STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

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MEMORANDUM

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To: Stew Messman & John Hodgson
From: Bob Bishop

Subject: Boise Creek survey

On 8-2-71, I conducted a survey on Boise Creek to study certain effects on stream water quality of effluent from the millpond of the Weyerhaeuser Company Wood Division White River mill near Enumclaw. Mr. Dennis Long, project engineer, pointed out what mill personnel had done to alter effluent waste from entering the creek. The creek has been diverted from upstream of the mill through a buried culvert which passes under the mill complex and flows from the culvert as Boise Creek upstream from confluence with millpond effluent. The company will next eliminate log pond outflow completely. At the time of the survey, the hydraulic barker used pond water in barking; the waste water was filtered, passed through a clarifier and aerated in an oxidation pond before flowing over the log pond dam to the creek. Most of the pond water is recycled to the barker operation.

Seven stations were sampled from 0900 to 1500 hours, Figure 1. The weather was clear and sunny. Stream and log pond effluent samples were tested for: total coliform counts, DO, BOD, pH, temperature, turbidity, color, nutrients and solids, Tables 1 and 2.

The log pond effluent at station two, 30 feet below the pond dam, had a coliform count of 10,000. The pond effluent, when compared to the other stations had the following characteristics: the DO was lowest, 2.0 mg/l; the BOD was highest, 22 mg/l; the temperature was highest; the turbidity and color the highest; and the solids concentration the highest. There was a DO drop of 1.2 mg/l and a slight DO sag produced at station 3, compared to station 1, the control, after pond effluent entered the stream. At the confluence of the creek water flowing from the culvert and meeting pond water, there is strong mixing due to the culvert height; at station 3, 100 yards downstream of the confluence, BOD was 2.0 mg/l, and turbidity and color dropped greatly as compared with No. 2 sample. Coliform counts increased going downstream from station 3 to 30,000 counts downstream of the Enumclaw STP outfall. DO dropped slightly; BOD, temperature, turbidity and color increased at St. 7 compared to St. 6, above the STP outfall. Organic nitrogen concentration was highest in pond effluent sample. Phosphorous concentrations were highest at St. 7, following by St. 2.

Station observations follow, note photographs:

No. 1. (Control)
The water was clear. The bottom was gravel with little silt and low algal growth, not slippery. Aquatic insects were diverse in family composition and very plentiful. Area was shaded, excellent waters for game fish.

No. 2 Log pond effluent below dam was very black and had a foul odor. Much silt was present.

No. 3 Upstream from No. 3, there is very vigorous mixing of the stream water flowing out of the culvert and the log pond effluent. At St. 3, the water was black, note photograph. There were few insects; gravel was silted and was slimy. The flow was about 14 cfs.

No. 4 Area 2/3 riffles adn 1/3 sandy bottom alternating, water was dark. Noted crayfish and rainbow and cutthroat fingerlings.

No. 5 Through farm pasture area. The grey color was almost gone. Noted stringy green algae growing on some rocks. Typical benthic fauna for this type of stream stretch. Flow about 20 cfs.

No. 6 Grey color evident. Much silt on bottom; green and brown algae or stringy slime bacteria. Some insects were present.

No. 7 Downstream from Enumclaw STP:
Brown slime on rocks but not like slime bacteria Sphaerotilus. Chlorine odor was strong. Some sludge worms and few insects seen. Heavy silt loading between rocks. Still some grey color noted. Total coliform count of 30,000 noted at this station.

The water quality of Boise Creek will be greatly improved when log pond effluent flow ceases. The esthetic value and life form habitation will be greater.

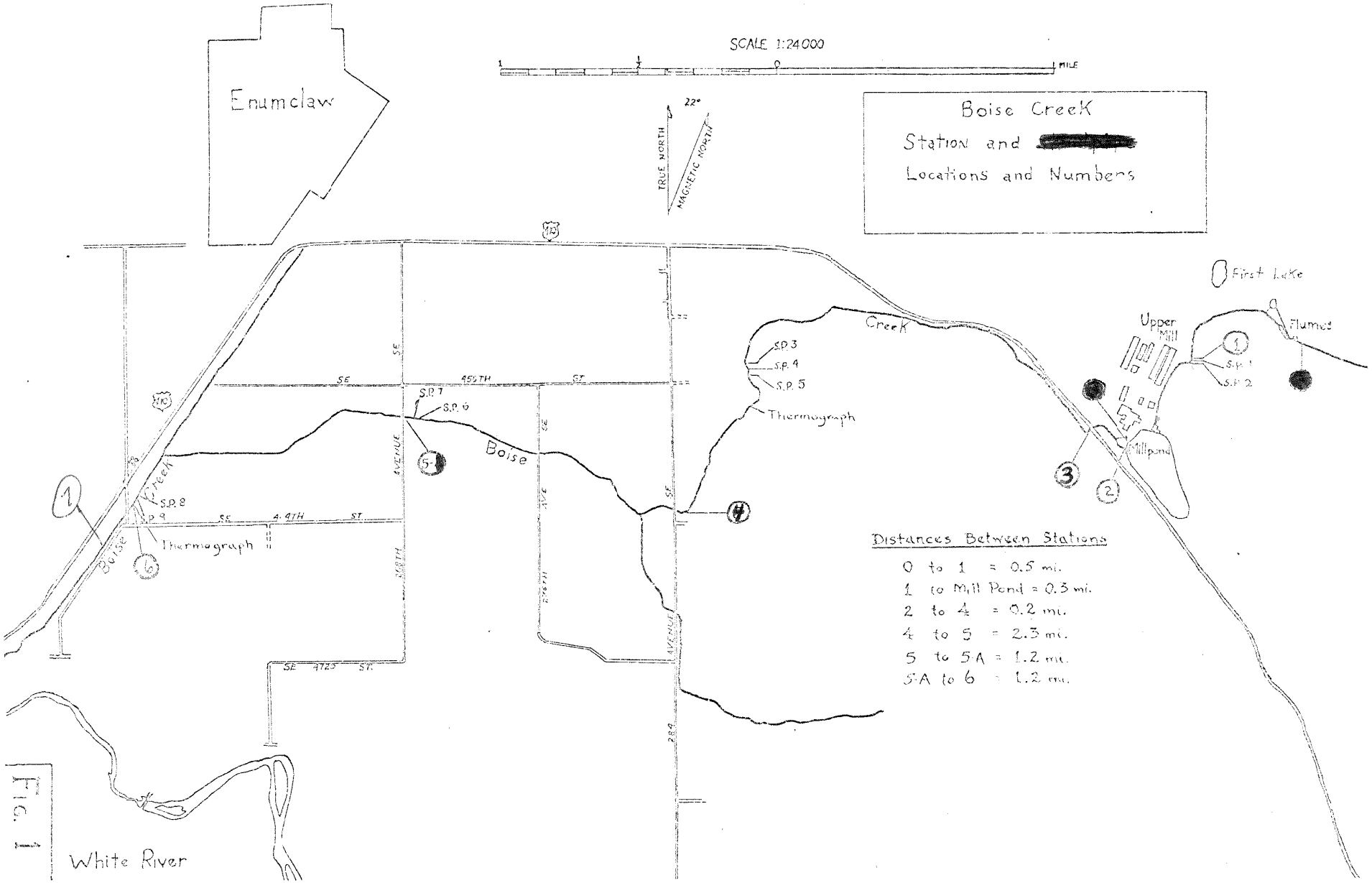
SCALE 1:24000
1 ½ 0 1 MILE
Boise Creek
Station and [redacted]
Locations and Numbers
Enumclaw
22°
TRUE NORTH
MAGNETIC NORTH
First Lake
Upper Mill
Flumes
S.P. 1
S.P. 2
Millpond
Creek
S.P. 3
S.P. 4
S.P. 5
Thermograph
SE 455TH ST
S.P. 7
S.P. 6
Boise
Creek
S.P. 8
S.P. 9
SE 4-9TH ST
Thermograph
Boise
SE 4725 ST.
AVENUE
SE
Distances Between Stations
0 to 1 = 0.5 mi.
1 to Mill Pond = 0.3 mi.
2 to 4 = 0.2 mi.
4 to 5 = 2.3 mi.
5 to 5-A = 1.2 mi.
5-A to 6 = 1.2 mi.
White River

Fig. 1

Table 1. Total coliform counts, DO, BOD, pH, temperature, turbidity and color at survey stations

St.	Time	Total coli. per 100 ml.	DO	PPM BOD	pH	Temp. °C	Turb. JTU	Color
1	0930	1,000	9.6	1	7.2	14	*1	13
2	1015	10,000	2.0	22	6.0	23	35	1400
3	1045	2,000	8.4	2	7.0	13	8	170
4	1130	5,000	9.2	1	7.1	15	3	74
5	1315	+8,000	9.4	1	7.3	16	3	67
6	1430	+8,000	8.6	2	7.3	17	4	67
7	1530	30,000	8.3	5	7.4	19	10	104

+ means greater than
* means less than

Table 2. Nutrient nitrogen and phosphorous concentrations in mg/l at the survey stations.

St.	NH_3 - N	NO_2 - N filtered	NO_3 - N filtered	organic k,-eldhal-N	T-P04-P	T-P04-P filtered	0-P04-P	0-P04-P filter
1	0.0	0.0	.28	.06	.03	.01	*.01	0.0
2	0.0	0.01	0.0	2.80	.56	.43	.55	.42
3	0.0	0.0	.33	.34	.12	.05	.09	.04
4	0.0	0.0	.23	.18	.05	.04	.05	.03
5	0.0	0.0	.30	.18	.05	.03	.05	.03
6	0.0	*.01	.32	.52	.08	.05	.07	.04
7	2.44	.03	.32	.96	.76	.71	.75	.67

*means less than

Table 3. Solids concentraitons in mg/l for survey stations

St.	T.S.	T.N.V.S.	T.S.S.	T.S.N.U.S.
1	52	31	1	0.0
2	225	82	81	39
3	63	29	9	4
4	62	31	6	3
5	56	32	6	2
6	65	42	9	3
7	102	56	15	9