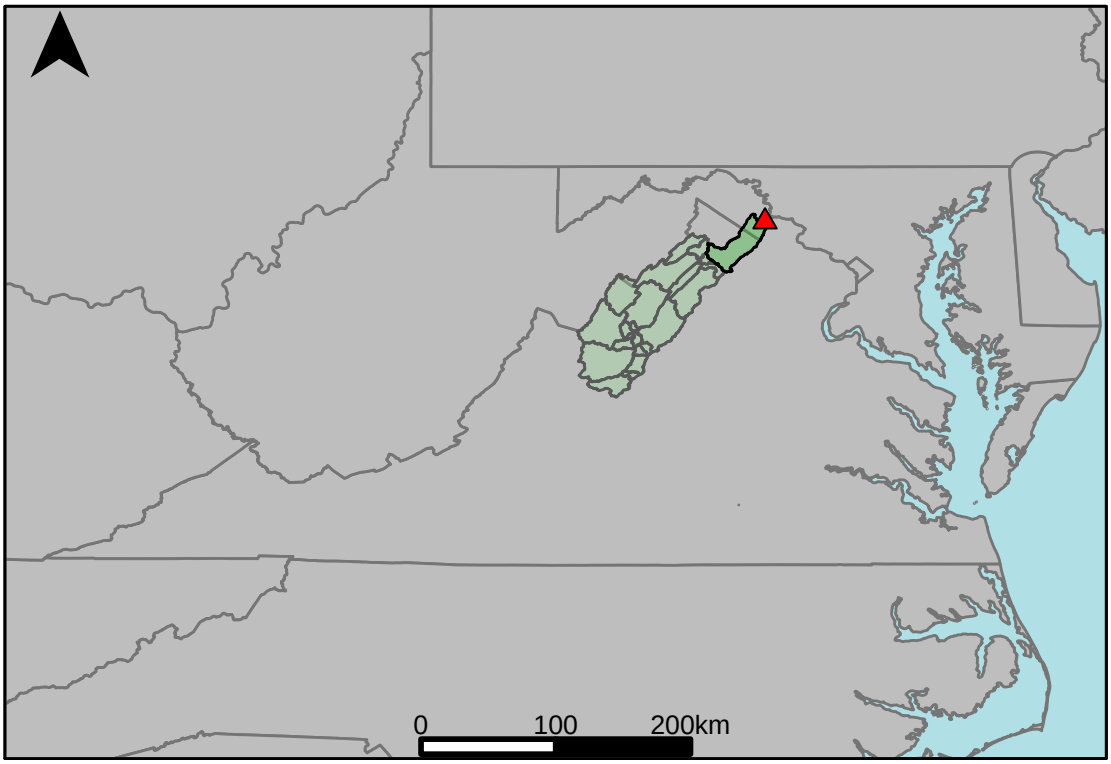
Appendix B.15: USGS Gage 01636500 vs. PS5_4380_4370 Shenandoah River



This river segment follows part of the flow of the Shenandoah River, a tributary of the Potomac. The gage is located in Jefferson County (Lat. 39°16'55.4", Long. -77°47'21"), approximately 8.1 miles west of Lovettsville, VA. Drainage area is 3041 sq. miles. This gage started taking data in 1895 and is still taking data. There is some regulation by upstream hydroelectric plants, including that of the Potomac Light and Power Company, 0.5 mi upstream. The average daily discharge error between the model and gage data for the 20 year timespan was -0.33%, with 23.3% of its rolling three month time spans above 20% error.

Table 1: Monthly Low Flows

	USGS Gage	Model	Pct. Error
Jan. Low Flow	661	488	-26.2
Feb. Low Flow	751	741	-1.33
Mar. Low Flow	1260	1240	-1.59
Apr. Low Flow	1480	1490	0.68
May Low Flow	1500	2070	38
Jun. Low Flow	1910	2250	17.8
Jul. Low Flow	2000	1820	-9
Aug. Low Flow	1530	1660	8.5
Sep. Low Flow	1130	1220	7.96
Oct. Low Flow	801	775	-3.25
Nov. Low Flow	674	636	-5.64
Dec. Low Flow	566	460	-18.7

Table 2: Monthly Average Flows

	USGS Gage	Model	Pct. Error
Overall Mean Flow	2990	3000	0.33
Jan. Mean Flow	3810	3350	-12.1
Feb. Mean Flow	3920	4310	9.95
Mar. Mean Flow	5310	5480	3.2
Apr. Mean Flow	4630	4360	-5.83
May Mean Flow	3530	3250	-7.93
Jun. Mean Flow	2410	2400	-0.42
Jul. Mean Flow	1440	1650	14.6
Aug. Mean Flow	1330	1490	12
Sep. Mean Flow	2430	2830	16.5
Oct. Mean Flow	1730	1800	4.05
Nov. Mean Flow	2570	2660	3.5
Dec. Mean Flow	2880	2550	-11.5

Table 3: Monthly High Flows

	USGS Gage	Model	Pct. Error
Jan. High Flow	1410	1950	38.3
Feb. High Flow	6510	4160	-36.1
Mar. High Flow	7200	3540	-50.8
Apr. High Flow	6510	5740	-11.8
May High Flow	5690	4760	-16.3
Jun. High Flow	14500	13400	-7.59
Jul. High Flow	10500	7150	-31.9
Aug. High Flow	5880	4900	-16.7
Sep. High Flow	3780	3220	-14.8
Oct. High Flow	2380	2890	21.4
Nov. High Flow	1450	1860	28.3
Dec. High Flow	1820	1480	-18.7

Table 4: Period Low Flows

	USGS Gage	Model	Pct. Error
Min. 1 Day Min	248	134	-46
Med. 1 Day Min	502	323	-35.7
Min. 3 Day Min	251	137	-45.4
Med. 3 Day Min	512	333	-35
Min. 7 Day Min	275	145	-47.3
Med. 7 Day Min	548	355	-35.2
Min. 30 Day Min	365	159	-56.4
Med. 30 Day Min	676	553	-18.2
Min. 90 Day Min	439	266	-39.4
Med. 90 Day Min	953	882	-7.45
7Q10	363	176	-51.5
Year of 90-Day Min. Flow	2002	1999	100
Drought Year Mean	927	924	-0.32
Mean Baseflow	1700	1820	7.06

Table 5: Period High Flows

	USGS Gage	Model	Pct. Error
Max. 1 Day Max	133000	142000	6.77
Med. 1 Day Max	25900	32400	25.1
Max. 3 Day Max	87900	100000	13.8
Med. 3 Day Max	18100	21100	16.6
Max. 7 Day Max	46200	52600	13.9
Med. 7 Day Max	14300	15000	4.9
Max. 30 Day Max	18700	16600	-11.2
Med. 30 Day Max	8210	7370	-10.2
Max. 90 Day Max	13200	12100	-8.33
Med. 90 Day Max	4740	4580	-3.38

Table 6: Non-Exceedance Flows

	USGS Gage	Model	Pct. Error
1% Non-Exceedance	394	185	-53
5% Non-Exceedance	486	327	-32.7
50% Non-Exceedance	1770	1900	7.34
95% Non-Exceedance	9170	9120	-0.55
99% Non-Exceedance	19300	19900	3.11
Sept. 10% Non-Exceedance	476	307	-35.5

Fig. 1: Hydrograph

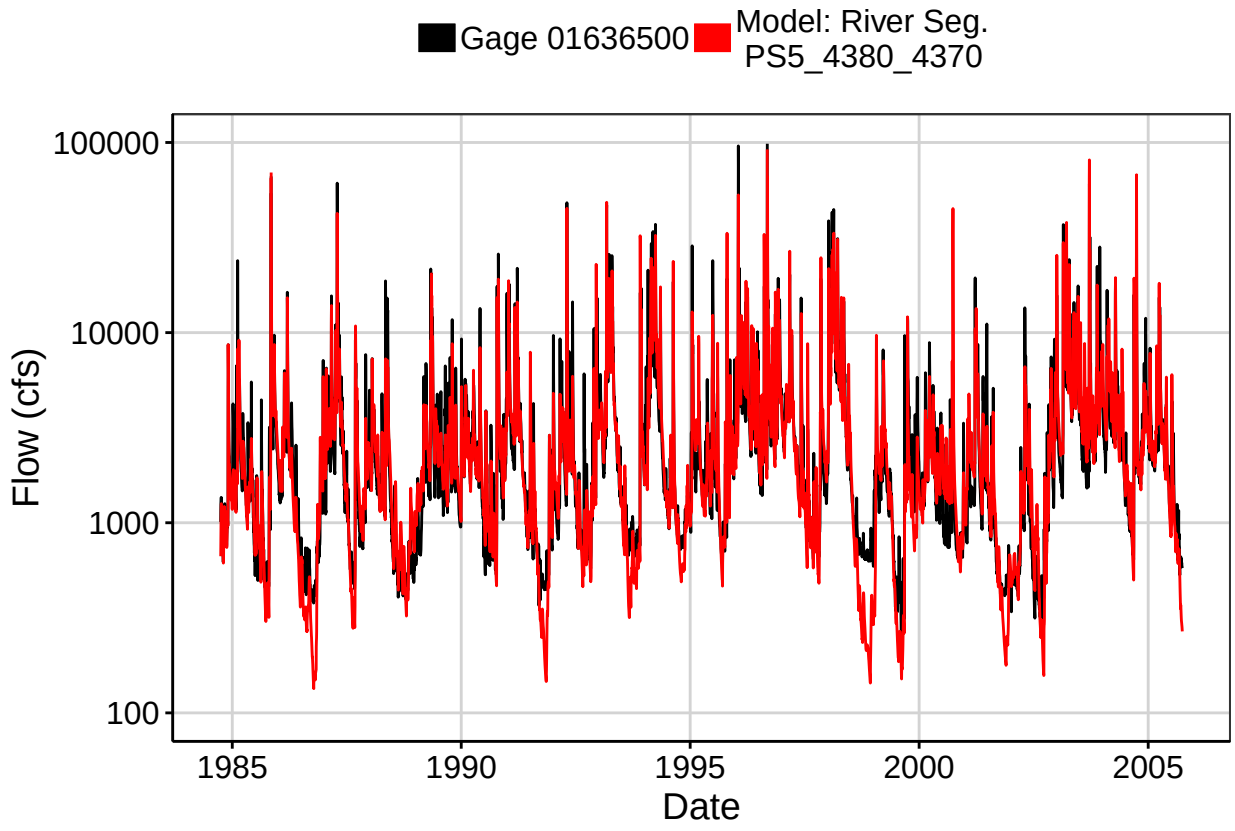


Fig. 2: Zoomed Hydrograph

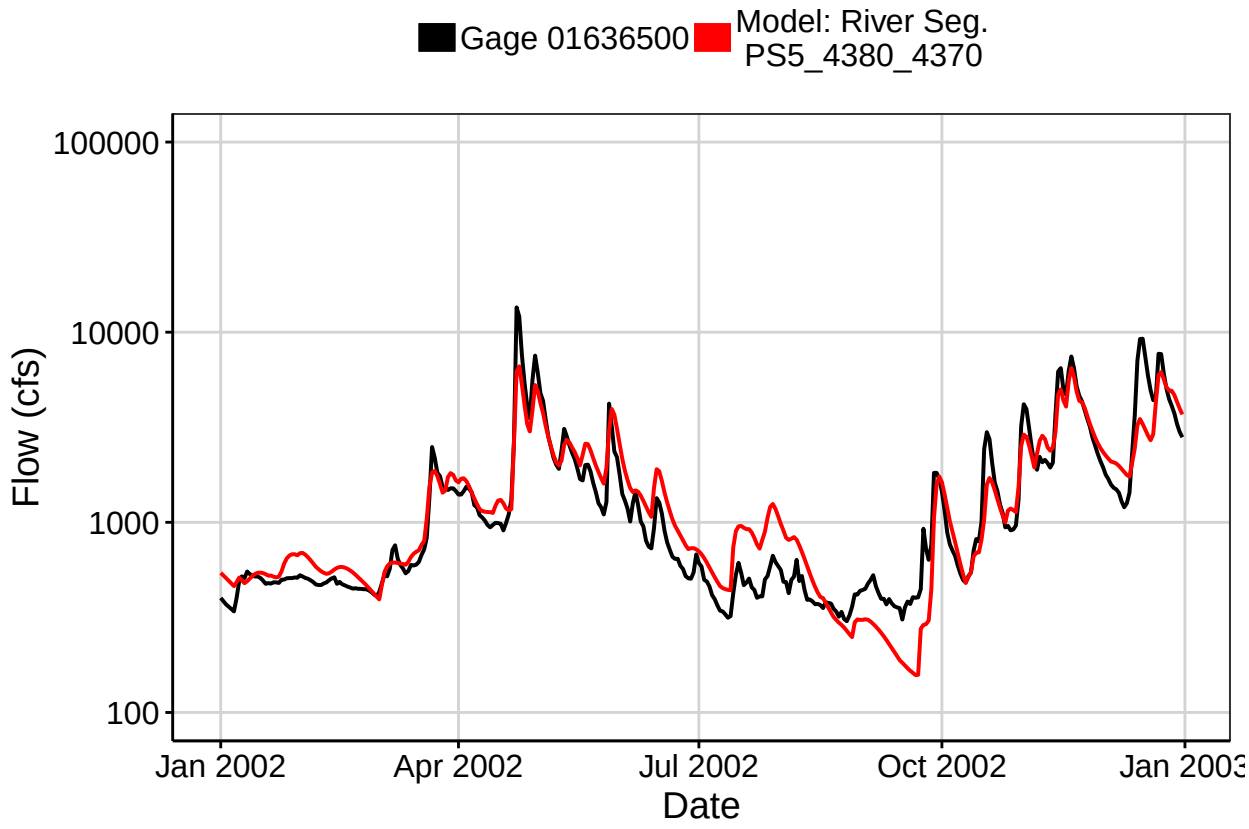


Fig. 3: Flow Exceedance

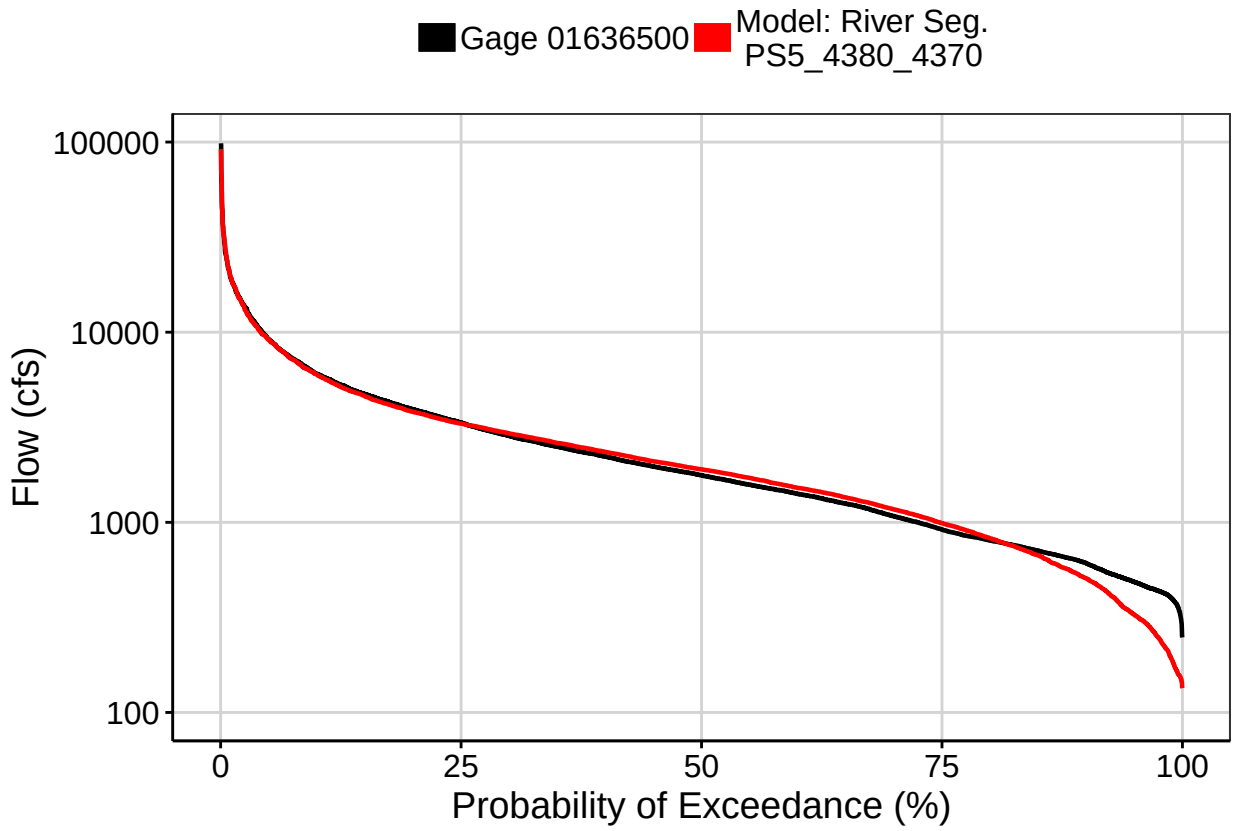


Fig. 4: Baseflow

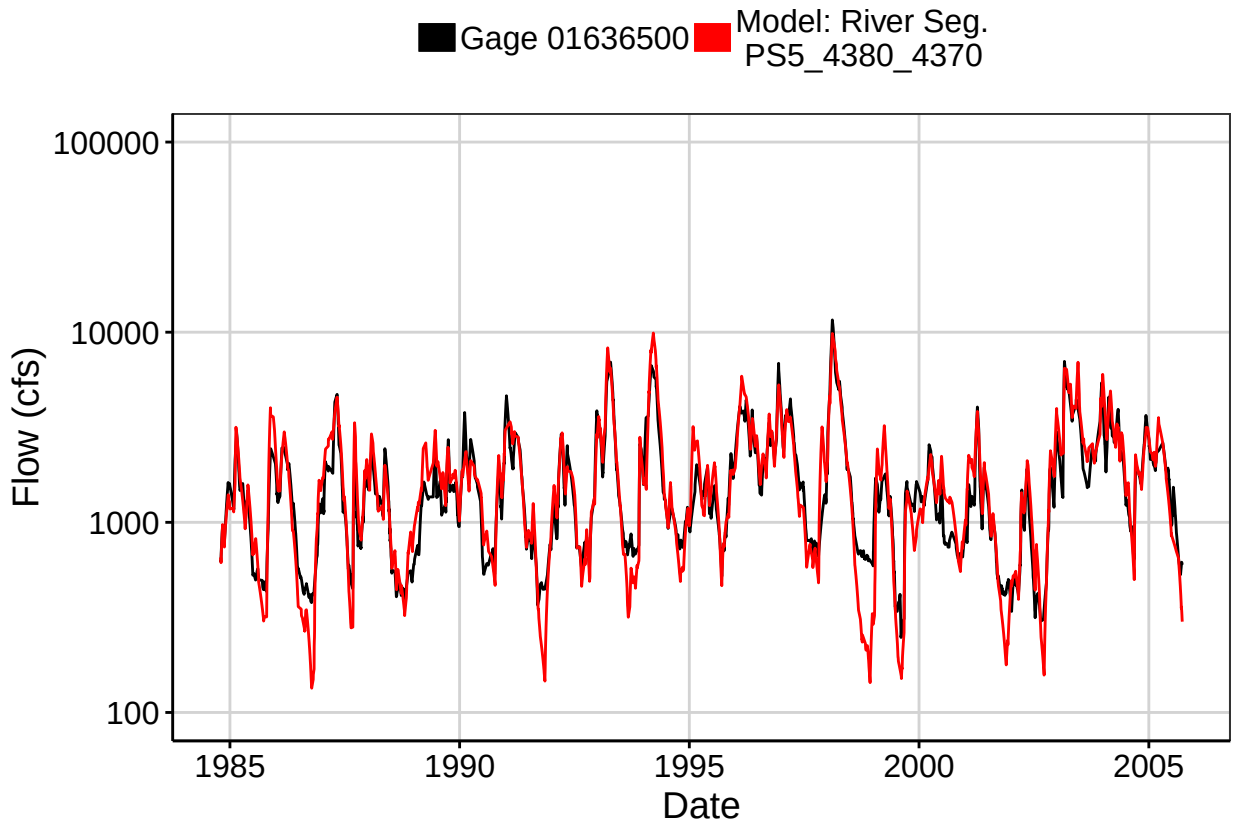


Fig. 5: Combined Baseflow

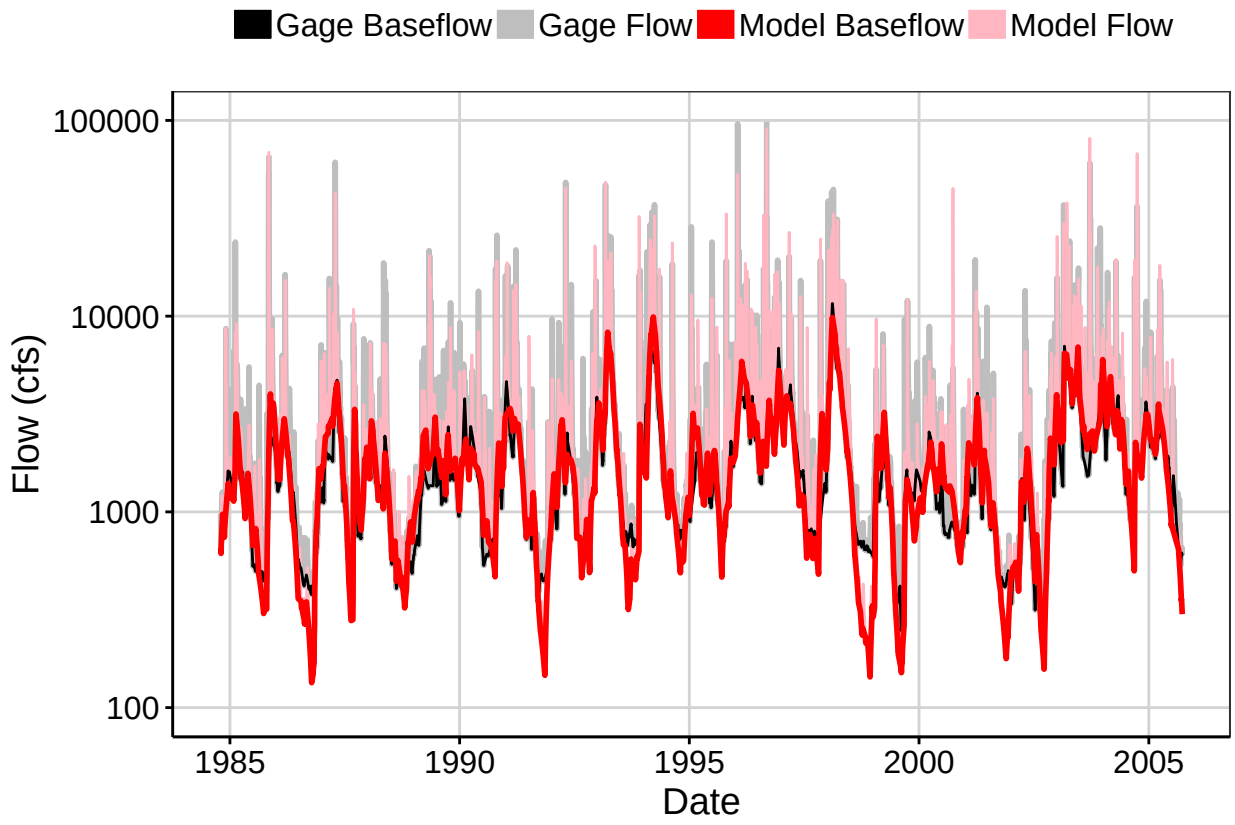


Fig. 6: Largest Error Segment

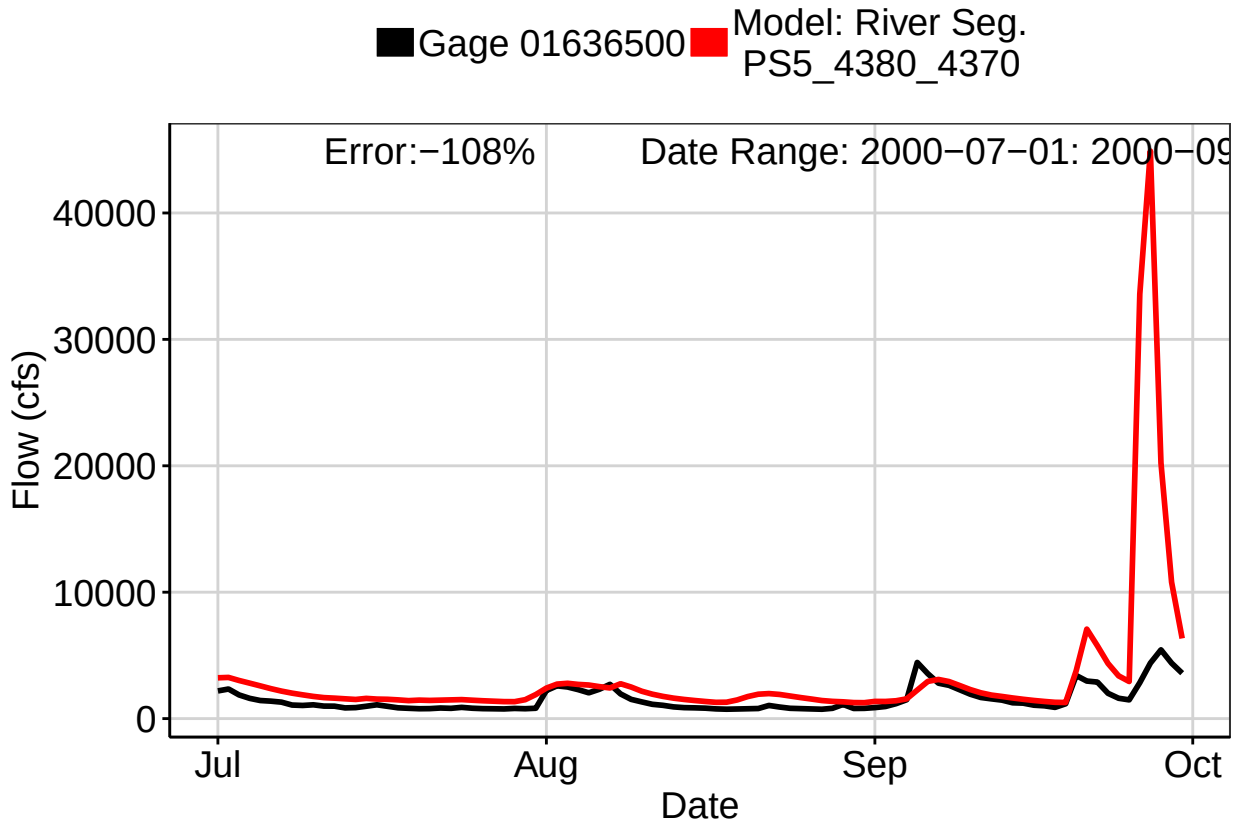


Fig. 7: Second Largest Error Segment

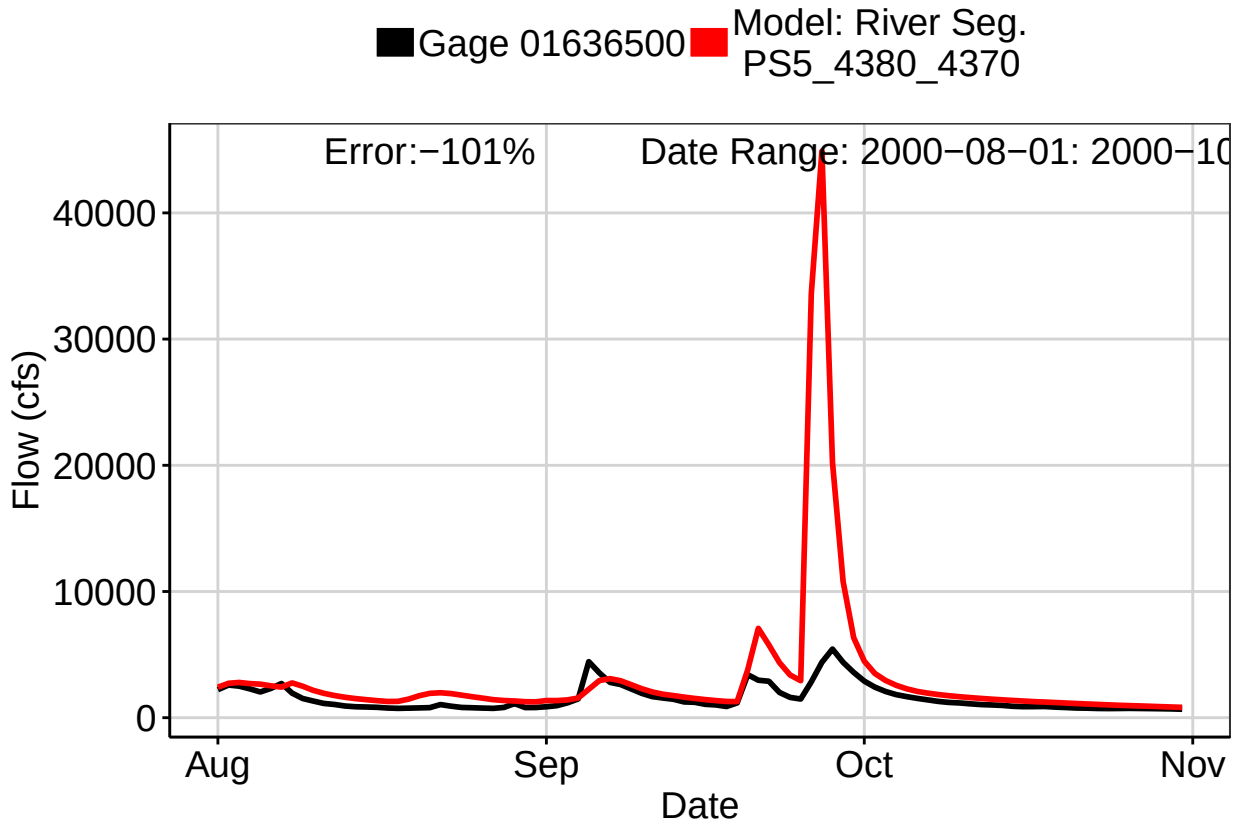


Fig. 8: Third Largest Error Segment

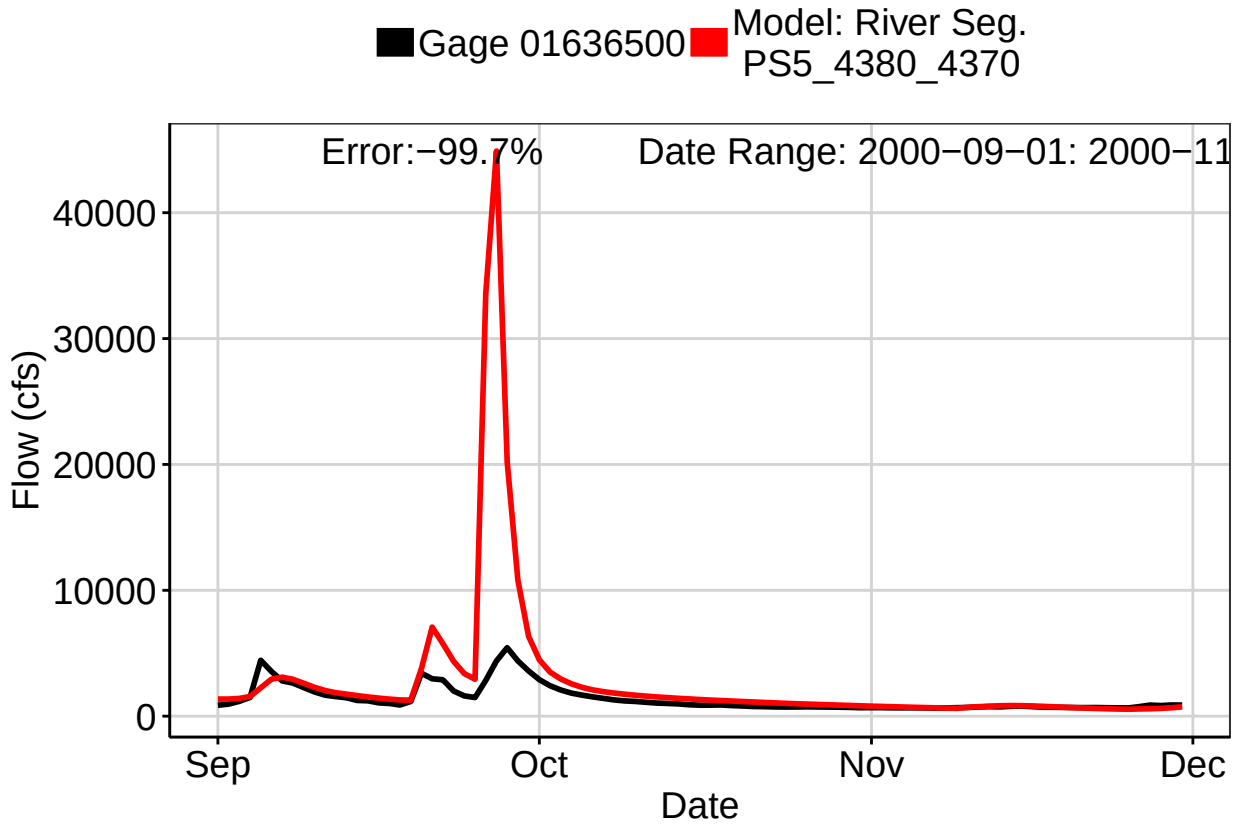


Fig. 9: Residuals Plot