

Title: Toxins in Lake Elsinore, California

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Lake Elsinore is Southern California's largest freshwater lake. The economy of the surrounding community depends on revenue generated by the lake's tourism industry. However, Lake Elsinore is prone to toxic algal blooms of Microcystis, a cyanobacteria that produces microcystin toxins. This project aims to determine how the toxins are aerosolized by lake activity and where the toxins go once airborne in the atmosphere. Previous research has shown that microcystins do aerosolize from water to the atmosphere. The natural water level flux of the lake was altered when the county authority constructed water/oxygen level regulators to ensure a stable ecosystem. In this study, three sites around the perimeter of the lake were sampled for aerosolized microcystins, water quality and apparent optical properties. All sites had low levels of toxins. Site 1 had a reading of 2.5 ppb of microcystin in the water sample, while the air sample detected trace amounts of microcystin. Time series analysis was completed on the three sample sites and for the entire lake using Sentinel-2 imagery. Based on time series of fluorescence line height (FLH), the three sites show correlations in bloom frequency. NOAA HYSPLIT modeling was used to determine the relative movement of the wind over and around the lake. In the winter, air blew in the Southwest direction while in the other seasons the wind blew generally to the east. FLH values serve as proxies to relative chlorophyll values. Surrounding areas of highest exposure likelihood can be determined by combining HYSPLIT models and FLH algorithms.

Biography

Daniel Tropper has completed his BS in Marine Science at the age of 21 years from the University of Delaware and is working towards his MBA at UDel. He Participated in the NASA SARP internship during the Summer of 2019, where this research took place. He learned the values of coolaborating with other scientists with various expertise in order to fully analyze the research task.

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