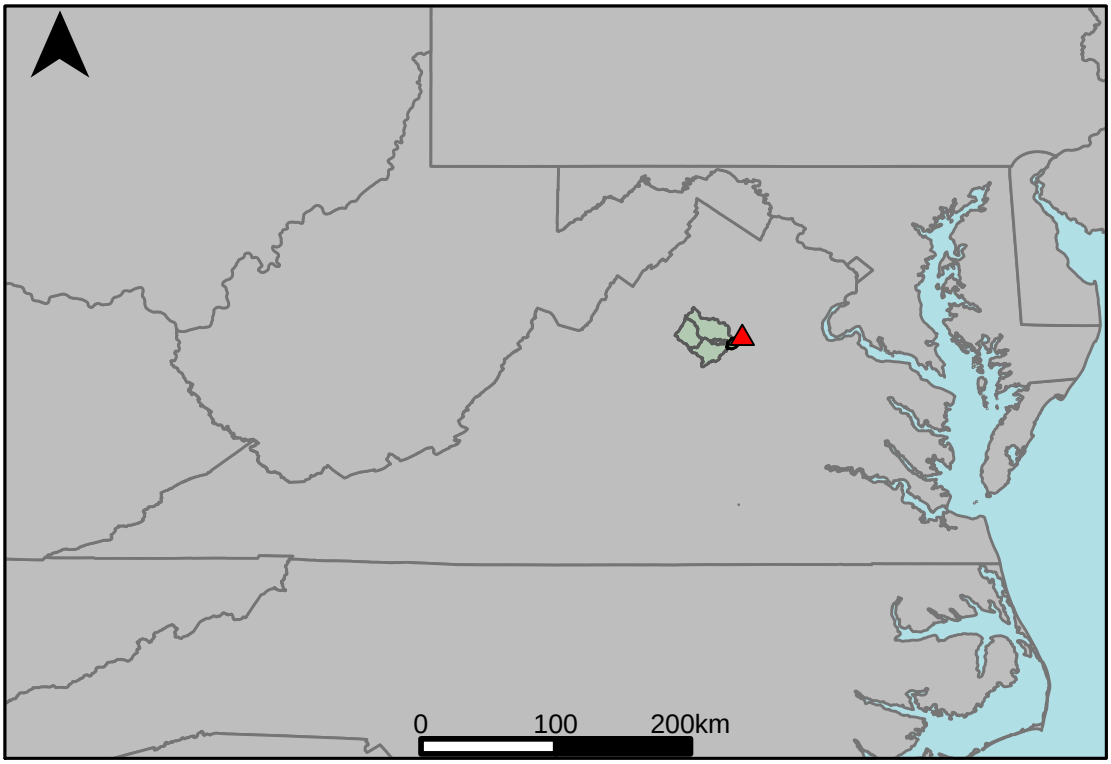
Appendix C.5: USGS Gage 01667500 vs. RU3_6170_6040 Upper Rappahannock River



This river segment follows part of the flow of the Rapidan River, a tributary of the Rappahannock. The gage is located in Culpeper County (Lat. 38°21'01.5", Long. -77°58'30.0"), approximately 8.4 miles south of Culpeper, VA. Drainage area is 468 sq. miles. This gage started taking data in 1930 and is still taking data. Prior to 1977, diurnal fluctuations at low flow were caused by a mill at Rapidan, and since July 1986, the flucutations have been caused by a powerplant at same site. The average daily discharge error between the model and gage data for the 20 year timespan was -2.24%, with 46.2% of its rolling three month time spans above 20% error.

Table 1: Monthly Low Flows

	USGS Gage	Model	Pct. Error
Jan. Low Flow	108	112	3.7
Feb. Low Flow	163	146	-10.4
Mar. Low Flow	275	291	5.82
Apr. Low Flow	273	322	17.9
May Low Flow	343	375	9.33
Jun. Low Flow	355	393	10.7
Jul. Low Flow	419	304	-27.4
Aug. Low Flow	252	177	-29.8
Sep. Low Flow	141	181	28.4
Oct. Low Flow	106	101	-4.72
Nov. Low Flow	74	113	52.7
Dec. Low Flow	59	75.6	28.1

Table 2: Monthly Average Flows

	USGS Gage	Model	Pct. Error
Overall Mean Flow	580	593	2.24
Jan. Mean Flow	742	752	1.35
Feb. Mean Flow	739	882	19.4
Mar. Mean Flow	884	993	12.3
Apr. Mean Flow	751	687	-8.52
May Mean Flow	610	555	-9.02
Jun. Mean Flow	564	444	-21.3
Jul. Mean Flow	338	413	22.2
Aug. Mean Flow	222	277	24.8
Sep. Mean Flow	533	519	-2.63
Oct. Mean Flow	366	368	0.55
Nov. Mean Flow	605	626	3.47
Dec. Mean Flow	620	626	0.97

Table 3: Monthly High Flows

	USGS Gage	Model	Pct. Error
Jan. High Flow	586	589	0.51
Feb. High Flow	1950	1500	-23.1
Mar. High Flow	2070	1220	-41.1
Apr. High Flow	2170	1470	-32.3
May High Flow	1090	1060	-2.75
Jun. High Flow	2320	2140	-7.76
Jul. High Flow	1510	1130	-25.2
Aug. High Flow	984	945	-3.96
Sep. High Flow	1090	957	-12.2
Oct. High Flow	884	758	-14.3
Nov. High Flow	568	407	-28.3
Dec. High Flow	593	376	-36.6

Table 4: Period Low Flows

	USGS Gage	Model	Pct. Error
Min. 1 Day Min	1.5	6.17	311
Med. 1 Day Min	49	47	-4.08
Min. 3 Day Min	1.58	6.41	306
Med. 3 Day Min	49.3	48.5	-1.62
Min. 7 Day Min	2.11	7.45	253
Med. 7 Day Min	53.3	55.8	4.69
Min. 30 Day Min	9.09	17	87
Med. 30 Day Min	83.3	91.9	10.3
Min. 90 Day Min	26.2	66	152
Med. 90 Day Min	188	202	7.45
7Q10	12.6	17.7	40.5
Year of 90-Day Min. Flow	2002	2002	0
Drought Year Mean	132	135	2.27
Mean Baseflow	292	319	9.25

Table 5: Period High Flows

	USGS Gage	Model	Pct. Error
Max. 1 Day Max	43500	32200	-26
Med. 1 Day Max	8800	9590	8.98
Max. 3 Day Max	23300	14200	-39.1
Med. 3 Day Max	4660	4780	2.58
Max. 7 Day Max	12400	8030	-35.2
Med. 7 Day Max	2970	3010	1.35
Max. 30 Day Max	3500	3450	-1.43
Med. 30 Day Max	1700	1560	-8.24
Max. 90 Day Max	2340	2210	-5.56
Med. 90 Day Max	1050	921	-12.3

Table 6: Non-Exceedance Flows

	USGS Gage	Model	Pct. Error
1% Non-Exceedance	19.5	27.6	41.5
5% Non-Exceedance	59	62.7	6.27
50% Non-Exceedance	348	363	4.31
95% Non-Exceedance	1670	1620	-2.99
99% Non-Exceedance	4250	4640	9.18
Sept. 10% Non-Exceedance	52	51.5	-0.96

Fig. 1: Hydrograph

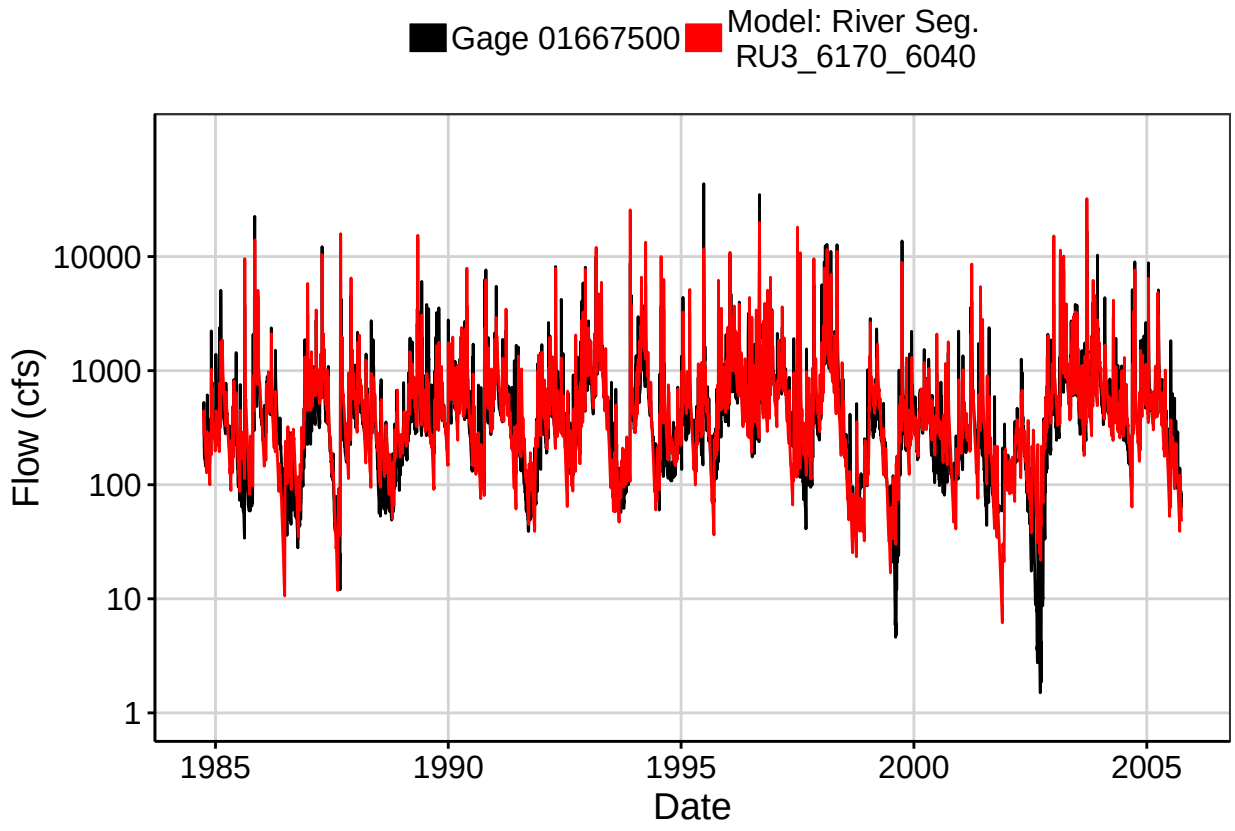


Fig. 2: Zoomed Hydrograph

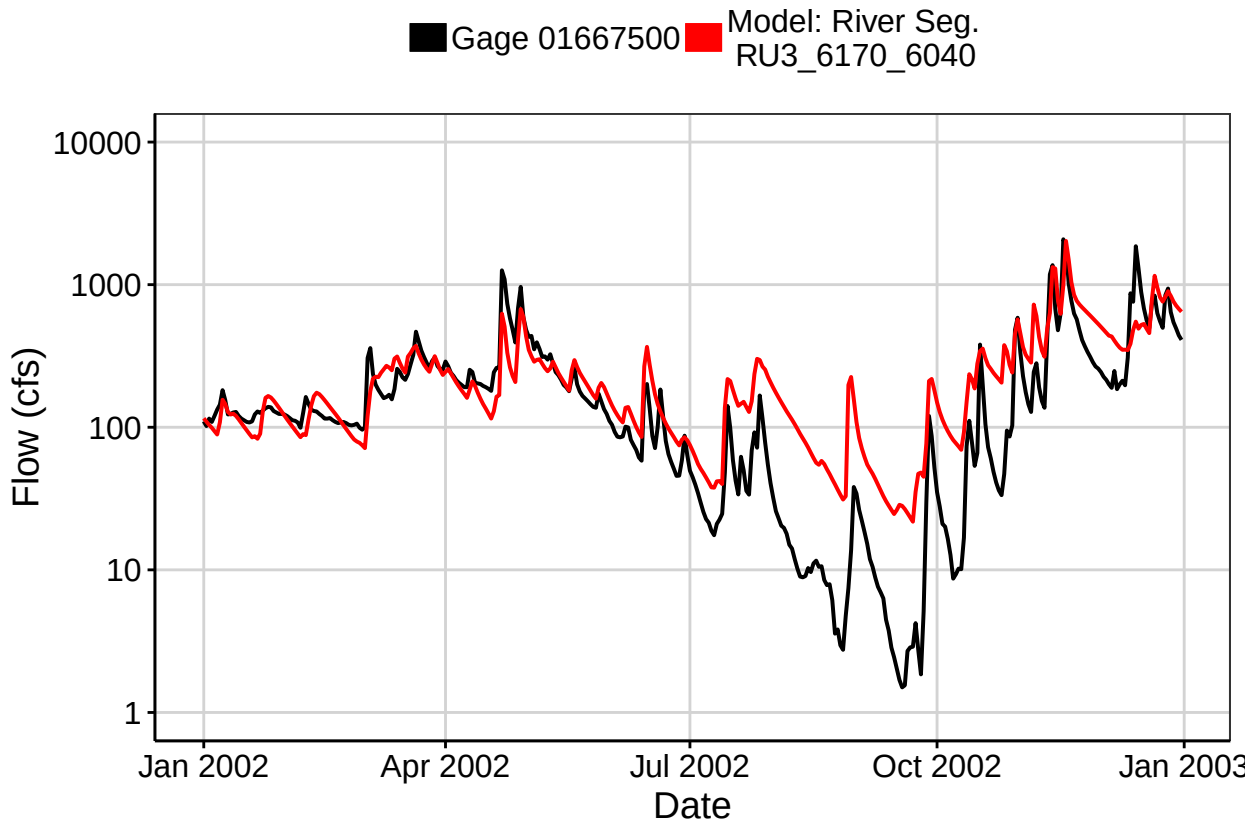


Fig. 3: Flow Exceedance

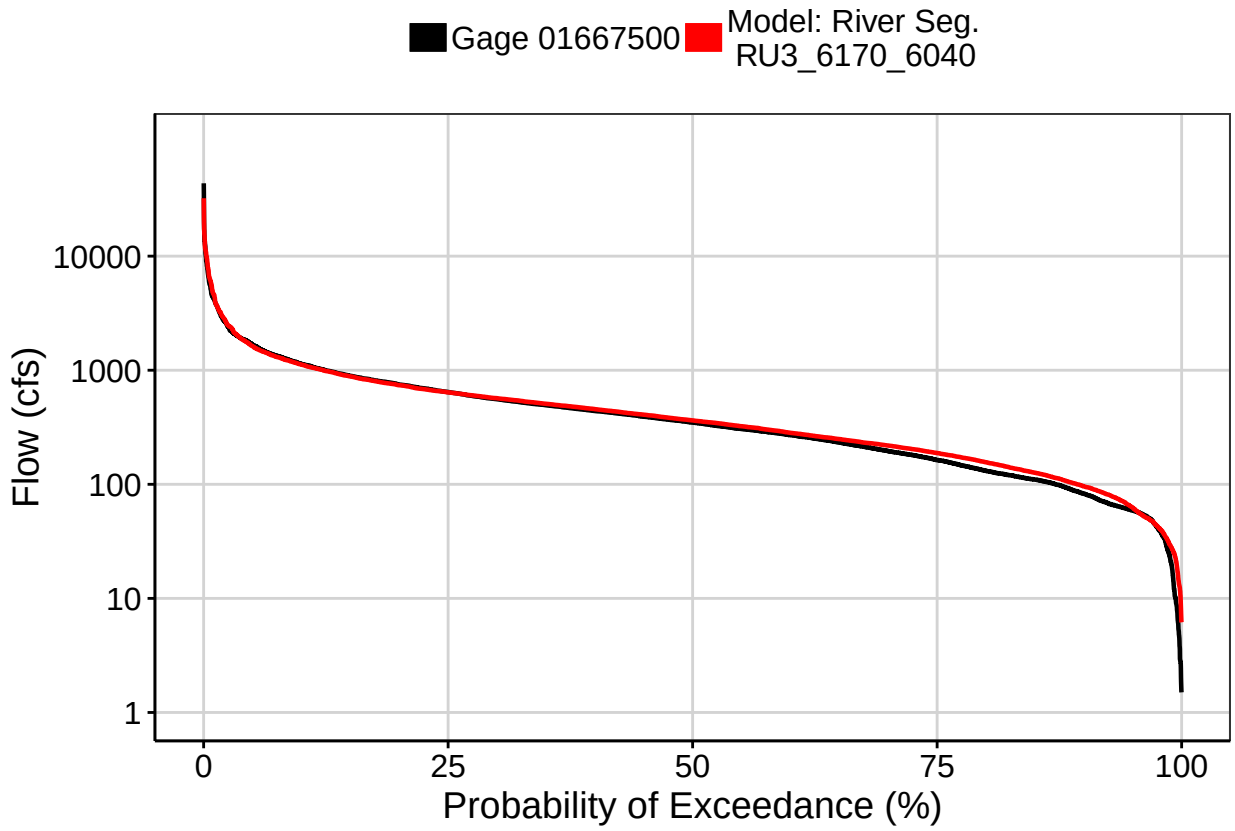


Fig. 4: Baseflow

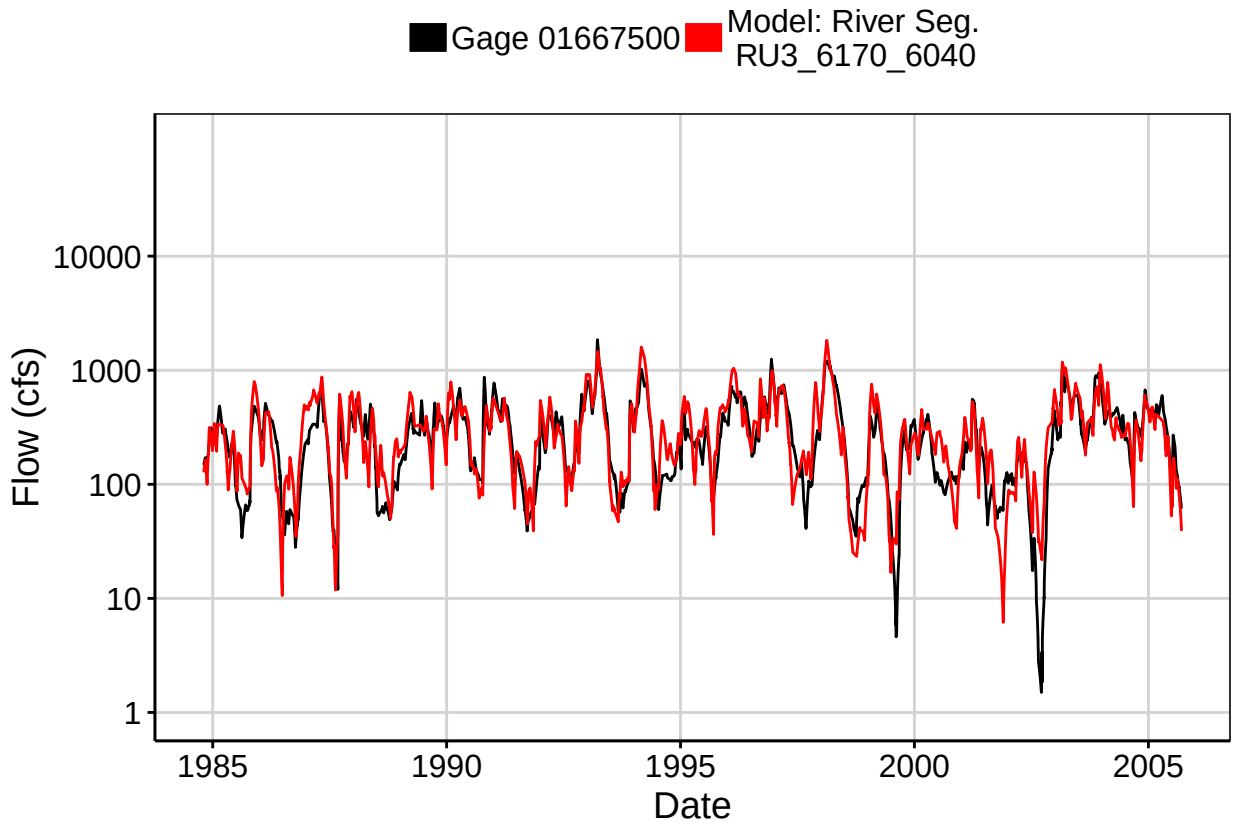


Fig. 5: Combined Baseflow

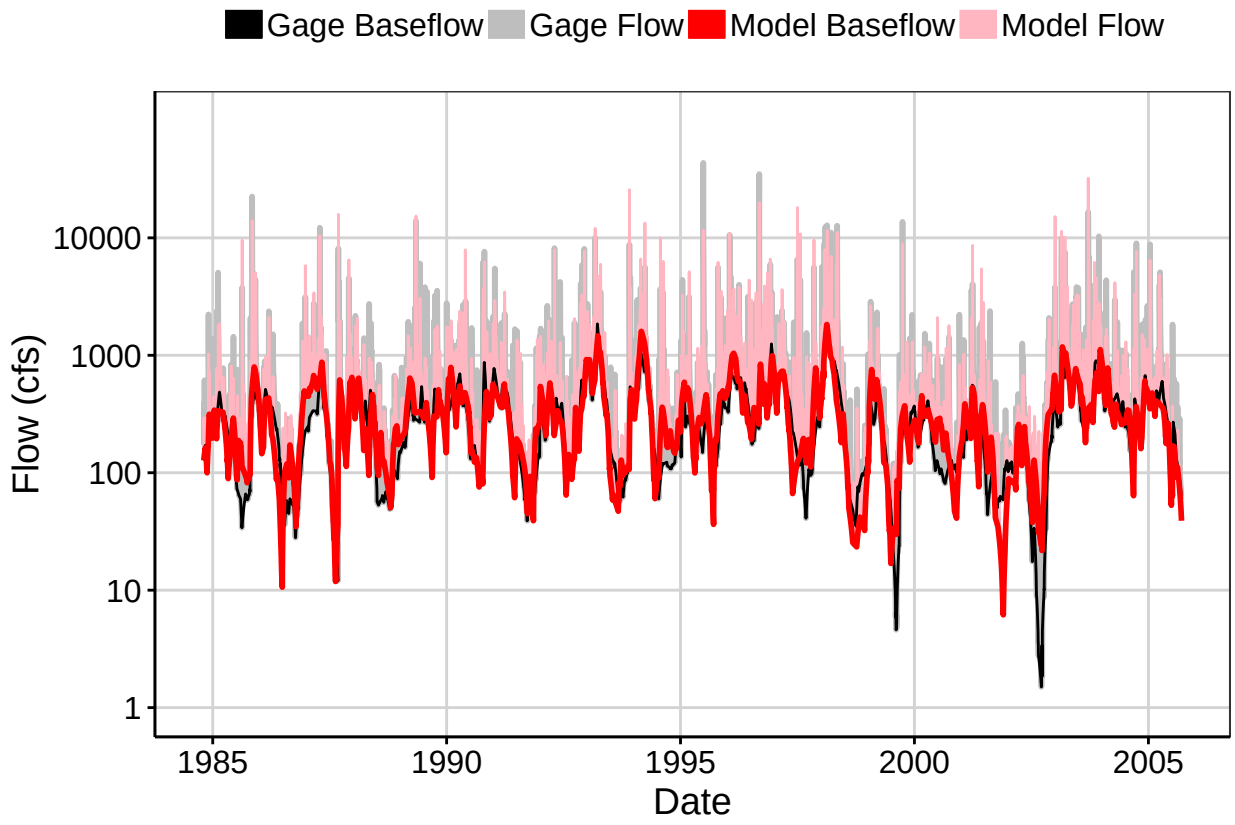


Fig. 6: Largest Error Segment

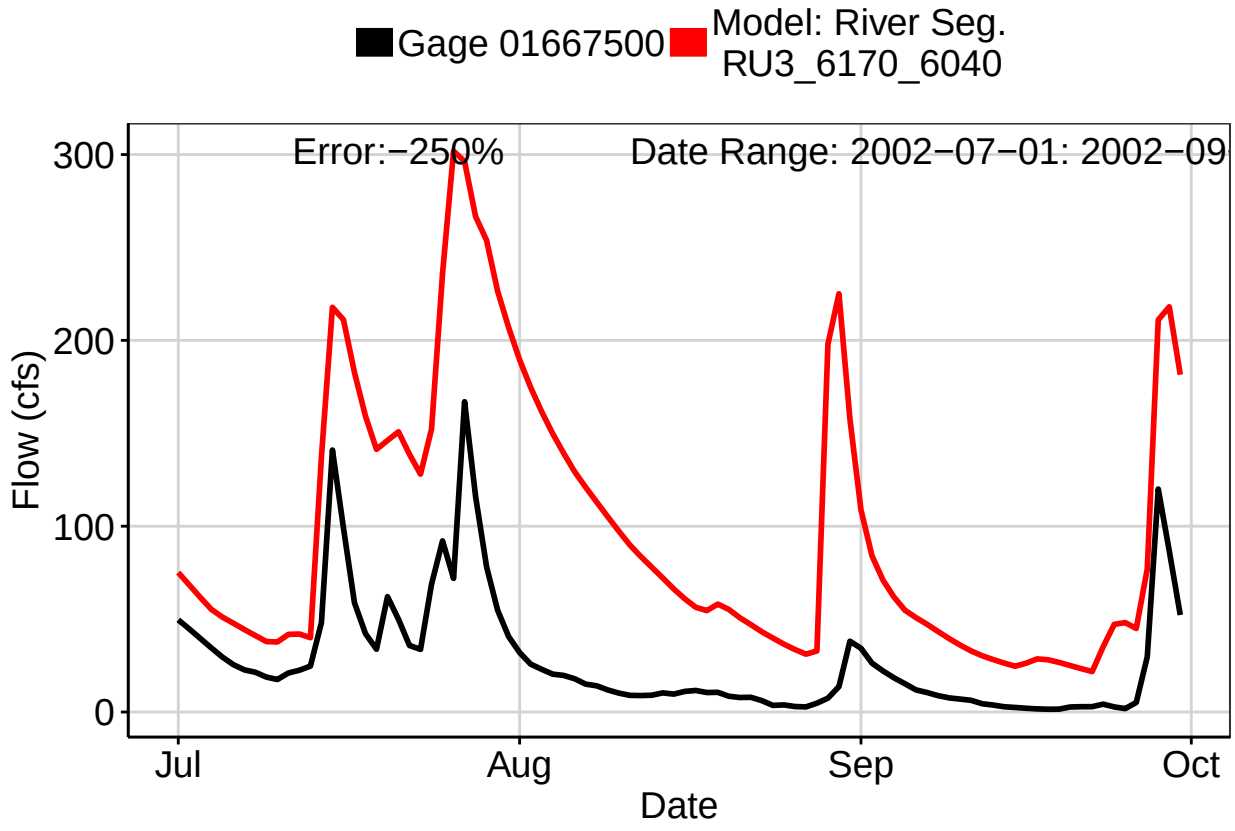


Fig. 7: Second Largest Error Segment

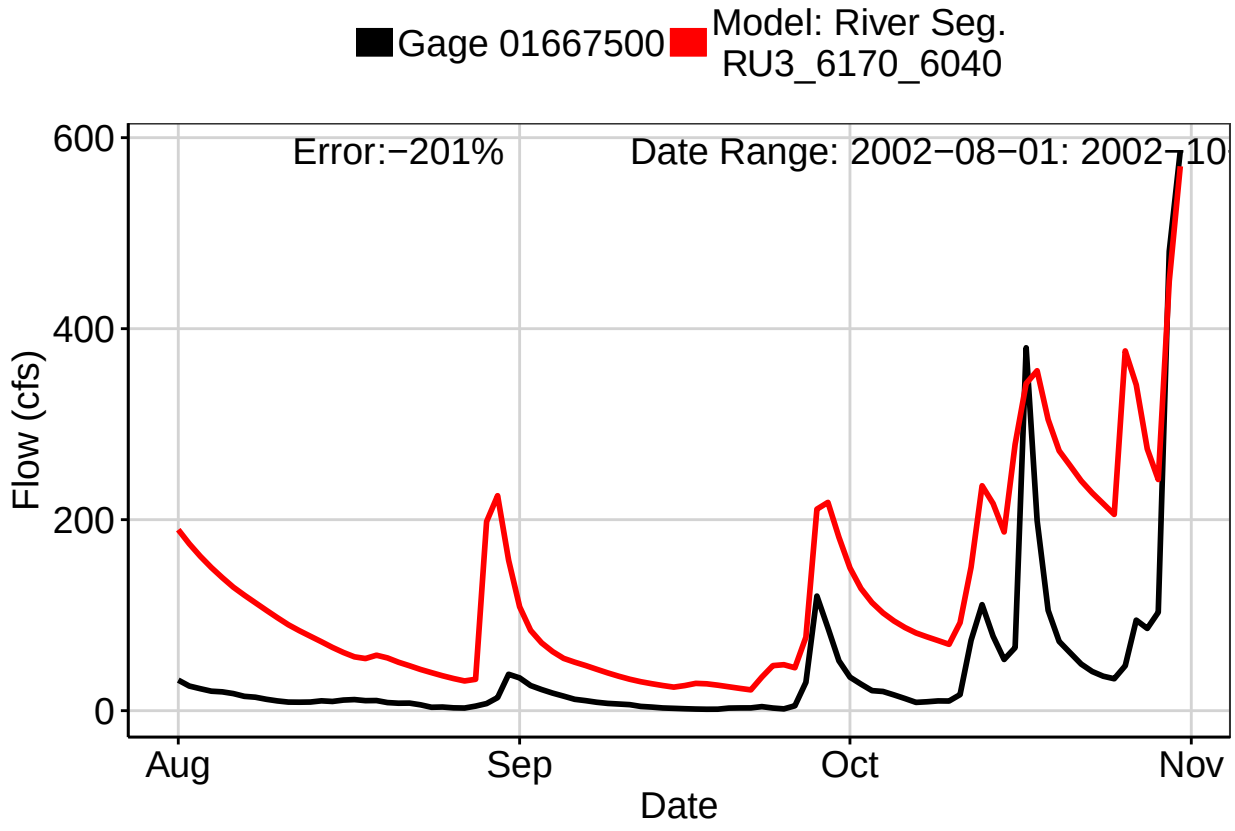


Fig. 8: Third Largest Error Segment

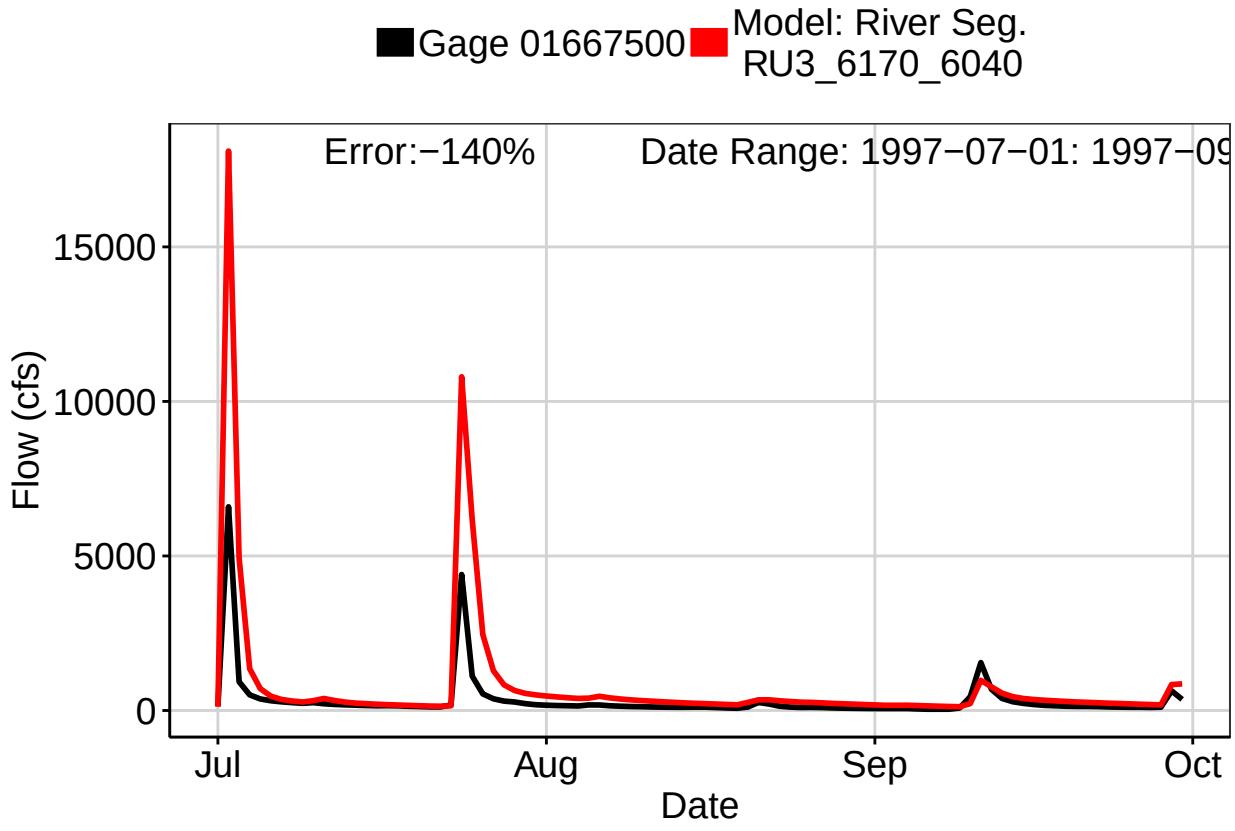


Fig. 9: Residuals Plot