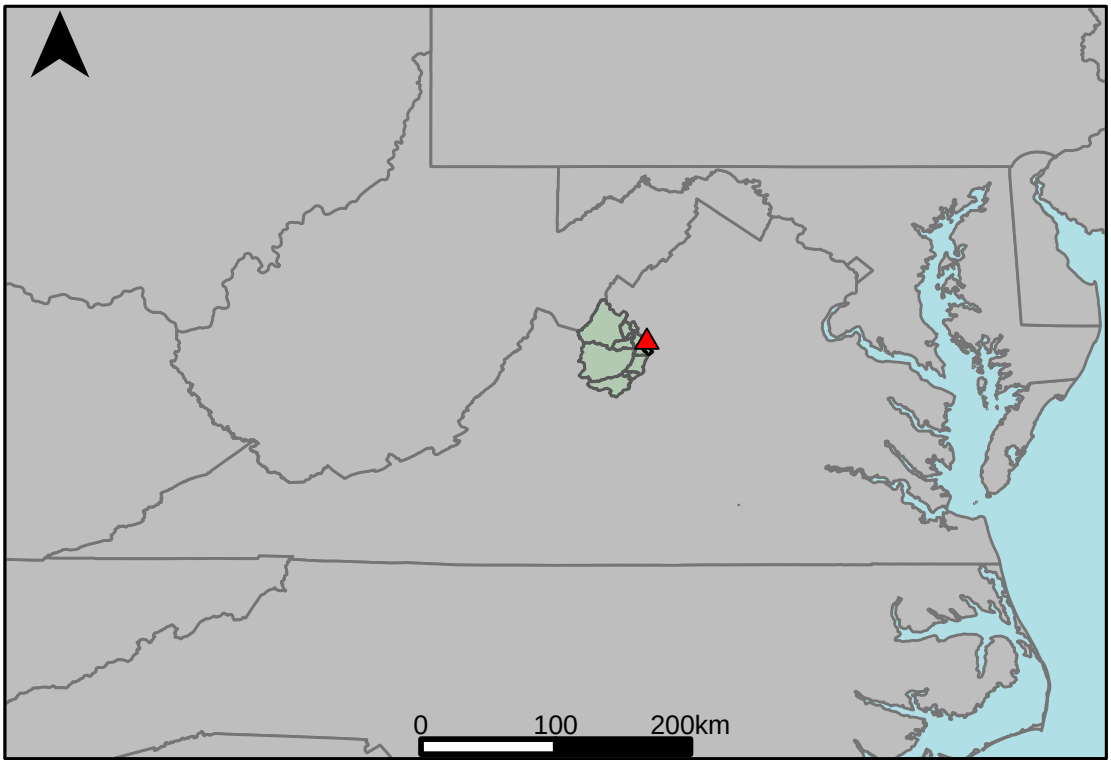
Appendix B.9: USGS Gage 01628500 vs. PS4_6360_5840 Shenandoah River



This river segment follows part of the flow of the South Fork of Shenandoah River, a tributary of the Potomac. The gage is located in Rockingham County (Lat. 38°19'21.5", Long. -78°45'17.1"), approximately 5.3 miles northeast of Grottoes, VA. Drainage area is 1079 sq. miles. This gage started taking data in 1930 and is still taking data. Diurnal fluctuations at low flow prior to 1960 are caused by a mill at Lynnwood and since by irrigation. The average daily discharge error between the model and gage data for the 20 year timespan was -6.25%, with 36.7% of its rolling three month time spans above 20% error.

Table 1: Monthly Low Flows

	USGS Gage	Model	Pct. Error
Jan. Low Flow	269	183	-32
Feb. Low Flow	327	349	6.73
Mar. Low Flow	448	552	23.2
Apr. Low Flow	520	651	25.2
May Low Flow	570	798	40
Jun. Low Flow	747	830	11.1
Jul. Low Flow	682	733	7.48
Aug. Low Flow	541	660	22
Sep. Low Flow	414	463	11.8
Oct. Low Flow	312	306	-1.92
Nov. Low Flow	291	268	-7.9
Dec. Low Flow	263	191	-27.4

Table 2: Monthly Average Flows

	USGS Gage	Model	Pct. Error
Overall Mean Flow	1120	1190	6.25
Jan. Mean Flow	1420	1370	-3.52
Feb. Mean Flow	1480	1740	17.6
Mar. Mean Flow	1880	2040	8.51
Apr. Mean Flow	1610	1630	1.24
May Mean Flow	1280	1270	-0.78
Jun. Mean Flow	926	992	7.13
Jul. Mean Flow	575	732	27.3
Aug. Mean Flow	551	589	6.9
Sep. Mean Flow	1020	1120	9.8
Oct. Mean Flow	628	736	17.2
Nov. Mean Flow	1060	1120	5.66
Dec. Mean Flow	1020	1040	1.96

Table 3: Monthly High Flows

	USGS Gage	Model	Pct. Error
Jan. High Flow	691	1120	62.1
Feb. High Flow	2870	2170	-24.4
Mar. High Flow	2680	2050	-23.5
Apr. High Flow	3090	3240	4.85
May High Flow	2130	1770	-16.9
Jun. High Flow	5470	4830	-11.7
Jul. High Flow	3180	3490	9.75
Aug. High Flow	2730	1960	-28.2
Sep. High Flow	1200	1850	54.2
Oct. High Flow	1280	1630	27.3
Nov. High Flow	654	1020	56
Dec. High Flow	531	755	42.2

Table 4: Period Low Flows

	USGS Gage	Model	Pct. Error
Min. 1 Day Min	84.1	50.8	-39.6
Med. 1 Day Min	234	141	-39.7
Min. 3 Day Min	85.6	51.8	-39.5
Med. 3 Day Min	236	147	-37.7
Min. 7 Day Min	89.6	54.2	-39.5
Med. 7 Day Min	242	157	-35.1
Min. 30 Day Min	105	71.1	-32.3
Med. 30 Day Min	277	215	-22.4
Min. 90 Day Min	136	142	4.41
Med. 90 Day Min	395	445	12.7
7Q10	156	73.7	-52.8
Year of 90-Day Min. Flow	2002	1999	100
Drought Year Mean	306	335	9.48
Mean Baseflow	611	691	13.1

Table 5: Period High Flows

	USGS Gage	Model	Pct. Error
Max. 1 Day Max	63500	55500	-12.6
Med. 1 Day Max	9850	11600	17.8
Max. 3 Day Max	41700	35800	-14.1
Med. 3 Day Max	7480	8820	17.9
Max. 7 Day Max	22500	20000	-11.1
Med. 7 Day Max	5520	6800	23.2
Max. 30 Day Max	7100	6430	-9.44
Med. 30 Day Max	2980	3220	8.05
Max. 90 Day Max	5030	4700	-6.56
Med. 90 Day Max	1930	1930	0

Table 6: Non-Exceedance Flows

	USGS Gage	Model	Pct. Error
1% Non-Exceedance	144	74.8	-48.1
5% Non-Exceedance	204	147	-27.9
50% Non-Exceedance	642	773	20.4
95% Non-Exceedance	3430	3510	2.33
99% Non-Exceedance	7520	8140	8.24
Sept. 10% Non-Exceedance	207	141	-31.9

Fig. 1: Hydrograph

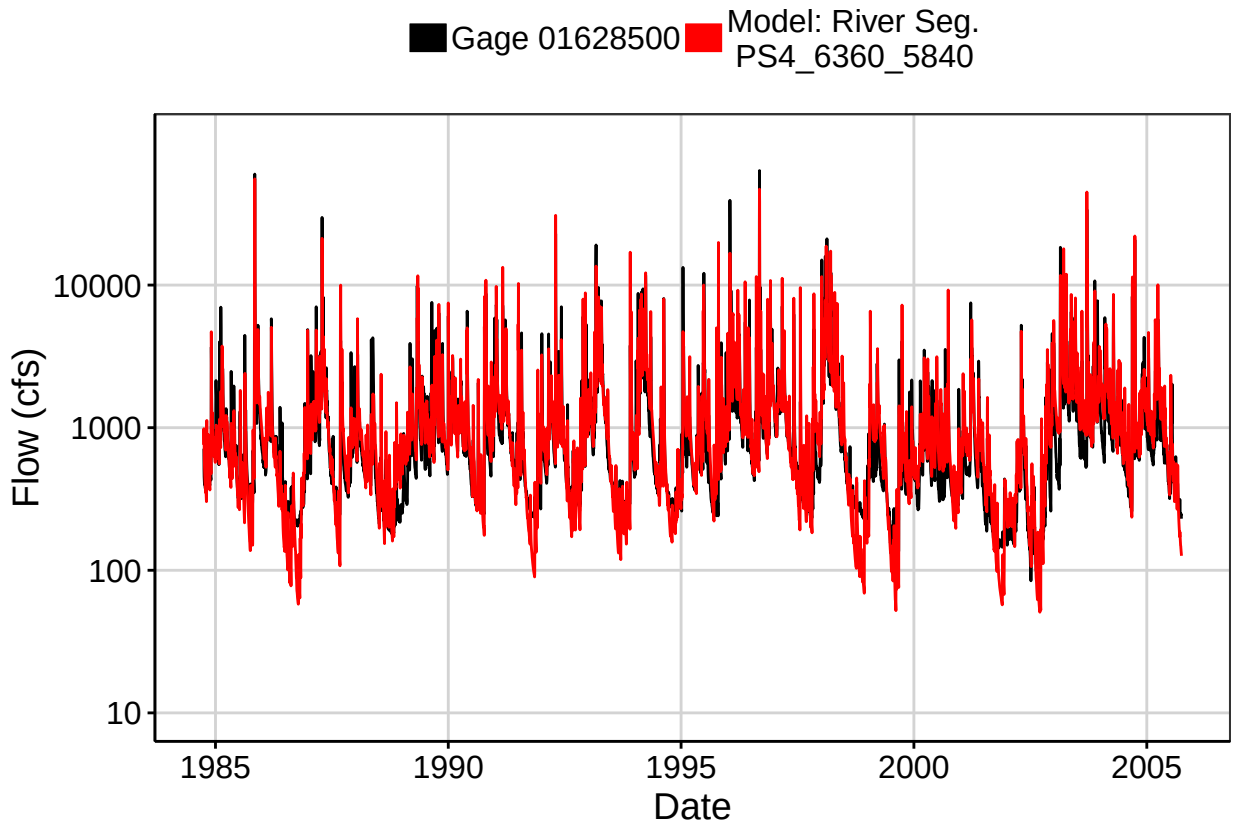


Fig. 2: Zoomed Hydrograph

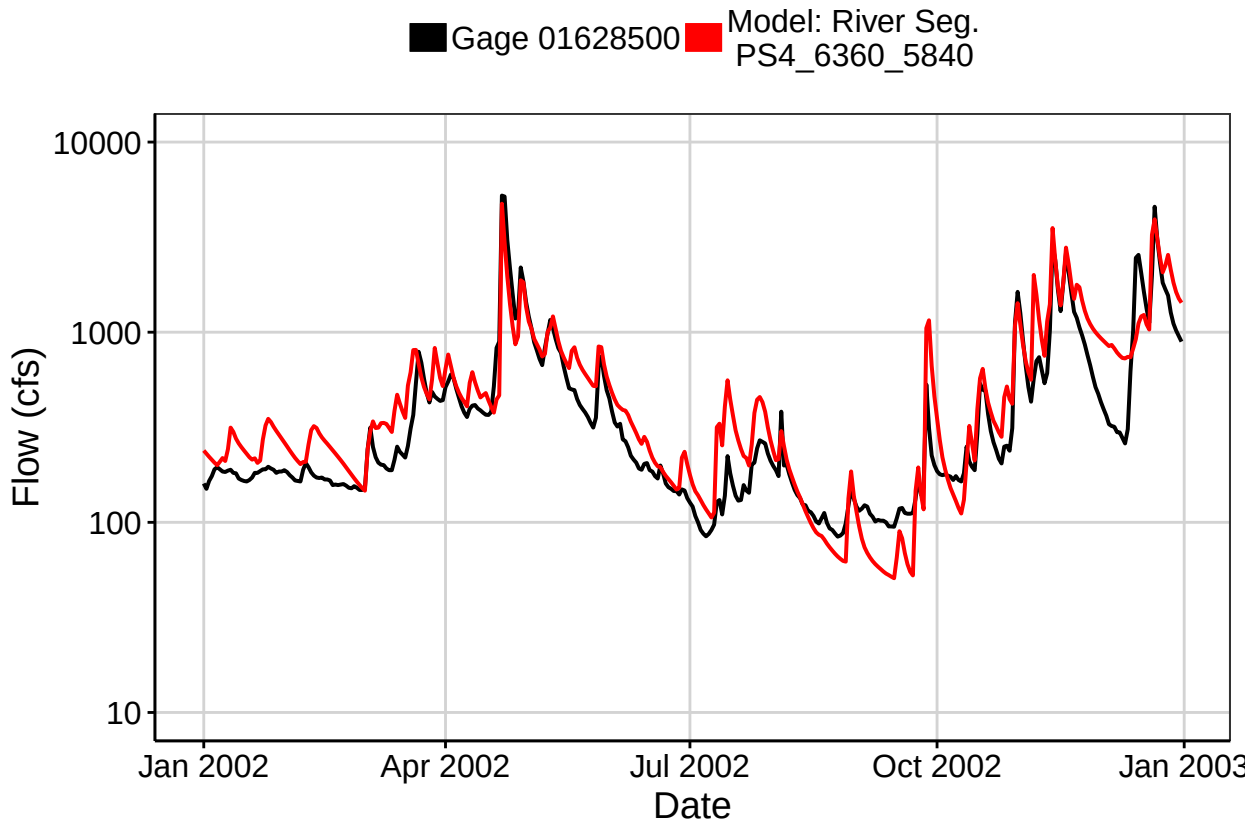


Fig. 3: Flow Exceedance

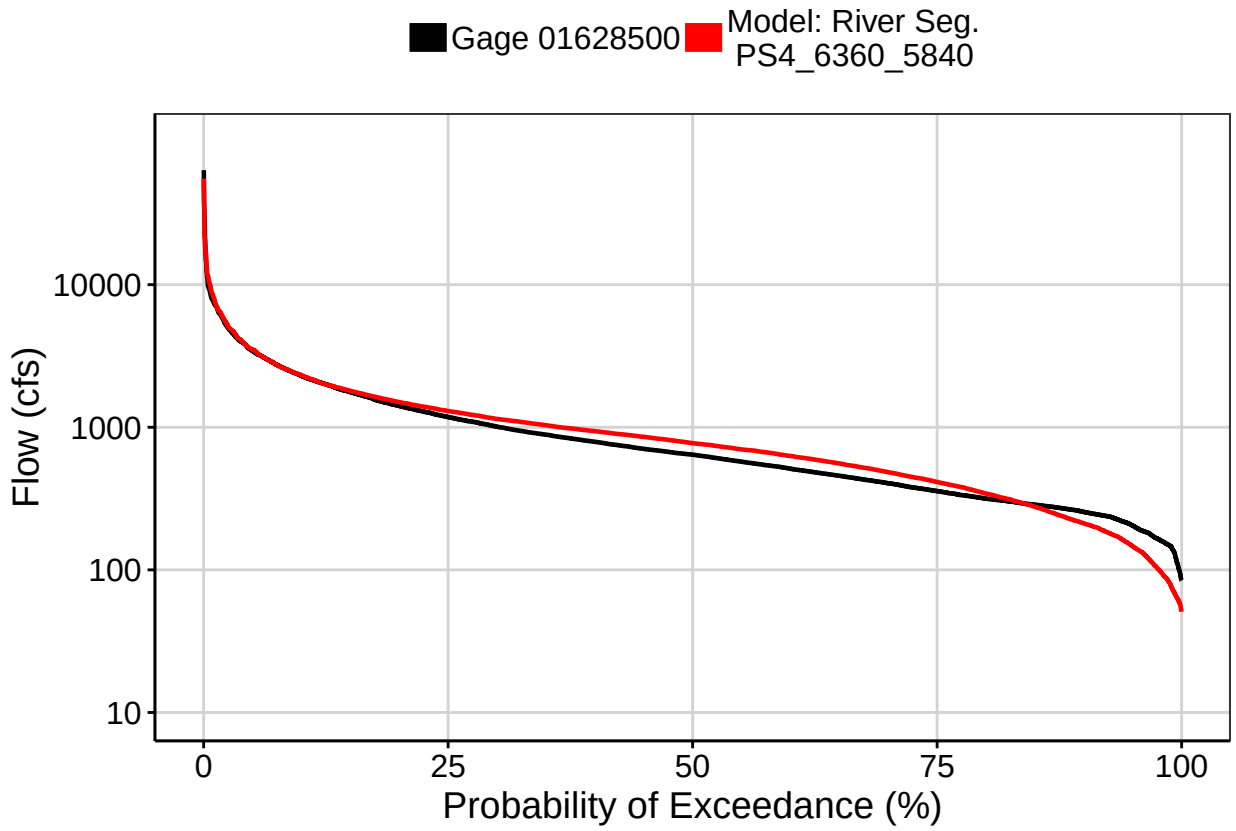


Fig. 4: Baseflow

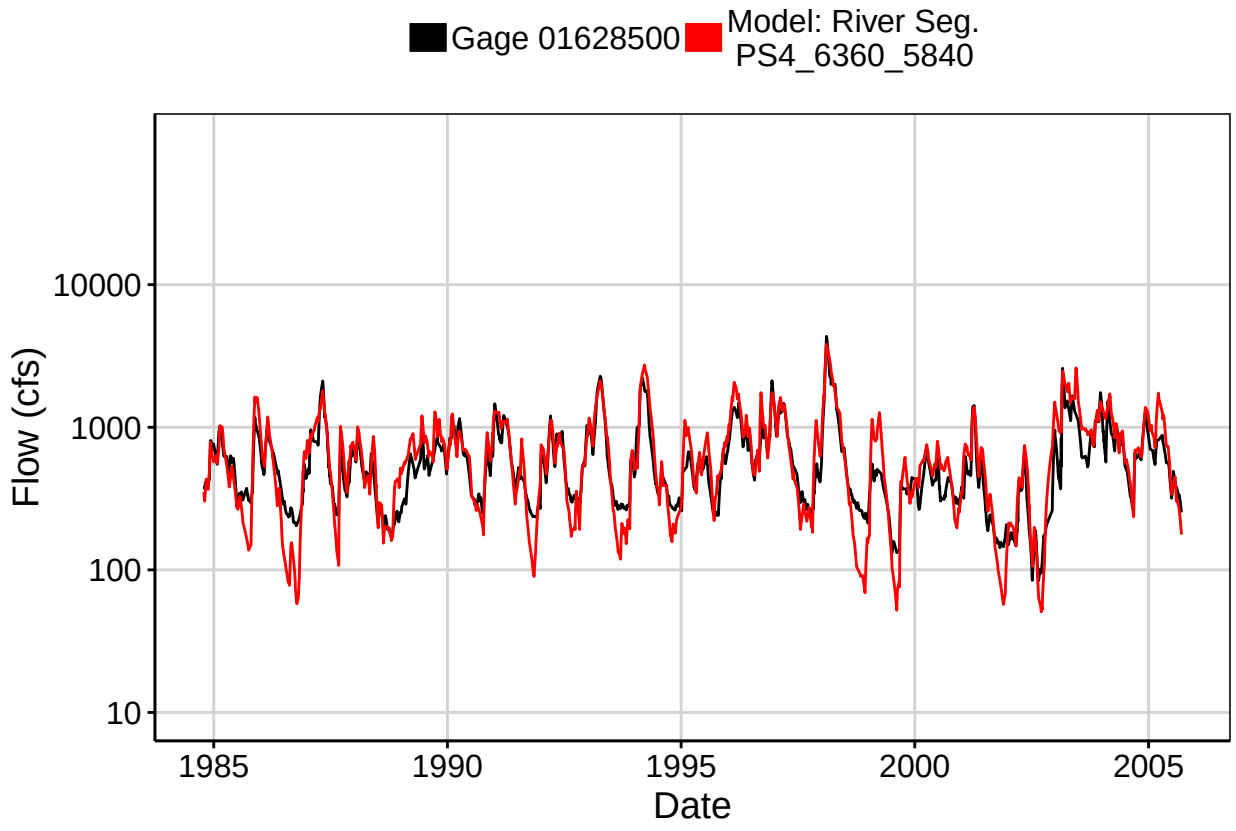


Fig. 5: Combined Baseflow

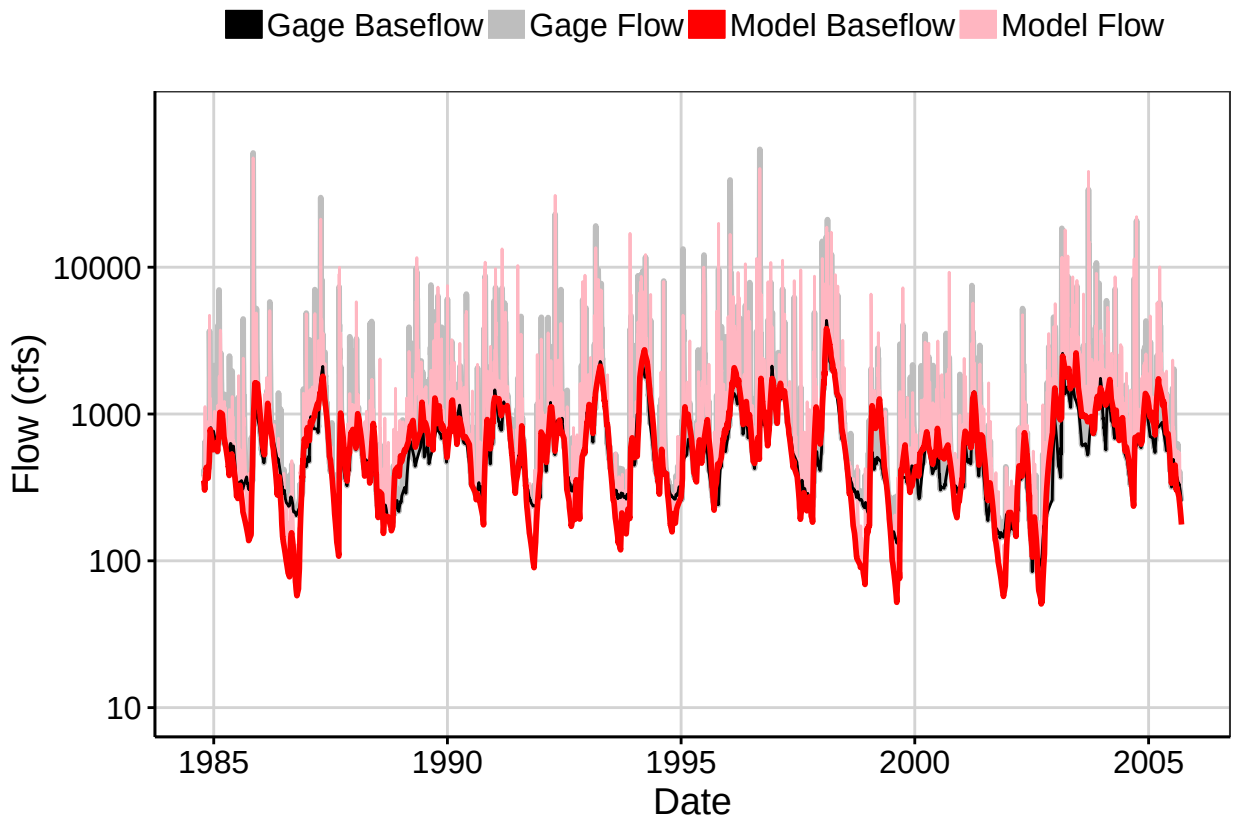


Fig. 6: Largest Error Segment

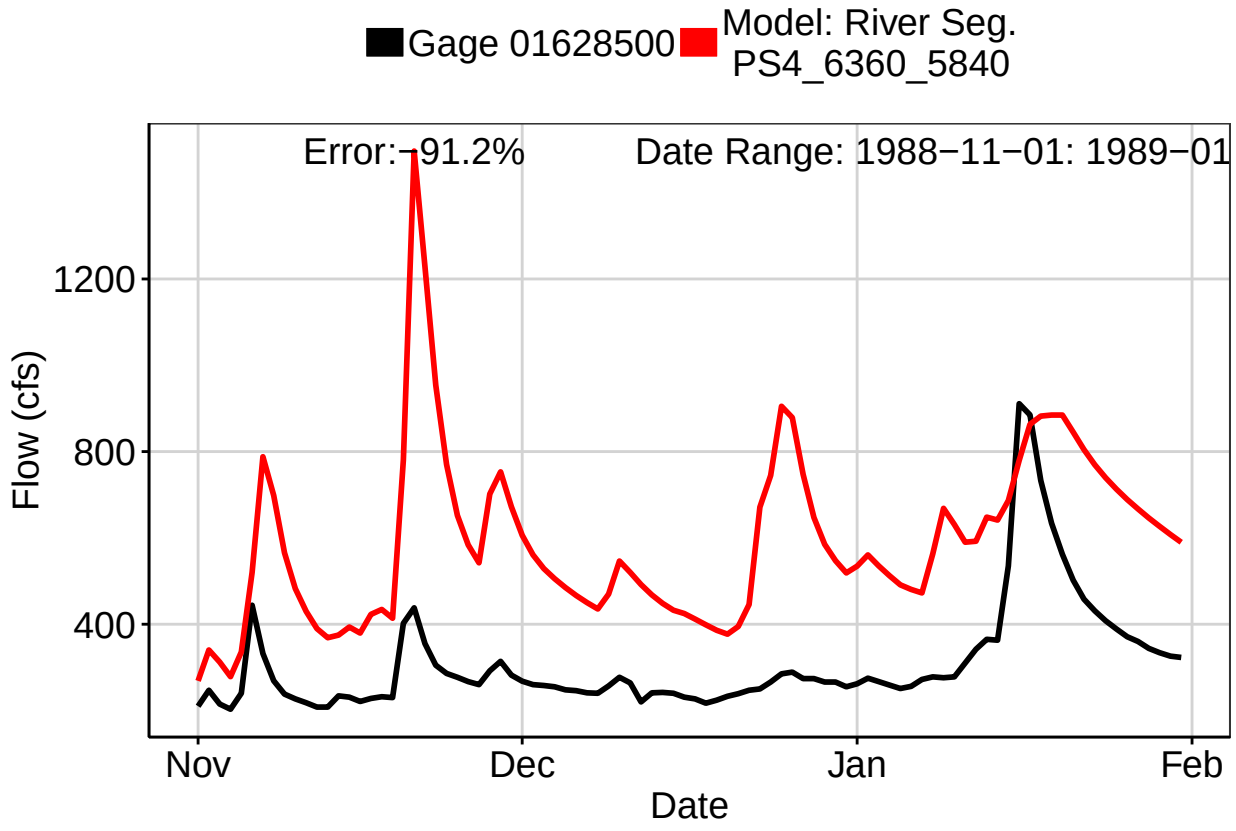


Fig. 7: Second Largest Error Segment

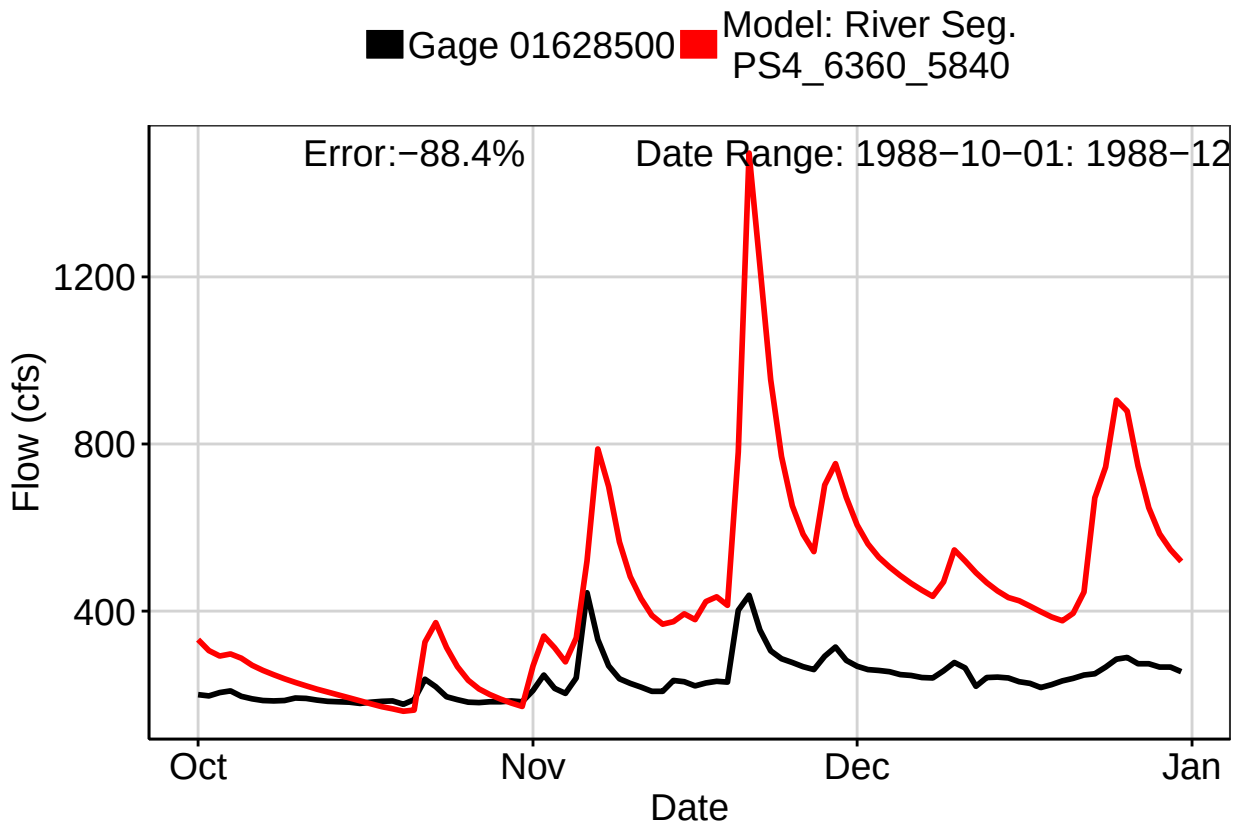


Fig. 8: Third Largest Error Segment

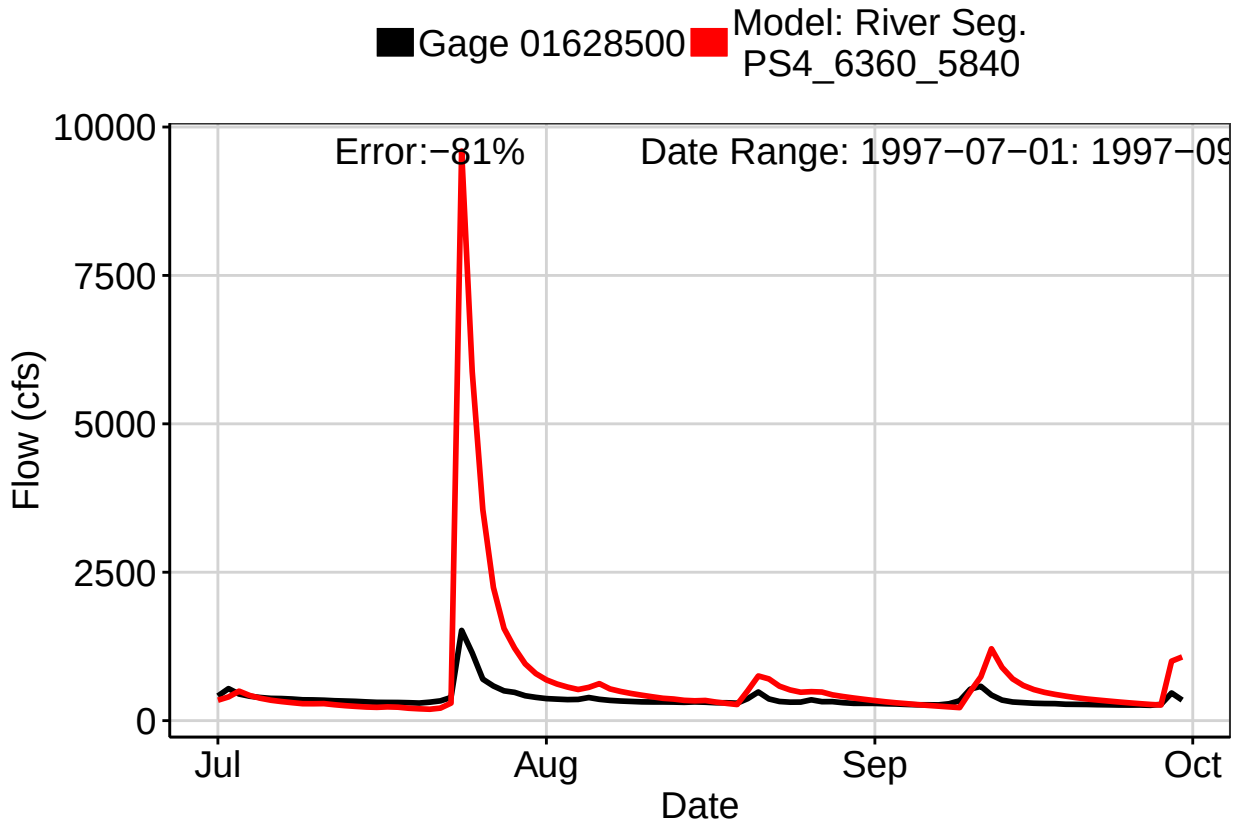


Fig. 9: Residuals Plot