



STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

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MEMORANDUM
October 2, 1981

To: John Bernhardt
From: Shirley Prescott
Subject: Capitol Lake Fecal Coliform Levels and Lake Flushing

At the request of the S.W. Regional Office, a survey of fecal coliform levels in Capitol Lake was conducted on August 21, 1981. The original intent of the survey was to determine fecal contamination before and after lake flushing. The planned lake flushing did not occur, however, so this was a one-time sampling effort.

Fecal coliform samples and secchi disk measurements were taken at 14 stations used in a previous study by CH₂M Hill^a. These stations were in the north basin in the vicinity of six storm sewer outfalls and the swimming area (Stations 5 a, b, c and 6 b, c, d), Percival Creek inlet (Station ??), Deschutes River inlet (Station 43), and the north basin outlet to the bay (Station 2). The remaining stations were located around the perimeter of the north basin. The near-shore stations, 5a-b and 6-b, were sampled in approximately one foot of water and the remaining stations in five or more feet of water. Figure 1 shows station locations and general flow pattern of water.

The fecal coliform samples were returned to the DOE Tumwater laboratory for analysis by Standard Methods membrane filter technique.

Results of sample analysis, shown in Table 1, indicate the highest fecal coliform concentrations to be in the north basin swimming area near the storm sewer outfalls (Stations 5 a, b, c and 6 b, c, d). The three samples taken in shallow water (Stations 5 a, c and 6 b) ranged from 240 to 370 col/100 mls and are in violation of state lake class standards. Stations 5 b and 6 c, d had concentrations of 15, 22, and 42 col/100 mls, respectively. Thurston County Department of Health is governed by requirements of WAC 248-98 of the Rules and Regulations of the State Board of Health regarding swimming pools, bathing beaches, and wading pools. Section 11.1 states that "fecal coliforms shall not exceed 50 fecal coliform per 100 ml sample."

^aCH₂M Hill, 1977, Water Quality of Capitol Lake, Olympia WA

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The remainder of the sites sampled were within state standards. Very low concentrations of fecal coliform organisms were observed in the main body of the north basin. Slightly elevated concentrations were seen in the north basin outlet, the Deschutes River, and Percival Creek.

Although the CH₂M Hill study was an intensive one-year investigation with bi-monthly sample collection and ours a one-time effort, there is close agreement in the fecal coliform density and distribution in these two studies. Figure 2 compares the two sets of data.

Secchi disk measurements varied from .5 foot in the near-shore stations to 3.5 feet in the deeper waters. CH₂M Hill secchi disk measurements were similar for August 1977.

The CH₂M Hill study concluded that lake flushing was useful in the control of algal blooms and as a cosmetic aid, but had minimal effect on coliform bacteria; that no storm sewers are indicated as regular dischargers of domestic wastewater; and that high levels of indicator bacteria appear to originate in the Deschutes River. Additional sources identified were Percival Creek and the large waterfowl population.

SP:cp

Attachments

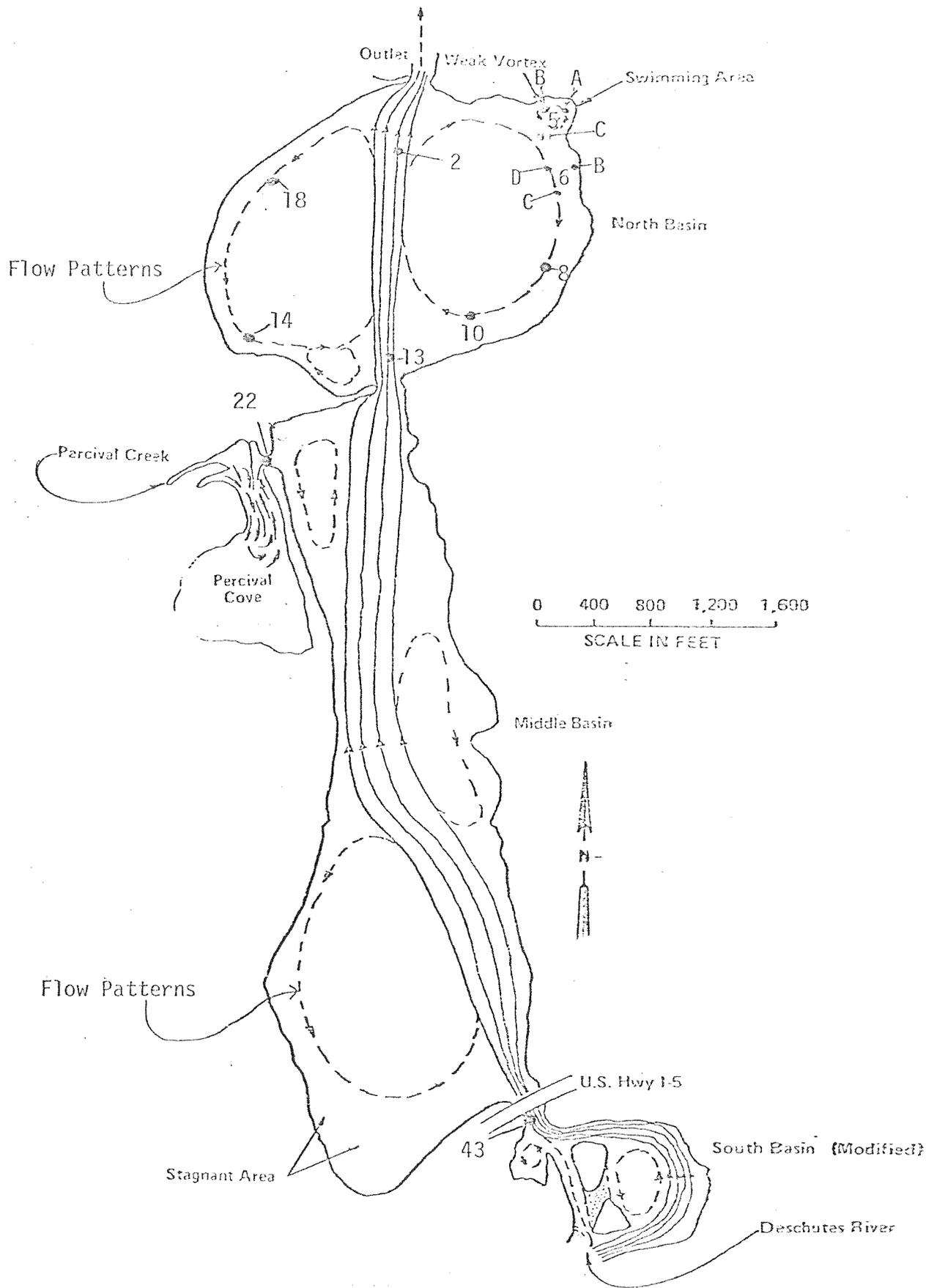


Figure 1. Capitol Lake stations sampled August 21, 1981 (modified from CH₂M Hill, 1977).

Figure 2. Capitol Lake fecal coliform density and distribution.

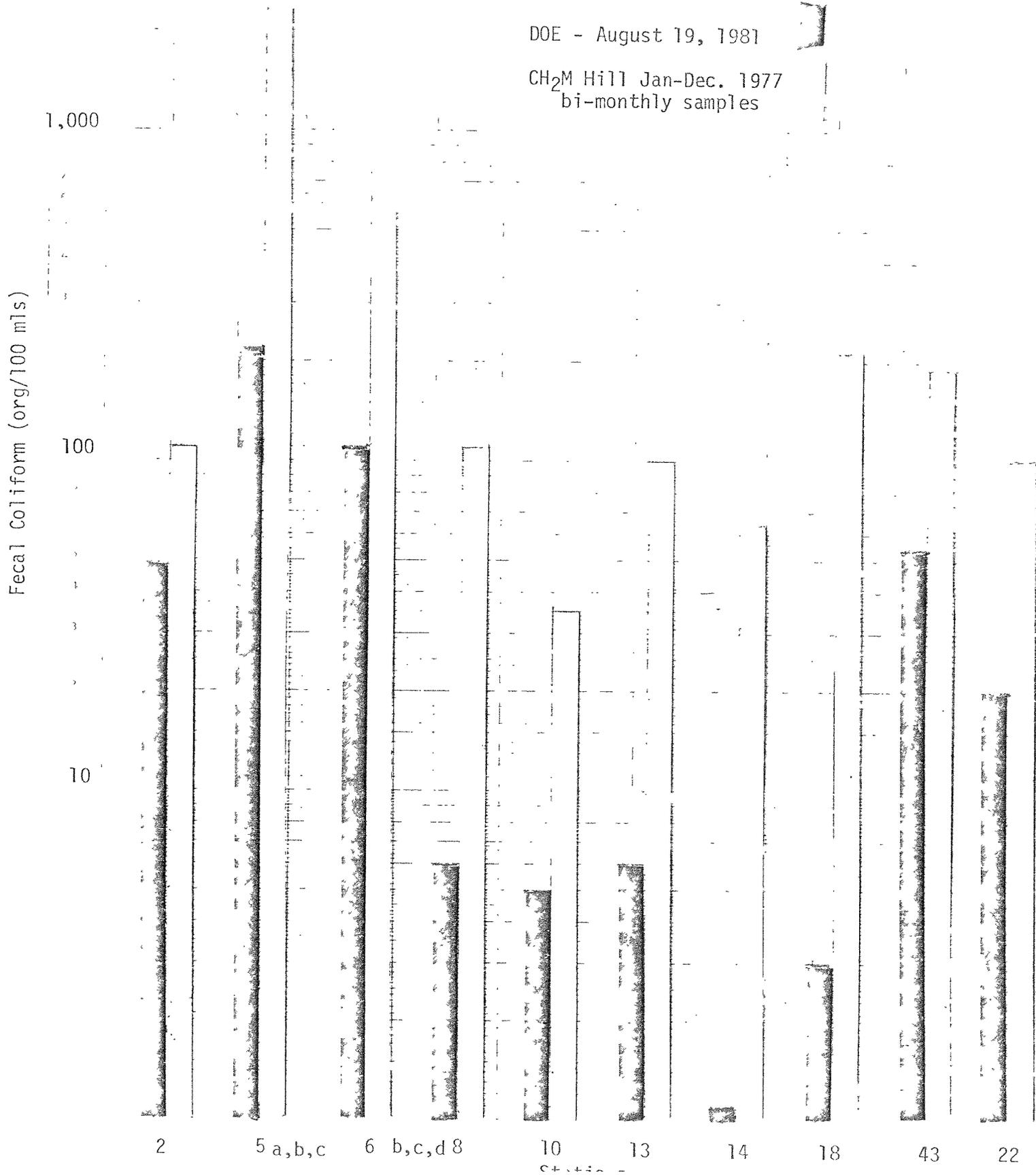


Table 1. Capitol Lake fecal coliform concentrations, August 19, 1981 and January-December 1977.

| Department of Ecology - August 19, 1981 | | CH ₂ M Hill - Jan-Dec. 1977 |
|---|--|---|
| Station | Fecal Coliform (org/100 mls) Membrane Filter | Fecal Coliform (org/100 mls) Multiple Tube MPN* |
| 2 - Outlet to Bay | 49 | 110 |
| 5 A - Storm Sewer Area | 270 | 2300 |
| B - Storm Sewer Area | 15 | |
| C - Storm Sewer Area | 370 | |
| 6 B - Storm Sewer Area | 240 | 260 |
| C - Storm Sewer Area | 22 | |
| D - Storm Sewer Area | 42 | |
| 8 - North Basin Perimeter | 6 est. | 110 |
| 10 - North Basin Perimeter | 5 est. | 35 |
| 13 - North Basin Perimeter | 6 est. | 100 |
| 14 - North Basin Perimeter | <1 est. | 62 |
| 18 - North Basin Perimeter | 3 est. | 210 |
| 43 - Deschutes River | 54 | 190 |
| 22 - Percival Creek | 20 | 100 |

*Bi-monthly samples