distributaries have the potential to harbor massive algae blooms of Cyanobacterial Algae, a harmless-looking blue-green algal bloom on the surface of the water that actually carries dangerous bacteria. In higher quantities, these bacteria can be toxic and potentially lethal to creatures that choose to interact with the water, via drinking, swimming, or consuming fish or bivalves from the water.

This project primarily focuses on two types of bacteria from the Cyanobacterial family that are present in these algae, cylindrospermopsin and microcystins. The parameter of interest for this study is the mean level of these toxins in the water, but the response variable is the amounts of toxins themselves. The mean level of these toxins will be compared to EPA, WHO, and State of California guidelines, and a determination concerning the body of water’s safety will be made. If deemed dangerous, an announcement in the form of a poster will follow alerting the relevant members of the public to not utilize the body of water. The phrase ‘relevant members of the public’ is used to provide a distinction in the event that the river is unsafe for pets and small children, but is safe for grown adults to use recreationally.

World Health Organization standards circa 2015 surrounding microsystins specify that the measurement should not exceed 1 μg/l in water to be used for drinking, not exceed 10 μg/l in water used to be in recreation to avoid allergenic effects, and to not exceed 50 μg/l to avoid moderate health risks. The EPA standards for drinking water are more stringent for microsystins, but also encompass cylindrospermosin as well. These standards specify that the level of microcystins in drinking water do not exceed 0.3 μg/l, and 0.7 μg/l for cylindrospermosin.

The null hypothesis in this scenario is that the Metolius River is below the dangerous levels of these bacteria, ergo being safe to utilize for recreation. An alternate hypothesis presented is that the river is unsafe to use for recreation, and the public must be notified of the toxicity levels. As previously stated, parameters of interest to be measured are the mean levels of toxins in these waters, and the response variables are the actual levels of toxins.

By running a single-tailed T-test on the two sets of data, we can conclude the Metolius River