Investigation of Fecal Indicator Bacteria in the Baker Lake via Monitoring of Fecal Coliforms and Genomic Analysis

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Starting with reports of illness after swimming in the lake in 2022, the Fallon County Commission decided to test the lake for toxic algae. The lake tests came back positive for a toxic algae bloom prompting the health department to post signage and make people aware. However, they were unable to identify the algae. This anomaly sparked us to take a closer look at what was going on, thinking there might be E. coli or some other type of bacteria. Lake samples showed high levels of bacteria, but they were unidentifiable. We then cultured water samples on Easygel Coliscan plates to determine if there were any fecal coliforms present. Samples cultured on Easygel Coliscan plates showed high levels of fecal coliforms and E. coli. We presented this information to the county commissioners and secured a partnership for funding to further investigate the issue. To determine the predominant organisms in the lake, we isolated the 16s ribosomal gene from lake samples and had Sanger sequencing conducted by Functional Biosciences. The Sanger sequencing revealed the bacteria most dominant in the samples were Cutibacterium acnes and Flavobacterium cheniae. Next, we sent a filtered sample of the water to Microbe Detectives for metagenomics (Illumina amplicon sequencing) to find the identities and relative amounts of all of the bacteria and archaea in the lake. Finally, we formed a partnership with DEQ to monitor E. coli levels for the year, which will assist in making recommendations to the commission and community.

Awards Won: