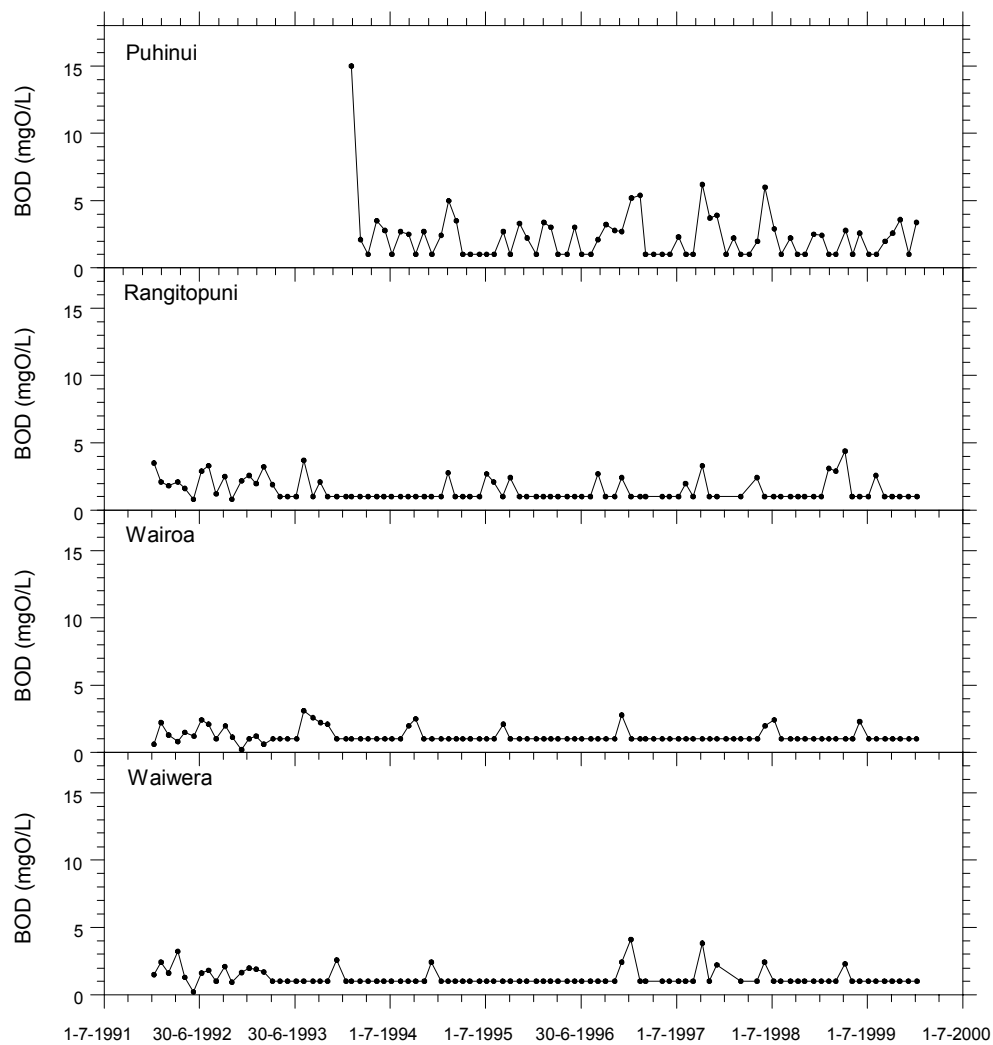




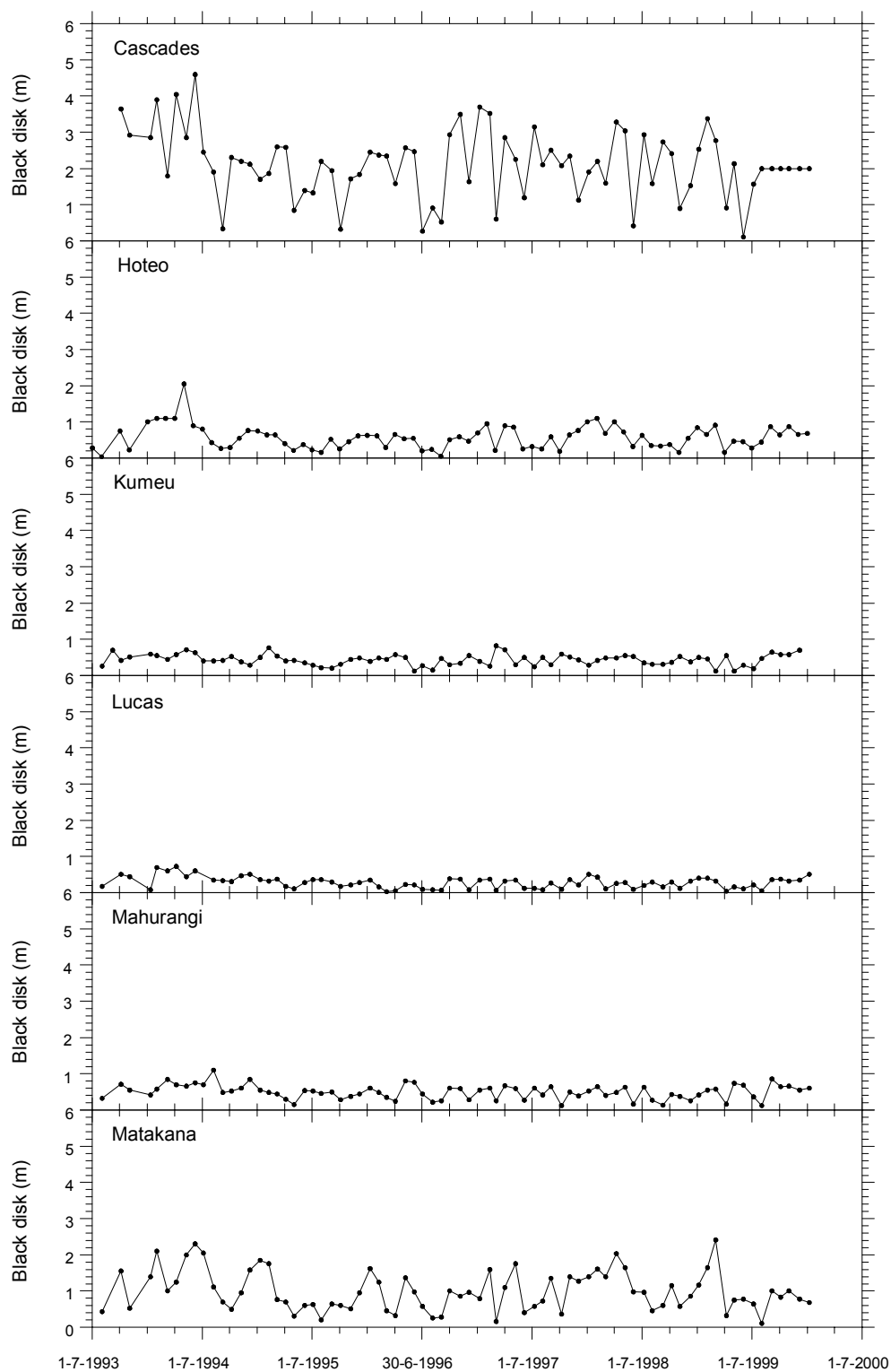
APPENDIX 4: BLACK DISK TRANSPARENCY– FRESHWATER**a) Black disk transparency (m) during January 1999 - December 1999**

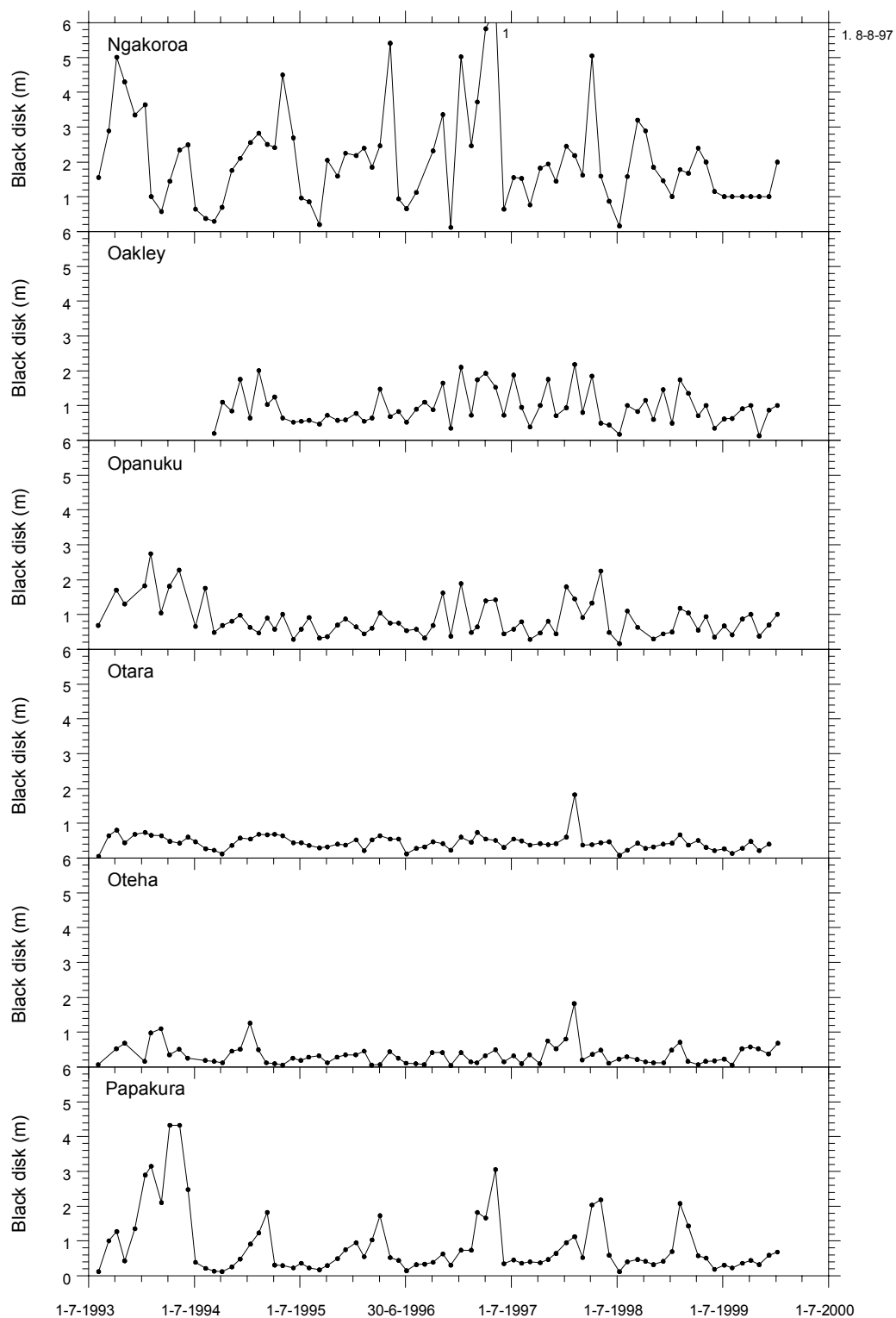
Date	Cascades	Hoteo	Kumeu	Lucas	Mahurangi	Matakana	Ngakoroa	Oakley	Opanuku	Otara	Oteha	Papakura	Puhinui	Rangitopuni	Wairoa	Waiwera
Jan-99	2.5	0.85	0.50	0.4	0.42	1.17	<1	<1	<1	0.43	0.48	0.7	0.38	0.38	>1	0.62
Feb-99	3.4	0.66	0.46	0.4	0.55	1.65	1.78	1.74	1.18	0.67	0.72	2.07	0.29	0.36	0.78	0.7
Mar-99	2.8	0.92	0.13	0.32	0.57	2.42	1.68	1.35	1.05	0.38	0.16	1.44	0.46	0.35	>1	0.71
Apr-99	0.9	0.16	0.55	0.035	0.16	0.32	2.4	0.71	0.55	0.515	0.07	0.58	0.21	0.115	0.55	0.21
May-99	2.1	0.47	0.12	0.17	0.74	0.75	>2	>1	0.94	0.31	0.17	0.51	0.43	0.32	0.83	0.42
Jun-99	0.1	0.46	0.29	0.11	0.68	0.78	1.15	0.35	0.35	0.21	0.18	0.19	0.3	0.28	0.35	0.36
Jul-99	1.6	0.29	0.19	0.21	0.36	0.65	>1	0.62	0.67	0.27	0.23	0.31	0.27	0.32	0.27	0.49
Aug-99	>2	0.44	0.47	0.05	0.13	0.11	<1	0.63	0.41	0.135	0.06	0.235	0.25	0.14	0.24	0.24
Sep-99	>2	0.88	0.64	0.36	0.86	>1	>1	0.92	0.87	0.28	0.52	0.36	0.35	0.41	0.68	0.85
Oct-99	>2	0.65	0.58	0.38	0.65	0.83	>1	>1	>1	0.49	0.58	0.44	0.54	0.67	0.95	>1
Nov-99	>2	0.88	0.57	0.32	0.66	>1	>1	0.14	0.38	0.22	0.53	0.33	0.12	0.38	0.84	0.79
Dec-99	>2	0.66	0.70	0.35	0.55	0.78	>1	0.88	0.7	0.4	0.38	0.59	0.38	0.7	0.85	0.74
median	>2	0.7	0.5	0.3	0.6	0.8	>1	0.7	0.7	0.3	0.3	0.5	0.3	0.36	0.73	0.62
IQR/median (%)	*	63.4	69.1	71.9	50.0	47.8	*	41.7	75.2	62.3	118.0	68.4	44.6	26.76	55.90	56.82

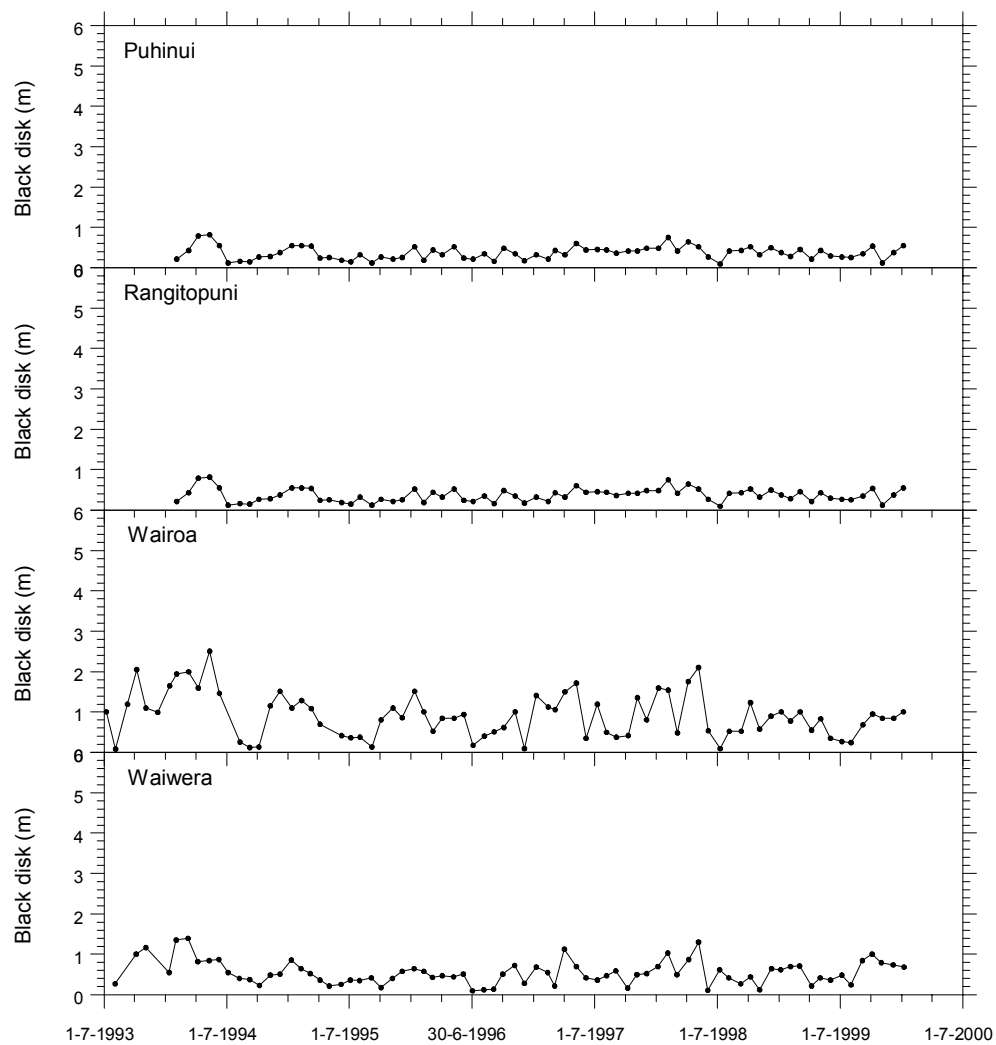
b) Statistical Summary for 1992-2000: Black disk transparency (m)

	Cascades	Hoteo	Kumeu	Lucas	Mahurangi	Matakana	Ngakoroa	Oakley	Opanuku	Otara	Oteha	Papakura	Puhinui	Rangitopuni	Wairoa	Waiwera
N	75	77	76	75	76	76	77	65	74	77	75	78	72	77	77	76
Median	2.1	0.6	0.5	0.3	0.5	1.0	1.8	0.9	0.7	0.4	0.3	0.5	0.4	0.4	0.9	0.5
Normality	Y	N	Y	N	Y	N	N	N	N	N	N	N	N	N	N	N
Seasonality	N	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y
Trend	NS	NS	NS	90%	NS	NS	NS	80%	90%	95%	NS	NS	90%	90%	90%	NS
Slope	NS	NS	NS	-0.02	NS	NS	NS	0.05	-0.04	-0.03	NS	NS	0.02	-0.02	-0.04	NS

c) The graphs on the following page show black disk transparency (m) measurements from January 1992 to January 2000 (where data are available)







APPENDIX 5: TURBIDITY – FRESHWATER

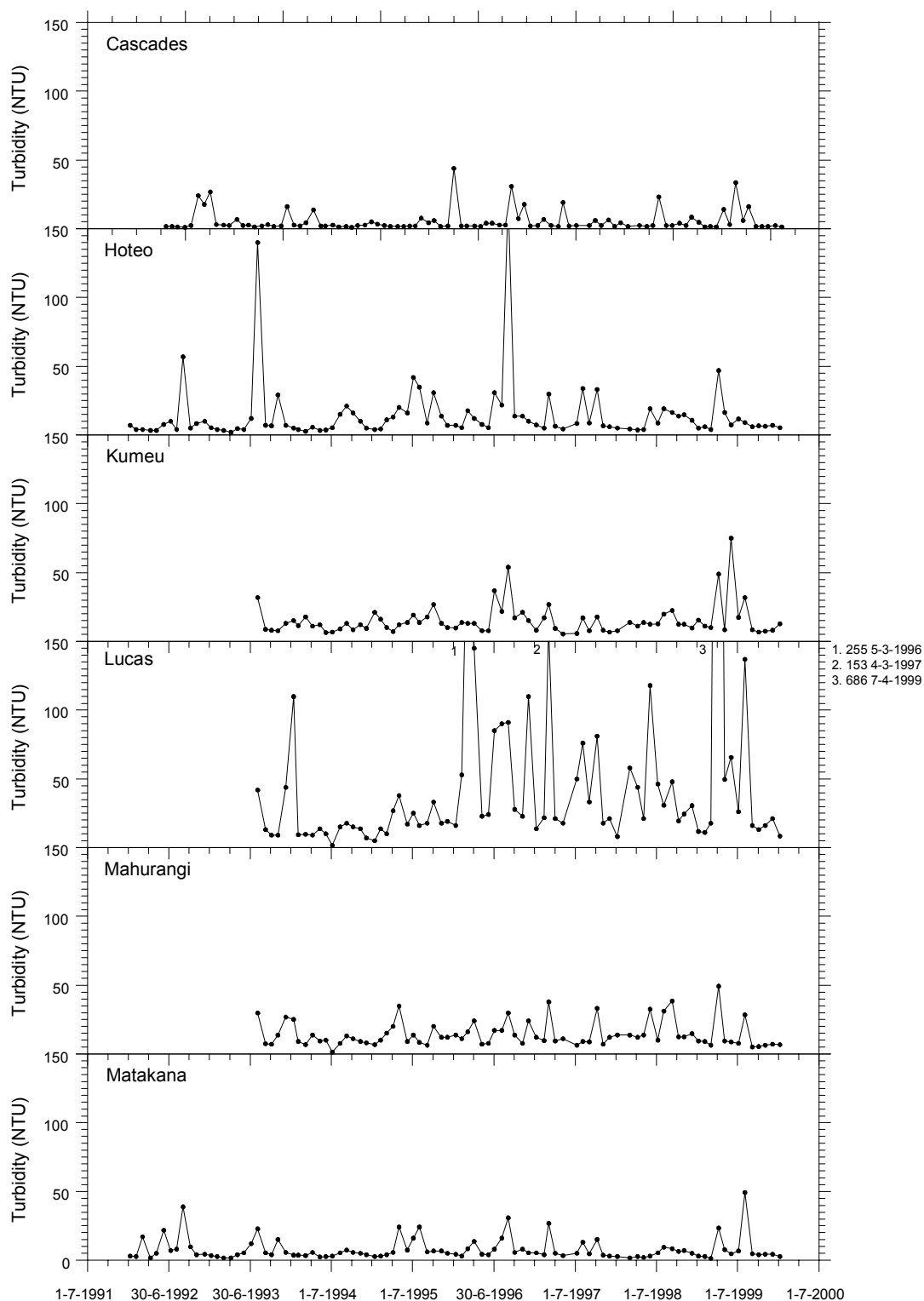
a) Turbidity (NTU) during January 1999 - December 1999

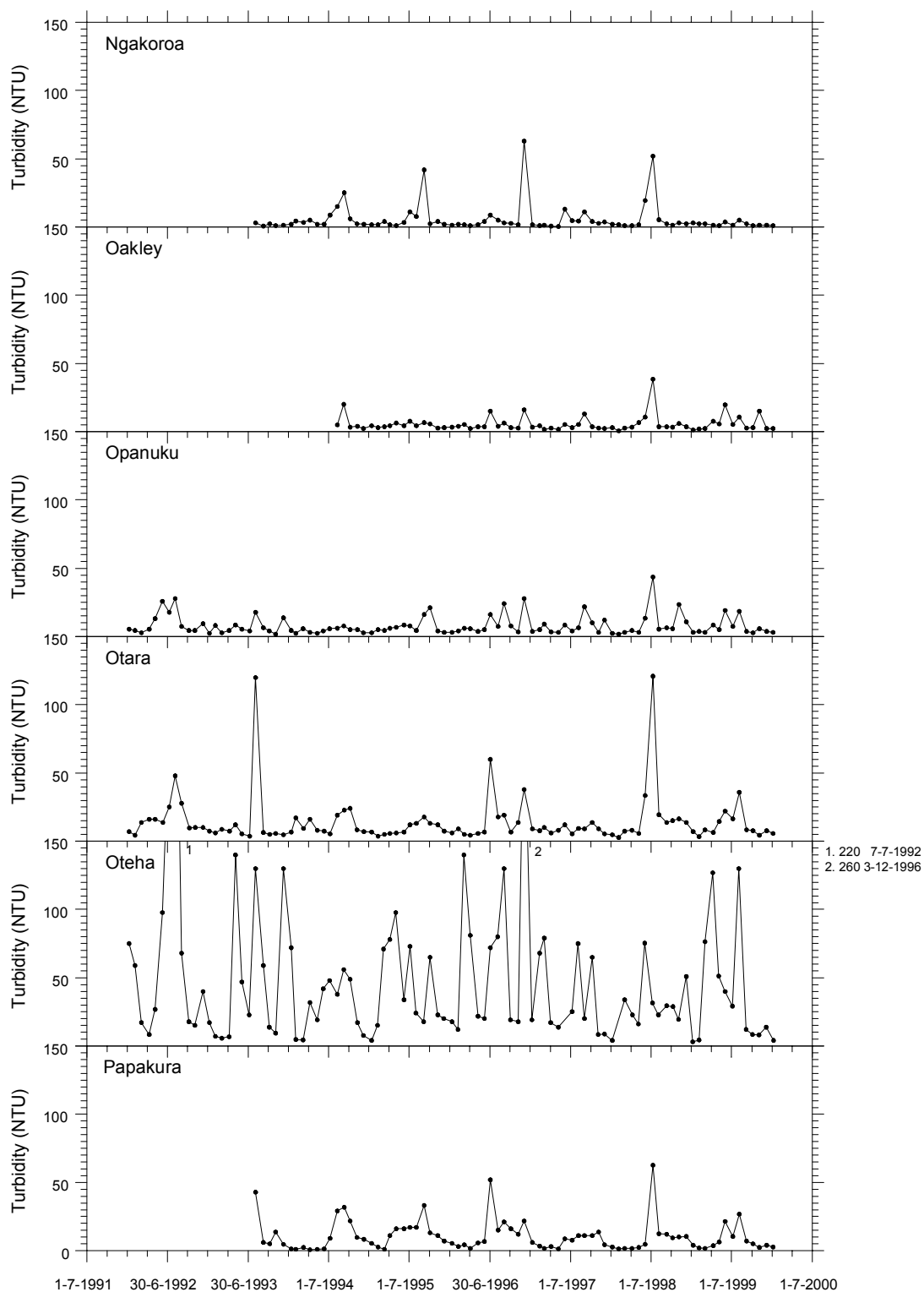
Date	Cascades	Hoteo	Kumeu	Lucas	Mahurangi	Matakana	Ngakoroa	Oakley	Opanuku	Otara	Oteha	Papakura	Puhinui	Rangitopuni	Wairoa	Waiwera
Jan-99	2.5	0.85	0.50	0.4	0.42	1.17	<1	<1	<1	0.43	0.48	0.7	0.38	0.38	>1	0.62
Feb-99	3.4	0.66	0.46	0.4	0.55	1.65	1.78	1.74	1.18	0.67	0.72	2.07	0.29	0.36	0.78	0.7
Mar-99	2.8	0.92	0.13	0.32	0.57	2.42	1.68	1.35	1.05	0.38	0.16	1.44	0.46	0.35	>1	0.71
Apr-99	0.9	0.16	0.55	0.035	0.16	0.32	2.4	0.71	0.55	0.515	0.07	0.58	0.21	0.115	0.55	0.21
May-99	2.1	0.47	0.12	0.17	0.74	0.75	>2	>1	0.94	0.31	0.17	0.51	0.43	0.32	0.83	0.42
Jun-99	0.1	0.46	0.29	0.11	0.68	0.78	1.15	0.35	0.35	0.21	0.18	0.19	0.3	0.28	0.35	0.36
Jul-99	1.6	0.29	0.19	0.21	0.36	0.65	>1	0.62	0.67	0.27	0.23	0.31	0.27	0.32	0.27	0.49
Aug-99	>2	0.44	0.47	0.05	0.13	0.11	<1	0.63	0.41	0.135	0.06	0.235	0.25	0.14	0.24	0.24
Sep-99	>2	0.88	0.64	0.36	0.86	>1	>1	0.92	0.87	0.28	0.52	0.36	0.35	0.41	0.68	0.85
Oct-99	>2	0.65	0.58	0.38	0.65	0.83	>1	>1	>1	0.49	0.58	0.44	0.54	0.67	0.95	>1
Nov-99	>2	0.88	0.57	0.32	0.66	>1	>1	0.14	0.38	0.22	0.53	0.33	0.12	0.38	0.84	0.79
Dec-99	>2	0.66	0.70	0.35	0.55	0.78	>1	0.88	0.7	0.4	0.38	0.59	0.38	0.7	0.85	0.74
median	>2	0.7	0.5	0.3	0.6	0.8	>1	0.7	0.7	0.3	0.3	0.5	0.3	0.36	0.73	0.62
IQR/median (%)	*	63.4	69.1	71.9	50.0	47.8	*	41.7	75.2	62.3	118.0	68.4	44.6	26.76	55.90	56.82

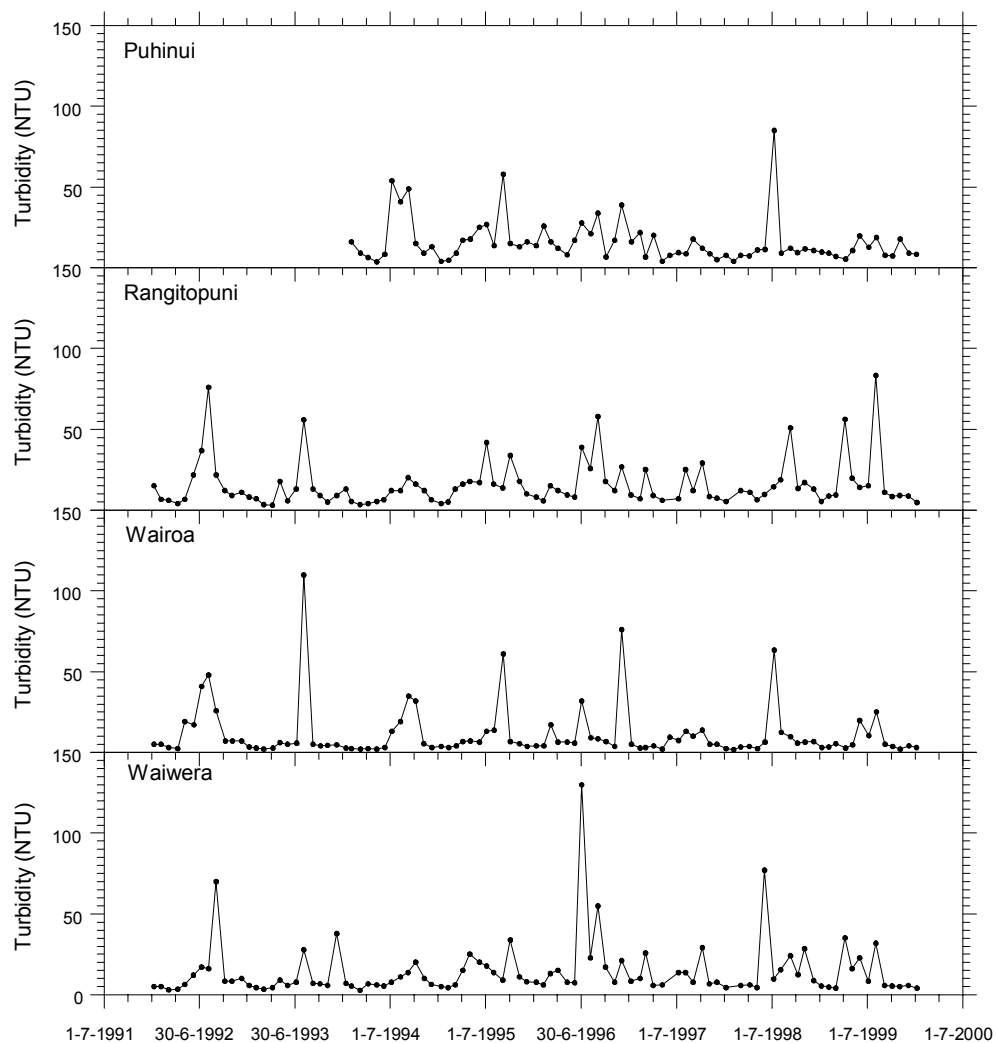
b) Statistical Summary for 1992-2000: Turbidity (NTU)

	Cascades	Hoteo	Kumeu	Lucas	Mahurangi	Matakana	Ngakoroa	Oakley	Opanuku	Otara	Oteha	Papakura	Puhinui	Rangitopuni	Wairoa	Waiwera
N	95	95	76	76	76	95	78	66	97	97	95	78	72	95	97	95
Median	2.3	7.5	12.5	21.0	11.0	5.1	2.4	3.8	5.4	8.5	27.0	6.9	11.9	12.0	5.3	8.2
Normality	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Seasonality	Y	Y	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Trend	NS	90%	NS	95%	NS	NS	NS	NS	NS	NS	80%	NS	95%	NS	NS	NS
Slope	NS	0.19	NS	2.26	NS	NS	NS	NS	NS	NS	-1.18	NS	-1.08	NS	NS	NS

c) The graphs on the following page show turbidity (NTU) measurements from January 1992 to January 2000 (where data are available)







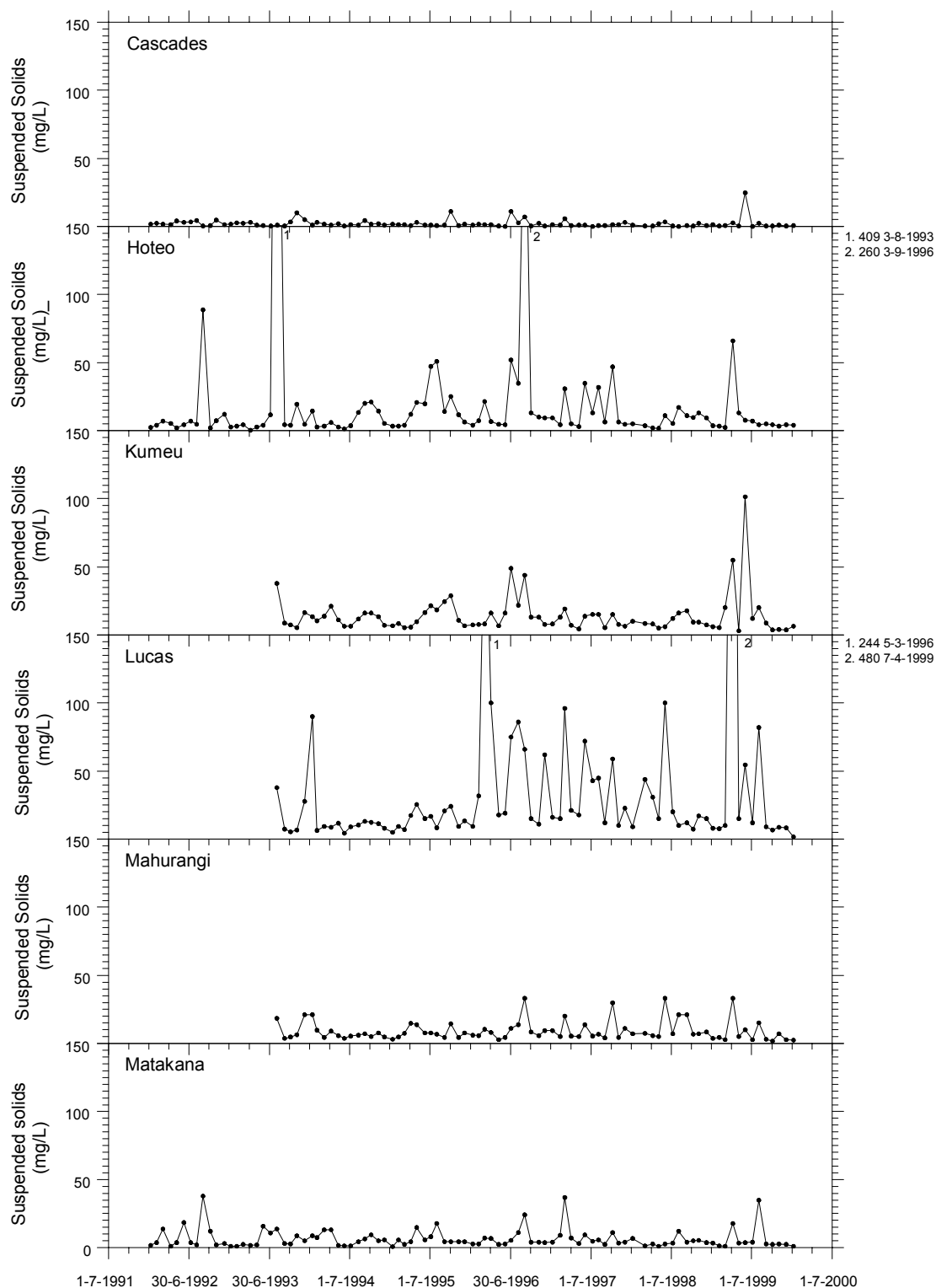
APPENDIX 6: SUSPENDED SOLIDS – FRESHWATER**a) Non-filterable residue (g/m3) during January 1999 - December 1999**

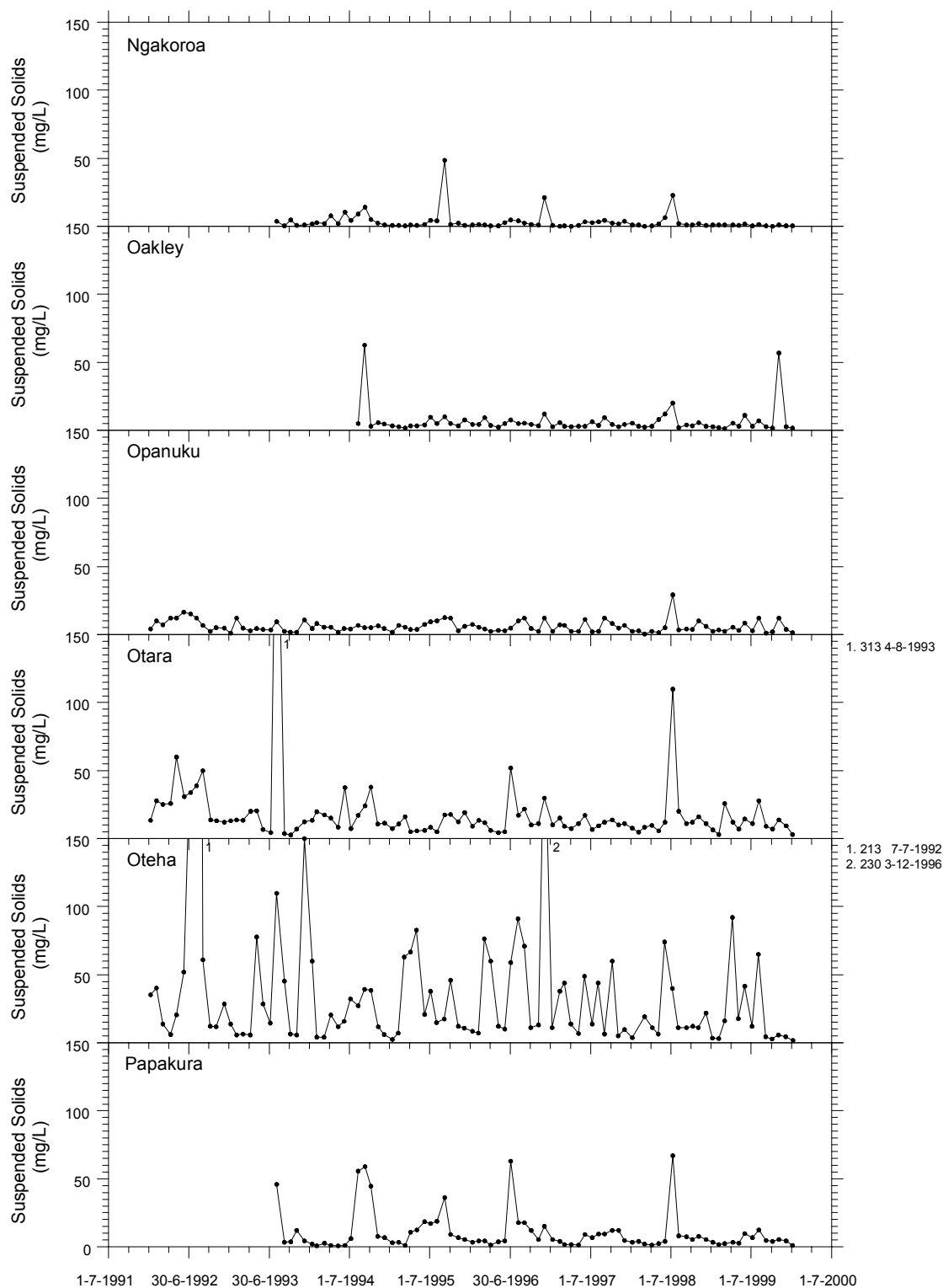
Date	Cascades	Hoteo	Kumeu	Lucas	Mahurangi	Matakana	Ngakoroa	Oakley	Opanuku	Otara	Oteha	Papakura	Puhinui	Rangitopuni	Wairoa	Waiwera
Jan-99	1.3	3.6	6.0	8.2	3.8	3.3	1.0	2.6	2.4	6.5	3.3	3.4	8.5	5.2	2.2	4.5
Feb-99	0.6	3.3	5.4	7.7	4.3	1.3	1.0	2.0	3.5	3.2	3.2	1.7	9.4	10.0	1.7	3.8
Mar-99	0.7	2.2	20.0	10.0	2.8	1.1	1.2	1.5	2.4	26.0	16.0	2.2	5.9	11.0	14.0	3.2
Apr-99	2.8	66.0	55.0	480.0	33.0	18.0	0.9	5.5	5.4	12.0	92.0	3.3	34.0	65.0	7.4	23.0
May-99	0.5	13.0	3.2	15.0	5.1	3.4	0.8	3.1	3.0	7.3	18.0	2.6	5.3	13.0	1.5	6.9
Jun-99	24.8	7.6	101.6	54.5	10.2	3.6	1.6	11.3	8.4	14.3	41.4	9.7	13.0	13.9	17.1	16.4
Jul-99	<0.1	7.2	12.0	12.0	2.8	3.9	0.5	3.1	2.8	11.0	12.0	6.8	10.0	14.0	7.0	4.0
Aug-99	2.4	4.4	20.0	82.0	15.0	35.0	1.4	7.0	12.2	27.7	65.0	12.5	7.6	81.0	10.9	12.0
Sep-99	0.3	4.9	8.8	9.2	3.1	2.6	0.6	2.7	1.1	8.9	4.6	4.7	10.6	7.9	3.4	3.8
Oct-99	0.6	4.5	3.6	6.9	1.8	2.2	0.2	1.6	2.0	7.0	2.7	4.0	9.4	5.7	1.4	2.2
Nov-99	0.9	3.4	3.9	8.7	7.1	2.7	1.2	57.0	12.0	14.0	5.9	5.5	73.0	11.0	2.7	3.3
Dec-99	0.6	4.6	3.8	8.4	2.8	2.2	0.6	2.9	3.7	9.6	4.5	4.3	11.0	4.5	2.6	1.9
median	0.7	4.6	7.4	9.6	4.1	3.0	1.0	3.0	3.3	10.3	9.0	4.2	9.7	11.0	3.1	3.9
IQR/median (%)	200.0	85.7	218.2	275.5	144.4	51.7	63.2	131.7	138.5	68.0	288.3	77.1	40.7	65.0	236.1	159.0

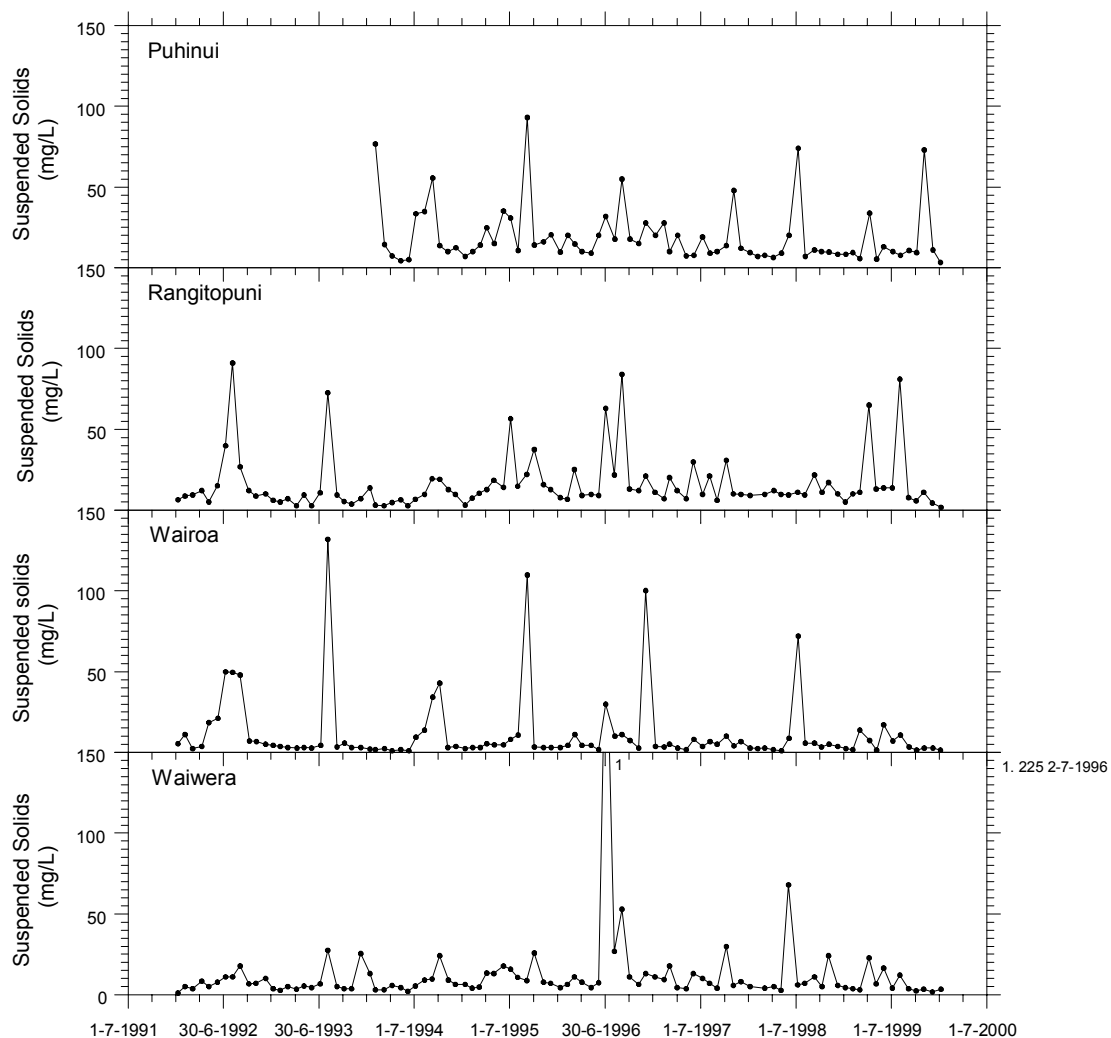
b) Statistical Summary for 1992-2000: Non-filterable residue (g/m3)

	Cascades	Hoteo	Kumeu	Lucas	Mahurangi	Matakana	Ngakoroa	Oakley	Opanuku	Otara	Oteha	Papakura	Puhinui	Rangitopuni	Wairoa	Waiwera
N	96	96	77	77	77	96	78	66	97	97	96	78	72	96	97	96
Median	1.3	6.3	10.0	15.0	6.8	4.2	1.3	4.1	4.8	12.0	14.7	5.4	12.3	10.0	4.3	6.8
Normality	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Seasonality	N	Y	Y	Y	N	N	Y	Y	N	N	Y	Y	N	Y	Y	Y
Trend	90%	NS	95%	NS	NS	NS	95%	95%	95%	99%	95%	NS	95%	NS	95%	NS
Slope	-0.15	NS	-0.67	NS	NS	NS	-0.22	-0.29	-0.30	-0.92	-1.07	NS	-1.54	NS	-0.30	NS

c) The graphs on the following page show non-filterable residue (g/m3) measurements from January 1992 to January 2000 (where data are available)







APPENDIX 7: PRESUMPTIVE COLIFORMS – FRESHWATER

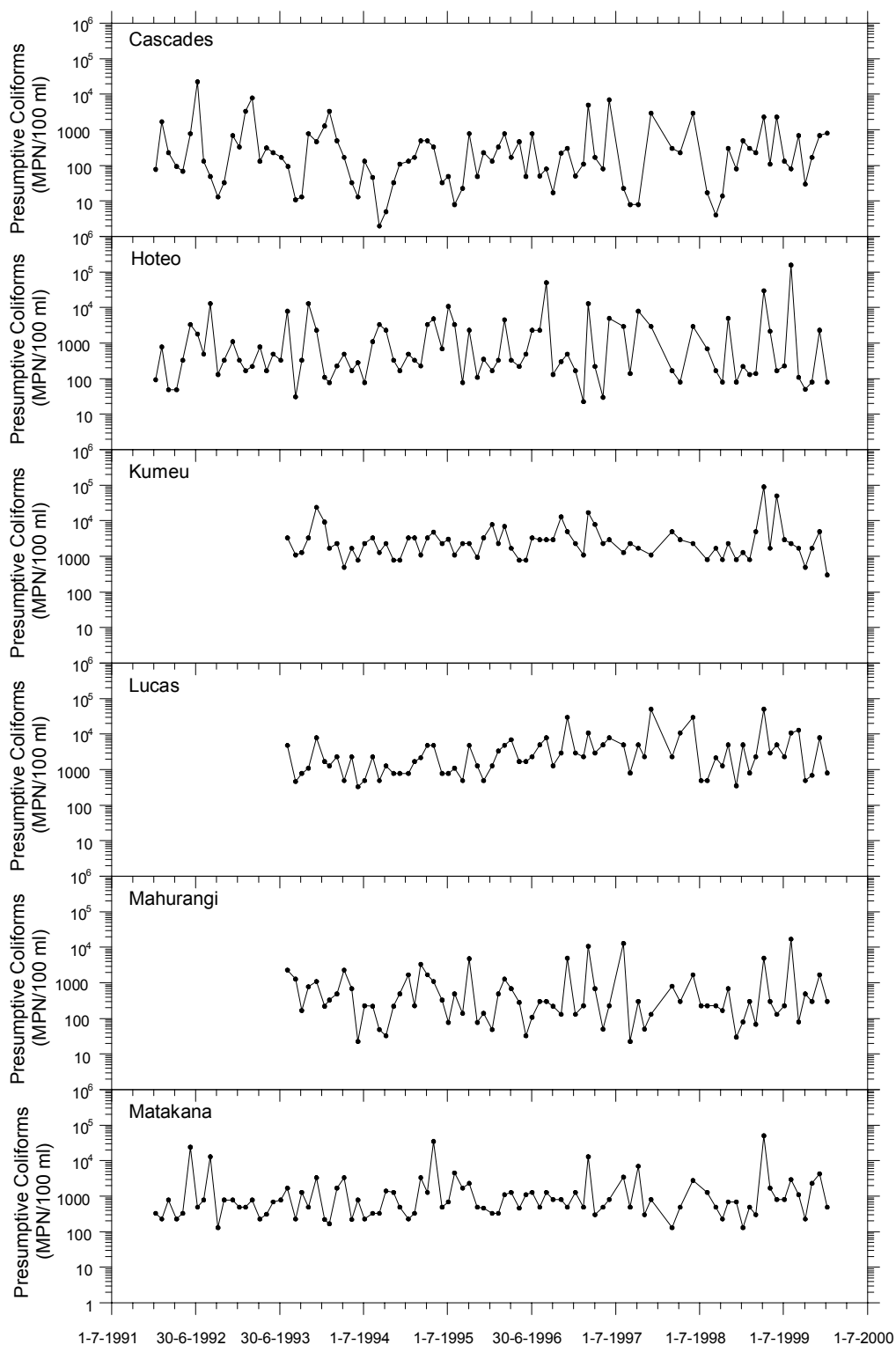
a) Presumptive coliforms (MPN/100 mL) during January 1999 - December 1999

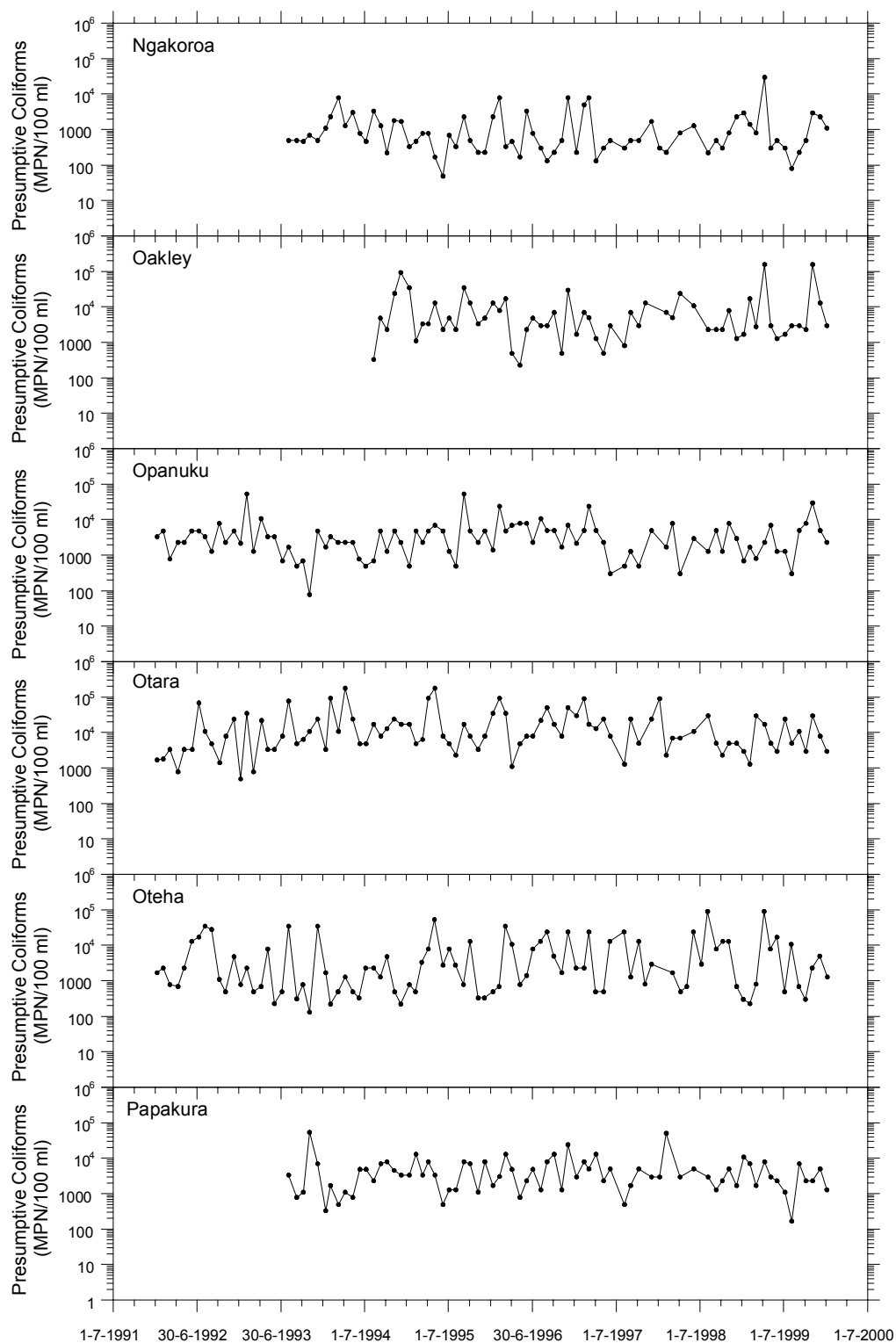
Date	Cascades	Hoteo	Kumeu	Lucas	Mahurangi	Matakana	Ngakoroa	Oakley	Opanuku	Otara	Oteha	Papakura	Puhinui	Rangitopuni	Wairoa	Waiwera
Jan-99	500	220	1300	5000	80	130	3000	1700	700	3000	300	11000	1300	3000	220	700
Feb-99	300	130	800	800	300	500	1400	17000	1700	1300	230	7000	5000	230	2300	2200
Mar-99	230	140	5000	2300	70	300	800	2800	800	30000	800	1700	1700	2200	500	800
Apr-99	2300	30000	90000	50000	5000	50000	30000	160000	2300	17000	90000	8000	240000	30000	8000	22000
May-99	110	2200	1700	3000	300	1700	300	3000	7000	5000	8000	3000	5000	2200	300	3000
Jun-99	2300	170	50000	5000	130	800	500	1300	1300	3000	17000	2300	24000	2300	24000	1700
Jul-99	130	230	3000	2300	230	800	300	1700	1300	24000	500	1100	8000	2300	800	500
Aug-99	80	>160000	2300	11000	17000	3000	80	3000	300	5000	11000	170	2300	8000	2300	5000
Sep-99	700	110	1700	13000	80	1100	230	3000	5000	11000	700	7000	8000	500	230	500
Oct-99	30	50	500	500	500	230	500	2300	8000	3000	300	2300	800	500	230	500
Nov-99	170	80	1700	700	300	2300	3000	>160000	30000	30000	2300	2300	30000	500	900	1700
Dec-99	700	2300	5000	8000	1700	4300	2300	13000	5000	8000	5000	5000	2300	8000	3000	3000
median	265	170	2000	4000	300	950	650	3000	2000	6500	1550	2650	5000	2250	850	1700
IQR/median (%)	219	1092	175	199	332	237	362	433	248	269	587	189	280	222	281	141

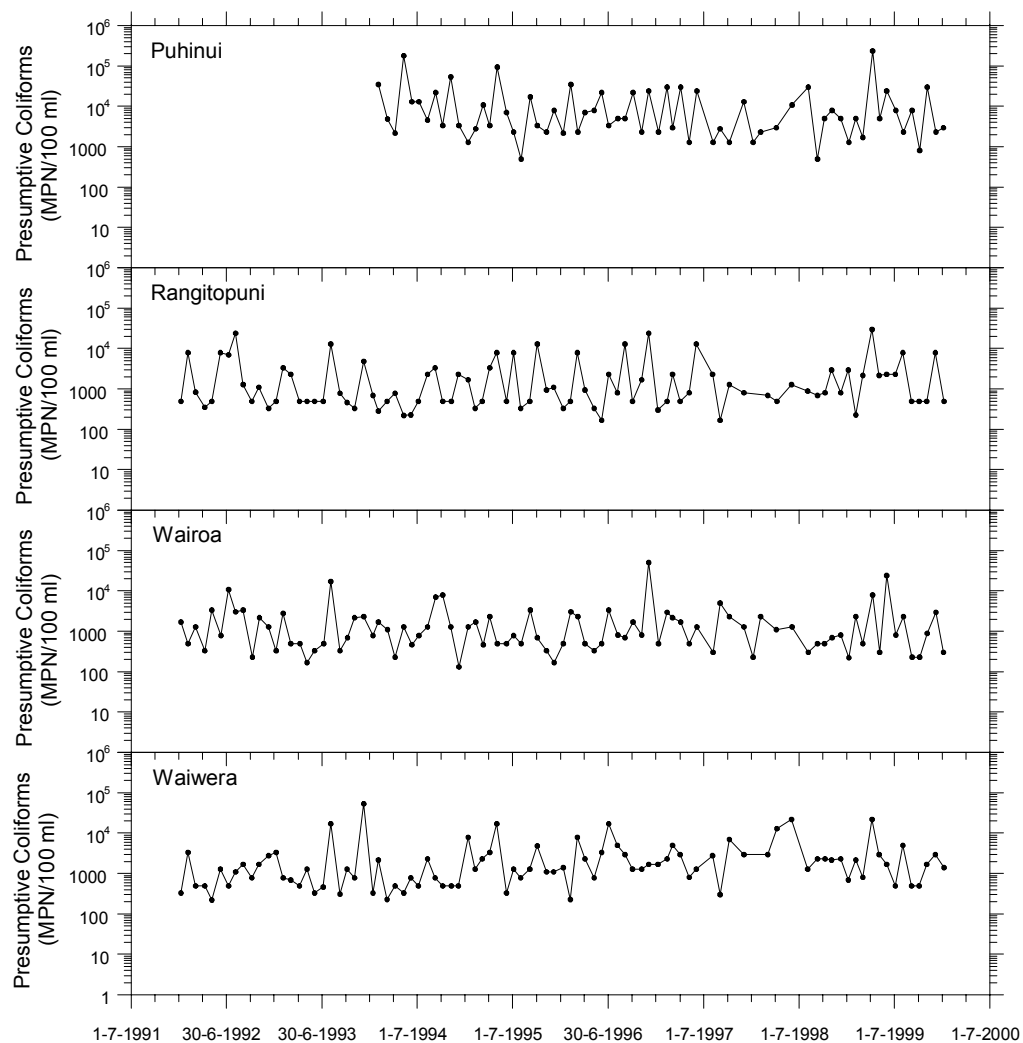
b) Statistical Summary for 1992-2000: Presumptive coliforms (MPN/100 mL)

	Cascades	Hoteo	Kumeu	Lucas	Mahurangi	Matakana	Ngakoroa	Oakley	Opanuku	Otara	Oteha	Papakura	Puhinui	Rangitopuni	Wairoa	Waiwera
N	91	91	72	74	74	92	73	61	92	93	94	73	67	91	92	91
Median	170	330	2300	2300	300	700	500	3300	2300	7900	2000	3100	5000	800	800	1300
Normality	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Seasonality	Y	Y	N	N	Y	Y	N	N	N	N	Y	N	N	N	N	N
Trend	NS	NS	NS	99%	NS	80%	NS	NS	NS	NS	80%	NS	NS	80%	NS	90%
Slope	NS	NS	NS	370	NS	11	NS	NS	NS	NS	50	NS	NS	2.5	NS	171

c) The graphs on the following page show presumptive coliforms (MPN/100 mL) measurements from January 1992 to January 2000 (where data are available)







APPENDIX 8: FAECAL COLIFORMS – FRESHWATER**a) Faecal coliforms (MPN/100 mL) during January 1999 - December 1999**

Date	Cascades	Hoteo	Kumeu	Lucas	Mahurangi	Matakana	Ngakoroa	Oakley	Opanuku	Otara	Oteha	Papakura	Puhinui	Rangitopuni	Wairoa	Waiwera
Jan-99	500	170	1300	1100	80	80	3000	500	700	60	130	11000	800	2300	140	700
Feb-99	50	80	800	70	30	80	230	140	300	230	80	7000	700	230	500	2200
Mar-99	30	110	1100	70	70	300	500	140	800	30000	170	3000	1700	2200	500	500
Apr-99	1300	8000	30000	5000	1700	11000	24000	3000	1300	11000	7000	8000	17000	24000	2200	17000
May-99	110	500	300	1700	130	500	300	500	700	1700	5000	1700	3000	1100	130	2300
Jun-99	1600	70	22000	3000	130	800	500	300	230	3000	5000	500	2800	500	24000	1700
Jul-99	50	50	1300	300	50	220	170	300	500	3000	500	500	1700	300	500	300
Aug-99	50	5000	800	8000	1700	3000	80	2300	300	5000	3000	1700	800	5000	2300	5000
Sep-99	700	17	800	1100	22	800	230	500	2200	1700	170	1200	8000	300	230	500
Oct-99	8	50	300	80	17	230	80	130	2300	230	80	500	500	220	130	300
Nov-99	30	50	1100	230	170	300	3000	30000	13000	2200	500	2300	24000	300	600	1100
Dec-99	50	230	1100	3000	50	700	500	1300	1700	800	1300	700	800	500	300	700
median	50	95	1100	1100	75	400	400	500	750	1950	500	1700	1700	500	500	900
IQR/median (%)	1120	332	45	259	147	144	388	316	207	179	770	259	276	390	243	194

b) Statistical Summary for 1992-2000: Faecal coliforms (MPN/100 mL)

	Cascades	Hoteo	Kumeu	Lucas	Mahurangi	Matakana	Ngakoroa	Oakley	Opanuku	Otara	Oteha	Papakura	Puhinui	Rangitopuni	Wairoa	Waiwera
N	96	96	77	76	77	96	77	65	96	96	95	77	71	96	96	96
Median	70	130	800	790	170	395	300	800	1100	2200	500	1700	1400	495	490	790
Normality	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Seasonality	Y	N	N	N	N	Y	N	N	Y	Y	Y	N	N	N	N	N
Trend	NS	NS	NS	NS	80%	NS	NS	90%	NS	NS	NS	NS	NS	NS	NS	90%
Slope	NS	NS	NS	NS	2.9	NS	NS	-90	NS	NS	NS	NS	NS	NS	NS	89

c) The graphs on the following page show faecal coliforms (MPN/100 mL) measurements from January 1992 to January 2000 (where data are available)

