

Publication No. 73-e66

WA-28-1020

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TO: Dick Burkhalter  
FROM: G. Scott Jeane II  
SUBJECT: Water Quality Survey of Burnt Bridge and Salmon  
Creeks, Clark County, Washington  
DATE: February 1, 1973

State of  
Washington  
Department  
of Ecology



Objective: To document existing water quality of both creeks prior to complete urbanization of drainage basins and to determine general location of water quality problem areas.

Summary: Salmon and Burnt Bridge creeks were evaluated by sampling aquatic insects and measuring basic water quality parameters. The creeks were under the influence of light surface runoff even though the monthly rainfall was below average. The nutrients (NO<sub>3</sub>-N, NO<sub>2</sub>-N, and NH<sub>3</sub>-N) at Burnt Bridge Creek are twice as high as Salmon Creek. Mill Creek (station BS) is the only station on Salmon Creek approaching the levels found in Burnt Bridge Creek. The two most downstream stations of Burnt Bridge Creek (28C070 and EB) exhibited the highest total coliform levels measured (20,000 and 8,000 colonies/100 ml). The source of these bacteria does not seem to be sewage due to low fecal levels and is probably due to surface runoff. Three stations on Salmon Creek (DS, BS, and AS) and two stations on Burnt Bridge Creek (28C070 and EB) were all higher than background turbidity levels by 50%. Soil erosion practices or other causative factors (construction) should be reviewed and modified to prevent these increases. Burnt Bridge Creek has been nearly channelized and is mainly influenced by agriculture and urban runoff. Aquatic insect populations are depressed on this creek due to lack of suitable habitat. No further channelization of the stream above station BB should be allowed. Salmon Creek is a much more productive creek according to quantity of aquatic insects and fish habitat. Current operation of the four STP's should be maintained or upgraded to prevent damage to the resource. The source of the high nutrients and turbidity in Mill Creek (station BS) should be located and corrected. Salmon Creek even with the discharges from four STP's exhibits lower levels of nutrients than Burnt Bridge Creek. The Columbia Academy STP should be repaired and the chlorine residual raised to and maintained at the required level. Operation of this plant by competent part-time personnel should be required.

Background

On November 28, 1972, Darrel Anderson and I sampled Salmon Creek, Columbia Academy STP, Battleground Municipal STP, and Burnt Bridge Creek. The following parameters were reviewed at applicable stations: total and fecal coliform, turbidity, chlorides, COD, pH, Temperature, D.O., aquatic insect life, chlorine residual and nutrients. The phosphate portion of the nutrient analysis is not available due to mechanical failure of a laboratory instrument.

The monthly precipitation (November) for Battleground and Vancouver was below normal at both meteorological stations by -0.74 and -0.62 inches respectively. Both stations experienced during the sampling day and four days previous 1.5 inches of accumulated rainfall. Both creeks were considered to be under the effect of light surface runoff.

Creek station designations utilized are as requested by Nelson Graham (see attached map).

### Salmon Creek

Seven stations were sampled on the creek or its tributaries. The Columbia Academy and Battleground STP's were sampled to determine impact of their discharges upon the creek. Temperature, D.O., COD, and pH were all consistent at the following average levels respectively, 7.1°C, 11.3 ppm, 14 ppm, and 7.4. The highest chloride level (9 ppm) was at station 28E070. This above background level is probably due to the influence of the Battleground STP discharge. Station 28D070 exhibited the highest total coliform level (7000 colonies/100 ml). Average background levels during the survey were 4000 colonies/100 ml total coliform and 200 colonies/100 ml fecal coliform. The nutrient analysis revealed that the Mill Creek tributary (Station BS) to Salmon Creek was above average in NO<sub>3</sub>-N (1.9 ppm), NO<sub>2</sub>-N (0.08 ppm), and NH<sub>3</sub>-N (0.76 ppm). Average background levels of nutrients at the remaining stations were NO<sub>3</sub>-N (1.0 ppm), NO<sub>2</sub>-N (0.2 ppm), and NH<sub>3</sub>-N (0.25 ppm). Turbidity levels were above the creeks background level (10 JTU) at stations AS, BS, and DS by 50%. Station AS monitors upstream Salmon Creek, while BS measures the influence of Mill Creek, and DS is the farthest downstream station on the creek. Station DS is located in an area of slow stream flow where fine sediments collect much of the water year. Sampling of aquatic insects took place at stations 28D110 and 20D070. Four orders of aquatic insects were found at both stations. The diversity and numbers of aquatic insects present indicate a productive natural regime.

The Columbia Academy STP was in a poor condition of repair. The trickling filter is cracked and leaking. The total coliform level was 40,000 colonies/100 ml and the chlorine residual was nonexistent. This plant's only noticeable effect during this survey on Salmon Creek was a slight increase in the chloride level. The Battleground STP was in a good state of upkeep. The chlorine residual was 0.75 ppm, while the total coliform level was the same as at Columbia Academy. The Battleground STP discharge does not effect the creek's total coliform levels but does increase station 28E070's chloride level (9 ppm) to the highest of all other stations on Salmon Creek.

### Burnt Bridge Creek

The water quality of Burnt Bridge Creek is mainly influenced by agriculture and urban runoff. The seven stations on Burnt Bridge Creek (AS, 28C110, BB, CB, DB, EB, and 28C070) exhibited greater variation than was observed in Salmon Creek. Turbidity increased steadily from the upstream most station (5 JTU) to a high at 28C070 of 15 JTU. The nutrient analysis was very stable and did not significantly fluctuate between stations. The NH<sub>3</sub>-N, NO<sub>2</sub>-N, and NO<sub>3</sub>-N levels averaged respectively N.D., 0.02 ppm, and 1.9 ppm. Bacteriological analysis revealed the upstream control station to have a total coliform level of 2,000. Intermediate stations averaged 4500 total coliform while the two downstream most stations were 8,000 at station EB and 20,000 total coliform at station 28C070. The fecal coliform levels remained low at all stations. A one unit increase in pH was observed between upper and lower most

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stations. Temperature and D.O. changes between station AB and 28C070 consisted of a 2°C drop and a 2 ppm increase. The COD increased steadily from 7 ppm at the upstream control station to 28 ppm at station 28C070. Two stations were sampled for aquatic insects, 28C110 and DB. The upstream station exhibited a good balance of normal aquatic insects, mollusk and fish with 8 orders represented in good number. The downstream station (DB) aquatic life was composed of 3 orders of which one order (isopods) comprised 90+% of the total number of animals. Isopods mainly feed on detritus and require a slow current to survive. Much of the creek has undergone channelization and is subject to heavy urban and agricultural siltation. These two factors make acceptable aquatic insect habitat nonexistent over much of the creek.

GSJ:bj

Wm. B. Co.

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5

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X

XXX

EB

DB

CB

BB

AB

28C110

AB



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