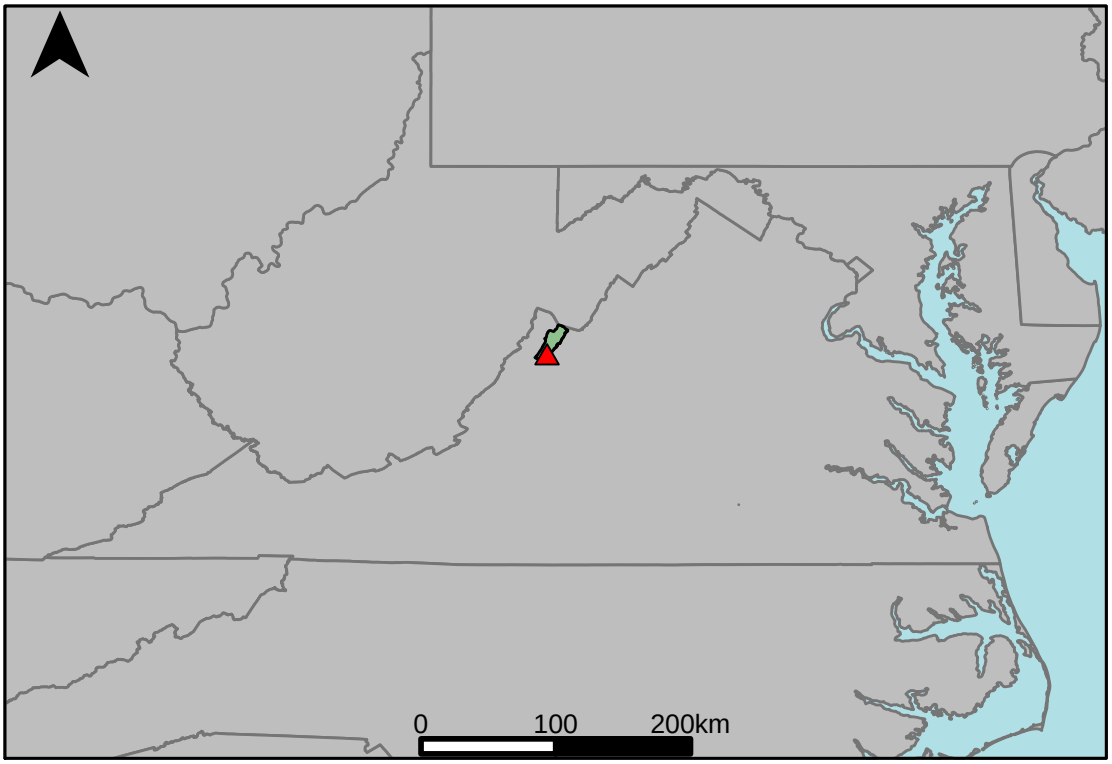
Appendix A.9: USGS Gage 02015700 vs. JU1_6300_6650 Upper James River



This river segment follows part of the flow of the Bullpasture River, a tributary of the James. The gage is located in Bath County (Lat. 38°11'43.5", Long. -79°34'13.2"), approximately 16 miles northwest of Craigsville, VA. Drainage area is 110 sq. miles. This gage started taking data in 1960 and is still taking data. 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 3.12%, with 32.1% of its rolling three month time spans above 20% error.

Table 1: Monthly Low Flows

	USGS Gage	Model	Pct. Error
Jan. Low Flow	35	33.6	-4
Feb. Low Flow	43	43.6	1.4
Mar. Low Flow	56	71.4	27.5
Apr. Low Flow	62	84.7	36.6
May Low Flow	74	90.1	21.8
Jun. Low Flow	101	110	8.91
Jul. Low Flow	93	96.5	3.76
Aug. Low Flow	81	65	-19.8
Sep. Low Flow	49	39.4	-19.6
Oct. Low Flow	39	35.2	-9.74
Nov. Low Flow	39	26.6	-31.8
Dec. Low Flow	34	25.8	-24.1

Table 2: Monthly Average Flows

	USGS Gage	Model	Pct. Error
Overall Mean Flow	160	155	-3.12
Jan. Mean Flow	200	188	-6
Feb. Mean Flow	197	236	19.8
Mar. Mean Flow	288	294	2.08
Apr. Mean Flow	239	211	-11.7
May Mean Flow	220	182	-17.3
Jun. Mean Flow	135	119	-11.9
Jul. Mean Flow	69.4	75.3	8.5
Aug. Mean Flow	65.8	69.6	5.78
Sep. Mean Flow	104	106	1.92
Oct. Mean Flow	70.5	80.8	14.6
Nov. Mean Flow	162	154	-4.94
Dec. Mean Flow	169	146	-13.6

Table 3: Monthly High Flows

	USGS Gage	Model	Pct. Error
Jan. High Flow	94	113	20.2
Feb. High Flow	538	413	-23.2
Mar. High Flow	752	326	-56.6
Apr. High Flow	520	500	-3.85
May High Flow	300	615	105
Jun. High Flow	686	1160	69.1
Jul. High Flow	421	551	30.9
Aug. High Flow	716	545	-23.9
Sep. High Flow	258	342	32.6
Oct. High Flow	163	174	6.75
Nov. High Flow	120	123	2.5
Dec. High Flow	104	195	87.5

Table 4: Period Low Flows

	USGS Gage	Model	Pct. Error
Min. 1 Day Min	22	9.53	-56.7
Med. 1 Day Min	31	22.1	-28.7
Min. 3 Day Min	22.1	10.2	-53.8
Med. 3 Day Min	32	22.7	-29.1
Min. 7 Day Min	22.3	11	-50.7
Med. 7 Day Min	33	23.8	-27.9
Min. 30 Day Min	25.4	13.7	-46.1
Med. 30 Day Min	36.6	33.5	-8.47
Min. 90 Day Min	31.1	21.4	-31.2
Med. 90 Day Min	50	52.5	5
7Q10	26.4	12.5	-52.7
Year of 90-Day Min. Flow	1999	1999	0
Drought Year Mean	71.1	93.9	32.1
Mean Baseflow	79	82.2	4.05

Table 5: Period High Flows

	USGS Gage	Model	Pct. Error
Max. 1 Day Max	8700	10600	21.8
Med. 1 Day Max	2290	2210	-3.49
Max. 3 Day Max	5720	5480	-4.2
Med. 3 Day Max	1450	1260	-13.1
Max. 7 Day Max	2750	2780	1.09
Med. 7 Day Max	875	739	-15.5
Max. 30 Day Max	808	848	4.95
Med. 30 Day Max	481	405	-15.8
Max. 90 Day Max	474	570	20.3
Med. 90 Day Max	293	268	-8.53

Table 6: Non-Exceedance Flows

	USGS Gage	Model	Pct. Error
1% Non-Exceedance	27.9	14.4	-48.4
5% Non-Exceedance	32.9	22.8	-30.7
50% Non-Exceedance	88	95.1	8.07
95% Non-Exceedance	492	438	-11
99% Non-Exceedance	1220	1110	-9.02
Sept. 10% Non-Exceedance	31	21	-32.3

Fig. 1: Hydrograph

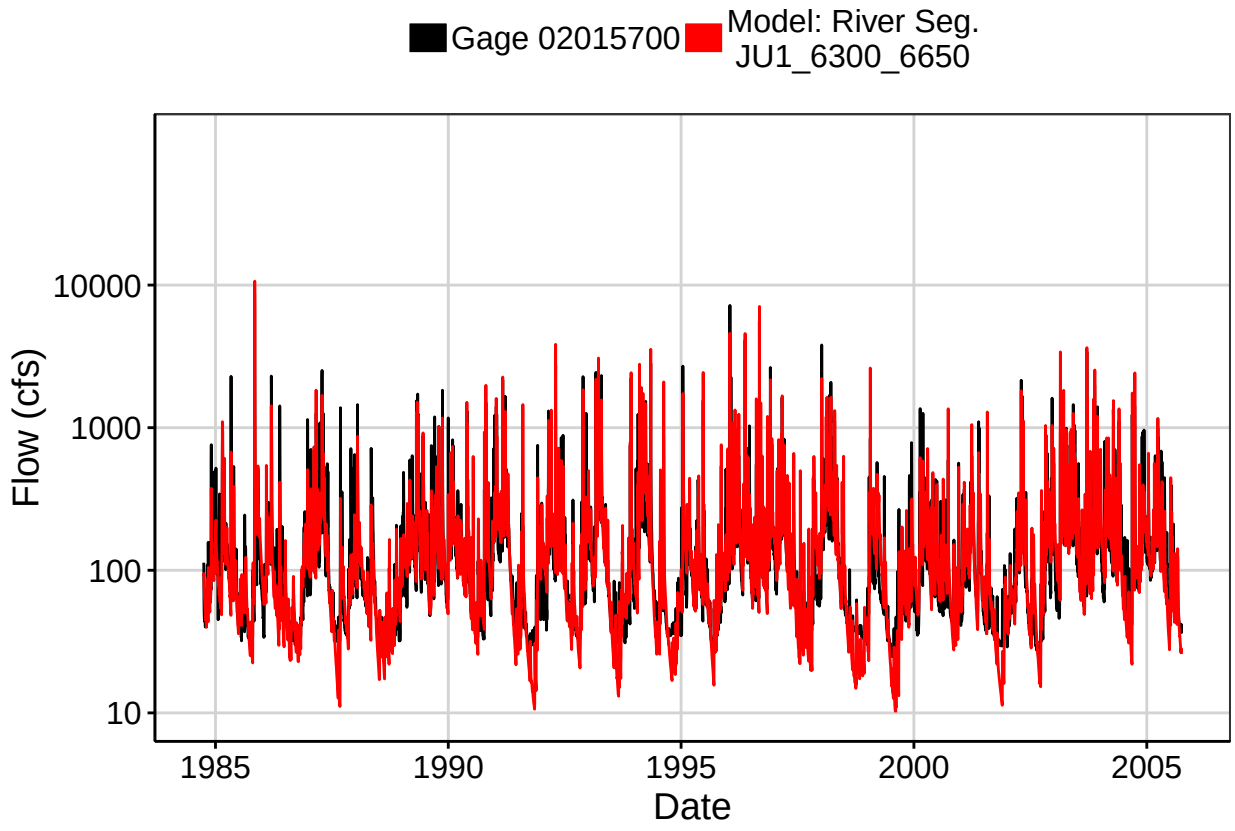


Fig. 2: Zoomed Hydrograph

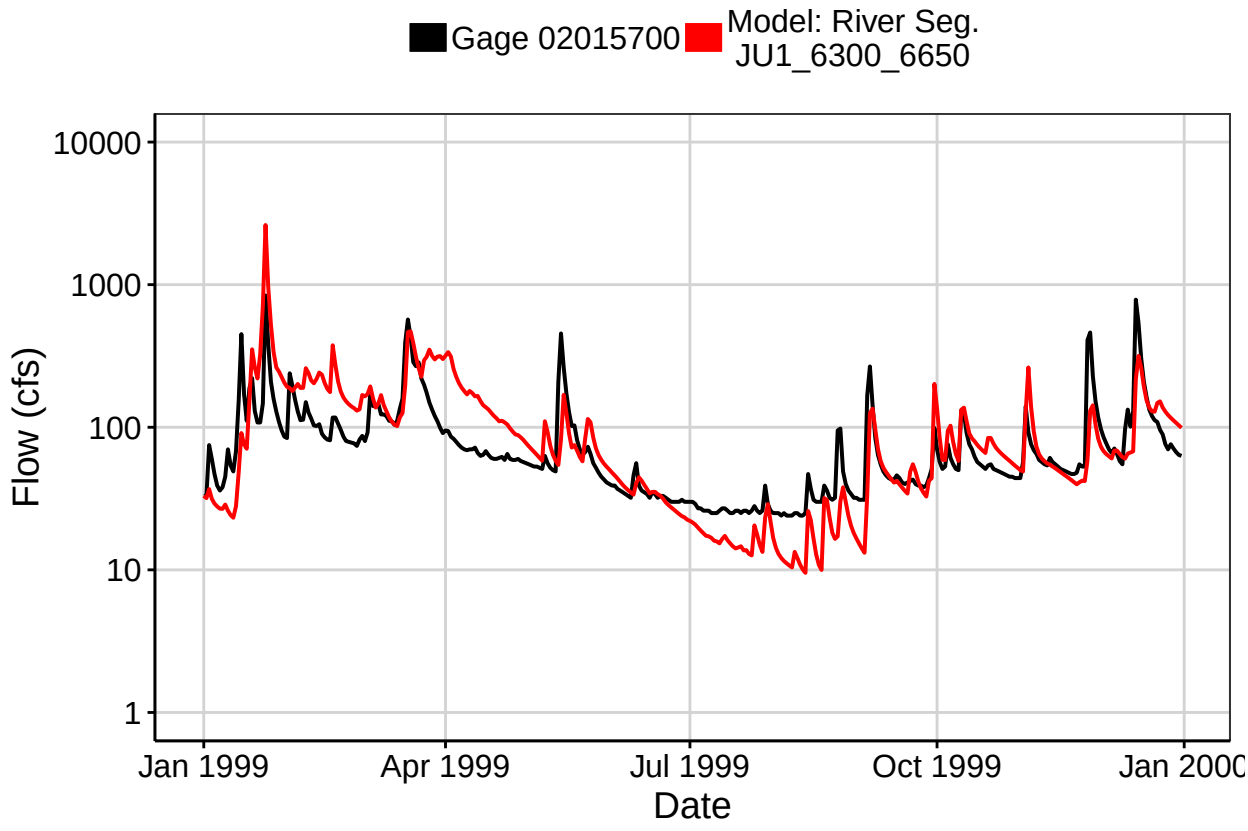


Fig. 3: Flow Exceedance

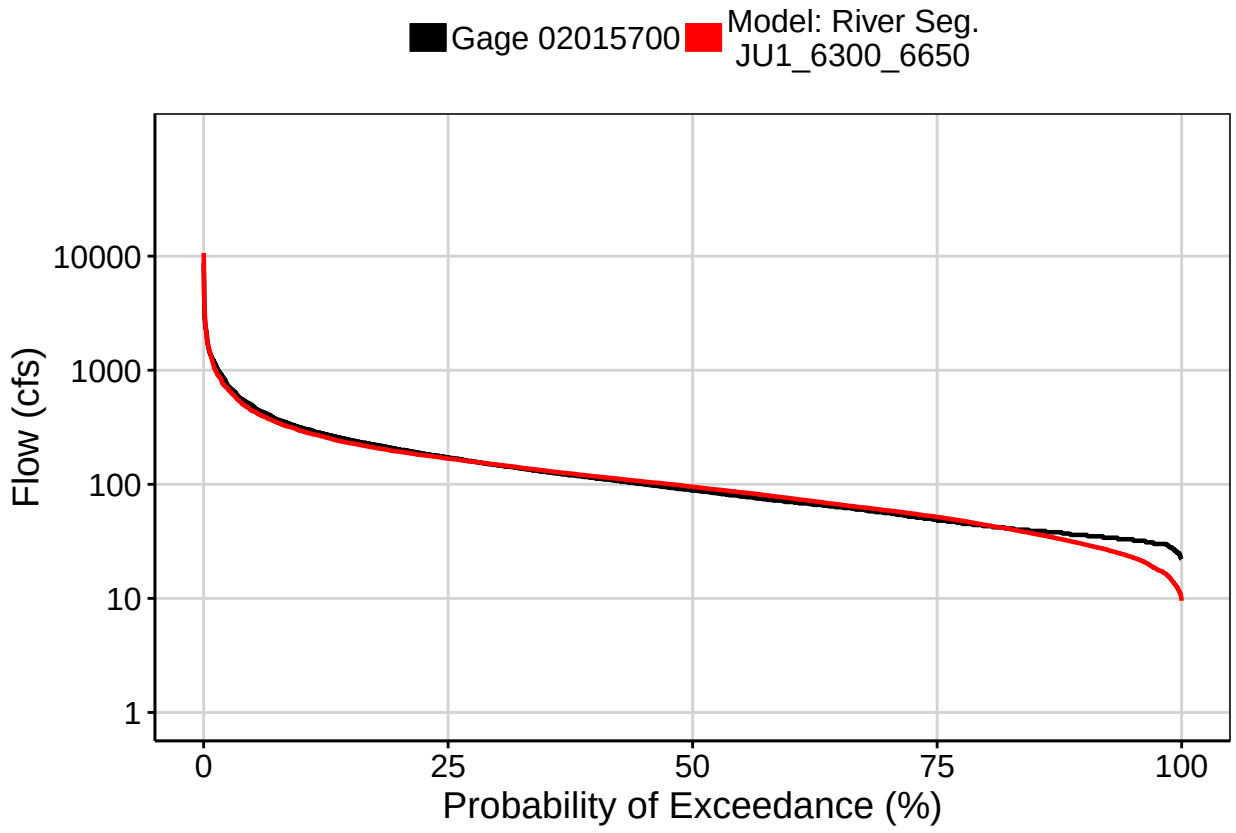


Fig. 4: Baseflow

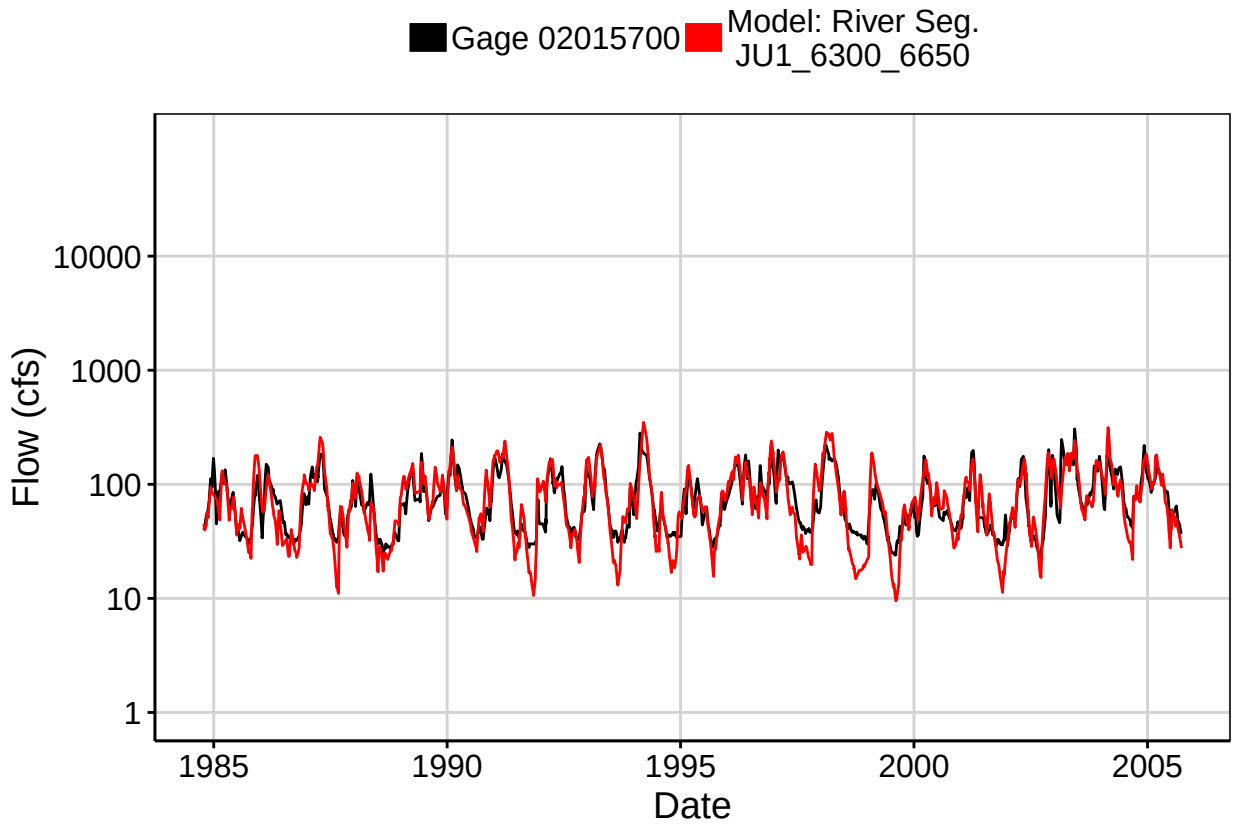


Fig. 5: Combined Baseflow

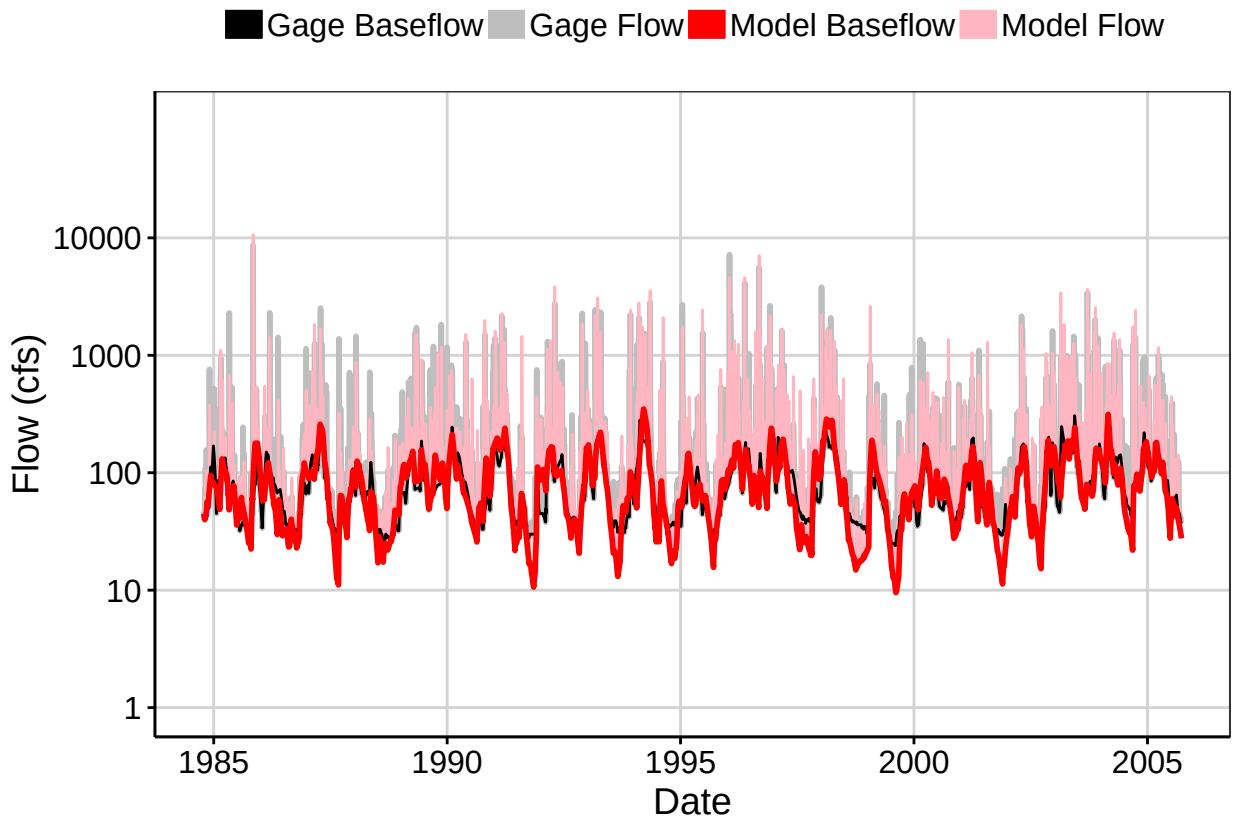


Fig. 6: Largest Error Segment

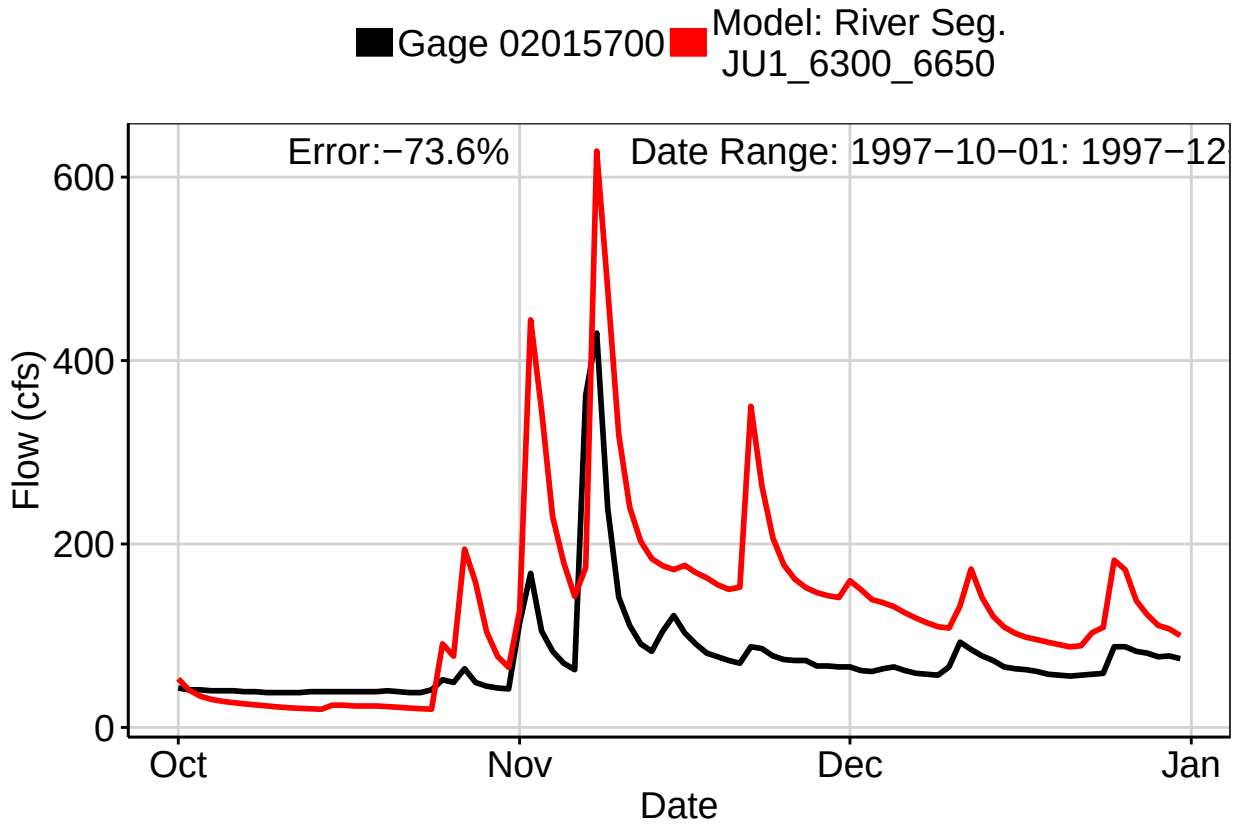


Fig. 7: Second Largest Error Segment

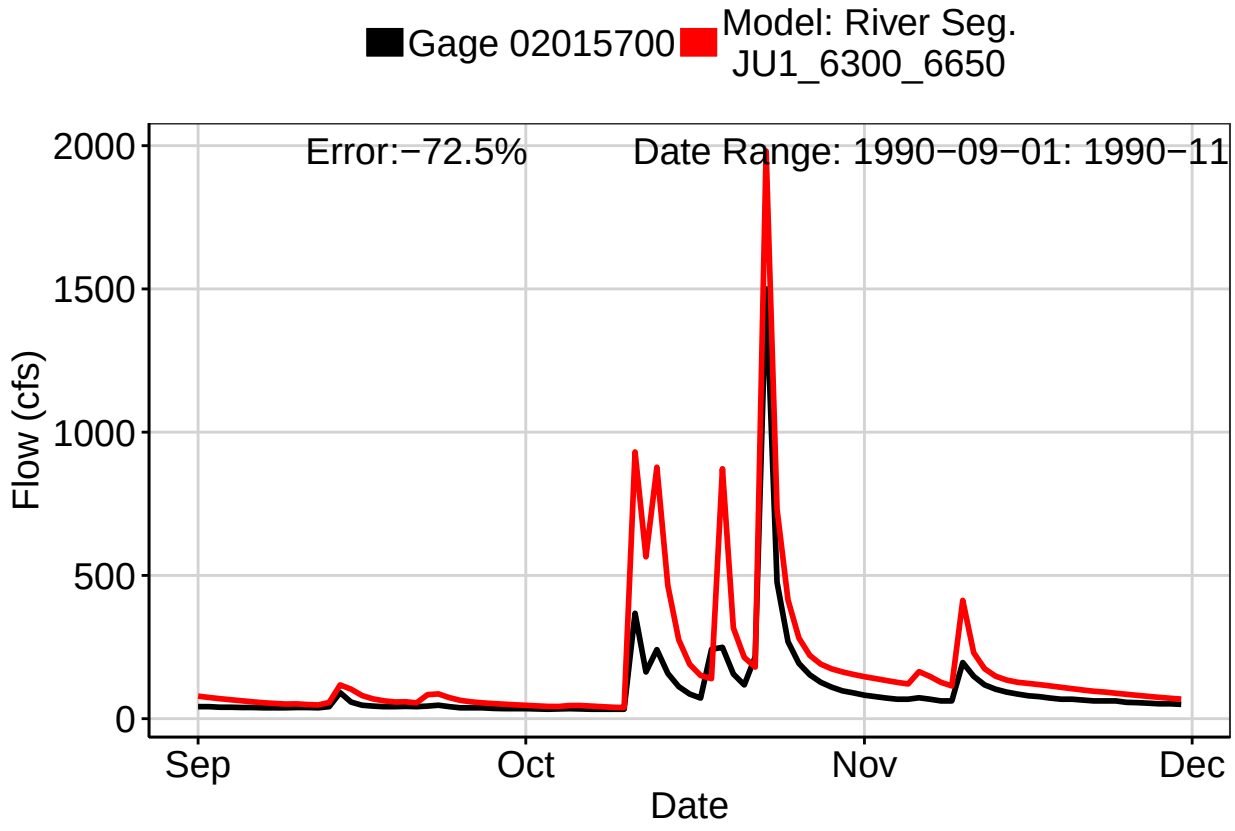


Fig. 8: Third Largest Error Segment

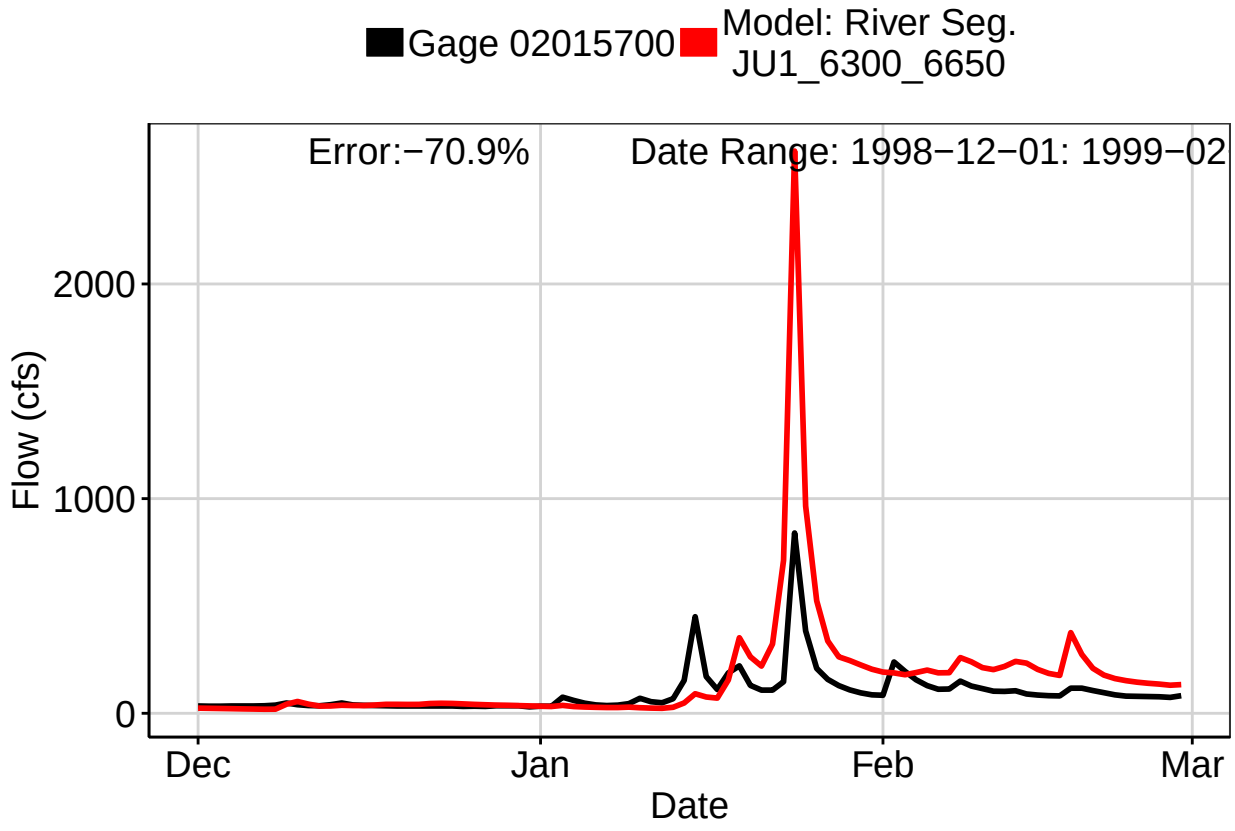


Fig. 9: Residuals Plot