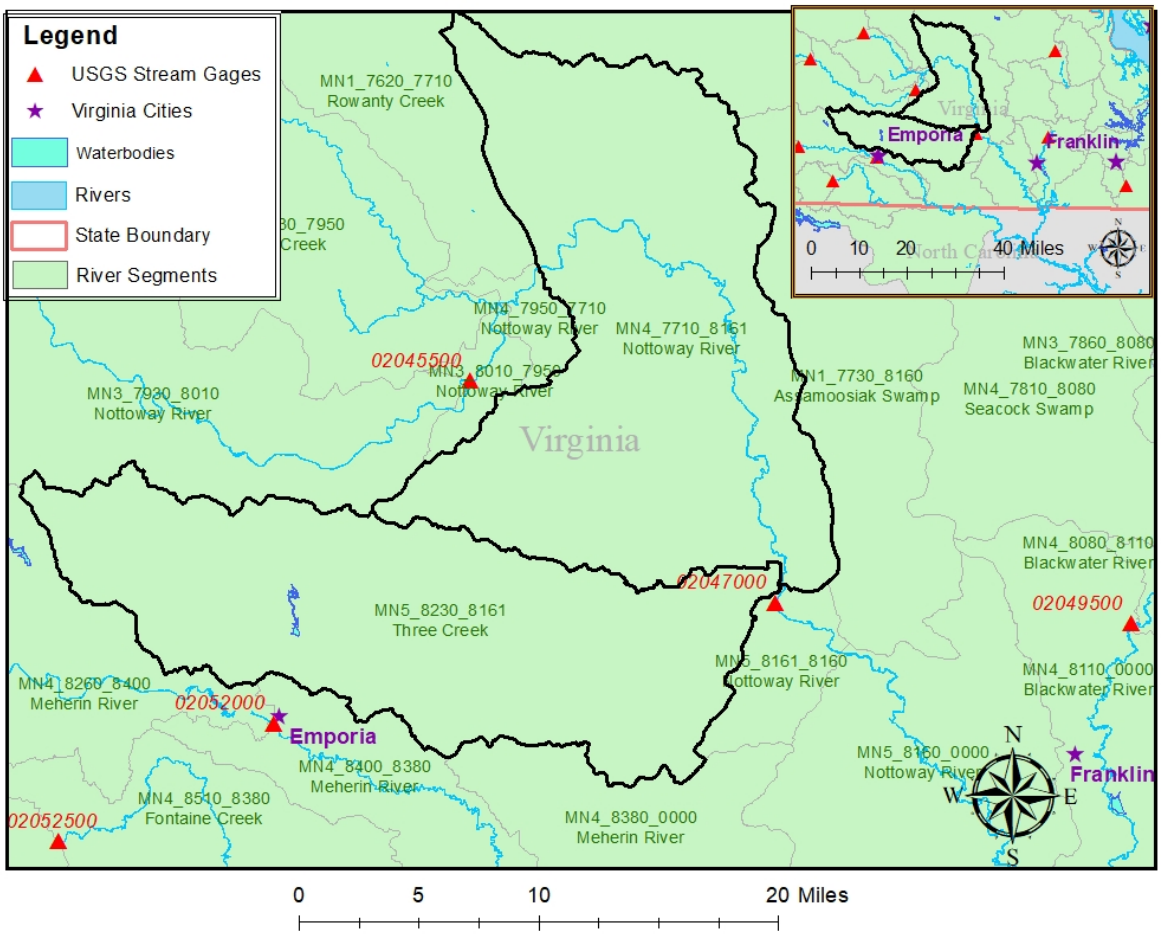
02047000 vs. MN4_7710_8161+MN5_8230_8161

Daniel Hildebrand, Hailey Alspaugh, and Kelsey Reitz

July 11, 2018



This river segment follows part of the flow of the Nottoway River, a tributary of the Meherrin River. The gage is located in Southampton County, VA (Lat 3646'13", Long 7709'59") approximately 34 miles southeast of Petersburg, VA. Drainage area is 1441 sq. miles. This gage started taking data in 1950 and is still taking data today. The City of Virginia Beach withdraws water downstream of this gage. It is believed that these withdrawals are far enough downstream that they would not drastically affect the gage, but it is unsure. The average daily discharge error between the model and gage data for the 20 year timespan was 0%, with 41.2% of its rolling three month time spans above 20% error.

Table 1: Monthly Low Flows

	USGS Gage	Model	Pct. Error
Jan. Low Flow	67	85.8	-28.1
Feb. Low Flow	156	306	-96.2
Mar. Low Flow	445	445	0
Apr. Low Flow	703	659	6.26
May Low Flow	1090	1080	0.92
Jun. Low Flow	1020	793	22.3
Jul. Low Flow	759	528	30.4
Aug. Low Flow	389	273	29.8
Sep. Low Flow	191	183	4.19
Oct. Low Flow	96	99.6	-3.75
Nov. Low Flow	75	110	-46.7
Dec. Low Flow	64	81.4	-27.2

Table 2: Monthly Average Flows

	USGS Gage	Model	Pct. Error
Overall Mean Flow	1390	1390	0
Jan. Mean Flow	1900	1930	-1.58
Feb. Mean Flow	2310	2340	-1.3
Mar. Mean Flow	2710	2830	-4.43
Apr. Mean Flow	2340	2030	13.2
May Mean Flow	1270	1150	9.45
Jun. Mean Flow	796	668	16.1
Jul. Mean Flow	505	456	9.7
Aug. Mean Flow	747	800	-7.1
Sep. Mean Flow	1330	1520	-14.3
Oct. Mean Flow	585	706	-20.7
Nov. Mean Flow	932	962	-3.22
Dec. Mean Flow	1340	1300	2.99

Table 3: Monthly High Flows

	USGS Gage	Model	Pct. Error
Jan. High Flow	707	875	-23.8
Feb. High Flow	1490	1880	-26.2
Mar. High Flow	1960	2090	-6.63
Apr. High Flow	4210	4330	-2.85
May High Flow	4790	4990	-4.18
Jun. High Flow	4550	6720	-47.7
Jul. High Flow	4900	4390	10.4
Aug. High Flow	3130	2460	21.4
Sep. High Flow	1960	1110	43.4
Oct. High Flow	1090	764	29.9
Nov. High Flow	1500	1000	33.3
Dec. High Flow	675	851	-26.1

Table 4: Period Low Flows

	USGS Gage	Model	Pct. Error
Min. 1 Day Min	13	3.92	69.8
Med. 1 Day Min	42	43.6	-3.81
Min. 3 Day Min	14.3	4.48	68.7
Med. 3 Day Min	43.3	45.9	-6
Min. 7 Day Min	17.4	5.47	68.6
Med. 7 Day Min	47.4	49.3	-4.01
Min. 30 Day Min	30	16.6	44.7
Med. 30 Day Min	82.6	74.5	9.81
Min. 90 Day Min	41.2	66.3	-60.9
Med. 90 Day Min	235	279	-18.7
7Q10	24.6	16.5	32.9
Year of 90-Day Min. Flow	2002	2002	0
Drought Year Mean	316	438	-38.6
Mean Baseflow	664	629	5.27

Table 5: Period High Flows

	USGS Gage	Model	Pct. Error
Max. 1 Day Max	34500	49800	-44.3
Med. 1 Day Max	8350	15000	-79.6
Max. 3 Day Max	32700	45600	-39.4
Med. 3 Day Max	8020	13100	-63.3
Max. 7 Day Max	26100	31500	-20.7
Med. 7 Day Max	7300	8530	-16.8
Max. 30 Day Max	9190	10100	-9.9
Med. 30 Day Max	4040	3870	4.21
Max. 90 Day Max	5420	5610	-3.51
Med. 90 Day Max	3020	2600	13.9

Table 6: Non-Exceedance Flows

	USGS Gage	Model	Pct. Error
1% Non-Exceedance	29.3	30.8	-5.12
5% Non-Exceedance	56	59.4	-6.07
50% Non-Exceedance	751	697	7.19
95% Non-Exceedance	5000	4700	6
99% Non-Exceedance	9160	11600	-26.6
Sept. 10% Non-Exceedance	54.6	42.5	22.2

Fig. 1: Hydrograph

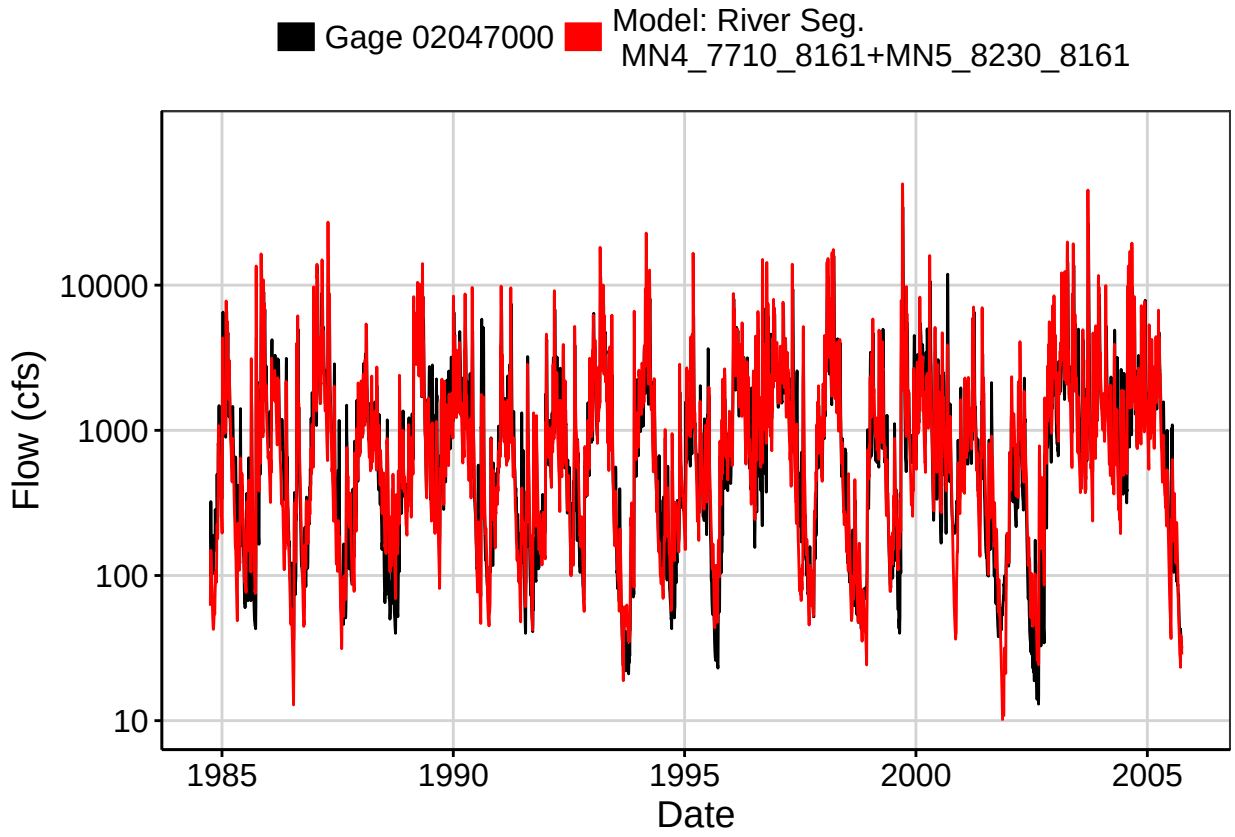


Fig. 2: Zoomed Hydrograph

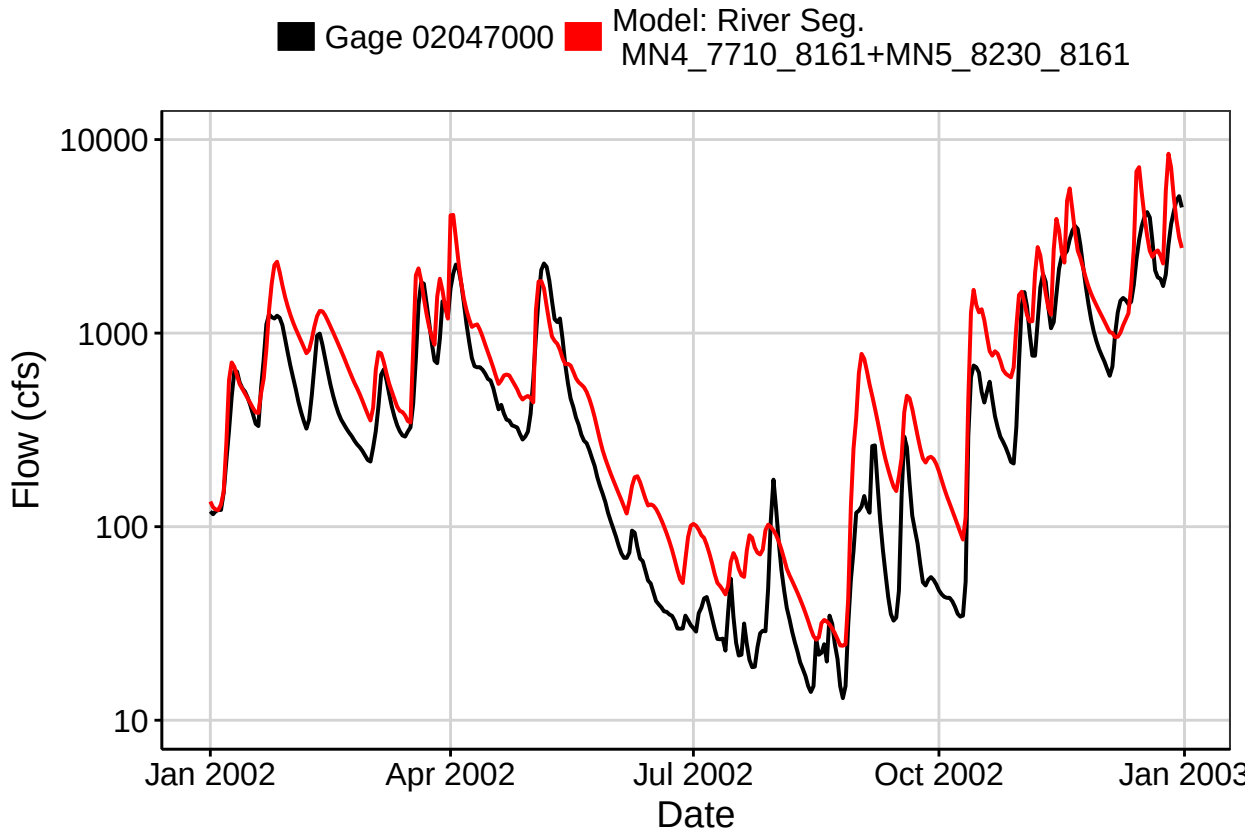


Fig. 3: Flow Exceedance

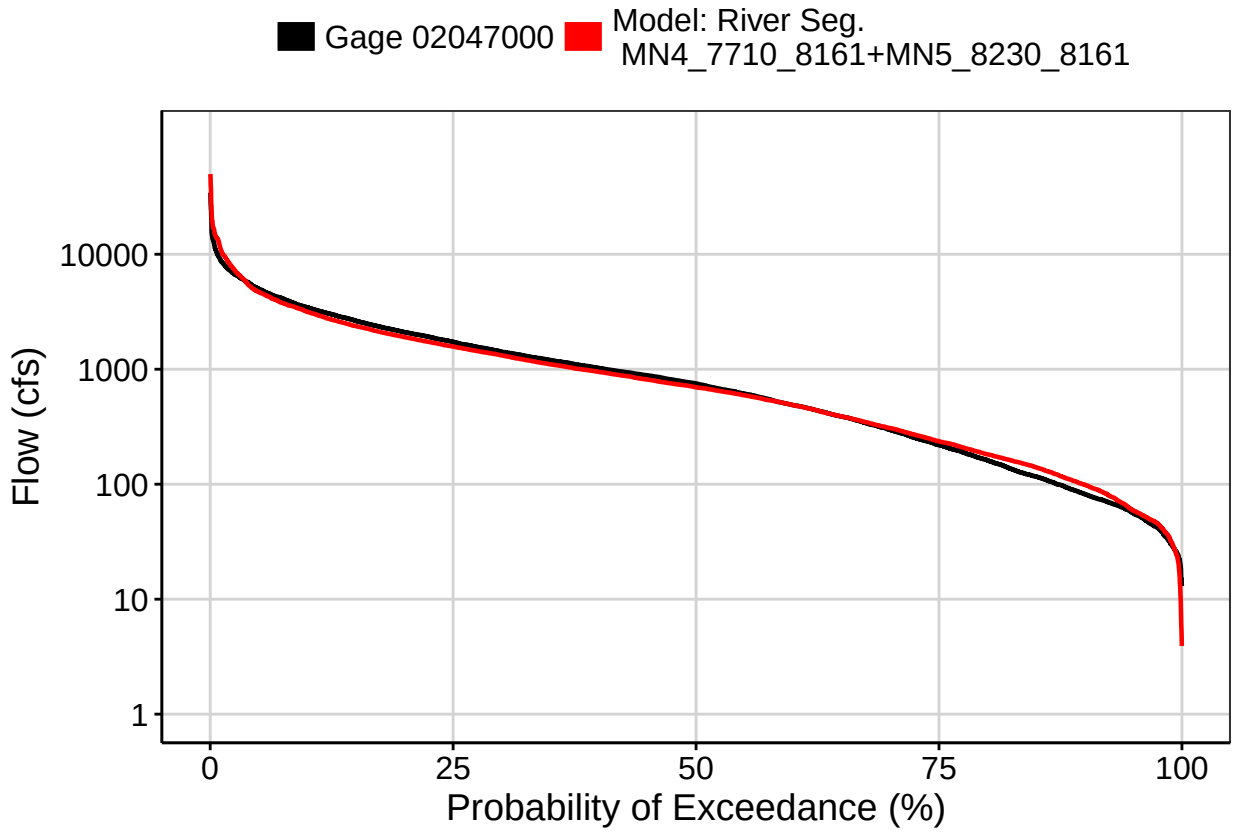


Fig. 4: Baseflow

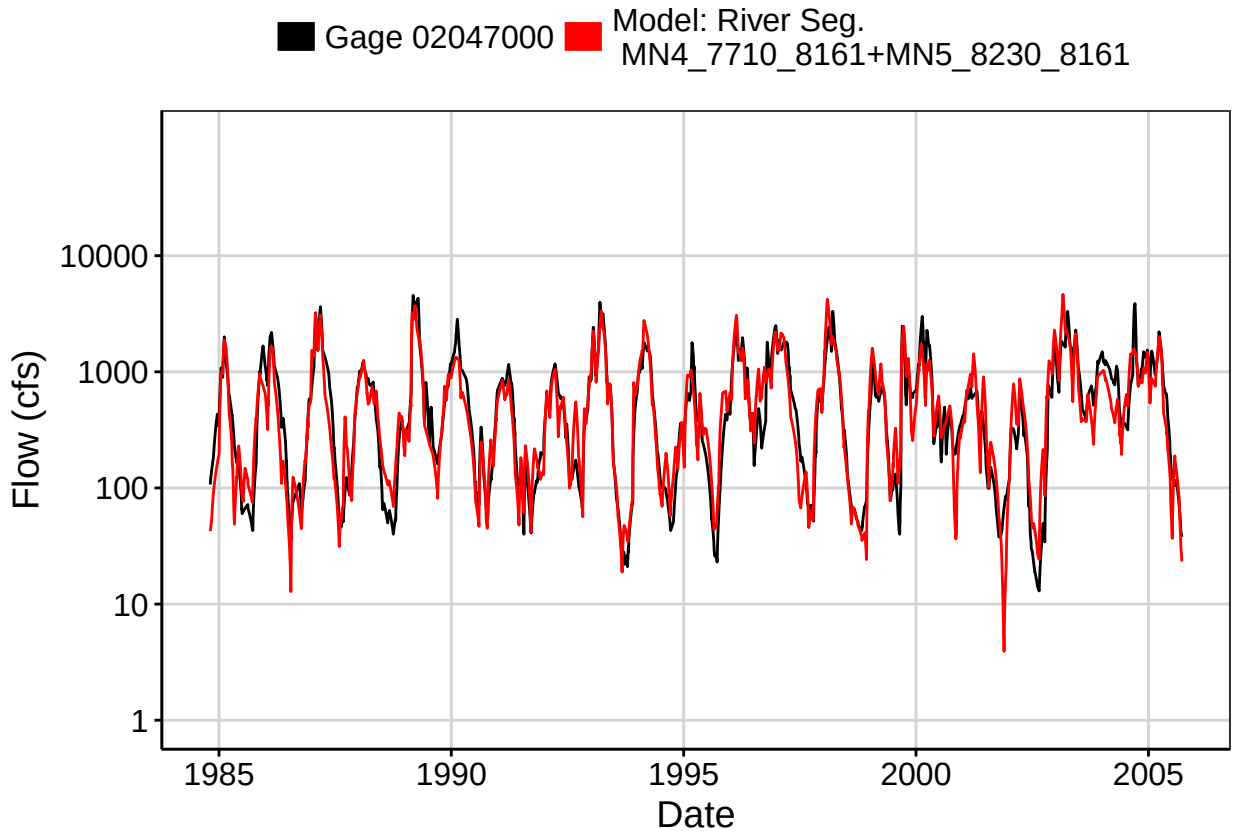


Fig. 5: Combined Baseflow

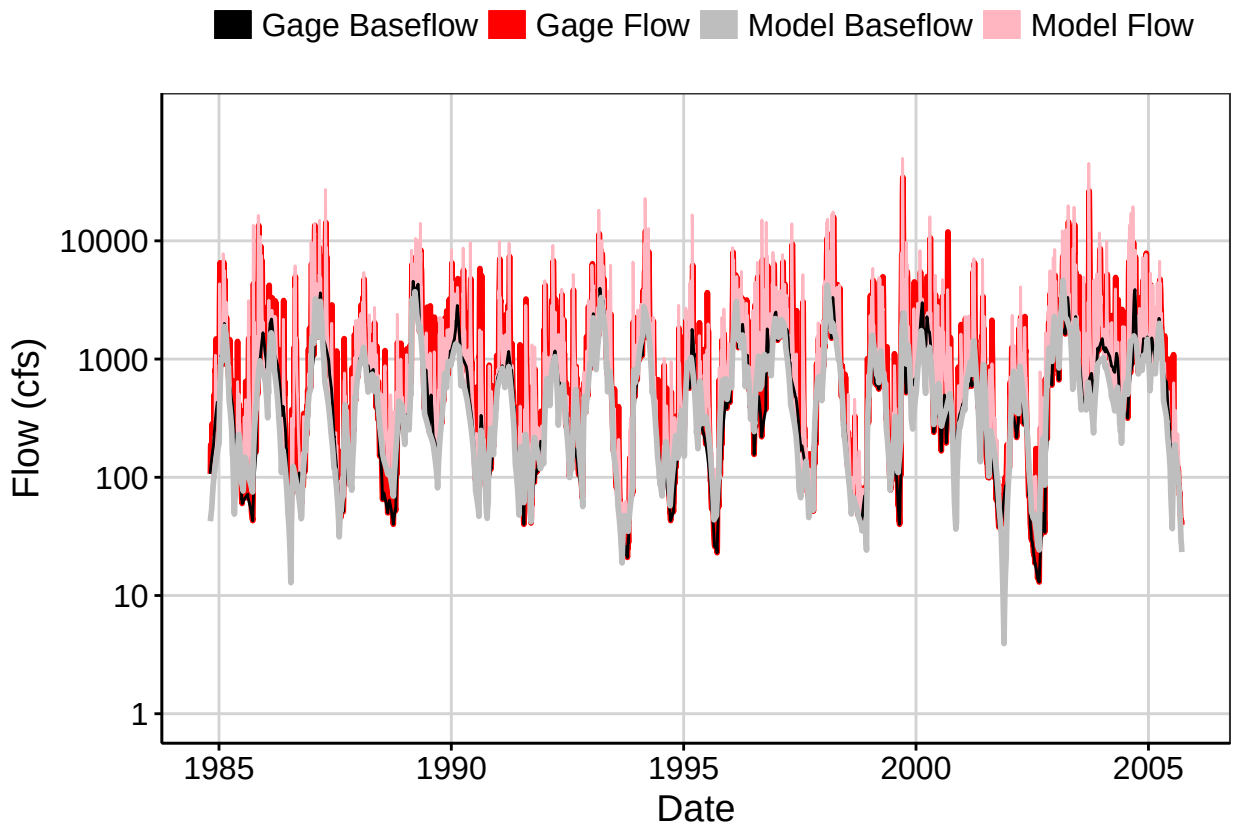


Fig. 6: Largest Error Segment

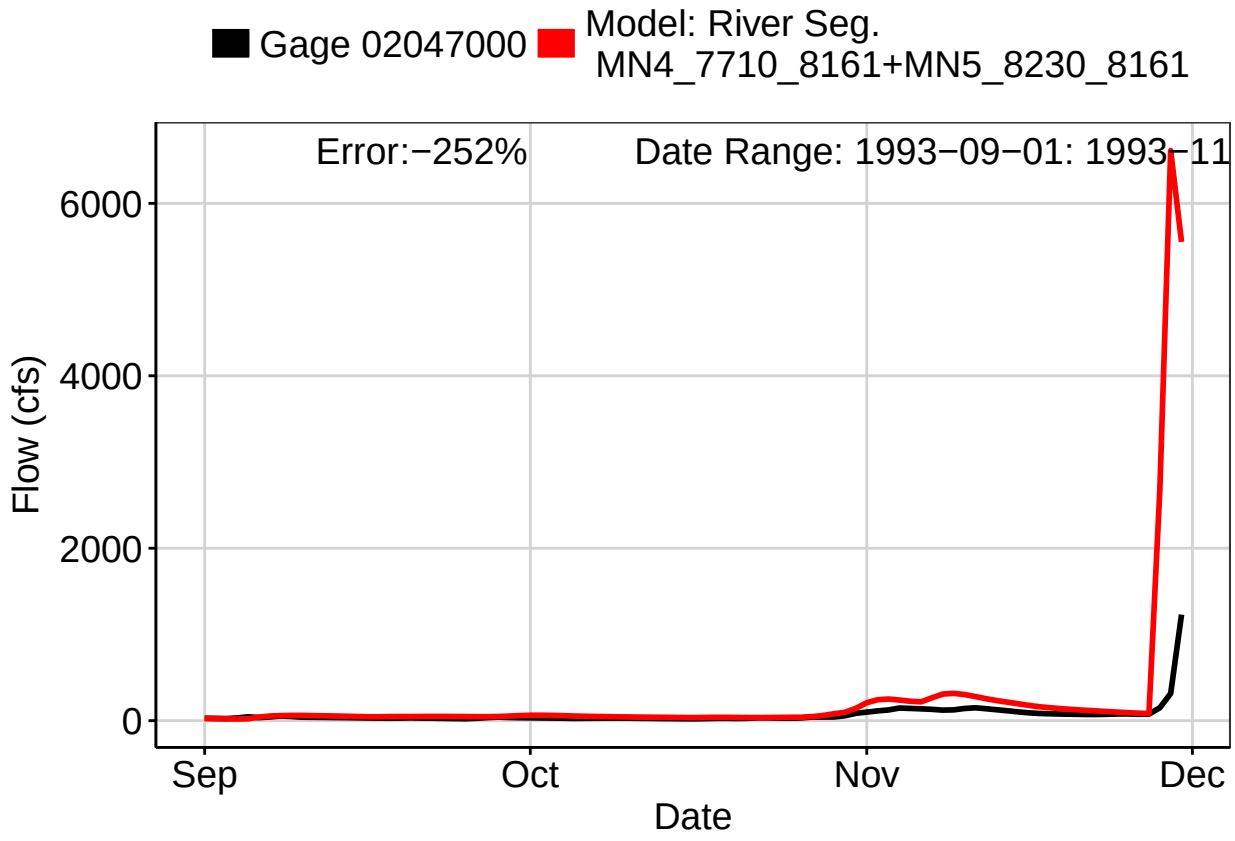


Fig. 7: Second Largest Error Segment

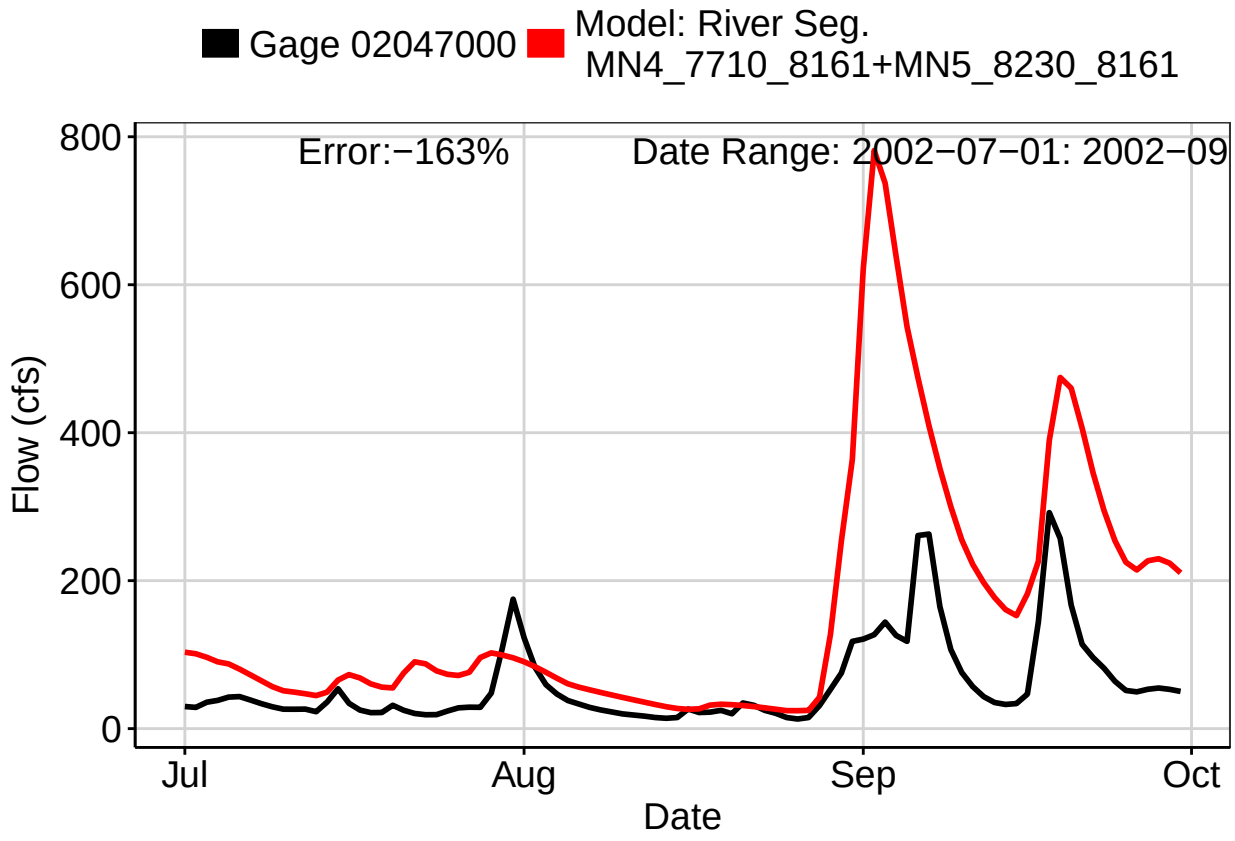


Fig. 8: Third Largest Error Segment

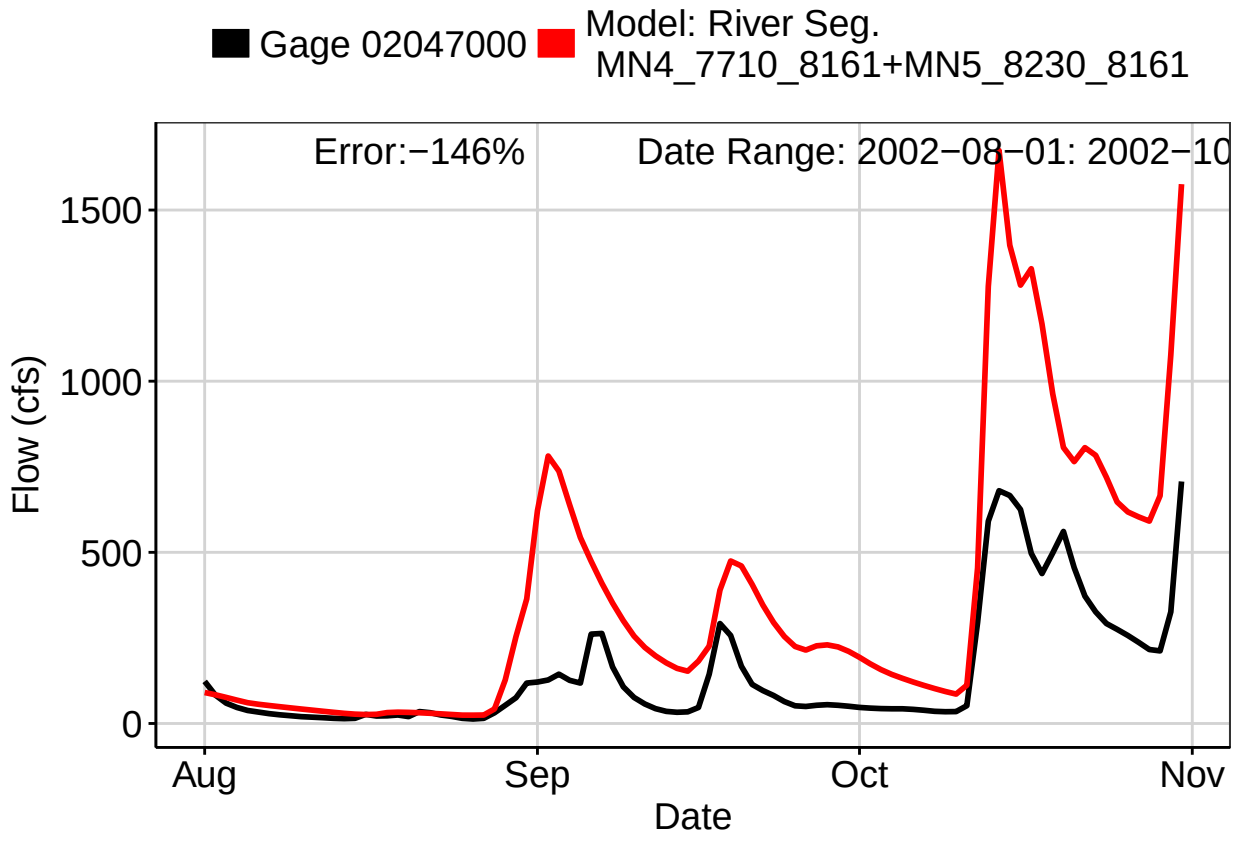


Fig. 9: Residuals Plot