

JOB PROGRESS REPORT

FILE

As required by

FEDERAL AID IN FISHERIES RESTORATION ACT

TEXAS

Federal Aid Project F-2-R-20

Region 2-B FISHERIES STUDIES

Job B-27, The Effects of a Thermal Effluent on Decker Lake

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May 29, 1973

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PROGRESS REPORT

State: Texas

Name: Region 2-B Fisheries Studies

Project: F-2-R-20

Title: The Effects of a Thermal Effluent  
on Decker Lake

Job No. B-27

Period Covered: February 1, 1972 to January 31, 1973

P. S. OBJECTIVE:

To determine the effects of a substantial thermal effluent on the seasonal criteria of Decker Lake, Travis County, Texas.

SEGMENT OBJECTIVES:

1. To review the existing literature relative to the effects of a thermal effluent on aquatic life.
2. To determine the seasonal changes in the important physical, chemical, and biotic parameters of the waters of Decker Lake.

PROCEDURES:

1. Literature relative to the effects of thermal discharges on aquatic life was reviewed.
2. Bi-monthly netting surveys were conducted using 150-foot experimental gill nets to provide information relative to fish composition by weight and number, fish distribution, and sexual development.
3. Temperature, pH, dissolved oxygen, turbidity, alkalinity, and specific conductance were measured monthly at seven stations. Water samples were collected from the surface and bottom at each station.
4. Benthos samples were collected monthly using a 6 inch x 6 inch Ekman dredge in an attempt to correlate temperature change with species diversity. Samples were collected across four transects of the lake, each transect comprised of eight samples. The samples were strained through a U. S. #30 sieve and preserved in 80% alcohol for future identification.
5. The lake was visually surveyed for outcrops of vegetation.

RESULTS AND FINDINGS:

To date, the data previously collected has not been analyzed, but merely tabulated. The data will be statistically analyzed and compiled in the final report.

Temperatures were measured at each station at five foot intervals. Figures 1-4 illustrate the temperatures during the past segment from February to January. It should be noted that no heated discharge was carried out until April although discharges did occur prior to December of the previous segment. The figures compare stations in the discharge arm with its counterpart in the intake arm of approximately the same depth.

Benthic collections have been tabulated in Table 1 of this report as to the numbers of each of the different species per square foot. Efforts will be made to statistically analyze this data in the final report.

Table II and III represent the annual totals of the gill net surveys. Table II lists the total fish collected in the discharge area and Table III the total in the intake area of the lake. This data will be later tabulated further for the final report. Attempts will be made to correlate fish distribution with the heated effluent at different times of the year.

Water quality data have been collected but have not been tabulated at this time.

The food habit study originally planned for this objective could not be carried out due to the time required to undertake such a study. This time was not available because of time devoted to other project work.

A few plankton samples were collected during this segment but it was felt that little could be learned with the time and manpower that could be devoted to this study and the limited data that could be collected. Therefore, these collections were eliminated so the time could be utilized on other portions of this study and other project jobs.

It was expected that productivity could be measured through the use of the carbon-14 method. However, the equipment could not be obtained and any other method would have proven too time consuming or unreliable.

Background information concerning the locations of sampling sites can be reviewed in Dingell-Johnson Progress Report F-2-R-19, Job B-27.

RECOMMENDATIONS:

Although this objective has suffered as a result of a shortage of time, manpower, and equipment, it is felt that valuable information concerning the effects of a heated discharge of this magnitude upon a lake of this size has been collected. However, since only a small portion of the study period included times of no thermal discharge, it is doubtful that a comparison can be made between periods before and after the introduction of a thermal effluent. For this reason it is recommended that field collections be terminated in June, 1973 after two years of data have been collected and a final report prepared comparing those areas under thermal influence with those out of the thermal influence of the discharge.

Prepared by: Project Leader  
Darrell W. Butler

Approved by: David L. Pritchard  
D-J Coordinator

Date: May 29, 1973

R. L. Bounds  
Region 2 Inland Fisheries Director

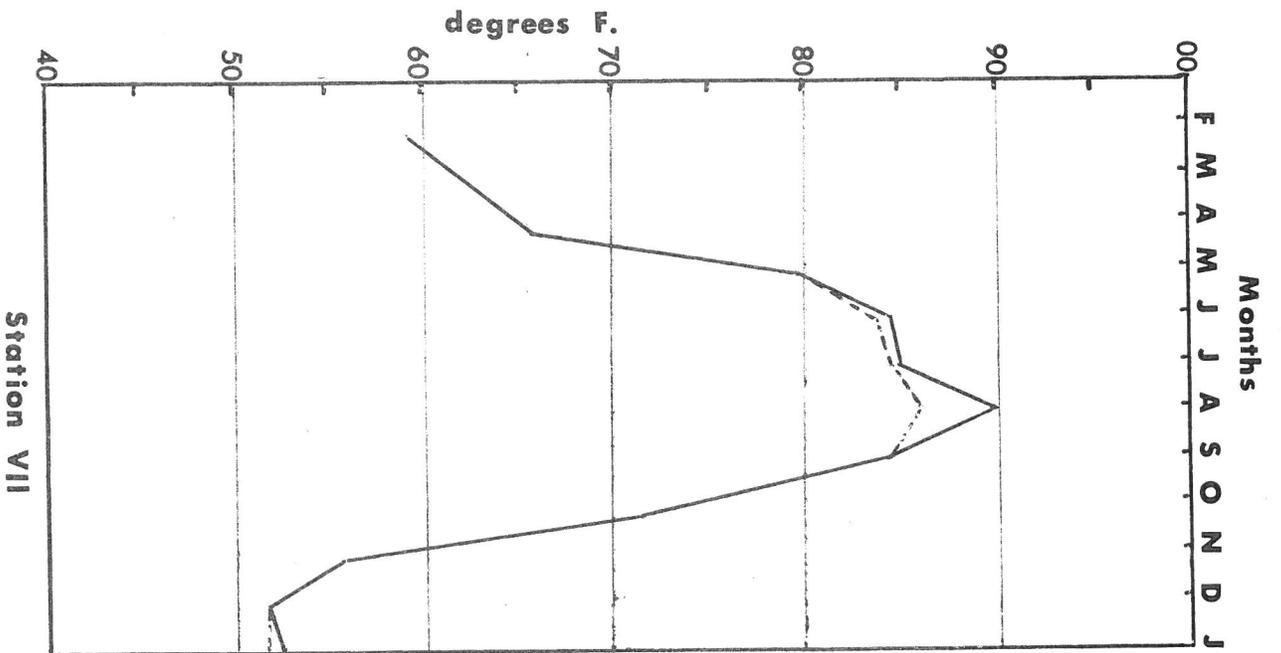
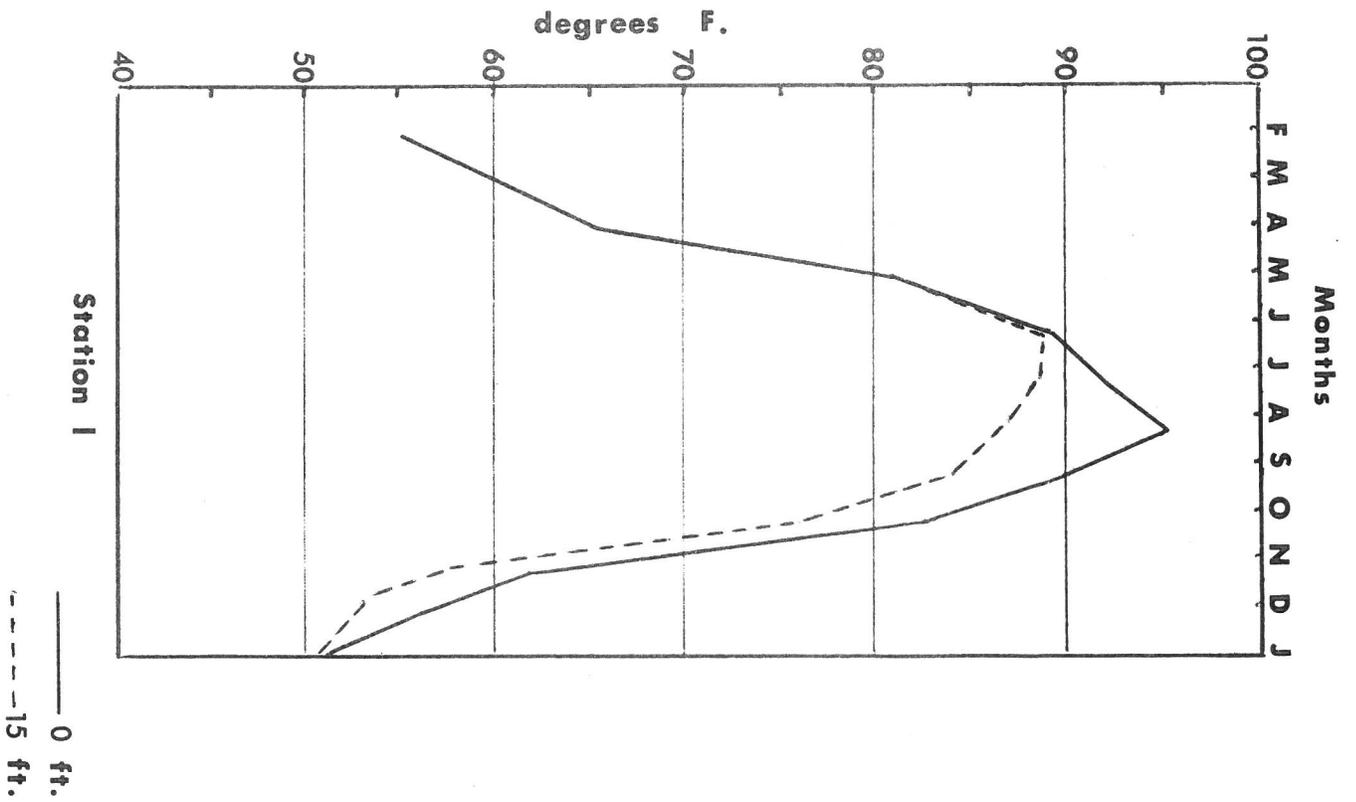


Figure 1. Annual change in temperature at the discharge, Station I, and the intake, Station VII.

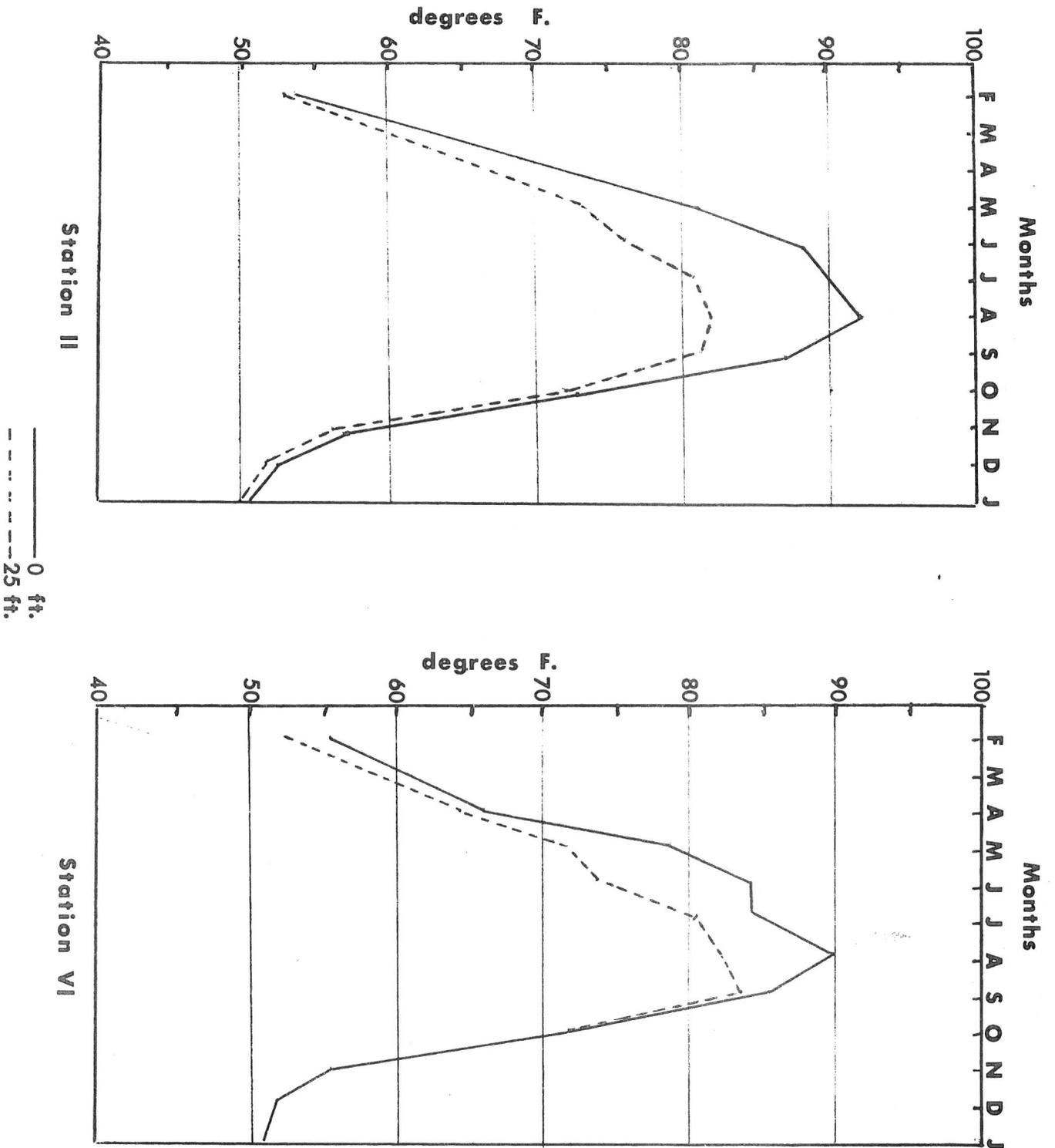


Figure 2. Annual change in temperature at Station II and VI.

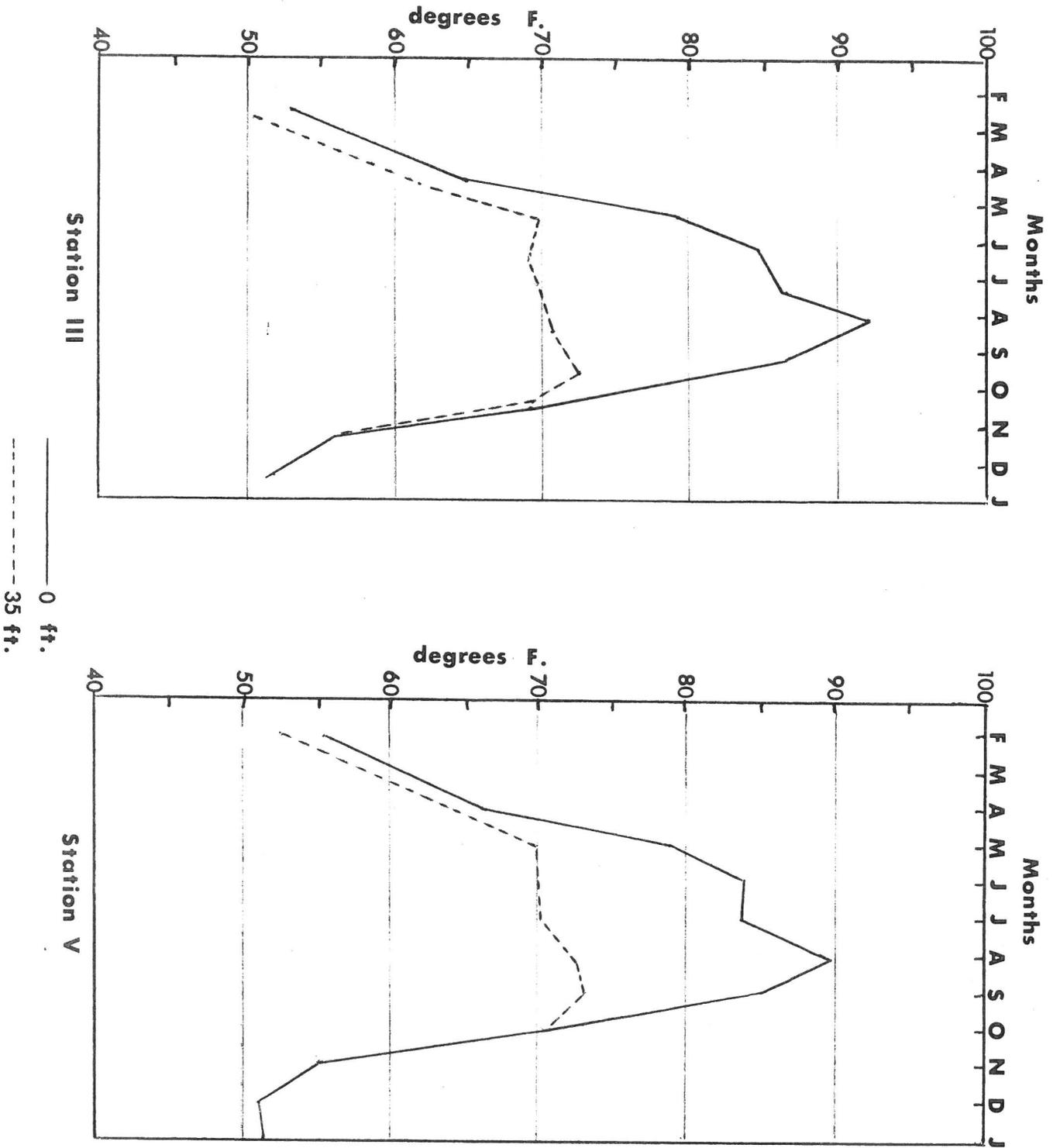


Figure 3. Annual change in temperature at Station III and V.

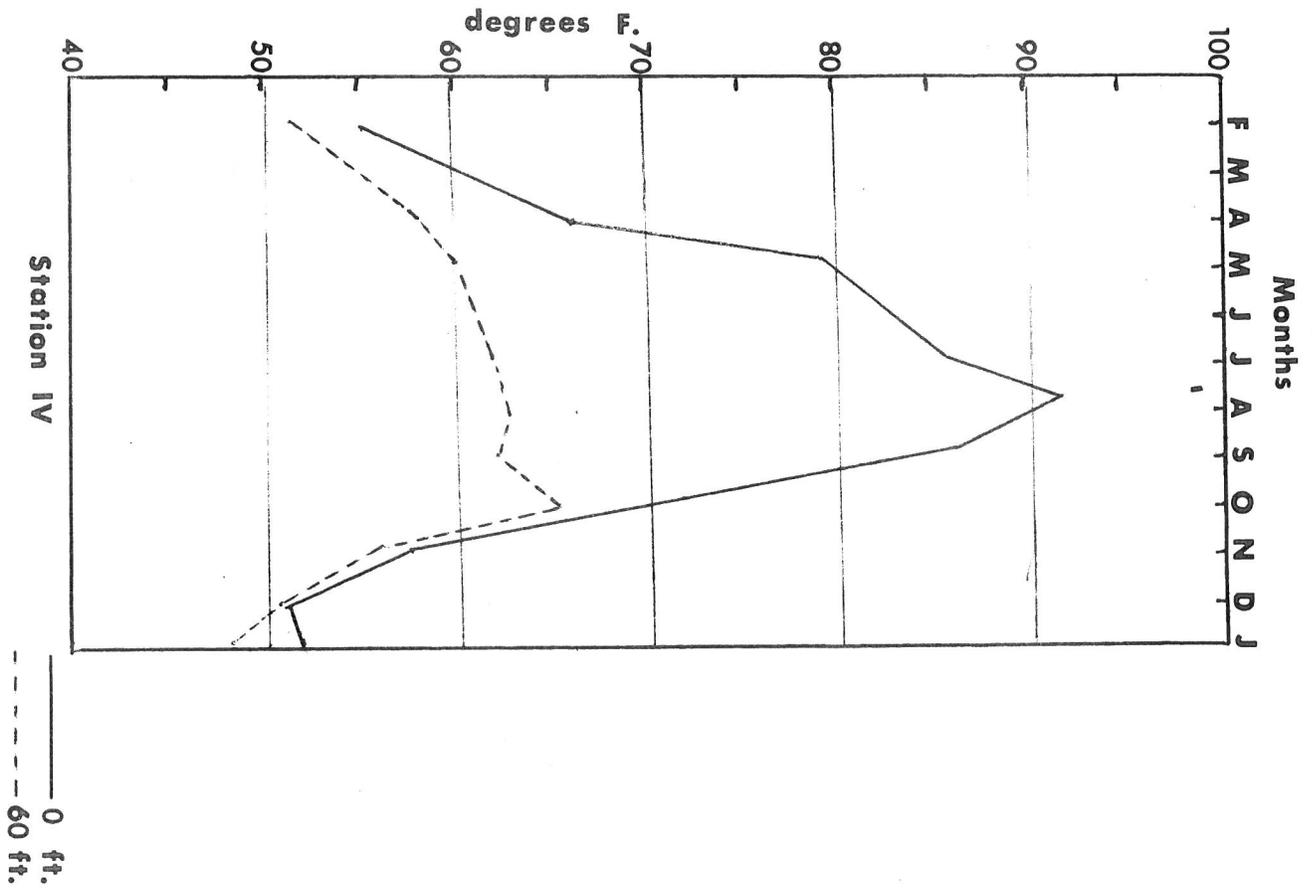


Figure 4. Annual change in temperature at Station IV.

TABLE I

BENTHIC COLLECTIONS  
Decker Lake

DISCHARGE		INTAKE				
Transect I No./ft. <sup>2</sup>	Transect II No./ft. <sup>2</sup>	Transect III No./ft. <sup>2</sup>	Transect IV No./ft. <sup>2</sup>			
Winter 1971-72	Hexagenia sp. Tendipes sp. Other	Chaoborus sp. Tendipes sp. Other	Hexagenia sp. Chaoborus sp. Tendipes sp. Other	11.63 7.38 4.50 1.74	Hexagenia sp. Pentaneura sp. Other	23.38 2.38 3.24
Spring 1972	Hexagenia sp. Pentaneura sp. Other	Chaoborus sp. Tendipes sp. Other	Hexagenia sp. Chaoborus sp. Tendipes sp. Other	5.75 18.75 4.50 5.88	Hexagenia sp. Chaoborus sp. Pentaneura sp. Other	19.42 6.93 3.20 2.27
Summer 1972	Hexagenia sp. Chaoborus sp. Other	Hexagenia sp. Chaoborus sp. Other	Hexagenia sp. Chaoborus sp. Other	25.25 13.83 2.67	Hexagenia sp. Chaoborus sp. Gammarrus sp. Other	19.42 18.50 9.00 2.25
Fall 1972	Hexagenia sp. Chaoborus sp. Other	Gammarrus sp. Chaoborus sp. Other	Hexagenia sp. Chaoborus sp. Other	3.58 54.33 4.67	Hexagenia sp. Chaoborus sp. Other	7.58 54.33 8.42
Winter 1972-73	Hexagenia sp. Chaoborus sp. Other	Chaoborus sp. Nematoda Hydra sp. Other	Hexagenia sp. Chaoborus sp. Other	2.00 24.67 5.60	Hexagenia sp. Chaoborus sp. Other	5.00 14.25 4.25

TABLE II  
Decker Lake Netting Data  
(Hot Side)  
1972

<u>Species</u>	<u>Number</u>	<u>Per Cent by Number</u>	<u>Weight</u>	<u>Per Cent by Weight</u>
<u>Lepisosteus oculatus</u>	1	.09	0.44	.03
<u>Ictiobus bubalus</u>	30	2.56	384.62	27.67
<u>Cyprinus carpio</u>	54	4.61	129.16	9.29
<u>Carpionodes carpio</u>	8	.68	36.44	2.62
<u>Dorosoma cepedianum</u>	211	18.00	111.81	8.04
<u>Ictalurus melas</u>	8	.68	2.26	.16
<u>Ictalurus natalis</u>	44	3.75	16.19	1.16
<u>Ictalurus punctatus</u>	137	11.69	480.61	34.58
<u>Ictalurus furcatus</u>	1	.09	16.88	1.21
<u>Notemigonus crysoleucas</u>	94	8.02	19.66	1.41
<u>Pomoxis annularis</u>	10	.85	13.32	.96
<u>Micropterus salmoides</u>	49	4.18	70.78	5.09
<u>Morone chrysops</u>	2	.18	5.06	.36
<u>Lepomis microlophus</u>	134	11.43	54.38	3.91
<u>Chaenobryttus cyanelus</u>	21	1.79	4.40	.33
<u>Lepomis megalotis</u>	45	3.84	5.83	.43
<u>Lepomis macrochirus</u>	322	27.47	37.21	2.68
<u>Moxostoma congestum</u>	1	.09	1.00	.07
<b>Total</b>	<b>1172</b>	<b>100.00</b>	<b>1390.05</b>	<b>100.00</b>

TABLE III  
 Decker Lake Netting Data  
 (Cold Side)  
 1972

<u>Species</u>	<u>Number</u>	<u>Per Cent by Number</u>	<u>Weight</u>	<u>Per Cent by Weight</u>
<u>Ictiobus bubalus</u>	13	1.40	198.27	22.87
<u>Cyprinus carpio</u>	46	4.97	55.25	6.37
<u>Carpiodes carpio</u>	9	.97	34.33	3.96
<u>Dorosoma cepedianum</u>	103	11.12	60.80	7.01
<u>Ictalurus melas</u>	11	1.19	4.30	.50
<u>Ictalurus natalis</u>	40	4.32	14.10	1.63
<u>Ictalurus punctatus</u>	86	9.29	324.16	37.40
<u>Notemigonus crysoleucas</u>	71	7.67	14.87	1.72
<u>Pomoxis annularis</u>	7	.76	8.94	1.03
<u>Micropterus salmoides</u>	36	3.89	47.26	5.45
<u>Lepomis microlophus</u>	111	11.99	29.16	3.36
<u>Chaenobryttus cyanelus</u>	58	6.26	10.26	1.18
<u>Lepomis megalotis</u>	49	5.29	6.57	.76
<u>Lepomis macrochirus</u>	283	30.56	30.57	3.53
<u>Lepisosteus osseus</u>	3	.32	28.00	3.23
Total	926	100.00	866.84	100.00

