



Des Moines Headwaters, Lower Des Moines, and East Fork Des Moines River Basins Watershed Model Development

Appendix D Suspended Solids and Water Quality Calibration and Validation for Des Moines River Watershed

Prepared for
Minnesota Pollution Control Agency

Prepared by



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June 6, 2016

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Beaver Creek near Currie (S002-005)

Total Suspended Solids (TSS)

Table 1. Total Suspended Solids (TSS) statistics

Period	2002-2014	2001-2002
Count	117	33
Concentration Average Error	-19.09%	-47.96%
Concentration Median Error	-11.20%	-13.85%
Load Average Error	27.20%	-63.01%
Load Median Error	-0.43%	-1.42%
Paired t concentration	0.53	0.03

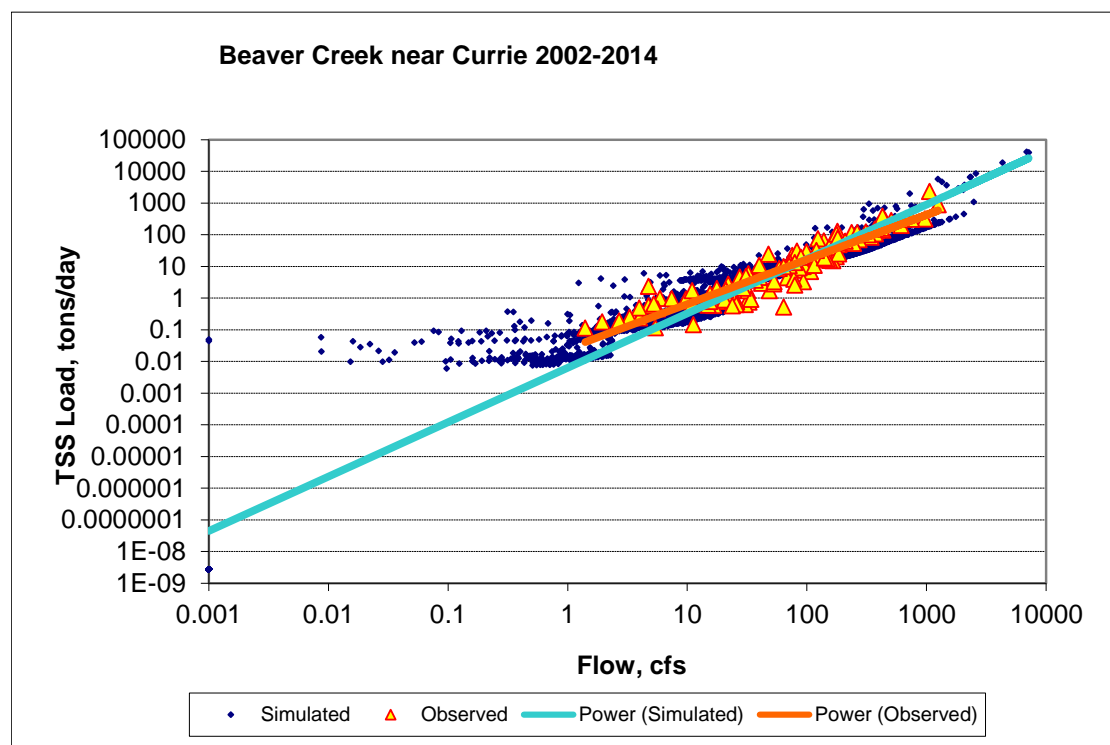


Figure 1. Power plot of simulated and observed Total Suspended Solids (TSS) load vs flow at Beaver Creek near Currie (calibration period)

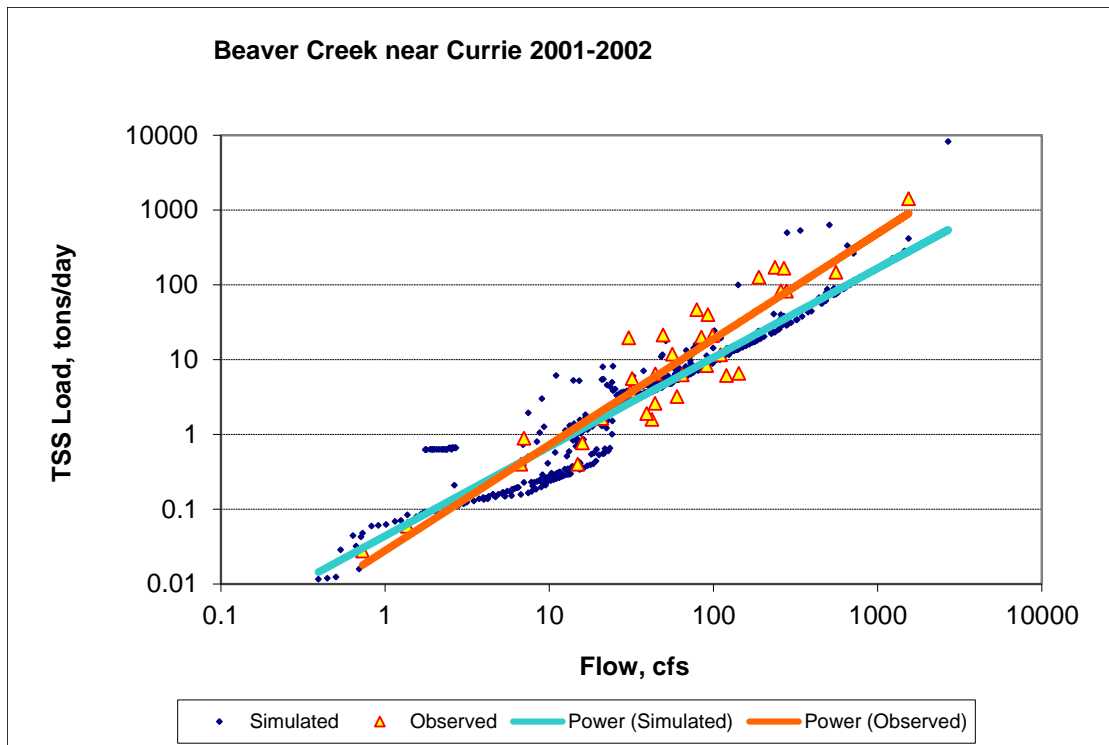


Figure 2. Power plot of simulated and observed Total Suspended Solids (TSS) load vs flow at Beaver Creek near Currie (validation period)

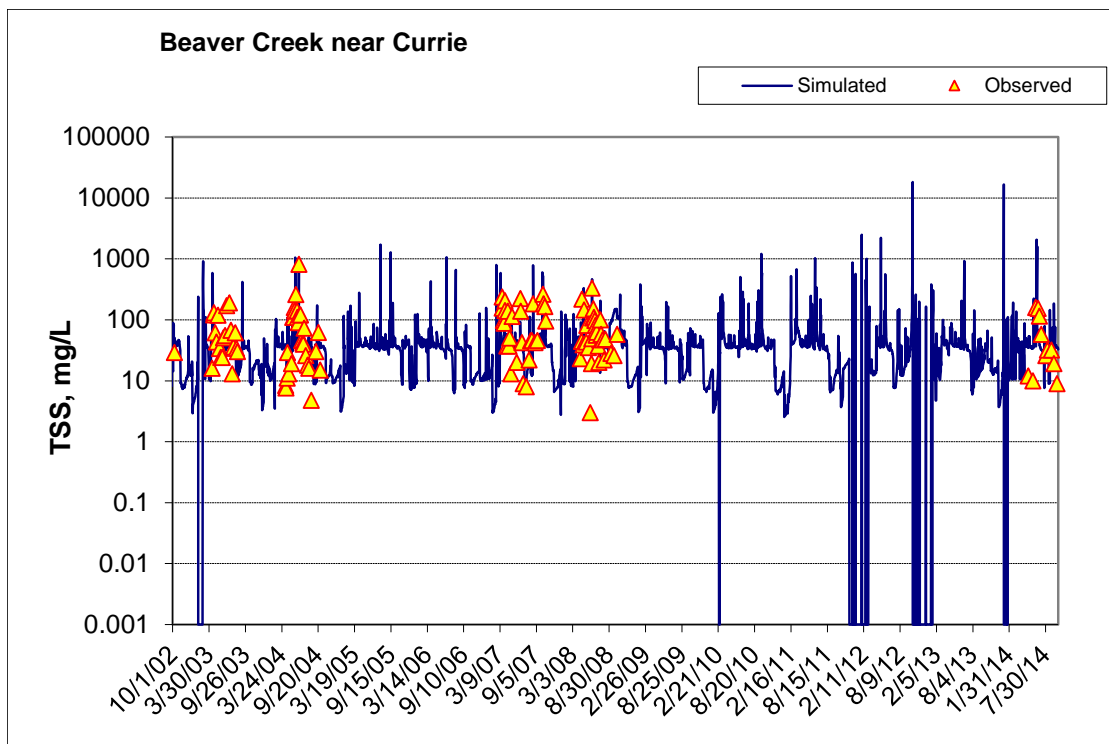


Figure 3. Time series of observed and simulated Total Suspended Solids (TSS) concentration at Beaver Creek near Currie (calibration period)

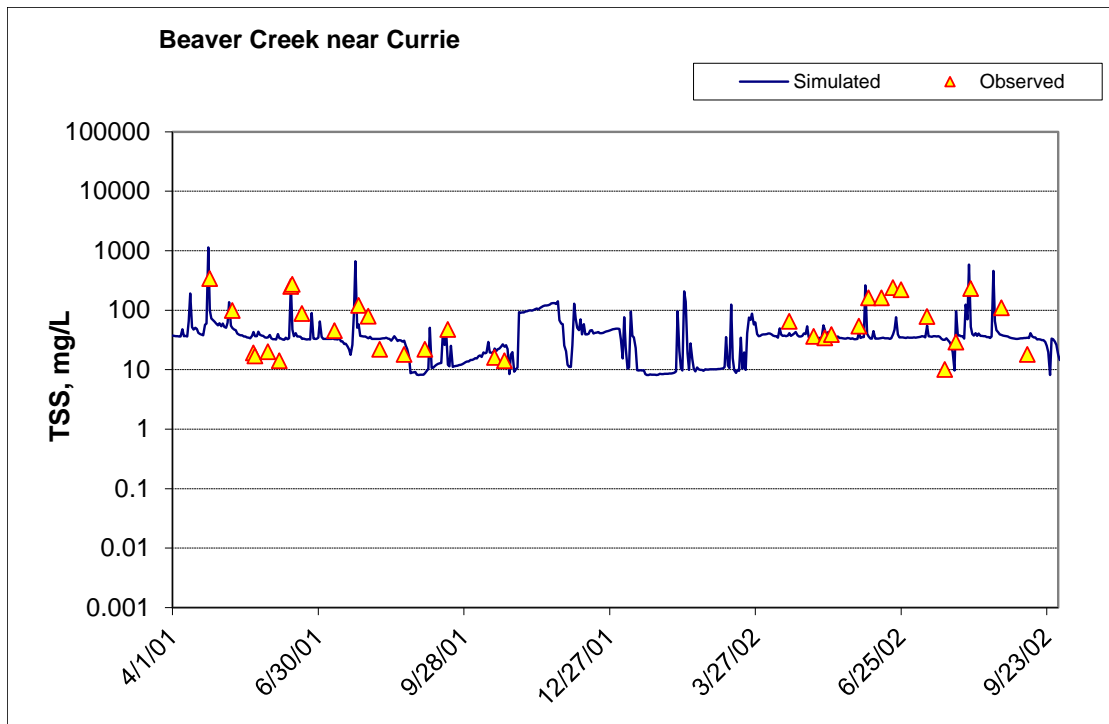


Figure 4. Time series of observed and simulated Total Suspended Solids (TSS) concentration at Beaver Creek near Currie (validation period)

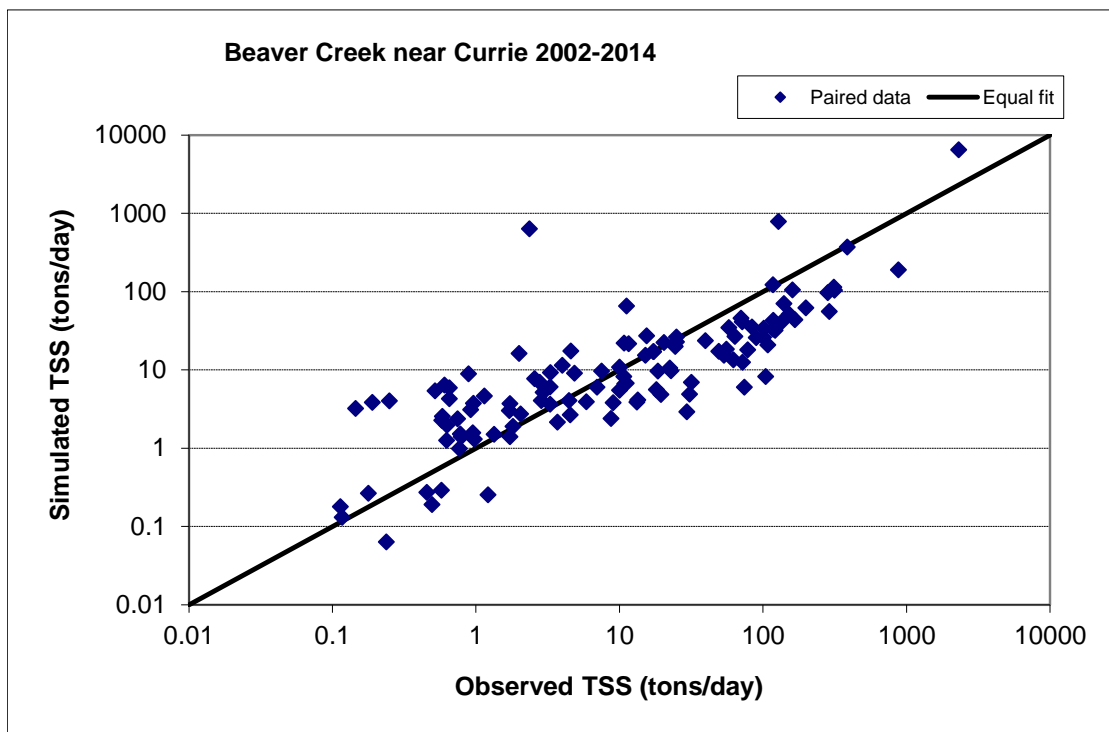


Figure 5. Paired simulated vs. observed Total Suspended Solids (TSS) load at Beaver Creek near Currie (calibration period)

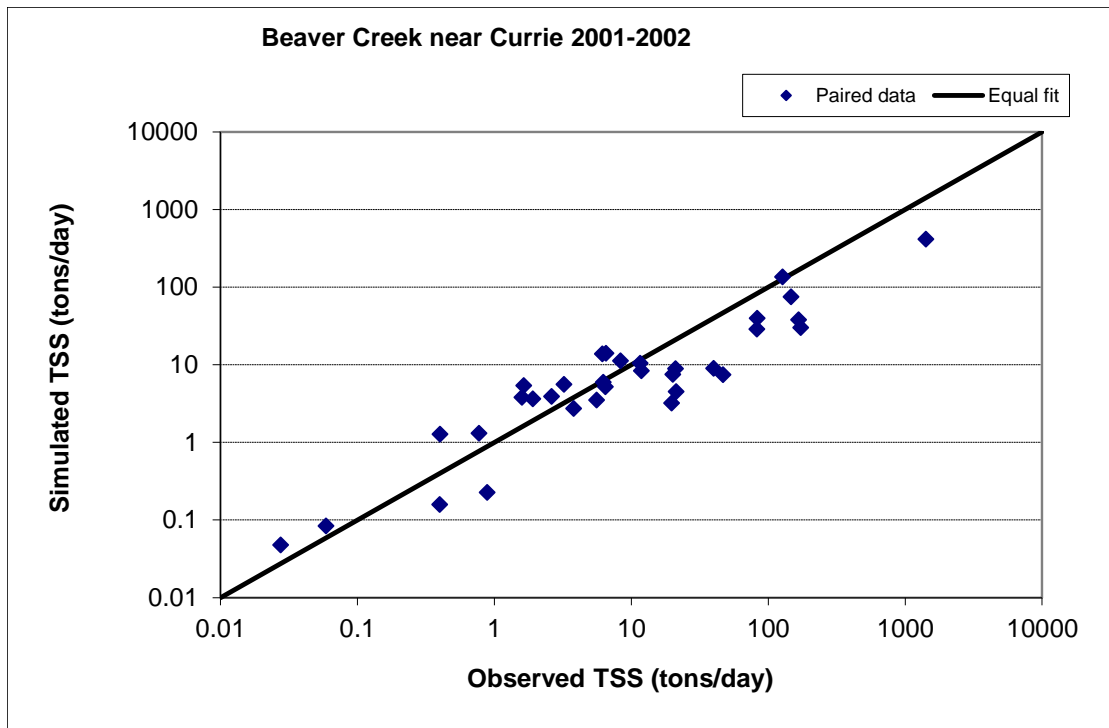


Figure 6. Paired simulated vs. observed Total Suspended Solids (TSS) load at Beaver Creek near Currie (validation period)

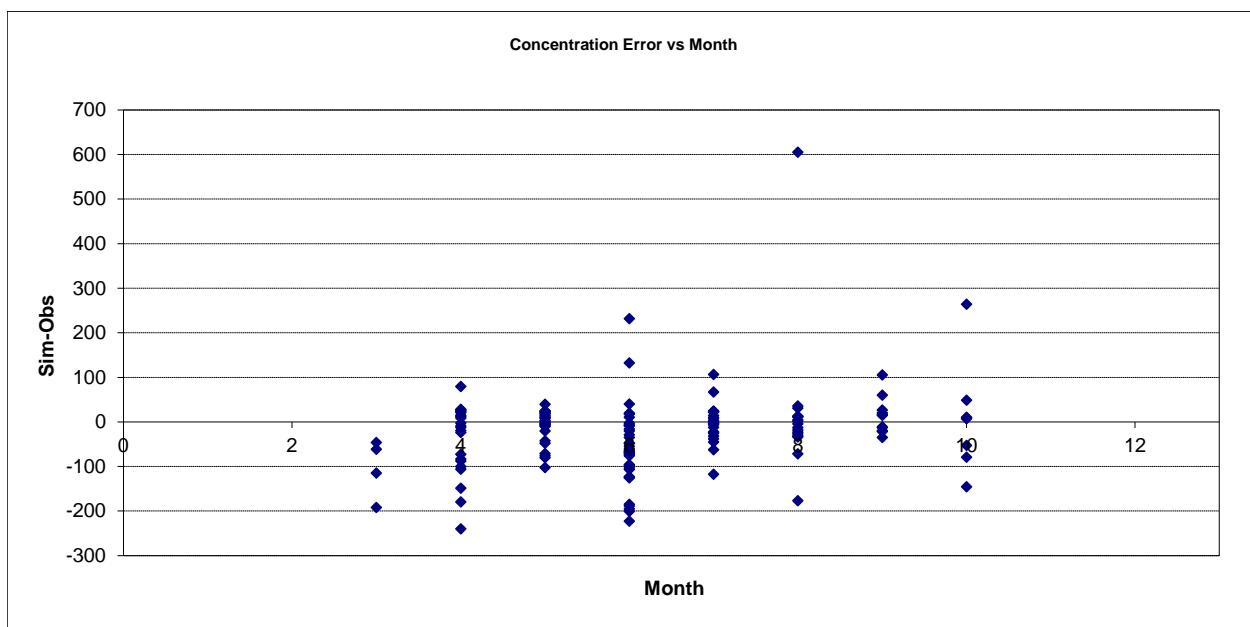


Figure 7. Residual (Simulated - Observed) vs. Month Total Suspended Solids (TSS) at Beaver Creek near Currie

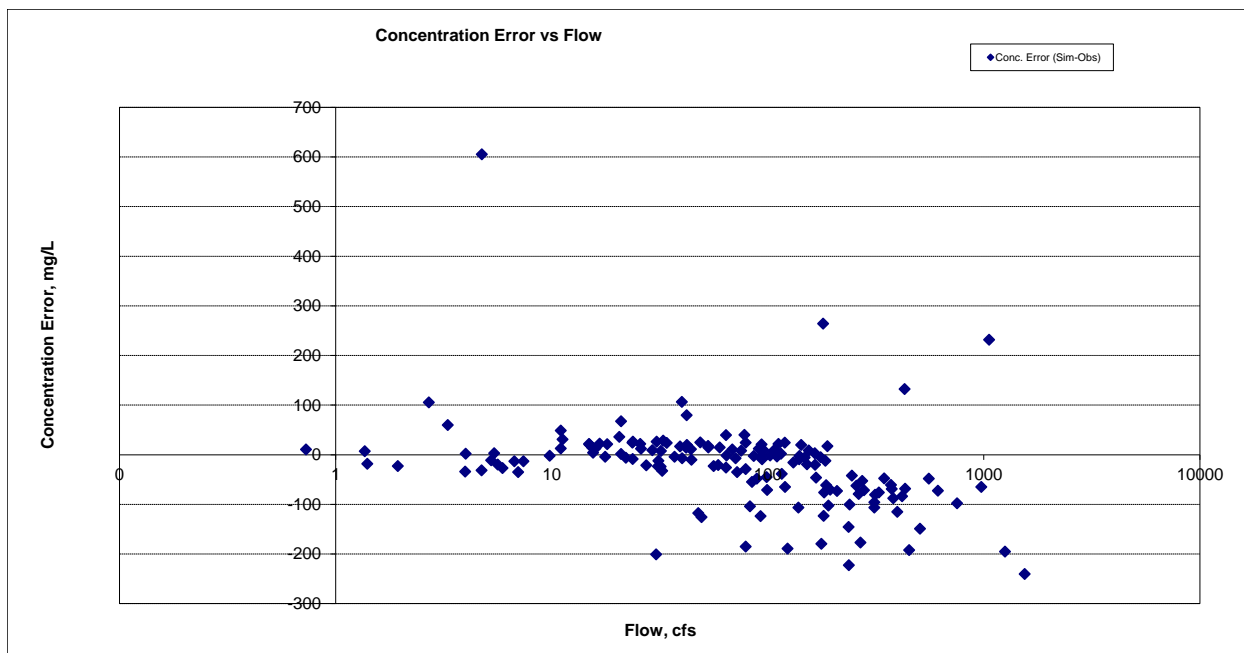


Figure 8. Residual (Simulated - Observed) vs. Flow Total Suspended Solids (TSS) at Beaver Creek near Currie

Ammonia Nitrogen (NH3)

Table 2. Ammonia Nitrogen (NH3) statistics

Period	2002-2014	2001-2002
Count	87	11
Concentration Average Error	112.60%	139.11%
Concentration Median Error	91.14%	84.79%
Load Average Error	290.04%	78.36%
Load Median Error	28.57%	14.78%
Paired t concentration	0.00	0.00

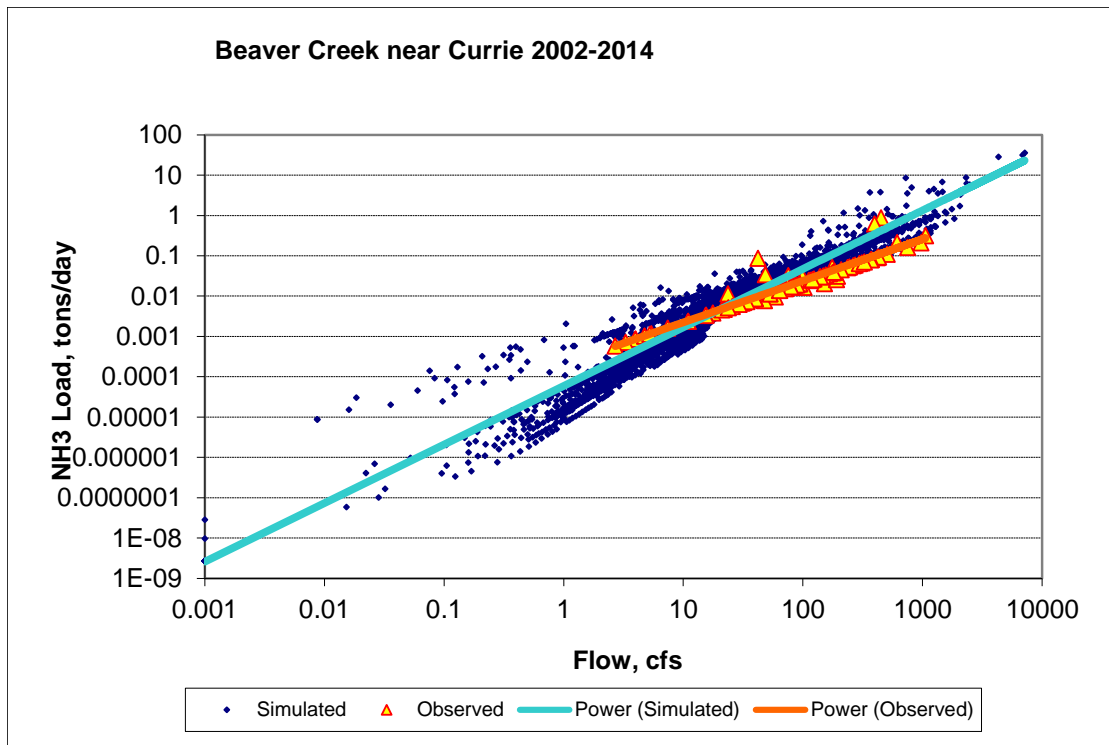


Figure 9. Power plot of simulated and observed Ammonia Nitrogen (NH3) load vs flow at Beaver Creek near Currie (calibration period)

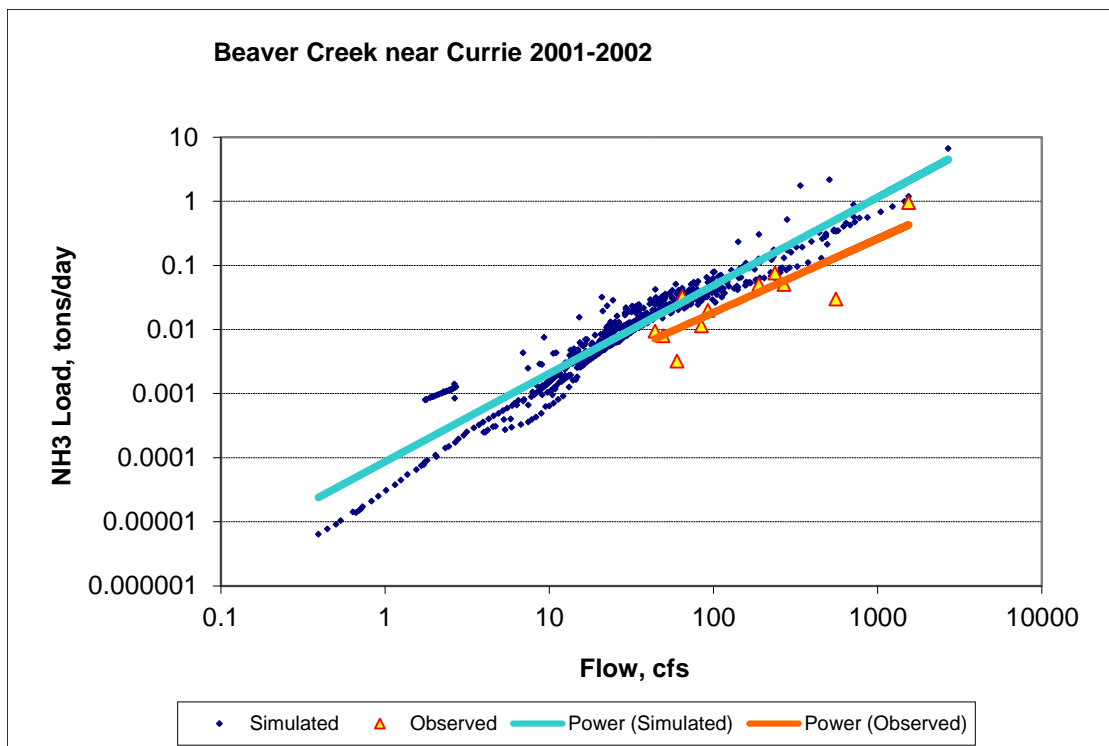


Figure 10. Power plot of simulated and observed Ammonia Nitrogen (NH3) load vs flow at Beaver Creek near Currie (validation period)

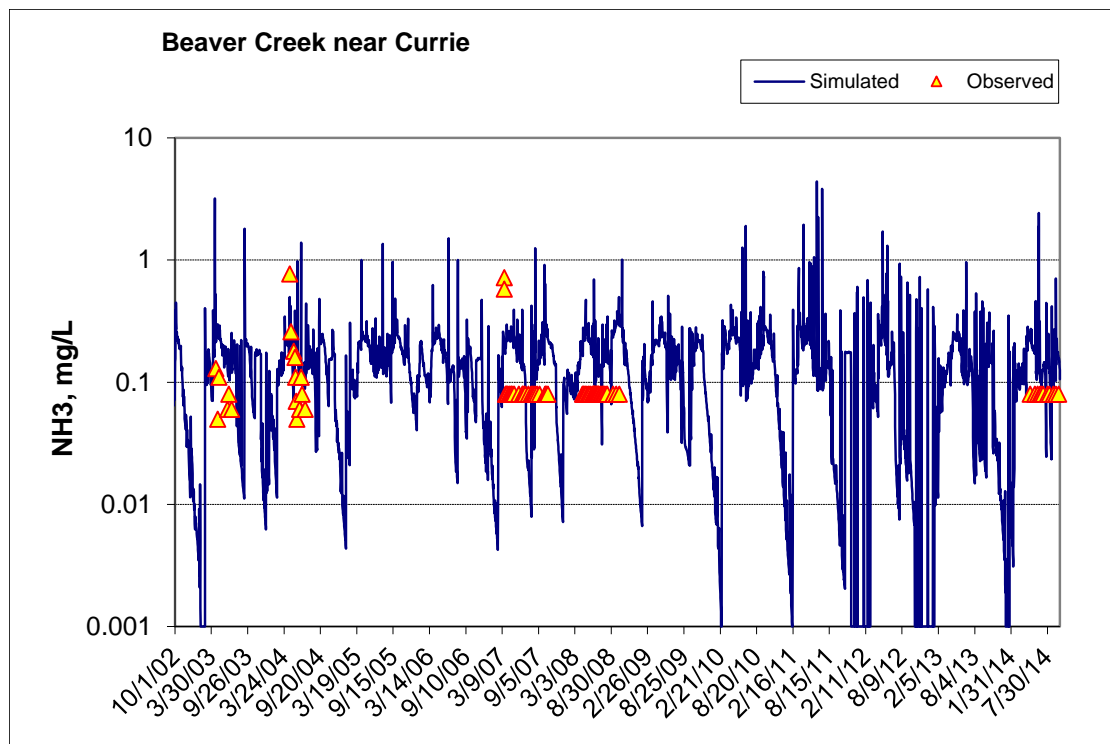


Figure 11. Time series of observed and simulated Ammonia Nitrogen (NH₃) concentration at Beaver Creek near Currie (calibration period)

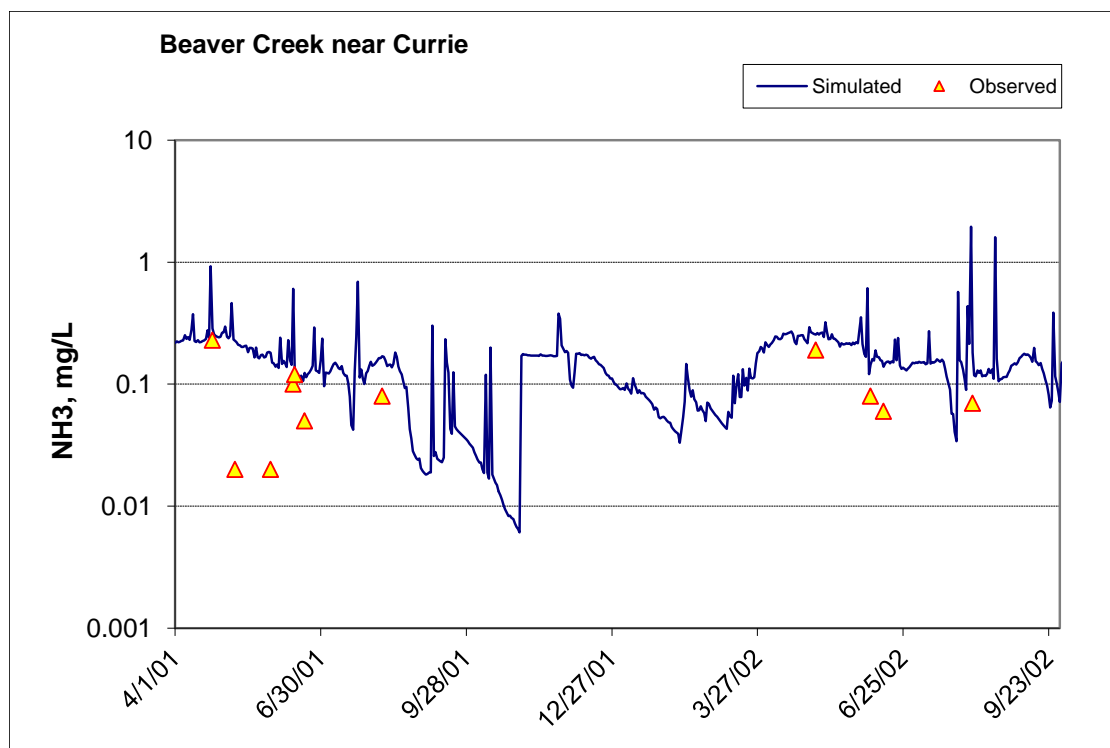


Figure 12. Time series of observed and simulated Ammonia Nitrogen (NH₃) concentration at Beaver Creek near Currie (validation period)

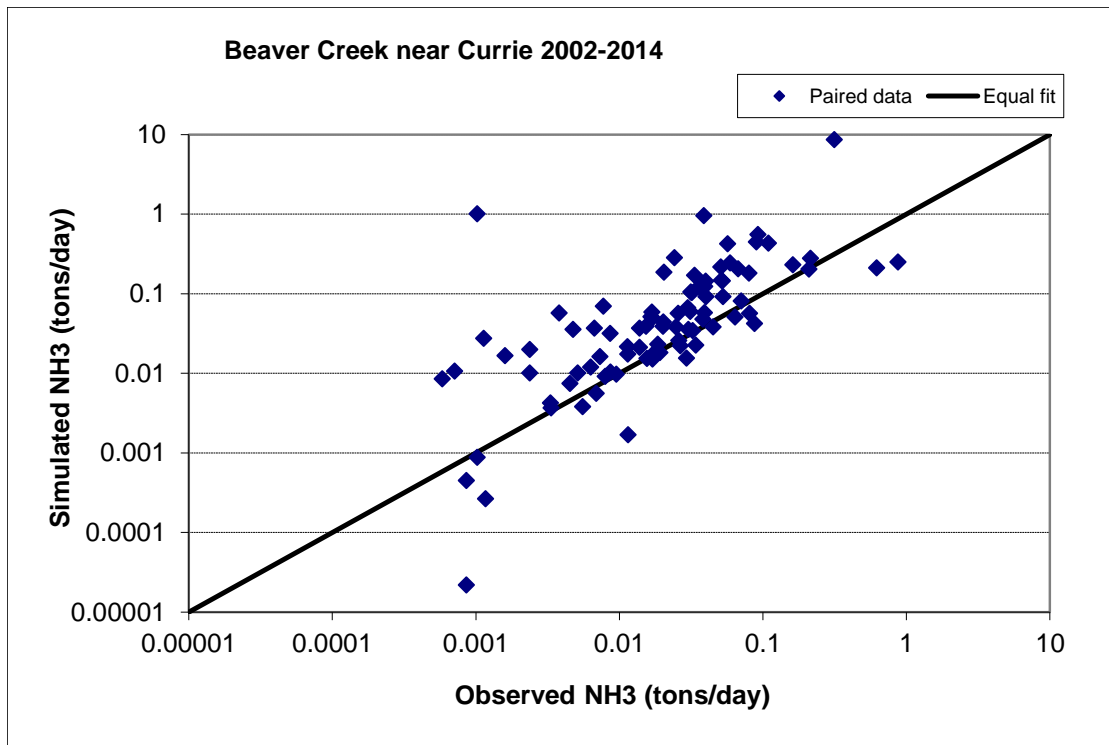


Figure 13. Paired simulated vs. observed Ammonia Nitrogen (NH3) load at Beaver Creek near Currie (calibration period)

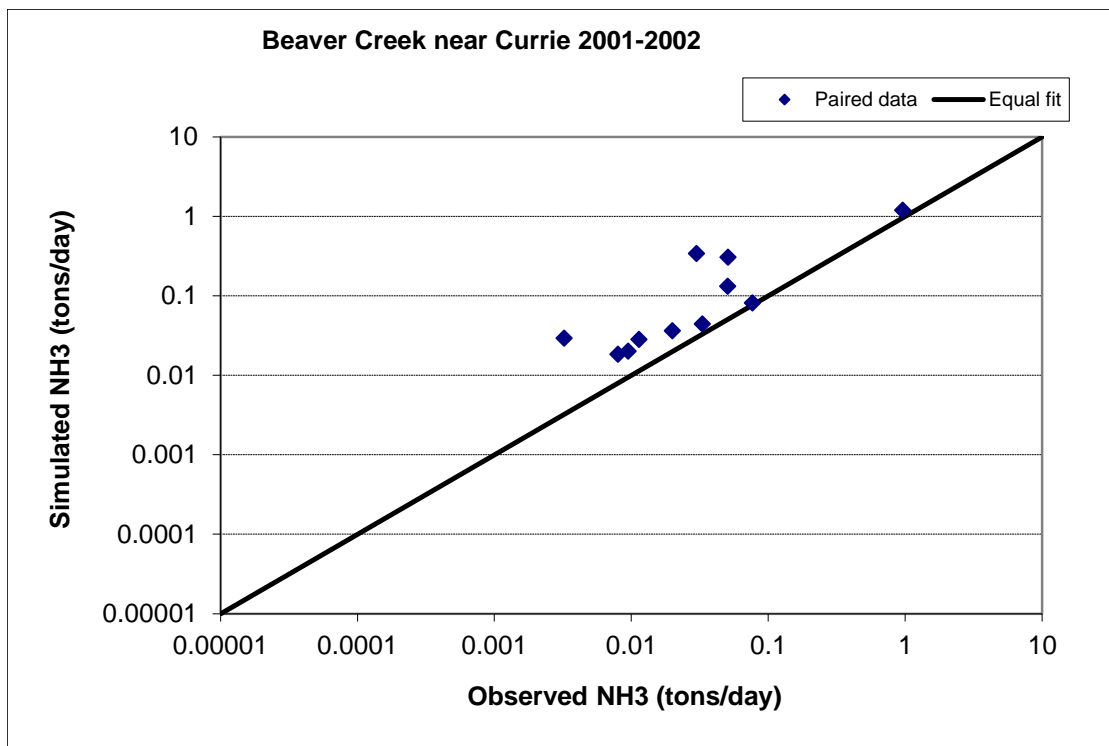


Figure 14. Paired simulated vs. observed Ammonia Nitrogen (NH3) load at Beaver Creek near Currie (validation period)

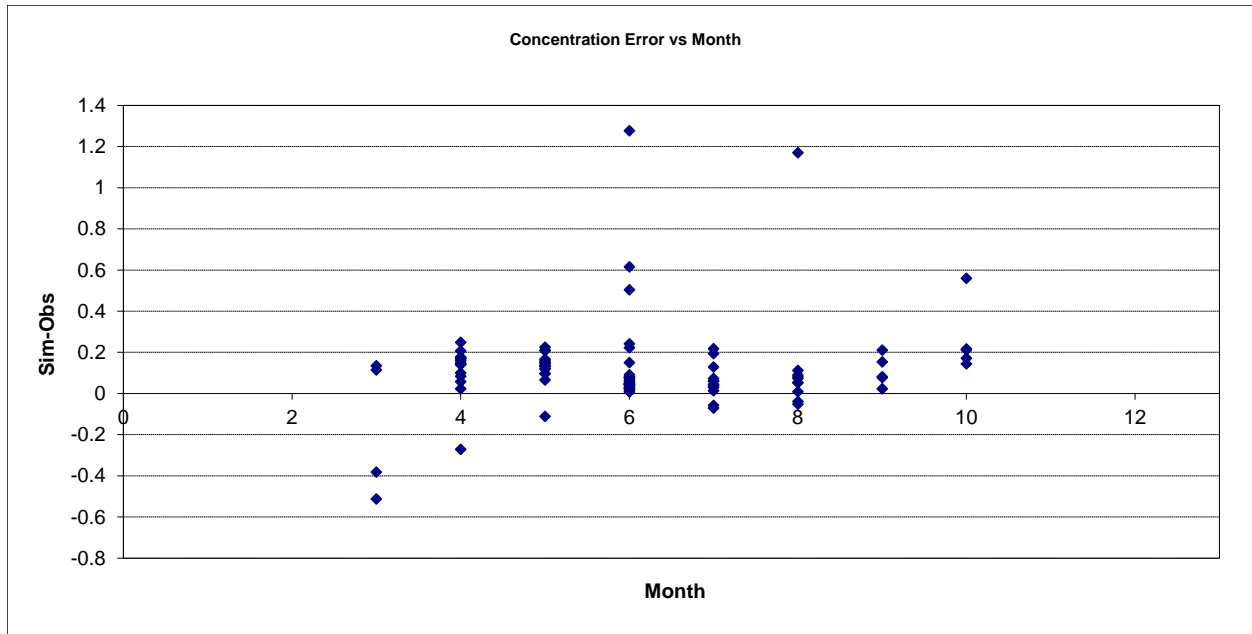


Figure 15. Residual (Simulated - Observed) vs. Month Ammonia Nitrogen (NH3) at Beaver Creek near Currie

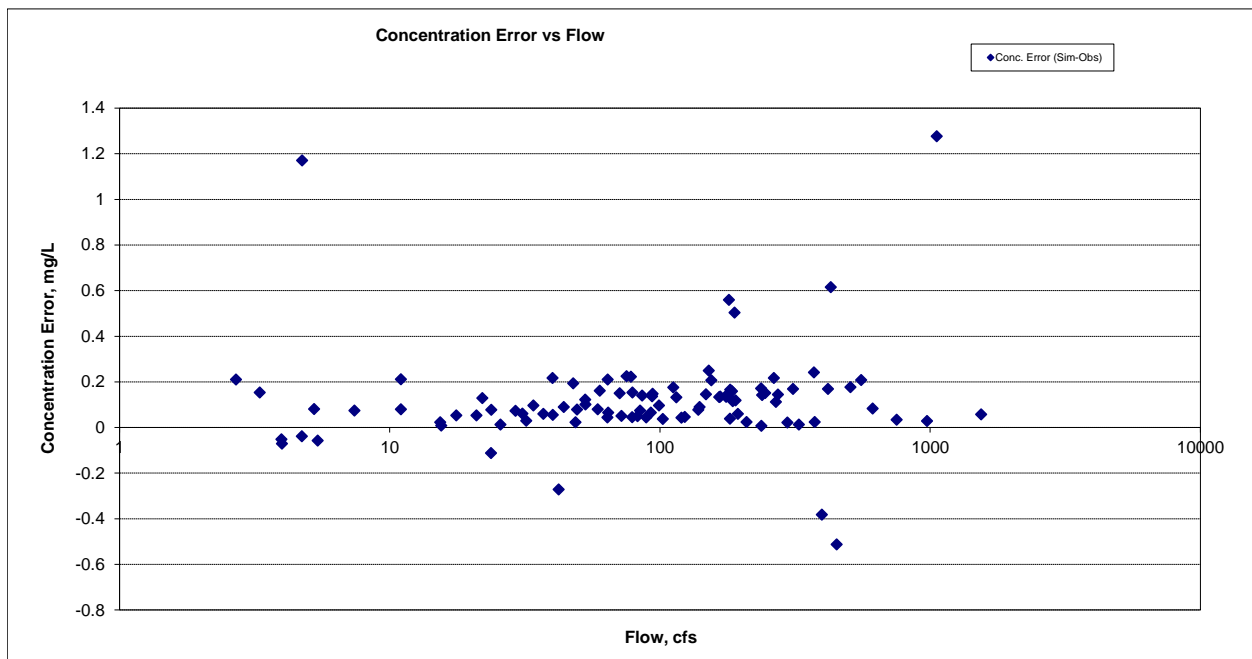


Figure 16. Residual (Simulated - Observed) vs. Flow Ammonia Nitrogen (NH3) at Beaver Creek near Currie

Organic Nitrogen (OrgN)

Table 3. Organic Nitrogen (OrgN) statistics

Period	2002-2014	2001-2002
Count	87	11
Concentration Average Error	14.32%	17.94%
Concentration Median Error	19.00%	19.71%
Load Average Error	42.94%	10.02%
Load Median Error	0.75%	4.96%
Paired t concentration	0.91	0.57

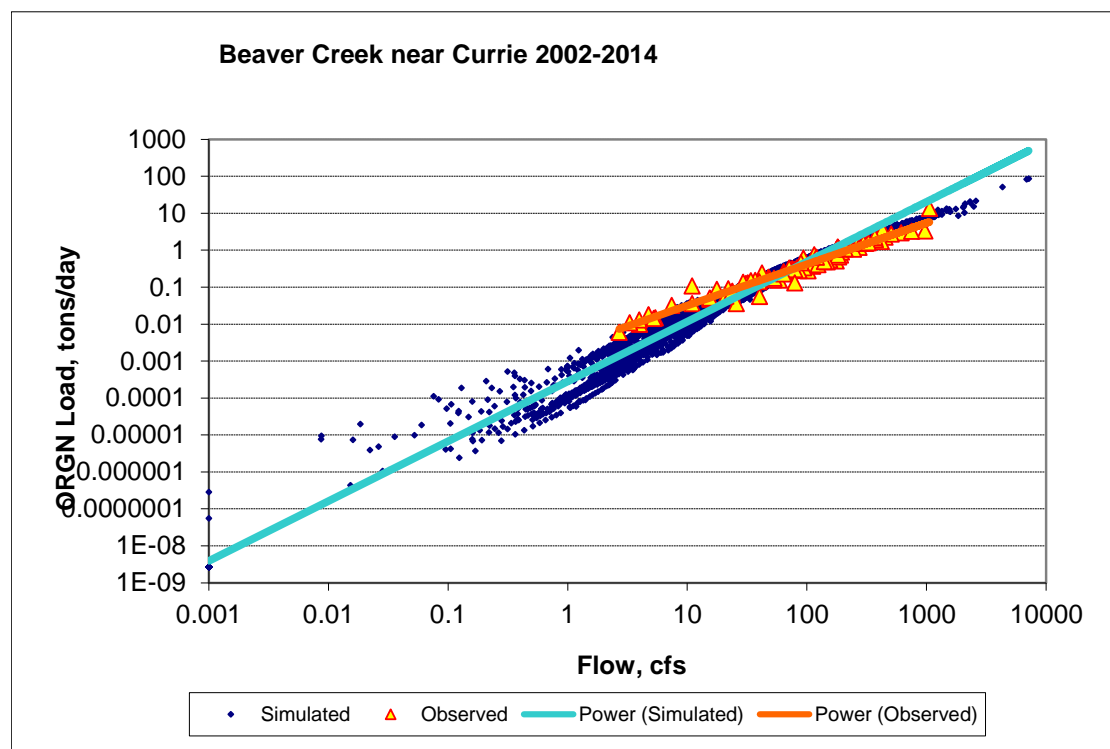


Figure 17. Power plot of simulated and observed Organic Nitrogen (OrgN) load vs flow at Beaver Creek near Currie (calibration period)

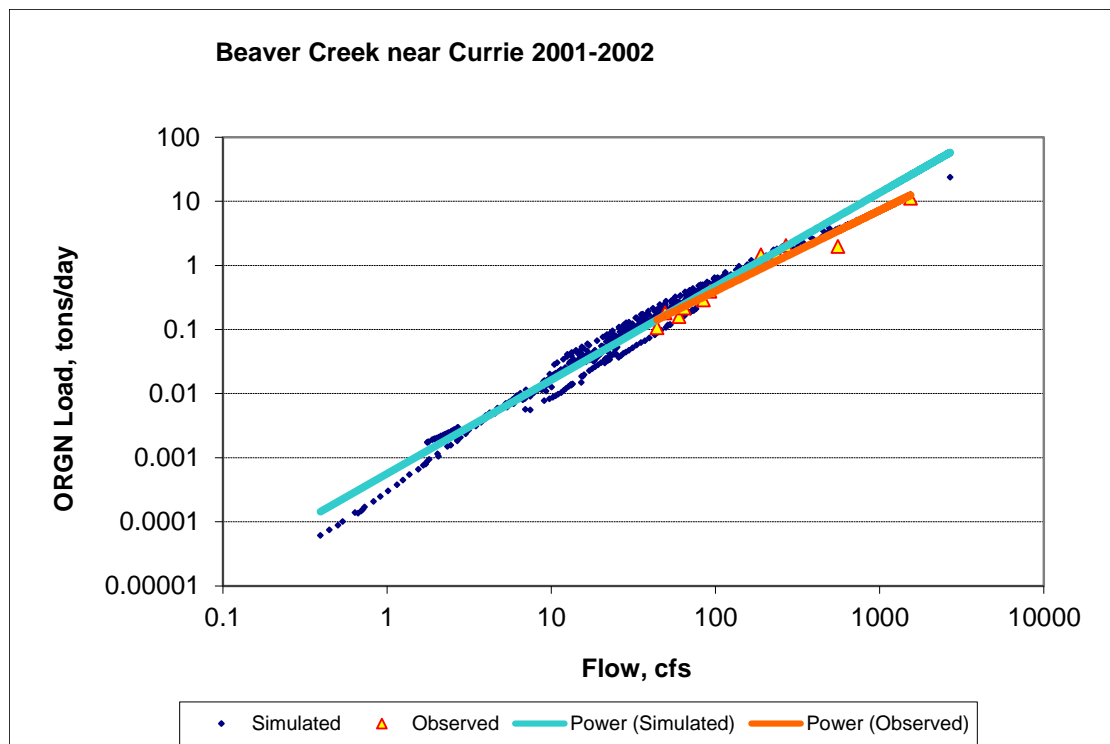


Figure 18. Power plot of simulated and observed Organic Nitrogen (OrgN) load vs flow at Beaver Creek near Currie (validation period)

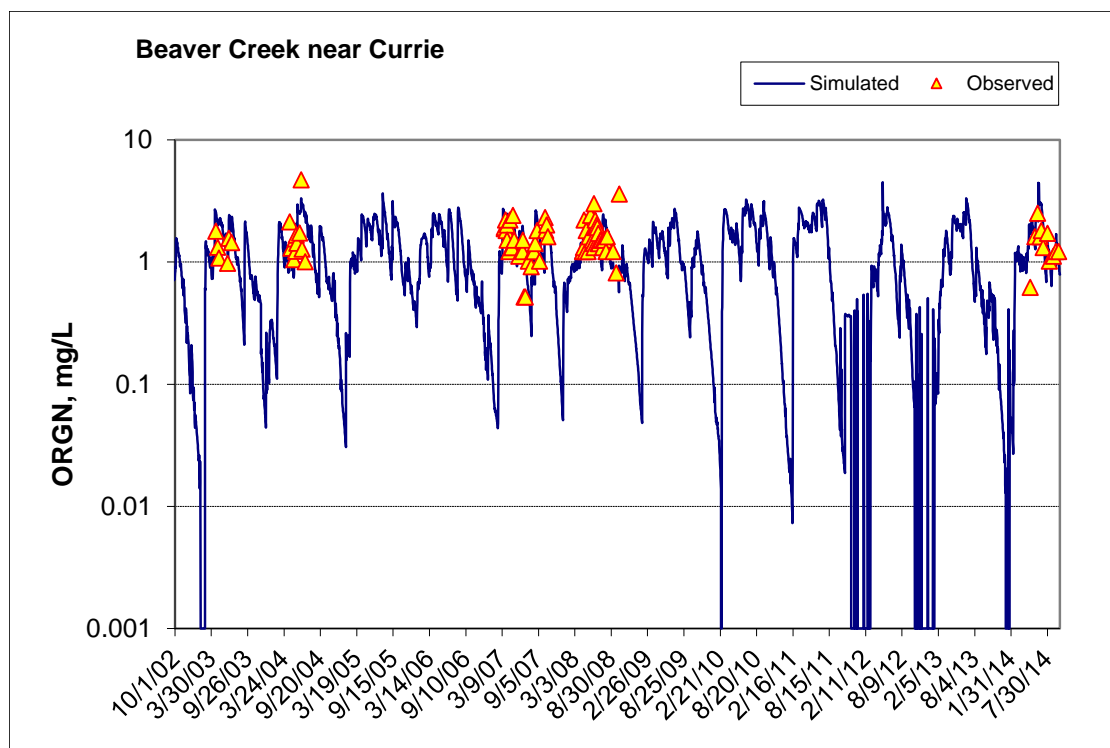


Figure 19. Time series of observed and simulated Organic Nitrogen (OrgN) concentration at Beaver Creek near Currie (calibration period)

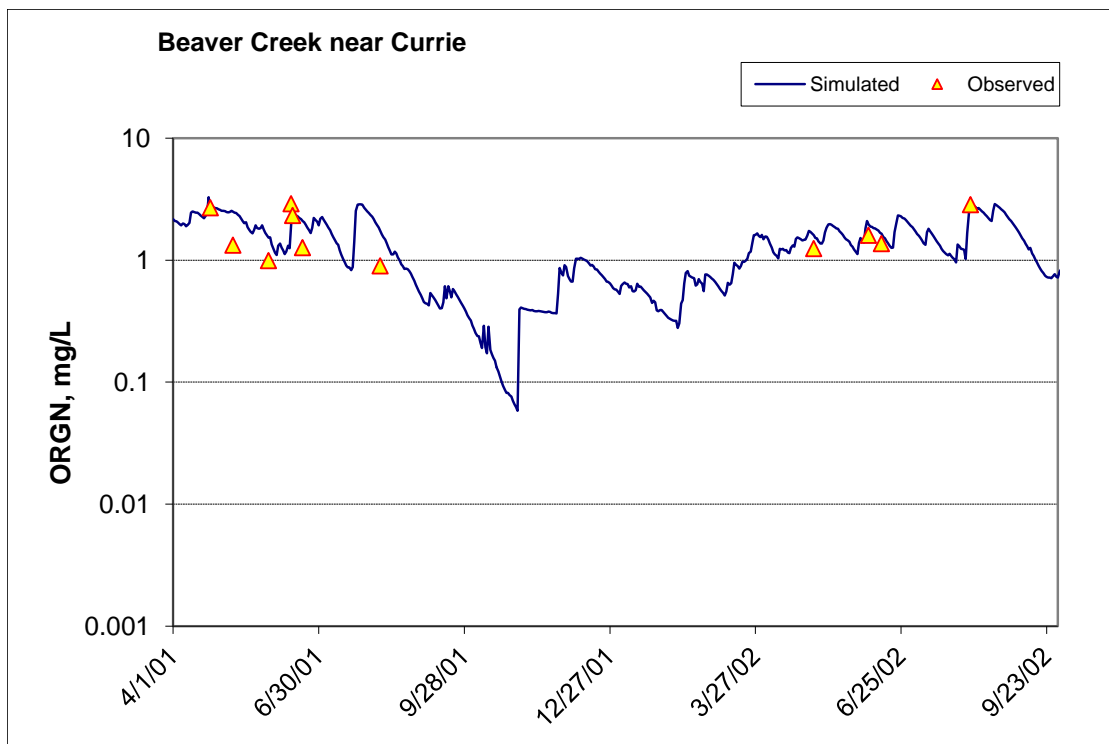


Figure 20. Time series of observed and simulated Organic Nitrogen (OrgN) concentration at Beaver Creek near Currie (validation period)

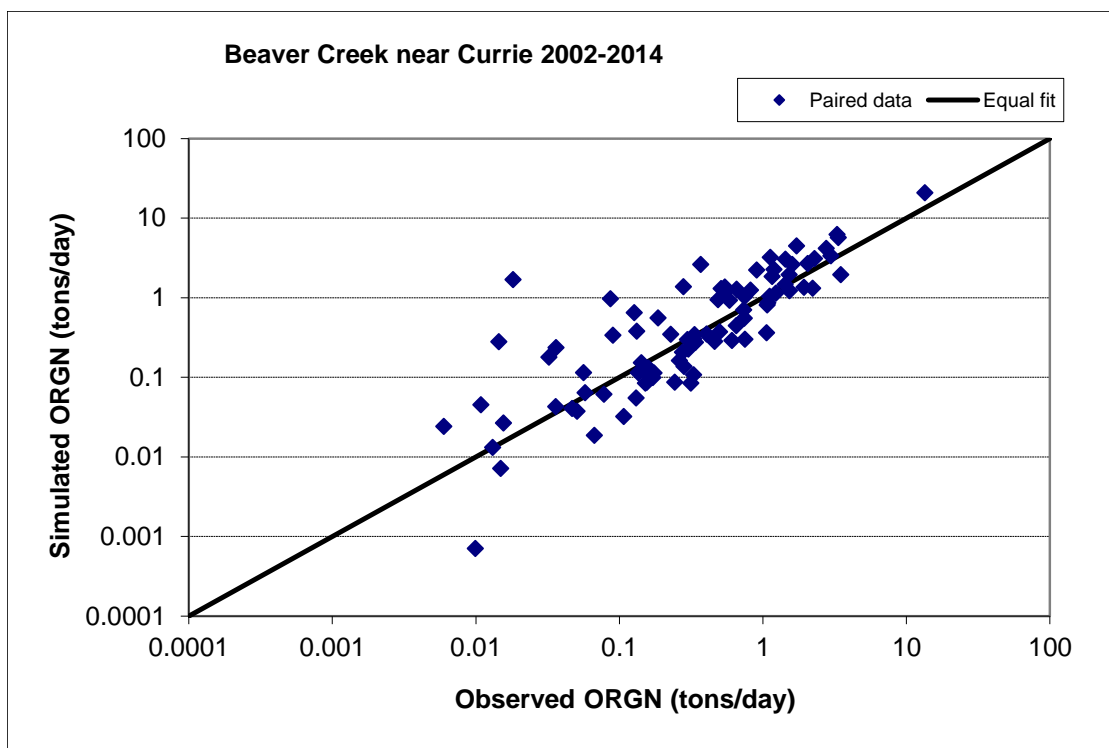


Figure 21. Paired simulated vs. observed Organic Nitrogen (OrgN) load at Beaver Creek near Currie (calibration period)

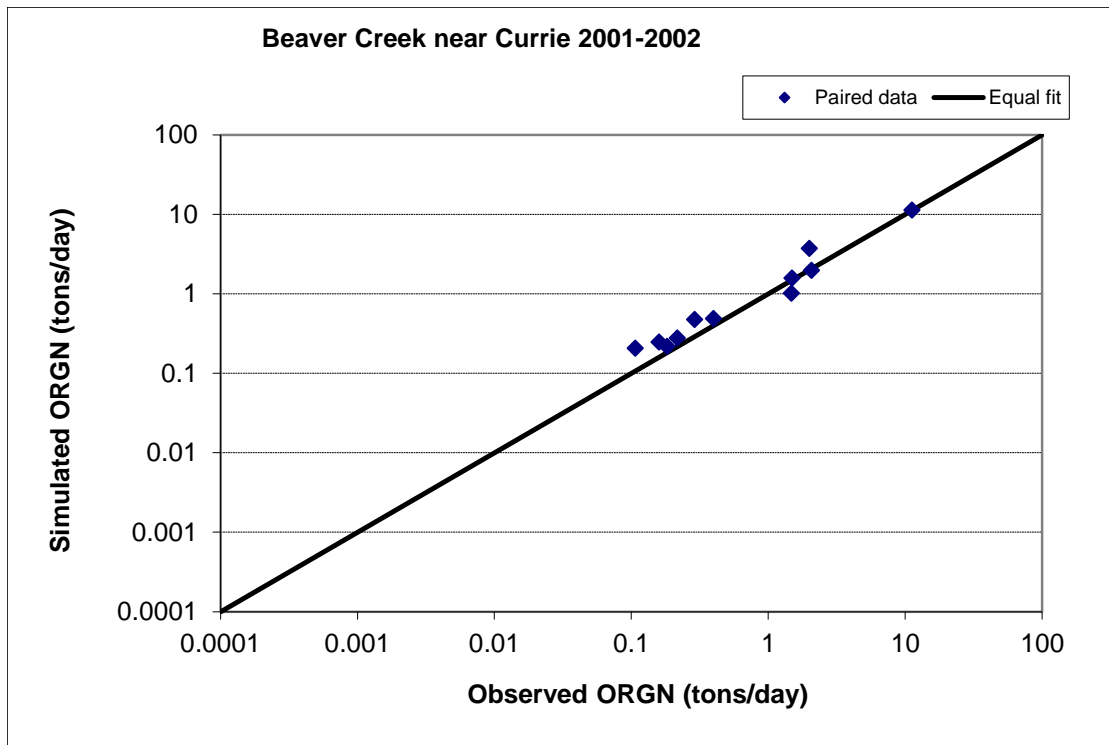


Figure 22. Paired simulated vs. observed Organic Nitrogen (OrgN) load at Beaver Creek near Currie (validation period)

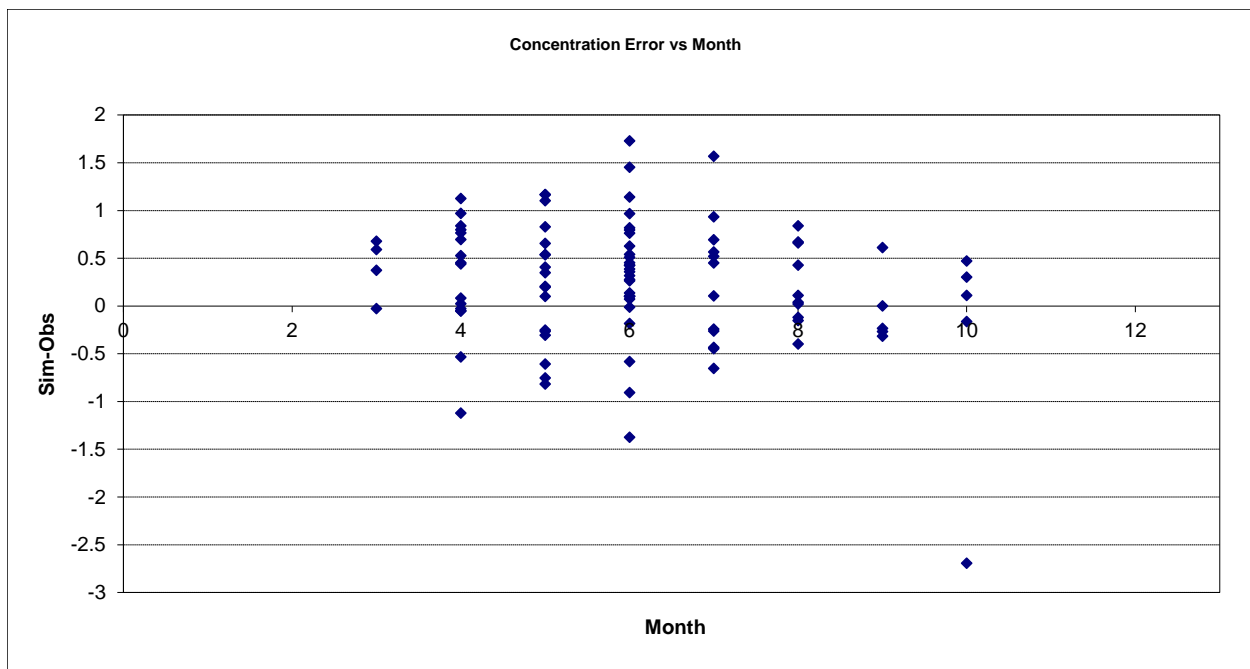


Figure 23. Residual (Simulated - Observed) vs. Month Organic Nitrogen (OrgN) at Beaver Creek near Currie

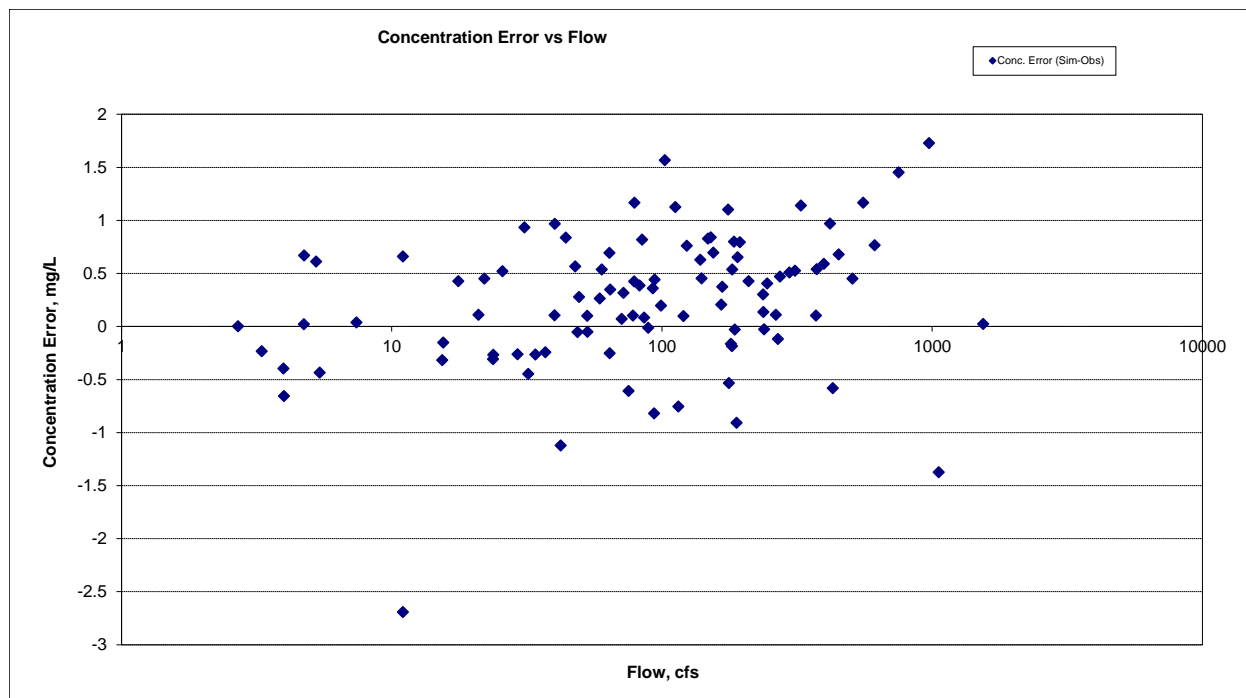


Figure 24. Residual (Simulated - Observed) vs. Flow Organic Nitrogen (OrgN) at Beaver Creek near Currie

Total Kjeldahl Nitrogen (TKN)

Table 4. Total Kjeldahl Nitrogen (TKN) statistics

Period	2002-2014	2001-2002
Count	118	33
Concentration Average Error	29.69%	36.18%
Concentration Median Error	31.05%	50.96%
Load Average Error	58.05%	27.72%
Load Median Error	4.16%	11.43%
Paired t concentration	0.01	0.04

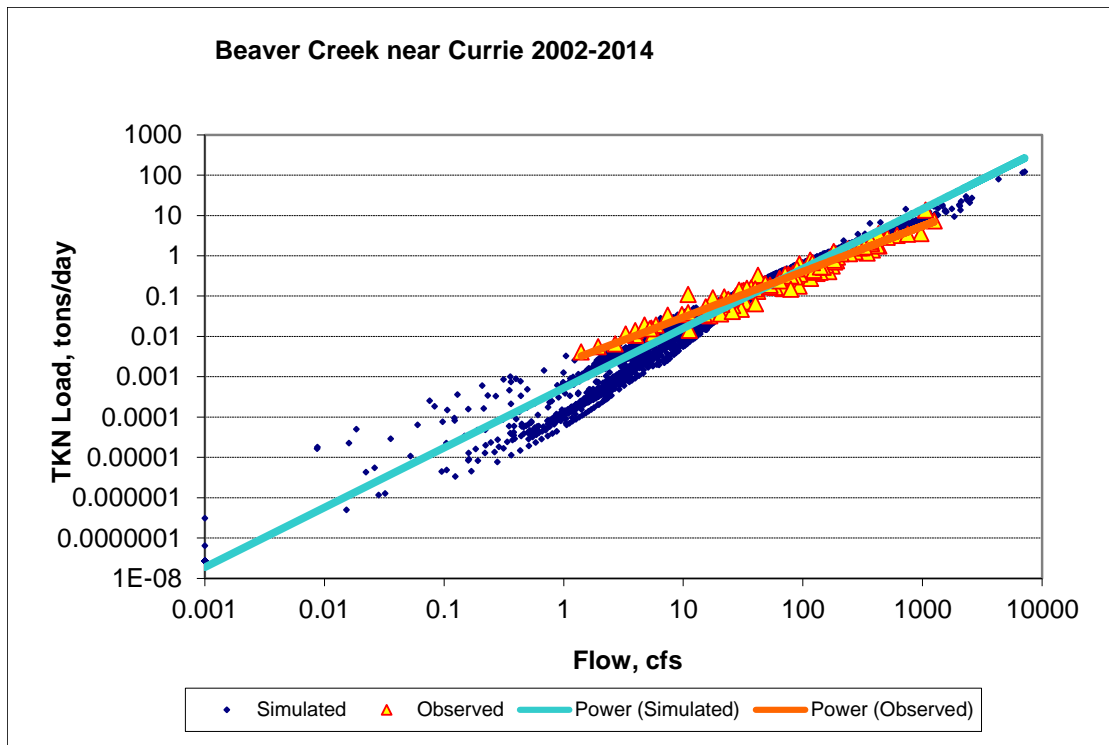


Figure 25. Power plot of simulated and observed Total Kjeldahl Nitrogen (TKN) load vs flow at Beaver Creek near Currie (calibration period)

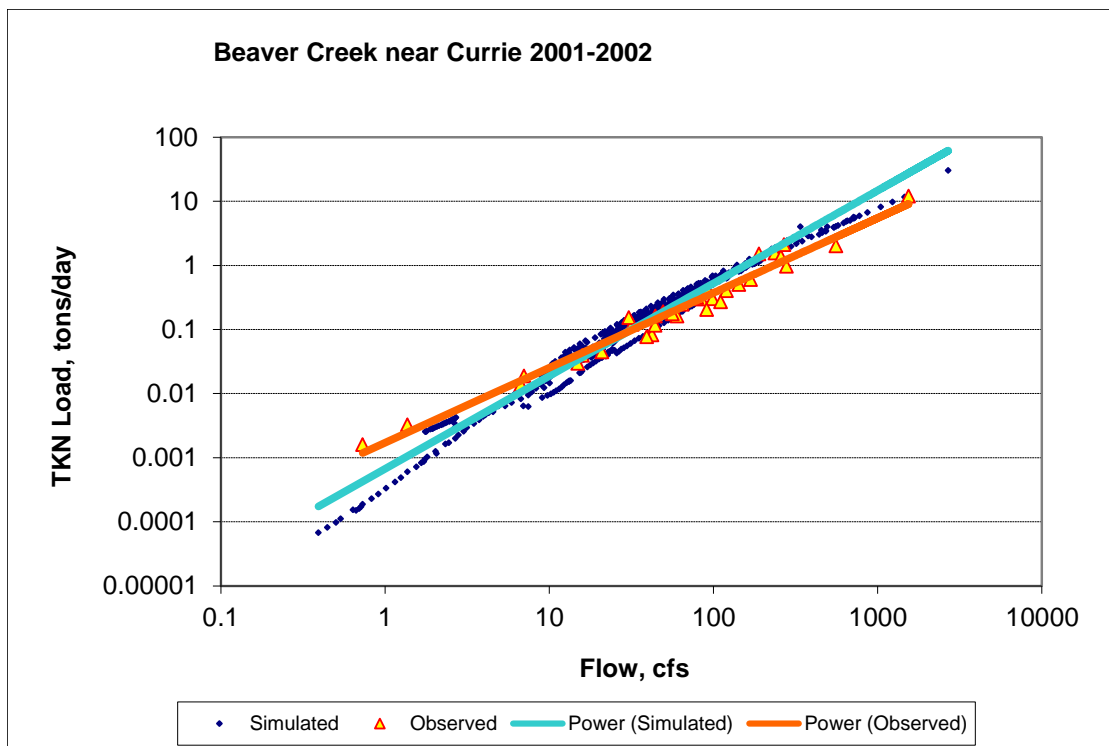


Figure 26. Power plot of simulated and observed Total Kjeldahl Nitrogen (TKN) load vs flow at Beaver Creek near Currie (validation period)

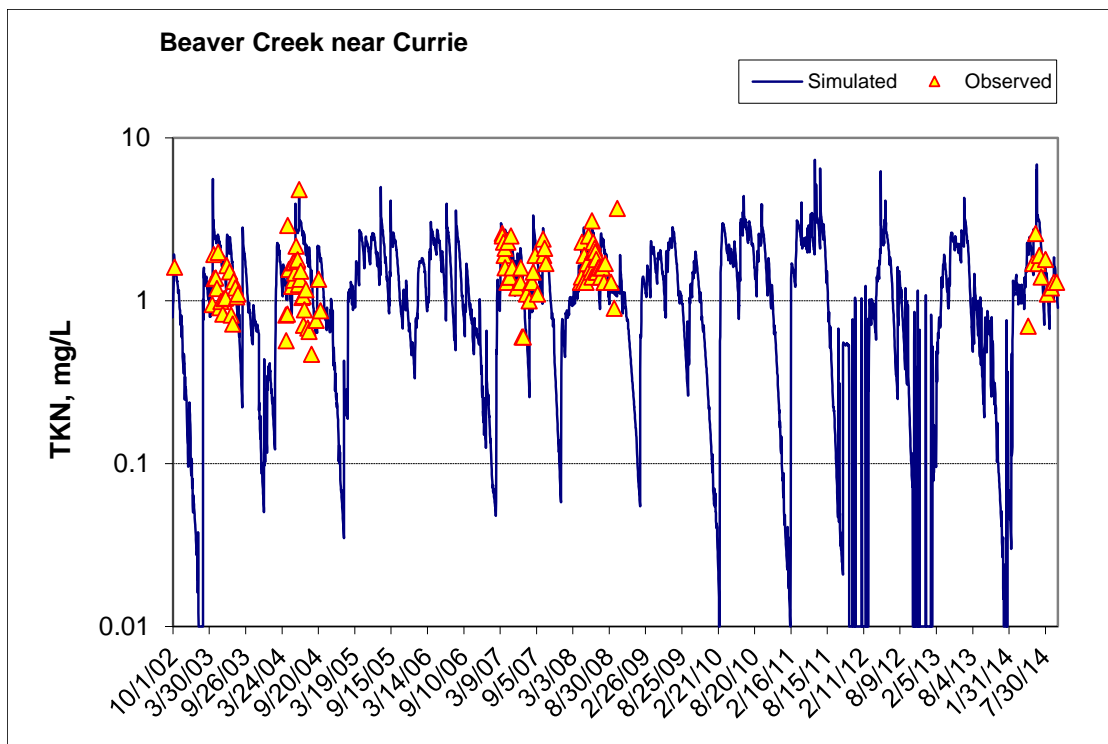


Figure 27. Time series of observed and simulated Total Kjeldahl Nitrogen (TKN) concentration at Beaver Creek near Currie (calibration period)

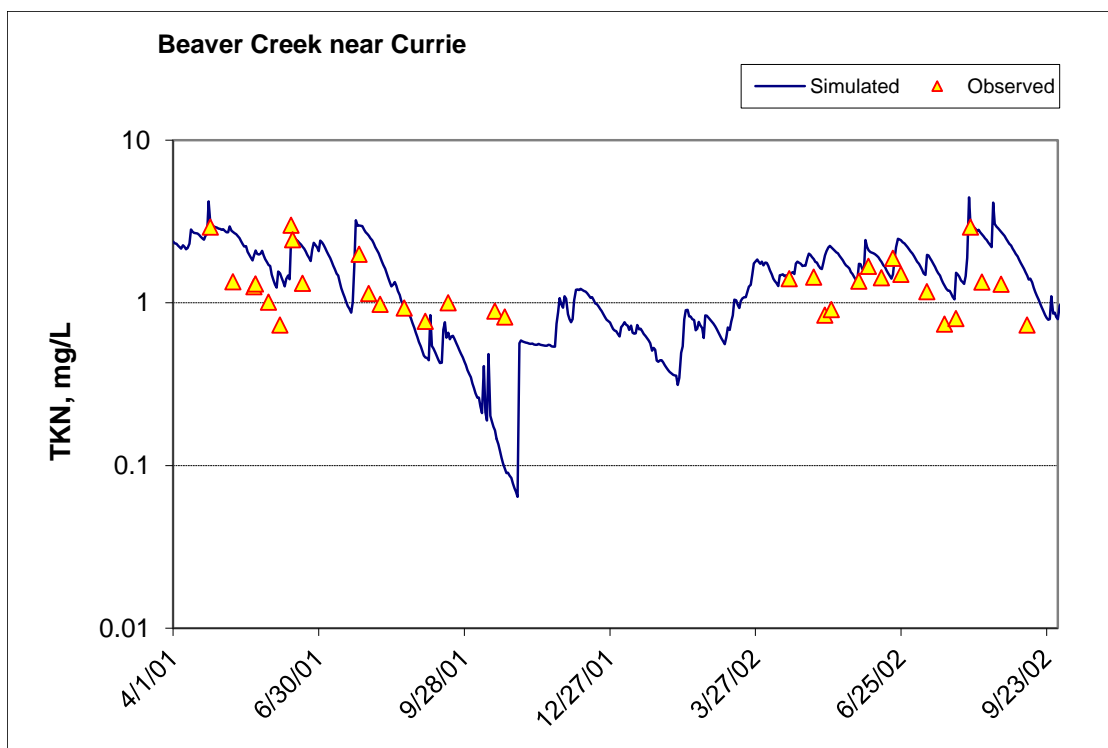


Figure 28. Time series of observed and simulated Total Kjeldahl Nitrogen (TKN) concentration at Beaver Creek near Currie (validation period)

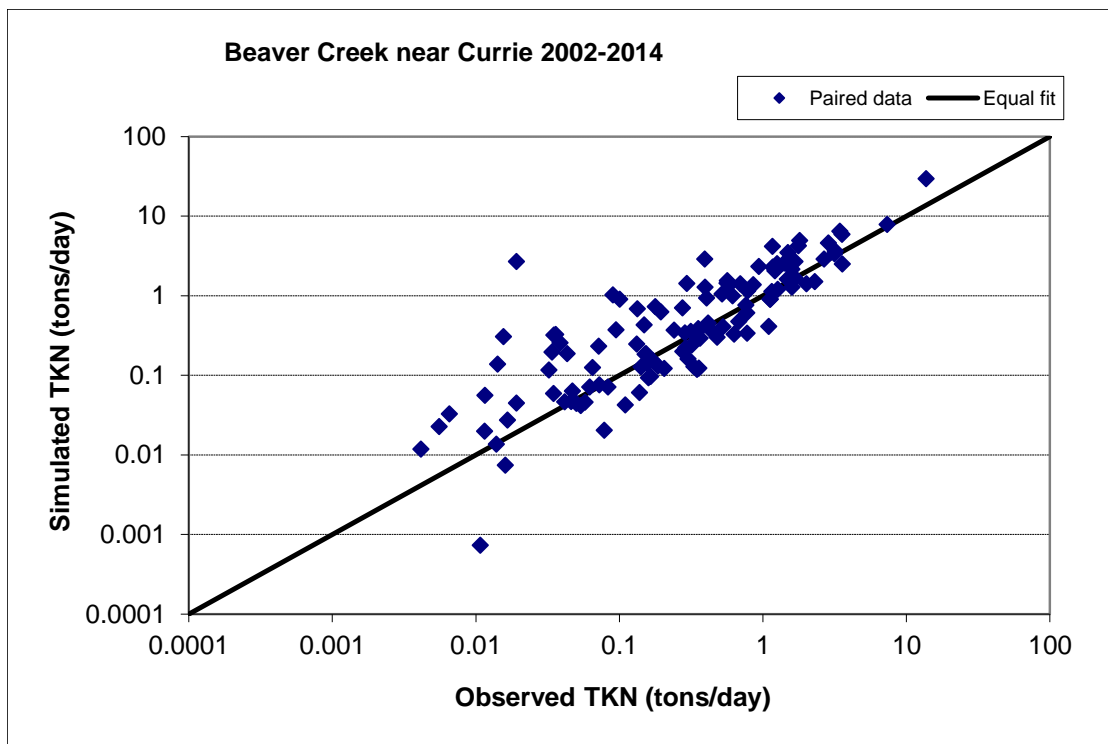


Figure 29. Paired simulated vs. observed Total Kjeldahl Nitrogen (TKN) load at Beaver Creek near Currie (calibration period)

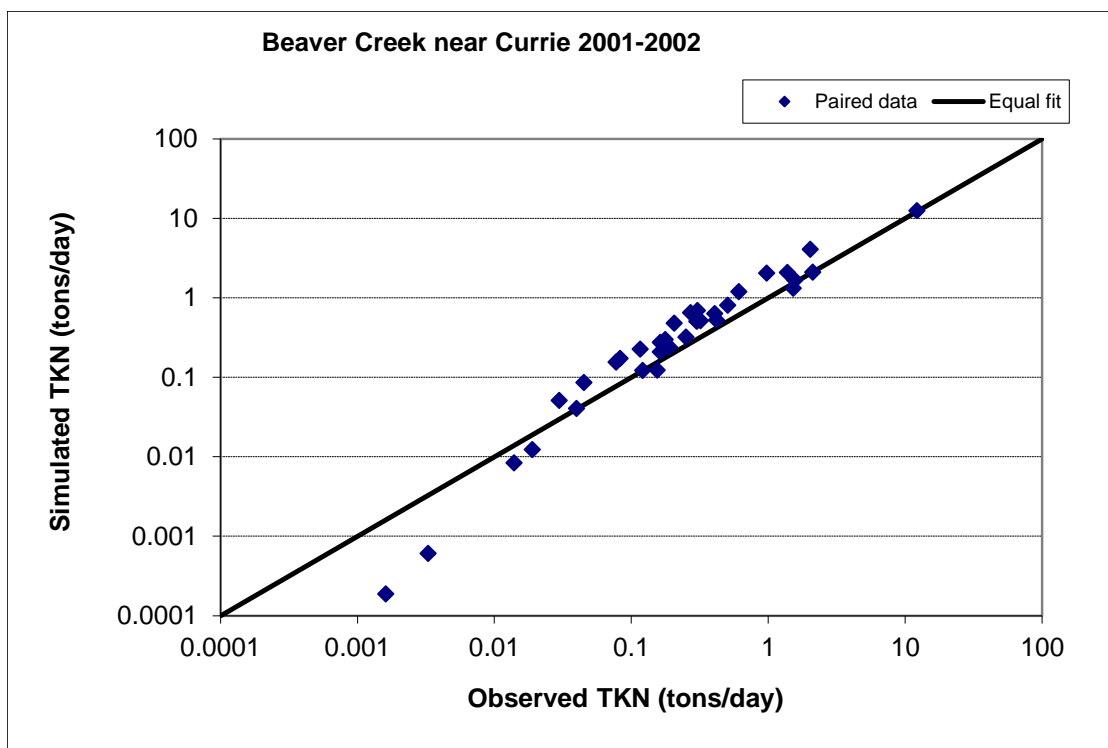


Figure 30. Paired simulated vs. observed Total Kjeldahl Nitrogen (TKN) load at Beaver Creek near Currie (validation period)

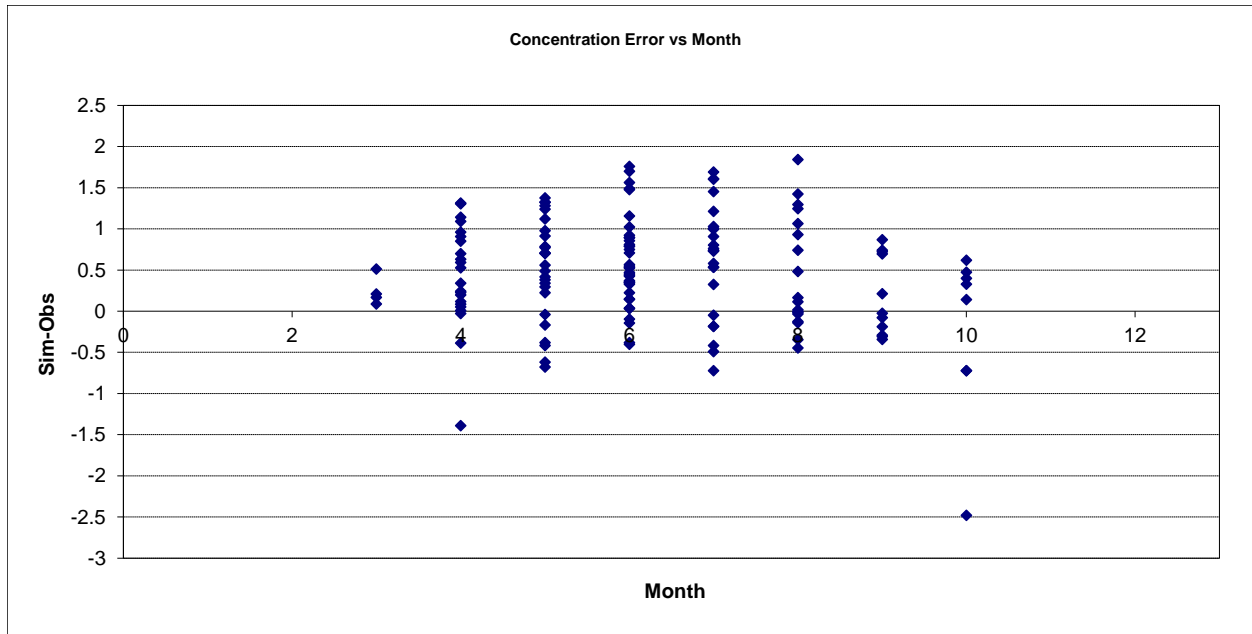


Figure 31. Residual (Simulated - Observed) vs. Month Total Kjeldahl Nitrogen (TKN) at Beaver Creek near Currie

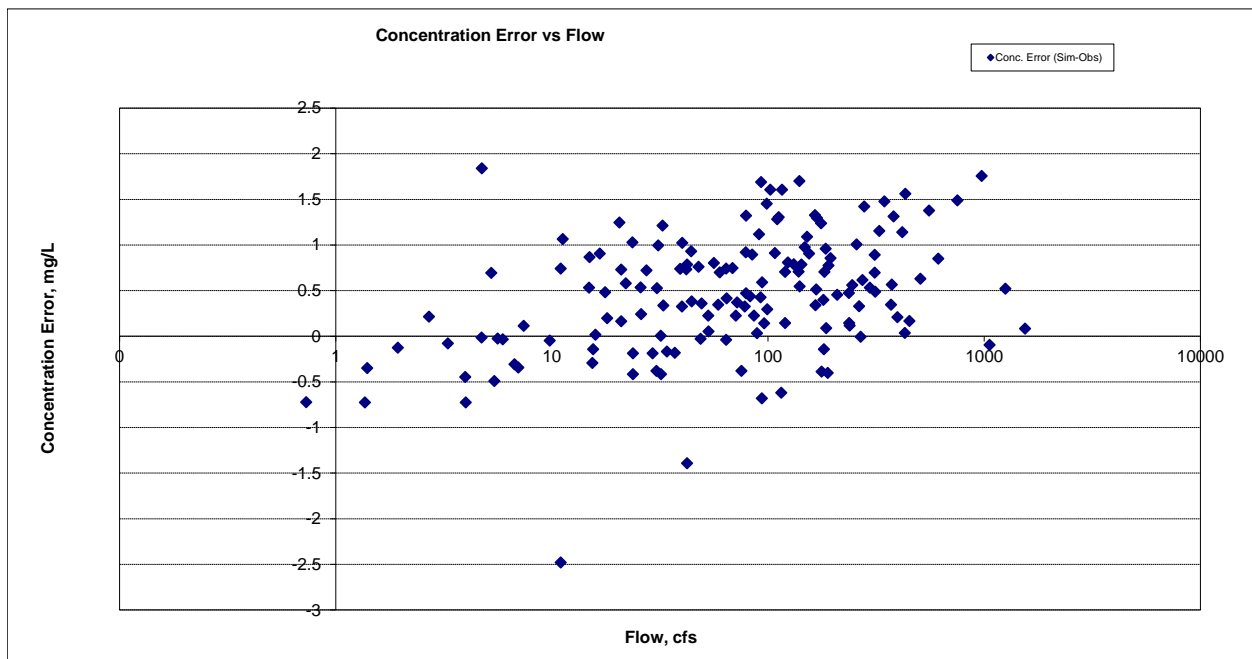


Figure 32. Residual (Simulated - Observed) vs. Flow Total Kjeldahl Nitrogen (TKN) at Beaver Creek near Currie

Nitrite+ Nitrate Nitrogen (NO_x)

Table 5. Nitrite+ Nitrate Nitrogen (NO_x) statistics

Period	2002-2014	2001-2002
Count	97	29
Concentration Average Error	-8.96%	-10.08%
Concentration Median Error	-15.97%	-13.74%
Load Average Error	21.94%	22.05%
Load Median Error	-2.71%	-8.14%
Paired t concentration	0.99	0.91

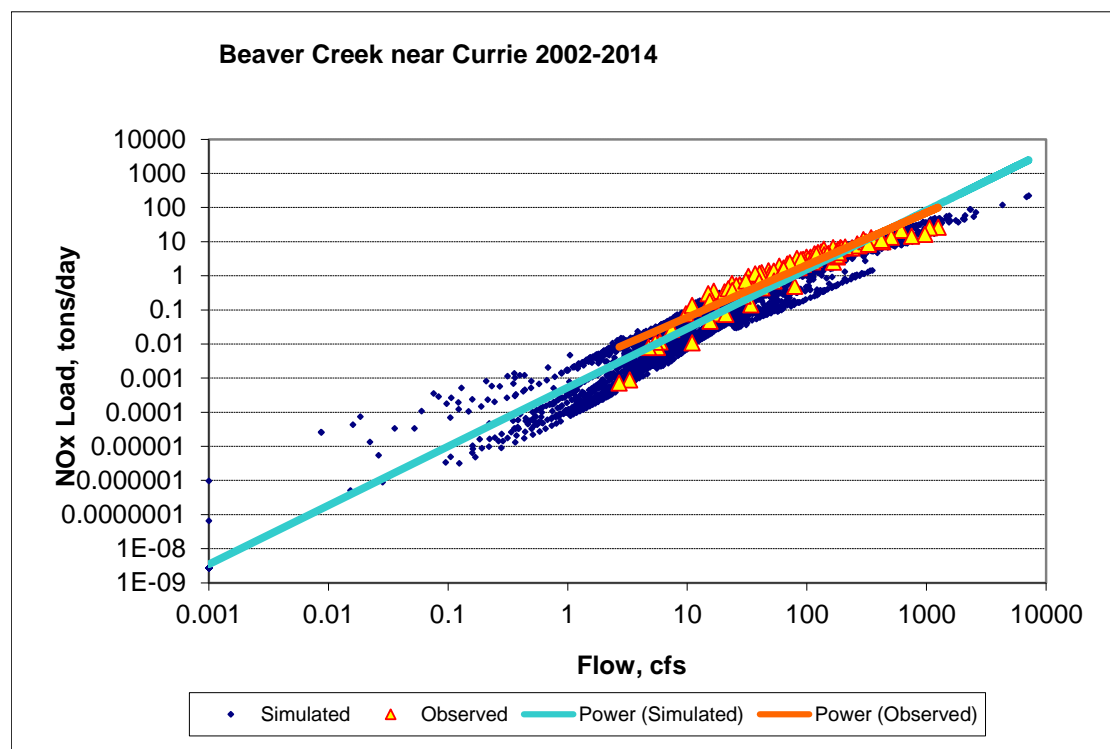


Figure 33. Power plot of simulated and observed Nitrite+ Nitrate Nitrogen (NO_x) load vs flow at Beaver Creek near Currie (calibration period)

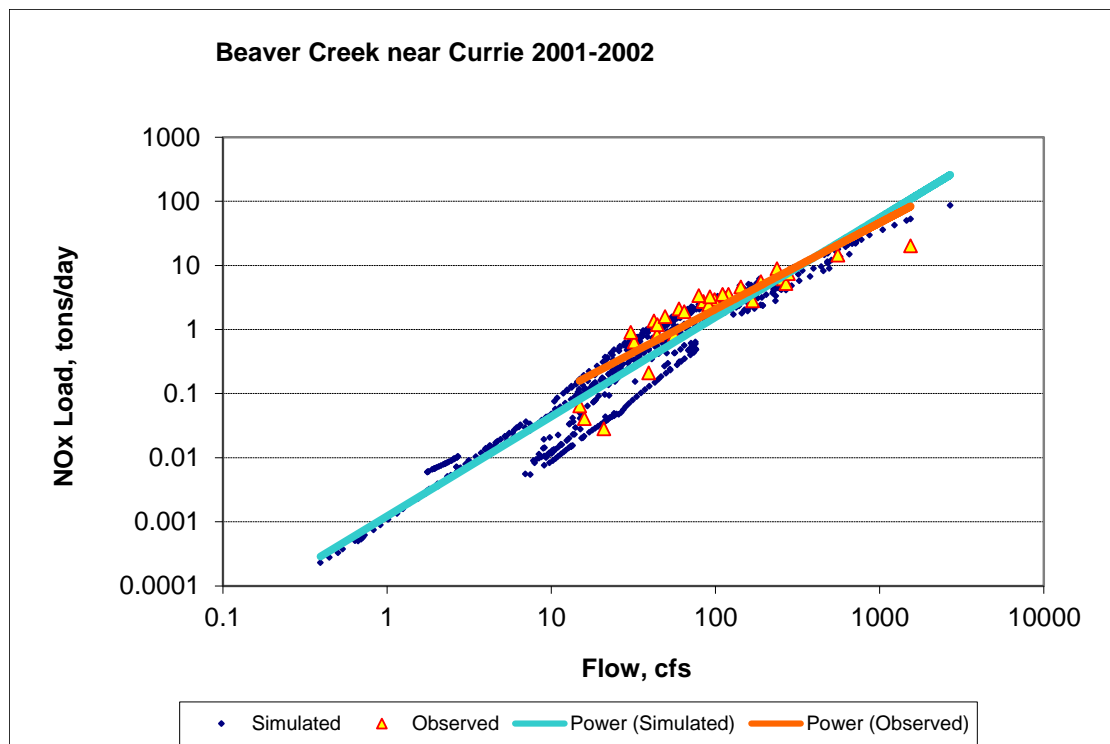


Figure 34. Power plot of simulated and observed Nitrite+ Nitrate Nitrogen (NOx) load vs flow at Beaver Creek near Currie (validation period)

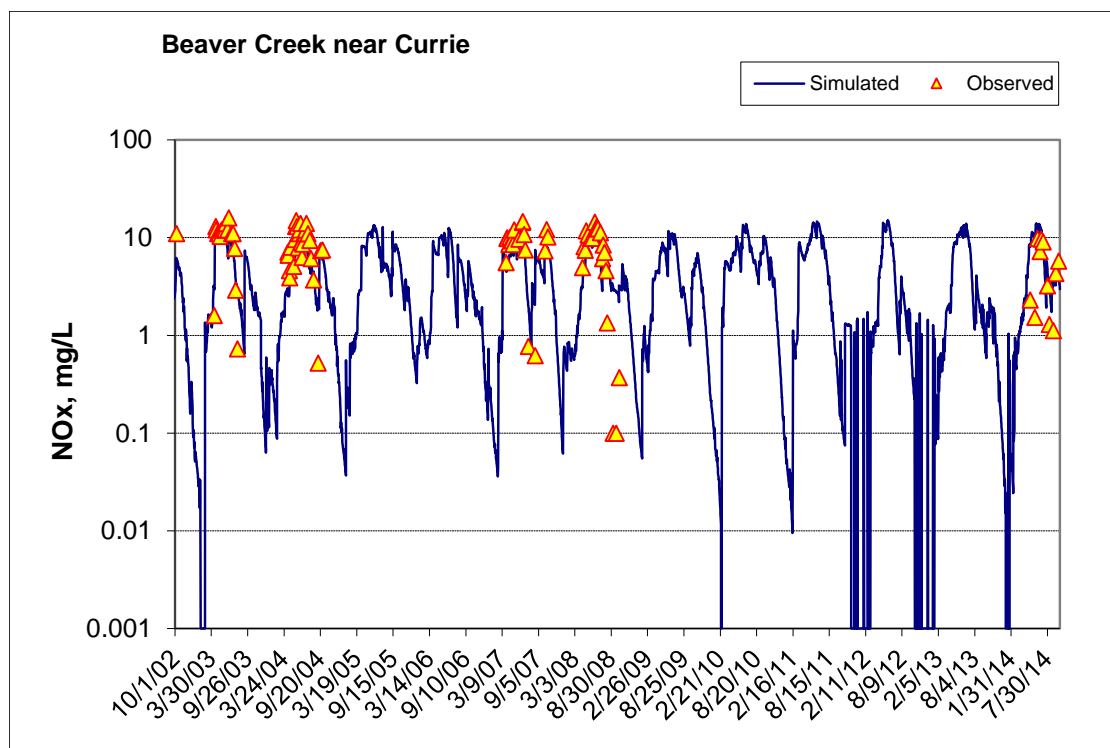


Figure 35. Time series of observed and simulated Nitrite+ Nitrate Nitrogen (NOx) concentration at Beaver Creek near Currie (calibration period)

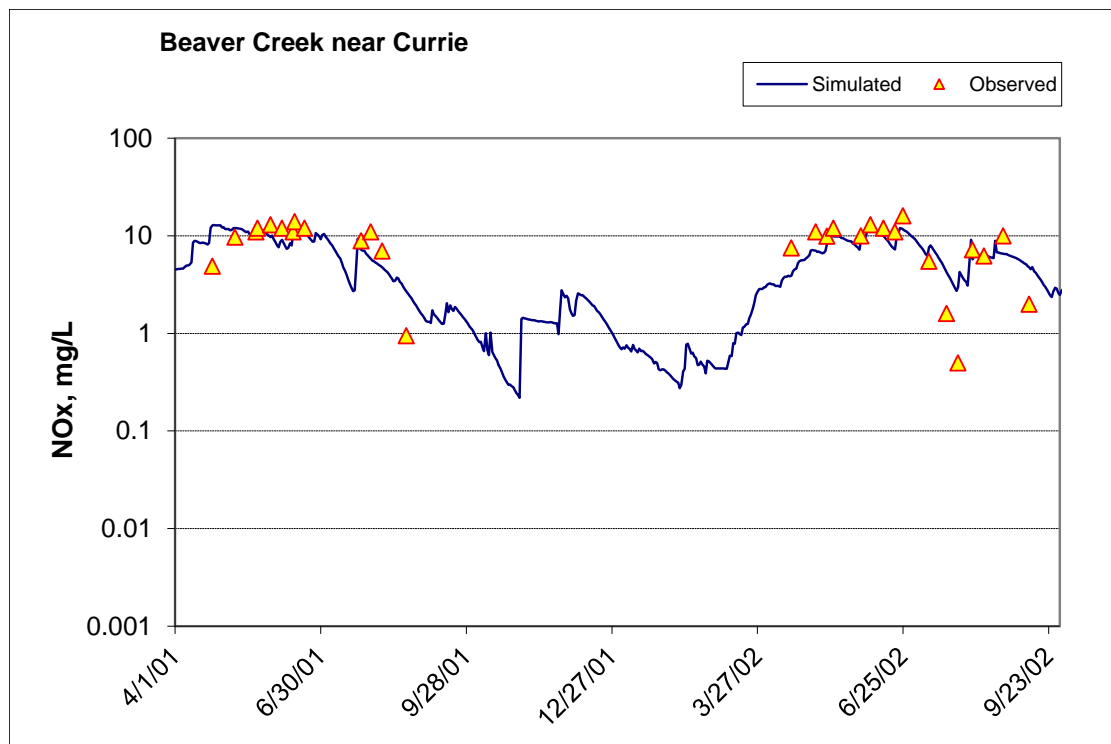


Figure 36. Time series of observed and simulated Nitrite+ Nitrate Nitrogen (NOx) concentration at Beaver Creek near Currie (validation period)

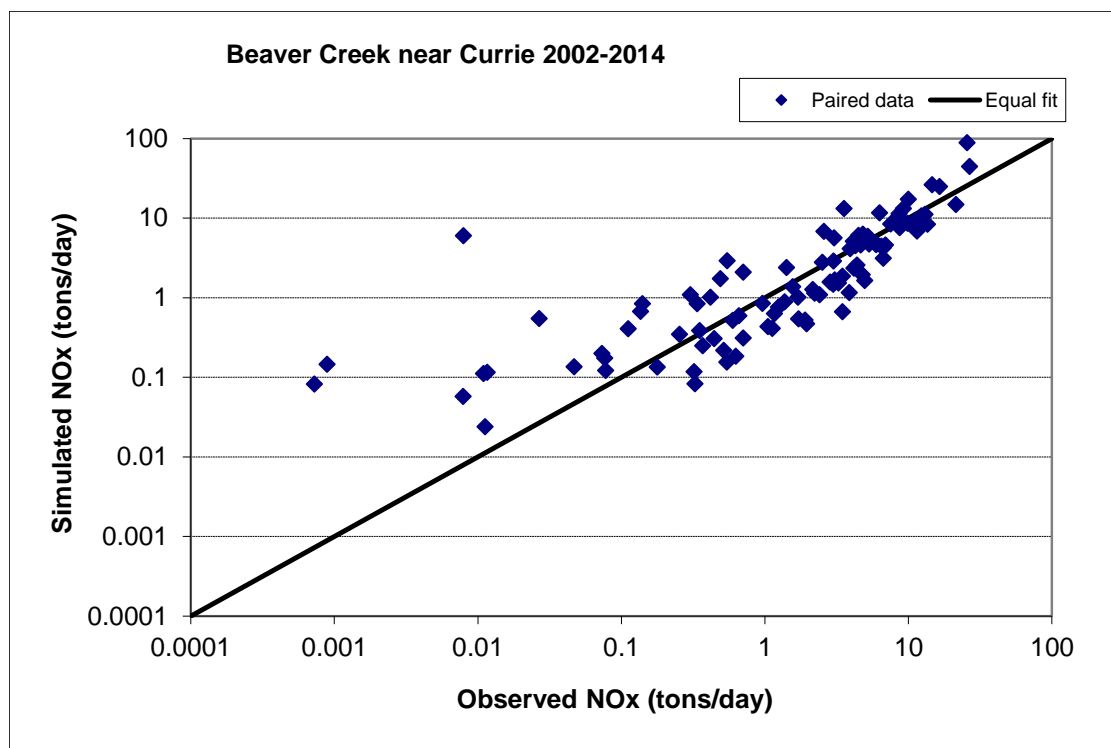


Figure 37. Paired simulated vs. observed Nitrite+ Nitrate Nitrogen (NOx) load at Beaver Creek near Currie (calibration period)

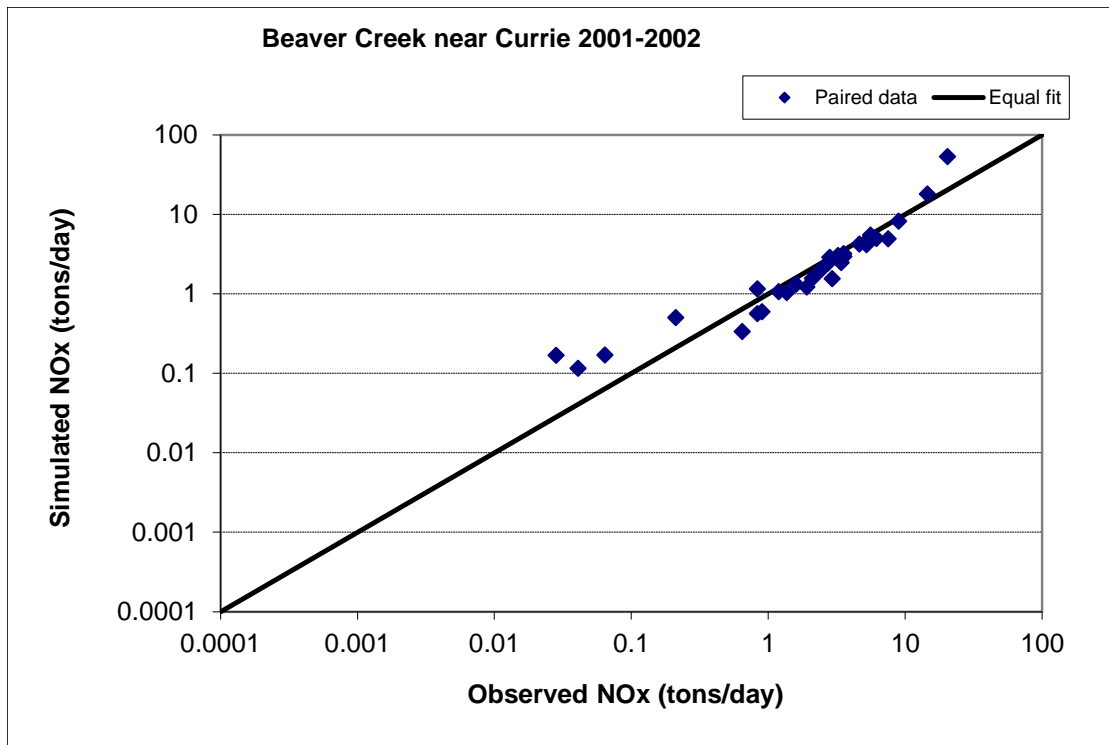


Figure 38. Paired simulated vs. observed Nitrite+ Nitrate Nitrogen (NOx) load at Beaver Creek near Currie (validation period)

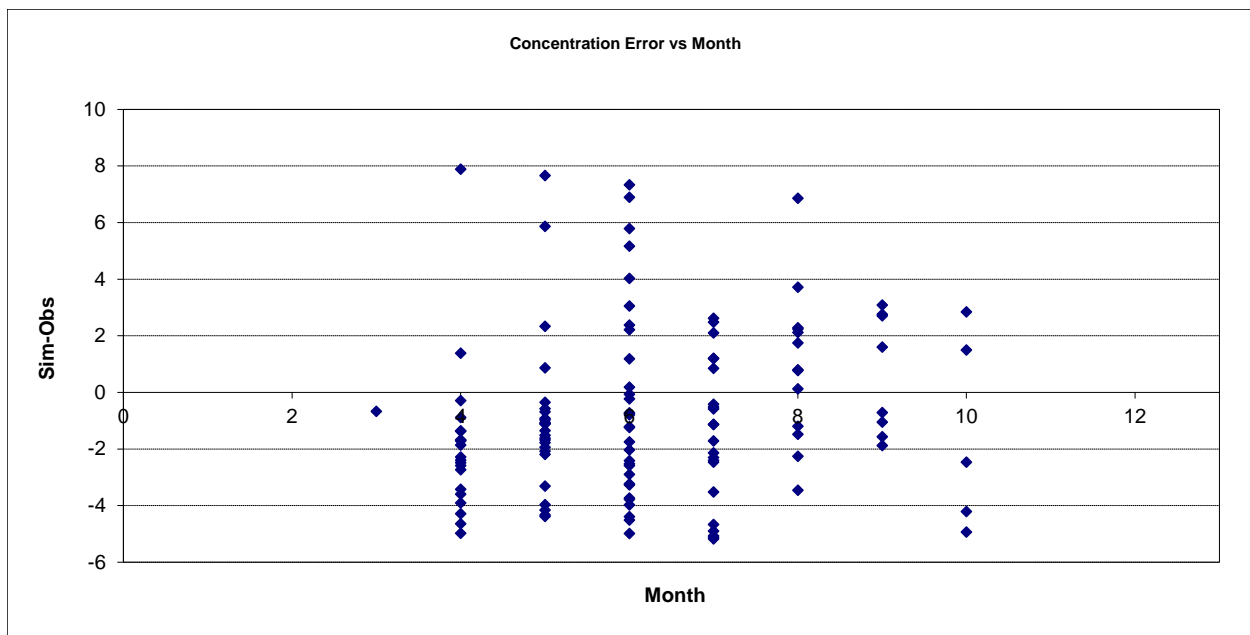


Figure 39. Residual (Simulated - Observed) vs. Month Nitrite+ Nitrate Nitrogen (NOx) at Beaver Creek near Currie

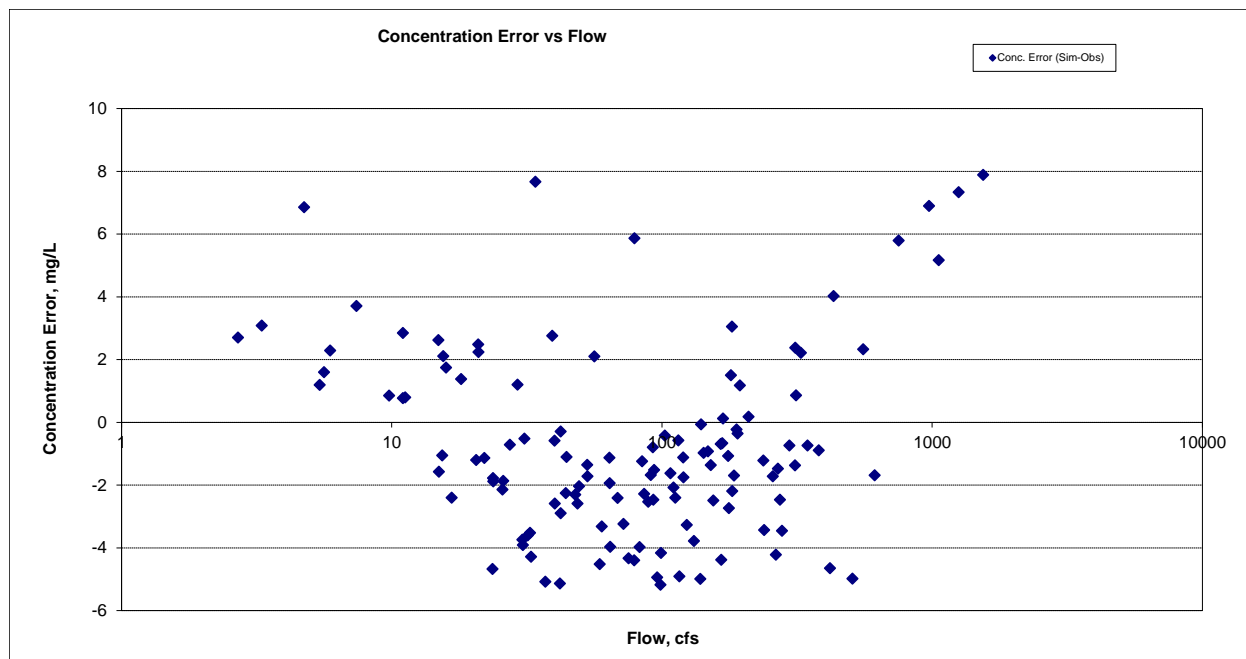


Figure 40. Residual (Simulated - Observed) vs. Flow Nitrite+ Nitrate Nitrogen (NOx) at Beaver Creek near Currie

Total Nitrogen (TN)

Table 6. Total Nitrogen (TN) statistics

Period	2002-2014	2001-2002
Count	97	29
Concentration Average Error	-2.44%	-2.63%
Concentration Median Error	-7.13%	-6.81%
Load Average Error	30.21%	23.18%
Load Median Error	0.08%	-3.37%
Paired t concentration	1.00	0.99

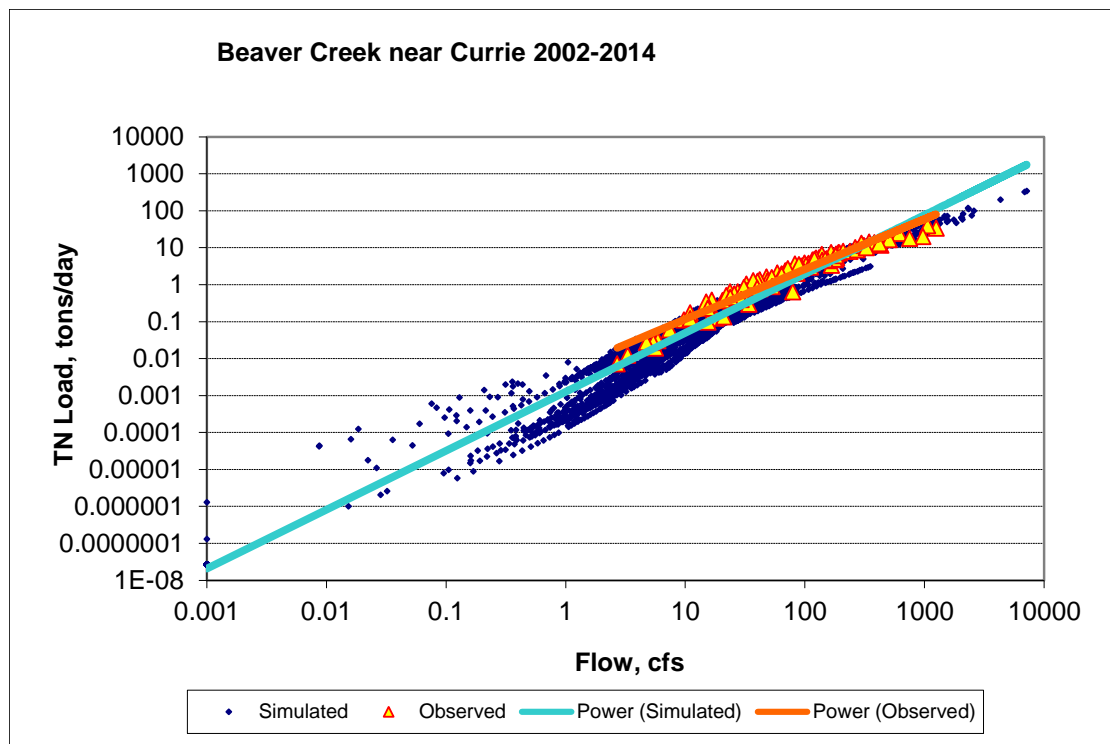


Figure 41. Power plot of simulated and observed Total Nitrogen (TN) load vs flow at Beaver Creek near Currie (calibration period)

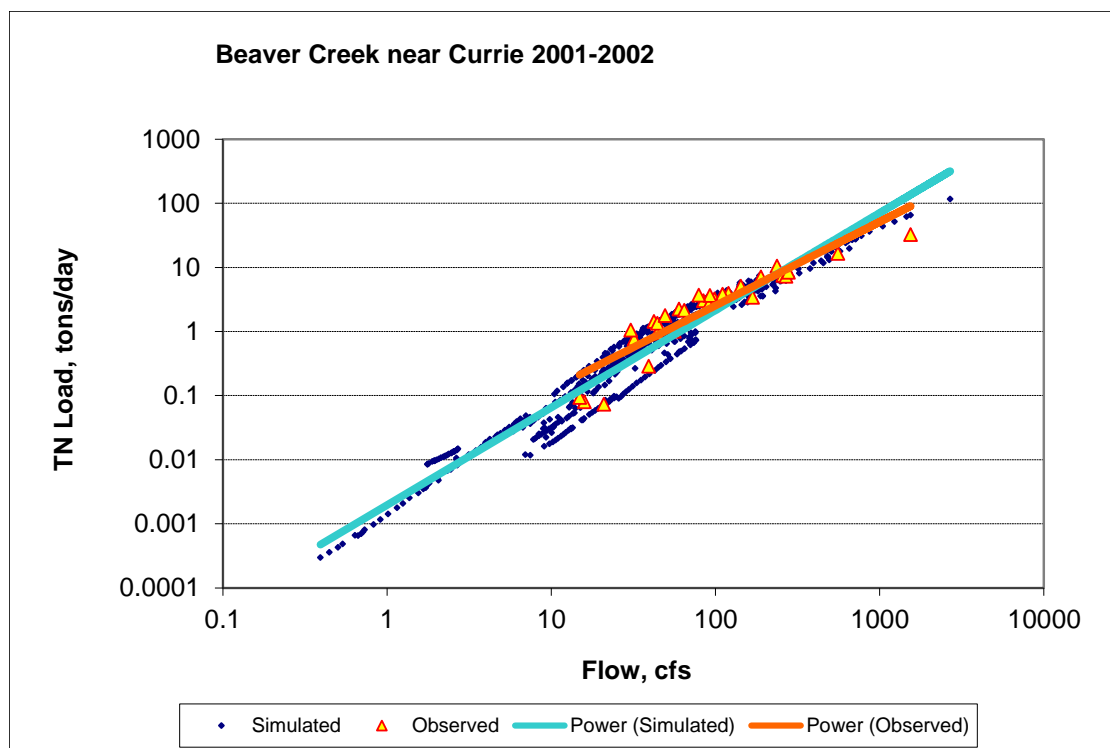


Figure 42. Power plot of simulated and observed Total Nitrogen (TN) load vs flow at Beaver Creek near Currie (validation period)

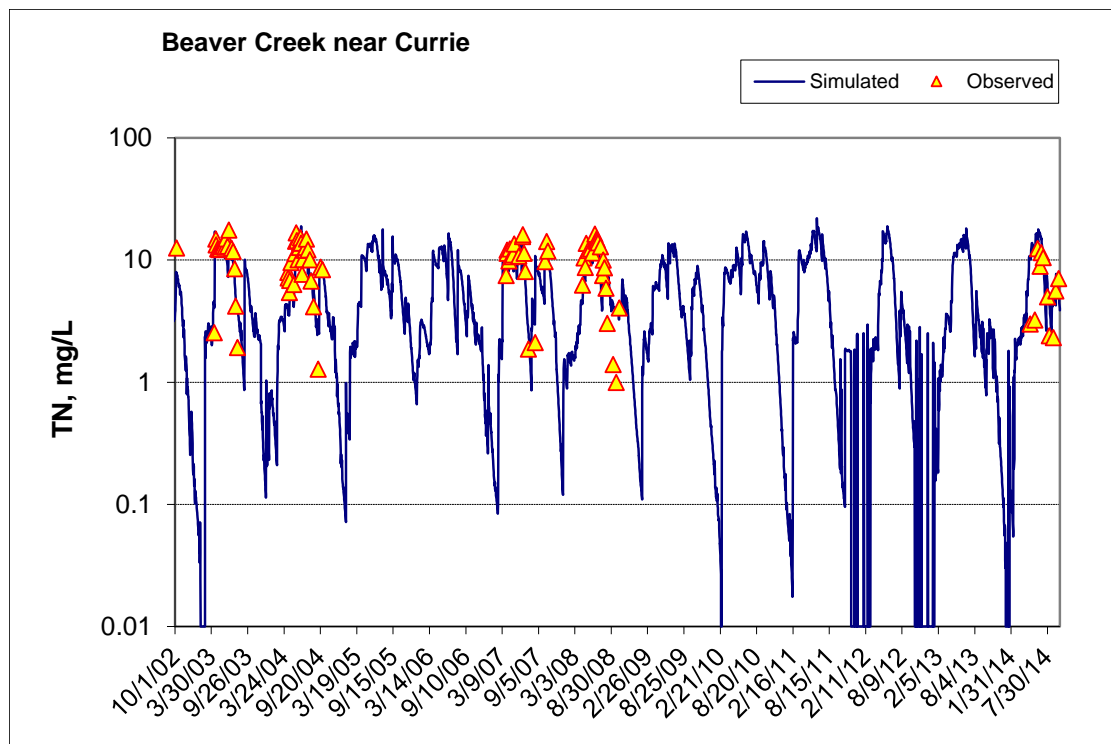


Figure 43. Time series of observed and simulated Total Nitrogen (TN) concentration at Beaver Creek near Currie (calibration period)

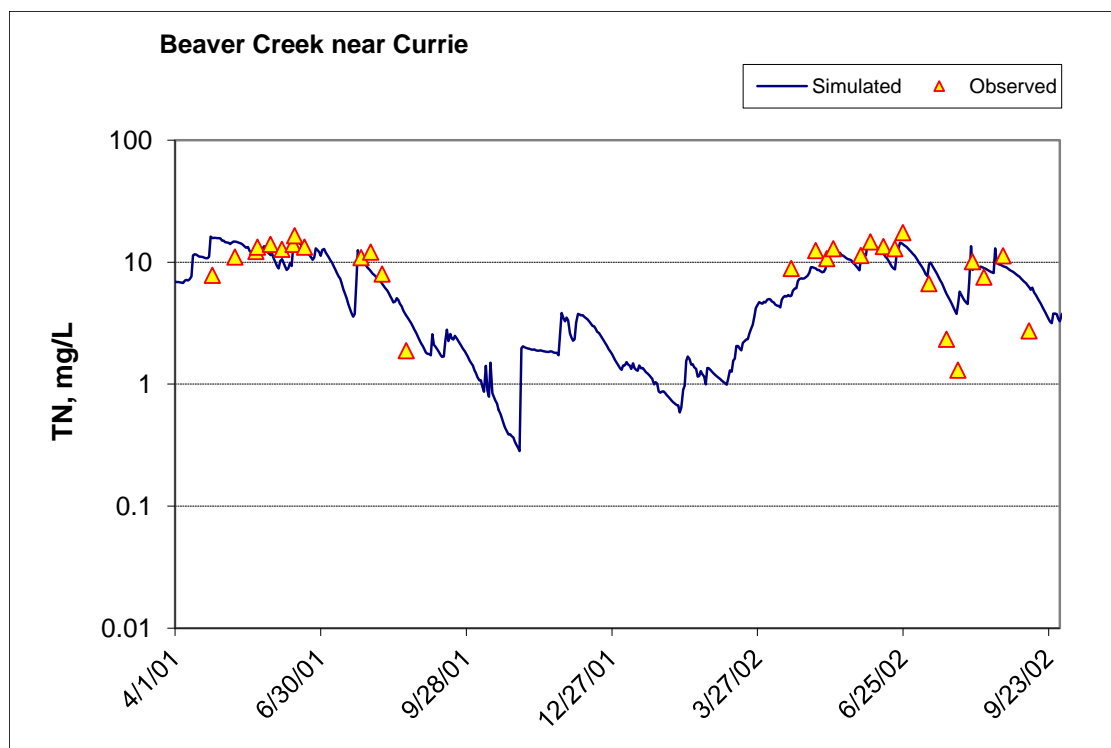


Figure 44. Time series of observed and simulated Total Nitrogen (TN) concentration at Beaver Creek near Currie (validation period)

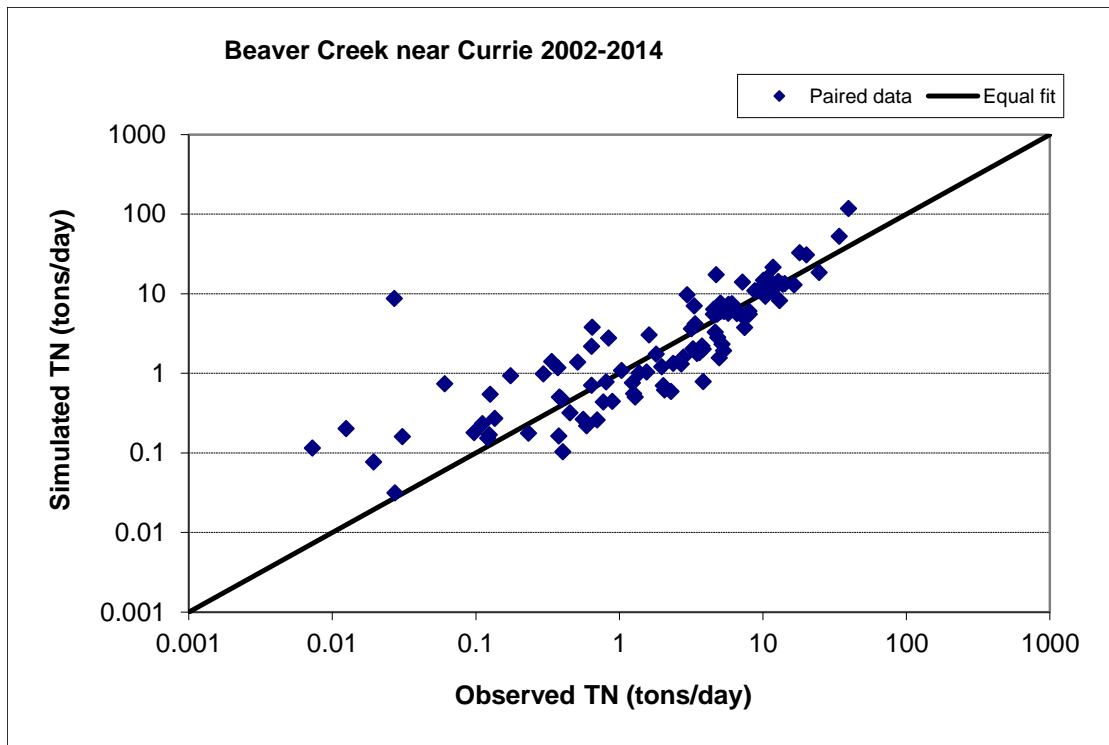


Figure 45. Paired simulated vs. observed Total Nitrogen (TN) load at Beaver Creek near Currie (calibration period)

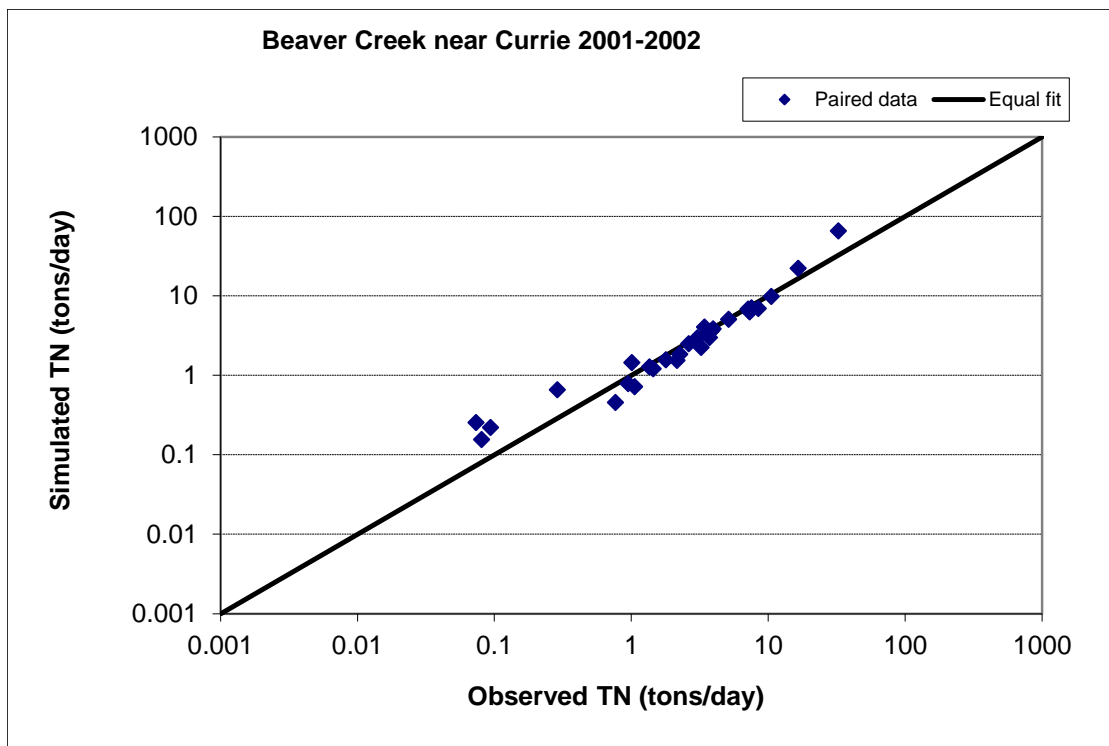


Figure 46. Paired simulated vs. observed Total Nitrogen (TN) load at Beaver Creek near Currie (validation period)

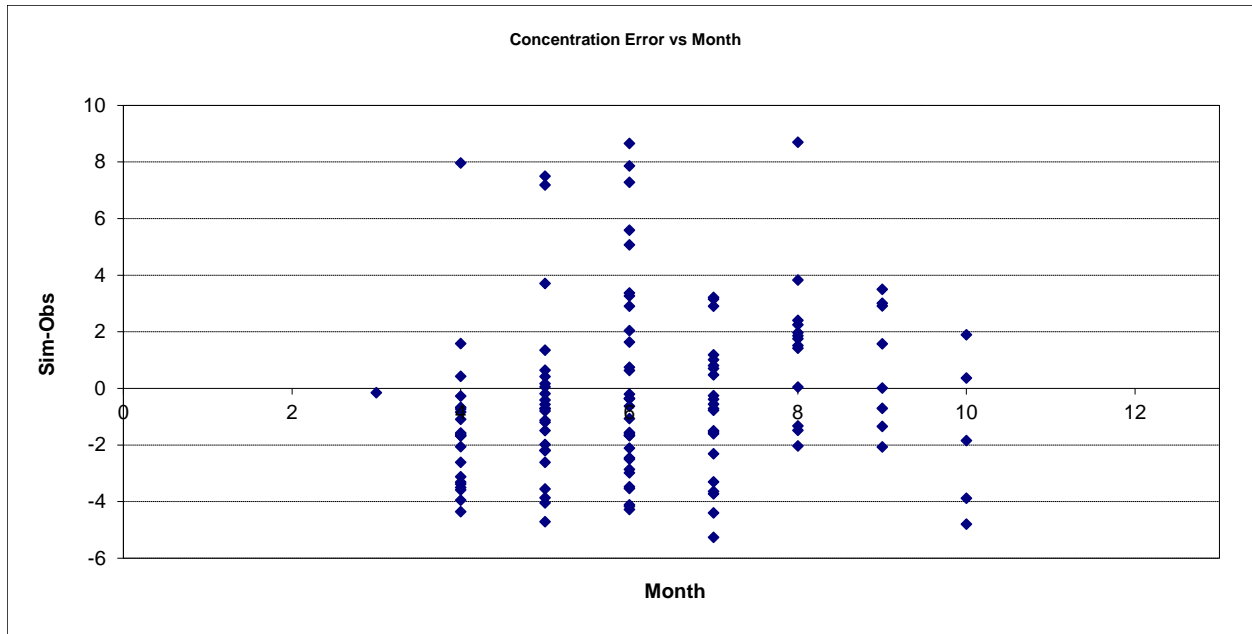


Figure 47. Residual (Simulated - Observed) vs. Month Total Nitrogen (TN) at Beaver Creek near Currie

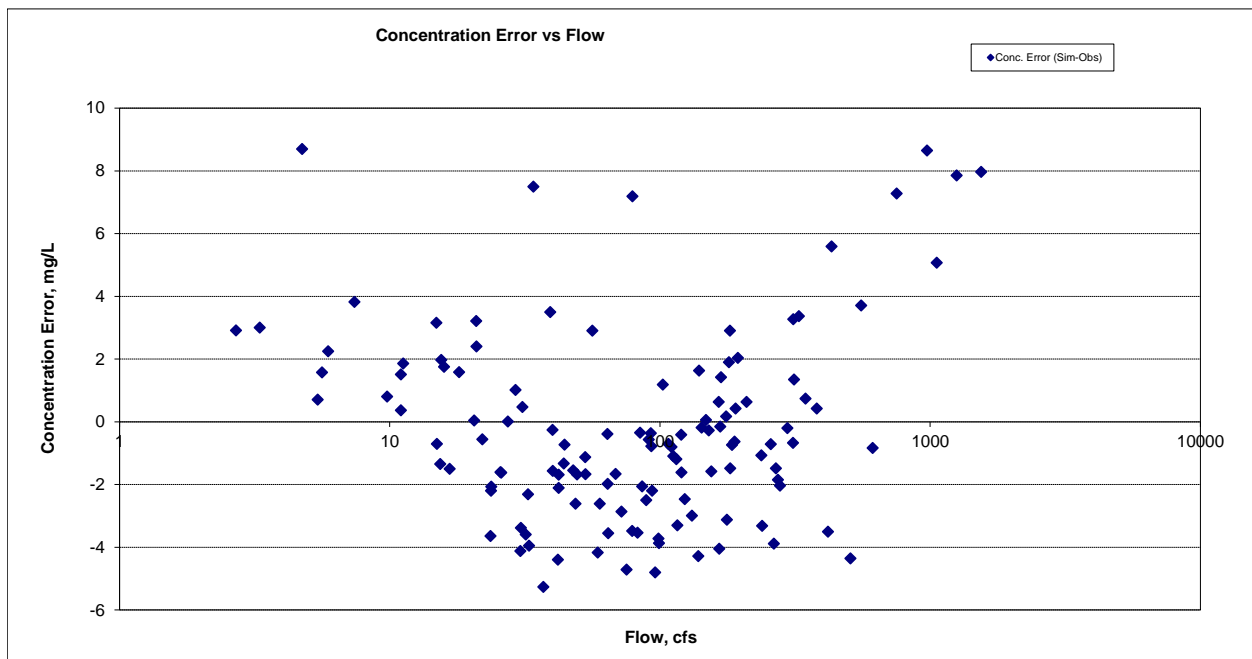


Figure 48. Residual (Simulated - Observed) vs. Flow Total Nitrogen (TN) at Beaver Creek near Currie

Soluble Reactive Phosphorus (SRP)

Table 7. Soluble Reactive Phosphorus (SRP) statistics

Period	2002-2014	2001-2002
Count	99	30
Concentration Average Error	23.61%	3.89%
Concentration Median Error	12.02%	7.97%
Load Average Error	27.63%	-36.50%
Load Median Error	1.12%	1.62%
Paired t concentration	0.37	0.87

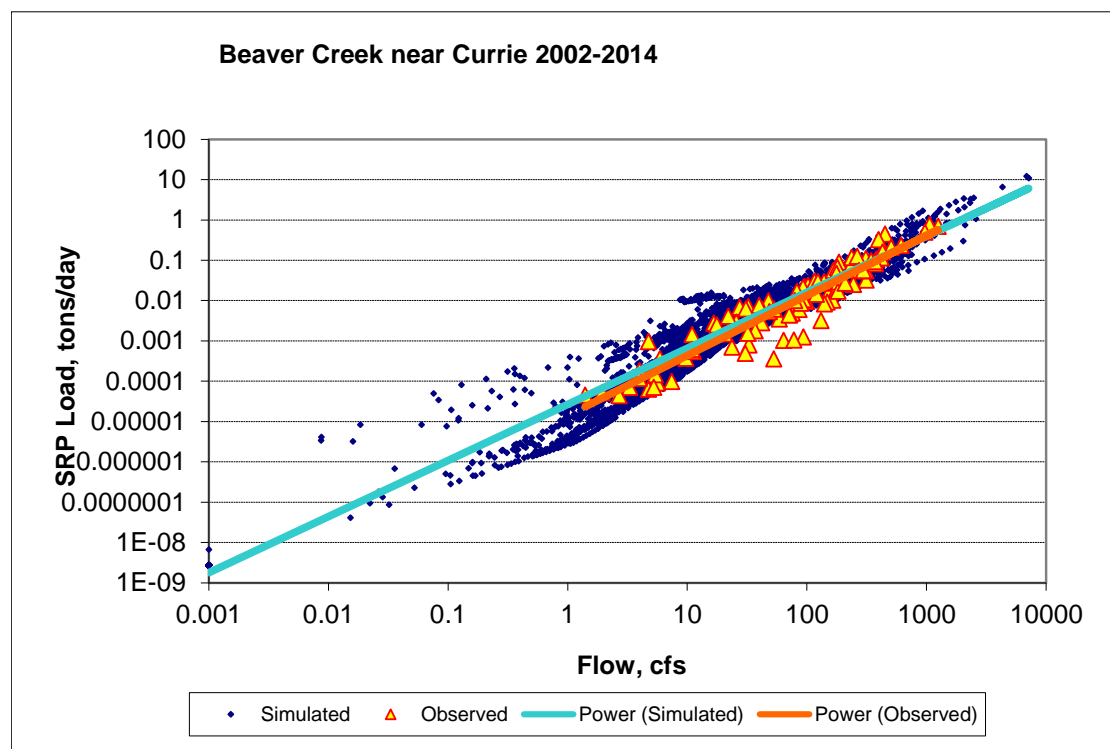


Figure 49. Power plot of simulated and observed Soluble Reactive Phosphorus (SRP) load vs flow at Beaver Creek near Currie (calibration period)

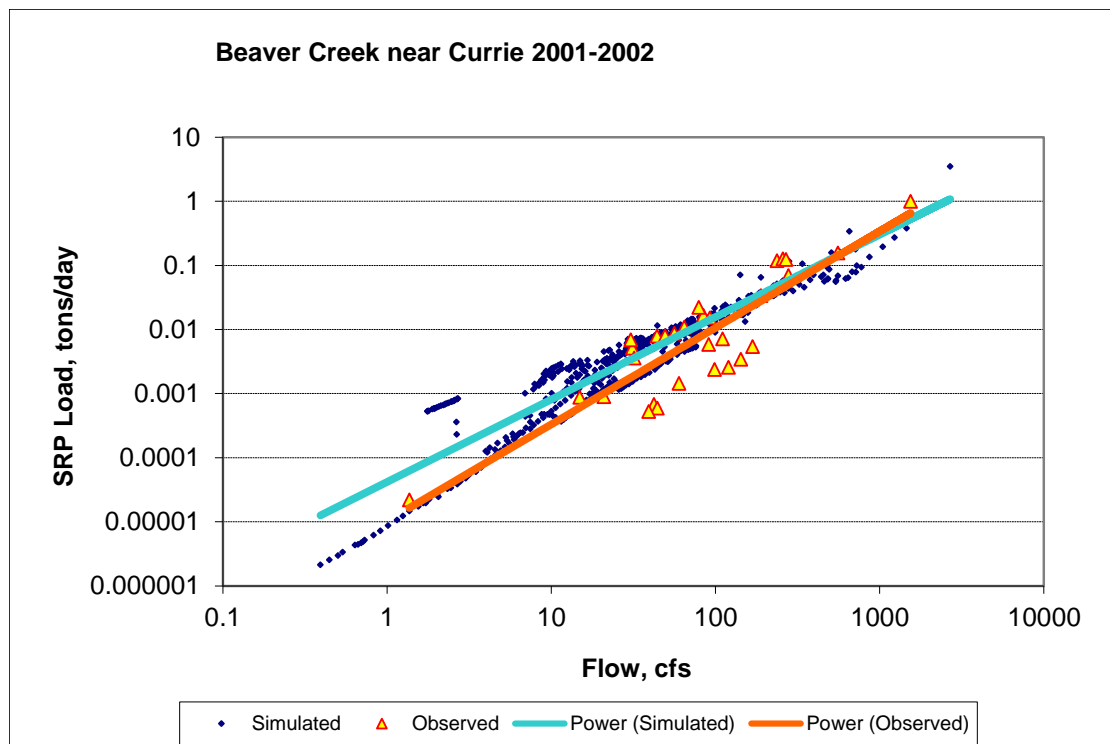


Figure 50. Power plot of simulated and observed Soluble Reactive Phosphorus (SRP) load vs flow at Beaver Creek near Currie (validation period)

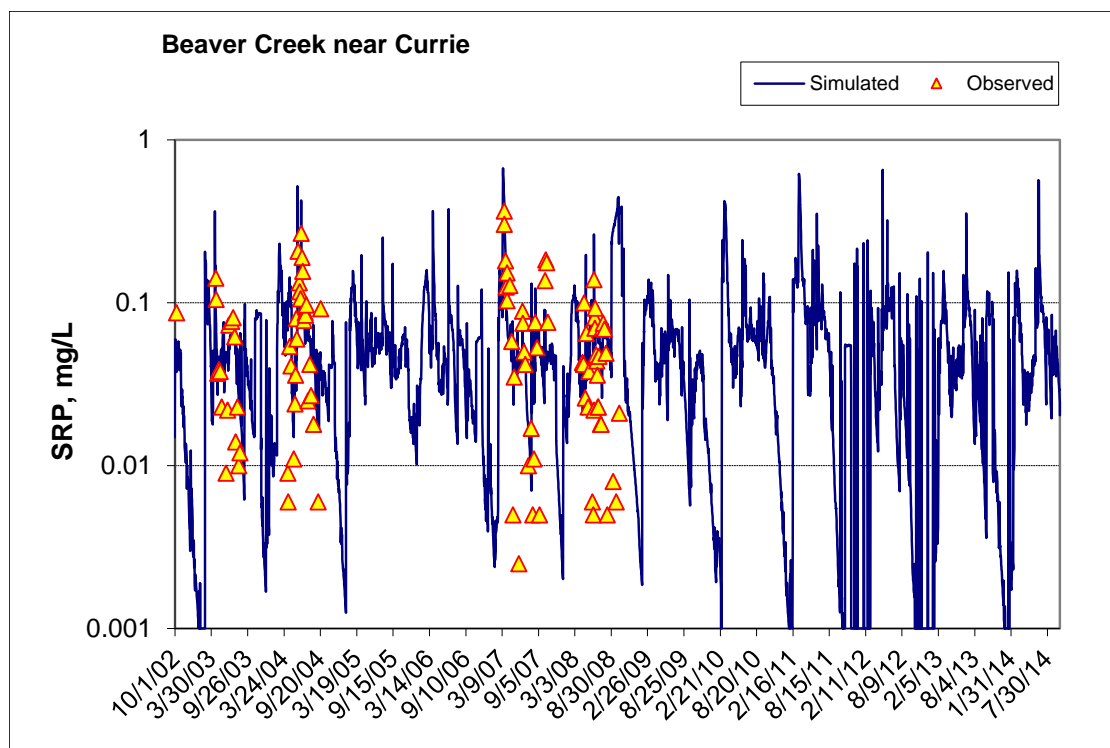


Figure 51. Time series of observed and simulated Soluble Reactive Phosphorus (SRP) concentration at Beaver Creek near Currie (calibration period)

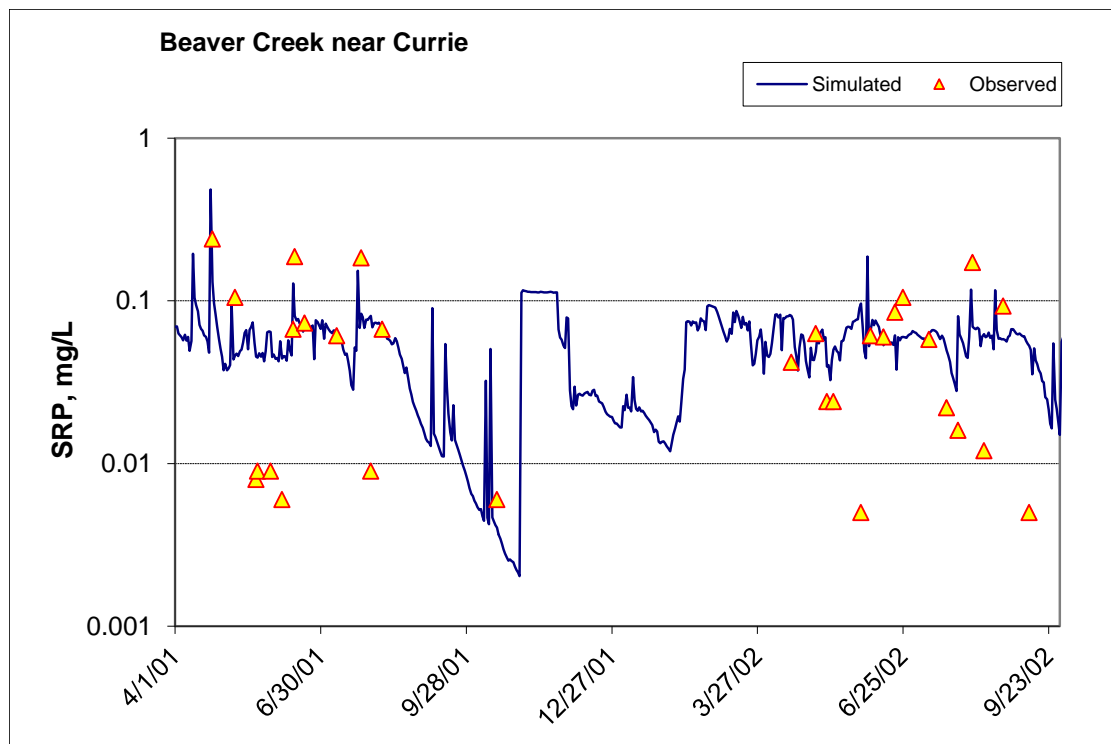


Figure 52. Time series of observed and simulated Soluble Reactive Phosphorus (SRP) concentration at Beaver Creek near Currie (validation period)

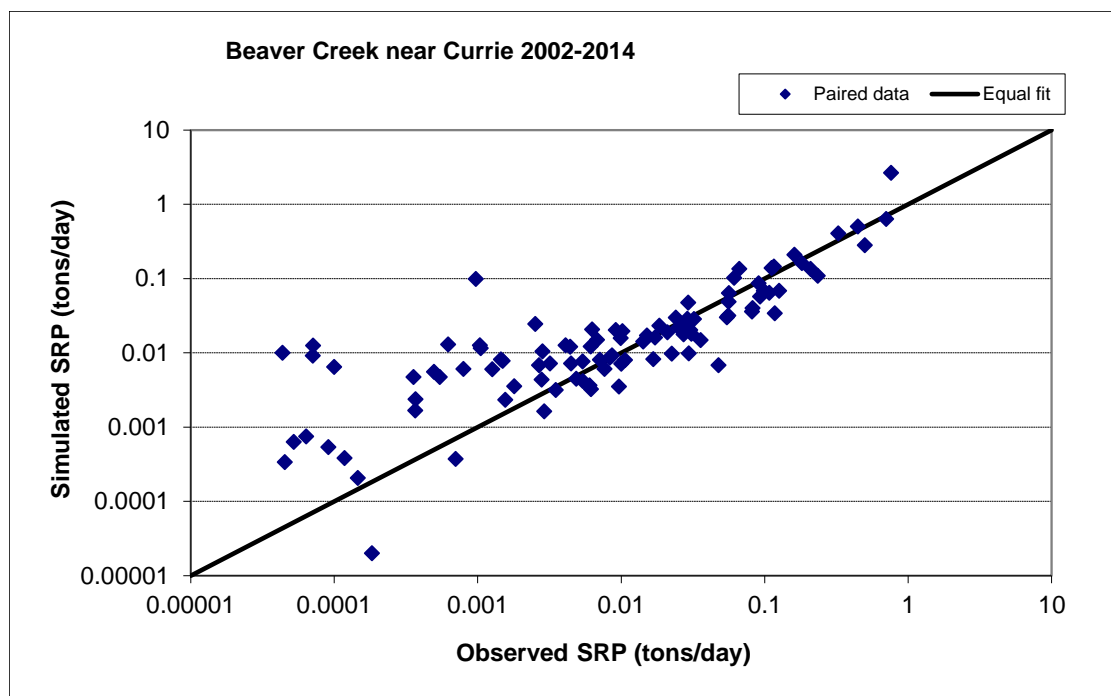


Figure 53. Paired simulated vs. observed Soluble Reactive Phosphorus (SRP) load at Beaver Creek near Currie (calibration period)

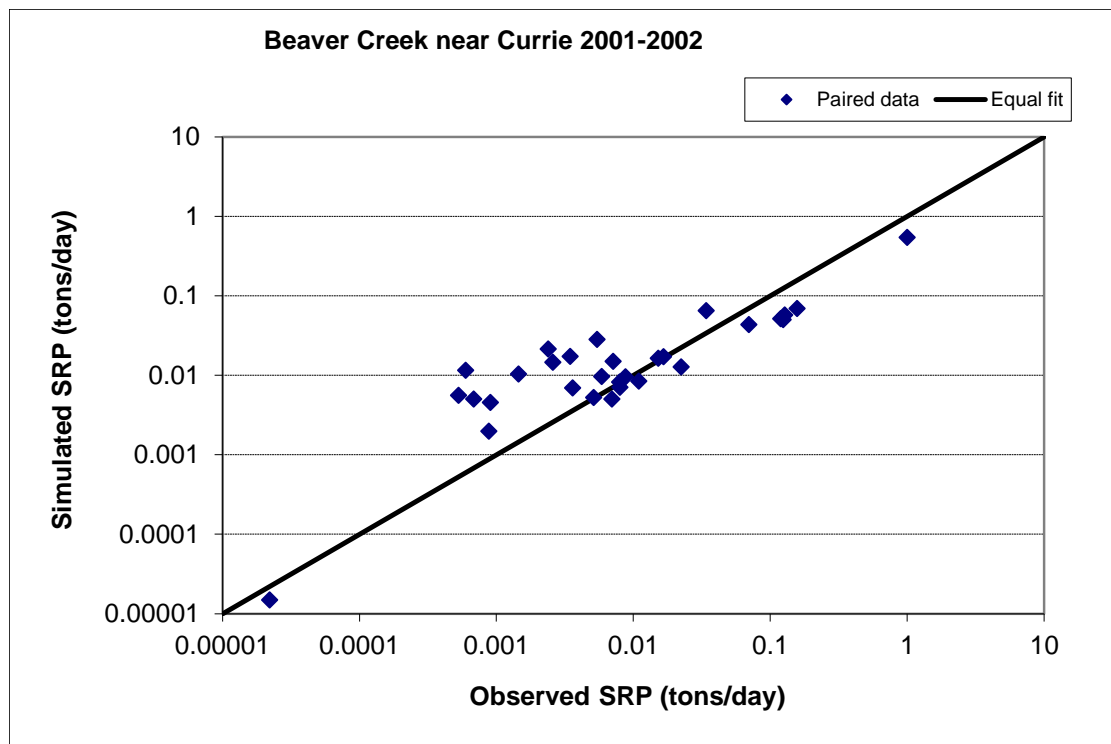


Figure 54. Paired simulated vs. observed Soluble Reactive Phosphorus (SRP) load at Beaver Creek near Currie (validation period)

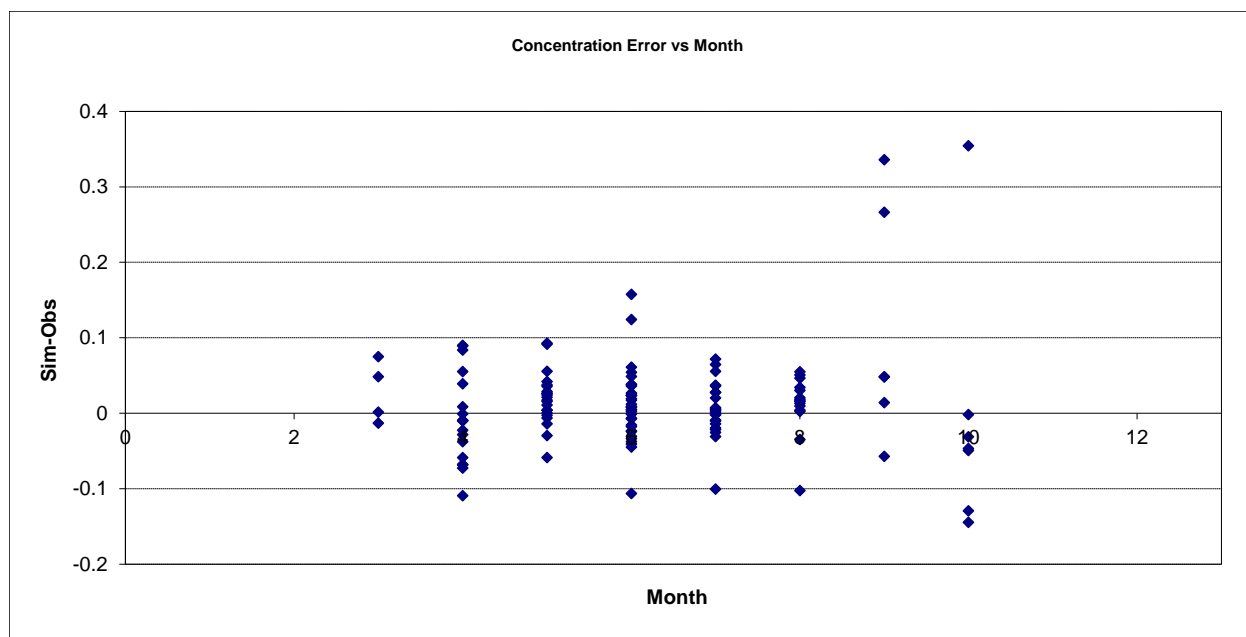


Figure 55. Residual (Simulated - Observed) vs. Month Soluble Reactive Phosphorus (SRP) at Beaver Creek near Currie

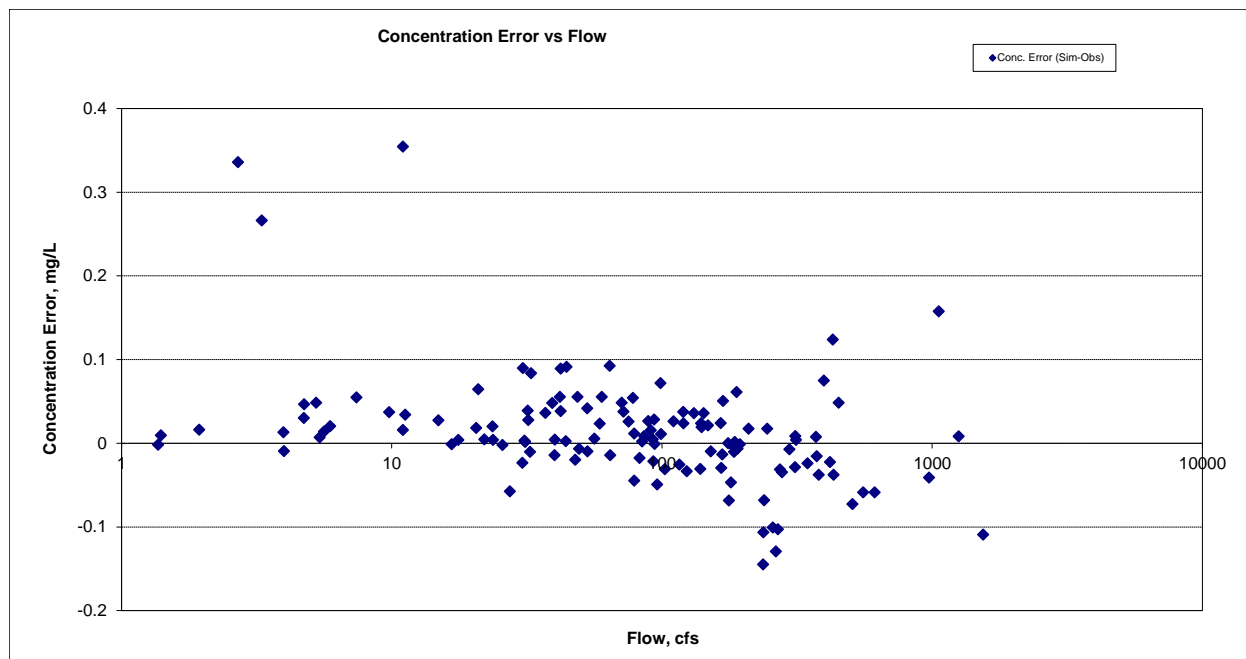


Figure 56. Residual (Simulated - Observed) vs. Flow Soluble Reactive Phosphorus (SRP) at Beaver Creek near Currie

Organic Phosphorus (OrgP)

Table 8. Organic Phosphorus (OrgP) statistics

Period	2002-2014	2001-2002
Count	99	30
Concentration Average Error	23.43%	1.40%
Concentration Median Error	45.55%	28.94%
Load Average Error	6.79%	-26.77%
Load Median Error	8.29%	3.17%
Paired t concentration	0.30	0.94

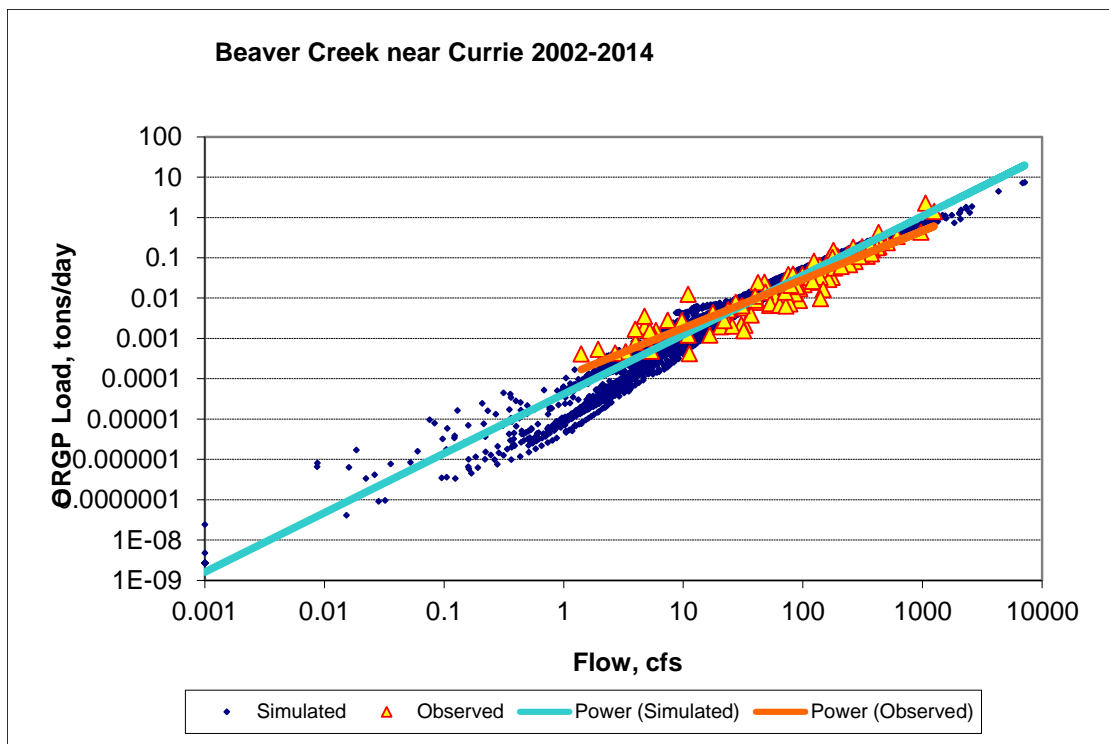


Figure 57. Power plot of simulated and observed Organic Phosphorus (OrgP) load vs flow at Beaver Creek near Currie (calibration period)

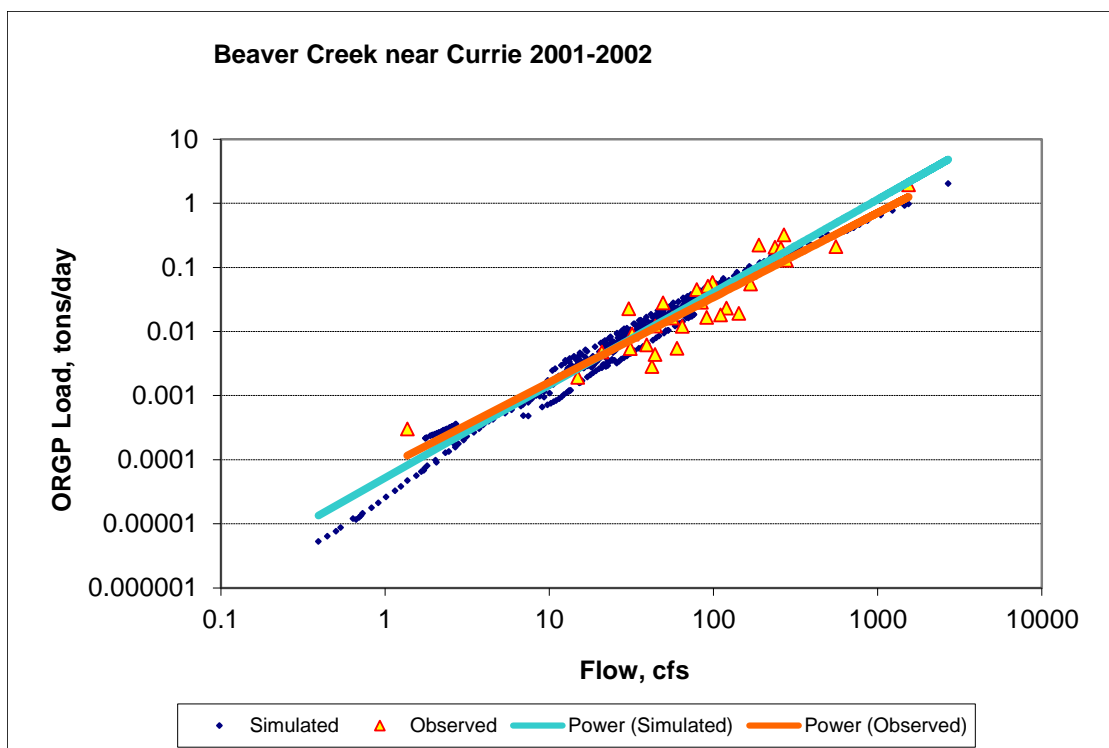


Figure 58. Power plot of simulated and observed Organic Phosphorus (OrgP) load vs flow at Beaver Creek near Currie (validation period)

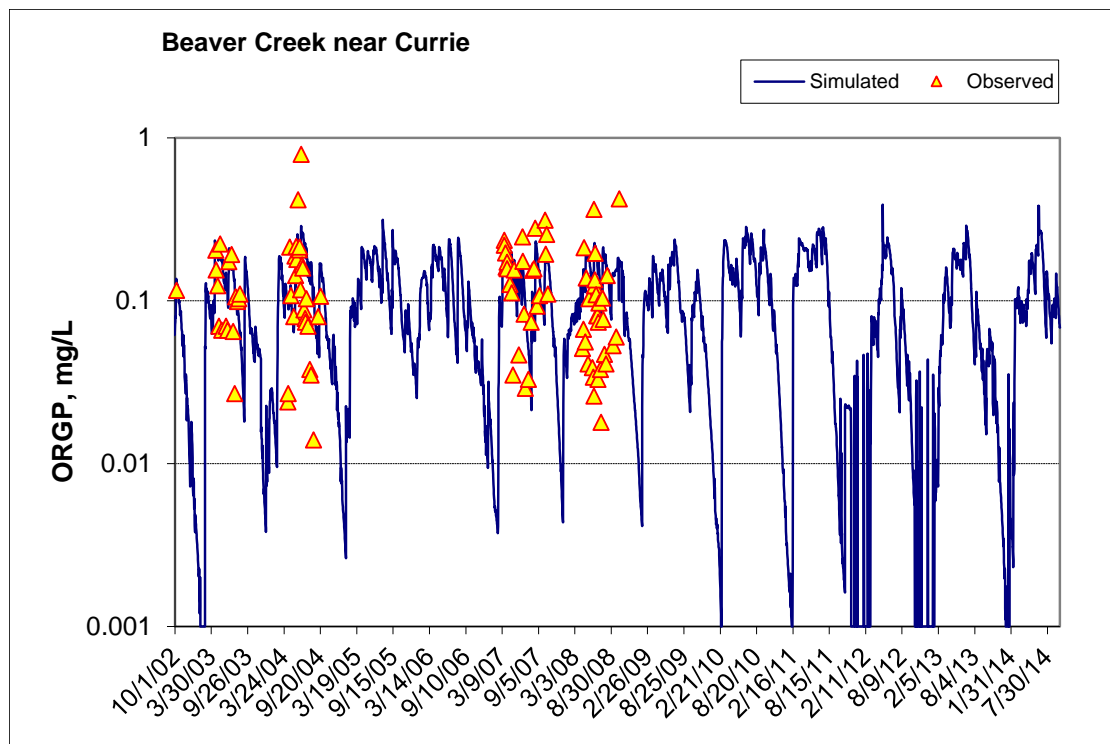


Figure 59. Time series of observed and simulated Organic Phosphorus (OrgP) concentration at Beaver Creek near Currie (calibration period)

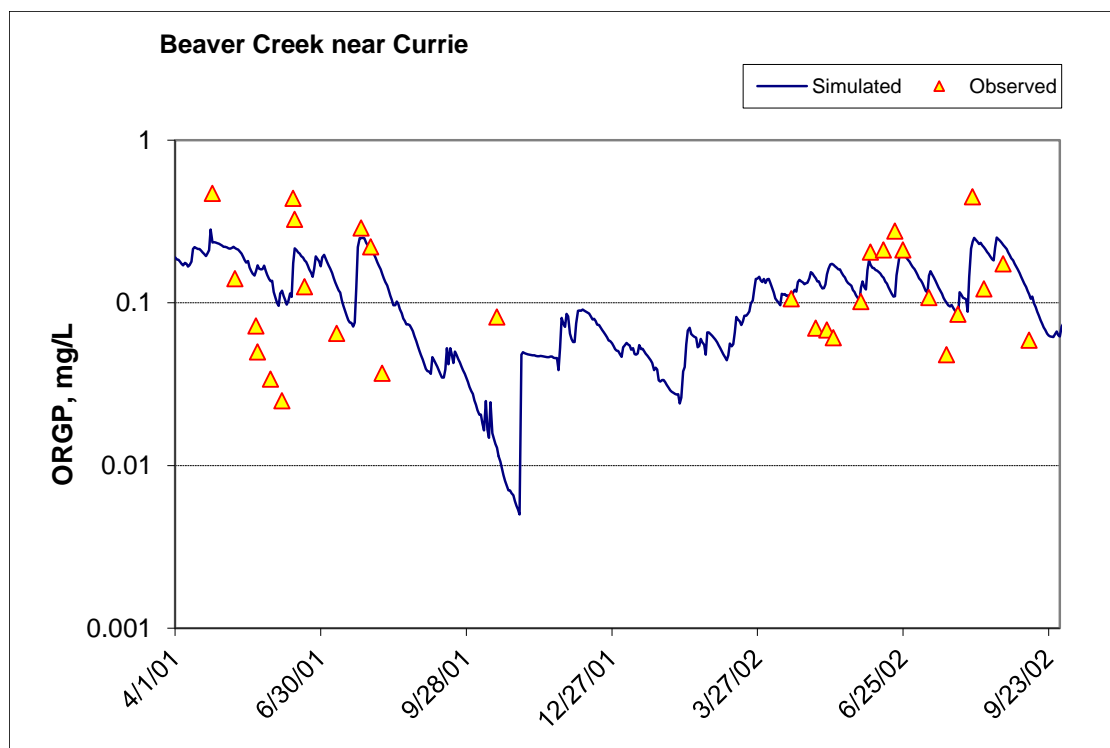


Figure 60. Time series of observed and simulated Organic Phosphorus (OrgP) concentration at Beaver Creek near Currie (validation period)

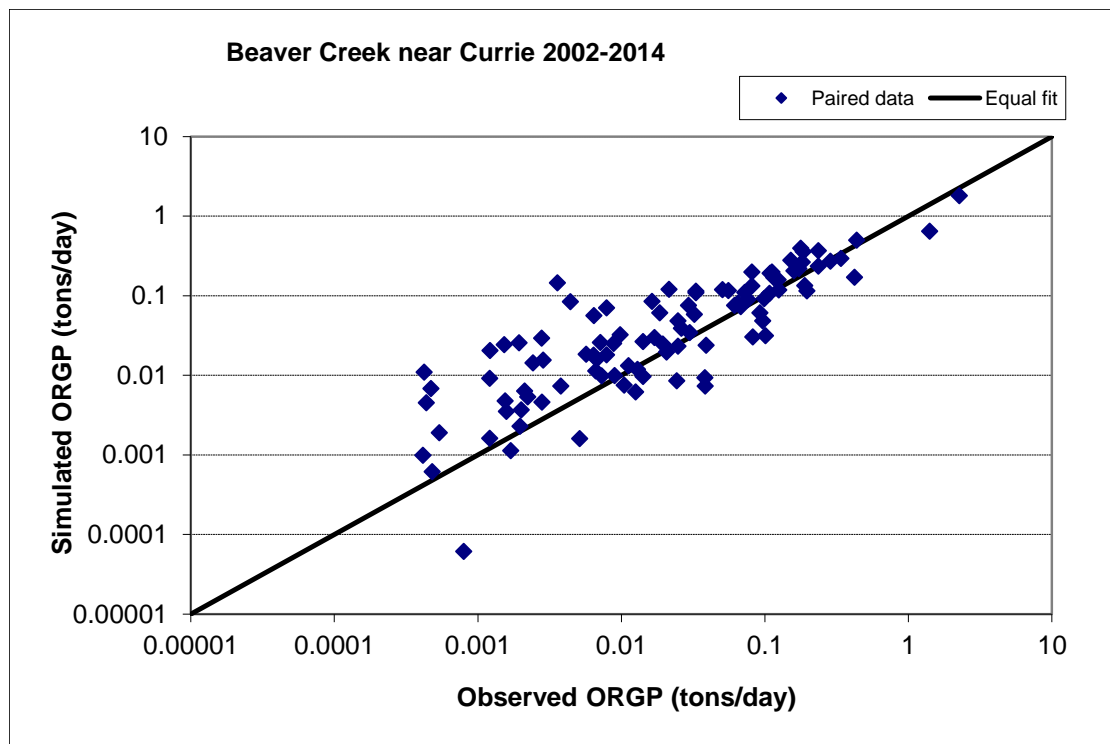


Figure 61. Paired simulated vs. observed Organic Phosphorus (OrgP) load at Beaver Creek near Currie (calibration period)

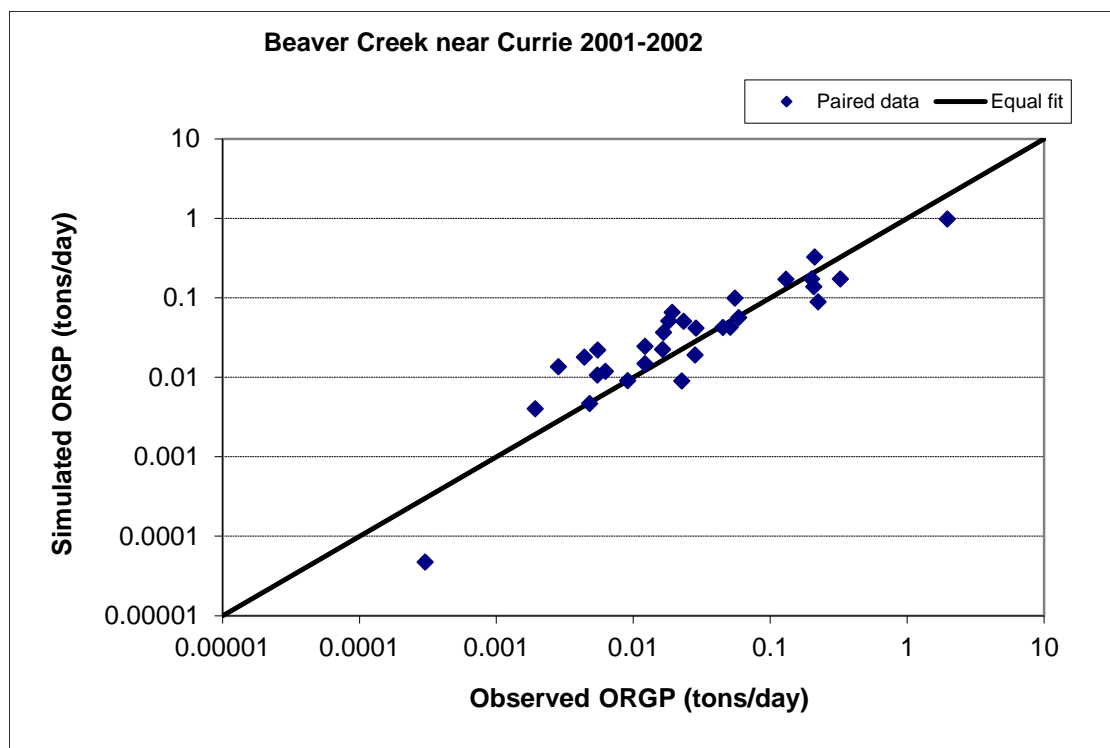


Figure 62. Paired simulated vs. observed Organic Phosphorus (OrgP) load at Beaver Creek near Currie (validation period)

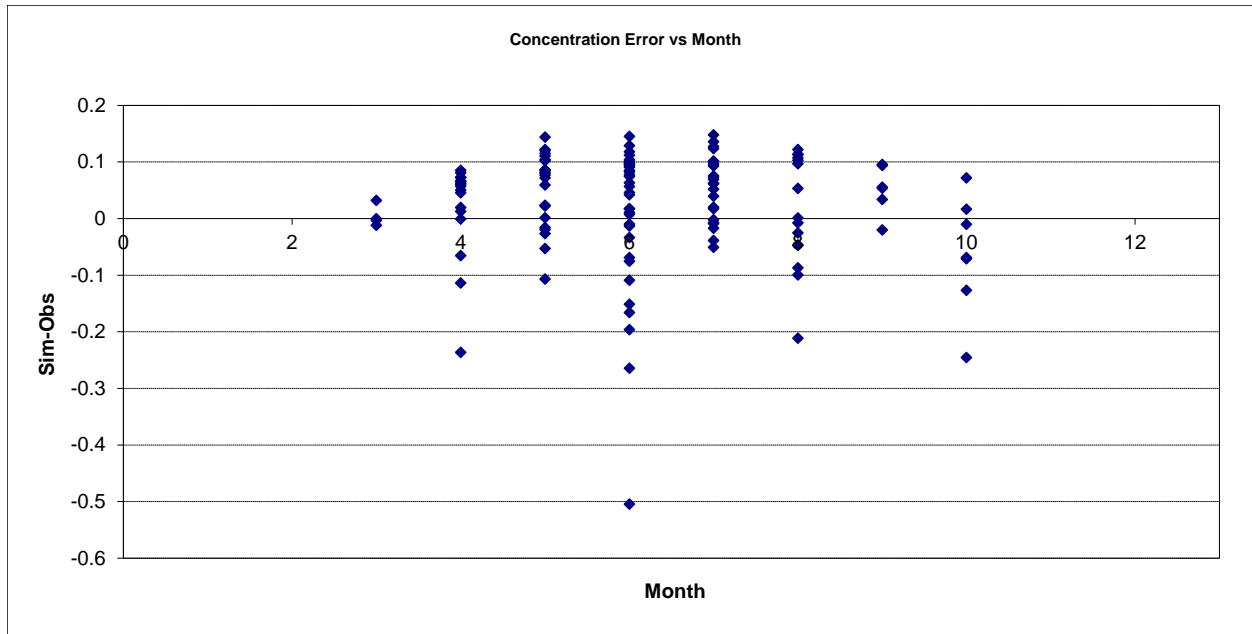


Figure 63. Residual (Simulated - Observed) vs. Month Organic Phosphorus (OrgP) at Beaver Creek near Currie

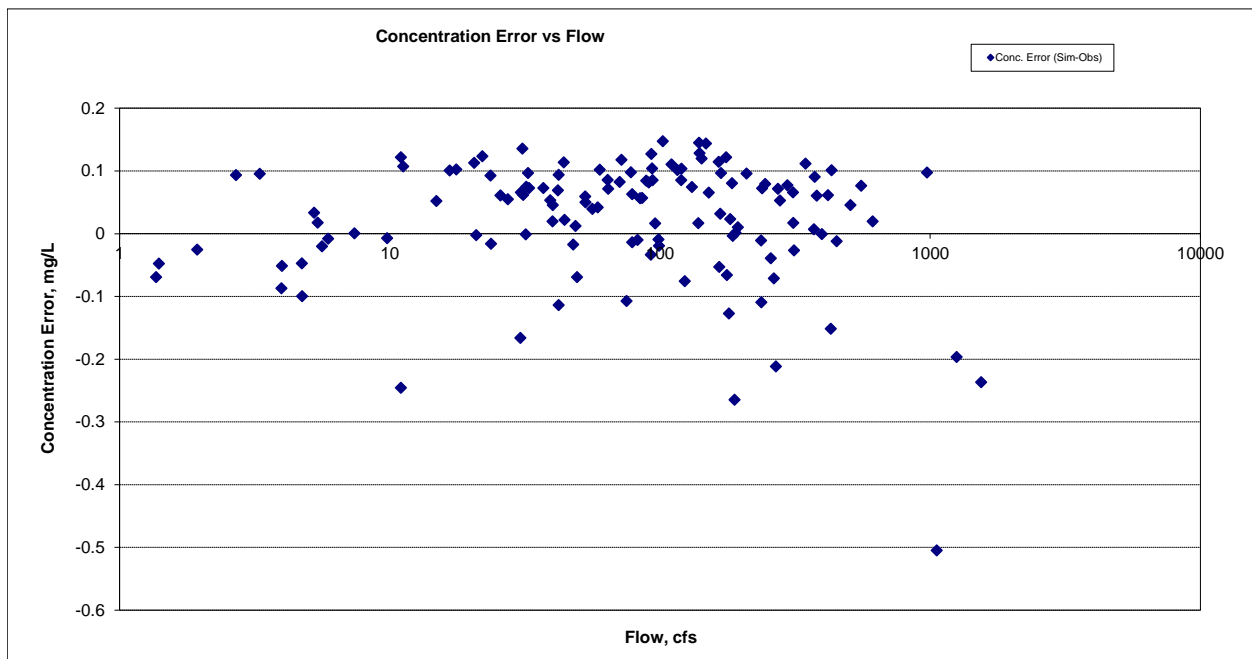


Figure 64. Residual (Simulated - Observed) vs. Flow Organic Phosphorus (OrgP) at Beaver Creek near Currie

Total Phosphorus (TP)

Table 9. Total Phosphorus (TP) statistics

Period	2002-2014	2001-2002
Count	118	34
Concentration Average Error	28.86%	2.33%
Concentration Median Error	34.69%	23.17%
Load Average Error	16.88%	-29.84%
Load Median Error	7.02%	2.74%
Paired t concentration	0.09	0.93

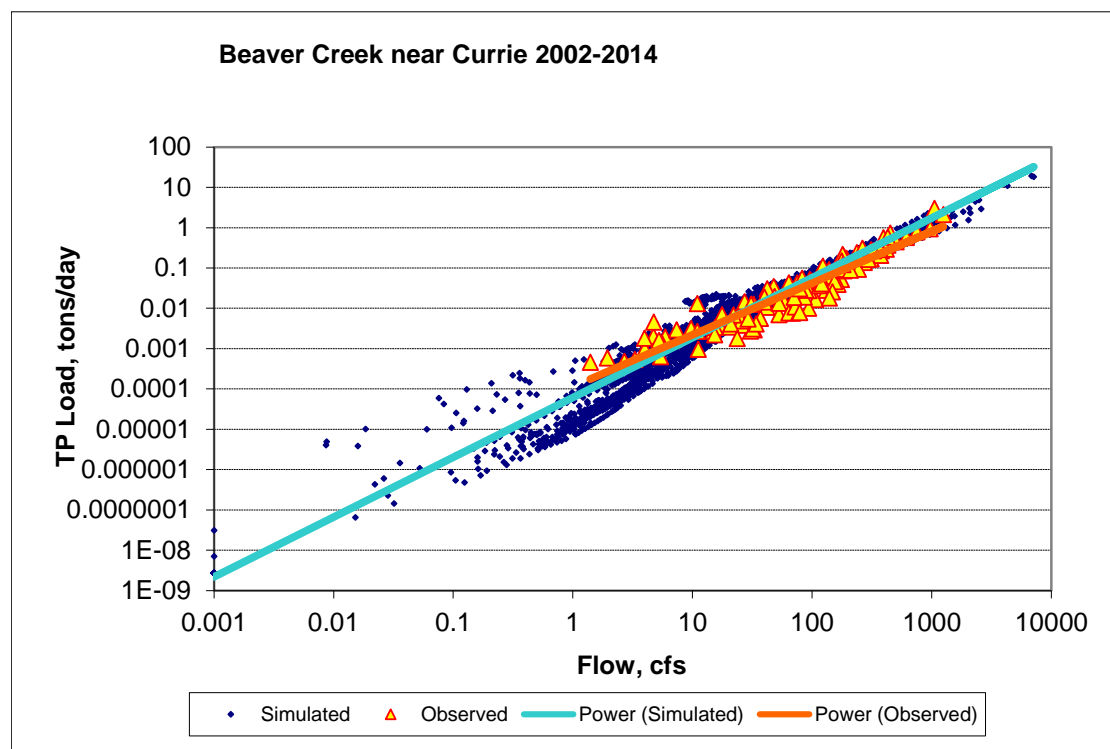


Figure 65. Power plot of simulated and observed Total Phosphorus (TP) load vs flow at Beaver Creek near Currie (calibration period)

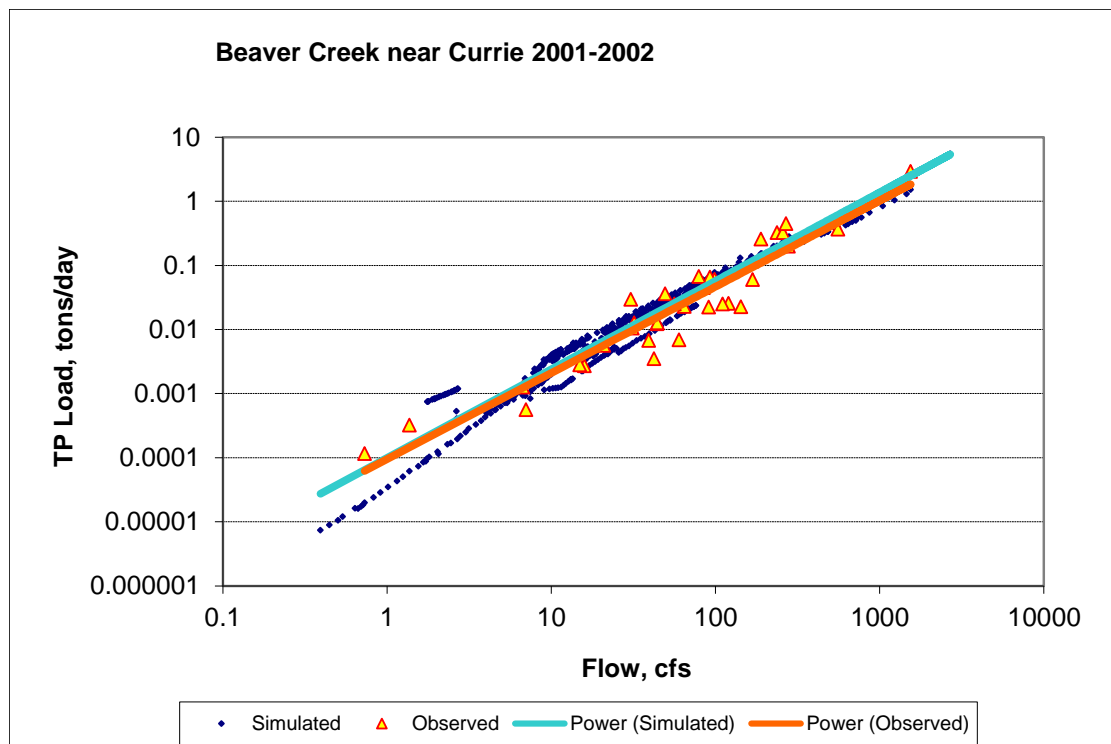


Figure 66. Power plot of simulated and observed Total Phosphorus (TP) load vs flow at Beaver Creek near Currie (validation period)

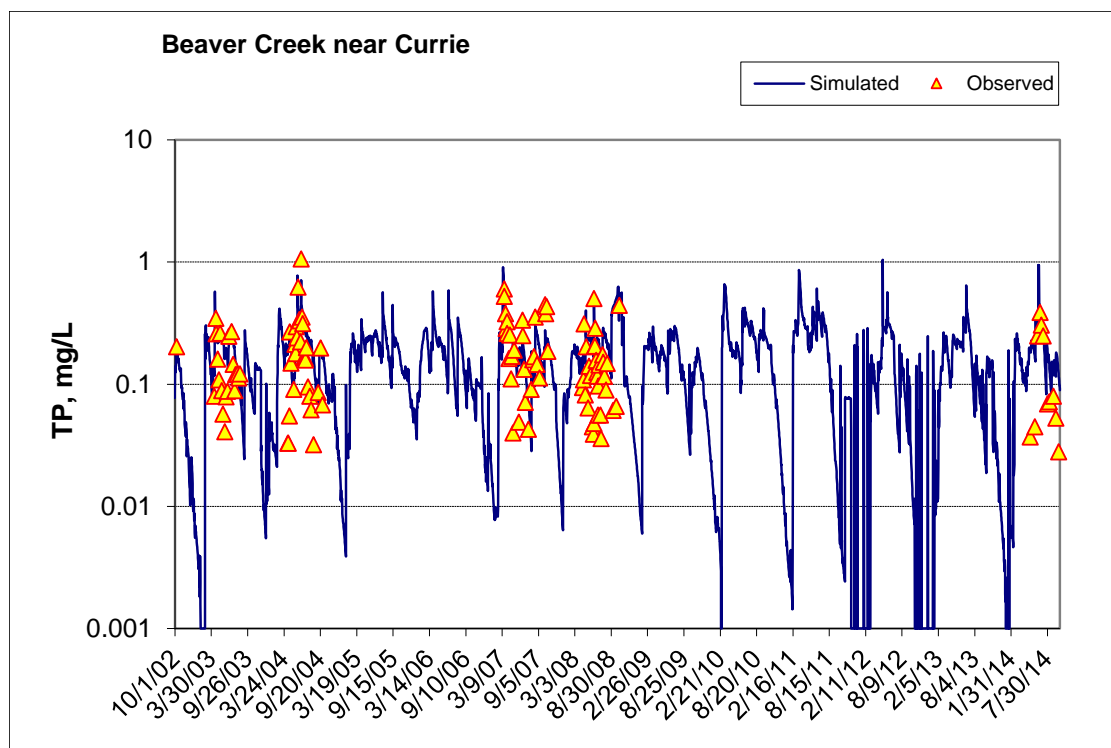


Figure 67. Time series of observed and simulated Total Phosphorus (TP) concentration at Beaver Creek near Currie (calibration period)

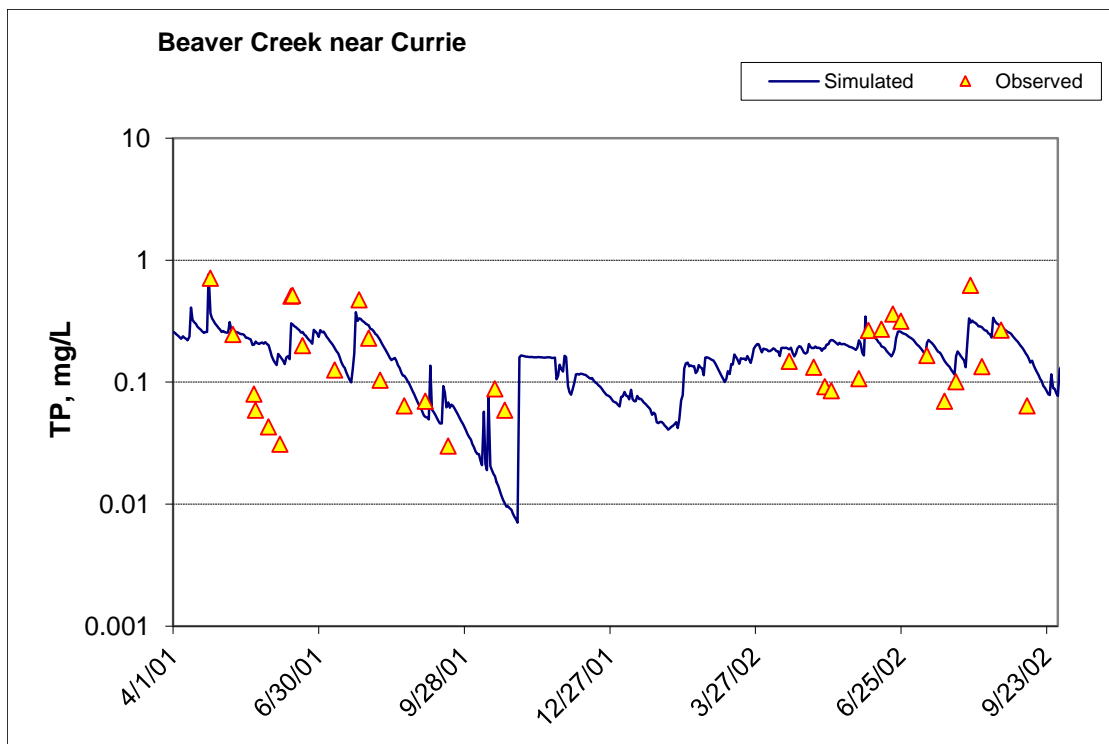


Figure 68. Time series of observed and simulated Total Phosphorus (TP) concentration at Beaver Creek near Currie (validation period)

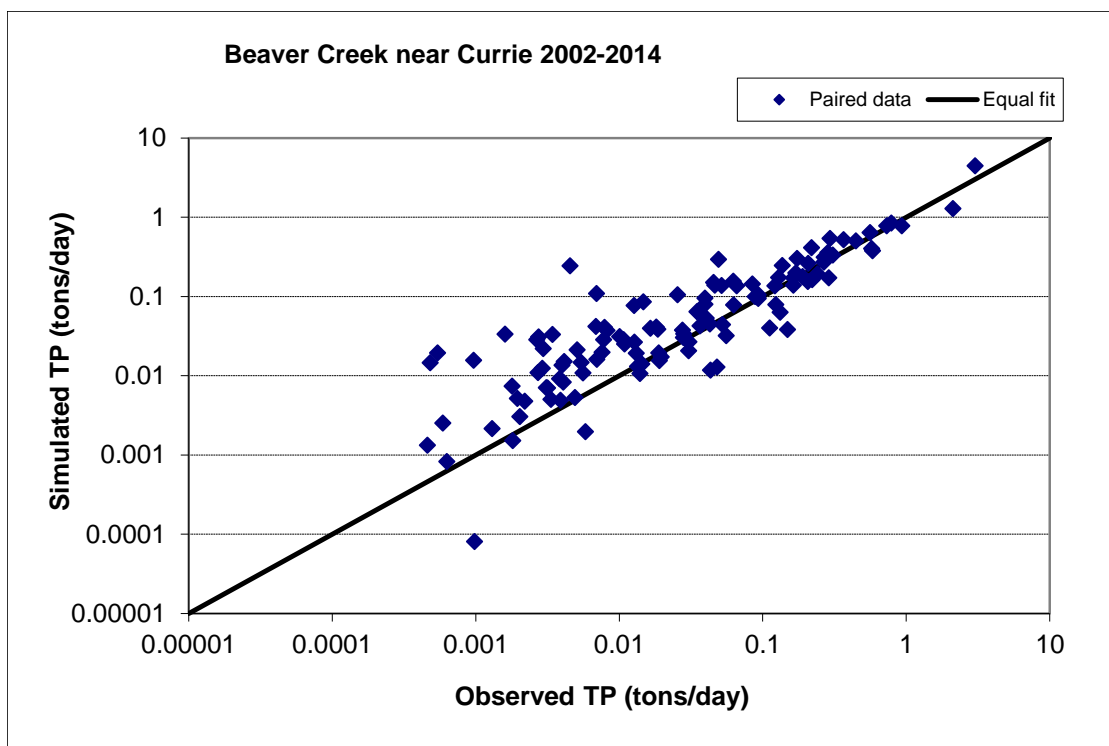


Figure 69. Paired simulated vs. observed Total Phosphorus (TP) load at Beaver Creek near Currie (calibration period)

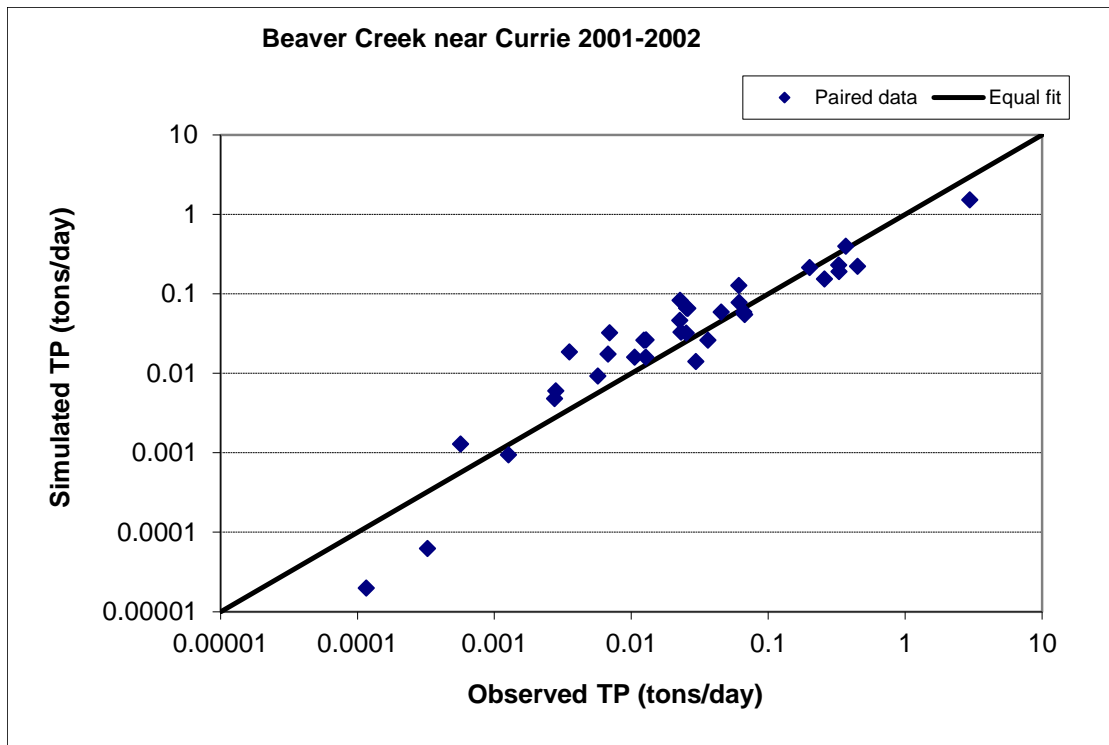


Figure 70. Paired simulated vs. observed Total Phosphorus (TP) load at Beaver Creek near Currie (validation period)

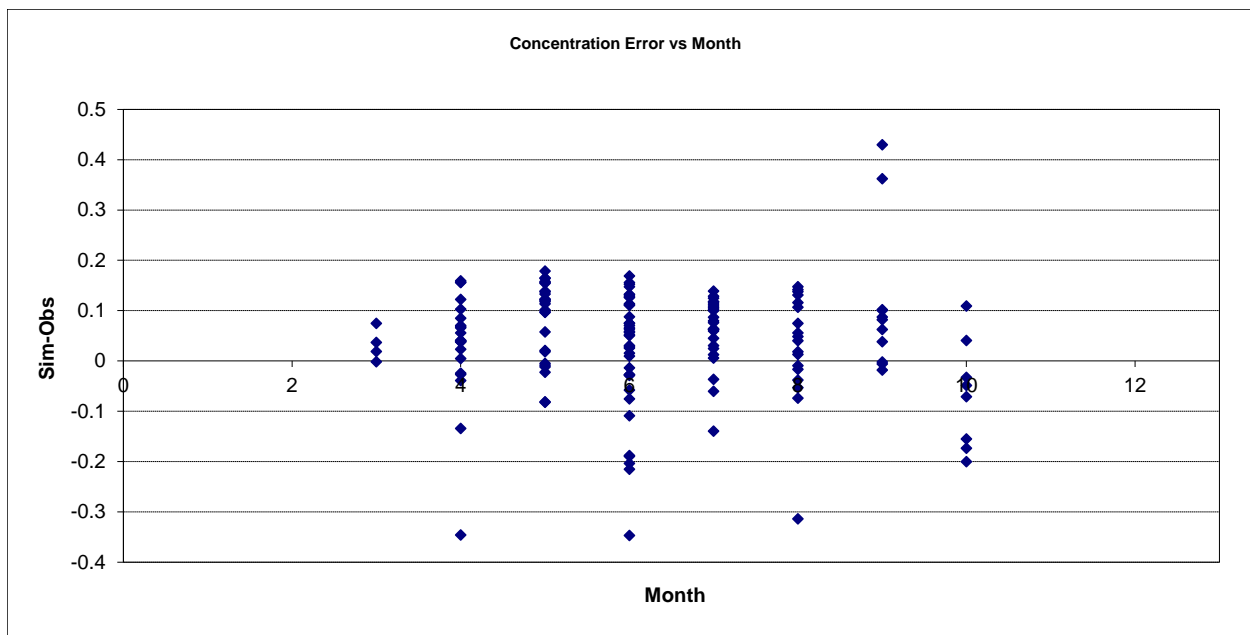


Figure 71. Residual (Simulated - Observed) vs. Month Total Phosphorus (TP) at Beaver Creek near Currie

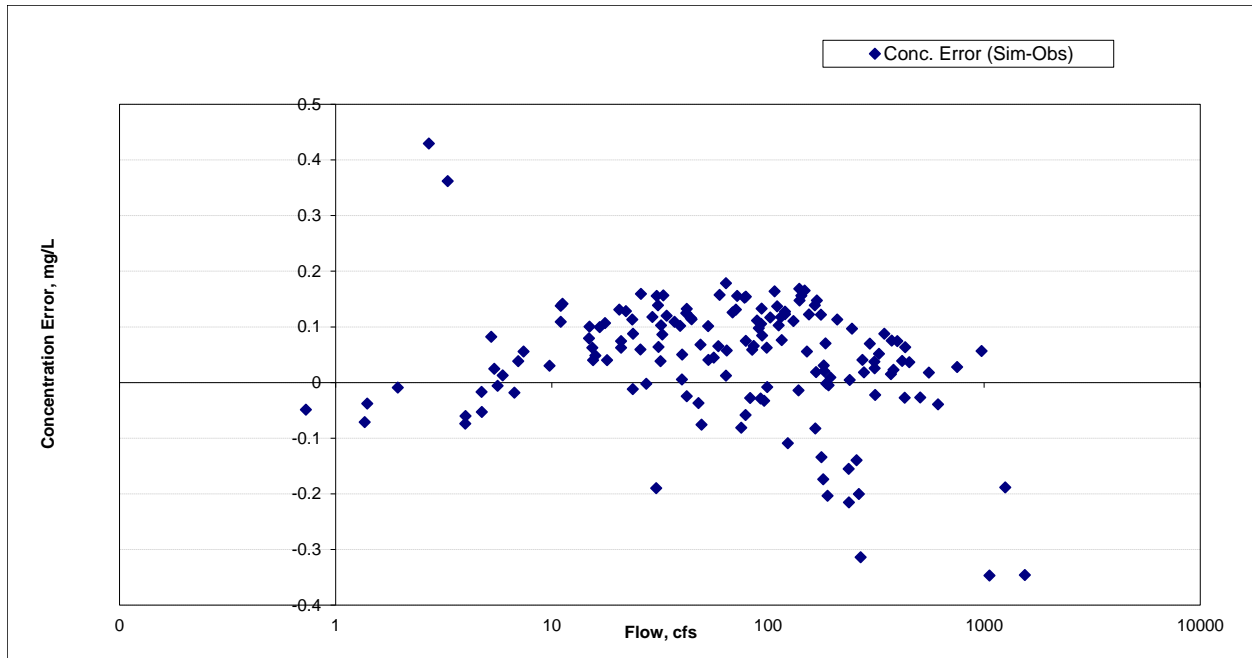


Figure 72. Residual (Simulated - Observed) vs. Flow Total Phosphorus (TP) at Beaver Creek near Currie

Lake Shetek Outlet near Currie (S002-006)

Total Suspended Solids (TSS)

Table 10. Total Suspended Solids (TSS) statistics

Period	2000-2014
Count	89
Concentration Average Error	27.04%
Concentration Median Error	10.79%
Load Average Error	80.07%
Load Median Error	4.39%
Paired t concentration	0.23

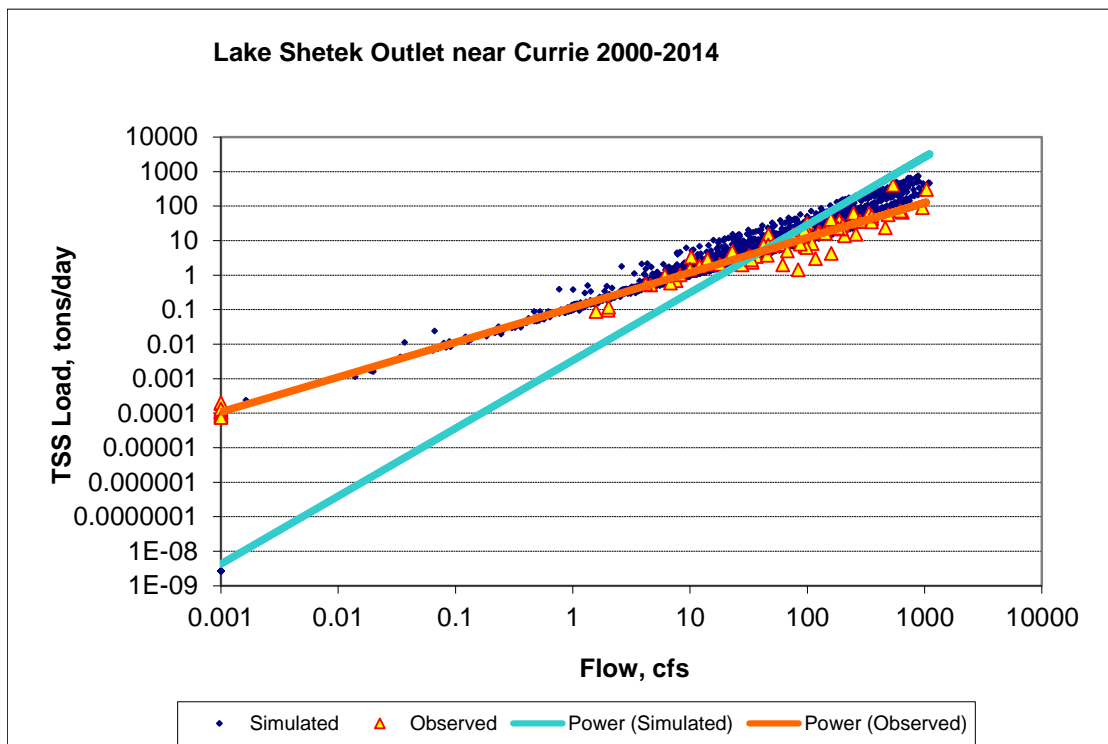


Figure 73. Power plot of simulated and observed Total Suspended Solids (TSS) load vs flow at Lake Shetek Outlet near Currie (calibration period)

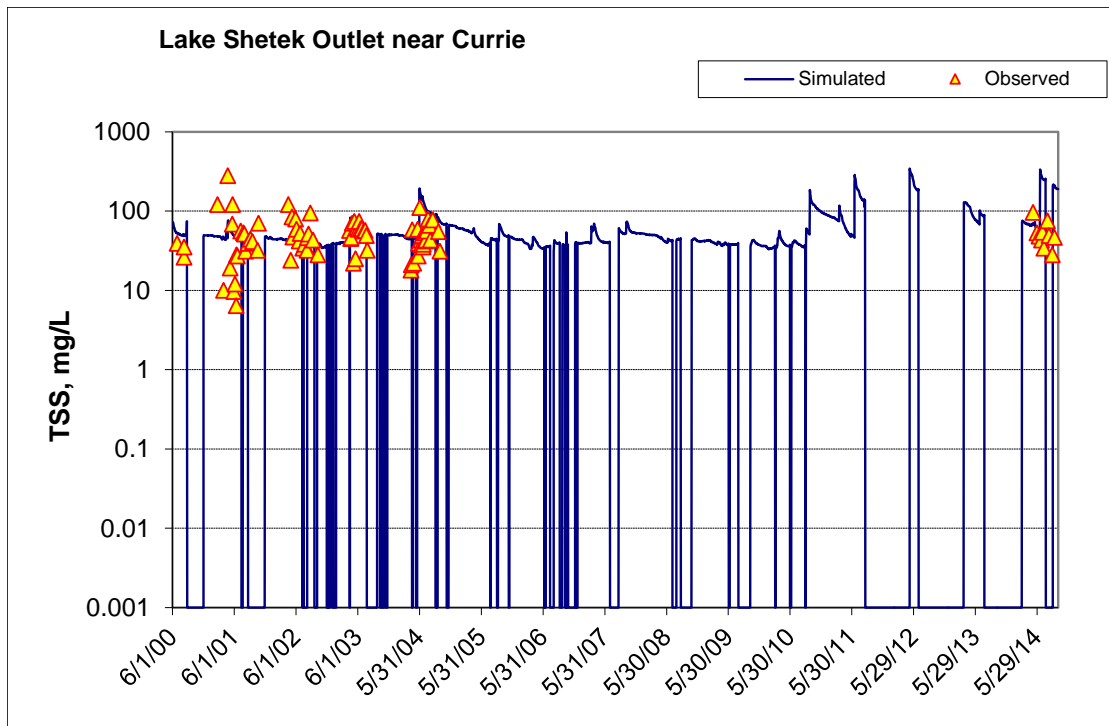


Figure 74. Time series of observed and simulated Total Suspended Solids (TSS) concentration at Lake Shetek Outlet near Currie (calibration period)

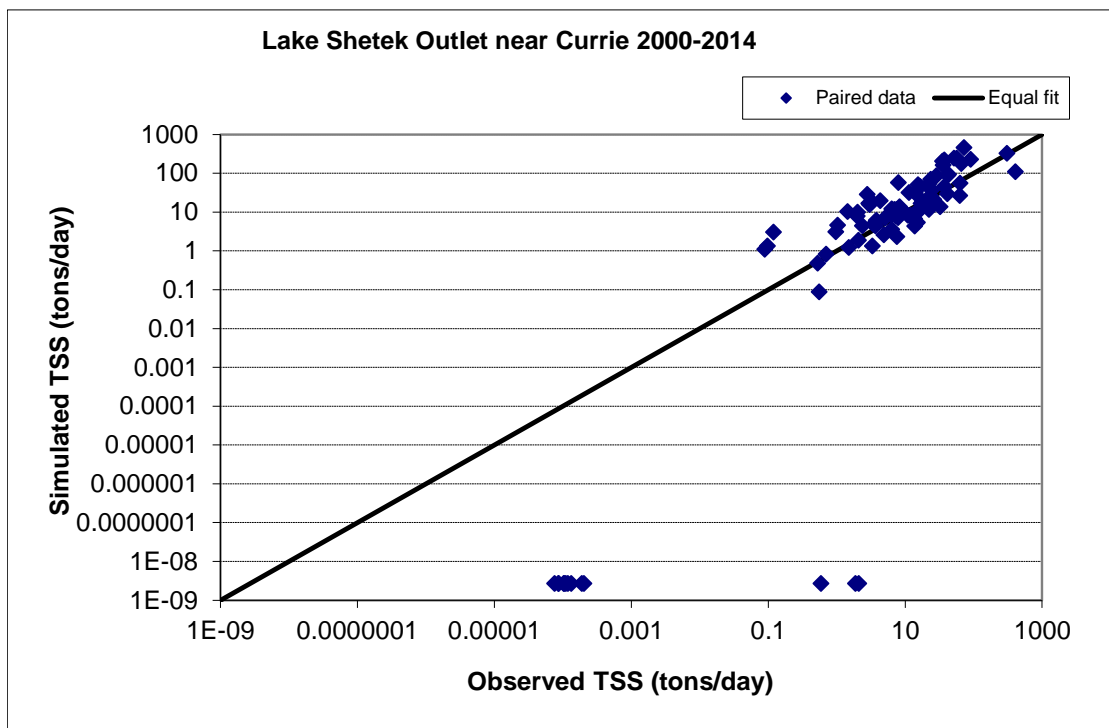


Figure 75. Paired simulated vs. observed Total Suspended Solids (TSS) load at Lake Shetek Outlet near Currie (calibration period)

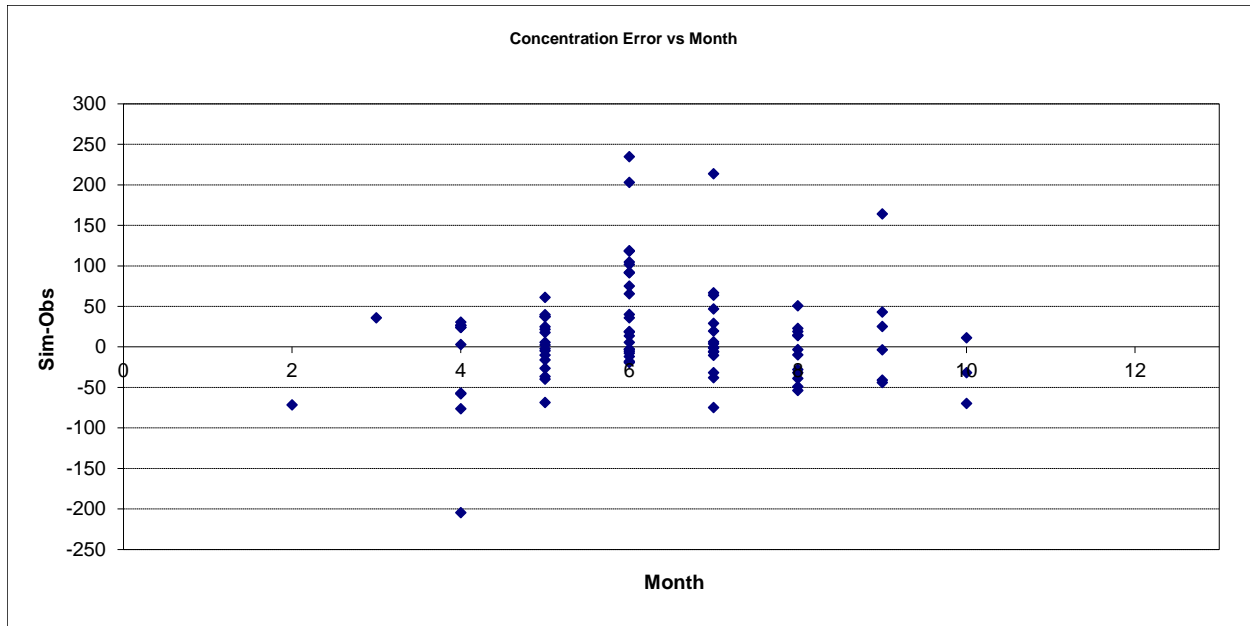


Figure 76. Residual (Simulated - Observed) vs. Month Total Suspended Solids (TSS) at Lake Shetek Outlet near Currie

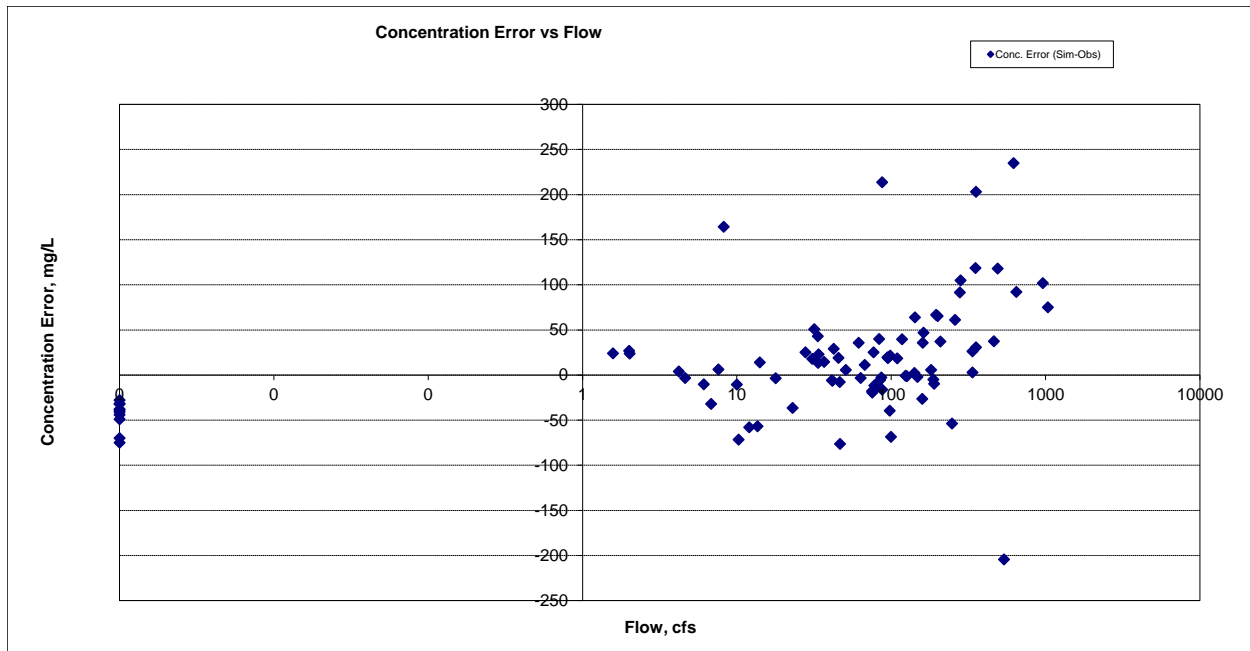


Figure 77. Residual (Simulated - Observed) vs. Flow Total Suspended Solids (TSS) at Lake Shetek Outlet near Currie

Ammonia Nitrogen (NH₃)

Table 11. Ammonia Nitrogen (NH₃) statistics

Period	2000-2014
Count	54
Concentration Average Error	-21.26%
Concentration Median Error	-10.66%
Load Average Error	9.51%
Load Median Error	0.00%
Paired t concentration	0.47

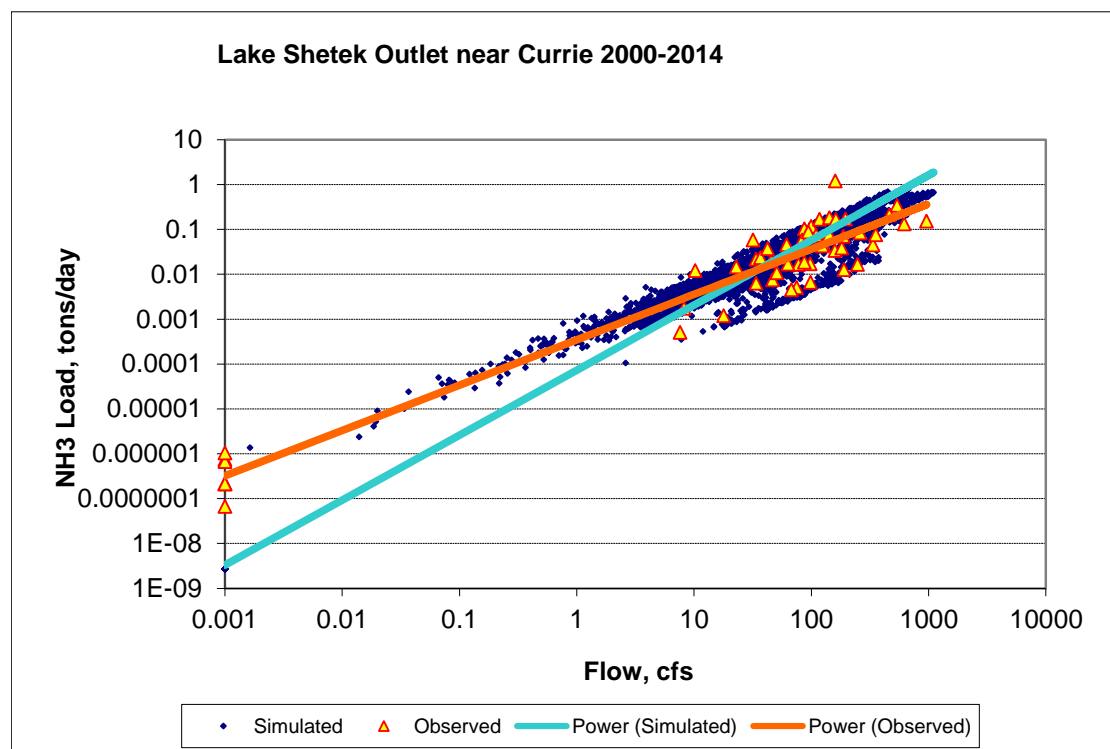


Figure 78. Power plot of simulated and observed Ammonia Nitrogen (NH₃) load vs flow at Lake Shetek Outlet near Currie (calibration period)

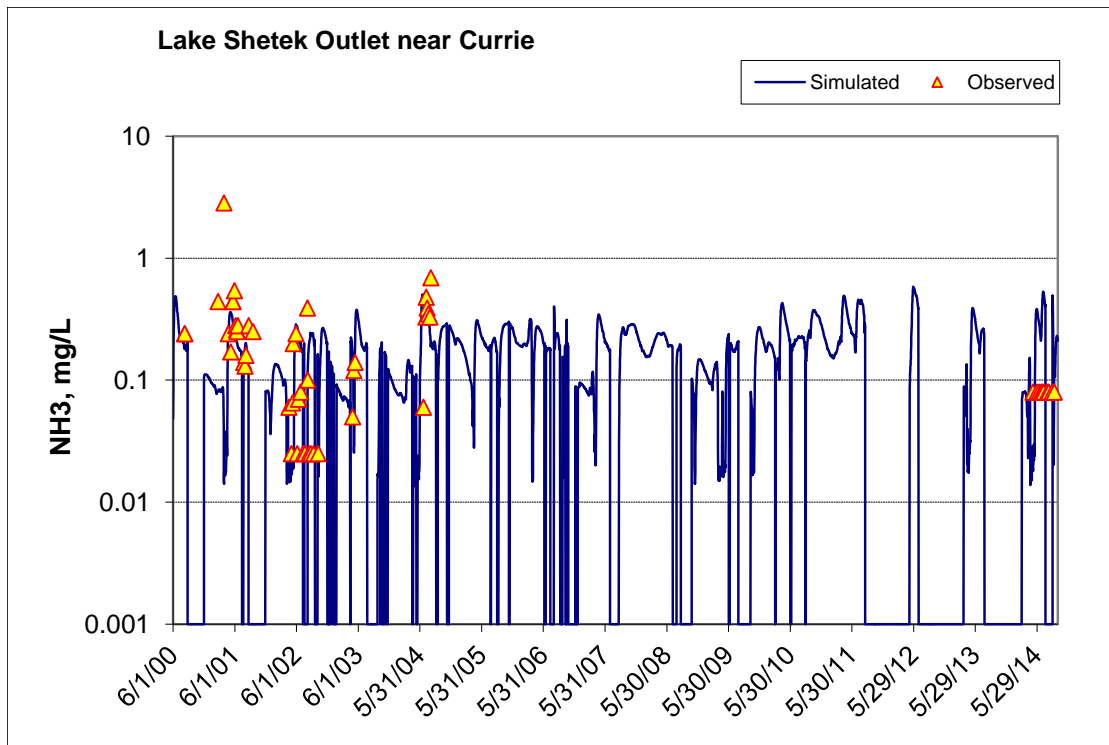


Figure 79. Time series of observed and simulated Ammonia Nitrogen (NH₃) concentration at Lake Shetek Outlet near Currie (calibration period)

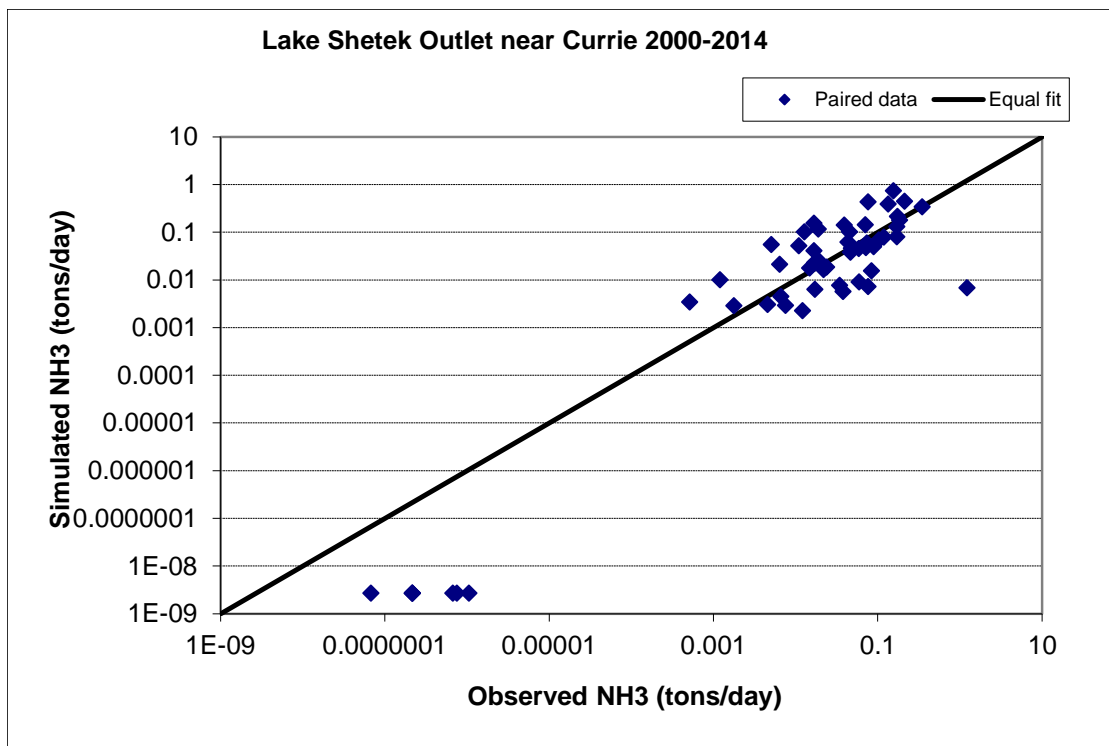


Figure 80. Paired simulated vs. observed Ammonia Nitrogen (NH₃) load at Lake Shetek Outlet near Currie (calibration period)

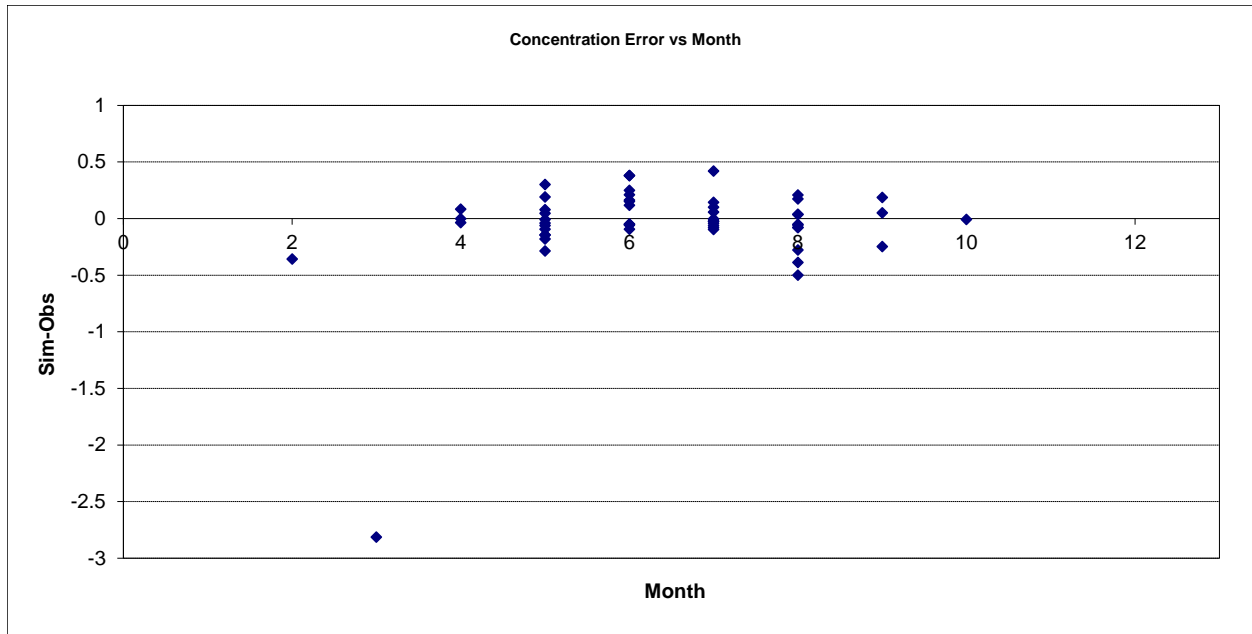


Figure 81. Residual (Simulated - Observed) vs. Month Ammonia Nitrogen (NH3) at Lake Shetek Outlet near Currie

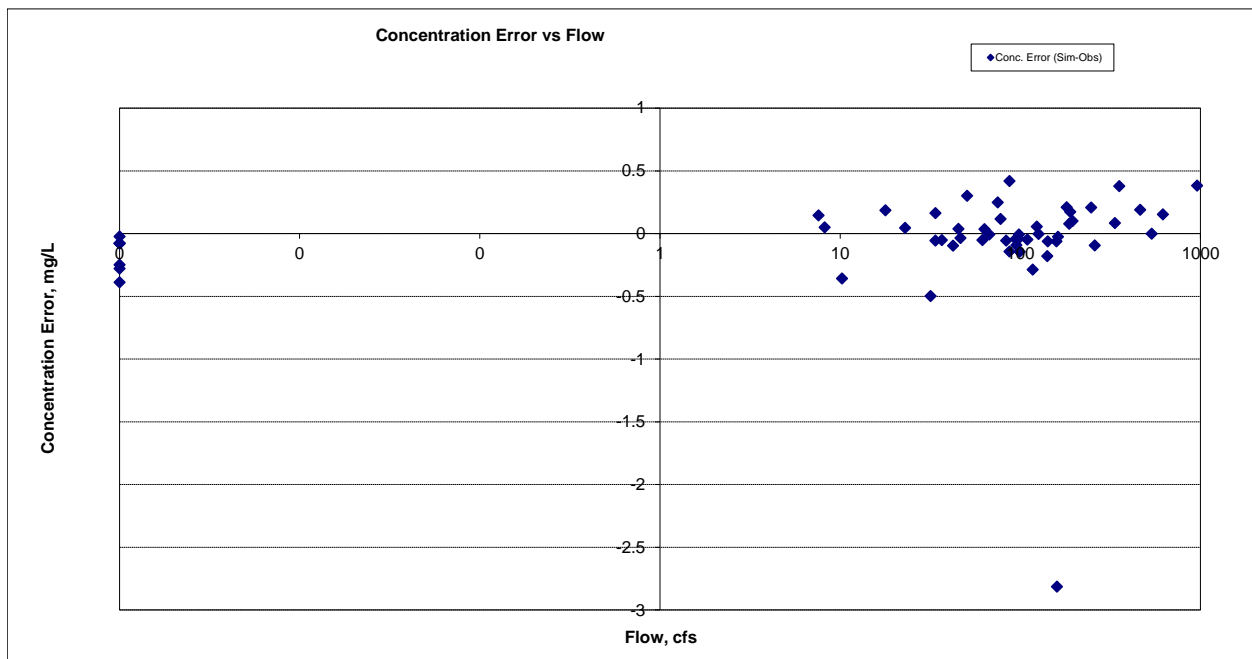


Figure 82. Residual (Simulated - Observed) vs. Flow Ammonia Nitrogen (NH3) at Lake Shetek Outlet near Currie

Organic Nitrogen (OrgN)

Table 12. Organic Nitrogen (OrgN) statistics

Period	2000-2014
Count	54
Concentration Average Error	-13.09%
Concentration Median Error	-1.91%
Load Average Error	-3.08%
Load Median Error	0.00%
Paired t concentration	0.92

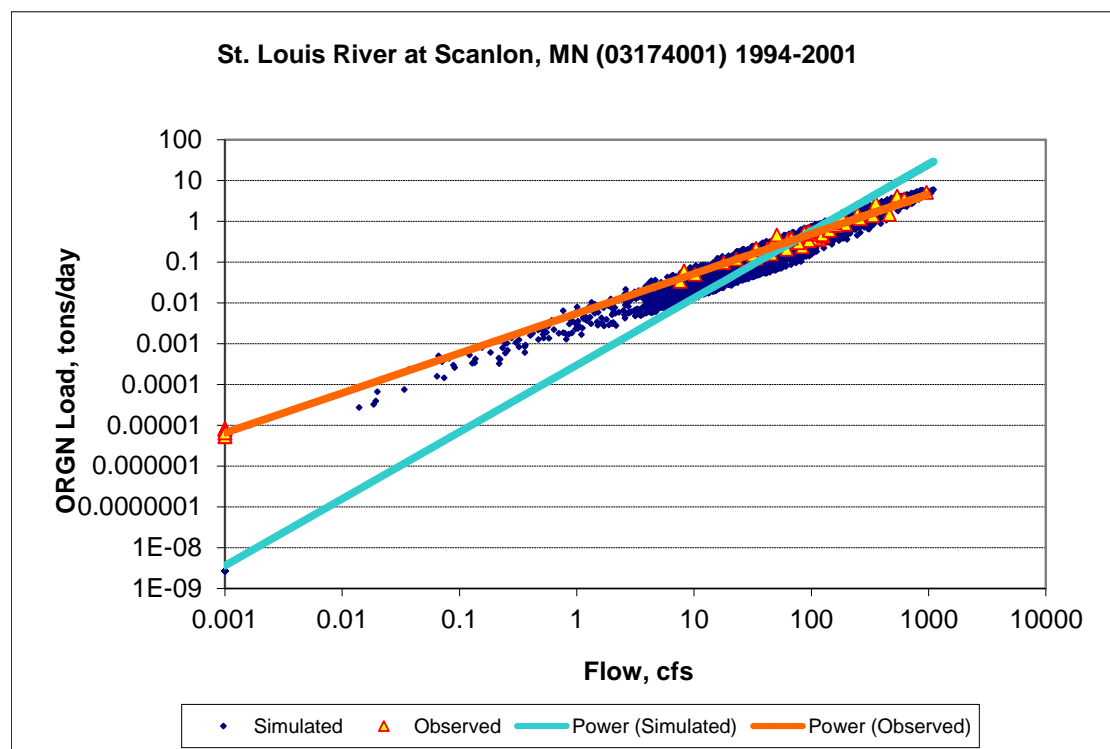


Figure 83. Power plot of simulated and observed Organic Nitrogen (OrgN) load vs flow at Lake Shetek Outlet near Currie (calibration period)

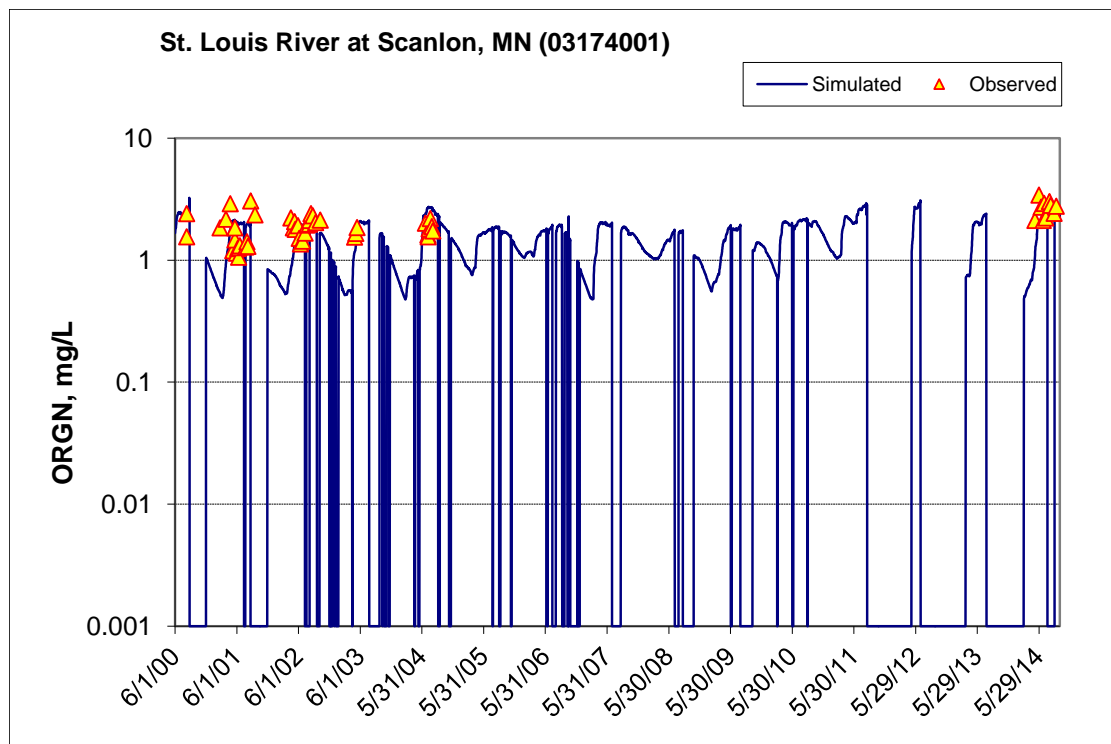


Figure 84. Time series of observed and simulated Organic Nitrogen (OrgN) concentration at Lake Shetek Outlet near Currie (calibration period)

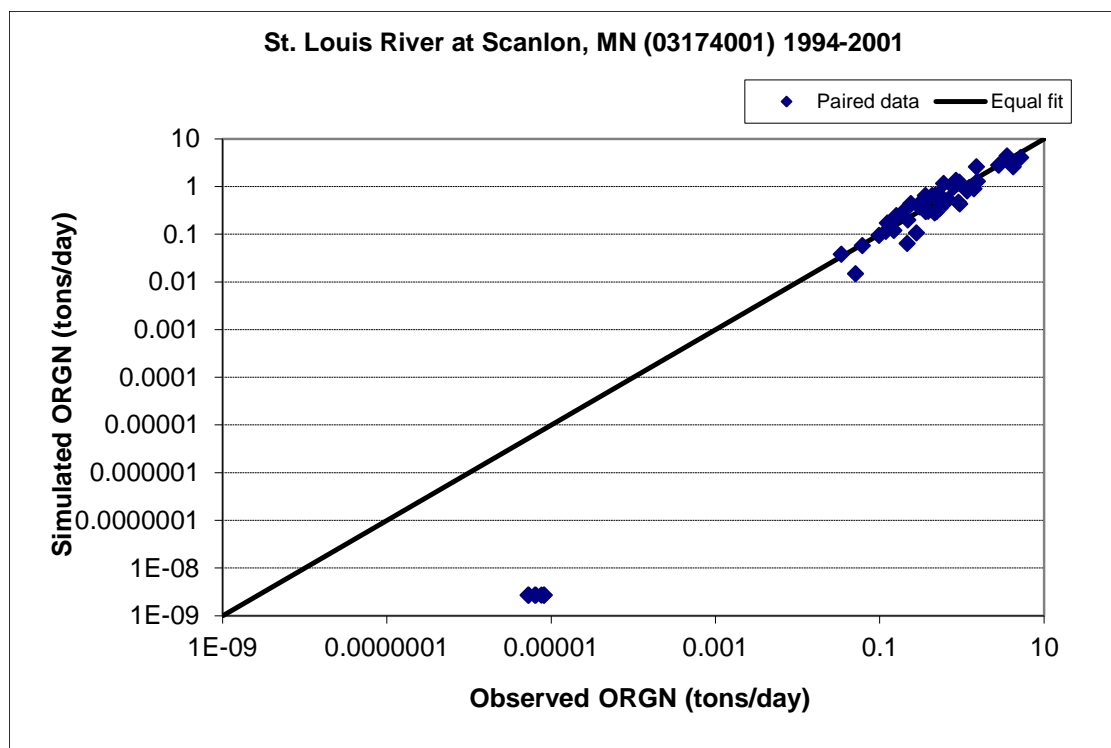


Figure 85. Paired simulated vs. observed Organic Nitrogen (OrgN) load at Lake Shetek Outlet near Currie (calibration period)

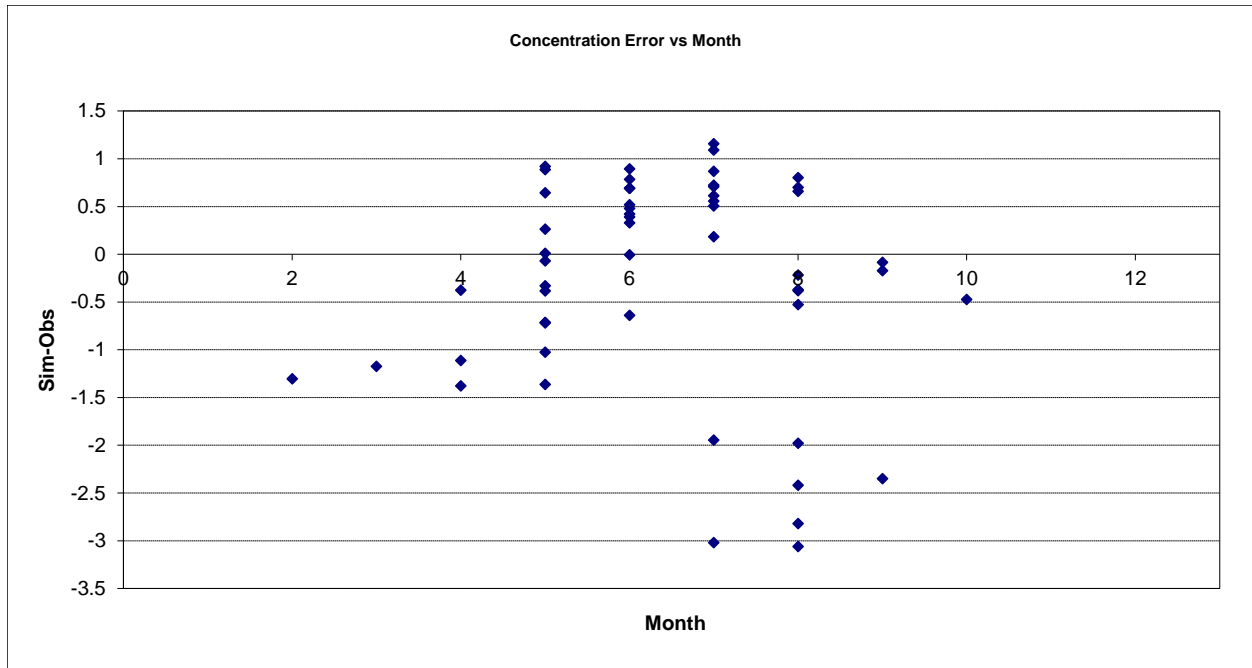


Figure 86. Residual (Simulated - Observed) vs. Month Organic Nitrogen (OrgN) at Lake Shetek Outlet near Currie

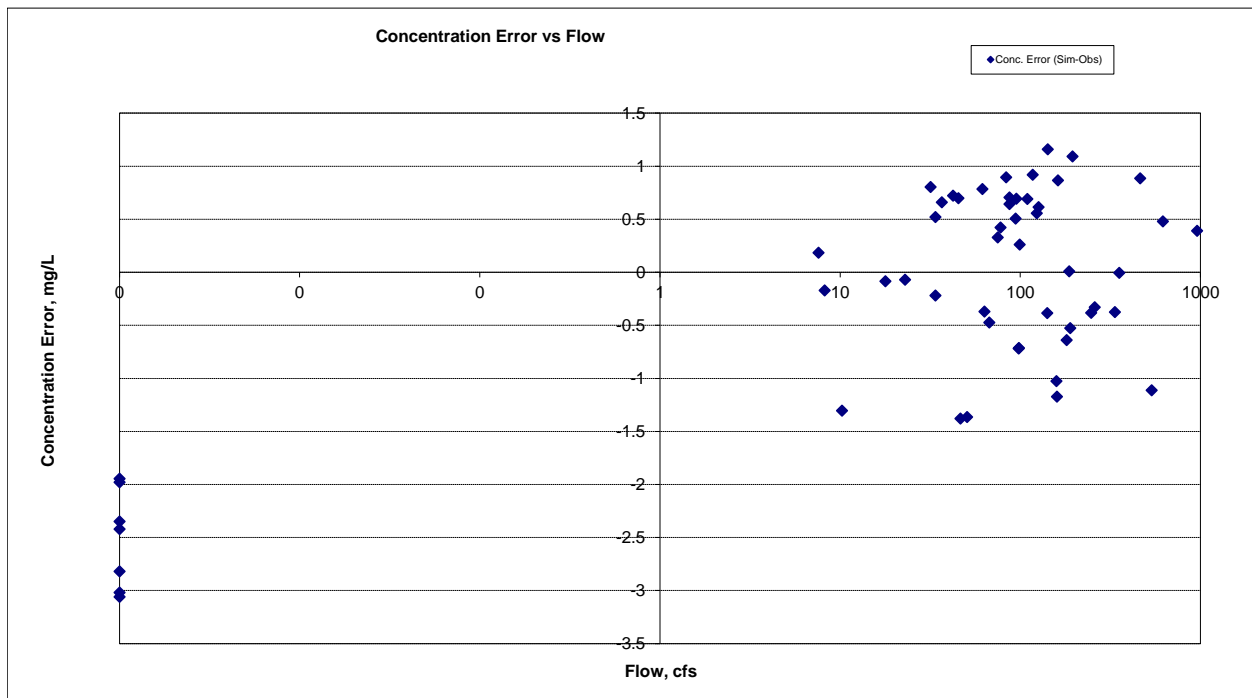


Figure 87. Residual (Simulated - Observed) vs. Flow Organic Nitrogen (OrgN) at Lake Shetek Outlet near Currie

Total Kjeldahl Nitrogen (TKN)

Table 13. Total Kjeldahl Nitrogen (TKN) statistics

Period	2000-2014
Count	89
Concentration Average Error	-18.67%
Concentration Median Error	-4.76%
Load Average Error	6.44%
Load Median Error	0.00%
Paired t concentration	0.63

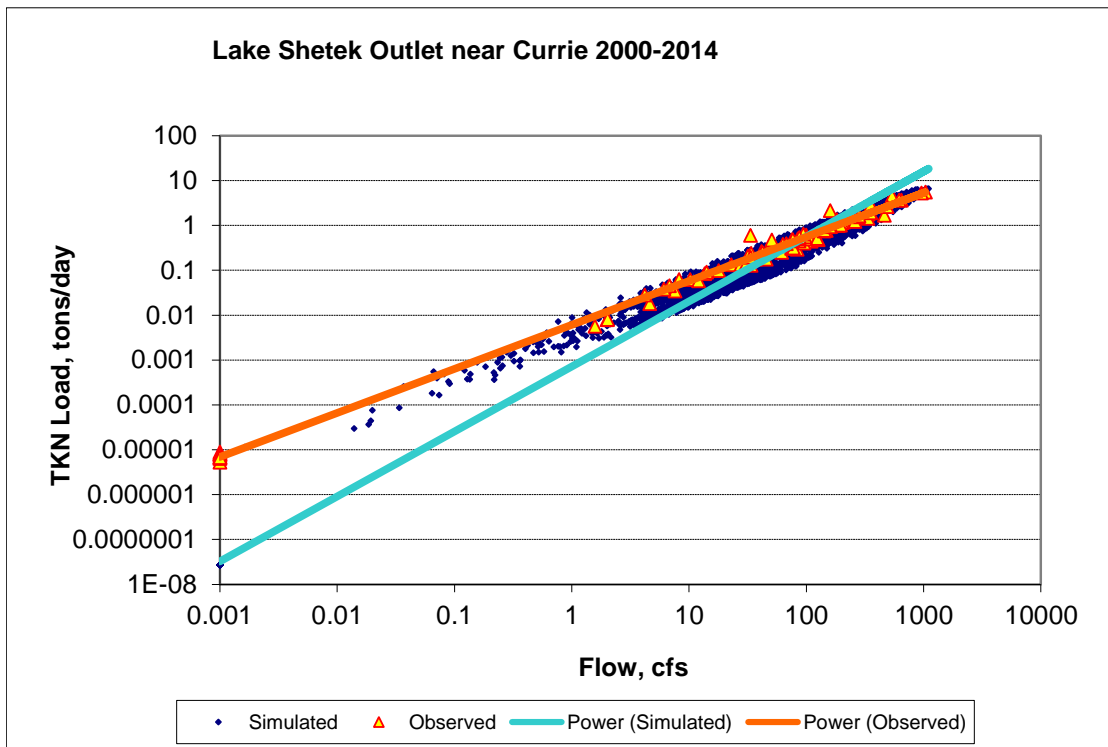


Figure 88. Power plot of simulated and observed Total Kjeldahl Nitrogen (TKN) load vs flow at Lake Shetek Outlet near Currie (calibration period)

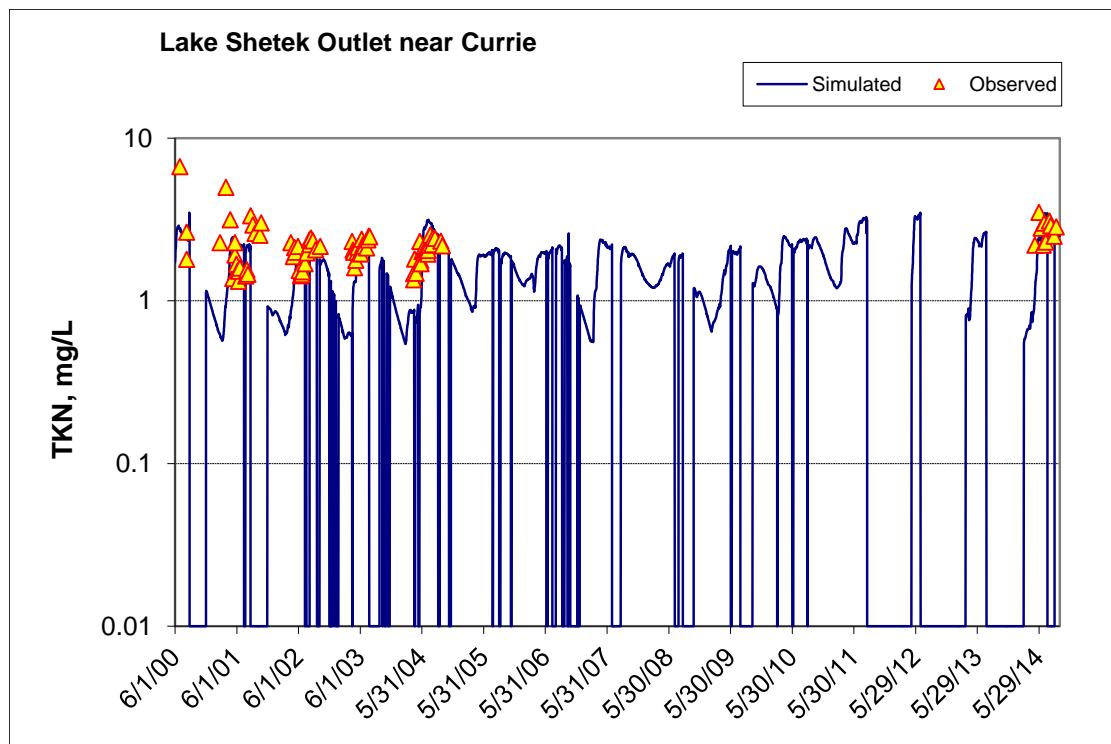


Figure 89. Time series of observed and simulated Total Kjeldahl Nitrogen (TKN) concentration at Lake Shetek Outlet near Currie (validation period)

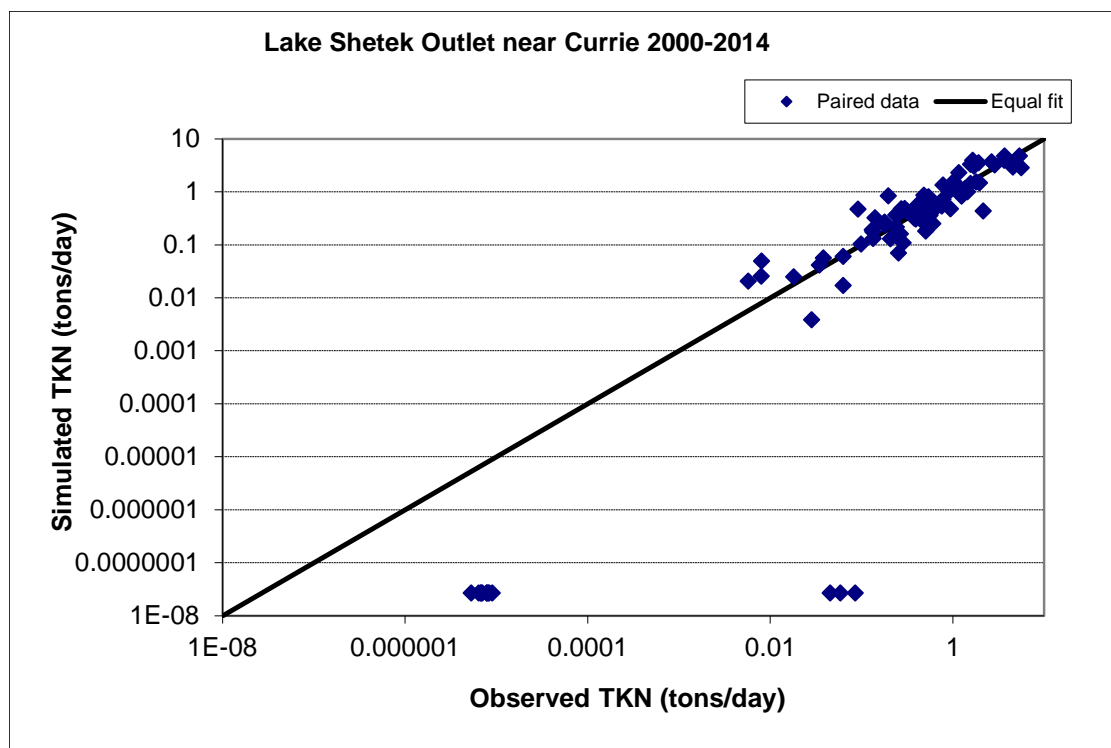


Figure 90. Paired simulated vs. observed Total Kjeldahl Nitrogen (TKN) load at Lake Shetek Outlet near Currie (validation period)

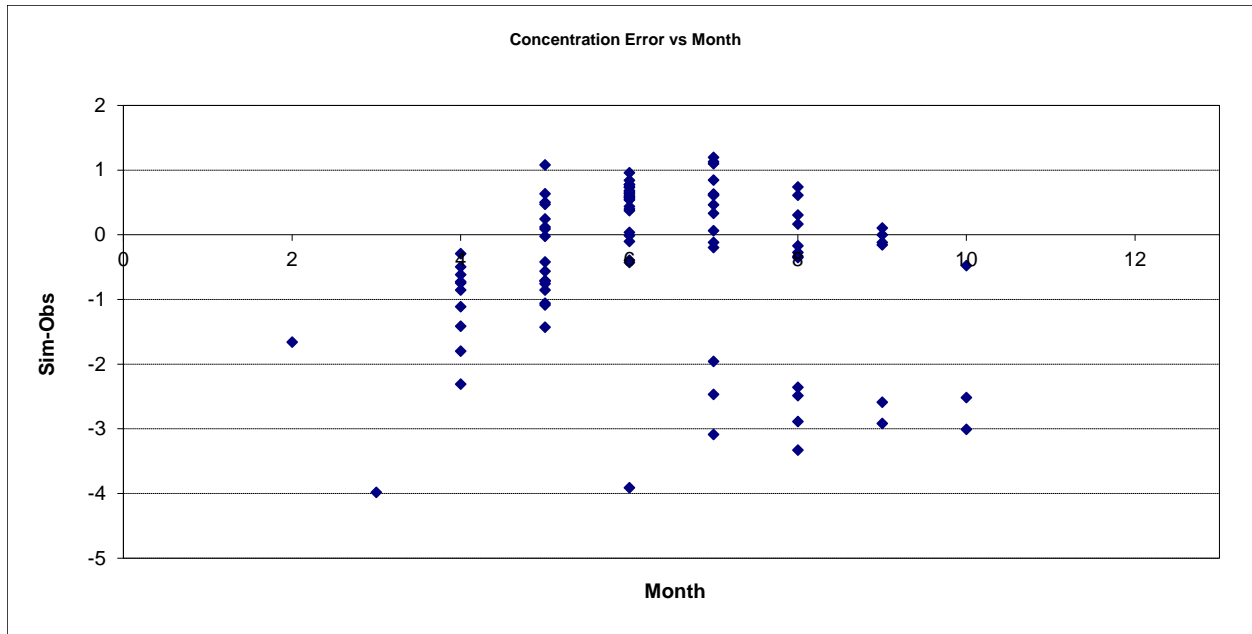


Figure 91. Residual (Simulated - Observed) vs. Month Total Kjeldahl Nitrogen (TKN) at Lake Shetek Outlet near Currie

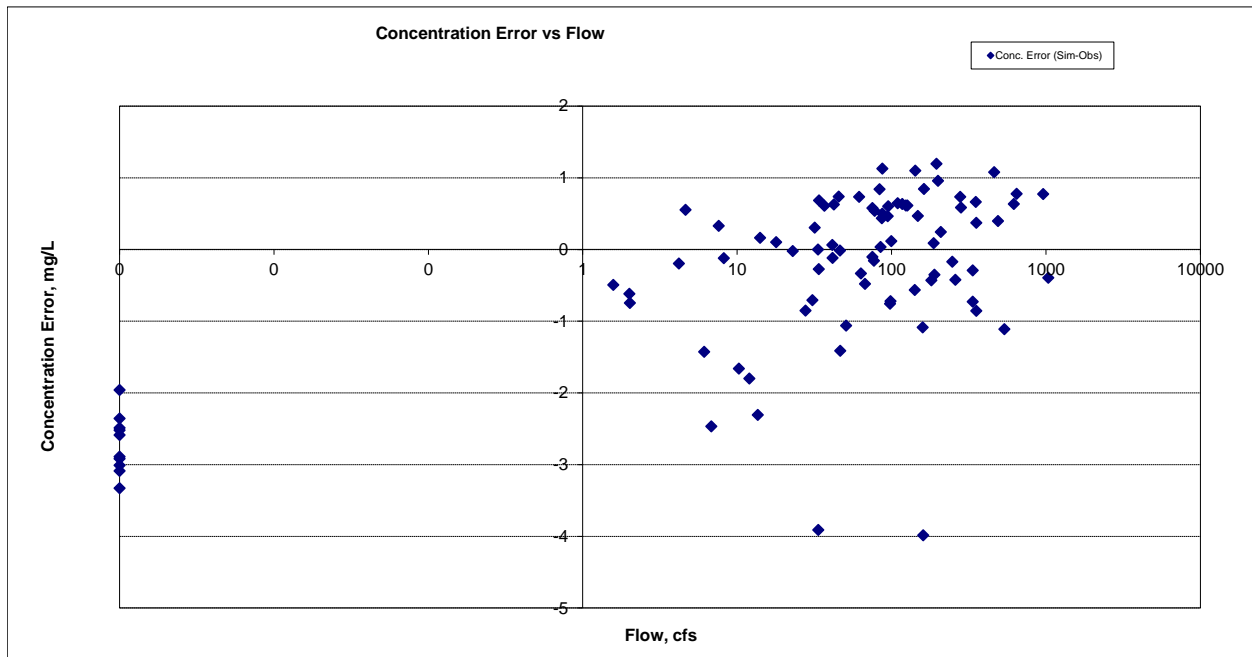


Figure 92. Residual (Simulated - Observed) vs. Flow Total Kjeldahl Nitrogen (TKN) at Lake Shetek Outlet near Currie

Nitrite+ Nitrate Nitrogen (NOx)

Table 14. Nitrite+ Nitrate Nitrogen (NOx) statistics

Period	2000-2014
Count	62
Concentration Average Error	-16.08%
Concentration Median Error	-3.59%
Load Average Error	12.16%
Load Median Error	0.00%
Paired t concentration	0.59

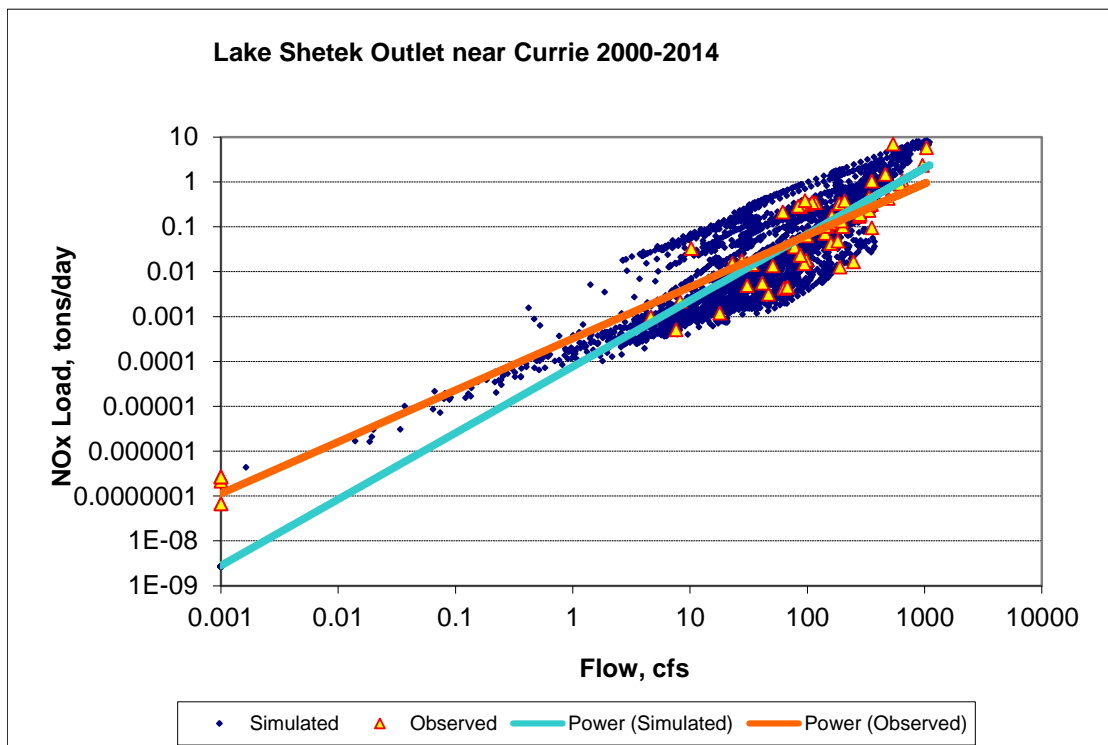


Figure 93. Power plot of simulated and observed Nitrite+ Nitrate Nitrogen (NOx) load vs flow at Lake Shetek Outlet near Currie (validation period)

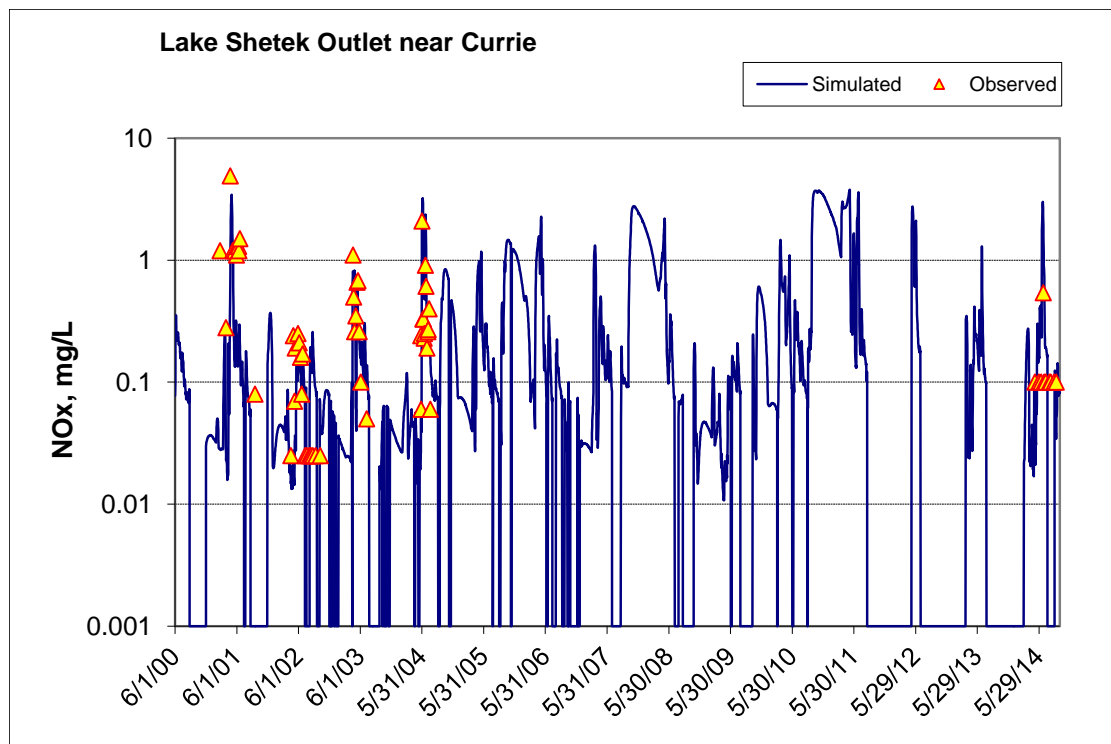


Figure 94. Time series of observed and simulated Nitrite+ Nitrate Nitrogen (NOx) concentration at Lake Shetek Outlet near Currie (validation period)

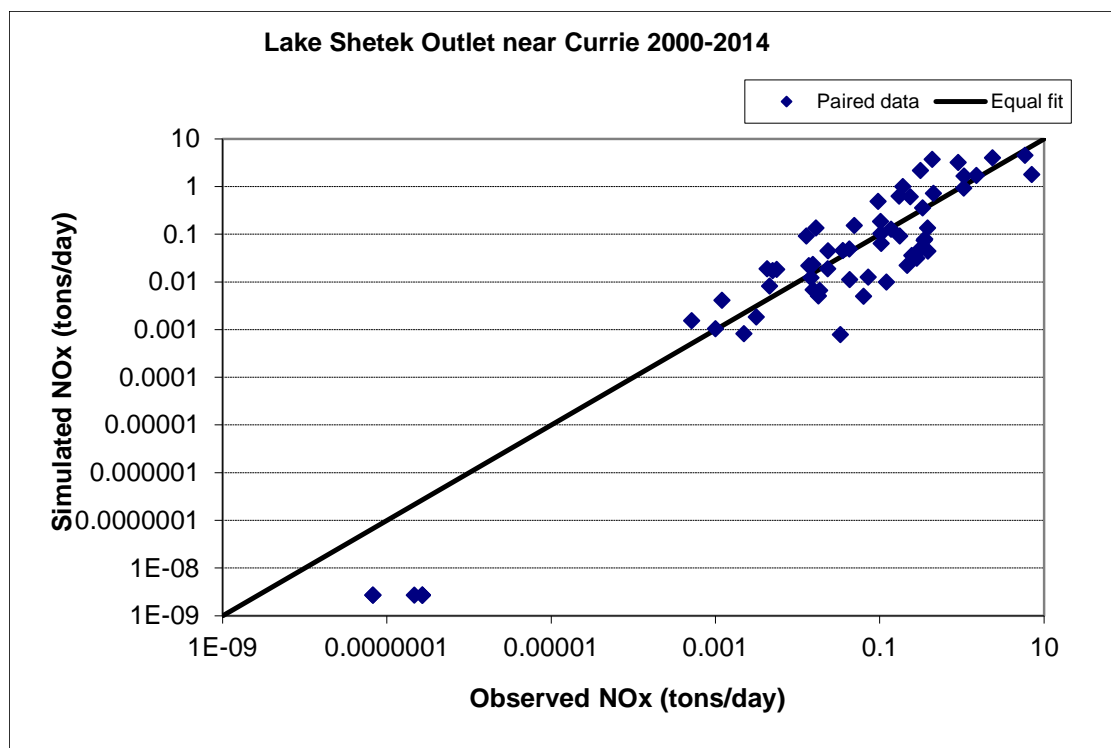


Figure 95. Paired simulated vs. observed Nitrite+ Nitrate Nitrogen (NOx) load at Lake Shetek Outlet near Currie (validation period)

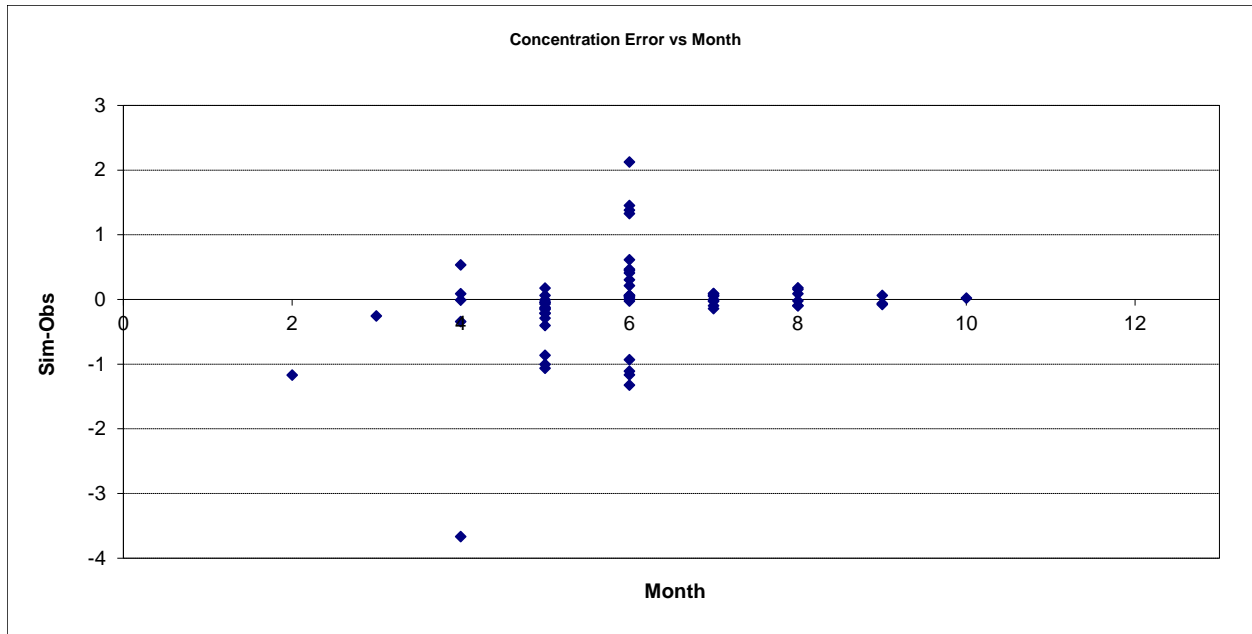


Figure 96. Residual (Simulated - Observed) vs. Month Nitrite+ Nitrate Nitrogen (NOx) at Lake Shetek Outlet near Currie

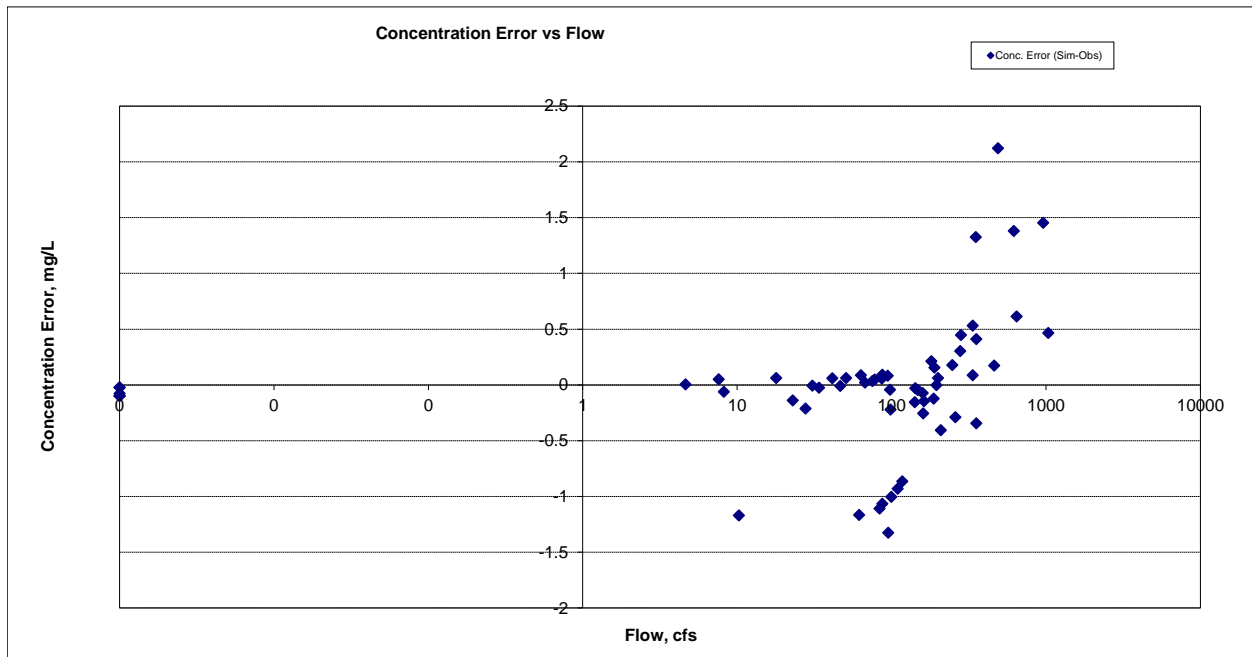


Figure 97. Residual (Simulated - Observed) vs. Flow Nitrite+ Nitrate Nitrogen (NOx) at Lake Shetek Outlet near Currie

Total Nitrogen (TN)

Table 15. Total Nitrogen (TN) statistics

Period	2000-2014
Count	62
Concentration Average Error	-11.57%
Concentration Median Error	-7.24%
Load Average Error	7.44%
Load Median Error	0.00%
Paired t concentration	0.94

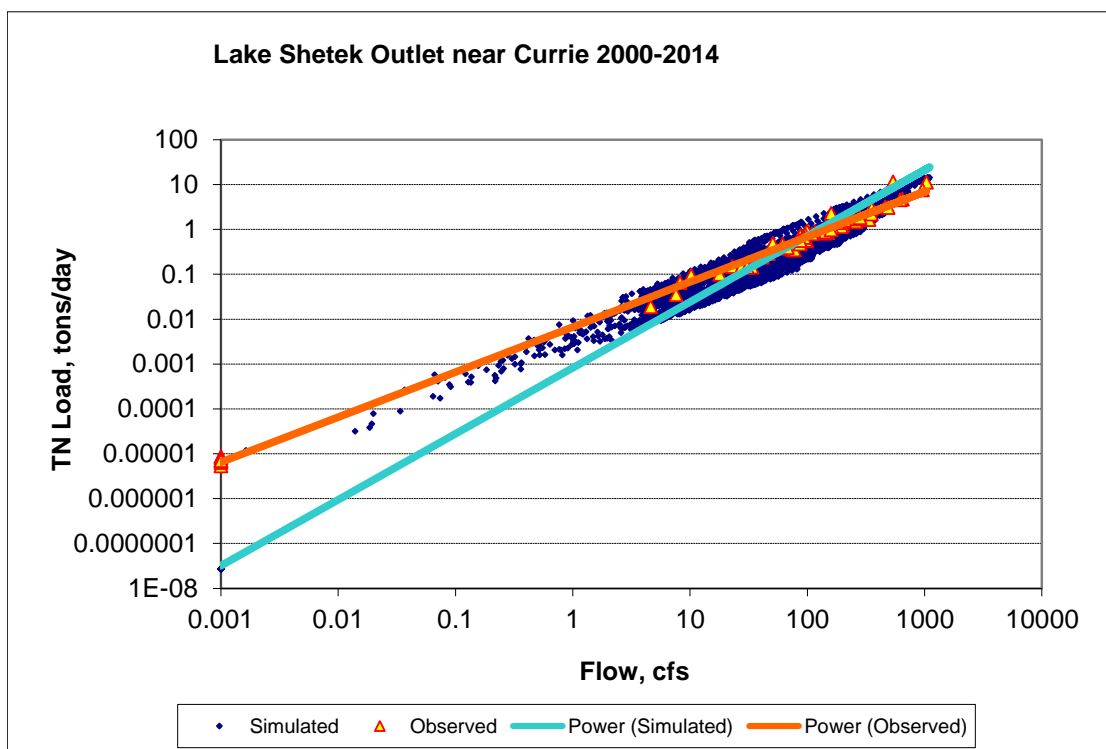


Figure 98. Power plot of simulated and observed Total Nitrogen (TN) load vs flow at Lake Shetek Outlet near Currie (validation period)

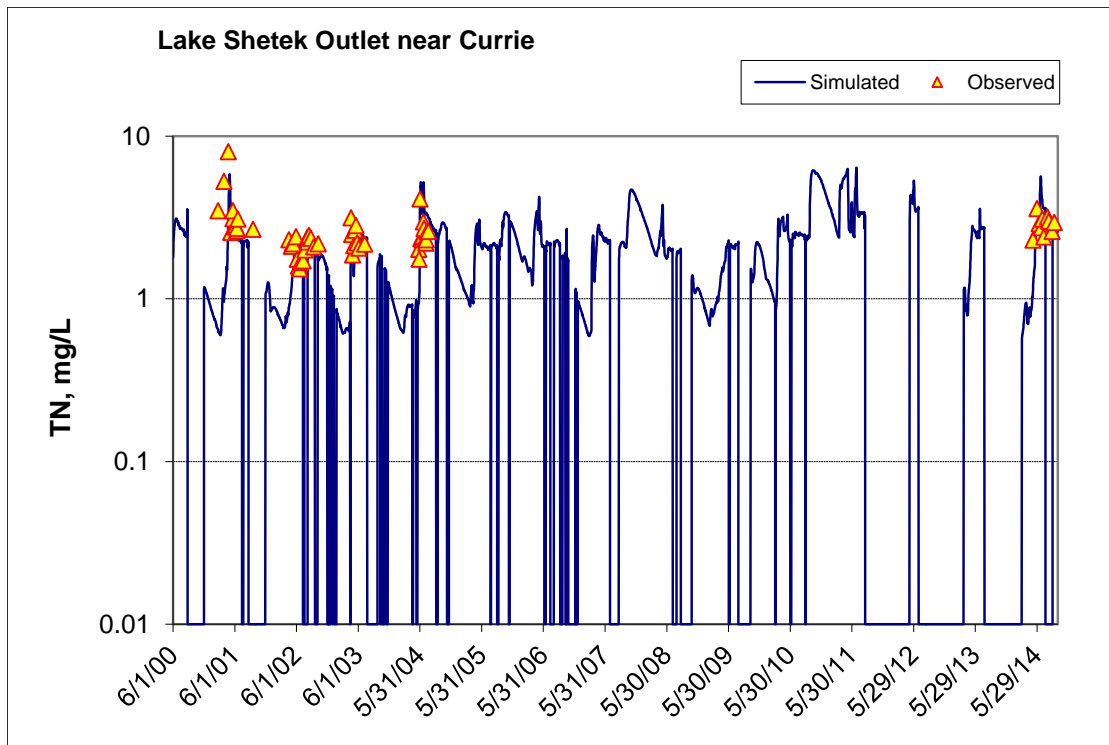


Figure 99. Time series of observed and simulated Total Nitrogen (TN) concentration at Lake Shetek Outlet near Currie (validation period)

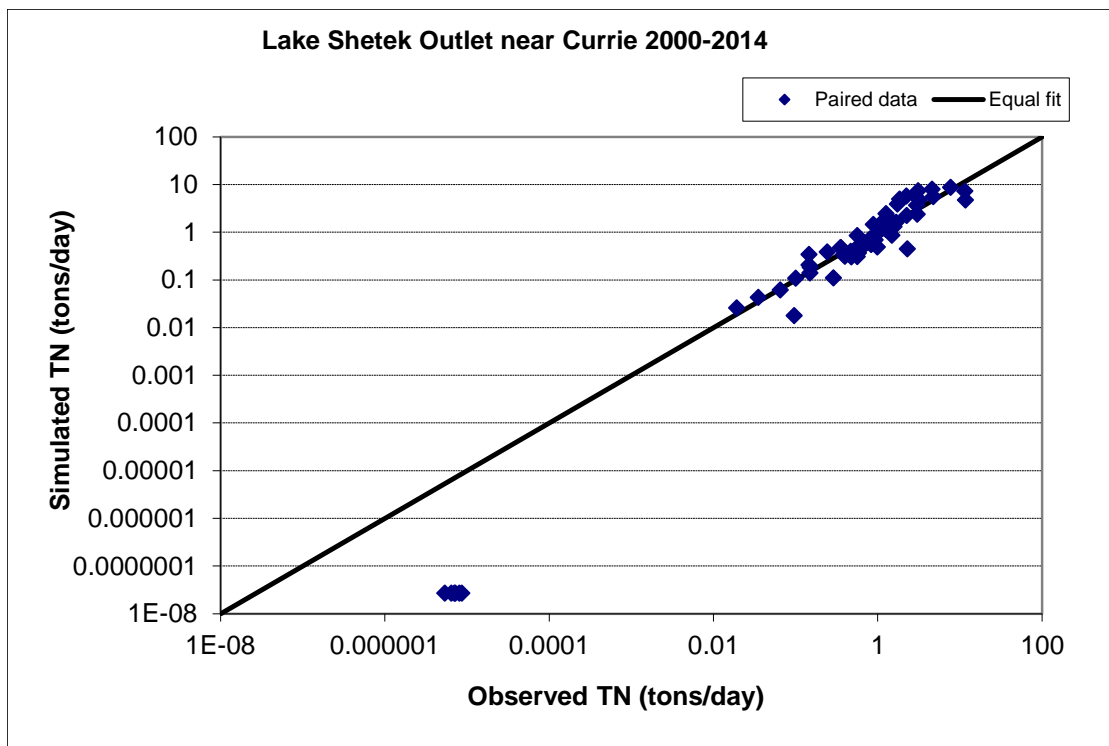


Figure 100. Paired simulated vs. observed Total Nitrogen (TN) load at Lake Shetek Outlet near Currie (validation period)

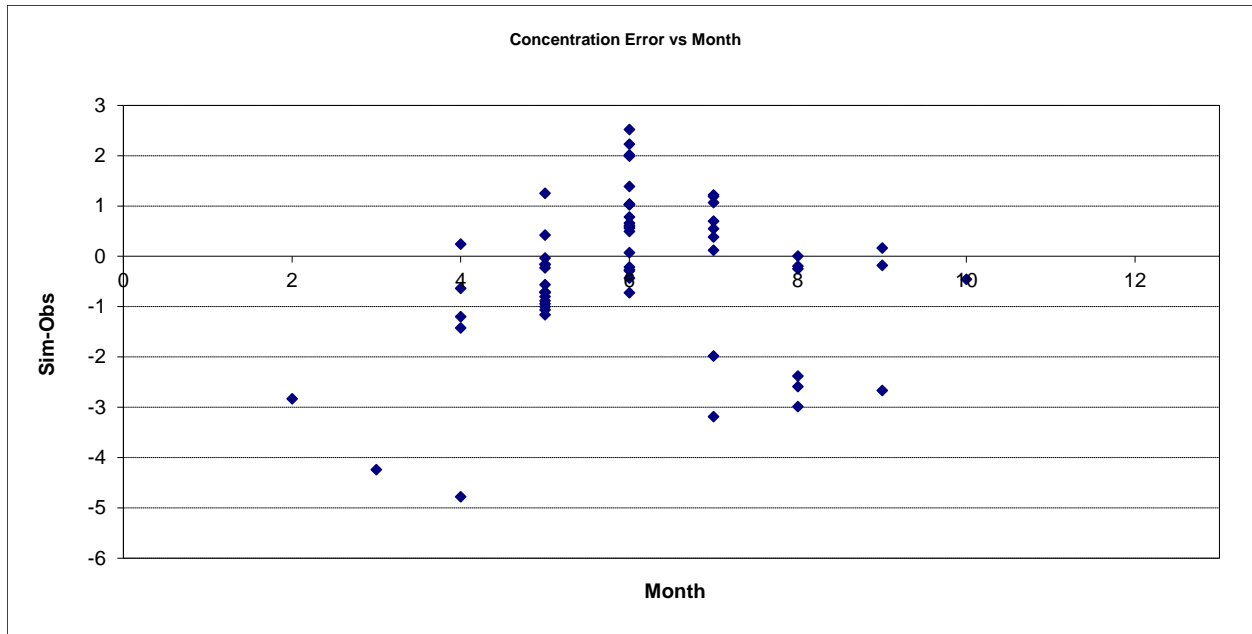


Figure 101. Residual (Simulated - Observed) vs. Month Total Nitrogen (TN) at Lake Shetek Outlet near Currie

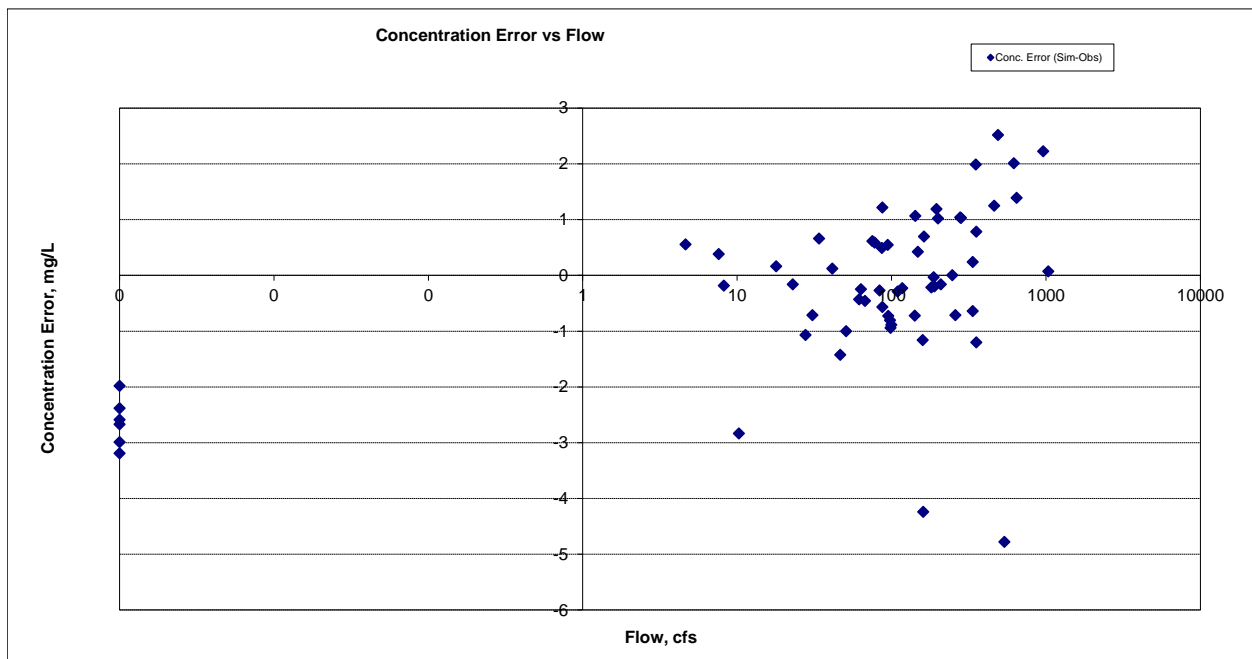


Figure 102. Residual (Simulated - Observed) vs. Flow Total Nitrogen (TN) at Lake Shetek Outlet near Currie

Soluble Reactive Phosphorus (SRP)

Table 16. Soluble Reactive Phosphorus (SRP) statistics

Period	2000-2014
Count	62
Concentration Average Error	-12.79%
Concentration Median Error	-27.96%
Load Average Error	-3.39%
Load Median Error	-5.78%
Paired t concentration	0.61

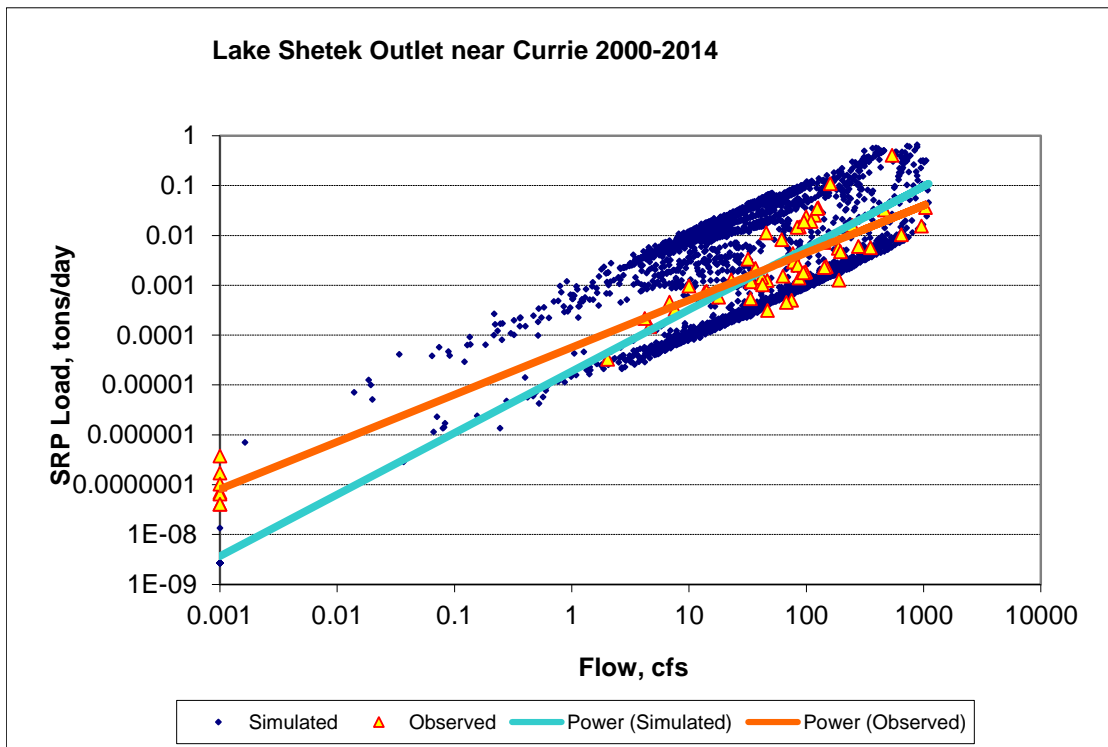


Figure 103. Power plot of simulated and observed Soluble Reactive Phosphorus (SRP) load vs flow at Lake Shetek Outlet near Currie (validation period)

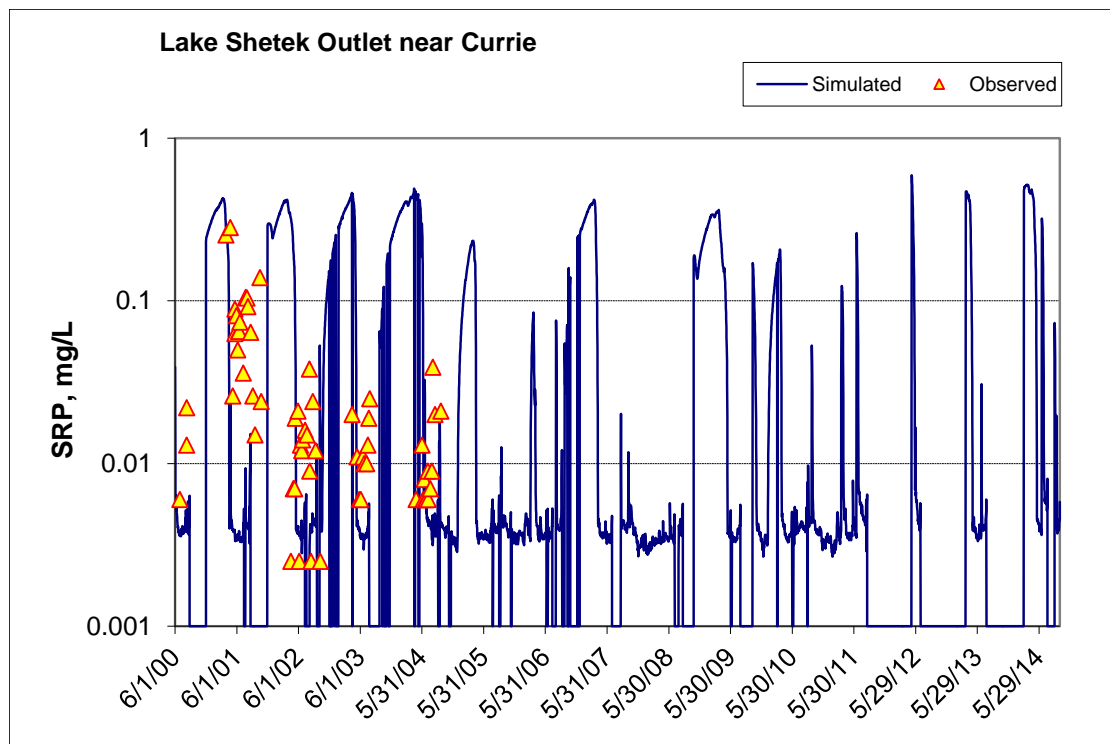


Figure 104. Time series of observed and simulated Soluble Reactive Phosphorus (SRP) concentration at Lake Shetek Outlet near Currie (validation period)

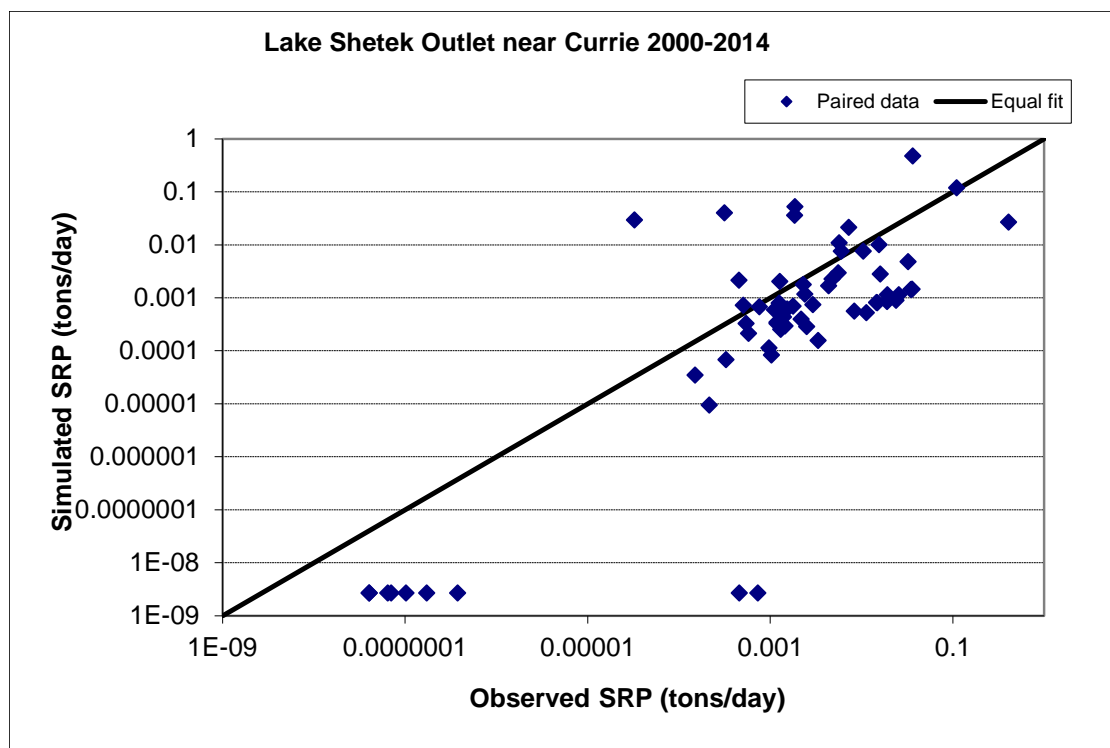


Figure 105. Paired simulated vs. observed Soluble Reactive Phosphorus (SRP) load at Lake Shetek Outlet near Currie (validation period)

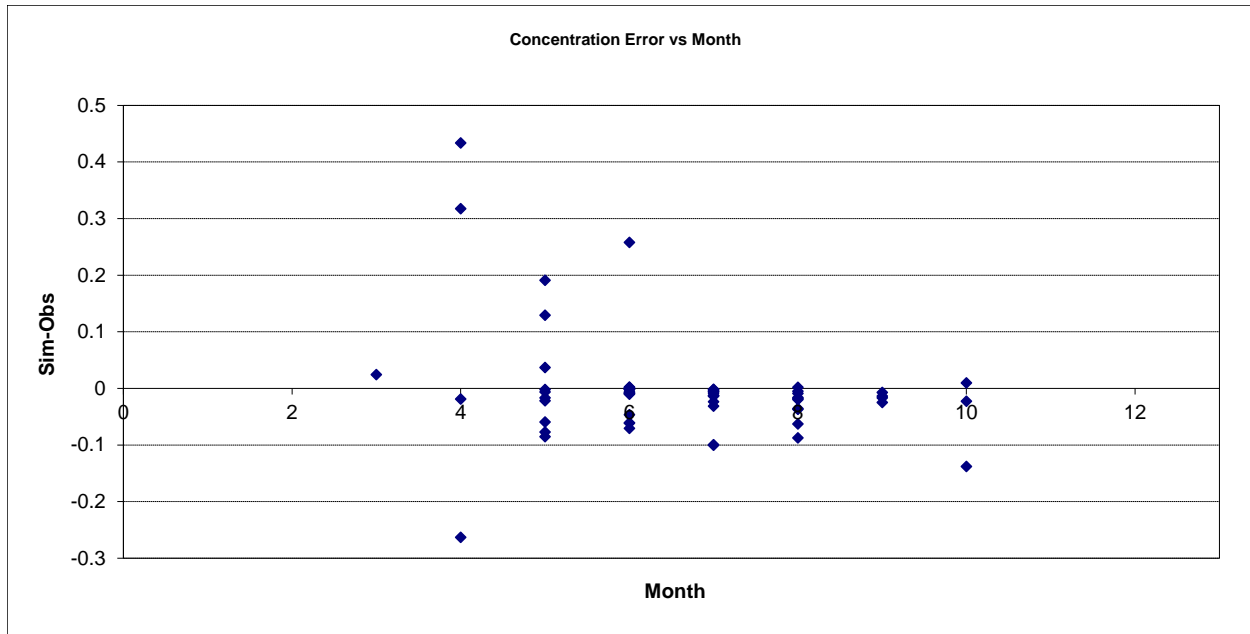


Figure 106. Residual (Simulated - Observed) vs. Month Soluble Reactive Phosphorus (SRP) at Lake Shetek Outlet near Currie

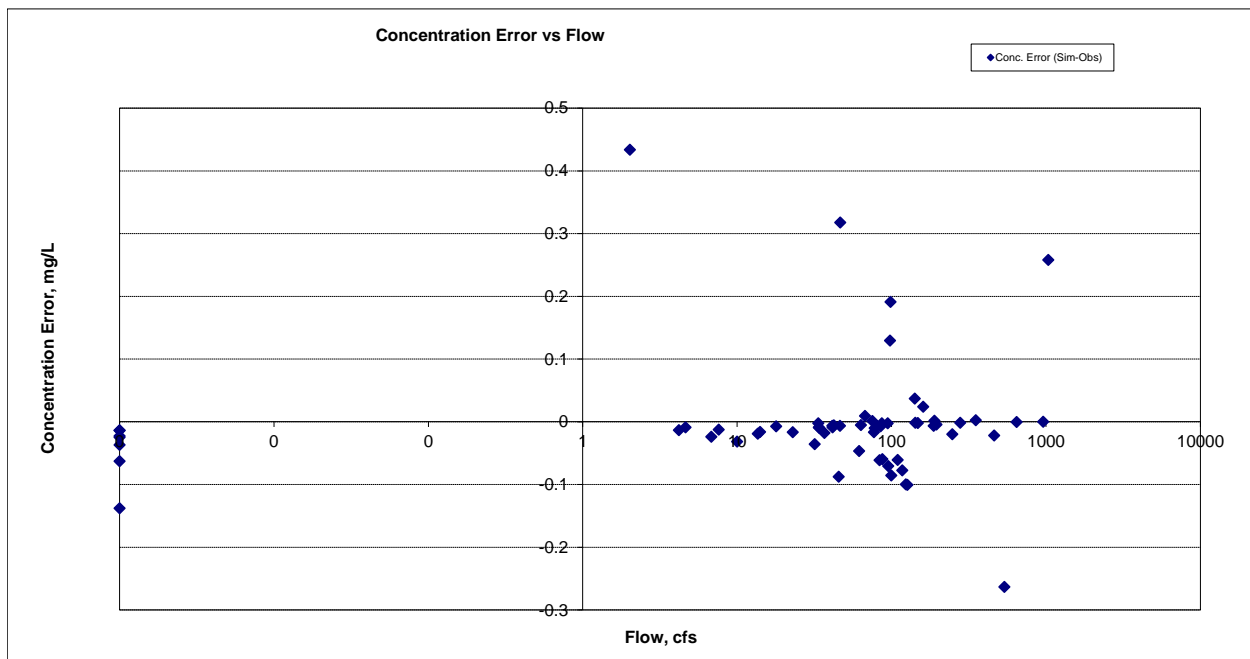


Figure 107. Residual (Simulated - Observed) vs. Flow Soluble Reactive Phosphorus (SRP) at Lake Shetek Outlet near Currie

Organic Phosphorus (OrgP)

Table 17. Organic Phosphorus (OrgP) statistics

Period	2000-2014
Count	62
Concentration Average Error	12.63%
Concentration Median Error	41.14%
Load Average Error	10.78%
Load Median Error	6.59%
Paired t concentration	0.88

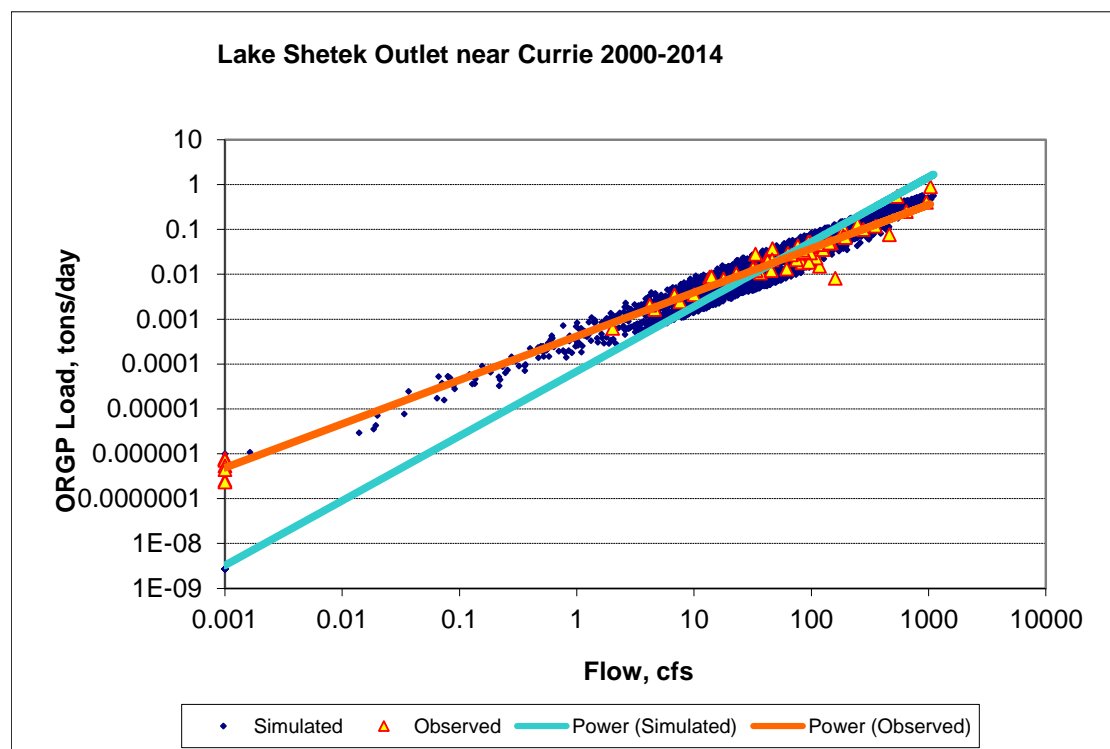


Figure 108. Power plot of simulated and observed Organic Phosphorus (OrgP) load vs flow at Lake Shetek Outlet near Currie (validation period)

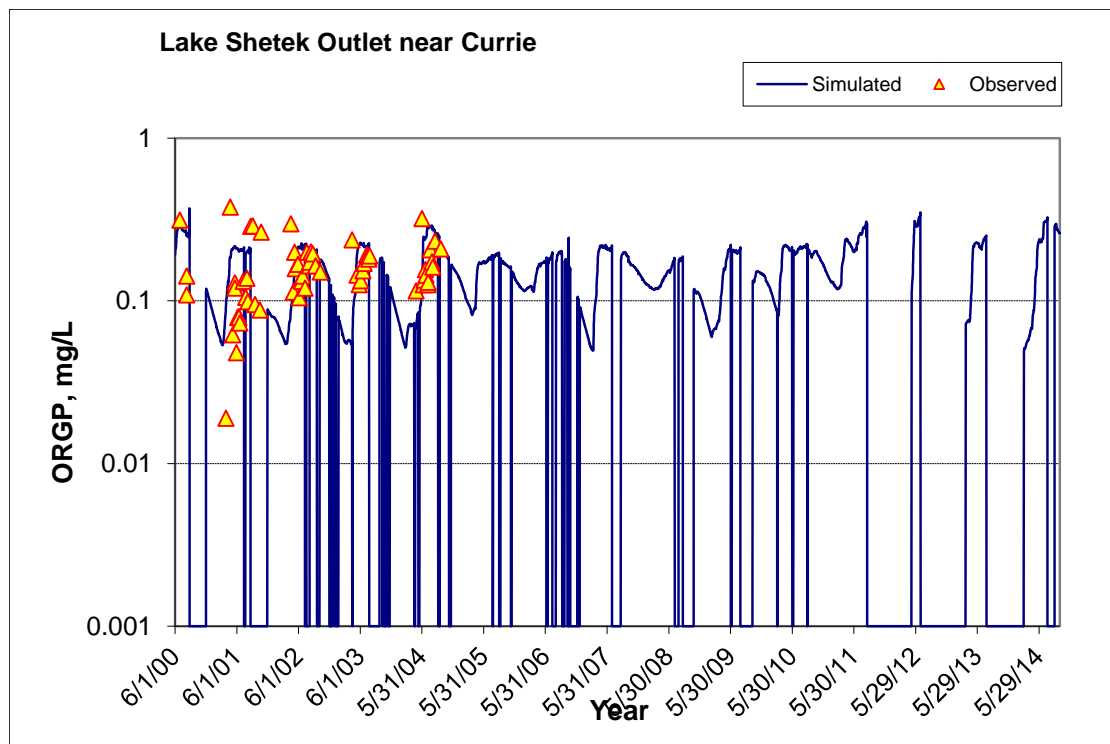


Figure 109. Time series of observed and simulated Organic Phosphorus (OrgP) concentration at Lake Shetek Outlet near Currie (validation period)

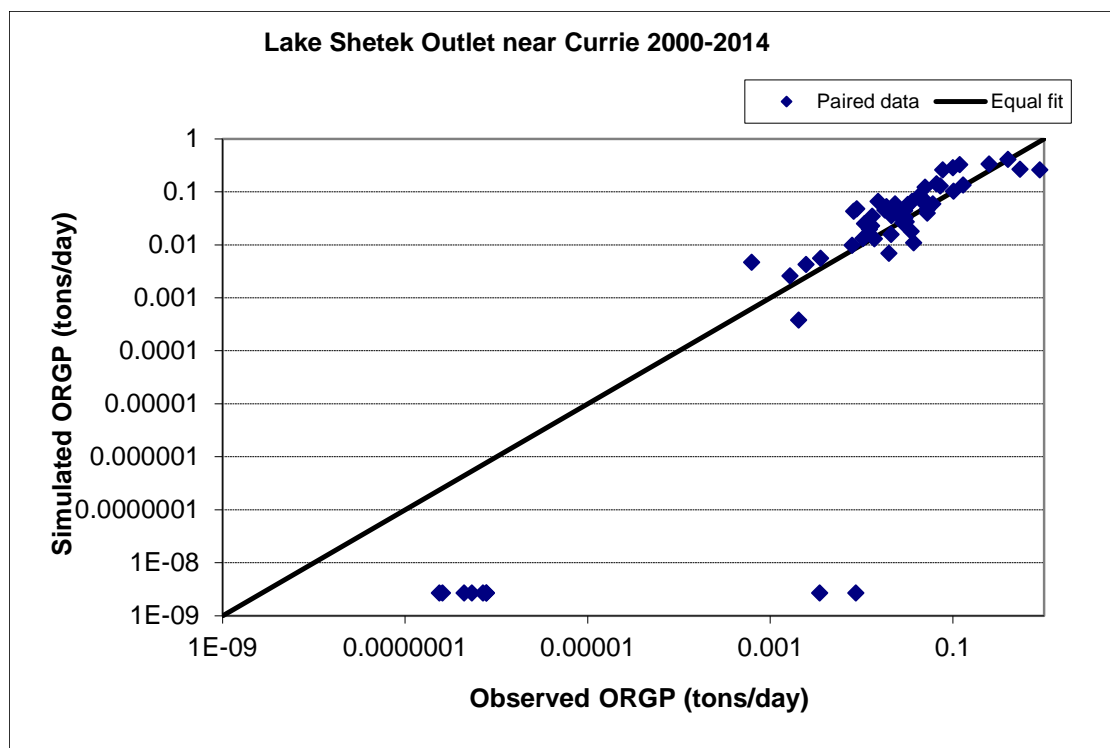


Figure 110. Paired simulated vs. observed Organic Phosphorus (OrgP) load at Lake Shetek Outlet near Currie (validation period)

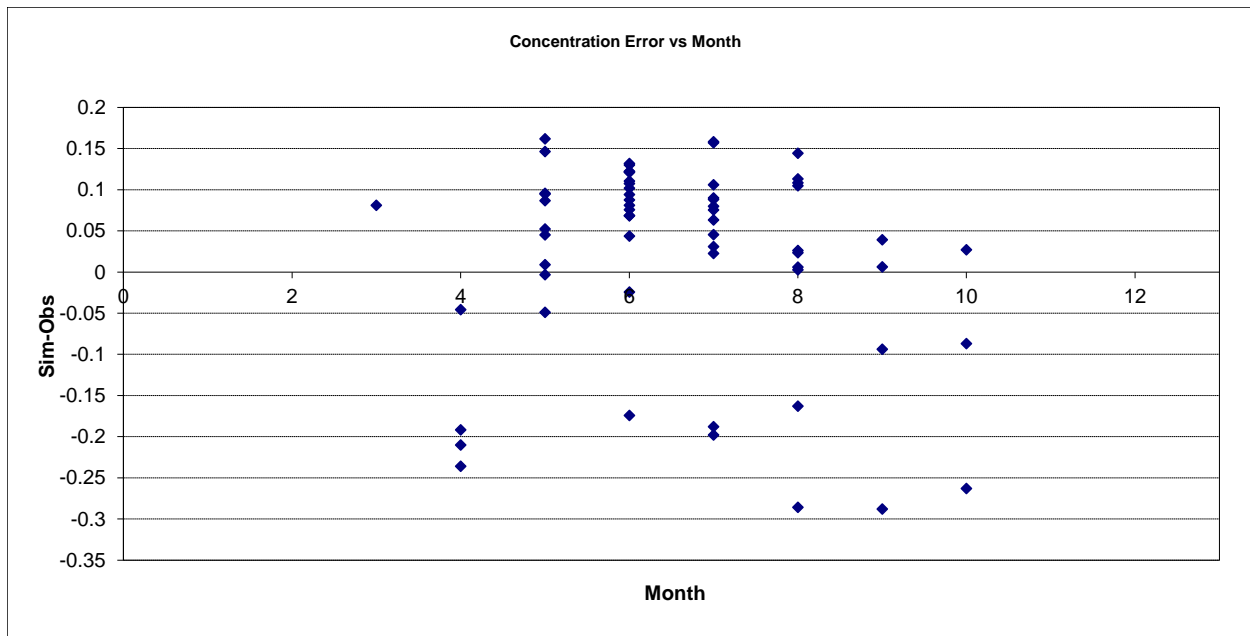


Figure 111. Residual (Simulated - Observed) vs. Month Organic Phosphorus (OrgP) at Lake Shetek Outlet near Currie

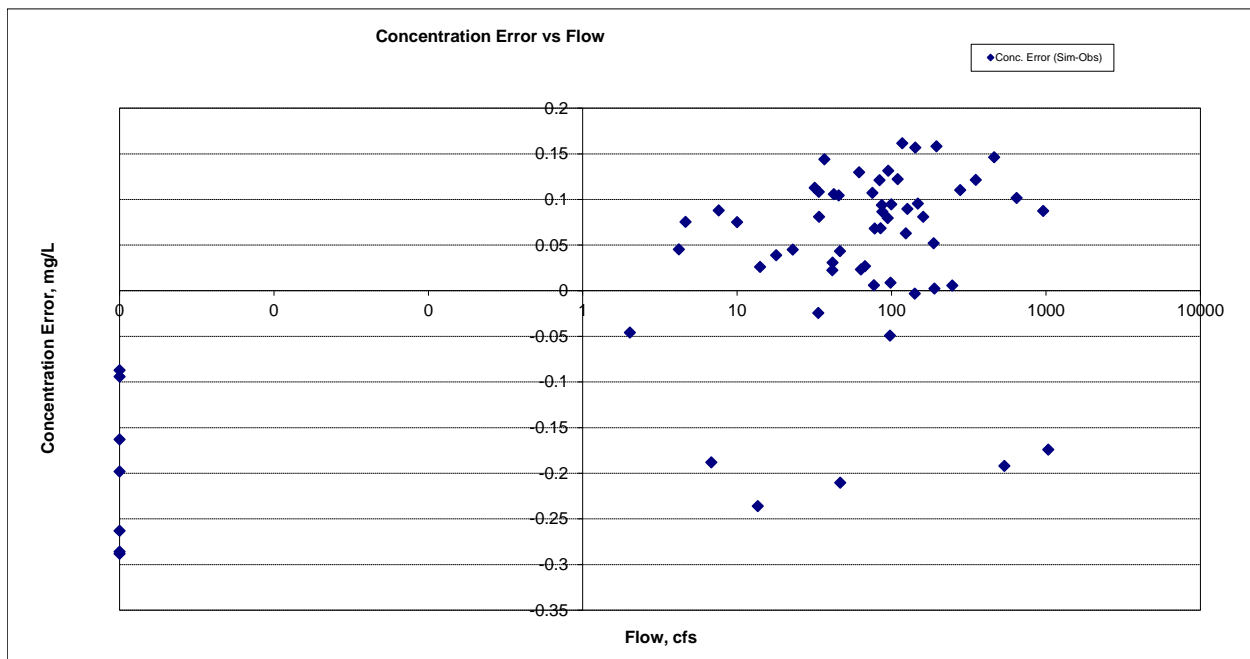


Figure 112. Residual (Simulated - Observed) vs. Flow Organic Phosphorus (OrgP) at Lake Shetek Outlet near Currie

Total Phosphorus (TP)

Table 18. Total Phosphorus (TP) statistics

Period	2000-2014
Count	91
Concentration Average Error	21.32%
Concentration Median Error	34.04%
Load Average Error	16.09%
Load Median Error	12.77%
Paired t concentration	0.42

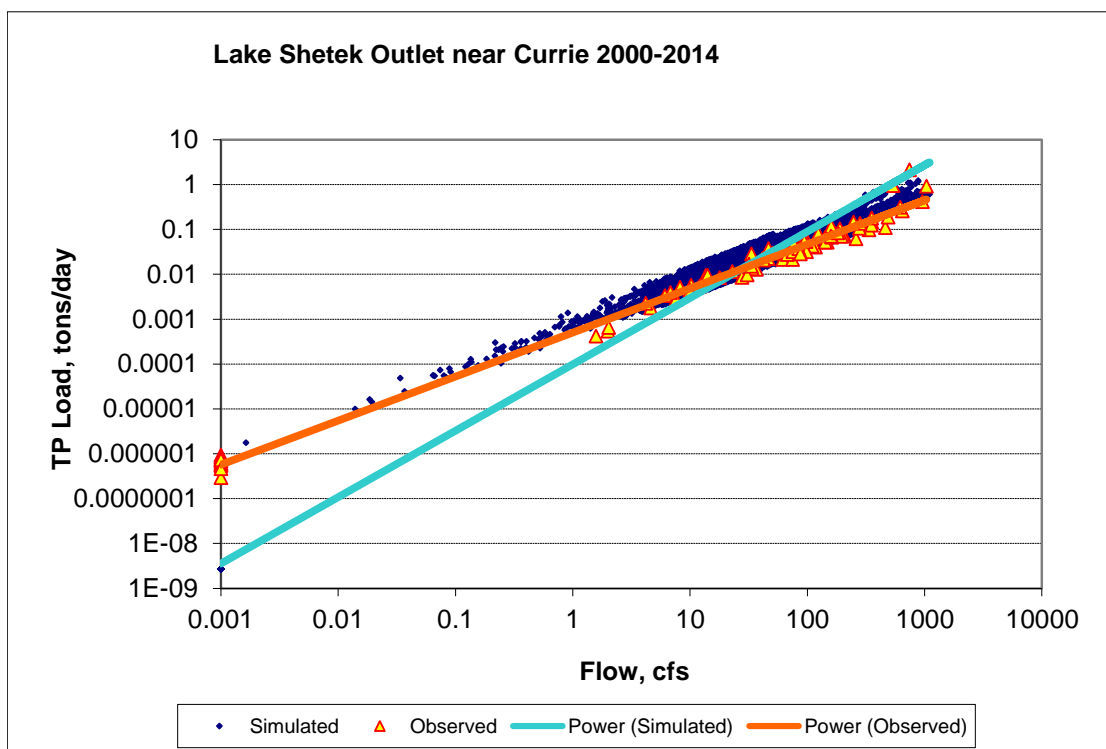


Figure 113. Power plot of simulated and observed Total Phosphorus (TP) load vs flow at Lake Shetek Outlet near Currie (validation period)

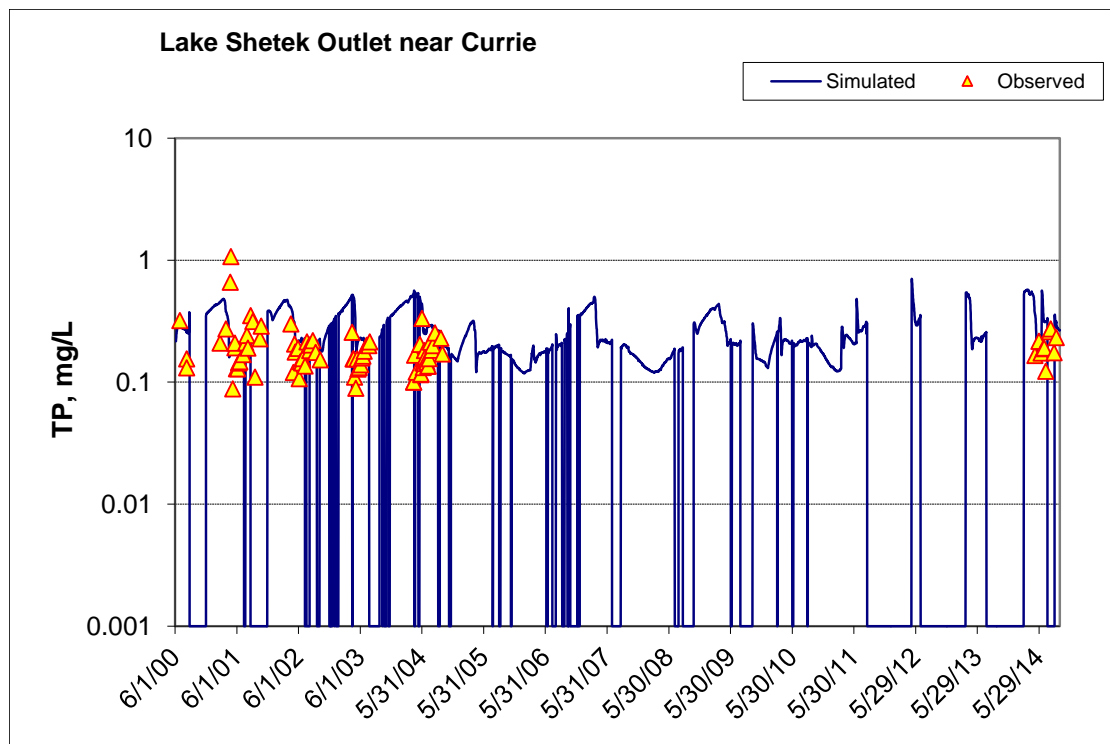


Figure 114. Time series of observed and simulated Total Phosphorus (TP) concentration at Lake Shetek Outlet near Currie (validation period)

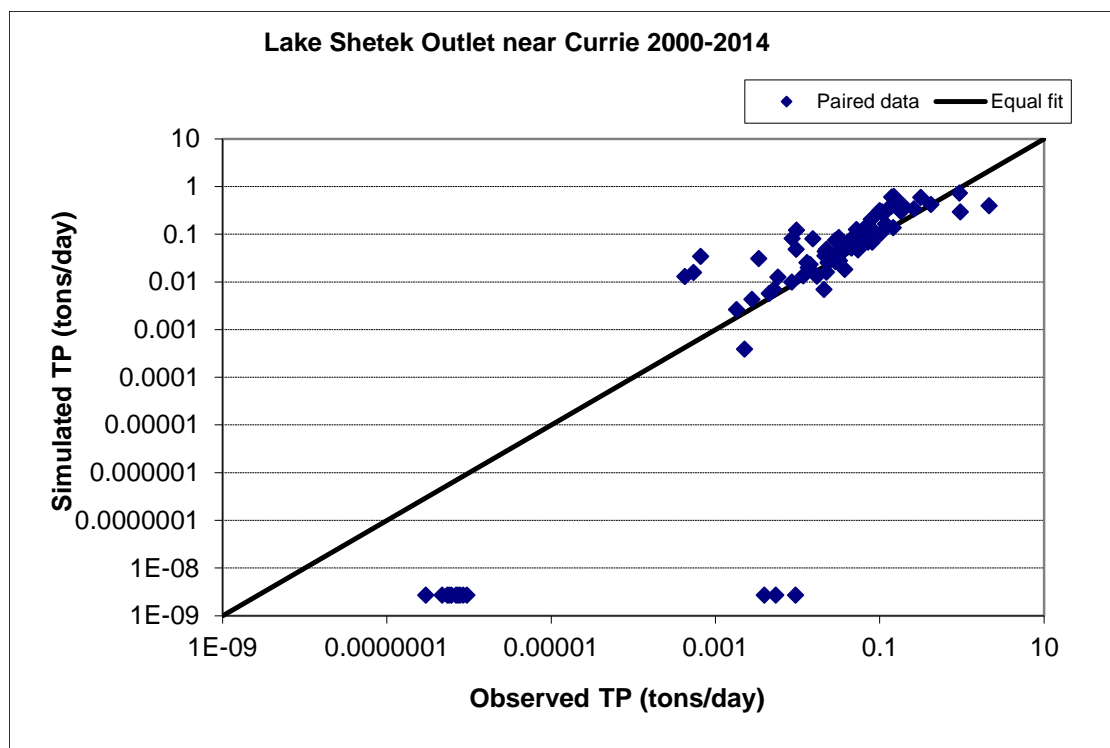


Figure 115. Paired simulated vs. observed Total Phosphorus (TP) load at Lake Shetek Outlet near Currie (validation period)

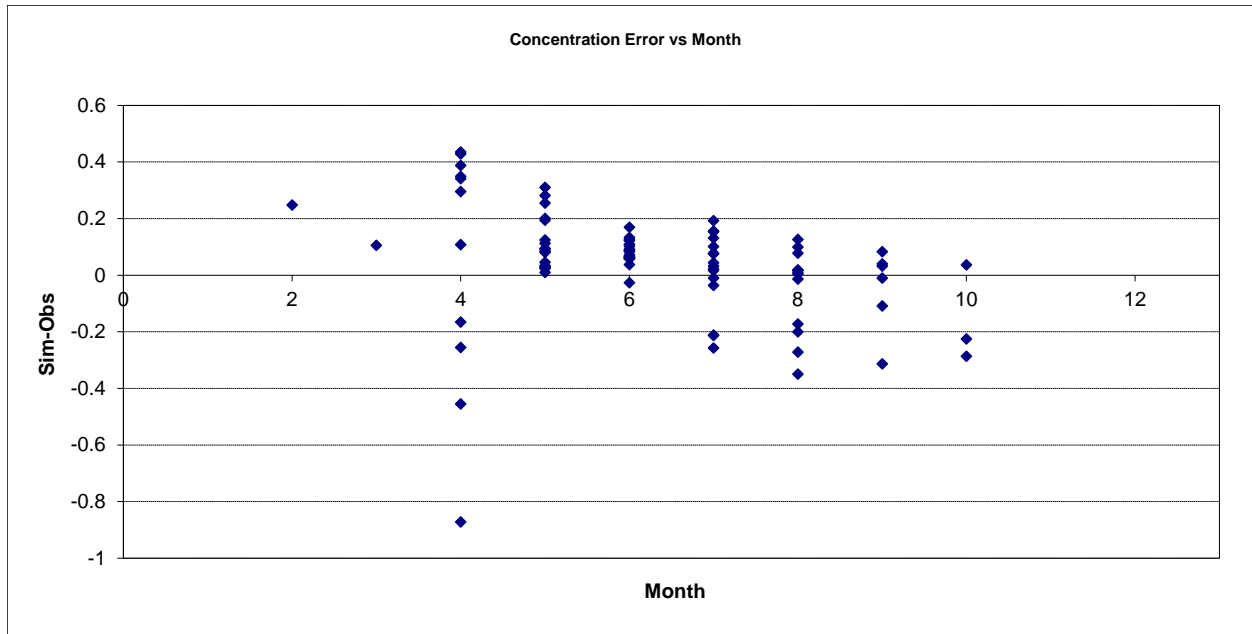


Figure 116. Residual (Simulated - Observed) vs. Month Total Phosphorus (TP) at Lake Shetek Outlet near Currie

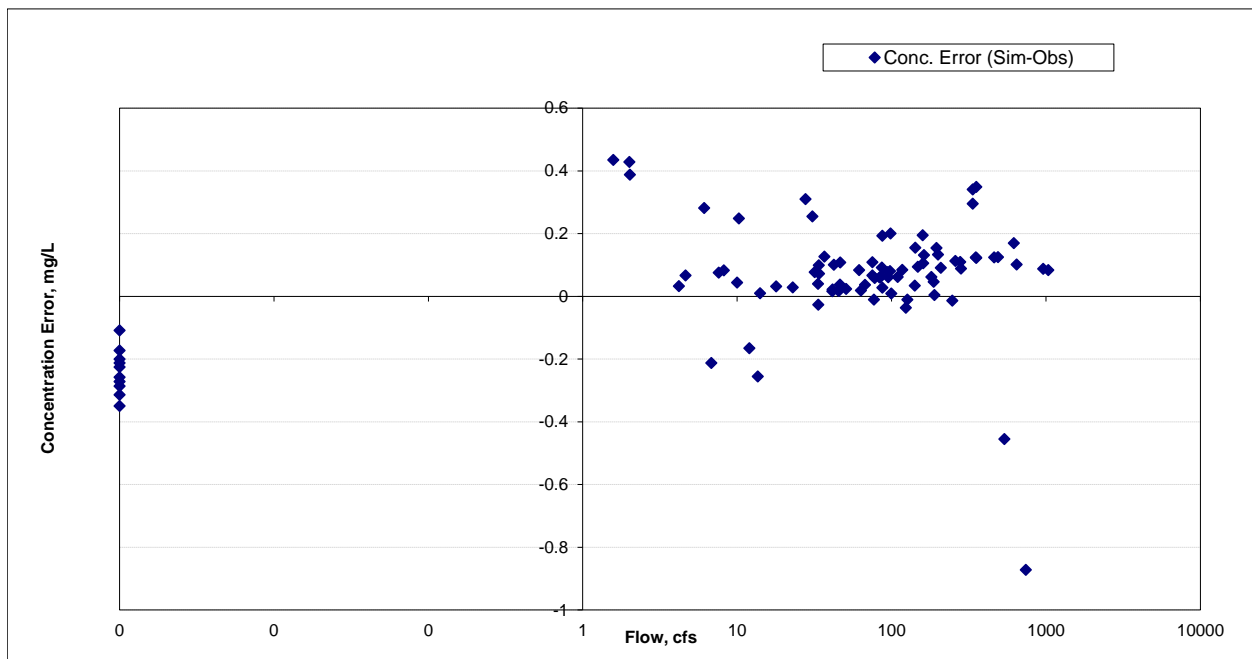


Figure 117. Residual (Simulated - Observed) vs. Flow Total Phosphorus (TP) at Lake Shetek Outlet near Currie

Jack Creek near Heron Lake (S001-557)

Total Suspended Solids (TSS)

Table 19. Total Suspended Solids (TSS) statistics

Period	2002-2014	1997-2002
Count	256	33
Concentration Average Error	-20.24%	-67.53%
Concentration Median Error	-16.52%	-52.55%
Load Average Error	69.51%	-53.84%
Load Median Error	-9.49%	-9.68%
Paired t concentration	0.48	0.00

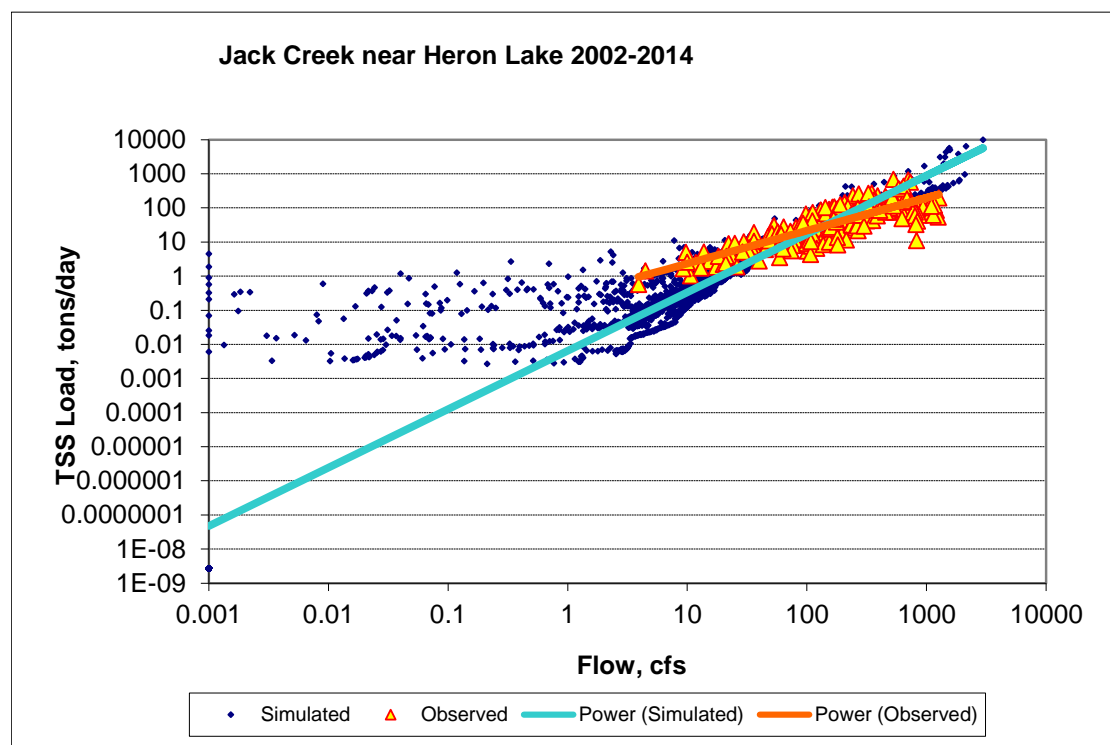


Figure 118. Power plot of simulated and observed Total Suspended Solids (TSS) load vs flow at Jack Creek near Heron Lake (calibration period)

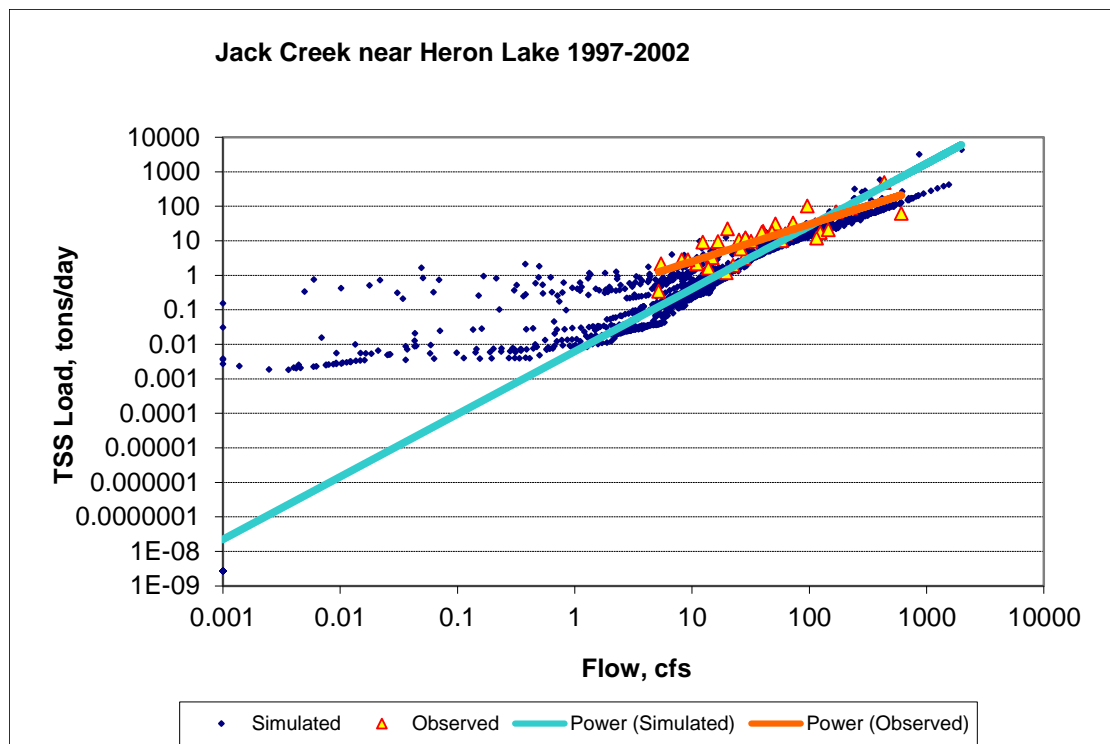


Figure 119. Power plot of simulated and observed Total Suspended Solids (TSS) load vs flow at Jack Creek near Heron Lake (validation period)

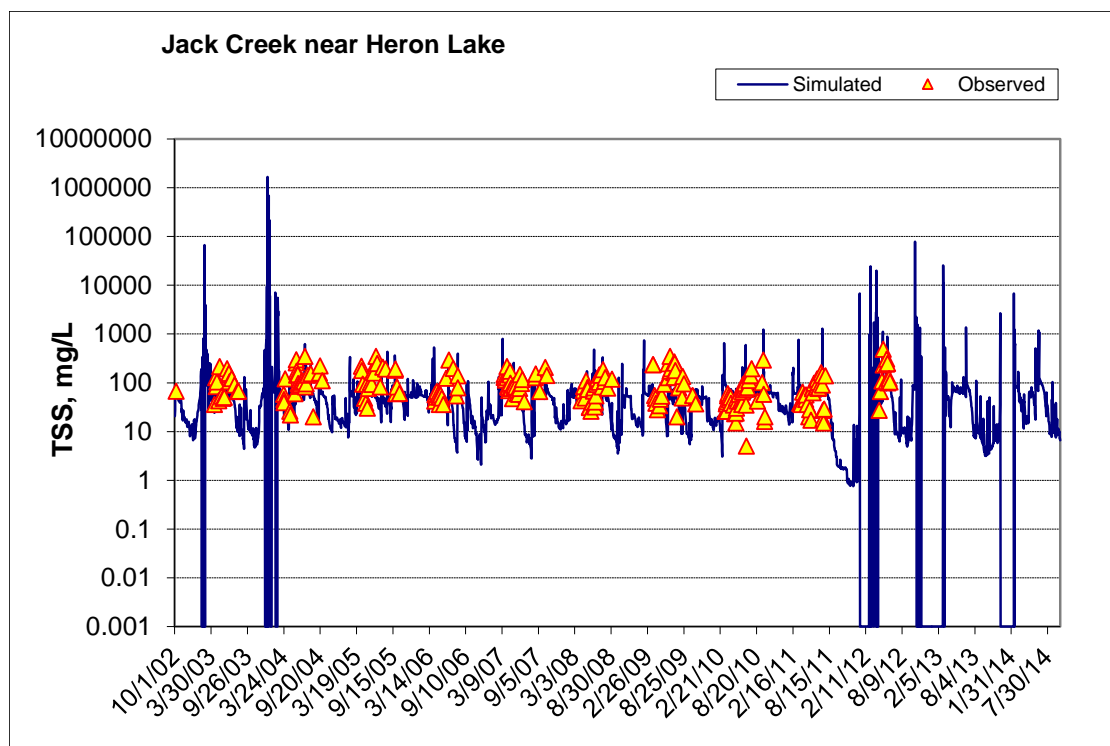


Figure 120. Time series of observed and simulated Total Suspended Solids (TSS) concentration at Jack Creek near Heron Lake (calibration period)

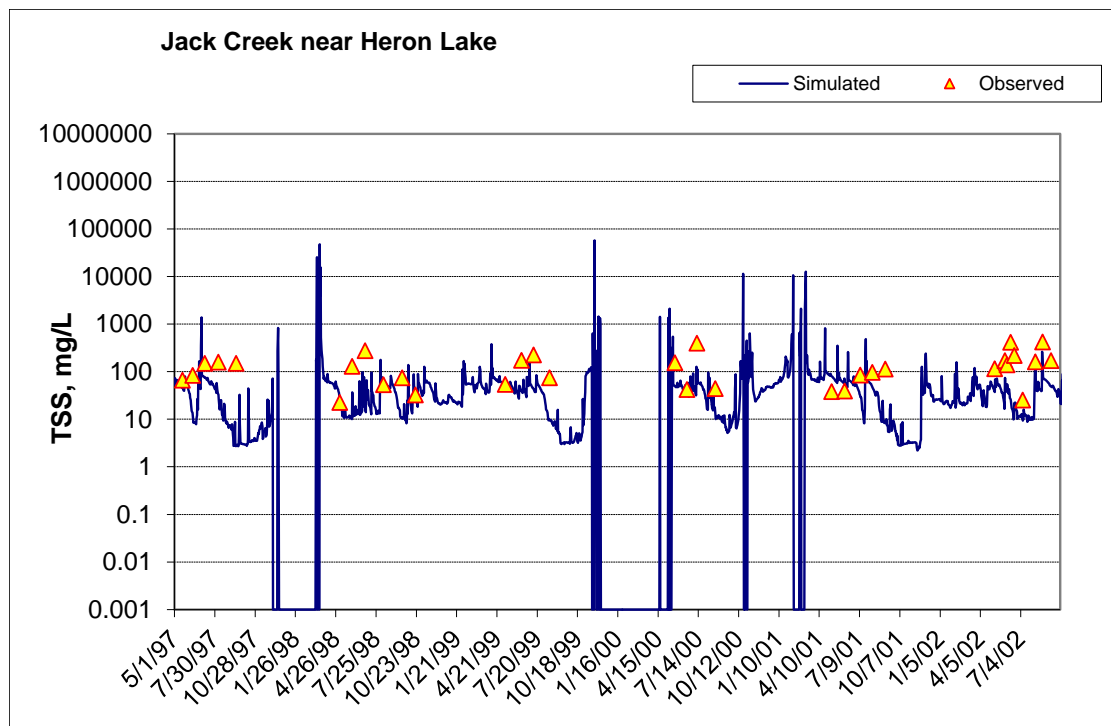


Figure 121. Time series of observed and simulated Total Suspended Solids (TSS) concentration at Jack Creek near Heron Lake (validation period)

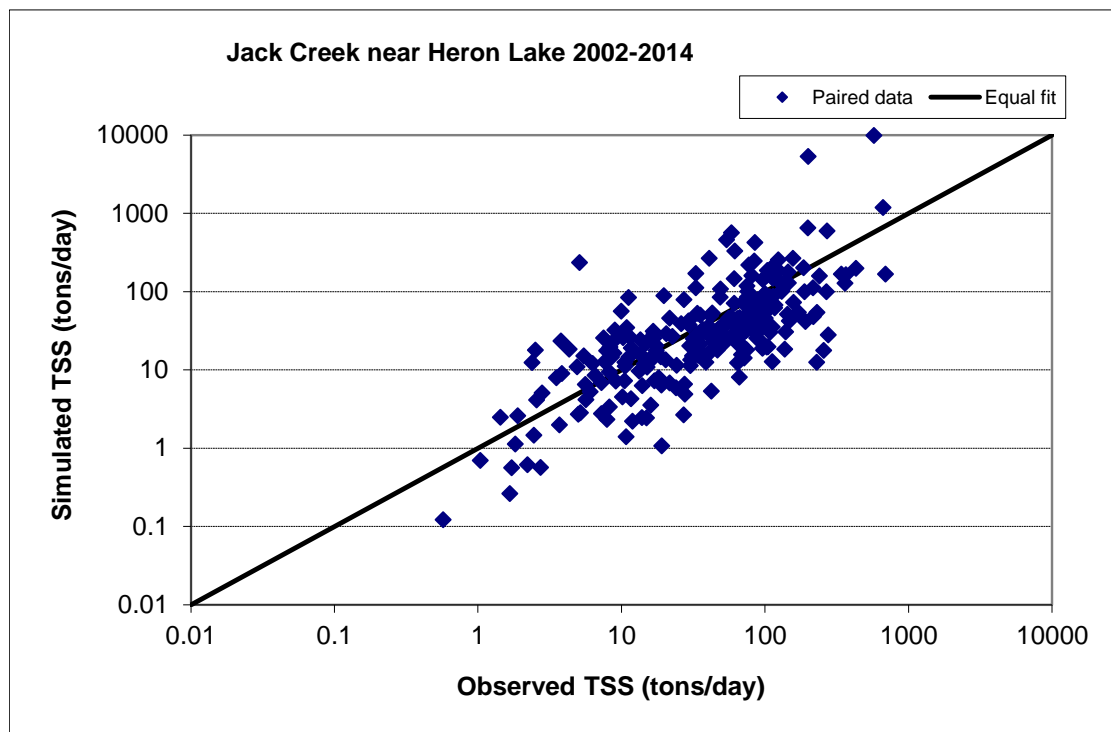


Figure 122. Paired simulated vs. observed Total Suspended Solids (TSS) load at Jack Creek near Heron Lake (calibration period)

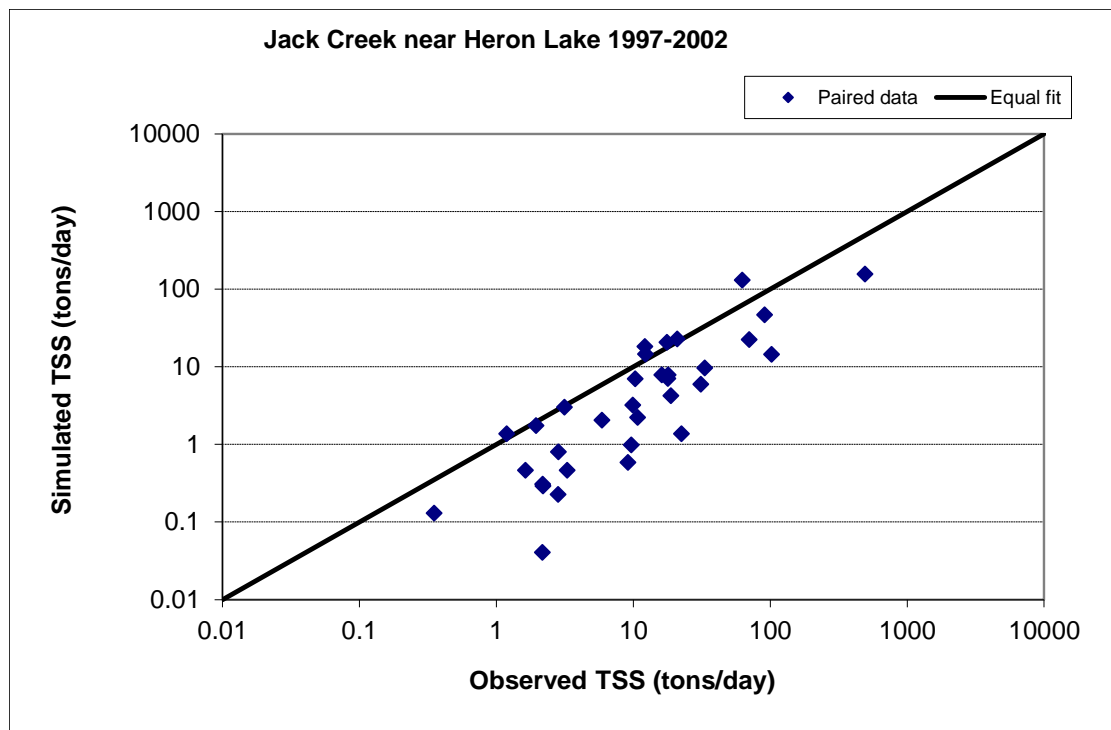


Figure 123. Paired simulated vs. observed Total Suspended Solids (TSS) load at Jack Creek near Heron Lake (validation period)

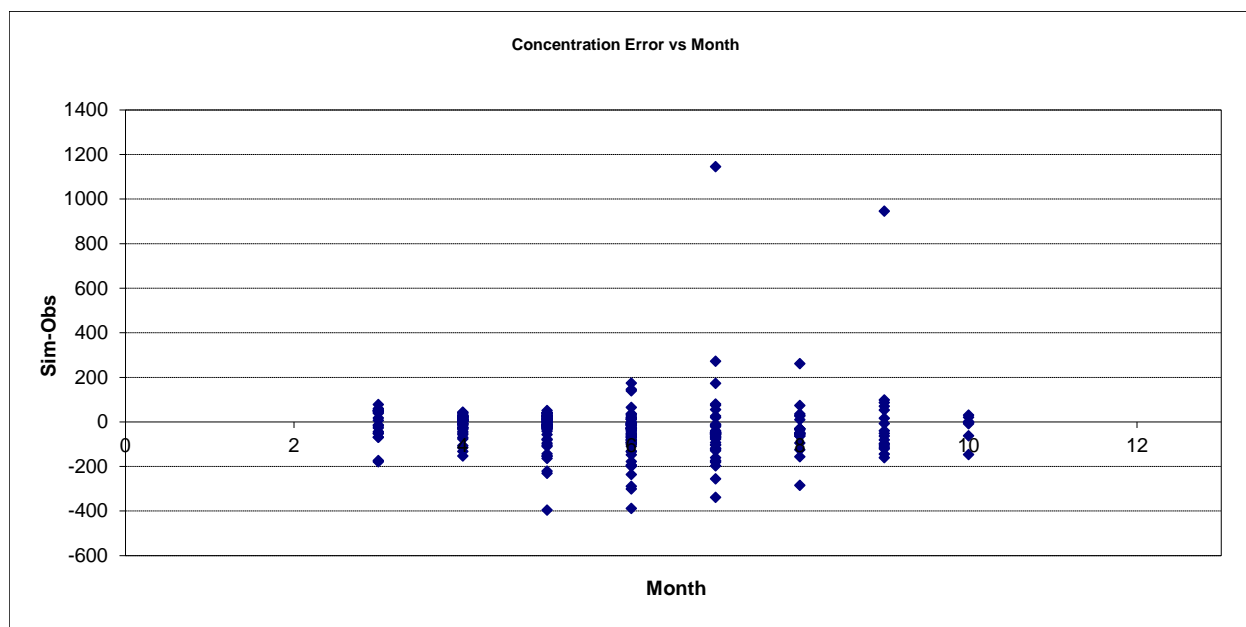


Figure 124. Residual (Simulated - Observed) vs. Month Total Suspended Solids (TSS) at Jack Creek near Heron Lake

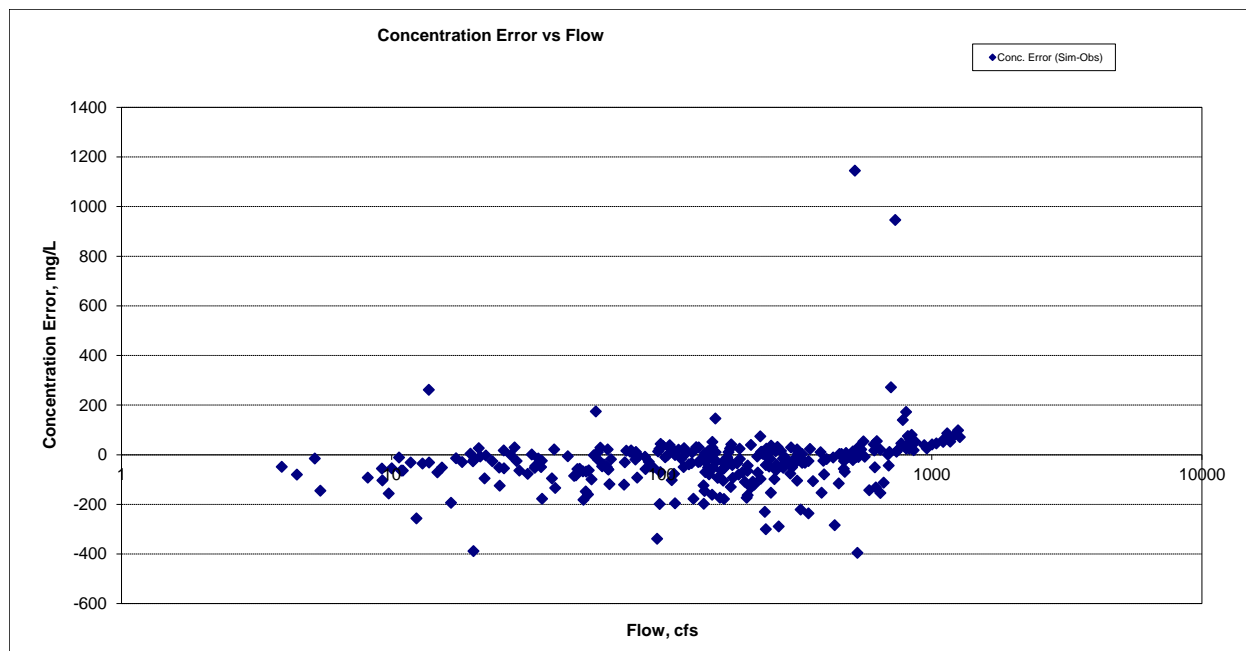


Figure 125. Residual (Simulated - Observed) vs. Flow Total Suspended Solids (TSS) at Jack Creek near Heron Lake

Ammonia Nitrogen (NH₃)

Table 20. Ammonia Nitrogen (NH₃) statistics

Period	2002-2014	1997-2002
Count	14	8
Concentration Average Error	-44.44%	-45.99%
Concentration Median Error	-36.12%	5.68%
Load Average Error	-34.67%	-28.76%
Load Median Error	-28.20%	1.16%
Paired t concentration	0.01	0.27

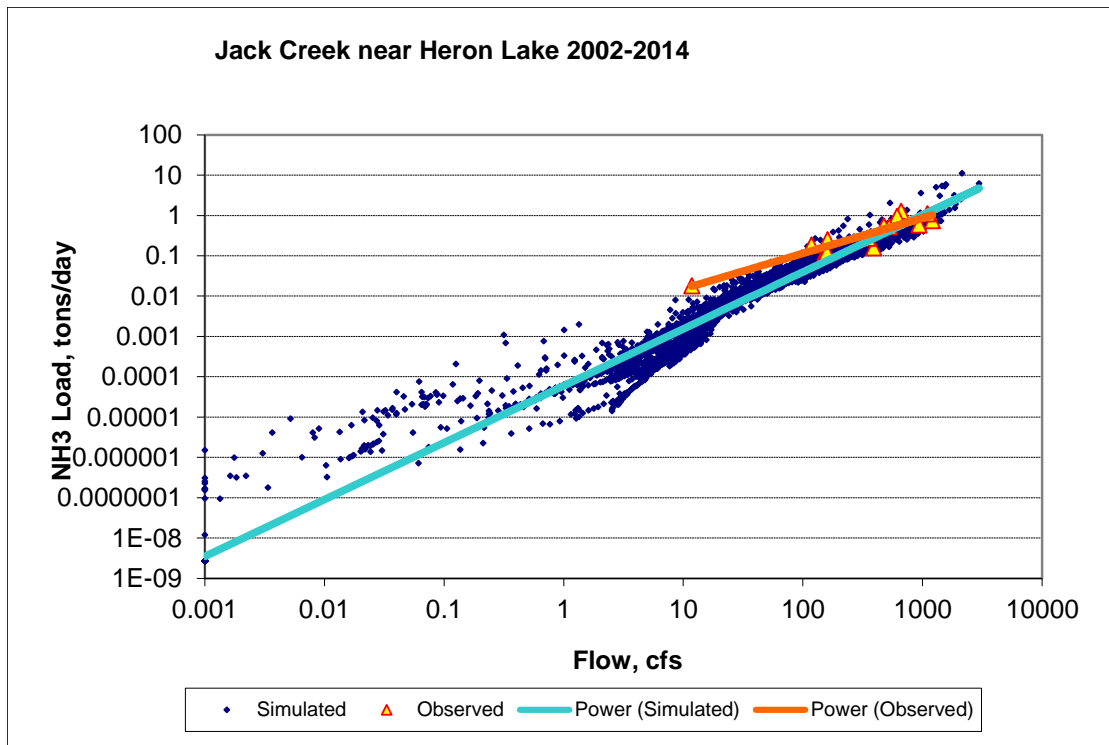


Figure 126. Power plot of simulated and observed Ammonia Nitrogen (NH3) load vs flow at Jack Creek near Heron Lake (calibration period)

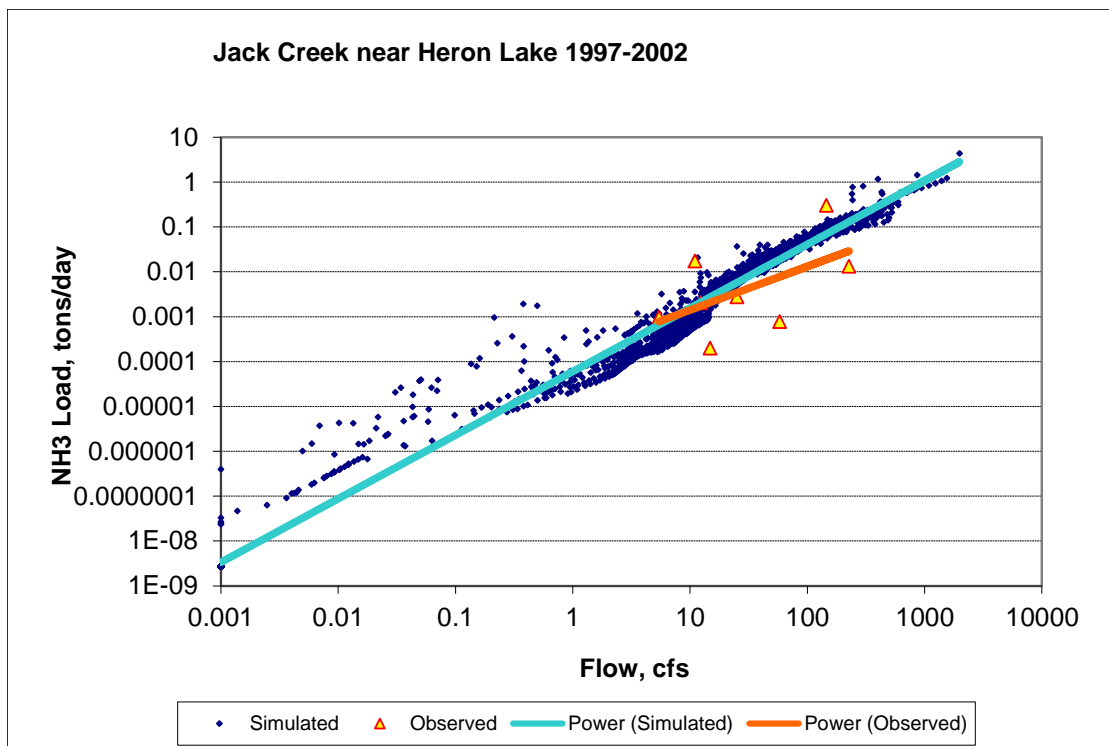


Figure 127. Power plot of simulated and observed Ammonia Nitrogen (NH3) load vs flow at Jack Creek near Heron Lake (validation period)

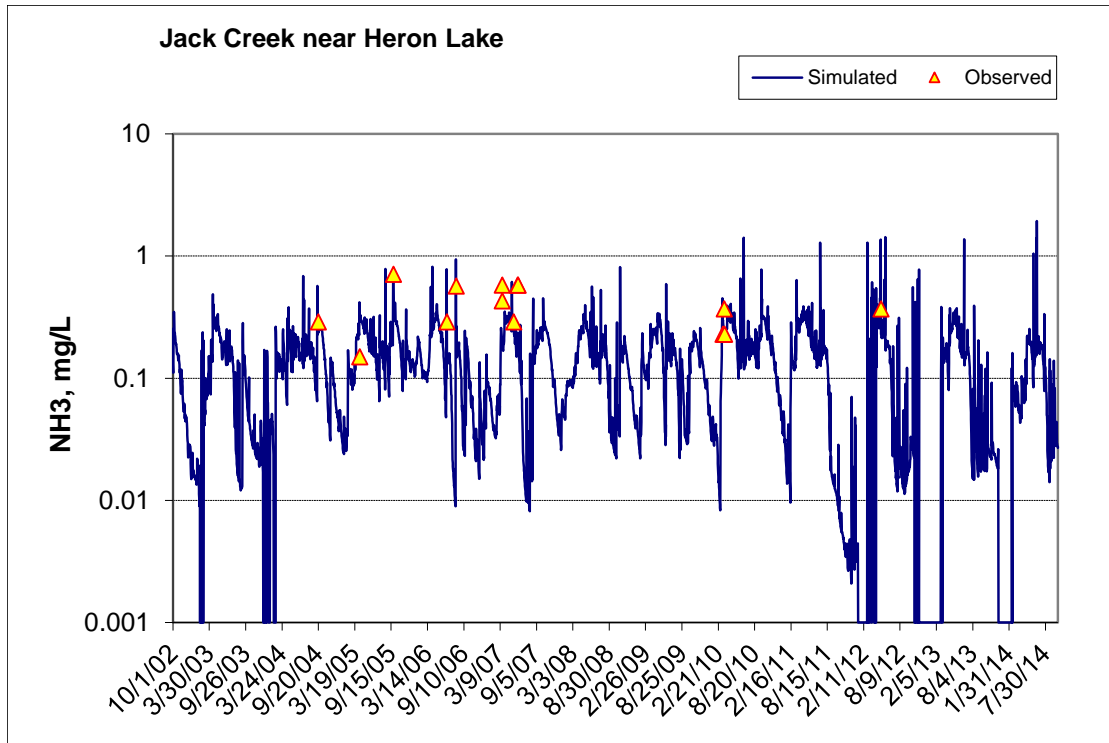


Figure 128. Time series of observed and simulated Ammonia Nitrogen (NH₃) concentration at Jack Creek near Heron Lake (calibration period)

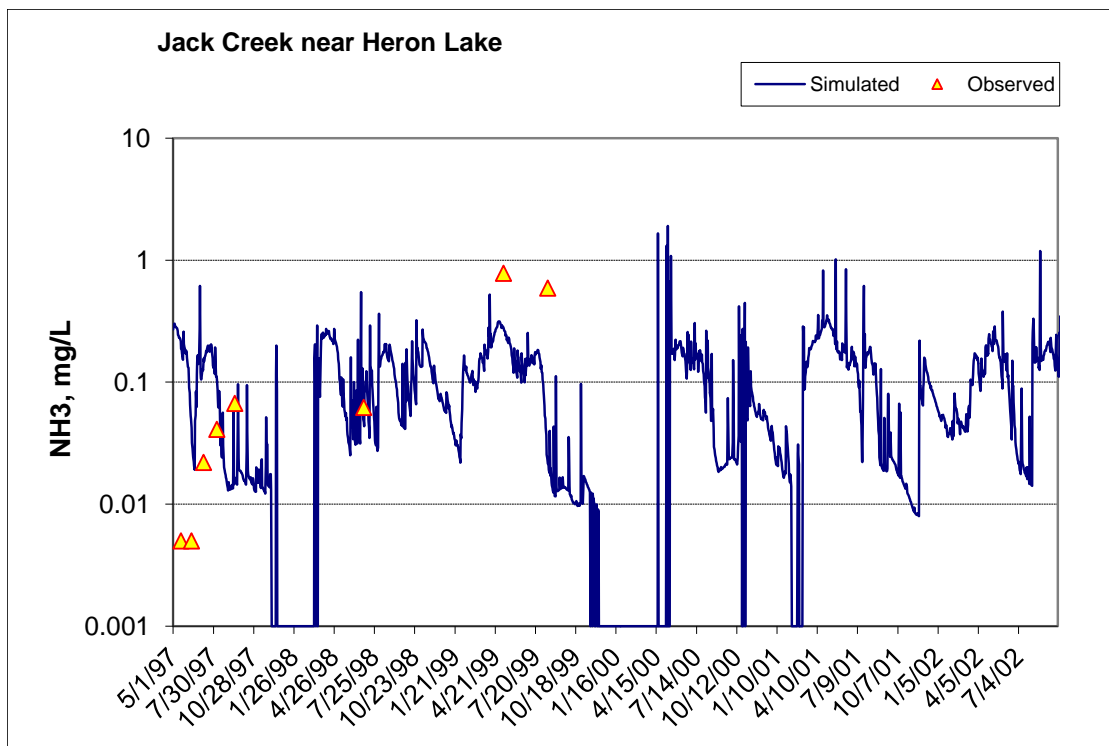


Figure 129. Time series of observed and simulated Ammonia Nitrogen (NH₃) concentration at Jack Creek near Heron Lake (validation period)

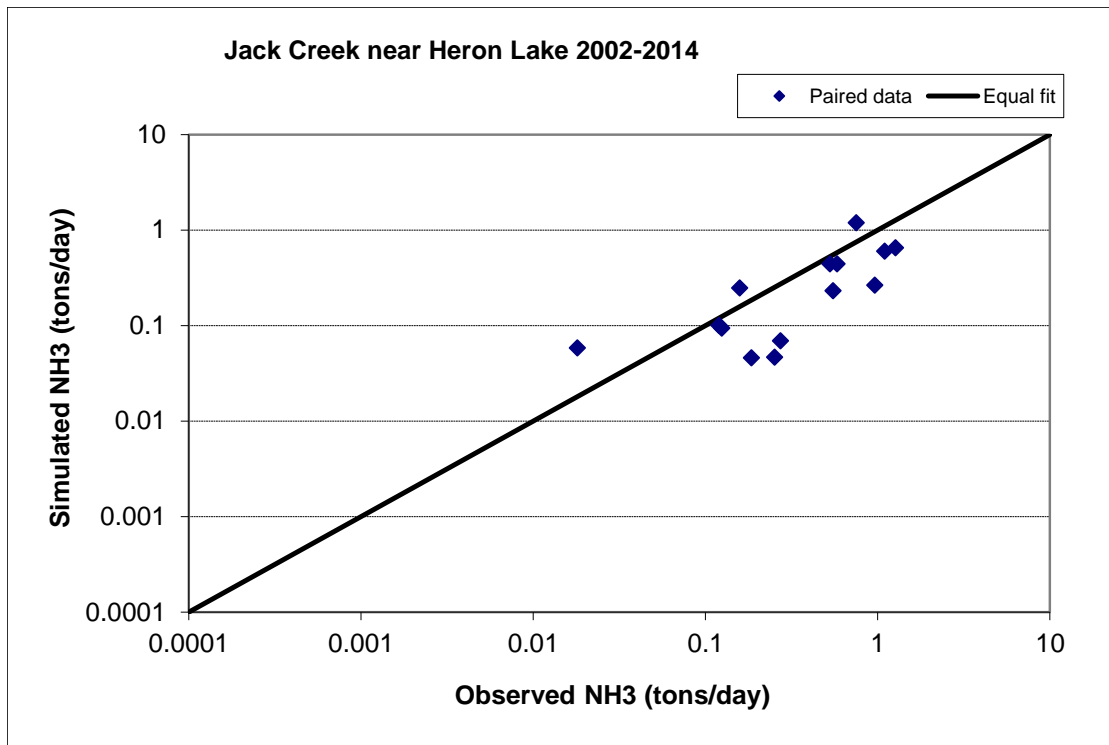


Figure 130. Paired simulated vs. observed Ammonia Nitrogen (NH3) load at Jack Creek near Heron Lake (calibration period)

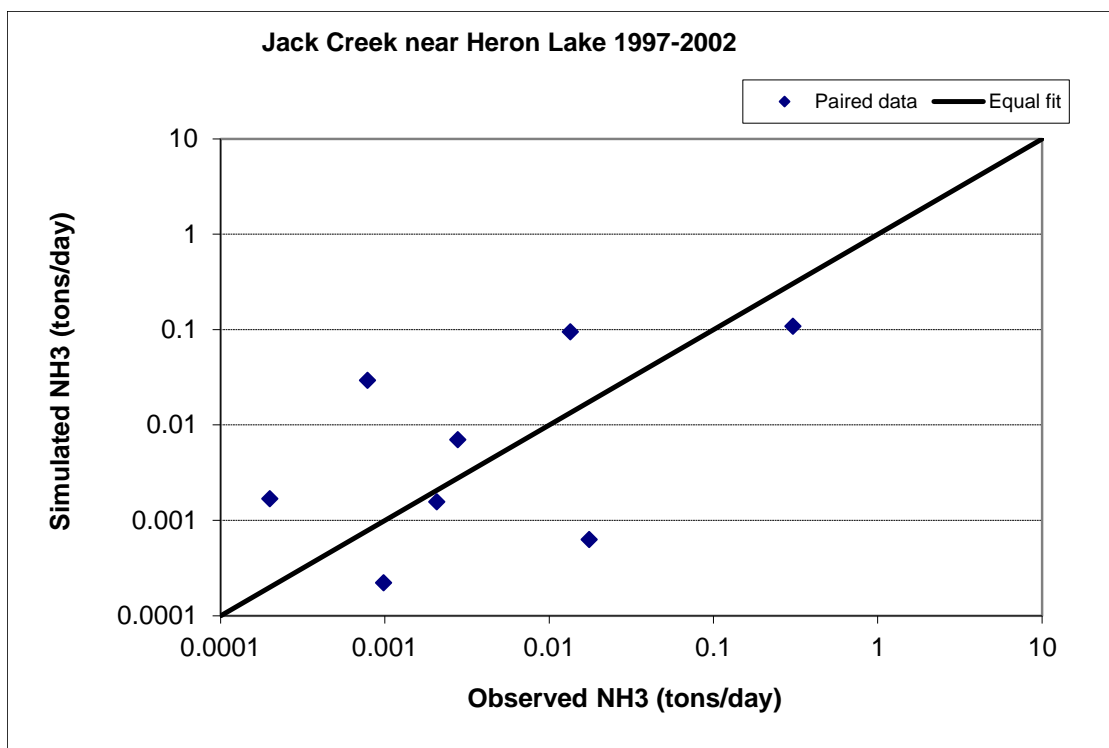


Figure 131. Paired simulated vs. observed Ammonia Nitrogen (NH3) load at Jack Creek near Heron Lake (validation period)

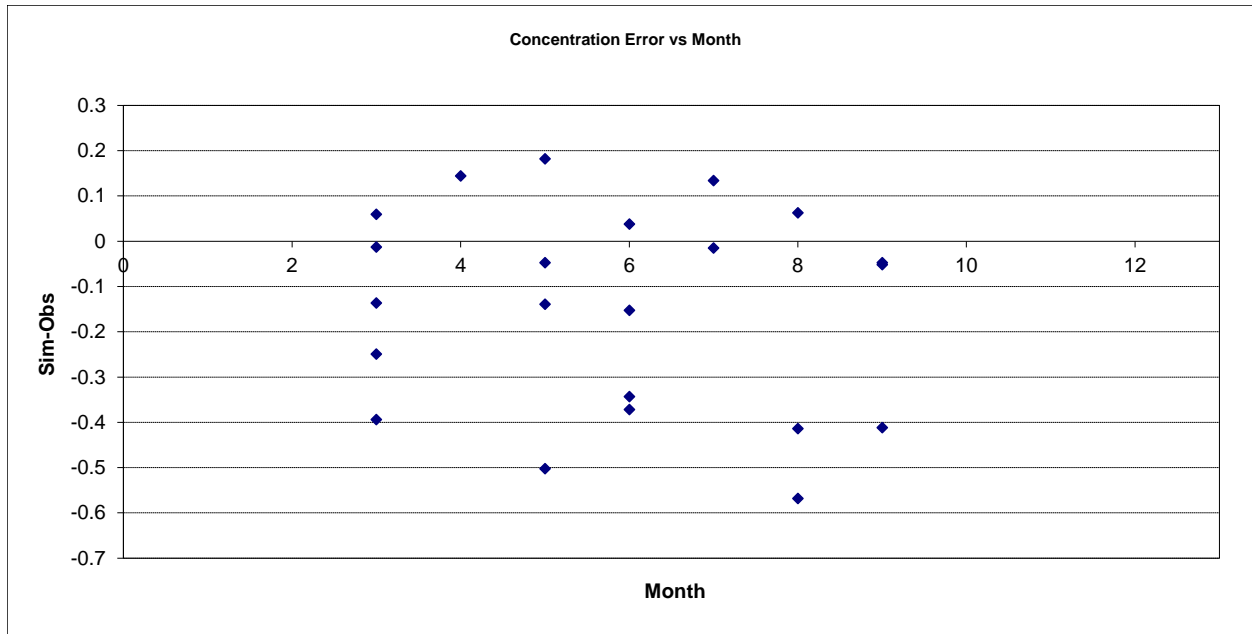


Figure 132. Residual (Simulated - Observed) vs. Month Ammonia Nitrogen (NH3) at Jack Creek near Heron Lake

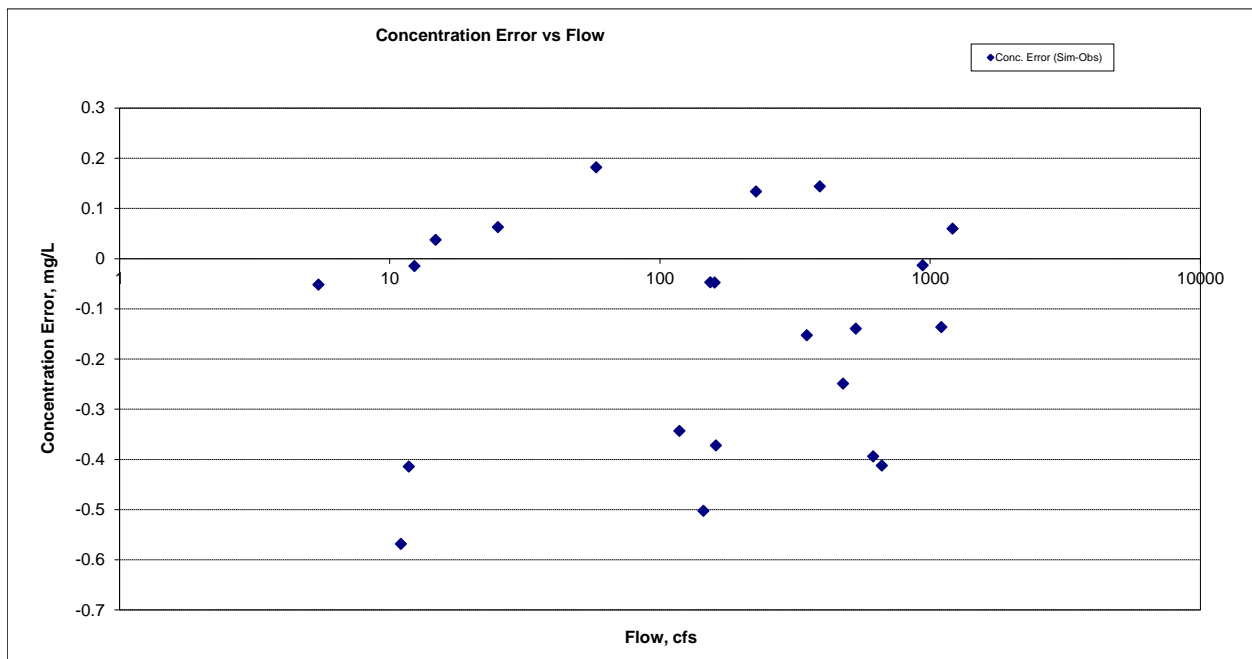


Figure 133. Residual (Simulated - Observed) vs. Flow Ammonia Nitrogen (NH3) at Jack Creek near Heron Lake

Organic Nitrogen (OrgN)

Table 21. Organic Nitrogen (OrgN) statistics

Period	2002-2014	1997-2002
Count	194	9
Concentration Average Error	-1.95%	-30.94%
Concentration Median Error	-1.64%	-34.42%
Load Average Error	20.25%	26.56%
Load Median Error	-4.92%	-7.82%
Paired t concentration	1.00	0.25

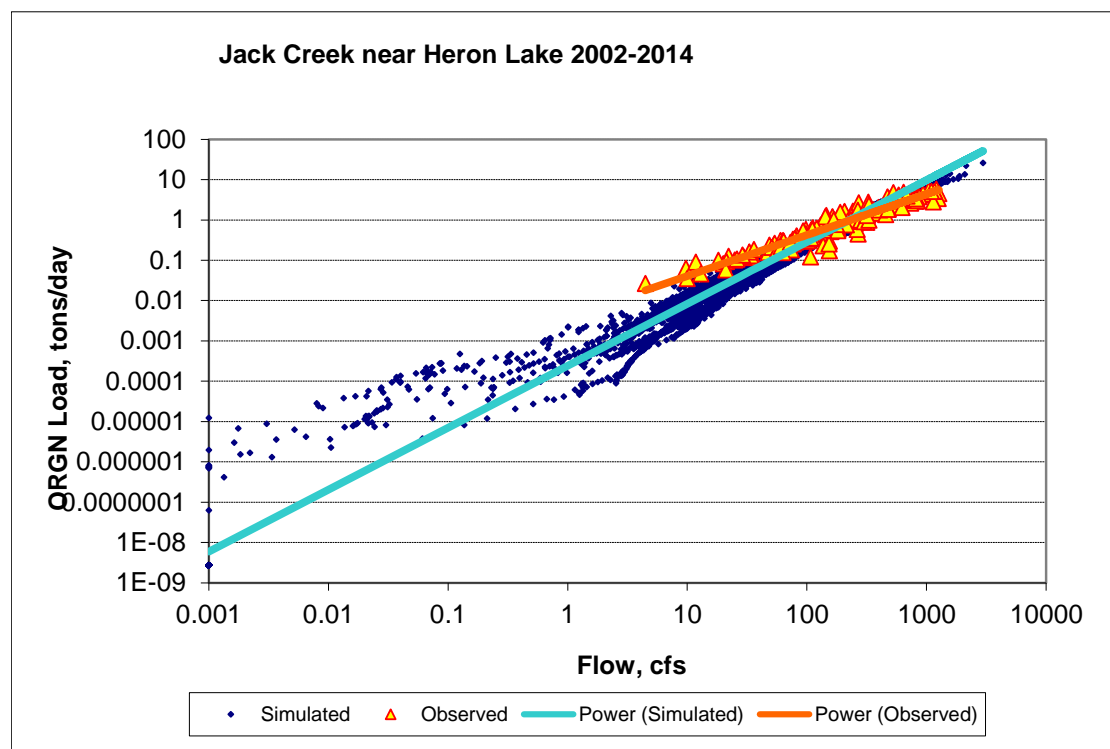


Figure 134. Power plot of simulated and observed Organic Nitrogen (OrgN) load vs flow at Jack Creek near Heron Lake (calibration period)

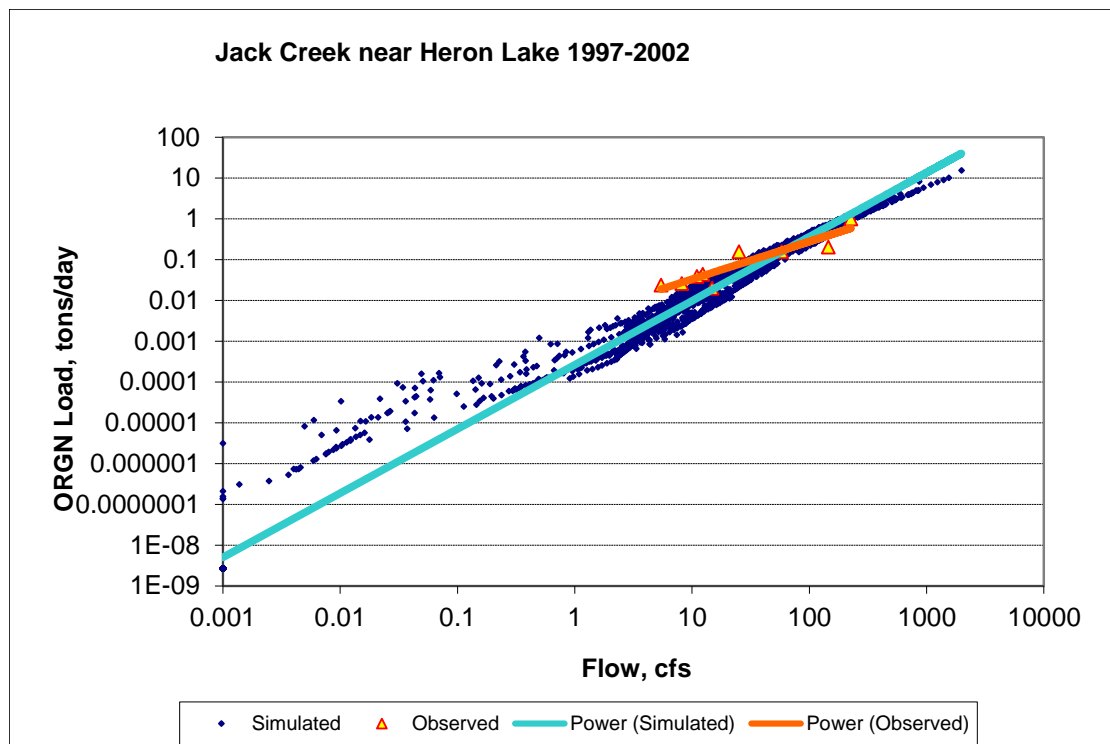


Figure 135. Power plot of simulated and observed Organic Nitrogen (OrgN) load vs flow at Jack Creek near Heron Lake (validation period)

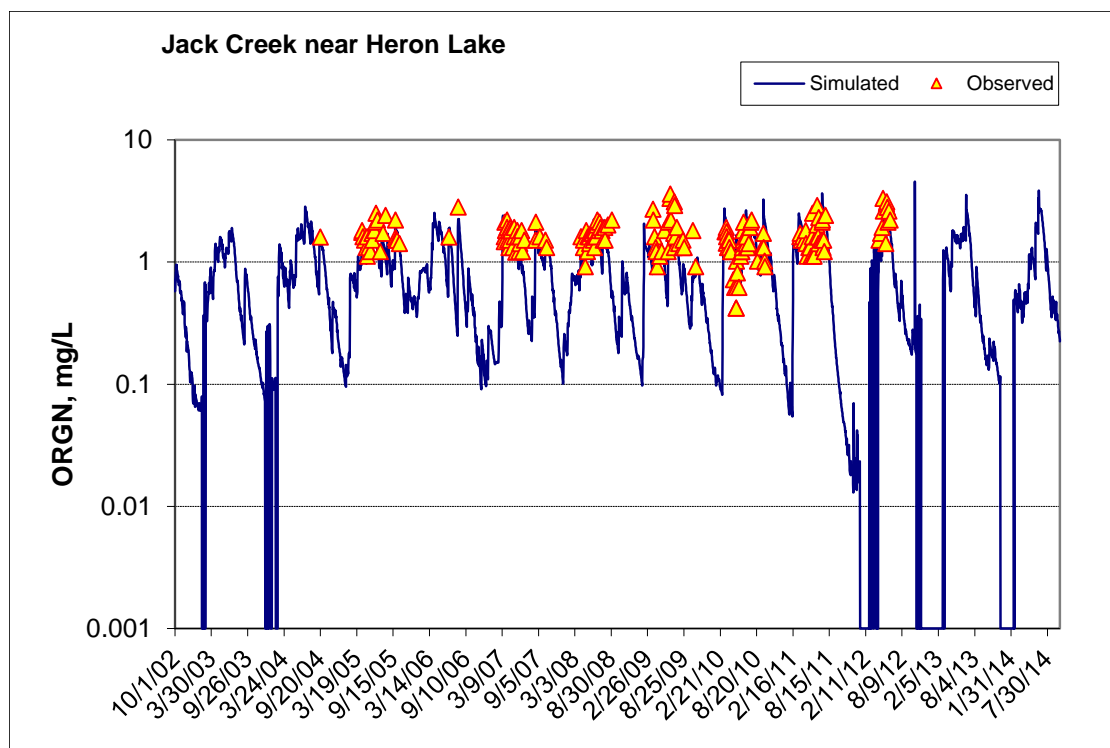


Figure 136. Time series of observed and simulated Organic Nitrogen (OrgN) concentration at Jack Creek near Heron Lake (calibration period)

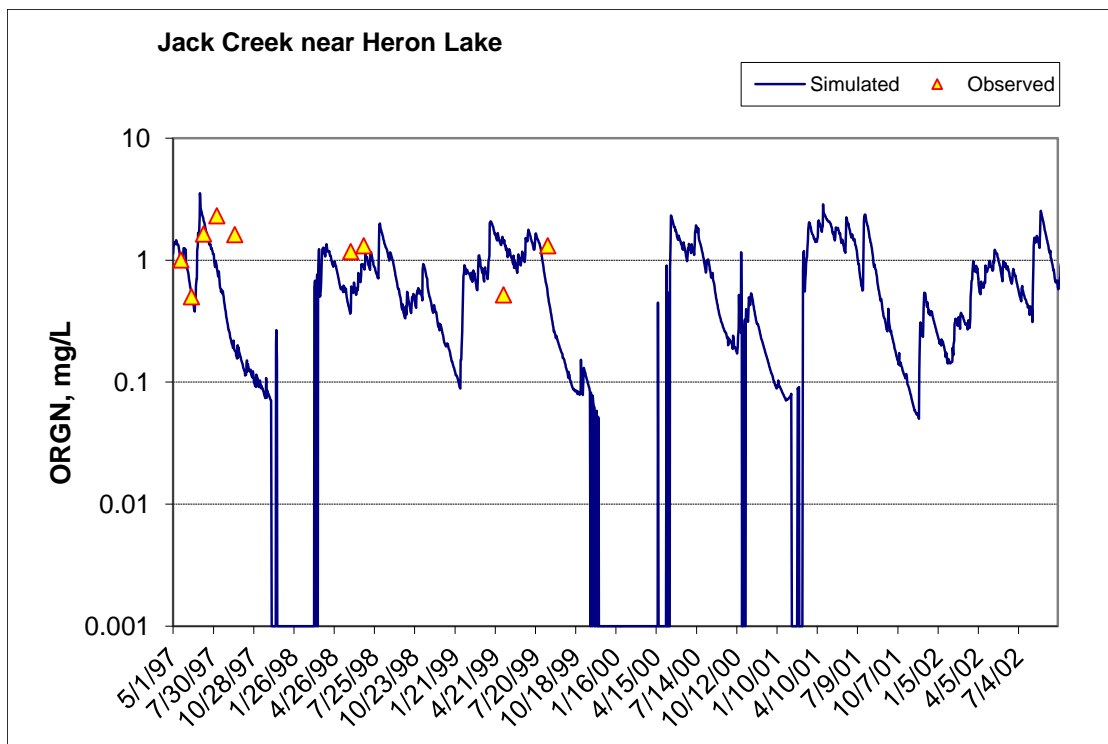


Figure 137. Time series of observed and simulated Organic Nitrogen (OrgN) concentration at Jack Creek near Heron Lake (validation period)

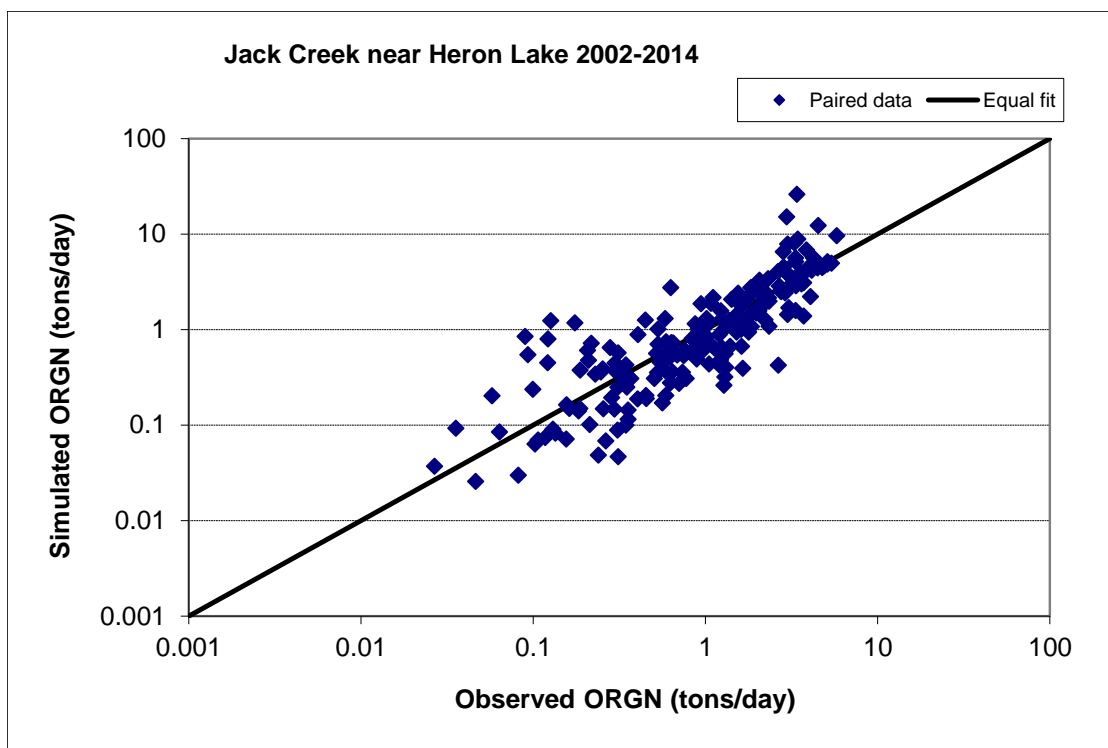


Figure 138. Paired simulated vs. observed Organic Nitrogen (OrgN) load at Jack Creek near Heron Lake (calibration period)

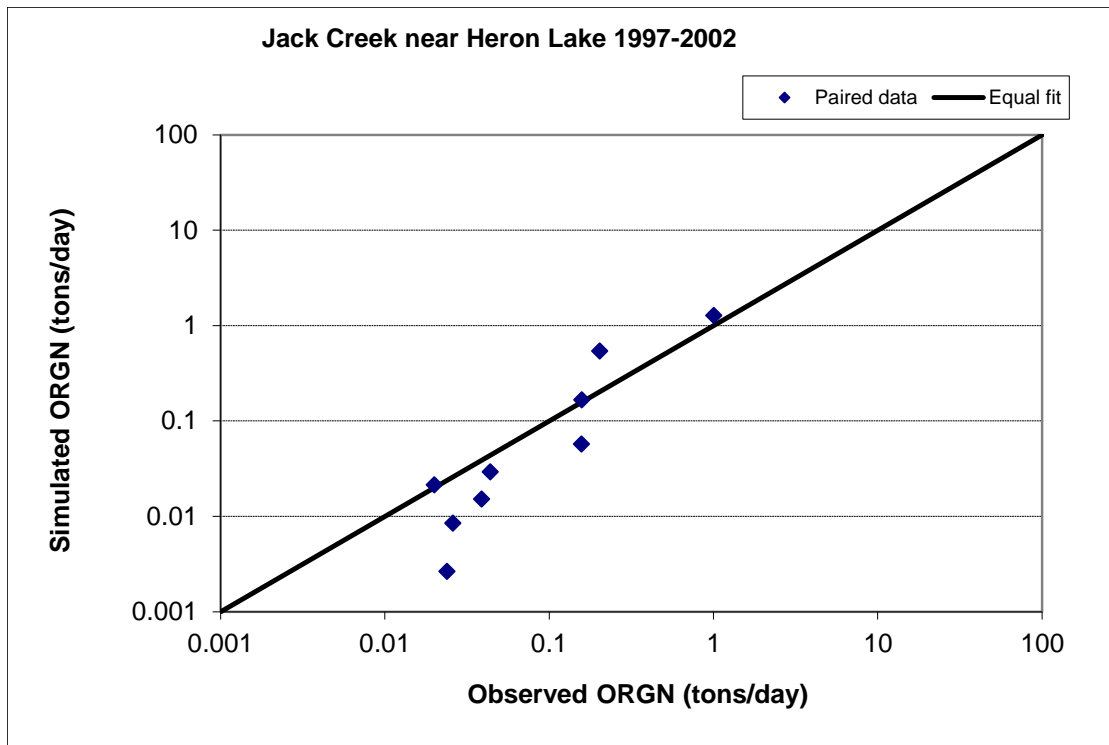


Figure 139. Paired simulated vs. observed Organic Nitrogen (OrgN) load at Jack Creek near Heron Lake (validation period)

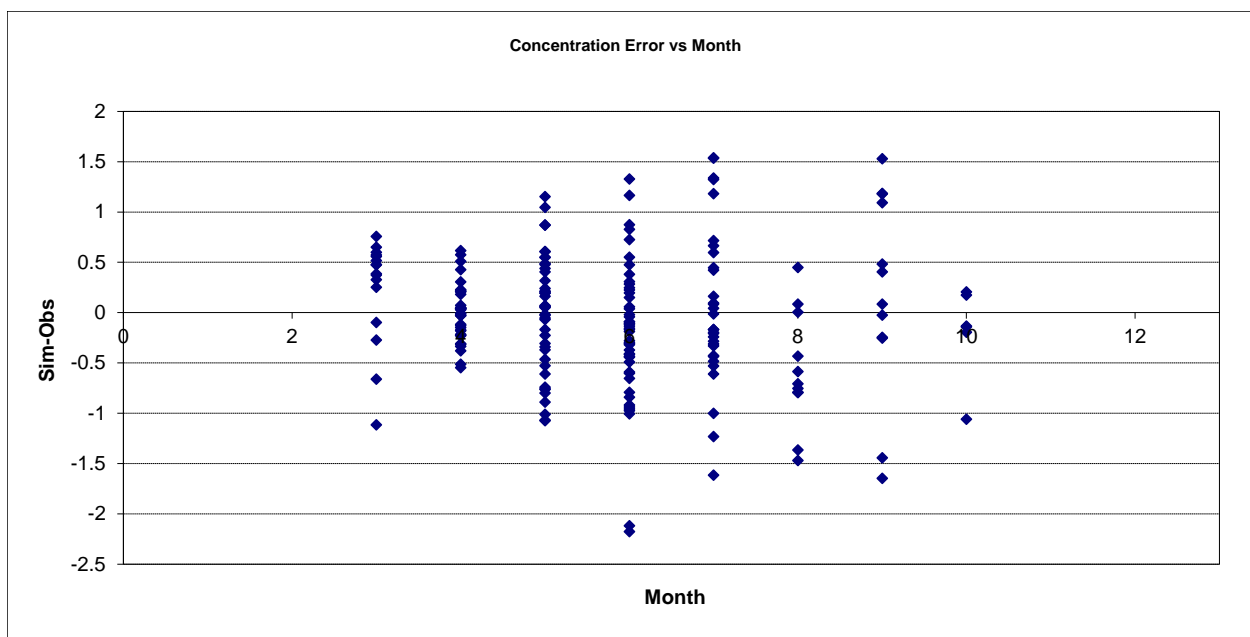


Figure 140. Residual (Simulated - Observed) vs. Month Organic Nitrogen (OrgN) at Jack Creek near Heron Lake

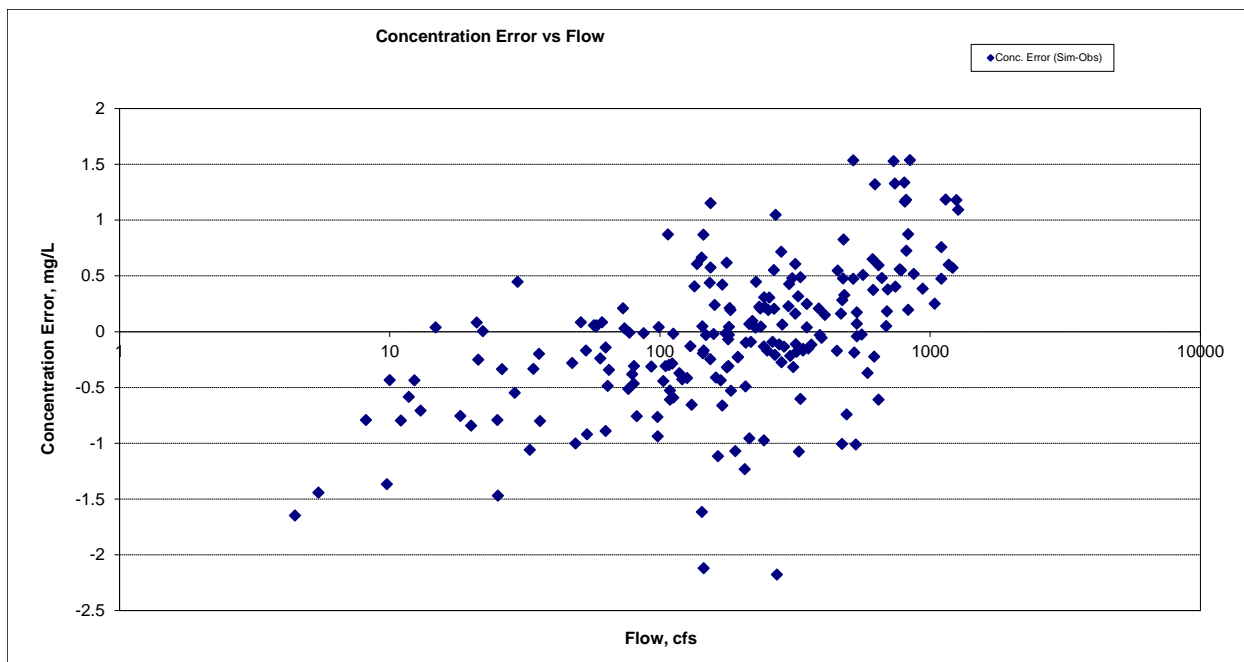


Figure 141. Residual (Simulated - Observed) vs. Flow Organic Nitrogen (OrgN) at Jack Creek near Heron Lake

Total Kjeldahl Nitrogen (TKN)

Table 22. Total Kjeldahl Nitrogen (TKN) statistics

Period	2002-2014	1997-2002
Count	233	14
Concentration Average Error	8.24%	-31.17%
Concentration Median Error	9.11%	-23.98%
Load Average Error	30.49%	8.16%
Load Median Error	0.82%	-6.91%
Paired t concentration	1.00	0.13

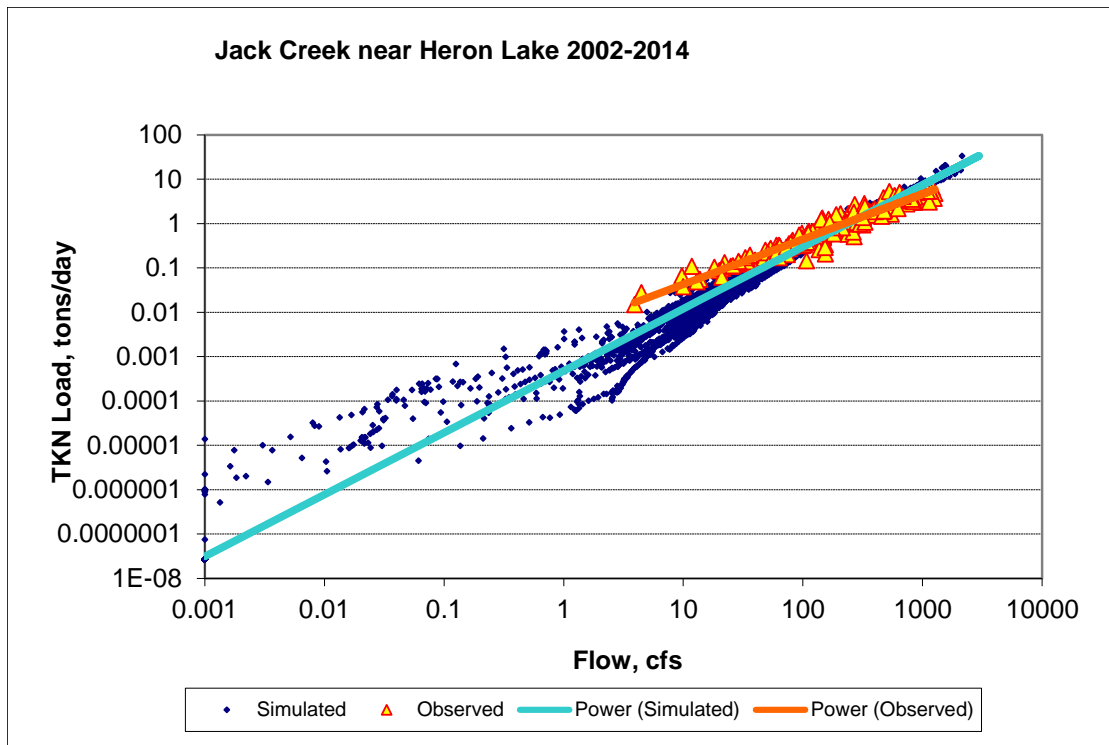


Figure 142. Power plot of simulated and observed Total Kjeldahl Nitrogen (TKN) load vs flow at Jack Creek near Heron Lake (calibration period)

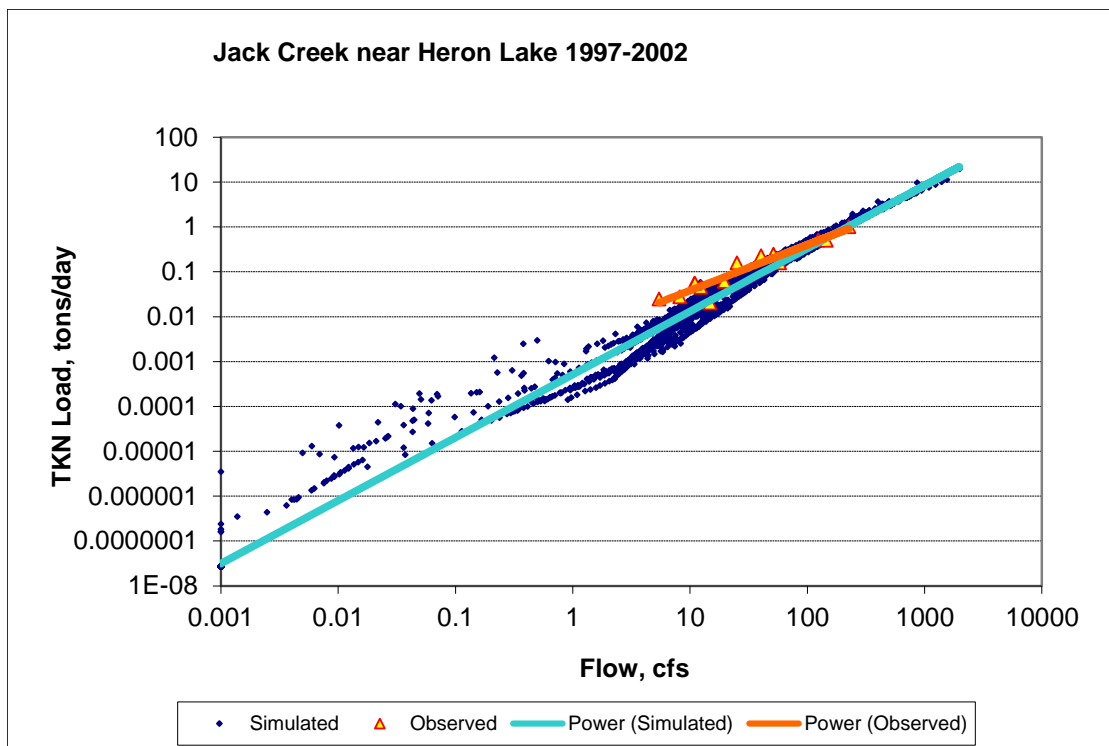


Figure 143. Power plot of simulated and observed Total Kjeldahl Nitrogen (TKN) load vs flow at Jack Creek near Heron Lake (validation period)

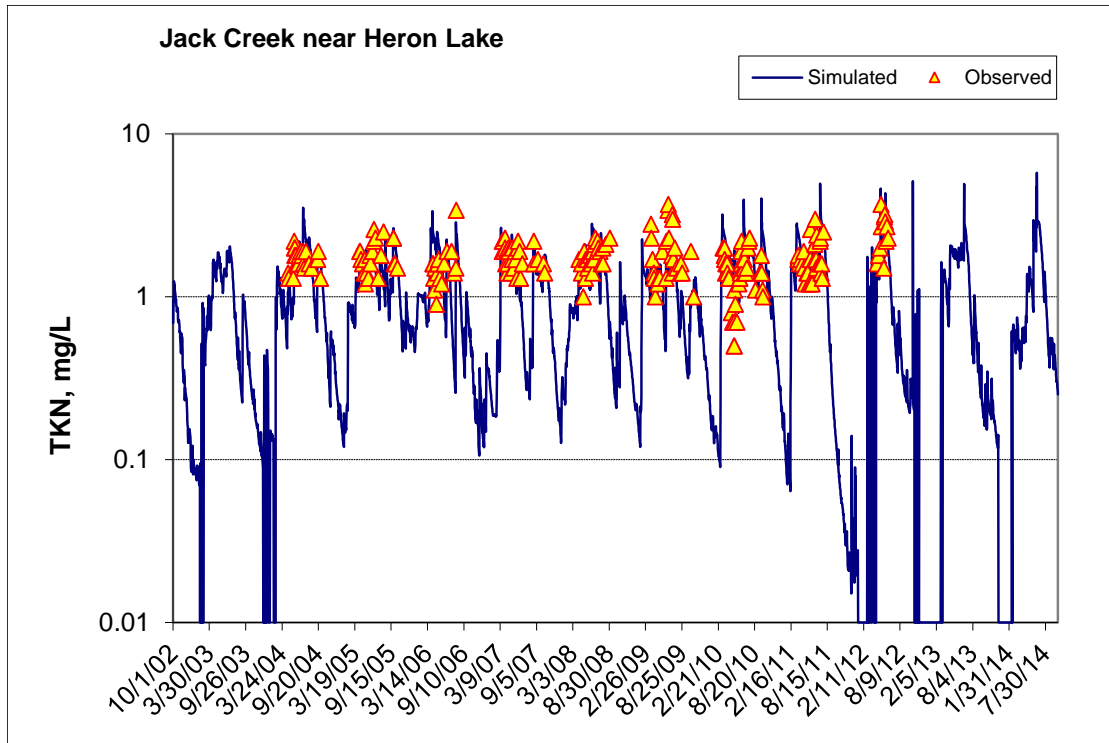


Figure 144. Time series of observed and simulated Total Kjeldahl Nitrogen (TKN) concentration at Jack Creek near Heron Lake (calibration period)

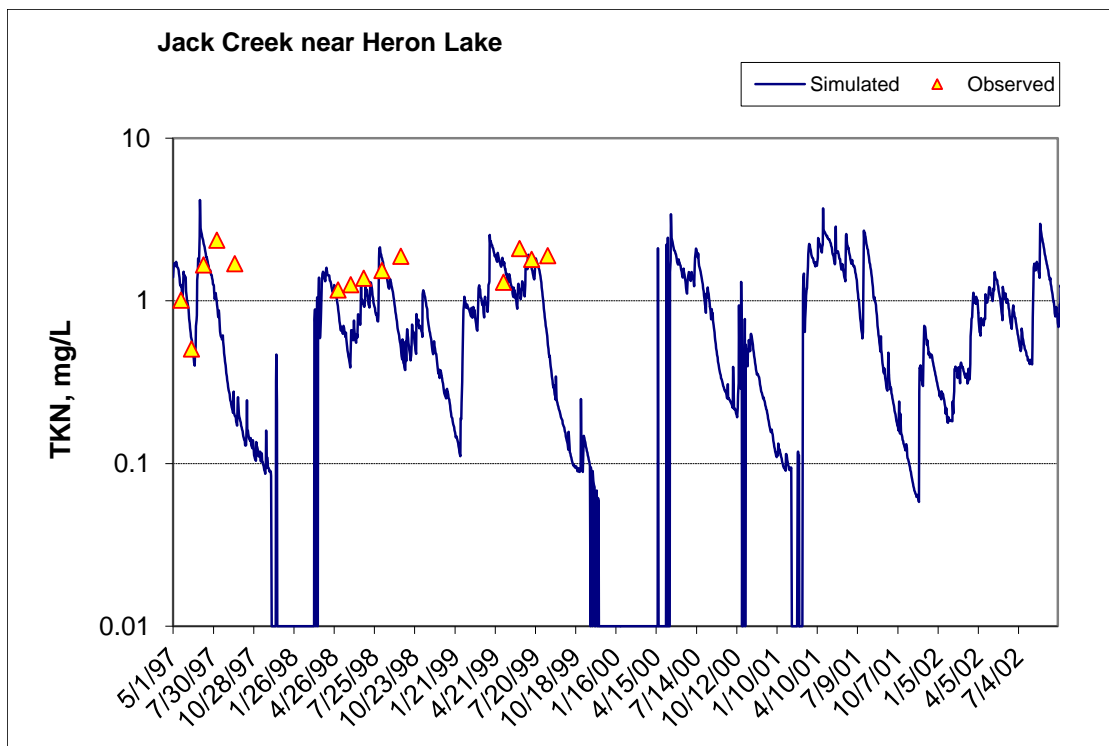


Figure 145. Time series of observed and simulated Total Kjeldahl Nitrogen (TKN) concentration at Jack Creek near Heron Lake (validation period)

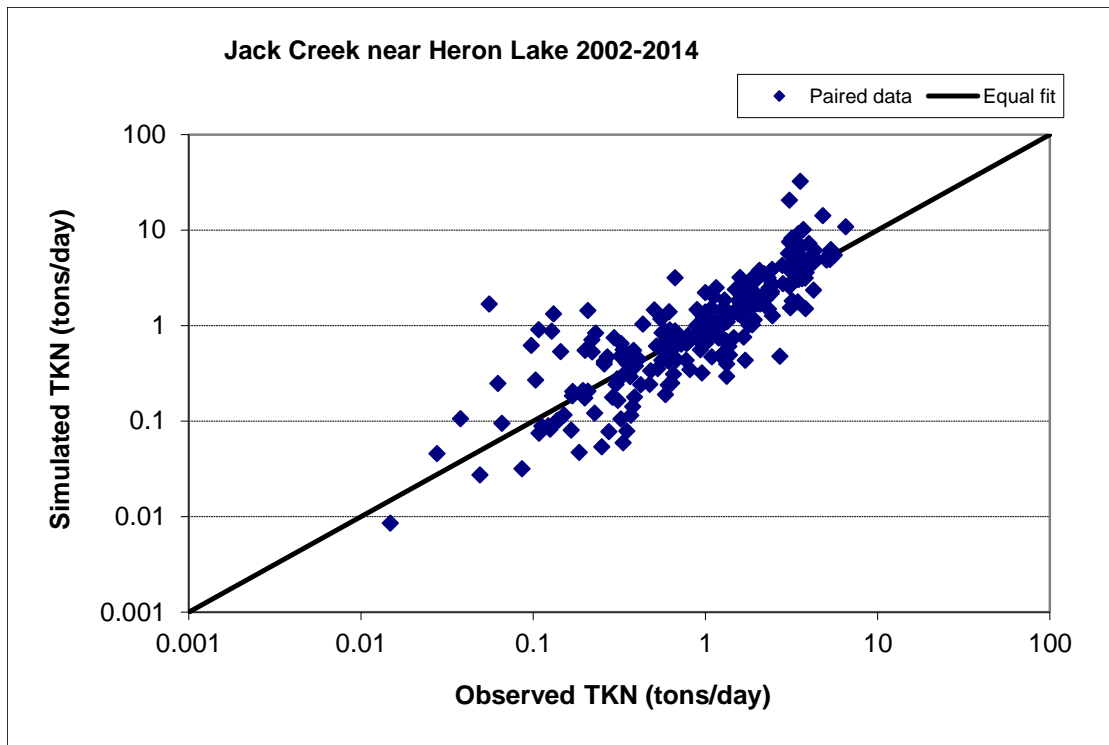


Figure 146. Paired simulated vs. observed Total Kjeldahl Nitrogen (TKN) load at Jack Creek near Heron Lake (calibration period)

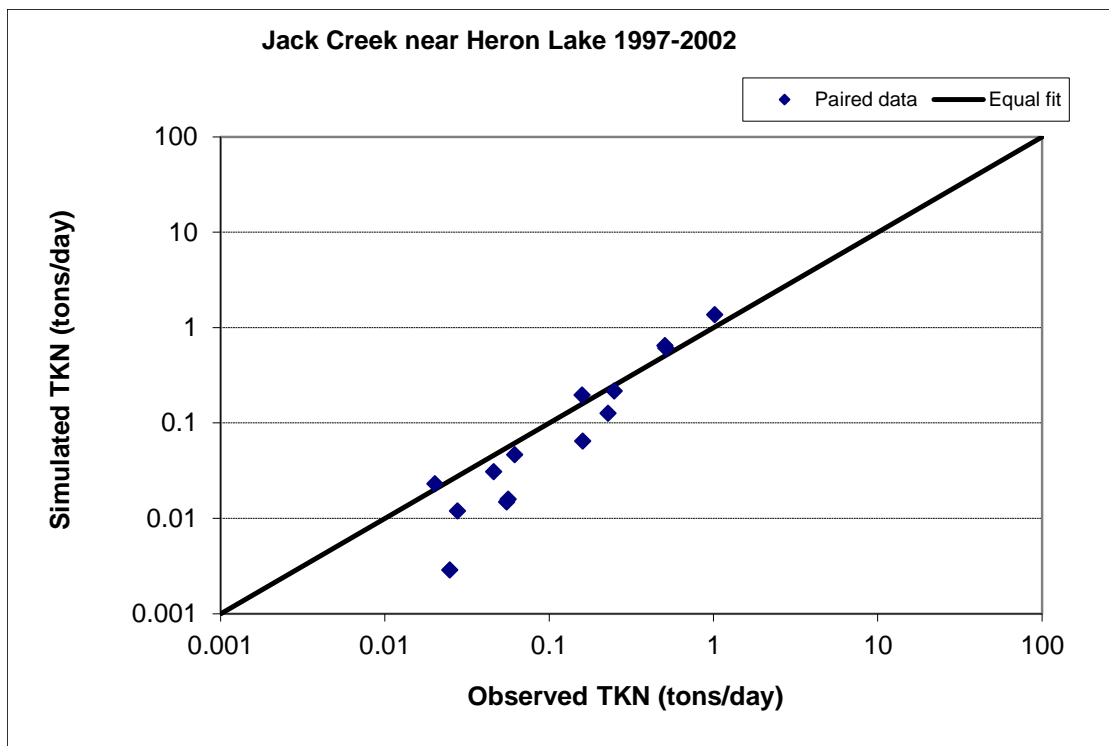


Figure 147. Paired simulated vs. observed Total Kjeldahl Nitrogen (TKN) load at Jack Creek near Heron Lake (validation period)

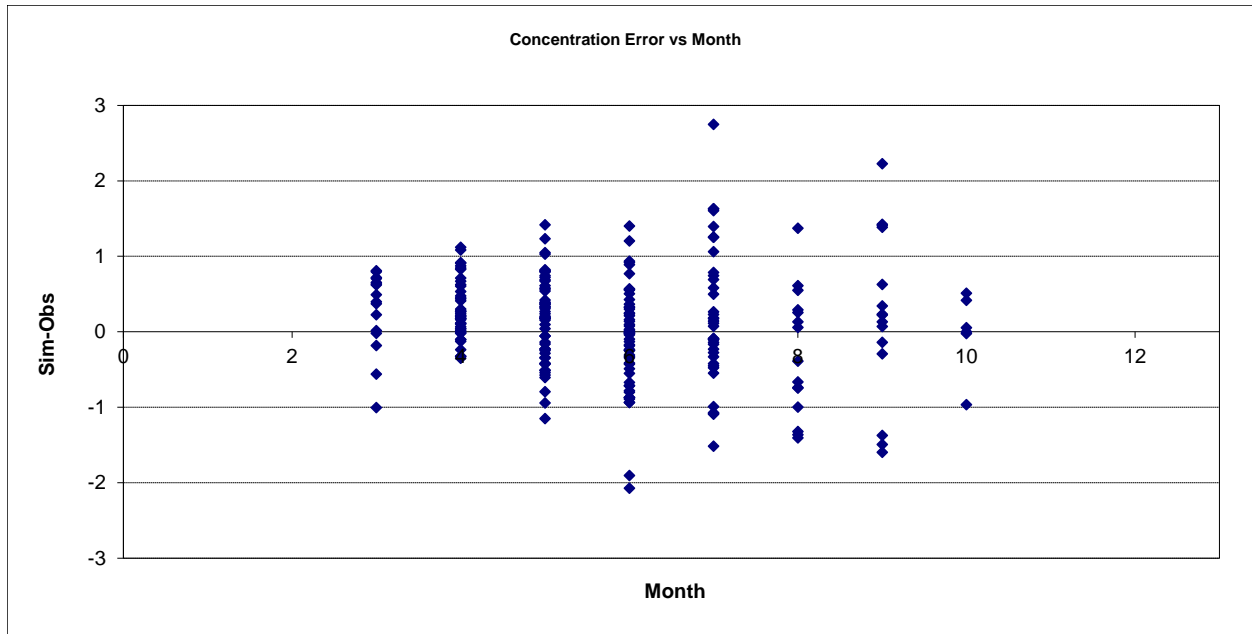


Figure 148. Residual (Simulated - Observed) vs. Month Total Kjeldahl Nitrogen (TKN) at Jack Creek near Heron Lake

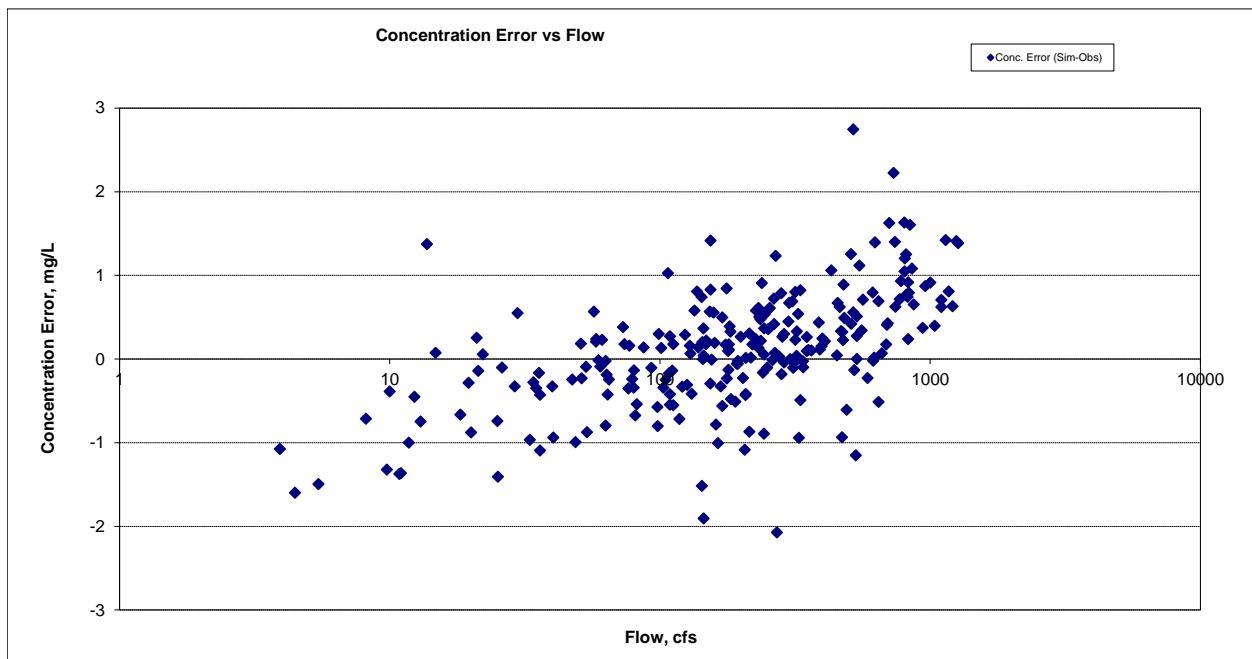


Figure 149. Residual (Simulated - Observed) vs. Flow Total Kjeldahl Nitrogen (TKN) at Jack Creek near Heron Lake

Nitrite+ Nitrate Nitrogen (NOx)

Table 23. Nitrite+ Nitrate Nitrogen (NOx) statistics

Period	2002-2014	1997-2002
Count	221	14
Concentration Average Error	-11.43%	-40.53%
Concentration Median Error	-16.07%	-38.76%
Load Average Error	-0.88%	-25.18%
Load Median Error	-11.99%	-19.04%
Paired t concentration	1.00	0.05

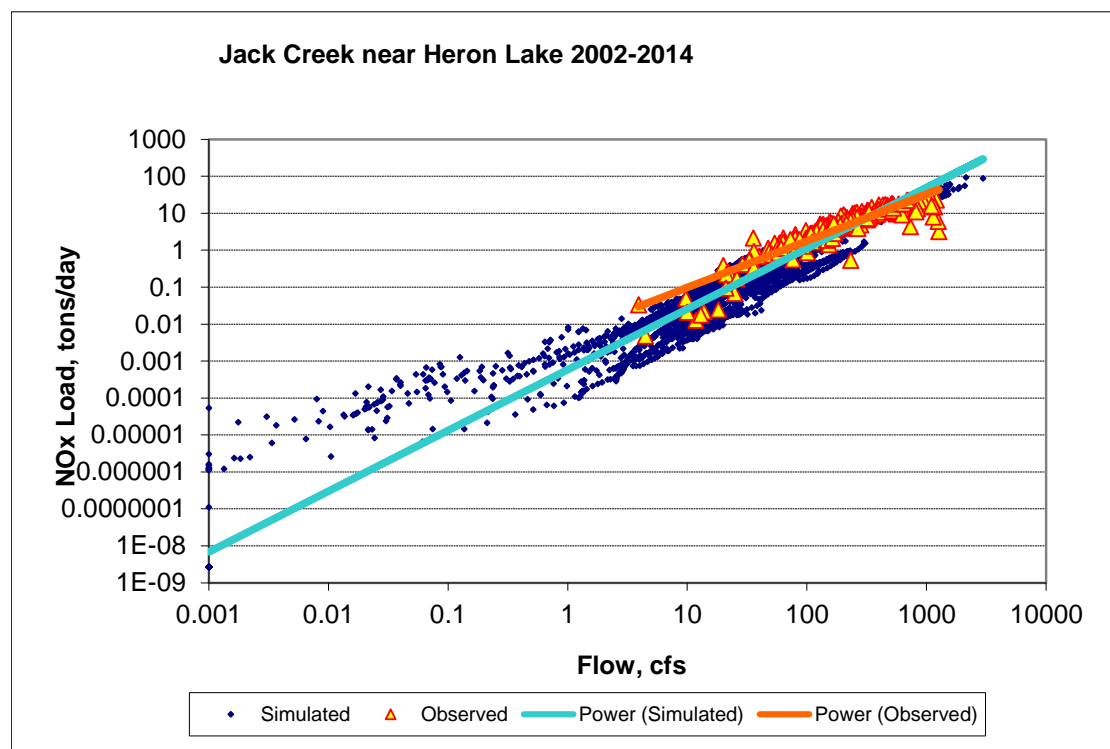


Figure 150. Power plot of simulated and observed Nitrite+ Nitrate Nitrogen (NOx) load vs flow at Jack Creek near Heron Lake (calibration period)

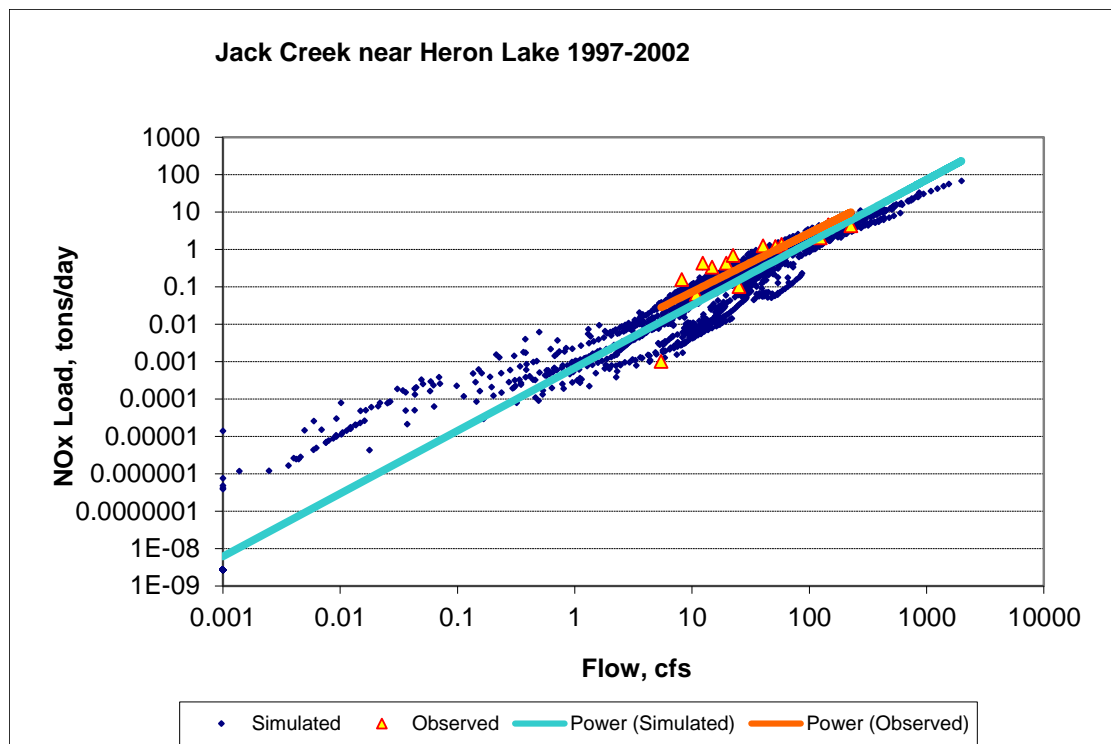


Figure 151. Power plot of simulated and observed Nitrite+ Nitrate Nitrogen (NOx) load vs flow at Jack Creek near Heron Lake (validation period)

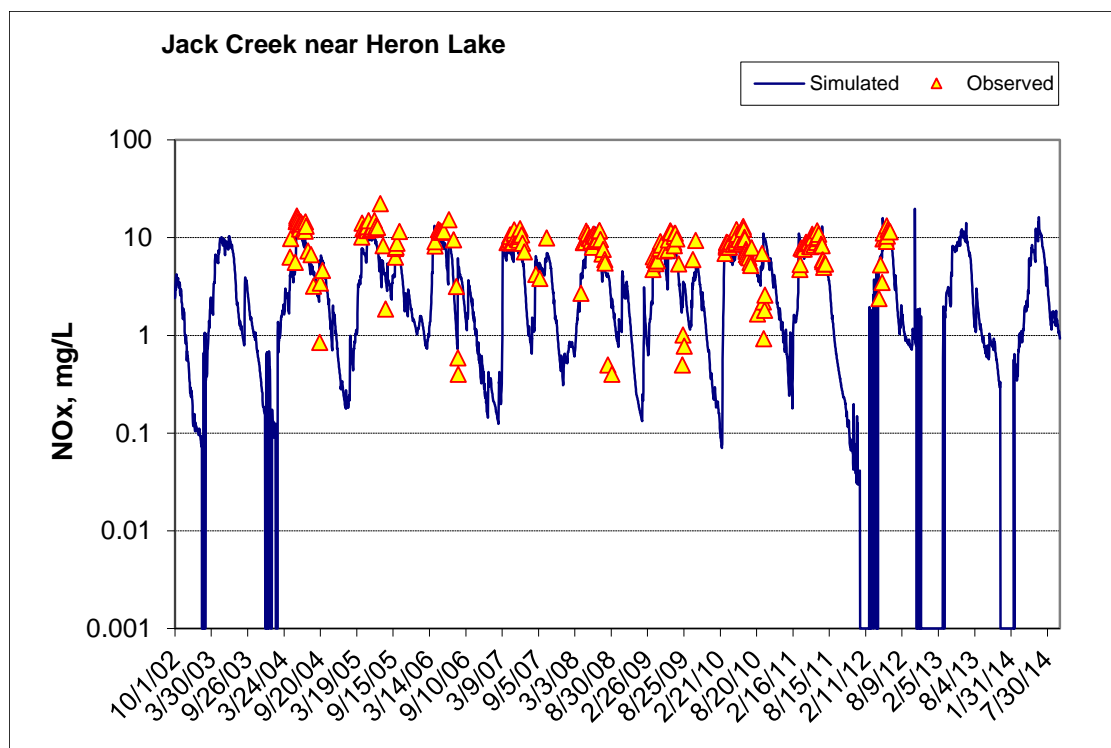


Figure 152. Time series of observed and simulated Nitrite+ Nitrate Nitrogen (NOx) concentration at Jack Creek near Heron Lake (calibration period)

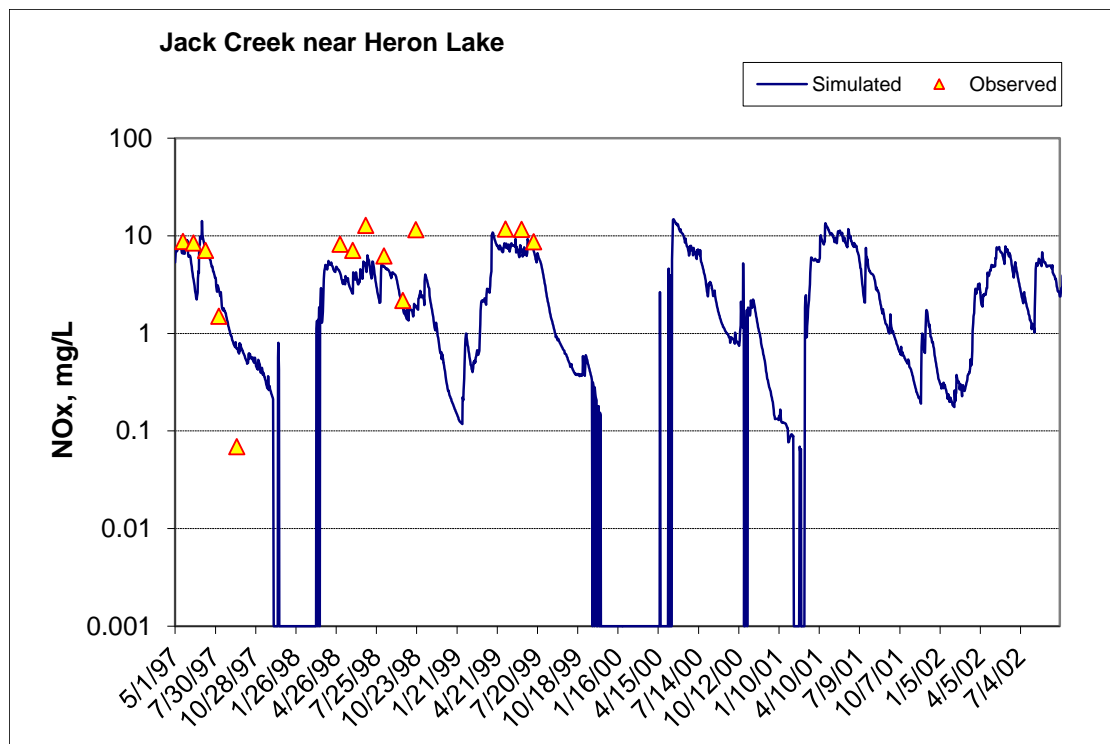


Figure 153. Time series of observed and simulated Nitrite+ Nitrate Nitrogen (NOx) concentration at Jack Creek near Heron Lake (validation period)

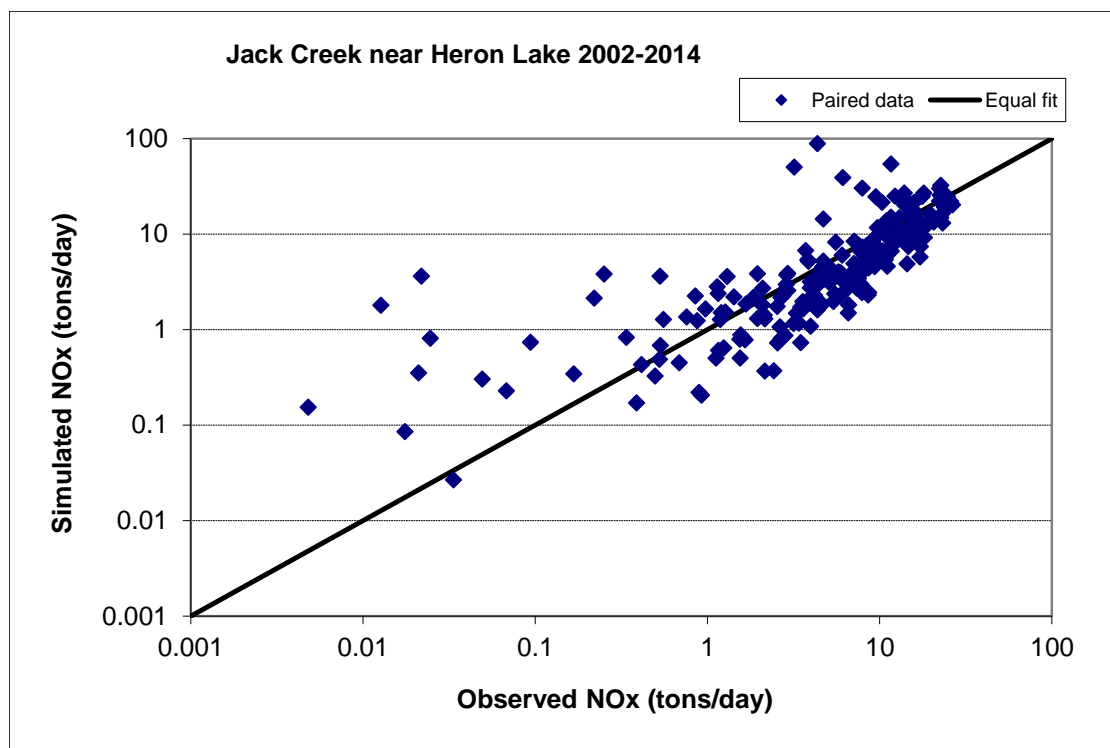


Figure 154. Paired simulated vs. observed Nitrite+ Nitrate Nitrogen (NOx) load at Jack Creek near Heron Lake (calibration period)

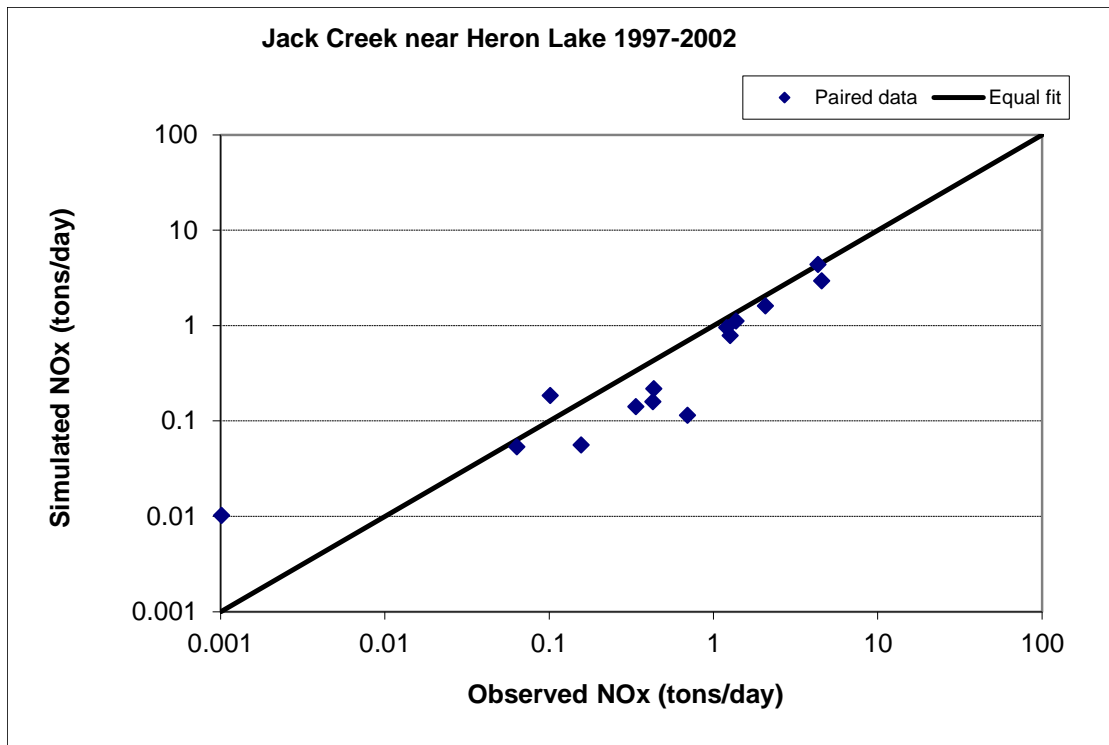


Figure 155. Paired simulated vs. observed Nitrite+ Nitrate Nitrogen (NOx) load at Jack Creek near Heron Lake (validation period)

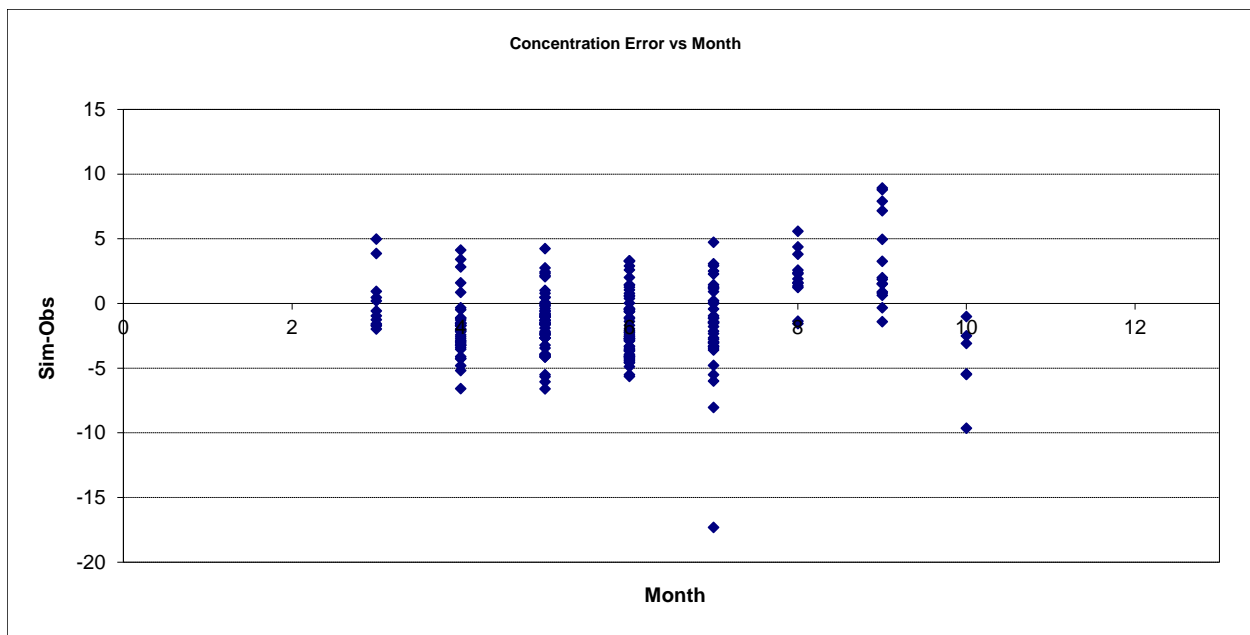


Figure 156. Residual (Simulated - Observed) vs. Month Nitrite+ Nitrate Nitrogen (NOx) at Jack Creek near Heron Lake

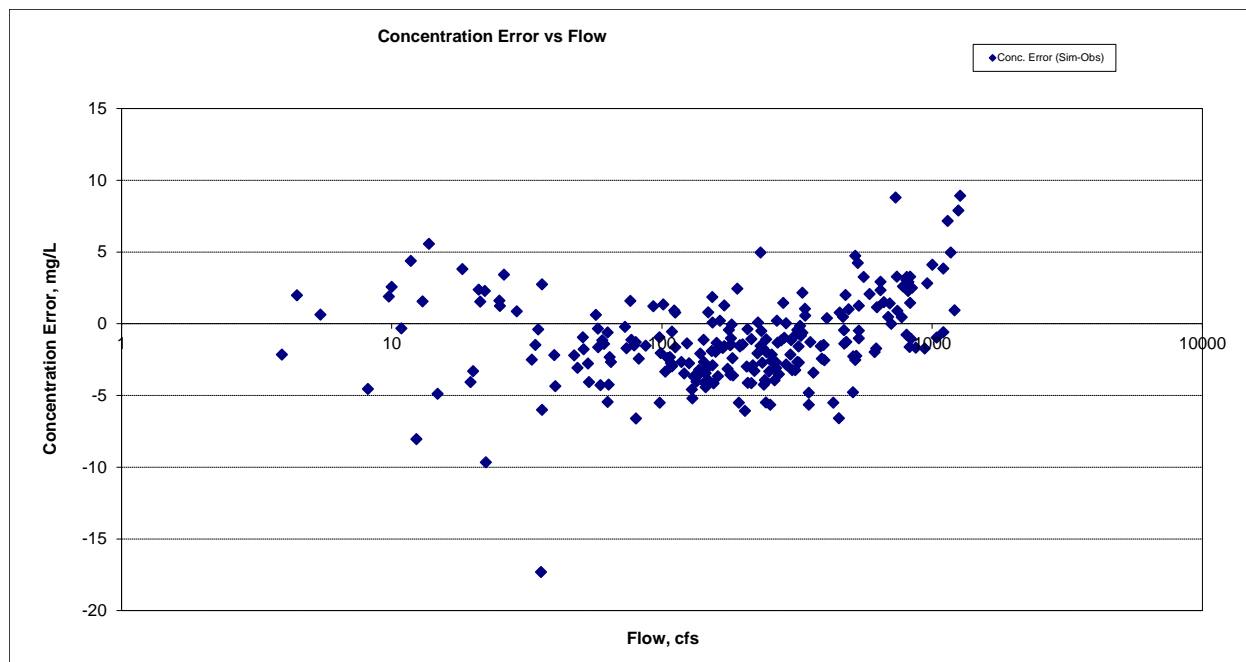


Figure 157. Residual (Simulated - Observed) vs. Flow Nitrite+ Nitrate Nitrogen (NOx) at Jack Creek near Heron Lake

Total Nitrogen (TN)

Table 24. Total Nitrogen (TN) statistics

Period	2002-2014	1997-2002
Count	220	13
Concentration Average Error	-8.26%	-33.89%
Concentration Median Error	-11.43%	-23.08%
Load Average Error	4.30%	-17.58%
Load Median Error	-10.13%	-14.77%
Paired t concentration	1.00	0.11

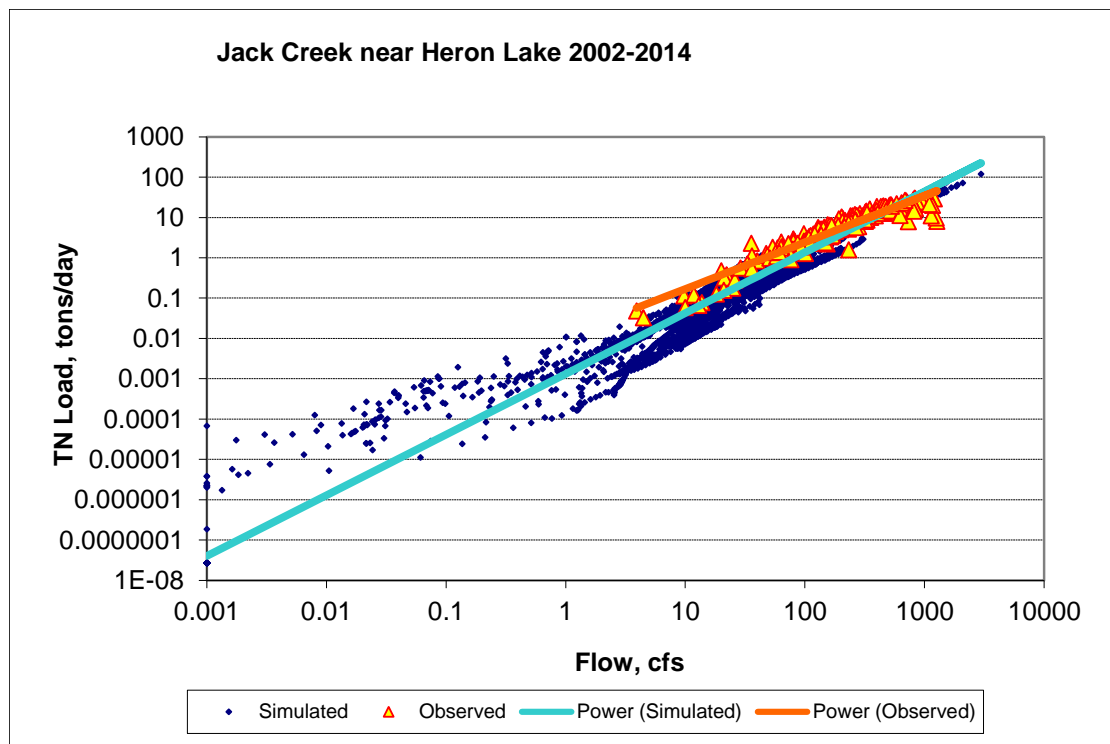


Figure 158. Power plot of simulated and observed Total Nitrogen (TN) load vs flow at Jack Creek near Heron Lake (calibration period)

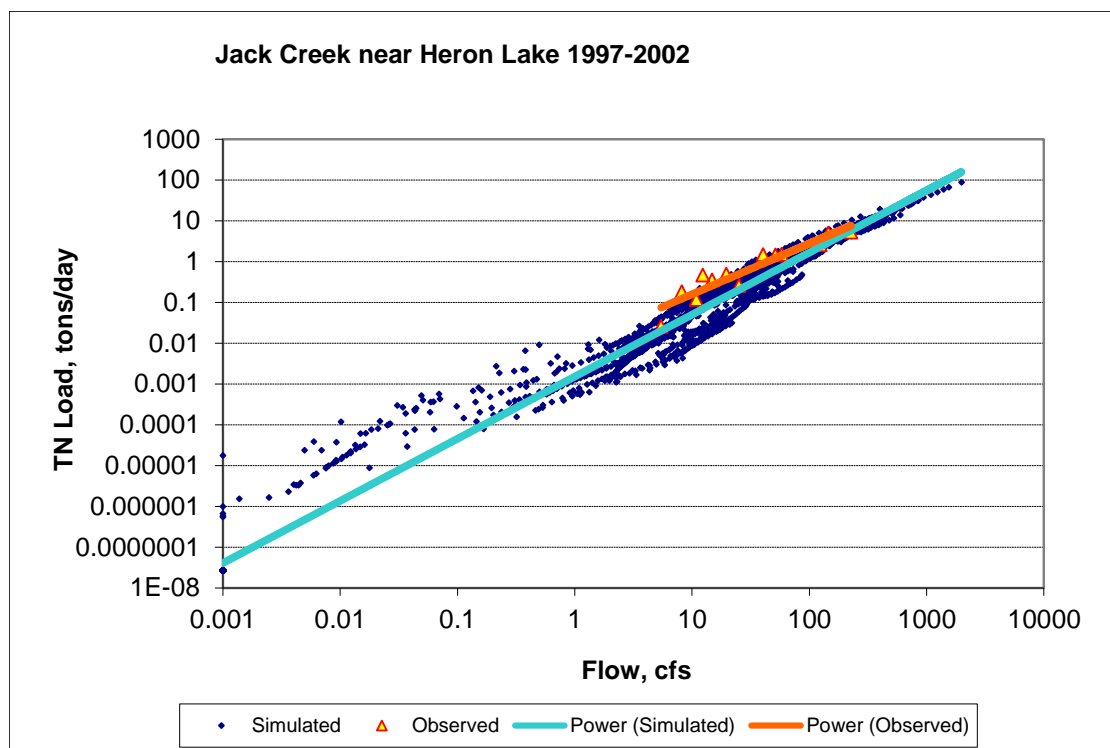


Figure 159. Power plot of simulated and observed Total Nitrogen (TN) load vs flow at Jack Creek near Heron Lake (validation period)

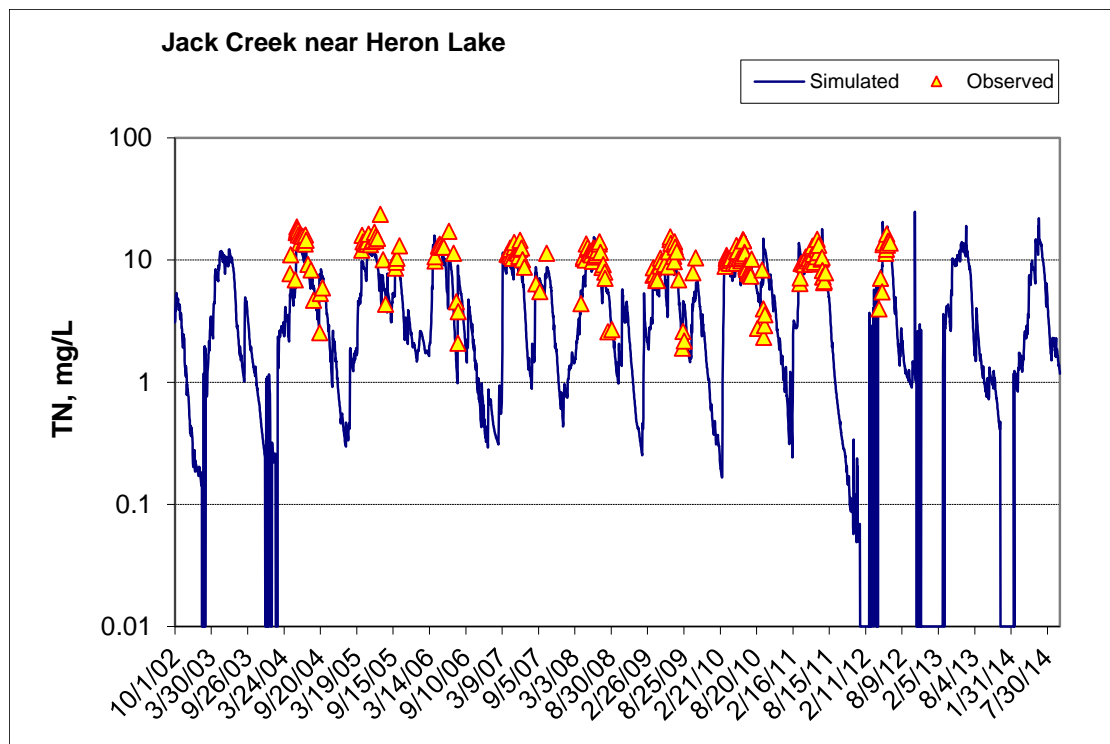


Figure 160. Time series of observed and simulated Total Nitrogen (TN) concentration at Jack Creek near Heron Lake (calibration period)

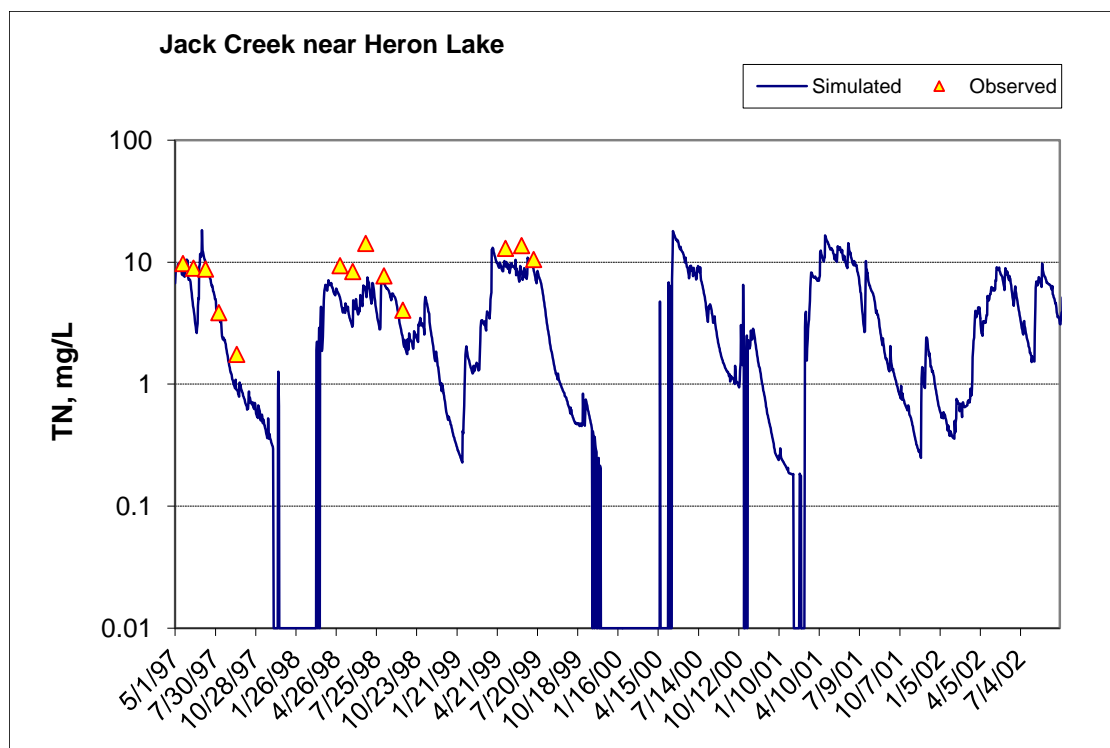


Figure 161. Time series of observed and simulated Total Nitrogen (TN) concentration at Jack Creek near Heron Lake (validation period)

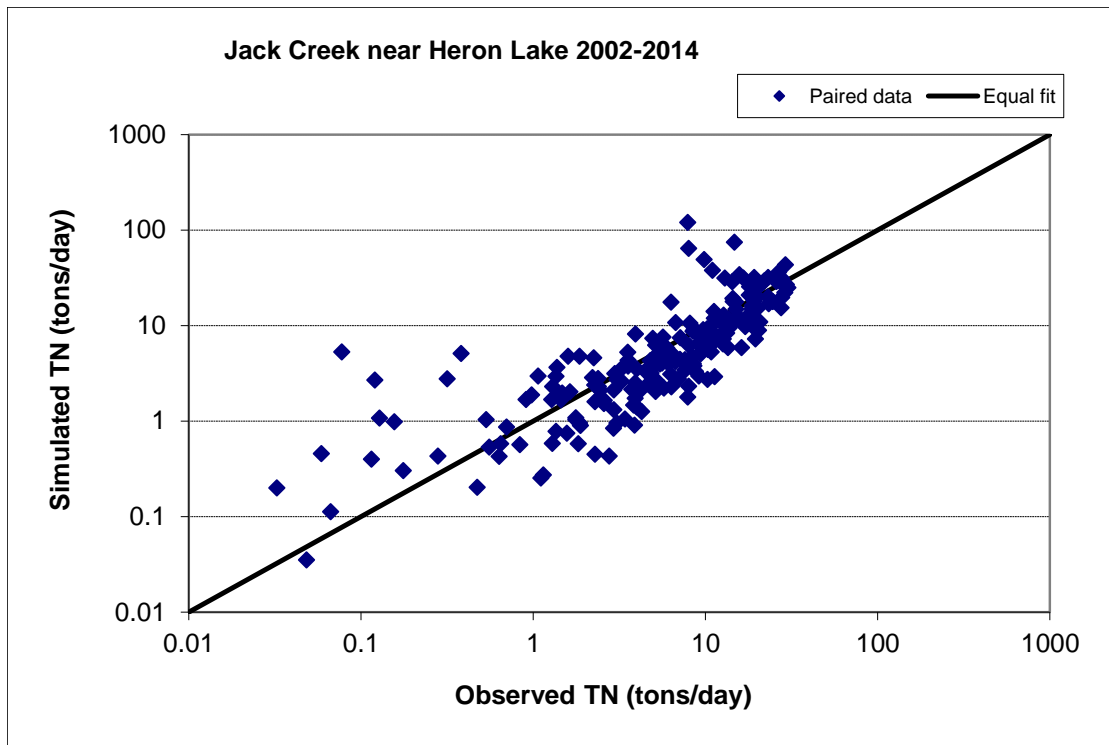


Figure 162. Paired simulated vs. observed Total Nitrogen (TN) load at Jack Creek near Heron Lake (calibration period)

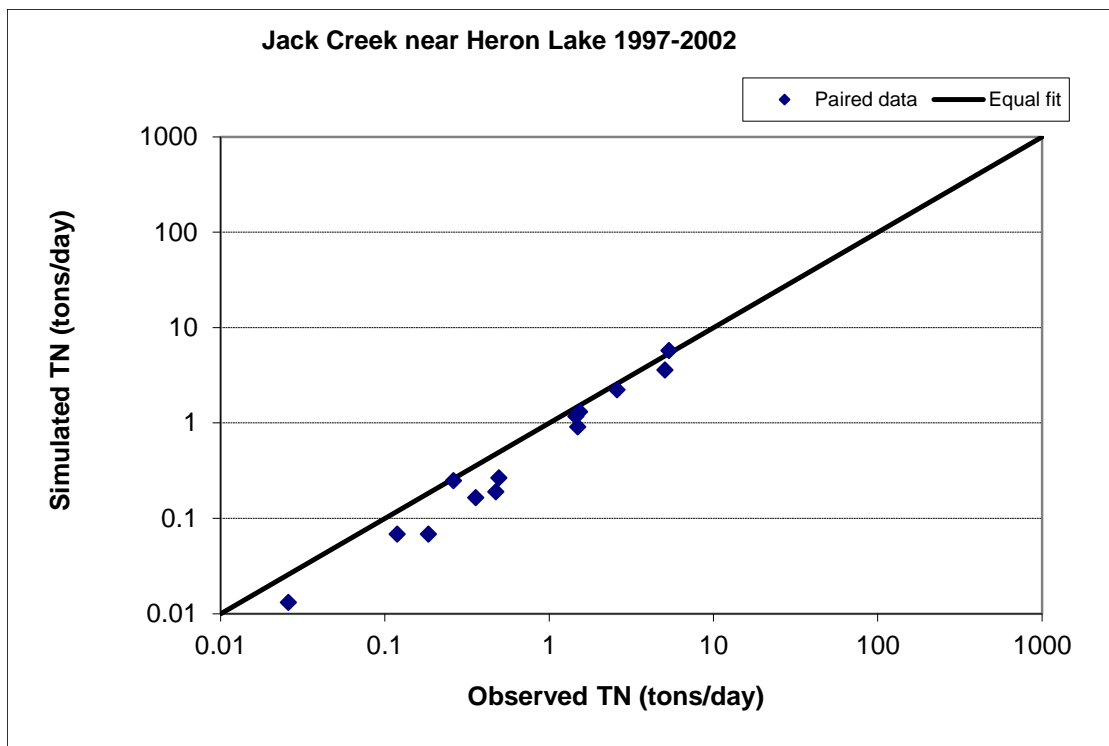


Figure 163. Paired simulated vs. observed Total Nitrogen (TN) load at Jack Creek near Heron Lake (validation period)

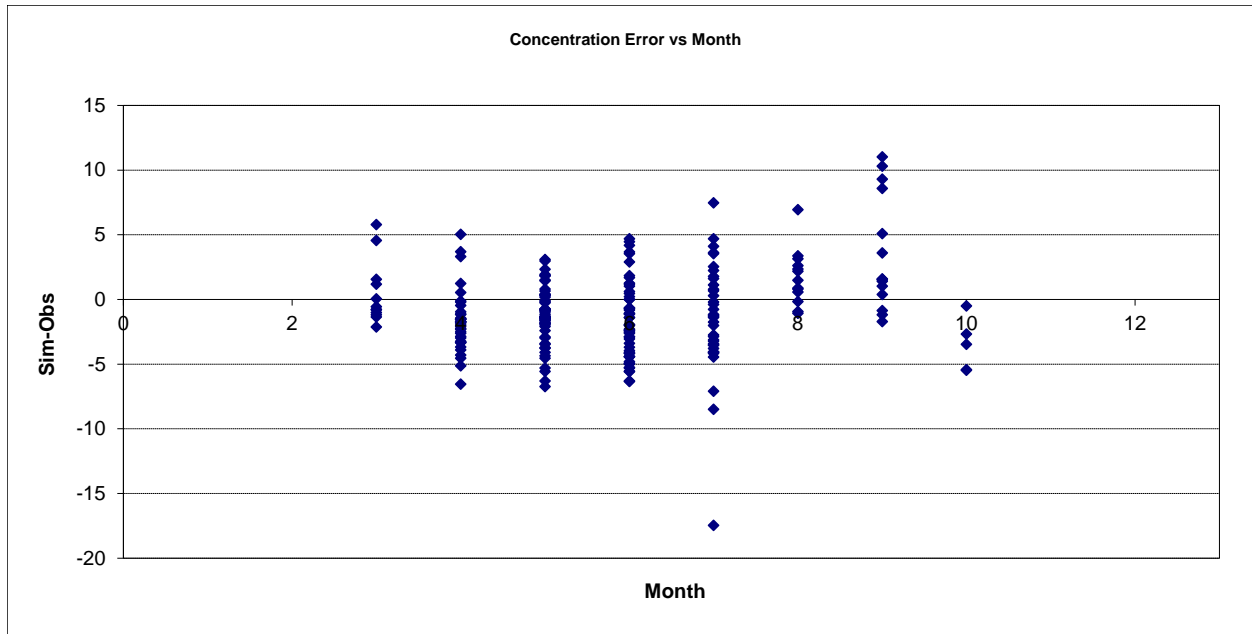


Figure 164. Residual (Simulated - Observed) vs. Month Total Nitrogen (TN) at Jack Creek near Heron Lake

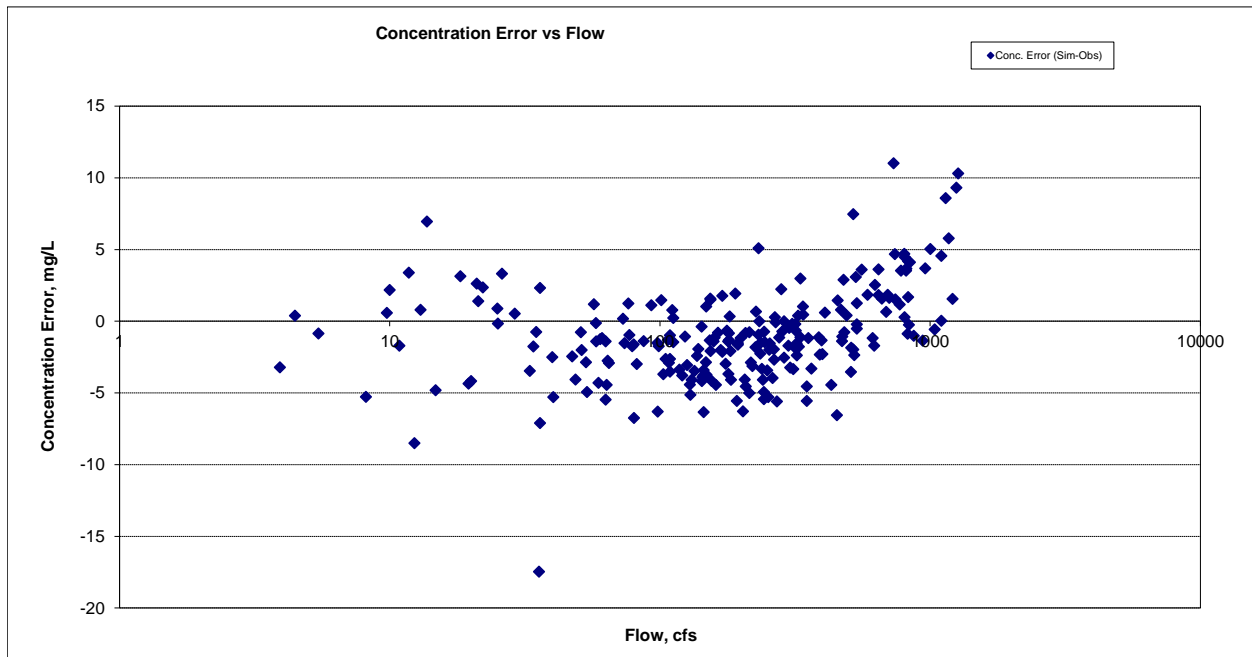


Figure 165. Residual (Simulated - Observed) vs. Flow Total Nitrogen (TN) at Jack Creek near Heron Lake

Soluble Reactive Phosphorus (SRP)

Table 25. Soluble Reactive Phosphorus (SRP) statistics

Period	2002-2014	1997-2002
Count	252	31
Concentration Average Error	-14.61%	-58.36%
Concentration Median Error	-5.08%	-26.13%
Load Average Error	0.95%	-67.31%
Load Median Error	-1.21%	-7.97%
Paired t concentration	0.80	0.01

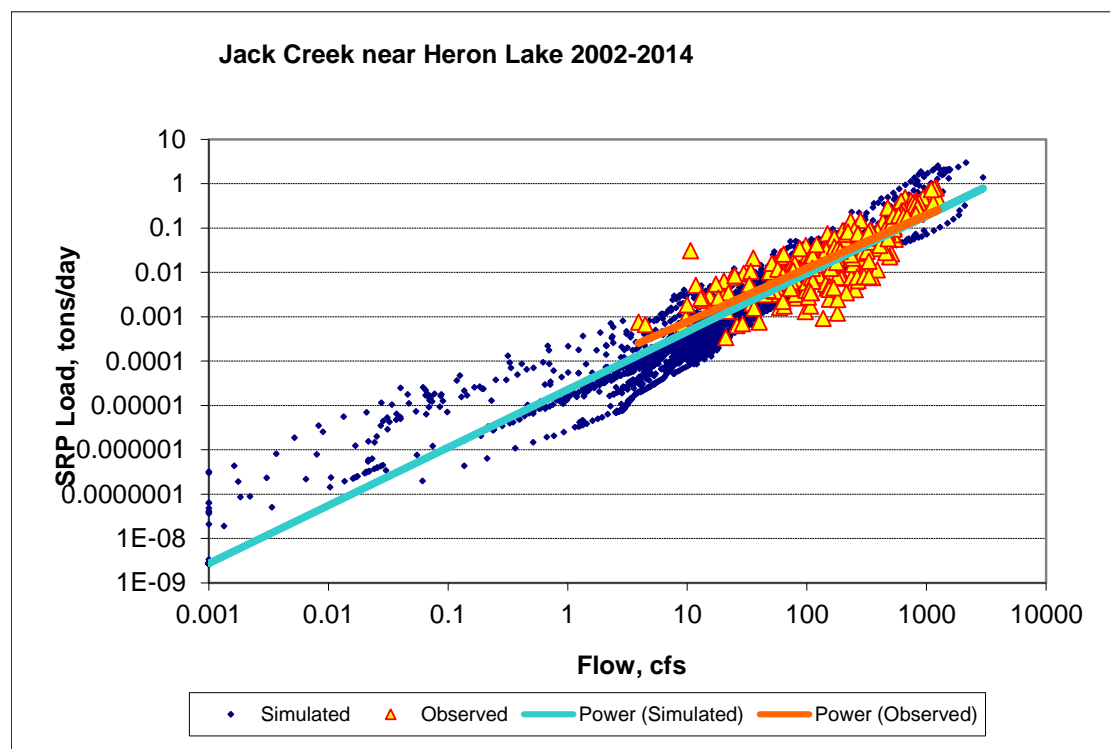


Figure 166. Power plot of simulated and observed Soluble Reactive Phosphorus (SRP) load vs flow at Jack Creek near Heron Lake (calibration period)

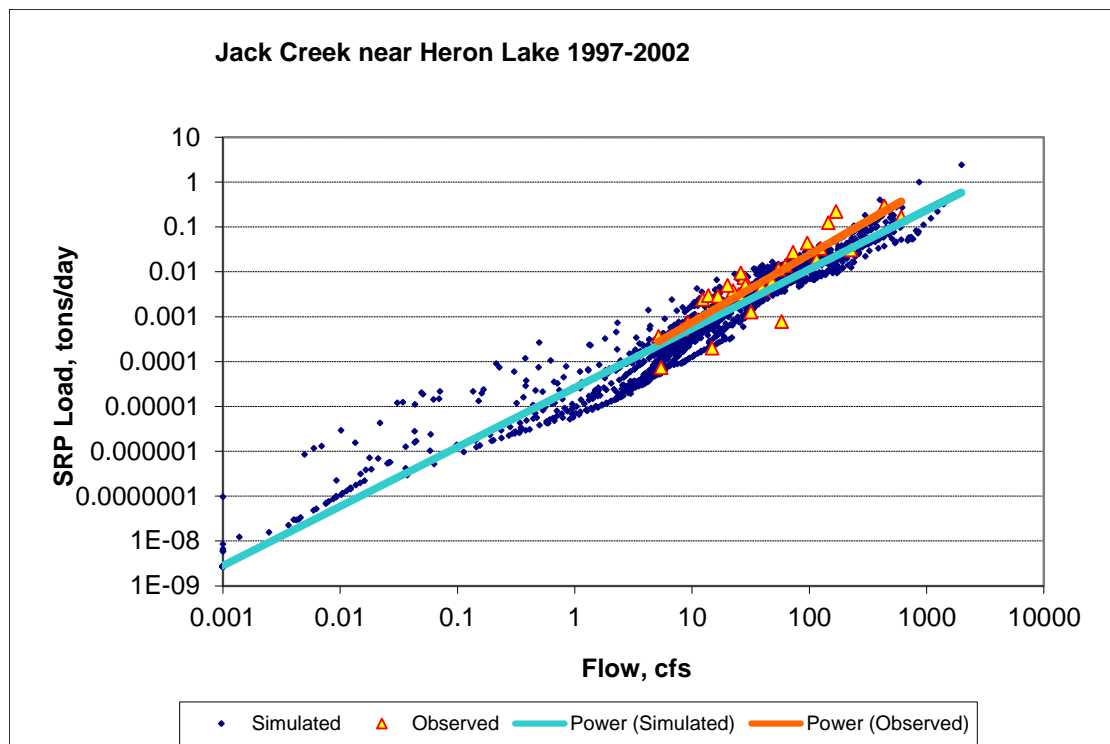


Figure 167. Power plot of simulated and observed Soluble Reactive Phosphorus (SRP) load vs flow at Jack Creek near Heron Lake (validation period)

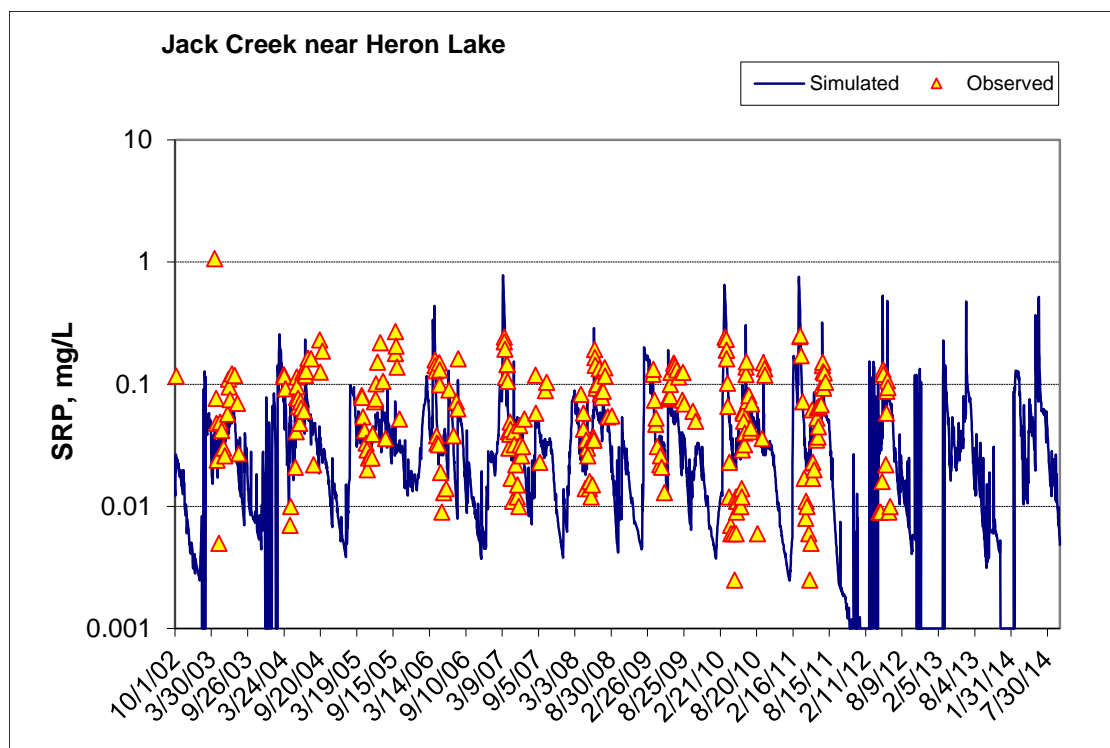


Figure 168. Time series of observed and simulated Soluble Reactive Phosphorus (SRP) concentration at Jack Creek near Heron Lake (calibration period)

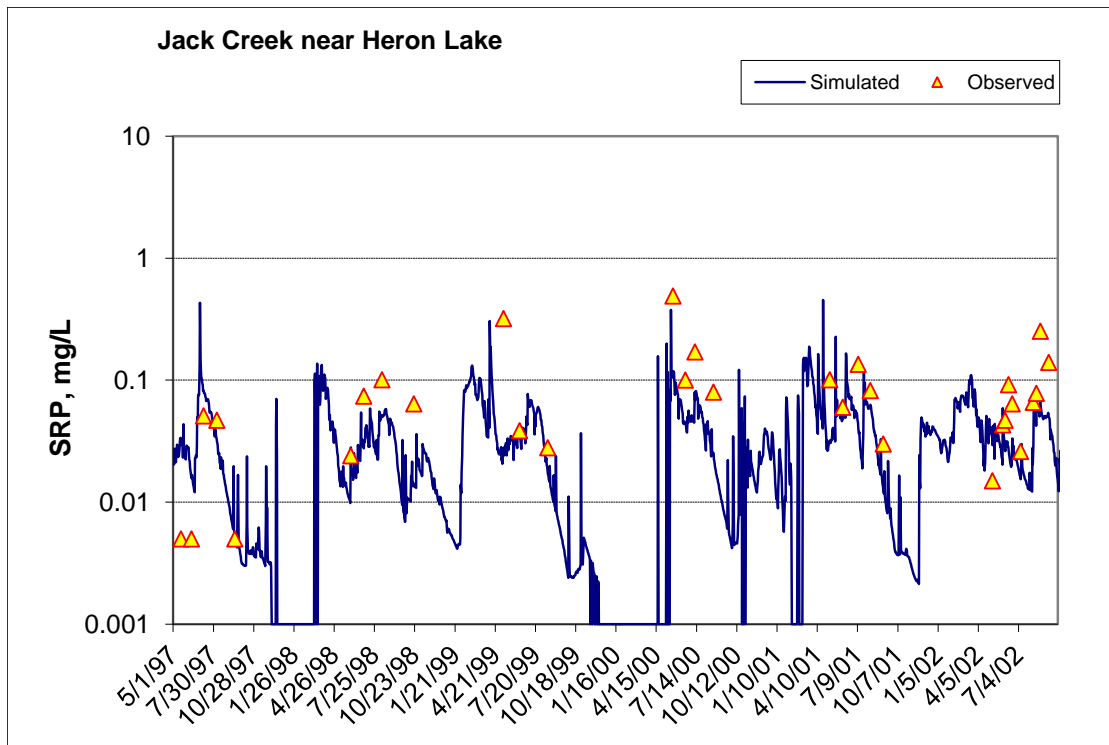


Figure 169. Time series of observed and simulated Soluble Reactive Phosphorus (SRP) concentration at Jack Creek near Heron Lake (validation period)

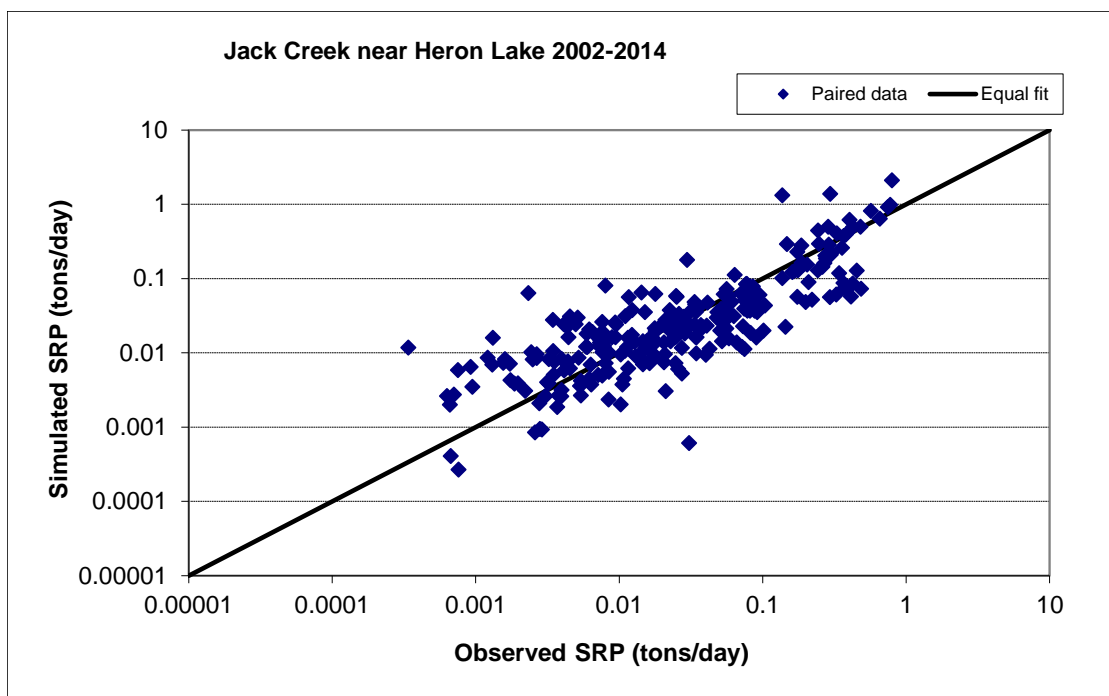


Figure 170. Paired simulated vs. observed Soluble Reactive Phosphorus (SRP) load at Jack Creek near Heron Lake (calibration period)

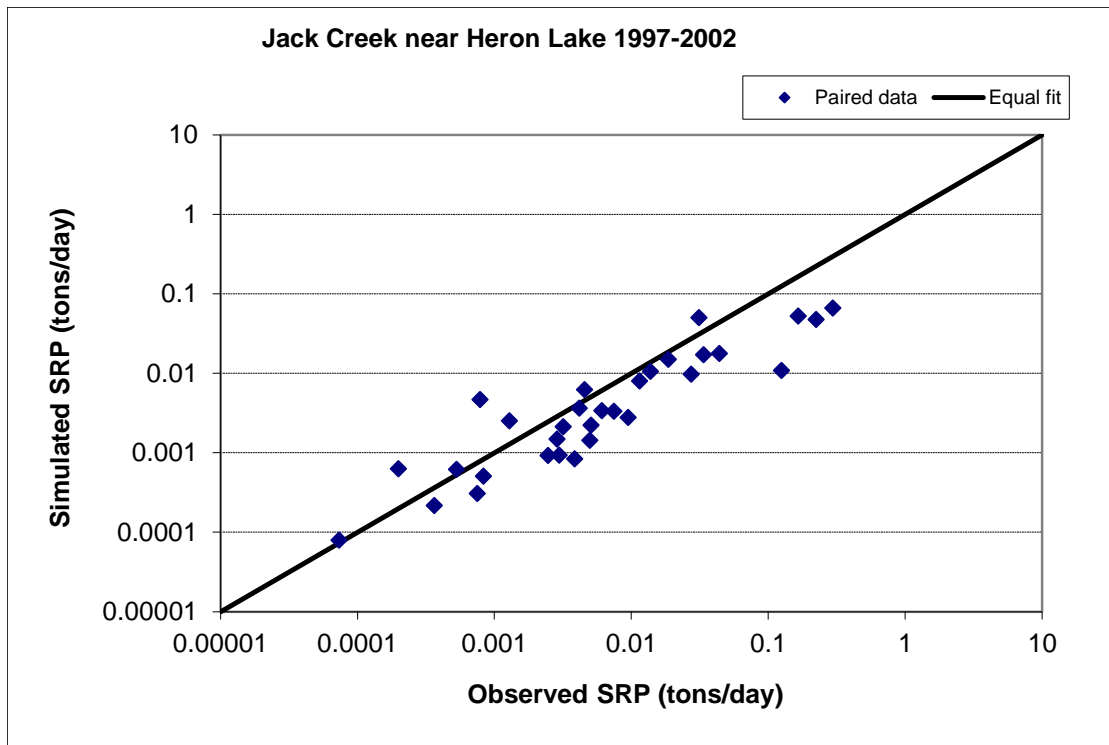


Figure 171. Paired simulated vs. observed Soluble Reactive Phosphorus (SRP) load at Jack Creek near Heron Lake (validation period)

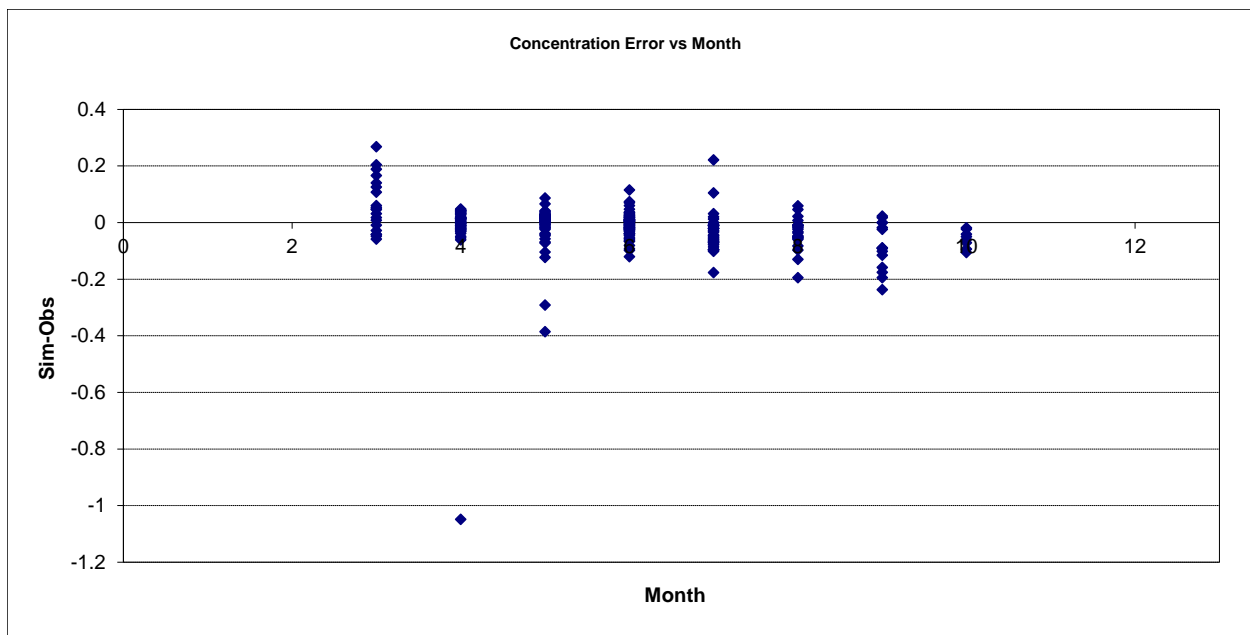


Figure 172. Residual (Simulated - Observed) vs. Month Soluble Reactive Phosphorus (SRP) at Jack Creek near Heron Lake

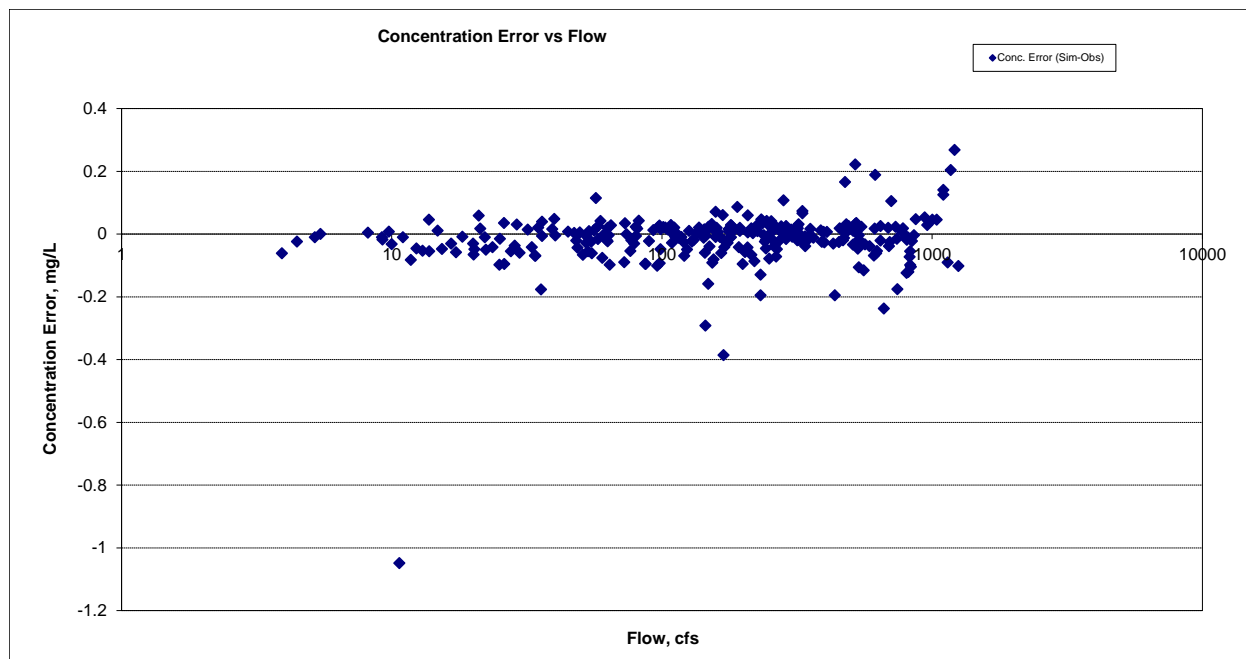


Figure 173. Residual (Simulated - Observed) vs. Flow Soluble Reactive Phosphorus (SRP) at Jack Creek near Heron Lake

Organic Phosphorus (OrgP)

Table 26. Organic Phosphorus (OrgP) statistics

Period	2002-2014	1997-2002
Count	251	30
Concentration Average Error	-1.94%	-64.98%
Concentration Median Error	0.78%	-49.12%
Load Average Error	22.79%	-47.27%
Load Median Error	0.35%	-14.25%
Paired t concentration	1.00	0.00

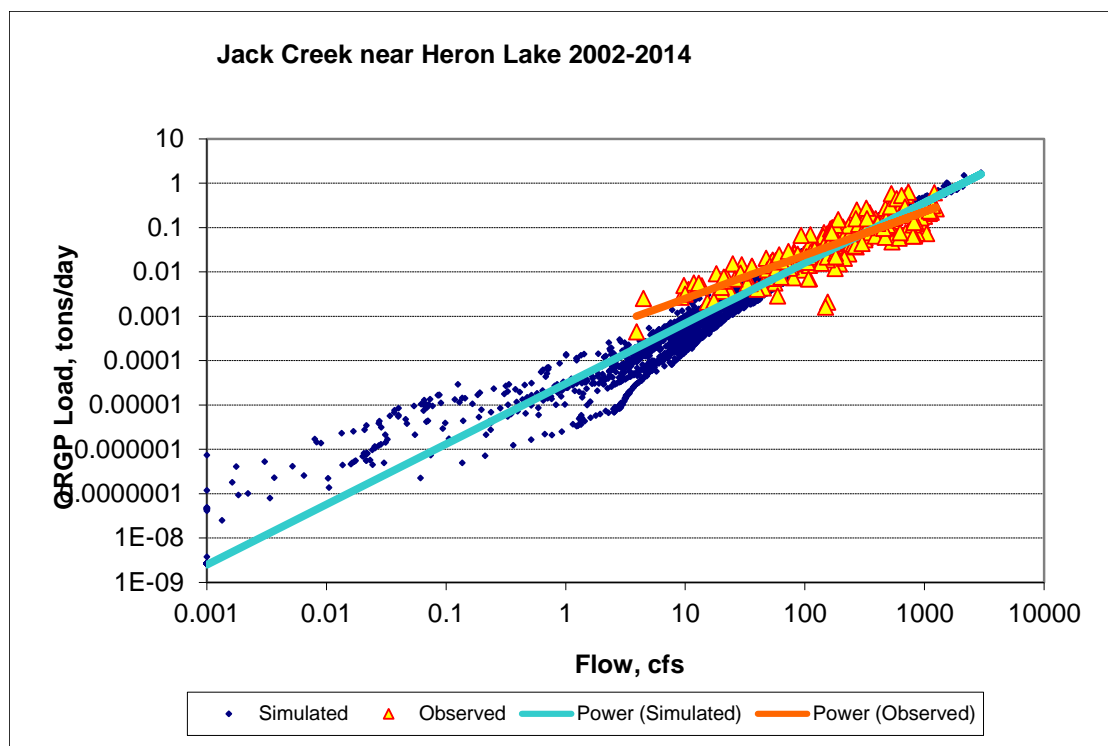


Figure 174. Power plot of simulated and observed Organic Phosphorus (OrgP) load vs flow at Jack Creek near Heron Lake (calibration period)

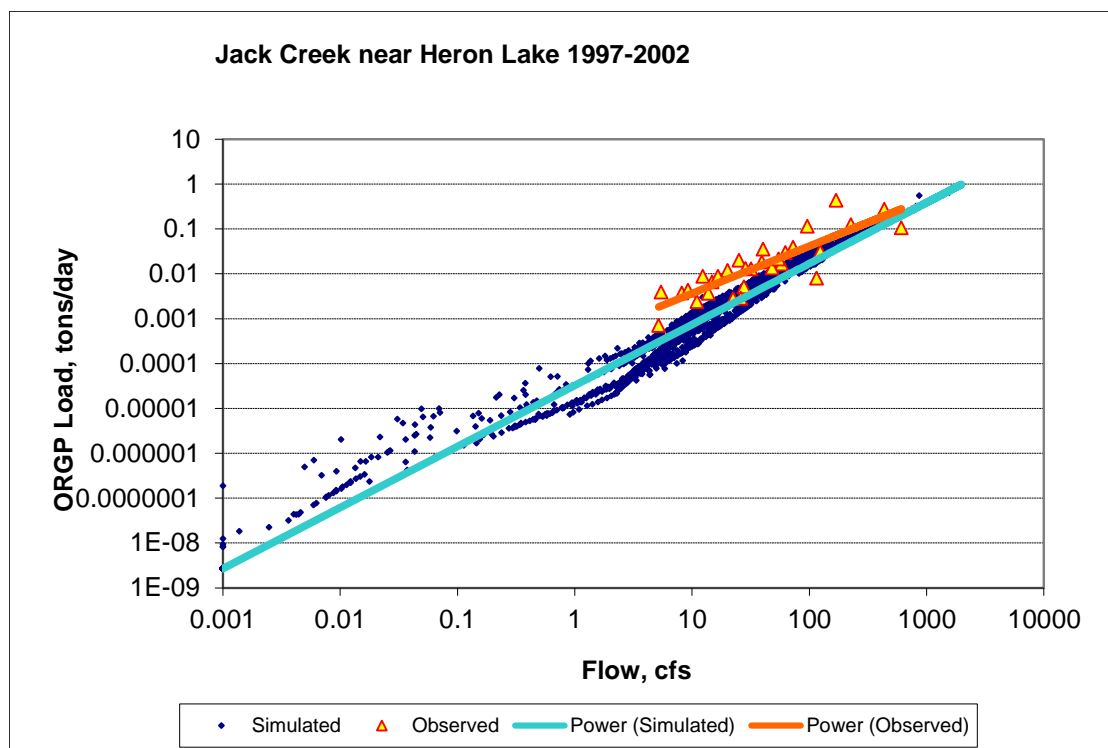


Figure 175. Power plot of simulated and observed Organic Phosphorus (OrgP) load vs flow at Jack Creek near Heron Lake (validation period)

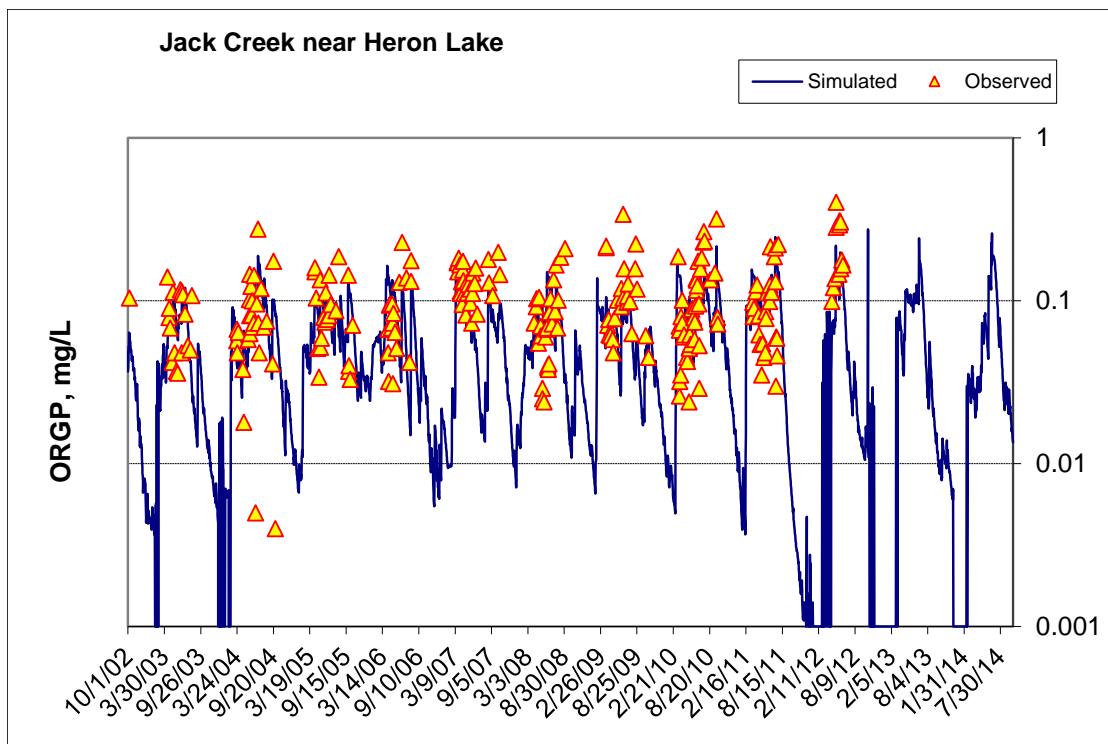


Figure 176. Time series of observed and simulated Organic Phosphorus (OrgP) concentration at Jack Creek near Heron Lake (calibration period)

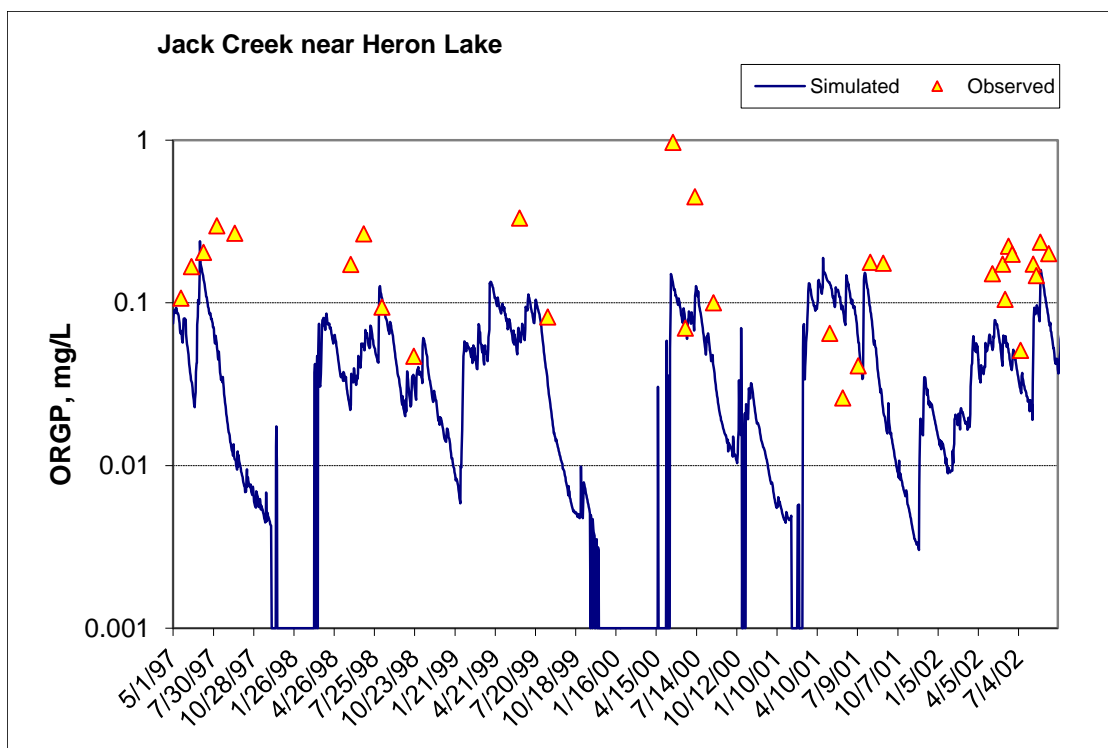


Figure 177. Time series of observed and simulated Organic Phosphorus (OrgP) concentration at Jack Creek near Heron Lake (validation period)

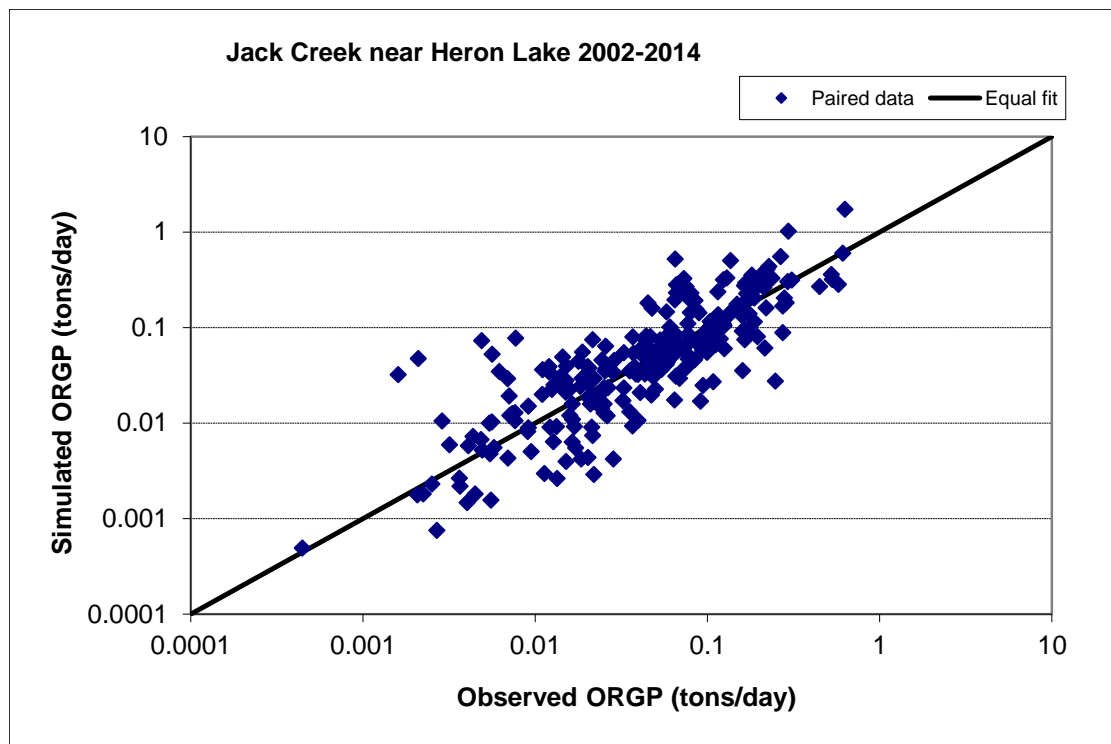


Figure 178. Paired simulated vs. observed Organic Phosphorus (OrgP) load at Jack Creek near Heron Lake (calibration period)

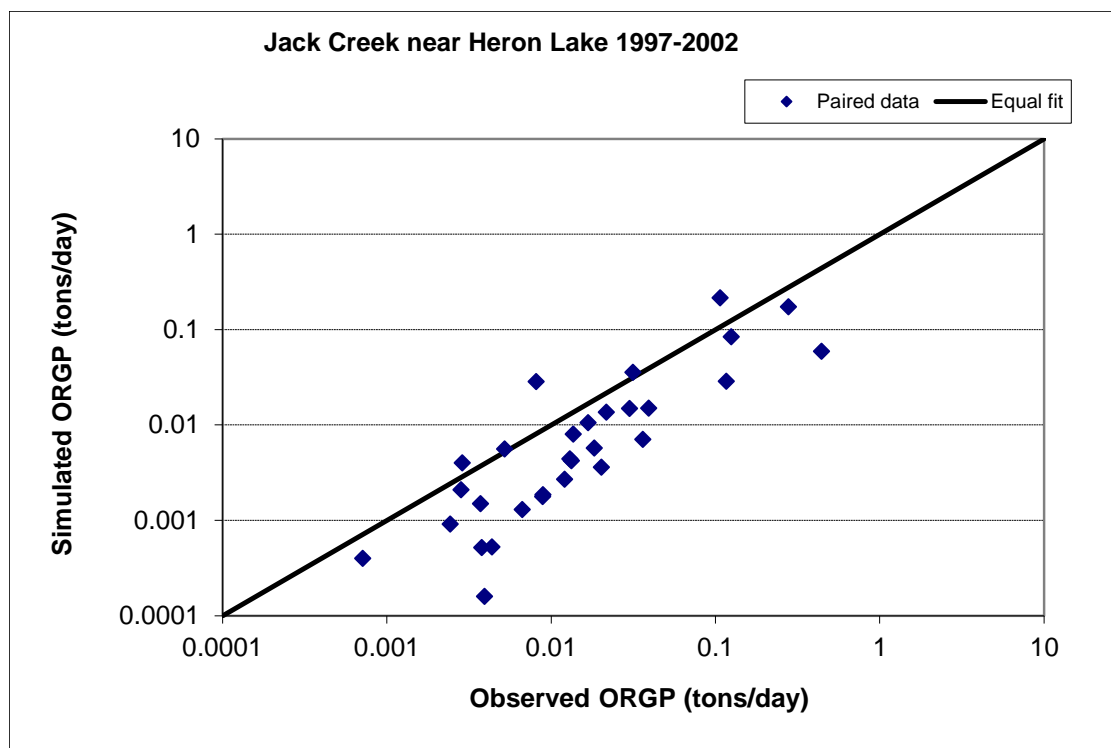


Figure 179. Paired simulated vs. observed Organic Phosphorus (OrgP) load at Jack Creek near Heron Lake (validation period)

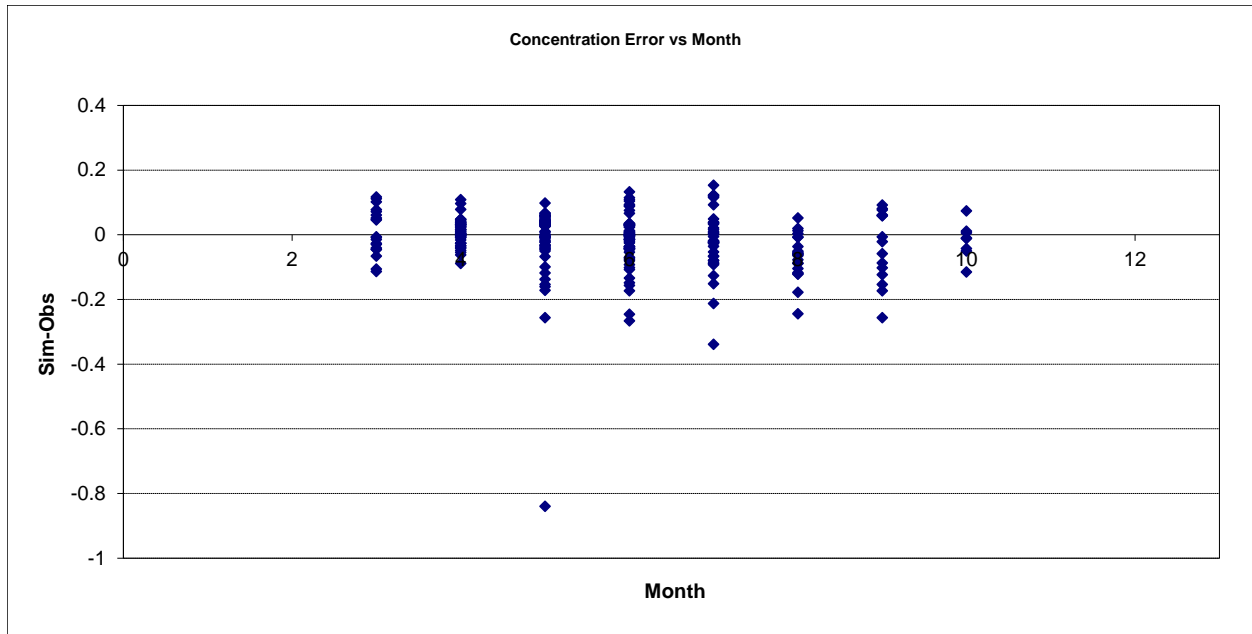


Figure 180. Residual (Simulated - Observed) vs. Month Organic Phosphorus (OrgP) at Jack Creek near Heron Lake

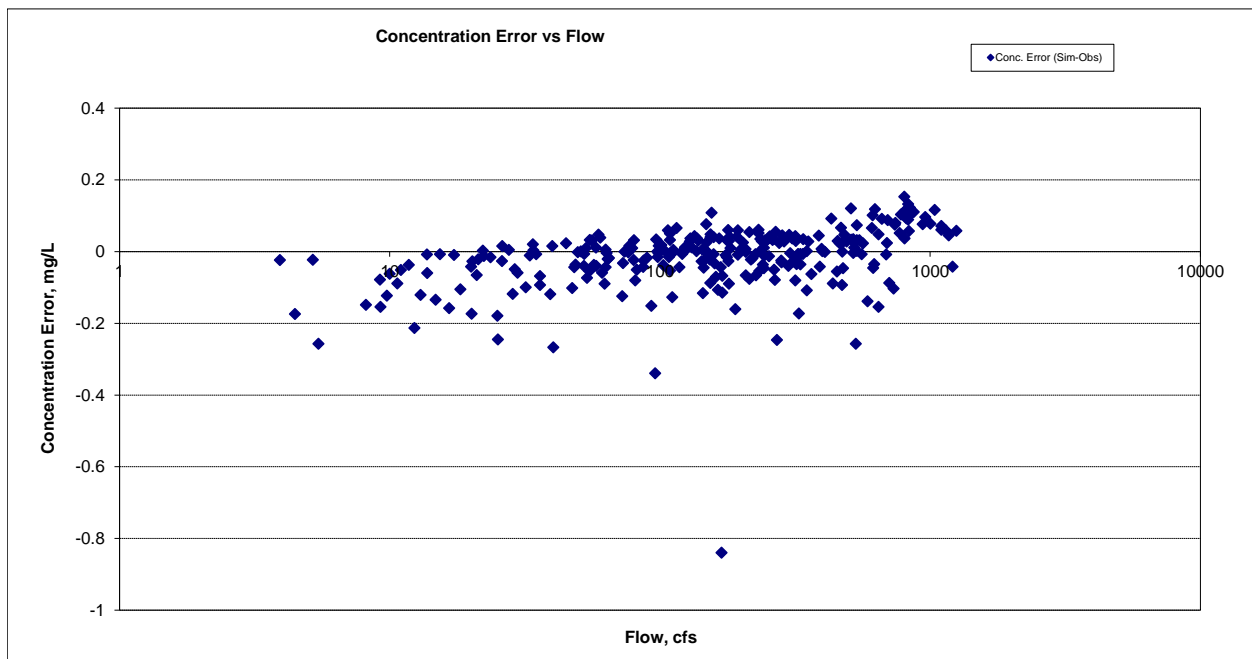


Figure 181. Residual (Simulated - Observed) vs. Flow Organic Phosphorus (OrgP) at Jack Creek near Heron Lake

Total Phosphorus (TP)

Table 27. Total Phosphorus (TP) statistics

Period	2002-2014	1997-2002
Count	256	34
Concentration Average Error	-8.41%	-60.48%
Concentration Median Error	-3.64%	-42.28%
Load Average Error	10.31%	-53.68%
Load Median Error	-1.32%	-10.81%
Paired t concentration	1.00	0.00

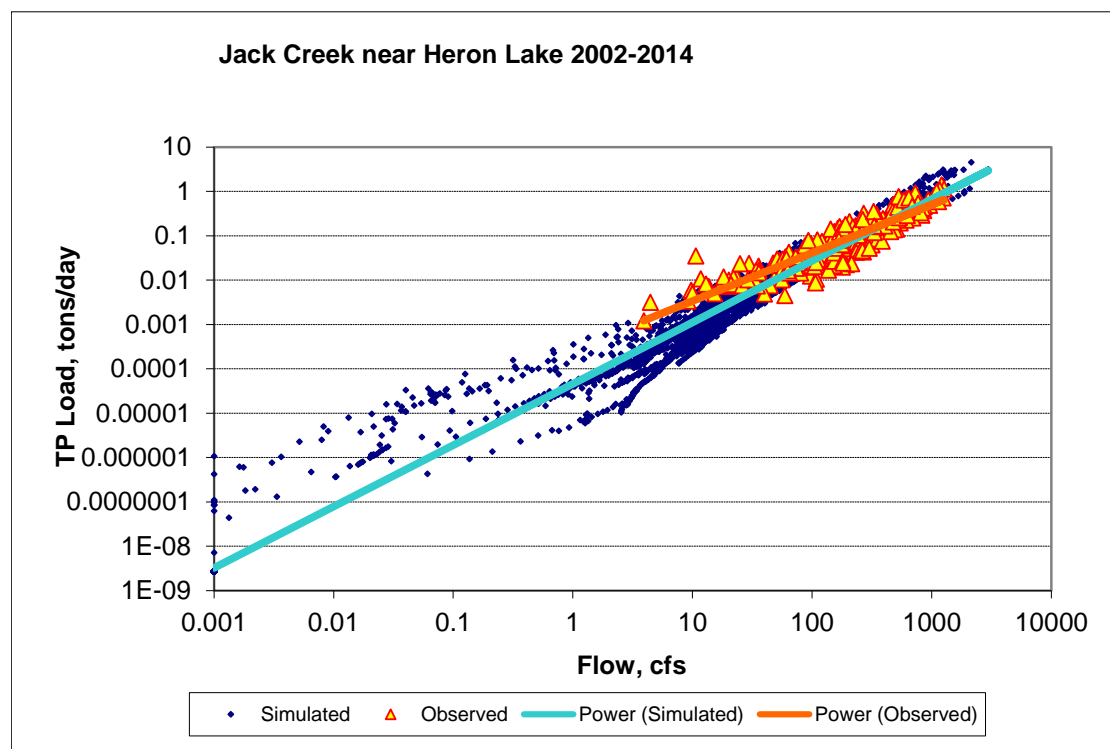


Figure 182. Power plot of simulated and observed Total Phosphorus (TP) load vs flow at Jack Creek near Heron Lake (calibration period)

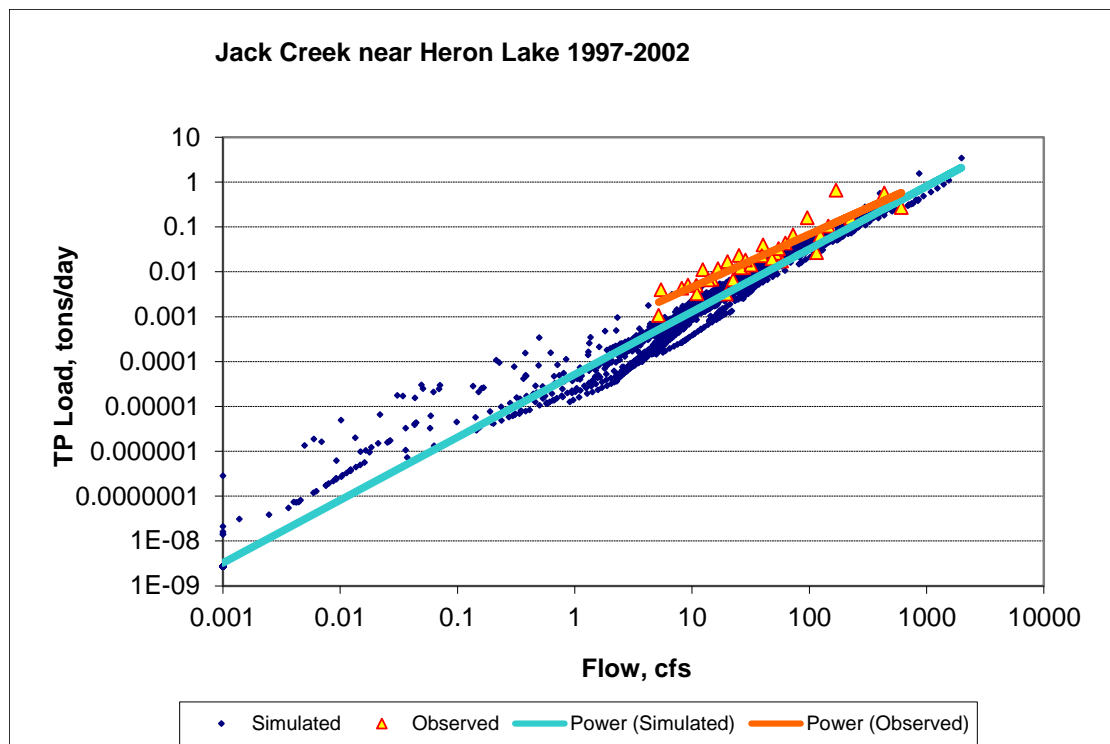


Figure 183. Power plot of simulated and observed Total Phosphorus (TP) load vs flow at Jack Creek near Heron Lake (validation period)

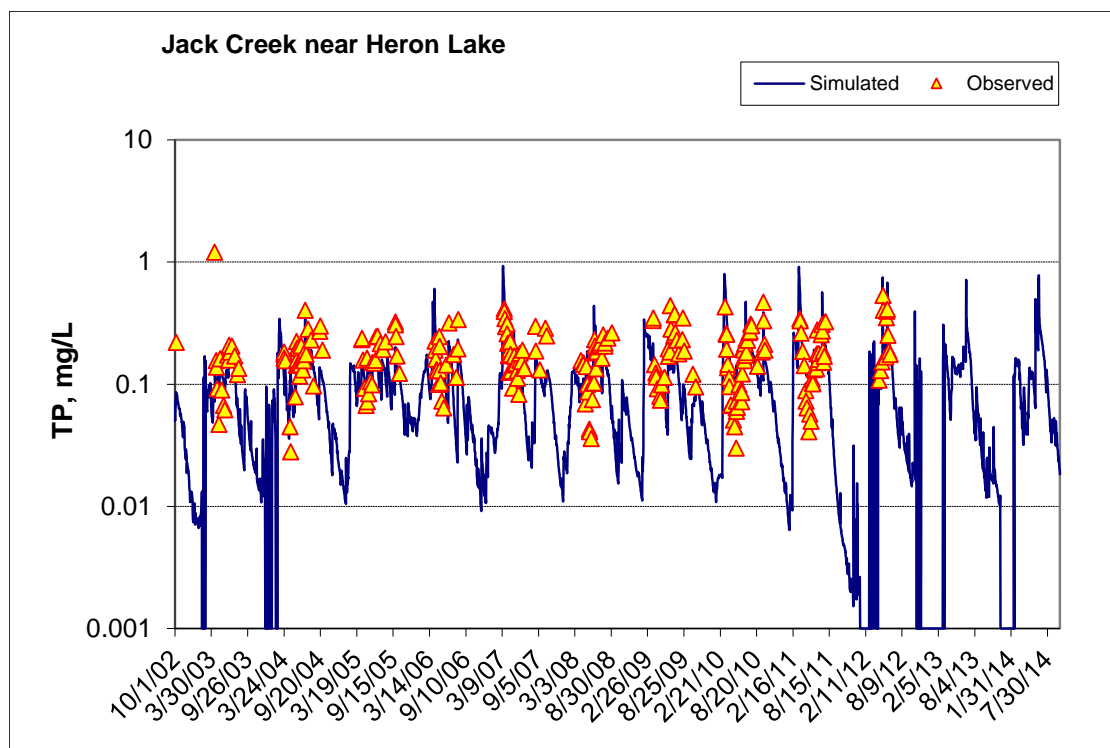


Figure 184. Time series of observed and simulated Total Phosphorus (TP) concentration at Jack Creek near Heron Lake (calibration period)

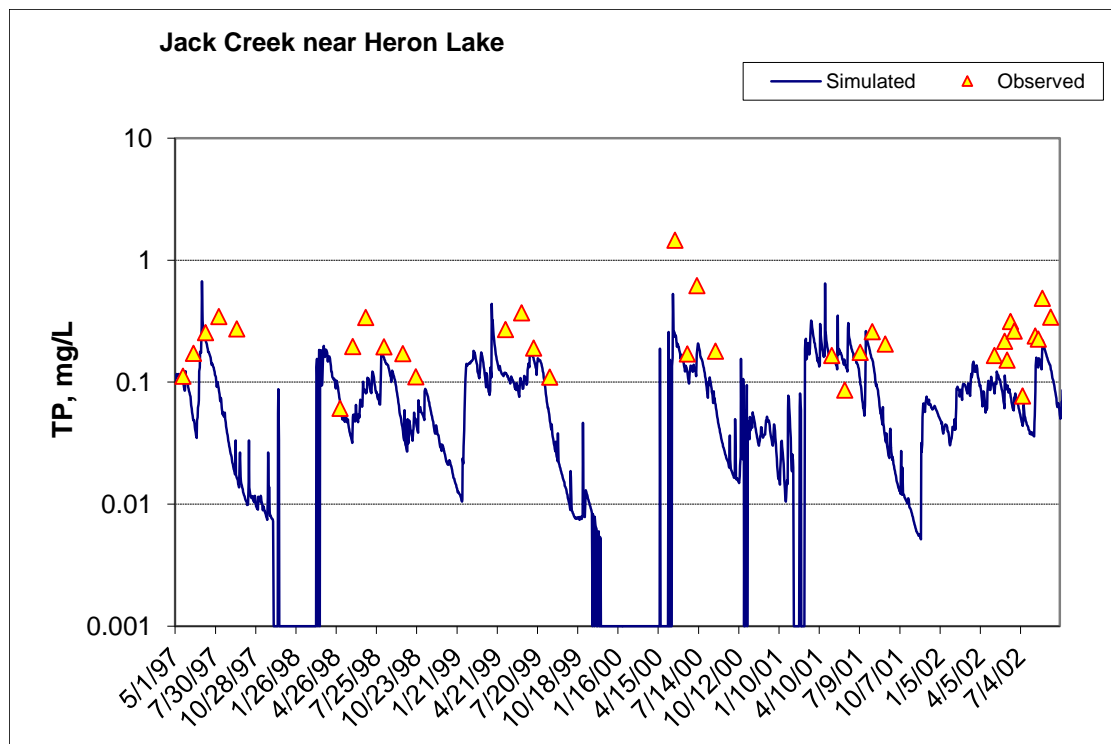


Figure 185. Time series of observed and simulated Total Phosphorus (TP) concentration at Jack Creek near Heron Lake (validation period)

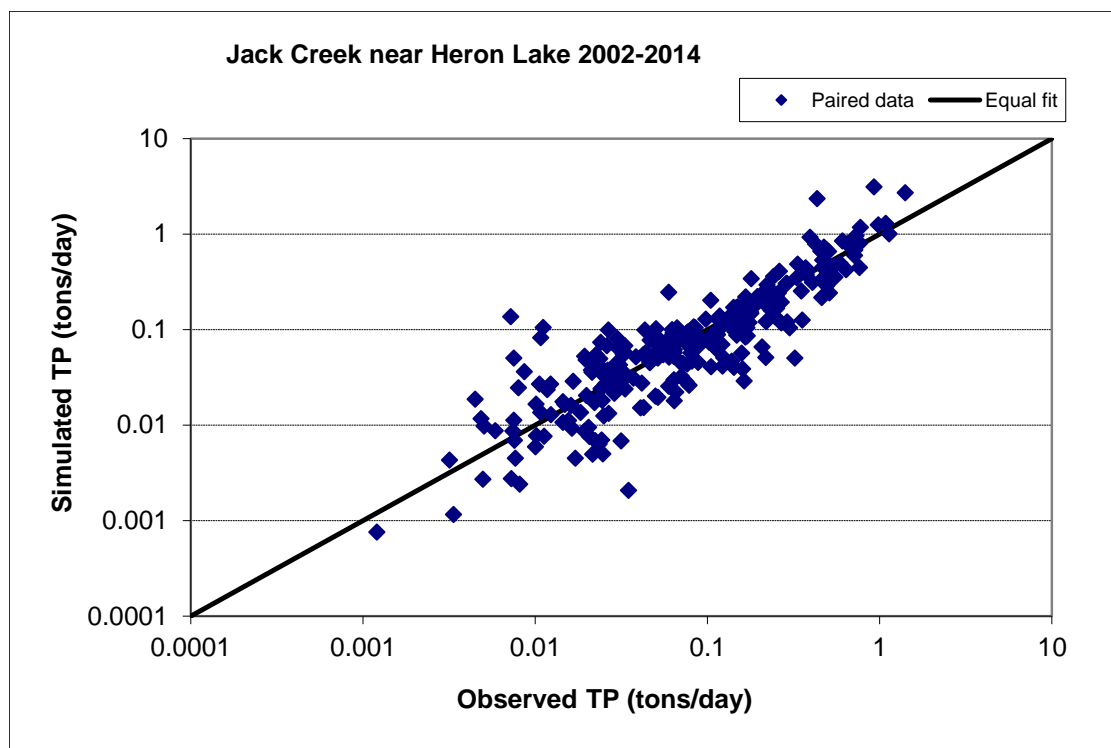


Figure 186. Paired simulated vs. observed Total Phosphorus (TP) load at Jack Creek near Heron Lake (calibration period)

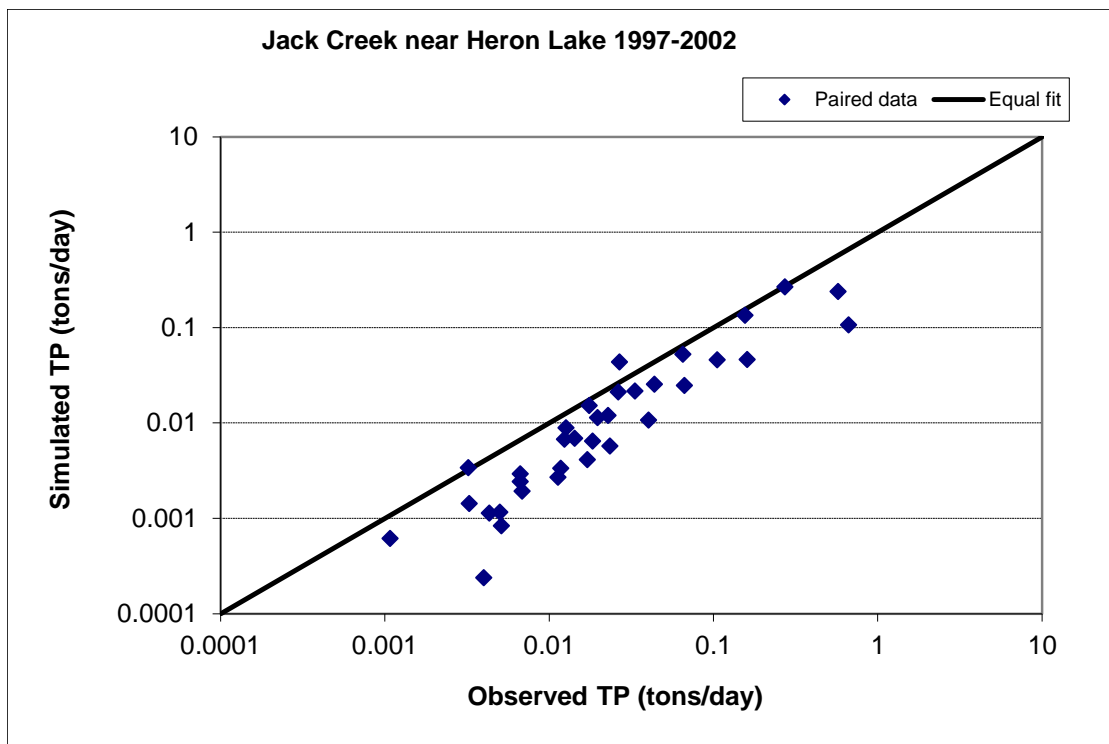


Figure 187. Paired simulated vs. observed Total Phosphorus (TP) load at Jack Creek near Heron Lake (validation period)

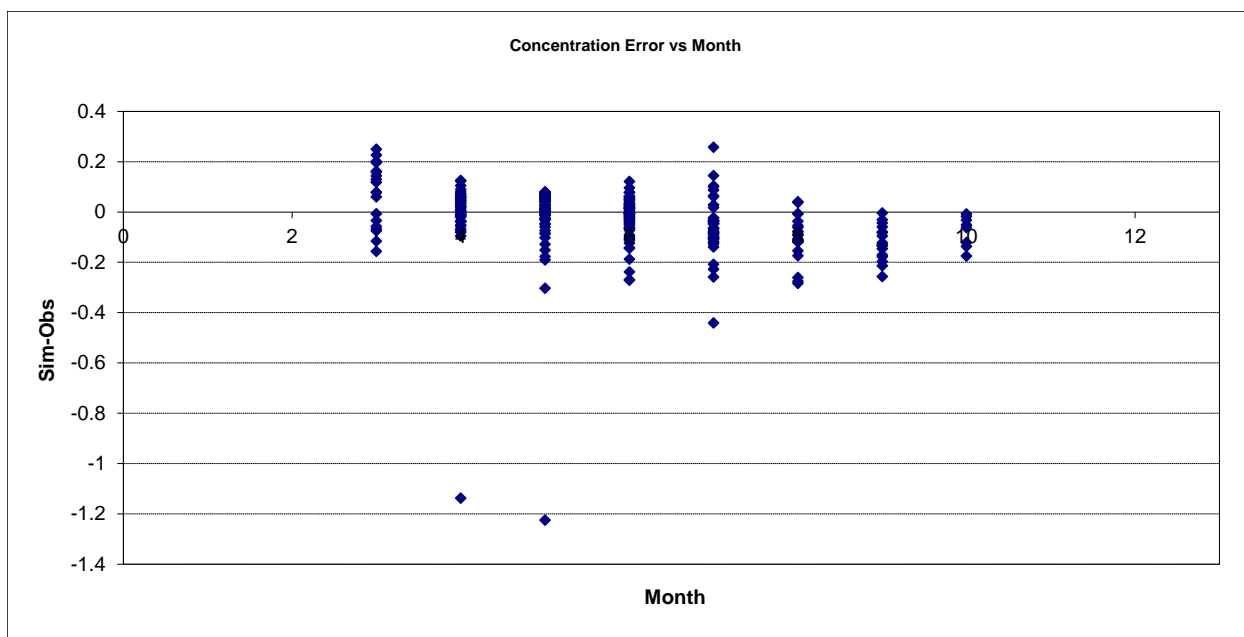


Figure 188. Residual (Simulated - Observed) vs. Month Total Phosphorus (TP) at Jack Creek near Heron Lake

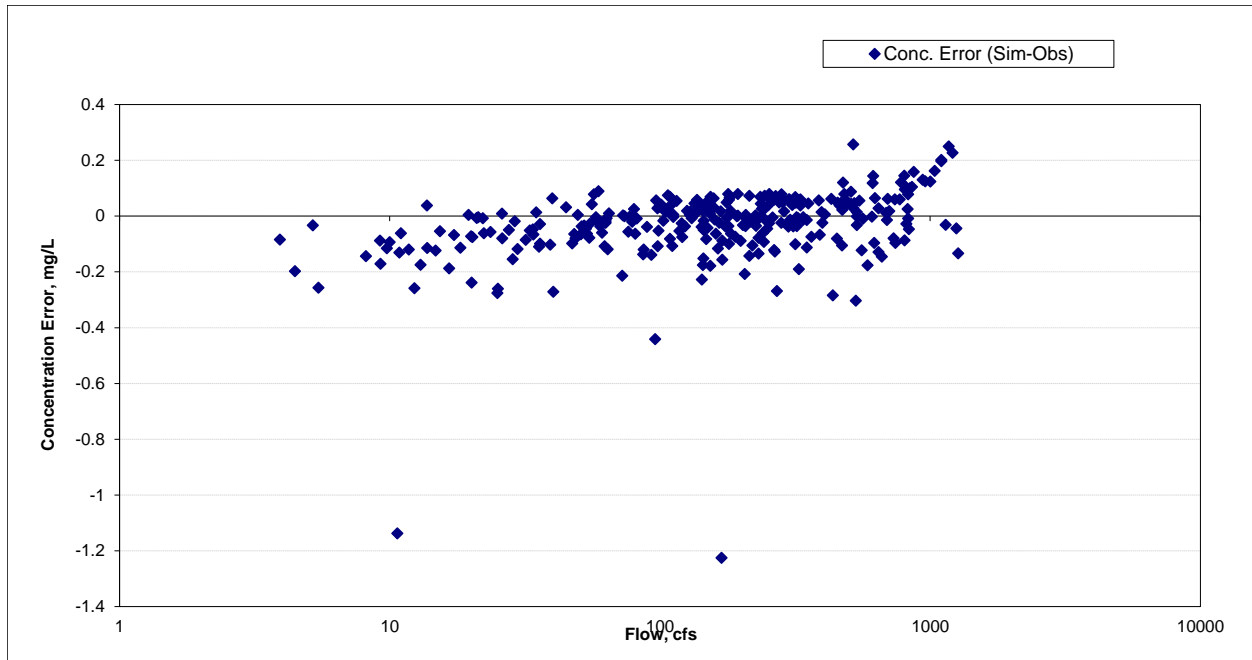


Figure 189. Residual (Simulated - Observed) vs. Flow Total Phosphorus (TP) at Jack Creek near Heron Lake

Okabena Creek near Okabena (S001-568)

Total Suspended Solids (TSS)

Table 28. Total Suspended Solids (TSS) statistics

Period	2002-2014	1997-2002
Count	309	39
Concentration Average Error	-23.40%	-53.14%
Concentration Median Error	-28.71%	-43.96%
Load Average Error	51.91%	-25.26%
Load Median Error	-6.70%	-3.73%
Paired t concentration	0.32	0.01

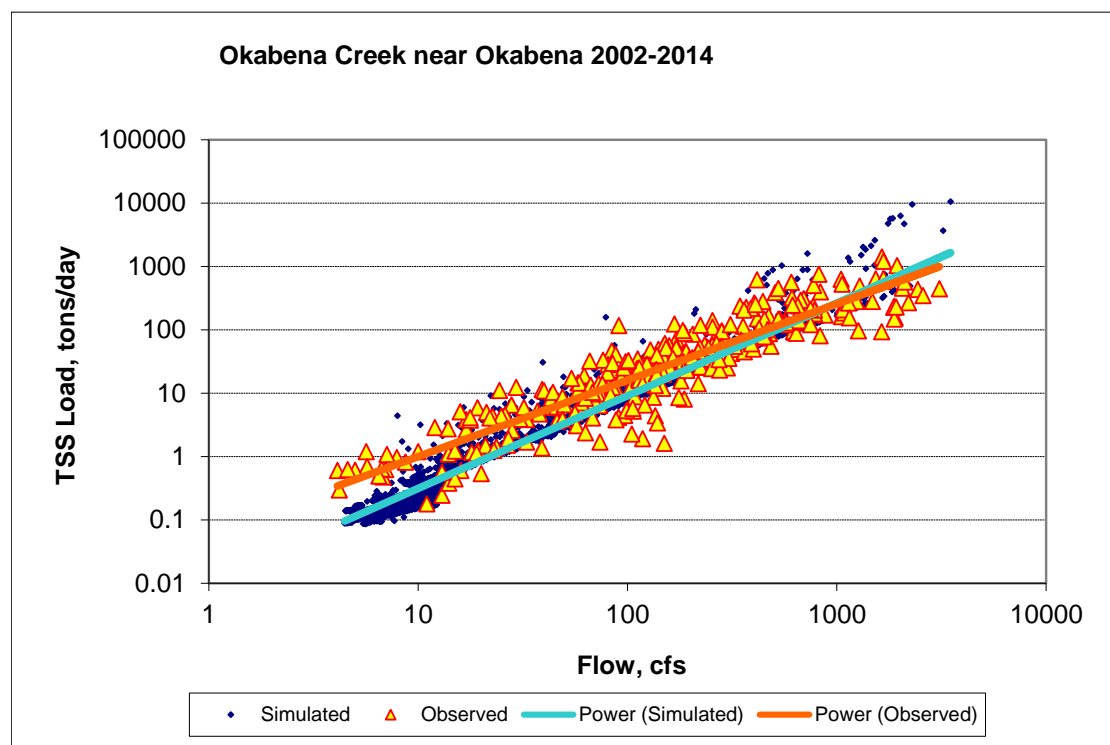


Figure 190. Power plot of simulated and observed Total Suspended Solids (TSS) load vs flow at Okabena Creek near Okabena (calibration period)

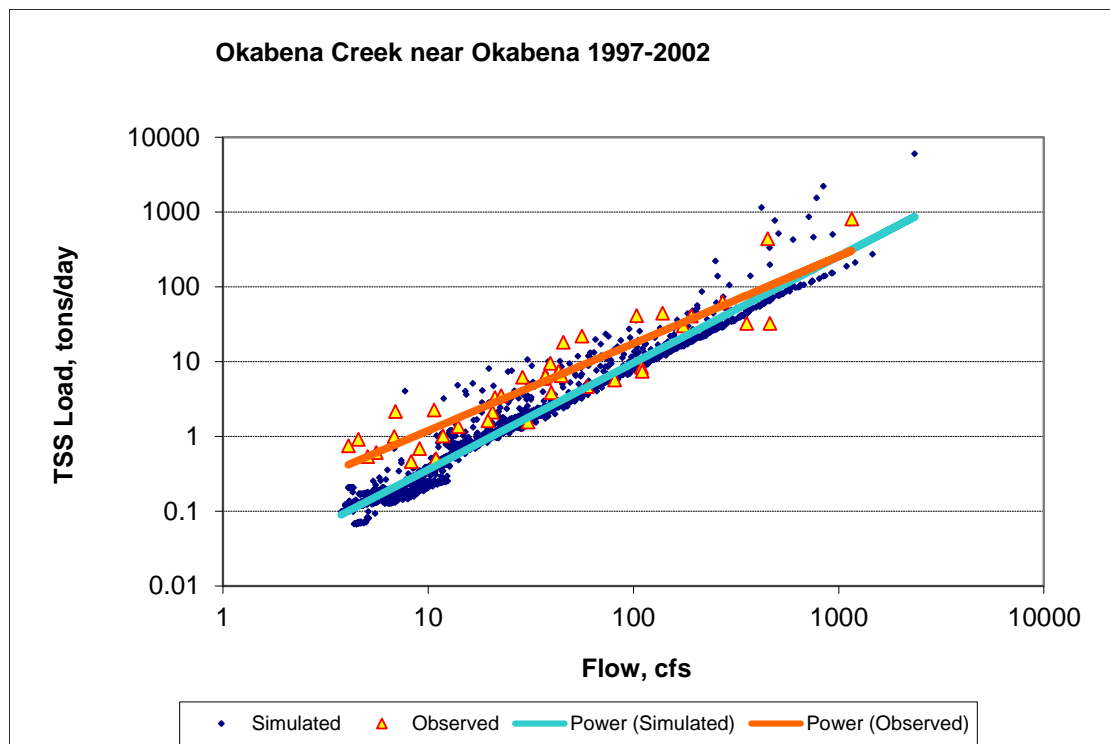


Figure 191. Power plot of simulated and observed Total Suspended Solids (TSS) load vs flow at Okabena Creek near Okabena (validation period)

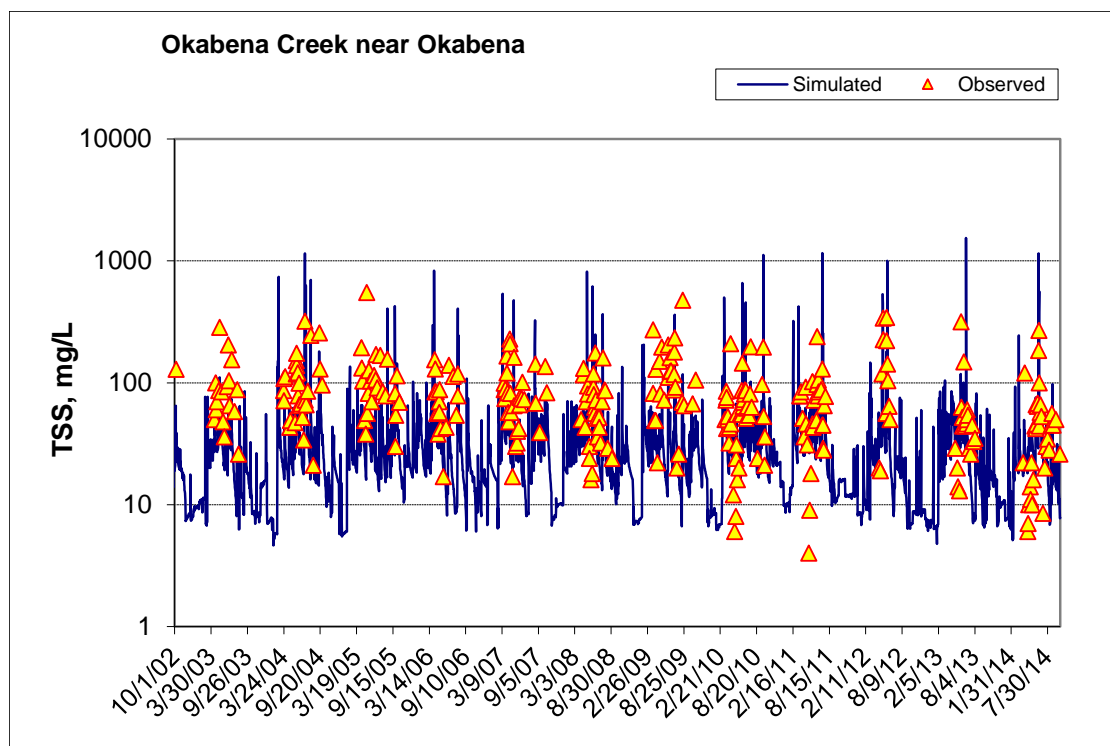


Figure 192. Time series of observed and simulated Total Suspended Solids (TSS) concentration at Okabena Creek near Okabena (calibration period)

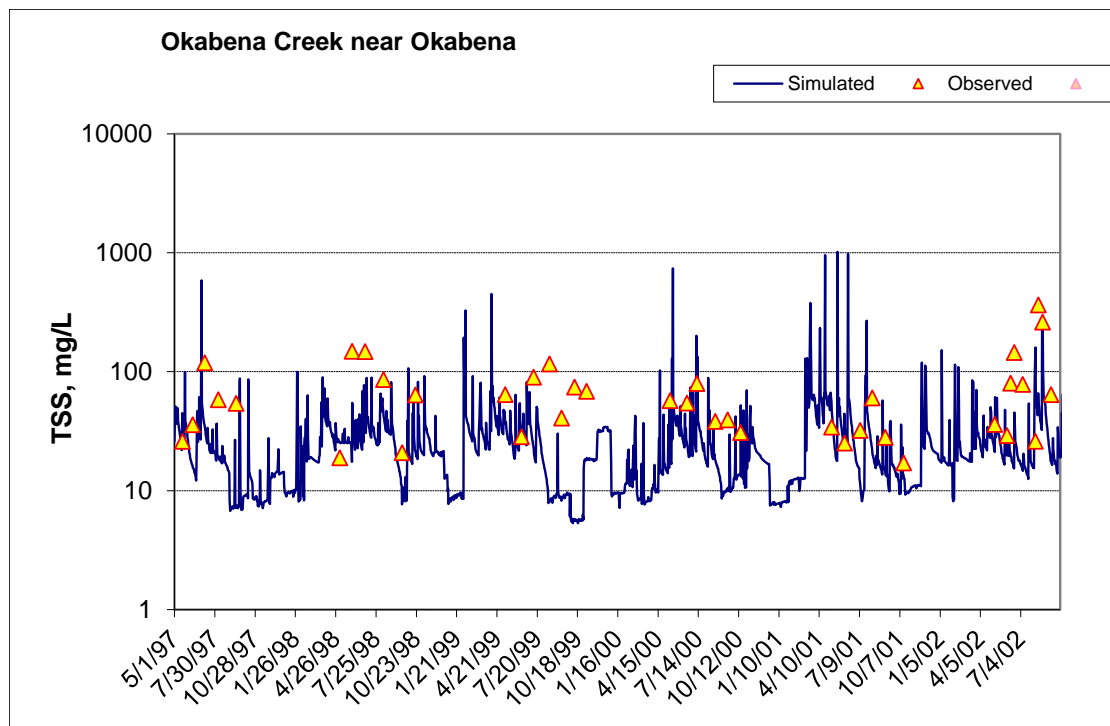


Figure 193. Time series of observed and simulated Total Suspended Solids (TSS) concentration at Okabena Creek near Okabena (validation period)

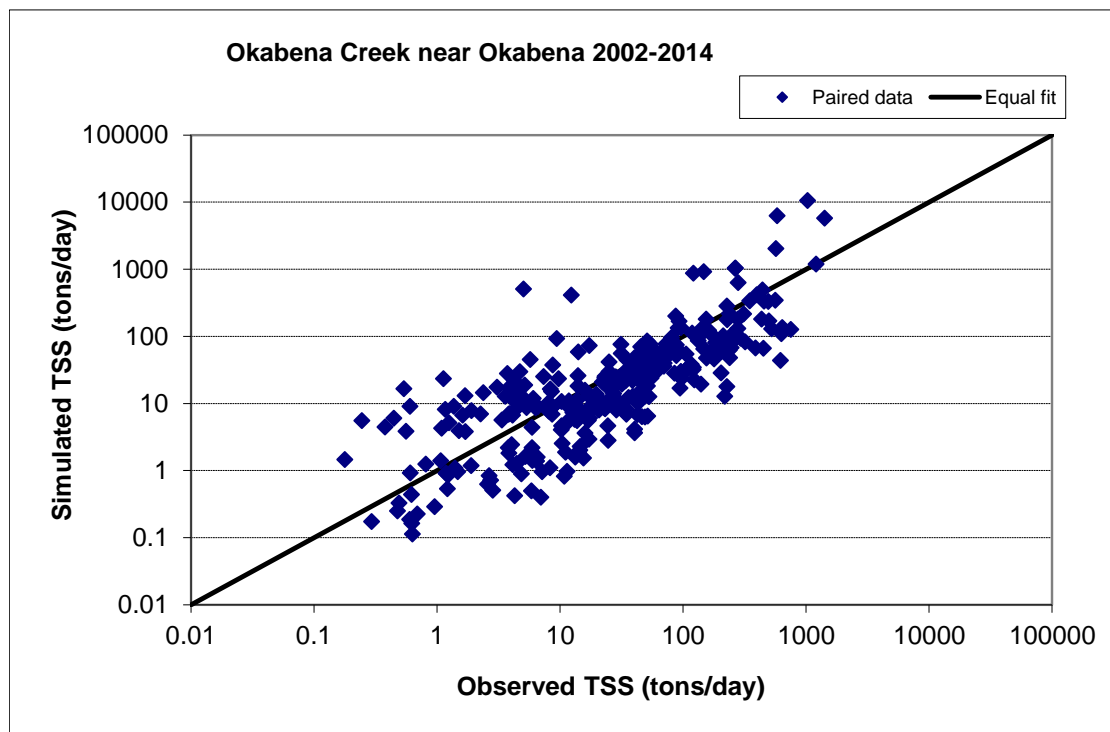


Figure 194. Paired simulated vs. observed Total Suspended Solids (TSS) load at Okabena Creek near Okabena (calibration period)

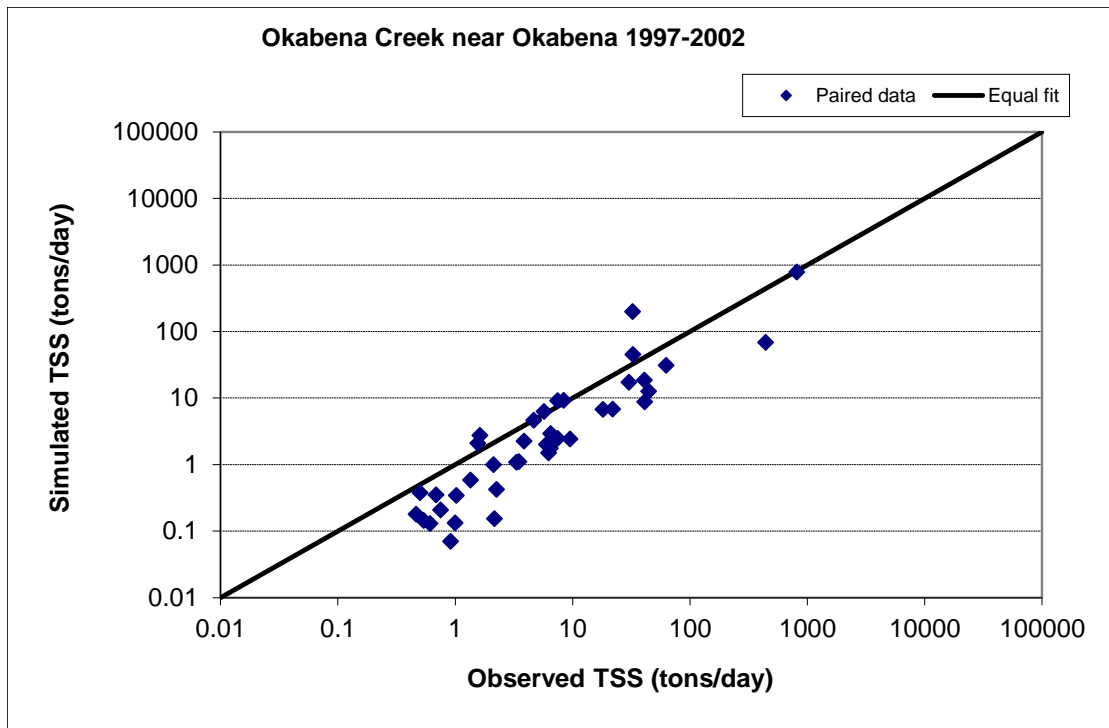


Figure 195. Paired simulated vs. observed Total Suspended Solids (TSS) load at Okabena Creek near Okabena (validation period)

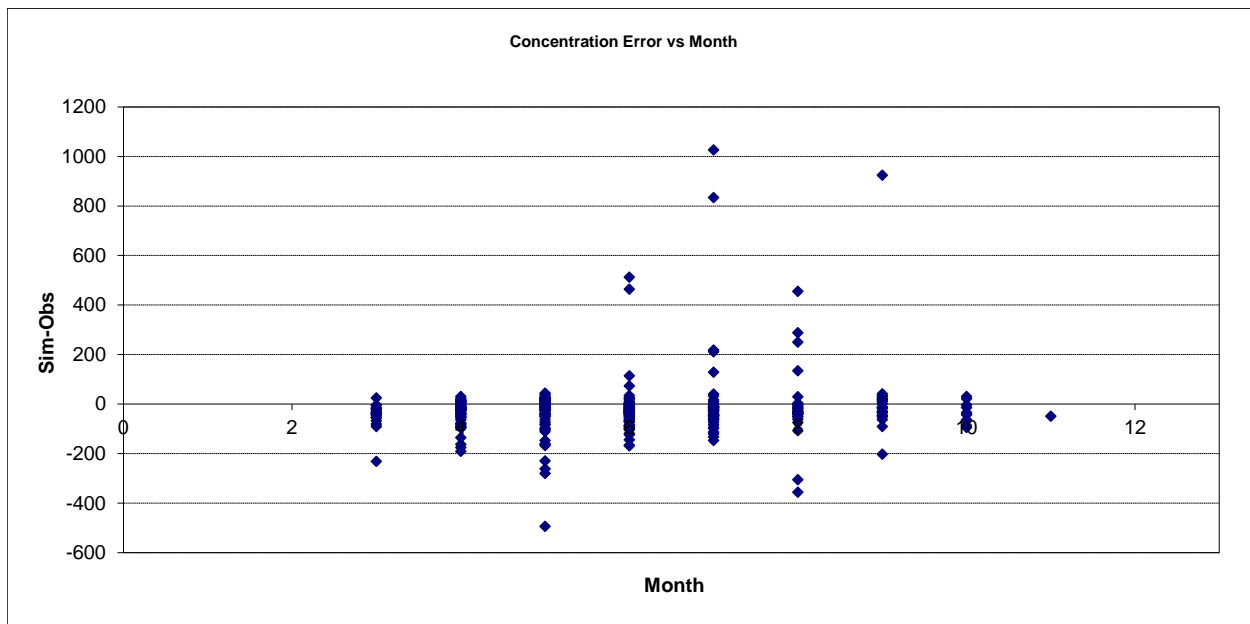


Figure 196. Residual (Simulated - Observed) vs. Month Total Suspended Solids (TSS) at Okabena Creek near Okabena

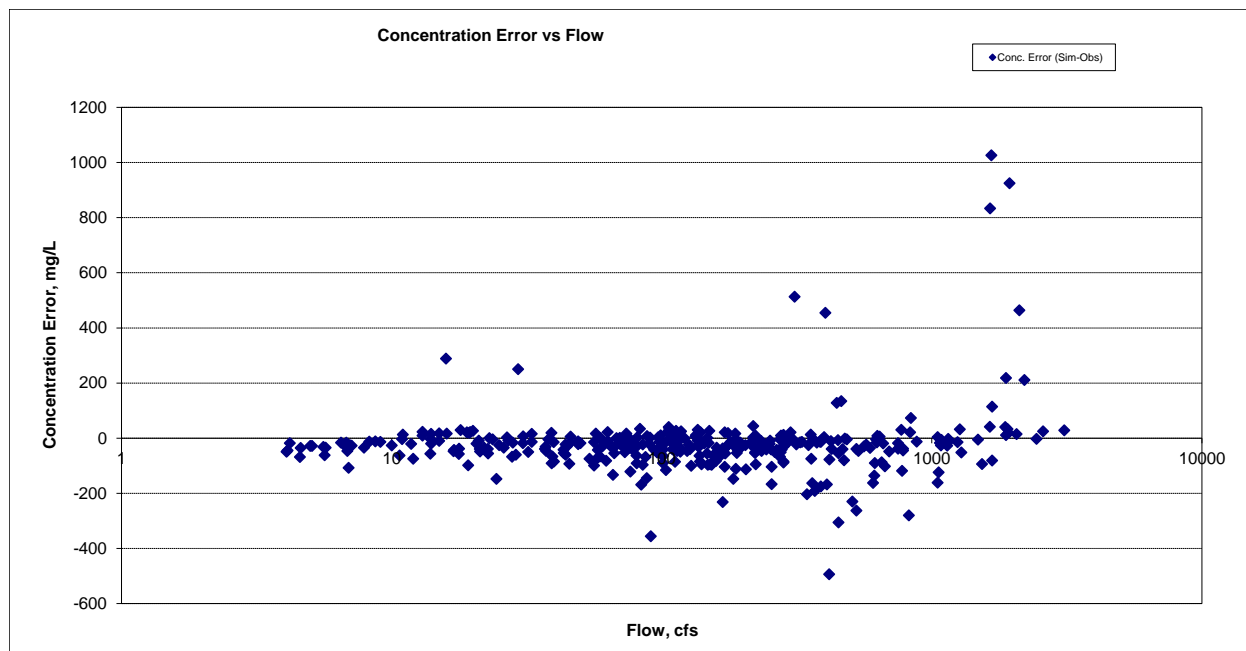


Figure 197. Residual (Simulated - Observed) vs. Flow Total Suspended Solids (TSS) at Okabena Creek near Okabena

Ammonia Nitrogen (NH₃)

Table 29. Ammonia Nitrogen (NH₃) statistics

Period	2002-2014	1997-2002
Count	15	9
Concentration Average Error	-18.10%	412.62%
Concentration Median Error	-29.28%	270.20%
Load Average Error	-15.43%	769.97%
Load Median Error	-5.86%	577.82%
Paired t concentration	0.55	0.00

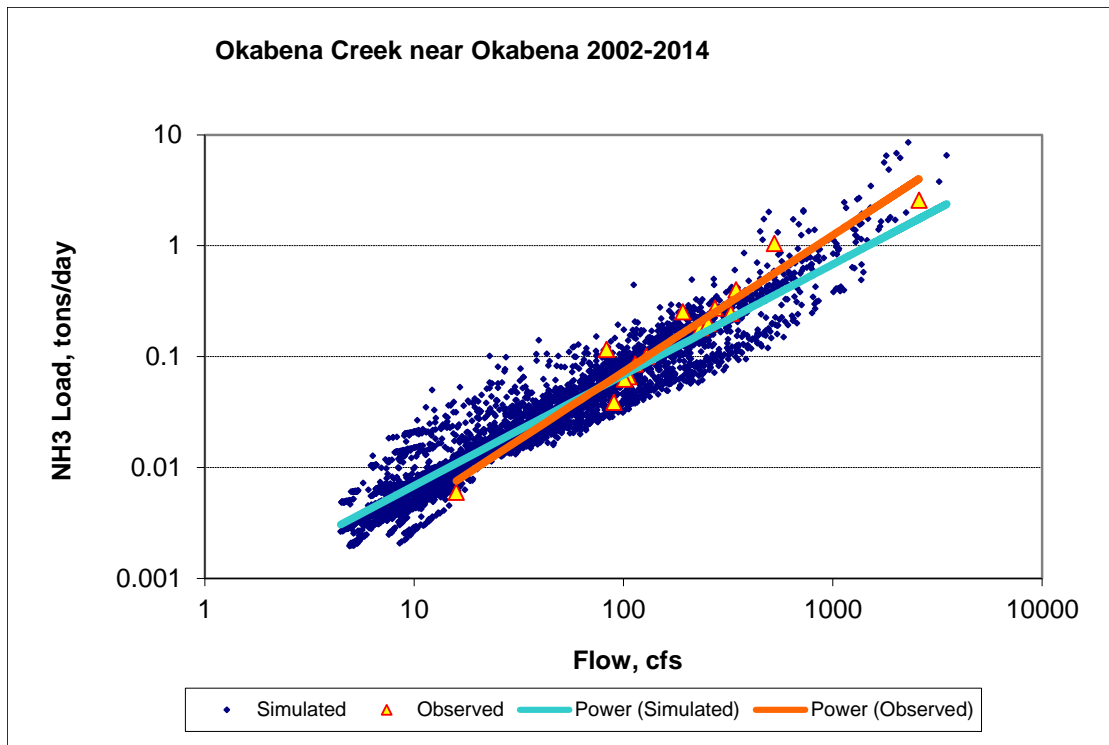


Figure 198. Power plot of simulated and observed Ammonia Nitrogen (NH3) load vs flow at Okabena Creek near Okabena (calibration period)

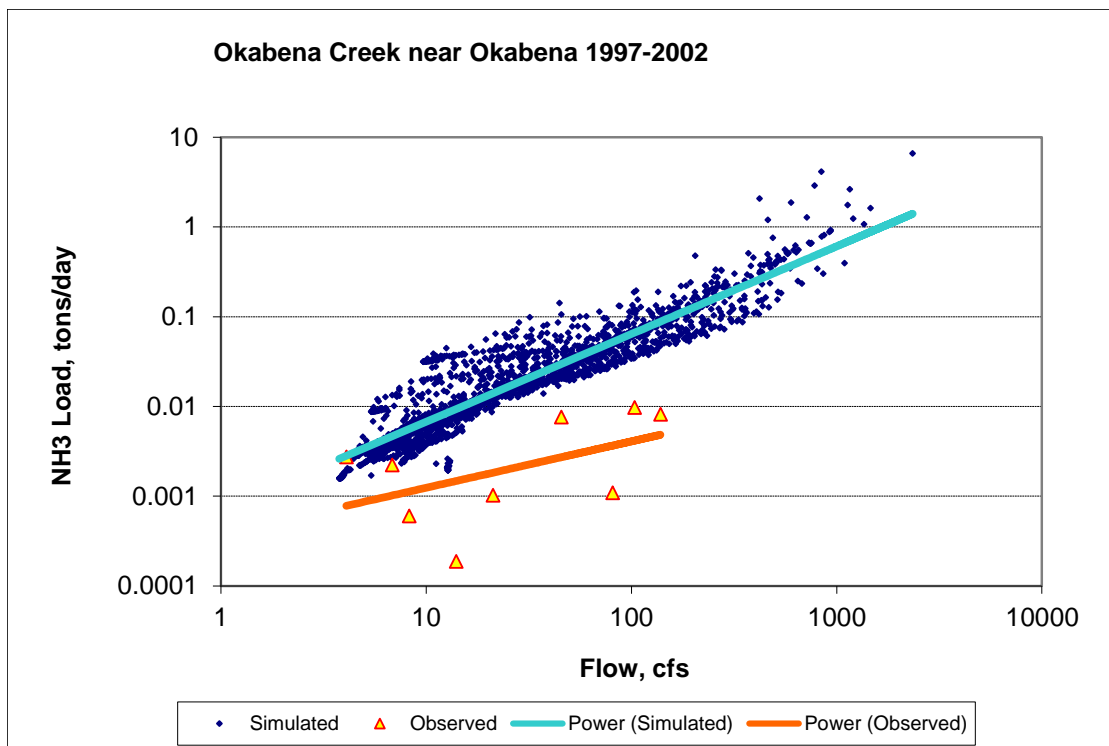


Figure 199. Power plot of simulated and observed Ammonia Nitrogen (NH3) load vs flow at Okabena Creek near Okabena (validation period)

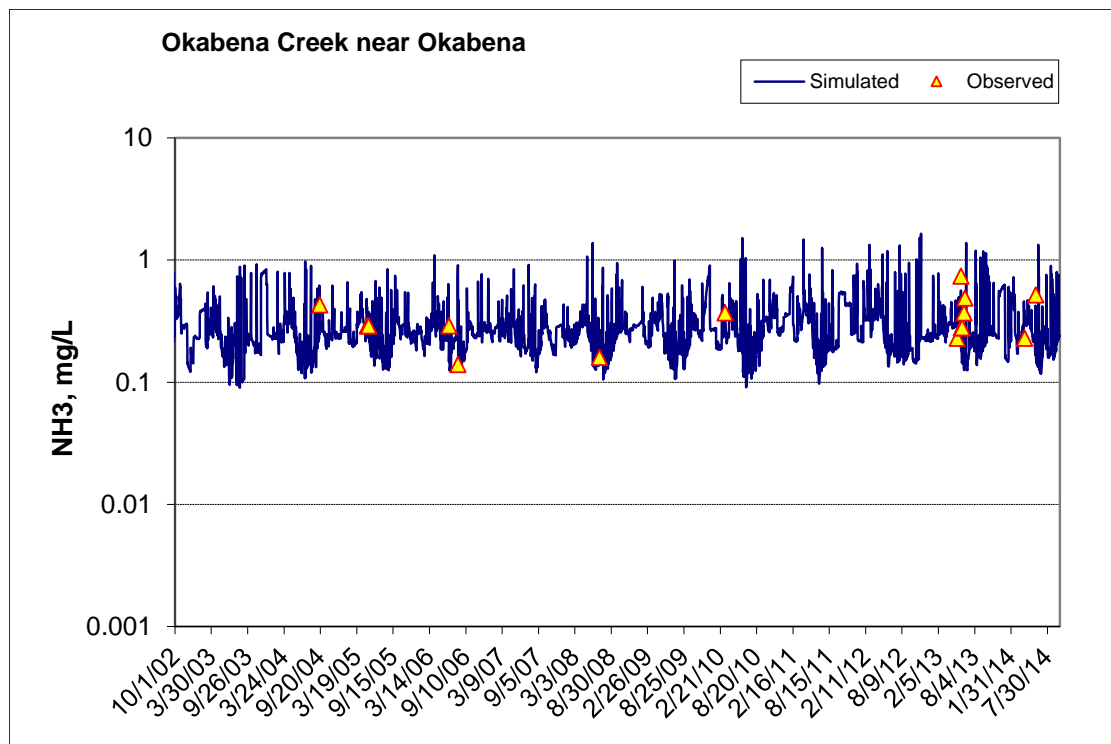


Figure 200. Time series of observed and simulated Ammonia Nitrogen (NH3) concentration at Okabena Creek near Okabena (calibration period)

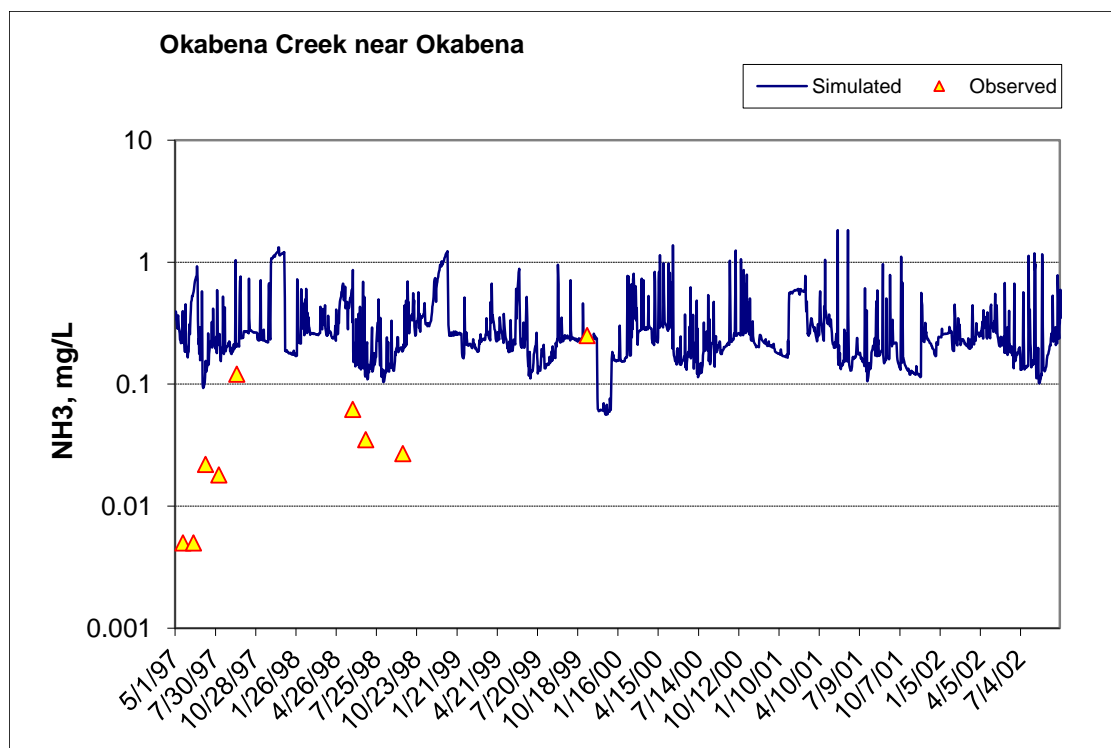


Figure 201. Time series of observed and simulated Ammonia Nitrogen (NH3) concentration at Okabena Creek near Okabena (validation period)

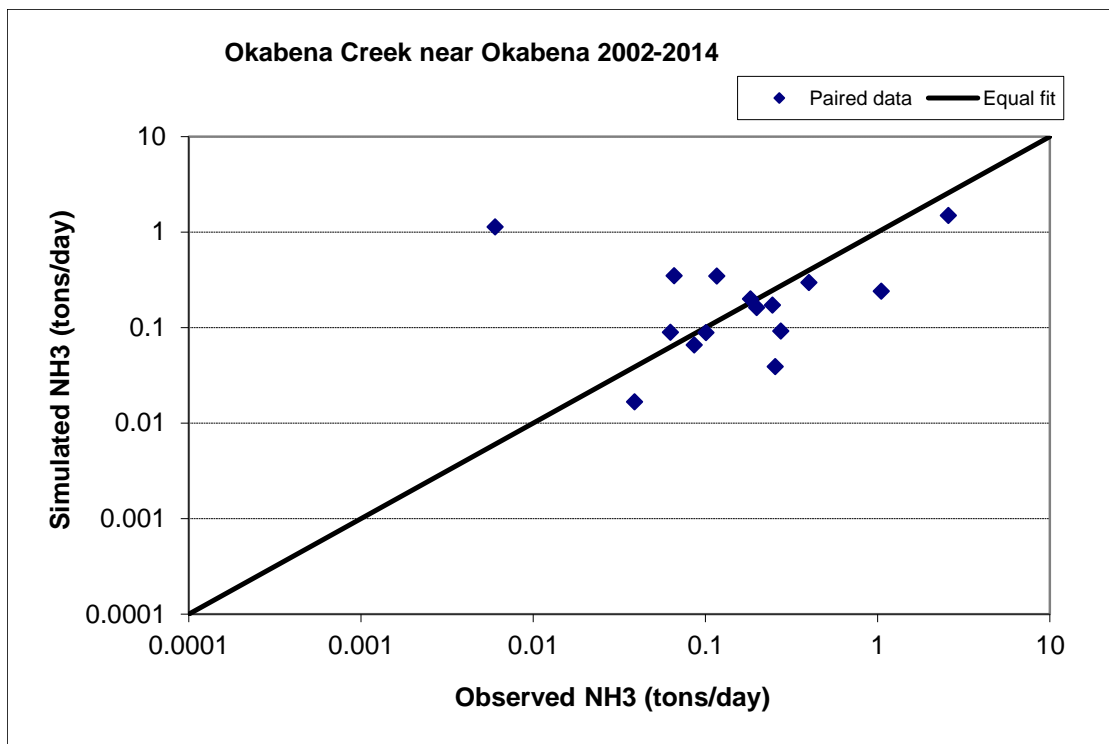


Figure 202. Paired simulated vs. observed Ammonia Nitrogen (NH3) load at Okabena Creek near Okabena (calibration period)

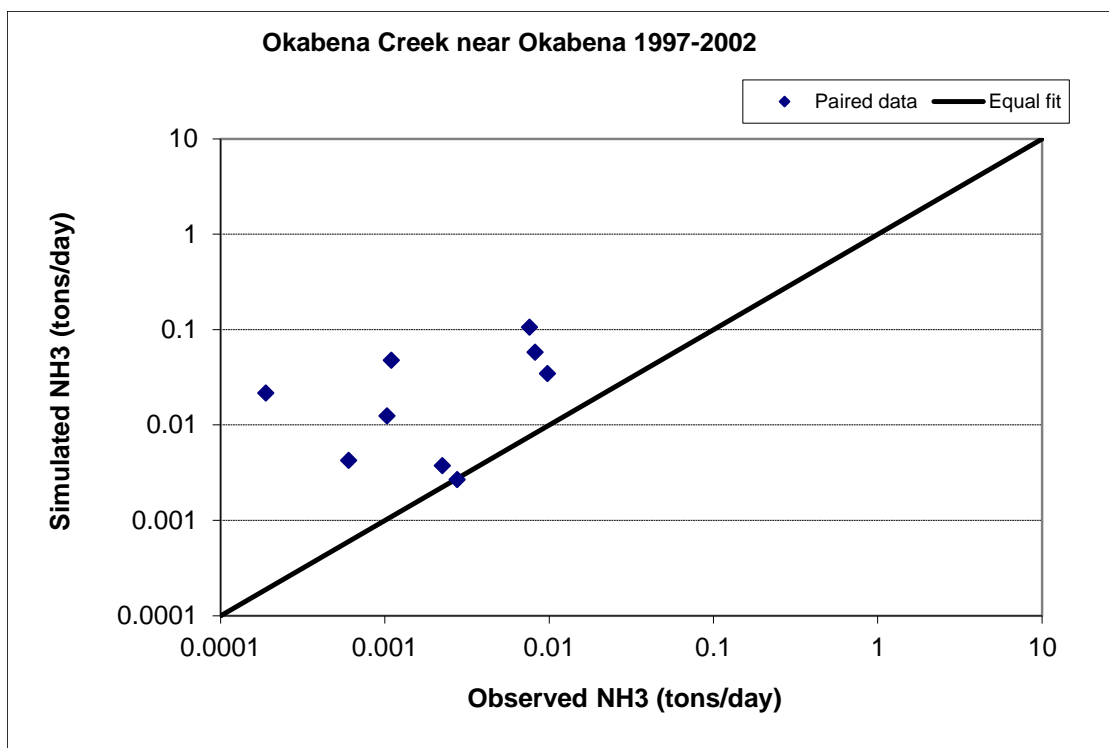


Figure 203. Paired simulated vs. observed Ammonia Nitrogen (NH3) load at Okabena Creek near Okabena (validation period)

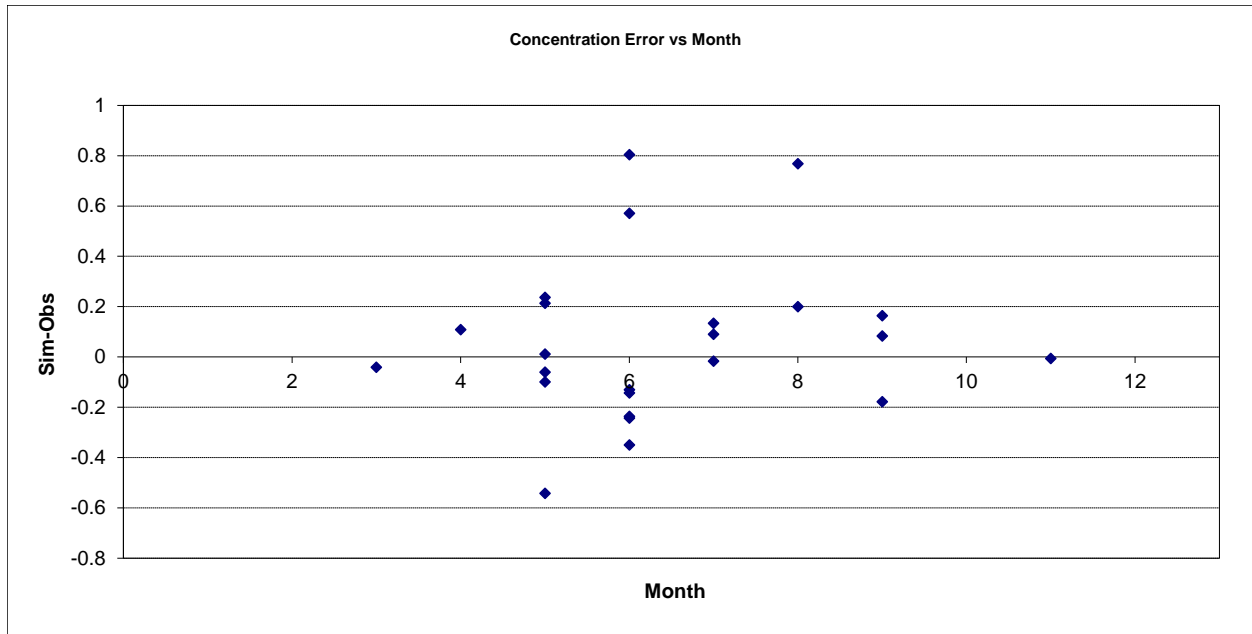


Figure 204. Residual (Simulated - Observed) vs. Month Ammonia Nitrogen (NH3) at Okabena Creek near Okabena

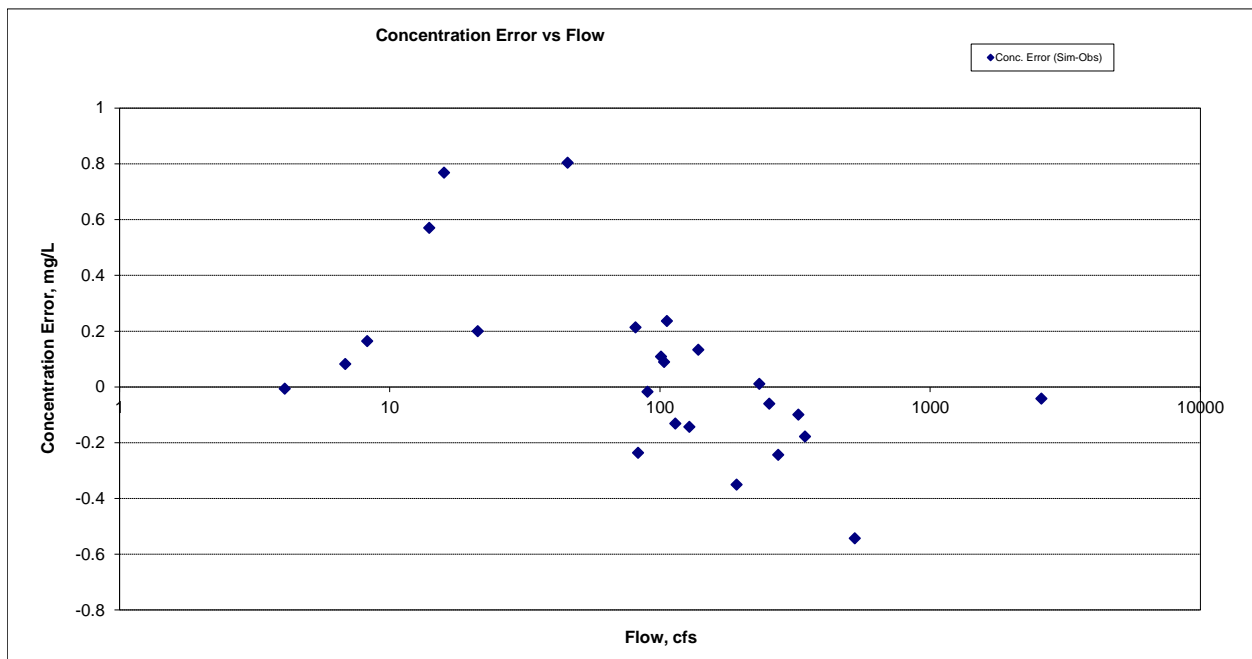


Figure 205. Residual (Simulated - Observed) vs. Flow Ammonia Nitrogen (NH3) at Okabena Creek near Okabena

Organic Nitrogen (OrgN)

Table 30. Organic Nitrogen (OrgN) statistics

Period	2002-2014	1997-2002
Count	248	7
Concentration Average Error	24.08%	187.90%
Concentration Median Error	31.68%	231.17%
Load Average Error	13.25%	245.58%
Load Median Error	9.17%	98.50%
Paired t concentration	0.03	0.00

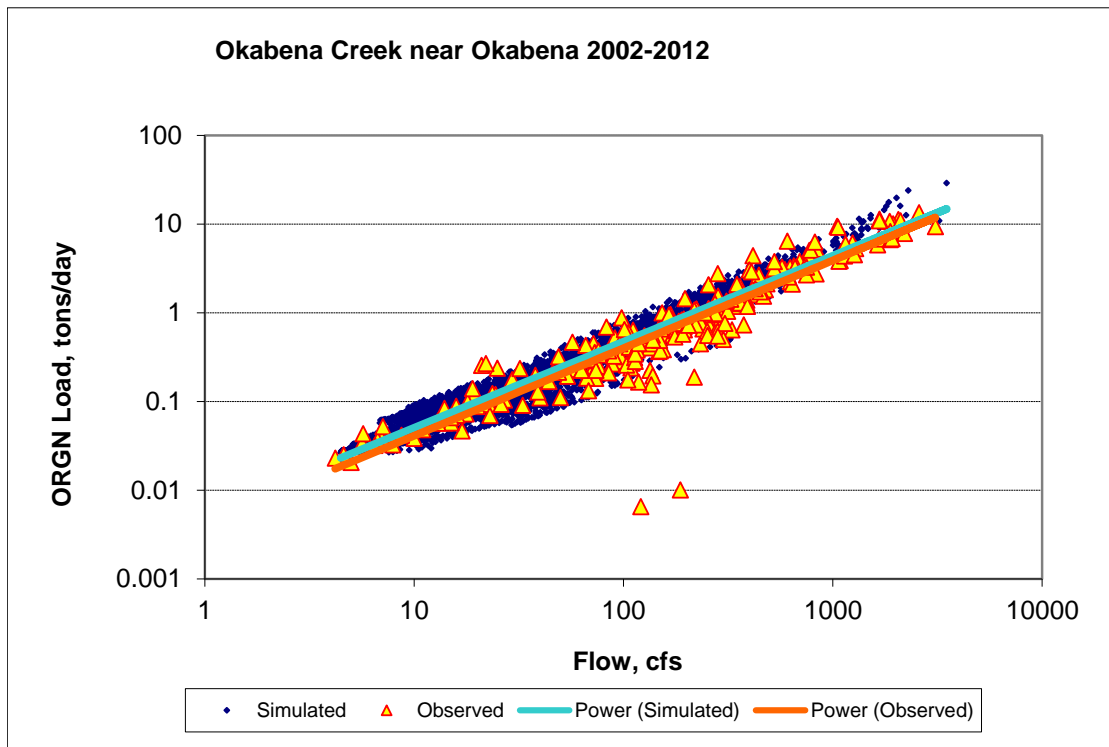


Figure 206. Power plot of simulated and observed Organic Nitrogen (OrgN) load vs flow at Okabena Creek near Okabena (calibration period)

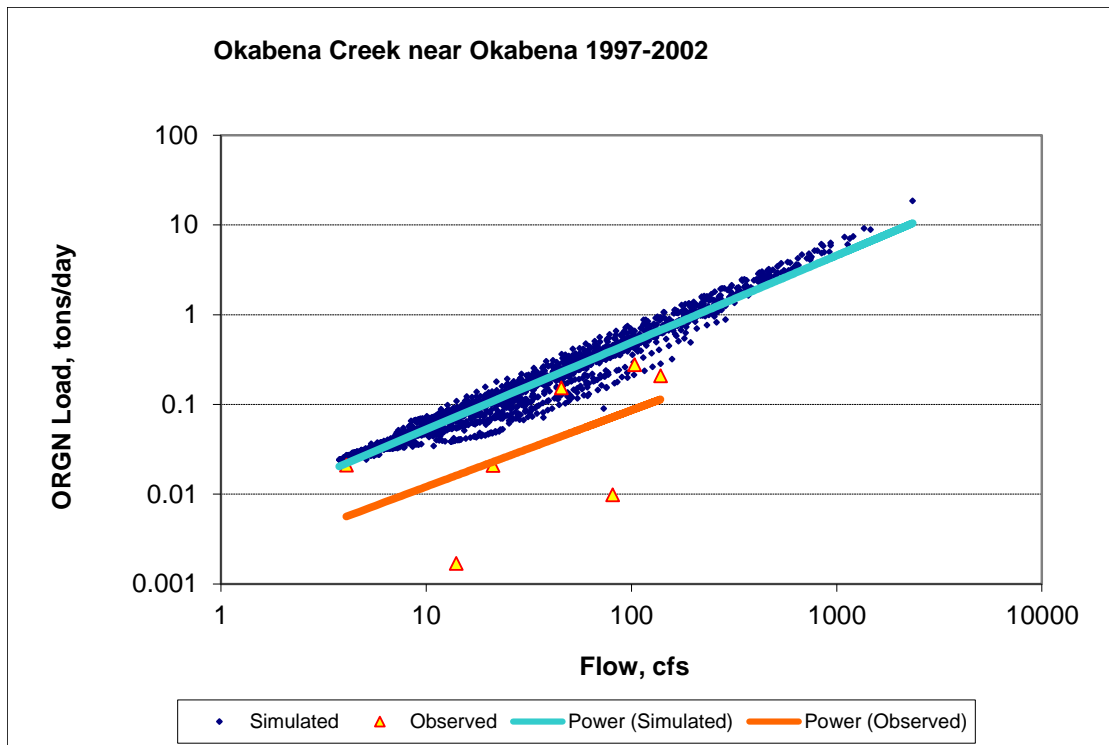


Figure 207. Power plot of simulated and observed Organic Nitrogen (OrgN) load vs flow at Okabena Creek near Okabena (validation period)

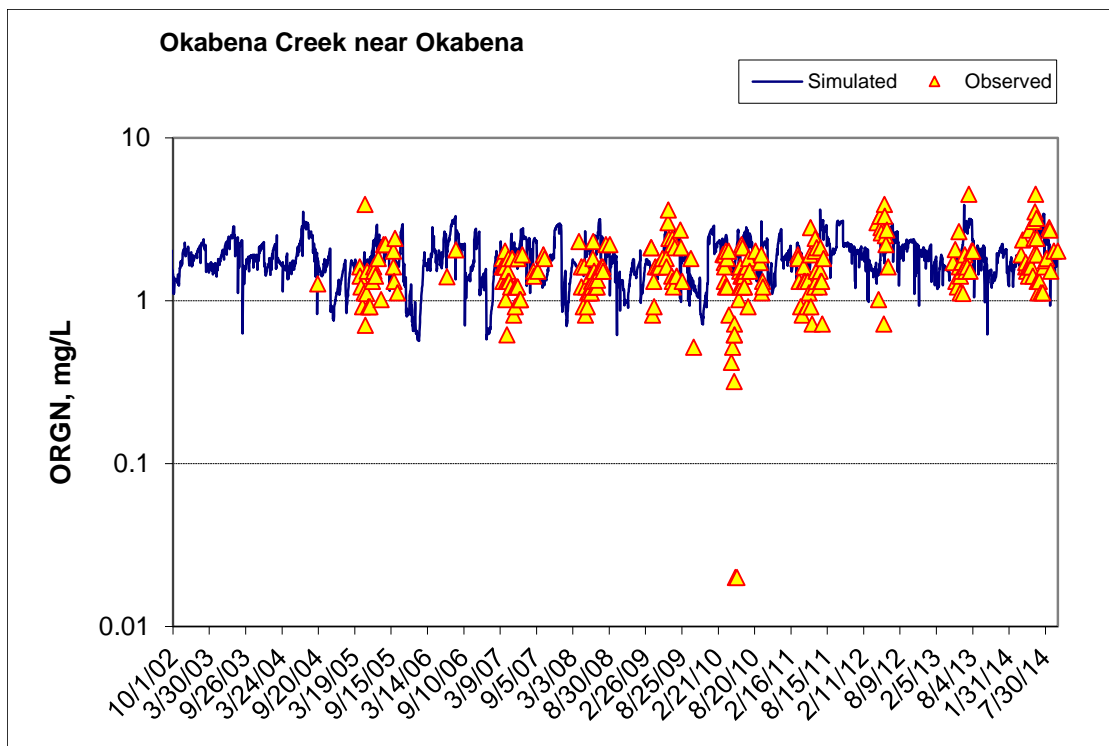


Figure 208. Time series of observed and simulated Organic Nitrogen (OrgN) concentration at Okabena Creek near Okabena (calibration period)

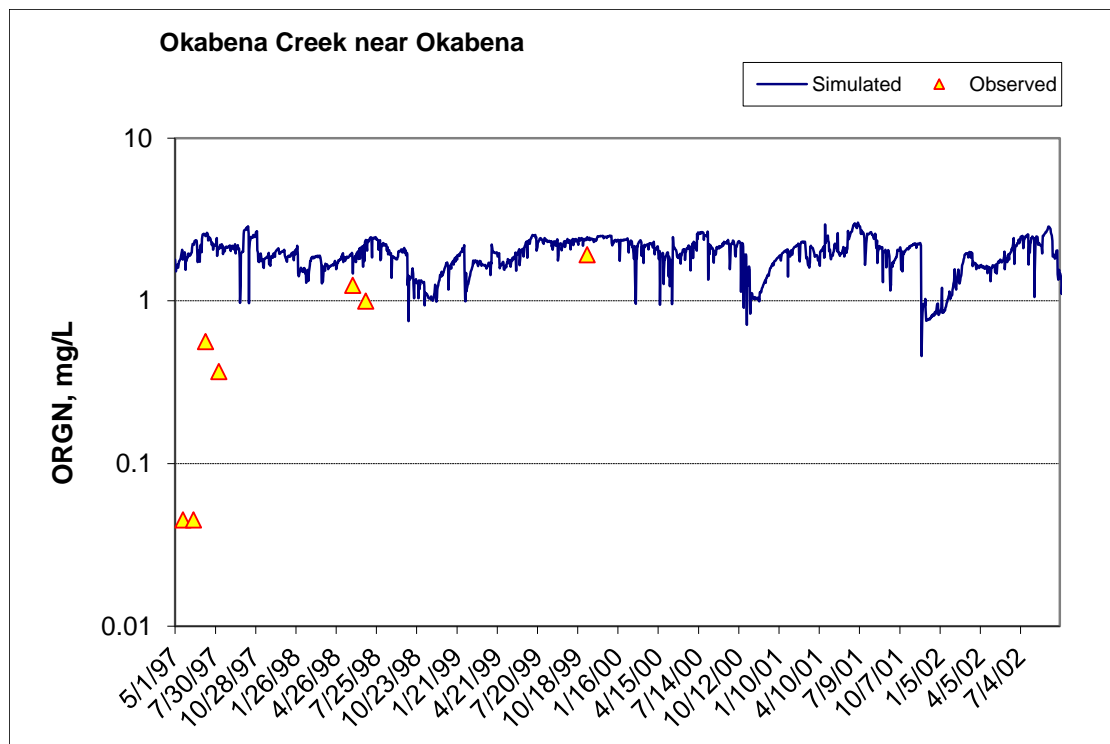


Figure 209. Time series of observed and simulated Organic Nitrogen (OrgN) concentration at Okabena Creek near Okabena (validation period)

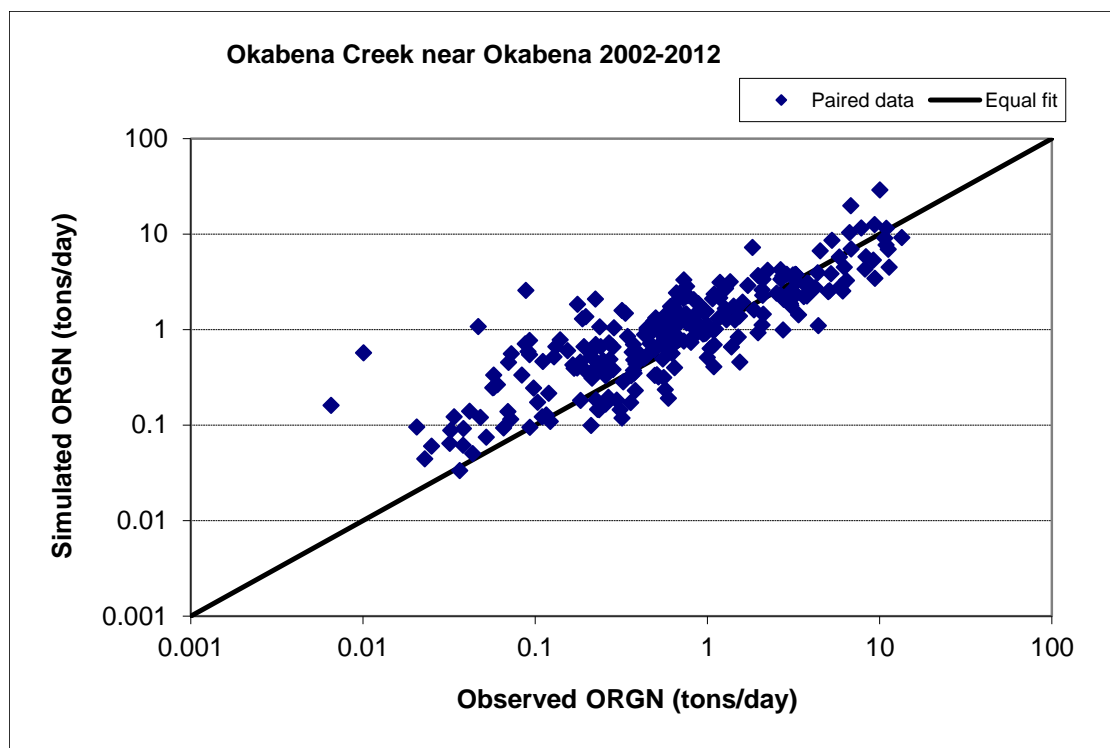


Figure 210. Paired simulated vs. observed Organic Nitrogen (OrgN) load at Okabena Creek near Okabena (calibration period)

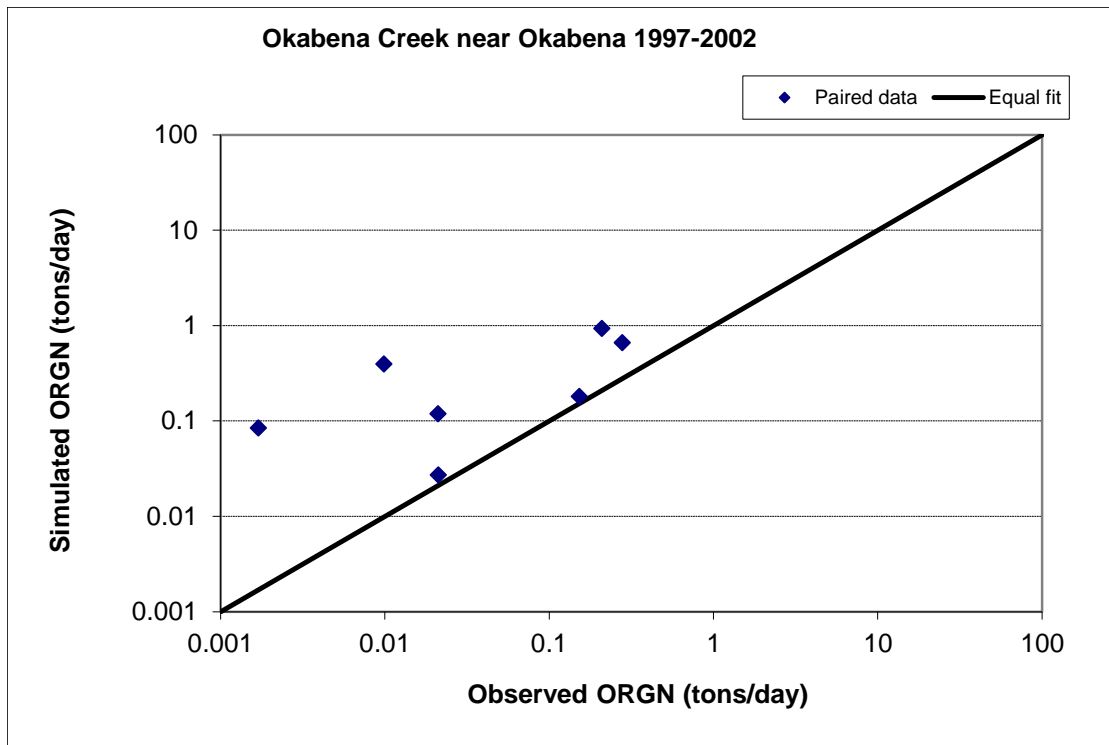


Figure 211. Paired simulated vs. observed Organic Nitrogen (OrgN) load at Okabena Creek near Okabena (validation period)

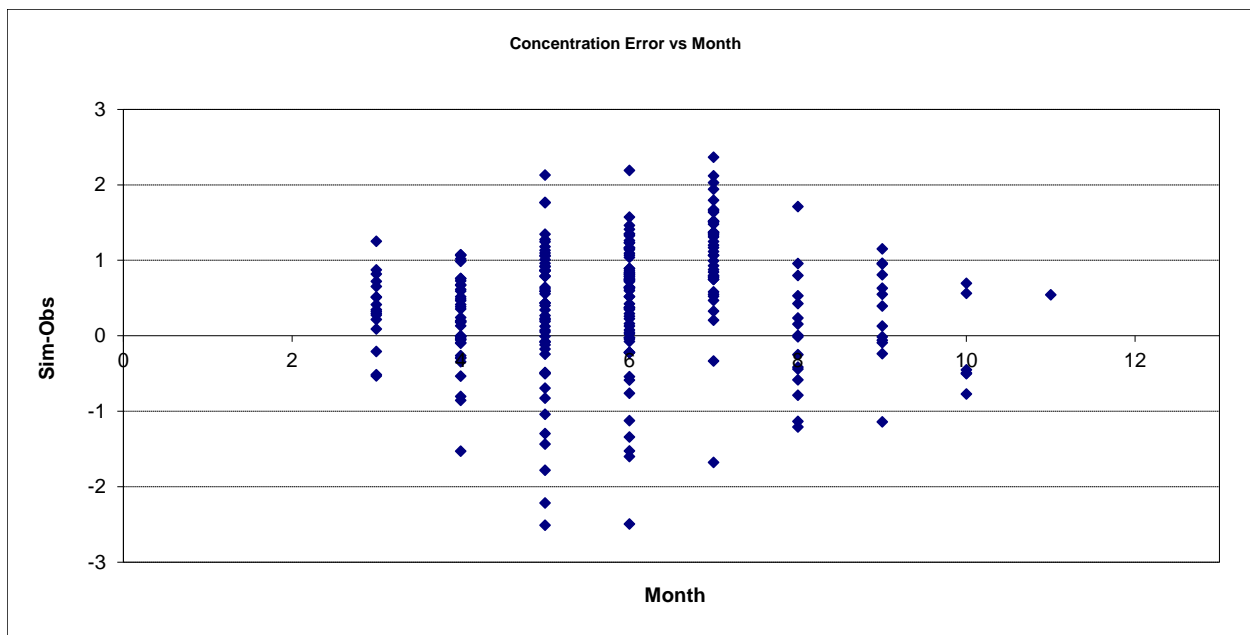


Figure 212. Residual (Simulated - Observed) vs. Month Organic Nitrogen (OrgN) at Okabena Creek near Okabena

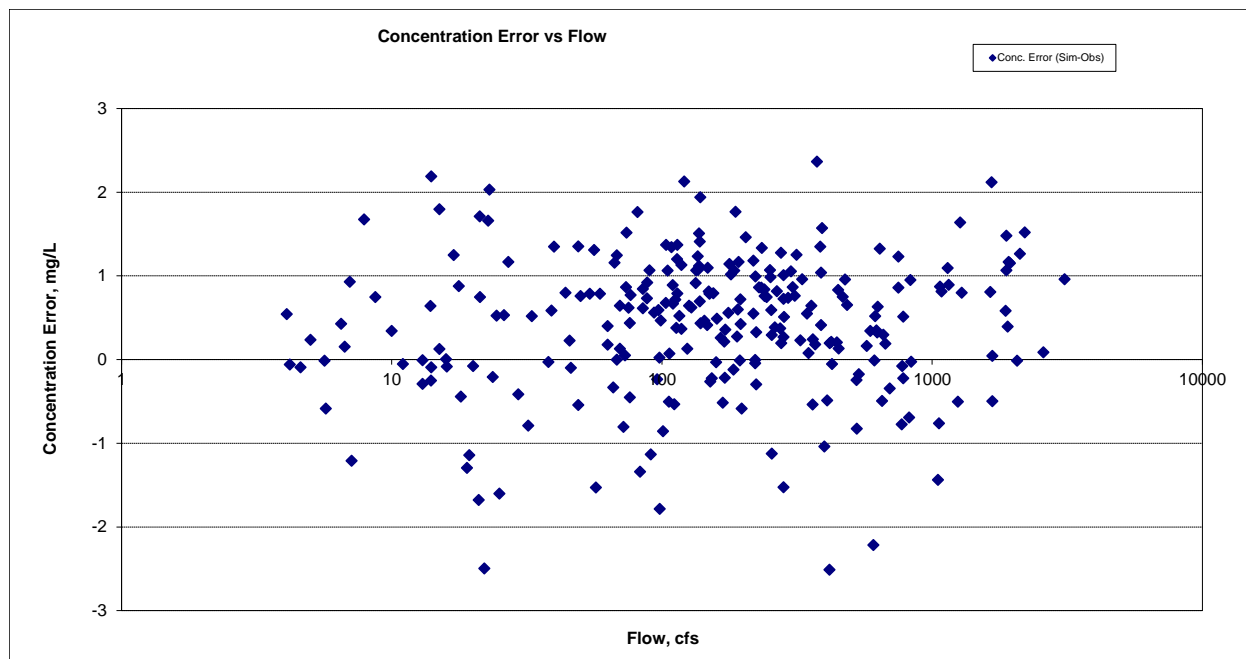


Figure 213. Residual (Simulated - Observed) vs. Flow Organic Nitrogen (OrgN) at Okabena Creek near Okabena

Total Kjeldahl Nitrogen (TKN)

Table 31. Total Kjeldahl Nitrogen (TKN) statistics

Period	2002-2014	1997-2002
Count	286	15
Concentration Average Error	37.69%	140.93%
Concentration Median Error	42.39%	115.46%
Load Average Error	25.82%	152.39%
Load Median Error	14.78%	74.66%
Paired t concentration	0.00	0.00

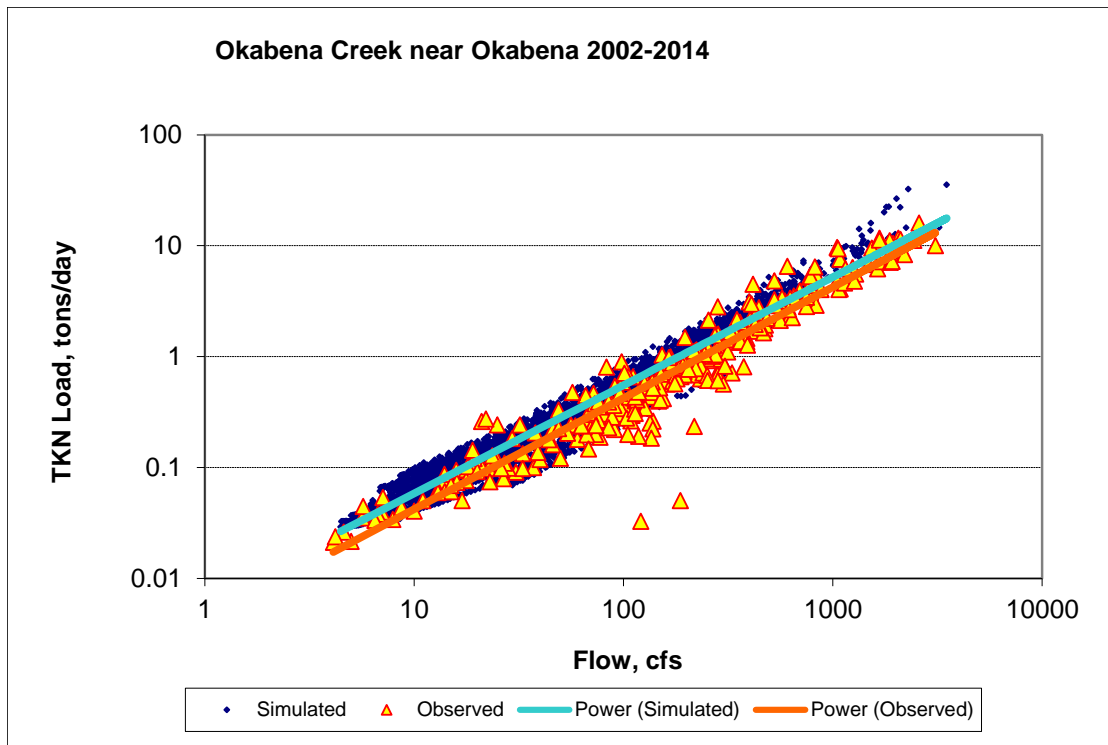


Figure 214. Power plot of simulated and observed Total Kjeldahl Nitrogen (TKN) load vs flow at Okabena Creek near Okabena (calibration period)

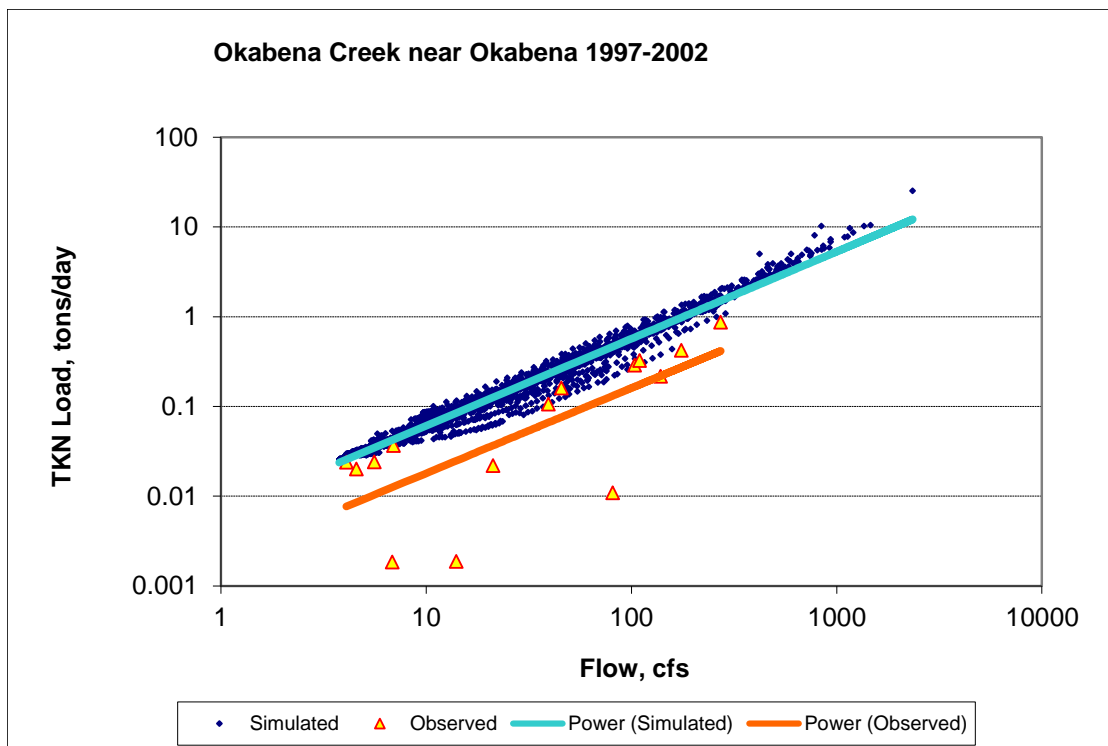


Figure 215. Power plot of simulated and observed Total Kjeldahl Nitrogen (TKN) load vs flow at Okabena Creek near Okabena (validation period)

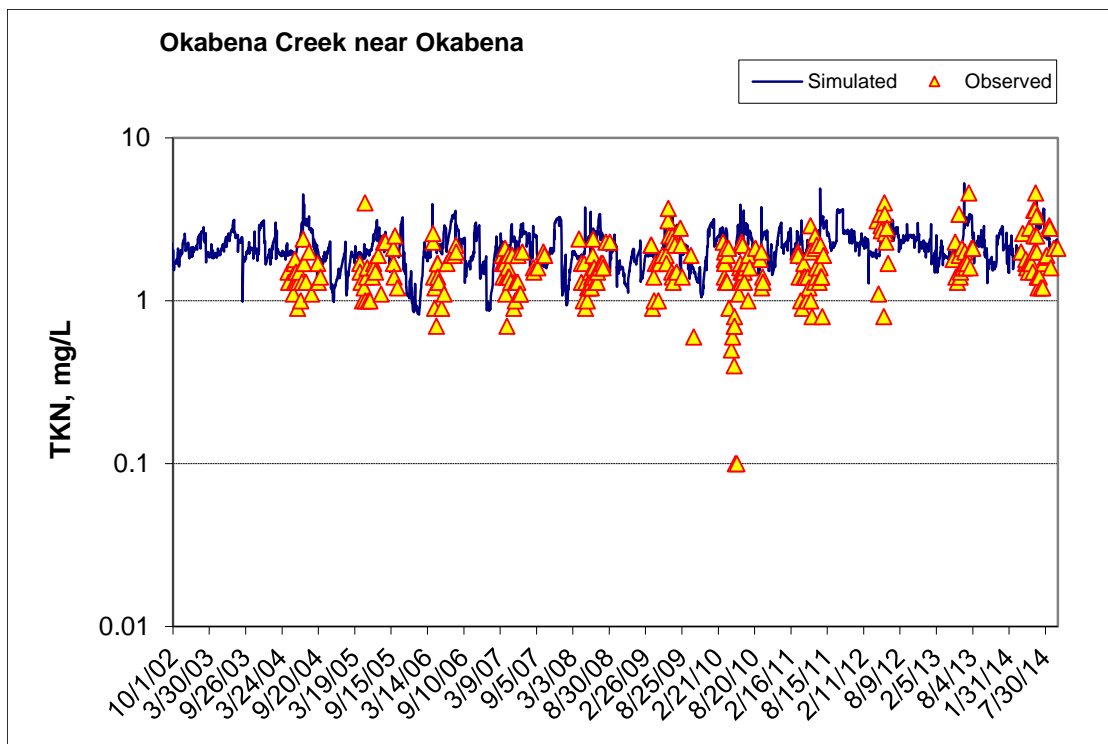


Figure 216. Time series of observed and simulated Total Kjeldahl Nitrogen (TKN) concentration at Okabena Creek near Okabena (calibration period)

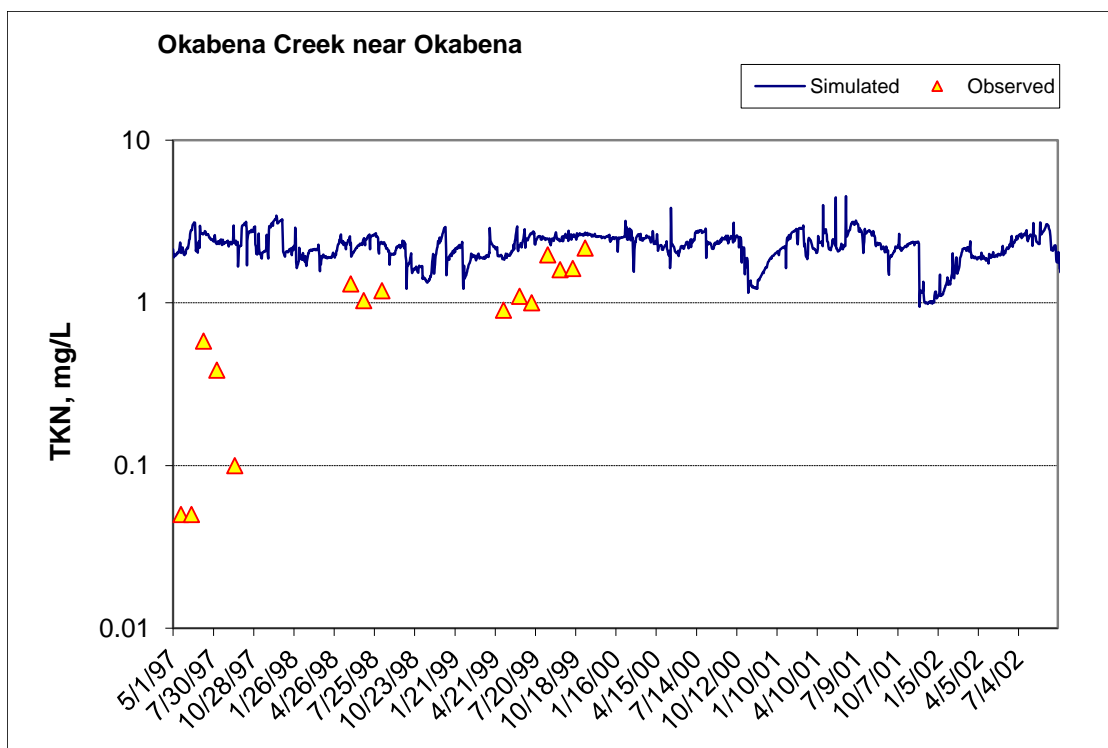


Figure 217. Time series of observed and simulated Total Kjeldahl Nitrogen (TKN) concentration at Okabena Creek near Okabena (validation period)

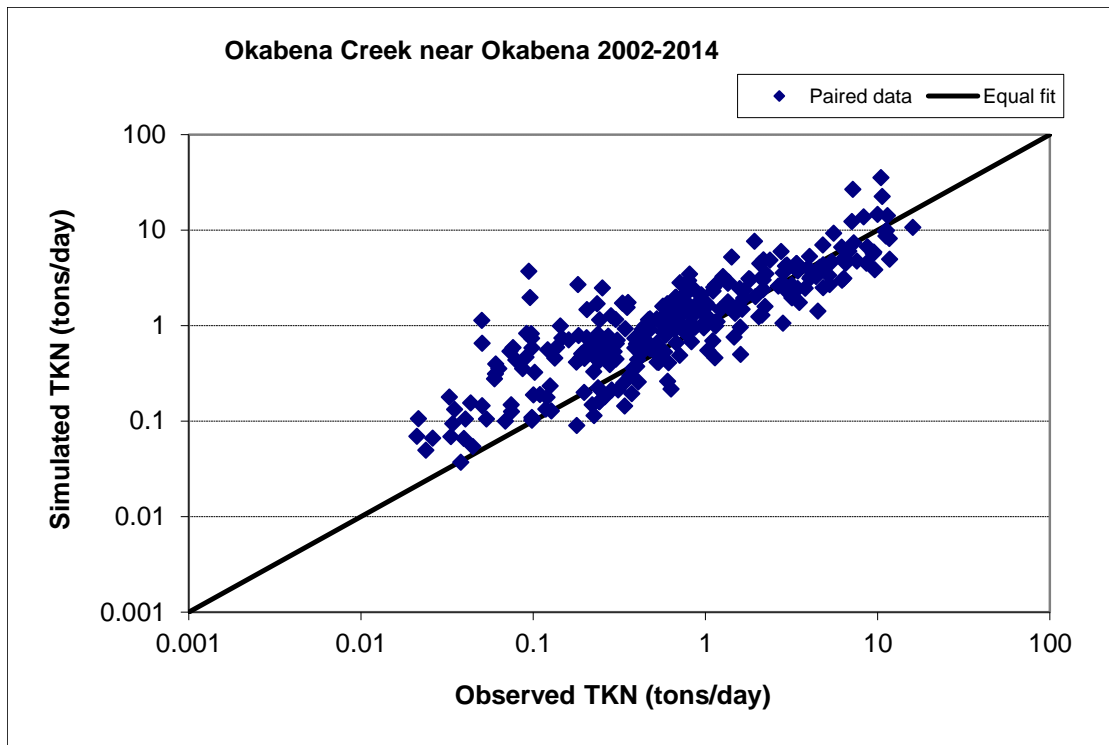


Figure 218. Paired simulated vs. observed Total Kjeldahl Nitrogen (TKN) load at Okabena Creek near Okabena (calibration period)

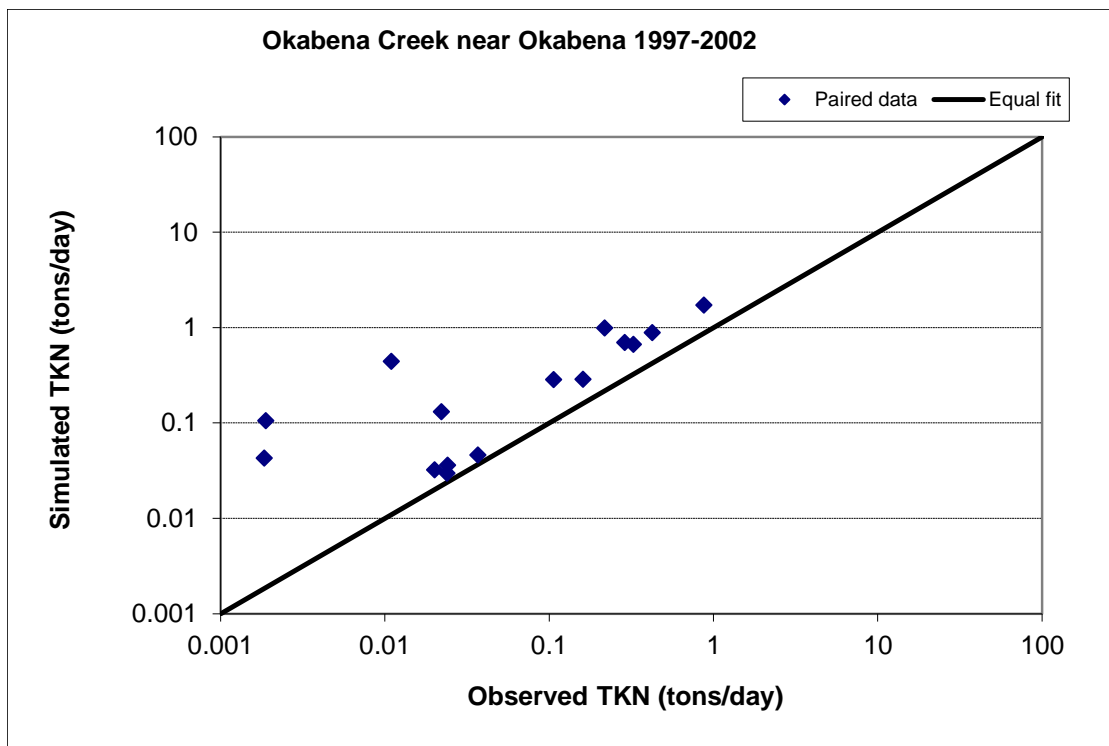


Figure 219. Paired simulated vs. observed Total Kjeldahl Nitrogen (TKN) load at Okabena Creek near Okabena (validation period)

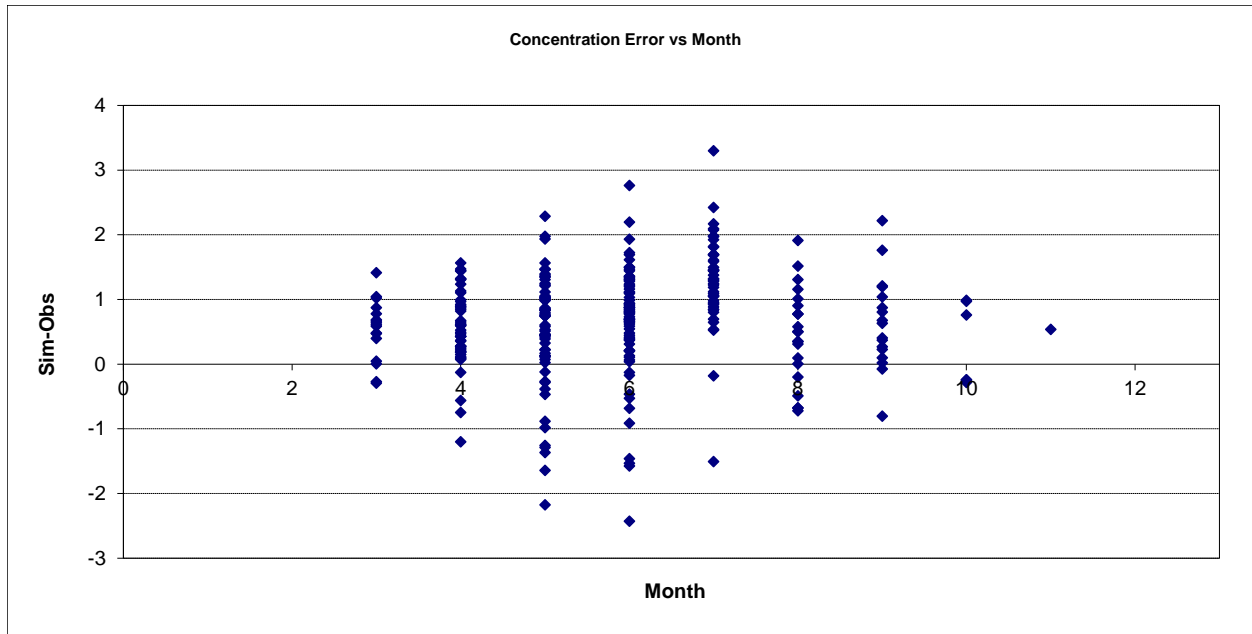


Figure 220. Residual (Simulated - Observed) vs. Month Total Kjeldahl Nitrogen (TKN) at Okabena Creek near Okabena

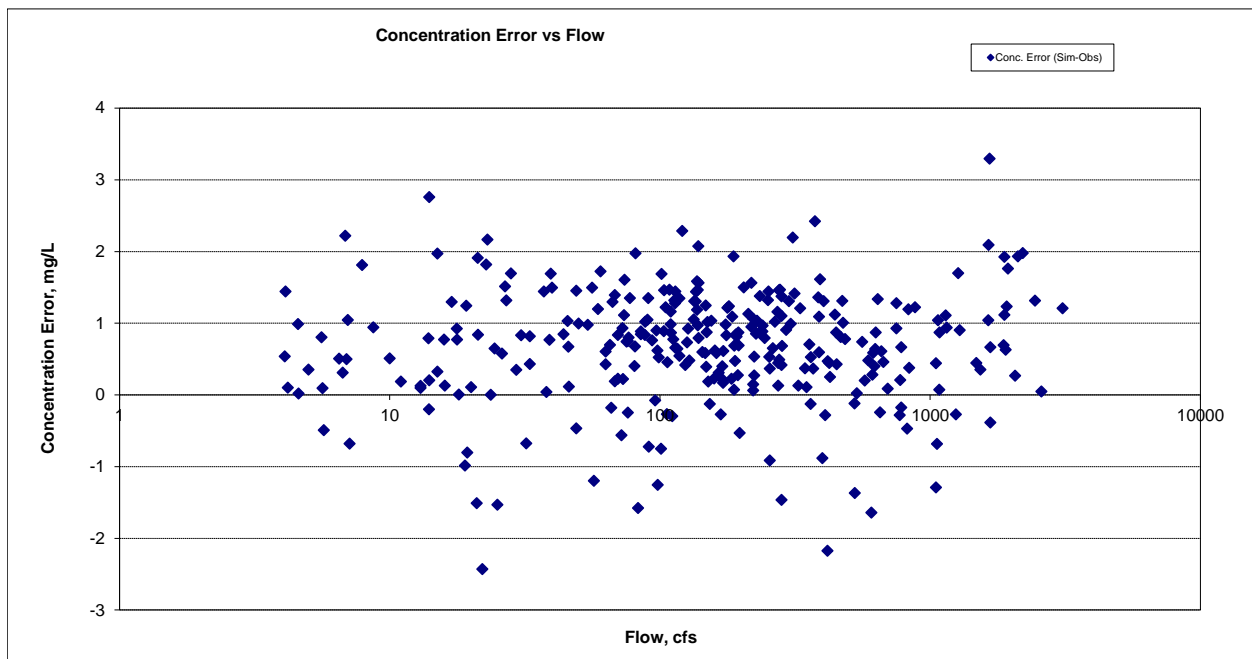


Figure 221. Residual (Simulated - Observed) vs. Flow Total Kjeldahl Nitrogen (TKN) at Okabena Creek near Okabena

Nitrite+ Nitrate Nitrogen (NO_x)

Table 32. Nitrite+ Nitrate Nitrogen (NO_x) statistics

Period	2002-2014	1997-2002
Count	274	18
Concentration Average Error	-5.73%	-1.11%
Concentration Median Error	-0.81%	-7.10%
Load Average Error	5.12%	-10.33%
Load Median Error	-0.21%	-8.16%
Paired t concentration	1.00	0.87

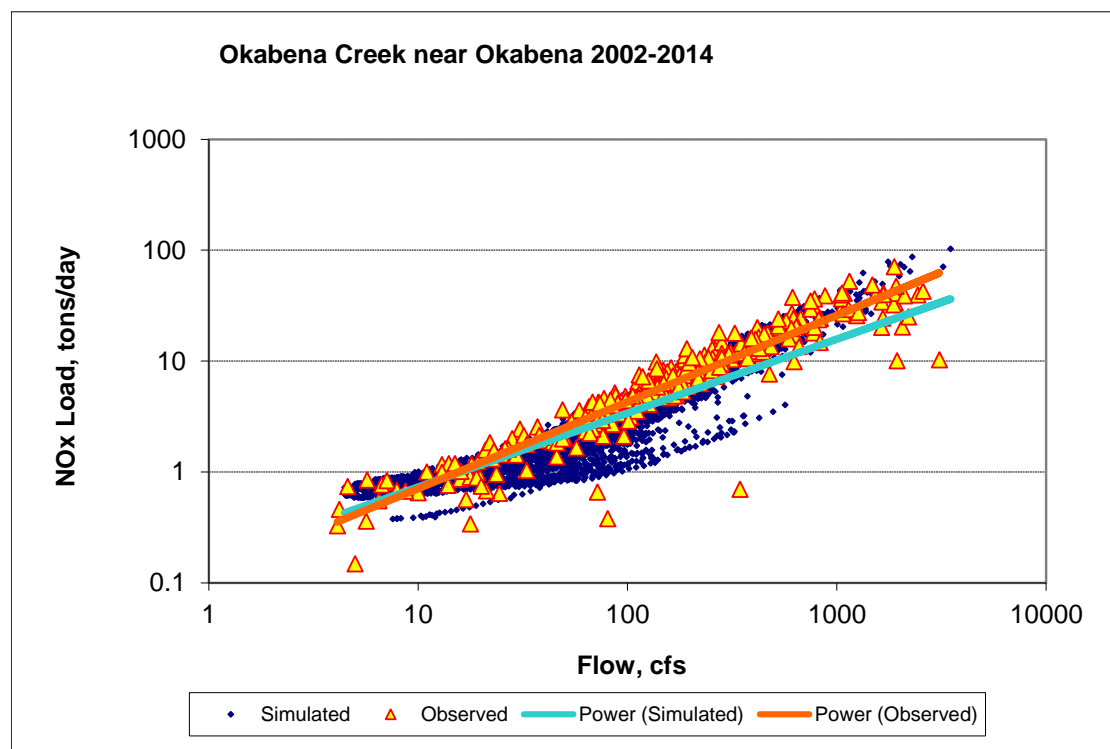


Figure 222. Power plot of simulated and observed Nitrite+ Nitrate Nitrogen (NO_x) load vs flow at Okabena Creek near Okabena (calibration period)

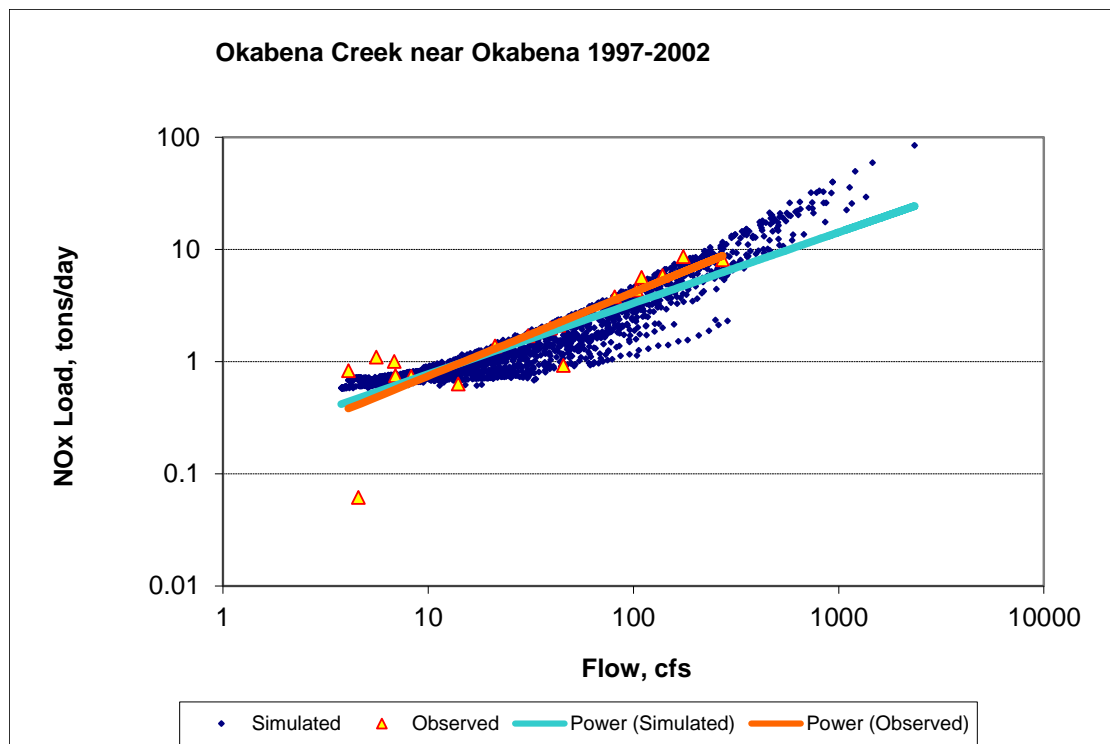


Figure 223. Power plot of simulated and observed Nitrite+ Nitrate Nitrogen (NOx) load vs flow at Okabena Creek near Okabena (validation period)

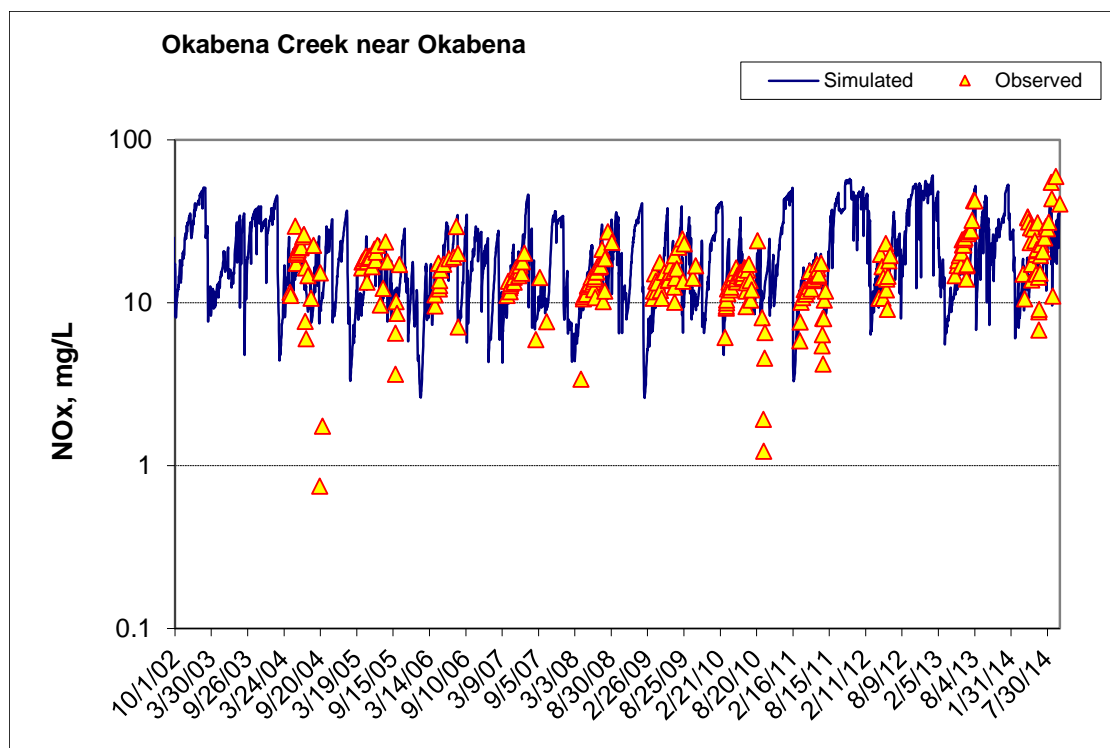


Figure 224. Time series of observed and simulated Nitrite+ Nitrate Nitrogen (NOx) concentration at Okabena Creek near Okabena (calibration period)

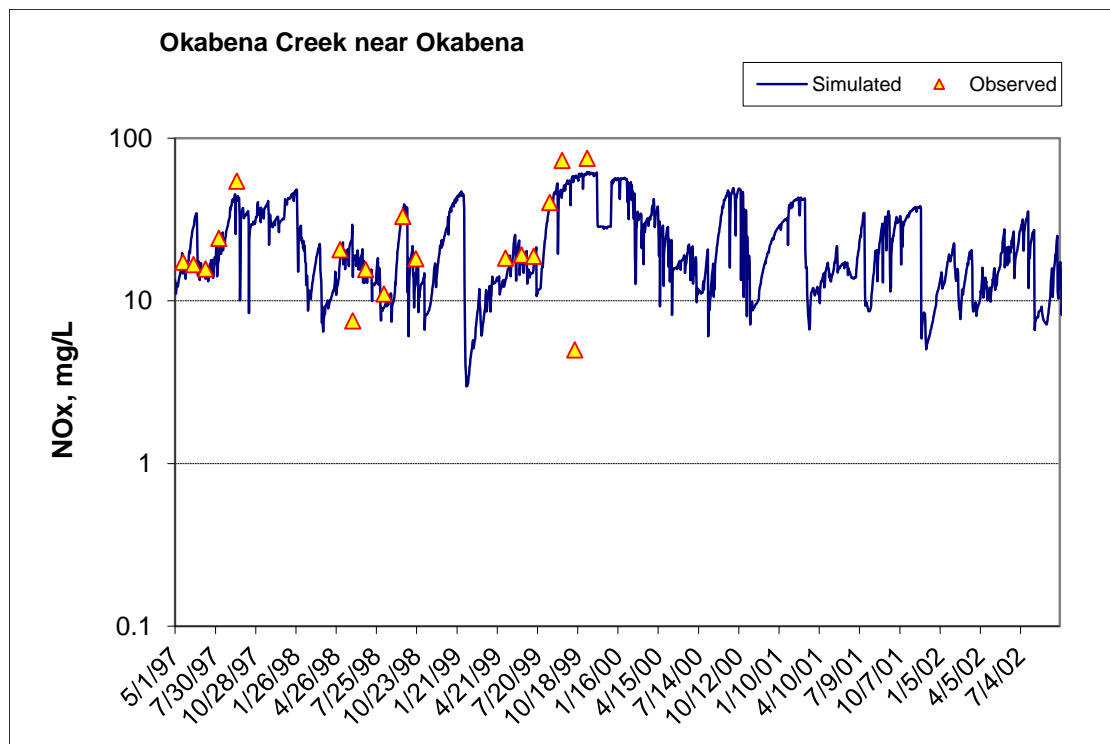


Figure 225. Time series of observed and simulated Nitrite+ Nitrate Nitrogen (NOx) concentration at Okabena Creek near Okabena (validation period)

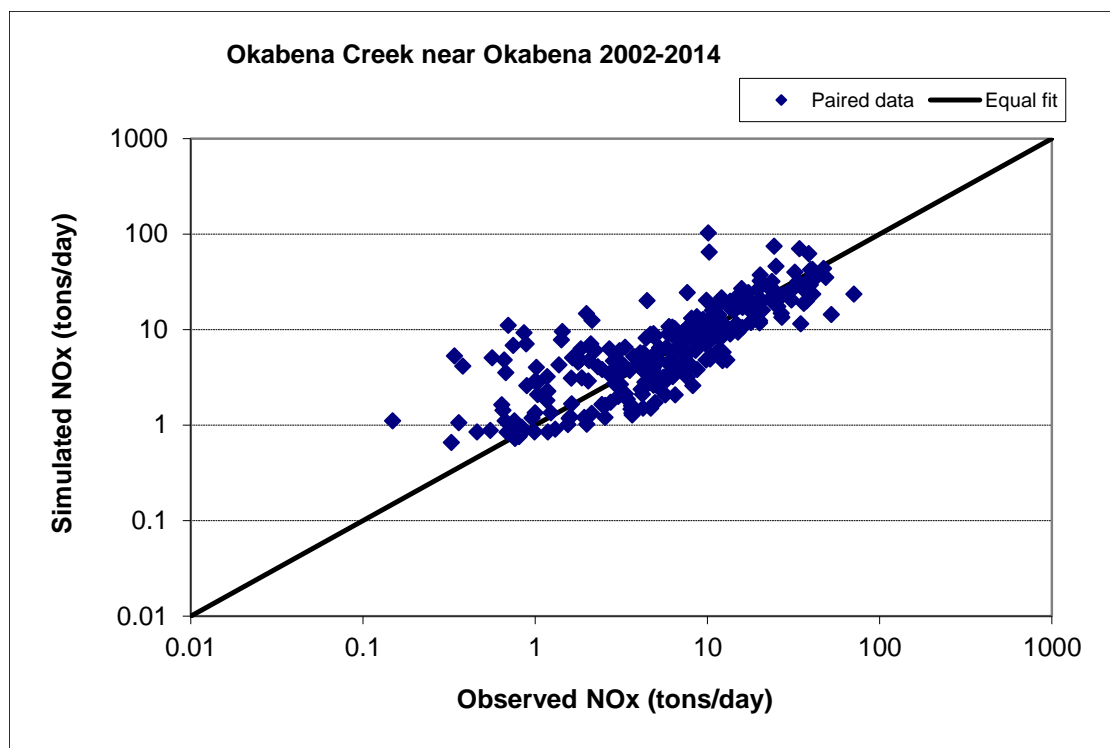


Figure 226. Paired simulated vs. observed Nitrite+ Nitrate Nitrogen (NOx) load at Okabena Creek near Okabena (calibration period)

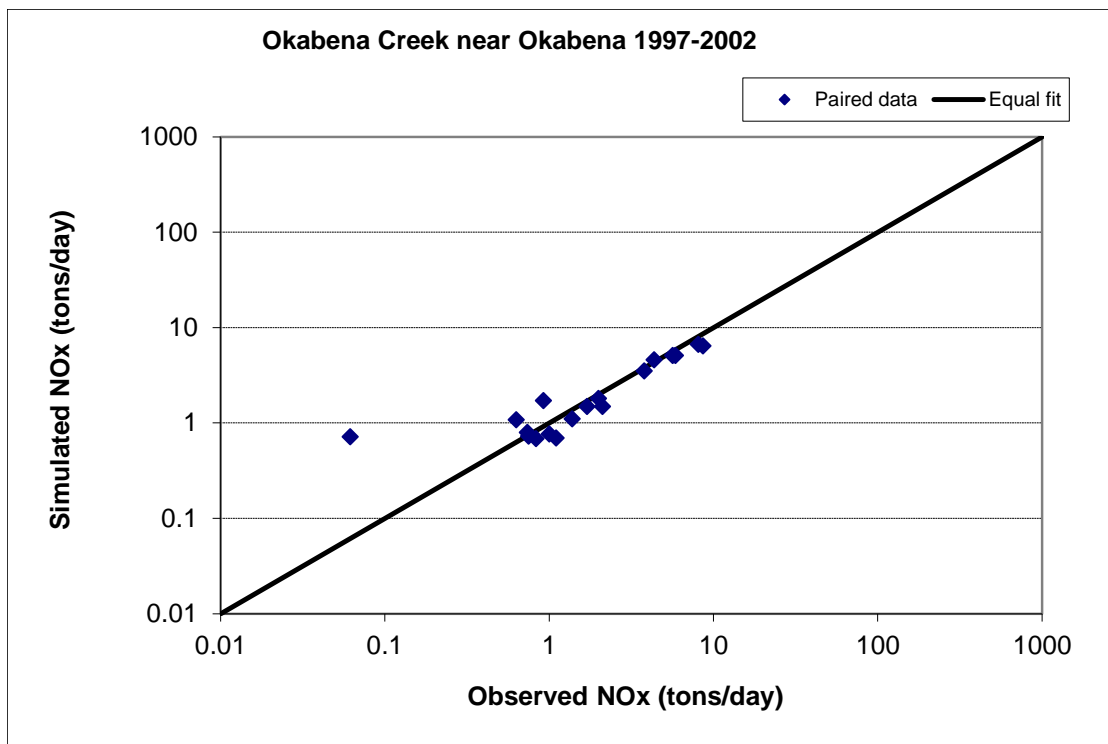


Figure 227. Paired simulated vs. observed Nitrite+ Nitrate Nitrogen (NOx) load at Okabena Creek near Okabena (validation period)

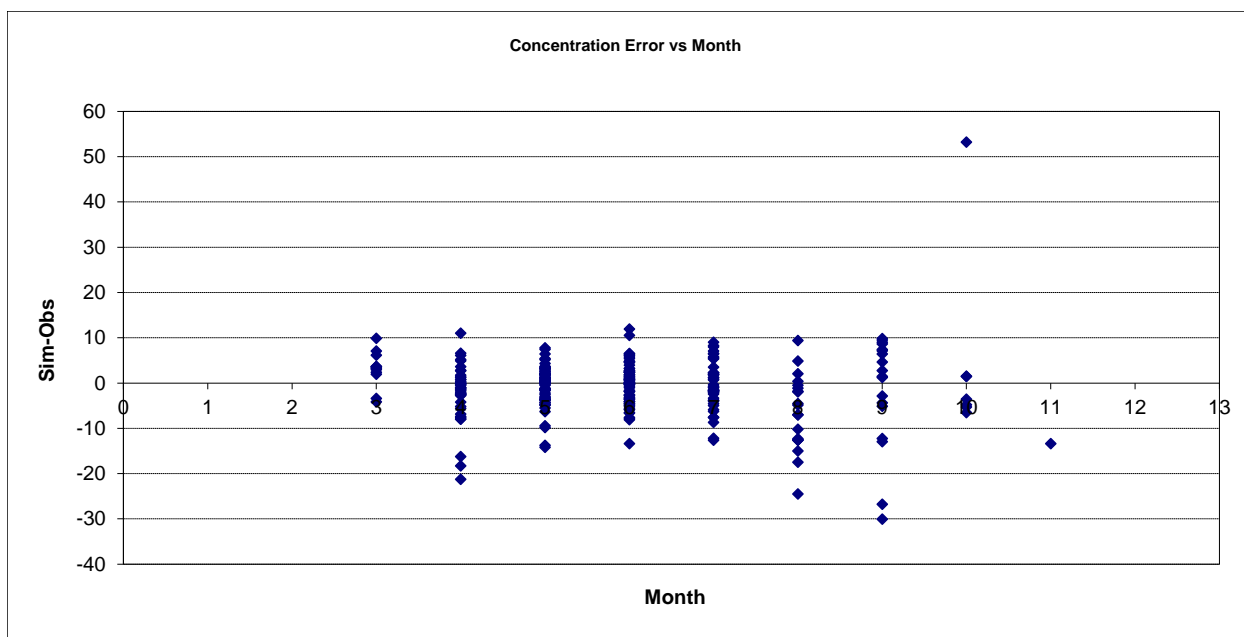


Figure 228. Residual (Simulated - Observed) vs. Month Nitrite+ Nitrate Nitrogen (NOx) at Okabena Creek near Okabena

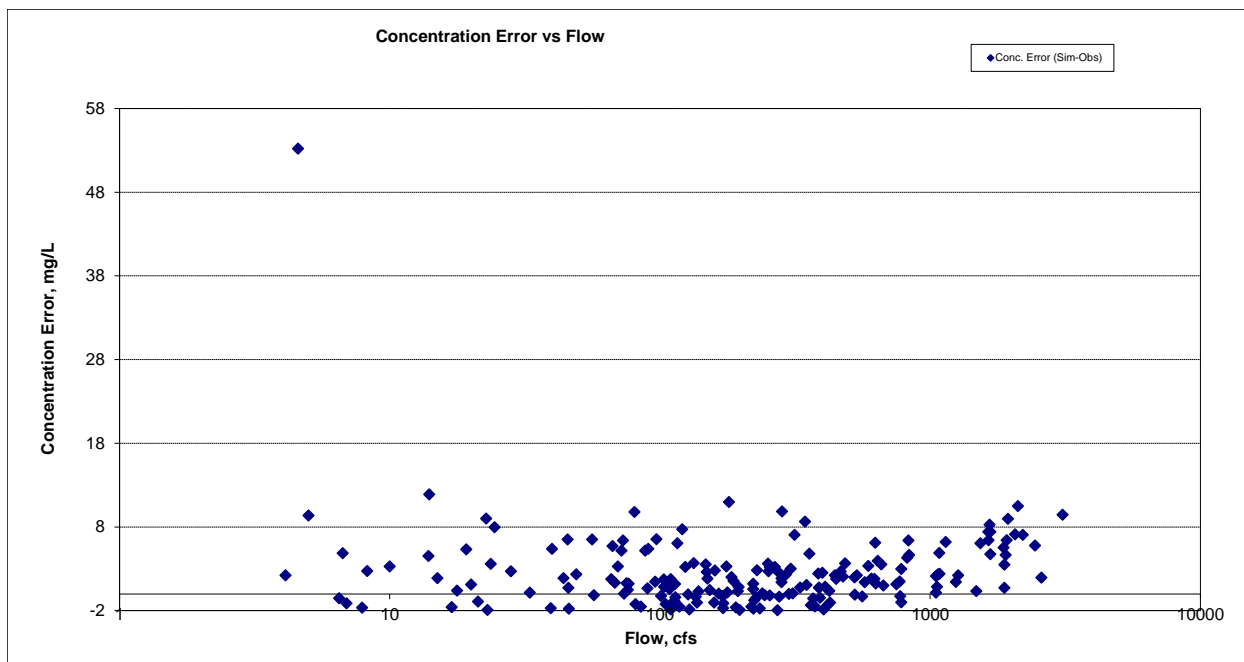


Figure 229. Residual (Simulated - Observed) vs. Flow Nitrite+ Nitrate Nitrogen (NOx) at Okabena Creek near Okabena

Total Nitrogen (TN)

Table 33. Total Nitrogen (TN) statistics

Period	2002-2014	1997-2002
Count	273	15
Concentration Average Error	-1.63%	4.91%
Concentration Median Error	2.72%	-2.22%
Load Average Error	7.78%	-1.03%
Load Median Error	1.82%	-0.37%
Paired t concentration	1.00	0.79

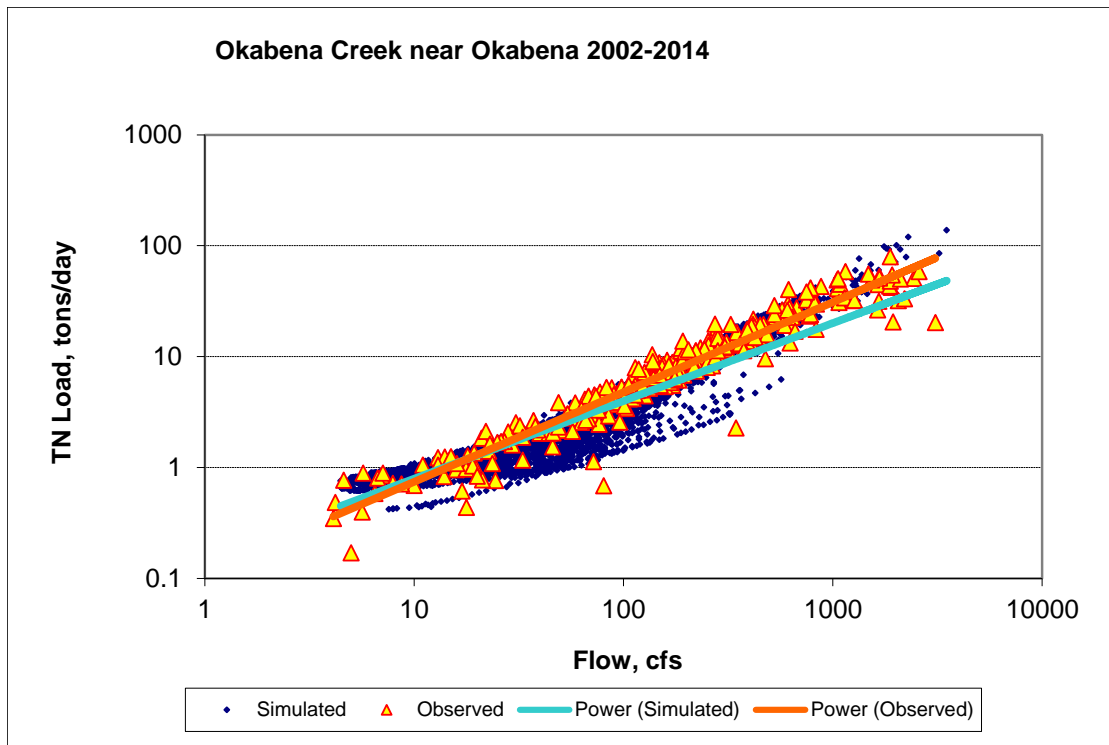


Figure 230. Power plot of simulated and observed Total Nitrogen (TN) load vs flow at Okabena Creek near Okabena (calibration period)

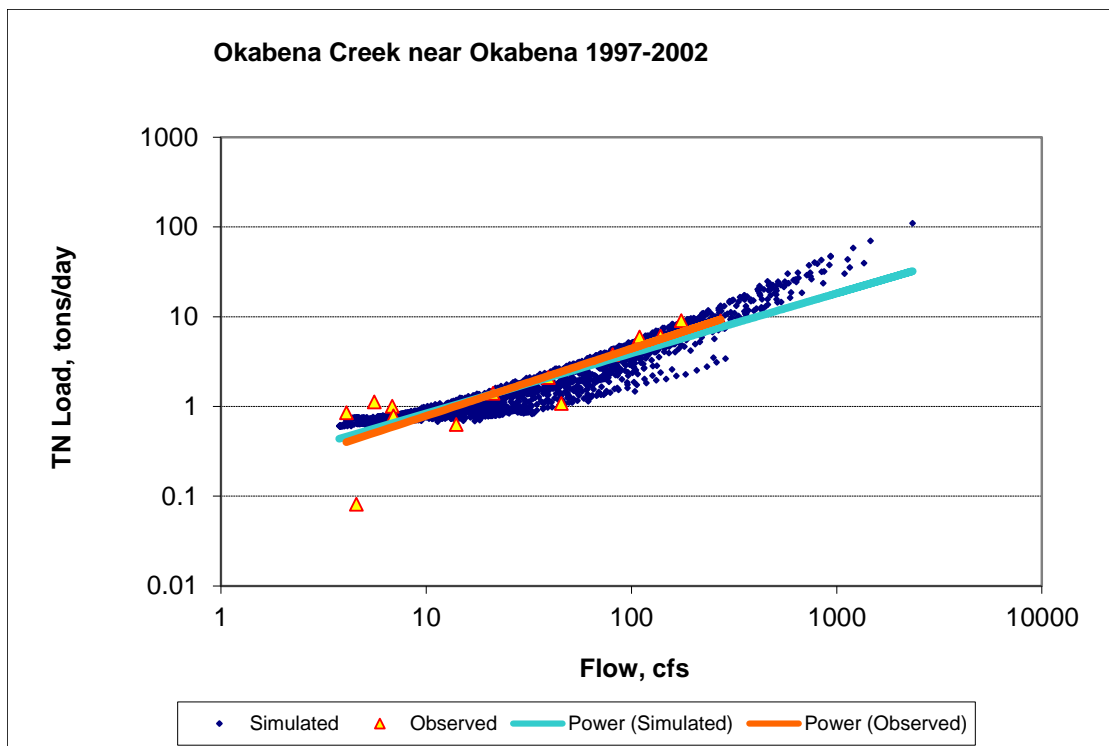


Figure 231. Power plot of simulated and observed Total Nitrogen (TN) load vs flow at Okabena Creek near Okabena (validation period)

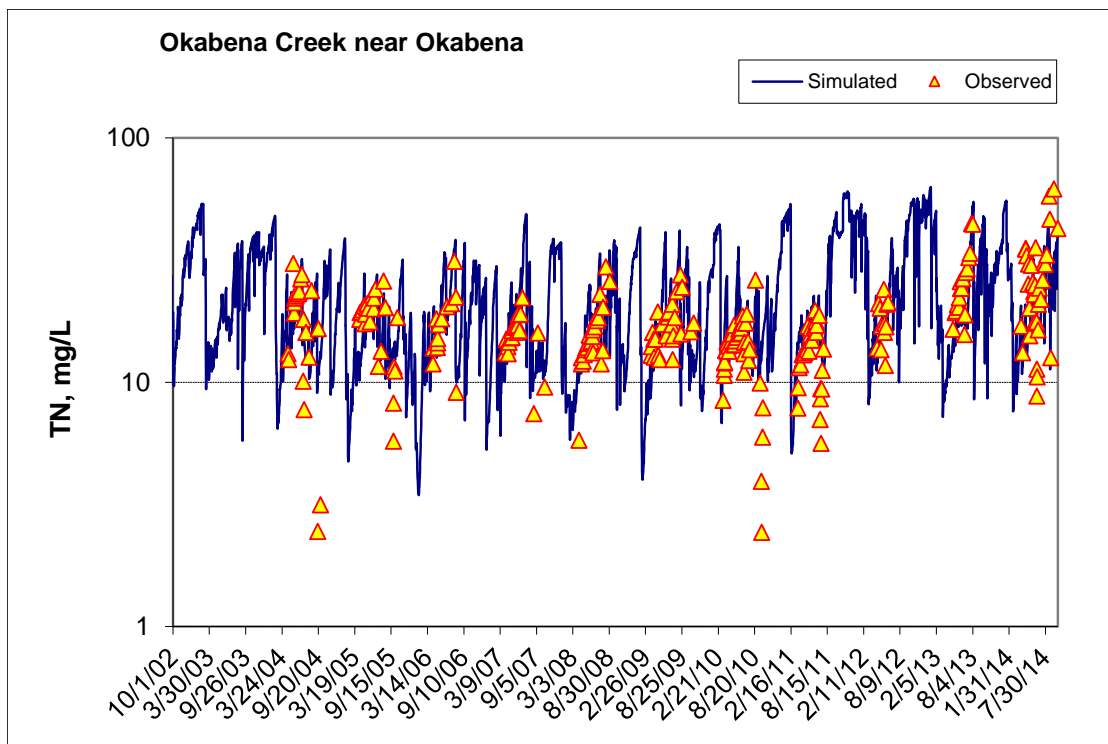


Figure 232. Time series of observed and simulated Total Nitrogen (TN) concentration at Okabena Creek near Okabena (calibration period)

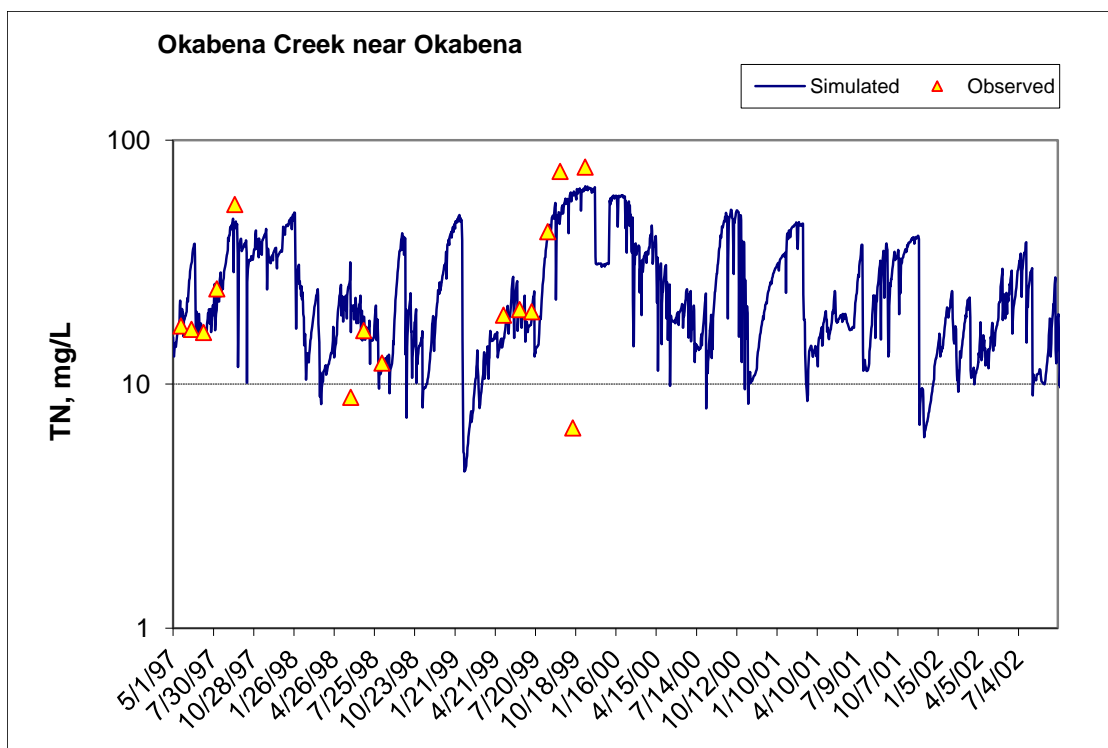


Figure 233. Time series of observed and simulated Total Nitrogen (TN) concentration at Okabena Creek near Okabena (validation period)

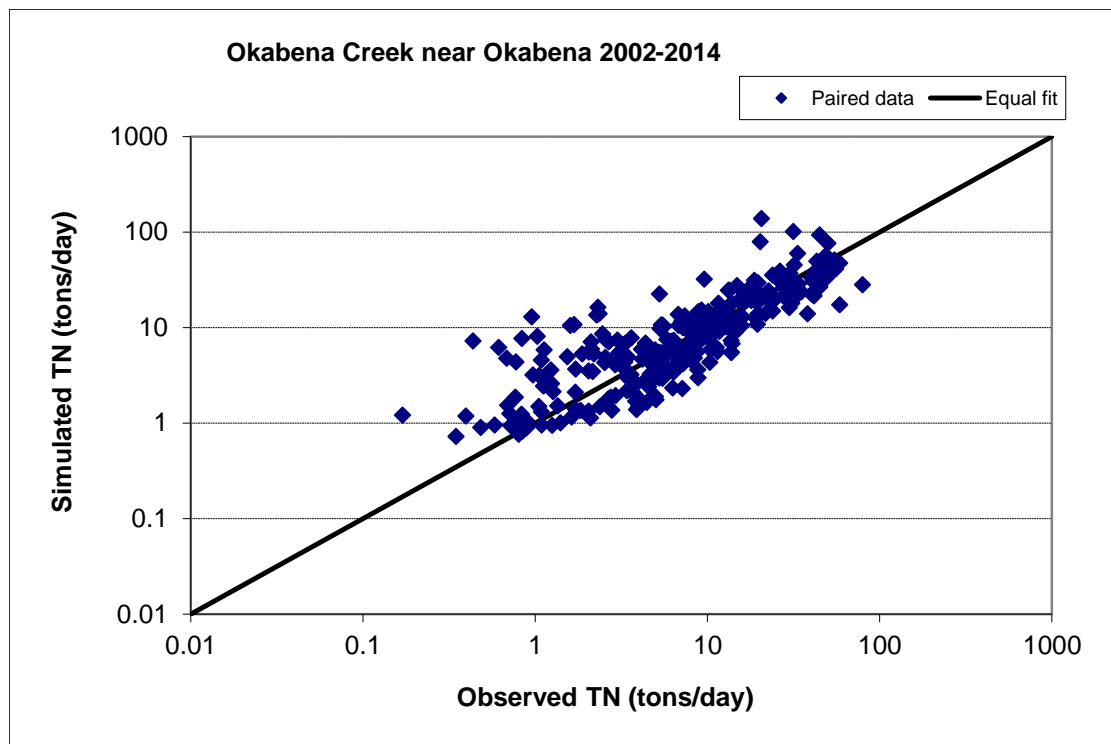


Figure 234. Paired simulated vs. observed Total Nitrogen (TN) load at Okabena Creek near Okabena (calibration period)

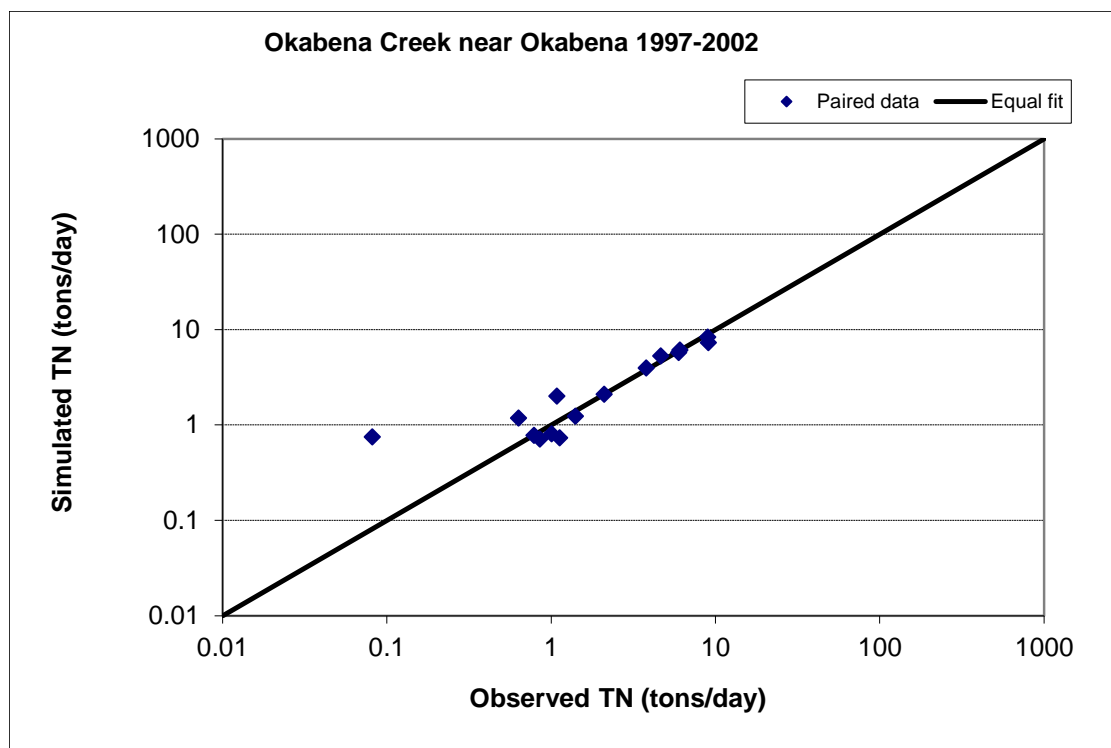


Figure 235. Paired simulated vs. observed Total Nitrogen (TN) load at Okabena Creek near Okabena (validation period)

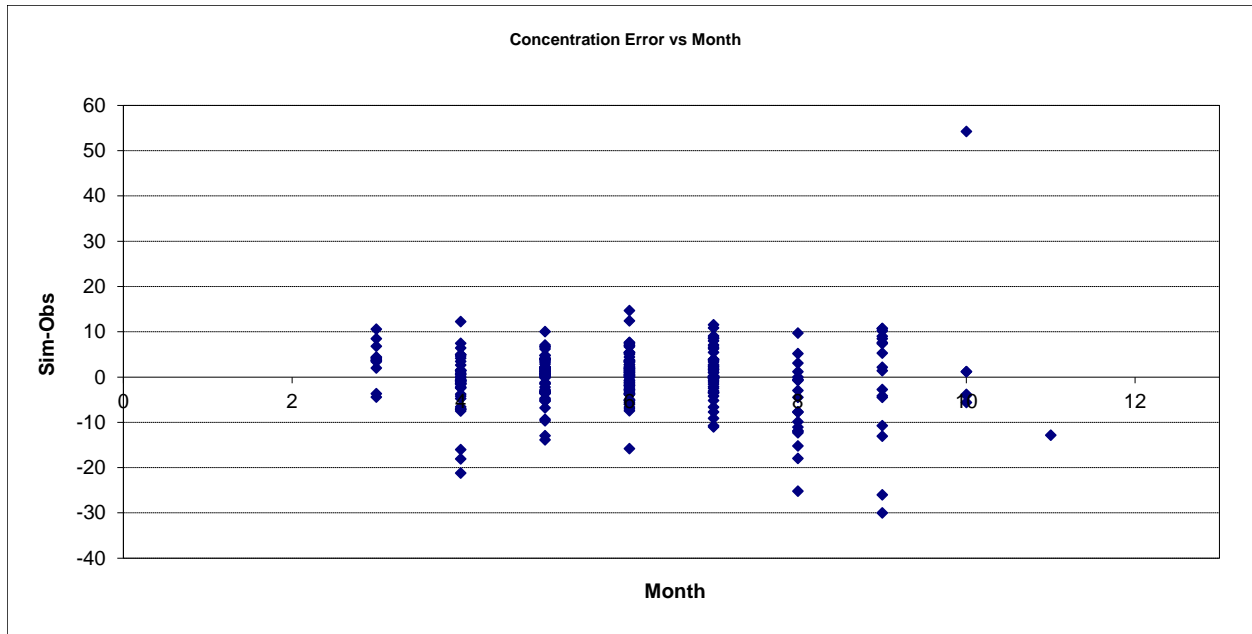


Figure 236. Residual (Simulated - Observed) vs. Month Total Nitrogen (TN) at Okabena Creek near Okabena

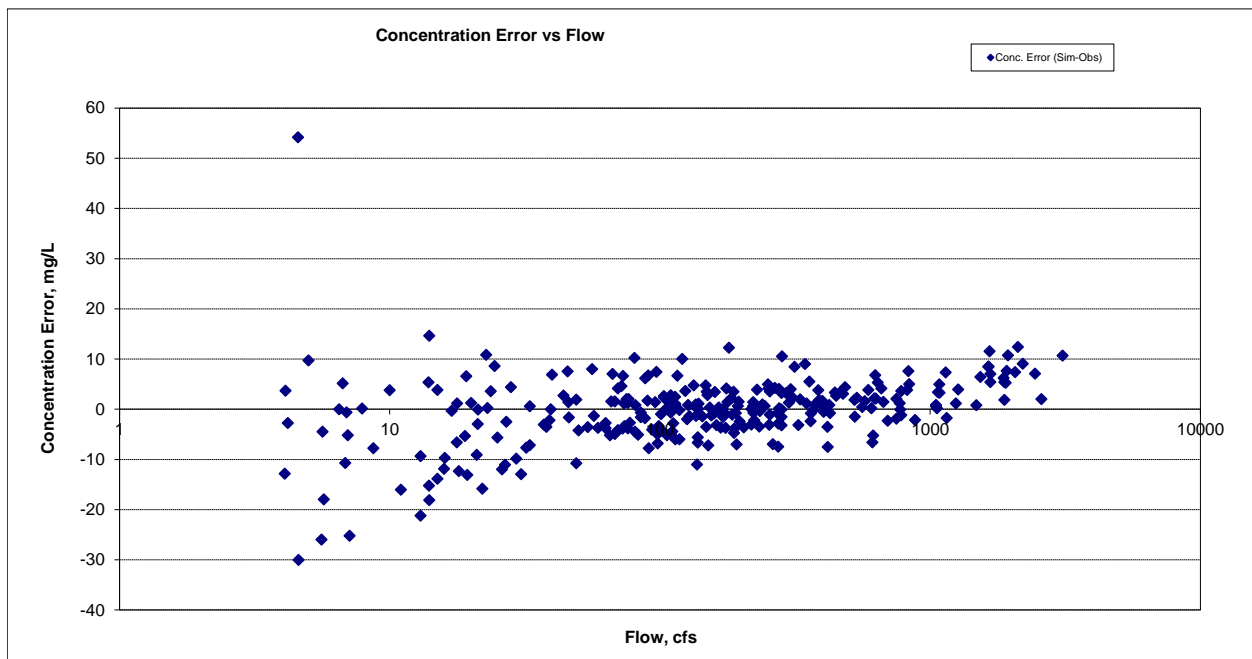


Figure 237. Residual (Simulated - Observed) vs. Flow Total Nitrogen (TN) at Okabena Creek near Okabena

Soluble Reactive Phosphorus (SRP)

Table 34. Soluble Reactive Phosphorus (SRP) statistics

Period	2002-2014	1997-2002
Count	305	40
Concentration Average Error	33.30%	160.95%
Concentration Median Error	7.14%	34.13%
Load Average Error	-19.56%	-39.73%
Load Median Error	4.92%	20.07%
Paired t concentration	0.15	0.00

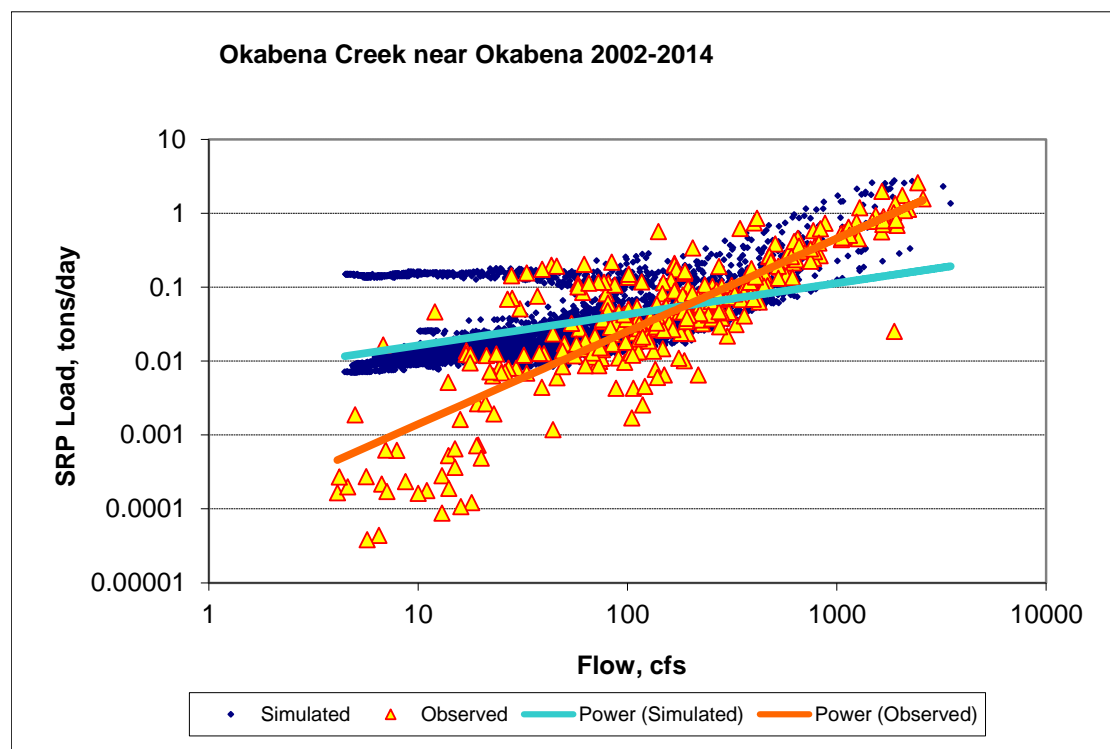


Figure 238. Power plot of simulated and observed Soluble Reactive Phosphorus (SRP) load vs flow at Okabena Creek near Okabena (calibration period)

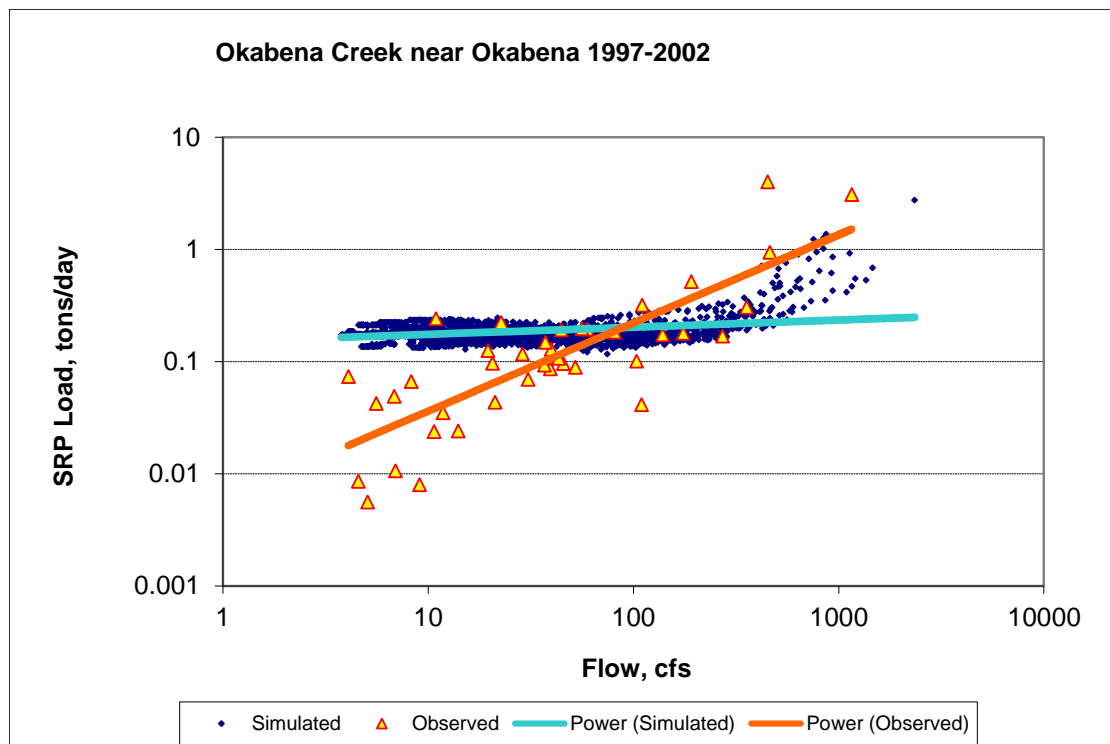


Figure 239. Power plot of simulated and observed Soluble Reactive Phosphorus (SRP) load vs flow at Okabena Creek near Okabena (validation period)

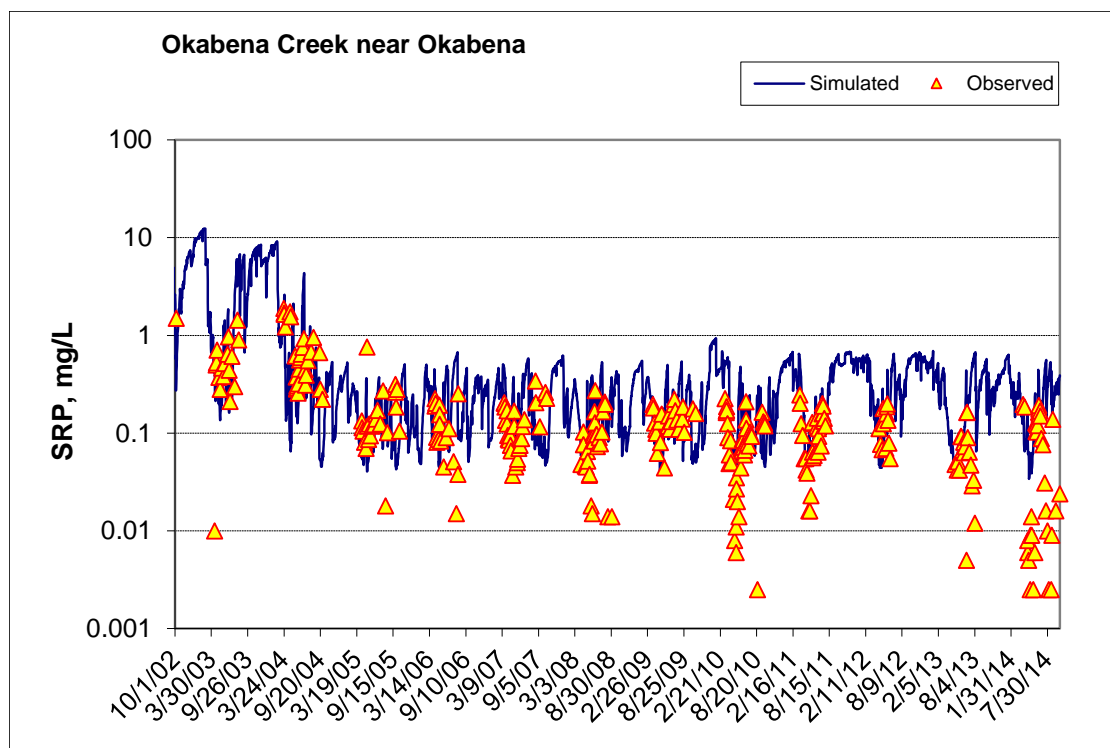


Figure 240. Time series of observed and simulated Soluble Reactive Phosphorus (SRP) concentration at Okabena Creek near Okabena (calibration period)

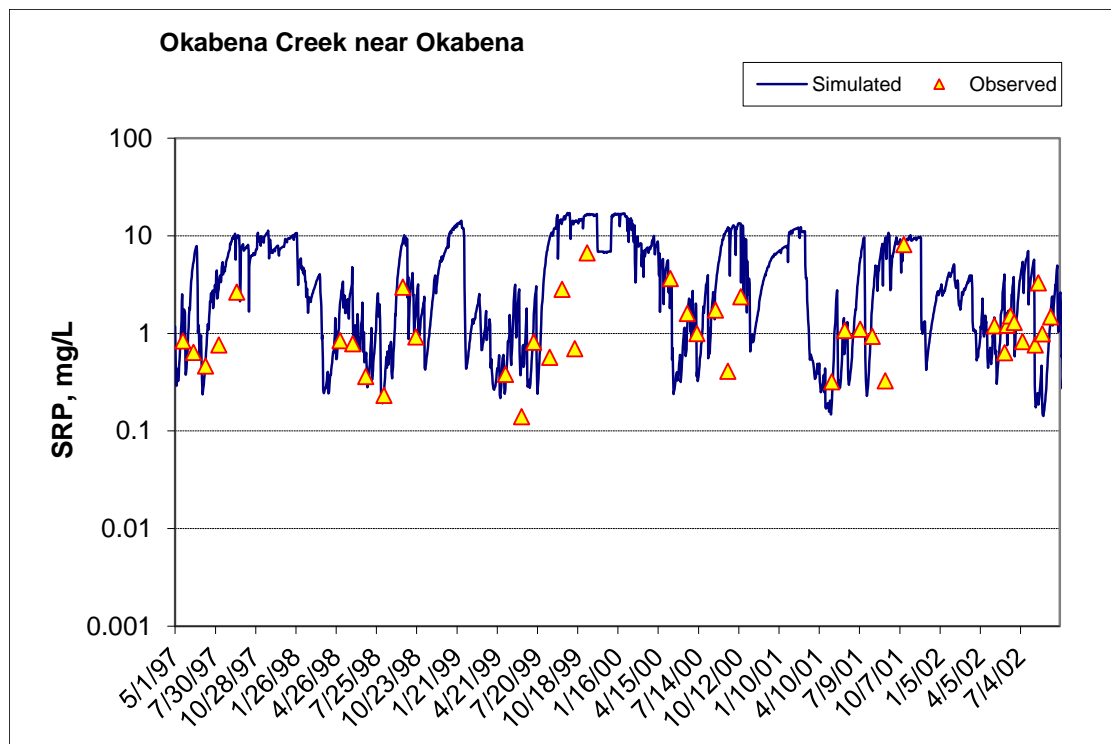


Figure 241. Time series of observed and simulated Soluble Reactive Phosphorus (SRP) concentration at Okabena Creek near Okabena (validation period)

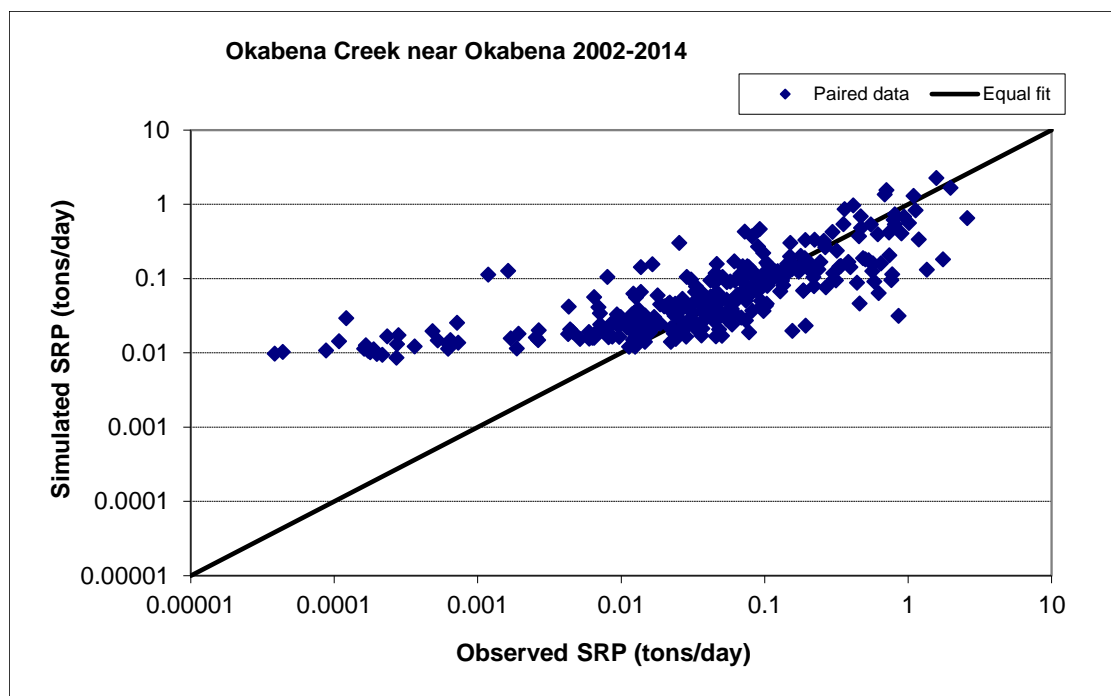


Figure 242. Paired simulated vs. observed Soluble Reactive Phosphorus (SRP) load at Okabena Creek near Okabena (calibration period)

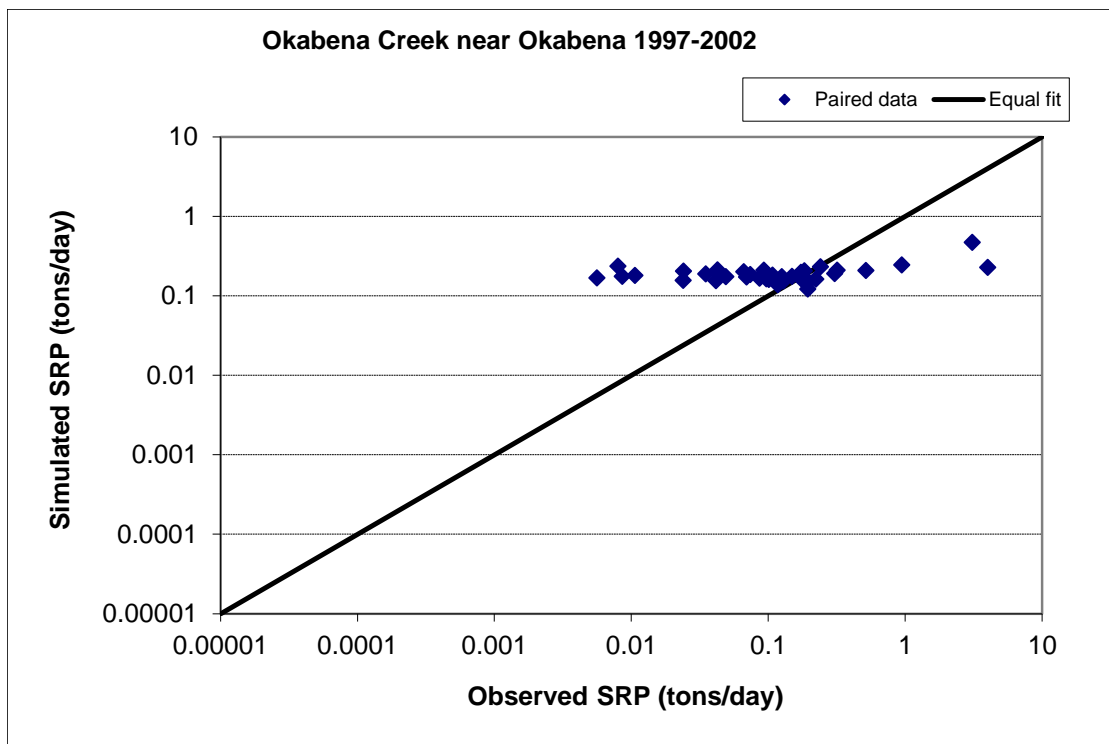


Figure 243. Paired simulated vs. observed Soluble Reactive Phosphorus (SRP) load at Okabena Creek near Okabena (validation period)

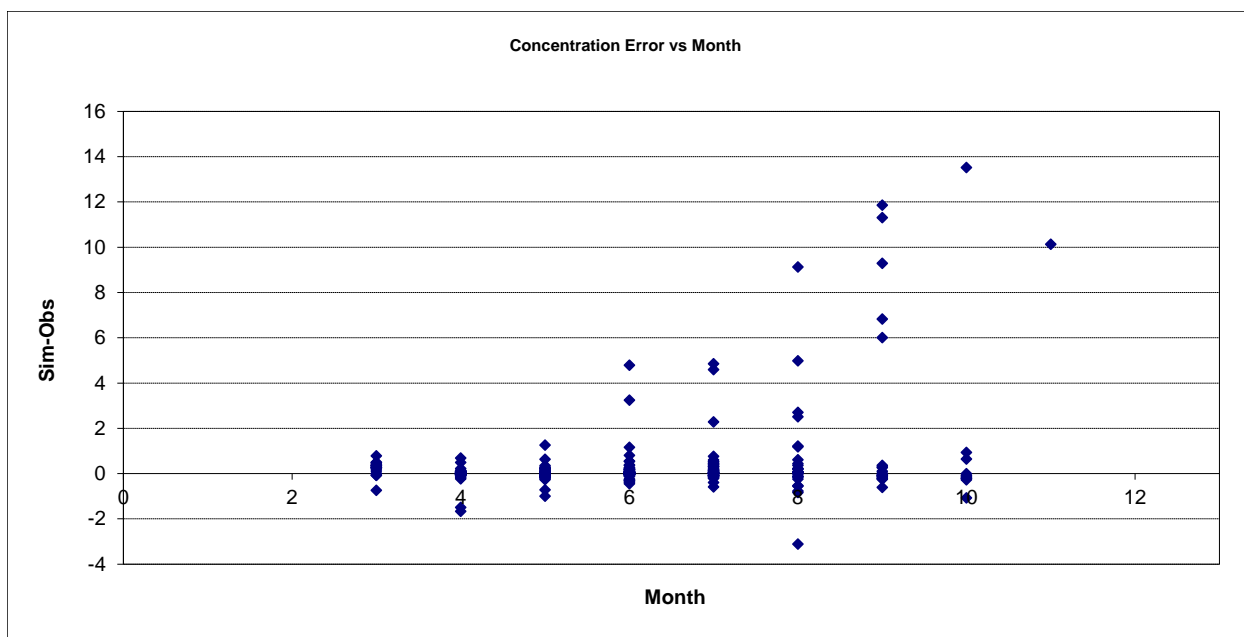


Figure 244. Residual (Simulated - Observed) vs. Month Soluble Reactive Phosphorus (SRP) at Okabena Creek near Okabena

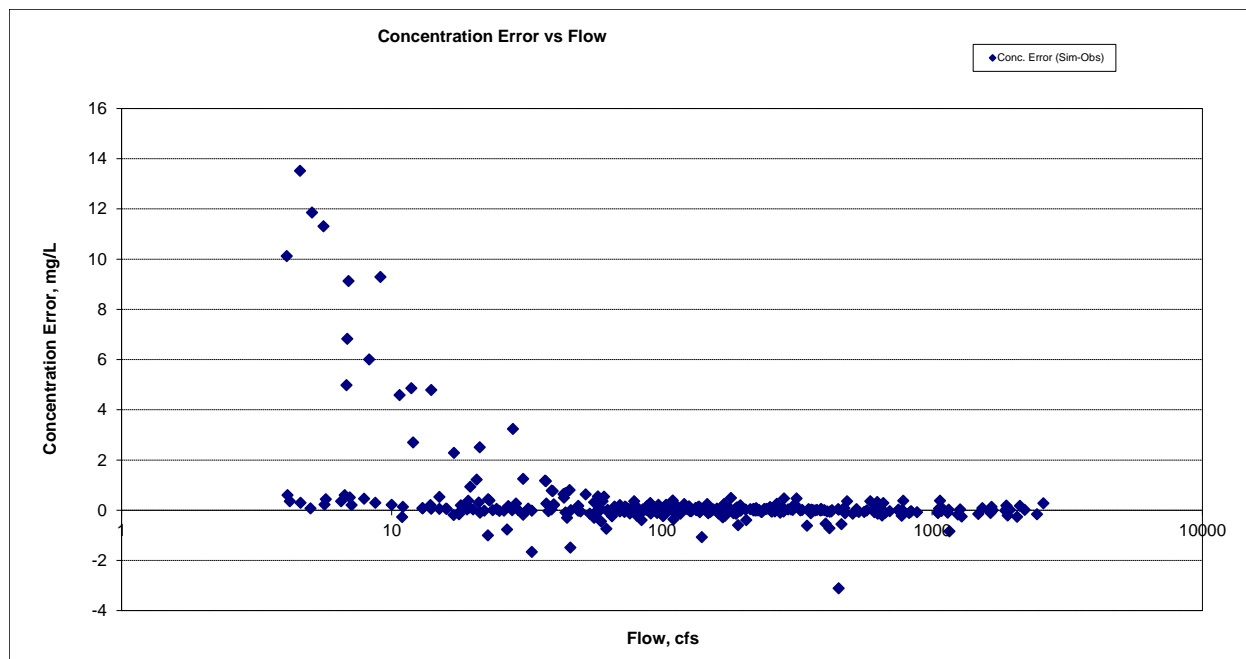


Figure 245. Residual (Simulated - Observed) vs. Flow Soluble Reactive Phosphorus (SRP) at Okabena Creek near Okabena

Organic Phosphorus (OrgP)

Table 35. Organic Phosphorus (OrgP) statistics

Period	2002-2014	1997-2002
Count	303	37
Concentration Average Error	13.44%	-27.78%
Concentration Median Error	32.14%	9.86%
Load Average Error	-15.66%	-53.39%
Load Median Error	8.46%	4.03%
Paired t concentration	0.98	0.39

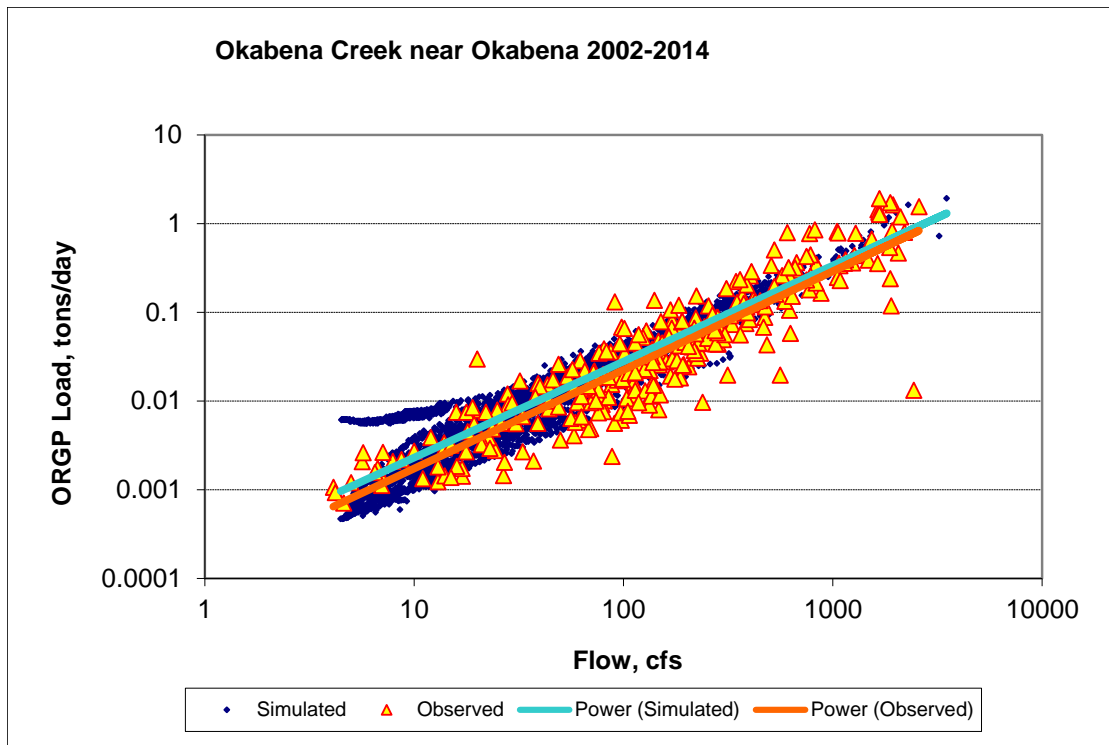


Figure 246. Power plot of simulated and observed Organic Phosphorus (OrgP) load vs flow at Okabena Creek near Okabena (calibration period)

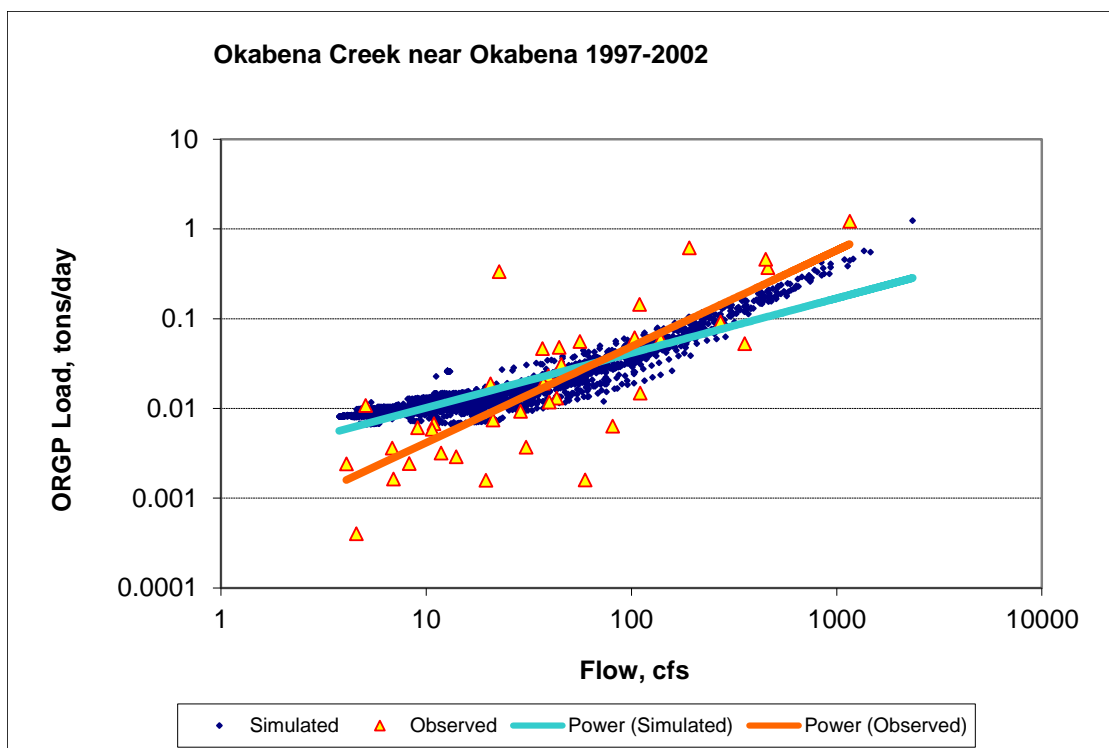


Figure 247. Power plot of simulated and observed Organic Phosphorus (OrgP) load vs flow at Okabena Creek near Okabena (validation period)

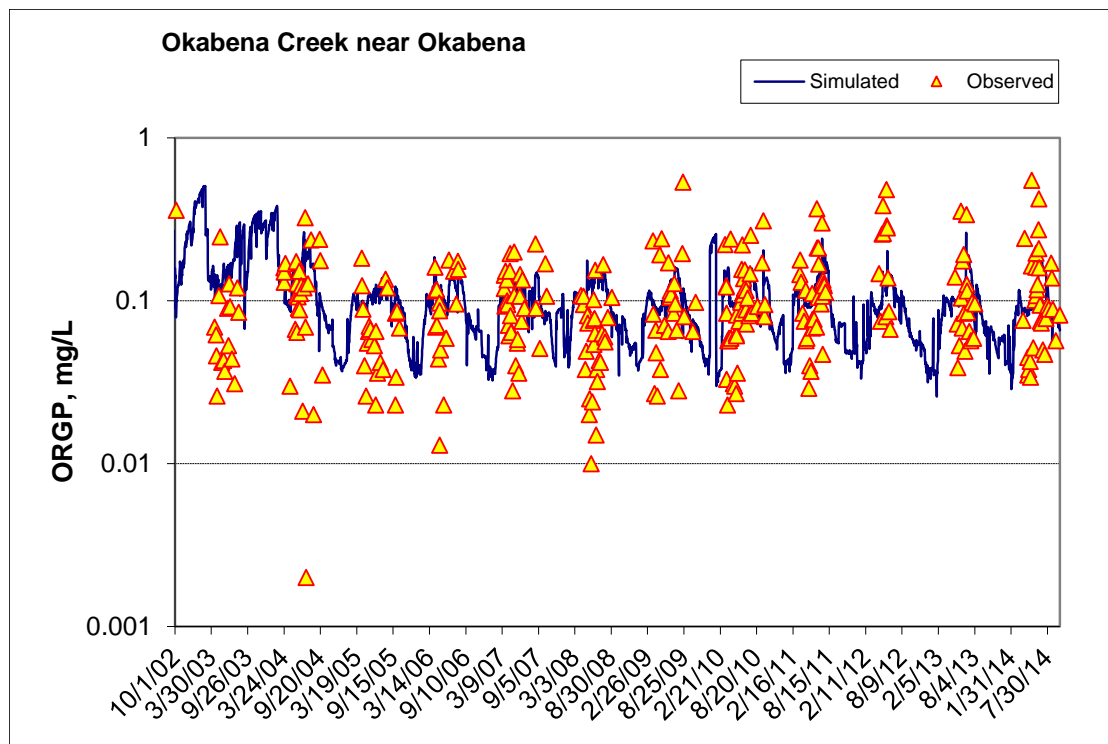


Figure 248. Time series of observed and simulated Organic Phosphorus (OrgP) concentration at Okabena Creek near Okabena (calibration period)

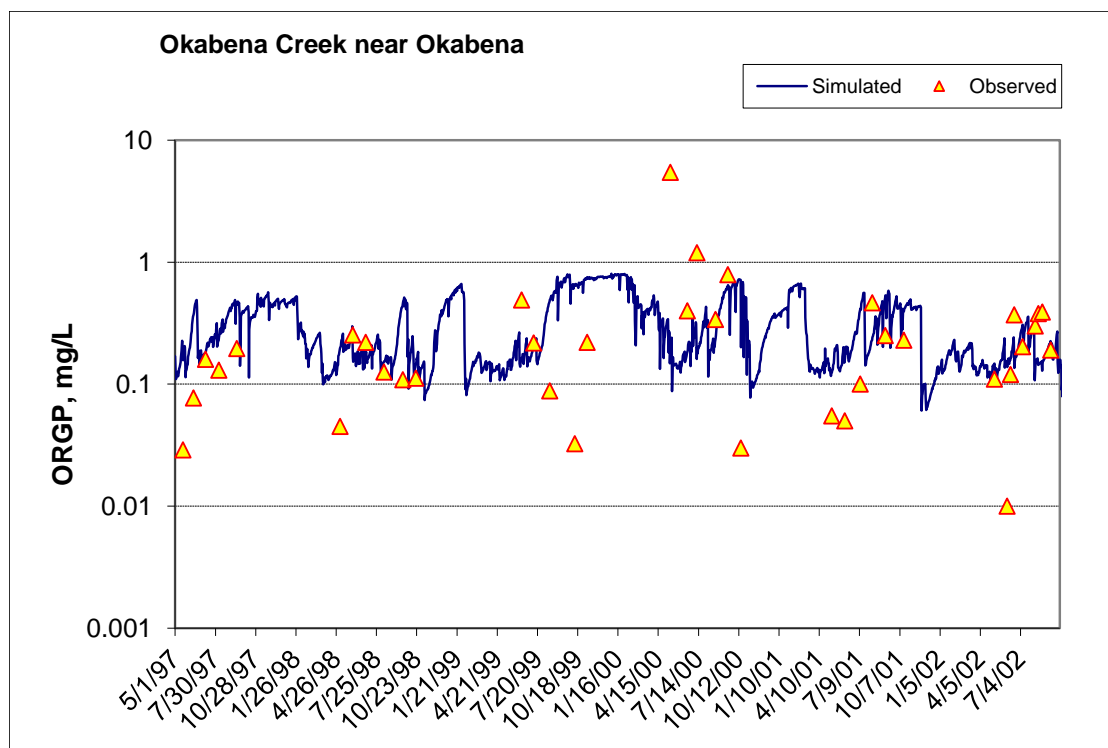


Figure 249. Time series of observed and simulated Organic Phosphorus (OrgP) concentration at Okabena Creek near Okabena (validation period)

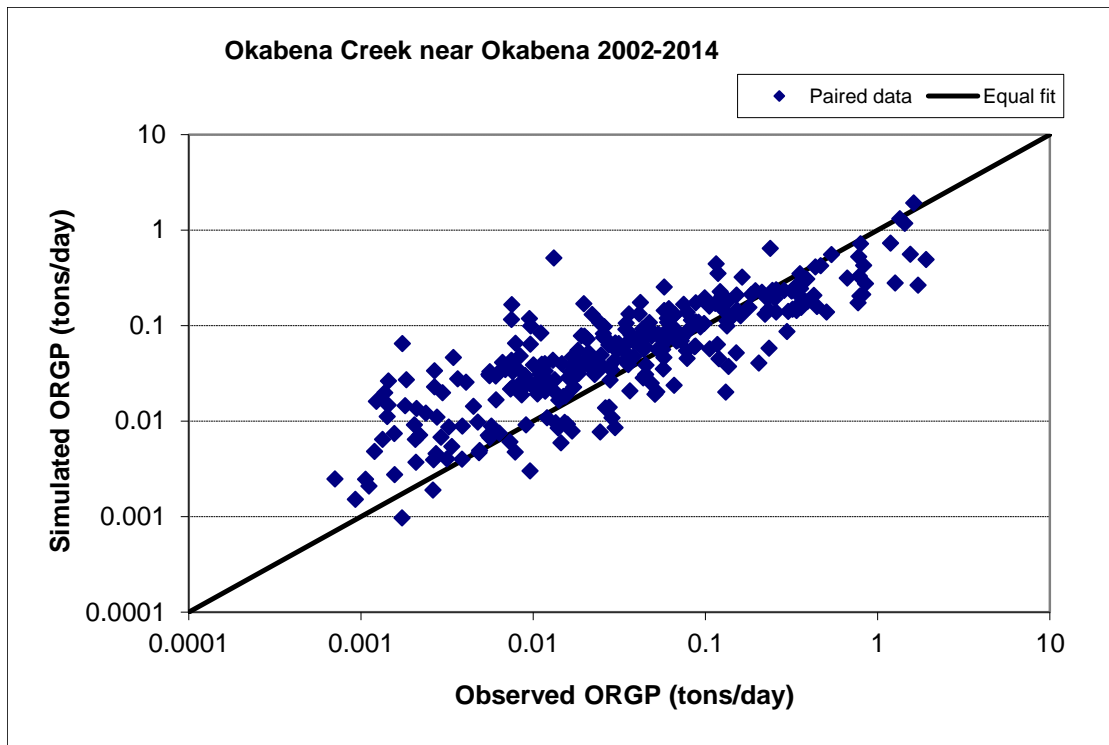


Figure 250. Paired simulated vs. observed Organic Phosphorus (OrgP) load at Okabena Creek near Okabena (calibration period)

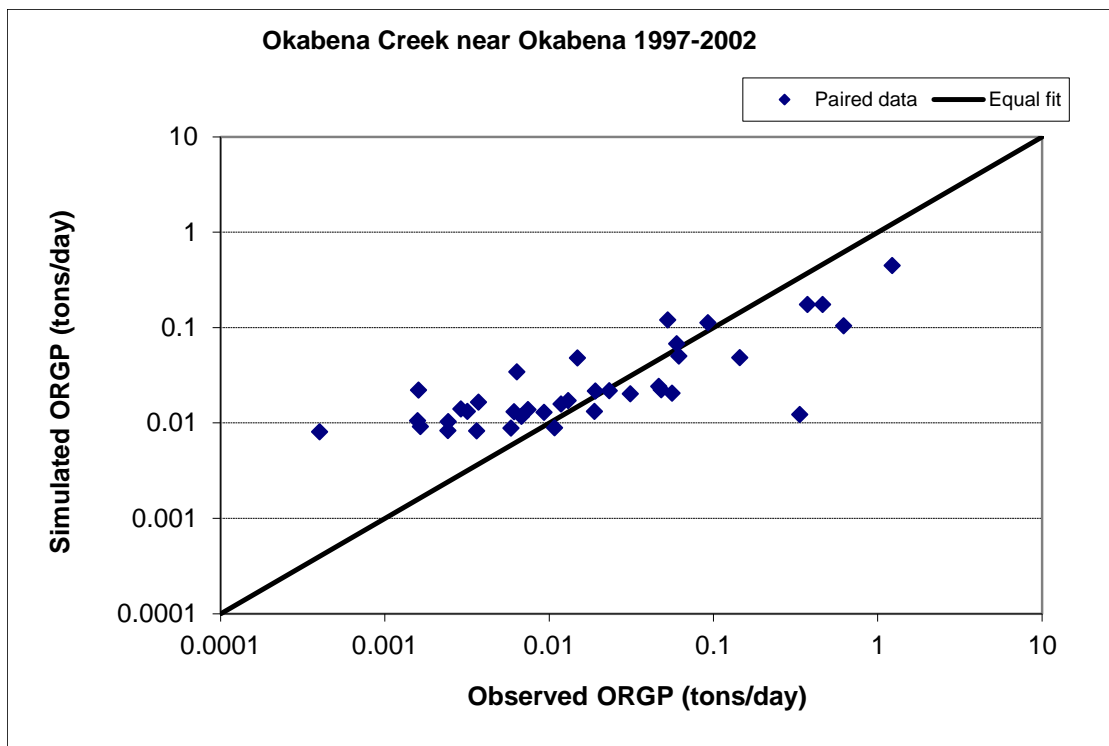


Figure 251. Paired simulated vs. observed Organic Phosphorus (OrgP) load at Okabena Creek near Okabena (validation period)

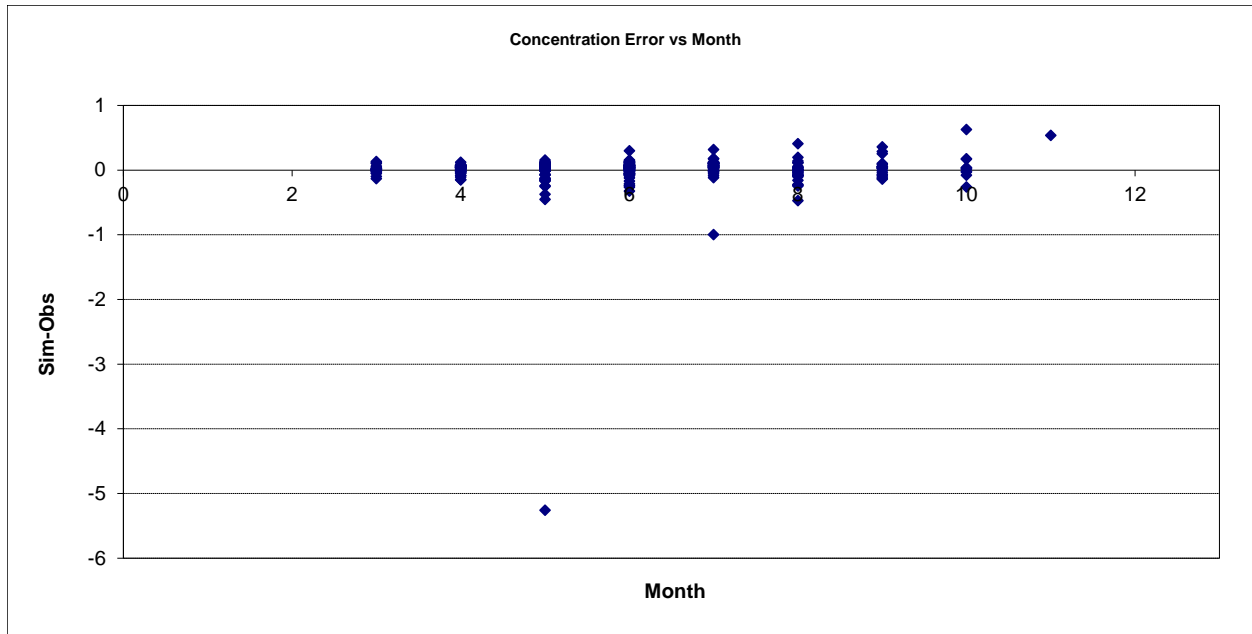


Figure 252. Residual (Simulated - Observed) vs. Month Organic Phosphorus (OrgP) at Okabena Creek near Okabena

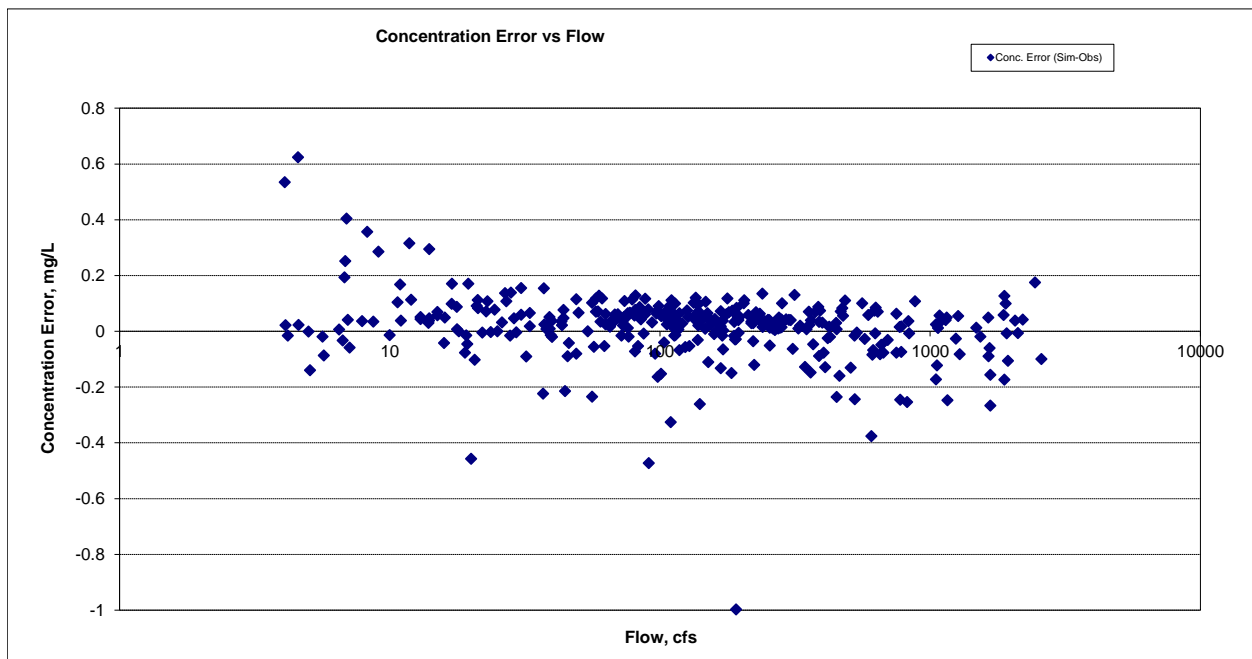


Figure 253. Residual (Simulated - Observed) vs. Flow Organic Phosphorus (OrgP) at Okabena Creek near Okabena

Total Phosphorus (TP)

Table 36. Total Phosphorus (TP) statistics

Period	2002-2014	1997-2002
Count	309	40
Concentration Average Error	25.81%	127.53%
Concentration Median Error	14.73%	27.00%
Load Average Error	-18.94%	-42.33%
Load Median Error	4.98%	13.24%
Paired t concentration	0.25	0.00

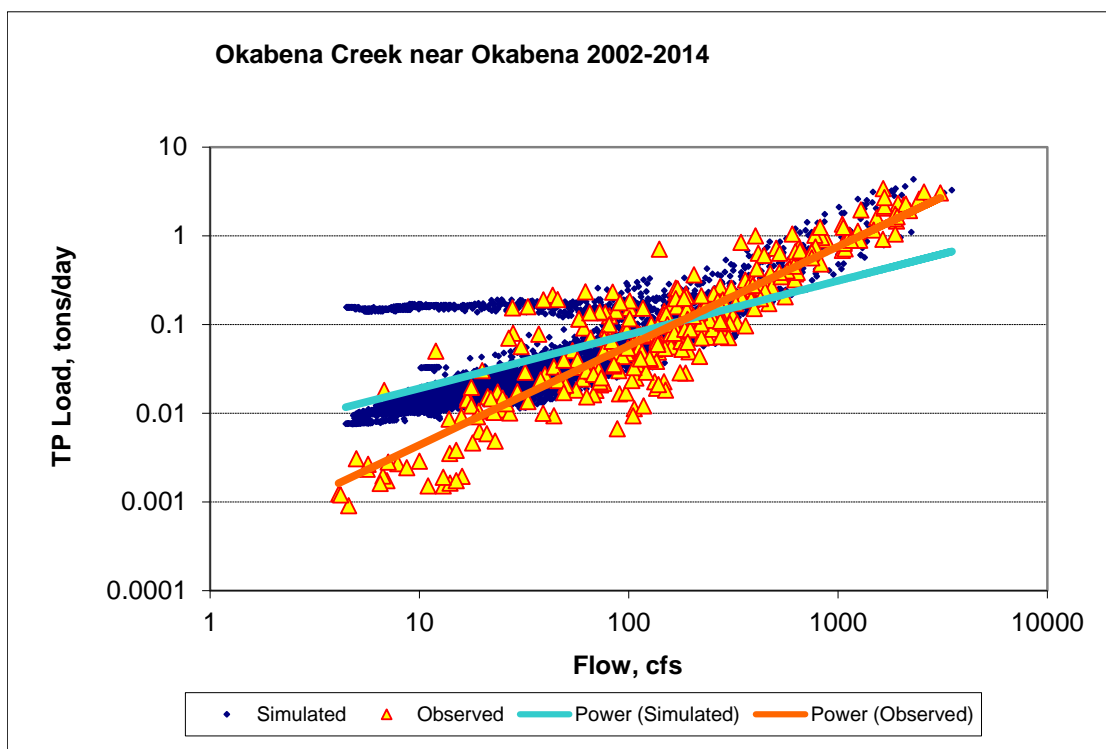


Figure 254. Power plot of simulated and observed Total Phosphorus (TP) load vs flow at Okabena Creek near Okabena (calibration period)

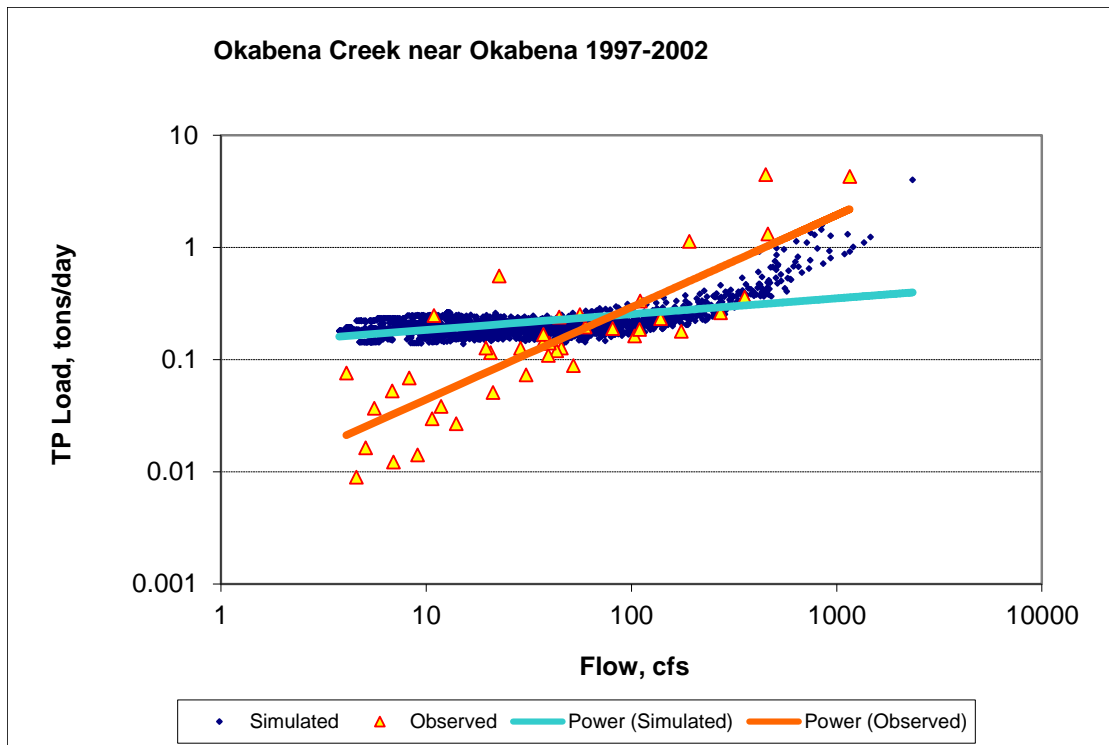


Figure 255. Power plot of simulated and observed Total Phosphorus (TP) load vs flow at Okabena Creek near Okabena (validation period)

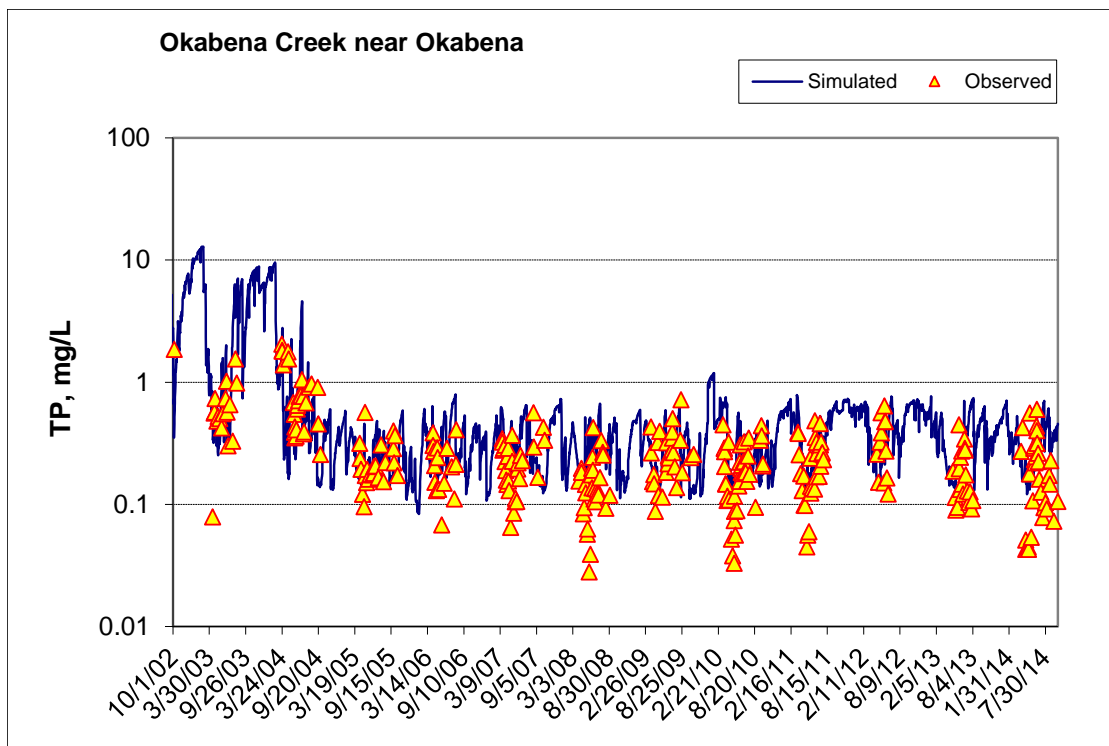


Figure 256. Time series of observed and simulated Total Phosphorus (TP) concentration at Okabena Creek near Okabena (calibration period)

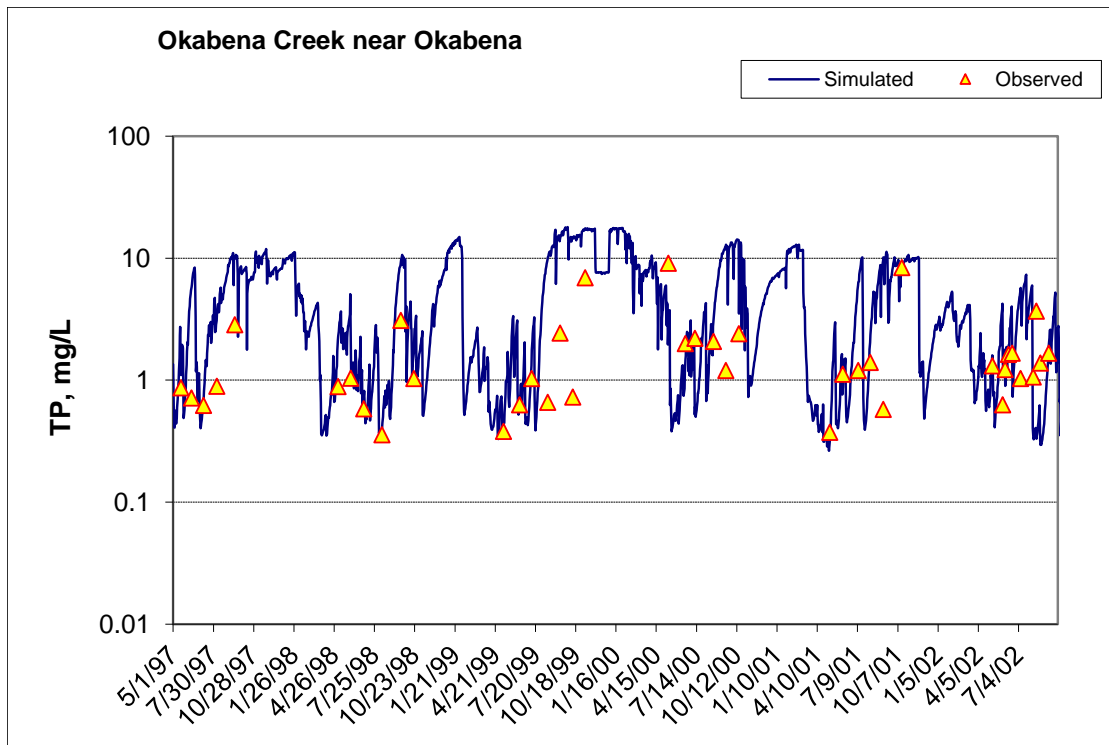


Figure 257. Time series of observed and simulated Total Phosphorus (TP) concentration at Okabena Creek near Okabena (validation period)

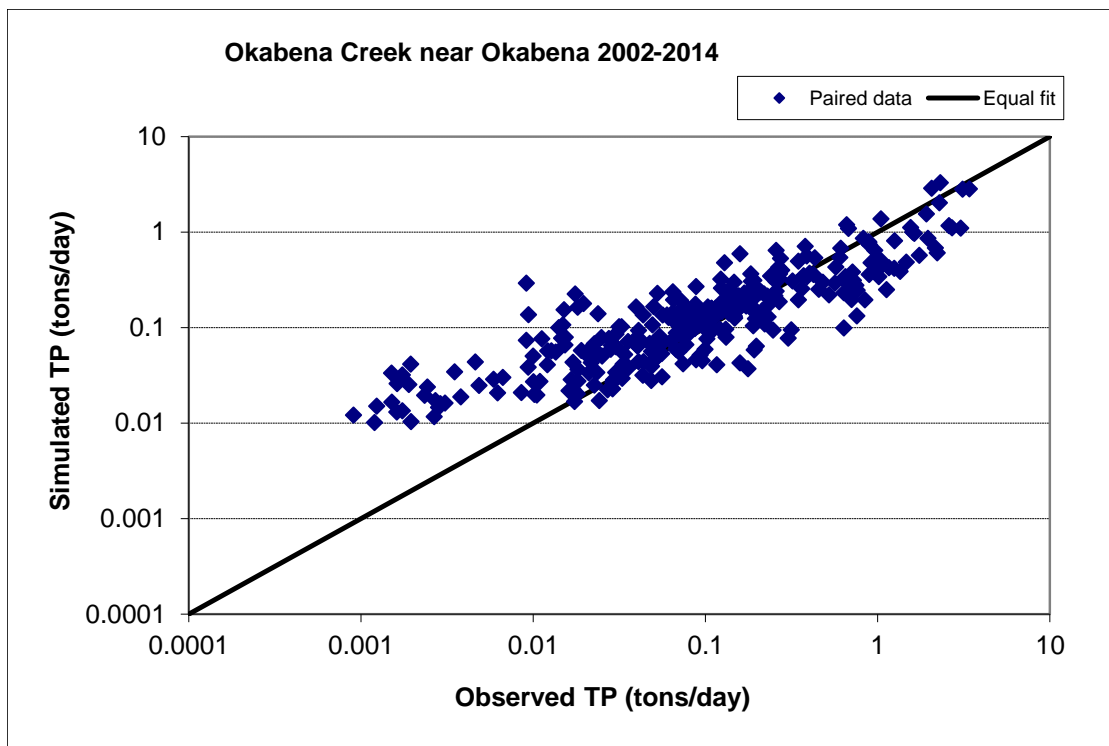


Figure 258. Paired simulated vs. observed Total Phosphorus (TP) load at Okabena Creek near Okabena (calibration period)

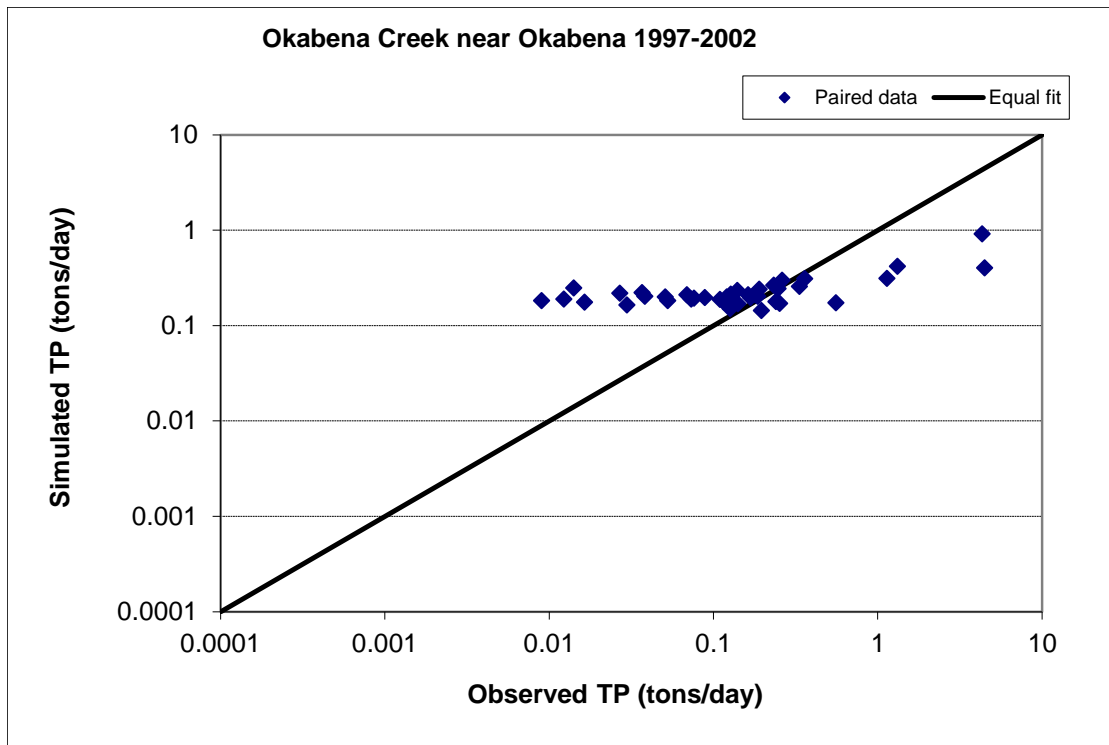


Figure 259. Paired simulated vs. observed Total Phosphorus (TP) load at Okabena Creek near Okabena (validation period)

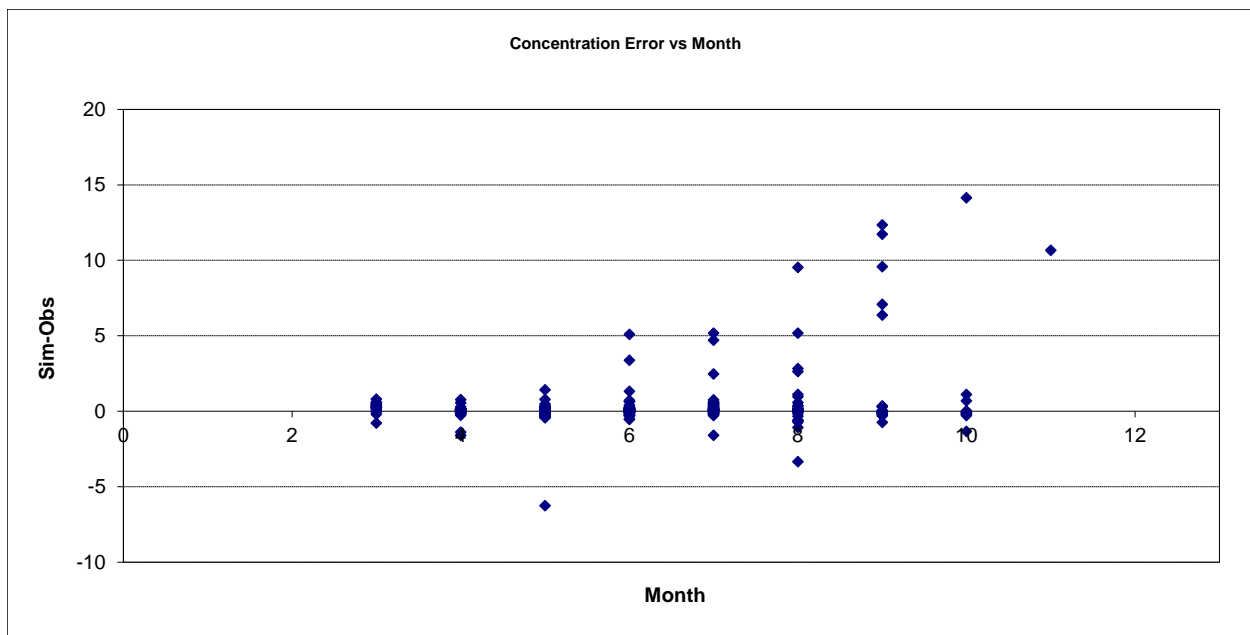


Figure 260. Residual (Simulated - Observed) vs. Month Total Phosphorus (TP) at Okabena Creek near Okabena

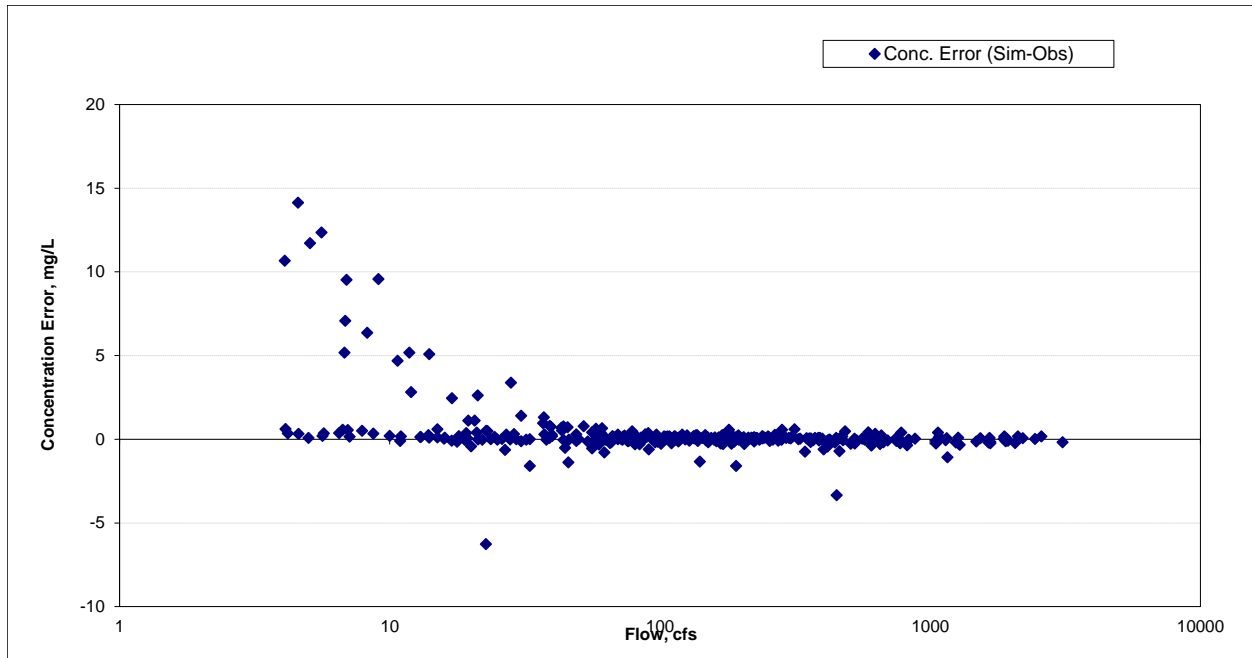


Figure 261. Residual (Simulated - Observed) vs. Flow Total Phosphorus (TP) at Okabena Creek near Okabena

Heron Lake Outlet (S002-009)

Total Suspended Solids (TSS)

Table 37. Total Suspended Solids (TSS) statistics

Period	2002-2014	1997-2002
Count	260	46
Concentration Average Error	-6.13%	-33.67%
Concentration Median Error	-21.94%	-26.43%
Load Average Error	123.33%	21.34%
Load Median Error	-18.05%	-14.70%
Paired t concentration	0.98	0.06

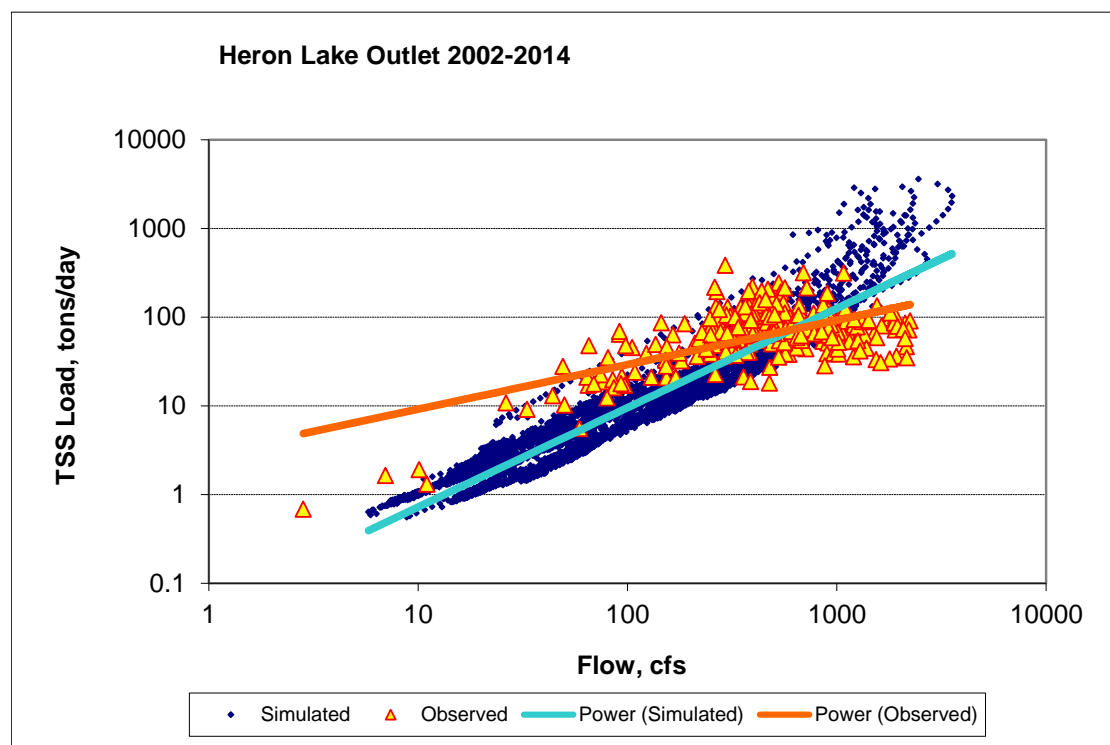


Figure 262. Power plot of simulated and observed Total Suspended Solids (TSS) load vs flow at Heron Lake Outlet (calibration period)

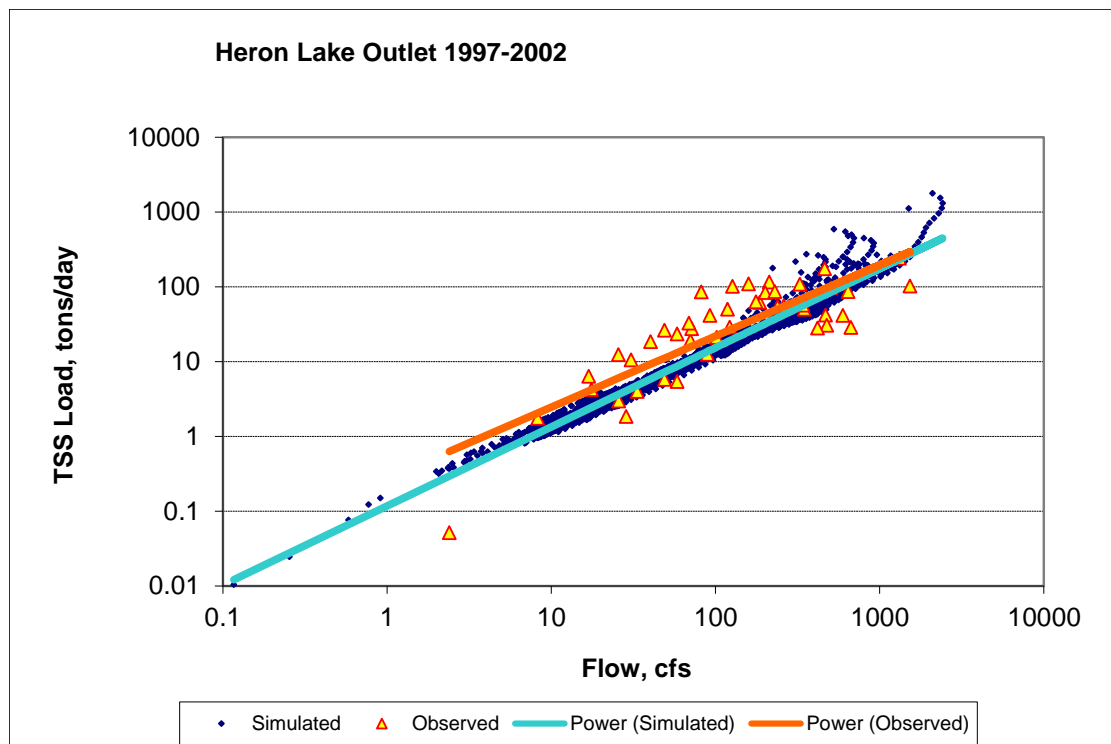


Figure 263. Power plot of simulated and observed Total Suspended Solids (TSS) load vs flow at Heron Lake Outlet (validation period)

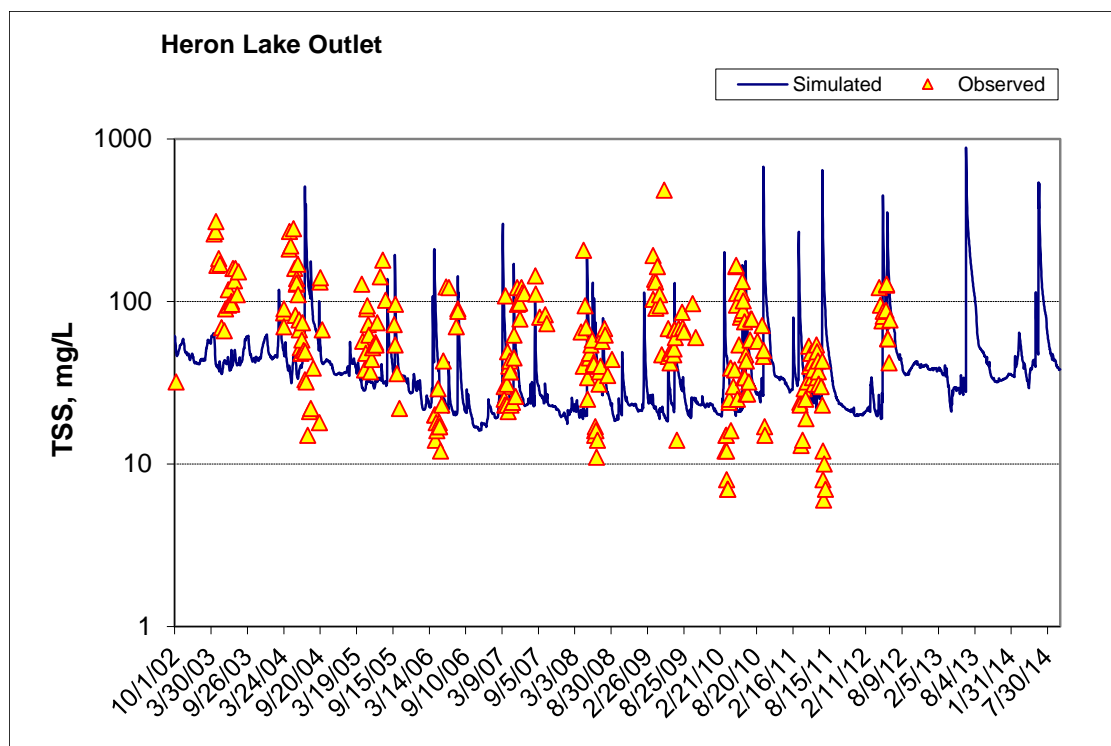


Figure 264. Time series of observed and simulated Total Suspended Solids (TSS) concentration at Heron Lake Outlet (calibration period)

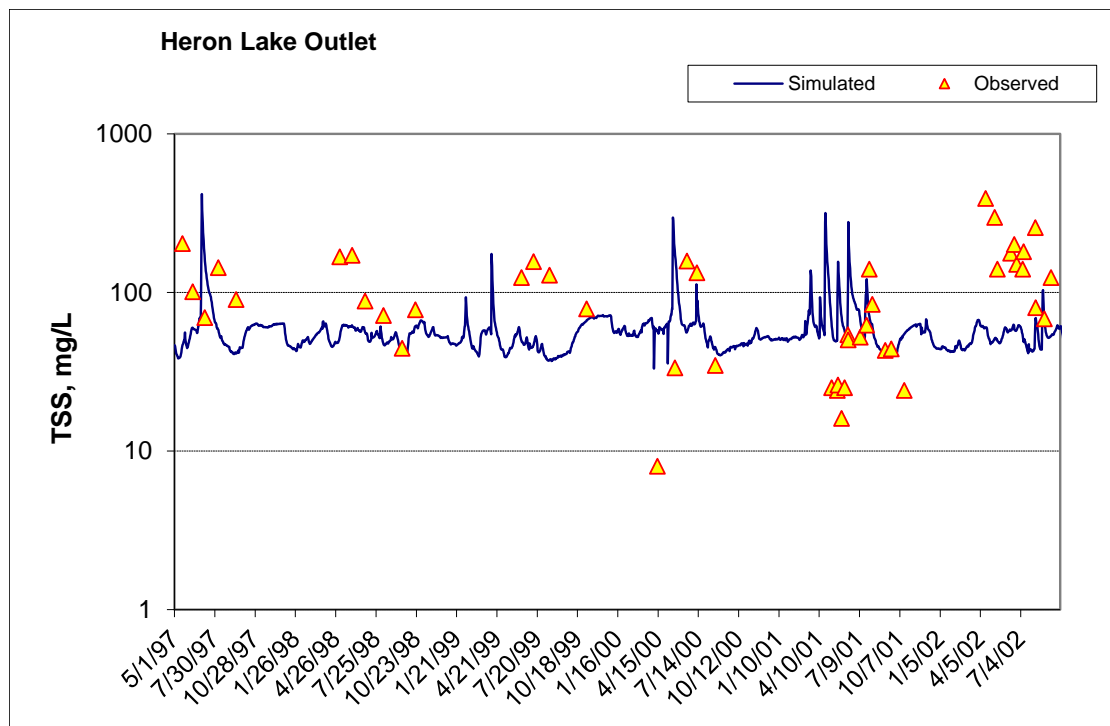


Figure 265. Time series of observed and simulated Total Suspended Solids (TSS) concentration at Heron Lake Outlet (validation period)

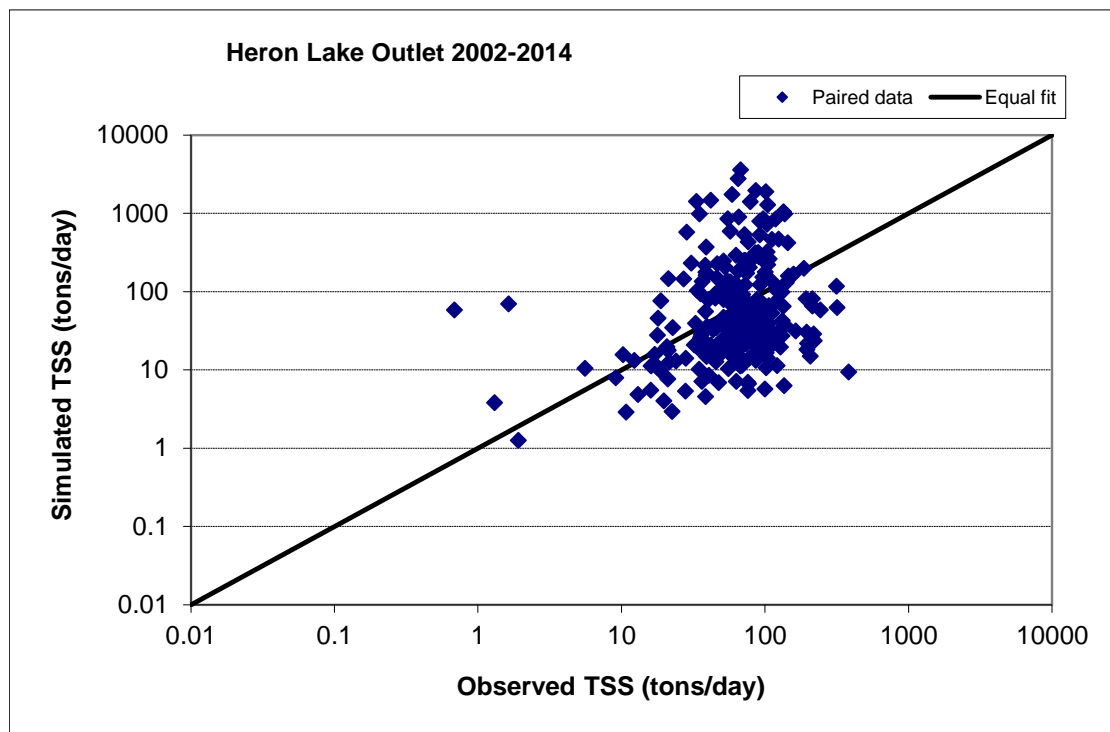


Figure 266. Paired simulated vs. observed Total Suspended Solids (TSS) load at Heron Lake Outlet (calibration period)

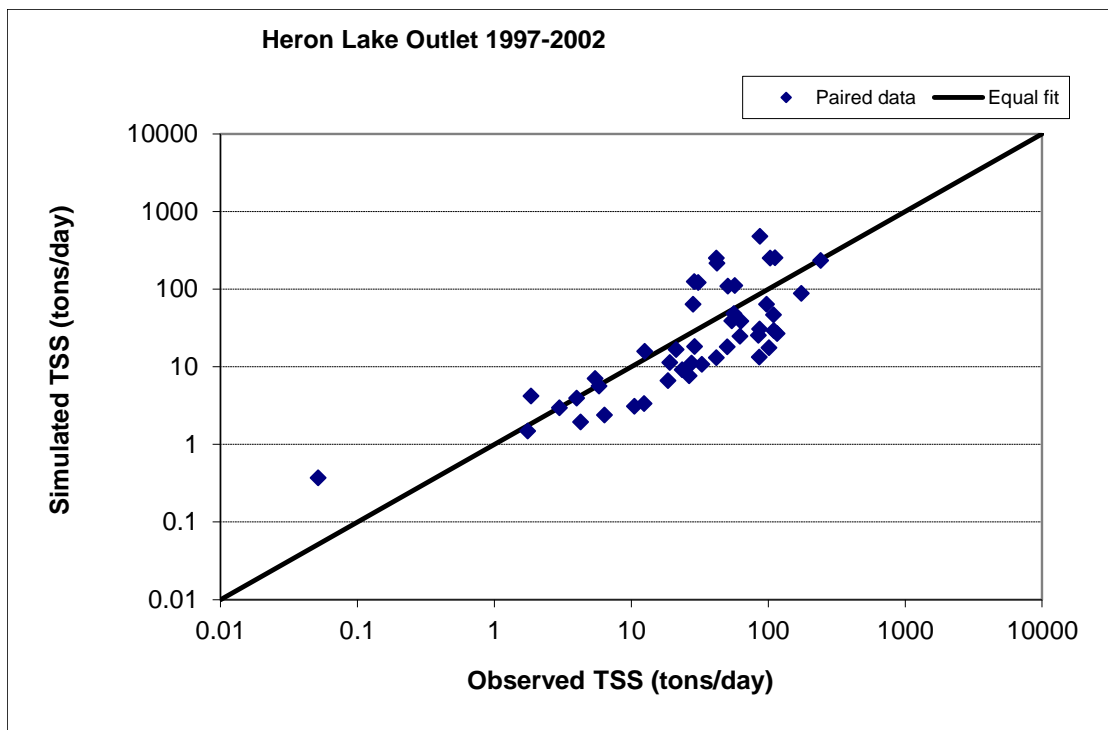


Figure 267. Paired simulated vs. observed Total Suspended Solids (TSS) load at Heron Lake Outlet (validation period)

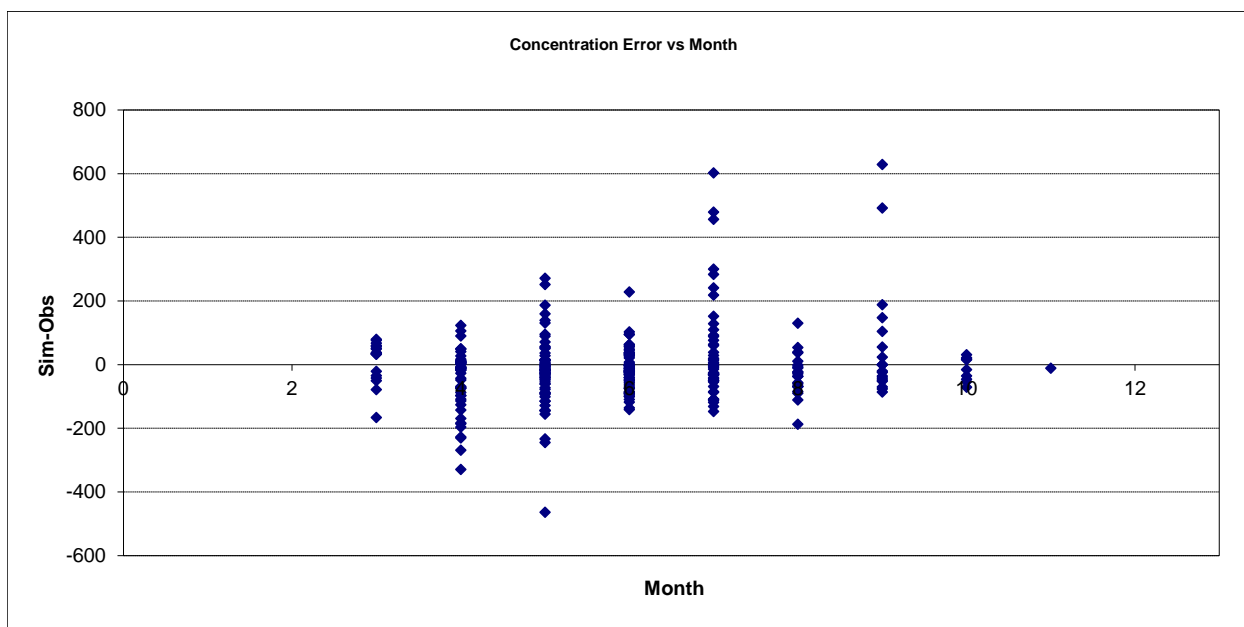


Figure 268. Residual (Simulated - Observed) vs. Month Total Suspended Solids (TSS) at Heron Lake Outlet

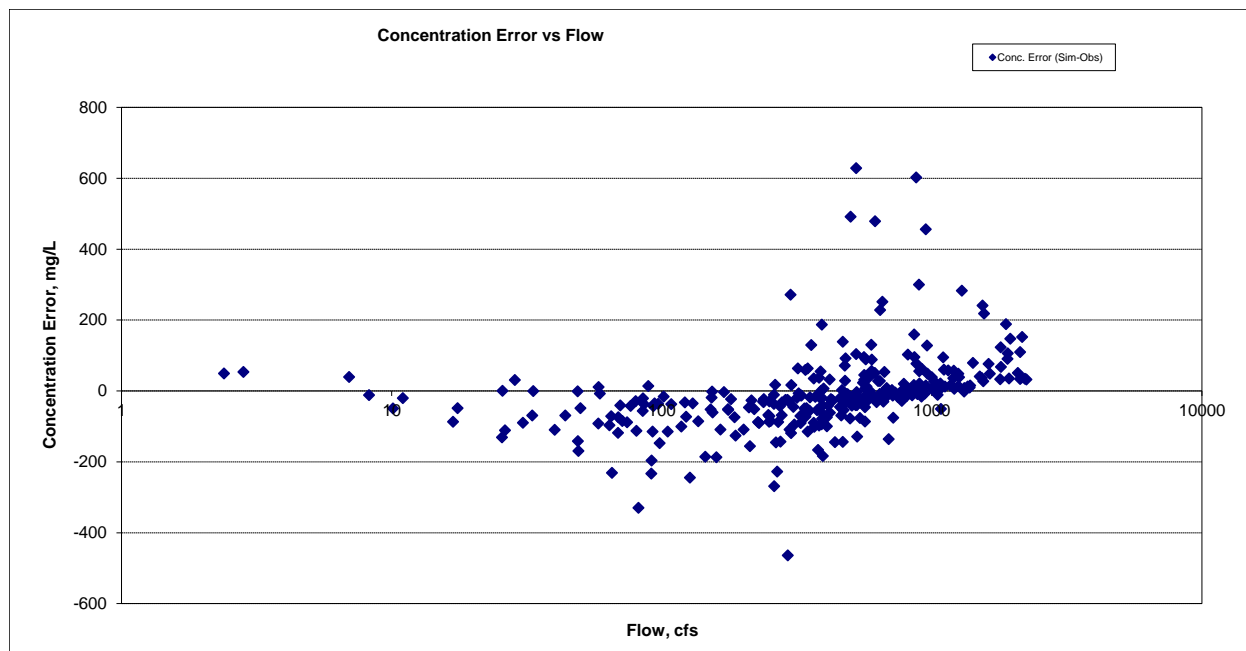


Figure 269. Residual (Simulated - Observed) vs. Flow Total Suspended Solids (TSS) at Heron Lake Outlet

Ammonia Nitrogen (NH₃)

Table 38. Ammonia Nitrogen (NH₃) statistics

Period	2002-2014	1997-2002
Count	217	22
Concentration Average Error	209.36%	52.40%
Concentration Median Error	212.94%	50.65%
Load Average Error	230.32%	66.85%
Load Median Error	142.25%	18.80%
Paired t concentration	0.00	0.15

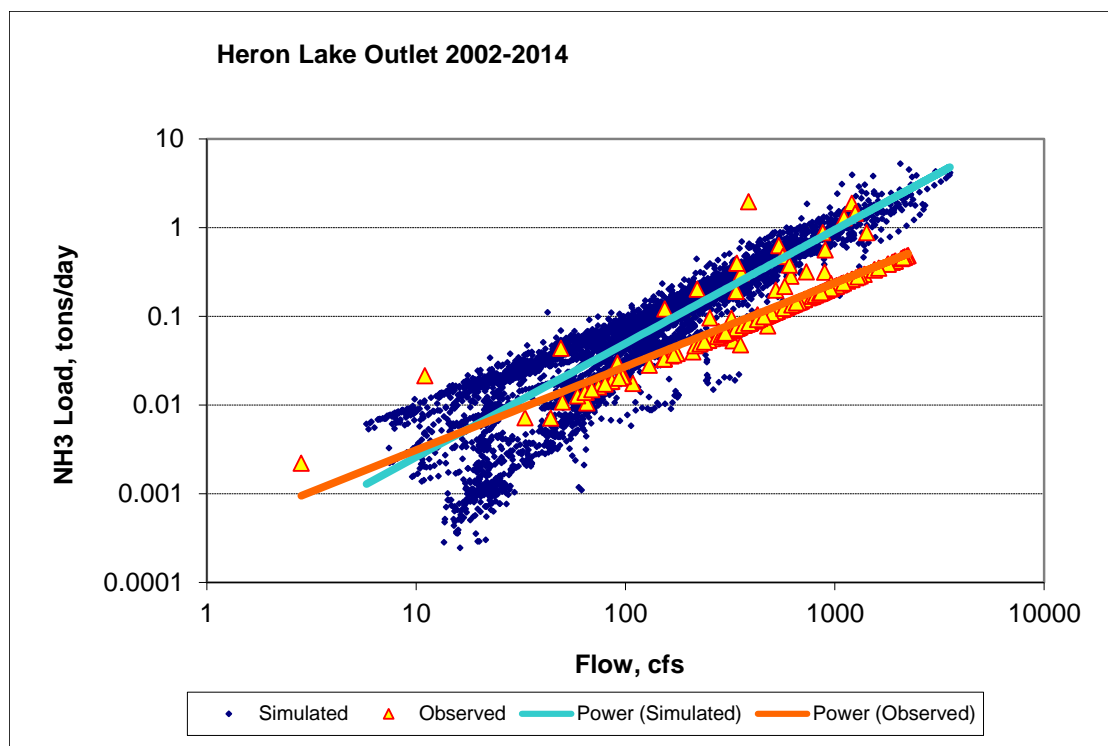


Figure 270. Power plot of simulated and observed Ammonia Nitrogen (NH₃) load vs flow at Heron Lake Outlet (calibration period)

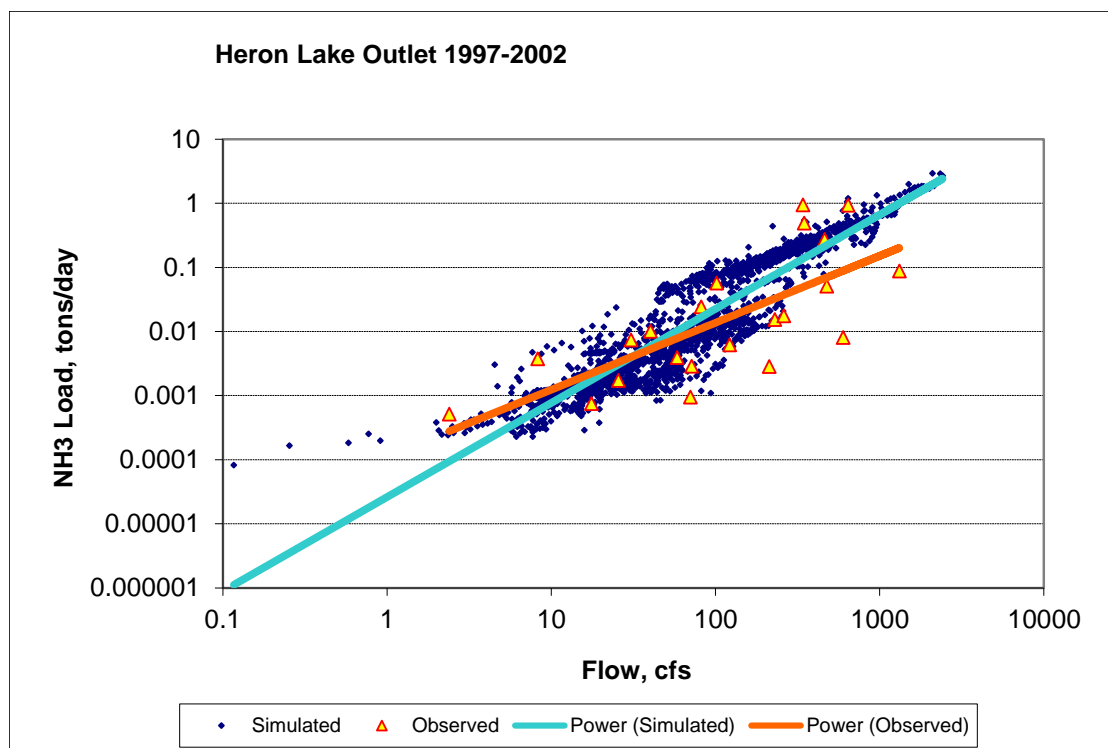


Figure 271. Power plot of simulated and observed Ammonia Nitrogen (NH₃) load vs flow at Heron Lake Outlet (validation period)

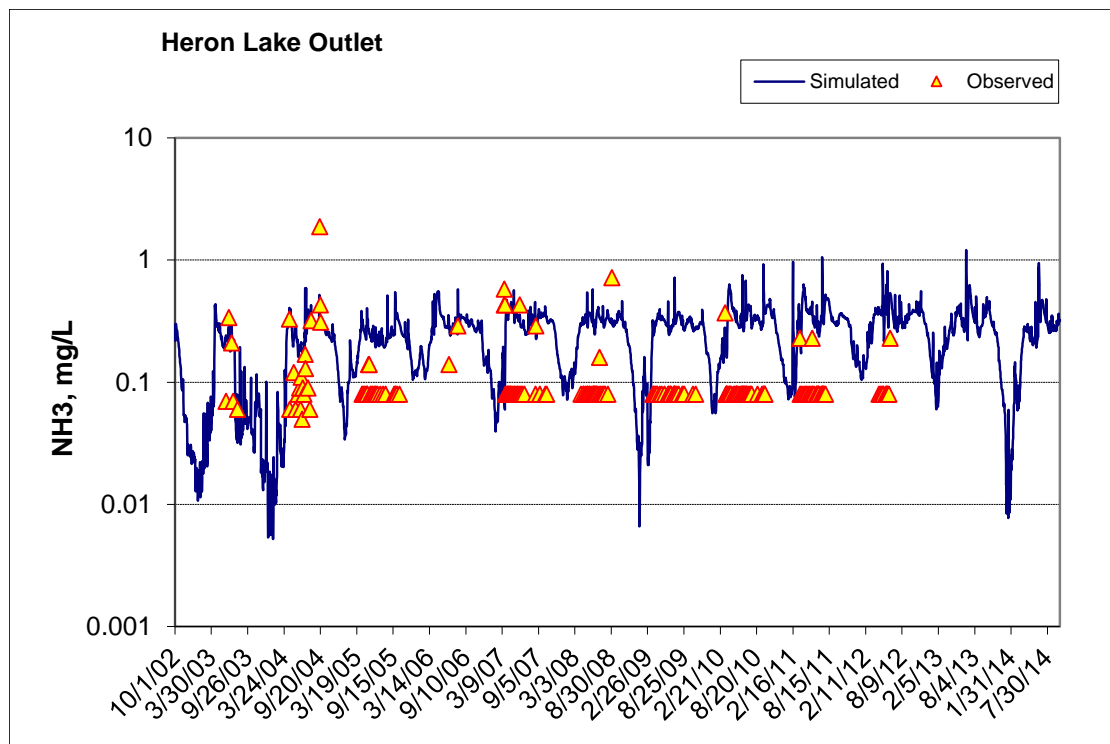


Figure 272. Time series of observed and simulated Ammonia Nitrogen (NH₃) concentration at Heron Lake Outlet (calibration period)

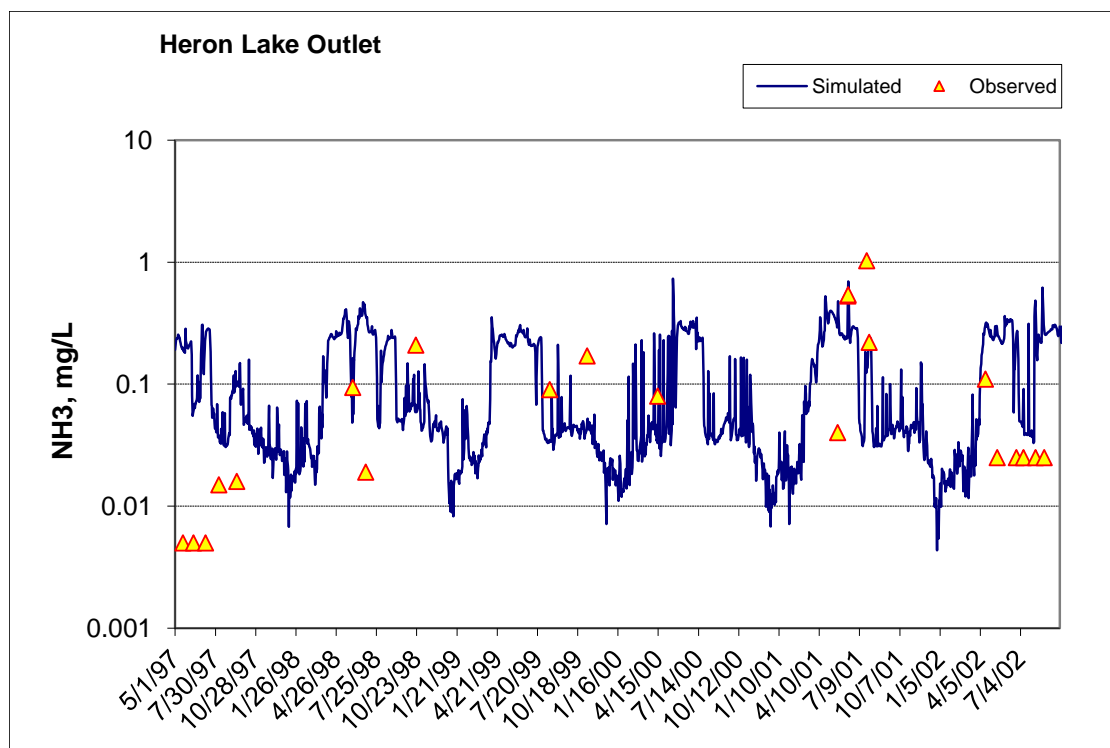


Figure 273. Time series of observed and simulated Ammonia Nitrogen (NH₃) concentration at Heron Lake Outlet (validation period)

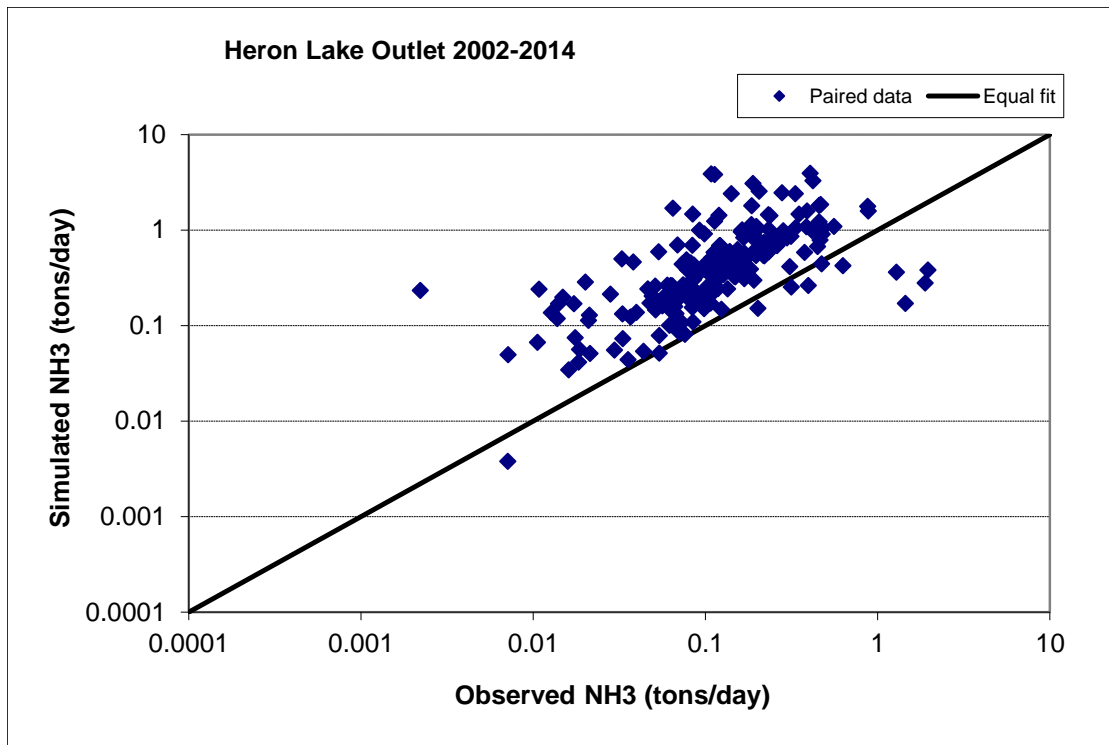


Figure 274. Paired simulated vs. observed Ammonia Nitrogen (NH3) load at Heron Lake Outlet (calibration period)

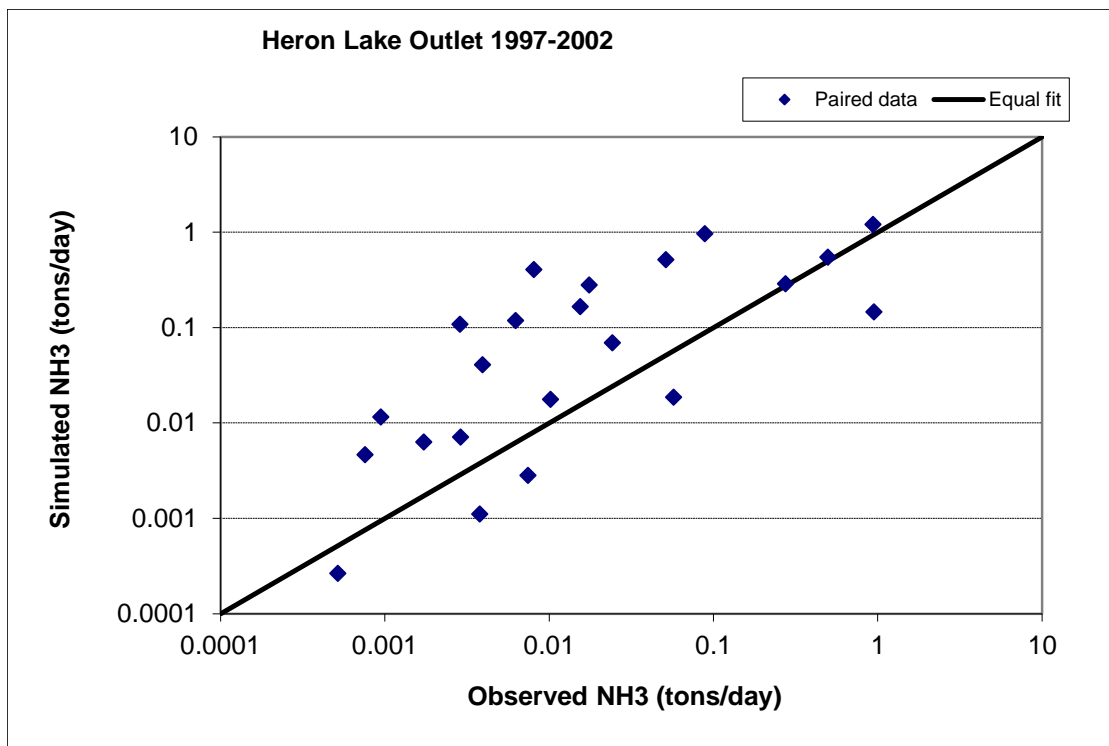


Figure 275. Paired simulated vs. observed Ammonia Nitrogen (NH3) load at Heron Lake Outlet (validation period)



Figure 276. Residual (Simulated - Observed) vs. Month Ammonia Nitrogen (NH3) at Heron Lake Outlet

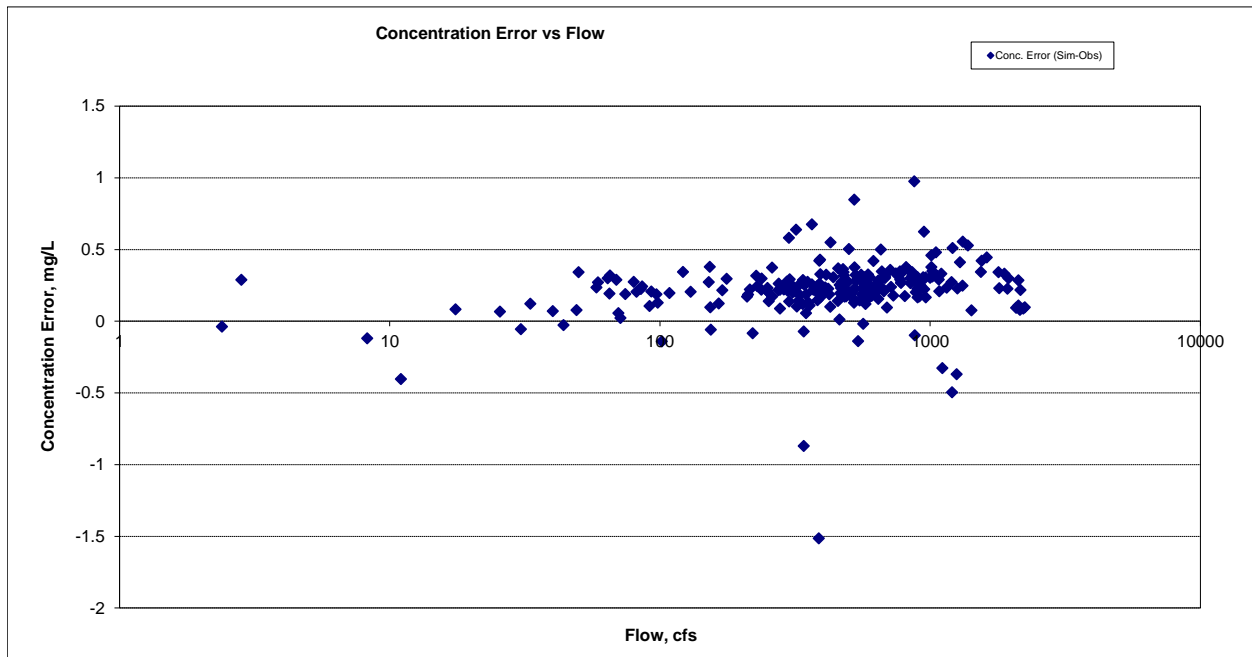


Figure 277. Residual (Simulated - Observed) vs. Flow Ammonia Nitrogen (NH3) at Heron Lake Outlet

Organic Nitrogen (OrgN)

Table 39. Organic Nitrogen (OrgN) statistics

Period	2002-2014	1997-2002
Count	217	22
Concentration Average Error	-35.32%	-59.42%
Concentration Median Error	-20.10%	-51.81%
Load Average Error	-8.81%	-39.84%
Load Median Error	-21.00%	-31.73%
Paired t concentration	0.00	0.00

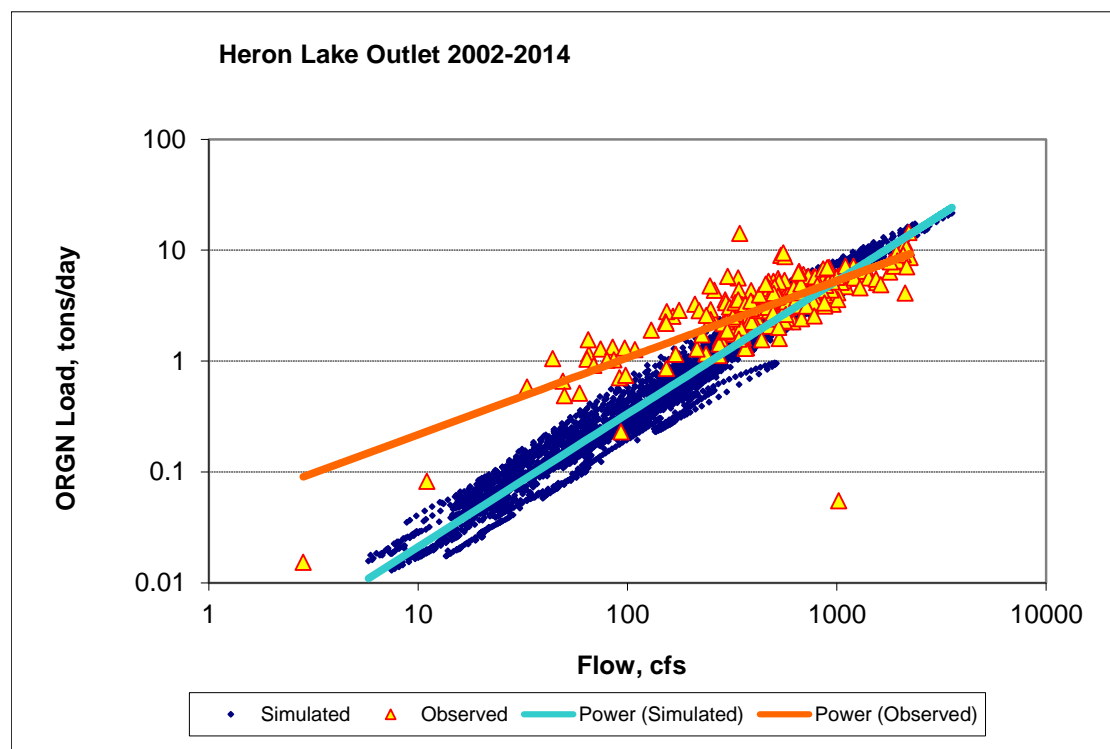


Figure 278. Power plot of simulated and observed Organic Nitrogen (OrgN) load vs flow at Heron Lake Outlet (calibration period)

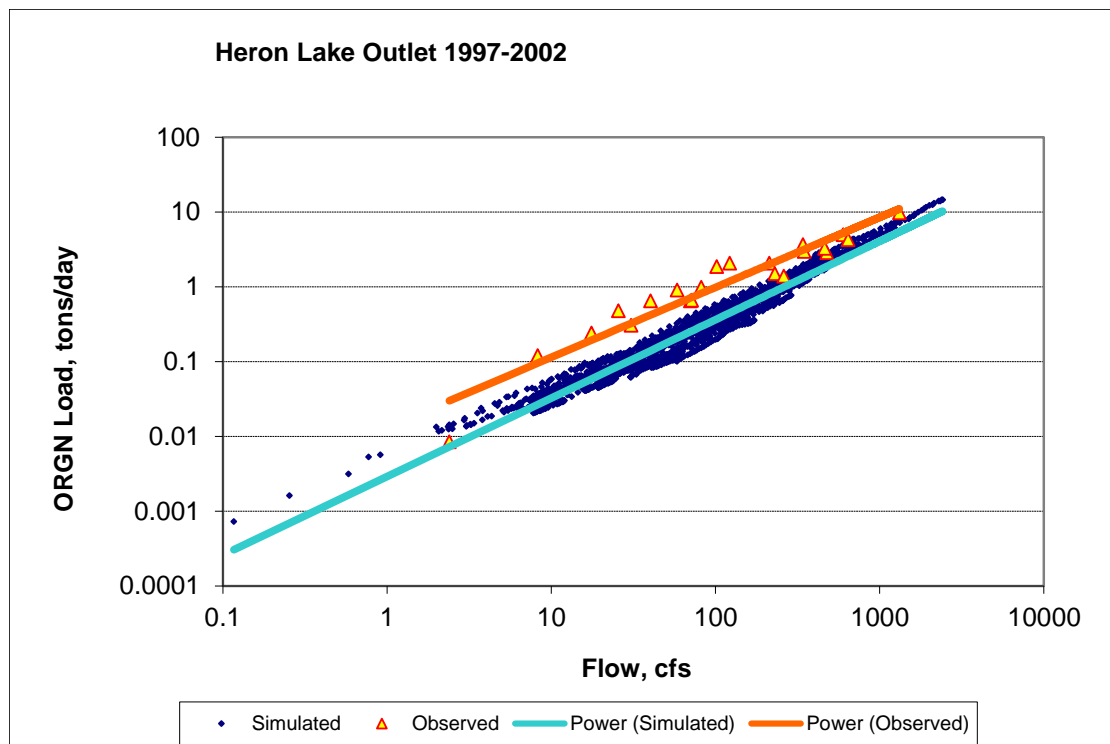


Figure 279. Power plot of simulated and observed Organic Nitrogen (OrgN) load vs flow at Heron Lake Outlet (validation period)

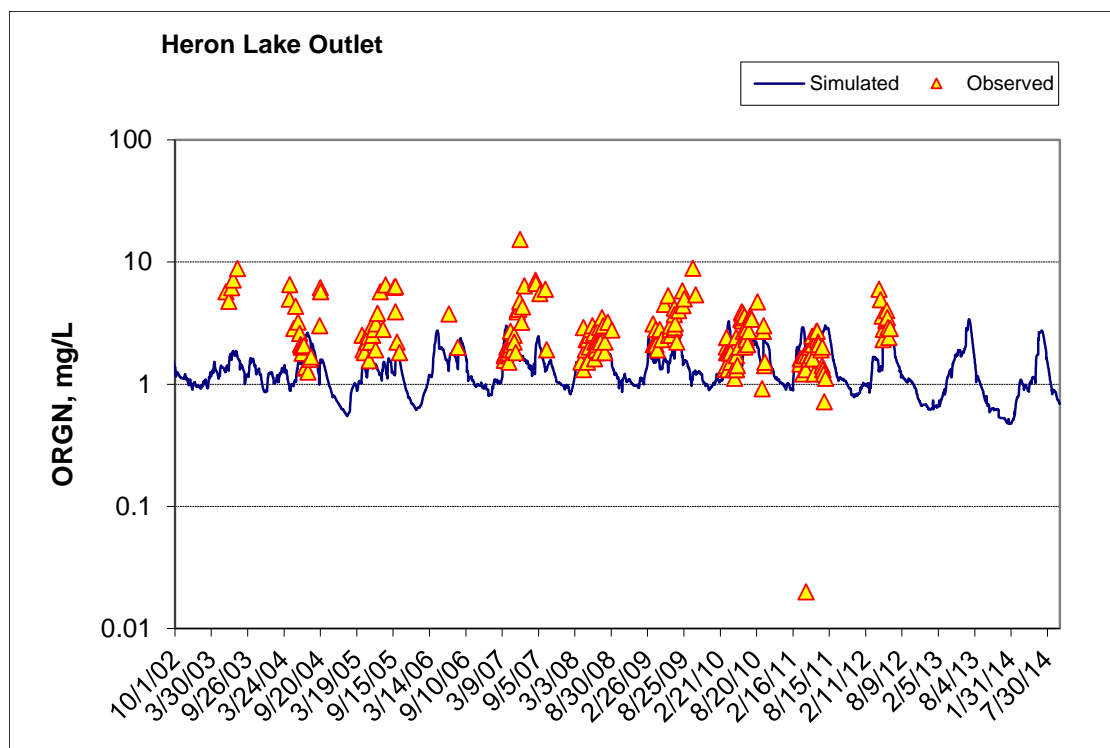


Figure 280. Time series of observed and simulated Organic Nitrogen (OrgN) concentration at Heron Lake Outlet (calibration period)

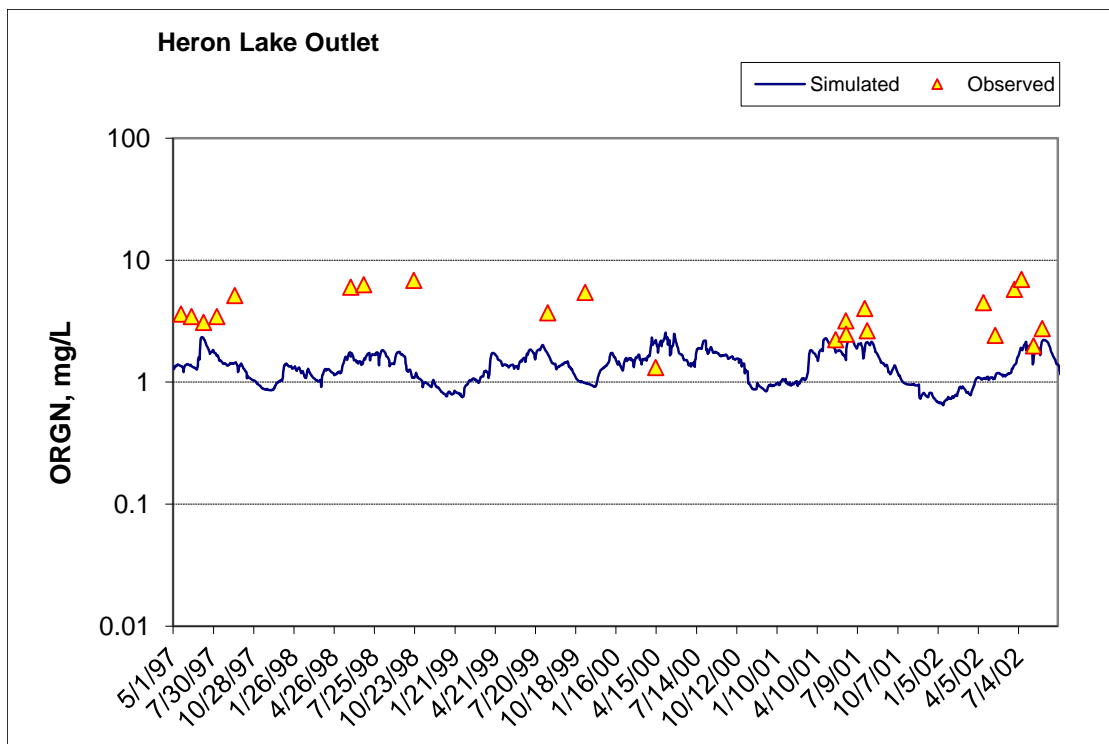


Figure 281. Time series of observed and simulated Organic Nitrogen (OrgN) concentration at Heron Lake Outlet (validation period)

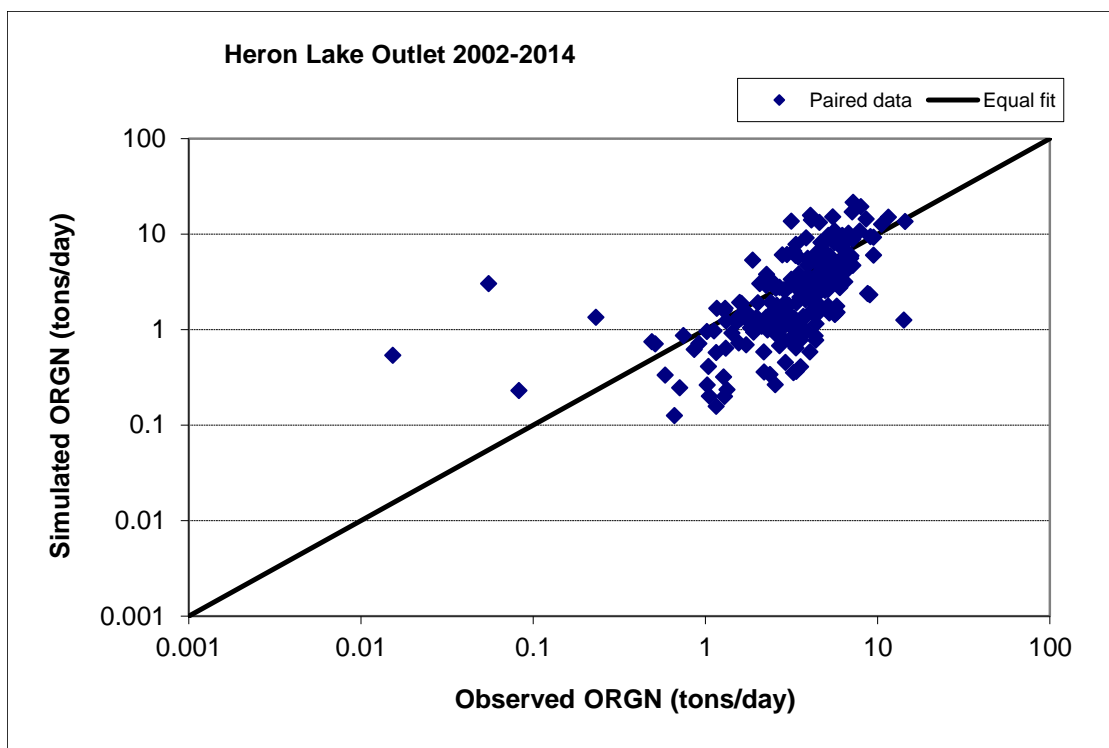


Figure 282. Paired simulated vs. observed Organic Nitrogen (OrgN) load at Heron Lake Outlet (calibration period)

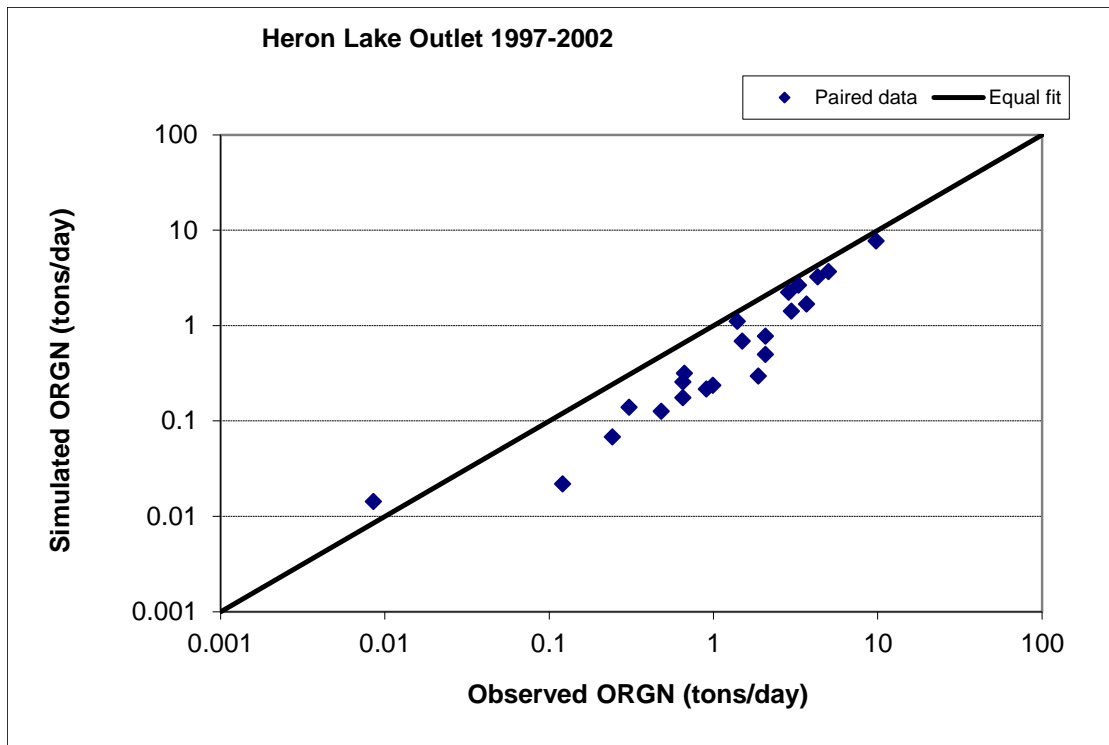


Figure 283. Paired simulated vs. observed Organic Nitrogen (OrgN) load at Heron Lake Outlet (validation period)

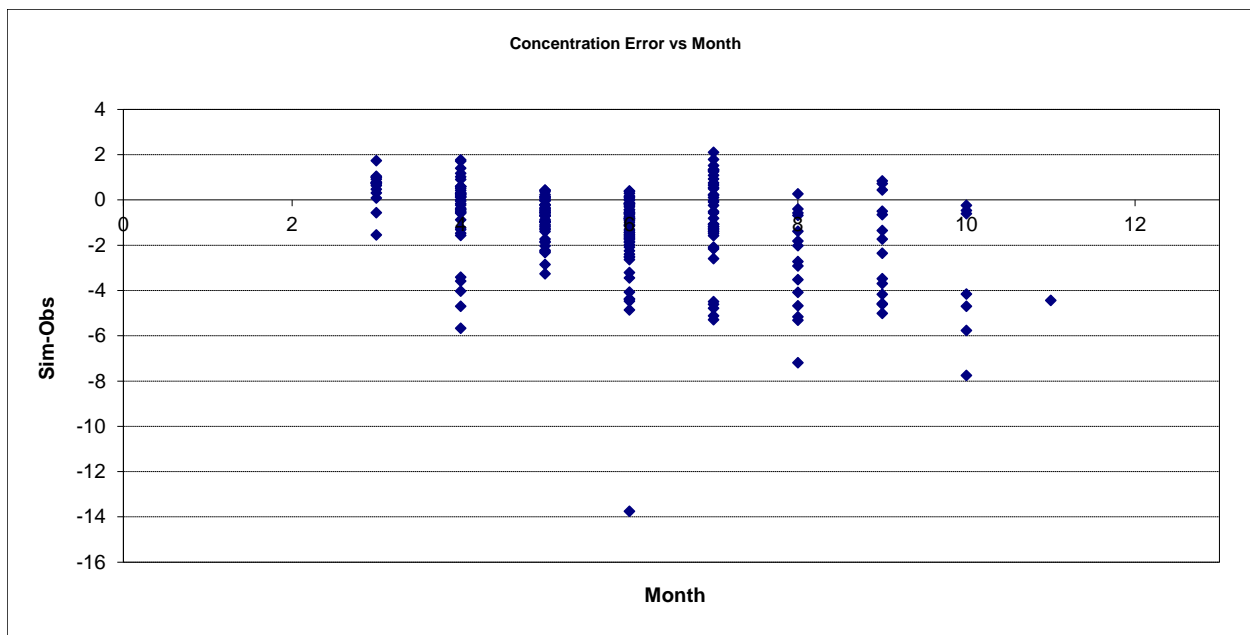


Figure 284. Residual (Simulated - Observed) vs. Month Organic Nitrogen (OrgN) at Heron Lake Outlet

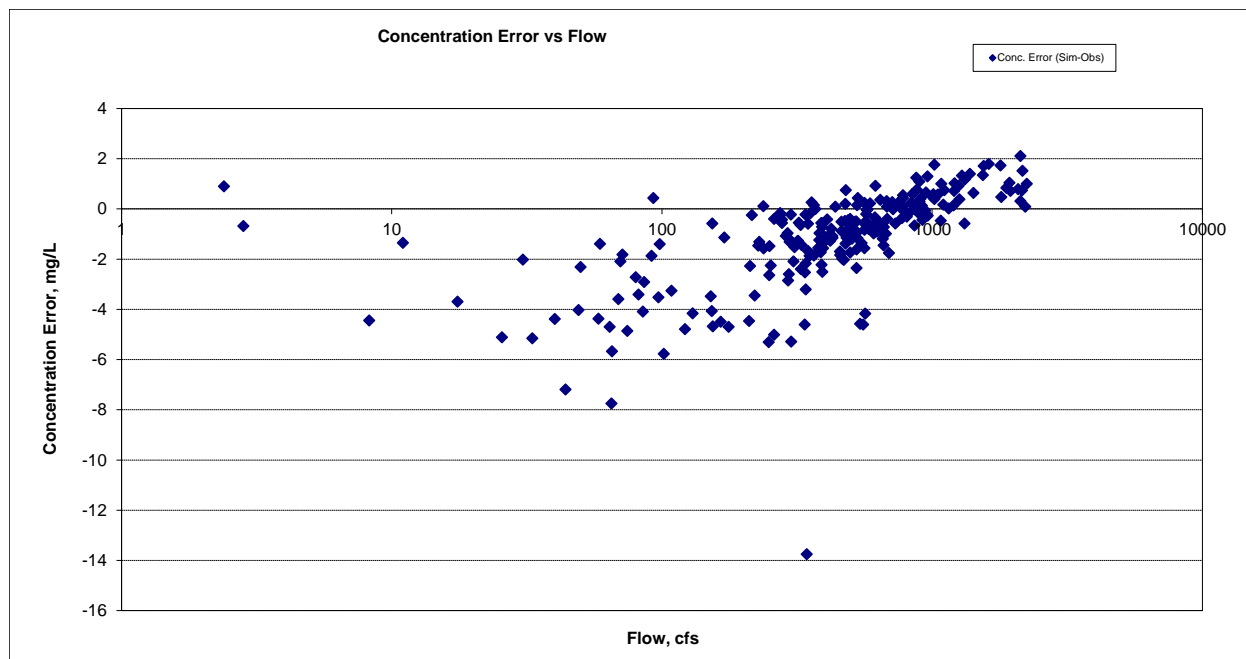


Figure 285. Residual (Simulated - Observed) vs. Flow Organic Nitrogen (OrgN) at Heron Lake Outlet

Total Kjeldahl Nitrogen (TKN)

Table 40. Total Kjeldahl Nitrogen (TKN) statistics

Period	2002-2014	1997-2002
Count	249	33
Concentration Average Error	-27.32%	-53.73%
Concentration Median Error	-11.60%	-53.55%
Load Average Error	3.08%	-33.32%
Load Median Error	-12.90%	-22.46%
Paired t concentration	0.00	0.00

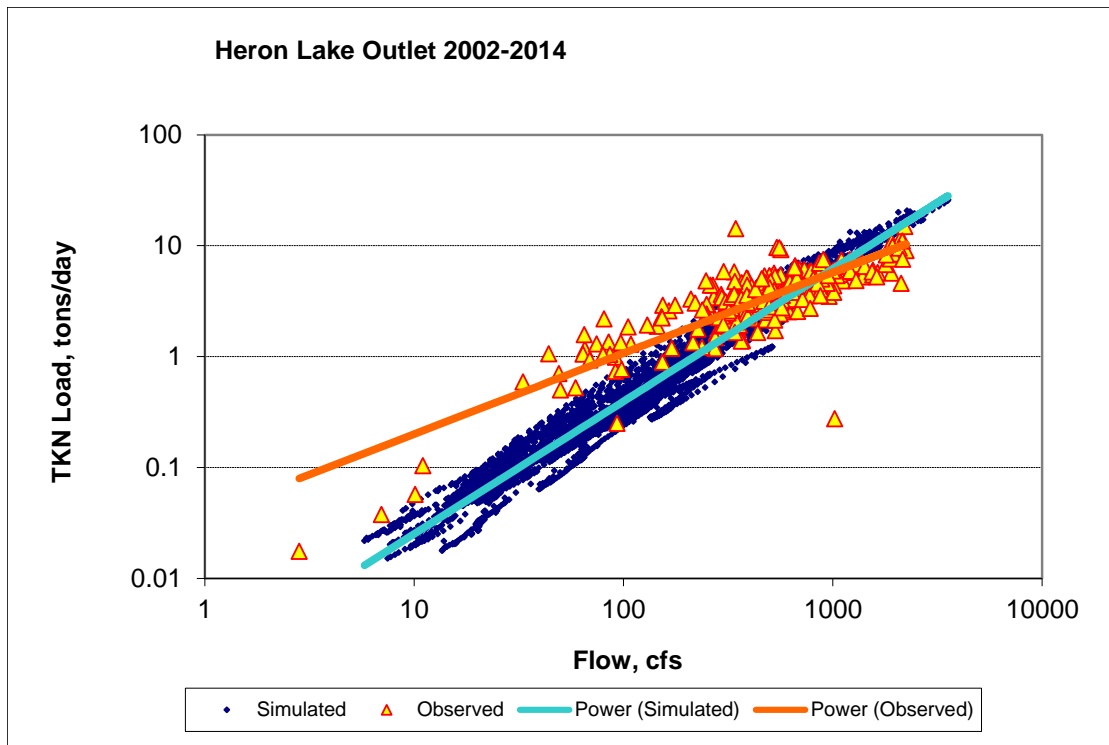


Figure 286. Power plot of simulated and observed Total Kjeldahl Nitrogen (TKN) load vs flow at Heron Lake Outlet (calibration period)

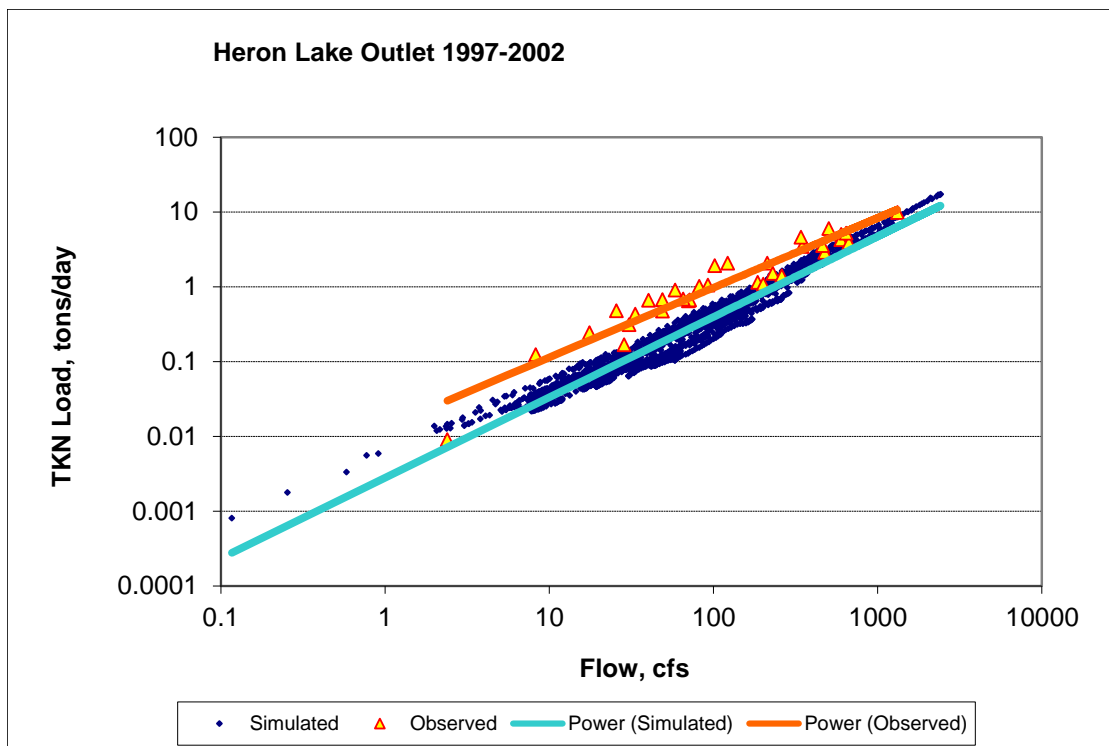


Figure 287. Power plot of simulated and observed Total Kjeldahl Nitrogen (TKN) load vs flow at Heron Lake Outlet (validation period)

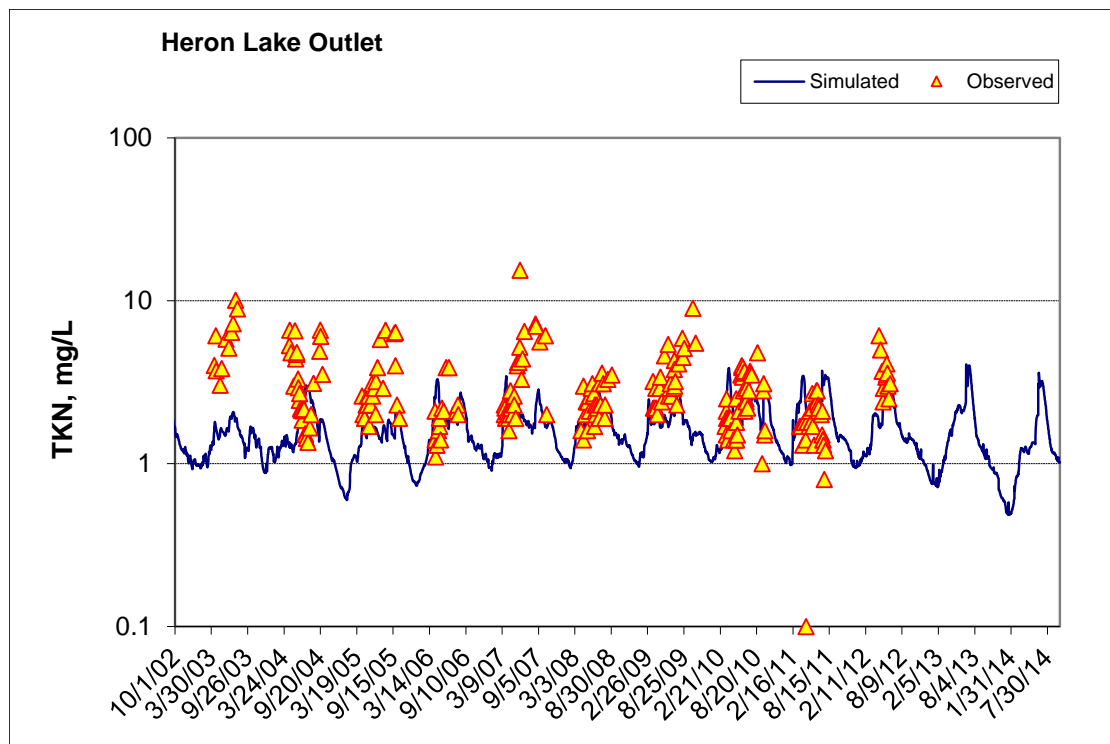


Figure 288. Time series of observed and simulated Total Kjeldahl Nitrogen (TKN) concentration at Heron Lake Outlet (calibration period)

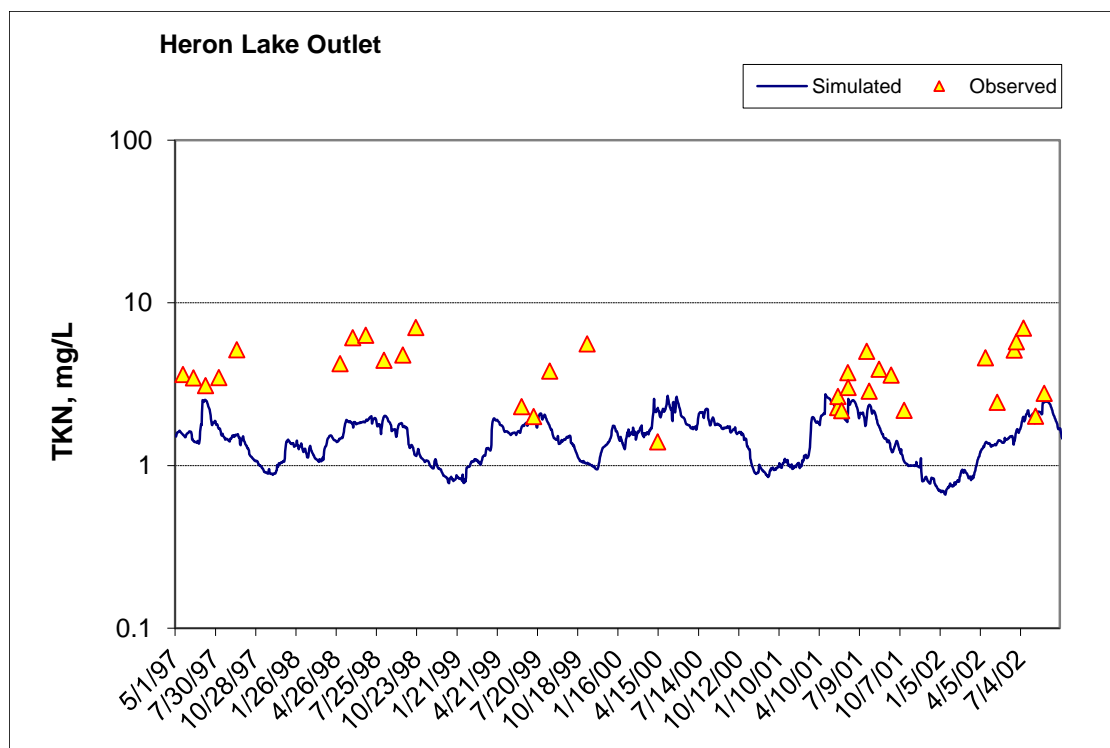


Figure 289. Time series of observed and simulated Total Kjeldahl Nitrogen (TKN) concentration at Heron Lake Outlet (validation period)

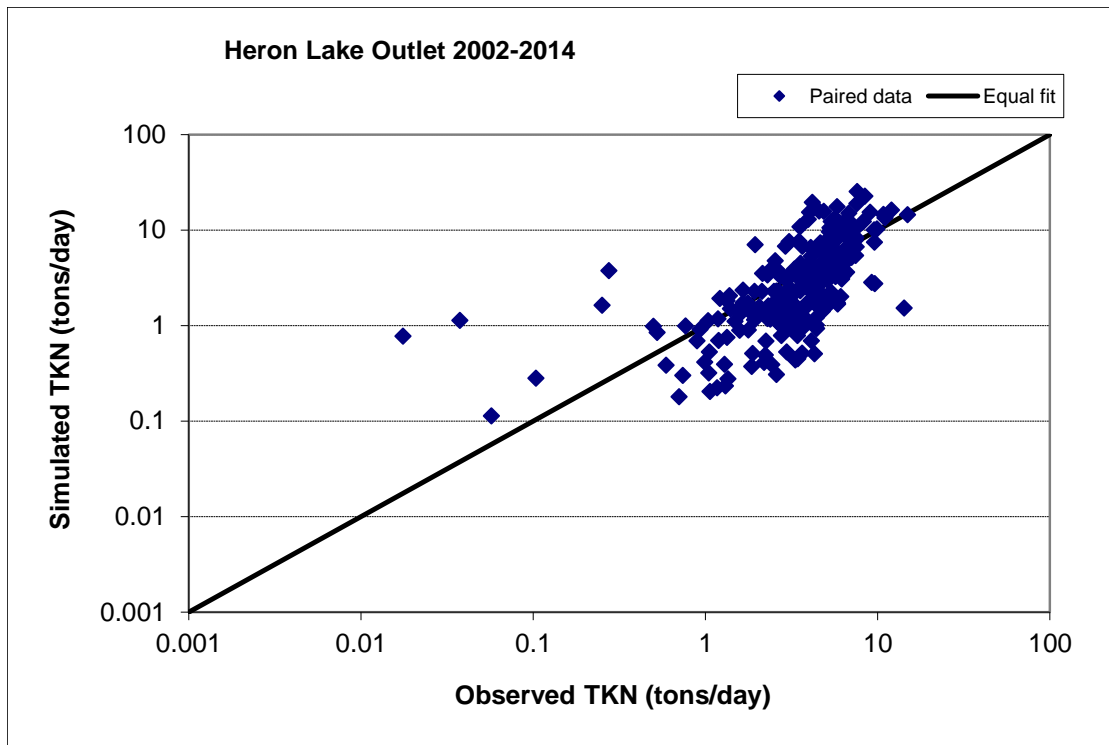


Figure 290. Paired simulated vs. observed Total Kjeldahl Nitrogen (TKN) load at Heron Lake Outlet (calibration period)

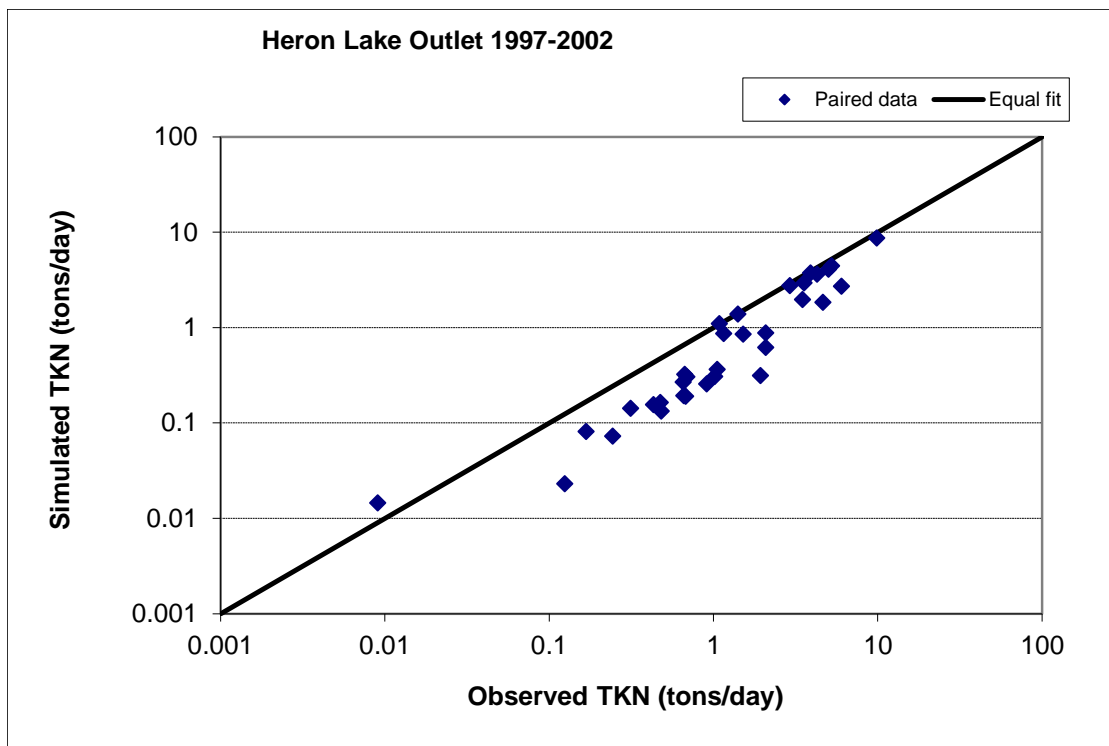


Figure 291. Paired simulated vs. observed Total Kjeldahl Nitrogen (TKN) load at Heron Lake Outlet (validation period)

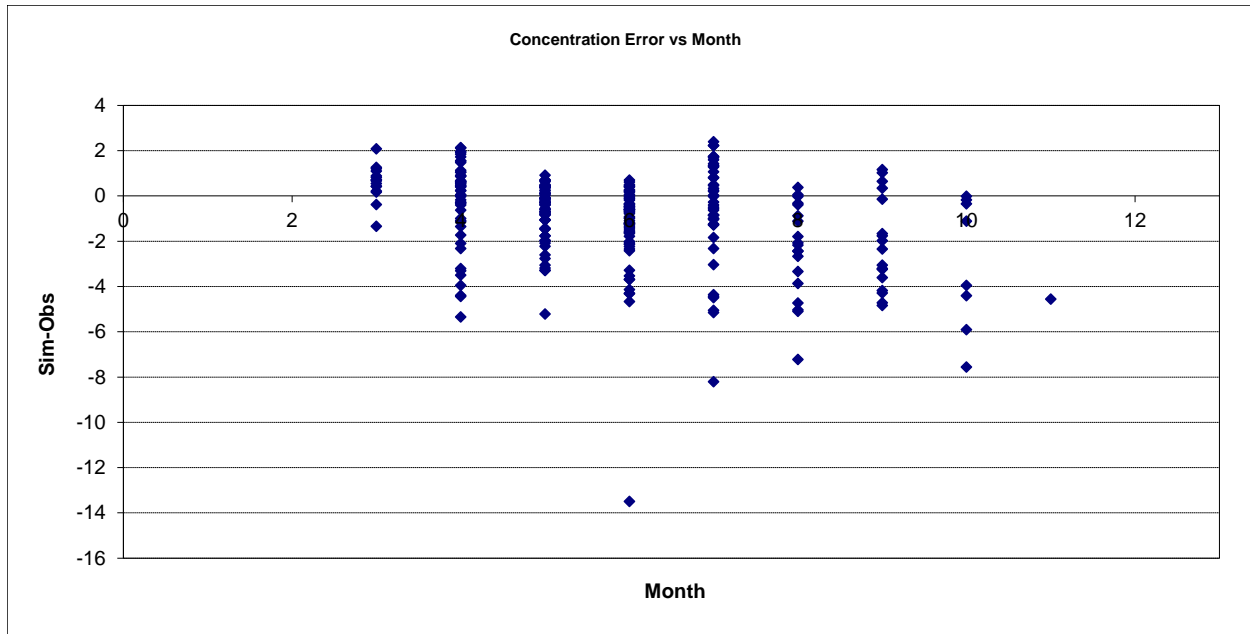


Figure 292. Residual (Simulated - Observed) vs. Month Total Kjeldahl Nitrogen (TKN) at Heron Lake Outlet

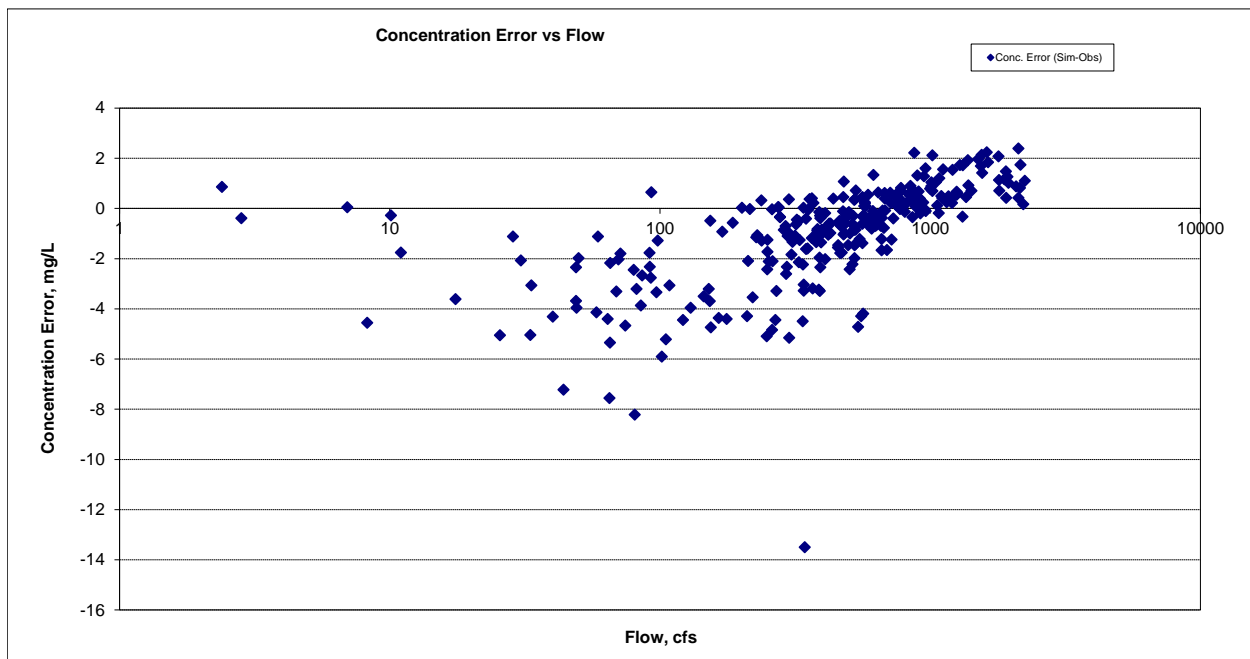


Figure 293. Residual (Simulated - Observed) vs. Flow Total Kjeldahl Nitrogen (TKN) at Heron Lake Outlet

Nitrite+ Nitrate Nitrogen (NO_x)

Table 41. Nitrite+ Nitrate Nitrogen (NO_x) statistics

Period	2002-2014	1997-2002
Count	222	27
Concentration Average Error	-7.79%	-39.14%
Concentration Median Error	-4.07%	-15.61%
Load Average Error	3.42%	-16.82%
Load Median Error	-10.01%	-6.62%
Paired t concentration	1.00	0.10

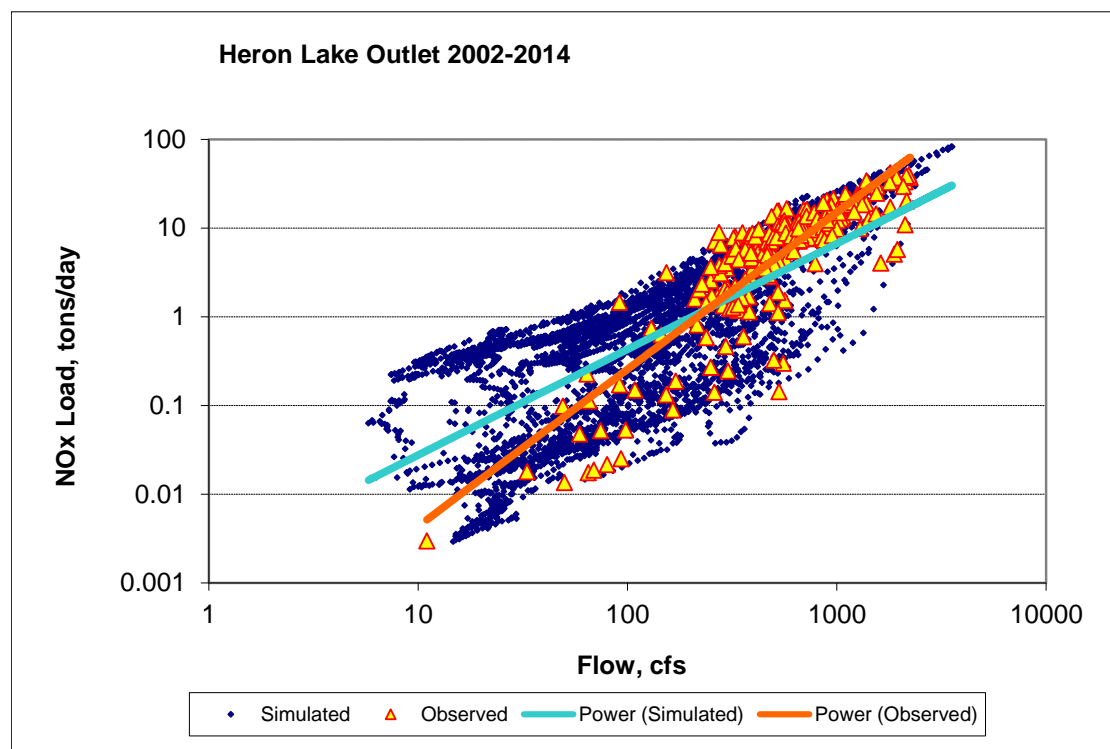


Figure 294. Power plot of simulated and observed Nitrite+ Nitrate Nitrogen (NO_x) load vs flow at Heron Lake Outlet (calibration period)

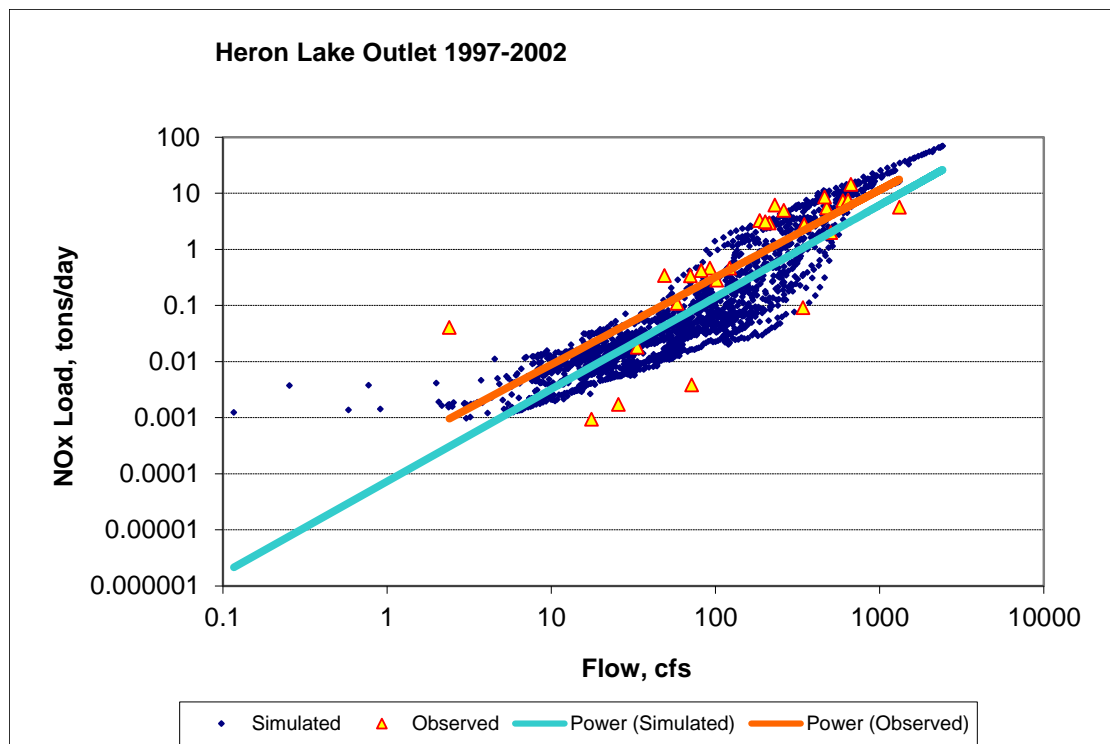


Figure 295. Power plot of simulated and observed Nitrite+ Nitrate Nitrogen (NOx) load vs flow at Heron Lake Outlet (validation period)

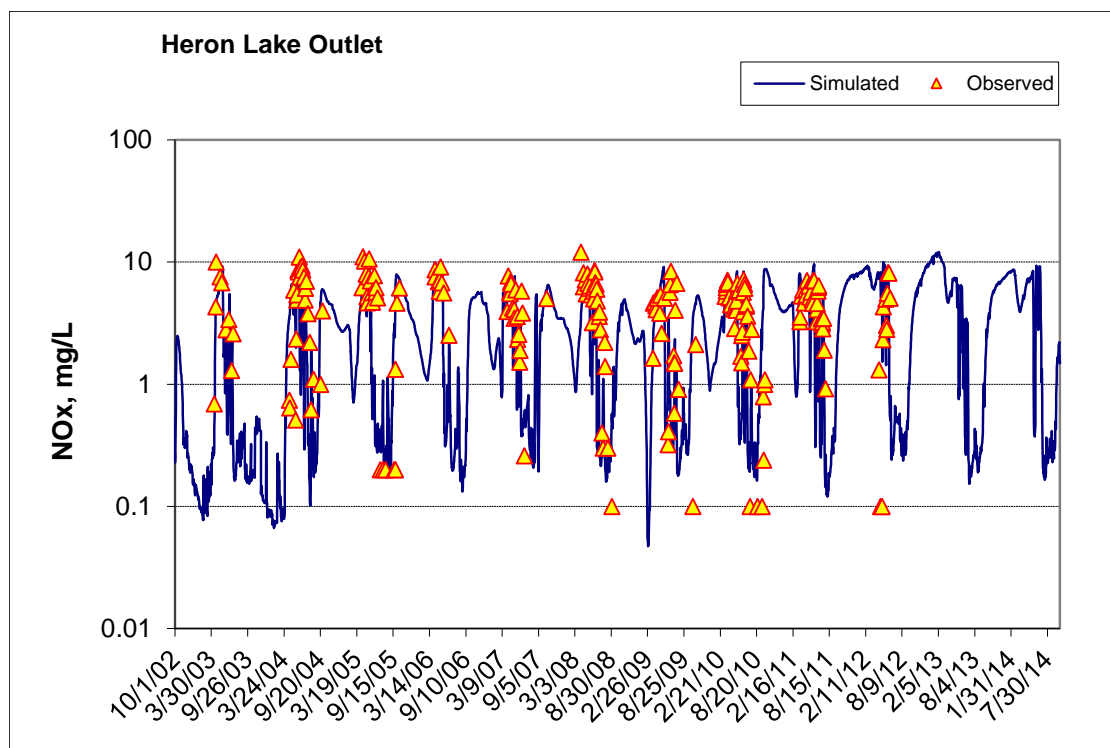


Figure 296. Time series of observed and simulated Nitrite+ Nitrate Nitrogen (NOx) concentration at Heron Lake Outlet (calibration period)

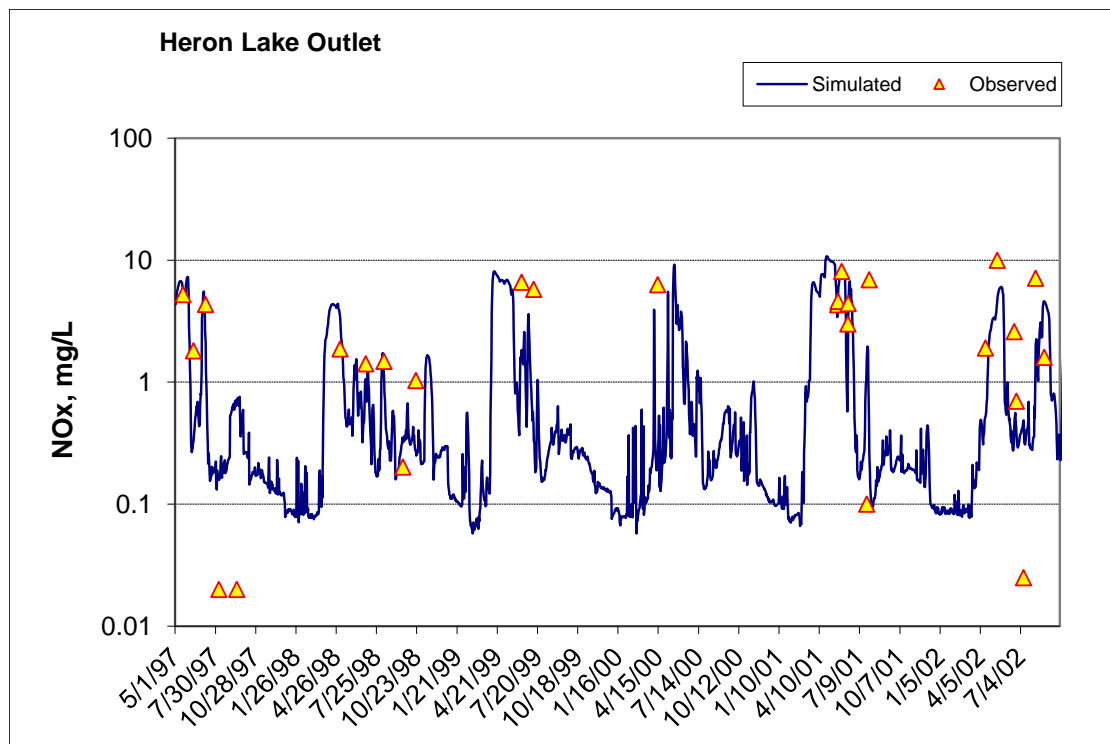


Figure 297. Time series of observed and simulated Nitrite+ Nitrate Nitrogen (NOx) concentration at Heron Lake Outlet (validation period)

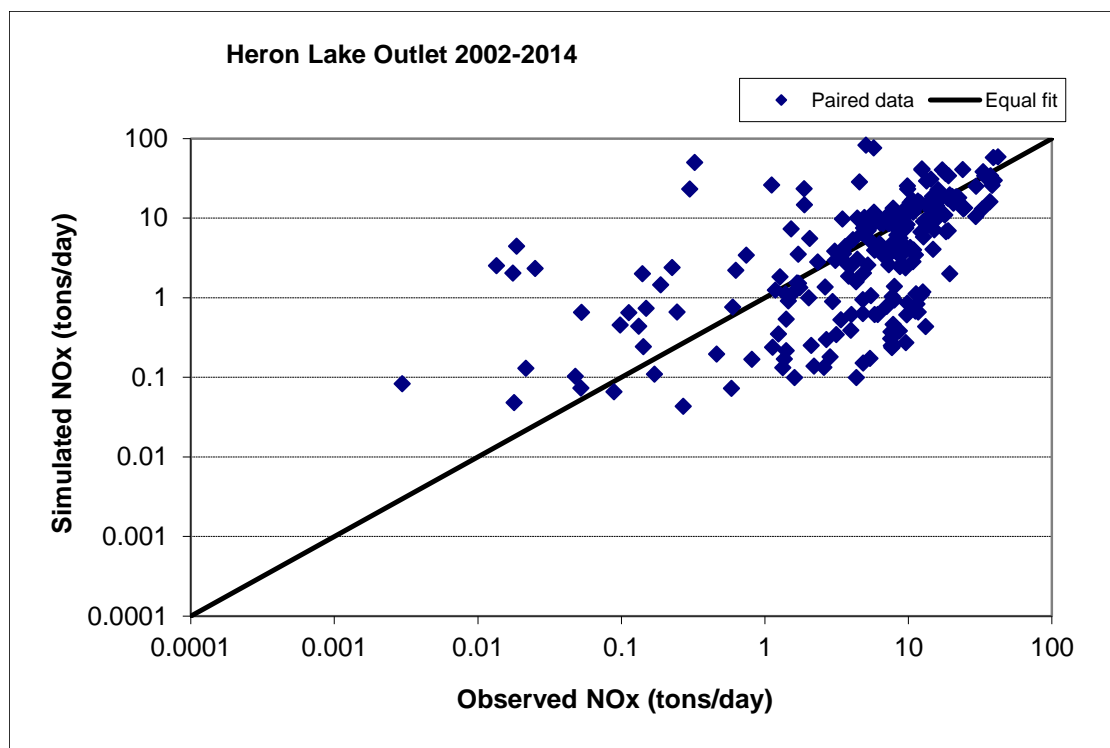


Figure 298. Paired simulated vs. observed Nitrite+ Nitrate Nitrogen (NOx) load at Heron Lake Outlet (calibration period)



Figure 299. Paired simulated vs. observed Nitrite+ Nitrate Nitrogen (NOx) load at Heron Lake Outlet (validation period)

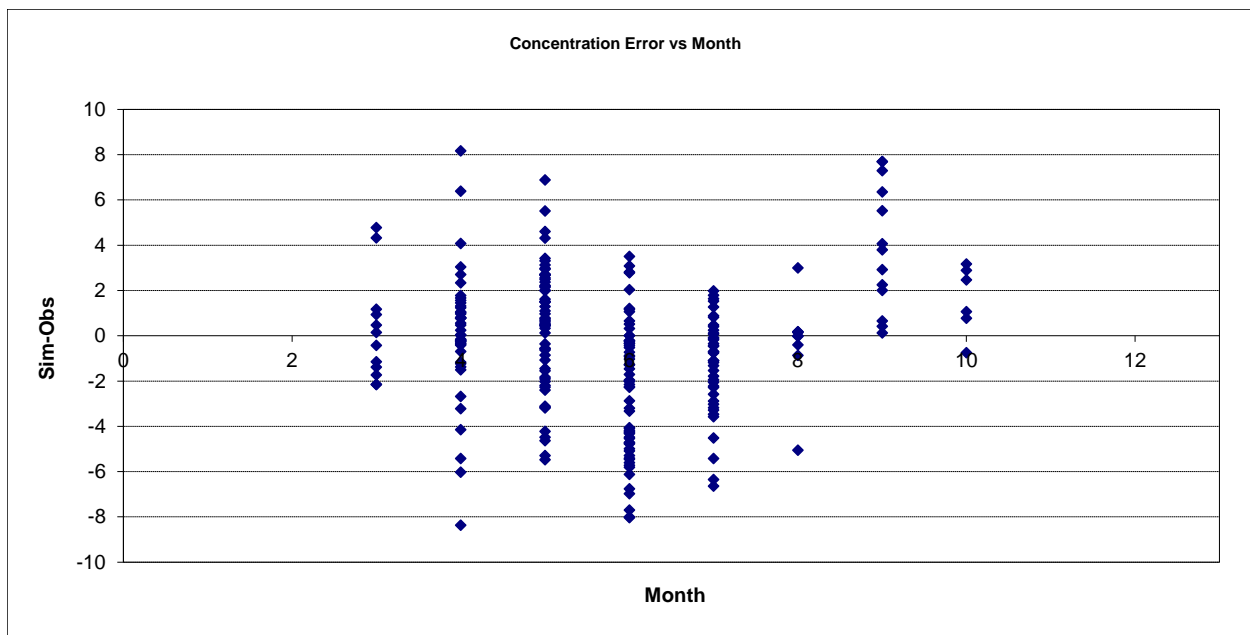


Figure 300. Residual (Simulated - Observed) vs. Month Nitrite+ Nitrate Nitrogen (NOx) at Heron Lake Outlet

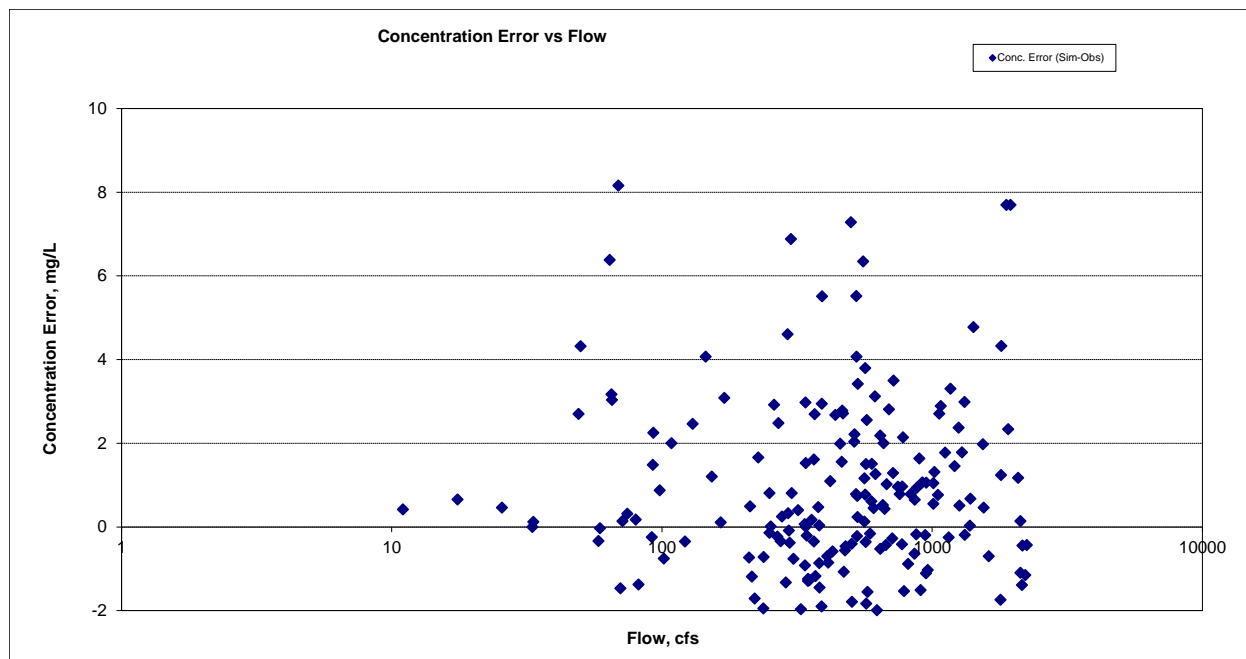


Figure 301. Residual (Simulated - Observed) vs. Flow Nitrite+ Nitrate Nitrogen (NOx) at Heron Lake Outlet

Total Nitrogen (TN)

Table 42. Total Nitrogen (TN) statistics

Period	2002-2014	1997-2002
Count	222	27
Concentration Average Error	-14.23%	-45.28%
Concentration Median Error	-12.92%	-41.15%
Load Average Error	2.75%	-23.61%
Load Median Error	-14.32%	-16.39%
Paired t concentration	0.99	0.00

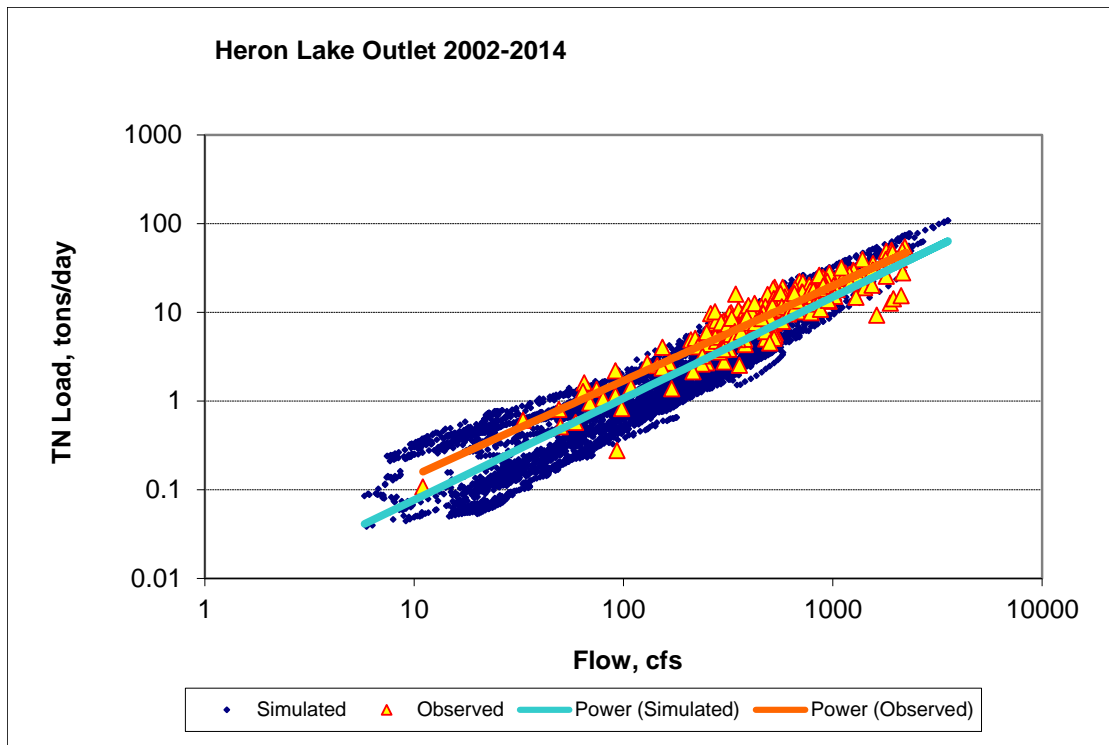


Figure 302. Power plot of simulated and observed Total Nitrogen (TN) load vs flow at Heron Lake Outlet (calibration period)

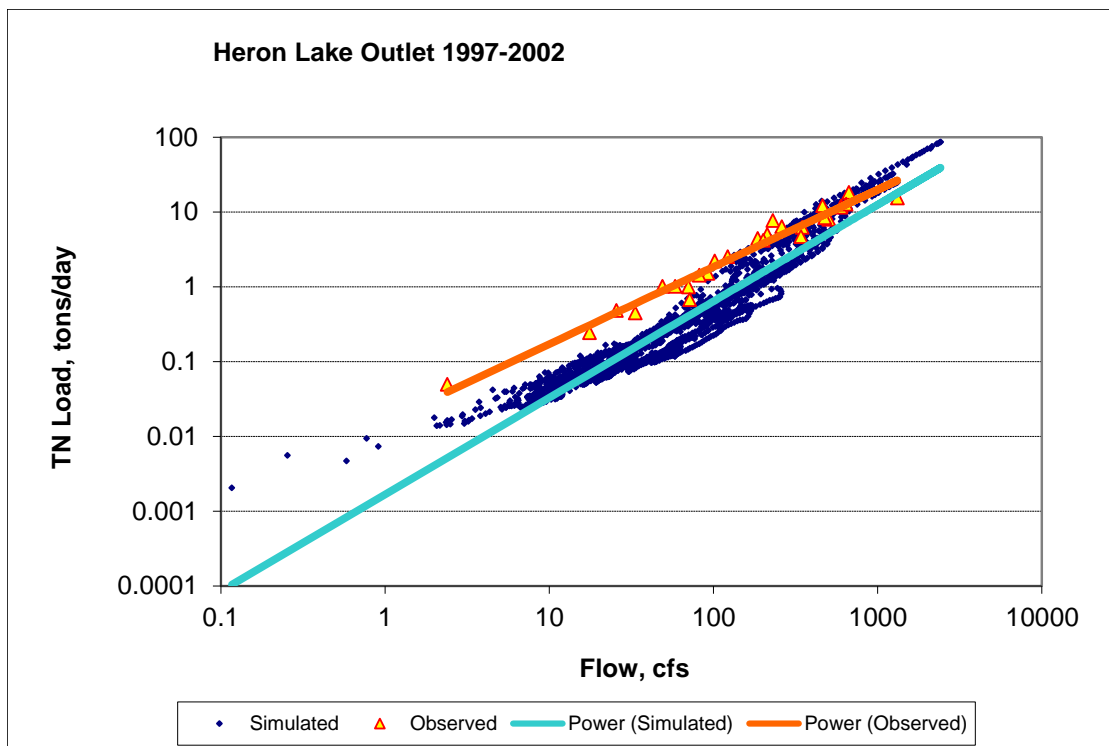


Figure 303. Power plot of simulated and observed Total Nitrogen (TN) load vs flow at Heron Lake Outlet (validation period)

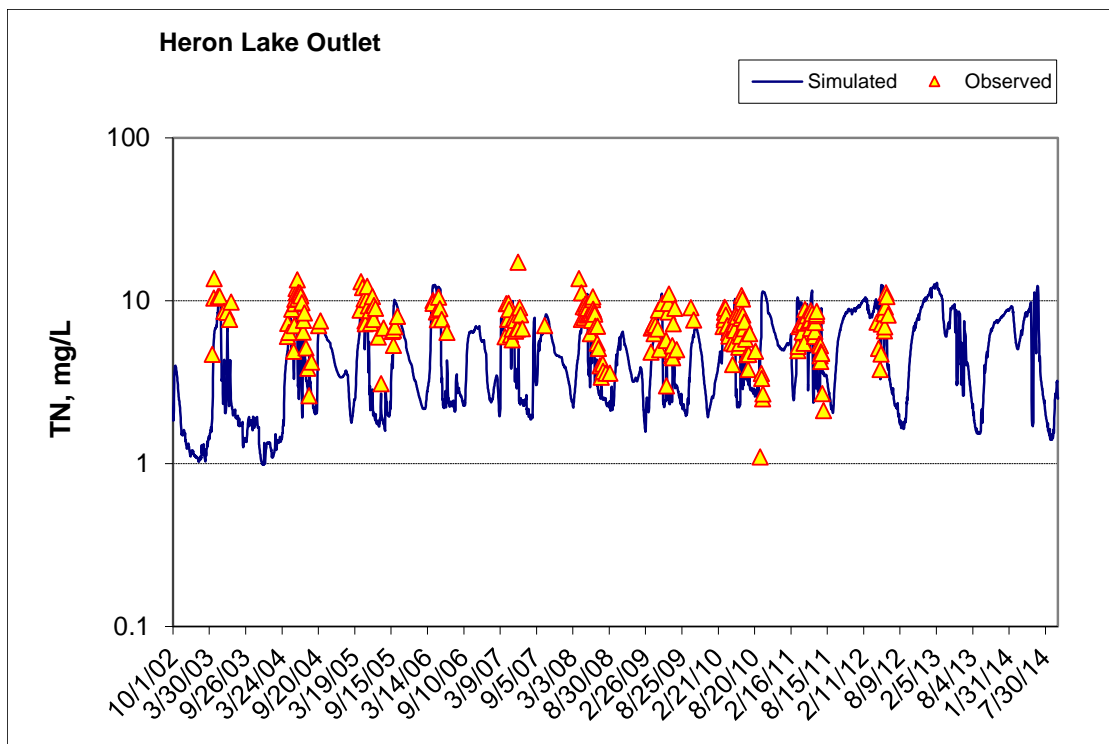


Figure 304. Time series of observed and simulated Total Nitrogen (TN) concentration at Heron Lake Outlet (calibration period)

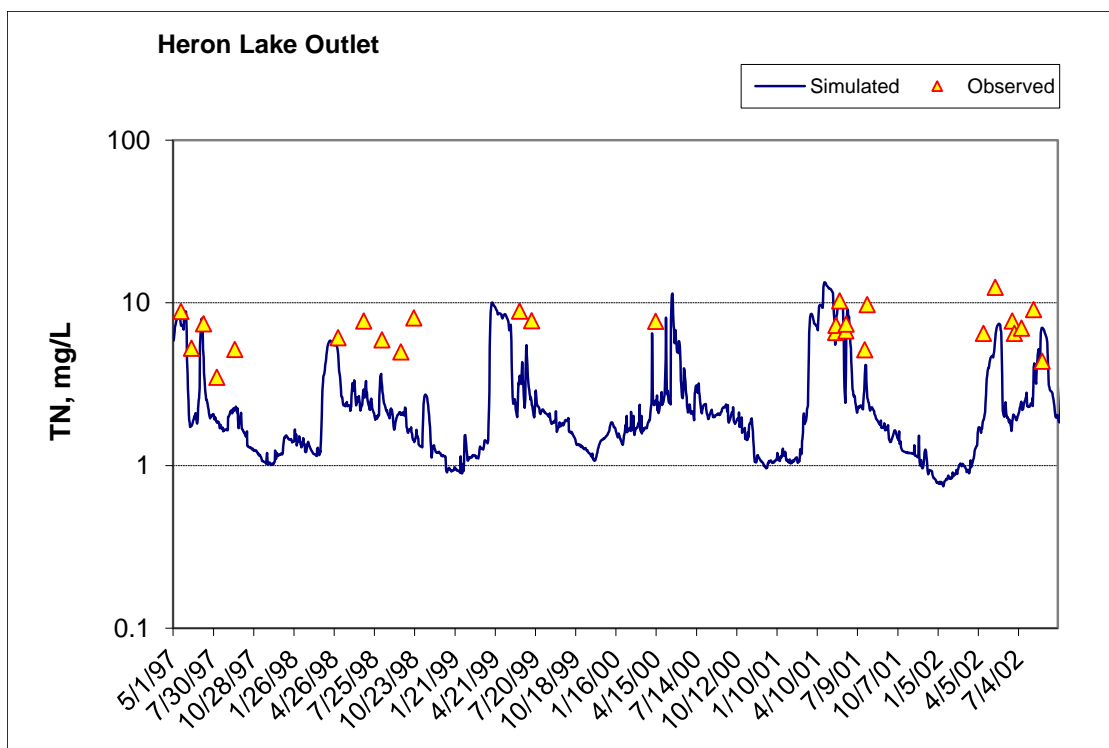


Figure 305. Time series of observed and simulated Total Nitrogen (TN) concentration at Heron Lake Outlet (validation period)

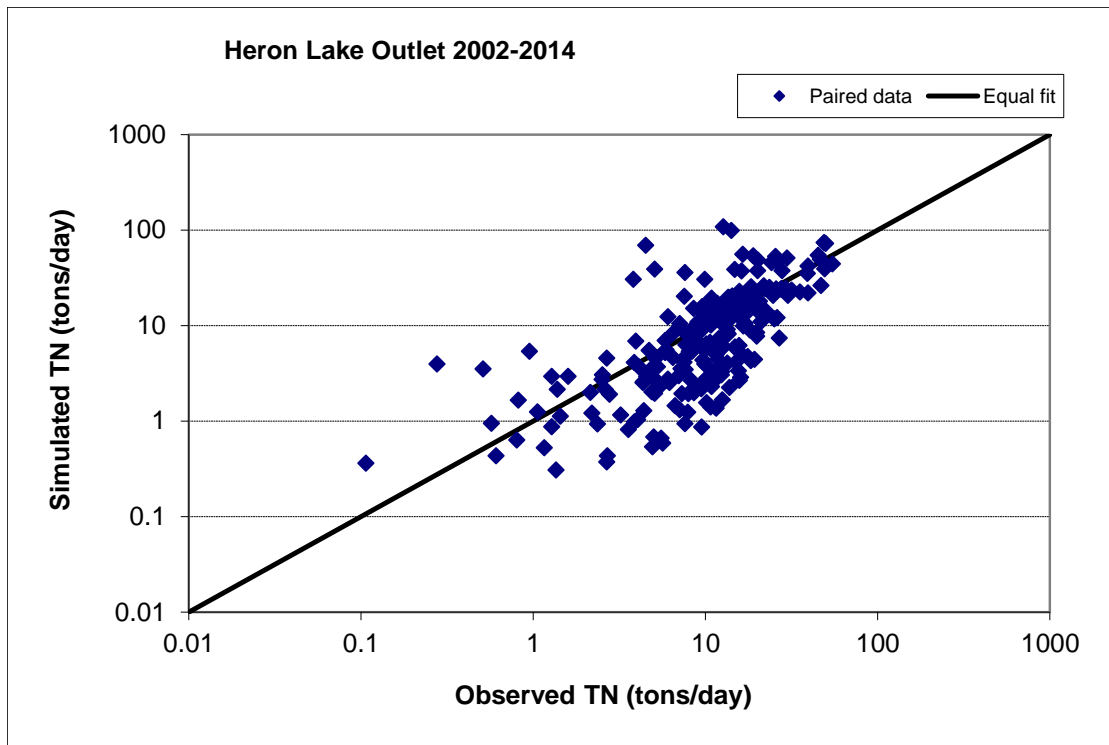


Figure 306. Paired simulated vs. observed Total Nitrogen (TN) load at Heron Lake Outlet (calibration period)

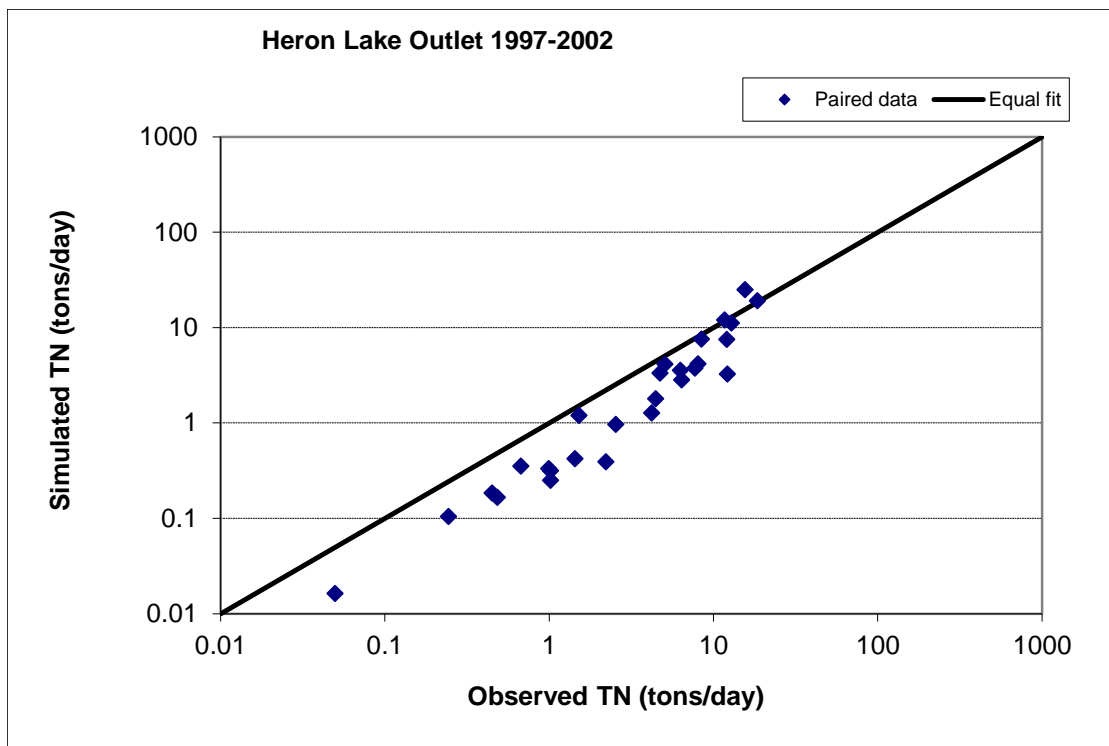


Figure 307. Paired simulated vs. observed Total Nitrogen (TN) load at Heron Lake Outlet (validation period)

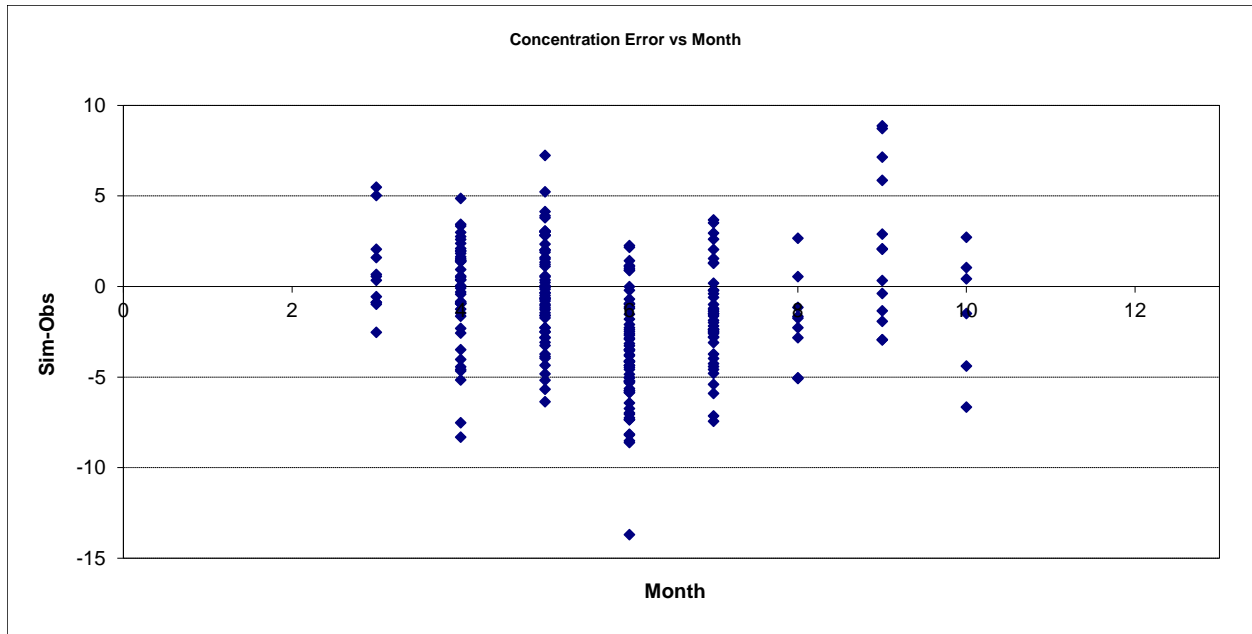


Figure 308. Residual (Simulated - Observed) vs. Month Total Nitrogen (TN) at Heron Lake Outlet

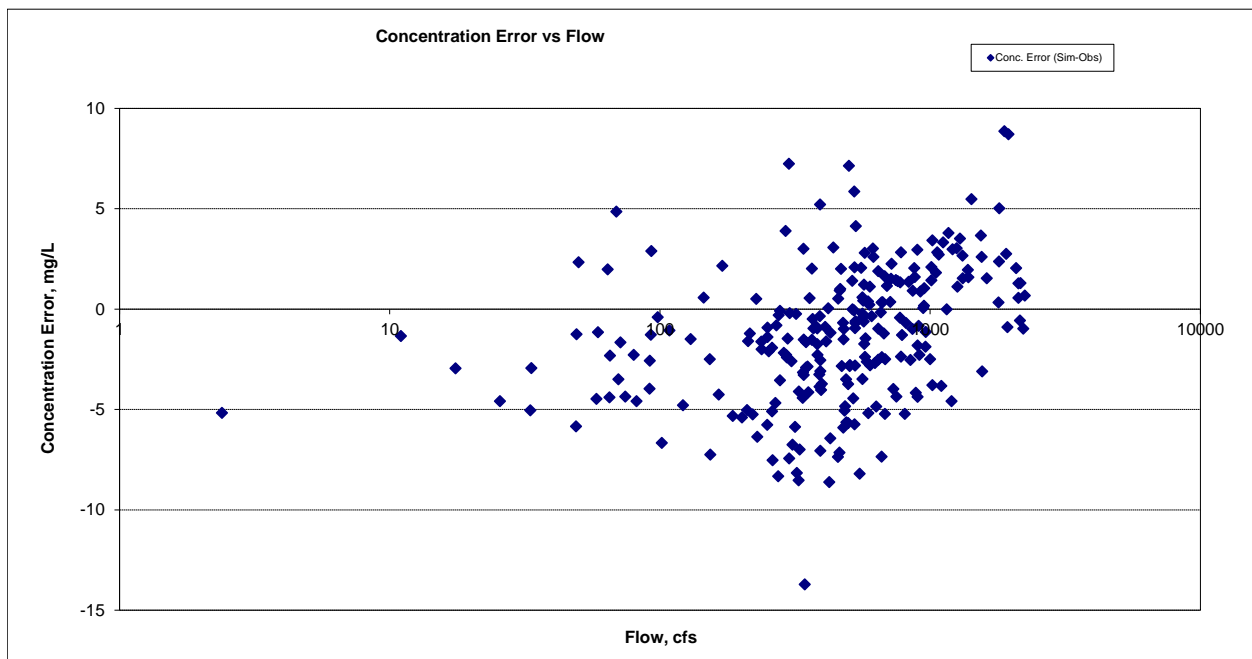


Figure 309. Residual (Simulated - Observed) vs. Flow Total Nitrogen (TN) at Heron Lake Outlet

Soluble Reactive Phosphorus (SRP)

Table 43. Soluble Reactive Phosphorus (SRP) statistics

Period	2002-2014	1997-2002
Count	247	43
Concentration Average Error	-25.30%	218.40%
Concentration Median Error	-13.35%	9.11%
Load Average Error	8.06%	-31.53%
Load Median Error	-6.79%	4.62%
Paired t concentration	0.28	0.01

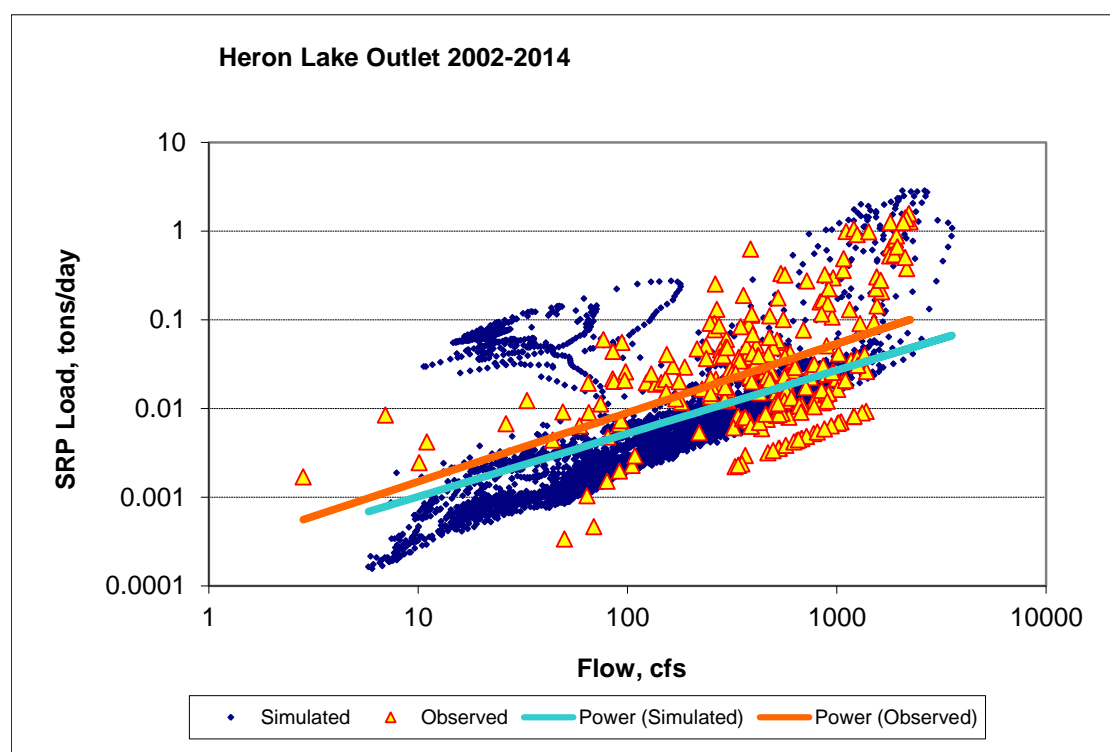


Figure 310. Power plot of simulated and observed Soluble Reactive Phosphorus (SRP) load vs flow at Heron Lake Outlet (calibration period)

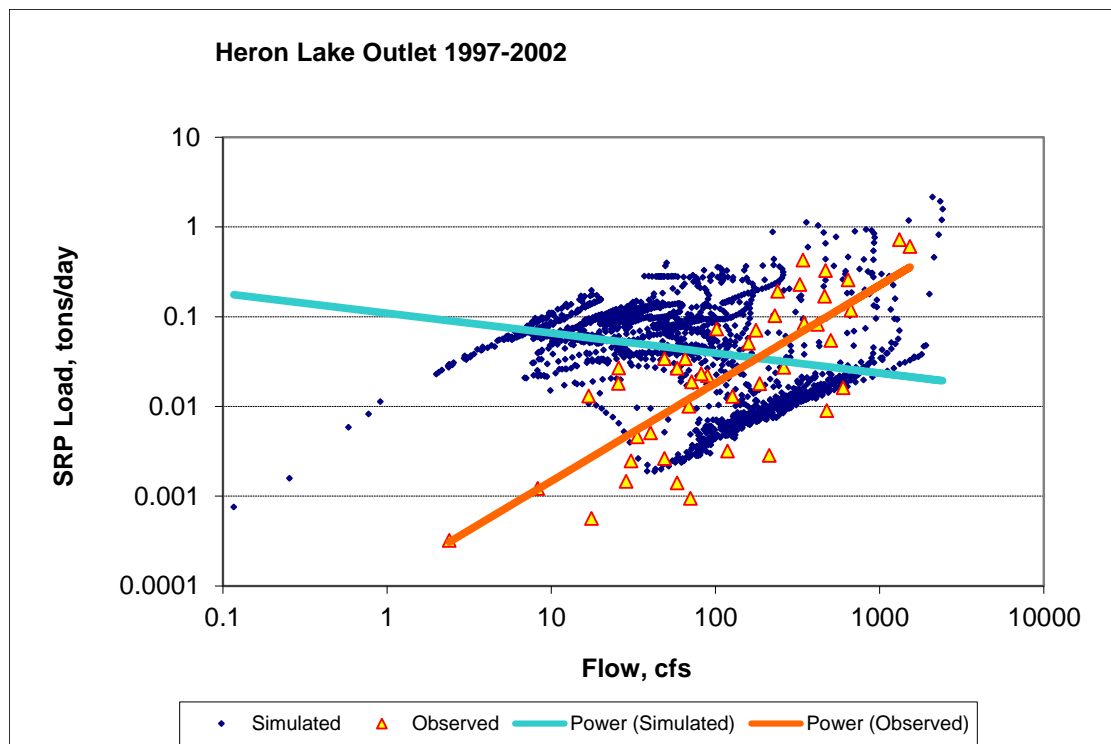


Figure 311. Power plot of simulated and observed Soluble Reactive Phosphorus (SRP) load vs flow at Heron Lake Outlet (validation period)

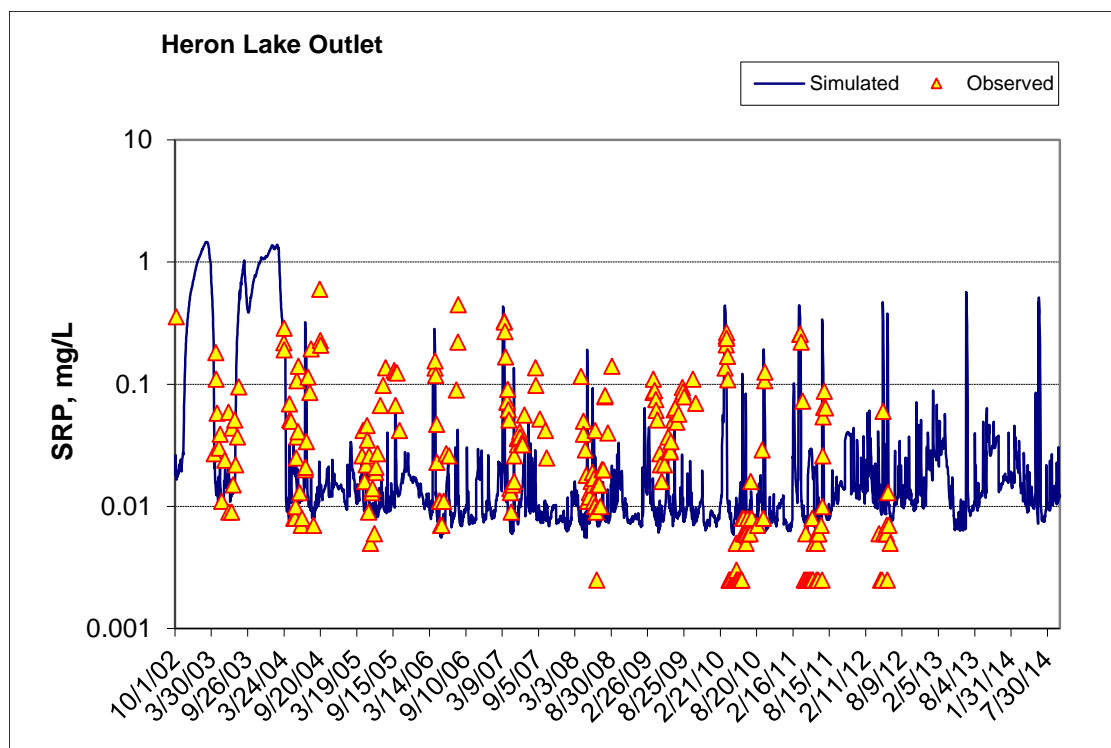


Figure 312. Time series of observed and simulated Soluble Reactive Phosphorus (SRP) concentration at Heron Lake Outlet (calibration period)

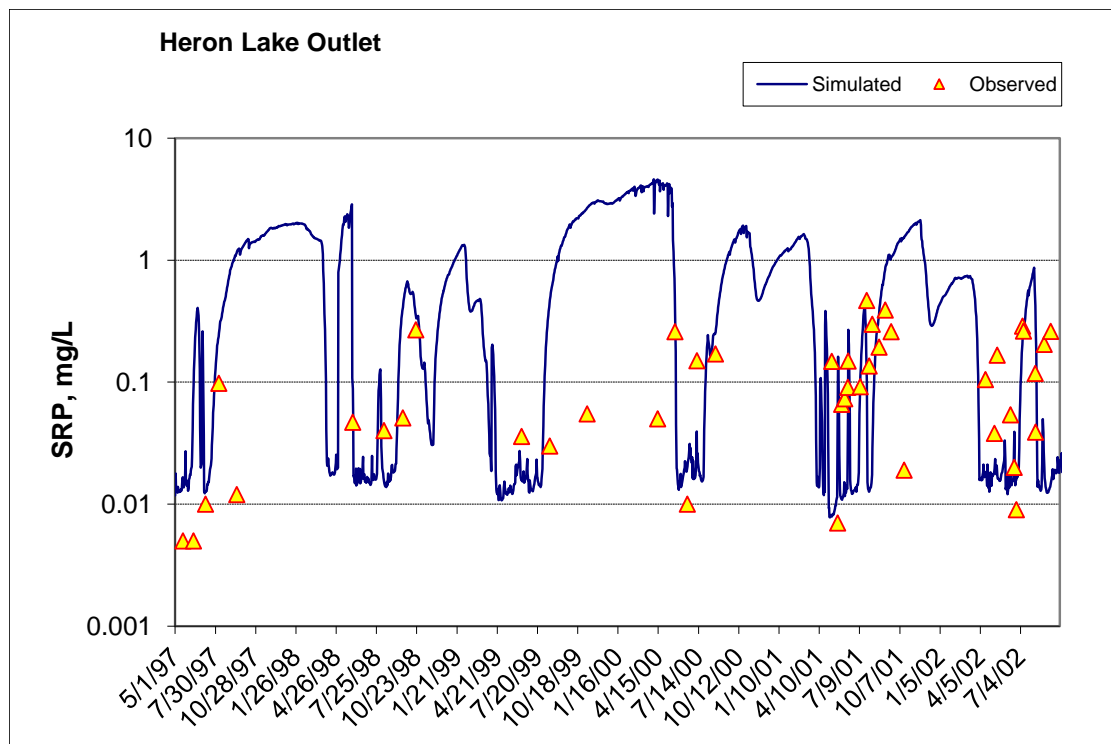


Figure 313. Time series of observed and simulated Soluble Reactive Phosphorus (SRP) concentration at Heron Lake Outlet (validation period)

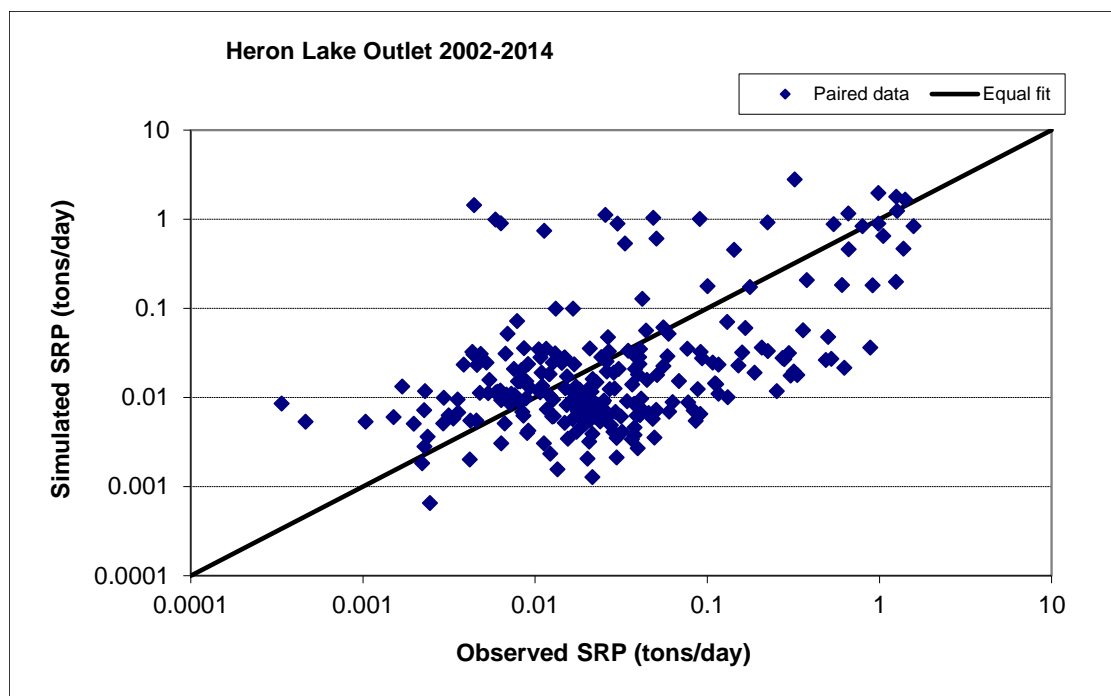


Figure 314. Paired simulated vs. observed Soluble Reactive Phosphorus (SRP) load at Heron Lake Outlet (calibration period)

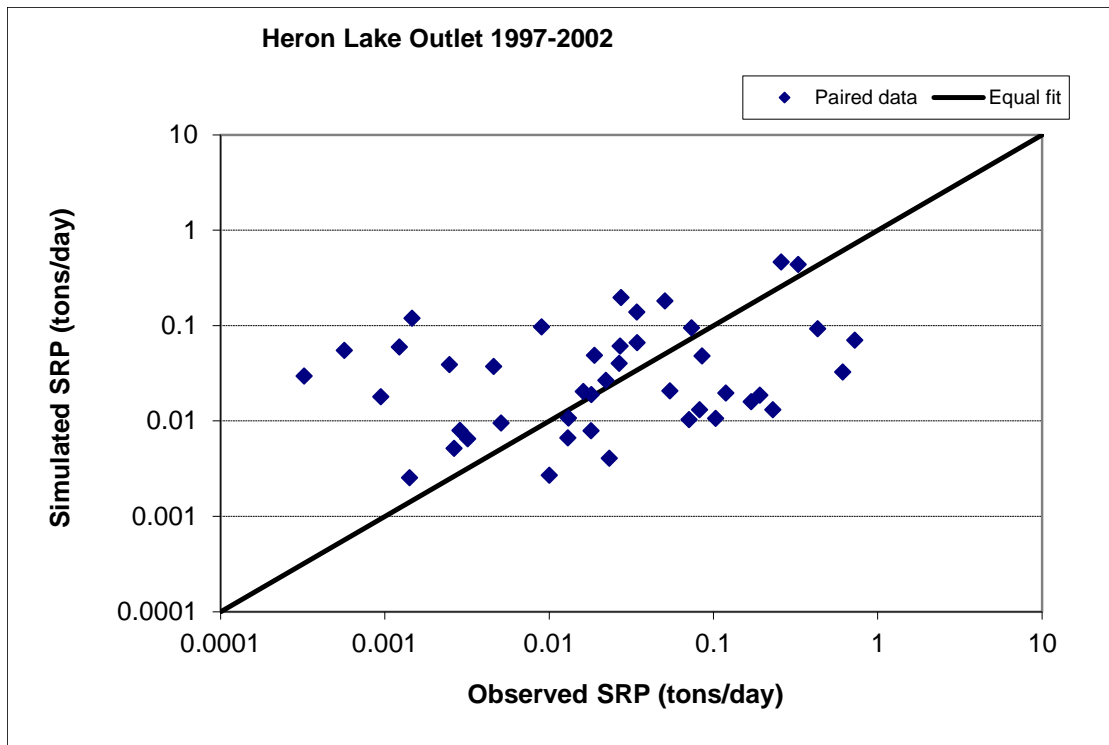


Figure 315. Paired simulated vs. observed Soluble Reactive Phosphorus (SRP) load at Heron Lake Outlet (validation period)

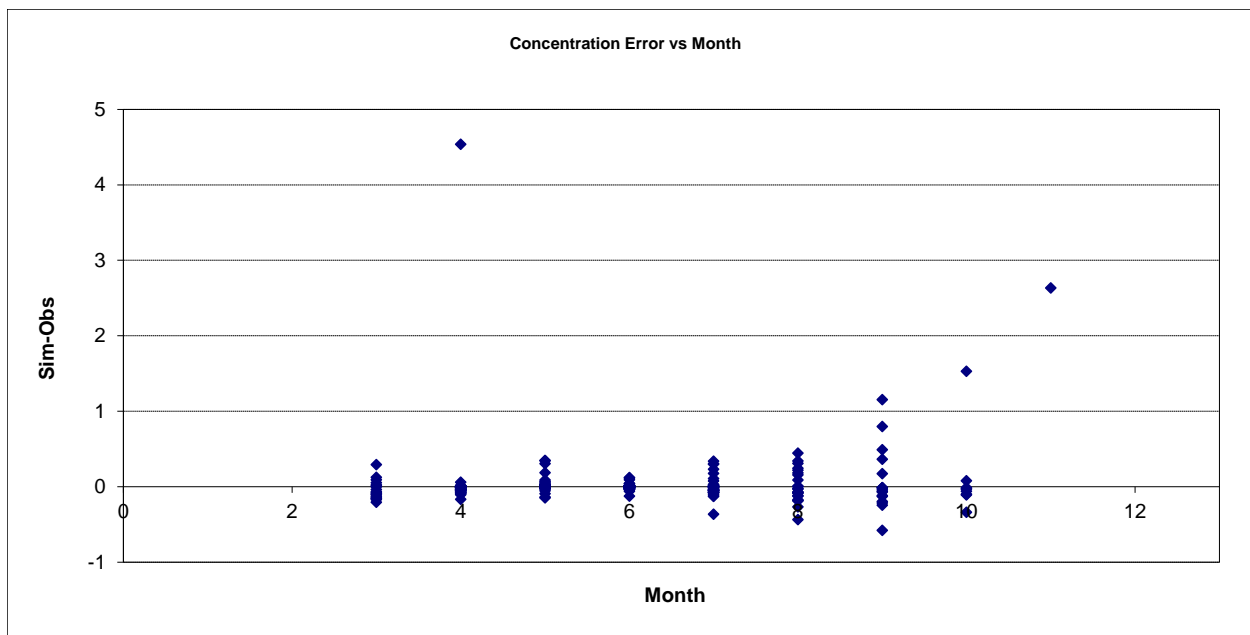


Figure 316. Residual (Simulated - Observed) vs. Month Soluble Reactive Phosphorus (SRP) at Heron Lake Outlet

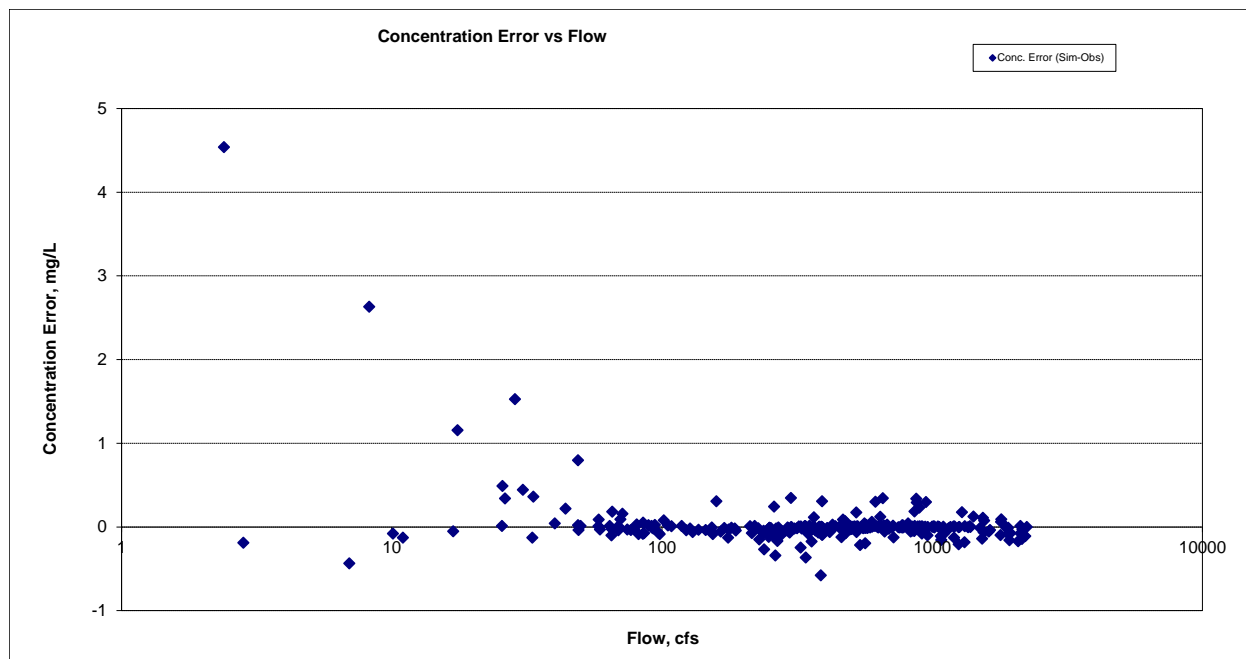


Figure 317. Residual (Simulated - Observed) vs. Flow Soluble Reactive Phosphorus (SRP) at Heron Lake Outlet

Organic Phosphorus (OrgP)

Table 44. Organic Phosphorus (OrgP) statistics

Period	2002-2014	1997-2002
Count	246	43
Concentration Average Error	-32.35%	-60.01%
Concentration Median Error	-6.20%	-49.92%
Load Average Error	11.38%	-49.30%
Load Median Error	-13.41%	-36.44%
Paired t concentration	0.00	0.00

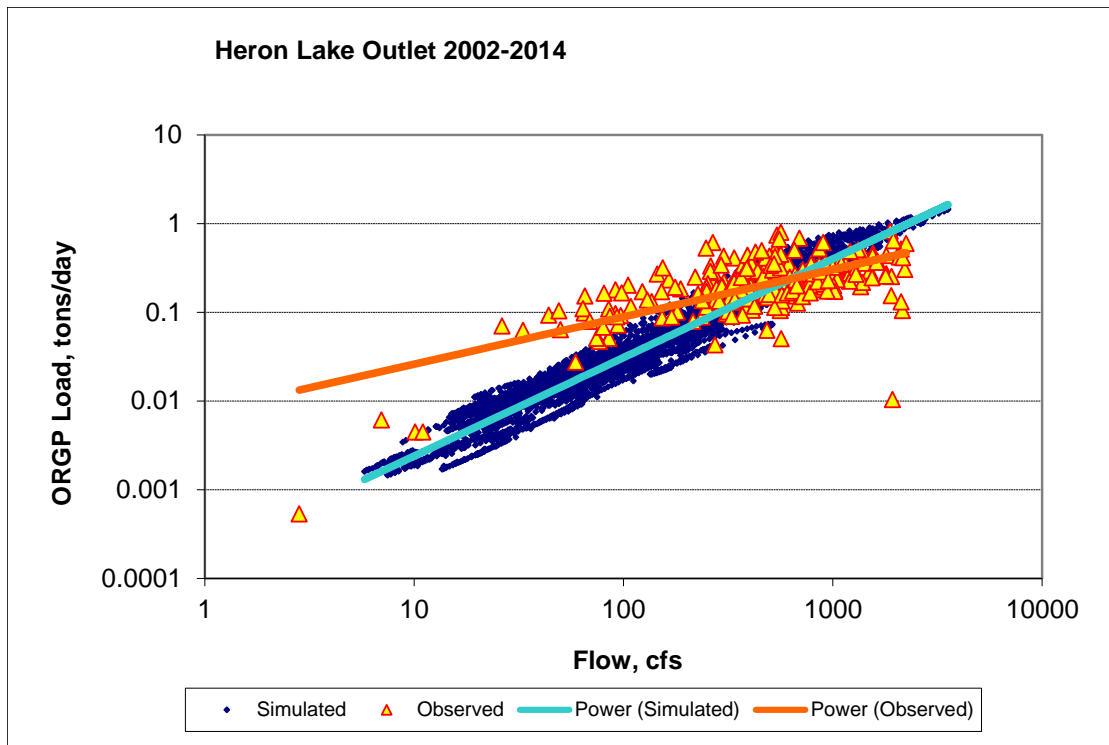


Figure 318. Power plot of simulated and observed Organic Phosphorus (OrgP) load vs flow at Heron Lake Outlet (calibration period)

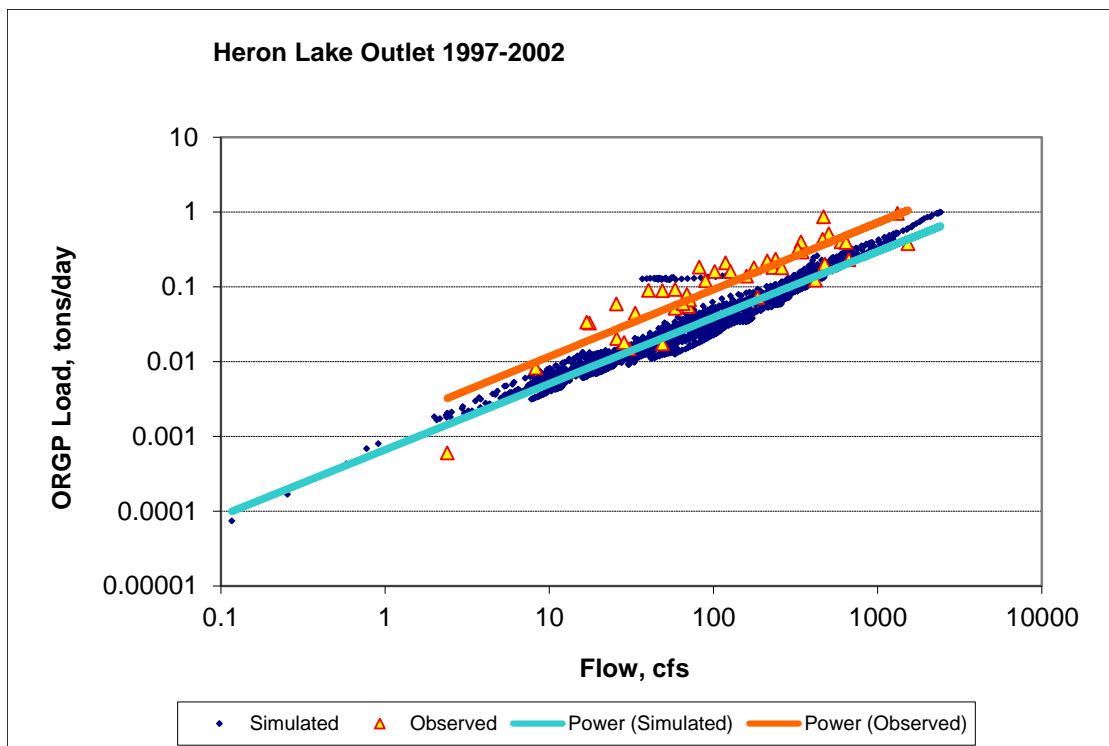


Figure 319. Power plot of simulated and observed Organic Phosphorus (OrgP) load vs flow at Heron Lake Outlet (validation period)

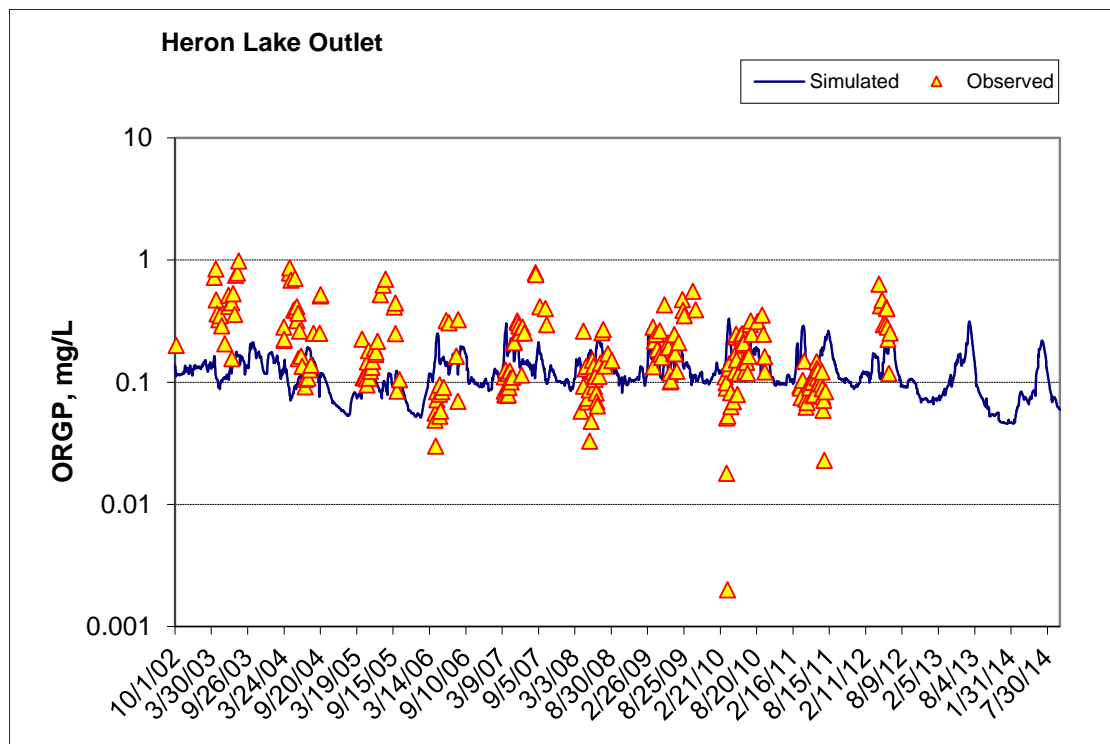


Figure 320. Time series of observed and simulated Organic Phosphorus (OrgP) concentration at Heron Lake Outlet (calibration period)

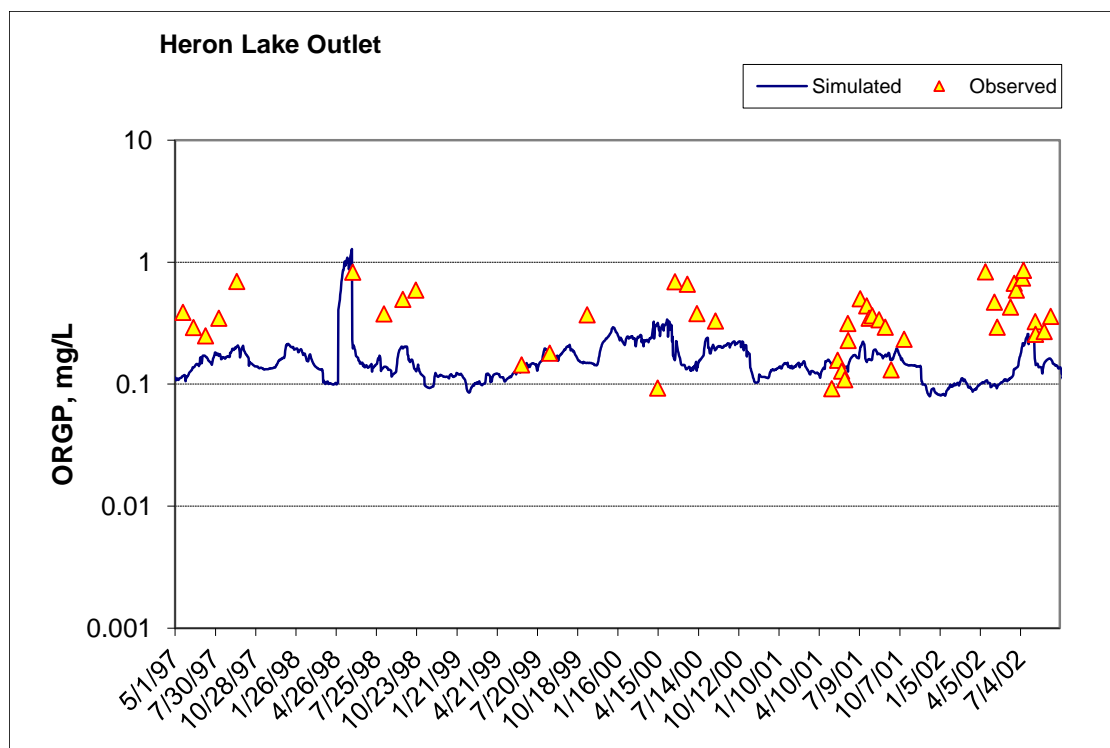


Figure 321. Time series of observed and simulated Organic Phosphorus (OrgP) concentration at Heron Lake Outlet (validation period)

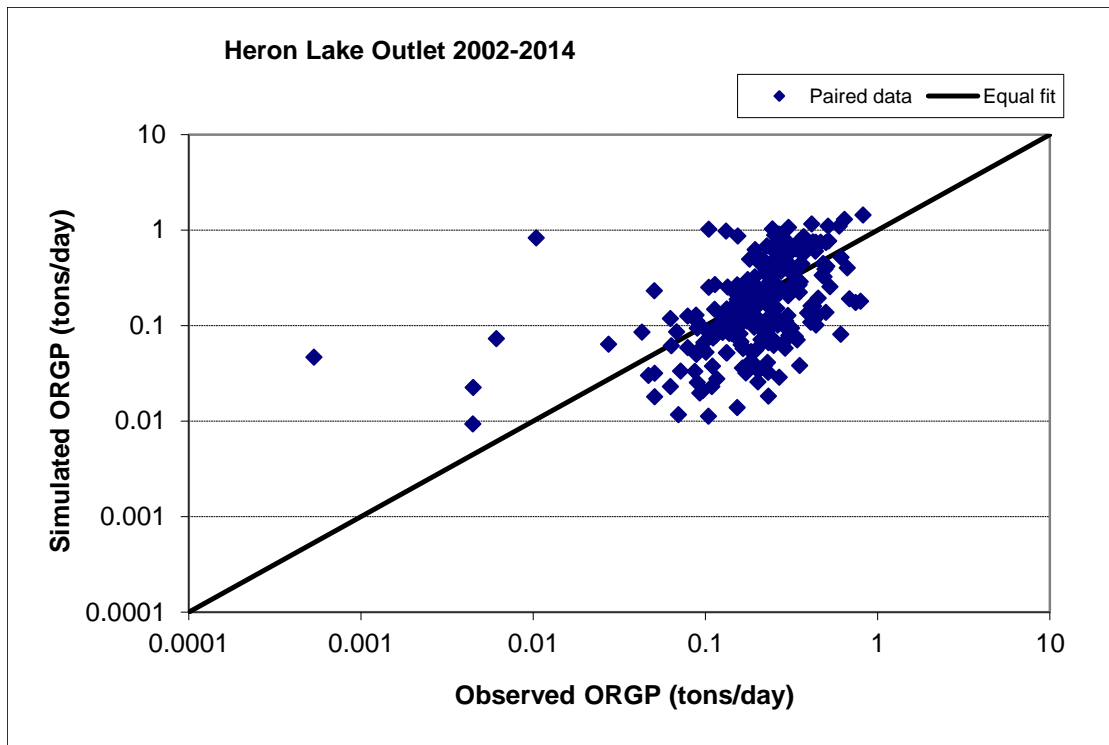


Figure 322. Paired simulated vs. observed Organic Phosphorus (OrgP) load at Heron Lake Outlet (calibration period)

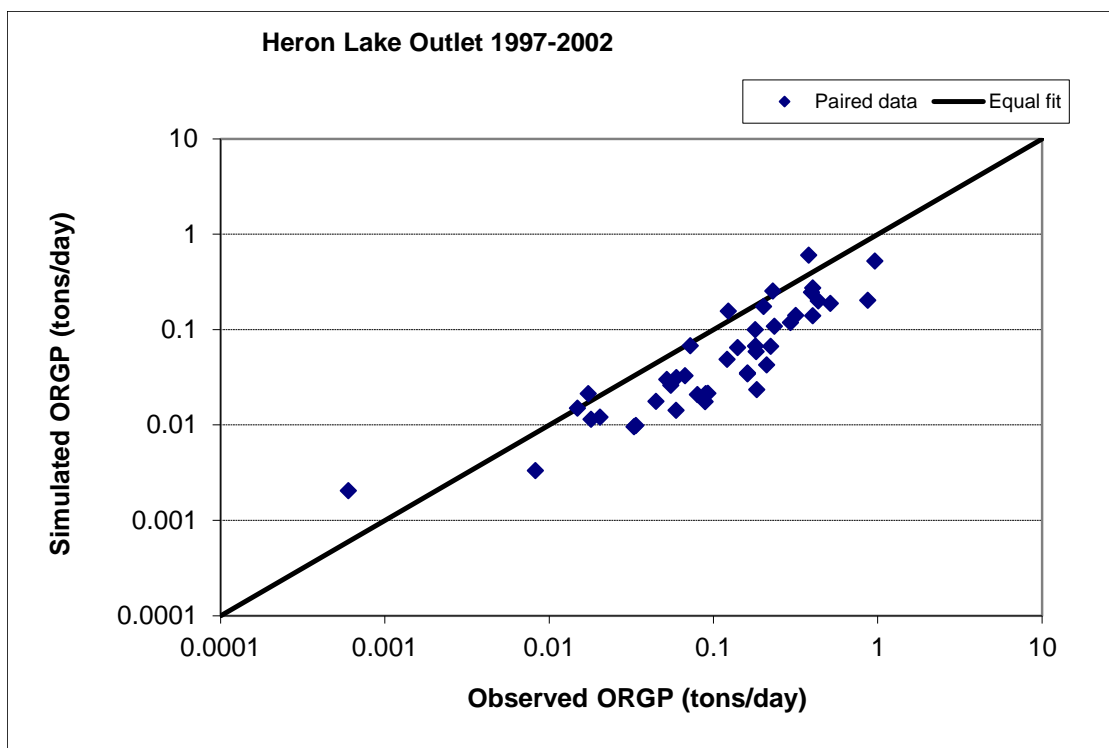


Figure 323. Paired simulated vs. observed Organic Phosphorus (OrgP) load at Heron Lake Outlet (validation period)

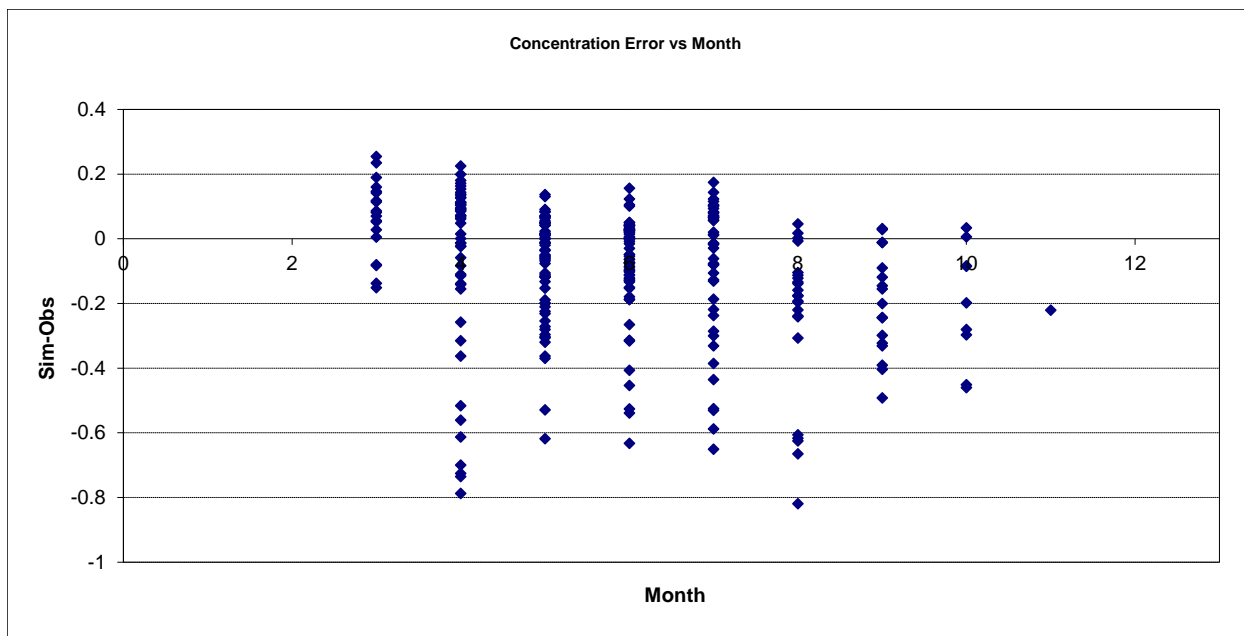


Figure 324. Residual (Simulated - Observed) vs. Month Organic Phosphorus (OrgP) at Heron Lake Outlet

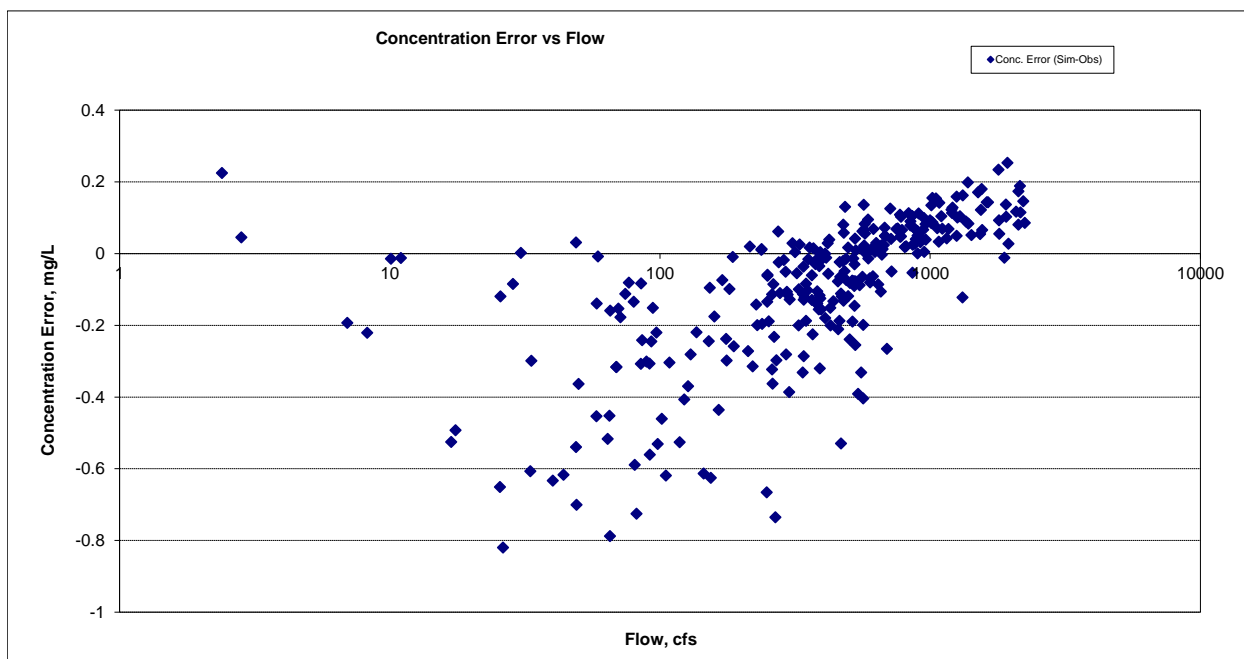


Figure 325. Residual (Simulated - Observed) vs. Flow Organic Phosphorus (OrgP) at Heron Lake Outlet

Total Phosphorus (TP)

Table 45. Total Phosphorus (TP) statistics

Period	2002-2014	1997-2002
Count	259	47
Concentration Average Error	-30.99%	10.69%
Concentration Median Error	-13.58%	-17.25%
Load Average Error	10.22%	-37.97%
Load Median Error	-10.98%	-23.43%
Paired t concentration	0.00	0.69

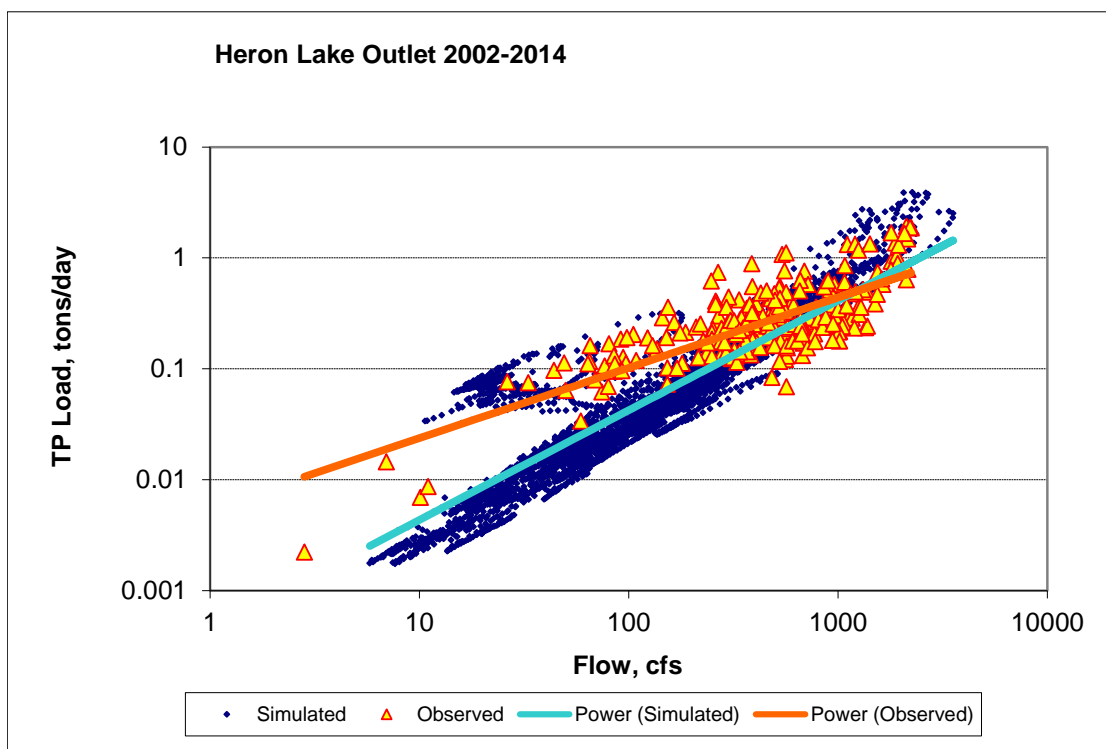


Figure 326. Power plot of simulated and observed Total Phosphorus (TP) load vs flow at Heron Lake Outlet (calibration period)

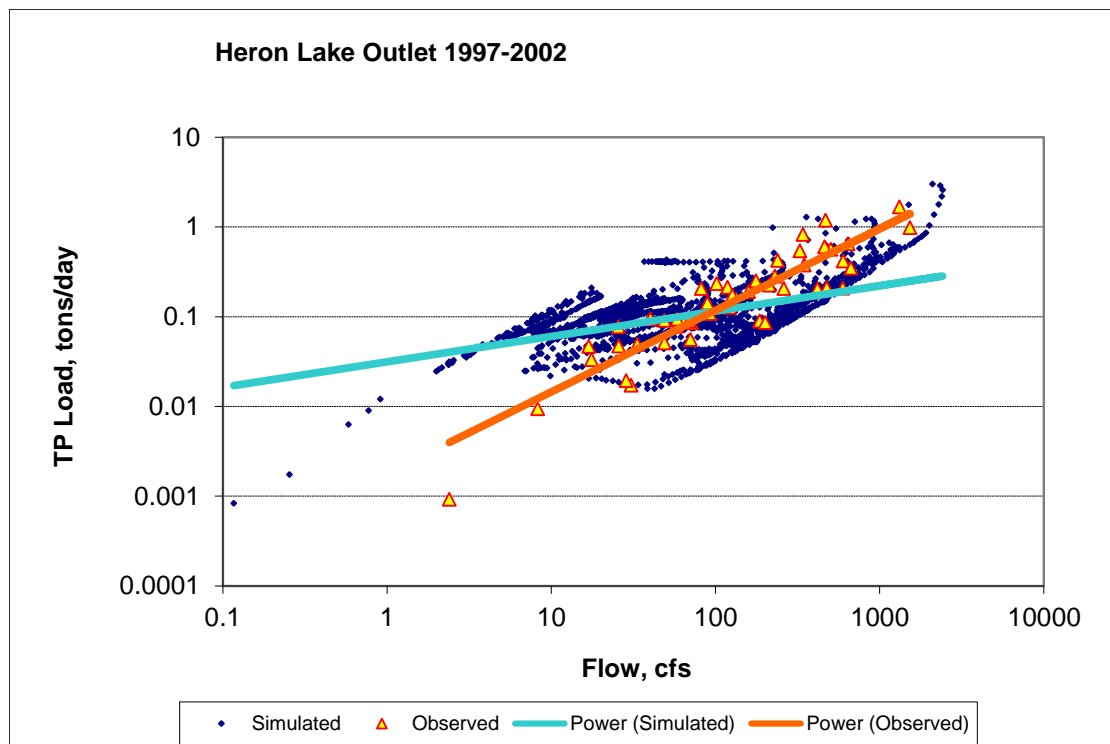


Figure 327. Power plot of simulated and observed Total Phosphorus (TP) load vs flow at Heron Lake Outlet (validation period)

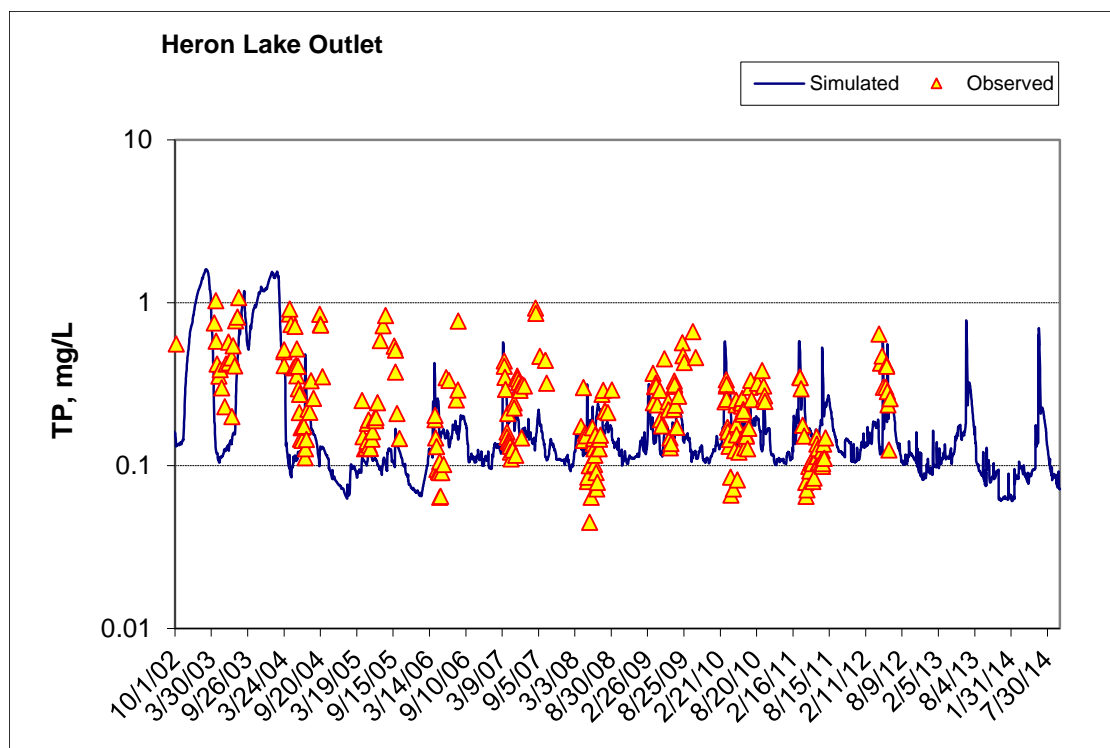


Figure 328. Time series of observed and simulated Total Phosphorus (TP) concentration at Heron Lake Outlet (calibration period)

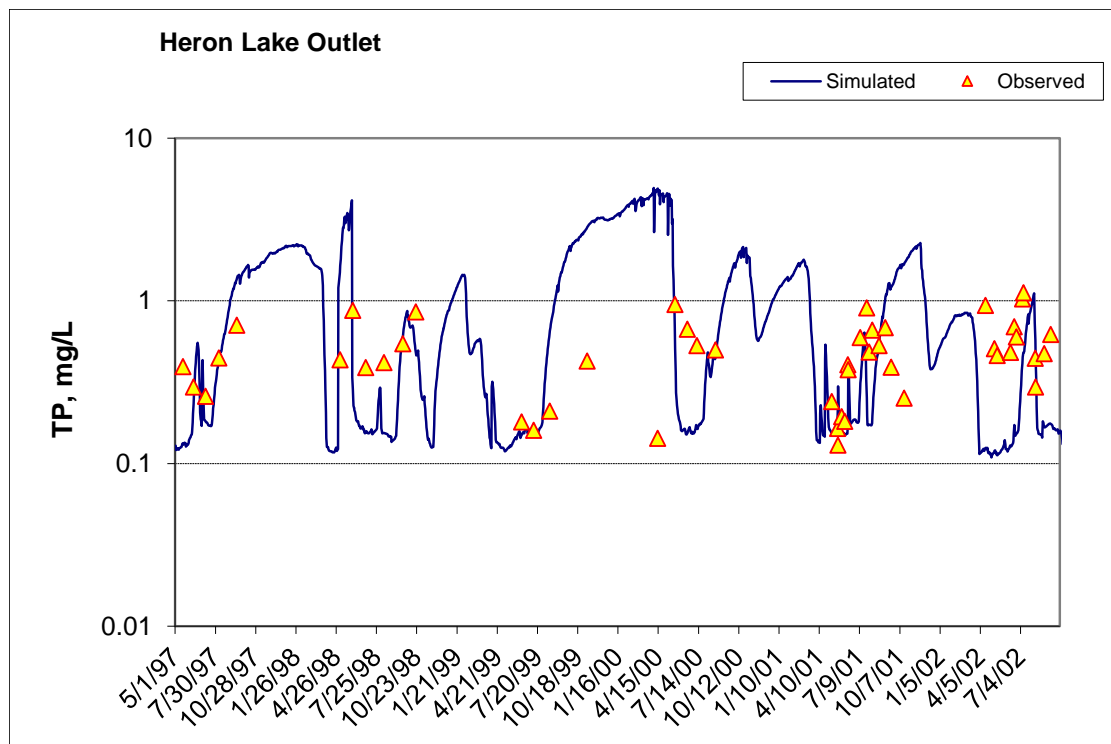


Figure 329. Time series of observed and simulated Total Phosphorus (TP) concentration at Heron Lake Outlet (validation period)

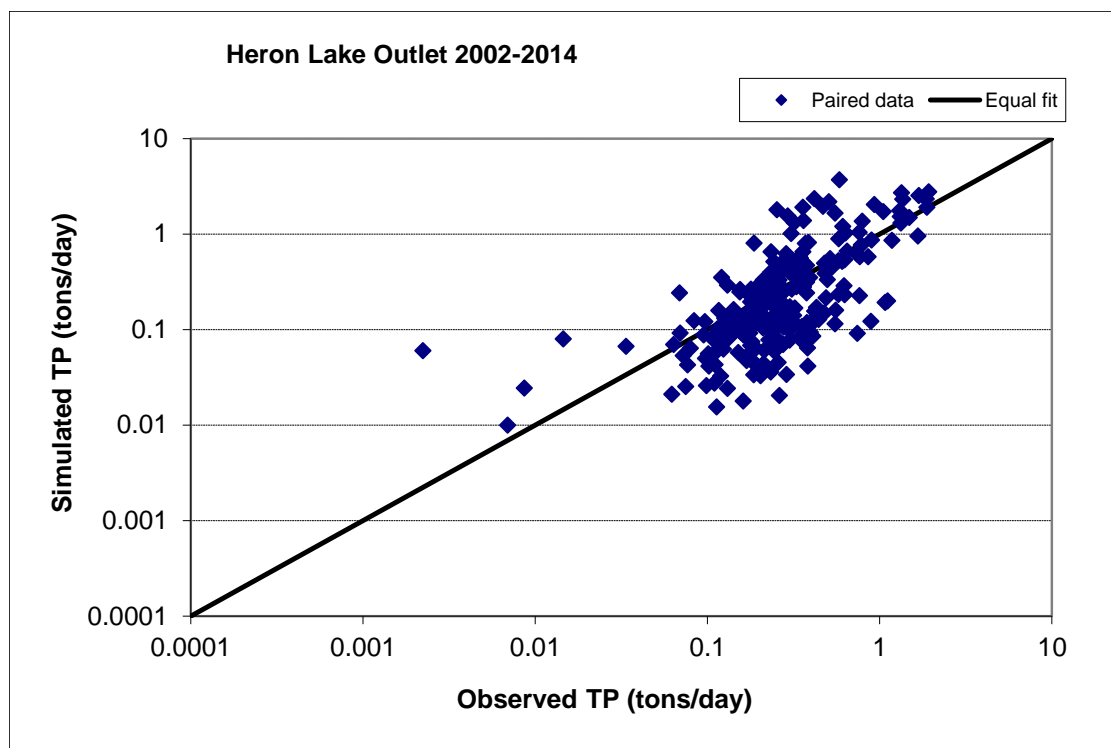


Figure 330. Paired simulated vs. observed Total Phosphorus (TP) load at Heron Lake Outlet (calibration period)

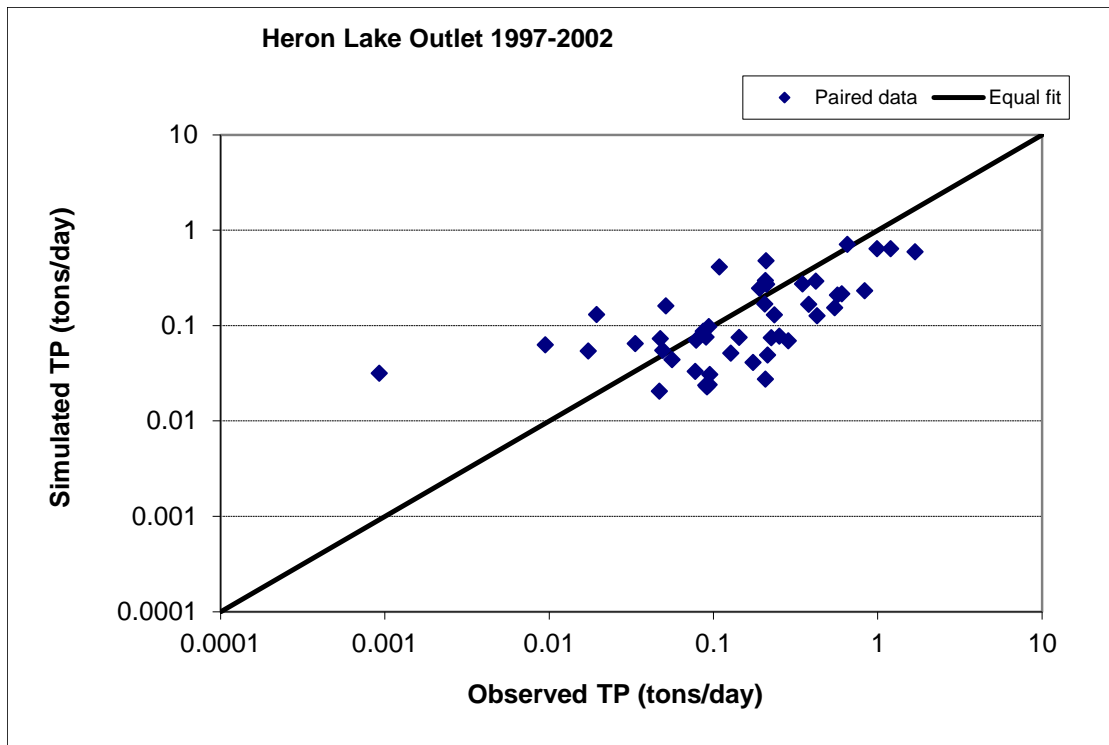


Figure 331. Paired simulated vs. observed Total Phosphorus (TP) load at Heron Lake Outlet (validation period)

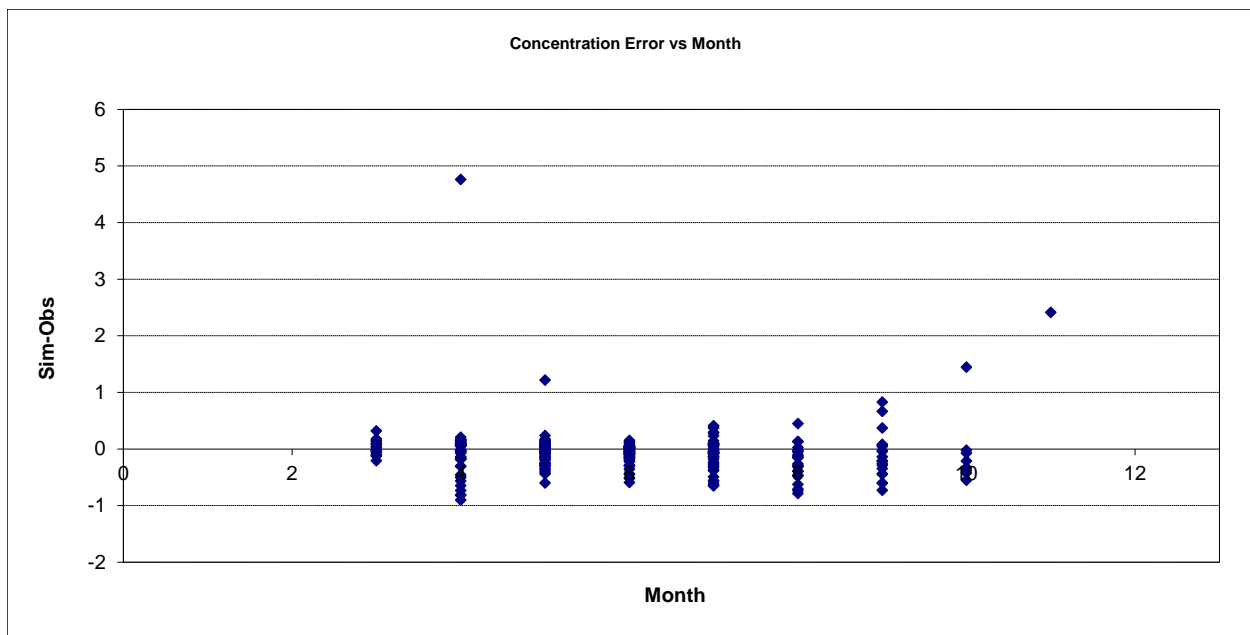


Figure 332. Residual (Simulated - Observed) vs. Month Total Phosphorus (TP) at Heron Lake Outlet

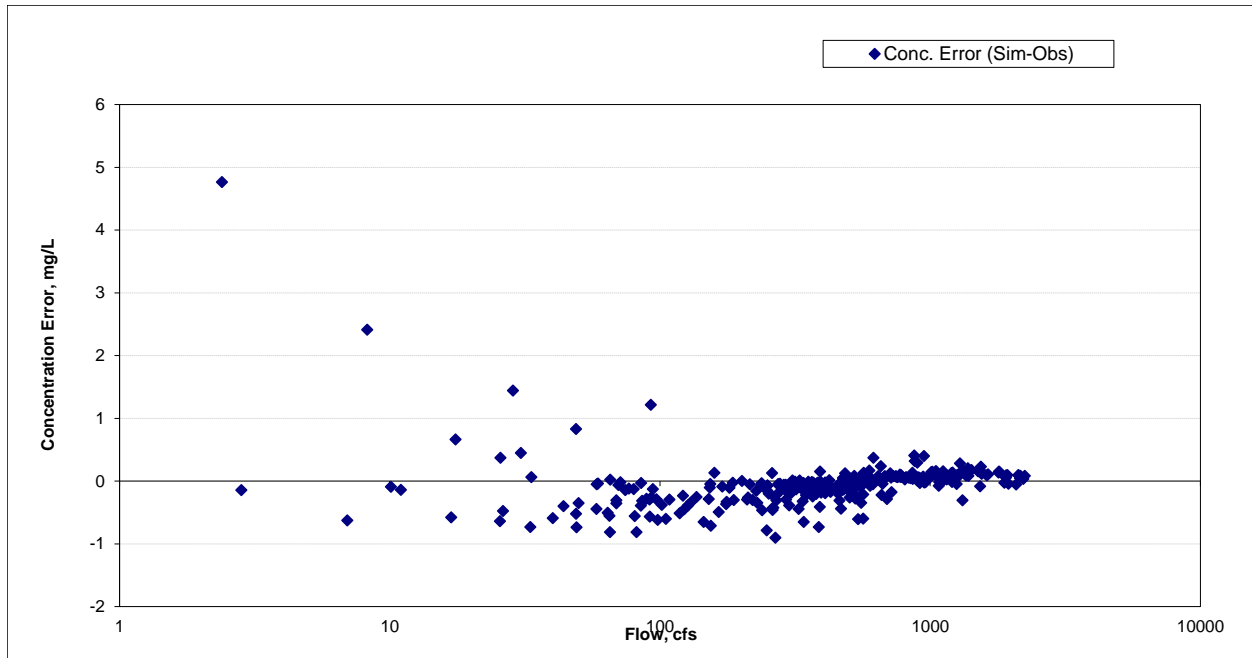


Figure 333. Residual (Simulated - Observed) vs. Flow Total Phosphorus (TP) at Heron Lake Outlet

West Fork Des Moines River near Avoca (S002-008)

Total Suspended Solids (TSS)

Table 46. Total Suspended Solids (TSS) statistics

Period	2001-2004
Count	79
Concentration Average Error	-36.81%
Concentration Median Error	-27.47%
Load Average Error	47.06%
Load Median Error	-5.15%
Paired t concentration	0.04

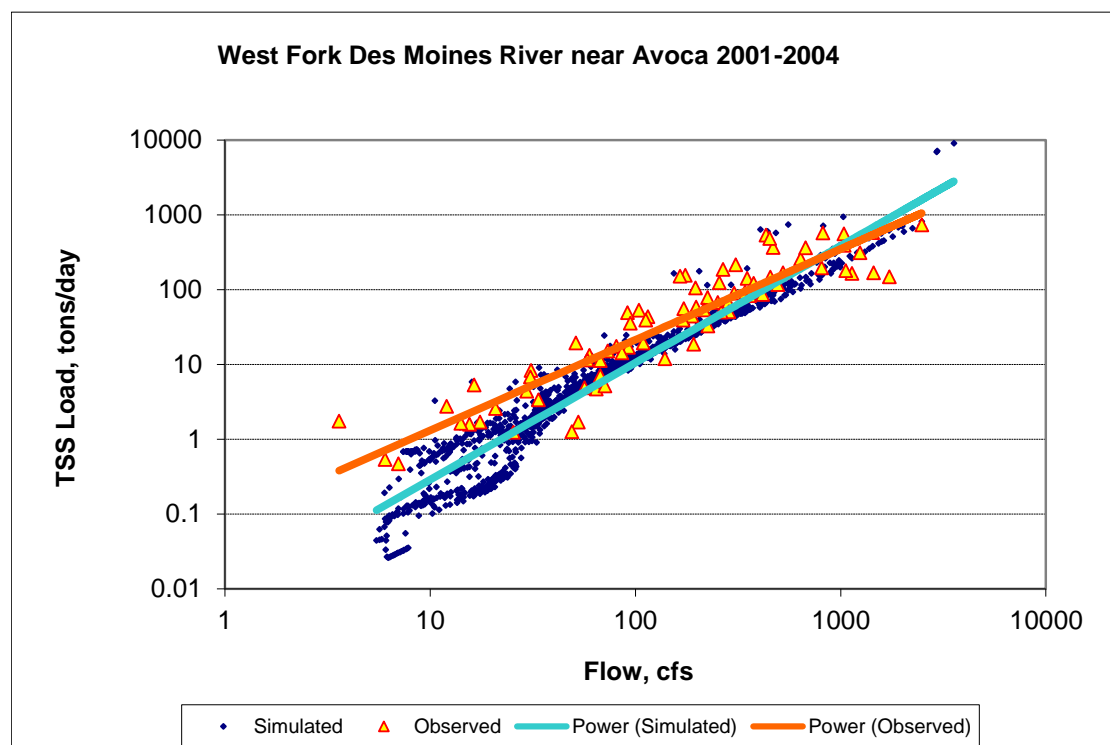


Figure 334. Power plot of simulated and observed Total Suspended Solids (TSS) load vs flow at West Fork Des Moines River near Avoca (calibration period)

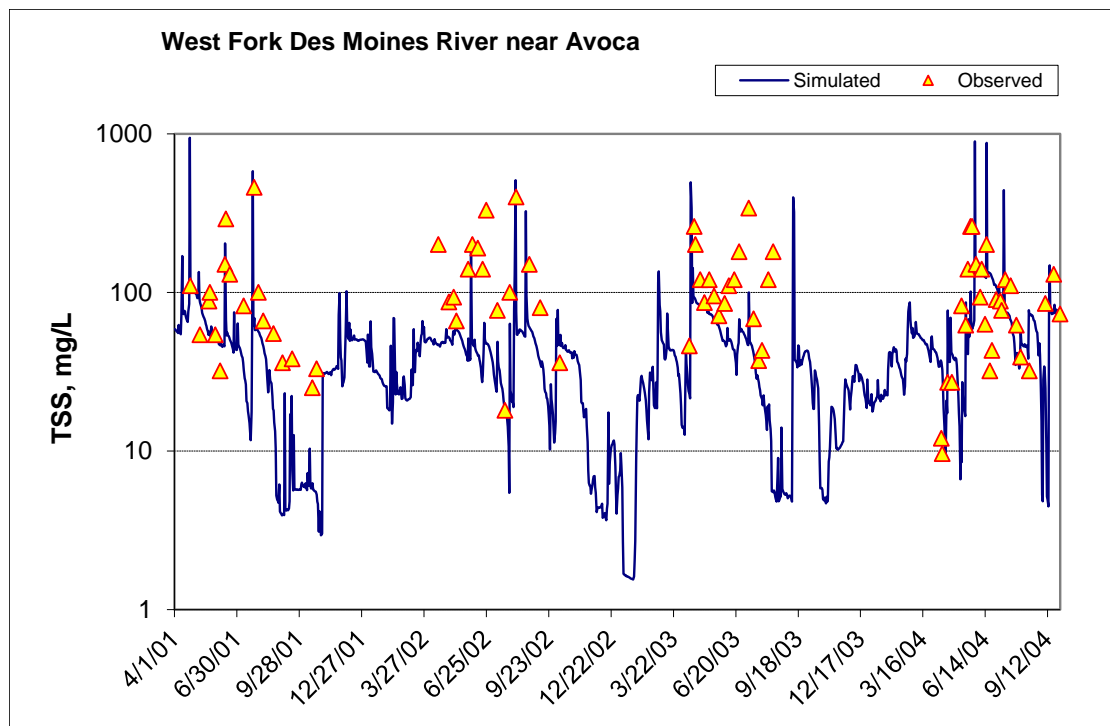


Figure 335. Time series of observed and simulated Total Suspended Solids (TSS) concentration at West Fork Des Moines River near Avoca (calibration period)

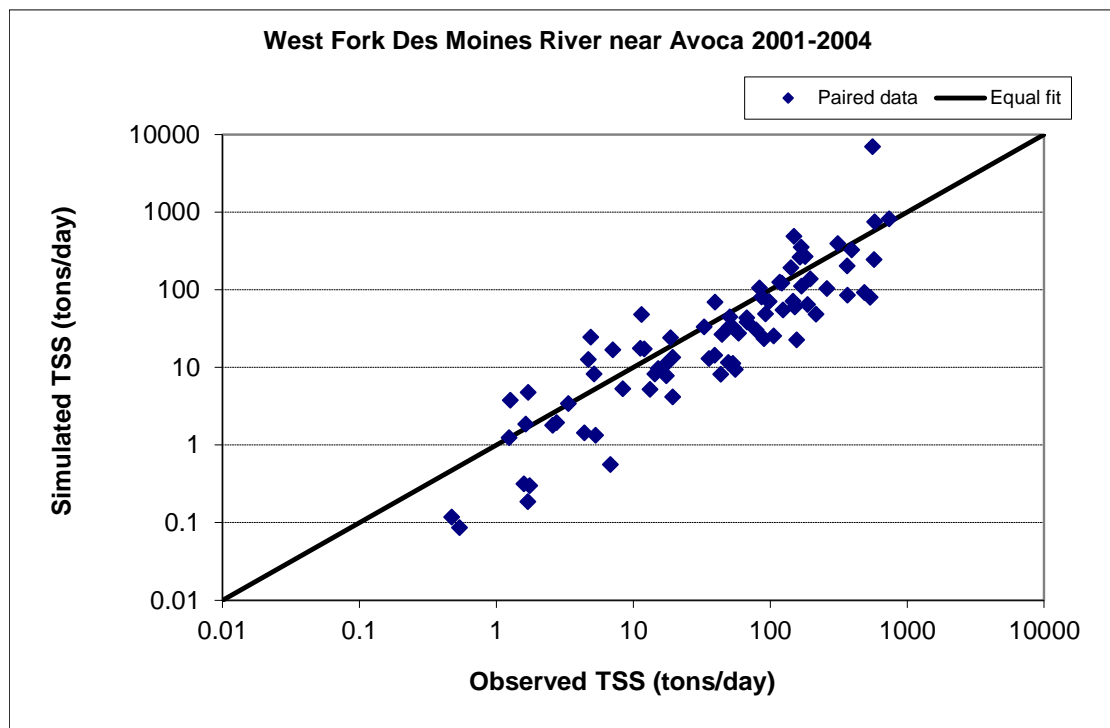


Figure 336. Paired simulated vs. observed Total Suspended Solids (TSS) load at West Fork Des Moines River near Avoca (calibration period)

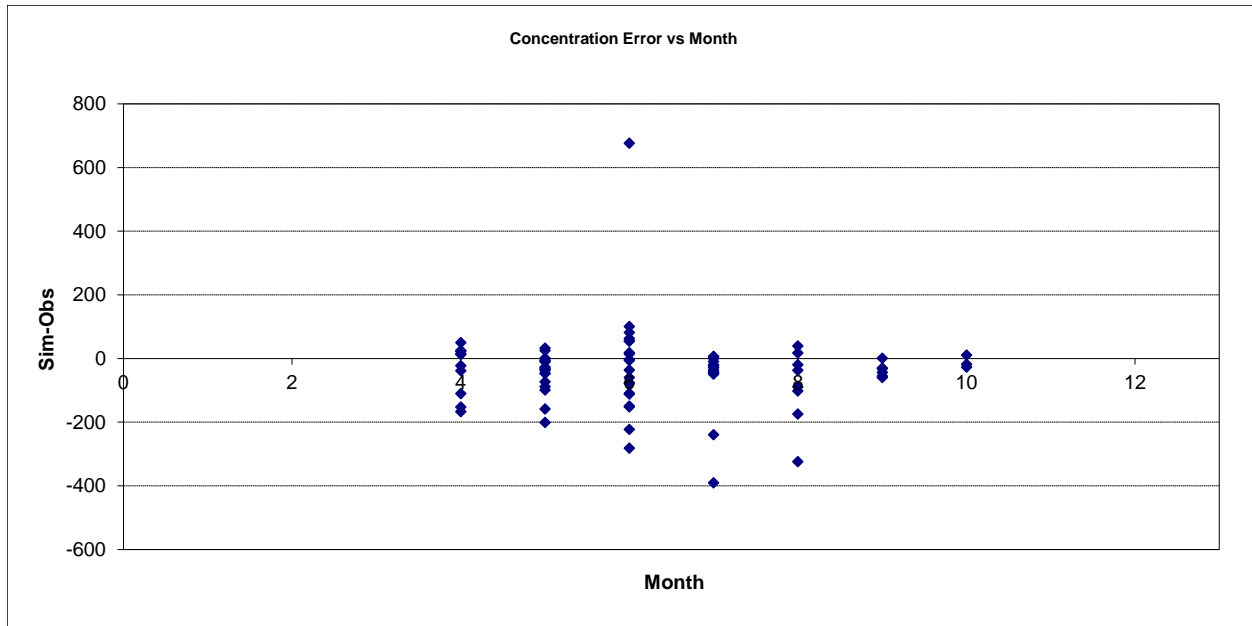


Figure 337. Residual (Simulated - Observed) vs. Month Total Suspended Solids (TSS) at West Fork Des Moines River near Avoca

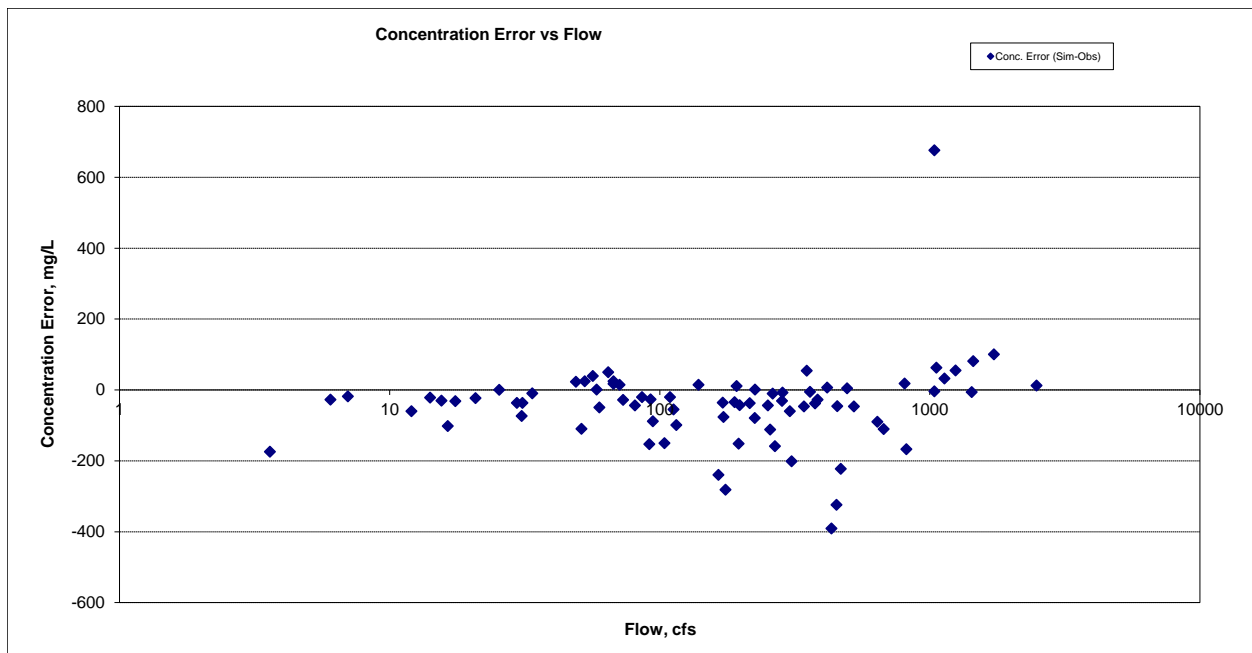


Figure 338. Residual (Simulated - Observed) vs. Flow Total Suspended Solids (TSS) at West Fork Des Moines River near Avoca

Ammonia Nitrogen (NH₃)

Table 47. Ammonia Nitrogen (NH₃) statistics

Period	2001-2004
Count	26
Concentration Average Error	118.15%
Concentration Median Error	108.42%
Load Average Error	90.59%
Load Median Error	41.79%
Paired t concentration	0.00

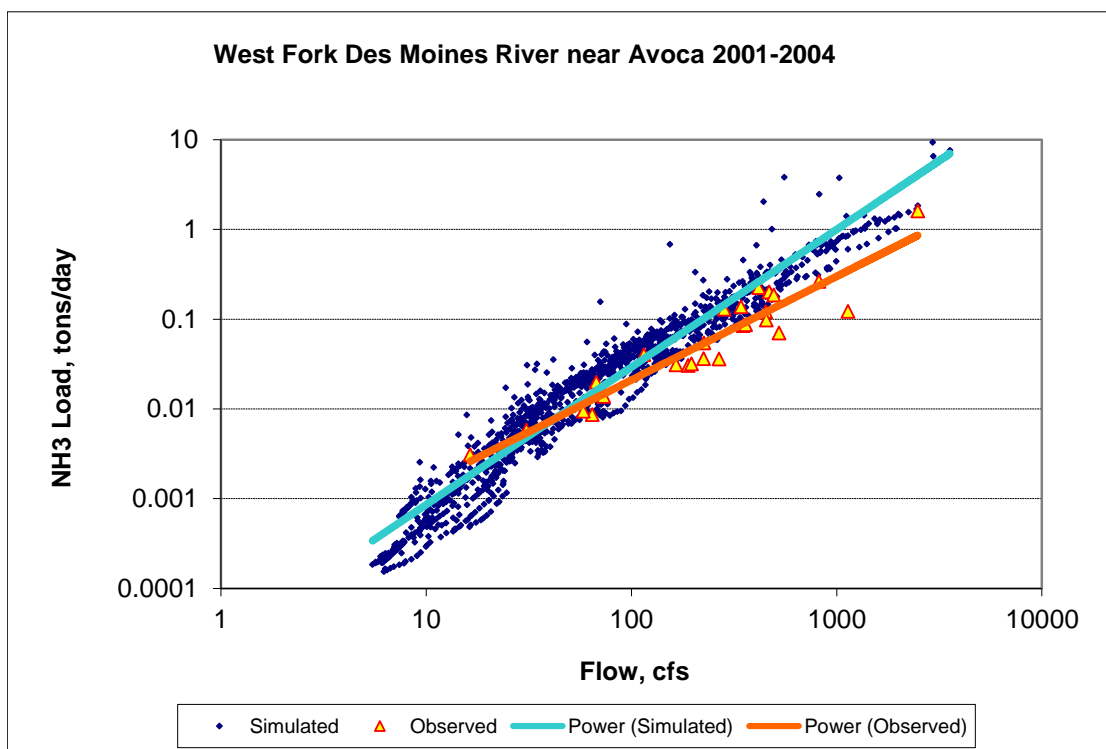


Figure 339. Power plot of simulated and observed Ammonia Nitrogen (NH₃) load vs flow at West Fork Des Moines River near Avoca (calibration period)

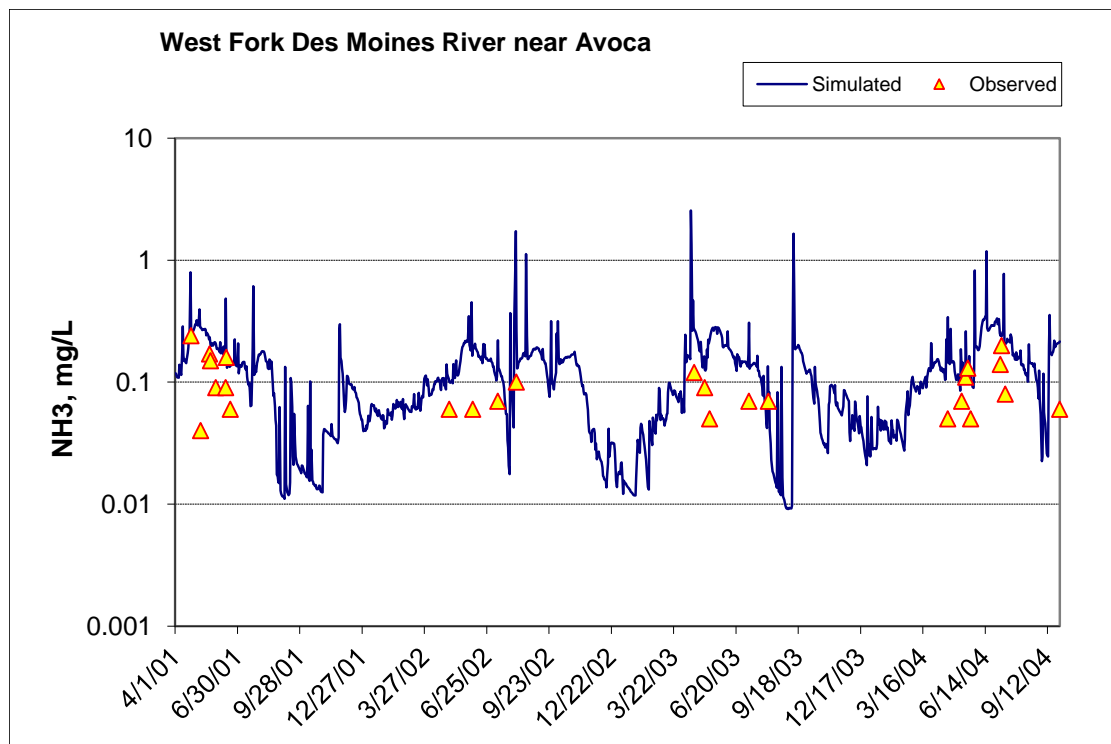


Figure 340. Time series of observed and simulated Ammonia Nitrogen (NH₃) concentration at West Fork Des Moines River near Avoca (calibration period)

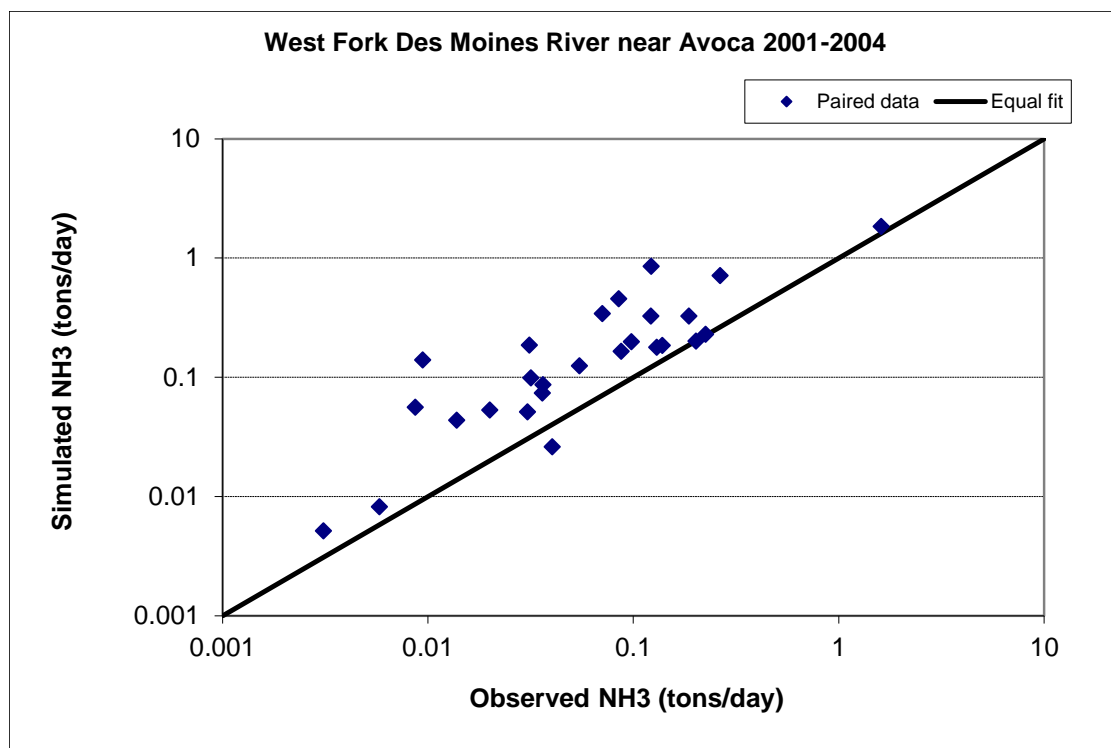


Figure 341. Paired simulated vs. observed Ammonia Nitrogen (NH₃) load at West Fork Des Moines River near Avoca (calibration period)

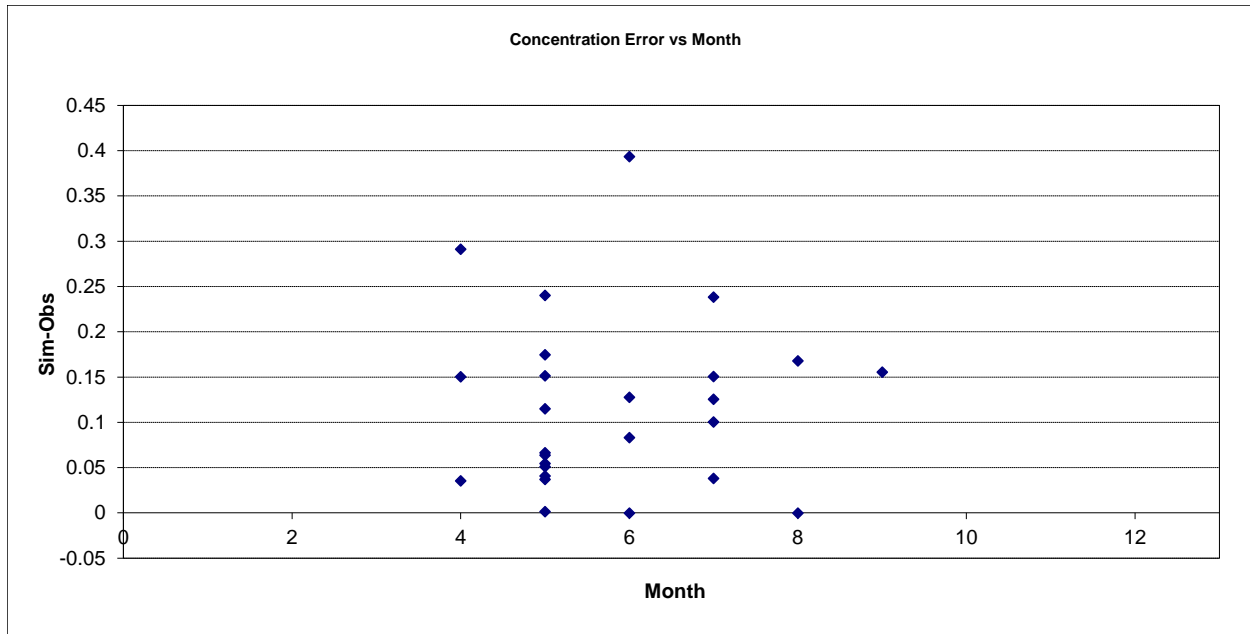


Figure 342. Residual (Simulated - Observed) vs. Month Ammonia Nitrogen (NH3) at West Fork Des Moines River near Avoca

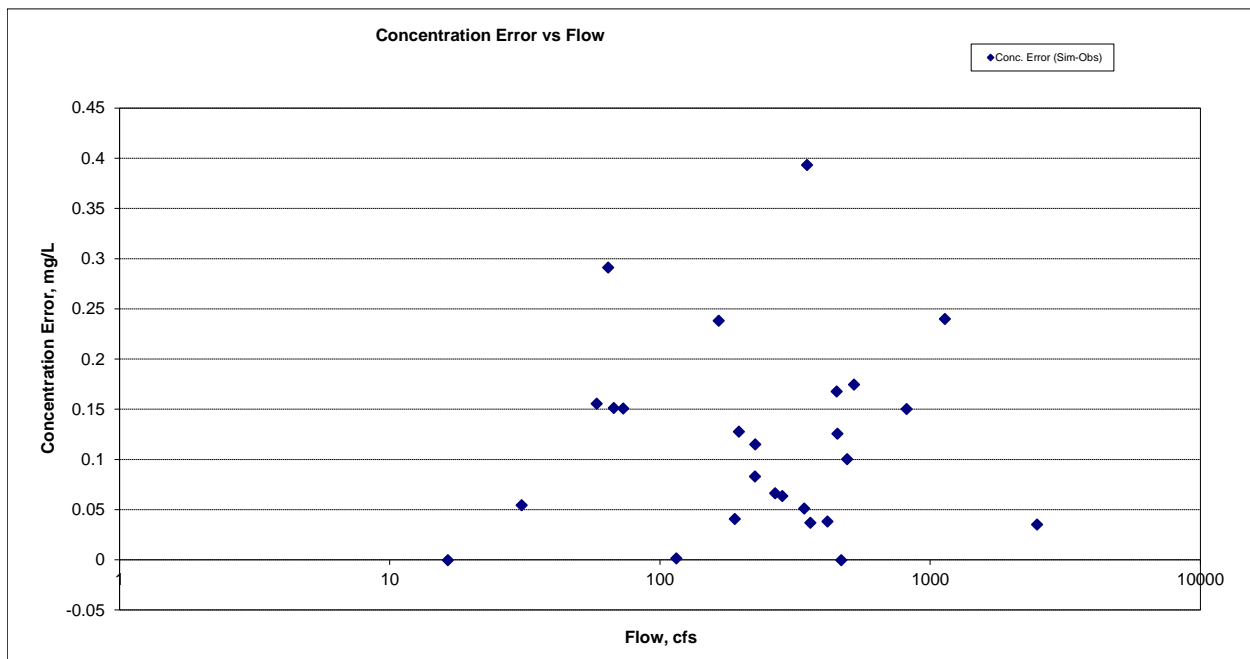


Figure 343. Residual (Simulated - Observed) vs. Flow Ammonia Nitrogen (NH3) at West Fork Des Moines River near Avoca

Organic Nitrogen (OrgN)

Table 48. Organic Nitrogen (OrgN) statistics

Period	2001-2004
Count	26
Concentration Average Error	-1.49%
Concentration Median Error	-2.67%
Load Average Error	8.74%
Load Median Error	0.77%
Paired t concentration	1.00

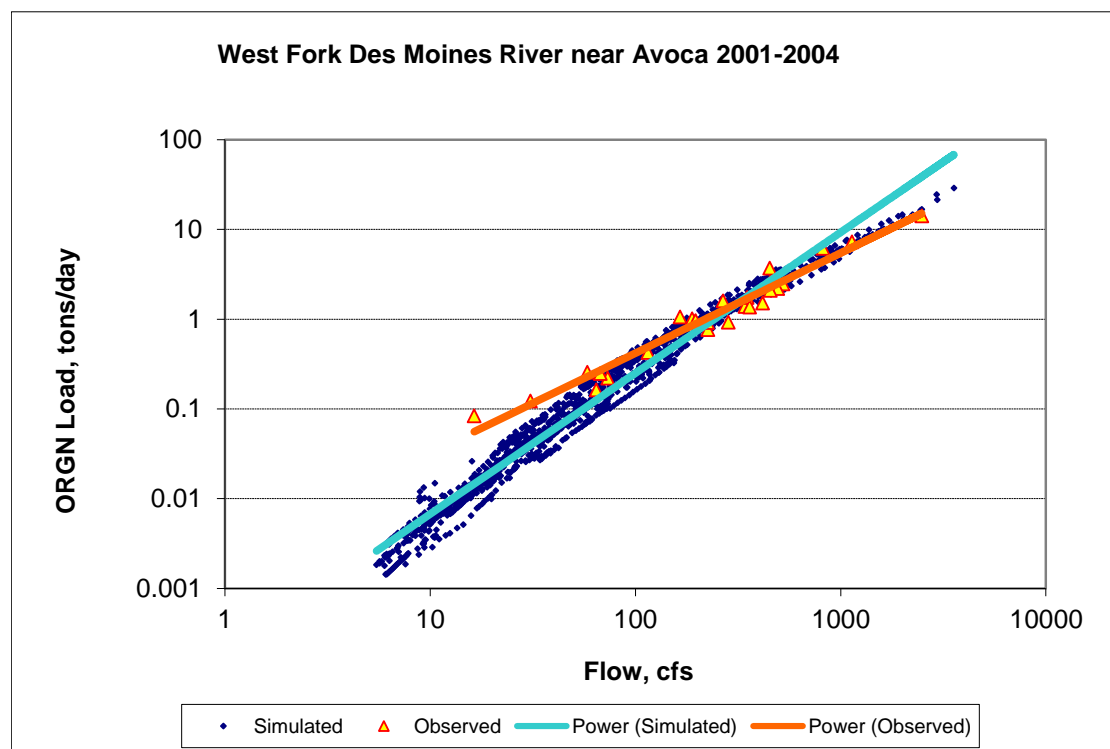


Figure 344. Power plot of simulated and observed Organic Nitrogen (OrgN) load vs flow at West Fork Des Moines River near Avoca (calibration period)

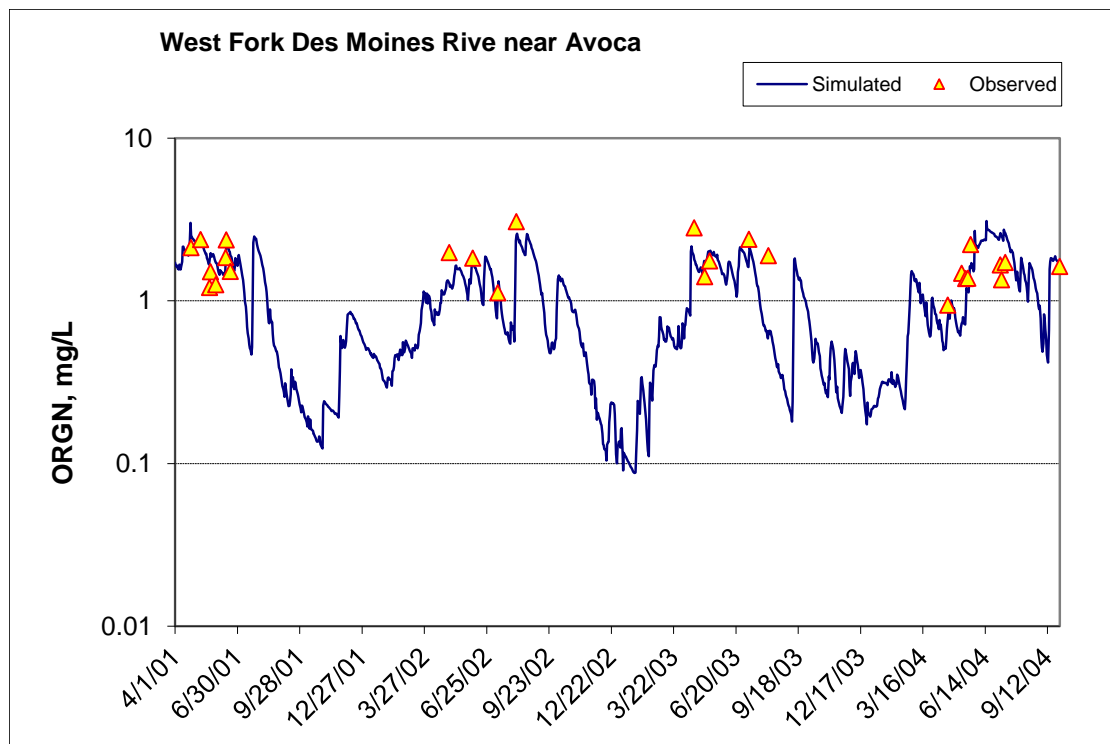


Figure 345. Time series of observed and simulated Organic Nitrogen (OrgN) concentration at West Fork Des Moines River near Avoca (calibration period)

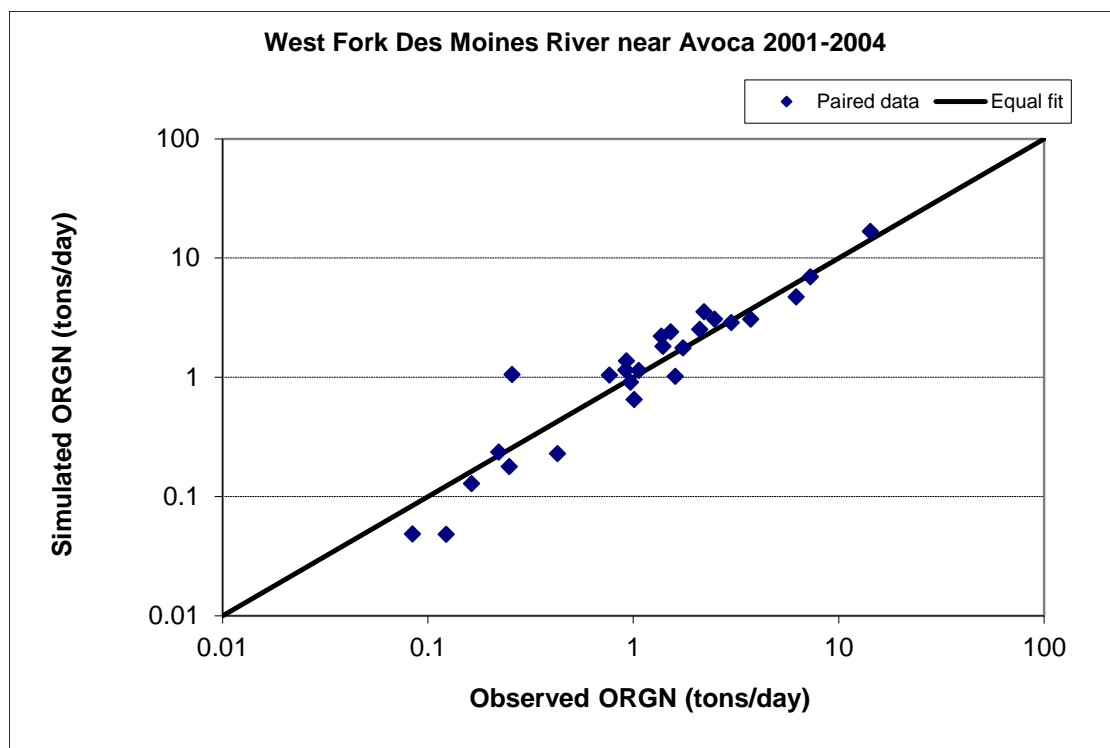


Figure 346. Paired simulated vs. observed Organic Nitrogen (OrgN) load at West Fork Des Moines River near Avoca (calibration period)

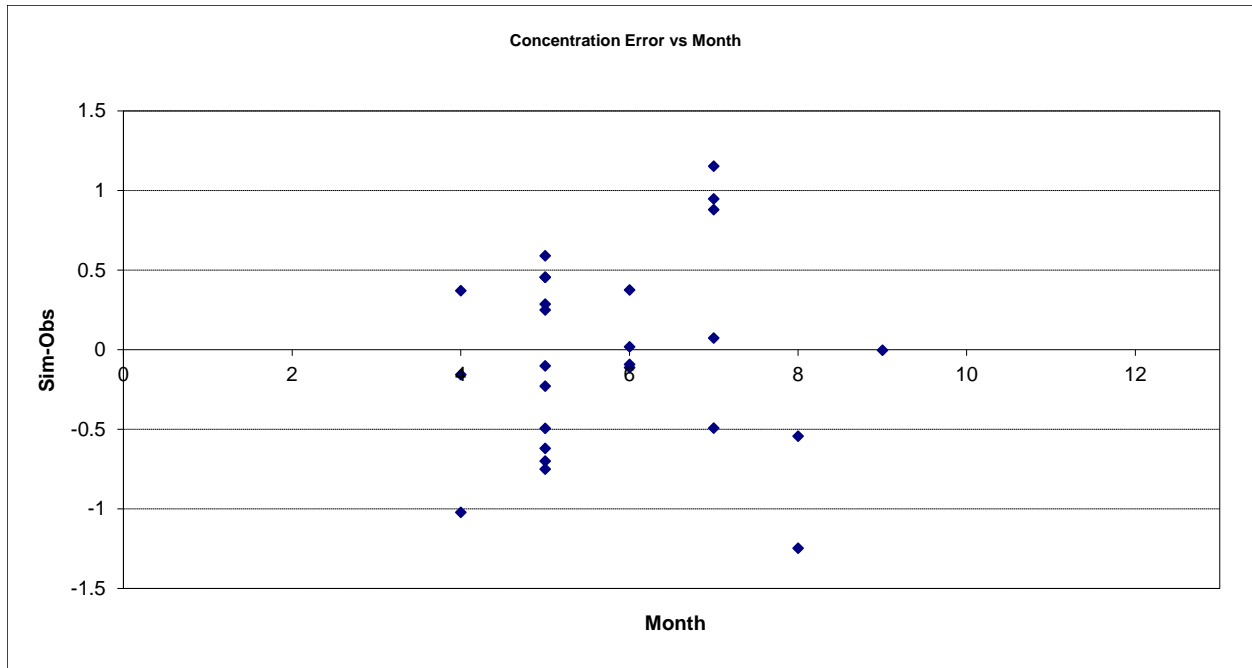


Figure 347. Residual (Simulated - Observed) vs. Month Organic Nitrogen (OrgN) at West Fork Des Moines River near Avoca

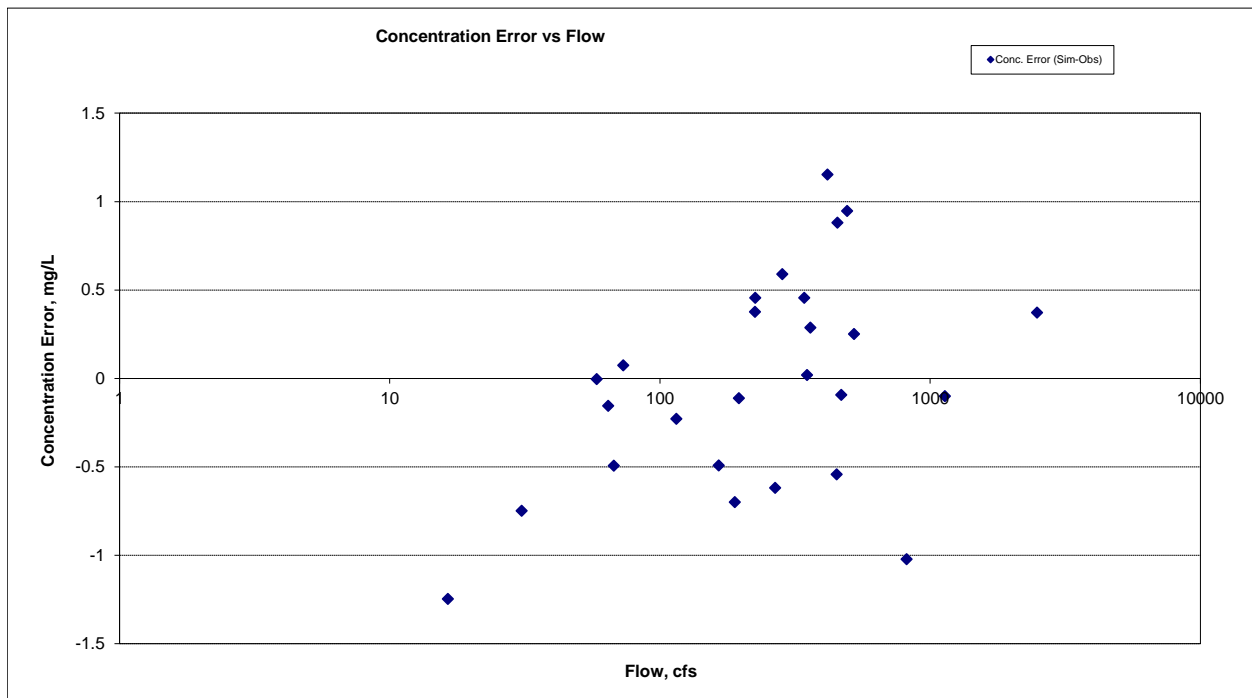


Figure 348. Residual (Simulated - Observed) vs. Flow Organic Nitrogen (OrgN) at West Fork Des Moines River near Avoca

Total Kjeldahl Nitrogen (TKN)

Table 49. Total Kjeldahl Nitrogen (TKN) statistics

Period	2001-2004
Count	79
Concentration Average Error	-0.18%
Concentration Median Error	1.12%
Load Average Error	30.73%
Load Median Error	-0.13%
Paired t concentration	1.00

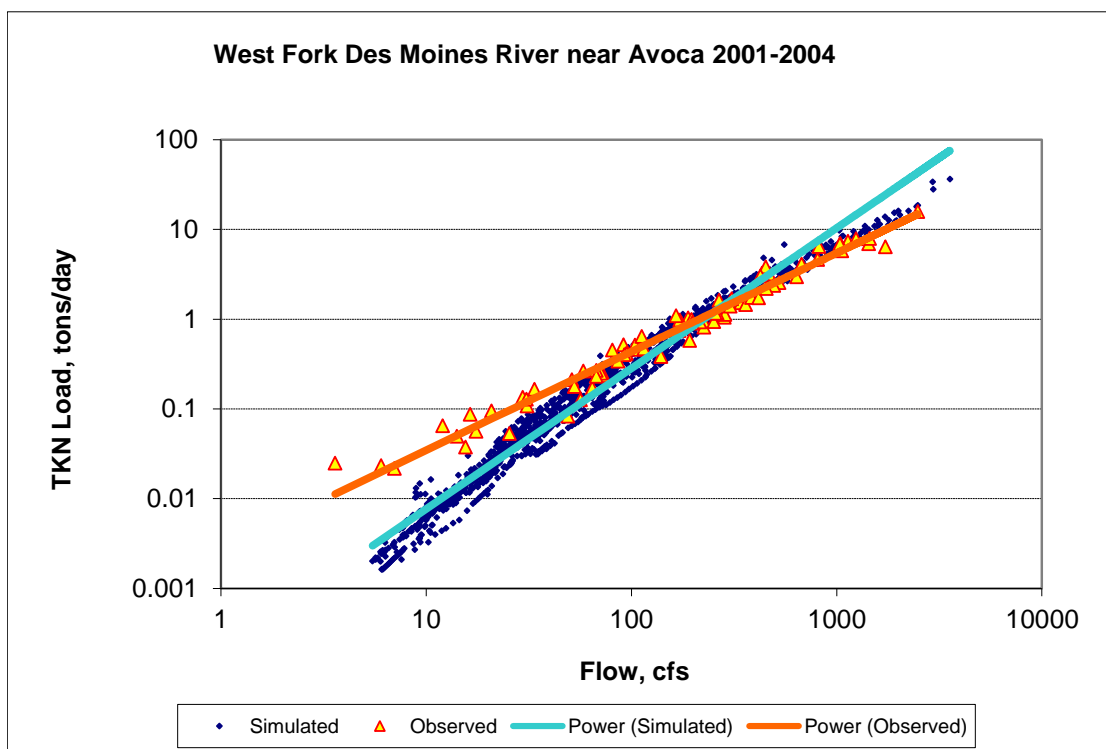


Figure 349. Power plot of simulated and observed Total Kjeldahl Nitrogen (TKN) load vs flow at West Fork Des Moines River near Avoca (calibration period)

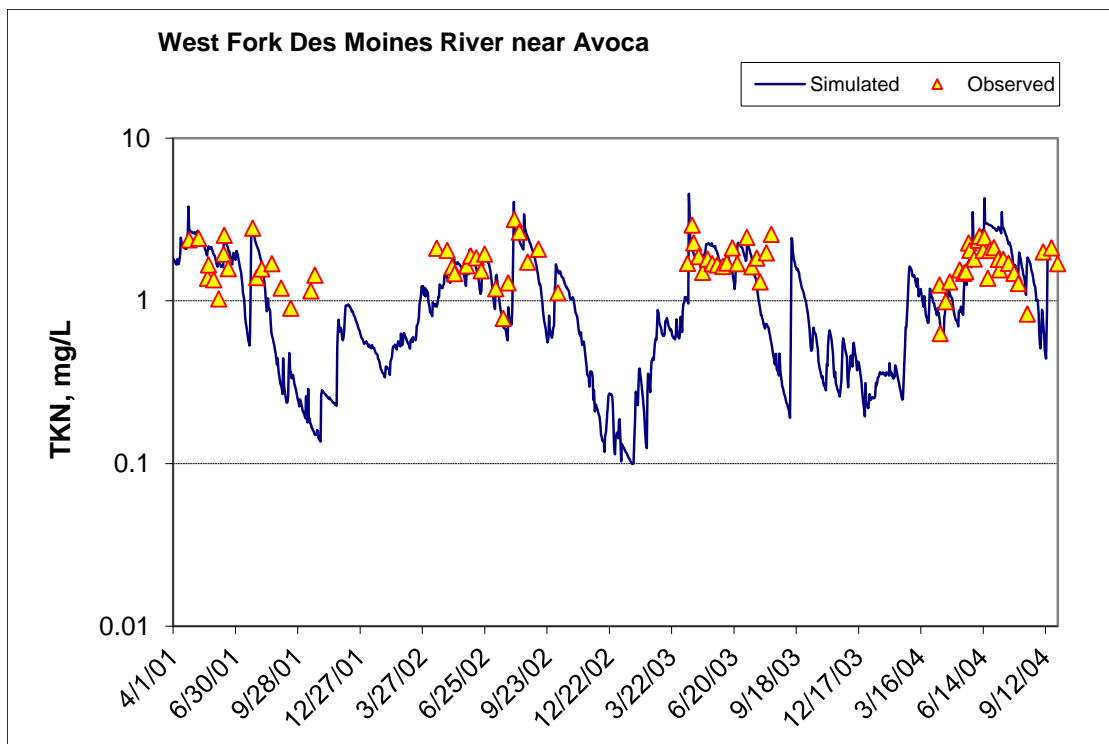


Figure 350. Time series of observed and simulated Total Kjeldahl Nitrogen (TKN) concentration at West Fork Des Moines River near Avoca (calibration period)

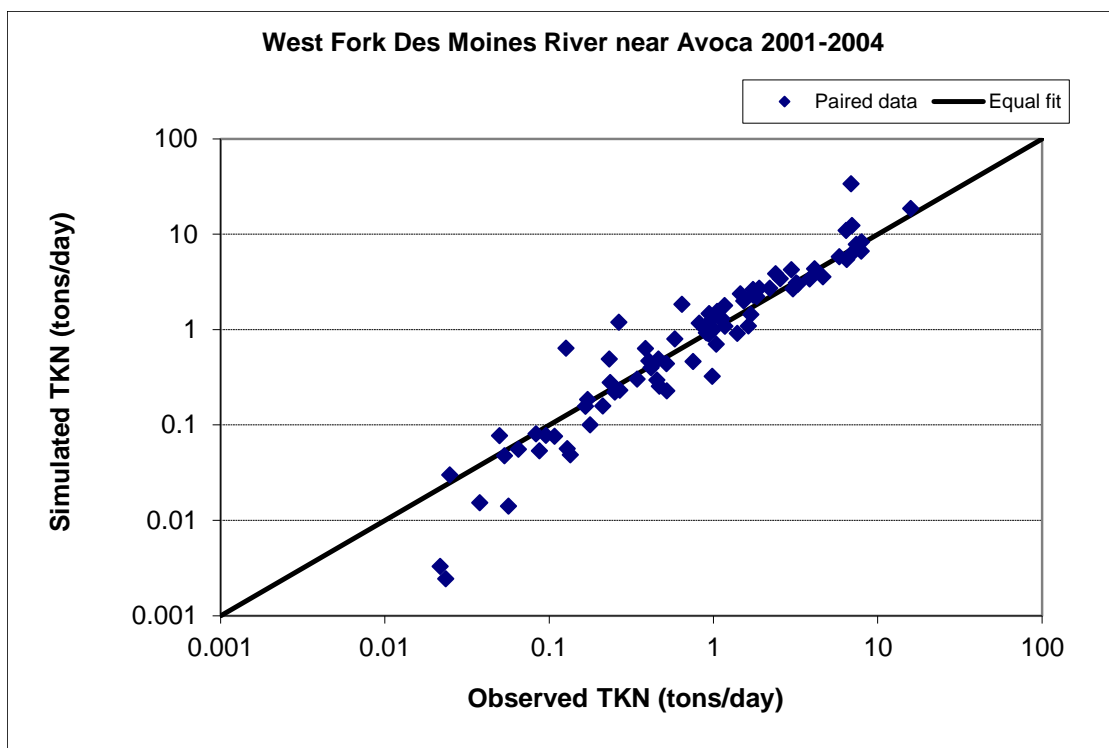


Figure 351. Paired simulated vs. observed Total Kjeldahl Nitrogen (TKN) load at West Fork Des Moines River near Avoca (calibration period)

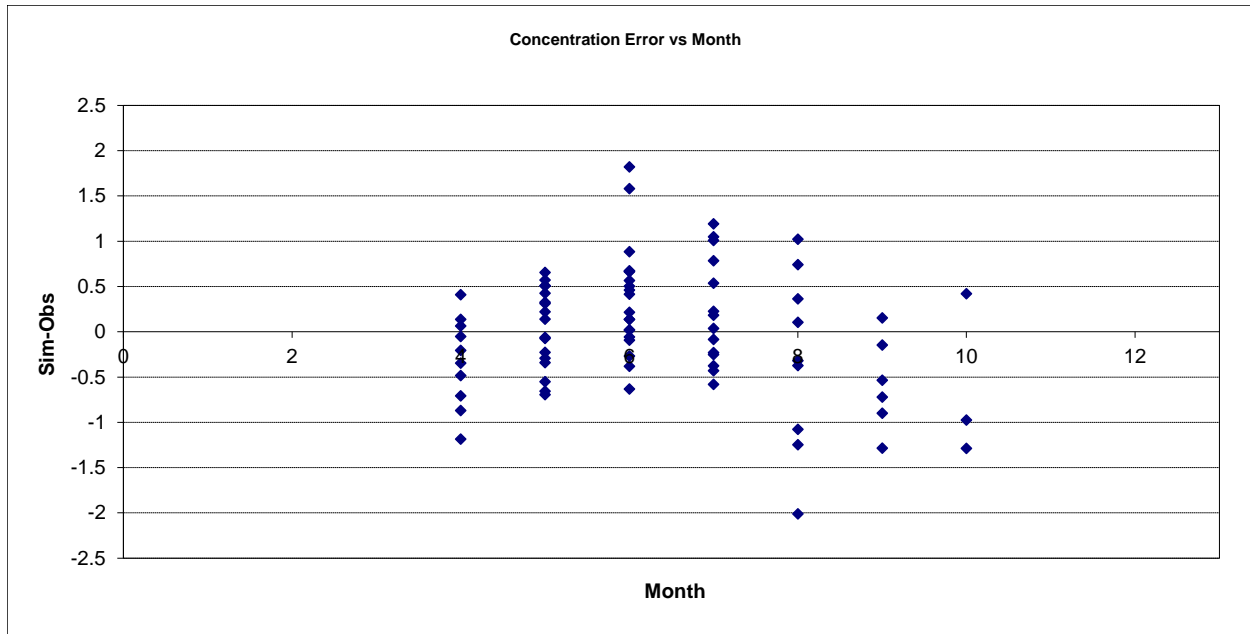


Figure 352. Residual (Simulated - Observed) vs. Month Total Kjeldahl Nitrogen (TKN) at West Fork Des Moines River near Avoca

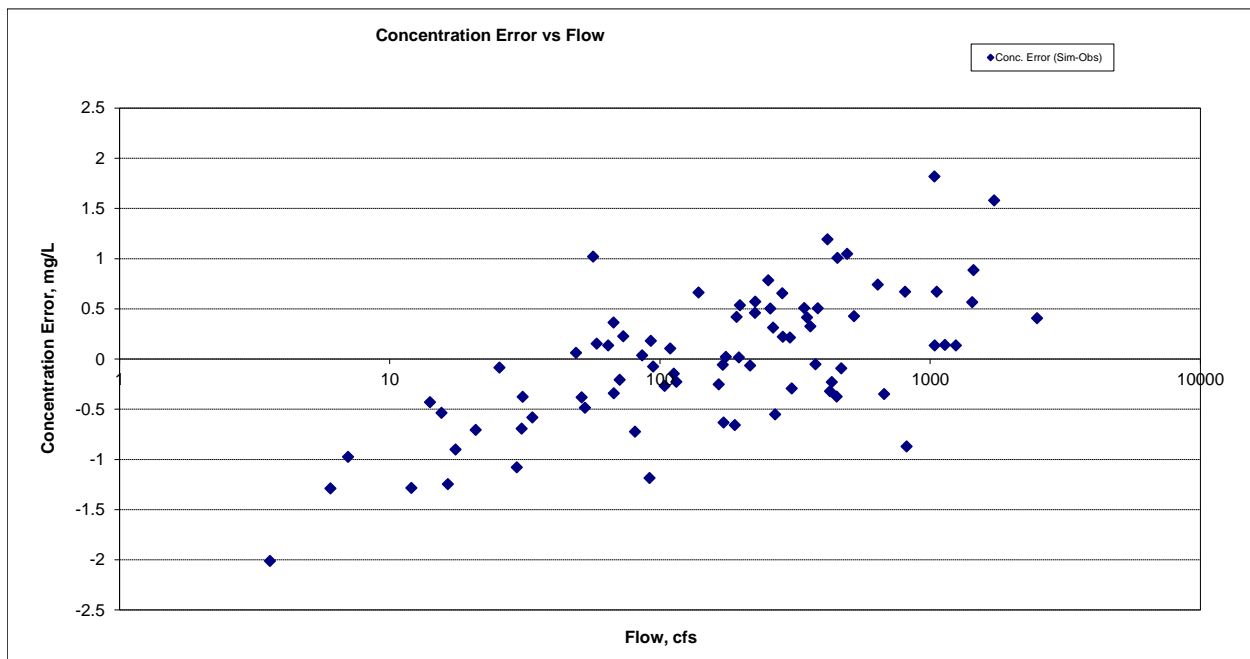


Figure 353. Residual (Simulated - Observed) vs. Flow Total Kjeldahl Nitrogen (TKN) at West Fork Des Moines River near Avoca

Nitrite+ Nitrate Nitrogen (NO_x)

Table 50. Nitrite+ Nitrate Nitrogen (NO_x) statistics

Period	2001-2004
Count	74
Concentration Average Error	-18.70%
Concentration Median Error	-24.06%
Load Average Error	21.31%
Load Median Error	-8.16%
Paired t concentration	0.60

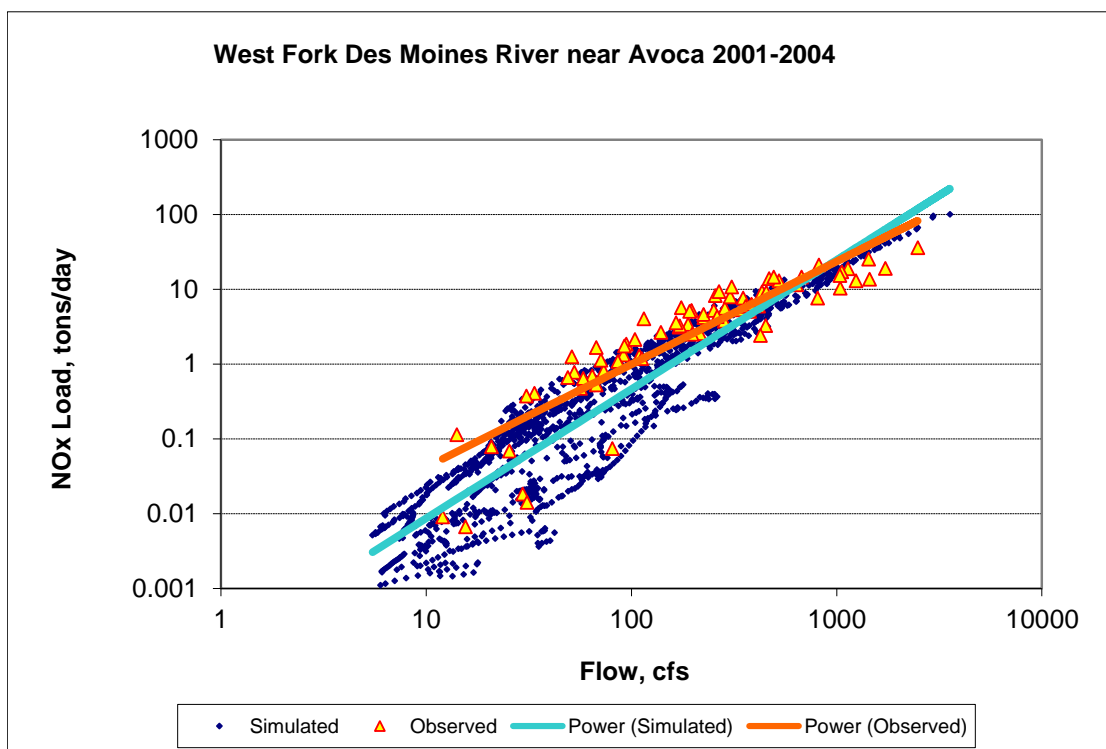


Figure 354. Power plot of simulated and observed Nitrite+ Nitrate Nitrogen (NO_x) load vs flow at West Fork Des Moines River near Avoca (calibration period)

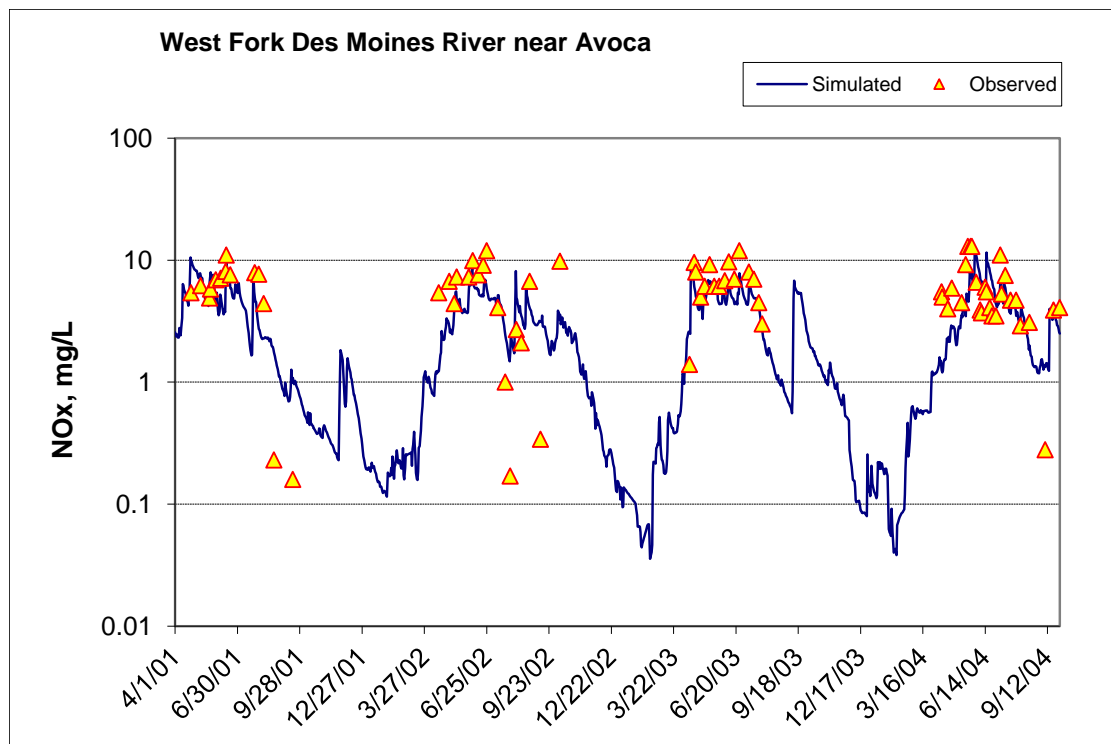


Figure 355. Time series of observed and simulated Nitrite+ Nitrate Nitrogen (NOx) concentration at West Fork Des Moines River near Avoca (calibration period)

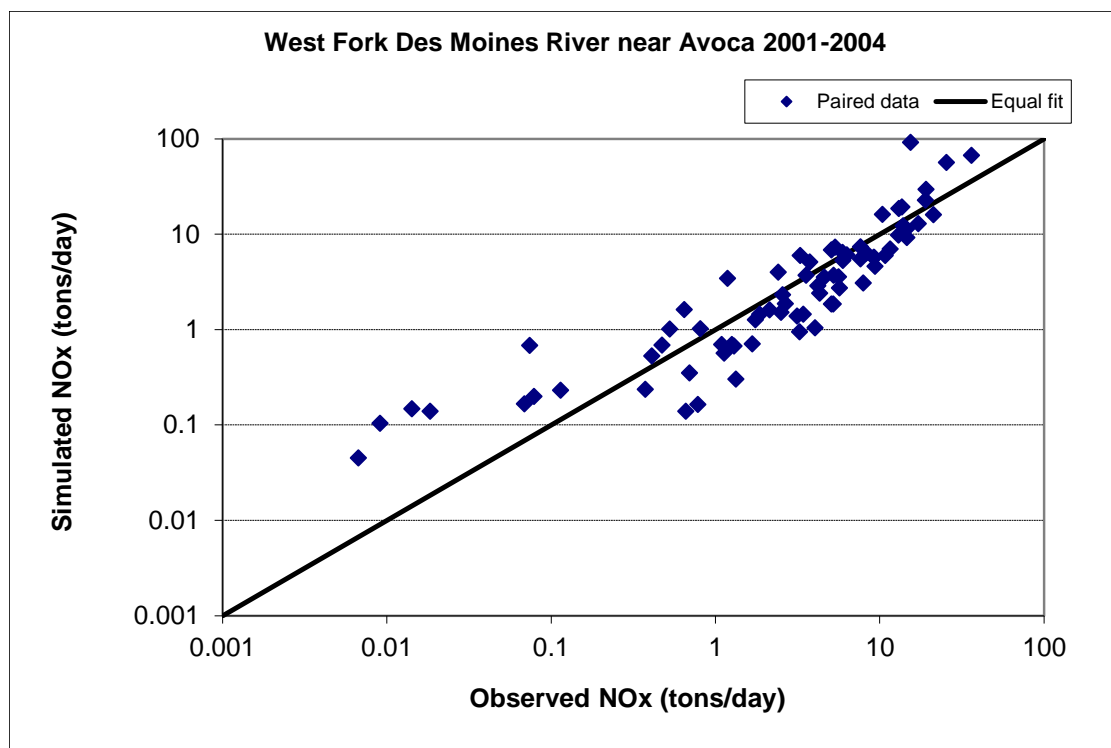


Figure 356. Paired simulated vs. observed Nitrite+ Nitrate Nitrogen (NOx) load at West Fork Des Moines River near Avoca (calibration period)

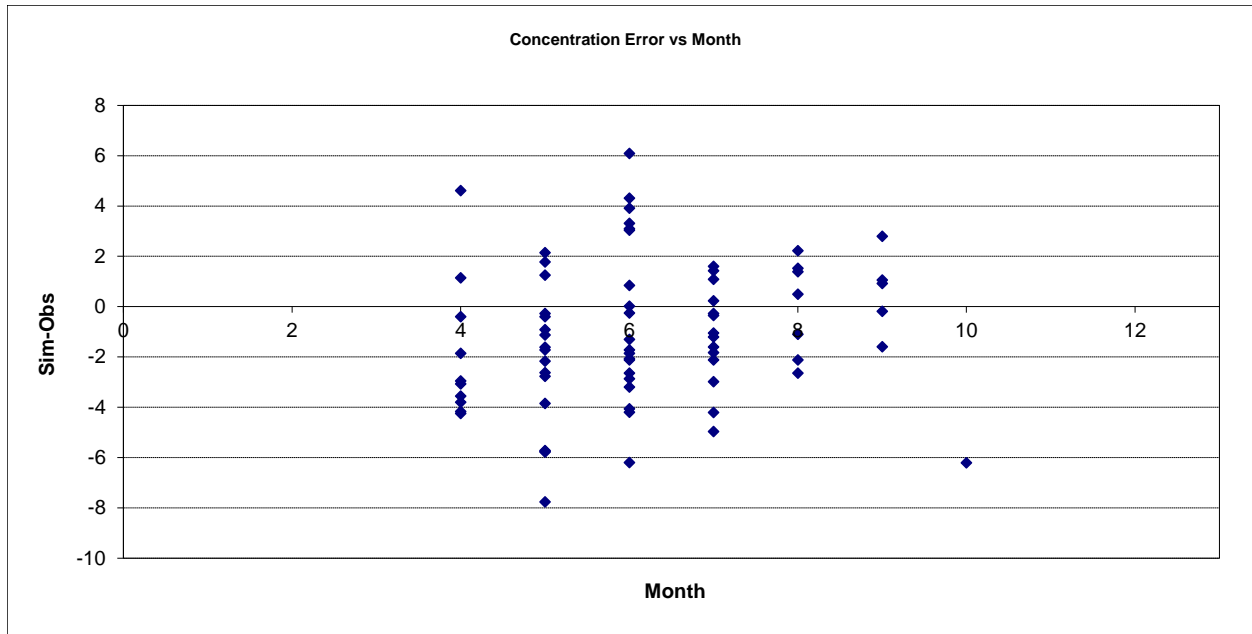


Figure 357. Residual (Simulated - Observed) vs. Month Nitrite+ Nitrate Nitrogen (NOx) at West Fork Des Moines River near Avoca

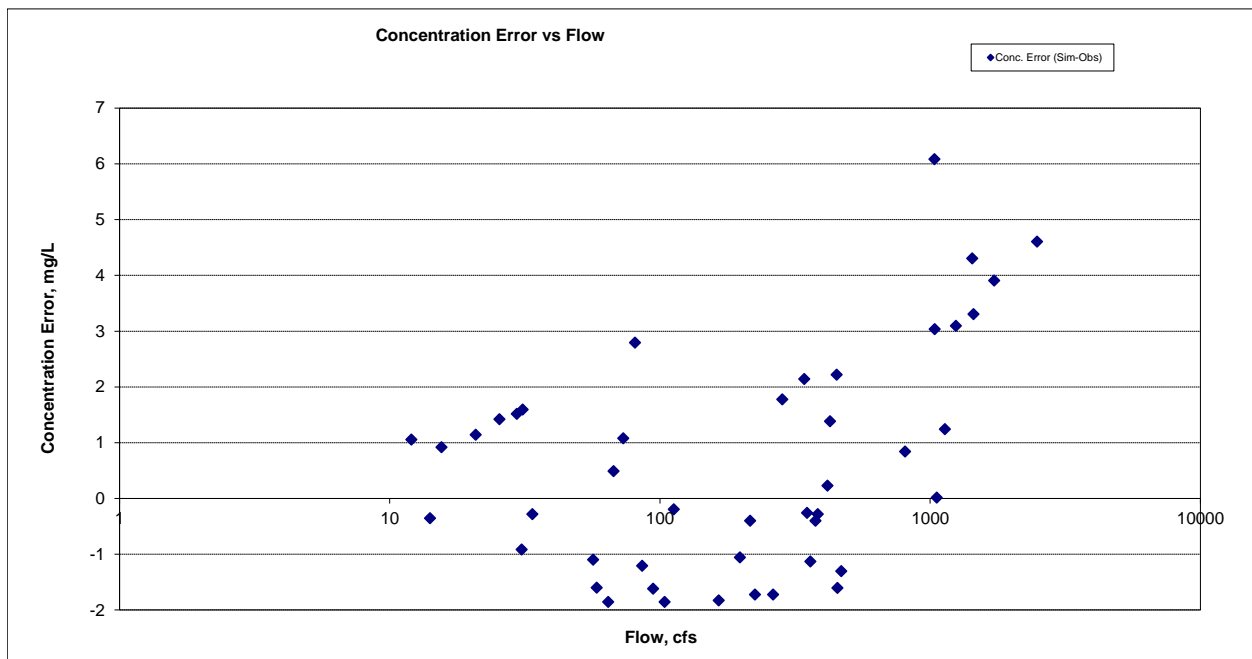


Figure 358. Residual (Simulated - Observed) vs. Flow Nitrite+ Nitrate Nitrogen (NOx) at West Fork Des Moines River near Avoca

Total Nitrogen (TN)

Table 51. Total Nitrogen (TN) statistics

Period	2001-2004
Count	74
Concentration Average Error	-13.40%
Concentration Median Error	-17.07%
Load Average Error	23.68%
Load Median Error	-5.33%
Paired t concentration	0.92

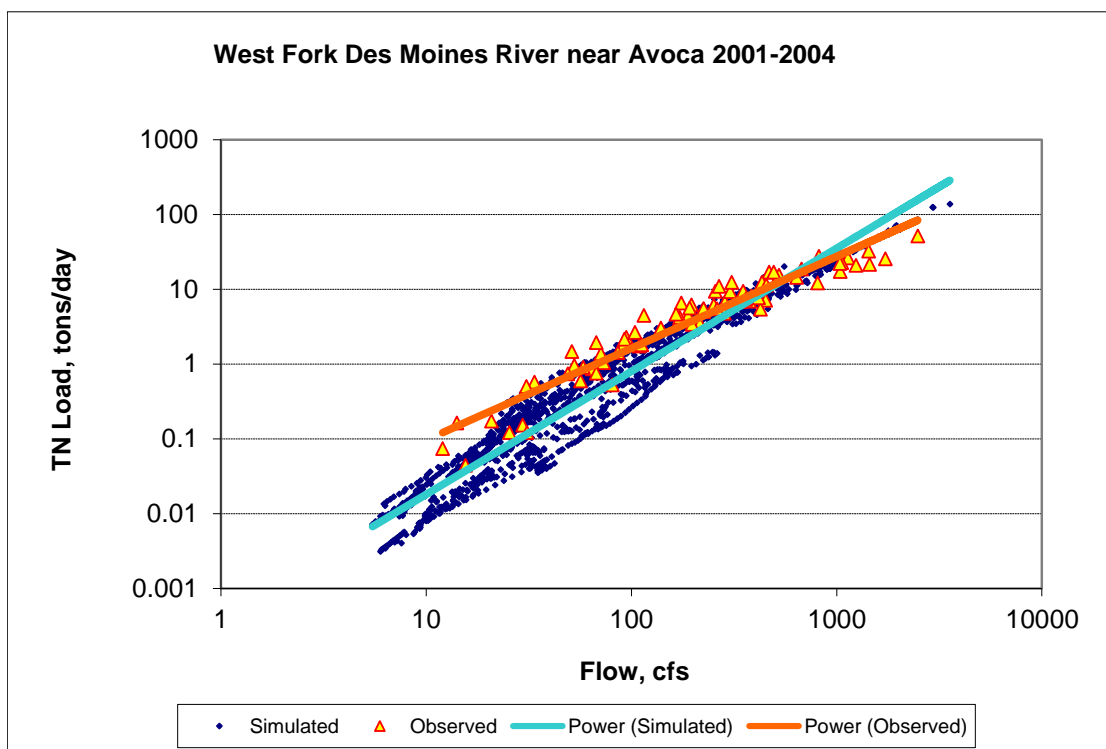


Figure 359. Power plot of simulated and observed Total Nitrogen (TN) load vs flow at West Fork Des Moines River near Avoca (calibration period)

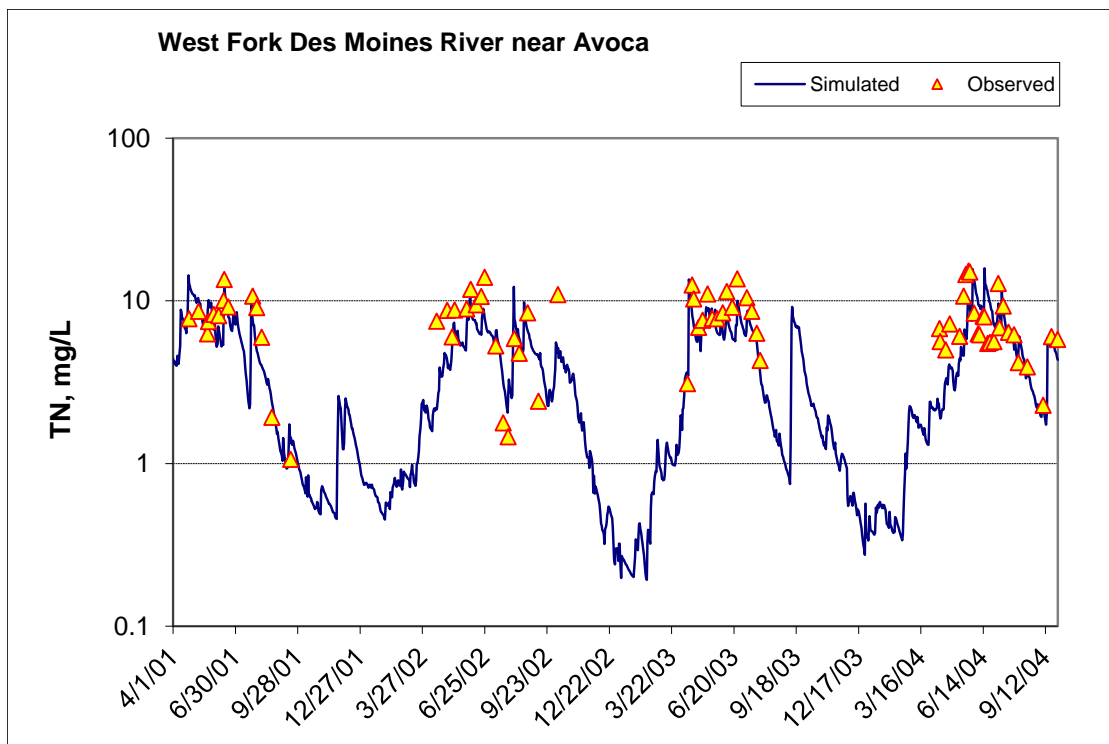


Figure 360. Time series of observed and simulated Total Nitrogen (TN) concentration at West Fork Des Moines River near Avoca (calibration period)

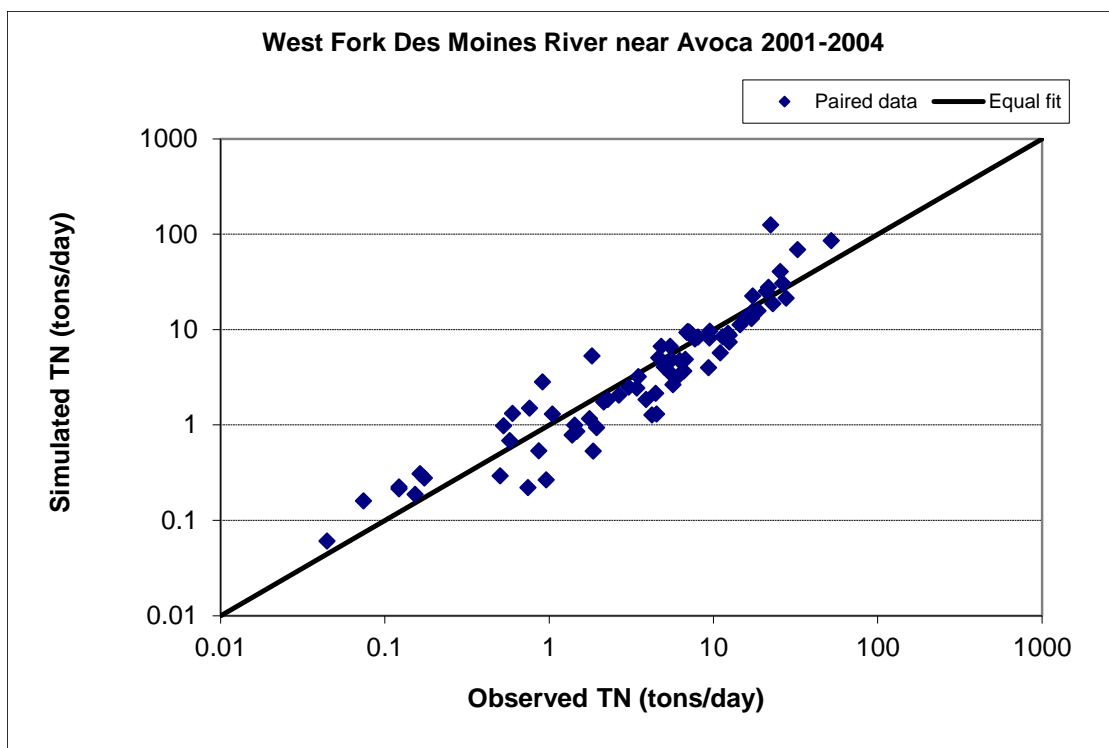


Figure 361. Paired simulated vs. observed Total Nitrogen (TN) load at West Fork Des Moines River near Avoca (calibration period)

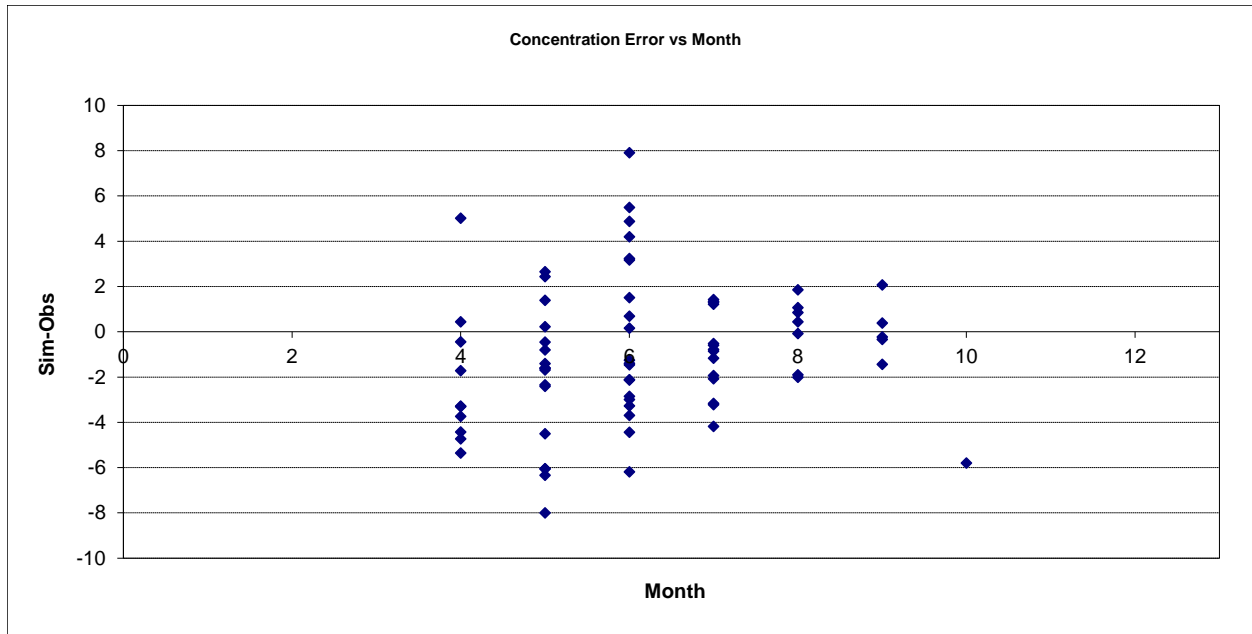


Figure 362. Residual (Simulated - Observed) vs. Month Total Nitrogen (TN) at West Fork Des Moines River near Avoca

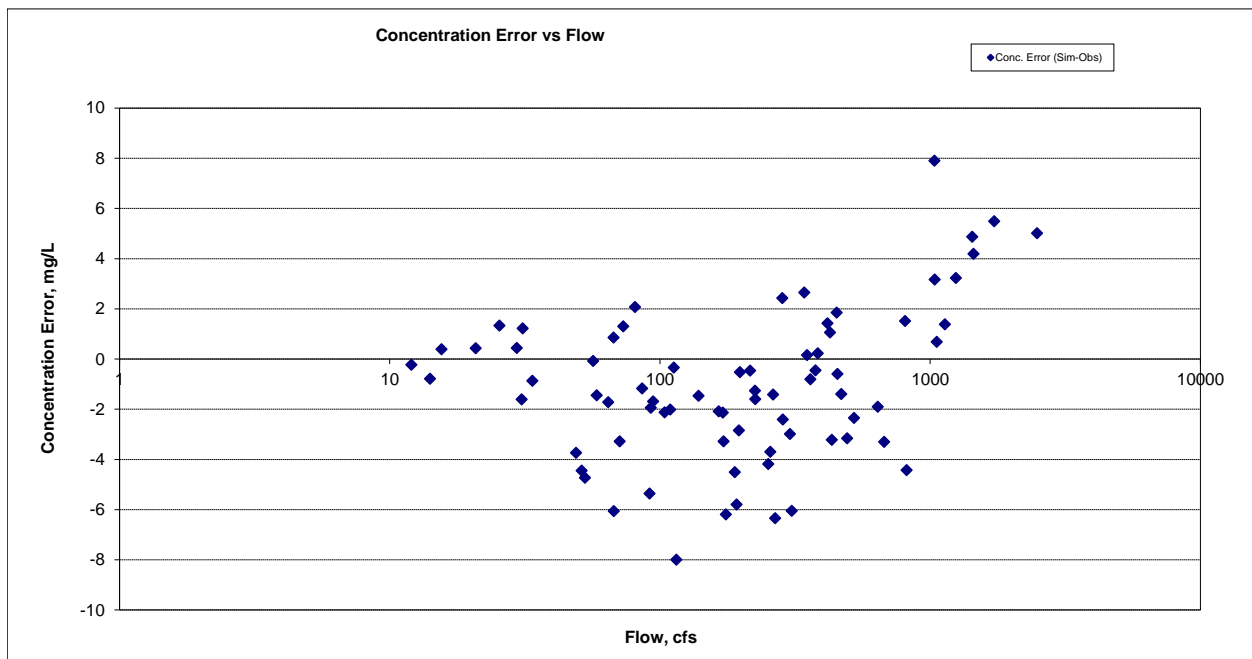


Figure 363. Residual (Simulated - Observed) vs. Flow Total Nitrogen (TN) at West Fork Des Moines River near Avoca

Soluble Reactive Phosphorus (SRP)

Table 52. Soluble Reactive Phosphorus (SRP) statistics

Period	2001-2004
Count	72
Concentration Average Error	23.85%
Concentration Median Error	22.52%
Load Average Error	68.15%
Load Median Error	2.87%
Paired t concentration	0.39

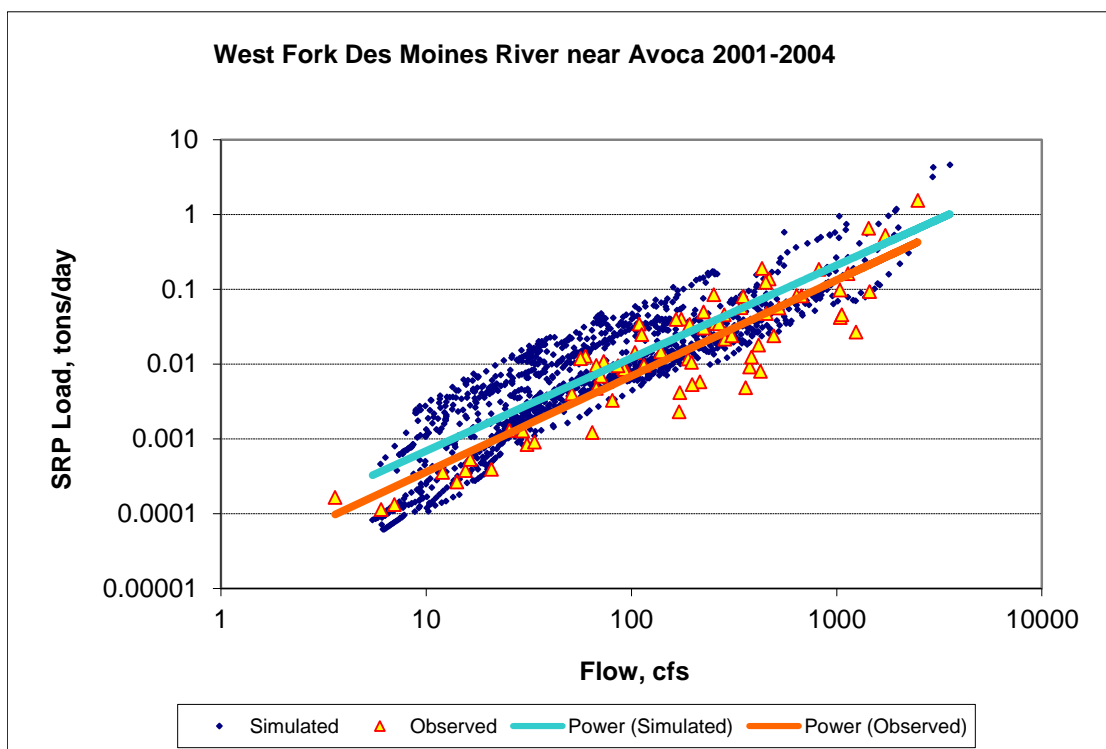


Figure 364. Power plot of simulated and observed Soluble Reactive Phosphorus (SRP) load vs flow at West Fork Des Moines River near Avoca (calibration period)

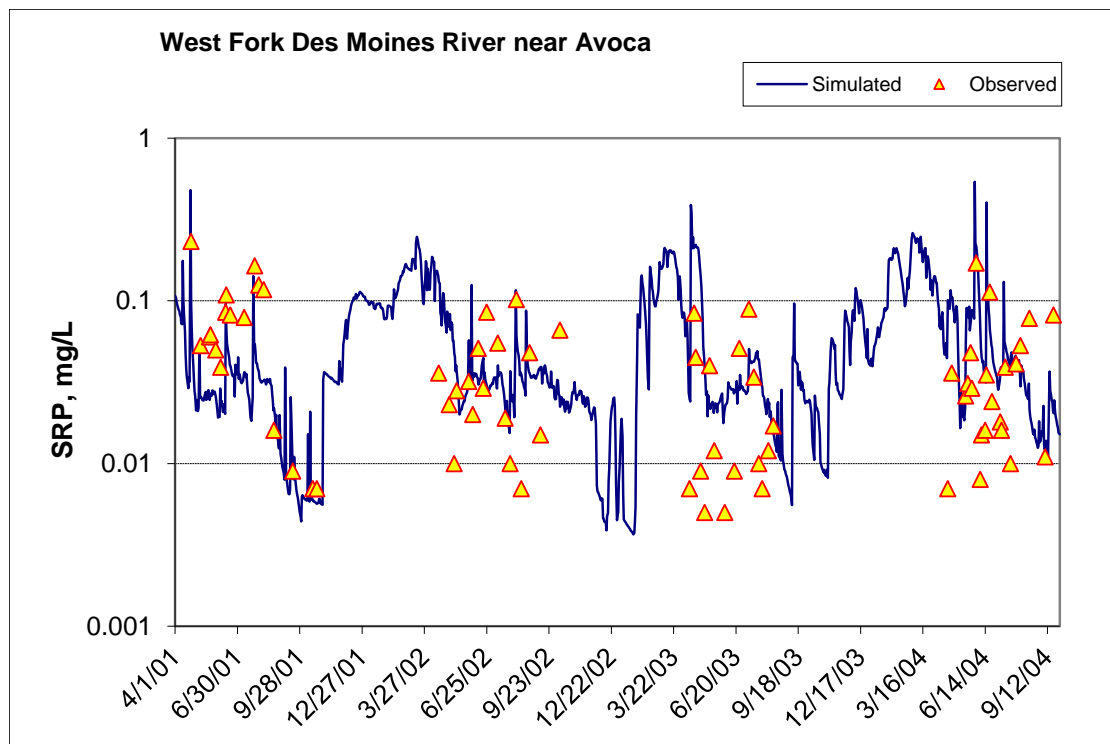


Figure 365. Time series of observed and simulated Soluble Reactive Phosphorus (SRP) concentration at West Fork Des Moines River near Avoca (calibration period)

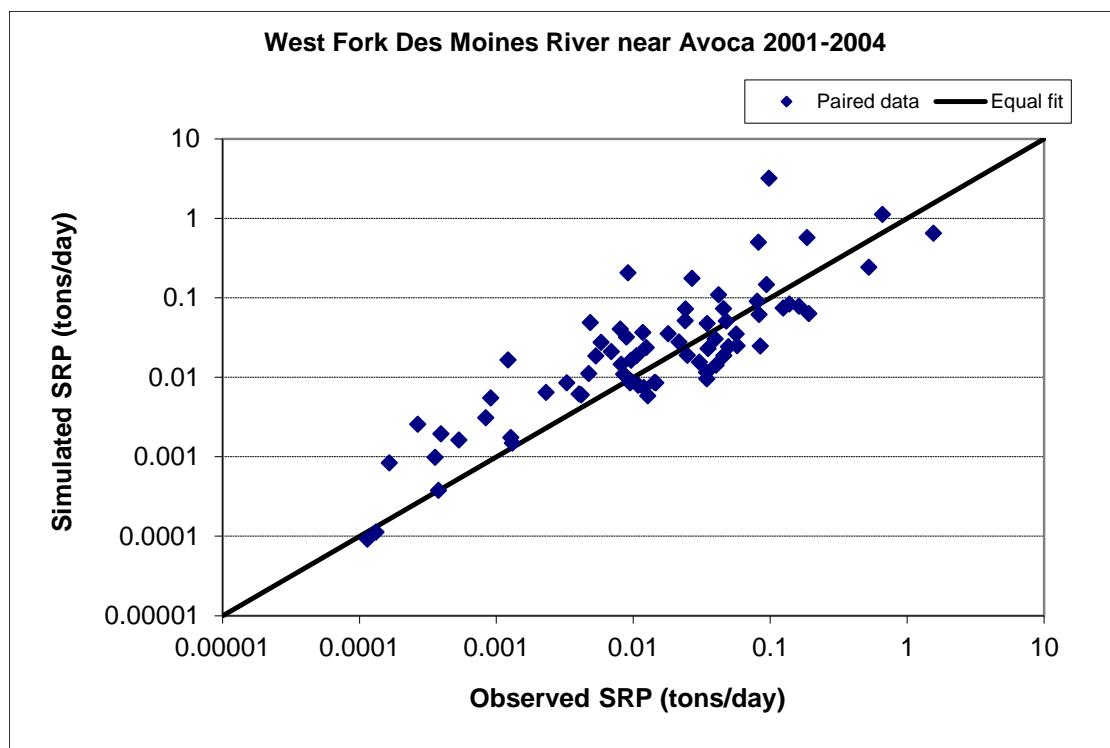


Figure 366. Paired simulated vs. observed Soluble Reactive Phosphorus (SRP) load at West Fork Des Moines River near Avoca (calibration period)

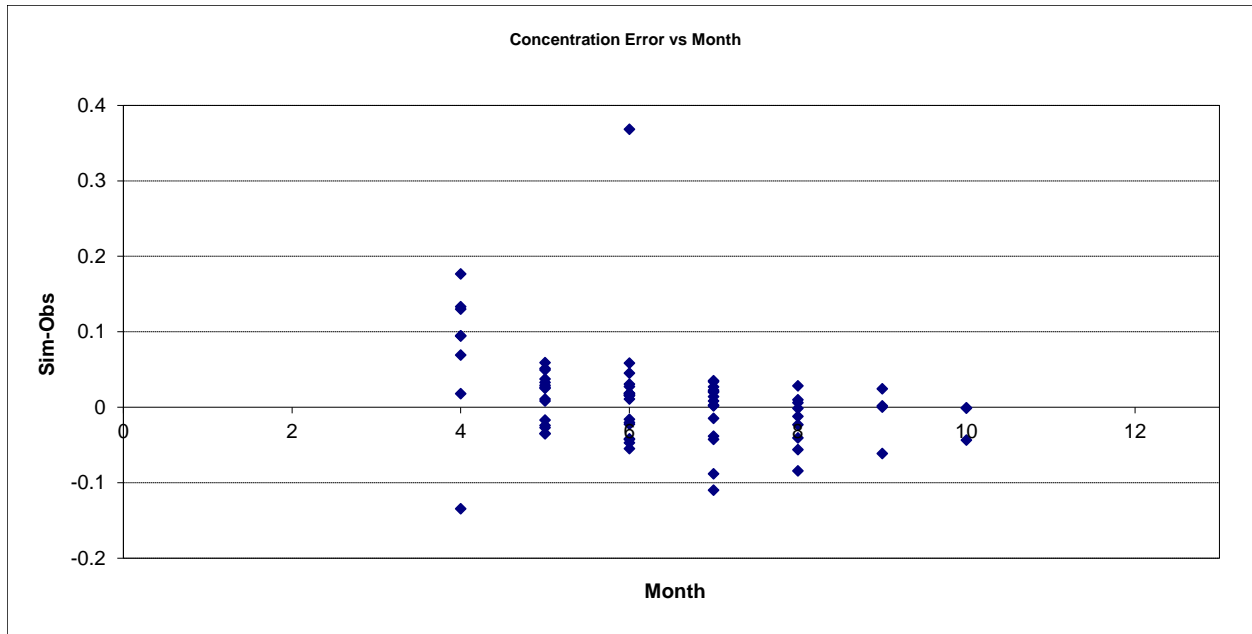


Figure 367. Residual (Simulated - Observed) vs. Month Soluble Reactive Phosphorus (SRP) at West Fork Des Moines River near Avoca

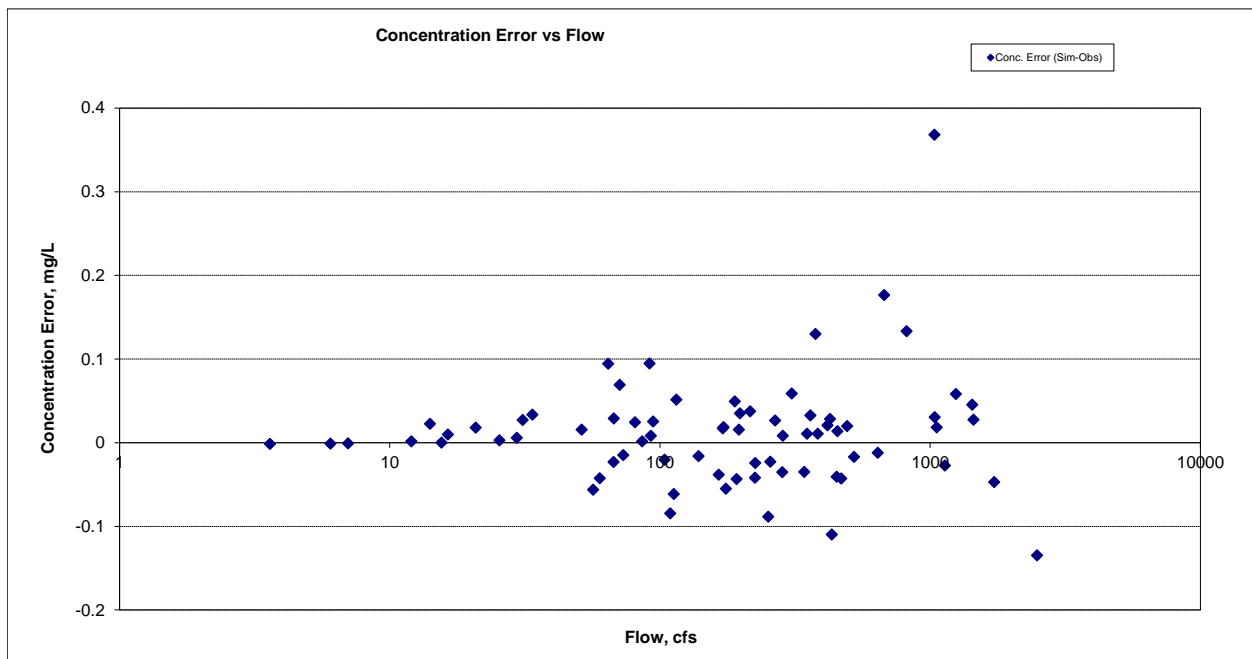


Figure 368. Residual (Simulated - Observed) vs. Flow Soluble Reactive Phosphorus (SRP) at West Fork Des Moines River near Avoca

Organic Phosphorus (OrgP)

Table 53. Organic Phosphorus (OrgP) statistics

Period	2001-2004
Count	72
Concentration Average Error	-23.54%
Concentration Median Error	-16.68%
Load Average Error	-3.84%
Load Median Error	-1.82%
Paired t concentration	0.24

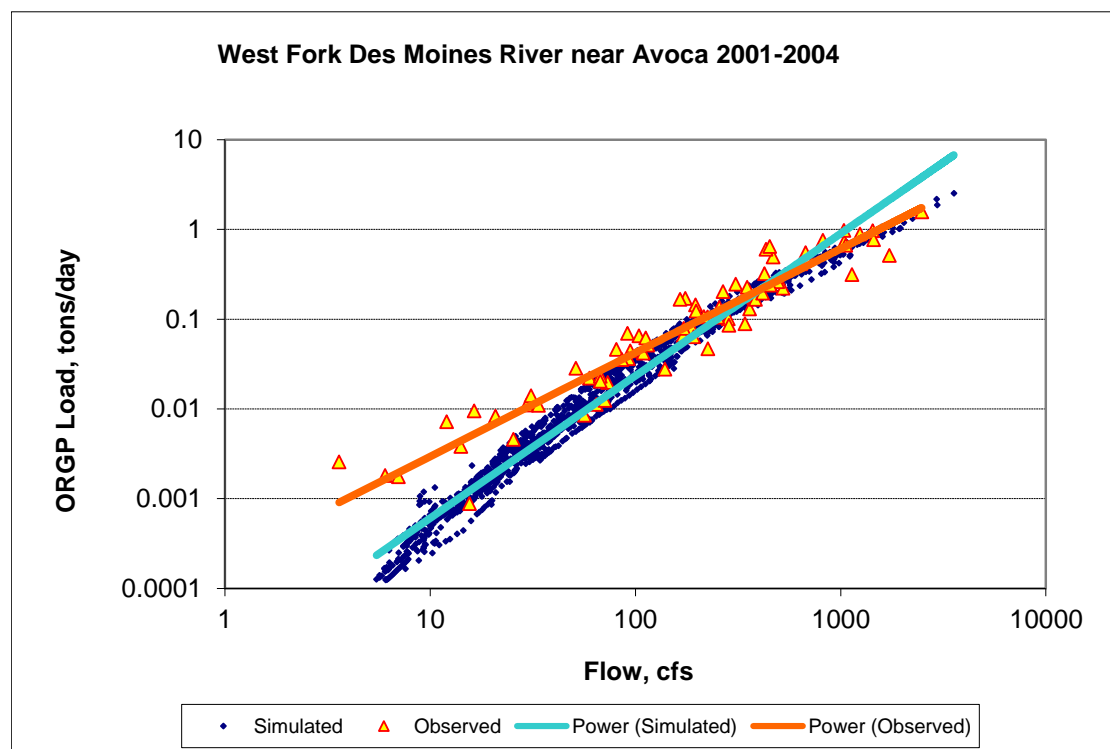


Figure 369. Power plot of simulated and observed Organic Phosphorus (OrgP) load vs flow at West Fork Des Moines River near Avoca (calibration period)

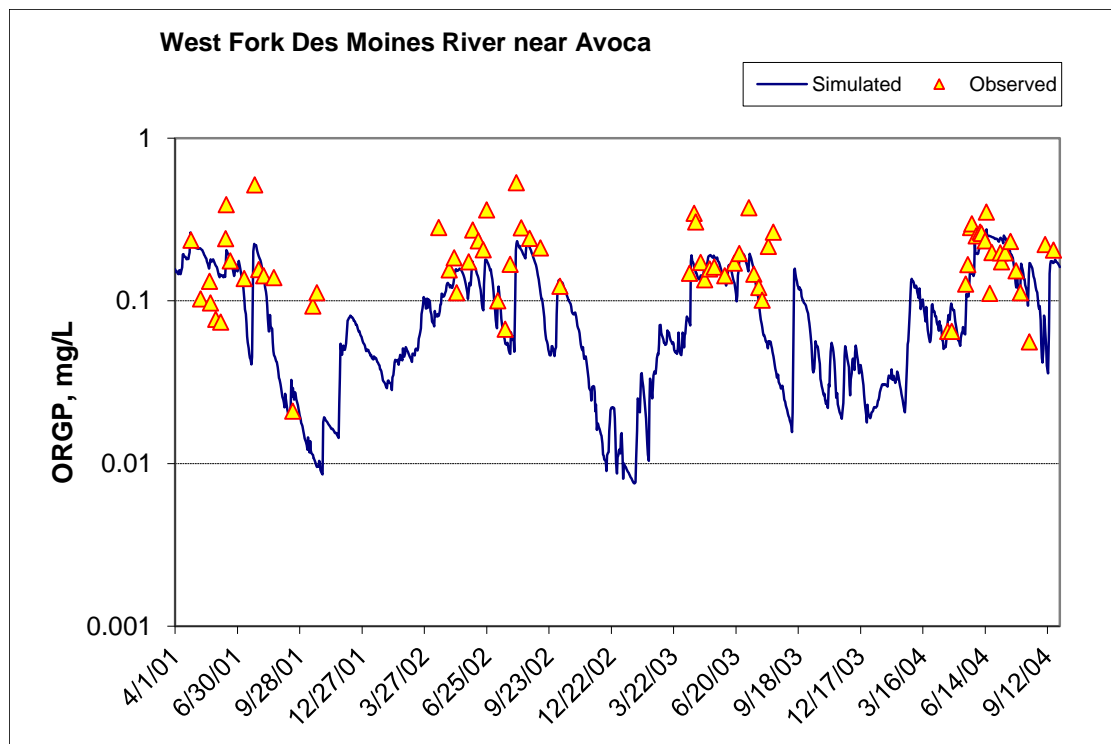


Figure 370. Time series of observed and simulated Organic Phosphorus (OrgP) concentration at West Fork Des Moines River near Avoca (calibration period)

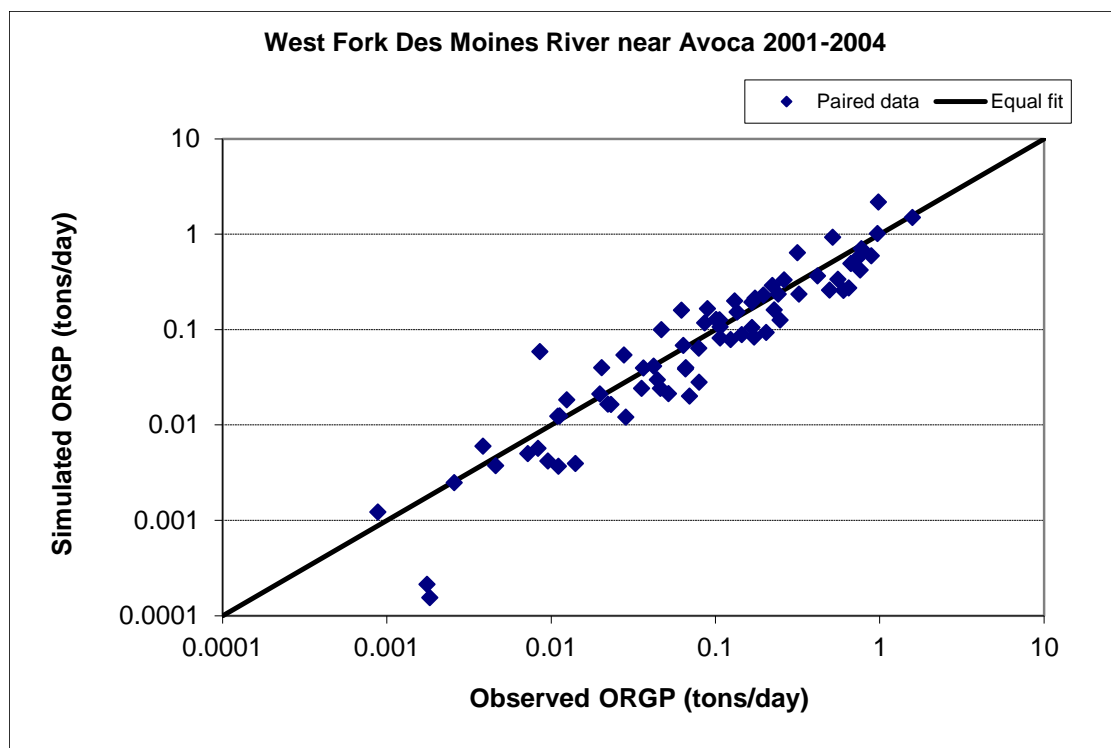


Figure 371. Paired simulated vs. observed Organic Phosphorus (OrgP) load at West Fork Des Moines River near Avoca (calibration period)

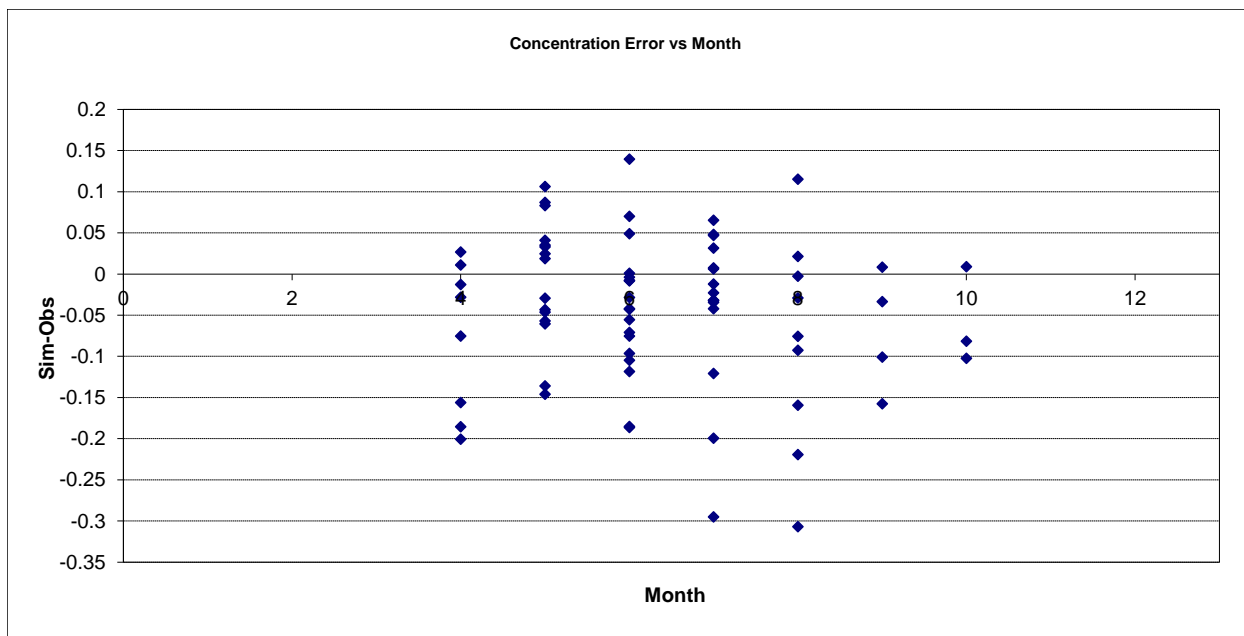


Figure 372. Residual (Simulated - Observed) vs. Month Organic Phosphorus (OrgP) at West Fork Des Moines River near Avoca

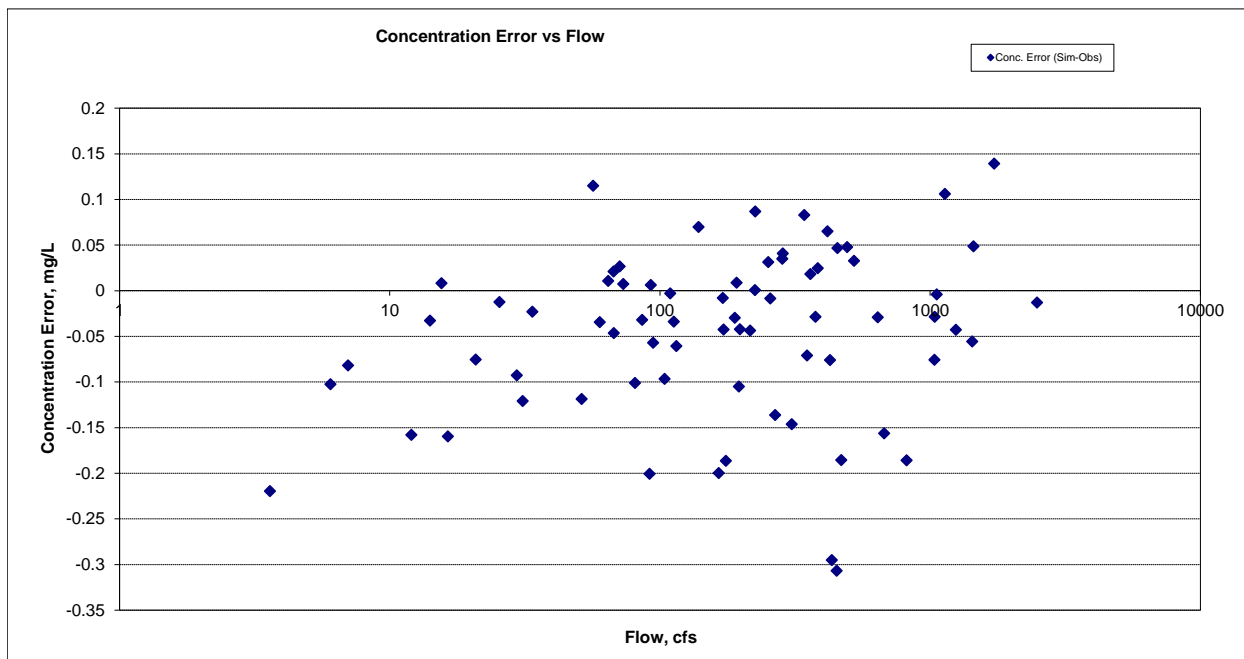


Figure 373. Residual (Simulated - Observed) vs. Flow Organic Phosphorus (OrgP) at West Fork Des Moines River near Avoca

Total Phosphorus (TP)

Table 54. Total Phosphorus (TP) statistics

Period	2001-2004
Count	80
Concentration Average Error	-12.88%
Concentration Median Error	-4.36%
Load Average Error	12.86%
Load Median Error	-0.68%
Paired t concentration	0.91

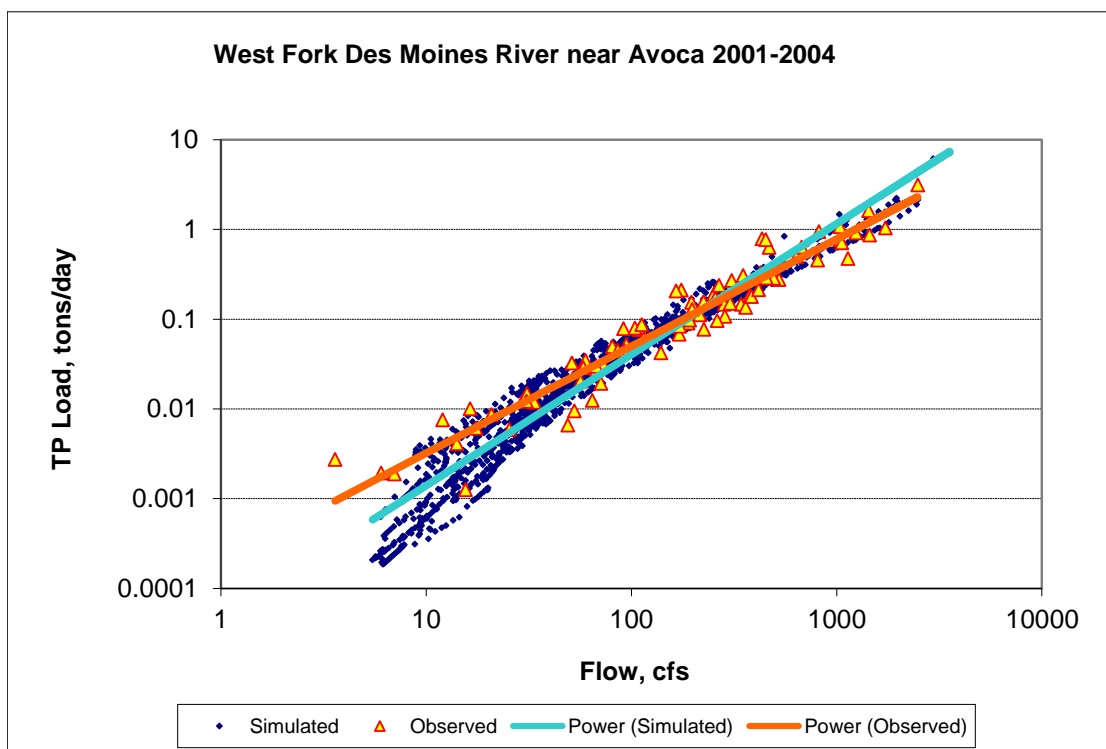


Figure 374. Power plot of simulated and observed Total Phosphorus (TP) load vs flow at West Fork Des Moines River near Avoca (calibration period)

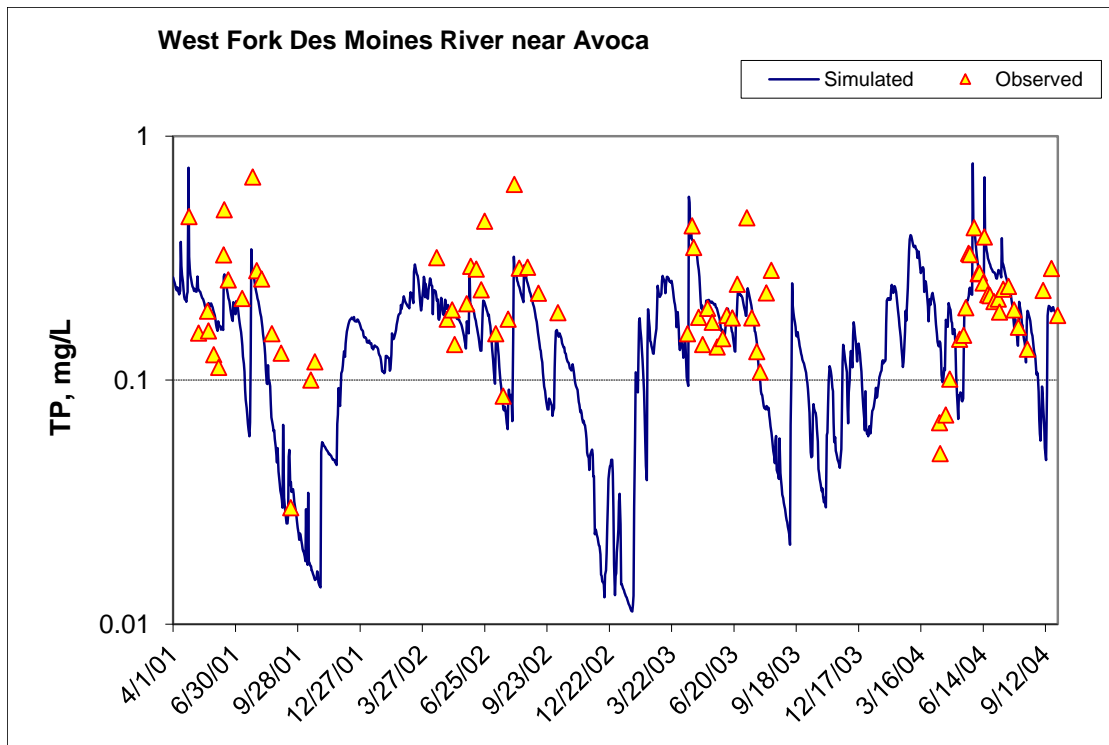


Figure 375. Time series of observed and simulated Total Phosphorus (TP) concentration at West Fork Des Moines River near Avoca (calibration period)

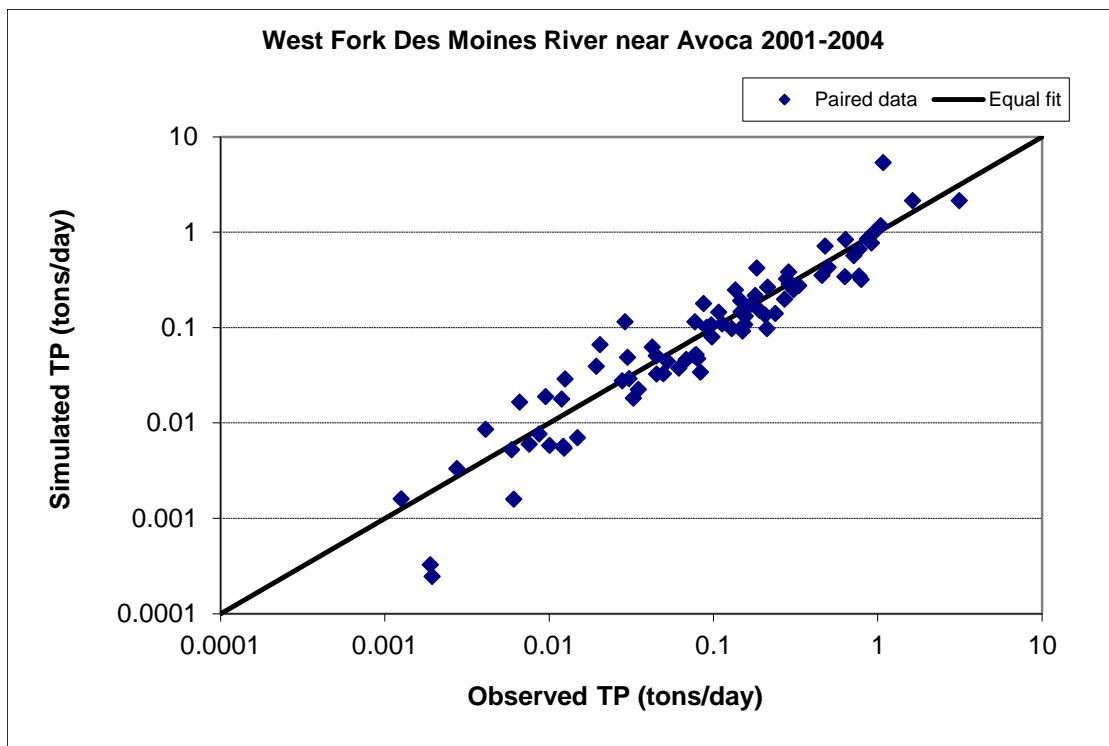


Figure 376. Paired simulated vs. observed Total Phosphorus (TP) load at West Fork Des Moines River near Avoca (calibration period)

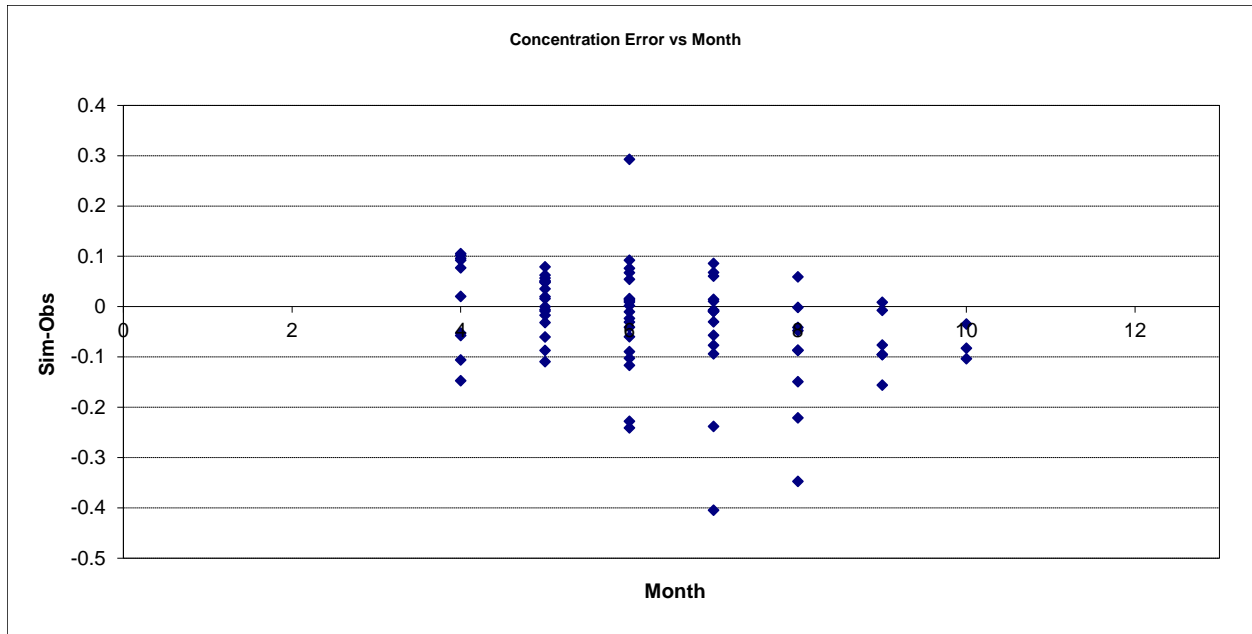


Figure 377. Residual (Simulated - Observed) vs. Month Total Phosphorus (TP) at West Fork Des Moines River near Avoca

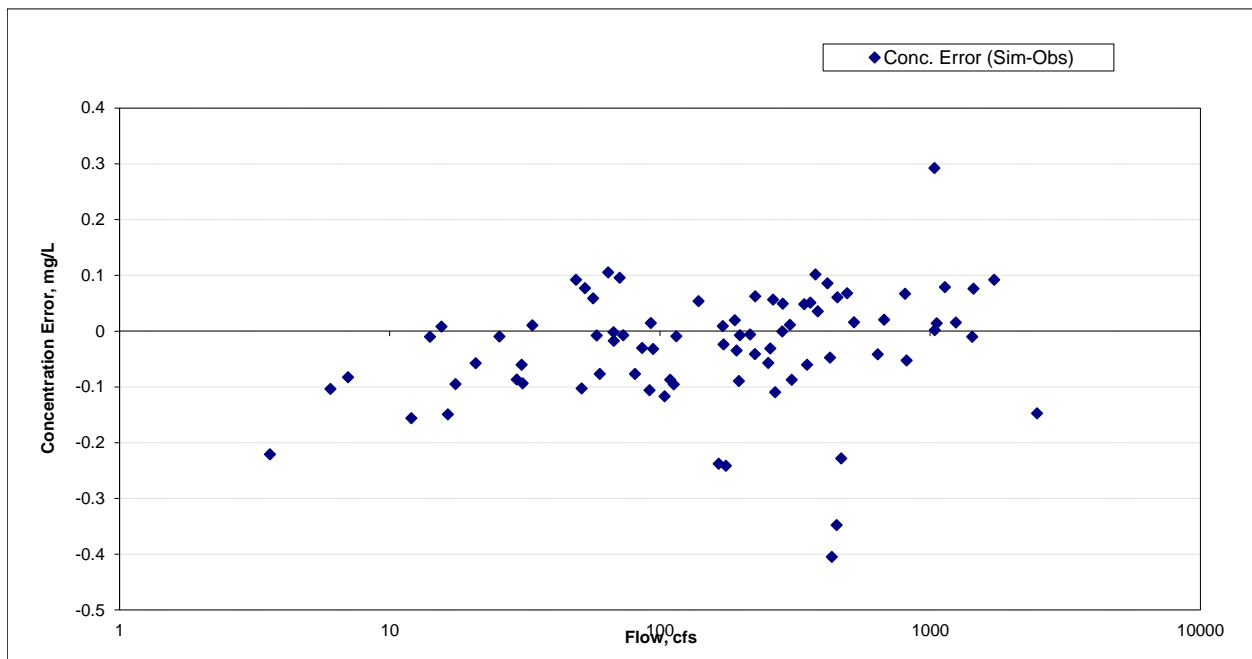


Figure 378. Residual (Simulated - Observed) vs. Flow Total Phosphorus (TP) at West Fork Des Moines River near Avoca

West Fork Des Moines River at Windom (S000-894)

Total Suspended Solids (TSS)

Table 55. Total Suspended Solids (TSS) statistics

Period	2001-2004
Count	79
Concentration Average Error	3.04%
Concentration Median Error	-14.12%
Load Average Error	60.24%
Load Median Error	-2.23%
Paired t concentration	0.99

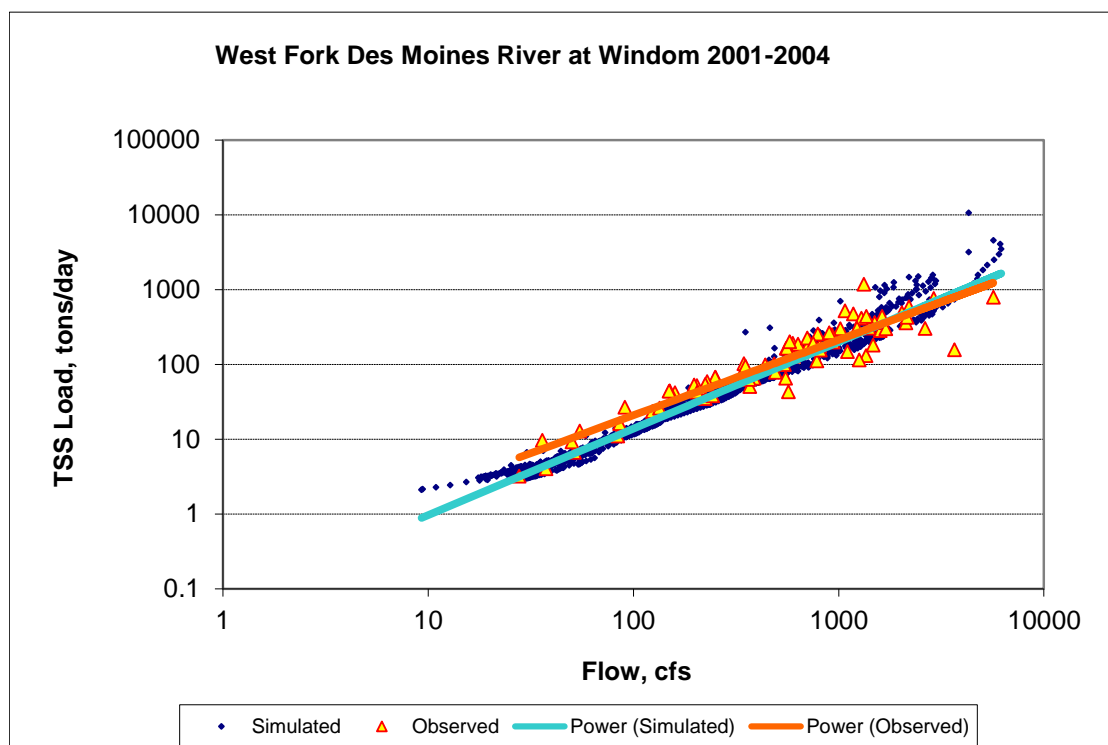


Figure 379. Power plot of simulated and observed Total Suspended Solids (TSS) load vs flow at West Fork Des Moines River at Windom (calibration period)

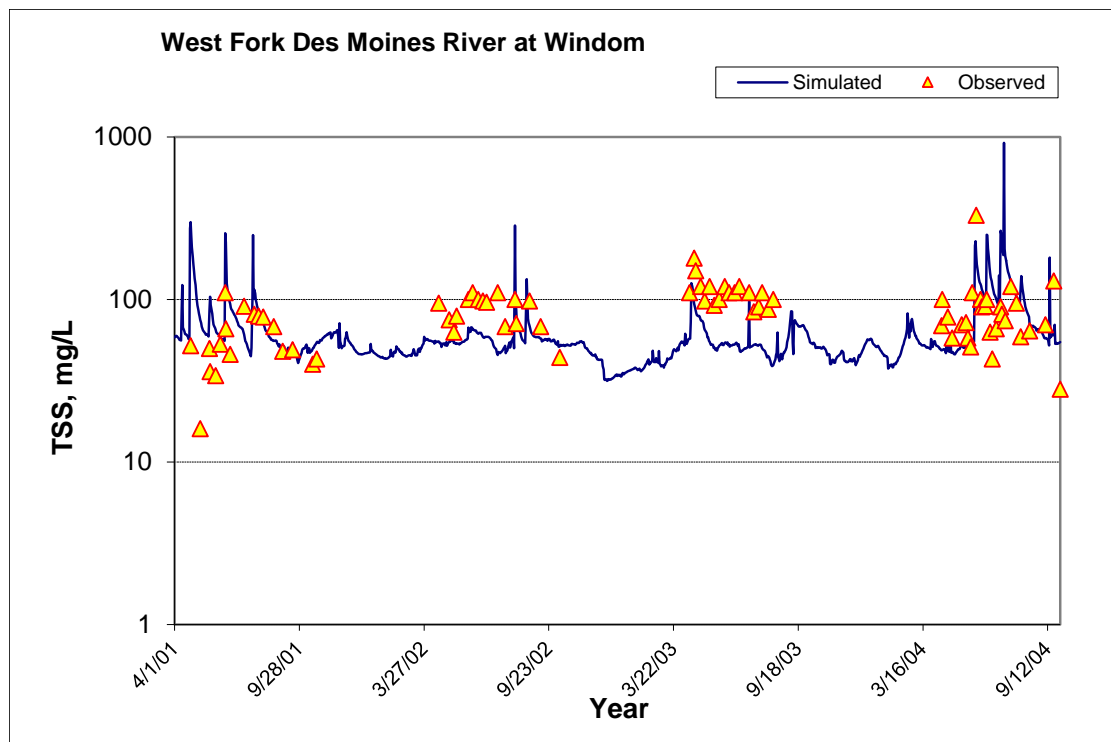


Figure 380. Time series of observed and simulated Total Suspended Solids (TSS) concentration at West Fork Des Moines River at Windom (calibration period)

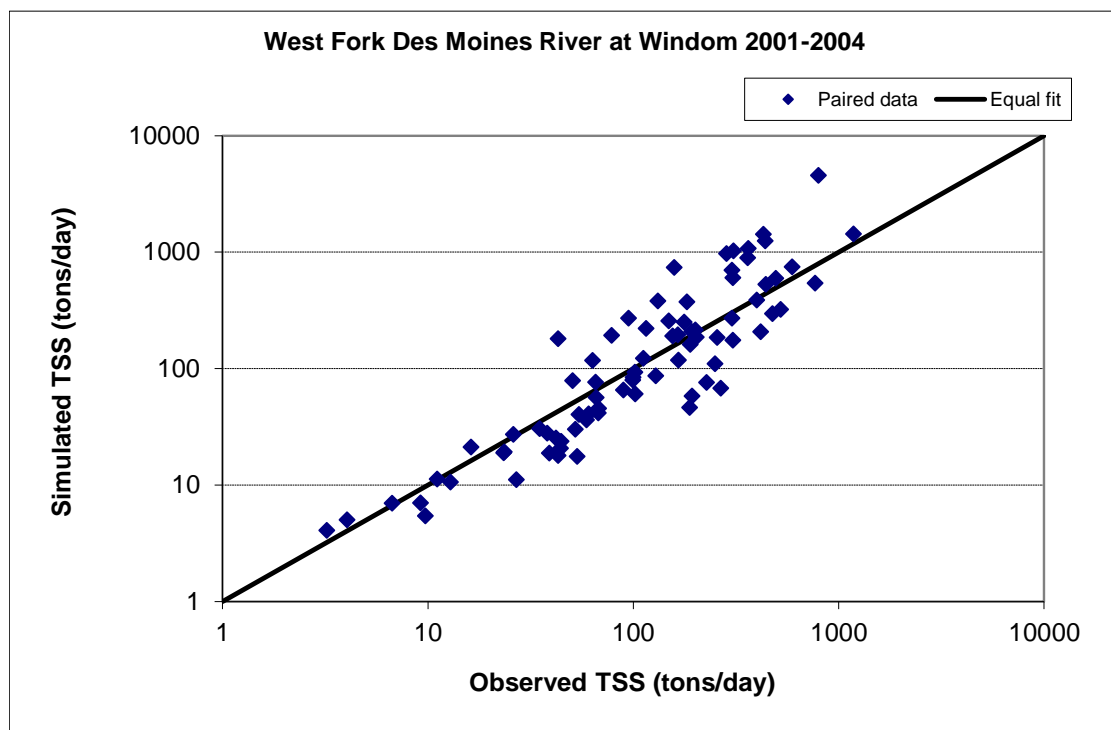


Figure 381. Paired simulated vs. observed Total Suspended Solids (TSS) load at West Fork Des Moines River at Windom (calibration period)

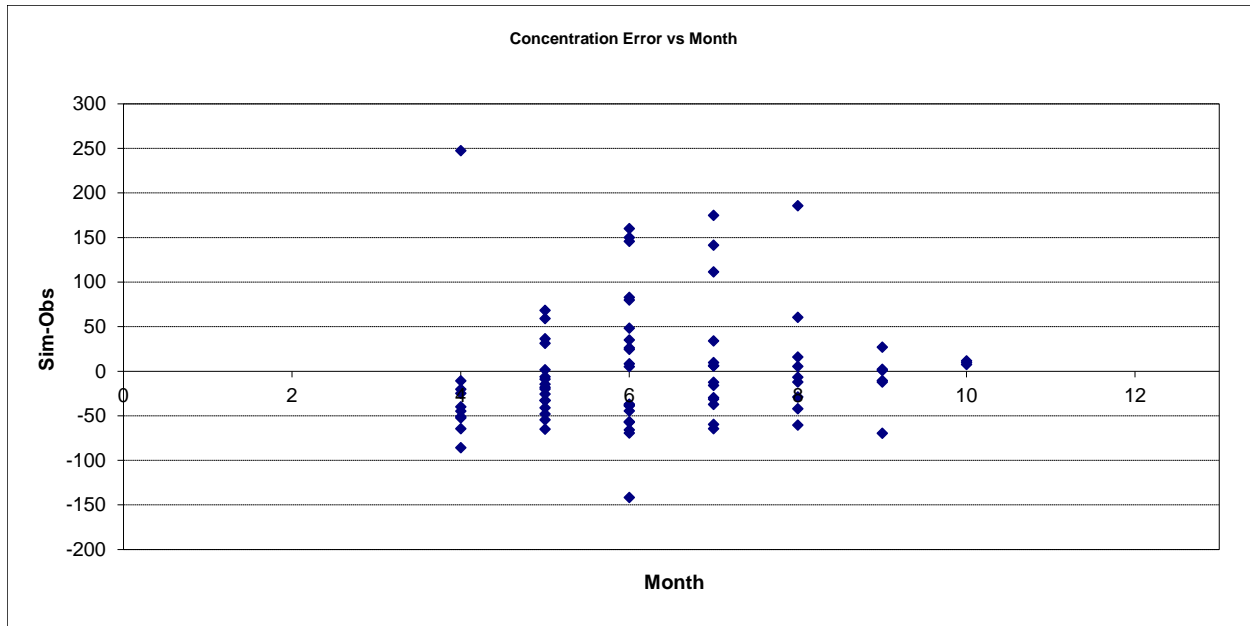


Figure 382. Residual (Simulated - Observed) vs. Month Total Suspended Solids (TSS) at West Fork Des Moines River at Windom

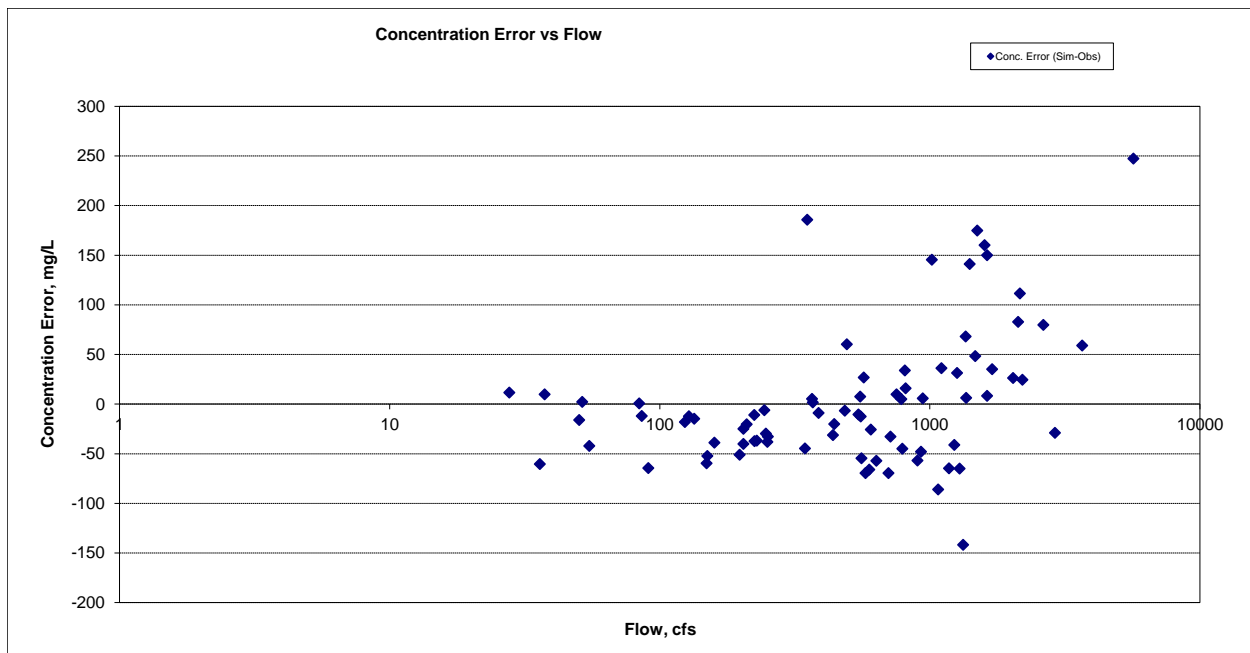


Figure 383. Residual (Simulated - Observed) vs. Flow Total Suspended Solids (TSS) at West Fork Des Moines River at Windom

Ammonia Nitrogen (NH₃)

Table 56. Ammonia Nitrogen (NH₃) statistics

Period	2001-2004
Count	28
Concentration Average Error	121.67%
Concentration Median Error	103.48%
Load Average Error	316.64%
Load Median Error	78.96%
Paired t concentration	0.00

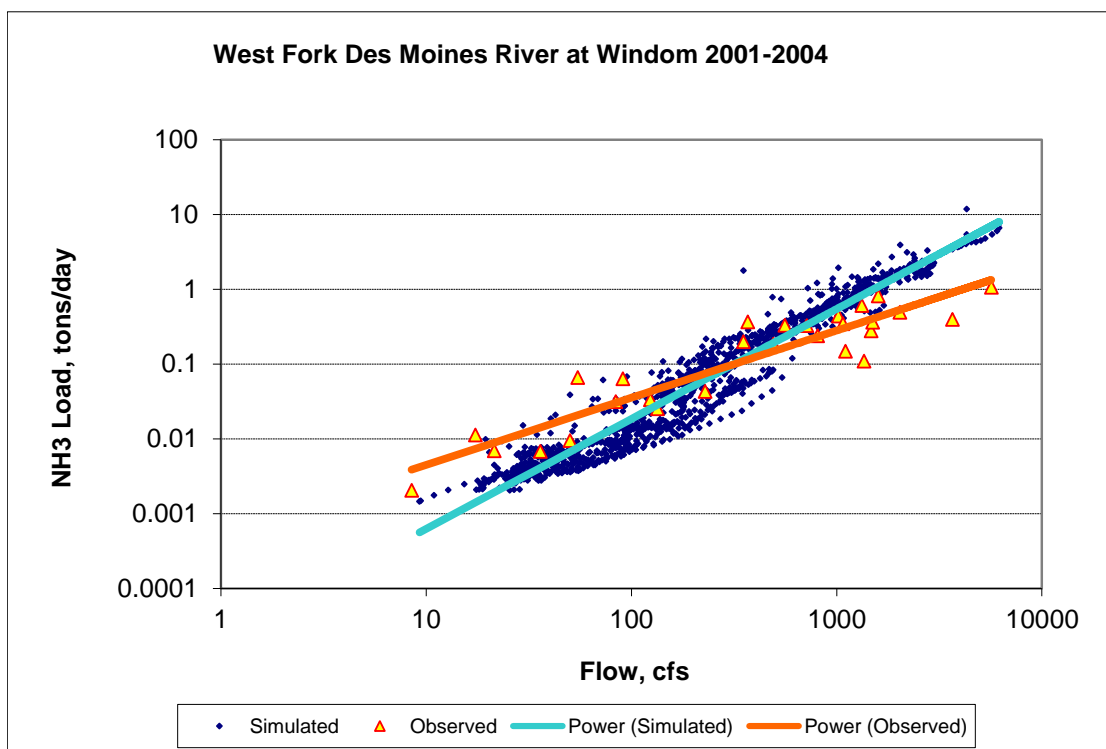


Figure 384. Power plot of simulated and observed Ammonia Nitrogen (NH₃) load vs flow at West Fork Des Moines River at Windom (calibration period)

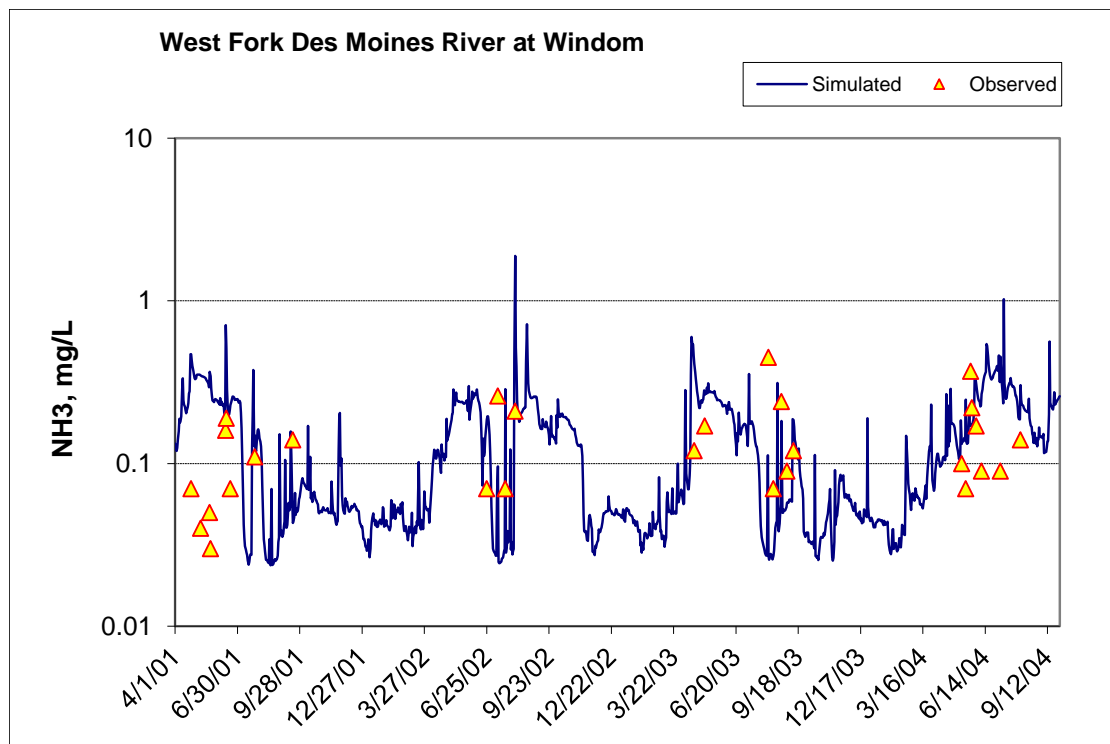


Figure 385. Time series of observed and simulated Ammonia Nitrogen (NH₃) concentration at West Fork Des Moines River at Windom (calibration period)

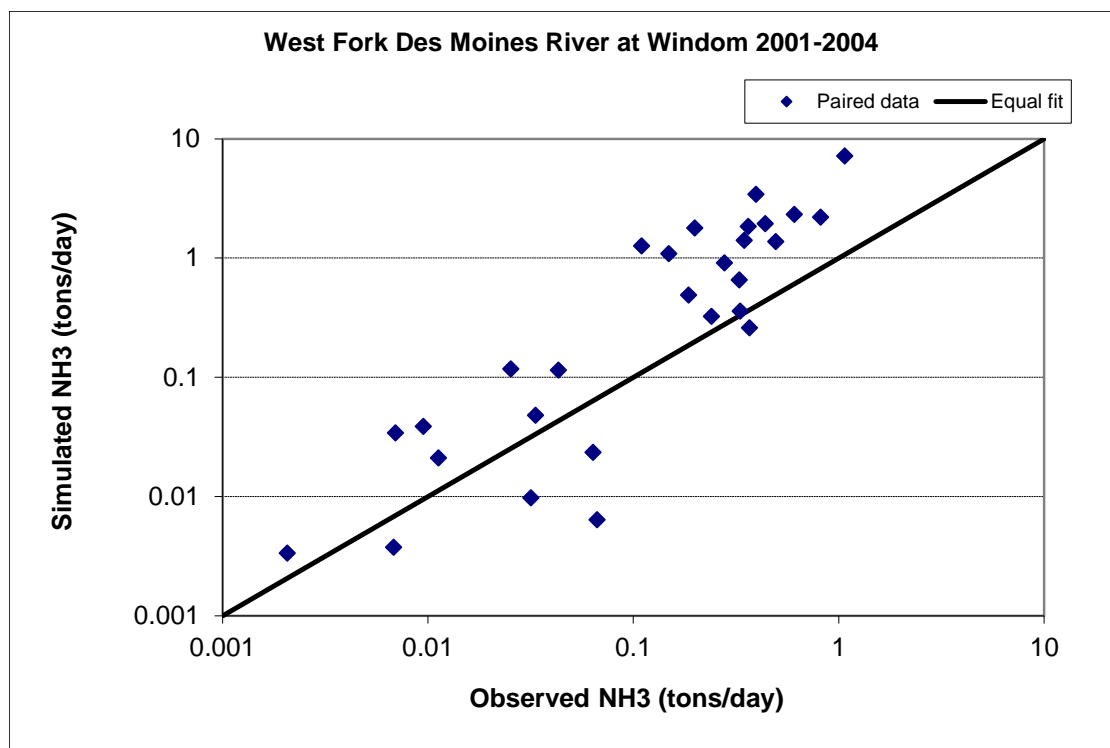


Figure 386. Paired simulated vs. observed Ammonia Nitrogen (NH₃) load at West Fork Des Moines River at Windom (calibration period)

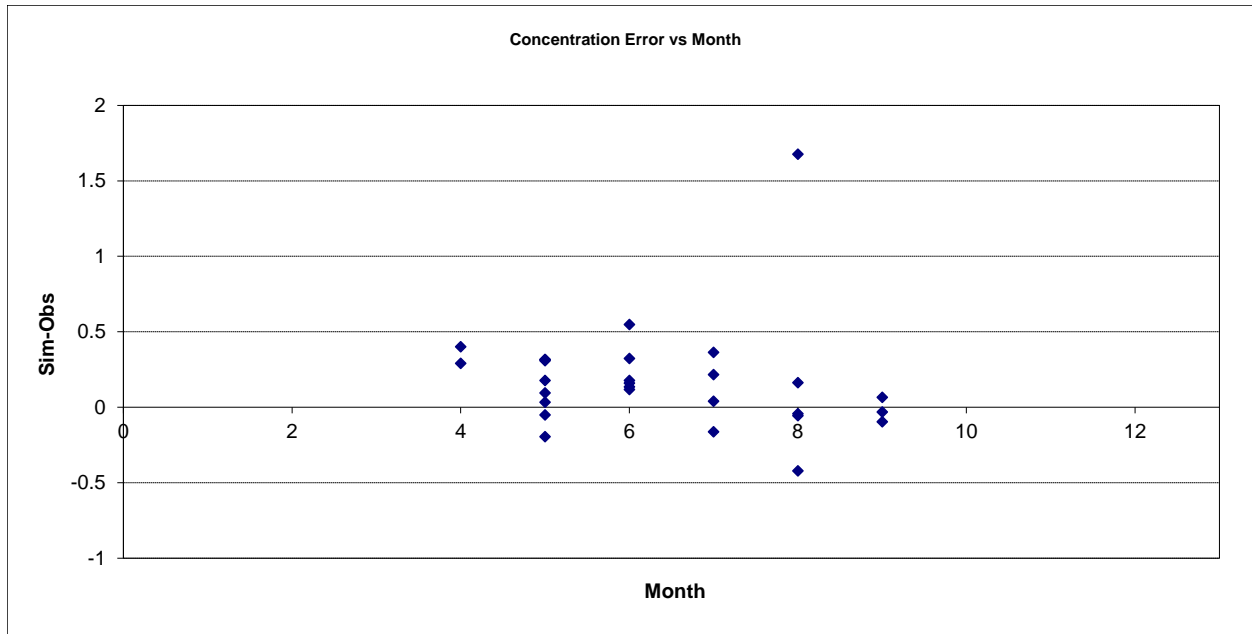


Figure 387. Residual (Simulated - Observed) vs. Month Ammonia Nitrogen (NH3) at West Fork Des Moines River at Windom

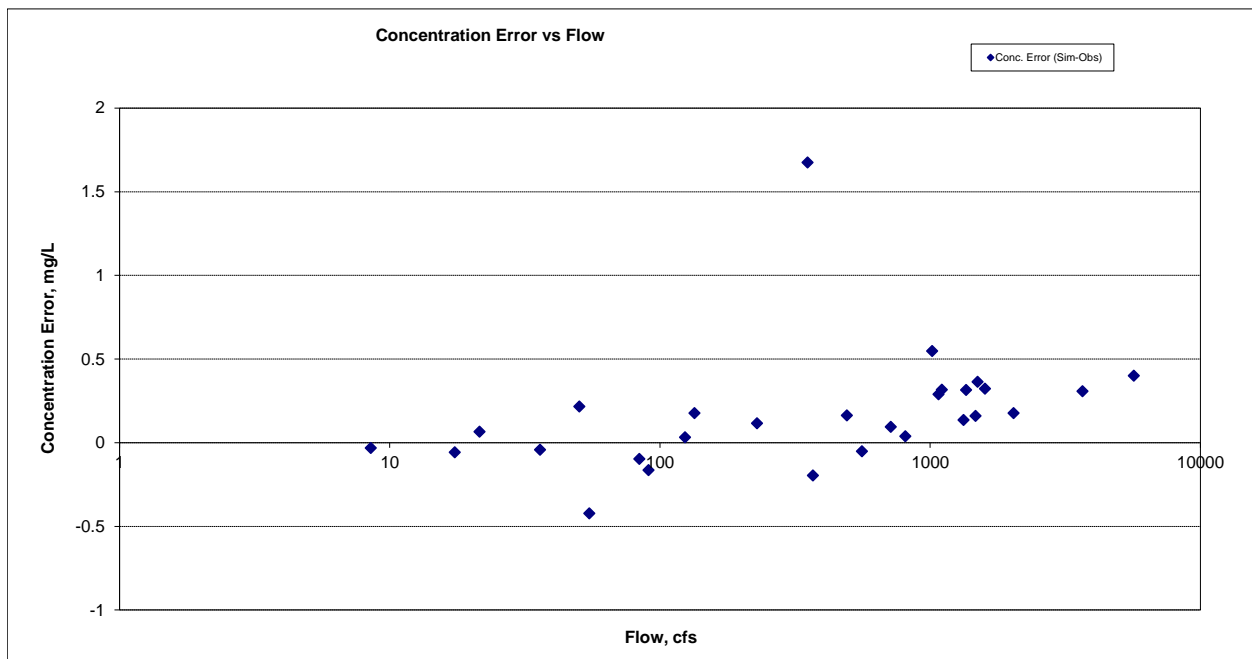


Figure 388. Residual (Simulated - Observed) vs. Flow Ammonia Nitrogen (NH3) at West Fork Des Moines River at Windom

Organic Nitrogen (OrgN)

Table 57. Organic Nitrogen (OrgN) statistics

Period	2001-2004
Count	25
Concentration Average Error	-31.48%
Concentration Median Error	-29.97%
Load Average Error	13.46%
Load Median Error	-3.86%
Paired t concentration	0.01

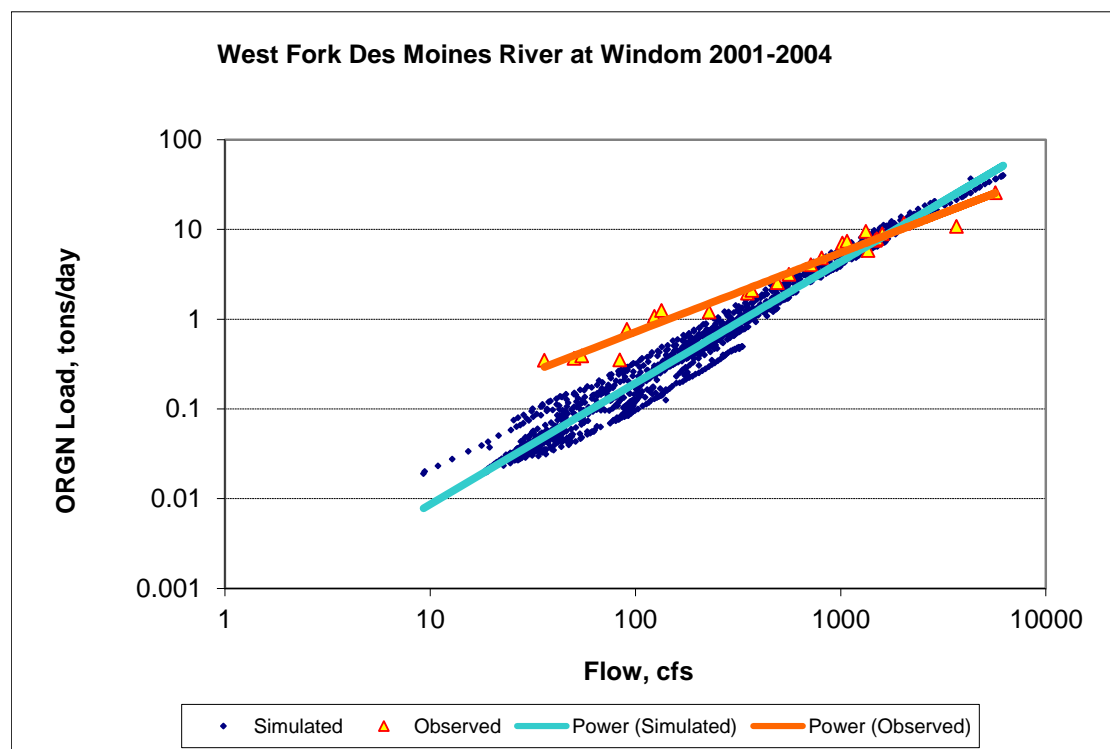


Figure 389. Power plot of simulated and observed Organic Nitrogen (OrgN) load vs flow at West Fork Des Moines River at Windom (calibration period)

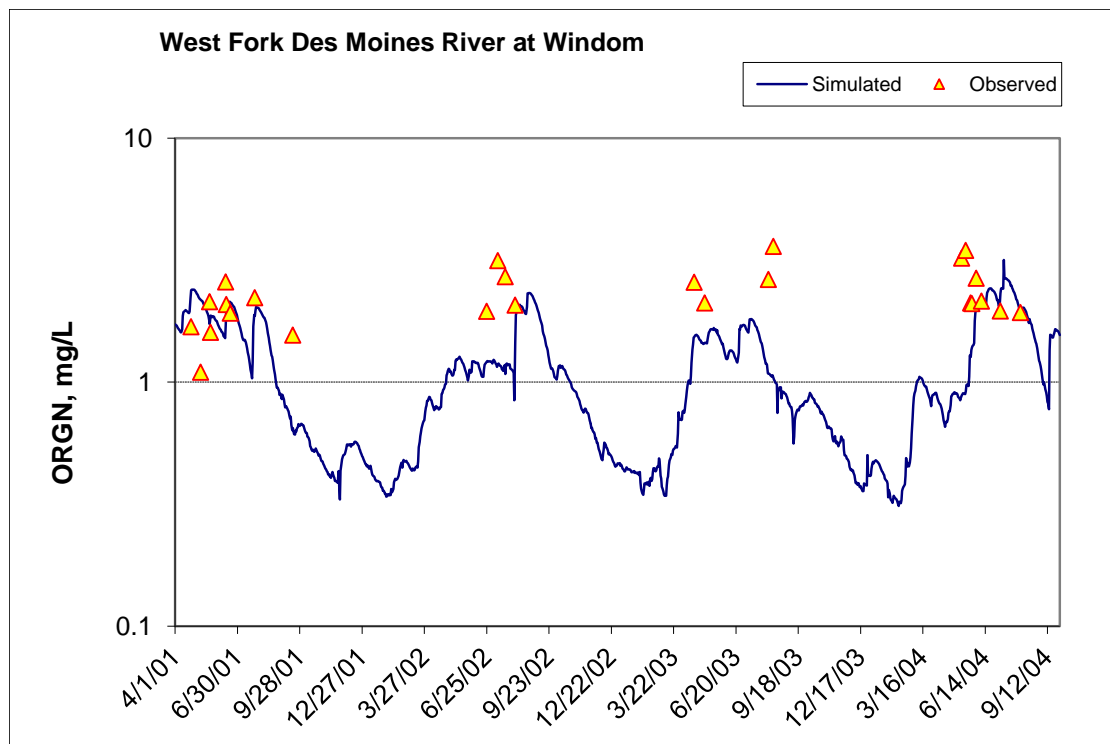


Figure 390. Time series of observed and simulated Organic Nitrogen (OrgN) concentration at West Fork Des Moines River at Windom (calibration period)

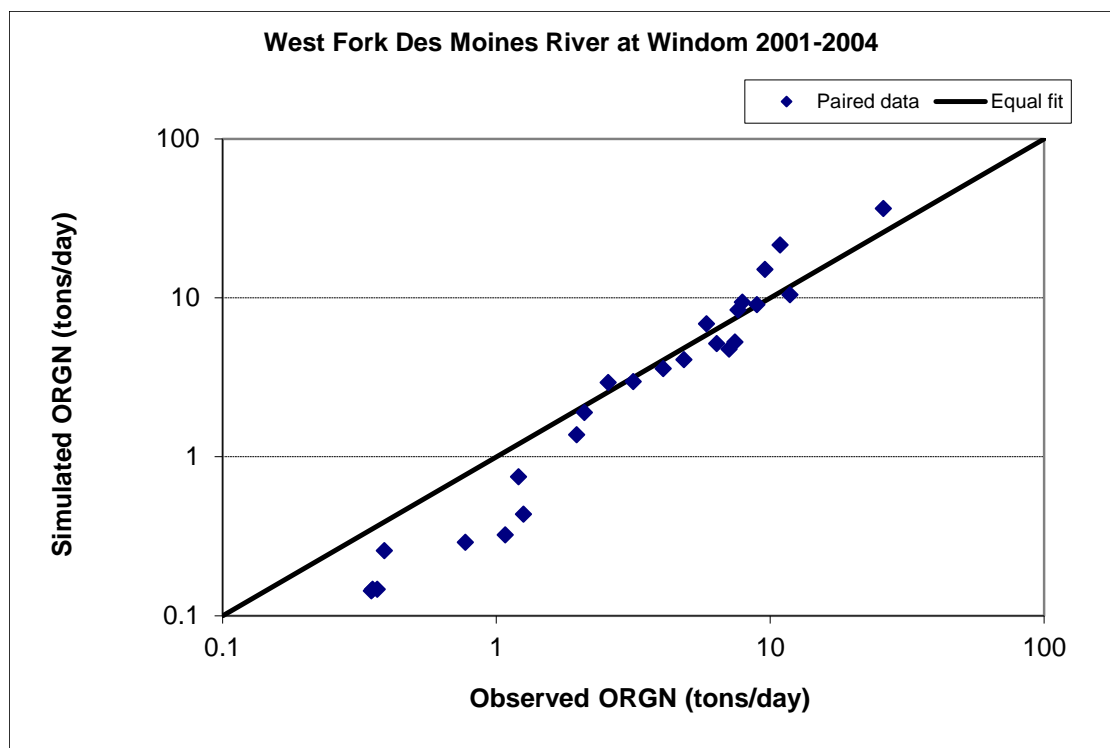


Figure 391. Paired simulated vs. observed Organic Nitrogen (OrgN) load at West Fork Des Moines River at Windom (calibration period)

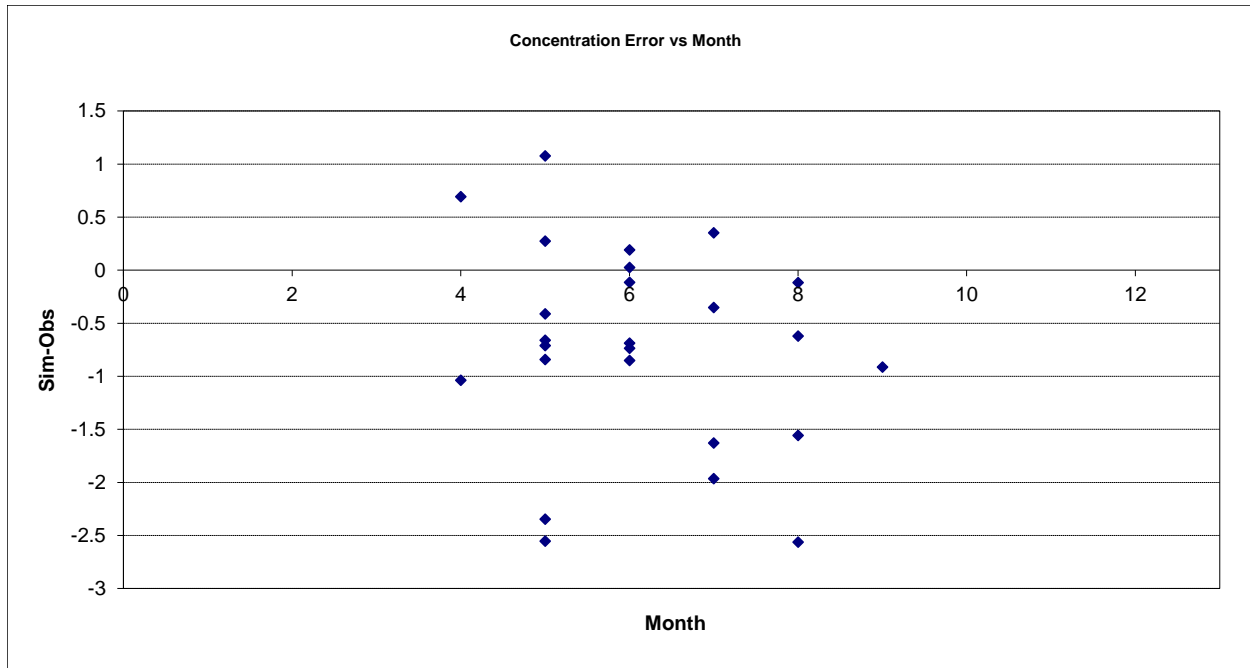


Figure 392. Residual (Simulated - Observed) vs. Month Organic Nitrogen (OrgN) at West Fork Des Moines River at Windom

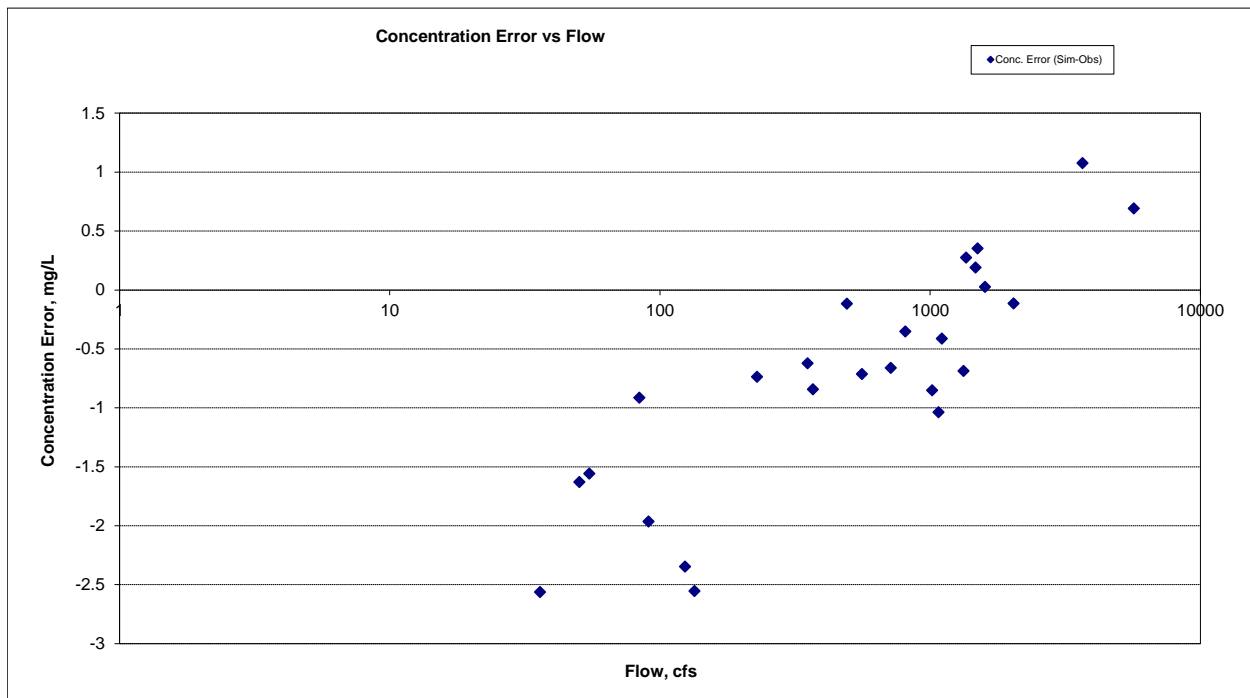


Figure 393. Residual (Simulated - Observed) vs. Flow Organic Nitrogen (OrgN) at West Fork Des Moines River at Windom

Total Kjeldahl Nitrogen (TKN)

Table 58. Total Kjeldahl Nitrogen (TKN) statistics

Period	2001-2004
Count	79
Concentration Average Error	-31.77%
Concentration Median Error	-28.07%
Load Average Error	4.43%
Load Median Error	-9.82%
Paired t concentration	0.00

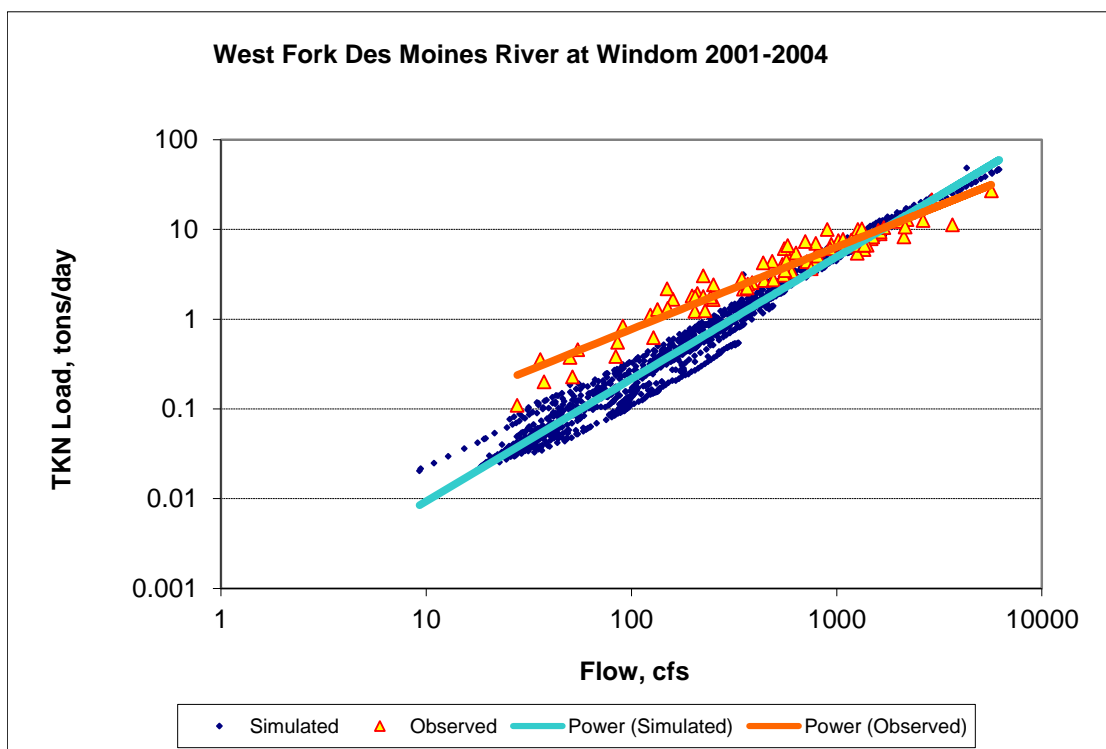


Figure 394. Power plot of simulated and observed Total Kjeldahl Nitrogen (TKN) load vs flow at West Fork Des Moines River at Windom (calibration period)

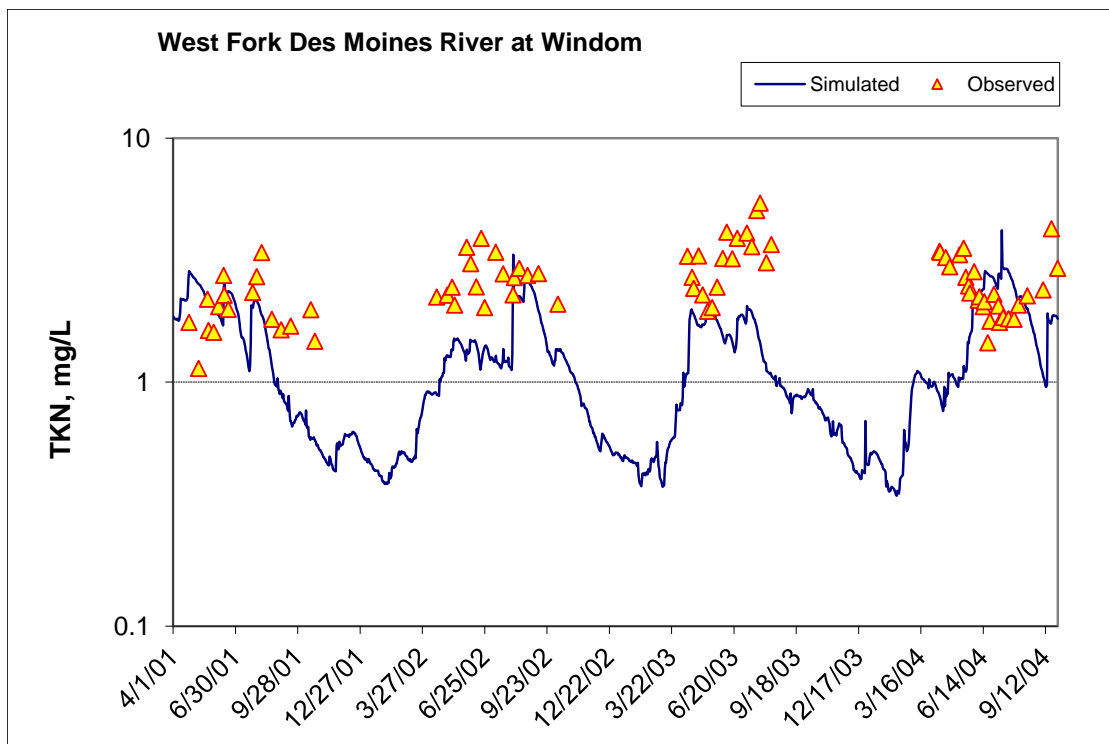


Figure 395. Time series of observed and simulated Total Kjeldahl Nitrogen (TKN) concentration at West Fork Des Moines River at Windom (calibration period)

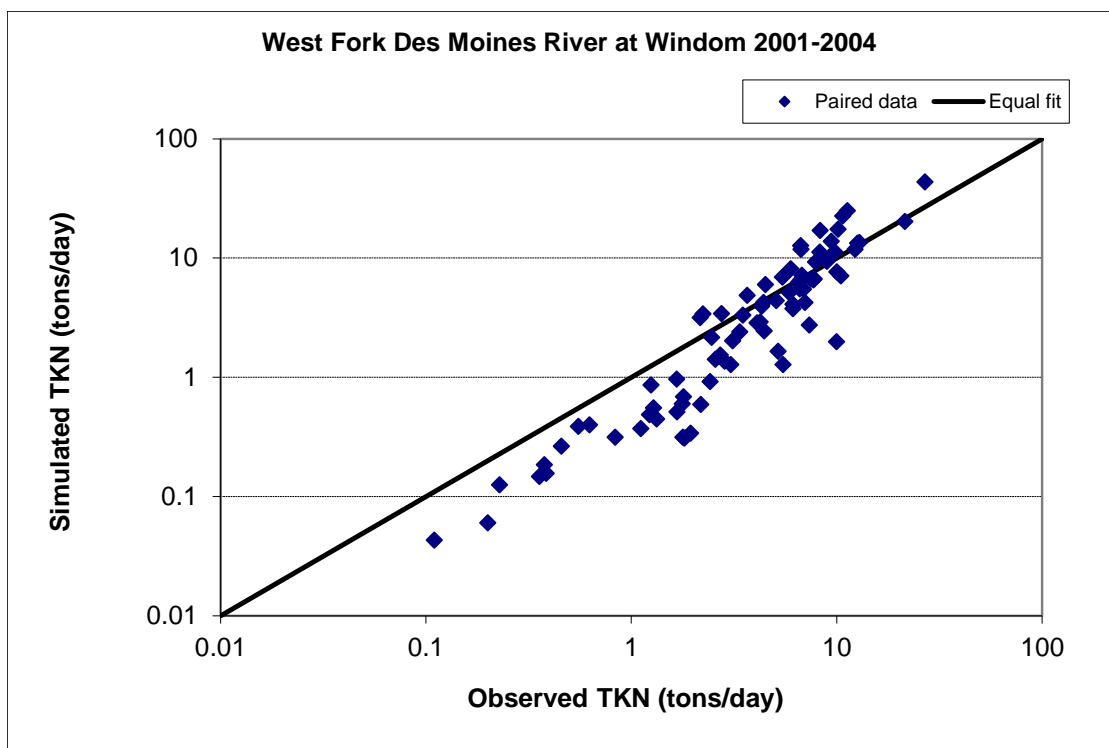


Figure 396. Paired simulated vs. observed Total Kjeldahl Nitrogen (TKN) load at West Fork Des Moines River at Windom (calibration period)

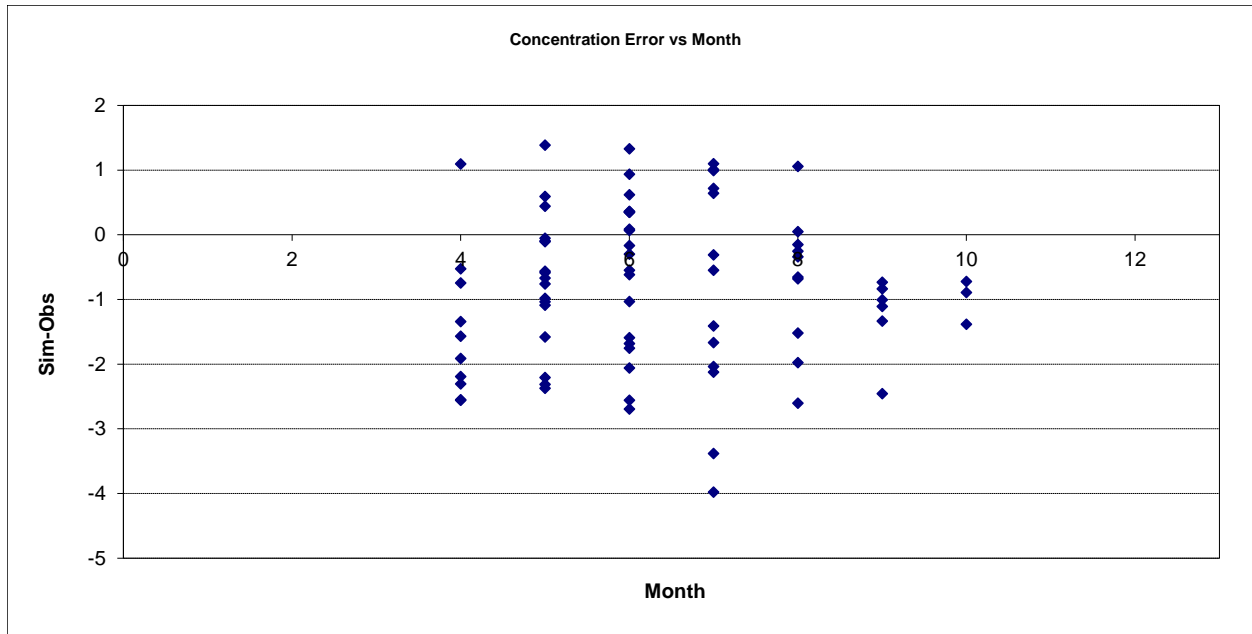


Figure 397. Residual (Simulated - Observed) vs. Month Total Kjeldahl Nitrogen (TKN) at West Fork Des Moines River at Windom

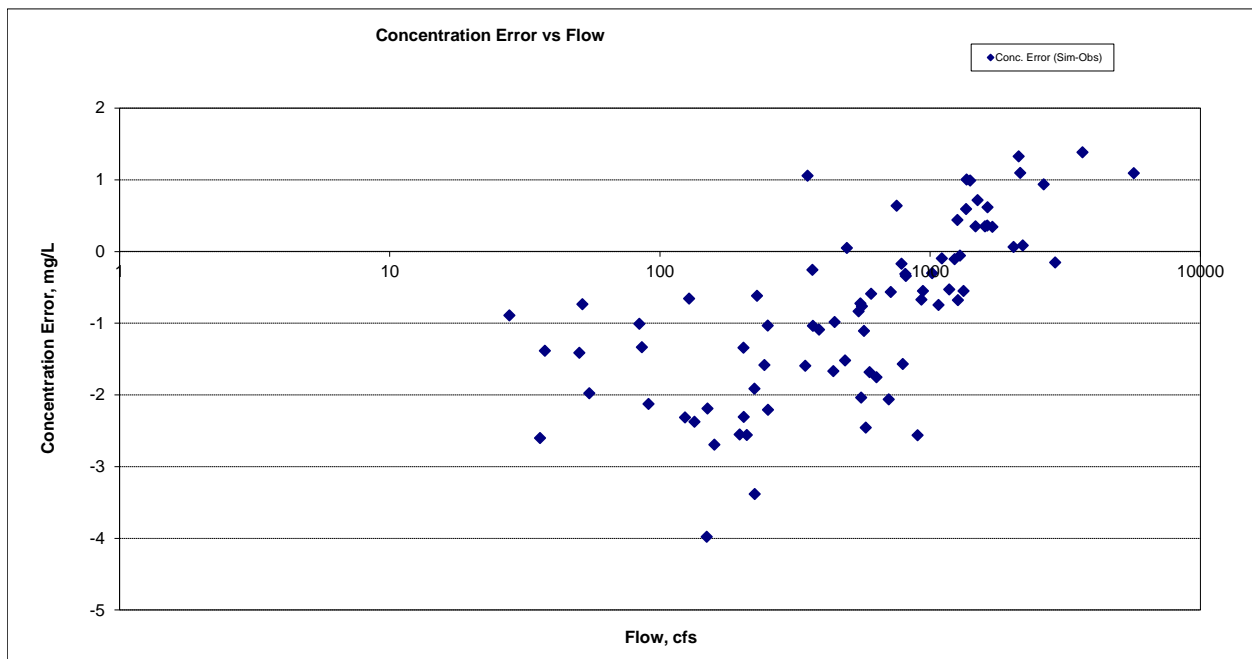


Figure 398. Residual (Simulated - Observed) vs. Flow Total Kjeldahl Nitrogen (TKN) at West Fork Des Moines River at Windom

Nitrite+ Nitrate Nitrogen (NO_x)

Table 59. Nitrite+ Nitrate Nitrogen (NO_x) statistics

Period	2001-2004
Count	71
Concentration Average Error	-19.37%
Concentration Median Error	-22.24%
Load Average Error	-3.33%
Load Median Error	-8.06%
Paired t concentration	0.54

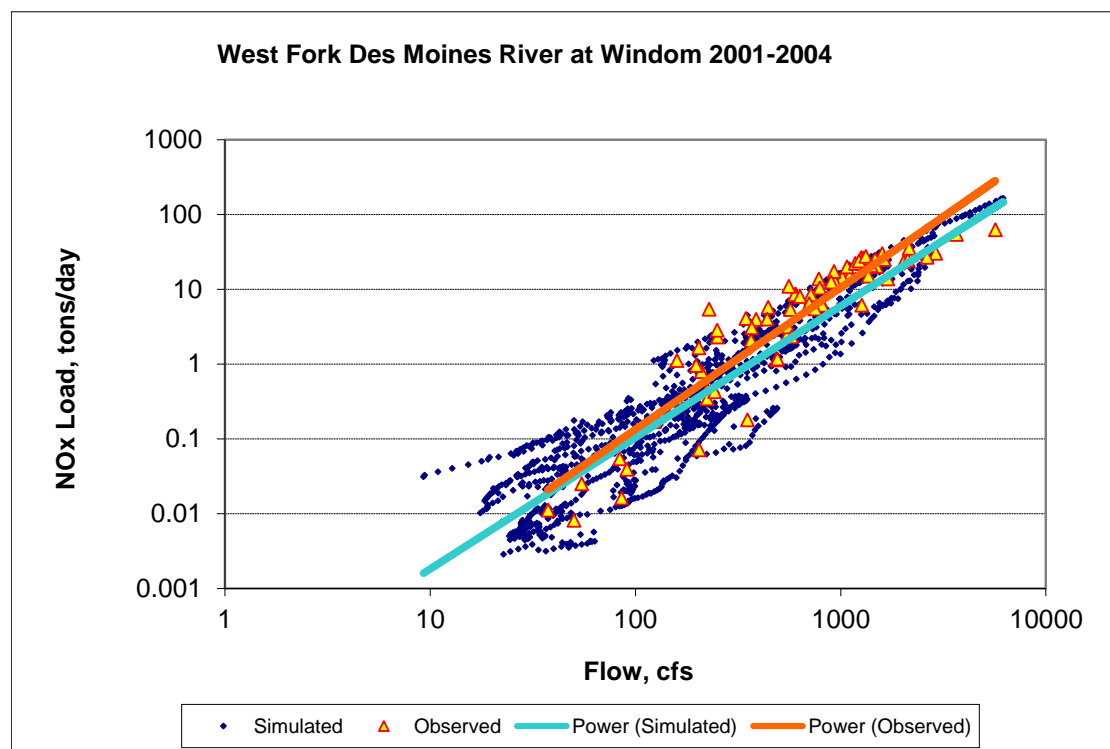


Figure 399. Power plot of simulated and observed Nitrite+ Nitrate Nitrogen (NO_x) load vs flow at West Fork Des Moines River at Windom (calibration period)

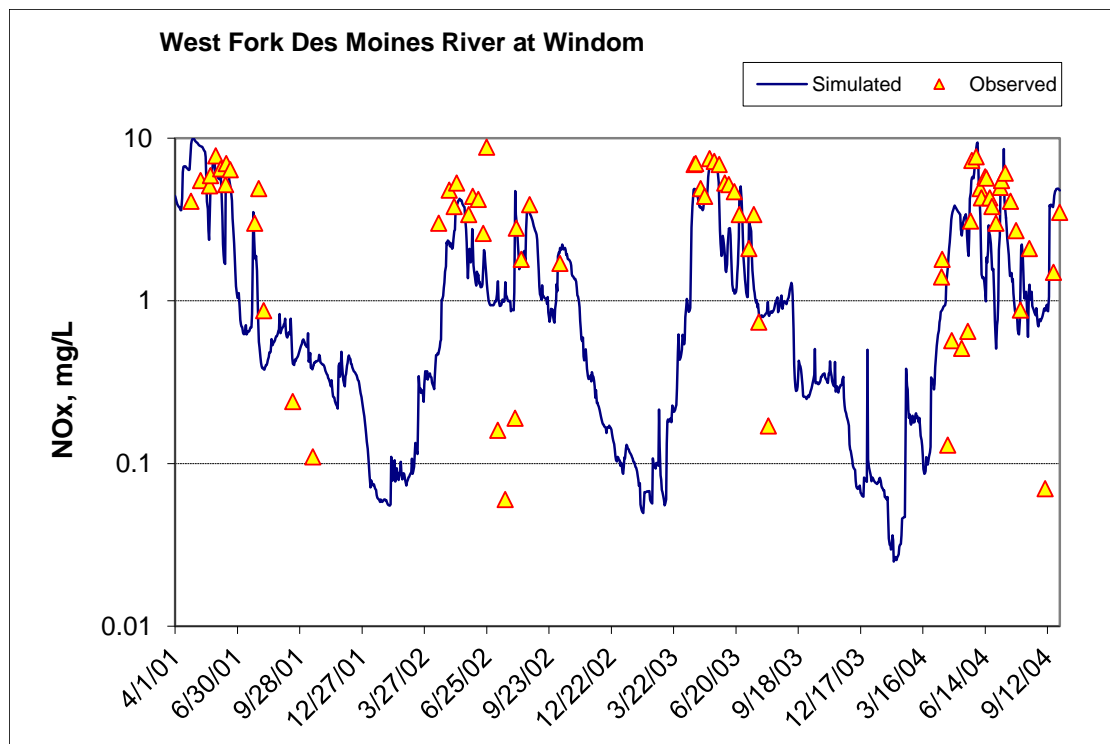


Figure 400. Time series of observed and simulated Nitrite+ Nitrate Nitrogen (NOx) concentration at West Fork Des Moines River at Windom (calibration period)

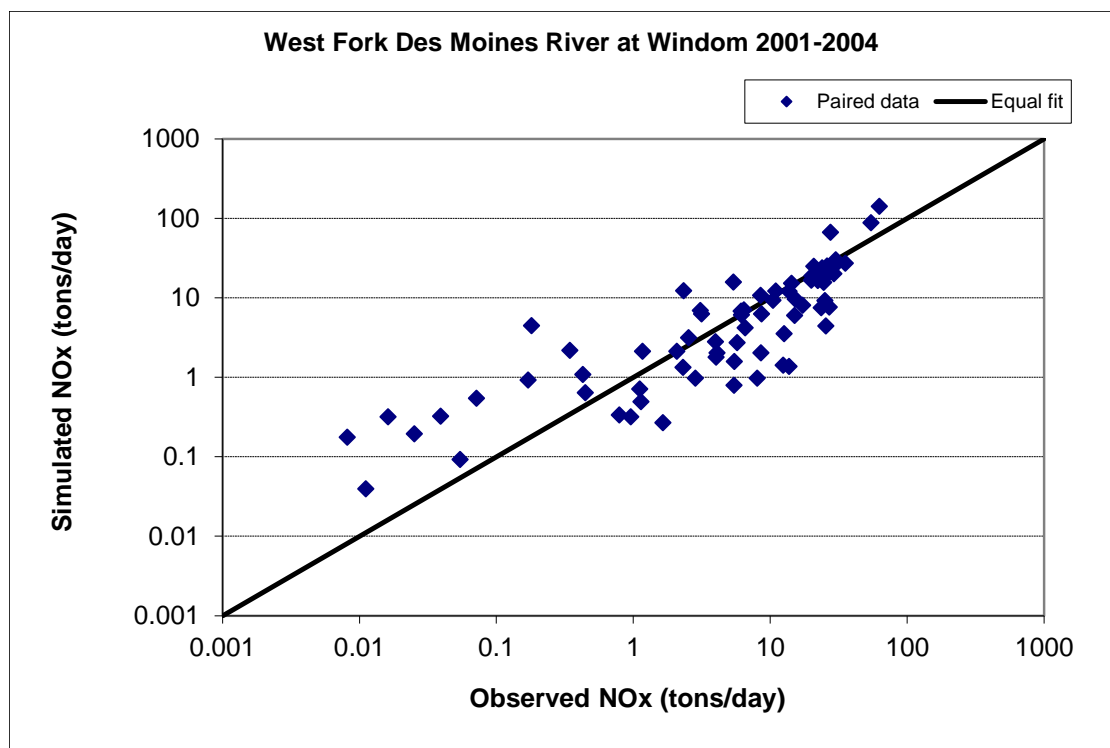


Figure 401. Paired simulated vs. observed Nitrite+ Nitrate Nitrogen (NOx) load at West Fork Des Moines River at Windom (calibration period)

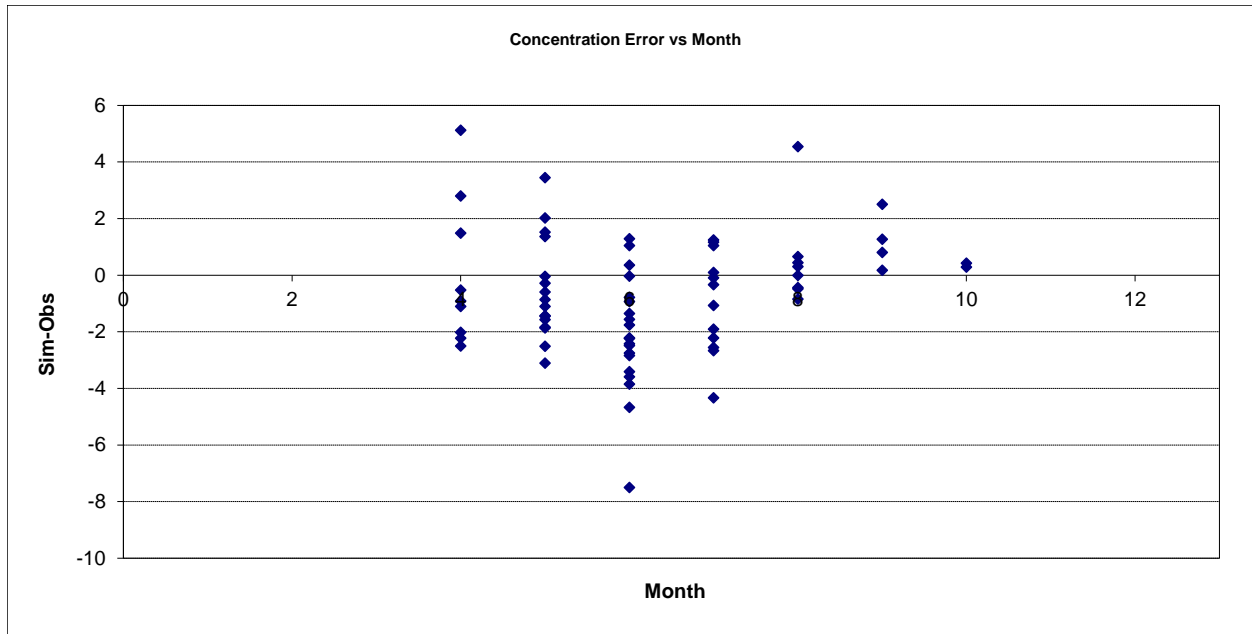


Figure 402. Residual (Simulated - Observed) vs. Month Nitrite+ Nitrate Nitrogen (NOx) at West Fork Des Moines River at Windom

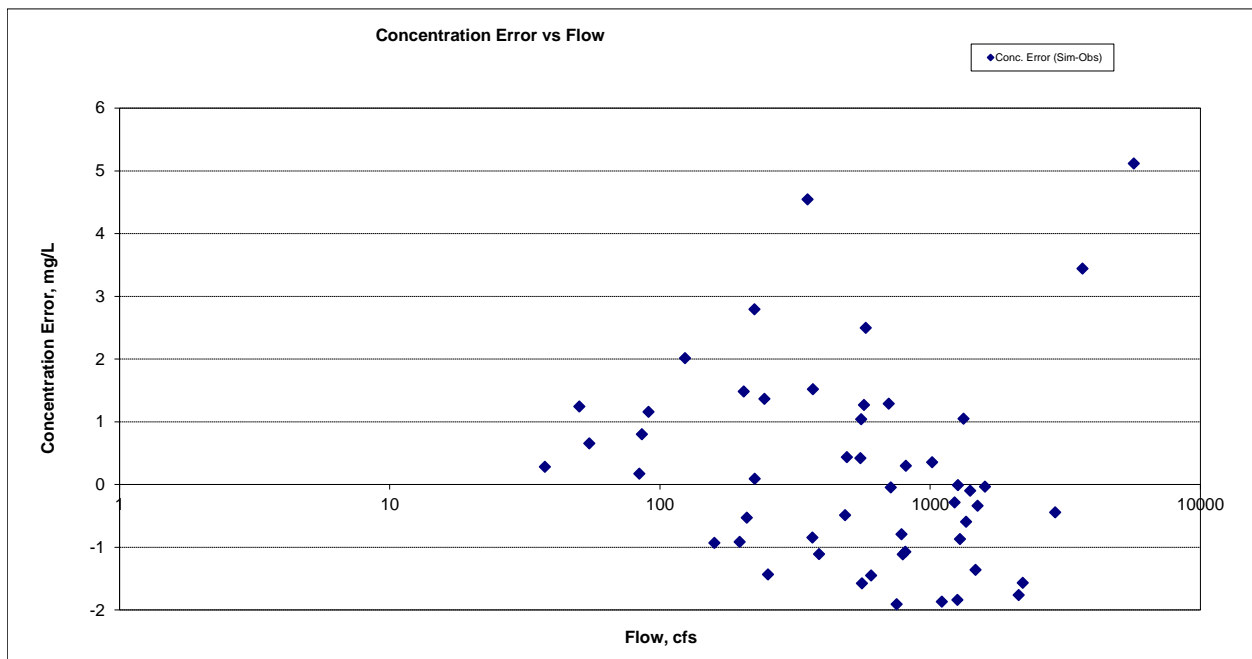


Figure 403. Residual (Simulated - Observed) vs. Flow Nitrite+ Nitrate Nitrogen (NOx) at West Fork Des Moines River at Windom

Total Nitrogen (TN)

Table 60. Total Nitrogen (TN) statistics

Period	2001-2004
Count	71
Concentration Average Error	-22.90%
Concentration Median Error	-19.90%
Load Average Error	-0.39%
Load Median Error	-11.42%
Paired t concentration	0.25

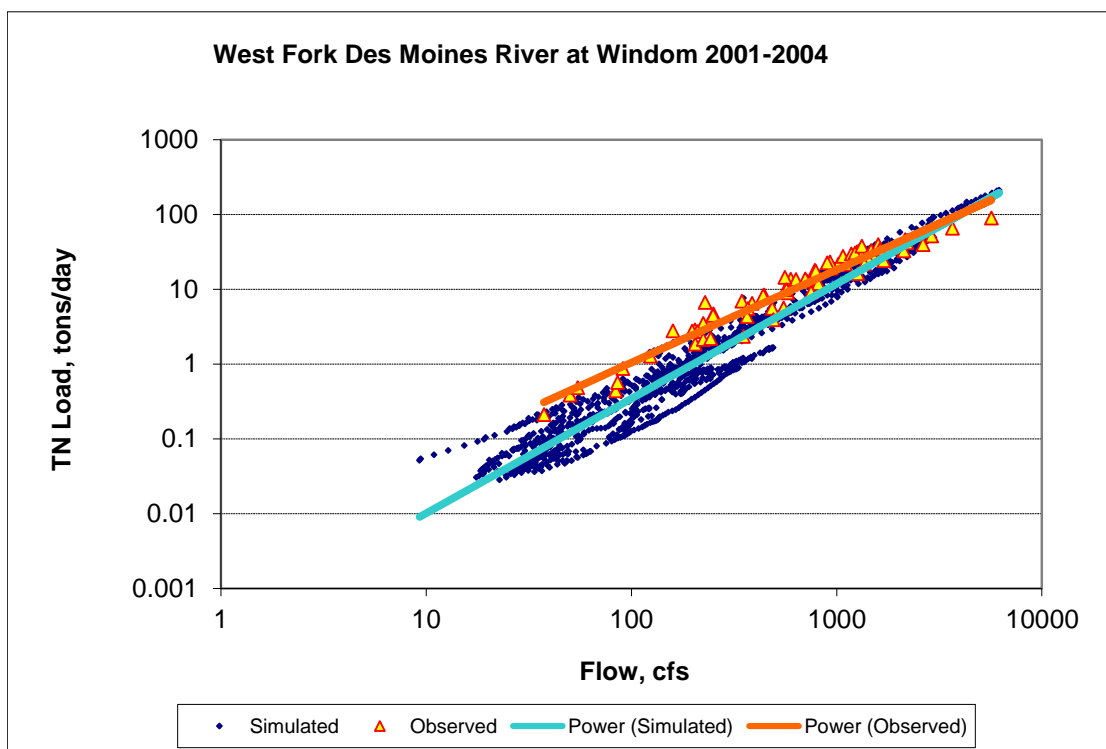


Figure 404. Power plot of simulated and observed Total Nitrogen (TN) load vs flow at West Fork Des Moines River at Windom (calibration period)

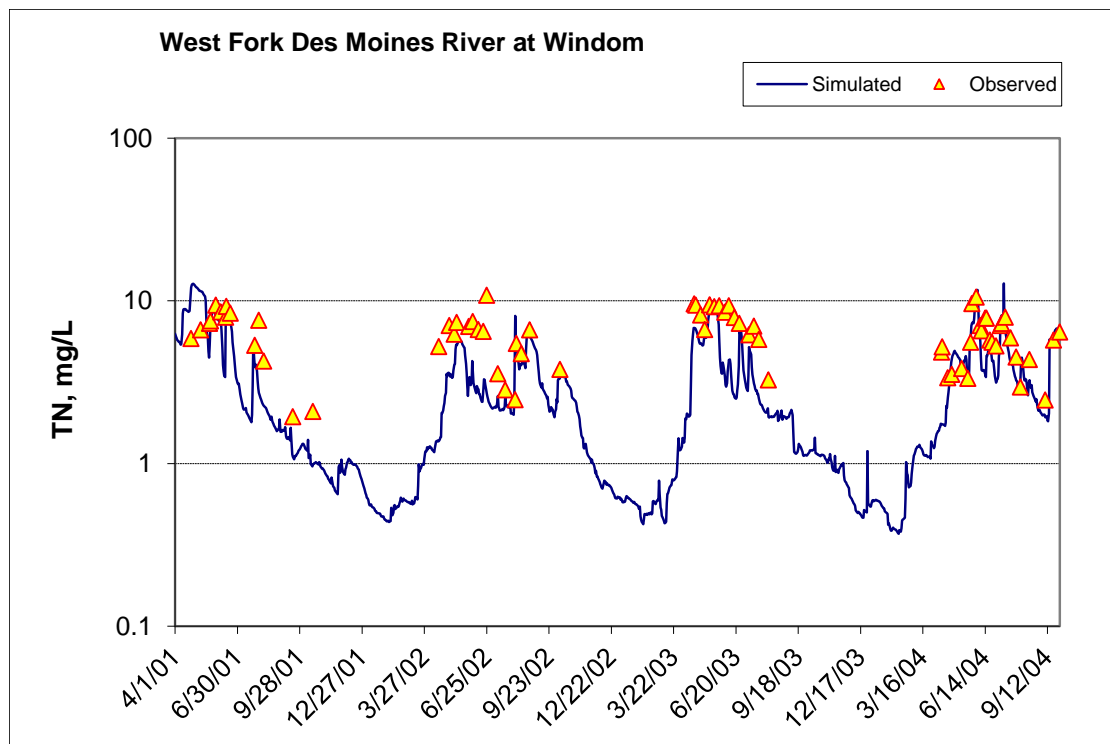


Figure 405. Time series of observed and simulated Total Nitrogen (TN) concentration at West Fork Des Moines River at Windom (calibration period)

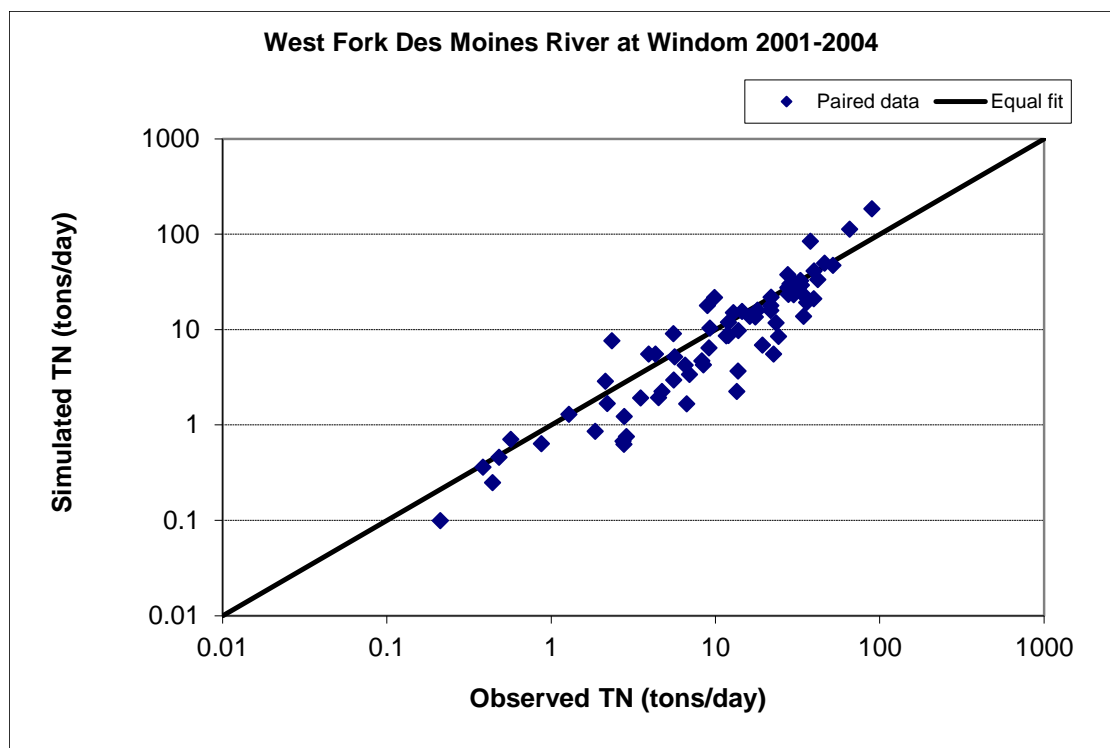


Figure 406. Paired simulated vs. observed Total Nitrogen (TN) load at West Fork Des Moines River at Windom (calibration period)

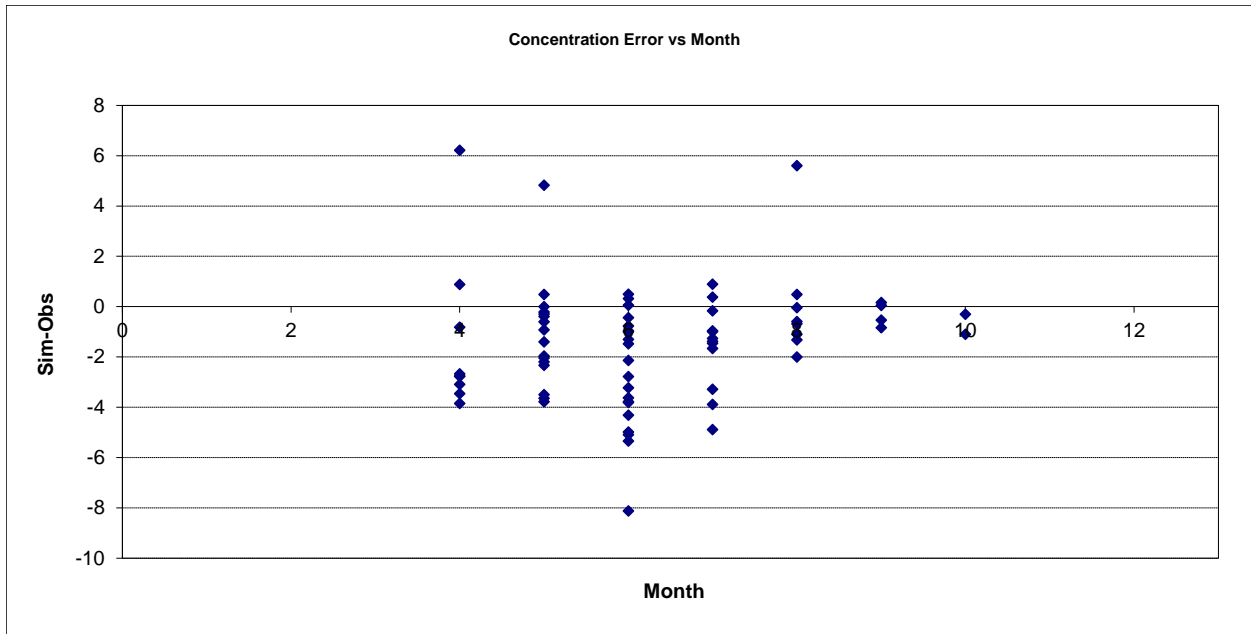


Figure 407. Residual (Simulated - Observed) vs. Month Total Nitrogen (TN) at West Fork Des Moines River at Windom

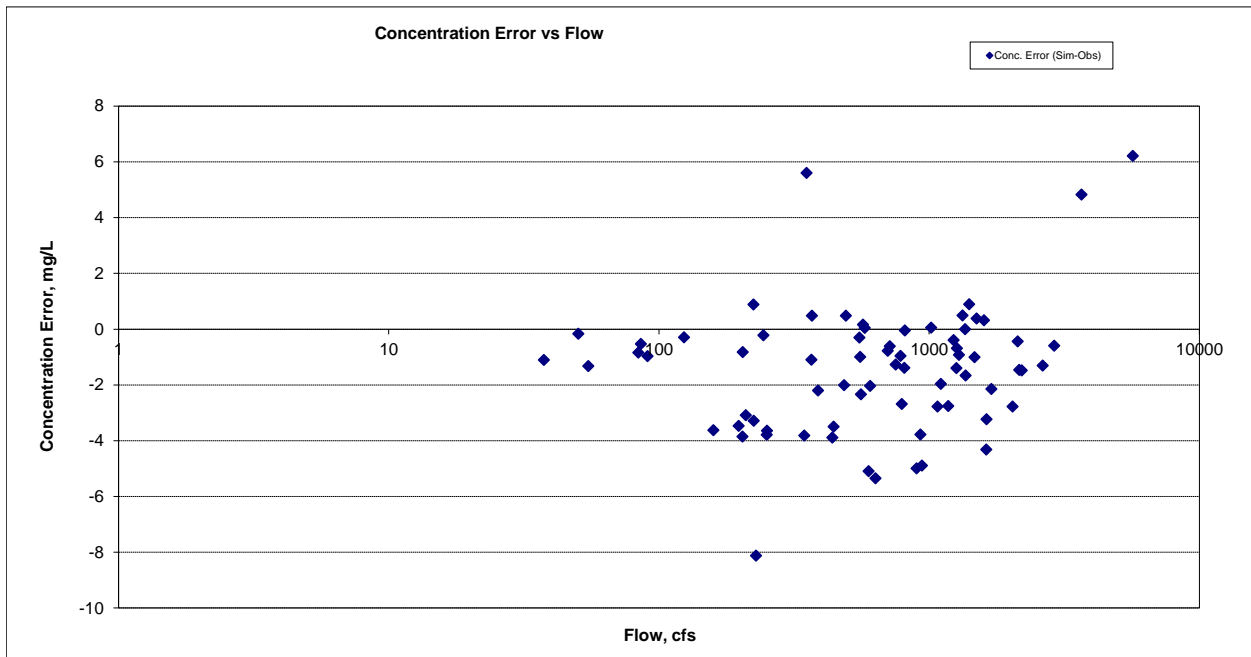


Figure 408. Residual (Simulated - Observed) vs. Flow Total Nitrogen (TN) at West Fork Des Moines River at Windom

Soluble Reactive Phosphorus (SRP)

Table 61. Soluble Reactive Phosphorus (SRP) statistics

Period	2001-2004
Count	74
Concentration Average Error	137.14%
Concentration Median Error	36.25%
Load Average Error	62.15%
Load Median Error	8.77%
Paired t concentration	0.00

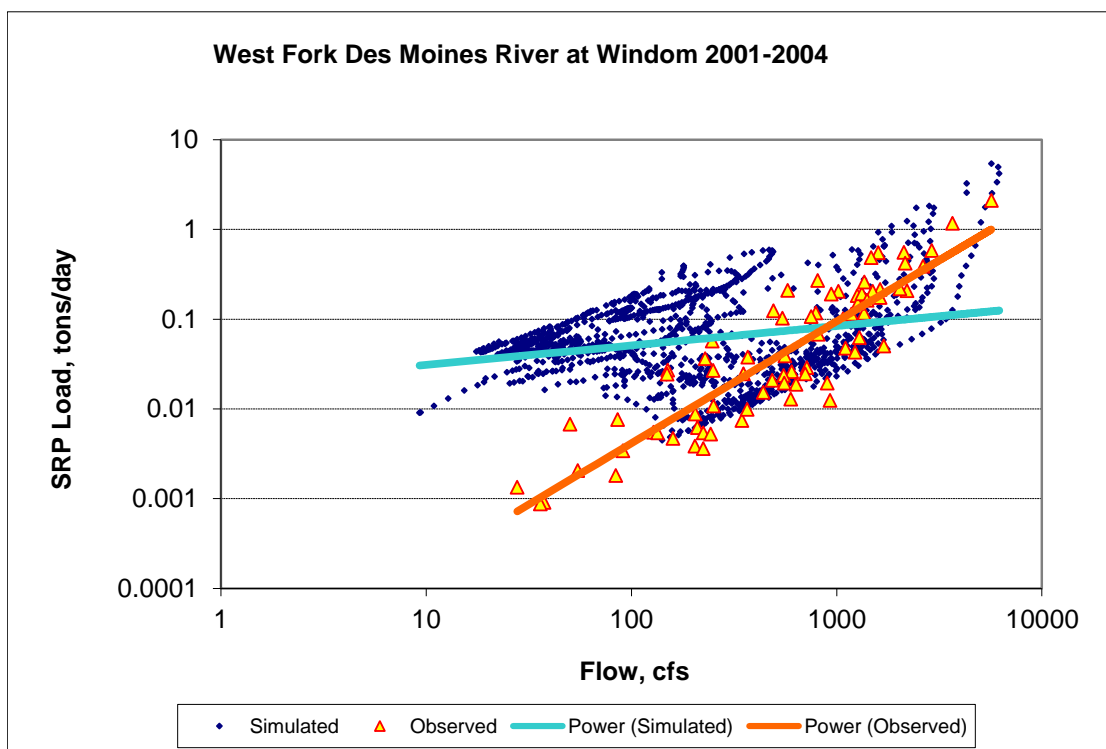


Figure 409. Power plot of simulated and observed Soluble Reactive Phosphorus (SRP) load vs flow at West Fork Des Moines River at Windom (calibration period)

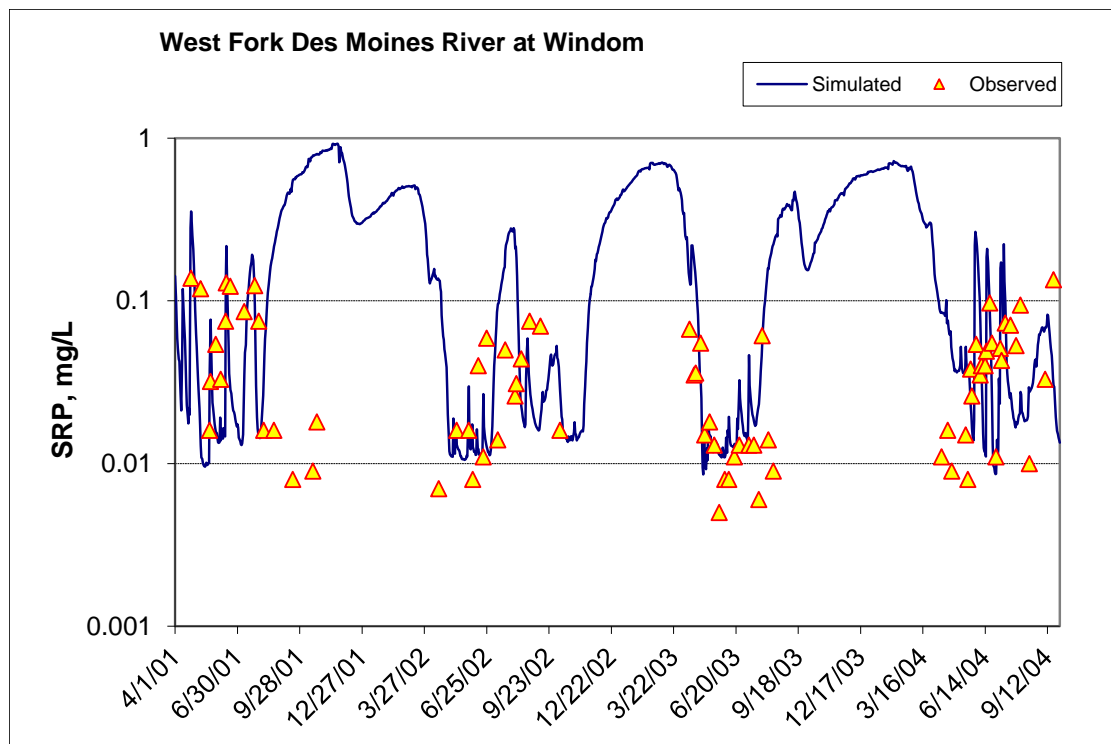


Figure 410. Time series of observed and simulated Soluble Reactive Phosphorus (SRP) concentration at West Fork Des Moines River at Windom (calibration period)

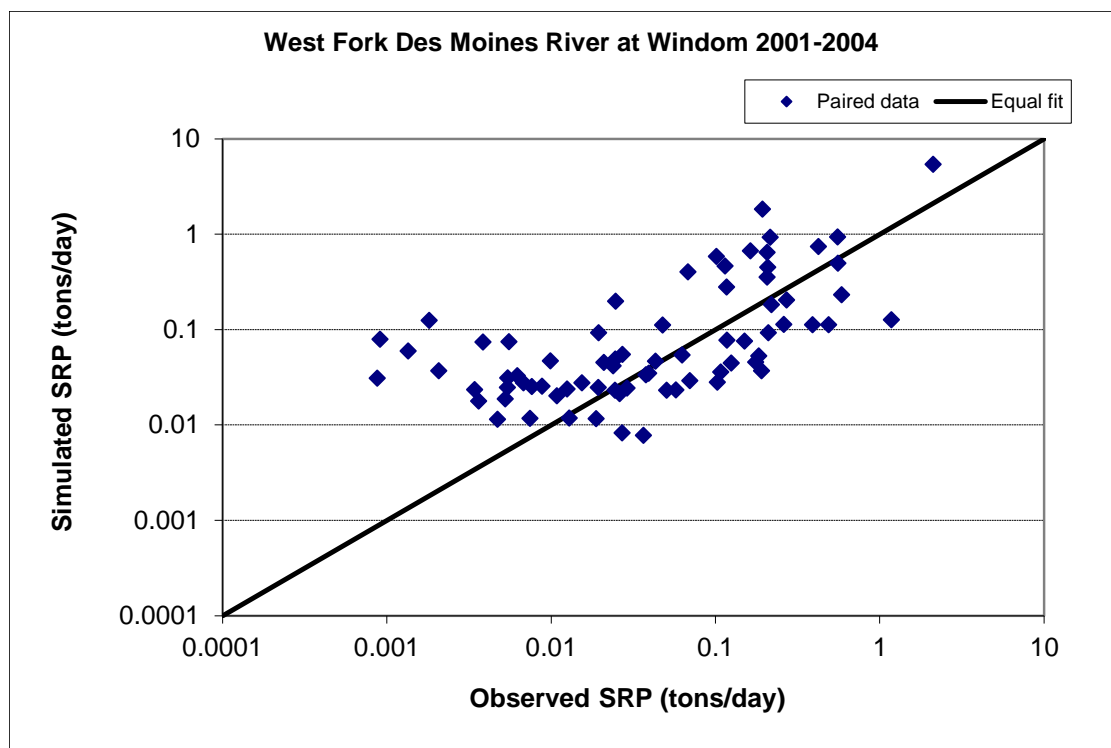


Figure 411. Paired simulated vs. observed Soluble Reactive Phosphorus (SRP) load at West Fork Des Moines River at Windom (calibration period)

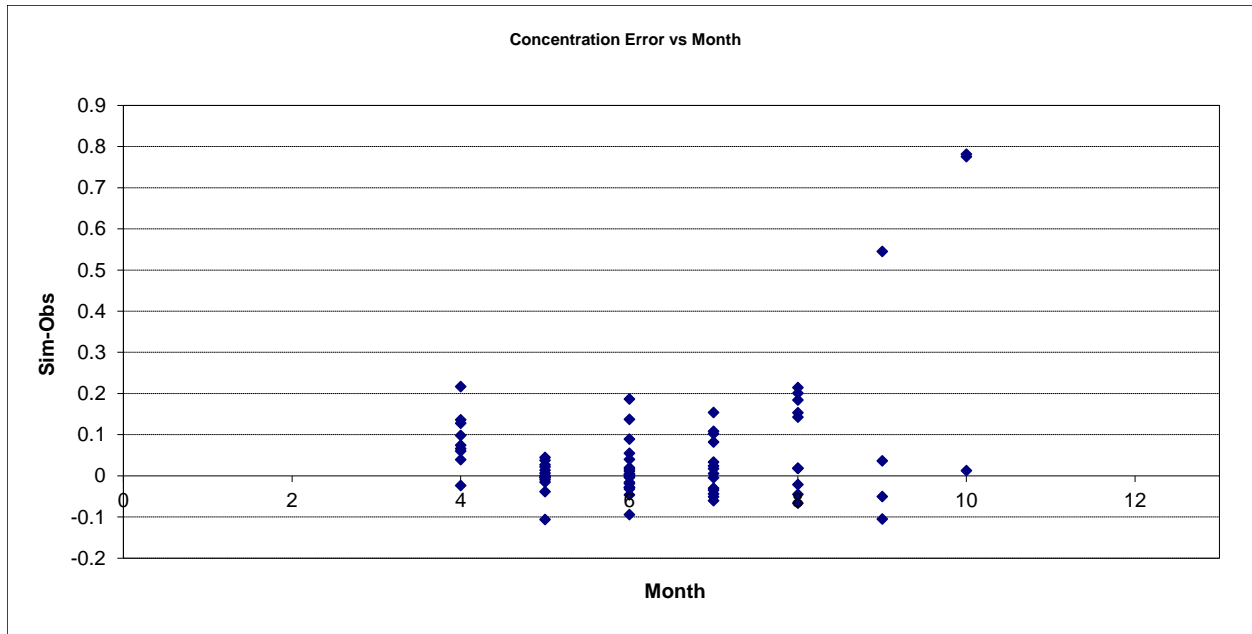


Figure 412. Residual (Simulated - Observed) vs. Month Soluble Reactive Phosphorus (SRP) at West Fork Des Moines River at Windom

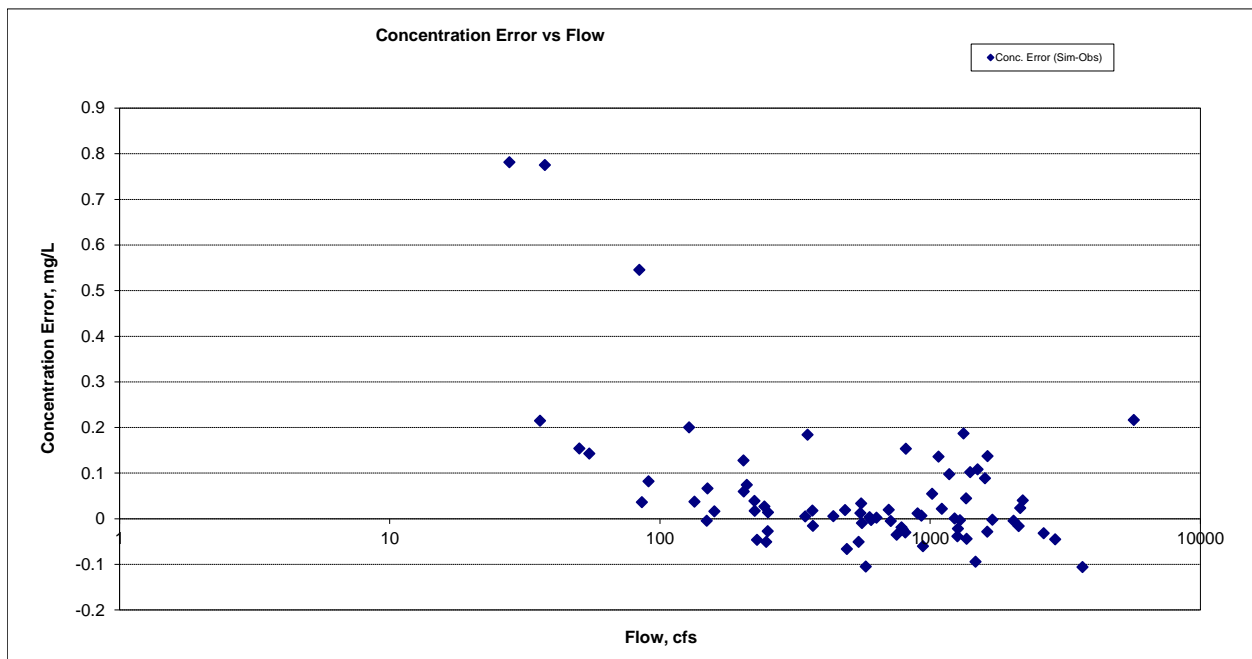


Figure 413. Residual (Simulated - Observed) vs. Flow Soluble Reactive Phosphorus (SRP) at West Fork Des Moines River at Windom

Organic Phosphorus (OrgP)

Table 62. Organic Phosphorus (OrgP) statistics

Period	2001-2004
Count	74
Concentration Average Error	-45.01%
Concentration Median Error	-45.03%
Load Average Error	-17.66%
Load Median Error	-22.39%
Paired t concentration	0.00

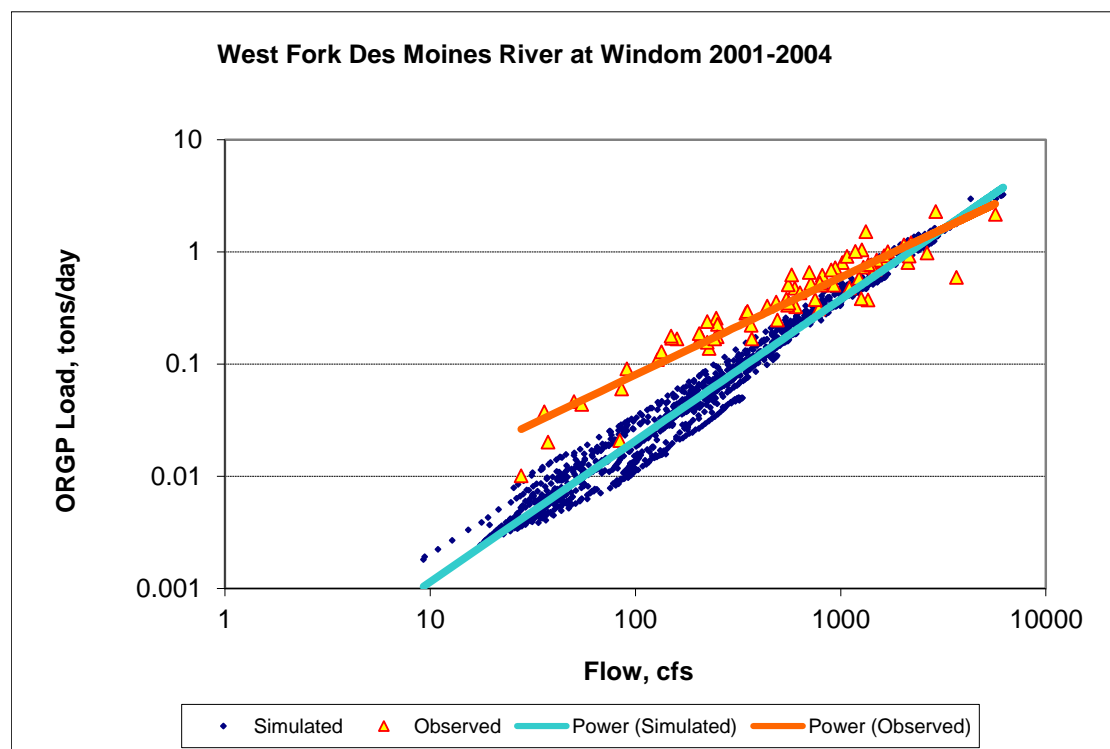


Figure 414. Power plot of simulated and observed Organic Phosphorus (OrgP) load vs flow at West Fork Des Moines River at Windom (calibration period)

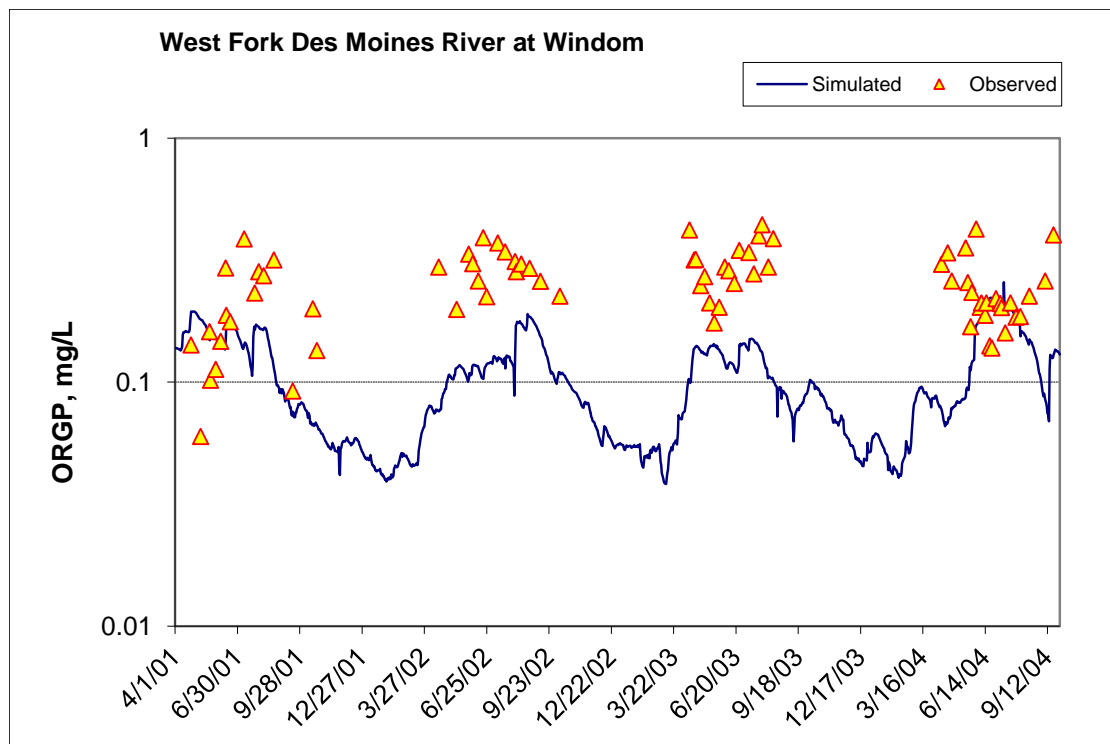


Figure 415. Time series of observed and simulated Organic Phosphorus (OrgP) concentration at West Fork Des Moines River at Windom (calibration period)

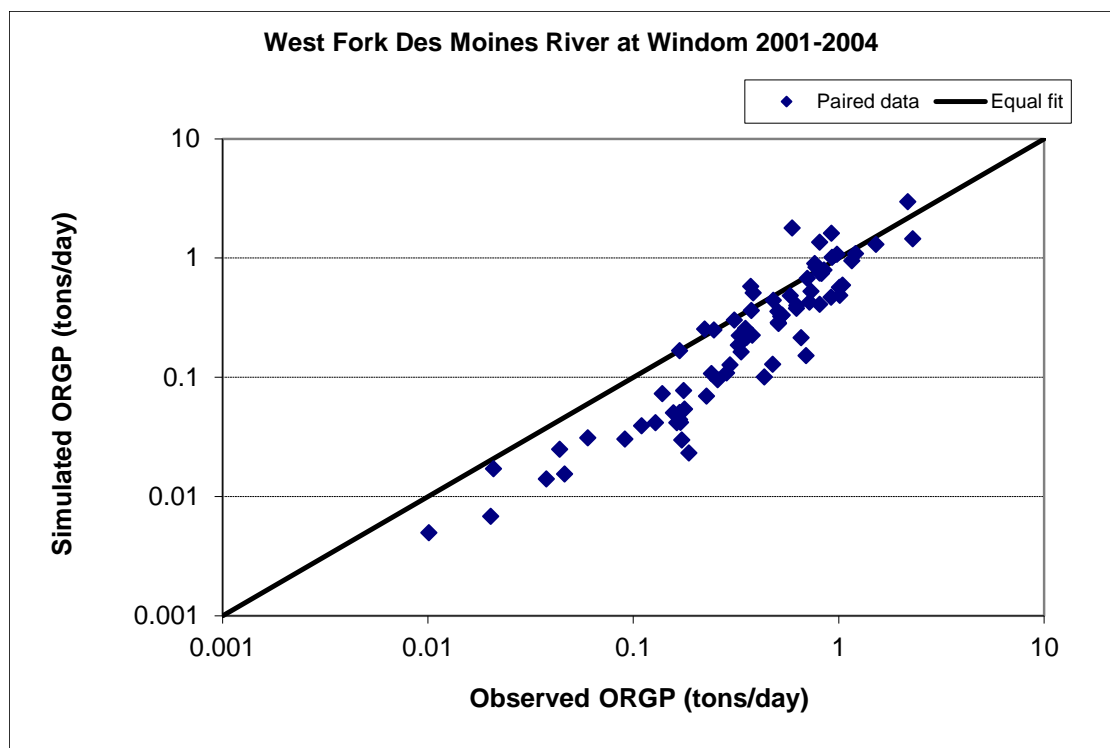


Figure 416. Paired simulated vs. observed Organic Phosphorus (OrgP) load at West Fork Des Moines River at Windom (calibration period)

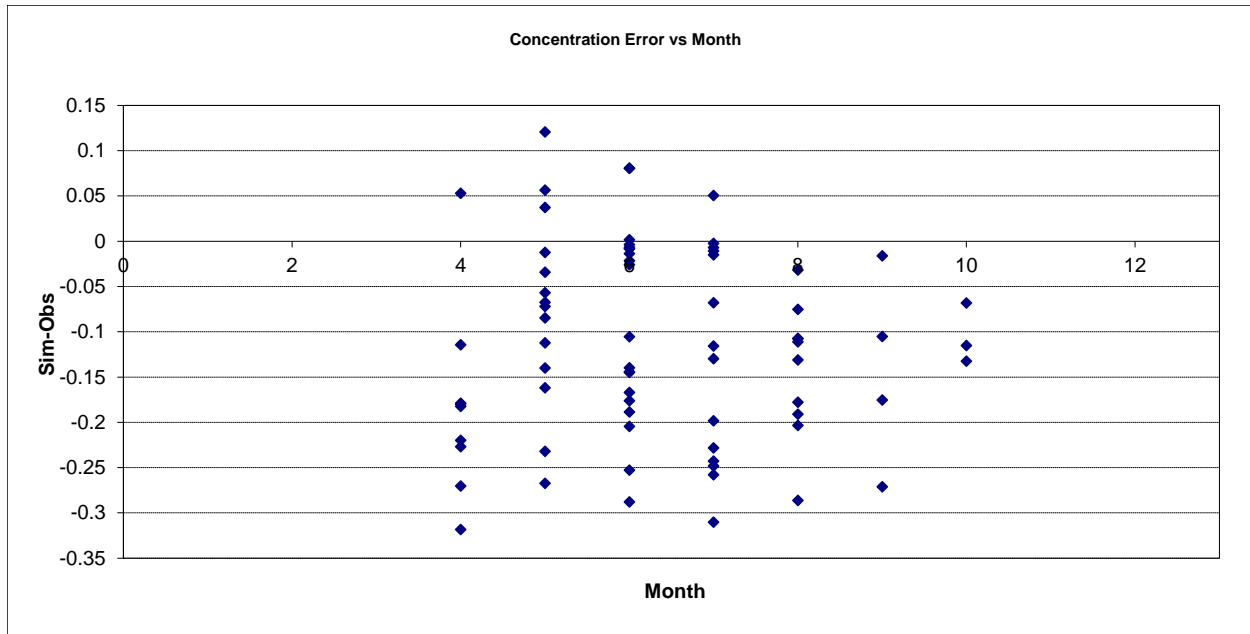


Figure 417. Residual (Simulated - Observed) vs. Month Organic Phosphorus (OrgP) at West Fork Des Moines River at Windom

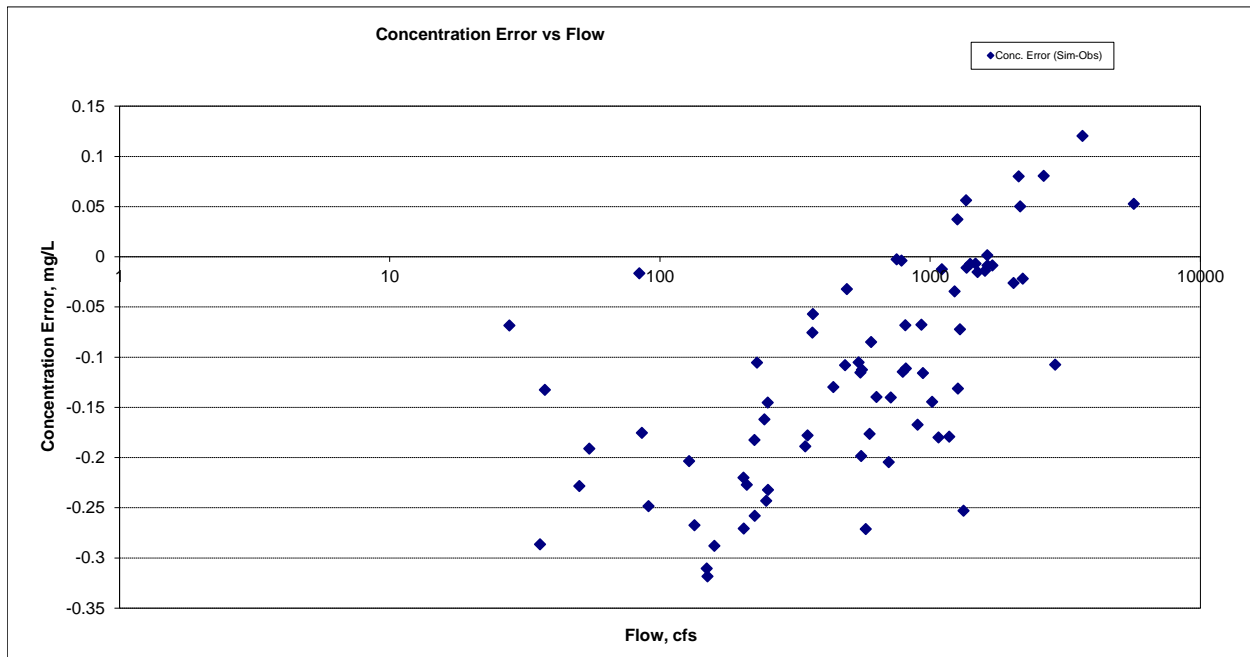


Figure 418. Residual (Simulated - Observed) vs. Flow Organic Phosphorus (OrgP) at West Fork Des Moines River at Windom

Total Phosphorus (TP)

Table 63. Total Phosphorus (TP) statistics

Period	2001-2004
Count	80
Concentration Average Error	-20.39%
Concentration Median Error	-31.10%
Load Average Error	-0.72%
Load Median Error	-15.16%
Paired t concentration	0.47

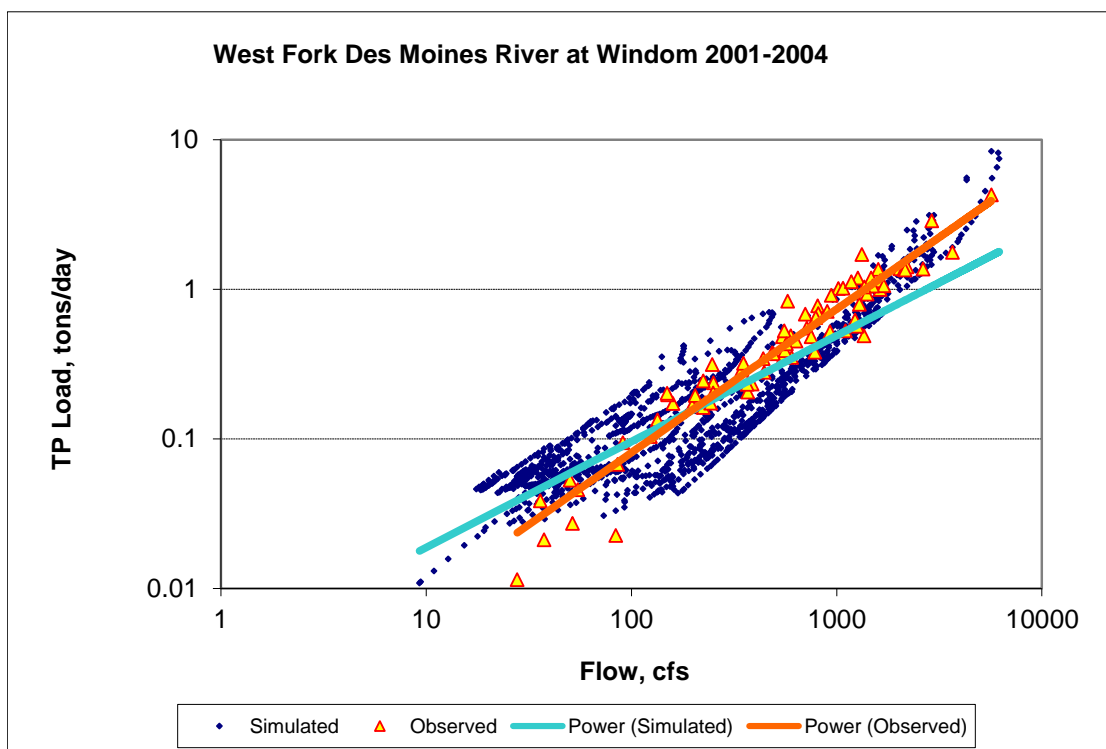


Figure 419. Power plot of simulated and observed Total Phosphorus (TP) load vs flow at West Fork Des Moines River at Windom (calibration period)

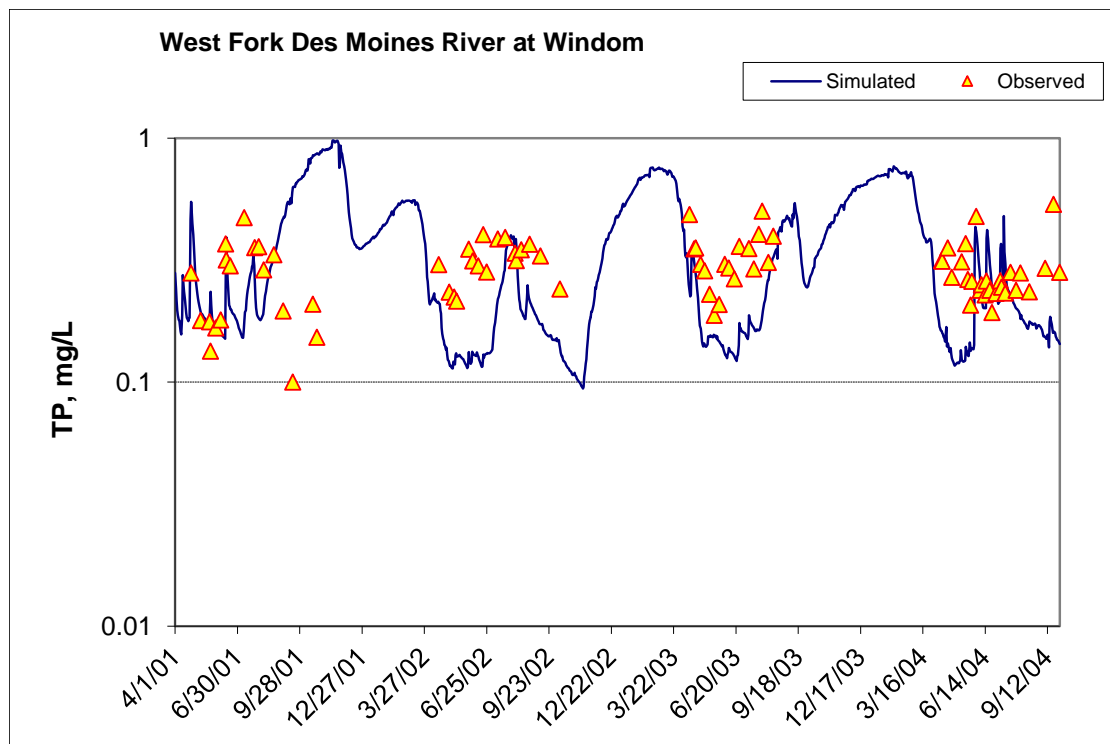


Figure 420. Time series of observed and simulated Total Phosphorus (TP) concentration at West Fork Des Moines River at Windom (calibration period)

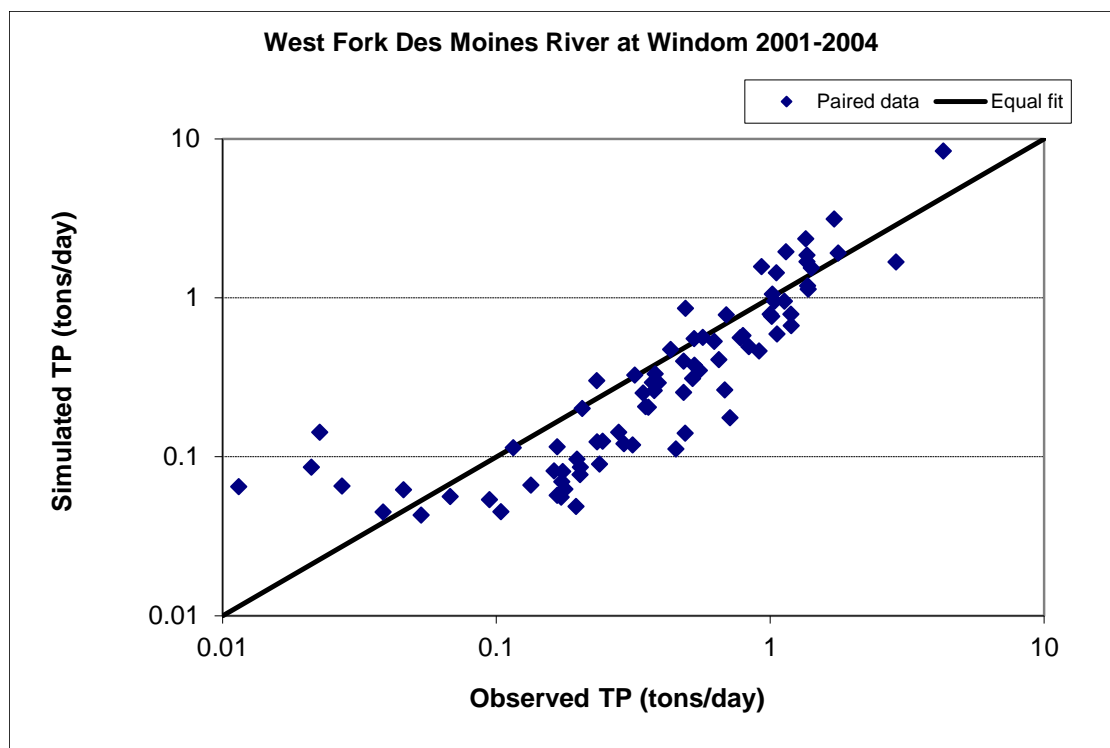


Figure 421. Paired simulated vs. observed Total Phosphorus (TP) load at West Fork Des Moines River at Windom (calibration period)

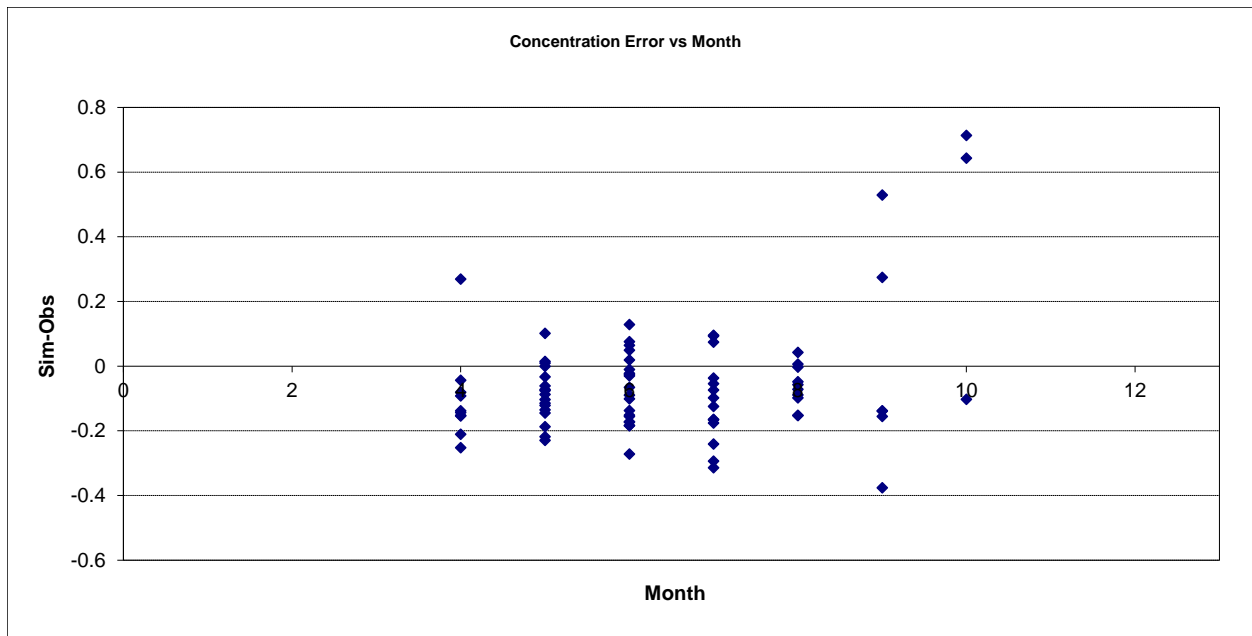


Figure 422. Residual (Simulated - Observed) vs. Month Total Phosphorus (TP) at West Fork Des Moines River at Windom

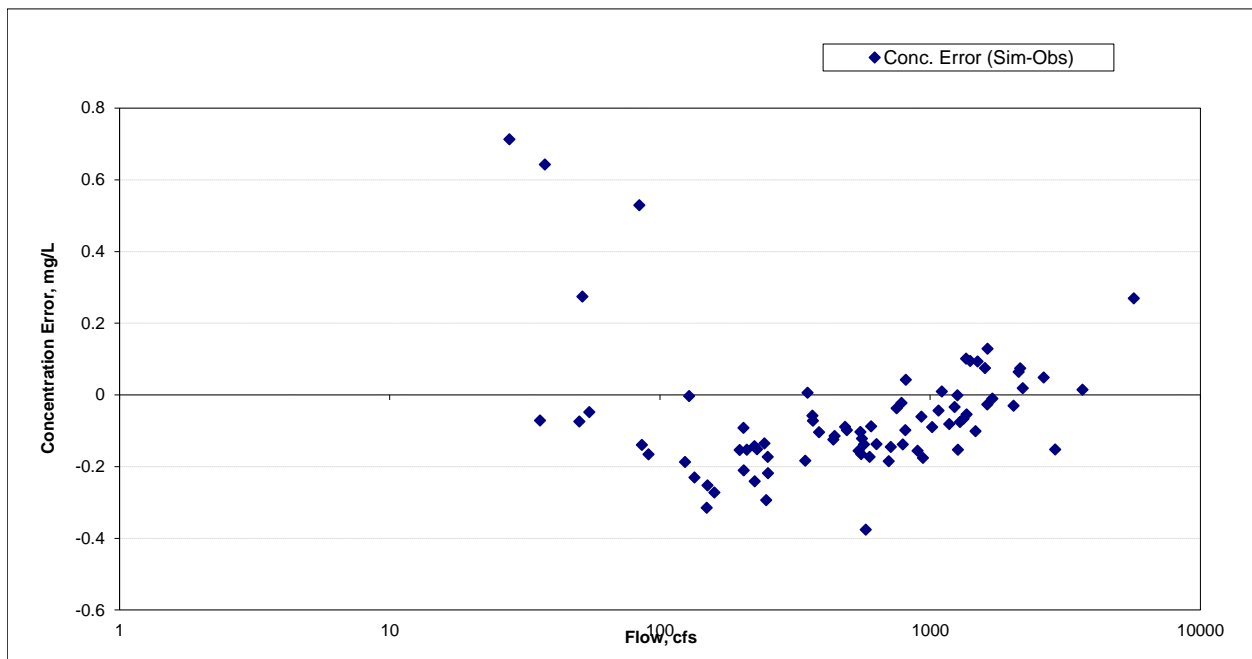


Figure 423. Residual (Simulated - Observed) vs. Flow Total Phosphorus (TP) at West Fork Des Moines River at Windom

West Fork Des Moines River at Jackson (S000-297, S004-359, S005-936)

Total Suspended Solids (TSS)

Table 64. Total Suspended Solids (TSS) statistics

Period	2002-2014	2001-2002
Count	303	33
Concentration Average Error	9.89%	29.29%
Concentration Median Error	-7.96%	2.91%
Load Average Error	131.22%	95.60%
Load Median Error	-0.26%	0.10%
Paired t concentration	0.90	0.28

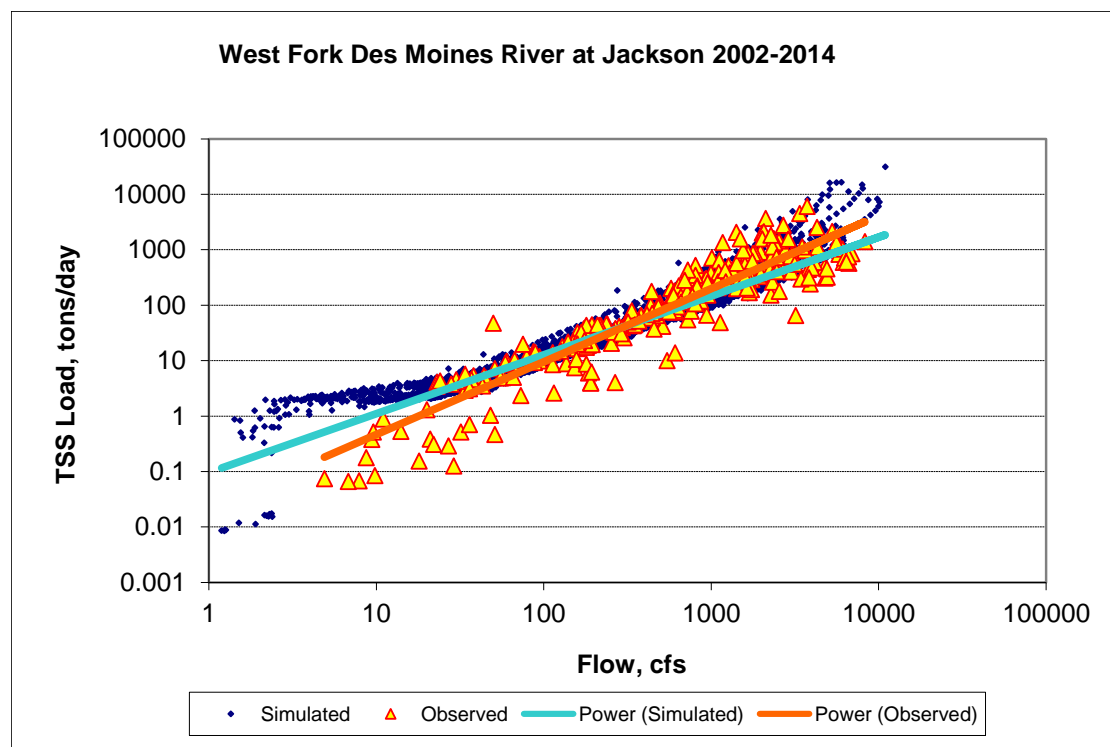


Figure 424. Power plot of simulated and observed Total Suspended Solids (TSS) load vs flow at West Fork Des Moines River at Jackson (calibration period)

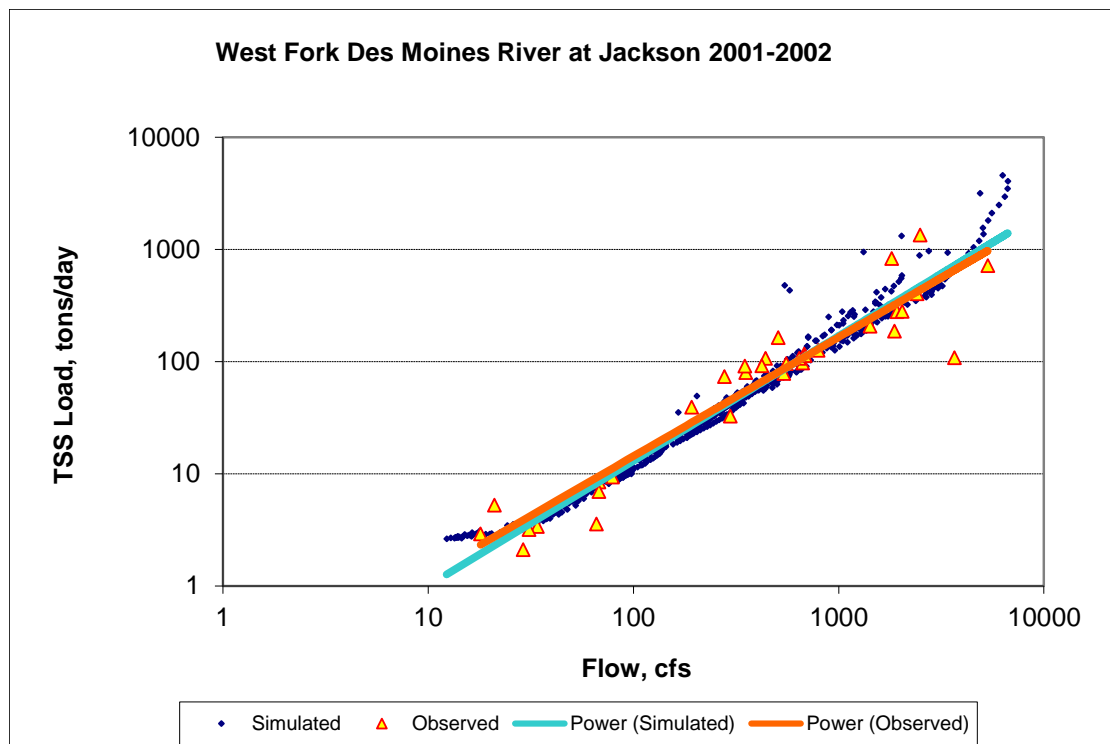


Figure 425. Power plot of simulated and observed Total Suspended Solids (TSS) load vs flow at West Fork Des Moines River at Jackson (validation period)

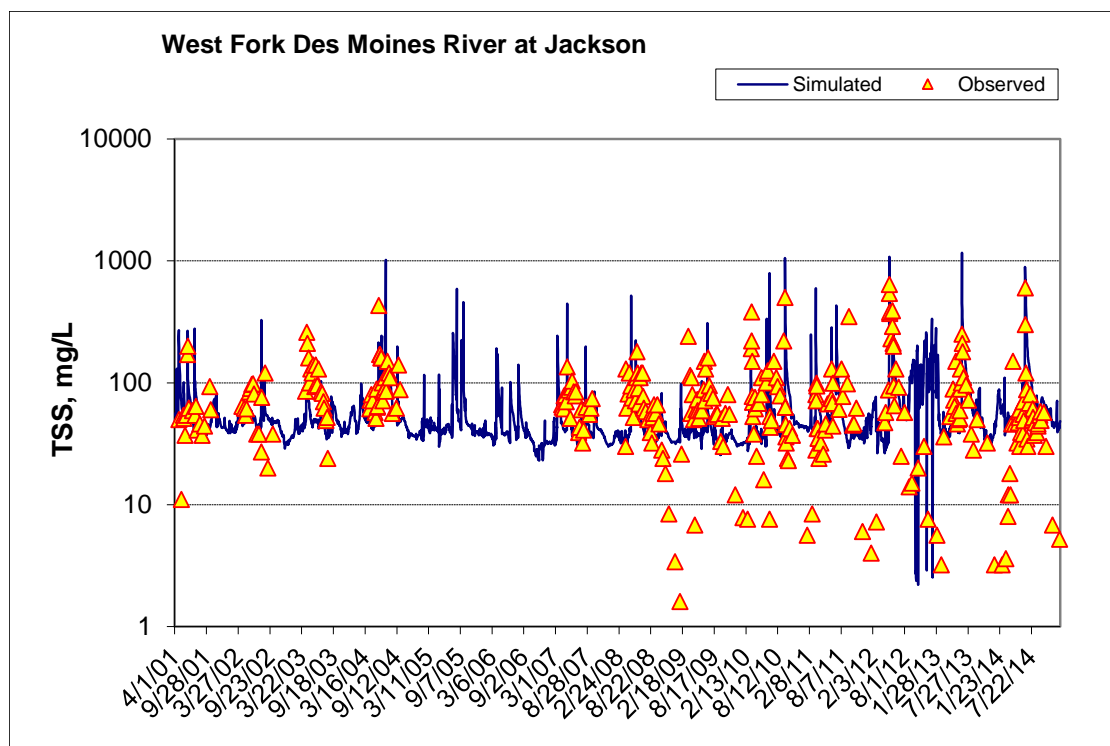


Figure 426. Time series of observed and simulated Total Suspended Solids (TSS) concentration at West Fork Des Moines River at Jackson (calibration period)

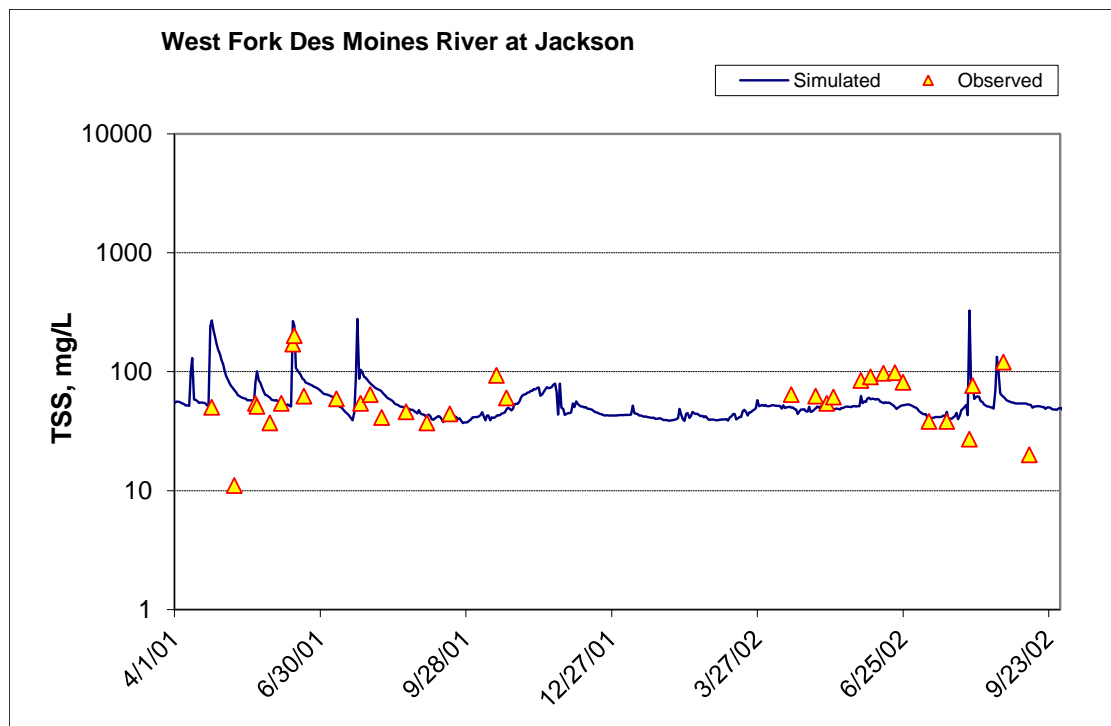


Figure 427. Time series of observed and simulated Total Suspended Solids (TSS) concentration at West Fork Des Moines River at Jackson (validation period)

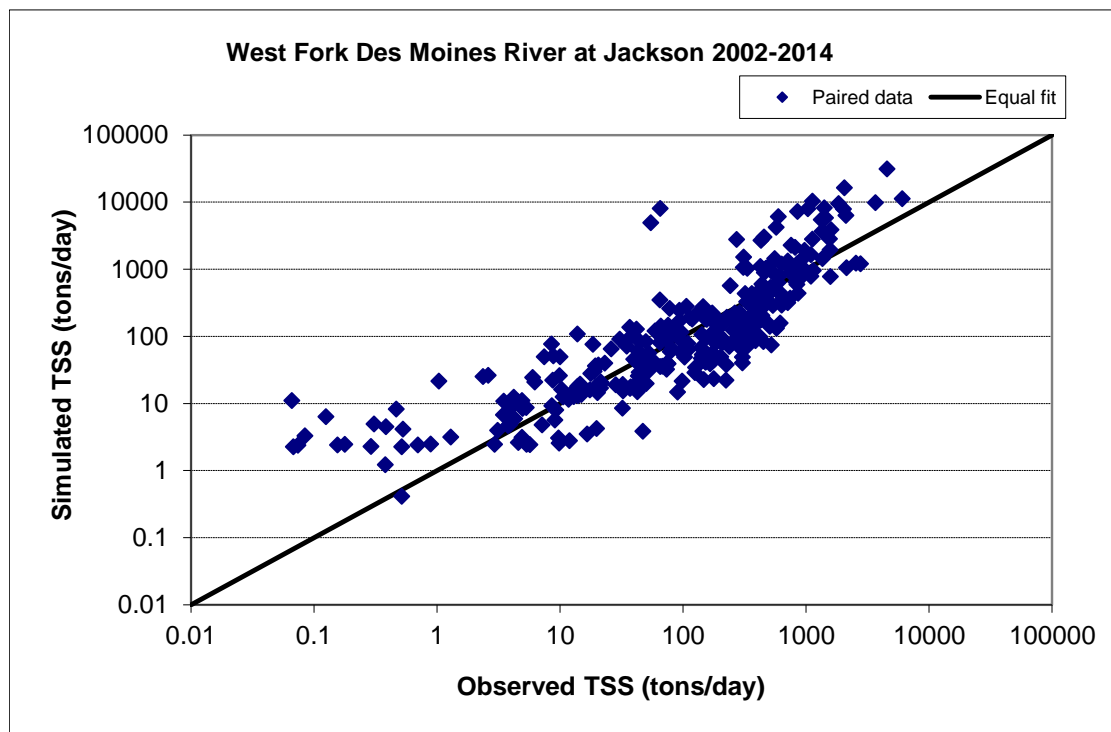


Figure 428. Paired simulated vs. observed Total Suspended Solids (TSS) load at West Fork Des Moines River at Jackson (calibration period)

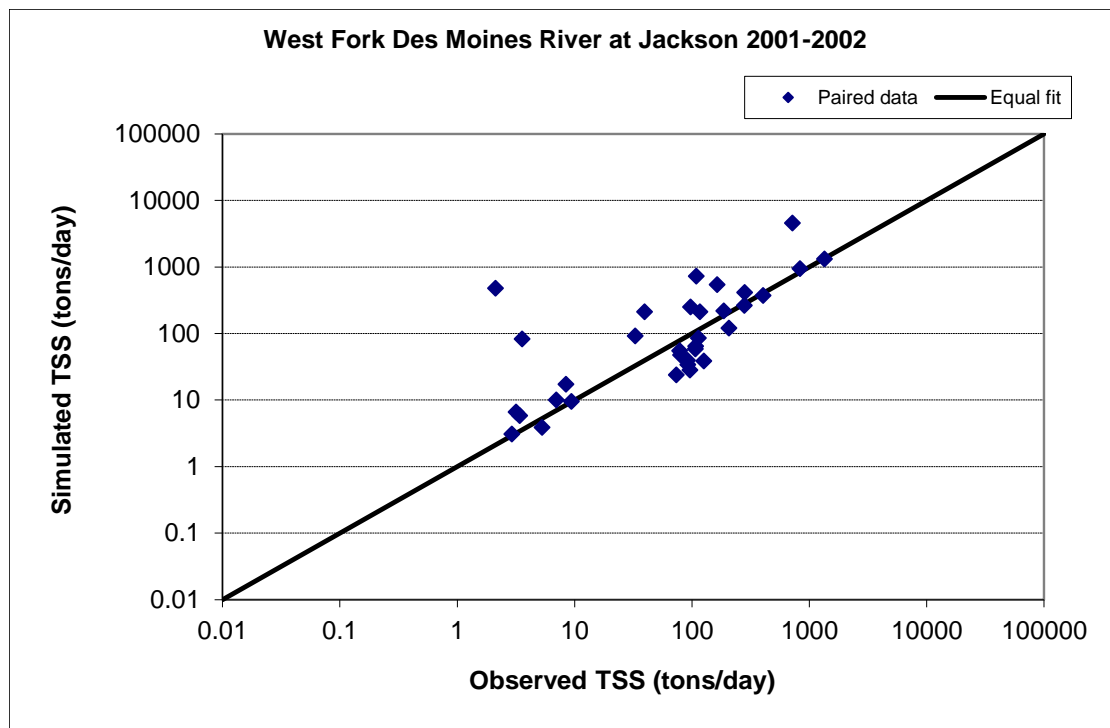


Figure 429. Paired simulated vs. observed Total Suspended Solids (TSS) load at West Fork Des Moines River at Jackson (validation period)

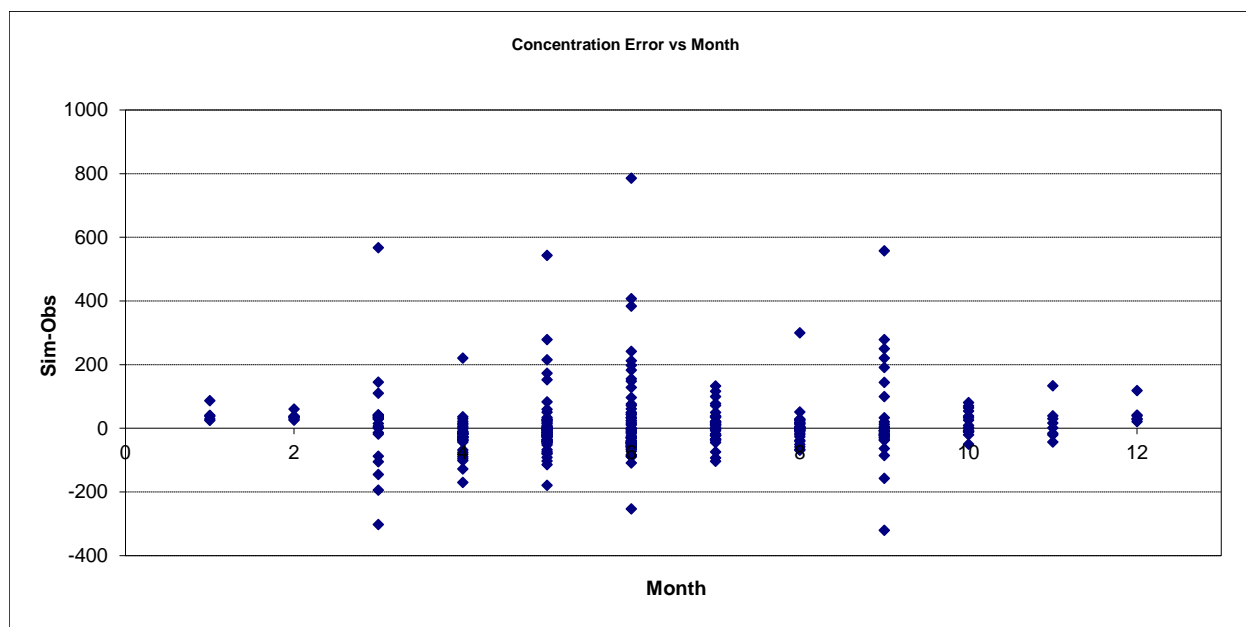


Figure 430. Residual (Simulated - Observed) vs. Month Total Suspended Solids (TSS) at West Fork Des Moines River at Jackson

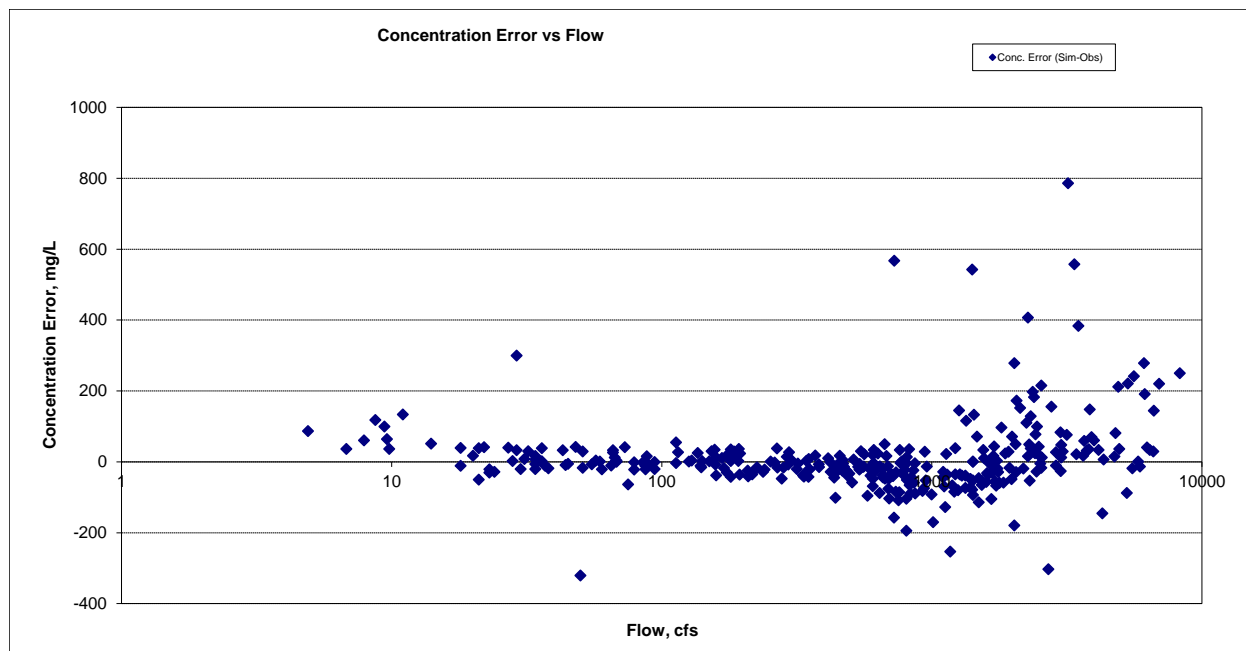


Figure 431. Residual (Simulated - Observed) vs. Flow Total Suspended Solids (TSS) at West Fork Des Moines River at Jackson

Ammonia Nitrogen (NH₃)

Table 65. Ammonia Nitrogen (NH₃) statistics

Period	2002-2014	2001-2002
Count	99	12
Concentration Average Error	110.14%	144.33%
Concentration Median Error	136.34%	140.51%
Load Average Error	313.15%	437.77%
Load Median Error	153.08%	270.38%
Paired t concentration	0.00	0.03

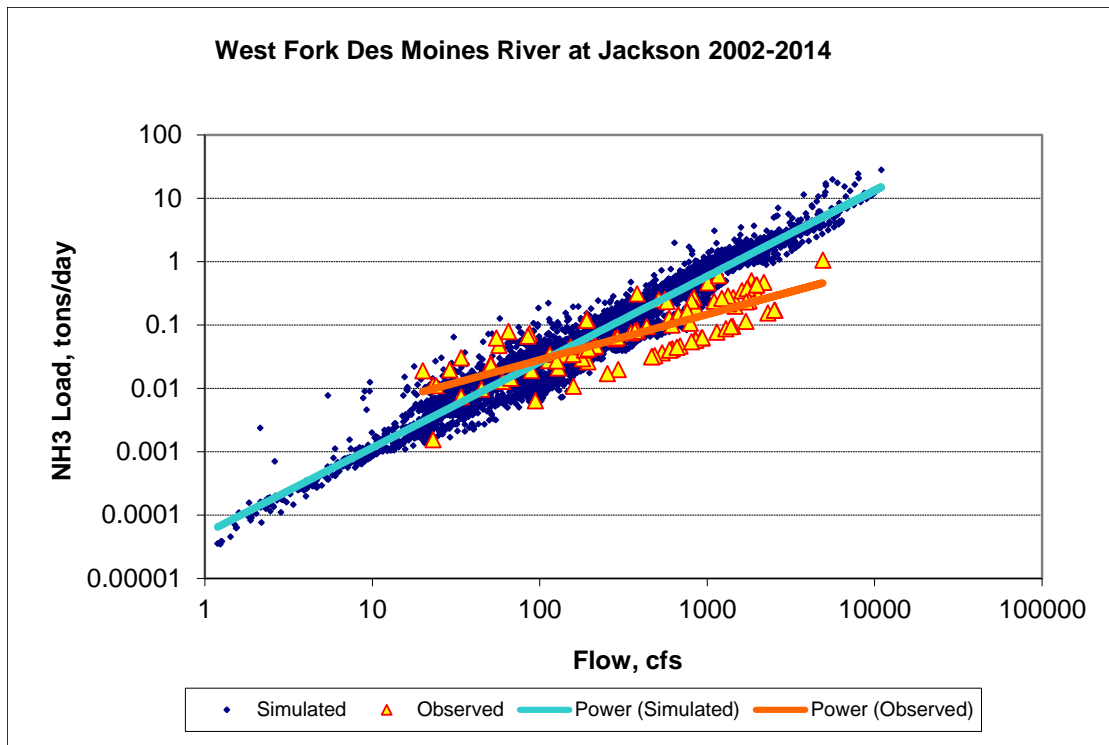


Figure 432. Power plot of simulated and observed Ammonia Nitrogen (NH3) load vs flow at West Fork Des Moines River at Jackson (calibration period)

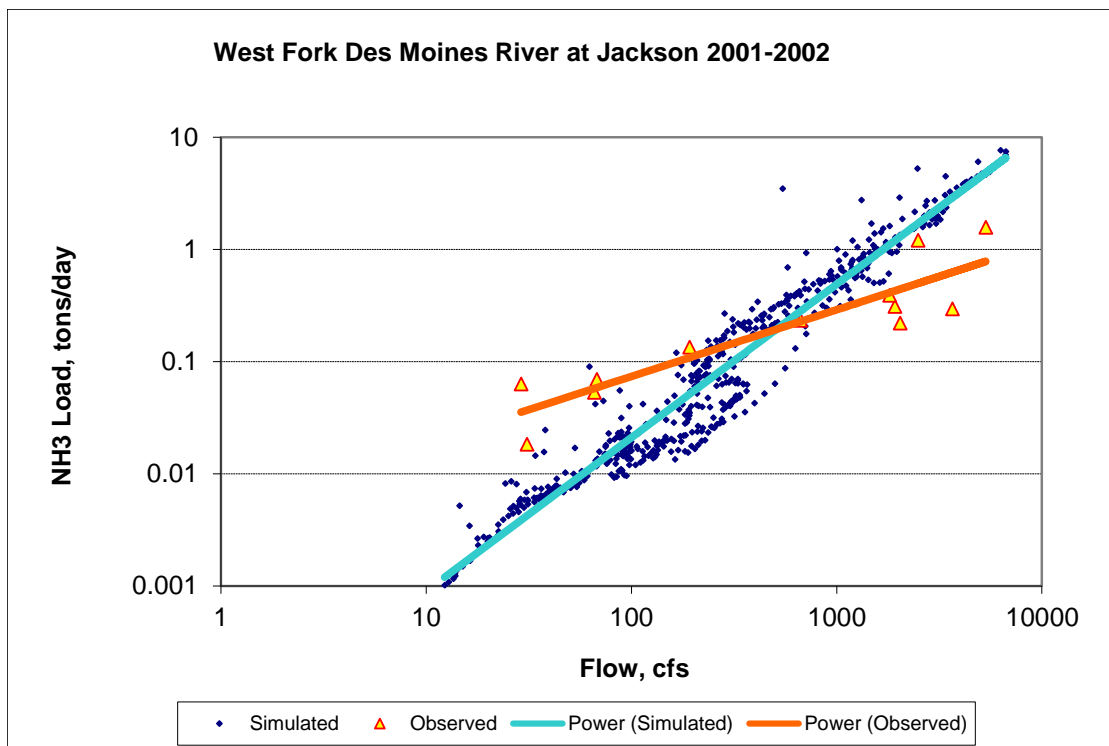


Figure 433. Power plot of simulated and observed Ammonia Nitrogen (NH3) load vs flow at West Fork Des Moines River at Jackson (validation period)

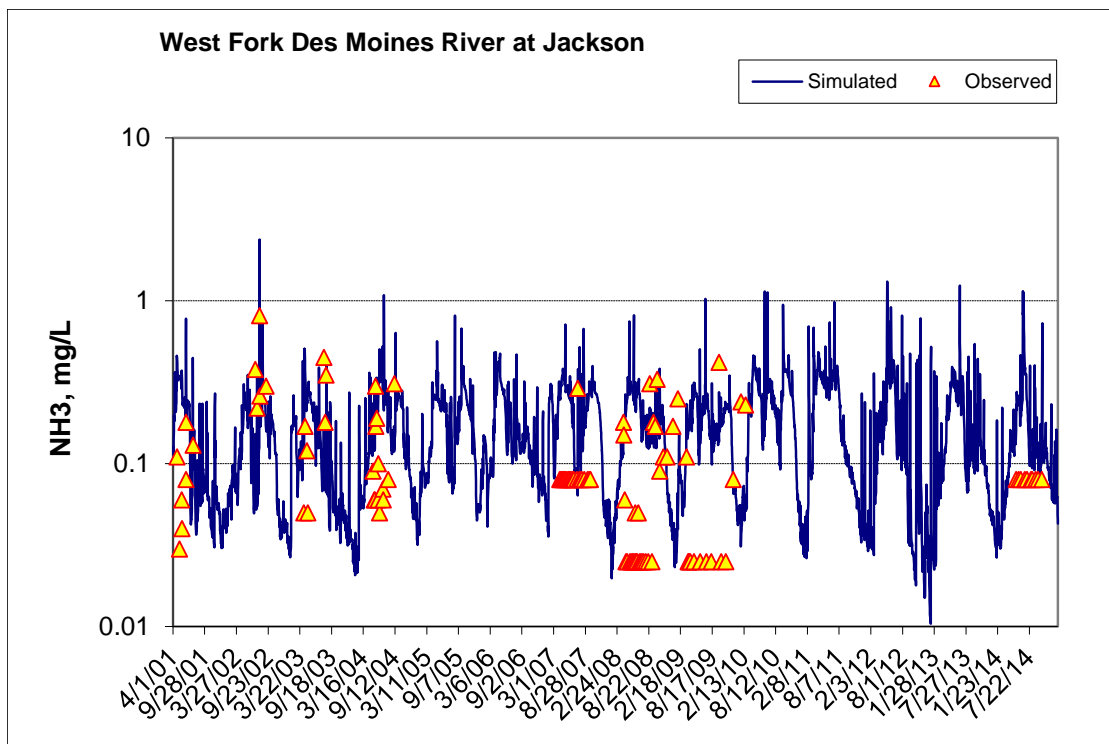


Figure 434. Time series of observed and simulated Ammonia Nitrogen (NH3) concentration at West Fork Des Moines River at Jackson (calibration period)

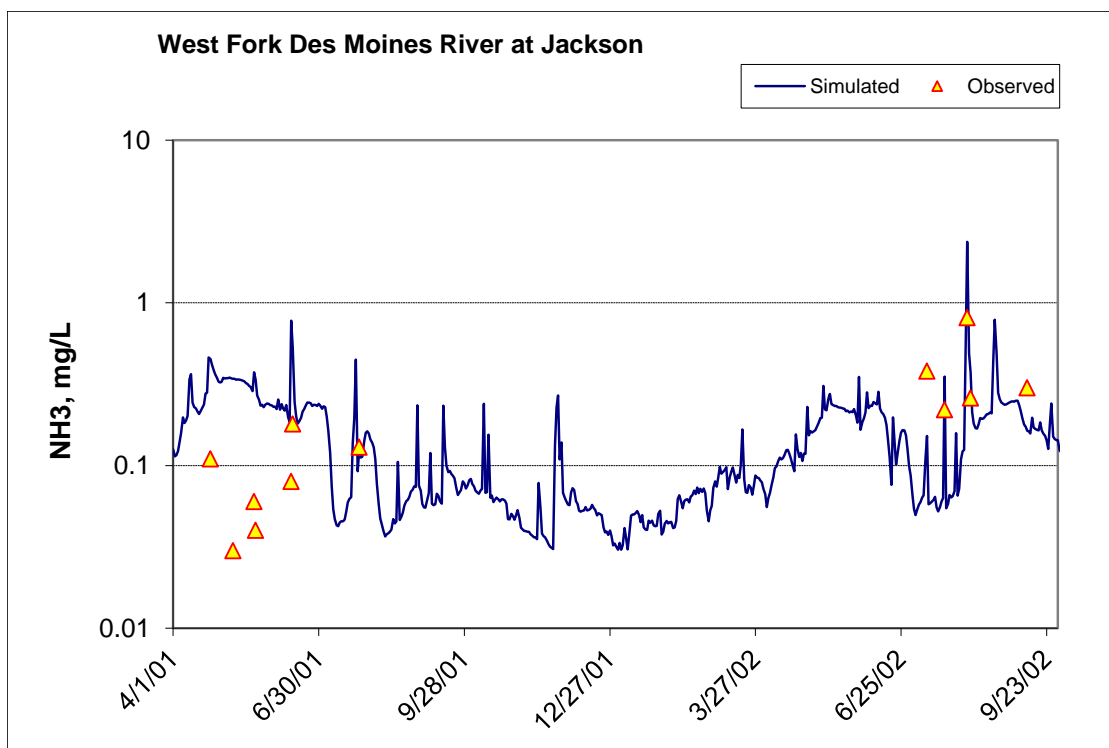


Figure 435. Time series of observed and simulated Ammonia Nitrogen (NH3) concentration at West Fork Des Moines River at Jackson (validation period)

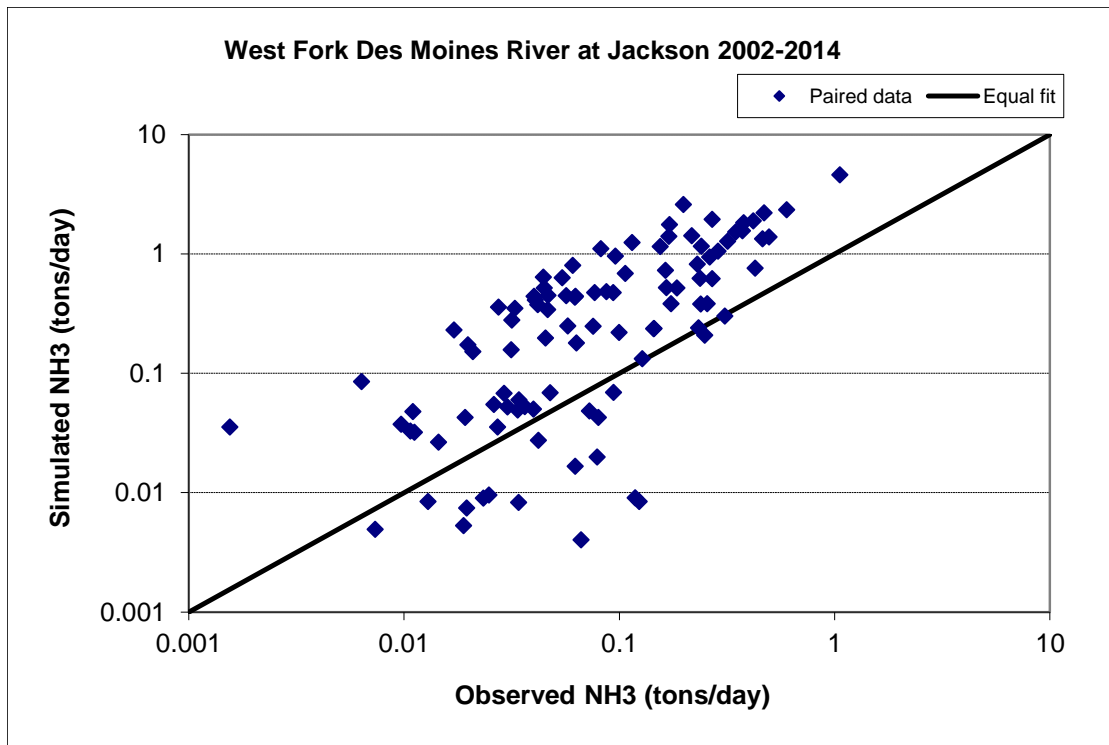


Figure 436. Paired simulated vs. observed Ammonia Nitrogen (NH3) load at West Fork Des Moines River at Jackson (calibration period)

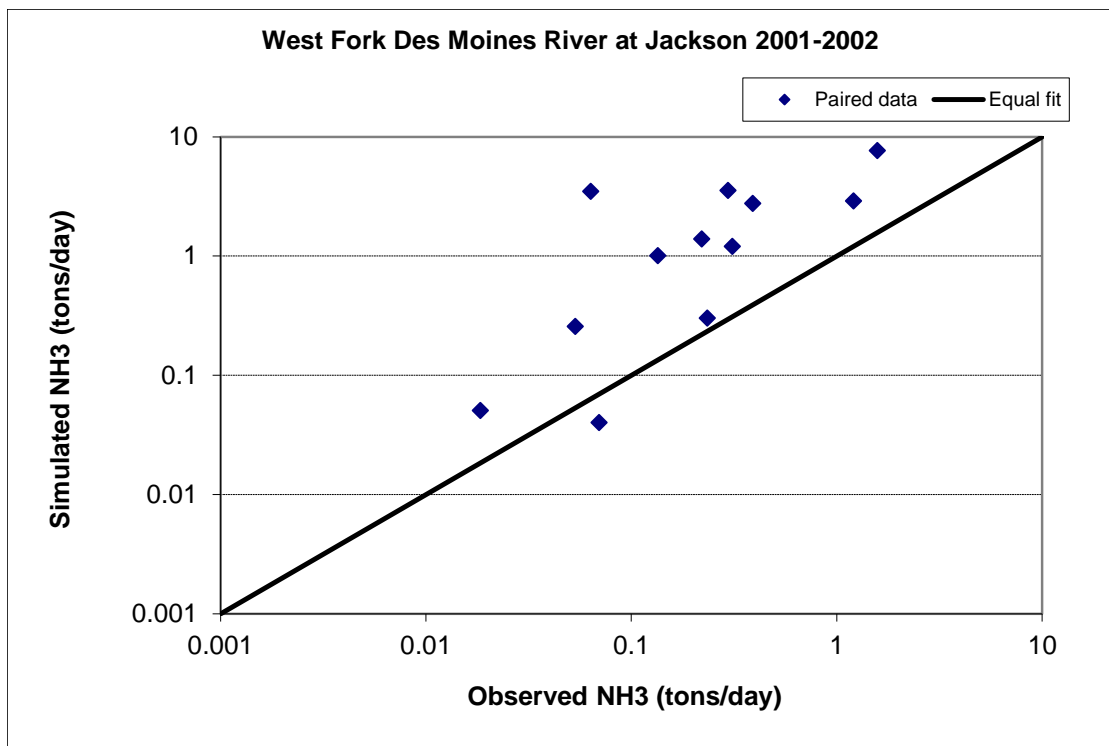


Figure 437. Paired simulated vs. observed Ammonia Nitrogen (NH3) load at West Fork Des Moines River at Jackson (validation period)

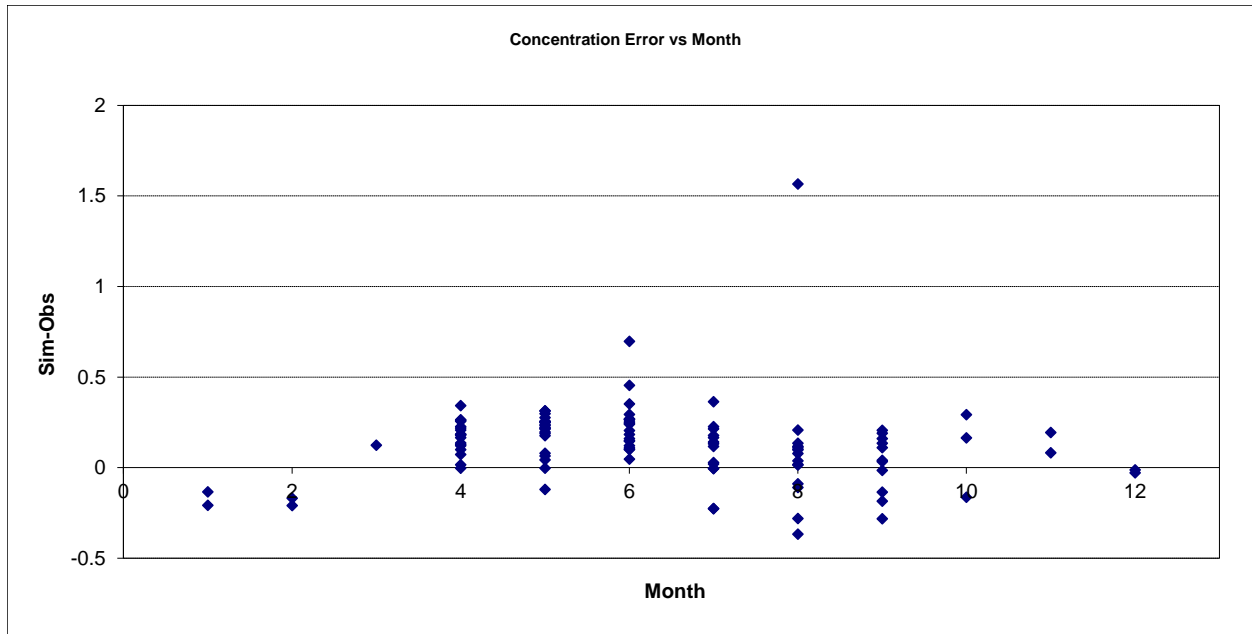


Figure 438. Residual (Simulated - Observed) vs. Month Ammonia Nitrogen (NH3) at West Fork Des Moines River at Jackson

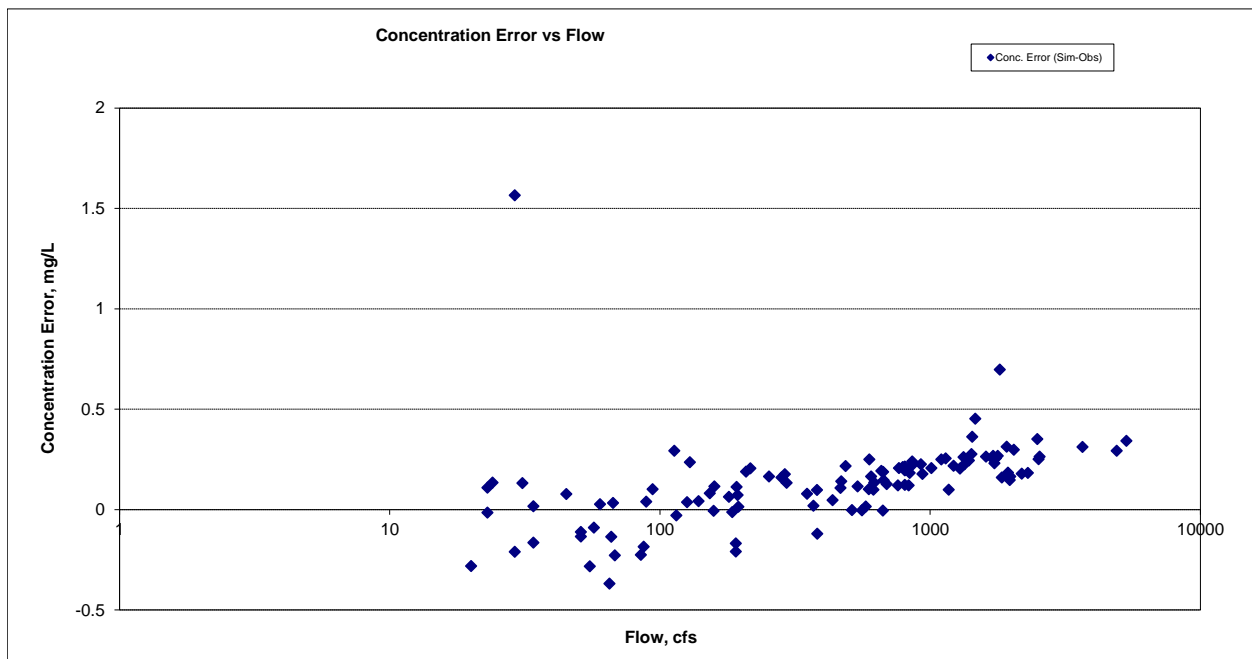


Figure 439. Residual (Simulated - Observed) vs. Flow Ammonia Nitrogen (NH3) at West Fork Des Moines River at Jackson

Organic Nitrogen (OrgN)

Table 66. Organic Nitrogen (OrgN) statistics

Period	2002-2014	2001-2002
Count	99	12
Concentration Average Error	-34.01%	-10.49%
Concentration Median Error	-21.68%	-13.25%
Load Average Error	-1.27%	26.11%
Load Median Error	-5.34%	3.88%
Paired t concentration	0.00	0.90

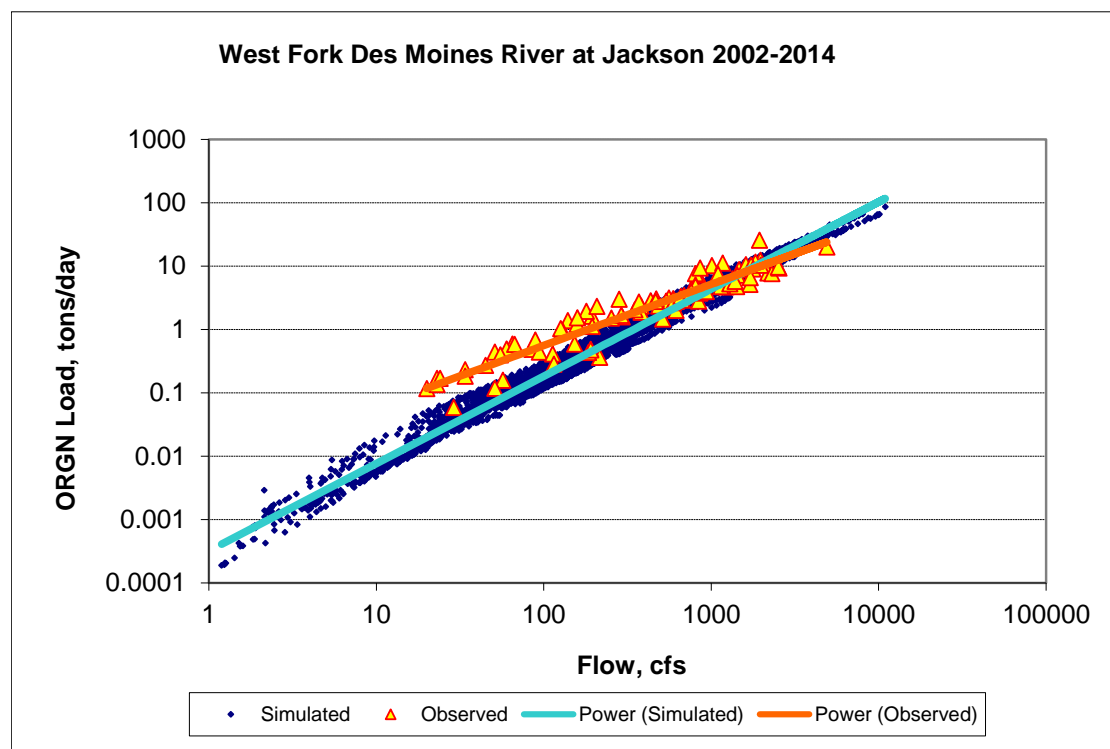


Figure 440. Power plot of simulated and observed Organic Nitrogen (OrgN) load vs flow at West Fork Des Moines River at Jackson (calibration period)

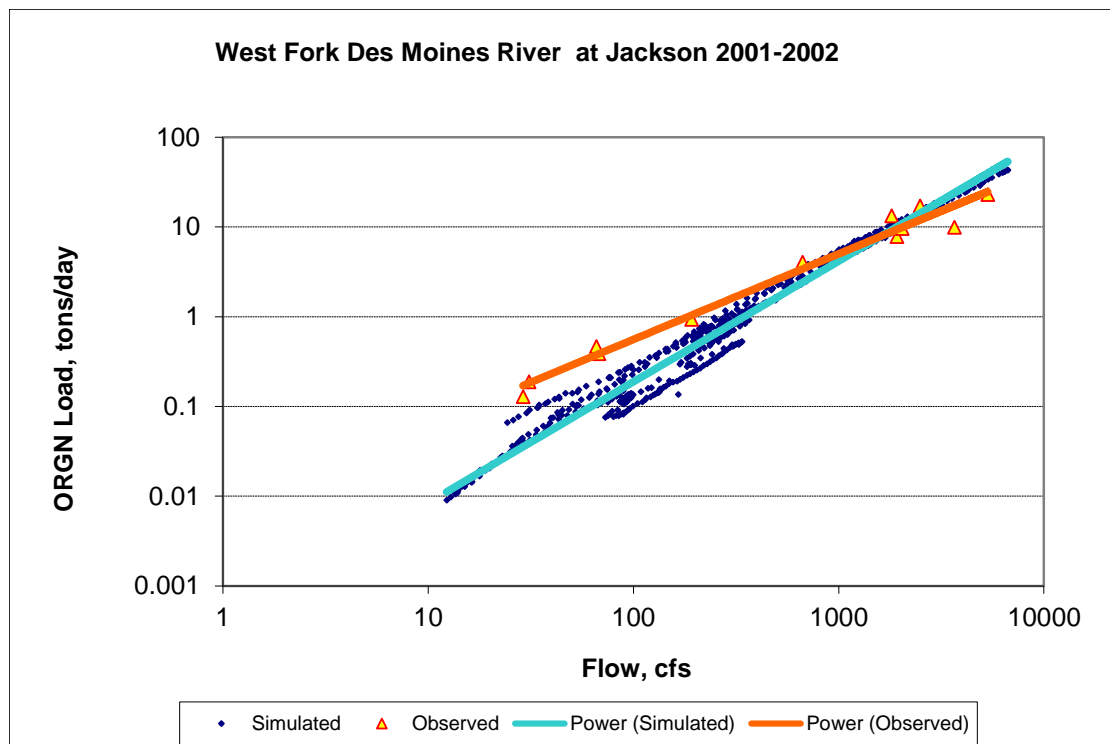


Figure 441. Power plot of simulated and observed Organic Nitrogen (OrgN) load vs flow at West Fork Des Moines River at Jackson (validation period)

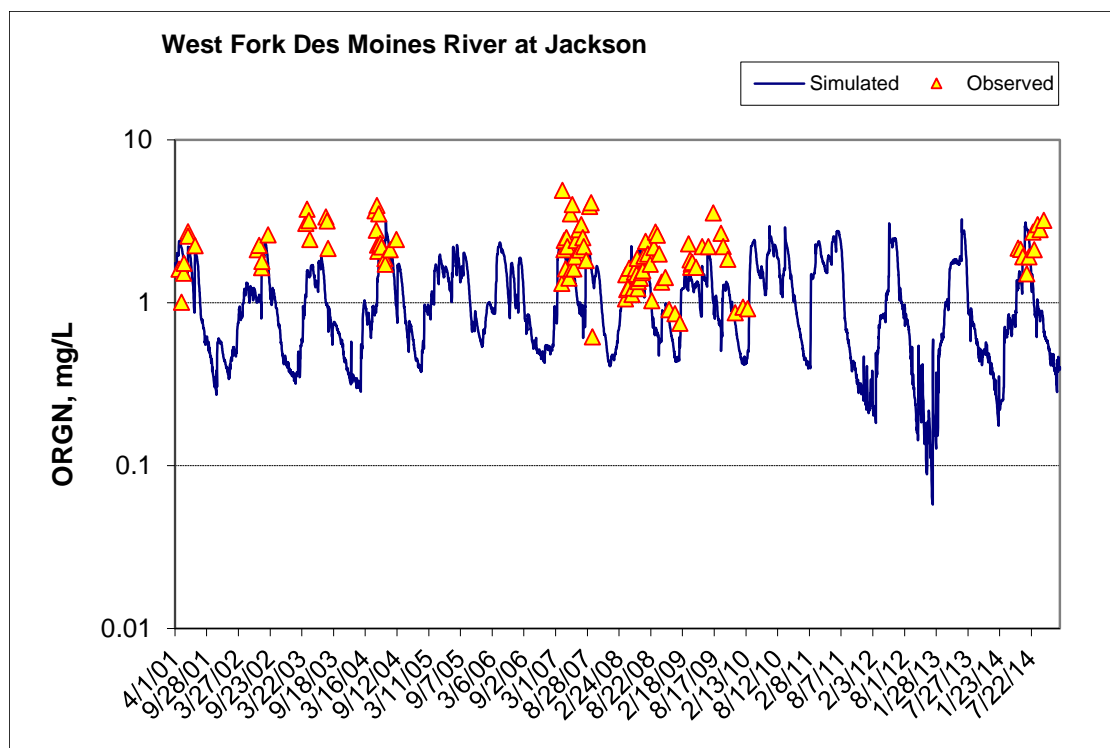


Figure 442. Time series of observed and simulated Organic Nitrogen (OrgN) concentration at West Fork Des Moines River at Jackson (calibration period)

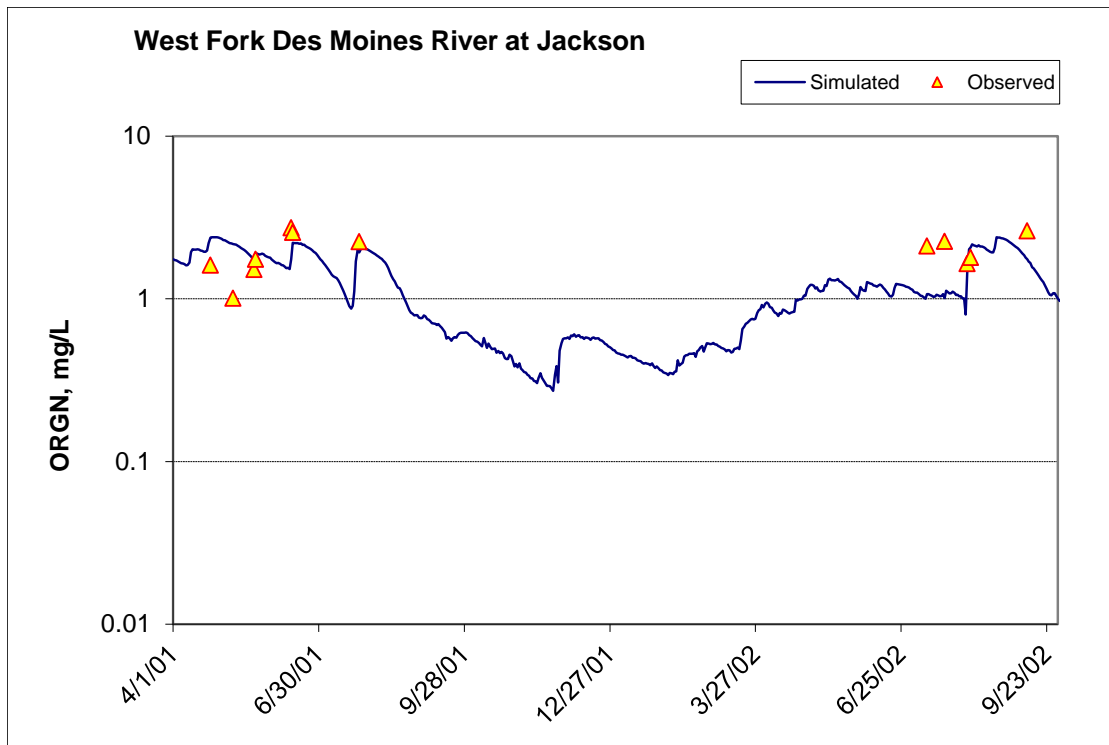


Figure 443. Time series of observed and simulated Organic Nitrogen (OrgN) concentration at West Fork Des Moines River at Jackson (validation period)

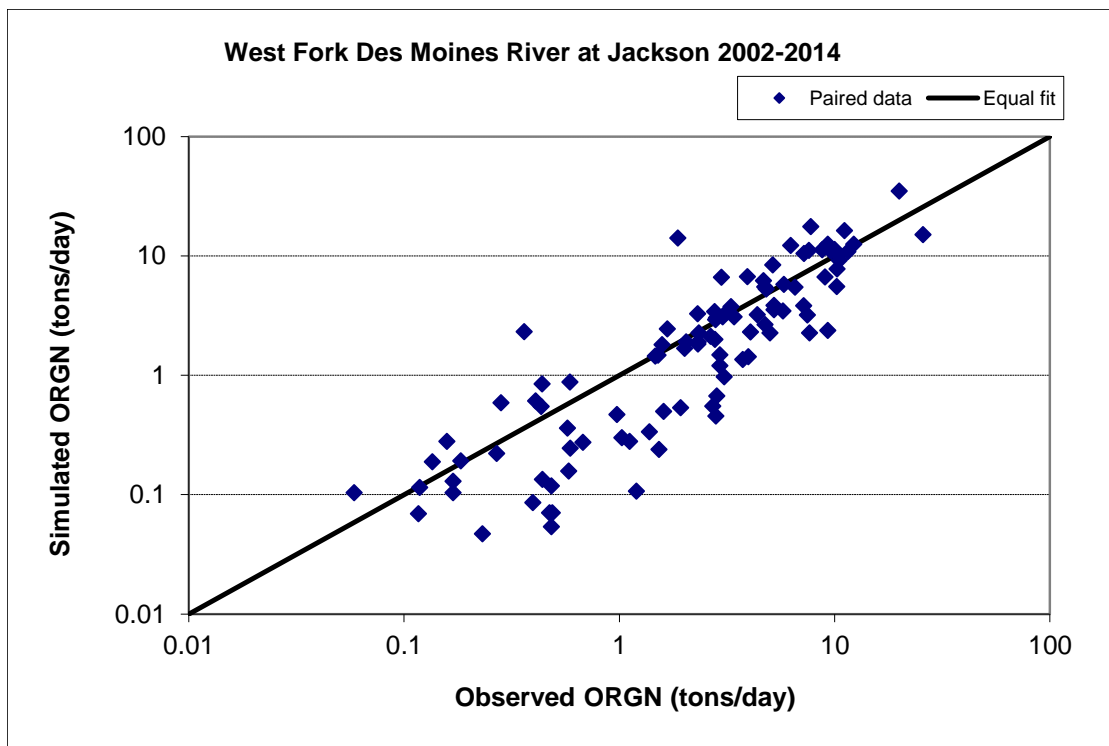


Figure 444. Paired simulated vs. observed Organic Nitrogen (OrgN) load at West Fork Des Moines River at Jackson (calibration period)

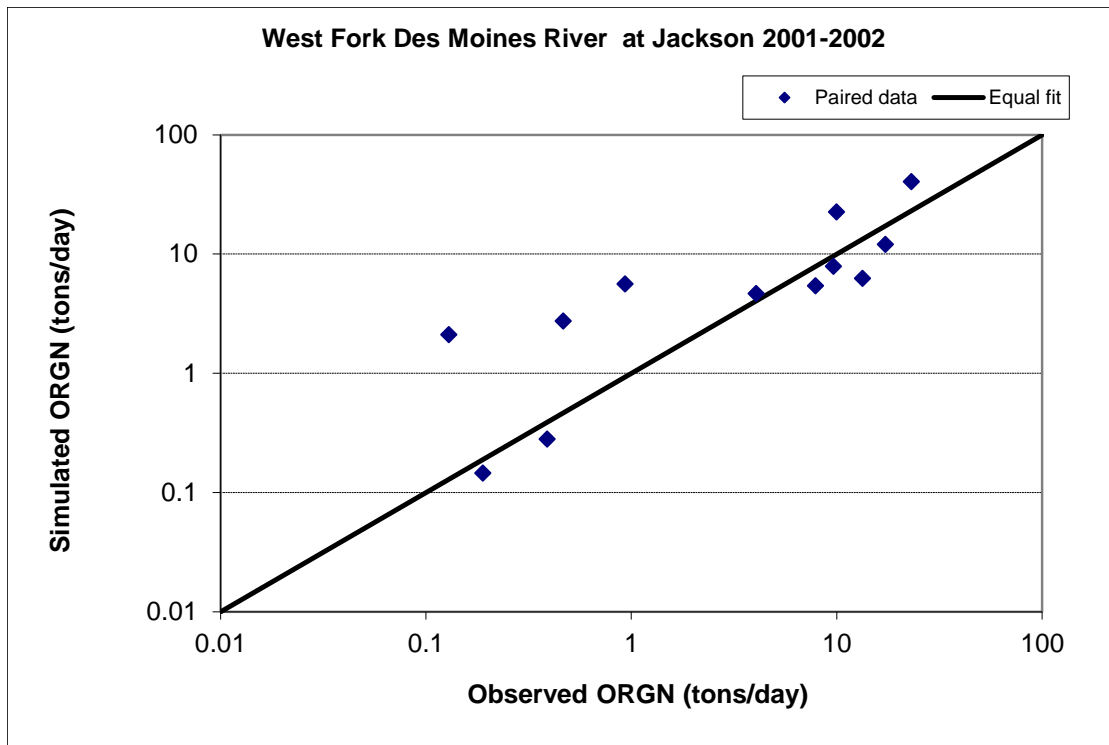


Figure 445. Paired simulated vs. observed Organic Nitrogen (OrgN) load at West Fork Des Moines River at Jackson (validation period)

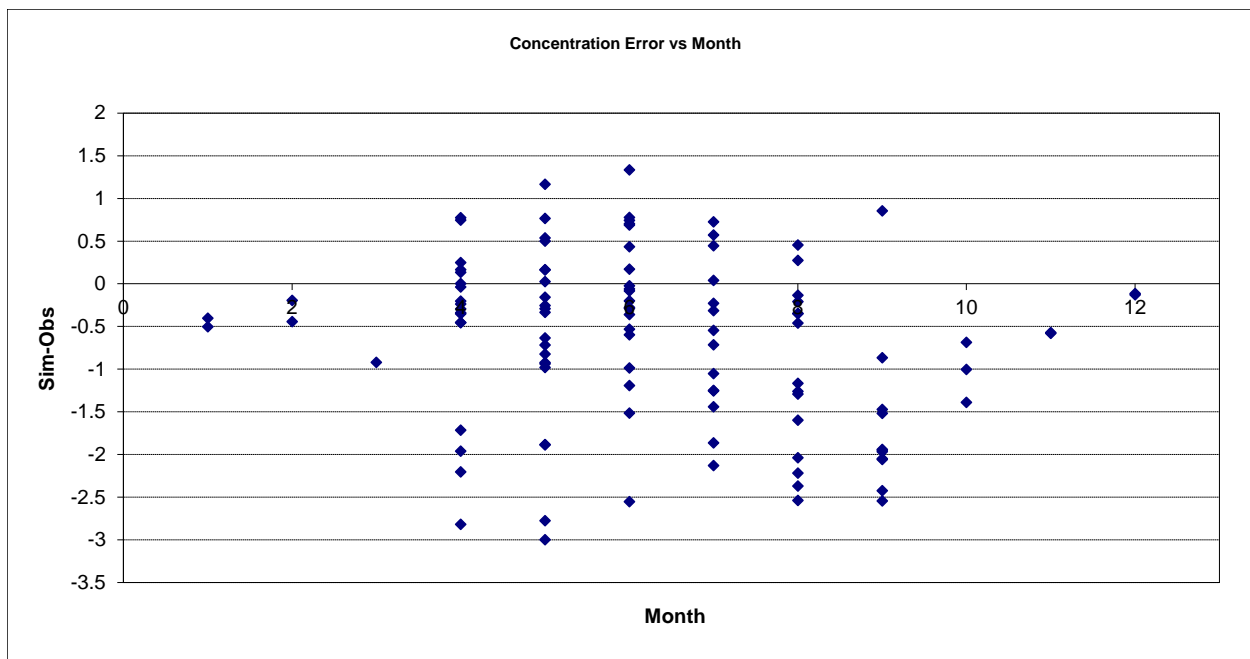


Figure 446. Residual (Simulated - Observed) vs. Month Organic Nitrogen (OrgN) at West Fork Des Moines River at Jackson

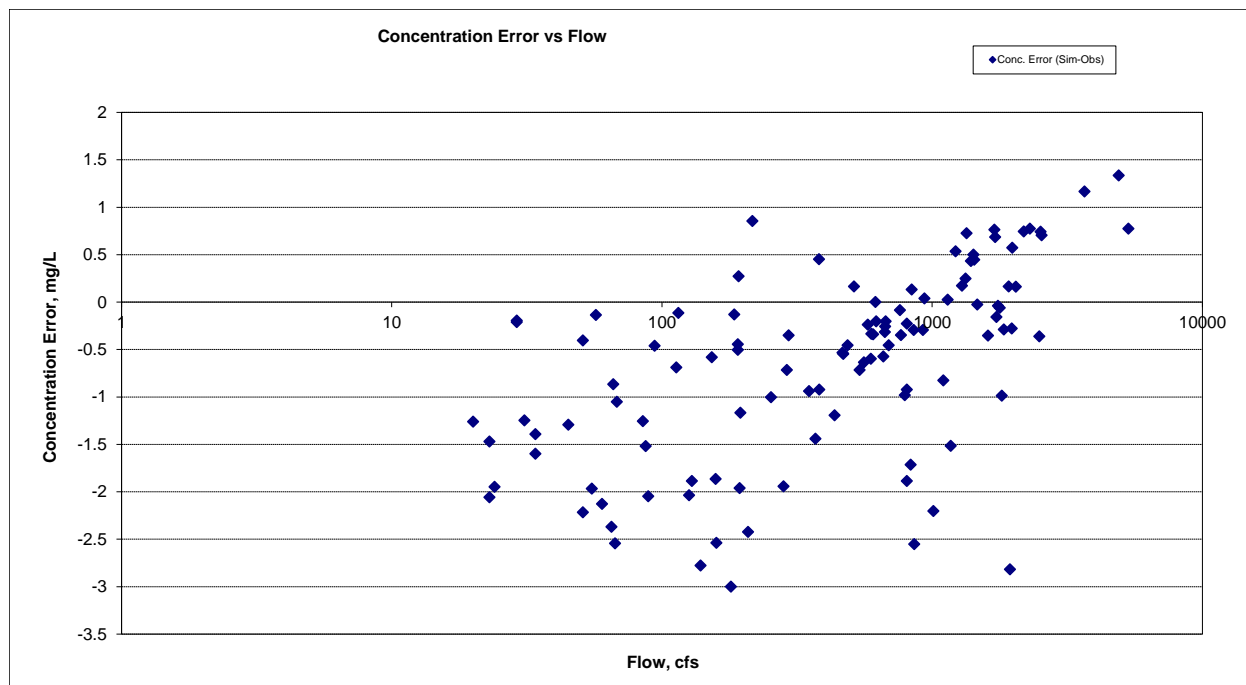


Figure 447. Residual (Simulated - Observed) vs. Flow Organic Nitrogen (OrgN) at West Fork Des Moines River at Jackson

Total Kjeldahl Nitrogen (TKN)

Table 67. Total Kjeldahl Nitrogen (TKN) statistics

Period	2002-2014	2001-2002
Count	284	33
Concentration Average Error	-20.18%	-27.83%
Concentration Median Error	-16.51%	-37.19%
Load Average Error	53.63%	27.54%
Load Median Error	-0.71%	-8.11%
Paired t concentration	0.47	0.05

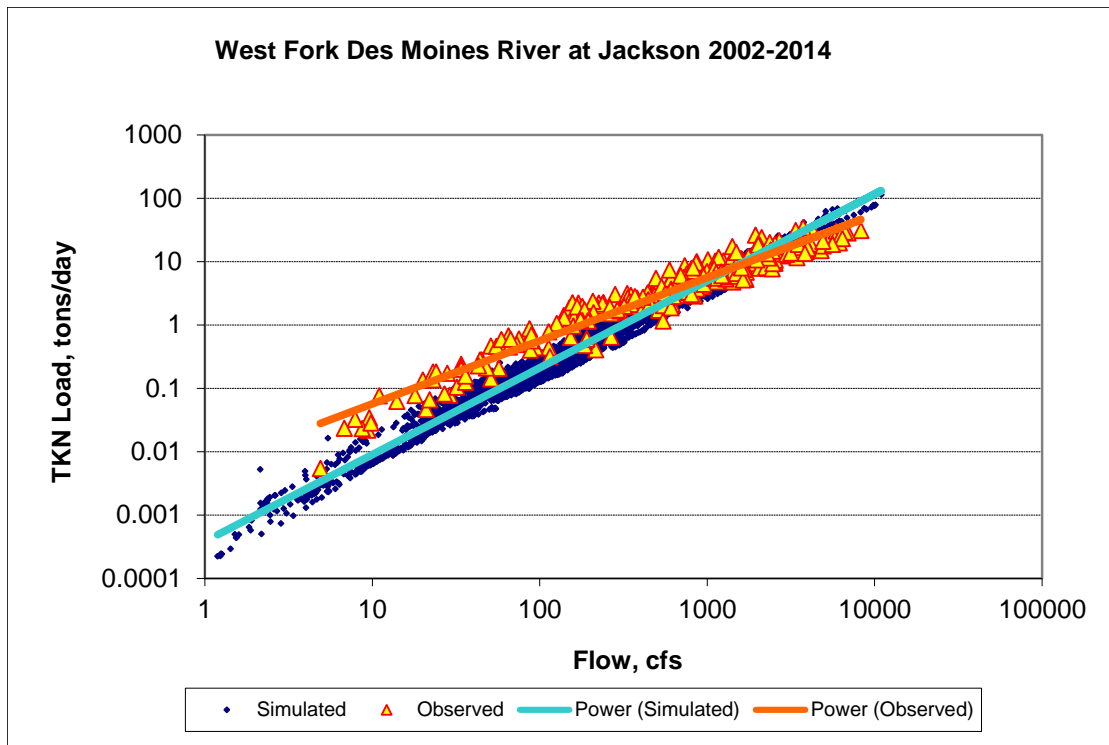


Figure 448. Power plot of simulated and observed Total Kjeldahl Nitrogen (TKN) load vs flow at West Fork Des Moines River at Jackson (calibration period)

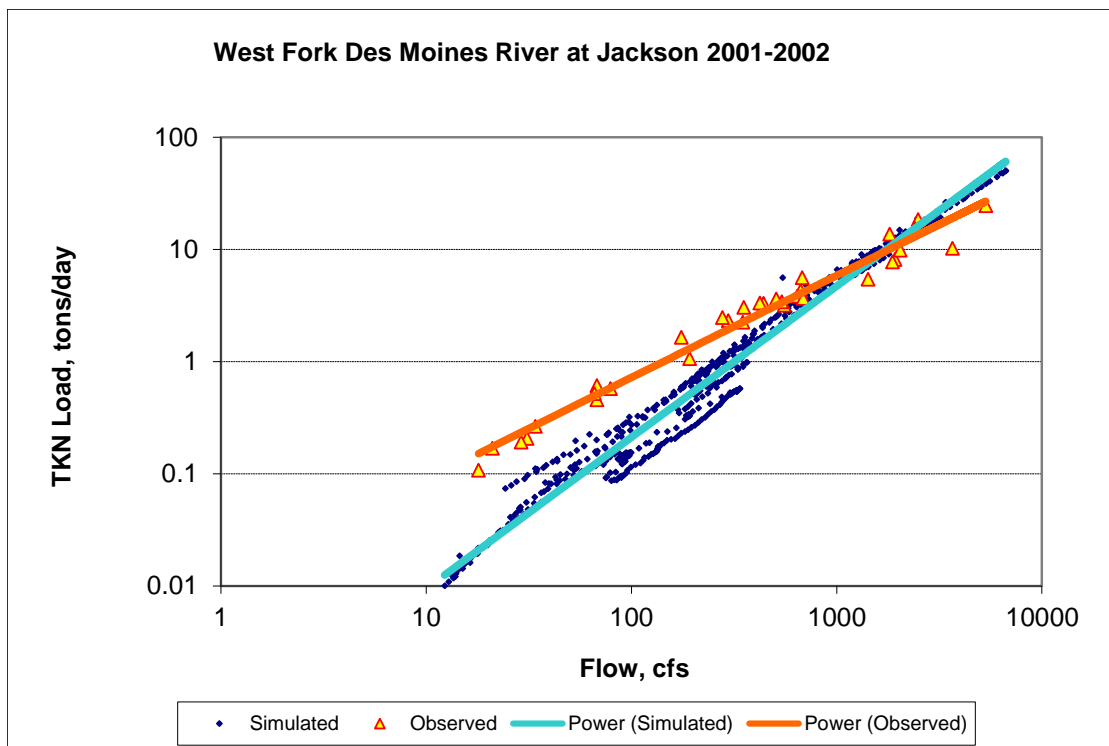


Figure 449. Power plot of simulated and observed Total Kjeldahl Nitrogen (TKN) load vs flow at West Fork Des Moines River at Jackson (validation period)

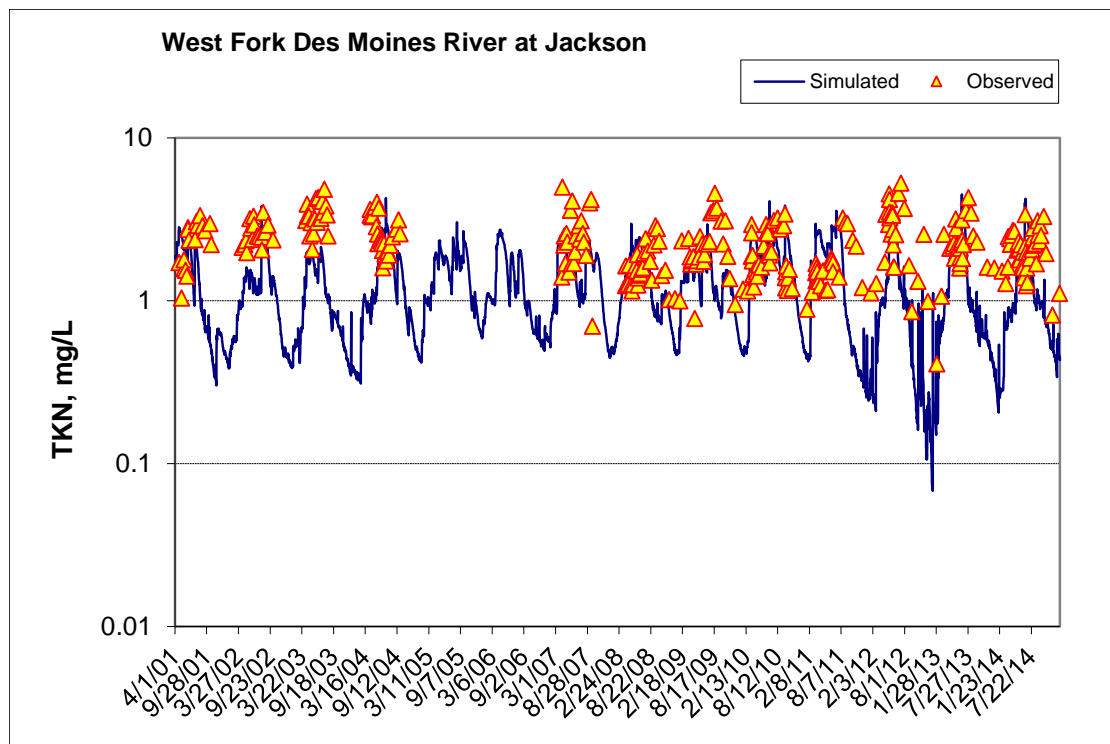


Figure 450. Time series of observed and simulated Total Kjeldahl Nitrogen (TKN) concentration at West Fork Des Moines River at Jackson (calibration period)

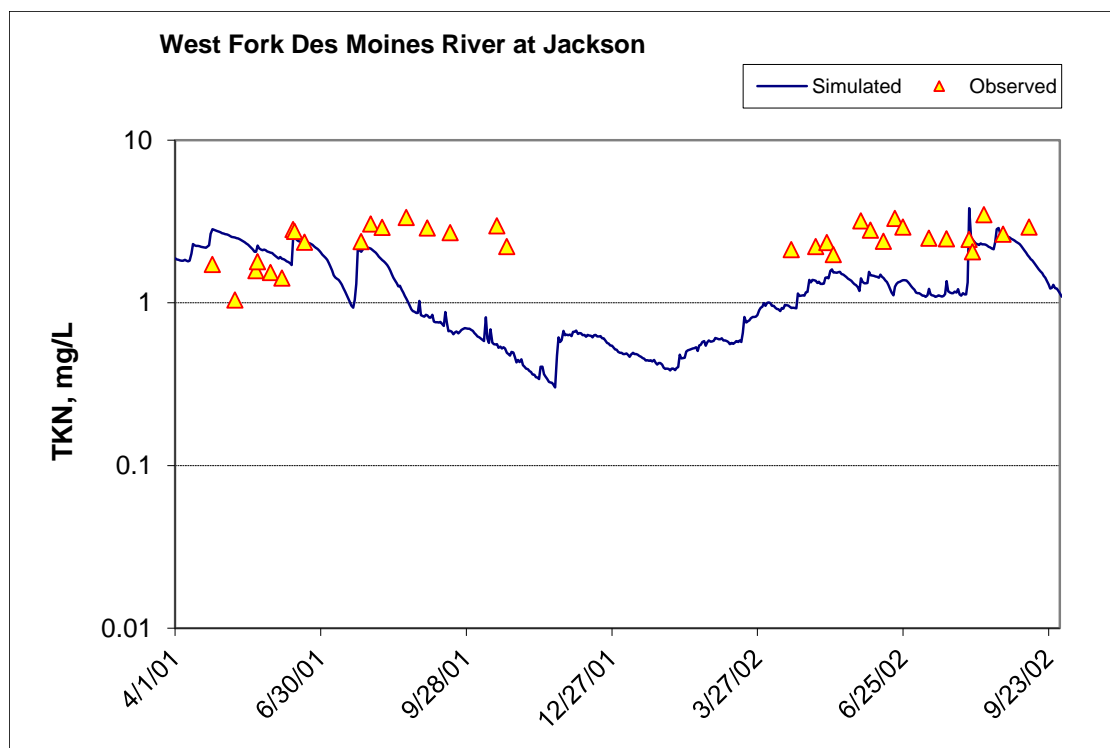


Figure 451. Time series of observed and simulated Total Kjeldahl Nitrogen (TKN) concentration at West Fork Des Moines River at Jackson (validation period)

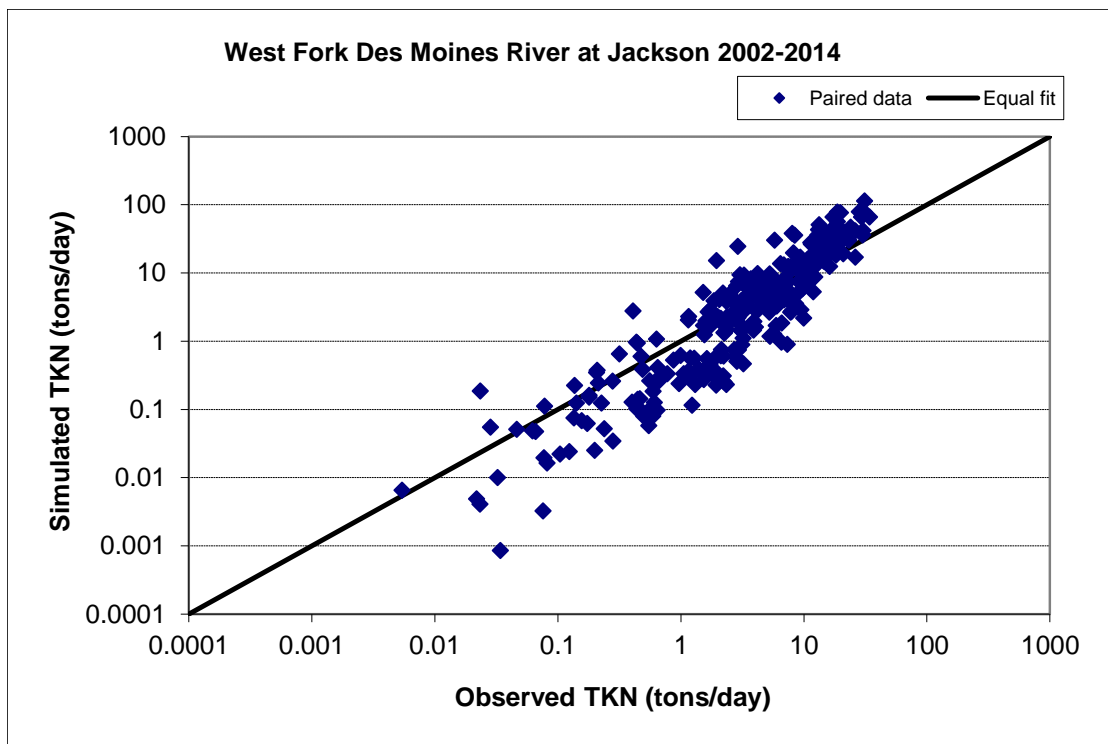


Figure 452. Paired simulated vs. observed Total Kjeldahl Nitrogen (TKN) load at West Fork Des Moines River at Jackson (calibration period)

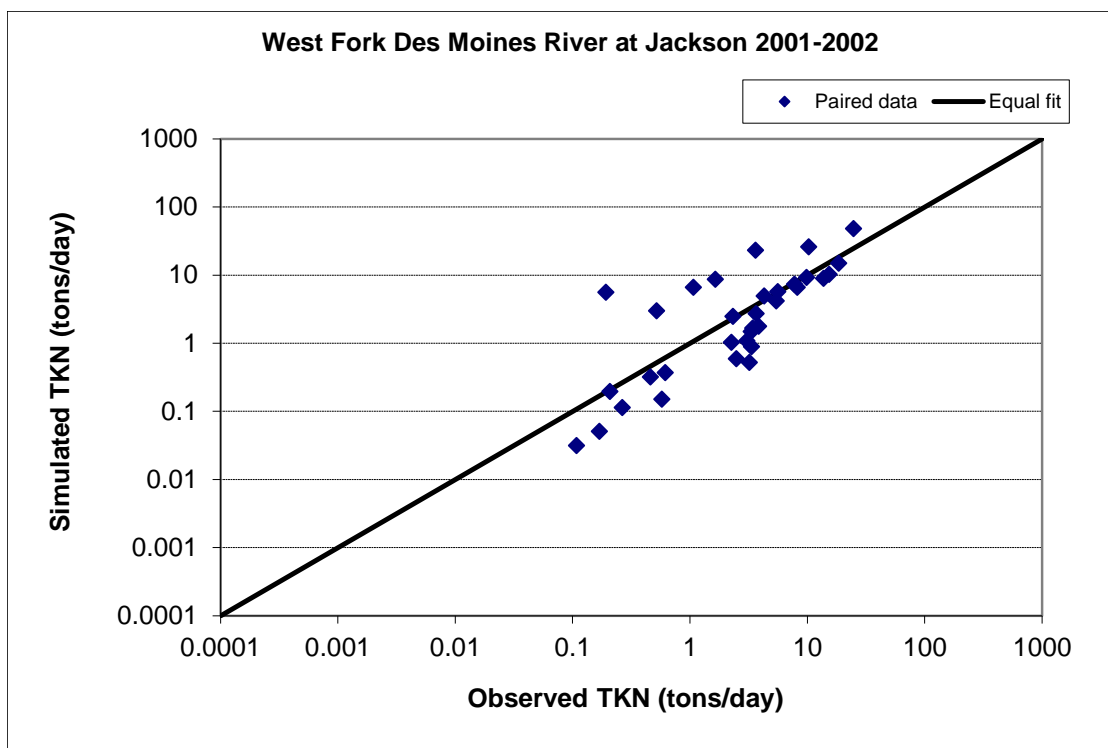


Figure 453. Paired simulated vs. observed Total Kjeldahl Nitrogen (TKN) load at West Fork Des Moines River at Jackson (validation period)



Figure 454. Residual (Simulated - Observed) vs. Month Total Kjeldahl Nitrogen (TKN) at West Fork Des Moines River at Jackson

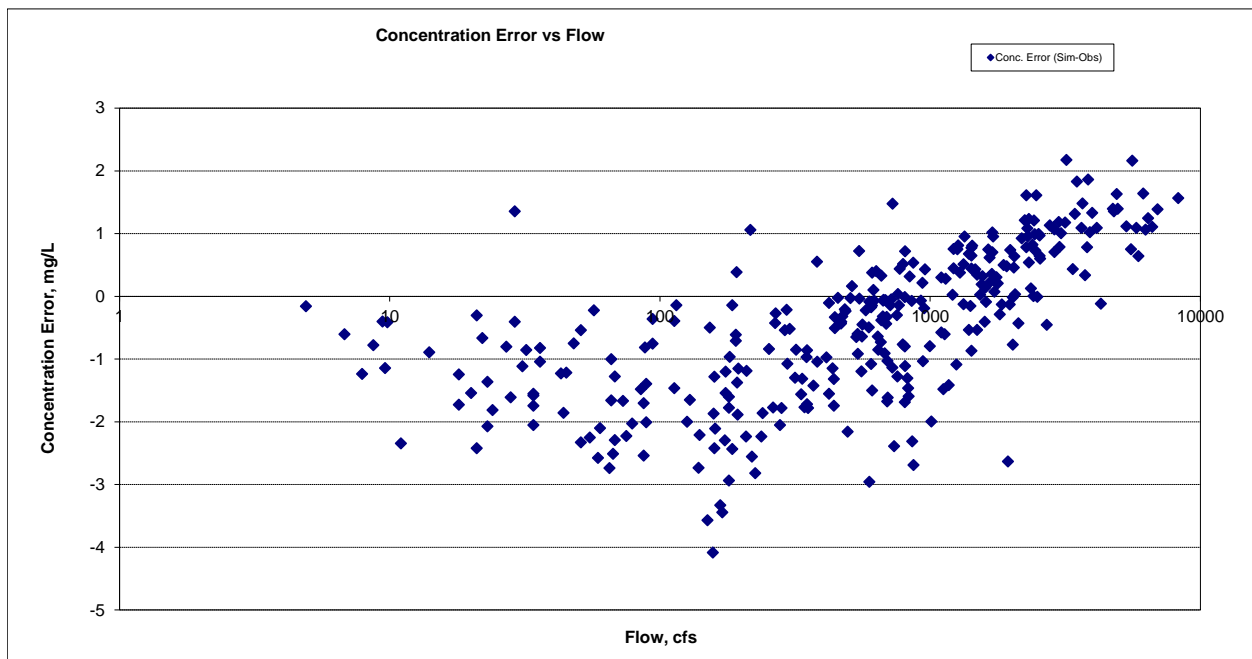


Figure 455. Residual (Simulated - Observed) vs. Flow Total Kjeldahl Nitrogen (TKN) at West Fork Des Moines River at Jackson

Nitrite+ Nitrate Nitrogen (NOx)

Table 68. Nitrite+ Nitrate Nitrogen (NOx) statistics

Period	2002-2014	2001-2002
Count	276	27
Concentration Average Error	-8.26%	-2.51%
Concentration Median Error	-1.64%	-16.86%
Load Average Error	25.10%	8.56%
Load Median Error	0.63%	-10.66%
Paired t concentration	1.00	0.94

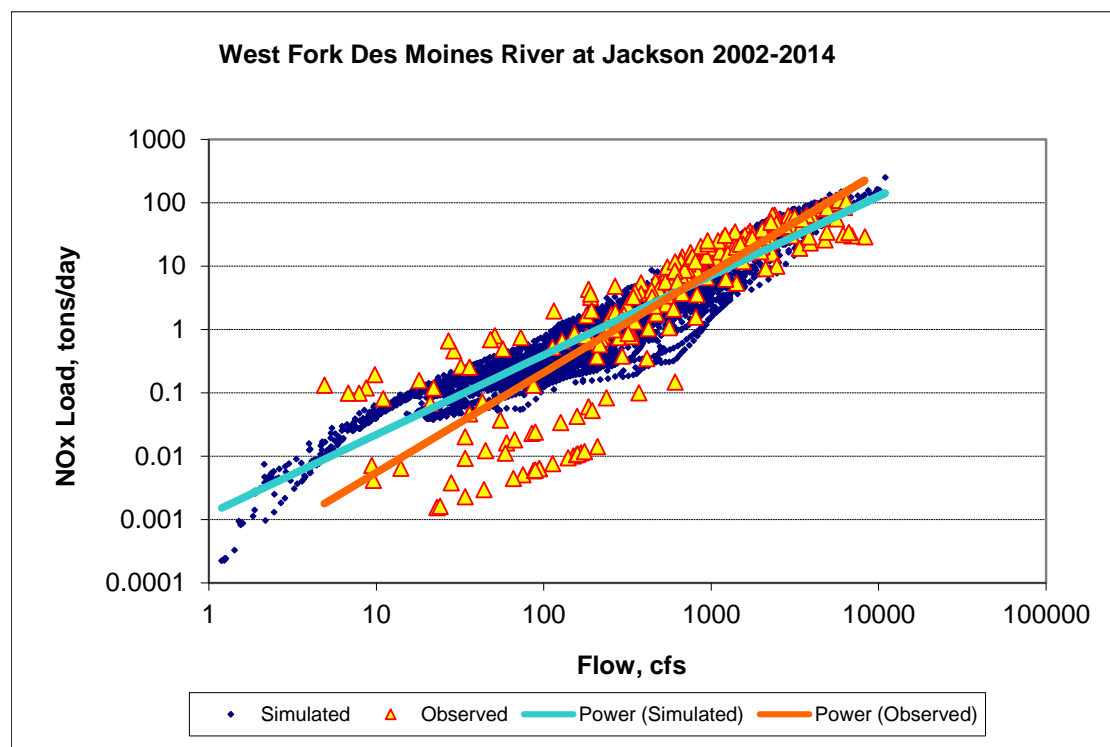


Figure 456. Power plot of simulated and observed Nitrite+ Nitrate Nitrogen (NOx) load vs flow at West Fork Des Moines River at Jackson (calibration period)

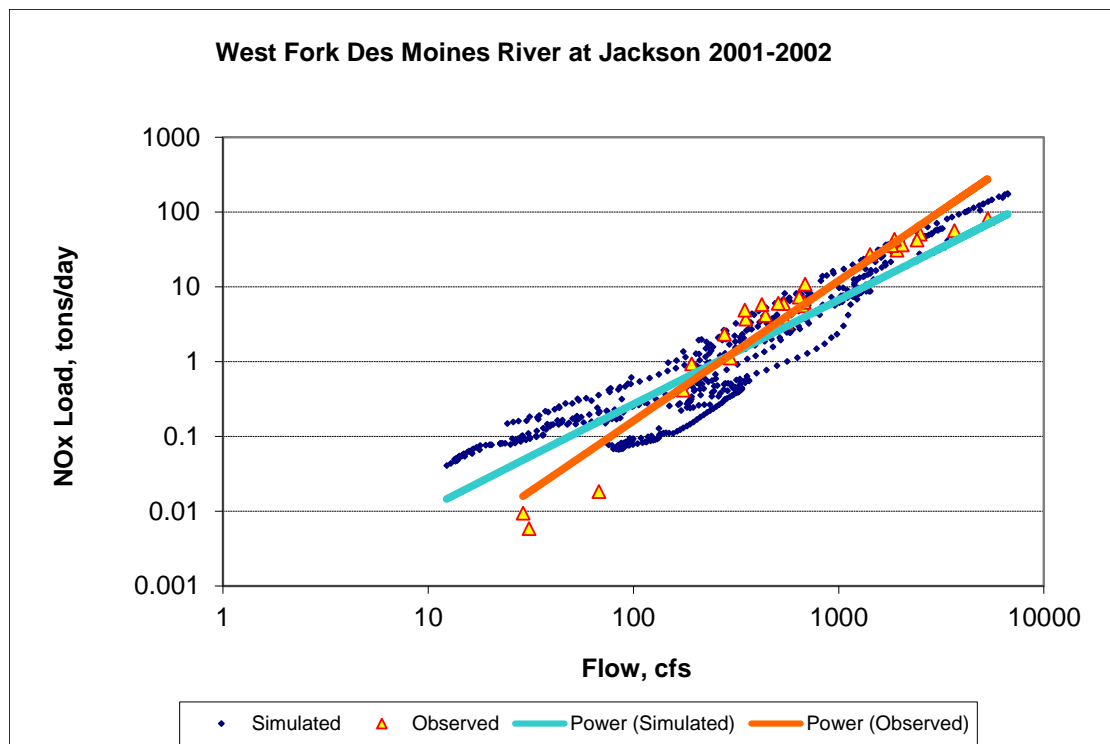


Figure 457. Power plot of simulated and observed Nitrite+ Nitrate Nitrogen (NOx) load vs flow at West Fork Des Moines River at Jackson (validation period)

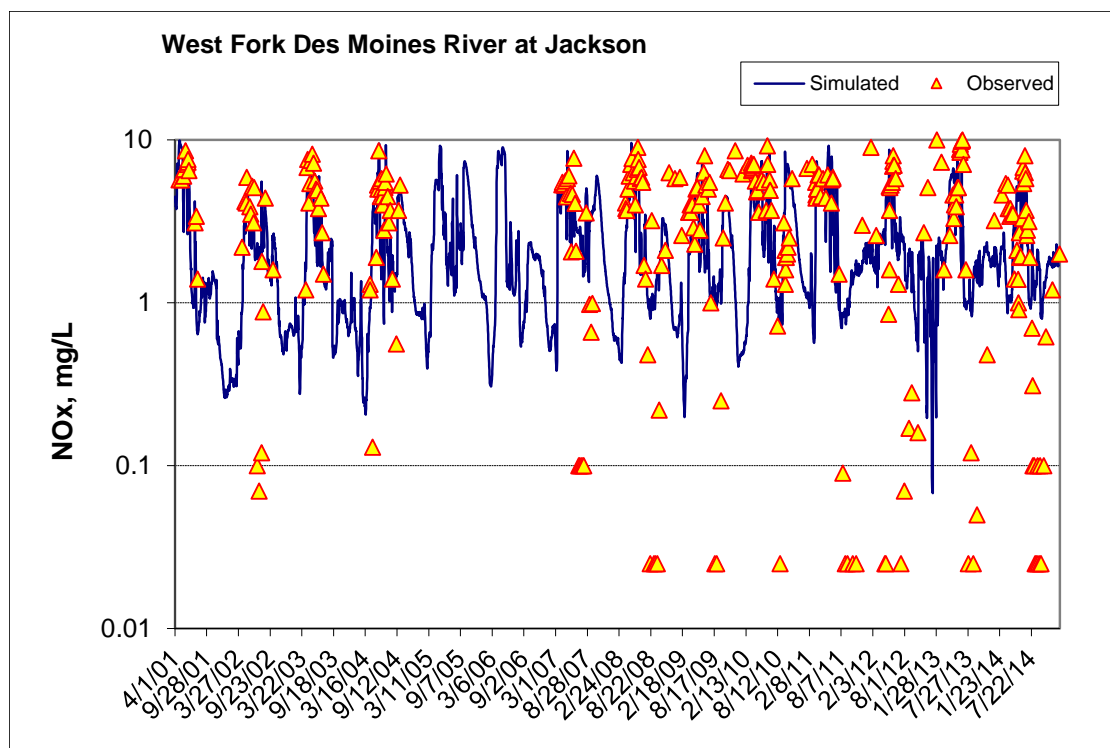


Figure 458. Time series of observed and simulated Nitrite+ Nitrate Nitrogen (NOx) concentration at West Fork Des Moines River at Jackson (calibration period)

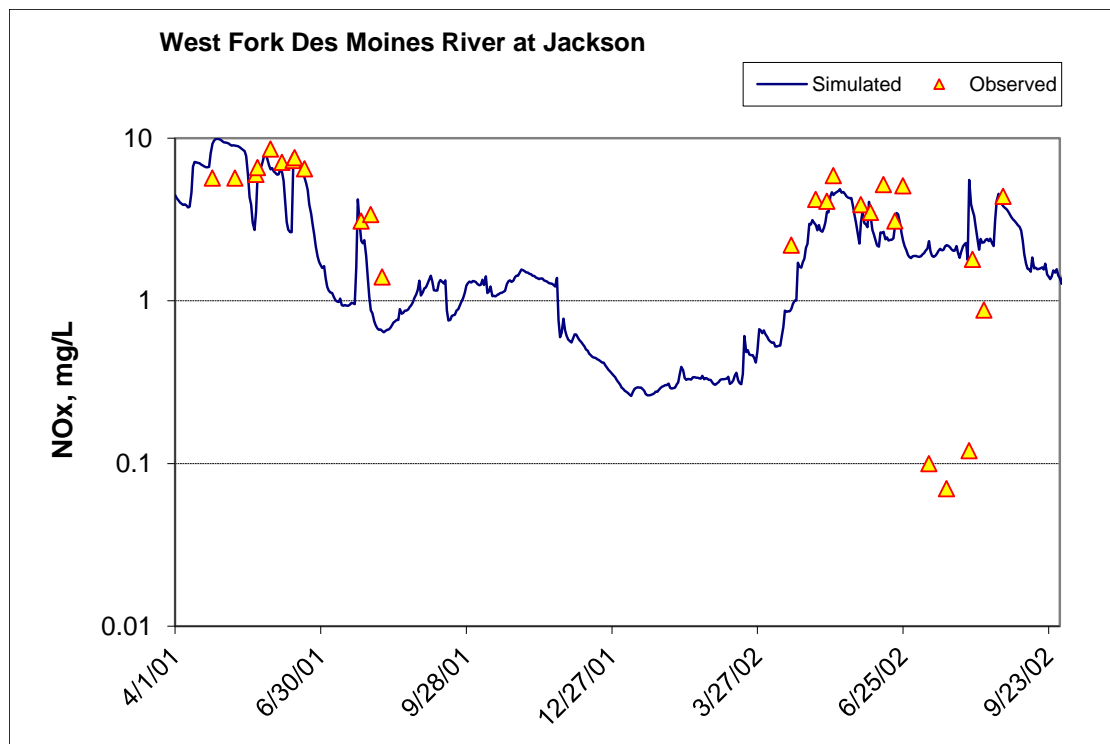


Figure 459. Time series of observed and simulated Nitrite+ Nitrate Nitrogen (NOx) concentration at West Fork Des Moines River at Jackson (validation period)

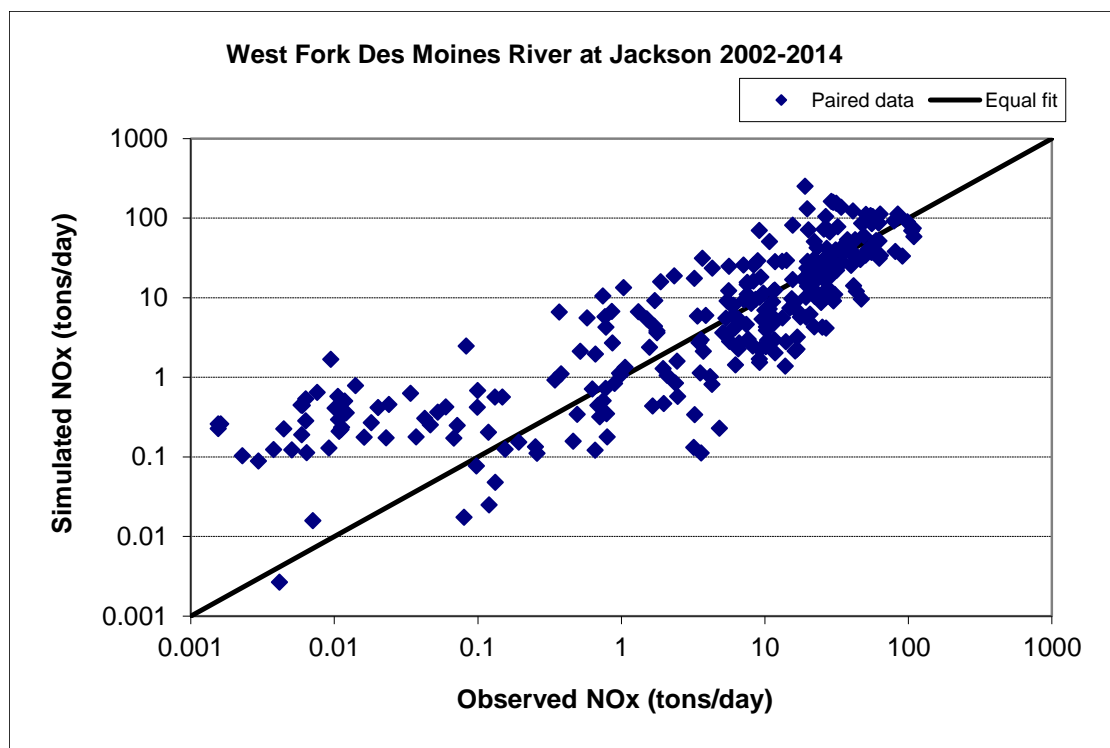


Figure 460. Paired simulated vs. observed Nitrite+ Nitrate Nitrogen (NOx) load at West Fork Des Moines River at Jackson (calibration period)

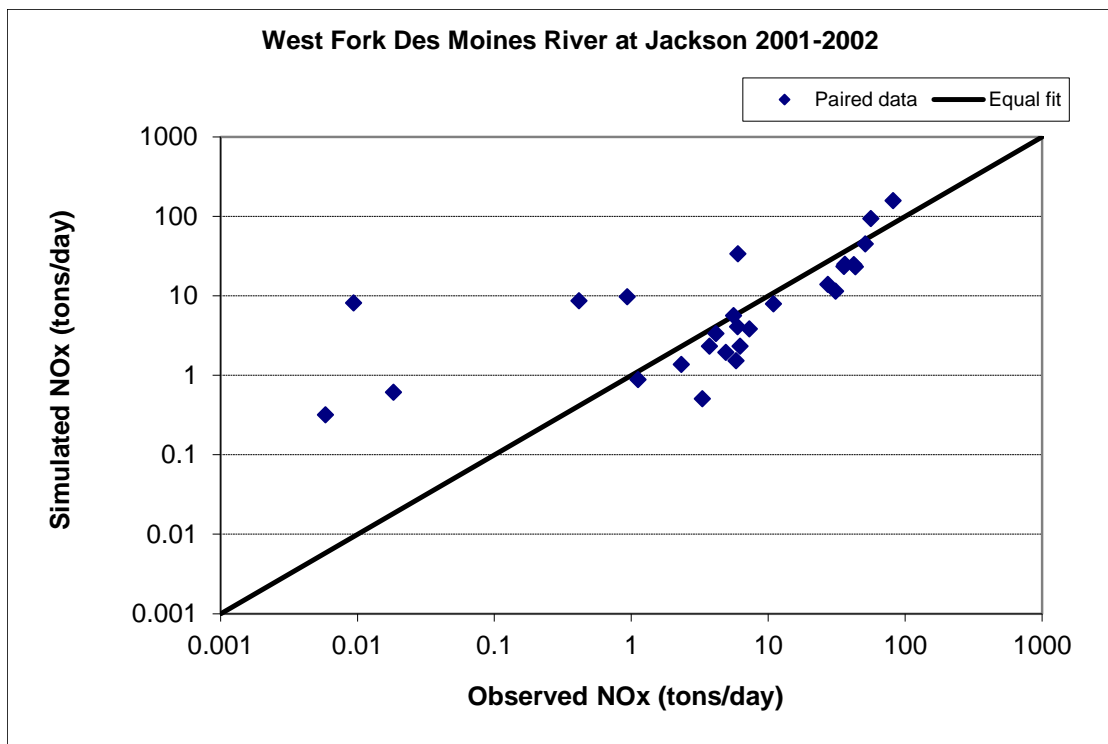


Figure 461. Paired simulated vs. observed Nitrite+ Nitrate Nitrogen (NOx) load at West Fork Des Moines River at Jackson (validation period)

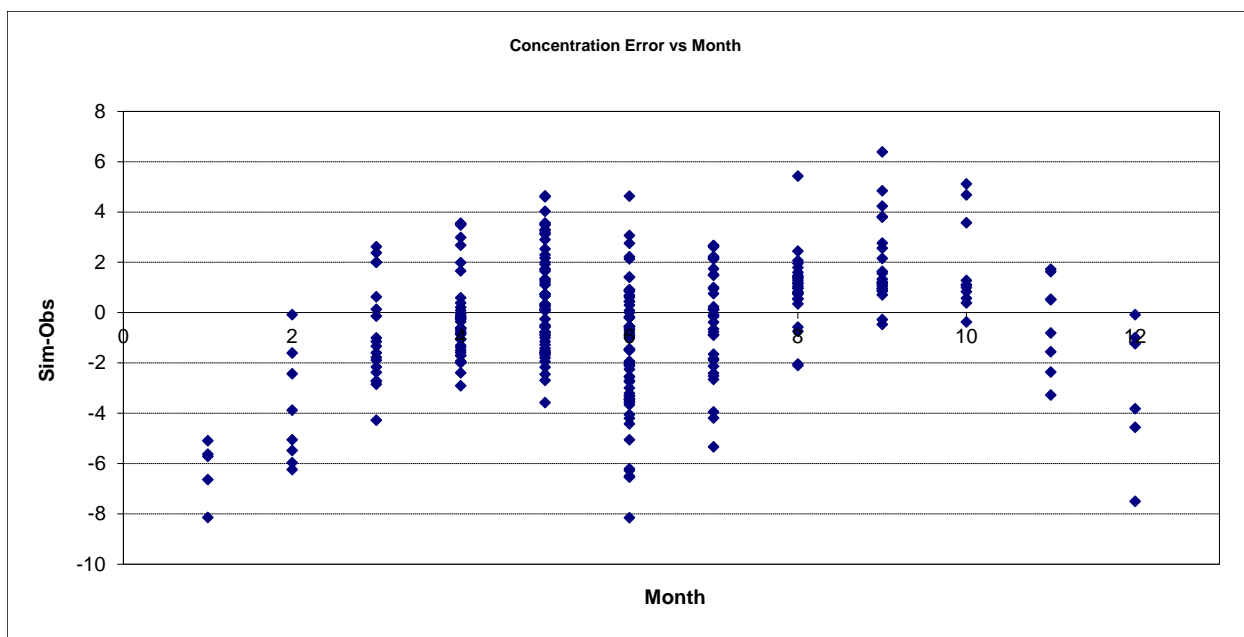


Figure 462. Residual (Simulated - Observed) vs. Month Nitrite+ Nitrate Nitrogen (NOx) at West Fork Des Moines River at Jackson

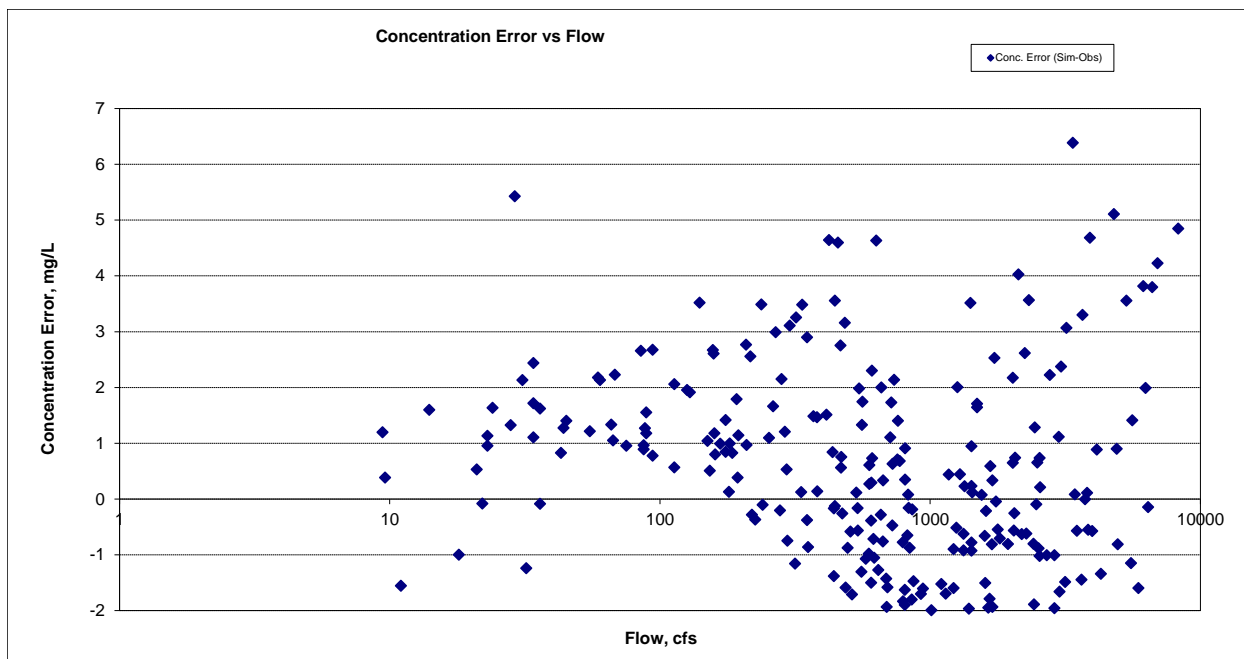


Figure 463. Residual (Simulated - Observed) vs. Flow Nitrite+ Nitrate Nitrogen (NOx) at West Fork Des Moines River at Jackson

Total Nitrogen (TN)

Table 69. Total Nitrogen (TN) statistics

Period	2002-2014	2001-2002
Count	276	27
Concentration Average Error	-11.69%	-7.86%
Concentration Median Error	-9.82%	-16.44%
Load Average Error	33.49%	13.26%
Load Median Error	-0.95%	-15.42%
Paired t concentration	1.00	0.94

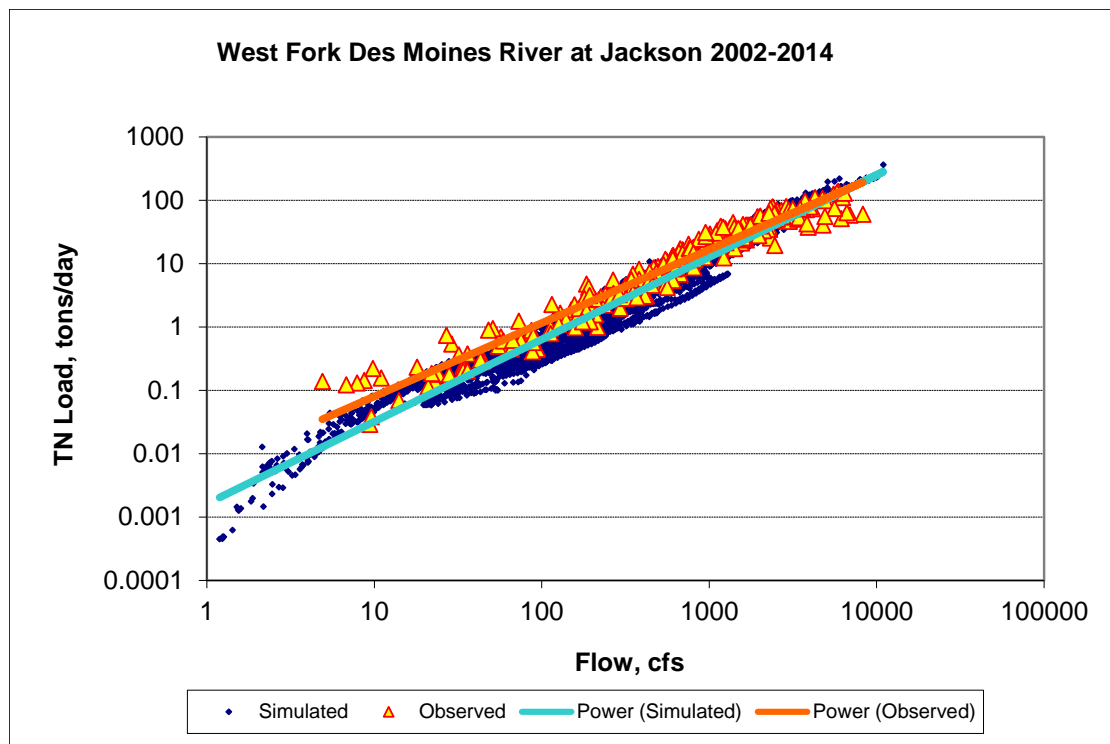


Figure 464. Power plot of simulated and observed Total Nitrogen (TN) load vs flow at West Fork Des Moines River at Jackson (calibration period)

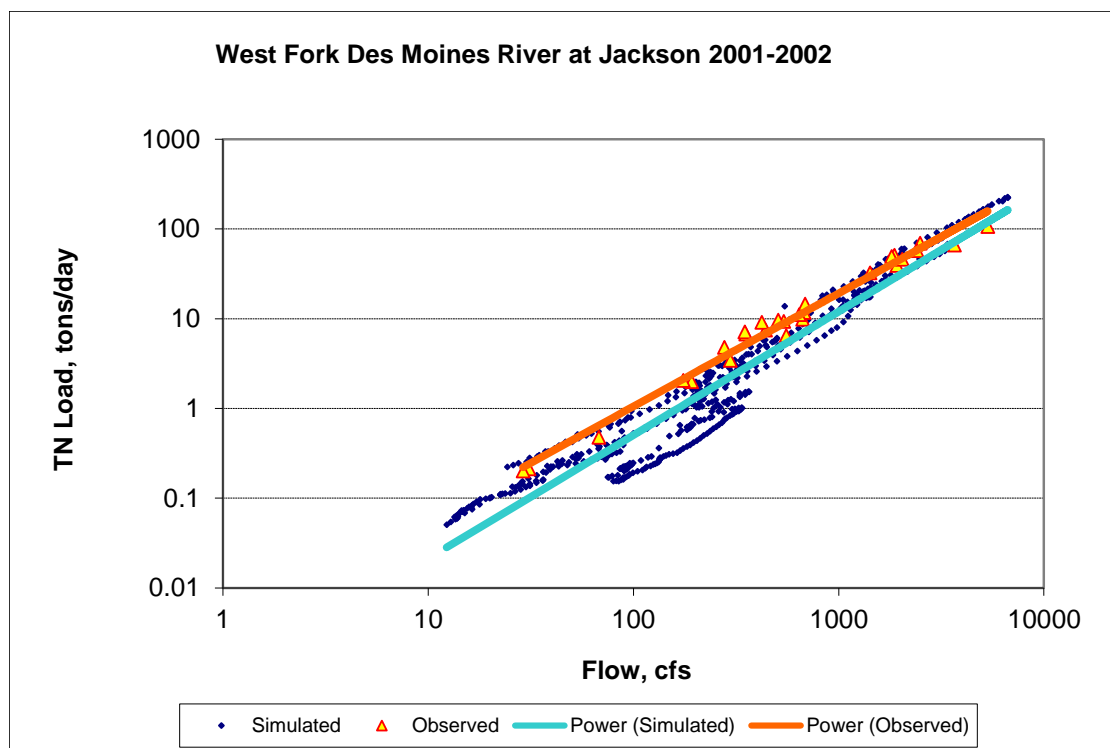


Figure 465. Power plot of simulated and observed Total Nitrogen (TN) load vs flow at West Fork Des Moines River at Jackson (validation period)

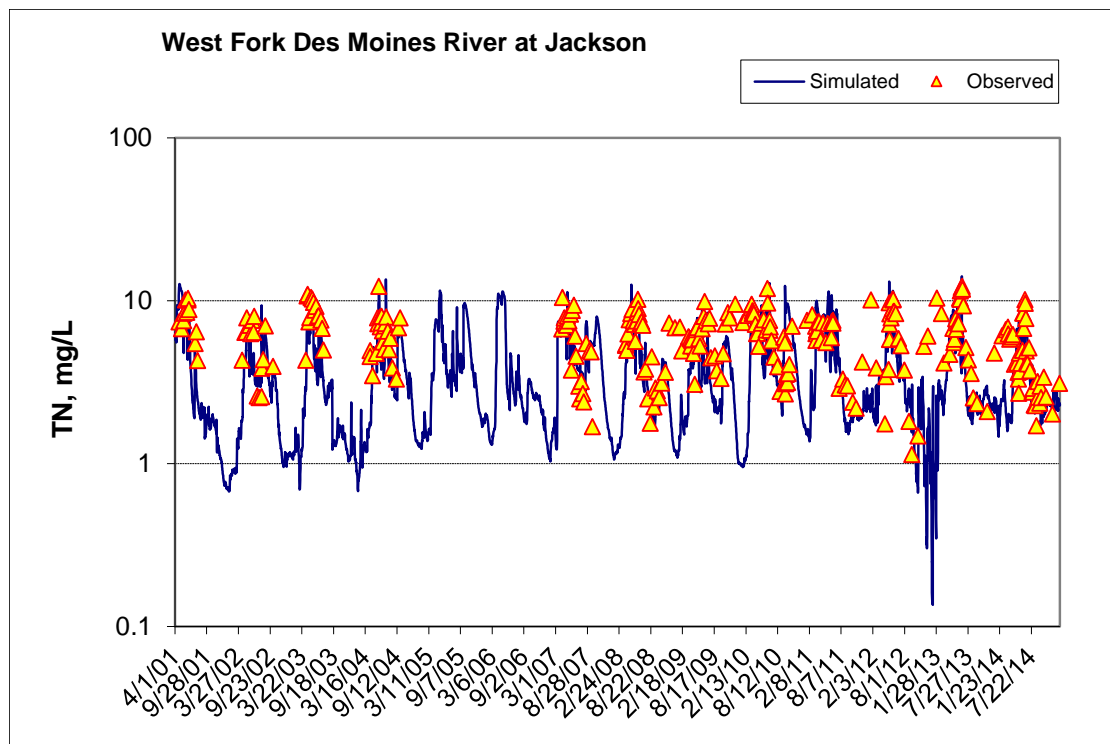


Figure 466. Time series of observed and simulated Total Nitrogen (TN) concentration at West Fork Des Moines River at Jackson (calibration period)

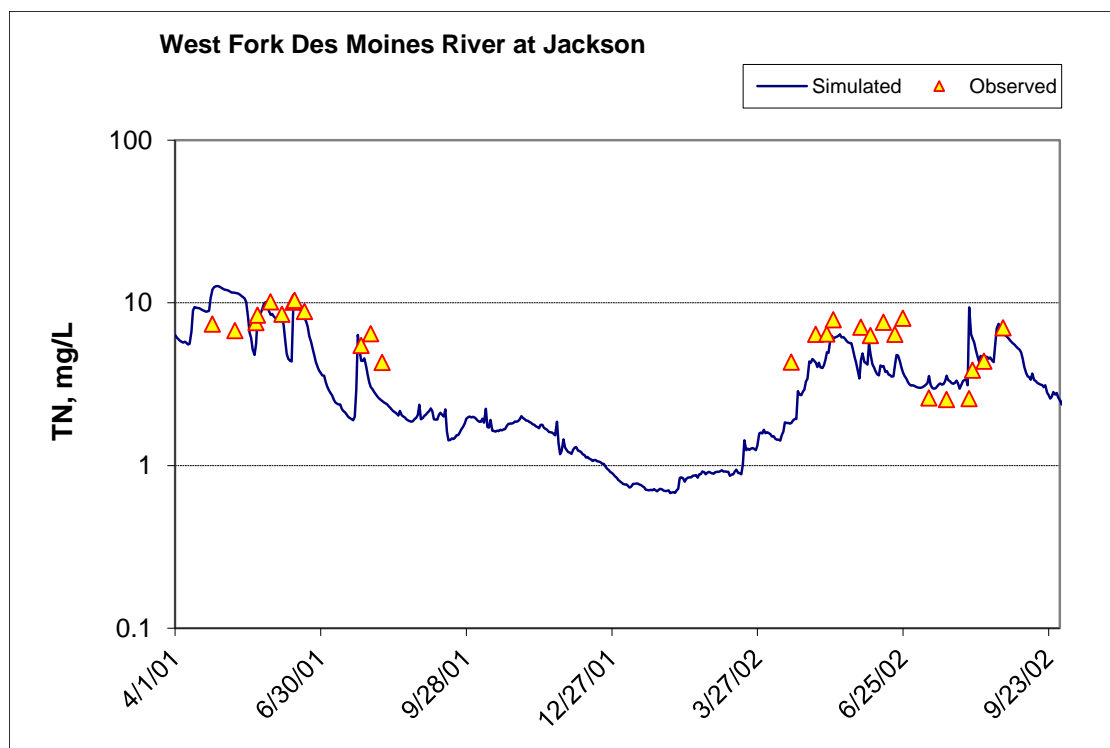


Figure 467. Time series of observed and simulated Total Nitrogen (TN) concentration at West Fork Des Moines River at Jackson (validation period)

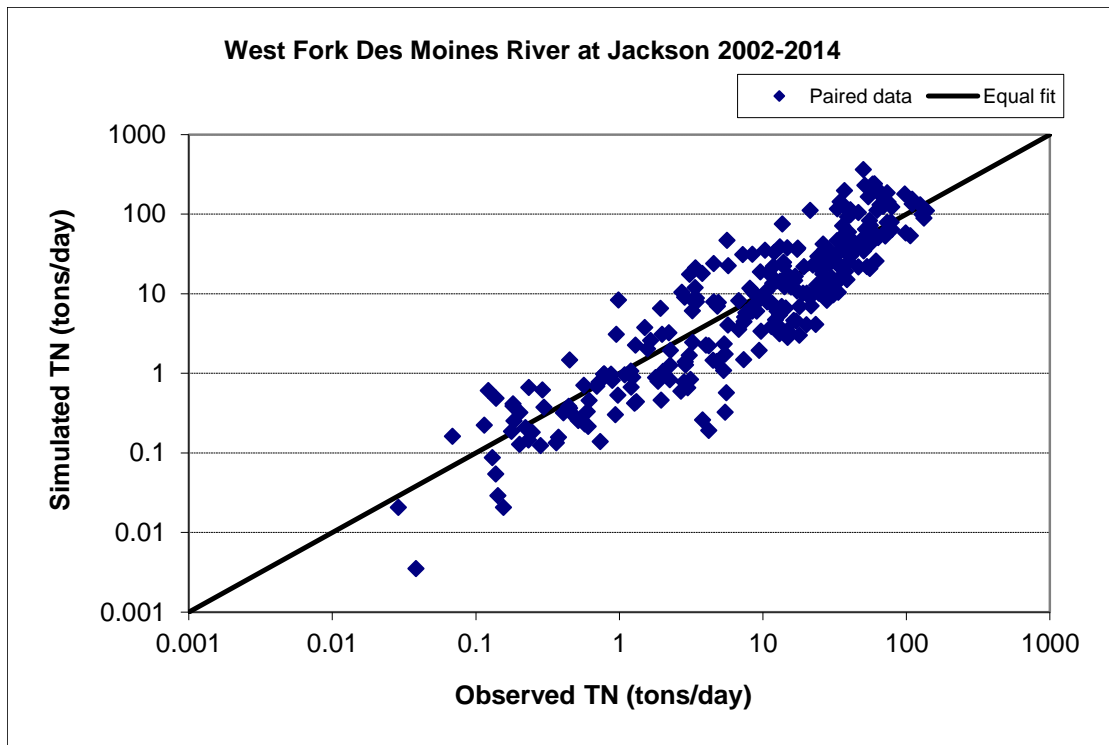


Figure 468. Paired simulated vs. observed Total Nitrogen (TN) load at West Fork Des Moines River at Jackson (calibration period)

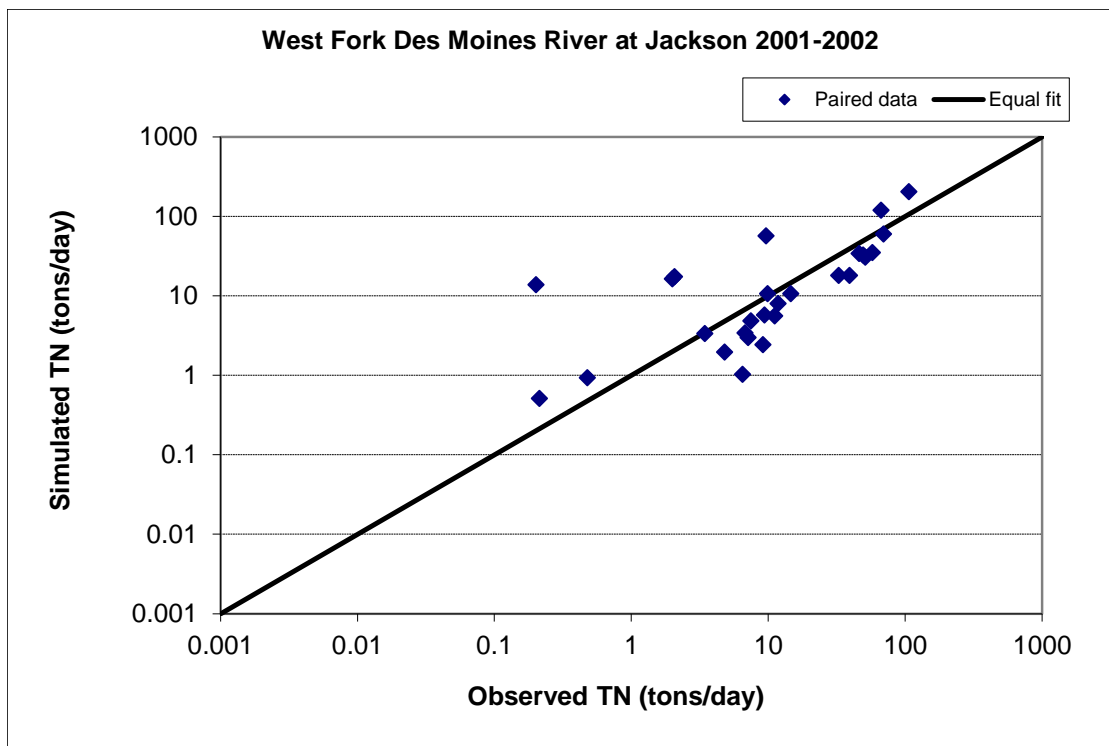


Figure 469. Paired simulated vs. observed Total Nitrogen (TN) load at West Fork Des Moines River at Jackson (validation period)

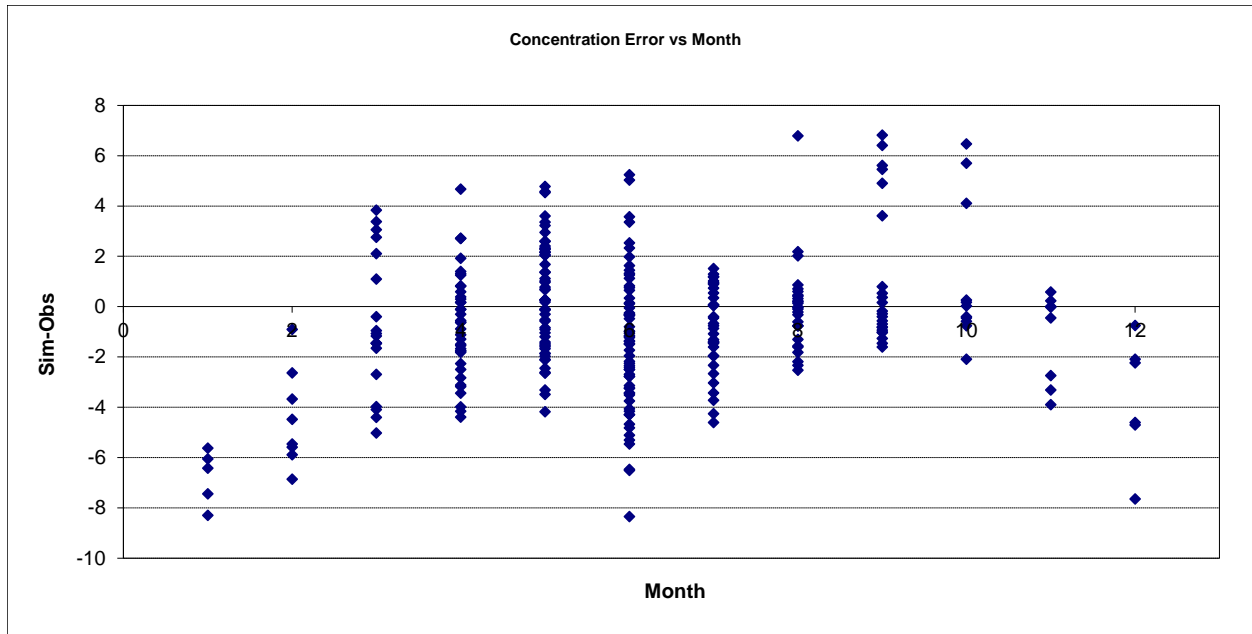


Figure 470. Residual (Simulated - Observed) vs. Month Total Nitrogen (TN) at West Fork Des Moines River at Jackson

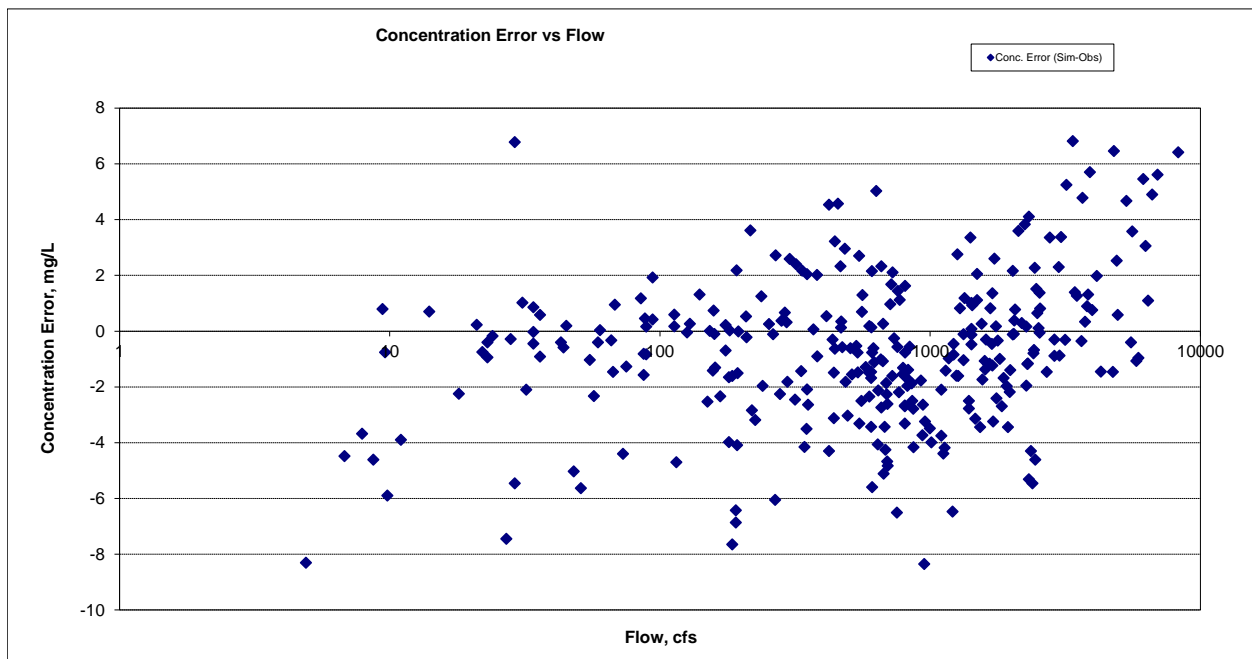


Figure 471. Residual (Simulated - Observed) vs. Flow Total Nitrogen (TN) at West Fork Des Moines River at Jackson

Soluble Reactive Phosphorus (SRP)

Table 70. Soluble Reactive Phosphorus (SRP) statistics

Period	2001-2002	2002-2014
Count	31	267
Concentration Average Error	101.35%	5.32%
Concentration Median Error	36.52%	4.55%
Load Average Error	32.69%	120.43%
Load Median Error	7.43%	1.23%
Paired t concentration	0.01	0.94

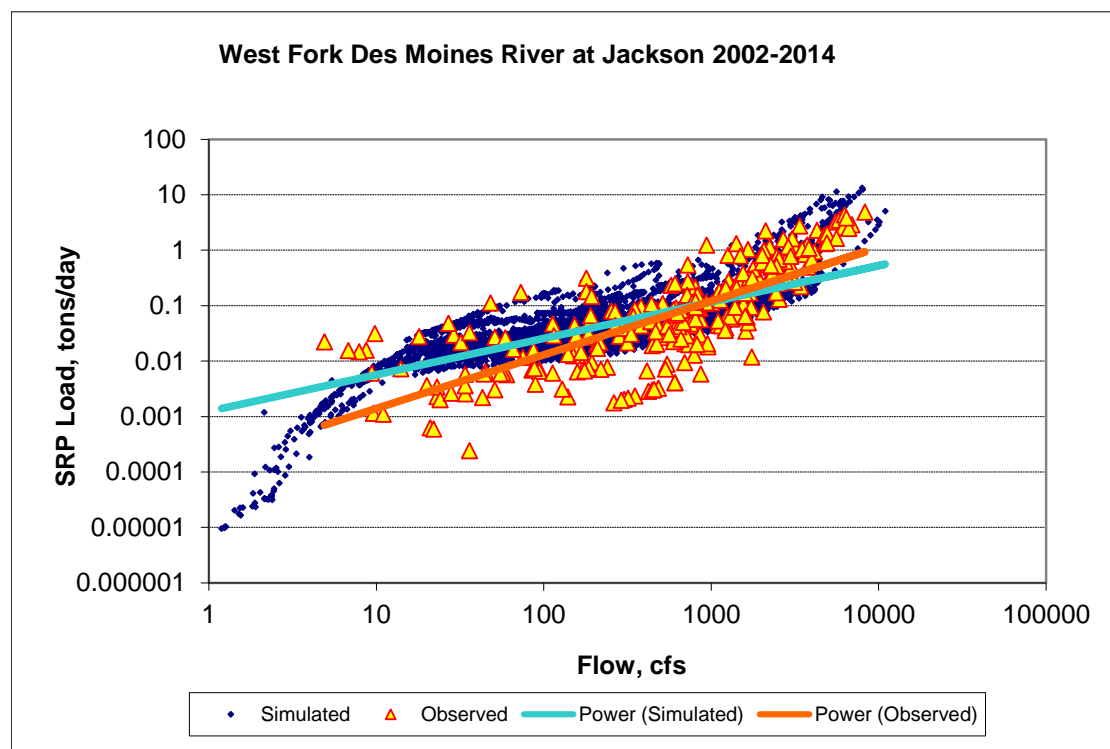


Figure 472. Power plot of simulated and observed Soluble Reactive Phosphorus (SRP) load vs flow at West Fork Des Moines River at Jackson (calibration period)

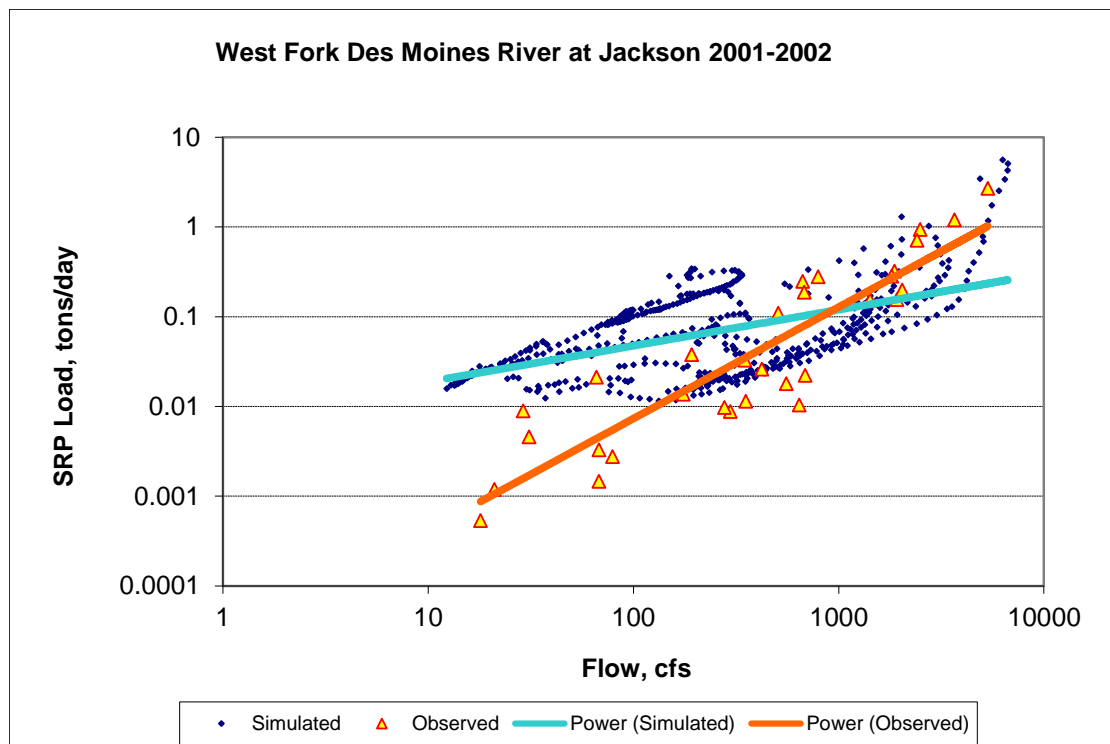


Figure 473. Power plot of simulated and observed Soluble Reactive Phosphorus (SRP) load vs flow at West Fork Des Moines River at Jackson (validation period)

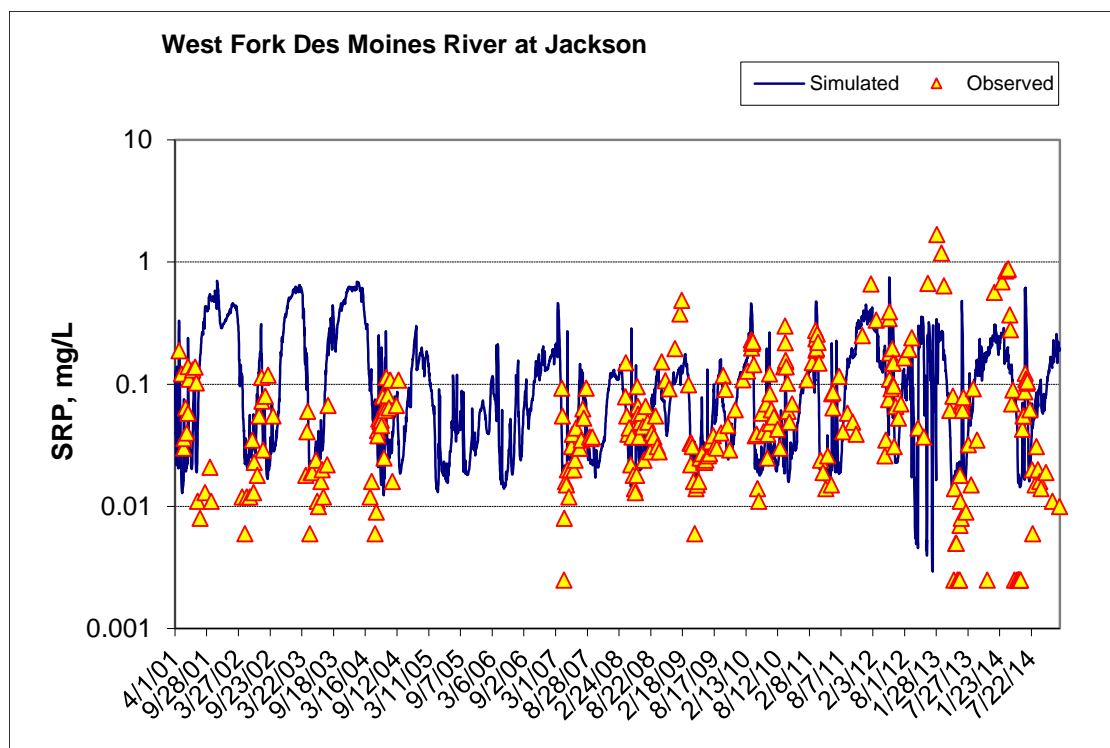


Figure 474. Time series of observed and simulated Soluble Reactive Phosphorus (SRP) concentration at West Fork Des Moines River at Jackson (calibration period)

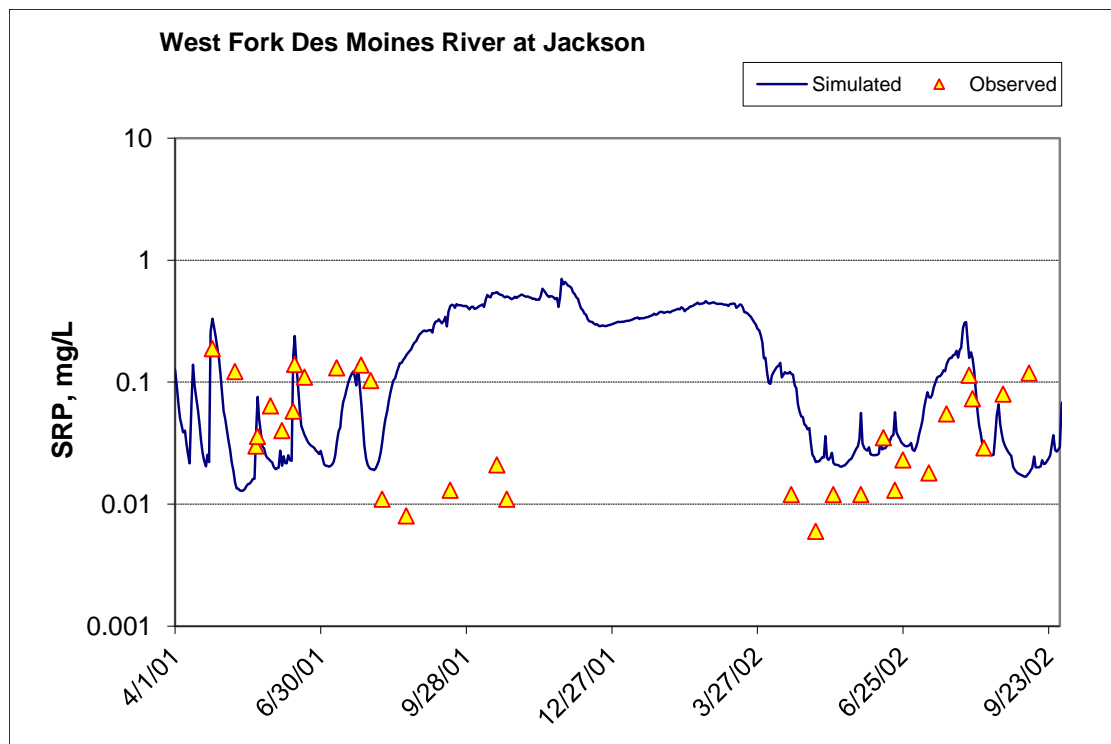


Figure 475. Time series of observed and simulated Soluble Reactive Phosphorus (SRP) concentration at West Fork Des Moines River at Jackson (validation period)

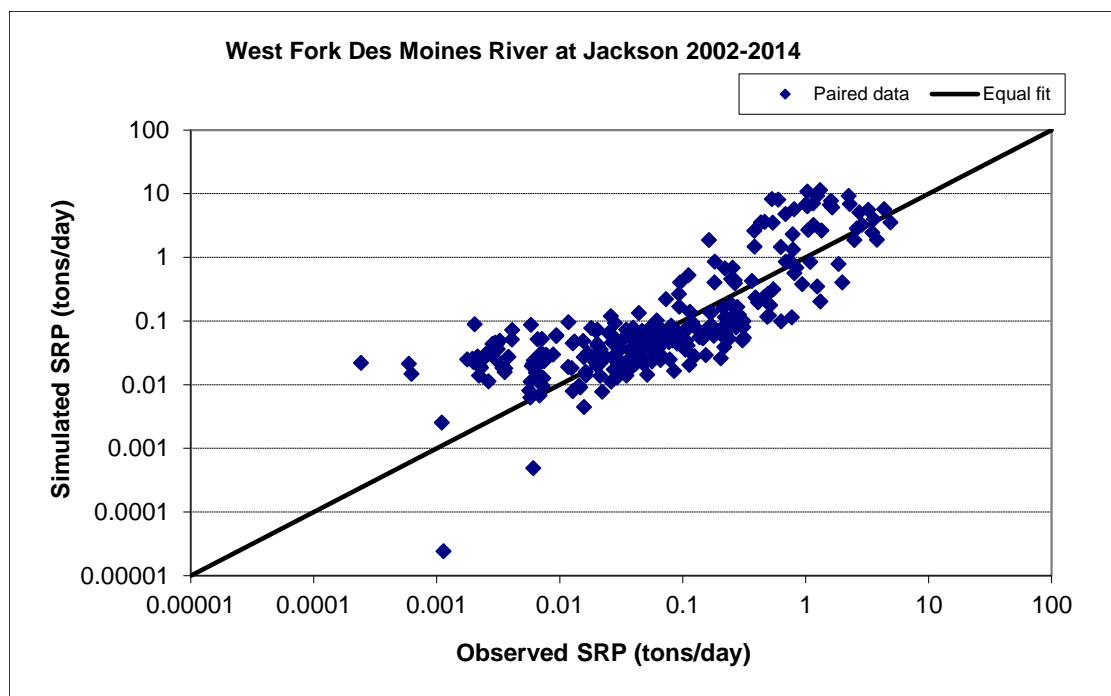


Figure 476. Paired simulated vs. observed Soluble Reactive Phosphorus (SRP) load at West Fork Des Moines River at Jackson (calibration period)

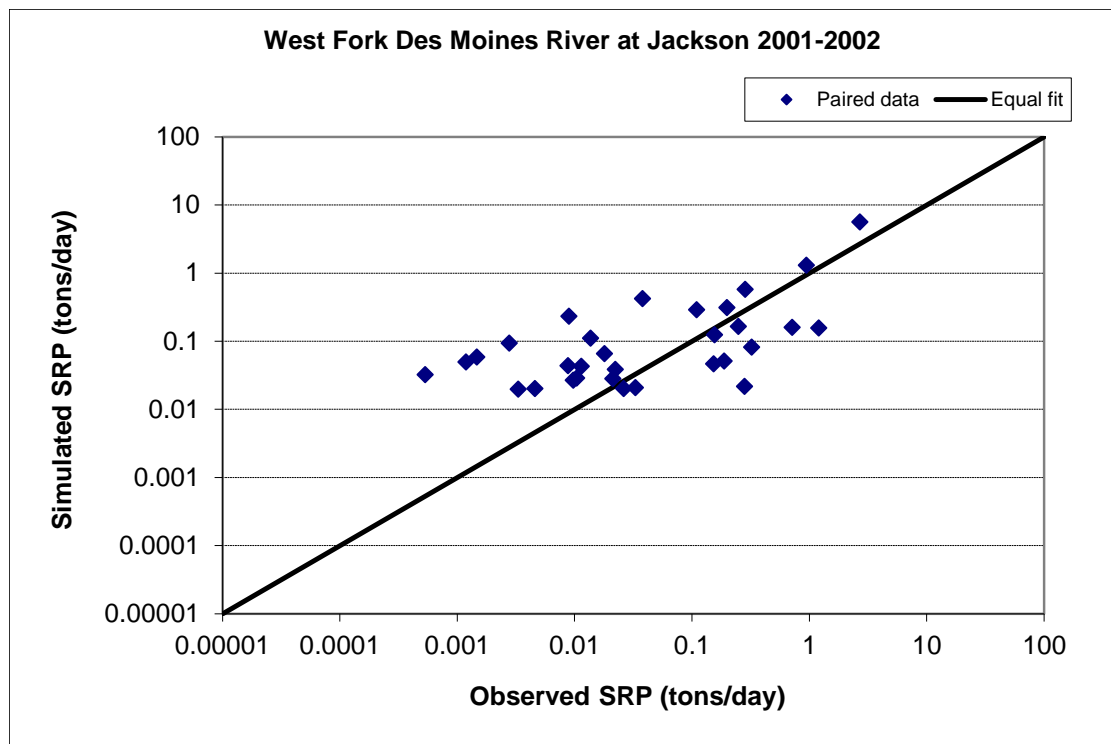


Figure 477. Paired simulated vs. observed Soluble Reactive Phosphorus (SRP) load at West Fork Des Moines River at Jackson (validation period)

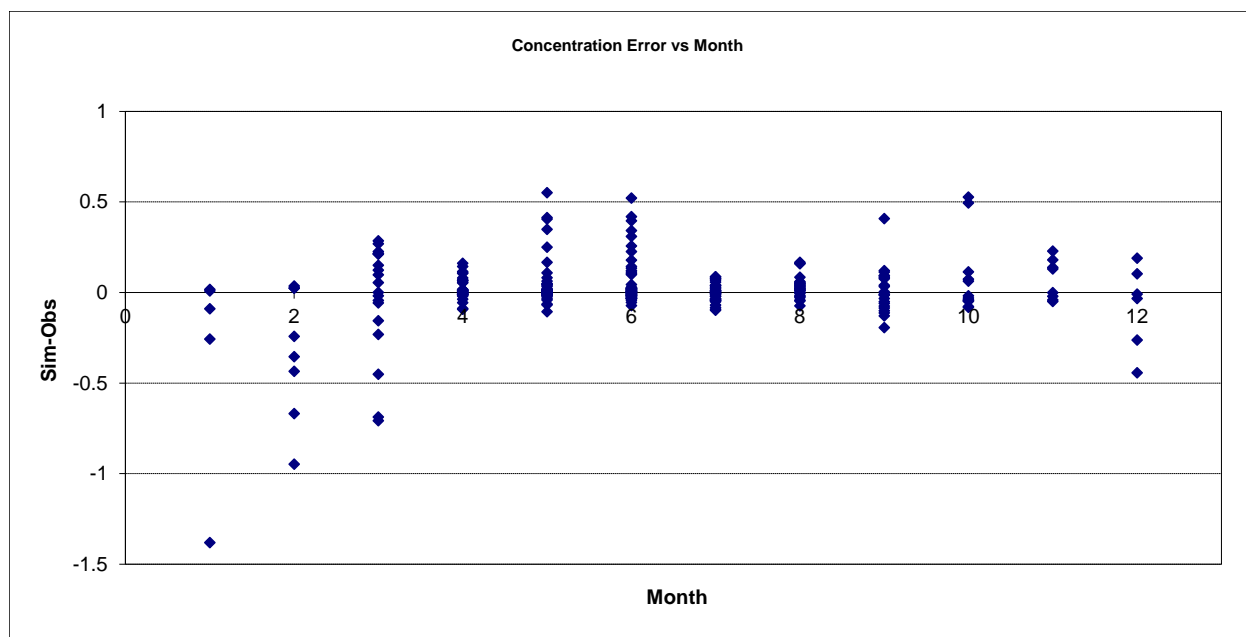


Figure 478. Residual (Simulated - Observed) vs. Month Soluble Reactive Phosphorus (SRP) at West Fork Des Moines River at Jackson

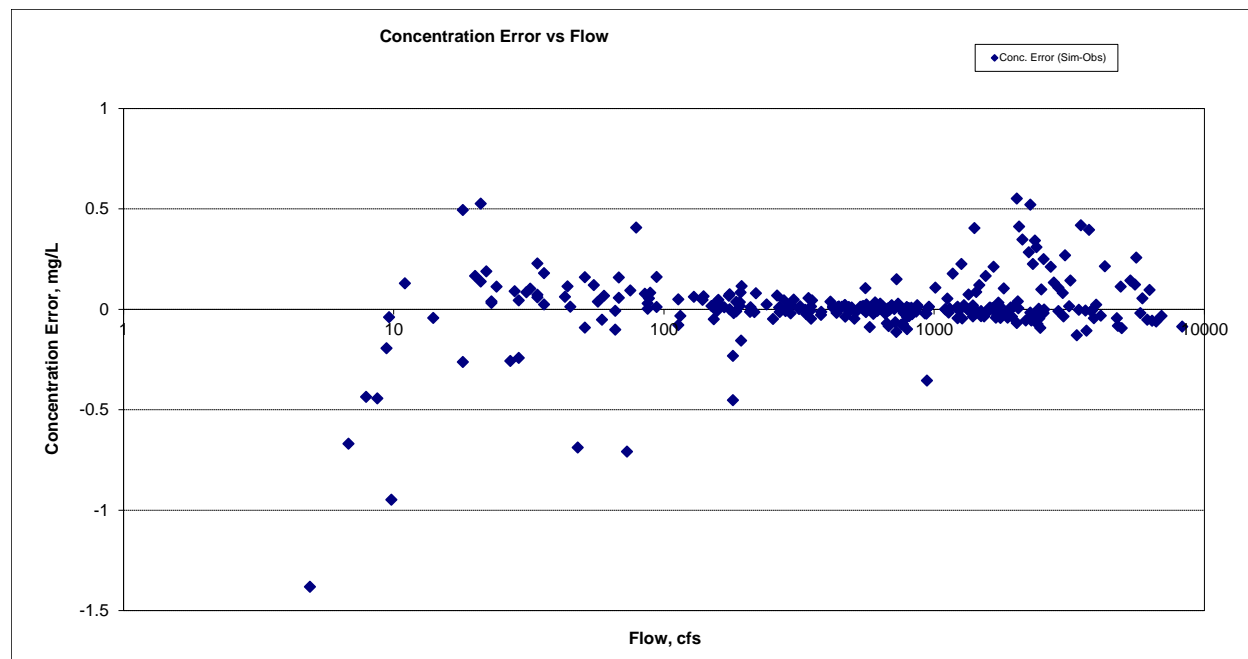


Figure 479. Residual (Simulated - Observed) vs. Flow Soluble Reactive Phosphorus (SRP) at West Fork Des Moines River at Jackson

Organic Phosphorus (OrgP)

Table 71. Organic Phosphorus (OrgP) statistics

Period	2002-2014	2001-2002
Count	213	31
Concentration Average Error	-19.41%	-42.67%
Concentration Median Error	-15.70%	-50.34%
Load Average Error	38.07%	-6.77%
Load Median Error	-4.37%	-3.25%
Paired t concentration	0.58	0.00

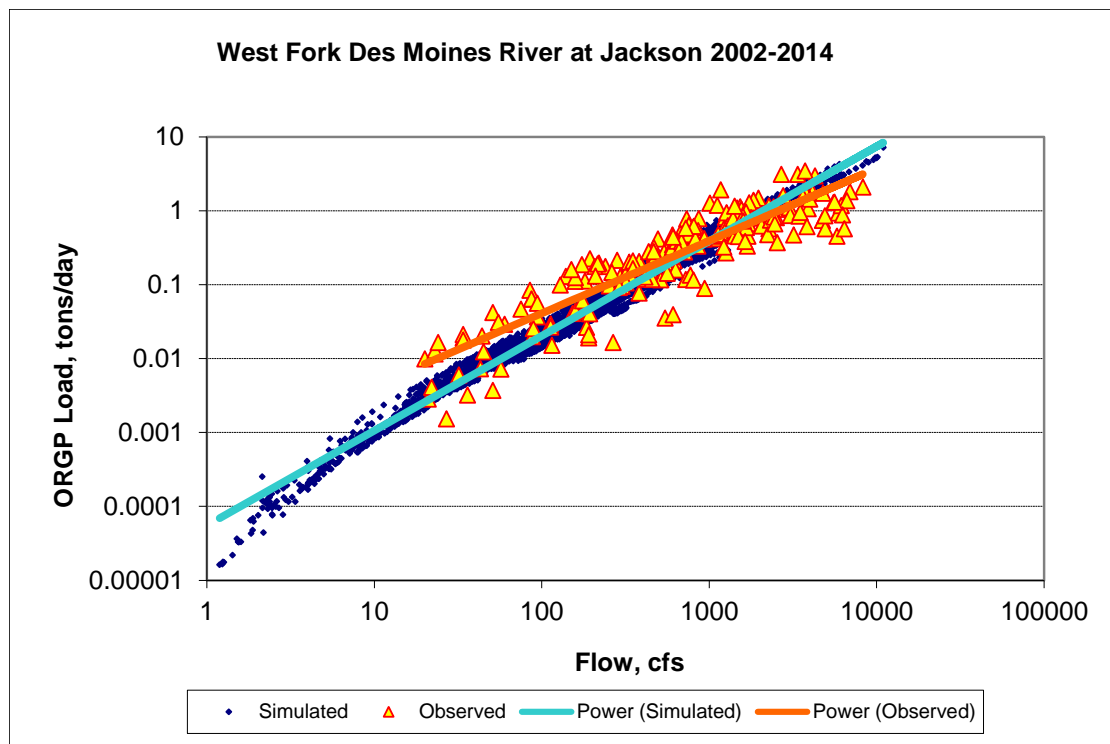


Figure 480. Power plot of simulated and observed Organic Phosphorus (OrgP) load vs flow at West Fork Des Moines River at Jackson (calibration period)

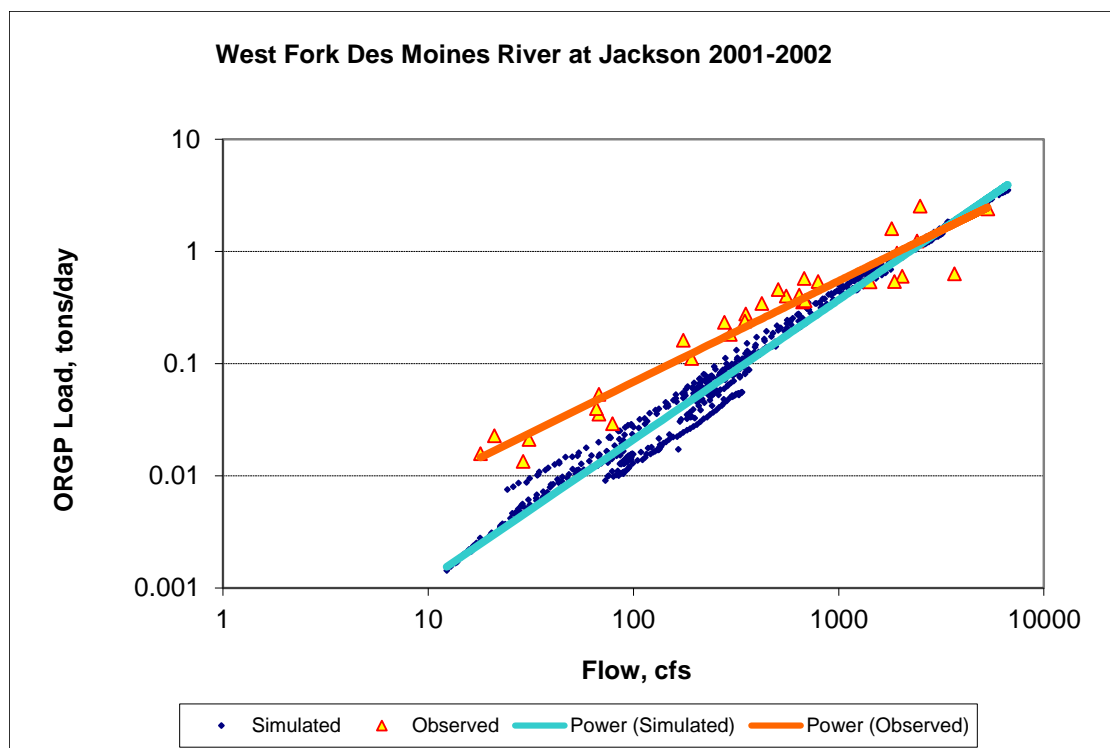


Figure 481. Power plot of simulated and observed Organic Phosphorus (OrgP) load vs flow at West Fork Des Moines River at Jackson (validation period)

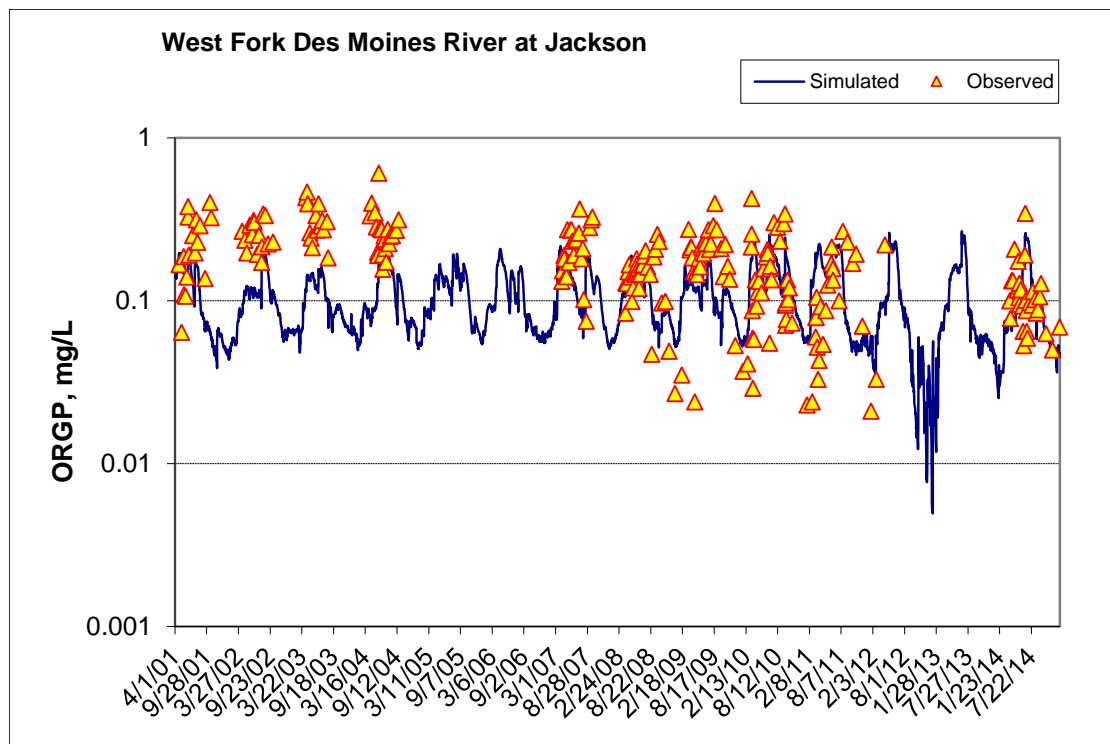


Figure 482. Time series of observed and simulated Organic Phosphorus (OrgP) concentration at West Fork Des Moines River at Jackson (calibration period)

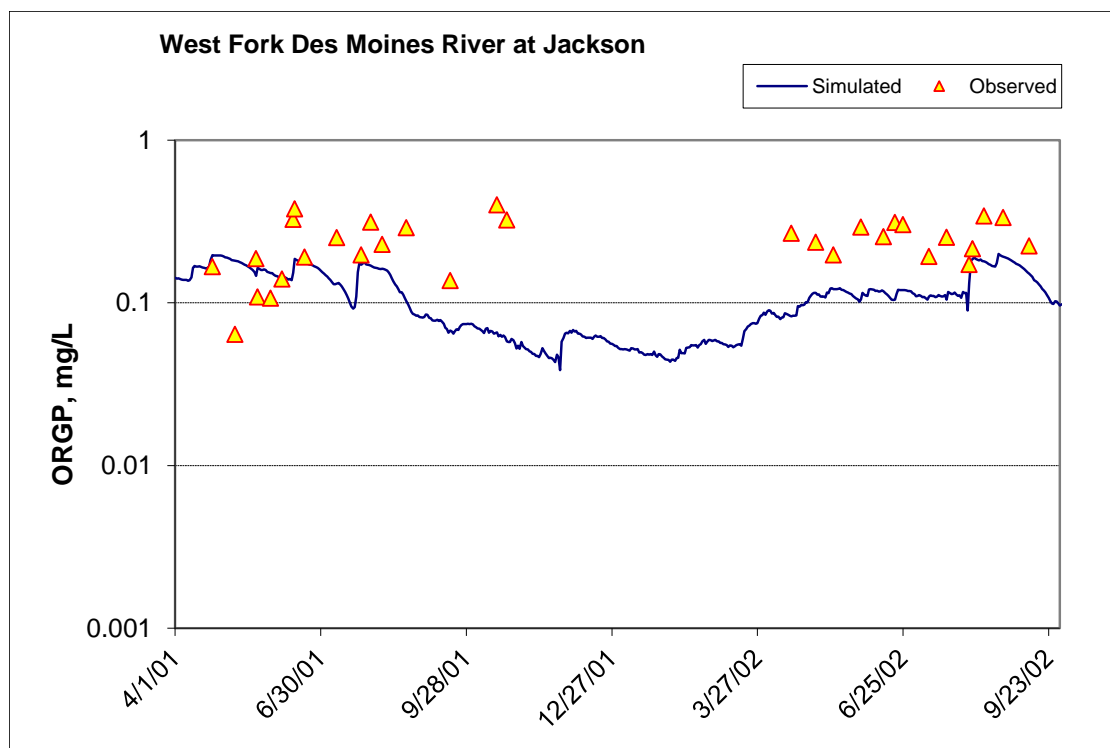


Figure 483. Time series of observed and simulated Organic Phosphorus (OrgP) concentration at West Fork Des Moines River at Jackson (validation period)

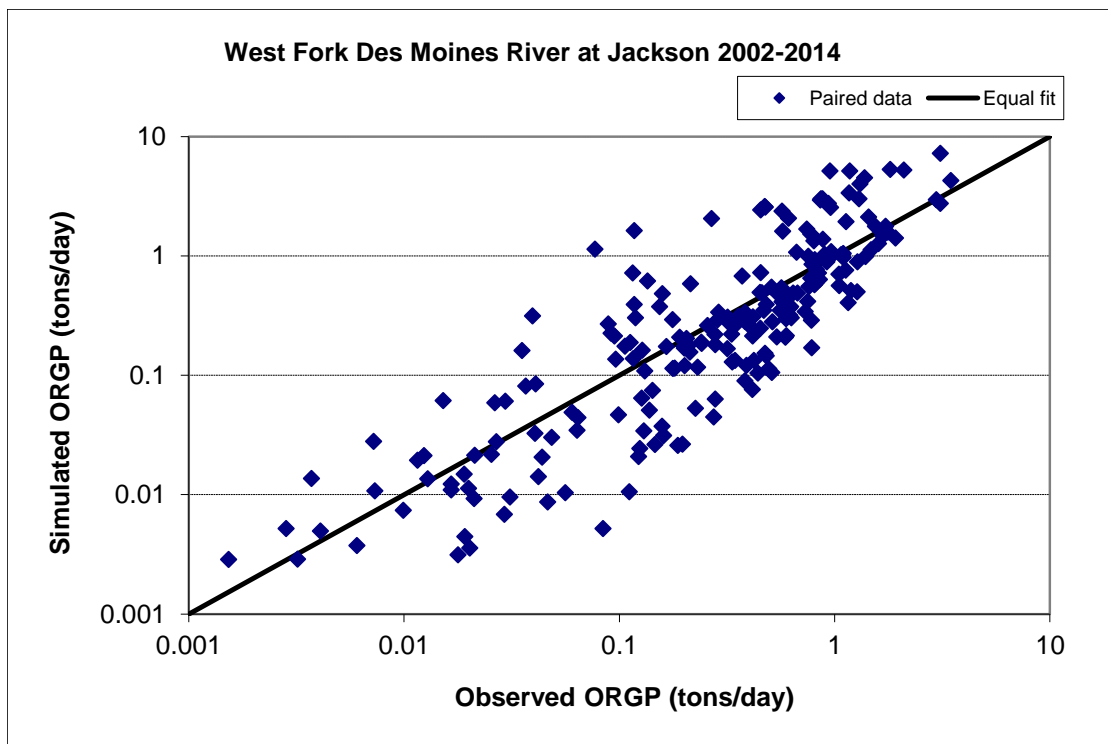


Figure 484. Paired simulated vs. observed Organic Phosphorus (OrgP) load at West Fork Des Moines River at Jackson (calibration period)

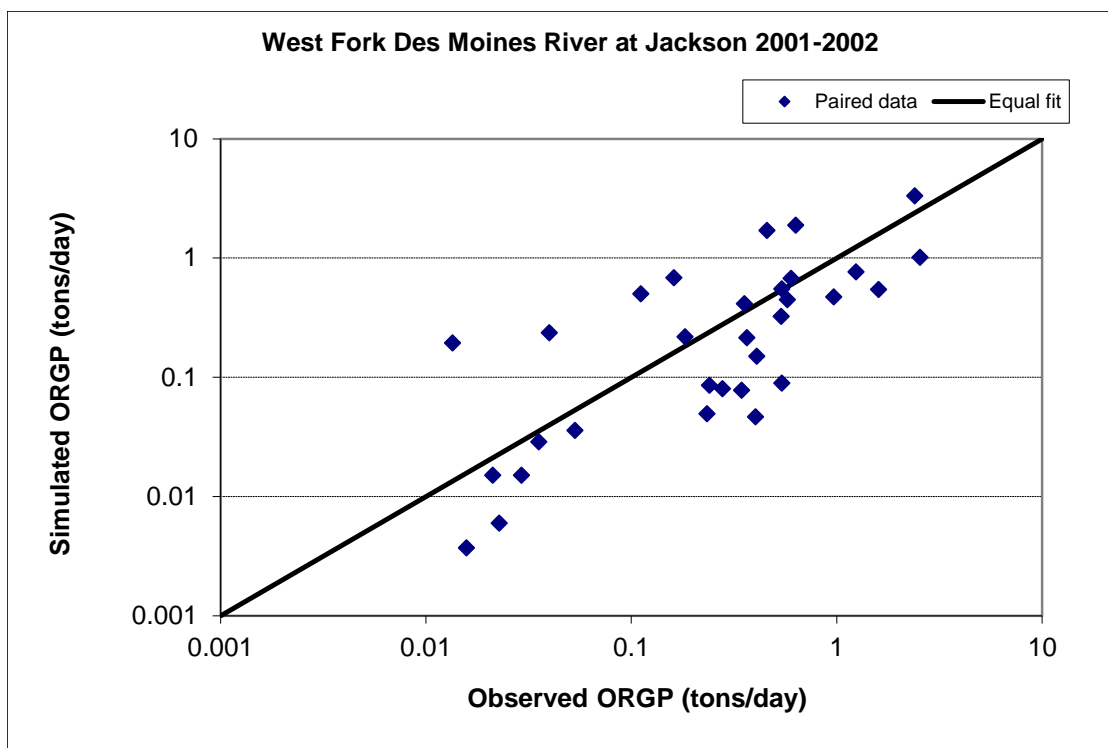


Figure 485. Paired simulated vs. observed Organic Phosphorus (OrgP) load at West Fork Des Moines River at Jackson (validation period)

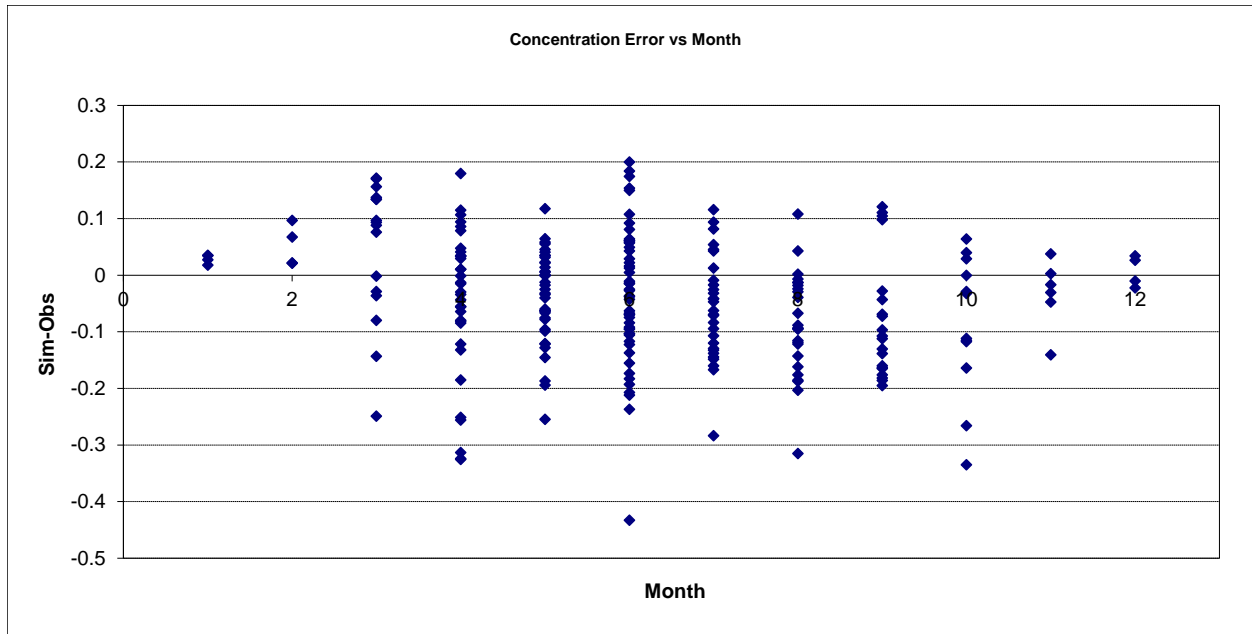


Figure 486. Residual (Simulated - Observed) vs. Month Organic Phosphorus (OrgP) at West Fork Des Moines River at Jackson

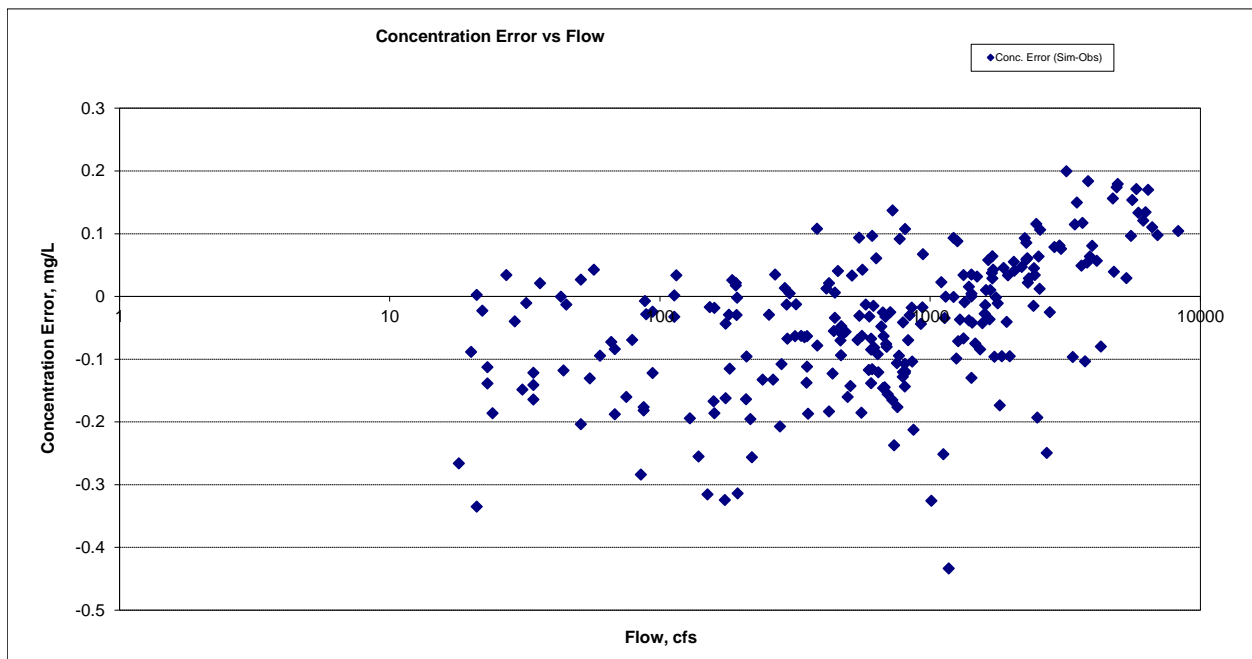


Figure 487. Residual (Simulated - Observed) vs. Flow Organic Phosphorus (OrgP) at West Fork Des Moines River at Jackson

Total Phosphorus (TP)

Table 72. Total Phosphorus (TP) statistics

Period	2002-2014	2001-2002
Count	231	34
Concentration Average Error	-8.94%	-15.39%
Concentration Median Error	-11.06%	-22.80%
Load Average Error	53.11%	4.46%
Load Median Error	-5.06%	-11.07%
Paired t concentration	1.00	0.76

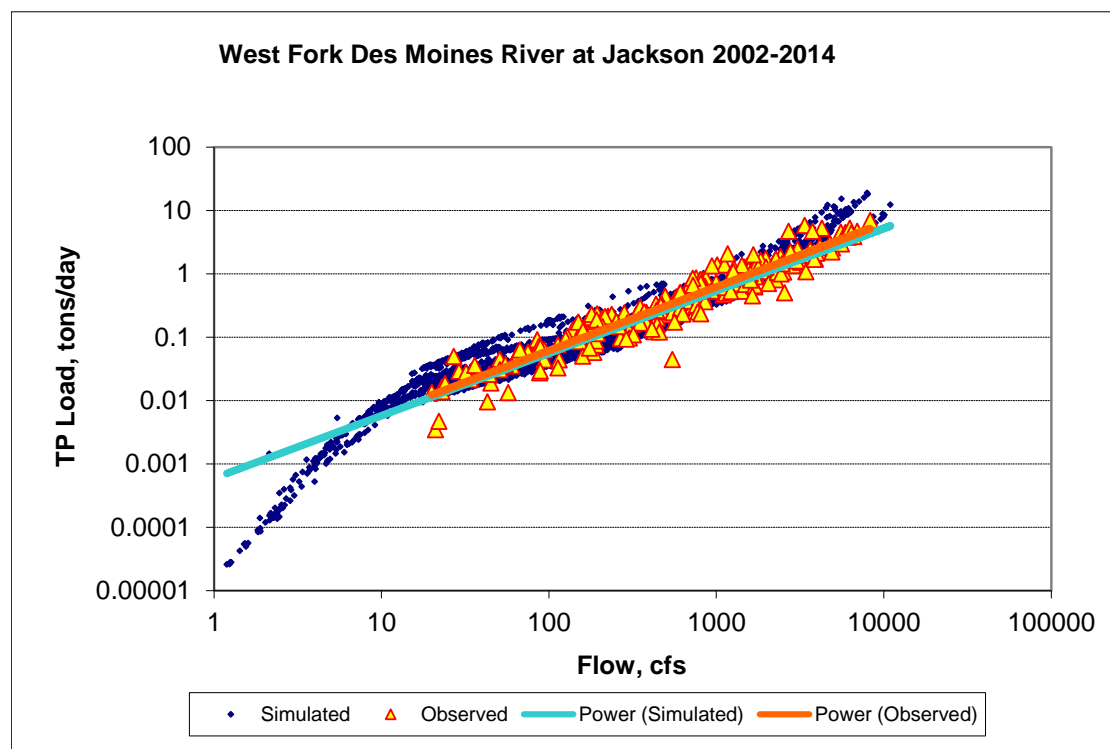


Figure 488. Power plot of simulated and observed Total Phosphorus (TP) load vs flow at West Fork Des Moines River at Jackson (calibration period)

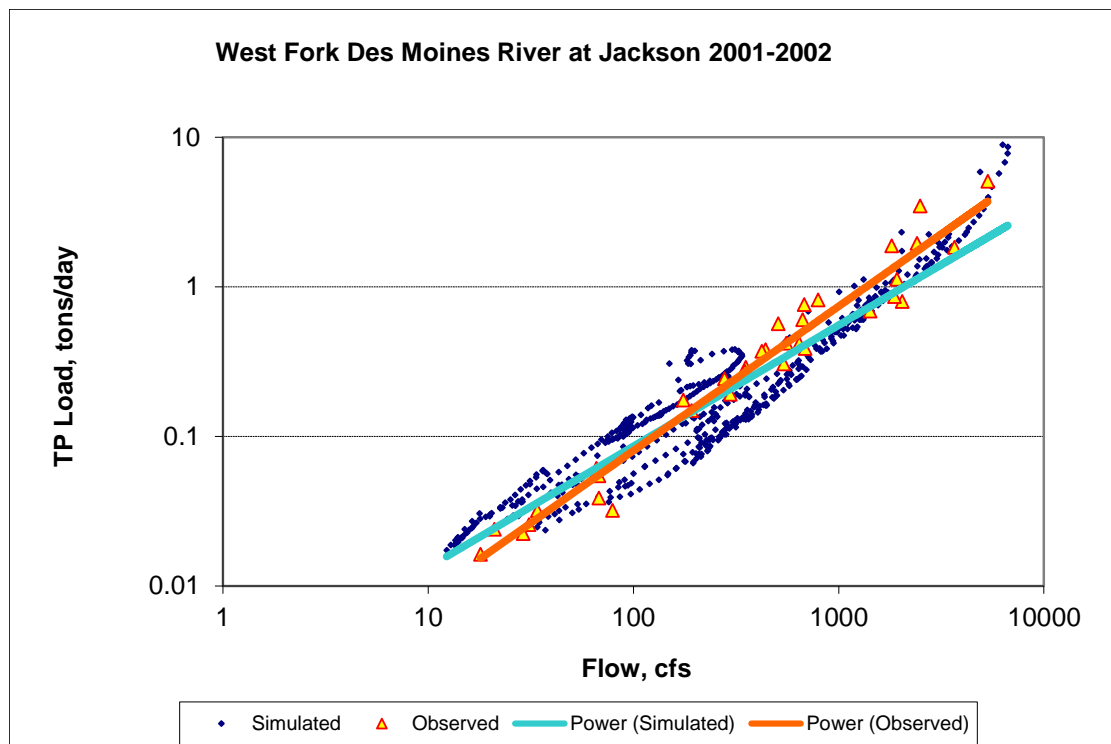


Figure 489. Power plot of simulated and observed Total Phosphorus (TP) load vs flow at West Fork Des Moines River at Jackson (validation period)

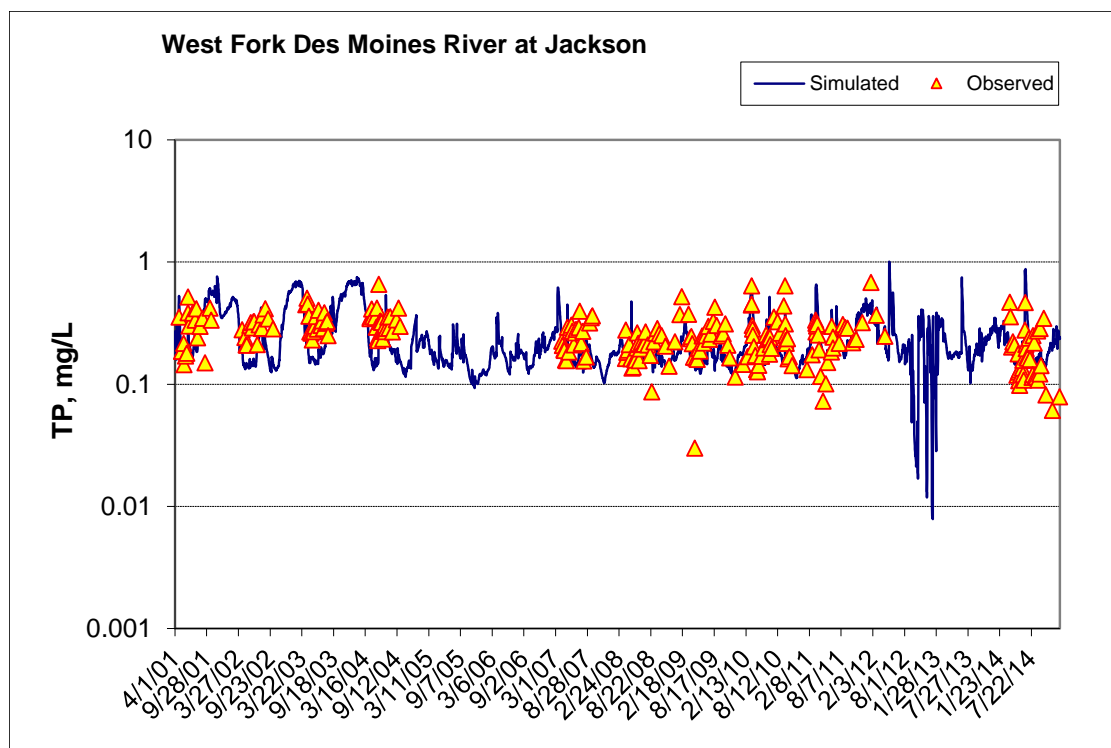


Figure 490. Time series of observed and simulated Total Phosphorus (TP) concentration at West Fork Des Moines River at Jackson (calibration period)

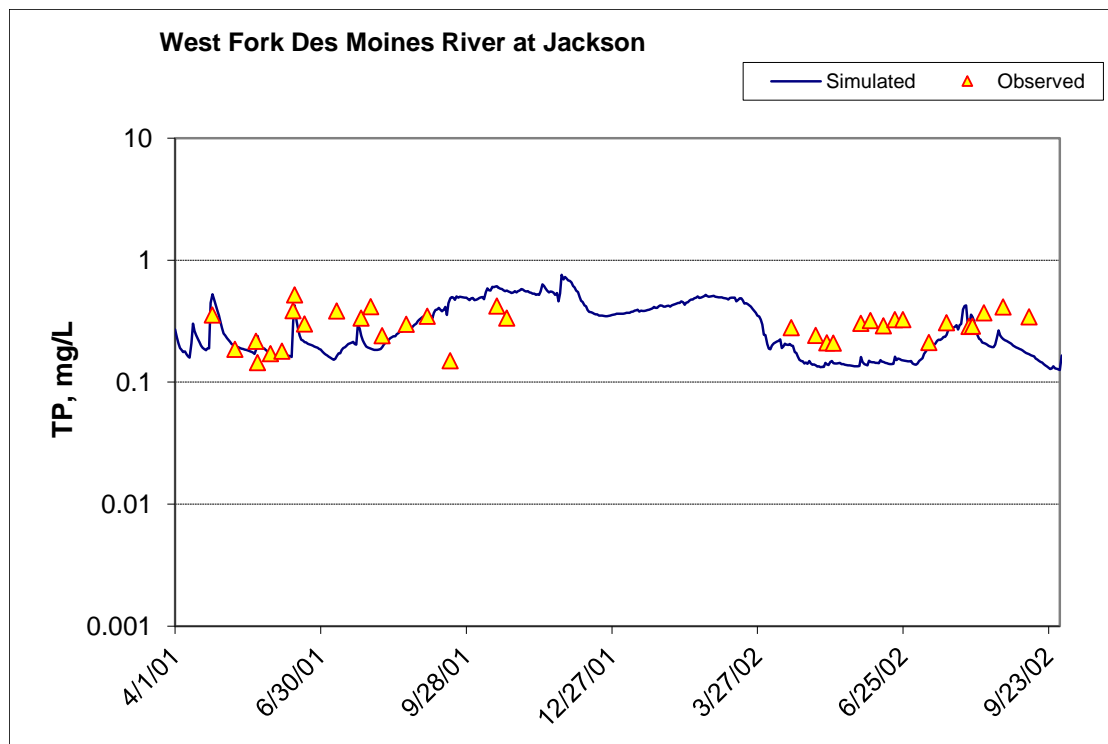


Figure 491. Time series of observed and simulated Total Phosphorus (TP) concentration at West Fork Des Moines River at Jackson (validation period)

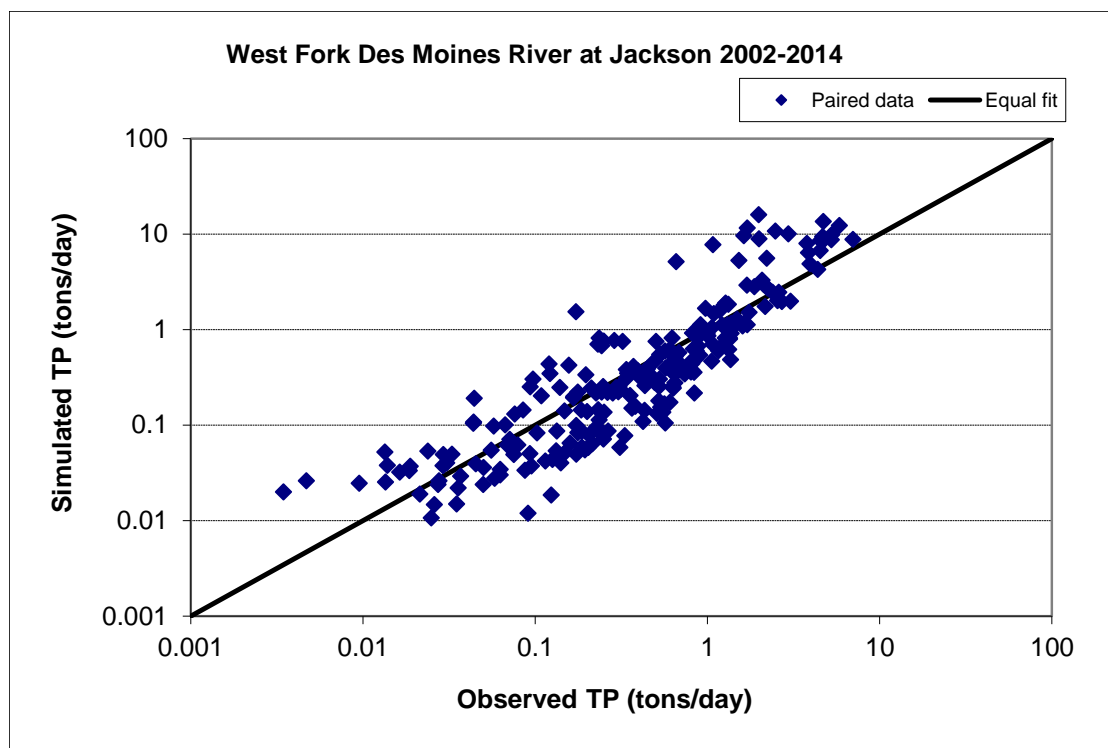


Figure 492. Paired simulated vs. observed Total Phosphorus (TP) load at West Fork Des Moines River at Jackson (calibration period)

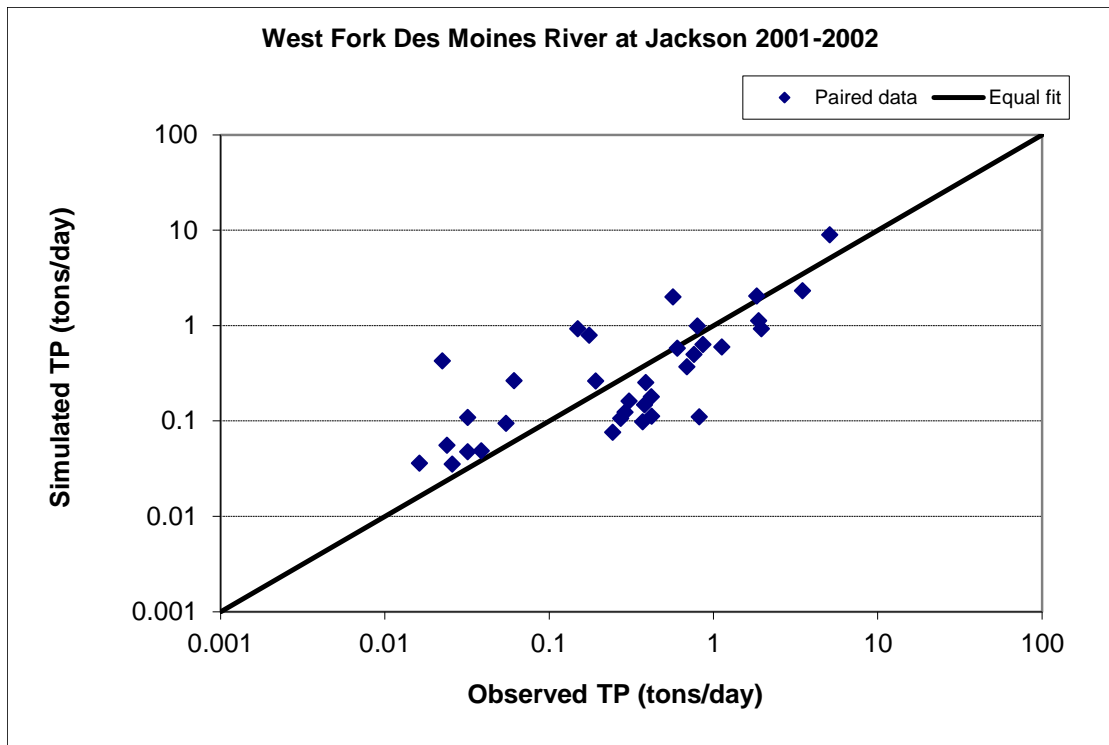


Figure 493. Paired simulated vs. observed Total Phosphorus (TP) load at West Fork Des Moines River at Jackson (validation period)

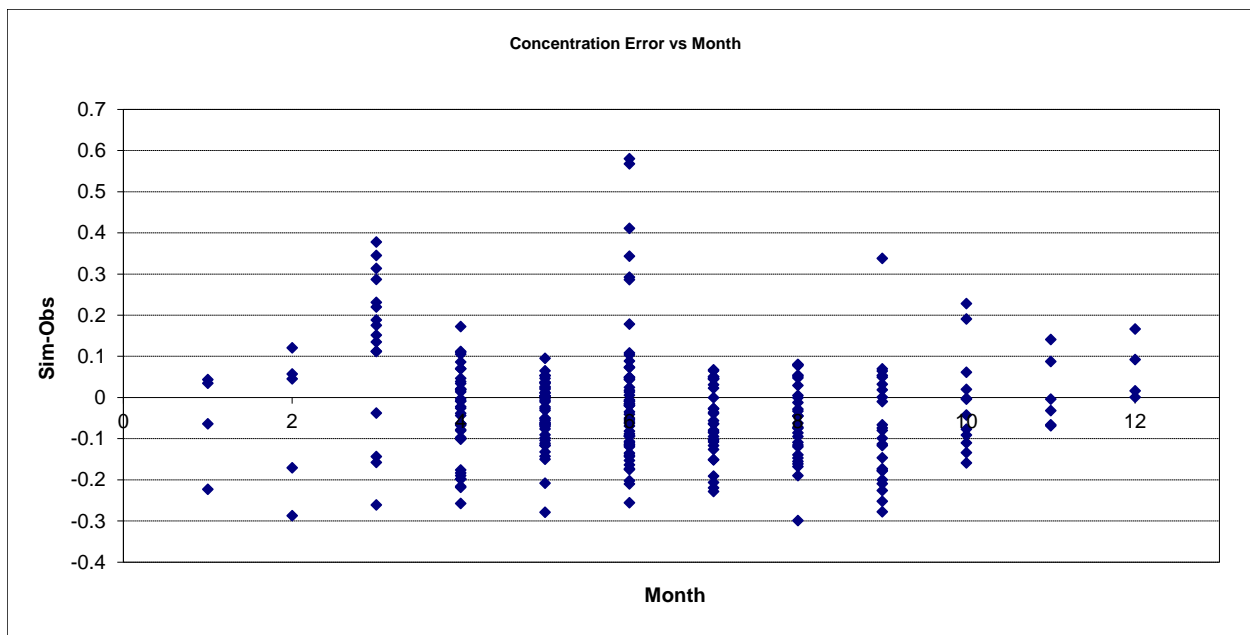


Figure 494. Residual (Simulated - Observed) vs. Month Total Phosphorus (TP) at West Fork Des Moines River at Jackson

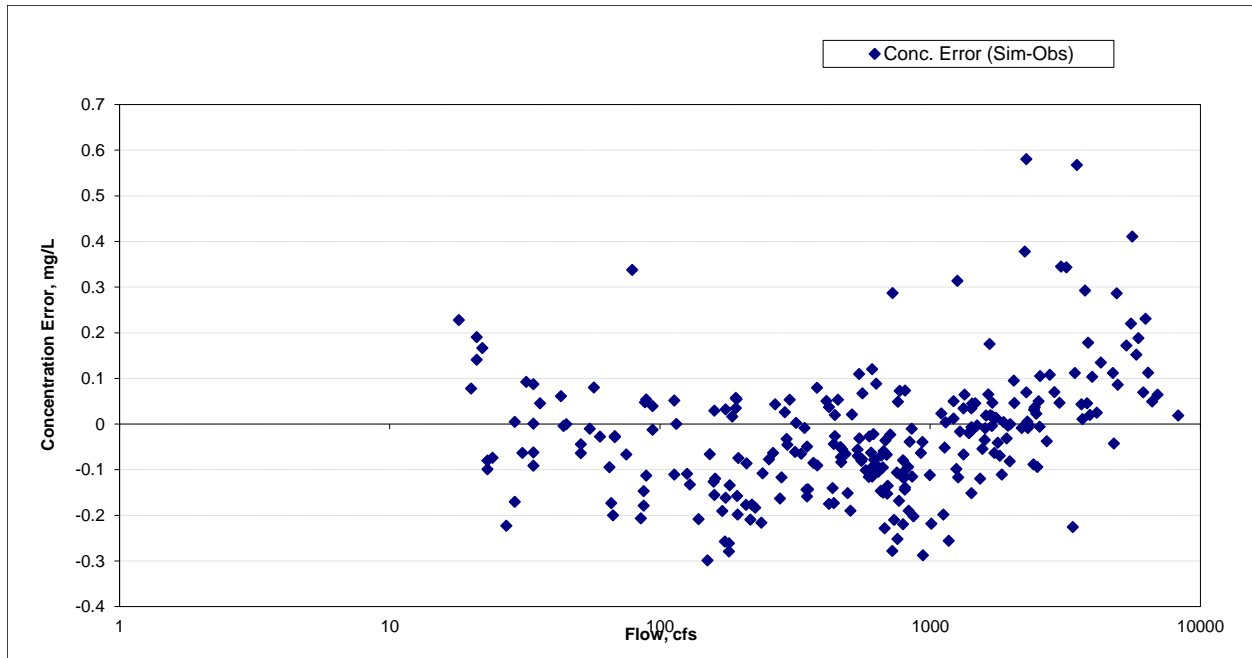


Figure 495. Residual (Simulated - Observed) vs. Flow Total Phosphorus (TP) at West Fork Des Moines River at Jackson

Martin County Ditch near Dunnell (S005-572)

Total Suspended Solids (TSS)

Table 73. Total Suspended Solids (TSS) statistics

Period	2008-2014
Count	80
Concentration Average Error	-12.56%
Concentration Median Error	-19.87%
Load Average Error	23.25%
Load Median Error	-0.91%
Paired t concentration	0.63

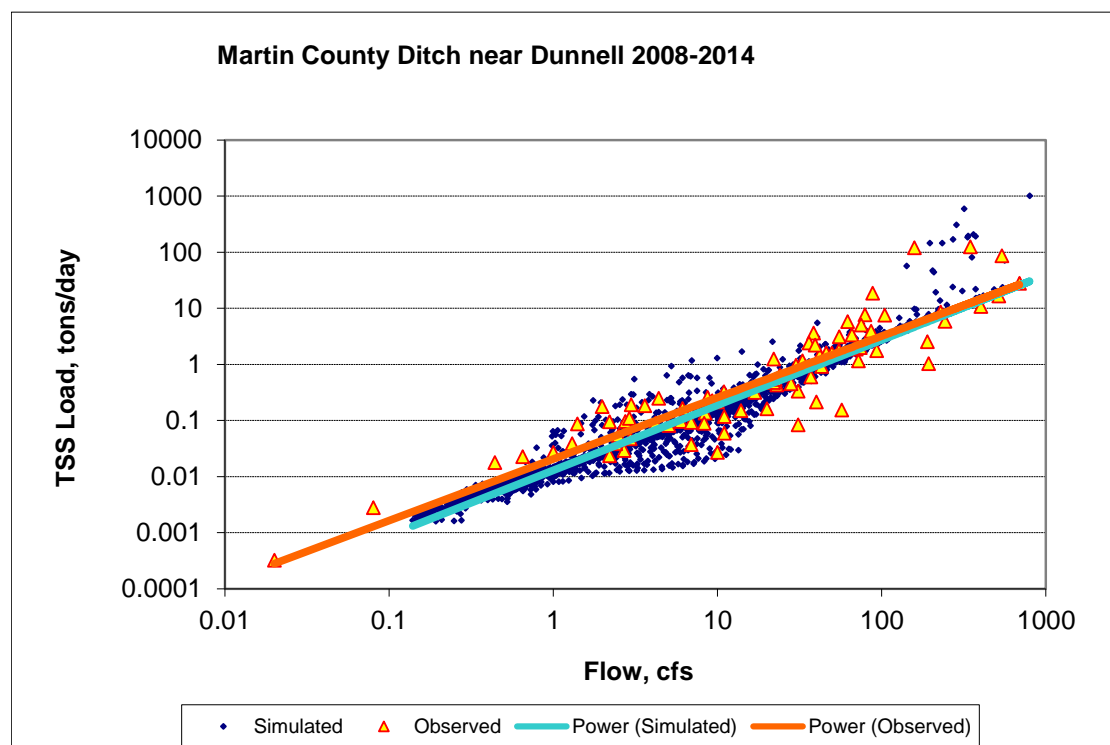


Figure 496. Power plot of simulated and observed Total Suspended Solids (TSS) load vs flow at Martin County Ditch near Dunnell (calibration period)

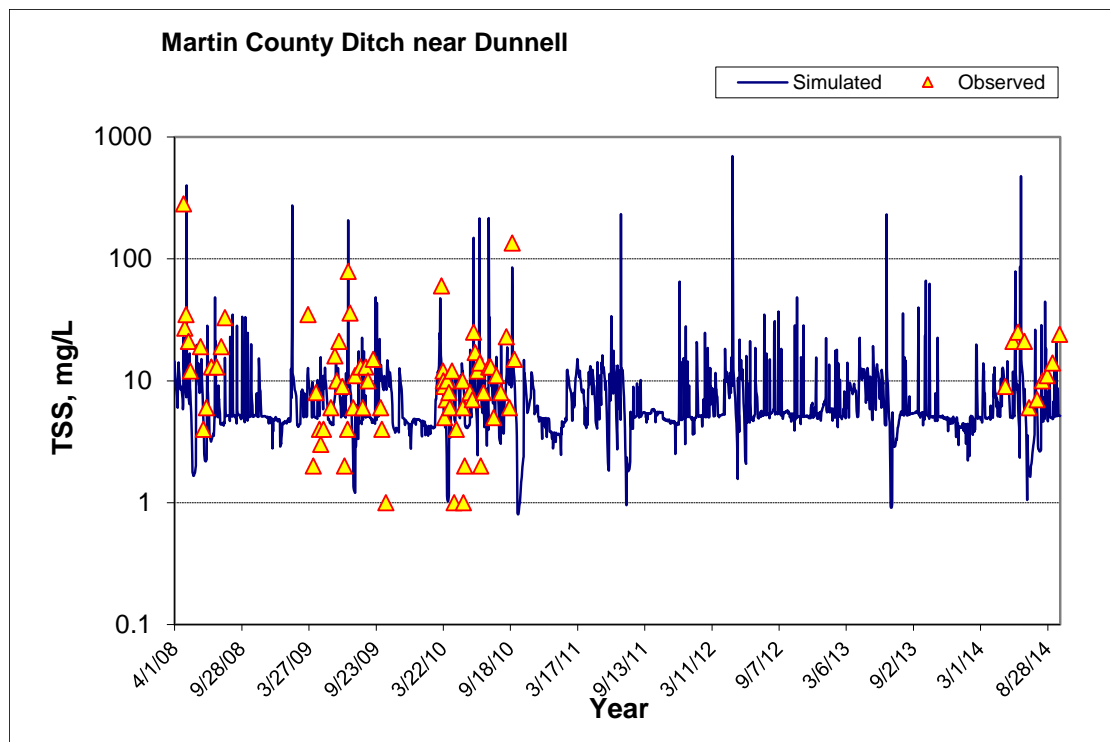


Figure 497. Time series of observed and simulated Total Suspended Solids (TSS) concentration at Martin County Ditch near Dunnell (calibration period)

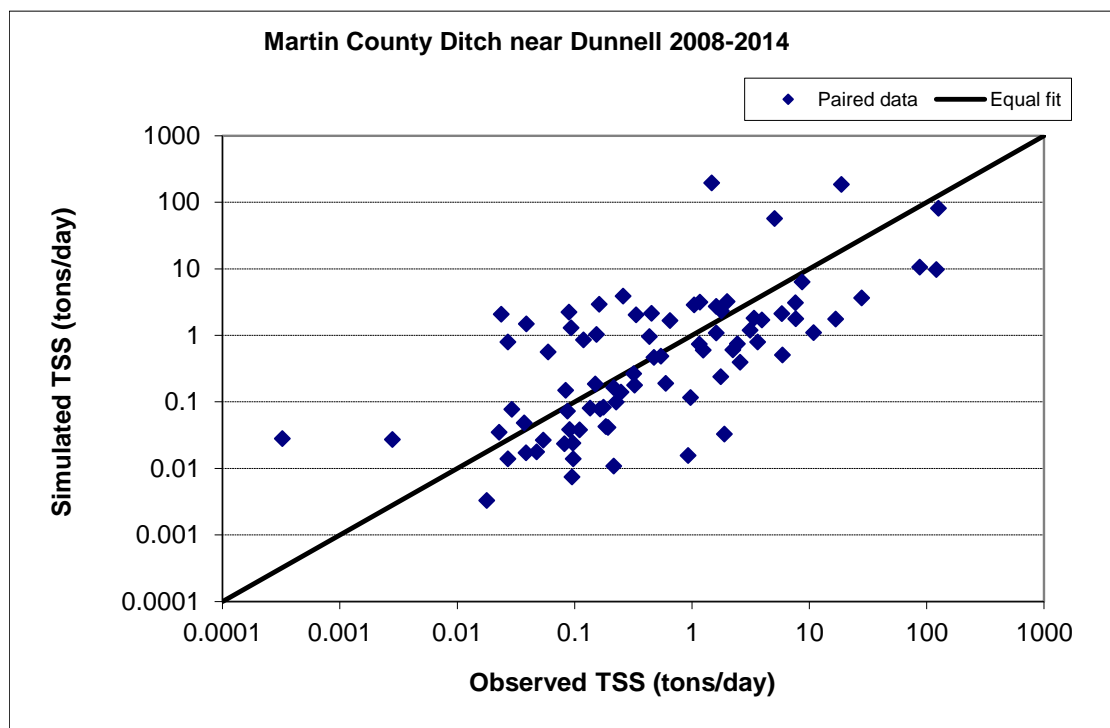


Figure 498. Paired simulated vs. observed Total Suspended Solids (TSS) load at Martin County Ditch near Dunnell (calibration period)

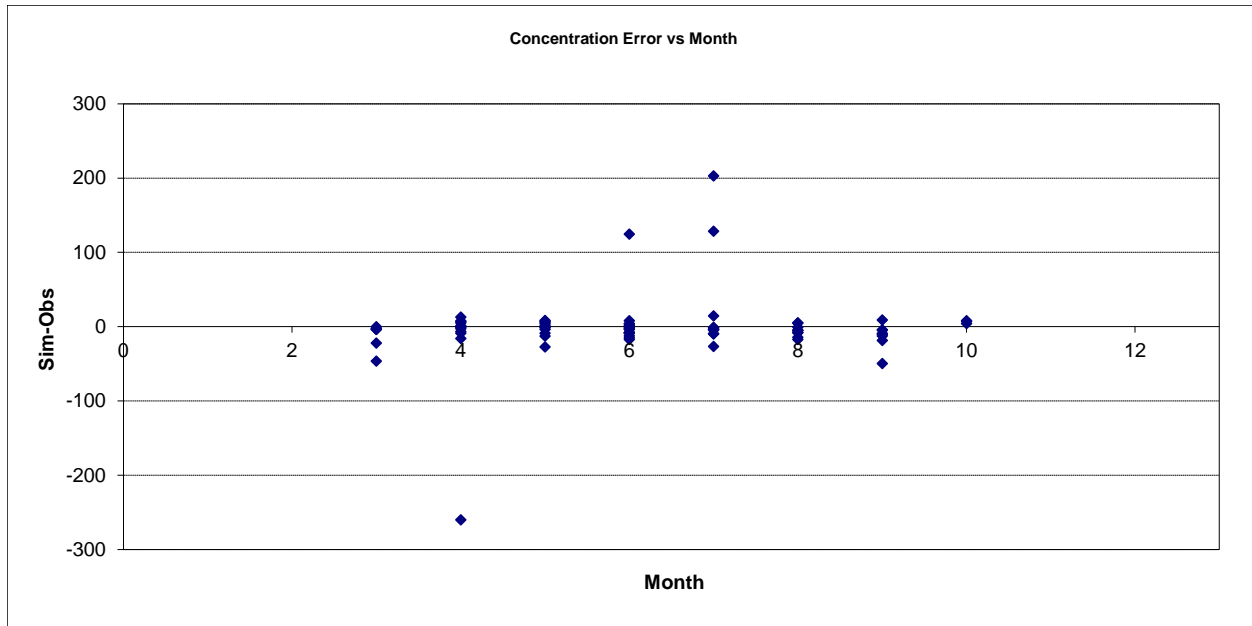


Figure 499. Residual (Simulated - Observed) vs. Month Total Suspended Solids (TSS) at Martin County Ditch near Dunnell

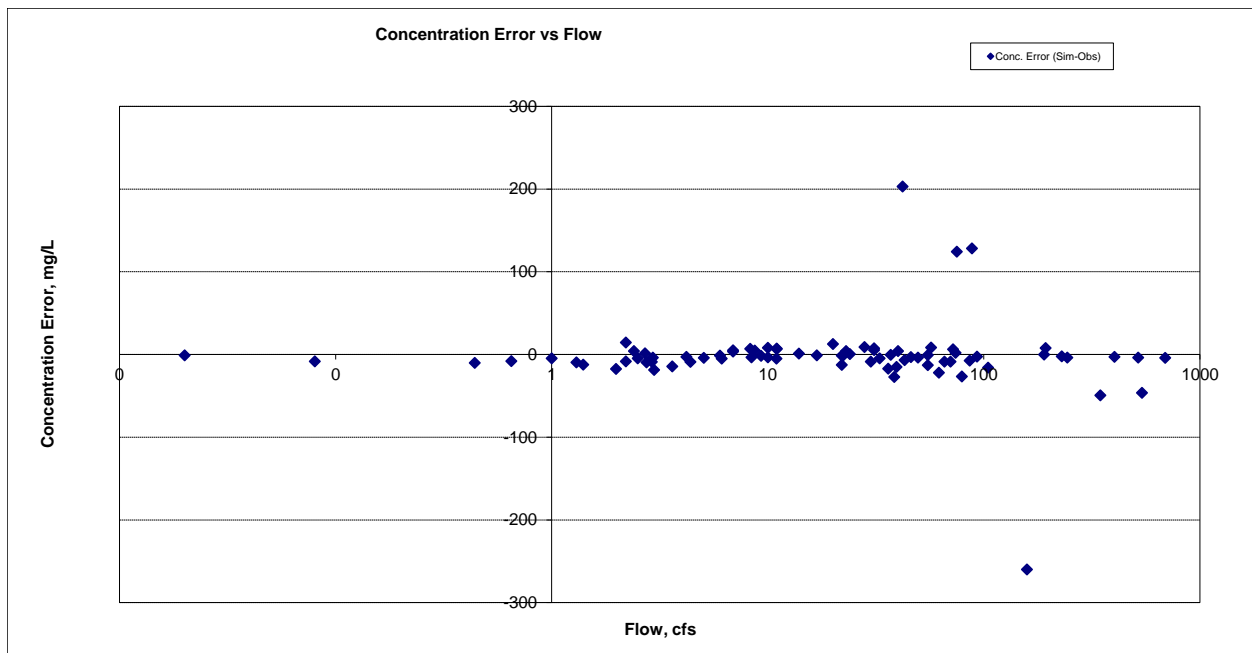


Figure 500. Residual (Simulated - Observed) vs. Flow Total Suspended Solids (TSS) at Martin County Ditch near Dunnell

Ammonia Nitrogen (NH3)

Table 74. Ammonia Nitrogen (NH3) statistics

Period	2008-2014
Count	81
Concentration Average Error	344.03%
Concentration Median Error	262.58%
Load Average Error	391.43%
Load Median Error	51.84%
Paired t concentration	0.00

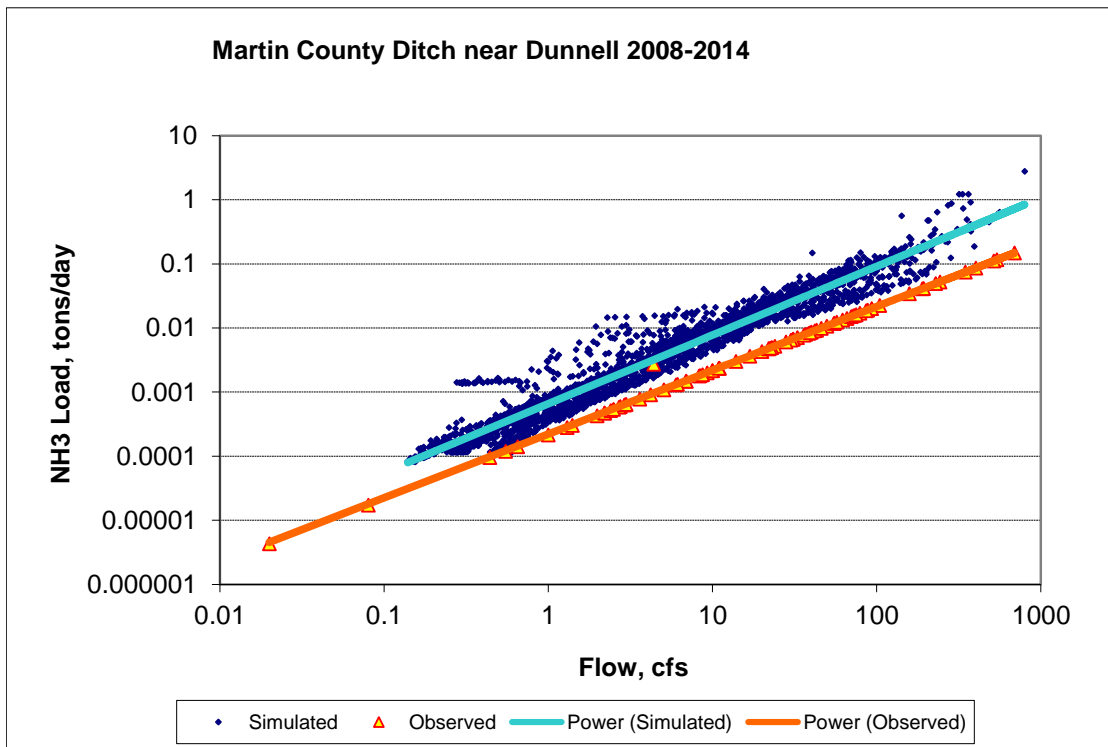


Figure 501. Power plot of simulated and observed Ammonia Nitrogen (NH3) load vs flow at Martin County Ditch near Dunnell (calibration period)

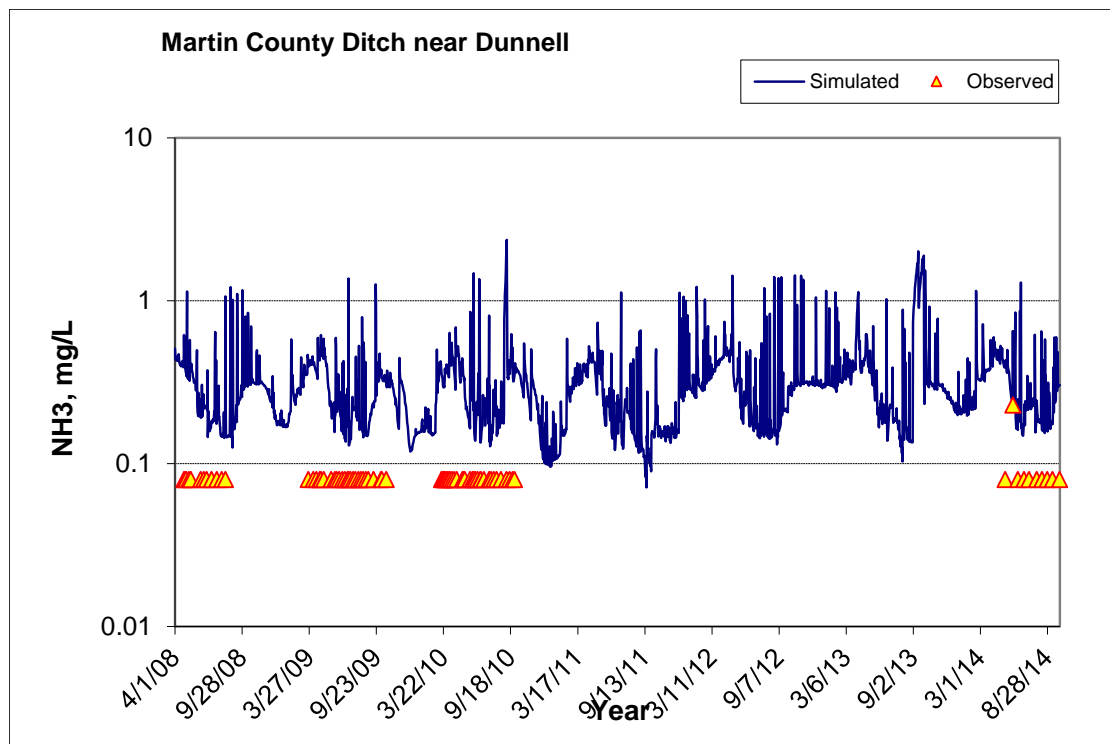


Figure 502. Time series of observed and simulated Ammonia Nitrogen (NH3) concentration at Martin County Ditch near Dunnell (calibration period)

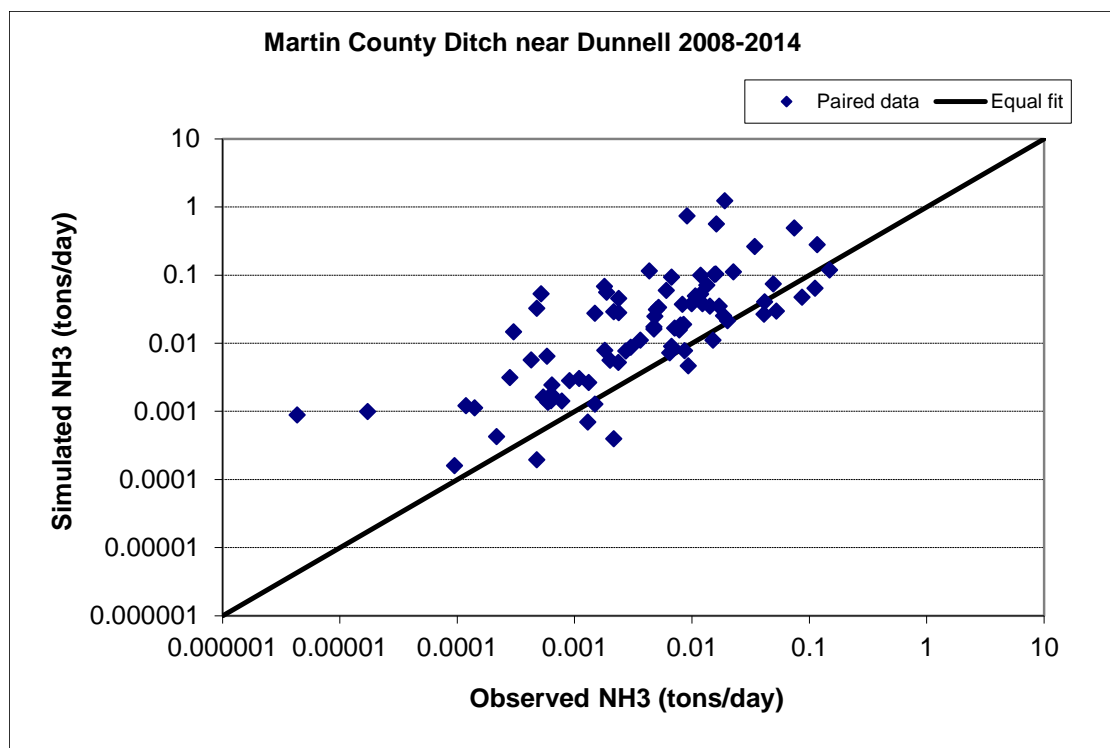


Figure 503. Paired simulated vs. observed Ammonia Nitrogen (NH3) load at Martin County Ditch near Dunnell (calibration period)

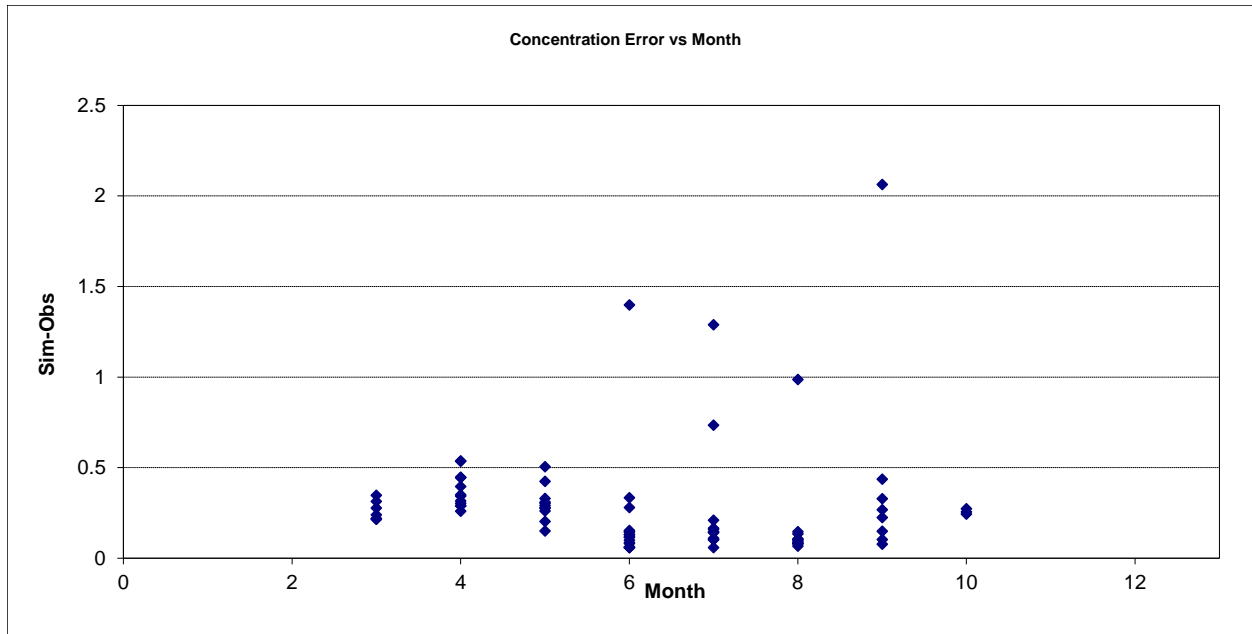


Figure 504. Residual (Simulated - Observed) vs. Month Ammonia Nitrogen (NH3) at Martin County Ditch near Dunnell

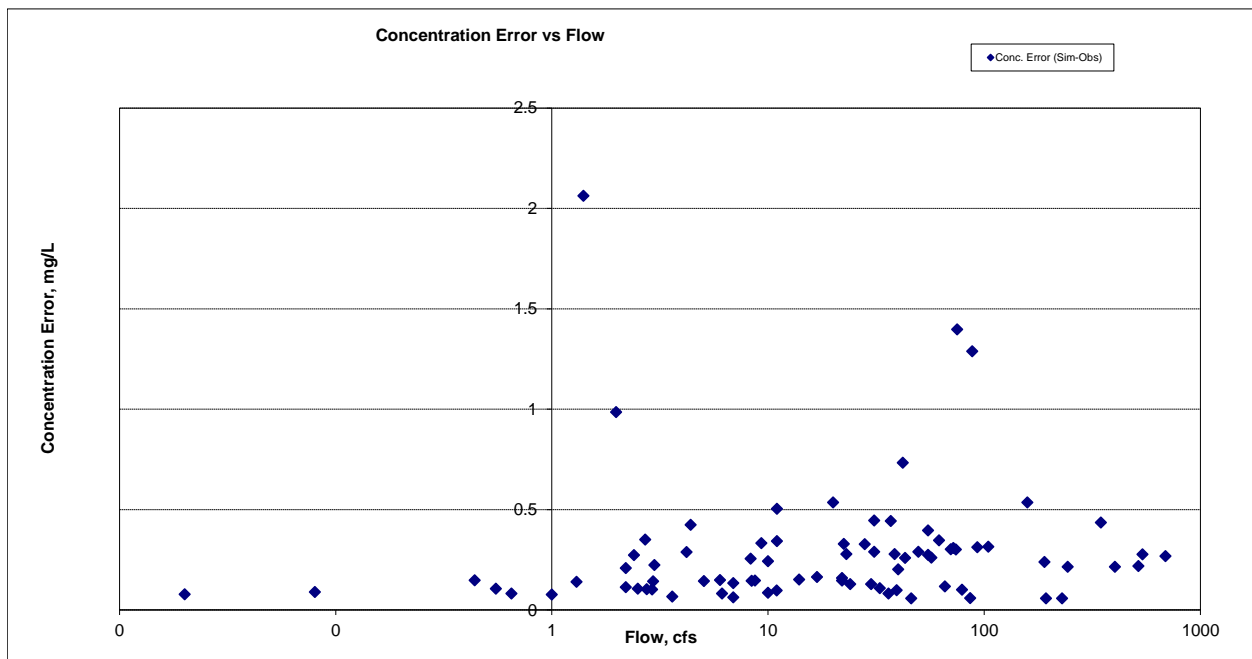


Figure 505. Residual (Simulated - Observed) vs. Flow Ammonia Nitrogen (NH3) at Martin County Ditch near Dunnell

Organic Nitrogen (OrgN)

Table 75. Organic Nitrogen (OrgN) statistics

Period	2008-2014
Count	10
Concentration Average Error	64.37%
Concentration Median Error	70.81%
Load Average Error	36.29%
Load Median Error	35.03%
Paired t concentration	0.00

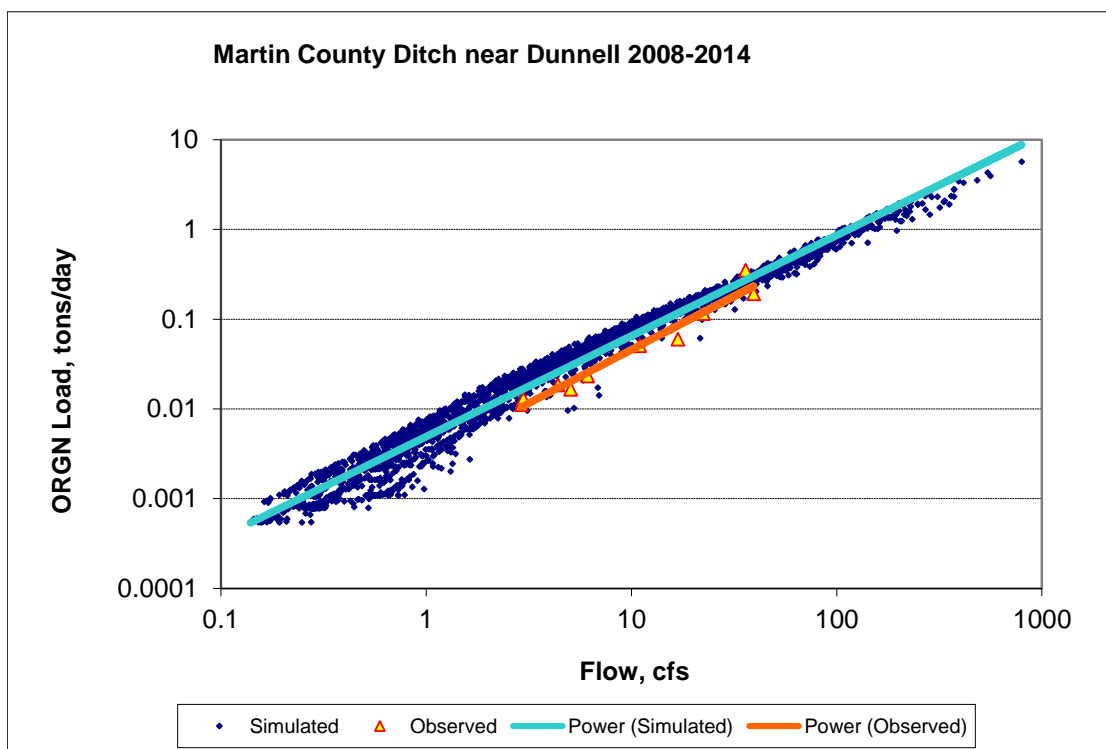


Figure 506. Power plot of simulated and observed Organic Nitrogen (OrgN) load vs flow at Martin County Ditch near Dunnell (calibration period)

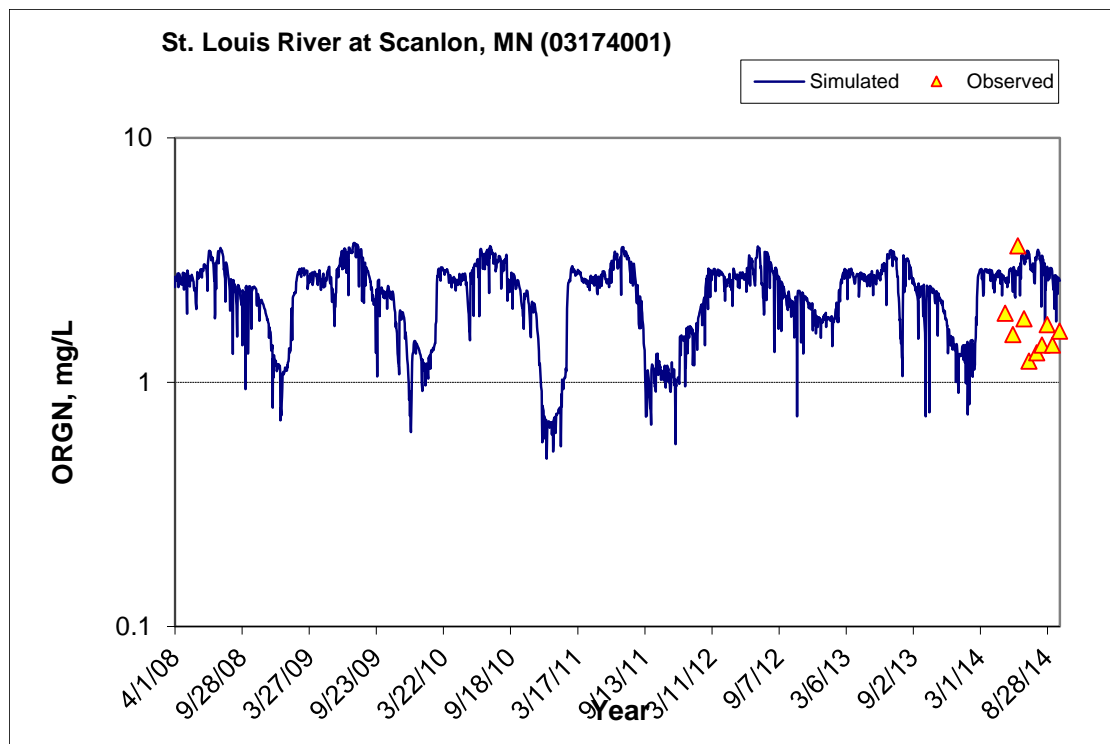


Figure 507. Time series of observed and simulated Organic Nitrogen (OrgN) concentration at Martin County Ditch near Dunnell (calibration period)

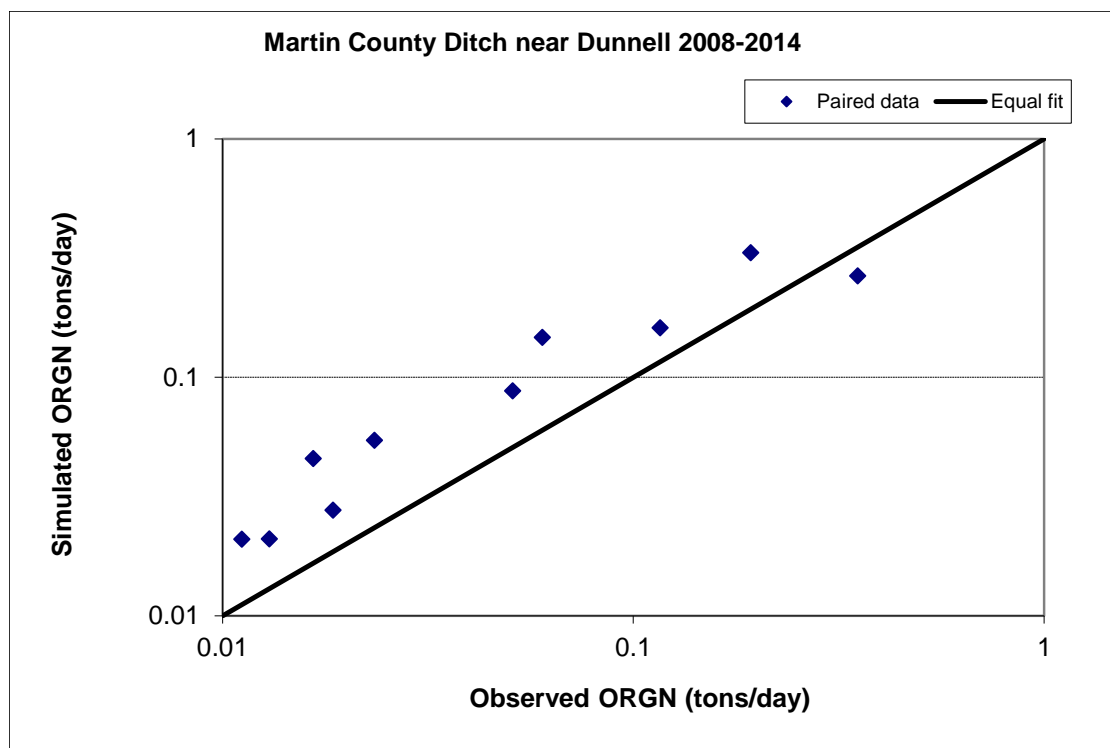


Figure 508. Paired simulated vs. observed Organic Nitrogen (OrgN) load at Martin County Ditch near Dunnell (calibration period)

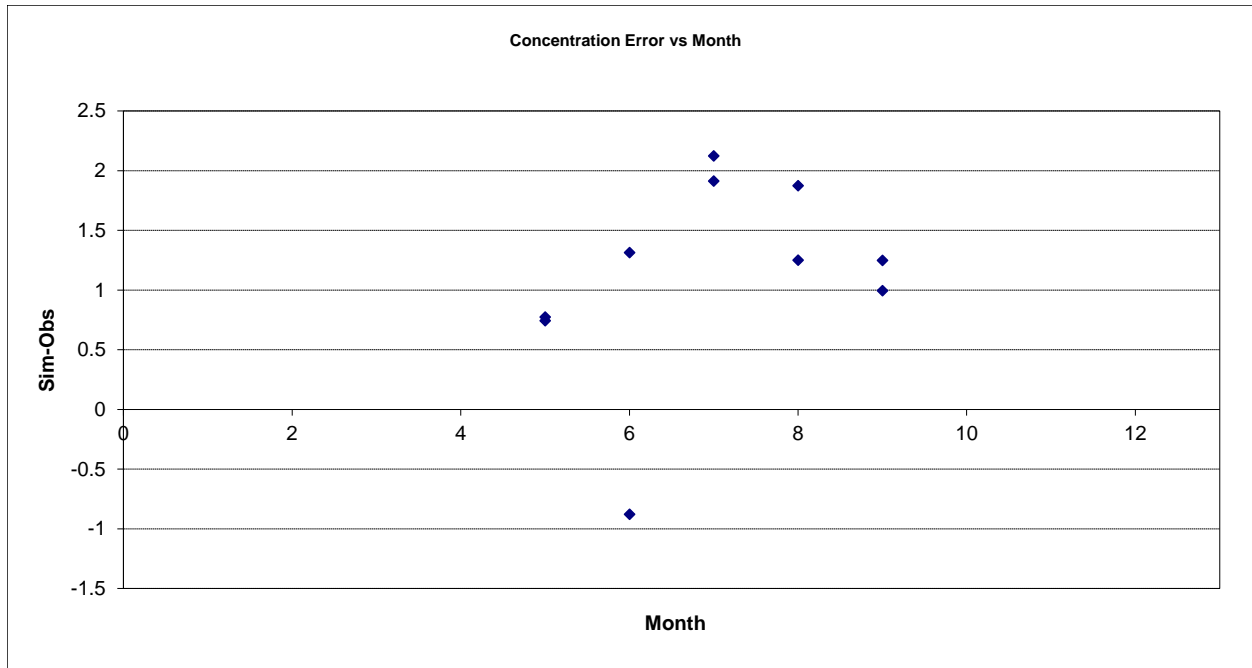


Figure 509. Residual (Simulated - Observed) vs. Month Organic Nitrogen (OrgN) at Martin County Ditch near Dunnell

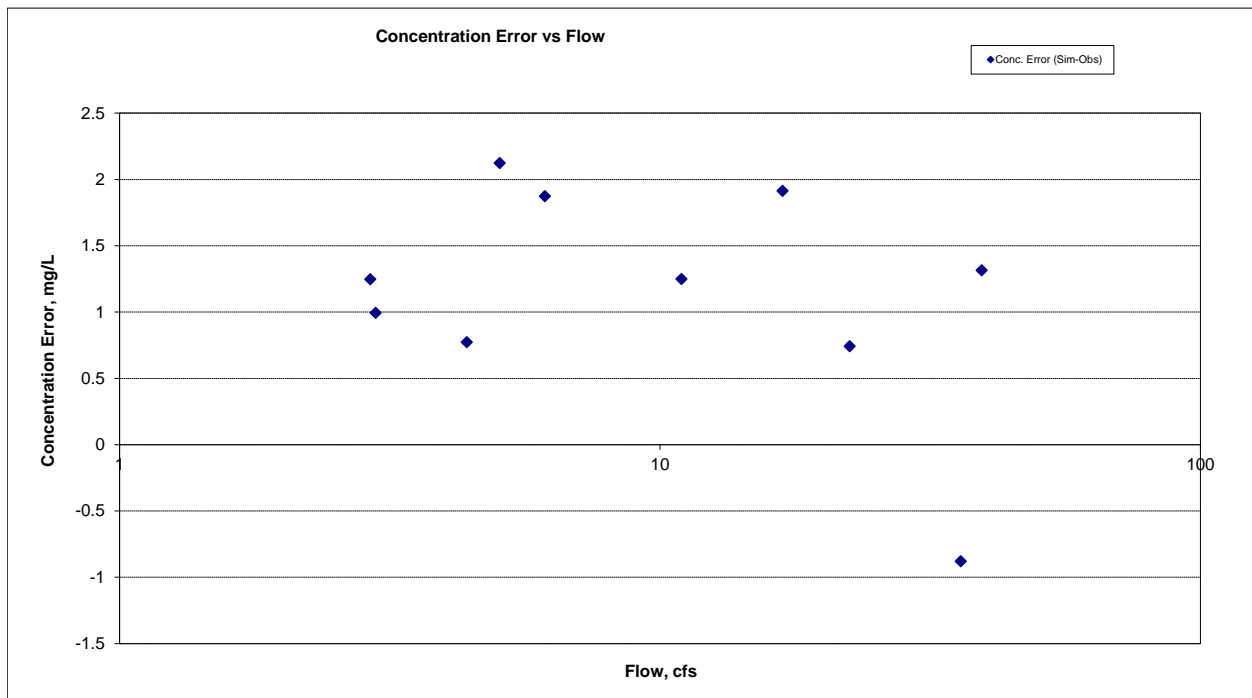


Figure 510. Residual (Simulated - Observed) vs. Flow Organic Nitrogen (OrgN) at Martin County Ditch near Dunnell

Total Kjeldahl Nitrogen (TKN)

Table 76. Total Kjeldahl Nitrogen (TKN) statistics

Period	2008-2014
Count	10
Concentration Average Error	70.45%
Concentration Median Error	72.53%
Load Average Error	41.61%
Load Median Error	35.57%
Paired t concentration	0.00

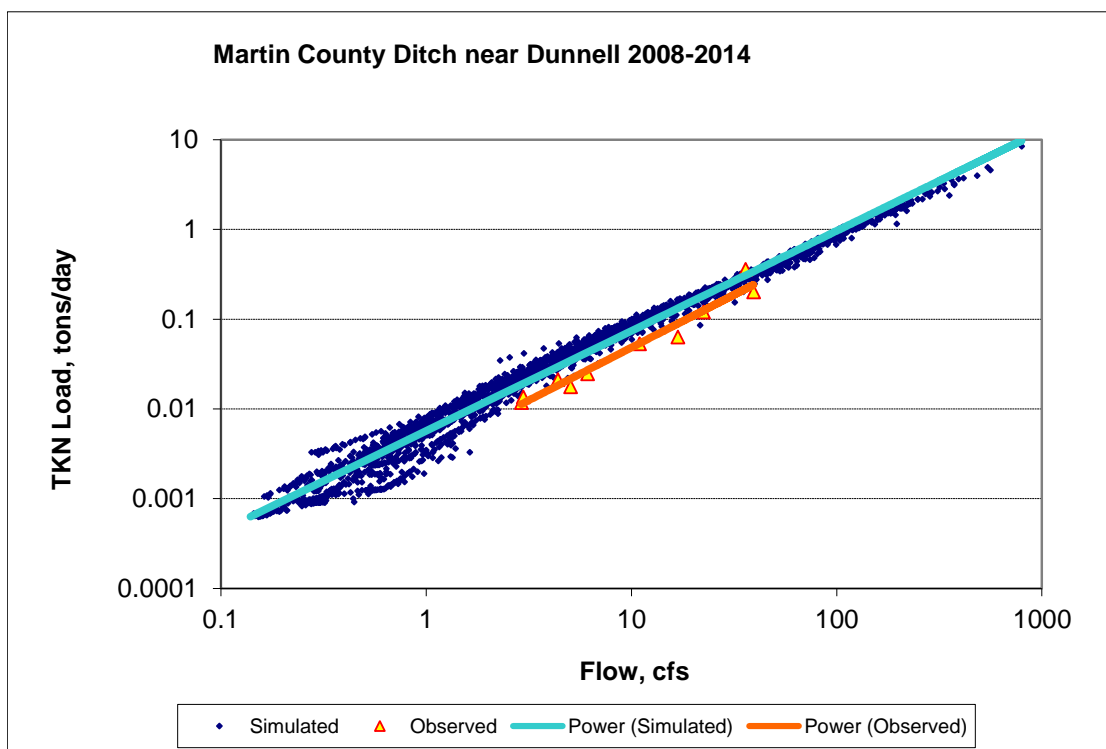


Figure 511. Power plot of simulated and observed Total Kjeldahl Nitrogen (TKN) load vs flow at Martin County Ditch near Dunnell (calibration period)

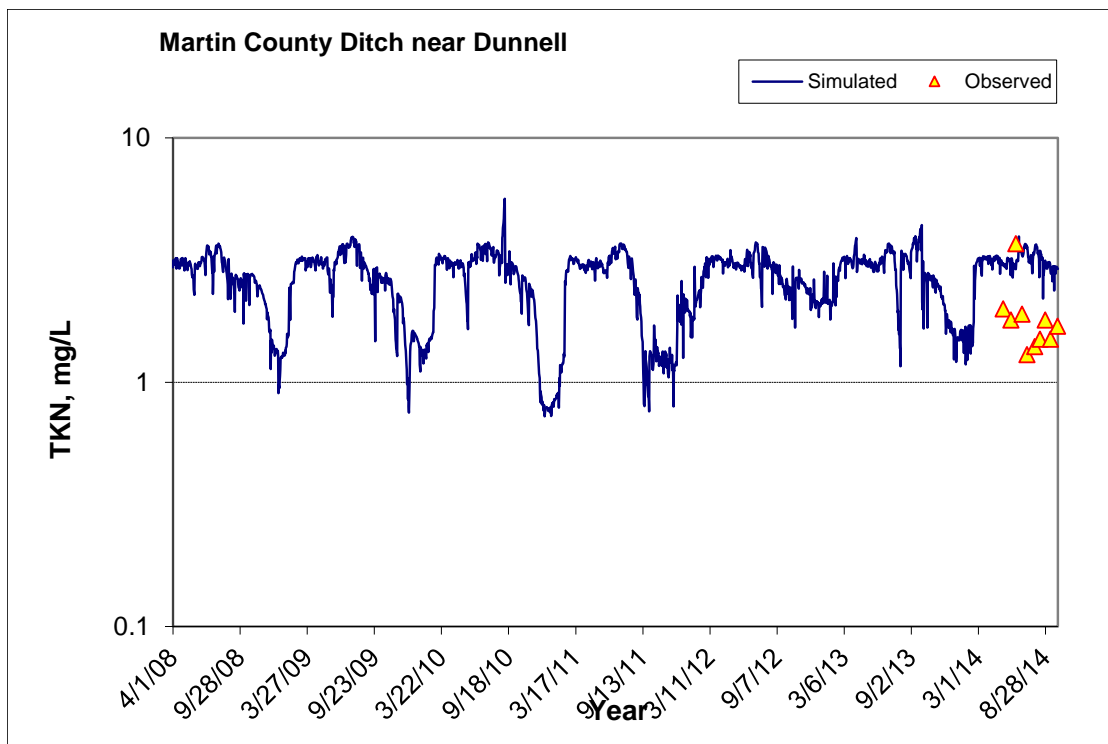


Figure 512. Time series of observed and simulated Total Kjeldahl Nitrogen (TKN) concentration at Martin County Ditch near Dunnell (calibration period)

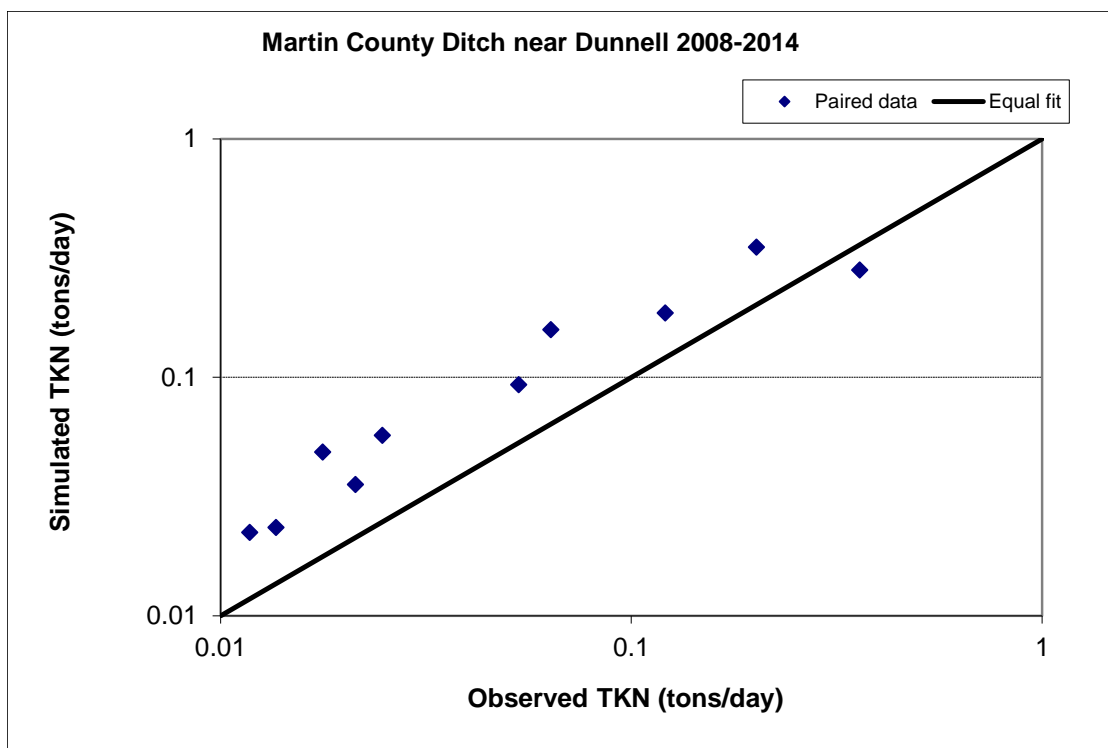


Figure 513. Paired simulated vs. observed Total Kjeldahl Nitrogen (TKN) load at Martin County Ditch near Dunnell (calibration period)

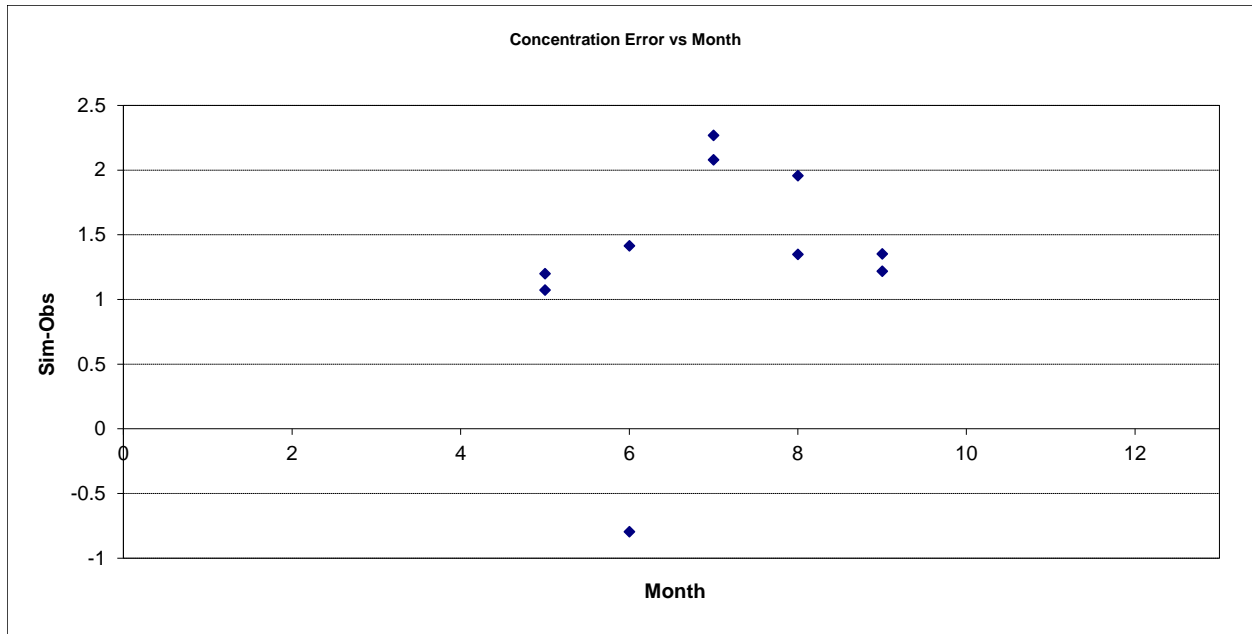


Figure 514. Residual (Simulated - Observed) vs. Month Total Kjeldahl Nitrogen (TKN) at Martin County Ditch near Dunnell

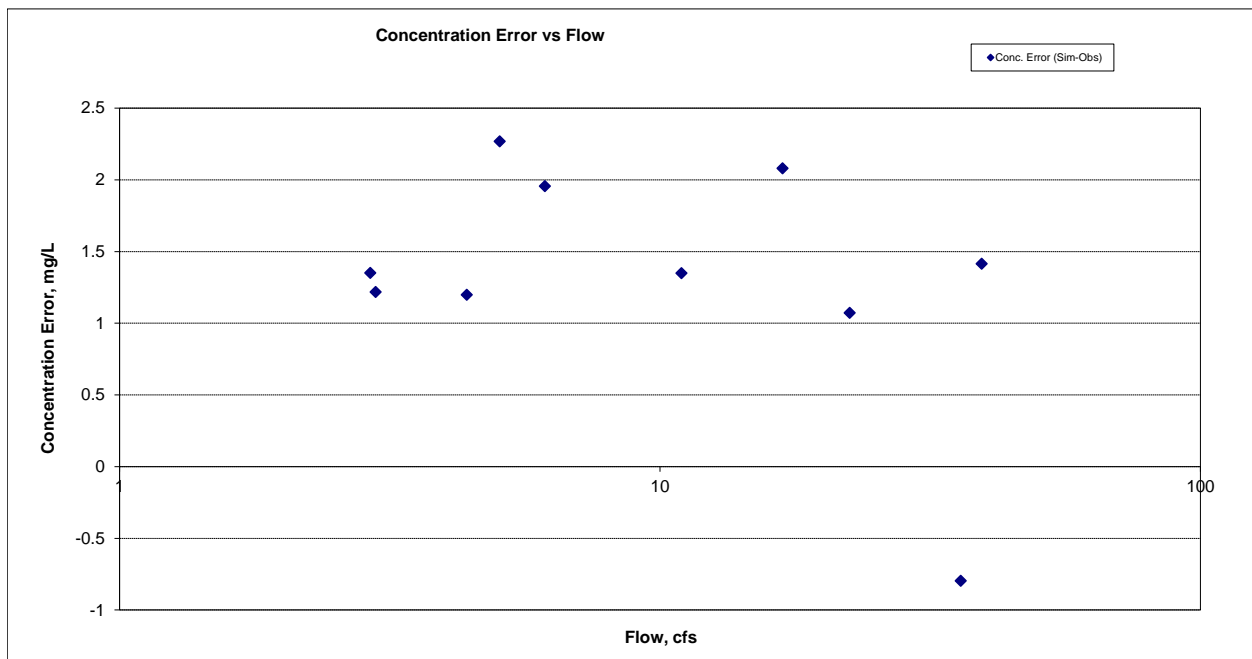


Figure 515. Residual (Simulated - Observed) vs. Flow Total Kjeldahl Nitrogen (TKN) at Martin County Ditch near Dunnell

Nitrite+ Nitrate Nitrogen (NOx)

Table 77. Nitrite+ Nitrate Nitrogen (NOx) statistics

Period	2008-2014
Count	81
Concentration Average Error	10.37%
Concentration Median Error	-0.33%
Load Average Error	-13.59%
Load Median Error	0.36%
Paired t concentration	0.98

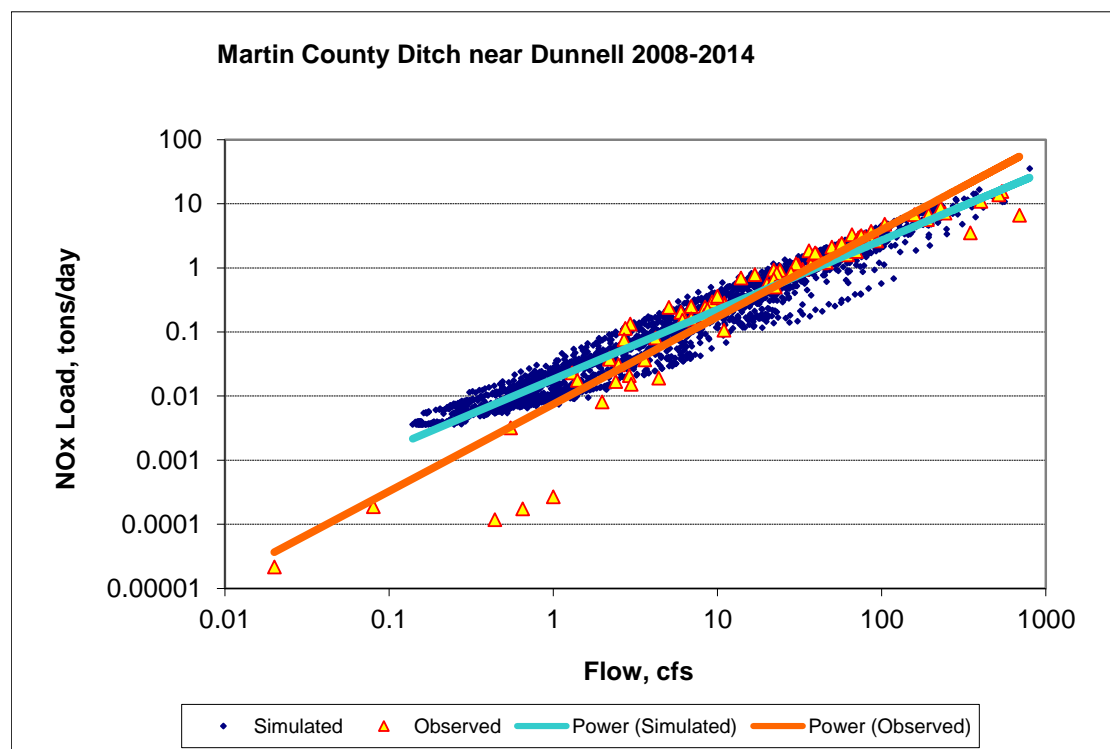


Figure 516. Power plot of simulated and observed Nitrite+ Nitrate Nitrogen (NOx) load vs flow at Martin County Ditch near Dunnell (calibration period)

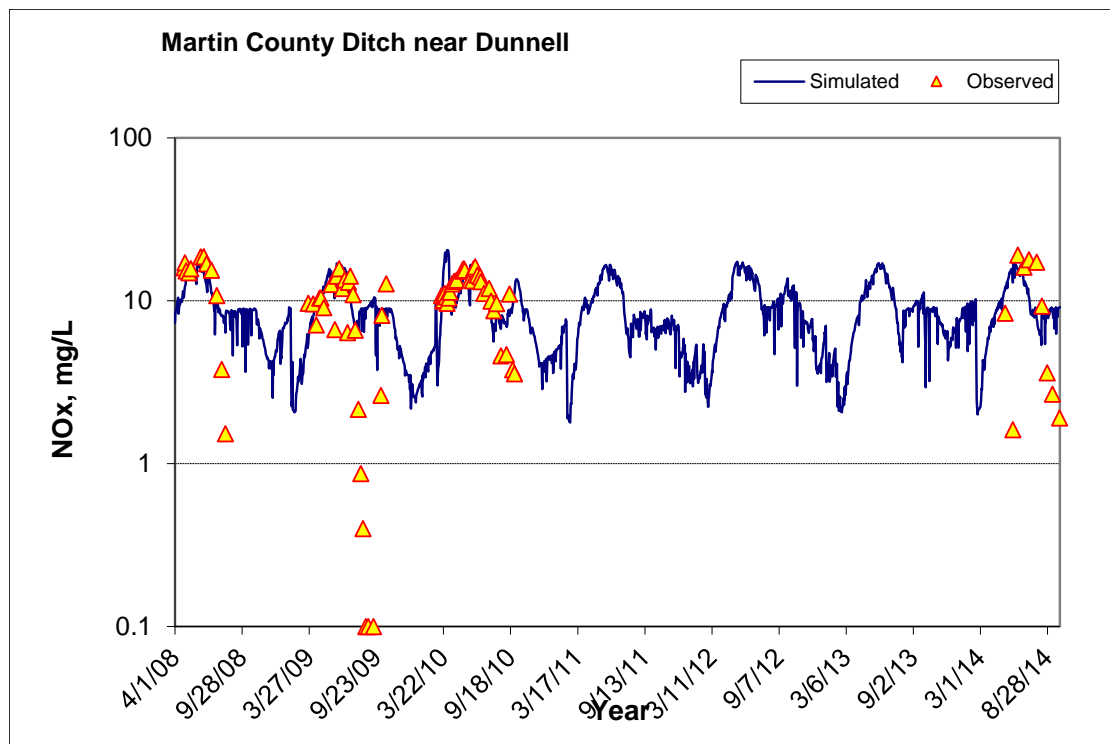


Figure 517. Time series of observed and simulated Nitrite+ Nitrate Nitrogen (NOx) concentration at Martin County Ditch near Dunnell (calibration period)

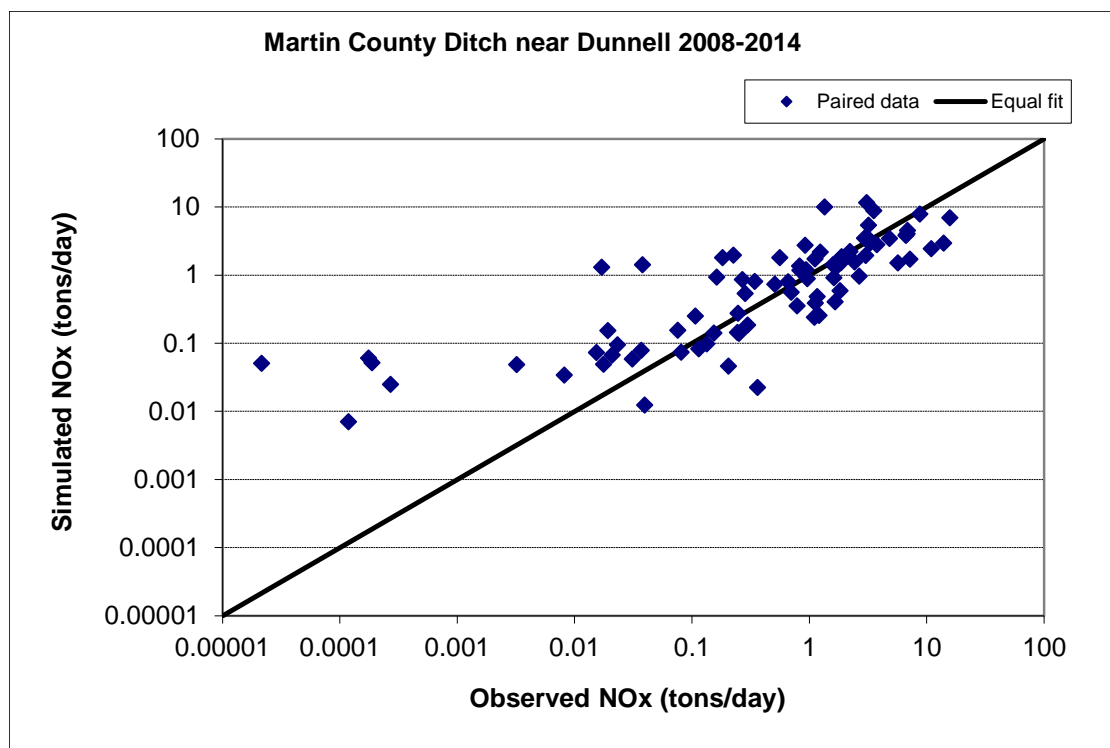


Figure 518. Paired simulated vs. observed Nitrite+ Nitrate Nitrogen (NOx) load at Martin County Ditch near Dunnell (calibration period)

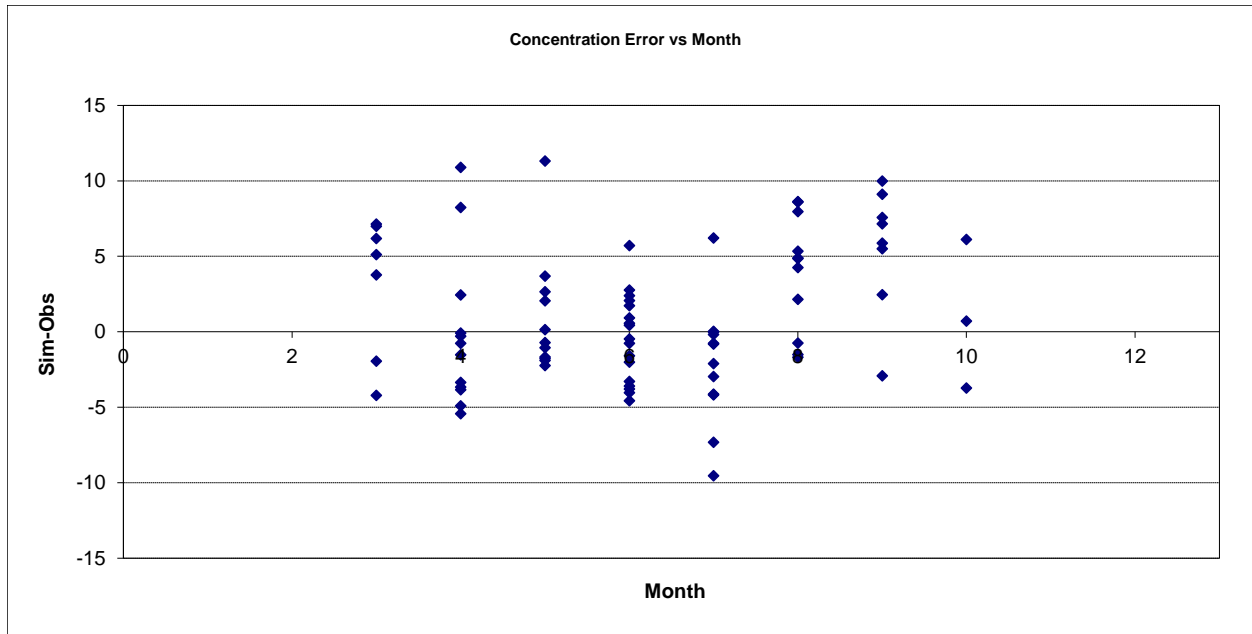


Figure 519. Residual (Simulated - Observed) vs. Month Nitrite+ Nitrate Nitrogen (NOx) at Martin County Ditch near Dunnell

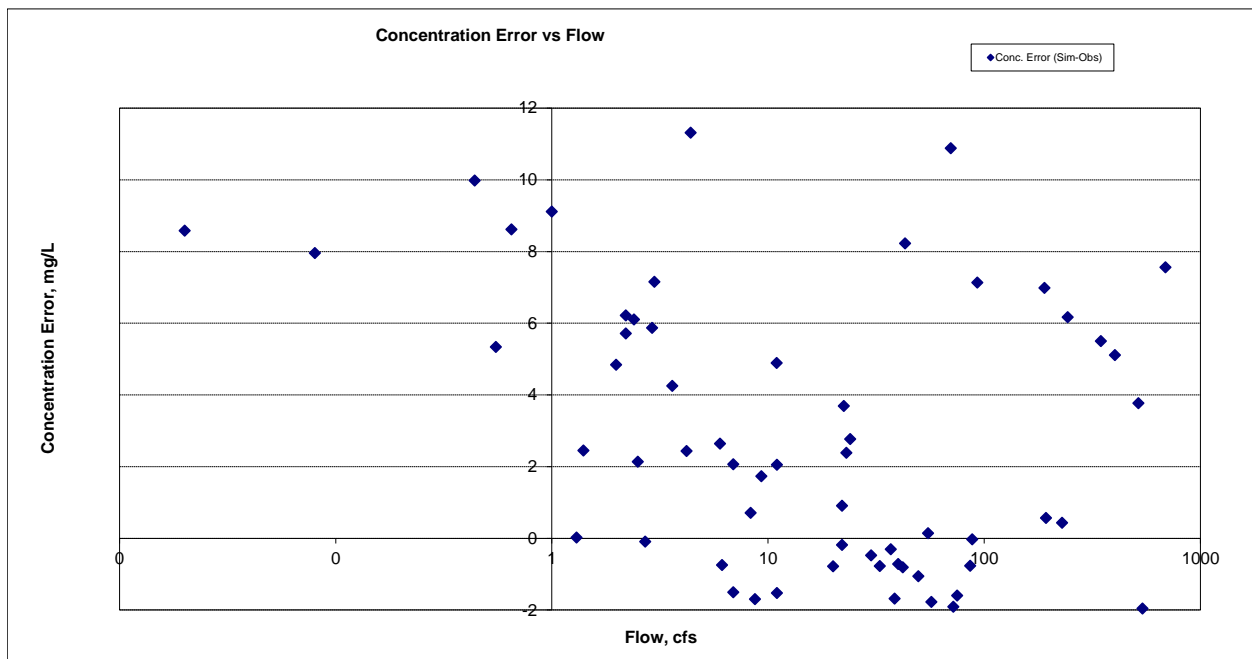


Figure 520. Residual (Simulated - Observed) vs. Flow Nitrite+ Nitrate Nitrogen (NOx) at Martin County Ditch near Dunnell

Total Nitrogen (TN)

Table 78. Total Nitrogen (TN) statistics

Period	2008-2014
Count	10
Concentration Average Error	18.41%
Concentration Median Error	25.59%
Load Average Error	-4.39%
Load Median Error	6.06%
Paired t concentration	0.54

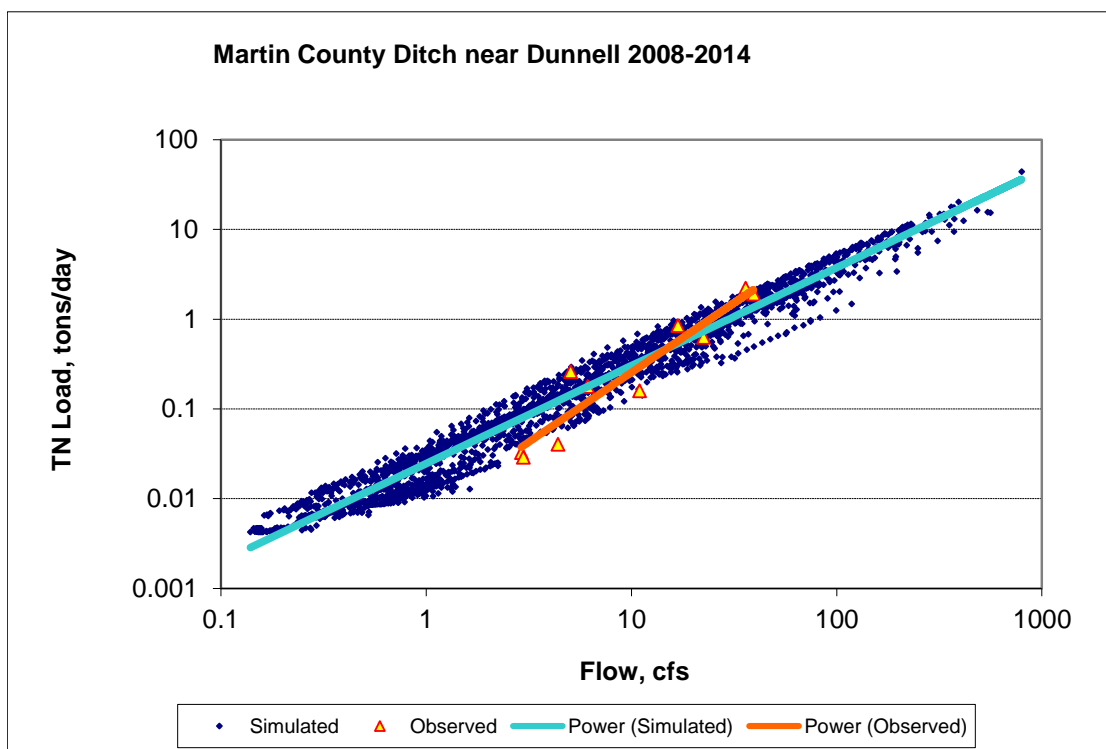


Figure 521. Power plot of simulated and observed Total Nitrogen (TN) load vs flow at Martin County Ditch near Dunnell (calibration period)

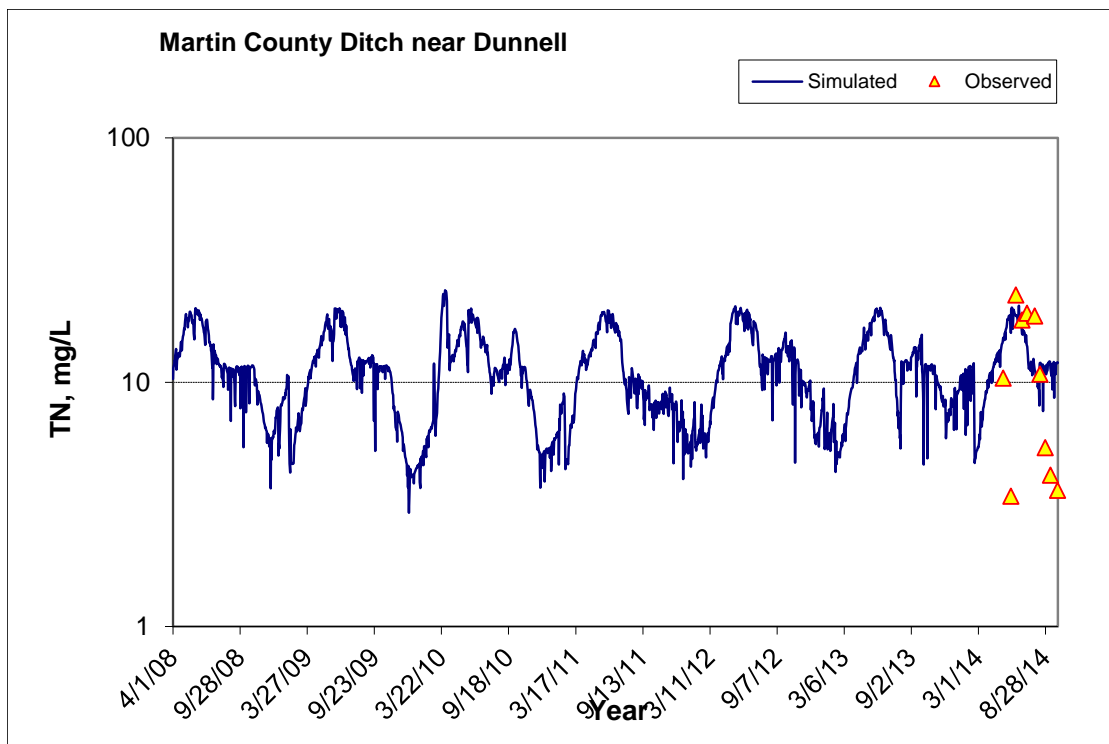


Figure 522. Time series of observed and simulated Total Nitrogen (TN) concentration at Martin County Ditch near Dunnell (calibration period)

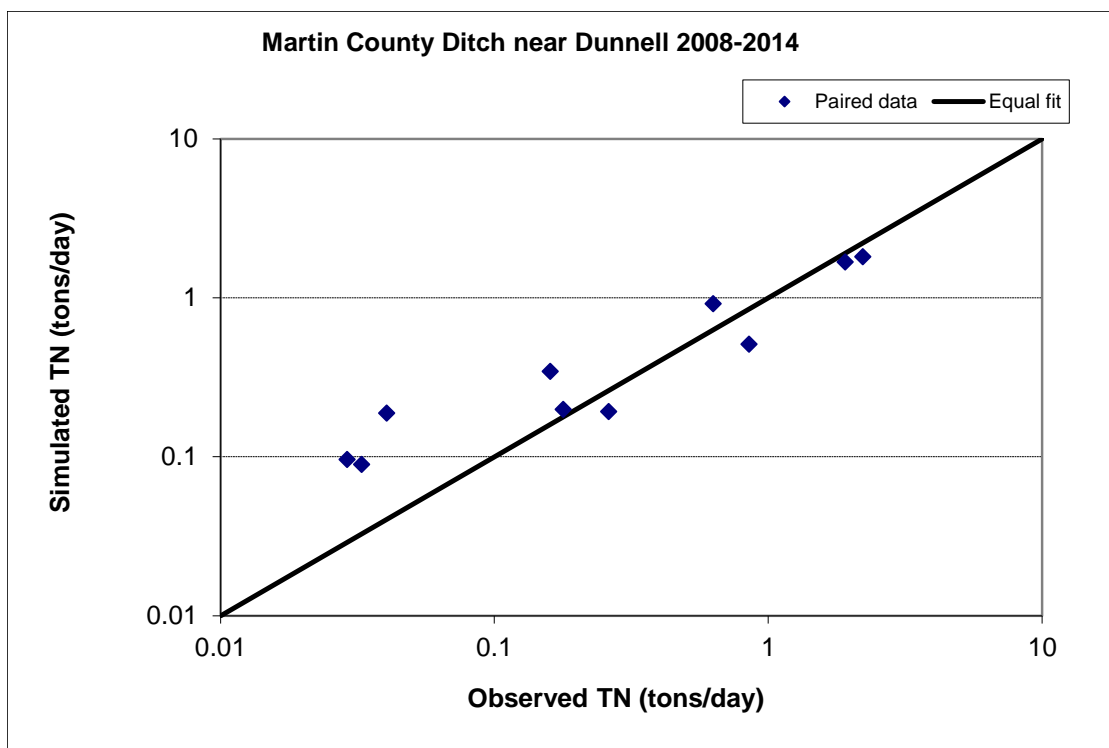


Figure 523. Paired simulated vs. observed Total Nitrogen (TN) load at Martin County Ditch near Dunnell (calibration period)

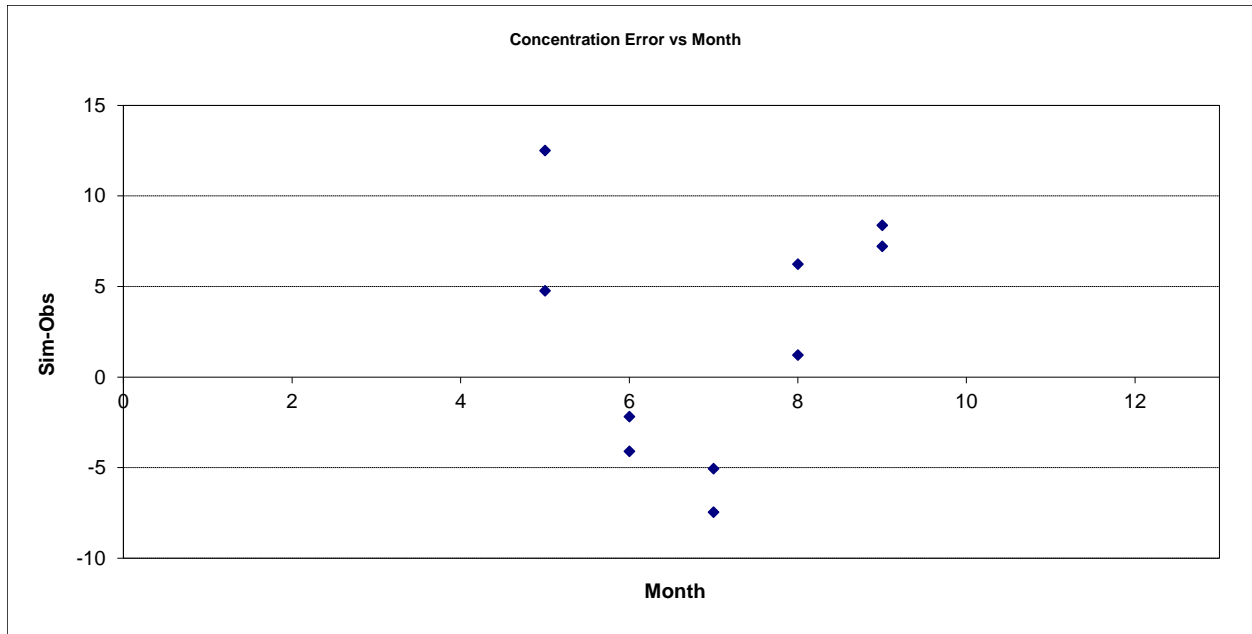


Figure 524. Residual (Simulated - Observed) vs. Month Total Nitrogen (TN) at Martin County Ditch near Dunnell

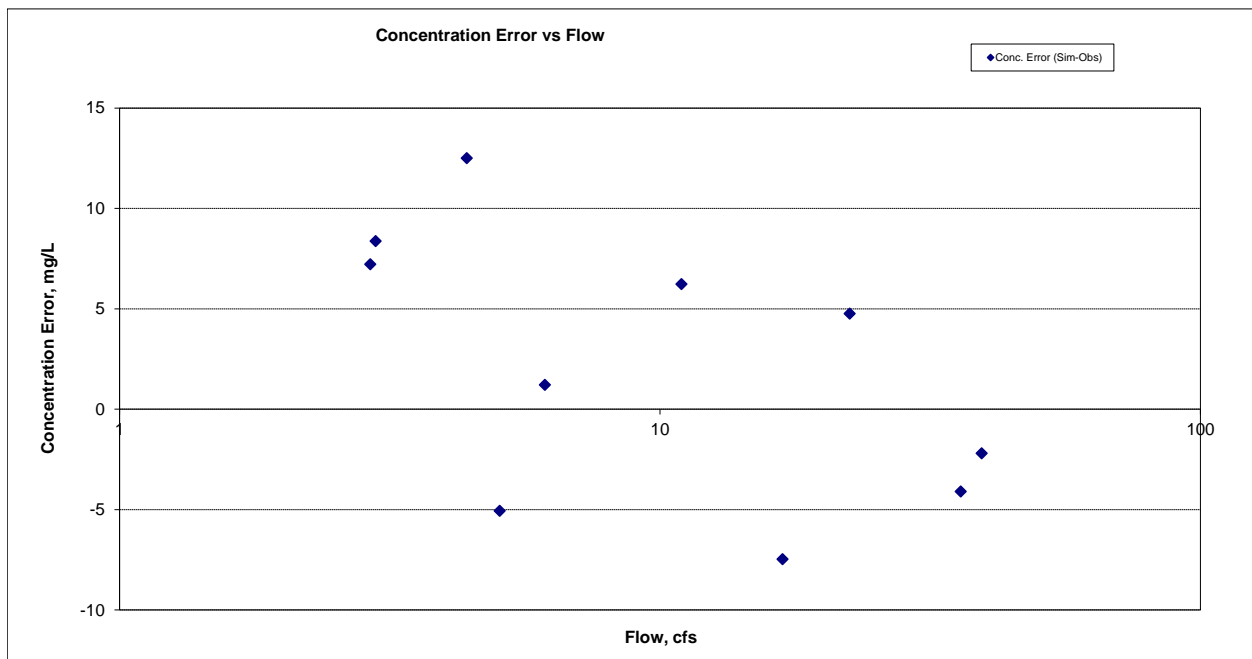


Figure 525. Residual (Simulated - Observed) vs. Flow Total Nitrogen (TN) at Martin County Ditch near Dunnell

Soluble Reactive Phosphorus (SRP)

Table 79. Soluble Reactive Phosphorus (SRP) statistics

Period	2008-2014
Count	66
Concentration Average Error	48.21%
Concentration Median Error	7.52%
Load Average Error	-28.67%
Load Median Error	2.92%
Paired t concentration	0.04

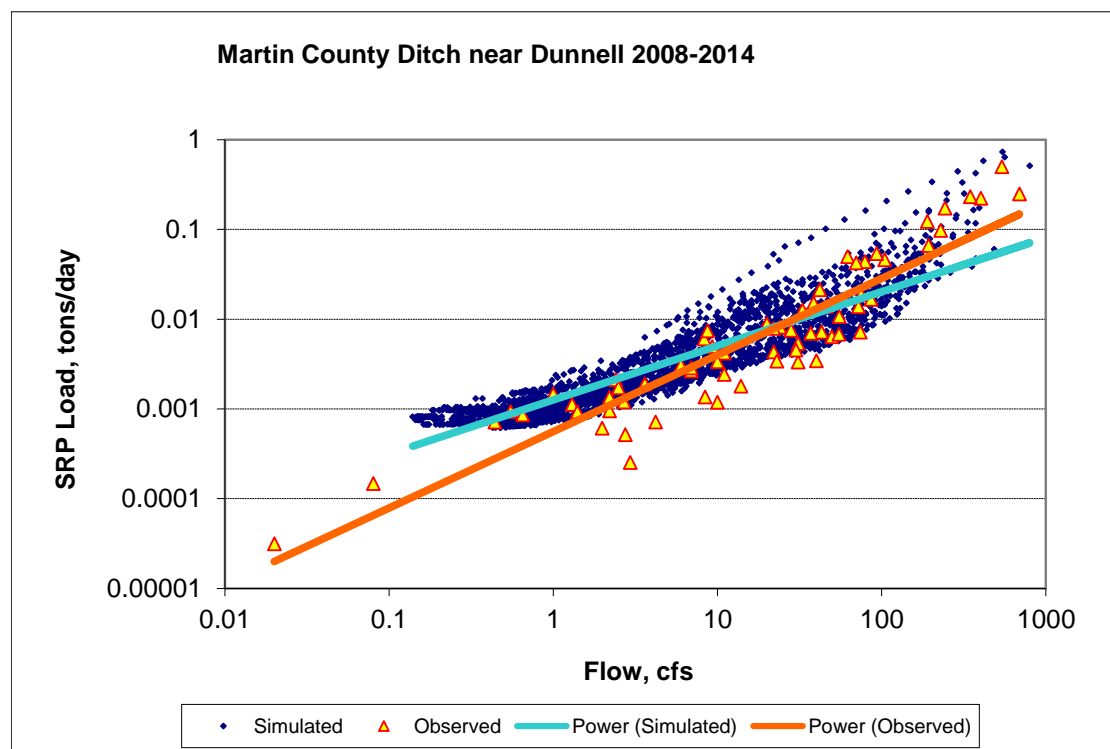


Figure 526. Power plot of simulated and observed Soluble Reactive Phosphorus (SRP) load vs flow at Martin County Ditch near Dunnell (calibration period)

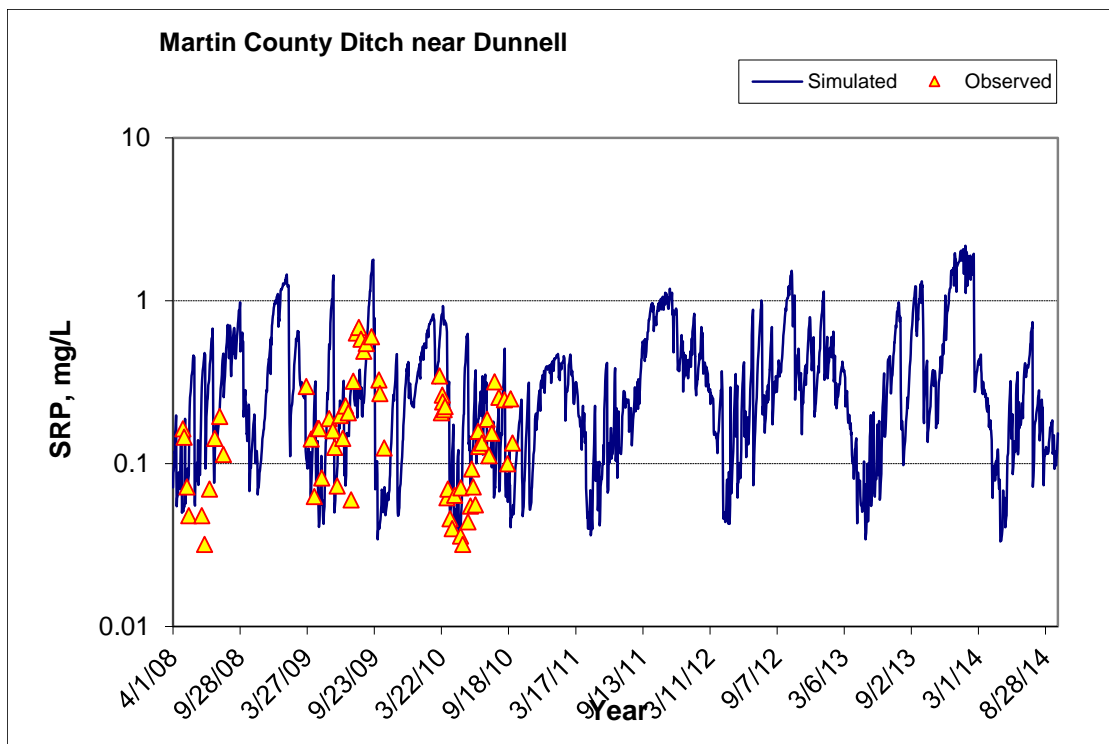


Figure 527. Time series of observed and simulated Soluble Reactive Phosphorus (SRP) concentration at Martin County Ditch near Dunnell (calibration period)

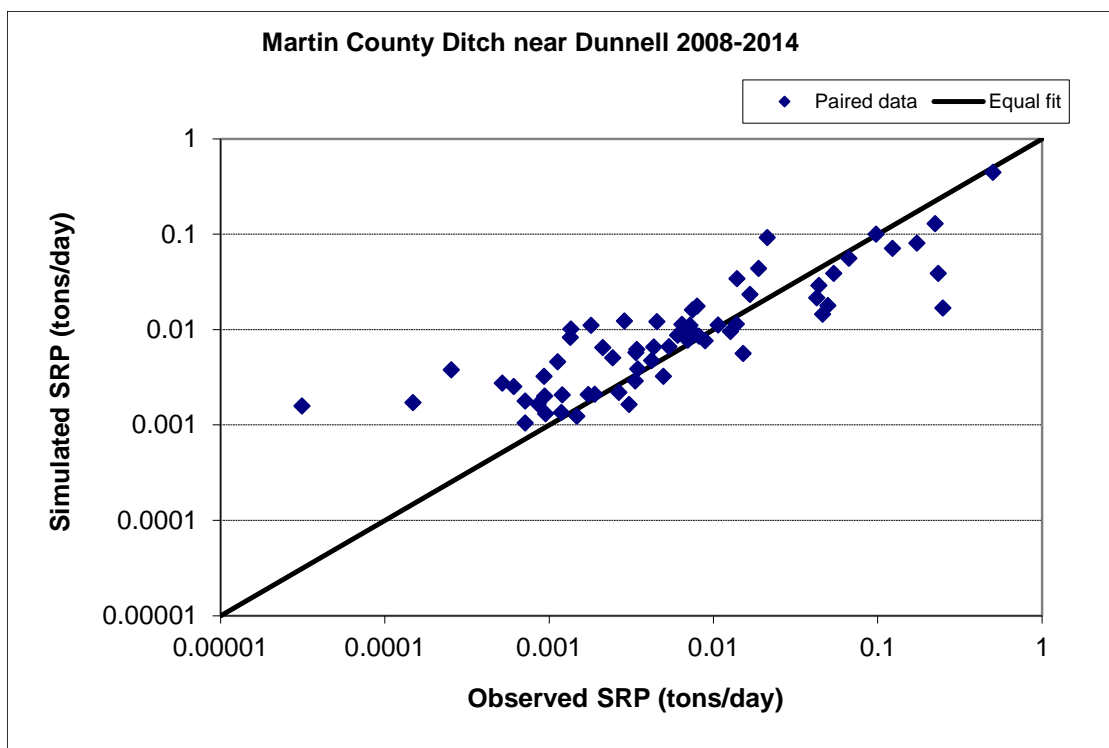


Figure 528. Paired simulated vs. observed Soluble Reactive Phosphorus (SRP) load at Martin County Ditch near Dunnell (calibration period)

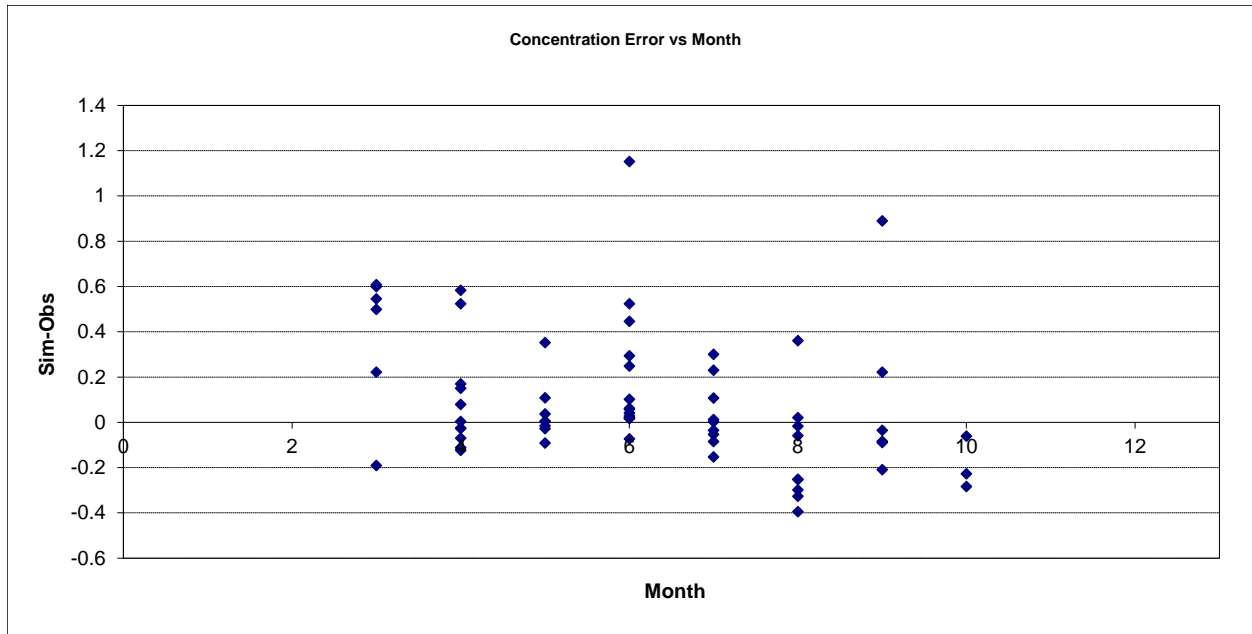


Figure 529. Residual (Simulated - Observed) vs. Month Soluble Reactive Phosphorus (SRP) at Martin County Ditch near Dunnell

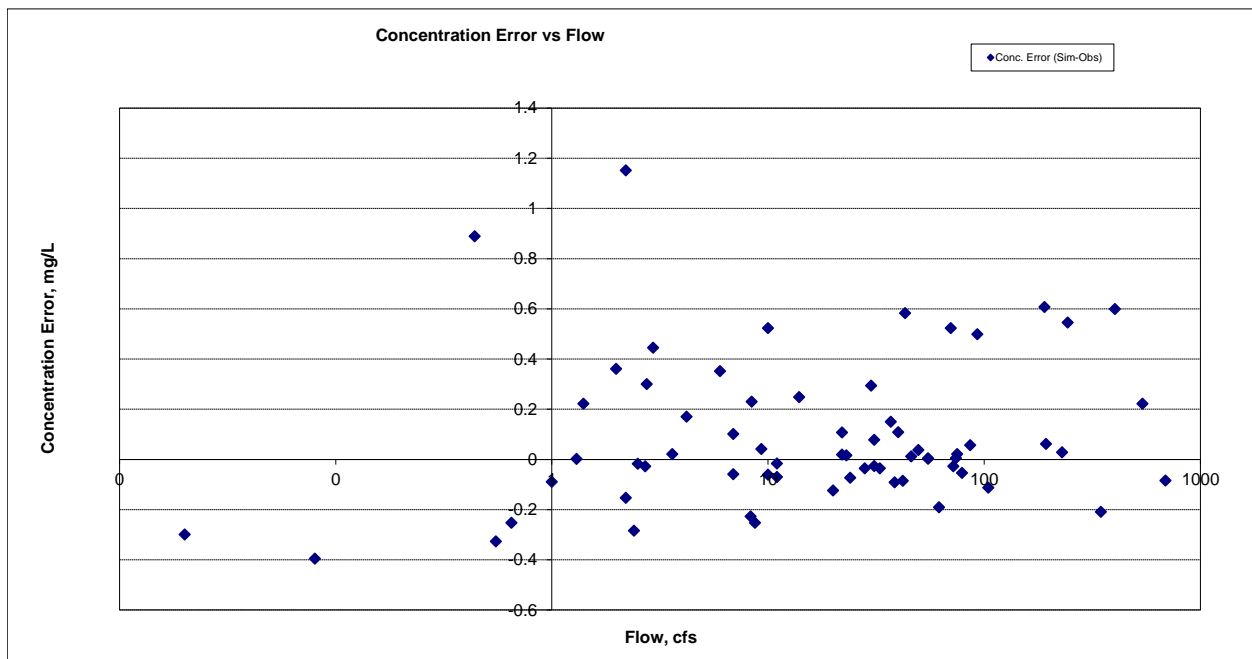


Figure 530. Residual (Simulated - Observed) vs. Flow Soluble Reactive Phosphorus (SRP) at Martin County Ditch near Dunnell

Organic Phosphorus (OrgP)

Table 80. Organic Phosphorus (OrgP) statistics

Period	2008-2014
Count	59
Concentration Average Error	70.65%
Concentration Median Error	48.11%
Load Average Error	-51.05%
Load Median Error	11.19%
Paired t concentration	0.00

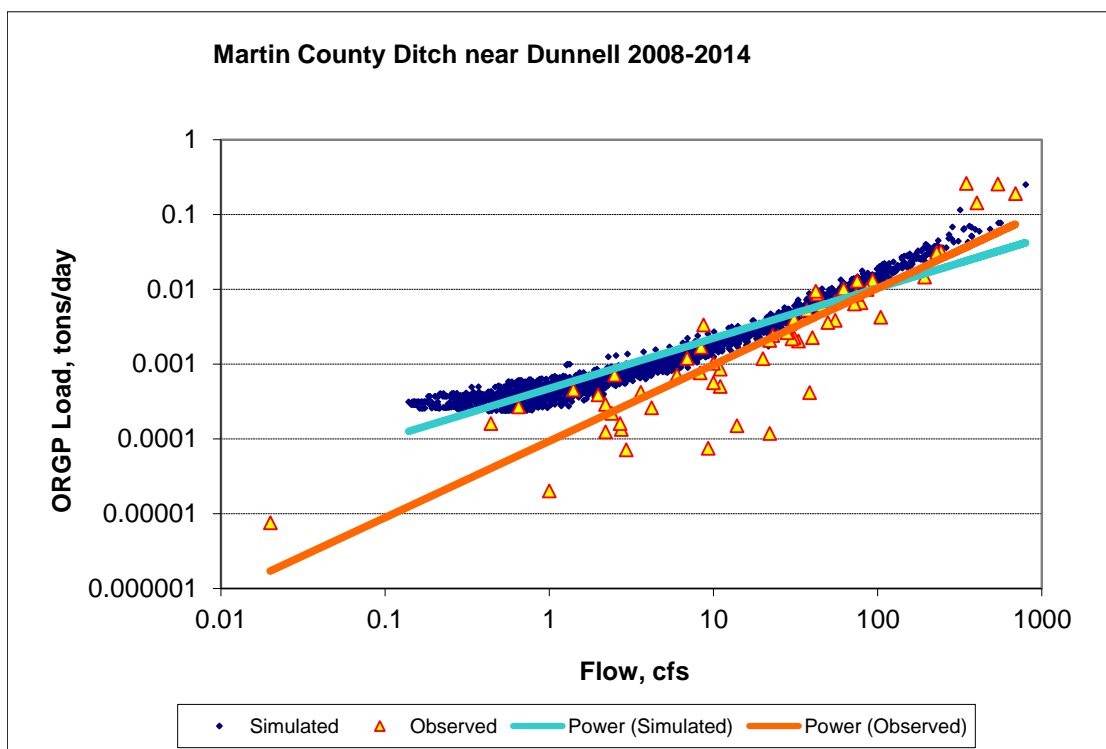


Figure 531. Power plot of simulated and observed Organic Phosphorus (OrgP) load vs flow at Martin County Ditch near Dunnell (calibration period)

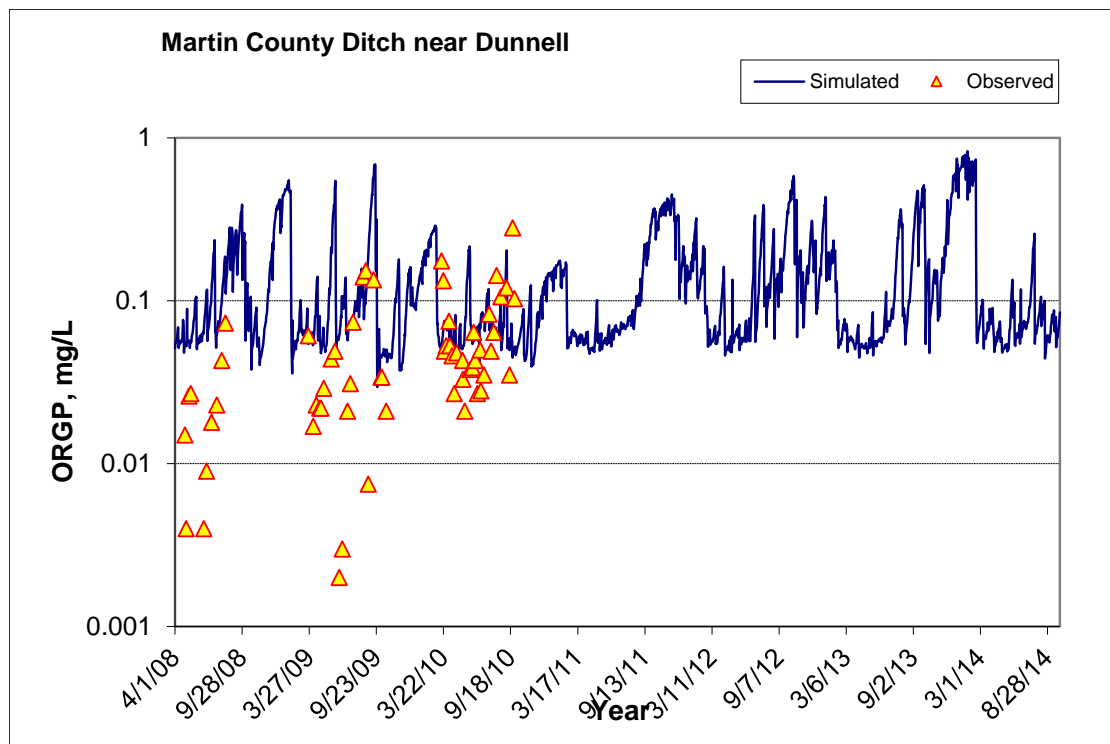


Figure 532. Time series of observed and simulated Organic Phosphorus (OrgP) concentration at Martin County Ditch near Dunnell (calibration period)

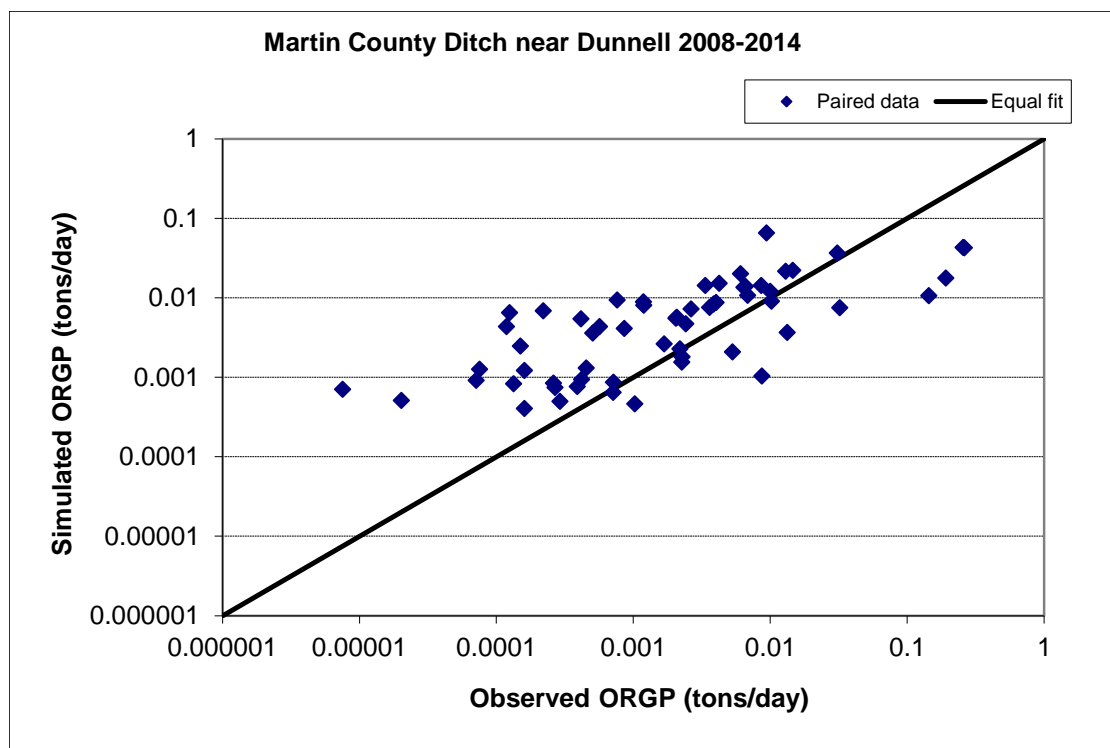


Figure 533. Paired simulated vs. observed Organic Phosphorus (OrgP) load at Martin County Ditch near Dunnell (calibration period)

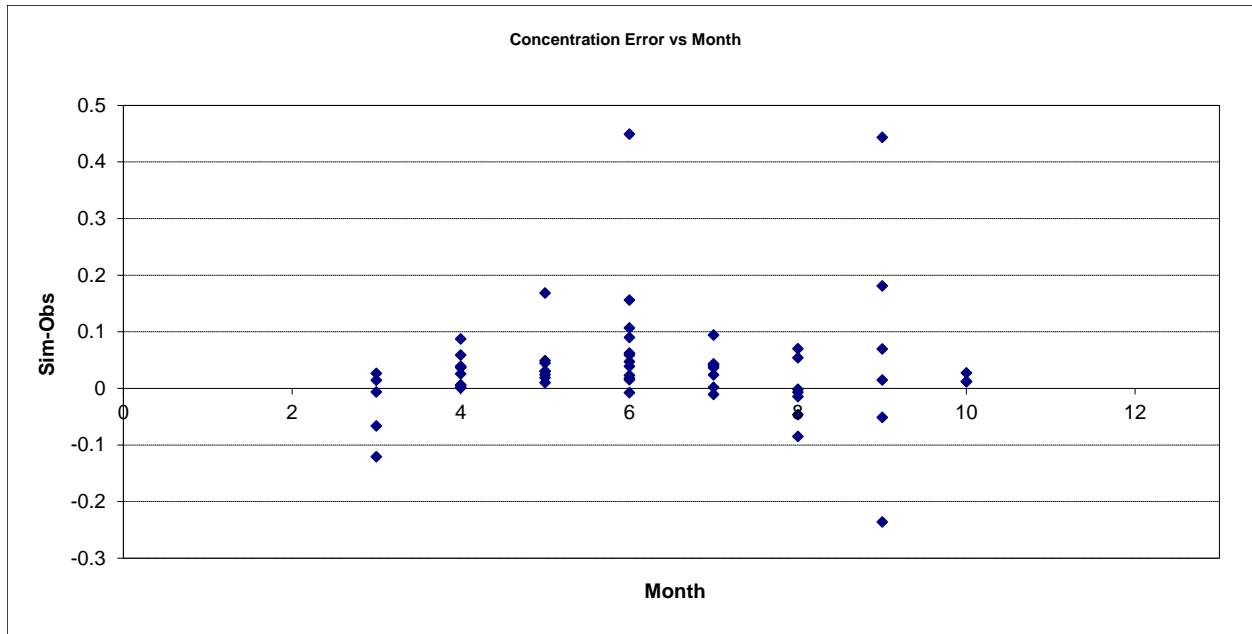
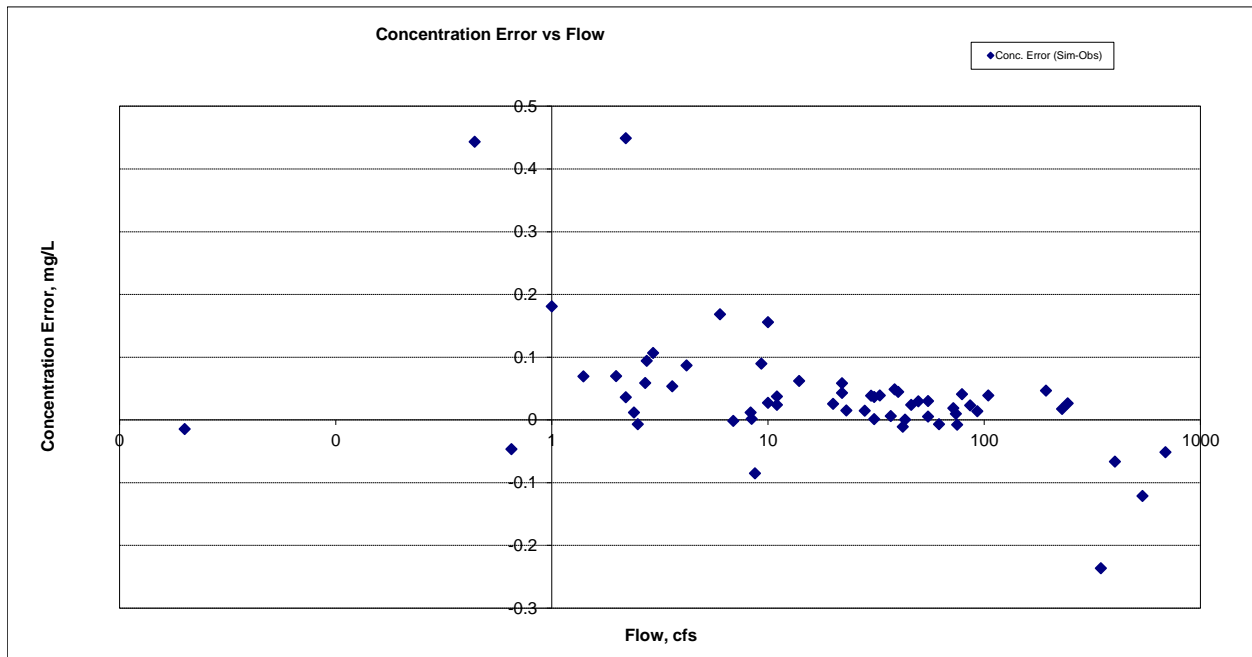


Figure 534. Residual (Simulated - Observed) vs. Month Organic Phosphorus (OrgP) at Martin County Ditch near Dunnell



Total Phosphorus (TP)

Table 81. Total Phosphorus (TP) statistics

Period	2008-2014
Count	79
Concentration Average Error	38.87%
Concentration Median Error	14.43%
Load Average Error	-38.88%
Load Median Error	4.34%
Paired t concentration	0.07

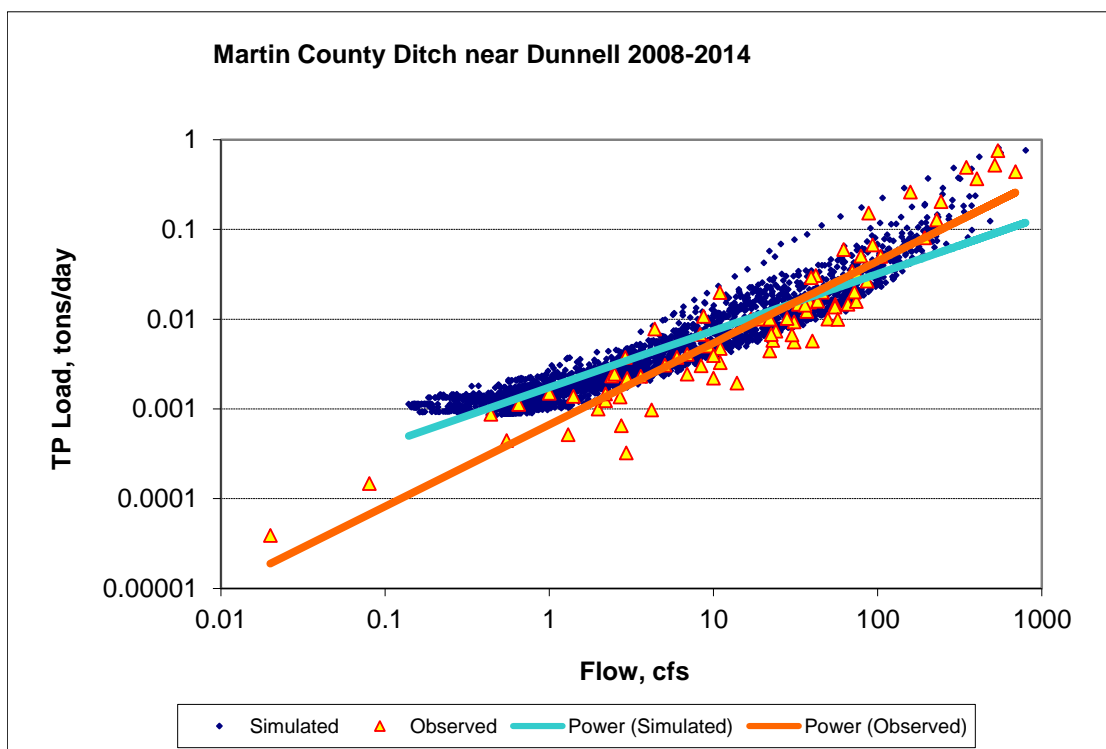


Figure 536. Power plot of simulated and observed Total Phosphorus (TP) load vs flow at Martin County Ditch near Dunnell (calibration period)

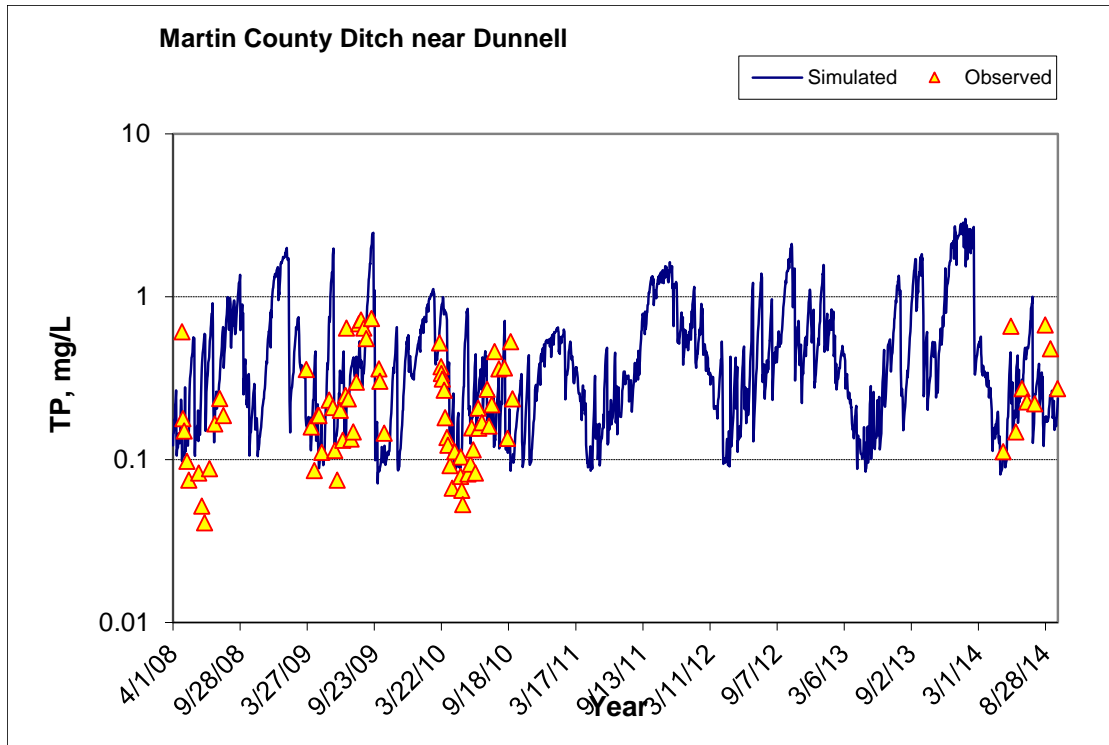


Figure 537. Time series of observed and simulated Total Phosphorus (TP) concentration at Martin County Ditch near Dunnell (calibration period)

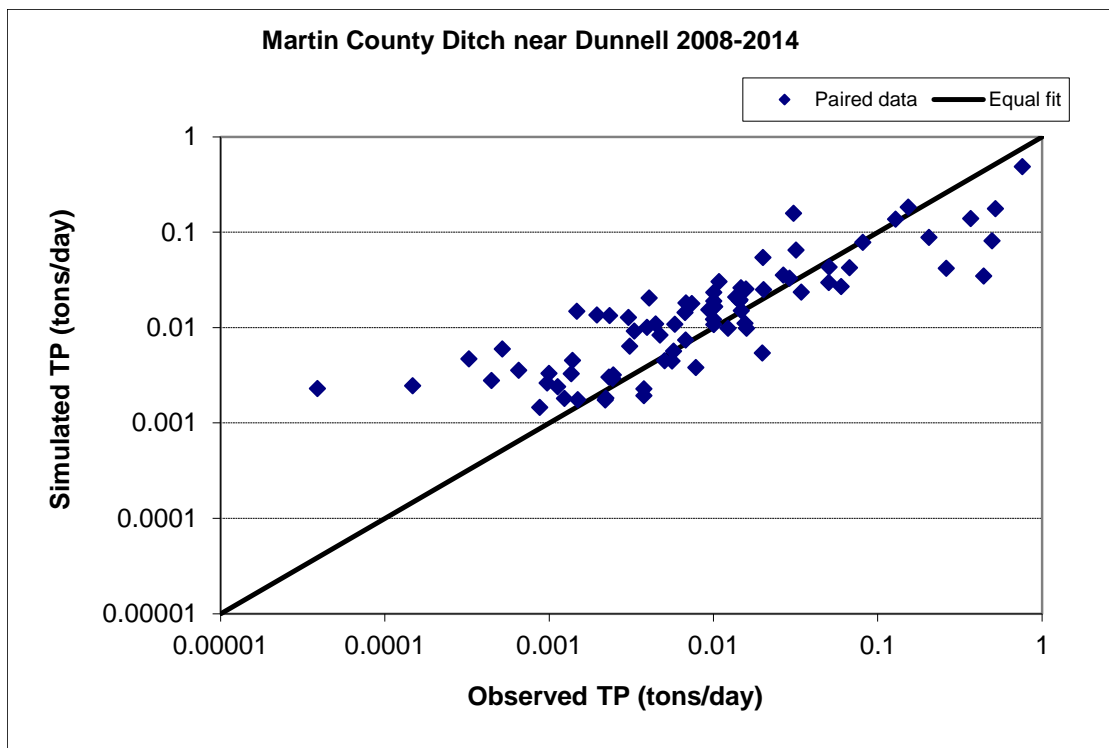


Figure 538. Paired simulated vs. observed Total Phosphorus (TP) load at Martin County Ditch near Dunnell (calibration period)

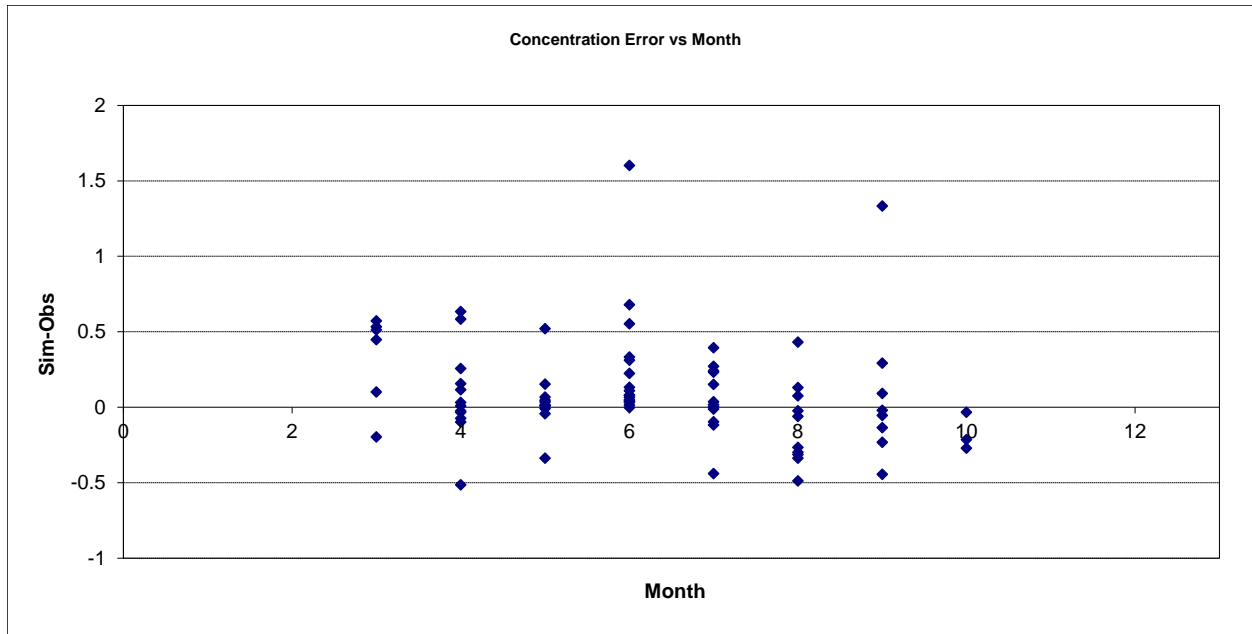


Figure 539. Residual (Simulated - Observed) vs. Month Total Phosphorus (TP) at Martin County Ditch near Dunnell

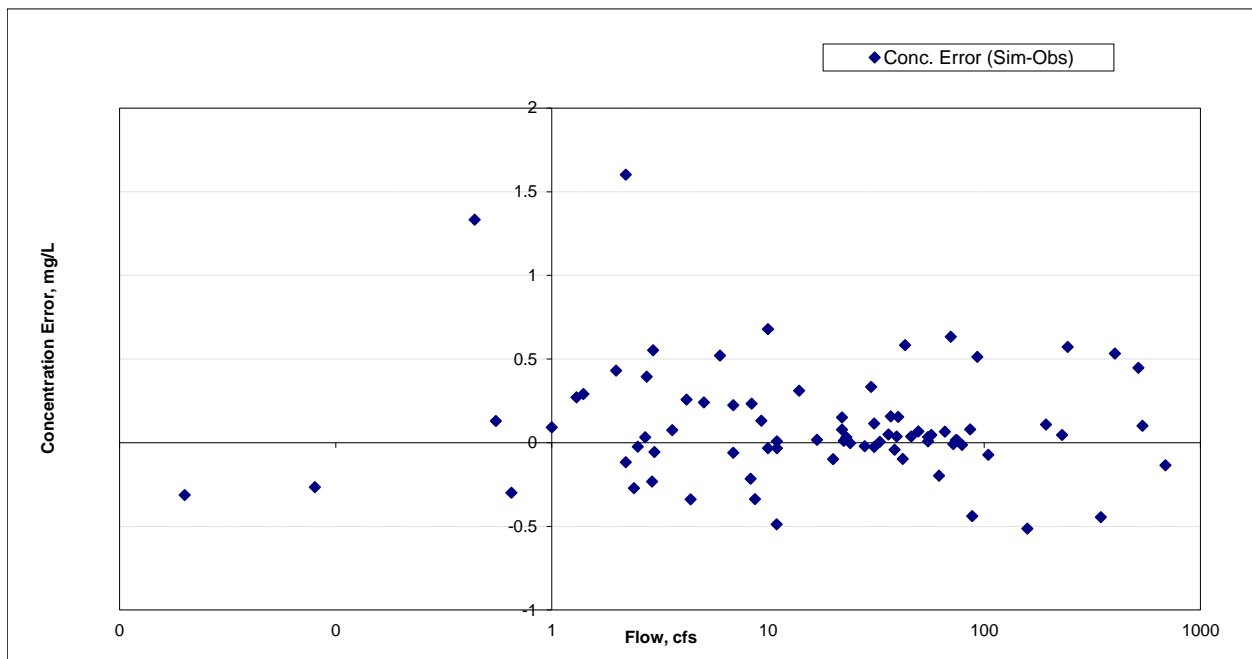


Figure 540. Residual (Simulated - Observed) vs. Flow Total Phosphorus (TP) at Martin County Ditch near Dunnell

Fourmile Creek near Dunnell (S005-027)

Total Suspended Solids (TSS)

Table 82. Total Suspended Solids (TSS) statistics

Period	2009-2010
Count	54
Concentration Average Error	-2.56%
Concentration Median Error	-21.68%
Load Average Error	92.97%
Load Median Error	-1.45%
Paired t concentration	0.75

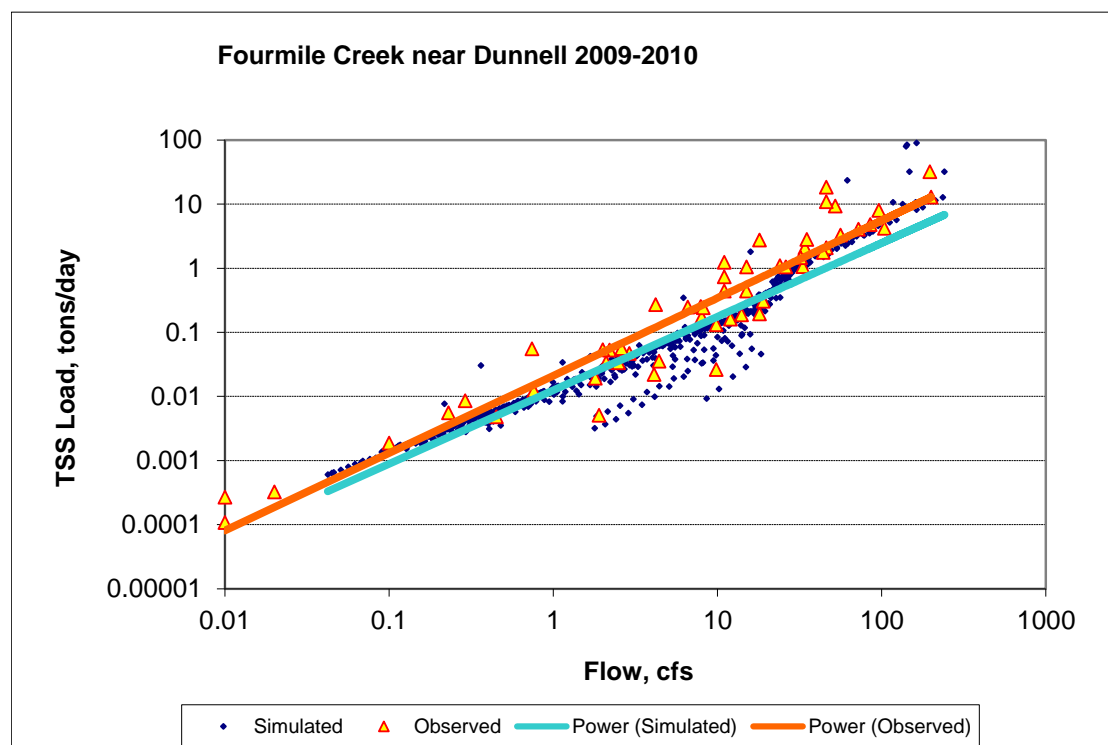


Figure 541. Power plot of simulated and observed Total Suspended Solids (TSS) load vs flow at Fourmile Creek near Dunnell (validation period)

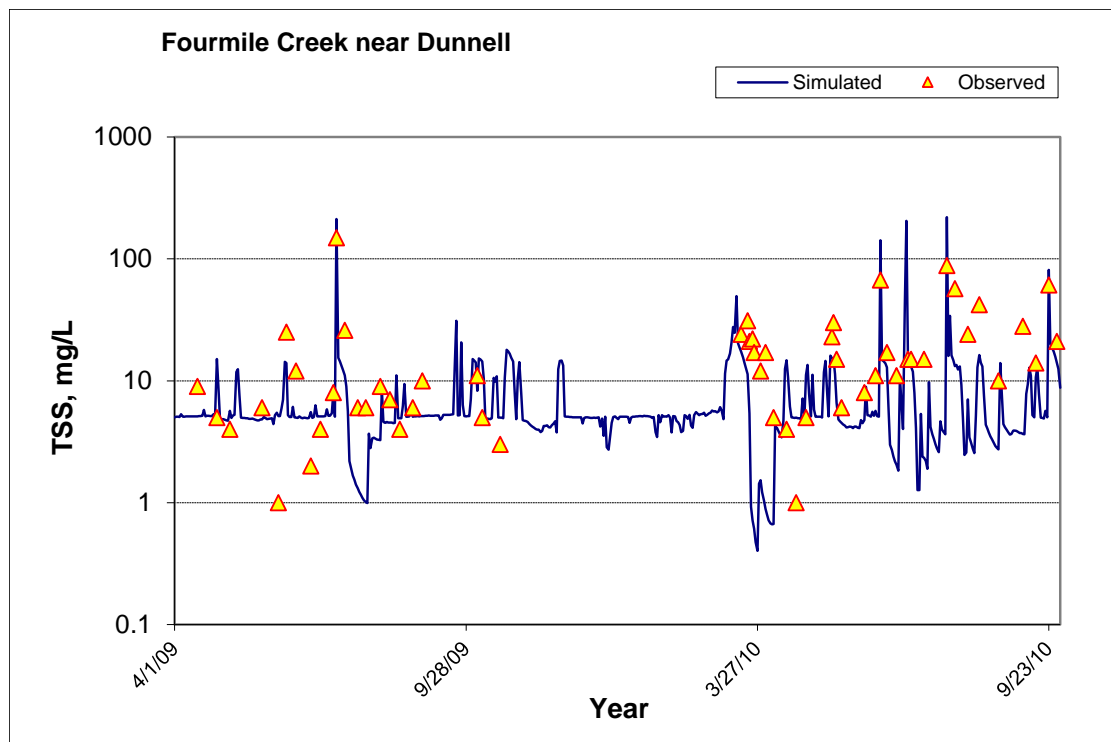


Figure 542. Time series of observed and simulated Total Suspended Solids (TSS) concentration at Fourmile Creek near Dunnell (calibration period)

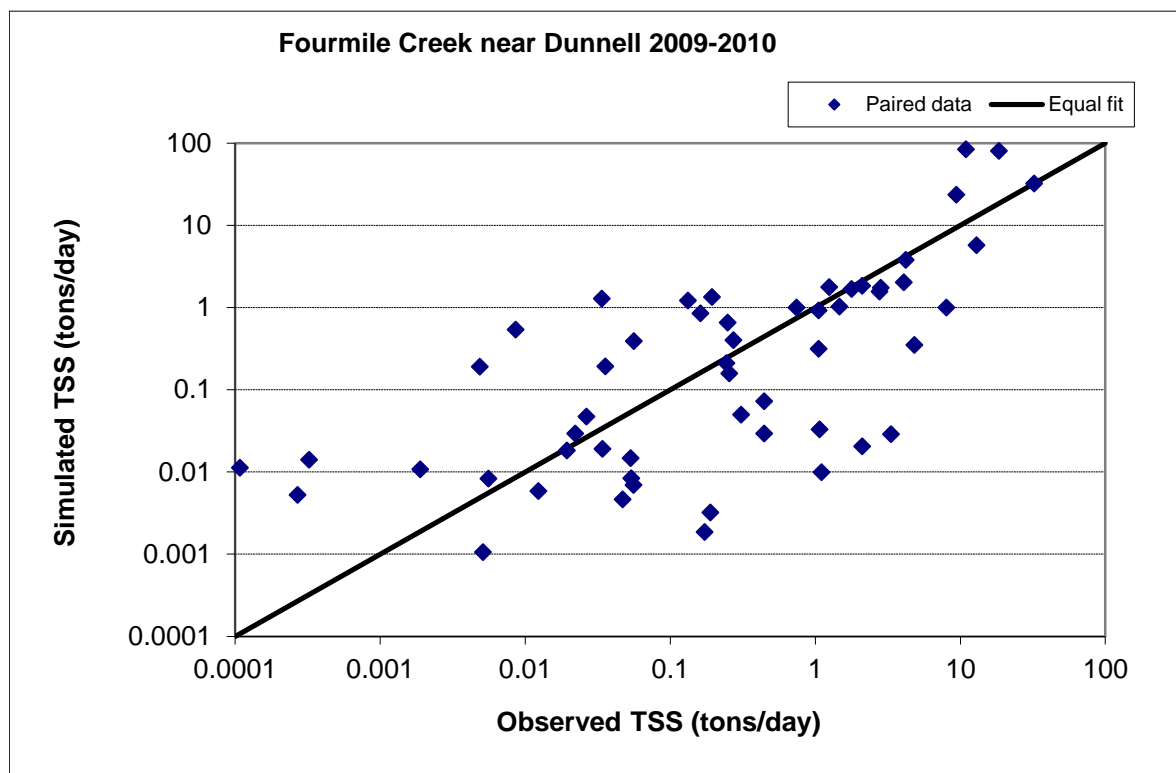


Figure 543. Paired simulated vs. observed Total Suspended Solids (TSS) load at Fourmile Creek near Dunnell (validation period)

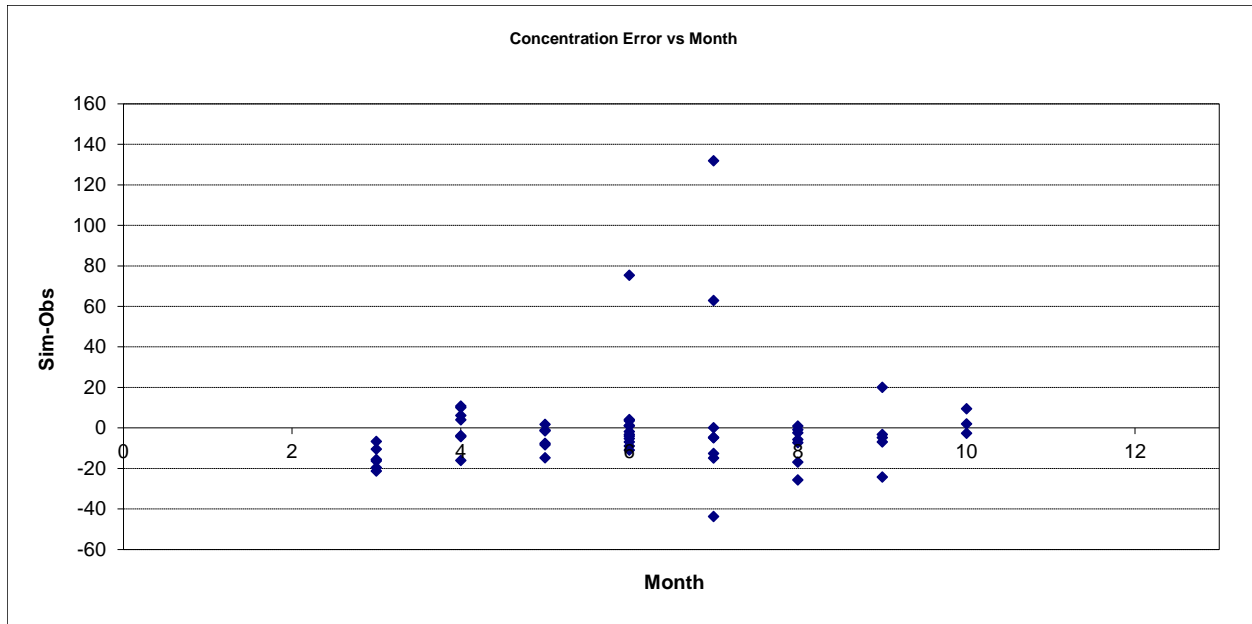


Figure 544. Residual (Simulated - Observed) vs. Month Total Suspended Solids (TSS) at Fourmile Creek near Dunnell

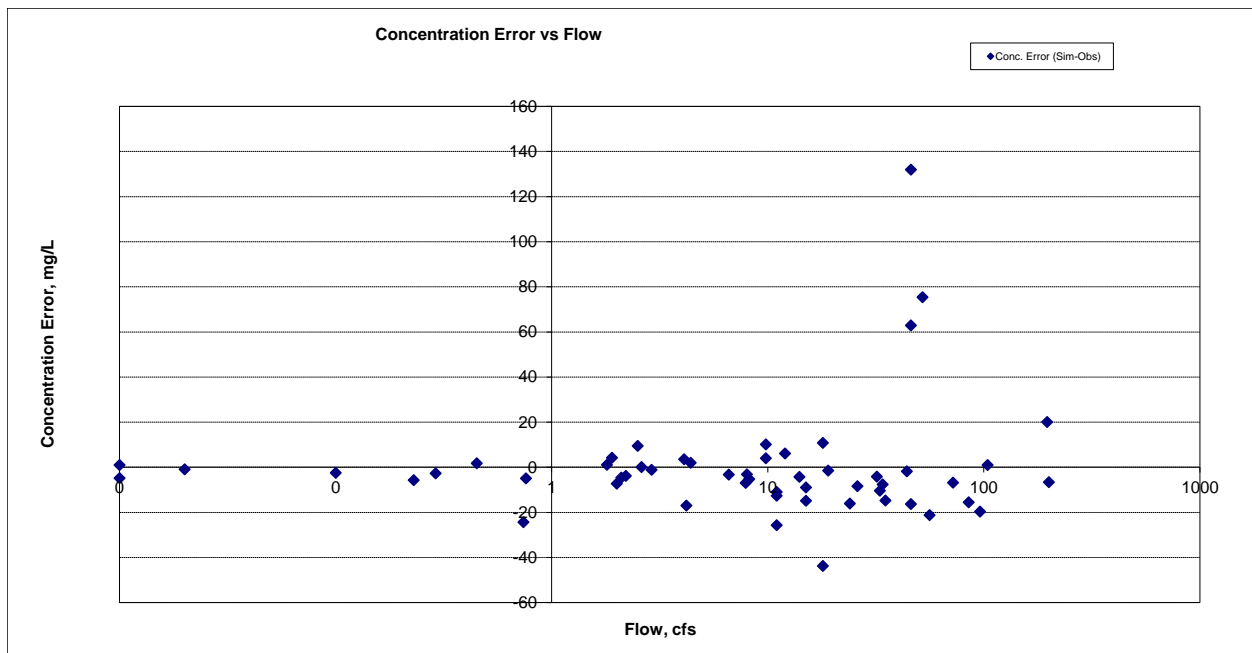


Figure 545. Residual (Simulated - Observed) vs. Flow Total Suspended Solids (TSS) at Fourmile Creek near Dunnell

Ammonia Nitrogen (NH3)

Table 83. Ammonia Nitrogen (NH3) statistics

Period	2009-2010
Count	55
Concentration Average Error	243.33%
Concentration Median Error	170.30%
Load Average Error	243.66%
Load Median Error	45.71%
Paired t concentration	0.00

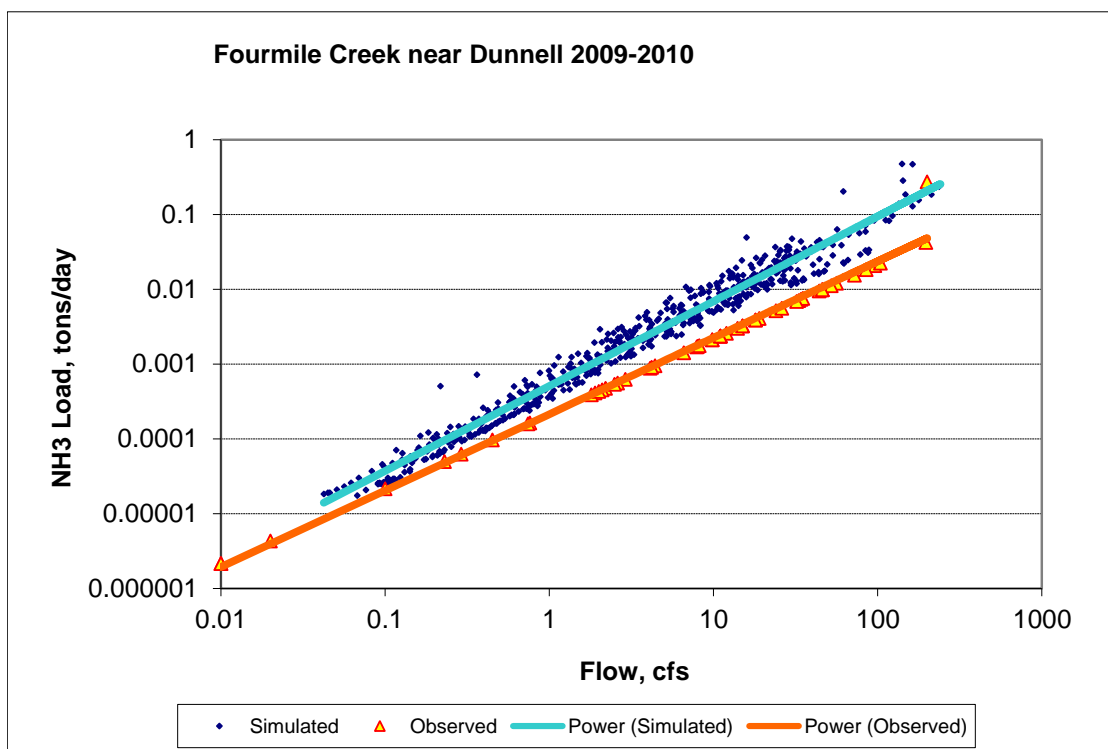


Figure 546. Power plot of simulated and observed Ammonia Nitrogen (NH3) load vs flow at Fourmile Creek near Dunnell (validation period)

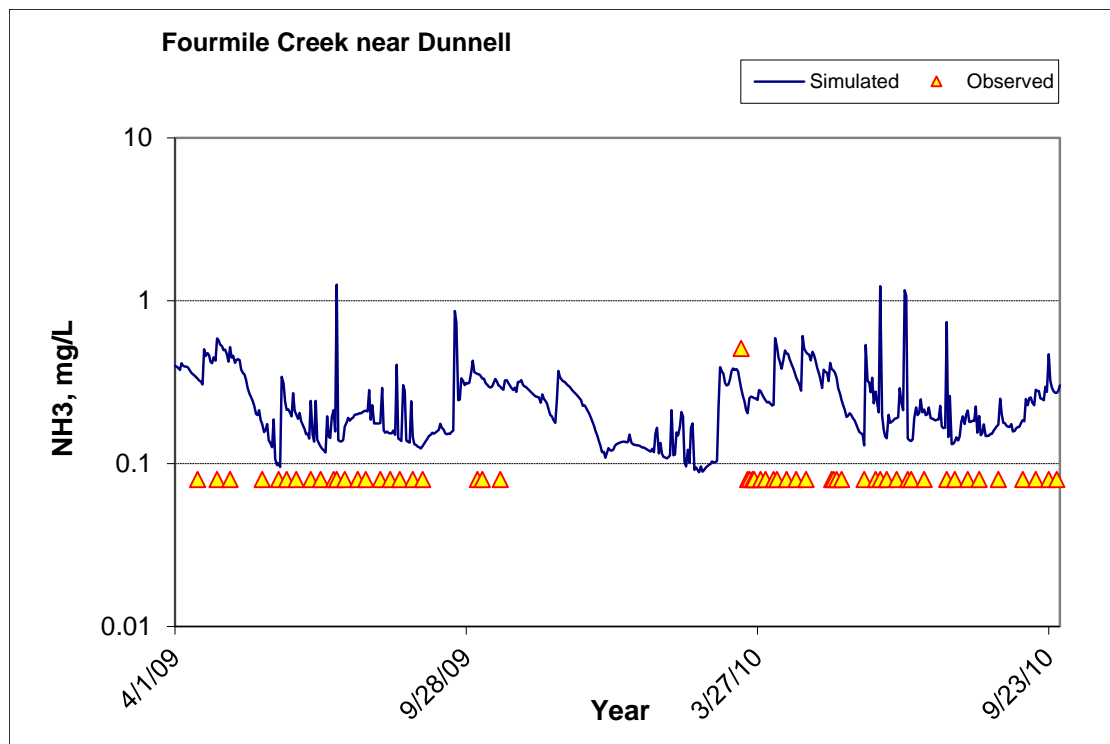


Figure 547. Time series of observed and simulated Ammonia Nitrogen (NH3) concentration at Fourmile Creek near Dunnell (calibration period)

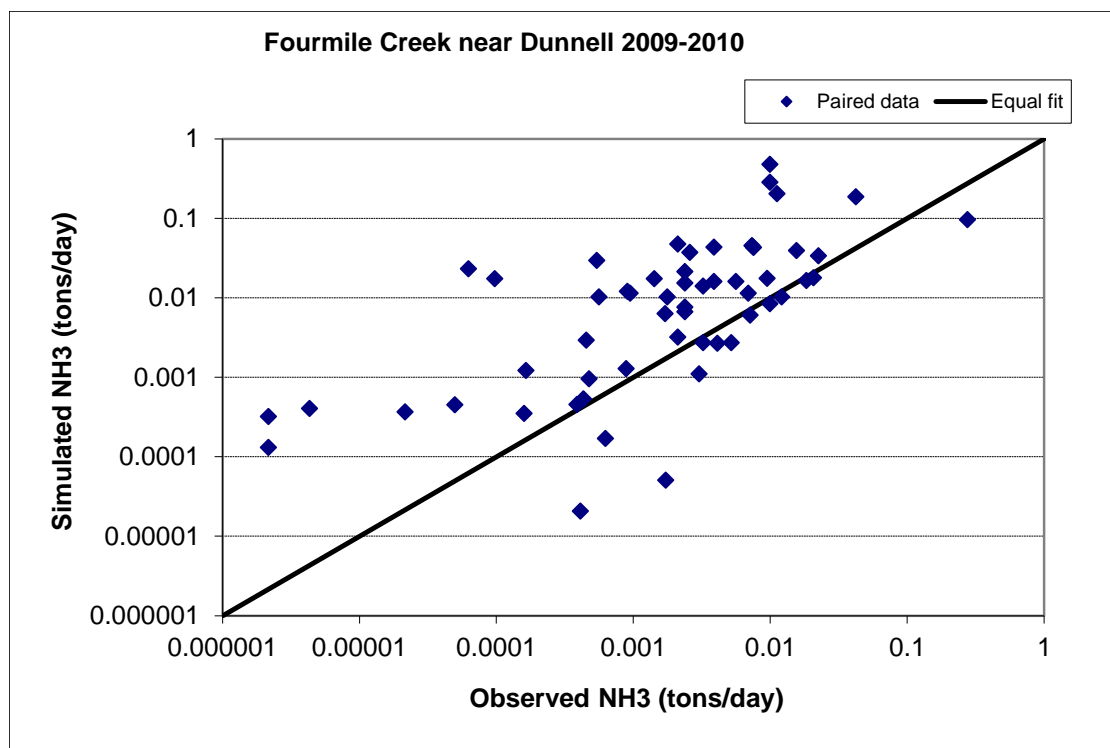


Figure 548. Paired simulated vs. observed Ammonia Nitrogen (NH3) load at Fourmile Creek near Dunnell (validation period)

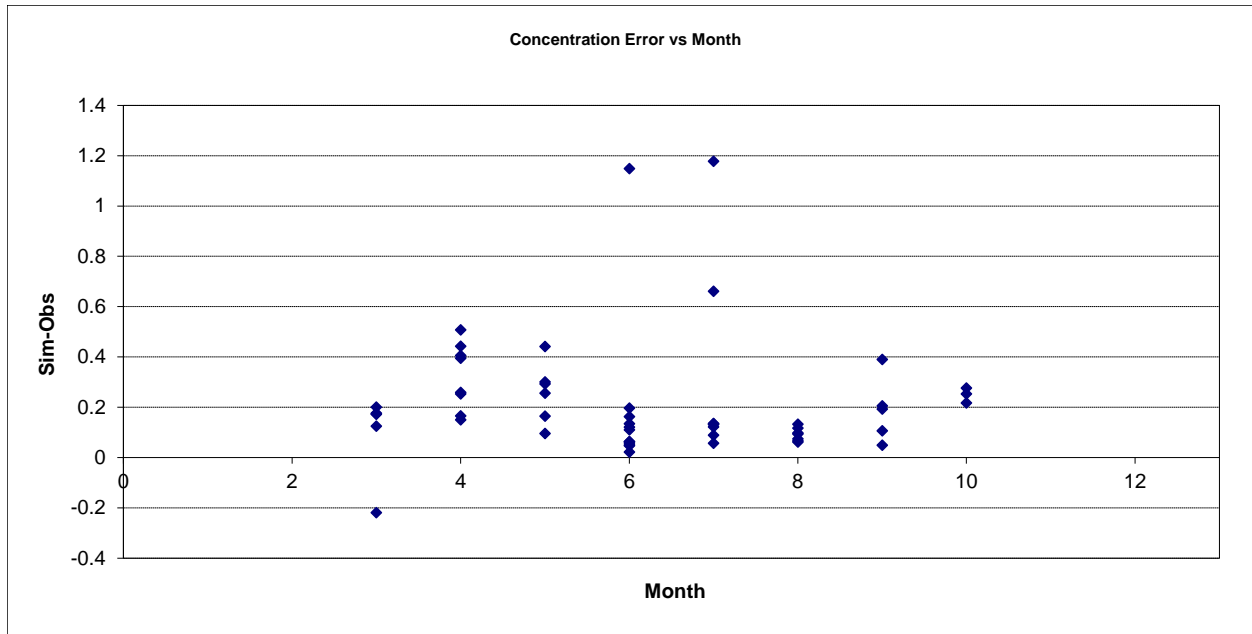


Figure 549. Residual (Simulated - Observed) vs. Month Ammonia Nitrogen (NH3) at Fourmile Creek near Dunnell

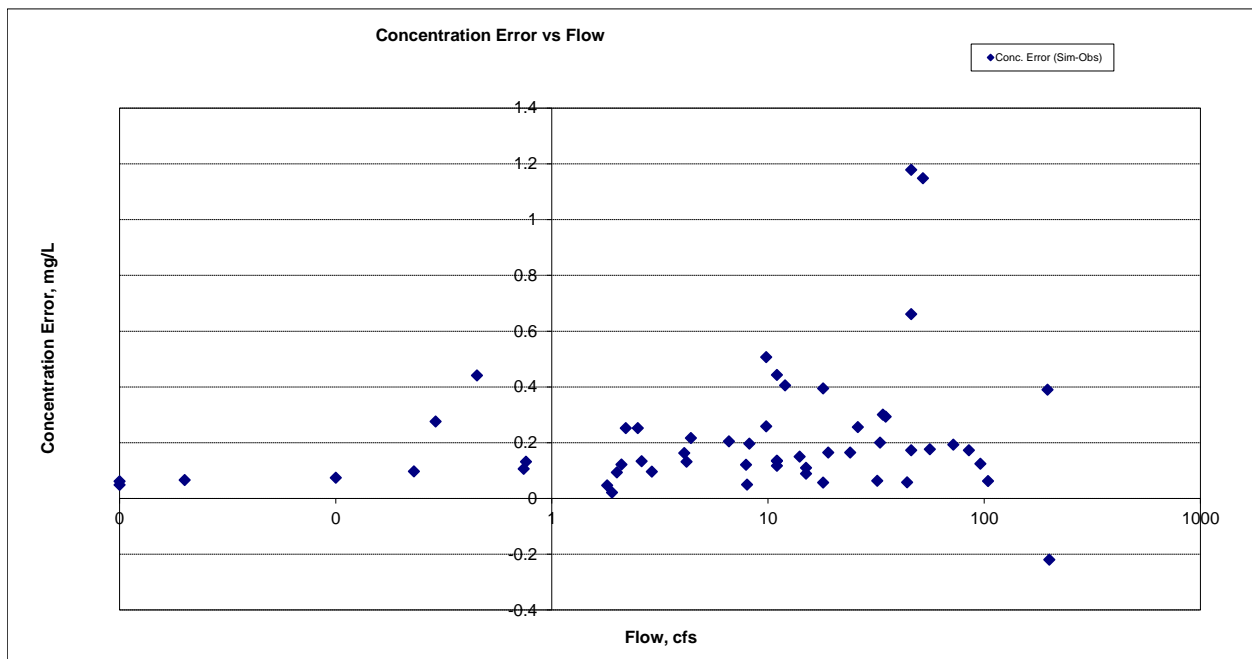


Figure 550. Residual (Simulated - Observed) vs. Flow Ammonia Nitrogen (NH3) at Fourmile Creek near Dunnell

Nitrite+ Nitrate Nitrogen (NOx)

Table 84. Nitrite+ Nitrate Nitrogen (NOx) statistics

Period	2009-2010
Count	55
Concentration Average Error	3.51%
Concentration Median Error	-1.03%
Load Average Error	6.77%
Load Median Error	2.00%
Paired t concentration	1.00

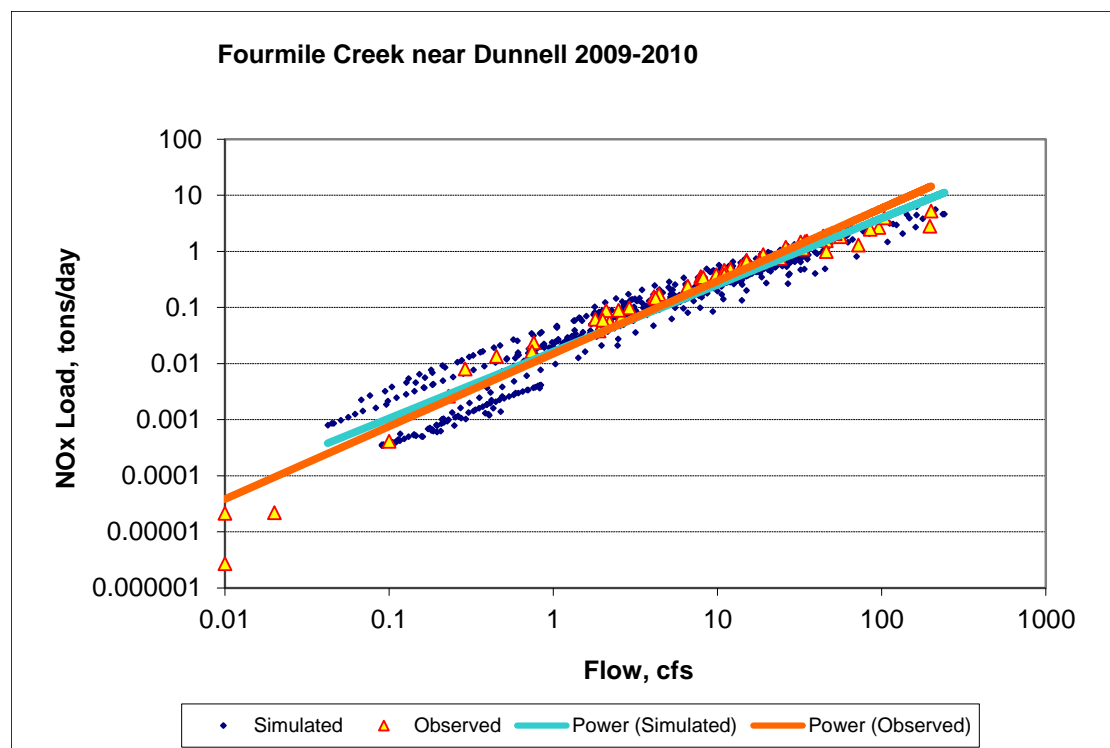


Figure 551. Power plot of simulated and observed Nitrite+ Nitrate Nitrogen (NOx) load vs flow at Fourmile Creek near Dunnell (validation period)

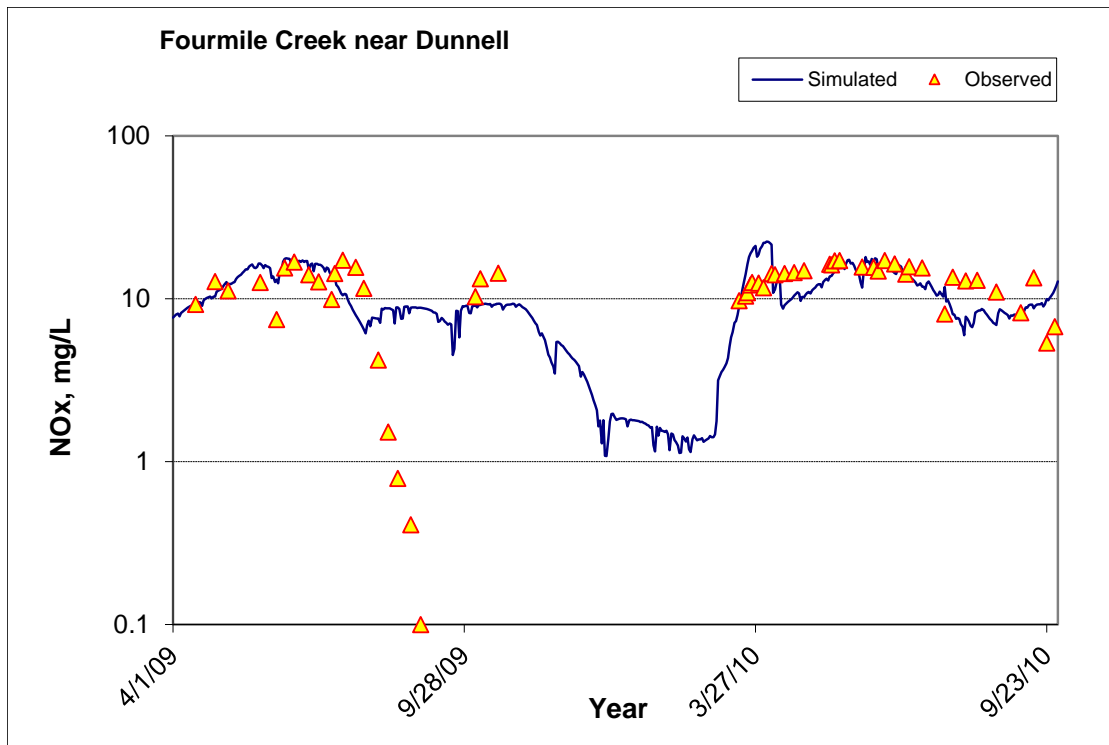


Figure 552. Time series of observed and simulated Nitrite+ Nitrate Nitrogen (NOx) concentration at Fourmile Creek near Dunnell (calibration period)

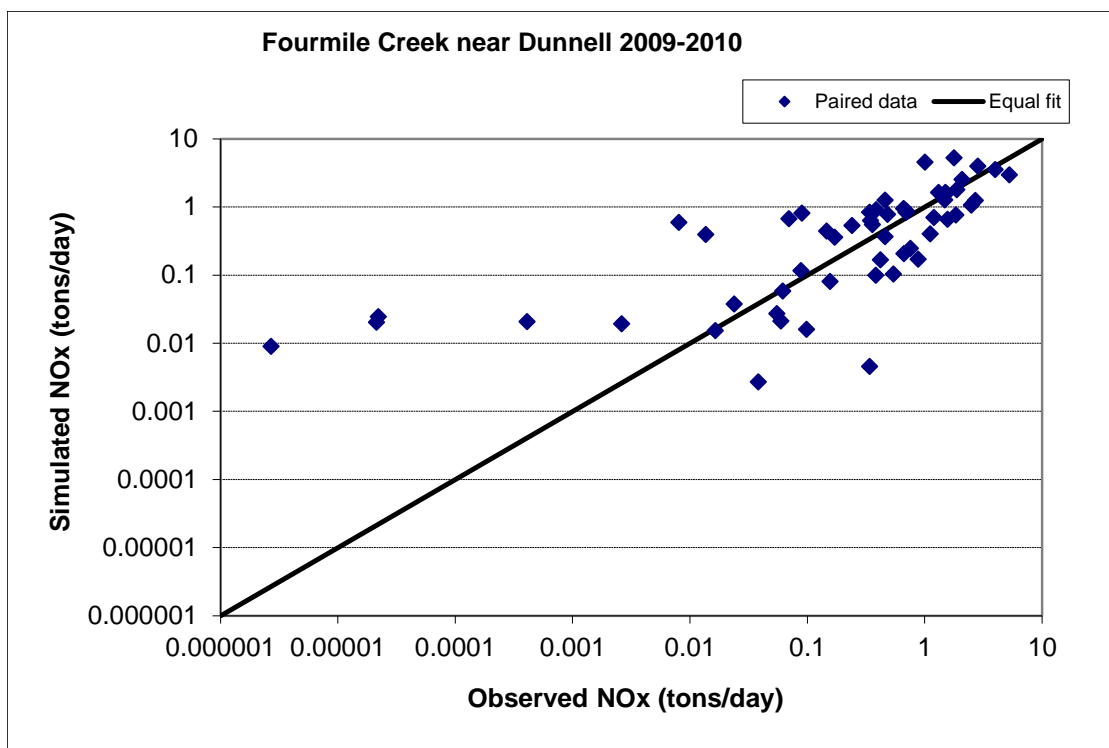


Figure 553. Paired simulated vs. observed Nitrite+ Nitrate Nitrogen (NOx) load at Fourmile Creek near Dunnell (validation period)

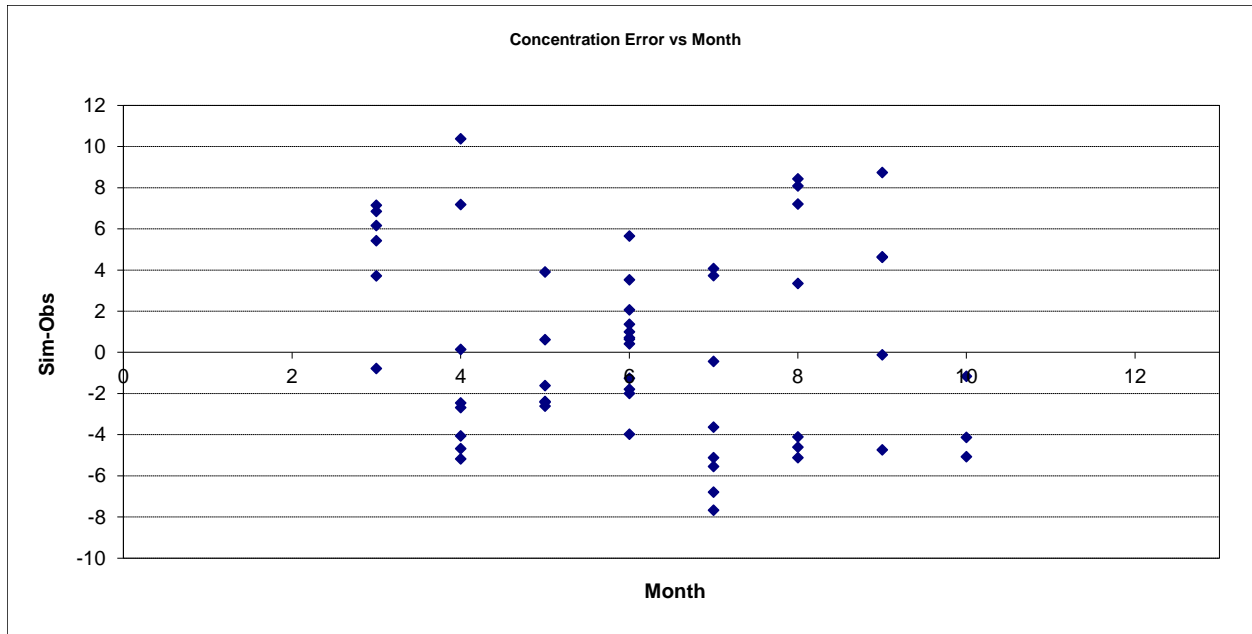


Figure 554. Residual (Simulated - Observed) vs. Month Nitrite+ Nitrate Nitrogen (NOx) at Fourmile Creek near Dunnell

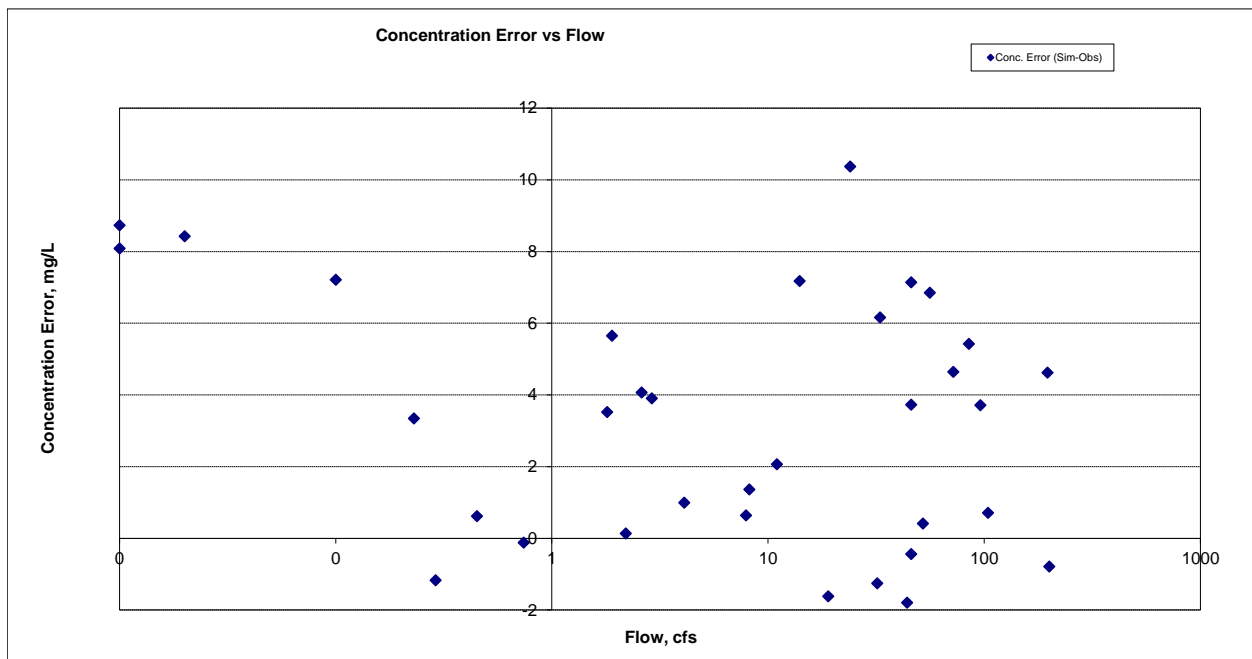


Figure 555. Residual (Simulated - Observed) vs. Flow Nitrite+ Nitrate Nitrogen (NOx) at Fourmile Creek near Dunnell

Soluble Reactive Phosphorus (SRP)

Table 85. Soluble Reactive Phosphorus (SRP) statistics

Period	2009-2010
Count	51
Concentration Average Error	30.05%
Concentration Median Error	9.13%
Load Average Error	-22.57%
Load Median Error	2.03%
Paired t concentration	0.29

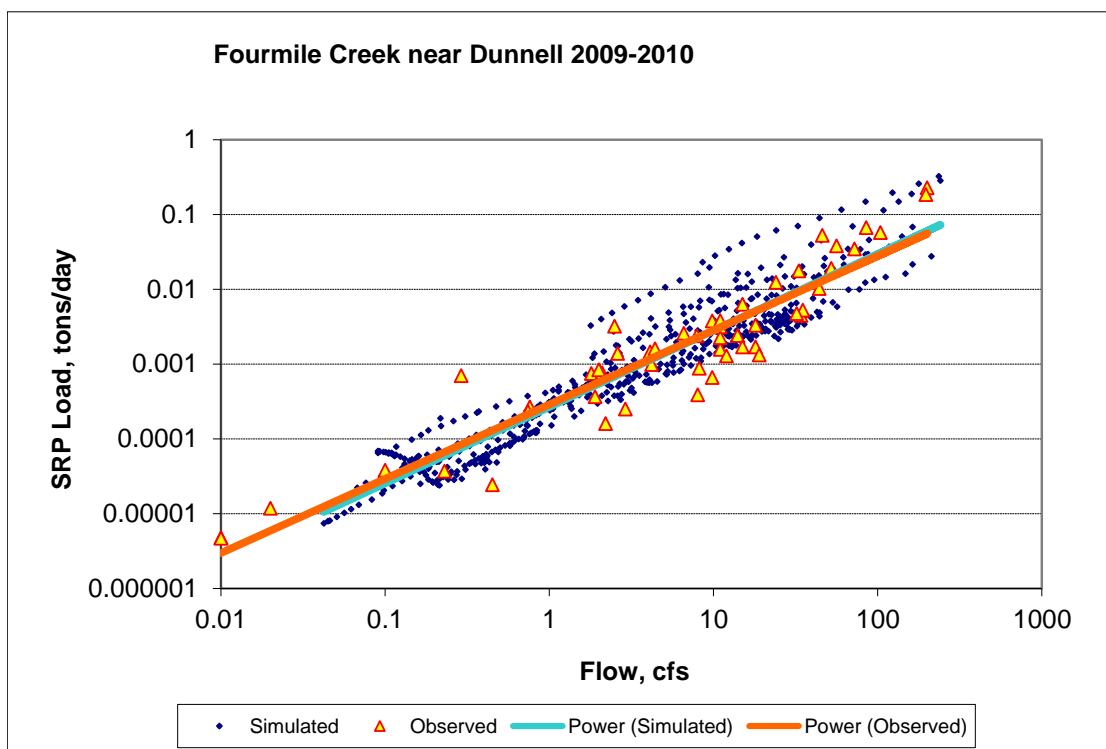


Figure 556. Power plot of simulated and observed Soluble Reactive Phosphorus (SRP) load vs flow at Fourmile Creek near Dunnell (validation period)

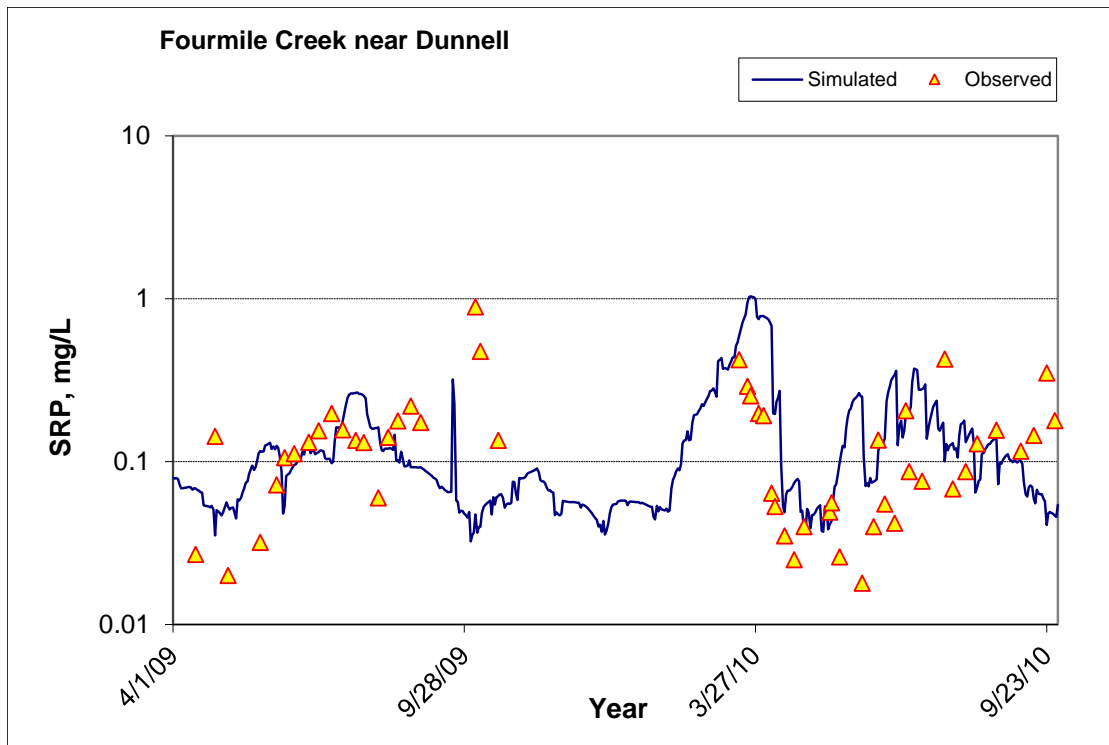


Figure 557. Time series of observed and simulated Soluble Reactive Phosphorus (SRP) concentration at Fourmile Creek near Dunnell (calibration period)

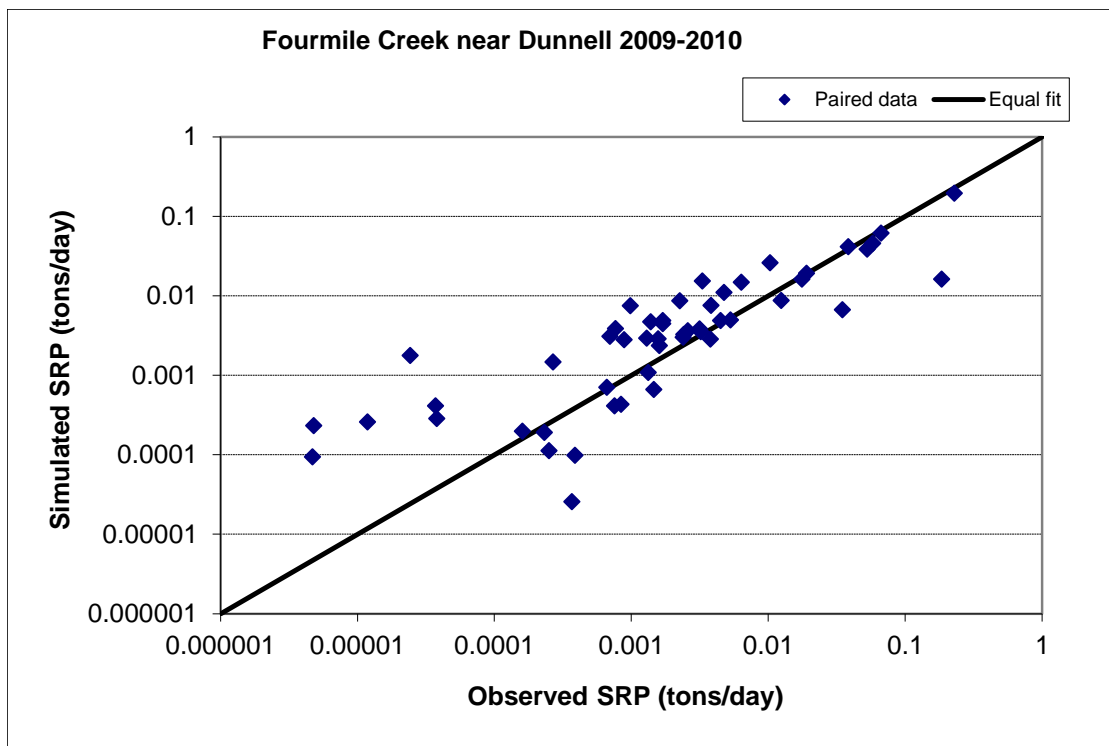


Figure 558. Paired simulated vs. observed Soluble Reactive Phosphorus (SRP) load at Fourmile Creek near Dunnell (validation period)

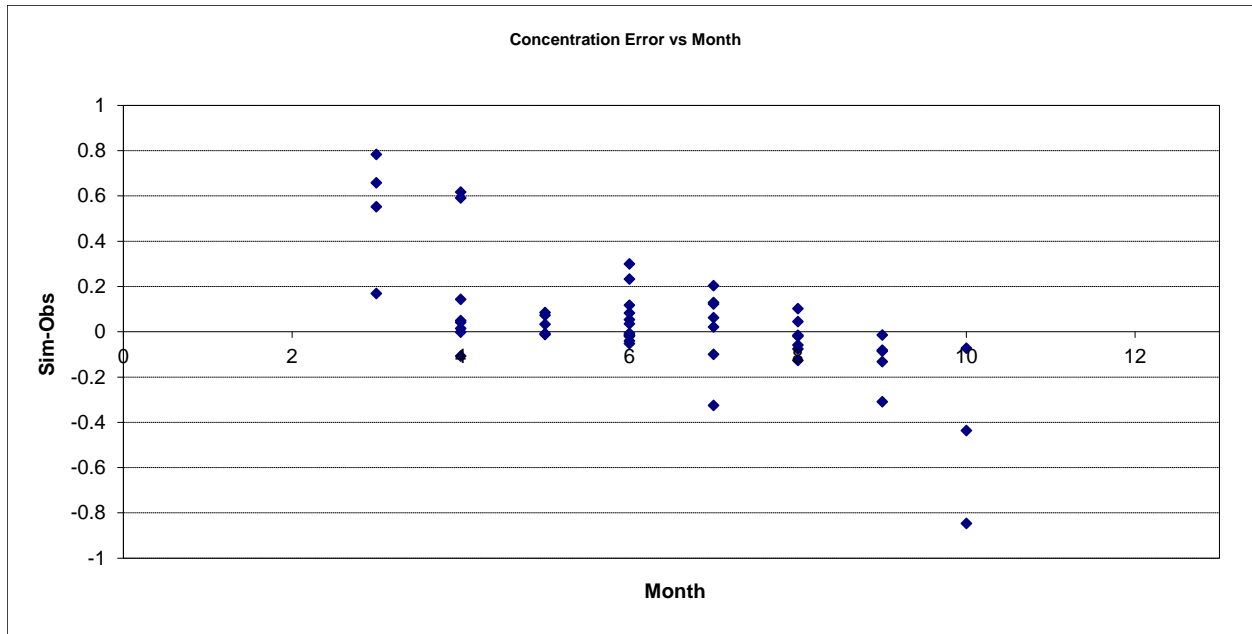


Figure 559. Residual (Simulated - Observed) vs. Month Soluble Reactive Phosphorus (SRP) at Fourmile Creek near Dunnell

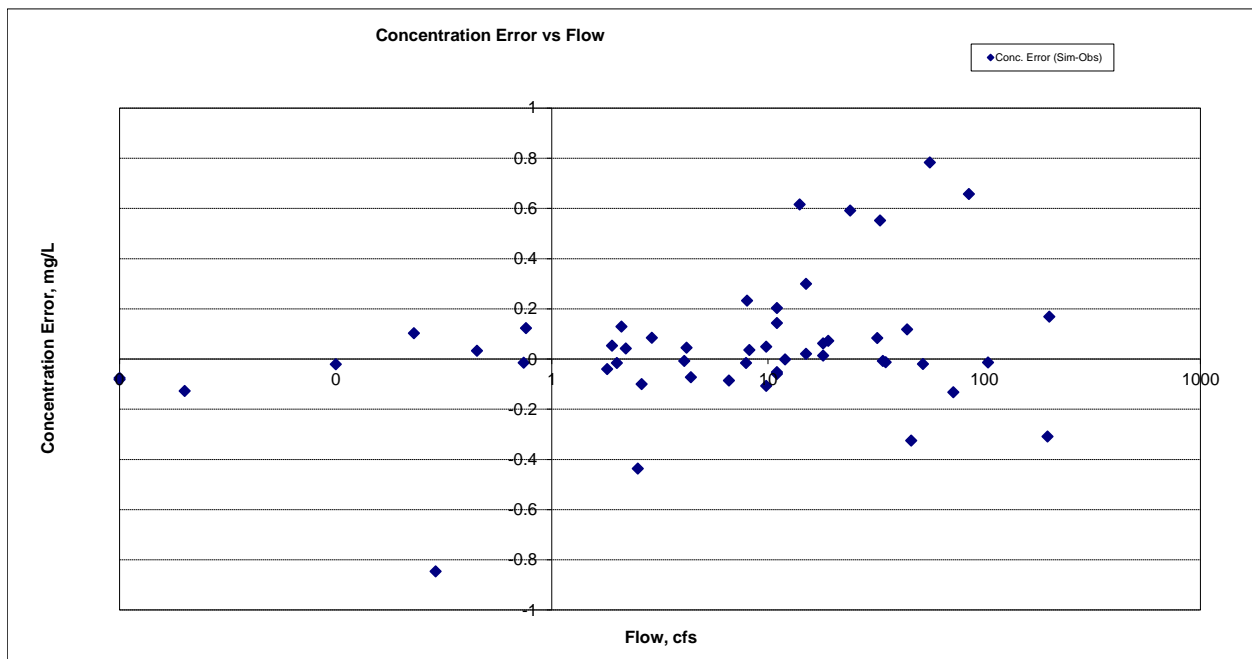


Figure 560. Residual (Simulated - Observed) vs. Flow Soluble Reactive Phosphorus (SRP) at Fourmile Creek near Dunnell

Organic Phosphorus (OrgP)

Table 86. Organic Phosphorus (OrgP) statistics

Period	2009-2010
Count	43
Concentration Average Error	0.50%
Concentration Median Error	23.65%
Load Average Error	-50.26%
Load Median Error	1.56%
Paired t concentration	0.95

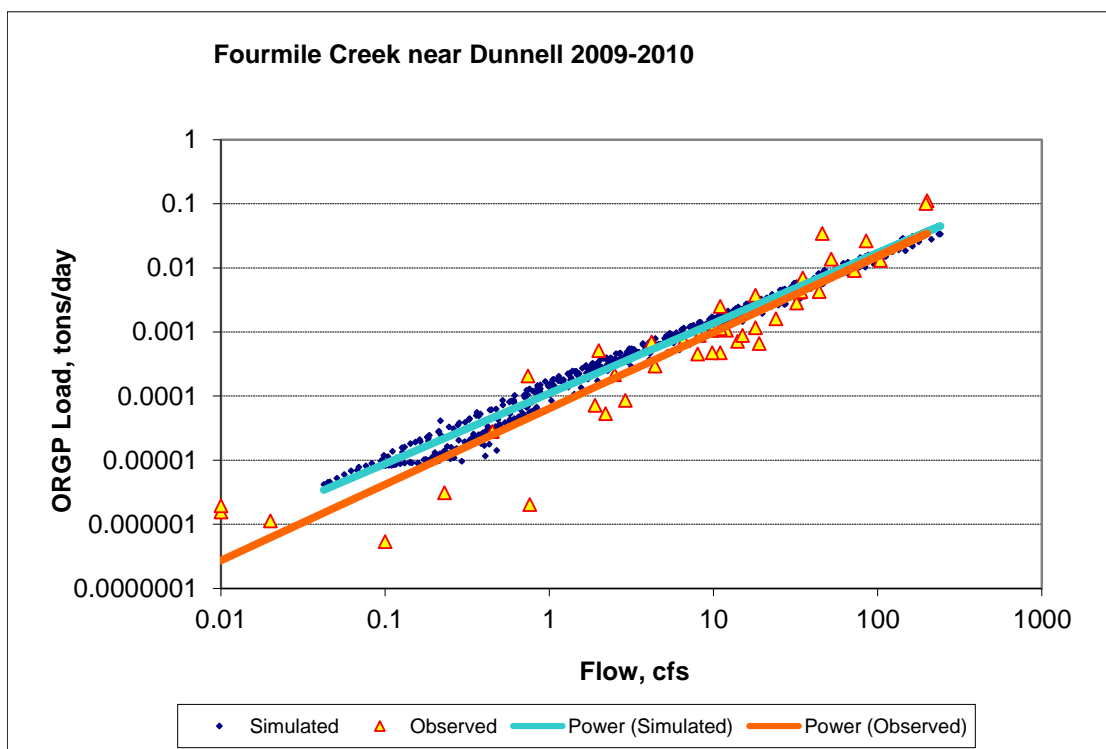


Figure 561. Power plot of simulated and observed Organic Phosphorus (OrgP) load vs flow at Fourmile Creek near Dunnell (validation period)

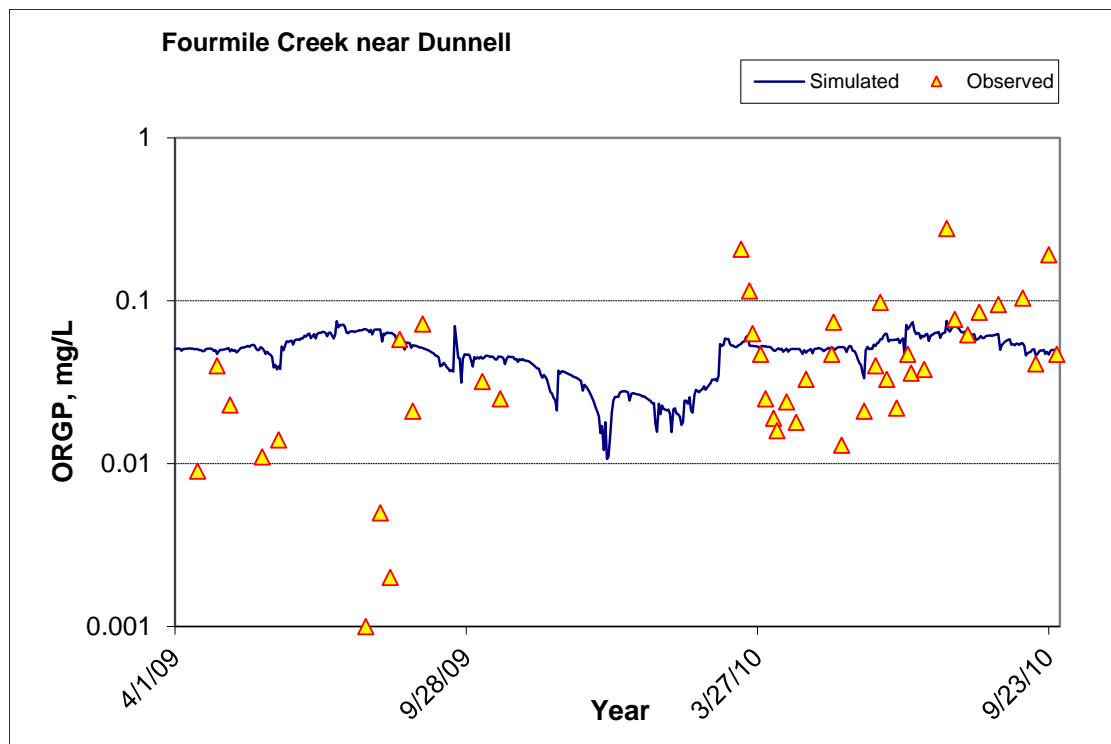


Figure 562. Time series of observed and simulated Organic Phosphorus (OrgP) concentration at Fourmile Creek near Dunnell (calibration period)

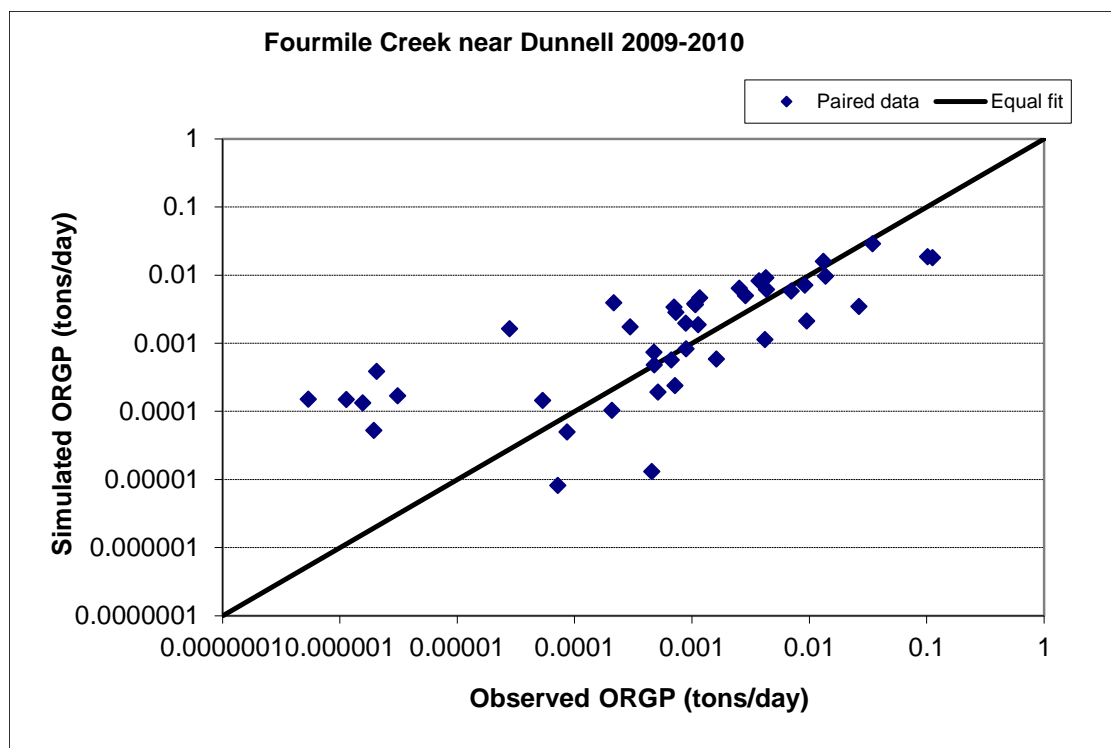


Figure 563. Paired simulated vs. observed Organic Phosphorus (OrgP) load at Fourmile Creek near Dunnell (validation period)



Figure 564. Residual (Simulated - Observed) vs. Month Organic Phosphorus (OrgP) at Fourmile Creek near Dunnell

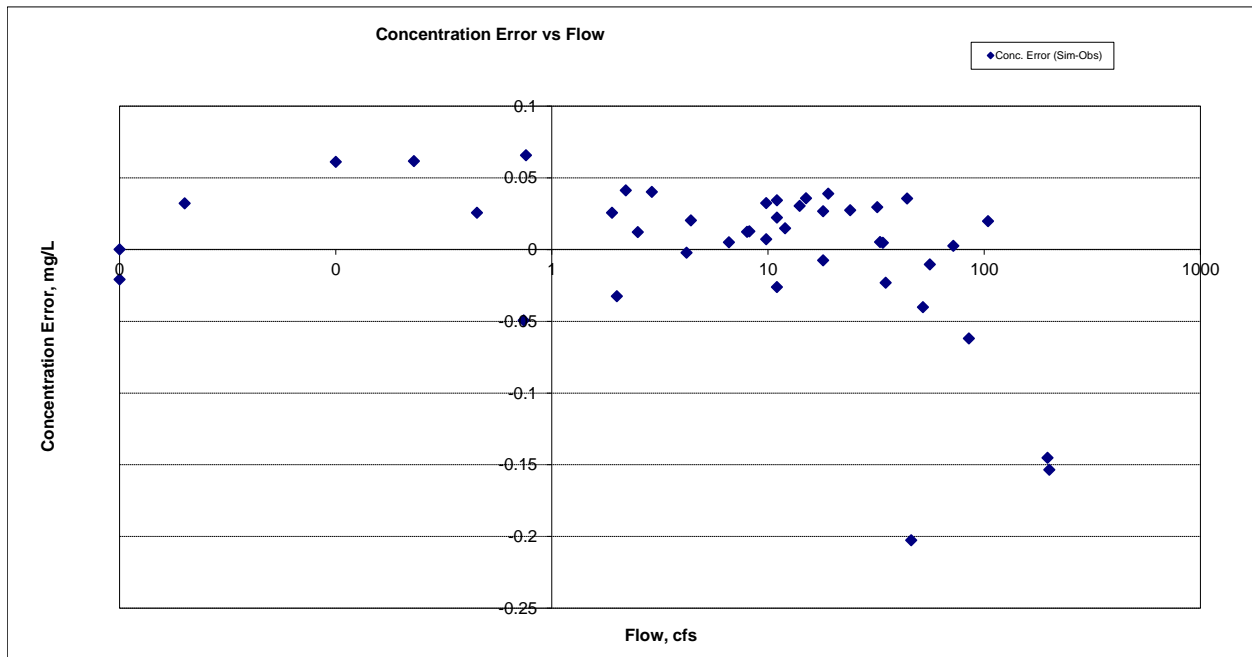


Figure 565. Residual (Simulated - Observed) vs. Flow Organic Phosphorus (OrgP) at Fourmile Creek near Dunnell

Total Phosphorus (TP)

Table 87. Total Phosphorus (TP) statistics

Period	2009-2010
Count	55
Concentration Average Error	35.46%
Concentration Median Error	23.72%
Load Average Error	-25.69%
Load Median Error	2.20%
Paired t concentration	0.16

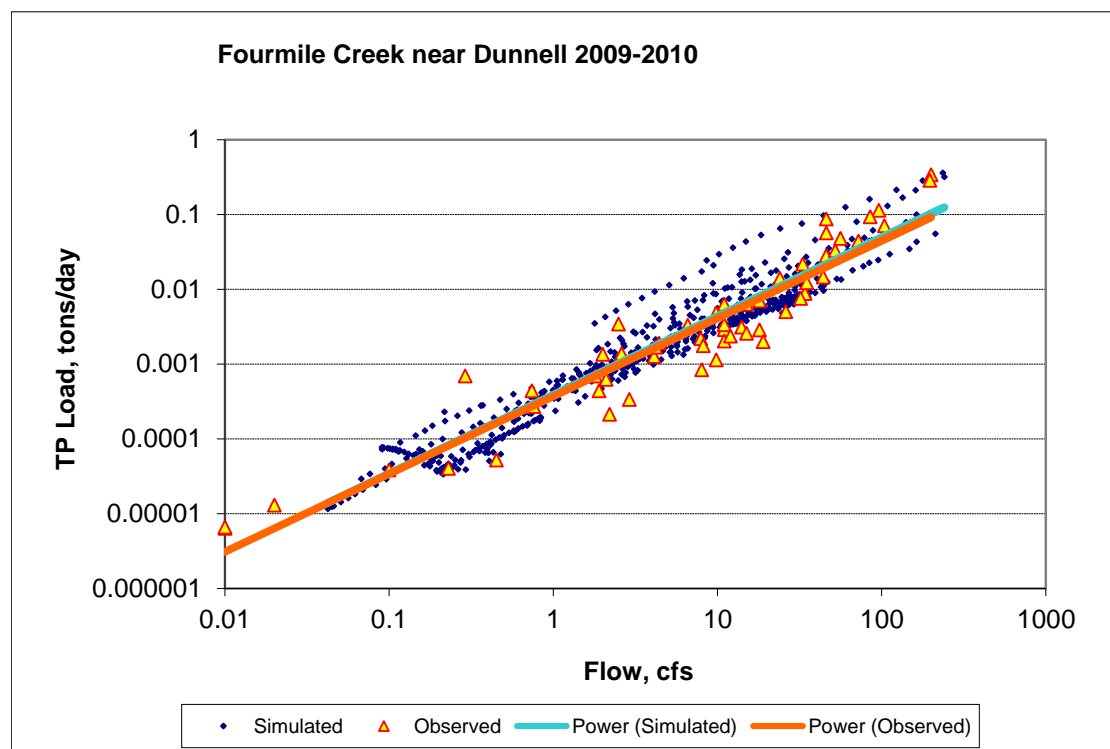


Figure 566. Power plot of simulated and observed Total Phosphorus (TP) load vs flow at Fourmile Creek near Dunnell (validation period)

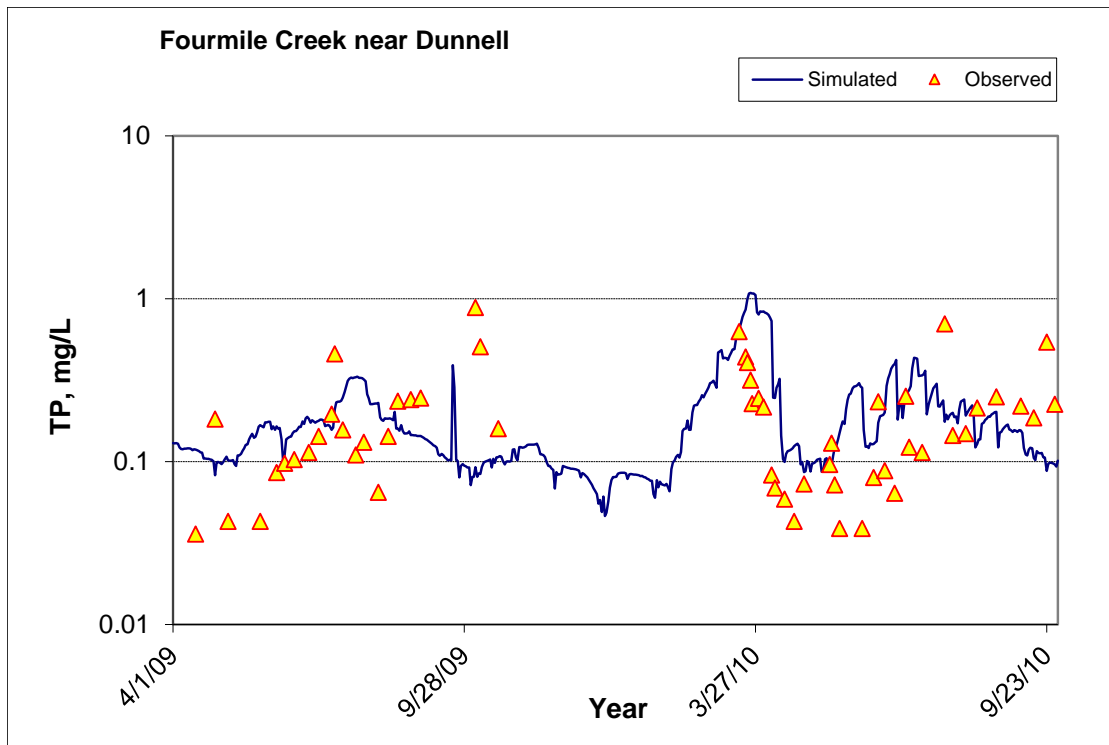


Figure 567. Time series of observed and simulated Total Phosphorus (TP) concentration at Fourmile Creek near Dunnell (calibration period)

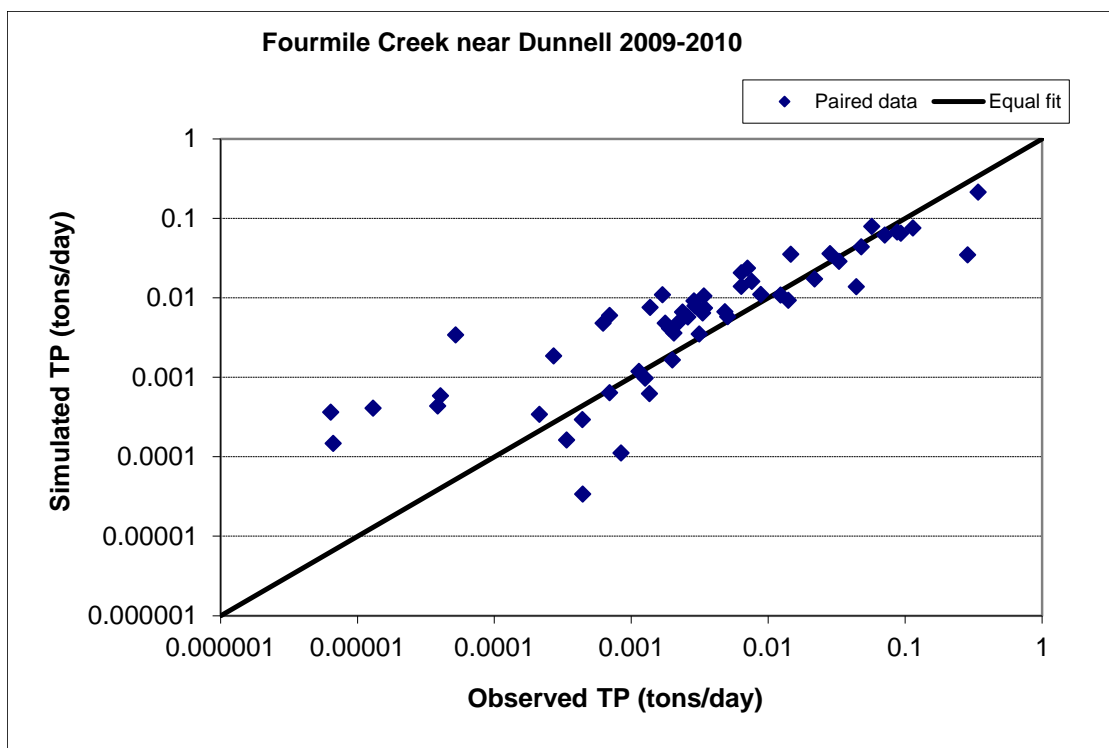


Figure 568. Paired simulated vs. observed Total Phosphorus (TP) load at Fourmile Creek near Dunnell (validation period)

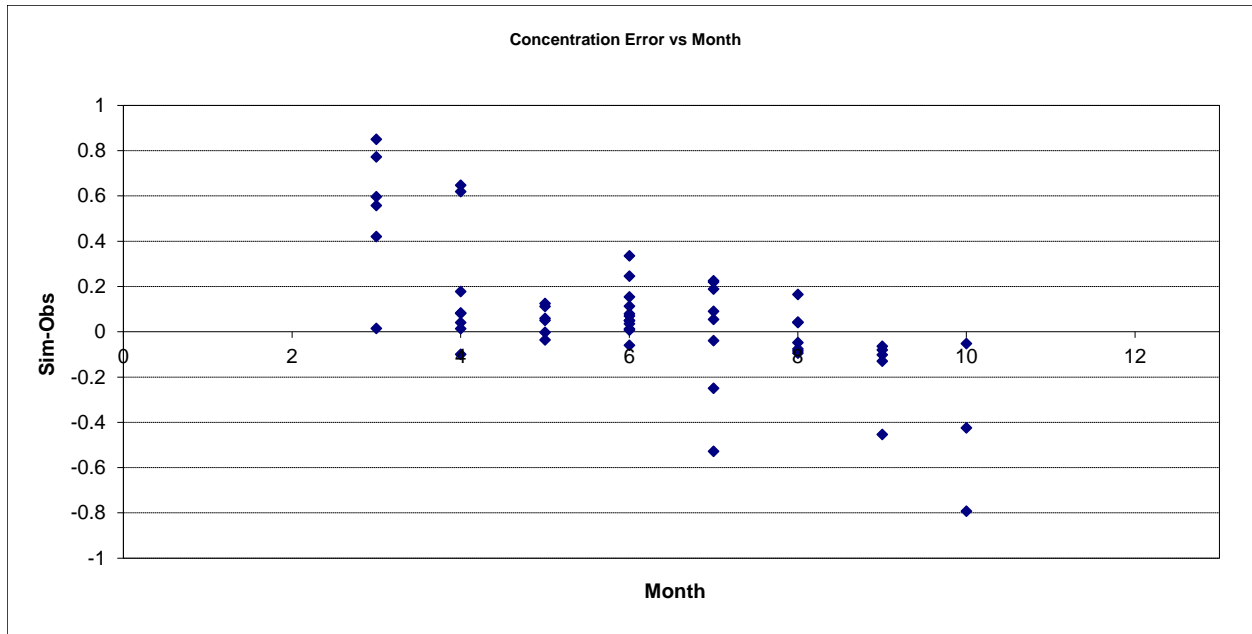


Figure 569. Residual (Simulated - Observed) vs. Month Total Phosphorus (TP) at Fourmile Creek near Dunnell

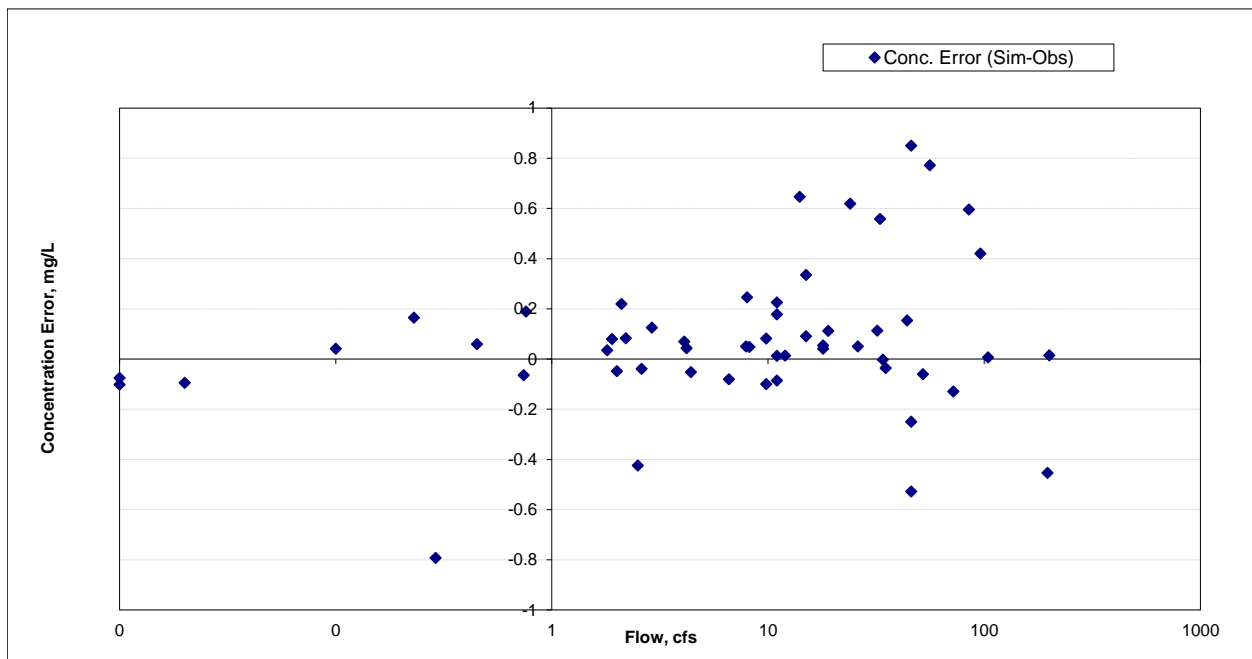


Figure 570. Residual (Simulated - Observed) vs. Flow Total Phosphorus (TP) at Fourmile Creek near Dunnell