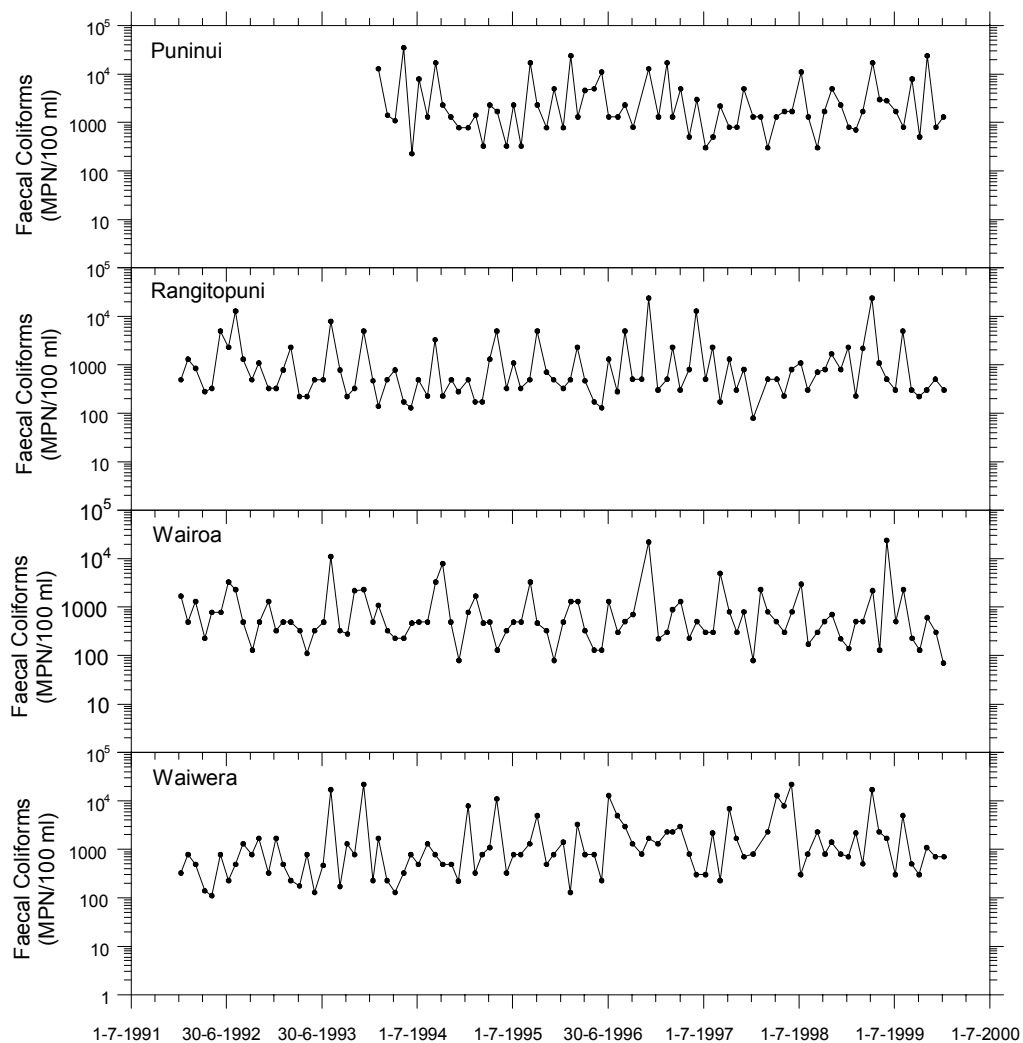




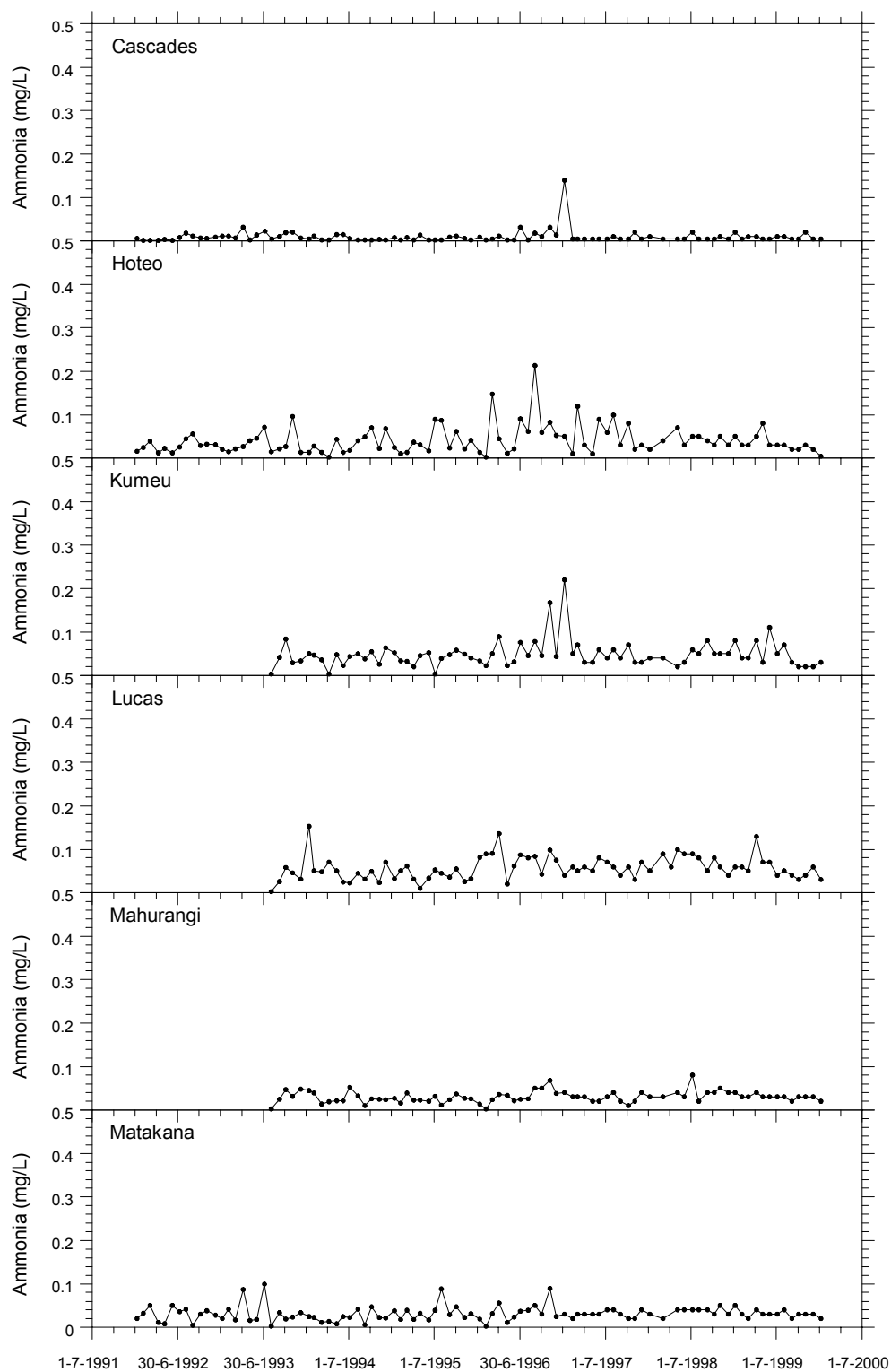
APPENDIX 9: AMMONIA – FRESHWATER**a) Ammonia (gN/m3) during January 1999 - December 1999**

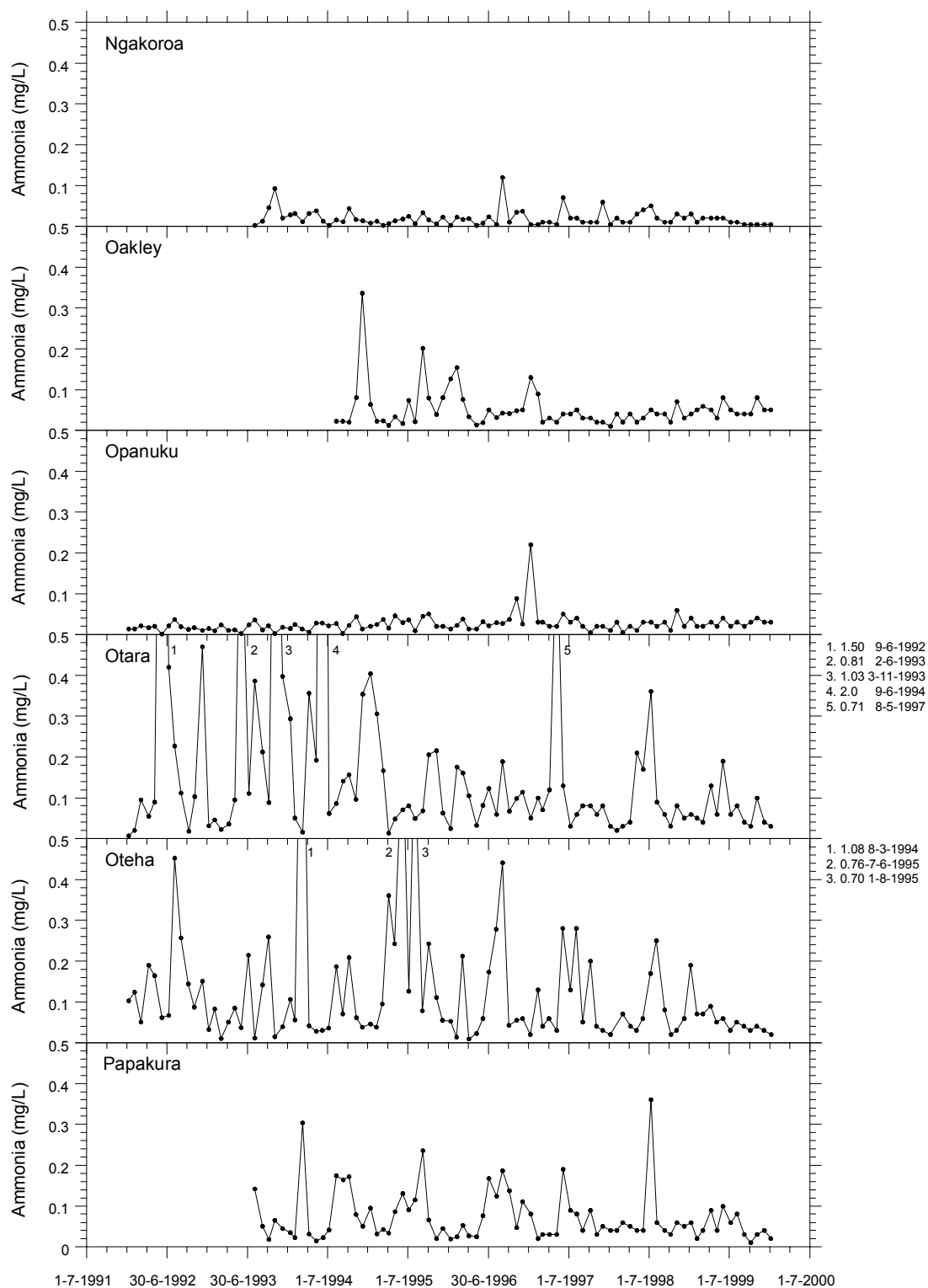
Date	Cascades	Hoteo	Kumeu	Lucas	Mahurangi	Matakana	Ngakoroa	Oakley	Opanuku	Otara	Oteha	Papakura	Puhinui	Rangitopuni	Wairoa	Waiwera
Jan-99	0.02	0.05	0.08	0.06	0.04	0.05	0.03	0.04	0.04	0.06	0.19	0.06	0.08	0.05	0.03	0.03
Feb-99	<0.01	0.03	0.04	0.06	0.03	0.03	0.01	0.05	0.02	0.05	0.07	0.02	0.05	0.08	0.01	0.01
Mar-99	0.01	0.03	0.04	0.05	0.03	0.02	0.02	0.06	0.02	0.04	0.07	0.04	0.03	0.04	0.02	0.02
Apr-99	0.01	0.05	0.08	0.13	0.04	0.04	0.02	0.05	0.03	0.13	0.09	0.09	0.12	0.05	0.05	0.05
May-99	<0.01	0.08	0.03	0.07	0.03	0.03	0.02	0.03	0.02	0.06	0.05	0.04	0.11	0.05	0.04	0.07
Jun-99	<0.01	0.03	0.11	0.07	0.03	0.03	0.02	0.08	0.04	0.19	0.06	0.10	0.13	0.05	0.05	0.03
Jul-99	0.01	0.03	0.05	0.04	0.03	0.03	0.01	0.05	0.02	0.06	0.03	0.06	0.06	0.03	0.02	0.03
Aug-99	0.01	0.03	0.07	0.05	0.03	0.04	0.01	0.04	0.03	0.08	0.05	0.08	0.05	0.07	0.04	0.05
Sep-99	<0.01	0.02	0.03	0.04	0.02	0.02	<0.01	0.04	0.02	0.04	0.04	0.03	0.06	0.04	0.02	0.02
Oct-99	<0.01	0.02	0.02	0.03	0.03	0.03	<0.01	0.04	0.03	0.03	0.03	0.01	0.05	0.04	0.04	0.04
Nov-99	0.02	0.03	0.02	0.04	0.03	0.03	<0.01	0.08	0.04	0.10	0.04	0.03	0.21	0.04	<0.01	0.02
Dec-99	<0.01	0.02	0.02	0.06	0.03	0.03	<0.01	0.05	0.03	0.04	0.03	0.04	0.04	0.03	0.02	0.01
median	0.01	0.03	0.04	0.06	0.03	0.03	0.02	0.05	0.03	0.06	0.05	0.04	0.06	0.05	0.03	0.03
IQR/median (%)	66.7	50.0	125.0	45.5	0.0	16.7	150.0	30.0	50.0	83.3	70.0	100.0	108.3	22.2	80.0	83.3

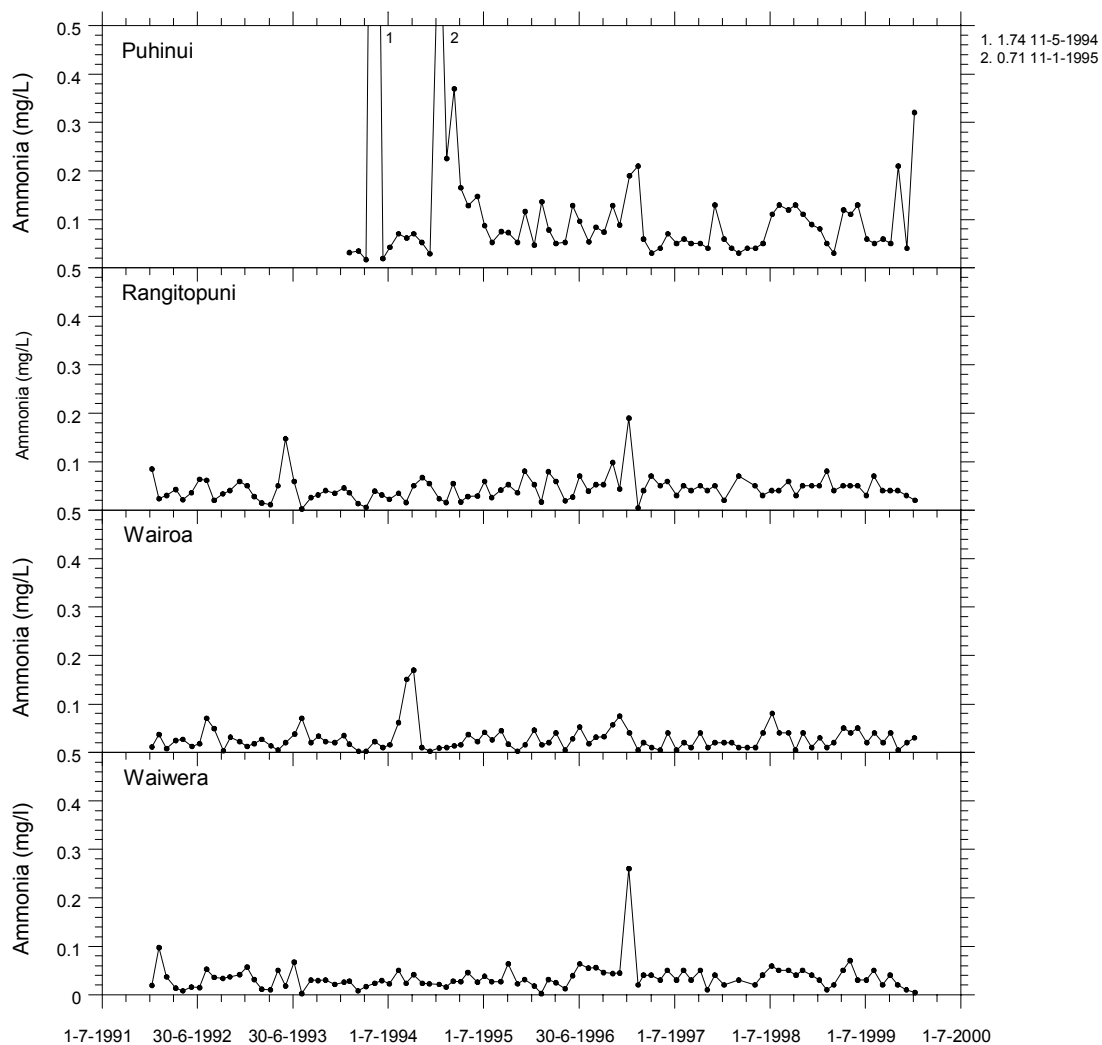
b) Statistical Summary for 1992-2000: Ammonia (gN/m3)

	Cascades	Hoteo	Kumeu	Lucas	Mahurangi	Matakana	Ngakoroa	Oakley	Opanuku	Otara	Oteha	Papakura	Puhinui	Rangitopuni	Wairoa	Waiwera
N	95	95	76	77	76	95	78	66	97	97	96	78	72	95	97	95
Median	0.01	0.03	0.04	0.05	0.03	0.03	0.01	0.04	0.02	0.08	0.06	0.05	0.07	0.04	0.02	0.03
Normality	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Seasonality	N	Y	N	N	N	Y	N	Y	N	N	N	Y	N	N	Y	N
Trend	NS	NS	NS	95%	80%	90%	NS	NS	99%	95%	95%	NS	NS	80%	NS	80%
Slope	NS	NS	NS	0.003	0.001	0.001	NS	NS	0.002	-0.008	-0.005	NS	NS	0.001	NS	0.001

c) The graphs on the following page show Ammonia (gN/m3) measurements from January 1992 to January 2000 (where data are available)







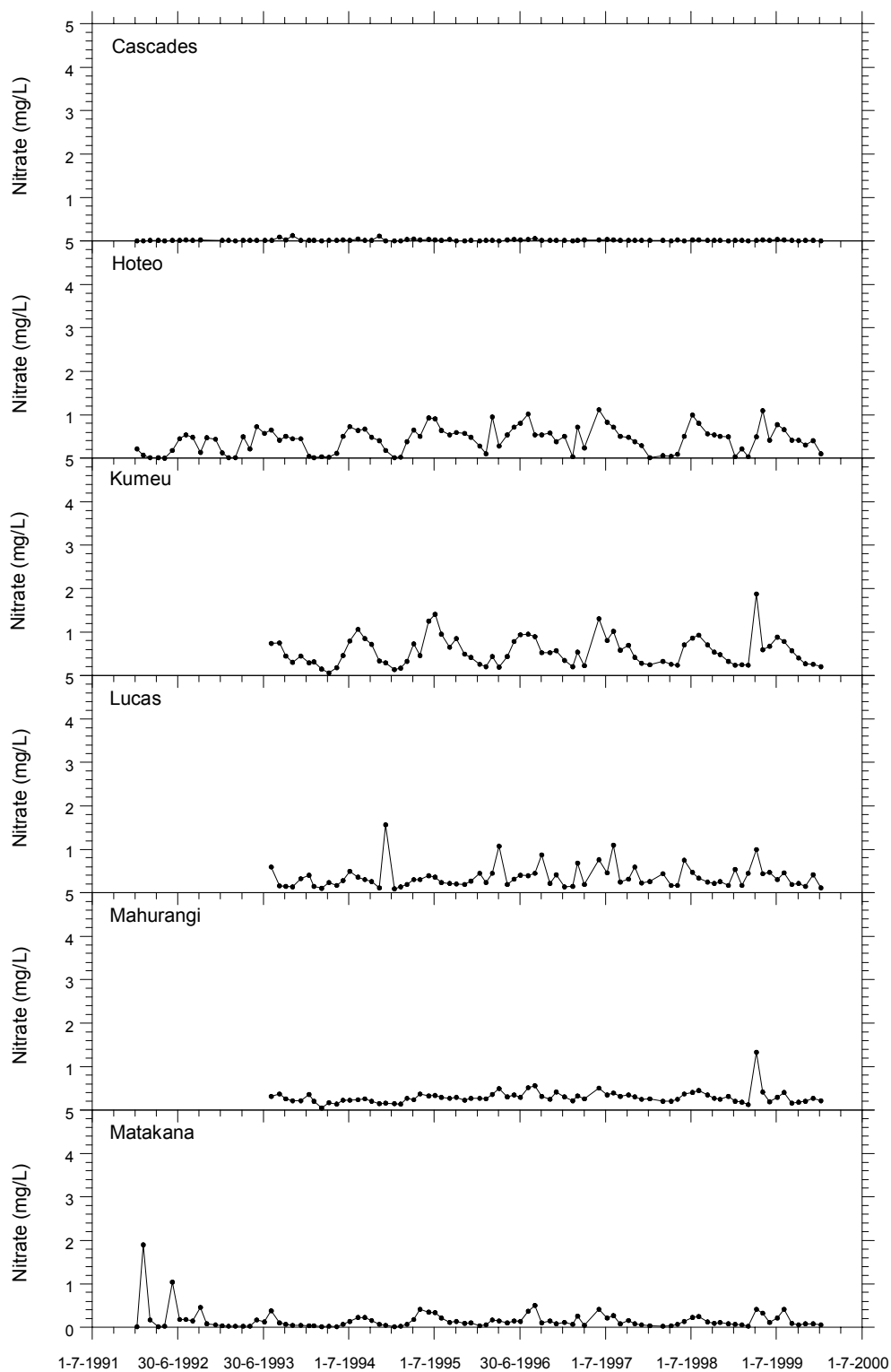
APPENDIX 10: NITRATE – FRESHWATER**a) Nitrate (gN/m3) during January 1999 - December 1999**

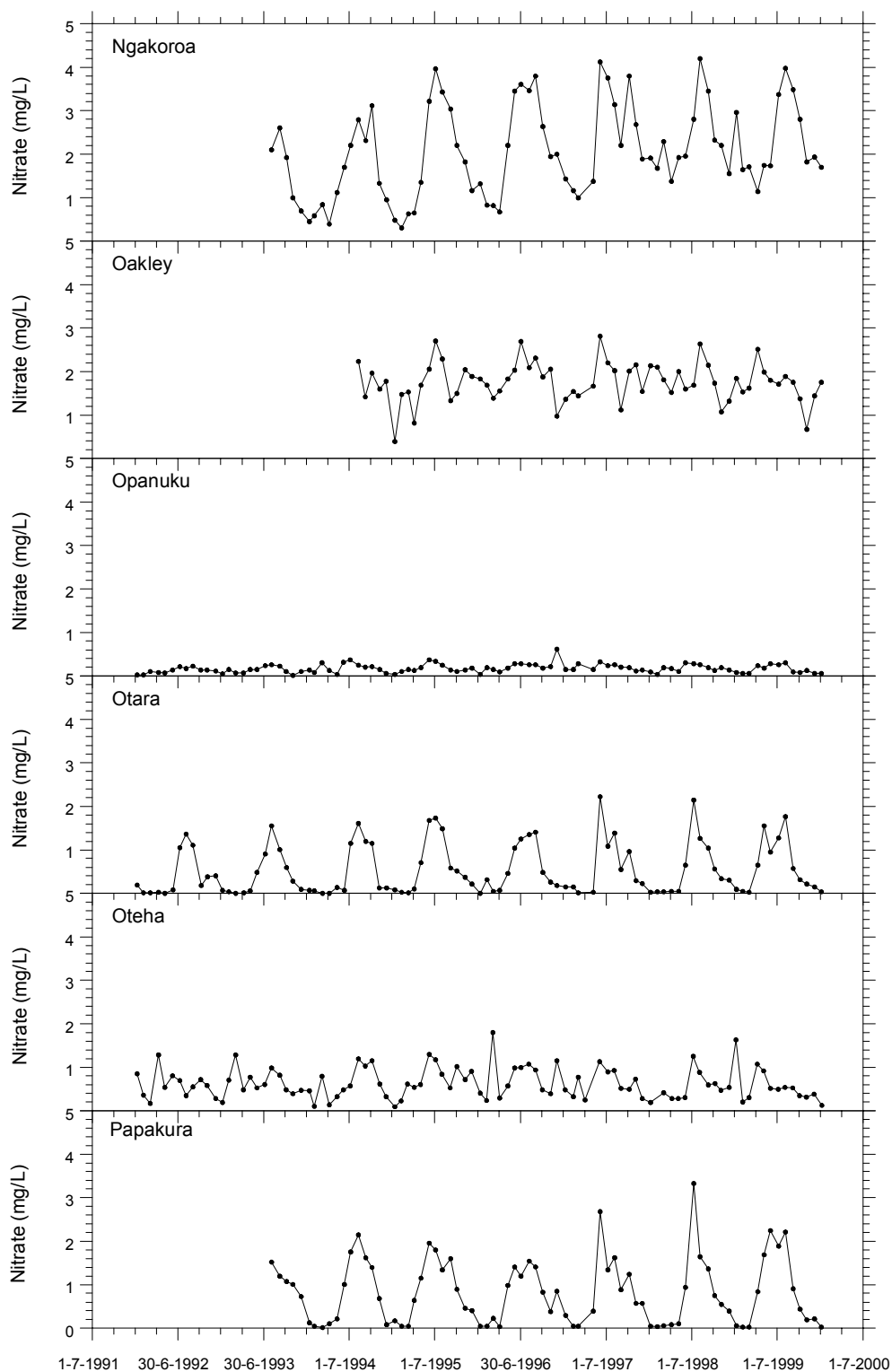
Date	Cascades	Hoteo	Kumeu	Lucas	Mahurangi	Matakana	Ngakoroa	Oakley	Opanuku	Otara	Oteha	Papakura	Puhinui	Rangitopuni	Wairoa	Waiwera
Jan-99	0.009	0.040	0.235	0.534	0.201	0.070	2.962	1.846	0.083	0.095	1.632	0.061	0.112	0.093	0.042	0.011
Feb-99	0.010	0.210	0.245	0.169	0.186	0.064	1.645	1.535	0.057	0.043	0.204	0.023	0.087	0.157	0.148	0.017
Mar-99	0.007	0.035	0.238	0.443	0.122	0.024	1.705	1.624	0.062	0.026	0.304	0.026	1.222	0.041	0.062	0.010
Apr-99	0.015	0.491	1.883	0.996	1.332	0.419	1.144	2.514	0.240	0.649	1.076	0.833	0.781	0.799	0.238	1.133
May-99	0.023	1.096	0.595	0.432	0.411	0.323	1.746	1.986	0.186	1.555	0.917	1.690	1.713	0.404	0.328	0.352
Jun-99	0.011	0.417	0.673	0.469	0.193	0.110	1.736	1.798	0.286	0.956	0.519	2.248	1.628	0.287	1.091	0.152
Jul-99	0.029	0.778	0.878	0.304	0.294	0.216	3.375	1.711	0.252	1.272	0.492	1.892	1.277	0.422	1.462	0.268
Aug-99	0.022	0.654	0.782	0.464	0.399	0.416	3.979	1.889	0.300	1.763	0.540	2.211	1.778	0.399	1.547	0.332
Sep-99	0.012	0.416	0.572	0.189	0.162	0.088	3.486	1.756	0.093	0.572	0.523	0.908	0.990	0.304	0.599	0.110
Oct-99	0.007	0.412	0.405	0.213	0.175	0.061	2.806	1.377	0.075	0.312	0.344	0.439	0.713	0.219	0.546	0.057
Nov-99	0.009	0.302	0.272	0.152	0.203	0.083	1.816	0.676	0.122	0.214	0.316	0.189	0.384	0.203	0.238	0.033
Dec-99	0.009	0.408	0.252	0.421	0.267	0.082	1.934	1.445	0.061	0.147	0.383	0.218	0.670	0.246	0.279	0.046
median	0.011	0.414	0.489	0.427	0.202	0.086	1.875	1.734	0.108	0.442	0.506	0.636	0.886	0.267	0.304	0.084
IQR/median (%)	90.5	76.4	98.1	62.3	82.2	236.8	77.2	21.8	165.1	224.7	78.8	261.9	104.5	83.1	214.8	329.3

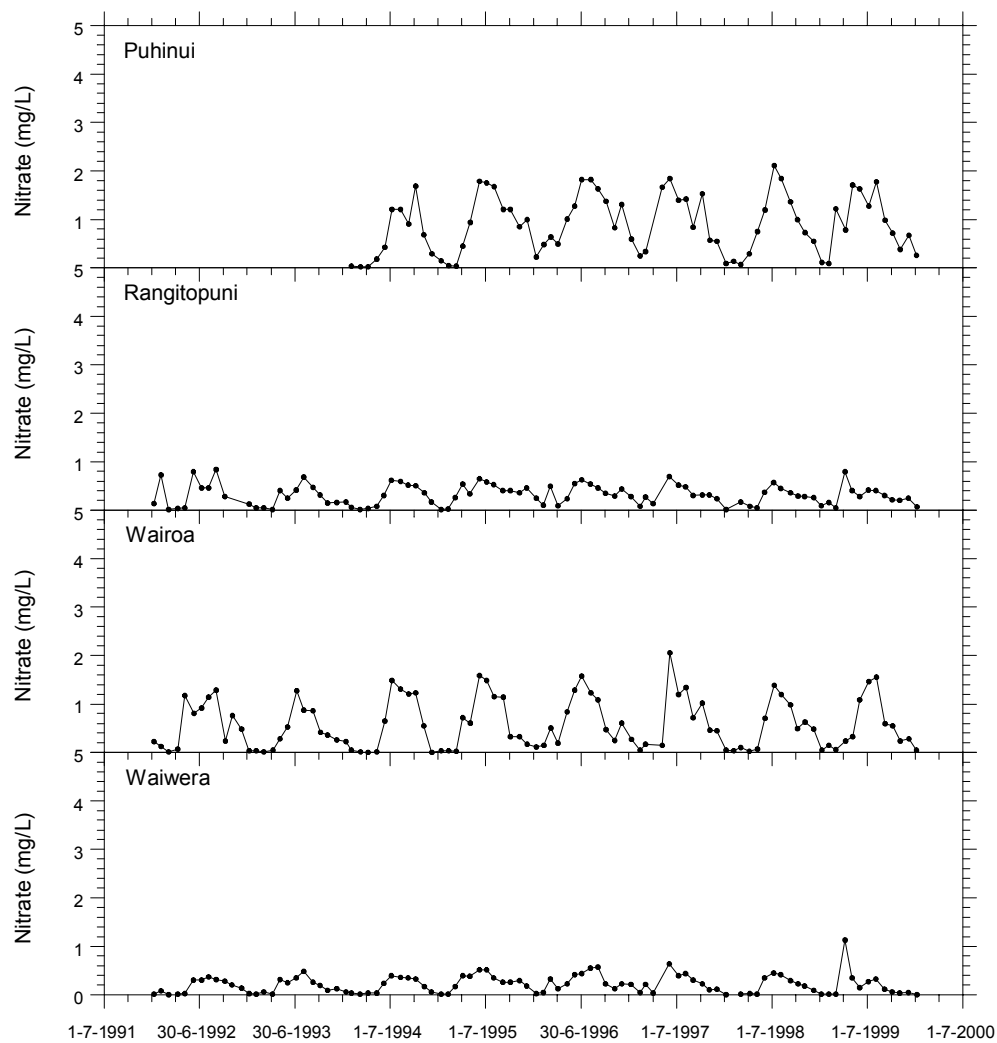
b) Statistical Summary for 1992-2000: Nitrate (gN/m3)

	Cascades	Hoteo	Kumeu	Lucas	Mahurangi	Matakana	Ngakoroa	Oakley	Opanuku	Otara	Oteha	Papakura	Puhinui	Rangitopuni	Wairoa	Waiwera
N	93	95	76	76	76	95	77	65	96	96	95	77	71	93	96	95
Median	0.017	0.474	0.474	0.292	0.266	0.101	1.917	1.756	0.149	0.288	0.539	0.725	0.838	0.304	0.467	0.203
Normality	N	N	N	N	N	N	Y	N	N	N	N	N	N	N	N	N
Seasonality	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Trend	NS	95%	NS	80%	NS	80%	95%	NS	80%	80%	NS	NS	NS	NS	NS	NS
Slope	NS	0.010	NS	0.010	NS	0.003	0.201	NS	0.004	0.005	NS	NS	NS	NS	NS	NS

c) The graphs on the following page show nitrate (gN/m3) measurements from January 1992 to January 2000 (where data are available)







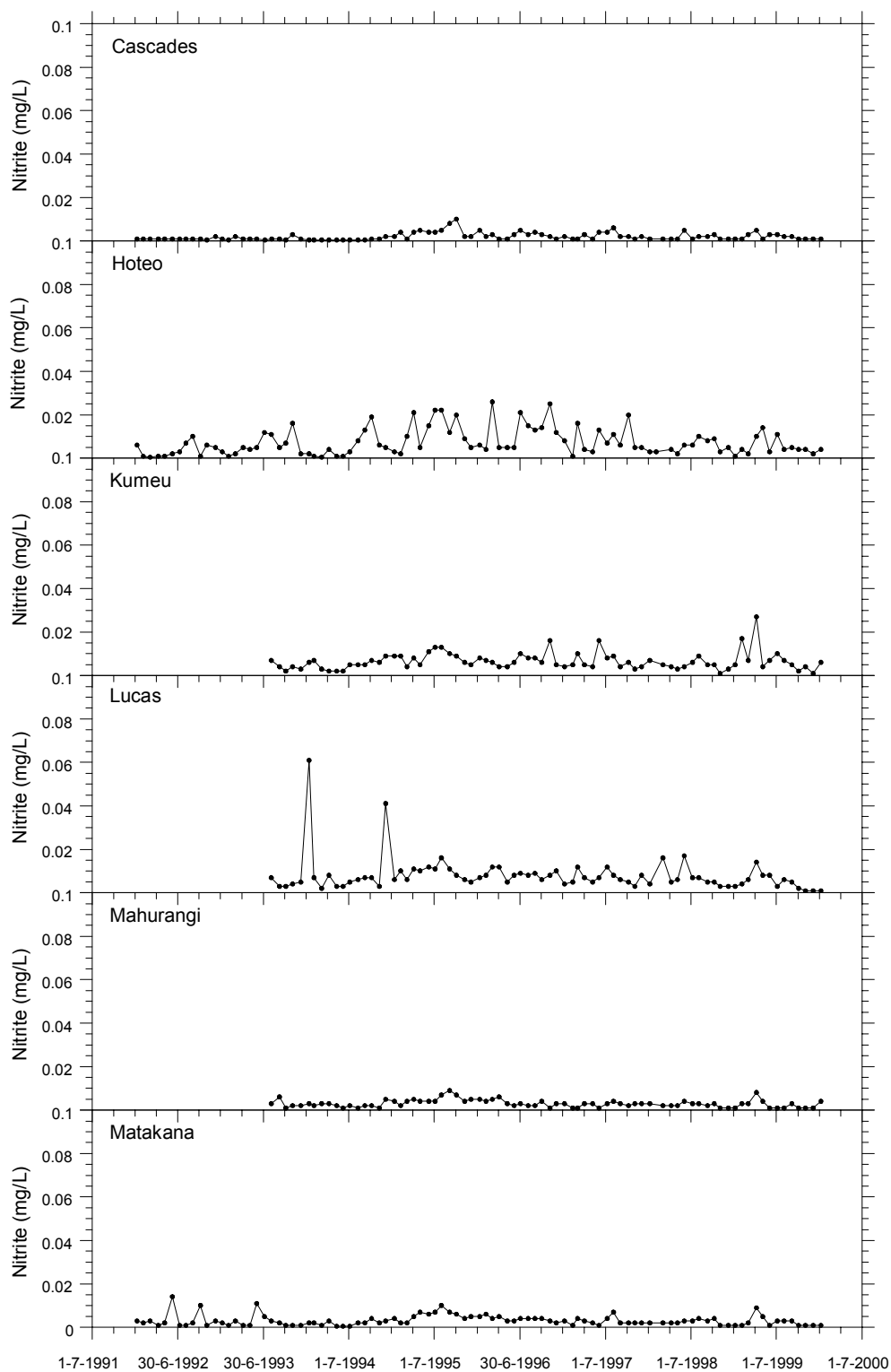
APPENDIX 11: NITRITE – FRESHWATER**a) Nitrite (gN/m3) during January 1999 - December 1999**

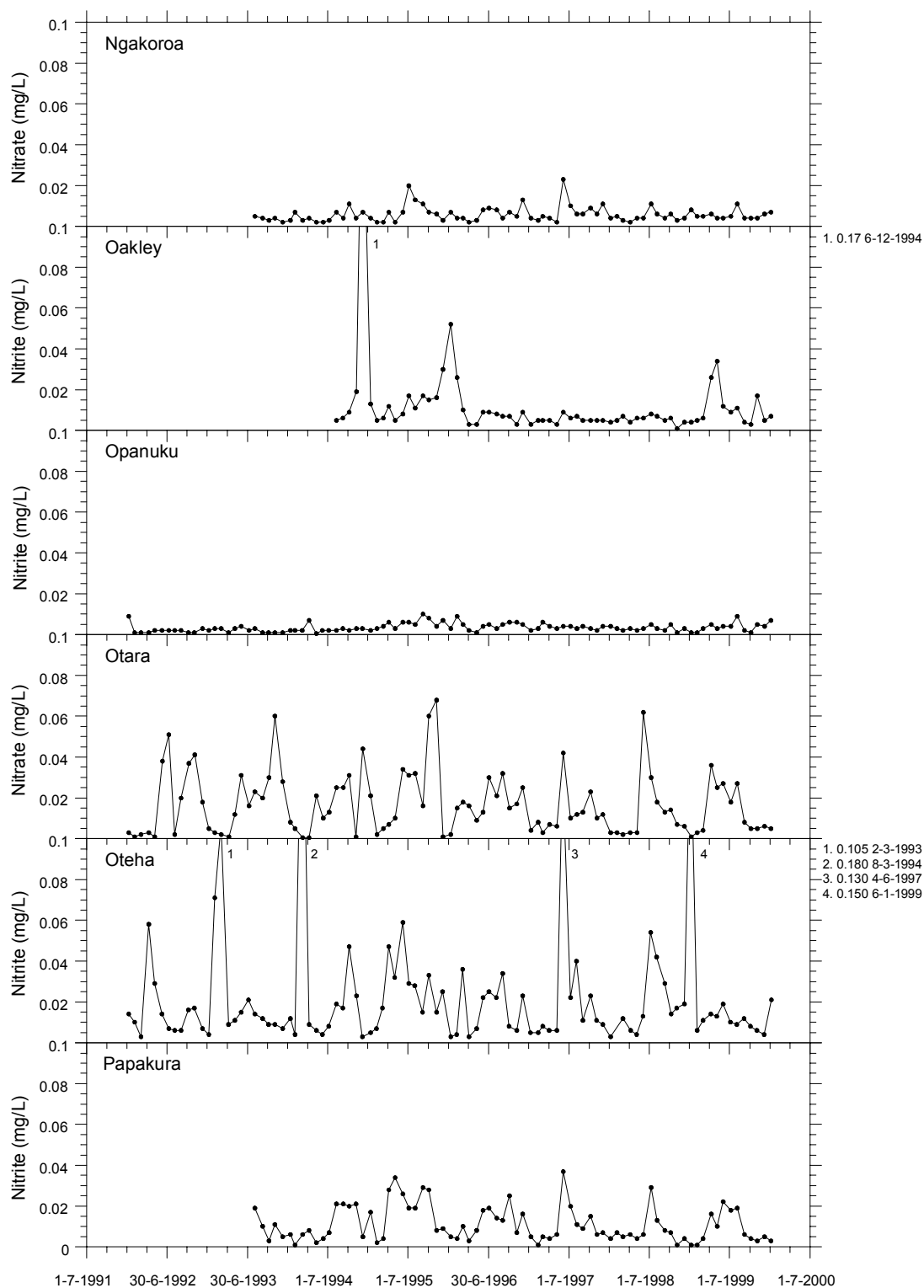
Date	Cascades	Hoteo	Kumeu	Lucas	Mahurangi	Matakana	Ngakoroa	Oakley	Opanuku	Otara	Oteha	Papakura	Puhinui	Rangitopuni	Wairoa	Waiwera
Jan-99	<0.002	<0.002	0.005	0.003	<0.002	<0.002	0.008	0.004	<0.002	<0.002	0.148	<0.002	0.004	<0.002	<0.002	<0.002
Feb-99	<0.002	0.004	0.017	0.004	0.003	<0.002	0.005	0.005	<0.002	0.003	0.006	<0.002	0.008	0.005	0.003	<0.002
Mar-99	0.003	0.002	0.007	0.006	0.003	0.002	0.005	0.006	0.003	0.004	0.011	0.004	0.008	0.003	0.004	0.003
Apr-99	0.005	0.010	0.027	0.014	0.008	0.009	0.006	0.026	0.005	0.036	0.014	0.016	0.023	0.015	0.006	0.017
May-99	<0.002	0.014	0.004	0.008	0.004	0.005	0.004	0.034	0.003	0.025	0.013	0.010	0.017	0.008	0.004	0.006
Jun-99	0.003	0.003	0.007	0.008	<0.002	<0.002	0.004	0.012	0.004	0.027	0.019	0.022	0.022	0.003	0.009	0.002
Jul-99	0.003	0.011	0.010	0.003	<0.002	0.003	0.005	0.009	0.004	0.018	0.010	0.018	0.013	0.006	0.008	0.005
Aug-99	0.002	0.004	0.007	0.006	<0.002	0.003	0.011	0.011	0.009	0.027	0.009	0.019	0.012	0.008	0.013	0.005
Sep-99	0.002	0.005	0.005	0.005	0.003	0.003	0.004	0.004	0.002	0.008	0.012	0.006	0.010	0.006	0.003	0.003
Oct-99	<0.002	0.004	0.002	0.002	<0.002	<0.002	0.004	0.003	<0.002	0.005	0.008	0.004	0.008	0.003	0.003	<0.002
Nov-99	<0.002	0.004	0.004	<0.002	<0.002	<0.002	0.004	0.017	0.005	0.005	0.006	0.003	0.005	0.004	0.003	0.003
Dec-99	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	0.006	0.005	0.004	0.006	0.004	0.005	0.014	0.003	0.006	<0.002
median	0.002	0.004	0.007	0.006	<0.002	0.002	0.005	0.008	0.004	0.008	0.011	0.008	0.011	0.005	0.004	0.003
IQR/median (%)	*	125.0	75.0	100.0	*	133.3	40.0	133.3	85.7	307.1	61.9	245.5	68.2	88.9	100.0	133.3

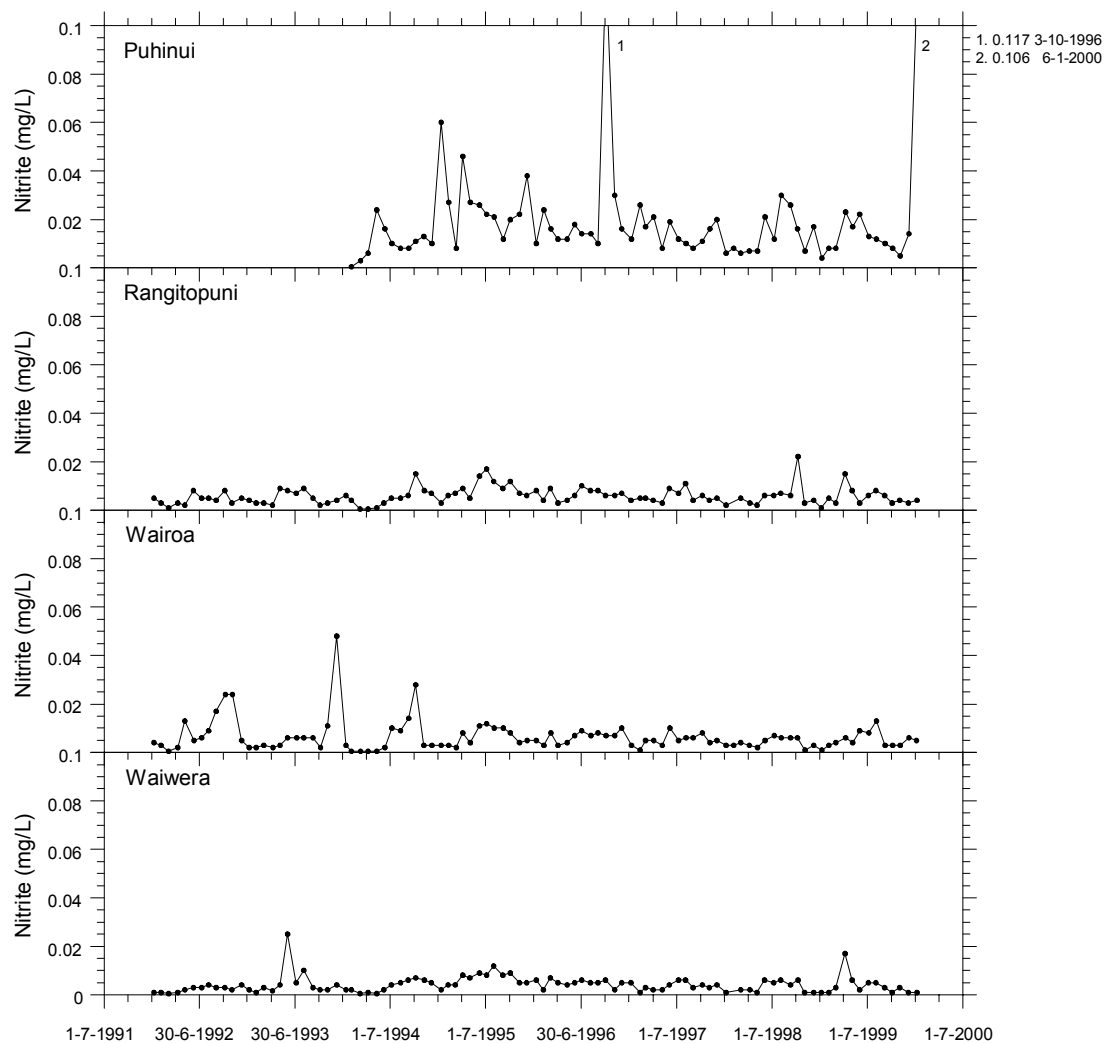
b) Statistical Summary for 1992-2000: Nitrite (gN/m3)

	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	0.001	0.005	0.006	0.006	0.003	0.003	0.005	0.007	0.003	0.013	0.013	0.008	0.014	0.005	0.005	0.004
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	N	N	Y	Y	Y	N	Y	Y	Y
Trend	*	NS	NS	90%	90%	NS	80%	95%	99%	80%	NS	90%	NS	NS	NS	NS
Slope	*	NS	NS	<0.001	<0.001	NS	<0.001	-0.001	<0.001	-0.001	NS	<0.001	NS	NS	NS	NS

c) The graphs on the following page show nitrite (gN/m3) measurements from January 1992 to January 2000 (where data are available)







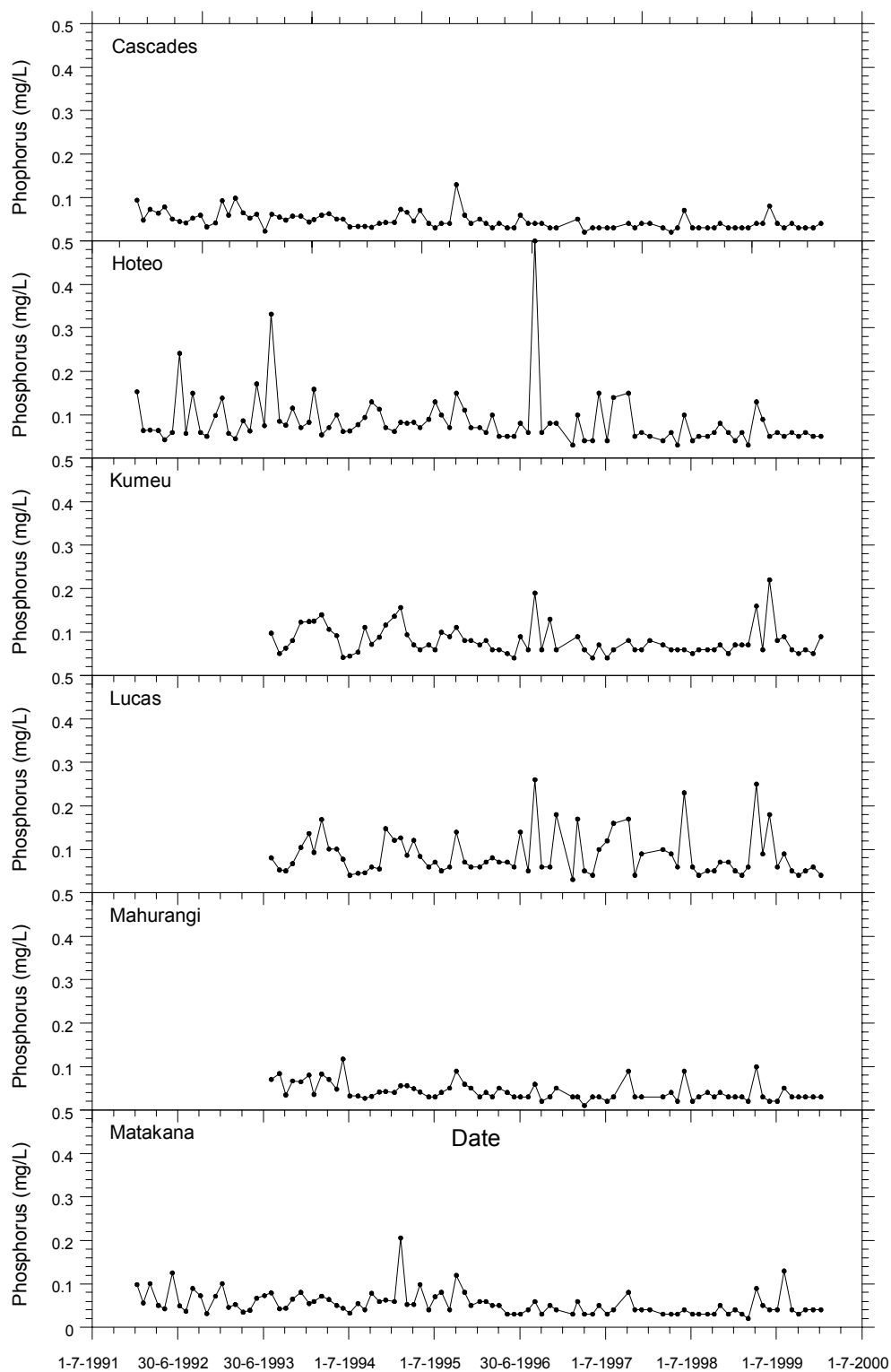
APPENDIX 12: TOTAL PHOSPHORUS – FRESHWATER**a) Total phosphorus (g P/m3) during January 1999 - December 1999**

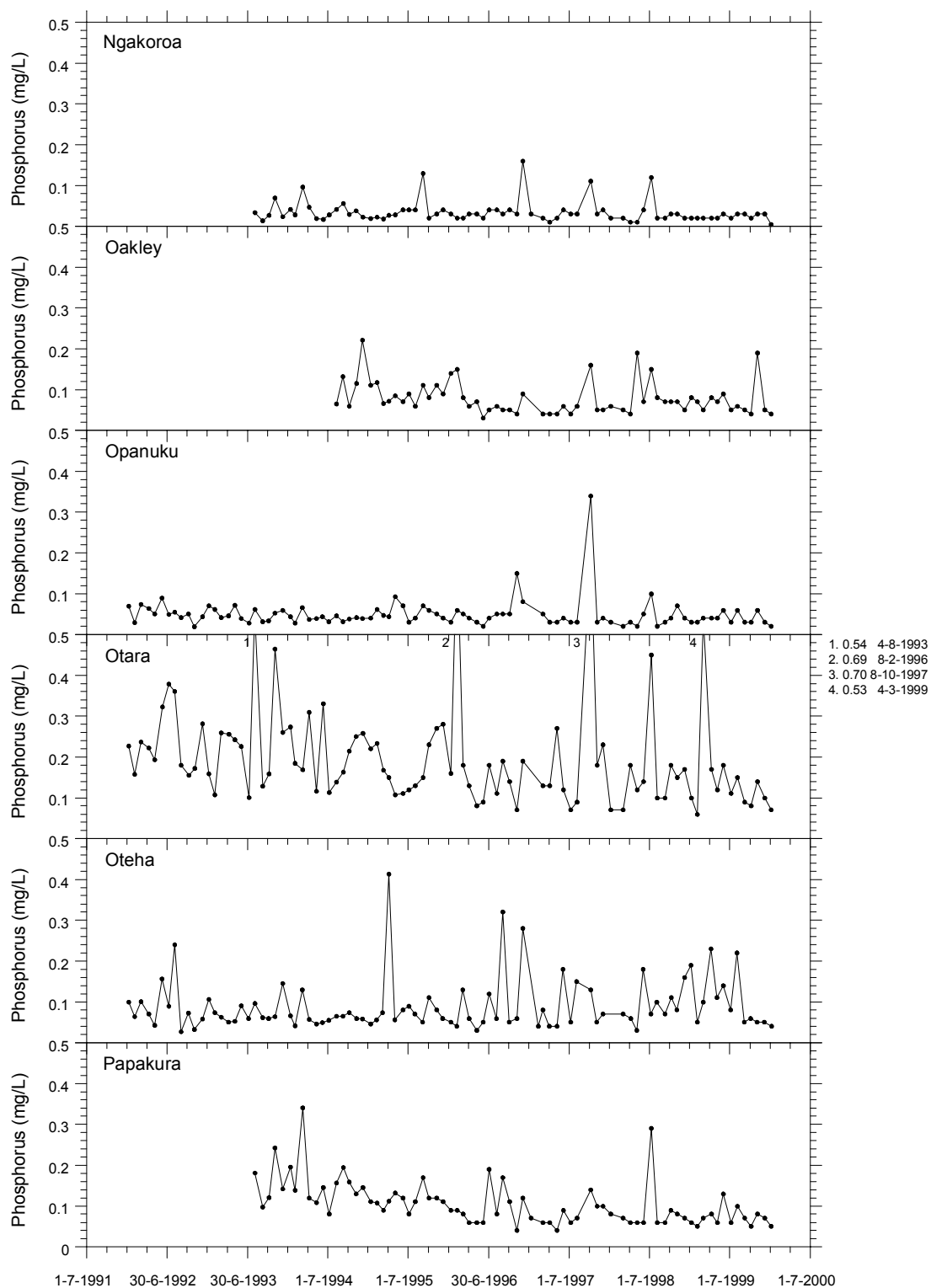
Date	Cascades	Hoteo	Kumeu	Lucas	Mahurangi	Matakana	Ngakoroa	Oakley	Opanuku	Otara	Oteha	Papakura	Puhinui	Rangitopuni	Wairoa	Waiwera
Jan-99	0.030	0.040	0.070	0.050	0.030	0.040	0.020	0.080	0.030	0.100	0.190	0.060	0.070	0.050	0.030	0.030
Feb-99	0.030	0.060	0.070	0.040	0.030	0.030	0.020	0.070	0.030	0.060	0.050	0.050	0.050	0.070	0.040	0.030
Mar-99	0.030	0.030	0.070	0.060	0.020	0.020	0.020	0.050	0.040	0.530	0.100	0.070	0.070	0.070	0.070	0.030
Apr-99	0.040	0.130	0.160	0.250	0.100	0.090	0.020	0.080	0.040	0.170	0.230	0.080	0.130	0.180	0.060	0.110
May-99	0.040	0.090	0.060	0.090	0.030	0.050	0.020	0.070	0.040	0.120	0.110	0.060	0.100	0.120	0.050	0.060
Jun-99	0.080	0.050	0.220	0.180	0.020	0.040	0.030	0.090	0.060	0.180	0.140	0.130	0.090	0.060	0.080	0.060
Jul-99	0.040	0.060	0.080	0.060	0.020	0.040	0.020	0.050	0.030	0.110	0.080	0.060	0.050	0.080	0.050	0.040
Aug-99	0.030	0.050	0.090	0.090	0.050	0.130	0.030	0.060	0.060	0.150	0.220	0.100	0.070	0.200	0.070	0.060
Sep-99	0.040	0.060	0.060	0.050	0.030	0.040	0.030	0.050	0.030	0.090	0.050	0.070	0.060	0.060	0.040	0.040
Oct-99	0.030	0.050	0.050	0.040	0.030	0.030	0.020	0.040	0.030	0.080	0.060	0.050	0.060	0.050	0.030	0.040
Nov-99	0.030	0.060	0.060	0.050	0.030	0.040	0.030	0.190	0.060	0.140	0.050	0.080	0.200	0.080	0.050	0.040
Dec-99	0.030	0.050	0.050	0.060	0.030	0.040	0.030	0.050	0.030	0.100	0.050	0.070	0.060	0.060	0.040	0.040
median	0.030	0.055	0.070	0.060	0.030	0.040	0.020	0.065	0.035	0.115	0.090	0.070	0.070	0.070	0.050	0.040
IQR/median (%)	33.3	18.2	35.7	66.7	16.7	25.0	50.0	46.2	57.1	56.5	127.8	28.6	50.0	57.1	50.0	62.5

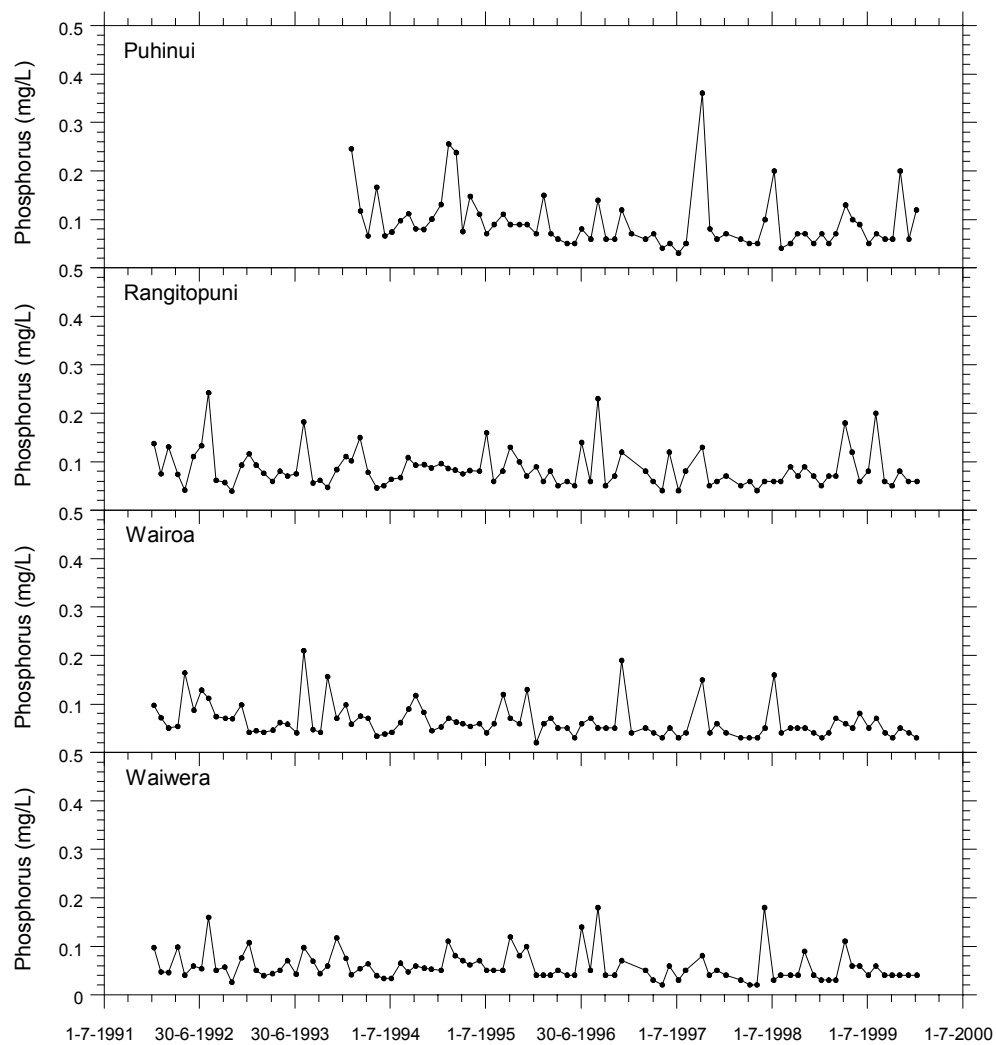
b) Statistical Summary for 1992-2000: Total phosphorus (g P/m3)

	Cascades	Hoteo	Kumeu	Lucas	Mahurangi	Matakana	Ngakoroa	Oakley	Opanuku	Otara	Oteha	Papakura	Puhinui	Rangitopuni	Wairoa	Waiwera
N	93	94	74	74	74	94	75	62	93	93	93	75	69	93	94	93
Median	0.040	0.068	0.070	0.070	0.032	0.050	0.030	0.070	0.040	0.168	0.065	0.090	0.070	0.075	0.050	0.050
Normality	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Seasonality	N	N	N	N	N	N	Y	N	N	N	N	N	N	N	N	N
Trend	99%	99%	95%	80%	99%	99%	95%	95%	99%	99%	NS	99%	99%	90%	99%	99%
Slope	-0.003	-0.004	-0.003	-0.002	-0.003	-0.004	-0.001	-0.005	-0.002	-0.014	0.000	-0.013	-0.006	-0.002	-0.004	-0.002

c) The graphs on the following page show total phosphorus (g P/m3) measurements from January 1992 to January 2000 (where data are available)







APPENDIX 13: DISSOLVED REACTIVE PHOSPHORUS – FRESHWATER**a) Dissolved reactive phosphorus (g P/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	0.020	0.020	0.030	0.020	0.010	0.020	0.010	0.030	0.010	0.020	0.140	0.030	0.030	0.020	0.020	0.010
Feb-99	0.020	0.030	0.030	0.020	0.010	0.010	0.010	0.050	0.010	0.020	0.020	0.020	0.020	0.020	0.020	0.010
Mar-99	0.020	0.010	0.020	0.010	<0.01	<0.01	0.010	0.020	0.020	0.020	0.020	0.030	0.020	0.020	0.020	0.010
Apr-99	0.020	0.020	0.020	0.010	0.010	0.010	0.010	0.020	0.010	0.040	0.010	0.020	0.020	0.020	0.020	0.010
May-99	0.020	0.020	0.010	<0.01	<0.01	<0.01	<0.01	0.010	<0.01	0.030	0.020	0.020	0.020	0.030	0.020	0.010
Jun-99	0.020	0.020	0.020	0.020	0.010	0.010	0.010	0.020	0.020	0.050	0.030	0.030	0.020	0.010	0.020	0.010
Jul-99	0.020	0.020	0.010	0.010	0.010	0.010	0.010	0.020	0.020	0.030	0.020	0.020	0.020	0.020	0.020	0.020
Aug-99	0.020	0.020	0.010	0.010	0.010	0.010	0.010	0.030	0.020	0.030	0.010	0.020	0.020	0.020	0.020	0.010
Sep-99	0.020	0.020	0.020	0.010	0.010	0.010	0.010	0.020	0.010	0.030	0.020	0.030	0.010	0.020	0.020	0.010
Oct-99	0.020	0.020	0.020	0.020	0.010	0.010	0.010	0.020	0.010	0.030	0.020	0.020	0.020	0.020	0.020	0.010
Nov-99	0.020	<0.01	0.020	<0.01	<0.01	<0.01	0.010	0.020	0.020	0.030	<0.01	0.030	0.050	0.030	0.020	0.010
Dec-99	0.010	0.020	0.010	0.010	<0.01	<0.01	<0.01	0.020	<0.01	0.030	0.020	0.020	<0.01	0.010	0.010	0.010
median	0.020	0.020	0.020	0.010	0.010	0.010	0.010	0.020	0.015	0.030	0.020	0.020	0.020	0.020	0.020	0.010
IQR/median (%)	0.0	0.0	50.0	100.0	50.0	50.0	0.0	25.0	100.0	16.7	25.0	50.0	0.0	0.0	0.0	0.0

b) Statistical Summary for 1992-2000: Dissolved reactive phosphorus (g P/m3)

	Cascades	Hoteo	Kumeu	Lucas	Mahurangi	Matakana	Ngakoroa	Oakley	Opanuku	Otara	Oteha	Papakura	Puhinui	Rangitopuni	Wairoa	Waiwera
N	93	93	74	74	75	94	76	64	95	95	93	76	70	93	95	93
Median	0.020	0.020	0.020	0.018	0.010	0.015	0.010	0.020	0.012	0.032	0.020	0.030	0.020	0.020	0.020	0.013
Normality	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Seasonality	Y	N	Y	N	N	N	N	N	N	Y	N	N	N	N	N	N
Trend	80%	99%	95%	99%	99%	99%	80%	95%	NS	95%	80%	99%	NS	99%	80%	95%
Slope	<0.001	-0.001	-0.001	-0.002	-0.001	-0.001	<0.001	<0.001	NS	-0.002	<0.001	-0.001	<0.001	-0.001	<0.001	<0.001

c) The graphs on the following page show dissolved reactive phosphorus (g P/m3) measurements from January 1992 to January 2000 (where data are available)

