Publication No. 73-e66

WA-28-1020

INFORMATION ____
FOR ACTION ____
PERMIT ____
OTHER ____

State of Washington Department of Ecology

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

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_3-N, NO_2-N, and NH_3-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 channalization 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 Acadamy 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 Acadamy 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 Acadamy 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_3-N (1.9 ppm), NO_2-N (0.08 ppm), and NH_3-N (0.76 ppm). Average background levels of nutrients at the remaining stations were NO_3-N (1.0 ppm), NO_2-N (0.2 ppm), and NH_3-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 Acadamy 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 Acadamy. 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

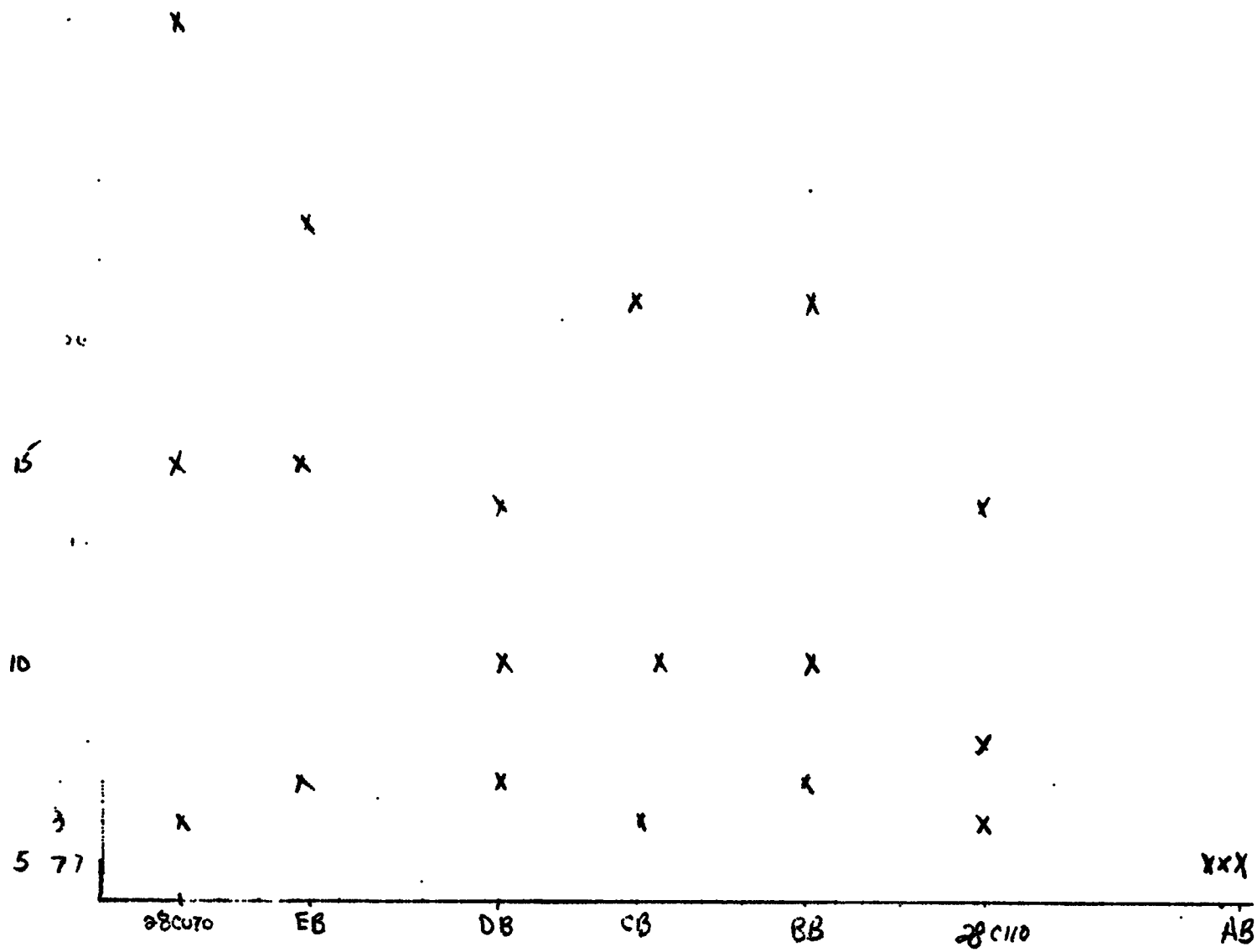
The water quality of Burnt Bridge Creek is mainly influenced by agriculture and urban runoff. The seven stations on Burnt Bridge Creek (AS, 28C110, BB, CB, DB, EB, and 28C070) exhibited greater variation than was observed in Salmon Creek. Turbidity increased steadily from the upstream most station (5 JTU) to a high at 28C070 of 15 JTU. The nutrient analysis was very stable and did not significantly fluctuate between stations. The NH_3-N, NO_2-N, and NO_3-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

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 steadly 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 nonexistant over much of the creek.

GSJ:bj

Burnt Bridge Cr.

NO_3	1.8	1.8	2.0	1.8	2.0	1.8	1.9
NH_3	N.D	N.D	N.D	N.D	N.D	N.D	N.D
NO_2	.02	.02	.02	.02	.02	.02	.02
T.C	20,000	8800	5000	4000	4500	4000	2000
F.C	120	60	90	50	<40	60	<40



	DS	28D070	CS	BS	AS	28E070	
NO_3^-	1.1	1.1	1.0	1.9	1.2	1.1	0.9
NH_3	N.D	0.32	0.24	0.76	0.24	0.32	N.D
NO_2	.02	0.02	0.02	0.08	0.02	0.04	N.D
T.C.	5000	7000	4000	700	3500	>7000	3000
S.C	200	250	200	80	200	50	120
					CA (>40,000 <1,000)	BG (>40,000 >6,000)	

15 X X

10 X X X X X

5 X X X X

4 X

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November 1, 1972

MEMO TO: Pete Hildebrandt

FROM: Nelson Graham

SUBJECT: Scoping for water quality survey on Salmon and Burnt Bridge Creeks, Clark County Washington

Objective:

In the case of Salmon Creek, we need to know what the existing water quality is prior to complete urbanization as well as to pin-point possible sources of agricultural runoff pollution. Salmon Creek is urbanized along I-5 and will become more densely urbanized when I-205 is completed.

Burnt Bridge Creek has many sources of pollution ranging from urban storm urnoff, septic tank drainage, to agricultural runoff. It is hoped that data from this survey will aid us in determining the general areas where these sources are located.

Background:

As can be seen on the attached map, Salmon Creek is being considered as an area in which to construct a sewerage system. Existing septic tank and treatment plant discharges would be intercepted when this system is constructed sometime within the next 2-3 years. There are many dairy farms within the Salmon Creek drainage basin which contribute contaminants to the creek. There is one industrial waste discharge into Salmon Creek located immediately downstream from the I-5 bridge. This discharge originates from a gravel washing and asphalt batch plant operation.

Burnt Bridge Creek drainage basin is currently being sewered by the City of Vancouver on a ten-year program. Storm drains are also being constructed which will discharge into the creek. The upper basin is still rural in nature which contributes to the pollution of the creek through agricultural runoff.

The stations to be sampled are located on the referenced map. There are seven stations on Burnt Bridge Creek; they are Stations AB, 28C110, BB, CB, DB, EB and 28C070. There are also seven stations on Salmon

Creek; they are Stations 28D110, 28E070, AS, BS, CS, 28D070 and DS. Stations 28C110, 28C070, 28D110, 28E070 and 28D070 are currently (as of October 1, 1972) being sampled by Dick Cunningham's group to determine long-term trends.

In addition to these stations, I would like to request as a secondary priority that the effluents from the following sewage treatment facilities be sampled (these all discharge into Salmon Creek); Battleground lagoon, Columbia Academy Trickling Filter plant, Clark County Sewer District No. 1 lagoon and Columbia River High School Package Treatment plant. They are located on the referenced map.

Expected Results: The following parameters should be measured at each of the stream stations: temperature, DO, pH, turbidity, nutrients, and total and fecal coliform, Agricultural Insecticides, Chlorides

One grab sample from each treatment facility effluent should be analyzed for total combined chlorine residual and total and fecal coliform.

Study completed by when: Best time would be during low flow (late fall) and during a runoff period.

Date final report needed: ASAP after survey is completed.

NOTE!
I NEED THE ATTACHED MAP, SO PLEASE HANDLE WITH CARE AND RETURN TO ME.

NG:as

COPY

State of Washington Department of Ecology

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

WATER QUALITY LABORATORY

DATA SUMMARY

ORIGINAL TO: G.S. JEANC

COPIES TO:

LAB FILES

Source SALMON & BURNT BR. CR

Collected By GSJ + DA

Date Collected 11-28

Goal, Pro./Obj. 3.2 21

Log No.	Station	T. Coli. (Col./100 ml)	F. Coli. (Col./100 ml)	Turb (JTU)	Cl^-	COD	NO_3-N	NH_3-N	(FILT) NO_2-N	Rb Ba/m	
7246-96	A-S	3500	200	15	7	14	1.2	.24	.02		
97	B-S	900	80.	15	6	14	1.9	.76	.08		
98	D-S	5000	200	15	6	14	1.1	ND	.02		
99	28 D110	3000	120	10	4	14	0.9	ND	ND	3,000	
4700	C-S	4000	200	10	6	14	1.0	.24	.02		
01	28 D 070	7000	250	10	6	14	1.1	.32	.02	6,0	
02	28 E070	>4000	50	10	9	14	1.1	.32	.04	8,000	
03	A-B	2000	<40	5	7	7	1.9	ND	.02		
04	B-B	4500	<40	10	9	21	2.0	ND	02		
05	C-B	4000	50	10	8	21	1.8	ND	.02		
06	28 C070	20,000	120	15	8	28	1.8	ND	.02	12,000	
07	28 C110	4000	60	8	8	16	1.8	ND	.02	5,000	
08	D-B	5000	90	10	9	16	2.0	ND	02		
09	E-B	8000	60	15	9	23	1.8	ND	.02		
10	COLUMBIA POST CHLORINATION	>40,000	<100								
11	BATTLEGROUND EFF	>40,000	>6000								

N : All results are in PPM unless otherwise specified. ND is "None Detected"

O-PO_4-P, T-P } NOT ANALYZED due to INSTRUMENT BREAKDOWN

Summary by [signature] Date 12-6-72

State of Washington Department of Ecology

P-1 Composite split. A subreg. composite was split 12/13-14/77 for addition comparison BOD_5

ORIGINAL TO: G.C.
COPIES TO: HS, DC, LAB FILES

OLYMPIA LABORATORY

SEQ# 13-28-03

~~DATA SUMMARY~~

Source SALMON CR. STP Clark County

Collected ~~By~~ G. CALKINS

Date Collected 11-15-77

Log Number: 77-	6904	05	06	07	08	09				
Station:	Sec-eff unchl	RAW INF	FINAL eff 0930	1030	1130	1230				
pH	7.2	7.3								
Turbidity (NTU)										
Sp. Conductivity (umhos/cm)										
COD										
BOD (5 day) STP	0.9 0.0	105 153								
Total Coliform (Col./100ml)			<10	est 8	<10	<10				
Fecal Coliform (Col./100ml)										
NO3-N (Filtered)	10.0									
NO2-N (Filtered)	0.2									
NH3-N (Unfiltered)	.07									
T. Kjeldahl-N (Unfiltered)										
O-PO4-P (Filtered)	4.4									
Total Phos.-P (Unfiltered)	4.4									
Total Solids										
Total Non. Vol. Solids										
Total Suspended Solids STP	5 7	240 212								
Total Sus. Non Vol. Solids										
Lead		<.05								
Copper		0.45								
Cadmium		<.02								
Zinc		0.25								

NOTE: All results are in PPM (mg/L) unless otherwise specified. ND is "None Detected" "<" is "Less Than" and ">" is "Greater Than"

ECY 060-2-32

Summary By [illegible] Date 11-28-77