Mark Begich, Mayor

Fecal Coliform at Anchorage Swimming Beaches

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MUNICIPALITY OF ANCHORAGE
WATERSHED MANAGEMENT PROGRAM

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WATERSHED MANAGEMENT

Office of Planning, Development & Public Works

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1.0 Introduction

The Municipality of Anchorage (MOA) Watershed Management Services (WMS) is required to monitor fecal coliform bacteria levels during the summer at the MOA Sports and Recreation Section-maintained swimming beaches to comply with the U. S. Environmental Protection Agency (EPA) National Pollution Discharge Elimination System (NPDES) Permit (No. AKS05255-8). To fulfill this requirement, water samples are collected at Goose Lake and Jewel Lake and analyzed for fecal coliform each summer. The sampling results are communicated to the MOA Department of Health and Human Services and Sports and Recreation.

While fecal coliform itself is not harmful, it is used as an indicator for the presence of other harmful pathogens that can be present in warm-blooded animals. Alaska water quality standards state that fecal coliform levels may not exceed 20 colonies per 100 milliliter (col/100 ml) for drinking water and 100 colonies per 100 ml for recreational contact (ADEC 1999). The purpose of monitoring fecal coliform is to ensure compliance with state and federal standards for bacteria.

2.0 Methods

Samples were collected and analyzed for fecal coliform levels once a month from May to September at Goose and Jewel Lake swimming beaches. A water quality scientist sampled each lake and a certified laboratory (Northern Testing Laboratories) analyzed the samples using the fecal coliform membrane filter method procedure (9222 D). See the 2000 Swimming Beach Monitoring Report for additional sampling methods (MOA 2001).

3.0 Results

Fecal coliform sampling and laboratory testing occurred once a month at the swimming beaches between May and September. Table 1 shows the results of the sampling efforts.

Table 1. 2003 MOA Swimming Beach Fecal Coliform Monitoring Laboratory Data[1].

Date	Fecal Coliform Col/100 ml	
	Jewel Lake	Goose Lake
27-May	0	0
13-Jun	0	271[2]
8-Jul	150	140
5-Aug	91	150
10-Sep	9	0

Although fecal coliform colony counts in Goose Lake were highest in June (271 col/100 ml), moderate colony counts were also present in July and August (140/100 ml and 150 col/100 ml, respectively). Jewel Lake exhibited its highest colony counts during July (150 col/100 ml) and maintained a detectable population during the August and September sampling periods (91/100 ml and 9 col/100 ml, respectively).

According to the MOA, no cases of swimmer's itch were reported for Goose Lake this year (Hose 2003). Nine reports of swimmer's itch were received by Jewel Lake lifeguards, seven during July and two occurring in early August (Hose 2003). There were no reports of illness related to waterborne pathogens other than swimmer's itch.

4.0 Discussion

Goose Lake fecal coliform levels were higher than in previous years. Results for Goose Lake ranged between 0 and 271 colonies in 100 ml water sample (or more, as the results of the June sampling were too numerous to count). During the sampling periods that yielded detectable fecal coliform colonies (June, July and August), results exceeded the state's water quality standards for recreational contact (100 col/100 ml).

Jewel Lake fecal coliform levels were also higher than in previous years. Results for Jewel Lake ranged between 0 and 150 colonies in 100 ml water sample. Fecal coliform was detected at Jewel Lake during July, August, and September with one of the results (July) exceeding the state's water quality standards for recreational contact.

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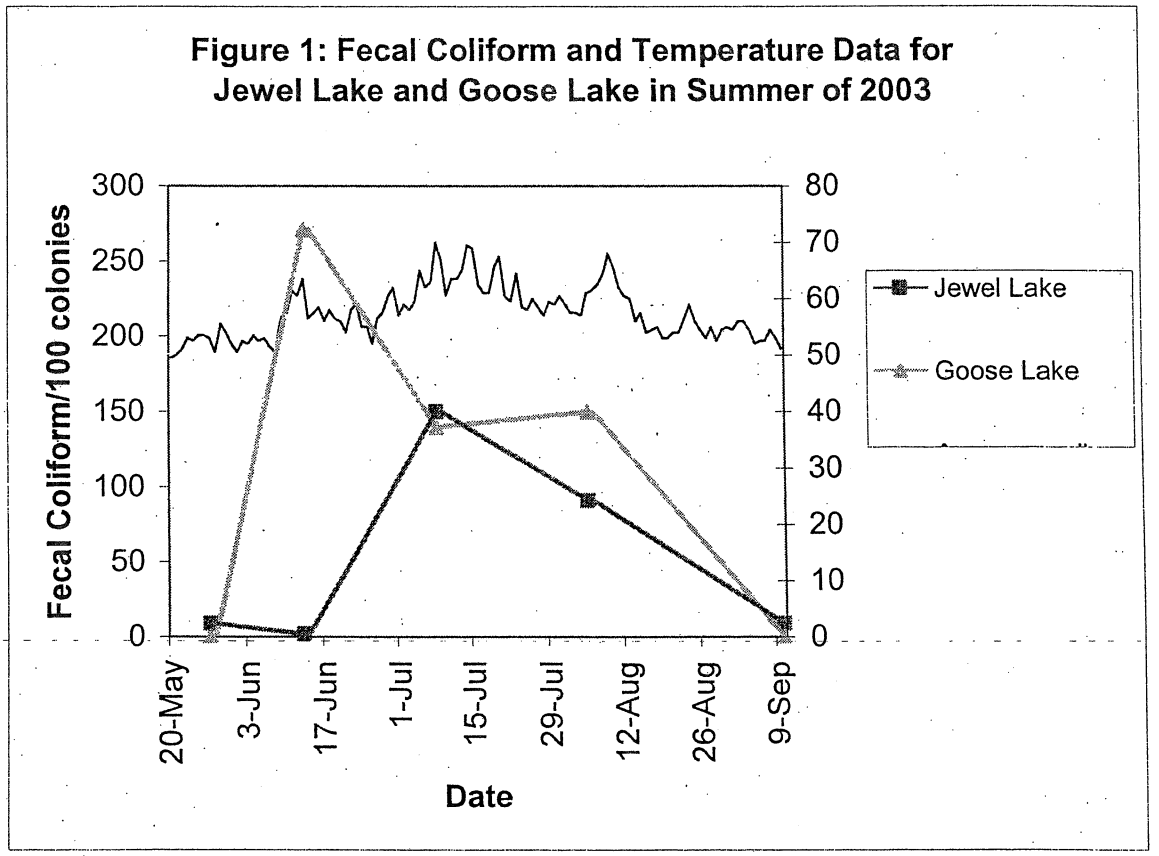
[1] Samples results that were less than the laboratory's method reporting limit of colonies/100 ml are reported as 0 cfu/100 ml for the purposes of this report.

[2] Although colonies were counted, samples were reported as "too numerous to count".

Interestingly, reports of swimmer's itch were also received in July and August, when fecal coliform levels were highest.

Fecal coliform colonies typically increase with higher temperatures in the laboratory environment. Ambient water temperature was not monitored in the lakes. However, the fecal coliform data were compared to summer weather trends using daily air temperatures in Anchorage collected by the National Weather Service (NOAA 2003). Figure 1 is a graph of fecal coliform levels in the summer of 2003 compared to daily air temperatures in degrees Fahrenheit.

Figure 1: Fecal Coliform and Temperature Data for Jewel Lake and Goose Lake in Summer of 2003



Fecal coliform data does not appear to fluctuate with temperature increases in the city. Anchorage temperatures and Jewel Lake colony counts were highest in the month of July. However, number of colonies in Goose Lake samples spiked in June and do not show much of an increase through July and August when temperatures were highest. However, more data points would be required to conduct conclusive statistical tests that predict relationship patterns between fecal coliform and temperature.

Goose Lake area trails are highly used by dog walkers and it is possible that higher levels of fecal coliform in Goose Lake in June could be a result of more animal waste carried with spring runoff into the lake. Since it is surrounded by residential properties with pets, Jewel Lake could be expected to yield similar results. However, no fecal coliform was detected in Jewel Lake during the June sampling event.

5.0 Conclusion

Laboratory results suggest fecal coliform levels in Goose Lake were above Alaska water quality standards for primary contact water recreation during three months in the summer of 2003. Fecal coliform levels in Jewel Lake were above Alaska water quality standards for primary contact water recreation during one month in the summer of 2003. Fecal coliform may be affected by water temperatures, but are not likely to be directly affected by air temperatures.

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6.0 Project Contributors

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