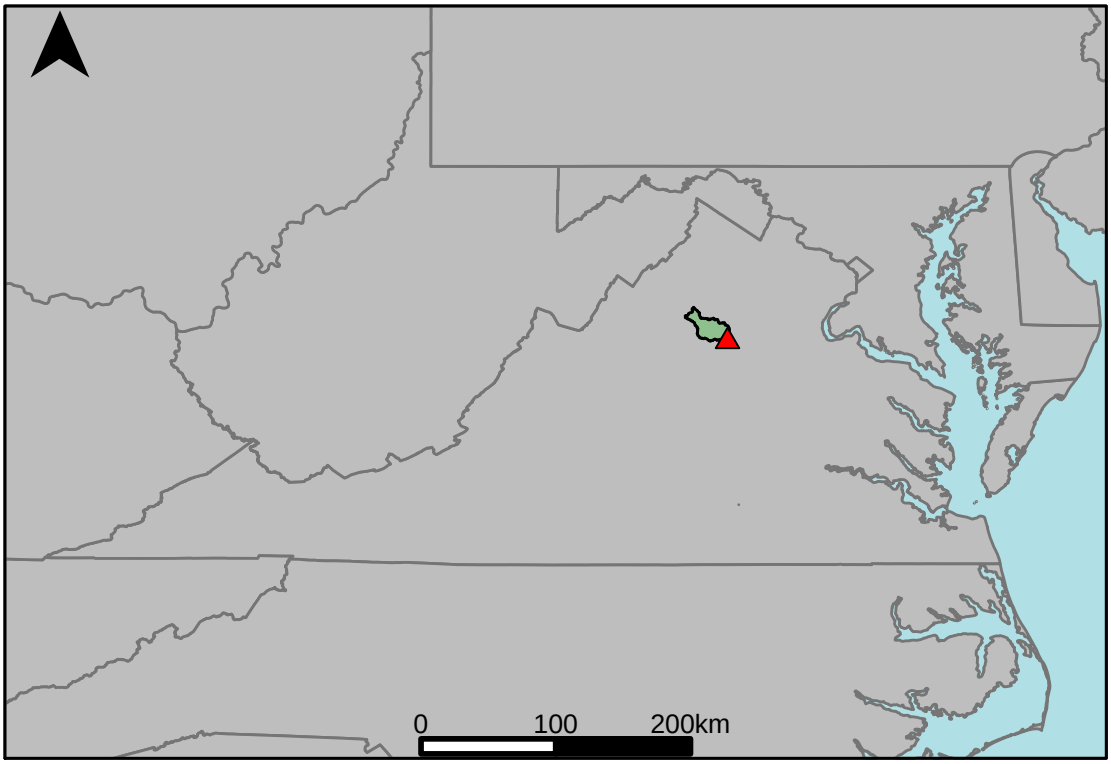
# Appendix C.4: USGS Gage 01666500 vs. RU2_5940_6200 Upper Rappahannock River




This river segment follows part of the flow of the Robinson River, a tributary of the Rappahannock. The gage is located in Madison County (Lat. 38°19'30.5", Long. -78°05'45.0"), approximately 5.4 miles north of Orange, VA. Drainage area is 179 sq. miles. This gage started taking data in 1943 and is still taking data. There are no known anthropogenic alterations in this area that would affect the flow conditions. The average daily discharge error between the model and gage data for the 20 year timespan was 1.69%, with 53.3% of its rolling three month time spans above 20% error.

**Table 1: Monthly Low Flows**

| | USGS Gage | Model | Pct. Error |
|---|---|---|---|
| Jan. Low Flow | 49 | 49.4 | 0.82 |
| Feb. Low Flow | 82.7 | 66.9 | -19.1 |
| Mar. Low Flow | 124 | 121 | -2.42 |
| Apr. Low Flow | 123 | 123 | 0 |
| May Low Flow | 140 | 153 | 9.29 |
| Jun. Low Flow | 154 | 153 | -0.65 |
| Jul. Low Flow | 178 | 122 | -31.5 |
| Aug. Low Flow | 113 | 73.3 | -35.1 |
| Sep. Low Flow | 63.6 | 77.9 | 22.5 |
| Oct. Low Flow | 54 | 49.2 | -8.89 |
| Nov. Low Flow | 36 | 49.8 | 38.3 |
| Dec. Low Flow | 30 | 32.5 | 8.33 |

**Table 2: Monthly Average Flows**

| | USGS Gage | Model | Pct. Error |
|---|---|---|---|
| Overall Mean Flow | 237 | 233 | -1.69 |
| Jan. Mean Flow | 291 | 287 | -1.37 |
| Feb. Mean Flow | 291 | 344 | 18.2 |
| Mar. Mean Flow | 353 | 386 | 9.35 |
| Apr. Mean Flow | 301 | 273 | -9.3 |
| May Mean Flow | 244 | 221 | -9.43 |
| Jun. Mean Flow | 223 | 179 | -19.7 |
| Jul. Mean Flow | 138 | 164 | 18.8 |
| Aug. Mean Flow | 97.9 | 115 | 17.5 |
| Sep. Mean Flow | 239 | 202 | -15.5 |
| Oct. Mean Flow | 164 | 145 | -11.6 |
| Nov. Mean Flow | 266 | 243 | -8.65 |
| Dec. Mean Flow | 246 | 247 | 0.41 |

**Table 3: Monthly High Flows**

| | USGS Gage | Model | Pct. Error |
|---|---|---|---|
| Jan. High Flow | 358 | 235 | -34.4 |
| Feb. High Flow | 821 | 582 | -29.1 |
| Mar. High Flow | 771 | 427 | -44.6 |
| Apr. High Flow | 938 | 575 | -38.7 |
| May High Flow | 392 | 426 | 8.67 |
| Jun. High Flow | 903 | 1020 | 13 |
| Jul. High Flow | 643 | 394 | -38.7 |
| Aug. High Flow | 398 | 346 | -13.1 |
| Sep. High Flow | 389 | 380 | -2.31 |
| Oct. High Flow | 412 | 288 | -30.1 |
| Nov. High Flow | 256 | 171 | -33.2 |
| Dec. High Flow | 412 | 153 | -62.9 |

**Table 4: Period Low Flows**

| | USGS Gage | Model | Pct. Error |
|---|---|---|---|
| Min. 1 Day Min | 1.99 | 2.17 | 9.05 |
| Med. 1 Day Min | 24 | 19.9 | -17.1 |
| Min. 3 Day Min | 2.03 | 2.33 | 14.8 |
| Med. 3 Day Min | 24.7 | 21.8 | -11.7 |
| Min. 7 Day Min | 2.46 | 2.68 | 8.94 |
| Med. 7 Day Min | 26 | 25.2 | -3.08 |
| Min. 30 Day Min | 5.89 | 6.61 | 12.2 |
| Med. 30 Day Min | 44.2 | 42 | -4.98 |
| Min. 90 Day Min | 14.1 | 27.5 | 95 |
| Med. 90 Day Min | 82 | 87.2 | 6.34 |
| 7Q10 | 7.51 | 7.1 | -5.46 |
| Year of 90-Day Min. Flow | 2002 | 2002 | 0 |
| Drought Year Mean | 61.6 | 57 | -7.47 |
| Mean Baseflow | 125 | 131 | 4.8 |

**Table 5: Period High Flows**

| | USGS Gage | Model | Pct. Error |
|---|---|---|---|
| Max. 1 Day Max | 13200 | 14900 | 12.9 |
| Med. 1 Day Max | 5070 | 3850 | -24.1 |
| Max. 3 Day Max | 9390 | 5740 | -38.9 |
| Med. 3 Day Max | 2560 | 2110 | -17.6 |
| Max. 7 Day Max | 4970 | 3130 | -37 |
| Med. 7 Day Max | 1360 | 1050 | -22.8 |
| Max. 30 Day Max | 1400 | 1320 | -5.71 |
| Med. 30 Day Max | 634 | 586 | -7.57 |
| Max. 90 Day Max | 907 | 851 | -6.17 |
| Med. 90 Day Max | 397 | 356 | -10.3 |

**Table 6: Non-Exceedance Flows**

| | USGS Gage | Model | Pct. Error |
|---|---|---|---|
| 1% Non-Exceedance | 9.71 | 11.4 | 17.4 |
| 5% Non-Exceedance | 28 | 27.5 | -1.79 |
| 50% Non-Exceedance | 150 | 148 | -1.33 |
| 95% Non-Exceedance | 639 | 607 | -5.01 |
| 99% Non-Exceedance | 1600 | 1610 | 0.62 |
| Sept. 10% Non-Exceedance | 21.9 | 23 | 5.02 |

**Fig. 1: Hydrograph**

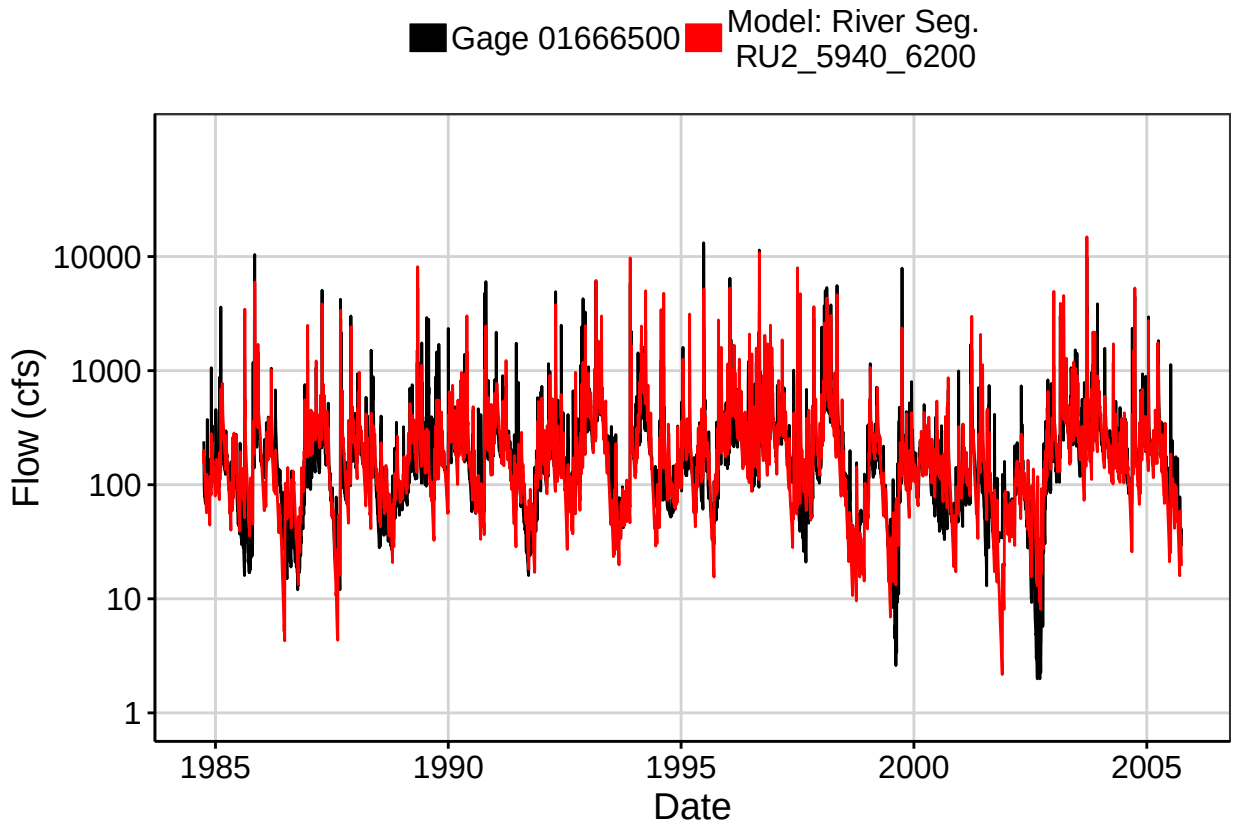


**Fig. 2: Zoomed Hydrograph**

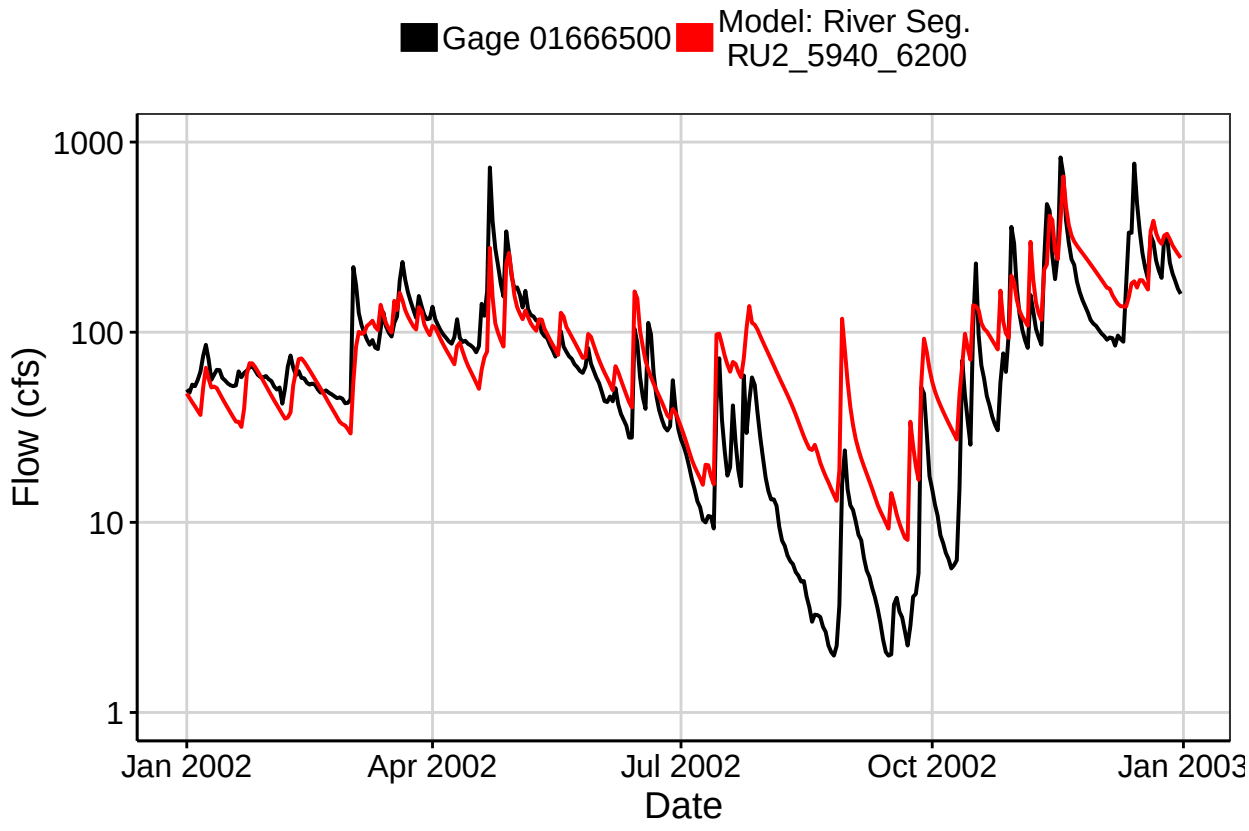


**Fig. 3: Flow Exceedance**

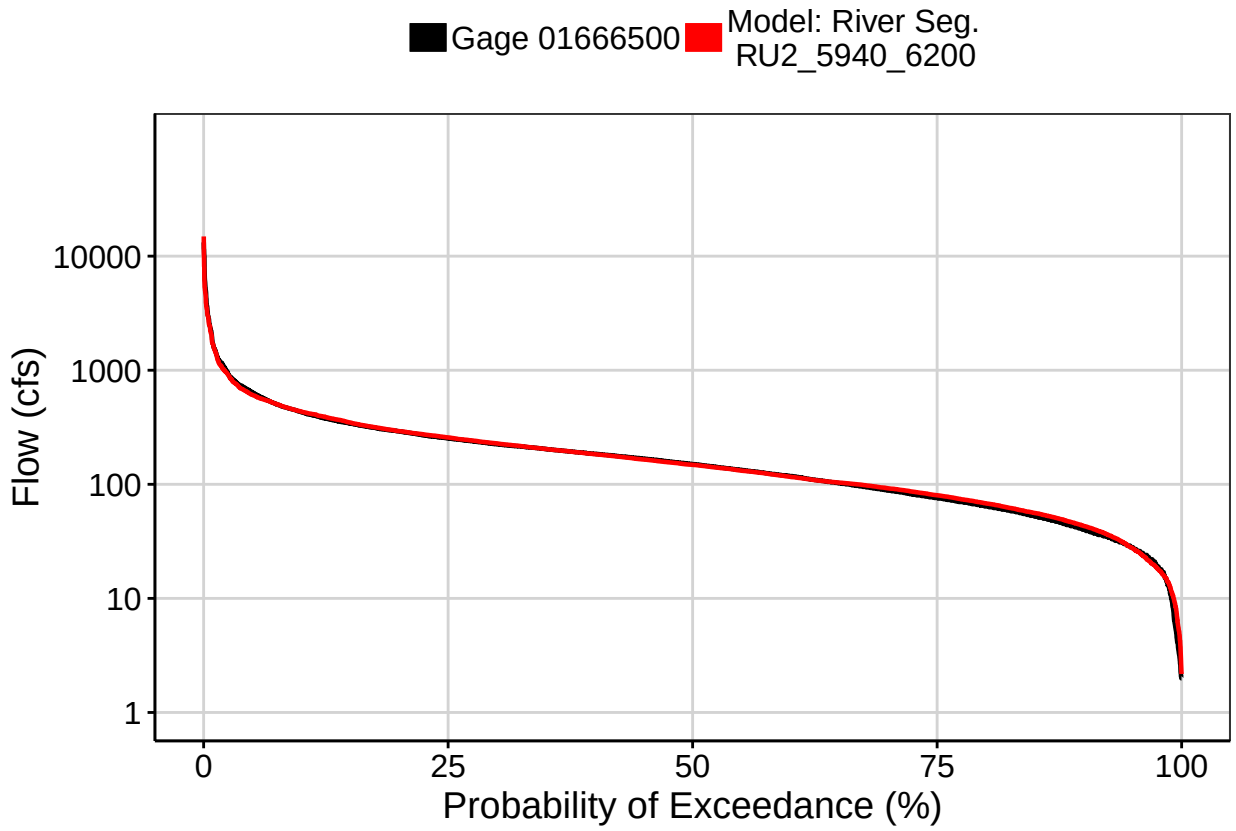


**Fig. 4: Baseflow**

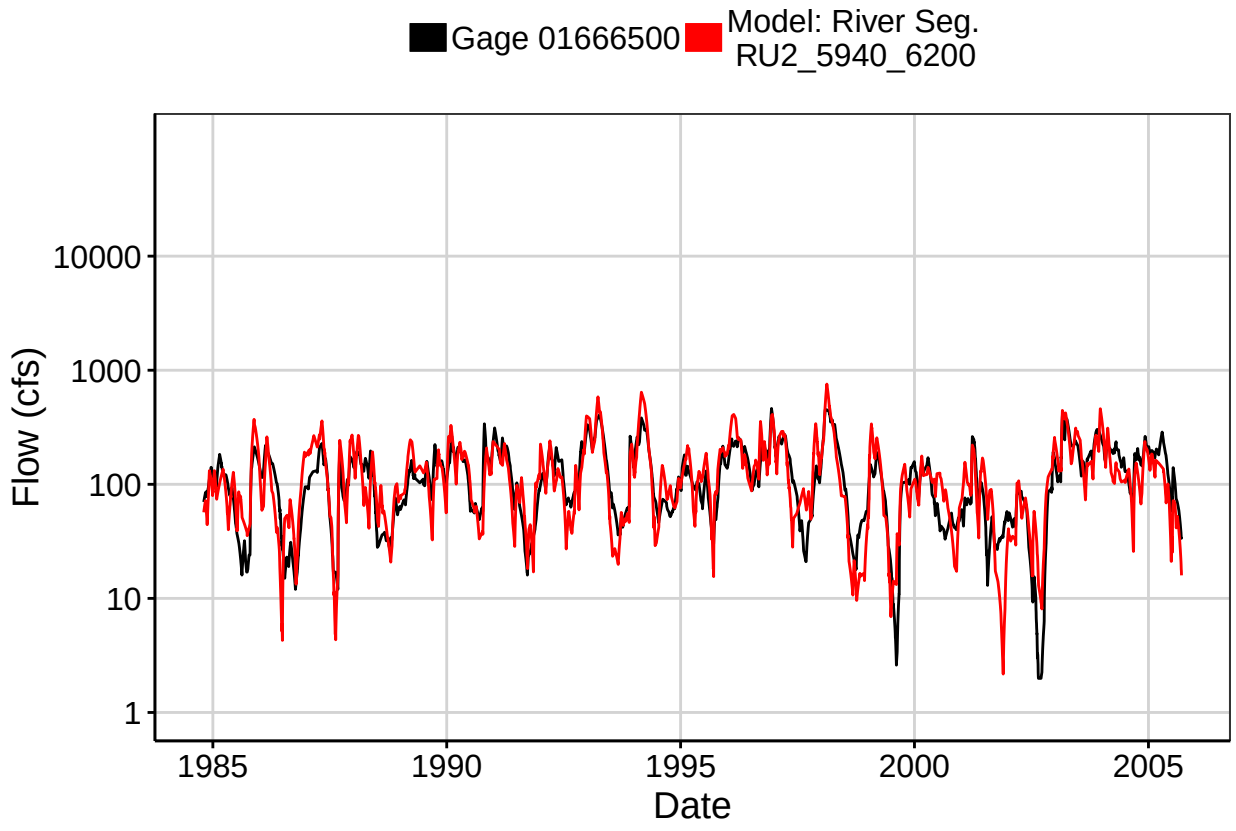


**Fig. 5: Combined Baseflow**

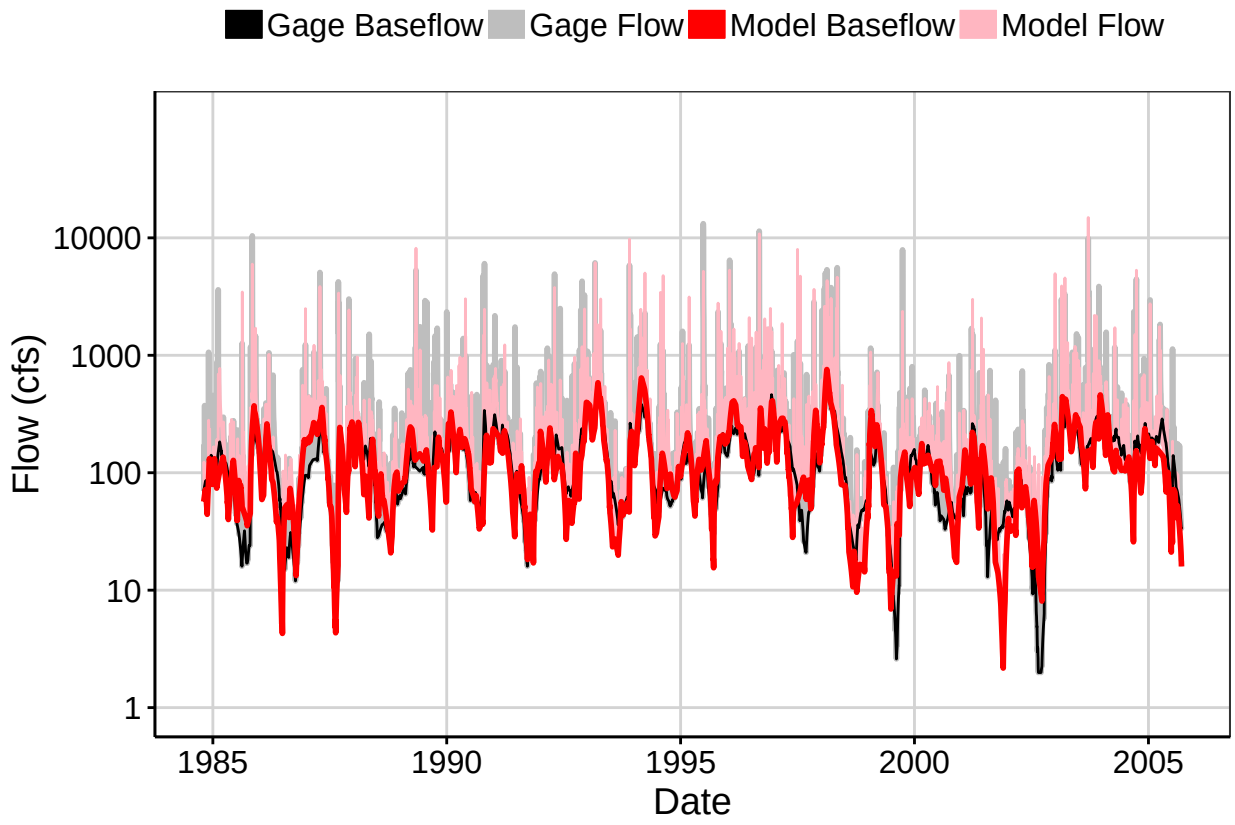


**Fig. 6: Largest Error Segment**

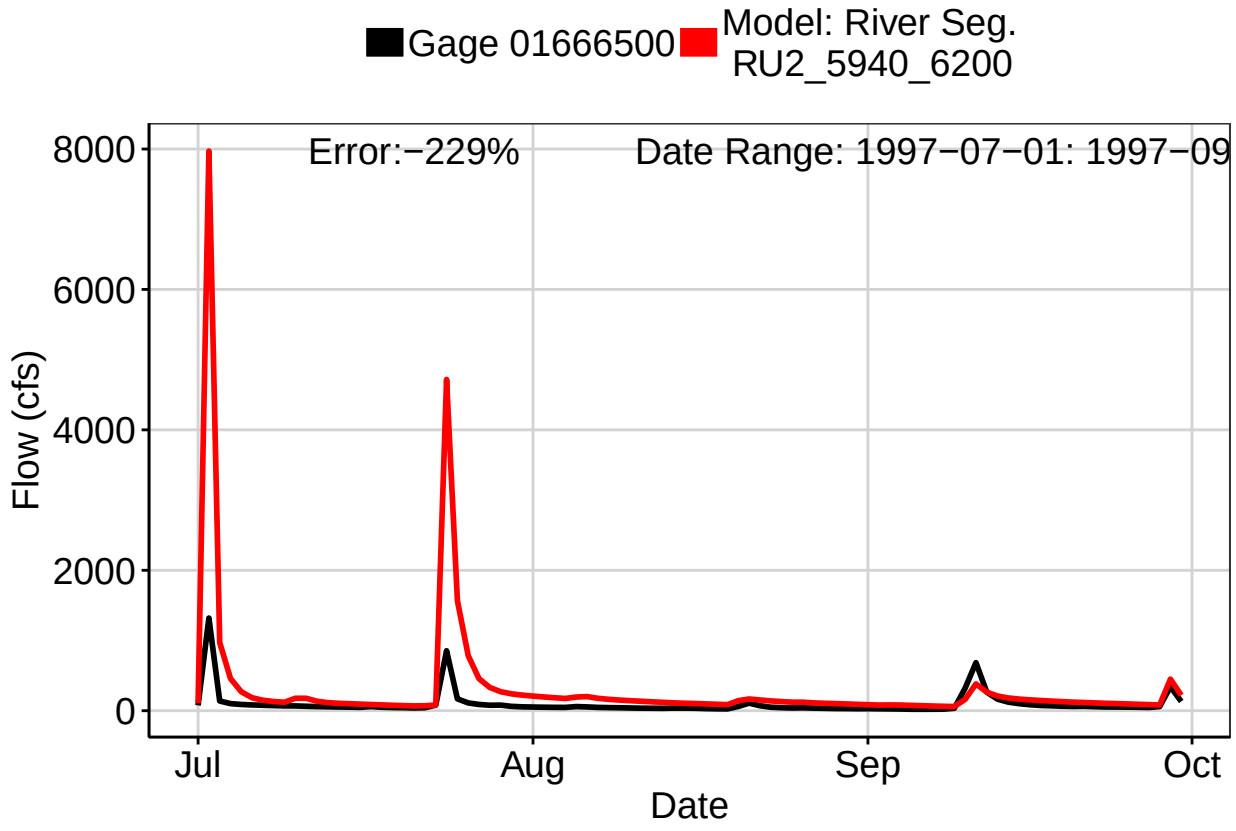


**Fig. 7: Second Largest Error Segment**

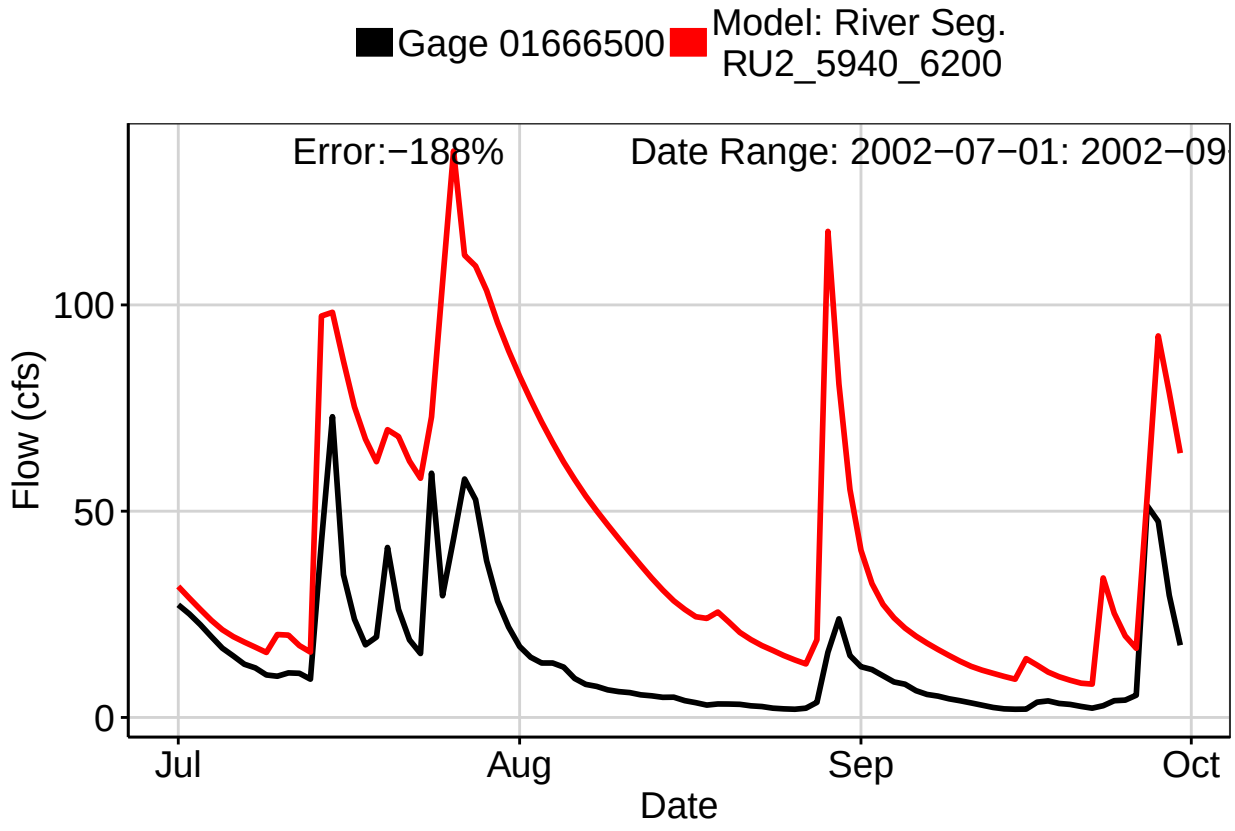


**Fig. 8: Third Largest Error Segment**

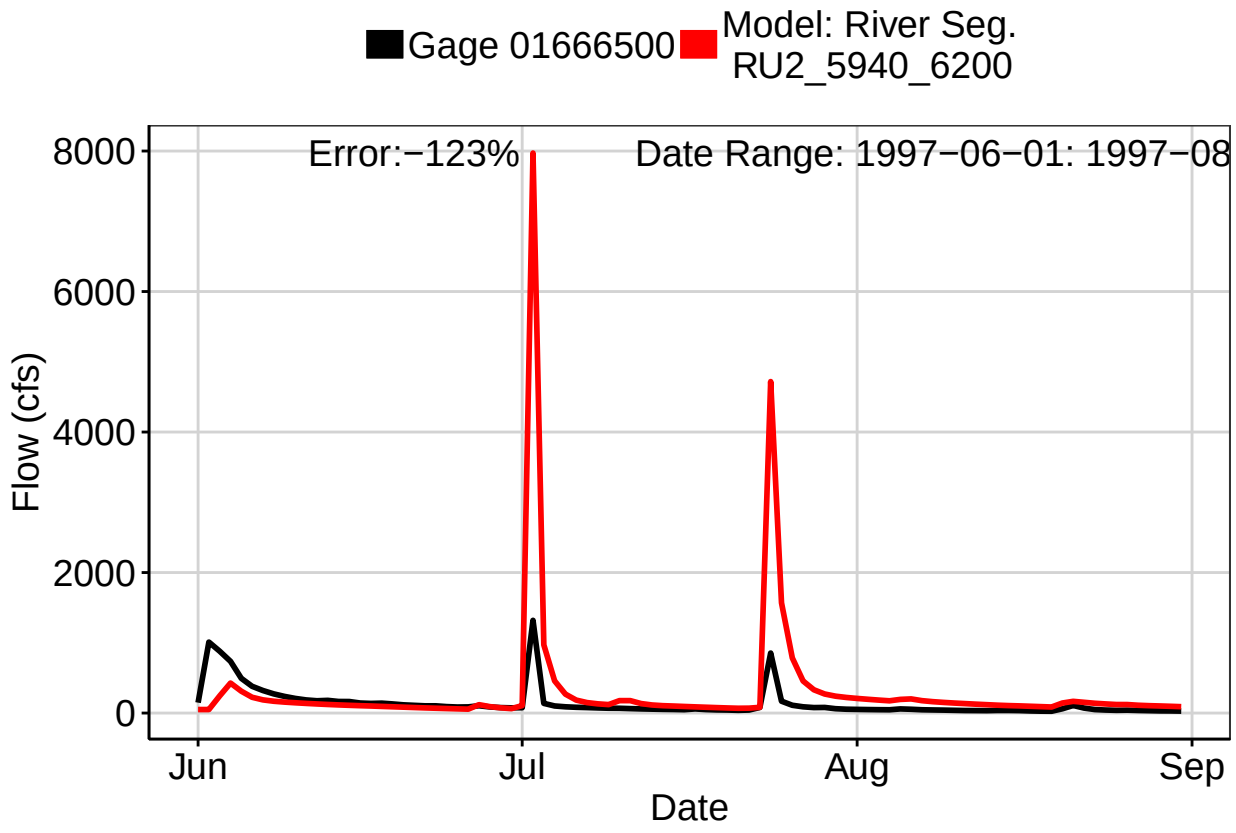


**Fig. 9: Residuals Plot**