

APPENDIX F
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APPENDIX F-1
LAKE AREA, LITTORAL AREA, AND PERCENT OF LAKE AREA
COMPRISED OF LITTORAL

LAKE (MAP NUMBER)	A LAKE AREA		A _L LITTORAL AREA		% LITTORAL A _L /A
	ACRES	KM ²	ACRES	KM ²	
OSOYOOS (Canadian portion)	3,706	15.0	860	3.5	23.2
VASEUX	680	2.7	336	1.3	49.4
SKAHA	4,966	20.7	784	3.2	15.7
OKANAGAN - South	14,998	60.7	1,298	5.3	8.6
- Central	8,722	35.3	862	3.5	9.8
- North	9,142	37.0	2,612	10.6	28.5
KALAMALKA	6,398	25.8	359	1.5	5.6
WOOD	2,298	9.3	208	0.8	9.0

ZOOPLANKTON ABUNDANCE IN THE OKANAGAN MAINSTEM LAKES

(Data of Patalas & Salki, 1972)

LAKE	NUMBER OF STATIONS		AVERAGE DENSITY (NO./cm ²)	
	1969	1971	1969	1971
Okanagan, South (Transects I & II)	6	6	229 ^a	87 ^b
Okanagan, Central (Transects IV & V)	6	6	173 ^a	102 ^b
Okanagan, North-Central (Transects VI, VII, VIII)	9	9	188 ^a	125 ^b
Okanagan, North (Transect X)	3	3	99 ^a	63 ^b
Okanagan, TOTAL (Transects I - X)	30	30	188 ^a	101 ^b
Skaha	3	3	238 ^c	233 ^d
Osoyoos	2	2	161 ^c	76 ^d
Wood	-	2	--	139 ^e
Kalamalka	-	5	--	136 ^e

^a September 9-10, 1969; ^b August 24-27, 1971; ^c September 11, 1969; ^d August 24, 1971;
^e August 26, 1971.

AVERAGE NUMBERS OF ZOOPLANKTONIC CRUSTACEANS IN THE GREAT LAKES AND
OKANAGAN BASIN LAKES (from Patalas 1972, Patalas and Salki 1972)

GREAT LAKES	INDIV/cm ²	OKANAGAN BASIN LAKES	INDIV/cm ²
Superior	43	Okanagan	101-188
Huron	167	Skaha	236-238
Ontario	306	Osoyoos	76-161
Erie	400	Wood	139
		Kalamalka	136

CHEMICAL ANALYSIS OF WATER FROM LAKES OKANAGAN, SKAHA, OSOYOOS,
WOOD AND KALAMALKA. SAMPLES TAKEN AT 1 m DEPTH

LAKE	TRANSECT STATION	DATE	SPEC.COND- UCTIVITY umho/cm	TDS	Ca	Mg	Na	K	CHLORIDE Cl	SULPHATE SO ₄
OKANAGAN	I	9.9.69	231	141	31.4	9.2	8.4	2.3	2.4	21
	II	"	250	152	31.9	9.2	8.3	2.3	1.3	24
	III	"	250	153	31.9	9.1	8.3	2.3	2.0	26
	IV	"	250	162	31.9	9.1	8.4	2.3	1.5	21
	V	"	250	169	31.9	9.1	8.5	2.2	1.5	19
	VI	10.9.69	250	172	31.9	9.1	8.4	2.3	1.9	23
	VII	"	248	173	31.9	9.1	8.3	2.3	1.6	26
	VII	"	250	174	31.9	9.2	8.3	2.3	1.5	25
	IX	"	253	170	32.2	9.2	8.4	2.3	2.0	27
	X	"	259	173	32.5	9.7	8.2	2.2	1.6	26
	Lake average		251	164	31.9	9.2	8.4	2.3	1.7	24
	I	27.8.71	.	.	34.5	9.9	9.0	2.4	2.0	25
	II	"	260	.	34.8	9.5	8.9	2.4	2.0	25
	III	"	248	.	35.3	9.5	8.4	2.4	2.0	24
	IV	"	253	.	34.6	9.6	8.3	2.4	2.0	24
	V	"	250	.	34.9	9.5	8.3	2.4	1.0	23
	VI	26.8.71	248	.	35.0	9.5	8.4	2.4	1.0	24
	VII	"	247	.	35.1	9.5	8.5	2.4	1.0	23
	VIII	"	250	.	34.9	9.6	8.5	2.4	1.0	24
	IX	"	253	.	35.9	9.7	8.7	2.5	1.0	24
X	"	257	.	35.7	10.1	8.9	2.7	1.0	22	
Lake average		252	.	35.1	9.6	8.6	2.4	1.4	24	
SKAHA	N(orth)	11.9.69	249	165	31.1	9.1	8.6	2.3	1.9	23
	C(entral)	"	250	164	31.4	9.2	8.6	2.3	1.6	28
	S(outh)	"	250	164	31.4	9.2	8.6	2.3	2.4	26
	Lake average	"	250	164	31.3	9.2	8.6	2.3	2.0	26
	N	24.8.71	246	.	33.6	9.4	8.8	2.3	1.0	23
	C	"	243	.	34.2	9.5	8.9	2.4	1.0	20
S	"	245	.	33.5	9.5	8.7	2.4	2.0	21	
Lake average	"	245	.	33.8	9.5	8.8	2.4	1.3	21	
OSOYOOS	N	11.9.69	252	168	31.6	9.7	9.0	2.4	1.6	25
	C	"	251	169	31.4	9.7	9.0	2.4	1.6	26
	Lake average	"	251	168	31.5	9.7	9.0	2.4	1.6	25
	N	24.8.71	249	.	33.2	9.6	9.0	2.4	2.0	19
	C	"	251	.	33.5	9.7	9.0	2.4	1.0	23
	Lake average	"	250	.	33.3	9.7	9.0	2.4	1.5	21
KALAMALKA	N(orth)	25.8.71	375	243	37.8	19.9	15.8	5.0	2.0	44*
	N C	"	370	250	38.5	20.0	15.5	5.1	2.0	44
	SC	"	368	261	36.1	20.3	15.5	5.1	2.0	50
	S(outh)	"	362	253	37.0	20.3	15.3	5.0	1.0	46
	Lake average	"	369	252	37.3	20.1	15.5	5.0	1.7	46
WOOD	N(orth)	25.8.71	294	224	22.1	20.6	18.4	4.6	3.0	26
	S(outh)	"	296	199	21.5	20.8	18.4	4.6	3.0	25
	Lake average	"	295	211	21.8	20.7	18.4	4.6	3.0	25

APPENDIX F-3

SPECIES COMPOSITION OF CRUSTACEAN PLANKTON (INDIVIDUALS PER CM²) IN LAKE OKANAGAN
 SEPTEMBER 9-10, 1969, AND AUGUST 24-26, 1971
 (First row for station is 1969 data - second row for station is 1971 data)*

Transect	Station	Depth	Epischura nevadensis Lilljeborg	Diaptomus			Cyclops			Cyclops vernalis Fischer	Daphnia thorata Forbes	Daphnia longiremis Sars	Daphnia schoedleri Sars (x pullex?)	Daphnia pulex Leydig	Bosmina longirostris (D.F. Muller)	Bosmina coregoni longispina Leydig	Diphanosoma leuchten- bergianum Fischer	Leptodora kindtii (Focke)	Sida crystallina (O.F. Muller)	Total
				adult	copepodid	nauplius	adult	copepodid	nauplius											
I	W	50	0.6	-	69.3	0.8	-	47.7	125.5	-	2.0	0.2	-	-	0.4	0.2	0.4	0.1	-	247.1
		50	0.9	-	20.1	0.8	-	10.5	44.1	-	1.6	1.2	-	-	0.1	0.1	0.4	-	-	79.6
	C	50	0.3	-	70.7	0.8	-	31.5	32.3	-	0.2	0.1	-	-	0.6	0.2	0.6	0.1	-	137.3
		50	2.2	-	20.1	0.4	-	16.6	49.5	-	0.8	0.8	-	-	0.1	0.1	0.1	0.1	-	90.6
	E	29	0.8	-	70.1	-	-	23.9	135.5	-	1.8	0.5	-	-	0.6	0.1	0.6	-	-	233.8
		50	1.0	-	23.6	0.8	-	16.6	43.0	-	1.9	0.9	-	-	0.8	0.1	0.4	-	-	88.9
II	W	35	0.1	0.8	96.2	0.8	1.5	49.2	66.9	-	4.7	0.7	-	-	0.3	0.1	0.3	-	-	221.6
		15	0.6	-	7.8	0.7	-	3.3	0.2	-	0.7	-	-	-	0.1	0.1	0.2	-	-	13.6
	C	50	1.0	1.5	109.2	-	1.5	32.4	183.0	-	0.5	0.3	-	-	1.9	0.1	0.3	-	-	331.7
		50	2.2	1.6	25.5	-	-	16.1	78.0	-	2.9	0.7	-	-	0.1	0.1	-	0.1	-	128.6
	E	27	0.7	-	108.5	-	-	54.5	38.5	-	3.8	0.2	-	-	0.6	0.1	0.3	0.1	-	207.4
		50	4.0	0.5	33.3	3.1	-	20.1	57.2	-	2.1	1.0	-	-	0.1	0.3	0.5	0.1	-	123.5
III	W	50	1.4	-	94.0	-	-	55.4	117.0	-	2.6	0.3	-	-	0.8	0.2	1.4	0.1	-	273.2
		50	0.2	0.5	30.2	1.6	0.5	23.9	60.8	-	2.1	2.1	-	-	0.1	0.1	0.1	0.1	-	122.5
	C	50	0.2	-	106.0	-	-	44.7	148.0	-	3.3	0.8	-	-	0.8	1.2	0.2	1.0	-	306.2
		50	1.2	-	41.1	1.0	-	18.2	56.7	-	0.5	3.1	-	-	0.1	0.1	-	0.1	-	122.1
	E	39	1.0	-	95.5	-	-	34.6	81.5	-	1.6	0.1	-	-	0.9	0.3	0.4	-	-	215.9
		50	0.8	0.5	33.8	1.6	-	16.6	52.0	-	1.6	1.6	-	-	0.1	0.1	-	-	-	109.1
IV	W	50	1.2	-	65.2	0.8	-	19.2	74.7	-	2.3	0.2	-	-	1.0	0.2	0.6	-	-	165.4
		41	1.4	-	17.1	2.5	0.3	15.5	20.8	-	0.6	0.6	-	-	0.4	0.1	0.1	0.1	-	59.3
	C	50	0.6	0.8	46.2	-	-	25.4	148.0	-	1.5	0.3	-	-	0.8	0.1	0.2	-	-	223.9
		50	1.3	0.5	20.3	1.0	-	21.8	84.8	-	2.6	0.5	-	-	0.1	0.1	0.1	0.1	-	133.7
	E	50	1.2	0.8	51.5	-	-	25.4	94.0	-	2.6	1.1	-	-	0.2	0.4	-	0.4	-	177.6
		50	2.4	-	29.6	1.6	-	23.4	56.2	-	0.5	5.2	-	-	0.1	0.1	0.1	0.1	-	119.0
V	W	26	0.8	-	71.0	-	-	22.2	12.3	-	3.6	0.1	-	-	0.7	0.1	0.2	-	-	110.8
		34	1.8	-	27.1	2.7	0.4	22.5	26.7	-	3.1	1.6	-	-	0.3	-	0.2	0.1	-	85.9
	C	50	1.0	-	80.0	-	-	31.5	56.9	-	2.7	0.1	-	-	0.6	0.3	0.2	-	-	173.3
		50	1.2	0.5	35.9	0.5	-	35.4	48.4	-	2.6	2.6	0.1	-	0.2	0.3	1.0	0.1	-	129.2
	E	37	1.3	-	108.5	-	-	40.0	32.3	-	1.9	0.1	-	-	0.6	0.1	0.3	-	-	185.0
		50	1.5	-	36.8	1.6	1.2	24.4	20.1	-	0.4	0.4	-	-	0.4	0.1	0.1	-	-	87.5
VI	W	50	0.5	0.8	49.2	1.5	1.5	19.2	97.8	-	1.5	0.2	-	-	0.5	0.1	0.2	-	-	173.0
		50	1.7	-	33.3	4.7	1.6	22.9	43.2	0.52	1.8	2.9	-	-	0.4	0.3	0.1	0.1	-	113.3
	C	50	0.5	-	61.5	-	0.8	20.7	126.6	-	1.8	0.3	-	-	0.2	-	0.5	-	-	212.8
		50	0.2	-	35.6	3.9	0.5	37.9	59.6	-	0.8	1.6	-	-	0.4	0.1	0.4	0.1	-	140.6
	E	46	0.5	-	78.5	-	-	43.0	75.5	-	2.3	1.8	-	-	1.0	0.3	0.2	-	-	203.1
		50	0.3	0.4	38.7	0.4	-	16.3	14.3	-	3.1	0.8	-	-	0.4	0.1	0.1	-	-	83.1
VII	W	50	0.1	1.5	36.1	-	-	31.5	90.8	-	1.0	0.2	-	-	0.7	0.1	0.1	-	-	162.0
		50	3.2	-	38.7	1.6	-	29.4	81.3	-	3.1	0.8	-	-	0.1	0.2	0.5	0.1	-	158.8
	C	50	0.5	0.8	47.8	-	1.5	20.0	99.1	-	0.7	0.1	-	-	0.9	0.2	0.4	-	-	171.9
		50	2.2	-	30.7	1.6	-	21.3	72.3	-	1.3	1.2	-	-	0.1	0.3	0.3	-	-	131.3
	E	50	0.8	1.5	51.5	-	-	26.2	84.5	-	0.7	0.4	-	-	1.0	-	0.3	-	-	166.9
		50	1.9	-	33.8	1.0	0.5	32.2	58.8	-	0.5	1.0	-	-	0.9	0.6	0.1	0.1	-	131.5
VIII	W	50	0.1	-	53.1	-	-	21.5	124.5	-	1.7	0.5	-	-	0.5	0.1	0.3	-	-	202.3
		50	1.3	-	45.2	3.1	0.5	22.9	47.3	-	1.5	-	-	-	0.2	0.1	0.5	-	-	122.6
	C	50	0.3	1.5	69.2	1.5	0.8	26.2	87.5	-	1.8	0.2	-	-	0.4	0.1	0.4	-	-	189.8
		50	0.1	0.5	38.0	1.0	0.5	19.2	54.6	-	1.0	0.5	-	-	0.4	0.1	0.7	-	-	117.1
	E	28	1.3	1.5	124.5	-	-	31.5	46.9	-	2.2	0.2	-	-	1.0	0.3	0.4	-	-	209.8
		50	1.1	-	36.4	-	-	20.8	66.0	-	1.0	-	-	-	0.6	0.1	0.1	-	-	126.0
IX	W	34	0.8	2.3	53.8	0.1	-	17.7	82.5	-	0.6	0.2	-	-	1.0	0.1	0.3	0.1	-	159.3
		50	0.4	0.8	33.0	1.6	0.8	19.7	32.1	-	-	-	-	-	0.2	0.1	0.5	-	-	89.1
	C	30	1.0	1.5	49.3	-	-	37.0	76.2	-	0.9	0.1	-	-	0.1	-	0.9	-	-	166.9
		50	1.2	-	20.9	0.8	0.4	17.0	36.0	-	0.8	-	-	-	0.2	0.1	0.2	-	-	77.5
	E	22	0.6	2.1	72.0	-	-	23.1	15.4	-	2.0	0.1	-	-	0.3	0.1	0.1	-	-	115.7
		25	0.4	-	28.1	0.5	0.3	14.0	11.4	-	1.2	0.4	-	-	0.1	-	0.3	0.1	-	56.7
X	W	19	1.1	2.3	67.2	0.8	-	16.5	2.3	-	2.1	0.1	-	-	-	-	0.3	-	-	92.6
		25	1.3	0.3	18.6	2.2	0.6	26.4	9.6	-	-	-	-	-	0.3	-	0.7	0.1	-	67.9
	C	30	0.4	-	57.7	0.8	3.9	45.4	50.0	-	0.4	0.1	-	-	-	0.1	0.4	-	-	159.1
		30	1.2	0.8	26.3	1.6	1.2	38.7	29.0	-	1.9	-	-	-	0.8	-	0.6	0.1	-	102.9
	E	12	0.8	0.8	32.4	0.5	-	8.5	1.1	-	1.5	-	-	-	0.1	-	0.7	-	-	46.4
		12	1.3	0.2	12.9	0.2	-	0.9	0.8	-	0.7	-	-	0.1	0.4	0.1	0.7	-	0.1	18.3
Lake average ind/cm ²				0.7	0.7	71.5	0.3	0.4	30.9	80.2	-	1.8	0.3	-	0.6	0.2	0.4	0.1	-	188.1
				1.3	0.2	29.1	1.5	0.3	20.8	43.8	0.1	1.3	1.0	0.1	0.3	0.1	0.3	0.1	0.1	100.99
percent				0.4	0.4	38.0	0.2	0.2	16.4	42.5	-	1.0	0.2	-	0.3	0.1	0.2	0.1	-	100.0
				1.3	0.2	29.0	1.5	0.3	20.8	43.7	-	1.3	1.0	0.1	-	0.3	0.1	0.3	0.1	0.1

APPENDIX F-4

THE DISTRIBUTION OF SPECIES IN THE UPPER 5 m LAYER OF INSHORE
AND OFFSHORE WATERS OF LAKE OKANAGAN. AUGUST 25-26,1971 (indiv./l)

Transect	Station	<i>Epischura nevadensis</i>	<i>Diaptomus ashlandi</i> copepodids	<i>Diaptomus ashlandi</i> nauplii	<i>Cyclops bicuspidatus thomasi</i> copepodids	<i>Cyclops bicuspidatus thomasi</i> nauplii	<i>Daphnia thorata</i>	<i>Bosmina longirostris</i>	<i>Diaphanosoma leuchtenbergianum</i>	Total
I	Inshore	0.98	5.8	1.2	1.0	0.32	0.48	0.12	0.10	10.2
	Offshore	7.0	4.4	6.6	5.2	0.30	2.4	0.46	0.62	27.2
II	In West	9.6	2.6	2.8	1.6	0.48	0.94	0.40	0.08	9.6
	In East	1.0	3.8	3.4	1.4	0.54	0.86	0.10	0.12	11.2
	Off	0.46	19.0	1.6	5.2	1.4	3.8	0.46	0.46	32.4
IV	In West	0.68	12.6	0.8	5.4	0.38	2.4	0.54	0.20	23.6
	In East	0.86	4.2	3.0	3.0	0.38	1.44	0.10	0.34	13.6
	Off	0.20	27.4	0.4	12.0	0.0	0.62	1.24	0.42	42.6
V	In East	1.04	3.2	4.0	1.64	0.2	0.54	0.28	0.12	11.6
	Off	1.04	9.6	1.0	7.0	0.6	3.2	0.0	0.2	23.2
VI	In West	0.64	3.8	1.0	3.6	0.14	2.24	0.36	0.24	14.4
	In East	1.10	2.8	5.4	3.8	0.26	1.08	0.52	0.16	15.6
	Off	1.32	2.0	7.2	4.6	0.36	1.68	0.26	0.08	18.0
VII	In West	0.98	7.8	1.8	3.4	0.38	1.04	1.2	0.48	16.6
	In East	1.26	0.8	9.6	2.8	0.50	0.56	0.28	0.08	16.4
	Off	1.68	11.2	2.0	6.0	0.70	3.0	0.44	0.36	25.4
X	In West	1.36	1.8	1.4	0.68	0.24	0.32	0.68	1.0	7.6
	Off	0.62	16.2	1.0	1.34	0.30	0.62	0.20	2.4	23.4
Mean	Inshore	0.95	4.5	3.0	2.6	0.33	1.1	0.41	0.26	13.6
	Offshore	1.75	12.8	2.9	5.8	0.52	2.1	0.44	0.64	27.6
<u>Offshore</u> ratio Inshore		1.8	2.8	0.97	2.2	1.6	1.9	1.1	2.5	2.0

APPENDIX F-5

SPECIES COMPOSITION OF CRUSTACEAN PLANKTON (INDIVIDUALS PER CM³) IN LAKES SKAHA AND OSOYOOS,
ON SEPTEMBER 11, 1969 AND AUGUST 24, 1971 AND IN LAKES WOOD AND KALAMALKA ON AUGUST 26, 1971
(First row for station is 1969 data - second row for station is 1971 data)*

Lake	Station	Depth m	Epischura nevadensis Lilljeborg	Diaptomus			Cyclops bicuspidatus thomasi Forbes			Cyclops vernalis Fisher	Daphnia thorata Forbes	Daphnia longiremis Sars	Daphnia schoedleri Sars	Daphnia pulex Leydig	Bosmina longirostris (O.F. Muller)	Bosmina coregoni longispina Leydig	Diaphanosoma leuchten- bergianum Fisher	Leptodora kindtii (Focke)	Total	
				adult	copepodid	nauplius	adult	copepodid	nauplius											
SKAHA	S	39	2.6	18.5	54.8	40.8	-	30.0	53.1	-	1.1	2.9	0.1	-	0.1	-	2.7	0.1	209.7	
		50	3.7	7.8	18.6	46.5	3.1	93.0	114.7	1.6	0.6	1.9	-	1.5	-	0.1	4.7	0.1	297.7	
	C	52	2.2	25.4	58.5	43.1	2.3	40.0	73.9	-	0.2	4.5	0.2	0.1	0.1	-	2.3	0.1	252.7	
		50	2.3	11.6	26.3	37.9	1.6	46.5	105.3	-	1.2	4.2	-	2.2	-	0.2	5.4	0.1	244.7	
	N	44	2.6	27.7	62.5	43.9	30.8	29.2	54.7	-	0.5	1.4	0.1	-	0.1	-	1.3	-	254.8	
		50	5.1	11.6	29.4	14.7	3.1	20.1	65.8	-	0.9	0.5	-	1.1	0.1	-	5.4	0.1	158.1	
	Lake average ind/cm ²			2.5	23.9	58.6	42.6	11.0	33.1	60.6	-	0.6	3.0	0.1	0.1	-	2.1	0.1	238.1	
per cent			3.7	10.3	24.8	33.0	2.6	53.2	95.3	0.5	0.9	2.2	-	1.6	-	0.1	5.17	0.1	233.5	
			1.0	10.0	24.6	17.9	4.6	13.9	25.4	-	0.3	1.2	0.1	0.1	-	0.9	0.1	100.0		
			1.6	4.4	10.6	14.1	1.1	22.8	40.8	0.2	0.4	0.9	-	0.7	-	0.1	2.2	0.1	100.0	
OSOYOOS	C	24	0.3	8.7	30.8	29.2	5.1	20.0	40.6	0.1	0.5	-	-	0.1	0.6	-	3.7	0.1	139.5	
		26	1.4	3.1	2.2	14.9	1.2	9.6	22.9	1.2	0.1	-	-	0.1	0.1	-	1.2	0.1	57.9	
	N	29	0.2	20.8	63.9	36.9	8.5	10.8	30.8	-	0.8	0.5	0.1	-	0.1	-	10.0	0.1	183.4	
		50	2.5	5.7	14.0	14.6	1.6	9.4	35.9	0.3	0.4	2.4	-	0.5	-	-	6.8	0.1	93.8	
	Lake average ind/cm ²			0.2	14.8	47.4	33.0	6.8	15.4	35.7	0.1	0.7	0.3	0.1	-	0.3	-	6.8	0.1	161.4
	per cent			2.0	4.4	8.1	14.8	1.4	9.5	29.4	0.8	0.2	1.2	-	0.3	0.1	-	4.0	0.1	75.9
				0.1	9.1	29.3	20.5	4.2	9.5	22.1	0.1	0.4	0.2	0.1	-	0.2	-	4.2	0.1	100.0
			2.6	5.8	10.6	19.4	1.8	12.5	38.6	1.1	0.3	1.6	-	0.4	0.1	-	5.3	0.1	100.0	
KALAMALKA	S	31	3.8	-	35.9	0.5	-	35.4	14.6	-	2.6	6.2	-	-	0.1	0.1	1.6	-	100.7	
		SC	50	2.8	-	51.9	3.1	0.1	64.3	20.1	-	2.3	7.0	-	-	0.4	0.1	-	-	152.0
	NC	40	3.9	-	55.8	1.6	0.8	53.4	39.5	-	-	13.2	-	-	0.4	0.6	-	0.1	169.1	
		50	5.3	-	27.0	0.5	-	48.4	22.9	-	3.1	5.2	-	-	3.1	0.5	0.1	-	116.0	
	NE	50	4.8	-	34.8	0.8	-	44.9	37.9	-	2.3	11.6	-	-	2.3	1.6	-	-	141.0	
					4.1	-	41.1	1.3	0.2	49.3	27.0	-	2.1	8.6	-	-	1.2	0.6	0.3	0.1
	per cent			3.0	-	30.3	1.0	0.1	36.3	19.9	-	1.5	6.3	-	-	0.9	0.4	0.2	0.1	100.0
WOOD	S	27	1.1	6.2	47.8	8.8	6.2	12.5	39.5	-	-	0.1	-	-	-	-	0.5	0.1	122.8	
		N	26	0.9	7.0	39.5	6.2	13.2	30.2	52.7	-	-	0.8	-	-	-	-	4.7	0.1	155.2
	Lake average ind/cm ²			1.0	6.6	43.7	7.5	9.7	21.4	46.1	-	-	0.4	-	-	-	2.6	0.1	139.0	
	per cent			0.7	4.7	31.4	5.4	7.0	15.4	33.2	-	-	0.3	-	-	-	1.9	0.1	100.0	

APPENDIX F-6

SOME LIMNOLOGICAL CHARACTERISTICS AND PARAMETERS USED FOR CALCULATION OF THE TOTAL PHOSPHORUS LOAD TO THE LAKES OF THE OKANAGAN VALLEY ACCORDING TO VOLLEHWEIDER'S CRITERIA (1968).

	SYMBOLS	YEAR	OKANAGAN LAKE	SKAHA LAKE	OSOYOOS LAKE (NORTHERN BASIN)	KALAMALKA LAKE	WOOD LAKE
Area of the lake in $10^6 m^2$	A_o		344.4	20.137	9.899	25.9	9.3
Area of the land drainage in $10^6 m^2$	A_d		6060.6	828.8	1269.	192.	55.
Ratio of the land drainage to lake area	$\frac{A_d}{A_o}$		17.	41.	128.	7.4	5.9
Maximum depth m	Z_m		242.	55.8	63.4	141.0	34.0
Mean depth m	\bar{Z}		75.3	26.5	20.7	58.0	21.0
Volume km^3	V		26.000	0.53192	0.204743	1.500	0.196
Discharge $km^3 \cdot year$	D		0.450221	0.473657	0.510661	0.013878	0.00181
Relative annual discharge	$\frac{D}{V}$		0.017	0.89	2.5	0.009	0.0092
Basin population	C	1850	2,000	500	200	200	100
		1921	17,000	5,000	500	1,000	500
		1935	21,000	8,000	1,000	1,500	800
		1969	60,000	20,000	3,000	4,000	2,000
		1990	110,000	36,000	5,500	7,000	3,600
Export of phosphorus from the soil in g/m^2 of land. yr tot. P	E_s		0.005	0.005	0.005	0.005	0.01
Per capita discharge of phosphorus reaching the lake in g/yr tot. P	E_c	1850	700	700	700	700	700
		1921-35	1,000	1,000	1,000	1,000	1,200
		1969-90	1,700	1,700	1,700	1,700	2,000
Retention of phosphorus in the lake in relation to the phosphorous load R			0.95	0.65	-	0.90	0.90
Calculations of load (in g/m^2 of lake year total P)							
Phosphorus load from soil $E_s \cdot A_d/A_o$	l_s		0.09	0.20	0.64	0.04	0.06
Population dependent phosphorus load $\frac{E_c \cdot C}{A_o}$	l_c	1850	0.009	0.017	0.014	0.005	0.01
		1921	0.05	0.25	0.05	0.04	0.07
		1935	0.06	0.40	0.10	0.06	0.10
		1969	0.30	1.68	0.51	0.26	0.43
		1990a	0.54	3.04	0.94	0.46	0.77
		1990b	0.10	0.61	0.19	0.09	0.15
Phosphorus load from the lake above $(1-R) \cdot L_p \cdot \frac{A_o(a)}{A_o}$	l_a	1850	0.0	0.08	0.21	0.003	0.01
		1921	0.0	0.12	0.42	0.005	0.01
		1935	0.0	0.13	0.50	0.006	0.01
		1969	0.0	0.33	1.56	0.02	0.01
		1990a	0.0	0.54	2.66	0.03	0.01
		1990b	0.0	0.17	0.67	0.01	0.01
Total phosphorus load from all sources $l_s + l_c + l_a$	L_p	1850	0.09	0.3	0.9	0.05	0.08
		1921	0.14	0.6	1.1	0.09	0.14
		1935	0.15	0.7	1.2	0.11	0.17
		1969	0.39	2.2	2.7	0.32	0.50
		1990a	0.63	3.7	4.2	0.53	0.84
		1990b	0.19	0.9	1.5	0.14	0.22

NOTES: Morphometric data of the lakes taken from the bathymetric maps prepared by the Fish and Wildlife Branch, Dept. of Recreation and Conservation in 1966 (J.A. Balkwill).

Area of the drainage basin according to Coulthard and Stein (1967). Discharge from Alcock and Clarke (1968).

Populations estimated 1850-1990 according to Government of British Columbia (1971).

Phosphorus retention (R) estimates based on Vollenwieder (1968).

Predicted P load estimates in 1990 based on the assumptions: a) no phosphorus removal; b) 80 per cent phosphorus removed in controllable sources.

APPENDIX F-7

A COMPARISON OF SEVERAL LIMNOLOGICAL CHARACTERISTICS OF LAKES OF OKANAGAN VALLEY, AND LAKES ONTARIO, MENDOTA AND WASHINGTON, LAKE MEANS, EXCEPT WHERE INDICATED. 1935 and 1936 DATA TAKEN FROM RAWSON (1939).

LAKE	DATE	SECCHI DISC VISIBILITY (Meters)	OXYGEN IN HYPOLIMNION PERCENTAGE OF SATURATION	HYPOLIMNETIC OXYGEN AREAL DEFICIT Mg/Cm ² /Day O ₂ May-Aug (Sept)	TOTAL DISSOLVED SOLIDS (mg/Liter)	CALCIUM (mg/Liter)	PHOSPHORUS LOAD (TOTAL PHOSPHORUS) (g/m ² /Year)	ZOOPLANKTON CRUSTACEANS	
								indiv/cm ²	mm ³ /cm ²
OKANAGAN	Aug. 1935	(8.0-10.0) ²	88 ²		145	28.7 ¹	0.15		2.8
	9.9-10.69	8.5 (9.0) ²	88 (94 ²)		164	31.9	0.39	188	13.3
	8.26-27.71	9.4 (10.9) ²	89 (94 ²)			35.1		101	7.8
SKAHA	9.11.69	2.7	60	0.076	164.3	31.3	2.2	238	23.2
	8.24.71	5.3	63	0.077	195.7	33.8		236	24.1
OSOYOOS	9.11.69	4.1	20	0.086	168.5	31.5	2.7	161	25.9
	8.24.71	4.0	22	0.077	169.0	33.3		76	10.9
KALAMALKA	8.14.35	(6.0-7.0)	87				0.11		4.5
	8.25.71	5.7	95		252	37.3	0.32	136	10.9
WOOD	8.13.35	(2.0-2.5)	21				0.17		15.4
	8.25.71	3.9	5	0.080	211.5	21.8	0.50	139	31.1
ONTARIO ³	Sept. 67	4.1	95		185	42.9	0.65	320	44.9
MENDOTA ⁴			0.5	0.109			0.55		
WASHINGTON ⁵	1957	2.0	42	0.086			1.06	ca. 300	

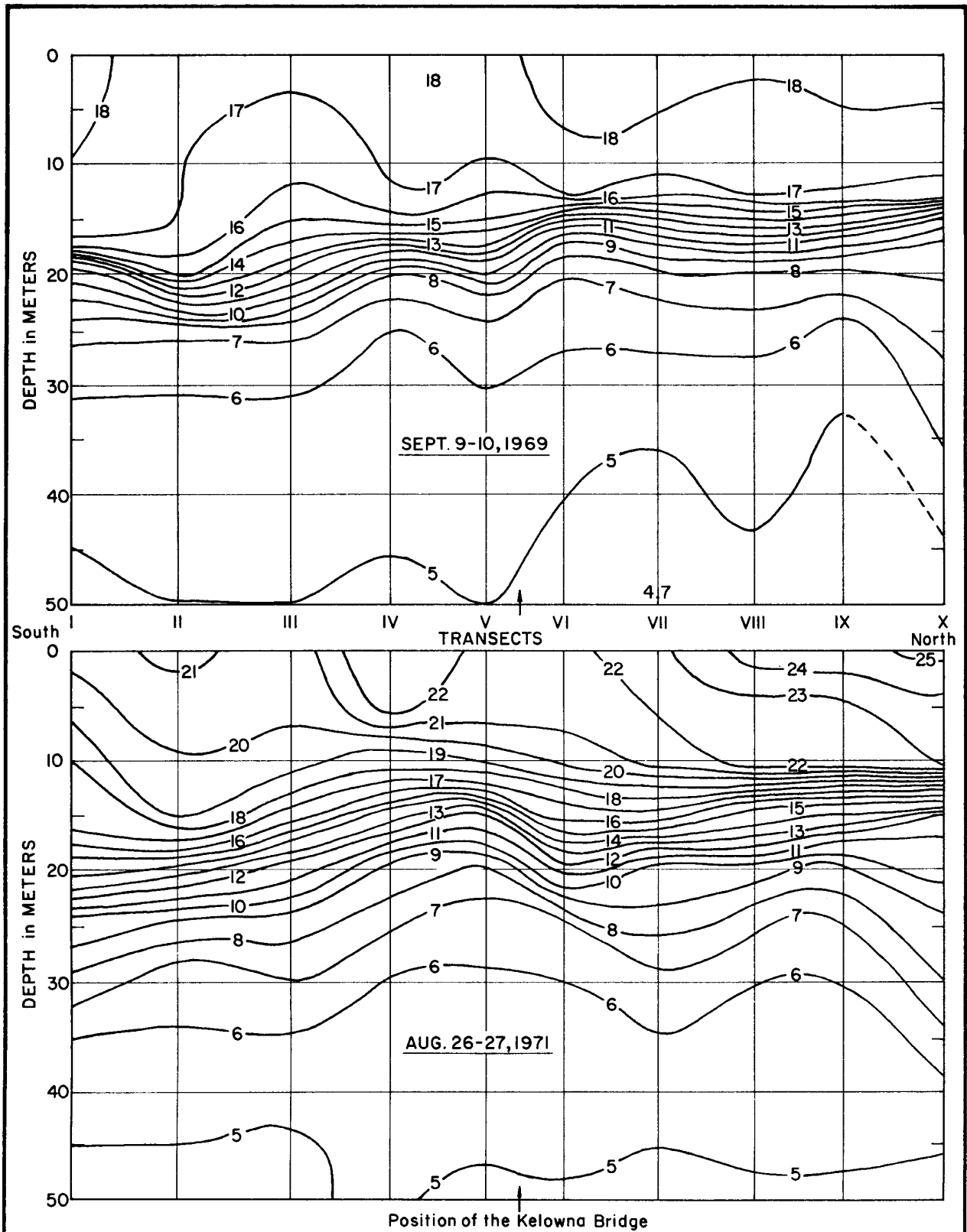
1. April 1936, sample taken between Peachland and Kelowna
2. Mean Value of Peachland - Kelowna area
3. Data from Patalas (1969) and Respt. I.J.C. (1969).
4. Data from Hutchinson (1957) and Edmondson (1969).
5. Data from Edmondson (1966, 1969).

APPENDIX F-8

List of species found in net plankton of Lakes Okanagan and Kalamalka in the period from 1935 to 1971. (1935 data taken from Rawson (1939), identifications by Dr. G.C. Carl; 1951 data, identifications by present authors from samples kindly provided by Dr. T.G. Northcote). (from Patalas and Salki, 1972).

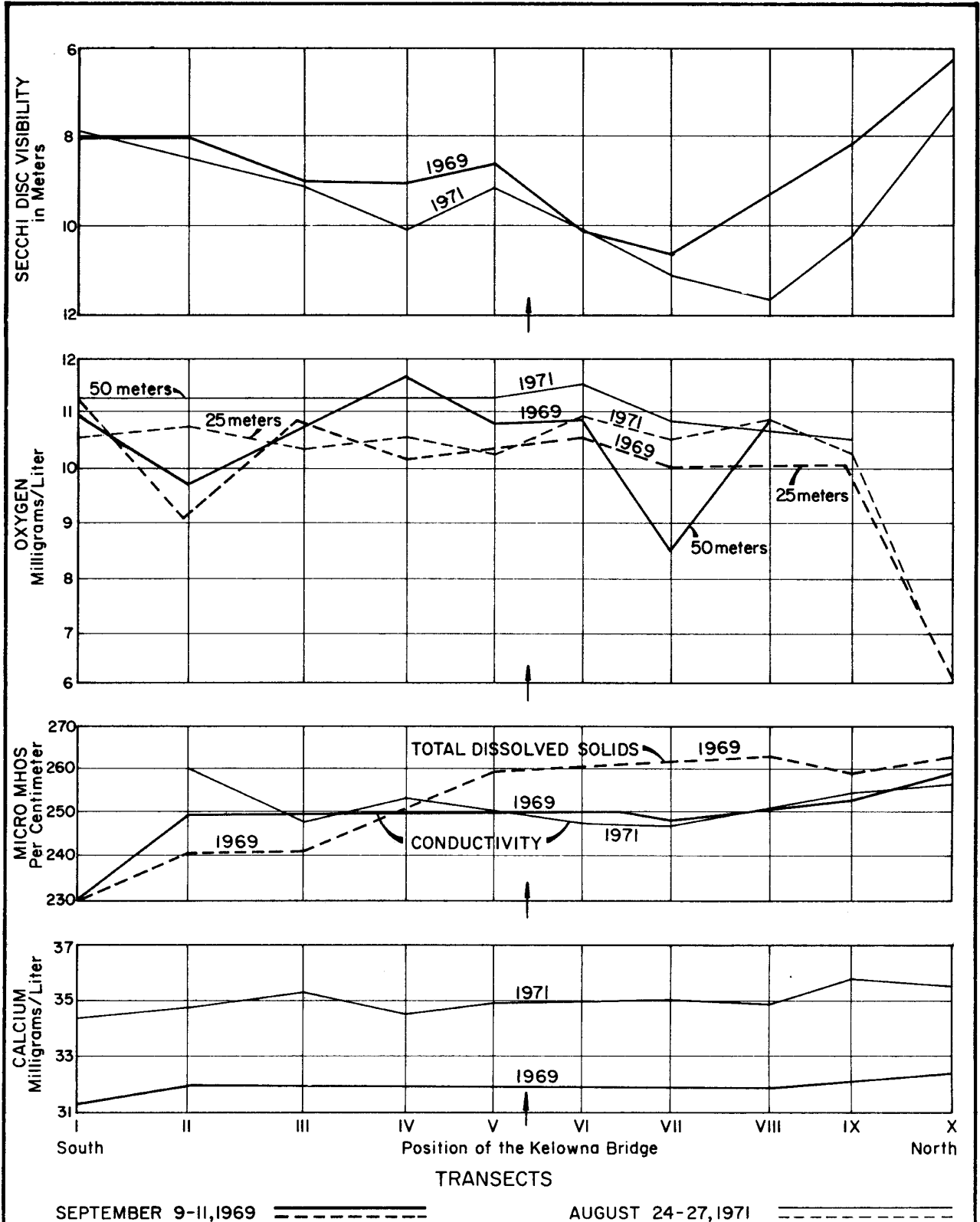
Species	Lake Okanagan				Kalamalka			
	Date	July-Aug 1935	July 25 1951	Sept 9-16 1969	Aug. 24-26 1971	Aug. 14 1935	July 31 1951	Aug 25 1971
<i>Epischura nevadensis</i> Lilljeborg	x		x	x	x	x	x	x
<i>Diaptomus ashlandi</i> Marsh	xx		xx	xx	xx	(xx)	xx	xx
<i>Diaptomus</i> sp.						xx		
<i>Cyclops bicuspidatus thomasi</i> Forbes	(xx)		xx	xx	xx	(xx)	xx	xx
<i>Cyclops bicuspidatus</i> Claus	xx					xx		
<i>Cyclops vernalis</i> Fischer					.			
<i>Daphnia longispina</i> (O.F.Müller)	x					x		
<i>Daphnia thorata</i> Forbes	(x)		x	x	x	(x)	x	x
<i>Daphnia longiremis</i> Sars	(x)		x	x	x	(x)	x	x
<i>Daphnia pulex</i> Leydig					.		.	
<i>Daphnia schoedleri</i> Sars (x pulex)					.			
<i>Scapholeberis mucronata</i> (O.F.Müller)	.				.	.		
<i>Bosmina longirostris</i> (O.F.Müller)			.	x	x	x	x	x
<i>Bosmina coregoni longispina</i> Leydig	x ¹		x	x	x		x	x
<i>Diaphanosoma brachyurum</i> Lievin	x							
<i>Diaphanosoma leuchtenbergianum</i> Fischer	(x)		x	x	x		.	x
<i>Sida crystallina</i> (O.F.Müller)	.				.	.		
<i>Leptodora kindtii</i> (Focke)
<i>Holopedium gibberum</i> Zaddach	.							

1. Listed as *Bosmina longispina* Leydig
xx abundant species above 10 per cent of the total number of crustaceans
x common but not abundant 0.1 - 10.0 per cent
. rare - less than 0.1 per cent
() probable names according to presently used taxonomy.



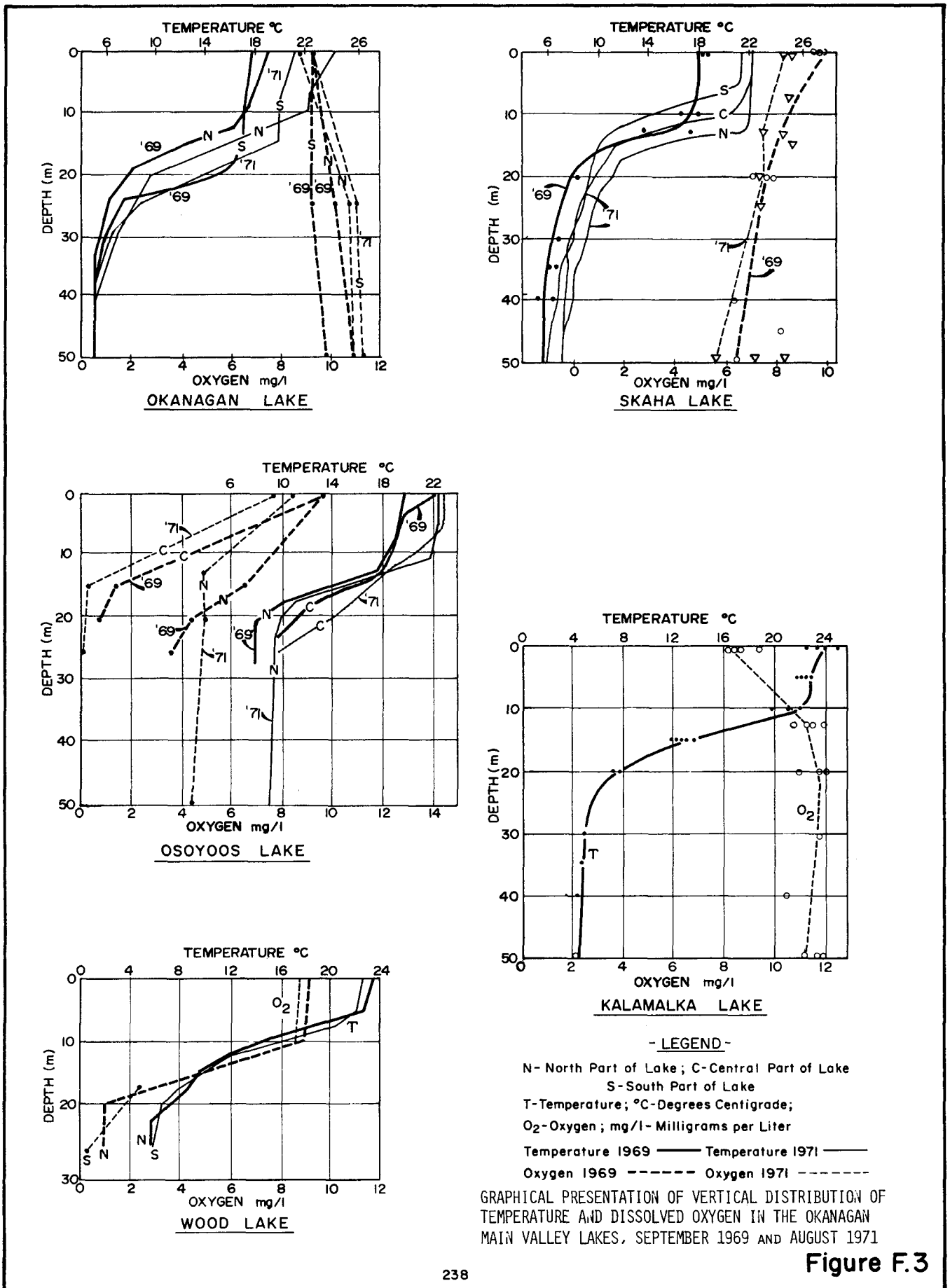
VERTICAL and HORIZONTAL DISTRIBUTION of TEMPERATURE in DEGREES CENTIGRADE in OKANAGAN LAKE for the DATES SHOWN

Figure F.1



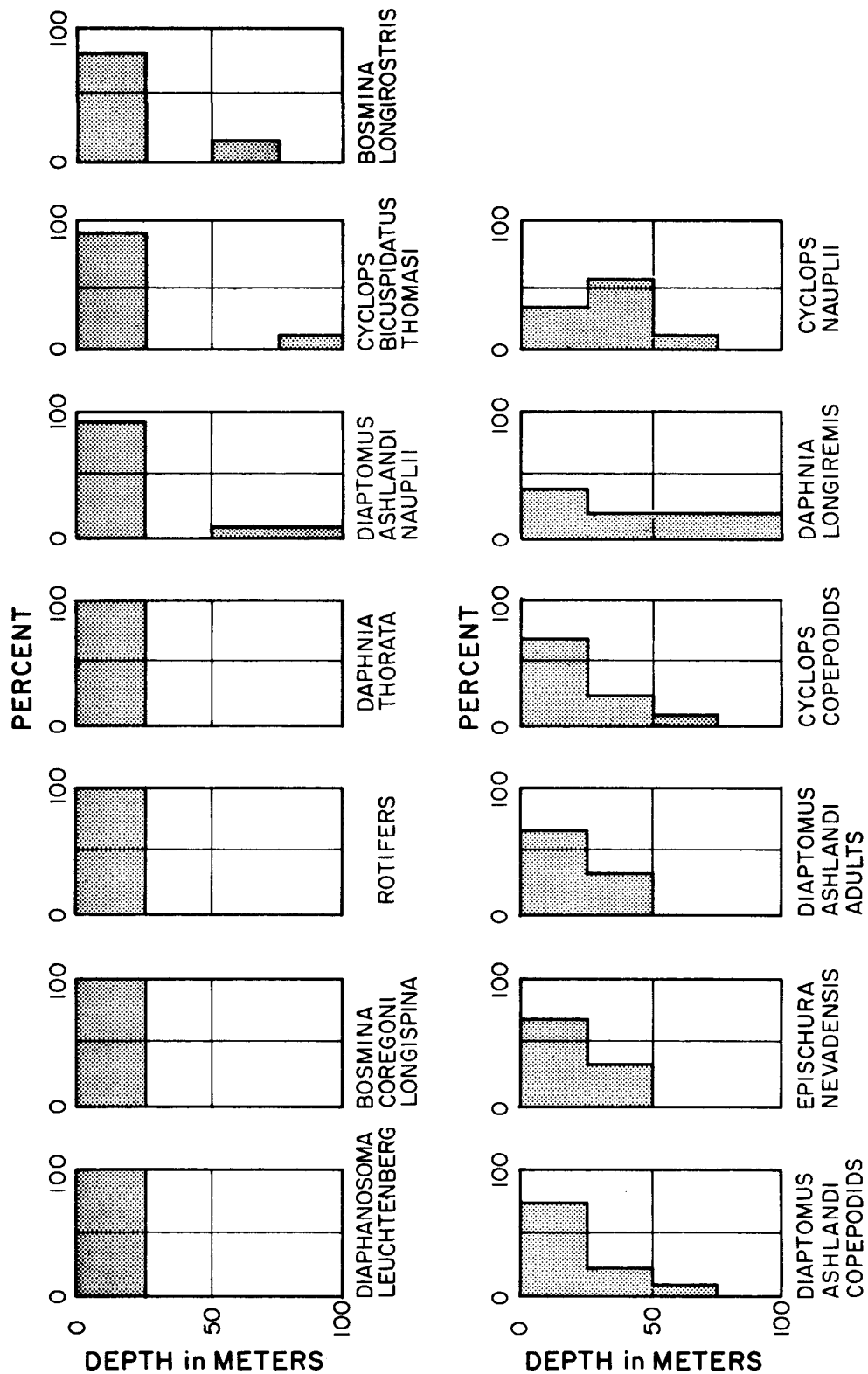
GRAPHICAL PRESENTATIONS OF HORIZONTAL DISTRIBUTION OF SECCHI DISC VISIBILITY, DISSOLVED OXYGEN, TOTAL SOLIDS, ELECTRICAL CONDUCTIVITY AND CALCIUM IN OKANAGAN LAKE IN SEPTEMBER 1969 AND AUGUST 1971.

Figure F.2

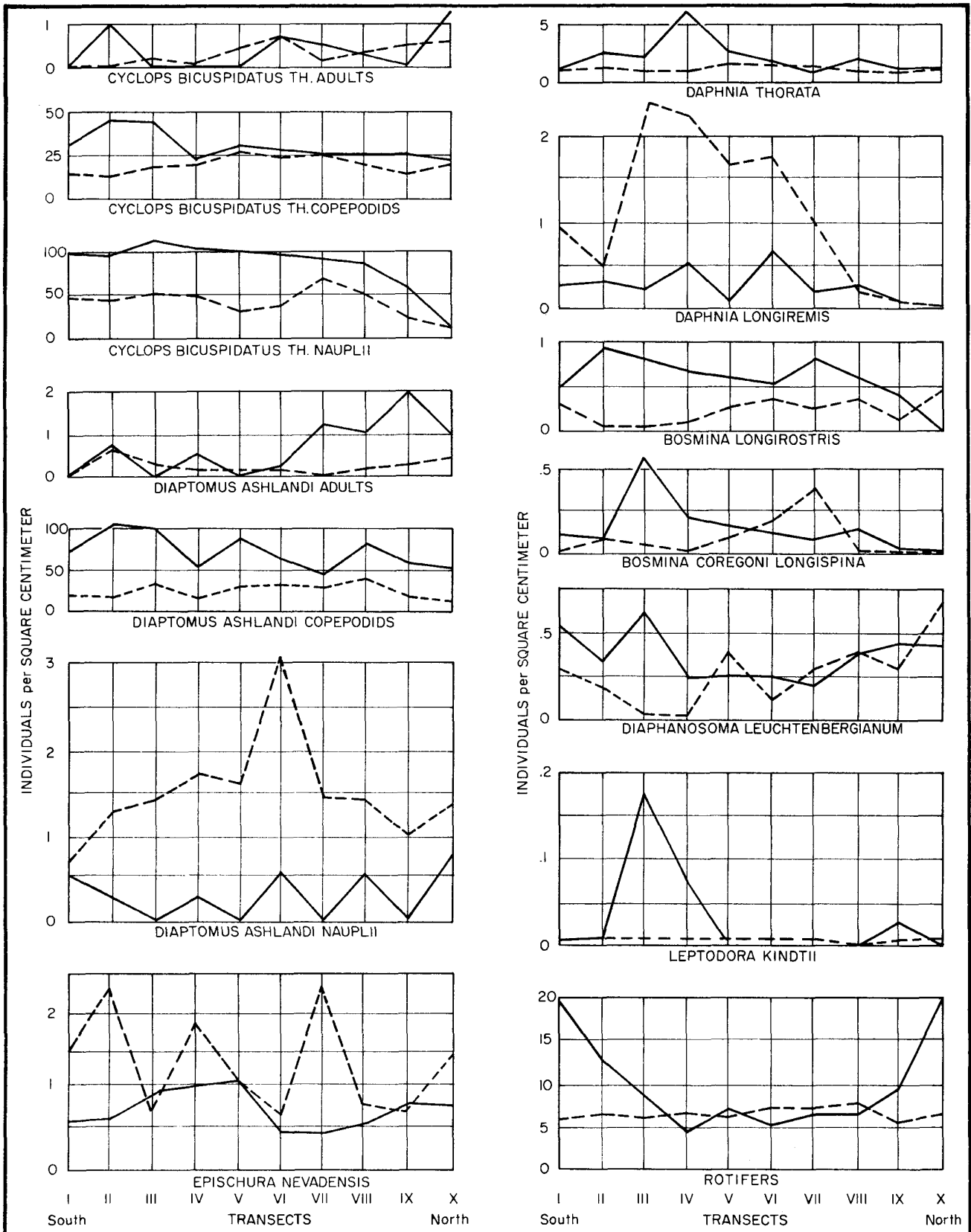


- LEGEND -
 N-North Part of Lake ; C-Central Part of Lake
 S-South Part of Lake
 T-Temperature ; °C-Degrees Centigrade ;
 O₂-Oxygen ; mg/l- Milligrams per Liter
 Temperature 1969 ——— Temperature 1971 ———
 Oxygen 1969 - - - - - Oxygen 1971 - - - - -
 GRAPHICAL PRESENTATION OF VERTICAL DISTRIBUTION OF
 TEMPERATURE AND DISSOLVED OXYGEN IN THE OKANAGAN
 MAIN VALLEY LAKES, SEPTEMBER 1969 AND AUGUST 1971

Figure F.3



VERTICAL DISTRIBUTION OF ZOOPLANKTON IN OKANAGAN LAKE (September 10, 1969; 1-3 p.m., central part, transect VII) Figure F.4



SEPTEMBER 9-10, 1969

AUGUST 26-27, 1971

HORIZONTAL DISTRIBUTION of PARTICULAR SPECIES of ZOOPLANKTON in OKANAGAN LAKE on the ABOVE DATES. Figure F.5