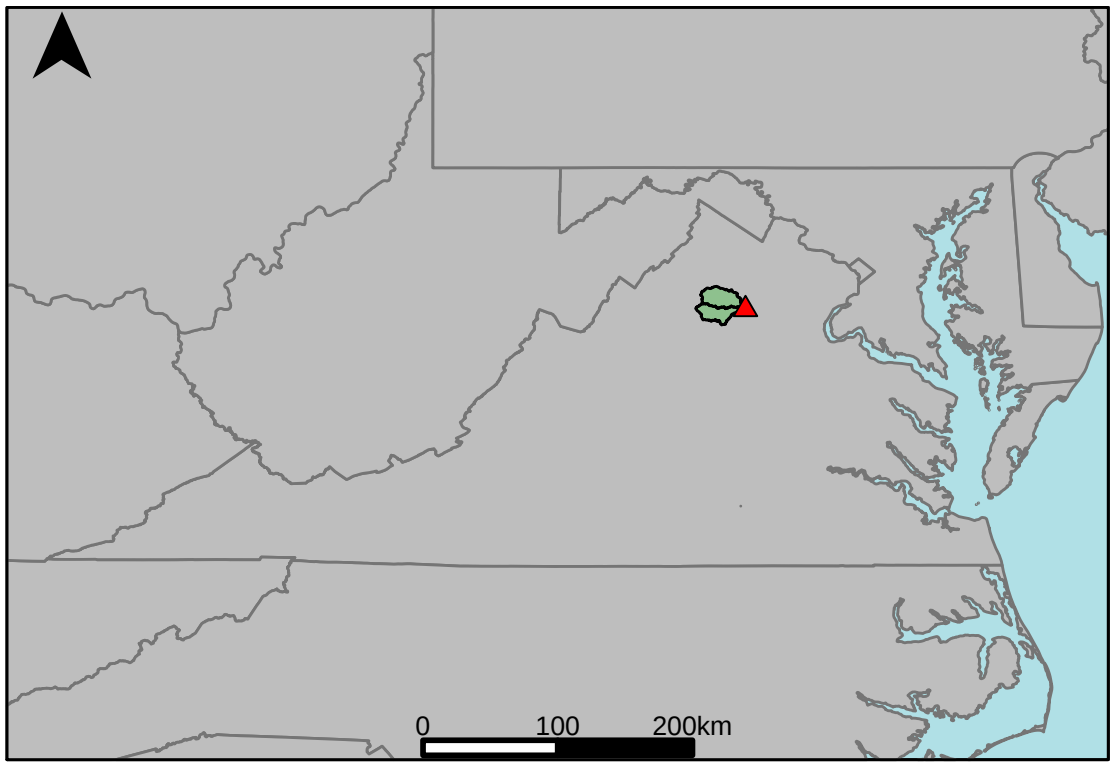
Appendix C: Rappahannock River Basin
Appendix C.1: USGS Gage 01663500
vs. RU2_5810_5610+RU2_5500_5610
Upper Rappahannock River



This river segment follows part of the flow of the Hazel River, a tributary of the Rappahannock. The gage is located in Culpeper County (Lat. 38°35'30.4", Long. -77°57'55.0"), approximately 8.6 miles northwest of Culpeper, VA. Drainage area is 285 sq. miles. This gage started taking data in 1942 but was decommissioned in 2018. There are no known anthropogenic alterations in this area that would affect the flow conditions. The average daily discharge error between the model and gage data for the 20 year timespan was 2.4%, with 71.2% of its rolling three month time spans above 20% error.

Table 1: Monthly Low Flows

	USGS Gage	Model	Pct. Error
Jan. Low Flow	66	78.1	18.3
Feb. Low Flow	119	99.7	-16.2
Mar. Low Flow	142	197	38.7
Apr. Low Flow	178	203	14
May Low Flow	212	191	-9.91
Jun. Low Flow	229	216	-5.68
Jul. Low Flow	254	184	-27.6
Aug. Low Flow	202	164	-18.8
Sep. Low Flow	85.5	112	31
Oct. Low Flow	60	59.7	-0.5
Nov. Low Flow	38.6	54.1	40.2
Dec. Low Flow	18.6	32.8	76.3

Table 2: Monthly Average Flows

	USGS Gage	Model	Pct. Error
Overall Mean Flow	333	325	-2.4
Jan. Mean Flow	355	385	8.45
Feb. Mean Flow	366	438	19.7
Mar. Mean Flow	450	433	-3.78
Apr. Mean Flow	517	431	-16.6
May Mean Flow	449	395	-12
Jun. Mean Flow	281	257	-8.54
Jul. Mean Flow	181	190	4.97
Aug. Mean Flow	106	117	10.4
Sep. Mean Flow	280	340	21.4
Oct. Mean Flow	271	225	-17
Nov. Mean Flow	386	345	-10.6
Dec. Mean Flow	367	361	-1.63

Table 3: Monthly High Flows

	USGS Gage	Model	Pct. Error
Jan. High Flow	675	464	-31.3
Feb. High Flow	1080	896	-17
Mar. High Flow	999	929	-7.01
Apr. High Flow	941	787	-16.4
May High Flow	612	860	40.5
Jun. High Flow	1150	1050	-8.7
Jul. High Flow	1150	948	-17.6
Aug. High Flow	1090	777	-28.7
Sep. High Flow	700	539	-23
Oct. High Flow	583	227	-61.1
Nov. High Flow	250	186	-25.6
Dec. High Flow	307	217	-29.3

Table 4: Period Low Flows

	USGS Gage	Model	Pct. Error
Min. 1 Day Min	1.06	4.9	362
Med. 1 Day Min	11	24	118
Min. 3 Day Min	1.13	5.38	376
Med. 3 Day Min	12	25.9	116
Min. 7 Day Min	1.61	6.18	284
Med. 7 Day Min	13.4	30.4	127
Min. 30 Day Min	8.56	17.8	108
Med. 30 Day Min	24.4	60.4	148
Min. 90 Day Min	24.4	63.9	162
Med. 90 Day Min	77.8	121	55.5
7Q10	3.41	10.1	196
Year of 90-Day Min. Flow	2002	2002	0
Drought Year Mean	109	128	17.4
Mean Baseflow	178	181	1.69

Table 5: Period High Flows

	USGS Gage	Model	Pct. Error
Max. 1 Day Max	18500	23400	26.5
Med. 1 Day Max	4160	3540	-14.9
Max. 3 Day Max	11800	9040	-23.4
Med. 3 Day Max	3080	2140	-30.5
Max. 7 Day Max	6270	5580	-11
Med. 7 Day Max	1870	1540	-17.6
Max. 30 Day Max	1890	1720	-8.99
Med. 30 Day Max	951	743	-21.9
Max. 90 Day Max	953	858	-9.97
Med. 90 Day Max	528	471	-10.8

Table 6: Non-Exceedance Flows

	USGS Gage	Model	Pct. Error
1% Non-Exceedance	5.7	14.8	160
5% Non-Exceedance	19.7	40.5	106
50% Non-Exceedance	224	222	-0.89
95% Non-Exceedance	935	840	-10.2
99% Non-Exceedance	2260	1750	-22.6
Sept. 10% Non-Exceedance	6.98	32.3	363

Fig. 1: Hydrograph

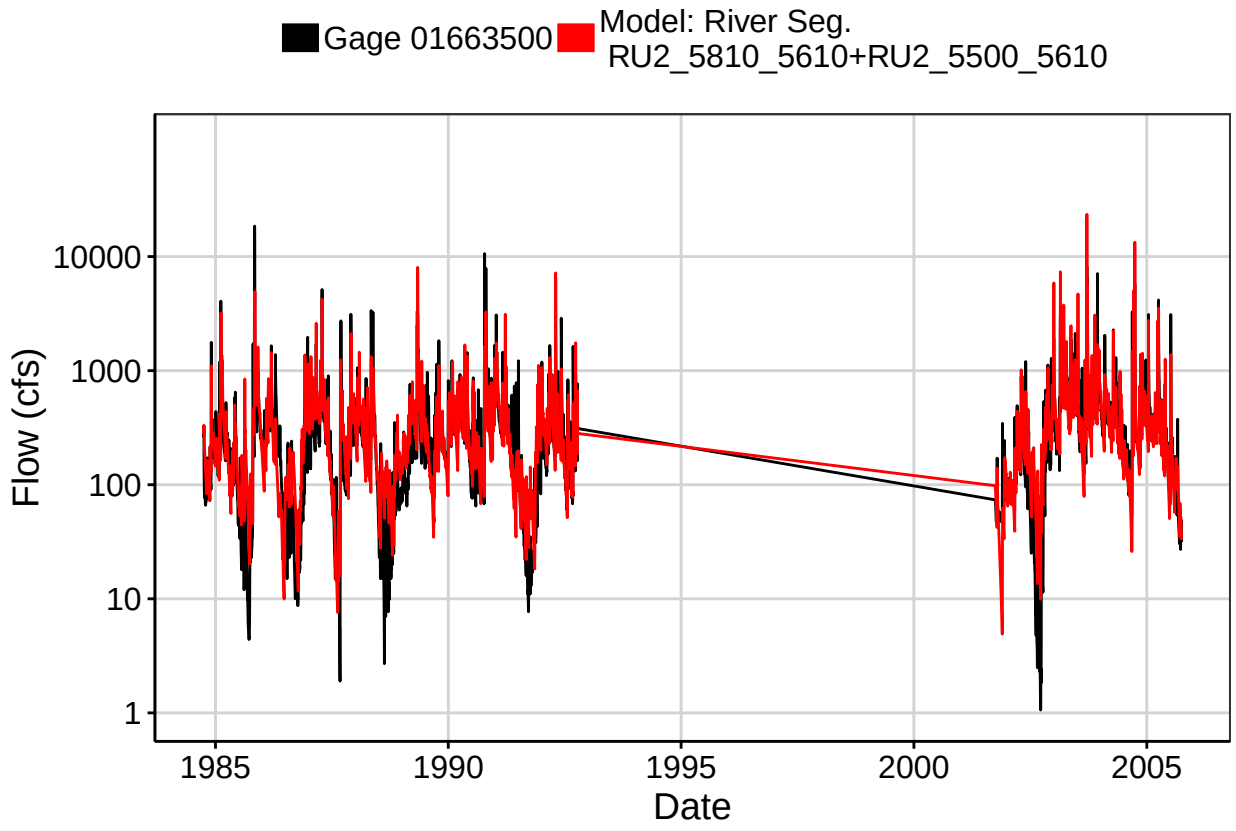


Fig. 2: Zoomed Hydrograph

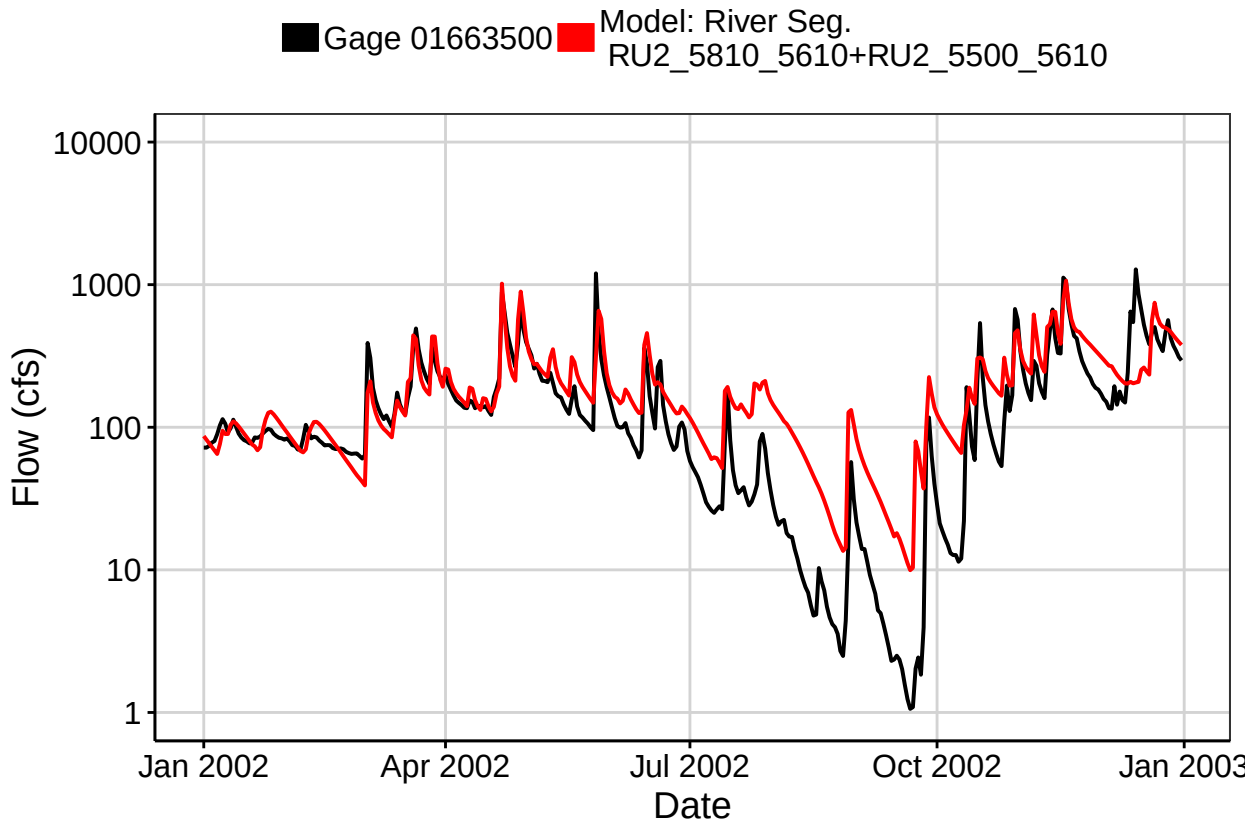


Fig. 3: Flow Exceedance

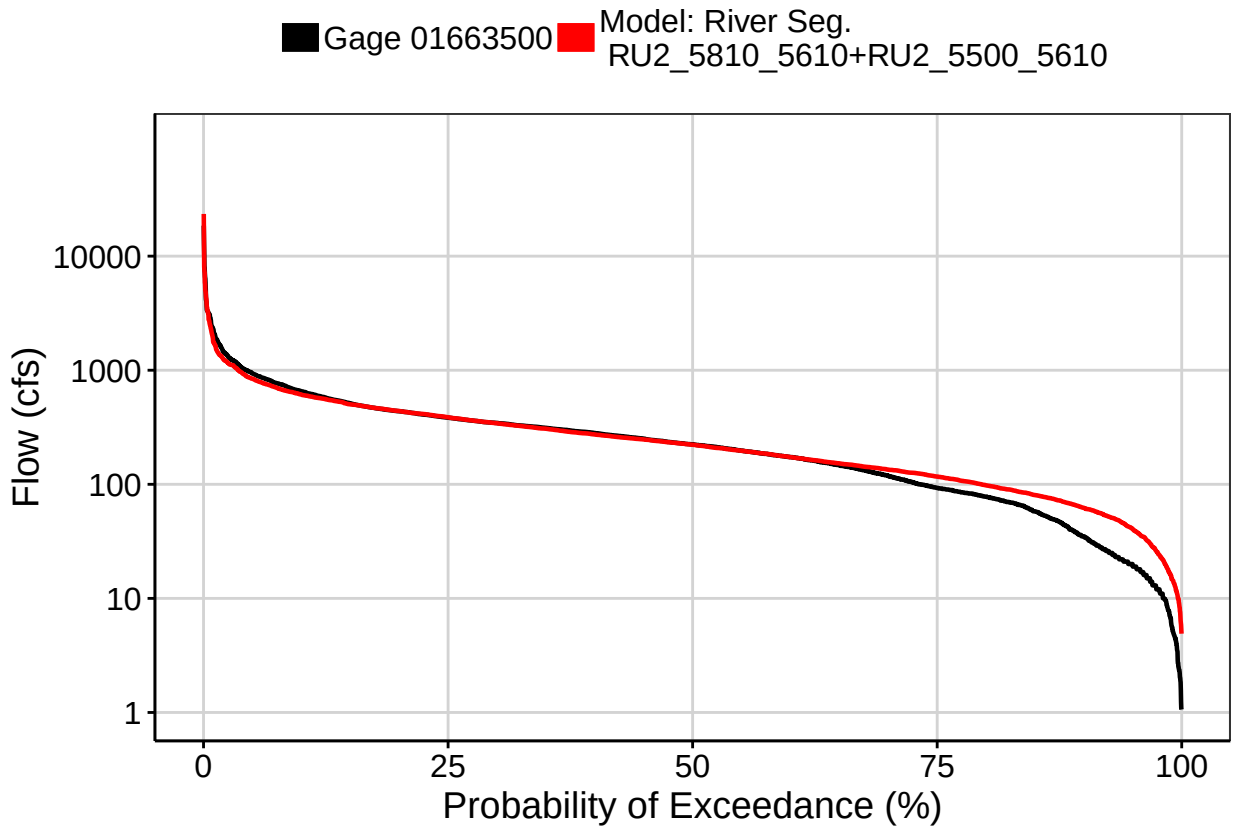


Fig. 4: Baseflow

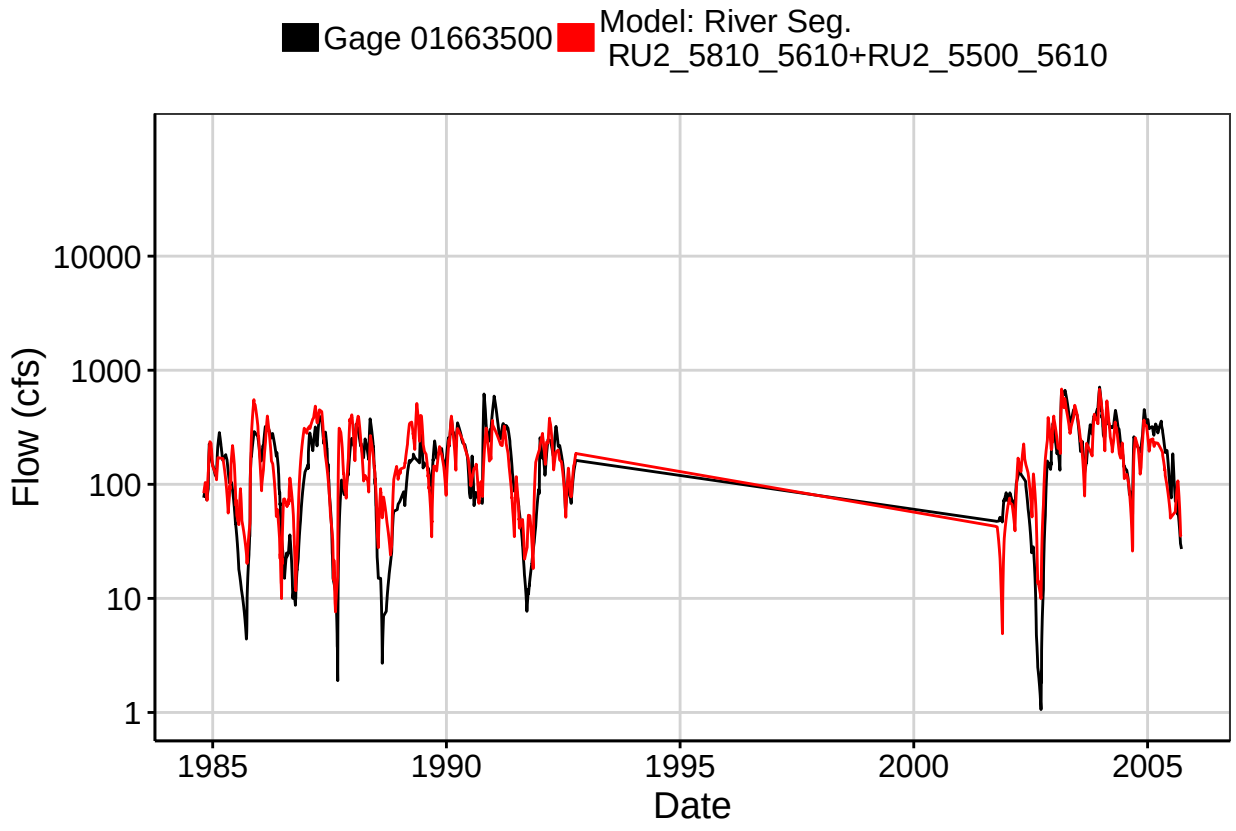


Fig. 5: Combined Baseflow

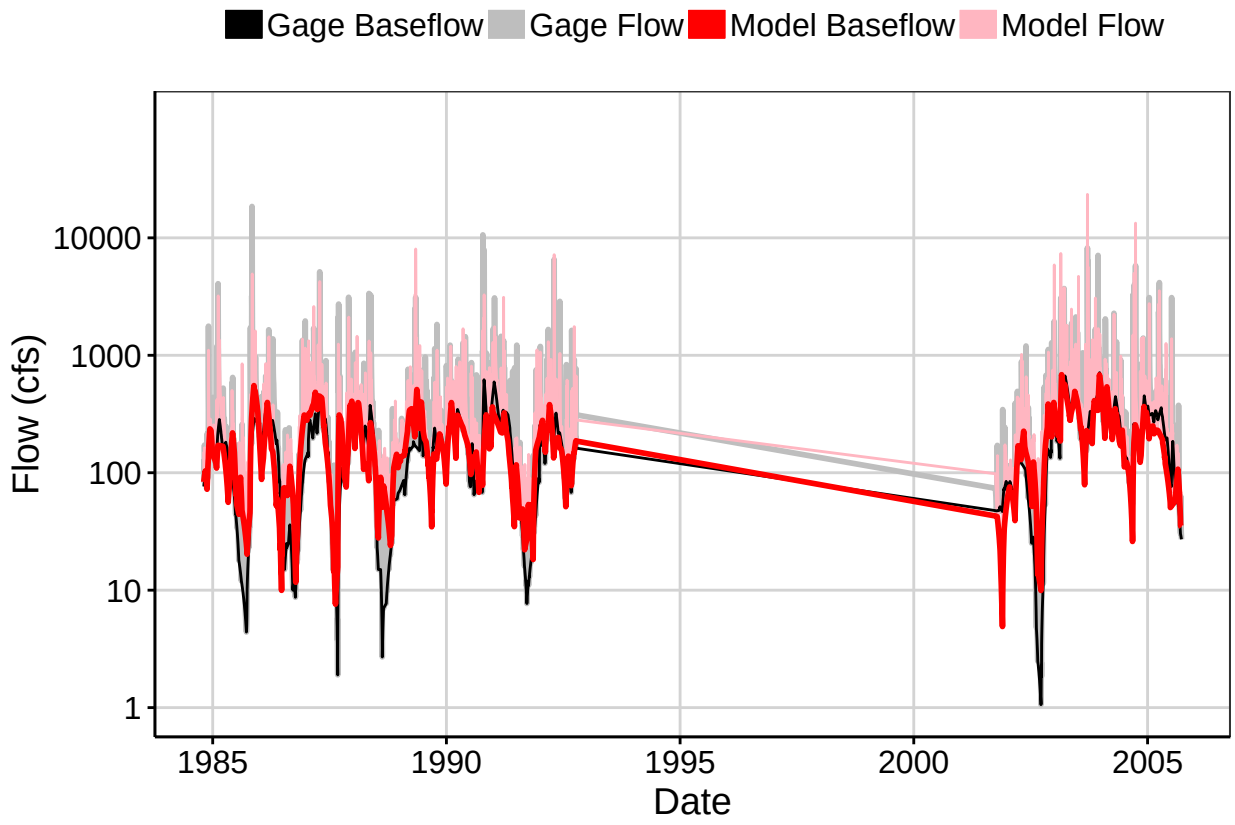


Fig. 6: Largest Error Segment

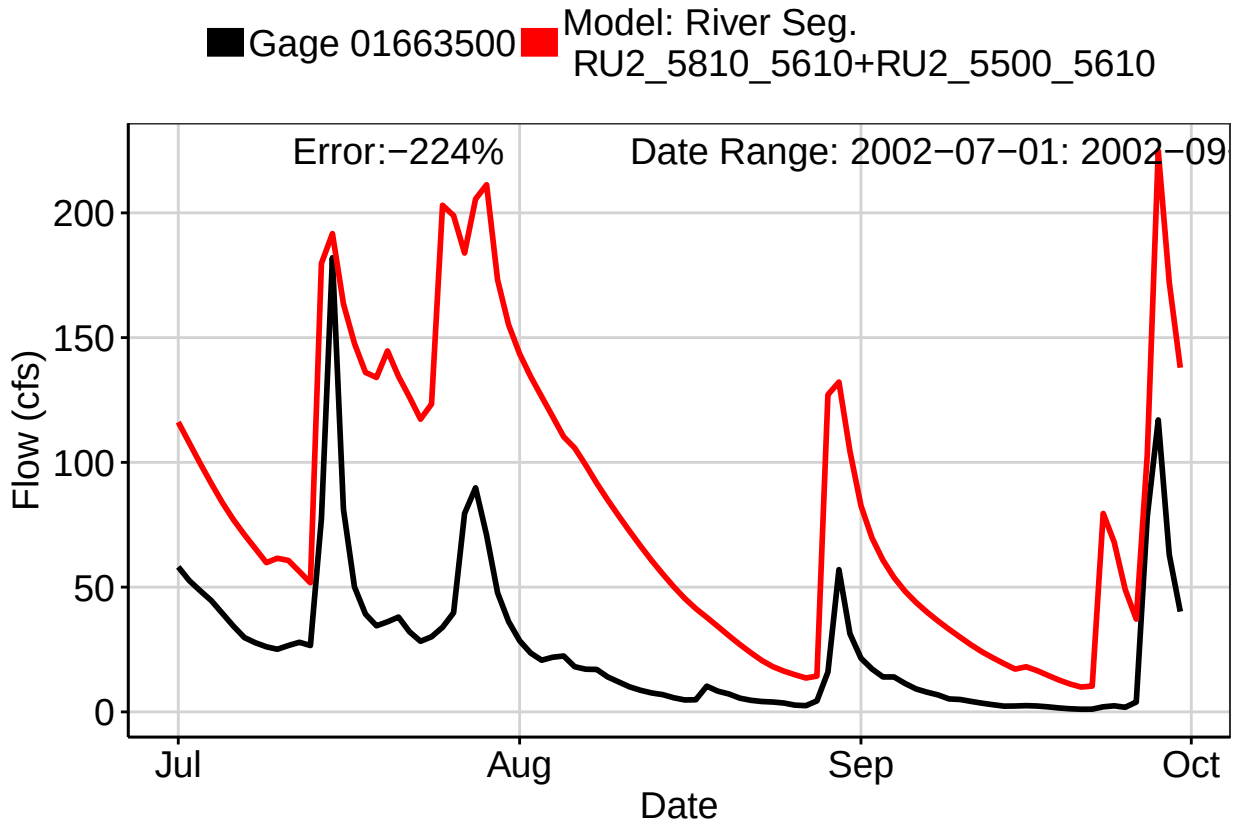


Fig. 7: Second Largest Error Segment

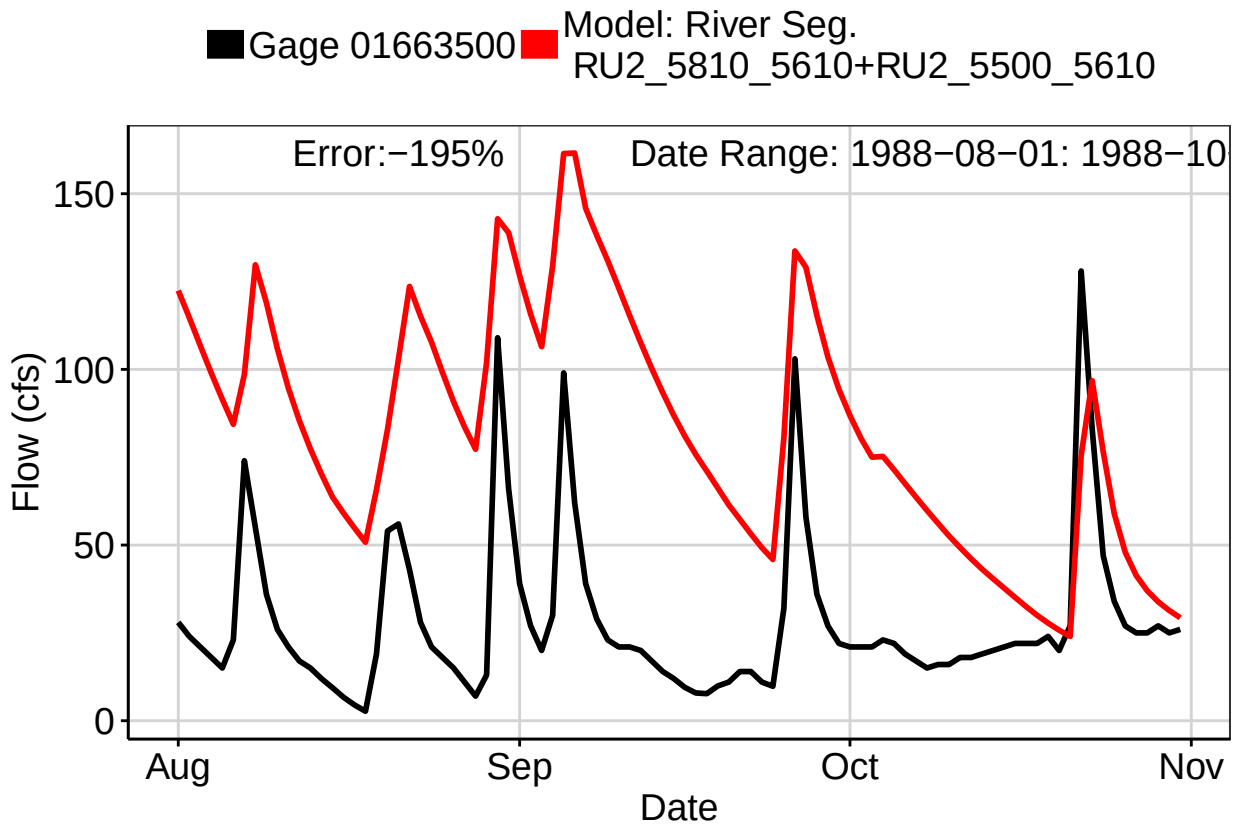


Fig. 8: Third Largest Error Segment

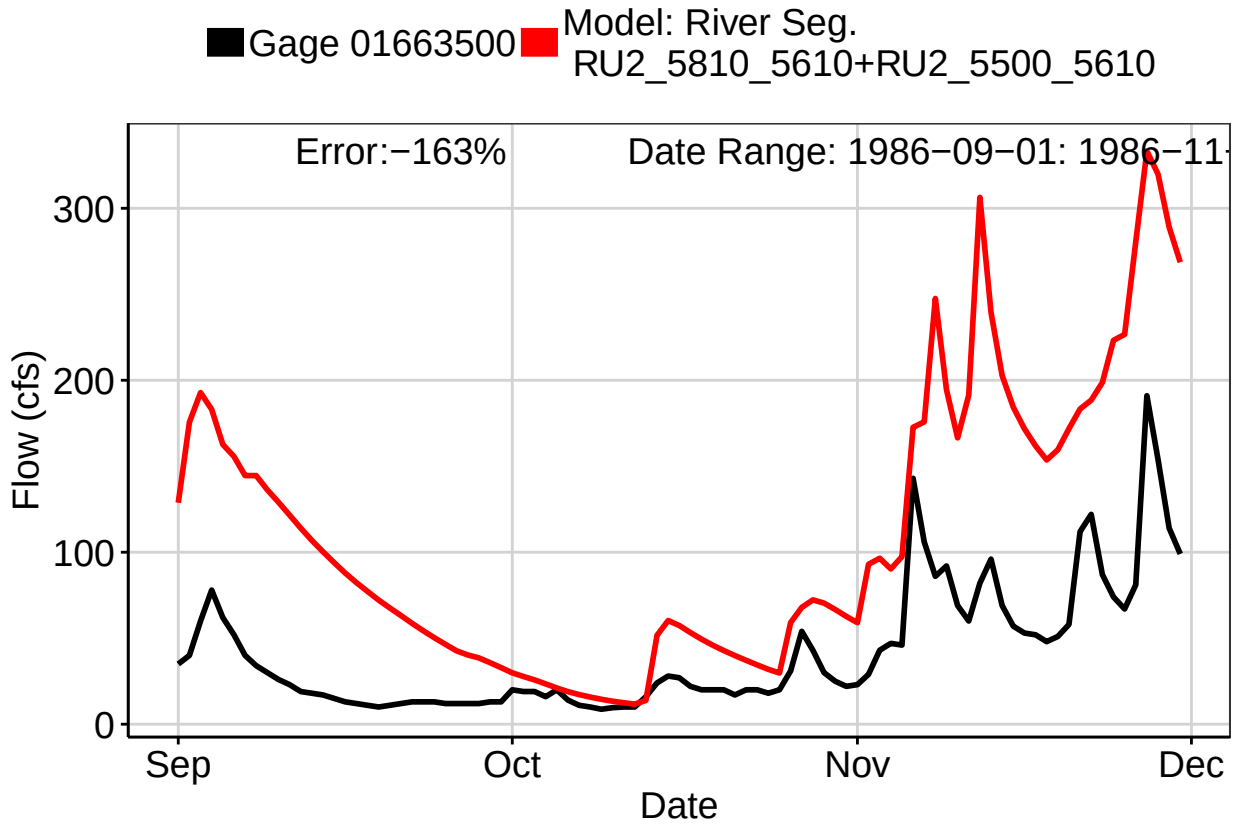


Fig. 9: Residuals Plot