DAVIS-BESSE NUCLEAR POWER STATION

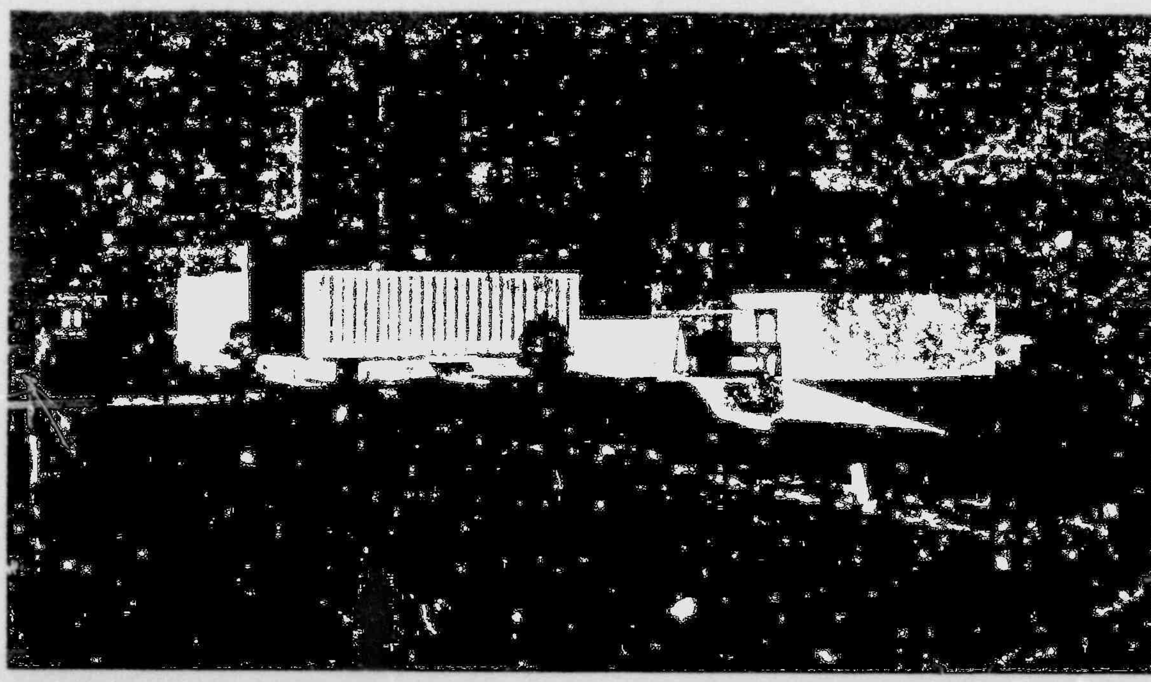
UNIT NO. 1

PRE-OPERATIONAL ENVIRONMENTAL MONITORING PROGRAMS

AQUATIC MONITORING PROGRAM
RADIOLOGICAL MONITORING PROGRAM
TERRESTRIAL MONITORING PROGRAM

SEMI-ANNUAL REPORT
JULY 1, 1974 - DECEMBER 31, 1974

VOLUME II



TOLEDO EDISON

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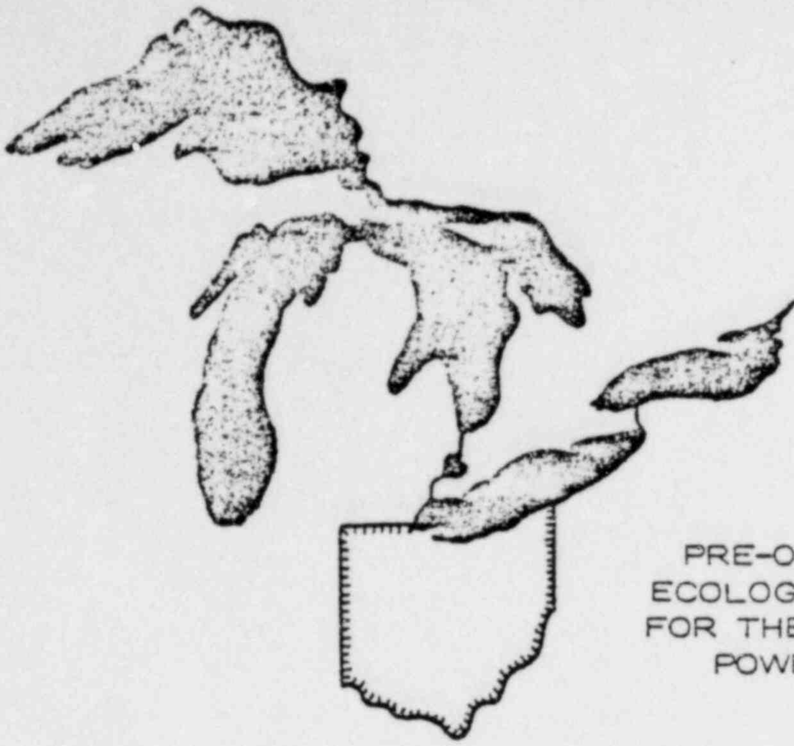

PRE-OPERATIONAL AQUATIC ECOLOGY MONITORING PROGRAM FOR THE DAVIS-BESSE NUCLEAR POWER STATION, UNIT 1

PROGRESS REPORT
JULY 1 - DECEMBER 31
1974

Prepared for
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Toledo, Ohio

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CENTER FOR LAKE ERIE AREA RESEARCH
THE OHIO STATE UNIVERSITY
COLUMBUS, OHIO

February 1975

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

PROJECT STAFF

Charles E. Herdendorf - Principal Investigator - Analysis of Physical Parameters and Field Sampling

Jeffrey M. Reutter - Co-Principal Investigator - Analysis of Biological Parameters and Field Sampling

Harold N. Cones, Jr. - Benthos and Fish Food Habits Analysis and Field Sampling

Donald H. Davis - Head of Sampling Team and Ichthyoplankton Analysis

William DeMott - Plankton Analysis

Carolyn S. Jenkinson - Administrative Assistant

Richard O. Moore, Jr. - Field Sampling and Clerical Aid

Veronica M. Reutter - Plankton Analysis and Clerical Aid

Marjorie A. Slagle - Secretarial Services

Gerald L. Treon, Jr. - Field Sampling and Clerical Aid

Nancy E. Zapotosky - Clerical Aid

OBJECTIVE

The purpose of this investigation is to ascertain the existing character of the aquatic ecosystem at Locust Point, Lake Erie prior to operation of the Davis-Besse Nuclear Power Station, Unit 1. Included in the assessment are studies of existing plankton, benthos, and fish populations and water quality and recent trends in these parameters. The report contained herein is for the period July 1, 1974 to December 31, 1974.

PROCEDURES

Sampling Station Location

Twenty-five stations, 18 along 4 transects in the open lake, 2 stations in the intake canal, 2 stations in the marshes, and 3 stations along the shoreline, were designated as sampling stations (Fig. 1). Of the 4 transects, one followed the intake conduit, one the discharge conduit, while control transects were set up on the east and west sides of the entire intake and discharge complex. Control west ran due north from the shore-end of the intake conduit with sampling stations located at 500 ft (Station 1), 1000 ft (Station 2), 2000 ft (Station 3), and 3000 ft (Station 4) from the shore line, sampling stations on the intake were located at 500 ft (Station 5), 1000 ft (Station 6), 2000 ft (Station 7), 3000 ft (Station 8, proposed intake), and 4000 ft (Station 9) from shore. Along the discharge transect sampling stations were at distances of 500 ft (Station 10), 1000 ft (Station 11), 1500 ft (Station 12, proposed discharge), 2000 ft (Station 13), and 3000 ft (Station 14 from shore. Additional stations were placed 500 ft due north of Station 12 (Station 15) and 500 ft south of Station 12 (Station 16). Control east ran perpendicular to the shore line, parallel to the intake, and approximately 2500 ft east of the intake. Stations were located 500 ft (Station 17) and 1000 ft (Station 18) from shore. Station 19 was located in the center of the intake canal, 1000 ft from the lake shore. Station 20 was located in the center of the forebay, 2500 ft from shore. Stations 21 and 22 were located in the northwest and southeast marshes, respectively. Stations 23 - 25 were on the shoreline at the intersection of the intake conduit and 1500 ft to either side.

Plankton

Plankton was sampled monthly, July through November, from 12 stations, 10 in the open lake and 2 in the intake canal and forebay (Table 1). Duplicate vertical tows, bottom to surface, were taken at each of the 12 stations with a Wisconsin plankton net (12 cm mouth;

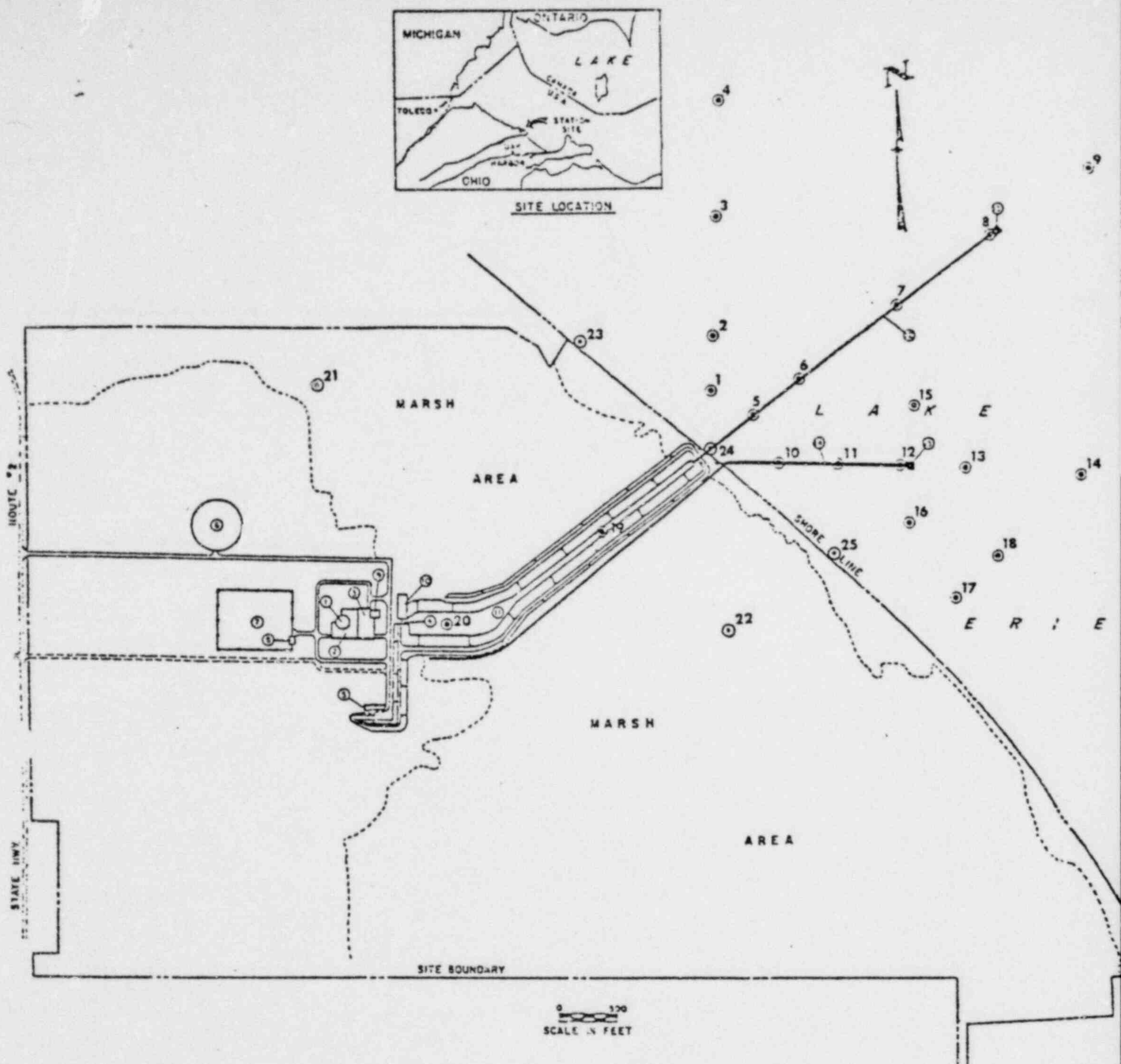

FIGURE 1

LOCATION MAP OF SAMPLING STATIONS AT THE DAVIS-BESSE NUCLEAR POWER STATION

LEGEND

EXISTING BUILDING & STATION AREA

1. CONTAINMENT BUILDING
2. AUXILIARY BUILDING
3. TURBINE BUILDING
4. INTAKE STRUCTURE
5. SEWAGE TREATMENT PLANT
6. COOLING TOWER
7. SWITCH YARD
8. RELAY HOUSE
9. CIRCULATION WATER SYSTEM PUMP HOUSE
10. WATER TREATMENT BUILDING
11. FORSBAY & INTAKE CANAL

PROPOSED WATER INTAKE AND DISCHARGE

- 96" INTAKE CONDUIT
- INTAKE CRIB
- 72" DISCHARGE CONDUIT
- DISCHARGE STRUCTURE

⊙ Monitoring Stations

WATER INTAKE AND DISCHARGE
DAVIS - BESSE NUCLEAR POWER STA

no. 25, 0.064 mm mesh). Each sample was concentrated to 50 ml and preserved in 5% formalin. The volume of each sample was computed by multiplying the length of the tow by the area of the net mouth. The works of Chengalath, Fornando, and George (1971), Collins and Kalinsky (1972), Eddy and Hodson (1964), Jahoda (1948), Pennak (1953), Taft and Taft (1971), and Ward and Whipple (1959) were used in plankton identification.

TABLE 1

AQUATIC MONITORING PROGRAM SAMPLING DATES-1974

Sample	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
PLANKTON	18	22	19	17	22	10	9	7	
BENTHOS	17-18	22-23	19-20	17	14	6	10	7	
FISH									
Gill Net	25-26	21-22	13-14	10-11	19-20	12-13	16-17	25-26	
Shore Seine	12	21	13	9	27	12	16	14	
Otter Trawl									
Lake	25	21	21	19	16	13	10	8	
Intake Canal			18		27	24	23		
Hoop Net	24-25	21-22	13-14	9-10	19-20	17-18	16-17	25-26	
Fry Net									
Lake		21	14	10	19	12	16	25	
Intake Canal					27				
WATER QUALITY	18	22	19	17	22	10	9	7	17
CURRENTS		24	21	18	16	12	17		
SOLAR RADIATION	25		1 & 29	26		7	31		

Phytoplankton. Three 1-ml aliquots were withdrawn from each sample and placed in Sedgewick-Rafter cells. Twenty-five random Wipple Disk fields from each cell were counted for phytoplankton with a microscope at 100x. Identification was generally to the genus level. Results were reported as number per liter.

Zooplankton. Again, three 1-ml aliquots were withdrawn from each sample and placed in Sedgewick-Rafter cells. The entire cell was scanned under a microscope at 60x while counting and identifying all zooplankters. Individuals were identified as far as possible (generally to the genus or species level) and reported as number per liter.

Benthos

Benthos was sampled monthly, July through November, from Stations 1 to 20 (Table 1). Three replicate samples were taken at each station with a Ponar grab (A = 0.055 m^2). Samples were sieved through a U.S. #40 sieve, preserved in 10% formalin and returned to the laboratory. Individuals were identified as far as possible (usually to genus; to species where possible) and reported as numbers of individuals per square meter. The works of Brinkhurst (1963), (1964), (1965), Brinkhurst, Hamilton, and Herrington (1968), Klemm (1972), Mason (1968), Pennak (1953), Stein (1962), Usinger (1956), Walter and Burch (1957), and Ward and Whipple (1959) were used for the benthos identification.

Fish

Fish were sampled by 5 methods, gill nets, shore seine, otter trawl, hoop nets, and fry net, July through November (Table 1). All fish captured were weighed, measured, and identified to species (Trautman, 1957).

Gill nets. Two experimental gill nets were set parallel to and near the end of the intake and discharge pipelines (Stations 8 and 12, respectively). Each net (125 ft x 6 ft) consisted of five 25 ft x 6 ft contiguous panels (1/2", 3/4", 1", 1 1/2", and 2" bar mesh). The nets were fished for approximately 24 hours monthly.

Shore Seine. Shore seining was accomplished monthly with a 100 ft bag seine at Stations 23, 24, and 25. The seine was stretched perpendicular to the shoreline until the shore brail was at the water's edge. The far brail was then dragged through a 90° arc back to shore. Two hauls were made at each station.

Otter Trawl. Both a 16-ft and an 8-ft otter trawl were used to collect fish for estimates of relative abundance and to obtain live fish for stomach analysis. The 16-ft trawl was used in the open lake. Four 5-minute tows between the intake (Station 8) and the discharge (Station 12) were completed monthly. A representative number of stomachs were taken from these for stomach analysis. Stomachs were preserved in 5-10% formalin.

The 8-ft trawl was used within the intake canal. Two tows of the entire canal length were conducted quarterly.

Hoop nets. Hoop nets (2.5 ft diameter, 1" bar mesh) were set at Stations 21 and 22 in the northwest and southeast marshes. The nets were fished for approximately 24 hours monthly. These fish were identified, weighed, measured and released.

Fry Net. A 0.75-meter diameter oceanographic plankton net (no. 00, 0.75 mm mesh) was used to capture fry, larvae, and eggs (ichthyoplankton). Five-minute circular tows, surface and near bottom, around the intake (Station 8) and discharge (Station 12), were completed monthly. Additional tows, surface and bottom, were made within the intake canal in August. Ichthyoplankton was preserved in 5% formalin and analyzed under a dissecting microscope. Individuals were identified as far as possible (generally species) using the works of Fish (1932) and Norden (unpublished key to larval fishes).

Water Quality

Twenty water quality parameters were measured monthly during the entire period July - December at three stations in Lake Erie. These parameters and the analytical method employed are listed in Table 2.

Field Measurements. Water quality measurements were made monthly in the field at Station 1, 8, and 12 (Figure 1). Temperature, dissolved oxygen and conductivity were measured from a small survey boat with submerged sensors and shipboard readout meters. Dissolved oxygen was determined with a YSI model 54 meter and conductivity with a Beckman RB3-3341 solubridge temperature-compensated meter; each meter was equipped with a thermistor for temperature readings. Sensor readings were taken at the surface and approximately 50 cm above the bottom. Transparency was determined with a 30 cm diameter Secchi disk lowered on a marked line until it was no longer visible. Solar radiation was measured at Station 8 with a GM Mfg. and Instr. Corp. model 268WA-300 submarine photometer at the surface and at one-meter depth intervals until the illumination equalled 1.0% of the surface value. Current velocity and direction were measured at Stations 8 and 12 with a HydroProducts model 65-A meter and surface drogues.

Laboratory Determinations. Surface and bottom (50 cm above) water samples were taken at Stations 1, 8, and 12 with a 3-liter Kemmerer sampler at the same time that field measurements were being made. These samples were placed in polyethylene containers and taken to the laboratory for analysis; in most cases, analyses were completed within 24 hours of the sampling time. Fifteen water quality parameters (Table 2) were determined in the laboratory using the procedures prescribed in "Standard Methods for the Examination of Water, 13th Edition" (American Public Health Association, 1971) and in "ASTM Standards, Part 23, Water" (American Society for Testing and Materials, 1973).

TABLE 2

ANALYTICAL METHODS FOR WATER QUALITY DETERMINATIONS

	Parameter	Units	Analytical Method
1.	Temperature	°C	Std. Methods, 13th Ed., 162 (1971)
2.	Dissolved oxygen	ppm	Std. Methods, 13th Ed., 218B (1971)
3.	Conductivity	umhos/cm (25°C)	ASTM D1135-64 (1973)
4.	Transparency	meters	Secchi disk (Welch, 1948)
5.	Solar radiation	u amps	G.M. Mfg. & Instr. Corp., submarine photometer
6.	Current	knots	HydroProducts, A-65 current meter
7.	Calcium (Ca)	mg/l	Std. Methods, 13th Ed., 110C (1971)
8.	Magnesium (Mg)	mg/l	Std. Methods, 13th Ed., 122B (1971)
9.	Sodium (Na)	mg/l	ASTM D1428-64 (1973)
10.	Chloride (Cl)	mg/l	Std. Methods, 13th Ed., 112B (1971)
11.	Nitrate (NO_3)	mg/l	ASTM D992-71 (1973)
12.	Sulfate (SO_4)	mg/l	ASTM D516-68C (1973)
13.	Phosphorous (Total as P)	mg/l	Std. Methods, 13th Ed., 223F (1971)
14.	Silica (SiO_2)	mg/l	ASTM D 859-68B (1973)
15.	Alkalinity (total as $CaCO_3$)	mg/l	Std. Methods, 13th Ed., 102 (1971)
16.	Biochemical oxygen demand	mg/l	Std. Methods, 13th Ed., 219 (1971)
17.	Suspended solids	mg/l	Std. Methods, 13th Ed., 224C (1971)
18.	Dissolved solids	mg/l	USEPA, Chem. Analysis, Water (1971)
19.	Turbidity	F.T.U.	Std. Methods, 13th Ed., 163A (1971)
20.	Hydrogen-ion conc.	pH units	ASTM D1293-65 (1973)

RESULTS

Plankton

Phytoplankton. Phytoplankters collected July through November 1974 were divided into 54 taxa, generally to the genus level (Table 3). Thirteen taxa were in the class Bacillariophyceae, 27 in the class Chlorophyceae, 1 in the class Chrysophyceae, 3 in the class Dinophyceae, 2 in the class Euglenophyceae, 6 in the class Myxophyceae, 1 consisted of unidentified bacteria, and 1 consisted of unidentified phytoplankter.

The range of the total phytoplankton population per liter per station was 53 - 6,855 in July, 410 - 2,274 in August, 1,385 - 9,543 in September, 11,757 - 38,151 in October, and 13,955 - 48,815 in November (Table 4). Additional data are contained in Appendix A.

Zooplankton. Zooplankters collected July through November 1974 were divided into 51 taxa, 27 under Rotifera, 8 under Copepoda, 9 under Cladocera, and 7 under Protozoa (Table 5). Twenty-four taxa were identified to the species level, 22 to the genus level, 2 consisted of unidentified rotifers, and 3 contained immature copepods.

The total zooplankton population per liter per station ranged from 246.7 - 2,202.2 in July, 224.8 - 431.3 in August, 213.1 - 1,018.3 in September, 92.3 - 394.0 in October, and 208.0 - 372.4 in November (Table 6). Additional data are contained in Appendix B.

Benthos

Benthic macroinvertebrates collected at Locust Point July through November 1974 were divided into 40 taxa (Table 7). The population was dominated by Oligochaetes. The total benthic macroinvertebrate population per square meter per station ranged from 51 - 3,185 in July, 89 - 7,659 in August, 83 - 7,175 in September, 38 - 3,737 in October, and 0 - 4,291 in November (Table 8). Additional data are contained in Appendix C.

Fish

The five fishing methods employed yielded 25,315 fish of 28 species during the period July through November 1974. A summary of these results is contained in Table 9.

Gill Net. Gill netting from July through November yielded 1,025 fish representing 19 species. The catch at Station 8 (intake)

TABLE 3

PHYTOPLANKTON POPULATIONS AT LOCUST POINT
1974 MONTHLY MEANS

TAXA	April 18	May 22	June 19	July 17	Aug 22	Sept 10	Oct 9	Nov 7
BACILLARIOPHYCEAE								
(Diatoms)								
Asterionella sp.	1735	1600	551	11	2	2	65	105
Centric diatom				10		0	49	63
Cyclotella sp.	4			2		43	0	0
Cymatopleura sp.	14	25	3		6	0	6	9
Fragilaria sp.	435	4556	63		21	38	368	2160
Gyrosigma sp.	1			2	6	6	5	10
Melosira sp.	3990	55597	350	238	719	754	3600	3398
Naviculoid	12		21	9	16	43	58	120
Stephanodiscus sp.				1		0	1710	4780
Surirella sp.		12	19	4		0	1	7
Synedra sp.	5	23		2		20	23	39
Tabellaria sp.	1335	6259	81	6	2	1	18	66
Unidentified Diatom							55	
CHLOROPHYCEAE								
(Green Algae)								
Actinastrum sp.						9	68	34
Ankistrodesmus sp.							36	17
Binuclearia sp.						22	384	628
Chlamydomonas sp.						38		
Closteriopsis sp.	43	11		2	25	0	185	632
Closterium sp.						245	10	23
Coelastrum sp.		3		62		56	32	21
Cosmarium sp.				4		4	5	11
Crucigenia sp.							24	
Cruciniginia sp.						4		
Dictyosphaerium sp.						6	111	124
Dimorphococcus sp.							9	8
Eudorina sp.				61	107	19	3	0
Lagerheimia sp.							3	
Micractinium sp.	2					0	55	36
Mougeotia sp.	6				2	935	4140	17776
Oocystis sp.							47	
Pandorina sp.	2	12	27	26		64	47	39
Pediastrum sp.	37	392	841	774	557	1400	1982	1351
Platydorina sp.						6		
Rhizoclonium sp.				3			2	0
Scenedesmus sp.	1	9	10	7	9	29	113	162
Selenastrum sp.							3	
Spirogyra sp.	4		3			0	0	0
Staurastrum sp.			5	82	90	83	74	129
Ulothrix sp.								3
Volvox sp.	7	5	18	3	3	1	33	4
CHRYSOPHYCEAE								
Dinobryon sp.							3	
DINOPHYCEAE								
(Dinoflagellates)								
Ceratium hirundinella	3	14	6	1757	17	23	11	3
Glenodinium sp.				41		0	0	0
Peridinium sp.						14		
EUGLENOPHYCEAE								
Euglena sp.						8	23	26
Trachelomonas sp.				4		0	4	0
MYXOPHYCEAE								
(Blue-green algae)								
Anabeana sp.				7	8	23	96	29
Aphanizomenon sp.				204		1547	5444	1322
Chroococcus sp.				61	14	46	22	23
Merismopedia sp.				2		0	0	0
Microcystis sp.			99	39	13	265	307	124
Spirulina sp.								
Unidentified Bacteria	182					0		5
Unidentified Phytoplankter				26		0		0
TOTAL	7860	68517	2002	3480	1103	5751	19232	33499

Data presented as number/liter.

TABLE 4

TOTAL PHYTOPLANKTON POPULATION PER LITER - 1974

Station	April 18	May 22	June 19	July 17	August 22	September 10	October 9	November 7
1	13282	12628	4205	6178	1393	7755	38151	35848
3	5929	78687	2047	2737	1329	3891	12016	33484
6	5510	84172	2276	3198	1680	5917	19424	27413
8	8250	100329	1593	2313	1562	5528	14883	43947
9	6227	57674	1657	1980	1727	4917	13456	48815
10	11758	240929	3357	6650	1977	9543	29853	35775
12	8097	118453	2335	6855	2274	6985	14540	32662
13	6657	103316	1892	2139	1679	6444	17977	26406
14	5904	76162	1314	3440	1353	4258	16030	33901
18	8510	91900	1976	2513	2252	6638	23463	36280
19	6333	5753	361	56	410	1385	11757	13955
20*								

* This station had been drained of all water for further construction.

TABLE 5

ZOOPLANKTON POPULATIONS AT LOCUST POINT
1974 MONTHLY MEANS

TAXA	April 18	May 22	June 19	July 17	Aug 22	Sept 10	Oct 9	Nov 7
ROTIFERA								
Asplanchna giroidi	0.3							
A. priodonta	0.0	2.2	1.8	2.6	57.3	29.8	3.1	2.2
Brachionus angularis	9.0	3.7	8.8	25.4	46.4	3.1	2.2	1.1
B. calyciflorus	3.7	5.2		0.3	0.1	1.6	9.5	27.4
B. havanaensis			0.1	0.2	1.3	1.0	0.1	
B. (Platyias) patulus						0.2		
B. urceolaris	1.2	0.1					0.0	
Chromogaster ovalis	1.0					2.3		0.0
Conochiloides sp.			3[illegible].9	7.3	0.3	0.2	5.8	2.5
Euchlanis sp.						0.1	0.0	0.0
Filinia terminalis	1.8	12.7	0.4	5.4	0.7	0.3	0.3	0.1
Hexarthra mira						0.4	0.1	
Kellicottia longispina	0.6	4.6	3.2					0.1
Keratella cochlearis	3.1	155.0	26.1	16.8	11.6	21.5	12.4	90.2
K. quadrata	3.9	35.4	8.1	1.1	2.0	0.5	1.0	9.3
Lecane (Monostyla) bulla							0.0	
L. (Monostyla) lunaris				0.0		0.1		
Nothoica squamula	6.5	13.1						
Pleosoma sp.							0.3	
Polyarthra sp.	5.8	73.1	128.5	512.8	105.5	215.0	37.1	33.1
Pompholyx sulcata						1.1		
Synchaeta sp.	1.8						0.1	0.1
Testudinella sp.	0.1							
Trichocerca cylindrica		0.0		0.4		0.7	0.2	
T. multicrinis		1.1	7.1	0.2	11.8	8.2	0.1	
Unidentified Rotifer A	0.1	1.8			2.7	39.1	0.3	27.5
Unidentified Rotifer B						7.9		
COPEPODA								
Calanoid copepods								
Diaptomus sp.	0.5	15.5	13.1	5.1	1.0	0.9	1.0	0.6
Eurytemora sp.								0.0
Immatures	0.1	5.2	1.3	2.4	0.7	1.3	4.2	1.0
Cyclopoid copepods								
Cyclops sp.	1.2	12.4	115.1	55.0	18.4	3.2	1.4	1.5
Mesocyclops sp.	0.1	0.4	0.1	0.0	0.4	0.1	0.1	0.0
Tropocyclops prasinus								0.1
Immatures	1.3	18.4	13.8	27.9	9.3	8.1	6.5	5.3
Nauplius	28.5	160.7	266.1	123.6	48.1	78.8	59.3	15.0
CLADOCERA								
Bosmina sp.	0.0	3.3	155.7	49.1	17.0	19.0	54.3	7.4
Ceriodaphnia sp.					0.0	0.2		
Chydorus sp.	0.1	0.1	0.1		0.0	4.8	12.8	15.1
Daphnia galeata			0.1	0.4	0.0	0.0		
D. pulex	0.0	10.5	0.1	0.3				
D. retrocurva			74.5	137.8	2.6	2.2	0.1	
Diaphanosoma sp.				0.0	0.0	1.4	0.2	
Holopedium sp.			0.0	0.2	0.1	1.2		
Leptodora kindtii			0.1	0.2	0.1	0.2		
PROTOZOA								
Acineta sp.	0.1							
Amphileptus sp.	0.1							
Difflugia sp.				69.6	26.9	99.3	42.2	15.8
Orphryodendron sp.	0.1							
Staurophyra sp.	5.6							
Vorticella sp.							0.6	0.5
Zoothamnium sp.						0.4	0.8	0.4
TOTAL	75.1	522.3	787.8	1131.8	354.5	555.3	259.2	256.0

Data presented as number/liter.

TABLE 6

TOTAL ZOOPLANKTON POPULATION PER LITER - 1974

Station	April 18	May 22	June 19	July 17	August 22	September 10	October 9	November 7
1	152.0	598.8	83.6	1746.3	235.9	1018.3	394.0	265.7
3	53.5	414.5	639.7	1211.2	416.7	487.7	213.5	253.3
6	51.7	38.4	722.3	984.0	383.2	494.3	285.1	246.1
8	55.6	265.0	732.5	917.6	424.2	261.1	256.2	256.2
9	44.7	269.5	721.8	992.3	431.0	343.7	228.3	372.4
10	144.8	1270.1	1495.9	2202.2	224.8	962.3	375.3	286.4
12	79.9	566.6	634.5	1027.6	387.5	694.4	209.9	234.2
13	62.5	453.9	829.0	1243.3	431.3	532.6	282.0	237.0
14	40.5	331.8	751.2	923.2	398.0	462.7	244.6	244.6
18	71.6	529.7	1067.7	954.9	319.8	549.5	270.1	208.0
19	69.4	1012.1	987.2	246.7	356.6	213.1	92.3	211.9
20*								

* This station had been drained of all water.

TABLE 7

BENTHIC MACROINVERTEBRATE POPULATIONS AT LOCUST POINT - 1974 MONTHLY MEANS

TAXA	April 17-18	May 22-23	June 19-20	July 17	Aug 14	Sept 6	Oct 10	Nov 7
COELENTERATA								
Hydra sp. (budding polyp)	2	7	54		1	0	4	6
Hydra sp. (single polyp)		5	68		1	1	11	11
NEMATODEA						3	4	
ANNELIDA								
Hirudinea								
Helobdella elongata						2	2	
H. stagnalis		1			1		2	0
Oligochaeta (unidentified)				21				
Immatures (hair setae)	3			5	1		4	1
Immatures (no hair setae)	1168	1109	634	688	1071	941	870	750
Branchiura sowerbyi	13	14	6	2	7	12	14	15
Limnodrilus cervix		4	3	7	39	21	3	10
L. claparedeanus	1	10	33	15	22	11	4	6
L. claparedeanus-cervix		1		1	1	13	5	11
L. hoffmeisteri	0	3						
L. maumeensis		1		0	1	1		1
L. udekemianus	2	10						
Nais sp.							1	5
Potamothrix moldaviensis	9	0	21	24	31	11	11	
P. vejdovskyi	2	1						
Stylaria sp.						0	7	
ARTHROPODA								
Cladocera								
Leptodora kindtii			16	136	40	166	14	0
Amphipoda								
Gammarus fasciatus	3	0	9	13	6	10	22	35
Hyalella azteca				1				
Decopoda								
Orconectes sp.			0					
Chironomidae								
Chironomus (chironomus) sp.	111	40	69	29	199	67	45	23
Chironomus pupa		0						
Coelotanypus sp.					20	2	3	1
Cricotopus sp.								1
Cryptochironomus sp.	4	6	3	3	8	2	13	17
Polypedilum sp.		1	1	1			1	
Procladius sp.	23	18	32	3	57	8	12	31
Procladius pupa		2	0	1	0			
Pseudochironomus sp.	0	1	0			1		
Tanypodinae pupa		1						
Tanytarsus sp.	8		568	52	17	202	160	52
Tanytarsus pupa			2					
Ephemeroptera								
Caenis sp.		2		1		0		
Trichoptera								
Hydropsychidae	0							
MOLLUSCA								
Gastropoda								
Bulimus sp.	0	0	0					
Pelecypoda								
Amblema plicata		1			2		1	
Sphaerium sp.		3	1	3	2	2	1	3
Station Total	1355	1218	1528	954	1527	1543	1269	992

Data presented as number/m^2.

TABLE 8

TOTAL BENTHOS POPULATION PER SQUARE METER - 1974

Station	April 17-18	May 22-23	June 19-20	July 17	August 14	September 6	October 10	November 7
1	19	44	1700	127	592	83	579	210
2	96	516	147	76	102	274	528	210
3	1541	1662	4170	3185	2776	1191	2903	3247
4	3228	2375	2693	1910	2782	1738	3737	1745
5	312	140	115	127	127	115	1904	32
6	166	2941	191	204	7659	478	1413	548
7	3763	2413	433	267	624	834	471	255
8	3361	255	1585	458	535	1394	1445	751
9	898	1414	936	1770	1343	4564	1643	2095
10	57	57	191	51	185	127	185	38
11	382	382	3361	471	3152	439	102	586
12	1178	2808	802	458	102	643	560	1159
13	1293	465	337	987	89	1827	337	1490
14	5857	3998	3769	3018	3890	5004	3444	4291
15	357	89	1452	1464	1388	840	1700	745
16	401	134	1101	1292	1127	1821	802	255
17	57	3082	2840	337	102	210	331	83
18	3635	204	3056	1770	2184	7175	840	1108
19	325	618	146	153	261	567	38	0
20	178	*	*	*	*	*	*	*

* This station had been drained of all water for further construction.

TABLE 9

SUMMARY OF FISHING RESULTS AT LOCUST POINT - JULY - NOVEMBER 1974

METHOD OF CAPTURE	JULY		AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		TOTAL	
	No. of Fish	No. of Species	No. of Fish	No. of Species	No. of Fish	No. of Species	No. of Fish	No. of Species	No. of Fish	No. of Species	No. of Fish	No. of Species
Gill Net	179	13	260	11	408	10	168	9	10	5	1025	19
Shore Seine	13150	9	458	7	697	7	1555	4	2084	4	17944	13
Otter Trawl												
Lake	18	8	88	9	64	10	67	3	1038	6	1275	14
Intake Canal			33	4	411*	18	1	1			445	18
Hoop Net	17	3	5	2	17	4	1	1	24	2	64	6
Fry Net												
Lake	4481	3	6	2	4	2	9	1	56	1	4556	5
Intake Canal			6	2							6	2
TOTAL	17845	19	856	19	1601	24	1801	12	3212	11	25315	28

* This was the total of more than 22 trawls made in an effort to remove as many fish (alive) as possible before poisoning the canal.

totaled 397 fish of 16 species, while at Station 12 (discharge) 328 fish of 17 species were captured (Tables 10 and 11).

Shore Seine. The yield from shore seines during the period July through November was 17,944 fish of 13 species. The monthly catches ranged from 458 - 13,150 fish (Tables 12 - 16).

Otter Trawl. Trawling in the lake during the period July through November yielded 1,275 fish of 14 species (Table 17). Scheduled trawling within the intake canal yielded 34 fish of 4 species during the summer and autumn quarters (Table 18). Twenty-two plus trawls, yielding 411 fish of 18 species, were made in September to remove as many fish as possible prior to poisoning[1] the canal (Table 19).

Hoop Net. Hoop nets set in the northwest marsh (Station 21) July through November yielded 28 fish of 5 species and 5 painted turtles (Table 20). Nets set in the southeast marsh (Station 2) during the same period caught 36 fish of 4 species, 1 painted turtle, and 2 snapping turtles (Table 21).

Fry Net. The catch during July through November from the lake totaled 4,556 fish of 5 species (Table 22). Fry netting within the intake canal on 27 August 1974, yielded 4 *Notropis a. atherinoides* (emerald shiner - mean length 77 mm) and 2 *Morone chrysops* (white bass - mean length 15 mm). These shiners are probably too large to be called fry. No sampling was done in the fall due to the poisoning of the canal in September.

Food Habits

The results of the food habits study for the period July through November will be presented in a supplementary report.

Water Quality

The results of the monthly water quality determinations at Stations 1, 8 and 12 are shown in Tables 23 - 28. Solar Radiation measurements for Station 8 are given in Table 29 and current measurements for Stations 8 and 12 are listed in Table 30. Water quality measurements for the ice-free period of the first half of 1974 and the second half (July - December) of 1974 showed moderate ranges for the parameters tested (Table 31).

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1. Poisoning of the intake canal took place on 25 September 1974 in order to remove fish from this area prior to plant operation. Continued monitoring of the canal will permit an assessment of fish movements, if any, through the intake crib.

TABLE 10

ANALYSIS OF GILL NET CATCH AT LOCUST POINT
STATION 8 - JULY - NOVEMBER, 1974

Date	Taxa	No.	Length (mm) Mean	Length (mm) Range	Weight (g) Mean	Weight (g) Total
July 10-11, 1974						
	Alosa pseudoharengus	4	184	173	58	232
	Ambloplites rupestris	1	196		166	166
	Aplodinotus grunniens	8	169	107-307	138	1104
	Catostomus c. commersoni	1	320		410	410
	Cyprinus carpio	5	327	238-377	497	2485
	Ictalurus punctatus	4	301	213-374	322	1288
	Morone chrysops	1	333		588	588
	Notropis a. atherinoides	3	111	110-112	7	21
	N. hudsonius	7	114	93-126	10	70
	Perca flavescens	51	160	105-207	54	2754
	Subtotal	85				9118
August 19-20, 1974						
	Aplodinotus grunniens	1	250		170	170
	Carassius auratus	2	243	240-245	215	430
	Cyprinus carpio	5	287	230-333	373	1863
	Dorosoma cepedianum	25	195	111-320	145	3624
	Ictalurus nebulosus	2	151	137-165	55	110
	Morone chrysops	1	223		175	175
	Notropis hudsonius	2	103	102-105	10	21
	Perca flavescens	56	174	95-207	75	4193
	Pomoxis annularis	4	144	118-165	44	176
	Subtotal	98				10762
September 12-13, 1974						
	Alosa pseudoharengus	72	103	93-184	12	864
	Dorosoma cepedianum	14	153	91-341	81	1140
	Ictalurus nebulosus	2	146	141-150	42	84
	Morone chrysops	1	90		10	10
	Notropis hudsonius	11	108	100-112	14	152
	Perca flavescens	40	190	137-213	85	3414
	Pomoxis annularis	5	177	155-215	85	426
	Stizostedion v. vitreum	1	199		70	70
	Subtotal	146				6160

TABLE 10 CONT.

ANALYSIS OF GILL NET CATCH AT LOCUST POINT
STATION 8 - JULY - NOVEMBER 1974

Date	Taxa	No.	Length (mm)		Weight (g)	
			Mean	Range	Mean	Total
October 16-17, 1974						
	Alosa pseudoharengus	27	99	93-111	9	247
	Dorosoma cepedianum	2	146	135-156	34	67
	Notropis hudsonius	19	113	104-128	15	287
	Osmerus eperlanus mordax	1	159		21	21
	Perca flavescens	14	181	147-211	75	1046
	Stizostedion v. vitreum	1	220		107	107
	Subtotal	64				1775
November 25-26, 1974						
	Notropis hudsonius	3	108	101-112	14	43
	Perca flavescens	1	180		79	79
	Subtotal	4				122
TOTAL		397				27937

TABLE 10 CONT.

ANALYSIS OF GILL NET CATCH AT LOCUST POINT
STATION 8 - JULY - NOVEMBER 1974

Date	Taxa	No.	Length (mm)		Weight (g)	
			Mean	Range	Mean	Total
October 16-17, 1974						
	Alosa pseudoharengus	27	99	93-111	9	247
	Dorosoma cepedianum	2	146	135-156	34	67
	Notropis hudsonius	19	113	104-128	15	287
	Osmerus eperlanus mordax	1	159		21	21
	Perca flavescens	14	181	147-211	75	1046
	Stizostedion v. vitreum	1	220		107	107
	Subtotal	64				1775
November 25-26, 1974						
	Notropis hudsonius	3	108	101-112	14	43
	Perca flavescens	1	180		79	79
	Subtotal	4				122
TOTAL		397				27937

TABLE 11

ANALYSIS OF GILL NET CATCH AT LOCUST POINT
STATION 12 - JULY - NOVEMBER, 1974

Date	Taxa	No.	Length (mm)		Weight (g)	
			Mean	Range	Mean	Total
July 10-11, 1974						
	Alosa pseudoharengus	72	172	142-207	47	3638
	Aplodinotus grunniens	3	209	144-338	186	558
	Dorosoma cepedianum	7	282	137-365	349	2443
	Hybopsis storeriana	1	181		62	62
	Ictalurus punctatus	2	241	196-285	148	296
	Notropis a. atherinoides	1	110		10	10
	N. hudsonius	1	125		22	22
	Perca flavescens	5	160	115-197	46	230
	Pomoxis annularis	2	136	121-151	36	72
	Subtotal	94				7331
August 19-20, 1974						
	Carassius auratus	3	308	292-321	436	1307
	Cyprinus carpio	18	292	123-398	454	8181
	Dorosoma cepedianum	63	116	82-302	30	1886
	Ictalurus nebulosus	4	146	136-167	48	190
	I. punctatus	1	162		30	30
	Morone chrysops	4	104	94-130	16	63
	Notropis hudsonius	7	111	102-120	13	94
	Perca flavescens	56	180	115-230	86	4847
	Pomoxis annularis	5	149	130-165	48	241
	P. nigromaculatus	1	15[illegible]		52	52
	Subtotal	162				16891
September 12-13, 1974						
	Alosa pseudoharengus	146	103	90-200	14	2044
	Cyprinus carpio	2	323	320-326	489	977
	Dorosoma cepedianum	67	135	81-335	54	3641
	Morone chrysops	6	226	130-257	202	1212
	Notropis hudsonius	6	116	105-130	18	107
	Perca flavescens	32	187	150-217	81	2590
	Pomoxis annularis	2	147	139-154	42	83
	P. nigromaculatus	1	174		90	90
	Subtotal	262				10744

TABLE 11 CONT.

ANALYSIS OF GILL NET CATCH AT LOCUST POINT
STATION 12 - JULY - NOVEMBER, 1974

Date	Taxa	No.	Length (mm) Mean	Length (mm) Range	Weight (g) Mean	Weight (g) Total
October 16-17, 1974						
	Alosa pseudoharengus	25	104	94-189	10	246
	Carassius auratus	2	267	229-304	314	629
	Dorosoma cepedianum	24	128	84-320	40	952
	Morone chrysops	1	136		187	187
	Notropis hudsonius	31	[illegible]	100-130	15	452
	Oncorhynchus kisutch	1	[illegible]		2321	2321
	Osmerus eperlanus mordax	1	176		37	37
	Perca flavescens	18	182	143-210	77	1387
	Stizostedion v. vitreum	1	234		115	115
	Subtotal	104				6326
November 25-26, 1974						
	Cyprinus carpio	1	540		2973	2973
	Dorosoma cepedianum	1	325		390	390
	Osmerus eperlanus mordax	3	146	138-156	22	65
	Perca flavescens	1	190		90	90
	Subtotal	6				3518
TOTAL		628				44810

TABLE 12

ANALYSIS OF SHORE SEINE CATCH FROM LOCUST POINT
JULY 9, 1974

Station	Taxa	No.	Length (mm) Mean	Length (mm) Range	Weight (g) Mean	Weight (g) Total
23						
	Dorosoma cepedianum (AD)	2	226	224-228	146	292
	Dorosoma cepedianum (YOY)	390	27	23-42		
	Morone chrysops (YOY)	112	25	17-37		
	Notropis a. atherinoides	2	96	91-101		
	N. hudsonius	3	58	29-108		
	Perca flavescens (YOY)	1	30			
	Percina caprodes	2	30	30-31		
	Subtotal	512				292
24						
	Aplodinotus grunniens	1	97			
	Dorosoma cepedianum (AD)	57	236	208-261	201	11443
	D. cepedianum (YOY)	10838		24-43		
	Morone chrysops (YOY)	809		20-37		
	Notropis a. atherinoides	3	66	52-80		
	N. hudsonius	8	43	25-112		
	Perca flavescens (YOY)	23		26-35		
	Percina caprodes	1	28			
	Stizostedion v. vitreum (YOY)	1	65		2.5	2.5
	Subtotal	11741				11446
25						
	Cyprinus carpio	1	285		339	339
	Dorosoma cepedianum (YOY)	632	31	25-54		
	Morone chrysops (YOY)	230	28	19-47		
	Notropis a. atherinoides	3	75	72-78	5	16
	N. hudsonius	15	33	25-40		
	Perca flavescens (YOY)	12	30	26-31		
	Percina caprodes	4	28	24-30		
	Subtotal	897				355
TOTAL		13150				12093

TABLE 13

ANALYSIS OF SHORE SEINE CATCH FROM LOCUST POINT
AUGUST 27, 1974

Station	Taxa	No.	Length (mm)		Weight (g)	
			Mean	Range	Mean	Total
23						
	Alosa pseudoharengus	22	62	30-81	4	81
	Dorosoma cepedianum	1	87		10	10
	Notropis a. atherinoides	182	75	40-105	4	740
	Subtotal	205				831
24						
	Alosa pseudoharengus	55	76	38-90	4	208
	Dorosoma cepedianum	1	120		20	20
	Notropis a. atherinoides	95	66	40-105	3	284
	Pomoxis annularis	1	40		1	1
	Subtotal	152				513
25						
	Alosa pseudoharengus	4	61	30-75	3	13
	Labidesthes sicculus	3	58	55-65	1	3
	Notropis a. atherinoides	92	73	40-111	3	301
	Osmerus eperlanus mordax	1	65		1	1
	Percina caprodes	1	65		4	1
	Subtotal	101				319
TOTAL		458				1663

TABLE 14

ANALYSIS OF SHORE SEINE CATCH FROM LOCUST POINT
September 12, 1974

Station	Taxa	No.	Length (mm)		Weight (g)	
			Mean	Range	Mean	Total
23						
	Dorosoma cepedianum	15	68	57-88	4	59
	Labidesthes sicculus	4	66	57-72	1	6
	Notropis a. atherinoides	216	75	50-90	4	864
	Subtotal	235				929
24						
	Dorosoma cepedianum	124	96	44-290	14	1736
	Morone chrysops	1	112		20	20
	Notropis a. atherinoides	169	71	50-107	3	570
	Subtotal	294				2326
25						
	Dorosoma cepedianum	56	95	50-135	11	638
	Labidesthes sicculus	5	65	53-70	2	8
	Morone chrysops	1	70		4	4
	Notropis a. atherinoides	103	64	50-97	2	206
	N. hudsonius	1	65		3	3
	Osmerus eperlanus mordax	1	70		2	2
	Percina caprodes	1	53		1	1
	Subtotal	168				862
TOTAL		697				4117

TABLE 15

ANALYSIS OF SHORE SEINE CATCH FROM LOCUST POINT
October 16, 1974

Station	Taxa	No.	Length (mm)		Weight (g	
			Mean	Range	Mean	Total
23						
	Alosa pseudoharengus	2	45	35-55	1	2
	Dorosoma cepedianum	15	83	57-110	7	98
	Notropis a. atherinoides	577	60	45-96	1	821
	Subtotal	594				921
24						
	Dorosoma cepedianum	42	84	57-162	7	312
	Notropis a. atherinoides	655	55	21-110	2	1048
	Subtotal	697				1360
25						
	Dorosoma cepedianum	21	71	50-102	5	103
	Notropis a. atherinoides	242	56	36-105	2	284
	Osmerus eperlanus mordax	1	140		16	16
	Subtotal	264				403
TOTAL		1555				2684

TABLE 15

ANALYSIS OF SHORE SEINE CATCH FROM LOCUST POINT
October 16, 1974

Station	Taxa	No.	Length (mm)		Weight (g	
			Mean	Range	Mean	Total
23						
	Alosa pseudoharengus	2	45	35-55	1	2
	Dorosoma cepedianum	15	83	57-110	7	98
	Notropis a. atherinoides	577	60	45-96	1	821
	Subtotal	594				921
24						
	Dorosoma cepedianum	42	84	57-162	7	312
	Notropis a. atherinoides	655	55	21-110	2	1048
	Subtotal	697				1360
25						
	Dorosoma cepedianum	21	71	50-102	5	103
	Notropis a. atherinoides	242	56	36-105	2	284
	Osmerus eperlanus mordax	1	140		16	16
	Subtotal	264				403
TOTAL		1555				2684

TABLE 16

ANALYSIS OF SHORE SEINE CATCH FROM LOCUST POINT
November 14, 1974

Station	Taxa	No.	Length (mm) Mean	Length (mm) Range	Weight (g) Mean	Weight (g) Total
23						
	Dorosoma cepedianum	1	91		9	9
	Labidesthes sicculus	1	68		2	2
	Notropis a. atherinoides	437	54	45-75	1	437
	Subtotal	439				448
24						
	Notropis a. atherinoides	174	53	45-80	1	174
	Subtotal	174	53	45-80	1	174
25						
	Dorosoma cepedianum	3	84	58-110	9	28
	Labidesthes sicculus	1	58		1	1
	Notropis a. atherinoides	1466	56	43-79	1	1764
	Pomoxis annularis	1	31			
	Subtotal	1471				1793
TOTAL		2084				2415

TABLE 17

ANALYSIS OF TRAWL CATCH FROM LOCUST POINT
JULY - NOVEMBER, 1974

Date Taxa	No.	Length (mm)		Weight (g)	
		Mean	Range	Mean	Total
July 19, 1974					
Cyprinus carpio	3	320	232-434	534	1601
Ictalurus nebulosus	2	248	247-250	235	470
I. punctatus	5	125	97-145	20	101
Morone chrysops	2	171	150-192	80	160
Notropis a. atherinoides	2	98	95-101	10	21
N. hudsonius	2	106	94-117	15	30
Perca flavescens	1	166		64	64
Pomoxis nigromaculatus	1	134		37	37
Subtotal	18				2484
August 16, 1974					
Alosa pseudoharengus	31	63	30-81	3	97
Aplodinotus grunniens	1	136		30	30
Cyprinus carpio	1	337		570	570
Dorosoma cepedianum	40	52	30-66	3	102
Ictalurus punctatus	1	192		66	66
Morone chrysops	8	45	34-71	2	14
Notropis a. atherinoides	3	98	81-116	8	23
N. hudsonius	2	30	27-33	1	2
Stizostedion v. vitreum	1	145		27	27
Subtotal	88				931
September 13, 1974					
Alosa pseudoharengus	15	84	33-93	6	87
Aplodinotus grunniens	1	85		8	8
Cyprinus carpio	1	280		315	315
Dorosoma cepedianum	3	66	47-97	5	16
Morone chrysops	21	48	23-78	2	44
Notropis a. atherinoides	3	50	30-90	2	7
N. hudsonius	12	101	70-121	12	143
Osmerus eperlanus mordax	3	49	44-57	1	3
Perca flavescens	4	124	63-180	37	146
Pomoxis nigromaculatus	1	171		101	101
Subtotal	64				870

TABLE 17 CONT.

ANALYSIS OF TRAWL CATCH FROM LOCUST POINT
JULY - NOVEMBER, 1974

Date	Taxa	No.	Length (mm)		Weight (g)	
			Mean	Range	Mean	Total
October 10, 1974						
	Alosa pseudoharengus	25	87	65-95	8	193
	Dorosoma cepedianum	38	92	70-117	12	445
	Notropis a. atherinoides	4	63	32-85	3	14
	Subtotal	67				652
November 8, 1974						
	Dorosoma cepedianum	56	83	61-135	7	381
	Morone chrysops	5	114	91-138	23	113
	Notropis a. atherinoides	917	56	43-123	1	1192
	N. hudsonius	50	90	55-127	9	436
	Perca flavescens	8	182	138-204	85	684
	Percina caprodes	2	55	48-62	2	4
	Subtotal	1038				2810
TOTAL		1275				7747

TABLE 18

ANALYSIS OF TRAWL CATCH FROM THE INTAKE CANAL AT THE DAVIS-BESSE NUCLEAR POWER STATION - 1974

Date	Taxa	No.	Length (mm)		Weight (g)	
			Mean	Range	Mean	Total
June 18, 1974						
	Carassius auratus	2	130	99-160	57	113
	Ictalurus nebulosus	6	142	105-169	54	326
	I. punctatus	1	90		9	9
	Pomoxis annularis	21	89	76-126	11	224
	P. nigromaculatus	1	142		43	43
	Subtotal	31				715
August 27, 1974						
	Cyprinus carpio (YOY)	1	35			
	Ictalurus melas	25	75	55-225	19	482
	Lepomis gibbosus	3	116	110-120	37	110
	Pomoxis annularis	4	86	50-120	13	52
	Subtotal	33				644
October 23, 1974*						
	Cyprinus carpio	1	555		2066	2066
	Subtotal	1				2066
TOTAL		65				3425

YOY - Designates young-of-the-year.

* The canal was poisoned on September 25, 1974

TABLE 19

RESULTS OF TRAWLING EFFORT TO REMOVE FISH
PRIOR TO POISONING THE INTAKE CANAL
SEPTEMBER 24, 1974

Scientific Name	Common Name	No. Captured
Aplodinotus grunniens	freshwater drum	2
Carassius auratus	goldfish	9
Cyprinus carpio	carp	1
Dorosoma cepedianum	gizzard shad	51
Ictalurus melas	black bullhead	56
I. natalis	yellow bullhead	7
I. nebulosus	brown bullhead	118
I. punctatus	channel catfish	1
Lepomis cyanellus	green sunfish	1
L. gibbosus	pumpkinseed sunfish	36
L. macrochirus	bluegill sunfish	12
Morone chrysops	white bass	2
Notropis a. atherinoides	emerald shiner	6
Perca flavescens	yellow perch	6
Percina caprodes	logperch darter	2
Percopsis omiscomaycus	troutperch	3
Pomoxis annularis	white crappie	96
P. nigromaculatus	black crappie	2
	crayfish	3
TOTAL		414

TABLE 20

ANALYSIS OF HOOP NET CATCH IN NORTHWEST MARSH
(STATION 21) - JULY - NOVEMBER, 1974

Date	Taxa	No.	Length (mm)		Weight (g)	
			Mean	Range	Mean	Total
July 9-10, 1974						
	Carassius auratus	1	201		148	148
	Cyprinus carpio	7	377	210-690	941	6589
	Midland Painted Turtle	5			367	1834
August 19-20, 1974						
	Cyprinus carpio	3	407	280-610	964	2983
September 17-18, 1974						
	Amia calva	1	415		679	679
	Cyprinus carpio	11	440	270-620	1303	14337
	Dorosoma cepedianum	3	269	258-290	190	570
	Pomoxis nigromaculatus	1	225		170	170
October 16-17, 1974						
	Pomoxis nigromaculatus	1	242		210	210
November 25-26, 1974						
	No fish					
TOTAL		33				27430

TABLE 21

ANALYSIS OF HOOP NET CATCH IN SOUTHEAST MARSH (STATION 22) - JULY - NOVEMBER, 1974

Date	Taxa	No.	Length (mm)		Weight (g)	
			Mean	Range	Mean	Total
July 9-10, 1974						
	Amia calva	3	473	362-560	934	2802
	Cyprinus carpio	6	406	326-444	769	4612
	Midland Painted Turtle	1			227	227
August 19-20, 1974						
	Carassius auratus	1	230		190	190
	Cyprinus carpio	1	270		224	224
September 17-18, 1974						
	Cyprinus carpio	1	462		883	883
	Snapping Turtle	2			7380	14760
October 16-17, 1974						
	No fish					
November 25-26, 1974						
	Amia calva	23	459	345-525	1007	23162
	Pomoxis annularis	1	222		453	453
TOTAL		39				47313

TABLE 22

ANALYSIS OF ICHTHYOPLANKTON COLLECTED AT LOCUST POINT
JULY - NOVEMBER, 1974

Date	Taxa	Length (mm) Range	Nos. of Individuals Collected			
			Sta. 8 (Intake)		Sta. 12 (Discharge)	
			Surface	Bottom	Surface	Bottom
July 10, 1974						
	Carassius auratus	6.5			1	
	Dorosoma cepedianum	7-18	6	8	45	39
	Notropis a. atherinoides	8-18	3815	8	549	10
	Subtotal		3821	16	595	49
August 19, 1974						
	Alosa pseudoharengus	18			1	
	Notropis a. atherinoides	9-17	3		1	1
	Subtotal		3	0	2	1
September 12, 1974						
	Labidesthes sicculus	57			1	
	Notropis a. atherinoides	52-53			3	
	Subtotal		0	0	4	0
October 16, 1974						
	Notropis a. atherinoides	28-57			8	1
	Subtotal		0	0	8	1
November 25, 1974						
	Notropis a. atherinoides	46-85				56
	Subtotal		0	0	0	56
TOTAL			3824	16	609	107

TABLE 23

LAKE ERIE WATER QUALITY ANALYSES FOR JULY 1974

Dates:
Field 7-17-74
Laboratory 7-18-74

Parameters	Station No. 1		Station No. 8		Station No. 12		Range	Mean	Standard Deviation
	Surface	Bottom	Surface	Bottom	Surface	Bottom			
Field Measurements:	1005 hrs	1005 hrs	1105 hrs	1105 hrs	1150 hrs	1150 hrs			
Temperature (°C)	24.5	23.8	25.3	24.0	25.4	24.1	23.8-25.4	24.5	0.7
Dissolved Oxygen (ppm)	8.6	7.4	8.1	6.3	N.A.	6.7	6.3-8.6	7.4	1.0
Conductivity (umhos/cm)	259	255	255	N.A.	230	220	220-259	244	18
Transparency (m)	0.35		0.55		0.35		0.35-0.55	0.42	0.12
Depth (m)		2.4		5.0		3.8	2.4-5.0	3.7	1.3
Laboratory Determinations:									
Calcium (mg/l)	36.0	36.0	34.0	34.4	32.8	36.4	32.8-36.4	34.9	1.4
Magnesium (mg/l)	8.2	8.6	8.4	8.2	8.9	8.9	8.2-8.9	8.5	0.3
Sodium (mg/l)	10.8	10.8	9.8	9.8	10.8	10.3	9.8-10.8	10.4	0.5
Chloride (mg/l)	17.0	17.0	16.3	16.0	17.0	16.8	16.0-17.0	16.7	0.4
Nitrate (mg/l)	0.84	0.84	3.10	2.40	3.10	1.60	0.84-3.10	1.98	1.04
Sulfate (mg/l)	27.0	28.5	24.5	24.0	25.5	24.5	24.0-28.5	25.7	1.8
Phosphorus (mg/l)	0.04	0.05	0.05	0.028	0.06	0.07	0.028-0.07	0.05	0.01
Silica (mg/l)	0.79	0.99	0.81	0.93	0.88	0.91	0.79-0.99	0.89	0.08
Total Alkalinity (mg/l)	96	96	86	86	94	96	86-96	92	5
B.O.D. (mg/l)	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	-	-	-
Suspended Solids (mg/l)	37	38	20	27	36	37	20-38	33	7
Dissolved Solids (mg/l)	180	182	174	180	176	190	176-190	180	6
Turbidity (F.T.U.)	8	9	9	8	9	21	8-21	11	5
pH	8.4	8.3	8.5	8.2	8.5	8.1	8.1-8.5	8.3	0.2
Conductivity (umhos/cm)									

N.A. - Not Analyzed

TABLE 24

LAKE ERIE WATER QUALITY ANALYSES FOR AUGUST 1974

Dates:
Field 8-22-74
Laboratory 8-22-74

Parameters	Station No. 1		Station No. 8		Station No. 12		Range	Mean	Standard Deviation
	Surface	Bottom	Surface	Bottom	Surface	Bottom			
	1115 hrs	1115 hrs	1145 hrs	1145 hrs	1250 hrs	1250 hrs			
Field Measurements:									
Temperature (^{o}C)	24.9	24.2	25.2	24.2	25.4	24.5	24.2-25.4	24.7	0.5
Dissolved Oxygen (ppm)	6.9	5.7	8.1	7.3	8.4	6.6	5.7-8.4	7.2	1.0
Conductivity (umhos/cm)									
Transparency (m)	0.50		0.45		0.50		0.45-0.50	0.48	0.03
Depth (m)		1.9		5.0		2.8	1.9-5.0	3.2	1.6
Laboratory Determinations:									
Calcium (mg/l)	38.8	40.4	40.0	39.2	38.4	40.4	38.4-40.4	39.5	0.9
Magnesium (mg/l)	6.2	7.2	5.8	5.5	7.0	5.3	5.3-7.2	6.2	0.8
Sodium (mg/l)	12.8	12.8	10.3	10.3	10.3	10.3	10.3-12.8	11.1	1.3
Chloride (mg/l)	18.3	21.0	18.3	18.3	18.3	18.3	18.3-21.0	18.8	1.0
Nitrate (mg/l)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Sulfate (mg/l)	26.5	32.0	25.0	23.0	25.5	23.5	23.0-32.0	25.9	3.3
Phosphorus (mg/l)	0.03	0.03	0.03	0.06	0.03	0.04	0.03-0.06	0.04	0.01
Silica (mg/l)	0.37	0.38	0.38	0.38	0.33	0.41	0.33-0.41	0.38	0.03
Total Alkalinity (mg/l)	96	94	94	92	96	94	92-96	94	1.5
B.O.D. (mg/l)	4	4	2	3	3	3	2-4	3	0.8
Suspended Solids (mg/l)	16	19	18	15	14	22	14-22	17	3
Dissolved Solids (mg/l)	258	252	228	226	222	228	222-258	236	15
Turbidity (F.T.U.)	8	10	10	10	8	15	8-15	10	2.5
pH	8.5	8.0	8.6	8.5	8.3	8.3	8.0-8.5	8.4	0.2
Conductivity (umhos/cm)	300	325	295	285	285	280	280-325	295	16

TABLE 25

LAKE ERIE WATER QUALITY ANALYSES FOR SEPTEMBER 1974

Dates:
Field 9-10-74
Laboratory 9-10-74

Parameters	Station No. 1		Station No. 8		Station No. 12		Range	Mean	Standard Deviation
	Surface	Bottom	Surface	Bottom	Surface	Bottom			
	915 hrs	915 hrs	950 hrs	950 hrs	1030 hrs	1030 hrs			
Field Measurements:									
Temperature (^{o}C)	19.5	19.5	19.5	19.5	19.0	19.0	19.0-19.5	19.3	0.3
Dissolved Oxygen (ppm)	7.9	7.8	9.2	8.9	8.5	8.2	7.8-9.2	8.4	0.6
Conductivity (umhos/cm)									
Transparency (m)	0.50		0.60		0.60		0.50-0.60	0.57	0.06
Depth (m)		1.7		4.1		3.2	1.7-4.1	3.0	1.2
Laboratory Determinations:									
Calcium (mg/l)	36.0	36.4	35.2	36.0	36.0	36.0	35.2-36.4	35.9	0.4
Magnesium (mg/l)	7.4	6.7	7.2	6.5	6.7	6.7	6.5-7.4	6.9	0.4
Sodium (mg/l)	9.6	9.6	9.3	9.6	9.6	9.6	9.3-9.6	9.6	0.1
Chloride (mg/l)	18.7	18.7	17.2	17.2	17.2	17.2	17.2-18.7	17.7	0.8
Nitrate (mg/l)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Sulfate (mg/l)	24.0	22.5	24.5	22.5	21.0	22.0	21.0-24.5	22.8	1.3
Phosphorus (mg/l)	0.05	0.06	0.06	0.05	0.05	0.07	0.05-0.07	0.06	0.01
Silica (mg/l)	0.09	0.11	0.17	0.19	0.12	0.19	0.09-0.19	0.15	0.04
Total Alkalinity (mg/l)	94	93	96	94	96	94	93-96	95	1
B.O.D. (mg/l)	3	3	2	2	3	2	2-3	2.5	0.6
Suspended Solids (mg/l)	15	17	15	9	11	14	9-17	14	3
Dissolved Solids (mg/l)	150	146	148	156	150	150	146-150	150	3
Turbidity (F.T.U.)	5	8	5	5	5	4	4-8	5	1
pH	8.2	8.3	8.4	7.8	7.9	8.4	7.8-8.4	8.2	0.3
Conductivity (umhos/cm)	264	265	265	267	264	264	264-267	265	1

TABLE 26

LAKE ERIE WATER QUALITY ANALYSES FOR OCTOBER 1974

Dates:
Field 10-9-74
Laboratory 10-10-74

Parameters	Station No. 1		Station No. 8		Station No. 12		Range	Mean	Standard Deviation
	Surface	Bottom	Surface	Bottom	Surface	Bottom			
	1100 hrs	1100 hrs	1130 hrs	1130 hrs	1210 hrs	1210 hrs			
Field Measurements:									
Temperature (^{o}C)	12.0	11.0	12.0	11.5	12.0	11.5	11.0-12.0	11.7	0.4
Dissolved Oxygen (ppm)	11.2	11.1	10.4	10.2	12.1	11.8	10.2-12.1	11.1	0.8
Conductivity (umhos/cm)									
Transparency (m)	0.45		0.50		0.50		0.45-0.50	0.50	0.03
Depth (m)		1.5		4.0		2.8	1.5-4.0	2.8	1.3
Laboratory Determinations:									
Calcium (mg/l)	34.4	34.4	34.4	32.8	32.8	32.8	32.8-34.4	33.6	0.9
Magnesium (mg/l)	6.7	6.7	6.7	7.2	7.9	7.9	6.7-7.9	7.2	0.6
Sodium (mg/l)	12.0	13.3	15.3	15.3	14.4	15.3	12.0-15.3	14.3	1.4
Chloride (mg/l)	16.8	16.8	18.3	17.5	16.8	17.5	16.8-18.3	17.3	0.6
Nitrate (mg/l)	1.2	1.2	2.0	1.6	1.6	1.2	1.2-2.0	1.5	0.3
Sulfate (mg/l)	24.5	28.0	29.0	28.0	30.5	27.0	24.5-30.5	27.8	2.0
Phosphorus (mg/l)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Silica (mg/l)	0.04	0.06	0.05	0.06	0.05	0.09	0.04-0.09	0.06	0.02
Total Alkalinity (mg/l)	89	90	91	94	91	92	89-94	91	1.7
B.O.D. (mg/l)	2	3	3	3	3	2	2-3	2.7	0.5
Suspended Solids (mg/l)	9	14	10	14	9	10	9-14	11	2
Dissolved Solids (mg/l)	174	188	182	186	194	194	174-194	186	8
Turbidity (F.T.U.)	9	10	10	10	10	10	9-10	10	0.4
pH	9.0	8.6	9.0	8.9	8.9	8.8	8.6-9.0	8.9	0.2
Conductivity (umhos/cm)	275	285	285	285	285	280	275-285	283	4

TABLE 27

LAKE ERIE WATER QUALITY ANALYSES FOR NOVEMBER 1974

Dates:
Field 11-7-74
Laboratory 11-8-74

Parameters	Station No. 1		Station No. 8		Station No. 12		Range	Mean	Standard Deviation
	Surface	Bottom	Surface	Bottom	Surface	Bottom			
	1000 hrs	1000 hrs	1030 hrs	1030 hrs	1100 hrs	1100 hrs			
Field Measurements:									
Temperature (^{o}C)	8.2	8.2	9.3	9.5	8.5	8.3	8.2-9.5	8.7	0.6
Dissolved Oxygen (ppm)	11.4	11.2	11.1	11.0	11.5	11.3	11.0-11.5	11.3	0.2
Conductivity (umhos/cm)									
Transparency (m)	0.30		0.30		0.30		-	0.30	0.0
Depth (m)		2.3		4.0		3.0	2.3-4.0	3.1	0.9
Laboratory Determinations:									
Calcium (mg/l)	36.8	36.8	36.8	38.0	36.8	34.8	34.8-36.8	36.3	0.8
Magnesium (mg/l)	7.0	6.2	4.8	7.4	7.4	8.6	4.8-8.6	6.9	1.3
Sodium (mg/l)	7.8	7.8	7.5	7.5	7.7	7.7	7.5-7.8	7.7	0.1
Chloride (mg/l)	14.3	12.4	15.0	14.5	14.5	15.0	12.4-15.0	14.3	1.0
Nitrate (mg/l)	3.84	3.52	2.9	2.6	1.7	5.1	1.7-5.1	3.3	1.2
Sulfate (mg/l)	24.0	24.0	24.0	24.0	25.0	25.5	24.0-25.5	24.4	0.7
Phosphorus (mg/l)	0.02	0.02	0.02	0.02	0.03	0.03	0.02-0.03	0.02	0.01
Silica (mg/l)	0.16	0.15	0.15	0.12	0.14	0.16	0.12-0.16	0.15	0.02
Total Alkalinity (mg/l)	94	95	88	87	90	90	87-95	91	3
B.O.D. (mg/l)	2	3	3	2	2	3	2-3	3	1
Suspended Solids (mg/l)	42	23	25	28	30	34	23-42	30	7
Dissolved Solids (mg/l)	140	152	150	154	138	148	138-152	147	7
Turbidity (F.T.U.)	11	7	9	16	11	13	7-16	11	3
pH	8.3	8.3	8.5	8.4	8.3	7.9	7.9-8.5	8.3	0.2
Conductivity (umhos/cm)	265	265	260	258	265	268	258-268	264	4

TABLE 28

LAKE ERIE WATER QUALITY ANALYSES FOR DECEMBER 1974

Dates:
Field 12-17-74
Laboratory 12-17-74

Parameters	Station No. 1		Station No. 8		Station No. 12		Range	Mean	Standard Deviation
	Surface	Bottom	Surface	Bottom	Surface	Bottom			
	1115 hrs	1115 hrs	1115 hrs	1115 hrs	1130 hrs	1130 hrs			
Field Measurements:									
Temperature (°C)	0.5	0.5	0.5	0.5	0.3	0.3	0.3-0.5	0.4	0.1
Dissolved Oxygen (ppm)	14.1	14.0	13.9	14.1	13.8	14.1	13.8-14.1	14.0	0.1
Conductivity (umhos/cm)									
Transparency (m)	0.4		0.4		0.45		0.4-0.45	0.42	0.03
Depth (m)		1.5		3.9		2.7	1.5-3.9	2.7	1.2
Laboratory Determinations:									
Calcium (mg/l)	34.4	33.6	34.4	31.2	32.0	31.2	31.2-34.4	32.8	1.5
Magnesium (mg/l)	6.2	7.0	6.7	5.3	7.9	7.4	5.3-7.9	6.8	0.9
Sodium (mg/l)	10.0	10.0	8.5	8.5	8.5	10.0	8.5-10.0	9.3	0.8
Chloride (mg/l)	16.5	15.8	15.5	15.0	15.5	15.0	15.0-16.5	15.6	0.6
Nitrate (mg/l)	2.6	2.6	3.2	3.6	2.0	2.0	2.0-3.6	2.7	0.6
Sulfate (mg/l)	22.0	23.0	21.0	21.0	21.5	21.5	21.0-23.0	21.7	0.8
Phosphorus (mg/l)	0.066	0.062	0.070	0.070	0.059	0.066	0.059-0.070	0.07	0.0
Silica (mg/l)	0.34	0.12	0.19	0.24	0.17	0.26	0.12-0.34	0.22	0.08
Total Alkalinity (mg/l)	92	91	88	87	91	90	87-92	90	2
B.O.D. (mg/l)	2	2	1	1	2	2	1-2	2	0.5
Suspended Solids (mg/l)	32	33	17	17	21	23	17-33	24	7
Dissolved Solids (mg/l)	176	156	164	160	160	164	156-176	163	7
Turbidity (F.T.U.)	24	25	16	16	19	21	16-25	20	4
pH	8.3	8.3	8.4	8.3	8.4	8.4	8.3-8.4	8.4	0.1
Conductivity (umhos/cm)	310	298	280	283	285	285	280-310	290	12

TABLE 29

SOLAR RADIATION IN LAKE ERIE AT LOCUST POINT FOR JULY - OCTOBER 1974[1]

Date: 26 July 1974 (1025 - 1055 hrs)

Depth	Photometer Reading	Percent of Surface Illumination
0.0 m	1825 u amp	100.0%
0.1	1325	76.2
1.0	275	15.1
2.0	52.5	2.88
3.0	13.0	0.71
4.0	3.25	0.18

Date: 7 September 1974 (1140 - 1155 hrs)

0.0 m	6100 u amp	100.0%
0.1	4400	72.1
1.0	350	5.74
2.0	32.5	0.53
3.0	4.0	0.06
4.0	0.5	0.01

Date: 31 October 1974 (1206 - 1216 hrs)

0.0 m	4100 u amp	100.0%
1.0	1300	31.7
2.0	700	17.1
3.0	375	9.15
4.0	155	3.78

1 Photometer readings taken at Station No. 8, 3000 feet offshore at intake structure

TABLE 30

CURRENT MEASUREMENTS IN LAKE ERIE AT LOCUST POINT FOR JULY - OCTOBER 1974

Date/Time	Station No.	Velocity (knots)	Direction (compass °)
7-18-74/1200	8	0.24	58°
7-18-74/1200	12	0.21	80°
8-16-74/1200	8	0.19	350°
8-16-74/1200	12	0.18	355°
9-12-74/1200	8	0.12	55°
9-12-74/1200	12	0.14	25°
10-17-74/1200	8	0.29	130°
10-17-74/1200	12	*	

* rough conditions

TABLE 31

MEAN VALUES AND RANGES FOR WATER QUALITY PARAMETERS TESTED IN 1974

Parameter	April - June 1974		July - December 1974	
	Mean	Range	Mean	Range
1) Temperature	14.0	7.7 - 20.0	14.9	0.3-25.4°C
2) Dissolved Oxygen	10.5	8.0 - 13.2	9.9	5.7 - 14.1 ppm
3) Conductivity	309	275 - 360	274	220 - 325 umhos/cm
4) Transparency	0.26	0.1 - 0.6	0.45	0.30 - 0.60 m
5) Calcium	40.0	34.0 - 50.8	35.5	31.2 - 40.4 mg/l
6) Magnesium	7.4	5.0 - 11.0	7.1	4.8 - 8.9 mg/l
7) Sodium	11.1	7.0 - 15.0	10.4	8.5 - 15.3 mg/l
8) Chloride	19.7	17.6 - 26.0	16.7	12.4 - 21.0 mg/l
9) Nitrate	0.69	0.0 - 2.4	0.45	0.0 - 5.1 mg/l
10) Sulfate	34.1	28.0 - 45.5	24.7	21.0 - 32.0 mg/l
11) Phosphorus	0.16	0.04 - 0.44	0.04	0.00 - 0.07 mg/l
12) Silica	1.26	0.11 - 3.83	0.31	0.04 - 0.99 mg/l
13) Total Alkalinity	94	90 - 100	92	86 - 96 mg/l
14) BOD	2.0	0.5 - 4.72	2.6	1 - 4 mg/l
15) Suspended Solids	39.3	8 - 109	21.5	9 - 42 mg/l
16) Dissolved Solids	180	86 - 396	177	138 - 258 mg/l
17) Turbidity	47	9 - 120	11	4 - 25 F.T.U.
18) Hydrogen-ions	8.0	7.3 - 8.6	8.4	7.8 - 9.0 pH
19) Solar Radiation (1m)	332	70 - 600	642	275 - 1300 u amps
20) Currents (speed)	0.37	0.20 - 0.80	2.0	0.12 - 0.29knots

DISCUSSION

Plankton

Phytoplankton. Phytoplankton populations were highest in the fall and spring and lowest during the summer (Fig. 2). This correlated well with zooplankton populations which peaked during the summer and were lowest in the spring and fall. This type correlation was to be expected since zooplankters graze on phytoplankton.

No comparison could be made with results of previous years since this was the first year phytoplankton was analyzed quantitatively. However, a qualitative comparison with the results from this project during 1973 showed the same cycle of dominance by the three major groups, Bacillariophyceae (diatoms), Chlorophyceae (green algae), and Myxophyceae (blue-green algae). The Bacillariophyceans (cold water forms) dominated in the spring, Chlorophyceans (intermediate temperature forms) in the summer, Chlorophyceans and Myxophyceans (warm water forms) in the early fall, and Chlorophyceans and Bacillariophyceans in the late fall (Fig. 3). The large late summer or early fall bloom of Aphanizomenon sp. (Myxophyceae) was not as evident as in the past.

It should be noted that although specimens from 54 taxa were collected, the blooms in May and November were each due to a pulse of one taxa, Melosira sp. and Mougeotia sp., respectively (Table 3). In May, Melosira sp. made up approximately 87 percent of the total phytoplankton population, while Mougeotia sp. made up approximately 53 percent of the November population. Moreover, the summer dominance by Chlorophyceans was mainly due to a decrease in the Melosira sp. population, as the water warmed, rather than an increase in the Chlorophycean population (Fig. 3).

There was some disagreement over the identification of what we have called Closteriopsis sp. in that some algalogists feel that it is Closterium gracile while others identify it as Closterium aciculare var. subpronum. It was often difficult to distinguish Binuclearia sp. from Mougeotia sp. and Melosira sp. from Stephanodiscus sp. When using this data, one must also realize that some of the very small forms such as Chlorella sp. may have passed through the sampling equipment.

FIGURE 2. MEAN MONTHLY PHYTOPLANKTON POPULATIONS FOR LAKE ERIE AT LOCUST POINT - 1974.

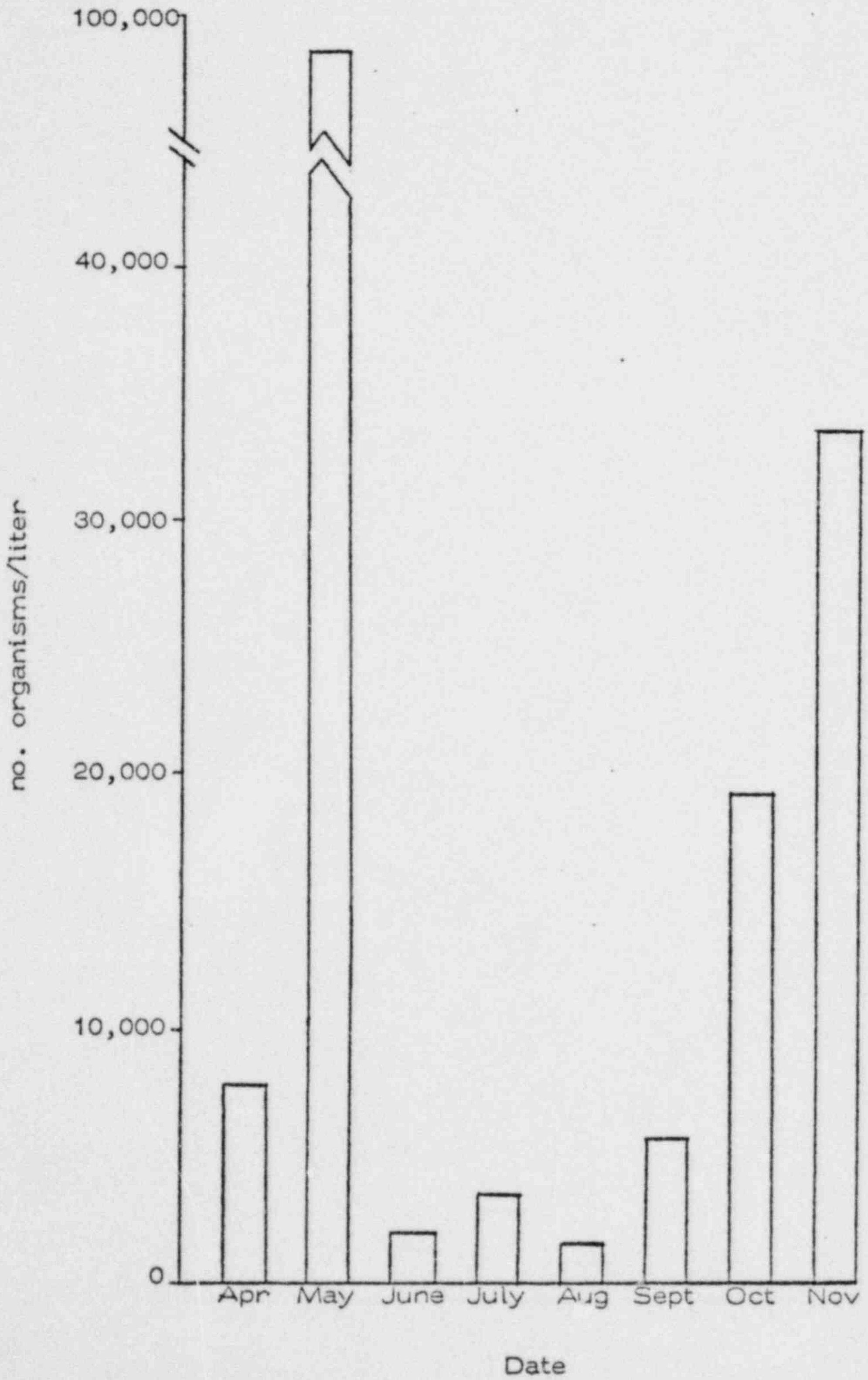


FIGURE 3. MEAN MONTHLY BACILLARIOPHYCEAE, CHLOROPHYCEAE, AND MYXOPHYCEAE POPULATIONS FOR LAKE ERIE AT LOCUST POINT - 1974.

Zooplankton. The zooplankton populations continued the rise, which was evident during the first half of the year, through July and then, with the exception of a very low August value, decreased steadily through November (Fig. 4). The populations from 1972 also peaked during the summer, August, but at a level 300 organisms per liter below that observed in 1974 (Hair and Herdendorf, 1973). Populations computed during 1973 on this project peaked in June, but at half the 1974 maximum and 360 organisms per liter below the 1972 maximum. The 1974 values approached a bell-shaped curve more than 1972 or 1973 populations.

The rotifer populations were the largest of the major groups and showed the greatest variation over the 3 year period (Fig. 5). In 1972 and 1974 the peaks occurred in the same month as the total zooplankton peaks occurred. In 1973 the rotifer peak occurred one month earlier, in May, than the total zooplankton peak.

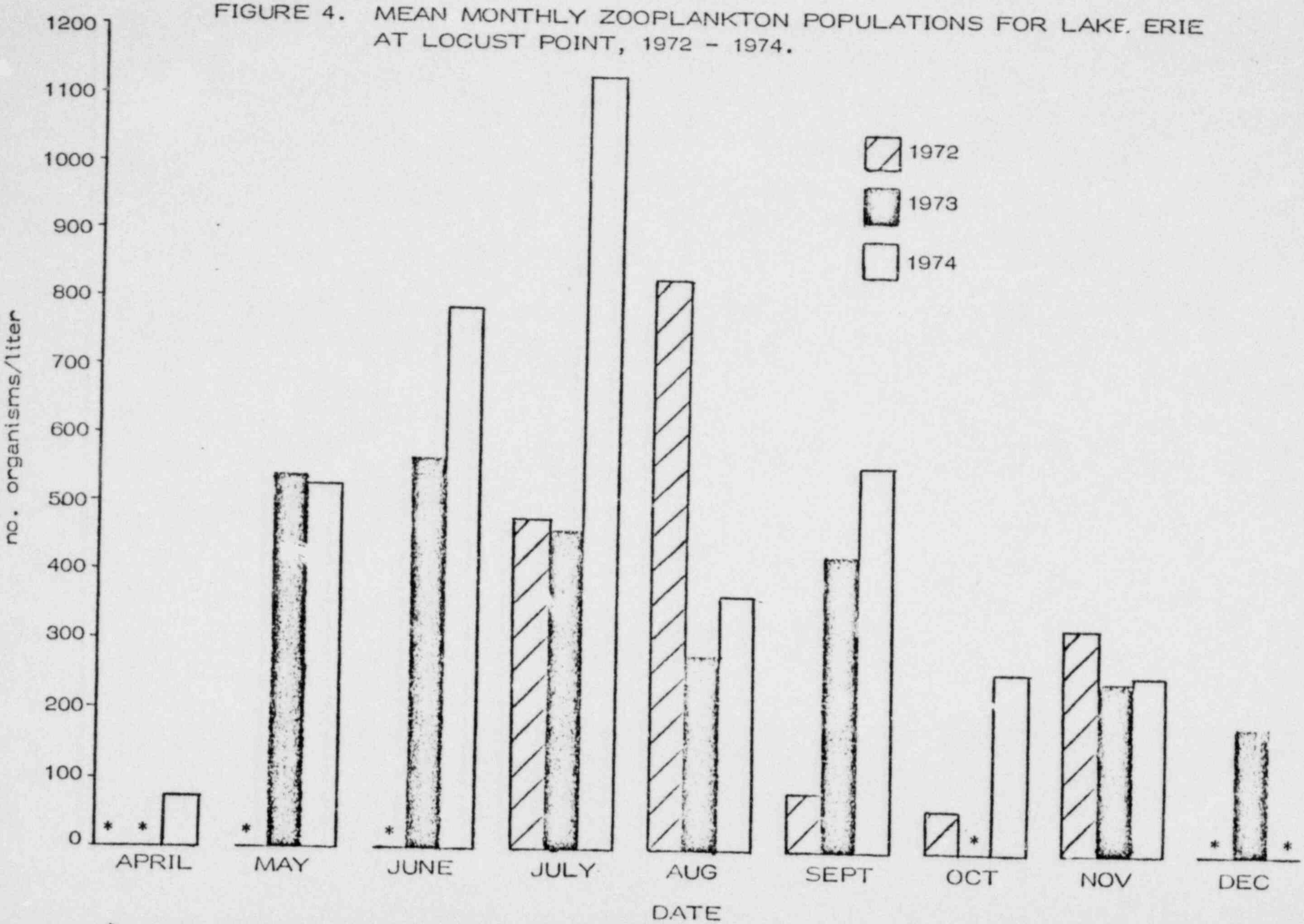
The copepod populations from the 3 years were very similar (Fig. 6). In 1973 and 1974 the peaks were in June. In 1972 the highest population occurred in July. However, no sampling had been done in June 1972, so the peak may have been missed.

Generally the cladocerans had the lowest populations of the 3 groups (Fig. 7). The 1973 populations were the lowest of the 3 years. The 1972 and 1974 populations were very similar.

There are several plausible explanations for the differences described above. Samples in 1972 were collected with a 3-liter Kemmerer water bottle at the surface. In 1973 and 1974 samples were collected by a vertical tow bottom to surface with a Wisconsin plankton net. A brief comparison study in 1973 showed that the vertical tow captured approximately 50 percent more taxa. The stations sampled over the 3 years were similar but not the same. In 1973 the intake and discharge pipelines were being dredged, and in 1972 tropical storm Agnes affected the weather. Also, due to the weather, samples were not collected on the same day of the month each year and were not spaced exactly one month apart. Finally, these samples were collected monthly, and Hubschman (1960) pointed out the tremendous differences which occurred when samples collected every Monday were compared to samples collected every Tuesday. However, monthly samples give an overview and, when done repetitively over a series of years, provide a relatively strong base for predicting trends.

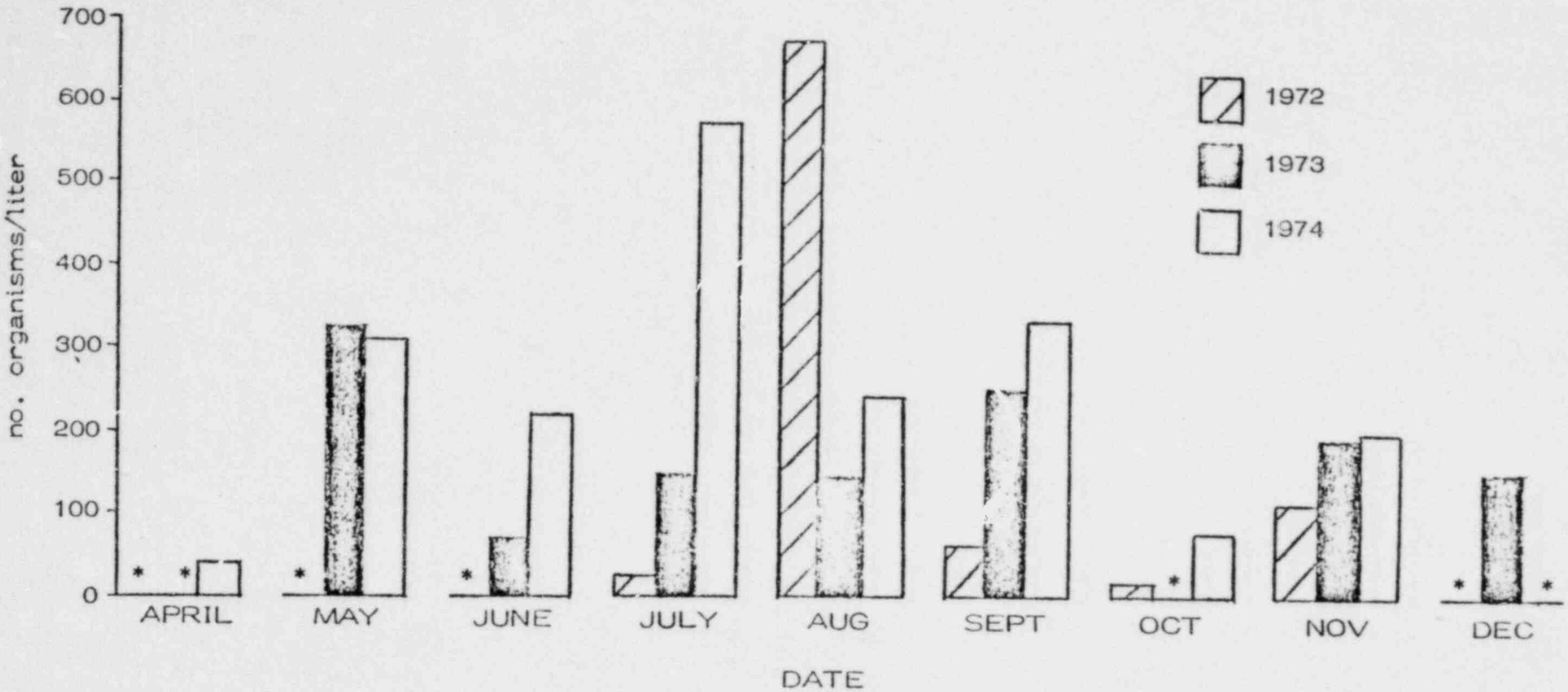
During 6 of the 8 months that were sampled in 1974, the highest populations were found at stations closest to shore. This indicates that the zooplankton populations were probably concentrating at the

FIGURE 4. MEAN MONTHLY ZOOPLANKTON POPULATIONS FOR LAKE ERIE AT LOCUST POINT, 1972 - 1974.



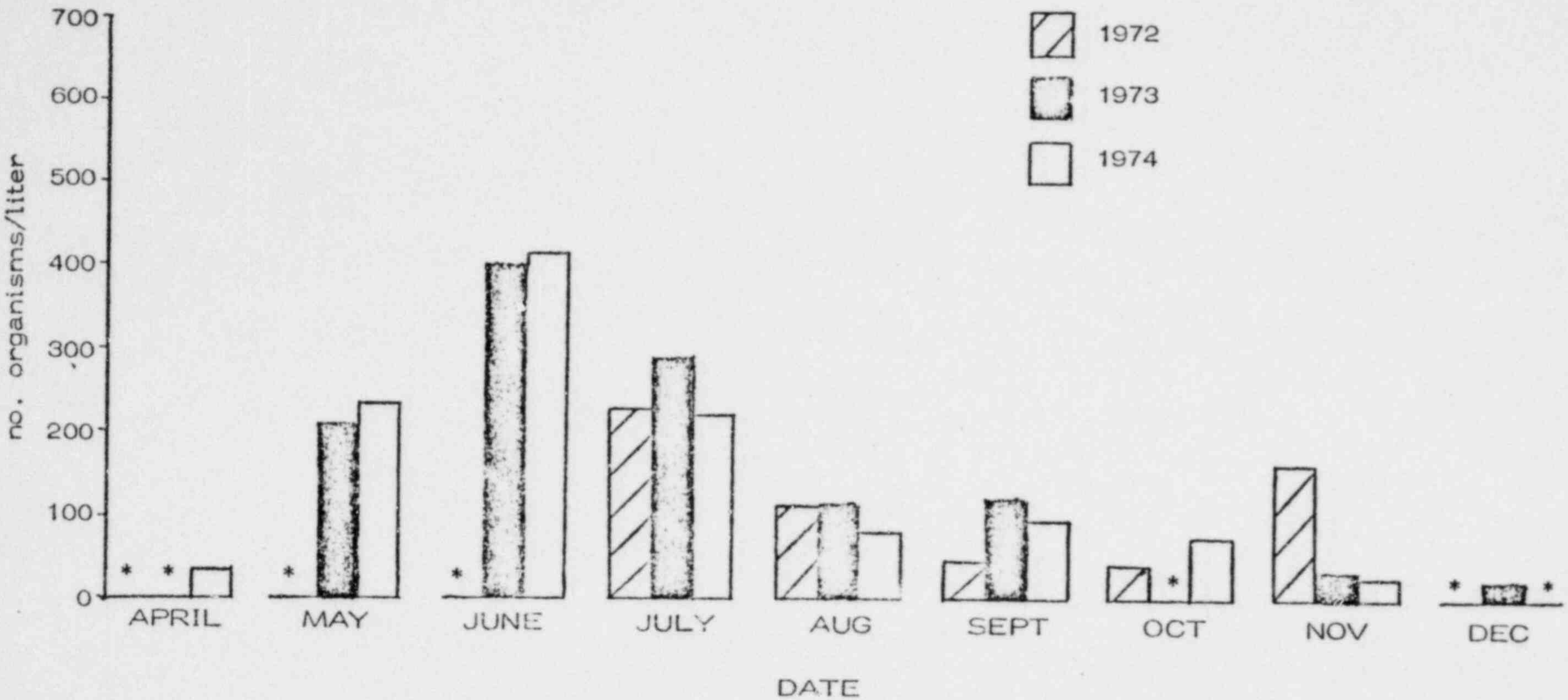
* No samples were collected

FIGURE 5. MEAN MONTHLY ROTIFER POPULATIONS FOR LAKE ERIE AT LOCUST POINT, 1972 - 1974.



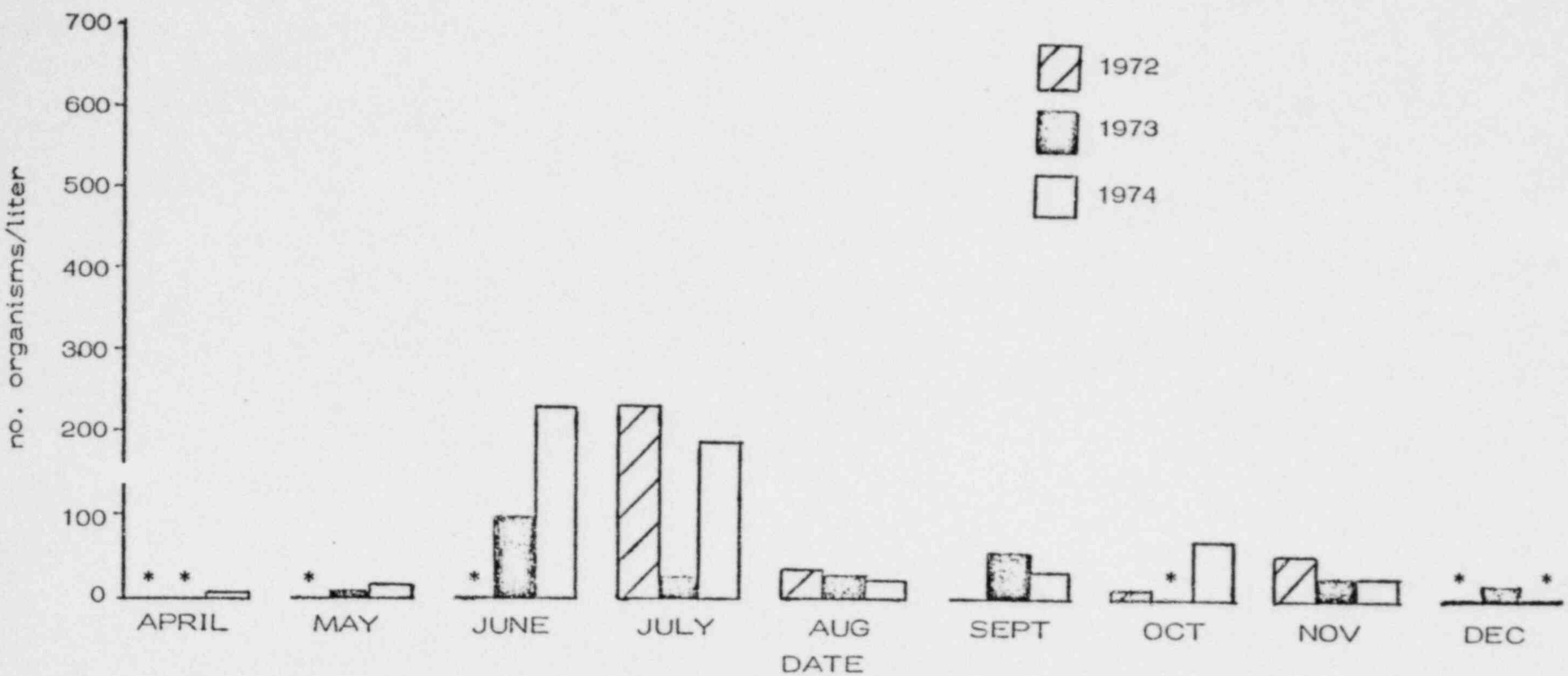
* No samples were collected.

FIGURE 6. MEAN MONTHLY COPEPOD POPULATIONS FOR LAKE ERIE AT LOCUST POINT, 1972 - 1974.



* No samples were collected.

FIGURE 7. MEAN MONTHLY CLADOCERAN POPULATIONS FOR LAKE ERIE AT LOCUST POINT, 1972 - 1974.



* No samples were collected.

surface. Thus, at the deeper stations this surface sample would be diluted by the bottom waters of the vertical tow.

Overall, no populations which could be considered unusual have occurred from 1972 - 1974. The populations of 1974 are probably more representative of a "typical" year, since dredging and storms undoubtedly affected the 1972 and 1973 populations. The data from these years show the magnitude of natural variability in zooplankton populations prior to operation of the power station.

There are always many difficulties involved in the identification of zooplankton. These are compounded when the organisms are preserved. It was especially difficult to identify the soft bodied rotifers. It was often difficult to distinguish between Pompholyx sp., Chromogaster ovalis, and rotifer eggs.

Benthos

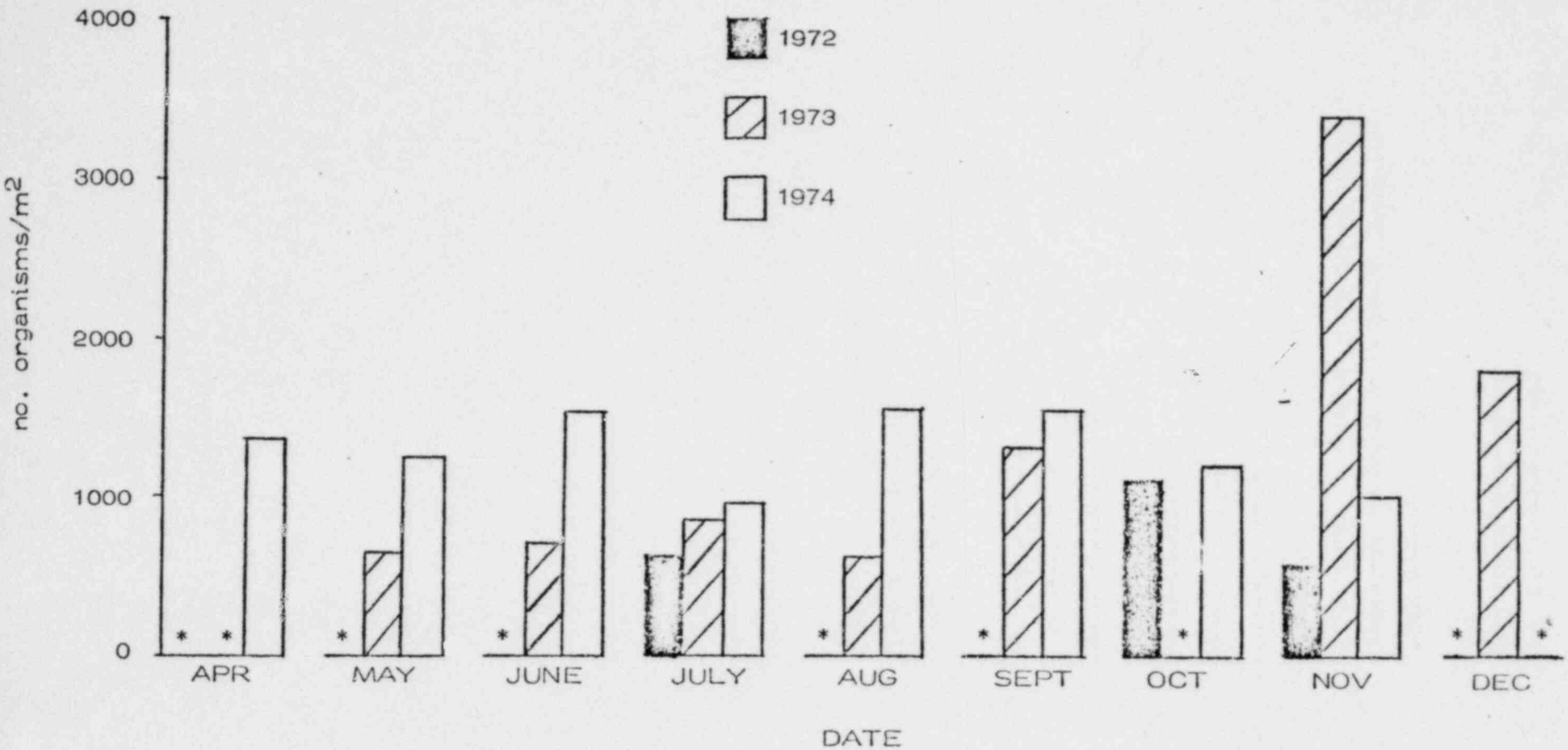
Mean monthly benthic macroinvertebrate populations were relatively stable in 1974 (Fig. 8). With the exception of July, they were slightly higher during the summer months, and, with the exception of November and possibly December, they were higher than those observed in 1972 and 1973. This in itself was a good indication that recolonization after dredging was successful.

The monthly populations were dominated by immature oligochaetes (no hair setae) (Table 7). The only other taxa to occur in large numbers were Leptodora kindtii, Chironomus (chironomus) sp., and Tanytarsus sp. Although the populations were dominated by these four taxa, the other taxa may be more important as indicators of community change since species at the fringe of their tolerance will reflect changes in the environment first.

Oligochaetes (sludge worms) are often used as pollution indicators. However, in this case, they probably indicate an unstable environment rather than polluted (sewage) water. Dredging the intake and discharge pipelines only added to the turbidity and shifting bottom material. To survive in this environment an organism must be able to burrow out when it becomes buried. Hence, a population dominated by oligochaetes and chironomids prevailed.

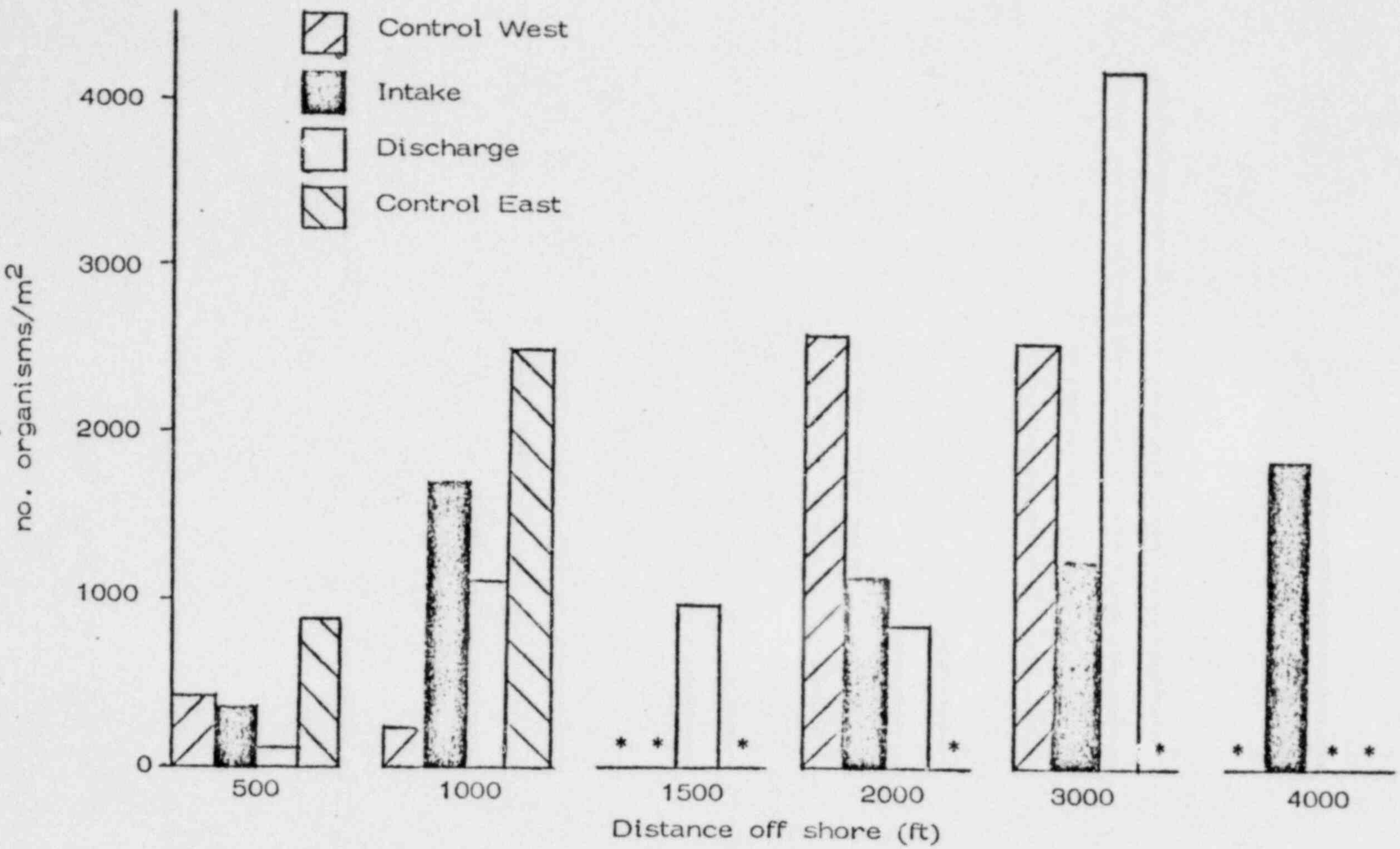
Again, as in 1972 and 1973, a tendency of increasing populations with distance off shore was noted (Fig. 9). The greatest increase occurred when going from 500 to 1000 ft. Once 1000 ft off shore, there was little change in populations along the control west and intake transects as one progressed to the end. However, a tremendous

FIGURE 8. MEAN MONTHLY BENTHIC MACROINVERTEBRATE POPULATIONS FOR LAKE ERIE AT LOCUST POINT, 1972 - 1974.



* No samples were collected.

FIGURE 9. MEAN BENTHIC MACROINVERTEBRATE POPULATIONS AT VARIOUS DISTANCES OFF SHORE ALONG THE FOUR SAMPLING TRANSECTS - 1974.



* No sampling station at this distance off shore on this transect.

increase was noted on the discharge transect at Station 14, 3000 ft off shore. Populations at Stations 12 and 13, 1500 and 2000 ft off shore, respectively, were probably inhibited due to dredging activities. The same thing, although to a lesser degree, was noted at Stations 7 and 8, 2000 ft and 3000 ft off shore, respectively, along the intake transect.

As with the plankton, nothing out of the ordinary for western Lake Erie was observed in the benthos results.

Fish

In 1973, 5300 fish were captured for the monitoring program. During the first half of 1974, 6,098 fish were captured. From July through November an additional 25,315 fish were captured for a total of 31,413 during 1974. The major reasons for this tremendous increase are increased sampling effort and ideal sampling conditions. In 1973, no fry netting was done, gill netting was accomplished on 5 dates instead of 8 as in 1974, trawling was done on 5 dates, fishing in the marsh was done only once, and shore seining was done 4 times and only once from Station 24 where the catch in 1974 was greatest. In 1973, foul weather conditions often forced us off the lake, while 1974 we were fortunate in to have had no serious setbacks due to weather conditions.

Although the total number of fish captured increased, the number of predators (sport fish) decreased (fry excluded). Yellow perch (Perca flavescens) show this trend quite well. In 1973, 812 perch were captured using gill nets. In 1974, with 3 more sampling dates, only 345 perch were captured. In 1973, trawling yielded 170 perch. In 1974, again with 3 more sampling dates, 82 perch were captured and 60 of these were young-of-the-year.

Meanwhile, the numbers of the forage species have increased. It is possible that this increase in the forage fish population was brought about by the decrease in the predator population. However, the cause of the low predator populations is not known at this time. It is extremely important to note natural fluctuations of this type prior to discharge so that any fluctuations which may occur after the plant goes into operation are not blamed solely on the power plant.

The gill netting results showed that approximately 50 percent more fish were captured at Station 12 than at Station 8 (Tables 10 and 11). In 1973, the populations were quite similar with 1334 from Station 12 and 1262 from Station 8.

Shore seining revealed Station 24 to be the most populous station (Tables 12 - 16). This was undoubtedly due to the outlet of the marsh control pump being in the vicinity. This should be a warm, nutrient-rich flow. Bits of fish have also been observed in this outflow.

Trawls after the intake was poisoned indicated a complete kill had occurred (Table 18). The commercial toxicant "Noxfish" was used. The entire benthic macroinvertebrate population was also destroyed in the process (Table 8).

July was the last month in which significant numbers of fry were captured (Table 22). However, even the largest value was less than one third of that observed commonly at Sandusky Bay.

Water Quality

Seasonal Variations. The water quality in the vicinity of the Davis-Besse Nuclear Power Station during the period of July through December 1974 was typical for western Lake Erie and showed normal seasonal trends. Water temperature fell 20°C during the 6-month period while the dissolved oxygen level rose 7 ppm (Fig. 10). The high turbulence and sediment load of the lake in early spring improved during the summer as indicated by a 6-fold increase in transparency, a 6-fold decrease in suspended solids, a 6-fold decrease in turbidity and an 8-fold increase in the amount of solar radiation at 1-meter below the surface (Fig. 11). Some decrease in water clarity was noted in the fall and early winter. Biochemical oxygen demand, which is related to the suspended organic material in the water, also showed a marked improvement in the bottom water from April to December.

In a like manner the dissolved substances in the water were highest in the April samples; both conductivity and total dissolved solids showed a significant decrease between April and May but remained fairly stable through the rest of the year (Fig. 12). Specific ions such as calcium and sulfate were also highest in April, whereas other ions such as magnesium, sodium and chloride were fairly stable throughout the year (Fig. 13). The important nutrients, such as nitrate, phosphate and silica, for primary productivity by green algae and diatoms had a peak in the spring and decreased markedly during the summer (Fig. 14). Silica, for example, had a 30-fold decrease in concentration between April and May. Because diatoms utilize silica for their rigid cell walls, the decrease of this substance in the water appears to be related to the spring pulse of the organisms which is also shown on Figure 14. Nitrate showed a build-up in the fall which may have resulted in the increased algal population during that season (Fig. 14).

FIGURE 10. MEAN MONTHLY HYDROGEN ION, TEMPERATURE AND DISSOLVED OXYGEN MEASUREMENTS FOR LAKE ERIE AT LOCUST POINT DURING 1974.

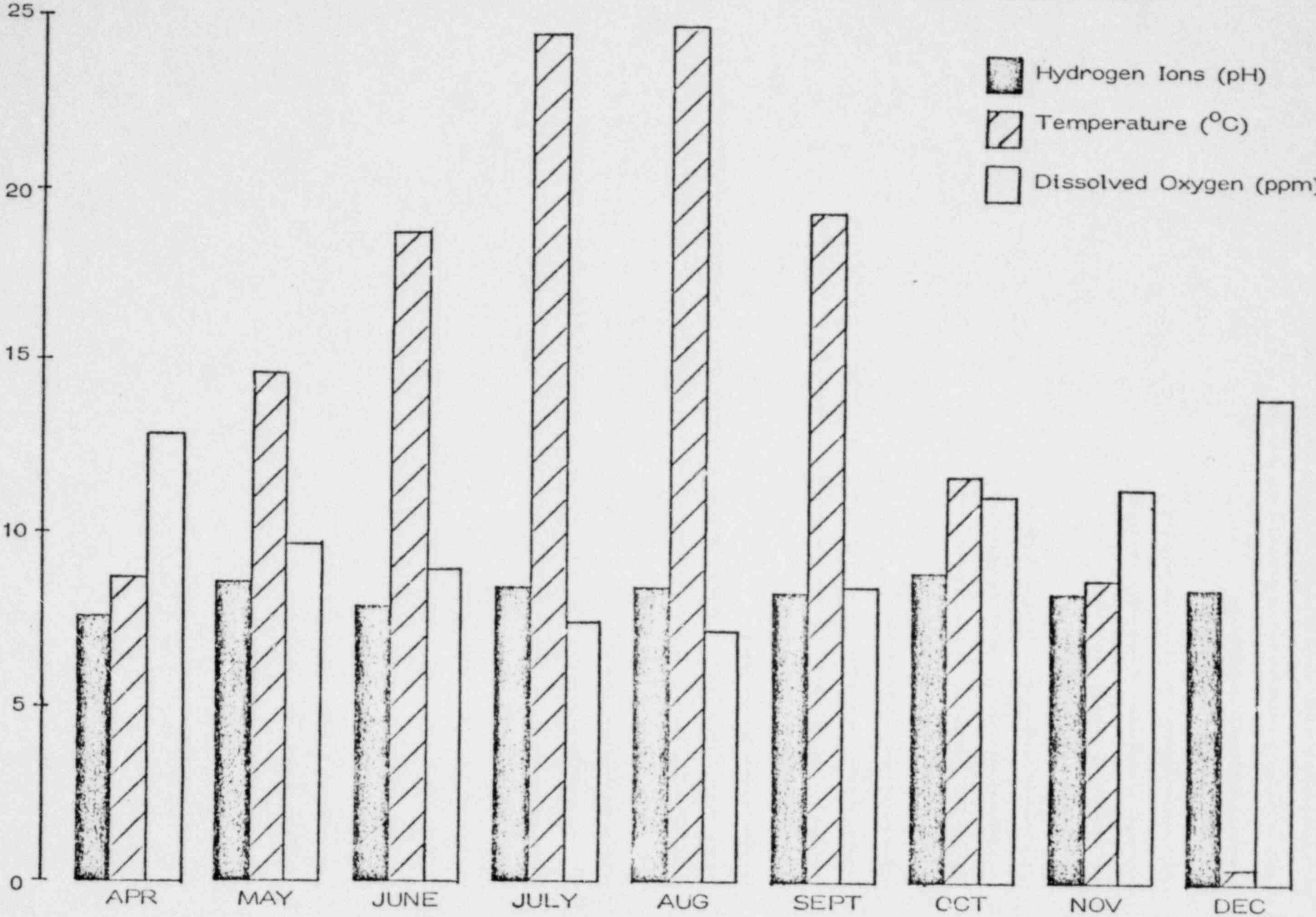


FIGURE 11. MEAN MONTHLY TURBIDITY, SUSPENDED SOLIDS AND TRANSPARENCY MEASUREMENTS FOR LAKE ERIE AT LOCUST POINT DURING 1974.

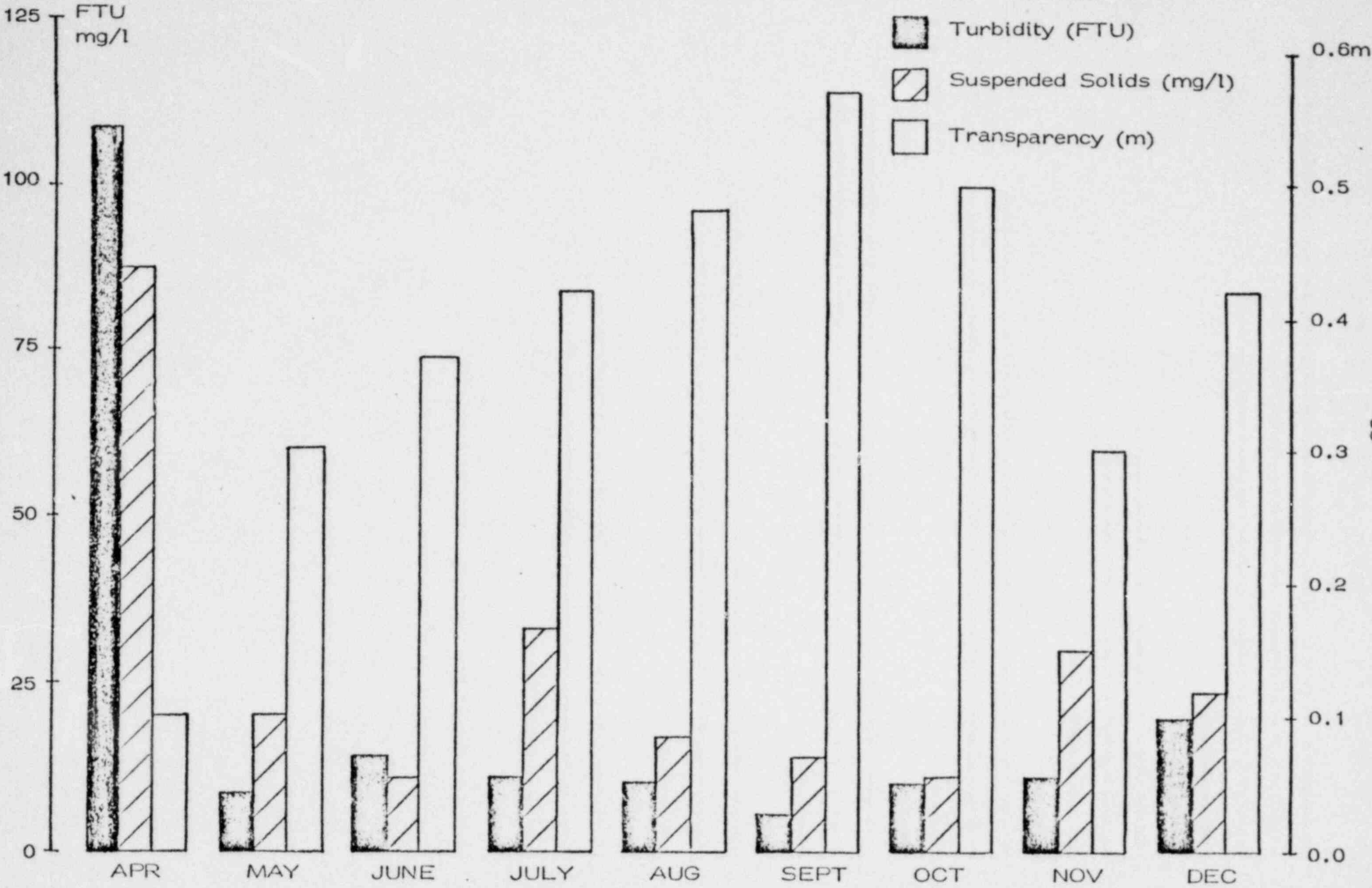


FIGURE 12. MEAN MONTHLY ALKALINITY, DISSOLVED SOLIDS AND CONDUCTIVITY MEASUREMENTS FOR LAKE ERIE AT LOCUST POINT DURING 1974.

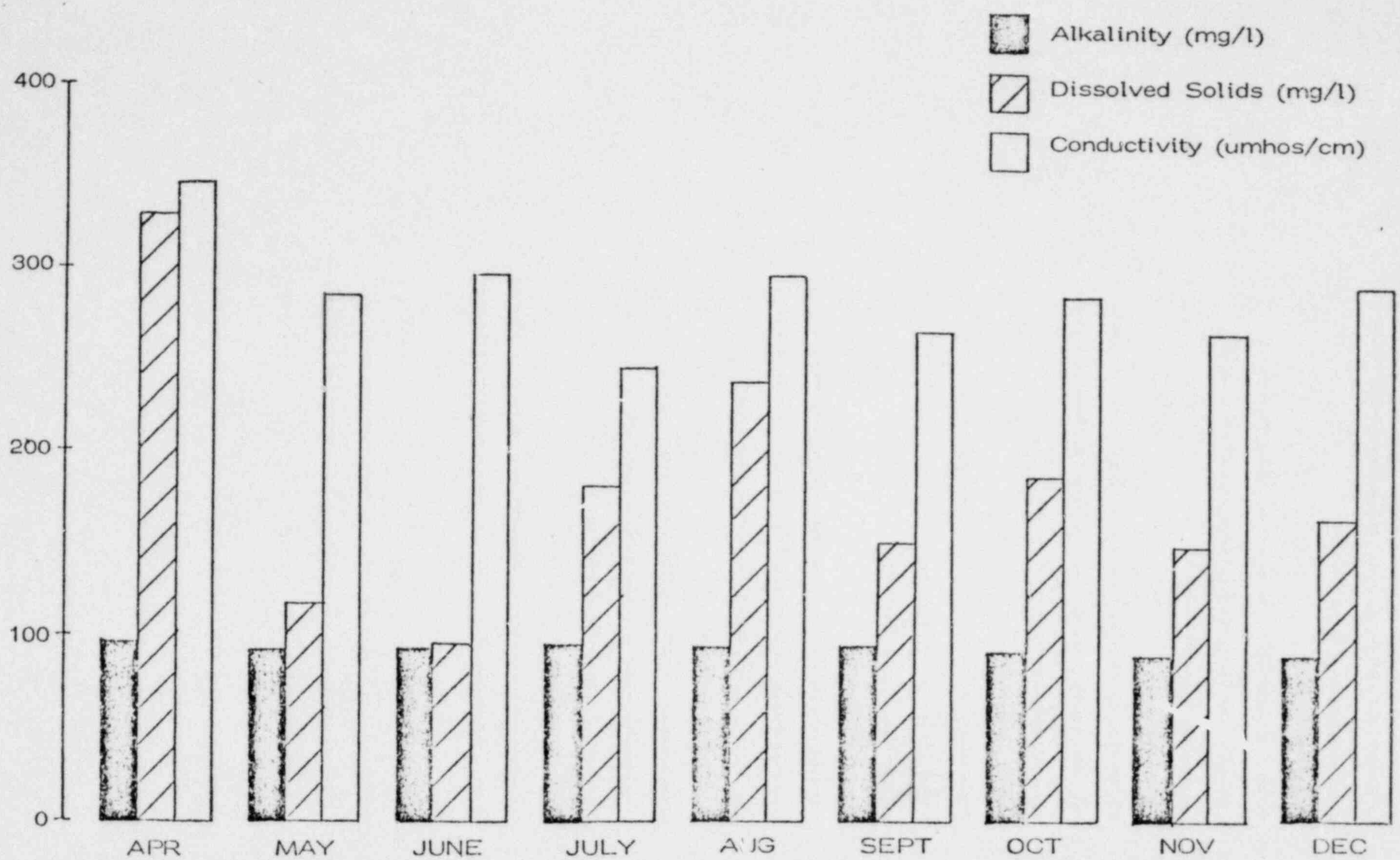


FIGURE 13. MEAN MONTHLY CALCIUM, CHLORIDE AND SULFATE CONCENTRATIONS IN LAKE ERIE AT LOCUST POINT DURING 1974.

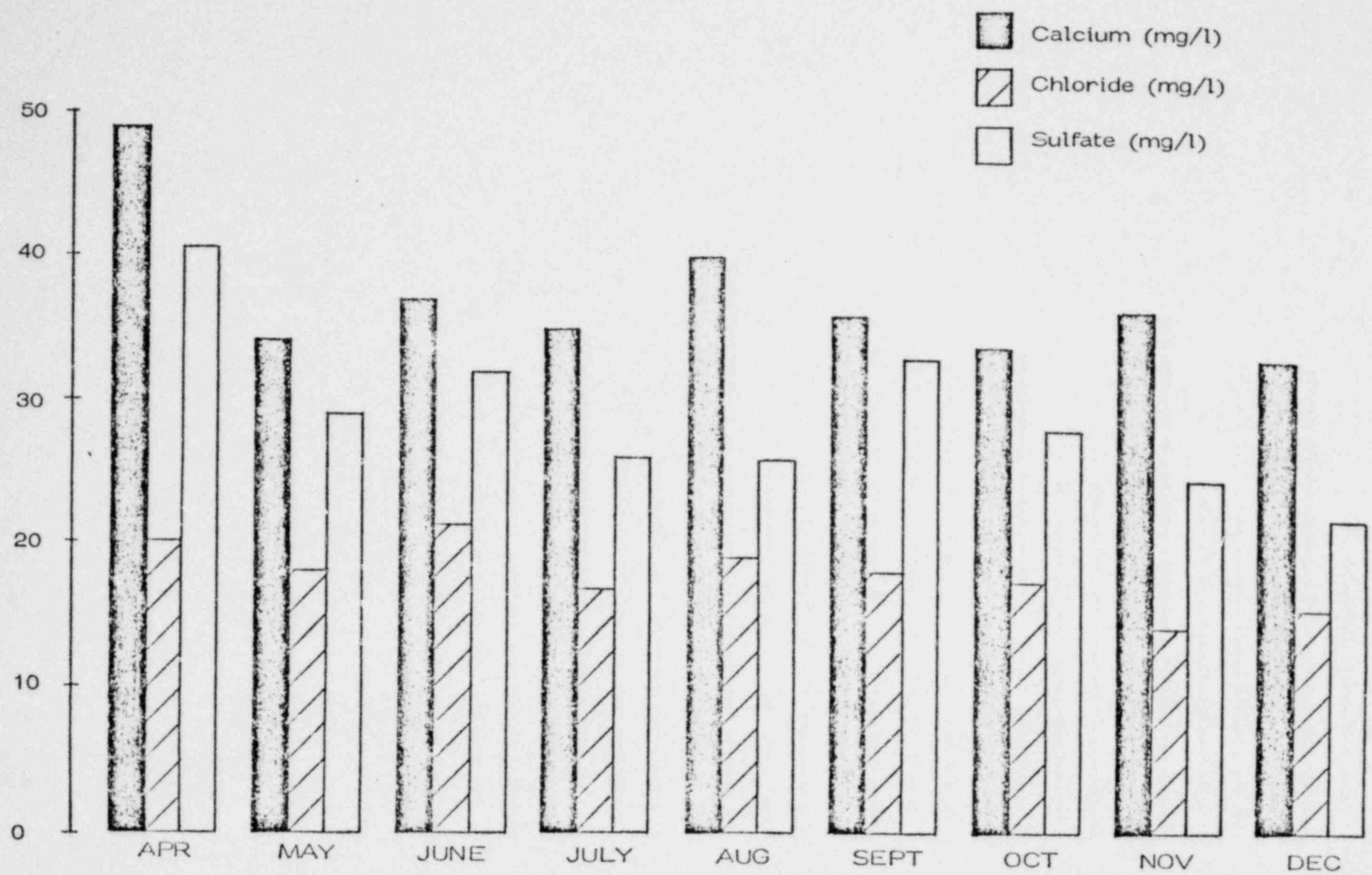
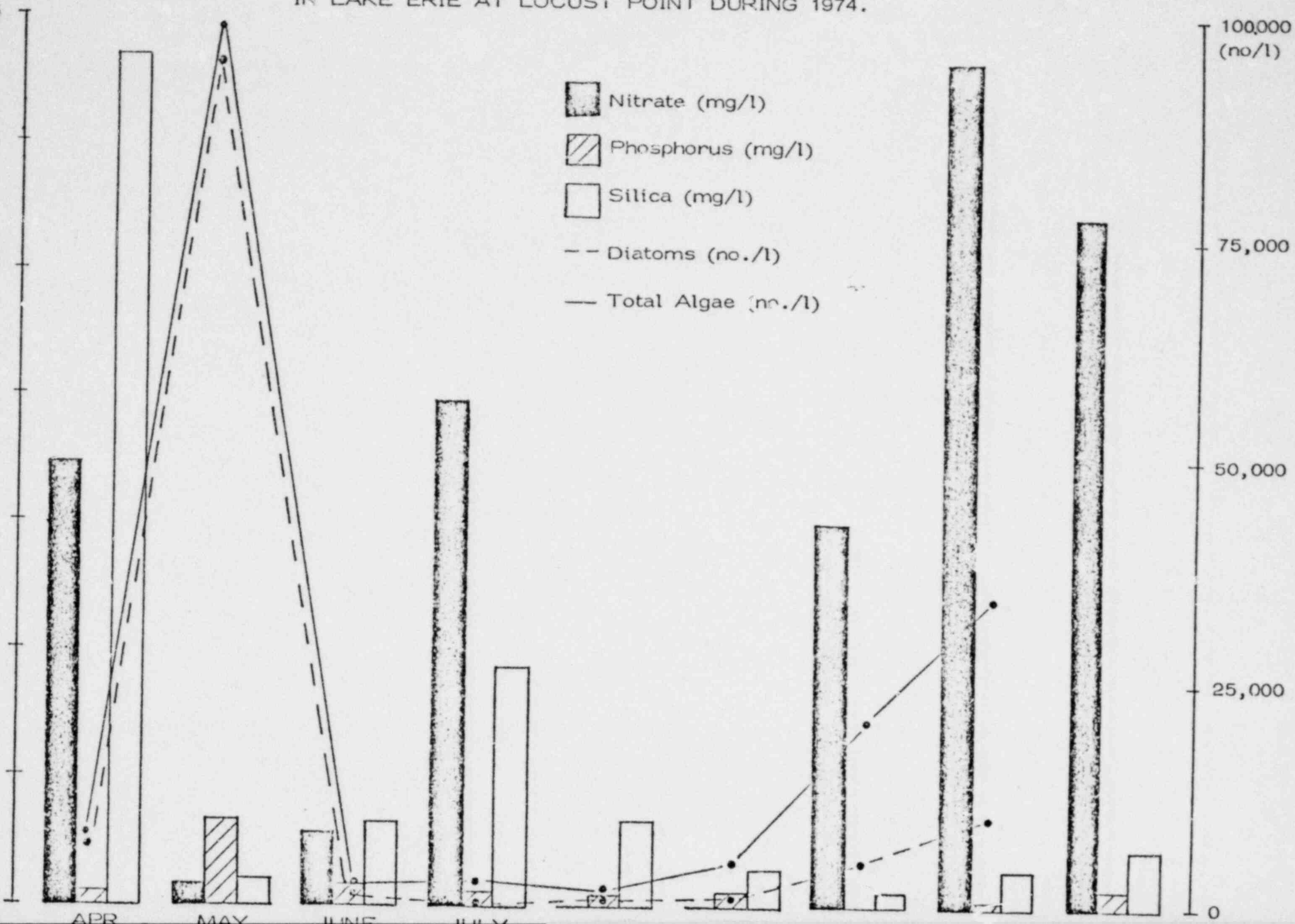


FIGURE 14. MEAN MONTHLY NITRATE, PHOSPHORUS AND SILICA CONCENTRATIONS IN LAKE ERIE AT LOCUST POINT DURING 1974.



The alkalinity and pH of the water remained fairly constant throughout the period (Figs. 10 and 12). Lake Erie is primarily a bicarbonate solution with a corresponding moderately alkaline pH of approximately 8. The bicarbonate in the water provides an abundant source of carbon for algae production. The pH showed a slight rise in May and October which may correspond with the algae pulses.

Station Variations. Stations 1, 8 and 12 are located approximately 500, 3,000 and 1,500 feet offshore respectively. Generally a slight temperature decrease was noted in an offshore direction in the spring. More noticeable decreases were found for such parameters as conductivity, most of the specific ions, alkalinity, B.O.D., suspended and dissolved solids, and turbidity in the early part of the year. Conversely, transparency increases away from the shore. Although Station 8 (the farthest offshore) had the best water quality, Station 12 (intermediate offshore) had the poorest quality for some parameters. This may be related to the condition of the lake bottom. Station 1 (nearshore) has a clean sand bottom whereas Station 12 has a recently disturbed mud bottom and is down current from the disturbed bottom along the intake pipeline. The differential in water quality values was greatest in the spring which may have been related to rough weather and leveling attempts along the pipelines. During the summer and fall no significant difference was noted between the inshore and offshore stations.

Differences between the surface and bottom water quality were slight because of the shallowness of this portion of Lake Erie. Some depression in the level of dissolved oxygen and small increases in the concentrations of dissolved and suspended solids were noted near the bottom.

Water Quality Trends. The Ohio State University, Center for Lake Erie Area Research initiated water quality studies at Locust Point in July 1972. Trends for eight water quality parameters from that date through December 1974 are shown on Figures 15 - 17. Temperature and dissolved oxygen show typical seasonal trends for each year with only minor variations from one year to the next. Dissolved oxygen appears to have undergone more depletion in 1974 than the two previous years. Hydrogen-ion concentration and alkalinity remained fairly stable over the three-year period. Transparency, turbidity, phosphorus and conductivity values have shown radical variations which are probably due to storms and dredging activities that have disturbed the bottom sediments. In general, no significant deviations from the normal quality of the water in this part of western Lake Erie have been observed in the past three years.

FIGURE 15. TRENDS IN MEAN MONTHLY TEMPERATURE, DISSOLVED OXYGEN, AND HYDROGEN IONS MEASUREMENTS FOR LAKE ERIE AT LOCUST POINT FOR THE PERIOD 1972 - 1974.

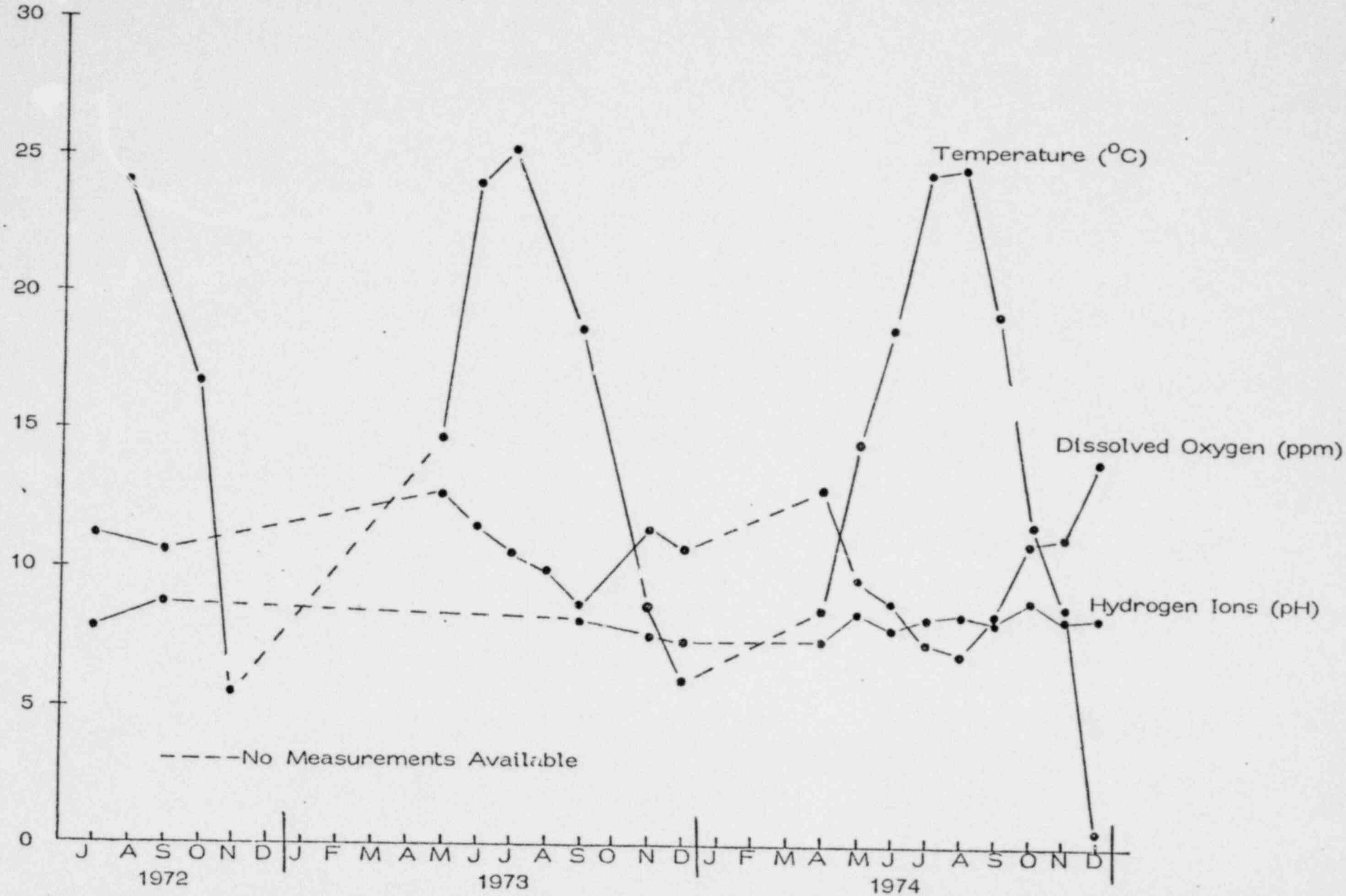


FIGURE 16. TRENDS IN MEAN MONTHLY TRANSPARENCY AND PHOSPHORUS MEASUREMENTS FOR LAKE ERIE AT LOCUST POINT FOR THE PERIOD 1972 - 1974.

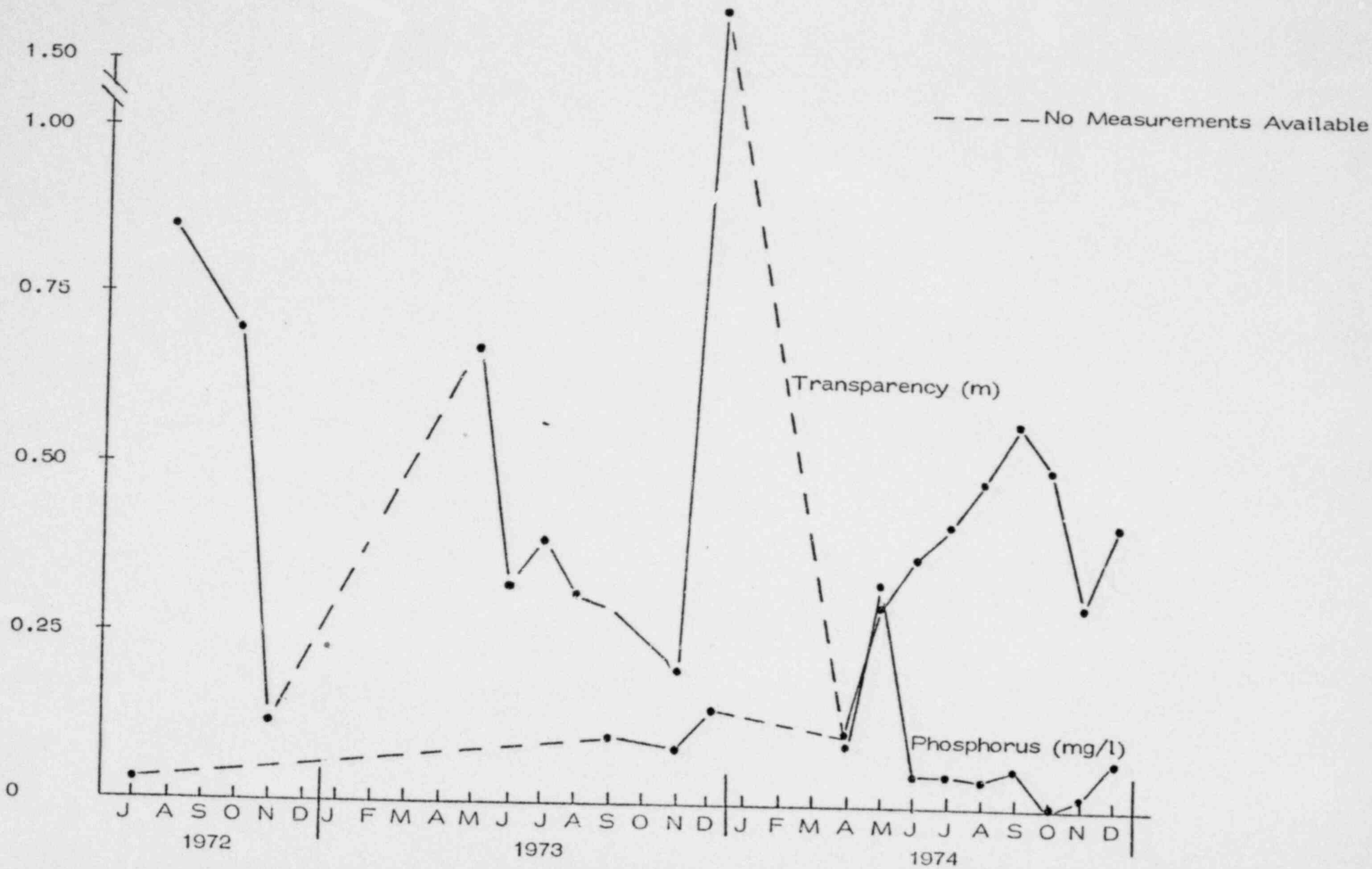
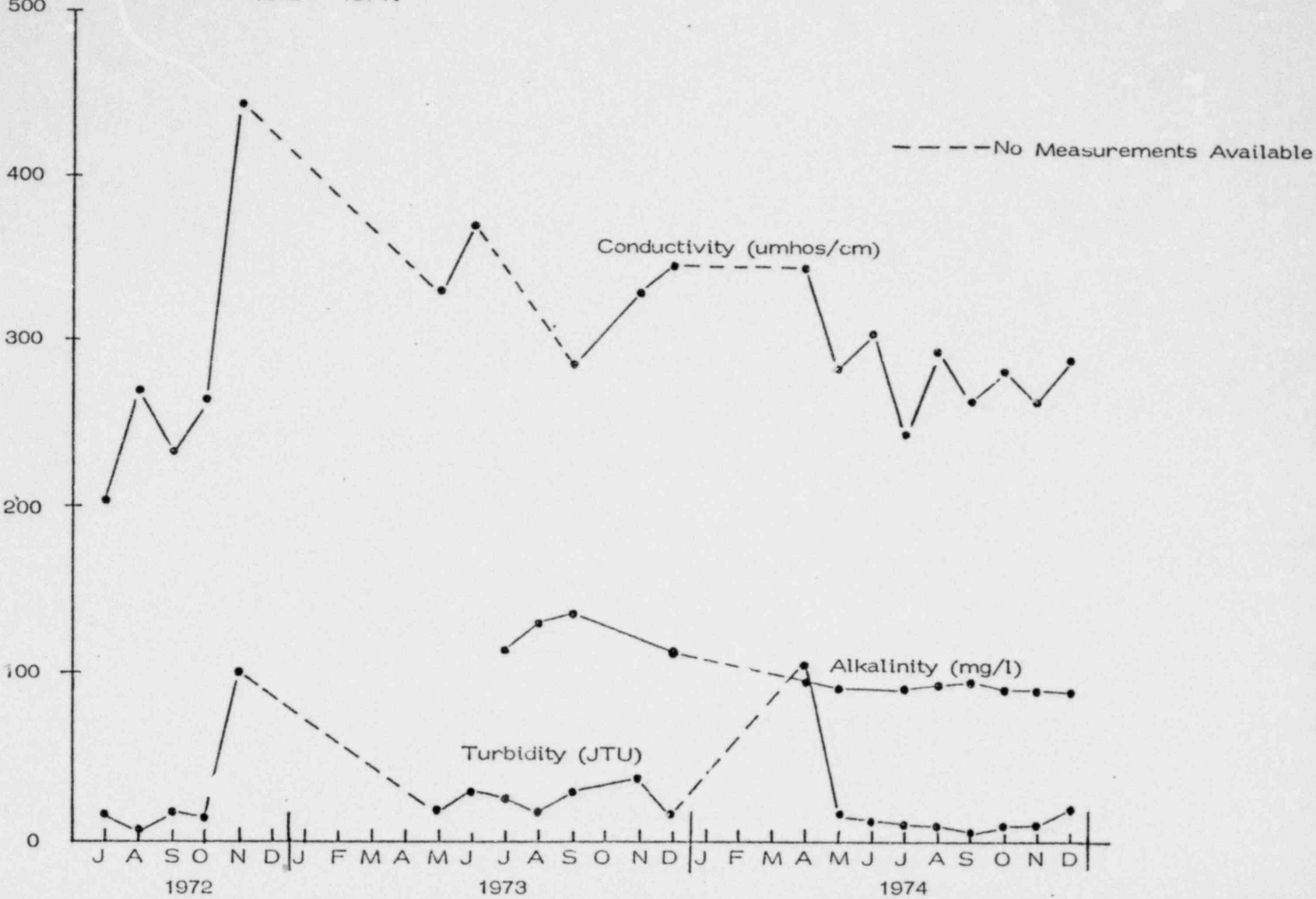


FIGURE 17. TRENDS IN MEAN MONTHLY CONDUCTIVITY, ALKALINITY AND TURBIDITY MEASUREMENTS FOR LAKE ERIE AT LOCUST POINT FOR THE PERIOD 1972 - 1974.



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APPENDIX A

PHYTOPLANKTON POPULATIONS AT LOCUST POINT JULY - NOVEMBER, 1974

TABLE A-1

ANALYSIS OF PHYTOPLANKTON POPULATIONS AT LOCUST POINT - JULY 17, 1974

TAXA	Station 1		Station 3		Station 6		Station 8	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
BACILLARIOPHYCEAE								
(Diatoms)								
Asterionella sp.	37	37			20	20		
Centric diatom								
Cyclotella sp.								
Cymatopleura sp.								
Fragilaria sp.								
Gyrosigma sp.								
Melosira sp.	293	220	126	20				
Naviculoid	37	37	18	18				
Stephanodiscus sp.								
Surirella sp.								
Synedra sp.					20	20		
Tabellaria sp.								
CHLOROPHYCEAE								
(Green Algae)								
Closteriopsis sp.			19	19				
Coelastrum sp.	147	147	19	19	20	20	140	55
Cosmarium sp.								
Eudorina sp.								
Micractinium sp.								
Mougeotia sp.								
Pandorina sp.	110	110	36		128	89		
Pediastrum sp.	987	37	736	187	1131	39	711	98
Rhizoclonium sp.	37	37						
Scenedesmus sp.								
Spirogyra sp.								
Staurastrum sp.	329	36	54	19	85	46	28	28
Volvox sp.	37	37			20	20		
DINOPHYCEAE								
(Dinoflagellates)								
Ceratium hirundinella	4168	878	1732	207	1606	865	1435	1435
Glenodinium sp.								
EUGLENOPHYCEAE								
Euglena sp.								
Trachelomonas sp.								
MYXOPHYCEAE								
(Blue-green algae)								
Anabaena sp.					44	44		
Aphanizomenon sp.								
Chroococcus sp.								
Merismopedia sp.								
Microcystis sp.					20	20		
Unidentified Bacteria								
Unidentified Phytoplankter								
TOTAL	6178	548	2737	43	3198	1092	2313	446

S.D. = Standard Deviation

Data presented as number/liter.

TABLE A-1 CONT.

ANALYSIS OF PHYTOPLANKTON POPULATIONS AT LOCUST POINT - JULY 17, 1974

TAXA	Station 9		Station 10		Station 12		Station 13	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
BACILLARIOPHYCEAE (Diatoms)								
Asterionella sp.	14	14	53	53				
Centric diatom			107	107				
Cyclotella sp.					20	20		
Cymatopleura sp.								
Fragilaria sp.								
Gyrosigma sp.								
Melosira sp.	28	28	958	107	642	369	176	59
Naviculoid	42	14						
Stephanodiscus sp.								
Surirella sp.								
Synedra sp.								
Tabellaria sp.			53	53				
CHLOROPHYCEAE (Green Algae)								
Closteriopsis sp.								
Coelastrum sp.	28	0	213	213			20	20
Cosmarium sp.								
Eudorina sp.	14	14	266	266	233	194	98	98
Micractinium sp.								
Mougeotia sp.								
Pandorina sp.	14	14						
Pediastrum sp.	919	139	639	107	1053	117	871	169
Rhizoclonium sp.								
Scenedesmus sp.							39	0
Spirogyra sp.								
Staurastrum sp.	56	28	53	53	153	114	78	0
Volvox sp.								
DINOPHYCEAE (Dinoflagellates)								
Ceratium hirundinella	809	157	2022	319	3441	867	800	176
Glenodinium sp.					431	314	20	20
EUGLENOPHYCEAE								
Euglena sp.								
Trachelomonas sp.								
MYXOPHYCEAE (Blue-green algae)								
Anabaena sp.					20	20		
Aphanizomenon sp.			1863	905	305	227		
Chroococcus sp.					413	94	20	20
Merismopedia sp.					27	27		
Microcystis sp.	42	14	160	24	119	41	20	20
Unidentified Bacteria								
Unidentified Phytoplankter			266	266				
TOTAL	1980	28	6650	374	6855	2136	2139	501

S.D. = Standard Deviation

Data presented as number/liter.

TABLE A-1 CONT.

ANALYSIS OF PHYTOPLANKTON POPULATIONS
AT LOCUST POINT - JULY 17, 1974

TAXA	Station 14		Station 18		Station 19		Mean # per Sta. Sampled
	Mean	S.D.	Mean	S.D.	Mean	S.D.	
BACILLARIOPHYCEAE (Diatoms)							
Asterionella sp.							11
Centric diatom							10
Cyclotella sp.							2
Cymatopleura sp.							
Fragilaria sp.							
Gyrosigma sp.			22	22			2
Melosira sp.	137	49	260	130			238
Naviculoid							9
Stephanodiscus sp.	16	16					1
Surirella sp.			44	44			4
Synedra sp.							2
Tabellaria sp.	16	16					6
CHLOROPHYCEAE (Green Algae)							
Closteriopsis sp.							2
Coelastrum sp.	59	59	22	22			62
Cosmarium sp.	44	15					4
Eudorina sp.	15	15	44	44			61
Micractinium sp.							
Mougeotia sp.							
Pandorina sp.							26
Pediastrum sp.	864	248	585	65	14	14	774
Rhizoclonium sp.							3
Scenedesmus sp.	15	15	22	22			7
Spirogyra sp.							
Staurastrum sp.	45	14	22	22			82
Volvox sp.							3
DINOPHYCEAE (Dinoflagellates)							
Ceratium hirundinella	2145	1190	1127	174	42	14	1757
Glenodinium sp.							41
EUGLENOPHYCEAE							
Euglena sp.							
Trachelomonas sp.			44	44			4
MYXOPHYCEAE (Blue-green algae)							
Anabaena sp.	15	15					7
Aphanizomenon sp.	29	29	44	44			204
Chroococcus sp.	44	44	195	195			61
Merismopedia sp.							2
Microcystis sp.			65	22			39
Unidentified Bacteria							
Unidentified Phytoplankter			22	22			26
TOTAL	3440	1532	2513	432	56	0	3460

S.D. = Standard Deviation

Data presented as number/liter.

TABLE A-2

ANALYSIS OF PHYTOPLANKTON POPULATIONS AT LOCUST POINT - AUGUST 22, 1974

TAXA	Station 1		Station 3		Station 6		Station 8	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
BACILLARIOPHYCEAE								
(Diatoms)								
Asterionella sp.			18	18				
Centric diatom								
Cyclotella sp.								
Cymatopleura sp.					22	22	14	14
Fragilaria sp.			53	53			27	0
Gyrosigma sp.			18	18				
Melosira sp.	531	0	461	36	894	17	780	9
Naviculoid	53	53			22	22	14	
Stephanodiscus sp.								
Surirella sp.								
Synedra sp.								
Tabellaria sp.					22	22		
CHLOROPHYCEAE								
(Green Algae)								
Closteriopsis sp.								
Coelastrum sp.			18	18	22	22	27	0
Cosmarium sp.								
Eudorina sp.	160	54			44	44	40	40
Micractinium sp.								
Mougeotia sp.					22	22		
Pandorina sp.								
Pediastrum sp.	319	213	586	231	525	178	538	21
Rhizoclonium sp.								
Scenedasmus sp.								
Spirogyra sp.								
Staurastrum sp.	213	0	106	71	59	59	109	109
Volvox sp.								
DINOPHYCEAE								
(Dinoflagellates)								
Ceratium hirundinella			53	18	22	22	14	14
Glenodinium sp.								
EUGLENOPHYCEAE								
Euglena sp.								
Trachelomonas sp.								
MYXOPHYCEAE								
(Blue-green algae)								
Anabaena sp.	53	53						
Aphanizomenon sp.								
Chroococcus sp.	107	107			29	29		
Merismopedia sp.								
Microcystis sp.	53	53	18	18	22	22		
Unidentified Bacteria								
Unidentified Phytoplankter								
TOTAL	1393	12	1329	408	1660	75	1562	71

S.D. = Standard Deviation

Data presented as number/liter.

TABLE A-2 CONT.

ANALYSIS OF PHYTOPLANKTON POPULATIONS
AT LOCUST POINT - AUGUST 22, 1974

TAXA	Station 9		Station 10		Station 12		Station 13	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
BACILLARIOPHYCEAE								
(Diatoms)								
Asterionella sp.								
Centric diatom								
Cyclotella sp.								
Cymatopleura sp.					31	31		
Fragilaria sp.					28	28	57	57
Gyrosigma sp.			53	53				
Melosira sp.	997	87	404	85	1109	62	755	113
Naviculoid	13	13			31	31	38	38
Stephanodiscus sp.								
Surirella sp.								
Synedra sp.								
Tabellaria sp.								
CHLOROPHYCEAE								
(Green Algae)								
Closteriopsis sp.								
Coelastrum sp.	42	16	53	53	31	31	57	57
Cosmarium sp.								
Eudorina sp.	41	12	514	124	112	112	94	19
Micractinium sp.								
Mougeotia sp.								
Pandorina sp.								
Pediastrum sp.	487	59	603	178	871	132	623	132
Rhizoclonium sp.								
Scenedesmus sp.			102	4				
Spirogyra sp.								
Staurastrum sp.	67	38	147	147	31	31	57	19
Volvox sp.	13	13						
DINOPHYCEAE								
(Dinoflagellates)								
Ceratium hirundinella	54	25	49	49				
Glenodinium sp.								
EUGLENOPHYCEAE								
Euglena sp.								
Trachelomonas sp.								
MYXOPHYCEAE								
(Blue-green algae)								
Anabaena sp.					31	31		
Aphanizomenon sp.								
Chroococcus sp.	15	15						
Merismopedia sp.								
Microcystis sp.			53	53				
Unidentified Bacteria								
Unidentified Phytoplankter								
TOTAL	1727	42	1977	171	2274	178	1679	18

S.D. = Standard Deviation

Data presented as number/liter.

TABLE A-2 CONT.

ANALYSIS OF PHYTOPLANKTON POPULATIONS
AT LOCUST POINT - AUGUST 22, 1974

TAXA	Station 14		Station 18		Station 19		Mean # per
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Sta. Sampled
BACILLARIOPHYCEAE (Diatoms)							
Asterionella sp.							2
Centric diatom							
Cyclotella sp.							
Cymatopleura sp.							6
Fragilaria sp.	61	1					21
Gyrosigma sp.							6
Melosira sp.	791	71	1124	130	59	20	719
Naviculoid							16
Stephanodiscus sp.							
Surirella sp.							
Synedra sp.							
Tabellaria sp.							2
CHLOROPHYCEAE (Green Algae)							
Closteriopsis sp.							25
Coelastrum sp.			21	21			
Cosmarium sp.							
Eudorina sp.	46	15	105	63	20	20	107
Micractinium sp.							
Mougeotia sp.							2
Pandorina sp.							
Pediastrum sp.	364	87	919	209	293	20	557
Rhizoclonium sp.							
Scenedesmus sp.							9
Spirogyra sp.							
Staurastrum sp.	77	47	84	42	39	0	90
Volvox sp.	15	15					3
DINOPHYCEAE (Dinoflagellates)							
Ceratium hirundinella							17
Glenodinium sp.							
EUGLENOPHYCEAE							
Euglena sp.							
Trachelomonas sp.							
MYXOPHYCEAE (Blue-green algae)							
Anabaena sp.							8
Aphanizomenon sp.							
Chroococcus sp.							14
Merismopedia sp.							
Microcystis sp.							13
Unidentified Bacteria							
Unidentified Phytoplankter							
TOTAL	1353	3	2252	79	410	20	1603

S.D. = Standard Deviation

Data presented as number/liter.

TABLE A-3

ANALYSIS OF PHYTOPLANKTON POPULATIONS AT LOCUST POINT - SEPTEMBER 10, 1974

TAXA	Station 1		Station 3		Station 6		Station 8	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
BACILLARIOPHYCEAE								
(Diatoms)								
Asterionella sp.								
Centric diatom								
Cyclotella sp.	81	81	29	29	44	44		
Cymatopleura sp.								
Fragilaria sp.	93	13	40	2	67	22	12	12
Gyrosigma sp.								
Melosira sp.	1097	352	477	137	807	42	512	187
Naviculoid	53	53			63	28	33	33
Stephanodiscus sp.								
Surirella sp.								
Synedra sp.	40	40			18	18		
Tabellaria sp.								
Unidentified Diatom								
CHLOROPHYCEAE								
(Green Algae)								
Actinastrum sp.	20	20			9	9	19	19
Ankistrodesmus sp.								
Binuclearia sp.			23	6	33	2		
Chlamydomonas sp.								
Closteriopsis sp.								
Closterium sp.	241	241	50	50	265	265	190	190
Coelastrum sp.	107	107	52	24	36	36	69	4
Cosmarium sp.								
Crucigenia sp.								
Cruciniginia sp.								
Dictyosphaerium sp.					9	9		
Dimorphococcus sp.								
Eudorina sp.					9	9	39	27
Lagerheimia sp.								
Micractinium sp.								
Mougeotia sp.	1137	392	491	151	851	85	1296	516
Oocystis sp.								
Pandorina sp.	242	242	41	3	62	62	43	43
Pediastrum sp.	1876	147	1148	135	1568	188	1204	424
Platydorina sp.								
Rhizoclonium sp.								
Scenedesmus sp.	73	33	7	7	27	27	37	37
Selenastrum sp.								
Spirogyra sp.								
Staurastrum sp.	133	27	15	15	112	24	75	10
Ulothrix sp.								
Volvox sp.								
CHRYSOPHYCEAE								
Dinobryon sp.								
DINOPHYCEAE								
(Dinoflagellates)								
Ceratium hirundinella	93	13	21	21	18	18		
Glenodinium sp.								
Peridinium sp.	60	60			9	9	6	6
EUGLENOPHYCEAE								
Euglena sp.			7	7				
Trachelomonas sp.								
MYXOPHYCEAE								
(Blue-green algae)								
Anabaena sp.	40	40	26	12	9	9	43	43
Aphanizomenon sp.	1609	443	1255	28	1515	165	1708	80
Chroococcus sp.	181	181	21	21	44	44	25	25
Merismopedia sp.								
Microcystis sp.	583	583	190	152	346	256	220	220
Spirulina sp.								
Unidentified Bacteria								
Unidentified Phytoplankter								
TOTAL	7755	2334	3801	401	5917	891	5528	1755

S.D. = Standard Deviation   Data presented as number/liter.

TABLE A-3 CONT.

ANALYSIS OF PHYTOPLANKTON POPULATIONS AT LOCUST POINT - SEPTEMBER 10, 1974

TAXA	Station 9		Station 10		Station 12		Station 13	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
BACILLARIOPHYCEAE								
(Diatoms)								
Asterionella sp.			22	22				
Centric diatom								
Cyclotella sp.	6	6	44	44	77	77	71	71
Cymatopleura sp.								
Fragilaria sp.	26	4			10	10	94	31
Gyrosigma sp.			22	22			21	21
Melosira sp.	401	116	1747	243	915	355	837	127
Naviculoid	11	11	125	8	29	29	69	27
Stephanodiscus sp.								
Surirella sp.								
Synedra sp.	11	11			48	48	48	48
Tabellaria sp.	11	11						
Unidentified Diatom								
CHLOROPHYCEAE								
(Green Algae)								
Actinastrum sp.	11	11					8	8
Ankistrodesmus sp.								
Binuclearia sp.	11	0	48	40	74	4	24	24
Chlamydomonas sp.			398	398			24	24
Closteriopsis sp.								
Closterium sp.	167	167	376	376	337	337	221	221
Coelastrum sp.	59	27	81	37	58	4	61	19
Cosmarium sp.			22	22				
Crucigenia sp.								
Cruciniginia sp.								
Dictyosphaerium sp.					19	19	24	24
Dimorphococcus sp.								
Eudorina sp.			117	117				
Lagerheimia sp.								
Micractinium sp.								
Mougeotia sp.	1163	131	656	539	1527	127	1129	168
Oocystis sp.								
Pandorina sp.	56	2			39	39	63	63
Pediastrum sp.	1305	237	2312	498	1542	138	1723	33
Platydorina sp.			67	67				
Rhizoclonium sp.								
Scenedesmus sp.			44	44	19	19	61	19
Selenastrum sp.								
Spirogyra sp.								
Staurastrum sp.	61	4	103	15	195	60	56	56
Ulothrix sp.								
Volvox sp.								
CHRYSOPHYCEAE								
Dinobryon sp.								
DINOPHYCEAE								
(Dinoflagellates)								
Ceratium hirundinella	6	6	22	22	10	10	35	4
Glenodinium sp.								
Peridinium sp.	6	6	44	44			16	16
EUGLENOPHYCEAE								
Euglena sp.	15	15			35	16		
Trachelomonas sp.								
MYXOPHYCEAE								
(Blue-green algae)								
Anabaena sp.	[illegible]	60			19	19	8	8
Aphanizomenon sp.	1341	309	2789	797	1787	347	1666	371
Chroococcus sp.			44	44	19	19	40	40
Merismopedia sp.								
Microcystis sp.	194	194	465	455	234	132	150	[illegible]
Spirulina sp.								
Unidentified Bacteria								
Unidentified Phytoplankter								
TOTAL	4917	759	9543	2044	6085	1419	6444	1389

S.D. = Standard Deviation

Data presented as number/liter.

TABLE A-3 CONT.

ANALYSIS OF PHYTOPLANKTON POPULATIONS AT LOCUST POINT - SEPTEMBER 10, 1974

TAXA	Station 14 Mean	Station 14 S.D.	Station 18 Mean	Station 18 S.D.	Station 19 Mean	Station 19 S.D.	Mean # per Sta. Sampled
BACILLARIOPHYCEAE							
(Diatoms)							2
Aster nella sp.							0
Centi ic diatom							
Cyclotella sp.	31	31	89	89			43
Cymatopleura sp.							0
Fragilaria sp.	63	[illegible]	11	11			38
Gyrosigma sp.			27	27			6
Melosira sp.	512	9	738	8	246	102	754
Naviculoid	49	49	44	44			43
Stephanodiscus sp.							0
Surirella sp.							0
Synedra sp.			56	56			20
Tabellaria sp.							1
Unidentified Diatom							
CHLOROPHYCEAE							
(Green Algae)							
Actinastrum sp.	13	13	22	22			9
Ankistrodesmus sp.							
Binuclearia sp.			21	1	9	3	22
Chlamydomonas sp.							38
Closteriopsis sp.							0
Closterium sp.	252	252	498	498	97	97	245
Coelastrum sp.	51	14	49	5			56
Cosmarium sp.			27	27			4
Crucigenia sp.	13	13	33	33			
Crucinigina sp.							4
Dictyosphaerium sp.	13	13					6
Dimorphococcus sp.							
Eudorina sp.	17	17	27	27			19
Lagerheimia sp.							
Micractinium sp.							0
Mougeotia sp.	727	207	1151	155	160	46	935
Oocystis sp.							
Pandorina sp.	37	37	122	122			64
Pediastrum sp.	1236	66	1426	11	65	22	1400
Platydorina sp.							6
Rhizoclonium sp.							
Scenedesmus sp.	25	25	22	22			29
Selenastrum sp.							
Spirogyra sp.							0
Staurastrum sp.	106	57	60	7			83
Ulothrix sp.							
Volvox sp.					15	15	1
CHRYSOPHYCEAE							
Dinobryon sp.							
DINOPHYCEAE							
(Dinoflagellates)							
Ceratium hirundinella	23	11	27	27			23
Glenodinium sp.							0
Peridinium sp.			11	11			14
EUGLENOPHYCEAE							
Euglena sp.			27	27			8
Trachelomonas sp.							0
MYXOPHYCEAE							
(Blue-green algae)							
Anabaena sp.	43	43					23
Aphanizomenon sp.	929	104	1726	730	693	9	1547
Chroococcus sp.			133	133			46
Merismopedia sp.							0
Microcystis sp.	123	123	310	310	103	103	265
Spirulina sp.							
Unidentified Bacteria							0
Unidentified Phytoplankter							0
TOTAL	4258	854	6638	2074	1385	352	5751

S.D. = Standard Deviation

Data presented as number/liter.

TABLE A-4

ANALYSIS OF PHYTOPLANKTON POPULATIONS AT LOCUST POINT - OCTOBER 9, 1974

TAXA	Station 1		Station 3		Station 5		Station 8	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
BACILLARIOPHYCEAE								
(Diatoms)								
Asterionella sp.	117	0	71	0	26	26	83	55
Centric diatom	29	29	36	36	64	64	45	45
Cyclotella sp.								
Cymatopleura sp.			9	9	13	13		
Fragilaria sp.	530	179	241	170	298	242	497	94
Gyrosigma sp.								
Melosira sp.	7636	441	3775	229	3332	491	2705	221
Naviculoid	177	60	18	18	67	11	9	9
Stephanodiscus sp.	2273	150	1086	58	1472	222	1564	134
Surirella sp.					13	13		
Synedra sp.			18	18	13	13	9	9
Tabellaria sp.			54	18	26	25	46	9
Unidentified Diatom			18	18			125	125
CHLOROPHYCEAE								
(Green Algae)								
Actinastrum sp.	59	59	45	45	64	64	45	45
Ankistrodesmus sp.	29	29	81	81	39	39	18	18
Binuclearia sp.	793	93	194	57	224	33	187	11
Chlamydomonas sp.								
Closteriopsis sp.	295	295	54	54	282	282	125	125
Closterium sp.			9	9	26	26	18	18
Coelastrum sp.	117	0			41	15	27	27
Cosmarium sp.	59	59						
Crucigenia sp.	59	59	9	9	26	26	9	9
Cruciniginia sp.								
Dictyosphaerium sp.	235	236	72	72	141	141	63	63
Dimorphococcus sp.			9	9	13	[illegible]	27	27
Eudorina sp.					28	26		
Lagerheimia sp.								
Micractinium sp.	59	59	27	27	26	26	18	18
Mougeotia sp.	6201	817	2210	685	4681	859	3233	307
Oocystis sp.	29	29	27	27	90	90	9	9
Pandorina sp.	59	59	38	35	28	28	74	74
Pediastrum sp.	3115	423	1594	69	2399	449	1759	298
Platydorina sp.								
Rhizoclonium sp.								
Scenedesmus sp.	118	118	39	0	77	77	82	28
Selenastrum sp.								
Spirogyra sp.								
Staurastrum sp.	148	148	54	54	80	24	72	1
Ulothrix sp.								
Volvox sp.			72	72	141	141	81	44
CHRYSOPHYCEAE								
Dinobryon sp.							9	9
DINOPHYCEAE								
(Dinoflagellates)								
Ceratium hirundinella					13	13	9	9
Glenodinium sp.								
Peridinium sp.								
EUGLENOPHYCEAE								
Euglena sp.								
Trachelomonas sp.								
MYXOPHYCEAE								
(Blue-green algae)								
Anabaena sp.	382	87	45	45	118	62	45	45
Aphanizomenon sp.	15045	2353	2148	623	5041	3091	3697	771
Chroococcus sp.	59	59	27	27			9	9
Merismopedia sp.								
Microcystis sp.	531	414	21	21	439	383	252	142
Spirulina sp.								
Unidentified Bacteria								
Unidentified Phytoplankter								
TOTAL	[illegible]3151	[illegible]	12016	2378	10424	6972	14883	1705

S.D. = Standard Deviation

Data presented as number/liter.

TABLE A-4 CONT.

ANALYSIS OF PHYTOPLANKTON POPULATIONS AT LOCUST POINT - OCTOBER 9, 1974

TAXA	Station 9		Station 10		Station 12		Station 13	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
BACILLARIOPHYCEAE								
(Diatoms)								
Asterionella sp.	43	43	135	12	65	30	22	22
Centric diatom	36	35	74	70	48	48	66	66
Cyclotella sp.								
Cymatopleura sp.							11	11
Fragilaria sp.	211	24	590	221	308	131	397	63
Gyrosigma sp.			37	37				
Melosira sp.	2838	321	6015	473	2689	7	3529	274
Naviculoid	22	22	37	37	19	19	54	12
Stephanodiscus sp.	1930	218	1919	146	1529	7	1487	111
Surirella sp.								
Synedra sp.	7	7			48	48	55	55
Tabellaria sp.	7	7			18	18	11	11
Unidentified Diatom			74	74				
CHLOROPHYCEAE								
(Green Algae)								
Actinastrum sp.	15	15	221	221	67	67	66	66
Ankistrodesmus sp.	7	7			19	19	66	66
Binuclearia sp.	362	17	794	18	427	50	319	53
Chlamydomonas sp.								
Closteriopsis sp.	180	180	185	185	48	48	131	131
Closterium sp.	7	7	37	37				
Coelastrum sp.	29	0	37	37	18	18	11	11
Cosmarium sp.								
Crucigenia sp.	29	29	37	37	38	38		
Cruciniginia sp.								
Dictyosphaerium sp.	36	36	258	258	105	105	99	99
Dimorphococcus sp.	22	22			10	10		
Eudorina sp.								
Lagerheimia sp.			37	37				
Micractinium sp.	15	15	74	74	38	38	66	66
Mougeotia sp.	2395	122	5573	31	3060	365	4468	655
Oocystis sp.	29	29	148	148	57	57	66	66
Pandorina sp.	30	30	123	123	36	36	84	84
Pediastrum sp.	1399	83	3260	58	1514	12	2239	186
Platydorina sp.								
Rhizoclonium sp.								
Scenedesmus sp.	66	23	332	37			98	56
Selenastrum sp.					10	10	22	22
Spirogyra sp.								
Staurastrum sp.	51	22	135	12	65	30	87	45
Ulothrix sp.								
Volvox sp.	36	36						
CHRYSOPHYCEAE								
Dinobryon sp.					10	10		
DINOPHYCEAE								
(Dinoflagellates)								
Ceratium hirundinella	15	15	62	62				
Glenodinium sp.								
Peridinium sp.								
EUGLENOPHYCEAE								
Euglena sp.			62	62	124	124	63	63
Trachelomonas sp.	7	7	37	37				
MYXOPHYCEAE								
(Blue-green algae)								
Anabaena sp.	15	15	74	74	48	48	77	77
Aphanizomenon sp.	3349	190	8706	3164	3897	1202	4074	1650
Chroococcus sp.	22	22	74	74			22	22
Merismopedia sp.								
Microcystis sp.	288	288	713	467	234	128	295	295
Spirulina sp.								
Unidentified Bacteria								
Unidentified Phytoplankter								
TOTAL	13456	311	29853	5754	14540	2275	17977	2009

S.D. = Standard Deviation   Data presented as number/liter.

TABLE A-4 CONT.

ANALYSIS OF PHYTOPLANKTON POPULATIONS AT LOCUST POINT - OCTOBER 9, 1974

TAXA	Station 14		Station 16		Station 19		Mean # per
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Sta. Sampled
BACILLARIOPHYCEAE							
(Diatoms)							
Asterionella sp.	34	0	62	62	58	3	65
Centric diatom	17	17	93	93	28	28	49
Cyclotella sp.							0
Cymatopleura sp.			16	16	14	14	6
Fragilaria sp.	336	68	449	45	189	39	368
Gyrosigma sp.			16	15			5
Melosira sp.	1810	252	3262	60	2212	358	3600
Naviculoid	9	9	109	109	112	82	58
Stephanodiscus sp.	2066	7	1859	2.	1629	33	1710
Surirella sp.							1
Synedra sp.	26	26	31	31	42	42	23
Tabellaria sp.	9	9			28	28	18
Unidentified Diatom	202	202	155	155	29	29	55
CHLOROPHYCEAE							
(Green Algae)							
Actinastrum sp.	110	110	45	45	14	14	68
Ankistrodesmus sp.	42	42	81	81	14	14	36
Binuclearia sp.	264	39	401	35	264	114	384
Chlamydomonas sp.							
Closteriopsis sp.	177	177	93	93	468	468	185
Closterium sp.			9	9			10
Coelastrum sp.	42	9	16	16	14	14	32
Cosmarium sp.							5
Crucigenia sp.	34	34	9	9	14	14	24
Cruciniginia sp.							
Dictyosphaerium sp.	85	85	72	72	55	55	111
Dimorphococcus sp.	9	9	9	9			9
Eudorina sp.							3
Lagerheimia sp.							3
Micractinium sp.	110	110	155	155	14	14	55
Mougeotia sp.	4408	654	5148	565	4163	419	4140
Oocystis sp.	17	17	27	27	14	14	47
Pandorina sp.	17	17			30	30	47
Pediastrum sp.	1955	253	2135	349	435	105	1982
Platydorina sp.							
Rhizoclonium sp.	17	17					2
Scenedesmus sp.	101	34	109	47	224	134	113
Selenastrum sp.							3
Spirogyra sp.							0
Staurastrum sp.	17	17	62	62	39	39	74
Ulothrix sp.							
Volvox sp.	34	34					33
CHRYSOPHYCEAE							
Dinobryon sp.	9	9					3
DINOPHYCEAE							
(Dinoflagellates)							
Ceratium hirundinella	9	9	16	16			11
Glenodinium sp.							0
Peridinium sp.							
EUGLENOPHYCEAE							
Euglena sp.							23
Trachelomonas sp.							4
MYXOPHYCEAE							
(Blue-green algae)							
Anabaena sp.	84	51	124	124	44	16	96
Aphanizomenon sp.	3851	1778	8461	5259	1616	185	5444
Chroococcus sp.	17	17	16	16			22
Merismopedia sp.							0
Microcystis sp.	345	278	264	264			307
Spirulina sp.							
Unidentified Bacteria							
Unidentified Phytoplankter							
TOTAL	16030	3225	23453	7945	11757	831	19227

S.D. = Standard Deviation   Data presented as number/liter.

TABLE A-5

ANALYSIS OF PHYTOPLANKTON POPULATIONS AT LOCUST POINT - NOVEMBER 7, 1974

TAXA	Station 1		Station 3		Station 6		Station 8	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
BACILLARIOPHYCEAE								
(Diatoms)								
Asterionella sp.	70	70	127	68	154	3	97	10
Centric diatom	35	35	40	40	69	69	90	90
Cyclotella sp.								
Cymatopleura sp.			20	20	10	10	18	18
Fragilaria sp.	1715	935	2346	506	1910	174	3000	33
Gyrosigma sp.			20	20	67	47		
Melosira sp.	2746	38	4295	1129	2137	84	4083	1314
Naviculoid	191	191	49	49	40	40	137	7
Stephanodiscus sp.	4263	286	4747	676	4139	994	8099	1130
Surirella sp.							22	22
Synedra sp.	74	5	10	10	49	49	57	14
Tabellaria sp.	91	13	98	20	10	10	83	47
Unidentified Diatom								
CHLOROPHYCEAE								
(Green Algae)								
Actinastrum sp.	18	18	40	40	30	30	72	72
Ankistrodesmus sp.	18	18	10	10	10	10		
Binuclearia sp.	1017	198	837	246	609	236	851	293
Chlamydomonas sp.								
Closteriopsis sp.	1246	1012	462	266	715	602	752	535
Closterium sp.	35	35	30	30				
Coelastrum sp.					10	10	62	26
Cosmarium sp.							44	44
Crucigenia sp.								
Cruciniginia sp.								
Dictyosphaerium sp.	139	139	138	138	69	69	179	179
Dimorphococcus sp.	18	18	10	10				
Eudorina sp.								
Lagerheimia sp.								
Micractinium sp.	35	35	84	84	40	40	54	54
Mougeotia sp.	21192	4815	16913	5094	14511	5187	20863	6909
Oocystis sp.							18	18
Pandorina sp.							130	130
Pediastrum sp.	1228	370	1283	4	1346	127	2087	94
Platydorina sp.								
Rhizoclonium sp.								
Scenedesmus sp.	187	48	235	78	96	17	176	3
Selenastrum sp.								
Spirogyra sp.								
Staurastrum sp.	87	87	148	109	213	62	115	28
Ulothrix sp.							36	36
Volvox sp.							22	22
CHRYSOPHYCEAE								
Dinobryon sp.								
DINOPHYCEAE								
(Dinoflagellates)								
Ceratium hirundinella							32	32
Glenodinium sp.								
Peridinium sp.								
EUGLENOPHYCEAE								
Euglena sp.			10	[illegible]	10	10	18	18
Trachelomonas sp.								
MYXOPHYCEAE								
(Blue-green algae)								
Anabaena sp.	52	52	40	40	10	10	18	18
Aphanizomenon sp.	1141	283	1332	45	1007	252	2605	602
Chroococcus sp.	52	52			10	10	18	18
Merismop[illegible] sp.								
Microcystis sp.	204	30	147	9	145	32	129	86
Spirulina sp.								
Unidentified Bacteria			20	20				
Unidentified Phytoplankter								
TOTAL	35848	8537	33484	4082	27413	6813	43347	[illegible]

S.D. = Standard Deviation   Data presented as number/liter.

TABLE A-5 CONT.

ANALYSIS OF PHYTOPLANKTON POPULATIONS AT LOCUST POINT - NOVEMBER 7, 1974

TAXA	Station 9		Station 10		Station 12		Station 13	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
BACILLARIOPHYCEAE (Diatoms)								
Asterionella sp.	177	89	75	16	107	0	115	75
Centric diatom	89	89	90	90	80	80	21	21
Cyclotella sp.								
Cymatopleura sp.	22	22					31	10
Fragilaria sp.	3572	852	1800	90	2084	62	1478	187
Gyrosigma sp.	22	22						
Melosira sp.	8306	409	2304	469	2871	512	1954	195
Naviculoid	44	44	295	295	134	134	137	137
Stephanodiscus sp.	6807	489	3021	636	4116	282	2737	275
Surirella sp.					54	54		
Synedra sp.	81	52			14	14	74	74
Tabellaria sp.	154	21	104	14	14	14	51	30
Unidentified Diatom								
CHLOROPHYCEAE (Green Algae)								
Actinastrum sp.	22	22	30	30	54	54	53	53
Ankistrodesmus sp.	67	67	59	59	14	14		
Binuclearia sp.	977	571	260	94	559	111	478	155
Chlamydomonas sp.								
Closteriopsis sp.	988	871	786	336	1070	432	1001	517
Closterium sp.			59	59	27	27	21	21
Coelastrum sp.	15	15			40	13	31	10
Cosmarium sp.	15	15						
Crucigenia sp.								
Cruciniginia sp.								
Dictyosphaerium sp.	155	155	207	207	121	121	158	158
Dimorphococcus sp.			30	30	14	14	11	11
Eudorina sp.								
Lagerheimia sp.								
Micractinium sp.	67	67	30	30	27	27	42	42
Mougeotia sp.	22422	12301	23185	654	18075	3131	15417	4658
Oocystis sp.								
Pandorina sp.	88	88			54	54	20	20
Pediastrum sp.	2035	486	1398	42	1216	152	1157	108
Platydorina sp.								
Rhizoclonium sp.								
Scenedesmus sp.	96	37	179	2	226	65	94	54
Selenastrum sp.								
Spirogyra sp.								
Staurastrum sp.	90	90	193	103	241	81	83	2
Ulothrix sp.								
Volvox sp.					27	27		
CHRYSOPHYCEAE								
Dinobryon sp.								
DINOPHYCEAE (Dinoflagellates)								
Ceratium hirundinella								
Glenodinium sp.								
Peridinium sp.								
EUGLENOPHYCEAE								
Euglena sp.			120	61	54	54	11	11
Trachelomonas sp.								
MYXOPHYCEAE (Blue-green algae)								
Anabaena sp.	67	67	30	30	40	40	21	21
Aphanizomenon sp.	2191	641	1154	704	1216	152	1125	76
Chroococcus sp.	44	44	89	89	27	[illegible]	11	11
Merismopedia sp.								
Microcystis sp.	207	148	148	148	94	41	85	85
Spirulina sp.								
Unidentified Bac' ria			45	45				
Unidentified Ph ,oplankter								
TOTAL	48815	17413	35775	9613	32662	3664	26409	6871

S.D. = Sc.ndard Deviation

Data presented as number/liter.

TABLE A-5 CONT.

ANALYSIS OF PHYTOPLANKTON POPULATIONS AT LOCUST POINT - NOVEMBER 7, 1974

TAXA	Station 14		Station 18		Station 13		Mean # per
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Sta. Sampled
BACILLARIOPHYCEAE							
(Diatoms)							
Asterionella sp.	111	48	127	16			105
Centric diatom	80	80	95	95			63
Cyclotella sp.							0
Cymatopleura sp.							9
Fragilaria sp.	2879	600	2085	33	886		2160
Gyrosigma sp.							10
Melosira sp.	2881	547	2797	435	3004		3398
Naviculoid	160	160	130	130			120
Stephanodiscus sp.	6090	1691	5253	653	3304		4780
Surirella sp.							7
Synedra sp.	8	8	59	59			39
Tabellaria sp.	88	40	36	36			66
Unidentified Diatom							
CHLOROPHYCEAE							
(Green Algae)							
Actinastrum sp.	24	24	36	35			34
Ankistrodesmus sp.			12	12			17
Binuclearia sp.	475	116	660	190	182		628
Chlamydomonas sp.							
Closteriopsis sp.	1043	695	992	491	95		832
Closterium sp.	40	40	36	35			23
Coelastrum sp.	16	16	28	28	32		21
Cosmarium sp.					63		11
Crucigenia sp.							
Cruciniginia sp.							
Dictyosphaerium sp.	152	152	47	47			124
Dimorphococcus sp.							8
Eudorina sp.							0
Lagerheimia sp							
Micractinium sp			12	12			36
Mougeotia sp.	16641	4649	20249	4593	6072		17778
Oocystis sp.			47	47			
Pandorina sp.	48	48	56	56	32		39
Pediastrum sp.	1604	181	1352	182	158		1351
Platydorina sp.							
Rhizoclonium sp.							0
Scenedesmus sp.	159	0	210	68	127		162
Selenastrum sp.							
Spirogyra sp.							0
Staurastrum sp.	64	64	190	23			129
Ulothrix sp.							3
Volvox sp.							4
CHRYSOPHYCEAE							
Dinobryon sp.							
DINOPHYCEAE							
(Dinoflagellates)							
Ceratium hirundinella							3
Glenodinium sp.							0
Peridinium sp.							
EUGLENOPHYCEAE							
Euglena sp.			68	44			26
Trachelomonas sp.							0
MYXOPHYCEAE							
(Blue-green algae)							
Anabaena sp.			35	35			29
Aphanizomenon sp.	1216	172	1552	382			1322
Chroococcus sp.							23
Merismopedia sp.							0
Microcystis sp.	104	72	99	43			124
Spirulina sp.							
Unidentified Bacteria							6
Unidentified Phytoplankter							0
TOTAL	[illegible]	4672	36280	6038	13055		[illegible]

' S.D. = Standard Deviation   Data presented as number/liter.

APPENDIX B

ZOOPLANKTON POPULATIONS AT LOCUST POINT
JULY - NOVEMBER, 1974

TABLE B-1

ANALYSIS OF ZOOPLANKTON POPULATIONS AT LOCUST POINT - JULY 17, 1974

TAXA	Station 1		Station 3		Station 6		Station 8	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
ROTIFERA								
Asplanchna giroidi								
A. priodonta	7.9	4.2	3.2	0.0	2.4	0.2	0.9	0.2
Brachionus angularis	75.7	20.3	33.1	9.1	11.8	2.5	8.4	0.0
B. calyciflorus	2.8	0.0						
B. havanaensis	0.9	0.9	0.5	0.0	0.3	0.3		
B. (Platyias) patulus								
B. urceolaris								
Chromogaster ovalis								
Conochiloides sp.	28.6	4.6	17.8	0.3	3.5	1.0	0.7	0.0
Filinia terminalis	30.9	6.0	8.6	1.7	5.9	3.9	1.3	0.2
Kellicottia longispina								
Keratella cochlearis	37.0	1.8	16.6	0.5	13.5	0.7	7.8	0.4
K. quadrata								
Notholca squamula								
Polyarthra sp.	892.2	13.4	469.1	9.5	509.1	60.4	349.7	2.3
Synchaeta sp.								
Testudinella sp.								
Trichocerca cylindrica	0.9	0.0	1.2	0.2	0.3	0.3		
T. multicrinis					0.3	0.3		
Unidentified Rotifer								
Lecane lunaris								
COPEPODA								
Calanoid copepods								
Diaptomus sp.	3.7	0.9	2.2	0.0	3.5	3.5	9.4	0.5
Immatures	2.8	0.0	0.5	0.5	1.5	1.5	2.3	0.2
Cyclopoid copepods								
Cyclops sp.	37.9	4.7	50.1	2.6	94.8	63.1	43.0	1.0
Mesocyclops sp.					0.3	0.3		
Immatures	48.0	3.7	25.5	0.4	28.9	12.5	16.7	0.5
Nauplius	321.2	3.7	241.6	2.7	166.4	25.2	143.1	1.2
CLADOCERA								
Bosmina sp.	59.1	6.5	64.4	3.5	31.8	12.1	39.8	2.8
Chydorus sp.								
Daphnia galeata							0.2	0.2
D. pulex	0.9	0.9	0.7	0.2	0.3	0.3	0.2	0.2
D. retrocurva	172.6	22.2	213.6	12.9	96.4	19.6	15[illegible].3	1.2
Diaphanosoma sp.					0.3	0.3		
Holopedium sp.	1.4	0.4			0.3	0.3		
Leptodora kindtii	0.5	0.5			0.3	0.3	0.2	0.2
Ceriodaphnia sp.								
PROTOZOA								
Acineta sp.								
Amphileptus sp.								
Difflugia sp.	21.7	4.2	62.8	2.3	12.9	12.9	140.8	0.4
Orphryodendron sp.								
Staurophrya sp.								
TOTAL	1746.3	50.9	1211.2	18.8	984.0	32.8	917.6	3.3

S.D. = Standard Deviation

Data presented as number/liter.

TABLE B-1 CONT.

ANALYSIS OF ZOOPLANKTON POPULATIONS
AT LOCUST POINT - JULY 17, 1974

TAXA	Station 9		Station 10		Station 12		Station 13	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
ROTIFERA								
Asplanchna giroidi								
A. priodonta	1.3	0.2	2.7	0.0	1.7	0.3	3.4	0.0
Brachionus angularis	9.4	0.2	45.0	10.1	12.8	5.4	35.9	10.3
B. calyciflorus								
B. havanaensis							0.3	0.3
B. (Platyias) patulus								
B. urceolaris								
Chromogaster ovalis								
Conochiloides sp.	0.4	0.0	2.7	0.0	2.7	0.2	19.2	0.0
Filinia terminalis	0.2	0.2	2.0	0.7	3.4	2.3	3.0	0.0
Kellicottia longispina								
Keratella cochlearis	2.8	0.0	45.1	6.1	16.7	0.6	18.2	0.0
K. quadrata								
Notholca squamula								
Polyarthra sp.	321.4	1.4	1104.1	11.4	555.9	101.8	492.5	4.9
Synchaeta sp.								
Testudinella sp.								
Trichocerca cylindrica			0.7	0.7	0.4	0.4	0.8	0.8
T. multicrinis								
Unidentified Rotifer								
Lecane lunaris								
COPEPODA								
Calanoid copepods								
Diaptomus sp.	5.3	0.3	8.8	2.1	4.0	2.0	3.0	0.0
Immatures	5.5	0.9	5.4	2.7	1.5	0.5	1.5	0.5
Cyclopoid copepods								
Cyclops sp.	51.4	3.5	50.4	3.4	48.4	17.5	50.5	0.3
Mesocyclops sp.								
Immatures	23.1	0.6	57.8	2.7	27.6	8.8	26.1	0.5
Nauplius	140.8	1.1						
CLADOCERA								
Bosmina sp.	51.4	1.8	114.3	6.8	34.4	14.3	62.0	0.5
Chydorus sp.								
Daphnia galeata	0.7	0.0	2.0	0.7	0.4	0.4		
D. pulex	0.2	0.2					0.3	0.3
D. retrocurva	144.9	2.0	233.2	15.5	89.7	25.7	207.4	24.9
Diaphanosoma sp.	0.2	0.2						
Holopedium sp.			0.7	0.7				
Leptodora kindtii			0.7	0.7	0.3	0.3	0.3	0.3
Ceriodaphnia sp.								
PROTOZOA								
Acineta sp.								
Amphileptus sp.								
Difflugia sp.	233.6	4.1	61.8	6.7	40.2	0.6	66.5	3.5
Orphryodendron sp.								
Staurophrya sp.								
TOTAL	992.3	8.3	2202.2	21.1	1027.6	130.1	1243.3	12.0

S.D. = Standard Deviation

Data presented as number/liter.

TABLE B-1 CONT.

ANALYSIS OF ZOOPLANKTON POPULATIONS
AT LOCUST POINT - JULY 17, 1974

TAXA	Station 14		Station 18		Station 19		Mean # per
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Station Sampled
ROTIFERA							
Asplanchna giroidi							
A. priodonta	0.6	0.6	2.5	0.3	1.6	0.2	2.6
Brachionus angularis	6.4	1.0	12.3	1.9	29.1	0.6	25.4
B. calyciflorus							0.3
B. havanaensis							0.2
B. (Platyias) patulus							
B. urceolaris							
Chromogaster ovalis							
Conochiloides sp.	1.4	0.2	3.6	0.9			7.3
Filinia terminalis	0.2	0.2	4.4	2.8			5.4
Kellicottia longispina							
Keratella cochlearis	7.6	0.6	14.2	0.0	5.7	0.4	16.8
K. quadrata					12.2	0.6	1.1
Notholca squamula							
Polyarthra sp.	408.9	2.3	522.1	28.2	16.0	0.2	512.8
Synchaeta sp.							
Testudinella sp.							
Trichocerca cylindrica			0.3	0.3			0.4
T. multicrinis					1.3	0.2	0.2
Unidentified Rotifer							
Lecane lunaris					0.2	0.2	0.0
COPEPODA							
Calanoid copepods							
Diaptomus sp.	10.6	0.9	4.1	1.4	1.1	0.0	5.1
Immatures	2.1	0.1	1.9	1.4	1.5	0.3	2.4
Cyclopoid copepods							
Cyclops sp.	59.6	0.9	31.5	0.9	87.9	1.3	55.0
Mesocyclops sp.							0.0
Immatures	16.5	0.6	18.3	0.8	18.7	0.7	27.9
Nauplius	177.3	2.8	177.0	12.4	46.7	0.6	128.6
CLADOCERA							
Bosmina sp.	45.0	3.7	31.8	9.9	6.5	0.2	49.1
Chydorus sp.							
Daphnia galeata	0.2	0.2			0.9	0.2	0.4
D. pulex					0.9	0.2	0.3
D. retrocurva	90.4	7.0	105.6	7.1	8.1	0.4	137.8
Diaphanosoma sp.							0.0
Holopedium sp.			0.3	0.3			0.2
Leptodora kindtii			0.3	0.3			0.2
Ceriodaphnia sp.							
PROTOZOA							
Acineta sp.							
Amphileptus sp.							
Difflugia sp.	96.7	46.1	25.2	3.9	3.7	0.5	69.6
Orphryodendron sp.							
Staurophrya sp.							
TOTAL	923.2	51.6	954.9	46.2	246.7	1.8	1131.8

S.D. = Standard Deviation
Data presented as number/liter.

TABLE B-2

ANALYSIS OF ZOOPLANKTON POPULATIONS
AT LOCUST POINT - AUGUST 22, 1974

TAXA	Station 1		Station 3		Station 6		Station 8	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
ROTIFERA								
Asplanchna giroidi								
A. priodonta	40.4	1.4	62.1	6.1	78.0	18.9	92.0	6.7
Brachionus angularis	14.8	0.0	50.9	6.5	29.0	8.8	58.5	12.1
B. calyciflorus			1.4	1.4				
B. havanaensis			2.5	0.3	3.7	1.5	2.2	0.5
B. (Platyias) patulus								
B. urceolaris								
Chromogaster ovalis								
Conochiloides sp.					0.3	0.3		
Filinia terminalis			1.1	0.2	0.6	0.1	1.0	0.3
Kellicottia longispina								
Keratella cochlearis	14.1	0.7	12.4	5.2	9.1	2.0	8.0	0.6
K. quadrata	6.7	0.0	0.4	0.0	0.6	0.6	1.5	0.2
Notholca squamula								
Polyarthra sp.	59.2	1.4	155.2	18.6	132.2	32.4	100.8	38.6
Synchaeta sp.								
Testudinella sp.								
Trichocerca cylindrica								
T. multicrinis	10.1	0.7	13.2	5.6	20.1	5.9	9.4	0.0
Unidentified Rotifer			3.8	1.1	6.9	2.0	2.3	0.2
Lecane lunaris								
COPEPODA								
Calanoid copepods								
Diaptomus sp.	1.3	0.0	0.9	0.0	0.3	0.3	0.4	0.4
Immatures	2.0	0.7	0.4	0.0	0.3	0.3	0.4	0.4
Cyclopoid copepods								
Cyclops sp.	31.6	2.0	15.0	2.5	9.7	0.1	26.7	1.2
Mesocyclops sp.			1.3	0.0	0.8	0.8	0.2	0.2
Immatures	6.1	0.7	6.3	0.0	10.8	3.4	11.7	0.3
Nauplius	27.6	2.1	50.4	1.1	63.9	2.6	52.9	5.9
CLADOCERA								
Bosmina sp.	7.4	0.7	17.7	0.2	12.6	0.0	37.0	5.4
Chydorus sp.								
Daphnia galeata								
D. pulex								
D. retrocurva			2.5	0.3	2.0	1.3	4.2	1.8
Diaphanosoma sp.							0.2	0.2
Holopedium sp.							0.2	0.2
Leptodora kindtii								
Ceriodaphnia sp.							0.4	0.4
PROTOZOA								
Acineta sp.								
Amphileptus sp.								
Difflugia sp.	14.8	1.4	19.5	1.1	9.7	2.3	14.8	0.7
Orphryodendron sp.								
Staurophrya sp.								
TOTAL	235.9	4.8	416.7	42.3	383.2	7.2	424.2	67.8

S.D. = Standard Deviation
Data presented as number/liter.

TABLE B-2 CONT.

ANALYSIS OF ZOOPLANKTON POPULATIONS
AT LOCUST POINT - AUGUST 22, 1974

TAXA	Station 9		Station 10		Station 12		Station 13	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
ROTIFERA								
Asplanchna giroidi								
A. priodonta	92.3	9.3	36.6	1.7	100.2	3.9	58.7	1.5
Brachionus angularis	60.8	7.0	13.6	1.3	39.0	3.8	51.8	8.4
B. calyciflorus								
B. havanaensis	1.6	0.3			1.1	1.1	2.7	0.3
B. (Platyias) patulus								
B. urceolaris								
Chromogaster ovalis								
Conochiloides sp.	3.0	3.0						
Filinia terminalis	0.5	0.2			1.1	0.3	1.9	0.0
Kellicottia longispina								
Keratella cochlearis	10.7	2.8	13.6	1.3	12.6	0.6	12.4	4.3
K. quadrata	1.4	0.0	6.5	0.3			0.3	0.3
Notholca squamula								
Polyarthra sp.	115.5	25.6	57.4	4.4	101.0	2.3	177.5	3.4
Synchaeta sp.								
Testudinella sp.								
Trichocerca cylindrica								
T. multicrinis	7.1	1.2	9.0	0.9	19.2	0.6	12.8	4.7
Unidentified Rotifer	1.6	0.5	1.3	1.3	2.6	0.3	2.9	0.0
Lecane lunaris								
COPEPODA								
Calanoid copepods								
Diaptomus sp.	0.2	0.2	1.3	0.0			1.0	0.0
Immatures	0.4	0.4	1.9	0.6			0.3	0.3
Cyclopoid copepods								
Cyclops sp.	23.4	1.4	27.1	2.5	10.9	1.6	13.1	3.1
Mesocyclops sp.	0.3	0.3					1.0	0.5
Immatures	12.2	0.3	5.2	1.5	8.2	1.2	6.5	0.3
Nauplius	54.5	7.9	28.4	3.8	67.4	4.1	48.2	1.0
CLADOCERA								
Bosmina sp.	37.3	3.5	9.8	2.4	16.3	0.8	16.8	0.6
Chydorus sp.							0.3	0.3
Daphnia galeata								
D. pulex								
D. retrocurva	3.4	0.9	0.6	0.6	1.1	0.3	2.7	0.3
Diaphanosoma sp.								
Holopedium sp.								
Leptodora kindtii								
Ceriodaphnia sp.								
PROTOZOA								
Acineta sp.								
Amphileptus sp.								
Difflugia sp.	5.8	5.8	12.8	2.0	7.1	0.8	21.0	3.8
Orphryodendron sp.								
Staurophrya sp.								
TOTAL	431.0	55.1	224.8	10.4	387.5	11.9	431.3	23.2

S.D. = Standard Deviation
Data presented as number/liter.

TABLE B-2 CONT.

ANALYSIS OF ZOOPLANKTON POPULATIONS
AT LOCUST POINT - AUGUST 22, 1974

TAXA	Station 14		Station 18		Station 19		Mean # per
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Sta. Sampled
ROTIFERA							
Asplanchna giroidi							
A. priodonta	49.1	0.5	19.3	0.3	1.8	0.3	57.3
Brachionus angularis	48.8	0.3	54.9	0.0	88.1	2.0	46.4
B. calyciflorus							0.1
B. havanaensis			0.8	0.8			1.3
B. (Platyias) patulus							
B. urceolaris							
Chromogaster ovalis							
Conochiloides sp.							0.3
Filinia terminalis	0.8	0.4	0.8	0.3			0.7
Kellicottia longispina							
Keratella cochlearis	11.6	0.2	5.6	0.3	17.0	0.8	11.6
K. quadrata	0.6	0.2	1.1	0.0	2.7	0.7	2.0
Notholca squamula							
Polyarthra sp.	154.9	0.9	107.2	1.6	10.3	0.0	106.5
Synchaeta sp.							
Testudinella sp.							
Trichocerca cylindrica							
T. multicrinis	16.9	0.6	11.6	0.0			11.8
Unidentified Rotifer	2.5	0.2	3.2	0.0	2.3	0.8	2.7
Lecane lunaris							
COPEPODA							
Calanoid copepods							
Diaptomus sp.	1.2	0.0	1.1	0.6	3.0	0.0	1.0
Immatures	0.8	0.0	1.1	0.6	0.3	0.3	0.7
Cyclopoid copepods							
Cyclops sp.	12.5	0.0	9.8	0.3	22.7	3.5	18.4
Mesocyclops sp.	0.6	0.2	0.6	0.6			0.4
Immatures	5.2	0.1	13.5	0.3	17.0	2.2	9.3
Nauplius	48.3	0.2	59.2	1.1	28.0	0.0	48.1
CLADOCERA							
Bosmina sp.	17.1	0.0	12.4	1.3	3.0	0.0	17.0
Chydorus sp.							0.0
Daphnia galeata					0.5	0.0	0.0
D. pulex							
D. retrocurva	2.3	0.0	4.0	0.8	7.4	1.0	2.8
Diaphanosoma sp.					0.3	0.3	0.0
Holopedium sp.					0.8	0.3	0.1
Leptodora kindtii	0.2	0.2	0.3	0.3	0.3	0.3	0.1
Ceriodaphnia sp.							0.0
PROTOZOA							
Acineta sp.							
Amphileptus sp.							
Difflugia sp.	25.0	0.5	13.7	2.1	151.6	3.0	23.9
Orphryodendron sp.							
Staurophrya sp.							
TOTAL	398.0	1.9	319.8	7.2	356.6	5.2	364.5

S.D. = Standard Deviation
Data presented as number/liter.

TABLE B-3

ANALYSIS OF ZOOPLANKTON POPULATIONS AT LOCUST POINT - SEPTEMBER 10, 1974

TAXA	Station 1		Station 3		Station 5		Station 9	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
ROTIFERA								
Asplanchna girodi								
A. priodonta	87.3	27.0	19.8	2.2	13.6	1.1	4.5	0.4
Brachionus angularis	3.4	2.1	1.7	0.7	1.5	0.4	3.1	0.2
B. calyciflorus	2.7	1.4	1.0	1.0	0.9	0.3	1.6	1.5
B. havanaensis	2.0	0.7	0.5	0.5	0.3	0.3	0.2	0.2
B. (Platyias) patulus					0.3	0.3	0.6	0.2
B. urceolaris								
Chromogaster ovalis								
Conochiloides sp.					0.9	0.9	0.2	0.2
Euchlanis sp.							0.4	0.4
Filinia terminalis	0.7	0.7			0.6	0.6	0.4	0.4
Hexarthra mira	0.7	0.7	0.3	0.3			0.2	0.2
Kellicottia longispina								
Keratella cochlearis	38.5	9.7	7.7	4.4	12.2	2.0	10.9	2.7
K. quadrata			1.0	0.5			0.2	0.2
Lecane (Monostyla) bulla								
L. (Monostyla) lunaris	0.7	0.7						
Notholca squamula								
Pleosoma sp.								
Polyarthra sp.	411.2	122.2	193.3	27.3	230.1	2.3	102.4	5.4
Pompholyx sulcata								
Synchaeta sp.								
Testudinella sp.								
Trichocerca cylindrica	0.7	0.7	0.5	0.0	1.2	0.6		
T. multicrinis	17.5	9.4	1.7	0.3	5.2	0.1	3.9	0.2
Unidentified Rotifer A	67.1	20.1	31.0	9.1	21.9	4.2	23.6	9.2
Unidentified Rotifer B	22.8	22.6	12.6	12.6	3.0	3.0	1.4	1.4
COPEPODA								
Calanoid copepods								
Diaptomus sp.	0.7	0.7	0.5	0.0			0.4	0.4
Eurytemora sp.								
Immatures	2.0	2.0	1.2	0.7	1.5	0.9	1.0	0.2
Cyclopoid copepods								
Cyclops sp.	4.0	3.7	1.7	1.7	0.9	0.3	1.5	1.5
Mesocyclops sp.			0.3	0.3				
Tropocyclops prasinus								
Immatures	16.8	4.7	7.2	0.0	4.9	1.4	5.5	0.5
Nauplius	161.0	42.7	64.1	10.7	63.1	16.0	41.3	2.8
CLADOCERA								
Bosmina sp.	33.5	14.7	20.0	6.2	22.9	4.2	17.0	3.5
Ceriodaphnia sp.			0.3	0.3				
Chydorus sp.	2.7	1.4	4.5	0.7	2.9	1.2	6.4	1.1
Daphnia galeata								
D. pulex								
D. retrocurva	0.7	0.7	2.2	1.2	2.6	0.2	1.6	0.4
Diaphanosoma sp.	2.0	2.0	1.0	1.0	0.6	0.6	0.4	0.0
Holopedium sp.			1.7	1.7	1.2	1.2		
Leptodora kindtii	0.7	0.7	0.3	0.3				
PROTOZOA								
Acineta sp.								
Amphileptus sp.								
Difflugia sp.	104.7	20.0	111.7	22.0	102.1	29.4	132.1	37.4
Orphryodendron sp.								
Staurophrya sp.								
Vorticella sp.								
Zoothamnium sp.			0.7	0.7	0.3	0.3	0.6	0.6
TOTAL	1018.3	205.1	487.7	131.3	494.3	52.0	351.1	58.7

S.D. = Standard Deviation

Data presented as number/liter.

TABLE B-3 CONT.

ANALYSIS OF ZOOPLANKTON POPULATIONS AT LOCUST POINT - SEPTEMBER 10, 1974

TAXA	Station 9		Station 10		Station 12		Station 13	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
ROTIFERA								
Asplanchna girodi								
A. priodonta	12.1	0.9	85.7	10.3	24.7	9.3	24.0	3.9
Brachionus angularis	6.7	0.9	2.3	0.8	1.9	0.0	2.1	0.5
B. calyciflorus	0.7	0.7	3.7	0.7	1.3	1.3	0.6	0.6
B. havanaensis	1.4	0.0	0.8	0.8	1.3	0.0	1.9	1.9
B. (Platyias) patulus	0.6	0.6	0.8	0.8				
B. urceolaris								
Chromogaster ovalis			19.9	19.9	3.2	3.2	2.7	2.7
Conochiloides sp.	0.2	0.2						
Euchlanis sp.					0.3	0.3	0.6	0.6
Filinia terminalis							0.3	0.3
Hexarthra mira	0.2	0.2			0.3	0.3	0.3	0.3
Kellicottia longispina								
Keratella cochlearis	11.5	0.7	73.1	18.4	23.5	7.4	17.1	8.7
K. quadrata			1.5	1.5	1.3	1.3		
Lecane (Monostyla) bulla								
L. (Monostyla) lunaris								
Notholca squamula								
Pleosoma sp.								
Polyarthra sp.	88.8	13.2	330.0	55.1	365.3	102.7	206.7	19.6
Pompholyx sulcata					4.8	4.8	4.2	4.2
Synchaeta sp.								
Testudinella sp.								
Trichocerca cylindrica	0.6	0.6	3.0	1.5			1.1	1.1
T. multicrinis	2.0	1.3	35.9	4.4	6.5	0.7	3.2	0.6
Unidentified Rotifer A	23.6	8.5	76.8	23.5	45.6	12.2	29.5	4.7
Unidentified Rotifer B	6.7	6.7	8.1	8.1	6.4	6.4		
COPEPODA								
Calanoid copepods								
Diaptomus sp.	0.8	0.4	1.5	1.5	1.6	1.6	1.9	1.4
Eurytemora sp.	1.3	0.5			1.0	1.0	1.1	0.0
Immatures								
Cyclopoid copepods								
Cyclops sp.	1.6	0.9	6.7	5.2	5.5	4.2	4.0	1.9
Mesocyclops sp.					0.3	0.3		
Tropocyclops prasinus								
Immatures	6.8	1.1	7.4	4.4	10.3	1.3	9.8	3.5
Nauplius	58.3	3.6	127.0	29.5	70.6	17.3	82.8	11.5
CLADOCERA								
Bosmina sp.	11.4	3.1	10.4	4.5	11.9	8.0	29.0	7.4
Ceriodaphnia sp.			1.5	1.5				
Chydorus sp.	8.0	2.2	4.4	0.0	4.5	1.9	6.9	0.0
Daphnia galeata					0.3	0.3		
D. pulex								
D. retrocurva	1.2	0.2			4.2	0.3	4.8	1.6
Diaphanosoma sp.	0.7	0.3	1.5	0.0	1.3	1.3	0.3	0.3
Holopedium sp.	1.3	1.3	0.8	0.8			0.3	0.3
Leptodora kindtii	0.4	0.4					0.6	0.6
PROTOZOA								
Acineta sp.								
Amphileptus sp.								
Difflugia sp.	96.7	6.3	158.7	33.1	106.8	18.8	93.3	22.5
Orphryodendron sp.								
Staurophrya sp.								
Vorticella sp.								
Zoothamnium sp.	0.7	0.7	0.3	0.3			0.8	0.8
TOTAL	343.7	30.5	962.3	206.9	694.4	178.0	532.6	95.0

S.D. = Standard Deviation

Data presented as number/liter.

TABLE B-3 CONT.

ANALYSIS OF ZOOPLANKTON POPULATIONS AT LOCUST POINT - SEPTEMBER 10, 1974

TAXA	Station 14		Station 18		Station 16		Mean # per
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Sta. Sampled
ROTIFERA							
Asplanchna girodi							
A. priodonta	32.8	1.3	20.6	4.5	3.1	1.3	29.8
Brachionus angularis	5.6	1.5	2.1	1.4	3.4	0.2	3.1
B. calyciflorus	3.3	3.3	1.1	1.1	0.4	0.4	1.6
B. havanaensis	1.2	0.4	1.1	0.4	0.4	0.4	1.0
B. (Platyias) patulus	0.4	0.4					0.2
B. urceolaris							
Chromogaster ovalis							2.3
Conochiloides sp.	0.4	0.4					0.2
Euchlanis sp.	0.2	0.2					0.1
Filinia terminalis			0.4	0.4	0.6	0.6	0.3
Hexarthra mira	0.2	0.2			2.7	2.7	0.4
Kellicottia longispina							
Keratella cochlearis	10.7	4.5	21.0	4.2	11.2	0.8	21.6
K. quadrata			0.4	0.4	0.9	0.5	0.5
Lecane (Monostyla) bulla							
L. (Monostyla) lunaris							0.1
Notholca squamula							
Pleosoma sp.							
Polyarthra sp.	145.3	0.5	2[illegible]5.7	38.1	55,8	5.4	215.0
Pompholyx sulcata					3.0	3.0	1.1
Synchaeta sp.							
Testudinella sp.							
Trichocerca cylindrica					1.1	1.1	0.7
T. multicrinis	3.1	0.6	9.3	3.3	0.9	0.5	8.2
Unidentified Rotifer A	37.5	19.9	58.6	1.7	36.9	7.0	39.1
Unidentified Rotifer B	6.2	6.2	15.5	15.5	4.2	4.2	7.9
COPEPODA							
Calanoid copepods							
Diaptomus sp.	0.6	0.6	0.4	0.4	1.1	0.7	0.9
Eurytemora sp.							
Immatures	1.7	0.5	2.1	0.8	1.3	0.9	1.3
Cyclopoid copepods							
Cyclops sp.	2.1	1.7	6.3	0.3	1.1	0.0	3.2
Mesocyclops sp.	0.2	0.2					0.1
Tropocyclops prasinus							
Immatures	5.5	0.2	7.3	2.9	7.2	0.7	8.1
Nauplius	95.3	13.9	61.4	3.7	40.7	0.7	78.8
CLADOCERA							
Bosmina sp.	19.1	2.7	23.7	2.2	10.1	0.7	19.0
Ceriodaphnia sp.							0.2
Chydorus sp.	6.2	1.7	3.0	3.0	2.9	1.1	4.8
Daphnia galeata					0.2	0.2	0.0
D. pulex							
D. retrocurva	3.5	0.6	2.0	2.0	1.8	1.8	2.2
Diaphanosoma sp.	1.2	1.2	0.8	0.8	5.6	5.6	1.4
Holopedium sp.			0.7	0.7	7.6	7.6	1.2
Leptodora kindtii	0.2	0.2			0.4	0.4	0.2
PROTOZOA							
Acineta sp.							
Amphileptus sp.							
Difflugia sp.	79.3	6.3	98.2	4.3	8.8	3.4	99.3
Ophryodendron sp.							
Staurophrya sp.							
Vorticella sp.							
Zoothamnium sp.	0.4	0.4	0.4	0.4	0.4	0.4	0.4
TOTAL	462.7	58.5	349.5	4.8	213.1	26.0	556.3

S.D. = Standard Deviation

Data presented as number/liter.

TABLE B-4

ANALYSIS OF ZOOPLANKTON POPULATIONS AT LOCUST POINT - OCTOBER 9, 1974

TAXA	Station 1		Station 3		Station 5		Station 8	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
ROTIFERA								
Asplanchna giroidi								
A. priodonta	1.5	1.5	3.6	0.9	3.8	1.9	2.3	0.9
Brachionus angularis	2.2	2.2	0.9	0.0	1.7	0.5	1.8	0.9
B. calyciflorus	11.1	6.7	7.6	1.8	9.4	0.3	9.7	2.8
B. havanaensis					0.3	0.3		
B. (Platyias) patulus								
B. urceolaris					0.4	0.4		
Chromogaster ovalis								
Conochiloides sp.	4.5	3.0	4.7	4.7	6.0	1.1	6.8	4.5
Euchlanis sp.								
Filinia terminalis			0.2	0.2	0.7	0.7		
Hexarthra mira							0.2	0.2
Kellicottia longispina								
Keratella cochlearis	16.3	3.0	10.7	3.1	10.8	6.5	7.7	1.2
K. quadrata	0.8	0.8	1.4	0.5	0.7	0.7	1.1	0.2
Lecane (Monostyla) bulla								
L. (Monostyla) lunaris								
Notholca squamula								
Pleosoma sp.	2.2	2.2					0.5	0.5
Polyarthra sp.	76.8	3.1	19.5	3.0	44.6	14.4	41.2	1.4
Pompholyx sulcata								
Synchaeta sp.			0.7	0.7				
Testudinella sp.								
Trichocerca cylindrica			0.2	0.2				
T. multicrinis	0.8	0.8						
Unidentified Rotifer A	2.2	2.2						
Unidentified Rotifer B								
COPEPODA								
Calanoid copepods								
Diaptomus sp.	3.7	0.8	0.5	0.5	0.7	0.7	0.9	0.9
Eurytemora sp.								
Immatures	4.5	4.5	6.0	3.3	2.6	1.2	5.0	0.8
Cyclopoid copepods								
Cyclops sp.	3.7	0.8	0.9	0.9	0.7	0.0	1.2	0.3
Mesocyclops sp.							0.3	0.3
Tropocyclops prasinus								
Immatures	5.2	2.2	3.6	2.7	12.5	0.3	5.6	5.1
Nauplius	113.7	6.1	53.5	2.9	57.7	6.4	64.1	8.7
CLADOCERA								
Bosmina sp.	70.8	7.5	56.7	0.3	62.4	28.0	54.4	4.4
Ceriodaphnia sp.	0.8	0.8						
Chydorus sp.	11.1	0.8	9.9	2.3	20.5	0.8	13.4	0.9
Daphnia galeata								
D. pulex								
D. retrocurva					0.3	0.3		
Diaphanosoma sp.					0.3	0.3	0.2	0.2
Holopedium sp.	0.8	0.8						
Leptodora kindtii								
PROTOZOA								
Acineta sp.								
Amphileptus sp.								
Difflugia sp.	57.6	4.5	32.9	13.2	48.4	12.5	39.1	10.9
Orphryodendron sp.								
Staurophrya sp.								
Vorticella sp.	0.8	0.8	0.2	0.2	0.3	0.3		
Zoothamnium sp.	3.7	3.7			0.7	0.7	1.1	1.1
TOTAL	394.0	5.0	213.5	30.0	285.1	72.2	255.2	33.4

S.D. = Standard Deviation

Data presented as number/liter.

TABLE B-4 CONT.

ANALYSIS OF ZOOPLANKTON POPULATIONS AT LOCUST POINT - OCTOBER 9, 1974

TAXA	Station 9		Station 10		Station 12		Station 13	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
ROTIFERA								
Asplanchna girodi								
A. priodonta	2.2	1.1	1.6	1.6	2.3	1.3	2.1	0.6
Brachionus angularis	1.5	0.0	4.2	0.5	1.2	0.8	2.4	1.4
B. calyciflorus	13.4	5.7	7.4	1.9	4.2	0.2	11.5	4.9
B. havanaensis			0.9	0.9				
B. (Platyias) patulus								
B. urceolaris								
Chromogaster ovalis								
Conochiloides sp.	4.7	2.5	7.9	3.2	8.3	8.3	6.8	5.3
Euchlanis sp.	0.2	0.2						
Filinia terminalis	0.2	0.2			0.5	0.0	1.1	1.1
Hexarthra mira					0.3	0.3	0.3	0.3
Kellicottia longispina								
Keratella cochlearis	9.1	1.7	13.1	5.3	8.6	0.5	9.5	3.0
K. quadrata	0.9	0.2			0.5	0.5	2.5	2.0
Lecane (Monostyla) bulla								
L. (Monostyla) lunaris								
Notholca squamula								
Pleosoma sp.	0.4	0.4						
Polyarthra sp.	34.0	2.3	44.7	9.7	23.5	0.7	45.7	8.5
Pompholyx sulcata								
Synchaeta sp.								
Testudinella sp.								
Trichocerca cylindrica	0.2	0.2	0.9	0.9	1.2	1.2		
T. multicrinis								
Unidentified Rotifer A	0.2	0.2			0.3	0.3		
Unidentified Rotifer B								
COPEPODA								
Calanoid copepods								
Diaptomus sp.	1.0	0.6			1.2	0.3	0.8	0.6
Eurytemora sp.								
Immatures	6.6	0.0	3.3	1.5	7.1	4.4	5.7	2.6
Cyclopoid copepods								
Cyclops sp.	1.1	0.0	1.6	1.6	1.8	0.4	1.6	0.6
Mesocyclops sp.							0.3	0.3
Tropocyclops prasinus								
Immatures	7.8	0.8	1.9	1.9	7.8	6.9	7.7	7.7
Nauplius	[illegible].4	4.8	72.5	0.5	46.5	3.2	61.9	12.5
CLADOCERA								
Bosmina sp.	42.8	10.0	77.2	5.7	55.7	1.9	62.0	2.4
Ceriodaphnia sp.								
Chydorus sp.	14.6	0.6	16.7	2.0	10.5	2.4	13.9	3.7
Daphnia galeata								
D. pulex								
D. retrocurva	0.2	0.2			0.3	0.3	0.3	0.3
Diaphanosoma sp.					1.0	1.0	0.6	0.6
Holopedium sp.								
Leptodora kindtii								
PROTOZOA								
Acineta sp.								
Amphileptus sp.								
Difflugia sp.	34.4	4.5	83.8	43.4	26.8	8.4	44.1	17.1
Orphryodendron sp.								
Staurophrya sp.								
Vorticella sp.	0.4	0.4	1.9	1.9	0.7	0.7	0.8	0.8
Zoothamnium sp.	0.4	0.4	0.9	0.9	0.3	0.3	0.8	0.8
TOTAL	228.3	33.6	375.3	9.6	209.9	31.6	282.0	76.3

S.D. = Standard Deviation

Data presented as number/liter.

TABLE B-4 CONT.

ANALYSIS OF ZOOPLANKTON POPULATIONS AT LOCUST POINT - OCTOBER 9, 1974

TAXA	Station 14		Station 18		Station 19		Mean # per
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Sta. Sampled
ROTIFERA							
Asplanchna girodi							
A. priodonta	5.7	1.9	5.5	0.8	3.8	1.2	3.1
Brachionus angularis	2.1	0.0	3.2	1.6	3.2	0.2	2.2
B. calyciflorus	9.7	4.6	6.2	0.8	14.6	0.2	9.5
B. havanaensis							0.1
B. (Platyias) patulus							
B. urceolaris							0.0
Chromogaster ovalis							
Conochiloides sp.	8.4	7.6	5.1	5.1	0.4	0.4	5.8
Euchlanis sp.							0.0
Filinia terminalis			0.4	0.4	0.2	0.2	0.3
Hexarthra mira	0.4	0.4					0.1
Kellicottia longispina							
Keratella cochlearis	13.1	3.8	12.5	8.6	24.5	7.4	12.4
K. quadrata	0.4	0.4	0.4	0.4	2.3	1.2	1.0
Lecane (Monostyla) bulla			0.4	0.4			0.0
L. (Monostyla) lunaris							
Notholca squamula							
Pleosoma sp.					0.4	0.4	0.3
Polyarthra sp.	31.8	4.8	35.3	6.6	10.5	0.6	37.1
Pompholyx sulcata							
Synchaeta sp.							0.1
Testudinella sp.							
Trichocerca cylindrica	0.2	0.2					0.2
T. multicrinis							0.1
Unidentified Rotifer A			0.4	0.4			0.3
Unidentified Rotifer B							
COPEPODA							
Calanoid copepods							
Diaptomus sp.	0.9	0.5	1.2	0.4			1.0
Eurytemora sp.							
Immatures	2.8	0.7	2.8	1.2			4.2
Cyclopoid copepods							
Cyclops sp.	1.7	0.9	0.4	0.4	0.2	0.2	1.4
Mesocyclops sp.							0.1
Tropocyclops prasinus							
Immatures	6.4	5.1	12.8	3.5	0.6	0.6	6.5
Nauplius	63.1	9.5	63.7	14.7	3.0	0.0	59.3
CLADOCERA							
Bosmina sp.	60.3	4.2	50.1	5.8	5.0	1.6	54.3
Ceriodaphnia sp.							
Chydorus sp.	10.4	0.7	12.1	5.1	7.8	2.1	12.8
Daphnia galeata							
D. pulex							
D. retrocurva							0.1
Diaphanosoma sp.			0.4	0.4	0.2	0.2	0.2
Holopedium sp.							
Leptodora kindtii							
PROTOZOA							
Acineta sp.							
Amphileptus sp.							
Difflugia sp.	27.0	3.4	55.1	25.4	15.4	2.1	42.2
Orphryodendron sp.							
Staurophrya sp.							
Vorticella sp.	0.4	0.4	1.1	1.1			0.6
Zoothamnium sp.	0.2	0.2	0.8	0.8	0.4	0.4	0.8
TOTAL	244.6	43.3	270.1	71.1	92.3	13.4	259.2

S.D. = Standard Deviation

Data presented as number/liter.

TABLE B-5

ANALYSIS OF ZOOPLANKTON POPULATIONS AT LOCUST POINT - NOVEMBER 7, 1974

TAXA	Station 1		Station 3		Station 6		Station 8	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
ROTIFERA								
Asplanchna girodi								
A. priodonta	0.5	0.5	3.2	0.7	3.4	0.5	1.5	0.2
Brachionus angularis	1.0	1.0	3.0	3.0				
B. calyciflorus	22.2	7.4	26.8	1.2	22.3	0.8	35.9	4.6
B. havanaensis								
B. (Platyias) patulus								
B. urceolaris								
Chromogaster ovalis	2.0	2.0						
Conochiloides sp.	5.9	2.0	2.2	1.7	2.7	0.8	3.0	2.5
Euchlanis sp.			0.3	0.3				
Filinia terminalis								
Hexarthra mira								
Kellicottia longispina					0.3	0.3		
Keratella cochlearis	93.2	29.2	92.2	20.9	92.1	23.4	103.1	17.2
K. quadrata	10.3	1.6	10.4	5.0	12.4	0.5	4.0	0.4
Lecane (Monostyla) bulla								
L. (Monostyla) lunaris								
Notholca squamula								
Pleosoma sp.								
Polyarthra sp.	38.6	1.9	30.5	2.0	23.2	1.6	29.4	3.7
Pompholyx sulcata								
Synchaeta sp.			0.5	0.5				
Testudinella sp.								
Trichocerca cylindrica								
T. multicrinis								
Unidentified Rotifer A	38.3	0.9	28.5	4.4	49.0	19.9	14.5	0.3
Unidentified Rotifer B								
COPEPODA								
Calanoid copepods								
Diaptomus sp.	1.0	1.0	0.3	0.3	0.3	0.3	0.8	0.3
Eurytemora sp.								
Immatures	1.3	1.3			0.3	0.3	0.7	0.2
Cyclopoid copepods								
Cyclops sp.	0.5	0.5	0.3	0.3	1.0	0.5	1.8	0.9
Mesocyclops sp.					0.3	0.3		
Tropocyclops prasinus			0.3	0.3			0.5	0.5
Immatures	5.9	1.0	3.0	2.0	3.4	1.4	6.8	1.3
Nauplius	8.2	1.3	15.3	3.5	17.3	1.6	13.5	3.1
CLADOCERA								
Bosmina sp.	7.7	1.8	8.6	1.7	4.6	1.3	6.4	0.4
Ceriodaphnia sp.								
Chydorus sp.	14.0	6.1	8.6	1.2	4.6	0.8	19.8	6.7
Daphnia galeata								
D. pulex								
D. retrocurva								
Diaphanosoma sp.								
Holopedium sp.								
Leptodora kindtii								
PROTOZOA								
Acineta sp.								
Amphileptus sp.								
Difflugia sp.	23.6	13.7	19.2	4.4	8.7	0.1	13.6	4.8
Orphryodendron sp.								
Staurophrya sp.								
Vorticella sp.	0.9	0.9	0.5	0.5	0.5	0.5	0.3	0.3
Zoothamnium sp.	0.5	0.5			0.3	0.3	1.1	1.1
TOTAL	265.7	65.8	253.3	27.9	248.1	45.8	256.2	35.3

S.D. = Standard Deviation

Data presented as number/liter.

TABLE B-5 CONT.

ANALYSIS OF ZOOPLANKTON POPULATIONS AT LOCUST POINT - NOVEMBER 7, 1974

TAXA	Station 9		Station 10		Station 12		Station 13	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
ROTIFERA								
Asplanchna giroidi								
A. priodonta	2.6	0.8	1.7	1.7	1.7	1.0	2.4	0.8
Brachionus angularis							0.8	0.8
B. calyciflorus	37.9	6.2	33.4	9.5	24.8	3.4	24.6	1.7
B. havanaensis								
B. (Platyias) patulus								
B. urceolaris								
Chromogaster ovalis								
Conochiloides sp.	2.4	1.3	0.8	0.8	1.4	0.7	1.8	0.3
Euchlanis sp.								
Filinia terminalis	1.0	0.5					0.3	0.3
Hexarthra mira								
Kellicottia longispina			0.6	0.6				
Keratella cochlearis	138.8	39.2	70.6	4.7	83.9	29.5	81.0	9.7
K. quadrata	8.5	2.7	14.9	5.3	3.1	0.4	11.5	1.1
Lecane (Monostyla) bulla								
L. (Monostyla) lunaris								
Notholca squamula								
Pleosoma sp.								
Polyarthra sp.	44.5	1.4	36.8	11.8	35.6	4.4	31.5	4.1
Pompholyx sulcata								
Synchaeta sp.								
Testudinella sp.								
Trichocerca cylindrica								
T. multicrinis								
Unidentified Rotifer A	29.0	10.5	43.6	9.5	17.1	5.0	42.4	24.1
Unidentified Rotifer B								
COPEPODA								
Calanoid copepods								
Diaptomus sp.	0.6	0.6			1.4	1.4	0.3	0.3
Eurytemora sp.	0.4	0.4						
Immatures	3.2	2.1	0.8	0.8	0.7	0.0	0.3	0.3
Cyclopoid copepods								
Cyclops sp.	2.2	1.1	1.2	1.2	3.4	2.1	0.8	0.8
Mesocyclops sp.								
Tropocyclops prasinus					0.4	0.4		
Immatures	8.7	4.3	4.1	1.8	4.4	1.7	2.4	1.4
Nauplius	15.3	5.7	10.4	5.9	16.8	1.4	13.8	4.1
CLADOCERA								
Bosmina sp.	19.2	5.2	3.7	0.8	6.1	0.7	4.6	2.5
Ceriodaphnia sp.								
Chydorus sp.	35.4	16.9	17.0	2.2	14.4	1.7	6.7	0.1
Daphnia galeata								
D. pulex								
D. retrocurva								
Diaphanosoma sp.								
Holopedium sp.								
Leptodora kindtii								
PROTOZOA								
Acineta sp.								
Amphileptus sp.								
Difflugia sp.	21.4	4.4	23.4	7.5	18.1	5.4	11.4	3.0
Orphryodendron sp.								
Staurophrya sp.								
Vorticella sp.	0.4	0.4	0.8	0.8	0.4	0.4	0.8	0.8
Zoothamnium sp.	1.5	1.5						
TOTAL	372.4	94.1	285.4	33.5	234.2	32.2	237.0	29.4

S.D. = Standard Deviation

Data presented as number/liter.

TABLE B-5 CONT.

ANALYSIS OF ZOOPLANKTON POPULATIONS AT LOCUST POINT - NOVEMBER 7, 1974

TAXA	Station 14		Station 18		Station 19		Mean # per
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Sta. Sampled
ROTIFERA							
Asplanchna giroidi							
A. priodonta	1.6	0.8	2.0	0.8	3.6	*	2.2
Brachionus angularis					6.8		1.1
B. calyciflorus	27.9	4.4	31.2	3.1	14.8		27.4
B. havanaensis							
B. (Platyias) patulus							
B. urceolaris							
Chromogaster ovalis							0.0
Conochiloides sp.	1.8	0.6	3.5	0.7	1.6		2.5
Euchlanis sp.							0.0
Filinia terminalis							0.1
Hexarthra mira							
Kellicottia longispina							0.1
Keratella cochlearis	93.1	10.2	58.1	3.3	86.2		90.2
K. quadrata	9.8	0.6	6.1	3.3	10.8		9.3
Lecane (Monostyla) bulla							
L. (Monostyla) lunaris							
Notholca squamula							
Pleosoma sp.							
Polyarthra sp.	36.9	9.0	36.1	5.5	22.3		33.1
Pompholyx sulcata							
Synchaeta sp.					0.4		0.1
Testudinella sp.							
Trichocerca cylindrica							
T. multicrinis							
Unidentified Rotifer A	20.4	0.4	17.1	5.9	2.8		27.5
Unidentified Rotifer B							
COPEPODA							
Calanoid copepods							
Diaptomus sp.	0.6	0.6	1.7	1.1			0.6
Eurytemora sp.							0.0
Immatures	0.6	0.6	3.0	2.3			1.0
Cyclopoid copepods							
Cyclops sp.	0.8	0.4	3.0	1.2	1.2		1.5
Mesocyclops sp.	0.2	0.2					0.0
Tropocyclops prasinus	0.2	0.2					0.1
Immatures	2.2	1.0	8.5	5.7	8.8		5.3
Nauplius	9.8	0.6	17.4	3.3	27.5		15.0
CLADOCERA							
Bosmina sp.	10.6	4.5	9.1	2.1	1.2		7.4
Ceriodaphnia sp.							
Chydorus sp.	11.8	9.4	11.5	2.7	22.7		15.1
Daphnia galeata							
D. pulex							
D. retrocurva							
Diaphanosoma sp.							
Holopedium sp.							*
Leptodora kindtii							
PROTOZOA							
Acineta sp.							
Amphileptus sp.							
Difflugia sp.	17.0	2.3	16.6	1.8	1.2		15.8
Orphryodendron sp.							
Staurophrya sp.							
Vorticella sp.	0.2	0.2	0.3	0.3			0.5
Zoothamnium sp.	1.2	1.2					0.4
TOTAL	244.6	43.7	208.0	18.3	211.9		255.0

S.D. = Standard Deviation

Data presented as number/liter.

* One sample was destroyed

APPENDIX C

BENTHOS POPULATIONS AT LOCUST POINT
JULY - NOVEMBER, 1974

TABLE C-1 CONT.

ANALYSIS OF BENTHOS POPULATIONS
AT LOCUST POINT - JULY 17, 1974

TAXA	Station 1		Station 2		Station 3		Station 4	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
COELENTERATA								
Hydra sp. (budding polyp)								
Hydra sp. (single polyp)								
NEMATODEA								
ANNELIDA								
Hirudinea								
Helobdella elongata								
H. stagnalis								
Oligochaeta (unidentified)					261.0	105.2	63.7	55.1
Immatures (hair setae)	6.4	11.0			6.4	11.0	6.4	11.0
Immatures (no hair setae)	31.8	29.2	31.8	22.1	3476.2	1051.5	1642.6	655.9
Branchyura sowerbyi					101.9	86.1	25.5	29.2
Limnodrilus cervix							31.8	55.1
L. claparedeanus					12.7	11.0	50.9	58.4
L. claparedeanus-cervix								
L. hoffmeisteri								
L. maumeensis								
L. udekemianus								
Potamothrix moldaviensis								
P. vejdovskyi								
Stylaria sp.								
ARTHROPODA								
Cladocera								
Leptodora kindtii	82.8	73.3	38.2	50.5	12.7	22.0	63.7	77.2
Amphipoda								
Gammarus fasciatus			6.4	11.0			12.7	11.0
Hyalella azteca								
Decopoda								
Orconectes sp.								
Chironomidae								
Chironomus (chironomus) sp.					108.2	127.2	25.5	29.2
Chironomus pupa								
Coelotanypus sp.								
Cryptochironomus sp.					44.6	22.1		
Polypedilum sp.					12.7	22.0		
Procladius sp.					25.5	11.0	12.7	22.0
Procladius pupa								
Pseudochironomus sp.								
Tanypodinae pupa								
Tanytarsus sp.					337.4	173.3	25.5	22.0
Tanytarsus pupa								
Ephemeroptera								
Caenis sp.	6.4	11.0						
Trichoptera								
Hydropsychidae								
MOLLUSCA								
Gastropoda								
Bulimus sp.								
Pelecypoda								
Amblema plicata								
Sphaerium sp.					6.4	11.0	12.7	11.0
Station Total	127.3	79.5	76.4	33.1	3184.7	2585.6	1910.0	607.3

S.D. = Standard Deviation. Data presented as number/m^2.

TABLE C-1 CONT.

ANALYSIS OF BENTHOS POPULATIONS AT LOCUST POINT - JULY 17, 1974

TAXA	Station 5 Mean	Station 5 S.D.	Station 6 Mean	Station 6 S.D.	Station 7 Mean	Station 7 S.D.	Station 9 Mean	Station 9 S.D.
COELENTERATA								
Hydra sp. (budding polyp)								
Hydra sp. (single polyp)								
NEMATODEA								
ANNELIDA								
Hirudinea								
Helobdella elongata								
H. stagnalis								
Oligochaeta (unidentified)			6.4	11.0				
Immatures (hair setae)							44.6	77.2
Immatures (no hair setae)	114.6	166.5	108.3	29.2	101.9	96.1	108.2	187.5
Branchyura sowerbyi			6.4	11.0				
Limnodrilus cervix								
L. claparedeanus					12.7	22.0		
L. claparedeanus-cervix								
L. hoffmeisteri								
L. maumeensis								
L. udekemianus								
Potamothrix moldaviensis					12.7	22.0		
P. vejdovskyi								
Stylaria sp.								
ARTHROPODA								
Cladocera								
Leptodora kindtii	6.4	11.0	25.5	11.0	127.3	127.2	171.9	297.8
Amphipoda								
Gammarus fasciatus			12.7	22.0			38.2	38.2
Hyalella azteca			12.7	22.0				
Decopoda								
Orconectes sp.								
Chironomidae								
Chironomus (chironomus) sp.			6.4	11.0	6.4	11.0	38.2	66.2
Chironomus pupa								
Coelotanypus sp.								
Cryptochironomus sp.								
Polypedilum sp.								
Procladius sp.							19.1	19.1
Procladius pupa					6.4	11.0		
Pseudochironomus sp.								
Tanypodinae pupa								
Tanytarsus sp.	6.4	11.0	6.4	11.0			38.2	38.2
Tanytarsus pupa								
Ephemeroptera								
Caenis sp.								
Trichoptera								
Hydropsychidae								
MOLLUSCA								
Gastropoda								
Bulimus sp.								
Pelecypoda								
Amblema plicata								
Sphaerium sp.			25.5	11.0				
Station Total	127.3	159.0	204.0	39.8	257.4	262.6	458.4	681.5

S.D. = Standard Deviation. Data presented as number/m².

TABLE C-1 CONT.

ANALYSIS OF BENTHOS POPULATIONS AT LOCUST POINT - JULY 17, 1974

TAXA	Station 9		Station 10		Station 11		Station 12	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
COELENTERATA								
Hydra sp. (budding polyp)								
Hydra sp. (single polyp)								
NEMATODEA								
ANNELIDA								
Hirudinea								
Helobdella elongata								
H. stagnalis								
Oligochaeta (unidentified)	25.5	29.2						
Immatures (hair setae)	19.1	33.1						
Immatures (no hair setae)	742.6	460.1	6.4	11.0	305.6	418.9	407.5	350.3
Branchyura sowerbyi								
Limnodrilus cervix								
L. claparedeanus					38.2	66.1	25.5	44.1
L. claparedeanus-cervix	6.4	11.0						
L. hoffmeisteri								
L. maumeensis							6.4	11.0
L. udekemianus								
Potamothrix moldaviensis	12.7	11.0						
P. vejdovskyi								
Stylaria sp.								
ARTHROPODA								
Cladocera								
Leptodora kindtii	617.6	177.5	44.6	39.8	25.5	44.1		
Amphipoda								
Gammarus fasciatus					70.0	29.2	114.6	95.5
Hyalella azteca								
Decopoda								
Orconectes sp.								
Chironomidae								
Chironomus (chironomus) sp.	6.4	11.0			19.1	33.1		
Chironomus pupa								
Coelotanypus sp.								
Cryptochironomus sp.								
Polypedilum sp.								
Procladius sp.	25.5	11.0						
Procladius pupa								
Pseudochironomus sp.								
Tanypodinae pupa								
Tanytarsus sp.	6.4	11.0			12.7	22.1	12.7	22.1
Tanytarsus pupa								
Ephemeroptera								
Caenis sp.							12.7	22.1
Trichoptera								
Hydropsychidae								
MOLLUSCA								
Gastropoda								
Bulimus sp.								
Pelecypoda								
Amblema plicata								
Sphaerium sp.								
Station Total	1769.9	354.9	50.9	44.1	471.1	539.0	458.0	496.9

S.D. = Standard Deviation. Data presented as number/m^2.

TABLE C-1 CONT.

ANALYSIS OF BENTHOS POPULATIONS AT LOCUST POINT - JULY 17, 1974

TAXA	Station 13		Station 14		Station 15		Station 16	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
COELENTERATA								
Hydra sp. (budding polyp)								
Hydra sp. (single polyp)								
NEMATODEA								
ANNELIDA								
Hirudinea								
Helobdella elongata								
H. stagnalis								
Oligochaeta (unidentified)	12.7	22.1	31.8	55.1				
Immatures (hair setae)			6.4	11.0				
Immatures (no hair setae)	789.5	278.3	2355.7	1218.4	872.2	1081.4	700.3	359.0
Branchyura sowerbyi			12.7	11.0	12.7	22.0		
Limnodrilus cervix	12.7	11.0	57.3	83.3	25.8	43.8		
L. claparedeanus			95.5	57.3	44.6	77.2		
L. claparedeanus-cervix					6.4	11.0		
L. hoffmeisteri								
L. maumeensis								
L. udekemianus								
Potamothrix moldaviensis	6.4	11.0	12.7	11.0	6.4	11.0	229.2	76.4
P. vejdovskyi								
Stylaria sp.								
ARTHROPODA								
Cladocera								
Leptodora kindtii	146.4	29.2	152.8	50.5	241.9	61.4	191.0	19.1
Amphipoda								
Gammarus fasciatus								
Hyalella azteca								
Decopoda								
Orconectes sp.								
Chironomidae								
Chironomus (chironomus) sp.			25.5	22.0	12.7	22.1	159.1	77.1
Chironomus pupa								
Coelotanypus sp.								
Cryptochironomus sp.					6.4	11.0		
Polypedilum sp.								
Procladius sp.			12.7	11.0	12.7	22.1		
Procladius pupa							6.37	11.0
Pseudochironomus sp.								
Tanypodinae pupa								
Tanytarsus sp.	31.8	22.0	285.5	166.5	216.5	242.4		
Tanytarsus pupa								
Ephemeroptera								
Caenis sp.								
Trichoptera								
Hydropsychidae								
MOLLUSCA								
Gastropoda								
Bulimus sp.								
Pelecypoda								
Amblema plicata								
Sphaerium sp.							6.37	11.0
Station Total	986.8	267.6	3017.8	1522.3	1464.3	1569.7	1292.4	496.0

S.D. = Standard Deviation. Data presented as number/m^2.

TABLE C-1 CONT.

ANALYSIS OF BENTHOS POPULATIONS
AT LOCUST POINT - JULY 17, 1974

TAXA	Station 17		Station 18		Station 19		Station 20	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
COELENTERATA								
Hydra sp. (budding polyp)								
Hydra sp. (single polyp)								
NEMATODEA								
ANNELIDA								
Hirudinea								
Helobdella elongata								
H. stagnalis								
Oligochaeta (unidentified)								
Immatures (hair setae)								
Immatures (no hair setae)	63.6	61.4	1216.0	800.9	6.3	1.0		
Branchyura sowerbyi								
Limnodrilus cervix								
L. claparedeanus								
L. claparedeanus-cervix								
L. hoffmeisteri								
L. maumeensis								
L. udekemianus								
Potamothrix moldaviensis	44.5	61.4	140.0	39.7				
P. vejdovskyi								
Stylaria sp.								
ARTHROPODA								
Cladocera								
Leptodora kindtii	95.5	38.2	401.1	206.6	133.7	114.6		
Amphipoda								
Gammarus fasciatus								
Hyalella azteca								
Decopoda								
Orconectes sp.								
Chironomidae								
Chironomus (chironomus) sp.	133.7	199.4	12.7	22.0				
Chironomus pupa								
Coelotanypus sp.								
Cryptochironomus sp.								
Polypedilum sp.								
Procladius sp.								
Procladius pupa								
Pseudochironomus sp.								
Tanypodinae pupa								
Tanytarsus sp.					12.7	22.0		
Tanytarsus pupa								
Ephemeroptera								
Caenis sp.								
Trichoptera								
Hydropsychidae								
MOLLUSCA								
Gastropoda								
Bulimus sp.								
Pelecypoda								
Amblema plicata								
Sphaerium sp.								
Station Total	337.4	285.7	1769.9	903.2	152.8	133.7		

S.D. = Standard Deviation. Data presented as number/m^2.

TABLE C-2

ANALYSIS OF BENTHOS POPULATIONS
AT LOCUST POINT - AUGUST 14, 1974

TAXA	Station 1		Station 2		Station 3		Station 4	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
COELENTERATA								
Hydra sp. (budding polyp)					12.8	11.0	10.8	18.5
Hydra sp. (single polyp)					10.8	18.5		
NEMATODEA								
ANNELIDA								
Hirudinea								
Helobdella elongata								
H. stagnalis							6.3	11.0
Oligochaeta (unidentified)								
Immatures (hair setae)			6.3	11.0				
Immatures (no hair setae)	445.7	605.6	0.0	0.0	2323.9	634.8	2202.9	1462.2
Branchyura sowerbyi					10.8	18.6	12.8	11.0
Limnodrilus cervix	10.8	18.6			31.9	39.8	44.6	22.0
L. claparedeanus	44.6	77.1			31.9	55.1	95.5	76.4
L. claparedeanus-cervix							19.1	33.0
L. hoffmeisteri								
L. maumeensis	10.8	18.6						
L. udekemianus								
Potamothrix moldaviensis	38.2	66.1			25.4	44.1	57.3	33.0
P. vejdovskyi								
Stylaria sp.								
ARTHROPODA								
Cladocera								
Leptodora kindtii			89.1	61.4	70.0	[illegible]		
Amphipoda								
Gammarus fasciatus	6.3	11.0					6.3	11.0
Hyalella azteca								
Decopoda								
Orconectes sp.								
Chironomidae								
Chironomus (*chironomus*) sp.	25.4	11.0			6.3	11.0	178.2	159.0
Chironomus pupa								
Coelotanypus sp.					44.5	44.1	6.3	11.0
Cryptochironomus sp.			6.3	11.0	6.3	11.0		
Polypedilum sp.								
Procladius sp.					159.1	48.0	121.0	127.1
Procladius pupa								
Pseudochironomus sp.								
Tanypodinae pupa								
Tanytarsus sp.	6.3	11.0			38.2	19.1	12.8	11.0
Tanytarsus pupa								
Ephemeroptera								
Caenis sp.								
Trichoptera								
Hydropsychidae								
MOLLUSCA								
Gastropoda								
Bulimus sp.								
Pelecypoda								
Amblema plicata							6.3	11.0
Sphaerium sp.								
Station Total	592.1	794.2	101.7	72.3	2775.9	574.7	2782.2	1819.7

S.D. = Standard Deviation. Data presented as number/m^2.

TABLE C-2 CONT.

ANALYSIS OF BENTHOS POPULATIONS
AT LOCUST POINT - AUGUST 14, 1974

TAXA	Station 5		Station 6		Station 7		Station 8	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
COELENTERATA								
Hydra sp. (budding polyp)								
Hydra sp. (single polyp)								
NEMATODEA								
ANNELIDA								
Hirudinea								
Helobdella elongata								
H. stagnalis							6.3	11.0
Oligochaeta (unidentified)								
Immatures (hair setae)			12.8	22.0				
Immatures (no hair setae)	6.3	11.0	6073.8	5575.0	222.8	105.1	127.3	105.1
Branchyura sowerbyi			51.0	22.0	6.3	11.0		
Limnodrilus cervix			203.8	185.6	57.3	57.3	6.3	11.0
L. claparedeanus			82.8	86.1				
L. claparedeanus-cervix								
L. hoffmeisteri								
L. maumeensis								
L. udekemianus								
Potamothrix moldaviensis	12.7	11.0	6.3	11.0			6.3	11.0
P. vejdovskyi								
Stylaria sp.								
ARTHROPODA								
Cladocera								
Leptodora kindtii	31.8	55.1	38.2	50.6	171.9	234.7	31.8	55.1
Amphipoda								
Gammarus fasciatus	6.3	11.0			12.8	22.0	31.9	29.1
Hyalella azteca								
Decapoda								
Orconectes sp.								
Chironomidae								
Chironomus (chironomus) sp.	63.7	11.0	624.0	496.8	57.3	51.0	178.2	276.3
Chironomus pupa								
Coelotanypus sp.			108.2	105.1	17.1	21.4	44.6	61.4
Cryptochironomus sp.							19.1	33.0
Polypedilum sp.								
Procladius sp.			267.4	258.3	31.9	11.0	82.8	61.4
Procladius pupa								
Pseudochironomus sp.								
Tanypodinae pupa								
Tanytarsus sp.	63.7	94.2	146.4	221.0				
Tanytarsus pupa								
Ephemeroptera								
Caenis sp.								
Trichoptera								
Hydropsychidae								
MOLLUSCA								
Gastropoda								
Bulimus sp.								
Pelecypoda								
Amblema plicata					25.4	29.1		
Sphaerium sp.			44.6	77.1				
Station Total	127.3	138.1	7659.1	6318.1	624.0	39.8	534.8	532.4

S.D. = Standard Deviation. Data presented as number/m^2.

TABLE C-2 CONT.

ANALYSIS OF BENTHOS POPULATIONS
AT LOCUST POINT - AUGUST 14, 1974

TAXA	Station 9		Station 10		Station 11		Station 12	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
COELENTERATA								
Hydra sp. (budding polyp)								
Hydra sp. (single polyp)								
NEMATODEA								
ANNELIDA								
Hirudinea								
Helobdella elongata								
H. stagnalis								
Oligochaeta (unidentified)								
Immatures (hair setae)								
Immatures (no hair setae)	961.3	635.9	57.3	33.0	2234.7	1556.0	31.9	22.0
Branchyura sowerbyi					6.3	11.0		
Limnodrilus cervix	6.3	11.0			140.0	105.1		
L. claparedeanus	44.6	29.1	6.3	11.0	38.2	38.2		
L. claparedeanus-cervix	6.3	11.0						
L. hoffmeisteri								
L. maumeensis					6.3	11.0		
L. udekemianus								
Potamothrix moldaviensis	31.9	11.0	12.8	11.0	12.8	22.0		
P. vejdovskyi								
Stylaria sp.								
ARTHROPODA								
Cladocera								
Leptodora kindtii	44.6	61.4					38.2	50.6
Amphipoda								
Gammarus fasciatus			31.9	55.1	6.3	11.0		
Hyalella azteca								
Decapoda								
Orconectes sp.								
Chironomidae								
Chironomus (chironomus) sp.	152.9	137.6	51.0	55.1	579.4	365.7	31.9	22.0
Chironomus pupa								
Coelotanypus sp.	31.9	29.1			6.3	11.0		
Cryptochironomus sp.								
Polypedilum sp.								
Procladius sp.	63.7	44.1	25.4	29.1	89.1	61.4		
Procladius pupa								
Pseudochironomus sp.								
Tanypodinae pupa								
Tanytarsus sp.					31.9	39.8		
Tanytarsus pupa								
Ephemeroptera								
Caenis sp.								
Trichoptera								
Hydropsychidae								
MOLLUSCA								
Gastropoda								
Bulimus sp.								
Pelecypoda								
Amblema plicata								
Sphaerium sp.								
Station Total	1343.3	658.6	184.9	88.6	3151.6	2088.2	101.9	67.0

S.D. = Standard Deviation. Data presented as number/m^2.

TABLE C-2 CONT.

ANALYSIS OF BENTHOS POPULATIONS
AT LOCUST POINT - AUGUST 14, 1974

TAXA	Station 13		Station 14		Station 15		Station 16	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
COELENTERATA								
Hydra sp. (budding polyp)								
Hydra sp. (single polyp)								
NEMATODEA								
ANNELIDA								
Hirudinea								
Helobdella elongata								
H. stagnalis					6.3	11.0	6.3	11.0
Oligochaeta (unidentified)								
Immatures (hair setae)								
Immatures (no hair setae)	31.9	55.1	3266.1	1744.4	916.9	398.9	611.2	83.2
Branchyura sowerbyi			6.3	11.0	31.9	29.1		
Limnodrilus cervix			101.9	130.0	76.4	57.3	19.1	19.1
L. claparedeanus								
L. claparedeanus-cervix								
L. hoffmeisteri								
L. maumeensis								
L. udekemianus								
Potamothrix moldaviensis			12.8	22.0	12.8	11.0	165.6	79.6
P. vejdovskyi								
Stylaria sp.								
ARTHROPODA								
Cladocera								
Leptodora kindtii	31.9	39.8	140.0	67.0	44.6	44.1	25.4	22.0
Amphipoda								
Gammarus fasciatus	6.3	11.0	6.3	11.0				
Hyalella azteca								
Decopoda								
Orconectes sp.								
Chironomidae								
Chironomus (chironomus) sp.	12.8	11.0	127.3	138.1	140.0	58.3	242.0	252.1
Chironomus pupa								
Coelotanypus sp.			57.3	33.0	63.7	48.0	6.3	11.0
Cryptochironomus sp.			25.4	44.1			38.2	19.1
Polypedilum sp.								
Procladius sp.	6.3	11.0	127.3	22.0	95.5	68.9		
Procladius pupa							6.3	11.0
Pseudochironomus sp.								
Tanypodinae pupa								
Tanytarsus sp.			19.1	33.0			6.3	11.0
Tanytarsus pupa								
Ephemeroptera								
Caenis sp.								
Trichoptera								
Hydropsychidae								
MOLLUSCA								
Gastropoda								
Bulimus sp.								
Pelecypoda								
Amblema plicata								
Sphaerium sp.								
Station Total	89.1	105.1	3890.0	2075.3	1388.0	289.2	1127.0	303.2

S.D. = Standard Deviation. Data presented as number/m^2.

TABLE C-2 CONT.

ANALYSIS OF BENTHOS POPULATIONS
AT LOCUST POINT - AUGUST 14, 1974

TAXA	Station 17		Station 18		Station 19		Station 20	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
COELENTERATA								
Hydra sp. (budding polyp)								
Hydra sp. (single polyp)								
NEMATODEA								
ANNELIDA								
Hirudinea								
Helobdella elongata								
H. stagnalis								
Oligochaeta (unidentified)								
Immatures (hair setae)								
Immatures (no hair setae)	19.1	33.0	770.3	177.4	51.0	39.8		
Branchyura sowerbyi								
Limnodrilus cervix	6.3	11.0	25.4	29.1	12.8	22.0		
L. claparedeanus			19.1	19.1	51.0	88.2		
L. claparedeanus-cervix								
L. hoffmeisteri								
L. maumeensis								
L. udekemianus								
Potamothrix moldaviensis	31.9	29.1	165.6	155.6				
P. vejdovskyi								
Stylaria sp.								
ARTHROPODA								
Cladocera								
Leptodora kindtii			6.3	11.0				
Amphipoda								
Gammarus fasciatus								
Hyalella azteca								
Decopoda								
Orconectes sp.								
Chironomidae								
Chironomus (chironomus) sp.	25.4	29.1	1152.3	466.4	133.8	101.0		
Chironomus pupa								
Coelotanypus sp.								
Cryptochironomus sp.	19.1	19.1	38.2	19.1				
Polypedilum sp.								
Procladius sp.			6.3	11.0	12.8	11.0		
Procladius pupa								
Pseudochironomus sp.								
Tanypodinae pupa								
Tanytarsus sp.								
Tanytarsus pupa								
Ephemeroptera								
Caenis sp.								
Trichoptera								
Hydropsychidae								
MOLLUSCA								
Gastropoda								
Bulimus sp.								
Pelecypoda								
Amblema plicata								
Sphaerium sp.								
Station Total	101.9	86.1	2183.8	747.0	261.0	110.2		

S.D. = Standard Deviation. Data presented as number/m^2.

TABLE C-3

ANALYSIS OF BENTHOS POPULATIONS AT LOCUST POINT - SEPTEMBER 6, 1974

TAXA	Station 1		Station 2		Station 3		Station 4	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
COELENTERATA								
Hydra sp. (budding polyp)								
Hydra sp. (single polyp)								
NEMATODEA								
ANNELIDA								
Hirudinea								
Helobdella elongata								
H. stagnalis								
Oligochaeta (unidentified)								
Immatures (hair setae)								
Immatures (no hair setae)	31.9	23.1	101.9	67.0	534.9	220.2	1165.1	978.2
Branchyura sowerbyi							44.6	48.0
Limnodrilus cervix							31.9	39.8
L. claparedeanus					6.3	11.0	6.3	11.0
L. claparedeanus-cervix							19.1	19.1
L. hoffmeisteri								
L. maumeensis					6.3	11.0	6.3	11.0
L. udekemianus								
Potamothrix moldaviensis							12.8	11.0
P. vejdovskyi								
Stylaria sp.								
ARTHROPODA								
Cladocera								
Leptodora kindtii			114.7	68.9	292.9	241.9	127.3	171.9
Amphipoda								
Gammarus fasciatus			6.3	11.0				
Hyalella azteca								
Decopoda								
Orconectes sp.								
Chironomidae								
Chironomus (*chironomus*) sp.	31.9	39.8	19.1	19.1			38.2	66.1
Chironomus pupa								
Coelotanypus sp.								
Cryptochironomus sp.	6.3	11.0					6.3	11.0
Polypedilum sp.								
Procladius sp.					6.3	11.0	19.1	19.1
Procladius pupa								
Pseudochironomus sp.			12.7	22.0				
Tanypodinae pupa								
Tanytarsus sp.	12.8	22.0	12.7	22.0	343.9	156.3	261.0	187.4
Tanytarsus pupa								
Ephemeroptera								
Caenis sp.			6.3	11.0				
Trichoptera								
Hydropsychidae								
MOLLUSCA								
Gastropoda								
Bulimus sp.								
Pelecypoda								
Amblema plicata								
Sphaerium sp.								
Station Total	82.8	48.0	273.6	112.0	1190.6	393.4	1738.1	1506.8

S.D. = Standard Deviation. Data presented as number/m^2.

TABLE C-3 CONT.

ANALYSIS OF BENTHOS POPULATIONS
AT LOCUST POINT - SEPTEMBER 6, 1974

TAXA	Station 5		Station 6		Station 7		Station 8	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
COELENTERATA								
Hydra sp. (budding polyp)								
Hydra sp. (single polyp)					6.3	11.0		
NEMATODEA			31.9	29.1	25.4	22.0		
ANNELIDA								
Hirudinea								
Helobdella elongata							44.6	48.0
H. stagnalis								
Oligochaeta (unidentified)								
Immatures (hair setae)								
Immatures (no hair setae)	51.0	44.1	146.4	155.5	490.2	466.4	573.0	193.9
Branchyura sowerbyi					63.7	58.3	31.9	11.0
Limnodrilus cervix					6.3	11.0	6.3	11.0
L. claparedearus							31.9	39.8
L. claparedearus-cervix	6.3	11.0					12.8	11.0
L. hoffmeisteri								
L. maumeensis							6.3	11.0
L. udekemianus								
Potamothrix moldaviensis								
P. vejdovskyi								
Stylaria sp.								
ARTHROPODA								
Cladocera								
Leptodora kindtii	38.2	19.1			25.4	29.1	6.3	11.0
Amphipoda								
Gammarus fasciatus			12.8	11.0	82.8	29.1	44.6	48.0
Hyalella azteca								
Decopoda								
Orconectes sp.								
Chironomidae								
Chironomus (*chironomus*) sp.	12.8	11.0	197.3	193.2	101.9	88.2	57.3	33.0
Chironomus pupa								
Coelotanypus sp.			12.8	22.0	6.3	11.0		
Cryptochironomus sp.								
Polypedilum sp.								
Procladius sp.			6.3	11.0	6.3	11.0	12.8	11.0
Procladius pupa								
Pseudochironomus sp.								
Tanypodinae pupa								
Tanytarsus sp.	6.3	11.0	38.2	19.1	19.1	19.1	528.4	423.0
Tanytarsus pupa								
Ephemeroptera								
Caenis sp.								
Trichoptera								
Hydropsychidae								
MOLLUSCA								
Gastropoda								
Bulimus sp.								
Pelecypoda								
Amblema plicata								
Sphaerium sp.							31.9	22.0
Station Total	114.7	58.9	477.6	381.8	834.0	568.0	1394.3	445.0

S.D. = Standard Deviation. Data presented as number/m^2.

TABLE C-3 CONT.

ANALYSIS OF BENTHOS POPULATIONS
AT LOCUST POINT - SEPTEMBER 6, 1974

TAXA	Station 9		Station 10		Station 11		Station 12	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
COELENTERATA								
Hydra sp. (budding polyp)	6.3	11.0						
Hydra sp. (single polyp)	6.3	11.0						
NEMATODEA								
ANNELIDA								
Hirudinea								
Helobdella elongata								
H. stagnalis								
Oligochaeta (unidentified)								
Immatures (hair setae)								
Immatures (no hair setae)	694.0	316.3	44.6	11.0	269.2	127.1	458.4	325.9
Branchyura sowerbyi			6.3	11.0				
Limnodrilus cervix							6.3	11.0
L. claparedeanus	12.8	11.0			6.3	11.0		
L. claparedeanus-cervix	6.3	11.0					6.3	11.0
L. hoffmeisteri								
L. maumeensis								
L. udekemianus								
Potamothrix moldaviensis	6.3	11.0			44.6	29.1	6.3	11.0
P. vejdovskyi								
Stylaria sp.	6.3	11.0						
ARTHROPODA								
Cladocera								
Leptodora kindtii	1324.2	363.5	25.4	11.0	19.1	19.1	31.9	29.1
Amphipoda								
Gammarus fasciatus								
Hyalella azteca							25.4	29.1
Decopoda								
Orconectes sp.								
Chironomidae								
Chironomus (chironomus) sp.	140.0	55.1	25.4	29.1			44.6	22.0
Chironomus pupa								
Coelotanypus sp.								
Cryptochironomus sp.							6.3	11.0
Polypedilum sp.								
Procladius sp.	51.1	29.1	6.3	11.0				
Procladius pupa								
Pseudochironomus sp.								
Tanypodinae pupa								
Tanytarsus sp.	1910.0	607.3	19.1	33.0			57.3	57.3
Tanytarsus pupa								
Ephemeroptera								
Caenis sp.								
Trichoptera								
Hydropsychidae								
MOLLUSCA								
Gastropoda								
Bulimus sp.								
Pelecypoda								
Amblema plicata								
Sphaerium sp.								
Station Total	4563.9	1500.3	127.3	55.1	439.3	172.0	643.0	408.4

S.D. = Standard Deviation. Data presented as number/m^2.

TABLE C-3 CONT.

ANALYSIS OF BENTHOS POPULATIONS
AT LOCUST POINT - SEPTEMBER 6, 1974

TAXA	Station 13		Station 14		Station 15		Station 16	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
COELENTERATA								
Hydra sp. (budding polyp)								
Hydra sp. (single polyp)					6.3	11.0		
NEMATODEA								
ANNELIDA								
Hirudinea								
Helobdella elongata								
H. stagnalis								
Oligochaeta (unidentified)								
Immatures (hair setae)								
Immatures (no hair setae)	942.2	535.2	4004.7	912.0	222.9	124.2	1407.0	303.4
Branchyura sowerbyi	6.3	11.0	19.1	33.0				
Limnodrilus cervix	12.8	22.0	127.3	105.1				
L. claparedeanus	6.3	11.0	19.1	19.1				
L. claparedeanus-cervix	12.8	22.0	6.3	11.0				
L. hoffmeisteri								
L. maumeensis								
L. udekemianus								
Potamothrix moldaviensis			6.3	11.0			63.7	11.0
P. vejdovskyi								
Stylaria sp.								
ARTHROPODA								
Cladocera								
Leptodora kindtii	522.0	258.0	471.1	293.7	477.6	281.3	6.3	11.0
Amphipoda								
Gammarus fasciatus			6.3	11.0	12.8	22.0		
Hyalella azteca								
Decopoda								
Orconectes sp.								
Chironomidae								
Chironomus (chironomus) sp.	299.2	238.9	172.0	144.2			38.2	38.2
Chironomus pupa								
Coelotanypus sp.			6.3	11.0			12.8	11.0
Cryptochironomus sp.			12.8	11.0	6.3	11.0		
Polypedilum sp.								
Procladius sp.	6.3	11.0	6.3	11.0			19.1	19.1
Procladius pupa								
Pseudochironomus sp.								
Tanypodinae pupa								
Tanytarsus sp.	19.1	33.0	146.4	105.1	114.7	33.0	51.0	44.1
Tanytarsus pupa								
Ephemeroptera								
Caenis sp.								
Trichoptera								
Hydropsychidae								
MOLLUSCA								
Gastropoda								
Bulimus sp.								
Pelecypoda								
Amblema plicata								
Sphaerium sp.							6.3	11.0
Station Total	1827.2	474.5	5004.2	813.2	840.4	319.0	1820.9	358.3

S.D. = Standard Deviation. Data presented as number/m^2.

TABLE C-3 CONT.

ANALYSIS OF BENTHOS POPULATIONS AT LOCUST POINT - SEPTEMBER 6, 1974

TAXA	Station 17		Station 18		Station 19		Station 20	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
COELENTERATA								
Hydra sp. (budding polyp)								
Hydra sp. (single polyp)								
NEMATODEA								
ANNELIDA								
Hirudinea								
Helobdella elongata								
H. stagnalis								
Oligochaeta (unidentified)								
Immatures (hair setae)								
Immatures (no hair setae)	121.0	39.8	6570.4	1032.0	57.3	50.5		
Branchyura sowerbyi			51.0	11.0				
Limnodrilus cervix			146.4	67.0	63.7	61.4		
L. claparedeanus			121.0	72.3				
L. claparedeanus-cervix			184.7	29.1				
L. hoffmeisteri								
L. maumeensis								
L. udekemianus								
Potamothrix moldaviensis	38.2	33.0	31.9	55.1				
P. vejdovskyi								
Stylaria sp.								
ARTHROPODA								
Cladocera								
Leptodora kindtii	25.4	29.1			19.1	33.0		
Amphipoda								
Gammarus fascia[illegible]								
Hyalella azteca								
Decopoda								
Orconectes sp.								
Chironomidae								
Chironomus (*chironomus*) sp.	25.4	11.0	51.0	11.0	25.4	29.1		
Chironomus pupa								
Coelotanypus sp.								
Cryptochironomus sp.			6.3	11.0				
Polypedilum sp.								
Procladius sp.			6.3	11.0	6.3	11.0		
Procladius pupa								
Pseudochironomus sp.								
Tanypodinae pupa								
Tanytarsus sp.			6.3	11.0	294.8	124.2		
Tanytarsus pupa								
Ephemeroptera								
Caenis sp.								
Trichoptera								
Hydropsychidae								
MOLLUSCA								
Gastropoda								
Bulimus sp.								
Pelecypoda								
Amblema plicata								
Sphaerium sp.								
Station Total	210.1	19.1	7175.2	948.3	565.7	67.0		

S.D. = Standard Deviation. Data presented as number/m^2.

TABLE C-4

ANALYSIS OF BENTHOS POPULATIONS AT LOCUST POINT - OCTOBER 10, 1974

TAXA	Station 1		Station 2		Station 3		Station 4	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
COELENTERATA								
Hydra sp. (budding polyp)								
Hydra sp. (single polyp)					6.4	11.0	12.7	22.0
NEMATODEA					38.2	33.0	19.1	19.1
ANNELIDA								
Hirudinea								
Helobdella elongata								
H. stagnalis								
Oligochaeta (unidentified)							6.4	11.0
Immatures (hair setae)								
Immatures (no hair setae)	95.6	57.3	210.1	252.7	1806.2	487.9	2545.7	704.3
Branchyura sowerbyi							19.1	19.1
Limnodrilus cervix					6.4	11.0		
L. claparedearus							25.4	22.0
L. claparedearus-cervix								
L. hoffmeisteri								
L. maumeensis								
L. udekemianus								
Potamothrix moldaviensis								
Nais sp.					12.8	11.0		
Stylaria sp.					6.4	11.0		
ARTHROPODA								
Cladocera								
Leptodora kindtii					44.6	39.8	51.0	39.8
Amphipoda								
Gammarus fasciatus	19.1	19.1	19.1	0.0			6.4	11.0
Hyalella azteca								
Decopoda								
Orconectes sp.								
Chironomidae								
Chironomus (chironomus) sp.			12.7	22.0	82.8	143.3	280.1	242.6
Chironomus pupa								
Coelotanypus sp.					31.9	29.1		
Cryptochironomus sp.					19.1	33.0		
Polypedilum sp.								
Procladius sp.					76.4	50.6	25.4	11.0
Procladius pupa								
Pseudochironomus sp.								
Tanypodinae pupa								
Tanytarsus sp.	467.8	58.3	280.1	485.2	764.0	202.1	560.2	435.7
Tanytarsus pupa								
Ephemeroptera								
Caenis sp.							6.4	11.0
Trichoptera								
Hydropsychidae								
MOLLUSCA								
Gastropoda								
Bulimus sp.								
Pelecypoda								
Amblema plicata								
Sphaerium sp.			6.4	11.0				
Station Total	579.3	112.0	528.4	767.9	2903.2	306.4	3737.2	985.3

S.D. = Standard Deviation. Data presented as number/m^2.

TABLE C-4 CONT.

ANALYSIS OF BENTHOS POPULATIONS AT LOCUST POINT - OCTOBER 10, 1974

TAXA	Station 5		Station 6		Station 7		Station 8	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
COELENTERATA								
Hydra sp. (budding polyp)								
Hydra sp. (single polyp)					6.3	11.0		
NEMATODEA			6.3	11.0				
ANNELIDA								
Hirudinea								
Helobdella elongata								
H. stagnalis			6.3	11.0				
Oligochaeta (unidentified)								
Immatures (hair setae)								
Immatures (no hair setae)	1725.3	358.5	1095.0	699.2	312.0	312.0	1107.9	646.9
Branchyura sowerbyi			127.3	[illegible]8.6	31.9	39.8	44.6	11.0
Limnodrilus cervix	12.8	11.0						
L. claparedeanus	12.8	22.0	19.1	33.0			6.3	11.0
L. claparedeanus-cervix								
L. hoffmeisteri								
L. maumeensis								
L. udekemianus								
Potamothrix moldaviensis	31.9	39.8						
Nais sp.								
Stylaria sp.					6.3	11.0		
ARTHROPODA								
Cladocera								
Leptodora kindtii	6.3	11.0			12.8	11.0		
Amphipoda								
Gammarus fasciatus	6.3	11.0			44.[illegible]	61.4	133.8	83.2
Hyalella azteca								
Decapoda								
Orconectes sp.								
Chironomidae								
Chironomus (chironomus) sp.	38.2	66.1	70.0	67.0	12.8	22.0	82.8	72.3
Chironomus pupa								
Coelotanypus sp.								
Cryptochironomus sp.	44.6	11.0	38.2	50.6			12.8	22.0
Polypedilum sp.			6.3	11.0	6.3	11.0		
Procladius sp.			12.7	11.0			6.3	11.0
Procladius pupa								
Pseudochironomus sp.								
Tanypodinae pupa								
Tanytarsus sp.	25.4	44.1	31.9	55.1	38.2	50.6	44.6	39.8
Tanytarsus pupa								
Ephemeroptera								
Caenis sp.								
Trichoptera								
Hydropsychidae								
MOLLUSCA								
Gastropoda								
Bulimus sp.								
Pelecypoda								
Amblema plicata							6.3	11.0
Sphaerium sp.								
Station Total	1903.7	328.9	1413.4	782.1	471.1	249.2	1445.2	553.7

S.D. = Standard Deviation. Data presented as number/m^2.

TABLE C-4 CONT.

ANALYSIS OF BENTHOS POPULATIONS AT LOCUST POINT - OCTOBER 10, 1974

TAXA	Station 9		Station 10		Station 11		Station 12	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
COELENTERATA								
Hydra sp. (budding polyp)	63.7	110.2					12.8	22.0
Hydra sp. (single polyp)	121.0	112.0					47.8	40.6
NEMATODEA								
ANNELIDA								
Hirudinea								
Helobdella elongata							31.9	55.1
H. stagnalis	12.8	22.0					6.3	11.0
Oligochaeta (unidentified)								
Immatures (hair setae)							6.3	11.0
Immatures (no hair setae)	885.0	488.7	127.3	138.1	76.4	33.0	222.9	238.9
Branchyura sowerbyi					6.3	11.0		
Limnodrilus cervix			6.3	11.0				
L. claparedearus	6.3	11.0			6.3	11.0		
L. claparedearus-cervix	6.3	11.0						
L. hoffmeisteri								
L. maumeensis								
L. udekemianus								
Potamothrix moldaviensis								
Nais sp.								
Stylaria sp.	101.9	127.1					12.8	22.0
ARTHROPODA								
Cladocera								
Leptodora kindtii	89.1	48.0			6.3	11.0		
Amphipoda								
Gammarus fasciatus	25.4	44.1	12.8	22.0			133.8	215.2
Hyalella azteca								
Decopoda								
Orconectes sp.								
Chironomidae								
Chironomus (*chironomus*) sp.	44.6	61.4	6.3	11.0			76.4	19.1
Chironomus pupa								
Coelotanypus sp.								
Cryptochironomus sp.	6.3	11.0	6.3	11.0				
Polypedilum sp.								
Procladius sp.	6.3	11.0						
Procladius pupa								
Pseudochironomus sp.								
Tanypodinae pupa								
Tanytarsus sp.	267.4	353.8	19.1	19.1	6.3	11.0	19.1	33.0
Tanytarsus pupa								
Ephemeroptera								
Caenis sp.								
Trichoptera								
Hydropsychidae								
MOLLUSCA								
Gastropoda								
Bulimus sp.								
Pelecypoda								
Amblema plicata	6.3	11.0						
Sphaerium sp.			6.3	11.0				
Station Total	1642.7	905.7	184.7	140.8	101.9	29.1	560.2	543.3

S.D. = Standard Deviation. Data presented as number/m^2.

TABLE C-4 CONT.

ANALYSIS OF BENTHOS POPULATIONS AT LOCUST POINT - OCTOBER 10, 1974

TAXA	Station 13		Station 14		Station 15		Station 16	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
COELENTERATA								
Hydra sp. (budding polyp)								
Hydra sp. (single polyp)			12.8	11.0				
NEMATODEA								
ANNELIDA								
Hirudinea								
Helobdella elongata								
H. stagnalis								
Oligochaeta (unidentified)								
Immatures (hair setae)	25.4	44.1	44.6	11.0	6.3	11.0		
Immatures (no hair setae)	191.0	152.9	2841.1	353.8	1604.4	1191.6	611.2	334.0
Branchyura sowerbyi			12.8	22.0				
Limnodrilus cervix			12.8	22.0	12.8	22.0		
L. claparedeanus								
L. claparedeanus-cervix			76.4	68.9	6.3	11.0	6.3	11.0
L. hoffmeisteri								
L. maumeensis								
L. udekemianus								
Potamothrix moldaviensis							114.6	33.0
Nais sp.							6.3	11.0
Stylaria sp.								
ARTHROPODA								
Cladocera								
Leptodora kindtii	31.9	39.8	6.3	11.0				
Amphipoda								
Gammarus fasciatus	6.3	11.0	12.8	11.0				
Hyalella azteca								
Decapoda								
Orconectes sp.								
Chironomidae								
Chironomus (*chironomus*) sp.	38.2	66.1	70.0	61.4	31.9	55.1		
Chironomus pupa								
Coelotanypus sp.			25.1	29.1	6.3	11.0		
Cryptochironomus sp.	6.3	11.0	63.7	29.1	19.1	19.1	6.3	11.0
Polypedilum sp.								
Procladius sp.			89.1	48.0	12.8	22.0	6.3	11.0
Procladius pupa								
Pseudochironomus sp.								
Tanypodinae pupa								
Tanytarsus sp.	38.2	3[illegible]	[illegible]20.2	191.0			51.0	39.8
Tanytarsus pupa								
Ephemeroptera								
Caenis sp.								
Trichoptera								
Hydropsychidae								
MOLLUSCA								
Gastropoda								
Bulimus sp.								
Pelecypoda								
Amblema plicata								
Sphaerium sp.								
Station Total	337.4	162.4	3444.3	1104.6	1700.0	1241.0	802.2	364.4

S.D. = Standard Deviation. Data presented as number/m^2.

TABLE C-4 CONT.

ANALYSIS OF BENTHOS POPULATIONS
AT LOCUST POINT - OCTOBER 10, 1974

TAXA	Station 17		Station 18		Station 19		Station 20	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
COELENTERATA								
Hydra sp. (budding polyp)								
Hydra sp. (single polyp)								
NEMATODEA			6.3	11.0				
ANNELIDA								
Hirudinea								
Helobdella elongata								
H. stagnalis								
Oligochaeta (unidentified)								
Immatures (hair setae)								
Immatures (no hair setae)	292.9	121.3	751.2	245.6	19.1	19.1		
Branchyura sowerbyi					19.1	33.0		
Limnodrilus cervix								
L. claparedeanus			6.3	11.0				
L. claparedeanus-cervix			6.3	11.0				
L. hoffmeisteri								
L. maumeensis								
L. udekemianus								
Potamothrix moldaviensis	19.1	33.0	44.6	39.8				
Nais sp.								
Stylaria sp.								
ARTHROPODA								
Cladocera								
Leptodora kindtii			12.8	11.0				
Amphipoda								
Gammarus fasciatus								
Hyalella azteca								
Decopoda								
Orconectes sp.								
Chironomidae								
Chironomus (chironomus) sp.								
Chironomus pupa								
Coelotanypus sp.								
Cryptochironomus sp.	12.8	22.0	12.8	11.0				
Polypedilum sp.								
Procladius sp.								
Procladius pupa								
Pseudochironomus sp.								
Tanypodinae pupa								
Tanytarsus sp.	6.3	11.0						
Tanytarsus pupa								
Ephemeroptera								
Caenis sp.								
Trichoptera								
Hydropsychidae								
MOLLUSCA								
Gastropoda								
Bulimus sp.								
Pelecypoda								
Amblema plicata								
Sphaerium sp.								
Station Total	331.0	154.3	840.4	252.7	38.2	50.6		

S.D. = Standard Deviation. Data presented as number/m².

TABLE C-5

ANALYSIS OF BENTHOS POPULATIONS AT LOCUST POINT - NOVEMBER 7, 1974

TAXA	Station 1		Station 2		Station 3		Station 4	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
COELENTERATA								
Hydra sp. (budding polyp)							44.6	61.4
Hydra sp. (single polyp)					6.4	11.0	57.3	33.2
NEMATODEA								
ANNELIDA								
Hirudinea								
Helobdella elongata								
H. stagnalis	6.4	11.0						
Oligochaeta (unidentified)								
Immatures (hair setae)								
Immatures (no hair setae)	127.3	122.8	108.2	86.1	2935.0	2966.0	1489.8	949.1
Branchyura sowerbyi					76.4	19.1	70.0	29.2
Limnodrilus cervix					70.0	105.2		
L. claparedeanus	19.1	19.1			19.1	33.1		
L. claparedeanus-cervix					25.5	44.1		
L. hoffmeisteri								
L. maumeensis								
Nais sp.								
Potamothrix moldaviensis								
P. vejdovskyi								
Stylaria sp.								
ARTHROPODA								
Cladocera								
Leptodora kindtii								
Amphipoda								
Gammarus fasciatus	31.8	55.1	63.7	79.5	6.4	11.0	6.4	11.0
Hyalella azteca								
Decopoda								
Orconectes sp.								
Chironomidae								
Chironomus (chironomus) sp.			25.5	11.0	25.5	22.1		
Cricotopus sp.							19.1	19.1
Coelotanypus sp.								
Cryptochironomus sp.	12.7	22.1			19.1	0.0	12.7	11.0
Polypedilum sp.								
Procladius sp.			6.4	11.0	38.2	33.1		
Procladius pupa								
Pseudochironomus sp.								
Tanypodinae pupa								
Tanytarsus sp.	6.4	11.0			25.5	29.2	19.1	0.0
Tanytarsus pupa								
Ephemeroptera								
Caenis sp.	6.4	11.0	6.4	11.0			6.4	11.0
Trichoptera								
Hydropsychidae								
MOLLUSCA								
Gastropoda								
Bulimus sp.								
Pelecypoda								
Amblema plicata								
Sphaerium sp.							19.1	19.1
Station Total	210.1	199.4	210.1	136.5	3247.0	3184.8	1744.5	1032.3

S.D. = Standard Deviation. Data presented as number/m^2.

TABLE C-5 CONT.

ANALYSIS OF BENTHOS POPULATIONS
AT LOCUST POINT - NOVEMBER 7, 1974

TAXA	Station 5		Station 6		Station 7		Station 8	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
COELENTERATA								
Hydra sp. (budding polyp)								
Hydra sp. (single polyp)					25.5	44.1		
NEMATODEA								
ANNELIDA								
Hirudinea								
Helobdella elongata								
H. stagnalis								
Oligochaeta (unidentified)								
Immatures (hair setae)								
Immatures (no hair setae)	6.4	11.0	286.5	257.0	165.5	72.3	359.3	164.7
Branchyura sowerbyi			44.6	48.1	12.7	22.1	19.1	19.1
Limnodrilus cervix							6.4	11.0
L. claparedeanus								
L. claparedeanus-cervix								
L. hoffmeisteri								
L. maumeensis								
Nais sp.								
Potamothrix moldaviensis								
P. vejdovskyi								
Stylaria sp.								
ARTHROPODA								
Cladocera								
Leptodora kindtii								
Amphipoda								
Gammarus fasciatus			76.4	57.3	38.2	19.1	178.3	90.3
Hyalella azteca								
Decopoda								
Orconectes sp.								
Chironomidae								
Chironomus (chironomus) sp.			38.2	33.1			89.1	138.2
Cricotopus sp.								
Coelotanypus sp.								
Cryptochironomus sp.	19.1	19.1	50.9	29.2			25.5	29.2
Polypedilum sp.								
Procladius sp.					6.4	11.0	6.4	11.0
Procladius pupa								
Pseudochironomus sp.								
Tanypodinae pupa								
Tanytarsus sp.	6.4	11.0	12.7	22.1	6.4	11.0	57.3	99.3
Tanytarsus pupa								
Ephemeroptera								
Caenis sp.			6.4	11.0				
Trichoptera								
Hydropsychidae								
MOLLUSCA								
Gastropoda								
Bulimus sp.								
Pelecypoda								
Amblema plicata								
Sphaerium sp.			31.8	39.8				
Station Total	31.8	22.1	547.5	357.5	254.7	148.4	751.3	287.4

S.D. = Standard Deviation. Data presented as number/m^2.

TABLE C-5 CONT.

ANALYSIS OF BENTHOS POPULATIONS
AT LOCUST POINT - NOVEMBER 7, 1974

TAXA	Station 9		Station 10		Station 11		Station 12	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
COELENTERATA								
Hydra sp. (budding polyp)	6.4	11.0					31.8	55.1
Hydra sp. (single polyp)							63.7	110.3
NEMATODEA								
ANNELIDA								
Hirudinea								
Helobdella elongata								
H. stagnalis								
Oligochaeta (unidentified)								
Immatures (hair setae)								
Immatures (no hair setae)	1999.1	1262.7	31.8	11.0	464.8	723.9	789.5	1172.8
Branchyura sowerbyi					25.5	44.1		
Limnodrilus cervix								
L. claparedeanus								
L. claparedeanus-cervix	31.8	11.0			31.8	55.1		
L. hoffmeisteri								
L. maumeensis					12.7	11.0		
Nais sp.								
Potamothrix moldaviensis								
P. vejdovskyi								
Stylaria sp.								
ARTHROPODA								
Cladocera								
Leptodora kindtii	6.4	11.0						
Amphipoda								
Gammarus fasciatus	12.7	22.1			12.7	11.0	203.7	210.4
Hyalella azteca								
Decopoda								
Orconectes sp.								
Chironomidae								
Chironomus (chironomus) sp.			6.4	11.0	25.5	29.2	31.8	11.0
Cricotopus sp.								
Coelotanypus sp.								
Cryptochironomus sp.	25.5	44.1			6.4	11.0	6.4	11.0
Polypedilum sp.								
Procladius sp.	12.7	11.0			6.4	11.0	6.4	11.0
Procladius pupa								
Pseudochironomus sp.								
Tanypodinae pupa								
Tanytarsus sp.							12.7	11.0
Tanytarsus pupa								
Ephemeroptera								
Caenis sp.							6.4	11.0
Trichoptera								
Hydropsychidae								
MOLLUSCA								
Gastropoda								
Bulimus sp.								
Pelecypoda								
Amblema plicata								
Sphaerium sp.							6.4	11.0
Station Total	2094.6	1224.8	38.2	19.1	585.7	868.2	1158.7	1573.2

S.D. = Standard Deviation. Data presented as number/m^2.

TABLE C-5 CONT.

ANALYSIS OF BENTHOS POPULATIONS AT LOCUST POINT - NOVEMBER 7, 1974

TAXA	Station 13		Station 14		Station 15		Station 16	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
COELENTERATA								
Hydra sp. (budding polyp)			12.7	22.1	12.7	22.1	6.4	11.0
Hydra sp. (single polyp)			6.4	11.0	31.8	39.8		
NEMATODEA								
ANNELIDA								
Hirudinea								
Helobdella elongata								
H. stagnalis								
Oligochaeta (unidentified)								
Immatures (hair setae)					25.5	22.1		
Immatures (no hair setae)	1311.5	1083.2	2400.2	964.9	515.7	252.6	235.6	159.0
Branchyura sowerbyi			31.8	29.2				
Limnodrilus cervix	63.7	110.3	31.8	29.2			12.7	22.1
L. claparedeanus	25.5	44.1	57.3	19.1				
L. claparedeanus-cervix	31.8	55.1	50.9	22.1				
L. hoffmeisteri								
L. maumeensis								
Nais sp.					89.1	67.1		
Potamothrix moldaviensis								
P. vejdovskyi								
Stylaria sp.								
ARTHROPODA								
Cladocera								
Leptodora kindtii								
Amphipoda								
Gammarus fasciatus	6.4	11.0	44.6	61.4	6.4	11.0		
Hyalella azteca								
Decopoda								
Orconectes sp.								
Chironomidae								
Chironomus (chironomus) sp.	19.1	0.0	95.5	68.9	31.8	39.8		
Cricotopus sp.								
Coelotanypus sp.			25.5	29.2				
Cryptochironomus sp.	19.1	33.1	44.6	22.1	6.4	11.0		
Polypedilum sp.								
Procladius sp.	6.4	11.0	483.9	408.0				
Procladius pupa								
Pseudochironomus sp.								
Tanypodinae pupa								
Tanytarsus sp.	6.4	11.0	999.6	529.8	19.1	19.1		
Tanytarsus pupa								
Ephemeroptera								
Caenis sp.					6.4	11.0		
Trichoptera								
Hydropsychidae								
MOLLUSCA								
Gastropoda								
Bulimus sp.								
Pelecypoda								
Amblema plicata								
Sphaerium sp.			6.4	11.0				
Station Total	1489.8	1319.3	4291.1	1799.5	744.9	380.6	254.7	177.5

S.D. = Standard Deviation. Data presented as number/m^2.

TABLE C-5 CONT.

ANALYSIS OF BENTHOS POPULATIONS AT LOCUST POINT - NOVEMBER 7, 1974

TAXA	Station 17		Station 18		Station 19		Station 20	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
COELENTERATA								
Hydra sp. (budding polyp)								
Hydra sp. (single polyp)			12.7	11.0				
NEMATODEA								
ANNELIDA								
Hirudinea								
Helobdella elongata								
H. stagnalis								
Oligochaeta (unidentified)								
Immatures (hair setae)								
Immatures (no hair setae)	70.0	58.4	935.9	559.5				
Branchyura sowerbyi								
Limnodrilus cervix								
L. claparedeanus								
L. claparedeanus-cervix			44.6	29.2				
L. hoffmeisteri								
L. maumeensis								
Nais sp.								
Potamothrix moldaviensis								
P. vejdovskyi								
Stylaria sp.								
ARTHROPODA								
Cladocera								
Leptodora kindtii								
Amphipoda								
Gammarus fasciatus								
Hyalella azteca								
Decapoda								
Orconectes sp.								
Chironomidae								
Chironomus (chironomus) sp.	6.4	11.0	31.8	29.2				
Cricotopus sp.								
Coelotanypus sp.								
Cryptochironomus sp.			70.0	44.1				
Polypedilum sp.								
Procladius sp.			6.4	11.0				
Procladius pupa								
Pseudochironomus sp.								
Tanypodinae pupa								
Tanytarsus sp.	6.4	11.0						
Tanytarsus pupa								
Ephemeroptera								
Caenis sp.								
Trichoptera								
Hydropsychidae			6.4	11.0				
MOLLUSCA								
Gastropoda								
Bulimus sp.								
Pelecypoda								
Amblema plicata								
Sphaerium sp.								
Station Total	82.8	67.1	1107.9	610.3	0.0	0.0		

S.D. = Standard Deviation. Data presented as number/m^2.

RADIOLOGICAL

Industrial BIO-TEST *Laboratories, Inc.*
1810 FRONTAGE ROAD
NORTHBROOK, ILLINOIS 60062

TOXICOLOGY
ENVIRONMENTAL SCIENCES
CHEMISTRY
PLANT SCIENCES
MEDICAL SCIENCES

AREA CODE 312
TELEPHONE 272-3030

REPORT TO

TOLEDO EDISON COMPANY
TOLEDO, OHIO

PREOPERATIONAL ENVIRONMENTAL RADIOLOGICAL MONITORING FOR THE DAVIS-BESSE NUCLEAR POWER PLANT
OAK HARBOR, OHIO

SEMI-ANNUAL REPORT
July-December 1974
IBT NO. 64305590

PREPARED AND SUBMITTED
BY
INDUSTRIAL BIO-TEST LABORATORIES, INC.

Report approved by: ______________________
B. G. Johnson, Ph. D.
Manager
Environmental Sciences

14 February 1975

PREFACE

The staff of the Nuclear Sciences Section of the Environmental Sciences Division of Industrial BIO-TEST Laboratories, Inc. was responsible for the acquisition of the data presented in this report.

The report was prepared by L. G. Huebner, Section Head, with the assistance of the staff of the Nuclear Sciences Section.

TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

LIST OF FIGURES

LIST OF FIGURES (continued)

LIST OF FIGURES (continued)

LIST OF TABLES

LIST OF TABLES (continued)

LIST OF TABLES (continued)

LIST OF TABLES (continued)

I. Introduction

Because of the many potential pathways of radiation exposure to man from both natural and man-made sources, it is necessary to document levels of radioactivity and the variability of these levels which exist in an area prior to the anticipated release of any additional radioactive nuclides. To meet this objective, an extensive preoperational environmental radiological monitoring program was initiated by Industrial BIO-TEST Laboratories, Inc. (BIO-TEST) in July 1972 for the Toledo Edison Company in the vicinity of the Davis-Besse Nuclear Power Plant site. This program included collection (both onsite and offsite) and radiometric analyses of airborne particulates, airborne iodine, ambient gamma radiation, surface water, ground water, precipitation, soil, bottom sediments, fish, clams, food crops, vegetation, milk, meat, and wildlife.

BIO-TEST completed the first two years of preoperational monitoring in June 1974. Results of radiometric analyses of samples collected from July through December 1974 are reported herein. This report, together with the previous reports (Industrial BIO-TEST Laboratories, Inc. 1973a, 1973b, 1973c, 1973d and 1974a) will help to establish environmental baseline radiological values for the period prior to operation of the Davis-Besse Nuclear Power Plant.

II. Summary

Results of sample analyses during the period July-December 1974 are presented by quarter in Tables 1 and 2. Monitoring data collected during the period July-December 1974 were similar to data obtained during the same period of 1973 with the exception of the following:

Gross beta activity in airborne particulates continued to decline after reaching its peak in April and June. By December the gross beta activity was approximately at the same level as in December 1973. Gamma isotopic analyses of quarterly air particulate composite indicated higher concentrations of gamma-emitting radionuclides during the third quarter and about the same level during the fourth quarter of 1974 as compared to the same period of 1973.

During the month of June 1974 the monthly, quarterly and annual thermluminescent dosimeters at Location T-1 were exposed to an unknown source of radiation. The excess exposure amounted to approximately 48 mrems. The higher exposure rate at this location persisted throughout the months of July and August, although at a lower level, and was not measured thereafter.

III. Methodology

The sampling locations for the Preoperational Environmental Radiological Monitoring Program at the Davis-Besse Nuclear Power Plant are shown in Figures 1 and 2 and are described in Table 3. The type of samples collected at each location and the frequency of collections are presented in Table 4. The sample codes used in this study are presented in Table 5.

A. The Atmospheric Environment

1. Airborne Particulates and Iodine

Airborne particulate samples were collected at a volumetric rate of approximately one cubic foot per minute on 47 mm membrane filters of 0.8 micron porosity. Vacuum air pumps were used. The filters were collected weekly from twelve locations (T-1, T-2, T-3, T-4, T-7, T-8, T-9, T-10, T-11, T-12, T-23 and T-27), placed in individual glassine protective envelopes, and dispatched by mail to BIO-TEST for radiometric analyses. The filters were counted approximately five days after collection to allow for decay of short-lived naturally-occurring radionuclides. In order to minimize counting variables, all samples were counted on the same instrument. The quarterly composites of all air particulate samples were gamma scanned and analyzed for strontium-90.

Each air sampler was equipped with a charcoal trap inline after the filter holder. The charcoal trap at each location was changed at the same time as the particulate filters and dispatched to BIO-TEST for analysis. The samples were analyzed for iodine-131 immediately after arrival at the laboratory.

2. Ambient Gamma Radiation

Integrated gamma ray background was measured with thermoluminescent dosimeters (TLD). Monthly and quarterly TLD's were placed on 1 July 1974 at eighteen locations (the twelve air sampling locations and locations T-5, T-6, T-14, T-15, T-24, and T-26). Monthly TLD's were exchanged on 5 August, 4 September, 30 September, 4 November, 9 December 1974 and 6 January 1975. Quarterly TLD's were removed on 30 September 1974 and 6 January 1975.

Each shipment of TLD's included controls which were stored in a shield at the Plant and returned with the field TLD's after their removal. In-transit exposures were measured by the control TLD's and subtracted from the field TLD measurements to obtain their net exposure.

3. Precipitation

Monthly precipitation samples were collected from two locations, onsite (T-1) and Put-In-Bay (T-23). No samples were collected in July due to the lack of measurable precipitation for that month. The samples were analyzed for gross beta activity and tritium.

B. The Terrestrial Environment

1. Well Water

One-gallon water samples were collected quarterly from wells at four locations (T-7, T-17, T-18, and T-27). The gross alpha and gross beta activities were determined on the suspended solids and dissolved solids of each sample. The tritium content was determined by direct counting of samples using liquid scintillation techniques. Strontium-90 activity was determined by milking yttrium-90. The samples were also gamma scanned for identification and quantification of gamma-emitting isotopes.

2. Milk

One-gallon milk samples were collected monthly from three herds that graze within five miles of the Plant site (T-8, T-20, and T-21) and from milk processing plants in Toledo (T-12) and Sandusky (T-24). Ten milliliters of 37% formaldehyde solution were added to each gallon of milk as a preservative before shipment. The samples were analyzed for gross beta, iodine-131, barium-140, cesium-137, potassium-40, strontium-89 and -90, and for stable calcium and potassium.

3. Fruits and Vegetables

Sixteen samples comprising twelve varieties of fruits and vegetables were collected from four locations (T-8, T-19, T-20, and T-25) during the third quarter of 1974. In addition one gallon of grape juice was collected on 10 December 1974 from Location T-16 (Put-In-Bay). The samples were scanned for gamma-ray activity and analyzed for gross alpha, gross beta, and strontium-90.

4. Domestic Meat

A sample of beef was collected on 16 September 1974 from Peter Farm (T-22). The flesh was separated from the bone and analyzed for gross beta and gamma-emitting isotopes.

5. Wildlife

Two representative species of fauna (muskrat and racoon) were collected from the vicinity of the site on 31 October 1974. The muscle was separated from the bone, gamma-scanned, and analyzed for gross beta activity; the bone was analyzed for strontium-90.

6. Waterfowl

Six ducks, three Blue Wing Teals and three Mallards were collected from the vicinity of the site on 9 August 1974. Three ducks of each species were combined, the muscle separated from the bone, gamma-scanned and analyzed for gross beta; the bone was analyzed for strontium-90.

7. Grass and Animal Feed

Grass samples were collected on 26 August 1974 from two locations (T-8 and T-21). In addition four samples of hay, silage and corn feed were collected on 16 December 1974 from the same locations, and one sample of Smartweed was collected on 22 August 1974 from the vicinity of the site. The samples were analyzed for gross alpha, gross beta, and strontium-90 activities and were gamma-scanned.

8. Soil

Soil samples from three dairy farms (T-8, T-19, and T-20) and one onsite location (T-1) were collected on 9 September 1974. The samples were taken from the top two inches of soil where vegetation was not growing. The samples were scanned for gamma-ray activity and were analyzed for gross beta activity and strontium-90.

C. The Aquatic Environment

1. Treated Surface Water

Weekly grab samples of treated water were collected from three filtration plants (T-10, T-11, and T-12) and analyzed for gross alpha and gross beta activities in total residue and for tritium. Quarterly composites were gamma scanned and analyzed for strontium-90.

2. Untreated Surface Water

Weekly grab samples of untreated water were collected from Lake Erie at four filtration plants (T-10, T-11, T-12, and T-28) and at three onsite locations (T-1, T-2, and T-3). The samples were composited monthly and analyzed for gross alpha and gross beta activities in suspended and dissolved solids, and for tritium. Quarterly composites were gamma scanned and analyzed for strontium-90.

3. Fish

Five species of fish comprising thirteen samples were collected from Lake Erie in the vicinity of the site by a commercial fisherman and from the Toussaint River near the storm drain outfall (T-3). The muscle was separated from the bone, gamma-scanned and analyzed for gross beta activity; the bone was analyzed for strontium-90.

4. Clams

Clams were collected on 9 July and on 19 September 1974 from Lake Erie in the vicinity of the site. The flesh was gamma-scanned and analyzed for gross beta activity.

5. Bottom Sediments

Bottom sediments were collected on 10 October 1974 from Lake Erie in the vicinity of the site (T-1) and in the vicinity of the intake and discharge areas (T-29 and T-30). The samples were collected approximately 50 feet offshore with the use of an Ekman dredge. The samples were gamma-scanned and analyzed for gross alpha, gross beta, and strontium-90 activities.

IV. Results and Discussion

The discussion of the results of data collected during the semi-annual reporting period, July through December 1974, has been divided into three broad categories: the air, the terrestrial, and the aquatic environments. Any references made to data collected during previous years for the Davis-Besse Nuclear Power Plant refers to data collected by Industrial BIO-TEST Laboratories, Inc., unless stated otherwise in the text.

A. The Atmospheric Environment

1. Airborne Particulates and Iodine

The results of the gross alpha and gross beta analyses for air particulates are given in Tables 6 through 17 and graphically presented in Figures 3 through 14. Monthly averages, minima and maxima for each location are given in Table 18. Gross alpha activity showed no definite trend throughout the period and was similar to the activity reported for the same period of 1973. There was an increase in gross beta activity at all locations during the first half of 1974, which reached a maximum in April and May and continued to decline throughout the remainder of the year.

The results of gamma and strontium-89 and -90 analyses are given in Table 19. All isotopes that were detected during the period July-December 1974 had higher activities than those reported for the same period of 1973. There was a considerable decrease in activities during the fourth quarter 1974 as compared to the second and third quarters of 1974. Beryllium-7, which is produced continuously in the upper atmosphere by cosmic-ray interaction (Arnold and Al-Salih 1955), was the predominant radionuclide measured during both quarters. An increase in beryllium-7 activity shows that there was considerably more atmospheric mixing during the spring and summer, causing more beryllium-7 and radioactive debris in the upper atmosphere to reach the lower atmosphere (Russel and Bruce 1969). The increased radioactivity in gross beta and gamma-emitting isotopes is attributed to the deposition of radioactive debris injected into the upper atmosphere by Chinese thermonuclear tests conducted in June 1973 (U.S.E.P.A. 1973-1974). Weekly levels of airborne iodine-131 were below the minimum level of detection (0.03 pCi/m^3) at all locations. A germanium-lithium gamma-ray spectrum of composited air particulate samples is shown in Figure 15.

2. Ambient Gamma Radiation

Ambient gamma radiation levels as measured by thermoluminescent dosimeters are given in Tables 20 and 21. During the month of June the TLD's at Location T-1 were exposed to approximately 47 mrems of radiation above background level. The higher exposure rate at this location persisted throughout the months of July and August although at lower levels. The extra exposure received was approximately 6 mrem for the two months. After the month of August, the exposure at T-1 returned to background level. No explanation is available for the elevated readings at T-1 during June, July, and August and the following discussion does not consider these results.

Monthly and quarterly TLD measurements averaged approximately the same for this reporting period as compared to those of the same period in

1973 (26.4 mrem for July-December 1974 as compared to 28.4 for July-December 1973), but were slightly higher than during the first half of 1974 (21.2 mrem). Readings averaged lower at Locations T-1, T-2, and T-3, which is probably due to the low radionuclide content in the sandy soil which surrounds these locations, as evidenced by radiometric analyses of soil samples.

3. Precipitation

The results of precipitation analyses are given in Table 22. Tritium activity remained essentially unchanged for the first half of 1974. Gross beta activity in deposition was higher than during the same period in 1973 and was highest for the month of November.

B. The Terrestrial Environment

1. Well Water

The results of well water analyses are given in Tables 23 and 24. Gross alpha and gross beta activities had the following ranges (pCi/l):

	Alpha		Beta	
	Min.	Max.	Min.	Max.
Suspended solids	<0.07	<0.11	<0.13	0.21
Dissolved solids	<0.50	7.01	2.36	4.82
Total residue	<0.58	7.01	2.36	4.82

Gross alpha, gross beta, and tritium activities correlated closely to last year's results. Cesium-137 activity was less than 1.5 pCi/l in all samples and no other gamma-emitting isotopes were detected above background level in any of the samples. One sample, collected on 8 July 1974 from T-18 had gross alpha activity of 7 pCi/l. As required by the technical specifications, this sample was analyzed for Ra-226. The analysis showed that Ra-226 activity was less than 0.5 pCi/l. Strontium-90 activity was less than 0.6 pCi/l and was similar to the results obtained for the same period of 1973 and the first half of 1974.

2. Milk

Results of milk analyses are given in Tables 25 and 26. Iodine-131, barium-lanthanum-140, and strontium-89 were below the minimum detectable levels in all samples. Cesium-137 activity was similar at all locations while strontium-90 activity was higher at Locations T-12 and T-24. Cesium-137 activity ranged from <3.5 to 6.91 pCi/l and strontium-90 activity ranged from 0.85 to 5.24 pCi/l. Strontium-90 values are plotted in Figures 16-20. Potassium-40 activity ranged from 1165 to 1357 pCi/l and gross beta activity ranged from 1009 to 1267 pCi/l. The radioactivity levels in milk were very similar to those found during the first half of 1974. A sodium iodide spectrum of milk is shown in Figure 21.

Because of similarities between strontium and calcium, and between cesium and potassium, the body tends to deposit cesium-137 in the soft tissue and muscle, and strontium-89 and -90 in the bones. Consequently, the ratios of strontium-90 activity to the weight of calcium in milk and cesium-137 to the weight of potassium in milk were determined in order to estimate the potential accumulation of these radionuclides. There were no trends noted in the ratio of cesium-137 to potassium either seasonally or by location. The strontium-90 to calcium ratio for samples collected from Toledo and Sandusky were slightly higher than those collected from the Earl Moore (T-8), Daup (T-20), and Haynes (T-21) farms.

3. Fruits and Vegetables

Results of analyses of vegetable samples are given in Table 27. Gross alpha and iodine-131 activities were below the limits of detection in all samples. Gross beta activity (wet weight) ranged from 0.9 pCi/g in apples to 4.7 pCi/g in Swiss chard and winter lettuce. Strontium-90 activity was low in all samples averaging 0.006 pCi/g wet weight. Cesium-137 activity was below the limit of detection in most samples. Gamma scan analyses of the samples indicated that the predominant radionuclide was naturally-occurring potassium-40. All other radionuclides were below the limits of detection. A typical gamma-ray spectrum of squash is shown in Figure 22. Radioactivity found in grape juice was also very low. Strontium-90 and Iodine-131 were below limits of detection. Gross alpha, gross beta, cesium-137 and potassium-40 were 0.02 pCi/l, 0.27 pCi/l, 0.001 pCi/l, and 0.22 pCi/l, respectively. A gamma-ray spectrum of grape juice is shown in Figure 23.

4. Domestic Meat

Results of beef sample analyses are given in Table 28. Cesium-137 and potassium-40 were the only gamma-emitting isotopes detected, measuring 0.015 pCi/g and 3.08 pCi/g wet weight, respectively. The level of radioactivity was slightly higher than those found for beef collected in April.

5. Wildlife

Results of analyses of muskrat and racoon are given in Table 29. Gross beta, strontium-90 and potassium-40 activities were similar in both species. Cesium-137 activity in racoon was slightly higher than in muskrat, 0.013 pCi/g in racoon as compared to 0.001 pCi/g wet weight in muskrat. Strontium-90 activity in the bone was 0.6 pCi/g dry weight in both species. The radionuclide concentrations found in the muskrat and racoon were similar to those for racoon and rabbits collected in the fall of 1973.

6. Waterfowl

The levels of radionuclide concentrations, gross beta, strontium-90, cesium-137, and potassium-40, found in Blue Wing Teal and Mallard ducks were similar to those found in the wildlife samples. The results of the analyses are given in Table 30.

7. Grass and Animal Feed

Results of the analyses on animal feed samples are given in Table 31. Gross alpha activity was below limits of detection in all samples but one silage sample (0.22 pCi/g wet weight). Gross beta activity ranged from 2.0 pCi/g wet weight in corn feed to 16.3 pCi/g wet weight in hay. Strontium-90 and cesium-137 activities ranged from less than 0.004 pCi/g and less than 0.008 pCi/g wet weight in corn feed to 0.17 pCi/g and 0.08 pCi/g wet weight in hay, respectively. Potassium-40 activity ranged from 2.1 pCi/g in corn feed to 12.6 pCi/g wet weight in silage, respectively. Radioactivity found in smartweed was similar to that in other animal feed samples. In general, the concentration of radionuclides found were highest in hay and silage and lowest in corn feed and were similar to those found in animal feed collected in the fall of 1973. Naturally-occurring potassium-40 was the predominant radionuclide in all samples, being highest in hay and silage. Gamma spectroscopic analyses showed trace amounts of fallout products present in all samples except in corn feed. Typical gamma-ray spectra of corn feed and grass are shown in Figures 24 and 25, respectively.

8. Soil

Soil collected from onsite Location T-1 was beach sand and had the lowest radioisotopic concentrations as compared to Locations T-8, T-19, and T-20. Samples collected from the other three locations (T-8, T-19, and T-20) had similar concentrations of radionuclides. The cesium-137 activity in the sample collected from T-8 was slightly higher than that found in the other samples. Gross beta activity ranged from 11.03 pCi/g to 31.16 pCi/g, strontium-90 from less than 0.12 pCi/g to less than 0.19 pCi/g, cesium-137 from less than 0.03 pCi/g to 0.96 pCi/g and potassium-40 from 15.0 pCi/g to 26.9 pCi/g (dry weight). The activities in soil samples were similar to those reported for the same period of 1973. The results of soil analyses are given in Table 32 and a typical germanium-lithium spectrum of soil is shown in Figure 26.

C. The Aquatic Environment

1. Treated Surface Water

The results of analyses of treated surface water samples are given in Tables 33 through 37 and graphically presented in Figures 27 through 30. Alpha activity of treated surface water samples ranged from <0.13 to 0.73 pCi/l; beta activity ranged from 0.82 to 2.96 pCi/l. Gross beta activity at the Toledo Water Treatment Plant (T-12) was slightly lower than at Locations T-10, T-11, and T-28 (1.65 pCi/l average at T-12 versus 2.33 pCi/l average for all other locations). Tritium activities were relatively uniform for all samples, and ranged from <0.29 to 0.72 pCi/ml. Strontium-90 activity in quarterly composites ranged from 0.31 pCi/l at T-12 to 0.74 pCi/l at T-10. No gamma-emitting isotopes were detected above background level. There were no appreciable seasonal variations noted.

2. Untreated Surface Water

Untreated surface waters were analyzed for gross alpha and gross beta content in suspended solids, dissolved solids, and total residue. Ranges of activities were as follows (pCi/l):

	Alpha		Beta	
	Min.	Max.	Min.	Max.
Suspended solids	<0.06	1.01	<0.10	3.34
Dissolved solids	<0.23	1.55	1.70	4.59
Total residue	<0.40	2.02	2.14	6.73

Tritium activity in these samples was similar to that in treated water samples. Strontium-90 activity in quarterly composites ranged from 0.35 pCi/l to 0.90 pCi/l and was slightly lower at Location T-12. No gamma-emitting radionuclides were detected above the background level. No seasonal trends were noted in radionuclide activities. The results of the untreated surface water analyses are given in Tables 38 and 39. A typical gamma-ray spectrum of the composite untreated surface water is shown in Figure 31.

3. Fish

Five species of fish were obtained from Lake Erie in the vicinity of the site and four species were obtained from the Toussaint River. Gross beta and potassium-40 activities in muscle were similar in all samples, averaging the same 2.7 pCi/g wet weight for gross beta and potassium-40. Cesium-137 activity in muscle ranged from 0.002 pCi/g in carp to 0.049 pCi/g in sheepshead. Strontium-90 activity in bones ranged from 0.22 pCi/g to 1.06 pCi/g dry weight.

Carp, walleye, bullheads, perch and catfish were collected and analyzed during this same period in 1973, and these results correlated closely to those reported in this report. Tables 40 and 41 contain the results of fish sample analyses and Figure 32 is a gamma-ray spectrum of carp flesh.

4. Clams

The clam sample collected in September was higher in radionuclide concentrations than the one collected in July. Gross beta, cesium-137, and potassium-40 in the July sample were 0.51 pCi/g, 0.001 pCi/g, and 0.14 pCi/g wet weight, respectively, while in the September sample, the activities were 1.22 pCi/g, 0.009 pCi/g, and 0.25 pCi/g wet weight. Gamma spectral analyses showed that all other gamma-emitting isotopes were less than the minimum detectable levels. The results of the analyses of clam are given in Table 42.

5. Bottom Sediments

Gross alpha activity in bottom sediment samples collected at Location T-1 was less than 3.3 pCi/g while gross alpha activity at T-29 and T-30 was 12.4 pCi/g and 11.3 pCi/g dry weight, respectively. The gross beta activity was also lower at Location T-1 when compared to Locations T-29 and T-30 (13.6 pCi/g compared to 21.5 pCi/g dry weight). Strontium-90 was below the limits of detection at all locations, but cesium-137 was considerably higher at Location T-30 (0.24 pCi/g versus 0.05 pCi/g and less than 0.04 pCi/g at Locations T-1 and T-29, respectively. Potassium-40 ranged from 16.2 pCi/g at T-1 to 21.0 pCi/g at T-29. The results of sample analyses were similar to those reported for the first half of 1974.

The differences in measured radioactivity in samples collected at Location T-1 as compared to those in samples collected at Location T-29 and T-30 can be attributed to differences in sample composition. The sample collected at the shore (T-1) was sand, while those collected offshore (T-29 and T-30) were a combination of sand and silt. The silt consists of smaller size particles and it is known that the measured radioactivity per unit mass of sediment may increase with decreasing particle size. The results of sediment analyses are given in Table 43.

Table 1. Radioactivity in environmental samples, third quarter 1974.

Facility: Davis-Besse NPP | Docket No.: 50-346 | Reporting Period: Third quarter 1974

Sample and collection Frequency/Type[a]	Location[b]	Average Quarterly Results[c]				
		Monthly TLD's (mrem/quarter)	Quarterly TLD's (mrem/quarter)		Annual TLD's (mrem/year)	
External radiation, TLD's M/I, Q/I, A/I	(I) T-1, 0.6 mi NE	15.6±2.1	16.2±3.3		Not scheduled this time	
	(I) T-2, 0.9 mi E	9.7±1.8	9.6±2.1			
	(I) T-3, 1.4 mi SE	10.0±2.1	9.3±2.2			
	(I) T-4, 0.8 mi S	12.9±1.8	14.4±2.9			
	(I) T-5, 0.25 mi W	16.4±2.3	15.7±2.9			
	(I) T-6, 0.6 mi NW	14.7±2.5	14.2±3.0			
	(I) T-7, 0.9 mi NNW	11.3±1.8	10.7±2.4			
	(I) T-8, 3.2 mi WSW	15.9±1.5	15.7±3.2			
	(B) T-9, 6.8 mi SW	16.5±1.9	10.7±2.3			
	(B) T-10, 6.5 mi SE	14.6±1.9	15.0±2.9			
	(B) T-11, 9.5 mi SE	12.4±2.1	12.2±2.7			
	(B) T-12, 23.5 mi WNW	16.2±2.0	14.0±3.5			
	(B) T-14, 3.8 mi WSW	17.1±1.7	17.1±3.5			
	(B) T-15, 6.6 mi SSE	16.3±2.1	16.0±3.4			
	(B) T-23, 14.3 mi ENE	13.3±1.9	12.6±2.8			
	(B) T-24, 24.9 mi SE	16.1±2.0	16.1±3.9			
	(B) T-26, 35.1 mi SW	17.0±2.3	17.2±3.1			
	(B) T-27, 5.3 mi WNW	13.6±2.0	14.4±2.3			
		10^{-14} μCi/cc				
		gross alpha		gross beta		I-131
Filtrable airborne particulates and charcoal W/C	(I) T-1, 0.6 mi NE	0.25±0.29		16.1±20.3		<3
	(I) T-2, 0.9 mi E	0.26±0.22		15.5±13.2		<3
	(I) T-3, 1.4 mi SE	0.24±0.20		15.2±16.4		<3
	(I) T-4, 0.8 mi S	0.27±0.18		16.7±12.0		<3
	(I) T-7, 0.9 mi NNW	0.29±0.16		17.5±13.4		<3
	(I) T-8, 3.2 mi WSW	0.28±0.22		17.8±13.2		<3
	(B) T-9, 6.8 mi SW	0.27±0.22		16.6±13.8		<3
	(B) T-10, 6.5 mi SE	0.23±0.18		15.8±11.8		<3
	(B) T-11, 9.5 mi SE	0.27±0.24		17.4±14.2		<3
	(B) T-12, 23.5 mi WNW	0.29±0.24		16.7±13.4		<3
	(B) T-23, 14.3 mi ENE	0.26±0.30		15.8±14.2		<3
	(B) T-27, 5.3 mi WNW	0.25±0.16		16.4±14.8		<3
		Sr-90	Ce-144	Ce-141	Be-7	Ru-103
	Composite of all samples	0.16±0.01	4.7±0.1	0.3±0.1	15.0±0.6	0.2±0.1
		Ru-106	Cs-137	Zr-95	Nb-95	
		2.4±0.1	0.5±0.1	0.9±0.1	1.5±0.1	
		10^{-9} μCi/ml				
		gross alpha		gross beta		H-3
Treated surface water (Drinking) WG	(B) T-10, 6.5 mi SE	0.31±0.21		1.85±0.45		350±90
	(B) T-11, 11.5 mi SE	0.50±0.34		2.46±0.50		360±110
	(B) T-12, 23.5 mi WNW	0.31±0.21		1.35±0.45		350±90
	(I) T-28, Unit 1 water supply	<0.67		2.22±0.52		310±60
			Sr-90	Cs-137		
Q/Co	(B) T-10, 6.5 mi SE		0.48±0.35	<1.5		
	(B) T-11, 11.5 mi SE		<0.46	<1.5		
	(B) T-12, 23.5 mi WNW		0.31±0.26	<1.5		
	(I) T-28, Unit 1 water supply		0.53±0.33	<1.5		

Table 1. Continued.

Facility: Davis-Besse NPP — Docket No.: 50-346 — Reporting Period: Third quarter 1974

Average Quarterly Results[c]

Sample and collection Frequency/Type[a]	Location[b]	gross alpha (10⁻⁹ µCi/ml)	gross beta (10⁻⁹ µCi/ml)	H-3 (10⁻⁹ µCi/ml)
Untreated surface water W/G - M/Co	(I) T-1, 0.6 mi NE	1.02±1.22	2.97±1.61	440±0
	(I) T-2, 0.9 mi E	1.00±1.23	3.15±2.40	450±380
	(I) T-3, 1.4 mi SE	1.23±1.44	4.26±2.22	390±140
	(B) T-10, 6.5 mi SE	0.96±0.37	3.62±2.28	390±110
	(B) T-11, 9.5 mi SE	1.28±1.48	3.65±1.30	450±170
	(B) T-12, 23.5 mi WNW	0.79±0.38	3.31±1.06	320±130

Sample and collection Frequency/Type	Location	Sr-90	Cs-137
Q/Co	(I) T-1, 0.6 mi NE	0.35±0.33	<1.5
	(I) T-2, 0.9 mi E	0.64±0.24	<1.5
	(I) T-3, 1.4 mi SE	0.54±0.32	<1.5
	(B) T-10, 6.5 mi SE	0.54±0.18	<1.5
	(B) T-11, 9.5 mi SE	0.56±0.25	<1.5
	(B) T-12, 23.5 mi WNW	0.49±0.34	<1.5

Sample and collection Frequency/Type	Location	gross alpha (10⁻⁹ µCi/ml)	gross beta	Sr-90	Cs-137	H-3
Well water Q/G	(I) T-7, 0.9 mi NNW	<0.58	2.36±0.33	<0.46	<1.5	<300
	(I) T-17, 0.7 mi SW	2.09±1.27	2.58±0.58	<0.56	<1.5	520±240
	(B) T-18, 1.3 mi S	7.01±3.40	3.03±2.30	<0.27	<1.5	<300
	(B) T-27, 5.3 mi WNW	<2.03	3.84±1.41	<0.27	<1.5	<300

Sample and collection Frequency/Type	Location	gross beta (10⁻⁹ µCi/ml)	H-3 (10⁻⁹ µCi/ml)	gross beta (10⁻⁶ µCi/m²)
Precipitation M/C	(I) T-1, 0.6 mi NE	52.8±84.0	250±230	785±616
	(B) T-23, 14.3 mi ENE	39.1±40.0	500±240	1211±2532

Sample and collection Frequency/Type	Location	gross beta (10⁻⁹ µCi/ml)	I-131	Sr-89	Sr-90	Ba-140	Cs-137	K-40
Milk M/G	(I) T-8, 3.2 mi WSW	1140±150	<3.2	<0.5	1.28±0.16	<3.7	4.91±2.05	1312±66
	(B) T-12, 23.5 mi WNW	1104±140	<3.2	<0.5	3.80±2.52	<3.7	4.75±3.78	1267±78
	(B) T-20, 5.4 mi SSE	1110±44	<3.2	<0.5	2.31±0.85	<3.7	6.34±3.12	1277±118
	(B) T-21, 3.6 mi SSW	1099±92	<3.2	<0.5	1.48±0.76	<3.7	<3.5	1192±80
	(B) T-24, 24.9 mi SE	1064±86	<3.2	<0.5	2.82±1.60	<3.7	5.78±0.90	1247±90

Sample and collection Frequency/Type	Location	gross beta (10⁻³ µCi/kg wet)	Cs-137	K-40
Meat SA/G	(B) T-22, 2.6 mi SW	2.30±0.04	0.015±0.003	3.05±0.09

Sample and collection Frequency/Type	Location	gross alpha (10⁻³ µCi/kg dry)	gross beta	I-131	Sr-90	Cs-137	K-40
Vegetables SA/G Pole beans	(I) T-8, 3.2 mi WSW	<0.17	18.4±0.5	<0.13	0.051±0.010	<0.07	22.0±1.5
Tomatoes	(I) T-8, 3.2 mi WSW	<0.25	33.4±0.8	<0.19	0.053±0.020	<0.09	47.1±2.5
Squash	(I) T-8, 3.2 mi WSW	<0.34	35.6±1.2	<0.17	0.017±0.016	<0.09	45.5±2.3
Squash	(I) T-8, 3.2 mi WSW	<0.18	37.6±0.6	<0.04	0.030±0.020	<0.05	40.9±1.9
Cabbage	(B) T-19, 3.7 mi S	<0.45	35.8±1.5	<0.10	0.327±0.030	<0.06	42.5±1.4
Swiss chard	(B) T-19, 3.7 mi S	<0.79	64.3±2.5	<0.24	0.115±0.040	<0.13	80.4±3.7
Beets	(B) T-20, 5.4 mi SSE	<0.18	37.6±0.6	<0.04	0.030±0.020	<0.05	40.9±1.9
Tomatoes	(I) T-25, 1.3 mi S	<0.24	43.2±1.5	<0.14	0.078±0.040	<0.08	54.1±2.2
		<0.34	44.0±1.4	<0.04	0.022±0.010	<0.05	45.9±1.9

Table 1. Continued.

Facility: Davis-Besse NPP | Docket No.: 50-346 | Reporting Period: Third quarter 1974

Fruits SA/G — Average Quarterly Results[c], 10^{-3} µCi/kg dry

Sample and collection Frequency/Type[a]	Location[b]	gross alpha	gross beta	I-131	Sr-90	Cs-137	K-40
Apples	(I) T-8, 3.2 mi WSW	<0.06	7.5±0.2	<0.22	<0.009	<0.10	8.5±1.7
Apples	(I) T-8, 3.2 mi WSW	<0.03	6.1±0.1	<0.03	0.005±0.004	<0.03	6.2±0.8
Peaches	(I) T-8, 3.2 mi WSW	<0.15	16.2±0.6	<0.03	0.017±0.010	0.070±0.030	16.3±0.9
Pears	(B) T-20, 5.4 mi SSE	0.13±0.10	8.5±0.3	<0.03	0.011±0.005	<0.03	5.5±0.8
Plums	(B) T-20, 5.4 mi SSE	<0.12	12.6±0.5	<0.03	0.010±0.007	0.050±0.030	11.7±0.9
Crab apples	(I) T-25, 1.3 mi S	<0.06	10.1±0.2	<0.03	0.021±0.006	<0.03	10.0±0.9
Peaches	(I) T-25, 1.3 mi S	<0.25	15.0±0.7	<0.03	0.036±0.010	0.040±0.030	14.7±1.0

Grape Juice A/G — 10^{-5} µCi/ml

Sample	Location	gross alpha	gross beta	I-131	Sr-90	Cs-137	K-40
Grape Juice A/G	(B) T-16, 15.3 mi ENE	Not scheduled this quarter					

Animal Feed — 10^{-3} µCi/kg dry

Sample	Location	gross alpha	gross beta	Sr-90	Cs-137	K-40
Smartweed A/G	(I) T-4, 0.8 mi S	<0.29	20.2±0.8	0.19±0.02	0.06±0.04	2.13±1.1
Grass A/G	(I) T-8, 3.2 mi WSW	<0.27	25.4±0.7	0.08±0.01	<0.05	25.7±1.3
	(B) T-21, 3.6 mi SSW	<0.22	15.0±0.6	0.18±0.02	0.13±0.04	13.3±1.1
Hay & silage A/G	(I) T-8, 3.2 mi WSW	Not scheduled this quarter				
	(B) T-21, 3.6 mi SSW					

Soil SA/G — 10^{-3} µCi/kg dry

Location	gross beta	Sr-90	Cs-137	K-40
(I) T-1, 0.6 mi NE	11.03±1.78	<0.17	<0.03	15.0±0.8
(I) T-8, 3.2 mi WSW	31.16±2.73	<0.12	0.96±0.07	26.9±1.25
(B) T-19, 3.7 mi S	30.59±2.72	<0.12	0.49±0.05	26.8±1.16
(B) T-20, 5.4 mi SSE	25.03±1.76	<0.19	0.52±0.05	23.9±0.7

Bottom Sediments TA/G — 10^{-3} µCi/kg dry

Location	gross alpha	gross beta	Sr-90	Cs-137	K-40
(I) T-1, 0.6 mi NE	Not scheduled this quarter				
(I) T-29, 1.5 mi NE					
(I) T-30, 0.9 mi ENE					

Wildlife SA/G

Location	gross beta (10^{-3} µCi/kg wet (flesh))	Cs-137 (10^{-3} µCi/kg wet (flesh))	K-40 (10^{-3} µCi/kg wet (flesh))	Sr-90 (10^{-3} µCi/kg dry (bones))
(I) Vicinity of site	Not scheduled this quarter			

Waterfowl A/G

Sample	Location	gross beta (10^{-3} µCi/kg wet (flesh))	Cs-137 (10^{-3} µCi/kg wet (flesh))	K-40 (10^{-3} µCi/kg wet (flesh))	Sr-90 (10^{-3} WCi/kg dr (bone))
Blue Winged Teal	(I) Vicinity of site	2.6±0.1	0.05±0.01	2.6±0.1	0.43±0.13
Mallard Duck	(I) Vicinity of site	3.0±0.1	0.02±0.01	2.7±0.1	0.57±0.09

Table 1. Continued.

Facility: Davis-Besse NPP		Docket No.: 50-346			Reporting Period: Third quarter 1974
Sample and collection Frequency/Type[a]	Location[b]	Average Quarterly Results[c]			
Fish		10^{-3} µCi/kg wet (flesh)			10^{-3} µCi/kg dry (bone)
Q/G		gross beta	Cs-137	K-40	Sr-90
Carp	(I) T-1, 0.6 mi NE	3.0±0.1	0.007±0.002	2.9±0.1	0.35±0.05
White bass	(I) T-1, 0.6 mi NE	2.9±0.1	0.025±0.004	2.8±0.1	0.22±0.06
Catfish	(I) T-1, 0.6 mi NE	2.5±0.1	0.021±0.003	2.7±0.1	0.49±0.09
White bass	(I) T-3, 1.4 mi SE	3.0±0.1	0.047±0.005	3.5±0.1	0.45±0.03
Catfish	(I) T-3, 1.4 mi SE	2.8±0.1	0.024±0.004	3.0±0.1	0.49±0.06
Catfish	(I) T-3, 1.4 mi SE	3.1±0.1	0.03±0.005	3.1±0.1	0.29±0.04
Carp	(I) T-3, 1.4 mi SE	2.6±0.1	0.010±0.003	2.5±0.1	1.06±0.08
		10^{-3} µCi/kg wet			
		gross beta	Cs-137	K-40	
Clams	(B) T-1, 0.6 mi NE	0.51±0.02	0.001±0.001	0.14±0.01	
TA/G	(B) T-1, 0.6 mi NE	1.22±0.09	0.009±0.004	0.25±0.05	

[a] Frequency: W-Weekly, M-Monthly, Q-Quarterly, SA-Semi-annually, TA- Three times a year, A-Annually. Type: G-Grab, C-Continuous, P-Proportional, Co-Composite, I-Integrating.

[b] Location: I-Indicator, B-Background; distance and direction are given from station.

[c] Results given are the mean ± 2 standard deviations for weekly and monthly analyses. Results of quarterly, semi-annual and annual analyses are reported with the counting error at the 95% confidence level.

Table 2. Radioactivity in environmental samples, fourth quarter 1974.

Facility: Davis-Besse NPP — Docket No.: 50-346 — Reporting Period: Fourth Quarter 1974

Average Quarterly Results[c]

Sample and collection Frequency/Type[a]	Location[b]	Monthly TLD's (mrem/quarter)	Quarterly TLD's (mrem/quarter)	Annual TLD's (mrem/year)
External radiation, TLD's M/I, Q/I, A/I	(I) T-1, 0.6 mi NE	7.3±2.[illegible]	8.2±1.5	Not scheduled this time
	(I) T-2, 0.9 mi E	9.4±2.1	9.1±1.5	
	(I) T-3, 1.4 mi SE	8.4±2.0	8.7±1.6	
	(I) T-4, 0.8 mi S	11.5±2.8	12.5±1.9	
	(I) T-5, 0.25 mi W	15.5±3.0	14.2±2.0	
	(I) T-6, 0.6 mi NW	13.4±2.7	13.7±2.0	
	(I) T-7, 0.9 mi NNW	12.6±2.7	11.4±1.7	
	(I) T-8, 3.2 mi WSW	15.1±2.5	14.5±2.1	
	(B) T-9, 6.8 mi SW	10.0±2.0	9.7±2.5	
	(B) T-10, 6.5 mi SE	12.2±3.0	13.5±2.2	
	(B) T-11, 9.5 mi SE	11.2±2.5	11.7±2.2	
	(B) T-12, 23.5 mi WNW	12.9±2.5	13.4±2.5	
	(B) T-14, 3.8 mi WSW	15.8±2.8	15.9±2.9	
	(B) T-15, 6.6 mi SSE	15.0±3.1	13.9±1.7	
	(B) T-23, 14.3 mi ENE	12.5±2.5	10.8±1.9	
	(B) T-24, 24.9 mi SE	15.4±2.9	15.5±2.6	
	(B) T-26, 35.1 mi SW	15.0±2.8	14.8±2.1	
	(B) T-27, 5.3 mi WNW	12.3±2.6	12.4±1.9	

10^{-14} μCi/cc

Sample and collection Frequency/Type[a]	Location[b]	gross alpha	gross beta	I-131
Filtrable airborne particulates and charcoal W/C	(I) T-1, 0.6 mi NE	0.18±0.16	6.8±5.2	<3
	(I) T-2, 0.9 mi E	0.20±0.10	7.1±4.0	<3
	(I) T-3, 1.4 mi SE	0.15±0.16	5.7±5.4	<3
	(I) T-4, 0.8 mi S	0.21±0.14	7.9±4.6	<3
	(I) T-7, 0.9 mi NNW	0.22±0.12	9.0±5.6	<3
	(I) T-8, 3.2 mi WSW	0.17±0.22	7.9±9.4	<3
	(B) T-9, 6.8 mi SW	0.26±0.14	9.5±10.2	<3
	(B) T-10, 6.5 mi SE	0.15±0.10	7.7±2.4	<3
	(B) T-11, 9.5 mi SE	0.21±0.10	8.2±4.2	<3
	(B) T-12, 23.5 mi WNW	0.24±0.12	9.0±5.2	<3
	(B) T-23, 14.3 mi ENE	0.22±0.14	8.3±4.4	<3
	(B) T-27, 5.3 mi WNW	0.19±0.16	7.8±11.2	<3

Location	Sr-90	Ce-144	Ce-141	Be-7	Ru-103
Composite of all samples	0.04±0.01	0.8±0.1	0.1±0.1	7.7±0.2	0.[illegible]±0.1

Location	Ru-106	Cs-137	Zr-95	Nb-95
Composite of all samples	0.4±0.1	0.1±0.1	0.5±0.1	1.0±0.1

Sample and collection Frequency/Type[a]	Location[b]	gross alpha	gross beta	H-3
Treated surface water (Drinking) ,G	(B) T-10, 6.5 mi SE	0.36±0.19	2.16±0.64	420±170
	(B) T-11, 11.5 mi SE	0.46±0.03	2.50±0.63	430±180
	(B) T-12, 23.5 mi WNW	0.21±0.15	1.45±0.49	400±160
	(I) T-28, Unit 1 water supply	0.46±0.27	2.24±0.05	420±260

Sample and collection Frequency/Type[a]	Location[b]	Sr-90	Cs-137
Q/Co	(B) T-10, 6.5 mi SE	0.74±0.22	<1.5
	(B) T-11, 11.5 mi SE	0.49±0.21	<1.5
	(B) T-12, 23.5 mi WNW	<0.45	<1.5
	(I) T-28, Unit 1 water supply	0.55±0.2[illegible]	<1.5

Table 2. Continued.

Facility: Davis-Besse NPP | Docket No.: 50-346 | Reporting Period: Fourth quarter 1974

Average Quarterly Results[c]

Sample and collection Frequency/Type[a]	Location[b]	10^{-9} µCi/ml gross alpha	gross beta	H-3
Untreated surface water W/G - M/Co	(I) T-1, 0.6 mi NE	0.88	3.41±2.17	360±290
	(I) T-2, 0.9 mi E	1.03±0.11	4.08±1.52	440±310
	(I) T-3, 1.4 mi SE	1.02±0.03	4.02±1.07	380±150
	(B) T-10, 6.5 mi SE	0.25±0.06	2.90±0.92	320±40
	(B) T-11, 9.5 mi SE	1.35±0.9	4.63±2.66	380±230
	(B) T-12, 23.5 mi WNW	1.18±0.52	2.97±1.34	380±230

Sample and collection Frequency/Type[a]	Location[b]	Sr-90	Cs-137
Q/Co	(I) T-1, 0.6 mi NE	0.90±0.33	<1.5
	(I) T-2, 0.9 mi E	0.68±0.25	<1.5
	(I) T-3, 1.4 mi SE	0.84±0.31	<1.5
	(B) T-10, 6.5 mi SE	0.83±0.35	<1.5
	(B) T-11, 9.5 mi SE	0.75±0.34	<1.5
	(B) T-12, 23.5 mi WNW	<0.37	<1.5

Sample and collection Frequency/Type[a]	Location[b]	10^{-9} µCi/ml gross alpha	gross beta	Sr-90	Cs-137	H-3
Well water Q/G	(I) T-7, 0.9 mi NNW	0.43±0.22	2.46±0.22	0.56±0.36	<1.5	500±186
	(I) T-17, 0.7 mi SW	2.71±0.70	4.82±0.47	<0.44	<1.5	280±130
	(B) T-18, 1.3 mi S	2.95±2.24	2.69±1.92	<0.32	<1.5	<200
	(B) T-27, 5.3 mi WNW	<2.39	3.00±1.10	<0.33	<1.5	<200

Sample and collection Frequency/Type[a]	Location[b]	10^{-9} µCi/ml gross beta	H-3	10^{-6} µCi/m^2 gross beta
Precipitation M/G	(I) T-1, 0.6 mi NE	57.2±42.0	350±220	2205±2464
	(B) T-23, 14.3 mi ENE	43.9±62.0	300±220	2241±5208

Sample and collection Frequency/Type[a]	Location[b]	10^{-9} µCi/ml gross beta	I-131	Sr-89	Sr-90	Ba-140	Cs-137	K-40
Milk M/G	(I) T-8, 3.2 mi WSW	1166±76	<3.2	<0.5	1.41±0.28	<3.7	4.01±1.23	1314±126
	(B) T-12, 23.5 mi WNW	1141±230	<3.2	<0.5	4.63±0.75	<3.7	4.45±3.26	1294±82
	(B) T-20, 5.4 mi SSE	1118±36	<3.2	<0.5	1.22±0.42	<3.7	4.85±3.00	1291±110
	(B) T-21, 3.6 mi SSW	1087±66	<3.2	<0.5	1.30±0.82	<3.7	<3.5	1241±95
	(B) T-24, 24.9 mi SE	1087±208	<3.2	<0.5	2.40±0.68	<3.7	4.89±1.92	1267±128

Sample and collection Frequency/Type[a]	Location[b]	10^{-9} µCi/kg wet gross beta	Cs-137	K-40
Meat SA/G	(B) T-22, 2.6 mi SW	Not scheduled this quarter		

Sample and collection Frequency/Type[a]	Location[b]	10^{-3} µCi/kg dry gross alpha	gross beta	I-131	Sr-90	Cs-137	K-40
Vegetables SA/G	(I) T-8, 3.2 mi WSW	Not scheduled this quarter					
	(B) T-19, 3.7 mi S						
	(I) T-25, 1.3 mi S						

Table 2. Continued.

Facility: Davis-Besse NPP — Docket No.: 50-346 — Reporting Period: Fourth quarter 1974

Sample and collection Frequency/Type[a]	Location[b]	Average Quarterly Results[c]					
Fruits SA/G		10⁻³ μCi/kg dry					
		gross alpha	gross beta	I-131	Sr-90	Cs-137	K-40
	(I) T-8, 3.2 mi WSW	Not scheduled this quarter					
	(B) T-19, 3.7 mi S						
	(I) T-25, 1.3 mi S						
		10^{-9} μCi/ml					
		gross alpha	gross beta	I-131	Sr-90	Cs-137	K-40
Grape Juice A/G	(B) T-16, 15.3 mi ENE	0.02±0.01	0.27±0.01	<0.003	<0.001	<0.003	0.22
Anim. Feed		10^{-3} μCi/kg dry					
		gross alpha	gross beta	Sr-90	Cs-137	K-40	
Smartweed A/G	(I) T-4, 0.8 mi S	Not scheduled this quarter					
Grass A/G	(I) T-8, 3.2 mi WSW	Not scheduled this quarter					
	(B) T-21, 3.6 mi SSW						
Corn feed	(I) T-8, 3.2 mi WSW	<0.04	2.6±0.9	<0.005	<0.01	2.8±0.2	
Silage	(I) T-8, 3.2 mi WSW	<0.26	23.7±0.9	0.052±0.009	0.10±0.03	22.0±0.9	
Hay	(B) T-21, 3.6 mi SSW	<0.19	18.7±0.7	0.20±0.01	0.07±0.02	9.3±0.4	
Silage A/G	(B) T-21, 3.6 mi SSW	0.48±0.37	10.6±0.7	0.06±0.01	<0.04	10.2±0.9	
Soil SA/G		10^{-3} μCi/kg dry					
		gross beta	Sr-90	Cs-137	K-40		
	(I) T-1, 0.6 mi NE	Not scheduled this quarter					
	(I) T-8, 3.2 mi WSW						
	(B) T-19, 3.7 mi S						
	(B) T-20, 5.4 mi SSE						
Bottom Sediments TA/G		10^{-3} μCi/kg dry					
		gross alpha	gross beta	Sr-90	Cs-137	K-40	
	(I) T-1, 0.6 mi NE	<3.3	13.6±2.9	<0.26	0.05±0.03	16.2±0.8	
	(I) T-29, 1.5 mi NE	12.4±1.9	23.4±1.0	<0.24	<0.04	21.0±0.1	
	(I) T-30, 0.9 mi ENE	11.3±5.4	19.6±3.2	<0.24	0.24±0.04	17.8±1.0	
Wildlife SA/G		10^{-3} μCi/kg wet (flesh)			10^{-3} μCi/kg dry (bones)		
		gross beta	Cs-137	K-40	Sr-90		
Muskrat	(I) Vicinity of site	2.34±0.05	0.001	2.8	0.62±0.13		
	(I) Vicinity of site	2.01±0.04	0.013	2.2	0.61±0.13		
Waterfowl A/G		10^{-3} μCi/kg wet (flesh)			10^{-3} μCi/kg dry (bones)		
		gross beta	Cs-137	K-40	Sr-90		
	(I) Vicinity of site	Not scheduled this quarter					

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Table 2. Continued.

Facility: Davis-Besse NPP — Docket No.: 50-346 — Reporting Period: Fourth quarter 1974

Sample and collection Frequency/Type[a]	Location[b]	Average Quarterly Results[c]			
Fish		10^{-3} μCi/kg wet (flesh)			10^{-3} μCi/kg dry (bone)
G/G		gross beta	Cs-137	K-40	Sr-90
Carp	(I) T-1, 0.6 mi NE	2.5±0.1	0.015±0.003	2.3±0.1	0.64±0.11
Crappie	(I) T-1, 0.6 mi NE	2.8±0.1	0.011±0.004	2.9±0.1	0.64±0.15
Bullhead	(I) T-1, 0.6 mi NE	2.6±0.1	0.009±0.003	2.3±0.1	0.52±0.10
Carp	(I) T-3, 1.4 mi SE	2.6±0.1	0.002±0.001	2.3±0.1	0.22±0.13
Sheepshead	(I) T-3, 1.4 mi SE	2.4±0.1	0.049±0.014	2.4±0.1	0.22±0.13
White bass	(I) T-3, 1.4 mi SE	2.7±0.1	0.045±0.012	2.4±0.1	0.64±0.13
Clams		10^{-3} μCi/kg wet			
Q/G		gross beta	Cs-137	K-40	
	(b) T-1, 0.6 m NE	Not scheduled this quarter			

[a] Frequency: W-Weekly, M-Monthly, Q-Quarterly, SA-Semi-annually, TA-Three times a year, A-Annually. Type: G-Grab, C-Continuous, P-Proportional, Co-Composite, I-Integrating.

[b] Location: I-Indicator, B-Background; distance and direction are given from station.

[c] Results given are the mean ± 2 standard deviations for weekly and monthly analyses. Results of quarterly, semi-annual and annual analyses are reported with the counting error at the 95% confidence level.

Table 3. Sampling locations, Davis-Besse Nuclear Power Plant.

Code	Type of Location[a]	Location
T-1	I	Site boundary, 0.6 miles NE of plant, near intake canal.
T-2	I	Site boundary, 0.9 miles E of plant.
T-3	I	Site boundary, 1.4 miles SE of plant, near Toussaint River and storm drain.
T-4	I	Site boundary, 0.8 miles S of plant, near Locust Point and Toussaint River.
T-5	I	Main entrance to site, 0.25 miles W of plant.
T-6	I	Site boundary, 0.6 miles NW of plant.
T-7	I	Sand Beach, 0.9 miles NNW of plant.
T-8	I	Earl Moore Farm, 3.2 miles WSW of plant.
T-9	B	Oak Harbor, 6.8 miles SW of plant.
T-10	B	Erie Industrial Park, 6.5 miles SE of plant.
T-11	B	Port Clinton, 9.5 miles SE of plant.
T-12	B	Toledo, 23.5 miles WNW of plant.
T-14	B	Township school, 3.8 miles WSW of plant.
T-15	B	Lacarne, 6.6 miles SSE of plant.
T-16	B	Put-In-Bay winery, 15.3 miles ENE of plant.
T-17	I	Irv Fick's well onsite, 0.7 miles SW of plant.
T-18	B	Hess Sunoco Garage, 1.3 miles S of plant, Route 2.

Table 3. Continued.

Code	Type of Location[a]	Location
T-19	B	Miller Farm, 3.7 miles S. of plant.
T-20	B	Daup Farm, 5.4 miles SSE of plant.
T-21	B	Haynes Farm, 3.6 miles SSW of plant.
T-22	B	Peter Farm, 2.6 miles SW of plant.
T-23	B	Put-In-Bay Lighthouse, 14.3 miles ENE of plant.
T-24	B	Sandusky, 24.9 miles SE of plant.
T-25	I	Wint.r Farm, 1.3 miles S of plant.
T-26	B	Fostoria, 35.1 miles SW of plant.
T-27	B	Magee Marsh, 5.3 miles WNW of plant.
T-28	I	Unit 1 treated water supply, onsite.
T-29	I	Lake Erie, Intake area, 1.5 miles NE of plant.
T-30	I	Lake Erie, discharge area, 0.9 miles ENE of plant.

[a] I = Indicator locations; B = background locations.

Table 4. Type and frequency of collection.

Location	Weekly	Monthly	Quarterly	Semi-annually	Annually
1	AP, AI, SWU	TLD P	TLD F[a], BS[a], CL[a]	SO	TLD, SMW
2	AP, AI, SWU	TLD	TLD	WL	TLD
3	AP, AI, SWU	TLD	TLD F[a]		TLD, WF
4	AP, AI	TLD	TLD		TLD
5		TLD	TLD		TLD
6		TLD	TLD		TLD
7	AP, AI	TLD	TLD, WW		TLD
8	AP, AI	TLD, M	TLD	VE, SO, AF[b]	TLD
9	AP, AI	TLD	TLD		TLD
10	AP, AI, SWU, SWT	TLD	TLD		TLD
11	AP, AI, SWU, SWT	TLD	TLD		TLD
12	AP, AI, SWU, SWT	TLD, M	TLD		TLD
14		TLD	TLD		TLD
15		TLD	TLD		TLD
16					WI
17			WW		
18			WW		
19				VE, SO	
20		M		SO	
21		M		AF[b]	
22				ME	
23	AP, AI	TLD P	TLD		TLD
24		TLD, M	TLD		TLD
25				VE	
26		TLD	T[illegible]D		TLD
27	AP, AI	TLD	TLD, WW		TLD
28	SWT				
29			BS[a]		
30			[illegible]S[a]		

[a] Three times a year, 2nd, 3rd, and 4th quarters.
[b] Cattle feed (silage and grain or hay) collected during 1st quarter; grass collected during 3rd quarter.

Table 5. Sample codes used in Table 4.

Code	Description
AP	Airborne Particulate
AI	Airborne Iodine
TLD (M)	Thermoluminescent Dosimeter - Monthly
TLD (Q)	Thermoluminescent Dosimeter - Quarterly
TLD (A)	Thermoluminescent Dosimeter - Annual
SWU	Surface water - Untreated
SWT	Surface water - Treated (tap)
WW	Well water (Ground Water)
P	Precipitation
BS	Bottom Sediments
SO	Soil
M	Milk
ME	Domestic meat
WL	Wildlife
F	Fish
CL	Clams
VE	Fruits and vegetables
WI	Wine
SMW	Smartweed
AF	Animal Feed (silage, grain, grass)
WF	Waterfowl

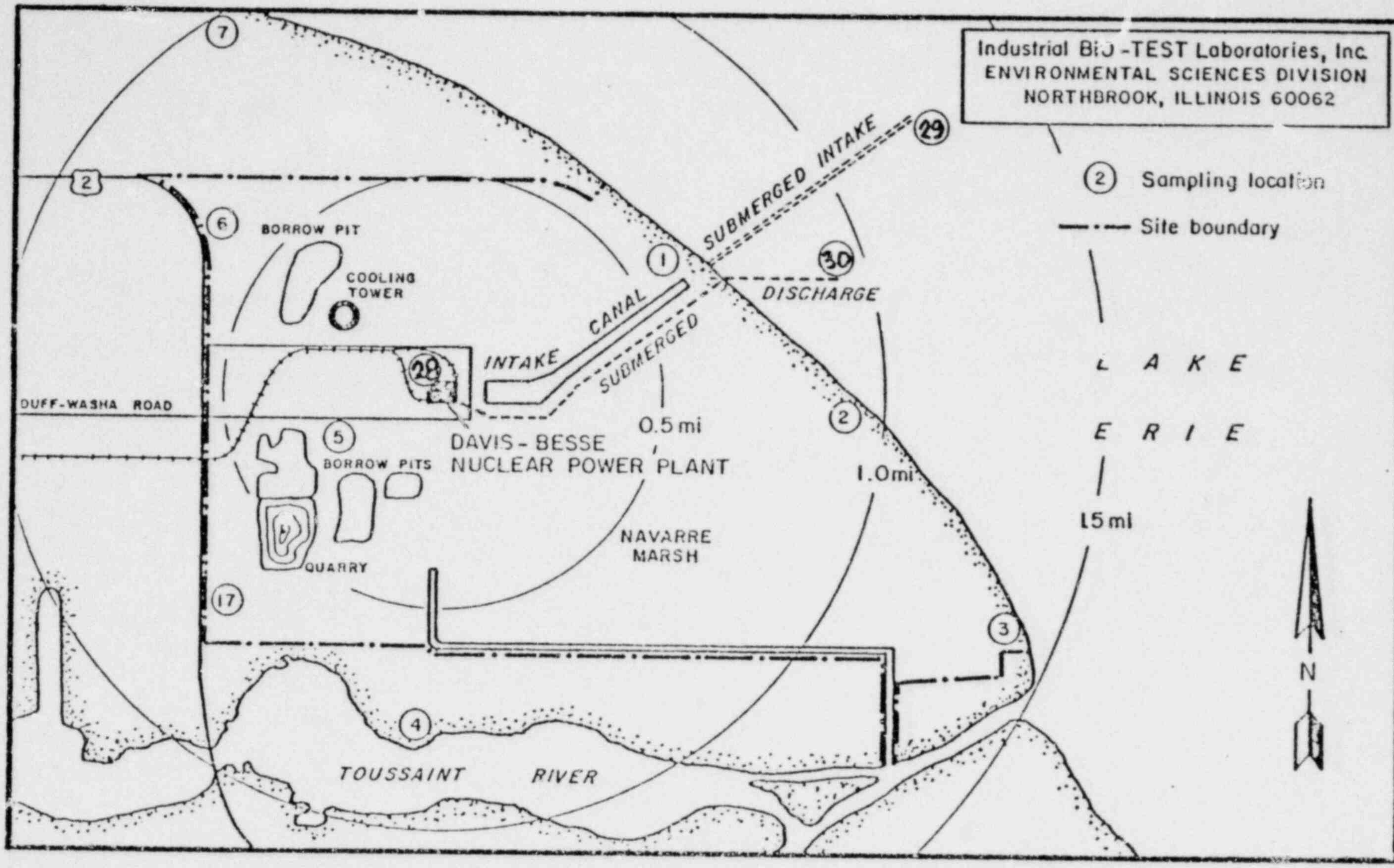

Figure 1. Sampling locations on the site periphery of the Davis-Besse Nuclear Power Plant.

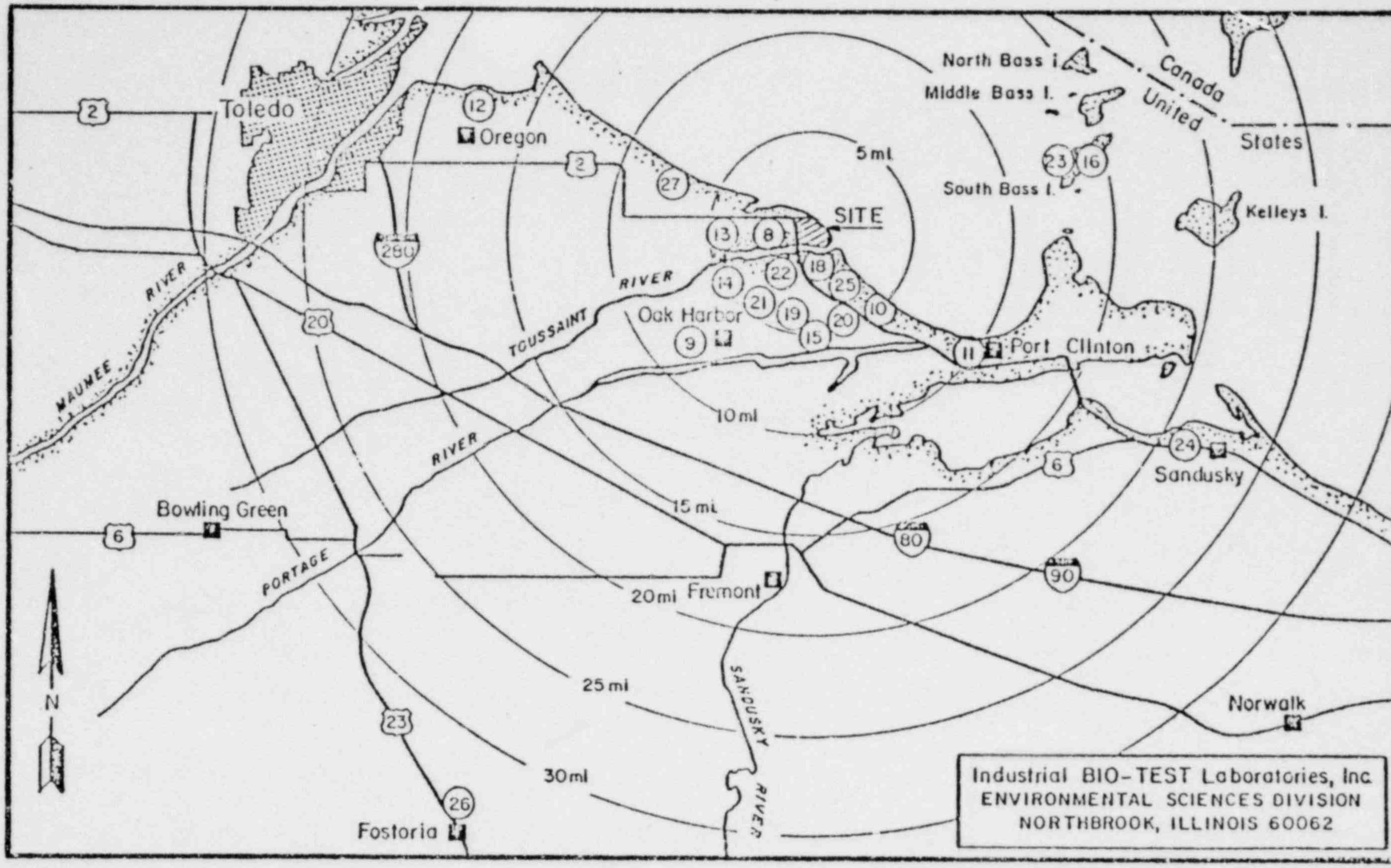

Figure 2. Sampling locations (excepting those on the site periphery), Davis-Besse Nuclear Power Plant.

Table 6. Air particulate samples and charcoal filters, analyses for gross alpha and gross beta (particulates) and iodine-131 (charcoal), collected near inlet canal (T-1, site boundary, 0.6 miles NE of plant), Davis-Besse NPP. Data from this table are plotted in Figure 3.

Date On	Date Off	Volume (m^3)	pCi/m^3 [a] Gross alpha	pCi/m^3 [a] Gross beta	pCi/m^3 [a] ^{131}I
7-01-74	7-08-74	262.6	0.0027±0.0012	0.275±0.007	<0.03
7-08-74	7-15-74	280.5	0.0031±0.0008	0.247±0.004	<0.03
7-15-74	7-22-74	199.3	0.0037±0.0011	0.172±0.004	<0.03
7-22-74	7-29-74	112.6	0.0054±0.0018	0.310±0.008	<0.03
7-29-74	8-05-74	237.3	0.0023±0.0012	0.144±0.005	<0.03
8-05-74	8-12-74	284.3	0.0017±0.0007	0.179±0.006	<0.03
8-12-74	8-19-74[b]				
8-19-74	8-26-74[b]				
8-26-74	9-03-74[b]				
9-03-74	9-09-74	226.4	0.0008±0.0006	0.052±0.004	<0.03
9-09-74	9-16-74	275.0	0.0009±0.0004	0.042±0.002	<0.03
9-16-74	9-23-74	192.3	0.0016±0.0006	0.072±0.003	<0.03
9-23-74	9-30-74	164.0	0.0016±0.0006	0.084±0.004	<0.03
	Mean ±2σ		0.0025±0.0029	0.161±0.203	
9-30-74	10-07-74	273.4	0.0009±0.0004	0.039±0.002	<0.03
10-07-74	10-14-74	267.6	0.0013±0.0004	0.037±0.002	<0.03
10-14-74	10-21-74	186.9	0.0016±0.0006	0.055±0.003	<0.03
10-21-74	10-28-74	46.0	0.0034±0.0019	0.101±0.008	<0.03
10-28-74	11-04-74	157.3	0.0024±0.0010	0.120±0.006	<0.03
11-04-74	11-11-74	154.9	0.0027±0.0011	0.093±0.006	<0.03
11-11-74	11-18-74	181.9	0.0021±0.0009	0.075±0.005	<0.03
11-18-74	11-25-74	280.3	0.0007±0.0005	0.052±0.003	<0.03
11-25-74	12-09-74[c]	376.4	0.0012±0.0005	0.073±0.003	<0.03
12-09-74	12-16-74	201.7	0.0019±0.0006	0.072±0.003	<0.03
12-16-74	12-23-74	83.7	0.0013±0.0009	0.041±0.004	<0.03
12-23-74	12-30-74	84.0	0.0015±0.0010	0.055±0.005	<0.03
	Mean±2σ		0.0018±0.0016	0.068±0.052	

[a] The error given is the probable counting error at the 95% confidence level. Less than (<) values are based on 3 sigma counting error for background sample.

[b] No sample due to loss of power and malfunction of pump.

[c] Two-week sample due to inclement weather on 12-02-74.

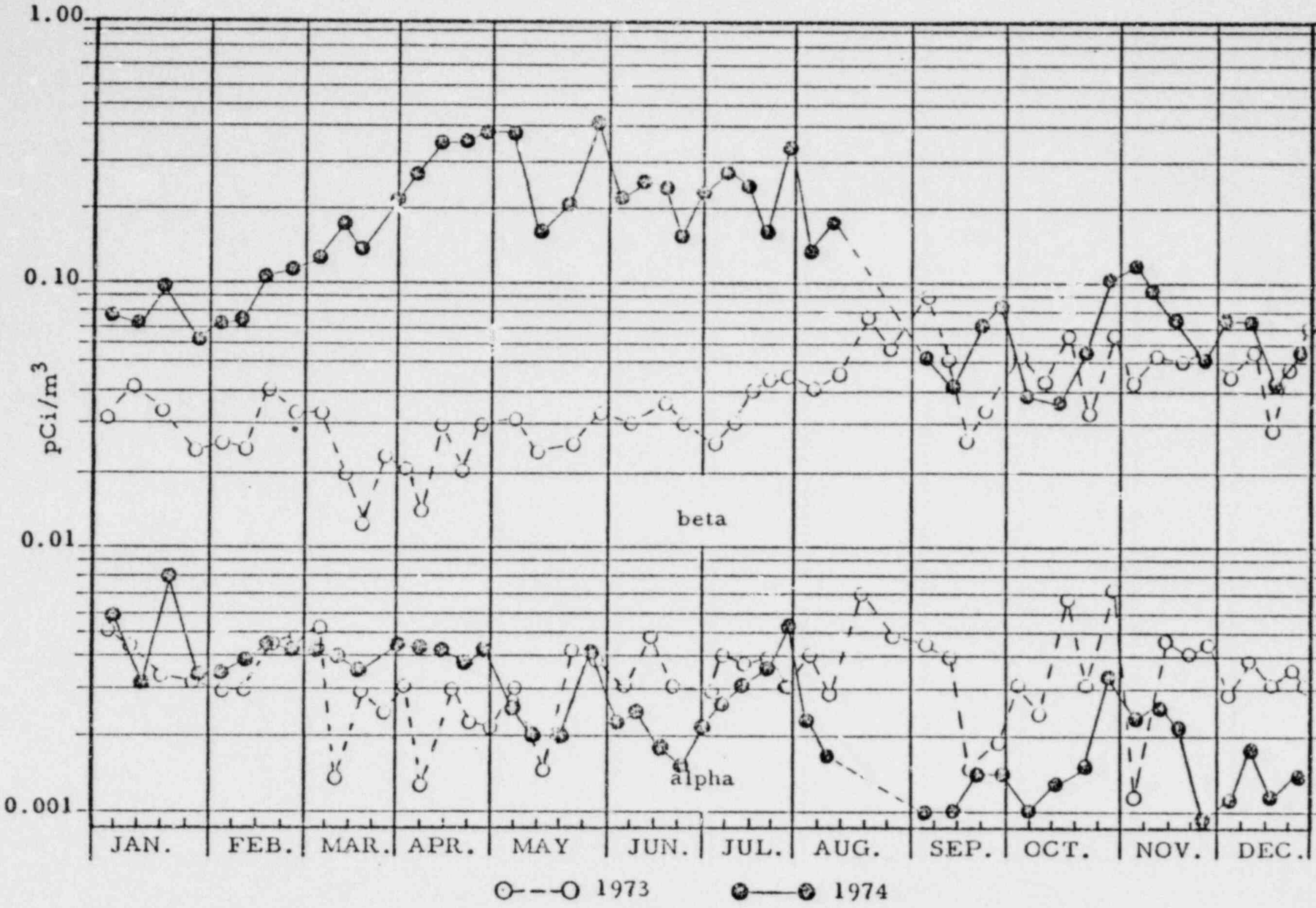

Figure 3. Air particulate samples, analyses for gross alpha and gross beta, collected near the inlet canal (T-1, site boundary, 0.6 miles NE of plant), Davis-Besse NPP. The data are from Table 6.

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Table 7. Air particulate samples and charcoal filters, analyses for gross alpha and gross beta (particulates) and iodine-131 (charcoal), collected at the site boundary (T-2, 0.9 miles E of plant), Davis-Besse NPP. Data from this table are plotted in Figure 4.

Date		Volume	pCi/m³ [a]		
On	Off	(m³)	Gross alpha	Gross beta	^{131}I
7-01-74	7-08-74	243.0	0.0025±0.0012	0.260±0.007	<0.03
7-08-74	7-15-74	217.0	0.0037±0.0010	0.258±0.005	<0.03
7-15-74	7-22-74	277.8	0.0039±0.0009	0.165±0.004	<0.03
7-22-74	7-29-74	251.9	0.0044±0.0010	0.252±0.005	<0.03
7-29-74	8-05-74	265.3	0.0040±0.0014	0.123±0.005	<0.03
8-05-74	8-12-74	256.4	0.0022±0.0008	0.174±0.006	<0.03
8-12-74	8-19-74	263.0	0.0016±0.0005	0.128±0.004	<0.03
8-19-74	8-26-74	198.9	0.0031±0.0008	0.163±0.005	<0.03
8-26-74	9-03-74	308.0	0.0017±0.0004	0.110±0.002	<0.03
9-03-74	9-09-74	184.1	0.0021±0.0009	0.138±0.006	<0.03
9-09-74	9-16-74	237.4	0.0016±0.0005	0.097±0.003	<0.03
9-16-74	9-23-74	267.9	0.0013±0.0005	0.077±0.003	<0.03
9-23-74	9-30-74	260.2	0.0018±0.0005	0.072±0.003	<0.03
	Mean ±2σ		0.0026±0.0022	0.155±0.132	
9-30-74	10-07-74	268.2	0.0017±0.0005	0.067±0.003	<0.03
10-07-74	10-14-74	185.0	0.0031±0.0008	0.086±0.004	<0.03
10-14-74	10-21-74	262.3	0.0022±0.0006	0.053±0.002	<0.03
10-21-74	10-28-74	246.8	0.0022±0.0006	0.090±0.003	<0.03
10-28-74	11-04-74	256.9	0.0020±0.0008	0.098±0.004	<0.03
11-04-74	11-11-74	261.6	0.0015±0.0006	0.086±0.004	<0.03
11-11-74	11-18-74	257.5	0.0021±0.0007	0.067±0.004	<0.03
11-18-74	11-25-74	264.7	0.0013±0.0006	0.095±0.004	<0.03
11-25-74	12-09-74 [b]	570.5	0.0016±0.0004	0.053±0.002	<0.03
12-09-74	12-16-74	242.0	0.0026±0.0006	0.072±0.003	<0.03
12-16-74	12-23-74	123.2	0.0013±0.0007	0.045±0.003	<0.03
12-23-74	12-30-74	120.5	<0.0006	0.044±0.003	<0.03
	Mean ±2σ		0.0020±0.0010	0.071±0.040	

[a] The error given is the probable counting error at the 95% confidence level. Less than (<) values are based on 3 sigma counting error for background sample.

[b] Two-week sample due to inclement weather on 12-02-74.

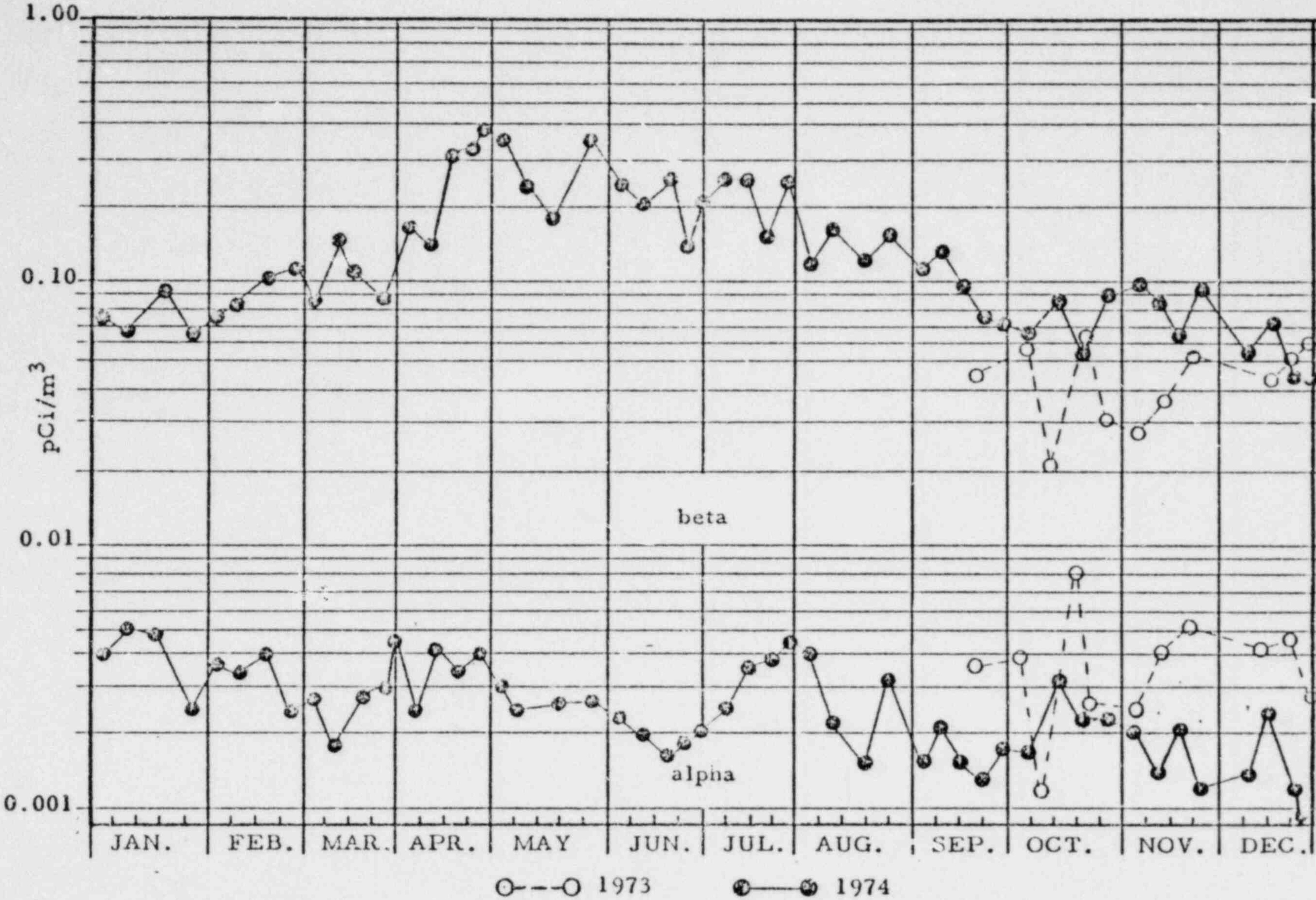

Figure 4. Air particulate samples, analyses for gross alpha and gross beta, collected at the site boundary (T-2, 0.9 miles E of plant), Davis-Besse NPP. The data are from Table 7.

Table 8. Air particulate samples and charcoal filters, analyses for gross alpha and gross beta (particulates) and iodine-131 (charcoal), collected near the Toussaint River and the storm drain (T-3, site boundary, 1.4 miles SE of plant), Davis-Besse NPP. Data from this table are plotted in Figure 5.

Date		Volume	pCi/m³ [a]		
On	Off	(m³)	Gross alpha	Gross beta	¹³¹I
7-01-74	7-08-74	224.8	0.0028±0.0013	0.294±0.008	<0.03
7-08-74	7-15-74	276.4	0.0035±0.0009	0.254±0.005	<0.03
7-15-74	7-22-74	192.9	0.0042±0.0012	0.166±0.004	<0.03
7-22-74	7-29-74	232.1	0.0035±0.0010	0.252±0.005	<0.03
7-29-74	8-05-74	302.3	0.0021±0.0010	0.108±0.004	<0.03
8-05-74	8-12-74	256.6	0.0025±0.0008	0.177±0.006	<0.03
8-12-74	8-19-74	214.1	0.0017±0.0006	0.114±0.004	<0.03
8-19-74	8-26-74 [b]				
8-26-74	9-03-74				
9-03-74	9-09-74	222.7	0.0014±0.0007	0.062±0.004	<0.03
9-09-74	9-16-74	266.8	0.0014±0.0005	0.101±0.003	<0.03
9-16-74	9-23-74	282.8	0.0011±0.0004	0.061±0.002	<0.03
9-23-74	9-30-74	237.6	0.0019±0.0006	0.087±0.003	<0.03
	Mean ±2σ		0.0024±0.0020	0.152±0.164	
9-30-74	10-07-74	306.8	0.0015±0.0004	0.059±0.002	<0.03
10-07-74	10-14-74	224.2	0.0031±0.0007	0.085±0.003	<0.03
10-14-74	10-21-74	262.3	0.0017±0.0005	0.053±0.002	<0.03
10-21-74	10-28-74	265.3	0.0025±0.0006	0.078±0.003	<0.03
10-28-74	11-04-74	253.9	0.0020±0.0008	0.094±0.004	<0.03
11-04-74	11-11-74	276.9	0.0023±0.0007	0.087±0.004	<0.03
11-11-74	11-18-74	268.7	0.0014±0.0006	0.066±0.004	<0.03
11-8-74	11-25-74	285.3	0.0008±0.0005	0.054±0.003	<0.03
11-25-74	12-09-74 [c]	542.5	0.0011±0.0004	0.044±0.002	<0.03
12-09-74	12-16-74	270.5	0.0008±0.0004	0.039±0.002	<0.03
12-16-74	12-23-74	285.3	0.0002±0.0002	0.004±0.001	<0.03
12-23-74	12-30-74	277.4	0.0003±0.0003	0.026±0.002	<0.03
	Mean ±2σ		0.0015±0.0016	0.057±0.054	

a The error given is the probable counting error at the 95% confidence level. Less than (<) values are based on 3 sigma counting error for background sample.

b No sample due to loss of power and malfunction of pump.

c Two-week sample due to inclement weather on 12-02-74.

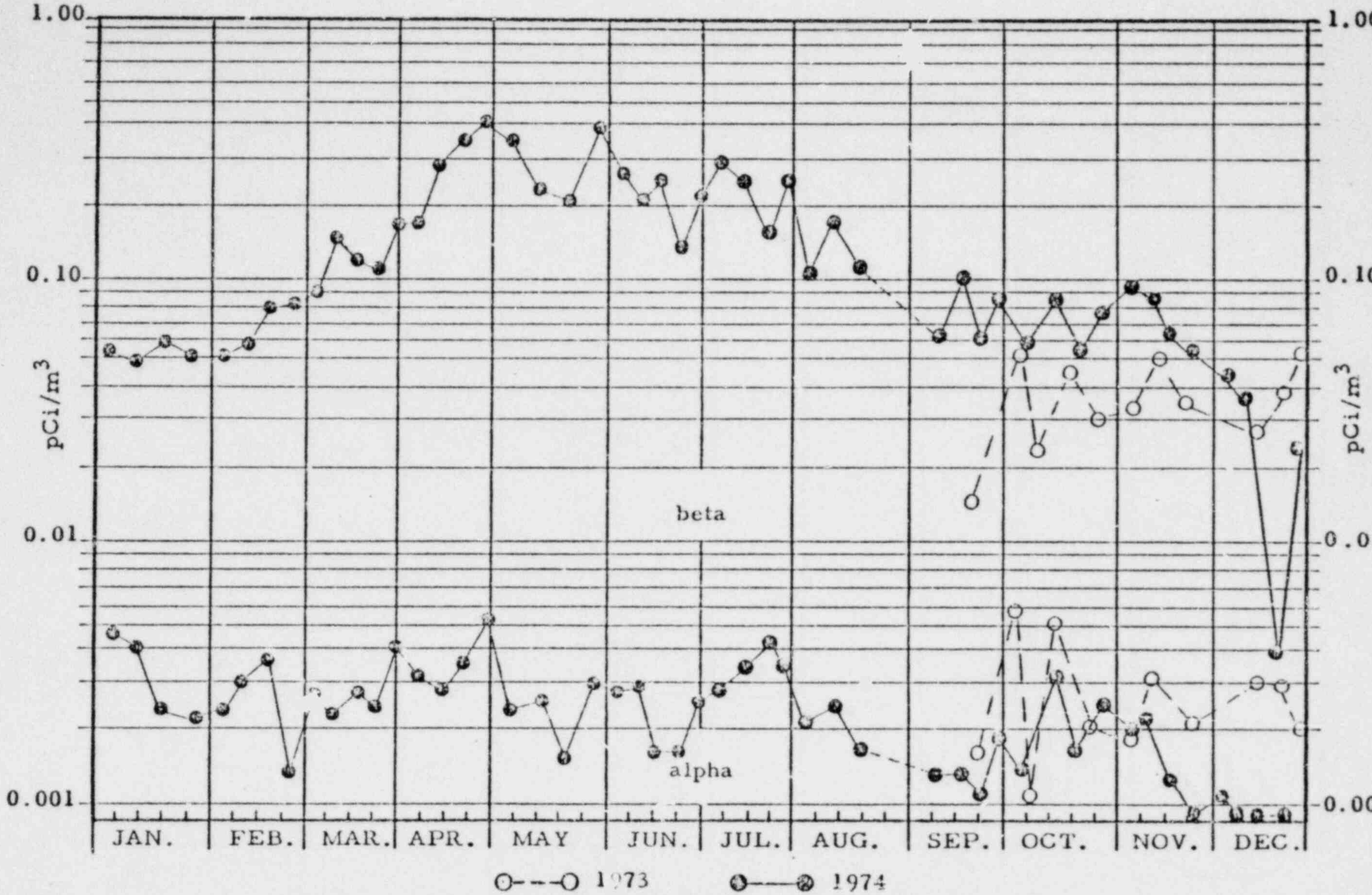

Figure 5. Air particulate samples, analyses for gross alpha and gross beta, collected near the Toussaint River and the storm drain (T-3, site boundary, 1.4 miles SE of plant), Davis-Besse NPP. The data are from Table 8.

Table 9. Air particulate samples and charcoal filters, analyses for gross alpha and gross beta (particulates) and iodine-131 (charcoal), collected at Locust Point and Toussaint Rive. (T-4, site boundary, 0.8 miles S of plant), Davis-Besse NPP. Data from this table are plotted in Figure 6.

Date		Volume	pCi/m³ [a]		
On	Off	(m^3)	Gross alpha	Gross beta	^{131}I
7-01-74	7-08-74	258.3	0.0032±0.0013	0.276±0.007	<0.03
7-08-74	7-15-74	265.1	0.0029±0.0008	0.253±0.005	<0.03
7-15-74	7-22-74	192.2	0.0046±0.0012	0.174±0.005	<0.03
7-22-74	7-29-74	278.2	0.0039±0.0009	0.221±0.004	<0.03
7-29-74	8-05-74	277.0	0.0027±0.0011	0.137±0.005	<0.03
8-05-74	8-12-74	265.1	0.0022±0.0008	0.205±0.006	<0.03
8-[illegible]-74	8-19-74	263.7	0.0016±0.0005	0.134±0.004	<0.03
8-19-74	8-26-74	186.5	0.0032±0.0011	0.203±0.007	<0.03
8-26-74	9-03-74	318.2	0.0019±0.0004	0.123±0.003	<0.03
9-03-74	9-09-74	160.9	0.0028±0.0011	0.145±0.007	<0.03
9-09-74	9-16-74	269.8	0.0018±0.0005	0.106±0.003	<0.03
9-16-74	9-23-74	253.1	0.0019±0.0006	0.100±0.003	<0.03
9-23-74	9-30-74	264.1	0.0019±0.0005	0.091±0.003	<0.03
	Mean ±2σ		0.0027±0.0018	0.167±0.120	
9-30-74	10-07-74	278.2	0.0016±0.0005	0.074±0.003	<0.03
10-07-74	10-14-74	206.3	0.0027±0.0007	0.070±0.003	<0.03
10-14-74	10-21-74	262.3	0.0021±0.0005	0.055±0.002	<0.03
10-21-74	10-28-74	100.3	0.0023±0.0010	0.0[illegible]9±0.005	<0.03
10-28-74	11-04-74	132.5	0.0037±0.0015	0.[illegible]±0.007	<0.03
11-04-74	11-11-74	219.9	0.0033±0.0010	0.[illegible]7±0.005	<0.03
11-11-74	11-18-74	273.9	0.0022±0.0008	0.094±0.004	<0.03
11-18-74	11-25-74	276.5	0.0016±0.0007	0.071±0.004	<0.03
11-25-74	12-09-74 [b]	413.0	0.001[illegible]±0.0005	0.046±0.002	<0.03
12-09-74	12-16-74	223.1	0.0026±0.0007	0.091±0.003	<0.03
12-16-74	12-23-74	130.3	0.0023±0.0008	0.088±0.004	<0.03
12-23-74	12-30-74	98.9	<0.00[illegible]	0.045±0.004	<0.03
	Mean ±2σ		0.0024±0.0014	0.079±0.046	

[a] The error given is the probable counting error at the 95% confidence level. Less than (<) values are based on 3 sigma counting error for background sample.

[b] Two-week sample due to inclement weather on 12-02-74.

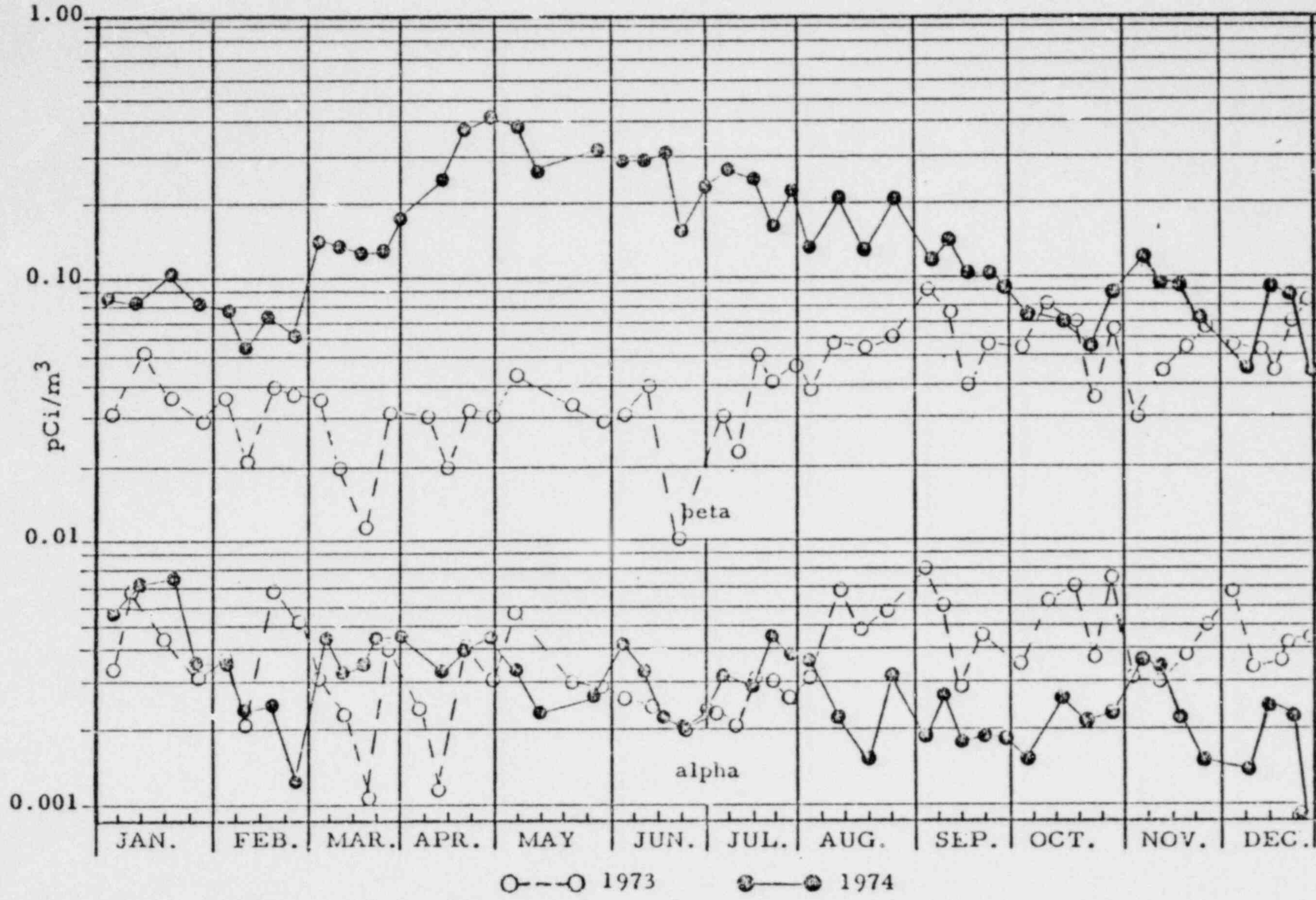

Figure 6. Air particulate samples, analyses for gross alpha and gross beta, collected at Locust Point and Toussaint River (T-4, site boundary, 0.8 miles S of plant), Davis-Besse NPP. The data are from Table 9.

Table 10. Air particulate samples and charcoal filters, analyses for gross alpha and gross beta (particulates) and iodine-131, (charcoal) collected at Sand Beach (T-7, 0.9 miles NNW of plant). Davis-Besse NPP. Data from this table are plotted in Figure 7.

Date On	Date Off	Volume (m^3)	pCi/m^3 [a] Gross alpha	Gross beta	^{131}I
7-01-74	7-08-74	270.9	0.0031±0.0012	0.282±0.007	<0.03
7-08-74	7-15-74	278.7	0.0040±0.0009	0.253±0.005	<0.03
7-15-74	7-22-74	276.0	0.0050±0.0011	0.221±0.004	<0.03
7-22-74	7-29-74	283.2	0.0041±0.0009	0.245±0.004	<0.03
7-29-74	8-05-74	274.5	0.0020±0.0010	0.125±0.005	<0.03
8-05-74	8-12-74	256.6	0.0016±0.0007	0.189±0.006	<0.03
8-12-74	8-19-74	261.5	0.0020±0.0005	0.133±0.004	<0.03
8-19-74	8-26-74	159.8	0.0050±0.0015	0.234±0.009	<0.03
8-26-74	9-03-74	277.5	0.0015±0.0004	0.120±0.003	<0.03
9-03-74	9-09-74	147.7	0.0029±0.0012	0.177±0.008	<0.03
9-09-74	9-16-74	270.9	0.0025±0.0006	0.103±0.003	<0.03
9-16-74	9-23-74	262.5	0.0017±0.0005	0.104±0.003	<0.03
9-23-74	9-30-74	264.2	0.0019±0.0005	0.087±0.003	<0.03
Mean ± 2σ			0.0029±0.0016	0.175±0.134	
9-30-74	10-07-74	298.8	0.0019±0.0005	0.066±0.002	<0.03
10-07-74	10-14-74	175.1	0.0026±0.0011	0.089±0.005	<0.03
10-14-74	10-21-74	279.1	0.0020±0.0005	0.056±0.002	<0.03
10-21-74	10-28-74	232.4	0.0032±0.0010	0.099±0.003	<0.03
10-28-74	11-04-74	220.0	0.0025±0.0009	0.136±0.006	<0.03
11-04-74	11-11-74	232.9	0.0030±0.0010	0.103±0.005	<0.03
11-11-74	11-18-74	267.8	0.0021±0.0008	0.065±0.004	<0.03
11-18-74	11-25-74	274.7	0.0015±0.0007	0.087±0.004	<0.03
-25-74	12-09-74 [b]	430.9	0.0017±0.0005	0.068±0.003	<0.03
09-74	12-16-74	218.4	0.0020±0.0006	0.094±0.003	<0.03
-16-74	12-23-74	66.8	0.0012±0.0010	0.072±0.006	<0.03
12-23-74	12-30-74	234.8	0.0025±0.0006	0.148±0.004	<0.03
Mean ± 2σ			0.0022±0.0012	0.090±0.056	

[a] The error given is the probable counting error at the 95% confidence level. Less than (<) values are based on 3 sigma counting error for the background sample.

[b] Two week sample due to inclement weather on 12-02-74.

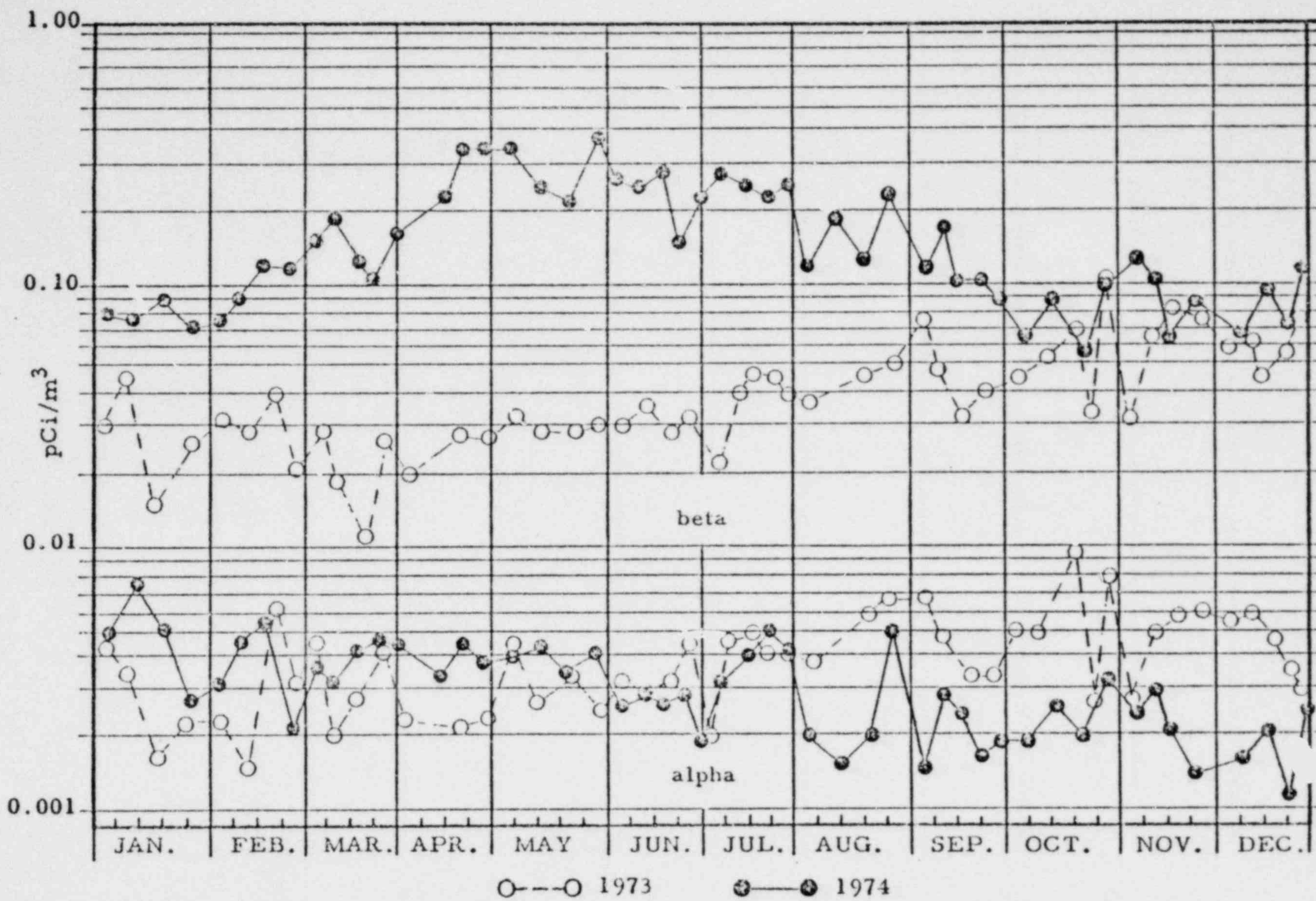

Figure 7. Air particulate samples, analyses for gross alpha and gross beta, collected at Sand Beach (T-7, 0.9 miles NNW of plant), Davis-Besse NPP. The data are from Table 10.

Table 11. Air particulate samples and charcoal filters, analyses for gross alpha and gross beta (particulates) and iodine-131 (charcoal), collected at the Earl Moore Farm (T-8, 3.2 miles WSW of plant), Davis-Besse NPP. Data from this table are plotted in Figure 8.

Date		Volume	pCi/m³ [a]		
On	Off	(m^3)	Gross alpha	Gross beta	^{131}I
7-01-74	7-08-74	198.7	0.0040±0.0016	0.397±0.010	<0.03
7-08-74	7-15-74	224.6	0.0047±0.0011	0.323±0.006	<0.03
7-15-74	7-22-74	246.9	0.0045±0.0011	0.175±0.004	<0.03
7-22-74	7-29-74	282.8	0.0033±0.0009	0.228±0.004	<0.03
7-29-74	8-05-74	264.2	0.0032±0.0013	0.131±0.005	<0.03
8-05-74	8-12-74	252.8	0.0021±0.0008	0.203±0.006	<0.03
8-12-74	8-19-74	277.6	0.0019±0.0005	0.135±0.004	<0.03
8-19-74	8-26-74	188.2	0.0035±0.0012	0.192±0.007	<0.03
8-26-74	9-03-74	285.2	0.0018±0.0004	0.126±0.003	<0.03
9-03-74	9-09-74	211.8	0.0016±0.0008	0.127±0.006	<0.03
9-09-74	9-16-74	201.0	0.0024±0.0007	0.117±0.004	<0.03
9-16-74	9-23-74	264.8	0.0021±0.0006	0.087±0.003	<0.03
9-23-74	9-30-74	247.8	0.0019±0.0005	0.084±0.003	<0.03
Mean ± 2σ			0.0028±0.0022	0.178±0.182	
9-30-74	10-07-74	275.1	0.0016±0.0005	0.065±0.003	<0.03
10-07-74	10-14-74	241.2	0.0012±0.0007	0.078±0.004	<0.03
10-14-74	10-21-74	230.2	0.0019±0.0006	0.052±0.002	<0.03
10-21-74	10-28-74	243.9	0.0031±0.0010	0.094±0.004	<0.03
10-28-74	11-04-74	249.8	0.0034±0.0010	0.205±0.006	<0.03
11-04-74	11-11-74	234.1	0.0034±0.0010	0.107±0.005	<0.03
11-11-74	11-18-74	264.6	0.0016±0.0007	0.067±0.004	<0.03
11-18-74	11-25-74	269.4	0.0016±0.0007	0.076±0.004	<0.03
11-25-74	12-09-74 [b]	591.3	0.0005±0.0003	0.100±0.003	<0.03
12-09-74	12-16-74	260.4	0.0008±0.0004	0.033±0.002	<0.03
12-16-74	12-23-74	275.5	0.0002±0.0002	0.022±0.002	<0.03
12-23-74	12-30-74	277.9	0.0006±0.0003	0.053±0.002	<0.03
Mean ± 2σ			0.0017±0.0022	0.079±0.094	

[a] The error given is the probable counting error at the 95% confidence level. Less than (<) values are based on 3 sigma counting error for background sample.

[b] Two-week sample due to inclement weather on 12-02-74.

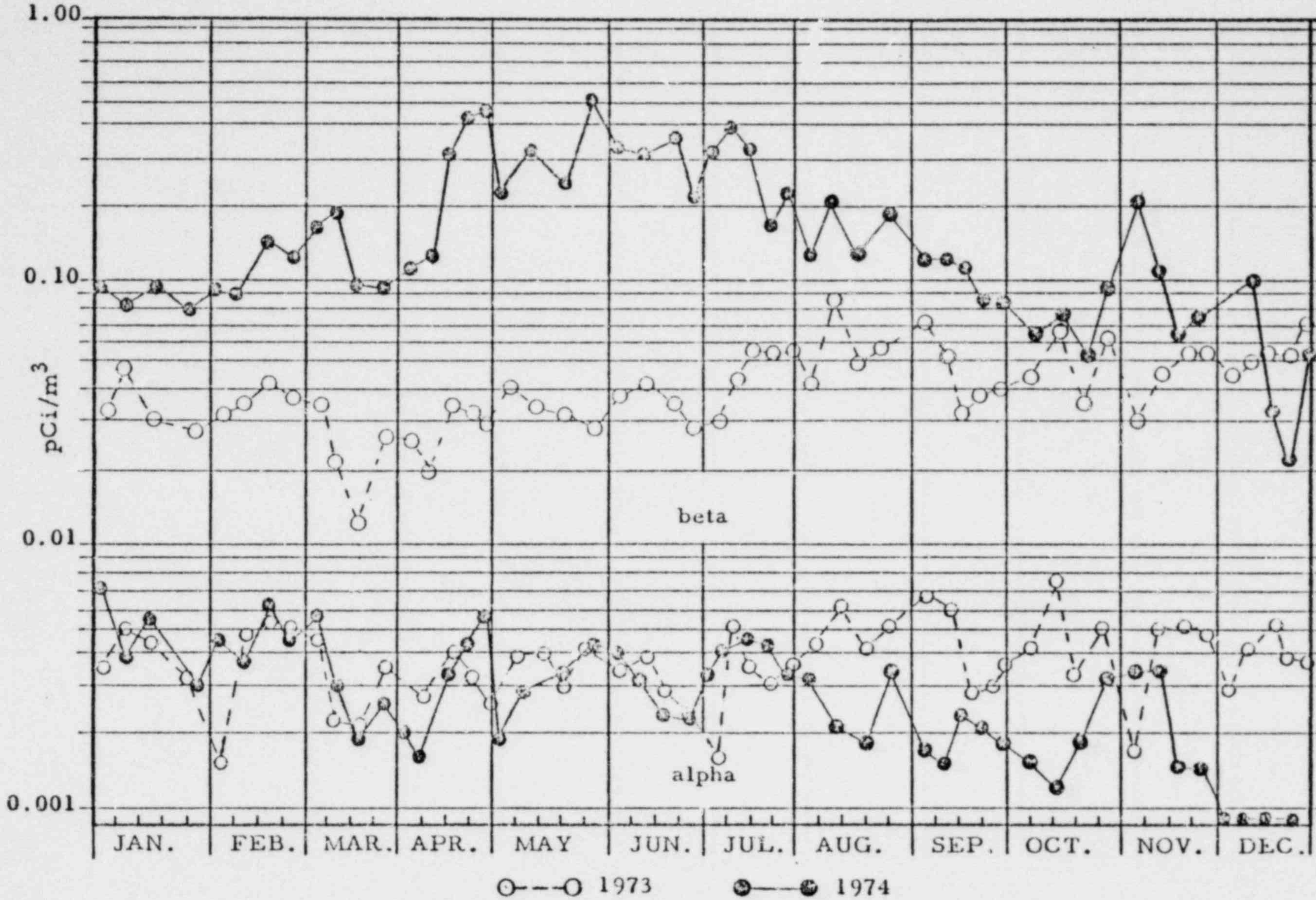

Figure 8. Air particulate samples, analyses for gross alpha and gross beta, collected at the Earl Moore Farm (T-8, 3.2 miles WSW of plant), Davis-Besse NPP. The data are from Table 11.

Table 12. Air particulate samples and charcoal filters, analysis for gross alpha and gross beta (particulates) and iodine-131 (charcoal), collected at Oak Harbor (T-9, 6.8 miles SW of plant), Davis-Besse NPP. Data from this table are plotted in Figure 9.

Date		Volume	pCi/m^3 [a]		
On	Off	(m^3)	Gross alpha	Gross beta	^{131}I
7-01-74	7-08-74	232.4	0.0045±0.0016	0.354±0.008	<0.03
7-08-74	7-15-74	283.7	0.0031±0.0008	0.189±0.004	<0.03
7-15-74	7-22-74	175.0	0.0052±0.0014	0.194±0.005	<0.03
7-22-74	7-29-74	257.0	0.0032±0.0009	0.200±0.004	<0.03
7-29-74	8-05-74	200.5	0.0031±0.0015	0.159±0.006	<0.03
8-05-74	8-12-74	261.0	0.0024±0.0008	0.187±0.006	<0.03
8-12-74	8-19-74	278.2	0.0020±0.0005	0.131±0.006	<0.03
8-19-74	8-26-74	171.5	0.0024±0.0010	0.176±0.007	<0.03
8-26-74	9-03-74	316.3	0.0016±0.0004	0.121±0.003	<0.03
9-03-74	9-09-74	148.1	0.0028±0.0012	0.172±0.008	<0.03
9-09-74	9-16-74	260.6	0.0017±0.0005	0.108±0.003	<0.03
9-16-74	9-23-74	262.7	0.0016±0.0005	0.087±0.003	<0.03
9-23-74	9-30-74	283.0	0.0019±0.0005	0.086±0.003	<0.03
	Mean ± 2σ		0.0027±0.0022	0.166±0.138	
9-30-74	10-07-74	276.5	0.0019±0.0005	0.063±0.002	<0.03
10-07-74	10-14-74	171.9	0.0024±0.0011	0.097±0.005	<0.03
10-14-74	10-21-74	249.2	0.0013±0.0005	0.055±0.002	<0.03
10-21-74	10-28-74	237.2	0.0030±0.0009	0.225±0.007	<0.03
10-28-74	11-04-74	304.2	0.0016±0.0006	0.087±0.004	<0.03
11-04-74	11-11-74	230.7	0.0035±0.0010	0.103±0.005	<0.03
11-11-74	11-18-74	262.5	0.0016±0.0007	0.082±0.004	<0.03
11-18-74	11-25-74	284.3	0.0012±0.0006	0.067±0.004	<0.03
11-25-74	12-09-74 [b]	457.6	0.0019±0.0006	0.060±0.003	<0.03
12-[illegible]-74	12-16-74	224.2	0.0028±0.0007	0.087±0.003	<0.03
12-16-74	12-23-74	104.5	0.0012±0.0008	0.052±0.004	<0.03
12-23-74	12-30-74	124.5	0.0021±0.0008	0.161±0.005	<0.03
	Mean ± 2σ		0.0020±0.0014	0.095±0.102	

[a] The error given is the probable counting error at the 95% confidence level. Less than (<) values are based on 3 sigma counting error for background sample.

[b] Two-week sample due to inclement weather on 12-02-74.

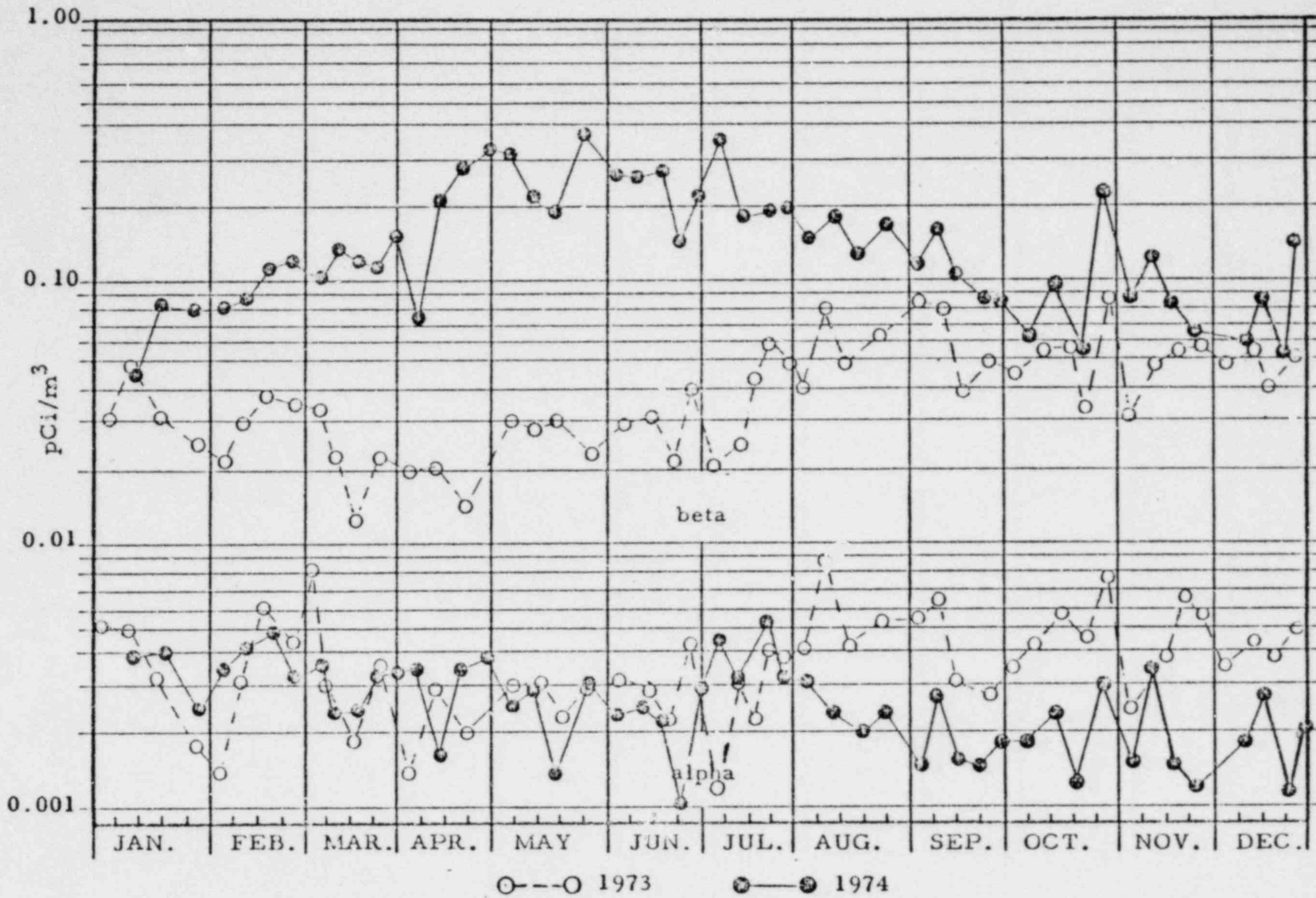

Figure 9. Air particulate samples, analyses for gross alpha and gross beta, collected at Oak Harbor (T-9, 6.8 miles SW of plant), Daris-Besse NPP. The data are from Table 12.

Table 13. Air particulate samples and charcoal filters, analysis for gross alpha and gross beta (particulates) and iodine-131 (charcoal), collected at the Erie Industrial Park (T-10, 6.5 miles SE of plant), Davis-Besse NPP. Data from this table are plotted in Figure 10.

Date		Volume	pCi/m[3a]		
On	Off	(m^3)	Gross alpha	Gross beta	^{131}I
7-01-74	7-08-74	260.0	0.0016±0.0010	0.270±0.007	<0.03
7-08-74	7-15-74	282.9	0.0024±0.0007	0.231±0.004	<0.03
7-15-74	7-22-74	285.4	0.0040±0.0009	0.202±0.004	<0.03
7-22-74	7-29-74	283.7	0.0039±0.0009	0.162±0.004	<0.03
7-29-74	8-05-74	261.5	0.0020±0.0010	0.132±0.005	<0.03
8-05-74	8-12-74	264.9	0.0025±0.0008	0.182±0.006	<0.03
8-12-74	8-19-74	269.7	0.0018±0.0005	0.119±0.003	<0.03
8-19-74	8-26-74	171.5	0.0031±0.0012	0.209±0.008	<0.03
8-26-74	9-03-74	317.9	0.0018±0.0005	0.123±0.003	<0.03
9-03-74	9-09-74	170.7	0.0016±0.0009	0.155±0.007	<0.03
9-09-74	9-16-74	271.1	0.0016±0.0005	0.097±0.003	<0.03
9-16-74	9-23-74	262.7	0.0016±0.0005	0.083±0.003	<0.03
9-23-74	9-30-74	277.9	0.0021±0.0005	0.083±0.003	<0.03
	Mean ± 2σ		0.0023±0.0018	0.158±0.118	
9-30-74	10-07-74	272.3	0.0016±0.0005	0.064±0.003	<0.03
10-07-74	10-14-74	264.7	0.0020±0.0008	0.077±0.004	<0.03
10-14-74	10-21-74	265.9	0.0015±0.0005	0.059±0.002	<0.03
10-21-74	10-28-74	245.7	0.0030±0.0009	0.088±0.004	<0.03
10-28-74	11-04-74	270.6	0.0028±0.0009	0.095±0.004	<0.03
11-04-74	11-11-74	245.9	0.0027±0.0009	0.094±0.004	<0.03
11-11-74	11-18-74	260.8	0.0025±0.0008	0.081±0.004	<0.03
11-18-74	11-25-74	266.7	0.0015±0.0007	0.074±0.004	<0.03
11-25-74	12-09-74[b]	457.6	0.0013±0.0005	0.081±0.003	<0.03
12-09-74	12-16-74	257.4	0.0021±0.0006	0.082±0.003	<0.03
12-16-74	12-23-74	104.8	0.0019±0.0009	0.072±0.004	<0.03
12-23-74	12-30-74	105.5	0.0014±0.0008	0.062±0.004	<0.03
	Mean ± 2σ		0.0015±0.0010	0.077±0.024	

[a] The error given is the probable counting error at the 95% confidence levle. Less than (<) values are based on 3 sigma counting error for background sample.

[b] Two-week sample due to inclement weather on 12-02-74.

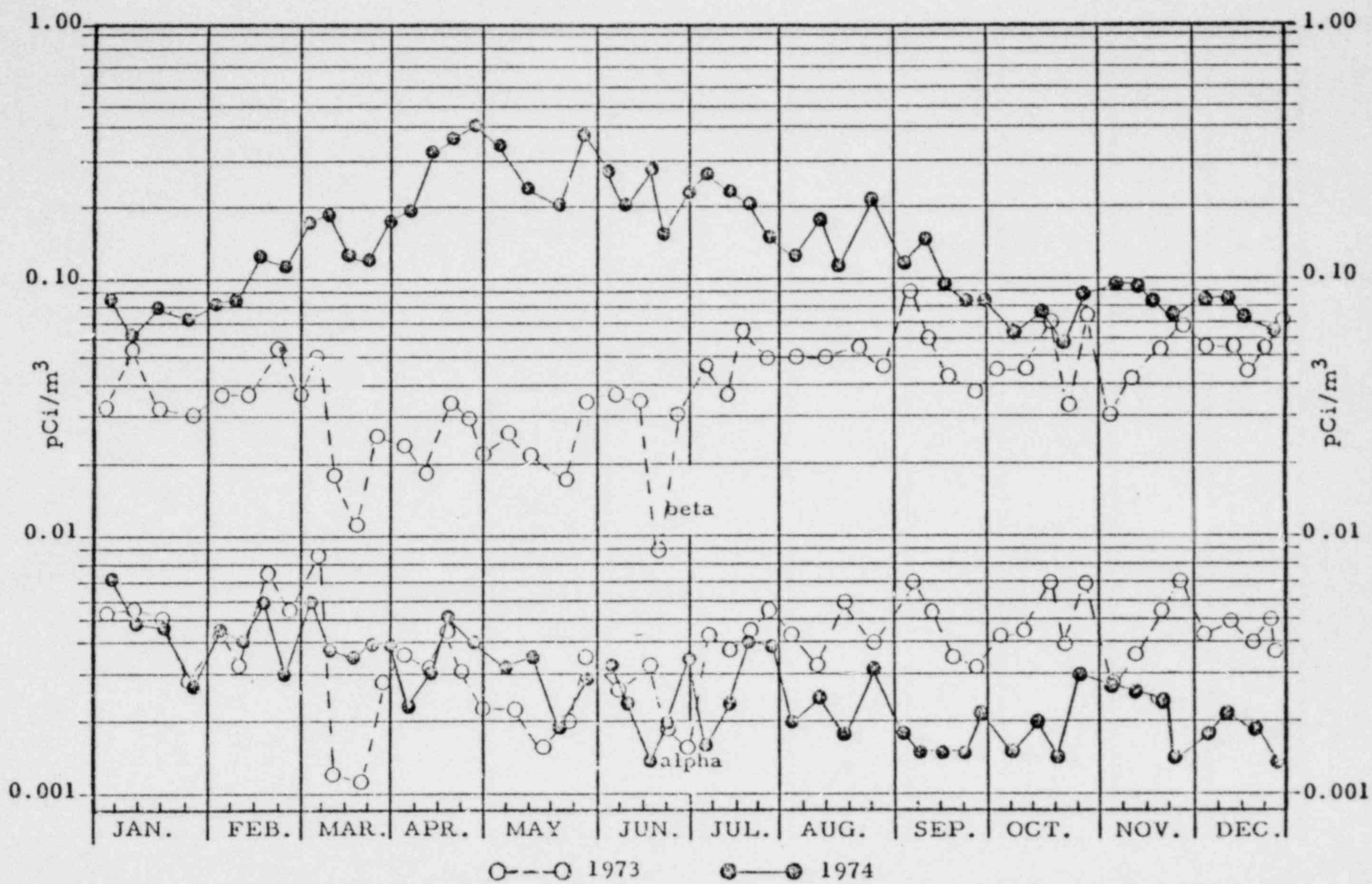

Figure 10. Air particulate samples, analyses for gross alpha and gross beta, collected at the Erie Industrial Park (T-10, 6.5 miles SE of plant), Davis-Besse NPP. The data are from Table 13.

Table 14. Air particulate samples and charcoal filters, analyses for gross alpha and gross beta (particulates) and iodine-131 (charcoal), collected at Port Clinton (T-11, 9.5 miles SE of plant), Davis-Besse NPP. Data from this table are plotted in Figure 11.

Date		Volume	pCi/m^3 [a]		
On	Off	(m^3)	Gross alpha	Gross beta	^{131}I
7-01-74	7-08-74	256.0	0.0024±0.0012	0.303±0.007	<0.03
7-08-74	7-15-74	274.9	0.0048±0.0010	0.252±0.005	<0.03
7-15-74	7-22-74	198.8	0.0048±0.0012	0.200±0.005	<0.03
7-22-74	7-29-74	218.8	0.0039±0.0011	0.268±0.005	<0.03
7-29-74	8-05-74	257.1	0.0027±0.0012	0.139±0.005	<0.03
8-05-74	8-12-74	230.7	0.0031±0.0010	0.217±0.007	<0.03
8-12-74	8-19=74	253.7	0.0017±0.0005	0.133±0.004	<0.03
8-19-74	8-26-74	221.0	0.0031±0.0010	0.191±0.007	<0.03
8-26-74	9-03-74	301.4	0.0014±0.0004	0.124±0.003	<0.03
9-03-74	9-09-74	168.9	0.0024±0.0011	0.152±0.007	<0.03
9-09-74	9-16-74	274.1	0.0015±0.0005	0.105±0.004	<0.03
9-16-74	9-23-74	257.8	0.0011±0.0006	0.090±0.004	<0.03
9-23-74	9-30-74	244.4	0.0023±0.0006	0.083±0.004	<0.03
	Mean ± 2σ		0.0027±0.0024	0.174±0.142	
9-30-74	10-07-74	278.2	0.0021±0.0005	0.069±0.003	<0.03
10-07-74	10-14-74	251.4	0.0020±0.0008	0.073±0.004	<0.03
10-14-74	10-21-74	263.0	0.0015±0.0005	0.069±0.003	<0.03
10-21-74	10-28-74	220.4	0.0029±0.0010	0.097±0.005	<0.03
10-28-74	10-04-74	270.4	0.0024±0.0008	0.101±0.004	<0.03
11-04-74	11-11-74	239.5	0.0027±0.0009	0.090±0.004	<0.03
11-11-74	11-18-74	263.1	0.0021±0.0008	0.069±0.004	<0.03
11-18-74	11-25-74	260.4	0.0015±0.0007	0.074±0.004	<0.03
11-25-74	12-09-74 [b]	462.9	0.0020±0.0005	0.071±0.003	<0.03
12-09-74	12-16-74	246.8	0.0019±0.0005	0.094±0.003	<0.03
12-16-74	12-23-74	98.0	0.0014±0.0008	0.044±0.004	<0.03
12-23-74	12-30-74	220.8	0.0021±0.0006	0.127±0.004	<0.03
	Mean ± 2σ		0.0021±0.0010	0.082±0.042	

[a] The error given is the probable counting error at the 95% confidence level. Less than (<) values are based on 3 sigma counting error for background sample.

[b] Two-week sample due to inclement weather on 12-02-74.

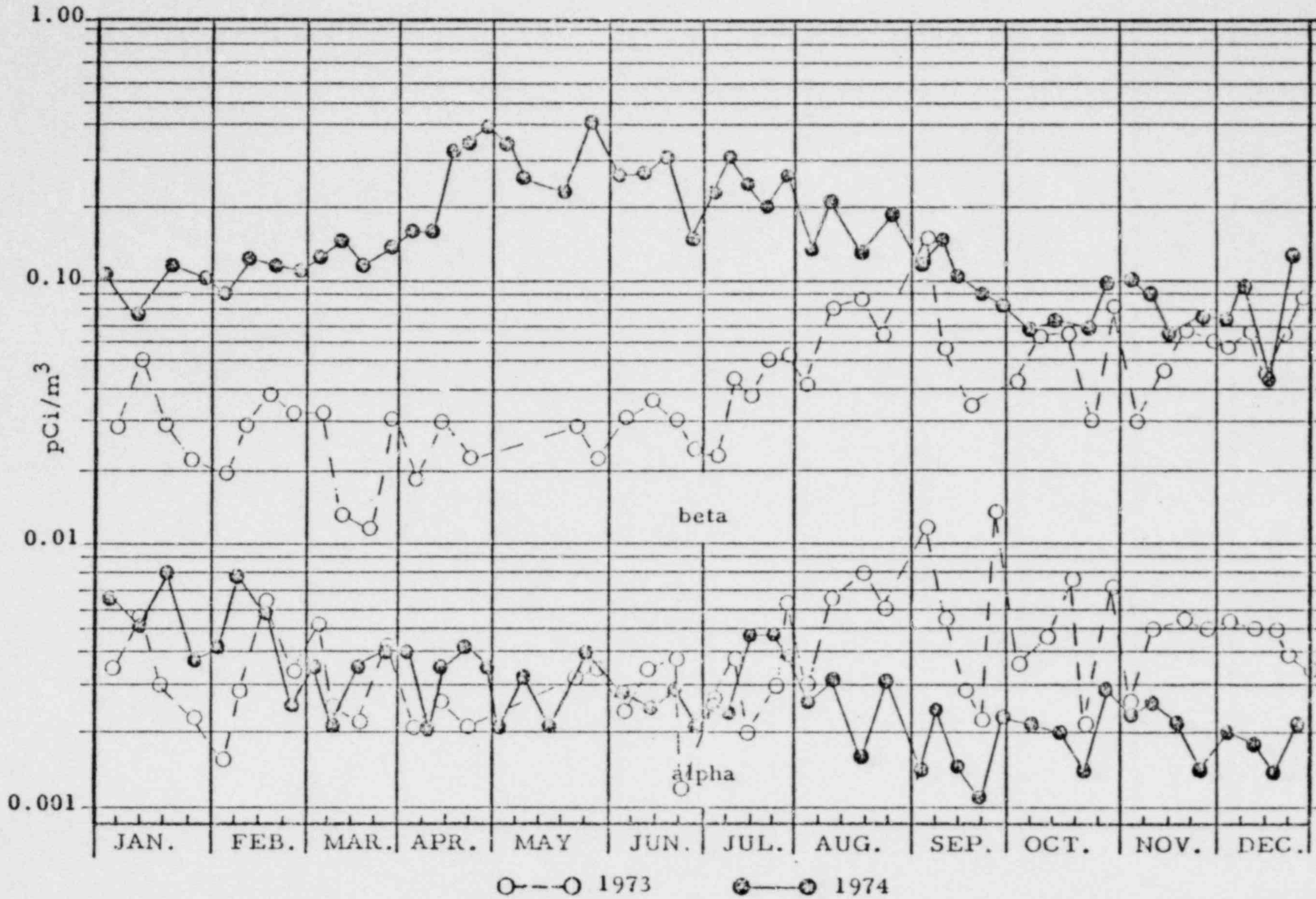

Figure 11. Air particulate samples, analyses for gross alpha and gross beta, collected at Port Clinton (T-11, 9.5 miles SE of 'lant), Davis-Besse NPP. The data are from Table 14.

Table 15. Air particulate samples and charcoal filters, analyses for gross alpha and gross beta (particulates) and iodine-131 (charcoal), collected at Toledo (T-12, 23.5 miles WNW of plant), Davis-Besse NPP. The data from this table are plotted in Figure 12.

Date On	Date Off	Volume (m^3)	pCi/m^3 [a] Gross alpha	pCi/m^3 [a] Gross beta	pCi/m^3 [a] ^{131}I
7-01-74	7-08-74	217.4	0.0025±0.0013	0.308±0.008	<0.03
7-08-74	7-15-74	247.8	0.0039±0.0010	0.227±0.005	<0.03
7-15-74	7-22-74	164.8	0.0057±0.0015	0.229±0.006	<0.03
7-22-74	7-29-74	285.4	0.0048±0.0010	0.195±0.004	<0.03
7-29-74	8-05-74	249.8	0.0019±0.0011	0.132±0.005	<0.03
8-05-74	8-12-74	174.9	0.0033±0.0012	0.225±0.008	<0.03
8-12-74	8-19-74	226.8	0.0020±0.0006	0.138±0.004	<0.03
8-19-74	8-26-74	192.4	0.0023±0.0010	0.179±0.007	<0.03
8-26-74	9-03-74	288.6	0.0015±0.0005	0.118±0.003	<0.03
9-03-74	9-09-74	193.9	0.0030±0.0011	0.129±0.006	<0.03
9-09-74	9-16-74	242.1	0.0023±0.0009	0.113±0.005	<0.03
9-16-74	9-23-74	254.8	0.0023±0.0008	0.087±0.004	<0.03
9-23-74	9-30-74	264.7	0.0020±0.0008	0.088±0.004	<0.03
	Mean ± 2σ		0.0029±0.0024	0.167±0.134	
9-30-74	10-07-74	264.7	0.0022±0.0005	0.060±0.002	<0.03
10-07-74	10-14-74	238.8	0.0025±0.0009	0.077±0.004	<0.03
10-14-74	10-21-74	256.5	0.0020±0.0005	0.053±0.002	<0.03
10-21-74	10-28-74	249.8	0.0031±0.0009	0.092±0.004	<0.03
10-28-74	11-04-74	254.0	0.0033±0.0010	0.111±0.005	<0.03
11-04-74	11-11-74	237.8	0.0025±0.0009	0.094±0.005	<0.03
11-11-74	11-18-74	259.2	0.0018±0.0007	0.071±0.004	<0.03
11=18-74	11-25-74	259.2	0.0021±0.0008	0.116±0.005	<0.03
11-25-74	12-03-74	257.8	0.0011±0.0003	0.056±0.002	<0.03
12-03-74	12-09-74	190.6	0.0031±0.0011	0.094±0.005	<0.03
12-09-74	12-16-74	228.3	0.0025±0.0006	0.095±0.003	<0.03
12-16-74	12-23-74	165.0	0.0026±0.0008	0.123±0.004	<0.03
12-23-74	12-30-74	256.9	0.0021±0.0006	0.134±0.004	<0.03
	Mean ± 2σ		0.0024±0.0012	0.090±0.052	

[a] The error given is the probable counting error at the 95% confidence level. Less than (<) values are based on 3 sigma counting error for background sample.

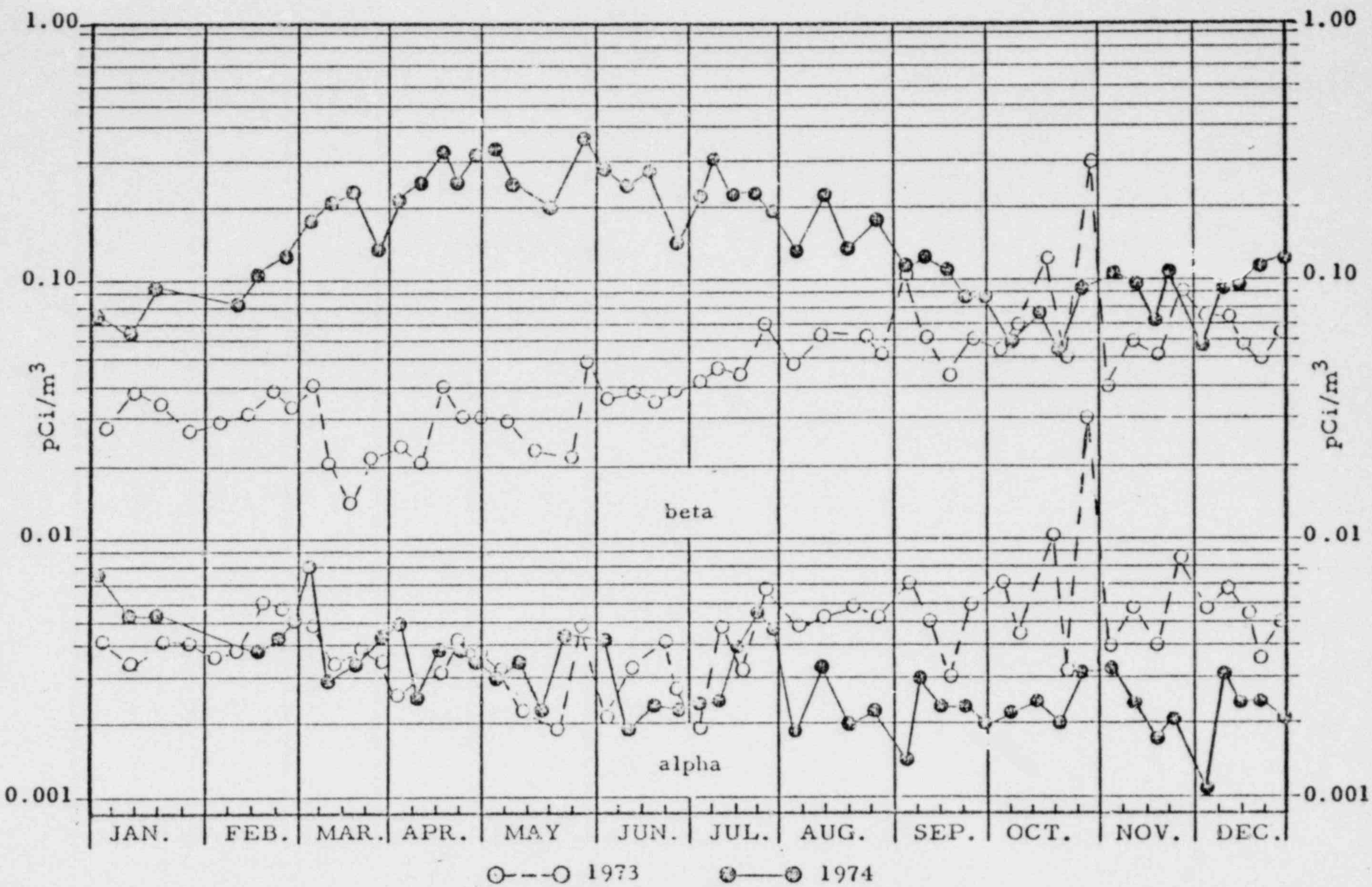

Figure 12. Air particulate samples, analyses for gross alpha and gross beta, collected at Toledo (T-12, 23.5 miles WNW of plant), Davis-Besse NPP. The data are from Table 15.

Table 16. Air particulate samples and charcoal filters, analyses for gross alpha and gross beta (particulates) and iodine-131 (charcoal), collected at Put-in-Bay Lighthouse (T-23, 14.3 miles ENE of plant), Davis-Besse NPP. Data from this table are plotted in Figure 13.

Date On	Date Off	Volume (m^3)	pCi/m^3 [a] Gross alpha	pCi/m^3 [a] Gross beta	pCi/m^3 [a] ^{131}I
7-01-74	7-08-74	231.9	0.0035±0.0014	0.288±0.008	<0.03
7-08-74	7-15-74	210.9	0.0047±0.0012	0.267±0.005	<0.03
7-15-74	7-22-74	180.4	0.0052±0.0013	0.215±0.005	<0.03
7-22-74	7-29-74	232.2	0.0050±0.0011	0.228±0.005	<0.03
7-29-74	8-05-74	259.4	0.0020±0.0011	0.136±0.005	<0.03
8-05-74	8-12-74	200.3	0.0031±0.0011	0.177±0.007	<0.03
8-12-74	8-19-74	255.8	0.0012±0.0006	0.116±0.005	<0.03
8-19-74	8-26-74	212.0	0.0022±0.0009	0.158±0.006	<0.03
8-26-74	9-03-74	313.4	0.0012±0.0004	0.113±0.003	<0.03
9-03-74	9-09-74	225.2	0.0021±0.0008	0.112±0.005	<0.03
9-09-74	9-16-74	260.8	0.0017±0.0007	0.090±0.004	<0.03
9-16-74	9-23-74	273.8	0.0012±0.0006	0.083±0.004	<0.03
9-23-74	10-01-74	315.9	0.0013±0.0006	0.075±0.004	<0.03
	Mean ± 2σ		0.0026±0.0030	0.158±0.142	
10-01-74	10-09-74	323.2	0.0020±0.0006	0.074±0.002	<0.03
10-09-74	10-16-74	234.1	0.0018±0.0008	0.073±0.004	<0.03
10-16-74	10-22-74	274.1	0.0016±0.0005	0.060±0.002	<0.03
10-22-74	10-30-74	273.2	0.0027±0.0008	0.105±0.004	<0.03
10-30-74	11-06-74	253.5	0.0021±0.0008	0.080±0.004	<0.03
11-06-74	11-12-74	202.7	0.0033±0.0011	0.106±0.005	<0.03
11-12-74	11-20-74	321.3	0.0018±0.0006	0.066±0.004	<0.03
11-20-74	11-27-74	279.5	0.0012±0.0006	0.052±0.003	<0.03
11-27-74	12-04-74	271.6	0.0012±0.0006	0.059±0.003	<0.03
12-04-74	12-10-74	202.5	0.0032±0.0011	0.094±0.005	<0.03
12-10-74	12-17-74	234.5	0.0029±0.0007	0.087±0.003	<0.03
12-17-74	12-23-74	228.2	0.0025±0.0006	0.099±0.003	<0.03
12-23-74	12-31-74	312.2	0.0023±0.0005	0.126±0.003	<0.03
	Mean ±2σ		0.0022±0.0014	0.083±0.044	

[a] The error given is the probable counting error at the 95% confidence level. Less than (<) values are based on 3 sigma counting error for background sample.

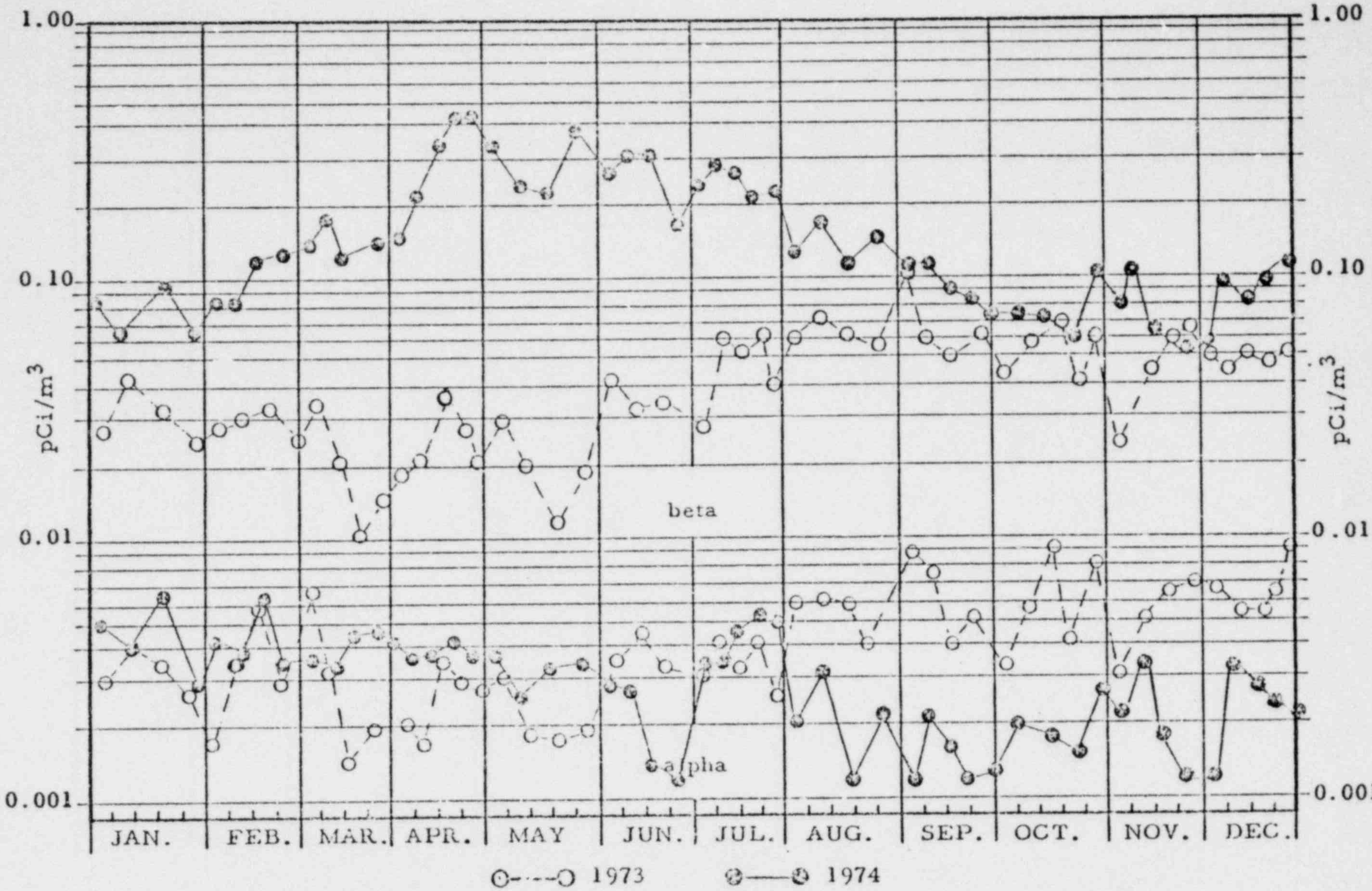

Figure 13. Air particulate samples, analyses for gross alpha and gross beta, collected at Put-In-Bay Lighthouse (T-23, 14.3 miles ENE of plant), Davis-Besse NPP. The data are from Table 16.

Table 17. Air particulate samples and charcoal filters, analyses for gross alpha and gross beta (particulates) and iodine-131 (charcoal), collected at McGee Marsh (T-27, 5.3 miles WNW of plant), Davis-Besse NPP. Data from this table are plotted in Figure 14.

Date On	Date Off	Volume (m^3)	pCi/m^3 [a] Gross alpha	pCi/m^3 [a] Gross beta	pCi/m^3 [a] ^{131}I
7-01-74	7-03-74	263.4	0.0036±0.0013	0.290±0.007	<0.03
7-08-74	7-15-74	286.1	0.0030±0.0008	0.238±0.004	<0.03
7-15-74	7-22-74	198.4	0.0038±0.0011	0.154±0.004	<0.03
7-22-74	7-29-74	224.4	0.0039±0.0010	0.316±0.006	<0.03
7-29-74	8-05-74	260.1	0.0020±0.0010	0.136±0.005	<0.03
8-05-74	8-12-74	269.4	0.0022±0.0008	0.172±0.006	<0.03
8-12-74	8-19-74	277.4	0.0014±0.0004	0.128±0.003	<0.03
8-19-74	8-26-74	207.9	0.0021±0.0009	0.177±0.007	<0.03
8-26-74	9-03-74	310.4	0.0016±0.0004	0.126±0.003	<0.03
9-03-74	9-09-74	220.1	0.0019±0.0008	0.119±0.005	<0.03
9-09-74	9-16-74	269.2	0.0019±0.0007	0.106±0.005	<0.03
9-16-74	9-23-74	271.2	0.0021±0.0008	0.091±0.004	<0.03
9-23-74	9-30-74	275.1	0.0026±0.0006	0.082±0.003	<0.03
	Mean ± 2σ		0.0025±0.0016	0.164±0.148	
9-30-74	10-07-74	273.6	0.0019±0.0005	0.063±0.002	<0.03
10-07-74	10-14-74	192.8	0.0033±0.0011	0.080±0.005	<0.03
10-14-74	10-21-74	261.0	0.0016±0.0005	0.052±0.002	<0.03
10-21-74	10-28-74	125.0	0.0024±0.0012	0.112±0.007	<0.03
10-28-74	11-04-74	264.3	0.0014±0.0007	0.223±0.007	<0.03
11-04-74	11-11-74	247.6	0.0031±0.0009	0.096±0.005	<0.03
11-11-74	11-18-74	267.0	0.0014±0.0006	0.066±0.004	<0.03
11-18-74	11-25-74	273.6	0.0017±0.0007	0.070±0.004	<0.03
11-25-74	12-09-74 [b]	570.9	0.0010±0.0003	0.025±0.002	<0.03
12-09-74	12-16-74	N.S. [c]	-	-	-
12-16-74	12-23-74	122.9	<0.0005	0.009±0.002	<0.03
12-23-74	12-30-74	123.2	0.0009±0.0006	0.060±0.004	<0.03
	Mean ± 2σ		0.0019±0.0016	0.078±0.112	

[a] The error given is the probable counting error at the 95% confidence level. Less than (<) values are based on 3 sigma counting error for background sample.

[b] Two-week sample due to inclement weather on 12-02-74.

[c] No sample due to power failure.

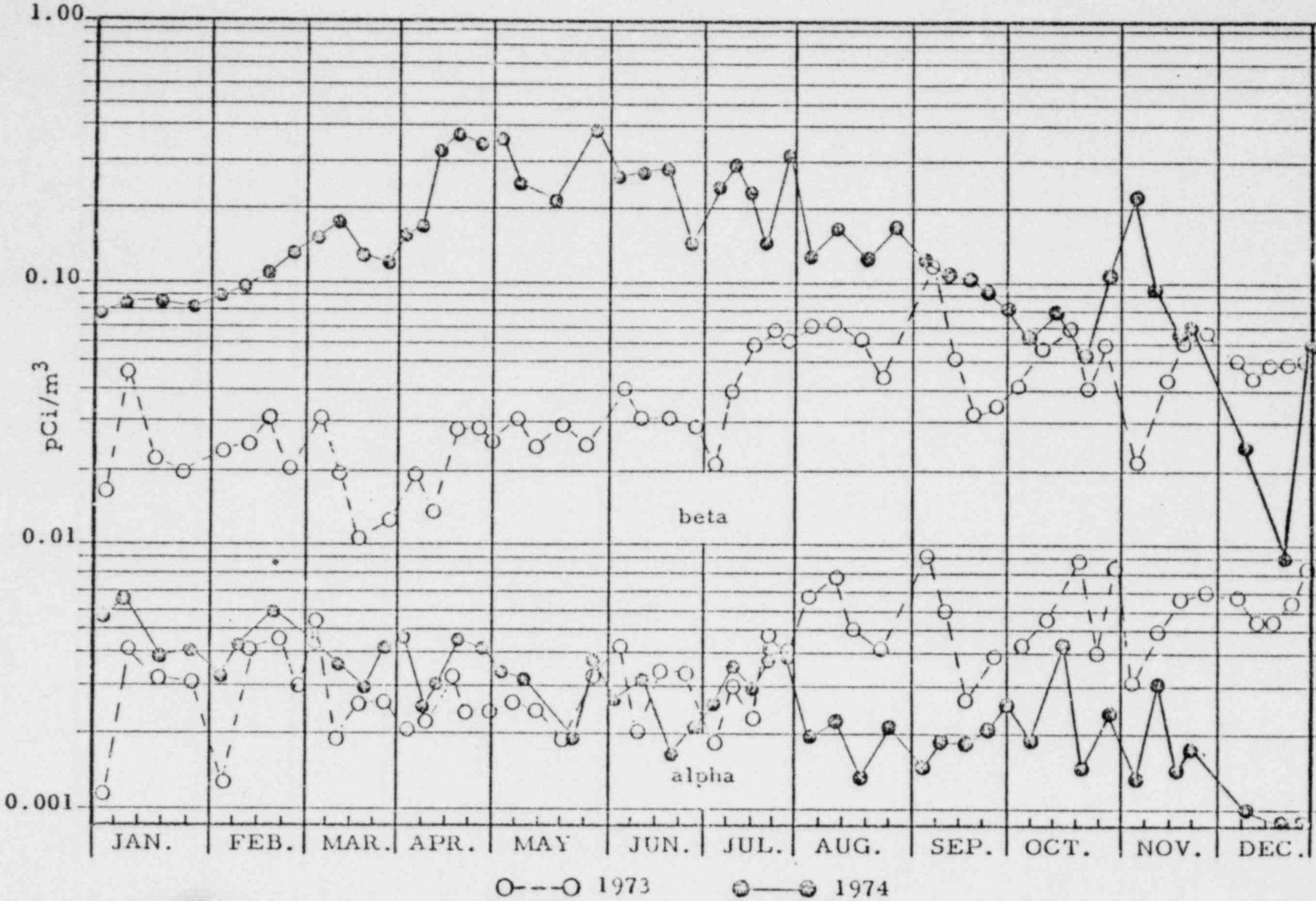

Figure 14. Air particulate samples, analyses for gross alpha and gross beta, collected at McGee Marsh (T-27, 5.3 miles WNW of plant), Davis-Besse NPP. The data are from Table 17.

Table 18. Airborne particulates, monthly average, minima and maxima for gross alpha and gross beta, July-December 1974, Davis-Besse NPP.

Month	Location	Number of Samples	Gross alpha (pCi/m^3) Average	Gross alpha (pCi/m^3) Minimum	Gross alpha (pCi/m^3) Maximum	Gross beta (pCi/m^3) Average	Gross beta (pCi/m^3) Minimum	Gross beta (pCi/m^3) Maximum
July	T-1	4	0.0037	0.0027	0.0054	0.258	0.172	0.340
	T-2	4	0.0036	0.0025	0.0044	0.234	0.165	0.260
	T-3	4	0.0035	0.0028	0.0035	0.242	0.166	0.294
	T-4	4	0.0037	0.0029	0.0046	0.231	0.174	0.221
	T-7	4	0.0041	0.0031	0.0050	0.250	0.221	0.282
	T-8	4	0.0041	0.0033	0.0047	0.281	0.175	0.397
	T-9	3	0.0040	0.0031	0.0052	0.236	0.189	0.354
	T-10	4	0.0030	0.0016	0.0040	0.217	0.162	0.270
	T-11	4	0.0040	0.0024	0.0048	0.256	0.200	0.303
	T-12	3	0.0042	0.0025	0.0057	0.240	0.195	0.308
	T-23	4	0.0046	0.0035	0.0052	0.250	0.215	0.288
	T-27	4	0.0036	0.0030	0.0039	0.250	0.154	0.316
August	T-1	2	0.0020	0.0017	0.0023	0.162	0.179	0.144
	T-2	4	0.0027	0.0016	0.0040	0.147	0.123	0.174
	T-3	3	0.0021	0.0017	0.0025	0.133	0.108	0.177
	T-4	4	0.0024	0.0016	0.0032	0.170	0.134	0.205
	T-7	4	0.0027	0.0016	0.0050	0.170	0.125	0.234
	T-8	4	0.0027	0.0019	0.0035	0.165	0.131	0.203
	T-9	4	0.0025	0.0020	0.0031	0.163	0.131	0.159
	T-10	4	0.0024	0.0018	0.0031	0.161	0.119	0.209
	T-11	4	0.0027	0.0017	0.0031	0.170	0.133	0.217
	T-12	3	0.0024	0.0019	0.0033	0.169	0.132	0.225
	T-23	4	0.0021	0.0012	0.0031	0.147	0.116	0.177
	T-27	4	0.0019	0.0014	0.0022	0.153	0.128	0.177
September	T-1	4	0.0012	0.0008	0.0016	0.063	0.042	0.084
	T-2	5	0.0017	0.0013	0.0021	0.099	0.072	0.138
	T-3	4	0.0015	0.0011	0.0019	0.078	0.061	0.101

Table 18. Continued.

Month	Location	Number of Samples	Gross alpha (pCi/m^3)			Gross beta (pCi/m^3)		
			Average	Minimum	Maximum	Average	Minimum	Maximum
September	T-4	5	0.0021	0.0018	0.0028	0.113	0.091	0.145
	T-7	5	0.0021	0.0015	0.0029	0.118	0.087	0.177
	T-8	5	0.0025	0.0016	0.0024	0.108	0.084	0.127
	T-9	5	0.0019	0.0016	0.0028	0.115	0.086	0.172
	T-10	5	0.0017	0.0016	0.0021	0.108	0.083	0.155
	T-11	5	0.0017	0.0011	0.0024	0.111	0.083	0.152
	T-12	5	0.0022	0.0015	0.0030	0.107	0.087	0.129
	T-23	5	0.0015	0.0012	0.0021	0.095	0.075	0.113
	T-27	5	0.0020	0.0016	0.0026	0.105	0.082	0.126
October	T-1	4	0.0018	0.0009	0.0034	0.058	0.037	0.101
	T-2	4	0.0023	0.0017	0.0031	0.074	0.053	0.090
	T-3	4	0.0022	0.0015	0.0031	0.069	0.053	0.078
	T-4	4	0.0022	0.0016	0.0027	0.072	0.055	0.074
	T-7	4	0.0024	0.0019	0.0032	0.078	0.056	0.099
	T-8	4	0.0020	0.0012	0.0031	0.072	0.052	0.094
	T-9	4	0.0022	0.0013	0.0030	0.110	0.055	0.225
	T-10	4	0.0021	0.0015	0.0030	0.072	0.059	0.088
	T-11	4	0.0021	0.0015	0.0029	0.077	0.069	0.097
	T-12	4	0.0025	0.0020	0.0031	0.071	0.053	0.092
	T-23	4	0.0020	0.0016	0.0027	0.078	0.060	0.105
	T-27	4	0.0023	0.0016	0.0033	0.077	0.063	0.112
November	T-1	4	0.0020	0.0007	0.0027	0.085	0.052	0.120
	T-2	4	0.0017	0.0013	0.0021	0.087	0.067	0.098
	T-3	4	0.0016	0.0008	0.0023	0.075	0.054	0.087
	T-4	4	0.0027	0.0016	0.0037	0.097	0.071	0.125
	T-7	4	0.0023	0.0015	0.0030	0.098	0.065	0.136

Table 18. Continued.

Month	Location	Number of Samples	Gross alpha (pCi/m3)			Gross beta (pCi/m3)		
			Average	Minimum	Maximum	Average	Minimum	Maximum
November	T-8	4	0.0025	0.0016	0.0034	0.114	0.067	0.205
	T-9	4	0.0020	0.0016	0.0035	0.085	0.067	0.103
	T-10	4	0.0024	0.0015	0.0028	0.086	0.081	0.095
	T-11	4	0.0022	0.0015	0.0027	0.084	0.069	0.101
	T-12	4	0.0024	0.0018	0.0033	0.098	0.071	0.116
	T-23	4	0.0021	0.0018	0.0033	0.076	0.066	0.106
	T-27	4	0.0019	0.0014	0.0031	0.114	0.066	0.223
December	T-1	4	0.0015	0.0012	0.0019	0.060	0.041	0.073
	T-2	4	0.0018	<0.0006	0.0026	0.054	0.044	0.072
	T-3	4	0.0006	0.0002	0.0011	0.028	0.004	0.044
	T-4	4	0.0021	<0.0008	0.0026	0.068	0.045	0.091
	T-7	4	0.0019	0.0012	0.0025	0.096	0.068	0.148
	T-8	4	0.0005	0.0002	0.0008	0.052	0.022	0.100
	T-9	4	0.0020	0.0012	0.0028	0.090	0.052	0.161
	T-10	4	0.0018	0.0014	0.0021	0.074	0.062	0.082
	T-11	4	0.0019	0.0014	0.0020	0.084	0.044	0.127
	T-12	5	0.0023	0.0011	0.0031	0.100	0.056	0.134
	T-23	5	0.0024	0.0012	0.0032	0.093	0.059	0.126
	T-27	3	0.0005	<0.0005	0.0010	0.020	0.009	0.060

Table 19. Airborne particulates, analyses for ^{89}Sr, ^{90}Sr and gamma-emitting isotopes, Davis-Besse NPP. Quarterly composites from all air monitoring locations, July-December 1974. Davis-Besse NPP.

	pCi/m^3	
Isotope	July-September	October-November
^{90}Sr	0.0014±0.0001	0.0004±0.0001
^{144}Ce	0.047±0.001	0.008±0.001
^{141}Ce	0.003±0.001	0.001±0.001
^{7}Be	0.150±0.006	0.077±0.002
^{103}Ru	0.002±0.001	0.002±0.001
^{106}Ru	0.024±0.001	0.004±0.001
^{137}Cs	0.005±0.001	0.001±0.001
^{95}Zr	0.009±0.001	0.005±0.001
^{95}Nb	0.018±0.001	0.010±0.001

[a] The error given is the probable counting error at the 95% confidence level. Values are corrected for radioactive decay to the mid-point of collection.

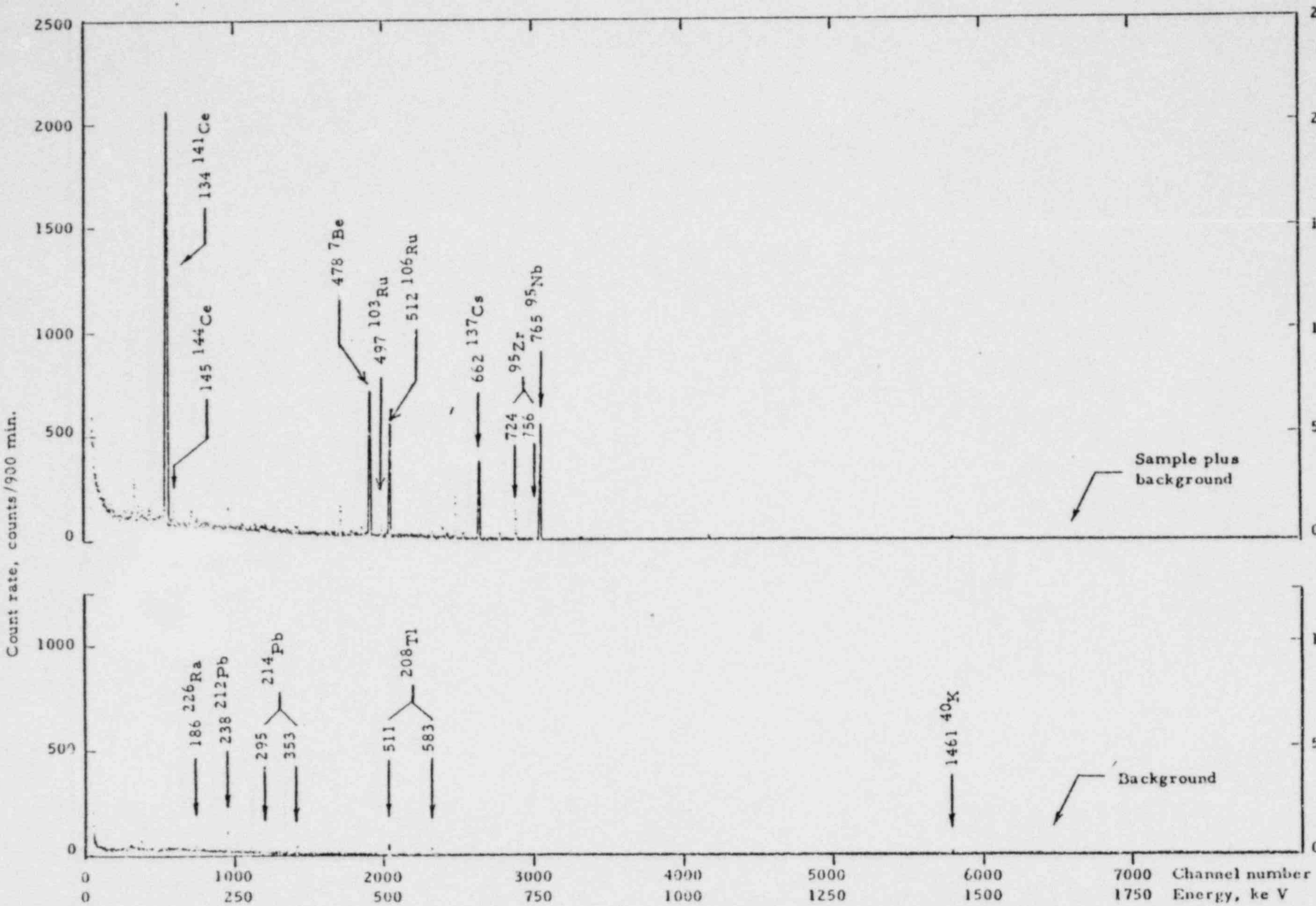

Figure 15. Gamma-ray spectrum of air particulates, 30-2048 keV Detector: Ge(Li), 86.8 cm^3 closed end coaxial. Sample: air particulate filters, composite of all locations, 37031 m^3 of air, collected 1 July 1974 through 30 September 1974. Counts: 900 min. on

Table 20. Area monitors - TLD (mrem), July-December 1974, Davis-Besse NPP.

Location	July 35 days	August 30 days	September 26 days	July-September 91 days
T-1	7.3±0.9[a]	5.8±1.5	2.5±1.1	15.6±2.1
T-2	3.6±1.1	3.2±1.1	2.9±0.9	9.7±1.8
T-3	3.5±1.2	3.1±1.0	3.4±1.4	10.0±2.1
T-4	4.8±1.1	4.0±1.1	4.1±1.0	12.9±1.8
T-5	6.5±1.2	5.0±1.1	4.9±1.6	16.4±2.3
T-6	5.5±1.2	4.5±1.2	4.7±1.8	14.7±2.5
T-7	4.3±1.5	3.5±1.0	3.5±1.0	11.3±1.8
T-8	5.9±0.9	4.7±1.1	5.3±1.0	15.9±1.5
T-9	4.0±1.2	3.3±1.3	3.2±0.7	10.5±1.9
T-10	5.5±1.2	4.4±0.9	4.7±1.1	14.6±1.9
T-11	4.9±0.9	3.7±1.4	3.8±1.3	12.4±2.1
T-12	5.3±1.3	5.1±0.8	5.8±1.3	16.2±2.0
T-14	6.3±0.7	5.3±1.1	5.5±1.1	17.1±1.7
T-15	6.7±1.6	4.9±1.0	4.7±0.9	16.3±2.1
T-23	5.2±0.9	3.6±1.0	4.5±1.3	13.3±1.9
T-24	6.1±1.0	5.0±1.3	5.0±1.2	16.1±2.0
T-26	6.4±1.2	5.1±1.2	5.5±1.5	17.0±2.3
T-27	5.0±1.6	4.1±1.0	4.5±0.7	13.6±2.0
Mean ±2σ	5.3±2.0[b]	4.3±1.5[b]	4.4±1.9	14.0±5.0[b]

Table 20. Continued.

Location	October 35 days	November 35 days	December 28 days	Total for October-December 98 days	Total for quarter adjusted to 91 days
T-1	3.2±1.0	3.0±1.9	1.7±0.7	7.9±2.3	7.3±2.1
T-2	3.3±1.1	3.6±1.6	2.1±1.3	9.0±2.3	8.4±2.1
T-3	3.3±1.2	3.1±1.3	2.7±1.2	9.1±2.1	8.4±2.0
T-4	4.4±1.1	5.1±2.1	2.9±1.8	12.4±3.0	11.5±2.8
T-5	5.6±1.2	5.4±2.0	5.7±2.2	16.7±3.2	15.5±3.0
T-6	4.9±1.4	4.9±1.6	4.6±2.0	14.4±2.9	13.4±2.7
T-7	4.6±1.3	4.3±2.0	4.7±1.6	13.6±2.9	12.6±2.7
T-8	5.7±1.0	5.6±2.0	5.0±1.5	16.3±2.7	15.1±2.5
T-9	3.6±0.9	3.9±1.7	3.3±1.1	10.8±2.2	10.0±2.0
T-10	4.9±1.3	4.8±2.0	3.5±2.1	13.2±3.2	12.2±3.0
T-11	4.4±1.4	4.7±1.7	3.0±1.6	12.1±2.7	11.2±2.5
T-12	5.4±1.2	4.3±1.8	4.2±1.7	13.9±2.7	12.9±2.5
T-14	5.5±1.4	6.6±2.3	4.9±1.4	17.0±3.0	15.8±2.8
T-15	5.5±1.3	5.6±2.5	5.1±1.8	16.2±3.3	15.0±3.1
T-23	4.4±1.1	4.8±2.0	4.3±1.4	13.5±2.7	12.5±2.5
T-24	5.8±1.3	5.4±1.4	5.4±2.5	16.6±3.1	15.4±2.9
T-26	5.8±1.2	6.2±2.2	4.2±1.7	16.2±3.0	15.0±2.8
T-27	5.2±0.9	5.0±1.9	3.0±1.8	13.2±2.8	12.3±2.6
Mean ± 2σ	4.8±1.8	4.8±2.0	3.9±3.2	13.5±5.6	12.5±5.2

[a] Mean ± two standard deviations for readings of five chips.
[b] T-1 is not included in the mean of the July, August and total for the third quarter measurements.

Table 21. Area monitors-TLD (mrem), quarterly, July-December 1974, Davis-Besse NPP.

Location	3rd quarter 1 July-30 Sept. (91 days)	4th quarter 30 Sept. -6 Jan. 98 days	4th quarter Adjusted to 91 days
T-1	16.2±3.3[a]	8.8±1.6	8.2±1.5
T-2	9.6±2.1	9.8±1.6	9.1±1.5
T-3	9.[illegible]±2.2	9.4±1.7	8.7±1.6
T-4	14.4±2.9	13.5±2.1	12.5±1.9
T-5	15.7±2.9	15.3±2.2	14.2±2.0
T-6	14.2±3.0	14.8±2.2	13.7±2.0
T-7	10.7±2.4	12.3±1.9	11.4±1.7
T-8	15.7±3.2	15.6±2.3	14.5±2.1
T-9	10.7±2.3	10.4±2.7	9.7±2.5
T-10	15.0±2.9	14.5±2.4	13.5±2.2
T-11	12.2±2.7	12.6±2.4	11.7±2.2
T-12	14.0±3.5	14.4±2.7	13.4±2.5
T-14	17.1±3.5	17.1±2.4	15.9±2.2
T-15	16.0±3.4	15.0±1.8	13.9±1.7
T-23	12.6±2.8	11.6±2.0	10.8±1.9
T-24	16.1±3.9	16.7±2.8	15.5±2.6
T-26	17.2±3.1	15.9±2.3	14.8±2.1
T-27	14.4±2.3	13.4±2.0	12.4±1.9
Mean ± 2σ	13.8±5.0[b]	13.4±5.0	12.4±4.7

[a] Mean ± two standard deviations for readings of five chips.

[b] T-1 is not included in the third quarter mean.

Table 22. Monthly precipitation samples, analyses for gross beta and tritium, July-December 1974, Davis-Besse NPP.

Location	Date Collected	Gross beta[a] pCi/l	Gross beta[a] pCi/m²	Tritium pCi/ml
T-1	July	N.S.[b]	-	-
(Site boundary	August	82.4±4.0	1002±49	<0.2
0.6 mi. NE of	September	23.1±1.5	567±38	0.25±0.23
plant, near				
inlet canal)	Mean ±2σ	52.8±84.0	785±616	0.25±0.23
	October	46.6±2.5	800±43	<0.2
	November	81.5±0.9	3101±35	0.35±0.22
	December	43.4±0.6	2713±40	<0.2
	Mean ±2σ	57.2±42.0	2205±2464	0.35±0.22
T-23	July	N.S.[b]	-	-
(Put-In-Bay)	August	53.3±1.7	2106±70	0.50±0.24
14.3 mi. ENE	September	24.9±2.2	316±28	<0.2
of plant)				
	Mean ±2σ	39.1±40.0	1211±2532	0.50±0.24
	October	13.2±1.0	446±33	<0.2
	November	76.0±0.7	5228±45	0.30±0.22
	December	42.5±1.0	1050±25	<0.2
	Mean ±2σ	43.9±62.0	2241±5208	0.30±0.22

[a] The error given is the probable counting error at the 95% confidence level. Less than (<) values are based on 3 sigma counting error for background sample.

[b] No sample due to weather condition.

Table 23. Well water samples, analyses for gross alpha, gross beta, and tritium, July-December 1974, Davis-Besse NPP.

Location	Date collected	Gross alpha (pCi/l)[a] Suspended solids	Gross alpha (pCi/l)[a] Dissolved solids	Gross alpha (pCi/l)[a] Total residue	Gross beta (pCi/l)[a] Suspended solids	Gross beta (pCi/l)[a] Dissolved solids	Gross beta (pCi/l)[a] Total residue	Tritium pCi/ml
T-7	7-08-74	<0.08	<0.50	<0.58	<0.14	2.36±0.33	2.36±0.33	<0.3
(Sand Beach, 0.9 mi NNW of station)	10-14-74	<0.09	0.43±0.22	0.43±0.22	<0.17	2.48±0.22	2.48±0.22	0.50±0.18
T-17	7-08-74	<0.07	2.09±1.27	2.09±1.27	0.21±0.11	2.37±0.57	2.58±0.58	0.52±0.24
(Irv Fick's well, 0.7 mi. SW of station)	10-14-74	<0.09	2.71±0.70	2.71±0.70	<0.17	4.82±0.47	4.82±0.47	0.28±0.18
T-18	7-08-74	<0.08	7.01±3.40[b]	7.01±3.40	<0.13	3.03±2.30	3.03±2.30	<0.3
(Hess Sunoco Garage 1.3 mi. S of station, State Route 2)	10-14-74	<0.10	2.95±2.24	2.95±2.24	<0.17	2.89±1.92	2.89±1.92	<0.2
T-27	7-08-74	<1.95	<1.95	<2.03	<0.13	3.84±1.41	3.84±1.41	<0.3
(McGee Marsh, 5.3 mi. WNW of station)	10-14-74	<0.11	<2.28	<2.39	<0.17	3.00±1.10	3.00±1.10	<0.2

[a] The error given is the probable counting error at the 95% confidence level. Less than (<) values are based on 3 sigma counting error for background sample.

[b] Analyses for Ra-226 showed that it was less than 0.5 pCi/l.

Table 24. Well water samples, analyses for ^{90}Sr and gamma-emitting isotopes July-December 1974, Davis-Besse NPP.

Location	Date collected	pCi/l[a] ^{90}Sr	pCi/l[a] ^{137}Cs
T-7 (Sand Beach, 0.9 mi. NNW of plant)	7-08-74	<0.46	<1.5
	10-14-74	0.56±0.36	<1.5
T-17 (Irv Fick's well, 0.7 mi SW of plant)	7-08-74	<0.56	<1.5
	10-14-74	<0.44	<1.5
T-18 (Hess Sunoco Garage 1.3 mi. S of plant, State Route 2)	7-08-74	<0.27	<1.5
	10-14-74	<0.32	<1.5
T-27 (McGee Marsh, 5.3 mi. WNW of plant)	7-08-74	<0.27	<1.5
	10-14-74	<0.33	<1.5

[a] The error given is the probable counting error at the 95% confidence level. Less than (<) values are based on 3 sigma counting error for background sample.

[b] No gamma-emitting isotopes were detected above background level.

Table 7 Milk samples, analyses for gross beta, ^{89}Sr, ^{90}Sr, and gamma-emitting isotopes July-December 1974, Davis-Besse NPP.

Location	Date collected	pCi/l[a] Gross beta	^{89}Sr	^{90}Sr	^{131}I	^{140}Ba	^{137}Cs	^{40}K
T-8 (Earl Moore Farm, 3.2 mi. WSW of plant)	7-01-74	1092±18	<0.5	1.37±0.41	<3.2	<3.7	4.17±2.17	2175±31
	8-05-74	1227±19	<0.5	1.26±0.40	<3.2	<3.7	<3.5	1339±32
	9-03-74	1101±25	<0.5	1.21±0.29	<3.2	<3.7	5.65±1.42	1323±21
	Mean±2σ	1140±150		1.28±0.16			4.91±2.08	1312±66
	10-01-74	1179±32	<0.5	1.49±0.28	<3.2	<3.7	3.50±1.68	1252±21
	11-04-74	1123±26	<0.5	1.49±0.44	<3.2	<3.7	3.80±2.51	1336±37
	11-27-74	1196±23	<0.5	1.24±0.29	<3.2	<3.7	4.72±3.04	1353±31
	Mean±2σ	1166±76		1.41±0.28			4.01±1.28	1314±108
T-12 (Toledo Dairy, 23.5 mi. WNW of plant)	6-28-74	1145±18	<0.5	2.87±0.49	<3.2	<3.7	3.78±2.24	1312±32
	7-31-74	1023±30	<0.5	3.28±0.51	<3.2	<3.7	3.49±2.08	1242±30
	8-30-74	1145±32	<0.5	5.24±0.62	[illegible].2	<3.7	6.91±1.99	1247±30
	Mean±2σ	1104±140		3.80±2.52			4.73±3.78	1267±78
	9-27-74	1114±44	<0.5	4.94±0.60	<3.2	<3.7	3.81±2.00	1271±30
	10-31-74	1042±25	<0.5	4.73±0.58	<3.2	<3.7	6.30±3.03	1342±44
	11-27-74	1267±24	<0.5	4.21±0.32	<3.2	<3.7	3.23±2.90	1270±43
	Mean±2σ	1141±230		4.63±0.75			4.45±3.26	1294±82
T-20 (Daup Farm, 5.4 mi. SSE of plant)	7-01-74	1081±13	<0.5	2.61±0.34	<3.2	<3.7	7.44±1.60	1320±23
	8-05-74	1067±14	<0.5	1.83±0.33	<3.2	<3.7	5.23±1.50	1210±22
	9-03-74	1110±44	<0.5	2.47±0.47	<3.2	<3.7	<3.5	1300±30
	Mean±2	1093±30		2.31±0.85			6.34±3.12	1277±118
	10-01-74	1137±26	<0.5	1.15±0.38	<3.2	<3.7	<3.5	1239±29
	11-04-74	1118±18	<0.5	1.06±0.44	<3.2	<3.7	<3.5	1340±44
	11-27-74	1100±22	<0.5	1.46±0.27	<3.2	<3.7	4.85±3.00	1285±44
	Mean±2σ	1118±36		1.22±0.42			4.85±3.00	1291±110

Table 25. Continued.

Location	Date collected	pCi/l[a] Gross beta	^{89}Sr	^{90}Sr	^{131}I	^{140}Ba	^{137}Cs	^{40}K
T-21	7-1-74	1051±18	<0.5	1.08±0.41	<3.2	<3.7	<3.5	1238±32
(Haynes Farm,	8-5-74	1102±20	<0.5	1.84±0.50	<3.2	<3.7	<3.5	1165±30
3.6 mi. SE	9-3-74	1144±45	<0.5	1.53±0.42	<3.2	<3.7	<3.5	1174±29
of plant)								
	Mean ±2σ	1099±92		1.48±0.76				1192±80
	10-1-74	1074±25	<0.5	0.85±0.29	<3.2	<3.7	<3.5	1185±29
	11-4-74	1062±25	<0.5	1.64±0.51	<3.2	<3.7	<3.5	1277±44
	11-27-74	1124±22	<0.5	1.40±0.32	<3.2	<3.7	<3.5	1261±43
	Mean ±2σ	1087±66		1.30±0.82				1241±98
T-24	7-1-74	1049±18	<0.5	3.74±0.60	<3.2	<3.7	5.68±2.16	1199±30
(Toft's Dairy in	8-5-74	1030±56	<0.5	2.50±0.48	<3.2	<3.7	6.28±2.17	1255±31
Sandusky, 24.9	9-3-74	1112±44	<0.5	2.22±0.72	<3.2	<3.7	5.39±2.01	1288±30
mi. SE of plant)								
	Mean ±2	1064±86		2.82±1.60			5.78±0.90	1247±90
	10-1-74	1051±25	<0.5	2.58±0.44	<3.2	<3.7	4.74±1.96	1230±29
	11-4-74	1009±24	<0.5	2.62±0.57	<3.2	<3.7	5.91±3.00	1279±44
	11-27-74	1206±23	<0.5	2.00±0.41	<3.2	<3.7	4.01±3.01	1357±44
	Mean ±2σ	1087±208		2.40±0.68			4.89±1.92	1287±128

[a] The error given is the probably counting error at the 95% confidence level. Less than (<) values are based on 3 sigma counting error for background sample.

[b] Mean ± 2 were not calculated because most values were below the minimum sensitivity level.

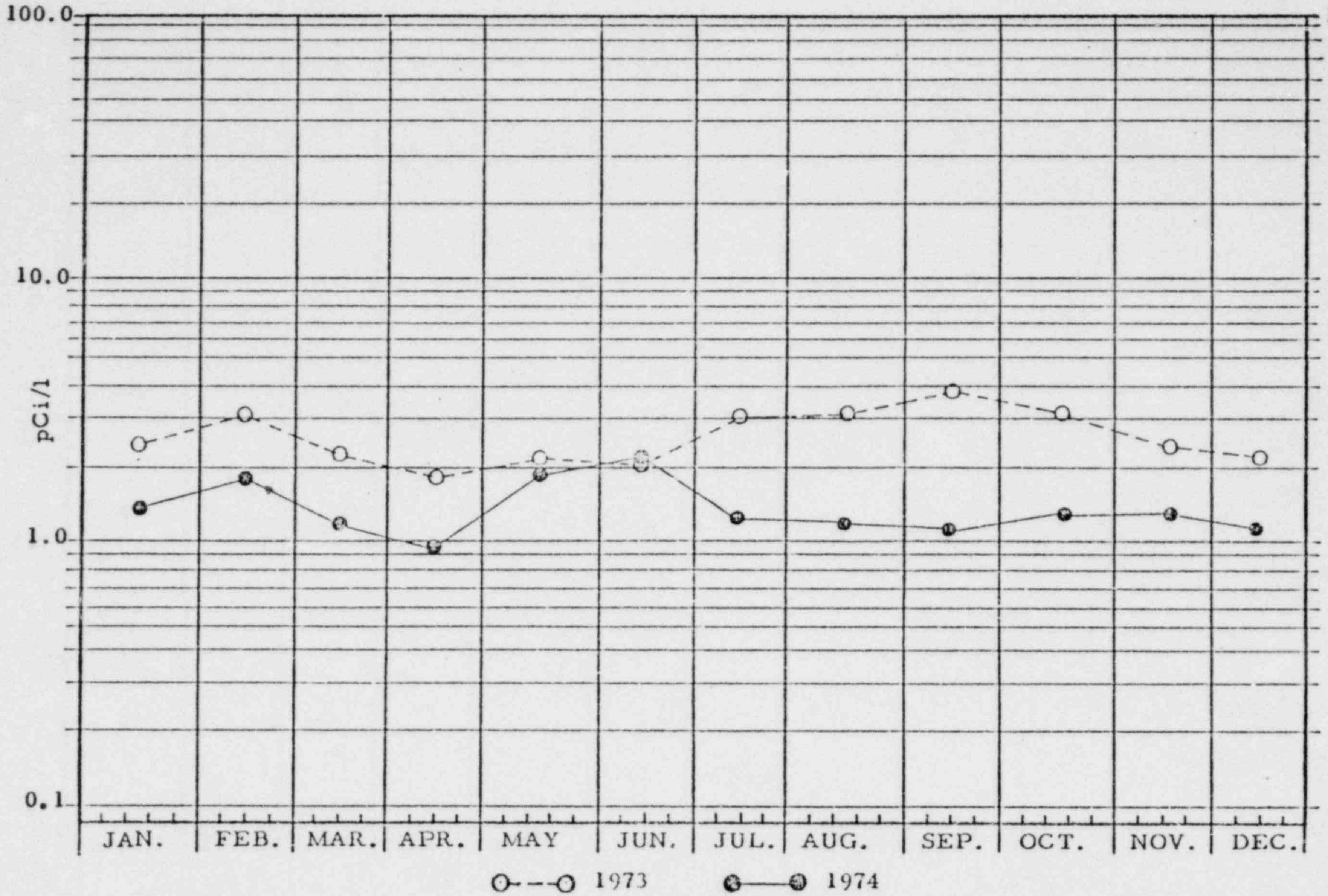

Figure 16. Milk samples, analyses for ^{90}Sr, collected from Earl Moore Farm (T-8, 3.2 miles WSW of plant), Davis-Besse NPP. The data are from Table 25.

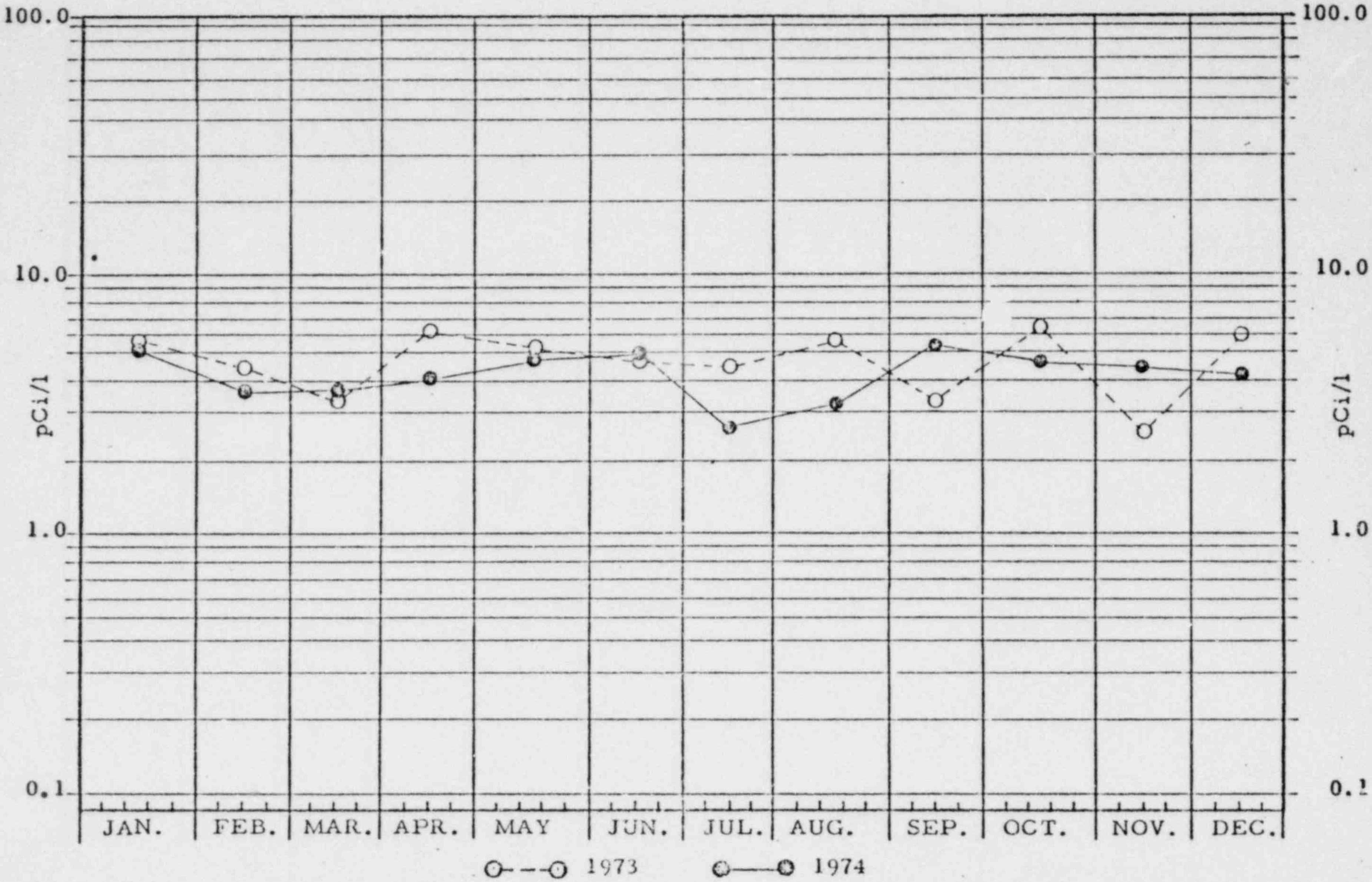

Figure 17. Milk samples, analyses for ^{90}Sr, collected from a Toledo Dairy (T-12, 23.5 miles WNW of plant), Davis-Besse NPP. The data are from Table 25.

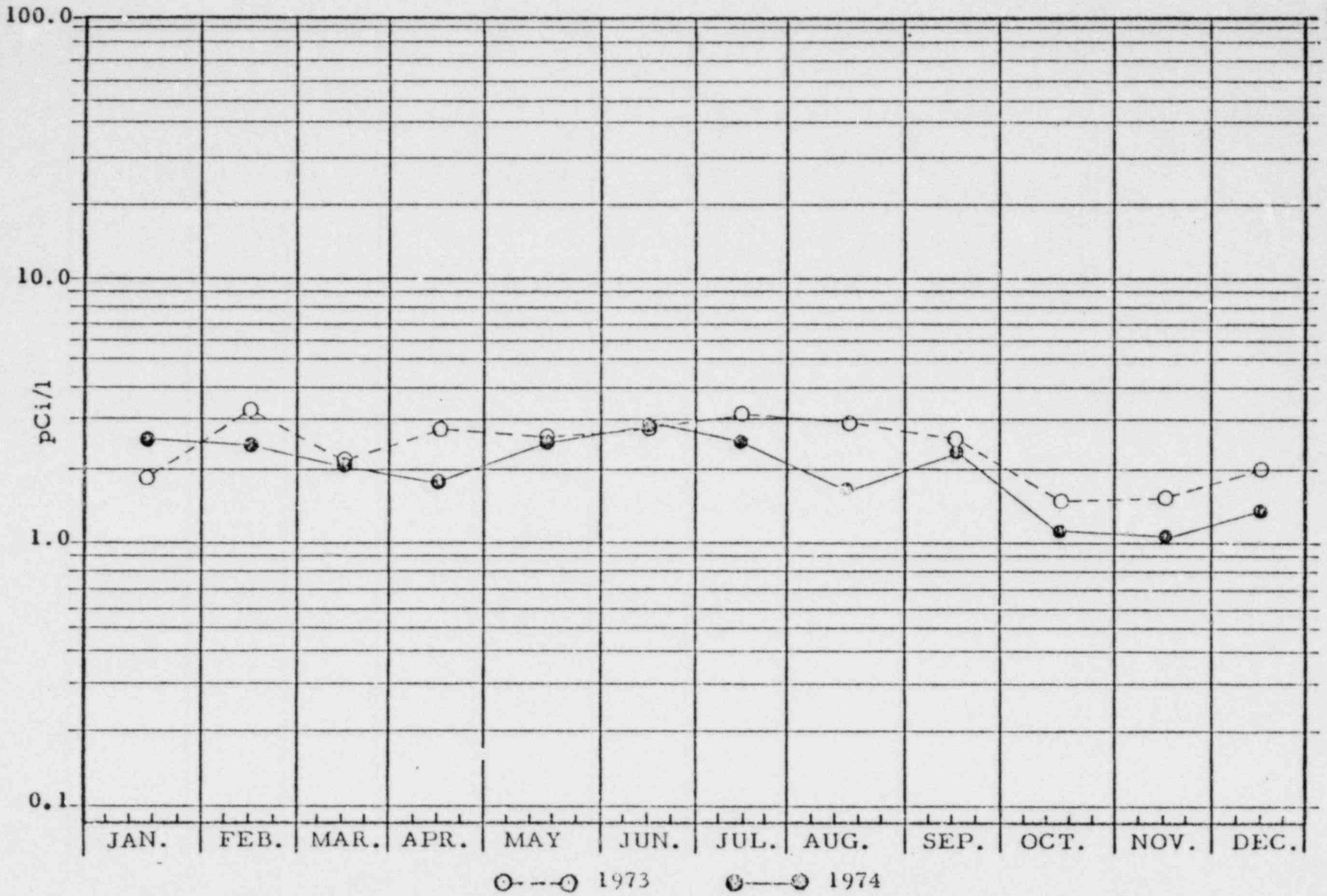

Figure 18. Milk samples, analyses for ^{90}Sr, collected from Daup Farm (T-20, 5.4 miles SSE of plant), Davis-Besse NPP. The data are from Table 25.

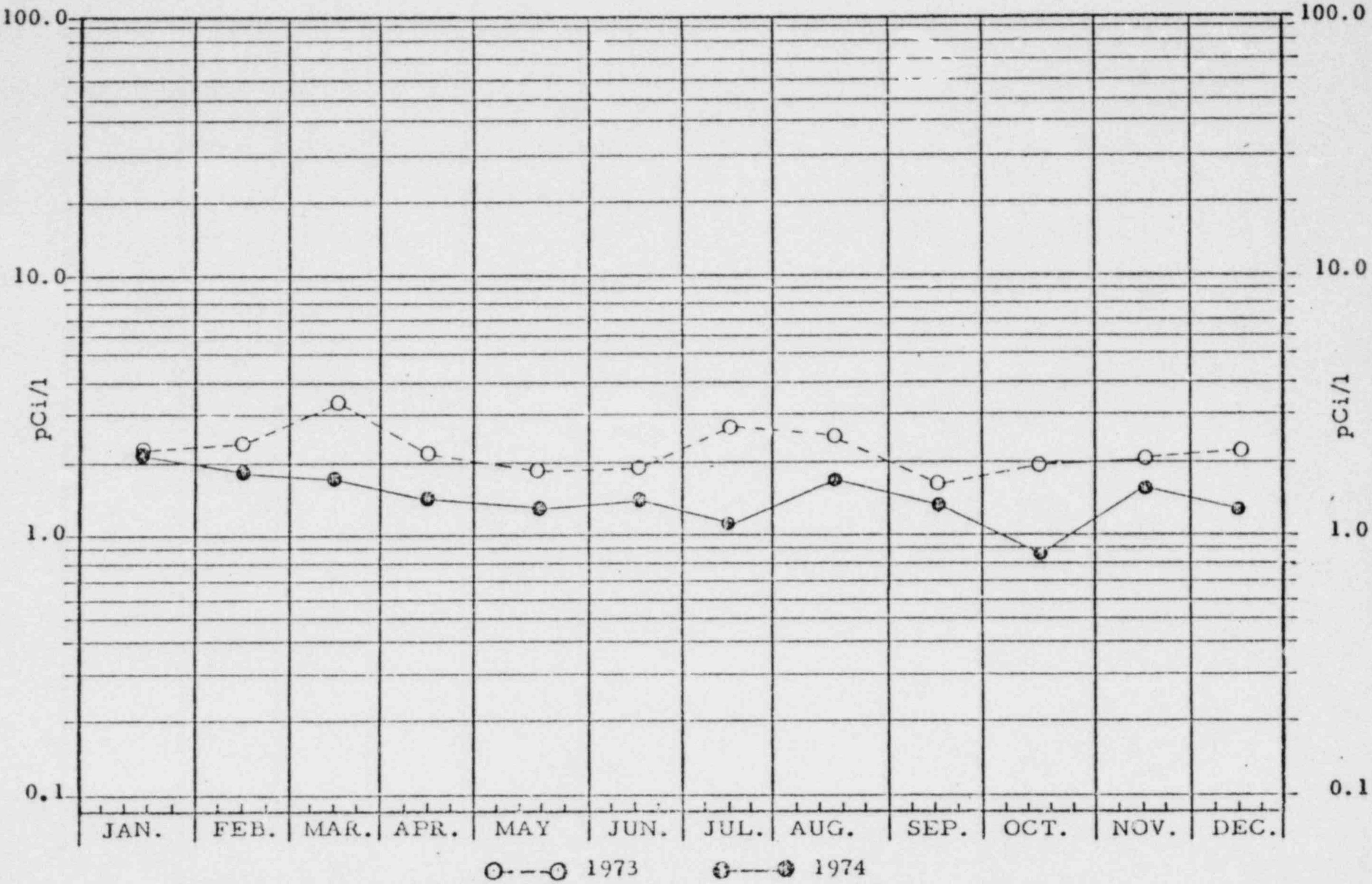

Figure 19. Milk samples, analyses for ^{90}Sr, collected from Haynes Farm (T-21, 3.6 miles SE of plant), Davis-Besse NPP. The data are from Table 25.

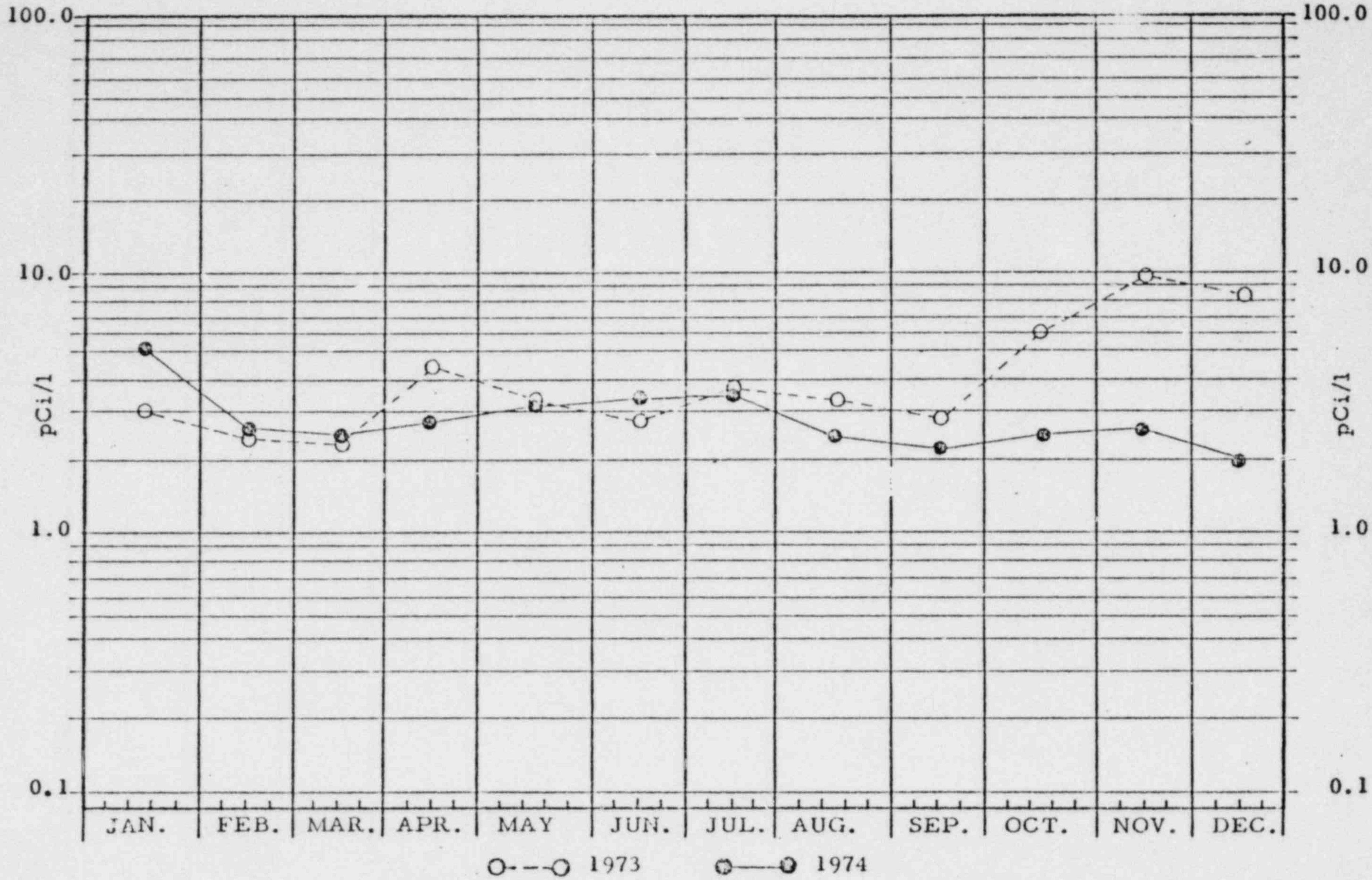

Figure 20. Milk samples, analyses for ^{90}Sr, collected from Toft's Dairy in Sandusky (T-24, 24.9 miles SE of plant), Davis-Besse NPP. The data are from Table 25.

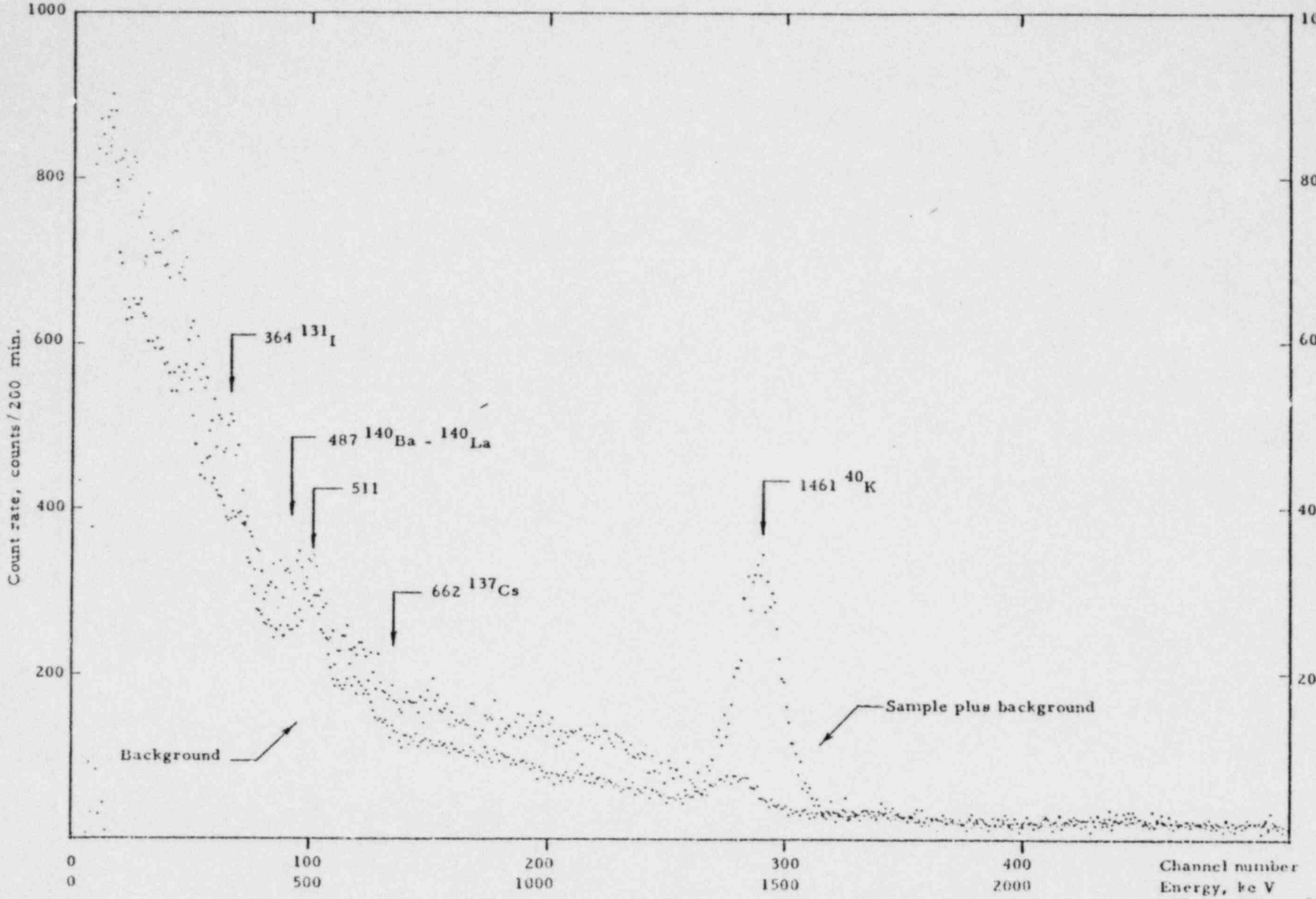

Figure 21. Gamma-ray spectrum of milk, 0-2560 KeV. Detector: 10 x 10 cm NaI (Tl), (No. 1). Sample: 3.5 c of milk, collected 2 December 1974 from Earl Moore Farm (T-8, 2.5 miles WSW of plant). Counts: 200 min. on 11 December 1974, Davis-Besse NPP.

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Table 26. Milk samples, analyses for calcium, stable potassium, and ratios of pCi ^{90}Sr/gCa and pCi ^{137}Cs/gK, July-December 1974, Davis-Besse NPS.

Location	Date Collected	Calcium g/l	Potassium g/l	pCi ^{90}Sr/g Ca	pCi ^{137}Cs/g K
T-8	7-01-74	1.12	1.49	1.22	2.80
(Earl Moore Farm	8-05-74	1.01	1.57	1.25	<2.23
3.2 mi. WSW of	9-03-74	1.10	1.55	1.10	3.65
plant)	10-01-74	1.05	1.47	1.42	2.38
	11-04-74	1.15	1.56	1.30	2.44
	12-02-74	1.03	1.59	1.20	2.96
T-12	6-28-74	1.12	1.54	2.56	2.45
(Toledo Dairy,	7-31-74	1.11	1.45	2.95	2.41
23.5 mi. WNW of	8-30-74	1.14	1.46	4.60	4.73
plant)	9-30-74	1.28	1.49	3.86	2.56
	10-31-74	1.20	1.57	3.94	4.01
	11-27-74	1.05	1.49	4.01	2.17
T-20	7-01-74	1.13	1.55	2.34	4.80
(Daup Farm, 5.4	8-05-74	1.06	1.42	1.73	3.68
mi. SSE of plant)	9-03-74	1.10	1.52	2.25	<2.30
	10-01-74	0.95	1.45	1.21	<2.41
	11-04-74	1.06	1.59	1.00	<2.20
	12-02-74	1.10	1.50	1.33	3.23

Table 26. Continued.

Location	Date Collected	Calcium g/l	Potassium g/l	pCi ^{90}Sr/g Ca	pCi ^{137}Cs/g K
T-21	7-01-74	1.23	1.45	0.88	<2.41
(Haynes Farm,	8-05-74	1.07	1.36	1.72	<2.57
3.6 mi. SE of plant)	9-03-74	1.04	1.37	1.47	<2.55
	10-01-74	1.10	1.39	0.85	<2.52
	11-04-74	1.00	1.50	1.64	<2.33
	12-02-74	1.07	1.48	1.31	<2.36
T-24	7-01-74	0.99	1.40	3.78	4.06
(Toft's Dairy in	8-05-74	1.01	1.47	2.48	4.27
Sandusky, 24.9 mi.	9-03-74	1.01	1.51	2.20	3.57
SE of plant)	10-01-74	1.02	1.44	2.53	3.29
	11-04-74	1.09	1.50	2.40	3.94
	12-02-74	1.10	1.59	1.82	2.52
Total Mean ± 2					

[a] Mean ± 2 were not calculated because most values were below the minimum sensitivity level.

Table 27. Fruit and vegetable samples, analyses for gross alpha, gross beta, ^{90}Sr, and gamma-emitting isotopes, July-December 1974, Davis-Besse NPP.

Location	Date collected	Sample type	Weight (g)		pCi/g[a] Gross alpha	Gross beta	Sr-90	I-131	Cs-137	K-40
T-8 (Earl Moore Farm, 3.2 mi. WSW of plant)	7-23-74	Apples	Wet	1986.0	<0.01	0.9±0.1	<0.001	<0.02	<0.01	1.0±0.2
			Dry	224.0	<0.06	7.5±0.2	<0.009	<0.22	<0.10	6.5±1.7
			Ash	5.43	<2.42	309.7±7.6	<0.37	<5.08	<3.93	351.5±69.1
		Pole beans	Wet	742.0	<0.02	2.2±0.1	0.006±0.001	<0.02	<0.008	2.6±0.2
			Dry	89.0	<0.17	18.4±0.5	0.051±0.01	<0.13	<0.07	22.0±1.5
			Ash	6.05	<2.47	270.3±7.3	0.756±0.15	<1.91	<0.99	324.2±22.2
		Tomatoes	Wet	4064.0	<0.01	2.0±0.1	0.003±0.001	<0.01	<0.005	2.7±0.2
			Dry	240.0	<0.25	33.4±0.8	0.053±0.020	<0.19	<0.09	47.1±2.5
			Ash	24.41	<2.47	326.6±8.1	0.521±0.180	<1.87	<0.89	463.1±24.6
		Squash	Wet	3755.0	<0.02	1.7±0.1	0.001±0.001	<0.01	<0.004	2.1±0.1
			Dry	174.0	<0.34	35.6±1.2	0.017±0.016	<0.17	<0.09	45.5±2.3
			Ash	16.06	<3.24	342.7±11.3	0.168±0.150	<1.64	<0.82	438.4±22.2
	9-16-74	Squash	Wet	7263.0	<0.01	1.5±0.1	0.001±0.001	<0.01	<0.002	1.6±0.1
			Dry	266.0	<0.18	37.6±0.6	0.030±0.020	<0.04	<0.05	40.9±1.9
			Ash	31.17	<1.67	344.9±5.9	0.27[illegible]0.15	<0.39	<0.46	375.4±17.4
		Apples	Wet	5636.0	<0.01	0.7±0.1	0.001±0.001	<0.01	<0.004	0.7±0.1
			Dry	634.0	<0.03	6.1±0.1	0.005±0.004	<0.05	<0.03	6.2±0.8
			Ash	11.12	<1.69	346.4±5.9	0.275±0.21	<1.93	<1.71	355.9±45.6
		Peaches	Wet	4638.0	<0.01	1.3±0.1	0.001±0.00	<0.01	0.006±0.002	1.3±0.1
			Dry	368.0	<0.15	16.2±0.6	0.017±0.01	<0.03	0.070±0.03	16.3±0.9
			Ash	17.91	<3.04	332.2±11.6	0.359±0.31	<0.56	1.52±0.62	334.7±18.5
T-16 (Put-in-Bay winery, 15.3 mi. ENE of plant)	12-10-74	Grape juice	Wet	3500.0	0.02±0.01	0.27±0.01	<0.001	<2.07	0.001	0.22
T-19 (Miller Farm, 3.7 mi. S of plant)	7-23-74	Cabbage	Wet	1914.0	<0.04	3.4±0.1	0.031±0.003	<0.01	<0.005	4.0±0.1
			Dry	180.0	<0.45	35.8±1.5	0.327±0.030	<0.10	<0.06	42.9±1.4
			Ash	27.5	<2.96	234.0±9.6	2.140±0.220	<0.68	<0.37	278.2±9.2
		Swiss chard	Wet	1878.0	<0.06	4.7±0.2	0.008±0.003	<0.02	<0.009	5.5±0.3
			Dry	136.0	<0.79	64.3±2.5	0.115±0.040	<0.24	<0.13	50.4±3.7
			Ash	32.0	<3.37	273.5±10.7	0.459±0.170	<1.03	<0.53	341.7±15.7
T-20 (Daup Farm, 5.4 mi. SSE of plant)	9-16-74	Beets	Wet	2538.0	<0.02	3.8±0.1	0.007±0.003	<0.01	<0.007	4.8±0.2
			Dry	224.0	<0.24	43.2±1.5	0.078±0.040	<0.14	<0.08	54.1±2.2
			Ash	30.0	<1.77	322.5±10.9	0.554±0.280	<1.05	<0.60	404.1±16.7
		Pears	Wet	4404.0	0.02±0.01	1.6±0.1	0.002±0.001	<0.01	<0.004	1.1±0.1
			Dry	597.0	0.13±0.10	8.5±0.3	0.014±0.005	<0.03	<0.03	8.3±0.8
			Ash	15.92	4.86±3.92	318.9±11.3	0.54±0.20	<1.08	<1.13	310.9±33.0
		Plums	Wet	3592.0	<0.02	1.8±0.1	0.001±0.001	<0.01	0.003±0.004	1.7±0.1
			Dry	520.0	<0.12	12.6±0.5	0.010±0.007	<0.03	0.05±0.03	11.7±0.9
			Ash	24.48	<3.01	269.6±10.6	0.212±0.140	<0.60	1.15±0.65	248.4±15.2

Table 27. Continued.

Location	Date collected	Sample type	Weight (g)		pCi/g[a]					
					Gross alpha	Gross b	Sr-90	I-131	Cs-137	K-40
T-25 (Winter Farm, 1.3 mi. S of plant)	7-23-74	Winter lettuce	Wet	730.0	<0.04	4.7±0.1	0.011±0.002	<0.01	0.009±0.005	5.6±0.2
			Dry	75.0	<0.41	45.8±1.6	0.106±0.02	<0.12	0.090±0.05	54.7±1.5
			Ash	12.42	<2.49	276.7±7.6	0.638±0.100	<0.72	0.540±0.32	330.4±9.1
	9-16-74	Crab apples	Wet	4732.0	<0.01	1.7±0.1	0.004±0.001	<0.01	<0.005	1.7±0.2
			Dry	803.0	<0.06	10.1±0.2	0.021±0.006	<0.03	<0.03	10.6±0.9
			Ash	29.13	<1.76	278.6±5.4	0.579±0.160	<0.82	<0.63	276.5±24.6
		Peaches	Wet	4802.0	<0.03	1.7±0.1	0.004±0.001	<0.01	0.005±0.004	1.7±0.1
			Dry	553.0	<0.25	15.0±0.7	0.036±0.01	<0.03	0.040±0.030	14.7±1.0
			Ash	36.50	<3.73	226.6±9.8	0.551±0.160	<0.48	0.660±0.53	222.5±15.7
		Tomatoes	Wet	6302.0	<0.02	2.3±0.1	0.001±0.00	<0.01	<0.003	2.4±0.1
			Dry	334.0	<0.34	44.0±1.4	0.022±0.010	<0.04	<0.05	45.9±1.9
			Ash	39.60	<2.67	370.6±11.7	0.184±0.100	<0.35	<0.44	387.1±16.0

[a] The error given is the probable counting error at the 95% confidence level. Less than (<) values are based on 3 sigma counting error for background sample. Gamma spectral analyses showed that all other gamma-emitting isotopes were less than minimum detectable levels.

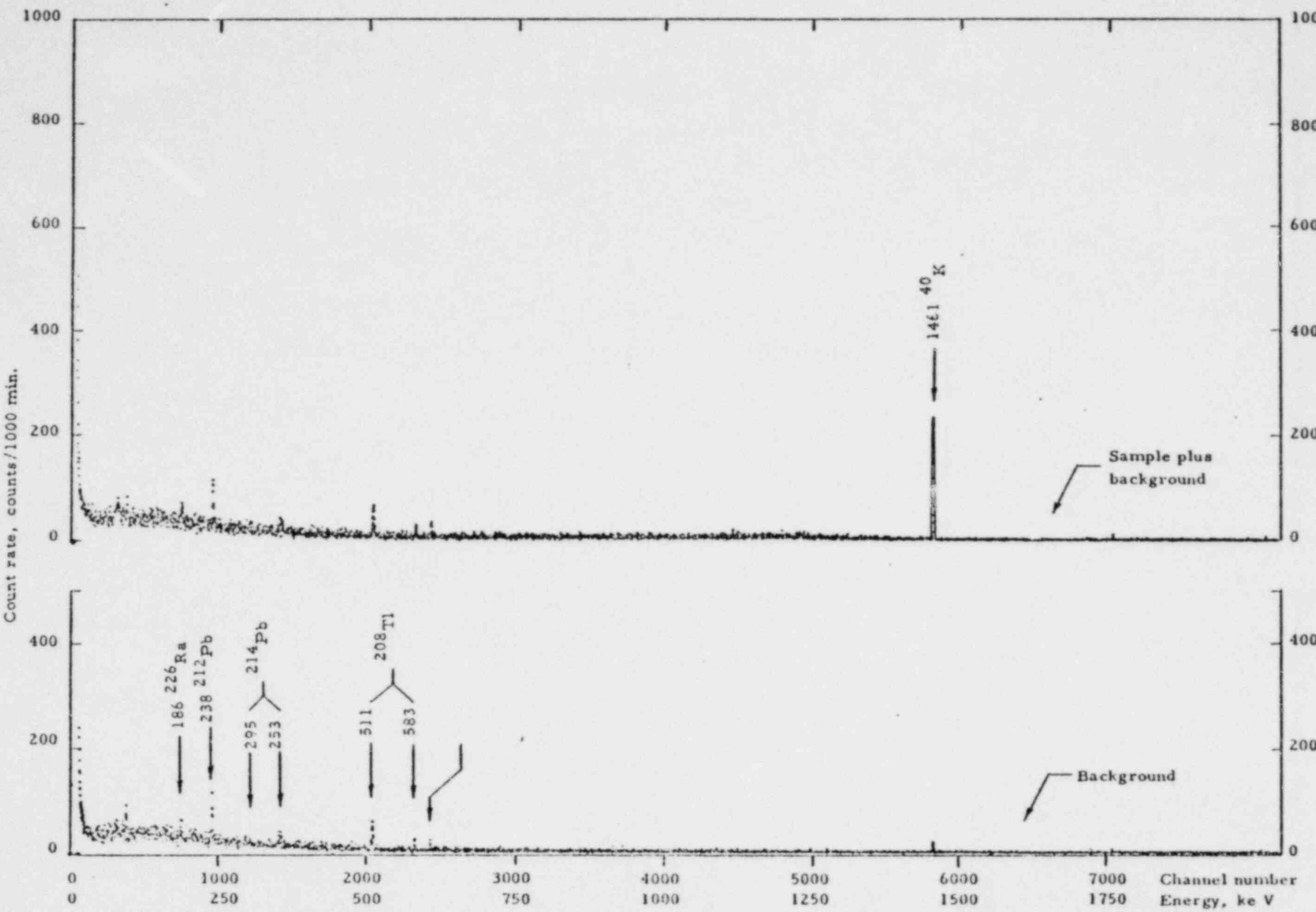

Figure 22. Gamma-ray spectrum of squash, 30-2048 keV. Detector: Ge(Li), 86.8 cm^3 closed end coaxial. Sample: 63.064 of dry squash, collected 23 July 1974 from Earl Moore Farm (T-8, 2.5 miles WSW of plant). Counts: 1000 min. on 8 November 1974, Davis-Besse NPP.

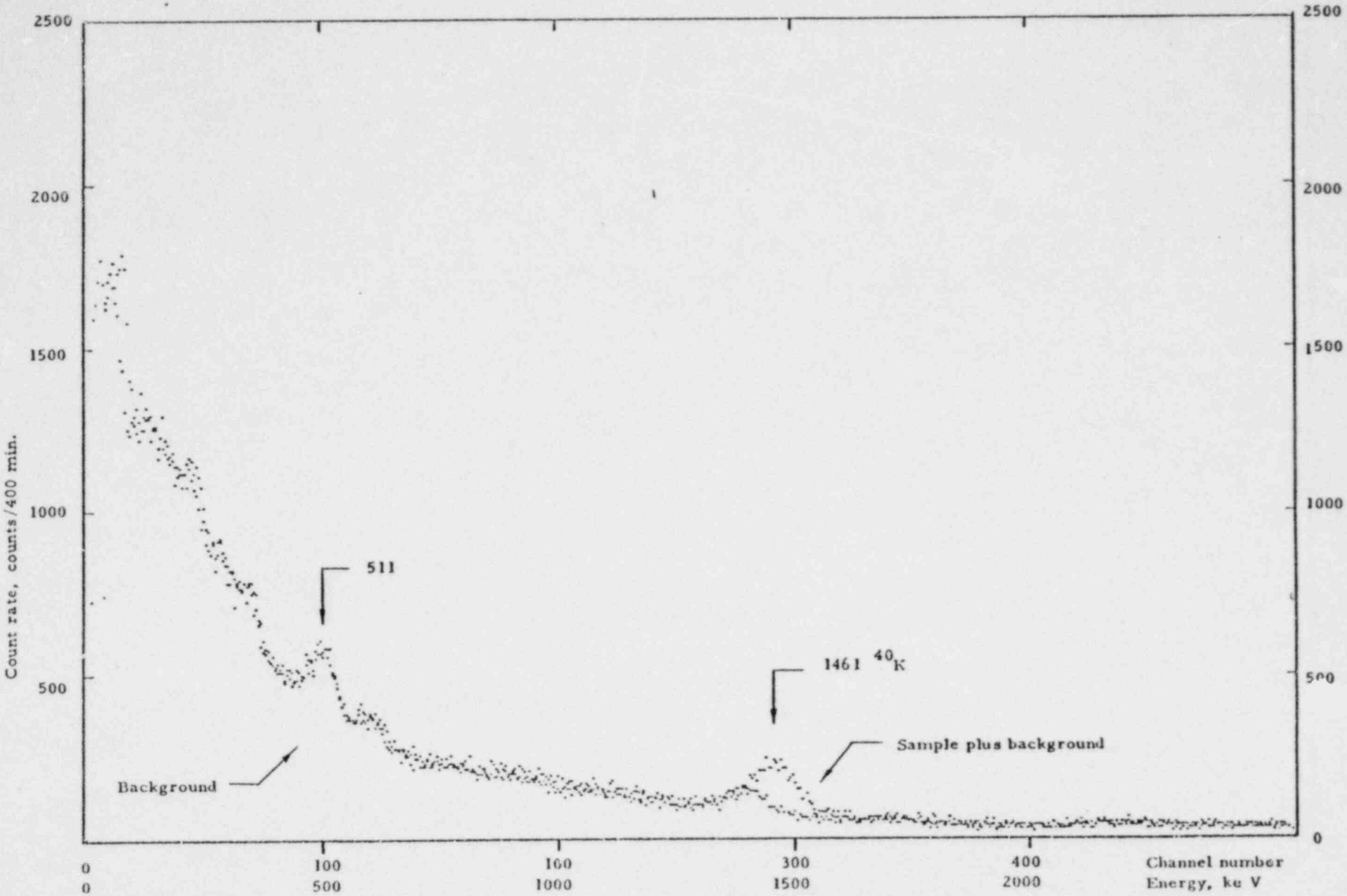

Figure 23. Gamma-ray spectrum of grape juice, 0-2560 keV. Detector: 10 cm x 10 cm NaI(Tl), (No. 1). Sample: 3.5 l of milk, collected 4 December 1974 from Put-In-Bay winery (T-16, 14.6 miles ENE of plant). Counts: 400 min. on 10 December 1974, Davis-Besse NPP.

Table 28. Beef sample, analyses for gross beta and gamma-emitting isotopes, collected from Peter Farm (T-22, 2.6 mi. SW of plant), Davis-Besse NPP.

Date collected	Weight (g)		pCi/g[a] Gross beta	^{137}Cs	^{40}K
9-16-74	Wet	2936.0	2.30±0.04	0.015±0.003	3.08±0.09
	Ash	27.74	243.07±4.17	1.61 ±0.29	326.4 ±9.30

[a] The error given is the probable counting error at the 95% confidence level. Gamma spectral analyses showed that all other gamma-emitting isotopes were less than the minimum detectable levels.

Table 29. Wildlife samples, analyses for gross beta, ^{90}Sr, and gamma-emitting isotopes, collected from the vicinity of the site.

Sample	Date Collected			Weight (g)	pCi/g[a] Gross beta	^{90}Sr	^{137}Cs	^{40}K
Muskrat	10-31-74	Muscle	Wet	182.0	2.34±0.05	NA	0.001	2.8
			Ash	2.00	213.4±4.9	NA	0.130	260.8
		Bone	Dry	20.70	NA	0.62±0.13	NA	NA
			Ash	13.94	NA	0.92±0.19	NA	NA
Racoon	10-31-74	Muscle	Wet	430.0	2.01±0.04	NA	0.013	2.2
			Ash	3.61	239.4±5.1	NA	1.520	258.3
		Bone	Dry	41.41	NA	0.61±0.13	NA	NA
			Ash	21.77	NA	1.16±0.25	NA	NA

[a] The error given is the probable counting error at the 95% confidence level. Less than (<) values are based on 3 sigma counting error for background sample.

[b] NA=Not analyzed. Analysis not required.

Table 30. Waterfowl samples, analyses for gross beta, ^{90}Sr and gamma-emitting isotopes, collected from the vicinity of the site, July-December 1974, Davis-Besse NPP.

Sample	Date collected			Weight (g)	pCi/g[a] Gross beta	^{90}Sr	^{137}Cs	^{40}K
Blue Winged Teal Ducks (3)	8-9-74	Muscle	Wet	268.0	2.6±0.1	NA	0.05±0.01	2.6± 0.1
			Ash	2.83	243.1±7.2	NA	5.20±0.55	247.1±10.3
		Bone	Dry	13.63	NA	0.93±0.13	NA	NA
			Ash	6.67	NA	1.90±0.27	NA	NA
Mallard Ducks (3)	8-9-74	Muscle	Wet	790.0	3.0±0.1	NA	0.02±0.01	2.7± 0.1
			Ash	9.46	253.3±7.3	NA	1.88±0.42	223.1±11.0
		Bone	Dry	63.75	NA	0.57±0.09	NA	NA
			Ash	28.89	NA	1.90±0.27	NA	NA

[a] The error given is the probable counting error at the 95% confidence level. Less than (<) values are based on 3 sigma counting error for background sample.

[b] NA = Not analyzed. Analysis not required.

Table 31. Grass and animal feed samples, analyses for gross alpha, gross beta, ^{90}Sr and gamma-emitting isotopes, July-December 1974, Davis-Besse NPP.

Location	Sample type	Date collected	Weight (g)		pCi/g[a] Gross alpha	Gross beta	^{90}Sr	^{137}Cs	^{40}K
T-8 (Earl Moore Farm, 2.5 mi. WSW of site)	Grass	8-26-74	Wet	3290.0	<0.04	4.1±0.1	0.013±0.002	<0.007	4.2±0.2
			Dry	538.0	<0.27	25.4±0.7	0.08±0.01	<0.05	25.7±1.3
			Ash	61.52	<2.35	221.9±6.5	0.69±0.13	<0.40	225.0±11.5
	Silage	12-16-74	Wet	1982.0	<0.15	13.6±0.5	0.030±0.005	0.06±0.02	12.6±0.5
			Dry	1137.0	<0.26	23.7±0.9	0.052±0.009	0.10±0.03	22.0±0.9
			Ash	101.42	<2.87	265.3±10.3	0.59±0.10	1.12±0.34	246.6±10.1
	Corn Feed	12-16-74	Wet	2271.0	<0.03	2.6±0.1	<0.004	<0.008	2.1±0.2
			Dry	1732.0	<0.04	2.6±0.9	<0.005	<0.01	2.5±0.2
			Ash	[illegible]3.03	<2.90	198.2±1.1	<0.41	<0.76	205.0±16.7
T-21 (Haynes Farm, 3.6 mi. SSW of plant)	Grass	8-26-74	Wet	1567.0	<0.12	7.9±0.3	0.09±0.01	0.07±0.02	7.0±0.6
			Dry	820.0	<0.22	15.0±0.6	0.18±0.02	0.13±0.04	13.3±1.1
			Ash	54.75	<3.4	224.7±9.7	2.62±0.25	1.57±0.07	199.2±16.2
	Hay	12-16-74	Wet	1610.0	<0.16	16.3±0.6	0.17±0.01	0.08±0.01	8.1±0.4
			Dry	1567.0	<0.19	18.7±0.7	0.20±0.01	0.09±0.02	9.3±0.4
			Ash	105.28	<2.63	260.1±10.5	2.94±0.17	1.30±0.25	130.5±6.1
	Silage	12-16-74	Wet	2027.0	0.22±0.17	5.1±0.3	0.029±0.007	<0.02	4.7±0.4
			Dry	946.0	0.46±0.37	10.8±0.7	0.06±0.01	<0.04	10.2±0.9
			Ash	89.55	5.06±3.95	114.6±7.0	0.66±0.15	<0.44	107.4±9.5
Vicinity of Site	Smartweed	8-22-74	Wet	6537.0	<0.06	4.5±0.2	0.041±0.004	0.012±0.008	4.7±0.3
			Dry	1456.0	<0.29	20.2±0.8	0.19±0.02	0.06±0.04	21.3±1.1
			Ash	126.02	<3.33	232.9±9.7	2.14±0.22	0.63±0.44	245.6±13.0

[a] The error given is the probable counting error at the 95% confidence level. Less than (<) values are based on 3 sigma counting error for background sample. Gamma spectral analyses showed that all other gamma-emitting isotopes were less than the minimum detectable levels in hay, silage and corn feed samples. Trace amounts of fallout products and beryllium-7 were detectable in grass samples.

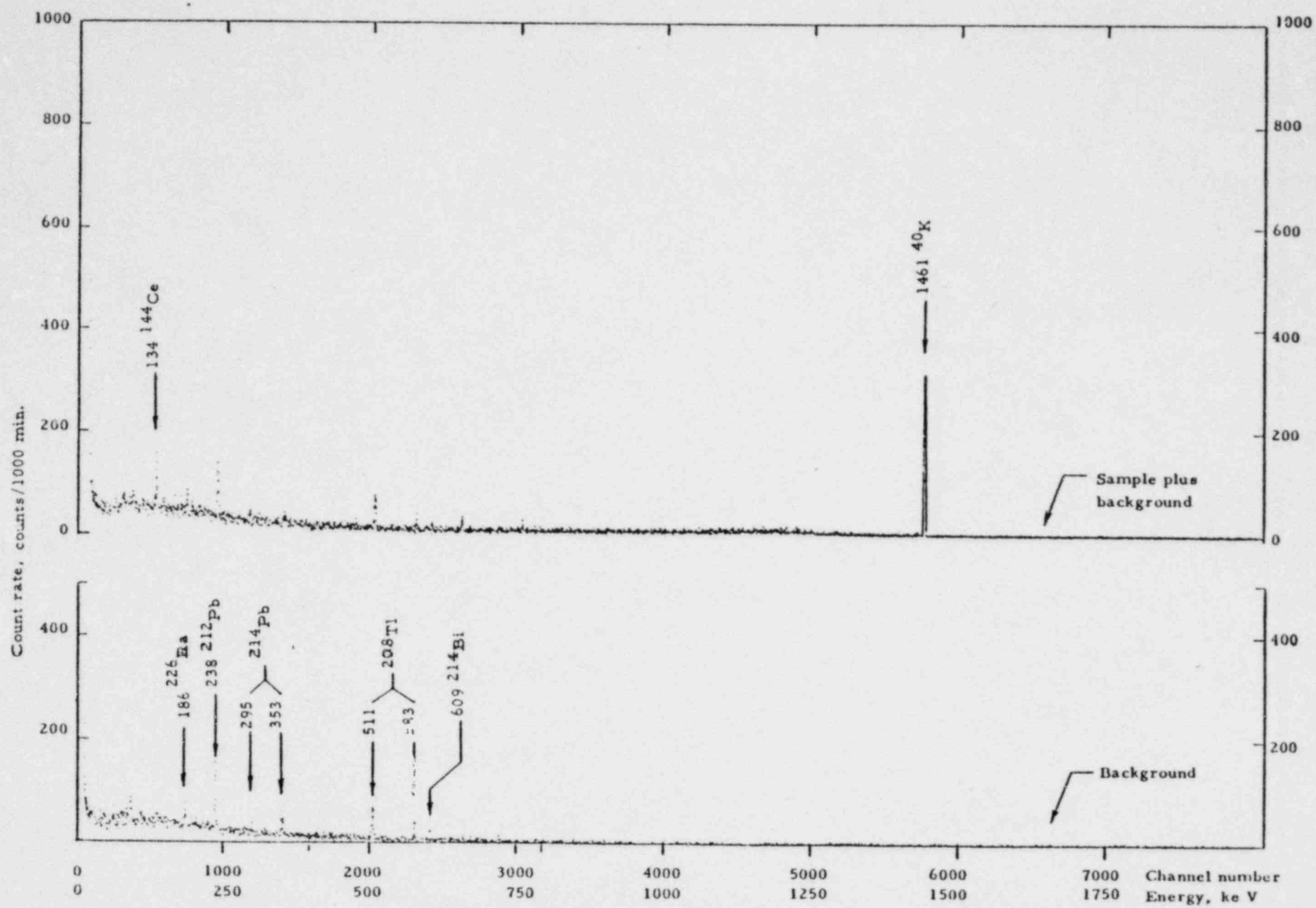

Figure 24. Gamma-ray spectrum of corn feed, 30-2048 KeV. Detector: Ge(Li), 86.8 cm^3 closed end coaxial. Sample: 178 g of dry corn feed, collected 16 December 1974 from Earl Moore Farm (T-8, 2.5 miles WSW of plant). Counts: 1000 min. on 8 January 1975,

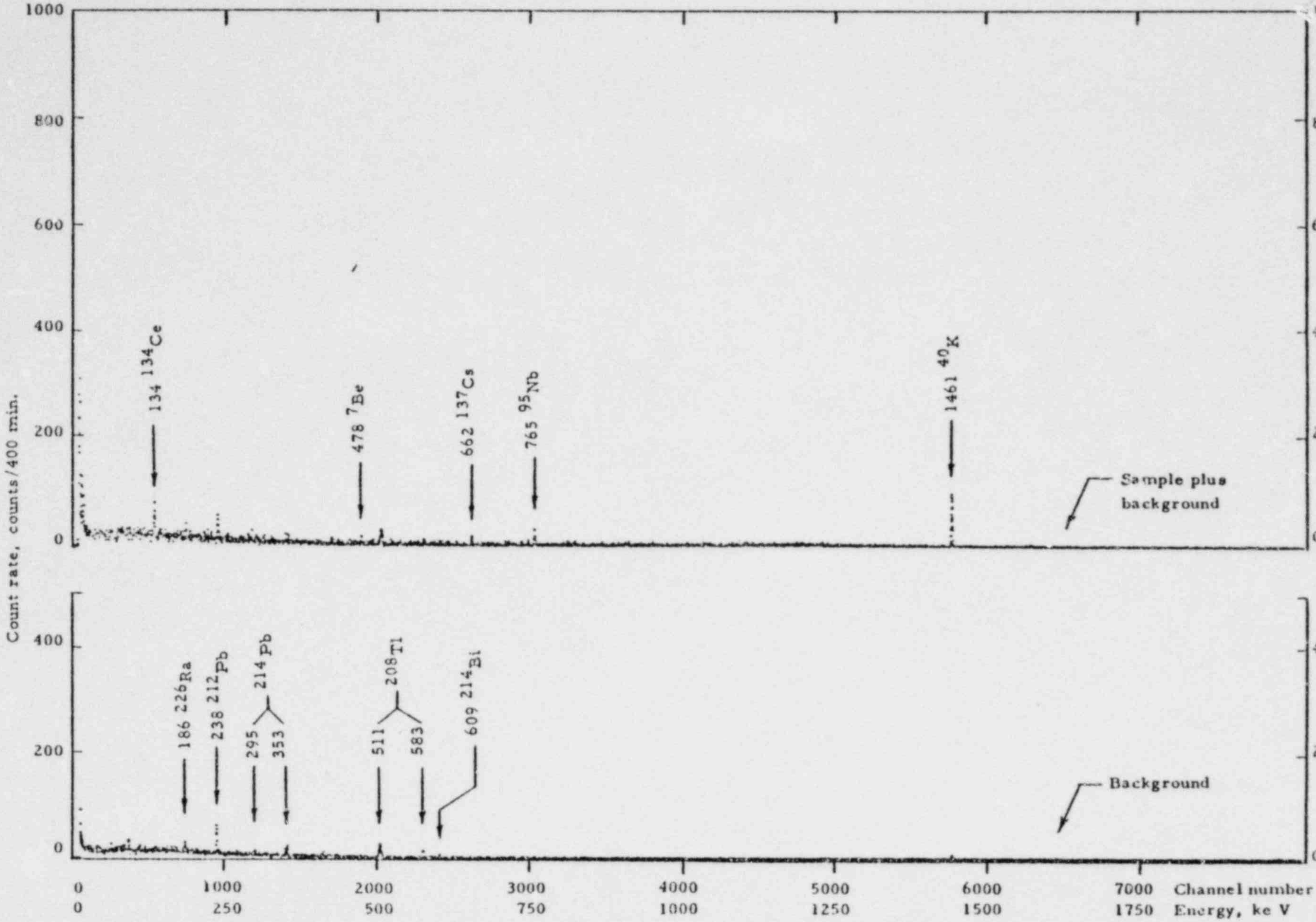

Figure 25. Gamma-ray spectrum of grass, 30-2048 keV. Detector: Ge(Li), 86.8 cm^3 closed end coaxial. Sample: 147 g of dry grass, collected 26 August 1974 from Haynes Farm (T-21, 3.6 miles SSW of plant). Counts: 400 min. on 6 December 1974, Davis-Besse NPP.

Table 32. Soil samples collected 16 September 1974, analyses for gross beta, ^{90}Sr, and gamma-emitting isotopes, Davis-Besse NPP.

Location	pCi/g dry weight[a]			
	Gross beta	^{90}Sr	^{137}Cs	^{40}K
T-1 (Site boundary, 0.6 mi. NE of plant)	11.03±1.78	<0.17	<0.03	15.0±0.8
T-8 (Earl Moore Farm, 3.2 miles WSW of plant)	31.16±2.73	<0.12	0.96±0.07	26.9±1.25
T-19 (Miller Farm, 3.7 miles S of plant)	30.59±2.72	<0.12	0.49±0.05	26.8±1.16
T-20 (Daup Farm, 5.4 miles SSE of plant)	25.03±1.76	<0.19	0.52±0.05	23.9±0.7

[a] The error given is the probable counting error at the 95% confidence level. Less than (<) values are based on 3 sigma counting error for background samples.

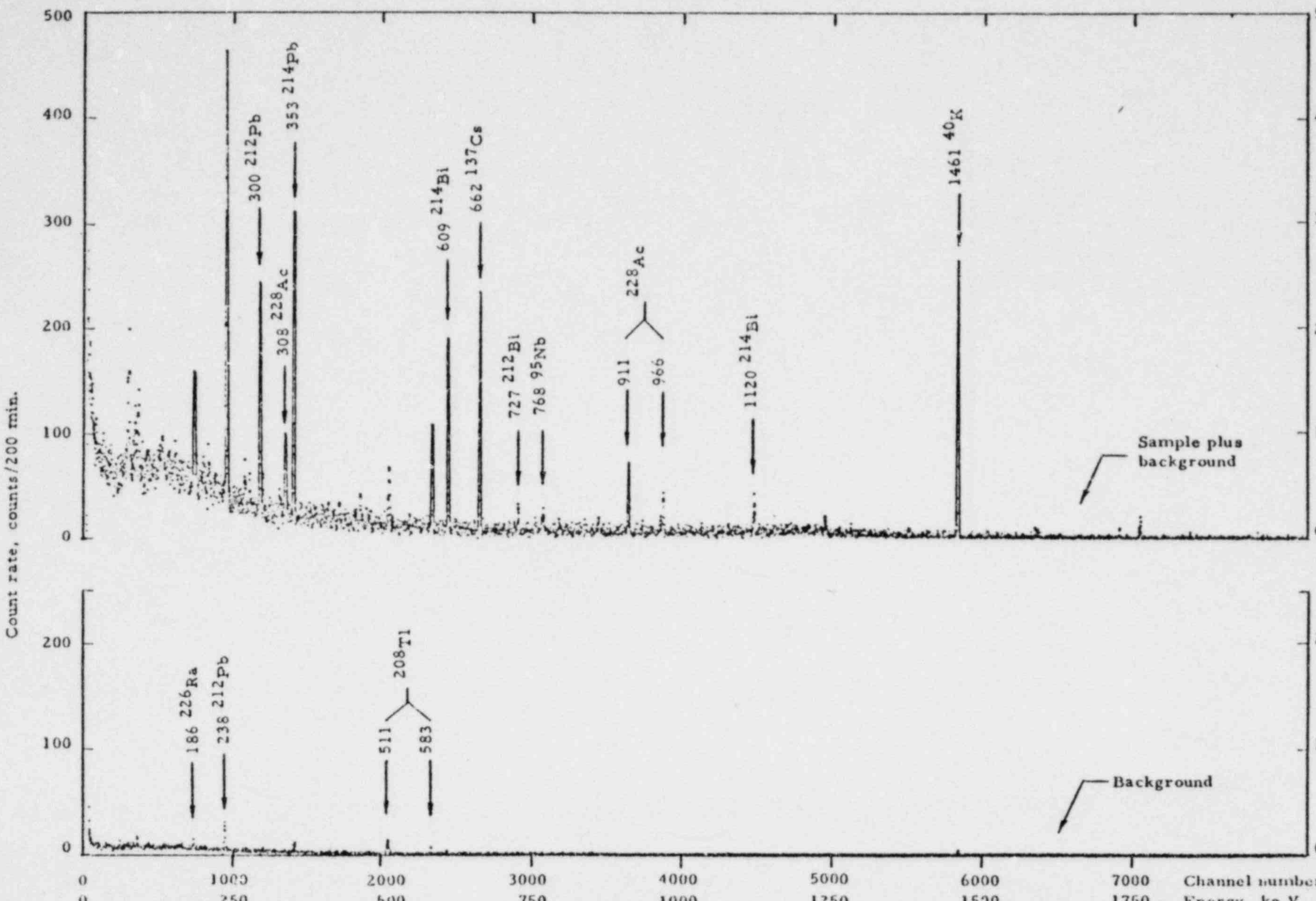

Figure 26. Gamma-ray spectrum of soil, 30-2048 keV. Detector: Ge(Li), 86.8 cm^3 closed end coaxial. Sample 556 g of dry soil, collected 16 September 1974 from Earl Moore Farm (T-8, 2.5 miles WSW of plant). Counts: 200 min. on 11 December 1974, Davis-Besse NPP

Table 33. Treated surface water samples, analyses for gross alpha, gross beta, and tritium, collected from the Erie Industrial Park (T-10, 6.5 miles SE of plant), Davis-Besse NPP. Gross beta data from this table are plotted in Figure 27.

Date Collected	pCi/l[a] Gross alpha	pCi/l[a] Gross beta	pCi/ml[a] Tritium
7-01-74	<0.27	2.45±0.20	0.34±0.11
7-08-74	0.30±0.16	2.45±0.20	0.42±0.12
7-15-74	<0.32	2.52±0.31	0.33±0.24
7-22-74	0.30±0.18	2.14±0.21	0.31±0.17
7-29-74	<0.30	2.42±0.31	<0.31
8-05-74	<0.31	2.60±0.32	<0.31
8-12-74	<0.28	2.54±0.31	0.36±0.22
8-19-74	0.55±0.34	2.20±0.29	<0.27
8-26-74	0.39±0.34	2.51±0.31	0.39±0.22
9-03-74	0.41±0.31	2.23±0.32	<0.23
9-11-74	0.50±0.39	2.96±0.38	0.36±0.18
9-16-74	0.34±0.32	2.33±0.35	0.33±0.18
9-23-74	<0.46	2.33±0.34	0.31±0.17
9-30-74	<0.38	2.14±0.44	0.34±0.16
Mean ± 2σ	0.40±0.19	2.41±0.43	0.35±0.07
10-07-74	0.37±0.25	2.22±0.23	0.51±0.20
10-14-74	0.49±0.28	2.80±0.25	0.45±0.14
10-21-74	0.26±0.25	2.31±0.26	0.44±0.20
10-28-74	<0.30	2.18±0.36	0.53±0.20
11-04-74	<0.41	2.43±0.37	0.28±0.22
11-11-74	<0.38	1.62±0.34	0.20±0.19
11-18-74	<0.45	2.11±0.34	0.38±0.14
11-25-74	<0.49	2.07±0.48	0.45±0.21
12-02-74	N.S.		
12-09-74	<0.19	2.46±0.22	0.37±0.19
12-16-74	<0.26	1.80±0.30	0.40±0.19
12-22-74	<0.19	2.07±0.14	0.45±0.19
12-30-74	0.33±0.27	1.84±0.23	0.45±0.19
Mean ± 2σ	0.36±0.19	2.16±0.64	0.42±0.17

[a] The error given is the probable counting error at the 95% confidence level. Less than (<) values are based on 3 sigma counting error for background sample.

[b] Less than (<) values are not included in the mean.

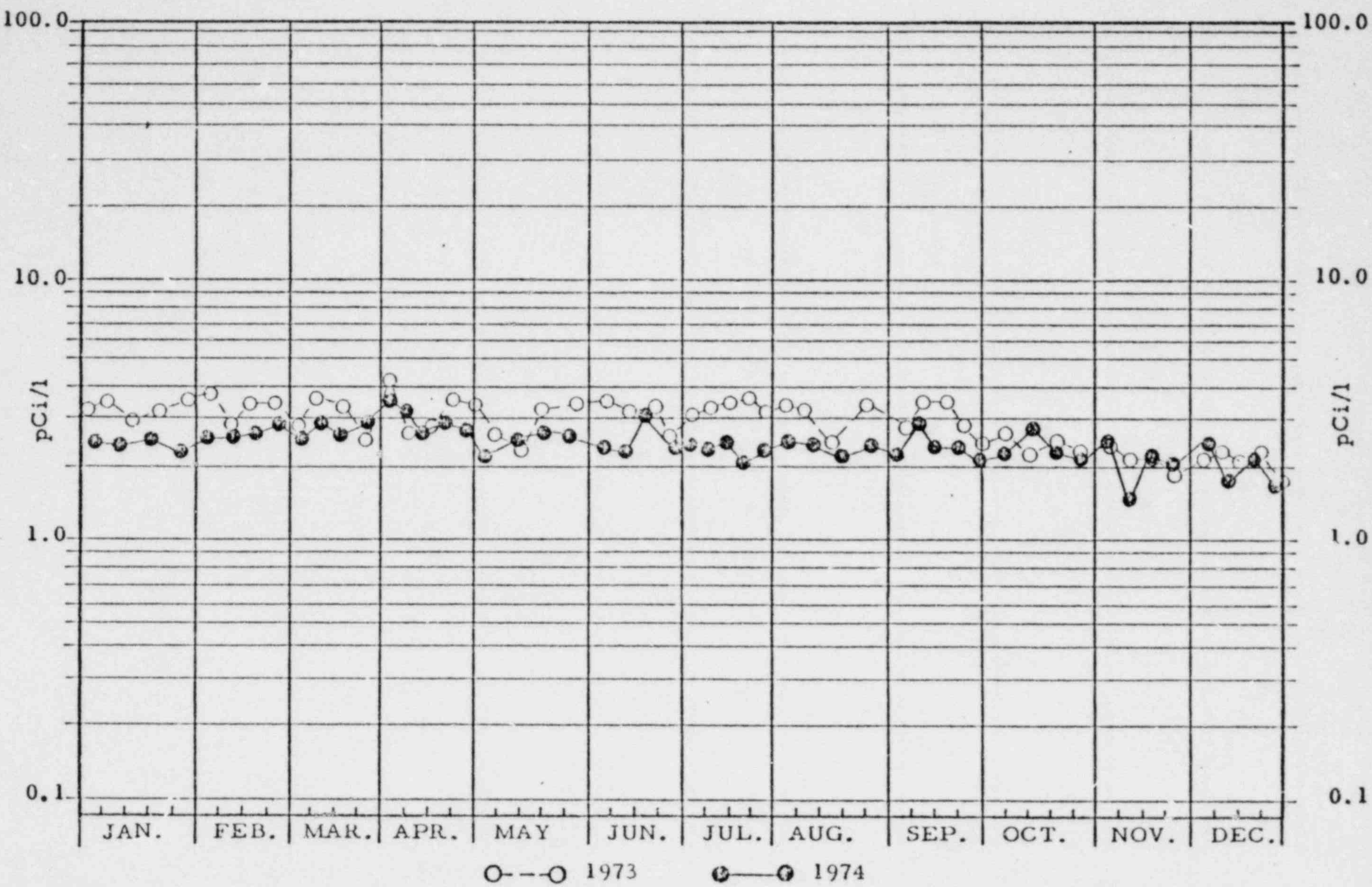

Figure 27. Treated surface water samples, gross beta activity, collected from Erie Industrial Park (T-10, 6.5 miles SE of plant), Davis-Besse NPP. The data are from Table 33.

Table 34. Treated surface water samples, analyses for gross alpha, gross beta and tritium, collected from Port Clinton (T-11, 9.5 miles SE of plant), Davis-Besse NPP. Gross beta data from this table are plotted in Figure 28.

Date Collected	pCi/l[a] Gross alpha	pCi/l[a] Gross beta	pCi/ml[a] Tritium
7-01-74	0.52±0.33	2.70±0.26	0.35±0.16
7-08-74	0.41±0.22	2.74±0.19	0.33±0.16
7-15-74	<0.33[b]	2.14±0.32	<0.31
7-22-74	<0.33	2.54±0.36	<0.31
7-29-74	<0.32	2.24±0.35	0.50±0.24
8-05-74>	<0.56	2.40±0.50	0.35±0.24
8-12-74	<0.30	2.34±0.24	0.42±0.19
8-19-74	<0.28	2.09±0.33	0.40±0.22
8-26-74	0.34±0.22	2.35±0.24	0.35±0.20
9-03-74	<0.31	2.77±0.35	0.34±0.19
9-11-74	<0.34	2.47±0.35	0.32±0.18
9-16-74	<0.31	2.21±0.34	0.36±0.18
9-23-74	0.73±0.55	2.85±0.52	0.26±0.16
9-30-74	<0.43	2.61±0.50	0.37±0.16
Mean ± 2σ	0.50±0.34	2.46±0.50	0.36±0.11
10-07-74	<0.28	2.58±0.27	0.48±0.20
10-14-74	0.47±0.31	2.74±0.28	0.47±0.20
10-21-74	<0.27	2.60±0.19	0.36±0.14
10-28-74	<0.35	1.97±0.34	0.62±0.20
11-04-74	<0.37	1.89±0.23	<0.20
11-11-74	<0.43	2.68±0.42	0.30±0.19
11-18-74	<0.57	2.31±0.44	0.36±0.19
11-25-74	<0.66	2.69±0.32	0.50±0.15
12-02-74	N.S.		
12-09-74	<0.23	2.44±0.23	0.49±0.19
12-16-74	<0.33	2.89±0.28	0.35±0.19
12-22-74	<0.33	2.35±0.27	0.43±0.19
12-30-74	0.45±0.21	2.80±0.19	0.41±0.14
Mean ± 2σ	0.46±0.03	2.50±0.63	0.43±0.18

[a] The error given is the probable counting error at the 95% confidence level. Less than (<) values are based on 3 sigma counting error for background sample.

[b] Less than (<) values are not included in the mean.

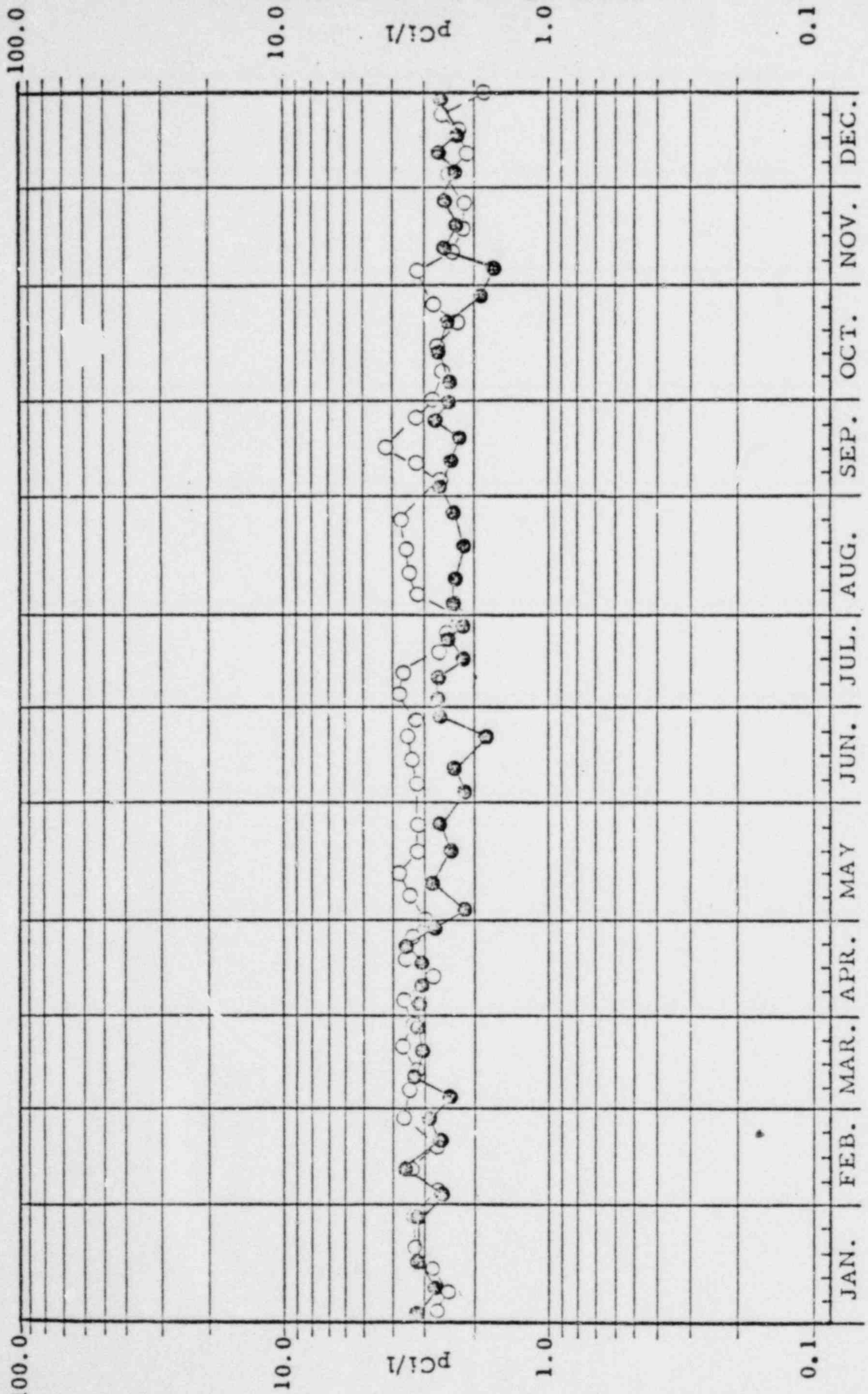

Figure 28. Treated surface water samples, gross beta activity, collected from Port Clinton (T-11, 11.5 miles SE of plant), Davis-Besse NPP. The data are from Table 34.

Table 35. Treated surface water samples, analyses for gross alpha, gross beta and tritium, collected from Toledo water treatment plant (T-12, 23.5 miles WNW of plant), Davis-Besse NPP. Gross beta data from this table are plotted in Figure 29.

Date Collected	Gross alpha	Gross beta	pCi/ml[a] Tritium
7-01-74	0.16±0.11	1.84±0.13	0.35±0.16
7-08-74	0.32±0.17	1.63±0.16	0.29±0.17
7-15-74	0.42±0.28	2.07±0.24	0.37±0.24
7-22-74	0.30±0.26	2.11±0.24	0.29±0.24
7-29-74	0.42±0.28	2.03±0.24	0.36±0.24
8-05-74	<0.24	2.12±0.17	0.32±0.20
8-12-74	<0.24	1.93±0.32	0.32±0.22
8-19-74	0.44±0.35	2.03±0.32	<0.27
8-26-74	<0.19	0.82±0.24	<0.27
9-03-74	<0.21	2.06±0.32	<0.27
9-09-74	<0.20	1.67±0.22	0.32±0.18
9-16-74	<0.18	1.48<0.21	0.41±0.18
9-23-74	0.21±0.19	1.61±0.21	0.42±0.18
9-30-74	0.21±0.18	1.56±0.19	0.38±0.13
Mean ±2σ	0.31±0.21	1.85±0.45	0.35±0.09
10-07-74	<0.28	1.71±0.20	0.36±0.14
10-14-74	<0.19	1.00±0.24	0.36±0.20
10-21-74	<0.22	1.14±0.25	0.38±0.21
10-28-74	<0.22	1.38±0.26	<0.20
11-04-74	<0.24	1.87±0.29	0.38±0.16
11-11-74	0.21±0.15	1.39±0.16	0.40±0.19
11-18-74	<0.13	1.64±0.17	0.50±0.19
11-25-74	<0.13	1.25±0.15	0.50±0.19
12-03-74	<0.14	1.28±0.11	0.52±0.13
12-09-74	<0.26	1.67±0.27	0.29±0.22
12-16-74	<0.26	1.52±0.26	0.33±0.24
12-23-74	<0.28	1.49±0.26	<0.30
12-30-74	<0.28	1.51±0.24	<0.30
Mean ±2σ		1.45±0.49	0.40±0.16

[a] The error given is the probable counting error at the 95% confidence level. Less than (<) values are based on 3 sigma counting error for background sample.

[b] Less than (<) values are not included in the mean.

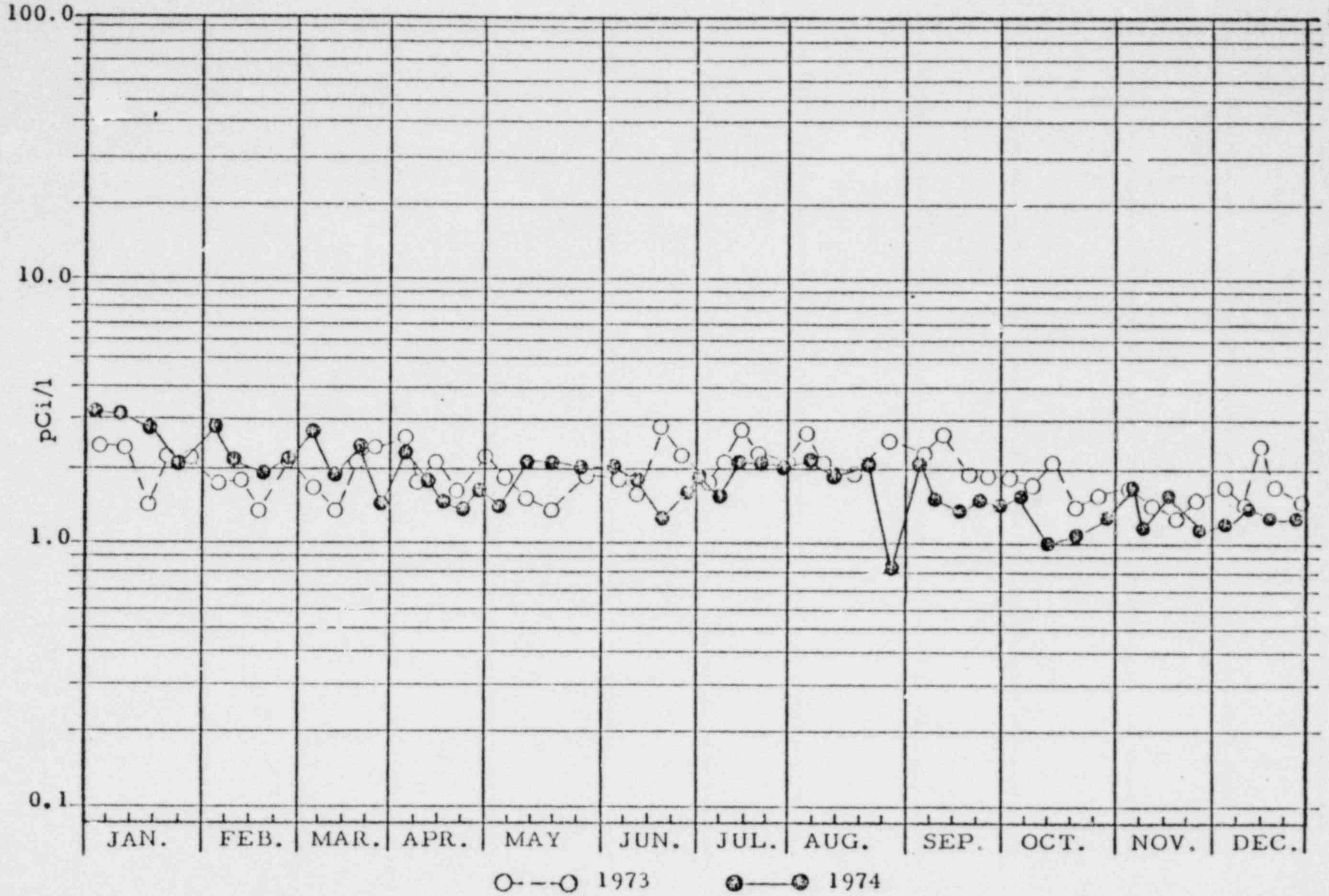

Figure 29. ' reated surface water samples, gross beta activity, collected from Toledo Water 'reatment Plant (T-12, 23.5 miles WNW of plant), Davis-Besse NPP. The data are from Table 35.

Table 36. Treated surface water samples, analyses for gross alpha, gross beta, and tritium, collected from Unit 1 treated water supply (T-28, onsite) Davis-Besse NPP. Gross beta data from this table are plotted in Figure 30.

Date Collected[a]	pCi/l[b] Gross alpha	pCi/l[b] Gross beta	pCi/ml[b] Tritium
9-03-74	<0.32[c]	2.64±0.34	0.28±0.18
9-11-74	<0.30	2.23±0.33	0.30±0.18
9-16-74	<0.30	2.11±0.32	0.32±0.18
9-23-74	<0.43	1.99±0.44	0.36±0.18
9-30-74	<0.67	2.05±0.42	0.28±0.16
Mean ± 2σ		2.20±0.52	0.31±0.06
10-07-74	<0.32	2.45±0.36	0.57±0.20
10-14-74	<0.33	2.52±0.37	0.51±0.20
10-21-74	<0.33	2.28±0.36	0.72±0.20
10-28-74	<0.32	2.32±0.30	0.49±0.19
11-04-74	<0.34	2.41±0.39	0.24±0.22
11-11-74	<0.35	2.07±0.39	0.35±0.19
11-18-74	<0.52	2.34±0.43	0.37±0.21
11-25-74	<0.64	2.57±0.55	0.37±0.21
12-02-74	N.S.		
12-09-74>	0.46±0.27	1.93±0.23	0.45±0.19
12-16-74	<0.25	2.25±0.29	0.33±0.19
12-22-74	<0.19	1.38±0.21	0.38±0.19
12-30-74	<0.25	2.41±0.25	0.31±0.22
Mean ± 2σ		2.24±0.65	0.42±0.26

[a] Sample collections started 3 September 1974.

[b] The error given is the probable counting error at the 95% confidence level. Less than (<) values are based on 3 sigma counting error for background sample.

[c] Less than (<) values are not included in the mean.

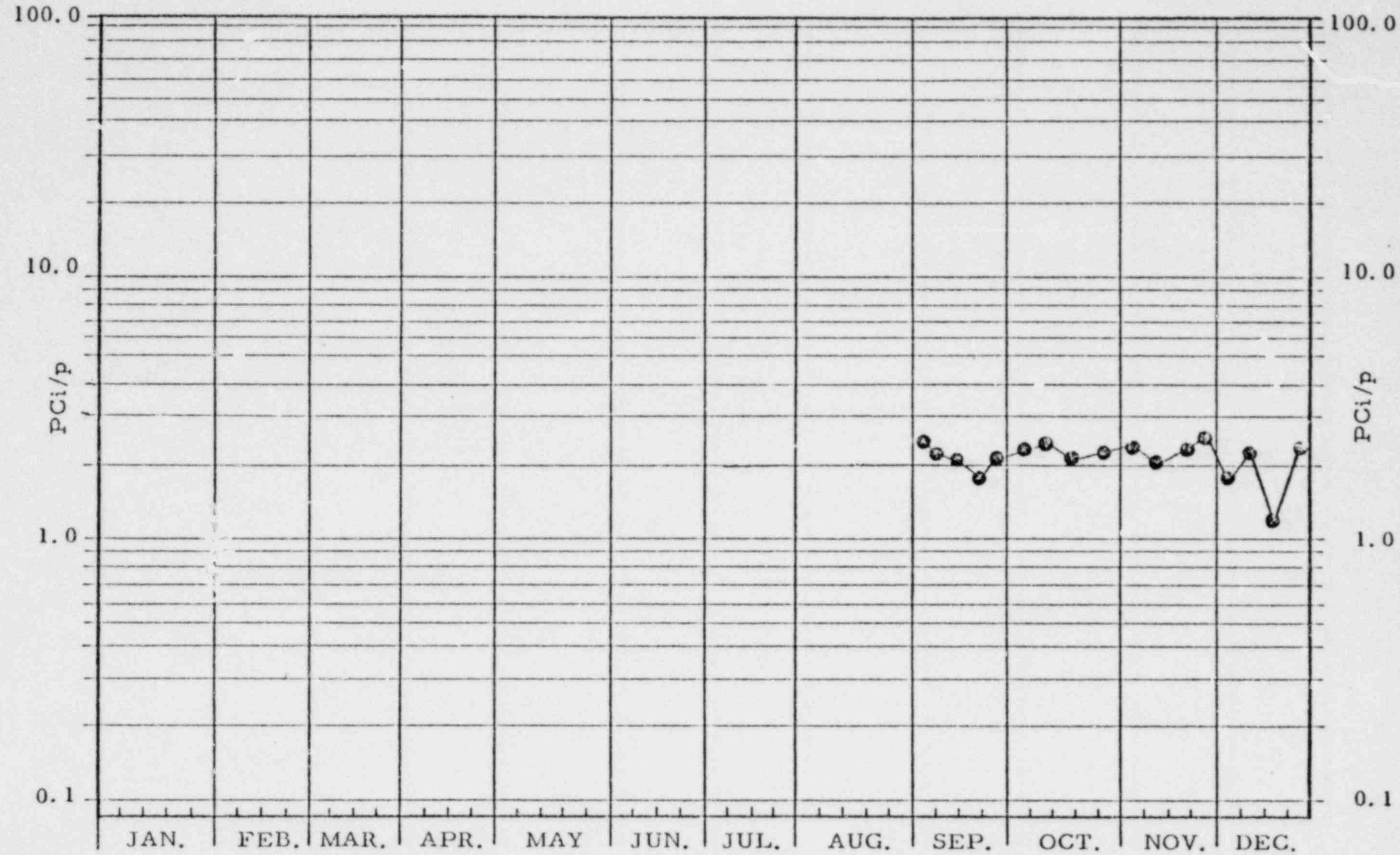

Figure 30. Treated surface water samples, gross beta activity, collected from Unit 1 treated water supply (T-28, onsite), Davis-Besse NPP. The data are from Table 36.

Table 37. Treated surface water samples, quarterly composites of weekly grab samples, for July-September and October-December 1974, analyses for ^{90}Sr and gamma-emitting isotopes, Davis-Besse NPP.

Location	Dates composited	pCi/l[a] ^{90}Sr	pCi/l[a] ^{137}Cs[b]
T-10			
(Erie Industrial Park tap water, 6.5 mi. SE of plant)	Jul.-Sept.	0.48±0.35	<1.5
	Oct.-Dec.	0.74±0.22	<1.5
T-11			
(Port Clinton tap water 9.5 mi. SE of plant)	Jul.-Sept.	<0.46	<1.5
	Oct.-Dec.	0.49±0.21	<1.5
T-12			
(Toledo tap water, 23.5 mi. WNW of plant)	Jul.-Sept.	0.31±0.26	<1.5
	Oct.-Dec.	<0.45	<1.5
T-28			
(Unit 1 Treated water supply, onsite)	Jul.-Sept.	0.53±0.33	<1.5
	Oct.-Dec.	0.55±0.20	<1.5

[a] The error given is the probable counting error at the 95% confidence level. Less than (<) values are based on 3 sigma counting error for background sample.

[b] No gamma-emitting isotopes were detected above background level.

Table 38. Untreated surface water, monthly composites of weekly grab samples, analyses for gross alpha, gross beta, and tritium, July-December 1974, Davis-Besse NPP.

Location	Month collected	Gross alpha (pCi/l)[a] Suspended solids	Gross alpha (pCi/l)[a] Dissolved solids	Gross alpha (pCi/l)[a] Total residue	Gross beta (pCi/l)[a] Suspended solids	Gross beta (pCi/l)[a] Dissolved solids	Gross beta (pCi/l)[a] Total residue	Tritium pCi/ml/[a]
T-1	July	0.07±0.06	<0.27	<0.40	0.20±0.10	2.02±0.30	2.22±0.32	0.44±0.24
(Site boundary, 0.6	August	0.14±0.09	0.31±0.29	0.55±0.30	0.23±0.14	2.64±0.30	2.87±0.33	0.44±0.21
mi. NE of plant	September	1.00±0.24	0.49±0.30	1.49±0.38	1.50±0.17	2.33±0.30	3.83±0.34	<0.23
near inlet canal)	Mean±2σ			1.02±1.22			2.97±1.61	0.44±0
	October	0.33±0.16	<0.35	<0.68	0.69±0.17	1.76±0.35	2.45±0.39	0.21±0.16
	November	0.21±0.13	<0.58	<0.79	0.44±0.16	2.74±0.42	3.16±0.45	0.46±0.19
	December	0.88±0.40	<0.29	0.85	1.38±0.28	3.21±0.27	4.59±0.39	0.47±0.19
	Mean±2σ			0.88			3.41±2.17	0.38±0.29
T-2[b]	July	0.24±0.07	0.40±0.21	0.64±0.22	0.32±0.08	1.84±0.21	2.14±0.22	<0.31
(Site boundary, 0.9	August	0.31±0.10	0.28±0.19	0.59±0.21	0.60±0.12	2.22±0.21	2.82±0.24	0.58±0.21
mi. E of plant)	September	0.97±0.24	0.80±0.38	1.77±0.45	1.31±0.16	3.17±0.32	4.48±0.36	0.31±0.19
	Mean±2σ			1.00±1.23			3.15±2.40	0.45±0.38
	October	0.99±0.30	<0.50	0.99	1.86±0.22	1.91±0.38	3.77±0.44	0.39±0.18
	November	1.07±0.31	<0.69	1.07±0.31	1.94±0.24	3.01±0.48	4.95±0.54	0.35±0.19
	December	0.49±0.27	<0.65	<1.14	0.52±0.21	3.00±0.51	3.52±0.55	0.61±0.16
	Mean±2σ			1.03±0.11			4.08±1.52	0.44±0.31
T-3	July	0.37±0.12	0.69±0.53	1.06±0.54	0.56±0.12	3.02±0.35	3.58±0.37	0.37±0.24
(Site boundary, 1.4	August	0.16±0.12	0.45±0.36	0.61±0.38	0.70±0.17	2.95±0.37	3.65±0.41	0.47±0.22
mi. SE of plant ;	September	0.47±0.17	1.55±0.68	2.02±0.70	0.95±0.15	4.59±0.44	5.54±0.46	0.34±0.19
Toussaint River at storm drain outfall)	Mean±2σ			1.23±1.44			4.26±2.22	0.39±0.14
	October	1.01±0.30	<0.59	1.01±0.30	1.71±0.22	1.70±0.50	3.41±0.55	0.46±0.18
	November	0.45±0.21	0.58±0.37	1.03±0.43	1.33±0.21	3.09±0.38	4.42±0.43	0.37±0.19
	December	0.38±0.25	<0.87	<1.25	0.92±0.25	3.31±0.51	4.23±0.57	0.31±0.19
	Mean±2σ			1.02±0.03			4.02±1.07	0.36±0.15
T-10	July	0.20±0.10	<0.30	<0.60	0.36±0.11	2.24±0.31	2.60±0.33	0.42±0.24
(Erie Industrial	August	0.25±0.13	<0.30	<0.68	0.42±0.16	2.83±0.32	3.25±0.36	0.43±0.22
Park intake, 6.5	September	1.05±0.22	0.81±0.30	1.96±0.37	1.34±0.17	3.64±0.27	5.00±0.32	0.33±0.18
mi. SE of plant)	Mean±2σ			1.96±0.37			3.62±2.28	0.39±0.11
	October	0.42±0.13	<0.66	<1.08	0.78±0.12	2.59±0.32	3.37±0.34	0.30±0.19
	November	0.25±0.06	<0.23	0.25±0.06	0.43±0.07	2.45±0.26	2.88±0.28	0.33±0.13
	December	<0.12	<0.44	<0.56	0.29±0.18	2.16±0.41	2.45±0.45	0.34±0.19
	Mean±2σ			0.25±0.06			2.90±0.92	0.32±0.40
T-11	July	0.54±0.15	<0.33	<1.02	0.85±0.13	2.77±0.30	3.62±0.33	0.52±0.24
(Port Clinton water	August	0.28±0.15	0.47±0.33	0.75±0.36	0.71±0.18	2.30±0.31	3.01±0.36	0.47±0.22
intake, 9.5 mi.	September	0.88±0.22	0.92±0.42	1.80±0.47	1.26±0.16	3.05±0.34	4.31±0.38	0.35±0.19
SE of plant)	Mean±2σ			1.28±1.48			3.65±1.30	0.45±0.17
	October	0.72±0.25	<0.56	0.72	1.03±0.19	2.82±0.45	3.85±0.49	0.49±0.20
	November	1.33±0.25	0.66±0.30	1.99±0.39	3.34±0.16	2.91±0.29	6.73±0.33	0.39±0.19
	December	0.23±0.18	<0.61	<0.84	0.48±0.20	3.32±0.50	3.80±0.56	0.26±0.19
	Mean±2σ			1.35±0.9			4.63±2.66	0.38±0.23

Table 38. Continued.

Location	Month collected	Gross alpha (pCi/l)[a] Suspended solids	Gross alpha (pCi/l)[a] Dissolved solids	Gross alpha (pCi/l)[a] Total residue	Gross beta (pCi/l)[a] Suspended solids	Gross beta (pCi/l)[a] Dissolved solids	Gross beta (pCi/l)[a] Total residue	Tritium pCi/ml[a]
T-12	July	0.35±0.11	0.55±0.28	0.90±0.30	0.56±0.12	2.41±0.25	2.97±0.28	0.35±0.17
(Toledo water	August	0.18±0.09	0.48±0.24	0.66±0.26	0.41±0.11	2.62±0.25	3.03±0.27	0.24±0.22
intake, 23.5 mi.	September	0.67±0.24	0.34±0.30	1.01±0.38	1.08±0.15	2.84±0.35	3.92±0.38	0.36±0.19
WNW of plant)	Mean±2σ			0.79±0.38			3.31±1.06	0.32±0.13
	October	0.33±0.16	0.85±0.49	1.18±0.52	0.42±0.15	2.72±0.44	3.14±0.46	0.52±0.20
	November	<0.06	<0.35	<0.41	<0.10	2.22±0.38	2.22±0.38	0.33±0.19
	December	0.46±0.18	<0.50	<0.96	0.53±0.15	3.01±0.31	3.54±0.34	0.32±0.14
	Mean±2σ			1.18±0.52			2.97±1.34	0.32±0.23

[a] The error given is the probable counting error at the 95% confidence level. Less than (<) values are based on 3 sigma counting error for background sample.

Table 39. Untreated surface water samples, quarterly composites of weekly grab samples, for July-September and October-December 1974, analyses for ^{90}Sr and gamma-emitting isotopes, Davis-Besse NPP.

Location	Dates composited	pCi/l[a] ^{90}Sr	pCi/l[a] ^{137}Cs[b]
T-1			
(Site boundary, 0.6 mi. NE of	Jul.-Sept.	0.35±0.33	<1.5
plant near inlet canal)	Oct.-Dec.	0.90±0.33	<1.5
T-2			
(Site boundary, 0.9 mi. E of	Jul.-Sept.	0.64±0.24	<1.5
plant)	Oct.-Dec.	0.68±0.25	<1.5
T-3			
(Toussaint River, site boundary,	Jul.-Sept.	0.54±0.32	<1.5
1.4 mi. SE of plant)	Oct.-Dec.	0.84±0.31	<1.5
T-10			
(Erie Industrial Park intake,	Jul.-Sept.	0.54±0.18	<1.5
6.5 mi. SE of plant)	Oct.-Dec.	0.83±0.35	<1.5
T-11			
(Port Clinton water intake,	Jul.-Sept.	0.58±0.25	<1.5
11.5 mi. SE of plant)	Oct.-Dec.	0.75±0.34	<1.5
T-12			
(Toledo water intake,	Jul.-Sept.	0.49±0.34	<1.5
23.5 mi. WNW of plant)	Oct.-Dec.	<0.37	<1.5

[a] The error given is the probable counting error at the 95% confidence level. Less than (<) values are based on 3 sigma counting error for background sample.

[b] No gamma-emitting isotopes were detected above background level.

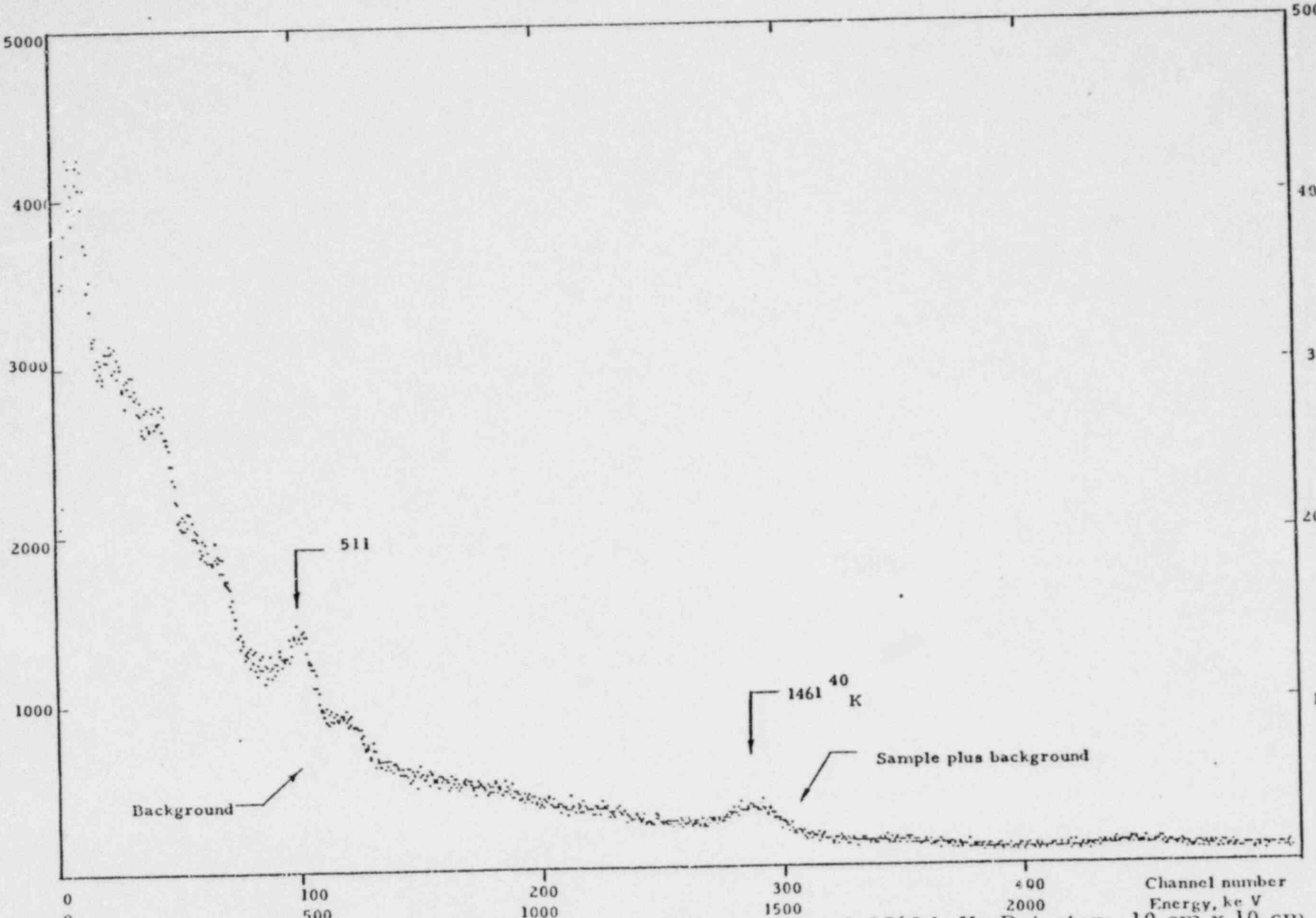

Figure 31. Gamma-ray spectrum of untreated surface water, 0-2560 keV. Detector: 10 cm x 10 cm NaI(Tl), (No. 1). Sample: 3. 5 l of untreated surface water, composite of weekly grab samples, collected from 1 October 1974 through 31 Dc⁻ember 1974 from Toledo water intake (T-12, 23. 5 miles WNW of plant). Counts: 1000 min. o' 9 January 1975, Davis-Besse NPP.

Table 40 . Fish samples, analyses for gross beta, ^{90}Sr and gamma-emitting isotopes, collected from Lake Erie in the vicinity of site (T-1, site boundary, NE of plant), Davis-Besse NPP.

Type of fish	Date collected	Sample type	Weight (g)		pCi/g[a] Gross beta	^{90}Sr	^{137}Cs	^{40}K
Carp	5-23-74	Muscle	Wet	1588.0	3.0±0.1	NA[b]	0.007±0.002	2.9±0.1
			Ash	18.53	256.9±7.4	NA	0.63 ±0.25	248.0±7.9
		Bone	Dry	70.30	NA	0.35±0.05	NA	NA
			Ash	29.64	NA	0.82±0.11	NA	NA
White Bass	8-23-74	Muscle	Wet	1174.0	2.9±0.1	NA	0.025±0.004	2.8±0.1
			Ash	12.70	267.1±7.7	NA	2.34 ±0.38	257.0±9.8
		Bone	Dry	33.00	NA	0.22±0.06	NA	NA
			Ash	13.07	NA	0.56±0.15	NA	NA
Catfish	8-23-74	Muscle	Wet	510.0	2.5±0.1	NA	0.021±0.003	2.7±0.1
			Ash	5.31	240.8±4.2	NA	2.02 ±0.27	263.3±6.8
		Bone	Dry	20.91	NA	0.49±0.09	NA	NA
			Ash	8.03	NA	1.29±0.23	NA	NA
Carp	11-24-74	Muscle	Wet	957.0	2.5±0.1	NA	0.015±0.003	2.3±0.1
			Ash	10.06	239.2±5.1	NA	1.00 ±0.32	223.2±9.1
		Bone	Dry	55.54	NA	0.64±0.11	NA	NA
			Ash	24.47	NA	1.44±0.25	NA	NA

Table 40 . Continued.

Type of fish	Date collected	Sample type	Weight (g)		pCi/g[a]			
					Gross beta	^{90}Sr	^{137}Cs	^{40}K
Crappie	11-24-74	Muscle	Wet	958.0	2.8±0.1	NA	0.011±0.004	2.9±0.1
			Ash	13.20	201.2±3.3	NA	0.74 ±0.37	210.4±8.9
		Bone	Dry	15.82	NA	0.64±0.15	NA	NA
			Ash	8.84	NA	1.15±0.28	NA	NA
Bullhead	11-26-74	Muscle	Wet	676.0	2.6±0.1	NA	0.009±0.003	2.3±0.1
			Ash	8.14	215.2±4.9	NA	0.85 ±0.33	217.1±10.4
		Bone	Dry	26.70	NA	0.52±0.10	NA	NA
			Ash	11.50	NA	1.20±0.22	NA	NA

a The error given is the probable counting error at the 95% confidence level. Less than (<) values are based on 3 sigma counting error for background sample. Gamma spectral analyses showed that all other gamma-emitting isotopes were less than the minimum detectable levels.

b NA = Not analyzed. Analysis not required.

Table 41. Fish samples, analyses for gross beta, ^{90}Sr and gamma-emitting isotopes, collected from the Toussaint River near storm drain outfall (T-3, site boundary, SE of plant), Davis-Besse NPP.

Type of fish	Date collected	Sample type		Weight (g)	pCi/g[a] Gross beta	^{90}Sr	^{137}Cs	^{40}K
White Bass	8-24-74	Muscle	Wet	1343.0	3.0±0.1	NA[b]	0.047±0.005	3.5± 0.1
			Ash	15.92	256.5 ±7.4	NA	4.01 ±0.40	293.1±10.2
		Bone	Dry	36.64	NA	0.45±0.08	NA	NA
			Ash	16.36	NA	1.01±0.18	NA	NA
Catfish	8-24-74	Muscle	Wet	1036.0	2.8±0.1	NA	0.024±0.004	3.0± 0.1
			Ash	10.62	268.4 ±7.7	NA	2.42 ±0.42	290.5±11.3
		Bone	Dry	40.49	NA	0.49±0.06	NA	NA
			Ash	14.36	NA	1.37±0.16	NA	NA
Carp	8-24-74	Muscle	Wet	1413.0	2.6±0.1	NA	0.010±0.003	2.5± 0.1
			Ash	14.62	250.1 ±[illegible].2	NA	0.97 ±0.29	239 ± 8.8
		Bone	Dry	73.05	NA	1.06±0.08	NA	NA
			Ash	34.13	NA	2.66±0.18	NA	NA
Catfish	9-9-74	Muscle	Wet	1380.0	3.1±0.1	NA	0.03 ±0.005	3.1± 0.1
			Ash	14.13	303.9 ±8.08	NA	2.98 ±0.47	298.8±10.7
		Bone	Dry	63.3	NA	0.29±0.04	NA	NA
			Ash	23.6	NA	0.76±0.11	NA	NA

[a] The error given is the probable counting error at the 95% confidence level. Less than (<) values are based on 3 sigma counting error for background sample. Gamma spectral analyses showed that all other gamma-emitting isotopes were less than the minimum detectable levels.

[b] NA = Not analyzed. Analysis not required.

Table 41. Continued.

Type of Fish	Date Collected	Sample Type	Weight (g)		pCi/g[a] Gross beta	^{90}Sr	^{137}Cs	^{40}K
White bass	11-26-74	Muscle	Wet	962.0	2.7±0.1	NA	0.045±0.012	2.4±0.1
			Ash	11.07	234.0±5.1	NA	3.893	204.2±8.3
		Bone	Dry	19.24	NA	0.64±0.13	NA	NA
			Ash	11.24	NA	1.10±0.23	NA	NA
Sheephead	11-26-74	Muscle	Wet	861.0	2.4±0.1	NA	0.019±0.014	2.4±0.1
			Ash	9.39	218.9±4.9	NA	4.495	222.5±9.0
		Bone	Dry	23.89	NA	0.22±0.13	NA	NA
			Ash	13.69	NA	0.39±0.22	NA	NA
Carp	11-26-74	Muscle	Wet	1078.0	2.6±0.1	NA	0.002±0.001	2.3±0.1
			Ash	11.66	242.8±5.1	NA	0.162	210.7±8.8
		Bone	Dry	30.99	NA	0.22±0.13	NA	NA
			Ash	16.52	NA	0.41±0.24	NA	NA

[a] The error given is the probable counting error at the 95% confidence level. Less than (<) values are based on 3 sigma counting error for background sample. Gamma spectral analyses showed that all other gamma-emitting isotopes were less than the minimum detectable levels.

[b] NA=Not analysed. Analysis not required.

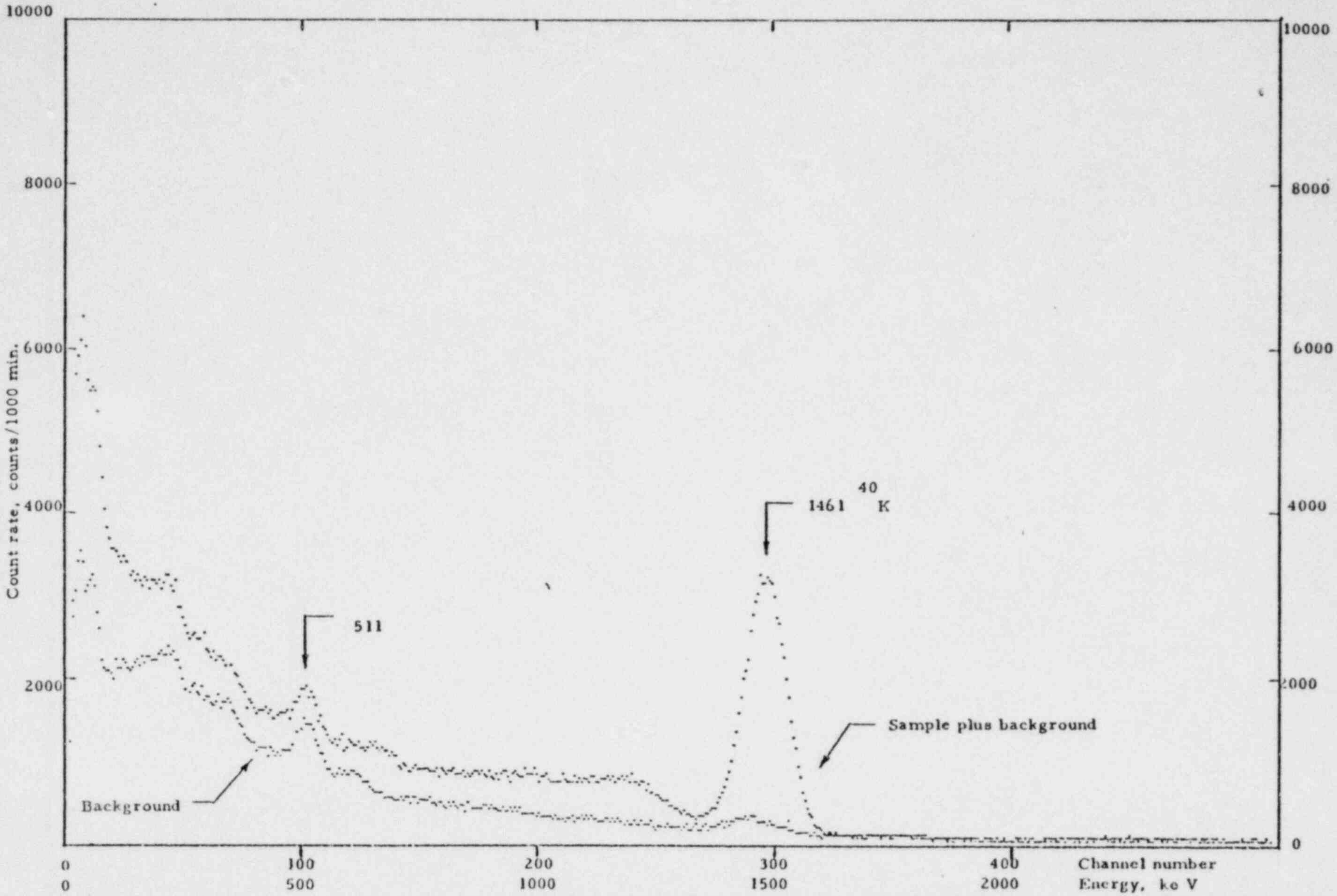

Figure 32. Gamma-ray spectrum of carp flesh, 0-2560 keV. Detector: 10 cm x 10 cm NaI(Tl), (No. 1). Sample: 18. 528 g ash of flesh, collected 23 August 1974 from inlet canal (T-1, site boundary, NE of plant). Counts: 1000 min. on 31 October 1974, Davis-Besse NPP.

Table 42. Clam samples from Lake Erie collected in the vicinity of site, (T-1, site boundary, NE of plant), analyses for gross beta and gamma-emitting isotopes.

Date collected	Weight (g)		pCi/g[a] Gross beta	^{137}Cs	^{40}K
7-9-74	Wet	3117.0	0.51±0.02	0.001± .001	0.14±0.01
	Ash	43.38	36.88±1.38	0.05 ±0.04	10.31±0.58
9-19-74	Wet	822.0	1.22±0.09	0.009±0.004	0.25±0.05
	Ash	24.02	41.83±3.11	0.31 ±0.13	8.60±1.71

[a] The error given is the probable counting error at the 95% confidence level. Less than (<) values are based on sigma counting error for background sample. Gamma spectral analyses showed that all other gamma-emitting isotopes were less than the minimum detectable levels.

Table 43. Bottom sediment samples, analyses for gross alpha, gross beta, ^{90}Sr, and gamma-emitting isotopes, Davis-Besse NPP.

Location	Date Collected	pCi/g dry weight Gross alpha	Gross beta	^{90}Sr	^{137}Cs	^{40}K
T-1 (Site boundary, 0.6 mi. NE of plant)	10-16-74	<3.3	13.6±2.9	<0.26	0.05±0.03	16.2±0.8
T-29 (Lake Erie, intake area 1.5 mi. NE of plant)	10-10-74	12.4±1.9	23.4±1.0	<0.24	<0.04	21.0±0.1
T-30 (Lake Erie, discharge area, 0.9 mi. ENE of plant)	10-10-74	11.3±5.4	19.6±3.2	<0.24	0.24±0.04	17.8±1.0

[a] The error given is the probable counting error at the 95% confidence level. Less than (<) values are based on 3 sigma counting error for background sample. Gamma-spectral analyses showed that all other gamma-emitting isotopes were less than the minimum detectable limits.

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APPENDIX A

Reported Nuclear Detonations in
1974

Reported Nuclear Detonations in 1974[a]

Date	Country	Location	Elevation	Yield
1-30-74	USSR	Semipalatinsk	Underground	20-200 kilotons
2-27-74	USA	Nevada	Underground	20-200 kilotons
5-15-74	USSR	Semipalatinsk	Underground	20-200 kilotons
5-17-74	India	Rajaschar	Underground	<20 kilotons
5-30-74	USSR	Semipalatinsk	Underground	20-200 kilotons
6-17-74	China	Lop Nor	Atomopheric	200-1000 kilotons
6-74	U. Kingdom	Nevada, USA	Underground	Unknown
7-10-74	USA	Nevada	Underground	20-200 kilotons
8-14-74	USA	Nevada	Underground	<20 kilotons
8-14-74	USSR	Tazovsky Peninsula	Underground	20-200 kilotons
8-29-74	USSR	Novaya Zemlya	Underground	1-3 megatons
8-30-74	USA	Nevada	Underground	20-200 kilotons
9-26-74	USA	Nevada	Underground	20-200 kilotons
10-74		Data not available yet.		
11-74		Data not available yet.		
12-74		Data not available yet.		

[a] U.S. Environmental Protection Agency, Radiation Data and Reports. 1974. Vol. 15, Number 1-9.

APPENDIX B

Maximum Permissible Concentrations of Radioactivity in Air and Water

Maximum Permissible Concentration of Radioactivity in Air and Water[a]

Air		Water	
Gross alpha	3 pCi/m^3	Strontium-89	3,000 pCi/l
Gross beta	100 pCi/m^3	Strontium-90	300 pCi/l
Iodine-131[b]	0.14 pCi/m^3	Cesium-137	20,000 pCi/l
		Barium-140	20,000 pCi/l
		Iodine-131	300 pCi/l
		Potassium-40[c]	3,000 pCi/l
		Gross Alpha	30 pCi/l
		Gross Beta	100 pCi/l
		Gross Beta[d]	1,000 pCi/l

[a] Taken from Code of Federal Regulations Title 10, Part 20, Table II and appropriate footnotes.

[b] From 10CFR 20 but adjusted by a factor of 700 to reduce the dose resulting from the air-grass-cow-milk-child pathway.

[c] A natural radionuclide, 30 FR 15801, in footnotes 10 CFR Part 20, Table II.

[d] Federal drinking water 1962, U.S. Public Health Service.

TERRESTRIAL

PRE-OPERATIONAL TERRESTRIAL ECOLOGY MONITORING FOR THE DAVIS-BESSE NUCLEAR POWER STATION, UNIT I

SEMI-ANNUAL REPORT, DECEMBER 1974

Prepared for

Toledo Edison Company
Toledo, Ohio

by

Environmental Studies Center
Bowling Green State University
Bowling Green, Ohio 43403

January 1975

Bowling Green State University

Environmental Studies Center
Bowling Green, Ohio 43403

SEMI-ANNUAL REPORT
DAVIS-BESSE TERRESTRIAL MONITORING CONTRACT
DECEMBER 1974

A. Designation and Mapping of Plant Communities

Ernest S. Hamilton and David Preston
Department of Biological Sciences

Introduction

Measurement of plant communities provides a basis for monitoring operations impact on biological systems. Selected communities on the site have been intensively examined to provide detailed baseline data so that natural influences can be distinguished from man-related activites.

In the period of June-December 1974 the scope of areas being investigated has been significantly changed. The addition of the Cooling Tower Woods as a study area was necessary, as those sites on the eastern shoreline designated as Low Beach I and II, Jewelweed I and II, Beach Hackberry I, and Dogwood-Sumac-Grape were eliminated from the fall sample because of the severe lake effect on these communities. Significant amounts of soil, parent material, and vegetation were eroded from the Beach Hackberry I community. Substantial deposition of sand and gravel occurred at the other study sites during storms and periods of high lake level. The Cottonwood community, however, remained sufficiently intact to sample and provides an indication of the role of lake action in shoreline succession. These other community areas will be re-examined as soon as water levels permit.

Fall sampling was performed in those communities designated as Inland Hackberry I and II, Hackberry-Kentucky Coffee Tree, Hackberry-Box Elder and in the woods adjacent to the cooling tower (Cooling Tower Woods). All methods of collection and data treatment were identical to those previously described (Section A Semi-Annual Report, June 1974). The inclusion of the Cooling Tower Woods added 144 (10 x 10 m) nested quadrats to the sampling effort. Nomenclature follows Fernald (1950).

Results

The COOLING TOWER WOODS is characterized by *Acer Negundo* and *Celtis occidentalis*; together they represent better than 43% of the total importance value (I.V.) of the tree layer (Table A-1). The only other trees of significance in this layer are *Crataegus* sp., *Gleditsia triacanthos*, and *Ulmus rubra*, their combined importance values representing approximately 44% of the total. The sapling layer is composed primarily of *Acer Negundo* (Importance Value 36), *Celtis occidentalis* (I.V. 4) being relatively unimportant. The viney species, *Vitis riparia* and *Parthenocissus quinquefolia*, constitute approximately 25% of the total importance value in this layer. The only shrub species component of any importance is *Ribes americanum* (Table A-2). Arborescent reproduction is dominated by *Acer Negundo* and *Celtis occidentalis*, respectively; viney reproduction by *Parthenocissus quinquefolia* and *Vitis riparia*; and shrub reproduction by *Ribes americanum* and *Rhus Toxicodendron* (Table A-3). Of the 20 species in the fall herbaceous layer only *Geum canadense* (I.V. 35), Grass sp. (I.V. 27), and *Viola* sp. (I.V. 15) appear to be of any consequence (Table A-4 and Fig. 1).

The BOX-ELDER HACKBERRY WOODS also is dominated by *Acer Negundo* and *Celtis occidentalis* (Importance Values of 40 and 36, respectively; Table A-1). Unlike the Cooling Tower Woods, however, there are no significant secondary arborescent species in the canopy. *Acer Negundo* and the shrub-like *Prunus virginiana* share essentially equal importance in the sapling and shrub layer (Table A-2). The shrub species *Cornus Drummondi* and the transgressives *Gymnocladus dioica* and *Celtis occidentalis* are, however, of secondary importance and approximately equal in their values. Arborescent reproduction is characterized by *Celtis occidentalis*, but here *Acer Negundo* is of very little importance. Shrub reproduction is dominated by *Prunus virginiana* and *Cornus Drummondi*; viney reproduction, by *Parthenocissus quinquefolia* (Table A-3).

The fall herbaceous data indicate that *Geum canadense* and a grass species again control this layer. Now, in contrast to late spring, *Cerastium vulgatum* ranks third and *Hydrophyllum virginianum* fourth. Of the remaining nine herbaceous species, only *Polygonatum* sp. appears to be of any consequence (Table A-4 and Fig.).

The KENTUCKY COFFEE-TREE HACKBERRY WOODS is characterized by *Gymnocladus dioica* (I.V. 47) and *Celtis occidentalis* (I.V. 34). The remaining six arborescent species are less significant in canopy control (Table A-1). The only transgressive arborescent species in the sapling layer is *Gymnocladus dioica*. *Prunus virginiana* and *Lonicera* sp. represent the most important shrubs (Table A-2). Arborescent reproduction, however, is limited to *Celtis occidentalis* (Table A-3).

Rhus toxicodendron is the most important reproducing shrub species during the spring but declines in relative importance in the fall, its position being assumed by *Staphylea trifolia*, a species not recorded in the spring sample. *Parthenocissus quinquefolia* reaches its highest importance in this community, although it exhibits a slight importance value drop in the fall (Table A-3 and Fig. 3).

The spring herbaceous layer is composed of 16 species, with *Impatiens capensis*, *Galium Aparine*, and *Pilea pumila* exhibiting significant importance values. Only six of the species recorded in the spring are present in the fall aspect of this layer. *Pilea pumila* now appears most important, with *Cerastium vulgatum* and *Hydrophyllum virginianum* being of secondary importance (Table A-4).

INLAND HACKBERRY II WOODS is dominated by *Celtis occidentalis* (I.V. 48). The only other canopy species of any consequence is *Fraxinus pennsylvanica*, although its importance value is only one-fourth that of hackberry (Table A-1). The only understory component is *Cornus Drummondi* (I.V. 30); the only significant arborescent species in the sapling layer is *Celtis occidentalis* (Table A-2). *Cornus Drummondi* clearly dominates the shrub layer (I.V. 61). Although *Celtis occidentalis* is absent in the spring reproduction data, it is the only arborescent species present in the fall data for this layer and becomes relatively important (Table A-3).

Twenty herbaceous species were recorded in the fall data. Of these only *Galium Aparine* and *Saponaria officianalis* appear to be of any significance, although their importance values are relatively low. The number of species in the fall sample is reduced to thirteen, but *Viola* sp., *Saponaria officianalis*, and a grass species are clearly dominant (Table A-4 and Fig. 4).

Celtis occidentalis clearly dominates the INLAND HACKBERRY I WOODS and reaches its highest importance value (58) here. *Fraxinus pennsylvanica* and *Gleditsia triacanthos* are a distant second each with importance values of 10 (Table A-1). None of these species, however, is evident in the sapling layer. Rather, this layer is dominated by *Prunus virginiana*, with *Vitis riparia* and *Cornus Drummondi* being of secondary importance (Table A-2). Although *Celtis occidentalis* is present in the seedling layer, its importance in the

Cornus Drummondi clearly dominates the shrub layer (I.V. 60.61). Although *Celtis occidentalis* is absent in the spring reproduction data, it is the only arborescent species present in the fall data for this layer and becomes relatively important (Table A-3).

Twenty herbaceous species were recorded in the fall data. Of these only *Galium Aparine* and *Saponaria officianalis* appear to be of any significance, although their importance values are relatively low. The number of species in the fall sample is reduced to thirteen, but *Viola sp.*, *Saponaria officianalis*, and *Grass sp* are clearly dominant (Table A-4 and Fig. 4).

Celtis occidentalis clearly dominates the INLAND HACKBERRY I WOODS and reaches its highest importance value (58.05) here. *Fraxinus pennsylvanica* and *Gleditsia triacanthos* are a distant second with important values of 9.49 and 9.45, respectively (Table A-1). None of these species, however, are evident in the sapling layer. Rather, this layer is controlled by *Prunus virginiana*, with *Vitis riparia* and *Cornus Drummondi* being of secondary importance (Table A-2). Although *Celtis occidentalis* is present in the seedling layer, its importance in the fall community is only one-fourth that of the spring community. *Prunus virginiana* appears to dominate this layer in both the spring and fall, although *Staphylea trifolia* and *Vitis riparia* are nearly as important. *Parthenocissus quinquefolia* assumes its greatest importance in the seedling layer in the spring, while *Ribes americanum* is only evident in the fall (Table A-3). *Impatiens capensis* and *Galium Aparine* are the most important of the 20 herbaceous species present in the spring sample. In contrast, *Saponaria officianalis* and *Solidago elongata* are by far the important species of the 11 present in the fall (Table A-4).

Discussion and Conclusions

The variation of a community in an established successional pattern can be utilized as an indicator of ecological stress. Up to this point efforts fall community is only one-fourth that of the spring community. *Prunus virginiana* appears to dominate this layer in both the spring and fall, although *Staphylea trifolia* and *Vitis riparia* are nearly as important. *Parthenocissus quinquefolia* assumes its greatest importance in the seedling layer in the spring, while *Ribes americanum* is only evident in the fall (Table A-3). *Impatiens capensis* and *Galium Aparine* are the most important of the 20 herbaceous species present in the spring sample. In contrast, *Saponaria officianalis* and *Solidago elongata* are by far the important species of the 11 present in the fall (Table A-4).

Discussion and Conclusions

The variation of a community from an established successional pattern can be utilized as an indicator of ecological stress. Up to this point efforts at the four inland sites and the Cooling Tower Woods have centered around the measurement and analysis of community types and the subsequent designation of a successional baseline. Extensive observation of community types from Darby Marsh to Little Cedar Point also has been utilized in our *preliminary* interpretation of this successional pattern. This progression in terms of these study sites, from the earlier to more advanced is as follows:

1). Box-elder - Hackberry

2). Kentucky Coffee Tree

3). Hackberry II

4). Hackberry I

The Cooling Tower Woods, although placed first in the sequence of woods indicated in the tables, is not considered representative of the pioneer community type. We recognize that this woods is composed of at least two communities that appear to be directly correlated with two basic soil types (Fulton and Toledo). Completion of detailed soil mapping will allow us to draw definite soil boundaries. Quadrat data can then be analyzed for each community, and they can logically be placed in a successional progression.

It should be noted that the Box-elder - Hackberry community is not the starting point, nor is Hackberry I the end point of this progression. Rather, these represent the earlier stages in the successional continuum. The position of each woods on the continuum is a function of the habitats required by the dominant arborescent components of the particular community. This progression is based on moisture tolerances of individual species. For instance, *Acer Negundo* and *Fraxinus pennsylvanica* compete well in poorly drained moist soils. *Celtis occidentalis* can also compete in such areas, as is evidenced in Bass Island research (Hamilton & Forsyth, 1974). Thus, through a preliminary correlation of the community type species with soil characteristics and a knowledge of moisture requirements this tentative progression has been set up.

Addition of moisture will manifest itself first in the seedling and herbaceous layer with increased importance values for moisture tolerant species, such as *Acer Negundo* and, to a lesser extent, *Fraxinus pennsylvanica*. This is not to designate *Celtis occidentalis* as moisture intolerant but simply as less tolerant than *Acer Negundo*. Other factors, such as canopy density and soil pH, also will affect the pattern. *Celtis occidentalis*, for example, is characterized by its growth on more alkaline sites (Forsyth & Hamilton, 1974). *Gymnocladus dioica*, however, characteristically grows in areas of high sunlight penetration (Otis, 1956).

For those communities where a baseline has been established, limited predictions can be made concerning their relation to an increased moisture stress. The Box-elder - Hackberry community, the most hydric of the four woods, will undoubtedly change the least. In the more advanced Hackberry I and II communities, however, a more hydric situation will bring about increased importance values for wetter species, such as *Acer Negundo* and *Fraxinus pennsylvanica*, in the seedling layers. Changes such as these will be exhibited quickly, but the bearing of these changes on canopy composition is harder to determine. Species with wide ranges of moisture tolerance will not be eliminated from the canopy quickly. Thus, a change in canopy dominance will not be evidenced for many years. The cessation of reproduction for a presently dominant species, however, provides an indication that successional patterns are not proceeding in the predicted pattern.

The Box-elder - Hackberry community is considered to represent the successionally most primitive of the four inland study areas, as evidenced by the importance of *Acer Negundo* in both the canopy and sapling layers. *Celtis occidentalis*, however, dominates the reproductive layer. Although the dry fall of 1974 undoubtedly prevented the normal germination of *Acer Negundo*, it is shade intolerant and ultimately will decrease in importance, giving way to *Celtis occidentalis* if predicted patterns are followed.

The Kentucky Coffee Tree community exhibits similar trends. *Gymnocladus dioica*, like *Acer Negundo*, is shade intolerant. At present, the canopy is relatively open, and the frequency of *Gymnocladus dioica* in the tree and sapling layers is high. It, however, was not sampled in the reproductive layer of this or any other community, whereas *Celtis occidentalis* is present in all communities. Although not reflected in the data, there were many dead *Gymnocladus dioica* saplings in the study area, indicating that its importance will markedly decline in the future.

The communities designated as Hackberry I & II are considered the more advanced in the continuum. Hackberry II occupies an earlier point on the progression because it exhibits a lower importance value for *Celtis occidentalis* in the canopy layer. Both communities exhibit *Fraxinus pennsylvanica* as a secondary canopy species, although it has a higher importance value in the Hackberry community. *Fraxinus pennsylvanica* is found in moist habitats, commonly in association with *Acer Negundo* (Hamilton & Forsyth, 1972). Neither community exhibits this species in the seedling layer, but it is contained in the sapling layer of the Hackberry II community. Increased moisture in these areas could be reflected in future increased importance values for *Fraxinus pennsylvanica* and possibly the invasion of *Acer Negundo* in the reproductive layer.

Quantitative data on the composition of the spring and fall herbaceous layers are being collected, and preliminary compositional patterns are indicated in the results. When these layers are again sampled (spring and fall of 1975), we should be able to more precisely depict these layers in terms of species present in relation to present environmental conditions. Many of these species will respond to changes in moisture conditions, either directly or indirectly through increased light resulting from canopy changes.

Stress on study sites resulting from the influences of the lake can be separated from other effects, particularly through the monitoring of the community designated as Cottonwood (Table A-5). This community is sufficiently protected by a high storm beach so that it remains relatively intact but still is influenced by storm action. Abrupt changes in the composition of this community indicate that an additional variable is introduced. As is visible from the seedling and herb data from spring and late summer of 1974, *Rhus typhina* has decreased in importance value probably due to storm action. Its removal makes possible the transgression of shade intolerant seedlings and herbs, such as *Melilotus alba* and *Populus deltoides* which were evident in the late summer but were not found in the spring sample. Since *Rhus typhina* is a fast growing species, it is likely to reestablish itself again soon; but if severe lake action continues, it will again be removed.

This type of community reaction to severe stress is far more easily diagnosed than community reaction to a slow moisture increase. Thus, it should be possible to separate the two variables. Continued monitoring of the herbaceous and seedling layers of the inland woods will provide the necessary data for depicting the normal seasonal fluctuation of species components present in these layers. Any abnormal changes that might occur might then be related to changes in soil and atmospheric moisture brought about by station operation.

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University Michigan Press, Ann Arbor 362 pp.

Table A-1. Importance Values, Trees (10 x 10 meter quadrats), 1974.

	Cooling Tower Woods	Box-Elder-Hackberry Woods	Kentucky Coffee-Tree-Hackberry Woods	Inland Hackberry II Woods	Inland Hackberry I Woods
Celtis occidentalis	20.35	35.91	33.65	48.06	58.05
Fraxinus pennsylvanica	0.31	2.54	3.99	12.19	9.49
Gymnocladus dioica	3.22	6.79	46.80	0.78	
Prunus virginiana	0.22	8.72	2.97		9.55
Rhus typhina	0.36	0.63	2.17		
Cornus Drummondi	2.95	4.60		29.90	7.55
Acer Negundo	23.06	39.86			
Gleditsia triacanthos	14.42		4.87	6.53	9.45
Prunus serotina	0.73		5.53		
Ulmus rubra	12.92			0.78	
Crataegus sp.	16.96			0.95	2.73
Juglans nigra	0.94				
Morus alba	1.41				
Robina Pseudo-Acacia	1.37				
Acer rubrum	0.35				
Populus deltoides	0.40				
Parthenocissus quinquefolia		0.94			
Vitis riparia				0.79	
Staphylea trifolia					3.17

Table A-2. Importance Values, Saplings and Shrubs (4 x 4 meter quadrats), 1974.

	Cooling Tower Woods	Box-Elder-Hackberry Woods	Kentucky Coffee-Tree-Hackberry Woods	Inland Hackberry II Woods	Inland Hackberry I Woods
Celtis occidentalis	3.82	8.24		4.95	
Fraxinus pennsylvanica	0.56	3.20		1.33	
Gymnocladus dioica	0.31	9.27	20.51	1.69	
Prunus virginiana	0.20	26.96	25.27	1.21	46.42
Rhus typhina	0.30	1.00			
Cornus Drummondi	2.96	10.05		60.61	13.22
Acer Negundo	35.62	27.20			
Gleditsia triacanthos	2.63			1.21	4.62
Ulmus rubra	0.56				
Crataegus sp.	1.22				
Juglans nigra	0.56				
Morus alba	0.20				
Parthenocissus quinquefolia	11.36	6.20	10.55	6.40	5.71
Vitis riparia	14.18	4.32		7.85	18.22
Staphylea trifolia			13.33		11.78
Rosa multiflora	0.20				
Solanum Dulcamara	0.51				
Rhus Toxicodendron	1.67				
Ribes americanum	22.37	3.54	7.77	5.68	
Rubus occidentalis	0.77		22.50	9.06	
Lonicera sp.					

Table A-3. Importance Values, Seedlings (½ x 2 meter quadrats), 1974.

	Cooling Tower Woods	Box-Elder-Hackberry Woods	Kentucky Coffee-Tree-Hackberry Woods		Inland Hackberry II Woods		Inland Hackberry I Woods	
	Fall	Fall	Spring	Fall	Spring	Fall	Spring	Fall
Celtis occidentalis	9.72	22.27	9.95	7.23		14.93	16.52	4.31
Prunus virginiana	0.25	17.10	8.71	11.75	2.43	2.31	23.92	23.44
Cornus Drummondi	3.69	14.78			22.67	25.55		15.10
Acer Negundo	11.34	5.19						
Gleditsia triacanthos	0.76							
Ulmus rubra	1.25							
Crataegus sp.	4.34							
Parthenocissus quinquefolia	16.81	21.62	45.90	40.93	41.22	11.92	31.13	15.91
Vitis riparia	9.64	6.31			19.74	11.43	16.52	16.97
Staphylea trifolia				20.16			11.46	18.24
Solanum Dulcamara	4.05	2.93						6.03
Rhus Toxicodendron	21.38	1.37	29.34	10.01	2.54	6.84		
Ribes americanum	15.90	8.43	6.09			17.02		
Rubus occidentalis	0.87			9.87	6.86	8.39		
Lonicera sp.					4.55	1.61		

Table A-4. Importance Values, Herbaceous Layer, 1974.

	Tower Woods	Hackberry Woods	Kentucky-Coffee-Tree-Hackberry Community		Hackberry Community II		Hackberry Community I	
	Fall	Fall	Spring	Fall	Spring	Fall	Spring	Fall
Geum canadense	34.57	27.05		7.88	1.89	5.50	1.15	5.60
Grass sp. 1	27.07	21.95		8.21	10.71	22.18	3.32	7.56
Urtica dioica	3.36	0.71	3.77	10.68		1.22	2.01	
Hydrophyllum virginianum	0.39	10.89	4.30	2.04	5.02		7.94	
Polygonatum sp.	6.62	6.75						
Lactuca sp.	0.31	1.69	0.95		1.11			
Viola sp.	14.81	0.67	2.26		10.06	28.54	0.71	
Strophostyles helvola	0.84			3.84		0.79		3.74
Smilacina racemose	0.40		5.07	2.04	7.86		7.53	
Solidago elongata	0.25					1.82		21.03
Chemopodium album	0.90				1.03	0.69	1.91	6.18
Echinocystis lobata	0.33					1.67		
Taraxacum officinale	0.75							
Convolvulus sepium	0.27		1.38		0.43		1.99	
Arctium minus	2.77							
Apocynum sp.	0.68							
Solanum nigrum	0.33							
Bidens sp.	0.99							
Acalypha virginica	2.35							
Oxalis europaea	2.03							
Cerastium vulgatum		16.42		10.70		7.15		11.10
Scrophularia marilandica		3.80	4.95	7.56	8.66	0.79	4.19	4.50
Euphatorium rugosum		1.41		2.04				5.73

Table A-4. (continued)

	Tower Woods	Box-Elder-Hackberry Woods	Kentucky-Coffee-Tree-Hackberry Community		Hackberry Community II		Hackberry Community I	
	Fall	Fall	Spring	Fall	Spring	Fall	Spring	Fall
Teucrium canadense		0.71				4.60		4.50
Leonurus Cardiaca		7.08	3.05		0.65	0.79		6.98
Allium tricoccum		0.87			1.31			
Solanum Dulcamara				9.77			2.05	
Impatiens capensis			26.53	8.20			17.51	
Pilea pumila			15.75	27.50				
Saponaria officianalis					12.59	24.26	3.25	23.08
Galium Aparine			16.29		14.84		14.32	
Saxifrage sp.			7.15		3.57		7.59	
Arisaema triphyllum			2.62					
Dicentra Cucullaria			1.61				0.63	
Grass sp. 2			3.25		4.53		1.86	
Lamium amplexicaule			0.87		3.76		5.56	
Plantago sp.					1.54		1.72	
Acalypha virginica					8.92		0.76	
Arabis laevigata					1.52			
Viola Rafinesquii					4.91		0.68	
Trillium sp.								

Table A-5. Importance values, Cottonwood Community.

	Tree Layer		Sapling Layer		Seedling Layer		
	Fall 1973	Summer 1974	Fall 1973	Summer 1974	Fall 1973	Spring 1974	Summer 1974
Cornus Drummondi	24.61	24.91	48.60	49.14	38.60	33.33	20.83
Salix alba	21.61	26.29					
Populus deltoides	20.96	21.61					41.66
Platunus occidentalis	11.80	11.56					
Rhus typhina	11.25	5.42	19.60	6.83			
Prunus virginiana	5.98	8.86	31.80	23.93	6.73		
Ulmus Rubra	3.79	1.35					
Vitis riparia				9.40			
Parthenocissus quinquefolia				10.68	33.43	66.66	37.50
Ribes americanum					11.20		
Celtis occidentalis					8.98		

Figure A-1. Importance values for principal herbaceous species in Cooling Tower Woods.

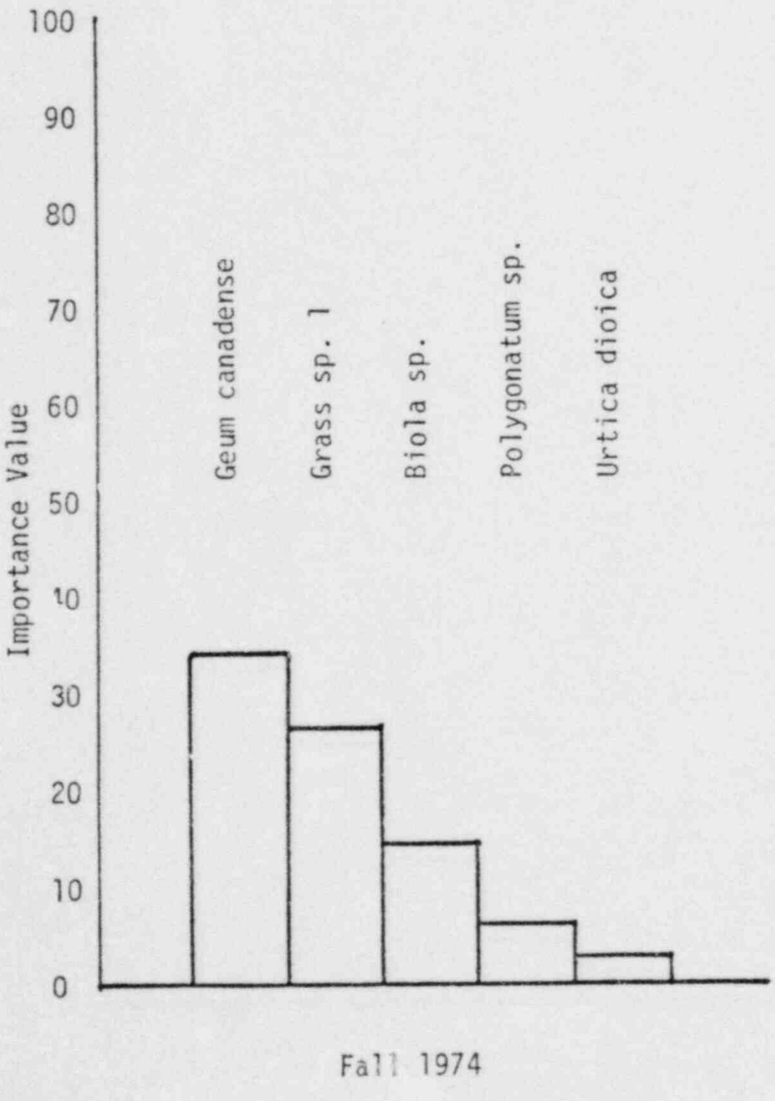


Figure A-2. Importance Values for principal herbaceous species in Box-Elder-Hackberry Woods.

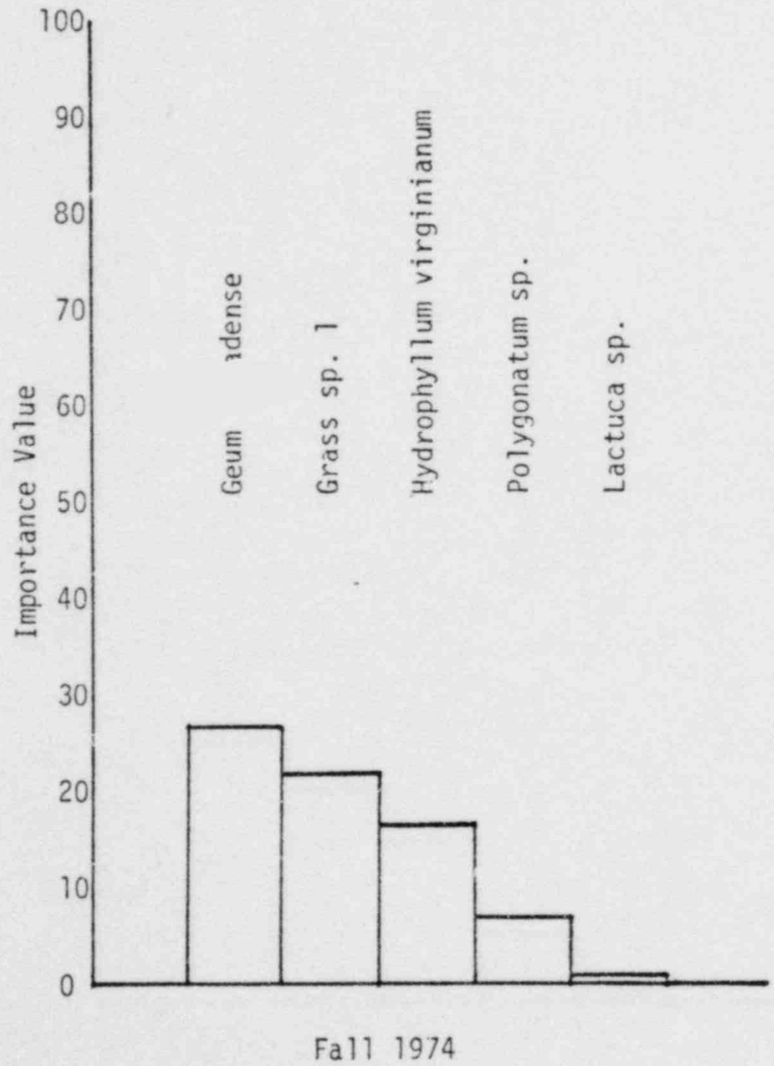


Figure A-3. Importance values for principal herbaceous species in Hackberry-Kentucky Coffee Tree Community.

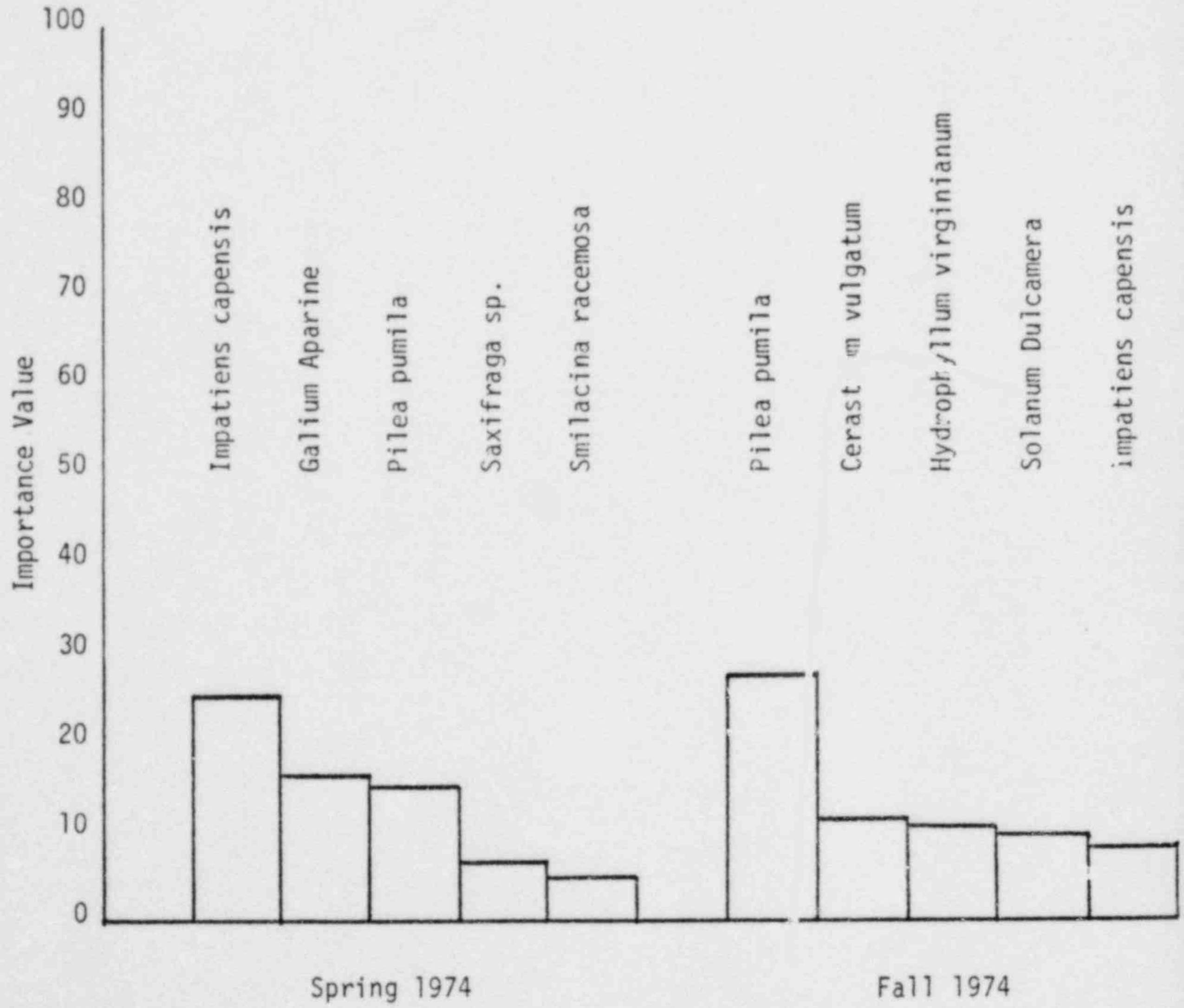


Figure A-4. Importance values for principal herbaceous species in Hackberry Community II.

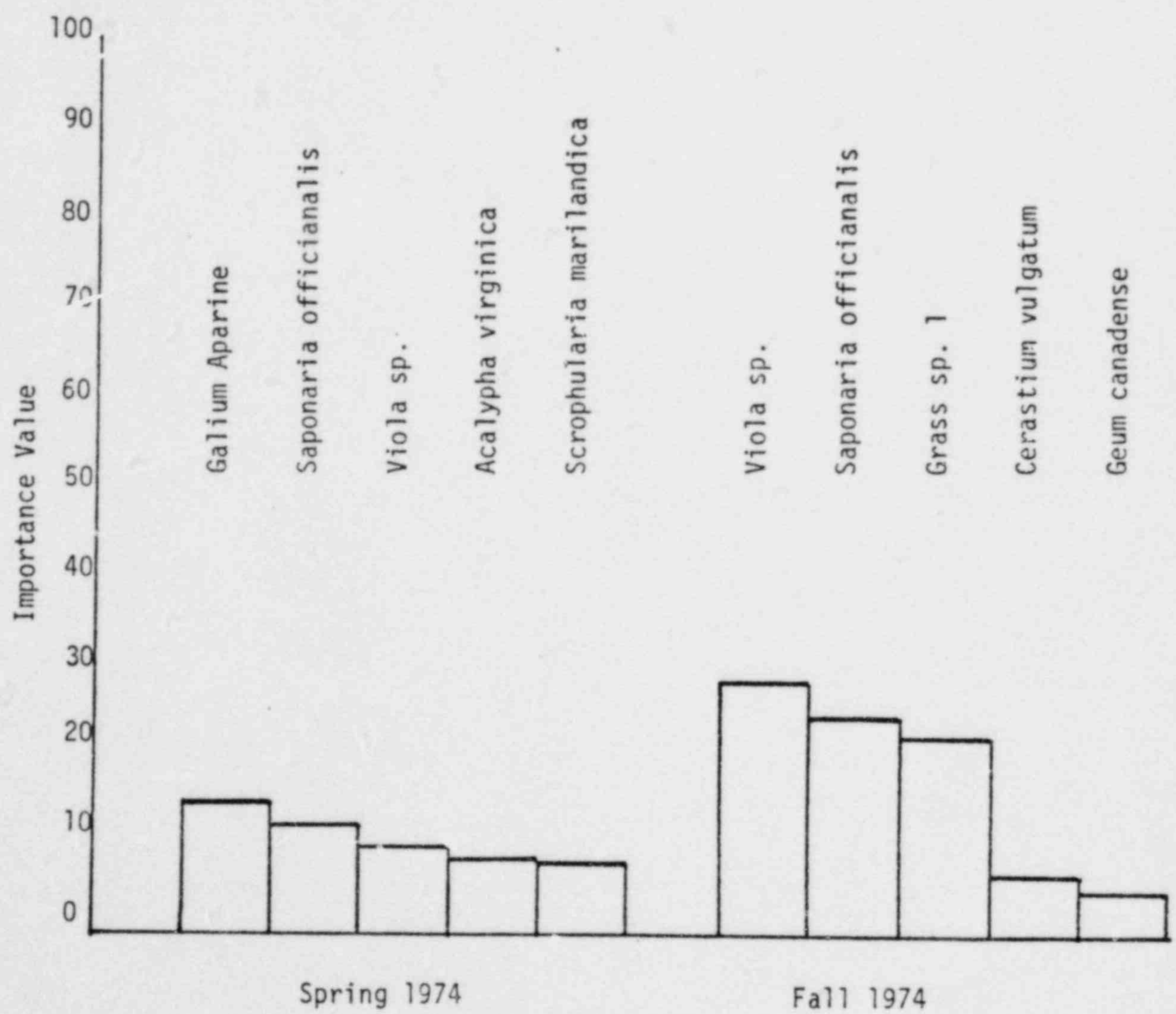


Figure A-5. Importance values for principal herbaceous species in Hackberry Community I.

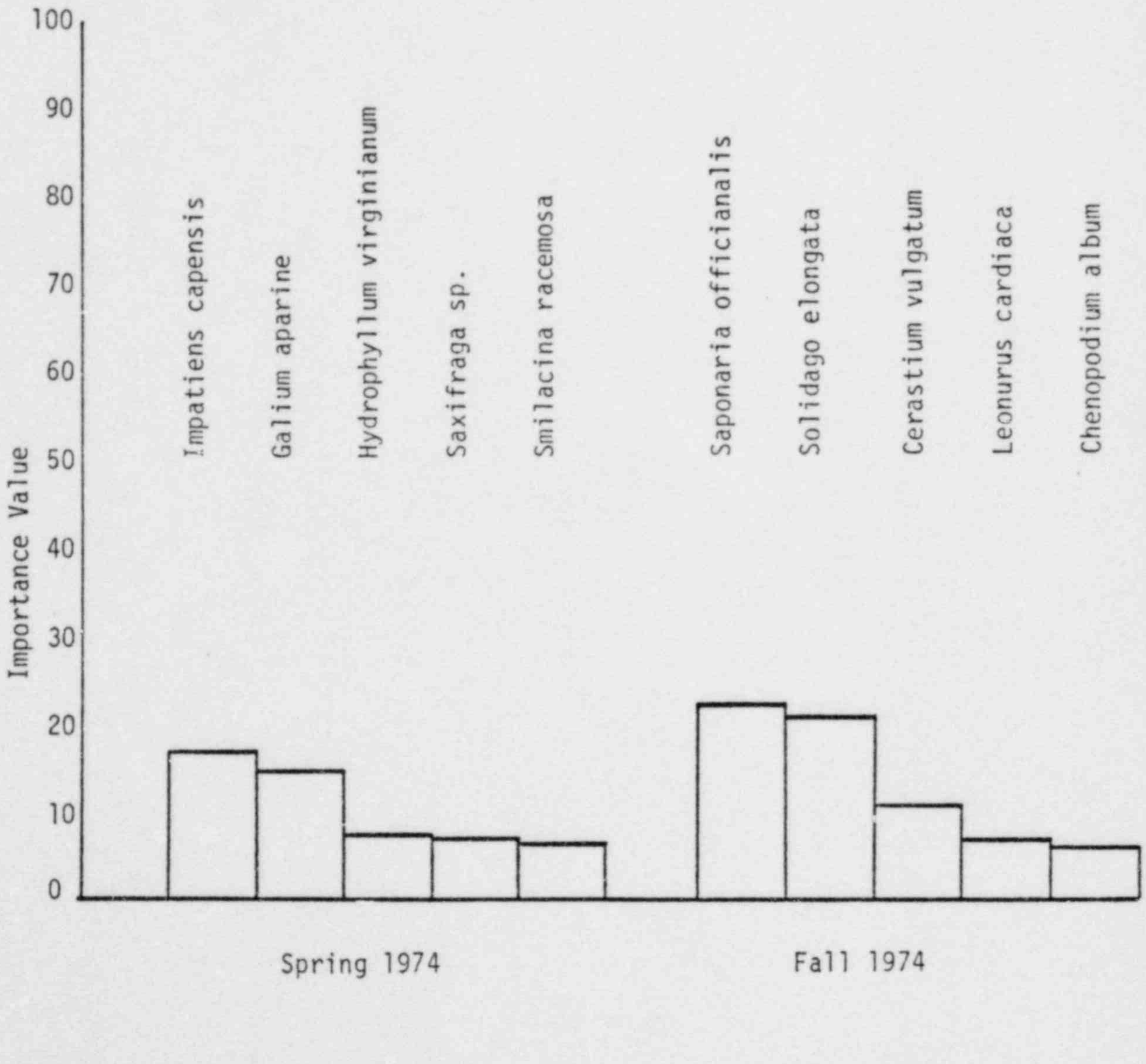


Figure A-6. Importance values in the major vegetation layers (quadrat sizes) for *Celtis occidentalis* in all communities (1974). The importance values in the seedling layers will decrease as added moisture provides conditions that are favorable to *Acer Negundo* or *Fraxinus pennsylvanica*.

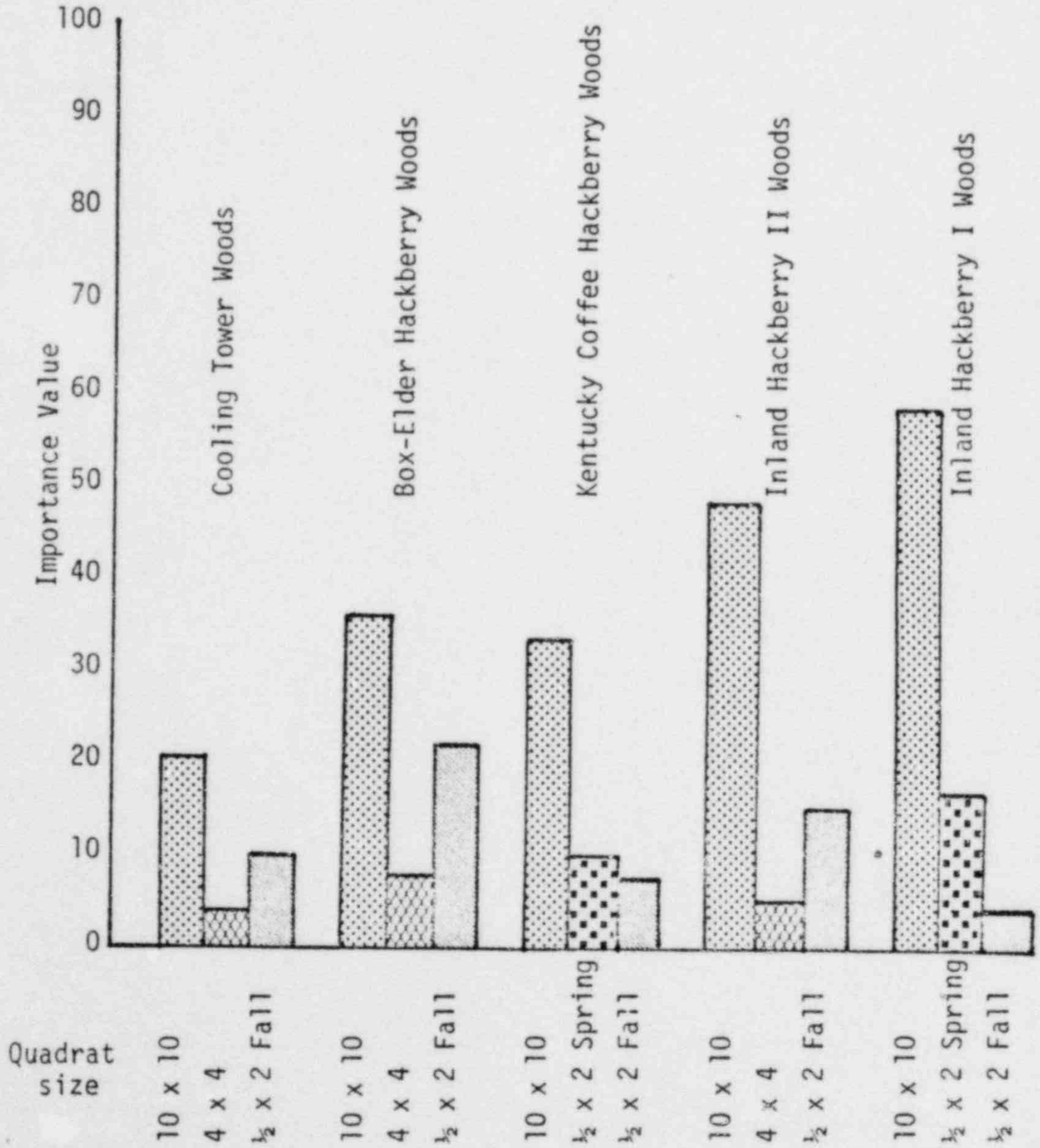


Figure A-7. Importance values in the major vegetation layers (quadrat sizes) for *Acer Negundo* in all communities (1974.). At present, *A. Negundo* is found in those areas designated as the Cooling Tower Woods and Box-Elder-Hackberry. Increased moisture will be exhibited as an increase in values for *Acer Negundo* in the seedling layers or in its appearance in other communities.

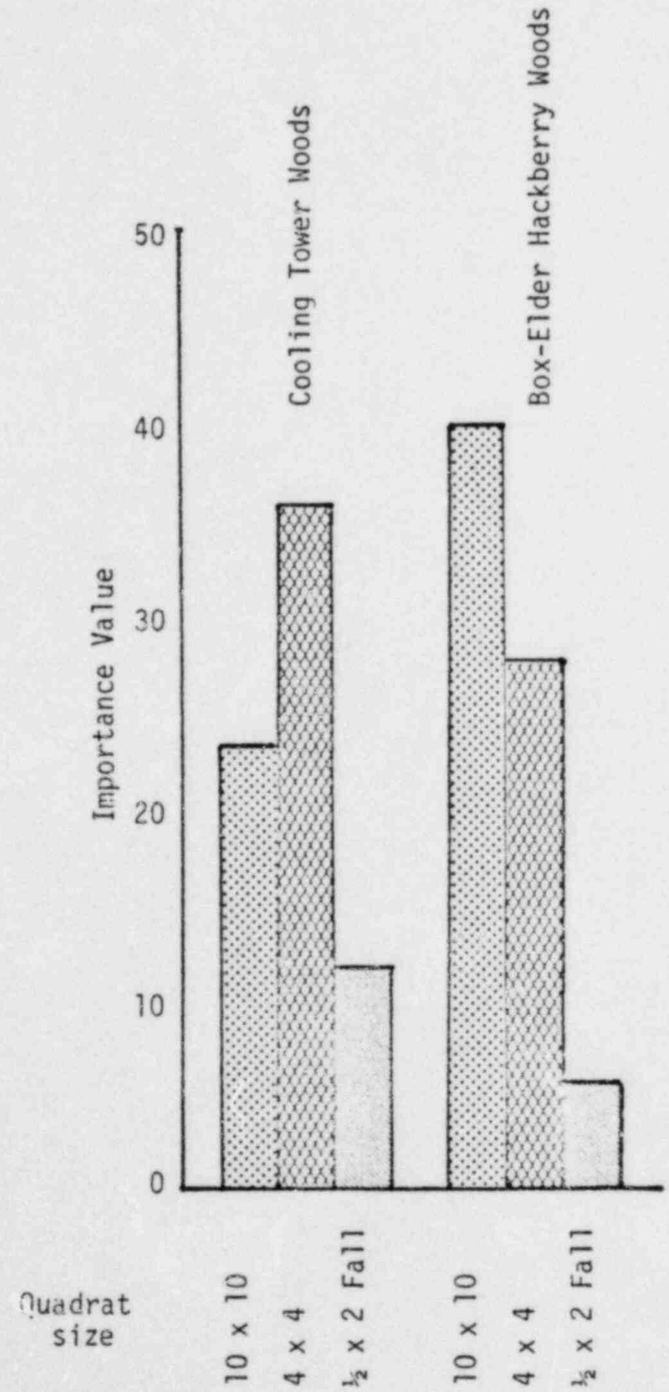
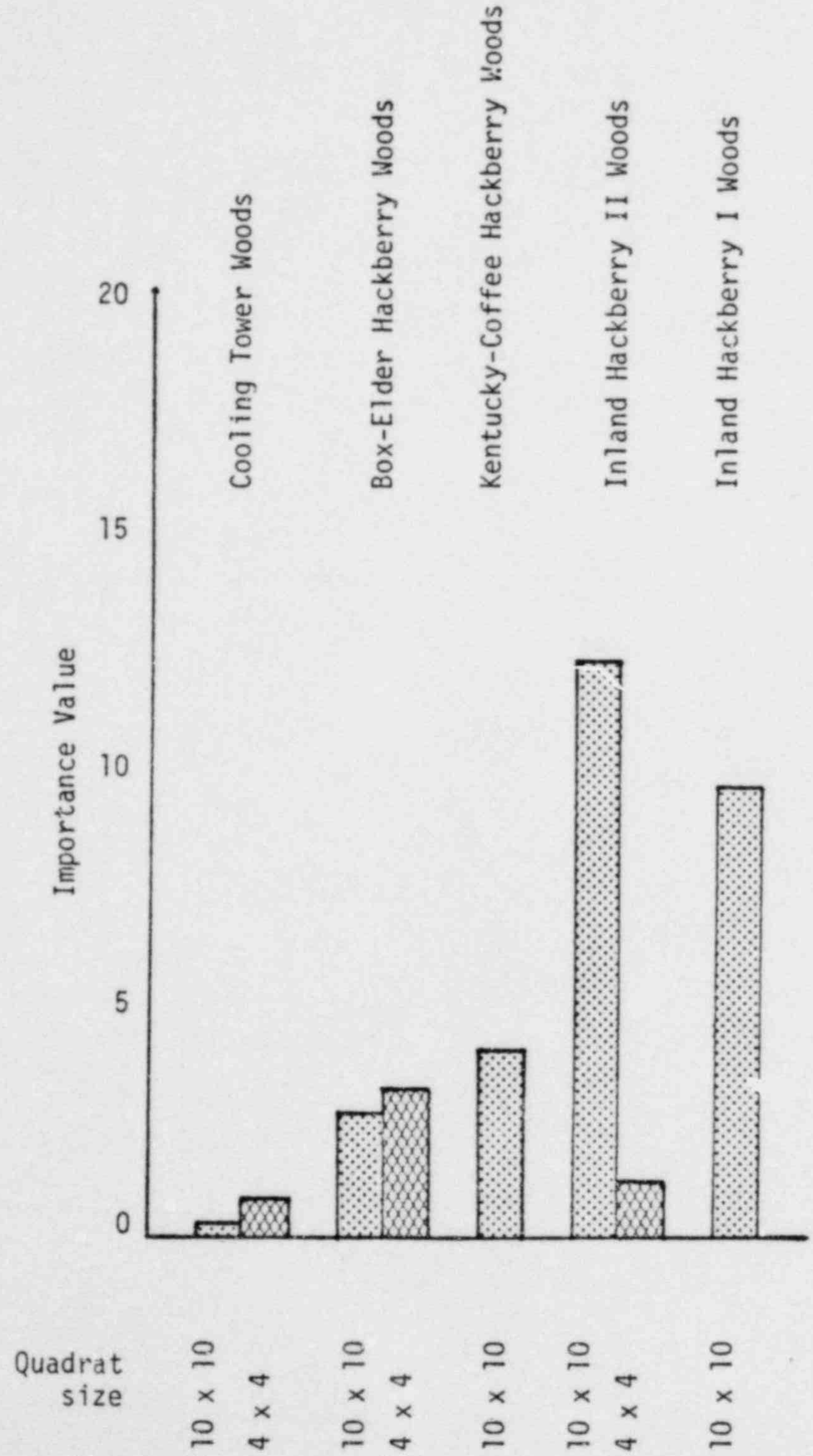


Figure A-8. Importance values in the major vegetation layers (quadrat size) for *Fraxinus pennsylvanica* in all communities (1974). Increased moisture will result in its appearance in the seedling layer.



Bowling Green State University

Environmental Studies Center
Bowling Green, Ohio 43403

SEMI-ANNUAL REPORT
DAVIS-BESSE TERRESTRIAL MONITORING CONTRACT
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B. Soil Environments

Arthur G. Limbird
Department of Geography

Introduction

The soil environment is the basic factor linking the atmospheric environmenta nd plant communities. Changes in atmospheric conditions can result in changes in soil temperature, moisture, and chemistry balances and, in turn, can result in frequency changes of terrestrial community members. The program objective is to maintain a monitoring program of soil parameters to determine changes during the period of cooling tower operations. It is important to establish a base line of pre-operational data to demonstrate normal environmental fluctuations or changes, so that changes attributable to the cooling tower operations can be designated.

Monitoring Locations and Methods

Three basic parameters are being monitored (See Section B, Semi-Annual Report, June, 1974). Soil temperature is being monitored on a continual basis at the beach and cooling tower woods weather shelter sites. In addition, weekly temperature data are being recorded in other plant communities, two on the beach and one in the cooling tower woods. Soil moisture is being monitored on a weekly basis at all of these sites. Soil chemistry is being monitored on a quarterly basis using samples taken from each of the five sites. Soil samples are being taken from the 10, 20, and 50 cm depths to correspond with instrumentation depths.

Two area types are being monitored. One area is the cooling tower woods with soils more typical of the agricultural lands near the Davis-Besse site. The other area is the beach where soils are in the initial stages of development and more susceptible to change. Subtle changes in atmospheric moisture or temperature should elicit a greater response in the beach area than in the cooling tower woods. Thus, the beach soils will act as good indicators of both natural evolution and seasonal cycles and any changes which may be attributed to cooling tower operation. Differences and similarities of the two basic areas are discussed in this report.

Soil Temperature

Soil temperature tends to follow the pattern of fluctuation and seasonal change that is familiar for air temperature. Since the soil acts as an insulator and tends to buffer the effects of atmospheric heating and cooling, the daily, weekly, and monthly variations in soil temperatures are of a much smaller magnitude than air temperature variations (Table B-1), and ranges of weekly soil temperatures tend to decrease with depth (Figures B-1 and B-2).

In analyzing the temperature data at the beach and cooling tower woods sites, weekly high temperatures, low temperatures, average temperatures, and temperature ranges (weekly maximum minus weekly minimum) are used. These temperature values allow for an overall understanding of temperature fluctuations and ranges in temperature without the burden of following day to day variations. Since day to day changes in soils are relatively insignificant, the weekly figures serve to summarize the daily record. The use of weekly figures is more sensitive to subtle changes in temperature than monthly data and thus can be more effective in establishing base line data and determining any subsequent changes during cooling tower operations. Yet, the weekly data can be summarized to indicate seasonal or yearly trends in temperature. For example, change in the yearly or seasonal average temperature at the 10 cm depth may be most important in producing change in plant communities.

Soil temperatures in the sumac community of the beach area are complete for the weeks from May 11, 1974 through November 20, 1974 and are used in discussing soil temperatures. The average soil temperature at 10 cm fluctuated somewhat from week to week in response to air temperature changes, but generally warmed from May until the end of August when cooler air temperatures triggered temperatures at the 10 cm depth to decrease. By the end of the data period, the average temperature at 10 cm was 32.3° F (Table B-1). The range in temperature at the 10 cm depth at the beach site was great for the initial week of the data period but then became more consistent at about 5 F° beginning in early June. Fluctuations in the average range were correlated with greater ranges in air temperatures for the corresponding weeks (See Figure B-1).

The average soil temperatures at the 20 cm depth also fluctuated in response to air temperature changes but warmed later than at the 10 cm depth. Near the end of August cooler air temperatures helped to initiate a reduction in average soil temperatures, which reached the low 30s by the end of the data period (See Table B-1). The weekly range in soil temperatures at the 20 cm depth was less than that at the 10 cm depth, averaging 2.75 F° beginning in early June. Fluctuations in the temperature range were correlated with the weeks having large ranges in air temperatures (See Figure B-1).

The average soil temperatures at the 50 cm depth did not fluctuate nearly as much as those nearer the surface nor warm as much as nearer the surface (only one week with average over 60° F). However, the warming and cooling which occurred from week to week was in direct response to changes in average air temperatures. The weekly average temperatures at 50 cm warmed from May through August. Late in August temperatures began to cool and reached the mid 30s late in the data period. From the middle of September to the end of the data period the average temperatures at the 50 cm depth were higher than at the 10 and 20 cm depth, since temperatures at greater depths are slower to change in response to air temperature changes (See Table B-1). Except for the initial week, the weekly range of soil temperatures at the 50 cm depth was relatively stable, near 1.75 F°, indicating a significantly reduced response to fluctuations in atmospheric temperatures (See Figure B-1).

The soils of the cooling tower woods are fine textured, compact soils, which should respond less to air temperature changes than the coarse textured, porous soils of the beach sites. As expected, temperatures fluctuated less in response to variations in air temperature, resulting in relatively small ranges in temperatures on a weekly basis. However, the differences between the two sites were not as great as expected. At both sites, the greatest range in temperature occurred at the 10 cm depth; the smallest, at the 50 cm depth.

Soil temperatures at the instrument shelter in the cooling tower woods are complete for the weeks from May 11, 1974 through November 20, 1974. The average soil temperature at 10 cm in the cooling tower woods fluctuated somewhat in response to air temperature changes but warmed slowly from May to the end of June. Near the end of August soil temperatures decreased because of cooler air temperatures and reached the 30s by November (See Table B-1). The average range of temperatures at the 10 cm depth in the tower woods was about 4.5 F°. Fluctuations in temperature range at 10 cm were correlated with the greatest fluctuations of air temperature ranges (See Figure B-2).

In comparing the 10 cm depth in the tower woods with the 10 cm depth in the beach area, it is apparent that weekly average temperatures vary in both locations in response to air temperature changes. The soil in the tower woods warmed somewhat more slowly in the spring due to greater moisture content at this time; but once the moisture content was reduced, the finer-textured soils of the tower woods responded well to warmer air temperatures. (See discussion of moisture below.) The range in soil temperatures each week in the tower woods is somewhat less than the range of soil temperatures each week at the beach site. The difference is not statistically significant and can probably be attributed to the smaller range in air temperatures from week to week at the tower woods (See Figures B-1 and B-2). The highest weekly average temperature at the 10 cm depth occurred the same week at both sites.

The average soil temperatures at the 20 cm depth in the cooling tower woods also fluctuated in response to air temperature changes, warming to a high weekly average temperature during the week of July 13. Fluctuations in temperature continued until mid-September when the soil temperature responded to cooler air temperatures and cooled to 33.9° F by the end of the data period (See Table B-1). The weekly range in soil temperatures at the 20 cm depth in the tower woods was considerably less than the range at the 10 cm depth, averaging about 2 F°, with the largest range generally corresponding to the largest weekly range in air temperatures (Figure B-2).

In comparing the 20 cm depths in the tower woods and beach area, it is apparent that the soils in the tower woods warmed more slowly because of greater moisture content, had a somewhat smaller range in temperature in response to a smaller range in air temperature, and yet managed to warm up as much as the more porous beach soils once moisture content was reduced in the summer. (See discussion of moisture below.)

The average soil temperatures at the 50 cm depth in the tower woods did not fluctuate nearly as much as those at the 10 and 20 cm depths. However, warming and cooling trends at the 50 cm depth still follow as a response to changes in air temperatures from week to week. The weekly average temperatures at 50 cm in the tower woods warmed slowly from May to late June. In mid-September the soil temperatures began to cool in response to cooler air temperatures. Since the soil at the 50 cm depth never reached the temperatures recorded at the 10 and 20 cm depths, the soil at this greater depth remained generally cooler than the upper soil horizons until the month of November.

Temperatures change much less at this greater depth in response to air temperature changes (See Table B-1). The average weekly range of soil temperatures at the 50 cm depth was about 1 F°. Except for the week of June 29, the range in temperatures fluctuated much less from week to week than at the 10 and 20 cm depths (See Figure B-2). The very small range in temperatures each week further substantiates the reduced response to changes in atmospheric temperatures with depth in the soil.

In comparing the 50 cm depth in the tower woods with the 50 cm depth in the beach area, it is apparent that the soils in the tower woods do not warm up as much at this depth as the more porous beach-sand soils. The highest weekly average soil temperature in the tower woods was three degrees cooler than the highest weekly average temperature in the beach area (See Table B-1). The weekly range in soil temperatures is not nearly as great in the tower woods as in the beach area. The difference is not statistically significant but is a trend which should be watched in the future. If soil temperatures do not warm enough for certain life processes in some plants, these plants will no longer thrive in the particular plant community or environment (See discussion of plant communities, Part A).

In summarizing the importance of monitoring soil temperatures, one must keep in mind the relationship of soil temperature to soil moisture, to air temperature, and to plant growth. Soil temperatures are greatly suppressed both in terms of weekly or monthly average values and range by an increase in soil moisture. Much more heat energy must be utilized to warm a wet soil than a dry soil. By comparing week to week, season to season, and year to year, trends in soil temperatures become evident.

Air temperatures directly affect soil temperatures. While soils do not warm as rapidly nor cool as rapidly as the air, soil temperature changes are a response to air temperature changes. If the range of air temperatures is greatly increased, then the range of soil temperatures will increase also. If air temperatures are reduced by increased cloud cover or water vapor in the atmosphere (a possible result of cooling tower operations), then soil temperatures would be reduced as well. The reduction of soil temperatures, either as a result of increased moisture or reduced air temperatures, would in turn affect plant life. The surface soil is most susceptible to changes (See Table B-1 and Figures B-1 and B-2) and can in turn elicit changes in plant types in plant communities. The shallow rooted ground cover plants would probably be the first to be changed. However, the response in plant communities is not restricted to the natural community. The lower soil temperatures could have the effect of shortening the growing season for crops, an important factor for agriculture. Measurement of soil temperatures can help to demonstrate natural as well as man-made changes occurring in the environment. Even so, the latter are likely to be the lesser of the two.

Soil Moisture

Soil moisture in the study sites tends to follow two basic patterns which are repeated in other locations where soil moisture has been studied. First, the late fall, winter, and early spring appear to be recharge periods where soil moisture increases until the soil reaches its storage capacity. During the late spring, summer, and early fall more moisture may be used for evaporation and transpiration than falls as precipitation. The moisture stored in the soil as a surplus is then used for evaporation and transpiration, thus decreasing soil moisture available for plant use.

Second, related to the first pattern, there is frequent opportunity for some of the depleted water to be replaced by precipitation. Rainfall during the late spring, summer, or fall can recharge the ground water supply and make a greater amount of moisture available to plants. Even so there is a decided seasonal cycle of soil moisture availability.

Water availability relates to the amount of water in the soil that can be utilized by plants. Compact, clay rich soils, like in the tower woods, hold much water tightly bonded to the clay particles and thus unavailable for plant use. Sandy soils, like at the beach site, cannot make much water available to plants, because little is stored in such soils. Organic matter can change these relationships by storing water which is readily available to plants. Thus additions of organic matter to either sands or clays can improve the moisture availability.

Soil moisture was recorded each week at the five locations beginning with the week of June 1, 1974 to November 20, 1974. At the beginning of the data period, the available moisture recorded at each depth in the sumac community of the beach area was 100 percent. The percentage of available moisture began to decrease at the 10 cm depth first. This corresponds with the time when actual evaporation was considerably greater than weekly precipitation (See Table B-2) and soil temperatures at the 10 cm depth increased markedly (See Table B-1). When weekly evaporation was considerably greater than weekly precipitation, the soil moisture was drawn upon for surface evaporation and transpiration. Dry conditions in July further depleted available moisture at the other depths as well (See Table B-2).

An increase of precipitation in early August helped to recharge the available moisture supply and raised the available moisture reading at the 10 cm depth; the lower horizons were not affected until the moisture moved downward through the sandy soil. The same trend is repeated later in the data period when greater amounts of precipitation in late October and early November conbined with little or no evaporation and cooler temperatures to recharge moisture at each depth. (See Table B-2.)

Several important relationships have been revealed by the monitoring of soil moisture at the beach site. In the spring, the soil is at field capacity with available moisture at 100 percent. Once actual evaporation is significantly greater than the precipitation, soil moisture is depleted from the surface downward. This depletion corresponds with higher soil temperatures. Weekly rainfall during the summer and early fall partially restores moisture availability levels; but later in the fall, when actual evaporation is nil, moisture recharge becomes even more evident.

The consistently high available moisture readings for the 20 cm depth can best be attributed to its relatively high organic matter content, which is storing more moisture than underlying layers deficient in organic matter, and the 10 cm depth which is subjected to greater evaporation stress.

In the cooling tower woods at the beginning of the data period the available moisture recorded at each depth was at or near 100 percent; but by the week of June 22 evaporation was considerably greater than precipitation, and the available moisture at the 10 cm depth began to decrease. As soil temperatures and actual evaporation increased greatly in the next weeks, soil moisture became depleted at the 20 and 50 cm depths. Even periods of high rainfall did not recharge the depleted moisture, but late in October a decrease in the evaporation combined with greater precipitation begin to restore the depleted soil moisture from the surface downward (See Table B-2).

Several important relationships have been revealed by the monitoring of soil moisture in the cooling tower woods. As at the beach site, in the spring the soil is at field capacity with available moisture at 100 percent. Once actual evaporation is considerably greater than the precipitation, then soil moisture is depleted from the surface downward; time of depletion corresponds with higher soil temperatures. Later in the fall, when the actual evaporation is nil, moisture recharge begins. However, unlike the beach site, rainfall during the summer does not initiate any available moisture recharge. Three factors may be responsible for this: one, fine textured, compact soil allows for less infiltration than with the coarser textured soil of the beach site; two, weekly rainfall at the tower woods is consistently less than at the beach site, apparently making less moisture available for recharge; and three, evaporation at the tower woods is consistently higher than at the beach site until late October, apparently more effectively removing moisture from the soil to a greater depth than at the beach site.

Moisture fluctuations are closely related to actual evaporation, precipitation, and soil and air temperatures. If cooling tower operations result in a significant increase in atmospheric moisture and/or precipitation, then actual evaporation would be less effective in drawing on soil moisture reserves. Increases in soil moisture would then reduce soil temperatures and delay plant life processes, such as germination, growth, and reproduction. Plant community composition could change as a result. Perhaps even more important, a prolonged increase in soil moisture could delay or hinder farm operations.

Increased soil moisture could have an impact on the soil chemistry of the area. The effect of added moisture could dissolve more bases and remove them from the soil complex. The bases would be replaced by hydrogen, and the soil pH would be reduced. The percent base saturation would be reduced, thus decreasing the amount of nutrients available for plant growth. Added soil moisture could have a widespread impact on both the natural and cultural environments of the area.

Soil Chemical Analysis

Soil samples were taken at each of the three beach quadrat locations and at both of the cooling tower woods quadrat locations at 10, 20, and 50 cm depths to correspond to the depths of instrumentation. At each depth a series of samples were taken from random points within the quadrat and mixed before being bagged and labeled. Each sample was kept separate, air dried, re-bagged, and sent to the U.S.D.A. Soil Testing Laboratory at Ohio State University for chemical analysis. Samples were taken in August (summer) and in November (fall) to correspond with the data period presented in this report. The analyses determined cation exchange capacity, percent base saturation, percent organic matter, and pH (See Table B-3). Some variations in analysis values for summer and fall can be attributed to the sampling procedure, and some variations can be attributed to the chemical analysis in the laboratory. However, other variations pointed out below indicate possible seasonal fluctuations in values or extreme variability within the plant communities sampled.

In the cooling tower woods, both the Fulton and the Toledo soils seem to be relatively stable. Cation exchange capacity, base saturation, organic matter content, and pH values are closely interrelated measures of soil stability and internal character. In both of these soils the 10 cm depth corresponds with an A_1 horizon, which is characterized by additions of organic matter, breakdown and incorporation of organic matter, and the associated release of bases (calcium, magnesium, and potassium) into the soil complex. Both soils contain moderately high amounts of clay and humus, resulting in moderately high cation exchange capacity. Only a small amount of leaching or removal of bases is apparent because of the high percent base saturation in both soils. The Toledo soil does show evidence of some leaching of mineral bases because of the somewhat lower pH and percent base saturation values compared to the Fulton soil (See Table B-3). However, a pH range from 6.5 to 7.5 usually can be considered neutral in soils, and the pH value can be expected to fluctuate within this range for soils which are nearly base saturated, as in this case.

The 20 cm depth in both soils corresponds with an A_2 horizon, which is generally characterized by a somewhat lower organic matter content than at the 10 cm depth, a slightly lower cation exchange capacity, and a slightly lower percent base saturation and pH due to leaching of soluble bases. However, this characterization does not hold true for the Toledo soil site. It appears that leaching has occurred downward from the surface and that the higher clay content at the 20 cm depth, compared to the 10 cm depth, has served to store bases from further removal. Thus, the percent base saturation is higher at the 20 cm depth than at the 10 cm depth (See Table B-3).

The 50 cm depth in both soils corresponds with a B_2 horizon, which is generally characterized by an accumulation of clay and a decrease in organic matter content. The relatively large increase in clay content helps to maintain a high cation exchange capacity at this depth. Leaching has been responsible for adding bases to this horizon, thus keeping the percent base saturation high and the pH value near neutral (See Table B-3).

The seasonal variation in values from summer to fall appear to be relatively unimportant, although some change in values can probably be attributed to the season. There is an apparent trend for organic matter to increase, especially at the 20 and 50 cm depth, in the fall season. This can in part be the result of biological activity in the soil which decomposes and incorporates organic matter into the soil during the summer and early fall. Corresponding to this is a slight increase in cation exchange capacity and percent base saturation, especially at the 20 cm depth. The pH value also appears to increase in the fall season. This may be a response to the release of bases in the breakdown of organic matter, but may just as well be a response to normal seasonal fluctuations or to soil moisture content at the time of sampling (Thompson and Troeh, Soils and Soil Fertility, McGraw-Hill, 1973, p. 174).

The developing soils of the beach area are much more unstable than the soils of the tower woods and vary considerably, even within the same plant community quadrat. The pH values of all three sites indicate a group of soils which have undergone little or no leaching of mineral bases. The very high percent base saturation figures substantiate the lack of leaching. Cation exchange capacity is lower than in the tower woods, with the exception of the fall value for the hackberry-box elder I community. The organic matter content of the beach sites is lower compared to the tower woods sites (See Table B-3).

Cation exchange capacity and percent organic matter decrease with depth at all three beach sites, as in the tower woods. The more obvious decrease in these values in the beach soils can best be attributed to the short time the soils have been developing relative to the tower woods soils. Much less organic matter has been thoroughly broken down and incorporated into the soil complex in the beach area than in the tower woods. The cation exchange capacity and organic matter content values generally support this lack of incorporation (See Table B-3).

However, there is extreme discrepancy in the percent organic matter and cation exchange capacity values from summer to fall for the 10 and 20 cm depths of the hackberry-box elder I community. The values for fall disagree with all of the general variations in soil properties between the beach area and the tower woods. Very high organic matter content and cation exchange capacity in this community are not in character with the other beach soils sampled. The variation is too great to be accounted for by seasonal fluctuation. Three factors may be responsible for such a difference. One, the fall sample may have included parts of partially decayed tree roots or tree branches, giving a very high organic matter reading. Two, the chemical analysis process may have been faulty. Three, there actually may be a wide range in organic matter content and cation exchange capacity in these developing beach soils.

Evidence points to variable organic matter as the greatest contributor to the difference from one soil analysis to the other. The soil samples were taken and prepared by the principal investigator. The samples were analyzed in the same laboratory, a laboratory set up solely for chemical analysis of soils. Additional sampling of surface soils in the beach area shows a wide range in organic matter content (See Additional Findings below), even within the same plant communities.

Additional Findings

In the process of monitoring soils and vegetation, three adjunct studies have been undertaken and are in the final stages of completion. Each one of these studies will be discussed in more detail in subsequent reports.

First, to assist the assessment of the impact of the cooling tower operation on the tower woods, a complete inventory was made of the trees in the woods (See Part A). At the present time soil sampling in detail is underway to determine the exact soil boundaries with respect to tree locations. The soil mapping will help to monitor plant communities and follow natural or man-induced changes in these communities.

Second, to better assess the variation of surface soils in the beach area, a more intense study of organic matter levels is underway in the sumac, hackberry-box elder I, hackberry-box elder II, and grape-Virginia creeper communities. The study should help to establish which communities are stable and which might be expected to undergo rapid or large natural changes. Thus, any effects of the cooling tower operation can be better documented.

Third, the soils of the entire beach area have been sampled and described by digging soil profiles. A general soil map with descriptive text will be the immediate end product. However, in the event of natural changes or in the event of any cooling tower operation effects, the results can be assessed by referring to the map and profile descriptions.

Table B-1. Summary of weekly average soil and air temperatures (°F), Beach and Cooling Tower Woods sites, week of May 11 to week of Nov. 14, 1974.

Week of:	Beach cm depth 10	Beach cm depth 20	Beach cm depth 50	Beach Air	Tower Woods Air	Tower Woods cm depth 10	Tower Woods cm depth 20	Tower Woods cm depth 50
May 11	57.0	54.7	56.1	63.0	60.7	51.7	49.4	46.9
May 18	60.7	59.4	56.1	62.4	60.7	56.0	54.9	51.3
May 25	53.9	51.1	50.3	61.6	59.9	52.3	49.6	49.1
June 1	59.4	56.1	53.3	70.9	69.3	57.7	55.0	47.9
June 8	57.0	54.7	54.3	67.9	66.3	56.1	54.4	50.0
June 15	54.6	52.7	52.3	65.3	65.1	54.0	52.0	48.6
June 22	54.7	53.1	52.3	66.9	62.6	55.6	54.1	50.4
June 29	62.1	59.1	56.4	76.0	74.4	60.9	58.6	55.9
July 6	62.0	60.5	58.1	74.7	72.3	63.9	61.1	55.3
July 13	64.4	62.0	59.1	77.0	75.6	65.1	62.1	56.4
July 20	61.7	60.1	58.1	69.0	69.1	61.1	59.4	54.7
July 27	63.0	61.6	59.0	71.0	71.9	63.6	61.1	56.1
Aug 3	60.7	59.6	57.7	68.9	68.3	57.3	56.1	54.9
Aug 10	62.6	61.1	58.3	71.6	72.0	63.1	60.7	56.3
Aug 17	62.7	62.1	59.0	72.1	73.4	63.6	61.6	56.3
Aug 24	62.9	62.3	60.9	70.0	70.6	61.7	61.3	57.9
Aug 31	56.3	56.1	56.4	60.9	61.6	56.0	55.6	54.4
Sept 7	57.6	56.6	55.4	67.4	68.6	58.6	56.4	53.4
Sept 12*	56.6	56.3	55.9	61.6	61.3	55.9	55.4	53.3
Sept 19	51.7	50.6	52.4	55.4	56.3	50.6	50.0	49.6
Sept 26	49.6	48.9	50.9	53.7	52.7	48.4	48.6	48.3
Oct 3	45.0	44.0	45.7	52.0	52.3	45.3	44.6	45.0
Oct 10	46.7	46.1	47.7	53.1	54.9	46.6	46.1	45.3
Oct 17	41.7	41.0	45.4	43.3	44.3	40.3	41.6	43.1
Oct 24	45.0	43.3	44.3	53.7	56.3	44.9	42.9	41.7
Oct 31	48.1	47.7	48.7	53.0	54.0	47.1	46.3	45.3
Nov 7	38.7	39.3	43.1	42.4	44.3	38.7	39.9	41.7
Nov 14	32.3	33.1	37.6	38.[illegible]	40.0	33.3	33.9	37.6

*This shortened week in September is the result of a change in the day for exchanging recording charts in instruments.

Table B-2. Weekly soil moisture variations, precipitation, and actual evaporation, June 1-Nov. 20, 1974.

Week of:	Beach Site: actual evaporation (in/wk)	Beach Site: precipitation (in/wk)	Beach Site: Sumac Community (cm depth) 10	20	50	100	Tower Woods: actual evaporation (in/wk)	Tower Woods: precipitation (in/wk)	Tower Woods: Fulton soil (cm depth) 10	20	50
June 1	1.56	1.07	100*	100	100	100	1.94	0.71	97*	97	100
8	1.39	1.30	100	100	100	100	2.89	0.72	100	100	100
15	0.84	1.50	100	100	100	100	1.97	1.00	100	100	100
22	0.81	0.10	100	100	100	100	1.09	0.0	75	100	100
29	1.97	0.27	90	100	100	100	3.82	0.13	53	100	100
July 6	1.17	0.0	95	95	96	96	2.08	0.0	63	68	100
13	1.77	0.05	97	95	90	100	4.11	0.0	62	65	100
20	1.03	0.12	0	88	67	92	1.59	0.0	0	20	90
27	1.38	0.14	0	83	50	48	2.81	0.08	0	0	43
Aug 3	0.83	0.14	0	85	45	25	1.51	0.20	0	0	25
10	0.84	1.03	40	85	45	25	1.26	0.79	0	0	15
17	[illegible].04	0.01	25	90	70	20	2.07	0.0	0	0	5
24	0.93	0.16	22	100	82	15	2.11	0.02	0	0	0
31	0.69	0.60	0	100	70	5	1.51	0.26	0	0	0
Sep 7	0.67	0.09	2	100	54	7	2.13	0.05	0	0	0
12	0.75	0.19	0	95	25	0	2.36	0.10	0	0	0
19	0.83	0.06	0	90	10	0	1.86	0.02	0	0	0
26	0.54	0.93	0	71	0	0	1.39	0.59	0	0	0
Oct 3	0.97	0.12	85	97	32	19	1.97	0.02	0	0	0
10	0.49	0.19	74	98	37	24	1.21	0.07	0	0	0
17	0.31	0.10	61	87	34	28	0.71	0.07	0	0	0
24	0.0	0.17	50	78	29	31	0.0	0.05	0	0	0
31	0.0	1.02	45	76	29	34	0.0	0.01	0	0	0
Nov 7	0.0	0.58	88	92	37	37	0.0	0.38	92	0	0
14	0.0	0.22	83	87	67	67	0.0	0 18	88	27	0

* %of available moisture.

Table B-3. Soil Chemical Analysis, Summer and Fall, 1974 - Beach sites and Tower Woods sites.

		Cation Exchange Capacity*		% Base Saturation		% Organic Matter		pH Value	
		Summer	Fall	Summer	Fall	Summer	Fall	Summer	Fall
TOWER WOODS Fulton Soil Site Tower Shelter	10 cm	25	31	99.0	99.0	8.6	8.2	7.1	7.1
	20 cm	[illegible]	27	94.4	98.7	2.4	5.9	6.6	7.3
	50 cm	24	23	99.4	99.4	1.8	2.8	6.8	7.3
Toledo Soil Site	10 cm	32	35	87.5	88.7	8.8	9.2	6.6	6.4
	20 cm	29	30	95.3	95.6	4.2	4.7	6.6	6.9
	50 cm	27	31	99.3	98.3	1.9	2.3	7.0	6.9
BEACH AREA Sumac Community Beach Shelter	10 cm	12	16	99.9	98.7	3.5	4.2	7.0	7.2
	20 cm	9	11	98.6	99.5	1.8	0.7	7.1	7.3
	50 cm	7	7	99.5	99.4	0.8	0.1	7.5	7.3
Hackberry-Box Elder I	10 cm	20	53	98.5	99.0	6.3	32.0	7.2	7.0
	20 cm	17	34	98.6	99.5	6.1	11.0	7.1	6.8
	50 cm	17	19	99.3	98.4	1.1	0.9	8.0	7.2
Hackberry-Box Elder II	10 cm	16	19	99.4	99.6	5.4	2.8	7.1	7.3
	20 cm	14	9	99.3	99.4	2.8	0.7	7.1	7.3
	50 cm	11	8	99.2	99.2	1.0	0.2	7.9	7.5

*Cation Exchange Capacity figure is in milliequivalents per 100 grams of soil.

FIGURE B-1. Beach Site--Temperature Ranges at 10, 20, and 50 cm. Depths and in Air, Week of May 11 to Week of November 14, 1974

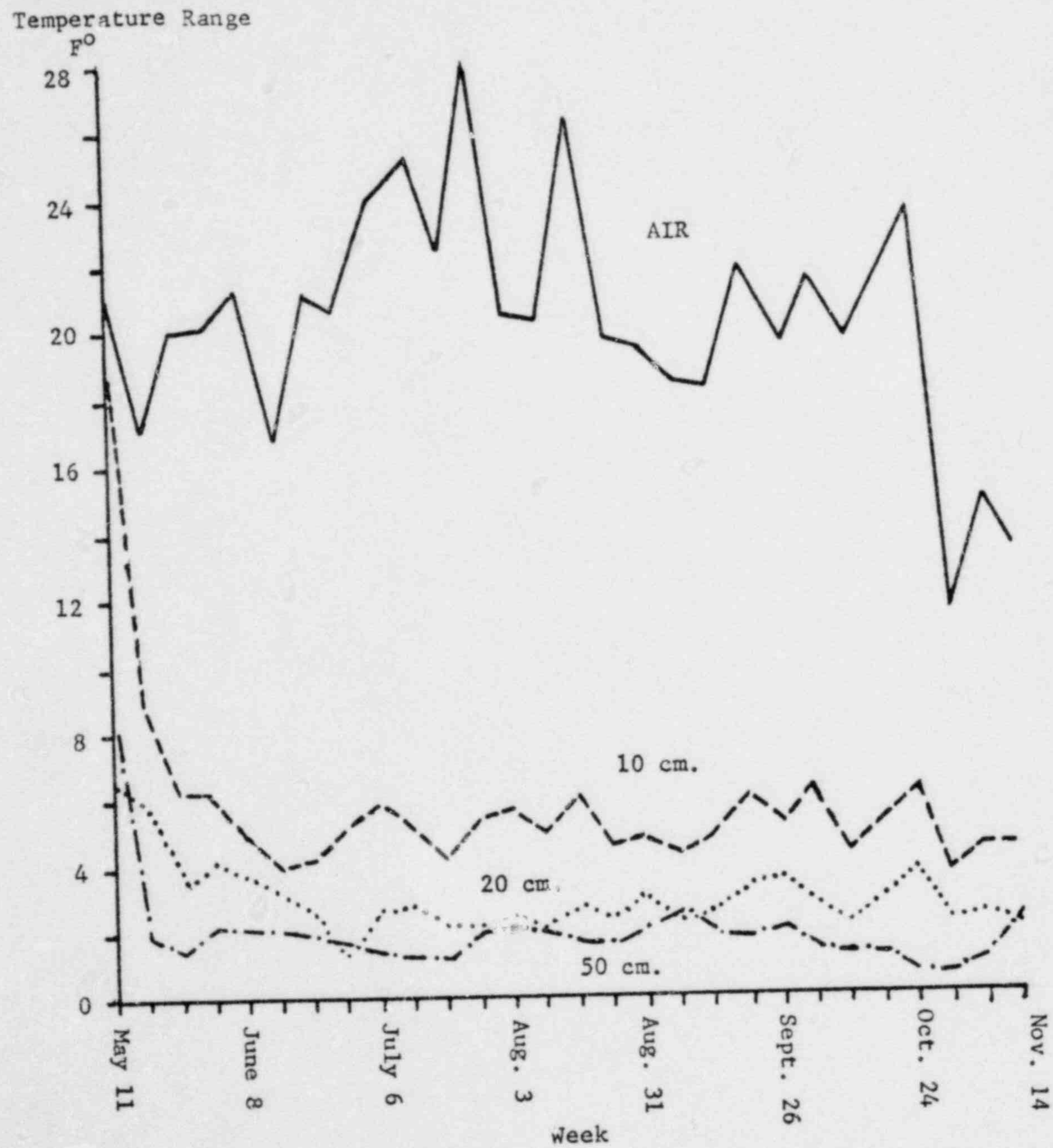
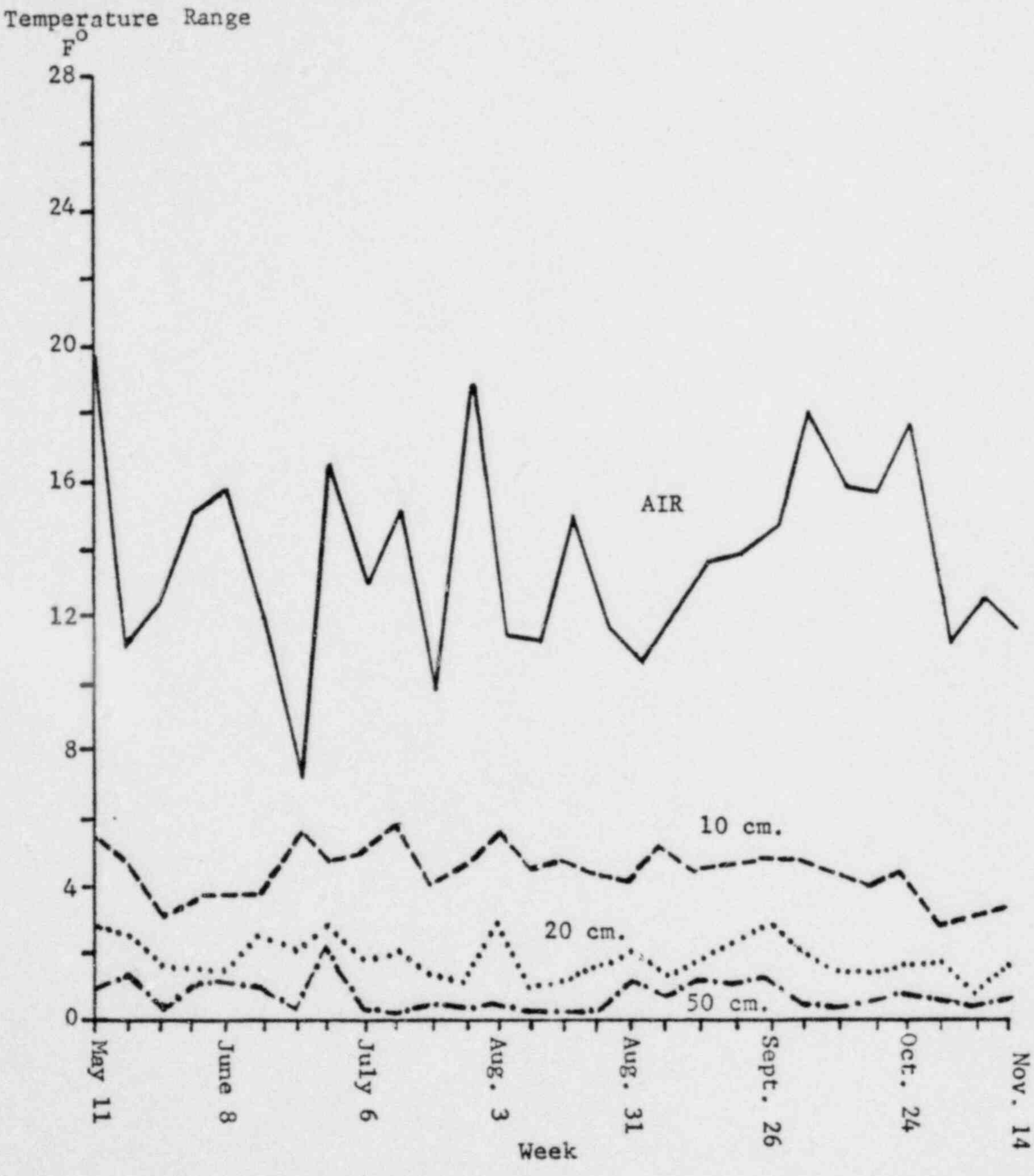


FIGURE B-2. Tower Woods Site--Temperature Ranges at 10, 20, and 50 cm. Depths and in Air, Week of May 11 to Week of November 14, 1974



Bowling Green State University

Environmental Studies Center
Bowling Green, Ohio 43403

SEMI-ANNUAL REPORT
DAVIS-BESSE TERRESTRIAL MONITORING CONTRACT
DECEMBER 1974

C. Terrestrial Fauna

Stephen H. Vessey, Paul A. Mazur, James Schmunk, and Craig DeCrane
Department of Biological Sciences

Introduction

Vertebrates constitute the apex of the food pyramid and ultimately will be affected by changes in habitat and in their sources of food. Our main objective is to identify those terrestrial vertebrate populations at the site that can be monitored precisely enough to detect changes in numbers in a statistically reliable way. Comparisons of data with those from appropriate reference areas will assist in determining whether significant shifts have occurred in these populations and in evaluating the effects of environmental forces. In this way the possible impact of cooling tower operations on these animals can be studied.

Procedures followed those described in the previous (Section C, Semi-Annual Report, June 1974) report. Locations of trap lines and grids also duplicated earlier efforts.

Amphibians and Reptiles

Thirty man-hours in October and November were expended searching for herptiles while checking traps in the small mammal grid and walking along the shore and edges of the marsh. Small numbers of leopard frogs, bull frogs, water snakes, and painted turtles were observed (Table C-1).

The study area is not prime habitat for terrestrial herptiles, and the fall is not the best time of year for finding these animals. Systematic observations will provide a measure of species diversity and data that will be useful in developing an ecological evaluation of the site. Attempts to obtain population estimates of herptiles would require the work of additional personnel during the spring and summer, but the relatively small numbers seen so far suggest that such an effort would not be desirable.

Summer Birds

In addition to the three circuits of the study area completed during late June and early July (see previous report), three more circuits were made in August (Table C-2). Although numbers of individuals and species were similar to the early summer circuits, several additional species of waterfowl and shore birds were present in August.

Birds also were counted on 9 and 20 August on the mud flats south of the study area (Tables C-3 and C-4). Most of these birds were pre-migratory flocks of herons, sandpipers and plovers, blackbirds, and gulls.

The early Summer bird censuses had been conducted by two observers working independently on different days. The close agreement in numbers of species and individuals across days indicated that this procedure was reliable in documenting the site bird fauna.

Observations made in the course of the cooling tower mortality study during the fall migratory period are summarized in Table C-5. At least once each week the cooling tower woods was visited by one of two observers, but many of the sightings were incidental to other surveys. These observations provide an indication of birds in the area but are not meant to be a quantification of total birds on the site. Winter bird counts will be presented in the next semi-annual report.

Observations of waterfowl on Navarre Marsh made by U. S. Fish and Wildlife Service officials are summarized in Table C-6.

Small Mammals

Live-trapping was conducted on five weekends during the fall in the grid established last spring. Twenty-eight captures of 15 different white-footed mice (*Peromyscus leucopus*) were made over 480 trap-nights. The Lincoln-Peterson estimate was 23 mice ± 10 (one standard error) for the entire grid (0.64 hectares) (Table C-7). This estimate indicates that differences of about 100 percent would be reliably detected.

The estimate of 36 mice per hectare is a moderately high population when compared with estimates reported in the literature. Published estimates for this species range from 7 to 111 per hectare. A control population of white-footed mice that is being intensively live-trapped in Carter Woods near Bowling Green State University (30 miles southwest of the Davis-Besse site) peaked at 64 per hectare in late July and was 31 per hectare in October, when most of the trapping was done at Davis-Besse.

The extremely low numbers of mice caught on the grid last spring probably reflect real decline from late summer peaks the previous year. White-footed mouse populations typically cycle annually with lows in the spring, since mortality is high and reproduction is absent in the winter.

Age, weight, reproductive condition, and movements were summarized using the Tally computer program (Table C-8). These data summaries and statistics will allow comparisons to be made with data from the site and control areas to be collected in future years for assessing the continuing responses of the populations to the environment.

Large Mammal Trapping

Ten different raccoons, opossums, and skunks were captured in live traps in 60 trap-nights (Table C-9). Several marked animals were caught but recaptures were not enough to estimate numbers by the Lincoln-Peterson method. Increased trapping effort and accumulation of marked individuals in the population should make estimates possible. Trapping effort will be increased by using 10 additional live traps.

Muskrats (*Ondatra zibethicus*)

Increased vegetation growth, due to marsh drainage in the spring, made counting of muskrat houses difficult in the fall. No houses were present in the study area marsh (between the dike road and the wooded peninsula), where 54 had been counted during the spring of 1974. A combination of three factors accounted for the decline in population: mortality, emigration, and movement into bank burrows. Only two muskrats were seen by us, one on 25 October and one on 2 November.

Other Observations of Mammals

Four full-grown deer were observed by us in the study area on 10 November. Security guards were given forms to record observations of mammals. Their information is recorded in Table C-10. Security guards were cooperative and knowledgeable about local mammals, and we plan to continue using the forms and to develop ways of quantifying the hours they spend observing to permit year-to-year comparisons in sightings. These observations will be added to our own records to provide information on species diversity. Population changes in the order of five to ten-fold should be detectable.

Darby Marsh

The beach ridge community was sampled for large and small mammals. Three white-footed mice were marked and released in 110 trap-nights on

19 and 20 October. Signs of raccoon, opossum, and skunk were found.

The beach ridge is extremely narrow and subject to periodic inundation. The mammal populations will be affected by lake levels and weather more than those at Davis-Besse, where the trapping grid is inland from the beach. For this reason we plan no extensive trapping at Darby Marsh but will live-trap small mammals for several days each fall to further assess the potential of the site. Meanwhile the prime reference area for monitoring changes in white-footed mouse populations will be Carter Woods, near Bowling Green State University.

Conclusions

The current program should be able to document two-fold changes in single-species populations of common winter and summer resident bird species in the study area. Similar precision should hold for fluctuations in white-footed mouse populations. In the next year we hope to obtain similarly reliable data for opossums and raccoons. Monitoring of other terrestrial vertebrates is such that five to ten-fold changes should be detected as well as counts of species diversity.

Assuming that statistically significant changes in terrestrial vertebrate populations do occur, the question still remains as to whether or not these changes are due to operations at the site. It will be necessary to make detailed comparisons with any changes in climate, soils, or vegetation before causality can be hypothesized.

Vertebrate populations should be among the last components of the ecosystem to show effects of site operations, such as increased moisture from the cooling tower. Increased precipitation or relative himidity, followed by increased soil moisture, will predictably modify the vegetation. Only then are changes in small mammal populations likely.

Evaluations of vertebrate populations necessarily will also involve comparisons of density estimates and trends with populations in designated reference areas away from the direct influence of site operations and perhaps with populations under study in other areas. Only in this way can the causal relationships of on-site operational factors be evaluated.

Table C-1. Reptiles and amphibians observed during the Fall, 1974. All were captured, identified, and released. Numbers in parentheses indicate numbers of individuals.

Leopard Frog (4) (*Rana pipiens*)	3 November
Bullfrog (6) (*Rana catesbeiana*)	3 November
Water Snake (2) (*Natrix sipedon*)	5, 6 October
Painted Turtle (*Chrysemys picta*)	12 October
Milk Snake (*Lampropeltis doliata*)*	17 September

*Observed by worker within cooling tower; said to be frequent occurrence.

Table C-2. August bird counts on study area circuit. Observer: Thomas W. Scott.

Species	No. of individuals counted 8 August 1000-1400	9 August 1400-1840	20 August 0730-1045
Great Blue Heron	6	1	1
Green Heron	2	2	1
Common Egret	4	3	8
Black-crowned Night Heron	75	75	100
Mallard	15	3	10
Black Duck	1		1
Gadwall	1		
Green-winged Teal	3		
Blue-winged Teal	6	1	2
Wood Duck	1	5	2
Red-tailed Hawk			1
Greater Yellowlegs			1
Lesser Yellowlegs			1
Herring Gull			2
Sharp-shinned Hawk	1		
Ring-billed Gull	2		
Common Tern	4		2
Mourning Dove	4	2	7
Yellow-billed Cuckoo	5	4	5
Black-billed Cuckoo			1
Screech Owl		1	
Great Horned Owl	2		1
Ruby-throated Hummingbird	3	1	1
Belted Kingfisher	1		
Common Flicker	1		
Downy Woodpecker	6	2	6
Eastern Kingbird	1	1	4
Great Crested Flycatcher	1	1	
Eastern Wood Pewee	2	3	
Tree Swallow	12	7	3
Purple Martin		1	2
Blue Jay			1
House Wren	10	8	15
Gray Catbird	4	4	6
Brown Thrasher	1	1	
American Robin	8	8	10
Cedar Waxwing			2
Starling	F*	F	F
Red-eyed Vireo		1	
Prothonotary Warbler	2		
Yellow Warbler	abundant	abundant	25
Yellowthroat	2	1	
Red-winged Blackbird	F	F	F
Rusty Blackbird			F
Northern Oriole	4		
Common Grackle	F	F	F
Cardinal	3	3	6
Indigo Bunting	6	4	6
American Goldfinch	6	4	8
Song Sparrow	4	4	6
TOTALS: species	39	31	36
individuals	209**	149**	256***

*F denotes mixed flocks. These birds were seen in abundant numbers in mixed flocks of Red-winged Blackbird, Rusty Blackbird, Common Grackle, and Starling.

**Excluding yellow warbler and mixed flocks of Red-winged Blackbird, Starling, and Common Grackle.

***Excluding mixed flocks of Red-winged Blackbird, Rusty Blackbird, Common Grackle, and Starling.

Table C-3. Estimated bird populations on August 9, 1974 (1000-1400 hours) on Mud Flats Circuit. Observer: Thomas W. Scott.

Species		No. of individuals
Great Blue Heron (one flock)		250
Great Egred (one flock)		130
Gadwall	(one flock)	10
Blue-winged Teal	(one flock)	50
Bald Eagle		1
Semipalmated Plover	(three flocks)***	16
Killdeer	(three flocks)***	12
Yellowlegs (Greater and Lesser)	(three flocks)***	134
Pectoral Sandpiper	(three flocks)***	70
"peeps"*	(three flocks)***	403
Dowitcher	(three flocks)***	35
Stilt Sandpiper	(three flocks)***	10
Gulls (Herring and Ring-billed) (2 flocks)		200
Tree swallow (two flocks)		60
Blackbirds** (two flocks)		70

Totals: 16 species
1461 individuals

*"peeps" refer to a group of difficult to distinguish small sandpipers and includes these species: semipalmated, least, Baird's, white-rumped, Western.

** Blackbirds includes Red-winged Blackbirds, Starlings, and Grackles.

*** Composition of shorebird flocks:

Species	No. of Individuals Flock #1	Flock #2	Flock #3
Semipalmated Plover	15	1	
Killdeer	10	1	1
Yellowlegs (Greater and Lesser)	80	50	4
Pectoral Sandpiper	45	25	
"peeps"*	305	48	50
Dowitcher	35		
Stilt Sandpiper	10		
	500	125	55

Totals: 8 species
680 individuals

Table C-4. Estimated bird populations on August 20, 1974 (1045-1610 hours) on Mud Flats Circuit. Observer: Thomas W. Scott.

Species		No. of individuals
Great Blue Heron (one flock of 375)		385
Green Heron		1
Great Egret (one flock of 160)		170
Black-crowned Night Heron (one flock of 6)		14
Canada Goose (3 flocks)		34
Mallard (flocks of 5 and 6)		19
Blue-winged Teal		6
Wood Duck		13
Sora Rail		3
Common Gallinule		2
Semipalmated Plover	(two flocks)**	15
Killdeer	(two flocks)**	24
Black-bellied Plover	(two flocks)**	1
Yellowlegs (Greater and Lesser)	(two flocks)**	40
Pectoral Sandpiper	(two flocks)**	85
"peeps"*	(two flocks)**	270
Dowitcher	(two flocks)**	27
Gull (Herring and Ring-billed) (one flock)		150
Common Tern		2
Mourning Dove		2
Eastern Kingbird		1
Purple Martin (one flock)		125
Starling	Mixed flocks of 20, 75, 75, 15	4
Red-winged Blackbird	Mixed flocks of 20, 75, 75, 15	209
Common Grackle	Mixed flocks of 20, 75, 75, 15	1
American Goldfinch		2
Song Sparrow		5

Totals: 32 species
1610 individuals

*"peeps" refer to a group of difficult to distinguish small sandpipers and includes these species: semipalmated, least, white-rumped, Baird's and Western.

** Composition of shorebird flocks:

Species	No. of individuals Flock #1	No. of individuals Flock #2
Semipalmated Plover	10	5
Killdeer	10	12
Black-bellied Plover		1
Yellowlegs (Greater & Lesser)	25	10
Pectoral Sandpiper	75	10
"peeps"*	230	40
Dowitcher	25	2
	375	80

Totals: 8 species
455 individuals

Table C-5. Estimates of species abundance made in conjunction with cooling tower studies, Fall 1974.

	Sept 1-7	Sept 8-14	Sept 15-21	Sept 22-28	Sept 29- Oct 5	Oct 6-12	Oct 13-19	Oct 20-26	Oct 27- Nov 1
Double-crested Cormorant								A	
Canada goose	E	F	F	F	F	F	F	F	F
Mallard	C	A		B		D	C	E	B
Black duck				C			B	D	
Blue-winged Teal	[illegible]			C					
Green-winged Teal				B					
Wood Duck				C					
Unknown ducks		B							
American Kestrel	A	A		A	A		A	A	A
Great Egret	B	A		A					
Great Blue Heron	D	C	A	B		A	A	A	A
Green Heron	A								
Black-crowned Night Heron				A					
American Bittern		A							
Killdeer	C	C	B	B	A	A	A		
Pectoral Sandpiper								B	
"Peeps"						B			
Herring Gull	C	F	D	D	B	C	E	E	E
Ring-billed Gull	C	E	B	C	B	C	F	F	F
Common Tern	A								
Caspian Tern	A								
Rock Dove	A		B	A		B	A	C	A
Mourning Dove	A					A			
Great Horned Owl	A	A							
Common Flicker	A			A					
Downy Woodpecker	A			A					
Eastern Woodpecker				A					
Horned Lark				A					A
Blue Jay				A					
Red-breasted Nuthatch				A					
Brown Creeper							A		
Winter Wren							A		
Carolina Wren			A						
Gray Catbird	A			A					
American Robin	B						A	A	
Wood Thrush			A					A	
Unidentified Thrushes			A					A	
Golden-crowned Kinglet						B	D	C	
Ruby-crowned Kinglet						D	D		
Unidentified Kinglets							D	F	
Shrike							A		
Starling	F	D	E	F	A	D	A	E	F
Yellow-throated Vireo				A					
Black & White Warbler	A		A	A					
Nashville Warbler			A						
Yellow Warbler	A								
Magnolia Warbler	A			B					
Black-throated Green Warbler				C					
Black-Throated Blue Warbler				A					
Blackburnian Warbler	A		A						

(continued)

Table C-5 (continued)

	Sept 1-7	Sept 8-14	Sept 15-21	Sept 22-28	Sept 29-Oct 5	Oct 6-12	Oct 13-19	Oct 20-26	Oct 27-Nov 1
Bay-breasted Warbler	A			B					
Blackpol Warbler					A				
Pine Warbler	A			A					
Connecticut Warbler			A						
Wilson's Warbler				A					
Canada Warbler	A								
Unidentified Warblers				A				B	
House Sparrow	D		E	C	A	A	D	B	B
Red-winged Blackbird	F	E	E	D		F	F	F	F
Rusty Blackbird	C								
Common Grackle	F			C				A	
Flocks - Blackbirds, Starlings, Grackles	F	F	F	F	F	F	F	F	F
Scarlet Tanager				A					
Cardinal	C			A	A				
American Goldfinch	B								
Song Sparrow	A			A		B		A	
Bat	A								

Code: A = 1-5 sightings per week
B = 6-10 " " "
C = 11-25 " " "
D = 26-50 " " "
E = 51-100 " " "
F = >100 " " "

Table C-6. Waterfowl observations at Navarre Marsh made by U.S. Fish & Wildlife Service personnel. Data represent average population for month; peak population observed is given in parentheses.

Species	July 1974	Aug 1974	Sept 1974	Oct 1974	Nov 1974	Dec 1974
American coot	20(20)	20(20)	20(20)	30(30)	30(30)	
Canada goose	15(15)	25(25)	15(15)	10(30)	100(100)	50(100)
Giant Canada goose				40(85)	500(500)	250(500)
Mallard duck	20(20)	100(100)	150(200)	250(600)	250(400)	1250(3750)
Black duck					10(10)	400(1250)
Gadwall						(5)
Pintail						(50)
Green-winged Teal			15(25)	5(25)	10(25)	
B-W/Cinn Teal	15(15)	15(15)	75(150)	60(150)		
Am. Widgeon					20(40)	(50)
Northern Shoveler						(25)
Wood Duck	10(10)	10(10)	30(30)	40(90)	30(50)	
Totals	80(80)	170(170)	305(440)	435(1030)	950(1155)	1950(5730)

Table C-7. Captures and population estimates of *Peromyscus leucopus* in the study area grid, Fall 1974.

Date	Caught	Released	Total recapture	Recaptures from the day before	Unmarked
29 Sept.	0	0	-	-	0
5 Oct.	2	2	0	0	2
6 Oct.	1	1	0	0	1
12 Oct.	3	3	0	0	3
13 Oct.	7	6	2	1	5
Totals	13	12	2		11
26 Oct.	5	5	3	3	2
27 Oct.	3	3	3	3	0
3 Nov.	7	7	5	3	2
Totals	15	15	11		4

Lincoln-Peterson Index for population estimation comparing first five days with last three days:

$M = 10$
$n = 7$
$m = 3$
$N = 23 \pm 10$ (1 S.E.) in 0.64 hectares, or 36 mice/hectare.

Table C-8. Summary of data derived from captures of *Peromyscus Leucopus*, Fall 1974.

	Adults		Subadults		Juveniles		Totals	
	Males	Females	Males	Females	Males	Females	Males	Females
Number of animals	4	4	5	2	0	0	9	6
Testes position								
scrotal	2		1		0			
abdominal	2		4		0			
Nipple size								
small		1		2		0		
medium		1		0		0		
large		2		0		0		
no. obviously pregnant		2		0		0		
No. of movements	3	5	0	2	0	0		
Mean length of movement	14.7	10.5	0.0	25.3	0.0	0.0		
Range: Maximum	20.0	22.4	0.0	28.3	0.0	0.0		
Minimum	10.0	0.0	0.0	22.4	0.0	0.0		
Standard deviations	5.0	7.9	0.0	4.2	0.0	0.0		

Table C-9. Results of large mammal live-trapping, Spring and Fall 1974. Location numbers refer to field map plots.

Species	Date	Location	Weight (lbs)	Sex	ID#
Opossum	28 Sept.	19	3.0	M	107
Opossum	29 Sept.	16	3.0	F	108
Raccoon	5 Oct.	21	8.5	M	106
Opossum	5 Oct.	21	2.5	M	110
Opossum	5 Oct.	17	3.0	F	109
Opossum	12 Oct.	20	3.0	M	111
Raccoon	12 Oct.	19	5.5	F	112
Opossum	13 Oct.	21	3.0	M	111*
Raccoon	13 Oct.	18	6.0	F	113
Opossum	26 Oct.	5	4.0	F	1-Alum.
Skunk	26 Oct.	14	5.0	-	(not marked)
Raccoon	3 Nov.	21	10.5	M	106

*Tag lost & ear notched.

Table C-10. Results of observations by security guards of large mammals, Fall 1974.

Species	Number	Date	Location	Time
Chipmunk	1	4 Oct.	N. Dike Rd.	1850
Muskrat	1	4 Oct.	N. Dike Rd.	1905
Muskrat	2	5 Oct.	S. Dike Rd.	1810
Skunk	1	7 Oct.	Guard House	0207
Rabbit	1	9 Oct.	West Laydown	2100
Raccoon	1	10 Oct.	S. Dike Rd.	1835
Woodchuck	1	11 Oct.	Guard House	1755
Raccoon	1	14 Oct	S. Dike Rd.	1840
Rabbit	1	14 Oct.	S. of Bechtel Whse.	2310
Red Fox	1	19 Oct.	S. Dike Rd.	2340
Skunk	1	25 Oct.	Dump Area	0124
Skunk	3	28 Oct.	Dump Area	0335
Opossum	2	28 Oct.	S. Dike Rd.	0355
Rabbit	1	4 Nov.	S. Bentley Off.	2045
Rabbit	1	5 Nov.	Met/Micro. Tower	2100
Deer	2	9 Nov.	W. Cooling Tower	2200
Rabbit	2	9 Nov.	Met/Mirco. Tower	2300
Rabbit	2	8 Nov.	Met/Micro. Tower	2100

Bowling Green State University

Environmental Studies Center
Bowling Green, Ohio 43403

SEMI-ANNUAL REPORT
DAVIS-BESSE TERRESTRIAL MONITORING CONTRACT
DECEMBER 1974

D. Atmospheric Environment

Glen R. Frey
Department of Geography

Introduction

Both spatial and temporal normal climatic fluctuations must be established in order to discover any possible impact by the cooling tower on the environment. Each individual climatic element will vary depending on the conditions surrounding the station. Lake or urban influences have a marked effect on temperature and humidity, causing deviations from adjacent areas. Thus atmospheric conditions at several locations must be monitored and continuously compared in order to establish how the different components are interrelated and how they change from place to place.

Climate variations through time are usually much greater than over space. From one month to the next climatic elements may shift from first to last place in distinguishing the overall differences between stations. Similarly, depending on the conditions of an individual year, the same month from one year to the next could be completely opposite in its variation characteristics. Thus it is of the utmost importance to continuously monitor the climatic elements and compare the differences to establish a frame of reference. Only after the highly varying normal interrelationships are isolated can reasonable assessments be made about artificially induced conditions.

Instruments and Measurements

Instrument installation was completed May 11th at Sites "A" and "B" after initial setup in Bowling Green University's Meteorological Lab for testing and calibration. Site "A" is in the cooling ..er woods and is highly influenced by the forest canopy. Site "B" is the beach location in a relatively open setting on sandy soil. Despite its close proximity to Lake Erie, lake influences seem to be minimal because of its isolated location due to a dense line of trees between the shelter and the shore line. Installation of instruments at Site "T", the meteorological/microwave tower, was not completed until after the heavy construction equipment moved out of the area on August 15th. The site is open and free from any forest vegetation and established on a grass-covered surface according to weather service standards (U. S. Department of Commerce, 1972). Site "BG" is at Bowling Green State University and is used as the off-site comparison station.

The recording evapometer at "BG" was off calibration for the first two weeks in May; therefore, the data were not used in Figure D-17 nor in the discriminant analysis. Similarly, in October when the temperature started to drop below freezing, the evaporation measurements were discontinued for the winter, since they use distilled water and freezing could damage the instruments.

Calibration of the instruments is holding up very well. Through field checks with an Assman Psychrometer approximately every three weeks very minor adjustments had to be made to keep the instruments comparable. The back-up hygrothermograph and evapometer were rotated on a weekly basis amongst the sites as an additional check, and readings were found to be identical.

Presentation of Data

Data are presented in three basic parts. Part I: Monthly summaries of normals and variations of the basic variables together with discriminant function coefficients are presented in Figures D-1 through D-8. Part II: Temperature and precipitation graph comparisons to normal are presented in Figures D-9 through D-12. The temperature graphs give information on normals and extremes for both maximum and minimum conditions. The left side of the daily bar illustrates maxima and the right side minima, with the darker shaded area the normal range; the light area, the extreme range; and the top and bottom lines, the past temperatures of record. The precipitation graph again represents the normal and extreme range, with the top and bottom of the bars representing the record occurrence. The current data and historical data for the figures represent the amount of rainfall in the past thirty day period. Part III: Graphs based on weekly summaries of the basic atmospheric variables, Figures D-13 through D-19.

In this report the discussion is centered around the period May through November 1974, even though the period of primary coverage should be July through December. The data for May and June are not the same as those presented in the previous report, although the conclusions derived from them are almost identical. [In the last report all the data that were available (partial May and partial June) were lumped into one analysis period.] In this report the basic discussion period is by month; therefore, the data previously presented for May and June were separated and analyzed. December is not included because of the amount of time needed for data reduction, analysis, and display (approximately five to six weeks after all data are received). Thus the graphic displays and primary discussions will normally have a one month time lag behind the official reporting periods. The reporting period July through December will cover atmospheric environmental data June through November, and the reporting period January through June will cover atmospheric environment data December through May. Since the data are being continuously collected and analyzed, any significant deviations would be submitted in a supplemental report at the earliest possible date.

Interpretation of Data

ENTIRE PERIOD. For the six month period, May 11 to November 28, 1974, Stations "A"-"B" had the greatest differences while "BG" was intermediate in terms of a climatological summary, as indicated by the relatively equal Dsq statistics (Figure D-8). The discriminant function coefficients, hile comparable amongst themselves for the entire period, are not comparable with the monthly values because their overall magnitude is a function of number of observations. The most significant elements in the discrimination were average air temperatures, weekly total precipitation, minimum air temperatures, and temperature range.

Temperature fluctuations are illustrative of basic controlling conditions both spatially and temporally. Average temperatures at "BG" were about 2.0 F° higher than at "A" and "B". Minimum temperatures at "BG" similarly were 1.9 F° warmer than "B", but 0.5 F° cooler than "A". On the other hand maximum temperatures for "BG" were the same as "B" but 4.4 F° warmer than "A". These variations represent the primary factors that affect each site. Minimum temperatures are slightly warmer at "BG" because of the "urban heat island effect" caused by the heat generating capacity of buildings. Station "A" had higher minimum temperatures caused by theblanketing effect of the forest canopy. Site "B" had the lowest temperature despite its close proximity to Lake Erie because of the barrier effect of vegetation between the station and the lake creating a relatively isolated pocket. In addition the site is located on sandy soil which dries out rapidly and exhibits large fluctuations of temperature under diverse heat radiation loads. Maximum temperatures at "A" are markedly cooler, again because of the blanketing effect of the trees.

Temporally the average weekly temperatures, maximum weekly temperatures, and minimum weekly temperatures (Figures D-13, D-14, and D-15) illustrate similar factors. Temperatures gradually rose until mid-summer and declined into fall. Fluctuations were relatively large from week to week, with very cold temperatures the third week of October and warm temperatures the last week of October. Generally the variations were lowest in mid-summer and increased in fall. Not only were the actual values of the standard deviations large, but the week to week fluctuations increased in the autumn months.

Daily temperature range enforced the patterns described above. The range was approximately 5 F° less at Station "A" (Figure D-8). Each week from the start of leaf development until leaf fall the temperature range was significantly less at "A" (Figure D-16). Temperature ranges were relatively similar for "A" and "BG", except during the drought of the summer when "A" was greater than "BG". The standard deviation of daily temperature range was very similar for each of the sites and exhibited the same temporal pattern as the other temperature elements.

Precipitation was exceptionally below normal for the period. The rainfall during the summer was the lowest of the entire century (Figures D-11 and D-12) and was extremely variable from place to place because of the occurrence of numerous isolated showers. Sites "A" and "B" show the greatest differences. Site "A" received 4.8 inches less than "B" because of interception by the trees.

Evaporation at "B" was 0.8 mm less than "A" primarily because of the sheltering effect of the surrounding vegetation. In most instances "A" and "BG" were quite similar in total amounts, with "B" being lower (Figure D-17). In terms of variation "BG" was usually the highest because of building influences. Buildings in one direction caused a funneling effect of the wind, while those in another caused a blockage. Thus, depending on wind direction, evaporation would be slightly increased or decreased. Humidity, as illustrated by average dew points (Figure D-19), had a very similar pattern to temperature. Dew points were relatively alike throughout the period.

Station "B" had slightly higher values in the early part of the period, probably because of the lake influence. Relative humidities were extremely variable, being generally lower in the warmer months. Davis-Besse sites averaged higher in the early part of the year. Station "B" was slightly lower in the dry spell because of the higher temperatures over the sandy soil.

Throughout this initial period there was a great amount of variability exhibited by the recorded data. These fluctuations must be completely documented both spatially and temporally in order to place any artificial changes in their proper perspective with the highly variable and ever-changing natural atmospheric environment.

MAY. Below normal temperatures were recorded for most of the month with minimum temperatures averaging over four degrees below normal. The last part of the month had two warmer spells, from the 14th to the 17th and 21st to the 23rd. Precipitation totaled 3.87 inches, approximately a third of an inch above the mean. The 13 days of rain showers helped recharge some of the soil moisture. Cooler temperatures along with a hard freeze on the seventh of the month generally retarded vegetation growth with some scattered damage to garden crops.

In distinguishing the differences between the various stations during May, evaporation and temperature range are the most important (Figure D-1). The difference in the average evaporation between Sites "A" and "B" was 0.8 mm, which was considerable when compared against a mean of 1.8 mm and a daily standard deviation of 1.0 mm for "A" (the larger of the two sites). This greater evaporation can probably be attributed to the lower humidities, since there is open bare ground in the vicinity, whereas the beach site ("B") is completely surrounded by marsh. Both sites had higher evaporation than "BG". This difference appears to be due to the lake effect, which kept humidities generally higher at the Davis-Besse sites than further inland. Average dew points and relative humidities are significantly lower at "BG" than at "A" or "B" (Figures D-18 and D-19).

The second most important element in discriminating between "A" and "B" was daily temperature range. Station "B" averaged 19.5 F°, which was 5.0 F° greater than the woods location ("A"). With a standard deviation of 5.2 F° the standard score of variationbetween the two stations was relatively large. "A" was smaller because of the forest canopy having a blanketing effect and preventing daily temperature extremes. This was reflected in the maximum and minimum temperatures, which rank third in importance in discriminating between the two locations. On the average the mean maximum temperatures for "A" (68.8°F) was 4.3 F° cooler than "B", while the mean minimum temperatures (54.4°F) was 0.7 F° warmer than "B". In relation to "BG" differentiations, temperature range does not rank second because of its intermediate position. It was greater than "A" but less than "B" (see the graph on Temperature Range, Figure D-16). However, minimum temperatures ranked second with "BG" averaging 0.7 F° cooler than "B" and 1.3 F° cooler than "A".

Even though above average precipitation was received, "B G" was much drier than "A" and "B". This occurred because humidity (which ranked high in distinguishing between locations) was considerably lower at "BG" than at both Davis-Besse sites. In addition, higher average temperatures lead to higher evaporation.

JUNE. June was a cool, dry month. The average temperature (67.3°F) was 3.3 F° cooler than normal. The only days that were marginally above average were from the 4th through the 9th and 18th through the 21st. The minimum temperature (49°F) recorded on the 23rd of the month at "BG" was 15 F° below average. Precipitation was relatively light but fairly evenly spread over the first three weeks of the month. It was an inch below the normal 30-day total. No rain fell from the 22nd to the end of the month, resulting in a total for the month of 2.33 inches, 1.53 inches below normal. The vegetative growth was slower than normal because of the temperature and was drawing heavily on stored soil moisture, although not as yet affected by the dryness.

Of the three stations in the analysis, "B" was the most different from the other two. This is shown by the overall Dsq (Figure D-2) with "A"-"B" equal to 7.8, "B"-"BG" equal to 7.7, and "A"-"BG" equal to 4.4. The two elements that were primarily responsible for the difference between "A"-"BG" were temperature range and maximum temperatures. The average air temperature range at "A" was 12.8 F° with a standard deviation of 4.8 F°. This is significant when compared with a difference of 6.0 F° between the stations. In relation to both "BG" and "B" Station, "A" had a small temperature range (Figure D-16). This is again due to the blanketing effect of the forest canopy. The principal reason for this marked reduction of the temperature range was due to the lowering of the maximum temperatures rather than the increase of the minimum temperatures. Station "A" with an average maximum of 73.1°F was 4.1 F° cooler than "BG" and 5.9 F° cooler than "B". Since the maximum temperatures between "B" and "BG" were relatively similar (Figure D-13), the discriminant function coefficient was relatively small on this element (Figure D-2). The minimum temperatures were slightly higher at "A" than "BG", approximately 1.8 F°. This was enough to rank minimum temperatures third in importance in distinguishing between "A" and "BG".

The most important distinguishing element between "B"-"BG" was precipitation. Significantly more rai fell at Davis-Besse during the month than at Bowling Green. This is best illustrated by a difference of 1.64 inches between the two sites and a high discriminant function rating. Second in importance was average temperature. The reason for the relatively high loadins was not the great difference in the averages (Figure D-15) but the individual fluctuations. Maximum and minimum temperatures rate third and fourth, respectively, in distinguishing between "B" and "BG". The wood lot canopy intercepted a considerable amount of precipitation at "A", thus making "A"-"BG" appear very similar. However, the degree of discrimination was still second in importance between "A" and "BG" because of individual weekly dissimilarities.

Evaporation was the most important element in determining the overall differences between "A" and "B". Although Site "A" had high maximum and average temperatures, "A" had 1.0 mm more evaporation (standard deviation of 0.6) than "B" because the beach site had higher humidities and a more protective setting from the wind. Evaporation did not play a significant part in the "A"-"BG" and "B"-"BG" station differences as in May, because other elements had a greater degree of variability. Precipitation and average temperatures ranked second and third in importance.

JULY. Most of July averaged slightly above normal temperatures with the exception of two distinct periods. July 11th was significantly below average, and the 23rd set a new all time low record (Figure D-9). Overall the temperature averaged only 0.3 F° below the long-term normals. Precipitation was extremely low. Only 0.17 inches fell during the whole month, some 3.31 inches below normal. The 30 day precipitation totals reveal the anomaly very well. The first half of the month was well below normal, and on the 22nd of the month dropped below the driest on record. This condition remained for the rest of July (Figure D-11).

During the month of July "BG" was relatively intermediate between Sites "A" and "B", being more similar to each of them than they are to each other. This is given by the overall Dsq between "A"-"BG" of 4, "B"-"BG" of 5, and "A"-"B" of 12 (Figure D-3). The element that revealed the greatest differentiation between the two Davis-Besse sites was total precipitation. Even though more precipitation was received along the shore of the lake, the interception reduced the total amount recorded at "A" below "BG" and set up a key difference between "A" and "B". The small amounts tend to lify the degree of variance, hence its relative importance.

The second element separating these two stations was evaporation. Station "A" averaged 2.9 mm per day, 1.4 mm higher than "B". This is significant if a combined variability of 1.1 mm is considered (Figure D-17). This is higher because of the lower dew points and greater air movements. The third element of importance was maximum air temperatures. The average temperature (79°F) was approximately one standard score below both "B" and "BG". Dew point was the function that ranked fourth.

The "B"-"BG" differences are derived primarily from evaporation, precipitation, and minimum air temperatures. Site "BG" averaged 3.1 mm of water loss per day, some 1.7 mm greater than "B". When considering a normal variation of 1.0 mm, it is highly significant (Figure D-17). Again this was caused by lower dew points, relative humidities, and freer flow of air. The precipitation totals ranked second because they were extremely low. The minimum air temperatures averaged 1.6 F° warmer at "BG" than at the beach but 0.9 F° cooler than the woods location.

The "A"-"BG" differences are based on temperature range, evaporation, and minimum air temperature. The range averaged 22.7 F° for "BG", 8.5 F° higher than "A". The woods site had a consistently smaller range because of the blanketing effect (Figure D-16). Even though the differences between

"A"-"B" were approximately the same, temperature range did not rank high in the other instance because of individual daily similarities. Evaporation while higher than both of the other stations had a difference of only 0.3 mm. Minimum air temperatures are relatively the same, thus leading to a high overall similarity between the two sites.

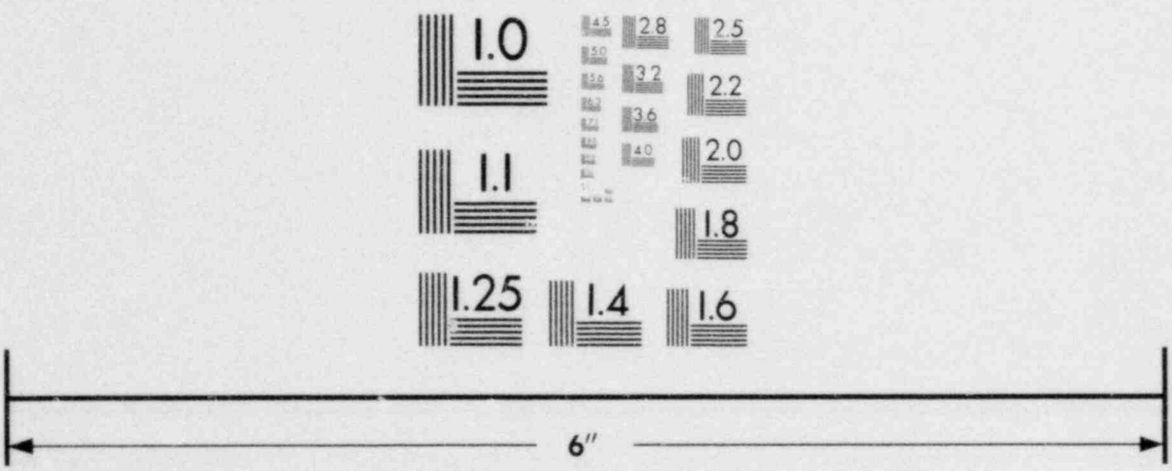
AUGUST. Rainfall for the most part was spotty with no general soaking rains occurring. The extreme dry spell that commenced in late June was broken in most areas. Precipitation totaled 2.14 inches, 1.04 inches below normal. The 30-day precipitation totals (Figure D-12) reveal that, although the record dry streak had been broken, conditions were still extremely dry. Temperatures were relatively normal, averaging only 0.7 F° warmer than long-term averages. The 13th and 22nd averaged higher than expected, while the 6th was lower.

Again during the month of August "B" was the most different with overall Dsq values of 15.2 for "B" and 17.9 for "BG", while the "A"-"BG" value was only 3.2 (Figure D-4). The actual evaporation in each case was the element that was most discriminating. Station "BG" was intermediate in amount with an average of 1.2 mm per day that was 0.3 mm higher than "B" and 0.6 mm lower than "A". This is relatively significant with an average normal variation of 0.5 mm.

Second in importance in the "A"-"B" differentiation was average air temperature. The principal discriminating element was derived from internal variability since the mean of "A" was only 0.5 F° higher than "B". Both maximum and minimum air temperatures rank next. Site "A" averaged 5.9 F° cooler in terms of maximum readings, while at the same time it averaged 3.4 F° warmer in terms of minima.

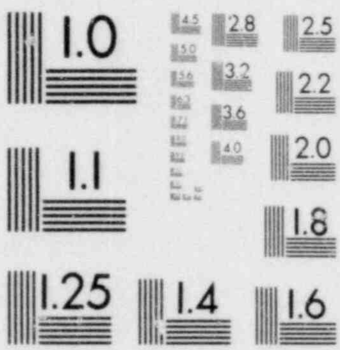
In addition to evaporation the "A"-"B" differences are attributable to total precipitation, dew points, and relative humidities. Precipitation totaled 0.68 inches greater at "BG", indicating that the dryness was even more intense

IMAGE EVALUATION TEST TARGET (MT-3)



MICROCOPY RESOLUTION TEST CHART

IMAGE EVALUATION
TEST TARGET (MT-3)



6"

MICROCOPY RESOLUTION TEST CHART

along the shore of Lake Erie. The higher weighting on this factor was a result of the variable nature of the showers this month. The humidity factor was relatively important with differences in dew points averaging 5.0 F° higher at "BG". The variation in terms of combined standard deviations was only 4.6 F°. Similarly relative humidities had large average deviations and variations (Figure D-18).

Average air temperatures and dew points were second and third in importance in distinguishing between "A"-"BG". Site "A" averaged 71.0°F, some 2.6 F° cooler than "BG". Since both Davis-Besse sites had cooler temperatures during the warmest days, the controlling factor was most likely the lake influence. The dew points were relatively similar with only a 0.7 F° separating the stations. The overall pattern of small average differences and internal variations lead to the similar "A"-"BG" climatic patterns.

Station "T", although in operation in August, did not have a complete record and hence was not used in the monthly analysis. Daily data summaries for the initial period of operation indicated that the station is more similar to "A" and "BG" than to the beach location.

SEPTEMBER. September was cold and dry. The dry spell that began in June continued. Rainfall totaled 1.03 inches, 1.52 inches below normal for the month. Total rainfall for the last four months, including September, was a meager 5.16 inches, making this the driest period on record. The prolonged drought left the ground dry with all of the soil moisture depleted. The monthly temperature of 62.7°F was one of the coldest on record. Most of the month averaged slightly below normal. Killing frost occurred on September 23rd when the shelter level readings were 32°F.

Station "B" was the most abnormal of the spatially oriented stations. The beach location had high loadings in comparison with all other stations. The highest was with "T" (24.6) and the lowest was with "BG" (11.5) (Figure D-5). The other stations were rather similar with overall Dsq values ranging from 4.2 to 0.4.

The greatest differences were between "B"-"T" with total precipitation, actual evaporation, and maximum air temperatures the most influential elements. Precipitation ranks high in most of the station comparisons because of the relatively low totals combined with the large variations of individual amounts. Showers this month were isolated and scattered with the exception of the more wide spread storm on the 9th of the month. Actual evaporation was much lower and had a smaller degree of variability at the beach site because of the restricted air flow caused by the surrounding vegetation. Maximum temperatures averaged 2.7 F° cooler at the tower site primarily because of the free flow of air. While the magnitude of the difference was not large, the daily fluctuations were diverse, leading to the relative importance of this factor.

In both "A"-"B" and "B"-"BG" comparisons, evaporation was the principal component in determining overall differences. Total precipitation ranked second in "B"-"BG", while in "A"-"B" relationship range of air temperature was second. Temperature range at "A" averaged 6.7 F° cooler with a combined variation of 5.0 F°. The third element of importance in the "A"-"B" discrimination was minimum temperatures, whereas for "B"-"BG" it was maximum temperatures.

Precipitation and evaporation are the two highest ranking elements in determining "A"-"BG" and "T"-"BG" differences. In both cases "BG" received more rainfall and had less evaporation. Since evaporation differences between "T"-"BG" of 0.5 mm with a standard deviation of 0.7 mm was greater than 0.4 mm with a variation of 0.8 mm, it ranked first. For "T"-"BG" precipitation exerted enough variability to rank first.

The smallest degree of variability was exhibited by the "A-"T" combination. The greatest difference was expressed by temperature range, maximum temperatures, and minimum temperatures, all reflecting the forest canopy affect.

OCTOBER. The weather of October was characterized by mostly sunny but cool days with continuation of the drought. Rainfall for the month was only 1.22 inches. By the end of October the total was 10 inches below long-term averages for the year. Measurable amounts of precipitation fell on five days of the month; however, only the quantity occurring on the 15th was of any value to vegetation. During the warm months precipitation of less than a quarter of an inch is of little value to most growing vegetation because of quick evaporation and little moisture retention by the soil. The temperature averaged 3.2 F° below long-term normals. The month began with cool temperatures that moderated until mid-month. The last half was very cool, reducing the average temperature.

The month of October had a larger degree of homogeneity amongst stations than September. The overall Dsq indicates that the most variation again occurred with "B" interrelationships. Although the amount of variation was almost insignificant, the greatest differences occurred in the "A"-"T" and "T"-"BG" comparisons (Figure D-32).

The elements that primarily caused the "A"-"B" differences are total precipitation and evaporation, the same as "B"-"T", while the "B"-"BG" variability was derived from air temperature range and maximum air temperatures. Station "B" had low evaporation with an average of 0.4 mm per day, approximately one standard score below "A". Monthly precipitation totals were fairly similar with differences being derived from individual variability. Daily temperature range at "B" was highest, some 3.0 F° greater than "T". The average maximum temperatures were almost identical, with individual daily fluctuations contributing to the higher ranking of the discriminant function. The proximity to Lake Erie, very dry sandy soils, complete wind break formed by vegetation, all lead to the high anomaly of "B".

The most similar combinations had the greatest degree of variation in total precipitation. Precipitation throughout northwest Ohio was highly variable most of the summer. This factor, together with the woods location, would be expected to lead to a higher ranking. Total evaporation ranked second with "T"-"BG", whereas with "A"-"T" it was average dew point. Evaporation includes only partial data, thus leading to some discrepancies. Overall, with the growing season coming to an end and vegetation effects being reduced, climatic factors between stations are much more similar.

NOVEMBER. Somewhat above normal precipitation in November ended the most extended dry spell on record in northwest Ohio. Rainfall totaled 2.48 inches, 0.36 inches above normal. Temperatures during the month ranged from unusually warm for the first two days to far below the normal on the 15th and 26th. Most of the month was on the cool side, except for the 23rd and 24th, which had afternoon readings in the 60s, well above the long time normal of 47°F for those dates. Overall the temperatures averaged slightly cooler than long-term normals.

November was very similar to October in terms of variability patterns. Again "B" had the greatest differences. The overall Dsq between "B"-"BG" was 3.4, between "B"-"A" was 2.7, and between "B"-"T" was 2.0, while all other interrelationships were less than 0.2 (Figure D-7). The factors that contributed to "B"-"BG" differences were total precipitation, minimum air temperatures, and range of daily air temperatures. Precipitation was a result of internal fluctuation compared to the means. Minimum temperatures were 2.6 F° lower at "B" because of the rapid cooling of the relatively dry sandy soils. These soils were drier due to rapid percolation. Because of this rapid night time cooling occurred, and temperature range was greater by 1.2 F° at "B". Comparison between "B"-"A" was identical, with precipitation, minimum temperatures, and temperature range ranking, one, two, and three. The only difference in the "B"-"T" differentiation was that average dew points replaced temperature range in the third position.

Stations that were most similar derived their differences primarily from precipitation. Station "A" received the lowest and "BG" the highest amount of rainfall. Although interception by a forest canopy is greatest during the period of foliation, it still occurs in the winter months. Minimum air temperatures ranked second in "T"-"BG" discrimination. Temperatures averaged 1.2 F° warmer, not a great difference. The reason for this was probably the relatively close proximity of the university buildings. In most instances differences are extremely small, as can be seen on Figures D-13 through D-19.

Reference Citation

U. S. Department of Commerce (1972). National Weather Service Observing Handbook No. 2, Substation Observations. Washington, D. C.: National Oceanic and Atmospheric Administration.

CLIMATOLOGICAL SUMMARY FOR MAY 11-MAY 31, 1974

	Station A		Station B		Station T		Station BG	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
MAX TEMP AIR	68.81	7.05	73.14	6.20			71.05	7.91
MIN TEMP AIR	54.38	4.49	53.67	5.20			53.14	6.14
AVE TEMP AIR	60.43	5.14	62.33	4.83			62.10	6.68
RANGE TEMP AIR	14.43	6.04	19.48	5.15			17.43	4.98
TOT PRECIP	2.43		3.14				1.78	
ACTUAL EVAP	1.82	1.09	1.02	0.58			0.16	0.11
AVE REL HUM	72.43	10.10	75.76	8.33			58.86	7.67
AVE DEW PT	51.43	7.32	54.05	6.73			47.43	8.54
MAX TEMP SOIL 10 CM	55.62	3.12	64.29	5.81				
MIN TEMP SOIL 10 CM	51.24	3.26	52.95	4.78				
AVE TEMP SOIL 10 CM	53.33	3.11	57.19	4.15				
RANGE TEMP SOIL 10 CM	4.38	1.94	11.33	6.38				
MAX TEMP SOIL 20 CM	52.62	3.06	57.95	4.56				
MIN TEMP SOIL 20 CM	50.29	3.04	52.67	3.92				
AVE TEMP SOIL 20 CM	51.29	3.09	55.10	4.01				
RANGE TEMP SOIL 20 CM	2.33	1.32	5.29	2.03				
MAX TEMP SOIL 50 CM	49.76	2.20	56.33	4.28				
MIN TEMP SOIL 50 CM	48.86	1.98	52.52	3.10				
AVE TEMP SOIL 50 CM	49.10	2.00	54.19	3.51				
RANGE TEMP SOIL 50 CM	0.90	0.87	3.81	3.23				

DISCRIMINANT FUNCTION COEFFICIENTS

	A-T	B-T	A-B	A-BG	B-BG	T-BG
MAX TEMP AIR			1.14392	-0.00438	0.00565	
MIN TEMP AIR			-1.14356	0.06098	-0.03485	
AVE TEMP AIR			-0.03267	-0.07778	-0.04361	
RANGE TEMP AIR			-1.14976	0.01784	-0.03276	
TOT PRECIP			0.01529	-0.00826	0.13403	
ACTUAL EVAP			0.04999	0.17704	-0.26774	
AVE REL HUM			-0.01008	0.00517	-0.05289	
AVE DEW PT			0.02959	0.01485	0.08710	
OVERALL DSQ			3.40255	23.36456	25.00519	

FIGURE D-1

CLIMATOLOGICAL SUMMARY FOR MAY 11-MAY 31, 1974

	Station A		Station B		Station T		Station BG	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
MAX TEMP AIR	68.81	7.05	73.14	6.20			71.05	7.91
MIN TEMP AIR	54.38	4.49	53.67	5.20			53.14	6.14
AVE TEMP AIR	60.43	5.14	62.33	4.83			62.10	6.68
RANGE TEMP AIR	14.43	6.04	19.48	5.15			17.43	4.98
TOT PRECIP	2.43		3.14				1.78	
ACTUAL EVAP	1.82	1.09	1.02	0.58			0.16	0.11
AVE REL HUM	72.43	10.10	75.76	8.33			58.86	7.67
AVE DEW PT	51.43	7.32	54.05	6.73			47.43	8.54
MAX TEMP SOIL 10 CM	55.62	3.12	64.29	5.81				
MIN TEMP SOIL 10 CM	51.24	3.26	52.95	4.78				
AVE TEMP SOIL 10 CM	53.33	3.11	57.19	4.15				
RANGE TEMP SOIL 10 CM	4.38	1.94	11.33	6.38				
MAX TEMP SOIL 20 CM	52.62	3.06	57.95	4.56				
MIN TEMP SOIL 20 CM	50.29	3.04	52.67	3.92				
AVE TEMP SOIL 20 CM	51.29	3.09	55.10	4.01				
RANGE TEMP SOIL 20 CM	2.[illegible]	1.32	5.29	2.03				
MAX TEMP SOIL 50 CM	49.76	2.20	56.33	4.28				
MIN TEMP SOIL 50 CM	48.86	1.98	52.52	3.10				
AVE TEMP SOIL 50 CM	49.10	2.00	54.19	3.51				
RANGE TEMP SOIL 50 CM	0.90	0.87	3.81	3.23				

DISCRIMINANT FUNCTION COEFFICIENTS

	A-T	B-T	A-B	A-BG	B-BG	T-BG
MAX TEMP AIR			1.14392	-0.00438	0.00565	
MIN TEMP AIR			-1.14356	0.06098	-0.03485	
AVE TEMP AIR			-0.03267	-0.07778	-0.04361	
RANGE TEMP AIR			-1.14976	0.01784	-0.03276	
TOT PRECIP			0.01529	-0.00826	0.13403	
ACTUAL EVAP			0.04999	0.17704	-0.26774	
AVE REL HUM			-0.01008	0.00517	-0.05289	
AVE DEW PT			0.02959	0.01485	0.08710	
OVERALL DSQ			3.40255	23.36456	25.00519	

FIGURE D-1

CLIMATOLOGICAL SUMMARY FOR JUNE 1974

	Station A		Station B		Station T		Station BG	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
MAX TEMP AIR	73.13	6.63	79.03	5.36			77.23	7.64
MIN TEMP AIR	60.37	5.48	59.60	5.83			58.50	6.32
AVE TEMP AIR	66.20	5.78	68.00	5.48			67.77	6.66
RANGE TEMP AIR	12.77	4.82	19.77	3.59			18.73	4.38
TOT PRECIP	2.43		3.97				2.33	
ACTUAL EVAP	2.15	1.41	1.20	0.55			1.51	1.04
AVE REL HUM	71.00	9.77	74.33	7.70			59.63	8.44
AVE DEW PT	56.23	6.08	59.10	5.45			52.80	7.26
MAX TEMP SOIL 10 CM	58.17	3.39	59.23	3.65				
MIN TEMP SOIL 10 CM	53.90	3.51	54.27	3.18				
AVE TEMP SOIL 10 CM	56.07	3.32	56.67	3.40				
RANGE TEMP SOIL 10 CM	4.27	1.91	4.80	1.62				
MAX TEMP SOIL 20 CM	54.97	2.41	56.27	3.00				
MIN TEMP SOIL 20 CM	52.97	2.43	52.87	2.92				
AVE TEMP SOIL 20 CM	54.07	2.39	54.40	2.81				
RANGE TEMP SOIL 20 CM	2.00	0.97	3.40	1.28				
MAX TEMP SOIL 50 CM	50.13	1.96	54.30	1.90				
MIN TEMP SOIL 50 CM	49.17	1.93	52.23	1.87				
AVE TEMP SOIL 50 CM	49.57	2.03	53.23	1.91				
RANGE TEMP SOIL 50 CM	0.97	0.75	2.07	1.12				

DISCRIMINANT FUNCTION COEFFICIENTS

	A-T	B-T	A-B	A-BG	B-BG	T-BG
MAX TEMP AIR			-0.00962	0.06885	-0.02073	
MIN TEMP AIR			-0.01143	-0.04951	-0.03438	
AVE TEMP AIR			0.01830	-0.02163	0.04968	
RANGE TEMP AIR			-0.01082	-0.06498	-0.00911	
TOT PRECIP			0.04449	-0.01506	0.05997	
ACTUAL EVAP			0.04743	0.01621	-0.00731	
AVE REL HUM			0.00228	0.09076	-0.00563	
AVE DEW PT			-0.00278	0.00319	0.00284	
OVERALL DSO			7.76015	4.41128	7.67057	

FIGURE D-2

CLIMATOLOGICAL SUMMARY FOR JULY 1974

	Station A		Station B		Station T		Station BG	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
MAX TEMP AIR	79.58	7.09	87.16	5.55			87.19	6.19
MIN TEMP AIR	65.35	4.52	62.77	5.55			64.42	5.45
AVE TEMP AIR	72.81	5.34	73.77	5.10			75.77	5.50
RANGE TEMP AIR	14.23	4.89	24.39	3.87			22.77	3.98
TOT PRECIP	0.13		0.44				0.17	
ACTUAL EVAP	2.85	1.67	1.47	0.63			3.13	1.00
AVE REL HUM	64.45	7.90	63.81	10.59			56.29	8.12
AVE DEW PT	59.90	5.32	60.55	8.08			58.97	5.89
MAX TEMP SOIL 10 CM	65.61	2.67	65.48	2.23				
MIN TEMP SOIL 10 CM	60.68	2.29	60.19	1.65				
AVE TEMP SOIL 10 CM	63.19	2.43	62.87	1.91				
RANGE TEMP SOIL 10 CM	4.94	1.37	5.29	1.40				
MAX TEMP SOIL 20 CM	61.42	1.72	61.94	1.64				
MIN TEMP SOIL 20 CM	59.61	1.72	59.52	1.46				
AVE TEMP SOIL 20 CM	60.74	1.66	60.84	1.39				
RANGE TEMP SOIL 20 CM	1.81	0.74	2.42	0.75				
MAX TEMP SOIL 50 CM	56.16	1.05	59.06	1.13				
MIN TEMP SOIL 50 CM	55.29	0.99	57.39	1.31				
AVE TEMP SOIL 50 CM	55.71	0.96	58.26	1.19				
RANGE TEMP SOIL 50 CM	0.84	0.92	1.68	0.59				

DISCRIMINANT FUNCTION COEFFICIENTS

	A-T	B-T	A-B	A-BG	B-BG	T-BG
MAX TEMP AIR			-0.01596	0.00051	0.00160	
MIN TEMP AIR			-0.00567	-0.00725	-0.01024	
AVE TEMP AIR			0.00643	0.00492	0.00285	
RANCE TEMP AIR			-0.00505	-0.01097	-0.00818	
TOT PRECIP			-0.32345	0.00208	0.01995	
ACTUAL EVAP			0.04193	0.00645	0.04086	
AVE REL HUM			-0.00390	-0.00011	-0.00277	
AVE DEW PT			0.01117	0.00222	0.00425	
OVERALL DSQ			12.19522	4.09020	5.04170	

FIGURE D-2

CLIMATOLOGICAL SUMMARY FOR AUGUST 1974

	Station A Mean	Station A Std. Dev.	Station B Mean	Station B Std. Dev.	Station T (partial) Mean	Station T (partial) Std. Dev.	Station BG Mean	Station BG Std. Dev.
MAX TEMP AIR	77.23	4.65	83.13	5.34	79.20	5.64	83.90	5.54
MIN TEMP AIR	64.45	3.46	60.77	4.10	65.20	4.07	64.42	4.09
AVE TEMP AIR	71.03	3.47	70.58	3.45	71.80	4.14	73.68	4.34
RANGE TEMP AIR	12.68	4.04	22.03	5.41	13.60	5.24	19.48	4.46
TOT PRECIP	1.23		1.48		0.13		2.14	
ACTUAL EV'P	1.78	1.00	0.92	0.25	2.20	0.52	1.19	0.54
AVE REL HUM	76.97	6.98	65.29	5.38	72.50	9.25	72.55	10.03
AVE DEW PT	63.68	4.61	58.65	4.88	62.70	4.52	64.39	4.62
MAX TEMP SOIL 10 CM	64.00	2.71	64.90	1.91				
MIN TEMP SOIL 10 CM	59.13	3.07	59.55	1.96				
AVE TEMP SOIL 10 CM	61.55	2.88	62.19	1.84				
RANGE TEMP SOIL 10 CM	4.87	1.10	5.29	1.02				
MAX TEMP SOIL 20 CM	61.13	1.70	62.52	1.68				
MIN TEMP SOIL 20 CM	59.45	2.17	60.06	1.54				
AVE TEMP SOIL 20 CM	60.32	2.02	61.29	1.65				
RANGE TEMP SOIL 20 CM	1.68	0.96	2.45	0.71				
MAX TEMP SOIL 50 CM	56.71	1.08	59.81	1.26				
MIN TEMP SOIL 50 CM	56.26	1.16	57.94	1.50				
AVE TEMP SOIL 50 CM	56.35	1.18	58.97	1.36				
RANGE TEMP SOIL 50 CM	0.45	0.50	1.87	0.83				

DISCRIMINANT FUNCTION COEFFICIENTS

	A-T	B-T	A-B	A-BG	B-BG	T-BG
MAX TEMP AIR			-0.01032	-0.00204	0.00142	
MIN TEMP AIR			-0.01309	0.00209	0.00260	
AVE TEMP AIR			0.03009	-0.01435	0.01013	
RANGE TEMP AIR			-0.00768	-0.00553	-0.00425	
TOT PRECIP			0.00145	0.00457	0.02700	
ACTUAL EVAP			0.07584	0.01540	0.22650	
AVE REL HUM			0.01149	-0.00534	0.01425	
AVE DEW PT			-0.00875	0.01259	-0.01565	
OVERALL DSQ			15.17979	3.23890	17.91342	

FIGURE D-4

CLIMATOLOGICAL SUMMARY FOR SEPTEMBER 1974

	Station A		Station B		Station T		Station BG	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
MAX TEMP AIR	67.26	7.99	71.73	7.24	69.00	7.79	72.10	7.25
MIN TEMP AIR	54.43	6.82	52.17	7.43	53.30	7.27	53.93	7.89
AVE TEMP AIR	60.37	6.90	60.17	6.88	60.90	6.91	62.70	7.26
RANGE TEMP AIR	12.83	4.91	19.50	5.15	15.70	4.99	18.17	3.65
TOT PRECIP	0.74		0.94		0.86		1.03	
ACTUAL EVAP	1.82	0.95	0.70	0.25	1.90	0.72	1.48	0.64
AVE REL HUM	72.23	10.91	65.60	5.79	71.60	11.01	70.60	11.49
AVE DEW PT	51.07	9.45	48.43	7.68	51.53	9.63	52.97	9.87
MAX TEMP SOIL 10 CM	56.33	4.33	57.10	3.16				
MIN TEMP SOIL 10 CM	51.67	4.25	52.10	4.01				
AVE TEMP SOIL 10 CM	54.17	4.24	54.60	3.66				
RANGE TEMP SOIL 10 CM	4.67	1.58	5.00	1.41				
MAX TEMP SOIL 20 CM	54.43	3.59	55.27	3.36				
MIN TEMP SOIL 20 CM	52.37	3.68	52.27	3.71				
AVE TEMP SOIL 20 CM	53.37	3.61	53.93	3.60				
RANGE TEMP SOIL 20 CM	2.07	1.29	3.00	1.21				
MAX TEMP SOIL 50 CM	52.53	2.43	55.33	2.40				
MIN TEMP SOIL 50 CM	51.27	2.38	53.27	2.63				
AVE TEMP SOIL 50 CM	51.87	2.54	54.37	2.44				
RANGE TEMP SOIL 50 CM	1.27	0.57	2.10	0.98				

DISCRIMINANT FUNCTION COEFFICIENTS

	A-T	B-T	A-B	A-BG	B-BG	T-BG
MAX TEMP AIR	0.01930	0.05806	0.01147	0.00203	-0.04115	0.00713
MIN TEMP AIR	-0.01741	-0.02380	-0.02179	-0.00135	0.01132	0.00133
AVE TEMP AIR	0.00399	-0.05490	0.02115	-0.00090	0.02810	0.00403
RANGE TEMP AIR	-0.02037	-0.03853	-0.02599	-0.00985	0.02137	0.00006
TOT PRECIP	-0.01616	0.26084	0.01657	-0.03585	-0.11805	0.07464
ACTUAL EVAP	0.00227	-0.23468	0.11681	0.05100	0.15779	-0.05337
AVE REL HUM	0.00221	-0.02536	0.01262	0.00324	0.00779	0.00062
AVE DEW PT	-0.00587	0.02976	-0.01758	-0.00332	-0.00260	-0.00946
OVERALL DSQ	0.42357	24.57370	14.21059	4.25659	11.49949	2.26738

FIGURE D-5

CLIMATOLOGICAL SUMMARY FOR OCTOBER 1974

	Station A		Station B		Station T		Station BG	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
MAX TEMP AIR	59.55	9.98	62.00	9.14	60.81	10.11	62.48	9.34
MIN TEMP AIR	43.32	7.66	40.45	8.28	42.35	7.75	42.87	8.50
AVE TEMP AIR	51.87	7.91	50.58	7.94	52.00	8.13	53.42	8.33
RANGE TEMP AIR	16.23	6.60	21.55	7.54	18.45	7.29	9.61	6.97
TOT PRECIP	1.32		1.51		1.06		1.22	
ACTUAL EVAP	0.98	1.09	0.43	0.51	1.10	1.24	0.49	0.79
AVE REL HUM	64.58	13.42	61.65	7.00	66.48	12.97	68.52	11.07
AVE DEW PT	40.03	9.44	37.68	8.24	41.16	9.63	43.19	9.24
MAX TEMP SOIL 10 CM	46.35	4.17	47.45	3.00				
MIN TEMP SOIL 10 CM	42.03	3.77	42.16	3.38				
AVE TEMP SOIL 10 CM	44.29	3.82	44.81	3.04				
RANGE TEMP SOIL 10 CM	4.32	1.57	5.29	1.73				
MAX TEMP SOIL 20 CM	44.77	2.55	45.19	2.62				
MIN TEMP SOIL 20 CM	43.03	2.46	42.23	2.77				
AVE TEMP SOIL 20 CM	43.94	2.40	43.81	2.71				
RANGE TEMP SOIL 20 CM	1.74	0.88	2.97	1.06				
MAX TEMP SOIL 50 CM	44.26	1.68	46.71	1.95				
MIN TEMP SOIL 50 CM	43.58	1.72	45.45	1.83				
AVE TEMP SOIL 50 CM	43.97	1.69	46.00	1.87				
RANGE TEMP SOIL 50 CM	0.68	0.74	1.26	0.84				

DISCRIMINANT FUNCTION COEFFICIENTS

	A-T	B-T	A-B	A-BG	B-BG	T-BG
MAX TEMP AIR	-0.00330	-0.00040	-0.00064	-0.00200	-0.02846	-0.00055
MIN TEMP AIR	0.00393	0.00850	-0.00858	0.00723	0.01697	-0.00266
AVE TEMP AIR	0.01489	-0.00632	0.00869	-0.00185	0.01155	0.00216
RANGE TEMP AIR	0.00070	0.00547	-0.00663	0.00229	0.02266	-0.00009
TOT PRECIP	-0.05908	0.01427	-0.05531	-0.05199	0.00448	0.02570
ACTUAL EVAP	-0.00257	-0.02089	0.01972	0.01220	0.00905	-0.01334
AVE REL HUM	0.00507	-0.00071	-0.00004	0.00100	0.00183	-0.00071
AVE DEW PT	-0.01599	-0.00171	0.00093	-0.00391	-0.00001	0.00165
OVERALL DSQ	0.82014	1.96879	2.27173	1.16681	1.77300	0.65453

FIGURE D-6

CLIMATOLOGICAL SUMMARY FOR NOVEMBER 1974

	Station A		Station B		Station T		Station BG	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
MAX TEMP AIR	47.53	10.42	47.57	10.46	47.80	10.61	49.00	10.83
MIN TEMP AIR	36.20	8.80	34.80	8.55	35.83	9.11	37.40	9.83
AVE TEMP AIR	41.83	9.24	40.67	8.92	41.57	9.25	43.13	10.10
RANGE TEMP AIR	11.33	4.74	12.77	5.62	11.97	5.36	11.60	5.61
TOT PRECIP	2.17		2.28		2.26		2.48	
ACTUAL EVAP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AVE REL HUM	79.13	7.09	69.70	6.36	78.63	9.34	81.37	9.47
AVE DEW PT	35.90	9.09	31.70	9.11	35.57	10.25	37.93	11.23
MAX TEMP SOIL 10 CM	37.73	6.80	37.83	7.49				
MIN TEMP SOIL 10 CM	34.57	6.53	33.87	7.20				
AVE TEMP SOIL 10 CM	36.27	6.66	35.97	7.25				
RANGE TEMP SOIL 10 CM	3.17	1.37	3.97	2.06				
MAX TEMP SOIL 20 CM	37.67	5.68	37.70	6.80				
MIN TEMP SOIL 20 CM	36.37	5.68	35.43	6.85				
AVE TEMP SOIL 20 CM	37.00	5.86	36.53	6.84				
RANGE TEMP SOIL 20 CM	1.30	0.82	2.27	1.39				
MAX TEMP SOIL 50 CM	39.67	3.94	41.50	4.84				
MIN TEMP SOIL 50 CM	39.07	3.87	40.20	5.26				
AVE TEMP SOIL 50 CM	39.37	4.01	40.83	4.99				
RANGE TEMP SOIL 50 CM	0.60	0.55	1.30	0.97				

DISCRIMINANT FUNCTION COEFFICIENTS

	A-T	B-T	A-B	A-BG	B-BG	T-BG
MAX TEMP AIR	0.00256	-0.00103	0.00619	0.00677	0.01451	0.00006
MIN TEMP AIR	-0.00536	0.01199	-0.01838	-0.00621	-0.02858	-0.00442
AVE TEMP AIR	0.00800	-0.00155	0.00653	0.00409	0.00209	0.00161
RANGE TEMP AIR	-0.00451	0.00542	-0.01237	-0.00672	-0.02061	-0.00233
TOT PRECIP	-0.00865	0.00982	-0.01112	0.00840	-0.05108	-0.02140
ACTUAL EVAP			0.0			
AVE REL HUM	0.00189	-0.00078	0.00240	0.00087	0.00098	-0.00003
AVE DEW PT	-0.00543	-0.00895	0.00585	-0.00490	0.01122	0.00273
OVERALL DSQ	0.09293	2.04123	2.71394	0.12188	3.42030	0.20337

FIGURE D-7

CLIMATOLOGICAL SUMMARY FOR MAY 11 TO NOVEMBER 30, 1974

	Station A		Station B		Station BG	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
MAX TEMP AIR	67.60	13.14	72.00	14.76	71.98	14.70
MIN TEMP AIR	54.11	12.03	52.00	12.09	53.60	12.10
AVE TEMP AIR	60.73	12.25	60.87	12.82	62.75	13.01
RANGE TEMP AIR	13.47	5.39	19.99	6.34	18.33	5.92
TOT PRECIP	9.13		13.76		10.12	
ACTUAL EVAP	1.62	1.43	0.81	0.64	1.34	1.34
AVE REL HUM	71.46	11.04	67.61	8.88	67.17	12.75
AVE DEW PT	51.22	12.23	49.88	12.98	51.32	11.96
MAX TEMP SOIL 10 CM	54.85	10.17	56.31	10.58		
MIN TEMP SOIL 10 CM	50.48	9.67	50.68	9.88		
AVE TEMP SOIL 10 CM	52.72	9.86	53.35	10.01		
RANGE TEMP SOIL 10 CM	4.38	1.65	5.60	3.22		
MAX TEMP SOIL 20 CM	52.47	8.75	53.69	9.37		
MIN TEMP SOIL 20 CM	50.65	8.64	50.68	9.24		
AVE TEMP SOIL 20 CM	51.59	8.75	52.19	9.28		
RANGE TEMP SOIL 20 CM	1.82	1.04	3.01	1.50		
MAX TEMP SOIL 50 CM	49.93	6.27	53.19	6.93		
MIN TEMP SOIL 50 CM	49.12	6.21	51.26	6.65		
AVE TEMP SOIL 50 CM	49.47	6.22	52.21	6.78		
RANGE TEMP SOIL 50 CM	0.81	0.75	1.93	1.52		

DISCRIMINANT FUNCTION COEFFICIENTS

	A-B	A-BG	B-BG
MAX TEMP AIR	-0.00045	-0.00053	-0.00058
MIN TEMP AIR	-0.00089	0.00071	-0.00112
AVE TEMP AIR	0.00141	-0.00066	0.00186
RANGE TEMP AIR	-0.00073	0.00019	-0.00044
TOT PRECIP	-0.00140	-0.00030	-0.00040
ACTUAL EVAP	0.00401	0.00135	0.00152
AVE REL HUM	0.00027	-0.00014	0.00009
AVE DEW PT	-0.00020	0.00045	-0.00015
OVERALL DSQ	3.52577	1.14169	1.21896

FIGURE D-8

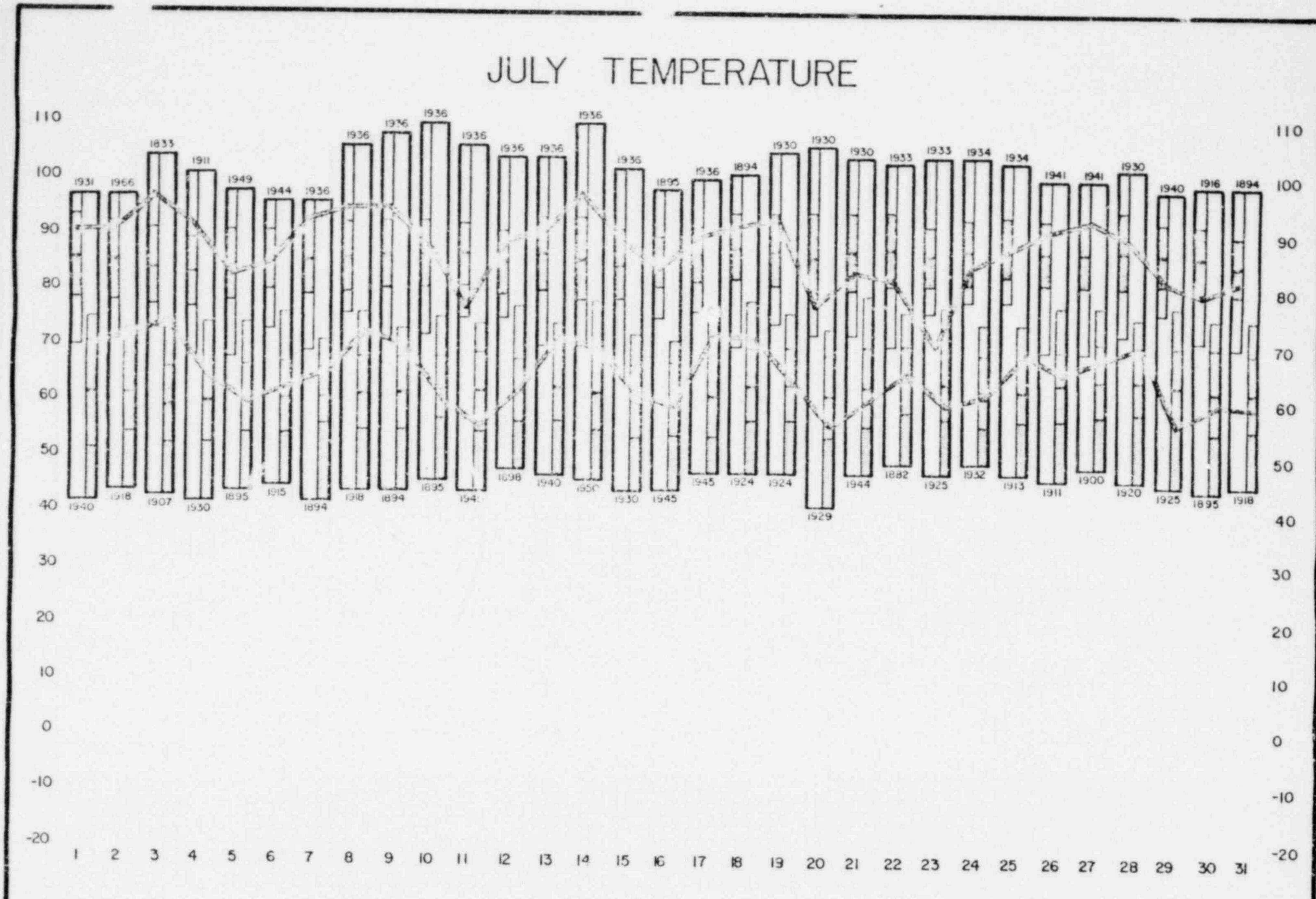


FIGURE D-9

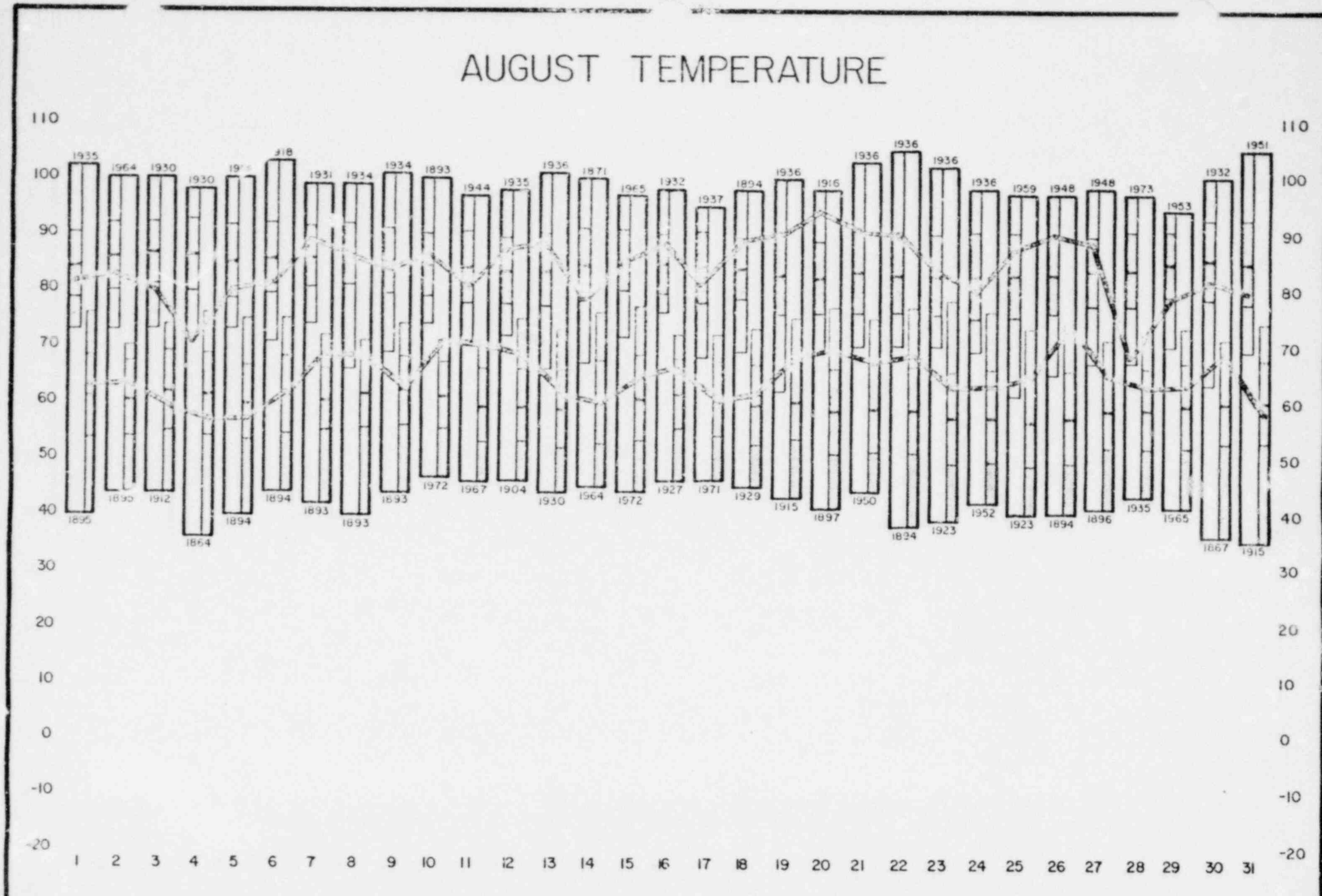

AUGUST TEMPERATURE
110
100
90
80
70
60
50
40
30
20
10
0
-10
-20
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

FIGURE D-10

AUGUST TEMPERATURE

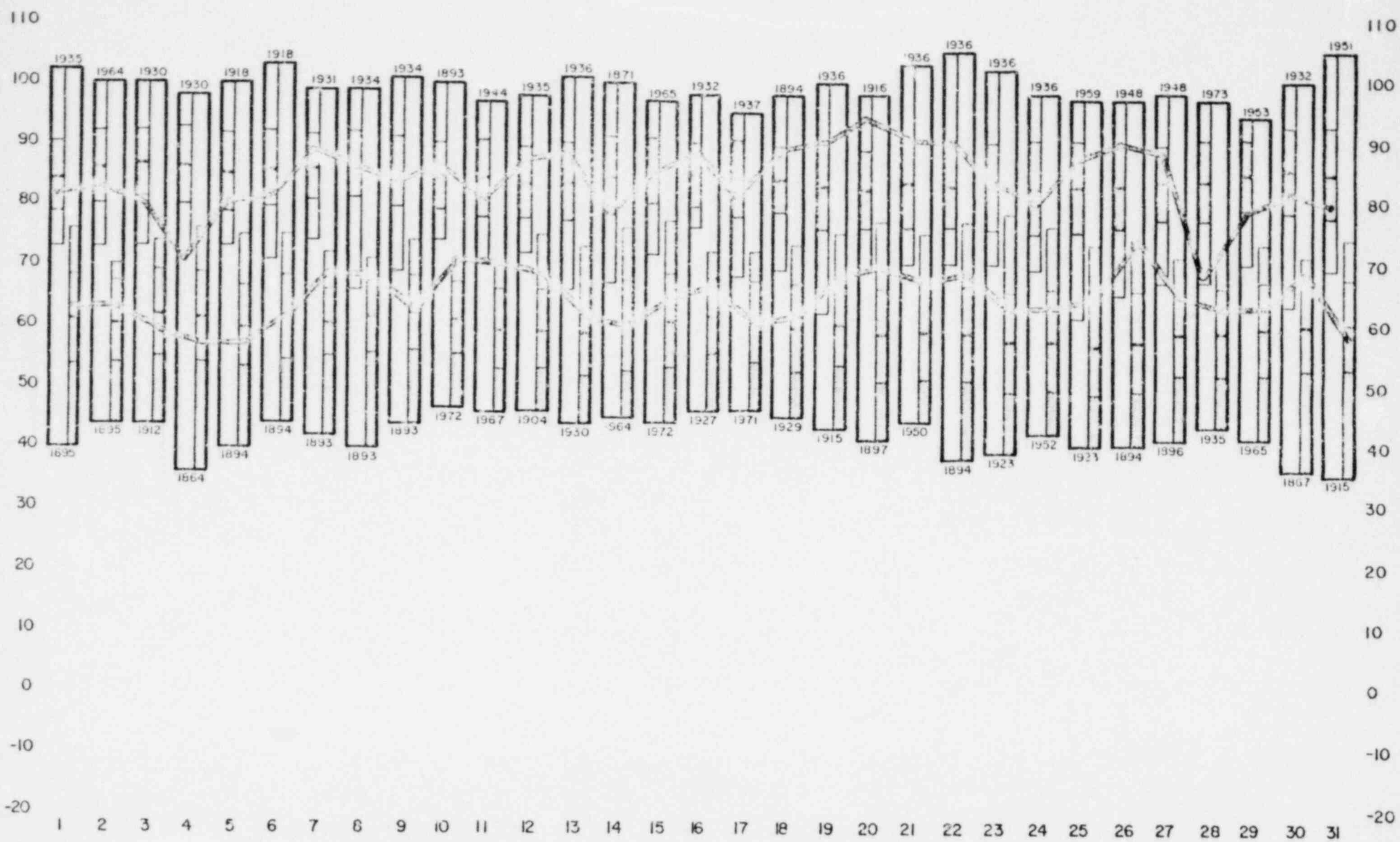


FIGURE D-10

JULY PRECIPITATION

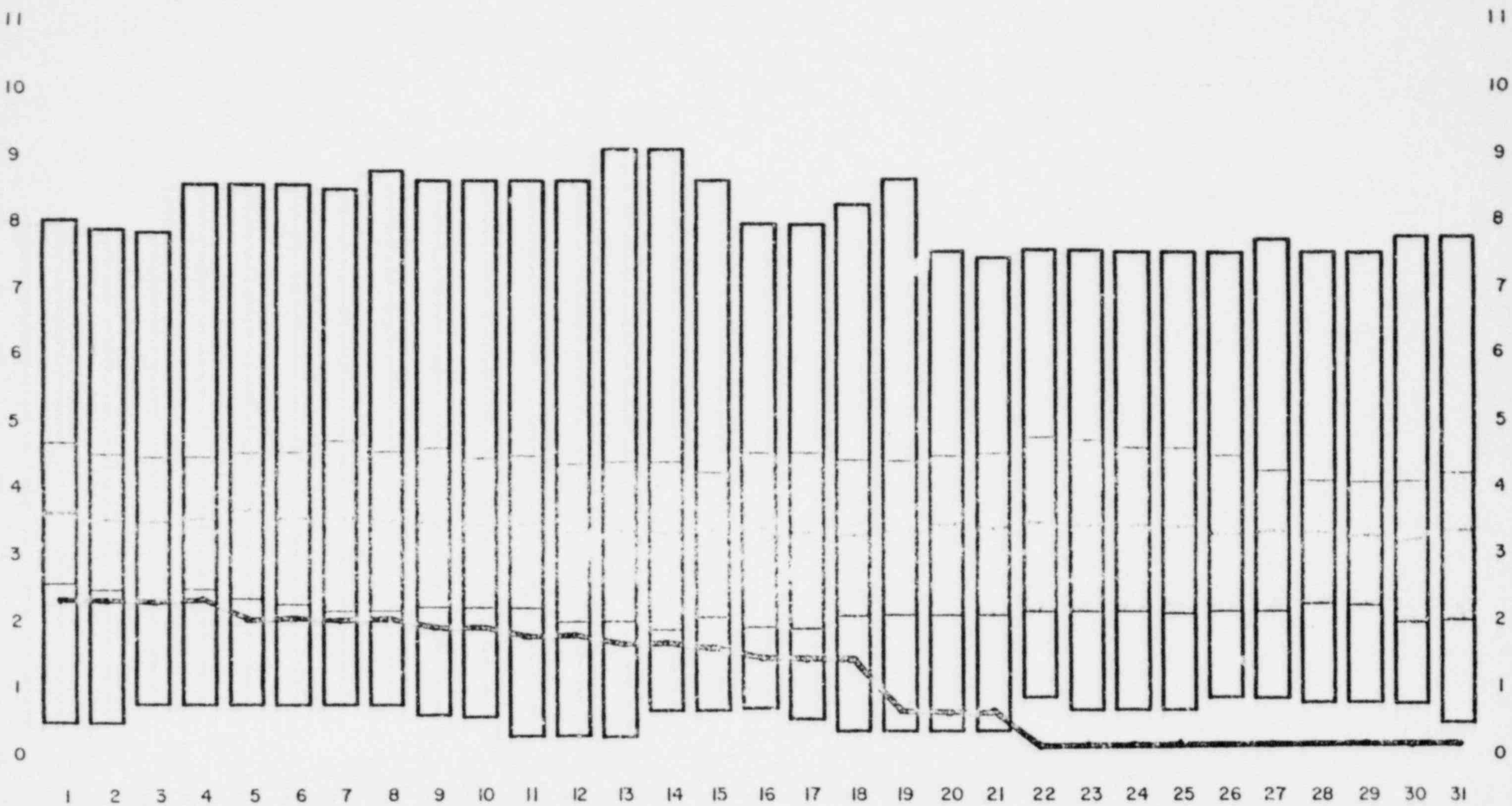


FIGURE D-11

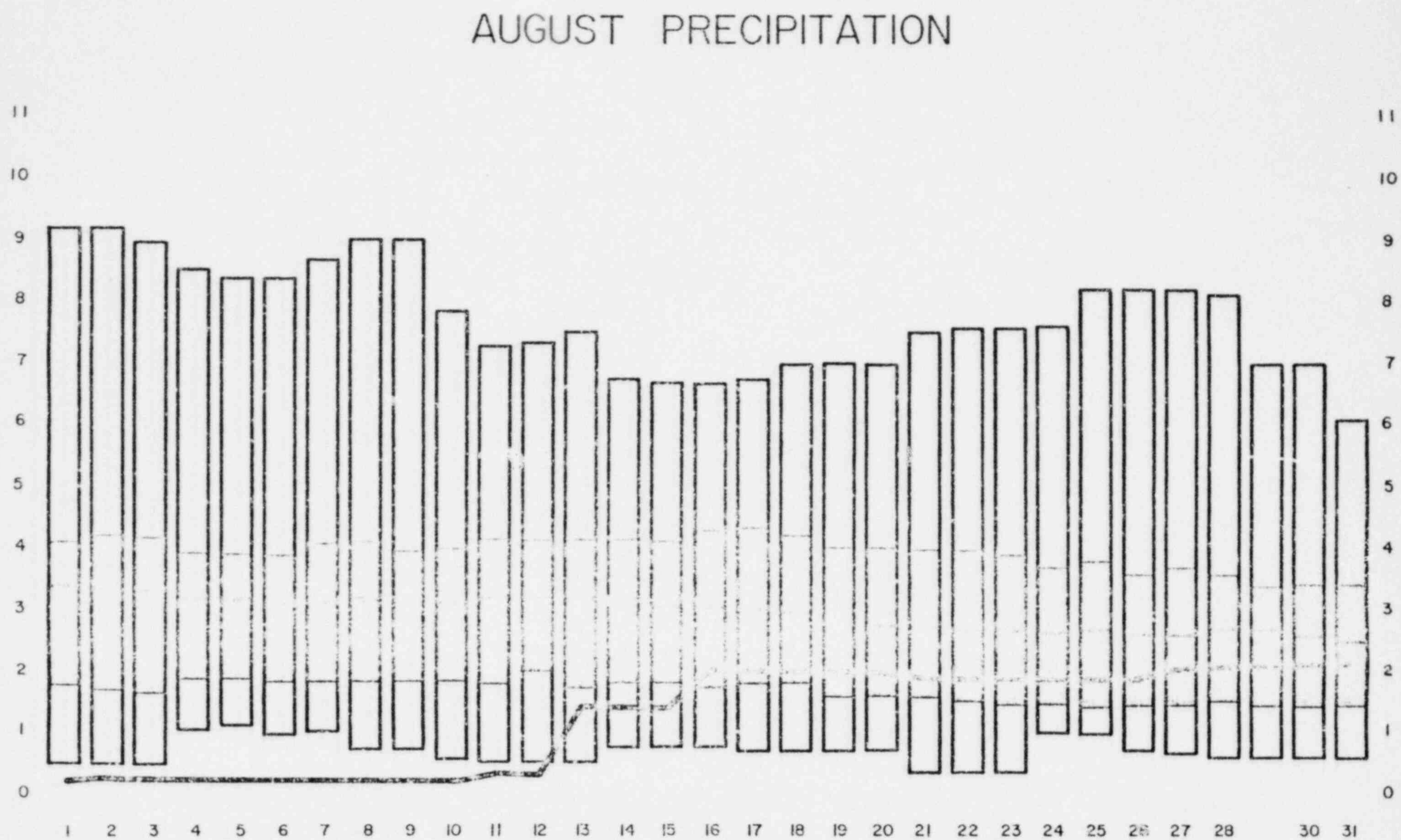
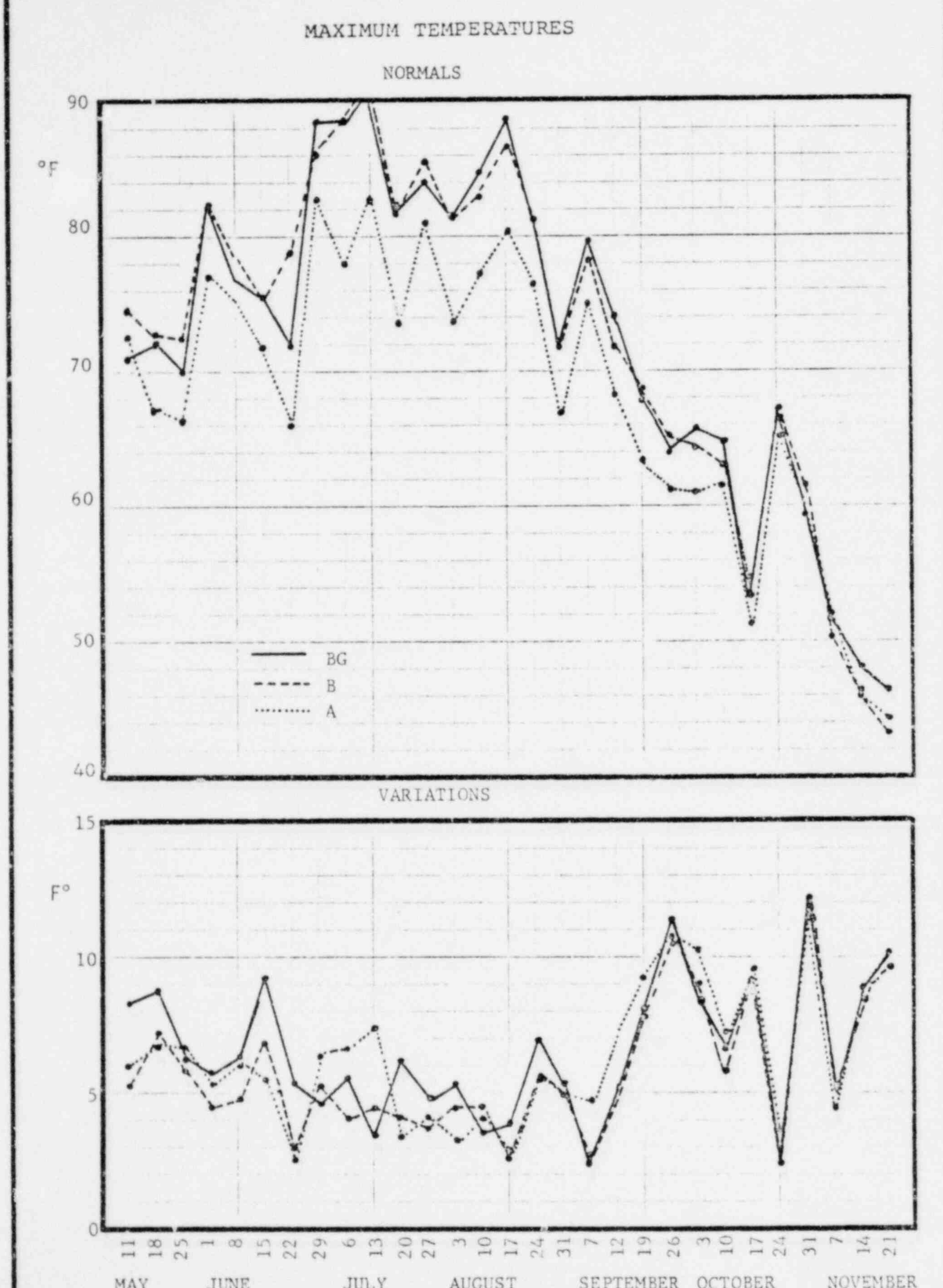

AUGUST PRECIPITATION
0
1
2
3
4
5
6
7
8
9
10
11
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 30 31

FIGURE D-12



MAXIMUM TEMPERATURES
NORMALS
°F
90
80
70
60
50
40
BG
B
A
VARIATIONS
F°
15
10
5
0
11 18 25 1 8 15 22 29 6 13 20 27 3 10 17 24 31 7 12 19 26 3 10 17 24 31 7 14 21
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER

FIGURE D-13

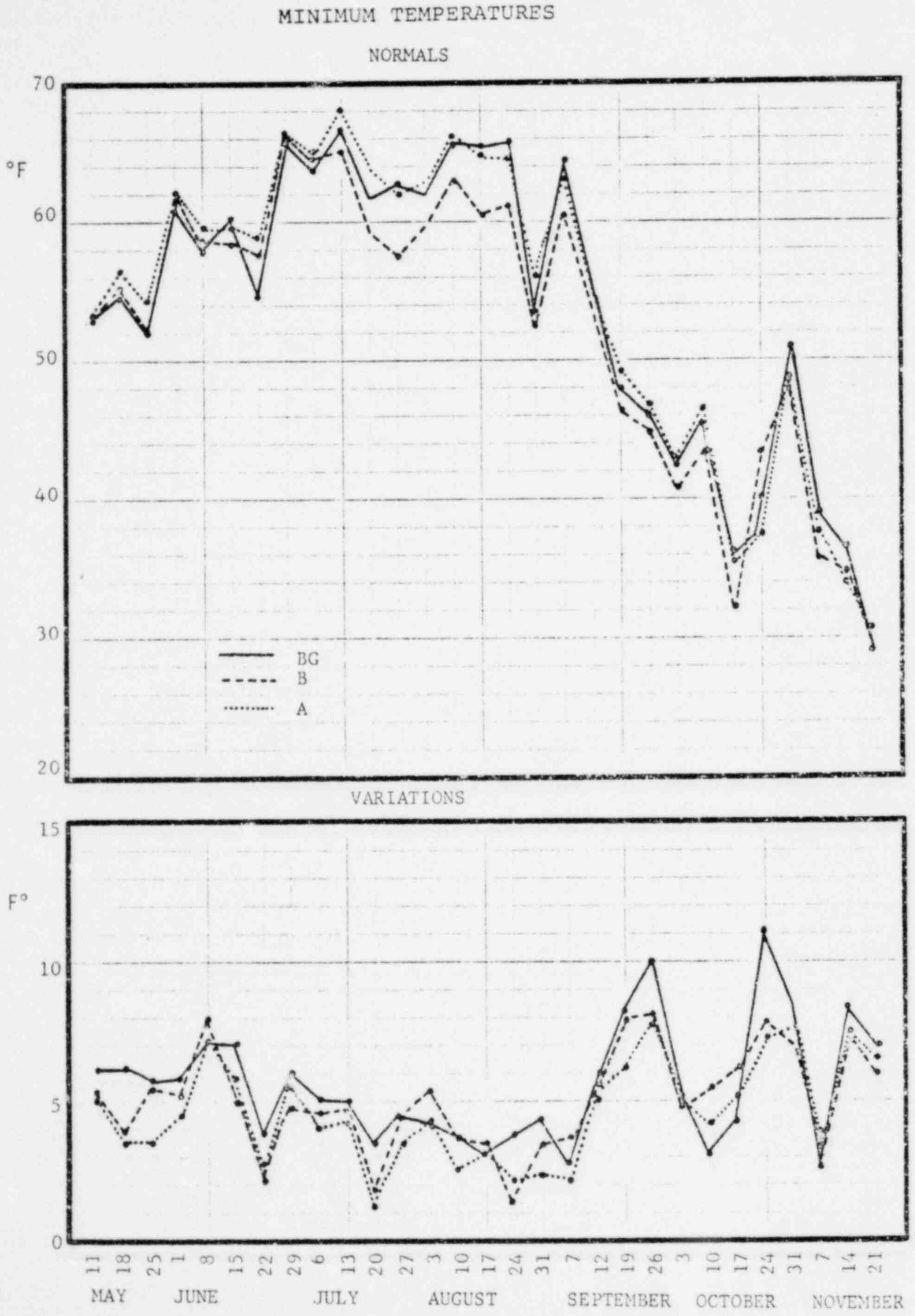

MINIMUM TEMPERATURES
NORMALS
70
60
50
40
30
20
°F
BG
B
A
VARIATIONS
15
10
5
0
F°
11
18
25
1
8
15
22
29
6
13
20
27
3
10
17
24
31
7
12
19
26
3
10
17
24
31
7
14
21
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER

FIGURE D-14

AVERAGE TEMPERATURES

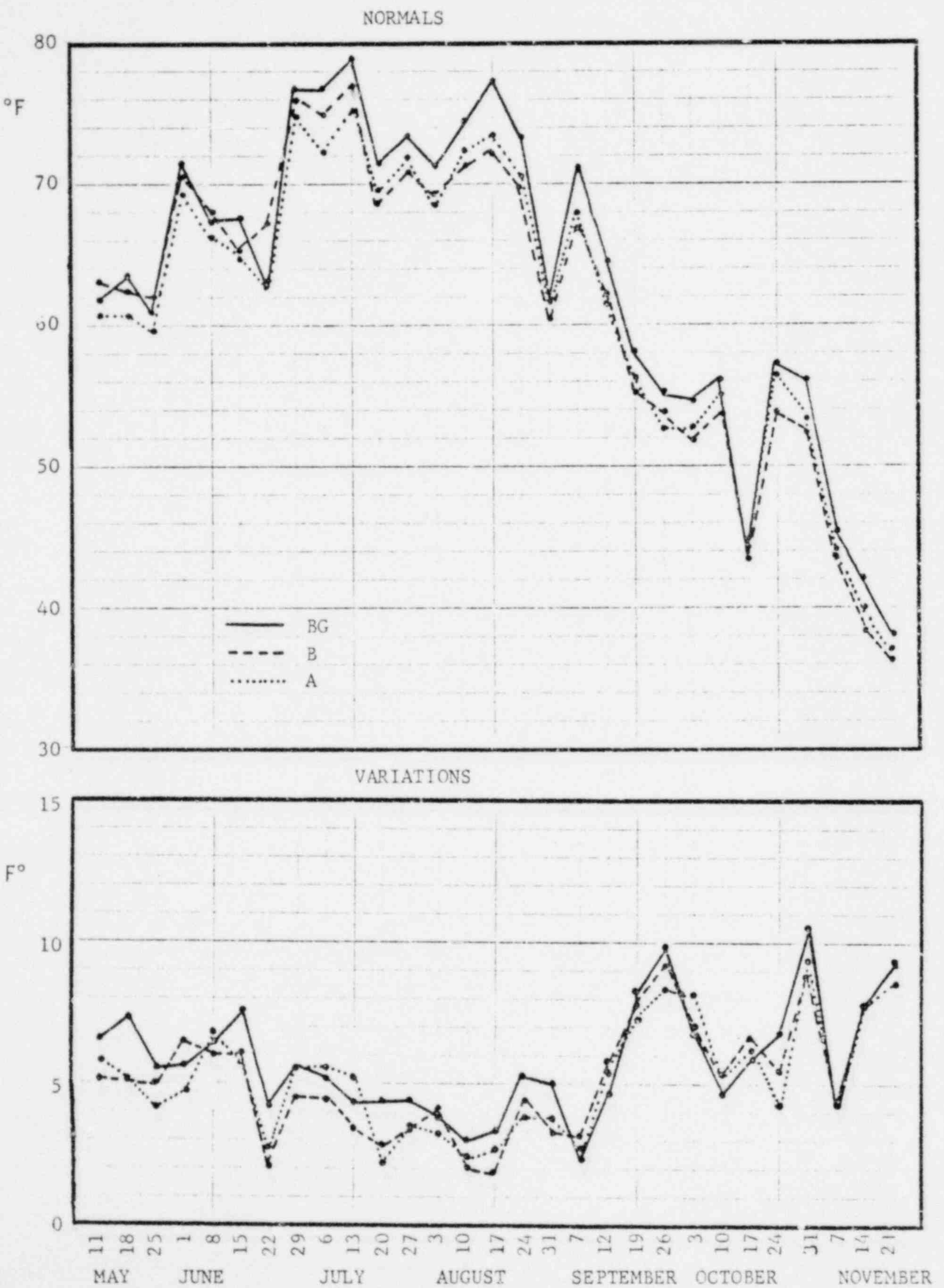


FIGURE D-15

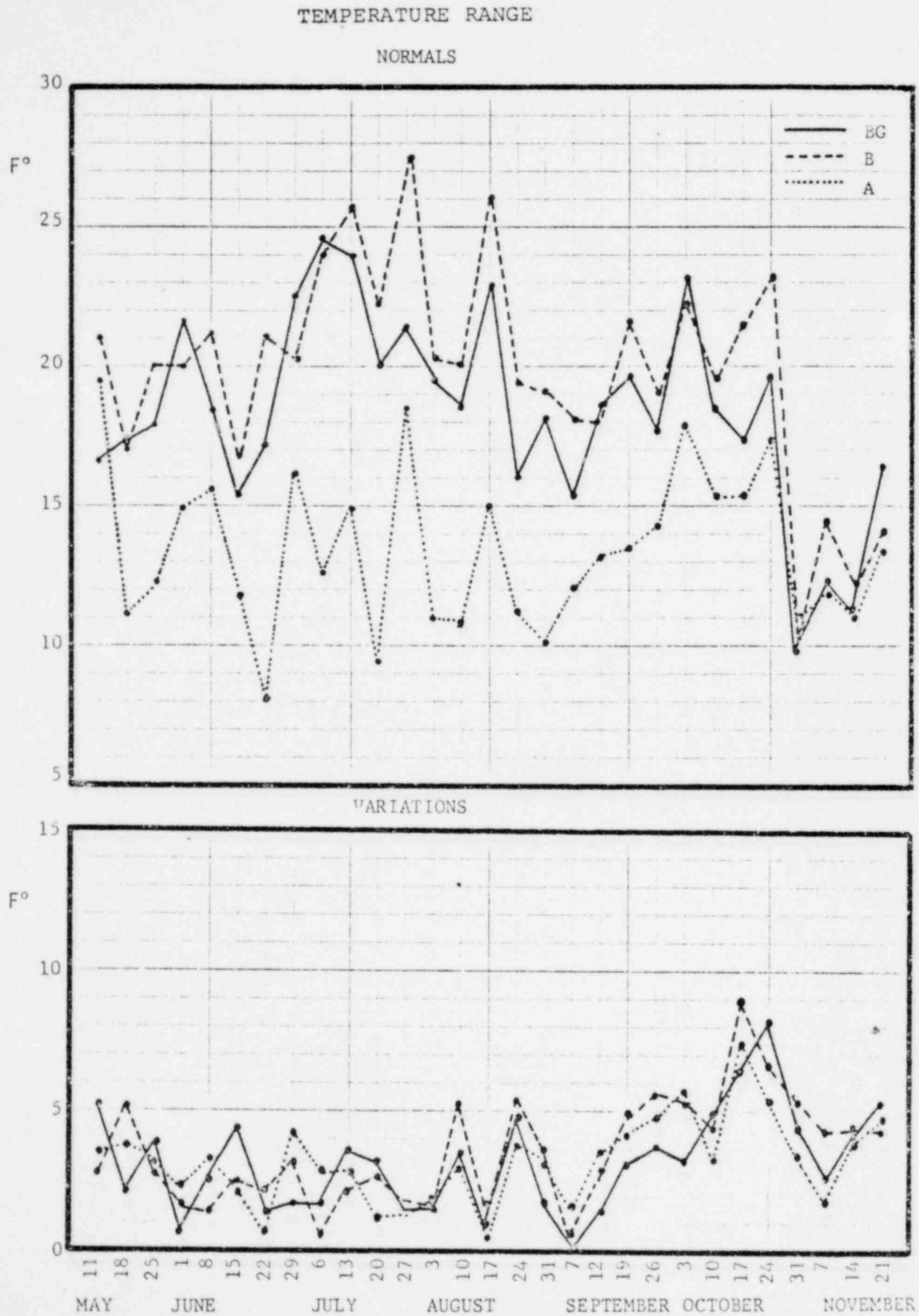
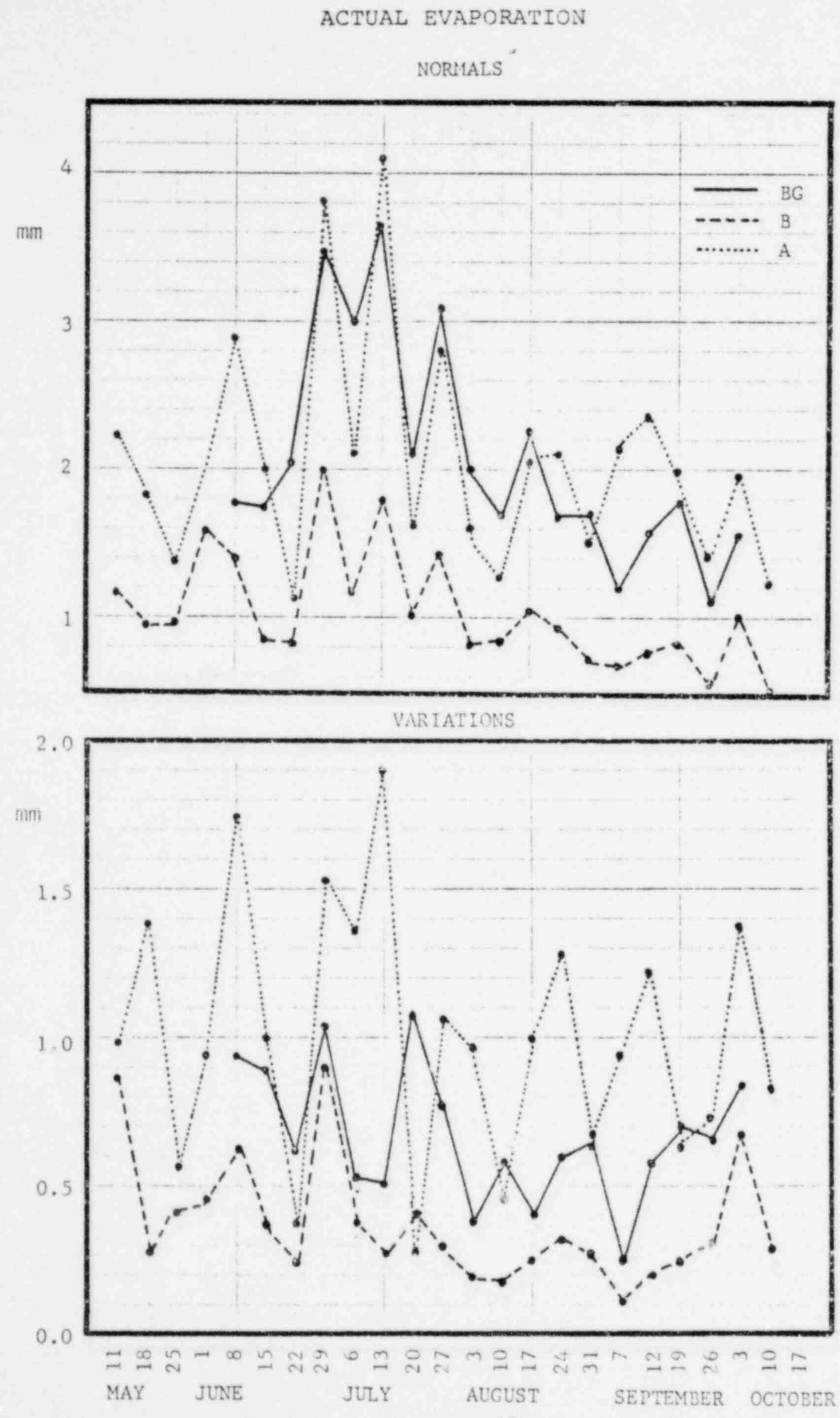
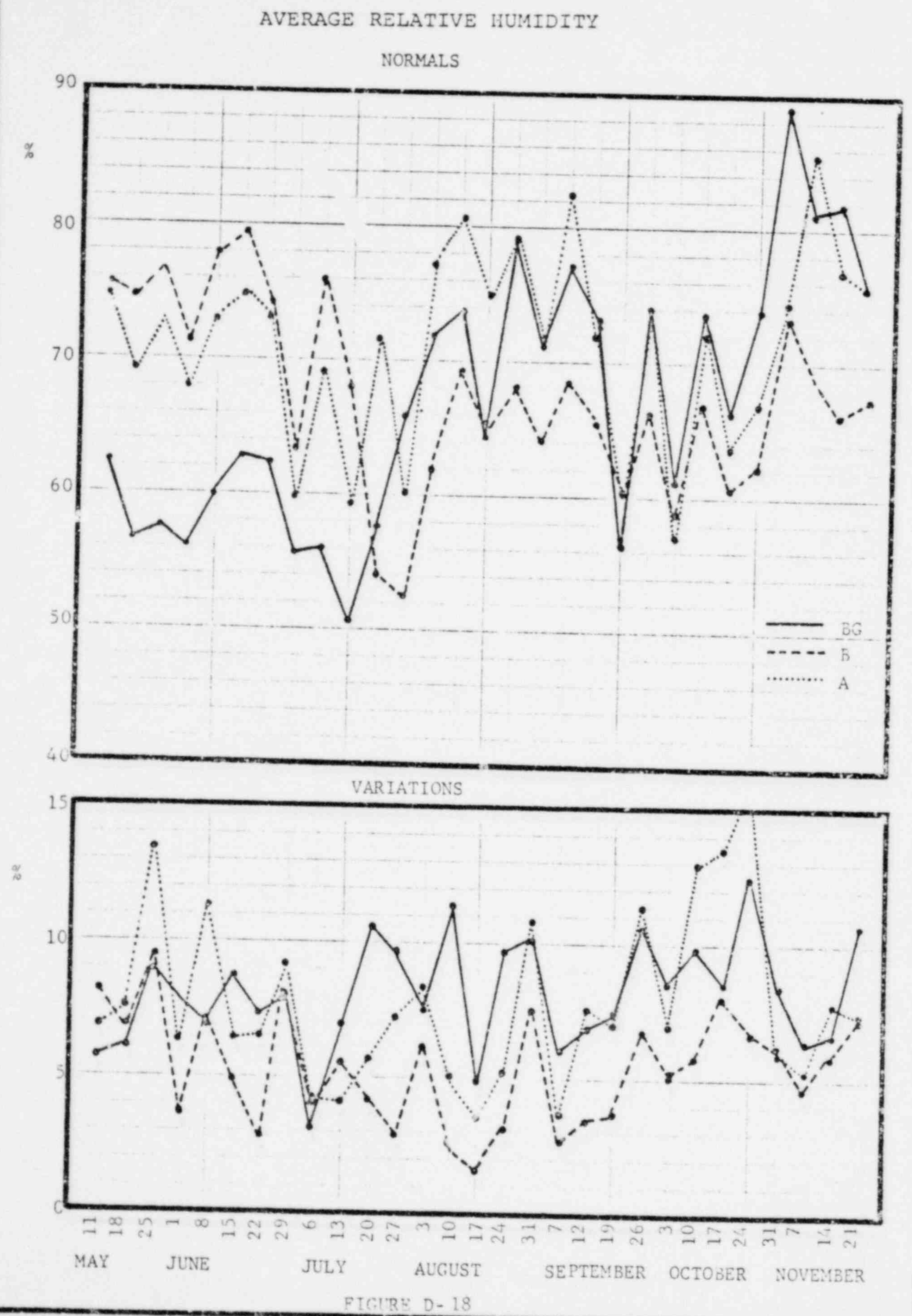

TEMPERATURE RANGE
NORMALS
30
25
20
15
10
5
F°
BG
B
A
VARIATIONS
15
10
5
0
11 18 25 1 8 15 22 29 6 13 20 27 3 10 17 24 31 7 12 19 26 3 10 17 24 31 7 14 21
MAY JUNE JULY AUGUST SEPTEMBER OCTOBER NOVEMBER

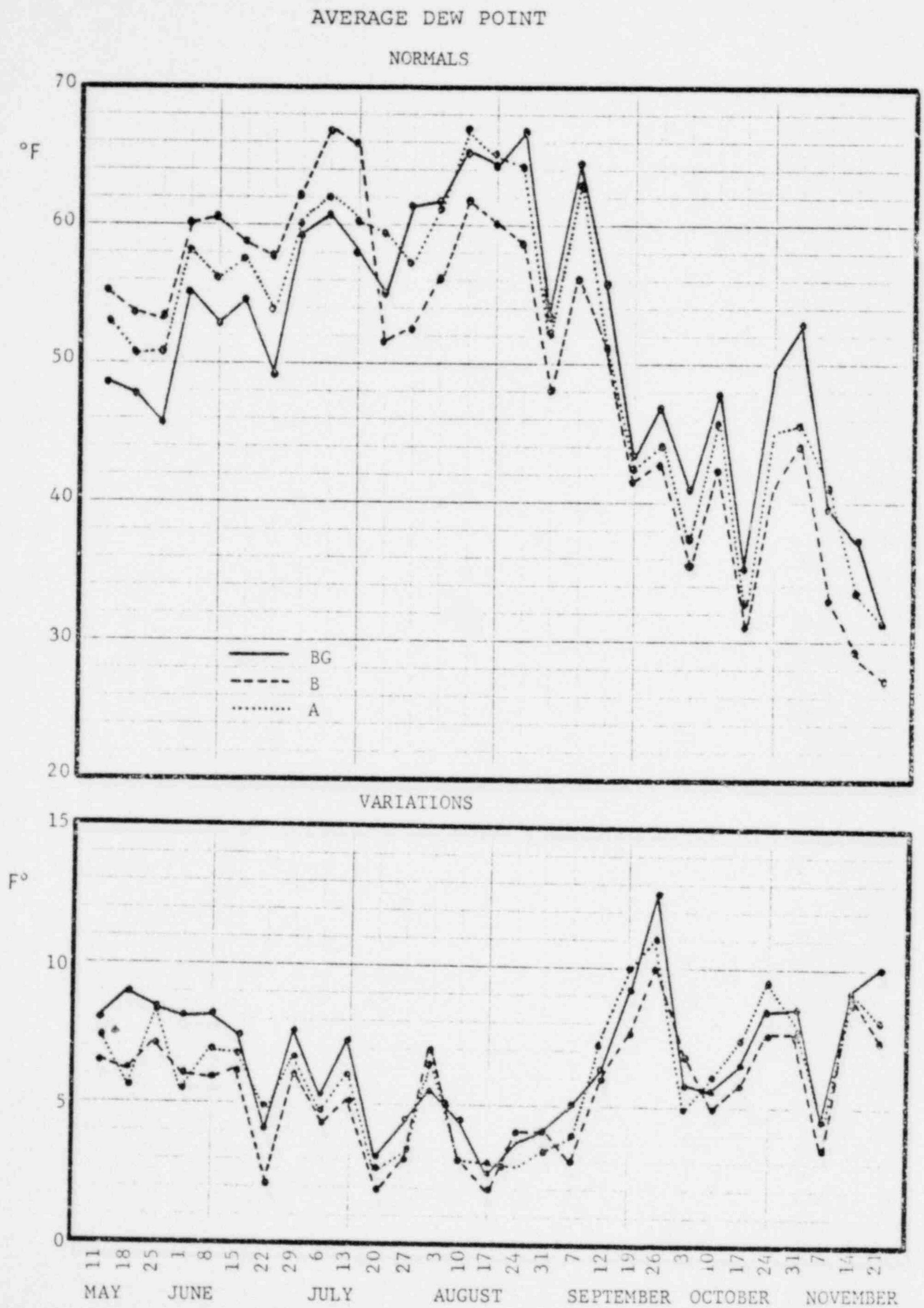
FIGURE D- 16


ACTUAL EVAPORATION
NORMALS
BG
B
A
mm
4
3
2
1
VARIATIONS
mm
2.0
1.5
1.0
0.5
0.0
11
18
25
1
8
15
22
29
6
13
20
27
3
10
17
24
31
7
12
19
26
3
10
17
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
FIGURE D-17



AVERAGE RELATIVE HUMIDITY
NORMALS
90
80
70
60
50
40
%
BG
B
A
VARIATIONS
15
10
5
0
%
11
18
25
1
8
15
22
29
6
13
20
27
3
10
17
24
31
7
12
19
26
3
10
17
24
31
7
14
21
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER

FIGURE D-18



AVERAGE DEW POINT
NORMALS
70
°F
60
50
40
30
20
BG
B
A
VARIATIONS
15
F°
10
5
0
11
18
25
1
8
15
22
29
6
13
20
27
3
10
17
24
31
7
12
19
26
3
10
17
24
31
7
14
21
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER

FIGURE D- 19

Bowling Green State University

Environmental Studies Center
Bowling Green, Ohio 43403

SEMI-ANNUAL REPORT
BIRD HAZARD MONITORING CONTRACT
DAVIS-BESSE SITE
JANUARY 1975

Robert E. Williams, William B. Jackson, and William A. Peterman
Environmental Studies Center

Introduction

The third consecutive fall bird-mortality survey was conducted during the 1974 fall migratory season. This report contains a detailed analysis for this period plus a comparative summary of the past fall seasons. Detailed descriptions of past seasons can be obtained from previous semi-annual reports.

External structure construction, and consequently night lighting on the site, was at a minimum; however, internal construction continued. A newly constructed microwave/meteorological tower (340 ft) was included for the first time in this survey.

Methods

Daily observations were made on the Davis-Besse site on 58 days from August 29 through November 1. Surveys conducted soon after sunrise and prior to sunset occurred on 15 days; morning surveys only, on 42 days (Table 1).

Routine observations included, as in previous seasons, the base of the cooling tower (both inside and out), the perimeter of the Unit 1 structures and their associated roofs, and the area around the base of the original meteorological tower (300 ft). Included for the first time was the area around the newly constructed microwave/meteorological tower. In addition, weekly checks were made within the fenced switchyard and under sections of the transmission lines. The current environmental conditions (temperature, wind, cloud cover, precipitation) were recorded; numbers and species of birds observed while making rounds of the structures were noted; all dead birds were collected, identified by numerical and location code, returned to the University, identified to species, and frozen. Examination by X-ray and detailed dissection has not been completed on all specimens.

A scavenger-loss investigation was conducted at the cooling tower and at the meteorological tower on four nights (September 17-20), and at the new microwave/meteorological tower on two nights (September 19-20). Recently obtained mortality specimens were tagged and placed each night at marked locations, particularly in areas of observed high mortality. Specimen status (i.e., presence and general condition or absence) was recorded the following morning shortly after sunrise; specimens still present were left in place. Signs of scavenger activity, such as tracks, strewn feathers, and burrows also were noted.

Results and Discussion

Mortality Patterns. Observed bird and bat mortality due to contact with Davis-Besse station structures during the nine-week study totaled 342; 281 (82.2%) recovered from the cooling tower, 53 (15.5%) recovered from the Unit 1 structures, and 8 (2.3%) recovered from the meteorological tower. Mortalities were neither recovered from the new microwave/meteorological tower nor from either the switchyard or transmission line areas. A summary of the fall 1974 mortality survey and summaries of the past fall surveys are given in Table 2. Avian mortality during the 1974 fall season was represented by 47 species, 10 of which were first-time occurrences.

A summary of bird families recovered for each fall season is given in Table 3. Warblers (Parulidae) comprised 52% of all the fall 1974 mortalities; kinglets (family Sylviidae), 27%. The two families each were represented in the same proportions at both the cooling tower and Unit 1 structures, but the total number of warblers collected at the site was twice that of the kinglets. However, the proportions of warblers and kinglets collected at the cooling tower in the falls of 1973 and 1974 were reversed.

Approximately thirty-five species of warblers might be expected as migrants in this area; 20 were recovered at the site, and two of three Sylviid species were found. Yet kinglets made up 27% of the total mortality. This may be a function of migratory patterns rather than population numbers. Especially in the fall kinglets are likely to be part of massed migrations and particularly subject to adverse weather patterns.

The proportional representation of Fringillidae, Mimmidae, and other families was much the same as that in previous fall surveys (Table 3). The proportions of Fringillids and Mimmids each fall were invariably lower than in the spring (Table 4).

Representations of the mortalities at the three structures are shown in Figures 1-3. The cooling tower and meteorological tower bases were divided into quadrants and triads, respectively. The Unit 1 structures were sectioned according to roofs.

The greatest proportion (53%) of mortalities at the cooling tower (Figure 1) occurred in the SE quadrant; 38% of the kills occurred in the NE quadrant. [The proportions in these two quadrants were the reverse of the 1974 spring findings (Williams and Jackson, 1974).] Fall mortalities of both the eastern quadrants accounted for 91% of the total, a pattern similar to that of the spring, but differing substantially from the previous fall (Vessey, Ryback, and Jackson, 1973).

Distribution of fall 1974 mortalities around the Unit 1 structures (Figure 2) also differed from that found previously. Mortalities were concentrated on the southern half of the shield building; 92% in fall 1974 compared with 18% in spring 1974 and 49% in fall 1973. Numerically, mortalities from the two fall seasons were essentially equal but were much greater than those found in the spring. Mortalities at the meteorological tower are too few to permit analysis (Figure 3).

In considering these mortality patterns, it should be recognized that the data from each season are not directly comparable. In the past year the procedure used in searching for dead birds has been the same, but the frequency of observation has greatly increased. The site was visited three times as frequently in fall 1974 as in fall 1973, and the fall visits were increased 50% over the spring 1974 observations. Thus while data from the several years of observation are presented in tables and are contrasted in the discussions, exact comparisons should not be attempted without realization of the differences in data collection intensity or methods. Early evening observations were attempted with some frequency this fall, but the data obtained did not justify the effort (Table 1). In the future the early morning routine will be relied upon for regular data collection.

The mortality patterns can be considered in two ways. First, the much larger numbers of kills reported for fall 1974 (over 3 times that reported in fall 1973 and 2 times that reported in spring 1974) can be related to the intensity of observations, which during fall 1974 were performed with greater regularity (once and sometimes twice daily) than in the previous fall seasons (1-3 times weekly). Also, with more frequent observations, the possibility of losing birds to outside sources (i.e., construction activities, scavengers) was reduced. Although frequency of observations did not differ (though the length of time monitored did) from spring 1974, increased mortality could result from the density of fall migrants which is augmented by a new generation of subadults. A greater number of bird mortalities could thus result from the same prevalence of bird strikes.

The second consideration of mortality patterns is the relation between the distribution of the mortalities around the site structures and the direction in which the migrants were moving. Unfortunately, little is known about movements of these small nocturnal migrants. Directional movements may be subject to geographical and environmental conditions. Proximity to large bodies of water, such as the Great Lakes, may alter local N-S migration movements, similar to effects on diurnal migrants (Gurn, Livingston, and Lewis 1972; Hofslund 1965; Pettingill 1970). Birds may fly around the bodies of water in response to undesirable environmental conditions (i.e., fog, air currents, and alterations in temperature and humidity). However, Lowery (1951) reported that nocturnal migrants did not show this pattern. Even so, it is possible though that such avoidance may indeed occur under extremely poor atmospheric conditions.

Weather and Factors. As in the past three migration seasons, an effort has been made to study the occurrences of bird mortality as a function of prevailing weather systems. The current analysis was carried out for all dates between August 29th and October 25th for which mortality observations were available; the six days when mortality data were not obtained were excluded. The analysis was concluded on October 25th.

Since the inception of this study, the purpose of the attempts to relate weather with mortality have been twofold. First, we have attempted to anticipate or to predict periods of high mortality in order to increase the efficiency and acc racy of the observations. Second, we have attempted to gain a clearer insight into what kinds of weather lead to high mortality, so that measures can be devised which will decrease mortality.

From the literature regarding migrating birds, it appears that in the midwestern United States fall migration occurs in waves most frequently in northerly air flow behind a south or eastward-moving cold front. Migration at any location appears to be heaviest in the first 24 hours following a frontal passage and then begins to taper off. Some migration is observed as long as the airflow remains northerly or as long as the trailing high pressure system remains west of the location. With a passage of the high, and subsequent shift to southerly flow, it is believed that migration ceases or becomes minimal. (See more detailed disucssions in previous reports for literature citations.)

From the data available on bird mortality resulting from contact with man-made objects (primarily television towers), it appears that extensive cloud cover, low ceilings, precipitaion, and reduced visibilities are conditions which favor mortality. Thus in the fall season it would seem that birds flying southward into a slow moving or stationary frontal system are most likely to be subject to high incidences of mortality.

During the 52 days for which bird counts were made, 339 birds were recovered. Nearly a third of these were made on two days, September 14th (50 cases) and September 22nd (53 cases). Ten or more cases were recorded on nine other days, while no dead birds were found on 14 days. Mortality was high between September 13th and 23rd and then dropped off, becoming somewhat higher again in mid-October.

As has been done in the past, an attempt was made to classify each as to the type of weather condition existing. Two types of classification were made. First, each day was evaluated with regard to its potential for migration and mortality. Days were judged to have been favorable (high), moderately favorable (moderate), or unfavorable (low) for migration, depending upon the airflow and relative position of synoptic weather features. A judgement of high or low potential for mortality also was made from the actual weather conditions existing at the western end of Lake Erie. Table 5 shows the data matrix and associated mortalities for this classification.

A second classification was made relating only to the actual synoptic weather patterns (Table 6). Seven possible synoptic categories were recognized, and the observation for each day was assigned to the proper synoptic category (Table 8).

If the data are studied according to the potential for migration and mortality, it is seen that there is a trend for the average number of deaths to increase with increasing potential for both migration and mortality (Table 7). Yet the matrix relationships are not clear, for the highest average mortality occurs on days judged high for migration but low for mortality. The category high migration potential, high mortality potential ranks third in average mortality, having only one day out of seven in which mortality was exceptionally high (N=43). It appears obvious that the potentials as defined are not wholly adequate for identifying incidences of mortality.

If we look, however, at a second classification, the data are much more interpretable (Table 8). Only one category is clearly associated with high mortality, days for which there was a high pressure system north or west of Lake Erie that resulted in northerly flow over the Lake. Three days clearly stand out in this category. The first, September 14, resulted in 50 mortalities. On this date a large high was centered over Missouri with a dissipating cold front along the East Coast. Winds had shifted from southerly to northerly over western Ohio during the day on the 13th.

On September 22, when 53 mortalities were observed, the synoptic situation was similar. This time the high was centered in southerly Minnesota, and the front was along the western edge of the Appalachians. On October 15, the third day with high mortalities (N=45), the high was further south, this time in the Texas panhandle; but there was again a weakening front along the Appalachians. These synoptic situations are considered ideal for migration but are frequently not situations with requisite weather for high mortality potential.

Based upon the analysis of the data for fall 1974 and supported by the data for the preceding spring, it seems that mortality can be said to be more dependent upon actual migration than unfavorable weather conditions. This is not to say that poor weather does not contribute to increased mortality, but that when birds are migrating mortality will occur regardless of the weather conditions.

This may, if correct, somewhat simplify any repellent procedures devised to decrease the incidences of mortality. Since migration waves can be observed and since they occur over a relatively brief time period, activity could be focused during this time. Further predictions of mortality potential should no doubt be based more closely upon synoptic patterns with a lesser emphasis upon expected weather.

Eventual availability of site meteorological data will permit a more precise analysis of behavior and mortality parameters. Thus far we have been restricted to the use of U. S. Weather Service data. We expect by our next report to have been provided with appropriate past records and to have re-analyzed our earlier mortality studies.

Scavengers. The proportion of bird mortalities lost to scavengers has become a significant concern of the mortality survey. Scavengers are known to occur on the site. Raccoons have been reported seen with dead birds in their mouths; skunks have been observed in and around the cooling tower, and muskrats have been reported around the meteorological tower. Fox (both grey and red), mink, and opposums, as well as crows, gulls, and great horned owls also have been reported on the site. One worker, during the fall 1974 season, reported seeing many snakes within the cooling tower, one of which, an eastern milk snake, was identified.

A pilot study conducted during the fall 1973 survey indicated a 62% loss at the cooling tower due to scavengers. A 23% scavenger-loss was reported at the cooling tower in a similar study made during spring 1974 (Vessey and Scott, 1974). The fall 1974 investigation included the cooling tower, the meteorological and microwave/meteorological towers and reported losses of 76%, 19% and 11%, respectively, based on 83 bird/night observations (Table 9). Scavenger pressure during the test period appeared to be relatively constant within the areas around each structure. Little difference was evident between losses occurring from sunset to sunrise and those occurring from 0130 to sunrise.

Seasonal differences may be partially explained by considering the relative number of scavengers present. Scavenger populations were larger in the fall, since spring-born young also were feeding independently. The scavenger-loss might then be expected to be greater in the fall than in the spring, and this was indeed the case.

These pilot studies indicated that scavenger activity does indeed impact on the collection of mortality data. However, extrapolation from these data (which might suggest a three-fold increase in actual mortality) is not fully justified. The number of observations is small and cannot be predictive, for example, of proportional losses at times of high mortality. Additional observations obviously are desirable.

At the present time there is no data base to determine what infinitesimal fraction of the total migrants over the area are intercepted by Davis-Besse structures. To obtain such information would require a substantial investment in equipment (radar, celiometers) and manpower over a period of several years.

Additional Observations. Dr. Mildred Miskimen of Put-in-Bay reports that only four birds (probably warblers and vireos) were found at Perry's Monument during 1974 by government workers. She also comments that she thinks small birds (and bats) are "caught in eddies around the towers and slammed into time." She reports finding most of the kills at the Perry Monument in past seasons on the lee side.

Investigation of Repellent Techniques. While arrangements had been made to utilize the strobe lights on the cooling tower during nights of high migration-mortality potential, the necessary combination of events and personnel did not gel. Hopefully it will be possible to test the use of these lights for their deterrent potential during the spring migration.

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Table 1. Early morning and late afternoon recovery of mortalities at Davis-Besse site, fall 1974.

Day	August AM	August PM	September AM	September PM	October AM	October PM	November AM	November PM
1					0		0	
2			4		0			
3					10			
4			1		3			
5			1		1			
6			1		0			
7			0		0			
8			0		0			
9			1	0	0			
10			5	0	11			
11			0	0	0			
12			2	0				
13			13	1	15*			
14			49	1				
15			6	1	45**			
16			18	5	2			
17			4	1	0			
18			3	0	18			
19			3		5			
20			1		11			
21			4		2			
22			51	2	3			
23			4		0			
24			4	0	18			
25			3	0	1			
26			1	0				
27			0		0			
28			1	0	0			
29		3	5		0			
30			0		0			
31					0			
Cumulative totals		3	197		342		342	

*Access to cooling tower was denied for security reasons

**Included 12 remains of birds from previous days

Table 2. Species recovered at Davis-Besse site during three conserutive fall seasons.

	Fall 1972				Fall 1973				Fall 1974			
	CT	ST	MT	Total	CT	ST	MT	Total	CT	ST	MT	Total
Sora rail						1		1				
Virginia rail									1			1
Common gallinule										1		1
Ring-billed gull								1				
Yellowbellied flycatcher								1	5	2		7
Least flycatcher									2			2
Acadian flycatcher									1			1
Domestic pigeon									1		1	2
Red-breasted nuthatch									1			1
Brown creeper					1			1	1	1		2
Long-billed marsh wren		1		1		1		1				
House wren									1			1
Winter wren									2			2
Carolina wren									2			2
Gray catbird						1		1				
Hermit thrush									1			1
Veery									1			1
Golden-crowned kinglet					15	2		17	44	9		53
Ruby-crowned kinglet	1			1	16	7		23	36	2		38
Solitary vireo										1		1
White-eyed vireo										1		1
Red-eyed vireo									15	4		19
Philadelphia vireo		1		1					2	1		3
Warbling vireo						1		1				
Black & White warbler									3			3
Tennessee warbler						2		2	3			3
Nashville warbler						3		3	7	2		9
Parula warbler									1			1
Yellow warbler	1		1	2					1			1
Magnolia warbler					3	7		10	31	7	1	39
Cape May warbler									1			1
Myrtle warbler		1		1		1		1	2	1		3
Black-throated green warbler		1		1	1	1		2	16	3		19
Black-throated blue warbler									5	3		8
Blackburnian warbler						1		1	11	1		12
Chestnut-sided warbler					1			1	8			8
Bay-breasted warbler									10	1	1	12
Blackpol warbler						2		2	5	3	1	9
Pine warbler					1	3		4	3			3
Ovenbird					1	1		2	6	1	1	8
Kentucky warbler									2			2
Connecticut warbler					1			1	1	1		2
Yellowthroat	1	1		2	2	1		3	18	5		23
Wilson's warbler					1			1	5			5
Canada warbler									2			2
Redstart						4		4	5			5
Unidentified warbler	1			1	1			1				
House sparrow											2	2
Savannah sparrow									1		1	2
White-crowned sparrow					1			1	1			1
White-throated sparrow									1	2		3
Song sparrow									1			1
Unidentified bird					10	6		16	13*			13
TOTAL BIRDS	4	5	1	10	56	47	-	103	279	52	8	339
Big brown bat						1		1				
Red bat									2			2
Eastern pipistrel										1		1
TOTAL BIRDS & BATS	4	5	1	10	56	47	-	103	281	53	8	342

CT=Cooling tower

ST=Unit 1 structures (including shield, turbine, and auxilliary buildings)

MT=Meteorological tower

*12 remains were found at CT on Oct. 15 after a major kill on Oct 13; access to CT was denied on Oct 13-14, and an unknown number of specimens was lost to scavengers.

Table 3. Families recovered at Davis-Besse site during three consecutive fall seasons. Figures in parentheses represent percent values.

	Fall 1972				Fall 1973				Fall 1974			
	CT	ST	MT	Total	CT	ST	MT	Total	CT	ST	MT	Total
Kinglets (Sylviidae)	1(25)	0	0	1(10)	31(55)	9(19)	-	40(39)	80(29)	11(21)	0	91(27)
Warblers (Parulidae)	3(75)	3(60)	1(100)	7(70)	13(23)	25(22)	-	38(37)	146(52)	28(54)	4(50)	178(52)
Fringillids (Fringillidae)	0	0	0	0	1(2)	1(2)	-	2(2)	4(1)	2(4)	3(38)	9(3)
Mimmids (Mimmidae	0	0	0	0	0	1(2)	-	1(1)	0	0	0	0
Other	0	2(40)	0	2(20)	1(2)	5(11)	-	6(6)	36(13)	11(21)	1(12)	48(14)
Rails (Rallidae)						1		1	1	1	1	2
Gulls (Laridae)						1		1				
Pigeons (Columbidae)									1			2
Flycatchers (Tyrannidae)						1		1	8	2		10
Nuthatches (Sittidae)									2	1		3
Creepers (Certhiidae)					1	1		1				
Wrens (Troglodytidae)		1						1	5			5
Thrushes (Turdidae)									2			2
Vireos (Vireonidae)		1				1		1	17	7		24
Unidentified	0	0	0	0	10(18)	6(13)	-	16(15)	13(5)	0	0	13
TOTAL BIRDS	4(40)	5(50)	1(10)	10	56(54)	47(46)	-	103	279(82)	52(15)	8(2)	339

CT=Cooling Tower

ST=Unit 1 structures

MT=Meteorological Tower

Table 4. Families recovered at Davis-Besse site during two consecutive spring seasons. Figures in parentheses represent percent values.

	Spring 1973				Spring 1974			
	CT	ST	MT	Total	CT	ST	MT	Total
Kinglets (Sylviidae)	0	1(25)	0	1(4)	0	0	0	0
Warblers (Parulidae)	17(50)	1(25)	2*(33)	20(45)	95(82)	6(55)	21(45)	22(69)
Fringillids (Fringillidae)	8(23)	1(25)	2(33)	11(25)	5(4)	1(9)	8(17)	14(8)
Mimmids (Mimmidae)	5(15)	0	1(17)	6(13)	4(3)	0	2(4)	6(3)
Other	4(12)	1(25)	1(17)	6(13)	12(0)	4(36)	15(32)	32*(18)
Unidentified	0	0	0	0	1(1)	0	1(2)	2(1)
TOTAL BIRDS	34(77)	4(11)	6(12)	44	117(67)	11(6)	48(27)	176

*One found near guard house

CT=Cooling Tower

ST=Unit 1 structures

MT=Meteorological Tower

Table 5. Bird Mortality at the Davis-Besse site as a function of migration and mortality potential.

		Mortality Potential	
		Low	**High**
Migration Potential	Low	1,1,0,0,1,5,3,7 23,5,3,4,0,1,0,0 11,0,2,0,2,3	0,2,14,3,1,1,1,0 5,0,18
	Moderate	1,4,10,0	3,4,4,51,0
	High	50,1,18	3,5,0,0,15,33,11

Table 6 - Categories of Synoptic Weather Conditions

A. Conditions associated with high pressure systems

H-1 leading edge of high over western Lake Erie (northerly flow)

H-2 high center over western Lake Erie (calm or variable flow)

H-3 trailing edge of high over western Lake Erie (southerly flow)

B. Conditions associated with low pressure systems

L-1 low center near or over western Lake Erie

L-2 warm sector with cold front immediately to the west or northwest of western Lake Erie

L-3 warm front over or immediately to the south of western Lake Erie

L-4 post frontal with low to the east or northeast of western Lake Erie

Table 7 - Average Daily Number of Dead Birds at Davis-Besse site as a Function of Migration and Mortality Potential

		Mortality Potential		
		Low	High	All Cases
Migration Potential	Low	3.3	4.1	3.5
	Moderate	3.8	12.4	8.6
	High	23.0	9.6	13.6
	All Cases	5.4	7.6	6.3

Table 8 - Bird Mortality at Davis-Besse site as a Function of Synoptic Weather Conditions

Synoptic Category	Individual Mortality Observations	Average Daily Mortality
High Pressure Systems		
H-1	0,0,33,18,11,4,1,50,3,1,51	15.6
H-2	10,0,11,0,15,0,5,2,1,7,23,5,4	6.4
H-3	3,1,0,3,1,0,0,1,5,0,3,4,0	1.6
Low Pressure Systems		
L-1	0,5,0	1.7
L-2	0,0,1,2,14,3,1	3.0
L-3	18,3,4,1	6.5
L-4	2	2.0

Table 9 - Summary of fall 1974 scavenger-study at Davis-Besse site.

Day***	Cooling Tower Quadrants I	II	III	IV	Total	Meteorological Tower Triants I	II	III	Total	Microwave/ Meteorological Tower Total
Sept 17	3/4*	4/5	0/1	**	7/10	0/3	0/1	0/1	0/5	**
18	6/6	4/4	1/2	**	11/12	0/6	0/2	0/1	0/9	**
19	5/6	0/3	2/3	2/2	9/14	0/6	0/2	0/1	0/9	1/5
20	1/1	3/4	1/1	**	5/6	4/6	1/2	1/1	6/9	0/4
TOTAL	15/17	11/16	4/7	2/2	32/42	4/21	1/7	1/4	6/32	1/9
Percent loss	88	69	57	100	76	20	14	25	19	11

*3 out of 4 specimens taken by scavengers

**no birds placed

***on September 17,18, and 20 specimens were distributed at sunset; on the night of September 19-20, at 0130.

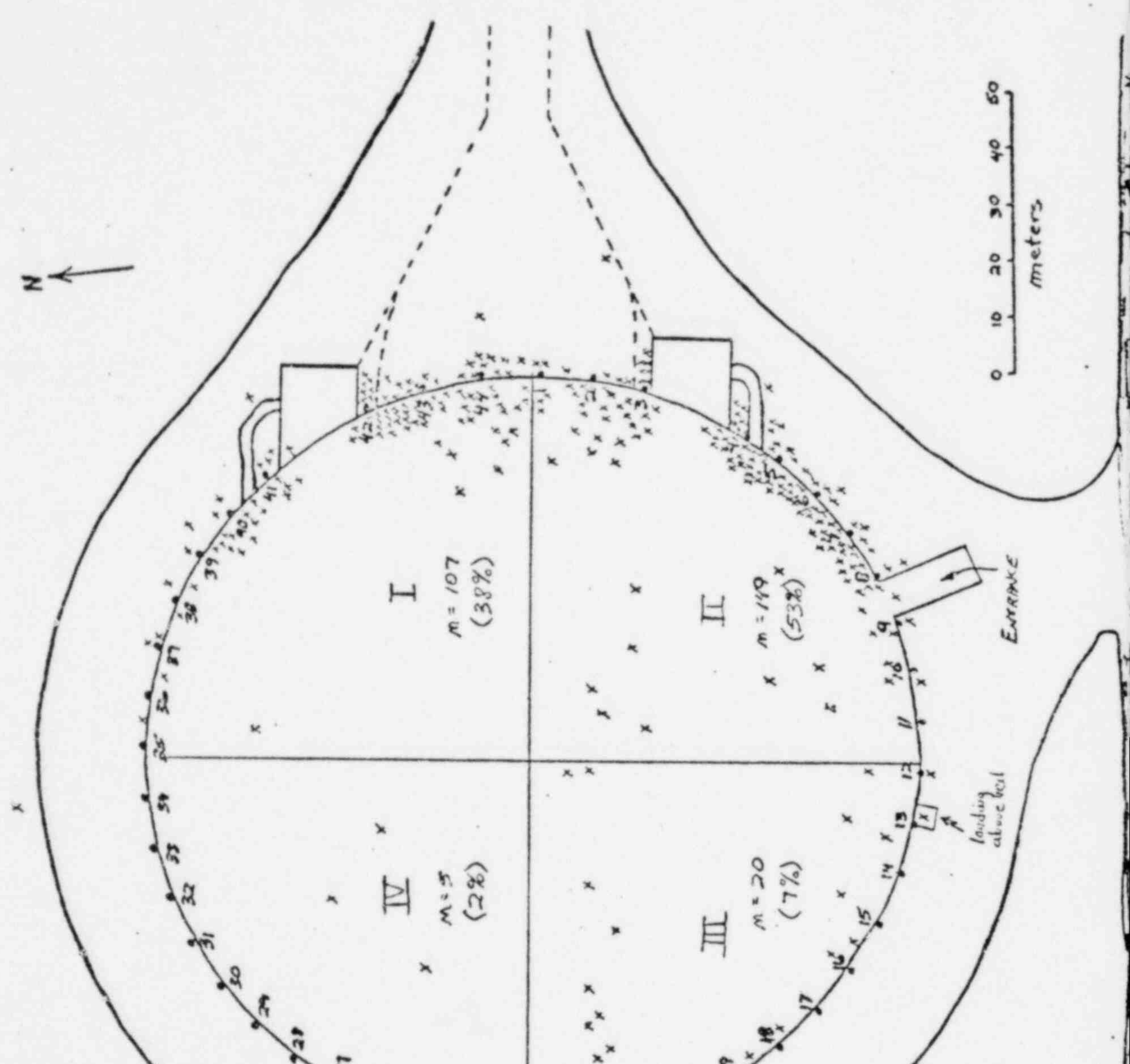


FIGURE 1
COOLING TOWER
N = 281

FIGURE 2
UNIT 1
STRUCTURES

N = 53

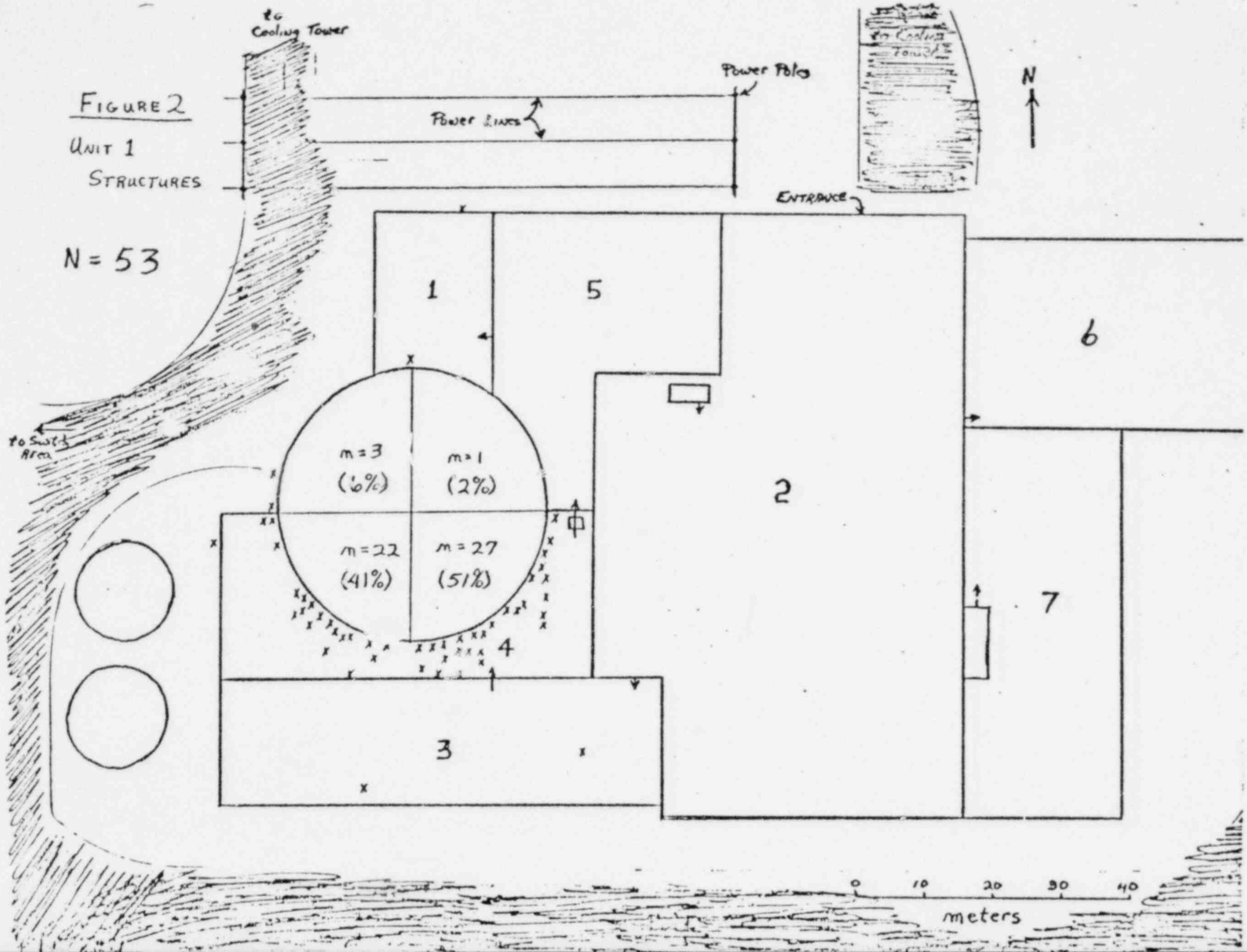
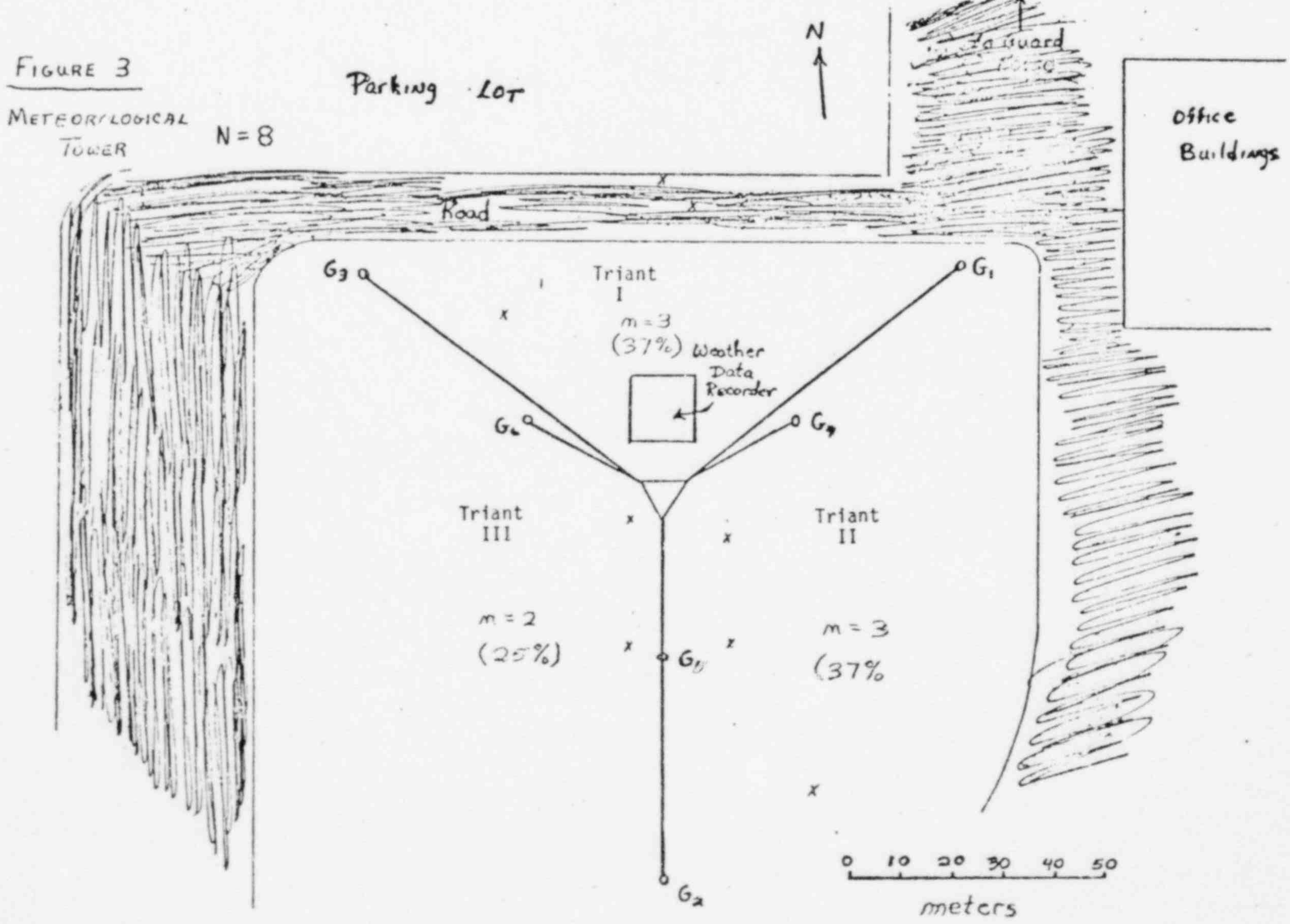


FIGURE 3


METEOROLOGICAL TOWER
N = 8
Parking Lot
N
Guard
Office Buildings
Road
Triant I
m = 3
(37%)
Weather Data Recorder
Triant II
m = 3
(37%
Triant III
m = 2
(25%)
G_1
G_2
G_3
G_4
G_5
G_6
0 10 20 30 40 50
meters