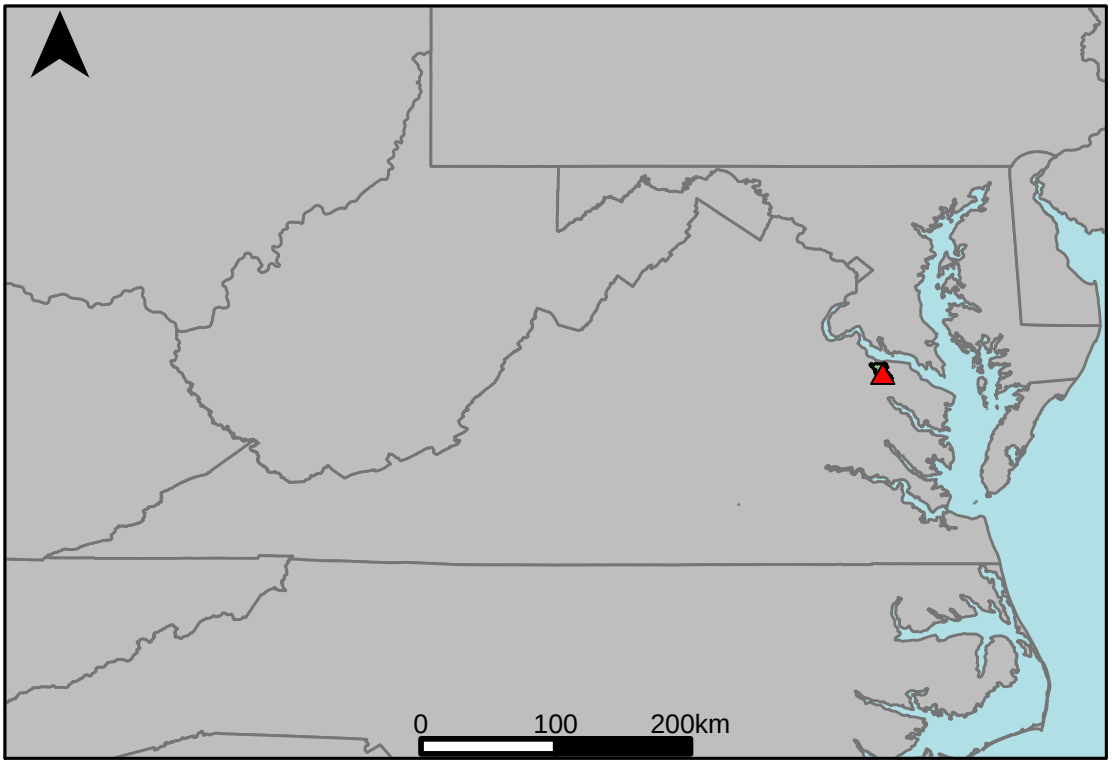
Appendix C.7: USGS Gage 01668500 vs. RL1_6180_0001 Lower Rappahannock River



This river segment follows part of the flow of the Cat Point Creek, a tributary of the Rappahannock. The gage is located in Richmond County (Lat. 38°02'23.5", Long. -76°49'36.9"), approximately 6.7 miles northwest of Warsaw, VA. Drainage area is 45.6 sq. miles. This gage started taking data in 1943 but was decommissioned in 1999. 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 -0.42%, with 52.6% of its rolling three month time spans above 20% error.

Table 1: Monthly Low Flows

	USGS Gage	Model	Pct. Error
Jan. Low Flow	4.7	5.16	9.79
Feb. Low Flow	23	11	-52.2
Mar. Low Flow	22	15.8	-28.2
Apr. Low Flow	33	30.4	-7.88
May Low Flow	40	32.6	-18.5
Jun. Low Flow	36	28	-22.2
Jul. Low Flow	37.5	19.5	-48
Aug. Low Flow	22.5	15.3	-32
Sep. Low Flow	4.9	9.63	96.5
Oct. Low Flow	2.2	6.38	190
Nov. Low Flow	1.6	5.21	226
Dec. Low Flow	2.5	3.7	48

Table 2: Monthly Average Flows

	USGS Gage	Model	Pct. Error
Overall Mean Flow	47.2	47.4	0.42
Jan. Mean Flow	63.4	73.2	15.5
Feb. Mean Flow	73.9	86.1	16.5
Mar. Mean Flow	83.2	94.4	13.5
Apr. Mean Flow	67.8	52.6	-22.4
May Mean Flow	53.5	48.1	-10.1
Jun. Mean Flow	27.6	21.6	-21.7
Jul. Mean Flow	30	22.3	-25.7
Aug. Mean Flow	24.3	26.1	7.41
Sep. Mean Flow	27.6	25.1	-9.06
Oct. Mean Flow	28	33.2	18.6
Nov. Mean Flow	40.2	36.9	-8.21
Dec. Mean Flow	47.9	50.4	5.22

Table 3: Monthly High Flows

	USGS Gage	Model	Pct. Error
Jan. High Flow	57.5	50.2	-12.7
Feb. High Flow	102	98.2	-3.73
Mar. High Flow	77.5	99.7	28.6
Apr. High Flow	155	203	31
May High Flow	132	190	43.9
Jun. High Flow	216	208	-3.7
Jul. High Flow	148	146	-1.35
Aug. High Flow	110	110	0
Sep. High Flow	76	49.4	-35
Oct. High Flow	89.5	39.7	-55.6
Nov. High Flow	69	57.7	-16.4
Dec. High Flow	23	35	52.2

Table 4: Period Low Flows

	USGS Gage	Model	Pct. Error
Min. 1 Day Min	0.27	0.41	51.1
Med. 1 Day Min	1.15	2.22	93
Min. 3 Day Min	0.3	0.47	56.7
Med. 3 Day Min	1.22	2.47	102
Min. 7 Day Min	0.31	0.64	105
Med. 7 Day Min	1.42	2.95	108
Min. 30 Day Min	1.09	2.67	145
Med. 30 Day Min	3.41	5.4	58.4
Min. 90 Day Min	7	5.85	-16.4
Med. 90 Day Min	11.2	14.4	28.6
7Q10	0.47	1.02	118
Year of 90-Day Min. Flow	1986	1998	100
Drought Year Mean	36.4	35.4	-2.75
Mean Baseflow	25.4	23.5	-7.48

Table 5: Period High Flows

	USGS Gage	Model	Pct. Error
Max. 1 Day Max	1890	1660	-12.2
Med. 1 Day Max	566	629	11.1
Max. 3 Day Max	1230	842	-31.5
Med. 3 Day Max	375	359	-4.27
Max. 7 Day Max	607	474	-21.9
Med. 7 Day Max	250	243	-2.8
Max. 30 Day Max	269	273	1.49
Med. 30 Day Max	119	128	7.56
Max. 90 Day Max	176	188	6.82
Med. 90 Day Max	90.4	92.6	2.43

Table 6: Non-Exceedance Flows

	USGS Gage	Model	Pct. Error
1% Non-Exceedance	0.82	1.76	114
5% Non-Exceedance	2.2	4.24	92.7
50% Non-Exceedance	33	28.4	-13.9
95% Non-Exceedance	128	144	12.5
99% Non-Exceedance	287	300	4.53
Sept. 10% Non-Exceedance	1.4	3.12	123

Fig. 1: Hydrograph

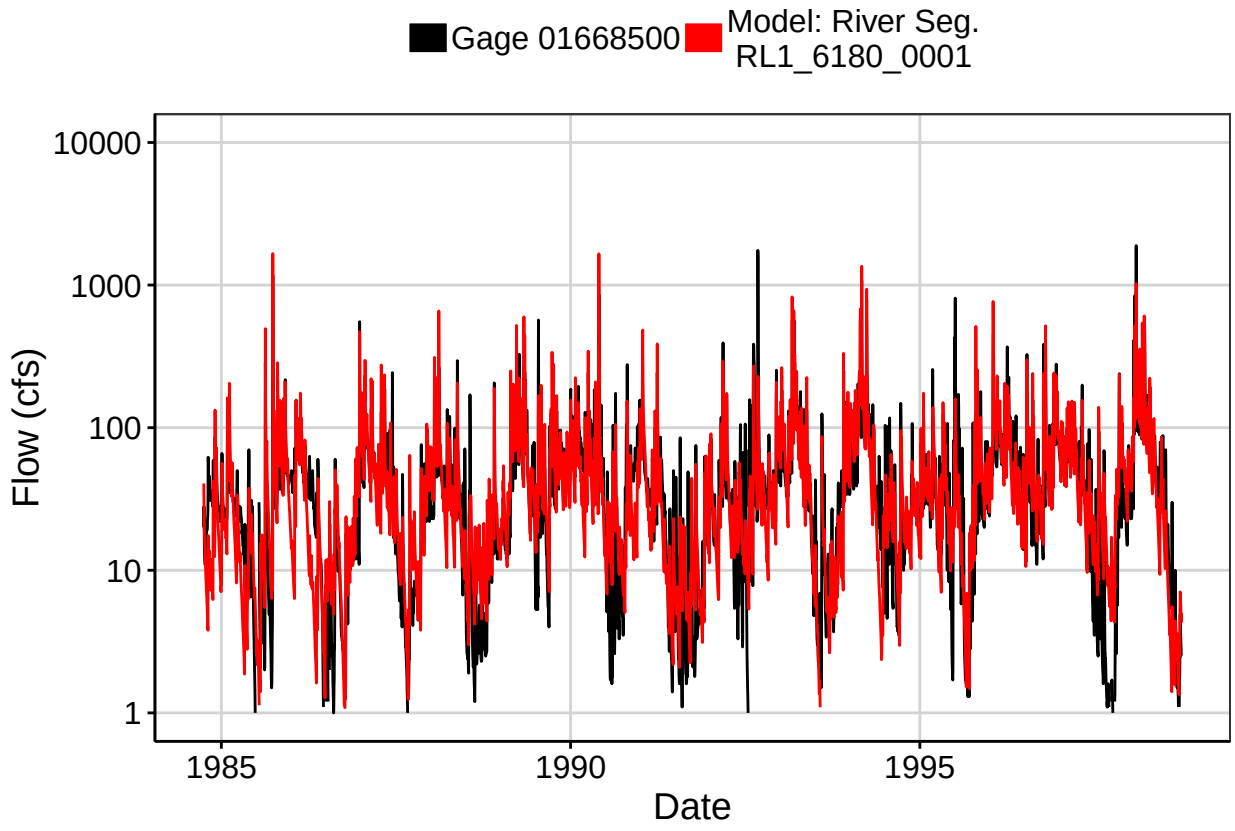


Fig. 2: Zoomed Hydrograph

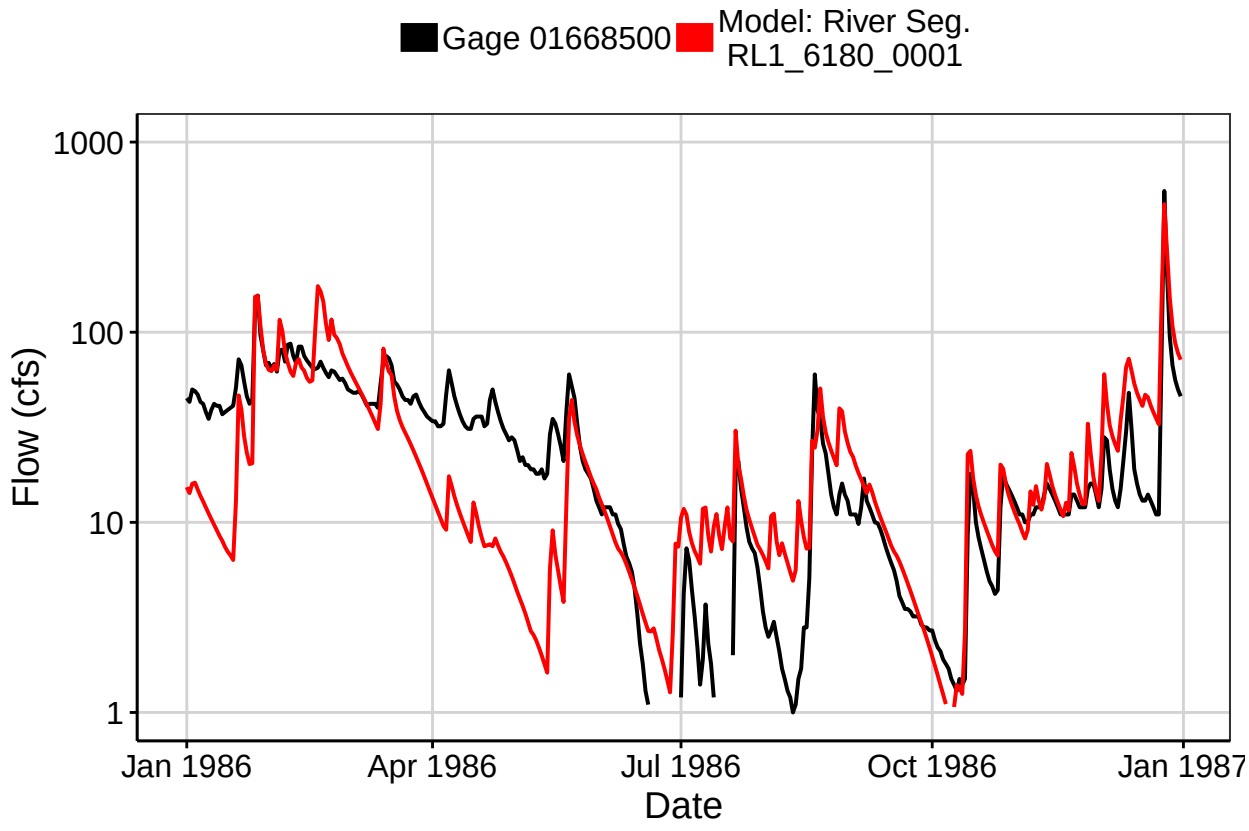


Fig. 3: Flow Exceedance

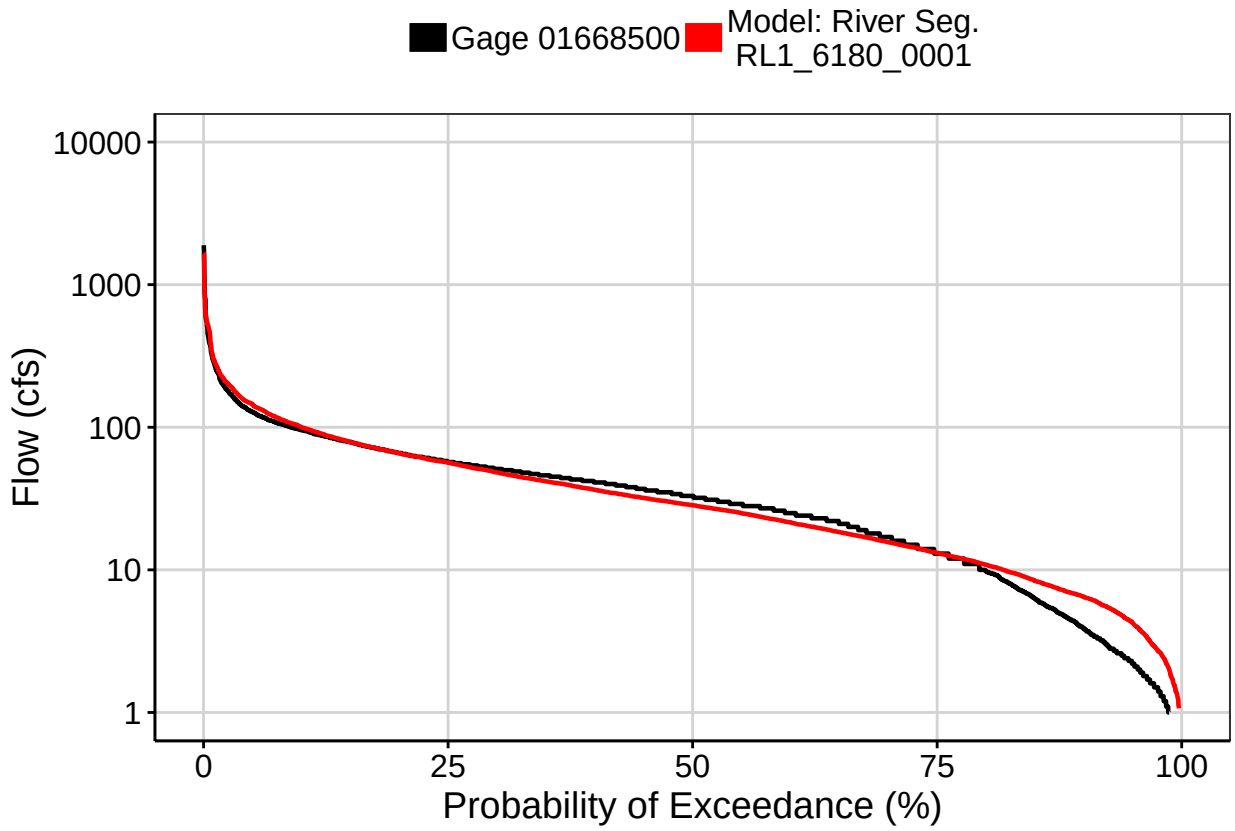


Fig. 4: Baseflow

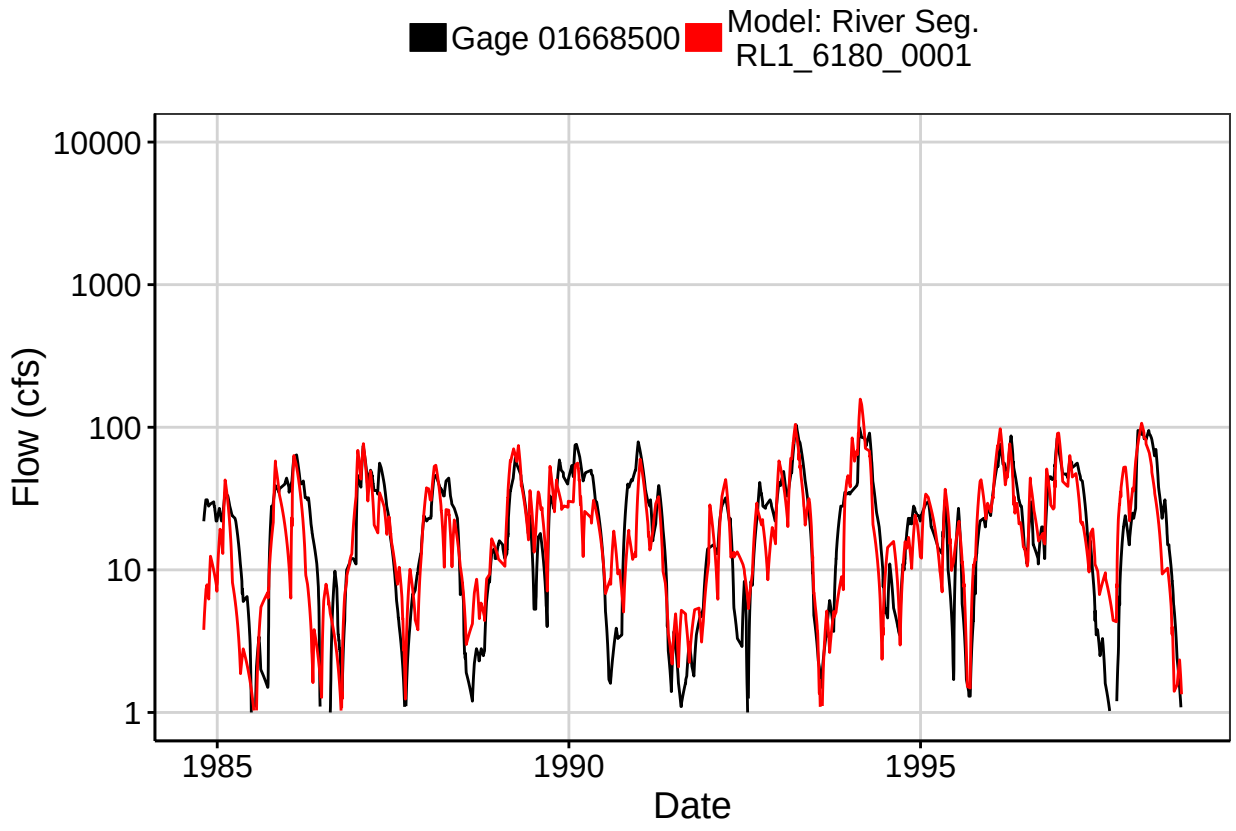


Fig. 5: Combined Baseflow

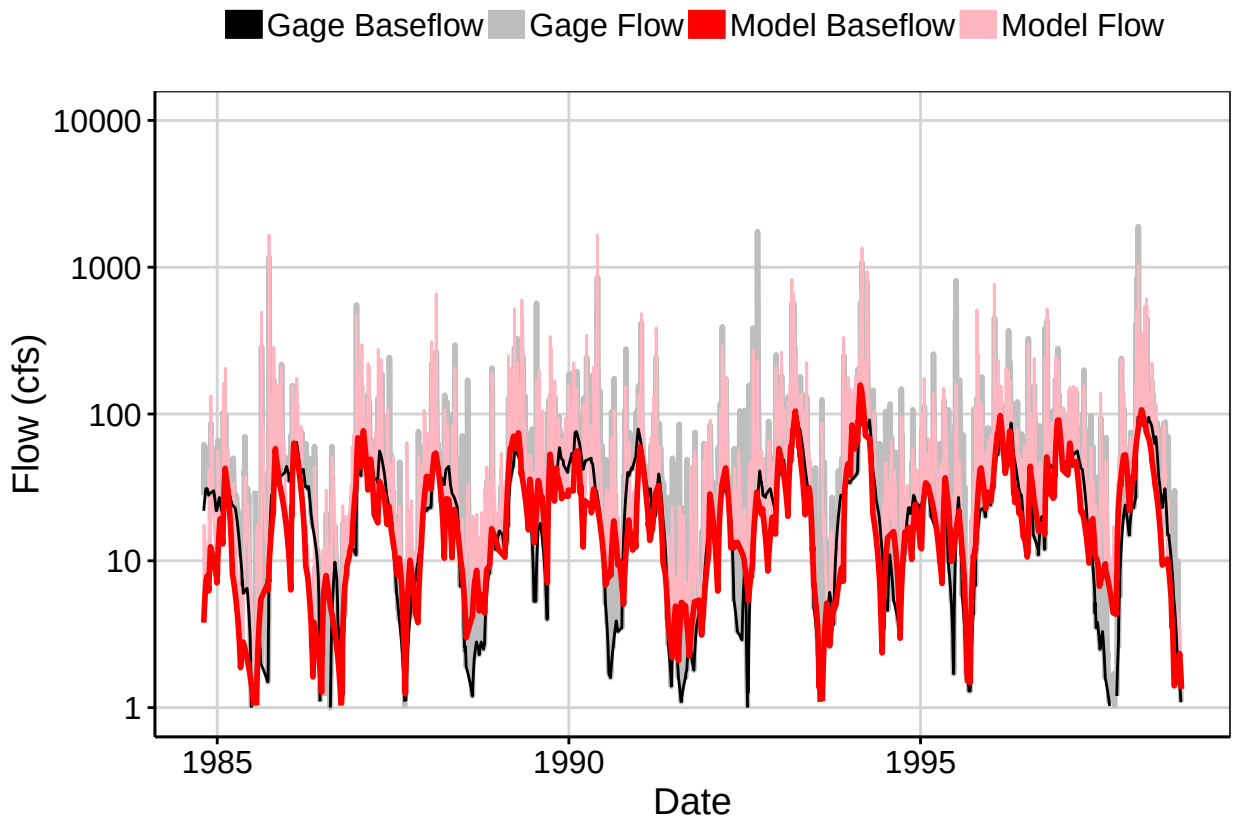


Fig. 6: Largest Error Segment

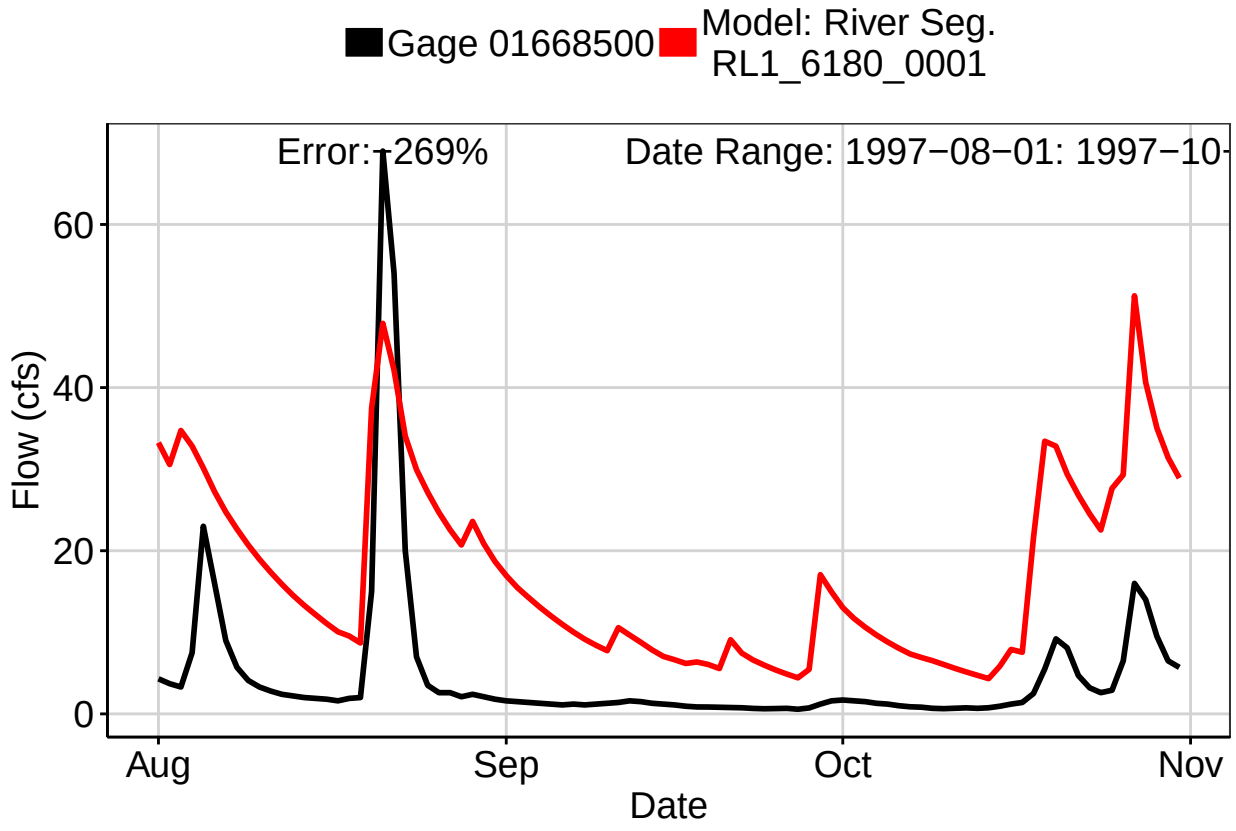


Fig. 7: Second Largest Error Segment

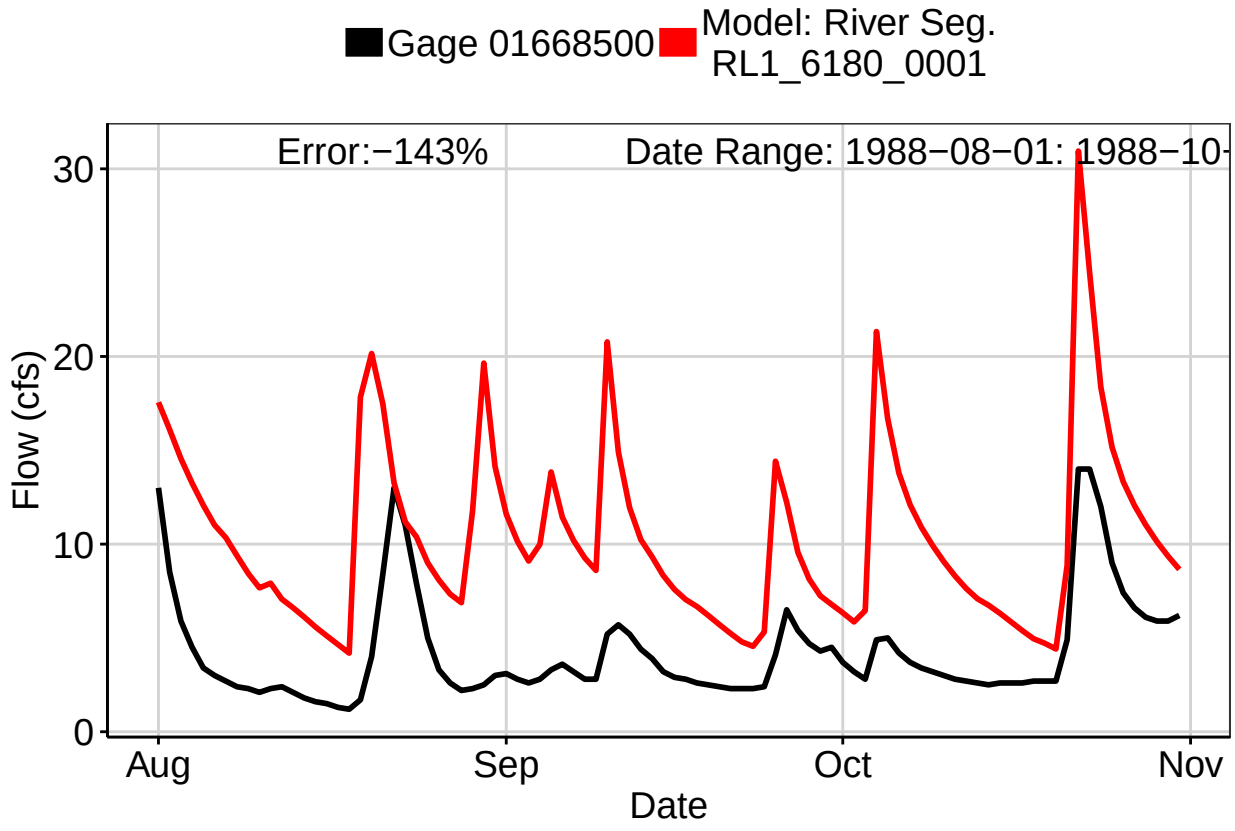


Fig. 8: Third Largest Error Segment

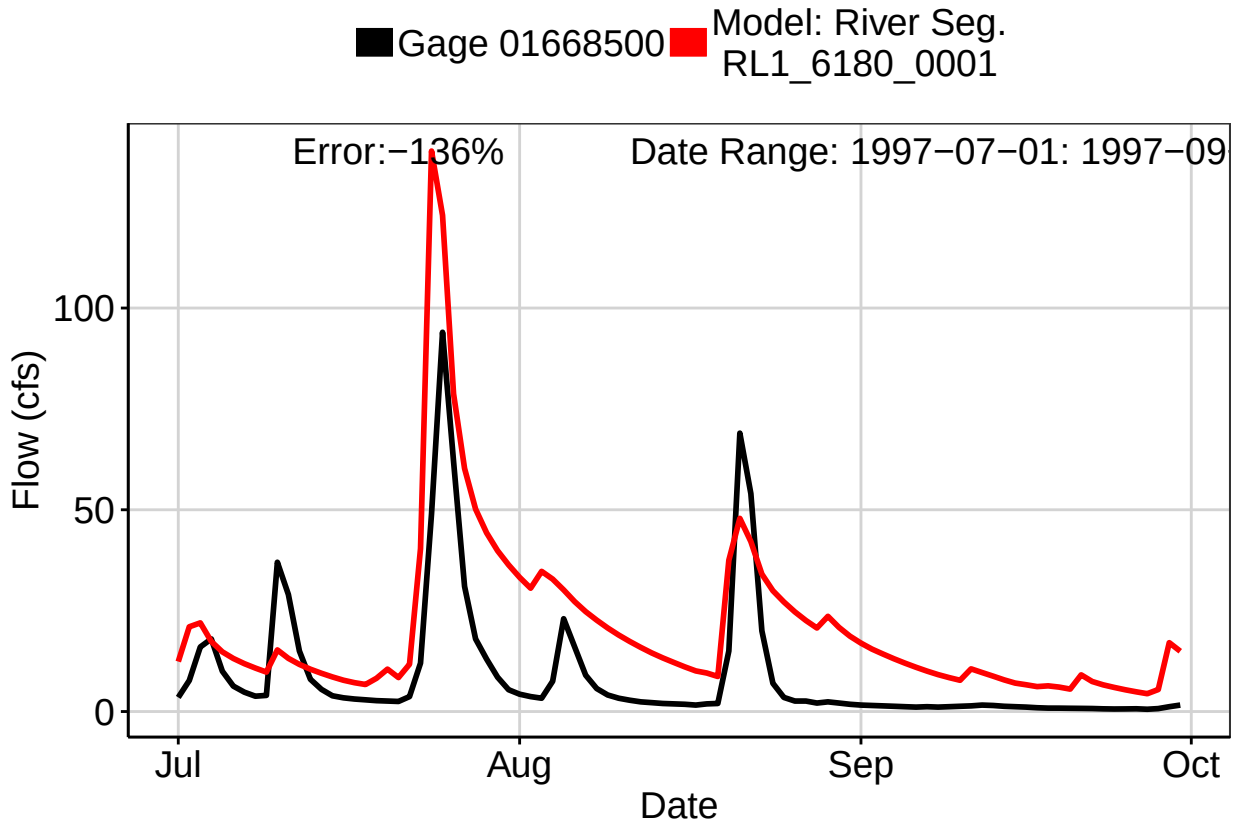


Fig. 9: Residuals Plot