

Appendix F. Water Quality Calibration Results

The constituent generation models were calibrated against available water quality data as described in **Section 7**. Primary monitoring sites were defined as those where sufficient (30+) data points were available during the calibration period. Additional calibration checks were also undertaken against the secondary monitoring sites.

Time series plots and summary statistics are presented below for all primary and secondary calibration monitoring sites. The timeseries plots display a consistent temporal period (June 1998 to June 2016) to allow easy comparison between sites, and cover the period over which the majority of the water quality samples were collected.

F.1 Total Nitrogen Results

The Kaituna WMA total nitrogen results are presented in **Figure F-1** to **Figure F-13**, the Rangitāiki WMA results are presented in **Figure F-14** to **Figure-22**.

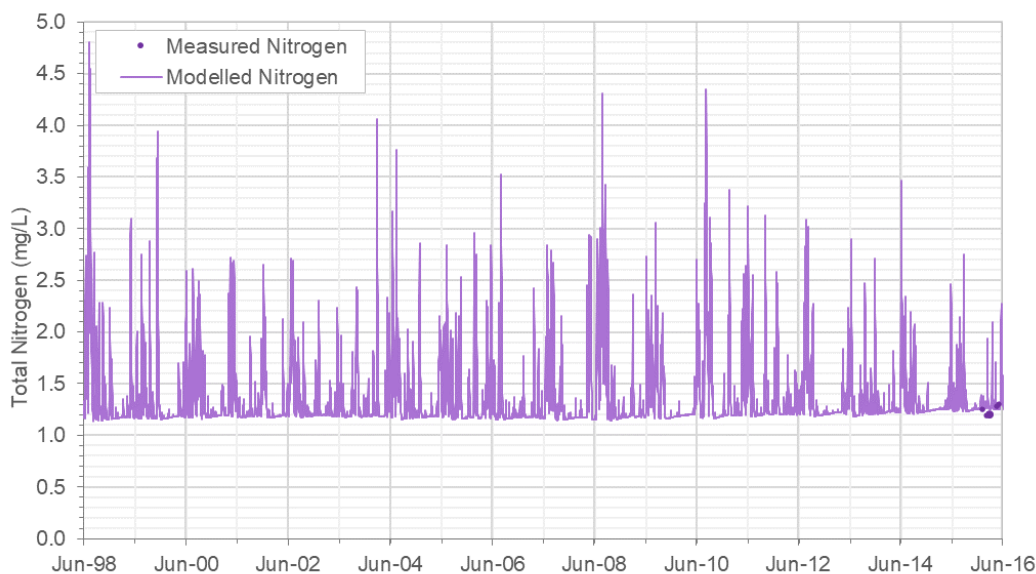


Figure F-1. Comparison of measured and modelled total nitrogen for SC#10. Secondary site: Paraiti (Mangorewa) at Saunders.

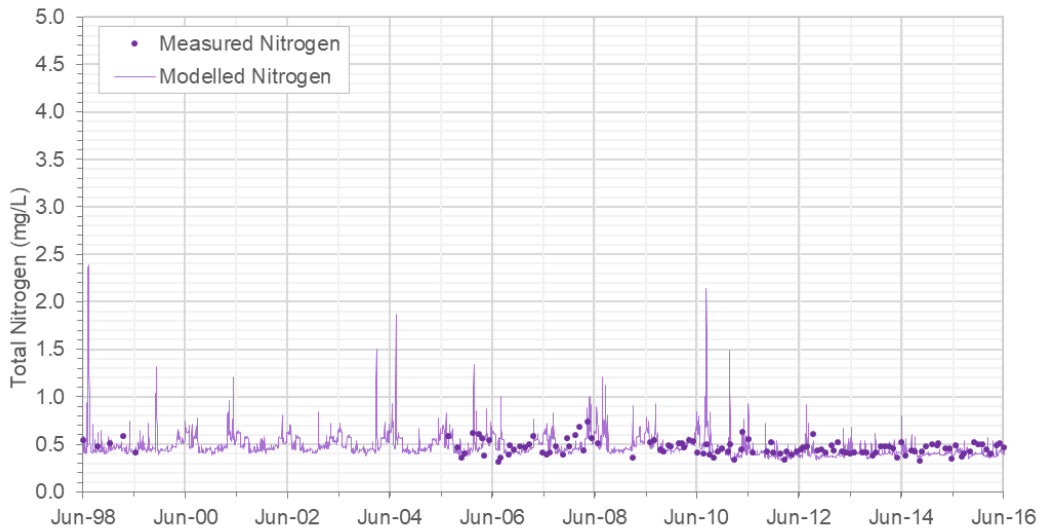


Figure F-2. Comparison of measured and modelled total nitrogen for SC#22. Primary site: Kaituna at Maungarangi Rd.

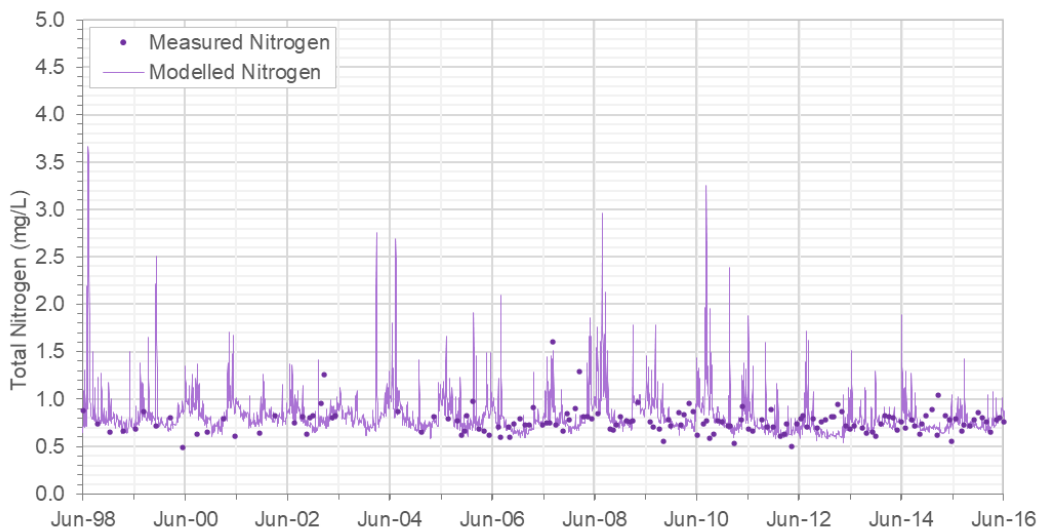


Figure F-3. Comparison of measured and modelled total nitrogen for SC#26. Primary site: Kaituna at Te Matai.

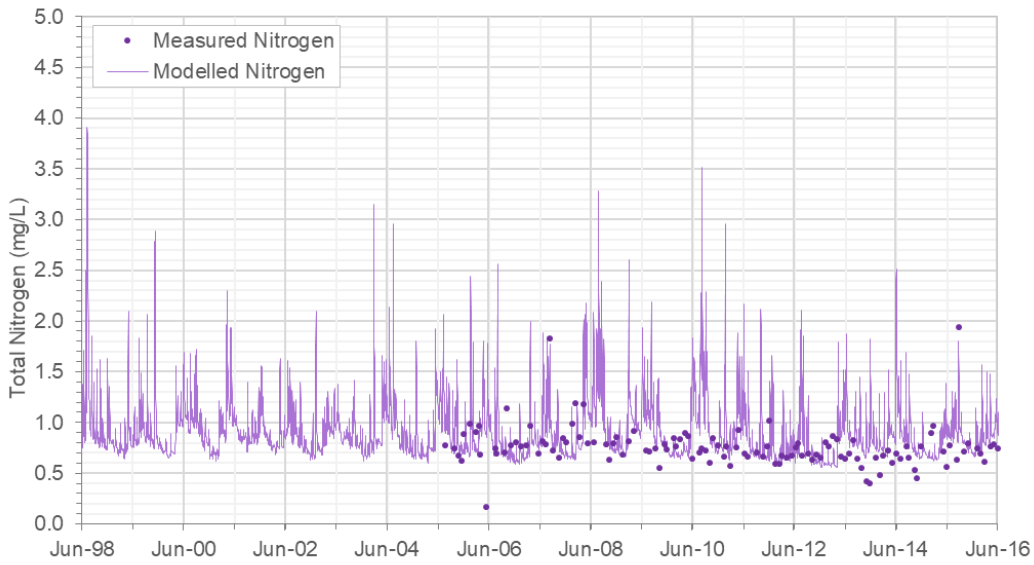


Figure F-4. Comparison of measured and modelled total nitrogen for SC#53. Primary site: Kaituna at Clarke's.

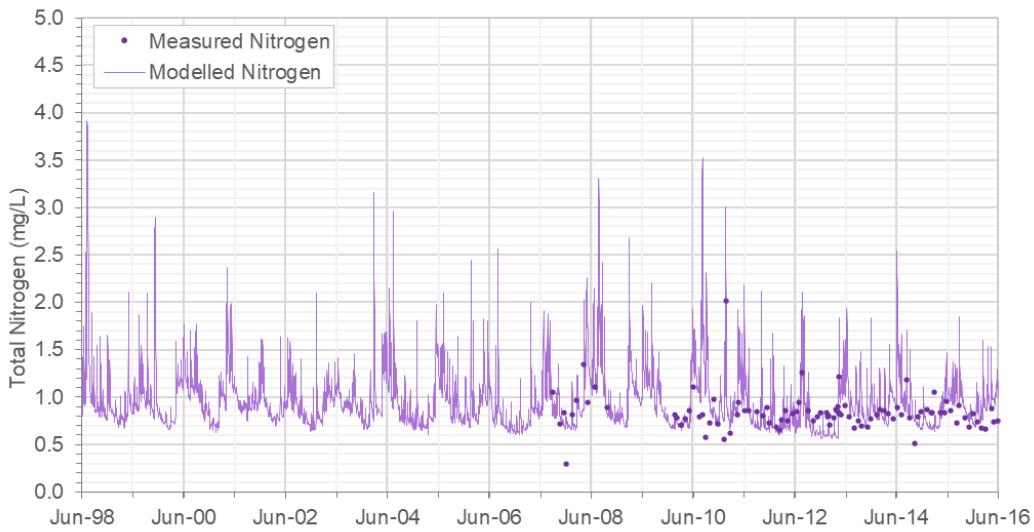


Figure F-5. Comparison of measured and modelled total nitrogen for SC#57. Primary site: Kaituna at Te Tumu.

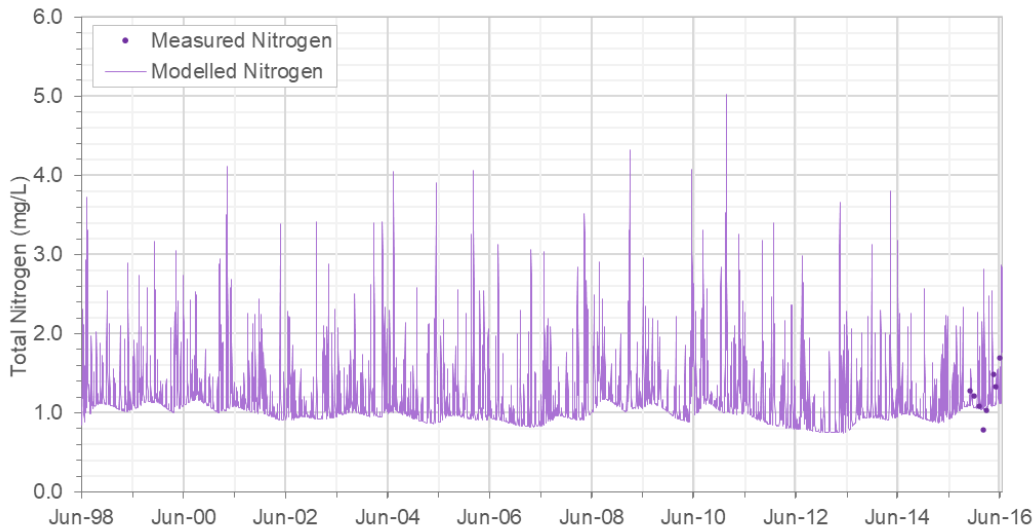


Figure F-6. Comparison of measured and modelled total nitrogen for SC#77. Secondary site: Puanene at SH2.

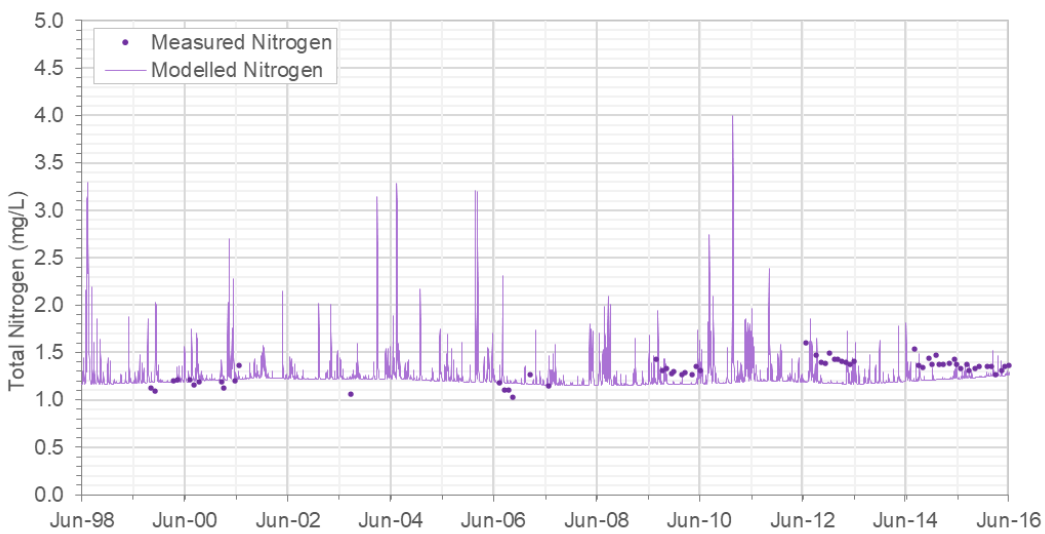


Figure F-7. Comparison of measured and modelled total nitrogen for SC#96 forest. Primary site: Pongakawa at Pumphouse.

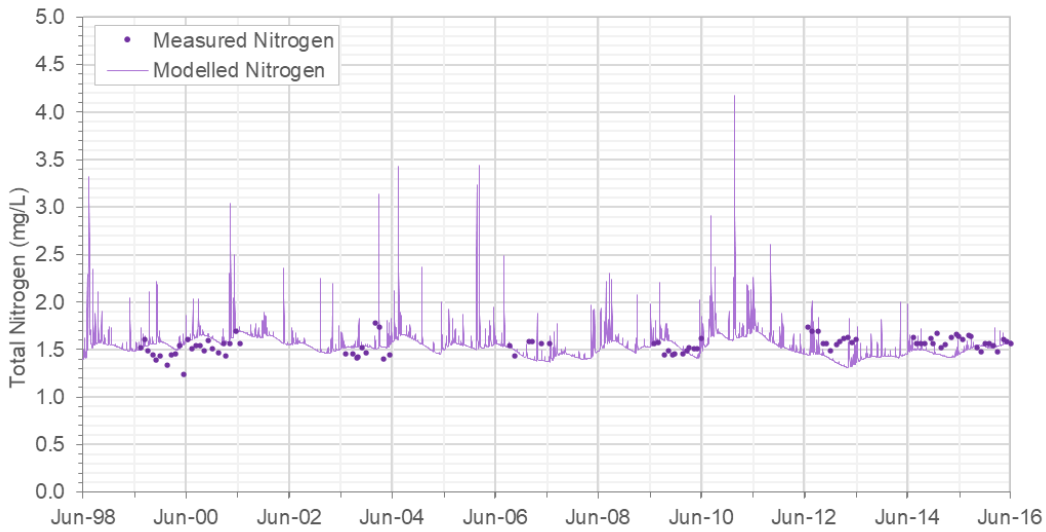


Figure F-8. Comparison of measured and modelled total nitrogen for SC#96. Primary site: Pongakawa at Old Coach Rd.

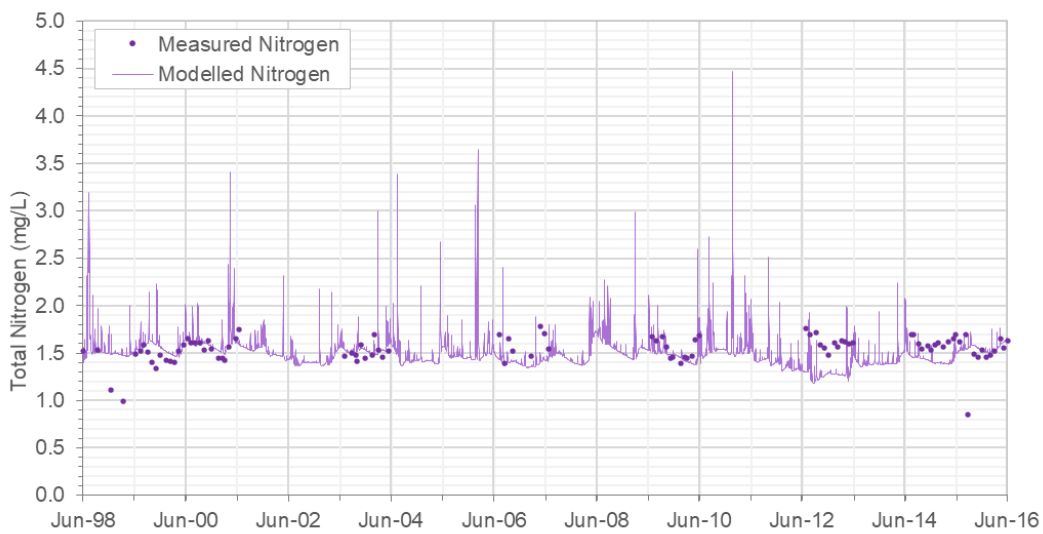


Figure F-9. Comparison of measured and modelled total nitrogen for SC#98. Primary Site: Pongakawa at SH2.

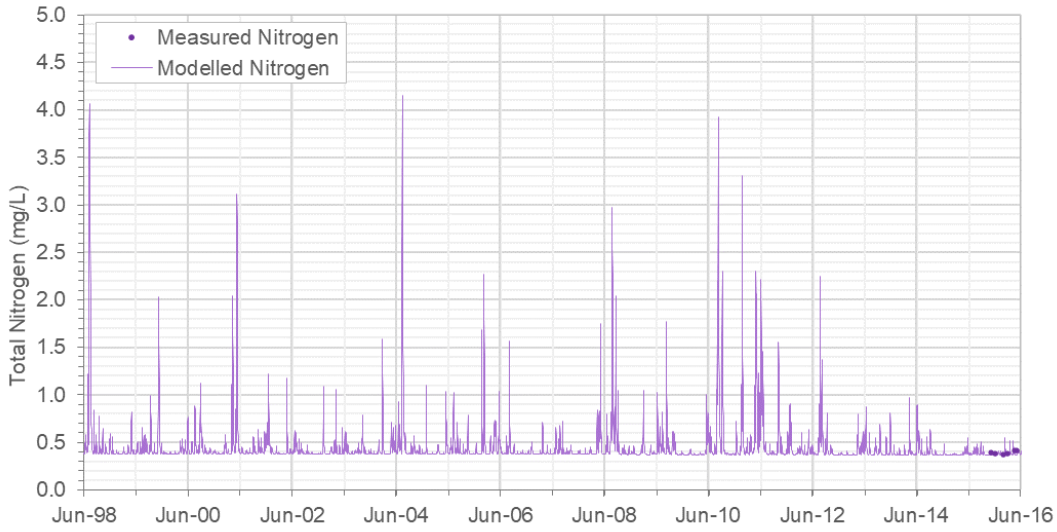


Figure F-10. Comparison of measured and modelled total nitrogen for SC#105. Secondary site: Waitahanui at u/s Campbell Rd.

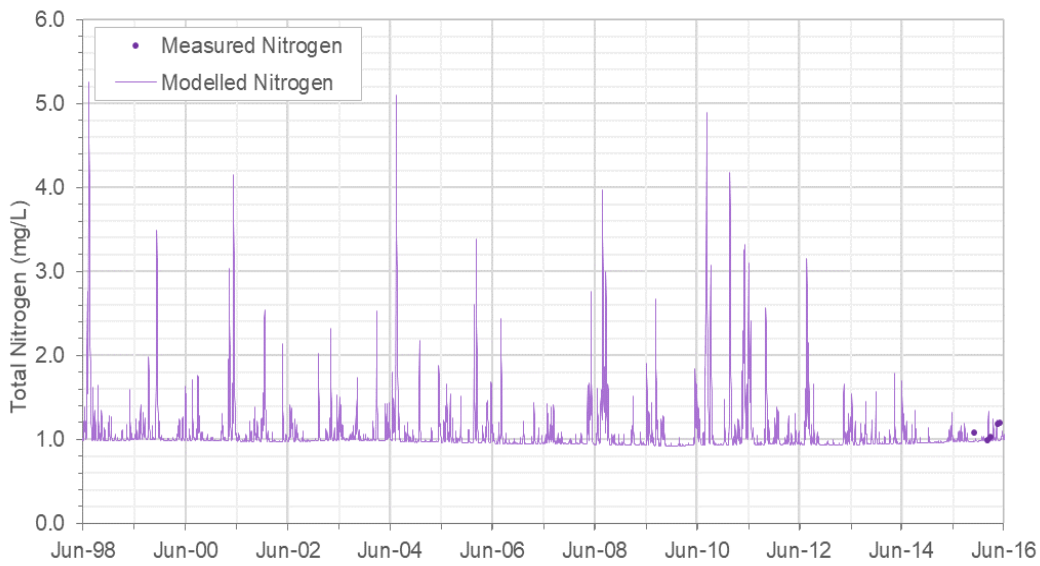


Figure F-11. Comparison of measured and modelled total nitrogen for SC#110. Secondary site: Morepara at u/s Pikowai Rd.

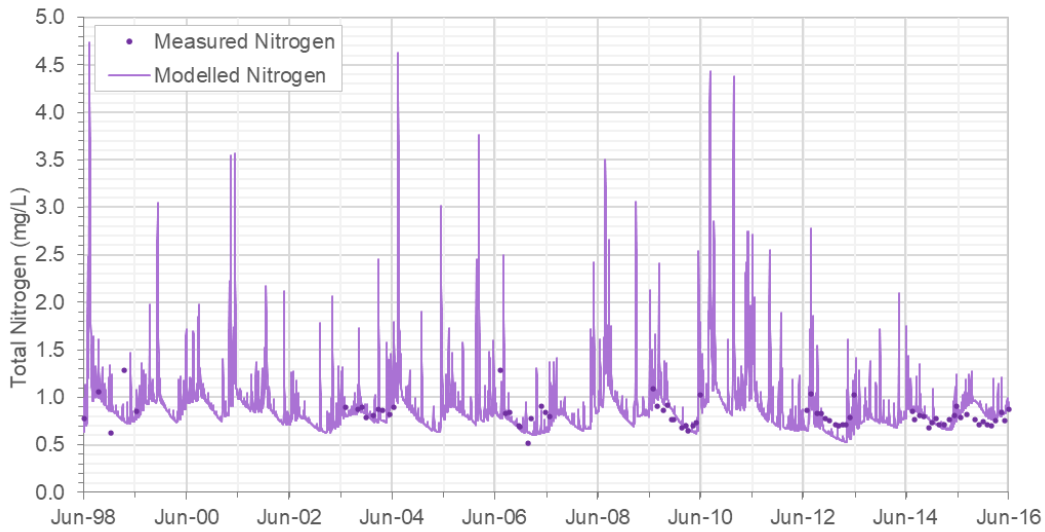


Figure F-12. Comparison of measured and modelled total nitrogen for SC#114. Primary site: Waitahanui at Otamarakau Marae.

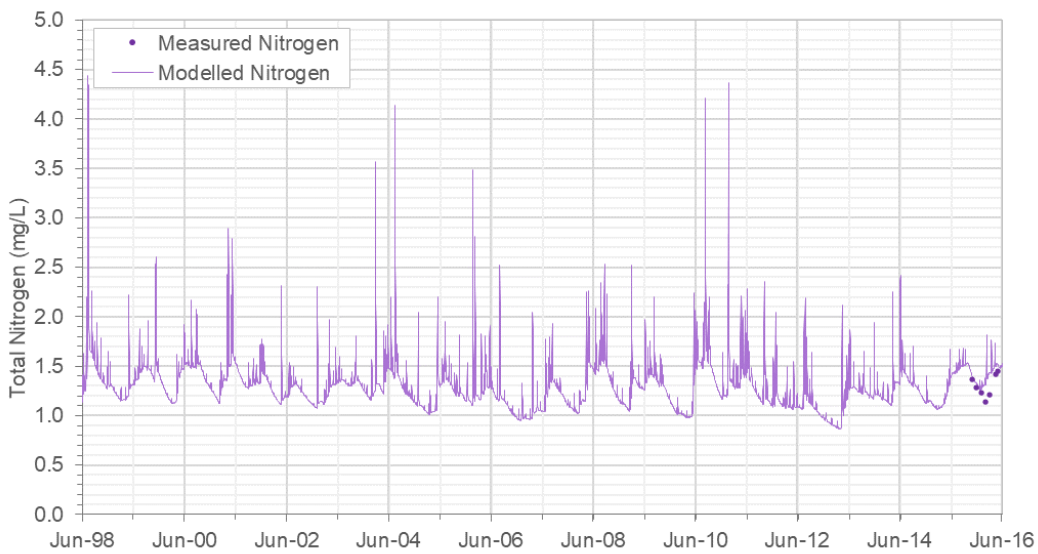


Figure F-13. Comparison of measured and modelled total nitrogen for SC#73. Secondary site: Pokopoko at Black Rd.

Table F-1. TN calibration summary statistics for the Kaituna WMA.

Site Code	Site Name	SC#	Type	Type	Mean	50%ile	Minimum	Maximum
FN448171	Paraiti (Mangorewa) at Saunders	10	Secondary	Modelled	1.4	1.3	1.2	3.5
				Measured	1.2	1.2	1.2	1.3
FN834668	Kaituna at Maungarangi Rd	22	Primary	Modelled	0.4	0.4	0.3	1.5
				Measured	0.4	0.4	0.3	0.6
FO620177	Kaituna at Te Matai	26	Primary	Modelled	0.8	1.0	0.5	2.4
				Measured	0.7	0.7	0.5	1.0
FO497605	Kaituna at Clarkes	53	Primary	Modelled	0.9	0.8	0.6	3.0
				Measured	0.7	0.7	0.4	1.9
GO089653	Kaituna at Te Tumu	57	Primary	Modelled	0.9	0.8	0.6	3.0
				Measured	0.8	0.8	0.5	2.0
GN561803	Puanene at SH2	77	Secondary	Modelled	1.2	1.0	0.7	5.0
				Measured	1.2	1.3	0.8	1.7
GM781934	Pongakawa at Pumphouse	90	Primary	Modelled	1.3	1.2	1.2	4.0
				Measured	1.4	1.4	1.3	1.6
GN849464	Pongakawa at Old Coach Rd	96	Primary	Modelled	1.5	1.7	1.3	4.2
				Measured	1.6	1.6	1.5	1.7
GN922883	Pongakawa at SH2	98	Primary	Modelled	1.5	1.4	1.2	4.5
				Measured	1.6	1.6	0.9	1.8
HM319871	Waitahanui at u/s Campbell Road	105	Secondary	Modelled	0.4	0.4	0.4	3.3
				Measured	0.4	0.4	0.4	0.4
HM688516	Morepara at u/s Pikowai Road	110	Secondary	Modelled	1.0	1.0	0.9	4.2
				Measured	1.1	1.1	1.0	1.2
HN674689	Waitahanui at Otamarakau Marae	114	Primary	Modelled	0.9	0.8	0.5	4.4
				Measured	0.8	0.8	0.7	1.0
GN178816	Pokopoko at Black Rd	73	Secondary	Modelled	1.3	1.3	0.9	4.4
				Measured	1.3	1.3	1.1	1.5

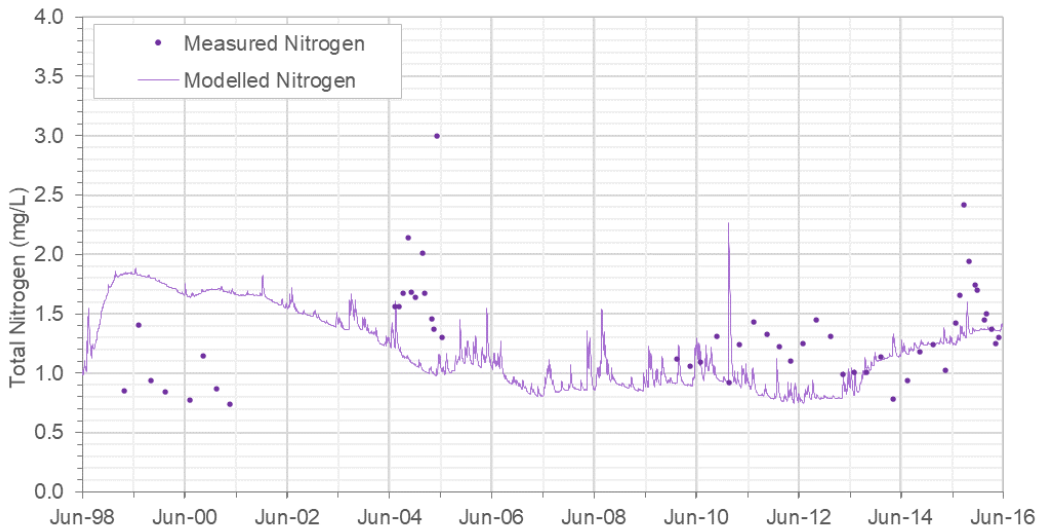


Figure F-14. Comparison of measured and modelled total nitrogen for SC#1. Primary site: Rangitāiki at SH5 gauge.

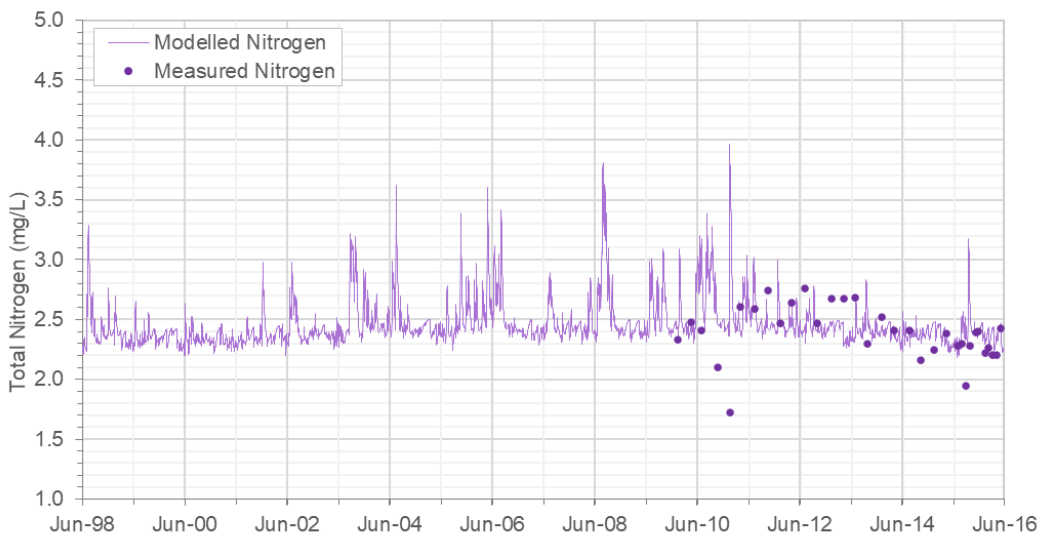


Figure F-15. Comparison of measured and modelled total nitrogen for SC#6. Secondary site: Otamatea at Wairere Rd.

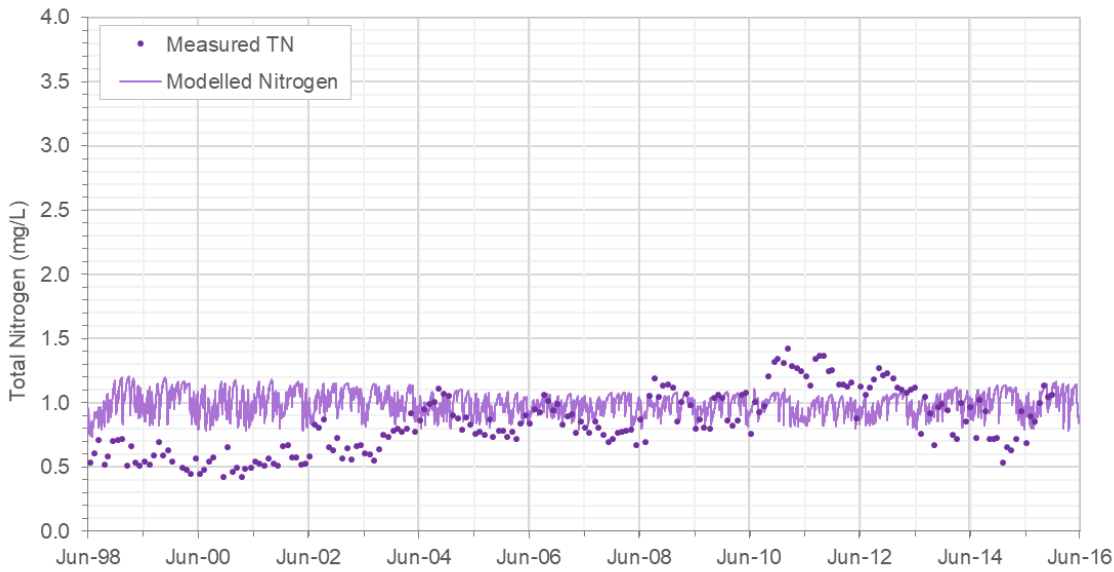


Figure F-16. Comparison of measured and modelled total nitrogen for SC#26. Primary Site: Rangitāiki at Murupara.

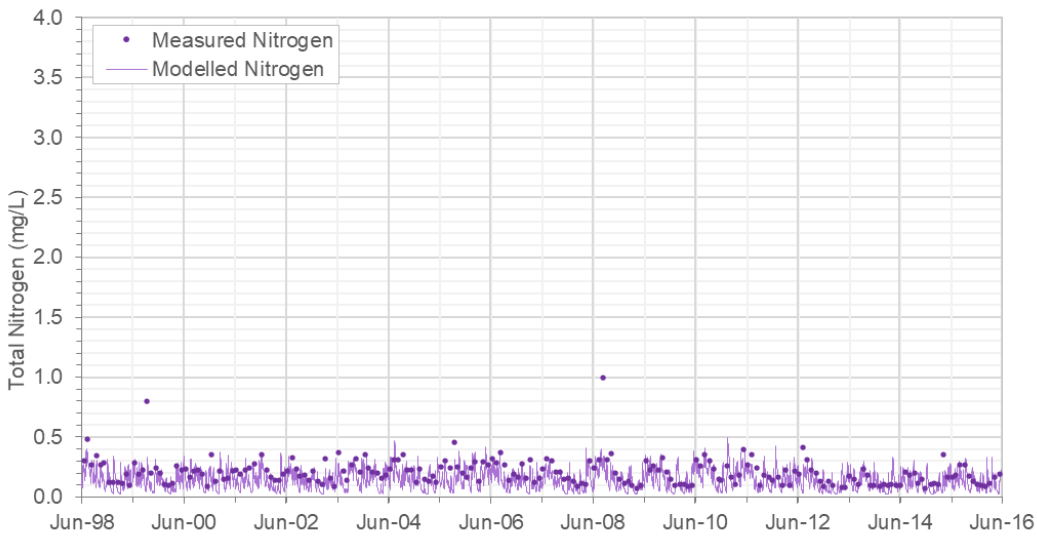


Figure F-17. Comparison of measured and modelled total nitrogen for SC#47. Primary Site: Whirinaki River at Galatea Bridge.

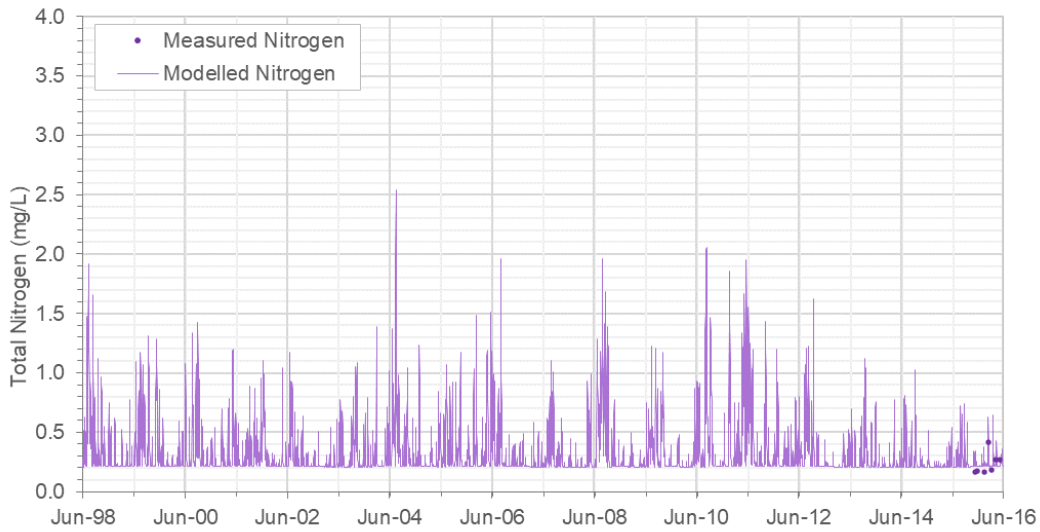


Figure F-18. Comparison of measured and modelled total nitrogen for SC#73. Secondary site: Pokairoa at Upstream Forestry Culvert.

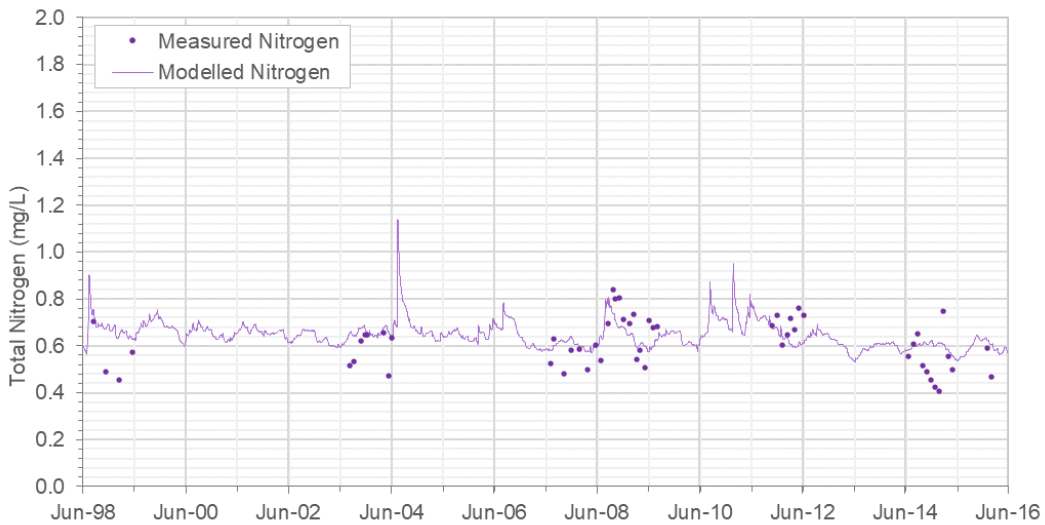


Figure F-19. Comparison of measured and modelled total nitrogen for SC#30. Primary Site: Rangitāiki at Inlet to Aniwhenua Canal.

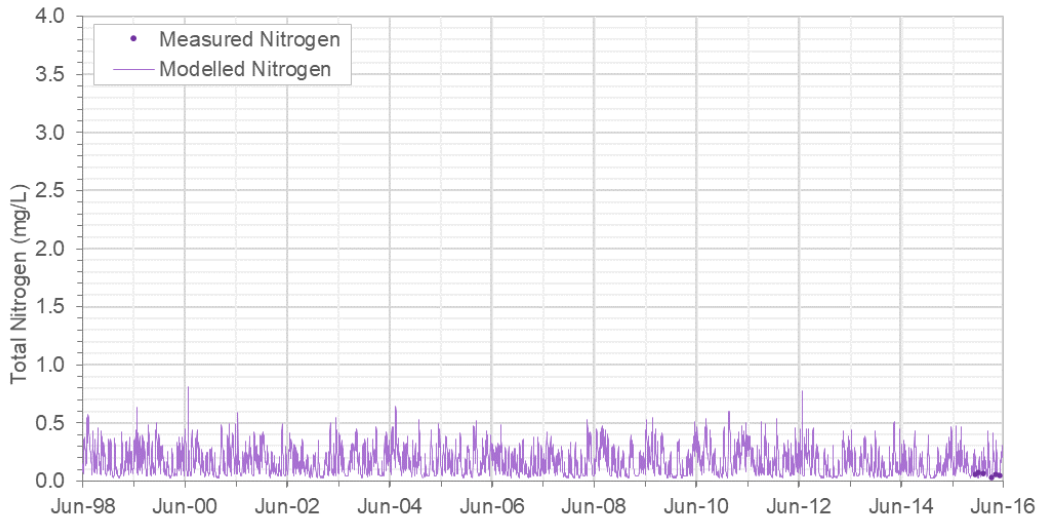


Figure F-20. Comparison of measured and modelled total nitrogen for SC#90. Secondary site: Waihua at Galatea Rd.

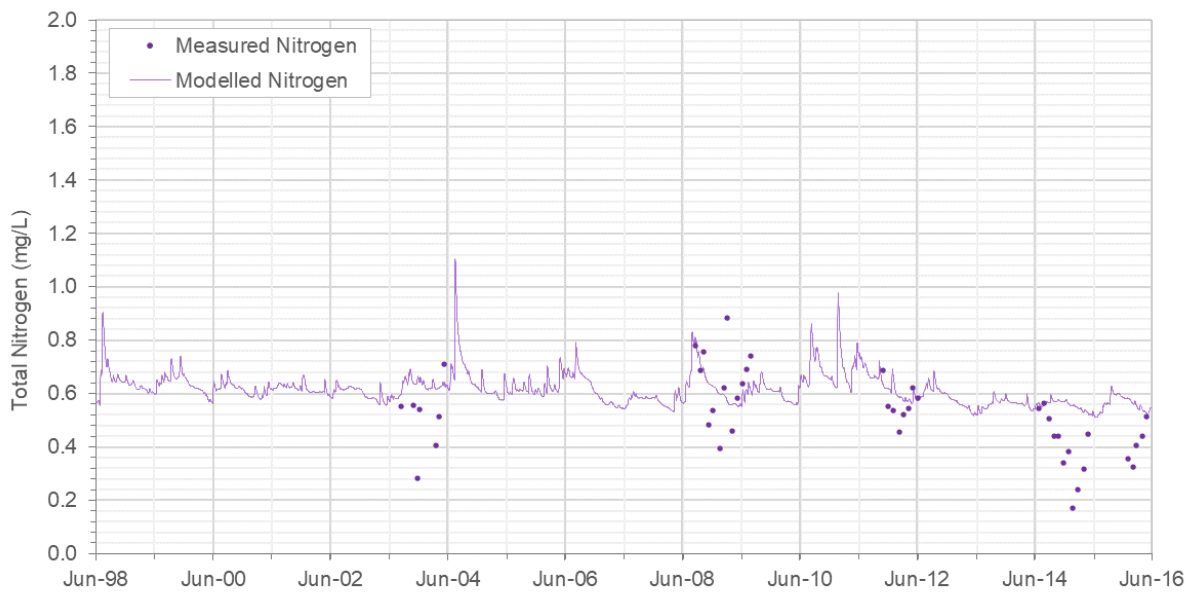


Figure F-21. Comparison of measured and modelled total nitrogen for SC#34. Primary site: Rangitaiki at Matahina Dam.

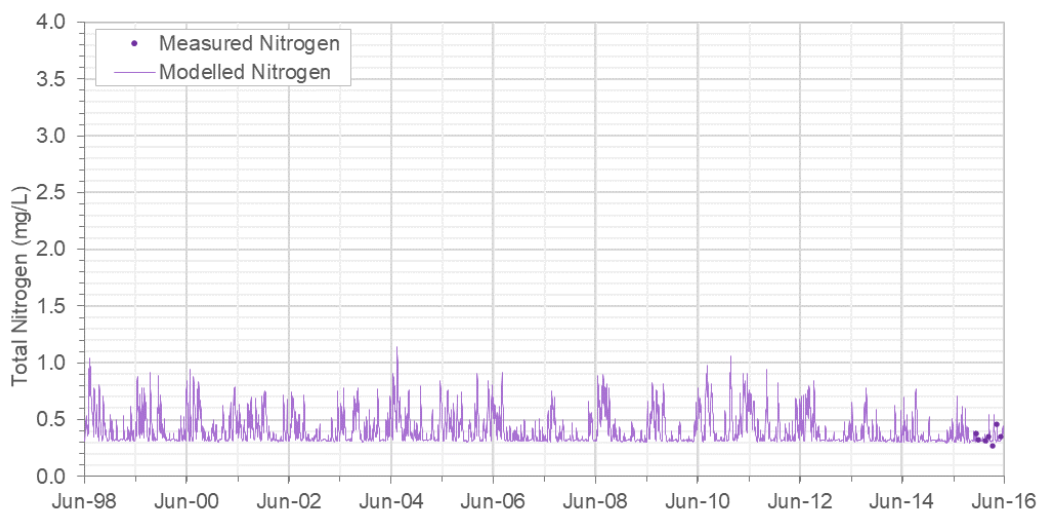


Figure F-22. Comparison of measured and modelled total nitrogen for SC#70. Secondary site: Ngatamawahine u/s of Kopuriki Rd.

Table F-2. TN calibration summary statistics for the Rangitāiki WMA.

Site Name	Site Code	SC#	Type	Type	Mean	50%ile	Minimum	Maximum
Rangitāiki at SH5	FC231176	1	Primary	Measured	1.3	1.3	0.8	2.4
				Modelled	1.1	1.1	0.7	2.3
Otamatea at Wairere Rd	FD445529	6	Secondary	Measured	2.4	2.4	1.7	2.8
				Modelled	2.4	2.4	2.2	4.0
Rangitāiki at Murupara	IG265664	26	Primary	Measured	1.0	1.1	0.5	1.4
				Modelled	1.0	1.0	0.8	1.2
Whirinaki River at Galatea Bridge	IG619428	47	Primary	Measured	0.2	0.1	0.1	0.4
				Modelled	0.1	0.1	0.0	0.5
Ngatamawahine u/s Kopuriki Rd	IH701900	70	Secondary	Measured	0.3	0.3	0.3	0.5
				Modelled	0.3	0.4	0.3	1.1
Pokairoa at Upstream Forestry Culvert	II631304	73	Secondary	Measured	0.2	0.2	0.2	0.4
				Modelled	0.3	0.2	0.2	2.0
Rangitāiki at Inlet to Aniwhenua Canal	JI148319	30	Primary	Measured	0.6	0.6	0.4	0.8
				Modelled	0.6	0.6	0.5	1.0
Waihua at Galatea Rd	JI485995	90	Primary	Measured	0.1	0.1	0.0	0.1
				Modelled	0.2	0.1	0.0	0.8
Rangitāiki at Matahina Dam	JK491452	34	Primary	Measured	0.5	0.5	0.2	0.7
				Modelled	0.6	0.6	0.5	1.0
Rangitāiki at Boat Ramp	KM083686	38	Secondary	Measured	0.6	0.6	0.3	0.8
				Modelled	0.7	0.6	0.6	1.0

F.2 E. Coli Results

The Kaituna and Rangitāiki WMA *E. coli* calibration results are presented below Figure F-23 to **Figure F-44**.

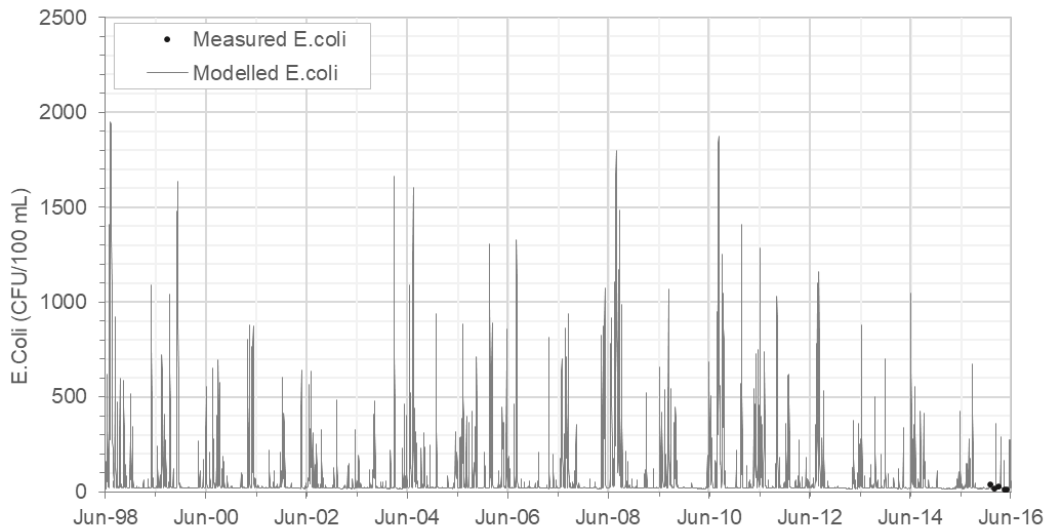


Figure F-23. Comparison of measured and modelled *E. coli* for SC#10. Secondary site: Paraiti (Mangorewa) at Saunders.

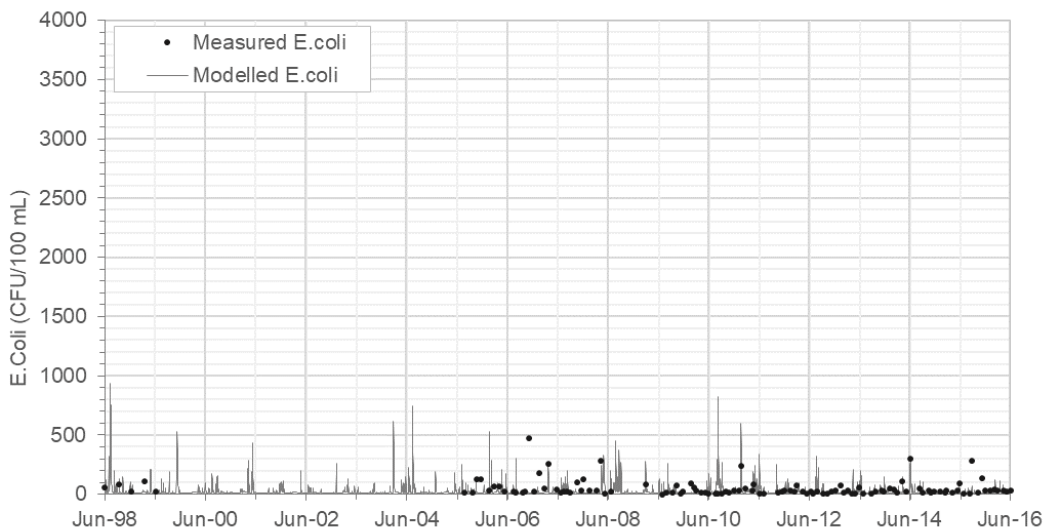


Figure F-24. Comparison of measured and modelled *E. coli* for SC#22. Primary site: Kaituna at Maungarangi Rd.

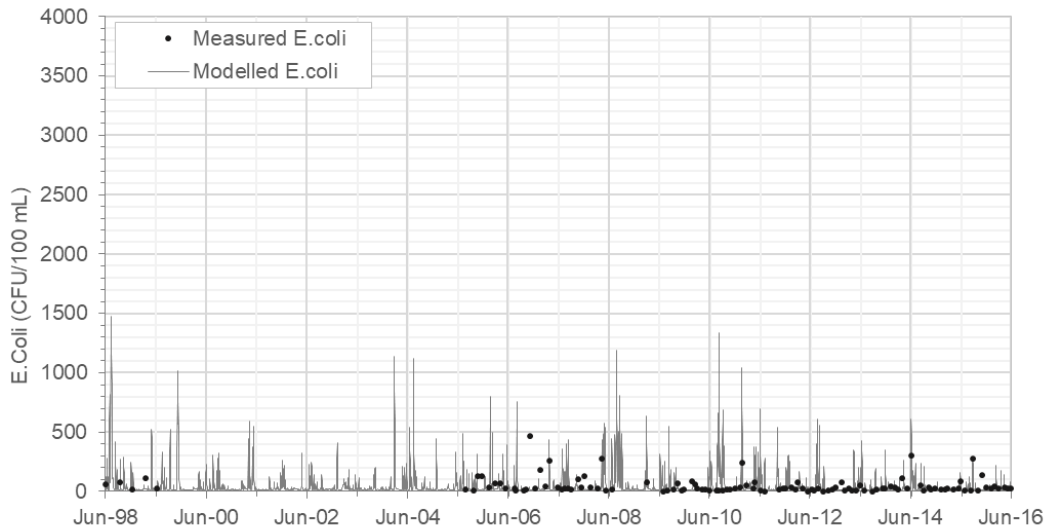


Figure F-25. Comparison of measured and modelled E. coli for SC#26. Primary site: Kaituna at Te Matai.

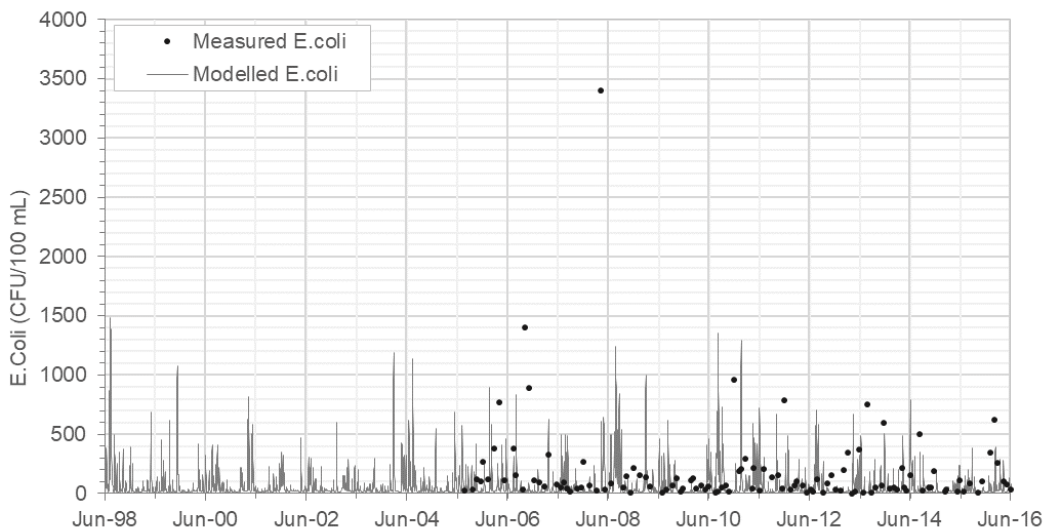


Figure F-26. Comparison of measured and modelled E. coli for SC#53. Primary site: Kaituna at Clarke's.

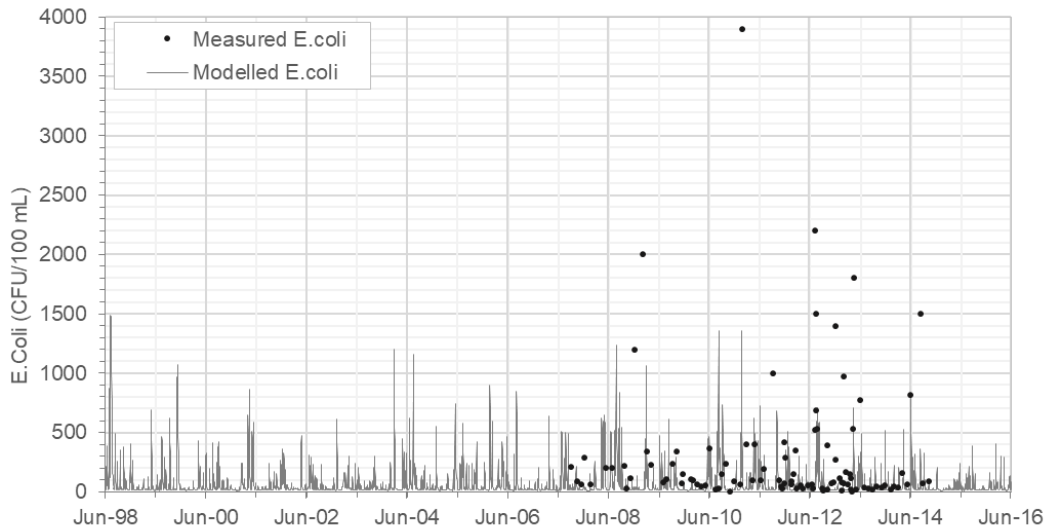


Figure F-27. Comparison of measured and modelled E. coli for SC#57. Primary site: Kaituna at Te Tumu.

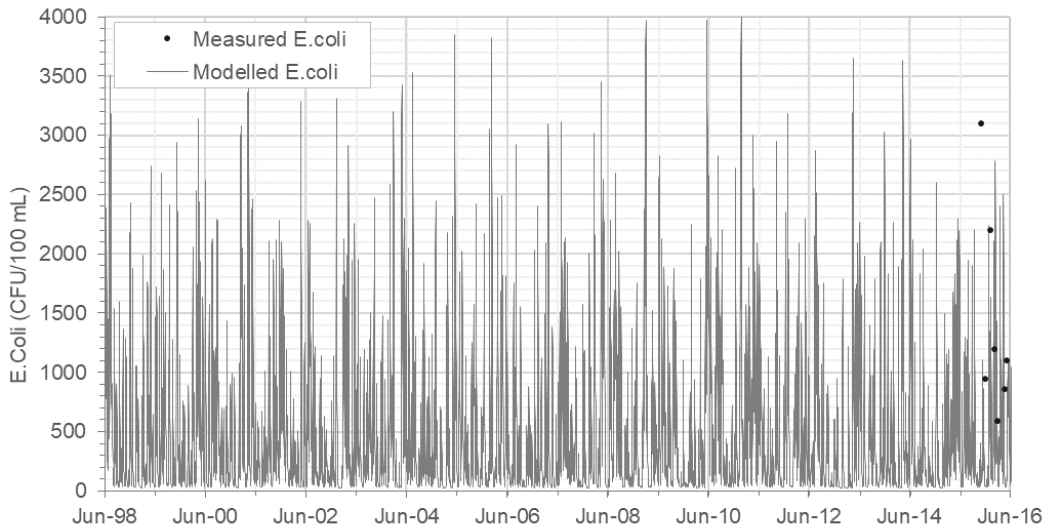


Figure F-28. Comparison of measured and modelled E. coli for SC#77. Secondary site: Puanene at SH2.

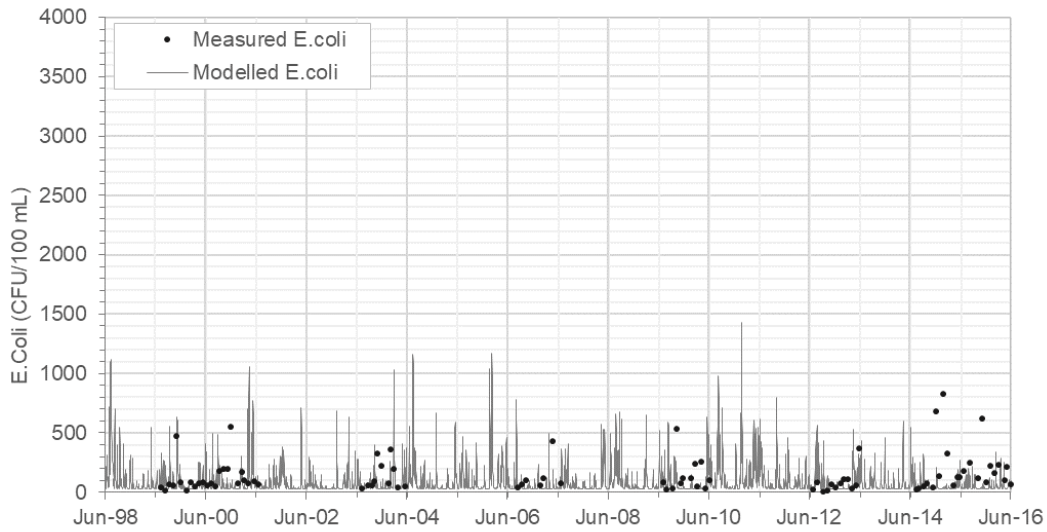


Figure F-29. Comparison of measured and modelled E. coli for SC#96. Primary site: Pongakawa at Old Coach Rd.

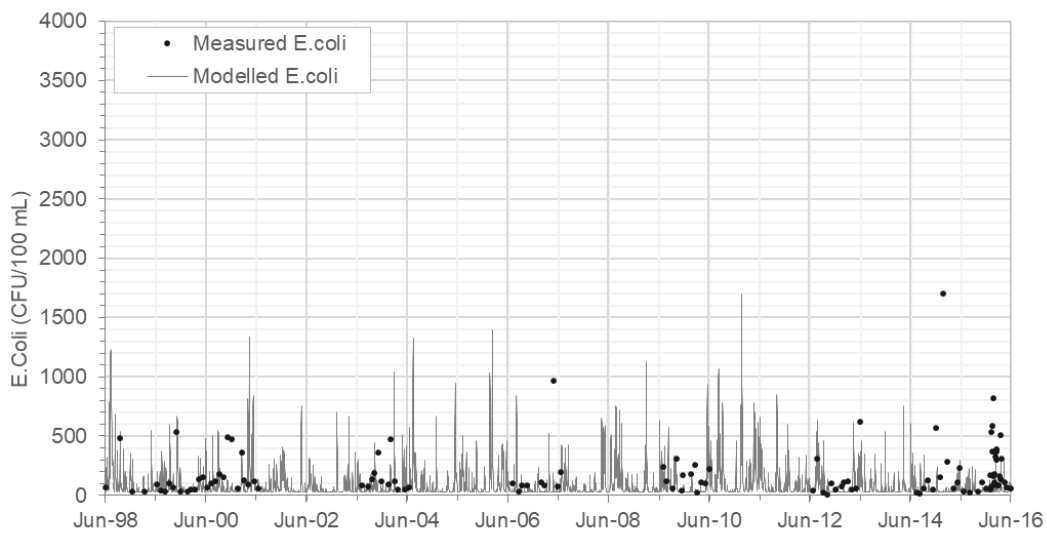


Figure F-30. Comparison of measured and modelled E. coli for SC#96. Primary Site: Pongakawa at SH2.

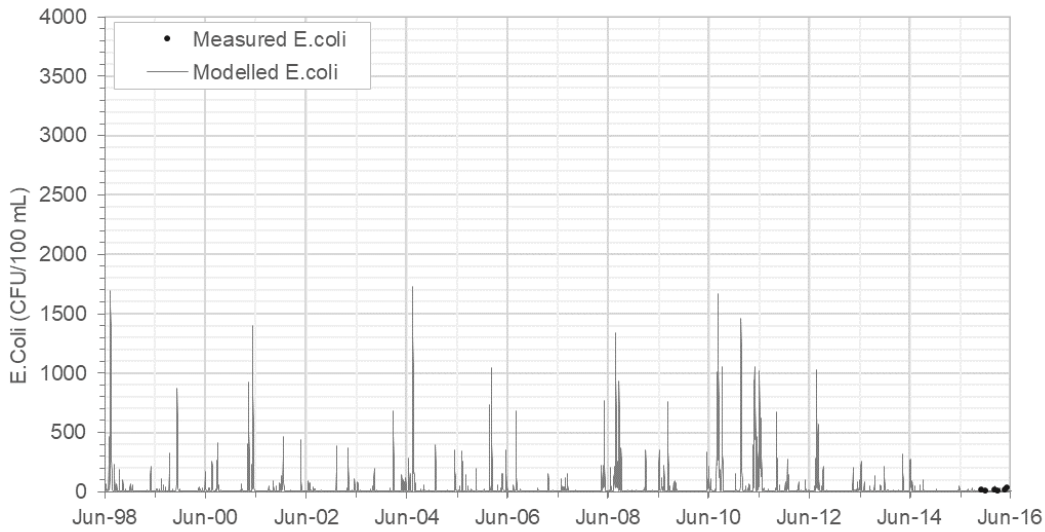


Figure F-31. Comparison of measured and modelled E. coli for SC#105. Secondary site: Waitahanui at u/s Campbell Rd.

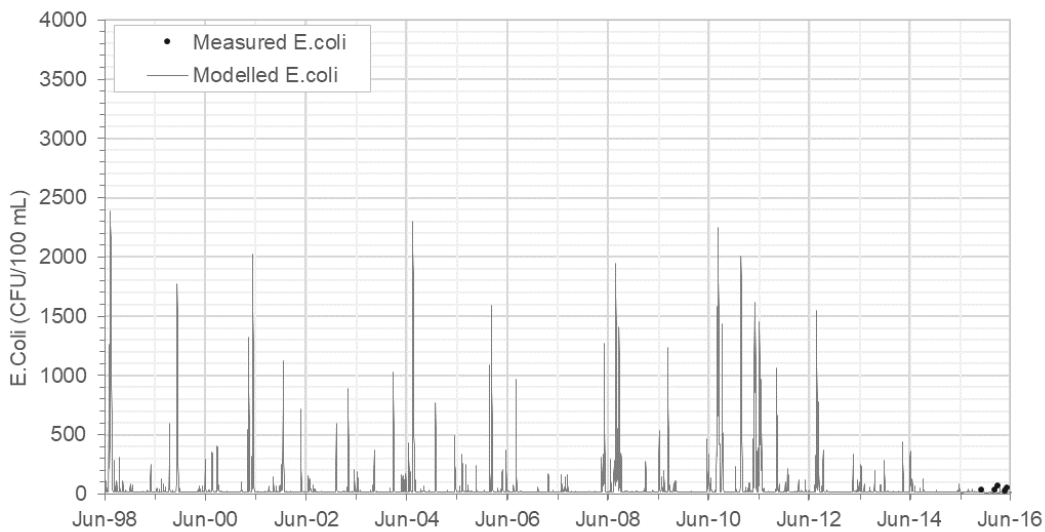


Figure F-32. Comparison of measured and modelled E. coli for SC#110. Secondary site: Morepara at u/s Pikowai Rd.

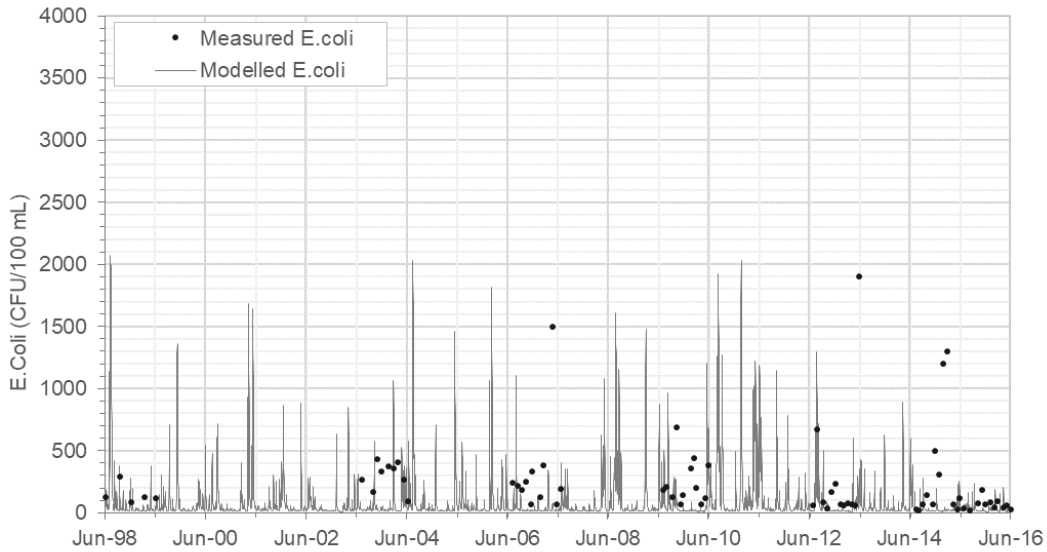


Figure F-33. Comparison of measured and modelled E. coli for SC#114. Primary site: Waitahanui at Otamarakau Marae.

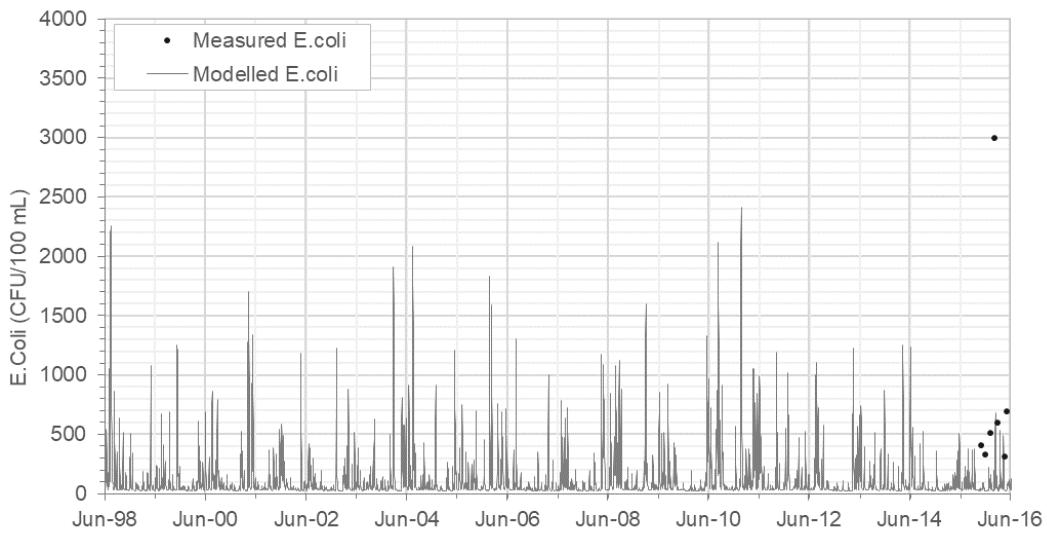


Figure F-34. Comparison of measured and modelled E. coli for SC#73. Site ID: GN178816 (Secondary site: Pokopoko at Black Rd).

Table F-3. E. coli calibration summary statistics for the Kaituna WMA.

Site Code	Site Name	SC#	Primary/ Secondary	Type	Mean	50%ile	Minimum	Maximum
FN448171	Paraiti (Mangorewa) at Saunders	10	Secondary	Modelled	69	19	16	1,399
				Measured	23	22	14	36
FN834668	Kaituna at Maungarangi Rd	22	Primary	Modelled	21	11	5	593
				Measured	42	27	2	300
FO620177	Kaituna at Te Matai	26	Primary	Modelled	37	14	7	1031
				Measured	77	44	4	870
FO497605	Kaituna at Clarkes	53	Primary	Modelled	46	16	9	1,215
				Measured	258	70	3	7,200
GO089653	Kaituna at Te Tumu	57	Primary	Modelled	59	20	10	1,339
				Measured	764	93	5	21,000
GN561803	Puanene at SH2	77	Secondary	Modelled	502	220	27	4,035
				Measured	1,366	1,025	590	3,100
GN849464	Pongakawa at Old Coach Rd	96	Primary	Modelled	83	38	30	1,462
				Measured	273	105	9	4,100
GN922883	Pongakawa at SH2	96	Primary	Modelled	85	36	28	1,696
				Measured	389	110	10	6,100
HM319871	Waitahanui at u/s Campbell Road	105	Secondary	Modelled	31	4	3	1,462
				Measured	19	17	10	36
HM688516	Morepara at u/s Pikowai Road	110	Secondary	Modelled	56	16	11	2,005
				Measured	42	40	13	77
HN674689	Waitahanui at Otamarakau Marae	114	Primary	Modelled	78	24	9	2,035
				Measured	230	70	15	1,900
GN178816	Pokopoko at Black Rd	73	Secondary	Modelled	108	41	24	2,397
				Measured	753	460	170	3,000

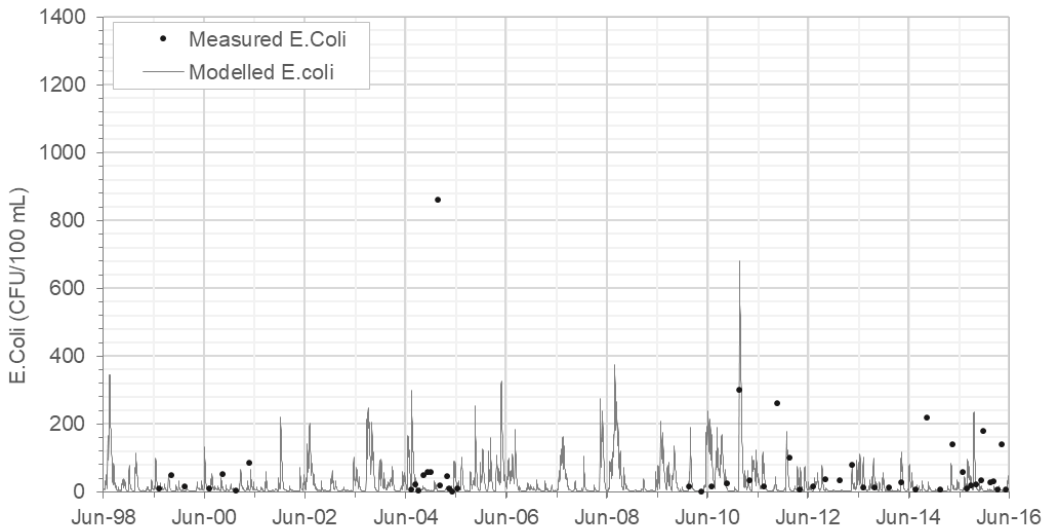


Figure F-35. Comparison of measured and modelled E. coli for SC#1. Primary site: Rangitāiki at SH5 gauge.

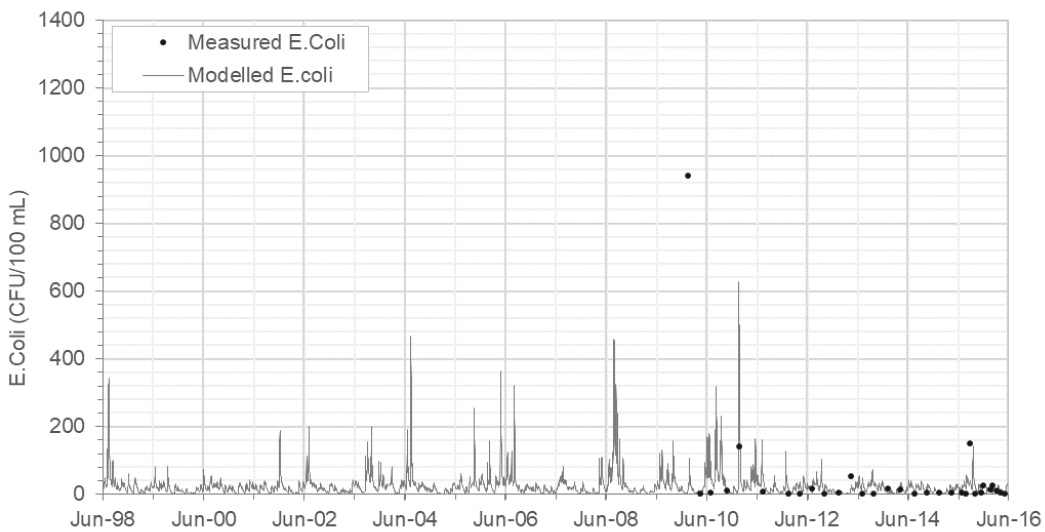


Figure F-36. Comparison of measured and modelled E. coli for SC#6. Secondary site: Otamatea at Wairere Rd.

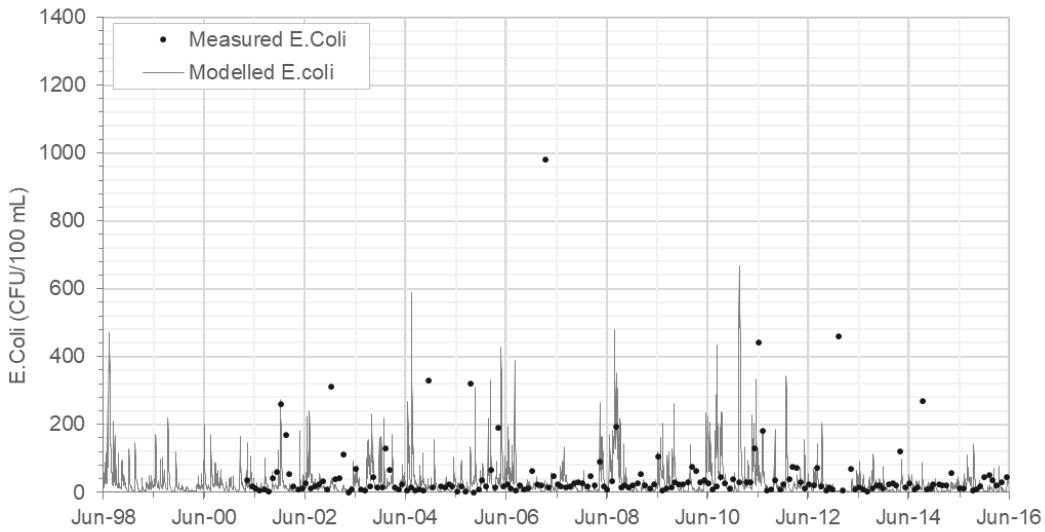


Figure F-37. Comparison of measured and modelled E. coli for SC#26. Primary Site: Rangitāiki at Murupara.

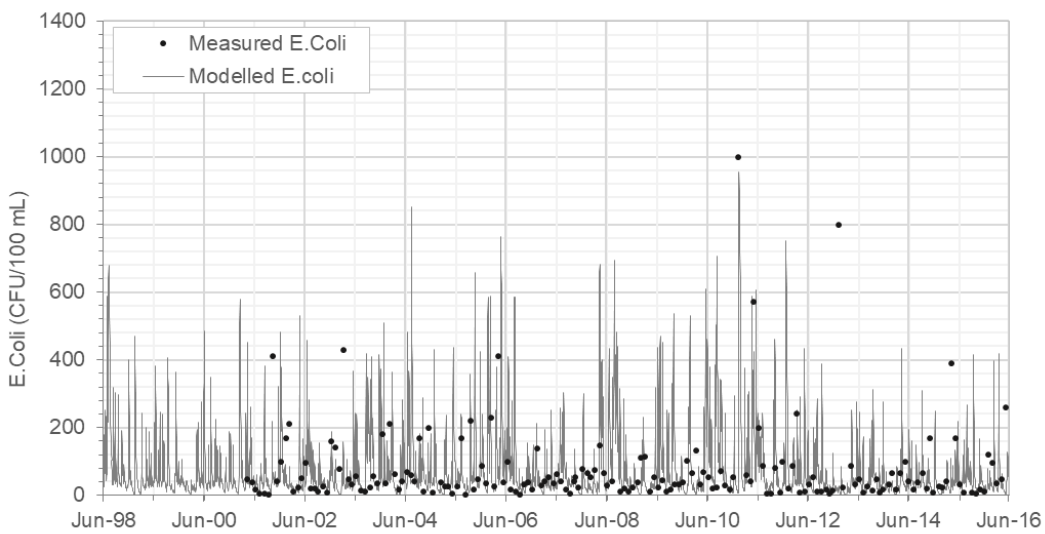


Figure F-38. Comparison of measured and modelled E. coli for SC#47. Primary Site: Whirinaki River at Galatea Bridge.

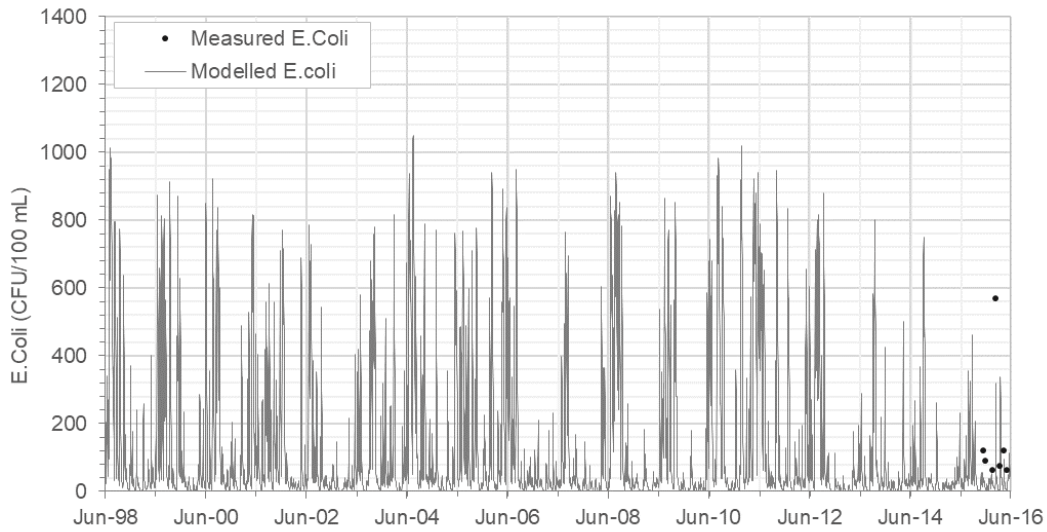


Figure F-39. Comparison of measured and modelled E. coli for SC#70. Secondary site: Ngatamawahine u/s of Kopuriki Rd.

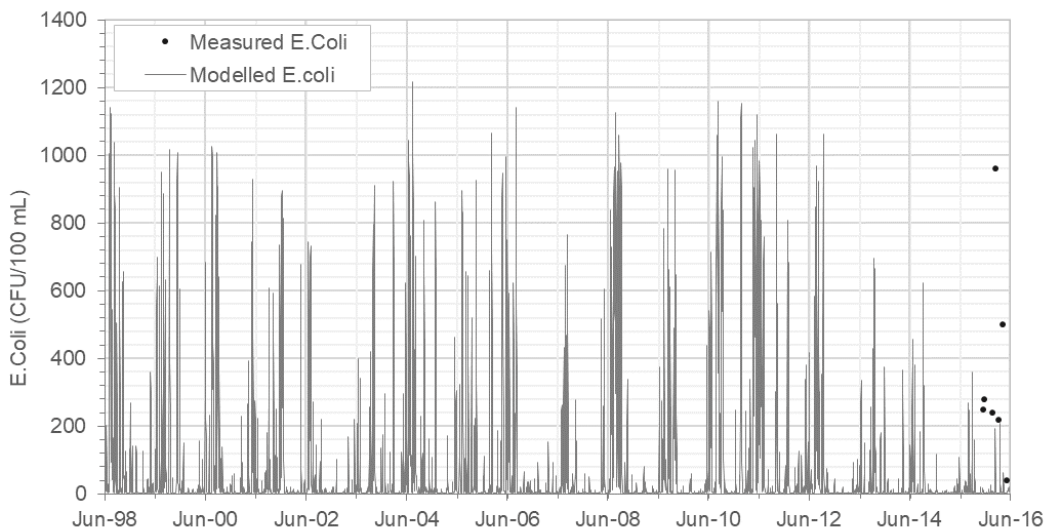


Figure F-40. Comparison of measured and modelled E. coli for SC#73. Secondary site: Pokairoa at Upstream Forestry Culvert.

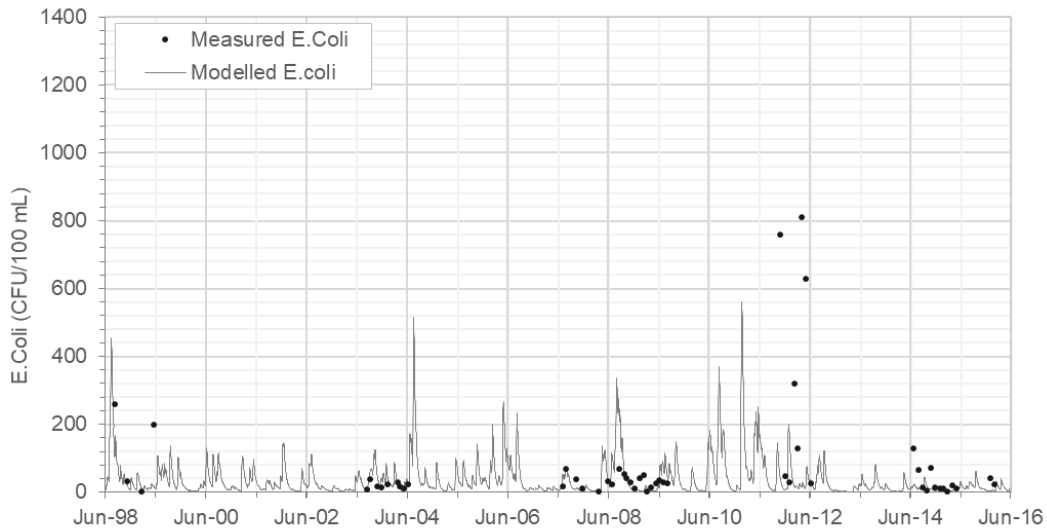


Figure F-41. Comparison of measured and modelled E. coli for SC#30. Primary Site: Rangitāiki at Inlet to Aniwhenua Canal.

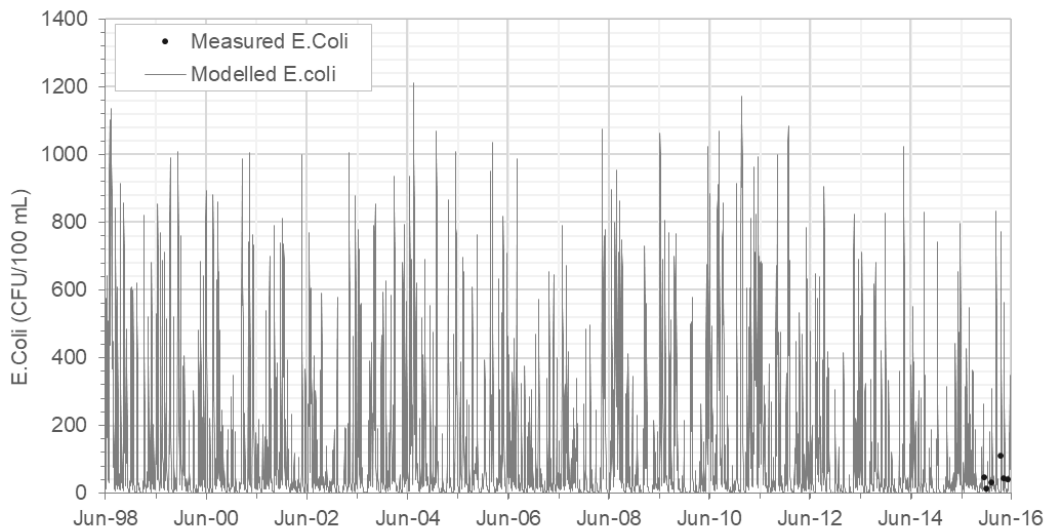


Figure F-42. Comparison of measured and modelled E. coli for SC#32. Secondary site: Waihua at Galatea Rd.

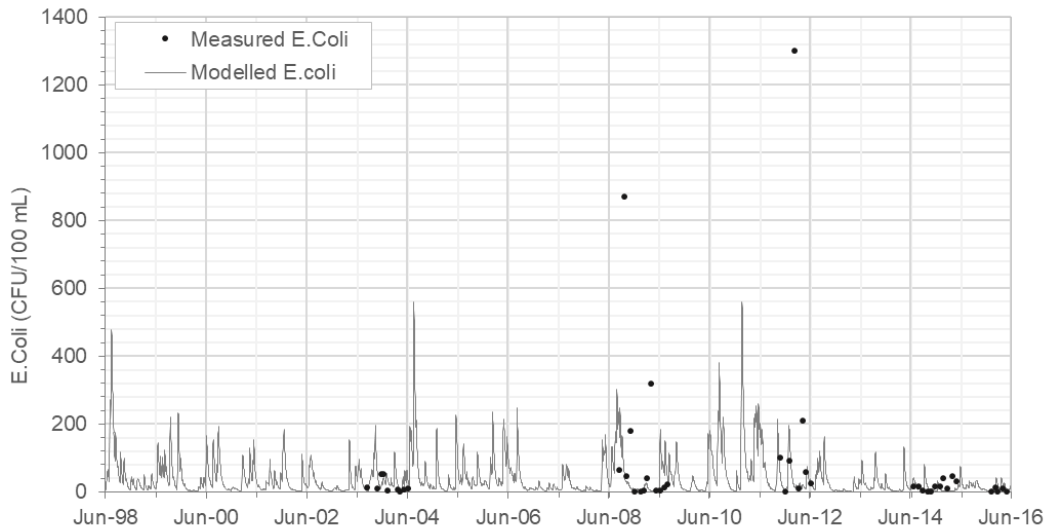


Figure F-43. Comparison of measured and modelled E. coli for SC#34. Primary site: Rangitāiki at Matahina Dam.

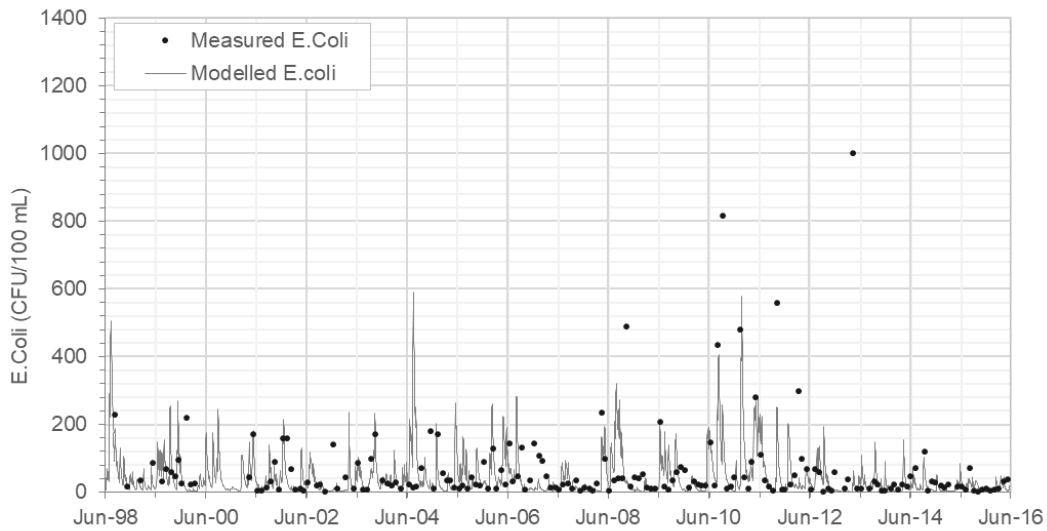


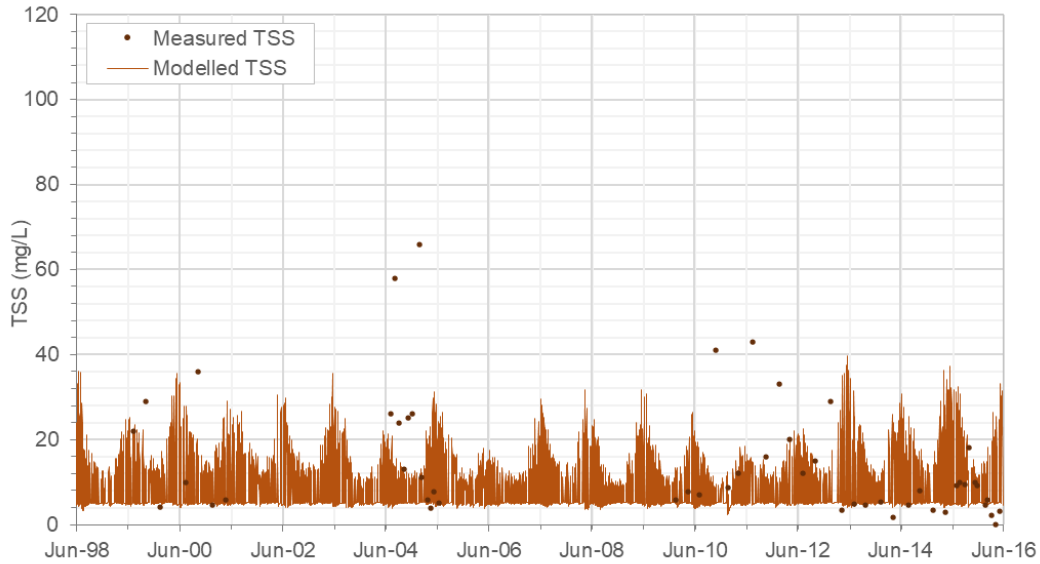
Figure F-44. Comparison of measured and modelled E. coli for SC#37. Secondary site: Rangitāiki at Te Teko.

Table F-4. E. coli calibration summary statistics for Rangitāiki WMA.

Site Name	Site Code	SC#	Type	Type	Mean	50%ile	Minimum	Maximum
Rangitāiki at SH5	FC231176	1	Primary	Measured	64	29	6	300
				Modelled	22	6	2	680
Otamatea at Wairere Rd	FD445529	6	Secondary	Measured	20	6	1	150
				Modelled	21	16	1	628
Rangitāiki at Murupara	IG265664	26	Primary	Measured	47	20	1	460
				Modelled	25	14	1	668
Whirinaki River at Galatea Bridge	IG619428	47	Primary	Measured	91	33	4	1,000
				Modelled	66	34	1	954
Ngatamawahine u/s Kopuriki Rd	IH701900	70	Secondary	Measured	158	90	63	570
				Modelled	104	28	1	1,018
Pokairoa at Upstream Forestry Culvert	II631304	73	Secondary	Measured	356	250	40	960
				Modelled	62	3	1	1,153
Rangitāiki at Inlet to Aniwhenua Canal	JI148319	30	Primary	Measured	151	29	3	810
				Modelled	31	13	1	559
Waihua at Galatea Rd	JI485995	32	Secondary	Measured	48	42	15	110
				Modelled	117	27	1	1,173
Rangitāiki at Te Teko	JL350292	37	Primary	Measured	69	20	2	1,000
				Modelled	36	15	1	578

F.3 Total Suspended Solids Results

TSS calibration results for the Kaituna WMA are presented in **Figure F-45** to **Figure F-55**, and for the Rangitāiki



WMA in

Figure F-56 to **Figure F-64**.

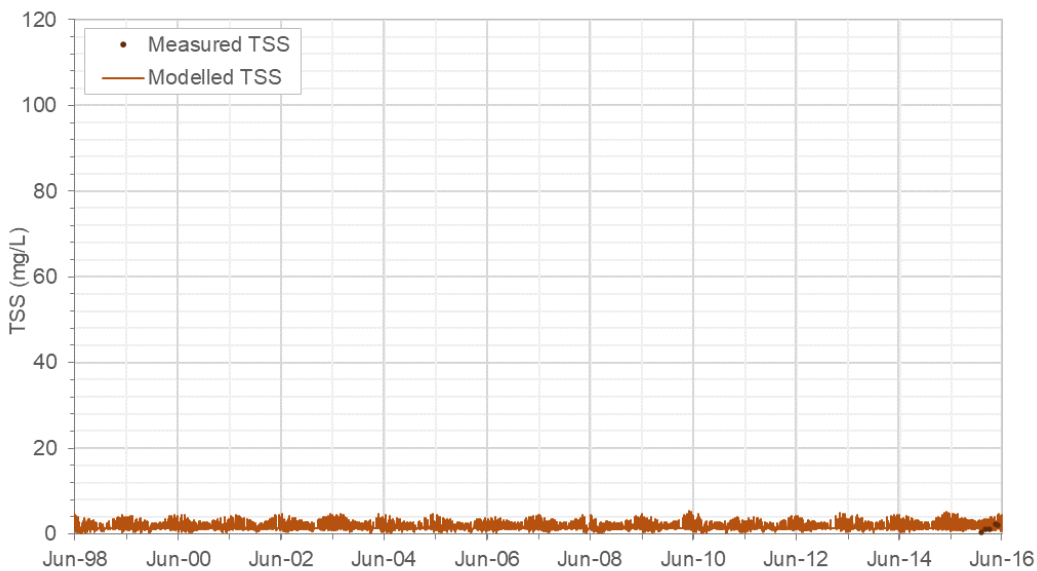


Figure F-45. Comparison of measured and modelled TSS for SC#10. Site ID: Secondary site: Paraiti (Mangorewa) at Saunders.

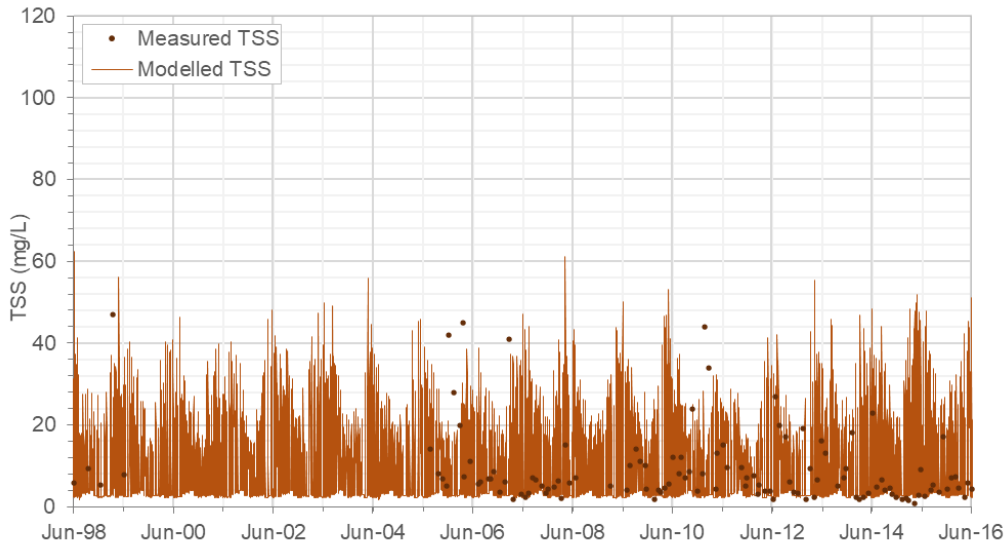


Figure F-46. Comparison of measured and modelled TSS for SC#22. Primary site: Kaituna at Maungarangi Rd.

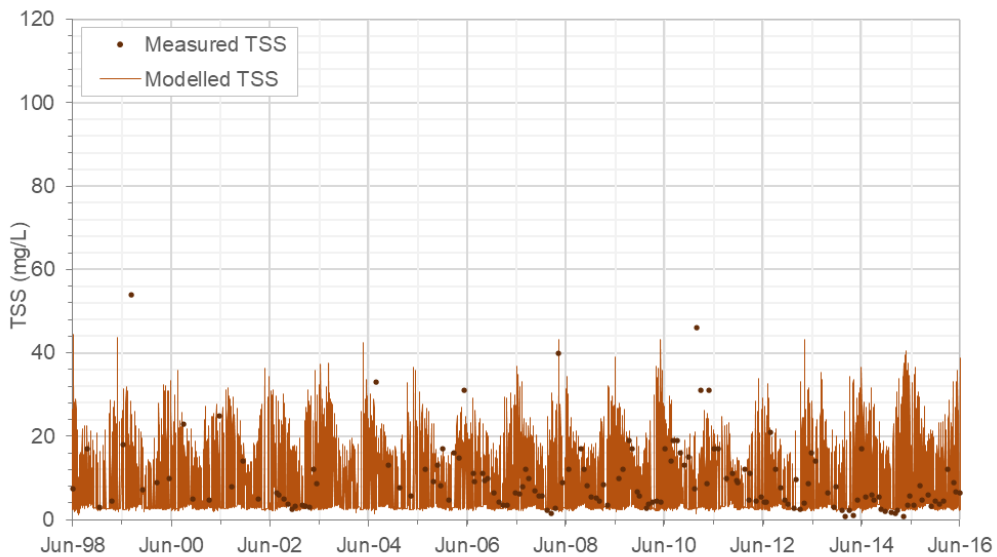


Figure F-47. Comparison of measured and modelled TSS for SC#26. Primary site: Kaituna at Te Matai.

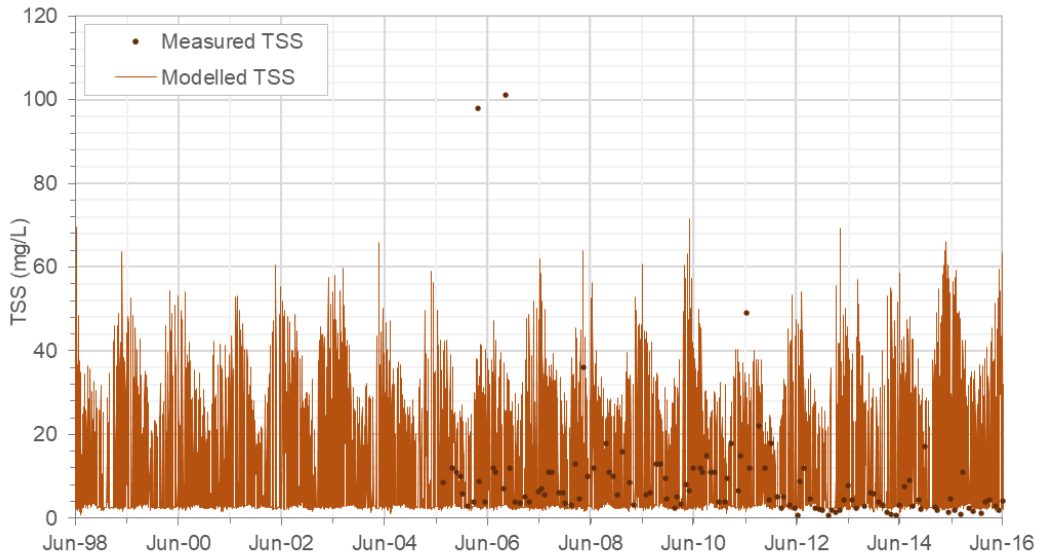


Figure F-48. Comparison of measured and modelled TSS for SC#53. Primary site: Kaituna at Clarkes.

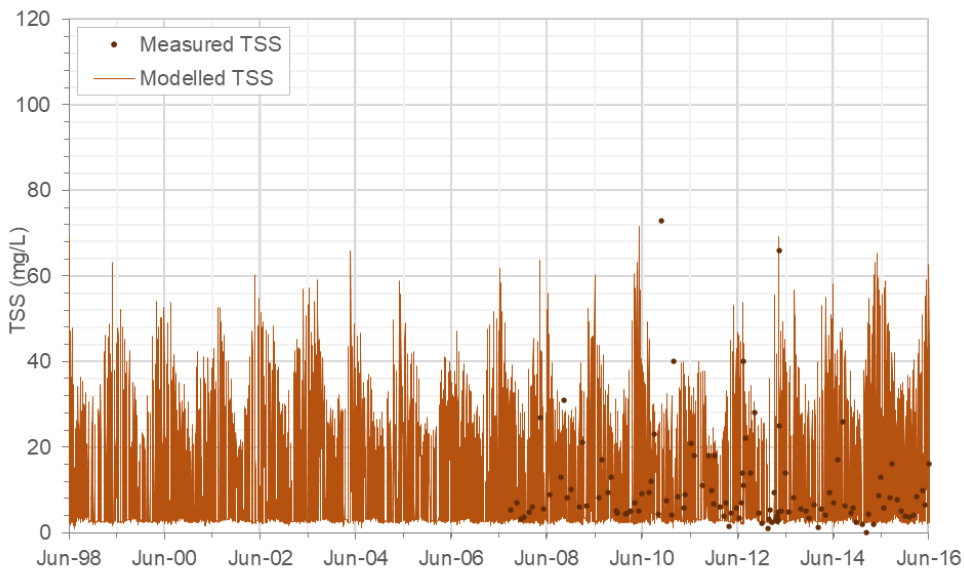


Figure F-49. Comparison of measured and modelled TSS for SC#57. Primary site: Kaituna at Te Tumu.

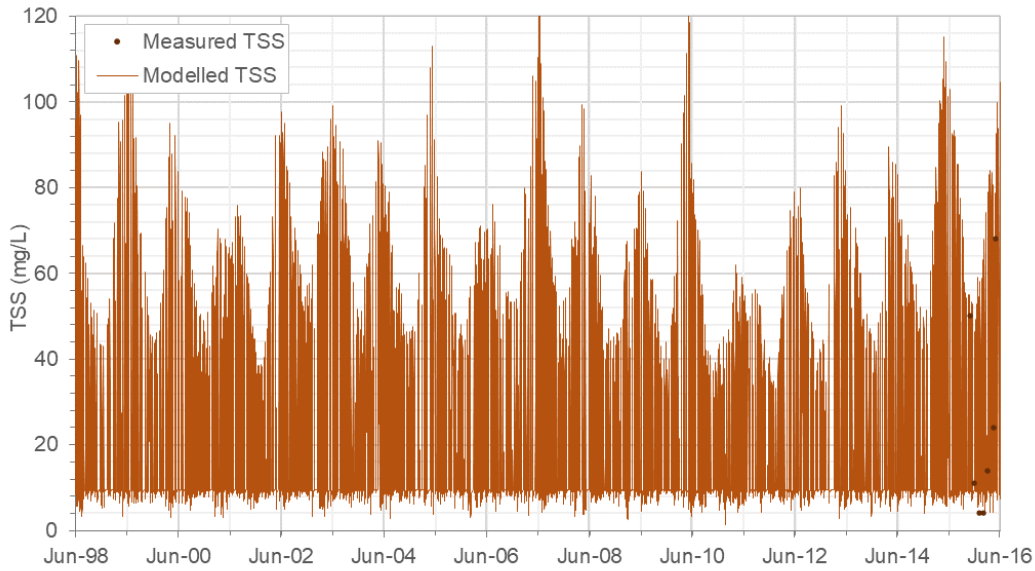


Figure F-50. Comparison of measured and modelled TSS for SC#77. Secondary site: Puanene at SH2.

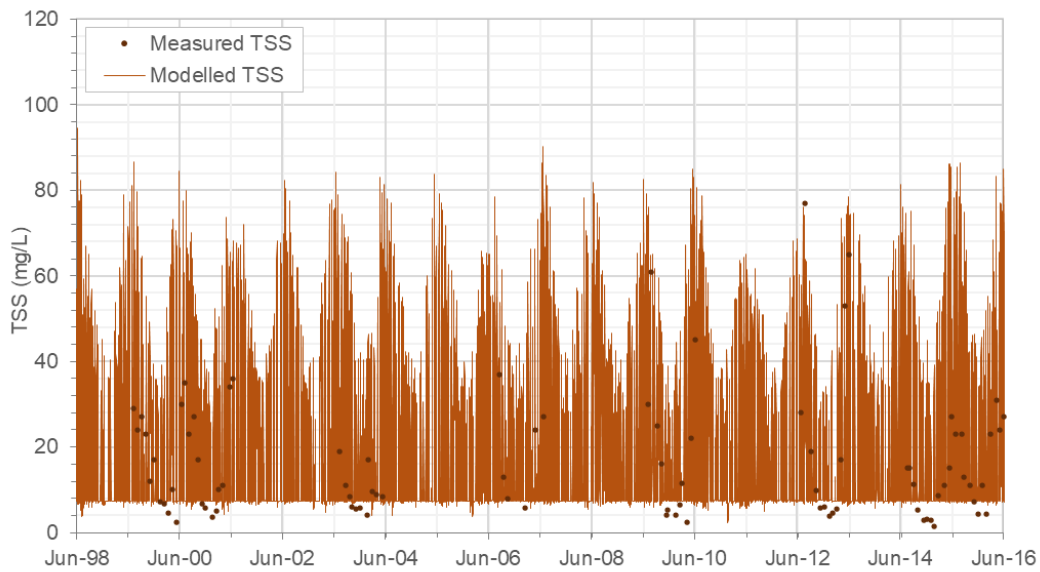


Figure F-51. Comparison of measured and modelled TSS for SC#96. Primary site: Pongakawa at Old Coach Rd.

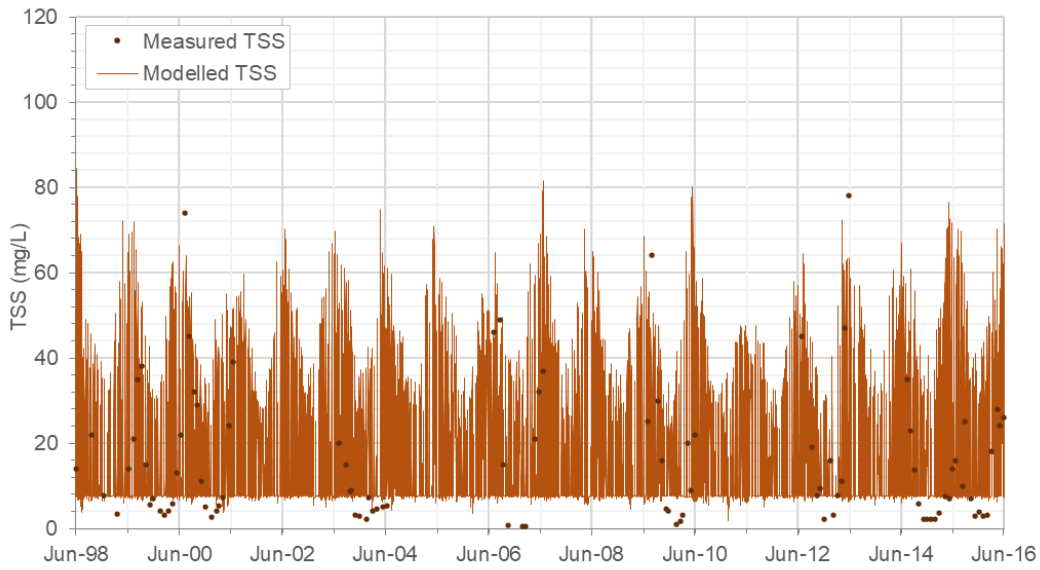


Figure F-52. Comparison of measured and modelled TSS for SC#98. Primary site: Pongakawa at SH2.

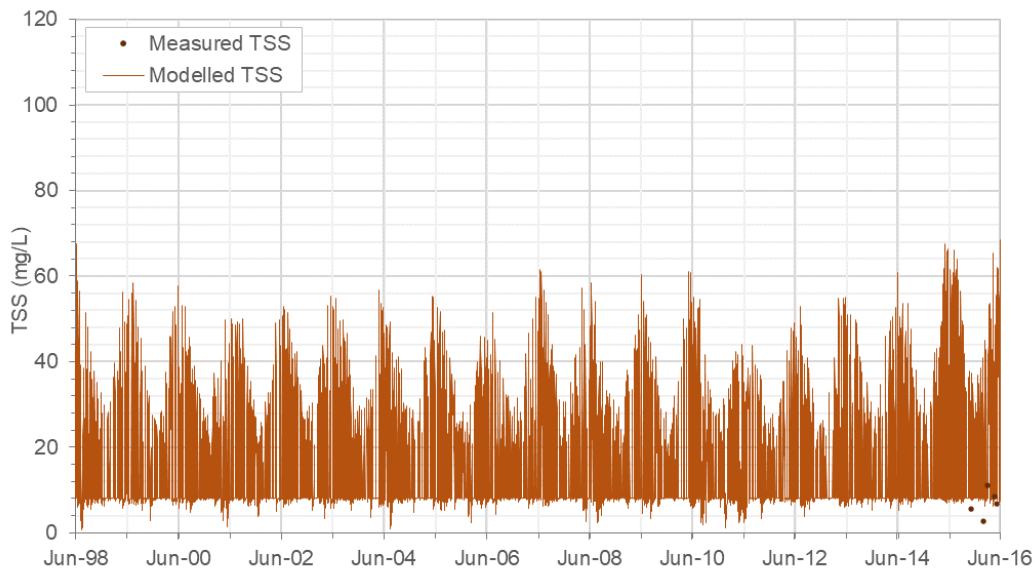


Figure F-53. Comparison of measured and modelled TSS for SC#110. Secondary site: Morepara at u/s Pikowai Rd.

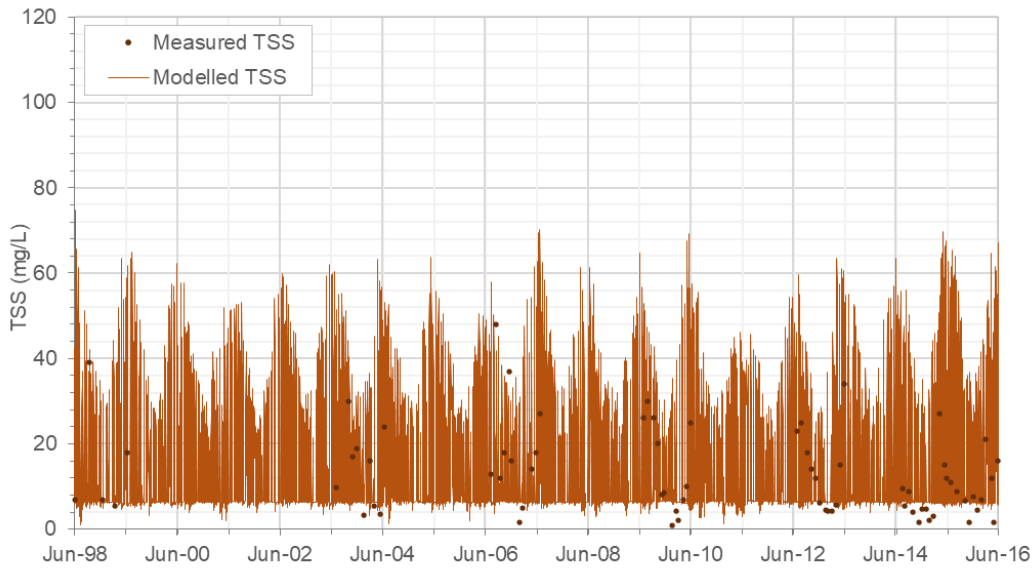


Figure F-54. Comparison of measured and modelled TSS for SC#114. Primary site: Waitahanui at Otamarakau Marae.

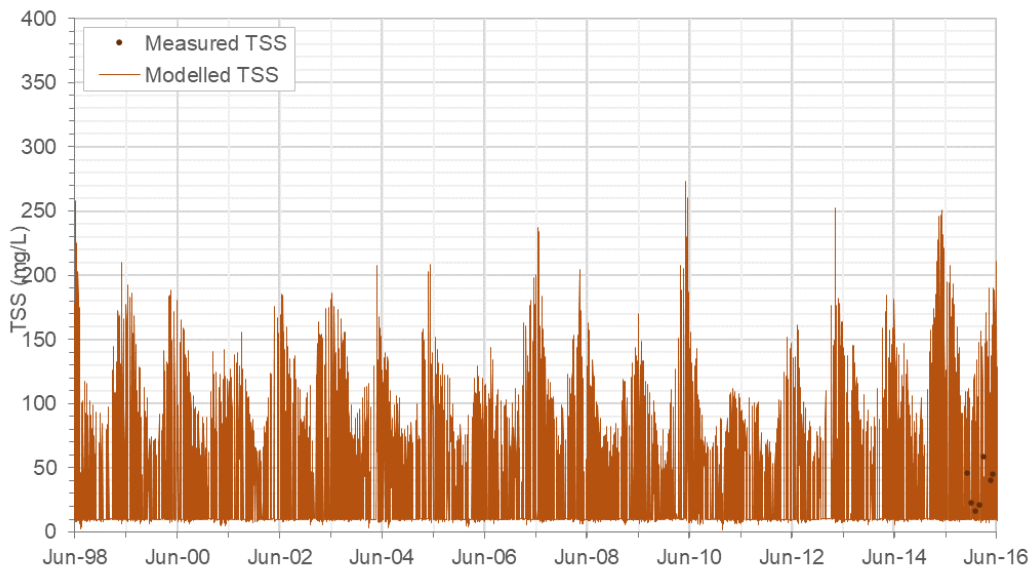


Figure F-55. Comparison of measured and modelled TSS for SC#73. Secondary site: Pokopoko at Black Rd.

Table F-5. TSS calibration summary statistics for the Kaituna WMA.

Site Code	Site Name	SC#	Primary/ Secondary	Type	Mean	50%ile	Minimum	Maximum
FN448171	Paraiti (Mangorewa) at Saunders	10	Secondary	Modelled	1.3	1.7	0.2	5.1
				Measured	1.5	1.6	0.4	2.3
FN834668	Kaituna at Maungarangi Rd	22	Primary	Modelled	3.0	9.7	2.1	55.4
				Measured	8.1	5.0	0.8	44.0
FO620177	Kaituna at Te Matai	26	Primary	Modelled	3.0	8.3	1.5	43.3
				Measured	8.1	5.5	0.7	46.0
FO497605	Kaituna at Clarkes	53	Primary	Modelled	3.0	12.4	1.2	69.2
				Measured	6.0	3.8	0.6	49.0
GO089653	Kaituna at Te Tumu	57	Primary	Modelled	3.1	12.3	1.2	69.2
				Measured	9.6	6.1	0.1	66.0
GN561803	Puanene at SH2	77	Secondary	Modelled	9.4	22.4	1.5	115.1
				Measured	25.3	19.0	4.0	68.0
GN849464	Pongakawa at Old Coach Rd	96	Primary	Modelled	7.4	19.7	2.2	95.8
				Measured	17.1	11.1	1.4	77.0
GN922883	Pongakawa at SH2	98	Primary	Modelled	7.6	17.5	1.9	79.4
				Measured	18.7	9.6	2.1	140.0
HM688516	Morepara at u/s Pikowai Road	110	Secondary	Modelled	8.1	16.5	1.2	68.4
				Measured	6.4	6.3	2.7	11.0
HN674689	Waitahanui at Otamarakau Marae	114	Primary	Modelled	6.4	15.5	1.2	69.7
				Measured	10.3	7.6	1.6	34.0
GN178816	Pokopoko at Black Rd	73	Secondary	Modelled	9.9	39.8	1.9	252.7
				Measured	37.0	42.5	16.0	59.0

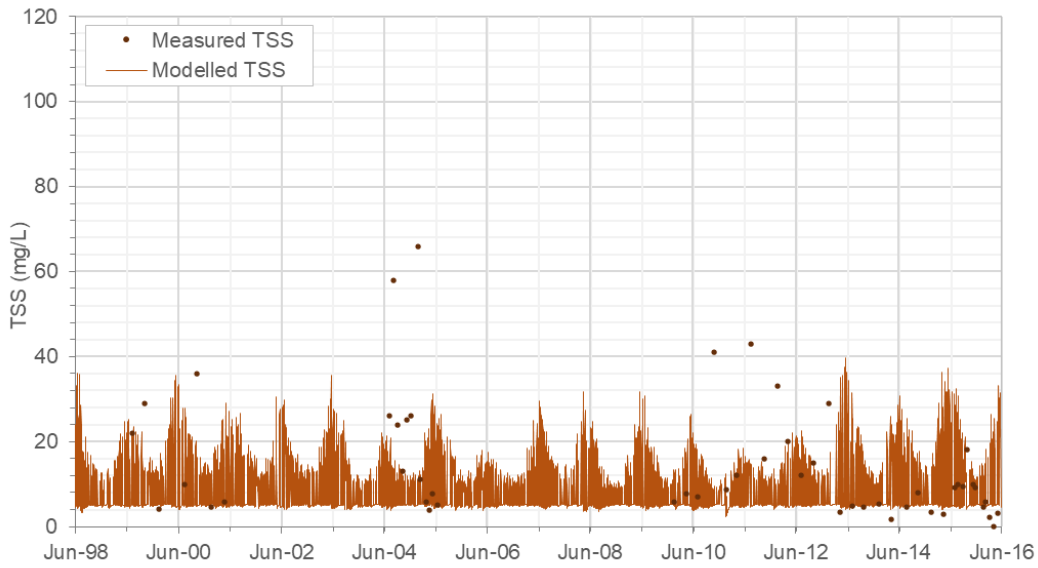


Figure F-56. Comparison of measured and modelled TSS for SC#1. Primary site: Rangitāiki at SH5 gauge.

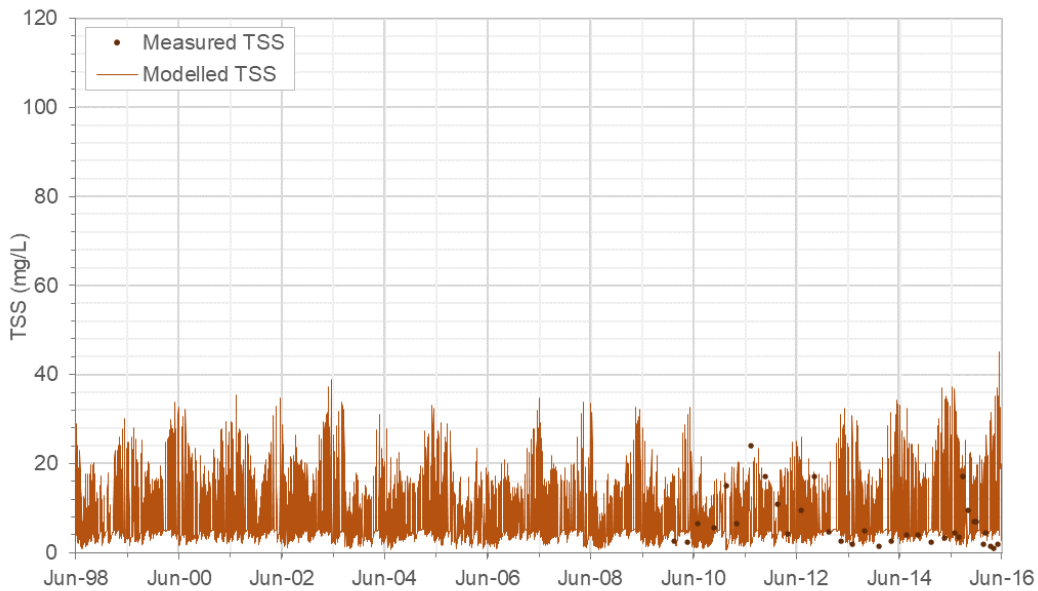


Figure F-57. Comparison of measured and modelled TSS for SC#6. Secondary site: Otamatea at Wairere Rd.

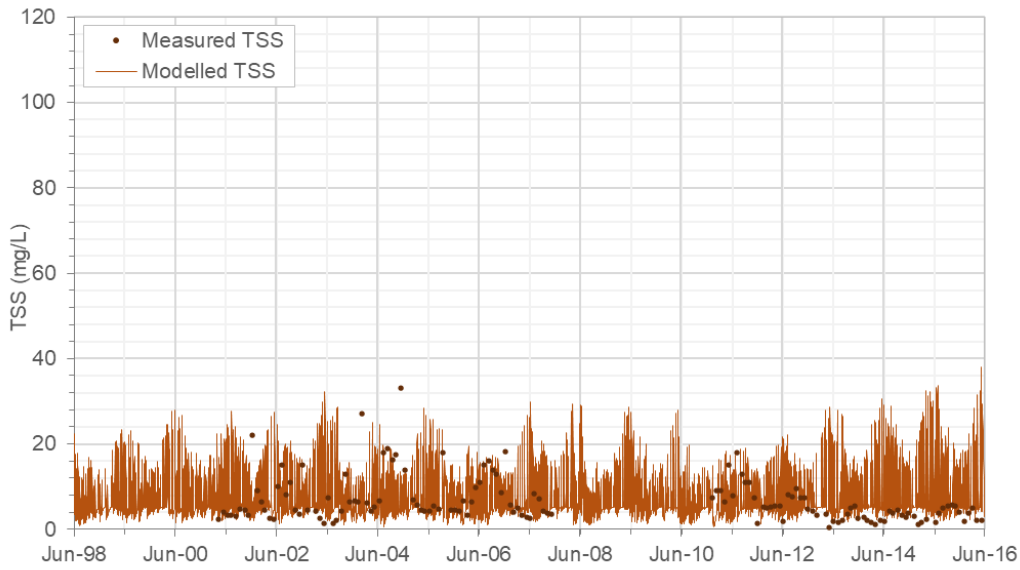


Figure F-58. Comparison of measured and modelled TSS for SC#26. Primary Site: Rangitāiki at Murupara.

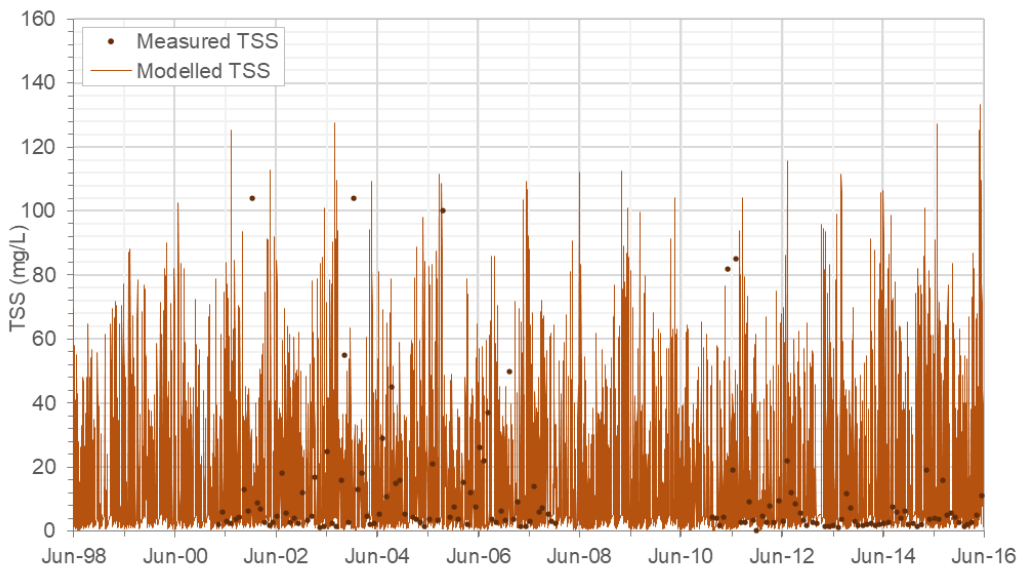


Figure F-59. Comparison of measured and modelled TSS for SC#47. Primary Site: Whirinaki River at Galatea Bridge.

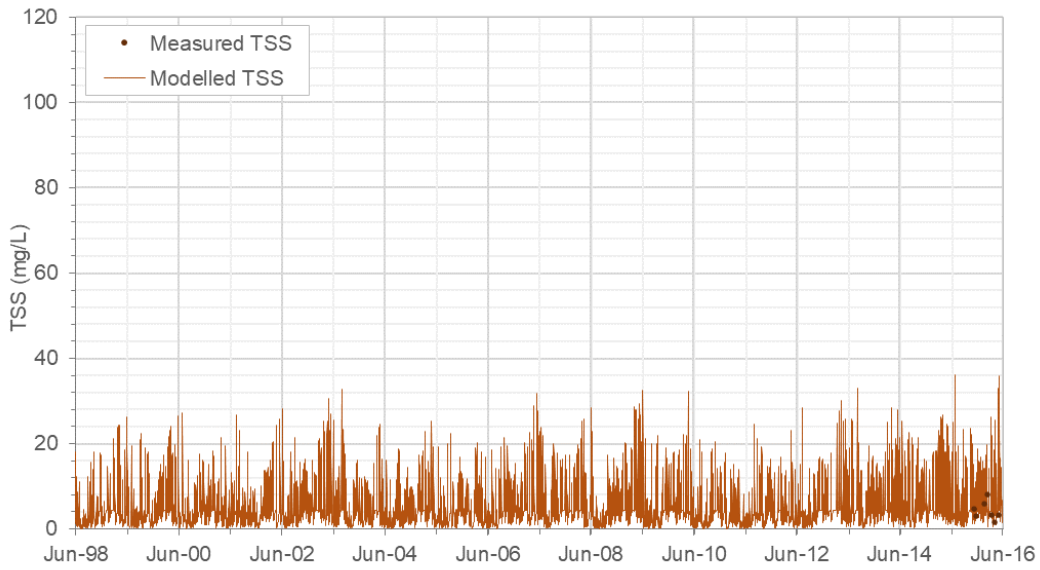


Figure F-60. Comparison of measured and modelled TSS for SC#70. Secondary site: Ngatamawahine u/s of Kopuriki Rd.

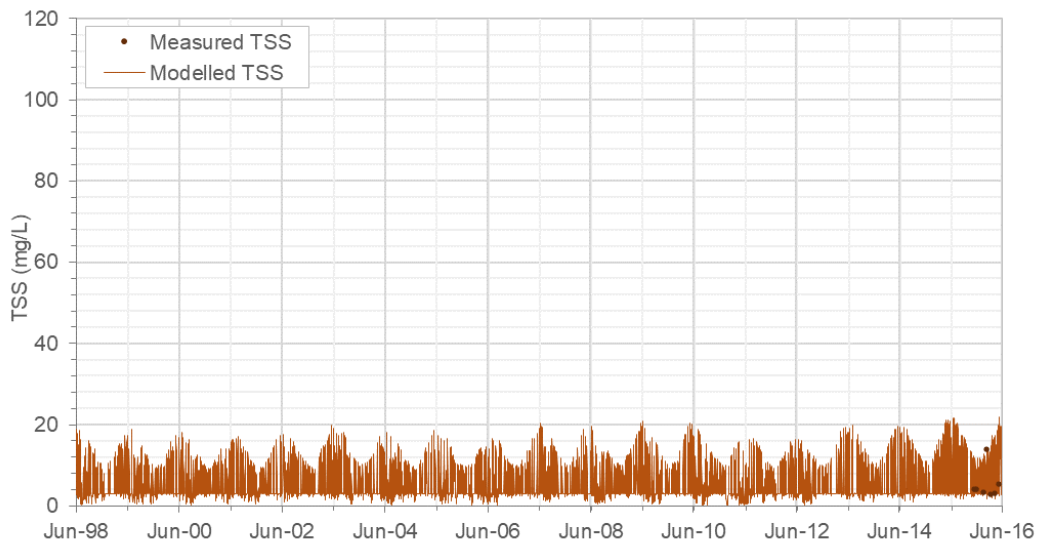


Figure F-61. Comparison of measured and modelled TSS for SC#73. Secondary site: Pokairoa at Upstream Forestry Culvert.

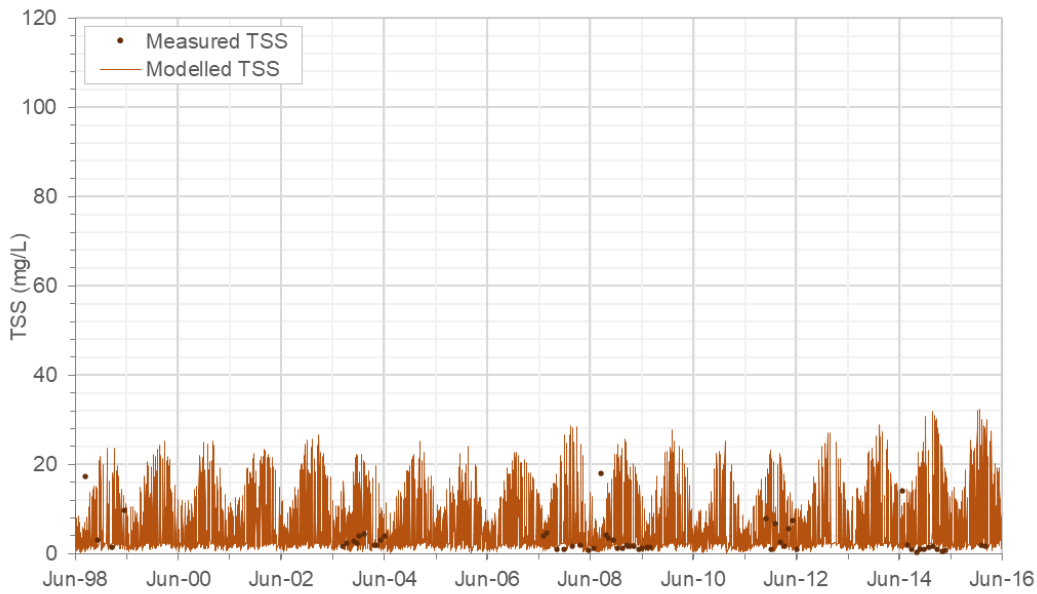


Figure F-62. Comparison of measured and modelled TSS for SC#30. Primary Site: Rangitāiki at Inlet to Aniwhenua Canal.

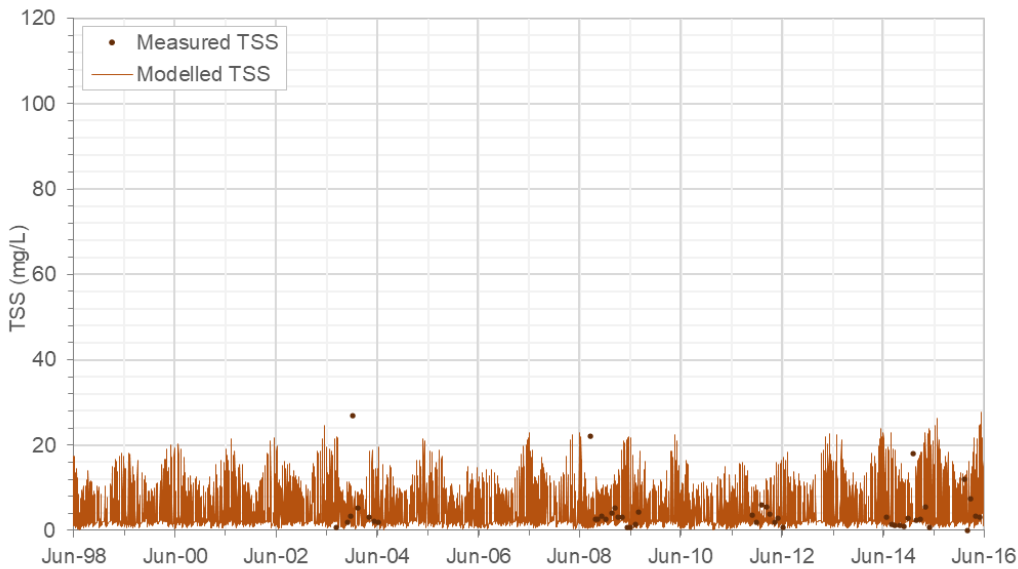


Figure F-63. Comparison of measured and modelled TSS for SC#34. Primary site: Rangitāiki at Matahina Dam.

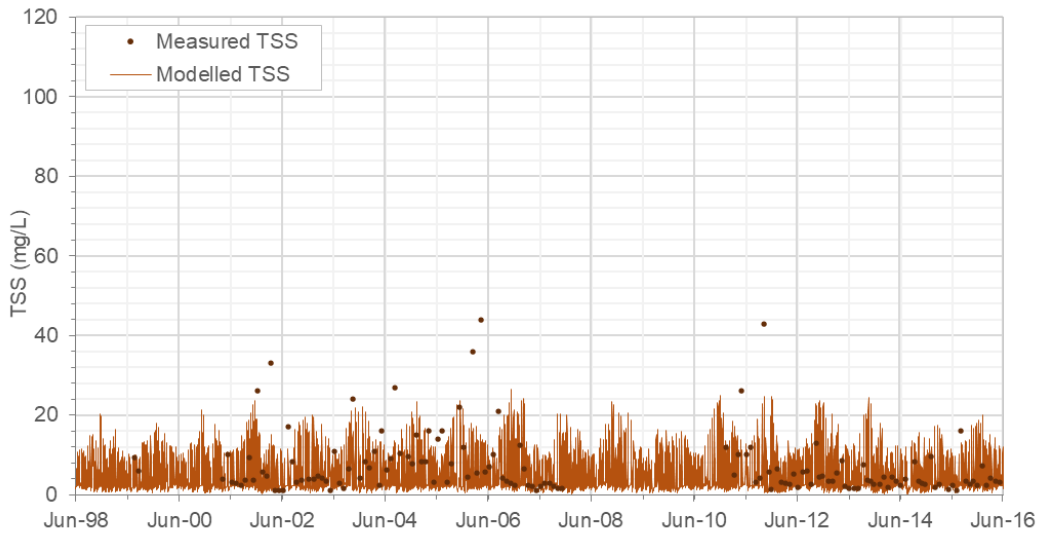


Figure F-64. Comparison of measured and modelled TSS for SC#37. Primary site: Rangitāiki at Te Teko.

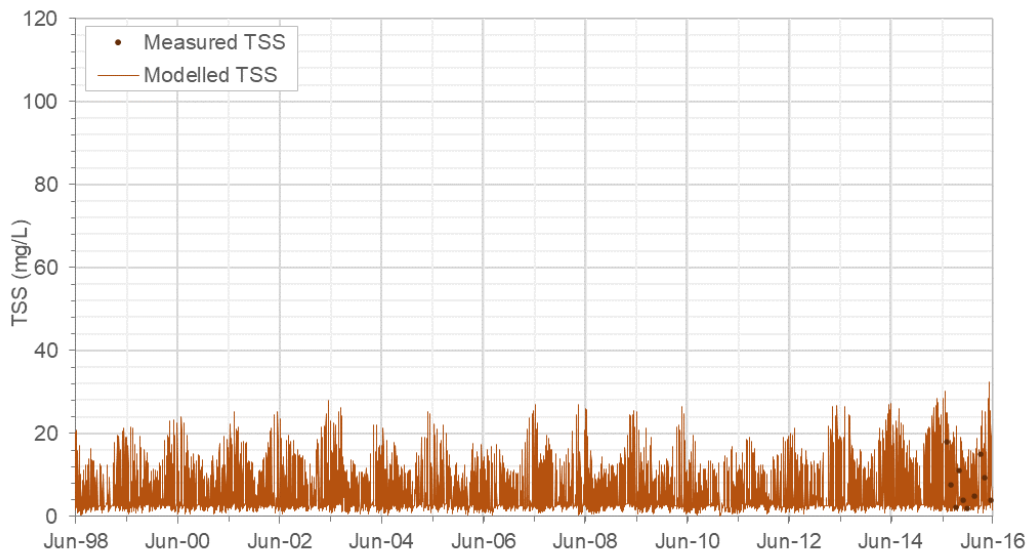


Figure F-65. Comparison of measured and modelled TSS for SC#38. Secondary site: Rangitāiki at Boat Ramp.

Table F-6. TSS calibration summary statistics for the Rangitāiki WMA.

Site Name	Site Code	SC#	Type	Type	Mean	50%ile	Minimum	Maximum
Rangitāiki at SH5	FC231176	1	Primary	Measured	10.7	8.6	0.0	43.0
				Modelled	8.9	5.1	2.4	39.7
Otamatea at Wairere Rd	FD445529	6	Secondary	Measured	6.7	4.5	0.9	24.0
				Modelled	8.5	4.8	0.5	45.1
Rangitāiki at Murupara	IG265664	26	Primary	Measured	5.0	4.2	0.4	18.0
				Modelled	7.8	5.0	0.5	38.1
Whirinaki River at Galatea Bridge	IG619428	47	Primary	Measured	7.4	3.4	0.3	85.0
				Modelled	15.9	4.2	0.2	133.5
Ngatamawahine u/s Kopuriki Rd	IH701900	70	Secondary	Measured	4.3	3.3	1.6	8.0
				Modelled	5.2	3.5	0.1	36.2
Pokairoa at Upstream Forestry Culvert	II631304	73	Secondary	Measured	5.3	4.2	2.8	14.0
				Modelled	5.5	3.0	0.1	22.0
Rangitāiki at Inlet to Aniwhenua Canal	JI148319	30	Primary	Measured	3.0	1.6	0.3	14.0
				Modelled	5.3	2.3	0.2	30.9
Rangitāiki at Matahina Dam	JK491452	34	Primary	Measured	3.8	2.9	0.0	18.0
				Modelled	4.8	2.1	0.1	27.8
Rangitāiki at Boat Ramp	KM083686	38	Secondary	Measured	18.9	7.7	1.9	130.0
				Modelled	5.9	2.8	0.2	32.4
Rangitāiki at Te Teko	JL350292	37	Secondary	Measured	5.5	3.4	1.2	43.0
				Modelled	4.6	2.3	0.2	24.7

F.4 TSS Probability Plots

The total suspended sediment probability plot calibration results are presented in **Figure F-66** to **Figure F-76** for the Kaituna WMA, and in **Figure F-77** to **Figure F-85** for the Rangitāiki WMA.

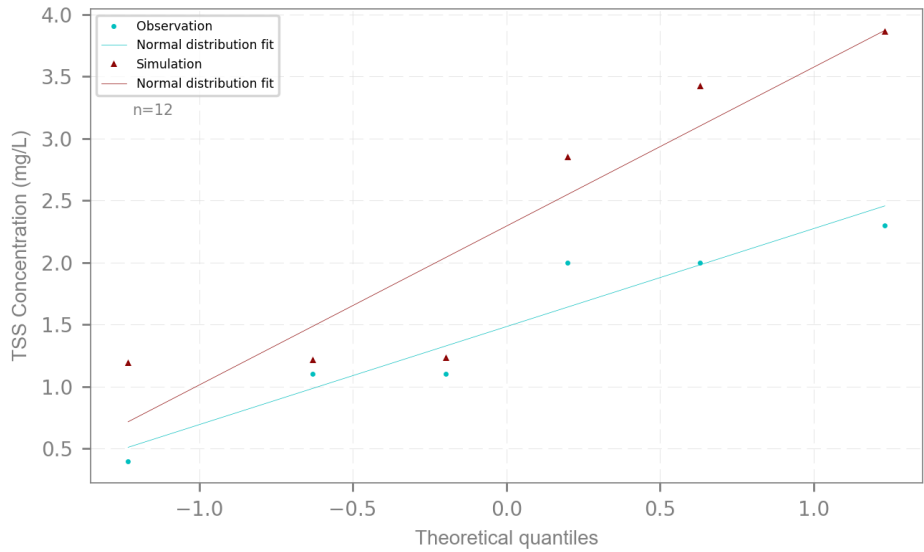


Figure F-66. Comparison of measured and modelled TSS for SC#10. Site ID: FN448171(Secondary site: Paraiti (Mangorewa) at Saunders)

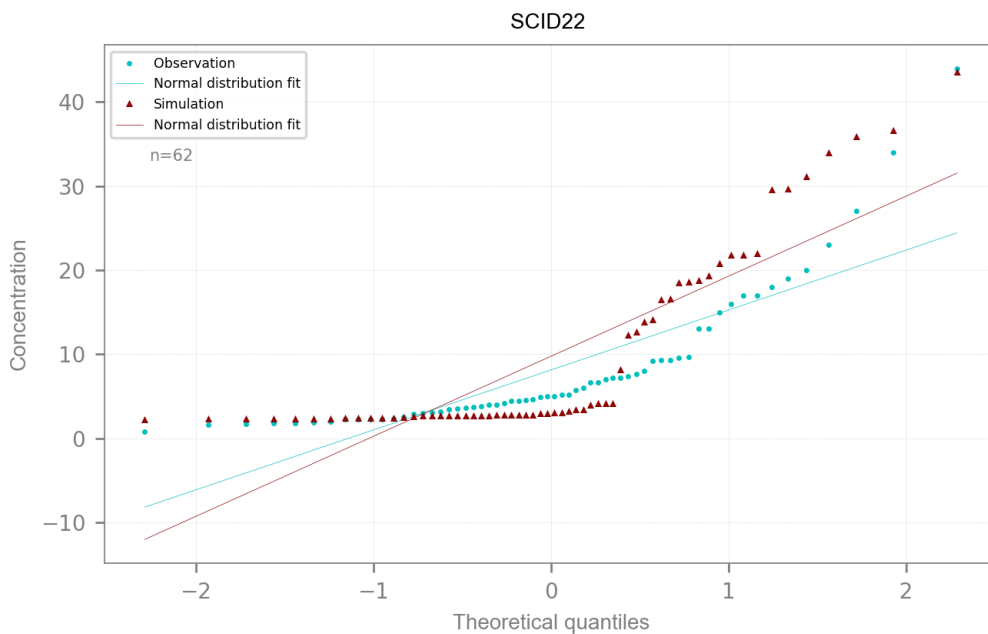


Figure F-67. Comparison of measured and modelled TSS for SC#22. Site ID: FN834668 (Primary site: Kaituna at Maungarangi Rd)

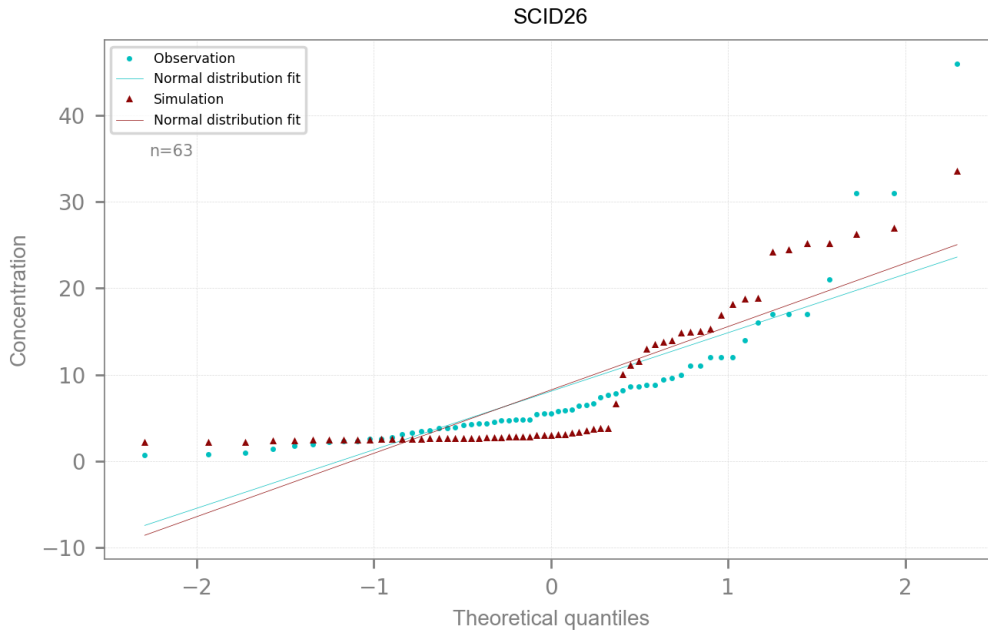


Figure F-68. Comparison of measured and modelled TSS for SC#26. Site ID: FO620177 (Primary site: Kaituna at Te Matai)

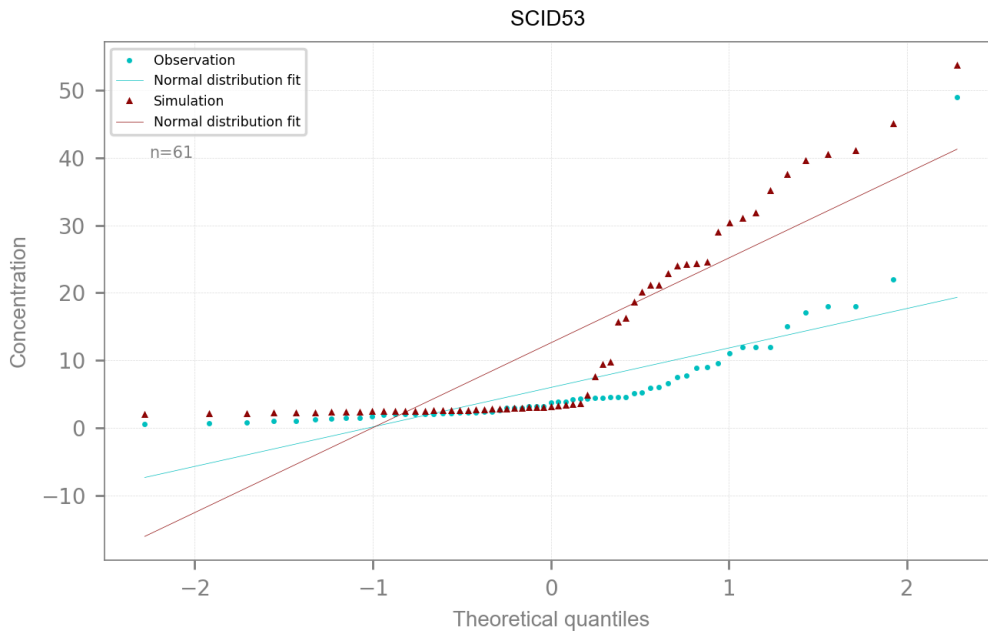


Figure F-69. Comparison of measured and modelled TSS for SC#53. Site ID: FO497605 (Primary site: Kaituna at Clarkes)

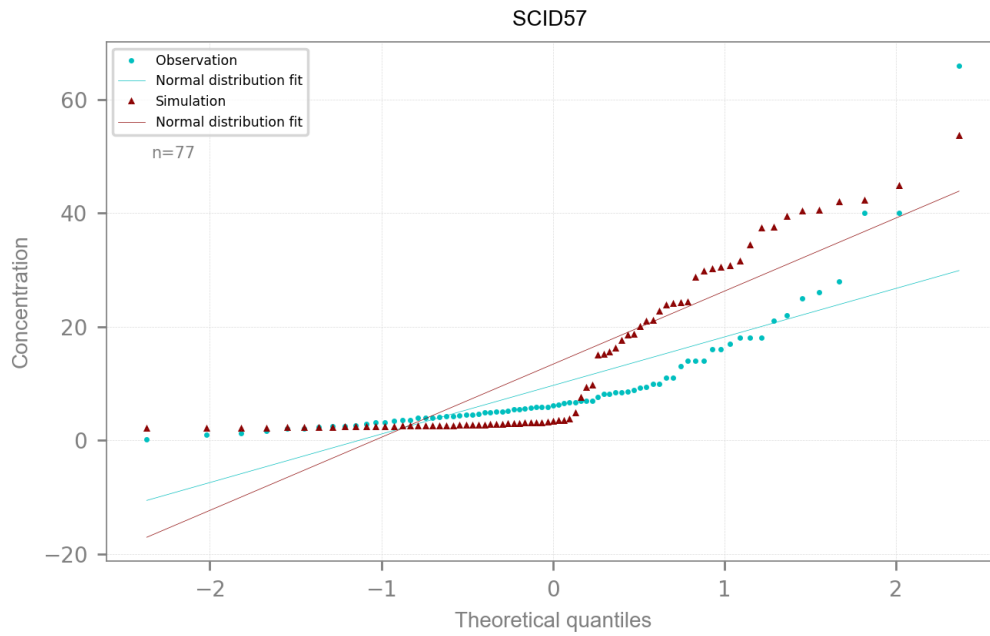


Figure F-70. Comparison of measured and modelled TSS for SC#57. Site ID: GO089653 (Primary site: Kaituna at Te Tumu).

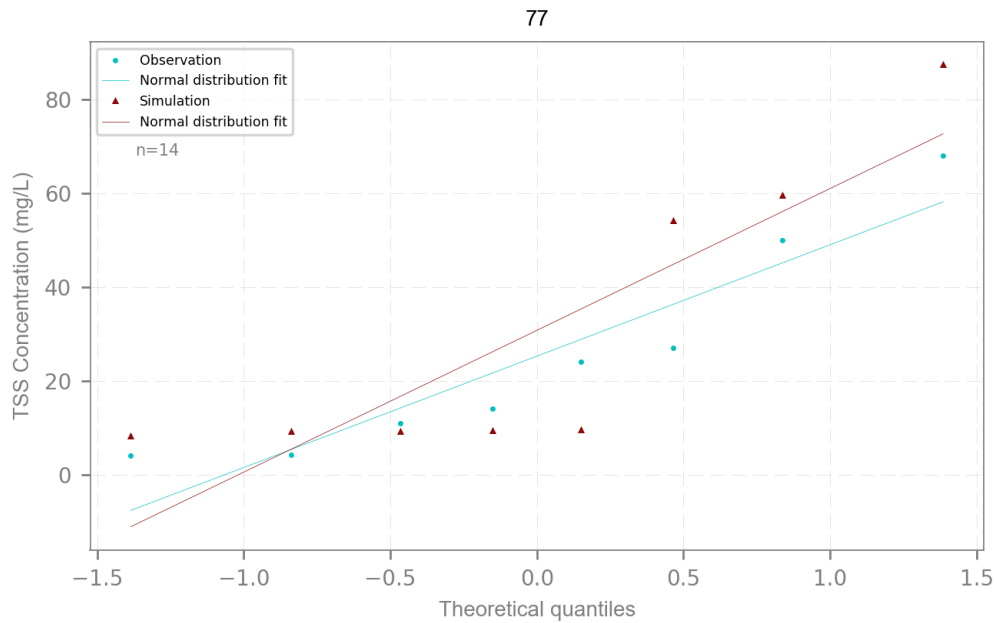


Figure F-71. Comparison of measured and modelled TSS for SC#77. Site ID: GN561803 (Secondary site: Puanene at SH2).

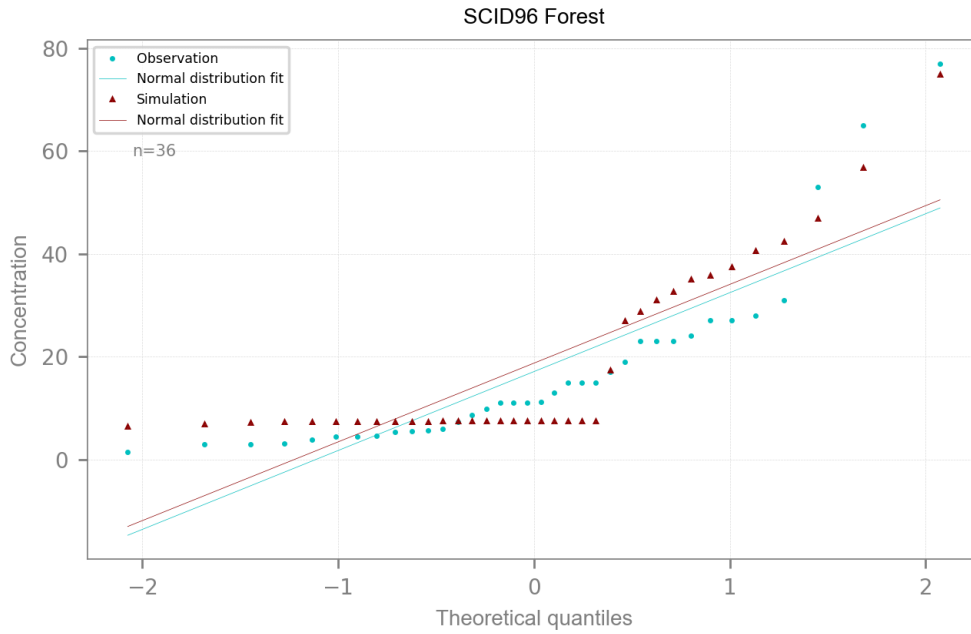


Figure F-72. Comparison of measured and modelled TSS for SC#96 forest. Site ID: GM781934 (Primary site: Pongakawa at Pumphouse)

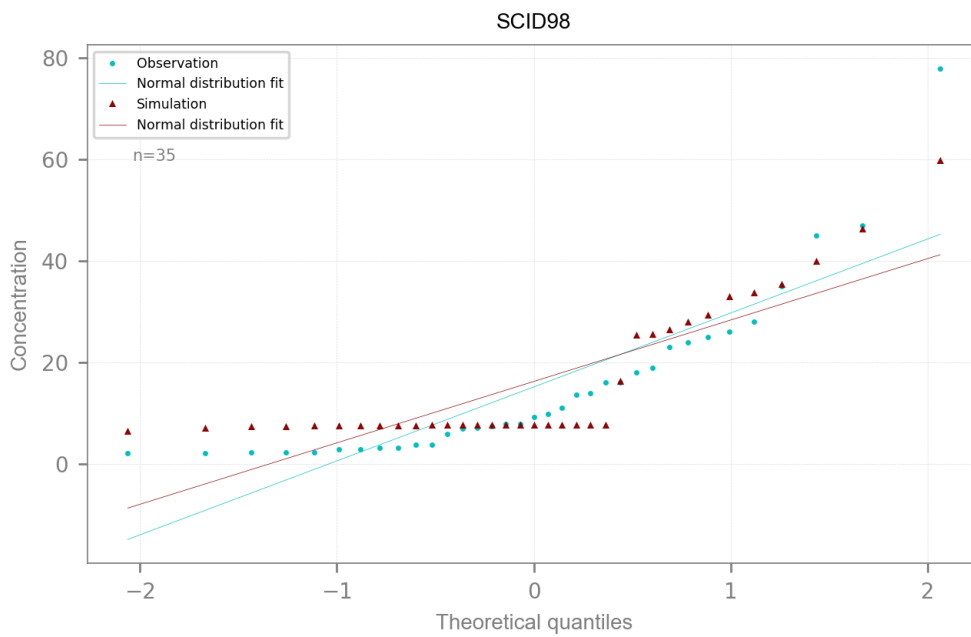


Figure F-73. Comparison of measured and modelled TSS for SC#98. Site ID: GN922883 (Primary Site: Pongakawa at SH2)

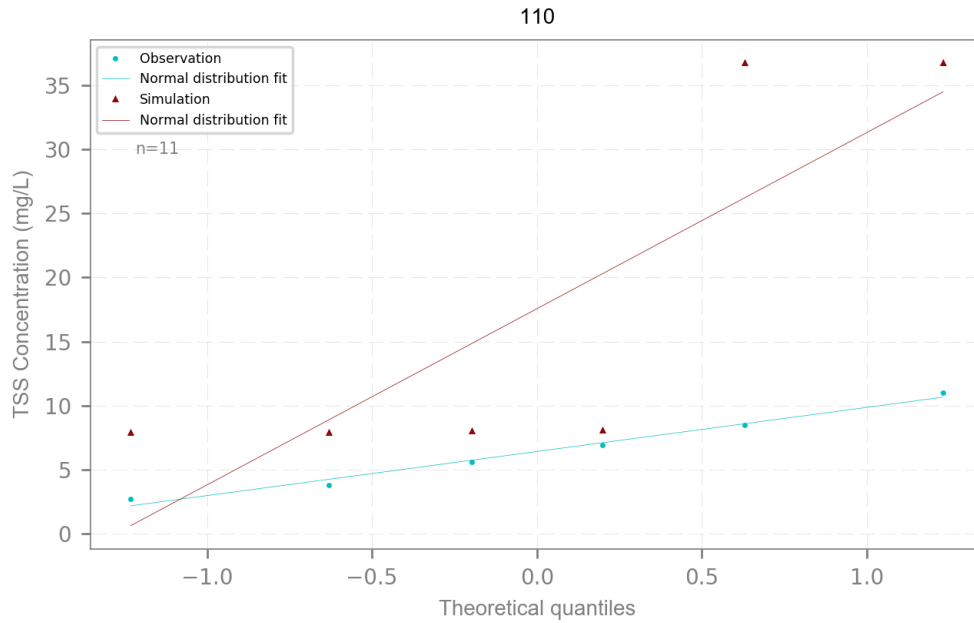


Figure F-74. Comparison of measured and modelled TSS for SC#110. Site ID: F HM688516 (Secondary site: Morepara at u/s Pikowai Rd)

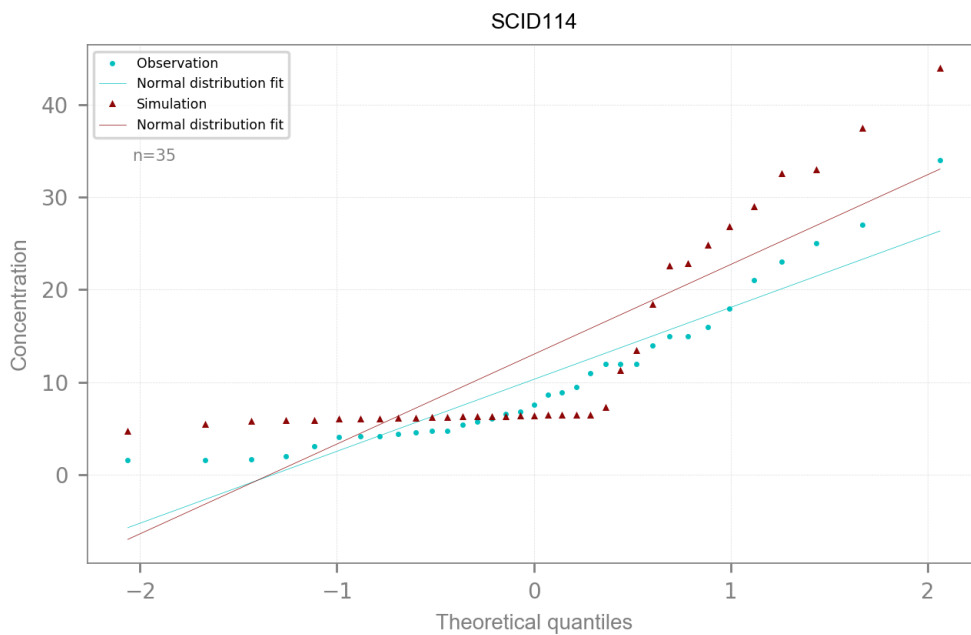


Figure F-75. Comparison of measured and modelled TSS for SC#114. Site ID: HN674689 (Primary site: Waitahanui at Otamarakau Marae)

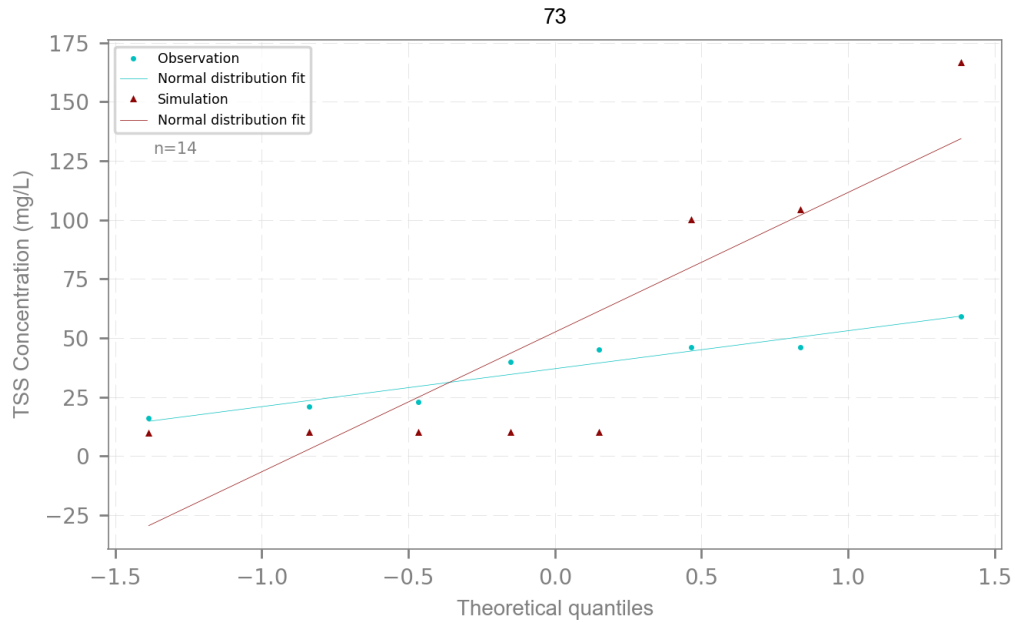


Figure F-76. Comparison of measured and modelled TSS for SC#73. Site ID: GN178816 (Secondary site: Pokopoko at Black Rd)

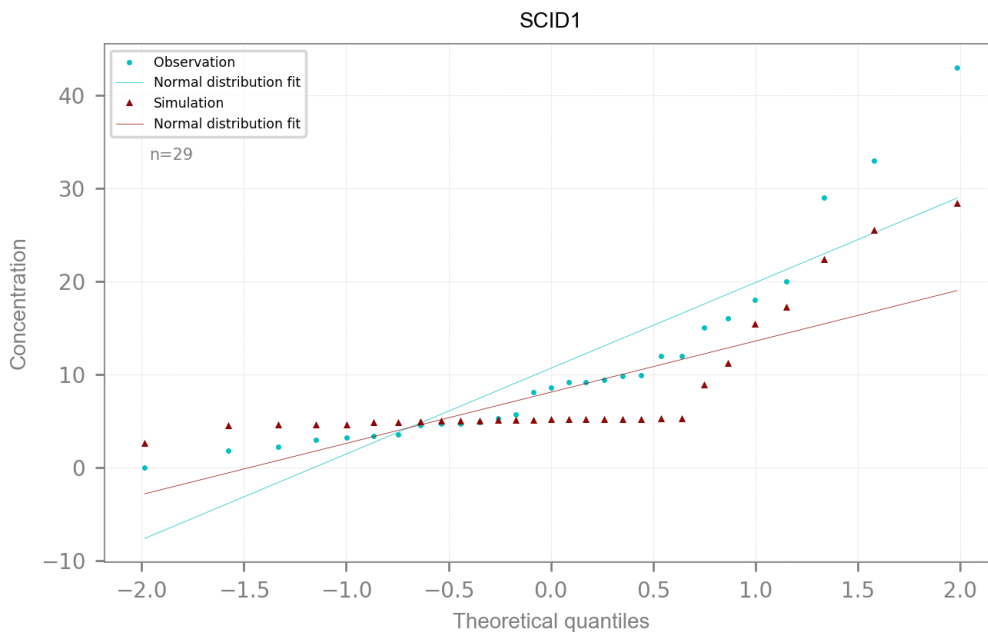


Figure F-77. Comparison of measured and modelled TSS for SC#1, Rangitāiki at SH5 gauge. Site ID: JJ632257 (Primary site: Rangitāiki at SH5 gauge)

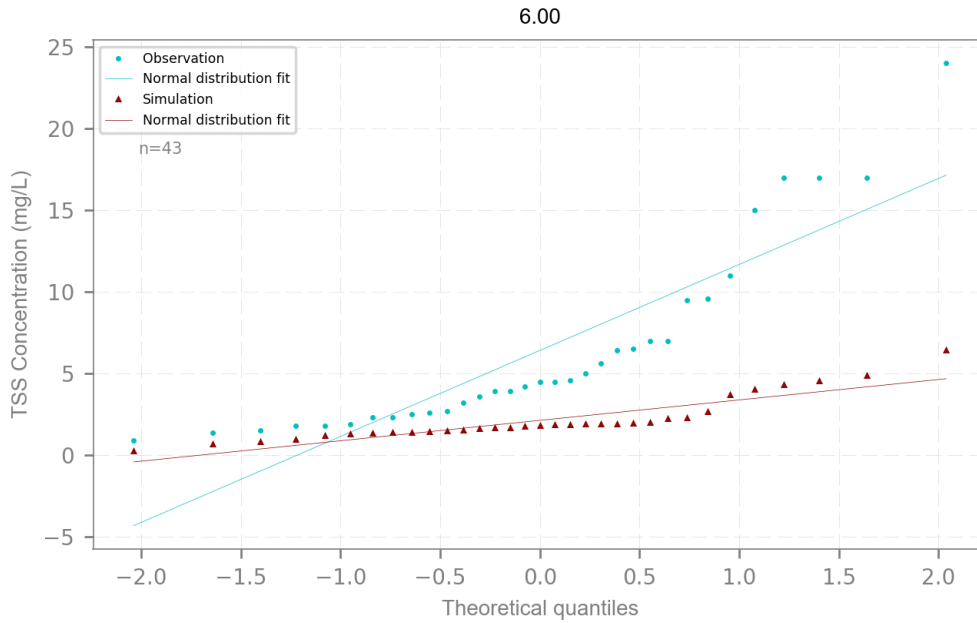


Figure F-78. Comparison of measured and modelled TSS for SC#6. Site ID: FD445529 (Secondary site: Otamatea at Wairere Rd)

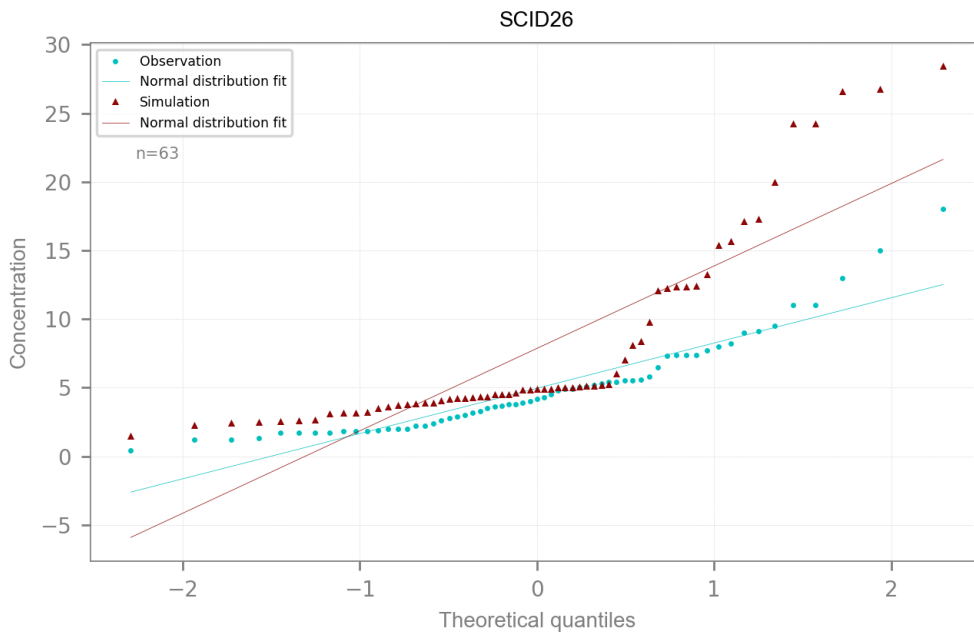


Figure F-79. Comparison of measured and modelled TSS for SC#26. Site ID: IG265664 (Primary Site: Rangitāiki at Murupara).

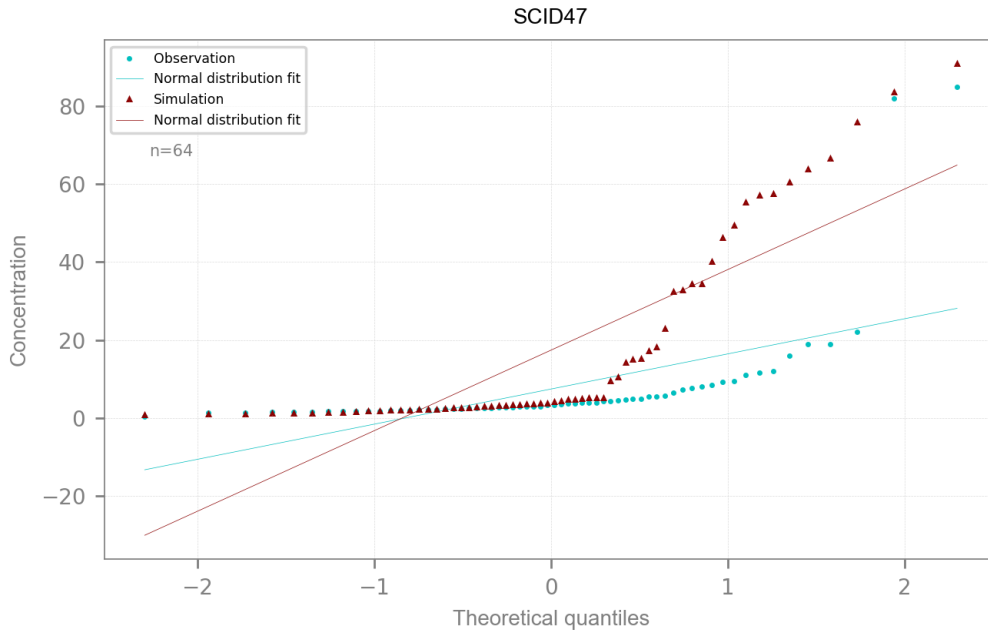


Figure F-80. Comparison of measured and modelled TSS for SC#47. Site ID: IG619428 (Primary Site: Whirinaki River at Galatea Bridge).

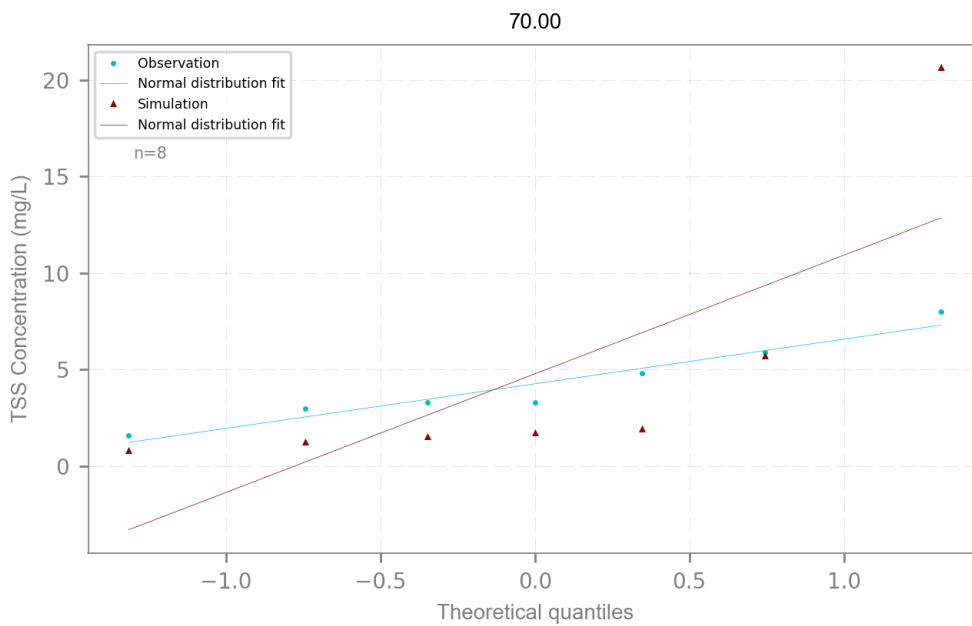


Figure F-81. Comparison of measured and modelled TSS for SC#70. Site ID: IH701900 (Secondary site: Ngatamawahine u/s of Kopuriki rd).

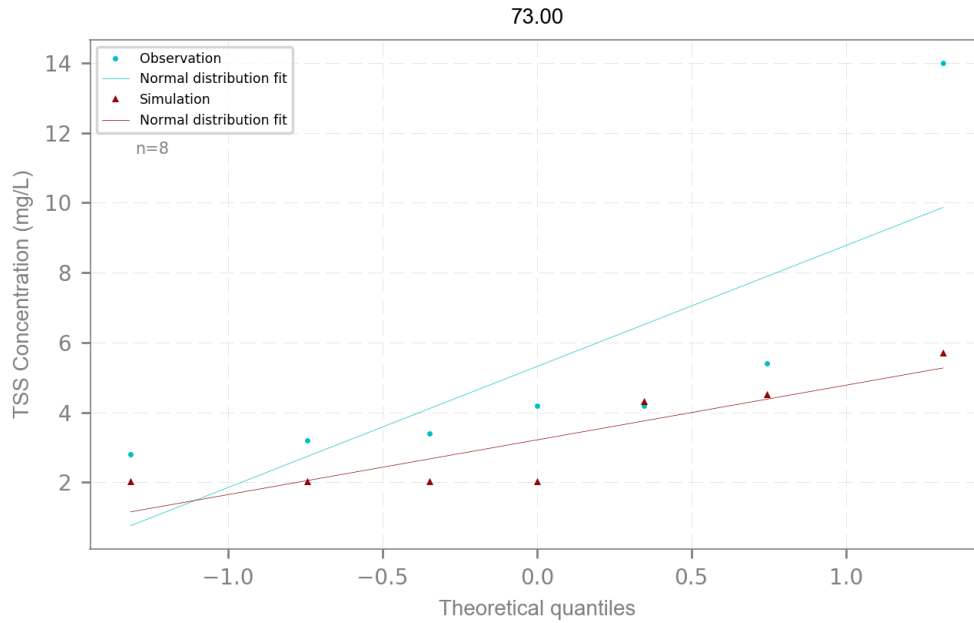


Figure F-82. Comparison of measured and modelled TSS for SC#73. Site ID: I1631304 (Secondary site: Pokairoa at Upstream Forestry Culvert).

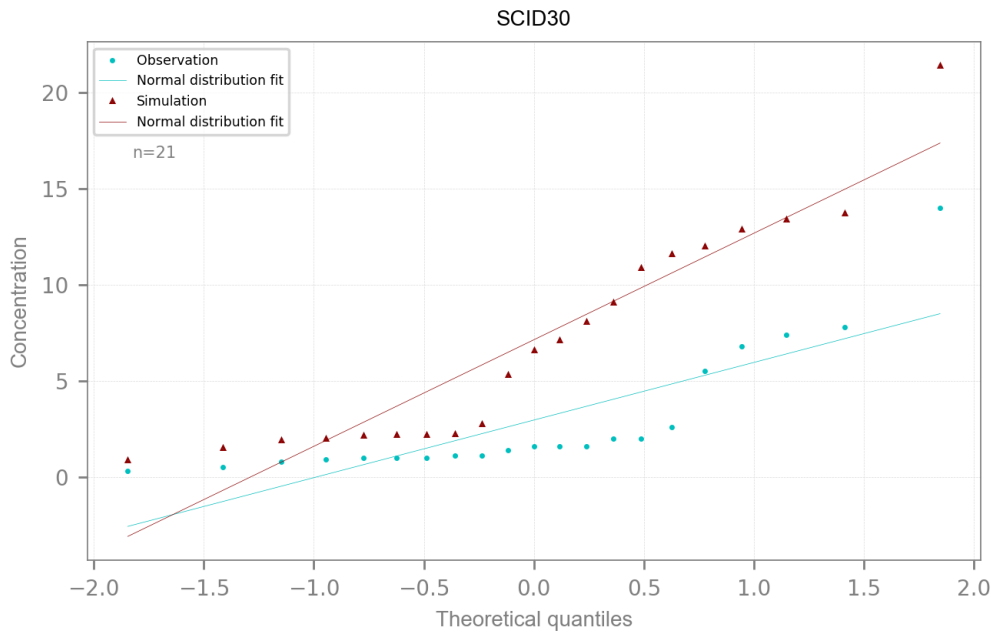


Figure F-83. Comparison of measured and modelled TSS for SC#30. Site ID: J1148319 (Primary Site: Rangitaiki at Inlet to Aniwhenua Canal).

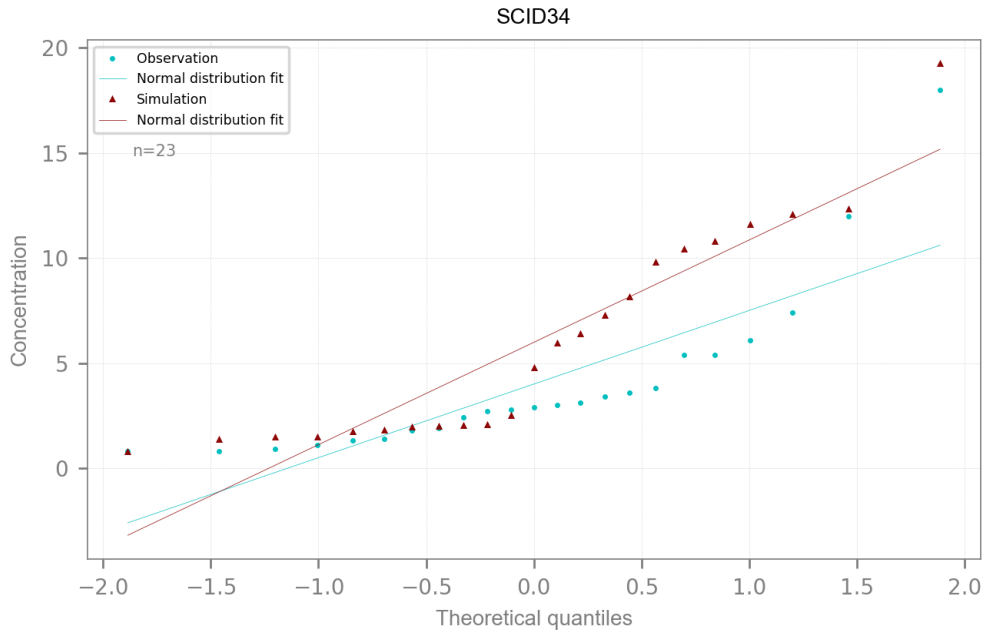


Figure F-84. Comparison of measured and modelled TSS for SC#34. Site ID: JK491452 (Primary site: Rangitāiki at Matahina Dam)

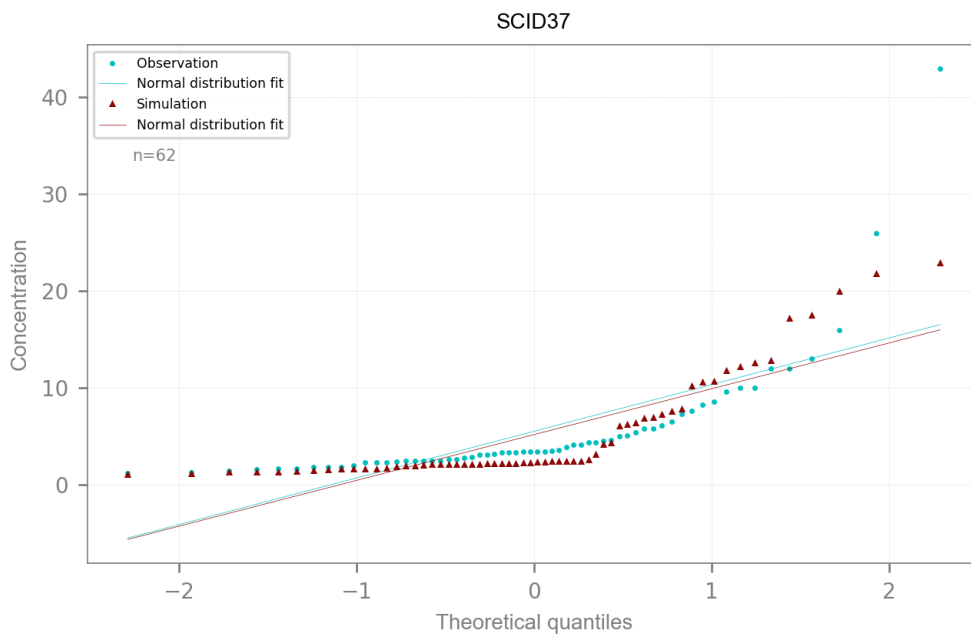


Figure F-85. Comparison of measured and modelled TSS for SC#37. Site ID: JL350292 (Primary site: Rangitāiki at Te Teko)

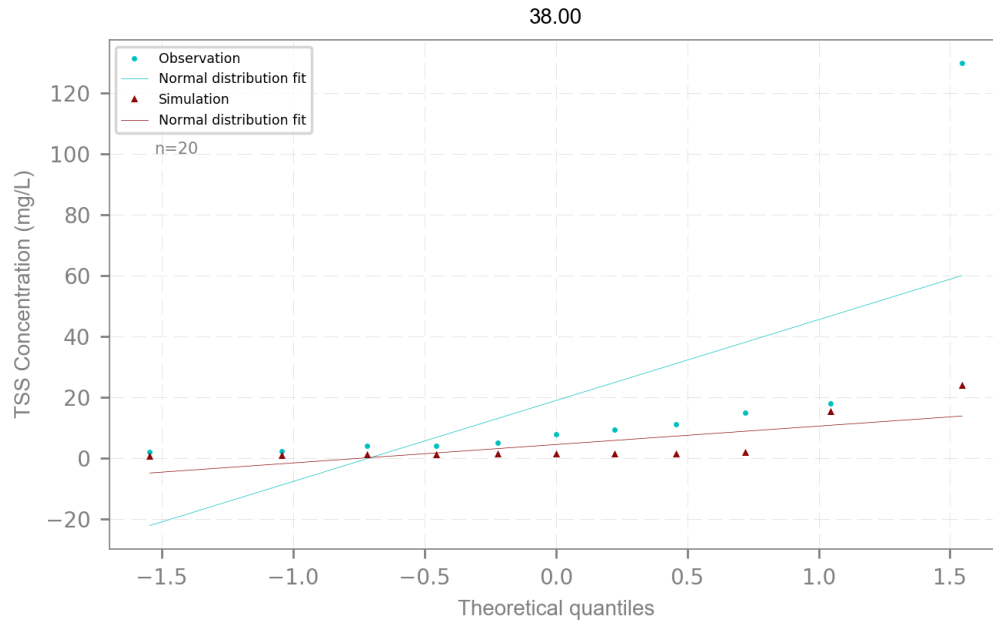


Figure F-86. Comparison of measured and modelled TSS for SC#38. Site ID: KM083686 (Secondary site: Rangitāiki at Boat Ramp)

F.5 Total Phosphorous Results

Total phosphorous calibration results for the Kaituna WMA are presented in **Figure F-87** to **Figure F-99**, and for the Rangitaiki WMA in **Figure F-100** to **Figure F-102**.

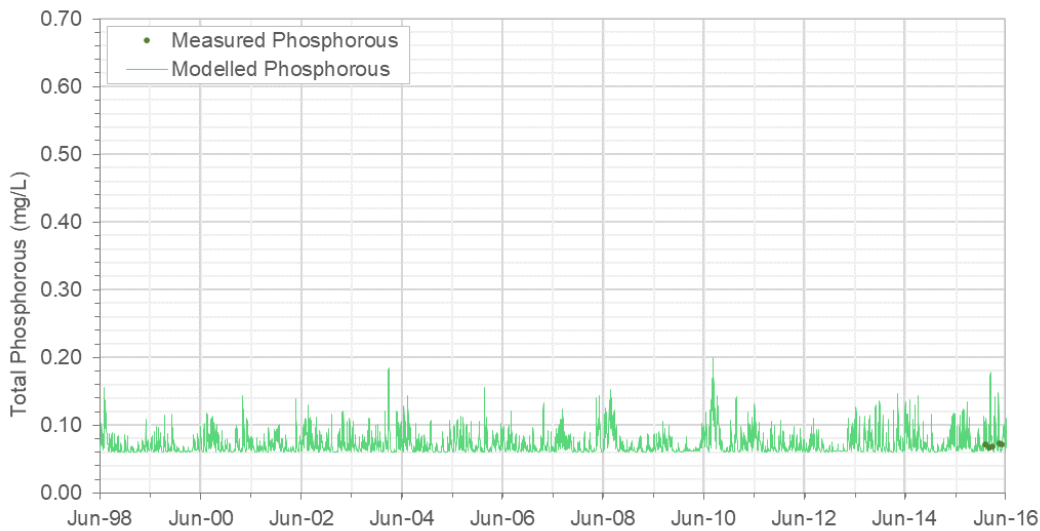


Figure F-87. Comparison of measured and modelled total phosphorous for SC#10. Secondary site: Paraiti (Mangorewa) at Saunders.

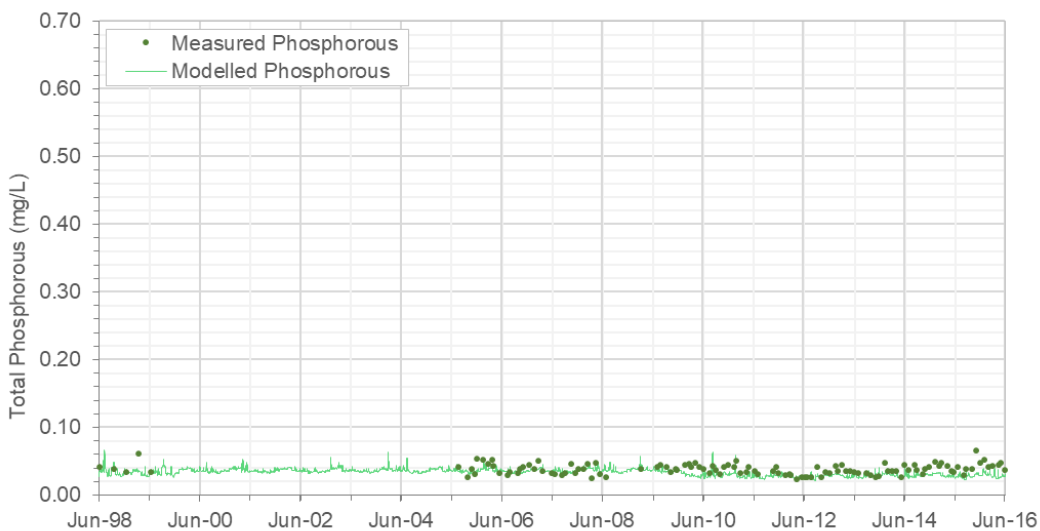


Figure F-88. Comparison of measured and modelled total phosphorous for SC#22. Primary site: Kaituna at Maungarangi Rd.

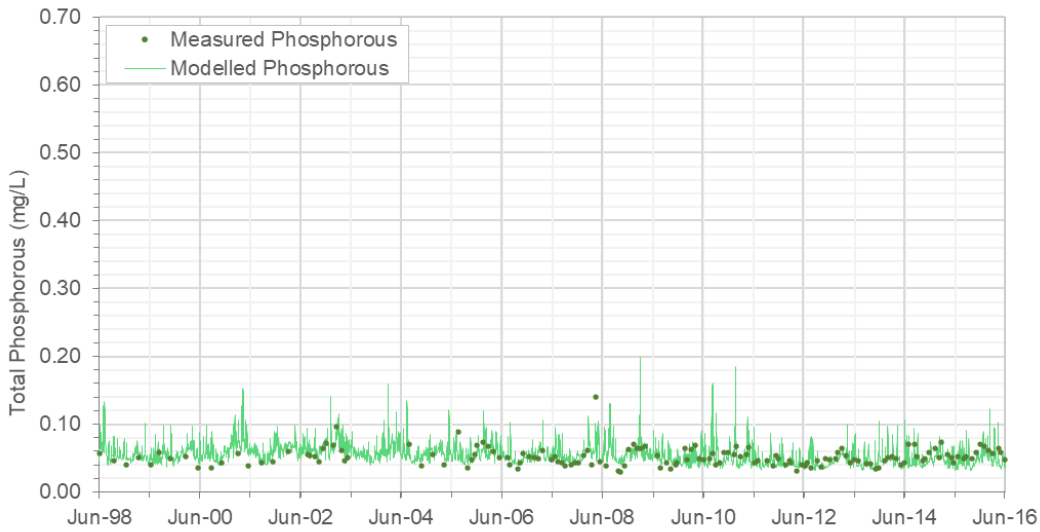


Figure F-89. Comparison of measured and modelled total phosphorous for SC#26. Primary site: Kaituna at Te Matai.

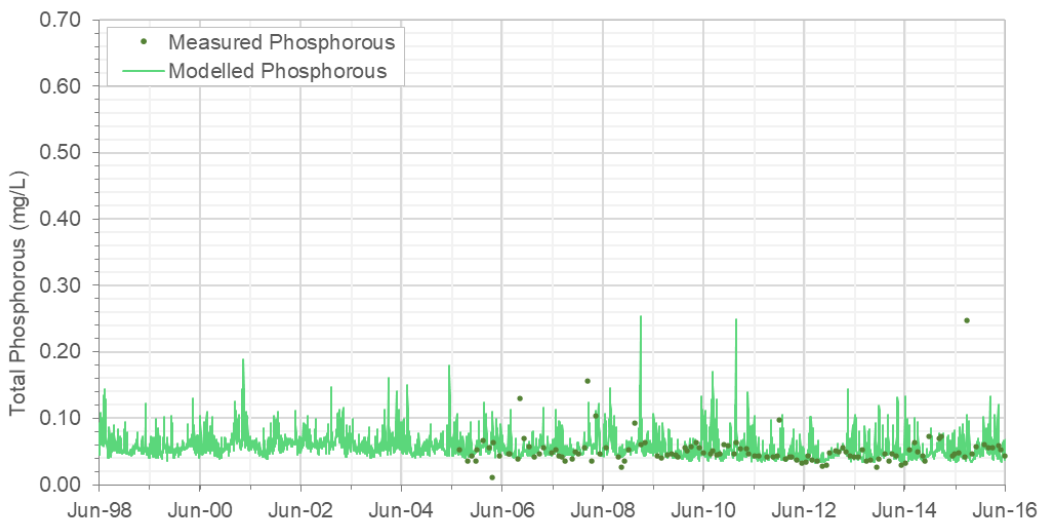


Figure F-90. Comparison of measured and modelled total phosphorous for SC#53. Primary site: Kaituna at Clarkes.

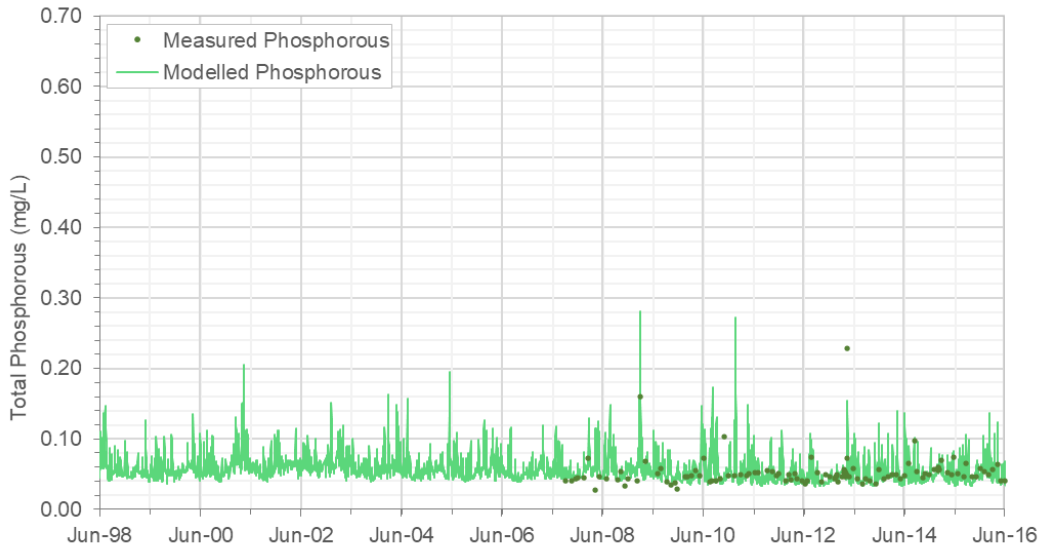


Figure F-91. Comparison of measured and modelled total phosphorous for SC#57. Primary site: Kaituna at Te Tumu.

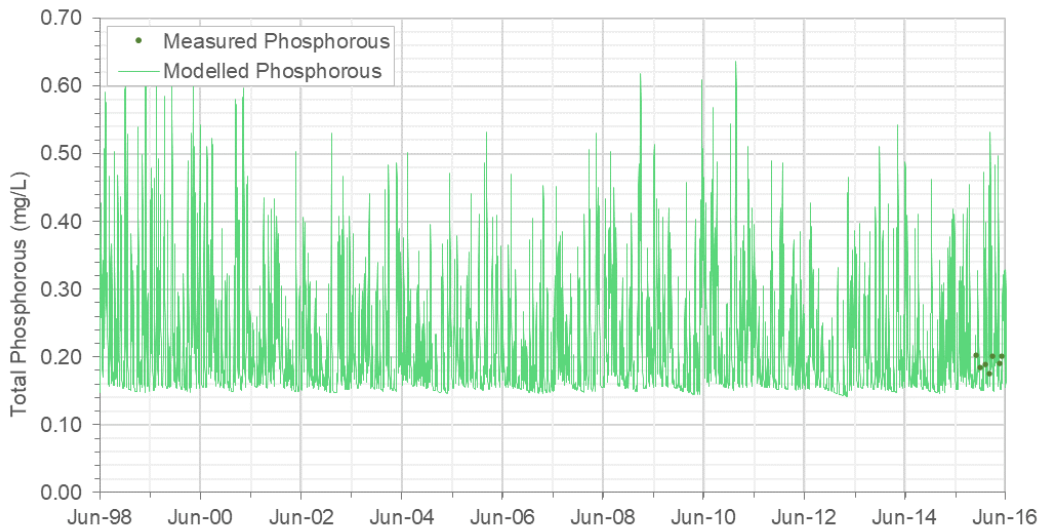


Figure F-92. Comparison of measured and modelled total phosphorous for SC#77. Secondary site: Puanene at SH2.

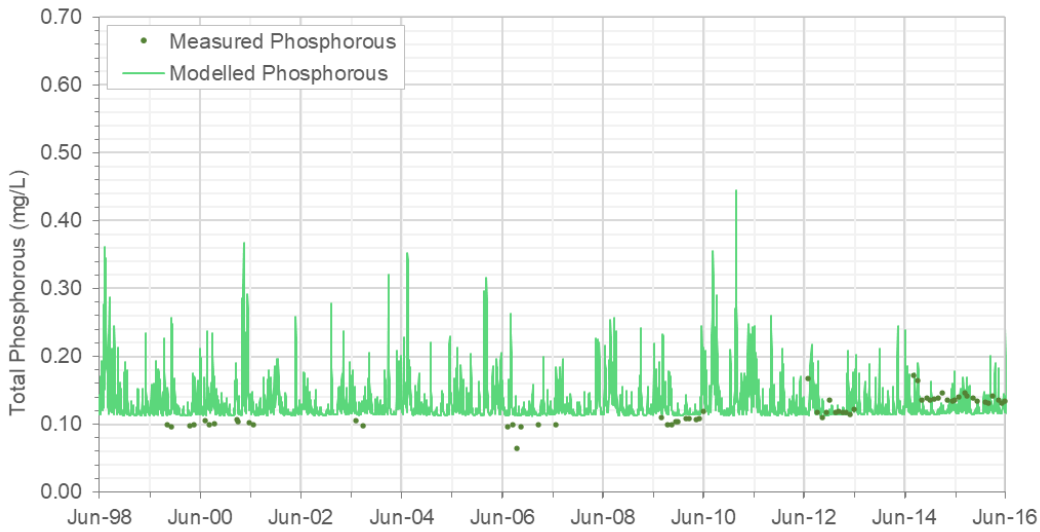


Figure F-93. Comparison of measured and modelled total phosphorous for SC#96 forest. Primary site: Pongakawa at Pumphouse.

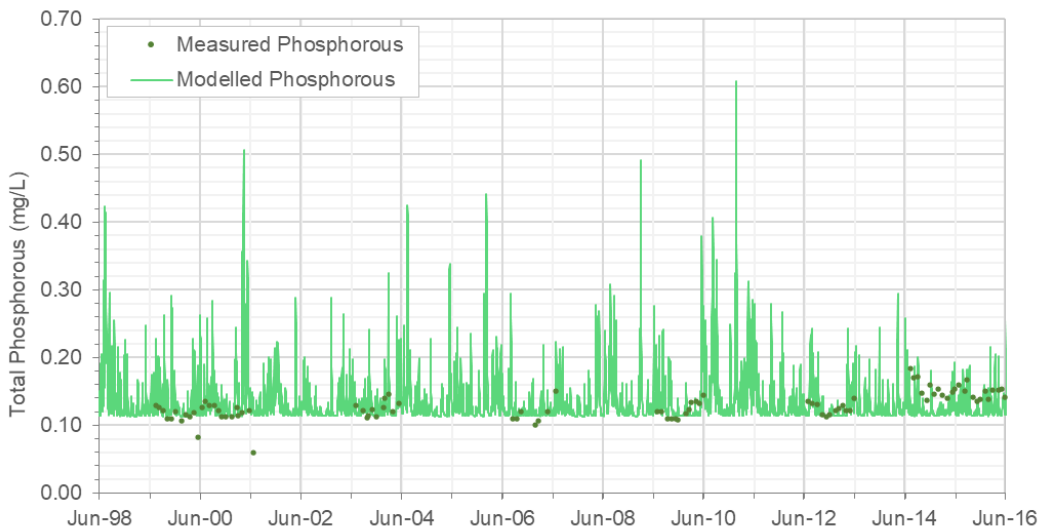


Figure F-94. Comparison of measured and modelled total phosphorous for SC#96. Primary site: Pongakawa at Old Coach Rd.

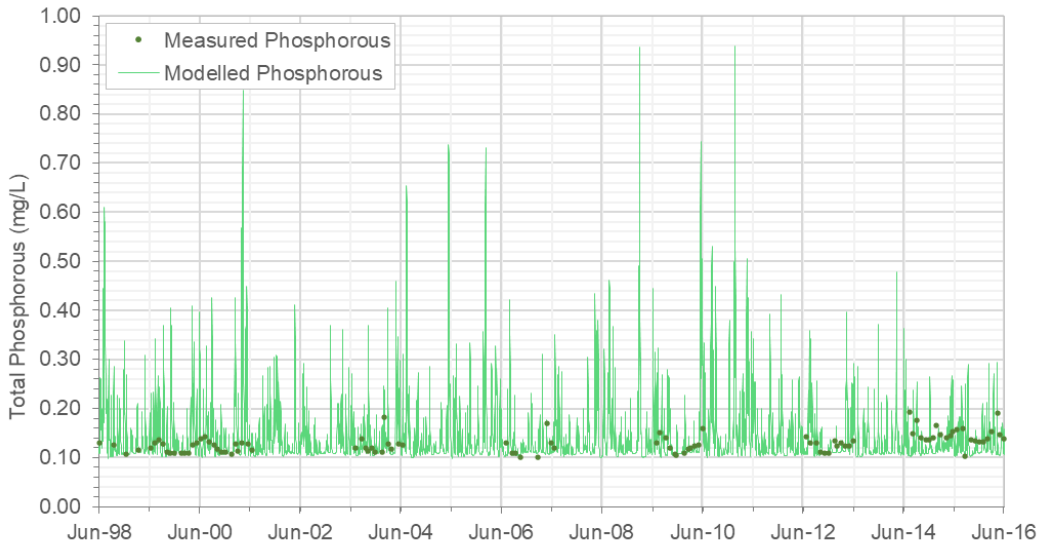


Figure F-95. Comparison of measured and modelled total phosphorous for SC#98. Primary Site: Pongakawa at SH2.

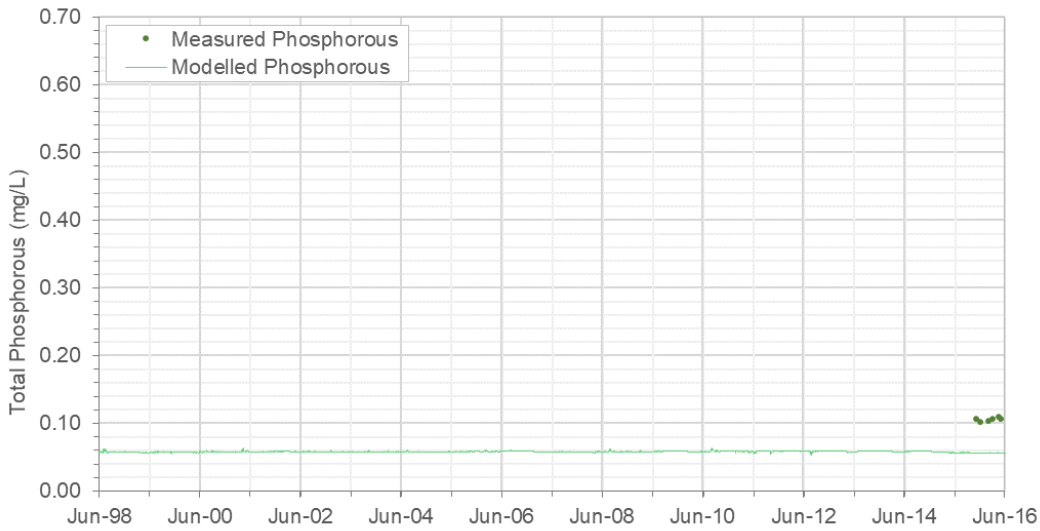


Figure F-96. Comparison of measured and modelled total phosphorous for SC#105. Secondary site: Waitahanui at u/s Campbell Rd.

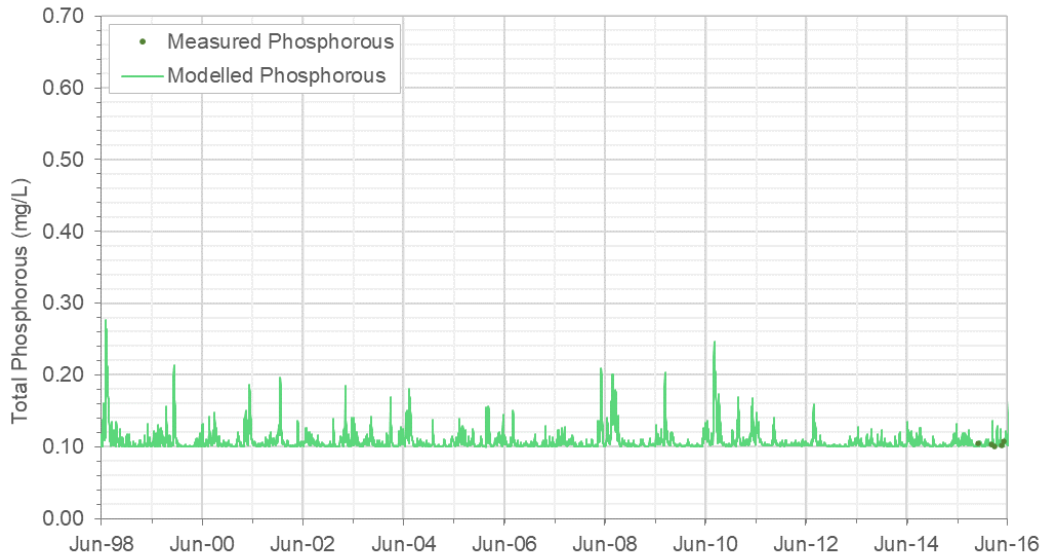


Figure F-97. Comparison of measured and modelled total phosphorous for SC#110. Secondary site: Morepara at u/s Pikowai Rd)

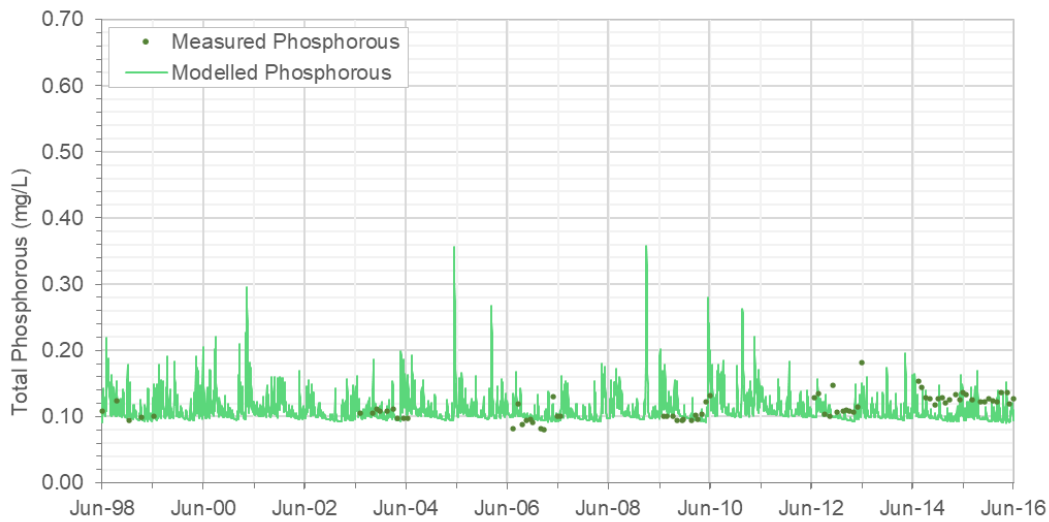


Figure F-98. Comparison of measured and modelled total phosphorous for SC#114. Primary site: Waitahanui at Otamarakau Marae.

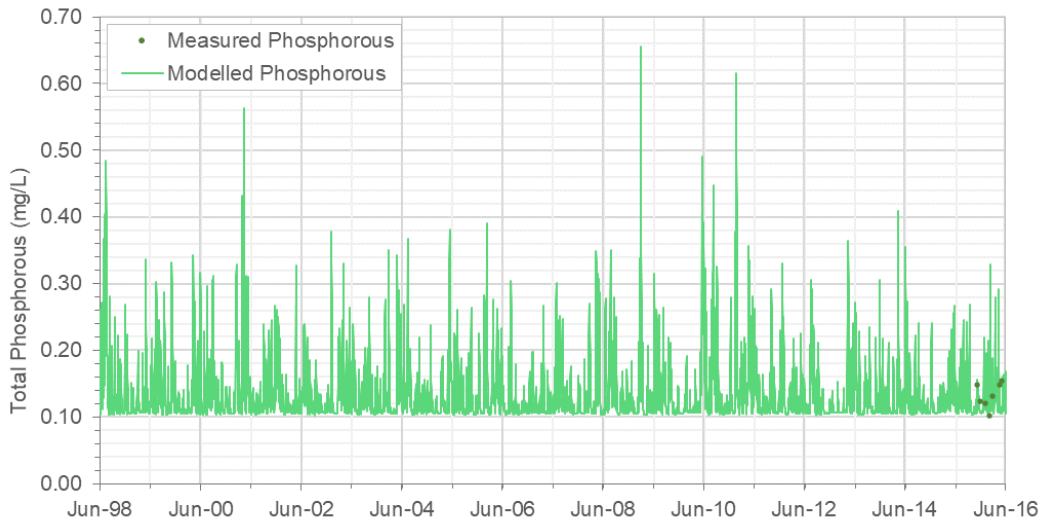


Figure F-99. Comparison of measured and modelled total phosphorous for SC#73. Secondary site: Pokopoko at Black Rd.

Table F-7. TP calibration summary statistics for the Kaituna WMA.

Site Code	Site Name	SC#	Type	Type	Mean	50%ile	Minimum	Maximum
FN448171	Paraiti (Mangorewa) at Saunders	10	Secondary	Modelled	0.08	0.07	0.06	0.20
				Measured	0.07	0.07	0.07	0.07
FN834668	Kaituna at Maungarangi Rd	22	Primary	Modelled	0.04	0.04	0.02	0.07
				Measured	0.04	0.04	0.02	0.07
FO620177	Kaituna at Te Matai	26	Primary	Modelled	0.04	0.04	0.03	0.06
				Measured	0.05	0.05	0.03	0.07
FO497605	Kaituna at Clarkes	53	Primary	Modelled	0.05	0.05	0.03	0.25
				Measured	0.05	0.04	0.03	0.25
GO089653	Kaituna at Te Tumu	57	Primary	Modelled	0.05	0.05	0.03	0.27
				Measured	0.06	0.05	0.04	0.87
GN561803	Puanene at SH2	77	Secondary	Modelled	0.22	0.18	0.14	0.64
				Measured	0.19	0.19	0.17	0.20
GM781934	Pongakawa at Pumphouse	96 forest	Primary	Modelled	0.13	0.18	0.11	0.44
				Measured	0.14	0.14	0.11	0.27
GN849464	Pongakawa at Old Coach Rd	96	Primary	Modelled	0.13	0.12	0.11	0.61
				Measured	0.15	0.14	0.11	0.35
GN922883	Pongakawa at SH2	98	Primary	Modelled	0.12	0.14	0.10	0.94
				Measured	0.14	0.14	0.10	0.19
HM319871	Waitahanui at u/s Campbell Road	105	Secondary	Modelled	0.06	0.06	0.06	0.06
				Measured	0.11	0.11	0.10	0.11
HM688516	Morepara at u/s Pikowai Road	110	Secondary	Modelled	0.11	0.10	0.10	0.17
				Measured	0.10	0.10	0.10	0.11
HN674689	Waitahanui at Otamarakau Marae	114	Primary	Modelled	0.11	0.10	0.09	0.26
				Measured	0.13	0.13	0.10	0.18
GN178816	Pokopoko at Black Rd	73	Secondary	Modelled	0.13	0.11	0.10	0.62
				Measured	0.14	0.14	0.10	0.17

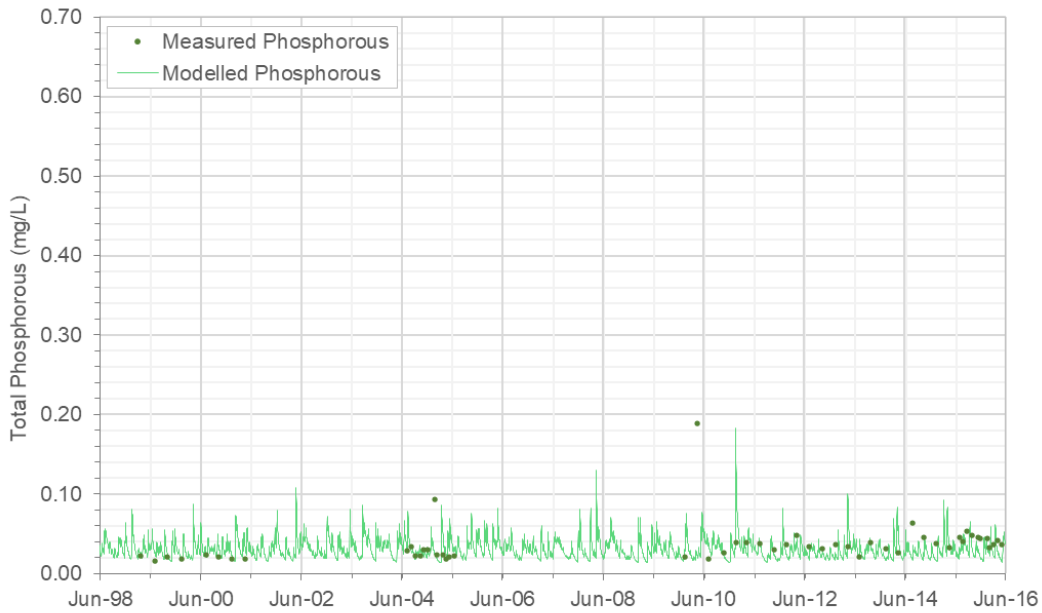


Figure F-100. Comparison of measured and modelled total phosphorous for SC#1. Primary site: Rangitāiki at SH5 gauge.

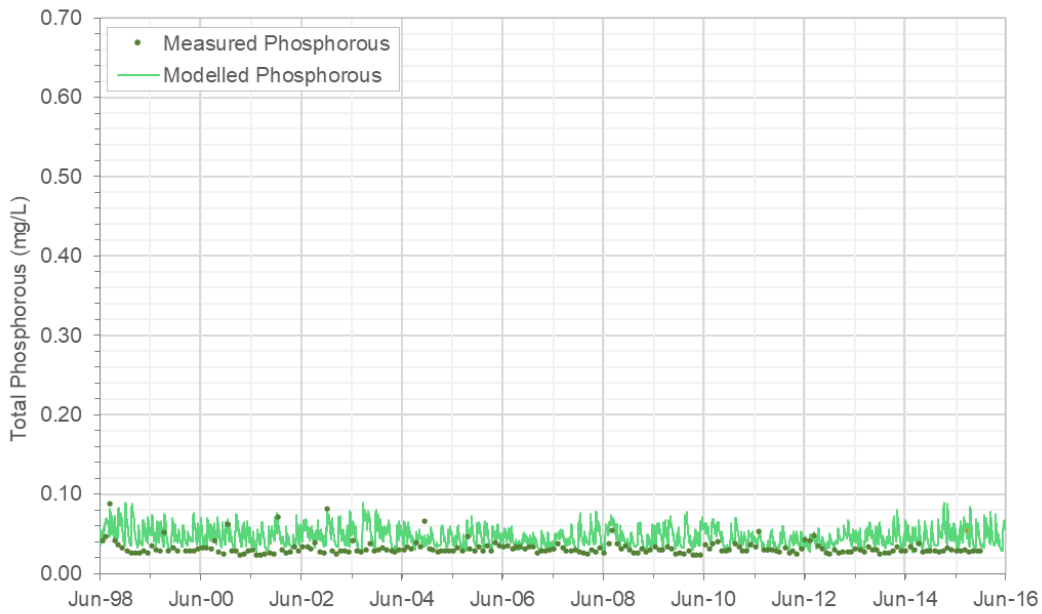


Figure F-101. Comparison of measured and modelled total phosphorous for SC#26. Primary Site: Rangitāiki at Murupara.

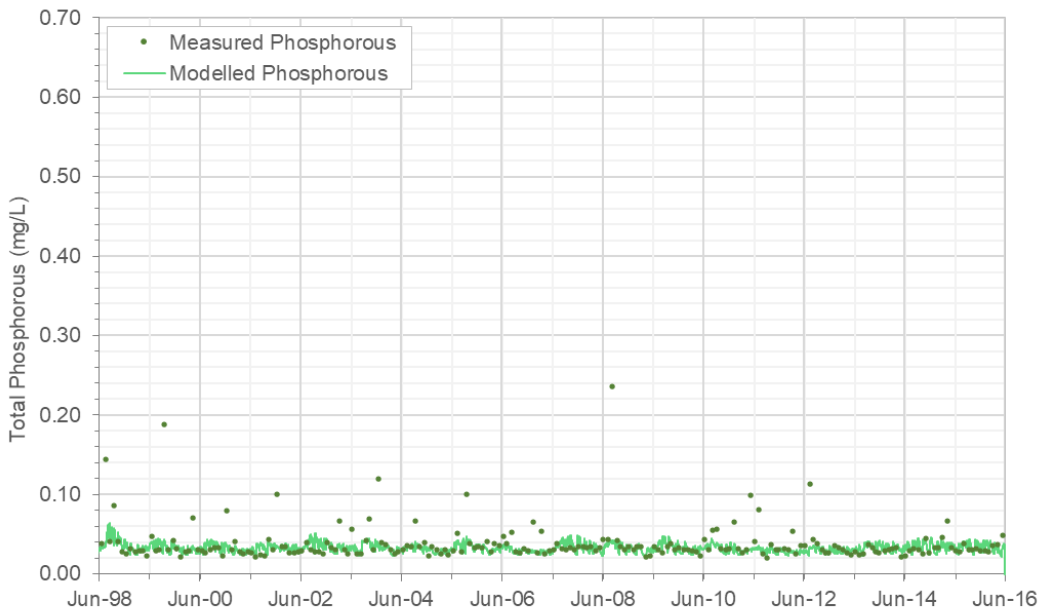


Figure F-102. Comparison of measured and modelled total phosphorous for SC#47. Primary Site: Whirinaki River at Galatea Bridge.

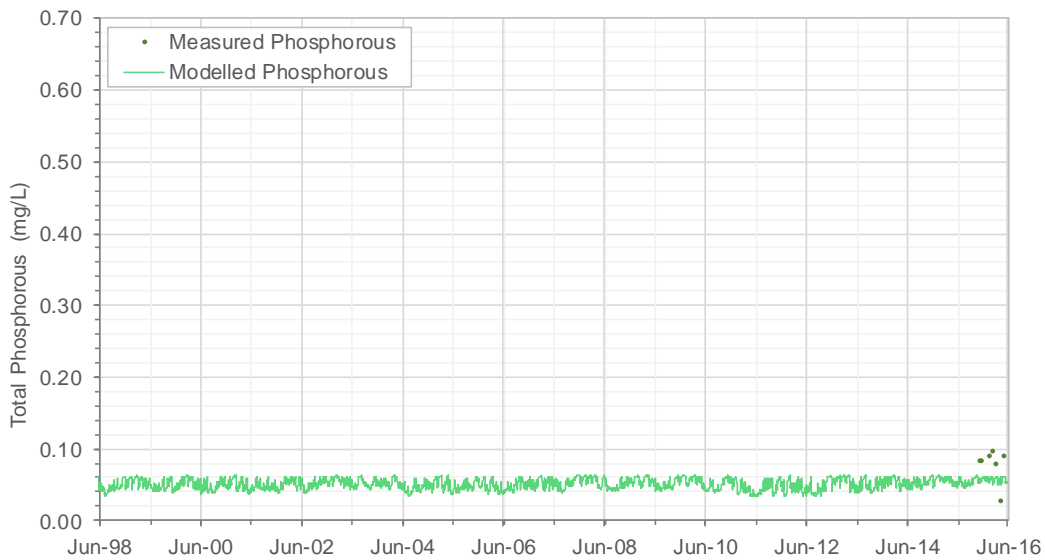


Figure F-103. Comparison of measured and modelled total phosphorous for SC#70. Secondary site: Ngatamawahine u/s of Kopuriki Rd.

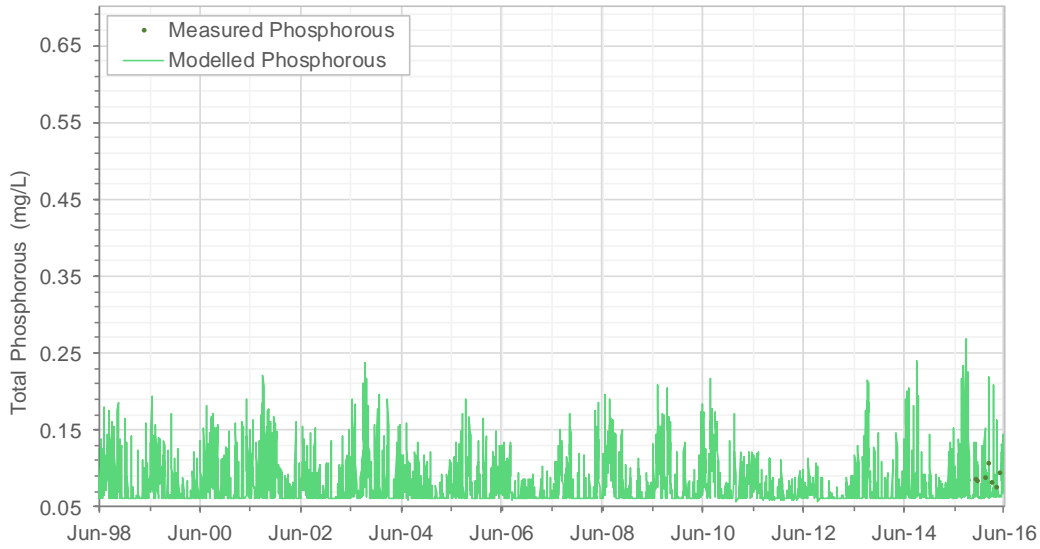


Figure F-104. Comparison of measured and modelled total phosphorous for SC#73. Secondary site: Pokairoa at Upstream Forestry Culvert.

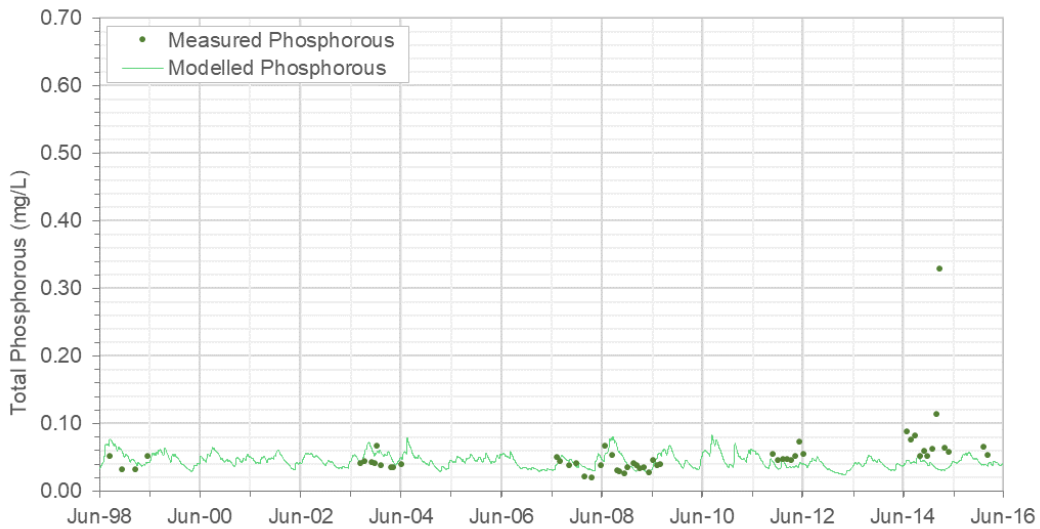


Figure F-105. Comparison of measured and modelled total phosphorous for SC#30. Primary Site: Rangitāiki at Inlet to Aniwhenua Canal.

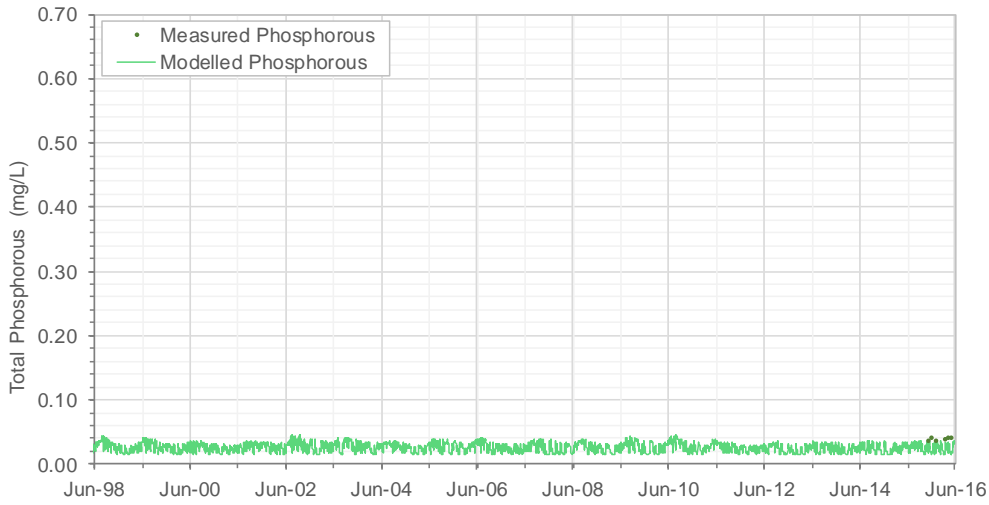


Figure F-106. Comparison of measured and modelled total phosphorous for SC#32. Secondary site: Waihua at Galatea Rd.

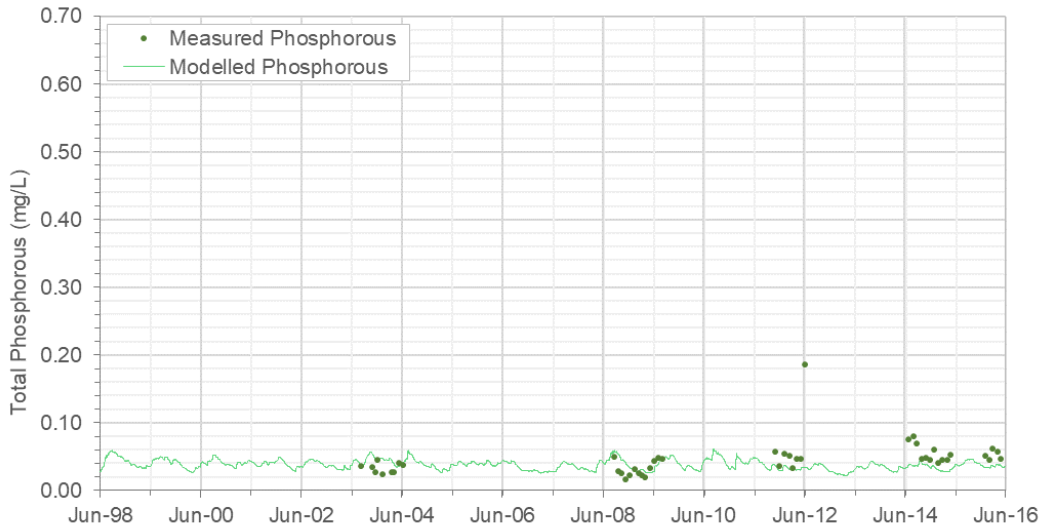


Figure F-107. Comparison of measured and modelled total phosphorous for SC#34. Primary site: Rangitāiki at Matahina Dam.

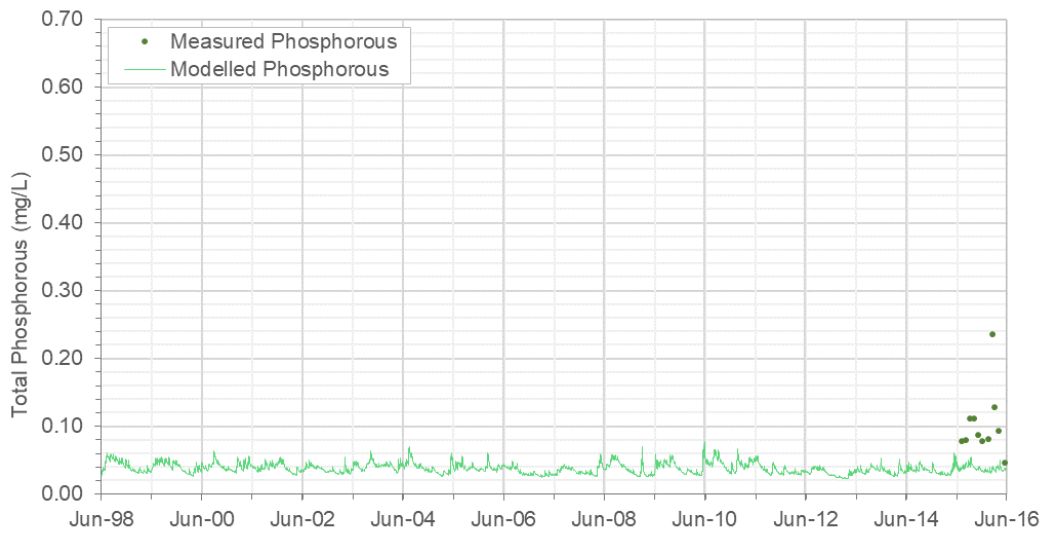


Figure F-108. Comparison of measured and modelled total phosphorous for SC#38. Secondary site: Rangitāiki at Boat Ramp.

Table F-8. TP calibration summary statistics for the Rangitāiki WMA.

Site Name	Site Code	SC#	Type	Type	Mean	50%ile	Minimum	Maximum
Rangitāiki at SH5	FC231176	1	Primary	Measured	0.04	0.04	0.02	0.06
				Modelled	0.03	0.03	0.01	0.18
Otamatea at Wairere Rd	FD445529	6	Secondary	Measured	0.04	0.04	0.02	0.07
				Modelled	0.09	0.09	0.02	0.25
Rangitāiki at Murupara	IG265664	26	Primary	Measured	0.03	0.03	0.03	0.05
				Modelled	0.04	0.04	0.03	0.09
Whirinaki River at Galatea Bridge	IG619428	47	Primary	Measured	0.04	0.03	0.02	0.11
				Modelled	0.03	0.03	0.02	0.05
Ngatamawahine u/s Kopuriki Rd	IH701900	70	Secondary	Measured	0.08	0.08	0.03	0.10
				Modelled	0.05	0.05	0.03	0.06
Pokairoa at Upstream Forestry Culvert	II631304	73	Secondary	Measured	0.09	0.09	0.08	0.11
				Modelled	0.07	0.06	0.06	0.27
Rangitāiki at Inlet to Aniwhenua Canal	JI148319	30	Primary	Measured	0.08	0.06	0.05	0.33
				Modelled	0.04	0.04	0.03	0.07
Waihua at Galatea Rd	JI485995	32	Secondary	Measured	0.04	0.04	0.04	0.04
				Modelled	0.02	0.02	0.02	0.04
Rangitāiki at Matahina Dam	JK491452	34	Primary	Measured	0.06	0.05	0.03	0.19
				Modelled	0.04	0.04	0.02	0.06
Rangitāiki at Boat Ramp	KM083686	38	Secondary	Measured	0.10	0.09	0.05	0.24
				Modelled	0.04	0.04	0.02	0.07