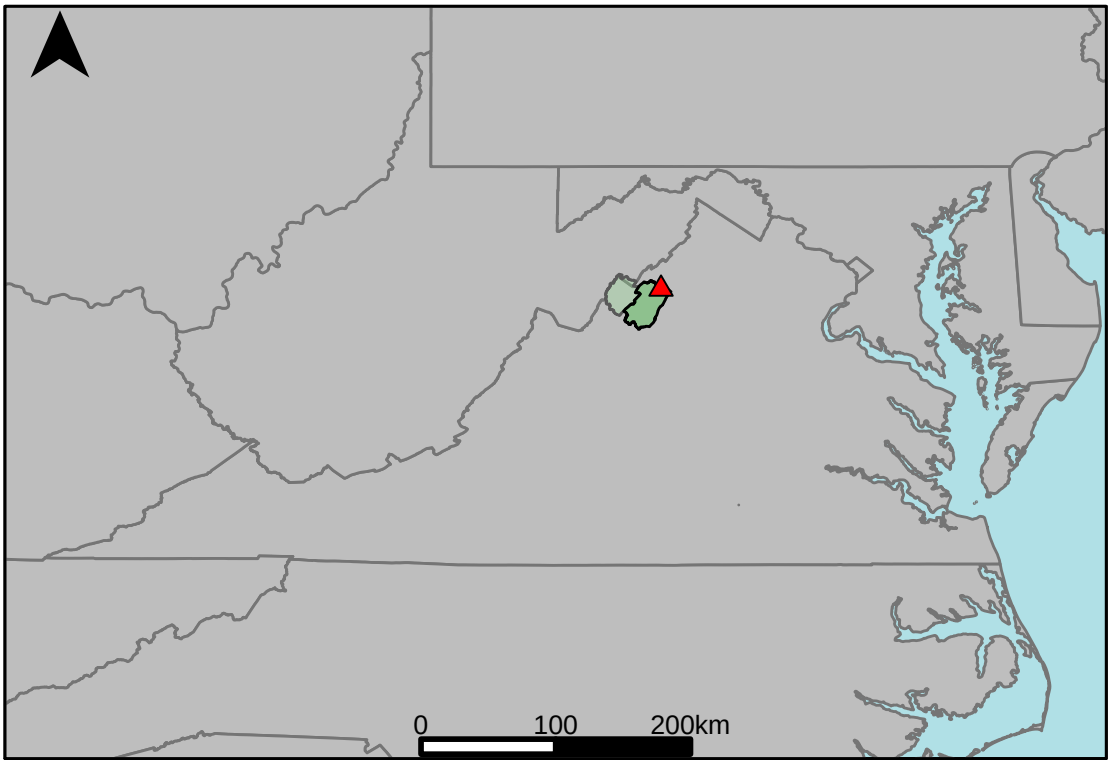
Appendix B.13: USGS Gage 01633000 vs. PS2_5560_5100 Shenandoah River



This river segment follows part of the flow of the North Fork of Shenandoah, a tributary of the Potomac. The gage is located in Shenandoah County (Lat. 38°44'44.4", Long. -78°38'20.1"), approximately 0.7 mile northeast of Mount Jackson, VA. Drainage area is 508 sq. miles. This gage started taking data in 1943 and is still taking data. There are some diversions during low flow for irrigation at points upstream. The average daily discharge error between the model and gage data for the 20 year timespan was -6.71%, with 42.1% of its rolling three month time spans above 20% error.

Table 1: Monthly Low Flows

	USGS Gage	Model	Pct. Error
Jan. Low Flow	46	37.5	-18.5
Feb. Low Flow	77	81.2	5.45
Mar. Low Flow	122	156	27.9
Apr. Low Flow	169	218	29
May Low Flow	171	275	60.8
Jun. Low Flow	242	328	35.5
Jul. Low Flow	244	250	2.46
Aug. Low Flow	177	197	11.3
Sep. Low Flow	104	112	7.69
Oct. Low Flow	61.5	71.3	15.9
Nov. Low Flow	49.5	41.9	-15.4
Dec. Low Flow	39.4	36	-8.63

Table 2: Monthly Average Flows

	USGS Gage	Model	Pct. Error
Overall Mean Flow	447	477	6.71
Jan. Mean Flow	568	548	-3.52
Feb. Mean Flow	551	701	27.2
Mar. Mean Flow	886	973	9.82
Apr. Mean Flow	710	677	-4.65
May Mean Flow	576	492	-14.6
Jun. Mean Flow	329	323	-1.82
Jul. Mean Flow	171	216	26.3
Aug. Mean Flow	193	217	12.4
Sep. Mean Flow	358	500	39.7
Oct. Mean Flow	217	243	12
Nov. Mean Flow	403	480	19.1
Dec. Mean Flow	417	382	-8.39

Table 3: Monthly High Flows

	USGS Gage	Model	Pct. Error
Jan. High Flow	190	366	92.6
Feb. High Flow	1400	907	-35.2
Mar. High Flow	1210	659	-45.5
Apr. High Flow	1480	1480	0
May High Flow	926	1040	12.3
Jun. High Flow	3480	3250	-6.61
Jul. High Flow	1880	1890	0.53
Aug. High Flow	1810	1170	-35.4
Sep. High Flow	490	567	15.7
Oct. High Flow	458	563	22.9
Nov. High Flow	165	221	33.9
Dec. High Flow	205	205	0

Table 4: Period Low Flows

	USGS Gage	Model	Pct. Error
Min. 1 Day Min	1.8	2.89	60.6
Med. 1 Day Min	37	23.5	-36.5
Min. 3 Day Min	2.3	3.07	33.5
Med. 3 Day Min	38	24.7	-35
Min. 7 Day Min	2.84	3.56	25.4
Med. 7 Day Min	39.7	27.6	-30.5
Min. 30 Day Min	6.07	7.22	18.9
Med. 30 Day Min	45.6	40	-12.3
Min. 90 Day Min	19.6	22.8	16.3
Med. 90 Day Min	86.1	102	18.5
7Q10	14.7	5.84	-60.3
Year of 90-Day Min. Flow	1999	1999	0
Drought Year Mean	144	181	25.7
Mean Baseflow	193	243	25.9

Table 5: Period High Flows

	USGS Gage	Model	Pct. Error
Max. 1 Day Max	32200	40800	26.7
Med. 1 Day Max	7140	8550	19.7
Max. 3 Day Max	20000	21400	7
Med. 3 Day Max	4510	4230	-6.21
Max. 7 Day Max	9640	11100	15.1
Med. 7 Day Max	2690	2510	-6.69
Max. 30 Day Max	2940	3300	12.2
Med. 30 Day Max	1330	1200	-9.77
Max. 90 Day Max	1860	2120	14
Med. 90 Day Max	759	786	3.56

Table 6: Non-Exceedance Flows

	USGS Gage	Model	Pct. Error
1% Non-Exceedance	12	8.01	-33.2
5% Non-Exceedance	34	25.5	-25
50% Non-Exceedance	199	261	31.2
95% Non-Exceedance	1560	1500	-3.85
99% Non-Exceedance	3920	3750	-4.34
Sept. 10% Non-Exceedance	33	18	-45.5

Fig. 1: Hydrograph

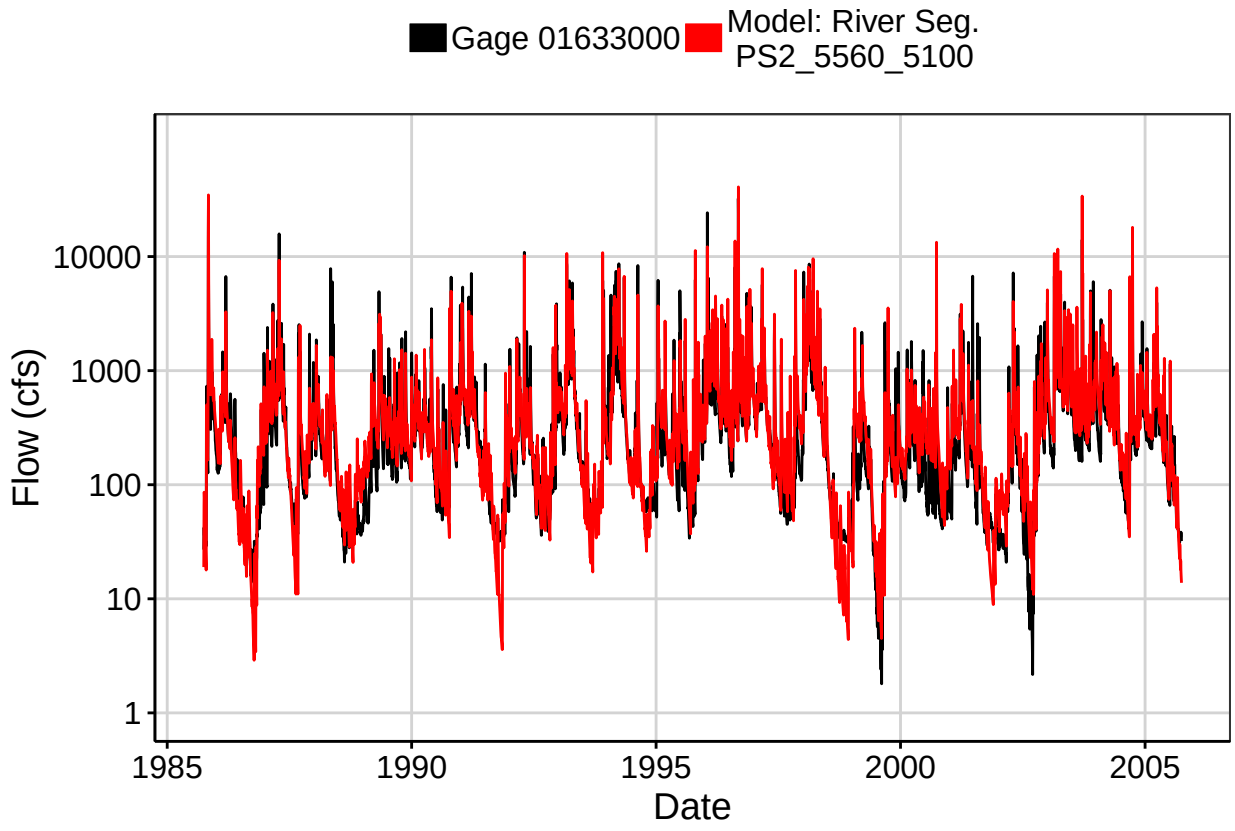


Fig. 2: Zoomed Hydrograph

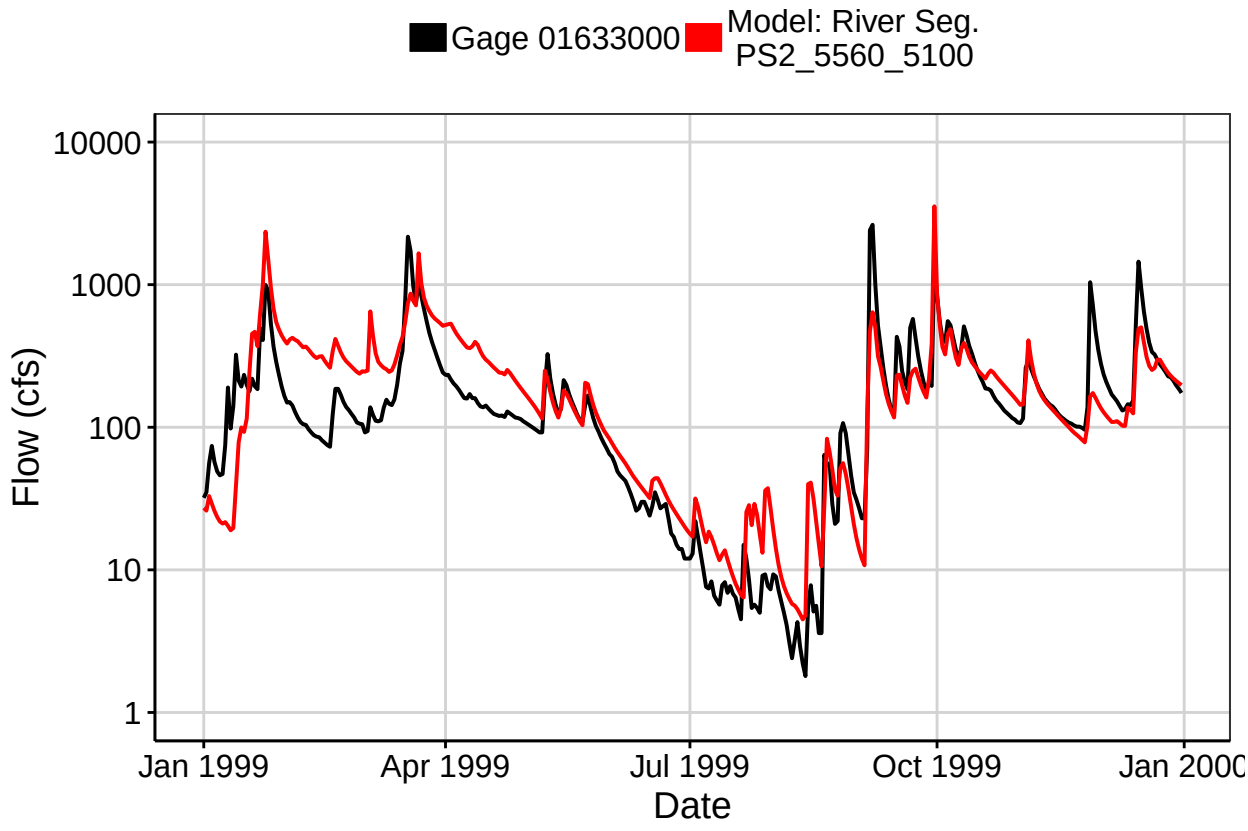


Fig. 3: Flow Exceedance

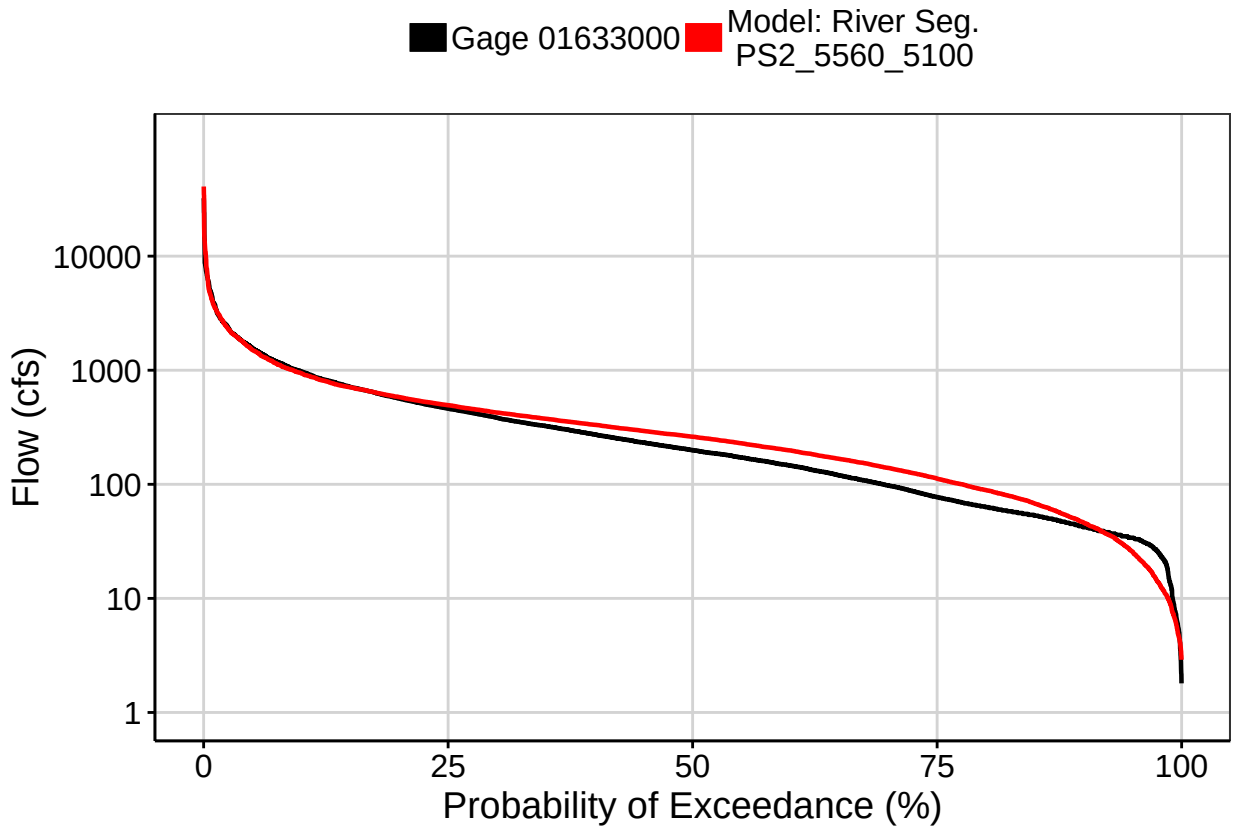


Fig. 4: Baseflow

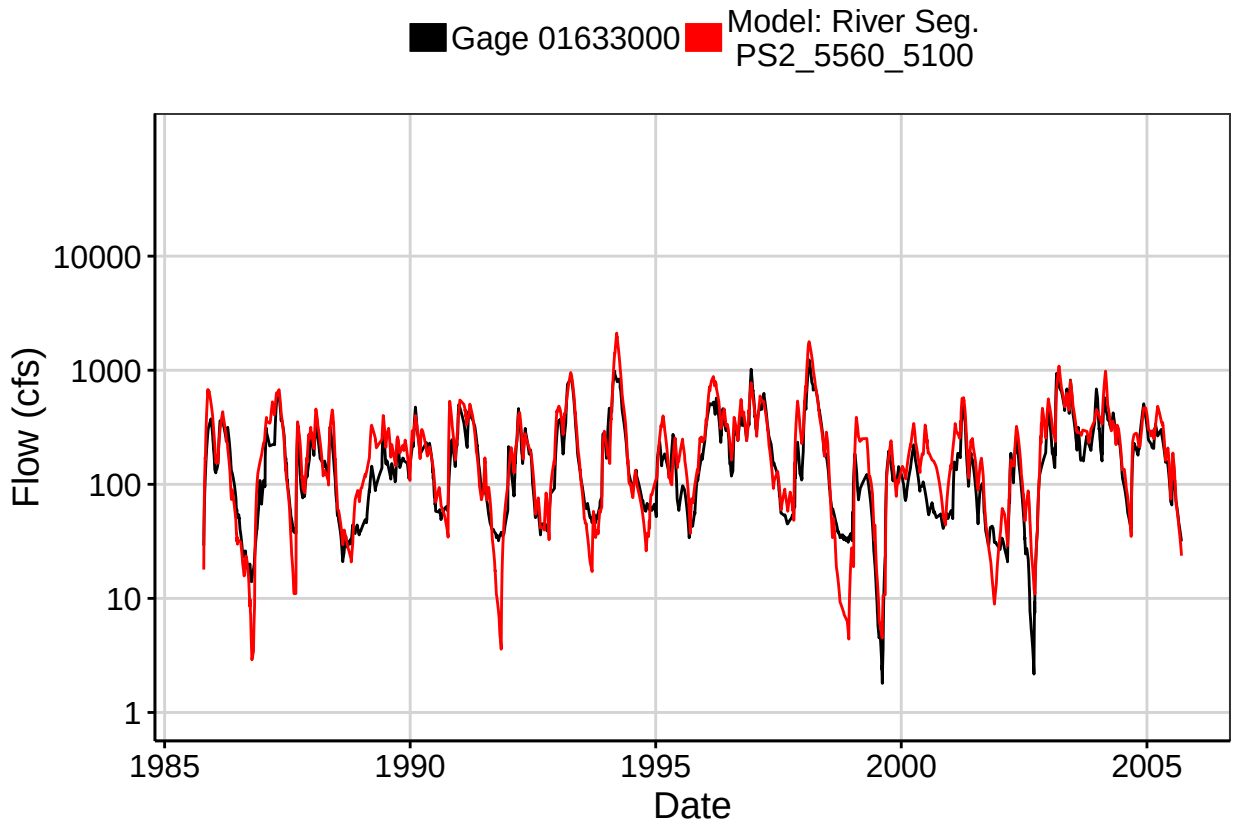


Fig. 5: Combined Baseflow

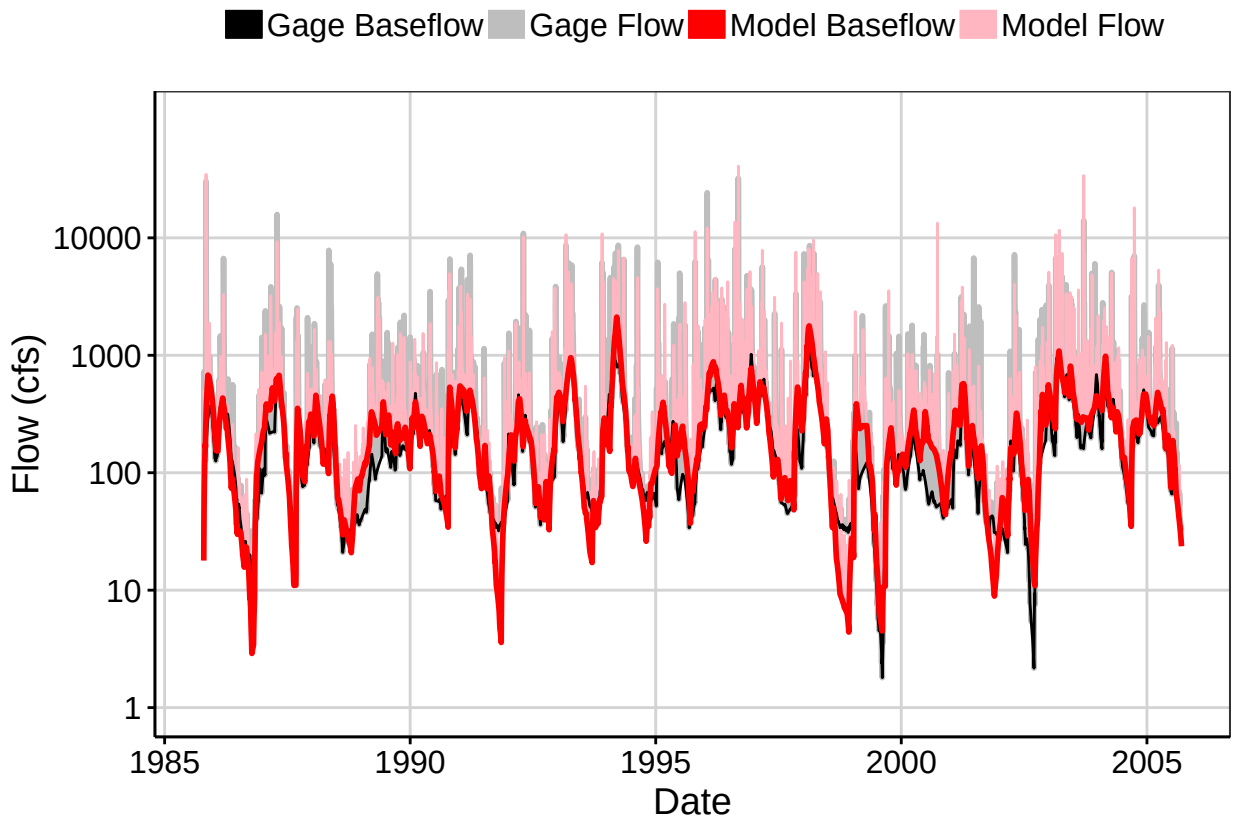


Fig. 6: Largest Error Segment

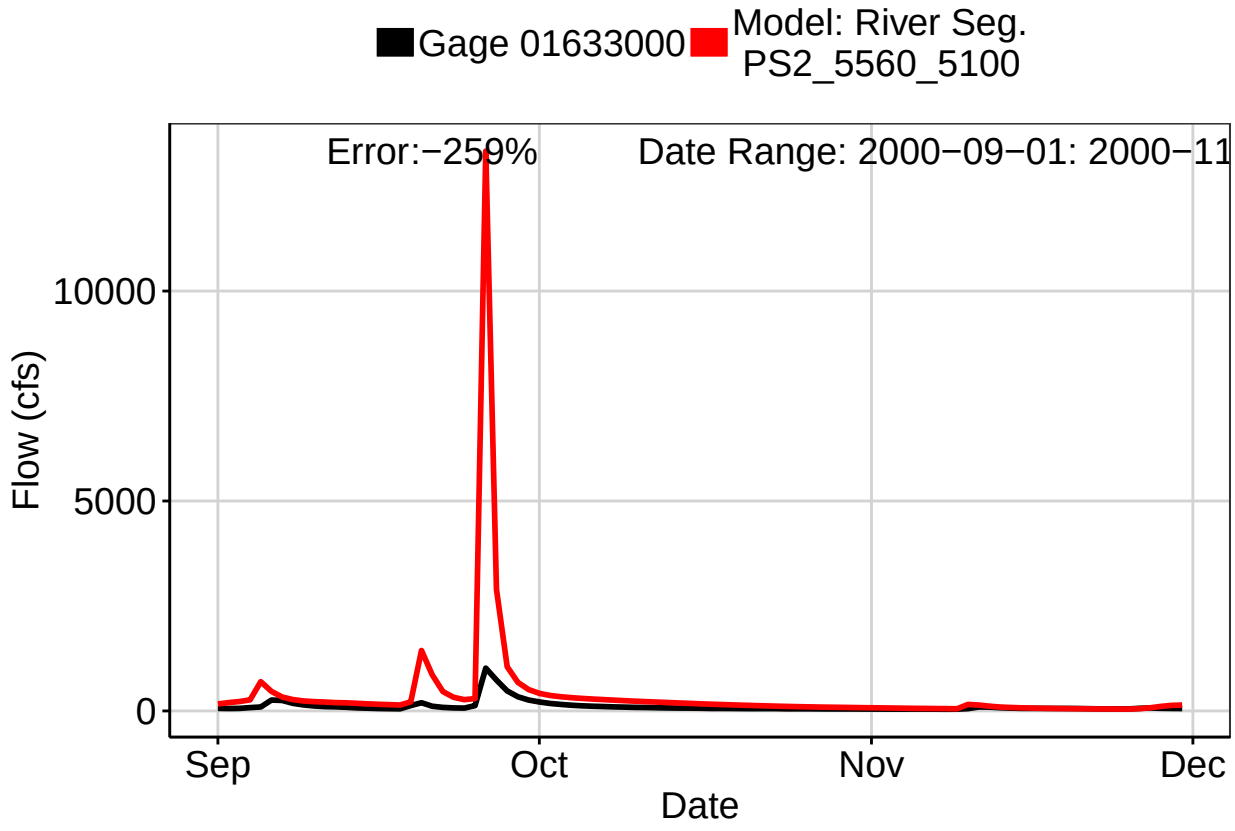


Fig. 7: Second Largest Error Segment

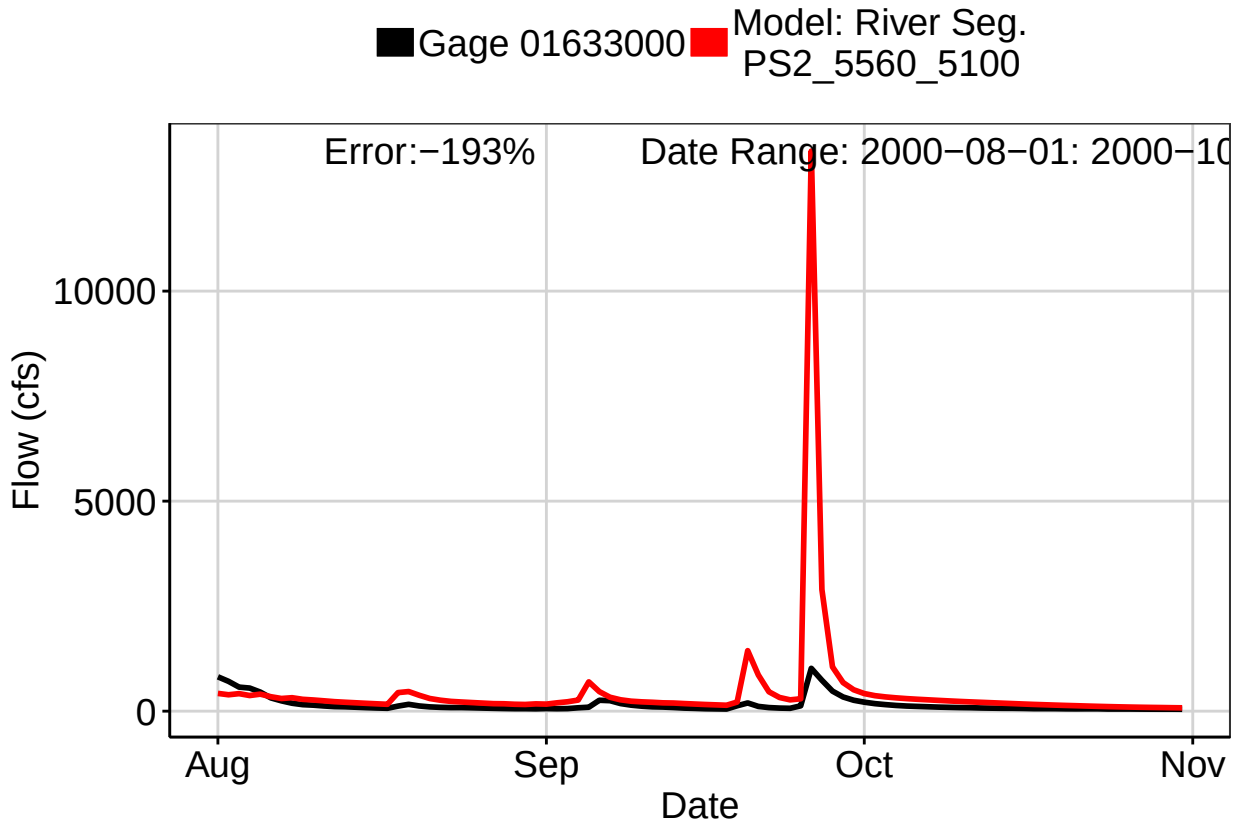


Fig. 8: Third Largest Error Segment

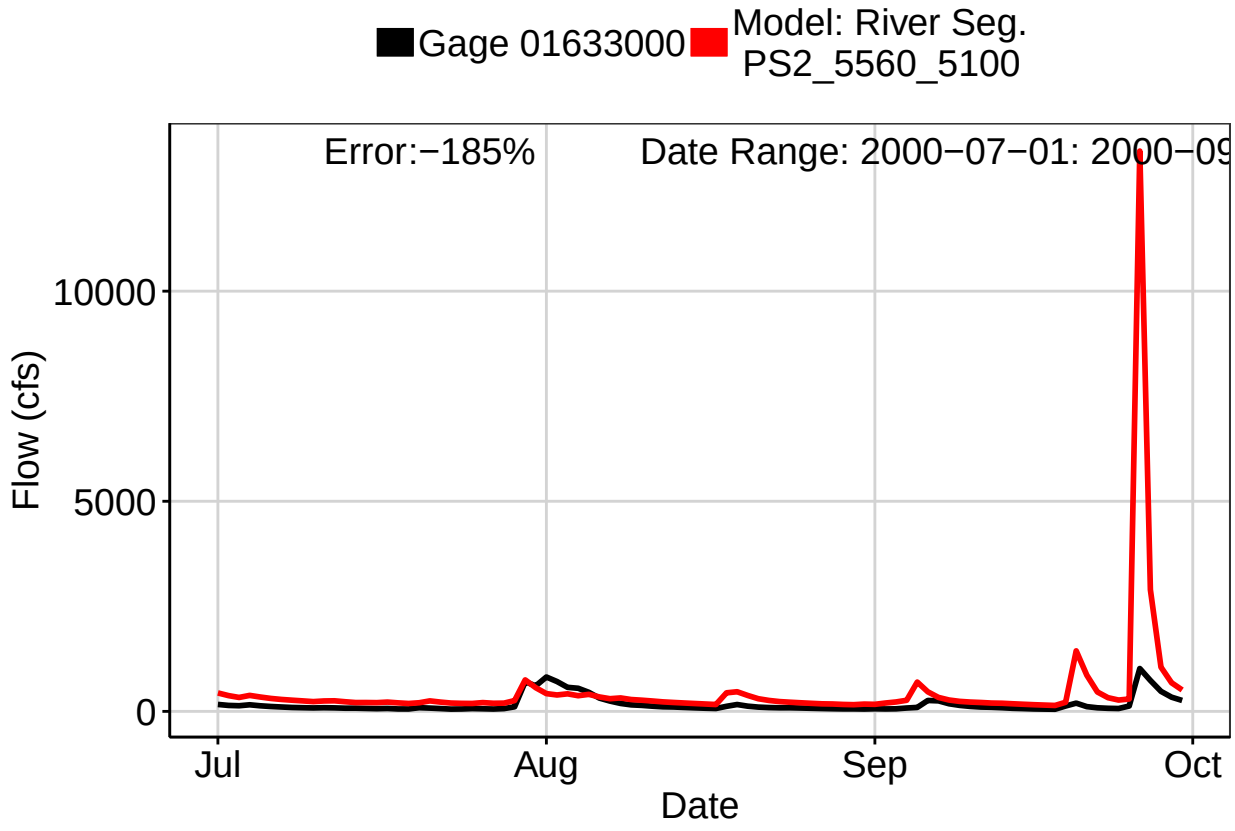


Fig. 9: Residuals Plot