Nonpoint Source Initiative on Medina Lake

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Introduction

Medina Lake is utilized as a source of drinking water for San Antonio and riparian residents. In the last few years, there has been an increase in population in the surrounding areas, and water recreation has grown in popularity. A survey Medina Lake's waters is needed to identify potential nonpoint source pollution, and/or potential health risks to the public.

Purpose

In order to maintain security and protection of the resource, Bandera County River Authority and Groundwater District (BCRAGD) will conduct surveillance of Medina Lake for the presence of nonpoint source pollutants.

Scope

The potential nonpoint sources of coliforms and E. coli comes from runoff, agriculture, wildlife, and potentially failed septic systems (OSSFs). In order to address the potential nonpoint source pollution, 9 Medina Lake coves will be sampled for the presence of fecal coliforms and E. coli in conjunction with other water quality monitoring that is currently taking place on Medina Lake, including the In-House water quality study and the Clean Rivers Program.

Methods

Over the course of 12 months, sampling was accomplished in each cove once per month. Sampling was done in accordance with current Texas Commission of Environmental Quality's protocols as designated in the Surface Water Quality Manual: Volume 1. Each sample was immediately put on ice for storage and transported back to the BCRAGD lab for analysis. The samples were then diluted to a 50% concentration and then filtered using the membrane filtration method for enumeration of coliforms and E. coli. The enumeration plates were incubated for 24 hours and the removed for counting.

Results

As seen in Fig. 1, total Coliform counts stayed routinely below 500 colony forming units (cfu). The highest count seen was 3110 cfu on the 28-Jun-2016. The spikes of coliforms over 500 cfu seemed to correlate with recent precipitation within the river basin. Figure 2 represents the E. coli counts that were accomplished at the same time as the previous coliform counts. The highest count seen was 46 cfu on 7-Dec-2016. Figure 3 is another representation of the same counts with a red line across the graph representing the recommended TCEQ threshold of 399 cfu, above which, TCEQ recommends no primary contact recreation take place.

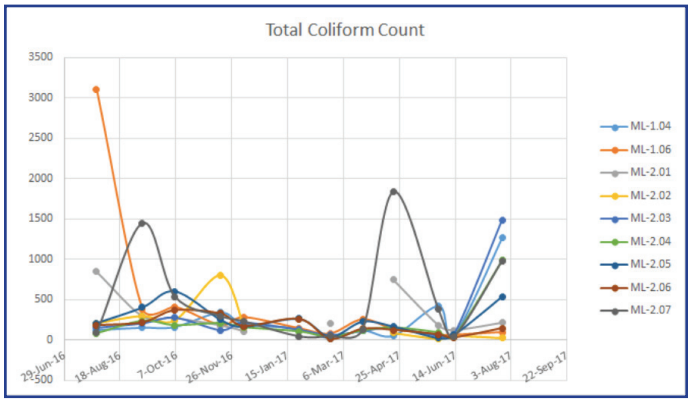

Figure 1: Graph of Total Coliform counts over the course of 12 months

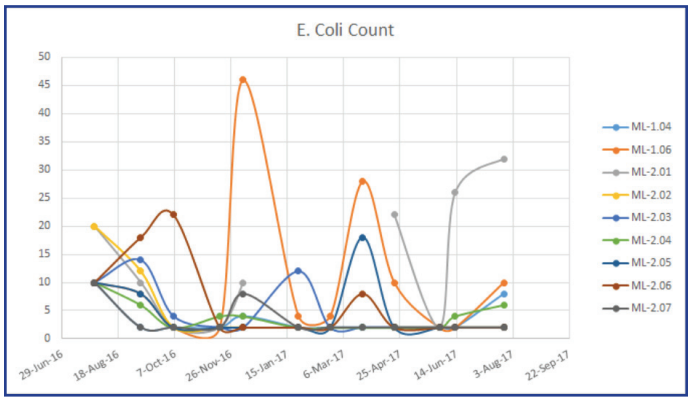

Figure 2: Graph of E. coli counts over the course of 12 months

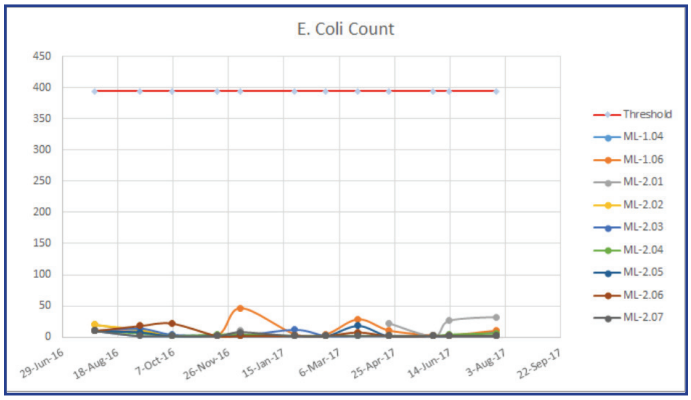

Figure 3: Graph of E. coli counts over the course of 12 months with the recommended TCEQ threshold of 399 cfu

Conclusion

In conclusion, with the E. coli counts being significantly lower than the recommended TCEQ threshold, it can be deduced that within those coves, there were non point sources of pollution causing a bacteria problem within Medina Lake. These coves were targeted in this study as the coves that have the most potential for human impact within the lakes boundaries.