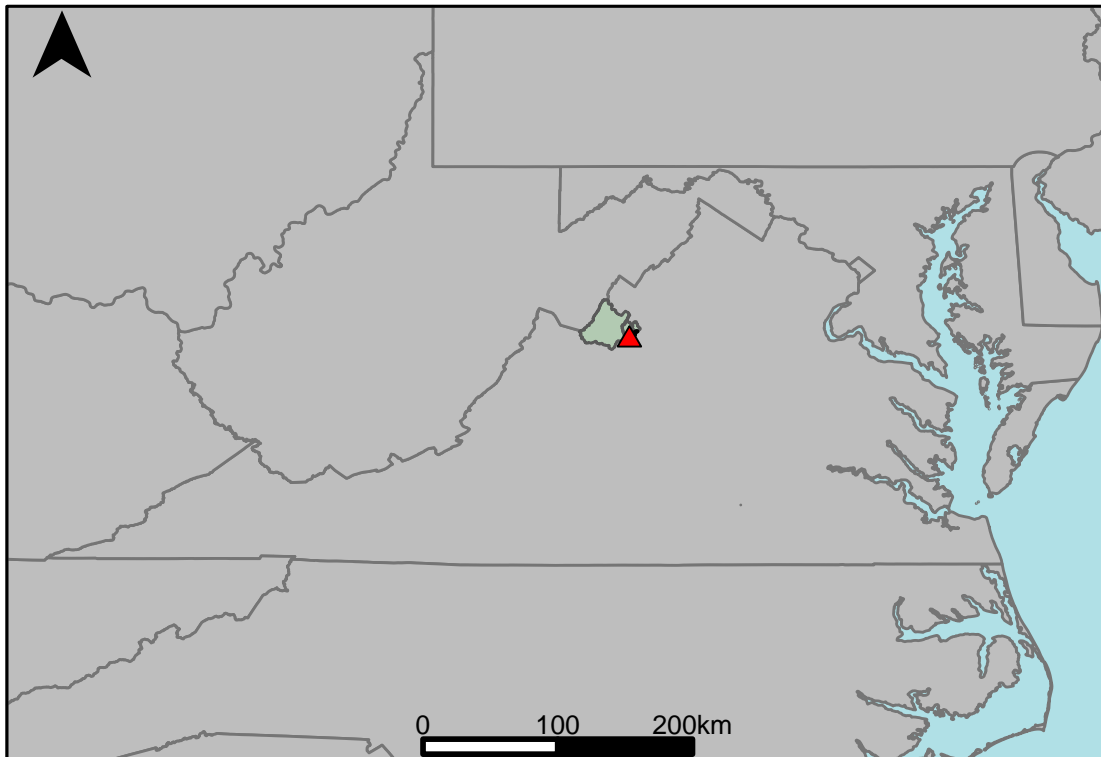


Appendix B.3: USGS Gage 01622000 vs. PS3_6161_6280 Shenandoah River



This river segment follows part of the flow of the North River, a tributary of the Potomac. The gage is located in Rockingham County (Lat. $38^{\circ}20'25.5''$, Long. $-78^{\circ}54'49.1''$), approximately 2 miles southeast of Mount Crawford, VA. Drainage area is 376 sq. miles. This gage started taking data in 1926 and is still taking data. At a point 26.8 mi upstream, there is a diversion from the Staunton Dam Reservoir. Diurnal fluctuation at low and medium flow is caused by a wastewater treatment plant discharge and irrigation at points upstream. The average daily discharge error between the model and gage data for the 20 year timespan was 4.09%, with 46.7% of its rolling three month time spans above 20% error.

Table 1: Monthly Low Flows

	USGS Gage	Model	Pct. Error
Jan. Low Flow	74	48.6	-34.3
Feb. Low Flow	101	84.2	-16.6
Mar. Low Flow	148	161	8.78
Apr. Low Flow	169	191	13
May Low Flow	183	245	33.9
Jun. Low Flow	252	250	-0.79
Jul. Low Flow	230	201	-12.6
Aug. Low Flow	180	164	-8.89
Sep. Low Flow	122	96.1	-21.2
Oct. Low Flow	87	61.9	-28.9
Nov. Low Flow	84	54.9	-34.6
Dec. Low Flow	75	38.3	-48.9

Table 2: Monthly Average Flows

	USGS Gage	Model	Pct. Error
Overall Mean Flow	416	399	-4.09
Jan. Mean Flow	519	468	-9.83
Feb. Mean Flow	486	591	21.6
Mar. Mean Flow	720	722	0.28
Apr. Mean Flow	601	528	-12.1
May Mean Flow	526	401	-23.8
Jun. Mean Flow	371	296	-20.2
Jul. Mean Flow	190	211	11.1
Aug. Mean Flow	214	188	-12.1
Sep. Mean Flow	393	405	3.05
Oct. Mean Flow	212	239	12.7
Nov. Mean Flow	380	407	7.11
Dec. Mean Flow	393	352	-10.4

Table 3: Monthly High Flows

	USGS Gage	Model	Pct. Error
Jan. High Flow	206	401	94.7
Feb. High Flow	1240	946	-23.7
Mar. High Flow	1050	495	-52.9
Apr. High Flow	1040	1360	30.8
May High Flow	737	624	-15.3
Jun. High Flow	2060	2050	-0.48
Jul. High Flow	1440	1440	0
Aug. High Flow	1400	778	-44.4
Sep. High Flow	462	630	36.4
Oct. High Flow	366	583	59.3
Nov. High Flow	280	343	22.5
Dec. High Flow	202	305	51

Table 4: Period Low Flows

	USGS Gage	Model	Pct. Error
Min. 1 Day Min	30	13.1	-56.3
Med. 1 Day Min	63	27	-57.1
Min. 3 Day Min	30.7	13.2	-57
Med. 3 Day Min	64.3	28.3	-56
Min. 7 Day Min	32.3	13.5	-58.2
Med. 7 Day Min	66.9	30.6	-54.3
Min. 30 Day Min	37.7	17.1	-54.6
Med. 30 Day Min	78.8	52.5	-33.4
Min. 90 Day Min	50.2	32.1	-36.1
Med. 90 Day Min	110	120	9.09
7Q10	39.9	16.6	-58.4
Year of 90-Day Min. Flow	1999	1999	0
Drought Year Mean	145	184	26.9
Mean Baseflow	206	206	0

Table 5: Period High Flows

	USGS Gage	Model	Pct. Error
Max. 1 Day Max	32000	31700	-0.94
Med. 1 Day Max	4070	5650	38.8
Max. 3 Day Max	21500	15700	-27
Med. 3 Day Max	3310	2910	-12.1
Max. 7 Day Max	11100	8260	-25.6
Med. 7 Day Max	2190	2180	-0.46
Max. 30 Day Max	3230	2560	-20.7
Med. 30 Day Max	1110	1100	-0.9
Max. 90 Day Max	1670	1690	1.2
Med. 90 Day Max	652	661	1.38

Table 6: Non-Exceedance Flows

	USGS Gage	Model	Pct. Error
1% Non-Exceedance	41	16.4	-60
5% Non-Exceedance	54	30.8	-43
50% Non-Exceedance	224	234	4.46
95% Non-Exceedance	1350	1190	-11.9
99% Non-Exceedance	2920	2960	1.37
Sept. 10% Non-Exceedance	54	26.8	-50.4

Fig. 1: Hydrograph

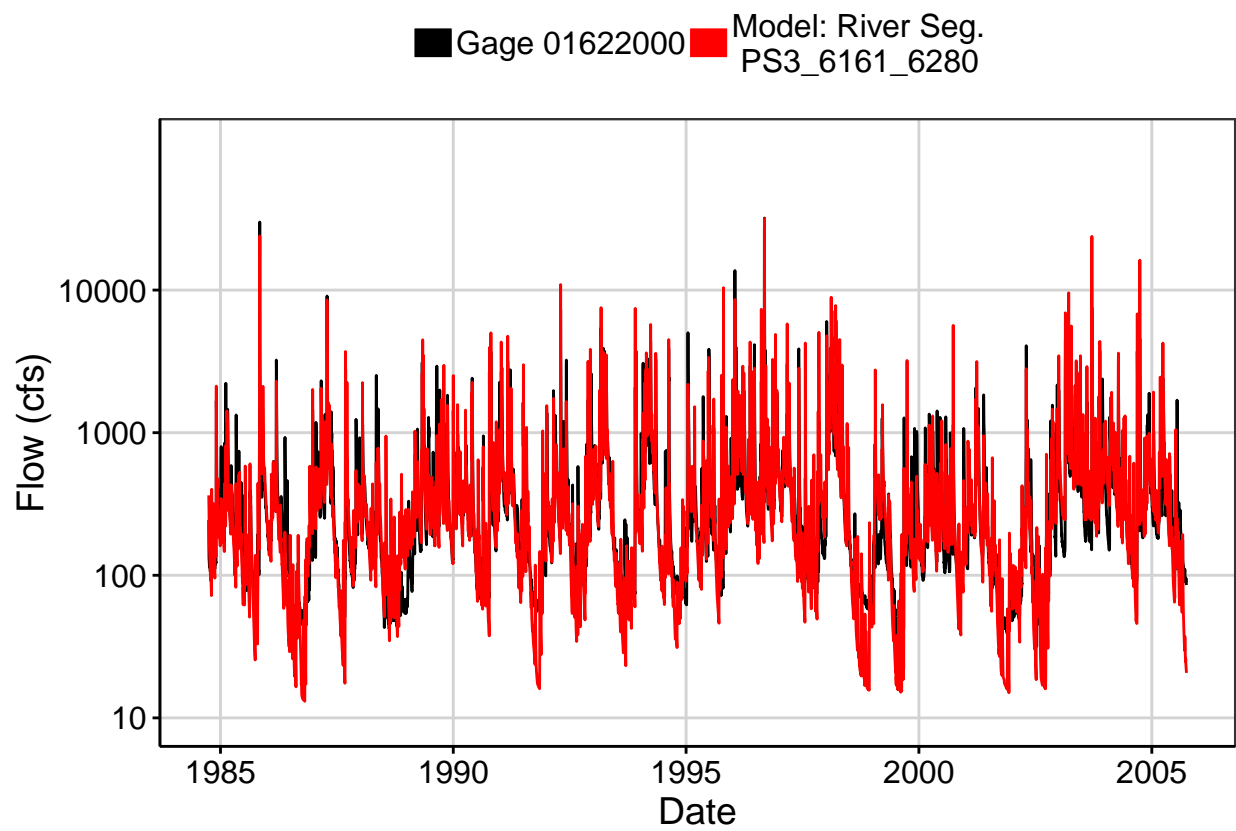


Fig. 2: Zoomed Hydrograph

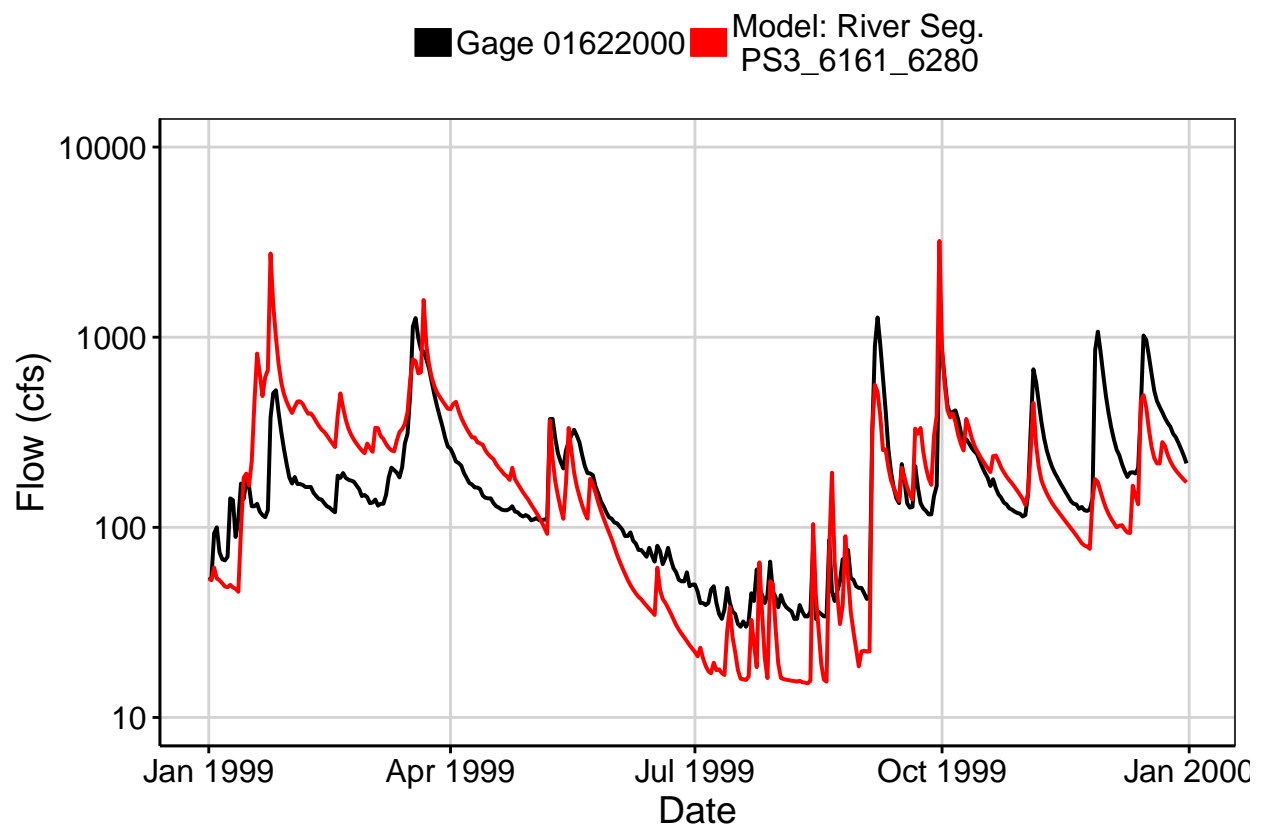


Fig. 3: Flow Exceedance

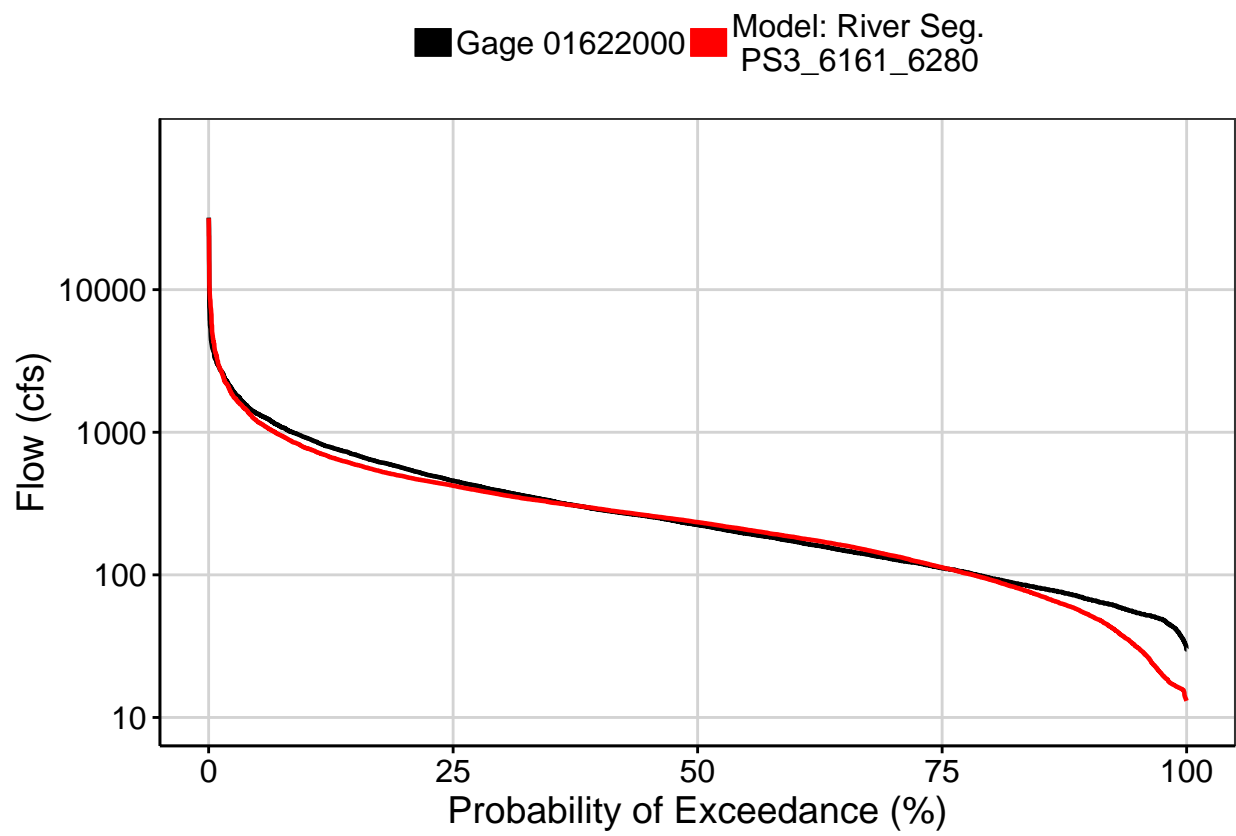


Fig. 4: Baseflow

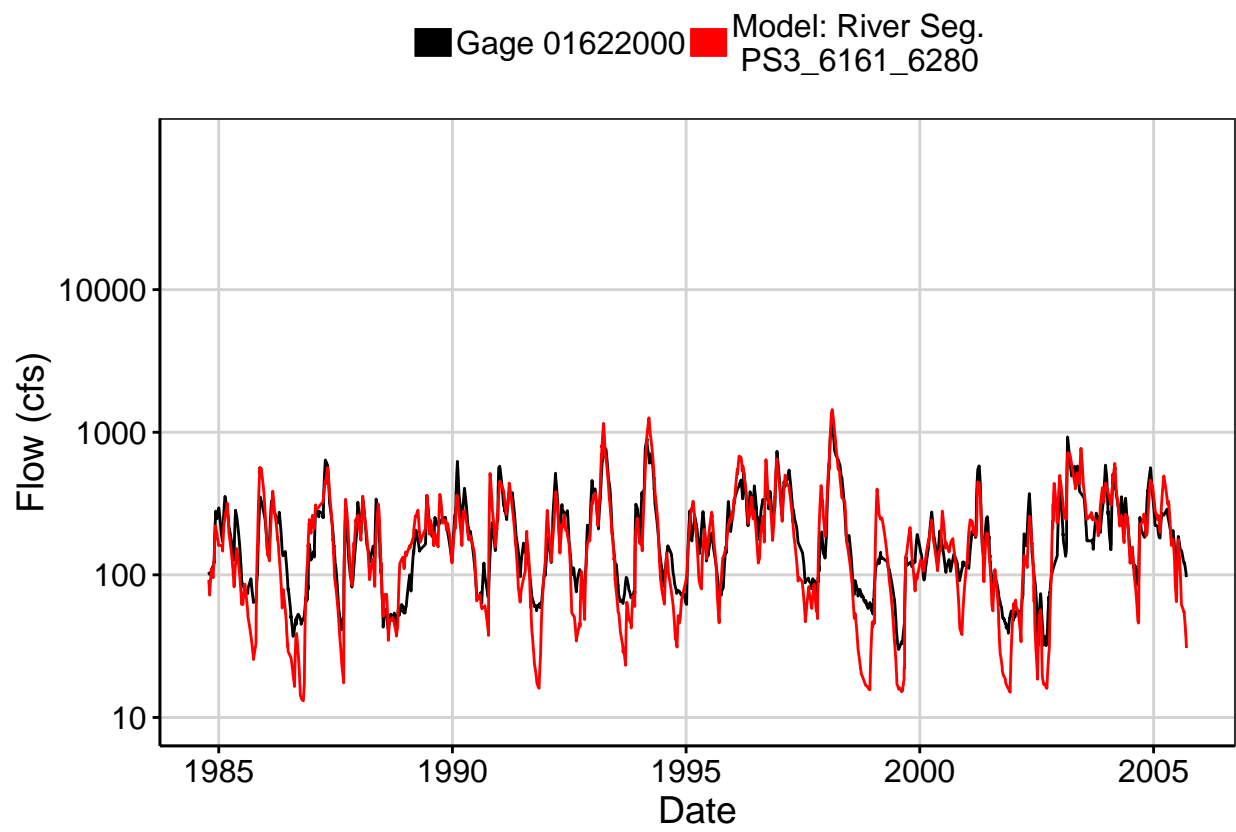


Fig. 5: Combined Baseflow

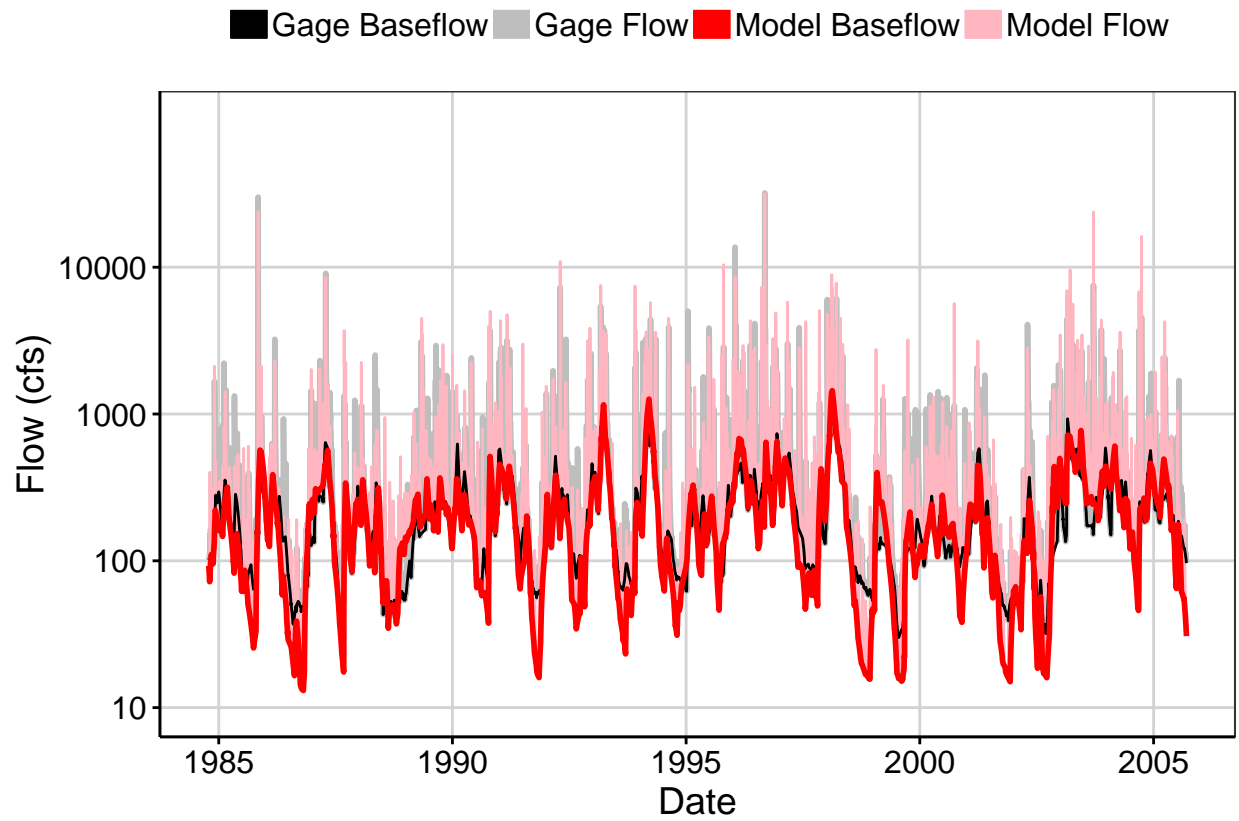


Fig. 6: Largest Error Segment

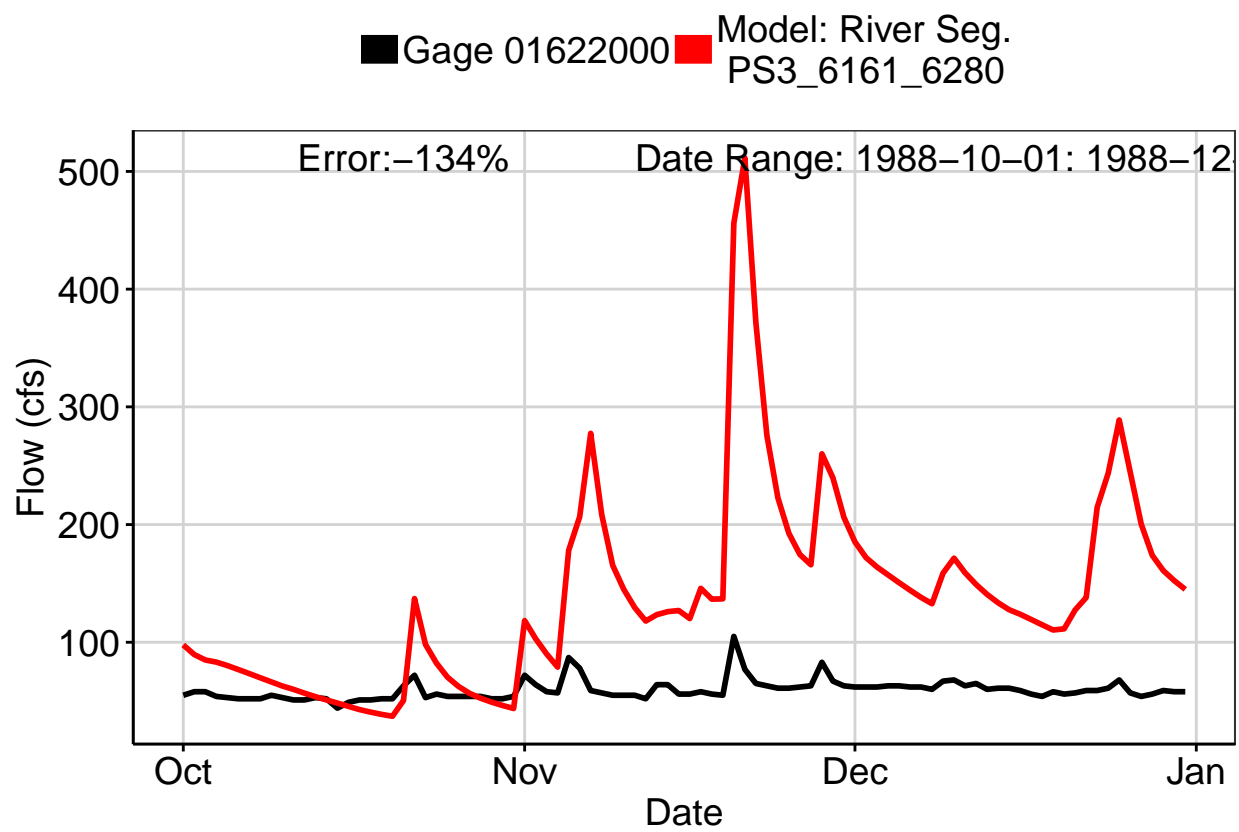


Fig. 7: Second Largest Error Segment

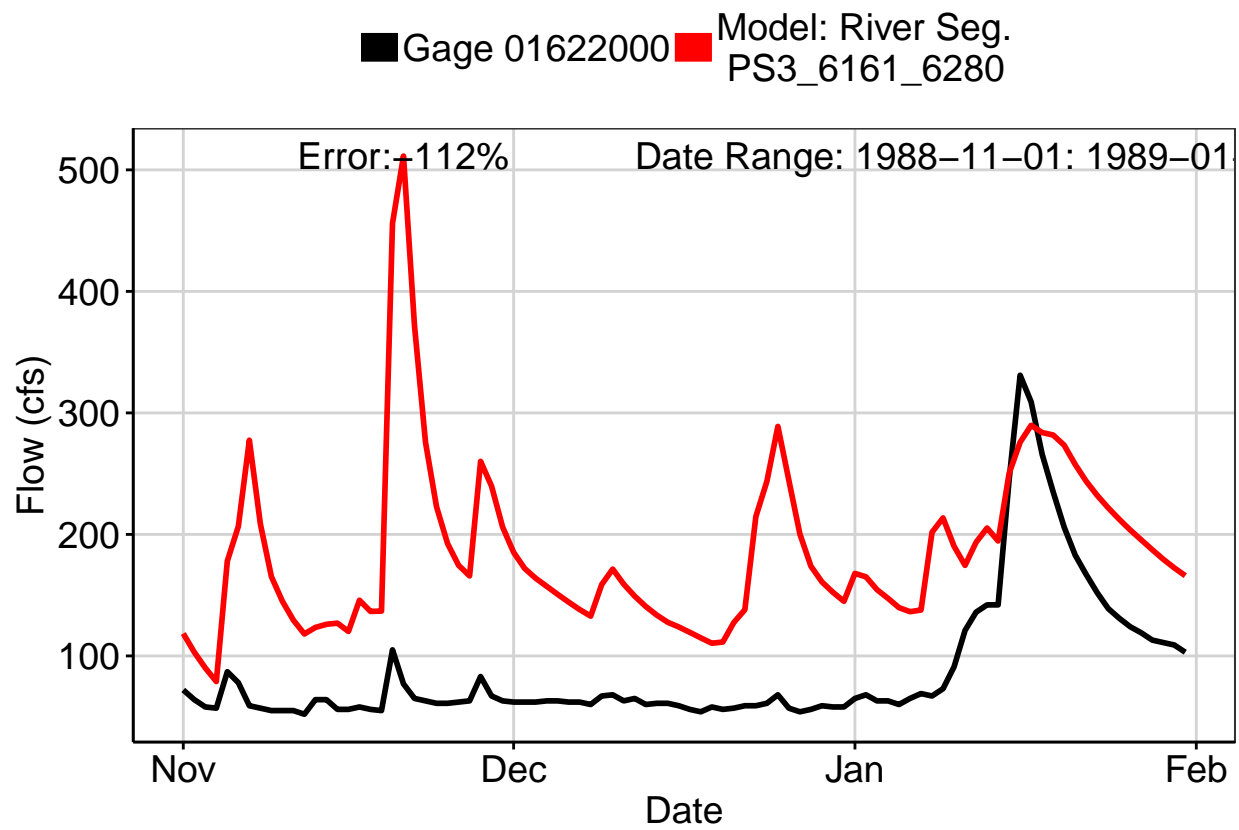


Fig. 8: Third Largest Error Segment

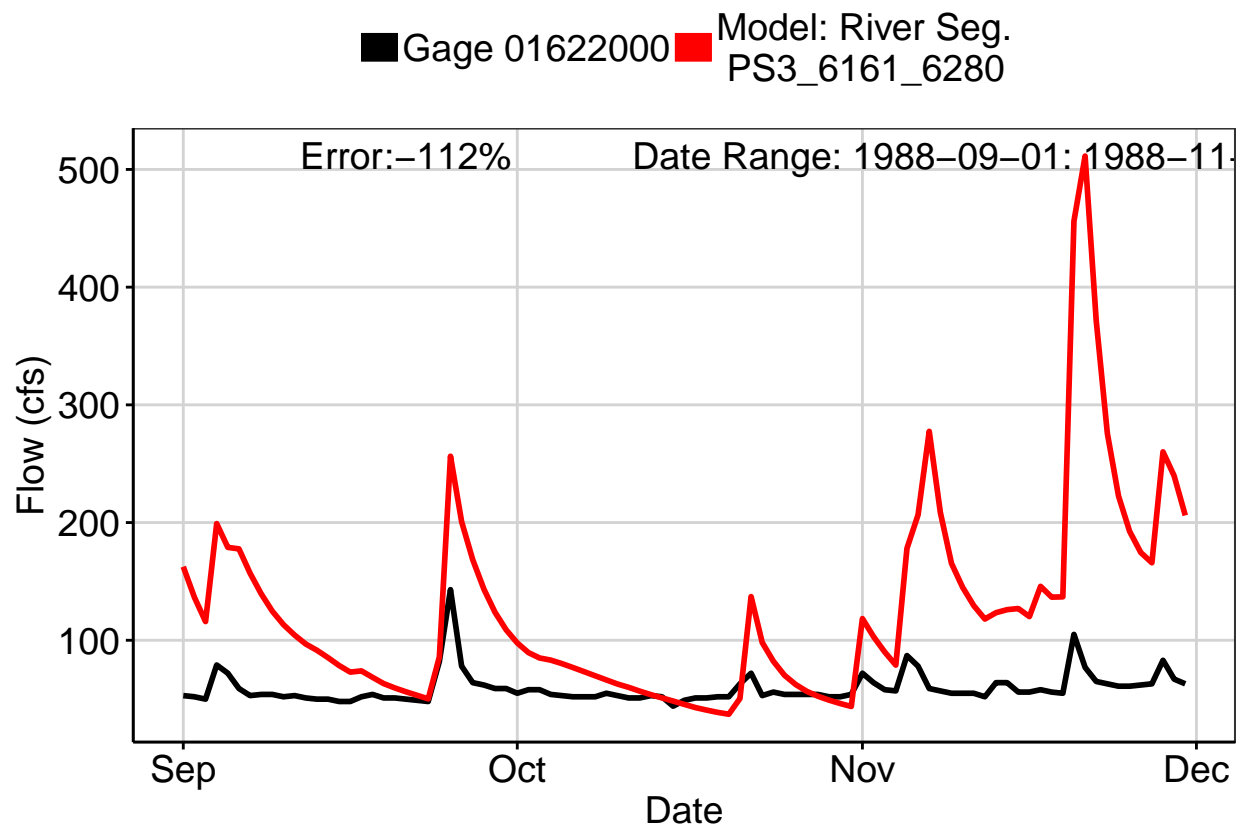


Fig. 9: Residuals Plot

