



STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

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M E M O R A N D U M
December 3, 1981

To: Jon Neel, S.W. Regional Office

From: Shirley Prescott and John Bernhardt
Water Quality Investigations Section

Subject: Coal Creek Slough Water Quality Survey, July 21, 1981

Introduction

The water quality of Coal Creek Slough, located west of Longview on the Columbia River, has recently become the focus of attention for a number of entities. The City of Longview is planning to double the capacity of the West Longview Lagoon which discharges to the slough. The WDOE S.W. Regional Office suspects the Ostrander Rock landfill treatment to be inadequate. Members of the Columbia River Fisheries Union are interested in the slough for a salmon rearing project.

Because of the many decisions to be made by the S.W. Regional Office regarding the slough, our assistance in a water quality survey was requested, the results of which are reported below. In addition to the data that John Bernhardt and I collected are included results from point source sampling done by Jon Neel, Mike Morhous, and Jim Jacoby.

Methods

Figure 1 shows the sites where receiving water and point source samples were collected. All samples were grabs with the exception of the West Longview Lagoon effluent which was an eight-hour composite. These samples were packed on ice and returned to the WDOE Tumwater laboratory for the following analyses: pH; specific conductance; turbidity; COD; BOD; fecal coliform; nitrate-nitrogen; nitrite-nitrogen; ammonia-nitrogen; total phosphorus; total suspended solids; tannic acid; and metals (Cu, Zn, Fe, Ni, Cr, Cd, Pb, and Mn at selected stations only). Temperature, pH, secchi depth, dissolved oxygen, and flow were measured in the field.

Discussion

Receiving Waters

Results of sample analysis for the receiving water survey are shown in Table 1. Fecal coliform and pH were within Class A standards. Temperatures were at or slightly in excess of the 18°C Class A limit. Slough waters were unstratified with respect to temperature.

Dissolved oxygen concentrations, however, were below state standards throughout the length of the slough except at the mouth. D.O. concentrations at Stations 4 and 6 were near the EPA criteria of 5 mg/L for freshwater aquatic life. It is difficult to determine the cause for this in the absence of control data from above the lagoon discharge. Point source data (see Table 2) show potential for impacts from nitrogenous demand in the lagoon effluent and elevated BOD and low D.O. water in upstream ditches and sloughs. The initially high oxygen demand of the Ostrander effluent is apparently satisfied within Ostrander Marsh before reaching Coal Creek Slough. The rise in D.O. at the slough's mouth probably reflects mixing with Columbia River water.

Because of problems with the IBC D.O. probe, it was necessary to adjust IBC readings to the Winkler measurement.

The observed maximums in conductivity, turbidity, ammonia-nitrogen, total phosphate-phosphorus, and COD below the lagoon and their gradual decrease toward Coal Creek Slough's mouth were point source impacts seen within the receiving waters at the time of this survey. Ammonia and phosphorus were sufficient to support algal blooms, other conditions being adequate for growth. Un-ionized ammonia did not reach the toxic levels of .02 mg/L for freshwater aquatic life.

Tannic acid concentrations were at the lower end of the range typically observed in Western Washington streams and rivers (Howard Dawson, Crown Zellerbach, Camas WA, personal communication).

Point Sources

Table 2 shows the point source sampling results.

The West Longview Lagoon municipal wastewater treatment facility (Station 18) is located at the head of Coal Creek Slough. Analysis of the eight-hour composite samples indicated that NPDES permit conditions were being met.

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Ostrander Rock Company Pond #7 (Station 17) is a leachate treatment pond associated with an industrial solid waste disposal site located near Coal Creek Slough. There is no surface discharge, but leachate from pond #7 reaches Coal Creek Slough via Ostrander Marsh to the west. Influent flow of .03 cfs was measured at pond #5 which is a tributary to pond #7. The specific conductance of 2080 umhos/cm is indicative of acid or salt pollution; a COD of 130 mg/L and a BOD of 40 mg/L indicate organic pollution not unexpected in this wastewater. All parameters measured in the Ostrander Marsh discharge were within acceptable limits with the exception of nitrate-nitrogen of .63 mg/L which exceeds the potential algal bloom criterion of .3 mg/L.

Coal Creek (Station 12) and Harmony Creek (Station 13) both meander through rural and residential areas before they join and enter Coal Creek Slough. Each creek was sampled and gaged above their confluence. Both met Class A water Quality standards with the exception of a marginal violation of fecal coliform standards in Harmony Creek.

Ditch #10 (Station 14) enters Coal Creek Slough slightly south and west of the lagoon discharge and parallels Longview's Industrial Way in its upper reaches. Flows were not measured because of high velocity due to the operation of the No. 1 pump (32,000 gal/minute). When this pump is operating, it could be drawing water from the industrial area in the upper reaches of the ditch.

The fecal coliform concentration of 170 col/100 mls measured here was the highest in the study area. D.O. was also very low at 2.5 mg/L. Total phosphorus exceeded the algal bloom potential of .05 mg/L.

There was no visible velocity in Cut-off Slough (Station 15). D.O. was high at 14.3 mg/L. Total phosphorus of .13 mg/L was above algal bloom potential of .05 mg/L. COD and BOD were high relative to other waters in the drainage.

Ditch #6 (Station 16) receives surface runoff from the north including Clark Creek which originates within the Longview city limits. This residential area is still partially served by septic systems. All parameters measured were within acceptable limits. COD was slightly elevated, indicating some organic pollution.

Table 3 shows results of metals analysis for samples collected at some of the above point sources. Zinc concentrations met or exceeded the 24-hour average criteria at Stations 15 and 16. Iron exceeds the criteria at Stations 14 and 15. This criterion has been criticized by the American Fisheries Society as being too stringent. The 24-hour average criteria for copper, chromium, cadmium, and lead are below the analytical method's limits of detection. Copper, chromium, and lead were, however, within maximum allowable concentrations.

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Summary

The major findings of this survey are as follows:

1. Fecal coliform and pH were within Class A standards in the slough.
2. Temperatures were at or slightly above the 18°C Class A limit.
3. Dissolved oxygen concentrations were below state standards throughout the length of the slough except at the mouth and Ditch #10.
4. Parameters characteristically high in sewage effluent were apparent below the West Longview Lagoon and showed a gradual decrease toward the slough mouth. This was the only point source impact observed in the slough.
5. The West Longview Lagoon was meeting permit limitations.
6. Ostrander Rock wastes appeared to be diluted in the marsh to non-problem levels.
7. Harmony Creek and Coal Creek were meeting Class A standards with the exception of marginal fecal coliform violation in Harmony Creek.
8. Ditch #10 had the highest fecal coliform concentration in the study area as well as the lowest D.O. and relatively high total phosphorus.
9. Cut-off Slough had relatively high BOD, COD, and total phosphorus.
10. All parameters measured in Ditch #6 were within acceptable levels except COD which was slightly elevated.
11. Zinc concentrations were exceeded in Cut-off Slough and Ditch #6. Iron concentrations were exceeded in Ditch #10 and Cut-off Slough.

SP:JB:cp

Attachments

cc: Dick Cunningham
Joan Thomas