STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
DANIEL J. EVANS
GOVERNOR
JOHN A. BIGGS
DIRECTOR

September 20, 1972

Publication No. 72-e33

WA-22-0030

MEMORANDUM

TO: Gene Asselstine and Mike Price

FROM: Scott Jeane

SUBJECT: Addendum to Memo Dated 8/28/72 on Grays Harbor Dredging Project

On the morning of Tuesday, August 29, 1972, Jerry Bollen and Mike Price requested a reinvestigation of the Port of Grays Harbor dredging project. Ron Robinson accompanied me to Aberdeen where we were to profile the dissolved oxygen characteristics of the estuary at high slack tide. Several new stations were added (see Figure 3).

We arrived at 1500 hours and observed that the dredge was not operating. At 1550 hours we initiated our survey in the vicinity of Westport and concluded our profile at 1830 hours, six + nautical miles upstream from Cosmopolis. The dredge was observed operating at 1725 hours during our upstream run. At that time sea gulls were seen capturing small fish from the surface of the water off slips 1 and 2. We were unable to observe any distressed fish.

After completing our river profile we returned and inspected the dredging operation. The spoil discharge had been moved 400 yeards to the southwest and was discharging into the eastern most end of south channel. A platform (see pictures) had been placed at the end of the dredge pipe to prevent the spoils from eroding a hole similar to the large one created at the previous location. The spoils were discharged onto the platform, from which they flowed into a ditch 200 yards long. The ditch opened onto the mud flats at the high tide line.

Two other areas of concern were the leaks in the portion of dredge pipe suspended over the river and the lack of diking to enable the suspended solids to settle out.

Parameter Analysis

The uppermost river sample had a COD of 42 ppm, while station #2 below Hoquiam airport measured 450 ppm (see table 5). The COD of the dredge spoils was 26,400 ppm O_2. This represents an increase over station #2 of 58.6 times. This increase of the BOD loading of the estuary caused dissolved oxygen levels (see Table 4) to fall below the minimum standards set by our department. Areas of low dissolved oxygen were from station #3 to station #9 on the morning of 8/26/72 and station #7 to station #12 that afternoon. The 8/29/72 survey showed the area between station #10 and station #13 to be substandard in dissolved oxygen. Relief from this stress on the oxygen equilibrium of the estuary was aided by tidal action and intermittent operation of the dredge. The estuary's ability to recover from the stress was worsened by higher than normal high tides and low summer flows in the Chehalis River.

The dredge spoils were 1583 times higher in total suspended solids and 4100 times greater in settleable solids than river water at station #2. In the distance from where the spoils were deposited and approximately where the supernatant returned to south channel the effluent had a decrease of 65% in COD, 38% in total suspended solids and 17% in settleable solids. It is interesting to note that 83% of the settleable solids were being returned to the estuary where, at a later date, it would be necessary to redredge this material.

Summary

The depletion of dissolved oxygen in the Grays Harbor estuary corresponds directly with operation of the Port of Grays Harbor dredge. The degree of sag in the dissolved oxygen and the area encompassed by the sag was directly affected by discharge of dredge spoils, low river discharge and poor tidal exchange. The three weeks previous to commencing of the dredging reveal no dissolved oxygen levels below minimum requirements set by the Department of Ecology. The estuary's substandard dissolved oxygen levels were raised slightly when the dredge effluent discharge was moved from the main river channel to the mouth of the south channel. Lack of a proper settling basin resulted in 83% of the settleable solids being returned to the estuary. The low dissolved oxygen levels and the high solids levels are both detrimental to fish conditions. Past studies of the harbor suggest that these two parameters are involved in synergistic reactions causing fish mortality.

GSJ:bj

Attachment

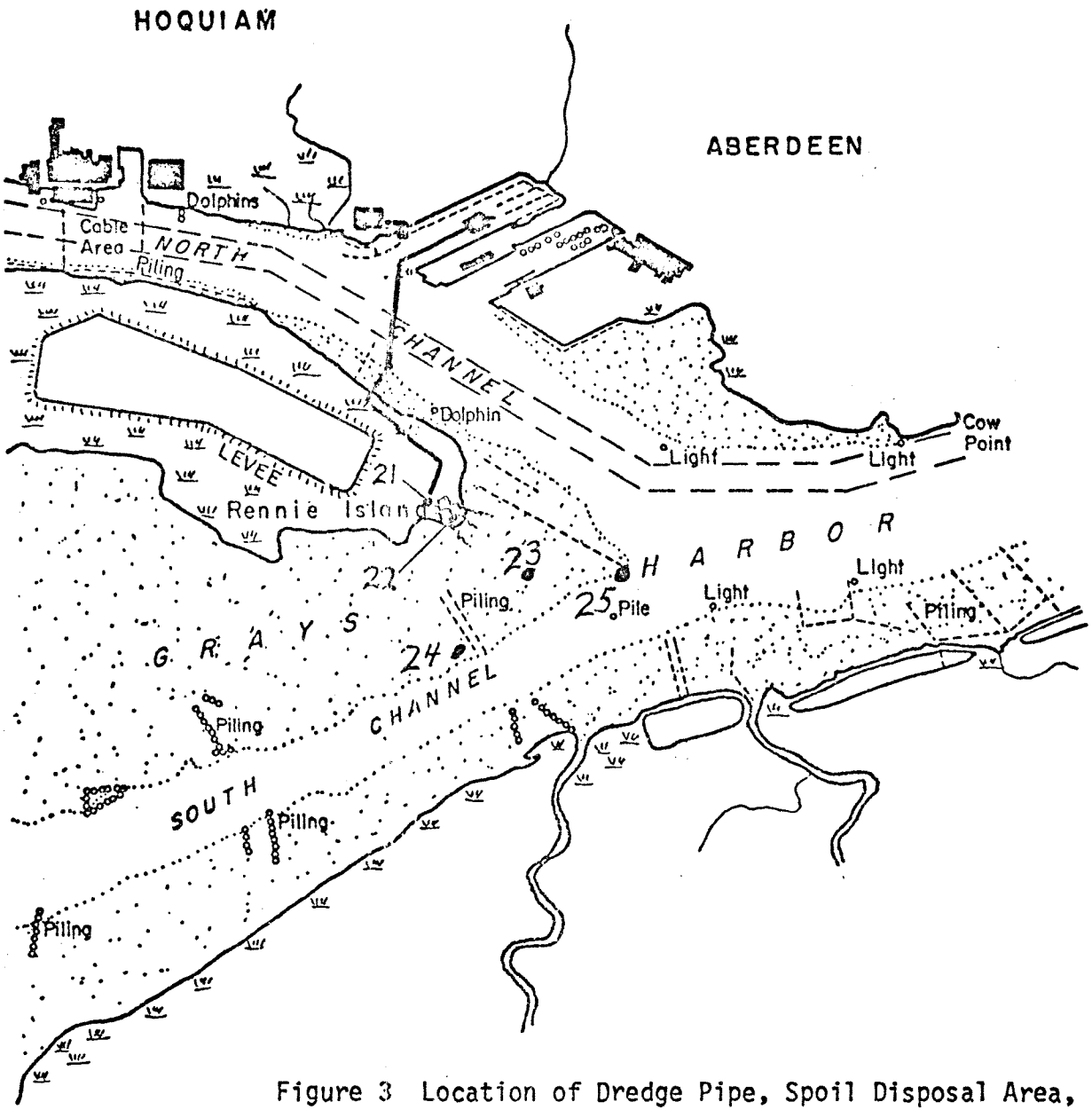

Figure 3 Location of Dredge Pipe, Spoil Disposal Area, and New Sampling Stations on 8/29/72

Table 4

Grays Harbor Water Quality Analysis, Samples Collected 8/29/72

Station	Time	Depth	D.O. ppm	Cond.	Salinity ppth	Temp. °C	PBI ppm
1	1550	Surface	---	37.6	35.5	8.6	0
		Bottom	4.3	41.4	39.8	8.5	0
2	1625	S	6.6	43.9	34.3	16.5	5
		B	6.4	43.8	36.4	14.3	5
3	1638	S	6.8	43.2	34.1	16.2	0
		B	6.4	43.1	35.1	15.1	0
4	1650	S	6.3	38.2	29.6	16.8	5
		B	6.4	42.7	34.1	16.0	0
5	1700	S	6.2	36.9	27.6	18.0	5
		B	6.1	37.8	29.4	16.4	0
6	1715	S	5.4	39.4	29.6	18.0	5
		B	5.8	37.2	28.6	16.8	5
15	1725	S	5.3	34.8	25.6	18.6	5
17	1730	S	5.0	34.9	25.6	18.8	0
7	1735	S	5.3	33.5	24.3	19.0	9
		B	5.7	36.9	28.1	17.2	5
8	1740	S	5.5	34.8	25.1	19.4	9
		B	5.6	40.0	30.5	17.4	5
9	1745	S	4.9	34.9	25.1	19.7	5
		B	5.2	35.4	26.4	18.2	5
10	1755	S	4.5	30.2	21.5	19.5	5
		B	4.3	32.8	23.8	19.0	5
12	1805	S	4.1	25.4	17.8	20.0	5
		B	3.9	28.3	19.9	19.7	5
13	1815	S	4.7	21.4	14.7	20.1	5
		B	3.9	28.3	19.9	20.0	5
20*	1830	S	6.3	8.4	5.4	20.4	0
		B	5.6	11.0	7.3	20.4	5
23	1950	S	4.9	32.6	23.5	19.1	0
24	2010	S	4.8	32.1	23.2	19.0	5
25	2030	S	4.4	32.1	23.5	19.1	5

* Located at Light #13

Table 5

Oxygen Demand and Solids Analysis of Dredge Spoils and Receiving Waters; Samples Collected on 8/29/72.

Station	COD ppm	BOD ppm	Total Sus. Solids ppm	Total Sus. Nonvol. Solids ppm	Settleable Solids ml/l
2	450	<8	48	39	<0.1
15	360	<80	35	26	<0.1
17	550	<80	51	38	<0.1
20	42	<8	14	10	<0.1
21	26,400	<2,000	76,000	69,000	410
22	9,240	<4,000	55,000	49,000	340

State of Washington Department of Ecology

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WATER QUALITY LABORATORY

DATA SUMMARY

ORIGINAL TO: Scott Jeanne.
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LAB FILES .....

Source Gray's Harbor

Collected By G. Scott Jeanne

Date Collected 8/26/72

Goal, Pro./Obj. 3-2-22

Log No.	Sample Station	ppm PBI	Station #		LOG NO.	STA.	ppm PBI	JTU TURB			
72-3180	1	36			723201	22	27				
3181	2	54			3202	23	23				
3182	3	50			3203	24	32				
3183	4	50			3204	25	23				
3184	5	54			3205	26	45				
3185	6	54			3206	27	27				
3186	7	77			3207	28	45				
3187	8	41			3208	29	32				
3188	9	41			3209	30	59				
3189	10	23			3210	31	36				
3190	11	32			3211	32	50				
3191	12	23			3212	33	59				
3192	13	27			3213	34	50				
3193	14	14			3214	35	86				
3194	15	23			3215	36	68				
3195	16	18			3216	37	45				
3196	17	18			3217	38	45				
3197	18	14			3218	39	45				
3198	19	5			3219	40	41	230			
3199	20	18			3220	41	131	54			
3200	21	14			3221	42	81	23			

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

Summary by Mary F. Holcomb Date 8/29/70

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

WATER QUALITY LABORATORY

ORIGINAL TO: Scott Jeane
COPIES TO:
LAB FILES

DATA SUMMARY

Source GRAYS HARBOR DREDGING PAGE 1 of 2 Collected By G.S.S

Date Collected 8-29 Goal, Pro./Obj. 3.2.22

Log Number: 72-	3259	3262	3263	3264	3267	3268					STORET
Station:	2A	15-S	17-S	20	21	22					
pH											00403
* Turbidity (JTU)	–	–	–	–	–	–					00070
Conductivity (umhos/cm)@25°C											00095
COD	450.	360.	550	42.	26,400	9240.					00340
BOD (5 day)	<8.	<80.	<80.	<8	<2000.	<4000					00310
Total Coliform (Col./100ml)											31504
Fecal Coliform (Col./100ml)											31616
NO3-N (Filtered)											00620
NO2-N (Filtered)											00615
NH3-N (Unfiltered)											00610
T. Kjeldahl-N (Unfiltered)											00625
O-PO4-P (Filtered)											00671
Total Phos.-P (Unfiltered)											00665
Total Solids											00500
Total Non Vol. Solids											
Total Suspended Solids	48.	35.	51.	14.	76,000	55,000					00530
Total Sus. Non Vol. Solids	39.	26.	38.	10.	69,000	49,000					
Settleable Solids (ml/l)	<0.1	<0.1	<0.1	<0.1	410.	340.					

Note: All results are in PPM unless otherwise specified. ND is "None Detected"
Convert those marked with a * to PPB (PPM X 10^3) prior to entry into STORET
* NOT ANALYZED BY MISTAKE

Summary By Stephen P. Dell Date 9-13-22

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DATA SUMMARY

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Source G-RAYS HARBOR DREDGING Collected By _____

Date Collected 8 24 PAGE 2 OF 2 Goal, Pro./Obj. _____

Log No.	Station	PBI		Log No	Station	PBI
7232-37	1-B	0		59	12-S	5
38	1-S	0		60	13-B	5
40	2-B	5		61	13-S	5
41	2-S	5		62	15-S	0
42	3-B	0		63	17-S	5
43	3-S	0		65	20-B	0
44	4-B	0		66	20-S	0
45	4-S	5		67*	21	0
46	5-B	0		69	23	5
47	5-S	5		70	24	5
48	6 B	5		71	25	9
49	6-S	5				
50	7-B	5				
51	7-S	9				
52	8-B	5				
53	8-S	9				
54	9-B	5				
55	9-S	5				
56	10-B	5				
57	10 S	5				
58	12-B	5				

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

* FILTERED

Summary by Stephen D. Ball Date 9-13-82