

M E M O R A N D U M

WA-24-2010

November 18, 1971

MEMO TO: NELSON GRAHAM
FROM: BOB BISHOP
SUBJECT: Willapa River Survey

On August 24th and 25th, 1971, a survey of the Willapa River estuary was conducted at certain stations, outlined in previous surveys, to provide data for use in determining summer river conditions,

1. An industrial efficiency survey at the Raymond Weyerhaeuser Mill was conducted on August 25th. Effluents from the South Bend and Raymond domestic sewage lagoons and the Raymond sewage treatment plant were sampled. A memorandum dated October 4, 1971, gives the results of the industrial survey at Weyerhaeuser.

The river survey was conducted from 1330 to 1800 hours August 24th and from 1000 to 1230 hours August 25th, when the high tide was 7.5 feet at 1534 hours and the low tide was 1.1 feet at 0952 hours, respectively. Parameters measured were: total and fecal coliform, DO and % saturation, pH, temperature turbidity, salinity, and conductivity, Tables 1, 2, 3, and 4. Station depth profiles were taken. St. 8 was located at the railroad bridge; 8A was established 1/4 mile upstream from the railroad bridge. St. 7 was about 100 feet from the clarifier; 9 was near the cooling tower. Data results were compared to interstate Class A surface water quality standard criteria, which are assigned to the Willapa River proper and the South Fork, from the mouth to the limit of tidal influence.

By the Class A criteria for surface water, the dissolved oxygen concentration shall exceed 8.0 mg/l (fresh water), or 6.0 mg/l (marine water). At the Willapa River proper and the South Fork survey stations, there is mixing of fresh and salt water and it is difficult to assign either the fresh water or marine water standards. At low tide, St. 8A had a salinity of 9.8 parts per thousand; the water was partially saline.

If the marine water standard is used, at high tide on August 24, all DO measurements were within the standard DO concentration. At low tide, DO at Sts. 6, 7, and 10, were substandard on August 25th. When the fresh water standard of 8.0 mg/l was used, all stations were substandard in DO at low tide; at high tide, only Sts. 2, 4, and 5 met the standard concentration.

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At low tide, the DO at one foot depth, was less than at high tide at all stations except 1, 8A, 11, 12, and 13. There was a progressive decrease in DO from St. 1 to 7. St. 8A was higher than at 5, 6, 7, and 9, located near the Raymond lagoon and the Weyerhaeuser clarifier. The lowest DO was at St. 7, 5.7 mg/l; at 8A the DO was 6.5 mg/l. The difference was only .8 mg/l. BOD loading may explain why values are lower near the lagoon and clarifier. In the South Fork, there was a decrease in DO from St. 12 to 10. The difference was 1.5 mg/l. This indicates a possible slight DO sag from the STP, but St. 13, upstream, was lower in DO by .5 mg/l than St. 11. At low tide, the highest DO was 7.6 mg/l at St. 1. The lowest was 5.7 mg/l at St. 7; the difference was 1.9 mg/l. There was a difference of 1.1 mg/l from St. 1 when compared to 8A.

At high tide, the DO at one foot depth, was highest at St. 4, 8.9 mg/l; the lowest DO values were 6.1 mg/l at St. 8A and 6.0 mg/l at St. 13. The difference between St. 4 and 1 was 2.8 mg/l. In the South Fork at high tide, there was a decrease in DO from St. 11 to 13, .8 mg/l; there might possibly be a backup of higher BOD water at 13, from incoming tide.

St. 8A was slightly lower in DO at high tide than at low tide, but the temperature and salinity were lower at low tide. The DO difference was only 0.4 mg/l. Sts. 11, 12, and 13, were also higher at low tide than at high tide, but at St. 13 the difference between low and high tide was slight, 0.5 mg/l.

For pH and turbidity, the data indicate the Class A criteria were being met.

The total coliform counts were highest at St. 8 and 8A at high tide. Sts. 9, 10, and 13, were also greater than the 240 Class A standard at high tide. At low tide, 8A was less than the 240 count. St. 13 was substandard at high, and low tide, Table 1. Fecal coliform counts are given in Table 1.

Temperatures of cooling water effluent from the Weyerhaeuser plant are given in the industrial survey memo. Several temperature readings were taken at surface and depth in the outfall vicinities; all readings were 20.5 and 21.0 degrees centigrade at low tide, indicating no temperature problem at that time.

Data was recorded at intermediate profile depths between high and low depths in Tables 3 and 4; if you need these they will be sent.

BB
BB:mh
69/10

cc: Ron Pine

WILLAPA RIVER

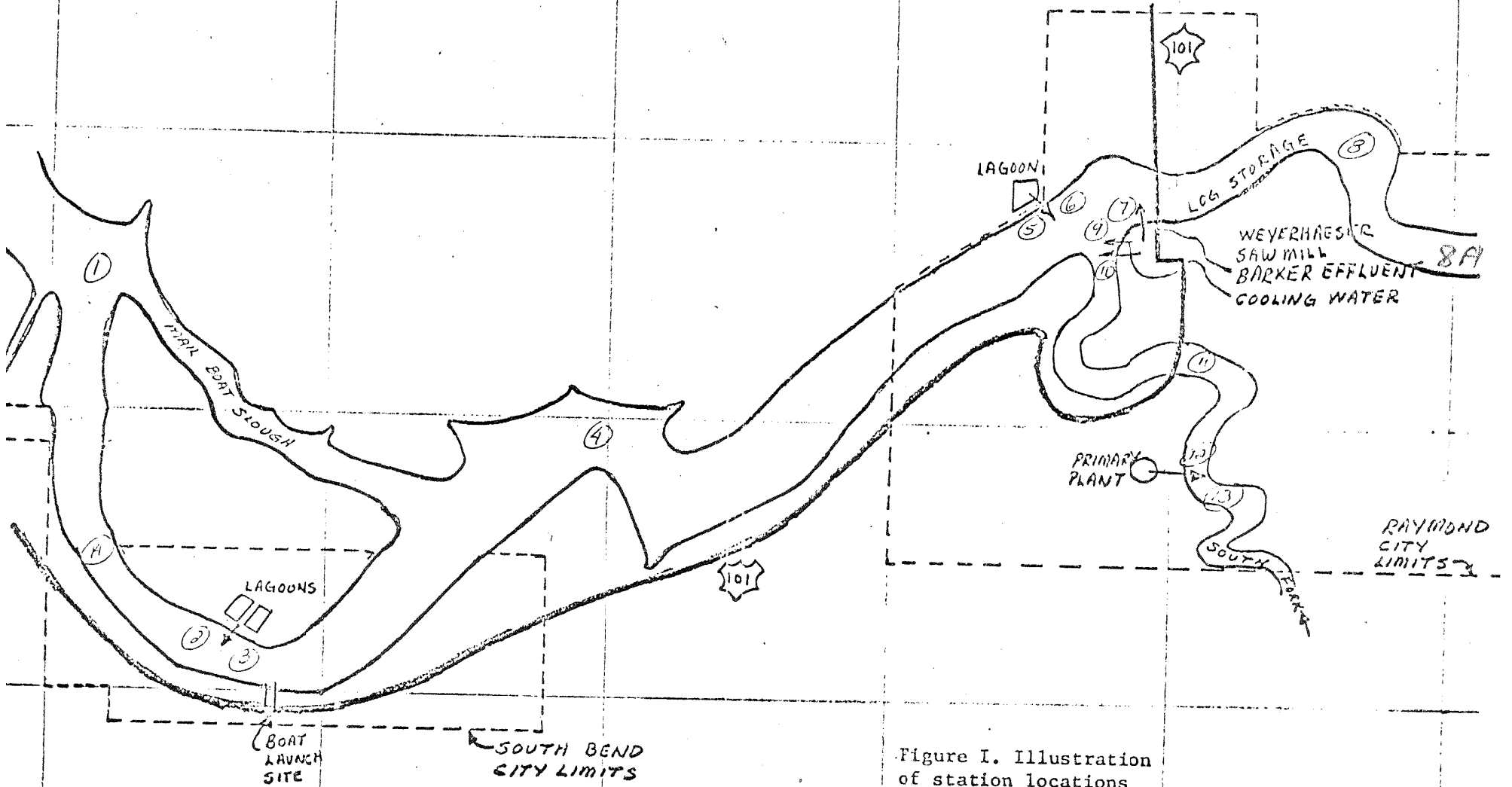


Figure I. Illustration of station locations for the Willapa River survey

Table 1. Total and fecal coliform colonies per 100 ml. for one foot samples from the Willapa River survey stations, high and low tides, 1971.

Stations	high tide 8-24		low tide 8-25	
	total col.	fecal col.	total col.	fecal col.
1	*40	*20	130	*40
14	"	*40	300	"
2	"	*20	200	"
3	54	*40	250	"
4	60	"	350	"
5	43	"	300	"
6	140	"	300	"
8	500	"	-	-
8A	500	"	200	*40
7	140	"	200	*20
9	300	"	230	*40
10	250	"	110	"
11	200	"	300	"
12	200	"	250	"
13	300	"	+4000	+100

less than + greater than

Table 2. Total coliform colonies per 100 ml. and residual chlorine for effluents from South Bend and Raymond lagoons and the Raymond STP, high and low tides, 1971.

	high tide, 8-24		low tide, 8-25	
	total col.	residual chlorine 3 min.	total col.	residual chlorine 3 min.
South Bend Lagoon	140,000	nil	160,000	nil
Raymond Lagoon	*400	.75 ppm	*400	.20
Raymond STP	*400	1.00 ppm	+160,000	nil

* less than + greater than

Table 3. Dissolved oxygen and % saturation, temperature, conductivity, salinity, turbidity, pH, and sampling time for various depths at the Willapa River survey stations.

high tide, 8-24-71

stations	depth ft.	sampling depths, ft.	DO ppm	% Sat.	temp. °C	cond umhos/cm.	sal. ppt.	turb. JTU	pH	time daylight
1	26	1	7.6	94	21.0	35,000	23.5	4	7.8	1400
		20	7.4	91	20.0	"	30.5		"	
14	36	1	8.0	103	21.5	34,000	23.3	2	7.8	1430
		30	7.5	95	20.5	35,000	23.7		"	
2	22	1	8.7	110	22.0	33,500	22.9	2	7.8	1445
		15	7.5	95	20.5	34,500	23.4		"	
3	20	1	7.9	100	22.5	32,500	22.7	2	7.7	1500
		15	7.4	92	21.0	33,500	23.2		"	
4	38	1	8.9	112	22.0	32,000	22.5	2	7.8	1530
		32	7.4	92	21.0	33,000	23.1		7.7	
5	36	1	8.2	102	22.0	30,500	*	1	7.7	1545
		30	7.0	89	21.5	32,000	*		7.6	
6	38	1	7.6	96	23.0	29,500	*	1	7.6	1600
		30	7.0	89	22.0	31,000	*		"	
8	26	1	6.4	80	22.0	27,000	19.2	2	7.4	1640
		24	6.4	80	22.0	27,500	*		"	
8(A)	36	1	6.1	76	23.0	24,500	17.8	2	7.2	1650
		14	6.1	75	22.5	25,000	18.7		"	
7	36	1	7.8	99	22.5	29,500	*	1	7.6	1615
		18	7.4	92	21.0	31,500	*		"	
		34	7.3	92	21.5	31,000	*		"	
9	36	1	7.6	94	22.5	26,000	19.6	1	7.6	1700
		30	7.3	91	21.5	28,000	21.5		"	
10	25	1	7.2	89	22.5	25,500	19.5	2	7.5	1710
		20	7.1	"	21.5	27,500	21.1		"	
11	26	1	6.8	84	22.5	24,000	17.3	2	7.4	1720
		20	6.4	79	21.5	26,500	19.1		"	
12	15	1	6.5	79	21.5	22,000	17.3	2	7.4	1730
		12	6.4	"	22.2	24,500	18.0		"	
13	10	1	6.0	74	22.0	26,000	17.2	2	7.3	1740
		8	5.8	72	22.0	"	"		"	

* meter reading error, disregard

Table 4. Dissolved oxygen and % saturation, temperature, conductivity, salinity, turbidity, pH, and sampling time for various depths at the Willapa River survey stations.

low tide, 8-25-71

stations	depth ft.	sampling depths, ft.	DO ppm	% Sat.	temp. °C	cond umhos/cm.	sal. ppt.	turb. JTU	pH	time daylight
1	20	1	7.6	89	20.5	22,000	23.7	3	7.7	1015
		18	7.4	88	"	24,500	25.0	"		
14	29	1	7.3	88	20.5	26,000	24.0	2	7.6	1020
		25	7.7	92	"	25,500	24.9	7.8		
2	20	1	7.0	84	20.5	26,000	22.5	3	7.6	1025
		14	7.2	86	20.0	-	24.2	"		
3	18	1	6.9	82	20.5	24,000	19.7	3	7.5	1030
		14	"	"	20.0	25,000	23.4	7.6		
4	30	1	6.3	75	20.5	23,000	18.3	2	7.4	1035
		25	6.8	81	"	24,000	19.8	"		
5	30	1	6.0	70	20.5	19,500	15.4	2	7.2	1040
		25	5.9	69	"	22,000	17.6	7.3		
6	28	1	5.8	67	21.0	15,000	15.2	2	7.2	1045
		20	"	"	20.5	17,000	17.4	"		
8(A)	15	1	6.5	74	20.5	12,000	9.8	2	7.1	1120
		12	6.4	73	"	"	10.3	"		
7	28	1	5.7	67	21.0	20,000	15.4	2	7.2	1100
		10	"	"	20.5	"	16.1	"		
		25	5.9	69	21.0	22,000	17.1	"		
9	28	1	6.3	72	21.0	18,000	15.1	2	7.2	1135
		20	6.1	"	20.5	21,000	17.8	7.3		
10	22	1	5.8	67	20.5	15,000	14.5	2	7.2	1145
		20	6.0	70	"	17,000	17.1	"		
11	10	1	7.0	79	20.0	11,000	11.1	2	7.2	1200
		8	6.1	69	"	14,000	14.2			
12	10	1	7.3	82	20.0	10,000	10.5	4	7.2	1205
		8	6.3	71	"	13,000	13.4	"		
13	8	1	6.5	74	20.0	12,000	10.5	3	7.2	1210
		6	6.2	70	"	13,000	13.3	"		

MEMORANDUM

October 4, 1971

MEMO TO: NELSON GRAHAM
FROM: RON DEVITT
SUBJECT: Weyerhaeuser - Raymond
Industrial Survey

On August 25, 1971, I composited Weyerhaeuser's industrial clarifier at Raymond. The influent was composited as it entered the clarifier (sedimentation tank); the effluent as it crested the weir, there was no flow from the effluent until 0822 hours. The results of this sampling are attached.

In addition, other discharges were inspected, beginning from the chimney south of the sedimentation tanks. The following were observed proceeding west and south. Estimates are approximate.

1. 12 inch pipe about 1/3 full - many wood chips in the discharge. @ 1015 hrs. the T=41°C
2. 6 inch pipe, small volume, about 1/16 full, directly west of chimney. T=90°C
3. T=48°C
4. 36 inch culvert, main flow, T=29°C

One sample was taken for coliform analyses for background data. Values taken from the Willapa River in the vicinity of the mill recorded values for total coliform of less than 300/100 mls. For fecal coliform less than 40/100 mls. The numbers of coliform in the effluent were total, greater than 160,000/100 mls. ~~See 4-1~~, greater than 1200/100 mls. These high values originating from a fecal source, whether from a sanitary hook-up or a regrowth, represent a potential health hazard. It could be determined if this were due to regrowth by sampling the influent to the clarifier and the effluent, and comparing the values. Additional samples should be taken to verify that disinfection is required.

RD:rh
62/5

DATA REPORT FORM

Location: Meyerhaeuser @ Raymond

Station and Log number

Field Results	Influent				Effluent			
	Max.	Min.	Mean	Median	Max.	Min.	Mean	Median
Temp °C	27.8	24.8	26.7	26.6	31.0	22.8	28.3	28.9
pH	7.2	6.6	7.0	7.0	7.2	6.6	6.9	7.0
Settleable Solids	35	5	23	27	.5	.1	.3	.2

Lab. Results	71-2853 Influent	71-2854 Effluent	% Reduction
BOD	175	150	14
COD	1,950	920	53
TS	24,092	21,596	10
TNVS	19,352	17,565	9
TSS	2,332	204	91
TSNVS	1,382	97	92
SCS	950	107	89
Settleable Solids	25	0.1	
Color	630	1,490	
pH	6.9	6.8	
Turbidity	300	54	
Conductivity	30,500	30,600	

MEMORANDUM
Department of Ecology
P. O. Box 829
OLYMPIA, WASHINGTON
98501

Information	
For Action	
Permit	
Other	

TO: Ron Lee

DATE: June 28, 1971

FROM: ^{NES} Nelson Graham

DEPARTMENT OF ECOLOGY
JUN 29 1971
AM 10:00
JUN 29 1971

SUBJECT: Willapa River Estuary, City of Raymond, City of South Bend, and Weyerhaeuser Company, Raymond

This memo is to request a water quality survey in the Willapa River estuary during the month of August and to request an eight hour industrial efficiency survey at Weyerhaeuser. We are negotiating with Weyerhaeuser on a permit at their mill in Raymond which will require secondary treatment of their hydraulic barker effluent. The City of Raymond also has a primary treatment plant discharge into the estuary and they may have to go to secondary.

Weyerhaeuser has one clarifier for treating their hydraulic barker waste. I would like an eight-hour composite on the influent to and effluent from the clarifier. The composite samples should be tested for BOD, COD, SS, SCS, pH, turbidity and color. Total flow for the eight hours should be determined.

✓ Notch

The water quality survey will be nearly identical to the two previous surveys (Feb. 2 & 3, 1970 and Aug. 4 & 5, 1970). Since the last August survey indicated there was a DO problem in the estuary, I think we should run the survey again to get additional data since we may have a battle on our hands with Weyerhaeuser and the City of Raymond.

check
dikes

The attached map shows the stations to be sampled (same as the last survey). The parameters to be measured at each station are: total and fecal coliform, D.O., pH, temperature, turbidity, salinity and conductivity. As before this survey should be run twice, once at low tide and once at high tide. A total coliform grab should be collected from the effluents of the Raymond primary plant, the Raymond lagoon, the Weyerhaeuser barker clarifier, and the South Bend lagoon. Determine chlorine residual at STP'S. Determine if there is any temperature affect in the immediate vicinity of Weyerhaeuser's cooling water discharge.

1. Al Followway PLANT ENGR.
2. Jess HAGEMAN MILL SUPT.
3 EARL Bethel - TECHNICIAN

Memo to: Ron Lee
From: Nelson Graham
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June 28, 1971

Summary of samples:

Weyerhaeuser	BOD -	2	
	COD -	2	
	SS -	2	
	SCS -	2	
	pH -	2	
	turbidity -	2	
	color -	2	
	total coliform -	2 2	
Willapa River	total coliform -	34	<i>put fecal onto</i>
	fecal coliform -	28	
	D.O. -	28	
	pH -	28	
	temperature -	28	
	turbidity -	28	
	salinity -	28	
conductivity -	28		

NAG:je