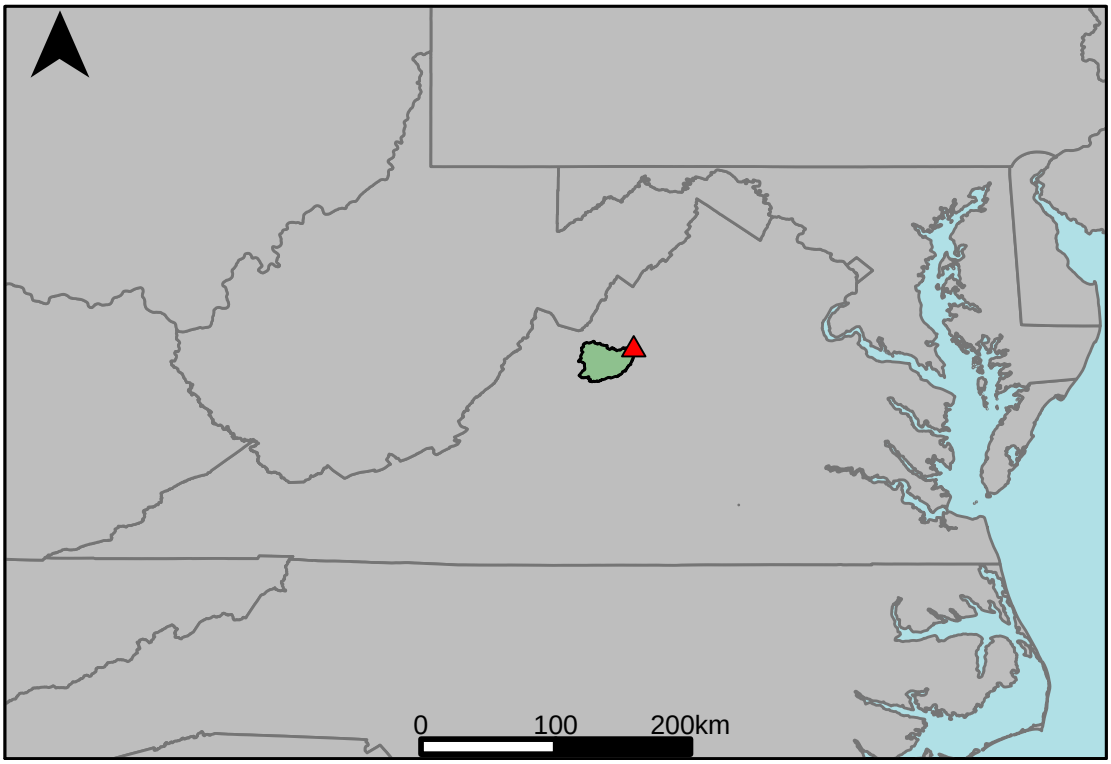
Appendix B.4: USGS Gage 01625000 vs. PS3_6460_6230 Shenandoah River



This river segment follows part of the flow of the Middle River, a tributary of the Potomac. The gage is located in Augusta County (Lat. 38°15'42.5", Long. -78°51'43.1"), approximately 2 miles west of Grottoes, VA. Drainage area is 373 sq. miles. This gage started taking data in 1927 and is still taking data. There are discharges of about 6.0 cfs from wastewater treatment plants upstream. Most of the water discharged from the treatment plants was diverted from another drainage basin for industrial and municipal supply. Small diurnal fluctuation at low flow is caused by upstream mills and irrigation. The average daily discharge error between the model and gage data for the 20 year timespan was -15.7%, with 50% of its rolling three month time spans above 20% error.

Table 1: Monthly Low Flows

	USGS Gage	Model	Pct. Error
Jan. Low Flow	93	61.8	-33.5
Feb. Low Flow	104	133	27.9
Mar. Low Flow	131	212	61.8
Apr. Low Flow	168	217	29.2
May Low Flow	188	276	46.8
Jun. Low Flow	263	309	17.5
Jul. Low Flow	215	281	30.7
Aug. Low Flow	181	263	45.3
Sep. Low Flow	132	186	40.9
Oct. Low Flow	110	139	26.4
Nov. Low Flow	94.1	105	11.6
Dec. Low Flow	95	71.6	-24.6

Table 2: Monthly Average Flows

	USGS Gage	Model	Pct. Error
Overall Mean Flow	345	399	15.7
Jan. Mean Flow	445	454	2.02
Feb. Mean Flow	501	584	16.6
Mar. Mean Flow	594	673	13.3
Apr. Mean Flow	484	569	17.6
May Mean Flow	375	450	20
Jun. Mean Flow	274	358	30.7
Jul. Mean Flow	187	264	41.2
Aug. Mean Flow	163	196	20.2
Sep. Mean Flow	316	337	6.65
Oct. Mean Flow	198	241	21.7
Nov. Mean Flow	306	340	11.1
Dec. Mean Flow	317	335	5.68

Table 3: Monthly High Flows

	USGS Gage	Model	Pct. Error
Jan. High Flow	231	302	30.7
Feb. High Flow	606	626	3.3
Mar. High Flow	1060	638	-39.8
Apr. High Flow	1100	1000	-9.09
May High Flow	926	572	-38.2
Jun. High Flow	1730	1520	-12.1
Jul. High Flow	1000	1150	15
Aug. High Flow	737	645	-12.5
Sep. High Flow	400	615	53.8
Oct. High Flow	360	473	31.4
Nov. High Flow	207	357	72.5
Dec. High Flow	185	221	19.5

Table 4: Period Low Flows

	USGS Gage	Model	Pct. Error
Min. 1 Day Min	17.9	11.2	-37.4
Med. 1 Day Min	80	53.9	-32.6
Min. 3 Day Min	19	11.6	-38.9
Med. 3 Day Min	81	55.3	-31.7
Min. 7 Day Min	20.2	12.5	-38.1
Med. 7 Day Min	82.6	58.1	-29.7
Min. 30 Day Min	27.9	18.2	-34.8
Med. 30 Day Min	91	76.3	-16.2
Min. 90 Day Min	36.3	43.7	20.4
Med. 90 Day Min	132	159	20.5
7Q10	44.4	21.9	-50.7
Year of 90-Day Min. Flow	2002	2002	0
Drought Year Mean	75.6	99.7	31.9
Mean Baseflow	194	251	29.4

Table 5: Period High Flows

	USGS Gage	Model	Pct. Error
Max. 1 Day Max	26000	13800	-46.9
Med. 1 Day Max	3340	3130	-6.29
Max. 3 Day Max	12800	10100	-21.1
Med. 3 Day Max	2540	2880	13.4
Max. 7 Day Max	6380	5610	-12.1
Med. 7 Day Max	1600	2020	26.2
Max. 30 Day Max	2370	2020	-14.8
Med. 30 Day Max	886	1010	14
Max. 90 Day Max	1610	1540	-4.35
Med. 90 Day Max	586	660	12.6

Table 6: Non-Exceedance Flows

	USGS Gage	Model	Pct. Error
1% Non-Exceedance	37.9	22	-42
5% Non-Exceedance	66	53.3	-19.2
50% Non-Exceedance	197	272	38.1
95% Non-Exceedance	1030	1150	11.7
99% Non-Exceedance	2410	2580	7.05
Sept. 10% Non-Exceedance	67.4	52.7	-21.8

Fig. 1: Hydrograph

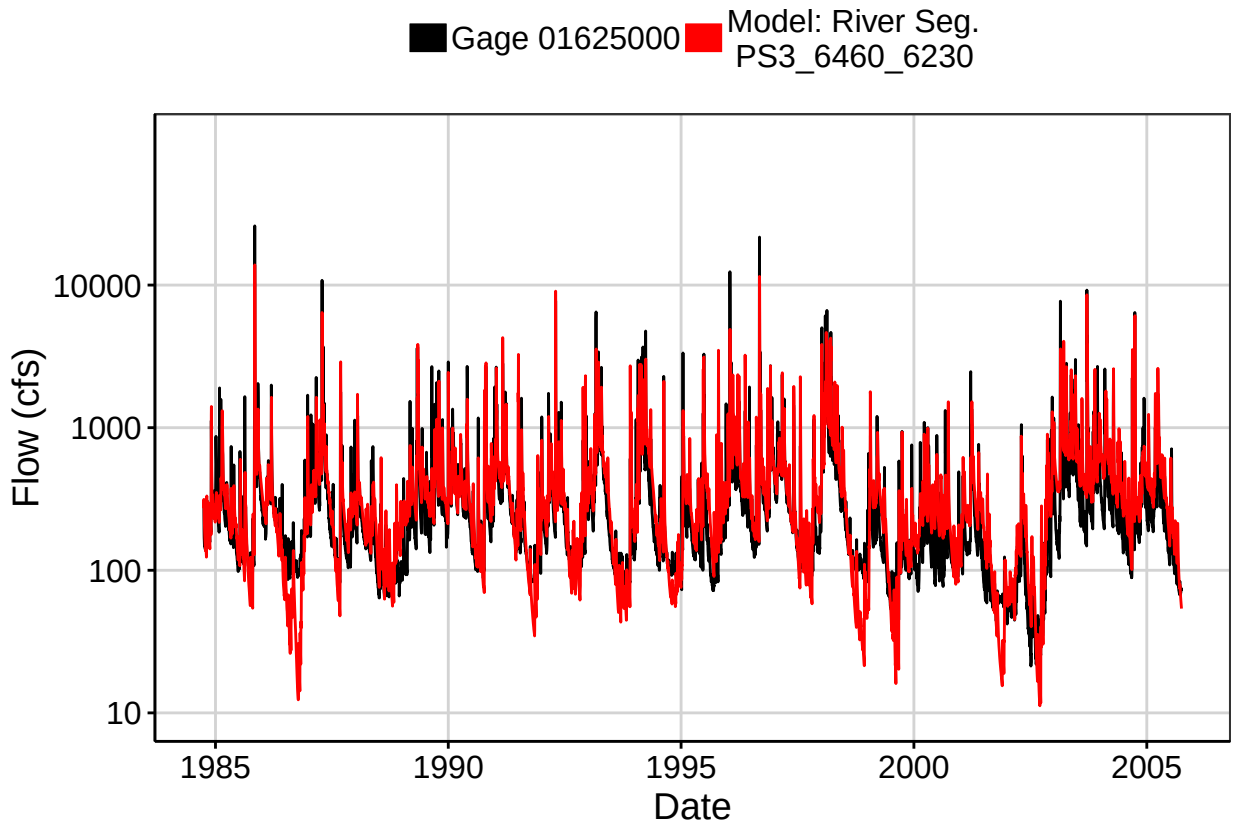


Fig. 2: Zoomed Hydrograph

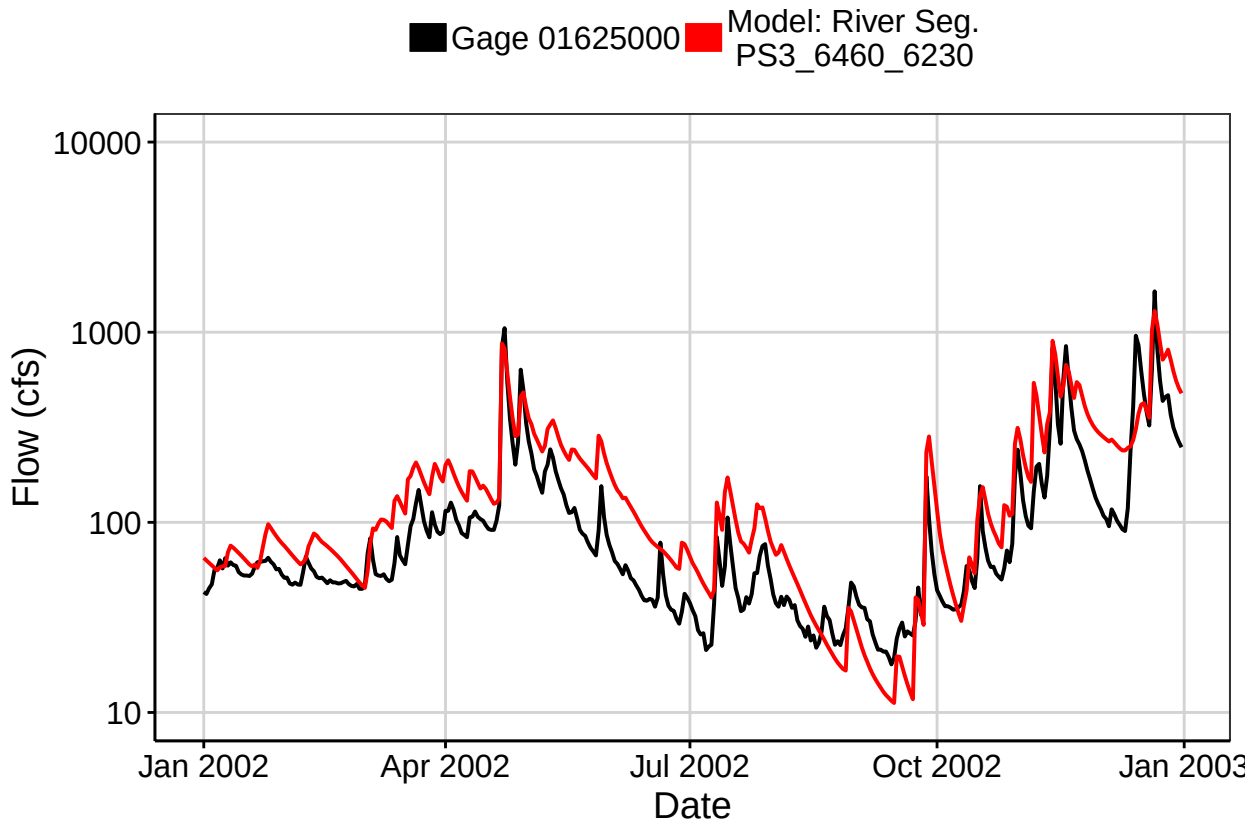


Fig. 3: Flow Exceedance

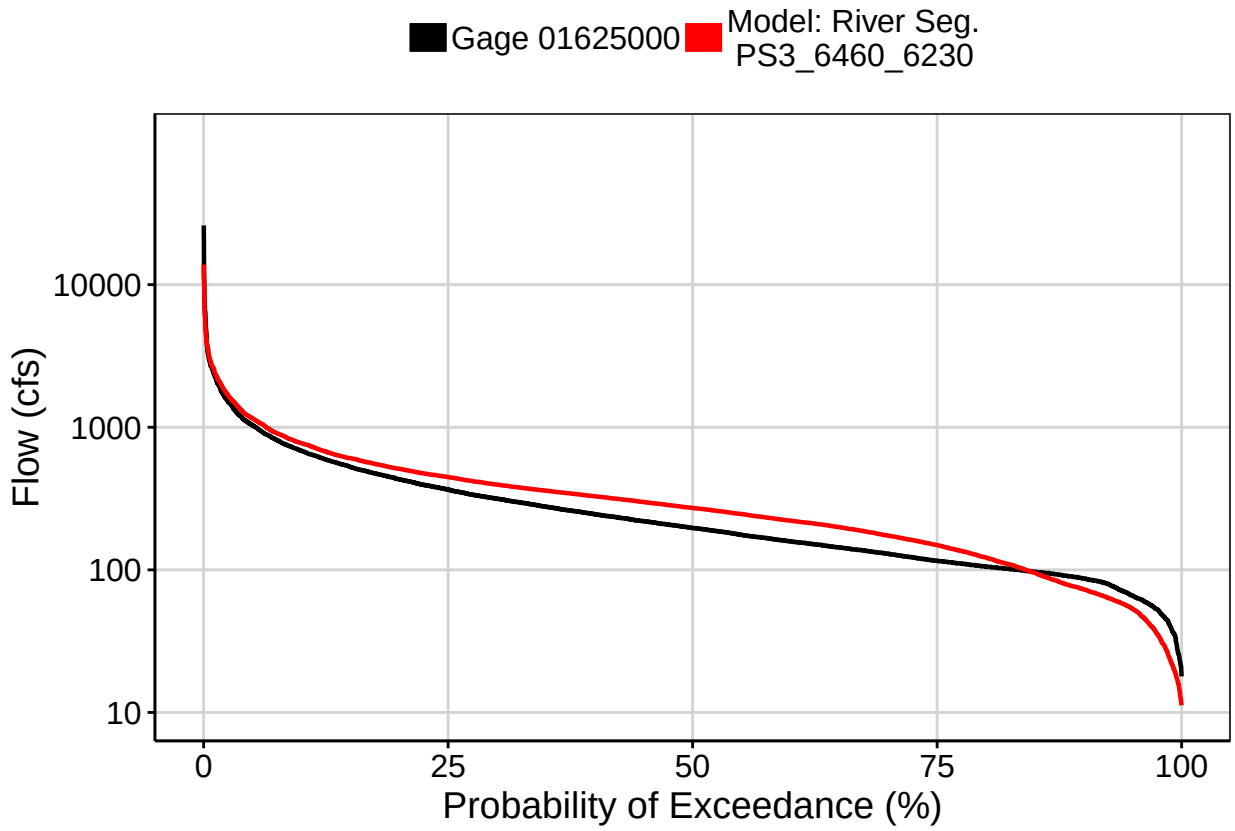


Fig. 4: Baseflow

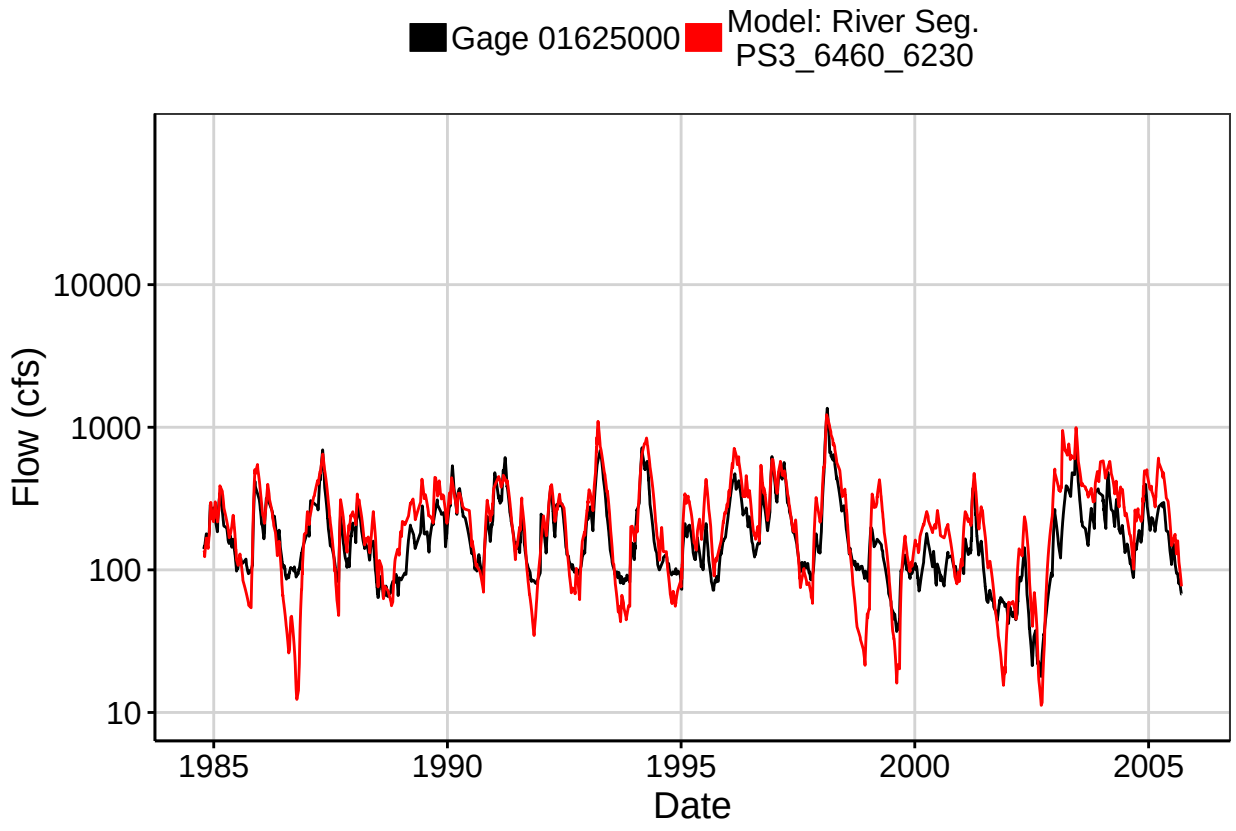


Fig. 5: Combined Baseflow

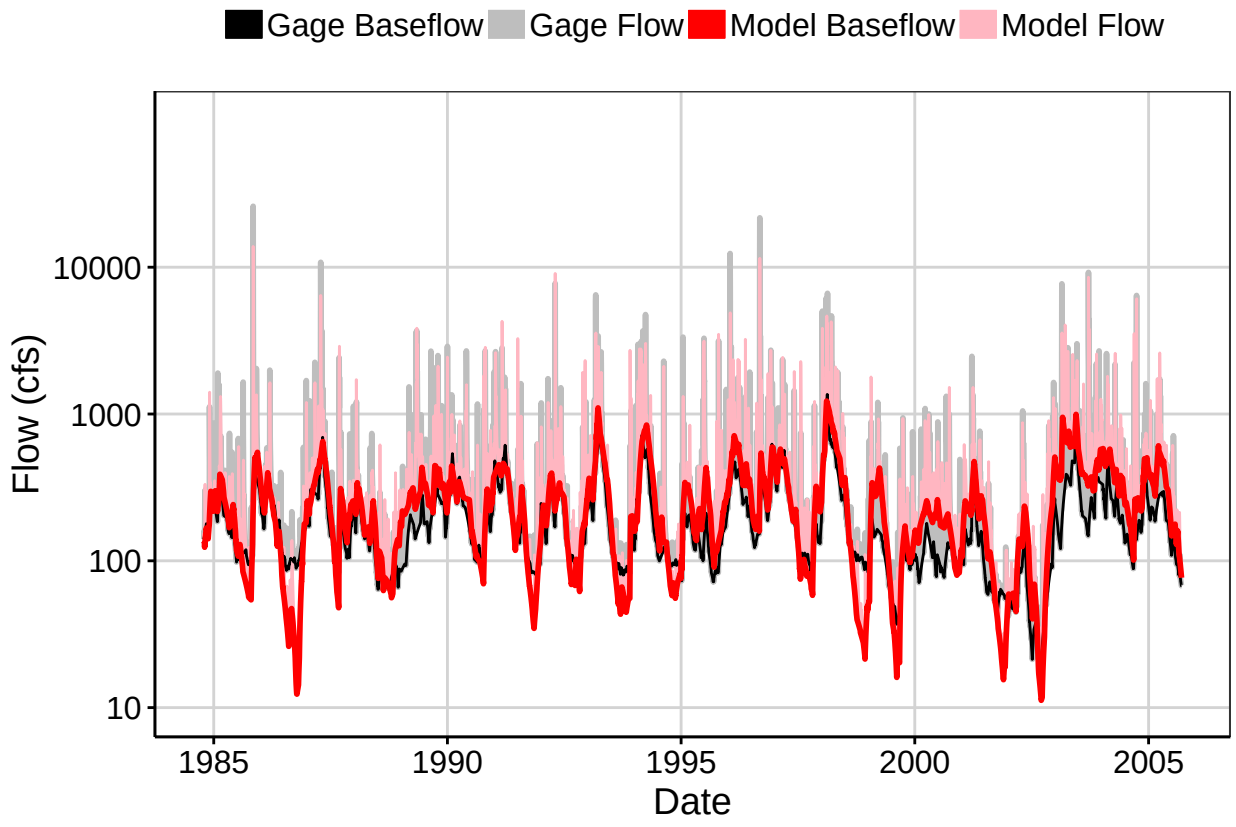


Fig. 6: Largest Error Segment

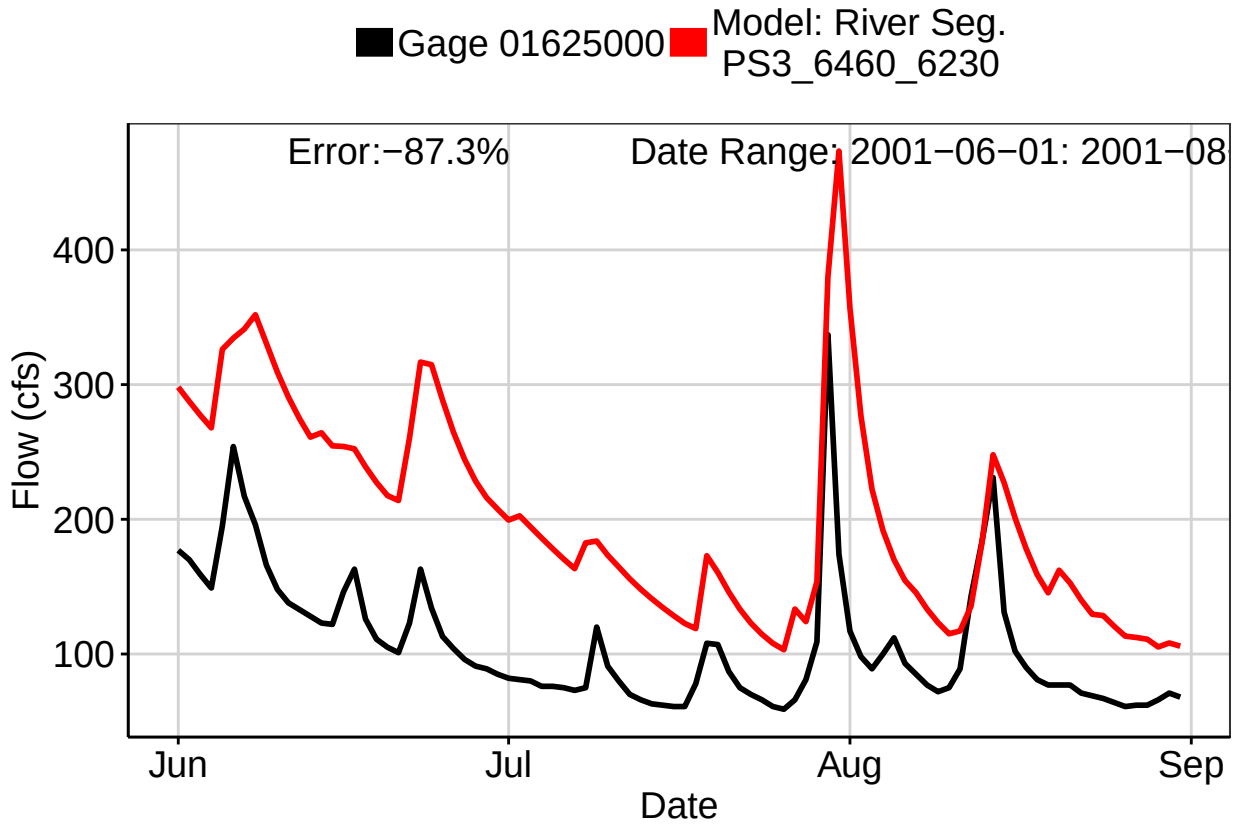


Fig. 7: Second Largest Error Segment

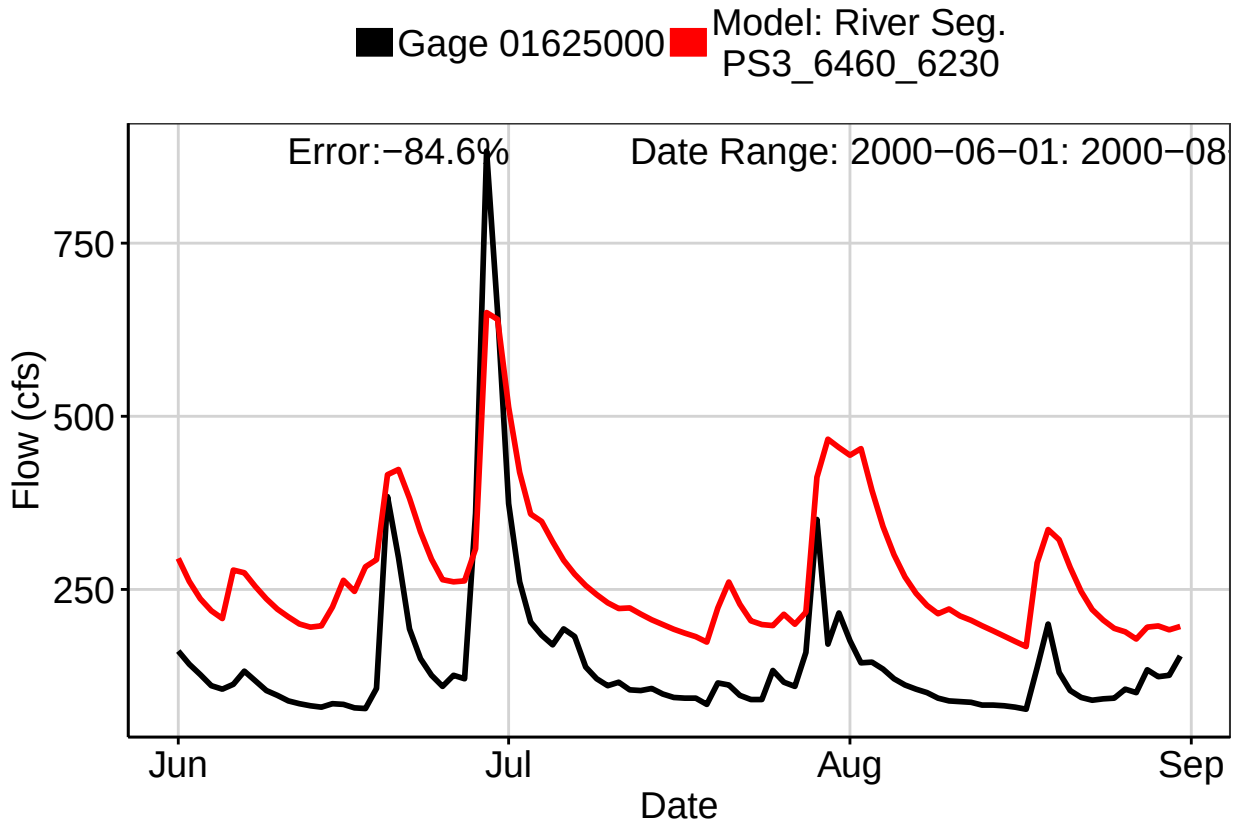


Fig. 8: Third Largest Error Segment

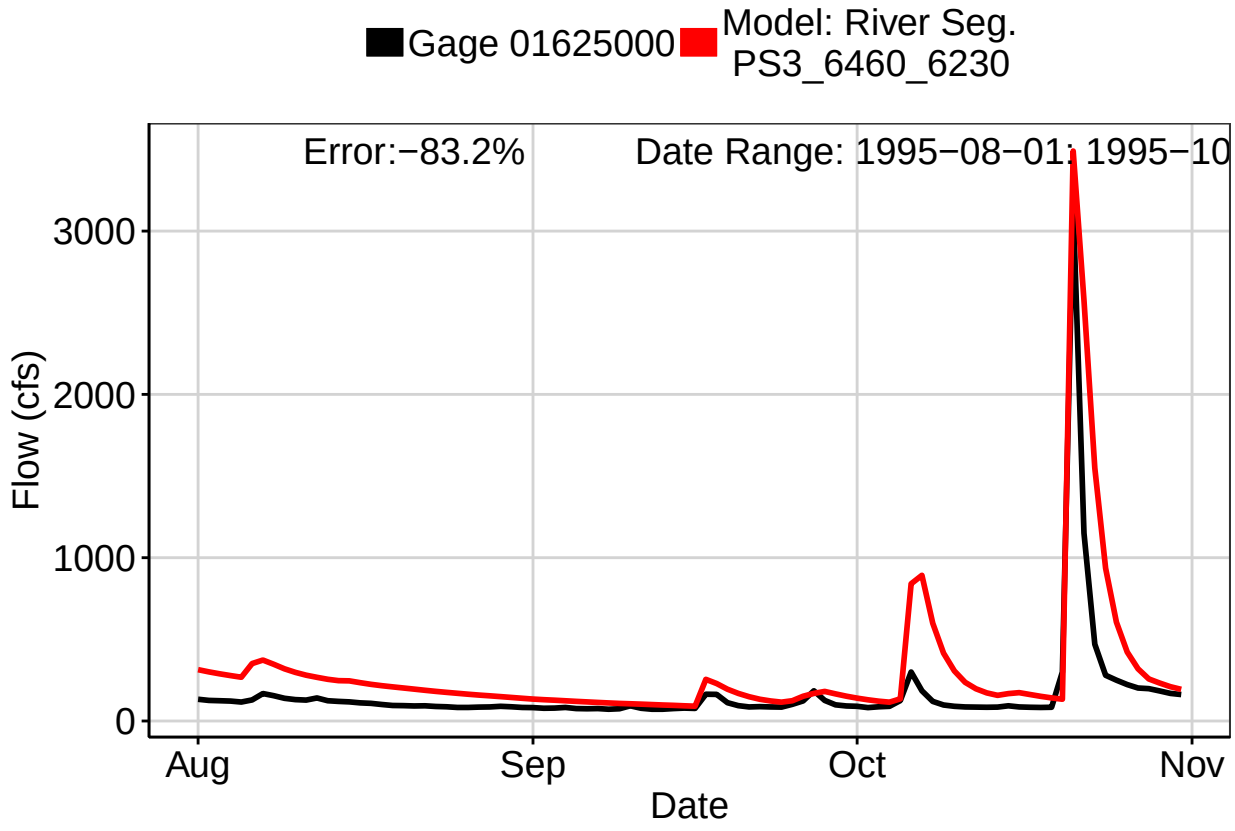


Fig. 9: Residuals Plot