

BEGA VALLEY COUNCIL

**MERIMBULA LAKE AND BACK LAKE
COMPENDIUM OF DATA REPORT**

DECEMBER, 1994



WEBB, McKEOWN & ASSOCIATES PTY. LTD.
CONSULTING ENGINEERS


BEGA VALLEY COUNCIL

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COMPENDIUM OF DATA REPORT**

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**MERIMBULA LAKE AND BACK LAKE
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1. INTRODUCTION

This Compendium of Data Report contains the data used in Appendices E and F of the Merimbula Lake and Back Lake Estuary Processes Study. These Appendices cover Water Quality Data, and Biology and Ecology.

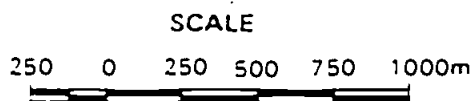
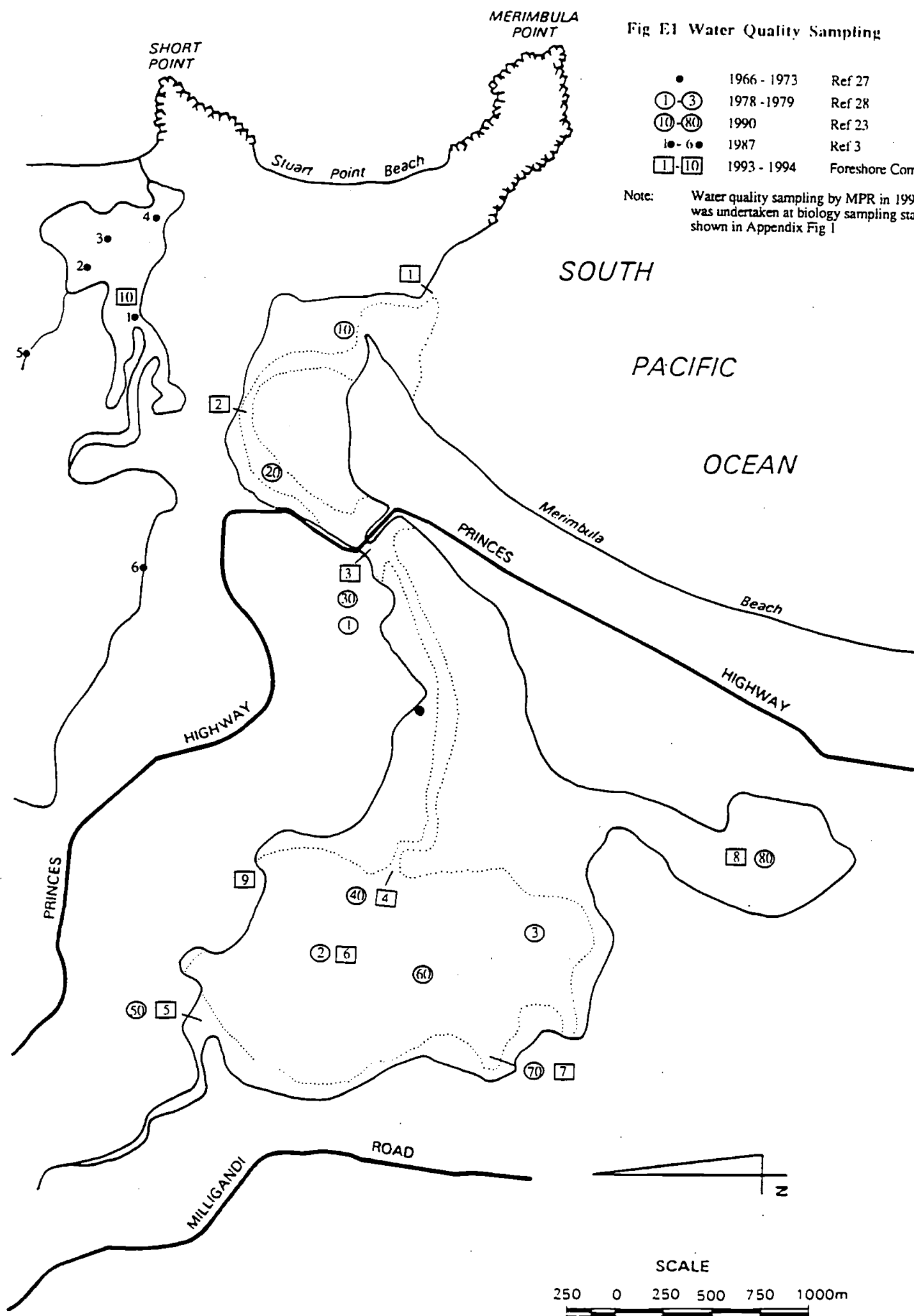
The data presented in this Compendium are either new data collected for the Processes Study or data from other studies which are not readily available.

**FIGURES REFERENCED IN
APPENDIX E
WATER QUALITY DATA**

Fig E1 Water Quality Sampling

- 1966 - 1973 Ref 27
- ①-③ 1978 - 1979 Ref 28
- ⑩-⑧⑩ 1990 Ref 23
- ⑩-⑥● 1987 Ref 3
- ①-⑩ 1993 - 1994 Foreshore Committee

Note: Water quality sampling by MPR in 1994 was undertaken at biology sampling stations shown in Appendix Fig 1



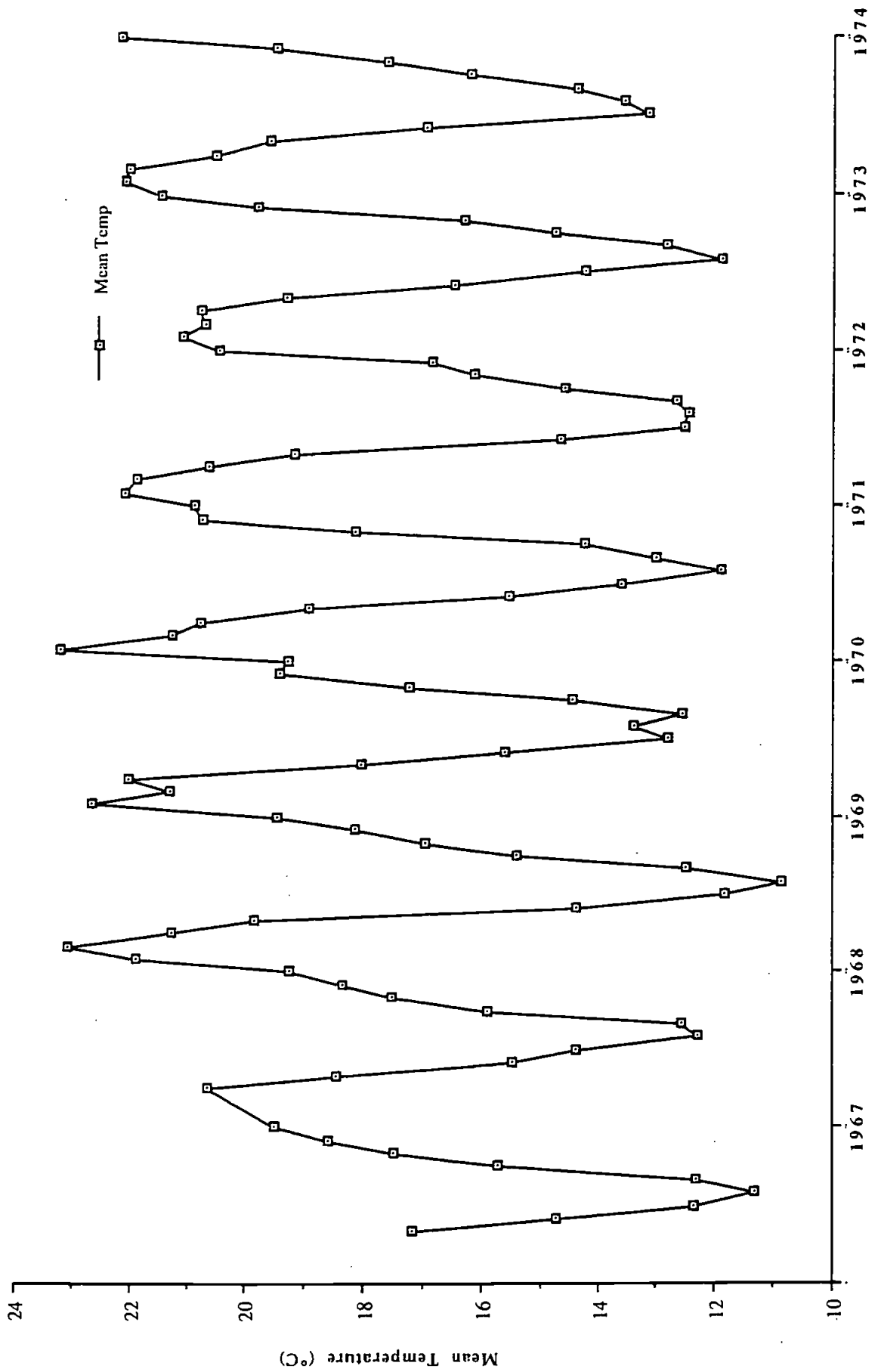


Fig E2 Mean Temperature For Merimbula Lake, 1966 - 1973 (NSW Fisheries - Ref 27).

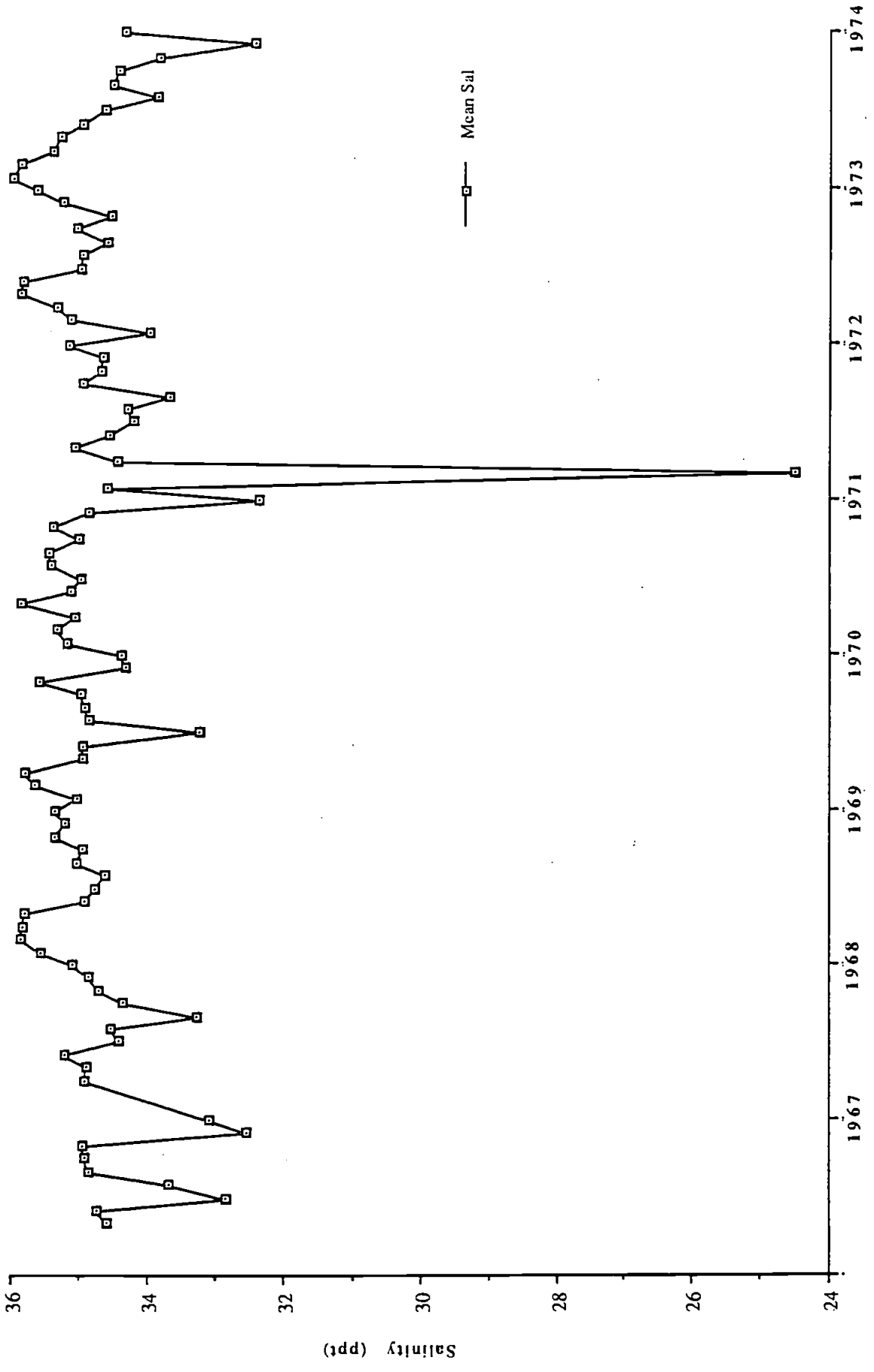


Fig E3 Mean Salinity For Merimbula Lake, 1966 - 1973 (NSW Fisheries - Ref 27).

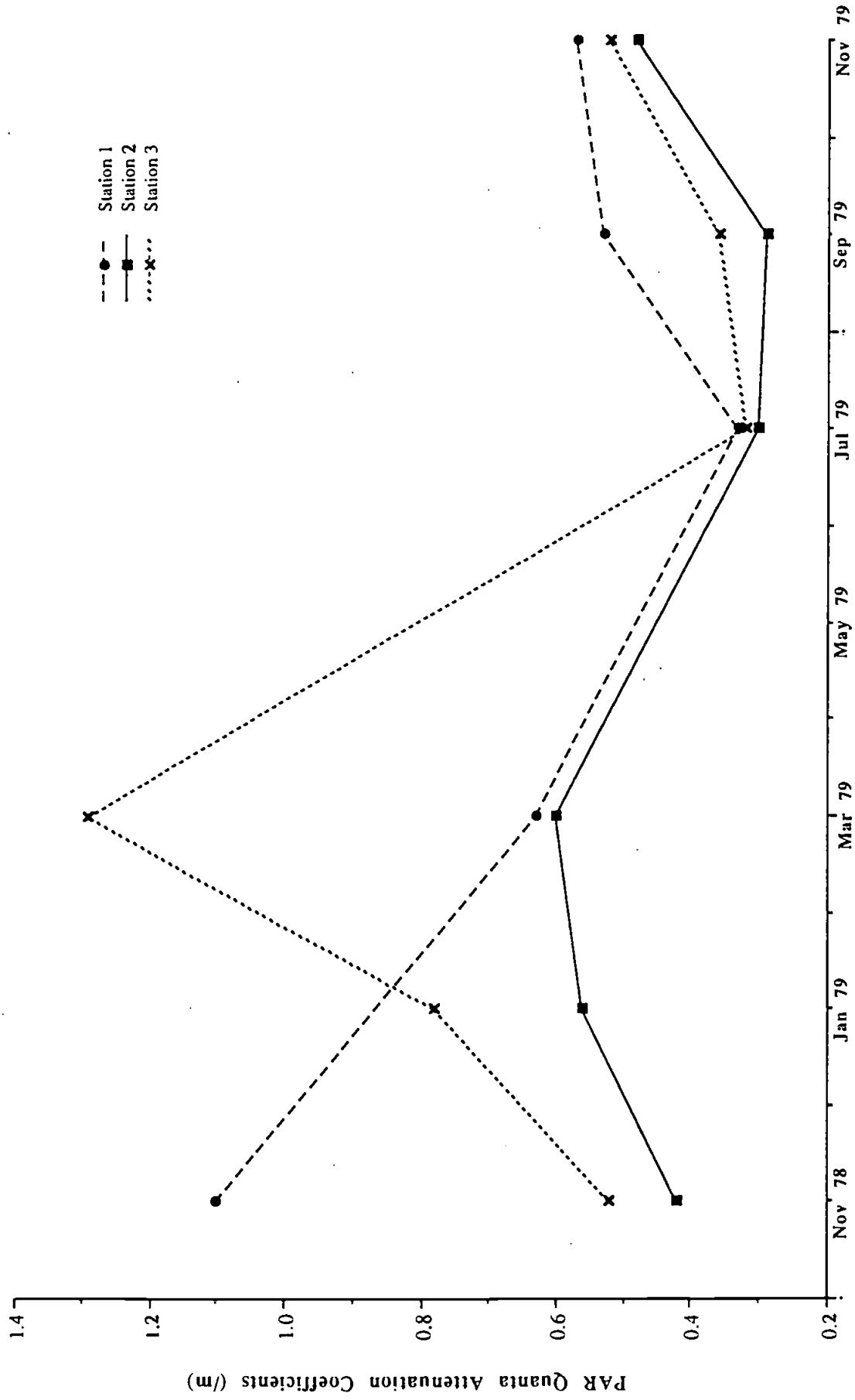


Fig E4 PAR Quanta Attenuation Coefficients for Merimbula Lake, 1978 - 79 (Fisheries Research Institute - Ref 28).

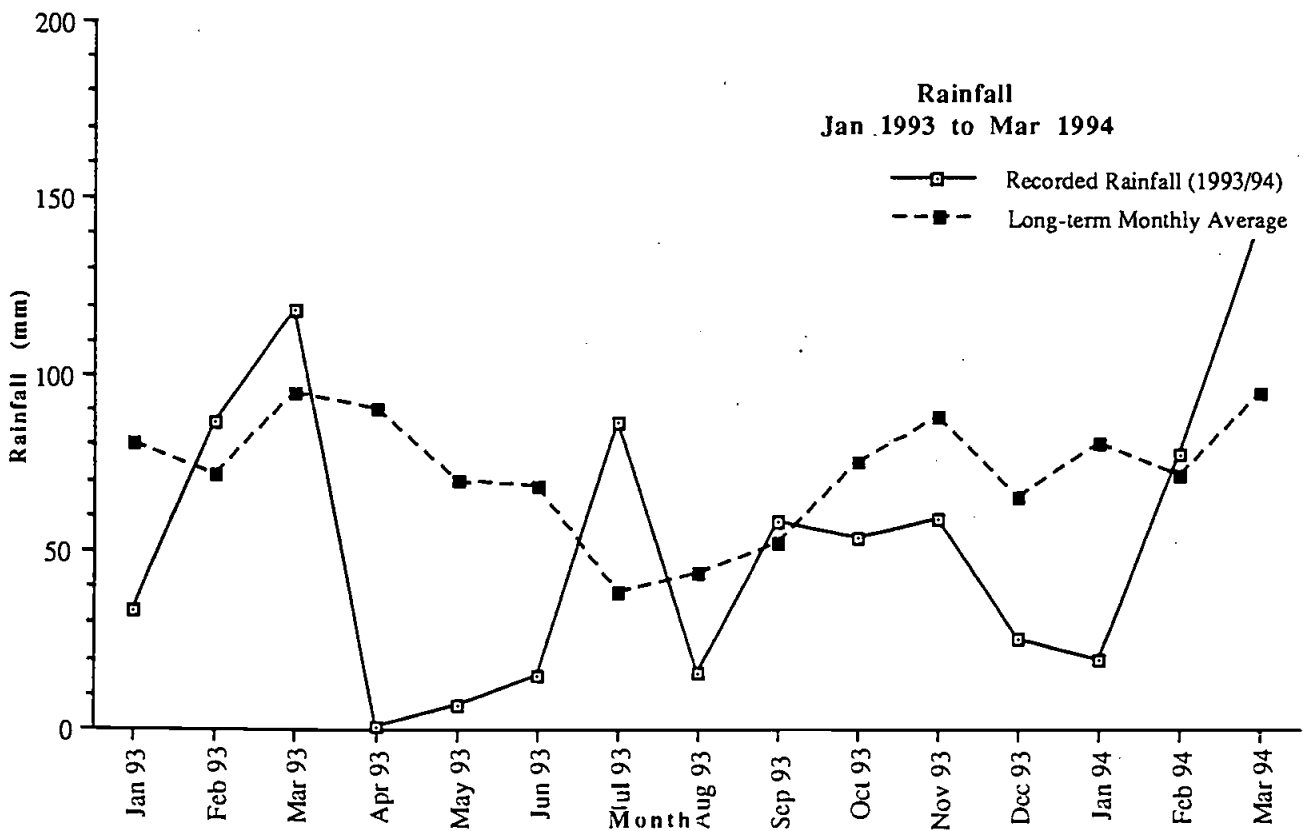
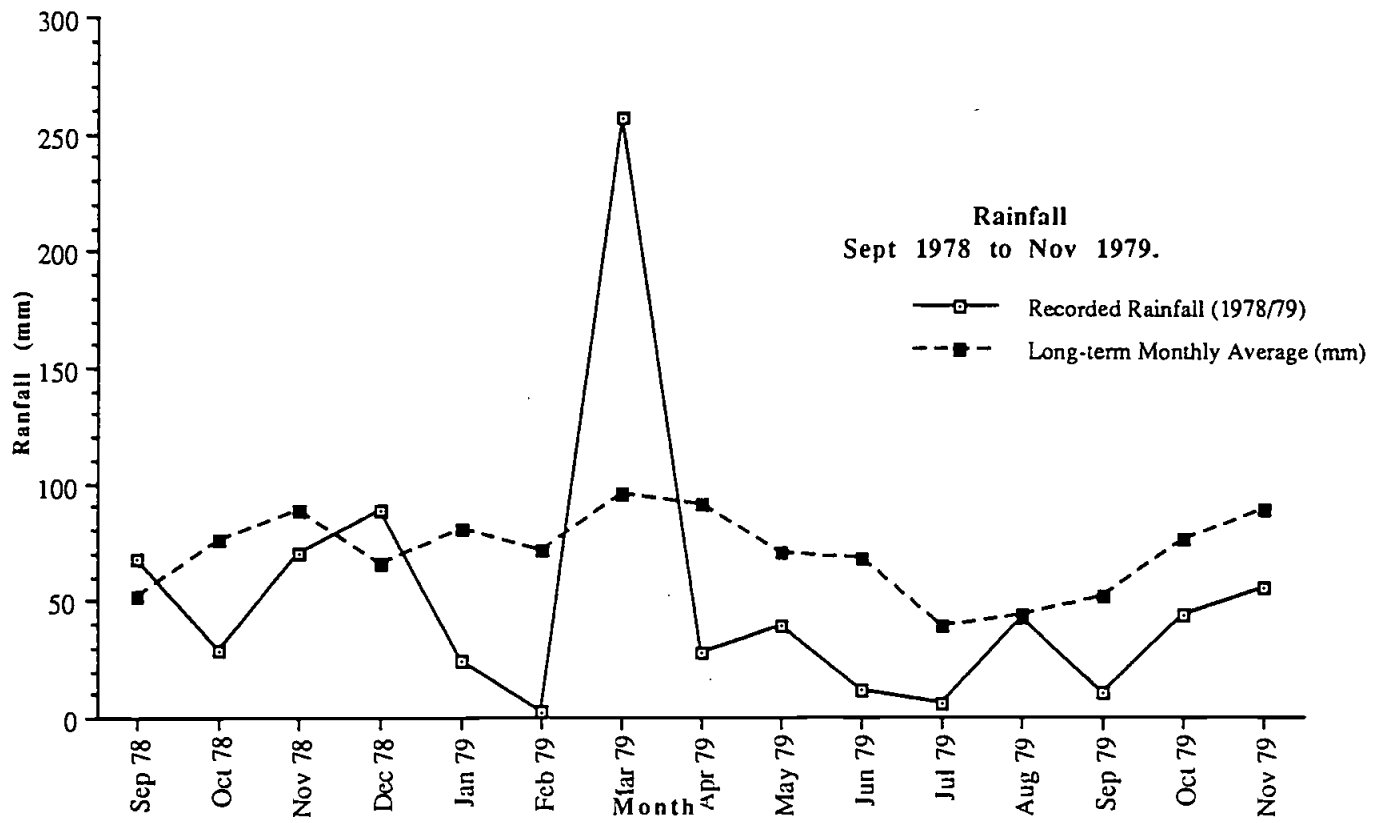


Fig E5 Monthly Rainfall, Merimbula Airport

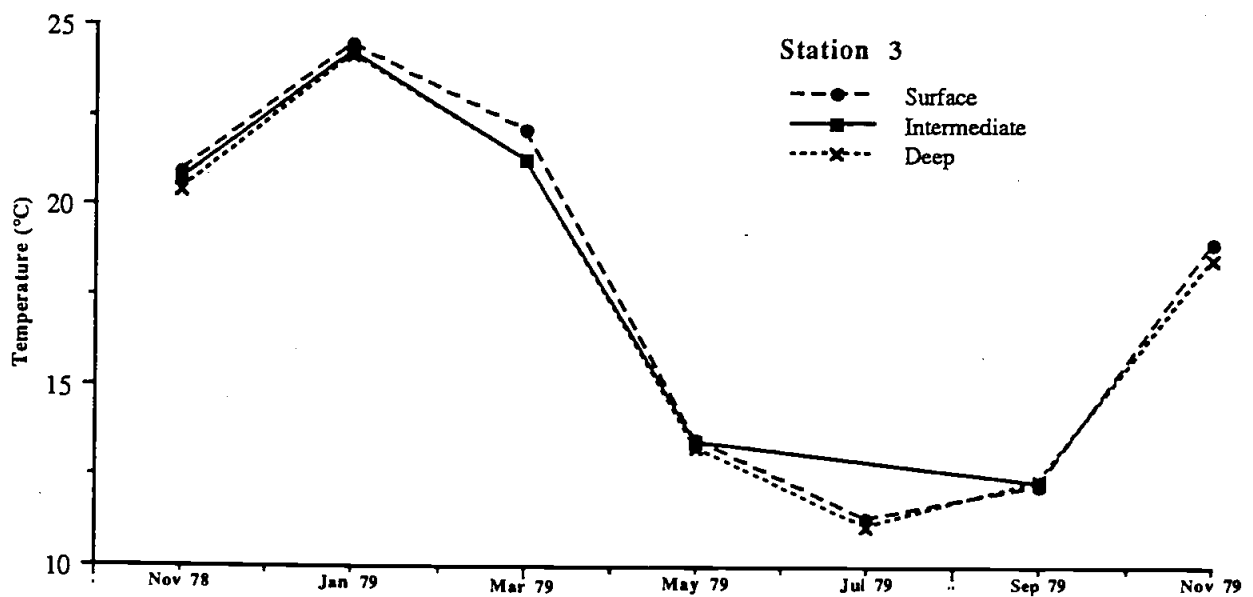
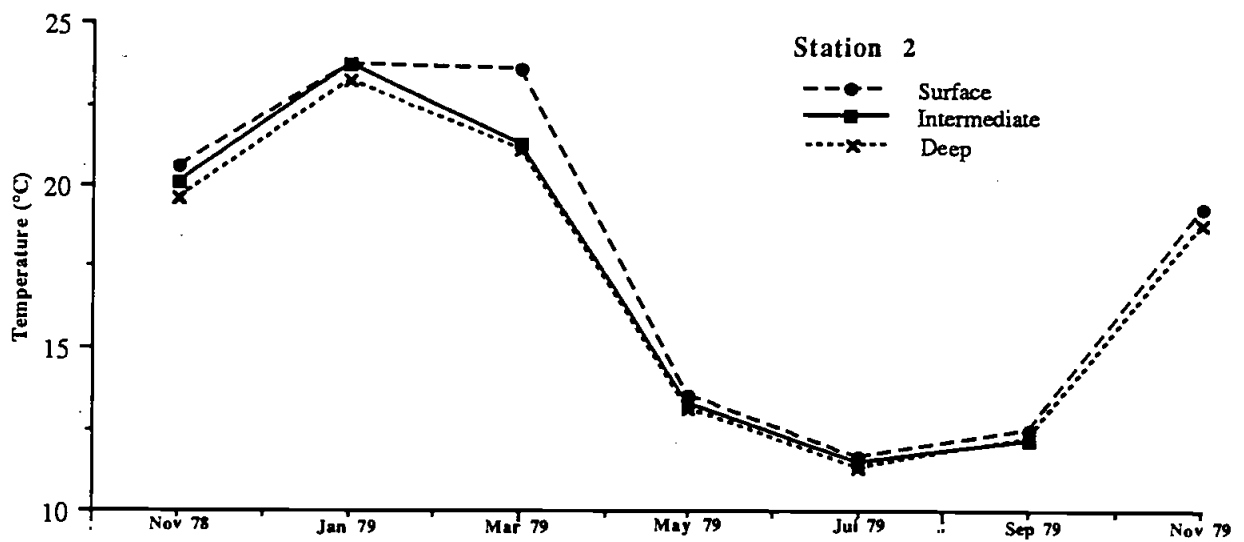
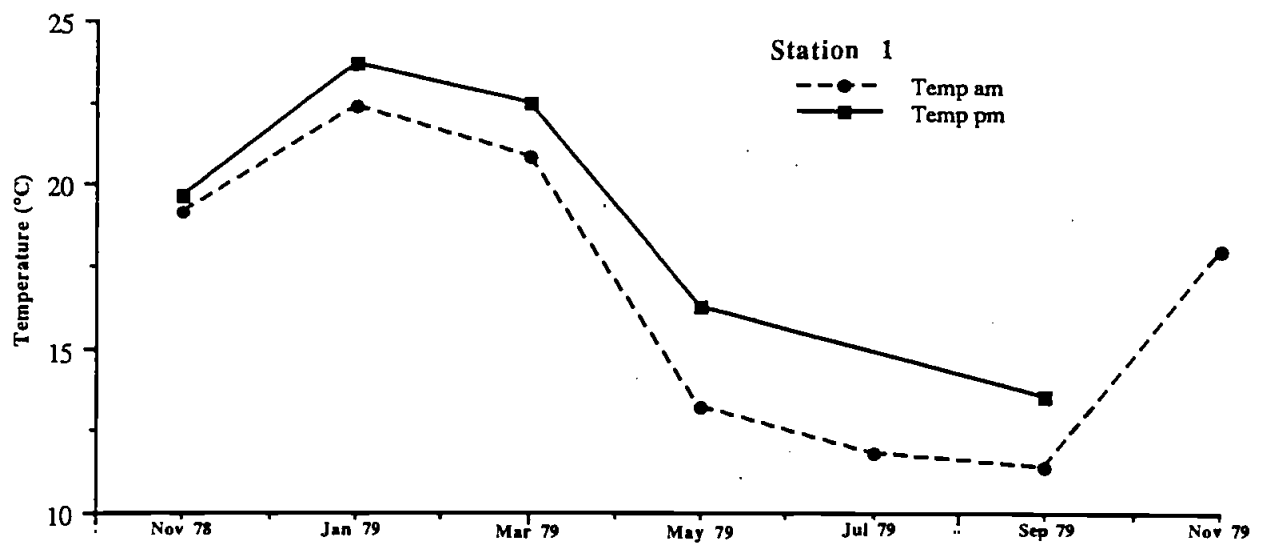


Fig E6 Water Temperature for Merimbula Lake, 1978 - 79 (Fisheries Research Institute).

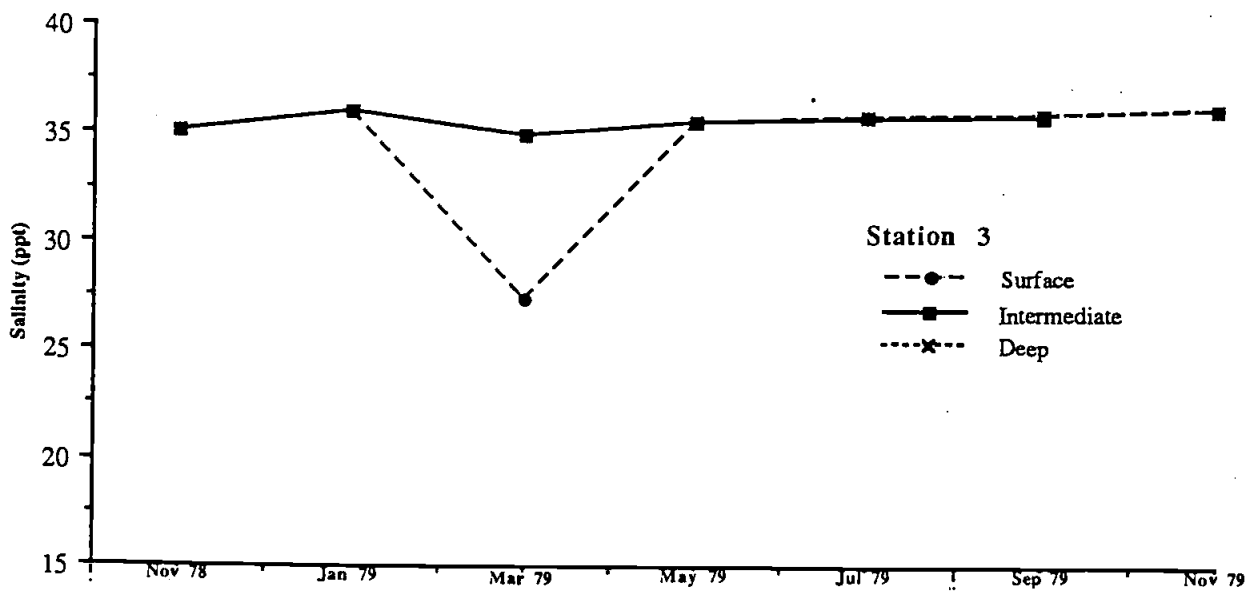
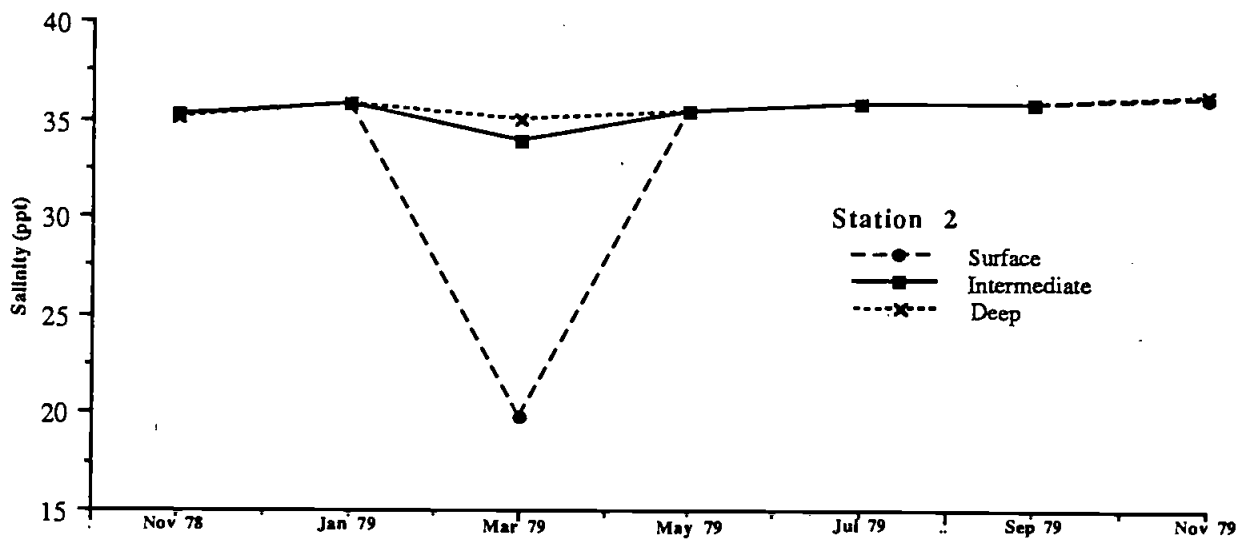
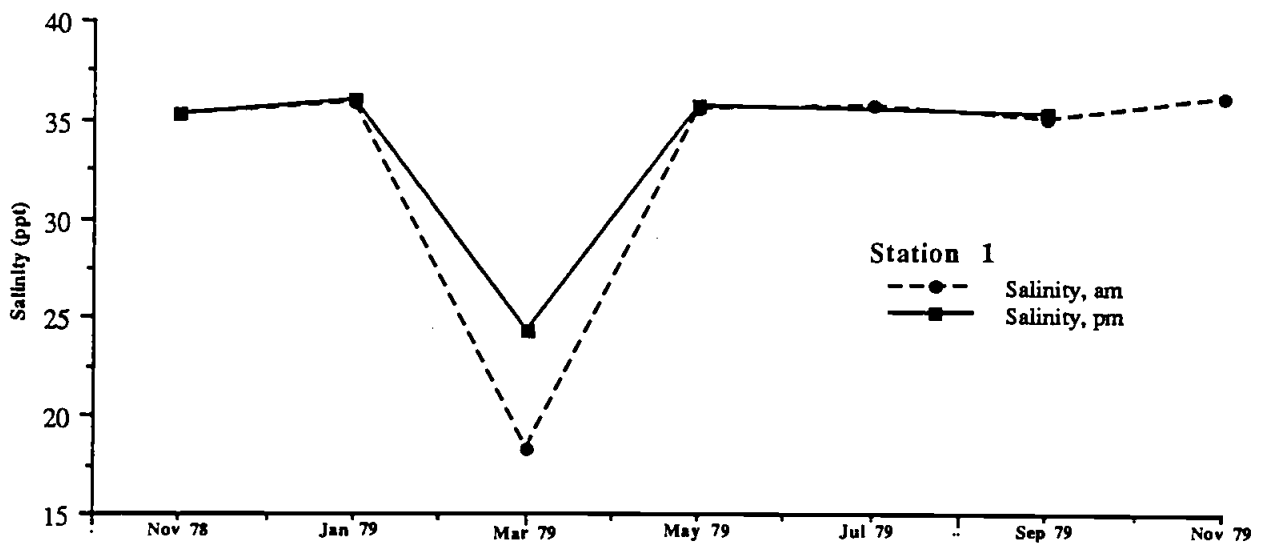


Fig E7 Salinity for Merimbula Lake, 1978 - 79 (Fisheries Research Institute).

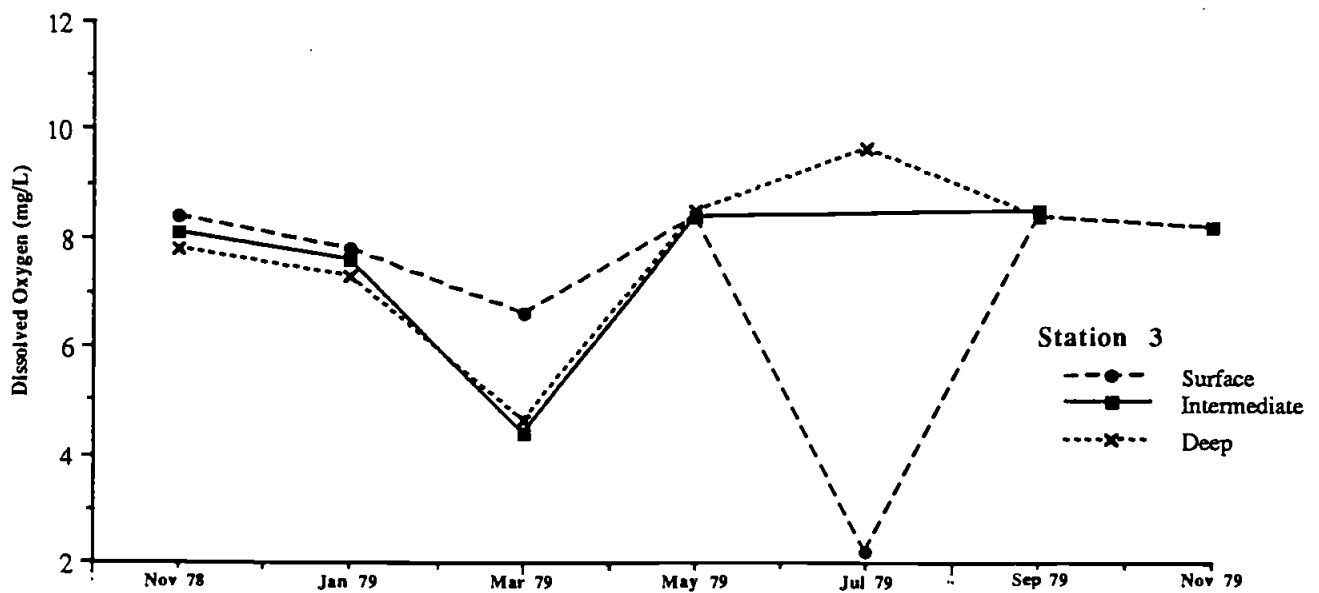
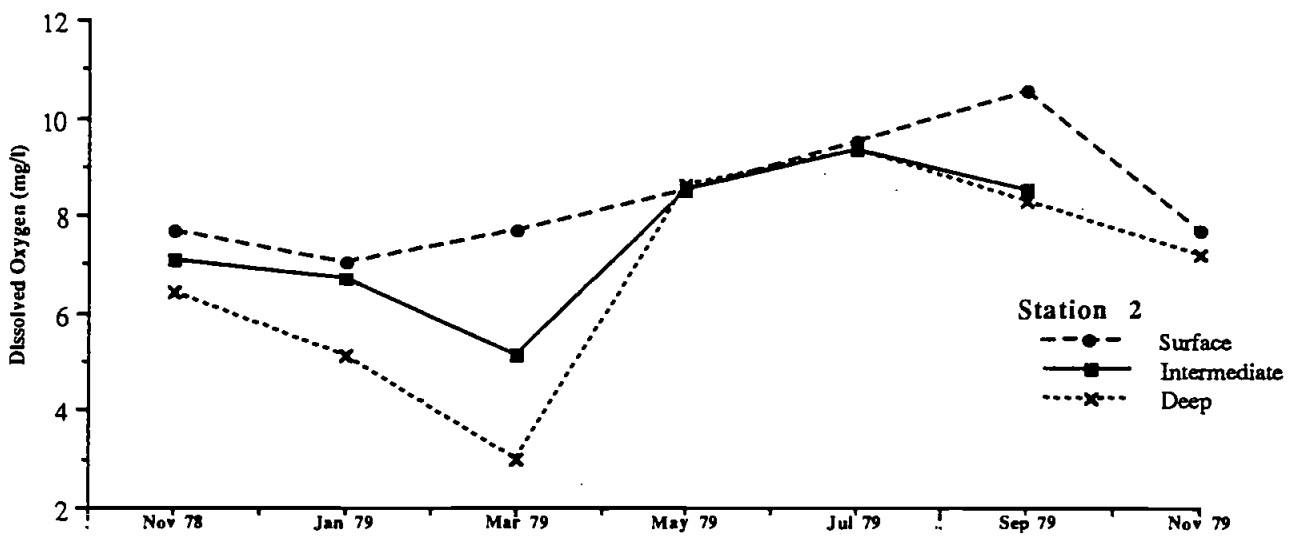
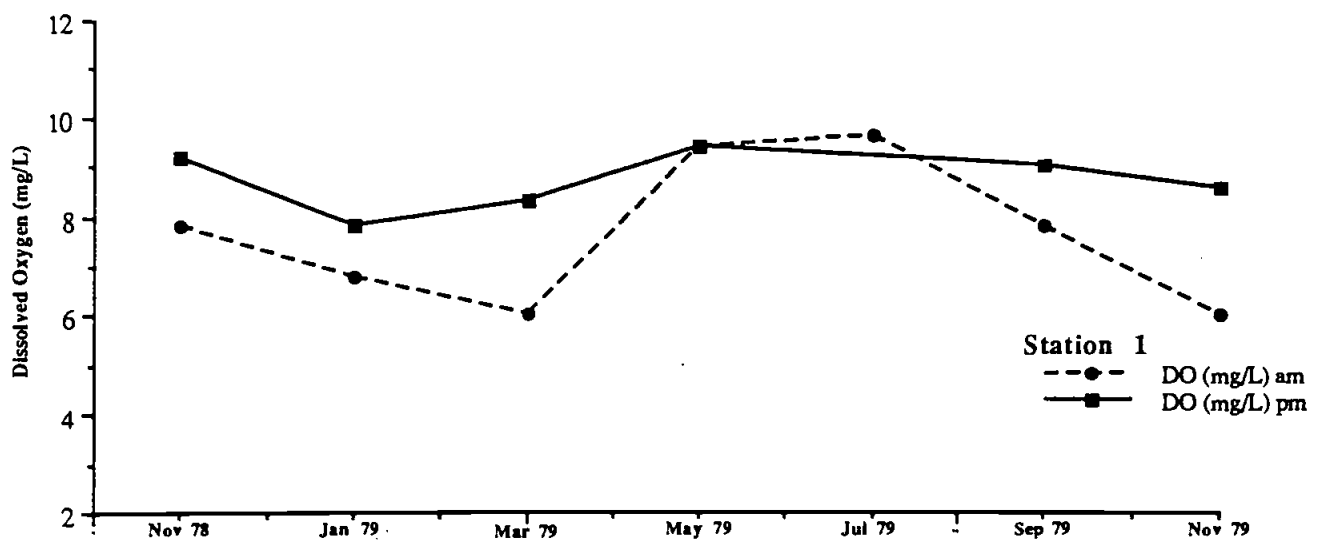


Fig E8 Dissolved Oxygen (mg/L) for Merimbula Lake, 1978 - 79 (Fisheries Research Institute).

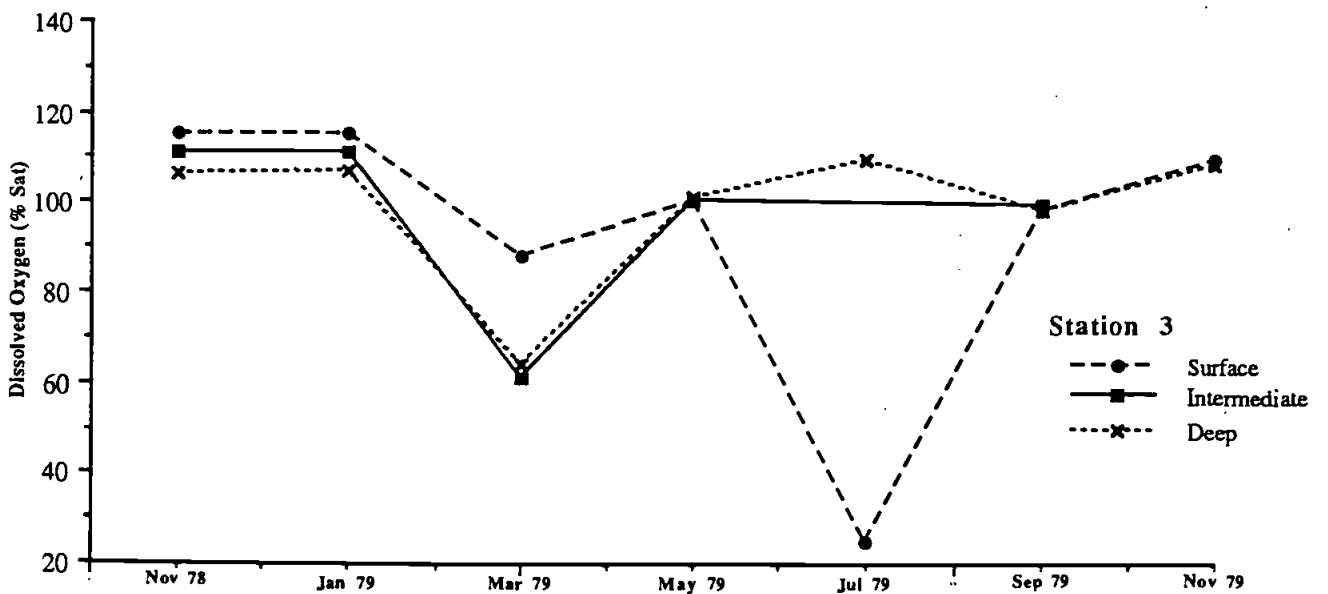
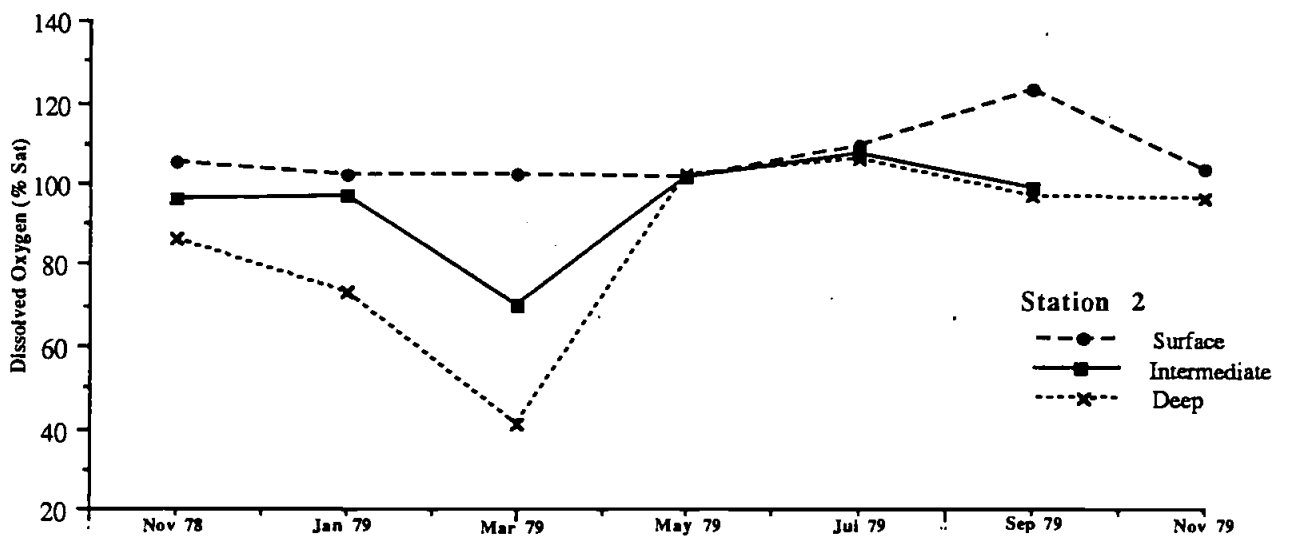
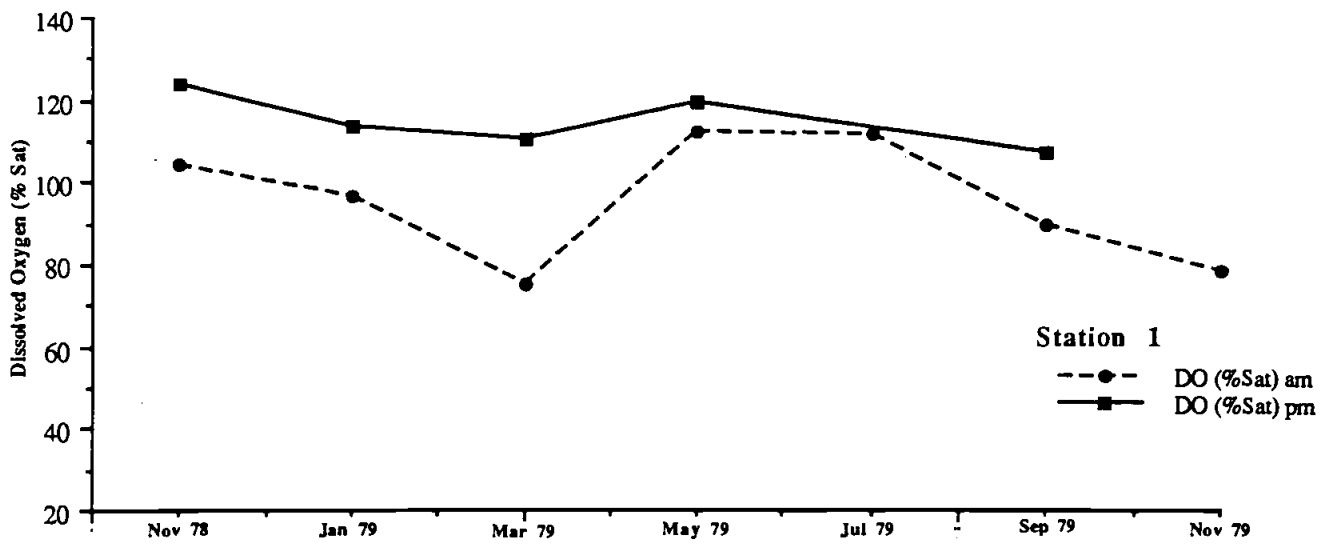


Fig E9 Dissolved Oxygen (% Sat) for Merimbula Lake, 1978 - 79 (Fisheries Research Institute).

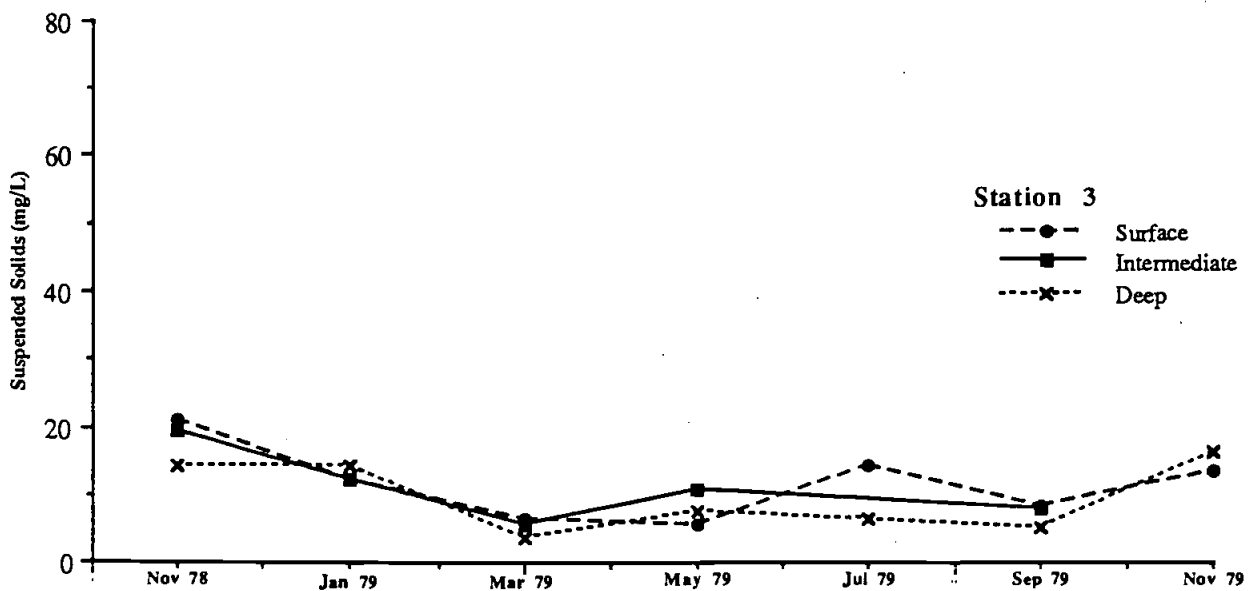
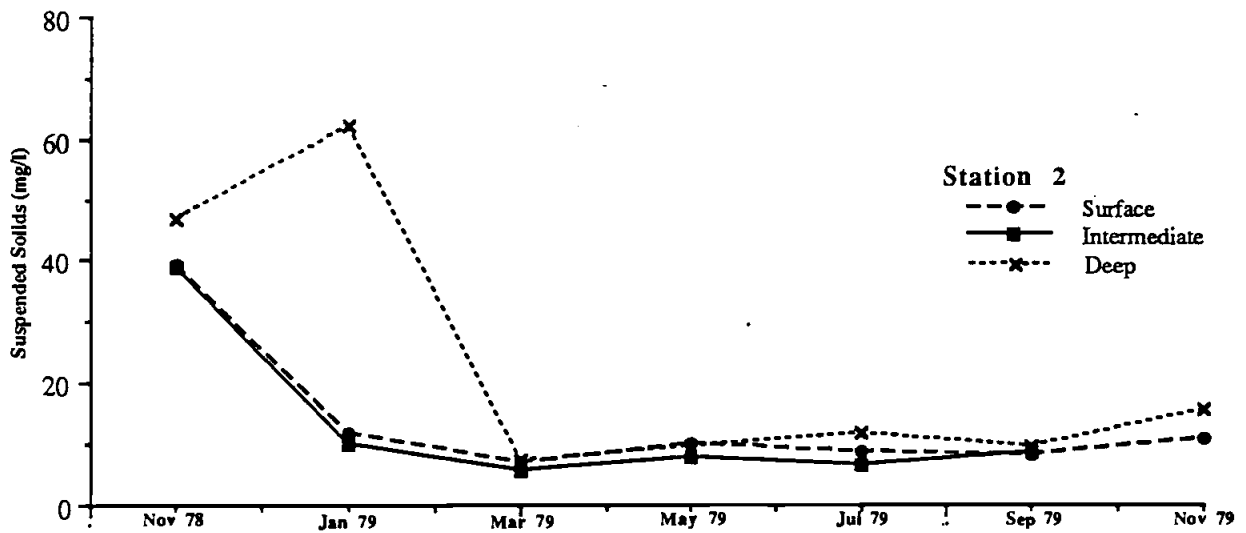
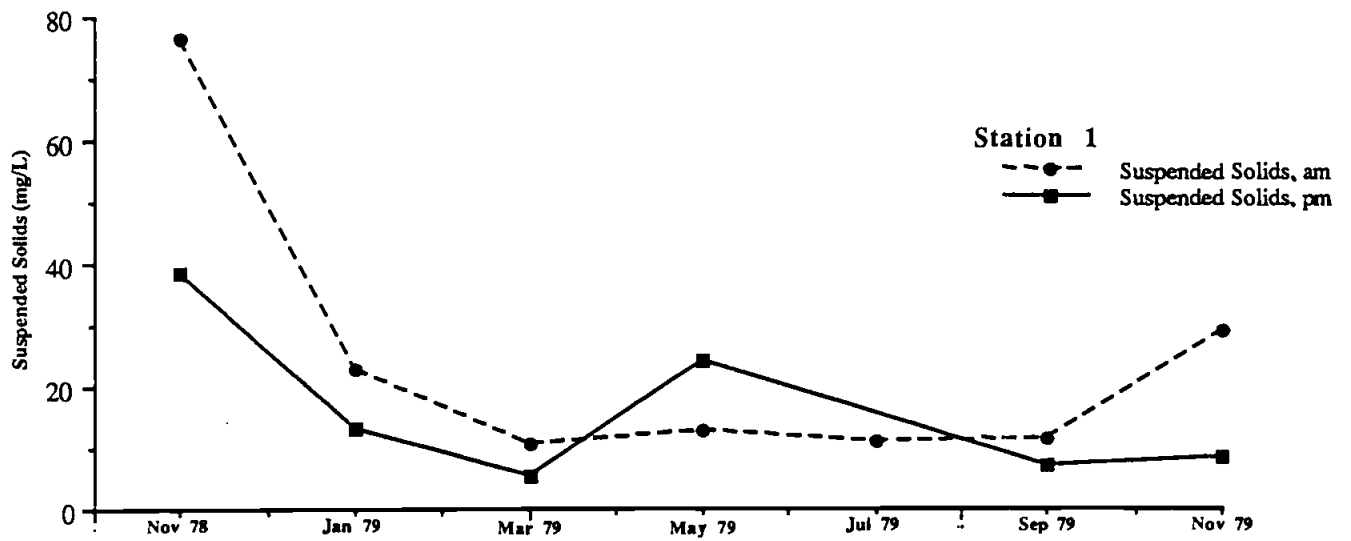


Fig E10 Suspended Solids in Merimbula Lake, 1978 - 79 (Fisheries Research Institute).

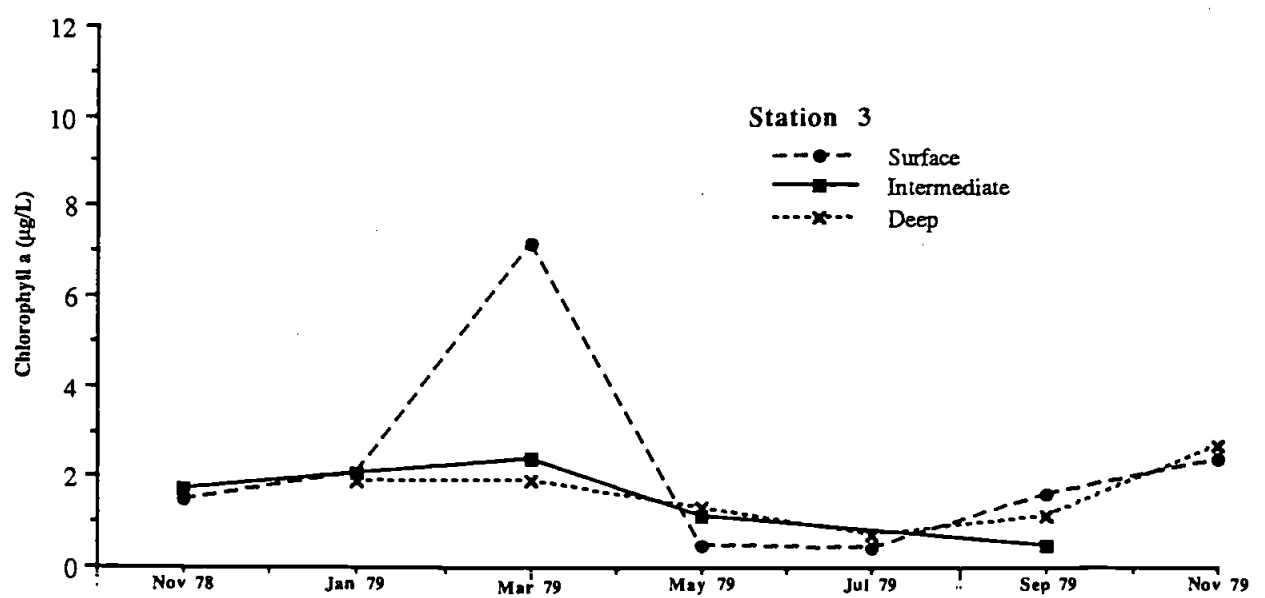
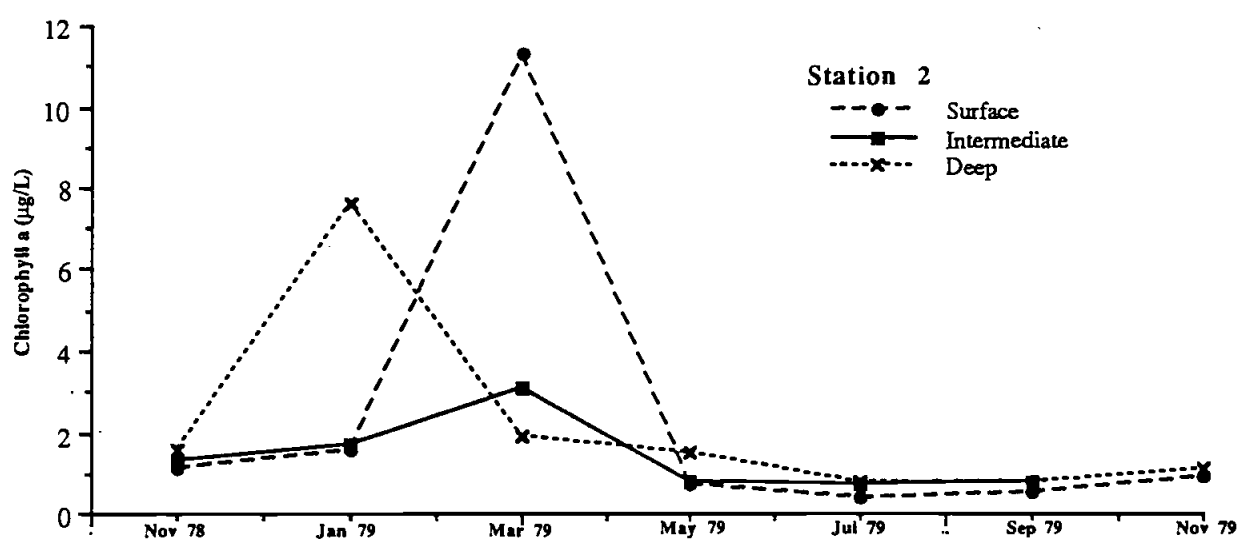
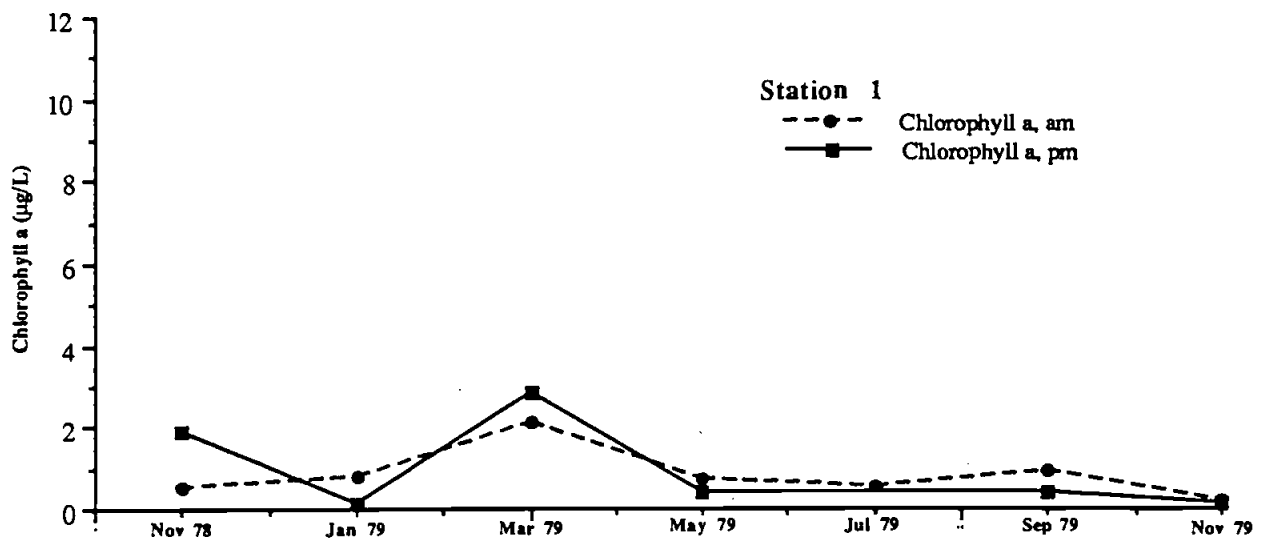


Fig E11 Levels of Chlorophyll-a for Merimbula Lake, 1978 - 79 (Fisheries Research Institute).

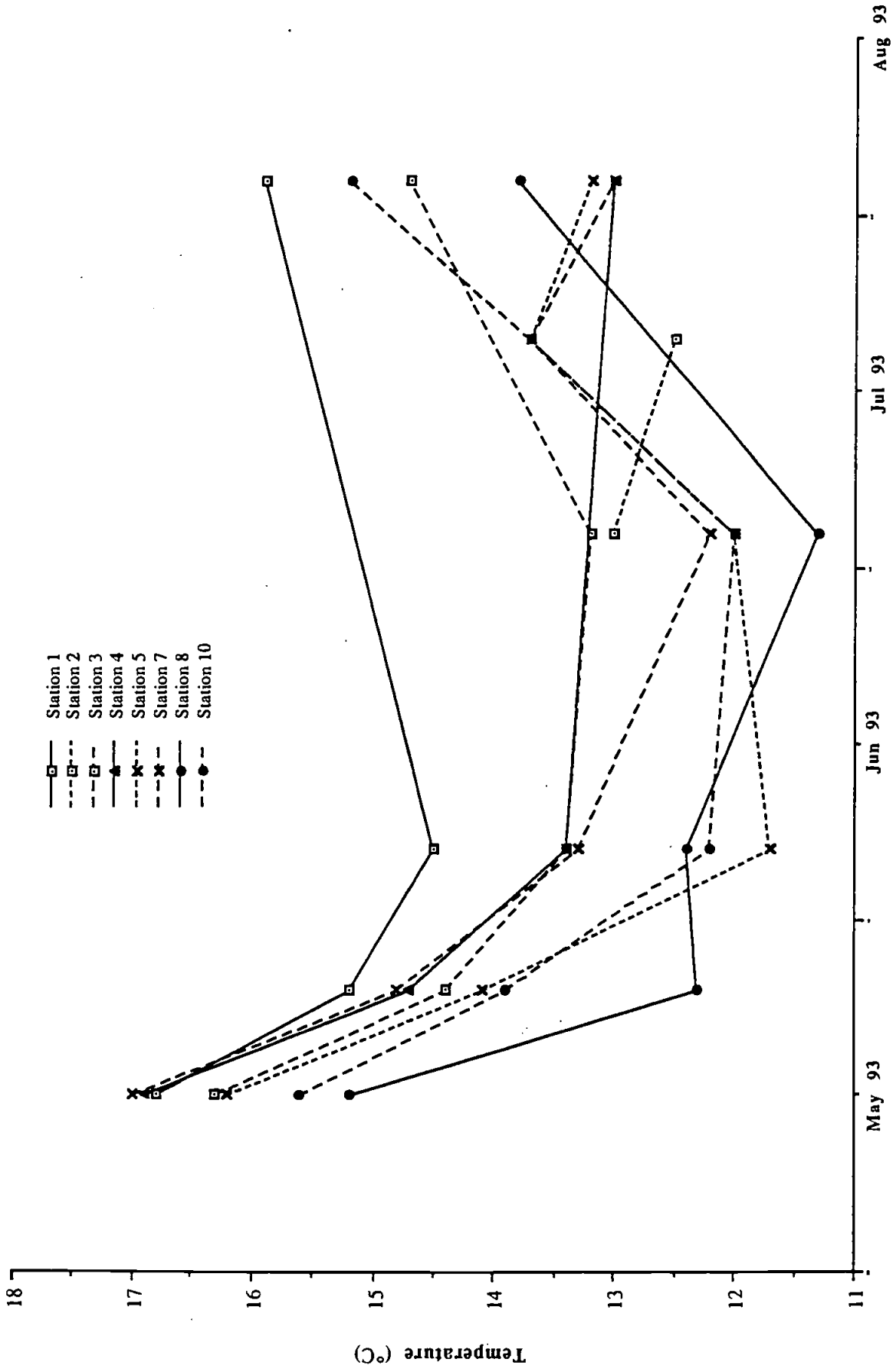


Fig E12 Temperature For Lake Merimbula/Back Lake

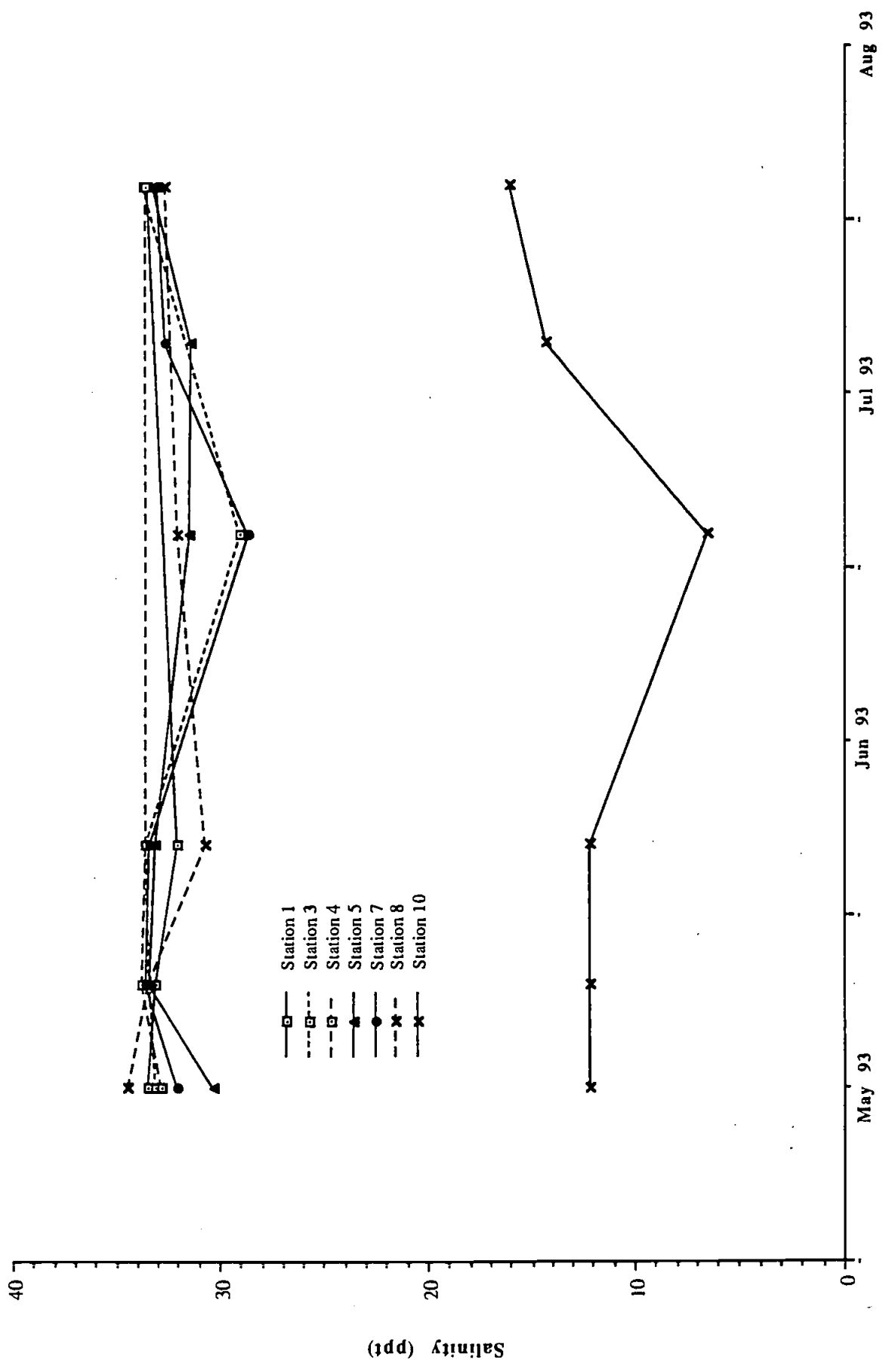


Fig E13 Salinity For Lake Merimbula/Back Lake

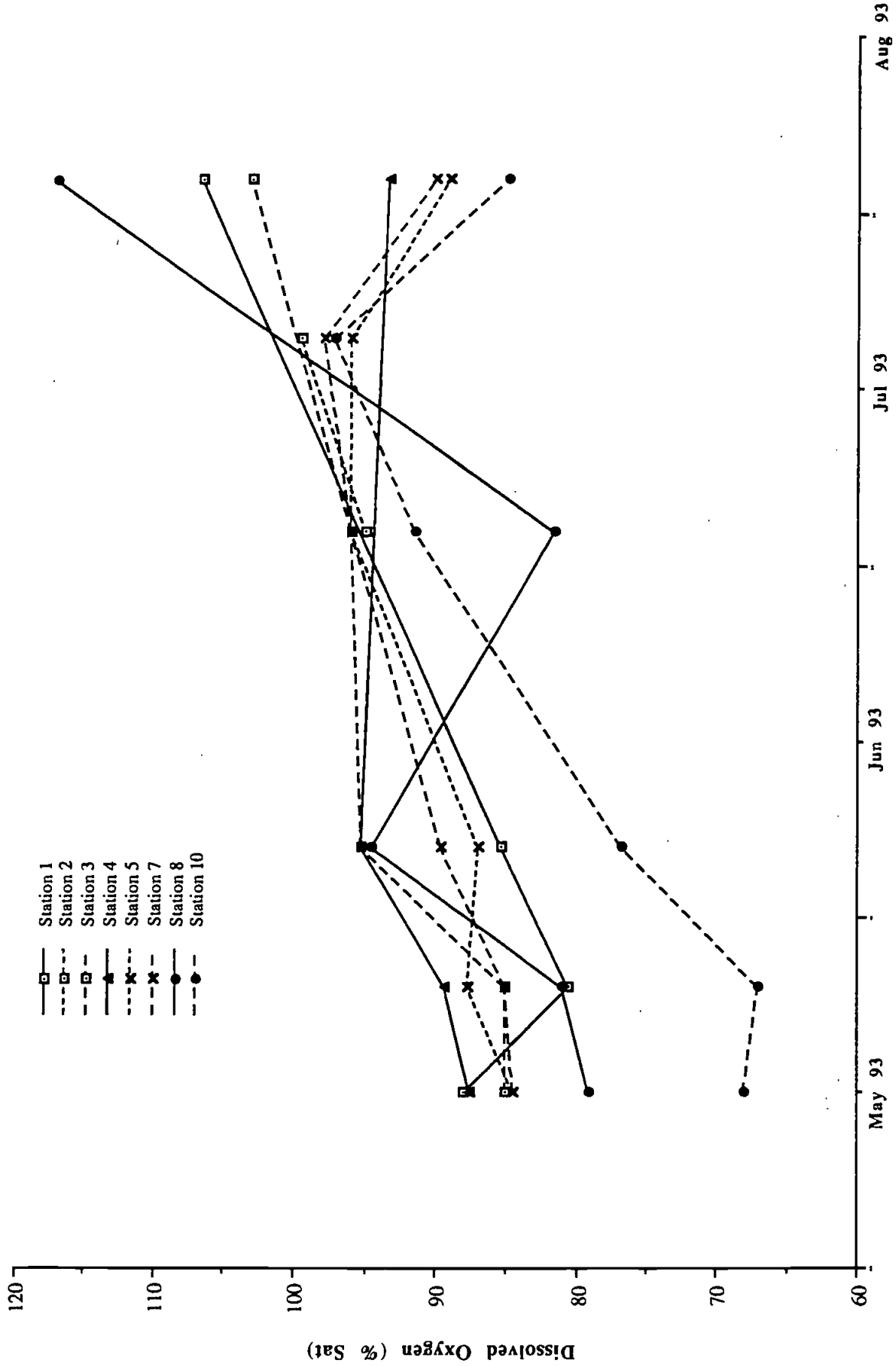


Fig E14 Dissolved Oxygen (% Saturation) For Lake Merimbula/Back Lake

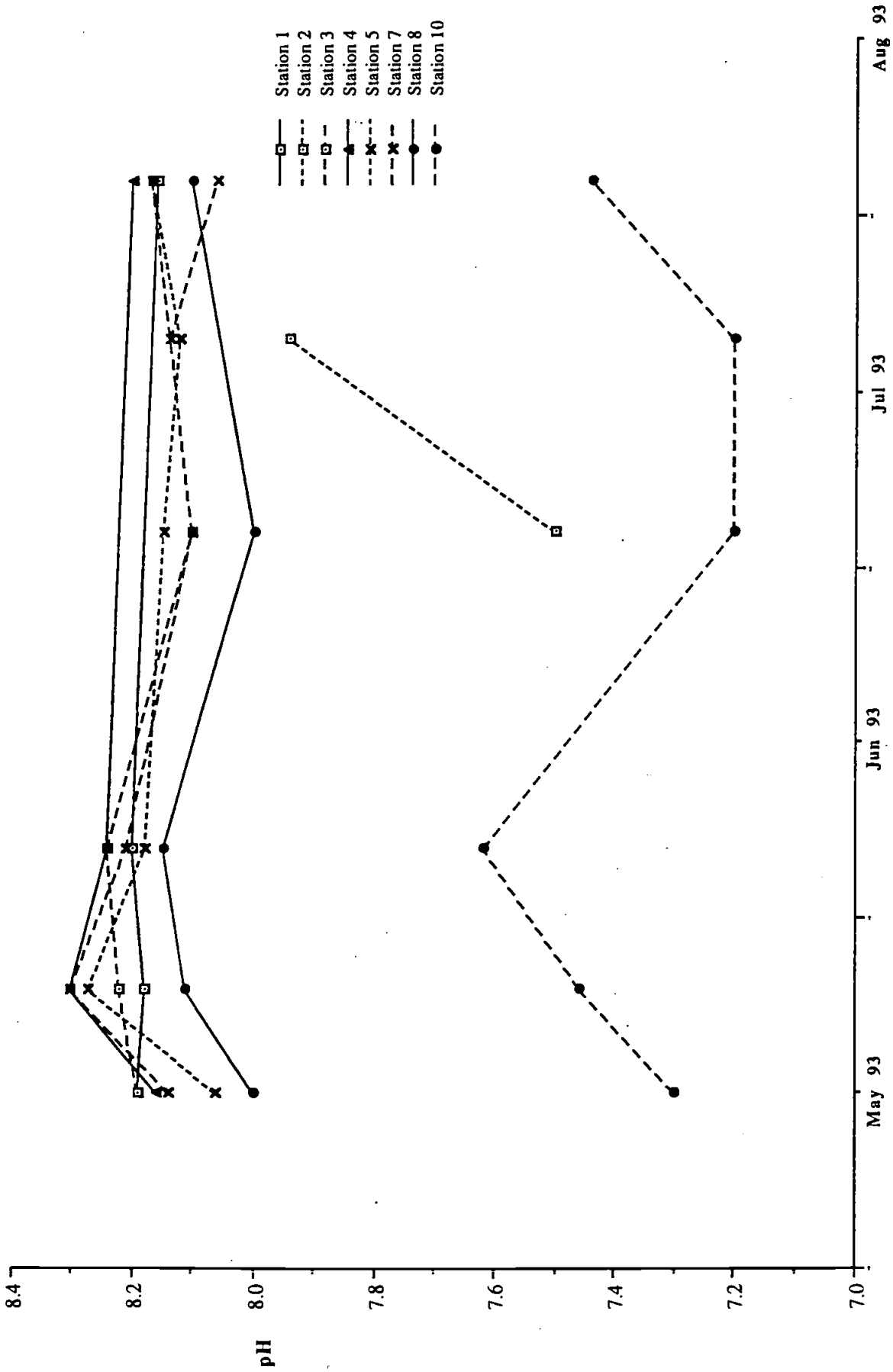


Fig E15 pH For Lake Merimbula/Back Lake

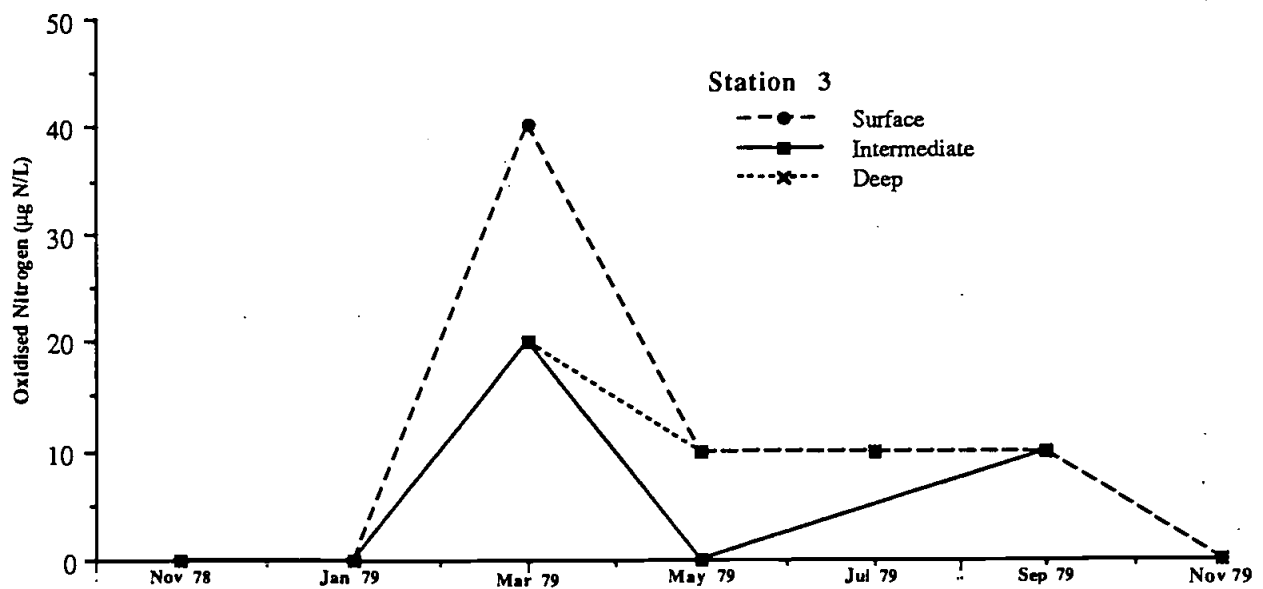
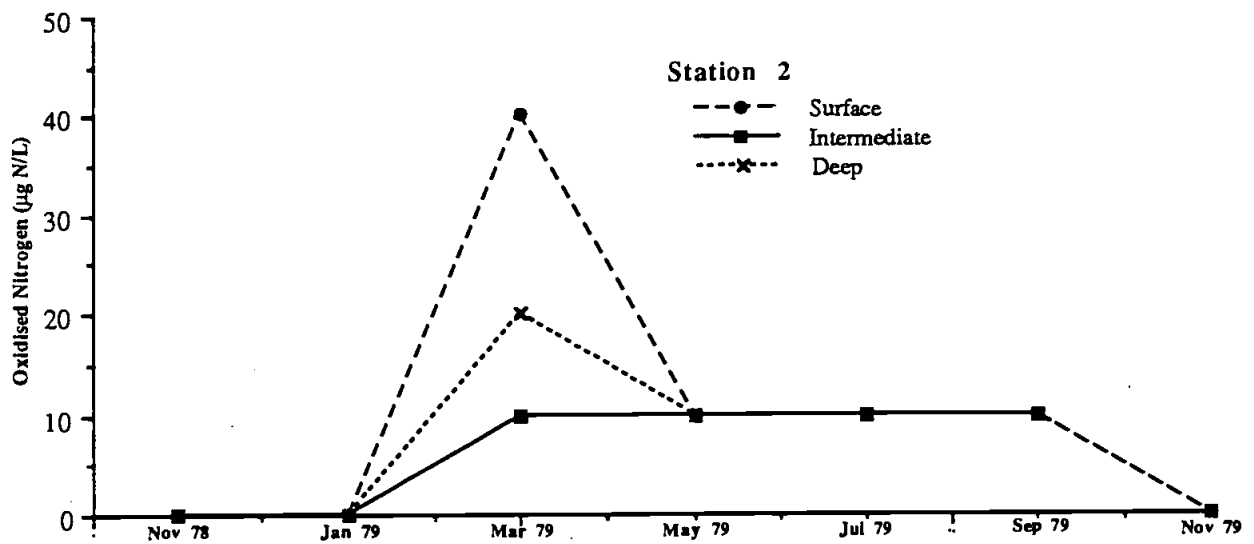
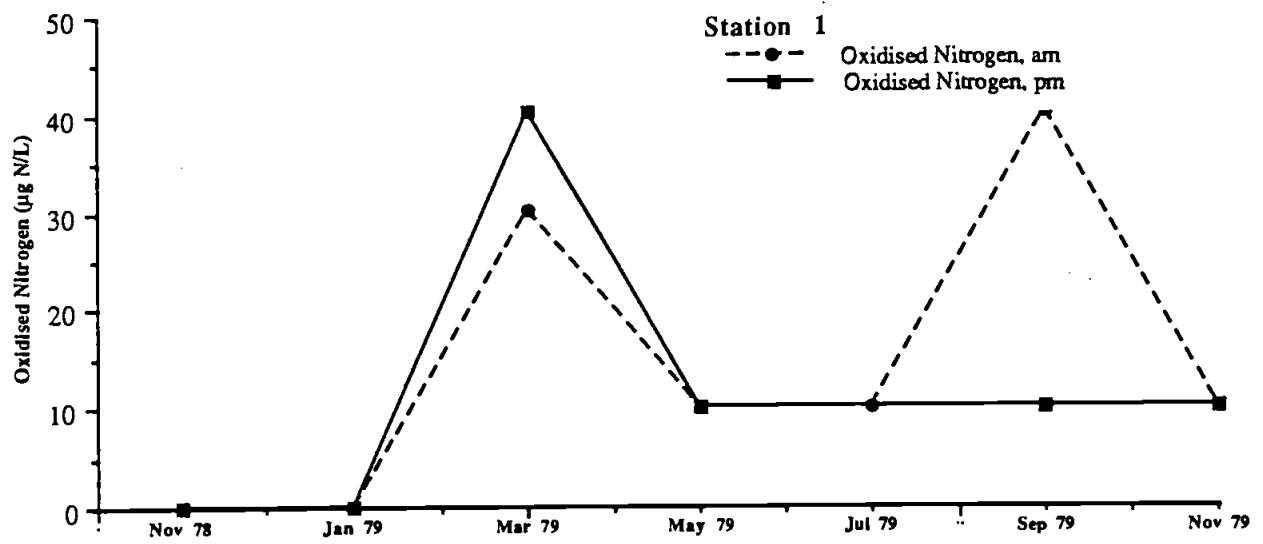


Fig E16 Oxidised Nitrogen ($\mu\text{g N/L}$) for Merimbula Lake, 1978 - 79 (Fisheries Research Institute).

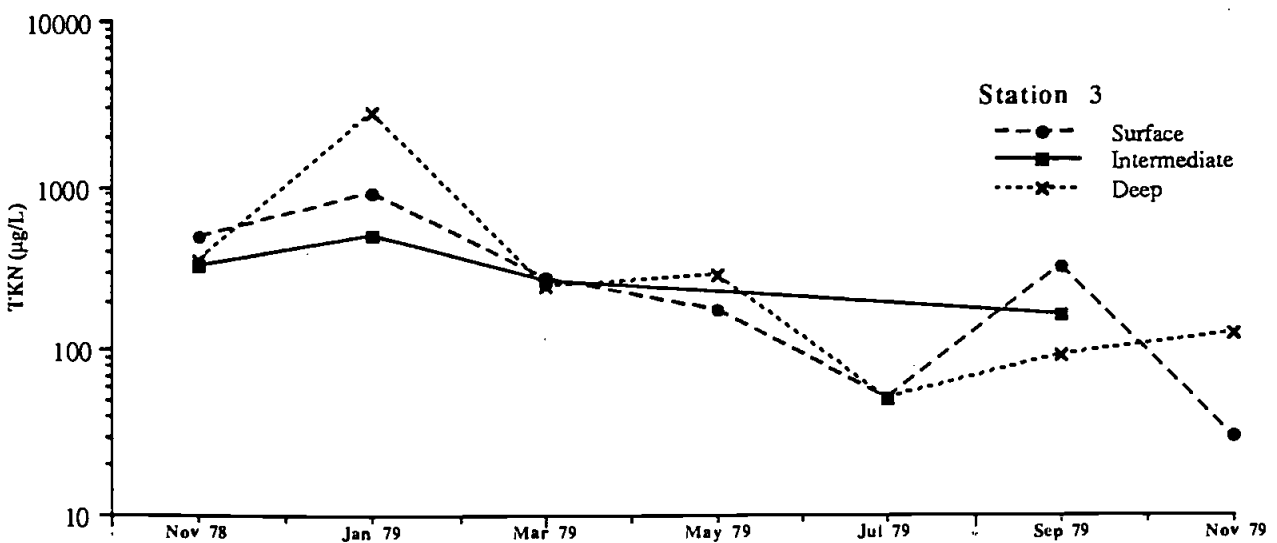
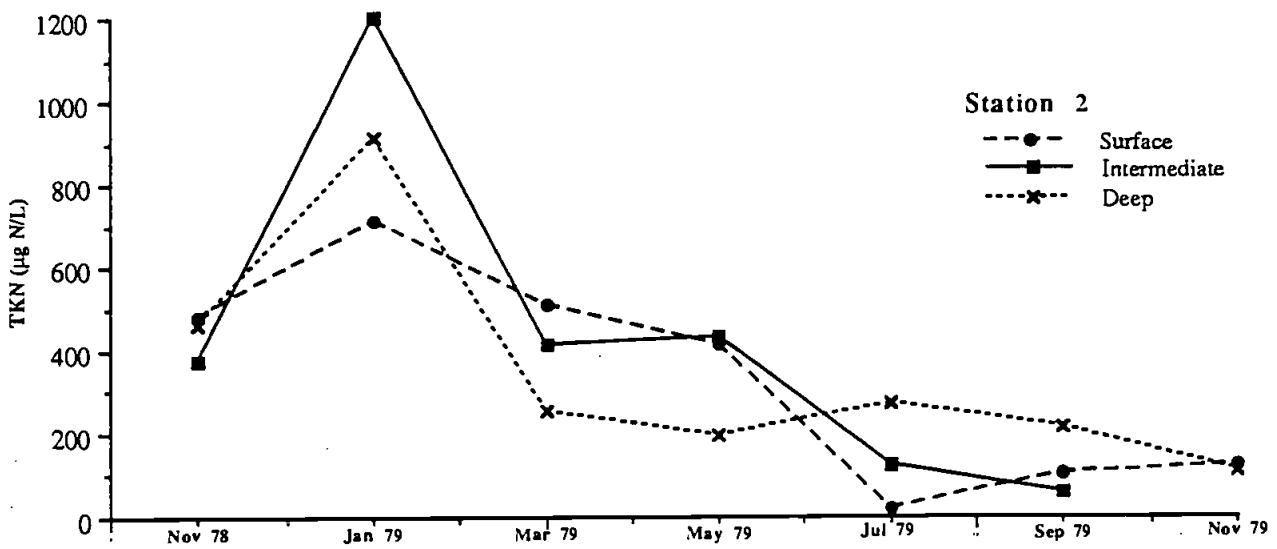
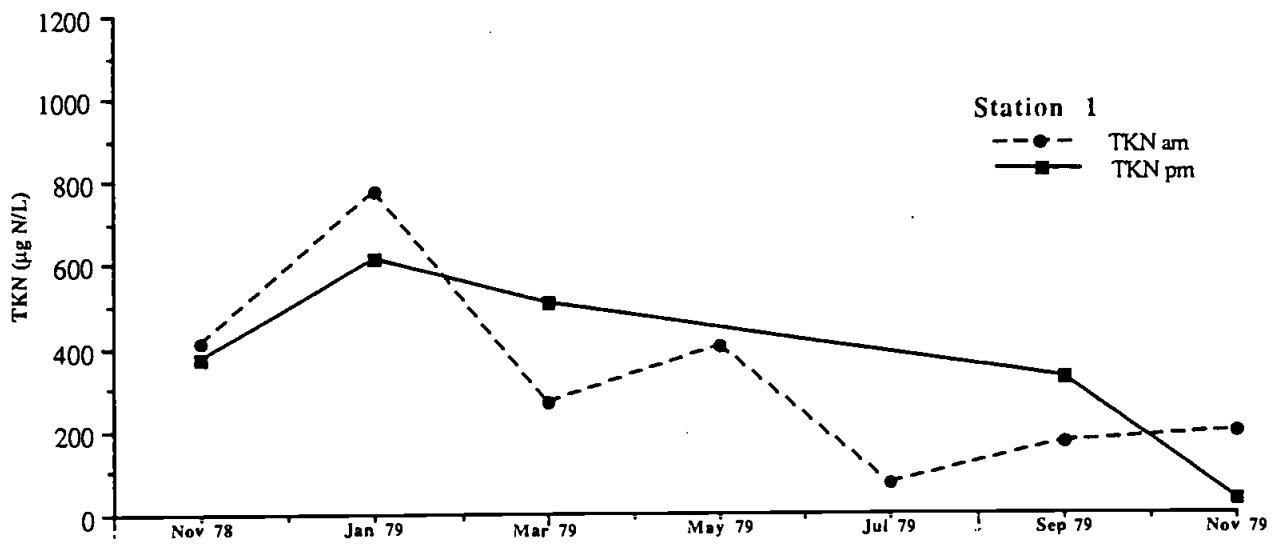


Fig E17 Total Kjeldahl Nitrogen ($\mu\text{g N/L}$) for Merimbula Lake, 1978 - 79 (FRI).

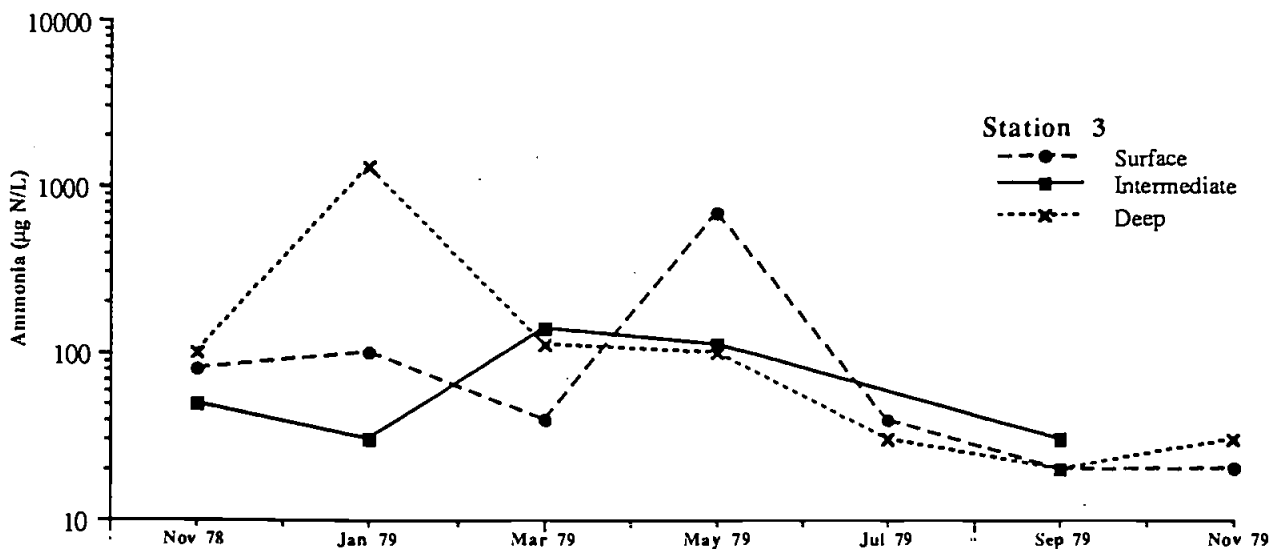
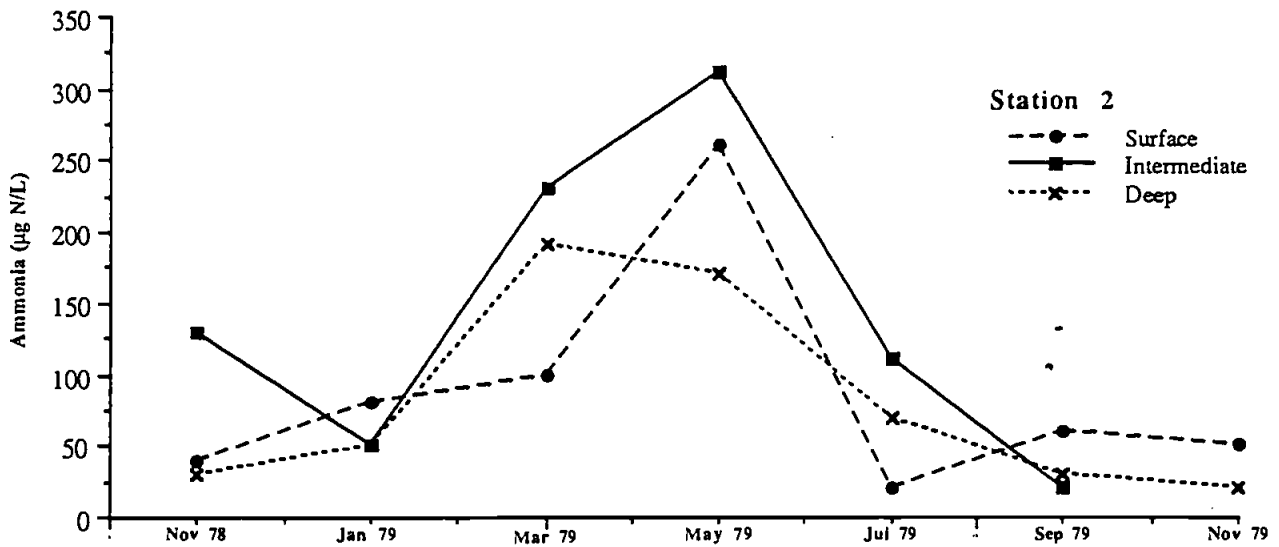
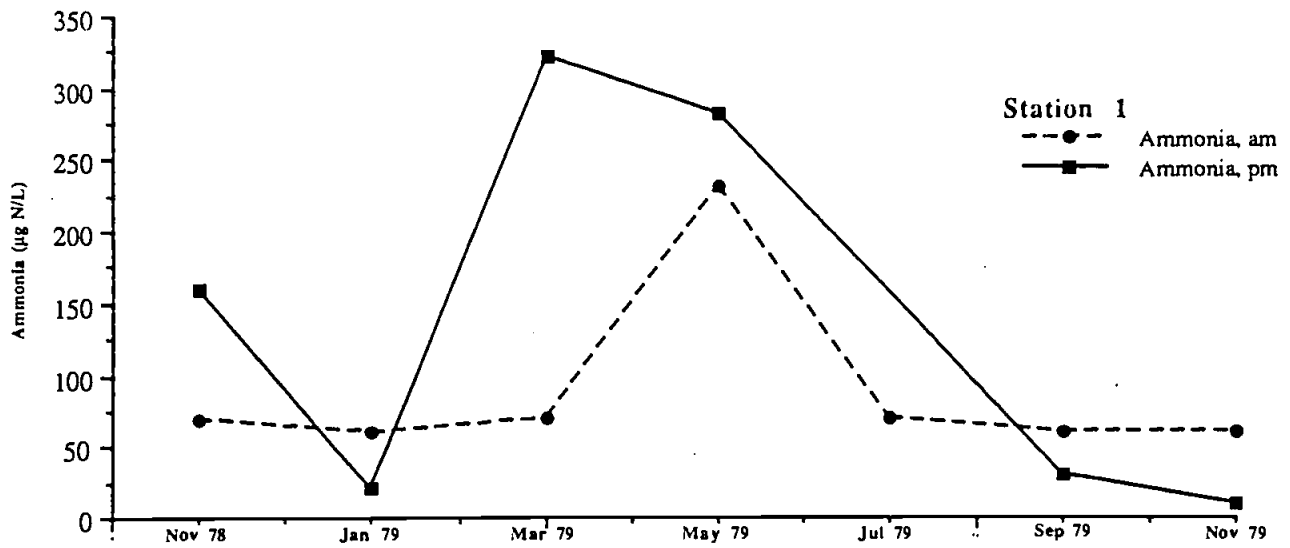


Fig E18 Ammonia Concentration in Merimbula Lake, 1978 - 79 (FRI).

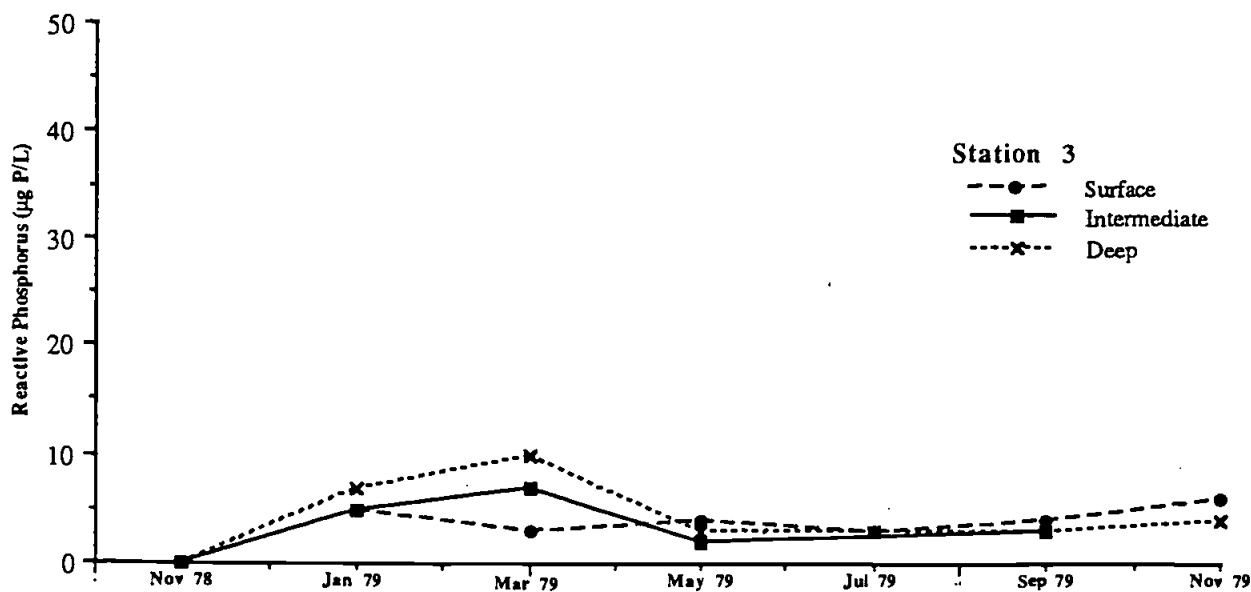
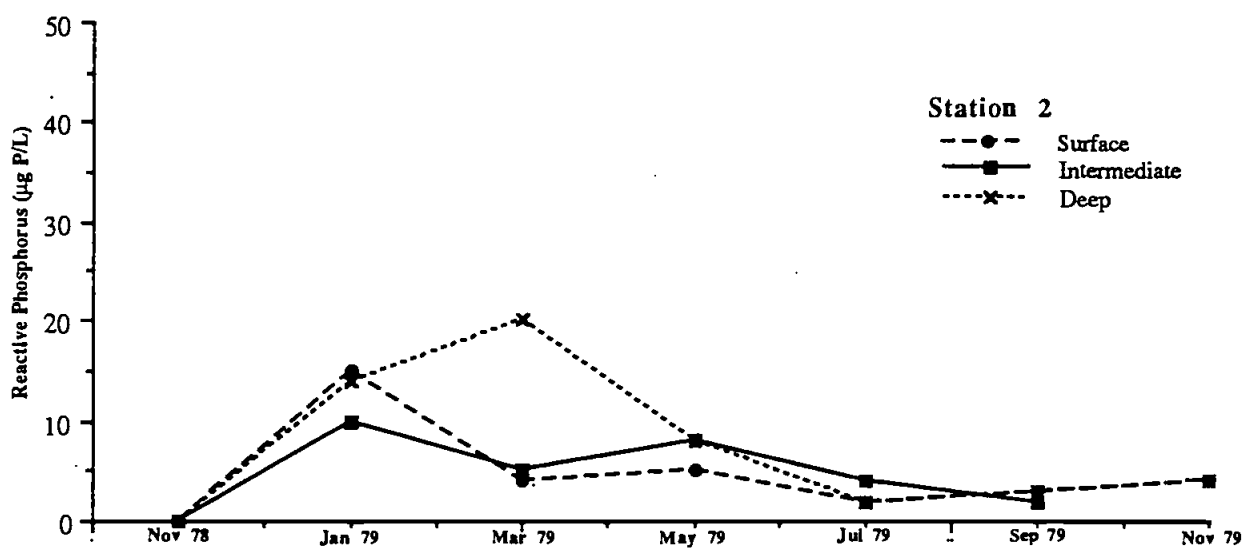
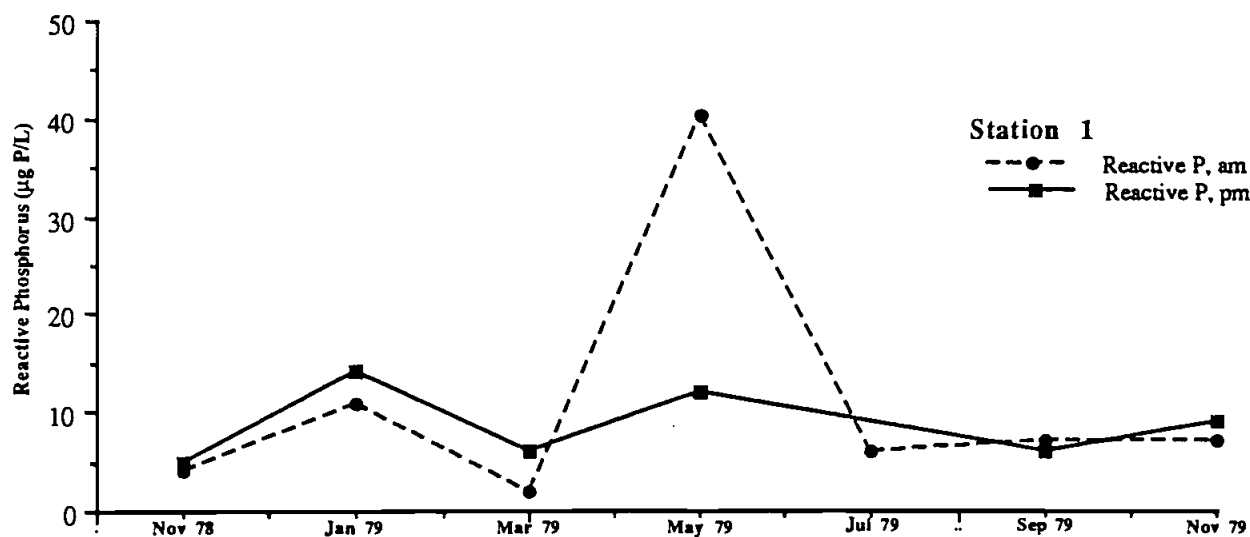


Fig E19 Reactive Phosphorus ($\mu\text{g P/L}$) for Merimbula Lake, 1978 - 79 (Fisheries Research Institute).

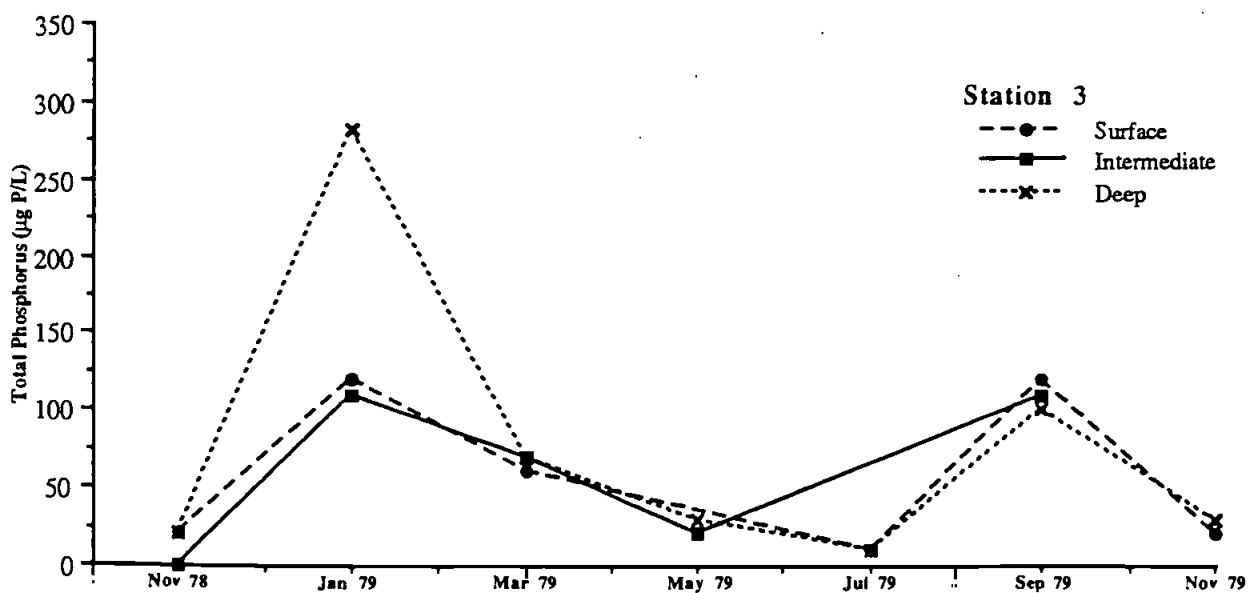
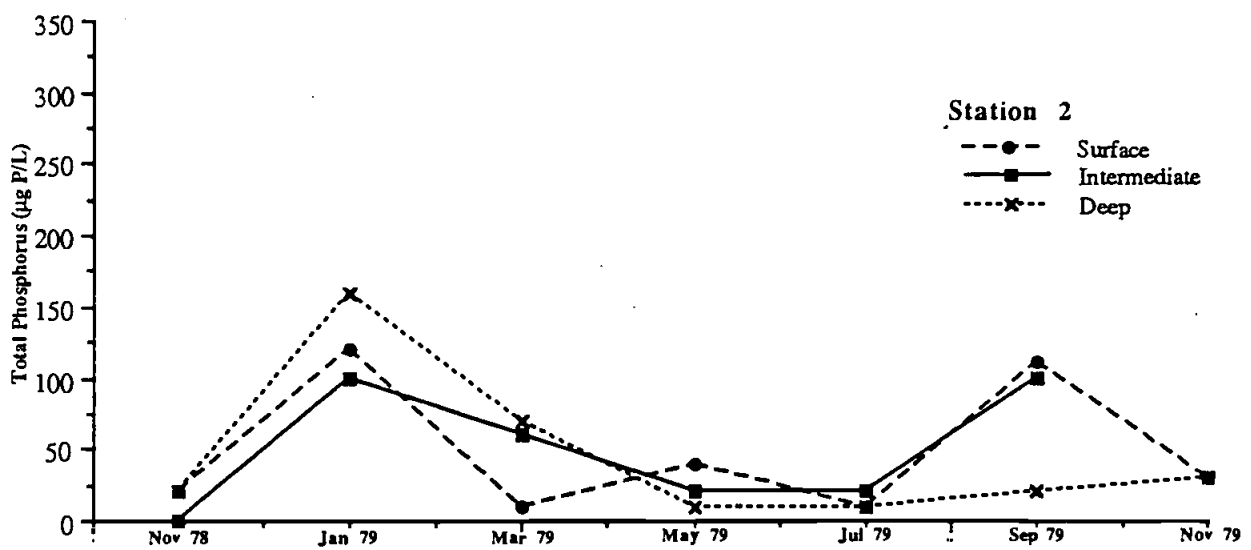
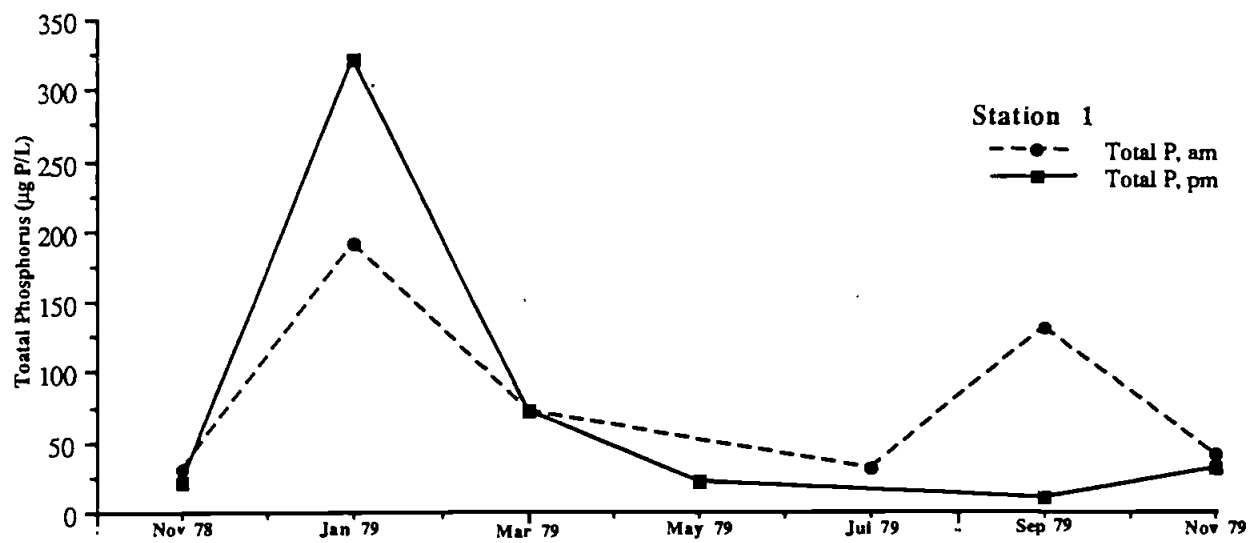


Fig E20 Total Phosphorus ($\mu\text{g P/L}$) for Merimbula Lake, 1978 - 79 (Fisheries Research Institute).

**TABLES REFERENCED IN
APPENDIX E
WATER QUALITY DATA**

Table E1 Mean Monthly Temperature and Salinity For Merimbula Lake 1966 - 1973, (From Ref 27).

Year	January		February		March		April		May		June		July		August		September		October		November		December	
	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.
1966	-	-	-	-	-	-	17.17	1.32	14.71	1.87	12.35	2.40	11.32	2.10	12.33	2.52	15.71	3.45	17.50	2.65	18.59	2.23	19.50	2.43
1967	-	-	-	-	20.65	3.33	18.44	2.64	15.49	1.39	14.35	2.34	12.27	2.47	12.56	2.45	15.90	1.28	17.52	2.40	18.35	2.24	19.24	2.35
1968	21.90	2.79	23.08	3.72	21.25	1.97	19.83	2.62	14.37	2.48	11.83	1.57	10.87	2.43	12.49	2.49	15.39	1.07	16.98	1.69	18.16	2.23	19.45	2.61
1969	22.65	1.97	21.30	1.24	22.01	3.55	18.04	2.10	15.63	2.00	12.82	1.92	13.39	1.30	12.56	2.46	14.42	1.52	17.25	1.23	19.41	3.01	19.28	1.52
1970	23.21	1.72	21.27	1.59	20.76	1.18	18.93	2.42	15.53	2.65	13.61	1.45	11.91	2.37	13.00	1.27	14.24	0.71	18.14	2.19	20.75	3.31	20.88	2.14
1971	22.09	1.63	21.88	2.58	20.64	1.25	19.17	2.43	14.64	1.58	12.53	1.45	12.45	2.07	12.68	2.13	14.56	1.97	16.14	2.00	16.85	1.43	20.45	2.46
1972	21.08	2.19	20.70	1.85	20.77	2.65	19.31	3.26	16.48	2.94	14.24	1.25	11.89	1.90	12.83	2.26	14.76	1.28	16.31	1.83	19.79	2.43	21.48	1.91
1973	22.11	1.45	22.01	1.68	20.55	1.70	19.60	1.76	16.96	1.82	13.15	1.24	13.57	0.95	14.38	1.64	16.21	1.14	17.61	1.62	19.49	1.64	22.17	1.80

Mean (\pm Standard Error) Monthly Salinity For Merimbula Lake

Year	January		February		March		April		May		June		July		August		September		October		November		December	
	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.
1966	-	-	-	-	-	-	34.57	0.82	34.72	0.71	32.83	2.42	33.66	0.84	34.84	0.44	34.92	0.85	34.93	1.09	32.55	3.61	33.08	1.32
1967	-	-	-	-	34.92	1.20	34.89	2.73	35.20	0.85	34.40	0.77	34.51	0.78	33.25	1.63	34.34	0.58	34.70	0.86	34.84	0.49	35.09	0.48
1968	35.56	0.54	35.84	0.95	35.82	0.47	35.78	0.72	34.92	1.01	34.77	0.71	34.61	0.56	35.01	0.47	34.93	0.69	35.34	0.67	35.21	0.57	35.35	0.67
1969	35.03	0.63	35.65	0.40	35.80	1.04	34.93	1.20	34.93	0.76	33.21	1.04	34.84	0.41	34.92	0.79	34.98	0.43	35.59	0.56	34.31	0.97	34.37	0.87
1970	35.18	0.61	35.31	0.64	35.04	0.54	35.86	0.81	35.12	0.95	34.97	0.66	35.42	0.63	35.44	0.44	34.99	0.89	35.37	0.91	34.85	0.78	32.36	4.35
1971	34.58	0.81	24.51	11.15	34.42	0.47	35.05	0.59	34.56	0.61	34.21	0.40	34.28	0.80	33.66	0.81	34.94	0.61	34.66	0.34	34.63	0.42	35.13	0.64
1972	33.96	2.84	35.12	0.71	35.31	0.33	35.85	0.49	35.82	0.59	34.98	0.92	34.93	0.50	34.58	0.57	35.02	0.12	34.51	0.52	35.22	0.52	35.61	0.54
1973	35.96	0.44	35.86	0.65	35.37	0.44	35.26	0.48	34.93	0.57	34.60	0.25	33.83	0.62	34.48	0.97	34.39	0.31	33.81	1.49	32.43	6.19	34.32	0.51

Table E2 Mean Monthly Salinity and Temperature for Period 1966 to 1973 (From Ref 27)

Month	Monthly Mean (for 8 year data 1966 - 1973)	
	Temperature (° C)	Salinity (‰)
Jan	22.1	35.15
Feb	21.83	33.61
Mar	20.92	35.26
Apr	18.82	35.26
May	15.48	35.02
Jun	13.07	34.15
Jul	12.17	34.49
Aug	12.78	34.51
Sep	15.19	34.84
Oct	17.24	34.73
Nov	18.94	34.1
Dec	20.32	34.56

Table E3 PAR Quanta Attenuation Coefficients 1978 - 1979 (From Ref 28)

Date	Station 1	Station 2	Station 3
Nov-78	1.10	0.42	0.52
Jan-79		0.56	0.78
Mar-79	0.63	0.6	1.29
Jul-79	0.33	0.3	0.32
Sep-79	0.53	0.29	0.36
Nov-79	0.57	0.48	0.52
Min	0.33	0.29	0.32
Max	1.10	0.6	1.29
Mean	0.63	0.44	0.63

Table E4 Water Quality for Station 1, 1978 - 1979 (From Ref 28)

Date / Time	Temperature (°C)		Salinity (‰)		D.O.(mg/l)		D.O.(% Sat)		Suspended Solids (mg/l)		Chlorophyll a (mg/l)	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Nov-78	19.1	19.6	35.2	35.2	7.8	9.2	104	124	76.1	38.4	0.5	1.9
Jan-79	22.3	23.6	35.8	35.9	6.8	7.8	96	113	22.5	13.1	0.8	0.1
Mar-79	20.8	22.4	18.3	24.3	6.0	8.3	75	110	10.6	5.4	2.1	2.8
May-79	13.2	16.2	35.5	35.6	9.4	9.4	112	119	12.7	23.9	0.7	0.4
Jul-79	11.8		35.6		9.6		111		10.7		0.5	
Sep-79	11.4	13.5	35.0	35.2	7.8	9.0	89	107	11.4	7.0	0.9	0.4
Nov-79	17.9		36.0		6.0	8.6	78		28.7	8.3	0.2	0.1

Date / Time	Ammonia (µg/l)		TKN (µg/l)		Oxidised Nitrogen (µg/l)		Reactive Phosphorus (µg/l)		Total Phosphorus (µg/l)		N:P Ratio	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Nov-78	70	160	410	370	0	0	4	5	30	20	14	19
Jan-79	60	20	770	610	0	0	11	14	190	320	4	2
Mar-79	70	320	260	500	30	40	2	6	70	70	4	8
May-79	230	280	400		10	10	40	12		20		1
Jul-79	70		70		10		6		30		3	
Sep-79	60	30	170	320	40	10	7	6	130	10	2	33
Nov-79	60	10	190	30	10	10	7	9	40	30	5	1

Table E5 Water Quality for Station 2, 1978-79 (From Ref 28)

Date	Temperature (°C)		Salinity (ppt)		Dissolved Oxygen (mg/l)		Dissolved Oxygen (% Sat)		Suspended Solids (mg/l)		Ammonia (µg/L)							
	Surface	Inter.	Deep	Surface	Inter.	Deep	Surface	Inter.	Deep	Surface	Inter.	Deep						
Nov-78	20.6	20.1	19.6	35.2	35.2	35.1	7.7	7.1	6.4	105	96	86	39.4	39.12	46.7	40	130	30
Jan-79	23.7	23.7	23.2	35.8	35.8	35.8	7	6.7	5.1	102	97	73	11.8	10	62	80	50	50
Mar-79	23.5	21.2	21.1	19.8	33.8	35	7.7	5.1	3	102	70	41	7.2	5.6	7.5	100	230	190
May-79	13.5	13.3	13.1	35.4	35.4	35.4	8.5	8.5	8.6	101	101	102	10	7.9	9.7	260	310	170
Jul-79	11.6	11.5	11.3	35.7	35.7	35.7	9.5	9.3	9.3	109	107	106	8.7	6.6	11.7	20	110	70
Sep-79	12.5	12.1	12.2	35.7	35.7	35.8	10.5	8.5	8.3	123	99	97	8.4	8.6	9.6	60	20	30
Nov-79	19.3	18.8	18.8	36.1	36.2	36.2	7.7	7.2	7.2	103	96	96	10.8	10.8	15.9	50	20	20

Date	TKN (µg/L)		Oxidised Nitrogen (µg/L)		Reactive Phosphorus (µg/L)		Total Phosphorus (µg/L)		Chlorophyll a (µg/L)		N:P	
	Surface	Inter.	Deep	Surface	Inter.	Deep	Surface	Inter.	Deep	Surface	Inter.	Deep
Nov-78	480	370	460	0	0	0	20	0	20	1.1	1.3	1.6
Jan-79	710	1200	910	0	0	10	120	100	160	1.6	1.7	7.6
Mar-79	510	410	250	40	10	5	10	60	70	11.3	3.1	1.9
May-79	413	430	190	10	10	8	40	20	10	0.7	0.8	1.5
Jul-79	20	120	270	10	10	4	10	20	10	0.4	0.7	0.8
Sep-79	100	60	210	10	10	3	110	100	20	0.5	0.8	0.8
Nov-79	120	110	110	0	0	4	30	30	30	0.9	1.1	1.1

Table E6 Water Quality for Station 3, Nov 1978-Nov 79 (From Ref 28)

Date	Temperature (°C)			Salinity (ppt)			Dissolved Oxygen (mg/l)			Dissolved Oxygen (% Sat)			Suspended Solids (mg/l)			Ammonia		
	Surface	Inter.	Deep	Surface	Inter.	Deep	Surface	Inter.	Deep	Surface	Inter.	Deep	Surface	Inter.	Deep	Surface	Inter.	Deep
Nov-78	20.9	20.7	20.4	35.1	35.1	35.1	8.4	8.1	7.8	115	111	106	21	19.3	14.3	80	50	100
Jan-79	24.4	24.2	24.1	35.9	35.9	35.9	7.8	7.6	7.3	115	111	107	12.1	12.1	14.3	100	30	1300
Mar-79	22	21.2	21.2	27.3	34.8	34.8	6.6	4.4	4.6	88	61	64	6.3	5.6	3.5	40	140	110
May-79	13.5	13.4	13.3	35.4	35.4	35.4	8.4	8.4	8.5	100	100	101	5.5	10.6	7.7	690	110	100
Jul-79	11.3		11.1	35.7		35.7	2.2		9.6	25	109	109	14.3		6.2	40		30
Sep-79	12.2	12.3	12.4	35.8	35.7	35.8	8.4	8.5	8.4	98	99	98	8.3	8.1	5.1	20	30	20
Nov-79	18.9		18.5	36		36	8.2		8.2	109	108	108	13.6		16.4	20		30

Date	TKN (µg/L)			Oxidised Nitrogen (µg/L)			Reactive Phosphorus (µg/L)			Total Phosphorus (µg/L)			Chlorophyll a (µg/L)			N:P Ratio		
	Surface	Inter.	Deep	Surface	Inter.	Deep	Surface	Inter.	Deep	Surface	Inter.	Deep	Surface	Inter.	Deep	Surface	Inter.	Deep
Nov-78	490	320	350	0	0	0	0	0	0	20	0	20	1.5	1.7	25	320	18	18
Jan-79	870	480	2740	0	0	0	5	5	7	120	110	280	2.1	2.1	7	4	10	10
Mar-79	270	260	240	40	20	20	3	7	10	60	70	70	7.1	2.4	1.9	4	4	4
May-79	170		280	10	0	10	4	2	3		20	30	0.5	1.1	1.3		10	10
Jul-79	50		50	10	10	10	3	3	3	10	10	10	0.4		0.7	6	6	6
Sep-79	310	160	90	10	10	10	4	3	3	120	110	100	1.6	0.5	1.1	2	1	1
Nov-79	30		120	0	0	0	6		4	20	30	30	2.4	2.7	2	2	4	4

Table E7 Monthly Rainfall Data 1978/79, 1993/94 and Long-term Average
 (Data from Bureau of Meteorology - Merimbula Airport Station)

1978 to 1979		1993 to 1994		Long term Average (to Dec 1993)
Month	Rainfall (mm)	Month	Rainfall (mm)	Mo Mean
Sep-78	68.0	Jan-93	33	80
Oct-78	28.4	Feb	86	71
Nov-78	69.8	Mar	118	95
Dec-78	88.6	Apr	1	90
Jan-79	24.2	May	7	70
Feb-79	2.0	Jun	15	68
Mar-79	255.9	Jul	86	39
Apr-79	28.0	Aug	16	44
May-79	39.4	Sep	58	52
Jun-79	10.9	Oct	54	75
Jul-79	5.2	Nov	59	88
Aug-79	42.6	Dec	26	65
Sep-79	10.2	Jan-94	20	80
Oct-79	43.3	Feb-94	77	71
Nov-79	55.1	Mar-94	143	95
Summary Statistics*		Summary Statistics†		
Yearly Total	620.1	Yearly Total	559.0	837.0
Annual Max	255.9	Annual Max	118.0	95.0
Annual Min	2.0	Annual Min	1.0	39.0
Mo Mean	51.7	Mo Mean	46.6	
SE of Mean	20.0	SE of Mean	10.6	

* Statistics for 12 months, Nov 78 to Oct 79.

† Statistics for 12 months, Jan 93 to Dec 93

Table E8 Merimbula Physical Water Quality as per Merimbula Lakes & Foreshore Committee 1994

Station	Merimbula Lake										Summary Statistics		
	1	2	3	4	5	6	7	8	9	10	Back Lake*	Merimbula Mean	SE
Date	Temperature												
14/5/93	16.80		16.30	16.90	16.20		17.00	15.20		15.60		16.40	0.27
26/5/93	15.20		14.40	14.70	14.10		14.80	12.30		13.90		14.25	0.42
9/6/93	14.50		13.40	13.40	11.70		13.30	12.40		12.20		13.12	0.39
6/7/93		13.00	13.20		12.00		12.20	11.30		12.00		12.34	0.35
21/7/93		12.50			13.70		13.70			13.70		13.30	0.40
3/8/93	15.90		14.70	13.00	13.20		13.00	13.80		15.20		13.93	0.47
10/3/94		20.70		20.00	20.00		19.00		19.70	18.60		19.88	0.27
24/3/94	19.10			20.30	20.30		20.30	20.50		21.20		20.10	0.25
	Salinity												
14/5/93	33.50		33.10	32.80	30.30		32.00	34.50		12.14		32.70	0.59
26/5/93	33.10		33.40	33.80	33.40		33.60	33.50		12.12		33.47	0.10
9/6/93	32.00		33.60	33.60	33.10		33.40	30.70		12.15		32.73	0.47
6/7/93			29.00		31.50		28.60	32.00		6.50		30.28	0.86
21/7/93		28.40			31.40		32.60			14.30		30.80	1.25
3/8/93	33.50		33.70	33.60	33.20		33.00	32.60		16.00		33.27	0.17
10/3/94		27.50		27.30	27.50		23.70		26.00	260.00		26.40	0.73
24/3/94	29.20			31.60	29.80		31.60	30.50		4.70		30.54	0.48
	Conductivity												
14/5/93	54.20		53.80	53.30	49.50		52.00	50.20		21.00		52.17	0.80
26/5/93	53.80		54.20	54.20	54.10		54.70	52.40		21.02		53.90	0.32
9/6/93	52.60		54.60	54.60	53.90		54.60	50.30		21.10		53.43	0.70
6/7/93		214.00	47.70		51.40		47.00	52.00		22.47		82.42	32.91
21/7/93		47.00			51.10		53.10			24.70		50.40	1.80
3/8/93	54.40		54.60	54.60	54.00		54.00	53.20		27.20		54.13	0.22
10/3/94		44.00		44.20	44.90		39.00		43.00	579.00		43.02	1.05
24/3/94	48.10			51.70	50.50		51.40	50.10		8.50		50.36	0.64
	pH												
14/5/93	8.19		8.19	8.16	8.06		8.14	8.00		7.30		8.12	0.03
26/5/93	8.18		8.22	8.30	8.27		8.30	8.11		7.46		8.23	0.03
9/6/93	8.20		8.24	8.24	8.18		8.21	8.15		7.62		8.20	0.01
6/7/93		7.50	8.10		8.15		8.10	8.00		7.20		7.97	0.12
21/7/93		7.94			8.12		8.14			7.20		8.07	0.06
3/8/93	8.16		8.17	8.20	8.17		8.06	8.10		7.44		8.14	0.02
10/3/94		7.90		7.95	7.96		7.96		7.99	6.74		7.95	0.01
24/3/94	7.70			8.03	7.98		7.98	7.78		6.92		7.89	0.06
	Dissolved Oxygen (mg/l)												
14/5/93			6.95										
26/5/93	6.53		6.95	7.22	7.26		6.93	6.95		6.60		6.97	0.11
9/6/93	7.06		7.89	7.89	7.53		7.54	8.26		7.32		7.70	0.17
6/7/93		9.90	8.34		8.30		8.54	7.30		9.40		8.48	0.42
21/7/93		8.84			8.14		8.27			9.28		8.42	0.21
3/8/93	8.42		8.34	7.90	7.40		7.65	9.80		7.75		8.25	0.35
10/3/94	5.67	6.25		6.10	6.50		6.65		6.60	7.66		6.30	0.15
24/3/94				6.47	6.08		6.26	4.83		6.20		5.91	0.37
	Dissolved Oxygen (% Sat)												
14/5/93	87.90		85.00	87.50	84.50		84.50	79.10		68.00		84.75	1.29
26/5/93	80.50		85.00	89.20	87.60		85.00	81.00		67.00		84.72	1.42
9/6/93	85.40		95.30	95.30	87.00		89.50	94.50		76.80		91.17	1.81
6/7/93		95.00	96.00		96.00		96.00	81.60		91.50		92.92	2.84
21/7/93		99.50			96.00		97.80			97.10		97.77	1.01
3/8/93	106.50		103.00	93.40	89.00		90.00	117.00		84.90		99.82	4.49
10/3/94		82.80		79.00	84.00		85.00			82.00		82.70	1.31
24/3/94	73.50			88.30	84.00		84.70	65.50		73.40		79.20	4.22
	Turbidity												
14/5/93													
26/5/93	1.40		1.60		1.00			2.20		1.50		1.55	0.25
9/6/93							1.70						
6/7/93		53.00	3.00				16.00	4.00		29.00		19.00	11.71
21/7/93													
3/8/93													
10/3/94									87.00				
24/3/94													

* Note that values shown are raw data. Bold figures are suspect.

Table E9 Merimbula Water Chemistry as per Merimbula Lakes & Foreshore Committee 1994

Station	Merimbula Lake									Back Lake	Merimbula Summary Statistics	
	1	2	3	4	5	7	8	9	10	Mean	SE	
Date	Chlorophyll-a ($\mu\text{g/L}$)											
14/5/93												
26/5/93	0.6		0.9	1.6	1.2	1.5	1.6		1.3	1.2	0.2	
9/6/93		1.0	0.9		3.0	5.0	3.0		0.8	2.6	0.8	
6/7/93												
21/7/93												
3/8/93	4.5		2.4	1.0	0.8	1.0	0.9		0.9	1.8	0.6	
10/3/94		0.3		0.5	0.5	2.0		2.4	0.3	1.1	0.4	
24/3/94		2.0		2.0	1.0	2.0	3.3		6.6	2.1	0.4	
18/4/94								11.0	2.0			
Means	2.6	1.1	1.4	1.3	1.3	2.3	2.2	6.7	2.0	1.7		
N	2	3	3	4	5	5	4	2	6	28		
Oxides of Nitrogen (NO_x - $\mu\text{g/L}$)												
14/5/93	< 10		< 10	< 10	< 10	< 10	< 10		< 10			
26/5/93	< 10		< 10	10	< 10	< 10	< 10		10			
9/6/93		120	30		< 10	< 10	< 10		30			
6/7/93												
21/7/93												
3/8/93	< 10		< 10	< 10	< 10	< 10	< 10		10			
10/3/94		140		30	10	40		40	400	52	23	
24/3/94		60		30	30	30	30		20	36	6	
18/4/94								34	8			
Total Kjeldahl Nitrogen (TKN - $\mu\text{g/L}$)												
14/5/93	550		460	550	550	550	550		550	535	15	
26/5/93			460	< 200					< 200			
9/6/93		300	< 200		< 200	400	300		300	333	33	
6/7/93		< 200			< 200	< 200			< 200	< 200		
21/7/93												
3/8/93	< 200		200	200	200	300	400		< 200	250	34	
10/3/94		500		600	900	1000		< 200	1000	750	119	
24/3/94		300		11000	300	400	700		2000	2540	2116	
18/4/94								< 200	30000			
Total Nitrogen (= NO_x + TKN)* $\mu\text{g/L}$												
14/5/93	558		468	558	558	558	558		558	543	15	
26/5/93			468	190					190	329	139	
9/6/93		420	210		188	408	308		330	307	48	
6/7/93												
21/7/93												
3/8/93	208		208	208	208	308	408		190	258	34	
10/3/94		640		630	910	1040		220	1400	688	141	
24/3/94		360		11030	330	430	730		2020	2576	2115	
18/4/94								214	30008			
Means	383	473	339	2523	439	549	501	217	4957	804		
N	2	3	4	5	5	5	4	2	7	30		

Table E9 Merimbula Water Chemistry (cont)

Station	Merimbula Lake									Back Lake	Merimbula Summary Statistics	
	1	2	3	4	5	7	8	9	10	Mean	SE	
Date	Total Phosphorus (TP - µg/L)											
14/5/93	10.00		< 10	< 10	< 10	< 10	12.00			11.00		
26/5/93	< 10		< 10	< 10	< 10	< 10	14.00			< 10		
9/6/93		190.00	20.00		10.00	100.00	30.00			60.00	70.0	33.9
6/7/93		30.00			10.00	< 10				10.00		
21/7/93												
3/8/93	30.00		30.00	20.00	20.00	20.00	20.00			< 10	23.3	2.1
10/3/94		20.00		20.00	40.00	30.00		50.00		70.00	32.0	5.8
24/3/94		30.00		20.00	40.00	10.00	30.00			20.00	26.0	5.1
18/4/94												
Means	20	68	25	20	24	40	21			34	33	
N	2	4	2	3	5	4	5			5	26	
	Nitrogen to Phosphorus Ratio (N:P)											
14/5/93	56		59	70	70	70	47			51	62	4
26/5/93			59	24						24	41	17
9/6/93		2	11		19	4	10			6	9	3
6/7/93												
21/7/93												
3/8/93	7		7	10	10	15	20			19	12	2
10/3/94		32		32	23	35		4		20	25	6
24/3/94		12		552	8	43	24			101	128	106
18/4/94												
Means	31	15	34	137	26	33	25			37	46	
N	2	3	4	5	5	5	4			6	29	
	Suspended Solids (Non Filterable Residue - NFR - mg/L)											
14/5/93	< 0.2		< 0.2	0.3	1.0	0.3	3.3			3.7	1.2	0.7
26/5/93	0.6		< 0.2	< 0.2	< 0.2	< 0.2	5.0			< 0.2		
9/6/93		64.0	7.8		1.2	32.0	16.0			26.0	24.2	11.2
6/7/93												
21/7/93												
3/8/93	0.6		0.2	0.8	0.8	0.6	1.2			1.0	0.7	0.1
10/3/94		5.8		3.9	12.0	16.0		24.0		150.0	12.3	3.6
24/3/94		3.0		18.0	23.0	1.2	8.6			2.0	10.8	4.2
18/4/94								0.7		0.2		
Means	0.6	24.3	4.0	5.8	7.6	10.0	6.8			30.5	9.3	
N	2	3	2	4	5	5	5			6	28	

Table E9 Merimbula Water Chemistry (cont)

Station	Merimbula Lake									Back Lake	Merimbula Summary Statistics	
	1	2	3	4	5	7	8	9	10	Mean	SE	
Date	Turbidity (NTU)											
14/5/93												
26/5/93	14.0		1.6	< 1	1.0	< 1	2.2			1.5		
9/6/93		53.0	3.0		< 1	16.0	4.0			29.0		
6/7/93												
21/7/93												
3/8/93												
10/3/94		3.4		2.8	6.9	15.0		19.0	130.0	9.4	3.2	
24/3/94		13.0		8.0	12.0	8.0	26.0		14.0	13.4	3.3	
18/4/94												
Means	14.0	23.1	2.3	5.4	6.6	13.0	10.7		43.6	11.6		
N	1	3	2	2	3	3	3		4	18		

Escherichia Coliforms (Number of Organisms/100mL)

14/5/93										
26/5/93										
9/6/93										
6/7/93										
21/7/93										
3/8/93										
10/3/94		250		90	120	0		0	72000	
24/3/94		560		0	0	0	0		80	
18/4/94										

Faecal Coliforms (Number of Organisms/100mL)

									Median
10/1/93	7	100000		559	724	301		1640	559.0
14/5/93				3	2	0		1100	2.0
26/5/93				5	8	8		22	8.0
9/6/93				21	3			69	12.0
6/7/93		1740		1	87	16		1260	51.5
21/7/93		220		0	0			7	0.0
3/8/93	0	61	0	0	0	1	0	4	0.0
10/3/94		1350		150	180	80	2000	179000	180.0
24/3/94		1080		0	0	0	0	80	0.0
18/4/94							150.0	350.0	150.0
Median		> 1215		3	3	4		215	7.5

Table E9 Merimbula Water Chemistry (cont)

Station	Merimbula Lake									Back Lake	Merimbula Summary Statistics
	1	2	3	4	5	7	8	9	10		Median
Date	Total Coliforms (Number of Organisms/100mL)										
10/1/93	252.0	100000			932.0	722.0	902.0			1148.0	902.0
14/5/93					18.0	4.0	14.0			420.0	14.0
26/5/93					99.0	57.0	40.0			271.0	57.0
9/6/93					110.0	129.0				1430.0	119.5
6/7/93		3520.0			41.0	1700.0	460.0			4820.0	1080.0
21/7/93		2040.0			7.0	4.0				101.0	7.0
3/8/93	0.0	268.0	0.0	0.0	0.0	2.0	8.0			172.0	0.0
10/3/94		1700.0		280.0	510.0	1420.0		9000.0	42000.0	1420.0	1420.0
24/3/94		2000.0		0.0	0.0	0.0	0.0			0.0	0.0
18/4/94								120.0	3300.0	120.0	120.0
Median		> 2020			41	57	27			784	104.5
	Total Plate Count (Number of Organisms/mL)										
10/1/93	98	2816			236	287	52			439	236.0
14/5/93					1	2	25			55	2.0
26/5/93											
9/6/93					65	48				87	56.5
6/7/93		152			14	47	17			159	32.0
21/7/93		181			3	1				17	3.0
3/8/93	0	26	0	0	78	31	7			39	7.0
10/3/94		1328		352	1136	1064		1656	1968	1136.0	1136.0
24/3/94		4960		5	18	1	9			4032	9.0
18/4/94										768	
Median		754.5			41.5	39	17			159	39.0

Table E10 Water Quality in Back Lake, 21 March 1987
(From Willing and Partners Pty Ltd 1987 - Ref 3)

Site *	Temperature (°C)	Salinity (%S)	Turbidity (NTU)	pH (0-14)	Redox (mV)	D.O. (mg/L)	D.O. (% Sat)	Total Phosphorus (µg/L)	Total Nitrogen (µg/L)	N:P Ratio	Total Coliforms (per 100 ml)	Faecal Coliforms (per 100 ml)
1	20.4	16.2	2.0	7.6	134	6.9	84	35	85	2.43	340	106
2	21.9	17.8	2.0	7.4	129	5.9	75	26	90	3.46	78	23
3	21.3	18.1	1.2	7.5	109	6.3	79	21	70	3.33	230	76
4	21.2	18.0	1.0	7.5	116	6.2	78	31	80	2.58	650	72
5	18.8	0.2	6.0	7.6	83	7.1	75	27	120	4.44	-	-
6	20.0	0.0	10.0	6.9	130	8.5	93	28	141	5.04	-	-
Mean**	20.6	11.7	3.7	7.4	116.8	6.8	80.7	28.0	97.7	3.55	285	74
SE	0.5	3.7	1.5	0.1	7.8	0.4	2.8	1.9	11.1	0.42		

* Site Locations Shown on Figure E1

** Means for all parameters except bacteriological data for which median values are shown

Table E11 Water Quality Profiles For Back Lake - Merimbula, 27 January 1994

Site*	Time	Depth m	Temp °C	Cond mS/cm	Salinity ppt	pH 0-14	D.O. % Sat	D.O. mg/l	S.G. -	Turb NTU's
B1	15:56	0.17	24.82	22.22	13.42	8.91	85.2	6.5	1.0072	5.7
B1	15:56	0.20	22.46	0.04	0.03	8.56	82.2	7.1	0.9977	9.8
B1	15:56	0.37	24.92	22.12	13.32	8.86	87.0	6.7	1.0071	6.0
	Max		24.92	22.22	13.42	8.91	87.00	7.10	1.0072	9.80
	Min		22.46	0.04	0.03	8.56	82.20	6.50	0.9977	5.70
	Mean		24.07	14.79	8.92	8.78	84.80	6.77	1.0040	7.17
	SE		0.80	7.38	4.45	0.11	1.40	0.18	0.0032	1.32
B2	12:42	0.07	21.88	22.06	14.22	9.11	88.2	7.1	1.0085	7.5
B2	12:42	0.20	24.73	21.96	13.27	8.99	84.5	6.5	1.0071	5.2
B2	12:42	0.30	24.73	21.94	13.26	8.96	83.7	6.4	1.0071	5.0
B2	12:42	0.44	24.74	21.96	13.27	8.94	83.2	6.4	1.0071	5.0
B2	12:42	0.50	24.75	21.94	13.25	8.93	83.2	6.4	1.0071	4.7
B2	12:42	0.54	24.76	21.96	13.26	8.91	83.3	6.4	1.0071	5.3
B2	12:42	0.60	24.77	21.96	13.26	8.90	83.5	6.4	1.0071	4.8
B2	12:42	0.67	24.78	21.90	13.22	8.89	82.7	6.4	1.0070	9.1
B2	12:42	0.70	24.80	21.90	13.21	8.89	79.5	6.1	1.0070	7.7
	Max		24.80	22.06	14.22	9.11	88.20	7.10	1.0085	9.10
	Min		21.88	21.90	13.21	8.89	79.50	6.10	1.0070	4.70
	Mean		24.44	21.95	13.36	8.95	83.53	6.46	1.0072	6.03
	SE		0.43	0.02	0.14	0.03	1.00	0.12	0.0002	0.72
B3	09:58	0.20	23.38	21.44	13.32	8.90	75.7	6.0	1.0075	9.3
B3	09:58	0.14	23.39	21.44	13.32	8.89	72.9	5.7	1.0075	9.9
B3	09:58	0.27	23.39	21.44	13.32	8.88	71.4	5.6	1.0075	15.1
B3	09:58	0.34	23.39	21.46	13.33	8.88	70.8	5.6	1.0075	10.5
B3	09:58	0.40	23.39	21.46	13.33	8.88	70.6	5.6	1.0075	9.1
B3	09:58	0.50	23.40	21.46	13.33	8.90	70.4	5.6	1.0075	9.8
B3	09:58	0.57	23.40	21.46	13.33	8.93	69.9	5.5	1.0075	8.7
B3	09:58	0.64	23.40	21.40	13.29	8.94	69.4	5.5	1.0074	8.9
	Max		23.40	21.46	13.33	8.94	75.70	6.00	1.0075	15.10
	Min		23.38	21.40	13.29	8.88	69.40	5.50	1.0074	8.70
	Mean		23.39	21.45	13.32	8.90	71.39	5.64	1.0075	10.16
	SE		0.00	0.01	0.00	0.01	0.72	0.06	0.0000	0.74
B4	09:27	0.14	24.28	20.80	12.64	8.77	80.5	6.3	1.0067	9.2
B4	09:27	0.17	24.49	20.74	12.54	8.64	75.6	5.9	1.0066	9.3
B4	09:27	0.20	24.51	20.52	12.39	8.47	71.0	5.5	1.0065	7.4
B4	09:27	0.27	24.52	20.50	12.37	8.44	70.4	5.5	1.0065	7.7
B4	09:27	0.30	24.55	20.46	12.34	8.41	69.7	5.4	1.0064	7.4
	Max		24.55	20.80	12.64	8.77	80.5	6.3	1.0067	9.3
	Min		24.28	20.46	12.34	8.41	69.7	5.4	1.0064	7.4
	Mean		24.47	20.60	12.46	8.55	73.4	5.7	1.0065	8.2
	SE		0.05	0.07	0.06	0.07	2.0	0.2	0.0001	0.4

Table E11 Water Quality Profiles For Back Lake (Cont)

Site*	Time	Depth m	Temp °C	Cond mS/cm	Salinity ppt	pH 0-14	D.O. % Sat	D.O. mg/l	S.G. -	Turb NTU's
B5	11:46	0.17	24.43	22.74	13.88	8.93	85.1	6.6	1.0076	11.1
B5	11:46	0.27	24.43	22.68	13.84	8.85	79.7	6.1	1.0076	12.9
B5	11:46	0.34	24.42	22.66	13.83	8.81	76.6	5.9	1.0076	11.8
B5	11:46	0.37	24.43	22.64	13.81	8.76	73.5	5.7	1.0076	20.5
B5	11:46	0.40	24.43	22.64	13.81	8.81	75.1	5.8	1.0076	24.4
B5	11:46	0.47	24.55	22.40	13.62	8.78	73.9	5.7	1.0074	25.7
	Max		24.55	22.74	13.88	8.93	85.10	6.60	1.0076	25.70
	Min		24.42	22.40	13.62	8.76	73.50	5.70	1.0074	11.10
	Mean		24.45	22.63	13.80	8.82	77.32	5.97	1.0076	17.73
	SE		0.02	0.05	0.04	0.02	1.81	0.14	0.0000	2.70
BR1	15:30	0.14	24.88	22.18	13.37	8.92	88.3	6.8	1.0071	6.5
BR1	15:30	0.34	24.94	22.14	13.33	8.88	92.1	7.1	1.0071	6.9
BR1	15:30	0.47	24.97	22.14	13.32	8.86	94.0	7.2	1.0071	6.1
BR1	15:30	0.57	24.98	22.10	13.29	8.84	95.1	7.3	1.0070	5.5
	Max		24.98	22.18	13.37	8.92	95.10	7.30	1.0071	6.90
	Min		24.88	22.10	13.29	8.84	88.30	6.80	1.0070	5.50
	Mean		24.94	22.14	13.33	8.88	92.38	7.10	1.0071	6.25
	SE		0.02	0.02	0.02	0.02	1.49	0.11	0.0000	0.30
BR2	15:07	0.17	24.82	22.12	13.35	8.73	86.8	6.7	1.0071	8.5
BR2	15:07	0.34	24.88	22.12	13.34	8.78	90.7	7.0	1.0071	8.7
BR2	15:07	0.47	24.88	22.12	13.34	8.78	92.4	7.1	1.0071	8.8
BR2	15:07	0.60	24.88	22.10	13.32	8.78	93.2	7.1	1.0071	6.9
BR2	15:07	0.67	24.91	22.10	13.31	8.78	93.7	7.2	1.0071	6.7
BR2	15:07	0.77	24.92	22.12	13.32	8.78	94.0	7.2	1.0071	8.1
BR2	15:07	0.94	24.92	22.14	13.34	8.78	94.3	7.2	1.0071	8.5
BR2	15:07	0.97	24.91	22.12	13.33	8.78	93.9	7.2	1.0071	11.2
	Max		24.92	22.14	13.35	8.78	94.30	7.20	1.0071	11.20
	Min		24.82	22.10	13.31	8.73	86.80	6.70	1.0071	6.70
	Mean		24.89	22.12	13.33	8.77	92.38	7.09	1.0071	8.43
	SE		0.01	0.00	0.00	0.01	0.90	0.06	0.0000	0.49
BZ1	12:19	0.04	24.33	5.12	2.79	8.81	80.2	6.6	0.9993	7.5
BZ1	12:19	0.07	24.35	21.82	13.29	8.79	77.8	6.0	1.0072	5.1
BZ1	12:19	0.10	24.35	21.80	13.28	8.72	76.7	5.9	1.0072	5.0
BZ1	12:19	0.20	24.36	21.80	13.28	8.68	76.2	5.9	1.0072	4.9
BZ1	12:19	0.30	24.39	21.72	13.21	8.64	75.8	5.9	1.0071	4.9
	Max		24.39	21.82	13.29	8.81	80.2	6.6	1.0072	7.5
	Min		24.33	5.12	2.79	8.64	75.8	5.9	0.9993	4.9
	Mean		24.36	18.45	11.17	8.73	77.3	6.1	1.0056	5.5
	SE		0.01	3.33	2.10	0.03	0.8	0.1	0.0016	0.5

Table E11 Water Quality Profiles For Back Lake (Cont)

Site*	Time	Depth m	Temp °C	Cond mS/cm	Salinity ppt	pH 0-14	D.O. % Sat	D.O. mg/l	S.G. -	Turb NTU's
BZ2	14:32	0.10	24.41	21.90	13.33	8.61	86.5	6.7	1.0072	9.0
BZ2	14:32	0.27	24.43	21.92	13.34	8.59	87.0	6.7	1.0072	9.7
BZ2	14:32	0.34	24.43	21.92	13.34	8.58	87.4	6.8	1.0072	20.4
BZ2	14:32	0.44	24.43	21.92	13.33	8.57	87.6	6.8	1.0072	27.5
BZ2	14:32	0.57	24.43	21.90	13.32	8.57	87.4	6.8	1.0072	25.9
BZ2	14:32	0.67	24.43	21.90	13.32	8.57	87.4	6.8	1.0072	22.3
BZ2	14:32	0.74	24.48	20.46	12.36	8.56	87.0	6.8	1.0065	15.8
	Max		24.48	21.92	13.34	8.61	87.60	6.80	1.0072	27.50
	Min		24.41	20.46	12.36	8.56	86.50	6.70	1.0065	9.00
	Mean		24.43	21.70	13.19	8.58	87.19	6.77	1.0071	18.66
	SE		0.01	0.21	0.14	0.01	0.14	0.02	0.0001	2.80
All Sites	Max	0.97	24.98	22.74	14.22	9.11	95.1	7.3	1.0085	27.5
	Min		21.88	0.04	0.03	8.41	69.40	5.40	0.9977	4.70
	Mean		24.36	21.13	12.85	8.78	82.07	6.38	1.0069	10.09
	SE		0.09	0.50	0.31	0.02	1.07	0.08	0.0002	0.79

Note * See Fig E1 for Site Locations

Table E12 Summary of Water Quality Profile Means For Back Lake 27 January 1994

Site*	Substratum	Temp °C	Cond mS/cm	Salinity ppt	pH 0-14	D.O. % Sat	D.O. mg/l	S.G. -	Turb NTU's
B1	Mud	24.07	14.79	8.92	8.78	84.80	6.77	1.0040	7.17
B2	Mud	24.44	21.95	13.36	8.95	83.53	6.46	1.0072	6.03
B3	Mud	23.39	21.45	13.32	8.90	71.39	5.64	1.0075	10.16
B4	Mud	24.47	20.60	12.46	8.55	73.44	5.72	1.0065	8.20
B5	Mud	24.45	22.63	13.80	8.82	77.32	5.97	1.0076	17.73
BR1	Ruppia	24.94	22.14	13.33	8.88	92.38	7.10	1.0071	6.25
BR2	Ruppia	24.89	22.12	13.33	8.77	92.38	7.09	1.0071	8.43
BZ1	Zostera	24.36	18.45	11.17	8.73	77.34	6.06	1.0056	5.48
BZ2	Zostera	24.43	21.70	13.19	8.58	87.19	6.77	1.0071	18.66
All sites		24.36	21.13	12.85	8.78	82.07	6.38	1.0069	10.09

Note * See Fig E1 for Site Locations

Table E13 Sediment Sample Description & Chemical Analysis

Sample Bottle Number	Location *	Depth (m)	Character	Chemical Test Results (all results in mg/Kg)						Comments	
				Nutrients			Heavy Metals				
				TP	TKN	NOx	TN**	Lead	Copper		
1	Off Town Drain	1/1	Muddy sand	15	350	0.5	350.5	23	< 5		
2	Bald Hill Creek	5.0	Mud	30	1900	< 0.5	1900	< 5	5		
3	Nth Shoal	1/1	Shelly sand	10							
4	Mid Top Lake	15.0	Mud	13	1800	< 0.5	1800				
5	Boggy Ck	5.0	Mud	63							
6	Not Used									Not Used	
7	Off Silt Pond	4.0	Mud	13						No water samp	
8	South Arm	1/1	Mud + Halophila	14							
9	Back Lk - Creek	0.5	Muddy sand	1				< 5	< 5		
10	Back Lk - Shoal	1.0	Sandy Mud	4				7	< 5		
11	Back Lk - Channel	1.5	Mud + Ruppia	9	960	< 0.5	960				
Total Samples				9	4	4	4	4	4	4	
Maximum (Merimbula)				63	1900						
Minimum (Merimbula)				10	350						
Mean (Merimbula)				22.6	1350						
Std Error of Mean (Merimbula)				7.2	327.9						
Maximum (Back Lake)				9							
Minimum (Back Lake)				1							
Mean (Back Lake)				4.7							
Std Error of Mean (Back Lake)				2.3							

Note * See Fig F1 for Sample Site Locations; Note that two pre-numbered sample bottles (6 and 7) were not used.

** TN = TKN + NOx

**TABLES REFERENCED IN
APPENDIX F
BIOLOGY AND ECOLOGY**

Table F1 Wetland Areas, Merimbula and Back Lakes and Regional Significance*

Estuary†	Areas (sq. km)			Water Area	% of Total Mangroves	Percentages		
	Mangrove	Seagrass	Saltmarsh			% of Area Grassed	% of Total Grass	% of Total Saltmarsh
Lake Illawarra	0.00	5.12	0.20	36.27	0.0	14.1	12.2	2.0
Minnamurra R	0.48	0.23	0.20	0.60	3.9	38.6	0.6	1.9
Shoalhaven R	0.67	0.34	0.15	12.89	5.3	2.6	0.8	1.4
Crookhaven R	2.81	0.68	1.40	7.88	22.4	8.6	1.6	13.7
Jervis Bay	1.25	9.06	2.33	102.13	10.0	8.9	21.7	22.9
St. Georges Basin	0.25	8.54	0.04	38.86	2.0	22.0	20.4	0.4
Swan Lake	0.00	0.59	0.00	4.08	0.0	14.4	1.4	0.0
Lake Conjola	0.00	0.53	0.01	5.36	0.0	9.8	1.3	0.1
Burrill Lake	0.00	0.51	0.16	4.21	0.0	12.1	1.2	1.5
Durras Lake	0.00	0.51	0.05	3.21	0.0	15.8	1.2	0.5
Clyde River	2.32	0.09	1.02	19.90	18.5	0.5	0.2	10.0
Cullendulla Creek	0.92	0.06	0.01	0.24	7.3	26.8	0.2	0.1
Tomago River	0.21	0.05	0.35	1.21	1.7	3.8	0.1	3.5
Moruya River	0.38	0.64	0.67	4.22	3.0	15.3	1.5	6.6
Coila Lake	0.00	1.86	0.32	6.34	0.0	29.4	4.5	3.1
Tuross Lake	0.57	0.45	0.40	13.30	4.5	3.4	1.1	3.9
Lake Brunderee	0.00	0.06	0.25	0.18	0.0	34.8	0.2	2.4
Lake Brou	0.00	0.08	0.25	1.66	0.0	4.7	0.2	2.5
Wagonga Inlet	0.25	1.48	0.06	6.28	2.0	23.6	3.5	0.6
Nangudga Lake	0.00	0.12	0.12	0.46	0.0	26.0	0.3	1.1
Wallaga Lake	0.00	1.34	0.30	7.81	0.0	17.2	3.2	2.9
Bermagui River	0.43	0.34	0.07	1.39	3.5	24.3	0.8	0.6
Cuttagee Lake	0.00	0.43	0.08	1.41	0.0	30.5	1.0	0.7
Murrah Lagoon	0.00	0.02	0.11	0.82	0.0	2.0	0.0	1.1
Wapengo Lagoon	0.41	0.36	0.32	3.19	3.3	11.3	0.9	3.1
Nelson Lagoon	0.27	0.11	0.06	0.71	2.2	16.0	0.3	0.6
Bega River	0.00	0.30	0.41	2.66	0.0	11.4	0.7	4.0
Wallagoot Lake	0.00	0.65	0.01	3.67	0.0	17.6	1.5	0.1
Back Lake	0.00	0.20	0.02	0.32	0.0	64.8	0.5	0.2
Merimbula Lake	0.38	2.30	0.63	4.56	3.0	50.4	5.5	6.2
Pembula Lake	0.45	0.87	0.19	2.95	3.6	29.4	2.1	1.9
Curalo Lagoon	0.00	0.06	0.12	0.71	0.0	8.2	0.1	1.1
Wonboyn River	0.00	0.24	0.48	3.62	0.0	6.6	0.6	4.8
Total**	12.53	41.828	10.16					

Notes:

* Areas from West et al 1985 - Ref 18.

** Total Area of habitat on south coast between lake Illawarra and NSW/Vic boarder.

† Only those estuaries or coastal lagoons which support at least 1 % of one of the wetland habitats are listed.

Table F2 Possible Native Mammal Occurrence in Merimbula Lake Fringing Terrestrial Vegetation (Ref 31)*

Group	Common Name	Scientific Name	Spotted Gum	Dune	Heath
Dasyurids	Brown marsupial mouse	<i>Antechinus stuarti</i>	R	R	R
	Common dunart	<i>Sminthopsis murina</i>	E	R	R
	Native cat	<i>Dasyurus viverrinus</i>	E		
	Tiger cat	<i>Dasyurus maculatus</i>	E		
Peramelids	Long-nosed bandicoot	<i>Perameles nasuta</i>	R	R	
	Short-nosed bandicoot	<i>Isoodon obesulus</i>	E	E	
Phalangerids	Pigmy possum	<i>Cercartetus nanus</i>	E	E	
	Pigmy glider	<i>Acrobatus pygmaeus</i>	E	E	
	Sugar glider	<i>Petaurus breviceps</i>	R	E	
	Squirrel glider	<i>Petaurus norfolkensis</i>	E		
	Greater glider	<i>Schoinobates volans</i>	R	E	
	Ring-tail possum	<i>Pseudocheirus peregrinus</i>	R	R	
	Brush-tail possum	<i>Trichosurus vulpecula</i>	R	E	
Vombatids	Wombat	<i>Vombatus ursinus</i>			R
	Koala	<i>Phascolarctos cinereus</i>	R		
Macropodids	Potoroo	<i>Potorous tridactylus</i>	E		R
	Red-necked wallaby	<i>Macropus rufogriseus</i>	R	R	R
	Grey kangaroo	<i>Macropus giganteus</i>	R	R	R
	Swamp wallaby	<i>Wallabia bicolor</i>	R	R	R
Monotremes	Spiny anteater	<i>Tachyglossus aculeatus</i>	R	R	R
Rodents	Bush rat	<i>Rattus fuscipes</i>	R	R	R
	Swamp rat	<i>Rattus lutreolus</i>	E	R	R

* R = Reported in Eurobodella Shire, E = Expected in Eurobodella Shire

Table F3 Possible Bat Occurrence in Merimbula Lake Fringing Terrestrial Vegetation*

Family	Common Name	Scientific Name	Occurrence
Pteropodidae	Grey-headed flying fox	<i>Pteropus poliocephalus</i>	R
	Red flying fox	<i>Pteropus scapulatus</i>	E
Vespertilionidae	Lesser long-eared bat	<i>Nyctophilus geoffroyi</i>	R
	Greater long-eared bat	<i>Nyctophilus timoriensis</i>	R
	Bent-wing bat	<i>Miniopterus schreibersii</i>	R
	Little bat	<i>Eptesicus pumilus</i>	R
	Gould's wattled bat	<i>Chalinolobus gouldii</i>	E
	Chocolate bat	<i>Chalinolobus morio</i>	E
	Large-eared pied bat	<i>Chalinolobus dwyeri</i>	E
	Tasmanian pipistrelle	<i>Pipistrellus tasmaniensis</i>	R
	Large-footed myotis	<i>Myotis adversus</i>	E
	Broad-nosed bat	<i>Nycticeius orion</i>	E
	Greater broad-nosed bat	<i>Nycticeius rueppellii</i>	R
Rhinolophidae	Eastern horseshoe bat	<i>Rhinolophus megaphyllus</i>	R
Molossidae	White-striped bat	<i>Tadarida australis</i>	E
	Little scurrying bat	<i>Tadarida loriae</i>	E
	Norfolk Island little scurrying bat	<i>Tadarida norfolkensis</i>	E
	Little flat bat	<i>Tadarida planiceps</i>	E
Emballonuridae	Yellow-bellied sheath-tailed bat	<i>Taphozous flaviventris</i>	E

Table F4 Possible Reptile Occurrence in Merimbula Lake Fringing Terrestrial Vegetation*

Family	Common Name	Scientific Name	Spotted Gum	Dune	Heath
Lacertilia	Lizards	<i>Amphibolurus muricatus</i>	R	R	
Scincidae	Skinks	<i>Anotis maccoyi</i>	R		
		<i>Lampropholis delicata</i>	R	R	
		<i>Lampropholis guichenoti</i>	R	R	E
		<i>Leiolopisma entrecasteauxi</i>			R
		<i>Leiolopisma spenceri</i>			E
		<i>Leiolopisma trilineata</i>			R
		<i>Sphenomorphus quoyii</i>			R
		<i>Egernia saxatilis intermedis</i>			E
		<i>Egernia whitii whitii</i>			E
		<i>Tiliqua casuarinae</i>			R
Ophidia	Snakes	<i>Denisonia superba</i>			R

Table F5 Possible Amphibian Occurrence in Merimbula Lake Fringing Terrestrial Vegetation*

Family	Common Name	Scientific Name	Spotted Gum	Dune	Heath
Hylidae	Heath Frog X	<i>Hyla sp</i>	R		
		<i>Litoria aurea</i>		R	
		<i>Litoria peronii</i>	R	R	
		<i>Litoria verreauxii</i>		R	
Leptodactylidae		<i>Crinia haswelli</i>			R
		<i>Crinia signifera</i>	R	R	R
		<i>Limnodynastes dumerilii dumerilii</i>			R
		<i>Limnodynastes peronii</i>		R	
		<i>Pseudophryne bibroni</i>	R	R	R

* Ref 31; R = Reported in Eurobodalla Shire, E = Expected in Eurobodalla Shire

Table F6 Aquatic Bird Observations in Pambula River, Merimbula and Back Lakes

Location	Number of Aquatic Birds Observed							
	Pambula River Estuary			Merimbula Lake			Back Lake	
	11-82*	12-91**	01-94**	11-82*	01-94†	Waderst†† 70 to 90	11-82*	01-94†
Hoary-headed grebe				20				
Australasian grebe	10			2				
Australian pelican	8	2		9	x			x
Pied cormorant		1		2	x			x
Little pied cormorant	13	3	x	28	x		4	x
Black cormorant	5	12	x	5	x		13	x
Little black cormorant	3	3	x	8	x			
Darter		1						
White-faced heron	12	4	20	4	x			
Great egret	5	2		8	x		1	x
Little egret				1				
Striated heron	1	2						
Rufous night heron	1							
Australasian bittern				1				
Sacred ibis	27		x	32	x		26	x
Royal spoonbill							5	
Yellow-billed spoonbill							1	
Black swan	18	46	20	39	x		128	x
Australian shelduck	24							
Black duck				9	x		69	x
Grey teal				200			120	
Chestnut teal			4	2				
Hardhead				2				
Musk duck				4				
White-bellied sea eagle	2	3	x		x		1	x
Baillon's crane				1				
Eurasian coot				8				
Pied oystercatcher		7	4	6	x	20	3	
Sooty Oystercatcher						1		
Masked lapwing	1	2	4	7		11	3	
Large sand plover		3						
Hooded plover						5		
Red-capped plover						4		
Black-fronted plover						1	1	
Eastern curlew	36	17	20	16	x	52		x
Whimbrel	6	2	2	2	x	9		
Grey-tailed tattler	1	2				1		
Latham's snipe				1		1		
Bar-tailed godwit		20	31	39	x	85		x
Red-necked stint		2						
Curlew sandpiper		7						
Silver gull	16			79	x		20	x
Crested tern	1			7	x		9	x
Total	190	141	105+	542			404	
Count	19	20	13	28			15	

Notes:

- Numbers are actual recorded observations; x denotes species present but not counted
- * Unpublished NSW FOC Wetland Survey data (courtesy P & J Smith Ecological Consultants)
- ** Unpublished data (from W Lawler CSIRO Div. Wildlife & Ecology Canberra)
- † Observations during the present survey
- †† From Smith P (1991) The biology & Management of Waders in NSW. NSW NPWS Report 9.

Table F7 Field Notes For Benthic Survey, 25 Jan - 27 Jan 1994 - Merrimittula.

Site	Date	SDL	Time	Secchi	Depth	Vis	Birds			Sea Eagle	Others	Flora	Substratum	Comments
							Pelicans	Waders	Comorants					
							Swans	Herrons						
1	26/1/94	No	12:00	Boit	1.0m					1		Sandy Mud	Fringing Mangroves	
2	26/1/94	No	12:30	1.0m	2.0m							Sandy	Lot of Shell Grit Present	
3	26/1/94	No	13:00	3.5m	4.0m	2.0m						Silt	Large Amount Of Dead Organic Matter	
4	26/1/94	No	11:00	4.5m	8.0m	3.0m						20cm Silt Over Mucky Sand		
4a	26/1/94	No	10:30	4.0m	6.0m	3.0m						10cm Silt Over Mucky Sand	Large Amount Of Dead Organic Matter	
5	26/1/94	No	9:30	Boit	5.0m	10m						Sand		
6	25/1/94	15:55		Boit	1.0m					1cm (1)		Sand	Suspect all Specimens Dead	
7	25/1/94	15:12		Boit	3.0m							Sand/Large Shell Grit	Possible 2 SDL Profiles	
8	25/1/94	14:04		Boit	1.5m							Muddy Sand and Shell Grit		
9	25/1/94	13:08		Boit	2.0m						Pos	Muddy Sand	Anchovies Seen Heading East	
10	25/1/94	11:47		Boit	1.5m							Sand		
Z1	26/1/94	No									Pos/Zos & Ital	Sand/Shell Grit		
Z4	25/1/94	12:41		Boit	0.5m						Zos	Muddy Sand		
P1	26/1/94	No	14:00	Boit	2.5m						Pos & Ital	Silt Over Mucky Sand		
P2	25/1/94	16:55		Boit	1.5m					1	Pos	Sand/Large Shell Grit	Very Dense Rhizome Network	
P3	25/1/94	14:45		Boit	0.7m					1	Pos	Muddy Sand	Very Silty	
P4	25/1/94	12:26		Boit	0.5m		2#				Pos	Muddy Sand	Smelt Like Shit	
OS1	25/1/94	17:20		1.3m	2.0m							Silt		
LS1	25/1/94	9:45		Boit	1.5m						Ital	Sand/Shell Grit	Very Silty	
ZL1	25/1/94	10:15		Boit	0.5m						Pos	Sand/Shell Grit		
B1	27/1/94	16:00		Boit	0.2m							Sand		
B2	27/1/94	12:40		Boit	0.5m							Sand/Mud/Shell Grit		
B3	27/1/94	10:00		Boit	1.0m							Course Sand / Muddy		
B4	27/1/94	9:45		Boit	0.4m							Very Course Sand		
B5	27/1/94	11:50		Boit	1.0m							Clay/Sand/Mud	Slight Algal Matting	
BR1	27/1/94	15:30		Boit	0.75m					1		Sand		
BR2	27/1/94	15:10		Boit	0.8m							Sand	No Zostera Found	
BR1	27/1/94	12:20		Boit	0.25m							Sand	Dense Algal Matting	
BR2	27/1/94	14:40		Boit	0.7m							Sandy Mud		

Eastern Curlew † Black Duck

Table 18 Late Merimbuas Benthos (24-28 January 1964)

MPX	Substratum	Site	Replicate	Class/Order	Family	Sp
1	1	1	1	Actinaria		1
2	1	1	1	Actinaria		1
3	1	1	1	Actinaria		1
4	1	1	1	Actinaria		1
5	1	1	1	Actinaria		1
6	1	1	1	Actinaria		1
7	1	1	1	Actinaria		1
8	1	1	1	Actinaria		1
9	1	1	1	Actinaria		1
10	1	1	1	Actinaria		1
11	1	1	1	Actinaria		1
12	1	1	1	Actinaria		1
13	1	1	1	Actinaria		1
14	1	1	1	Actinaria		1
15	1	1	1	Actinaria		1
16	1	1	1	Actinaria		1
17	1	1	1	Actinaria		1
18	1	1	1	Actinaria		1
19	1	1	1	Actinaria		1
20	1	1	1	Actinaria		1
21	1	1	1	Actinaria		1
22	1	1	1	Actinaria		1
23	1	1	1	Actinaria		1
24	1	1	1	Actinaria		1
25	1	1	1	Actinaria		1
26	1	1	1	Actinaria		1
27	1	1	1	Actinaria		1
28	1	1	1	Actinaria		1
29	1	1	1	Actinaria		1
30	1	1	1	Actinaria		1
31	1	1	1	Actinaria		1
32	1	1	1	Actinaria		1
33	1	1	1	Actinaria		1
34	1	1	1	Actinaria		1
35	1	1	1	Actinaria		1
36	1	1	1	Actinaria		1
37	1	1	1	Actinaria		1
38	1	1	1	Actinaria		1
39	1	1	1	Actinaria		1
40	1	1	1	Actinaria		1
41	1	1	1	Actinaria		1
42	1	1	1	Actinaria		1
43	1	1	1	Actinaria		1
44	1	1	1	Actinaria		1
45	1	1	1	Actinaria		1
46	1	1	1	Actinaria		1
47	1	1	1	Actinaria		1
48	1	1	1	Actinaria		1
49	1	1	1	Actinaria		1
50	1	1	1	Actinaria		1
51	1	1	1	Actinaria		1
52	1	1	1	Actinaria		1
53	1	1	1	Actinaria		1
54	1	1	1	Actinaria		1
55	1	1	1	Actinaria		1
56	1	1	1	Actinaria		1
57	1	1	1	Actinaria		1
58	1	1	1	Actinaria		1
59	1	1	1	Actinaria		1
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61	1	1	1	Actinaria		1
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68	1	1	1	Actinaria		1
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71	1	1	1	Actinaria		1
72	1	1	1	Actinaria		1
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77	1	1	1	Actinaria		1
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79	1	1	1	Actinaria		1
80	1	1	1	Actinaria		1
81	1	1	1	Actinaria		1
82	1	1	1	Actinaria		1
83	1	1	1	Actinaria		1
84	1	1	1	Actinaria		1
85	1	1	1	Actinaria		1
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93	1	1	1	Actinaria		1
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100	1	1	1	Actinaria		1
101	1	1	1	Actinaria		1
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103	1	1	1	Actinaria		1
104	1	1	1	Actinaria		1
105	1	1	1	Actinaria		1
106	1	1	1	Actinaria		1
107	1	1	1	Actinaria		1
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111	1	1	1	Actinaria		1
112	1	1	1	Actinaria		1
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126	1	1	1	Actinaria		1
127	1	1	1	Actinaria		1
128	1	1	1	Actinaria		1
129	1	1	1	Actinaria		1
130	1	1	1	Actinaria		1
131	1	1	1	Actinaria		1
132	1	1	1	Actinaria		1
133	1	1	1	Actinaria		1
134	1	1	1	Actinaria		1
135	1	1	1	Actinaria		1

Number of Tubs per Replicate	Total Abundance per Replicate	Number of Tubs per Sample Site	Total Abundance per Sample Site	Mean No. of Tubs per Sample Site	SE of Mean No. Tubs / Sample	Mean Abundance per Site	SE of Mean Abundance
4	6	3	2	4	0.8	19	2.6
6	3	2	4	8	3	21	3.6
3	7	0	9	11	9	7	7
7	6	0	9	12	10	7	8
9	7	6	10	6	9	0	2
2	6	10	6	9	4	10	9
10	9	4	10	9	4	10	9
11	12	16	6	21	14	40	84
12	20	14	40	84	22	86	21
13	36	3	20	31	38	31	80
14	44	21	36	31	46	46	0
15	26	21	17	21	18	22	18
16	36	32	32	32	246	103	231
17	30	34	7.4	7.4	8.2	8.2	32
18	9	1.1	0.4	1.9	0.9	1.1	1
19	1.1	0.7	2.1	3.2	3.4	3.1	50
20	34	34	74	74	49	21	50
21	10	17	22	4.4	13	4.9	7.9

Table 99. Back Lake Smiths (31-38 January 1964)

Mph. Surface Pellets	Class/Order	Family	Abundance	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	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029	1030	1031	1032	1033	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	1056	1057	1058	1059	1060	1061	1062	1063	1064	1065	1066	1067	1068	1069	1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1080	1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091	1092	1093	1094	1095	1096	1097	1098	1099	1100	1101	1102	1103	1104	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114	1115	1116	1117	1118	1119	1120	1121	1122	1123	1124	1125	1126	1127	1128	1129	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	1200	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	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Table F10 Lake Merimbula Benthos Study Summary Statistics

	Site*	S1	S2	S3	S4	S4A	S5	S6	S7	S8	S9	S10	P1	P2	P3	P4	Z1	Z4	OS1	LS1	ZL1	Max	Min
Number of Taxa per Sample Site	12	21	19	26	21	17	21	21	18	22	28	2	14	30	28	28	20	31	19	24	21	31	2
Total Abundance per Sample Site	122	176	168	356	369	260	52	246	246	103	251	7	18	77	143	118	65	197	77	173	87	369	7
Mean No of Taxa per sample Site	3.8	6.6	7.2	9.0	7.4	7.8	5.4	8.6	8.6	8.2	12.4	0.4	3.2	9.0	9.0	8.8	6.6	11.0	5.6	8.2	7.4		
SE of Mean No Taxa / Sample	0.7	0.7	1.9	1.1	2.1	0.4	1.9	0.9	0.9	1.1	1.0	0.4	1.7	1.5	2.6	1.6	1.4	3.1	1.3	1.0	0.9		
Mean Abundance per Site	24.4	35.2	33.6	71.2	73.8	52.0	10.4	49.2	20.6	50.2	1.4	3.6	15.4	28.6	23.6	13.0	39.4	15.4	34.6	17.4			
SE of Mean Abundance/Site	8.7	9.0	10.3	16.7	22.0	6.5	4.4	15.2	4.9	7.9	1.4	2.0	4.4	9.8	1.5	4.3	14.8	3.4	7.1	3.4			

Animal Group	Common Name	Freq of Occur	No. Ind's
Cnidaria	Anemones and hydroids	2	2
Echinodermata	Sea urchins and sea stars	4	6
Platyhelminthes	Worms	2	2
Nematoda	Worms	3	17
Nemertea	Worms	56	125
Polychaeta	Worms	87	2004
Sipunculata	Worms	7	31
Crustacea	Shrimps and prawns	63	518
Mollusca	Seashells	76	356
Pices	Fish	4	3
Tunicata	Sea squirts	1	1
Total		113	3065

Note * See Table F7 for further site descriptions.

Table F11 Back Lake Benthos Study Summary Statistics

Site*	B1	B2	B3	B4	B5	BR1	BR2	BZ1	BZ2	Max	Min	
Number of Taxa per Sample Site	15	16	10	16	13	20	21	22	27	27	10	
Total Abundance per Sample Site	484	706	54	164	953	941	1111	456	1388	1388	54	
Mean No of Taxa per sample Site	9.2	7.8	4	8.2	9.4	9.6	14.2	10.8	14.3			
SE of Mean No Taxa / Sample	0.86	2.458	0.632	0.374	0.51	1.939	0.583	0.583	1.11			
Mean Abundance per Site	96.8	141.2	10.8	32.8	190.6	188.2	222.2	91.2	278			
SE of Mean Abundance/Site	35.16	44.62	1.463	3.666	50.82	43.53	40.64	34.56	73.7			
Animal Group	Common Name										Freq of Occur	No. Ind's
Cnidaria	Anemones and hydroids										0	0
Echinodermata	Sea urchins and sea stars										0	0
Platyhelminthes	Worms										0	0
Nemaloda	Worms										0	0
Nemerita	Worms										7	13
Polychaeta	Worms										42	1022
Sipunculata	Worms										0	0
Crustacea	Shrimps and prawns										30	136
Mollusca	Seashells										44	5084
Pices	Fish										1	2
Tunicata	Sea squirts										0	0
Total											124	6257

Note * See Table F7 for further site descriptions.

Table F12 Comparison of Benthic Studies - Merimbula and Back Lakes*

Phyla/Class	Merimbula 1976	Merimbula 1994	Back 1976	Back 1994
Cnidaria	√	√	x	x
Phoronids	√	x	x	x
Sipunculids	√	x	x	x
Nemertean	x	√	x	√
Nematods	x	√	x	x
Platyhelminths	x	√	x	x
Polychaetes	√	√	√	√
Amphipods	√	√	√	√
Isopods	√	√	√	√
Decapods	√	√	√	√
Chitons	√	√	x	x
Bivalves	√	√	√	√
Gastropods	√	√	√	√
Celaphopods	√	√	x	x
Echinoids	√	√	x	x
Asciacea	x	√	x	x

Note* Merimbula & Back 1976 = Day & Hutchings (1983) - Ref 6
 Merimbula & Back 1994 = MPR 1994 data (This study - see Tables F8 to F11)

Table F13 Fish Caught in Bait Seine and Mesh Nets, Merimbula and Back Lakes 25 to 27 January 1994

Merimbula Lake

Site	Method	Species	Length (mm)										Max	Min	Mean	SE					
		Mesh																			
S1	Seining	Whiting	45	54	223											223	45	107	57.89		
S1	Seining	Luderick	56																	56	
S1	Seining	SP. A	21																	21	
S2	Seining	Sea Mullet	58	64	90											90	58	70.7	9.821		
S2	Seining	Luderick	48																	48	
S3	Seining	Sea Mullet	112	106	109	106	112	106	105	102						112	102	107	1.236		
N1	Meshing	2" Dusky Flathead	308																	308	
N1	Meshing	3" Whiting	380	370	348											380	348	366	9.452		
N1	Meshing	Dusky Flathead	488																	488	
N1	Meshing	4" Nil																			
N1	Observed	little red eyed toady																			
N1	Observed	Fiddler ray																			
N1	Observed	Skates																			
N2	Meshing	2" Sea Mullet	265	331	243	236	235	290	261	304	255	311	284								
N2	Meshing	2" Sea Mullet	298	268	258	243	247	280	294	258	310	258	303								
N2	Meshing	2" Sea Mullet	294	264	294	254	292	296	274	234	309	264	331	21	275	4.605					
N2	Meshing	3" Nil																			
N2	Meshing	4" Nil																			
N3	Meshing	2" Sea Mullet	260	274	238	228	235	230	239	254	257	310	300								
N3	Meshing	2" Sea Mullet	233	221	293	228	291	294	264	233	230	228	227								
N3	Meshing	2" Sea Mullet	230	264	245											310	21	252	5.430		
N3	Meshing	Whiting	279																	279	
N3	Meshing	3" Nil																			
N3	Meshing	4" Taylor	294																	294	
N4	Meshing	2" Sea Mullet	316	270													293				
N4	Meshing	3" Nil																			
N4	Meshing	4" Nil																			

Back Lagoon

Site	Method	Species	Length (mm)										Max	Min	Mean	SE					
		Mesh																			
S1	Seining	Sea Mullet	88	161	96	106	89	111	116	112	108	98	103								
S1	Seining	Sea Mullet	105	89	92	92	108	33	118	114	96	97	111								
S1	Seining	Sea Mullet	116											161	33	103	4.497				
S2	Seining	Nil																			
S3	Seining	Nil																			
N1	Meshing	2" Dusky Flathead	283	300													292				
N1	Meshing	3" Nil																			
N1	Meshing	4" Nil																			
N2	Meshing	2" Nil																			
N2	Meshing	3" Nil																			
N2	Meshing	4" Nil																			
N3	Meshing	2" Sea Mullet	223																	223	
N3	Meshing	3" Nil																			
N3	Meshing	4" Nil																			

Table 14

Summary Statistics for Fish Caught in Bait Seine and Mesh Nets,
Merimbula and Back Lakes 25 to 27 January 1994

Species	Location	Method	N	Max	Fish Lengths		
					Min	Mean	SE
Dusky Flathead	Back Lagoon	Meshing	2	300	283		
Dusky Flathead	Merimbula	Meshing	2	488	308		
Luderick	Merimbula	Seining	2	56	48		
Sea Mullet	Back Lagoon	Meshing	1			223.00	
Sea Mullet	Merimbula	Meshing	59	331	221	262.63	3.77
Sea Mullet	Back Lagoon	Seining	23	161	33	102.57	4.50
Sea Mullet	Merimbula	Seining	11	112	58	97.27	5.71
SP. A	Merimbula	Seining	1			21.00	
Tailor	Merimbula	Meshing	1			294.00	
Whiting	Merimbula	Meshing	4	380	279	344.25	22.75
Whiting	Merimbula	Seining	3	223	45	107.33	57.89

Table F15

Comparison of Merimbula Lake Oyster Production to
Other NSW Estuarine Oyster Production 1990/91*

Estuary		Oyster Production (Kg)			Percent of State Production			Ranking
		Plate Grade	Bottle Grade	Total	Plate Grade	Bottle Grade	Total	
Tweed R	1	1360	32844	34205	0.0	2.2	0.6	20
Brunswick R	2	68	1224	1294	0.0	0.1	0.0	30
Richmond R	3	9044	16864	25911	0.2	1.1	0.5	23
Clarence R	4	13600	19040	32644	0.3	1.3	0.6	21
Woolli R	5	2720	4080	6805	0.1	0.3	0.1	25
Bellingher R	6	3876	0	3882	0.1	0.0	0.1	28
Nambucca R	7	72080	19448	91535	1.7	1.3	1.6	13
Macleay R	8	51408	21420	72836	1.2	1.5	1.3	14
Hastings R	9	149124	35632	184765	3.5	2.4	3.2	9
Camden haven R	10	32640	21828	54478	0.8	1.5	1.0	16
Manning R	11	186320	53108	239439	4.4	3.6	4.2	7
Wallis Lake	12	719032	165920	884964	16.9	11.3	15.5	3
Port Stephens	13	575144	538084	1113241	13.5	36.6	19.5	1
Hunter R	14	18632	7684	26330	0.4	0.5	0.5	22
Brisbane Waters	15	286552	77384	363951	6.7	5.3	6.4	5
Hawkesbury R	16	402220	75004	477240	9.5	5.1	8.3	4
Georges R	17	782000	160004	942021	18.4	10.9	16.5	2
Crookhaven R	18	171632	55420	227070	4.0	3.8	4.0	8
Lake Conjola	19	3400	1768	5187	0.1	0.1	0.1	26
Clyde R	20	237864	90916	328800	5.6	6.2	5.7	6
Moruya R	21	748	612	1381	0.0	0.0	0.0	29
Tuross Lake	22	56236	4556	60814	1.3	0.3	1.1	15
Wagonga R	23	132294	5202	137519	3.1	0.4	2.4	11
Bermagui R	24	8160	1292	9476	0.2	0.1	0.2	24
Nelson Lake	25	4828	0	4853	0.1	0.0	0.1	27
Wapengo Lake	26	40256	7208	47490	0.9	0.5	0.8	17
Merimbula Lake	27	99280	7072	106379	2.3	0.5	1.9	12
Pambula Lake	28	40120	6392	46540	0.9	0.4	0.8	18
Wonboyn R	29	134504	19924	154457	3.2	1.4	2.7	10
Other Estuaries	30	14280	20468	34778	0.3	1.4	0.6	19
Total		4249422	1470398	5719820				

Note: * Data from Pease & Scribner (1993) - Ref 39

Table F16

Merimbula and Pambula Lake Oyster Production 1991/92*

Lake	Oyster Production (Kg)			Value (\$)		
	Plate Grade	Bottle Grade	Total	Plate Grade	Bottle Grade	Total
Merimbula	99280	7072	106379	481800	24960	506760
Pambula	40120	6392	46540	194700	22560	217260

Note: * Data from Pease & Scribner (1993) - Ref 39

Table F17

Comparison of Merimbula Lake Oyster Production to Other NSW Estuarine Oyster Production 1993*

Estuary		Oyster Production (Bags)	Percent of State Production	
			%	Rank
Tweed R	1	2401	2.3	11
Brunswick R	2	103	0.1	28
Richmond R	3	41	0.0	31
Clarence R	4	377	0.4	23
Wooli R	5	769	0.7	18
Bellinger R	6	268	0.3	25
Nambucca R	7	2786	2.6	9
Macleay R	8	1310	1.2	15
Hastings R	9	3215	3.1	8
Camden Haven R	10	1033	1.0	16
Manning R	11	3696	3.5	7
Wallis Lake	12	25621	24.3	1
Port Stephens	13	24228	23.0	2
Hunter R	14	658	0.6	20
Brisbane Waters	15	6245	5.9	5
Patonga Creek	16	390	0.4	22
Hawkesbury R	17	6505	6.2	4
Botany Bay	18	83	0.1	29
Georges R	19	9940	9.4	3
Shoalhaven R	20	291	0.3	24
Crookhaven R	21	2454	2.3	10
Jervis Bay	22	200	0.2	26
Lake Conjola	23		0.0	36
Clyde R	24	4791	4.5	6
Moruya R	25	50	0.0	30
Tuross Lake	26	2018	1.9	12
Wagonga R	27	939	0.9	17
Wallaga Lk	28	4	0.0	35
Bermagui R	29	27	0.0	33
Nelson Lake	30	110	0.1	27
Bega River	31	10	0.0	34
Wapengo Lake	32	679	0.6	19
Merimbula Lake	33	1825	1.7	13
Pambula Lake	34	476	0.5	21
Wonboyn R	35	1781	1.7	14
Other Estuaries	36	41	0.0	32
Total		105365		

Note: * Data from unpublished State Fisheries Data (Courtesy of NSW Fisheries)