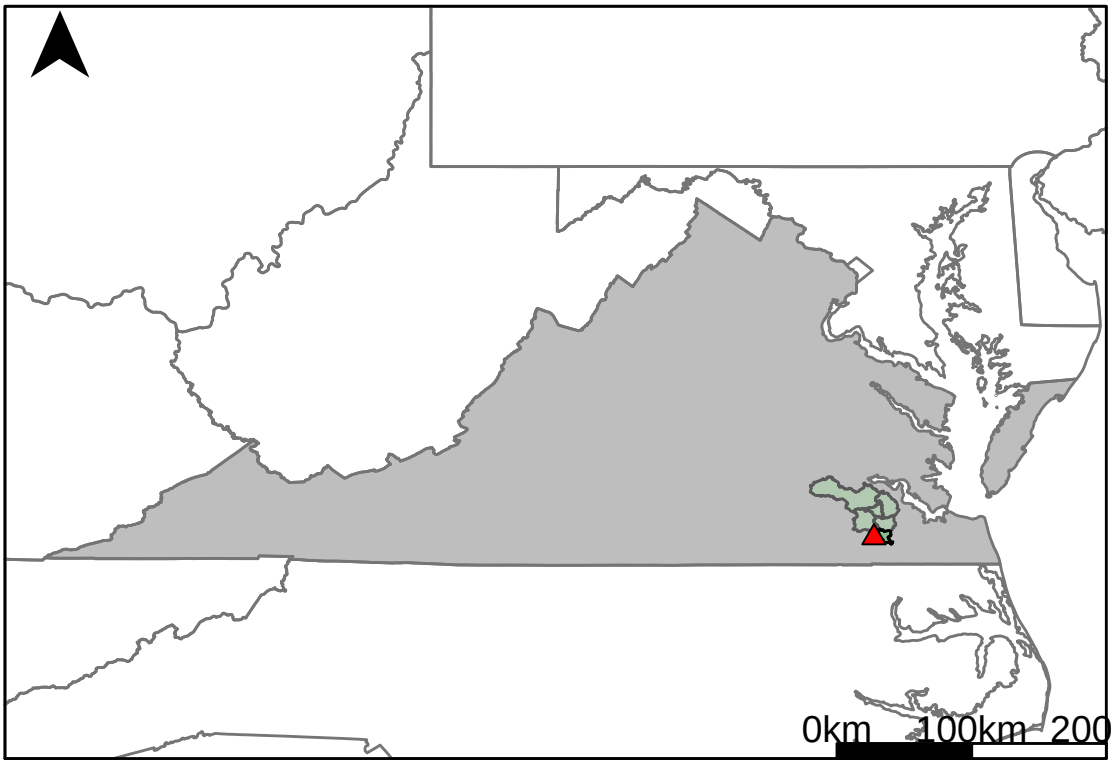
# Appendix B.2: USGS Gage 02049500 vs. MN4_8080_8110




This river segment follows part of the flow of the Blackwater River, a tributary of the Meherrin River. The gage is located in Southampton County, VA (Lat 3645'45", Long 7653'55") approximately 17 miles west of Suffolk, VA. Drainage area is 613 sq. miles. This gage started taking data in 1944 and is still taking data. Water is diverted from this area to the City of Norfolk by a pumping station upstream of the gage. It is also believed that in extreme low flow conditions, water can be lost to storage, especially between Zuni and Franklin. The average daily discharge error between the model and gage data for the 20 year timespan was -0.31%, with 51.2% of its rolling three month time spans above 20% error.

**Table 1: Monthly Low Flows**

| | USGS Gage | Model | Pct. Error |
|---|---|---|---|
| Jan. Low Flow | 4.92 | 22.4 | -355 |
| Feb. Low Flow | 19 | 159 | -737 |
| Mar. Low Flow | 118 | 155 | -31.4 |
| Apr. Low Flow | 346 | 340 | 1.73 |
| May Low Flow | 519 | 513 | 1.16 |
| Jun. Low Flow | 534 | 451 | 15.5 |
| Jul. Low Flow | 369 | 241 | 34.7 |
| Aug. Low Flow | 62.5 | 175 | -180 |
| Sep. Low Flow | 11 | 53.3 | -385 |
| Oct. Low Flow | 2.8 | 23.3 | -732 |
| Nov. Low Flow | 5.3 | 37.8 | -613 |
| Dec. Low Flow | 3.34 | 23.9 | -616 |

**Table 2: Monthly Average Flows**

| | USGS Gage | Model | Pct. Error |
|---|---|---|---|
| Overall Mean Flow | 648 | 650 | -0.31 |
| Jan. Mean Flow | 882 | 895 | -1.47 |
| Feb. Mean Flow | 1140 | 1100 | 3.51 |
| Mar. Mean Flow | 1210 | 1180 | 2.48 |
| Apr. Mean Flow | 1030 | 887 | 13.9 |
| May Mean Flow | 485 | 519 | -7.01 |
| Jun. Mean Flow | 330 | 328 | 0.61 |
| Jul. Mean Flow | 207 | 245 | -18.4 |
| Aug. Mean Flow | 476 | 464 | 2.52 |
| Sep. Mean Flow | 750 | 796 | -6.13 |
| Oct. Mean Flow | 330 | 400 | -21.2 |
| Nov. Mean Flow | 368 | 413 | -12.2 |
| Dec. Mean Flow | 615 | 611 | 0.65 |

**Table 3: Monthly High Flows**

| | USGS Gage | Model | Pct. Error |
|---|---|---|---|
| Jan. High Flow | 114 | 307 | -169 |
| Feb. High Flow | 481 | 813 | -69 |
| Mar. High Flow | 813 | 932 | -14.6 |
| Apr. High Flow | 1300 | 1460 | -12.3 |
| May High Flow | 1600 | 1900 | -18.8 |
| Jun. High Flow | 1600 | 1630 | -1.88 |
| Jul. High Flow | 1760 | 1900 | -7.95 |
| Aug. High Flow | 855 | 939 | -9.82 |
| Sep. High Flow | 745 | 619 | 16.9 |
| Oct. High Flow | 431 | 318 | 26.2 |
| Nov. High Flow | 812 | 589 | 27.5 |
| Dec. High Flow | 371 | 446 | -20.2 |

**Table 4: Period Low Flows**

| | USGS Gage | Model | Pct. Error |
|---|---|---|---|
| Min. 1 Day Min | 0 | 0 | NaN |
| Med. 1 Day Min | 0.77 | 5.17 | -571 |
| Min. 3 Day Min | 0.17 | 0 | 100 |
| Med. 3 Day Min | 1.11 | 7.37 | -564 |
| Min. 7 Day Min | 0.26 | 0.05 | 80.9 |
| Med. 7 Day Min | 1.59 | 12.4 | -680 |
| Min. 30 Day Min | 0.88 | 3.91 | -343 |
| Med. 30 Day Min | 3.51 | 34.6 | -886 |
| Min. 90 Day Min | 5.85 | 30.3 | -418 |
| Med. 90 Day Min | 65.6 | 131 | -99.7 |
| 7Q10 | 0.44 | 0.41 | 6.64 |
| Year of 90-Day Min. Flow | 2002 | 2002 | 0 |
| Drought Year Mean | 174 | 650 | -274 |
| Mean Baseflow | 323 | 318 | 1.55 |

**Table 5: Period High Flows**

| | USGS Gage | Model | Pct. Error |
|---|---|---|---|
| Max. 1 Day Max | 22000 | 26200 | -19.1 |
| Med. 1 Day Max | 4320 | 5300 | -22.7 |
| Max. 3 Day Max | 20800 | 25000 | -20.2 |
| Med. 3 Day Max | 4150 | 4650 | -12 |
| Max. 7 Day Max | 17500 | 20300 | -16 |
| Med. 7 Day Max | 3140 | 3280 | -4.46 |
| Max. 30 Day Max | 5920 | 6650 | -12.3 |
| Med. 30 Day Max | 1730 | 1770 | -2.31 |
| Max. 90 Day Max | 2560 | 2530 | 1.17 |
| Med. 90 Day Max | 1330 | 1220 | 8.27 |

**Table 6: Non-Exceedance Flows**

| | USGS Gage | Model | Pct. Error |
|---|---|---|---|
| 1% Non-Exceedance | 0.62 | 4.22 | -581 |
| 5% Non-Exceedance | 2 | 15 | -650 |
| 50% Non-Exceedance | 369 | 384 | -4.07 |
| 95% Non-Exceedance | 2320 | 2090 | 9.91 |
| 99% Non-Exceedance | 4160 | 4240 | -1.92 |
| Sept. 10% Non-Exceedance | 16.6 | 16.7 | -0.6 |

**Fig. 1: Hydrograph**

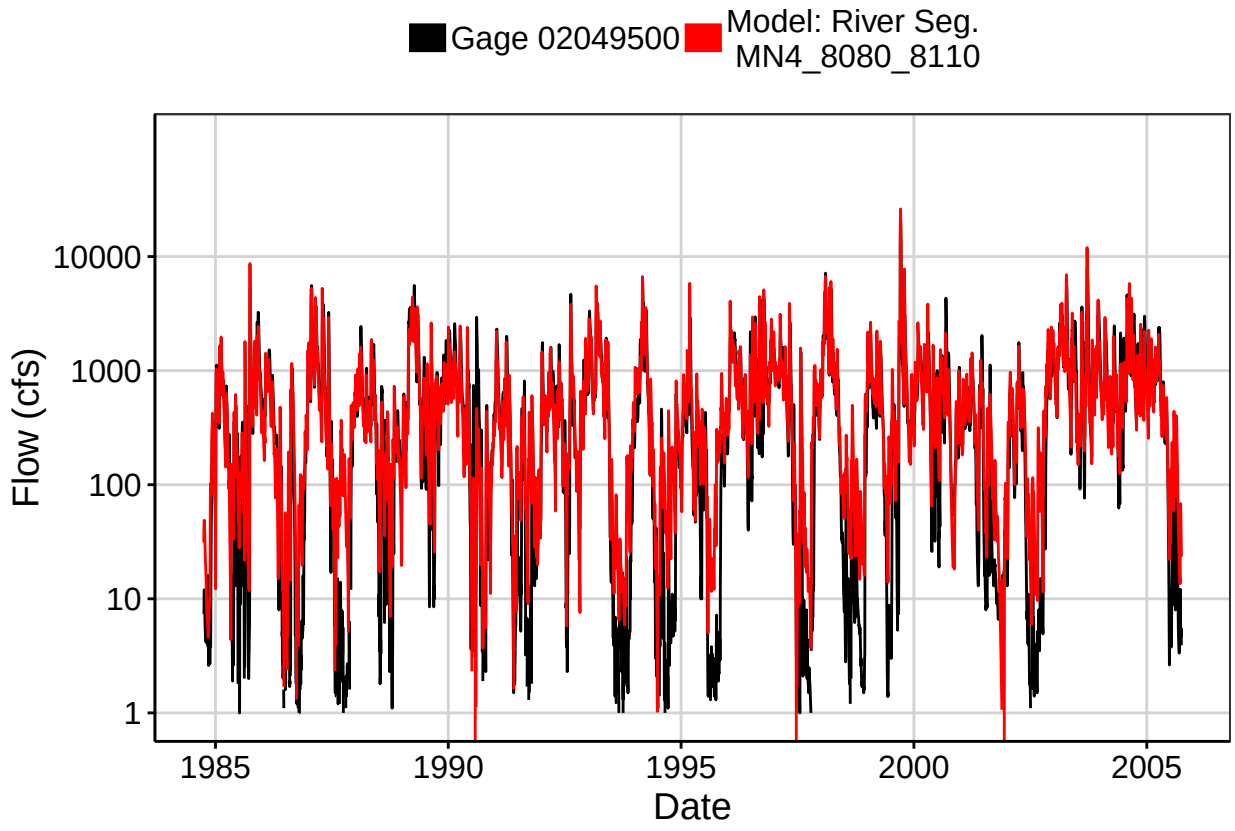


**Fig. 2: Zoomed Hydrograph**

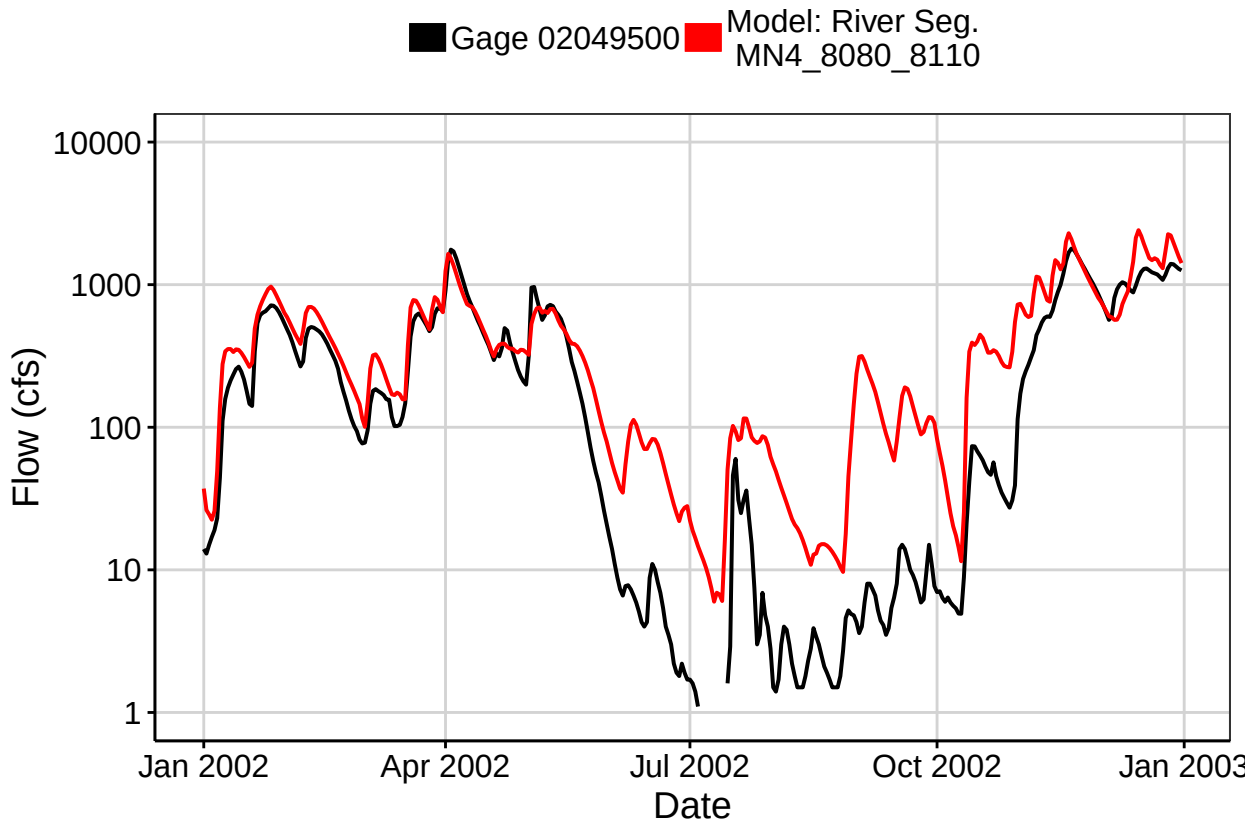


**Fig. 3: Flow Exceedance**

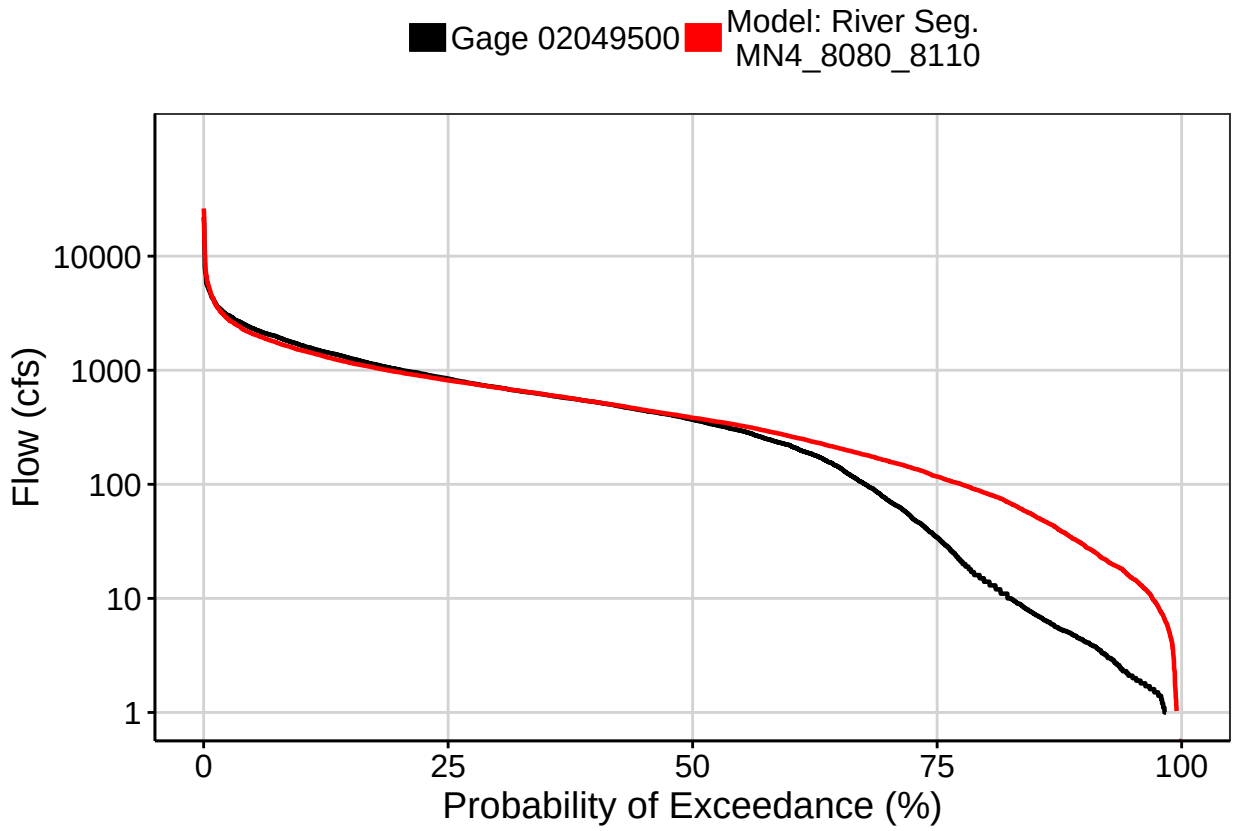


**Fig. 4: Baseflow**

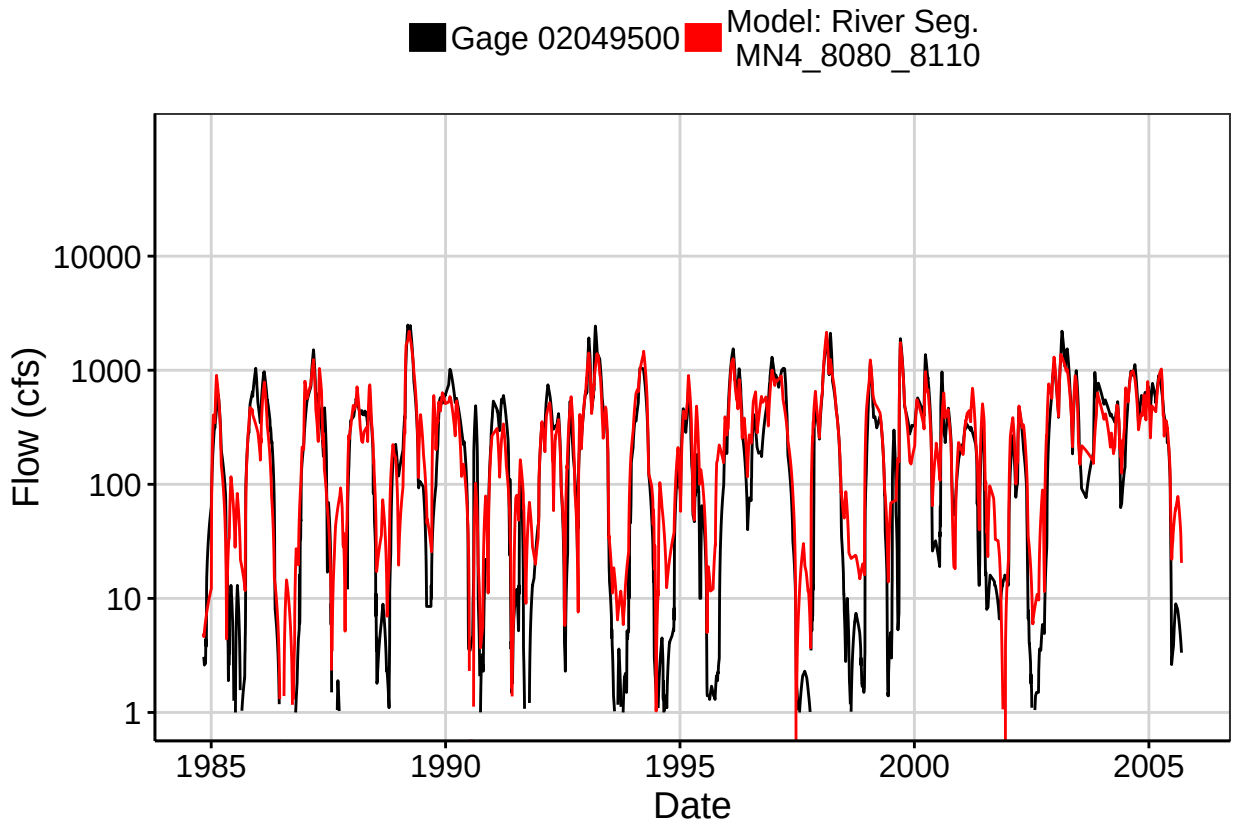


**Fig. 5: Combined Baseflow**

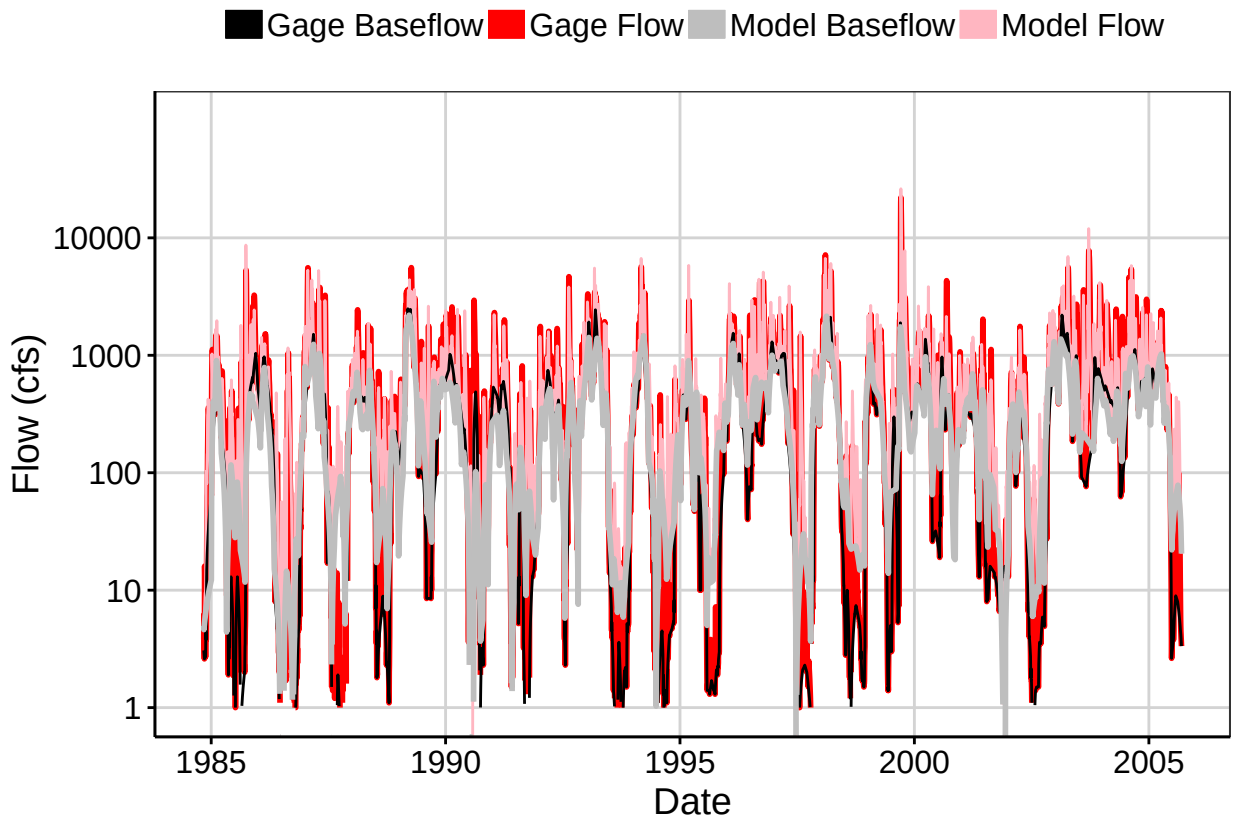


**Fig. 6: Largest Error Segment**

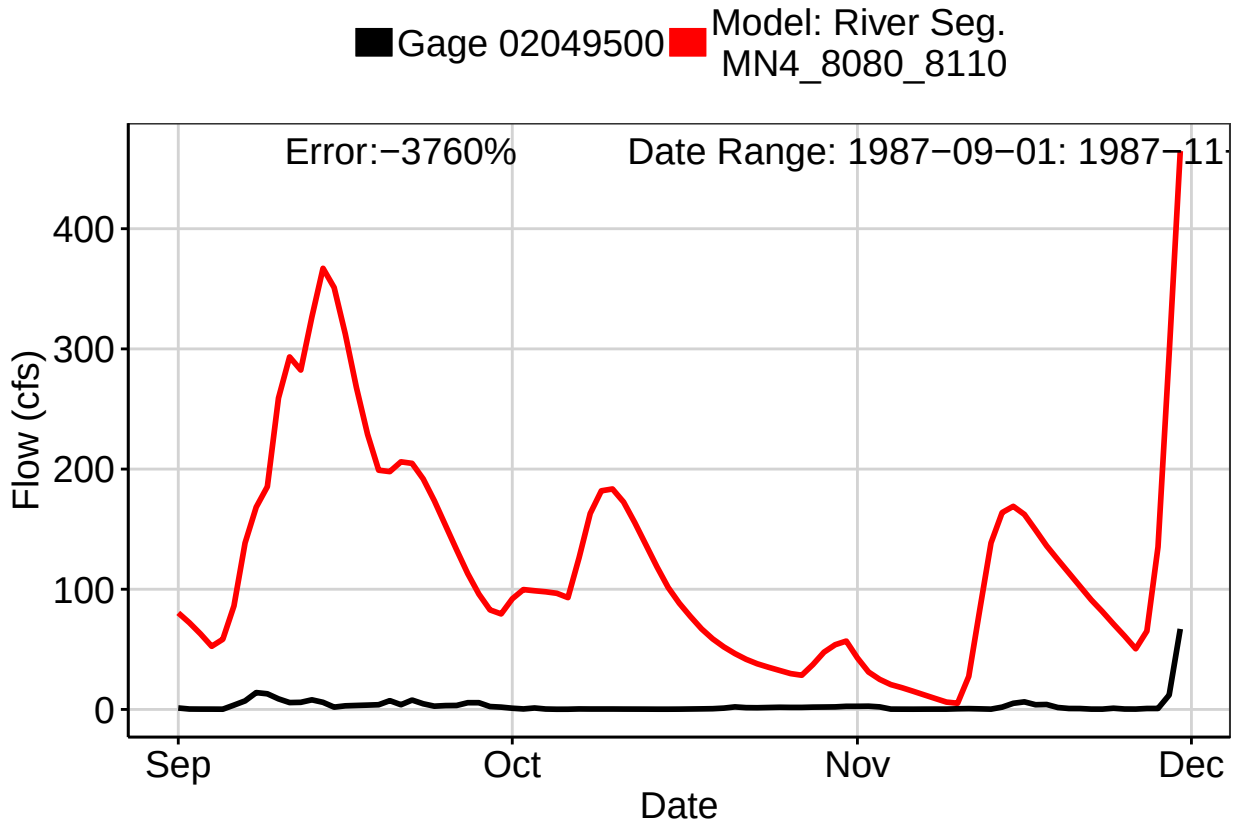


**Fig. 7: Second Largest Error Segment**

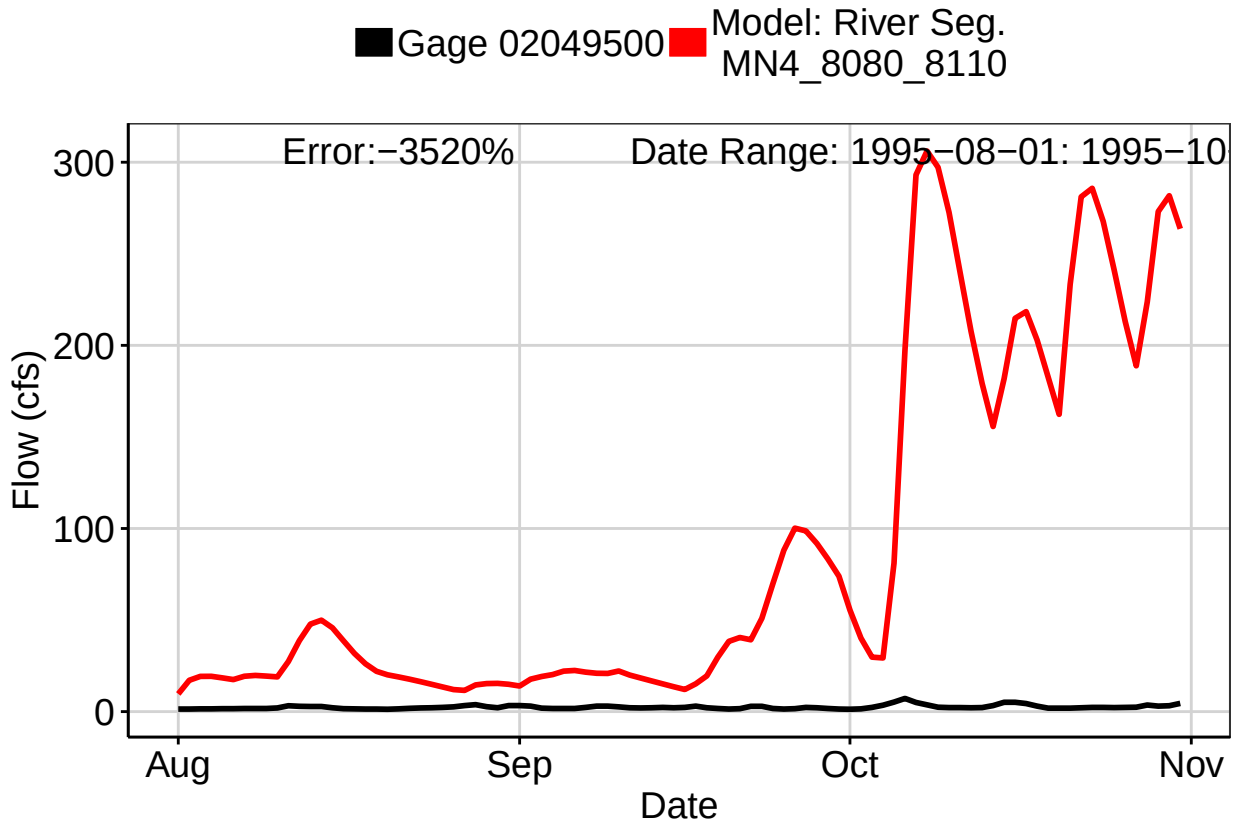


**Fig. 8: Third Largest Error Segment**

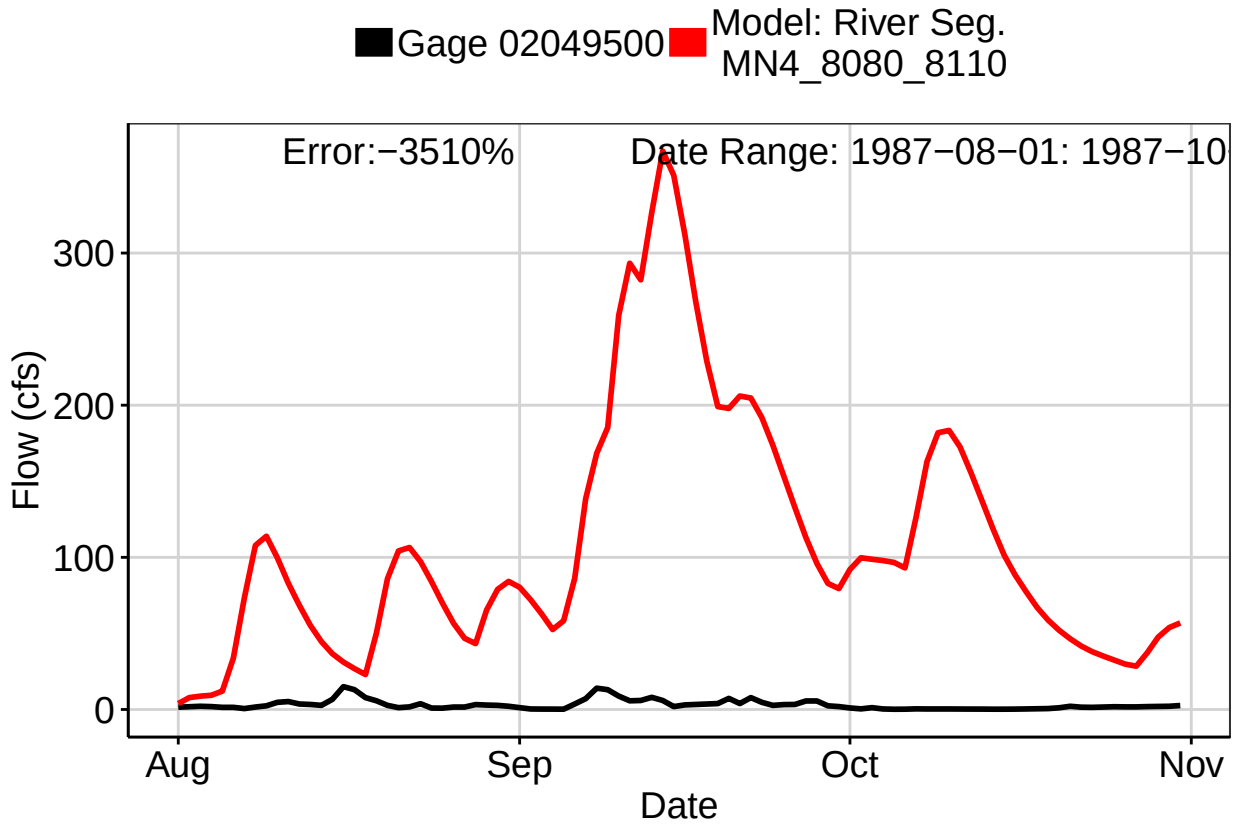


**Fig. 9: Residuals Plot**