MEMORANDUM
Water Pollution Control Commission
P. O. Box 829
OLYMPIA, WASHINGTON
98501

Publication No. 69-e11

WA-45-1020

TO: Ron Pine

DATE: May 12, 1969

FROM: H. B. Tracy

SUBJECT: Report on the pollution complaint investigation concerning an algae growth in the Wenatchee River

This preliminary investigation was conducted by Ron Pine and Harry Tracy on April 1, 1969. Our records show that a filamentous algae growth has occurred in the Wenatchee River for several consecutive years and has precipitated a number of complaints to the WWPCC. In the spring, large clumps of this cold water plant break loose from the substrate (bloom) and drift downstream, where they interfere with water recreation and detract from the appearance of the river water. Previous studies have determined that the bloom does not occur above the town of Cashmere; however a heavy growth has been noted in Mission Creek, a tributary of the Wenatchee that flows north out of the Wenatchee Mountains to its confluence with the Wenatchee River at Cashmere.

Previous investigators have experienced difficulty in timing their visits to the river to coincide with the bloom. This year we instigated this preliminary study which was conducted to isolate heavy algae concentrations and to locate sampling stations for monitoring the expected bloom. However, an early spring run-off eliminated any prospects for visual observations in the Wenatchee River and probably washed out existing algae growth. It was also noted that algae production in Mission Creek was comparatively light this year; however, there is a possibility that an algae growth sufficiently dense to cause a bloom may develop in the late fall.

A sawmill operation that stores incoming logs in a pond adjacent to Mission Creek was considered a possible contributor to the algae problem in Mission Creek and the Wenatchee River. The log pond receives a 1-cfs. flow from a small creek and drains through a channel into an unnamed creek that subsequently empties into Mission Creek (Figure 1). To provide background data and to analyze the effects of the log pond effluent on the water of the Mission Creek tributary, water samples and benthic samples were taken at three sampling locations (Figure 1): Station #1, above the log pond outfall in the unnamed tributary of Mission Creek; station #2, below the log pond outfall in the same tributary, and station #3, in Mission Creek five miles above Cashmere. Station #3 was located above the densely populated and farming area and served primarily as an index stream.

Water analyses for each station included nutrients (phosphates and nitrates), pH, D.O., conductivity and turbidity (Table 1). The biological samples were keyed to Family, and organism diversity ($\bar{D}$) and insect diversity ($\bar{d}$) were calculated using the equation $-\Sigma pi \log_e pi$ from "Biological Parameters for Water Quality Criteria" by Wilhm and Dorris. Analyses of the water samples indicated that the Mission Creek tributary contained significantly higher concentrations of nitrates and slightly higher concentrations of phosphates than Station #3 on Mission Creek. However, the source of the nutrient enrichment was not the log pond since Station #1 had higher concentrations of both nitrates and phosphates than Station #2, indicating that the log pond effluent diluted the concentrations existing in the tributary (Table 1).

Examinations of the biological samples indicated that the log pond effluent has little, if any, effect on the Mission Creek tributary. A biota comparison of samples obtained from Station #1 (above log pond) with those from Station #2 (below log pond) show little difference. Organism diversity (D) and insect diversity (d) are approximately equal (Figure 2). Almost half of the organisms taken at both stations were non-insects while the remainder in both cases were predominantly Diptera (two-winged flies), a pollution resistant form. The insect computations show Diptera dominating Station #1 and #2 samples with about 80% contribution (Figure 3).

The benthic samples taken from Station #3, located 5 miles above Cashmere on Mission Creek, contained predominantly Ephemeroptera (mayflies). The contribution of non-insects and the pollution tolerant two-winged flies was insignificant. The Tricoptera (caddisfly) representatives obtained from Station #3 samples were of a different species and more pollution sensitive than those taken from Stations #1 and #2. These differences point out that the Mission Creek Station #3 samples were obtained from a reasonably clean, cold-water stream, whereas samples from the tributary Stations #1 and #2 were taken from a stream that is comparatively slow-moving and passes through farm yards and populated areas where it is highly enriched. Any effects that the log pond might have on the waters of this creek are masked by the enrichment it receives upstream.

HBT:pc

Attachments

5/12/69

Table 1. Pollution Complaints – H_2O Analyses — Wenatchee River Algae Bloom 4/1/69

Lab No	Sta No.	pH	D.O.	NO_3	NO_2	Free NH_3	Kjl N.	Ortho PO_4	Tot. PO_4	Cond	Turb	Colif	Stream
69-1127	1	7.5	10.4	4.6	0.016	0	0.6	0.29	0.50	340	12		4/3/6
1128	2	7.5	9.2	2.7	0.026	0	0.5	0.27	0.44	340	14		"
1129	3	7.8	11.2	0.1	0.012	0	0.5	0.02	0.12	210	13		"

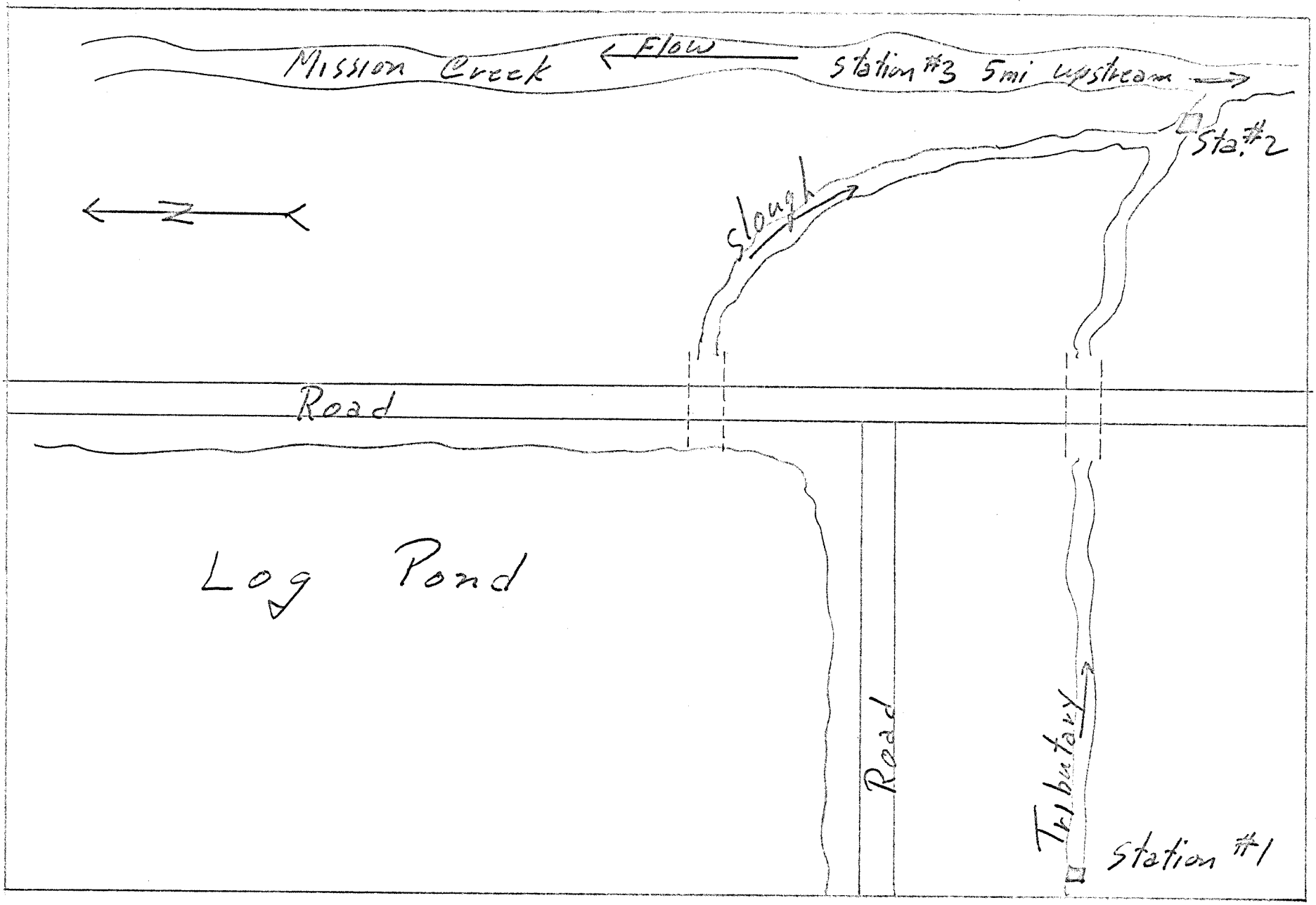
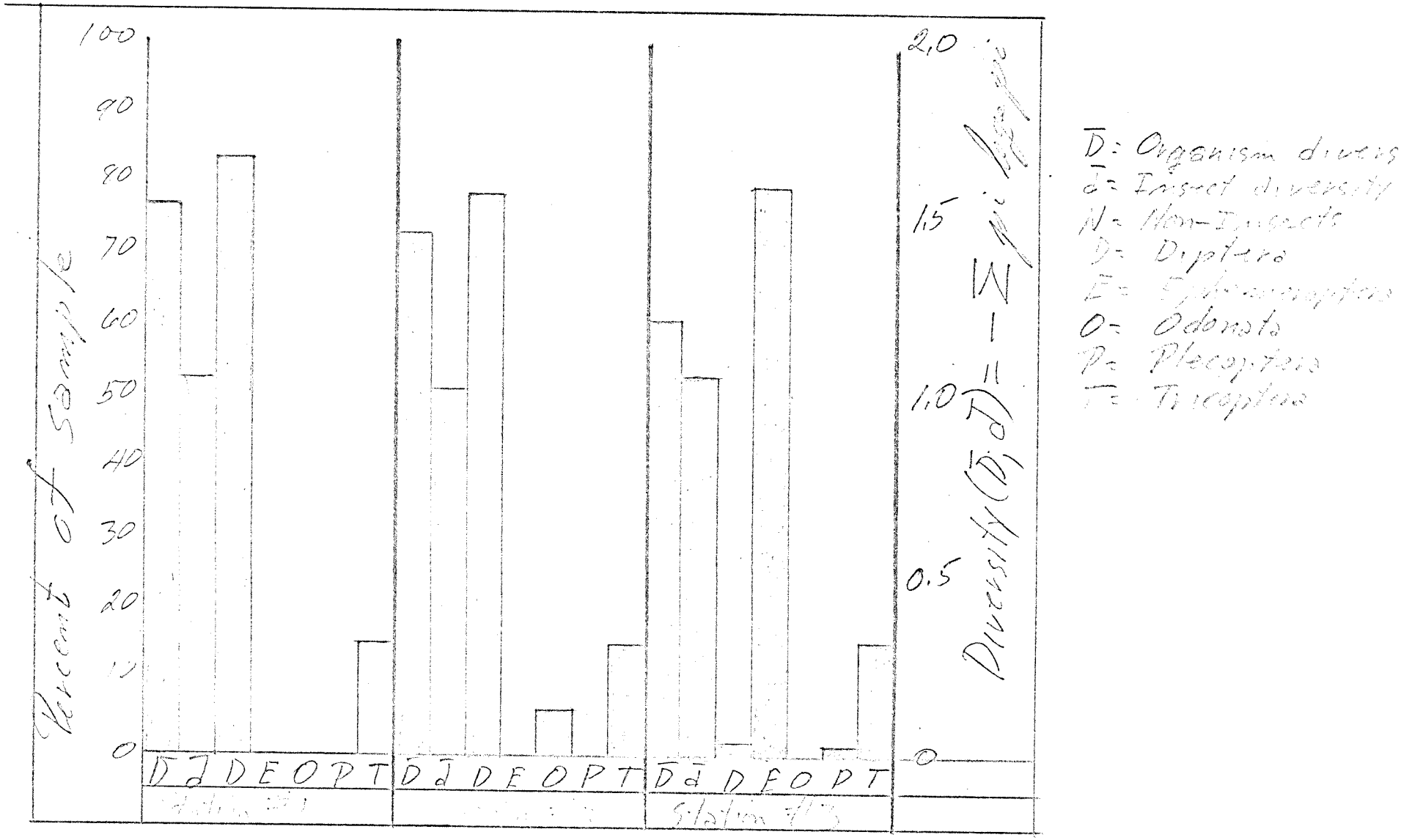
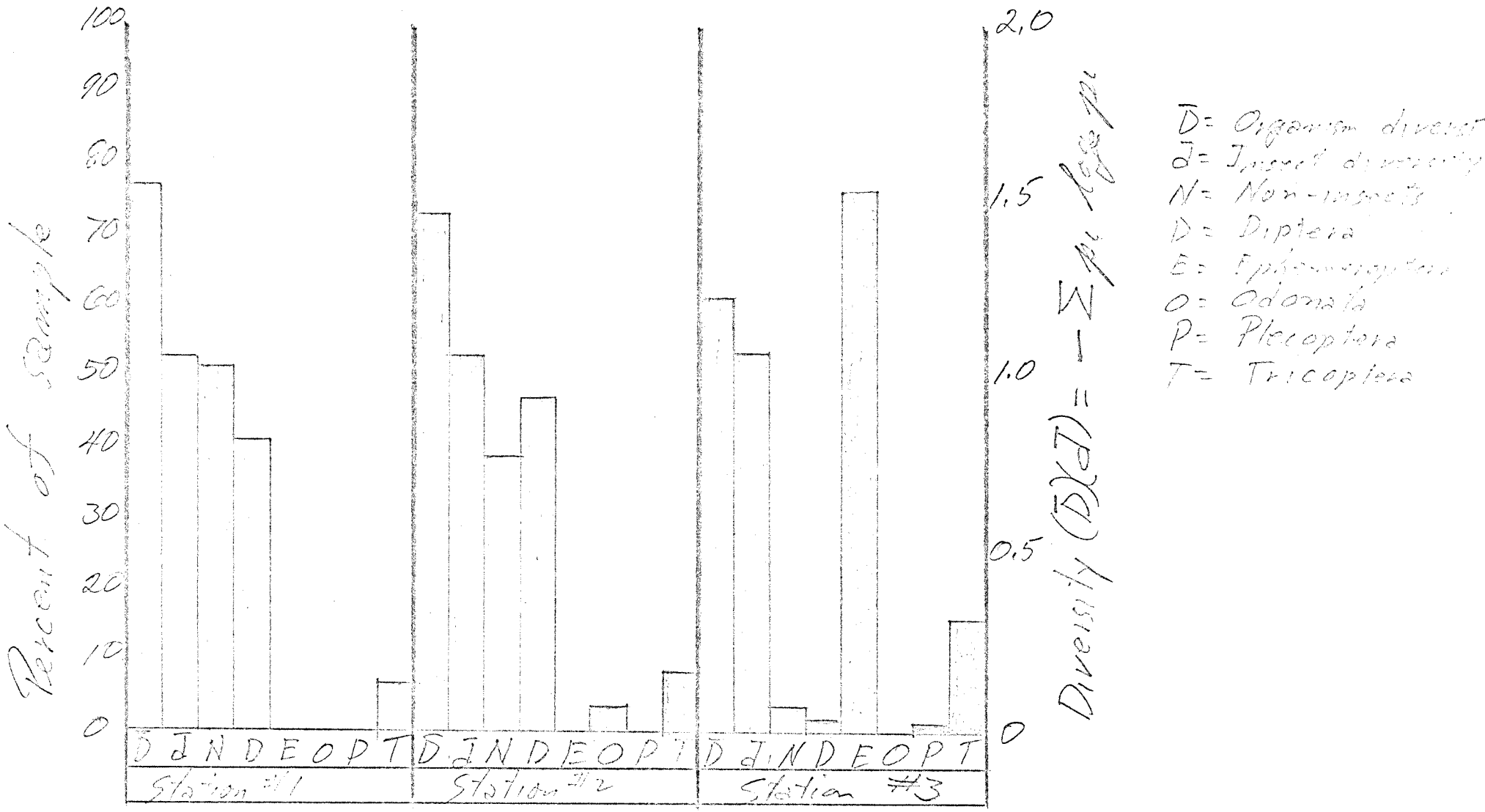


Figure 1. Sketch of Mission Creek algae study sampling stations conducted 4/1/69, WWPCC.



Station #1 Mission Cr. Tributary 50yds above log pond
Station #2 " " " Immediatly below confluence with log pond outlet
Station #3 Mission Creek [illegible] above Cashmere

Figure 2. [illegible] Samples - Insects only



Station #1 : Missouri R. Tributary 50 yards above log yard
Station #2 : " " " Immediately below confluence with log yard creek.
Station #3 Missouri River 5mi above Cochrane

Figure 3. Histogram of Missouri R. Station [illegible] organisms