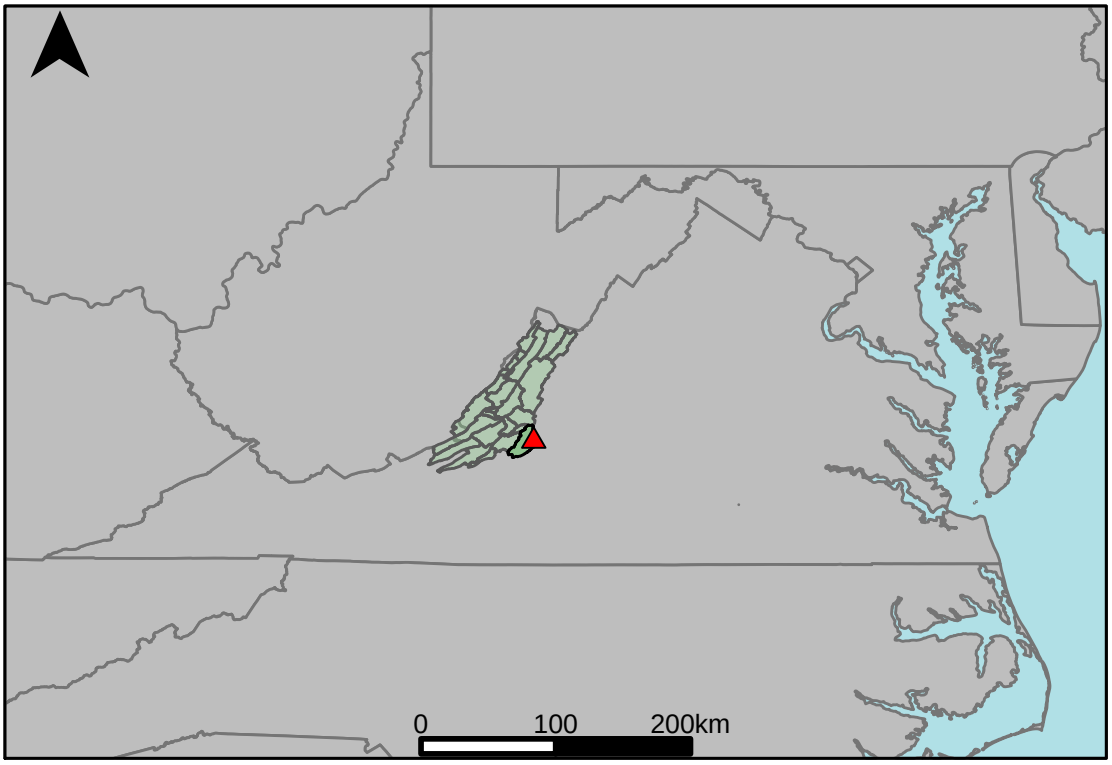
Appendix A.15: USGS Gage 02019500 vs. JU5_7500_7420 Upper James River



This river segment follows part of the flow of the James River, a tributary of the James. The gage is located in Botetourt County (Lat. 37°31'50.5", Long. -79°40'44.1"), approximately 1 mile northeast of Buchanan, VA. Drainage area is 2073 sq. miles. This gage started taking data in 1910 and is still taking data. Flow has been regulated since December 1979 by Lake Moomaw (station 02011795) 79.6 mi upstream; since October 1984 by Back Creek Lake 107.6 mi upstream; and since January 1985 by Little Back Creek Lake 110.7 mi upstream, amounts unknown. The average daily discharge error between the model and gage data for the 20 year timespan was 5.79%, with 36.2% of its rolling three month time spans above 20% error.

Table 1: Monthly Low Flows

	USGS Gage	Model	Pct. Error
Jan. Low Flow	496	472	-4.84
Feb. Low Flow	541	622	15
Mar. Low Flow	819	1090	33.1
Apr. Low Flow	882	1320	49.7
May Low Flow	1180	1810	53.4
Jun. Low Flow	1850	2080	12.4
Jul. Low Flow	1360	1330	-2.21
Aug. Low Flow	1210	1010	-16.5
Sep. Low Flow	803	703	-12.5
Oct. Low Flow	710	418	-41.1
Nov. Low Flow	663	408	-38.5
Dec. Low Flow	567	356	-37.2

Table 2: Monthly Average Flows

	USGS Gage	Model	Pct. Error
Overall Mean Flow	2590	2440	-5.79
Jan. Mean Flow	3460	3130	-9.54
Feb. Mean Flow	3850	4060	5.45
Mar. Mean Flow	4850	4570	-5.77
Apr. Mean Flow	4220	3530	-16.4
May Mean Flow	3330	2750	-17.4
Jun. Mean Flow	2200	1980	-10
Jul. Mean Flow	1170	1040	-11.1
Aug. Mean Flow	993	924	-6.95
Sep. Mean Flow	1500	1710	14
Oct. Mean Flow	1110	1310	18
Nov. Mean Flow	2160	2160	0
Dec. Mean Flow	2370	2240	-5.49

Table 3: Monthly High Flows

	USGS Gage	Model	Pct. Error
Jan. High Flow	983	1120	13.9
Feb. High Flow	3860	3910	1.3
Mar. High Flow	9050	3670	-59.4
Apr. High Flow	10500	7240	-31
May High Flow	7280	6890	-5.36
Jun. High Flow	12400	13900	12.1
Jul. High Flow	12100	9370	-22.6
Aug. High Flow	7660	6220	-18.8
Sep. High Flow	2500	2940	17.6
Oct. High Flow	2280	1830	-19.7
Nov. High Flow	1370	1410	2.92
Dec. High Flow	1370	1310	-4.38

Table 4: Period Low Flows

	USGS Gage	Model	Pct. Error
Min. 1 Day Min	321	145	-54.8
Med. 1 Day Min	496	288	-41.9
Min. 3 Day Min	326	147	-54.9
Med. 3 Day Min	504	297	-41.1
Min. 7 Day Min	333	151	-54.7
Med. 7 Day Min	512	317	-38.1
Min. 30 Day Min	373	167	-55.2
Med. 30 Day Min	578	430	-25.6
Min. 90 Day Min	505	380	-24.8
Med. 90 Day Min	881	743	-15.7
7Q10	415	197	-52.5
Year of 90-Day Min. Flow	1999	1999	0
Drought Year Mean	1190	1470	23.5
Mean Baseflow	1300	1400	7.69

Table 5: Period High Flows

	USGS Gage	Model	Pct. Error
Max. 1 Day Max	102000	135000	32.4
Med. 1 Day Max	32300	23500	-27.2
Max. 3 Day Max	60000	66800	11.3
Med. 3 Day Max	22700	18200	-19.8
Max. 7 Day Max	33000	33900	2.73
Med. 7 Day Max	15800	12400	-21.5
Max. 30 Day Max	16400	12300	-25
Med. 30 Day Max	7310	6450	-11.8
Max. 90 Day Max	9140	8520	-6.78
Med. 90 Day Max	4630	4340	-6.26

Table 6: Non-Exceedance Flows

	USGS Gage	Model	Pct. Error
1% Non-Exceedance	439	224	-49
5% Non-Exceedance	509	321	-36.9
50% Non-Exceedance	1320	1470	11.4
95% Non-Exceedance	8830	7530	-14.7
99% Non-Exceedance	18700	16800	-10.2
Sept. 10% Non-Exceedance	560	295	-47.3

Fig. 1: Hydrograph

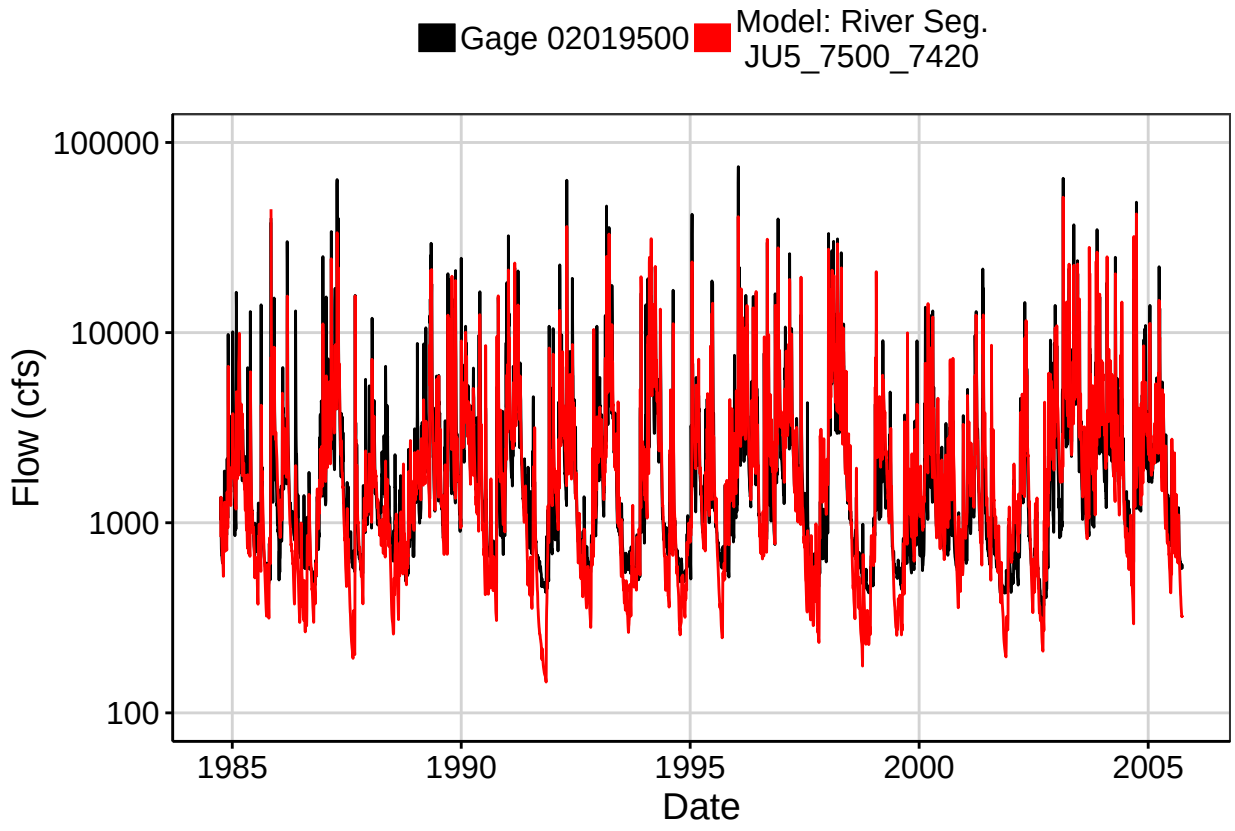


Fig. 2: Zoomed Hydrograph

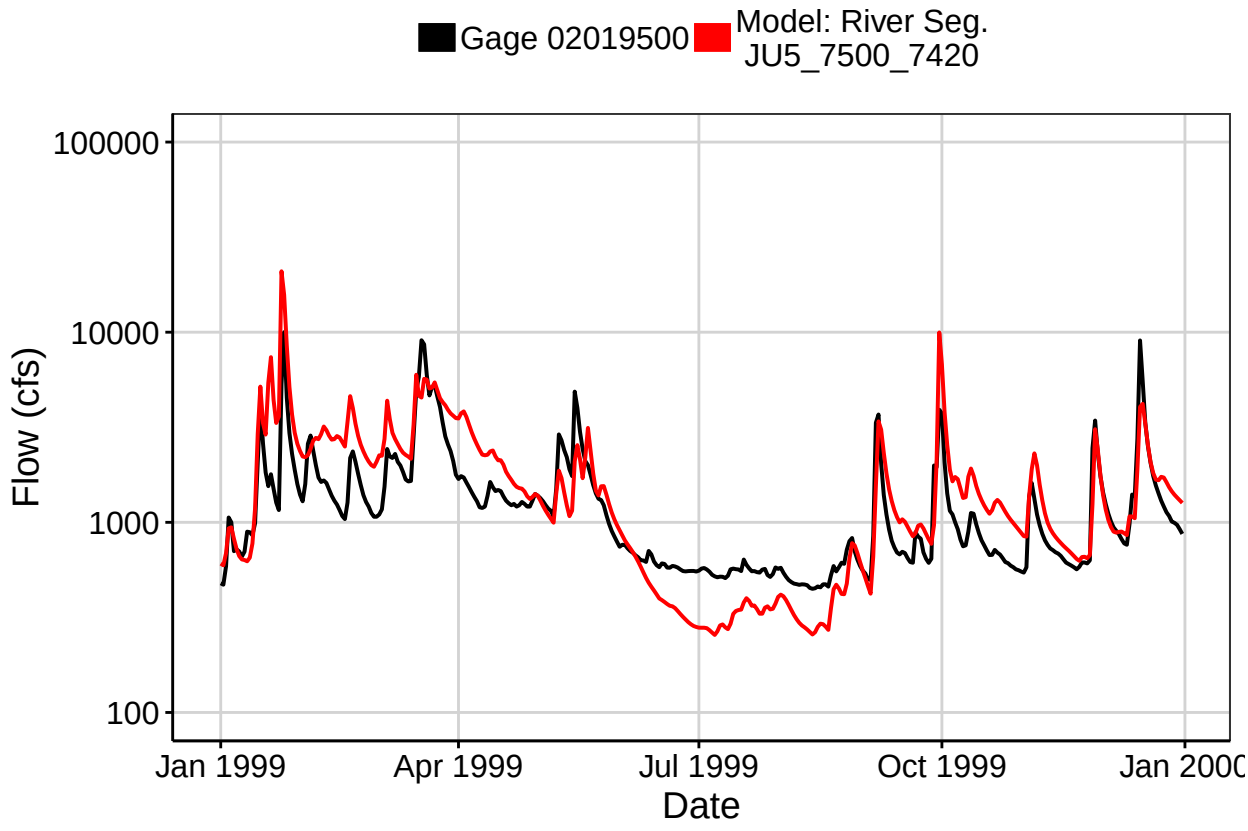


Fig. 3: Flow Exceedance

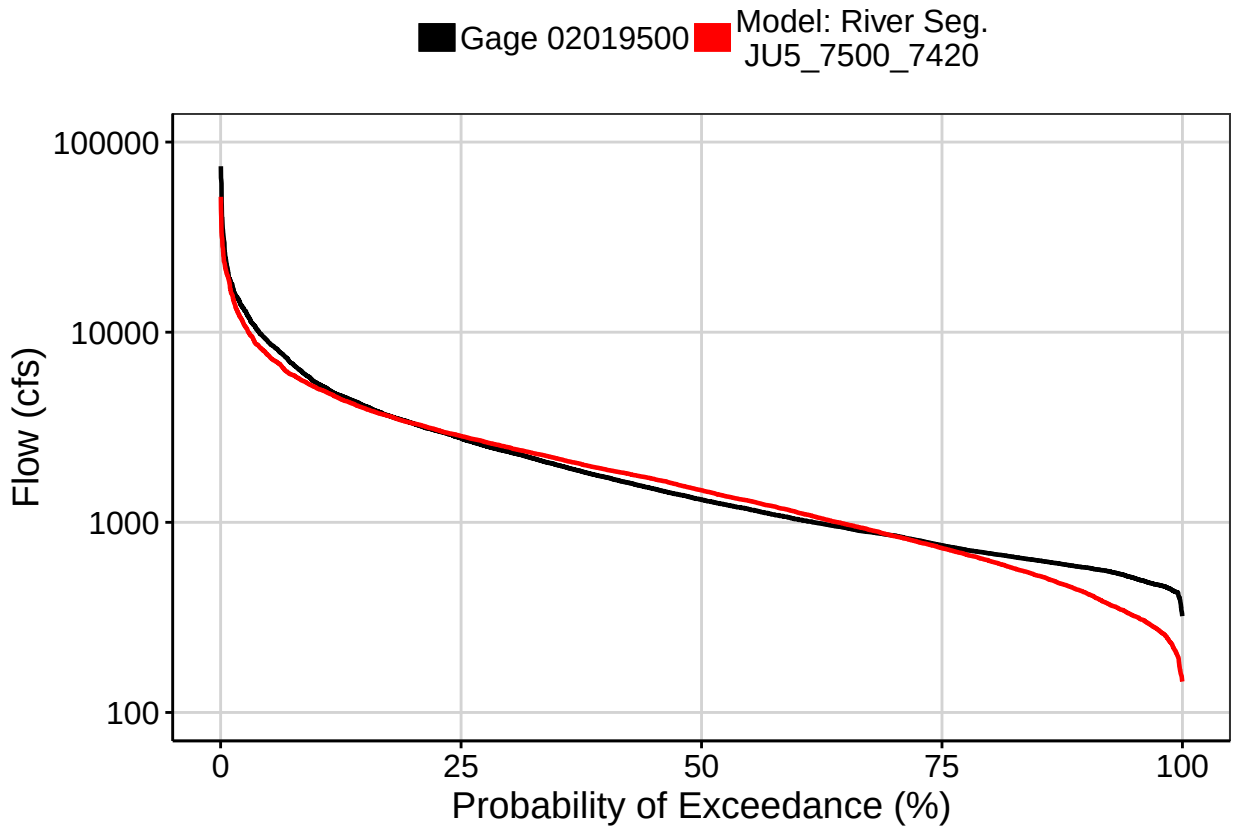


Fig. 4: Baseflow

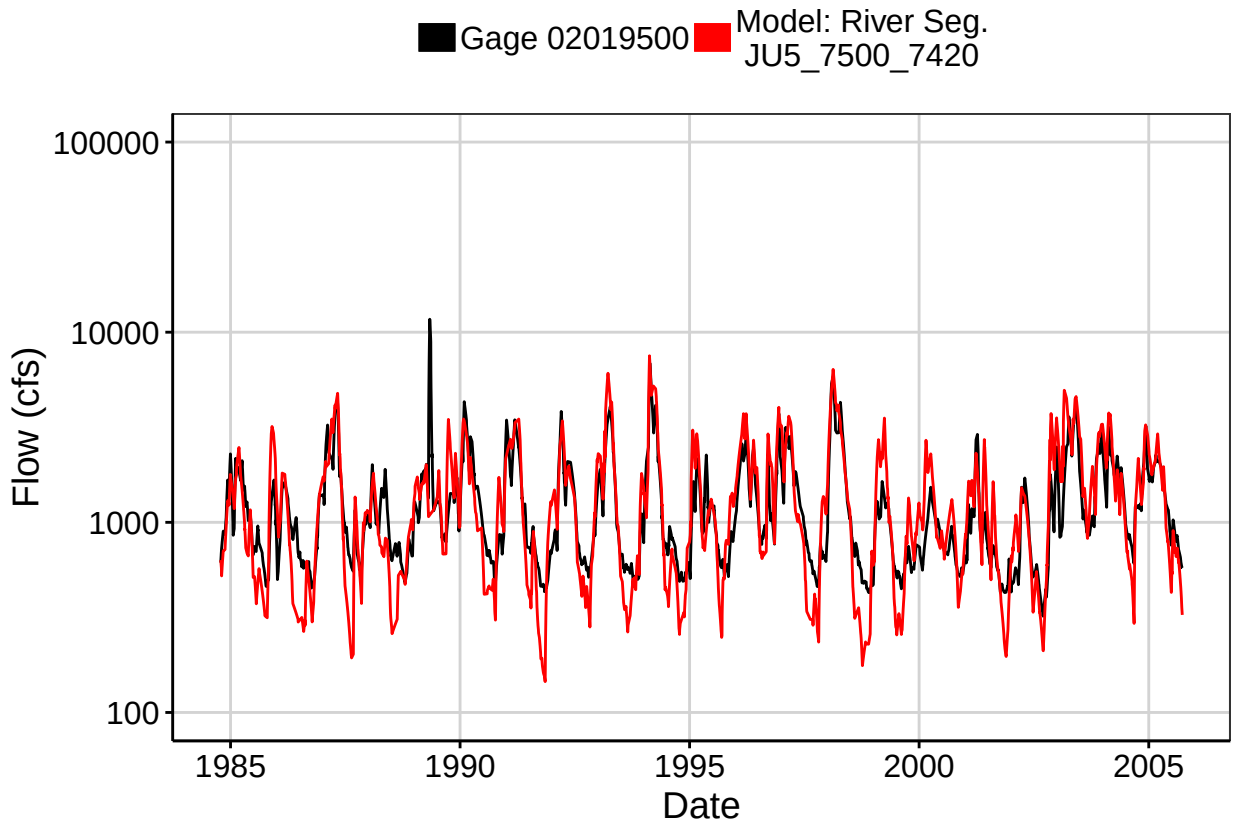


Fig. 5: Combined Baseflow

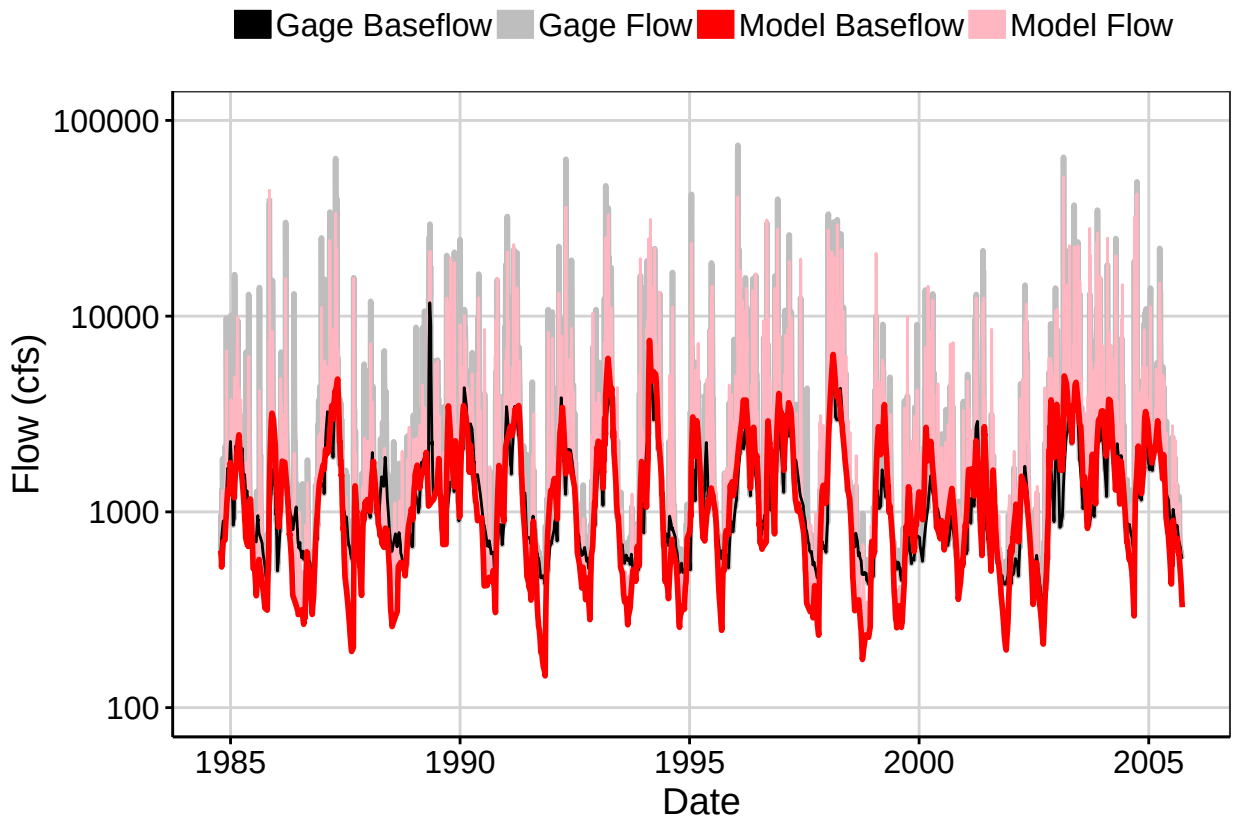


Fig. 6: Largest Error Segment

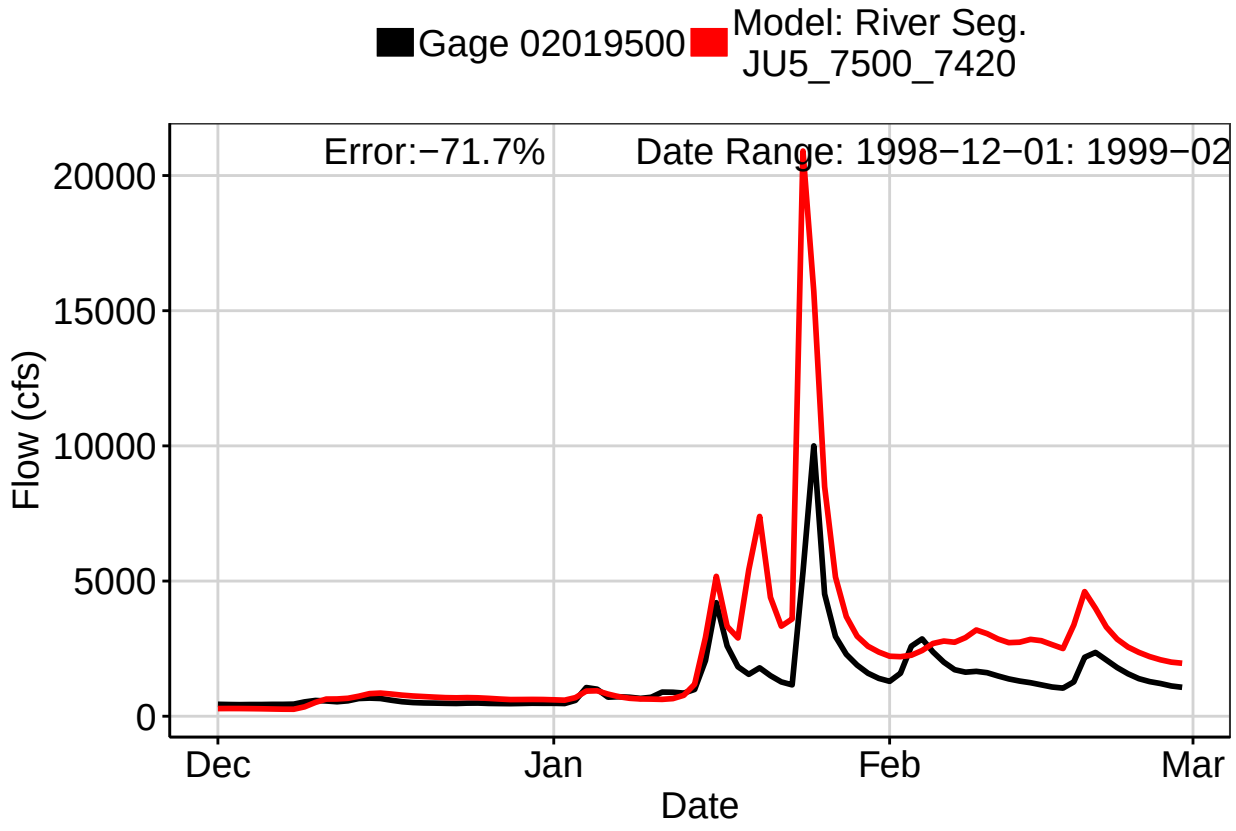


Fig. 7: Second Largest Error Segment

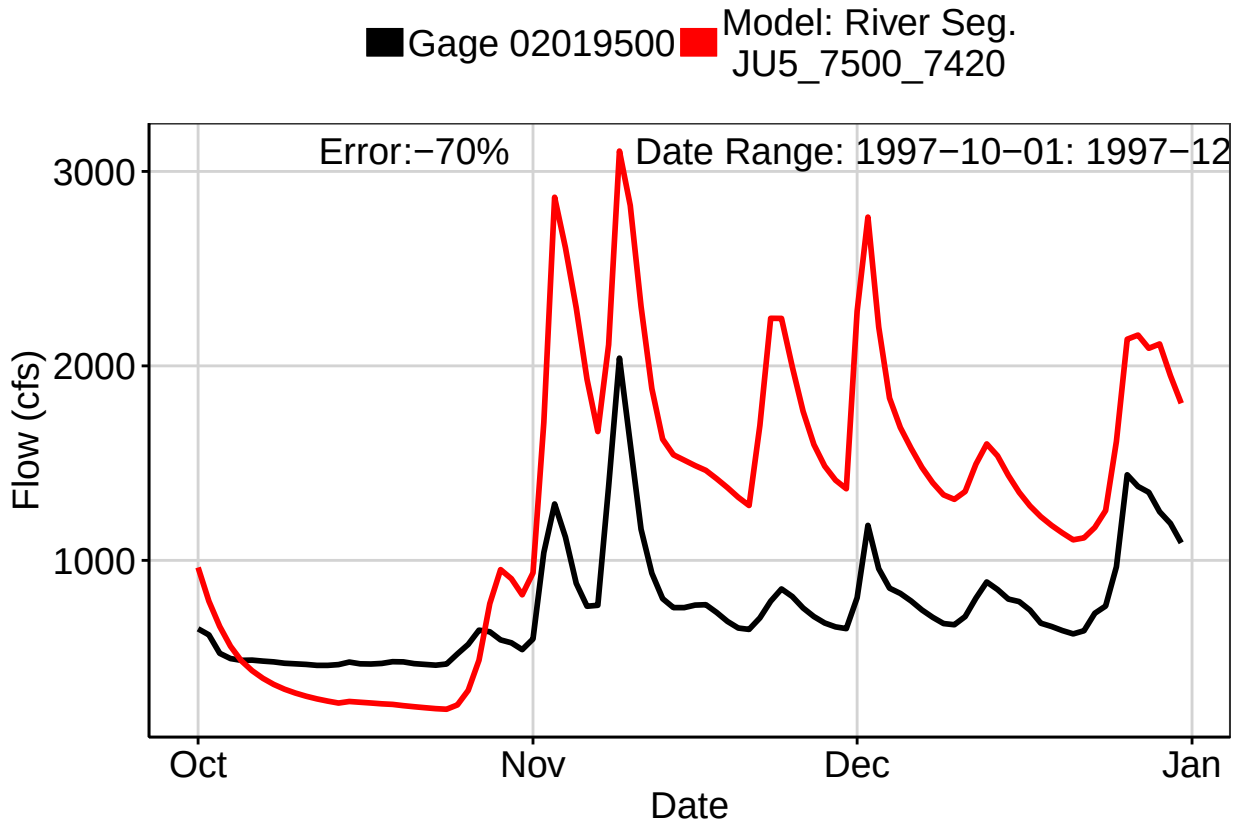


Fig. 8: Third Largest Error Segment

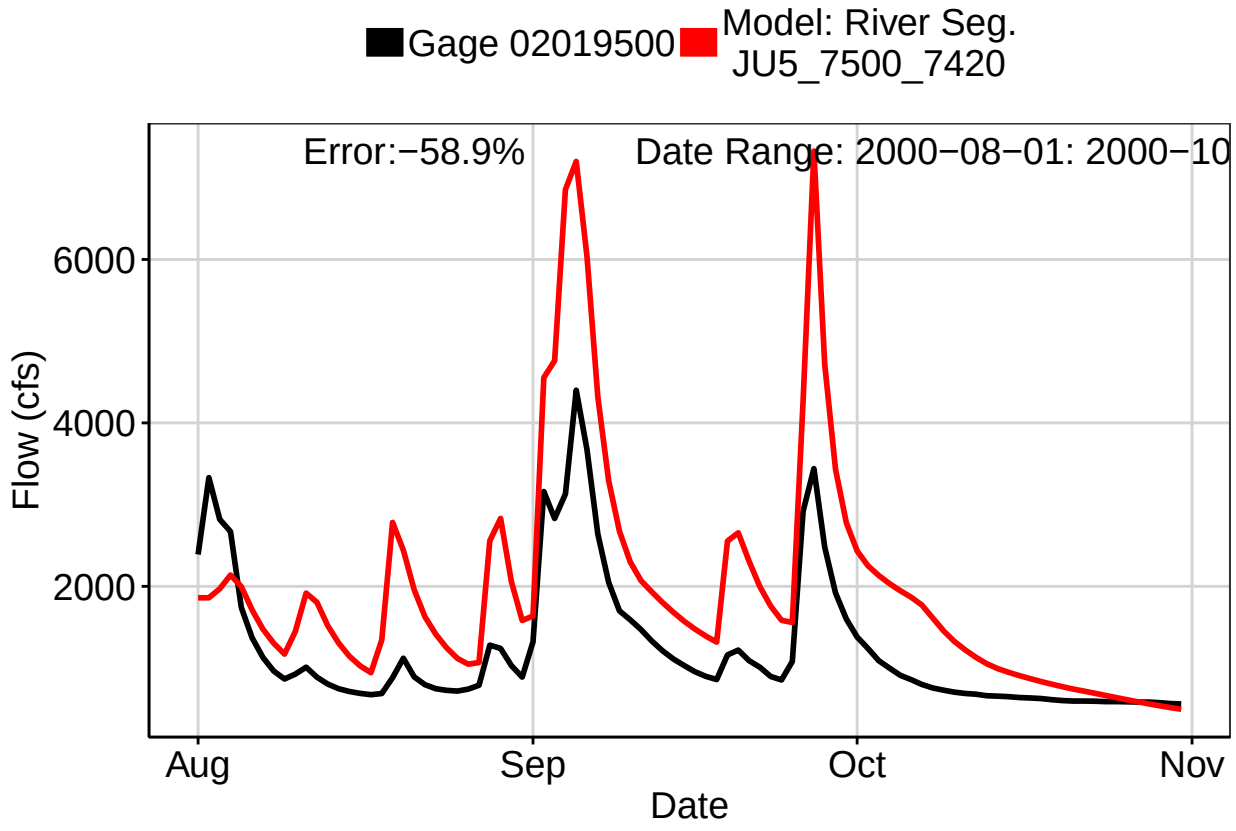


Fig. 9: Residuals Plot