

Water Quality Status Report

BILLINGSLEY CREEK (Gooding County)

Report No. WQ-21

January 1977

Department of Health and Welfare
Division of Environment
Statehouse, Boise, Idaho 83720

WATER QUALITY STATUS REPORT

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ABSTRACT

A review of Billingsley Creek water quality data collected from 1971 through 1976 is presented. The creek meets all water quality standards except those for total and fecal coliform bacteria. Since no effluent limitations guidelines have been adopted for the primary sources of the coliform bacteria, the stream must be classified as water quality limiting.

INTRODUCTION

Billingsley Creek is a Class A stream in southwestern Gooding County (Map 1). It is almost entirely spring fed during the non-irrigation season. More than 20 major springs discharge from the Snake Plain aquifer to the creek. Curren Spring, the primary headwater source, has a base flow in March of 40 to 45 cfs. The creek's discharge increases to about 220 cfs in the less than 8 miles distance to its mouth. The creek discharges to the Snake River north of Hagerman.

One major canal diverts Billingsley Creek water near its source during the irrigation season. Some irrigation wastewater returns to the creek.

Being a Class A stream, Billingsley Creek is protected by the 1973 Idaho Water Quality Standards and Wastewater Treatment Requirements for all beneficial uses.

This report presents an analysis of water quality data collected at selected locations from 1971 through 1976 by the Division of Environment. The data analysis was performed to determine if Billingsley Creek meets the 1973 Idaho Water Quality Standards and Wastewater Treatment Requirements and to determine if the creek is water quality limiting or effluent limiting.

WASTE SOURCES

Municipal and Industrial Sources

There are no municipal or industrial waste discharges to Billingsley Creek. All domestic sanitary wastes in the area are treated by subsurface waste disposal systems.

Agricultural Sources

Five fish rearing facilities discharge untreated and treated wastewater to Billingsley Creek. Wastes from these facilities include metabolic by-products, fish fecal matter, and uneaten fish food. Organic matter from the raceway cleaning operations constitutes the greatest amount of waste from the fish rearing operations. Normally concentrations of certain wastes are small but significant because of the large volume of water used. The rearing facilities are also a source of coliform bacteria.

1. Rangen, Inc., hatches and rears rainbow trout for the commercial market. The installation located at River Mile 7.4 consists of the hatchery room, a nutritional research laboratory and 55 rearing ponds. Water for this operation is taken from Curren Springs. The facility discharges 15 to 20 million gallons of water per day. Raceways are cleaned about twice per month. The cleaning effluent was discharged untreated during the period of time the water quality data were collected. The facility now uses a vacuum system for cleaning the raceways. During the irrigation season, Billingsley Creek is diverted to Curren Ditch just below the Rangen discharges.
2. The Jones and Sandy Livestock Company also operates a rainbow trout propagation and rearing facility located at River Mile 5.7. This facility includes a hatchery building, 72 rearing ponds and a waste settling pond. This facility uses 20 to 25 million gallons of water per day from Three Springs and Weatherby Springs. All raceway cleaning wastewater receives settling treatment for solids removal prior to discharge to Billingsley Creek.

3. Thousand Springs Trout Farms, Inc., operates two facilities for rainbow trout spawning, hatching, and rearing. One facility, in the Hewitt Springs area River Mile 4, discharges about 4 million gallons of wastewater per day. The other, Idaho Springs Trout Farm at River Mile 3.8, discharges about 100 million gallons of wastewater per day. The wastewater receives settling treatment before discharge.
4. Hidden Springs Trout Ranch, Inc., operates a facility at River Mile 3 to rear rainbow trout. They discharge about 10 million gallons of wastewater per day.

Other agricultural sources are irrigation wastewater and drainage from feedlots and dairy operations. Numerous irrigation drains discharge to Billingsley Creek during the irrigation season. No studies have been made to determine the specific impact of each agricultural source.

WATER QUALITY STATUS

Coliform Bacteria

Total and fecal coliform densities observed at various locations on Billingsley Creek are shown in Figures 1, 2, and 3. The Idaho Water Quality Standard for Class A₂ water (240 organisms per 100 ml) was exceeded only once in the creek at its source, Curren Springs. Total coliform density at all other locations always exceeded the monthly geometric mean standard.

Fecal coliform densities were determined at only two locations during 1975 and 1976: near the source and at the Highway 30 bridge (Figure 3). The monthly geometric mean fecal coliform standard for Class A₂ waters (50/100 ml) was always met at the uppermost station and was always exceeded at the lowermost station. One sample near the mouth violated the single sample standard of 500/100 ml.

Dissolved Oxygen

The dissolved oxygen in Billingsley Creek at the Highway 30 bridge was always greater than the 6 mg/l standard but fell below the 90% saturation level three out of the seven times sampled in 1973 and 1974. These low percent saturation values are due to decreased water temperatures.

pH

The pH of Billingsley Creek near the mouth (Figure 5) was always within the range specified in the Water Quality Standards (6.5 to 9.0).

Other Standards

The general requirements in the 1973 Idaho Water Quality Standards and Wastewater Treatment Requirements and other specific water quality standards appear to have been met during the time for which data are available.

Suspended Solids

A comparison of suspended solids data collected at two locations on Billingsley Creek is shown in Figure 6. Suspended solids near the mouth were always greater than or equal to those found at the uppermost station. Although there were substantial increases in suspended sediment at the downstream station, the concentrations observed were not excessive.

CONCLUSIONS AND RECOMMENDATIONS

A review of the water quality data collected on Billingsley Creek from 1971 through 1976 indicates that the stream does not meet the Water Quality Standards for total and fecal coliform bacteria. Sources of coliform bacteria include fish hatcheries, irrigation return water, feedlots and dairies. The specific sources contributing the bacteria can only be identified after a more thorough and detailed study.

Billingsley Creek at this time must be classified as water quality limiting because no effluent limitation guidelines have been adopted for coliform bacteria in discharges from fish rearing operations or agricultural runoff. These agricultural sources appear to be the cause of the coliform bacteria violations in Billingsley Creek.

An intensive water quality survey must be conducted to determine the relative impacts of the fish rearing facilities and other specific agricultural sources.

Improved waste treatment and implementation of Best Management Practices for fish hatcheries in addition to better on-farm management of irrigation wastewater and feedlot runoff should improve the quality of Billingsley Creek.

DATA COLLECTION METHODS

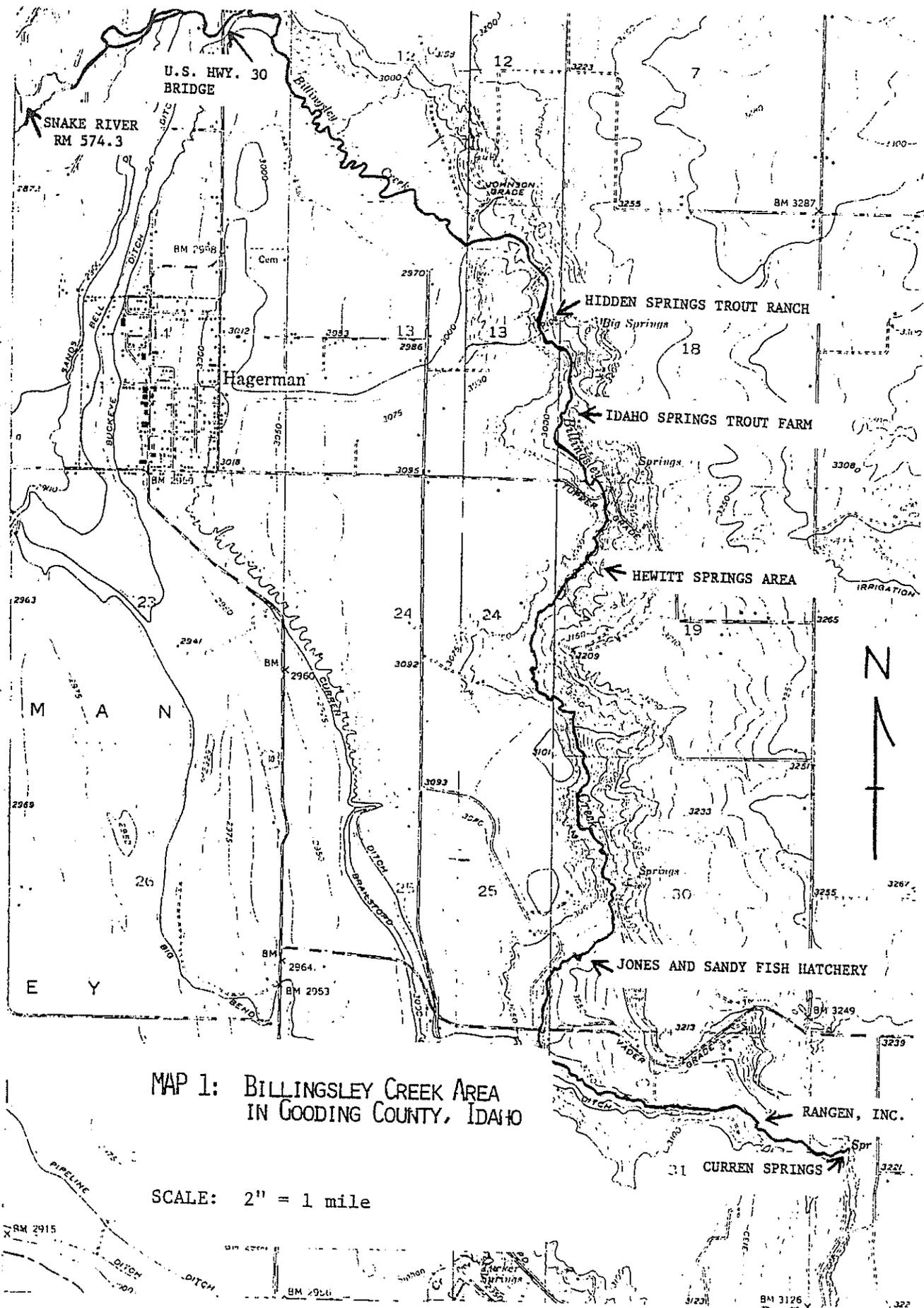
All water quality samples were collected using "grab sampling" techniques. Samples were properly preserved and submitted to the laboratory for analysis within the recommended holding times.

Field measurements of dissolved oxygen were done using a modified Winkler titration or by using a Yellow Springs Instrument Model 54 D.O. Meter. Temperature was measured using the YSI D.O. meter or by using a mercury thermometer. pH was determined using an Orion 404 Specific Ion Meter.

REFERENCES CITED

Idaho Department of Environmental and Community Services, 1973.

Water Quality Standards and Wastewater Treatment Requirements.
IDECS, Boise. 19 pp.



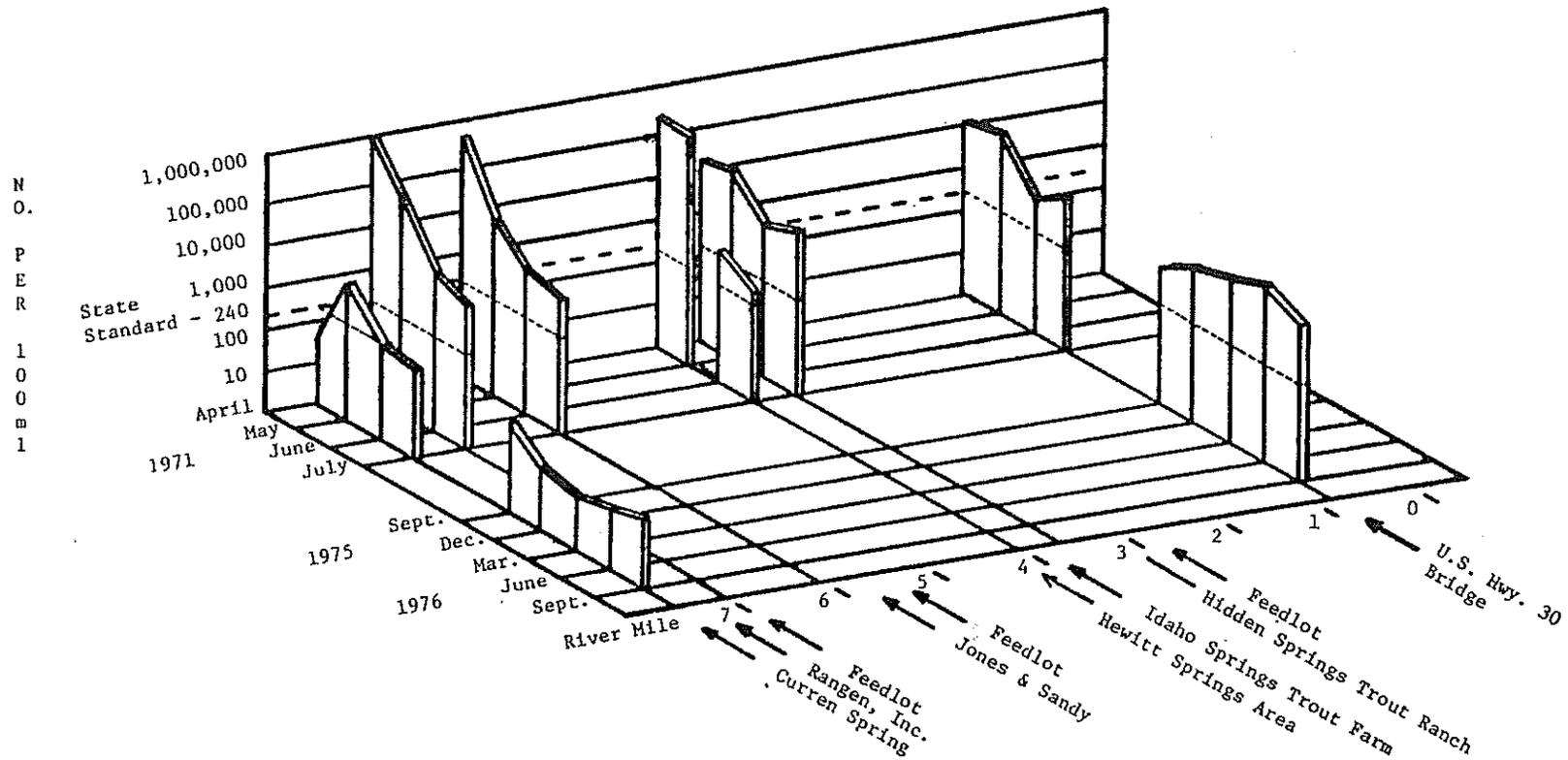


FIGURE 1: Total coliform densities observed in Billingsley Creek.

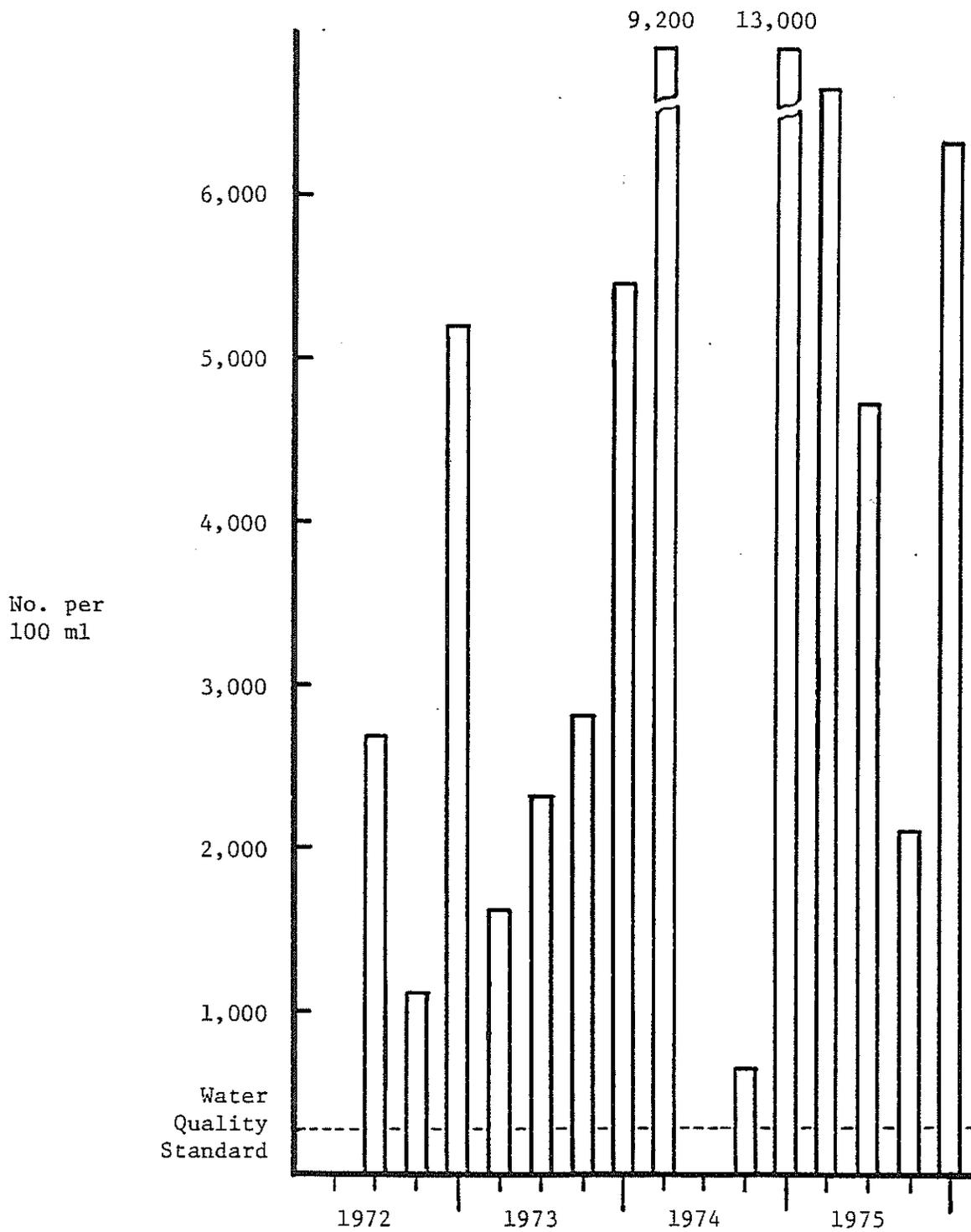


FIGURE 2: Total coliform densities observed on Billingsley Creek at Highway 30 bridge near mouth.

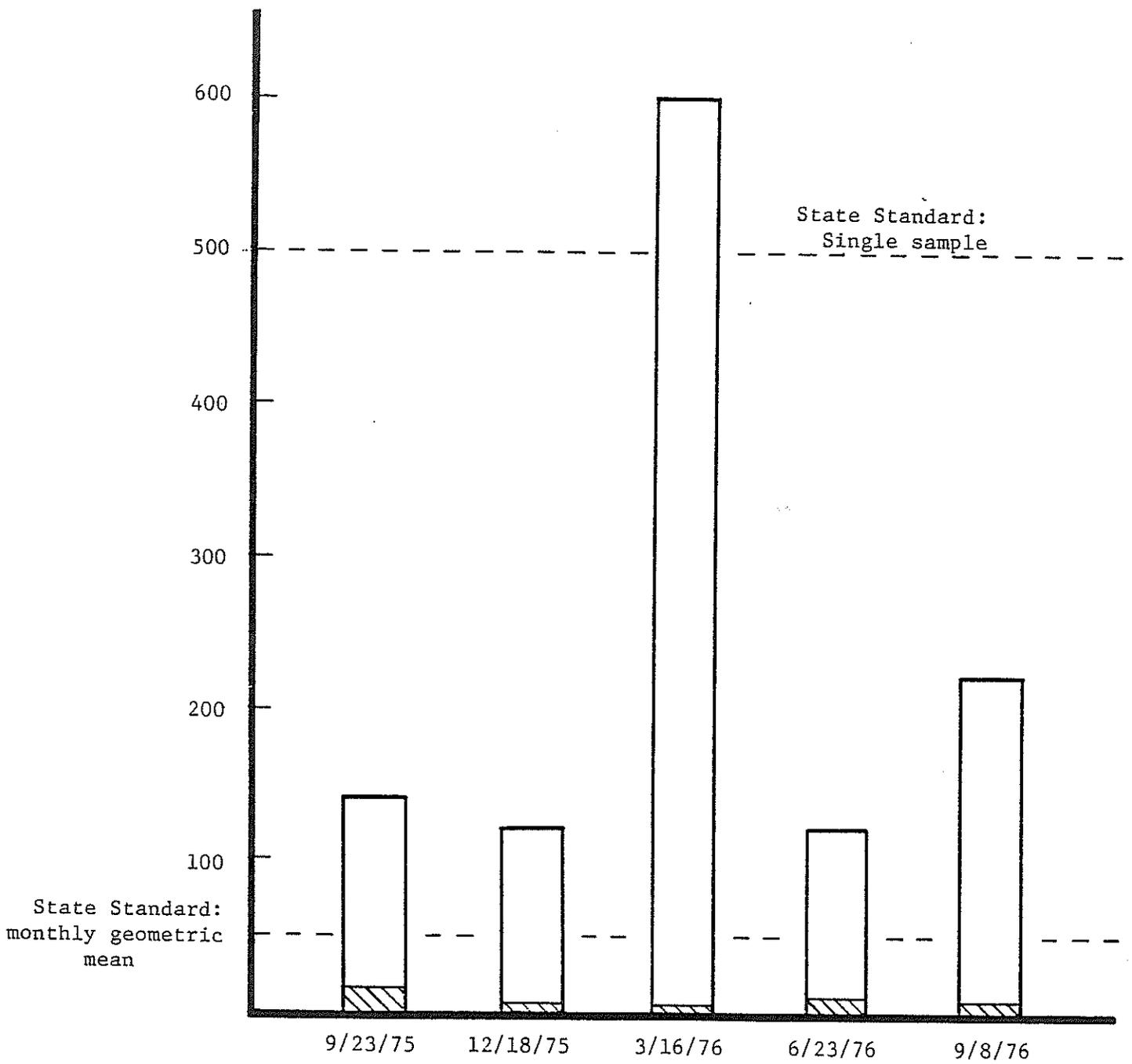


FIGURE 3: Fecal coliform density per 100 ml observed in Billingsley Creek at:



Curren Springs



Highway 30 bridge near mouth

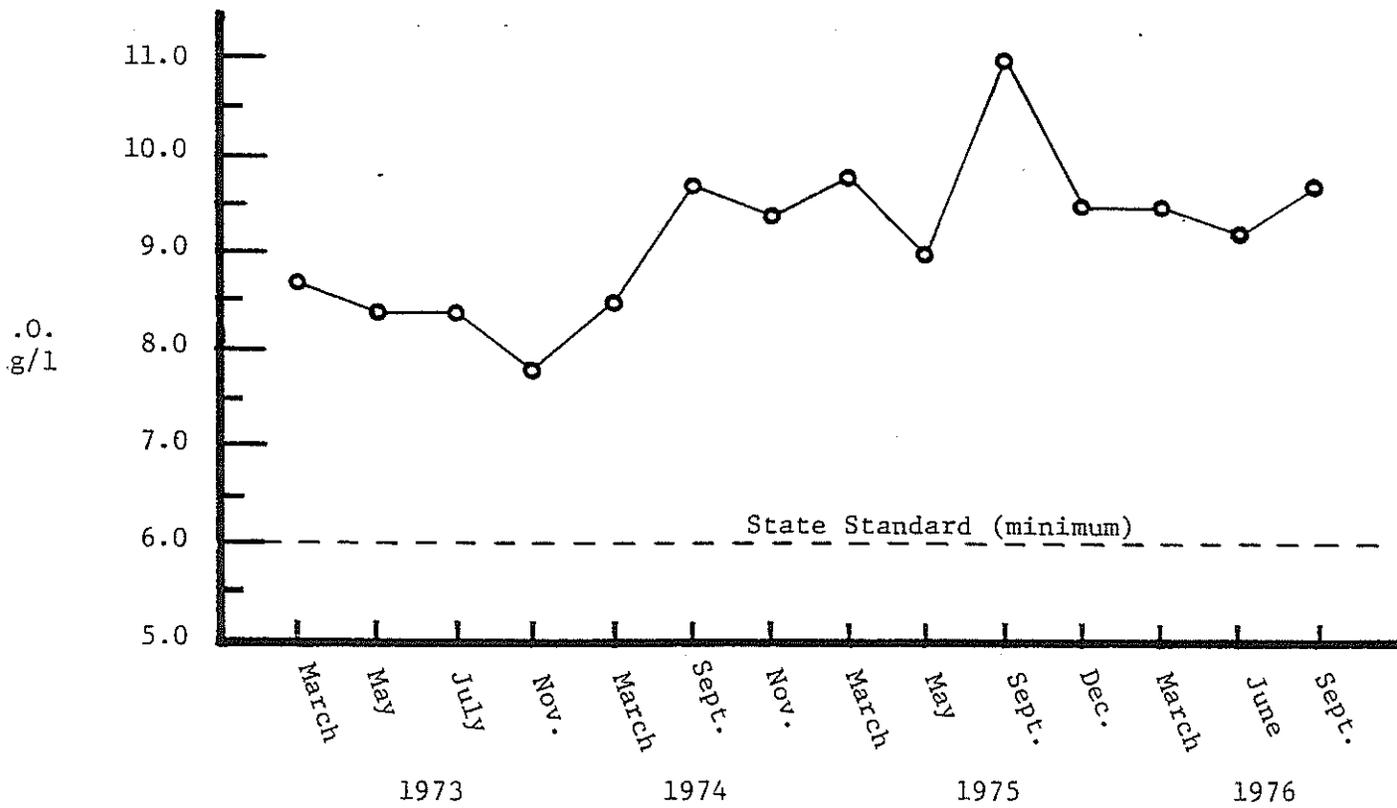
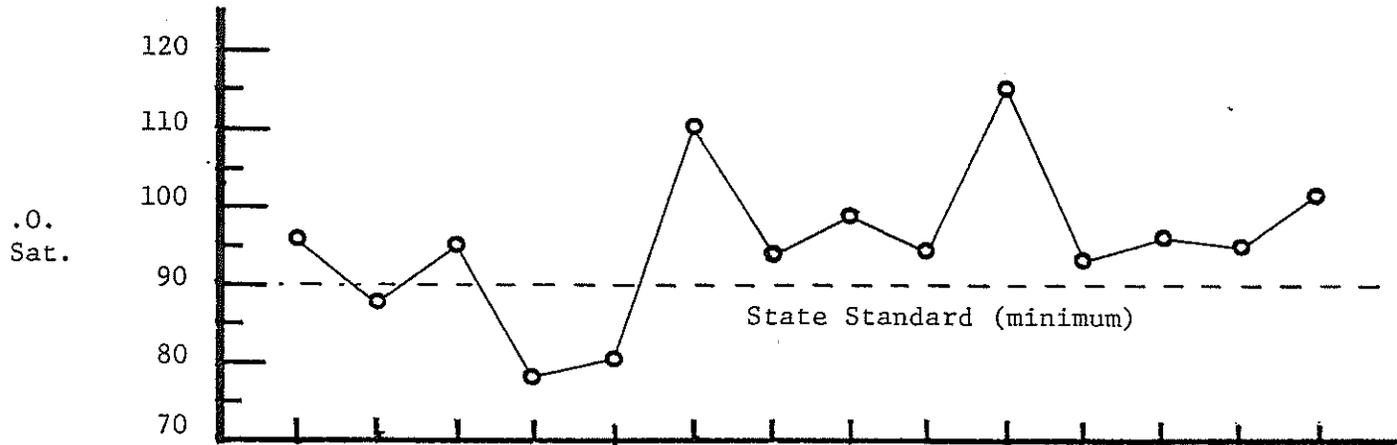


FIGURE 4: Dissolved oxygen (% saturation and mg/l) observed in Billingsley Creek at Highway 30 bridge near mouth.

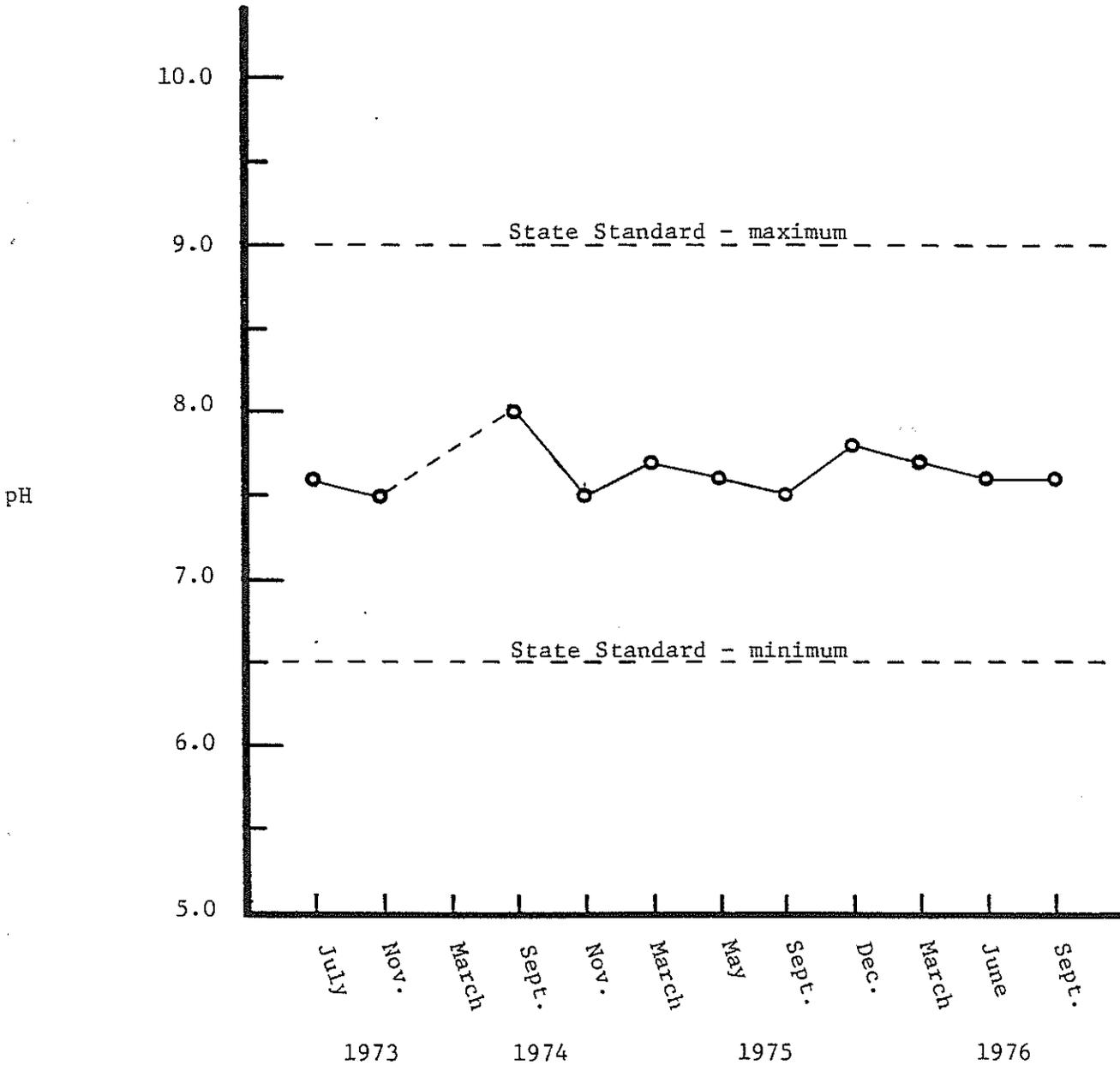


FIGURE 5: pH values observed in Billingsley Creek at Highway 30 bridge near mouth.

suspended
solids
mg/l

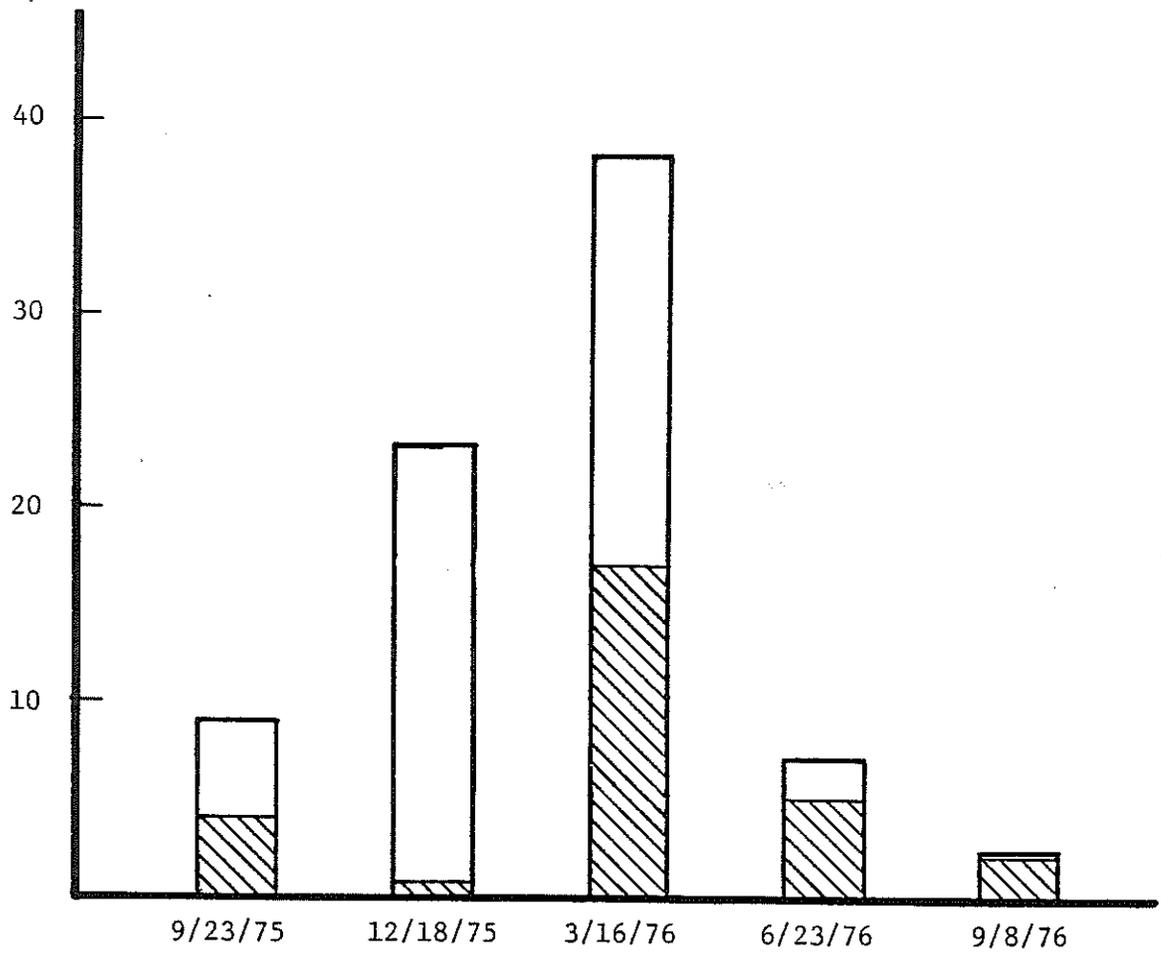


FIGURE 6: Suspended solids observed in Billingsley Creek at:



Curren Springs



Highway 30 bridge near mouth