

elid : 298524 , Facility SHENANDOAH (TOWN) WTP:SF Shenandoah River @ Luray : 11 vs. 18

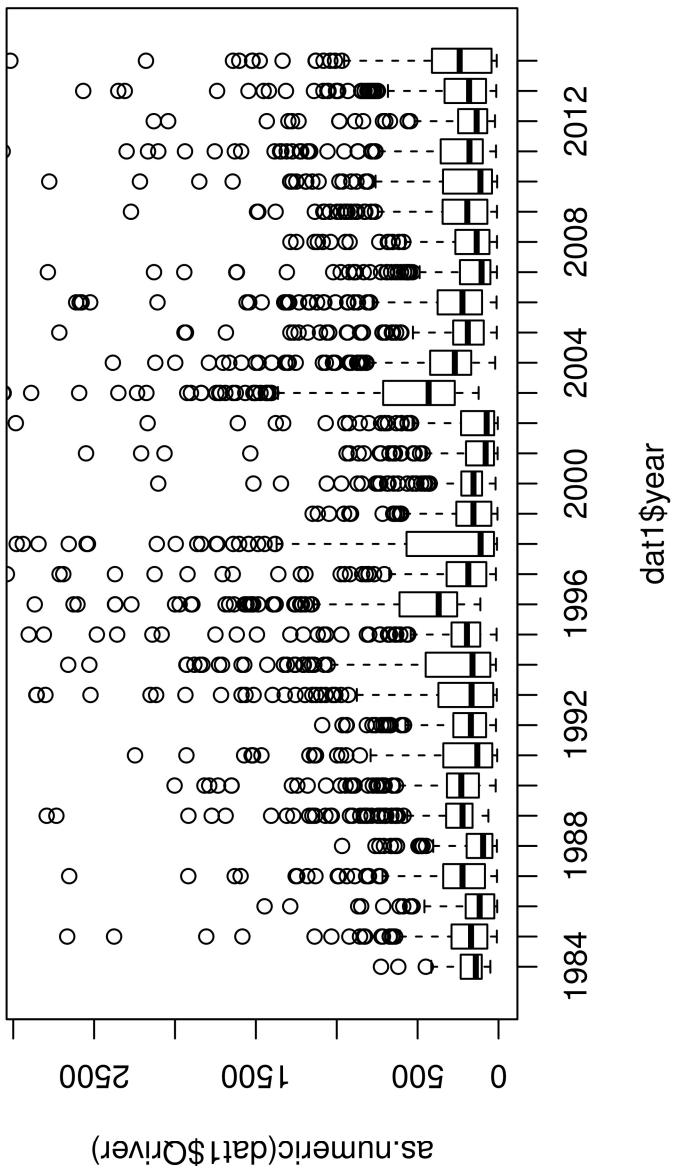


Figure 1: Qriver

Table 1: Quantiles11

	available_mgd	Qintake	flowby	base_demand_mgd	adj_demand_mgd	wd_mgd	unmet_demand	drought_adj
1%	5.552819	8.590212	0	1.952064	1.952064	0	0	0
5%	10.354283	16.018076	0	1.952064	1.952064	0	0	0
10%	16.400424	25.371455	0	1.961659	1.961659	0	0	0

	available_mgd	Qintake	flowby	base_demand_mgd	adj_demand_mgd	wd_mgd	unmet_demand	drought_adj
20%	32.569581	50.385142	0	1.985847	1.985847	1.985847	0	0
30%	57.608731	89.120706	0	2.017291	2.017291	2.017291	0	0

Table 2: Quantiles18

	available_mgd	Qintake	flowby	base_demand_mgd	adj_demand_mgd	wd_mgd	unmet_demand	drought_adj
1%	2.854851	4.416455	0	2.5	2.370808	2.155177	0	0
5%	4.736260	7.326993	0	2.5	2.500000	2.500000	0	0
10%	6.635448	10.265038	0	2.5	2.500000	2.500000	0	0
20%	14.105248	21.820818	0	2.5	2.500000	2.500000	0	0
30%	36.324499	56.194000	0	2.5	2.500000	2.500000	0	0

Table 3: Rejected Demand11

	Rejected Demand
90%	0
95%	0
97%	0
98%	0
99%	0
100%	0

Table 4: Rejected Demand18

	Rejected Demand
90%	0.0000000
95%	0.0000000
97%	0.0000000
98%	0.0000000
99%	0.0516769
100%	0.5378644

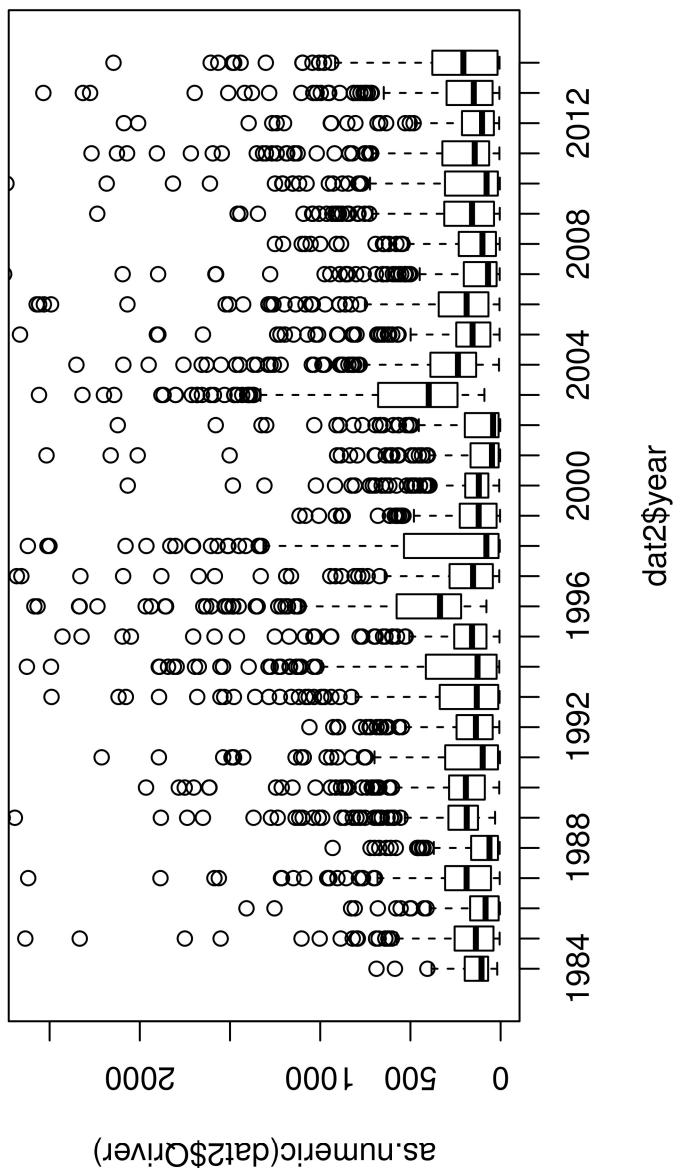


Figure 2: Qriver

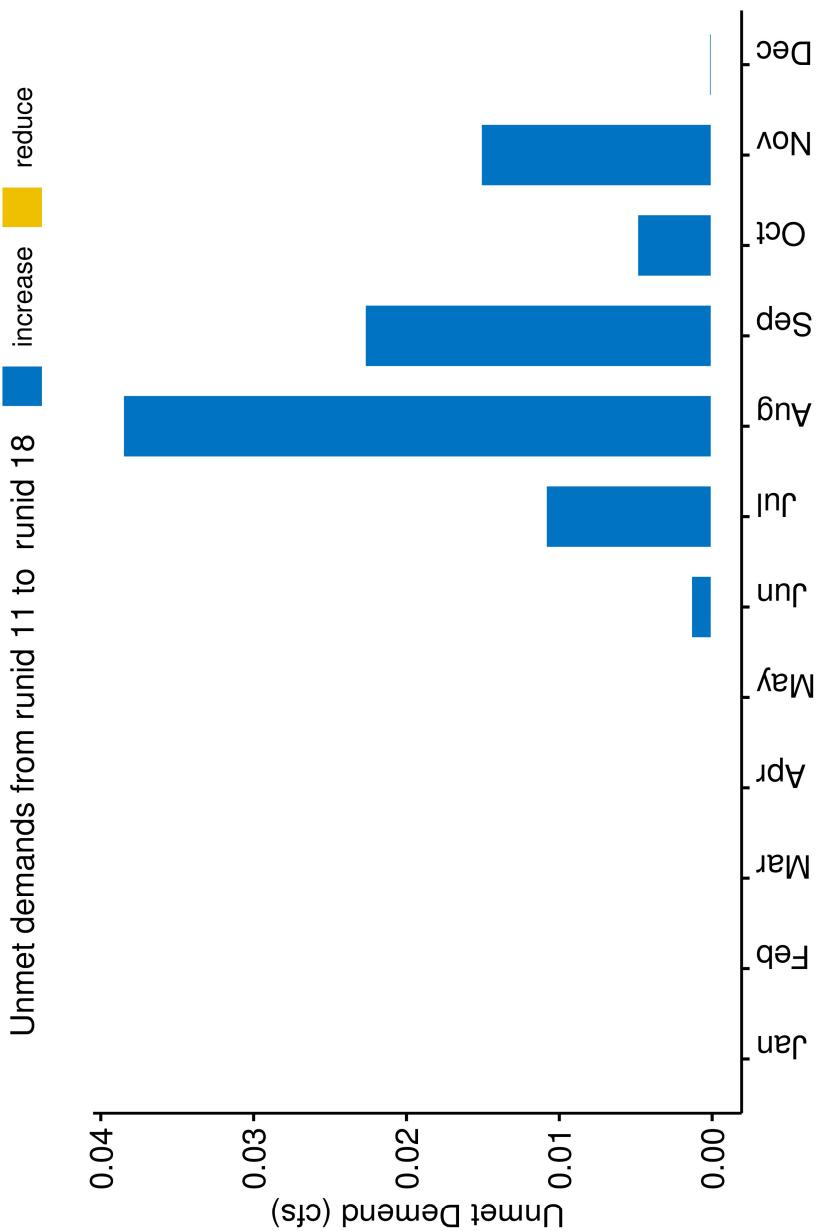


Figure 3: Demands

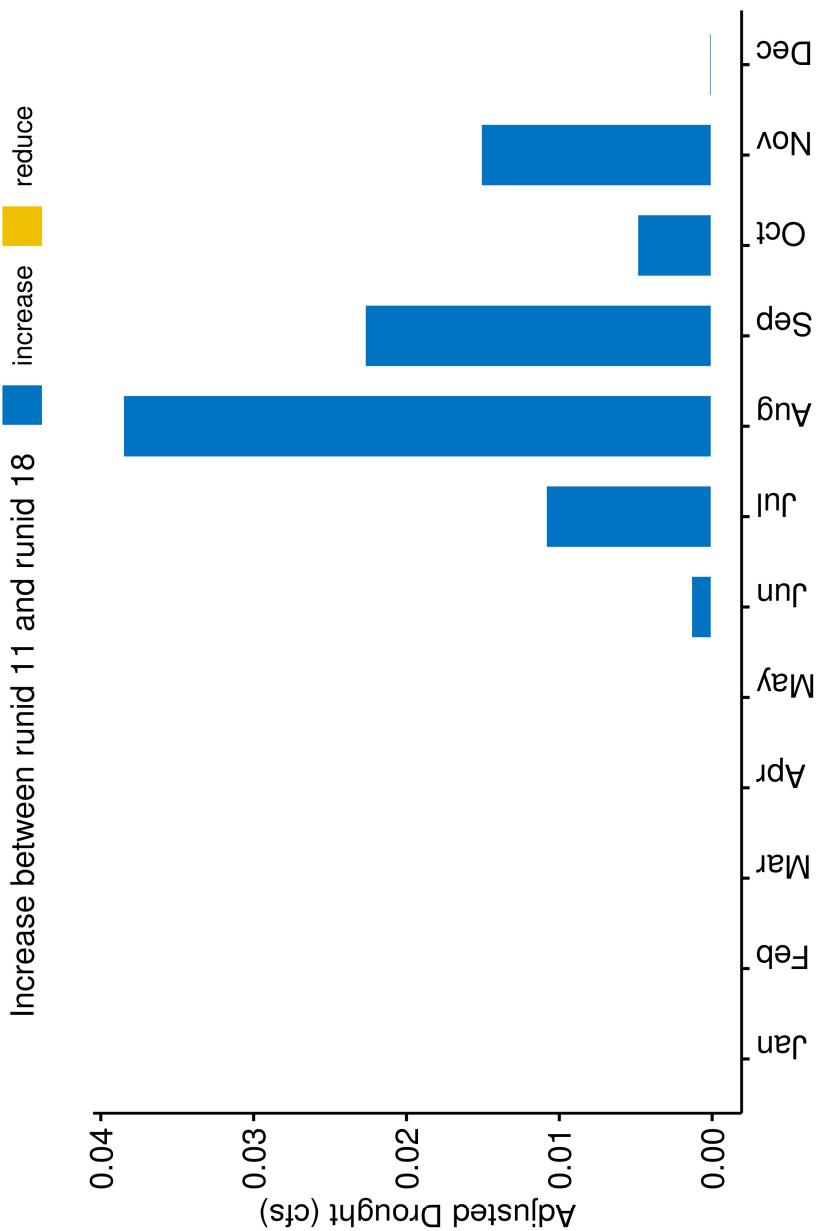


Figure 4: Demands

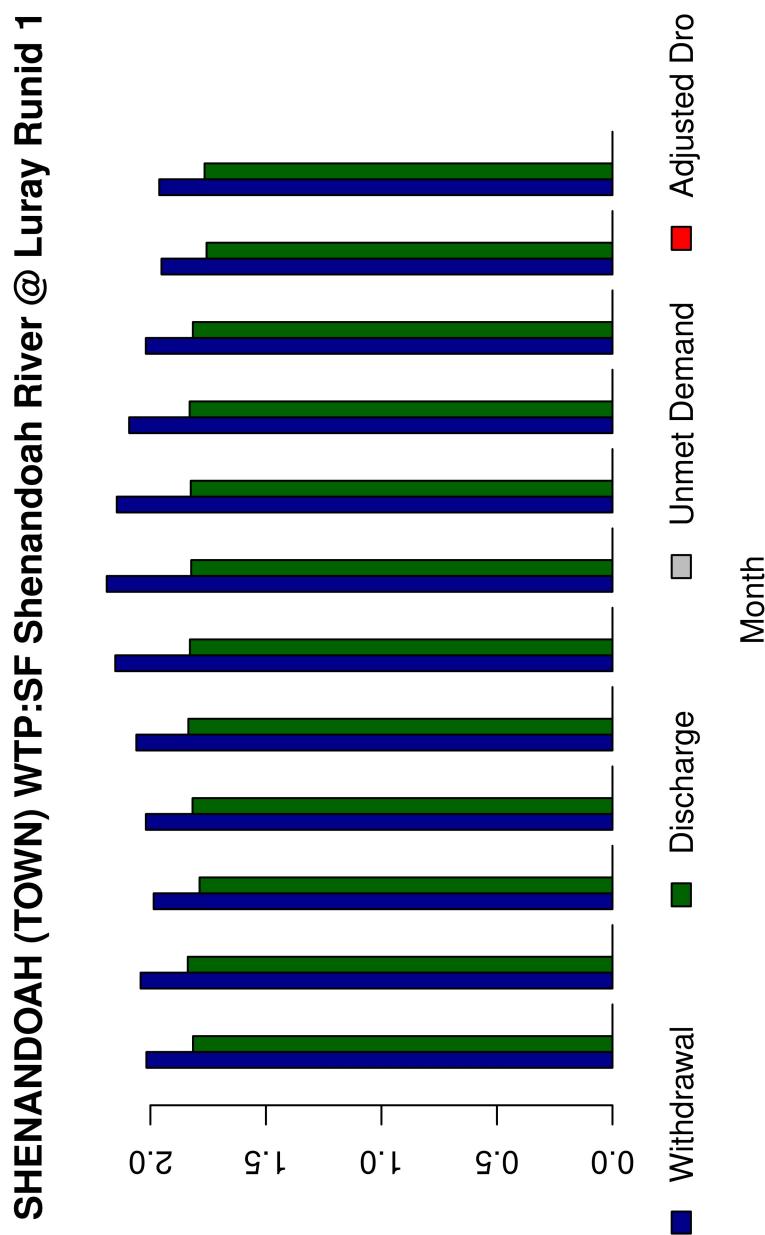


Figure 5: Demands

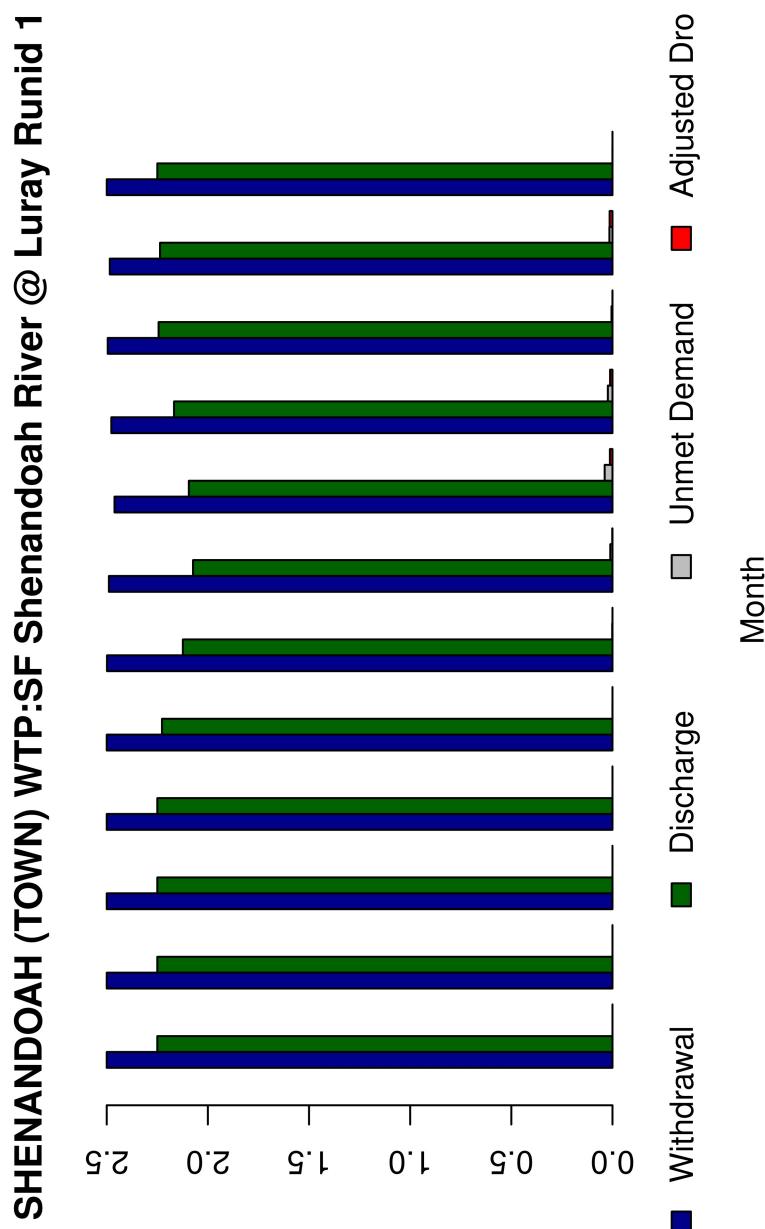


Figure 6: Demands

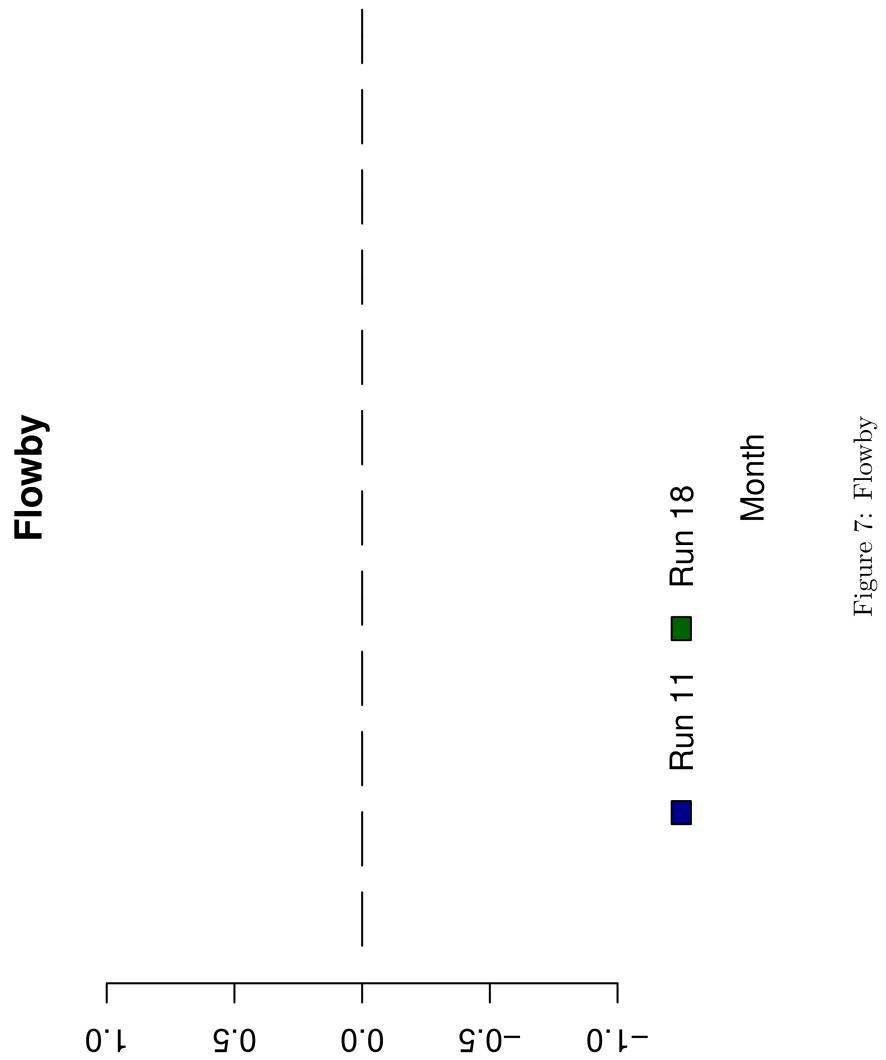


Figure 7: Flowby

Table 5: Unmet Demands Quantiles11

	1 Day Min	1 Day Max	3 Day Min	3 Day Max	7 Day Min	7 Day Max	30 Day Min	30 Day Max	90 Day Min	90 Day Max	Zero Flow Days
1%	0	0	0	0	0	0	0	0	0	0	365
5%	0	0	0	0	0	0	0	0	0	0	365
10%	0	0	0	0	0	0	0	0	0	0	365
25%	0	0	0	0	0	0	0	0	0	0	365
50%	0	0	0	0	0	0	0	0	0	0	365
75%	0	0	0	0	0	0	0	0	0	0	365
90%	0	0	0	0	0	0	0	0	0	0	366
95%	0	0	0	0	0	0	0	0	0	0	366
99%	0	0	0	0	0	0	0	0	0	0	366

Table 6: Unmet Demands Quantiles18

	1 Day Min	1 Day Max	3 Day Min	3 Day Max	7 Day Min	7 Day Max	30 Day Min	30 Day Max	90 Day Min	90 Day Max	Zero Flow Days
1%	0	0.0000000	0	0.0000000	0	0.0000000	0	0.0000000	0	0.0000000	292.24
5%	0	0.0000000	0	0.0000000	0	0.0000000	0	0.0000000	0	0.0000000	340.55
10%	0	0.0000000	0	0.0000000	0	0.0000000	0	0.0000000	0	0.0000000	354.60
25%	0	0.0723771	0	0.0241257	0	0.0103396	0	0.0024634	0	0.0008211	358.50
50%	0	0.4323727	0	0.1952018	0	0.0836579	0	0.0201693	0	0.0067231	363.00
75%	0	0.7686210	0	0.4241849	0	0.2066379	0	0.0600965	0	0.0210611	364.00
90%	0	1.0434734	0	0.6589701	0	0.3152215	0	0.1344640	0	0.0524737	365.10
95%	0	1.5339293	0	1.1211152	0	0.7654619	0	0.4799461	0	0.1822398	366.00
99%	0	2.0255791	0	1.5193203	0	1.3105605	0	0.9747649	0	0.4775564	366.00

**Table 1: Monthly Low Flows**

	VA Hydro: Base	VA Hydro: Exempt Users	Pct. Difference
Jan. Low Flow	21.7	8.91	-59
Feb. Low Flow	70.9	37	-47.9
Mar. Low Flow	149	114	-23.2
Apr. Low Flow	176	142	-19.4
May Low Flow	184	150	-18.4
Jun. Low Flow	205	170	-16.8
Jul. Low Flow	157	124	-21.3
Aug. Low Flow	129	95.5	-26
Sep. Low Flow	41.7	14.6	-65.1
Oct. Low Flow	24.3	9.87	-59.3
Nov. Low Flow	20.2	8.74	-56.7
Dec. Low Flow	13.2	6.54	-50.3

**Table 2: Monthly Average Flows**

	VA Hydro: Base	VA Hydro: Exempt Users	Pct. Difference
Overall Mean Flow	296	265	-10.2
Jan. Mean Flow	391	357	-8.83
Feb. Mean Flow	408	374	-8.26
Mar. Mean Flow	498	463	-6.98
Apr. Mean Flow	415	381	-8.23
May Mean Flow	328	294	-10.4
Jun. Mean Flow	209	179	-14.4
Jul. Mean Flow	114	88.3	-22.7
Aug. Mean Flow	99.5	75.9	-23.7
Sep. Mean Flow	240	218	-9.22
Oct. Mean Flow	185	159	-13.8
Nov. Mean Flow	311	280	-9.87
Dec. Mean Flow	359	325	-9.61

**Table 3: Monthly High Flows**

	VA Hydro: Base	VA Hydro: Exempt Users	Pct. Difference
Jan. High Flow	334	301	-9.73
Feb. High Flow	655	618	-5.75
Mar. High Flow	922	885	-3.97
Apr. High Flow	959	923	-3.68
May High Flow	736	701	-4.79
Jun. High Flow	1500	1460	-2.46
Jul. High Flow	959	924	-3.65
Aug. High Flow	672	635	-5.53
Sep. High Flow	384	346	-9.82
Oct. High Flow	231	193	-16.6
Nov. High Flow	205	166	-18.8
Dec. High Flow	178	144	-18.9

Table 4: Period Low Flows

	VA Hydro: Base	VA Hydro: Exempt Users	Pct. Difference
Min. 1 Day Min	4.07	2.08	-48.9
Med. 1 Day Min	10.7	5.73	-46.6
Min. 3 Day Min	4.17	2.18	-47.7
Med. 3 Day Min	10.9	5.86	-46.3
Min. 7 Day Min	4.42	2.27	-48.7
Med. 7 Day Min	11.9	6.03	-49.1
Min. 30 Day Min	6.31	3.02	-52.1
Med. 30 Day Min	26.8	11.5	-57.1
Min. 90 Day Min	17.7	9.6	-45.8
Med. 90 Day Min	70	44.1	-37
7Q10	7.05	3.49	-50.4
Year of 90-Day Min. Flow	1999	1999	0
Drought Year Mean	132	109	-17.5
Mean Baseflow	143	115	-19.8

Table 5: Period High Flows

	VA Hydro: Base	VA Hydro: Exempt	Users	Pct. Difference
Max. 1 Day Max	22400	22400		-0.17
Med. 1 Day Max	3240	3200		-1.18
Max. 3 Day Max	15500	15500		-0.23
Med. 3 Day Max	2470	2430		-1.38
Max. 7 Day Max	8220	8190		-0.43
Med. 7 Day Max	1590	1560		-2.17
Max. 30 Day Max	2360	2330		-1.47
Med. 30 Day Max	790	756		-4.33
Max. 90 Day Max	1190	1160		-2.9
Med. 90 Day Max	534	499		-6.52

	VA Hydro: Base	VA Hydro: Exempt	Users	Pct. Difference
1% Non-Exceedance	8.37	4.14		-50.5
5% Non-Exceedance	15.7	6.98		-55.6
50% Non-Exceedance	180	146		-18.9
95% Non-Exceedance	902	865		-4.06
99% Non-Exceedance	2370	2330		-1.63
Sept. 10% Non-Exceedance	11.6	6		-48.4

Table 6: Non-Exceedance Flows

Fig. 1: Hydrograph

■ 1: VA Hydro: Base ■ 2: VA Hydro: Exempt Users

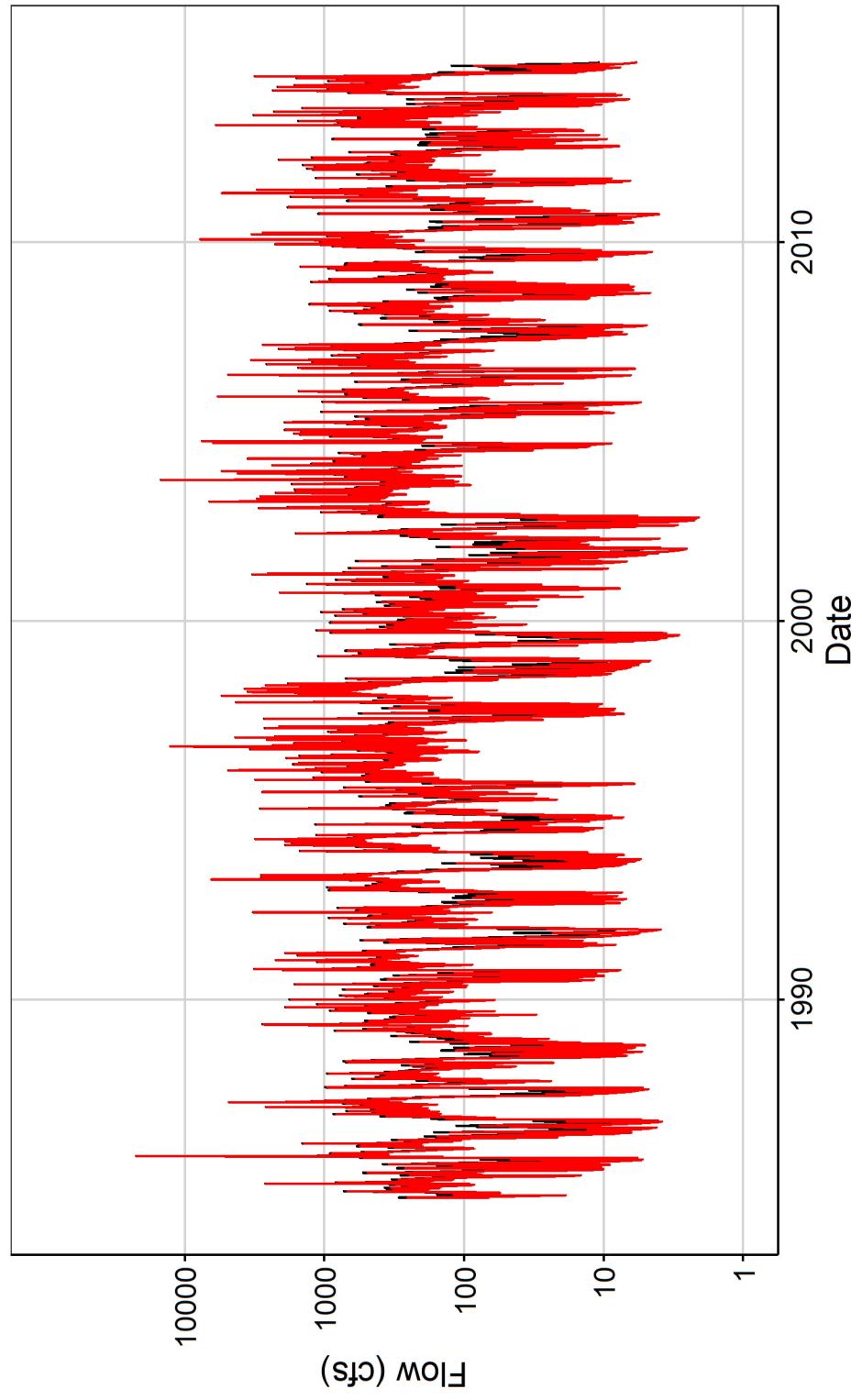


Fig. 2: Zoomed Hydrograph

■ 1: VA Hydro: Base ■ 2: VA Hydro: Exempt Users

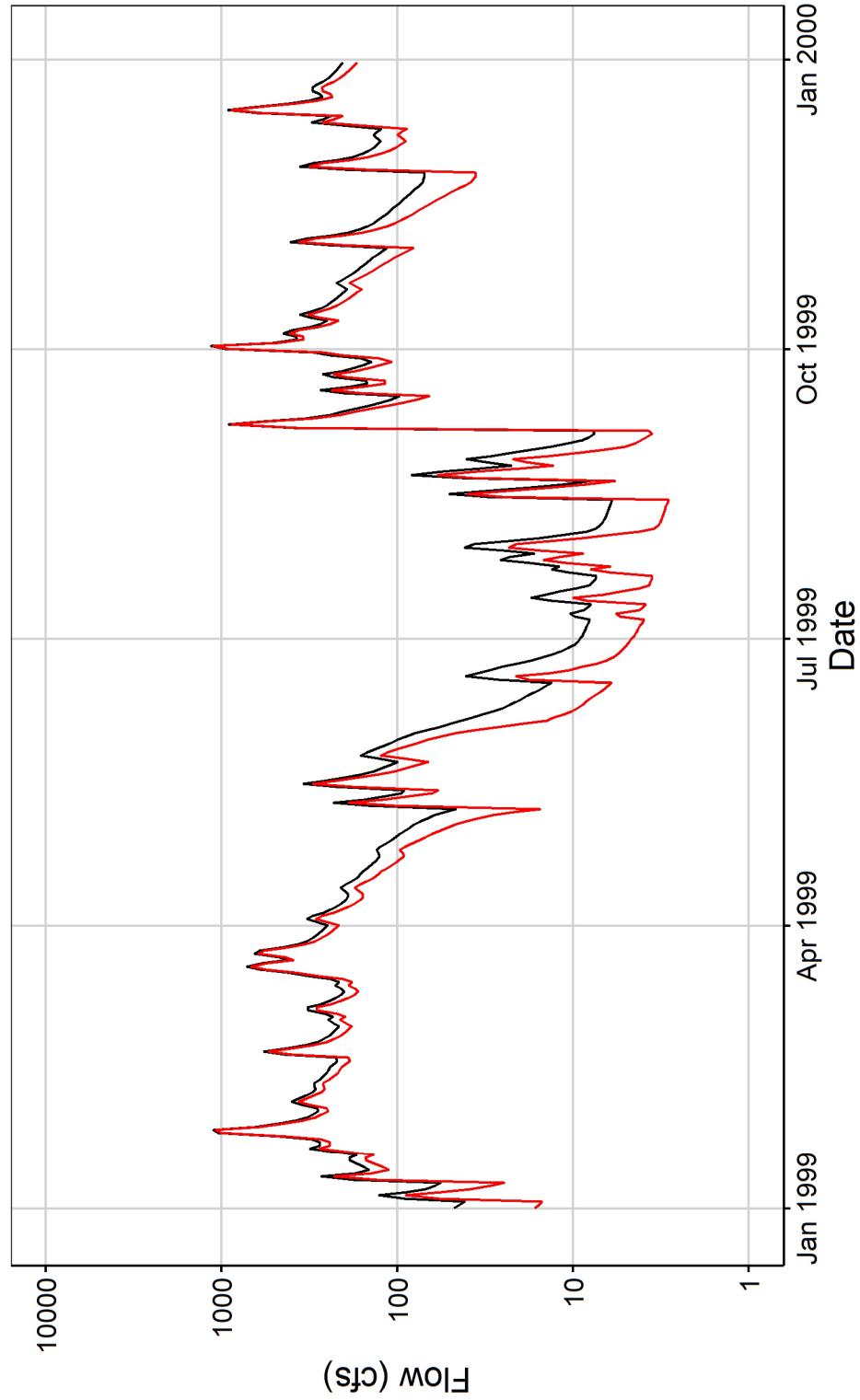


Fig. 3: Flow Exceedance

■ 1: VA Hydro: Base ■ 2: VA Hydro: Exempt Users

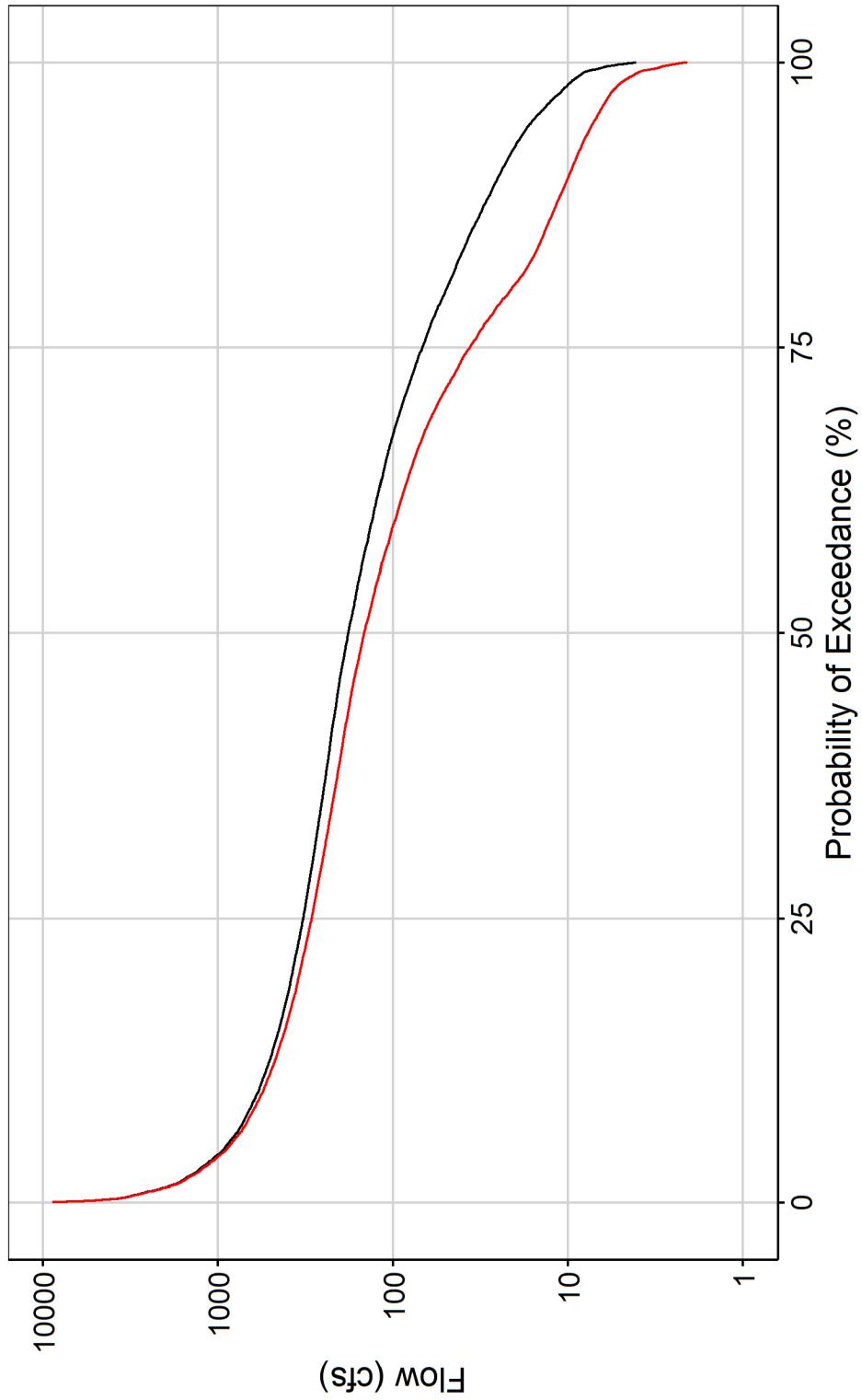


Fig. 4: Baseflow

■ 1: VA Hydro: Base ■ 2: VA Hydro: Exempt Users

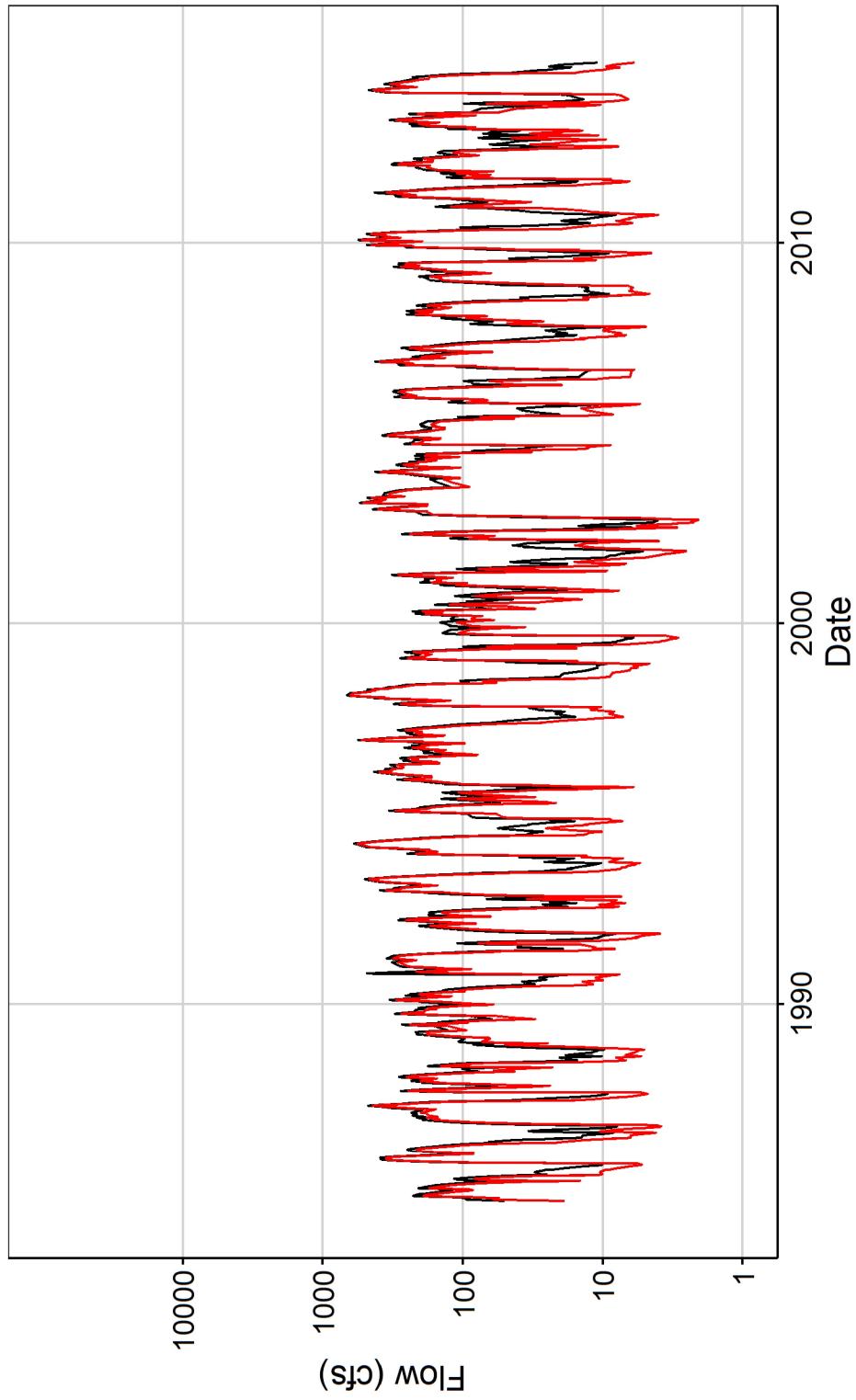


Fig. 5: Combined Baseflow

■ Scen. 1 Baseflow ■ Scen. 1 Flow ■ Scen. 2 Baseflow ■ Scen. 2 Flow

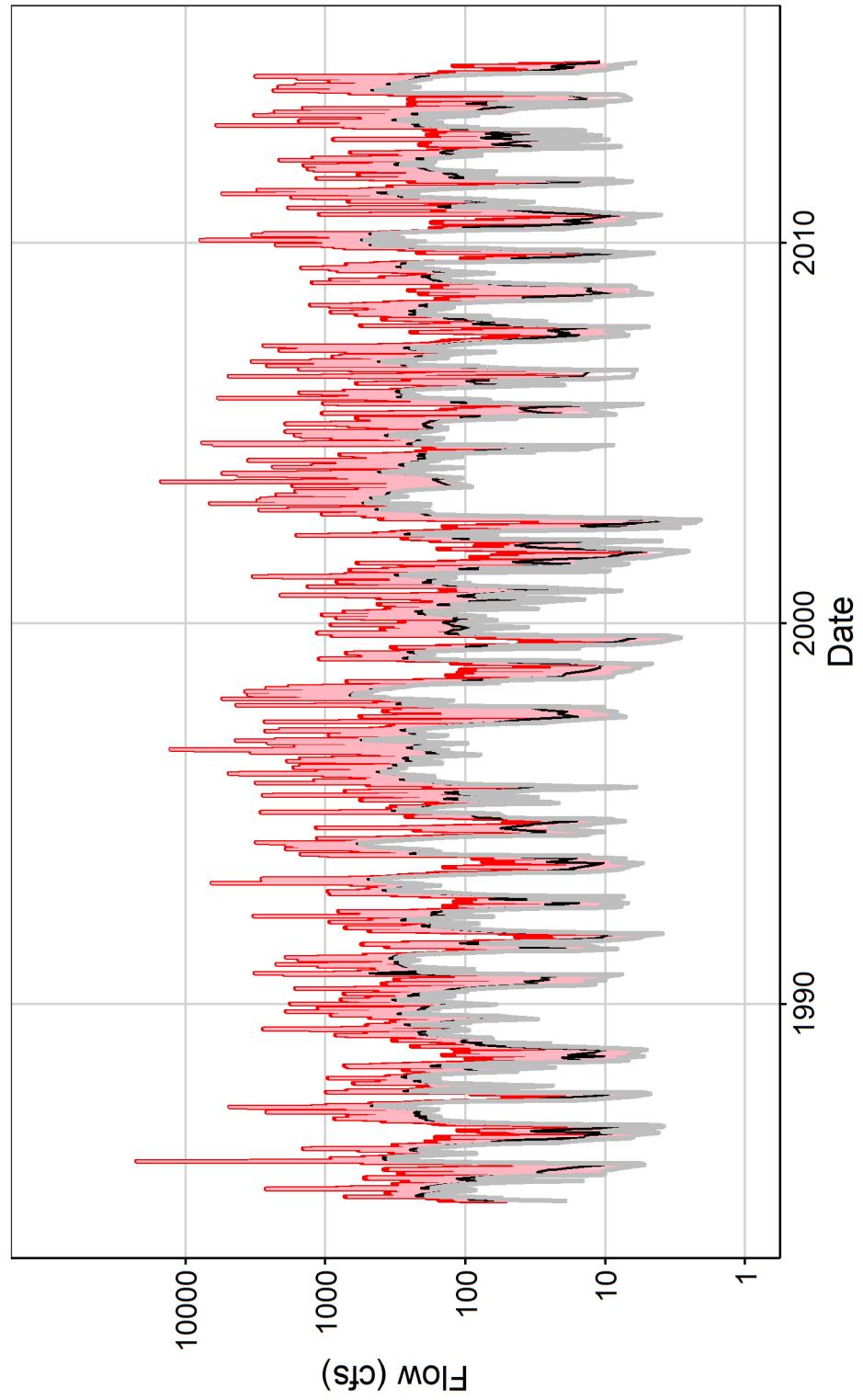


Fig. 6: Largest Difference Period

■ 1: VA Hydro: Base ■ 2: VA Hydro: Exempt Users

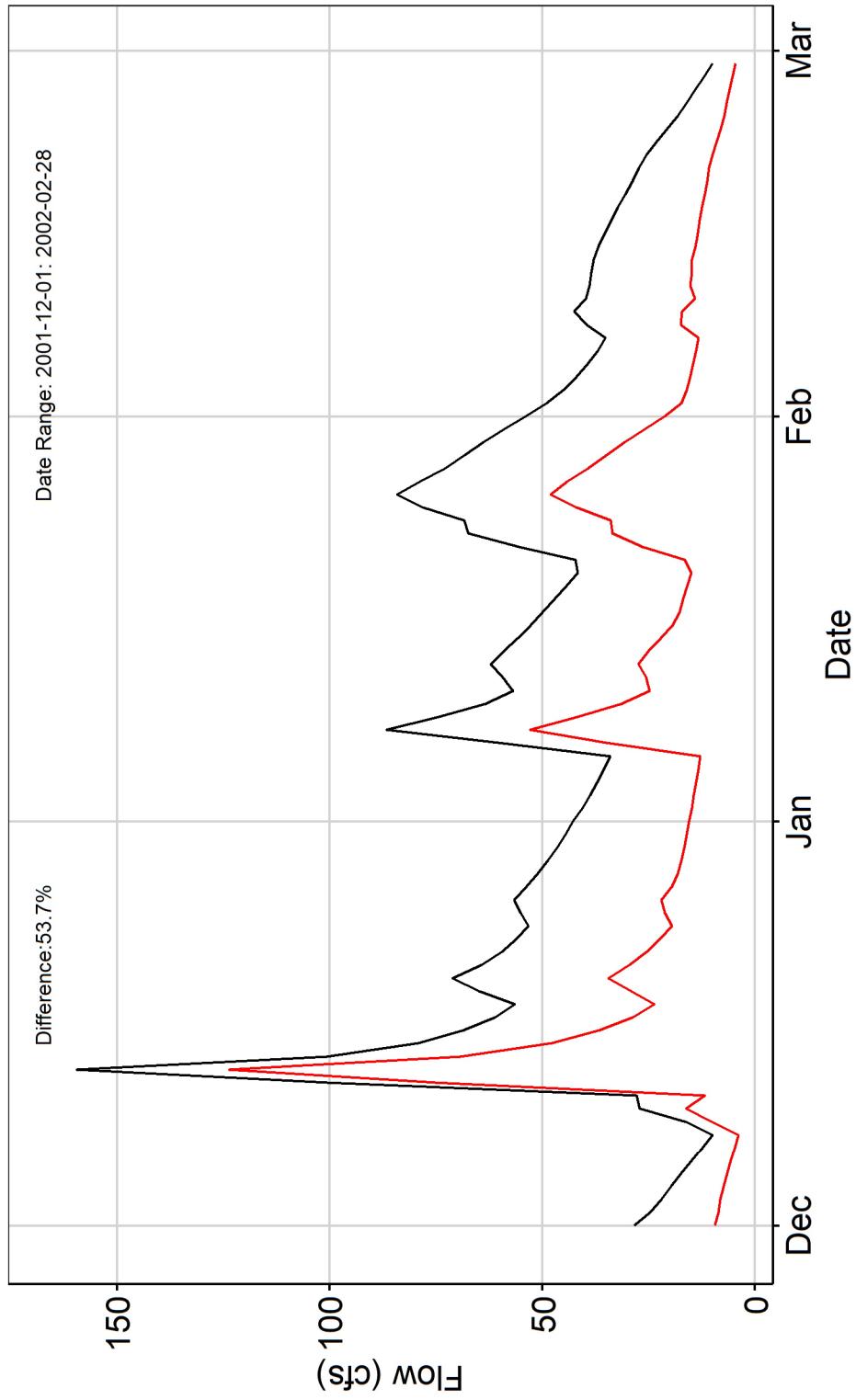


Fig. 7: Second Largest Difference Period

■ 1: VA Hydro: Base ■ 2: VA Hydro: Exempt Users

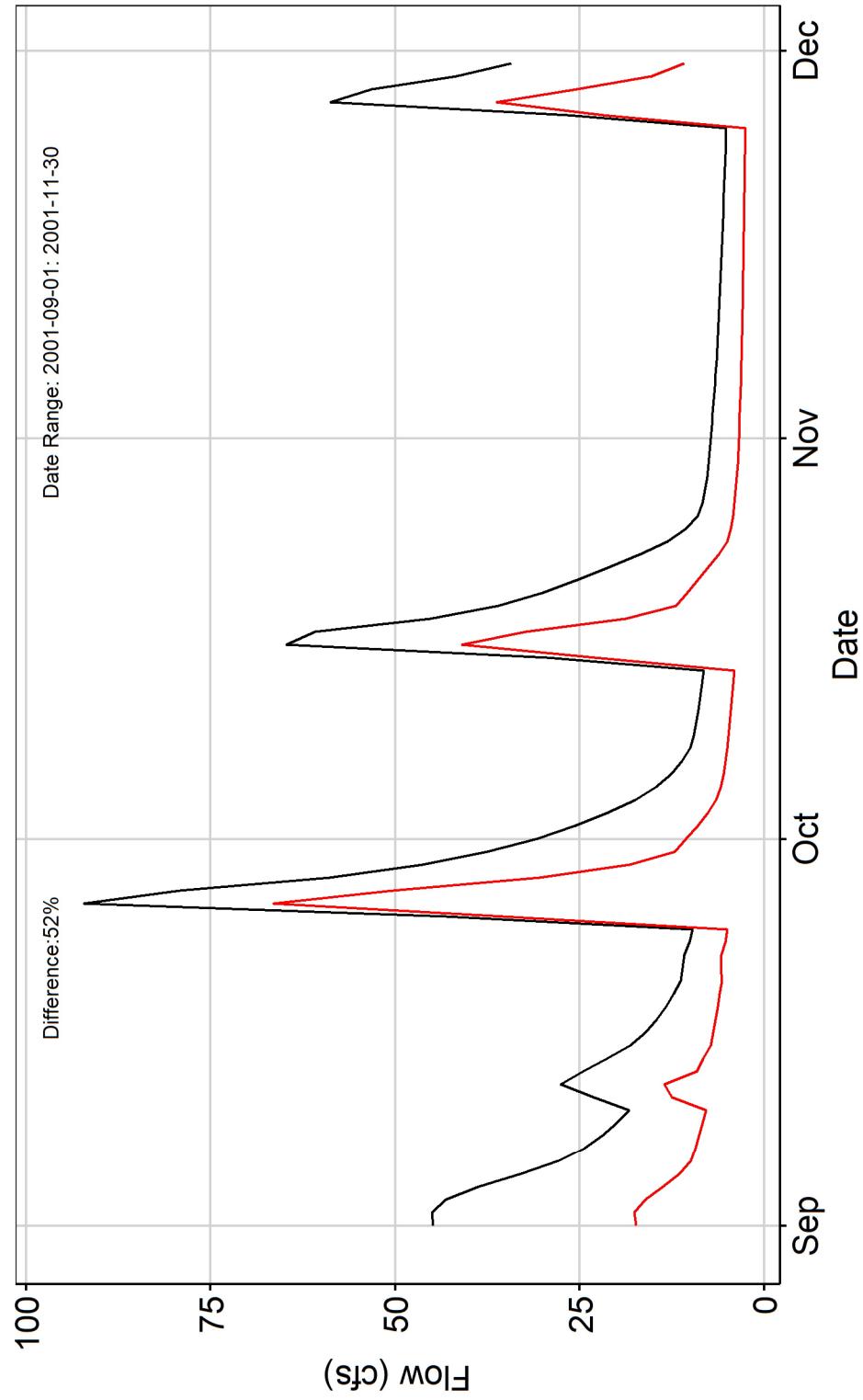


Fig. 8: Third Largest Difference Period

■ 1: VA Hydro: Base ■ 2: VA Hydro: Exempt Users

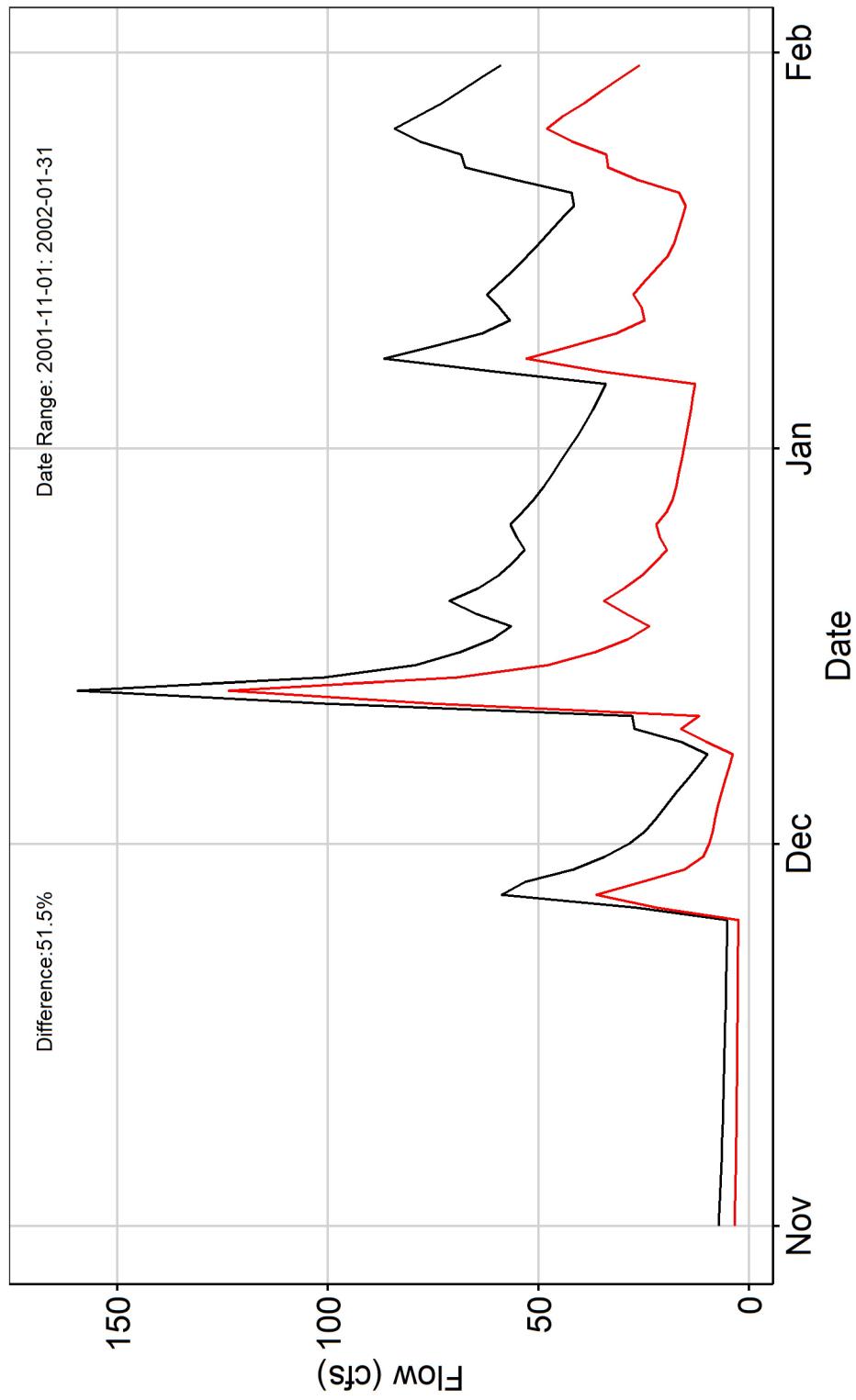


Fig. 9A: Residuals Plot

■ Residual (VA Hydro: Exempt Users - VA Hydro: Base) ■ Zeroline

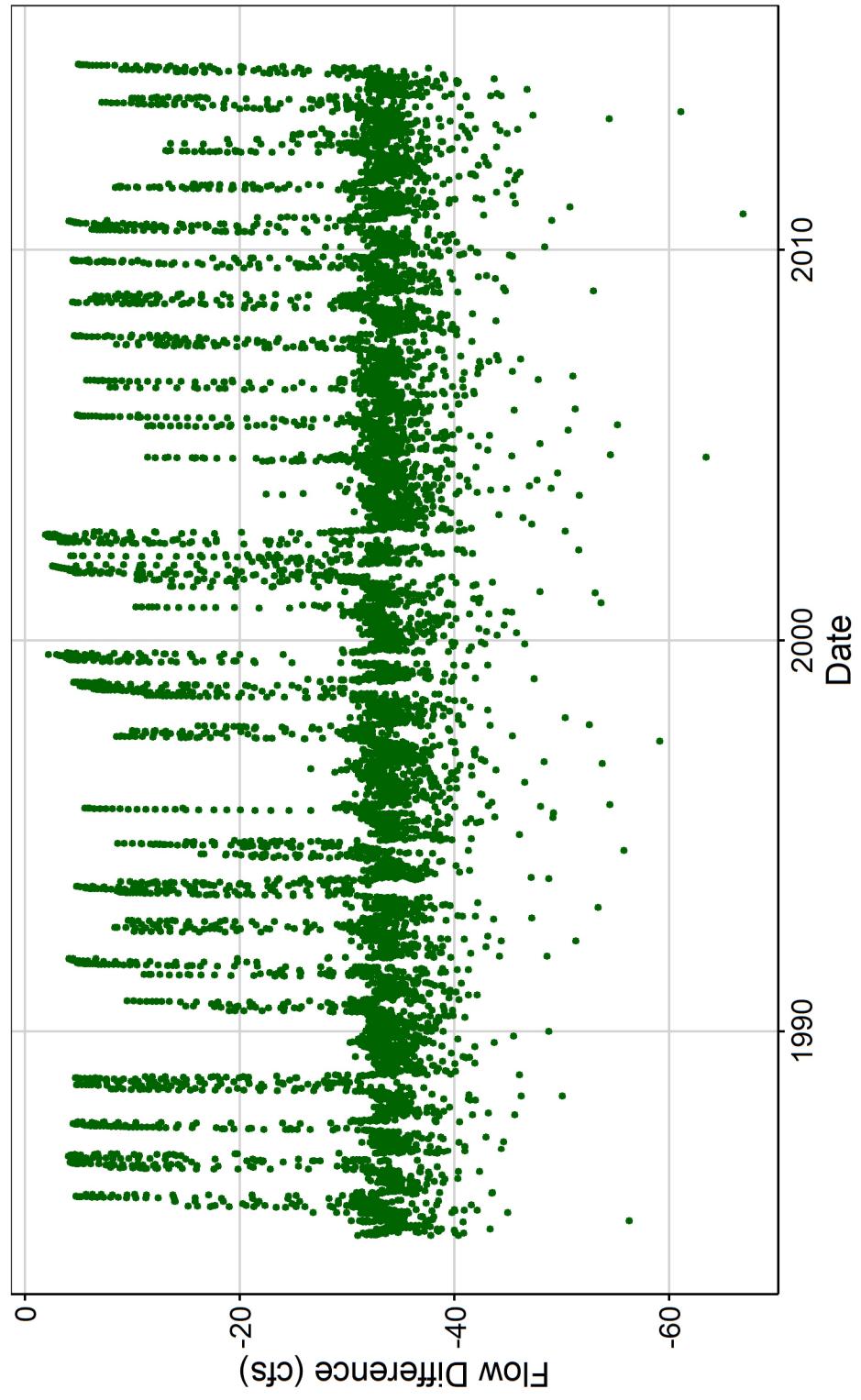


Fig. 11: Smallest Difference Period

■ 1: VA Hydro: Base ■ 2: VA Hydro: Exempt Users

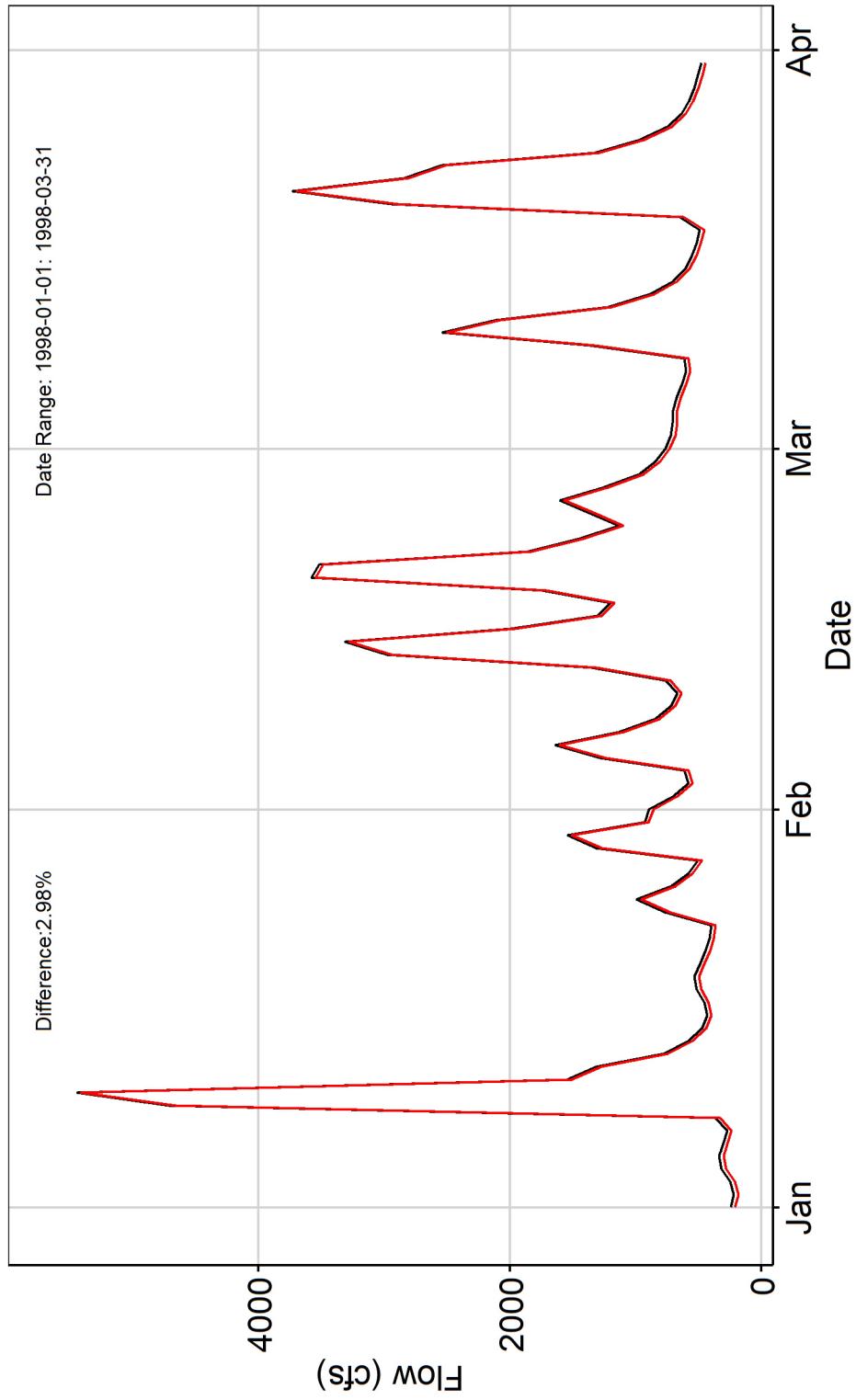


Fig. 12: Second Smallest Difference Period

■ 1: VA Hydro: Base ■ 2: VA Hydro: Exempt Users

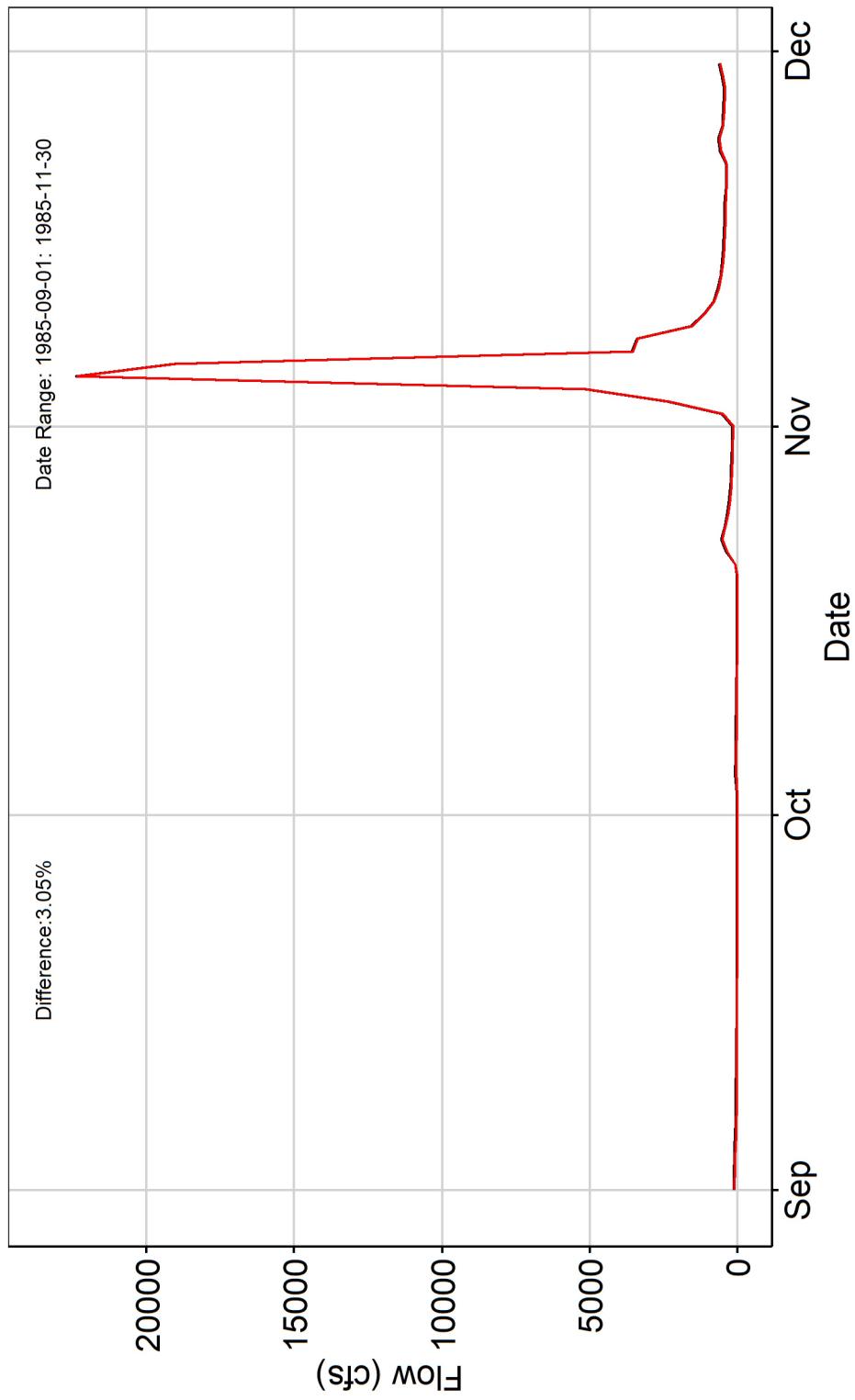
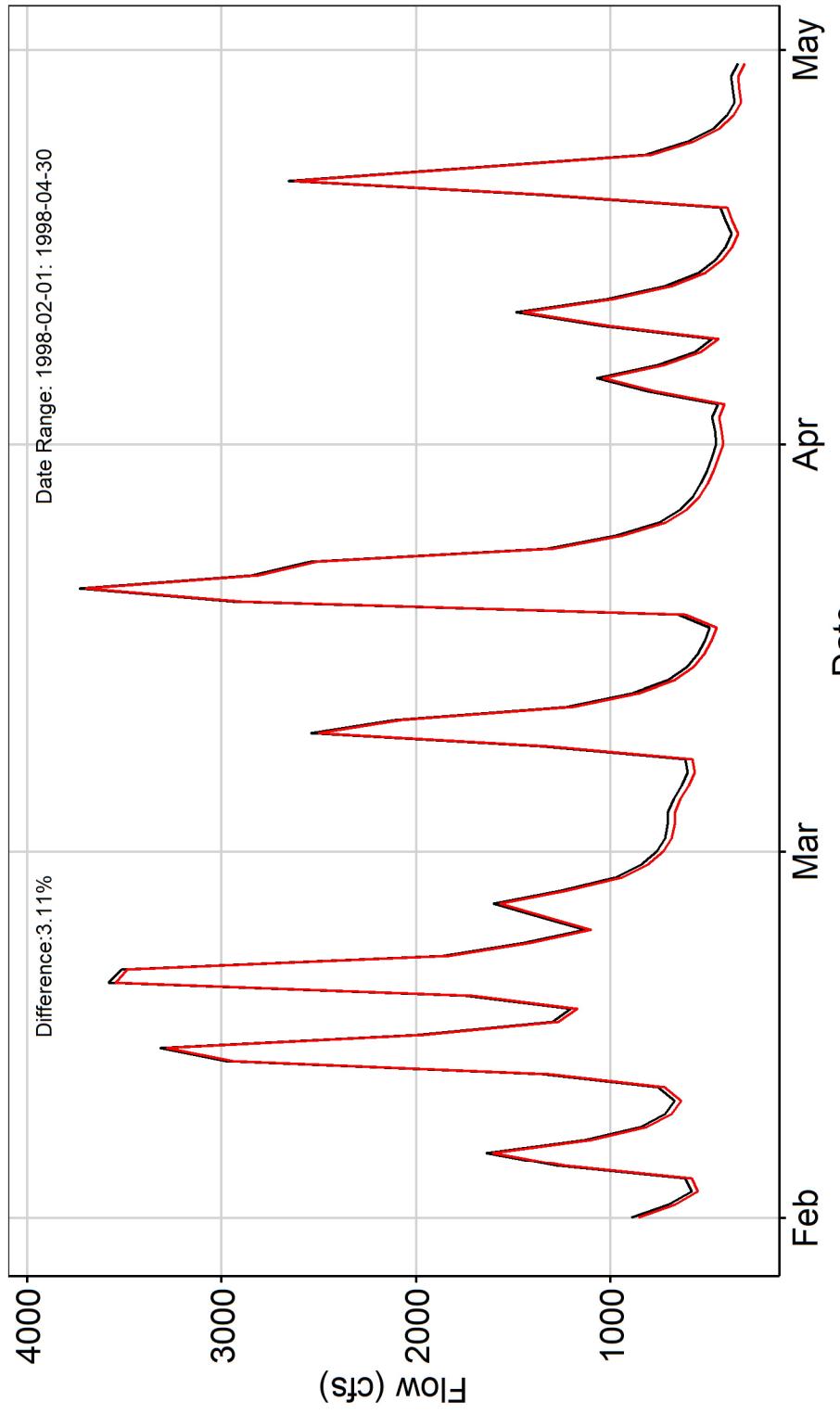


Fig. 13: Third Smallest Difference Period

■ 1: VA Hydro: Base ■ 2: VA Hydro: Exempt Users



# Fig. 14:

Summer Months for year with max 90 day max Run 11

May

Apr

Mar

Feb

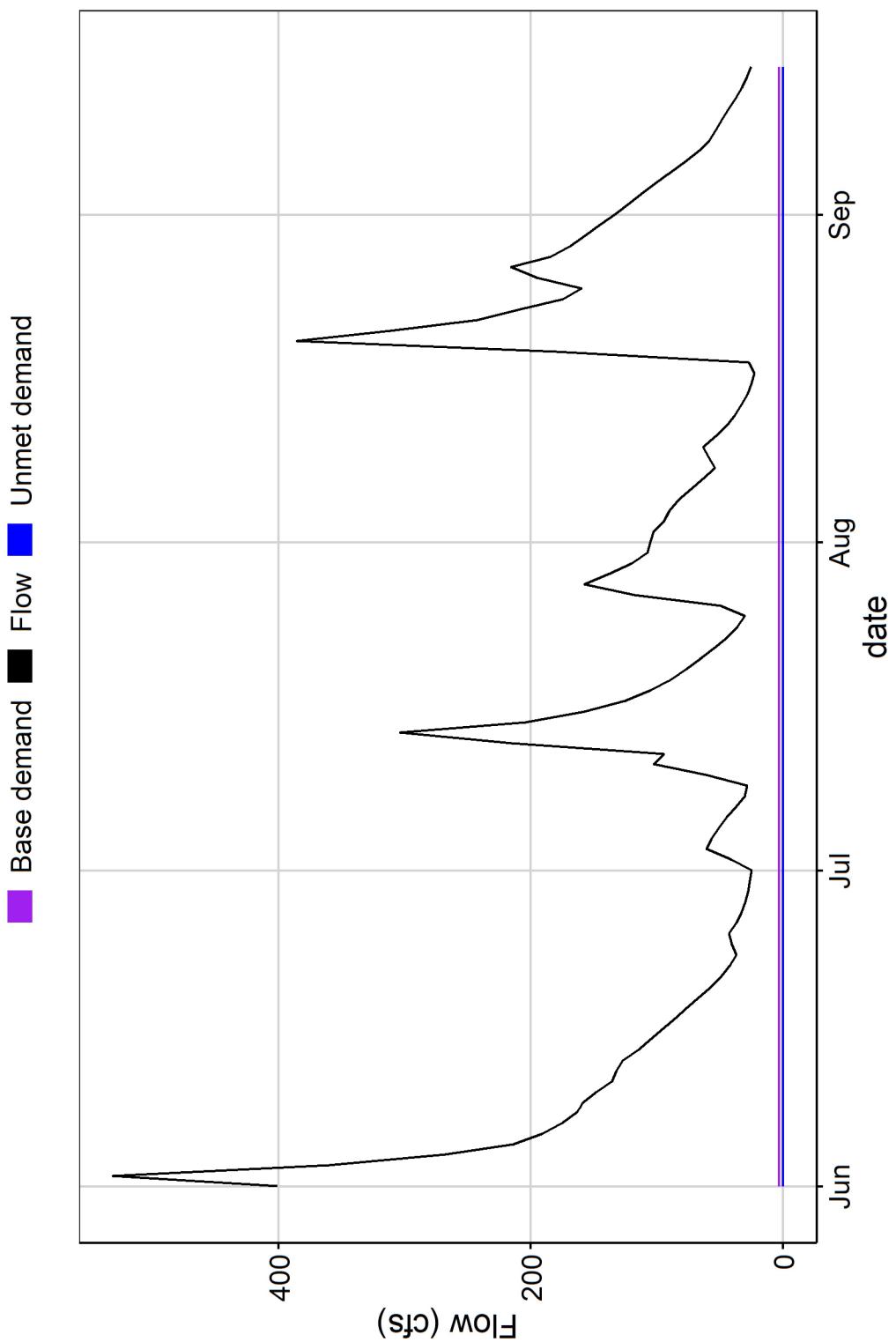


Fig. 15: Summer Months for year with max in 90 day max Run 18

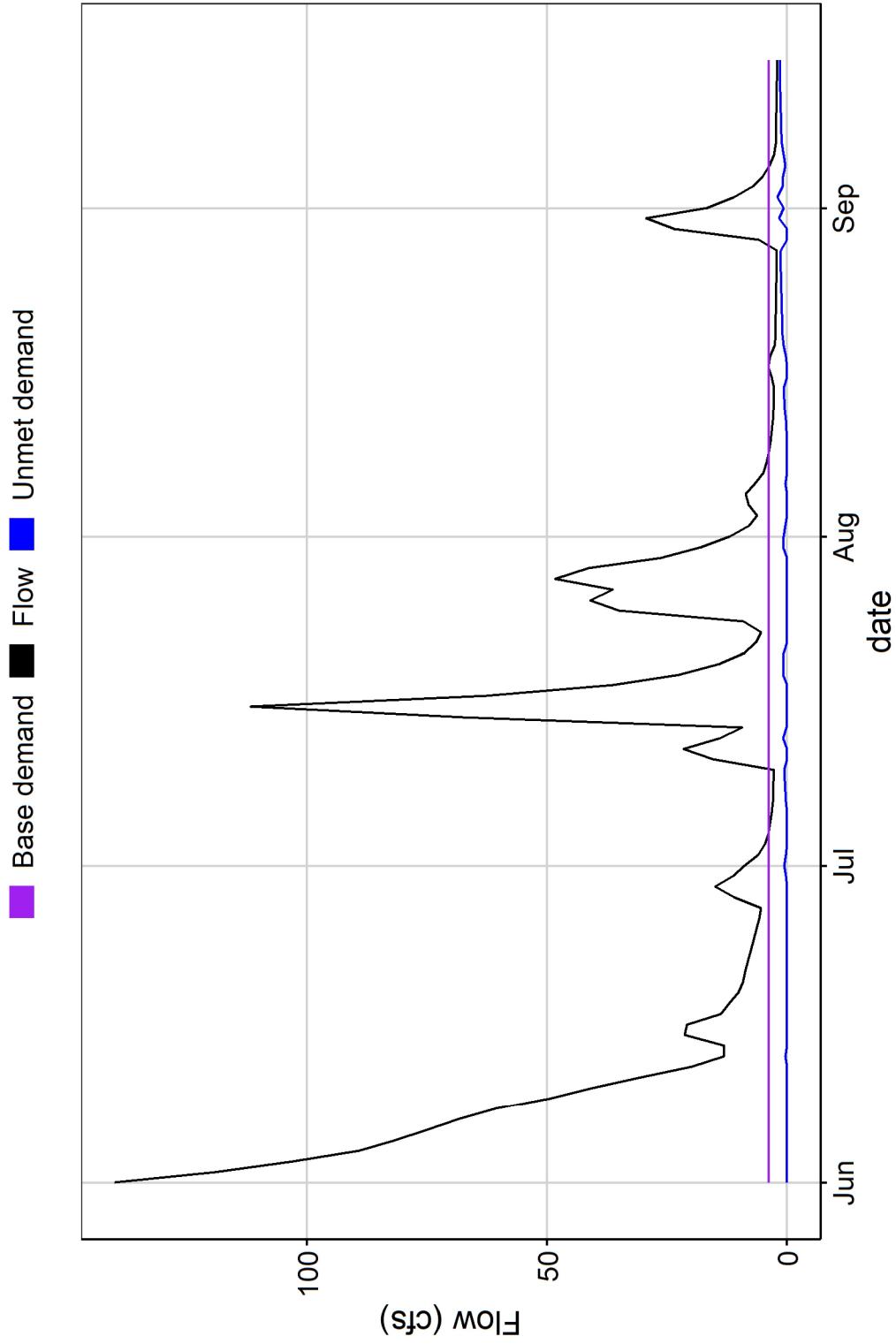


Fig. 16: Summer Months for year with max 30 day max Run 11

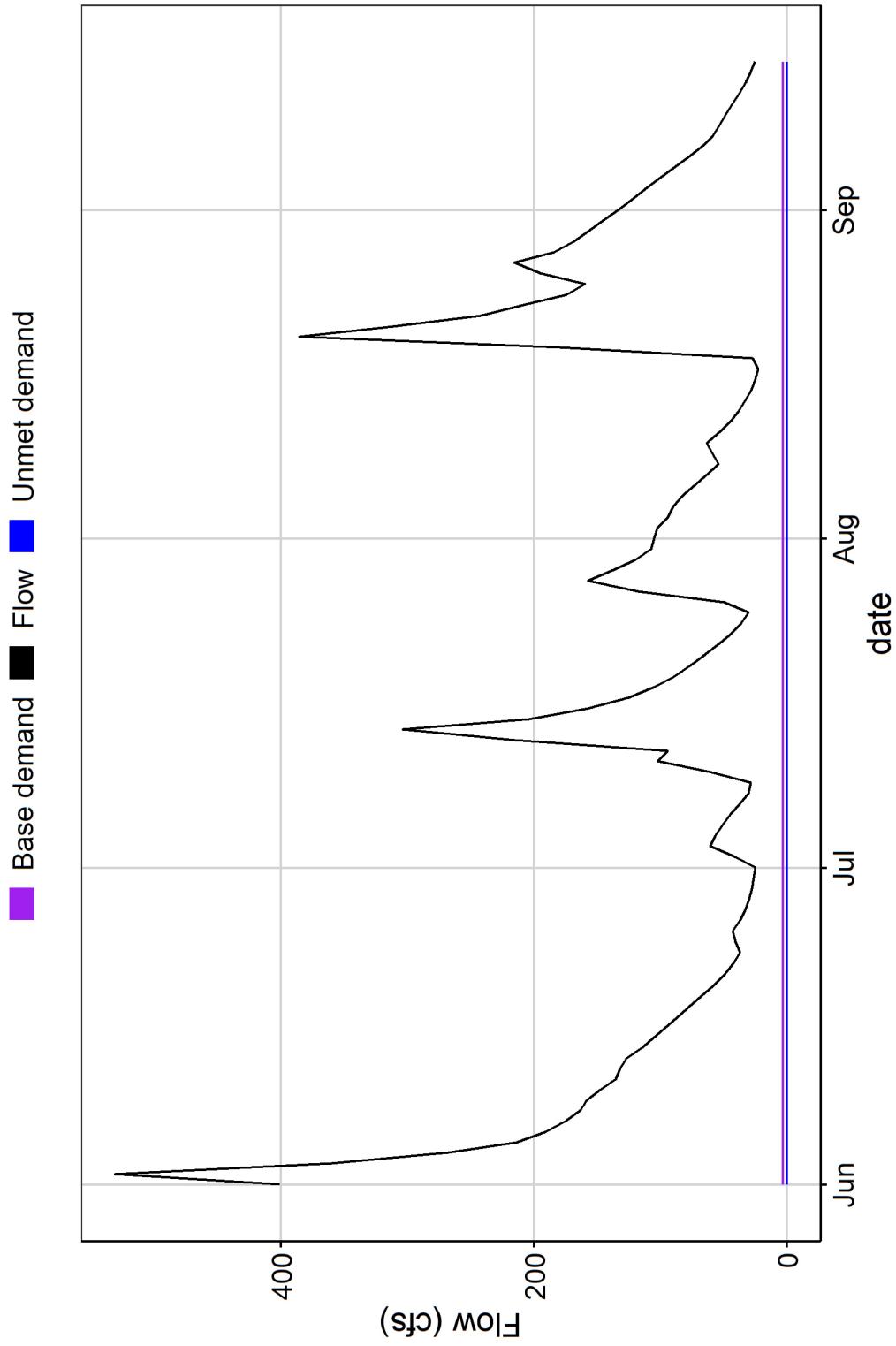


Fig. 17: Summer Months for year with max in 30 day max Run 18

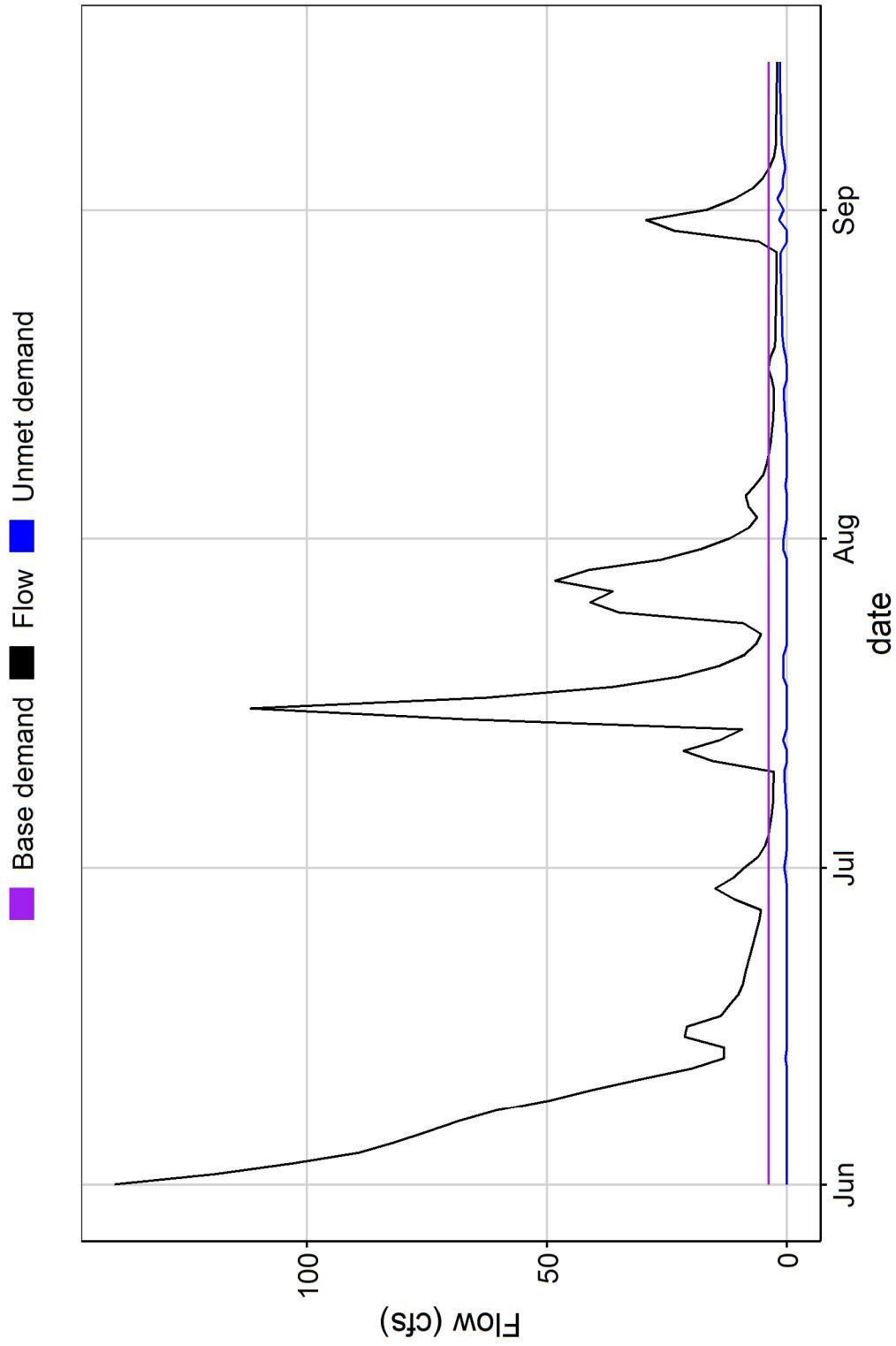


Fig. 18: Summer Months for year with max in 7 day max Run 11

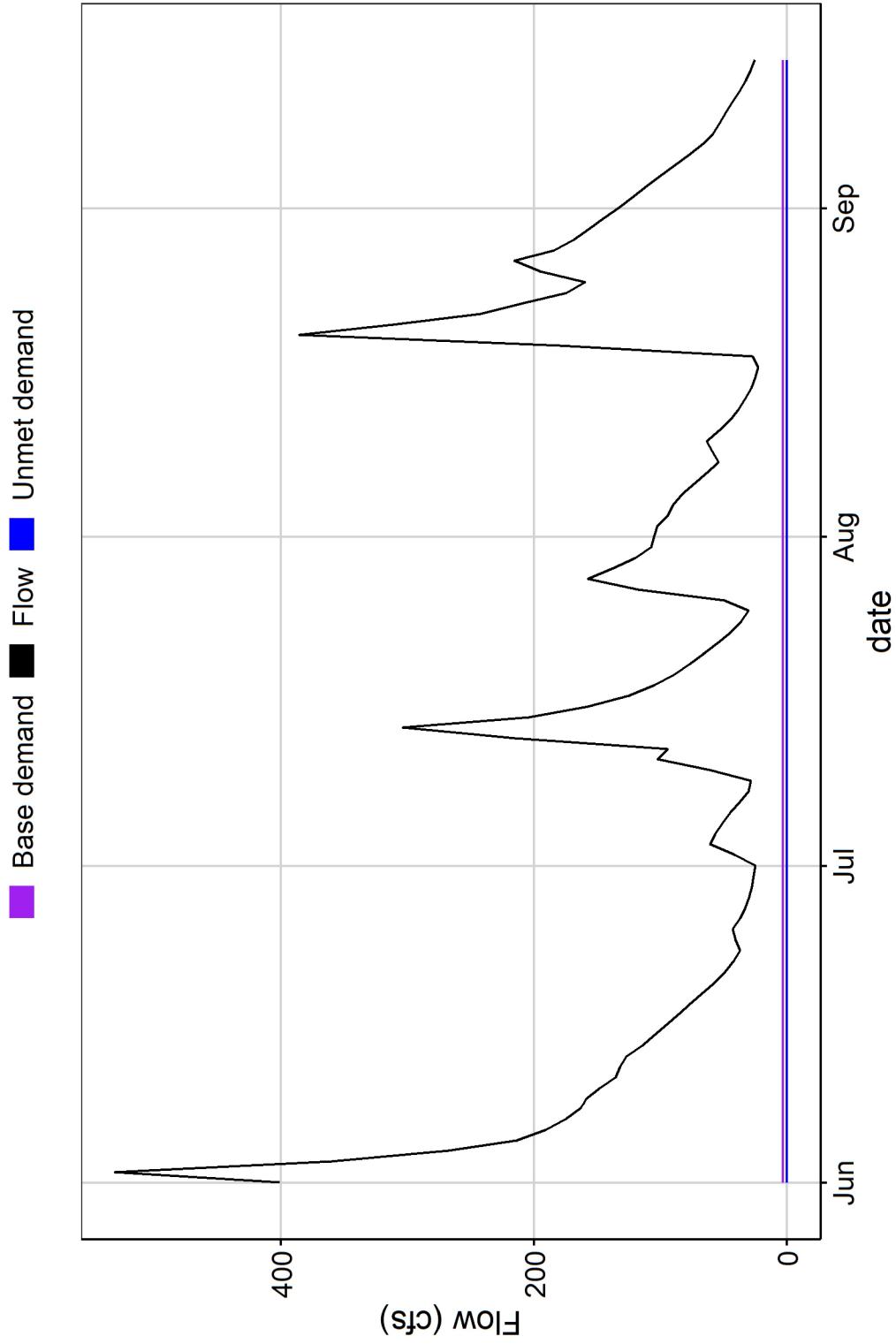
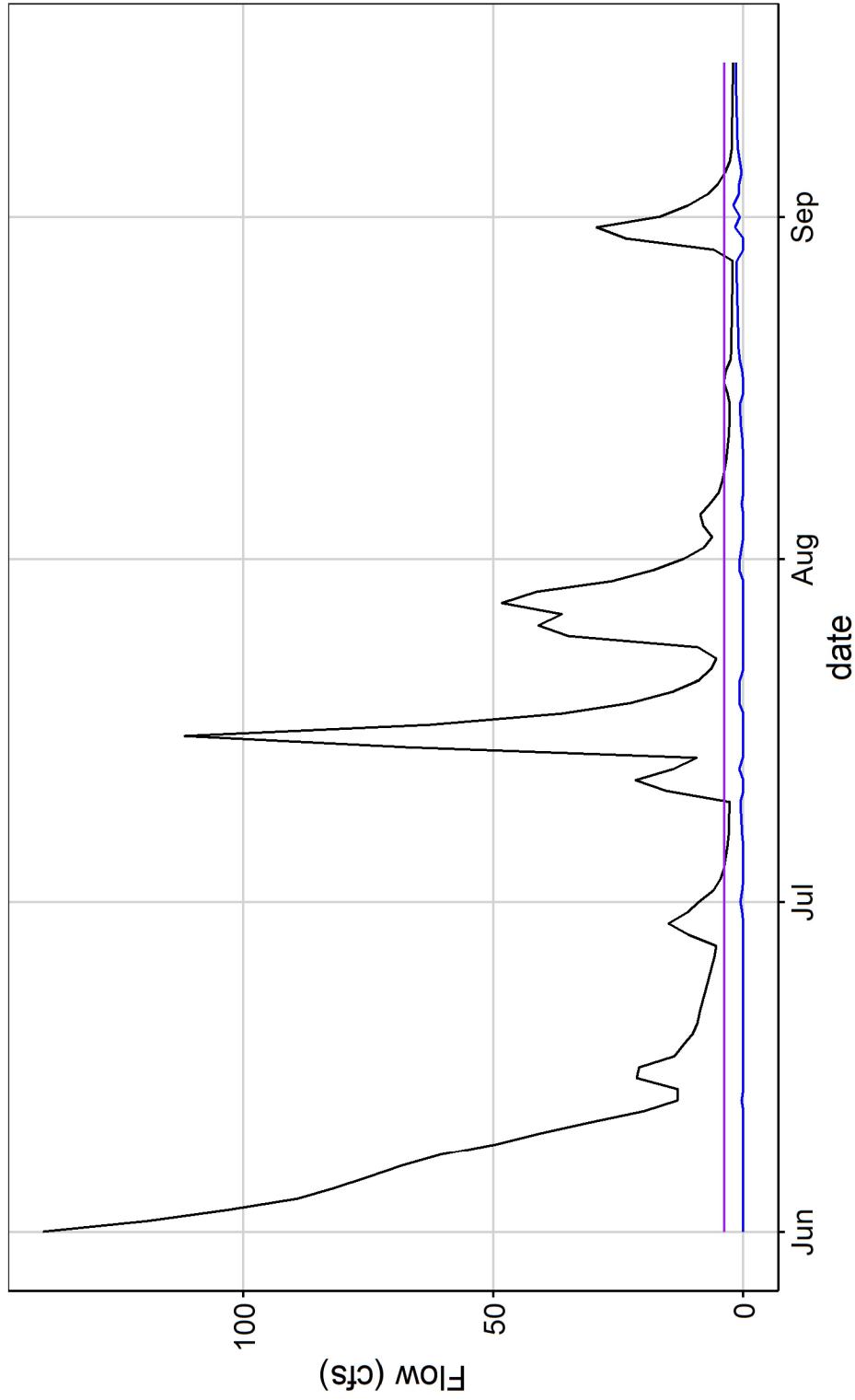


Fig. 19: Summer Months for year with max in 7 day max Run 18

■ Base demand ■ Flow ■ Unmet demand



Summer Months for year with max in 1 day max Run 11

# Fig. 18:

18:

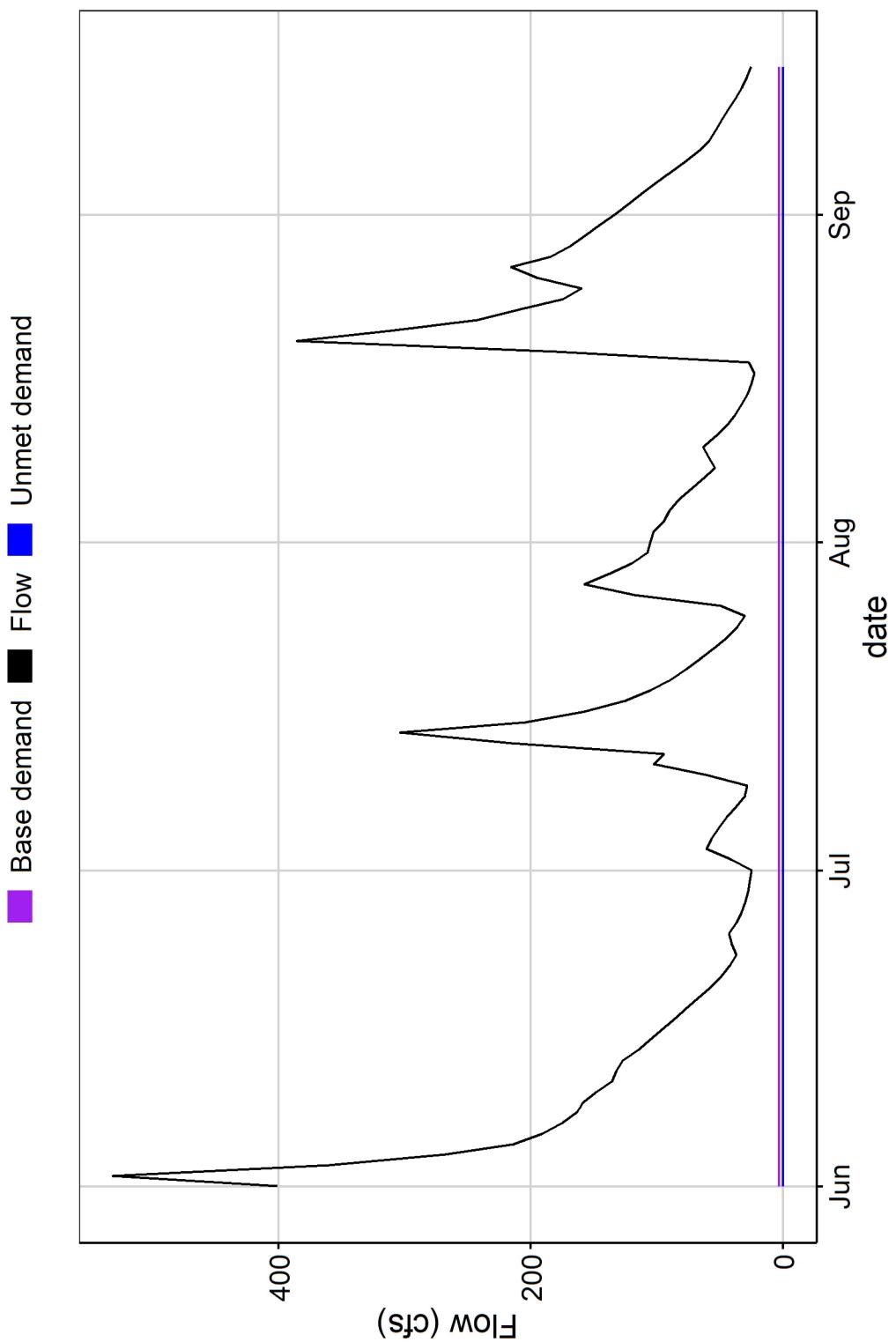


Fig. 19: Summer Months for year with max in 1 day max Run 18

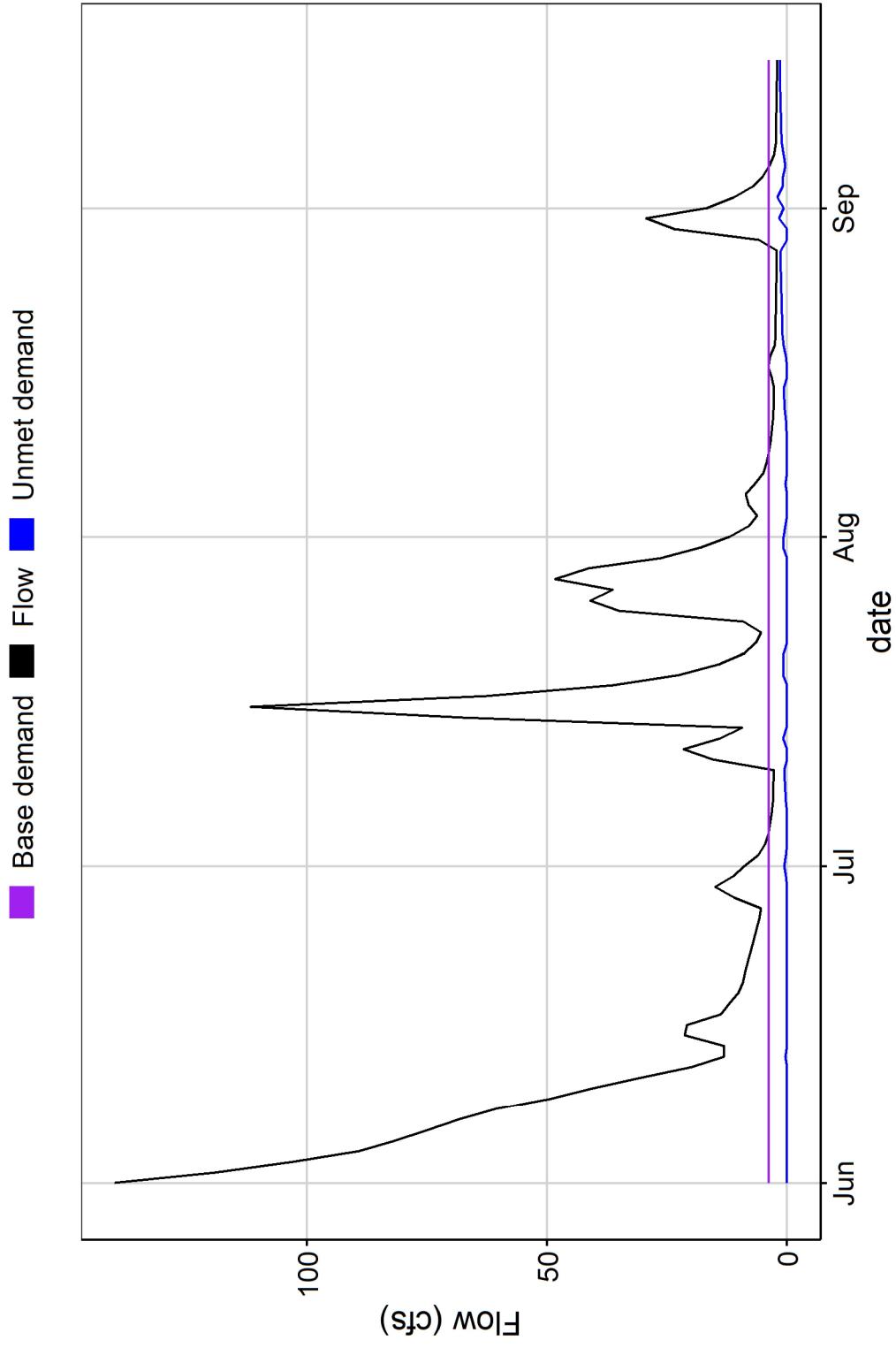


Fig. 20: Summer Months for year with 90 day min Run 11

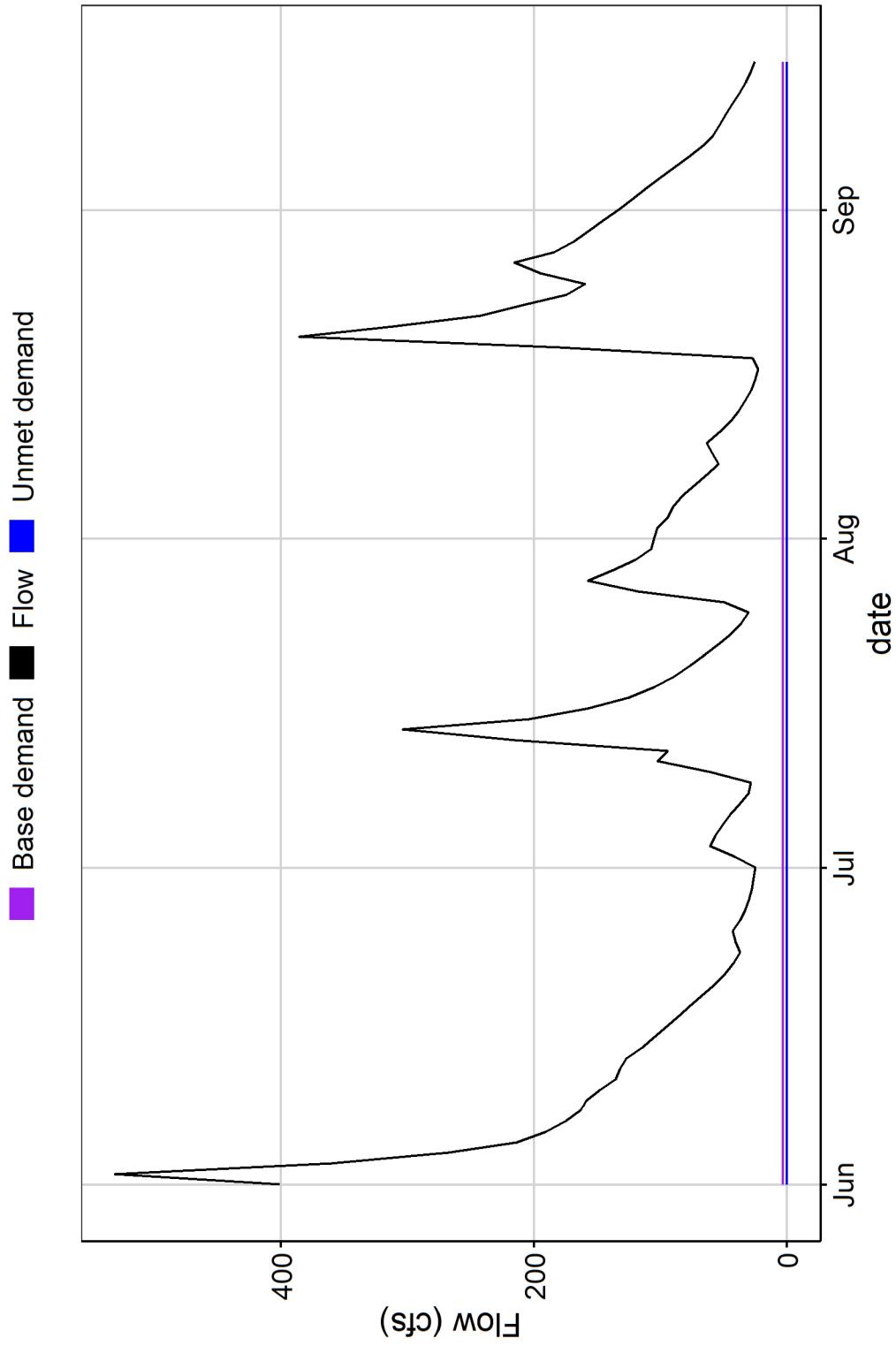


Fig. 21: Summer Months for year with 90 day min Run 18

