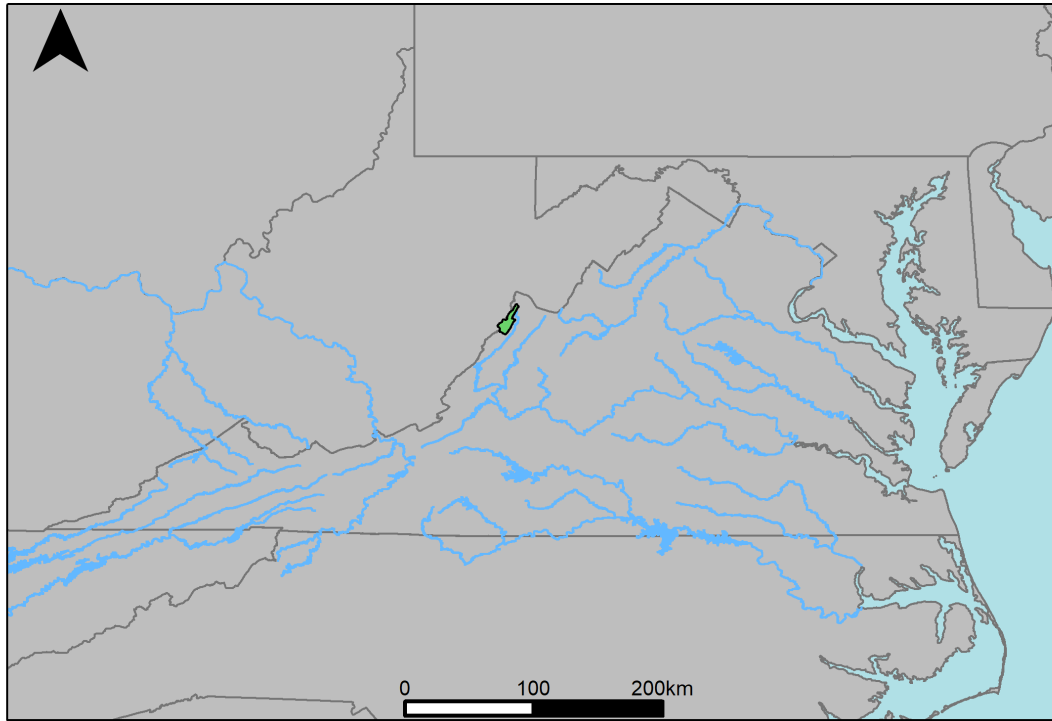# River Segment JU1_6290_6590: VA Hydro Run 11 vs. VA Hydro Run 14

The average daily discharge change between scenario 1 and scenario 2 for the 20 year timespan was 3.86235%, with 0% of its rolling three month time spans above 20% difference.

Table 1: Monthly Low Flows

	VA Hydro: Base	VA Hydro: CC: Precip 50, Temp 50	Pct. Difference
Jan. Low Flow	6.69	6.58	-1.7
Feb. Low Flow	12.4	12.7	2.53
Mar. Low Flow	37	38.4	3.64
Apr. Low Flow	44.9	45.4	1.16
May Low Flow	43.9	45	2.53
Jun. Low Flow	61	59.3	-2.89
Jul. Low Flow	26.3	25.9	-1.67
Aug. Low Flow	14.6	14.3	-2.38
Sep. Low Flow	2.05	1.93	-6.04
Oct. Low Flow	1.36	1.2	-11.8
Nov. Low Flow	0.37	0.32	-13.4
Dec. Low Flow	1.01	0.97	-3.96

Table 2: Monthly Average Flows

	VA Hydro: Base	VA Hydro: CC: Precip 50, Temp 50	Pct. Difference
Overall Mean Flow	92.1	95.7	3.86
Jan. Mean Flow	162	173	6.63
Feb. Mean Flow	131	133	1.32
Mar. Mean Flow	190	188	-0.85
Apr. Mean Flow	102	108	6.8
May Mean Flow	88.1	94.5	7.24
Jun. Mean Flow	53.8	53	-1.41
Jul. Mean Flow	32.4	30.6	-5.36
Aug. Mean Flow	42.8	42	-1.89
Sep. Mean Flow	53.2	56.5	6.14
Oct. Mean Flow	55.4	56.8	2.54
Nov. Mean Flow	79.5	84.3	5.99
Dec. Mean Flow	117	129	10.5

Table 3: Monthly High Flows

	VA Hydro: Base	VA Hydro: CC: Precip 50, Temp 50	Pct. Difference
Jan. High Flow	87	92.4	6.25
Feb. High Flow	325	344	5.87
Mar. High Flow	561	543	-3.29
Apr. High Flow	695	541	-22.2
May High Flow	391	451	15.4
Jun. High Flow	572	599	4.76
Jul. High Flow	362	405	11.7
Aug. High Flow	176	199	12.7
Sep. High Flow	337	337	-0.24
Oct. High Flow	112	110	-2.18
Nov. High Flow	73.4	72.3	-1.43
Dec. High Flow	81.2	86.5	6.56

Table 4: Period Low Flows

	VA Hydro: Base	VA Hydro: CC: Precip 50, Temp 50	Pct. Difference
Min. 1 Day Min	0.03	0.03	-6.21
Med. 1 Day Min	0.18	0.16	-8.54
Min. 3 Day Min	0.03	0.03	-6.44
Med. 3 Day Min	0.21	0.2	-8.15
Min. 7 Day Min	0.04	0.03	-7.05
Med. 7 Day Min	0.28	0.26	-5.95
Min. 30 Day Min	0.32	0.3	-7.24
Med. 30 Day Min	2.78	2.63	-5.53
Min. 90 Day Min	3.5	3.22	-7.98
Med. 90 Day Min	15.2	14.8	-3.05
7Q10	0.06	0.06	-5.37
Year of 90-Day Min. Flow	2000	2000	0
Drought Year Mean	44.6	46.1	3.36
Mean Baseflow	32.4	33.2	2.59

Table 5: Period High Flows

	VA Hydro: Base	VA Hydro: CC: Precip 50, Temp 50	Pct. Difference
Max. 1 Day Max	1750	1900	8.75
Med. 1 Day Max	1180	1220	4.1
Max. 3 Day Max	1200	1310	9
Med. 3 Day Max	821	865	5.32
Max. 7 Day Max	647	653	0.86
Med. 7 Day Max	469	493	4.98
Max. 30 Day Max	364	340	-6.52
Med. 30 Day Max	260	272	4.62
Max. 90 Day Max	251	257	2.67
Med. 90 Day Max	173	181	4.87

Table 6: Non-Exceedance Flows

	VA Hydro: Base	VA Hydro: CC: Precip 50, Temp 50	Pct. Difference
1% Non-Exceedance	0.12	0.12	-5.07
5% Non-Exceedance	0.58	0.56	-3.59
50% Non-Exceedance	48.8	50.9	4.15
95% Non-Exceedance	326	344	5.51
99% Non-Exceedance	823	841	2.17
Sept. 10% Non-Exceedance	0.44	0.45	3.18

Fig. 1: Hydrograph

■ 1: VA Hydro: Base　■ 2: VA Hydro: CC: Precip 50, Temp 50

Fig. 2: Zoomed Hydrograph

■ 1: VA Hydro: Base   ■ 2: VA Hydro: CC: Precip 50, Temp 50

Fig. 3: Flow Exceedance

Legend: 1: VA Hydro: Base   2: VA Hydro: CC: Precip 50, Temp 50
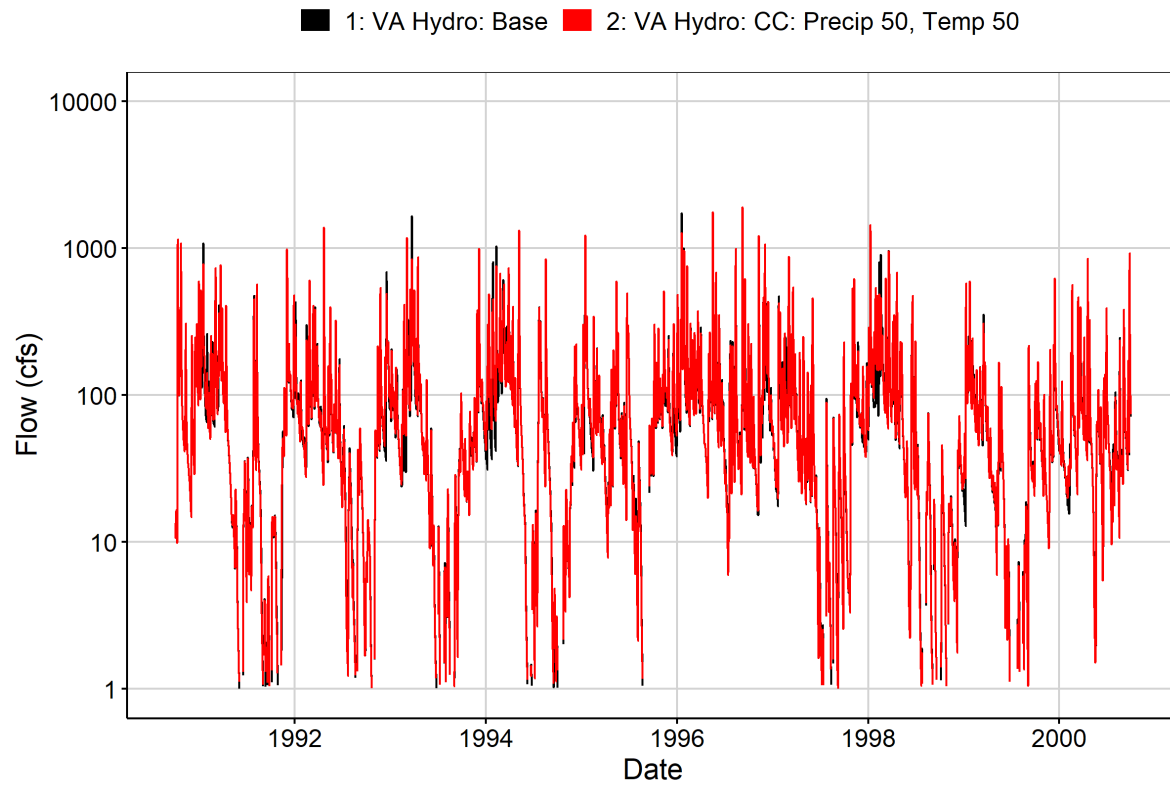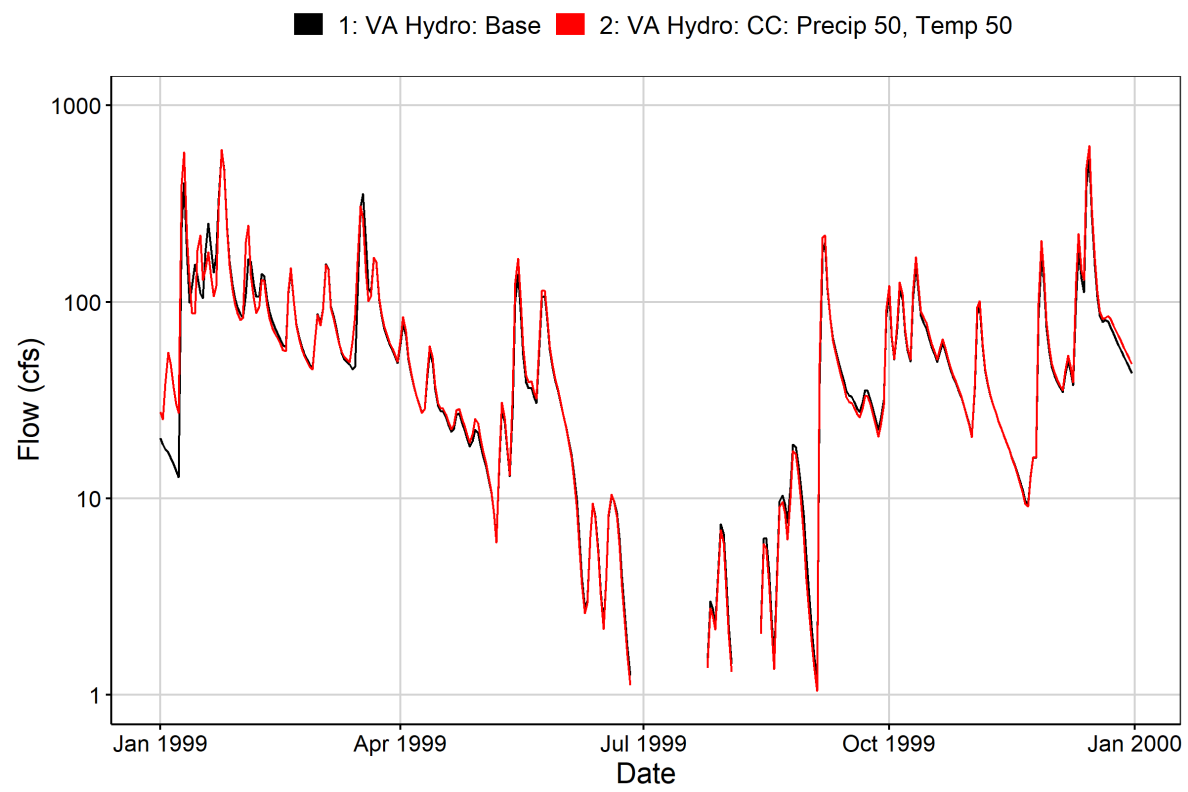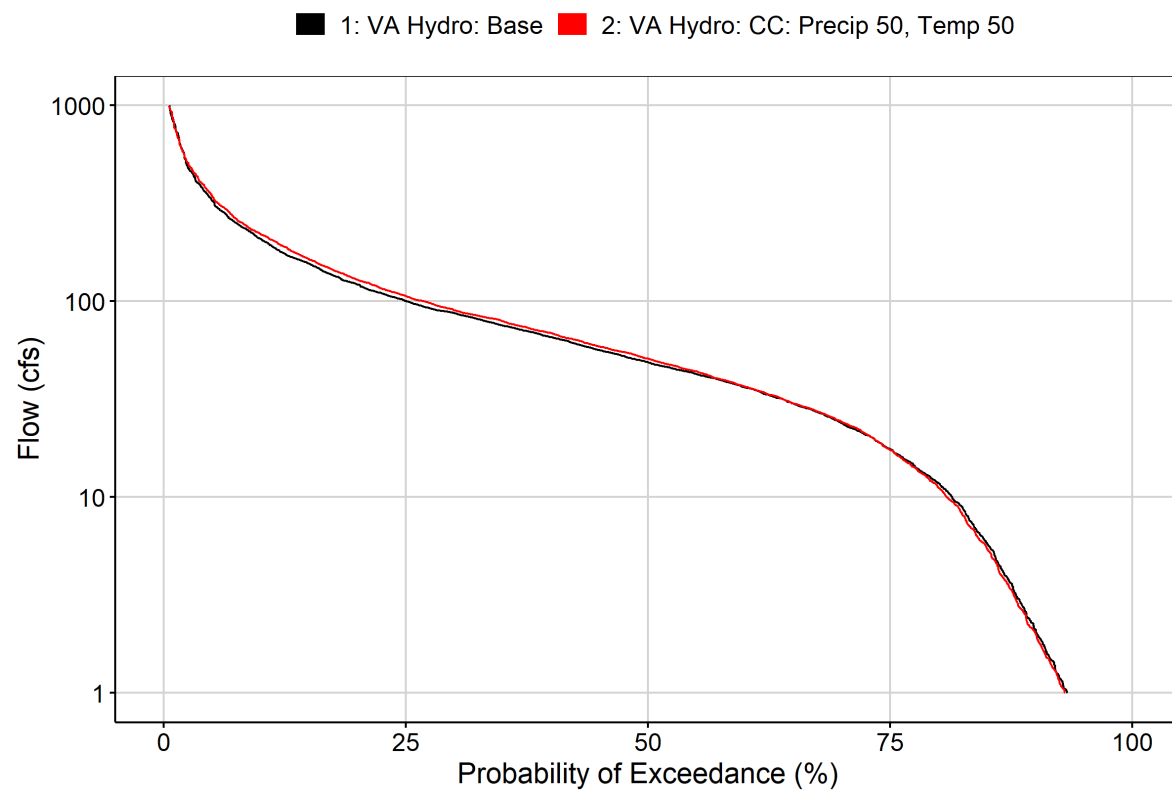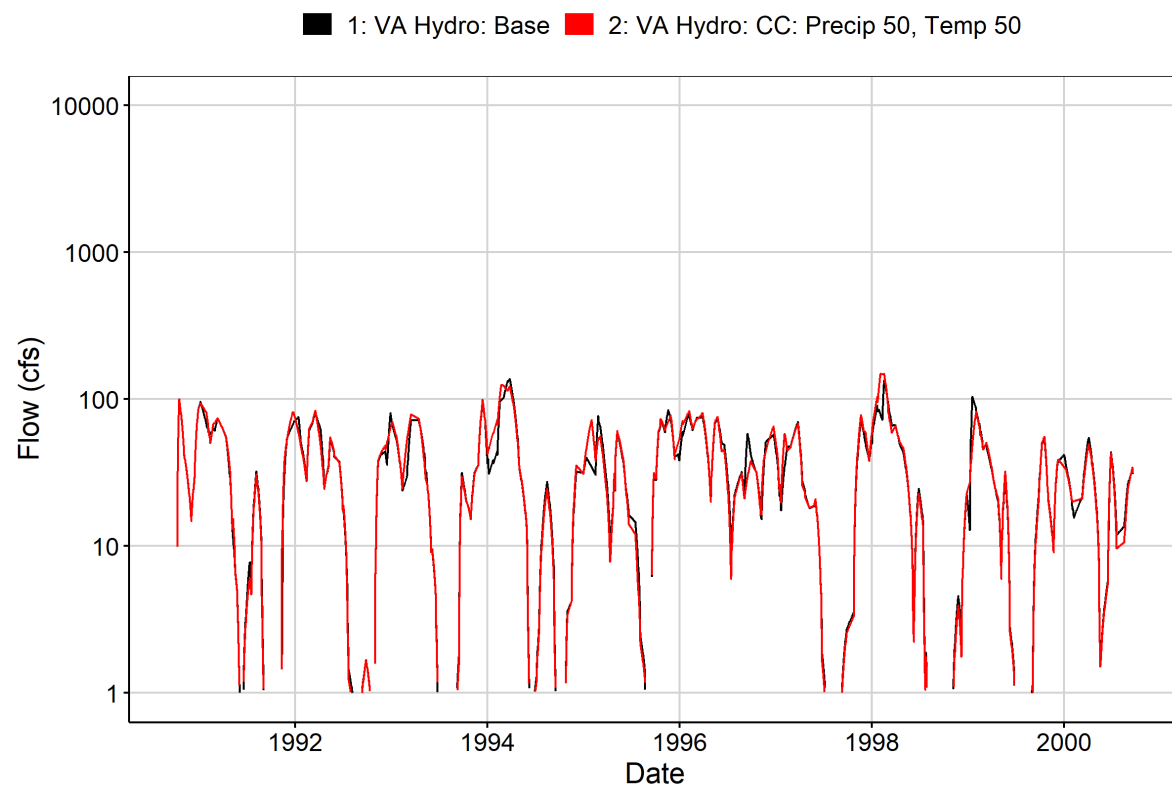
Fig. 4: Baseflow

Fig. 5: Combined Baseflow
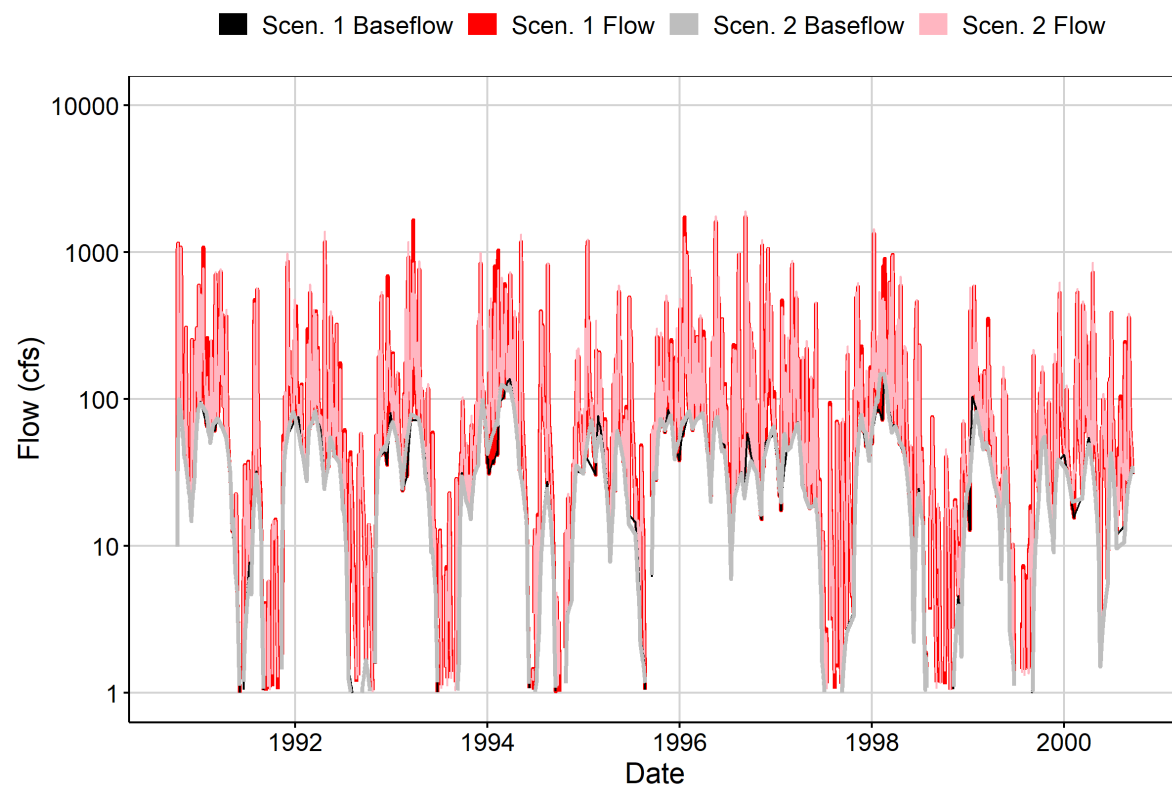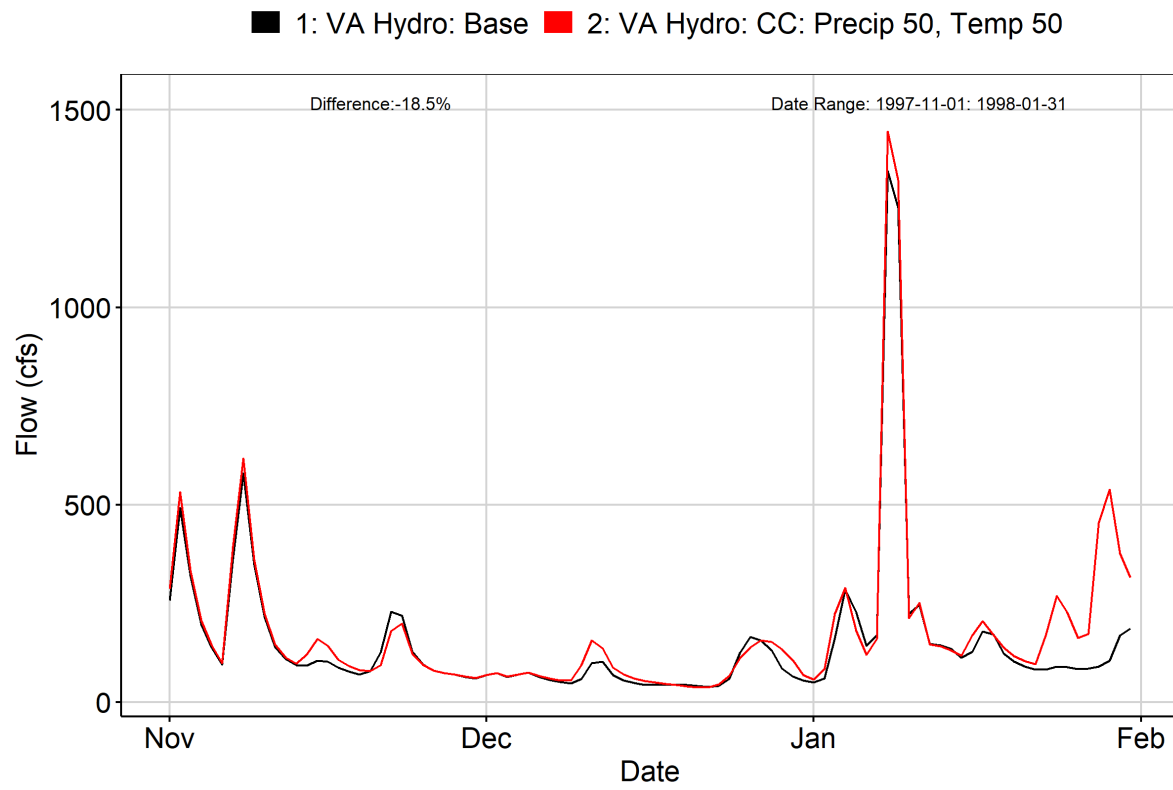
Fig. 6: Largest Difference Period

Fig. 7: Second Largest Difference Period

■ 1: VA Hydro: Base ■ 2: VA Hydro: CC: Precip 50, Temp 50
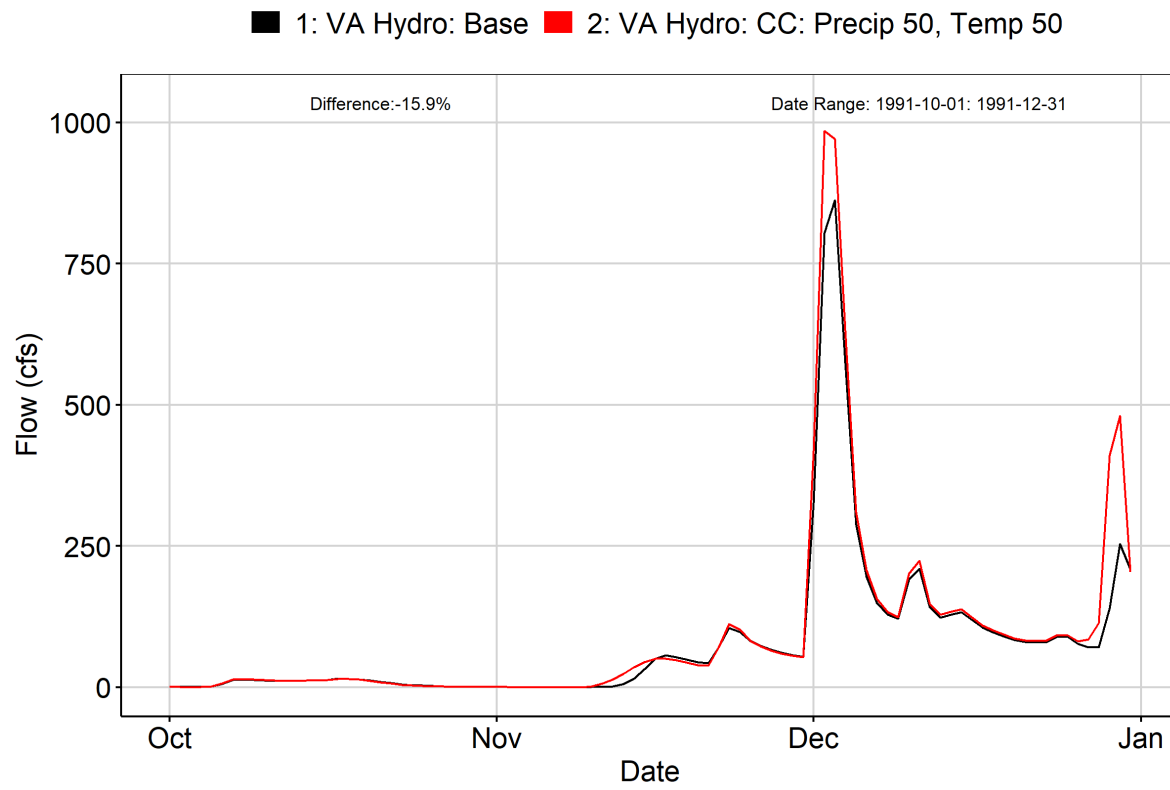
Fig. 8: Third Largest Difference Period

■ 1: VA Hydro: Base ■ 2: VA Hydro: CC: Precip 50, Temp 50

Fig. 9A: Residuals Plot

Legend: ■ Residual (VA Hydro: CC: Precip 50, Temp 50 - VA Hydro: Base) ■ Zeroline
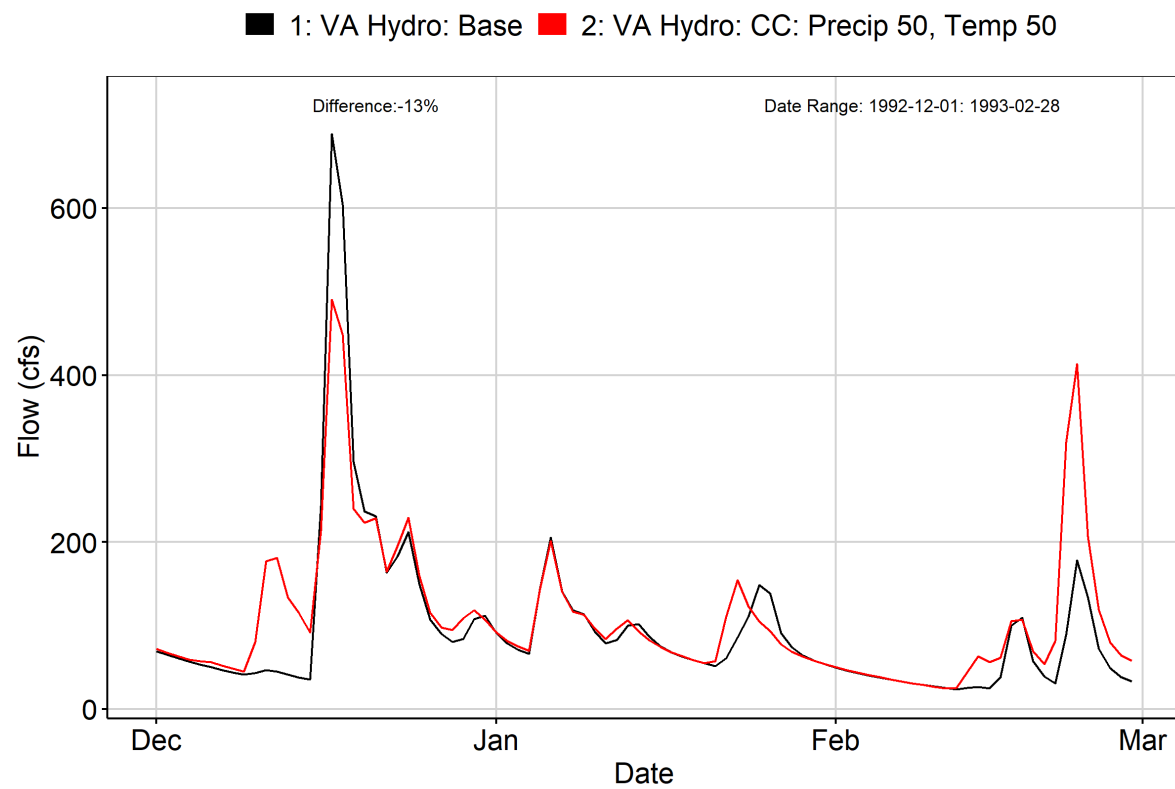
Fig. 9B: Area Weighted Residuals Plot

Legend: Residual (VA Hydro: CC: Precip 50, Temp 50 - VA Hydro: Base) ■ Zeroline

Y-axis: Area Weighted Flow Difference*10^6 (ft/s)

X-axis: Date
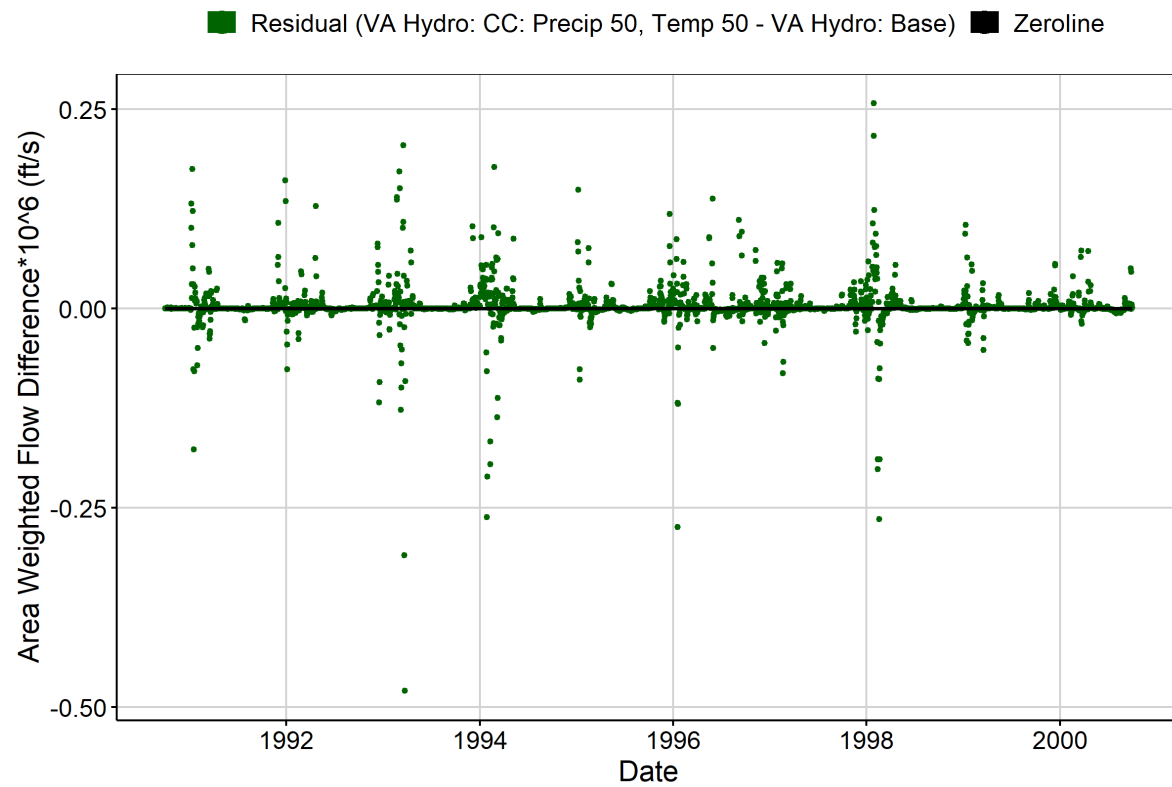
Fig. 10: VA Hydro Scen. 1 Runit Values (Outliers Excluded)
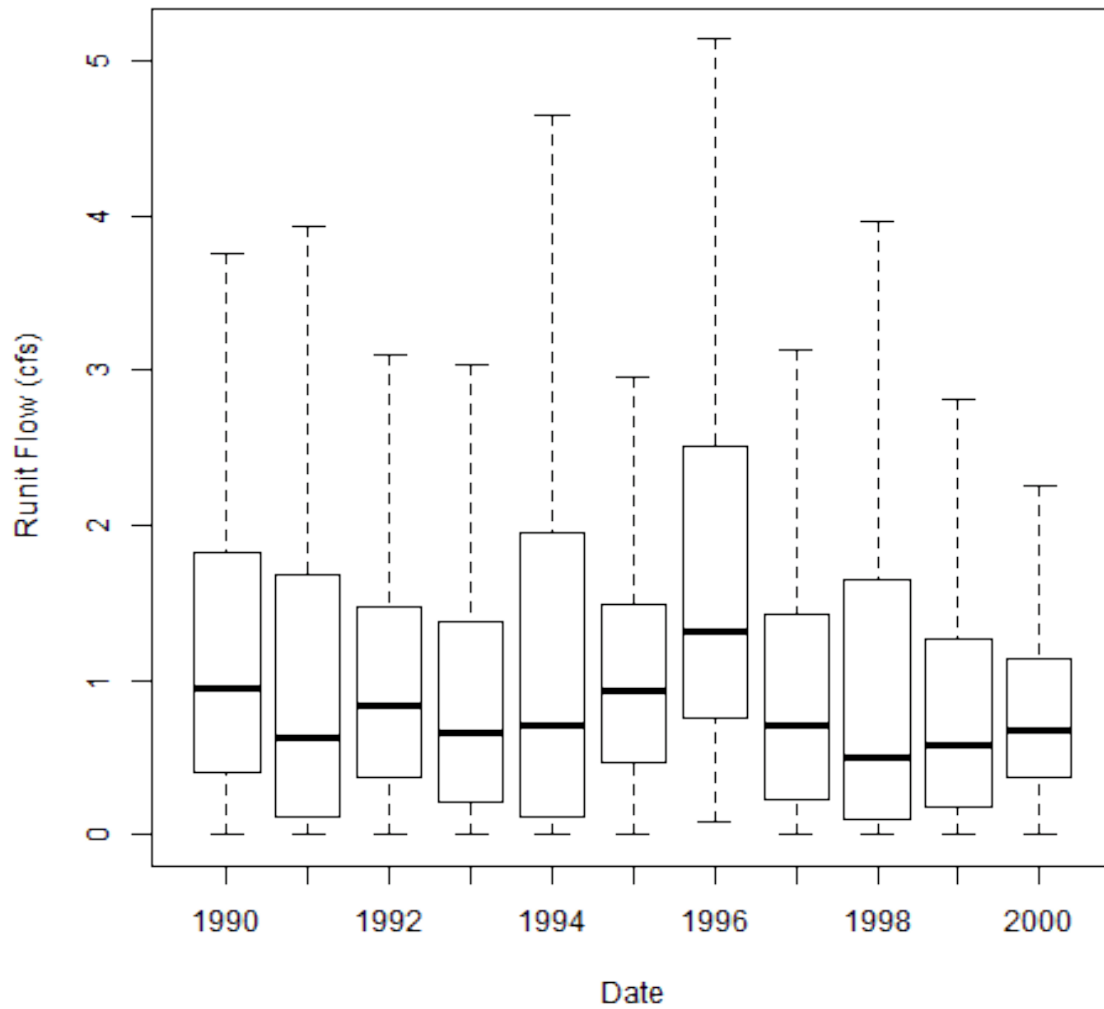
Tab: Annual IQR of Local Runoff Inflows

	IQR of Runit Flows (cfs/sq. mi) [25th, 75th]
1990	1.41 [0.406, 1.82]
1991	1.56 [0.109, 1.67]
1992	1.09 [0.368, 1.46]
1993	1.17 [0.211, 1.38]
1994	1.83 [0.119, 1.95]
1995	1.02 [0.474, 1.49]
1996	1.76 [0.763, 2.52]
1997	1.19 [0.234, 1.42]

	IQR of Runit Flows (cfs/sq. mi) [25th, 75th]
1998	1.55 [0.1, 1.65]
1999	1.09 [0.183, 1.27]
2000	0.773 [0.367, 1.14]

Fig. 11: Smallest Difference Period
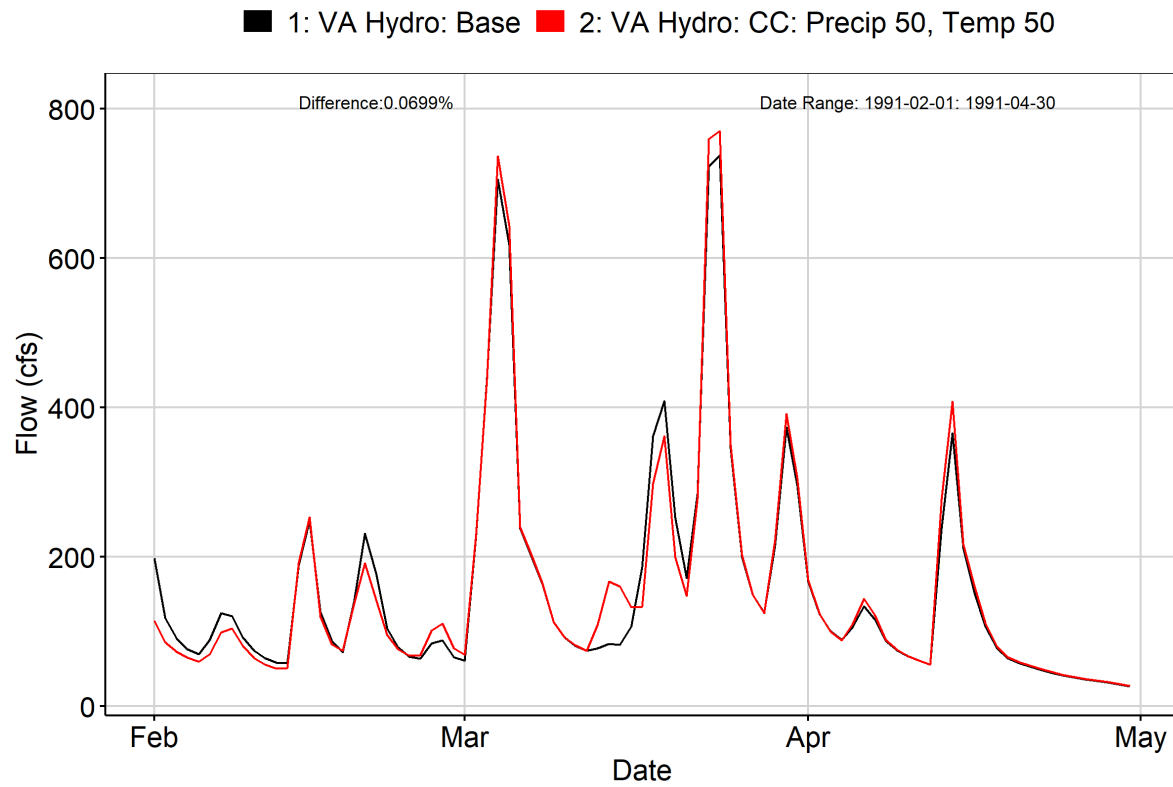
Fig. 12: Second Smallest Difference Period
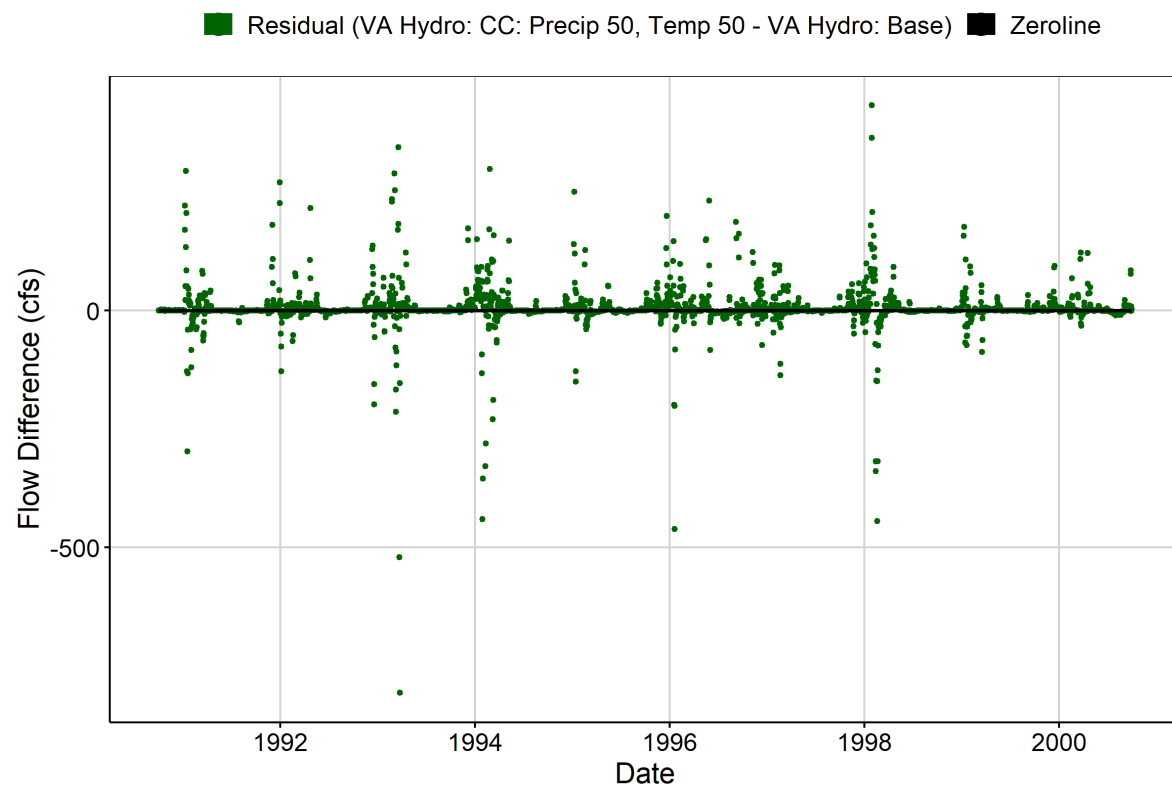
Fig. 13: Third Smallest Difference Period
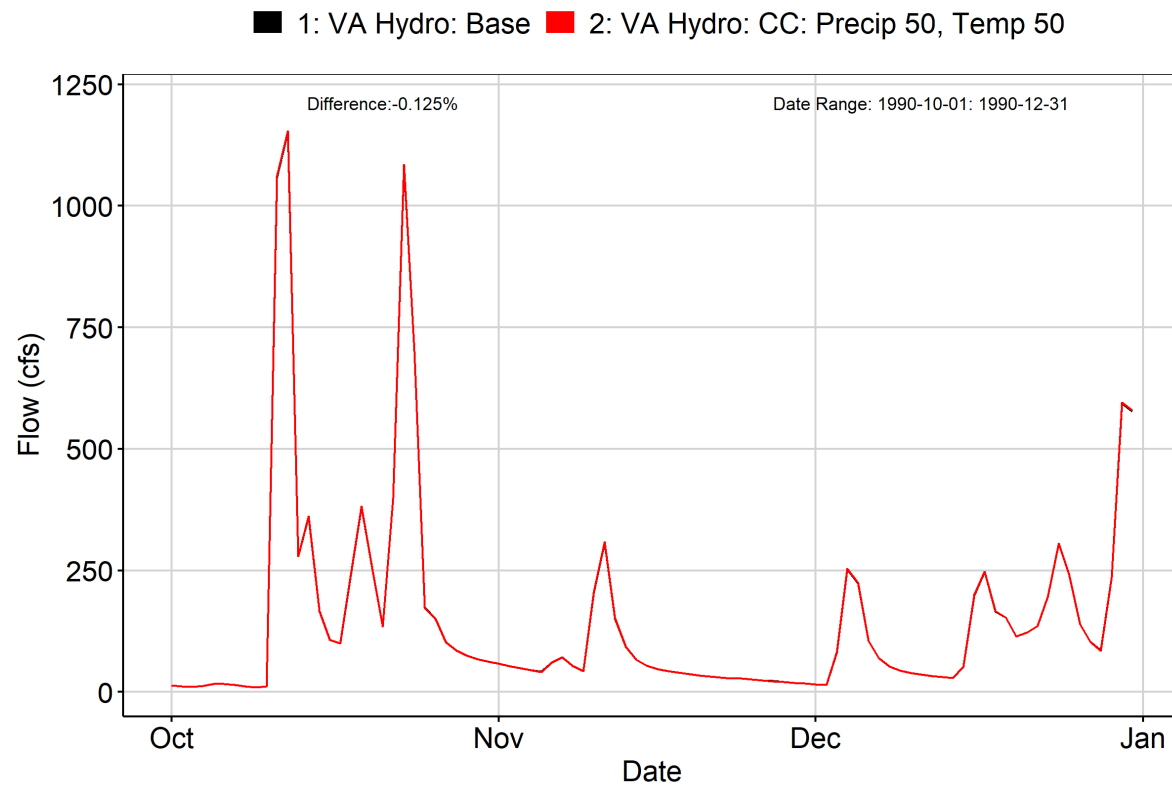
■ 1: VA Hydro: Base ■ 2: VA Hydro: CC: Precip 50, Temp 50
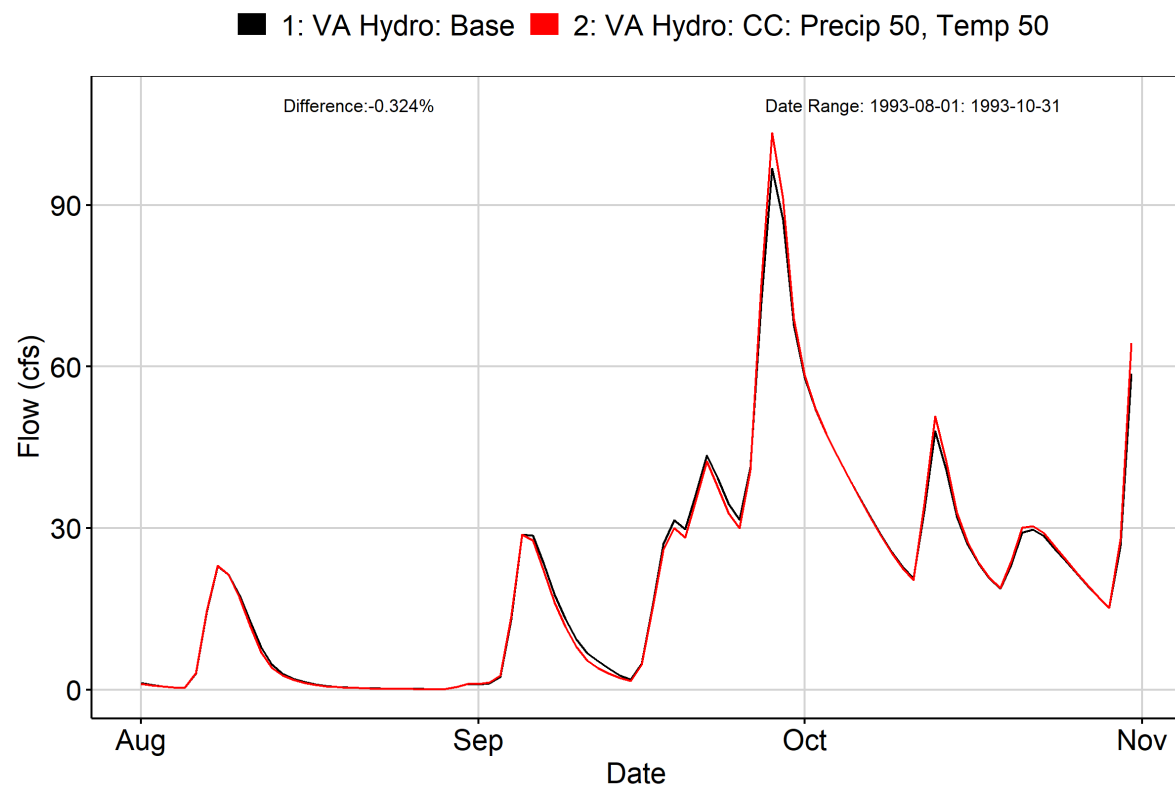
Additional Tables: Land-River Segment Flow Metrics

Tab: Mean Flows by Flow Type: LR-Seg cbp6_N51017_JU1_6290_6590

	Mean Unit Flow (cfs/sq. mi)
SURface Outflow	0.00146
InterFloW Outflow	0.00036
Active GroundWater Outflow	0.000506

Tab: Ratio of Zero-Flow Days by Flow Type: LR-Seg cbp6_N51017_JU1_6290_6590

	Ratio of Days with Zero Flow to Total Days
SURface Outflow	0.644
InterFloW Outflow	0.496
Active GroundWater Outflow	0.33

Tab: IQR for SURface Outflow: LR-Seg cbp6_N51017_JU1_6290_6590

	IQR of Unit Flows (cfs/sq. mi) [25th, 75th]
1990	1.25e-05 [0, 1.25e-05]
1991	6.08e-06 [0, 6.08e-06]
1992	9.96e-06 [0, 9.96e-06]
1993	9.89e-06 [0, 9.89e-06]
1994	1.63e-05 [0, 1.63e-05]
1995	1.43e-05 [0, 1.43e-05]
1996	8.17e-05 [0, 8.17e-05]
1997	6.44e-06 [0, 6.44e-06]
1998	5.91e-06 [0, 5.91e-06]
1999	2.92e-06 [0, 2.92e-06]
2000	3.53e-06 [0, 3.53e-06]

Tab: IQR for InterFloW Outflow: LR-Seg cbp6__N51017__JU1__6290__6590

	IQR of Unit Flows (cfs/sq. mi) [25th, 75th]
1990	0.000152 [0, 0.000152]
1991	6.1e-05 [0, 6.1e-05]
1992	6.98e-05 [0, 6.98e-05]
1993	7.43e-05 [0, 7.43e-05]
1994	8.87e-05 [0, 8.87e-05]
1995	7.64e-05 [0, 7.64e-05]
1996	0.000277 [0, 0.000277]
1997	9.36e-05 [0, 9.36e-05]
1998	6.8e-05 [0, 6.8e-05]
1999	6.15e-05 [0, 6.15e-05]
2000	6.75e-05 [0, 6.75e-05]

Tab: IQR for Active GroundWater Outflow: LR-Seg cbp6__N51017__JU1__6290__6590

	IQR of Unit Flows (cfs/sq. mi) [25th, 75th]
1990	0.000918 [0, 0.000918]
1991	0.000848 [0, 0.000848]
1992	0.000933 [0, 0.000933]
1993	0.000916 [0, 0.000916]
1994	0.000935 [0, 0.000935]
1995	0.000798 [0, 0.000798]
1996	0.00117 [0, 0.00117]
1997	0.000748 [0, 0.000748]
1998	0.000902 [0, 0.000902]
1999	0.000567 [0, 0.000567]
2000	0.000661 [0, 0.000661]

Tab: Mean Flows by Land Use: LR-Seg cbp6_N51017_JU1_6290_6590

	Mean Unit Flow (cfs/sq. mi)
aop	0.000557
cch	0.000725
cci	0.00112
ccn	0.000754
cfr	0.000509
cir	0.00112
cmo	0.00053
cnr	0.00112
ctg	0.000725
dbl	0.000581
fnp	0.00112
for	0.000511
fsp	0.00112
gom	0.000581
gwm	0.000581
hfr	0.000598
lhy	0.000557
mch	0.000725
mci	0.00112
mcn	0.000754
mir	0.00112
mnr	0.00112
mtg	0.000725
nch	0.000725
nci	0.00112
nir	0.00112
nnr	0.00112
ntg	0.000725
oac	0.000581
ohy	0.000557
osp	0.00053
pas	0.000557
sch	0.000581
scl	0.000581
sgg	0.000581
sho	0.00112
som	0.000581
soy	0.000581
stb	0.00112
stf	0.00112
swm	0.000581
wfp	0.000511
wto	0.000511

Tab: Ratio of Zero-Flow Days by Land Use: LR-Seg cbp6_N51017_JU1_6290_6590

	Ratio of Days with Zero Flow to Total Days
aop	0.29
cch	0.292
cci	0.89
ccn	0.28
cfr	0.338
cir	0.89
cmo	0.311
cnr	0.89
ctg	0.292
dbl	0.287
fnp	0.89
for	0.345
fsp	0.89
gom	0.287
gwm	0.287
hfr	0.279
lhy	0.29
mch	0.292
mci	0.89
mcn	0.28
mir	0.89
mnr	0.89
mtg	0.292
nch	0.292
nci	0.89
nir	0.89
nnr	0.89
ntg	0.292
oac	0.287
ohy	0.29
osp	0.31
pas	0.29
sch	0.287
scl	0.287
sgg	0.287
sho	0.89
som	0.287
soy	0.287
stb	0.89
stf	0.89
swm	0.287
wfp	0.345
wto	0.345

Tab: Mean Flows by Flow Type: LR-Seg cbp6_N51091_JU1_6290_6590

	Mean Unit Flow (cfs/sq. mi)
SURface Outflow	0.00158
InterFloW Outflow	0.000603
Active GroundWater Outflow	0.000609

Tab: Ratio of Zero-Flow Days by Flow Type: LR-Seg cbp6_N51091_JU1_6290_6590

	Ratio of Days with Zero Flow to Total Days
SURface Outflow	0.606
InterFloW Outflow	0.444
Active GroundWater Outflow	0.367

Tab: IQR for SURface Outflow: LR-Seg cbp6_N51091_JU1_6290_6590

	IQR of Unit Flows (cfs/sq. mi) [25th, 75th]
1990	3.69e-05 [0, 3.69e-05]
1991	2.35e-05 [0, 2.35e-05]
1992	2.04e-05 [0, 2.04e-05]
1993	1.13e-05 [0, 1.13e-05]
1994	1.72e-05 [0, 1.72e-05]
1995	5.6e-05 [0, 5.6e-05]
1996	0.000464 [0, 0.000464]
1997	1.91e-05 [0, 1.91e-05]
1998	2.07e-05 [0, 2.07e-05]
1999	9.55e-06 [0, 9.55e-06]
2000	9.64e-06 [0, 9.64e-06]

Tab: IQR for InterFloW Outflow: LR-Seg cbp6__N51091__JU1__6290__6590

	IQR of Unit Flows (cfs/sq. mi) [25th, 75th]
1990	0.000459 [0, 0.000459]
1991	0.000151 [0, 0.000151]
1992	0.000214 [0, 0.000214]
1993	0.000169 [0, 0.000169]
1994	0.000245 [0, 0.000245]
1995	0.00034 [0, 0.00034]
1996	0.000879 [0, 0.000879]
1997	0.000302 [0, 0.000302]
1998	0.000188 [0, 0.000188]
1999	0.000143 [0, 0.000143]
2000	0.000196 [0, 0.000196]

Tab: IQR for Active GroundWater Outflow: LR-Seg cbp6__N51091__JU1__6290__6590

	IQR of Unit Flows (cfs/sq. mi) [25th, 75th]
1990	0.00107 [0, 0.00107]
1991	0.00114 [0, 0.00114]
1992	0.00111 [0, 0.00111]
1993	0.000988 [0, 0.000988]
1994	0.00115 [0, 0.00115]
1995	0.00114 [0, 0.00114]
1996	0.00138 [0, 0.00138]
1997	0.000794 [0, 0.000794]
1998	0.000871 [0, 0.000871]
1999	0.000845 [0, 0.000845]
2000	0.000868 [0, 0.000868]

Tab: Mean Flows by Land Use: LR-Seg cbp6_N51091_JU1_6290_6590

	Mean Unit Flow (cfs/sq. mi)
aop	0.000788
cch	0.000881
cci	0.00116
ccn	0.000902
cfr	0.000778
cir	0.00116
cmo	0.00078
cnr	0.00116
ctg	0.000881
dbl	0.0008
fnp	0.00116
for	0.00078
fsp	0.00116
gom	0.0008
gwm	0.0008
hfr	0.00081
lhy	0.000788
mch	0.000881
mci	0.00116
mcn	0.000902
mir	0.00116
mnr	0.00116
mtg	0.000881
nch	0.000881
nci	0.00116
nir	0.00116
nnr	0.00116
ntg	0.000881
oac	0.0008
ohy	0.000788
osp	0.00078
pas	0.000788
sch	0.0008
scl	0.0008
sgg	0.0008
sho	0.00116
som	0.0008
soy	0.0008
stb	0.00116
stf	0.00116
swm	0.0008
wfp	0.00078
wto	0.00078

Tab: Ratio of Zero-Flow Days by Land Use: LR-Seg cbp6_N51091_JU1_6290_6590

	Ratio of Days with Zero Flow to Total Days
aop	0.269
cch	0.283
cci	0.876
ccn	0.257
cfr	0.322
cir	0.876
cmo	0.283
cnr	0.876
ctg	0.283
dbl	0.261
fnp	0.873
for	0.335
fsp	0.873
gom	0.261
gwm	0.261
hfr	0.269
lhy	0.269
mch	0.283
mci	0.876
mcn	0.257
mir	0.876
mnr	0.876
mtg	0.283
nch	0.283
nci	0.876
nir	0.876
nnr	0.876
ntg	0.283
oac	0.261
ohy	0.269
osp	0.286
pas	0.269
sch	0.261
scl	0.261
sgg	0.261
sho	0.876
som	0.261
soy	0.261
stb	0.876
stf	0.876
swm	0.261
wfp	0.335
wto	0.335

Additional Figures: Land-River Segment Flow Boxplots

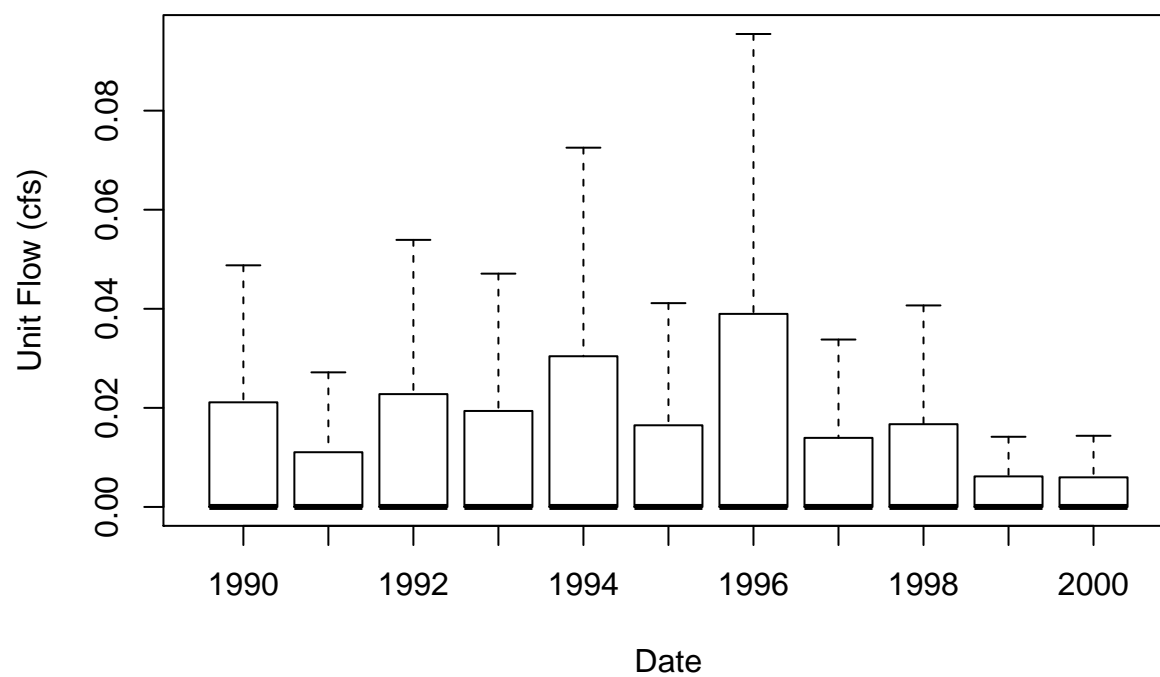Fig: Annual SURO Flows for LR-seg cbp6_N51017_JU1_6290_6590

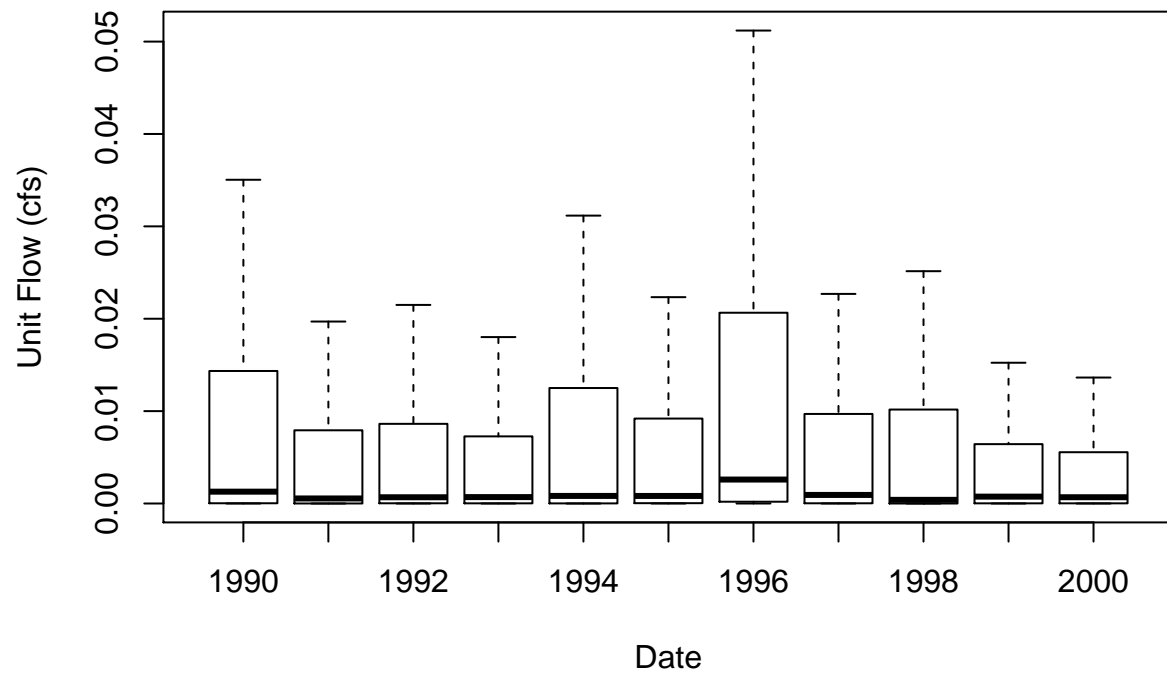Fig: Annual IFWO Flows for LR-seg cbp6_N51017_JU1_6290_6590

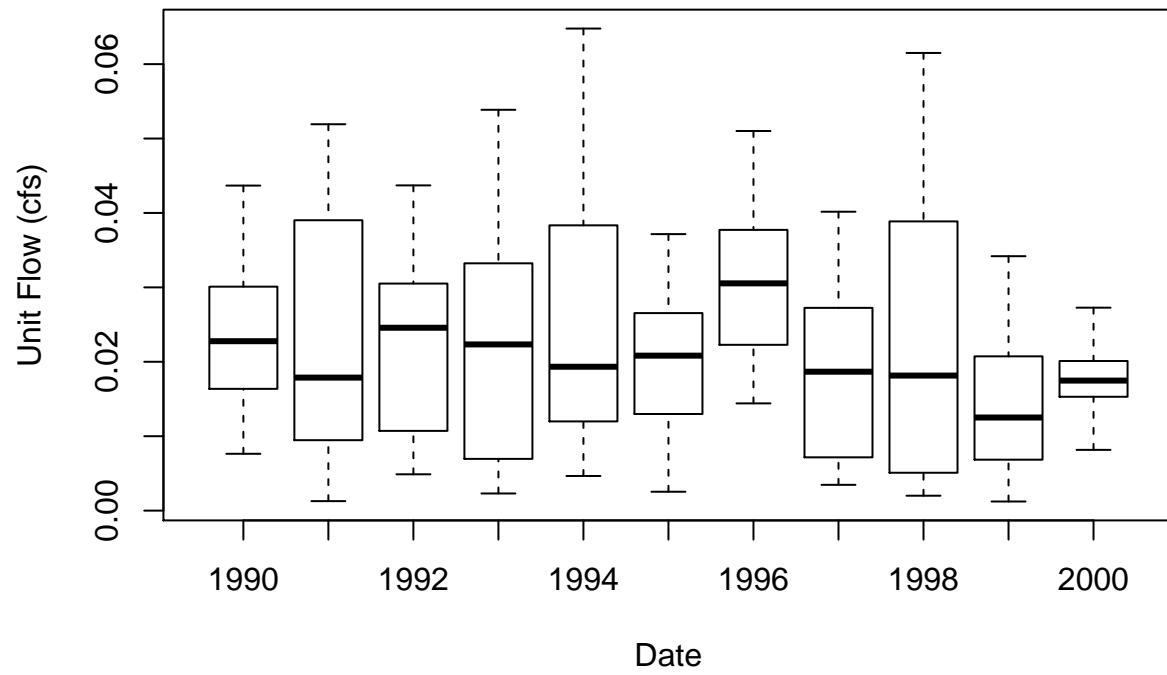Fig: Annual AGWO Flows for LR-seg cbp6_N51017_JU1_6290_6590

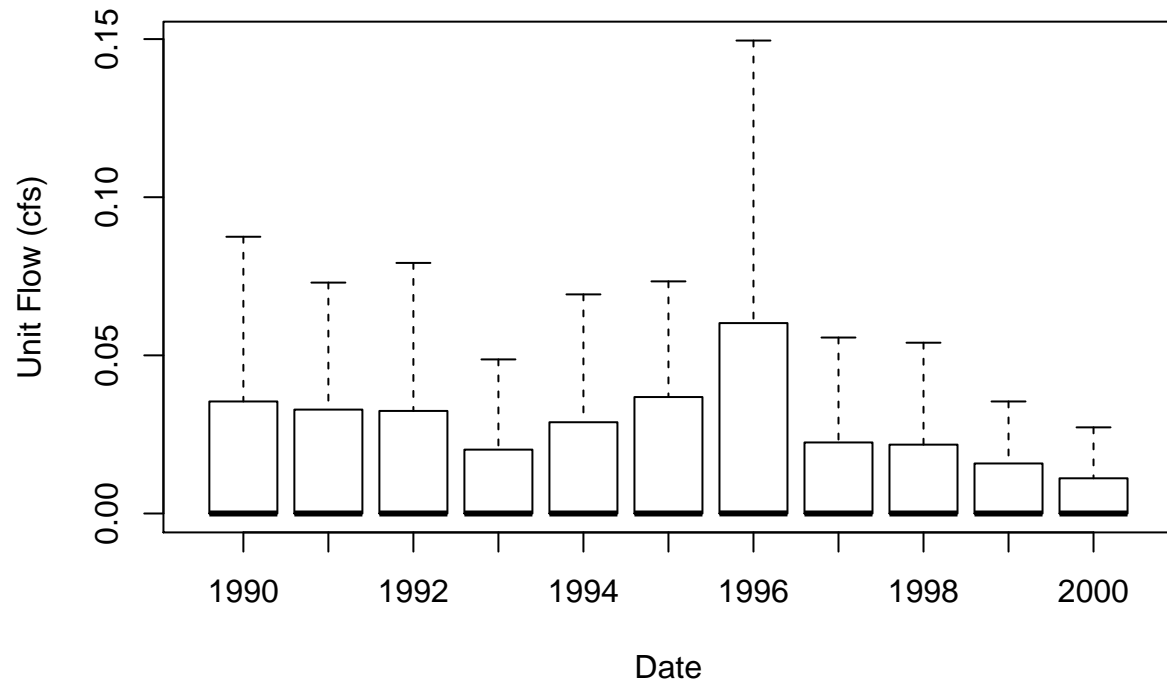Fig: Annual SURO Flows for LR-seg cbp6_N51091_JU1_6290_6590
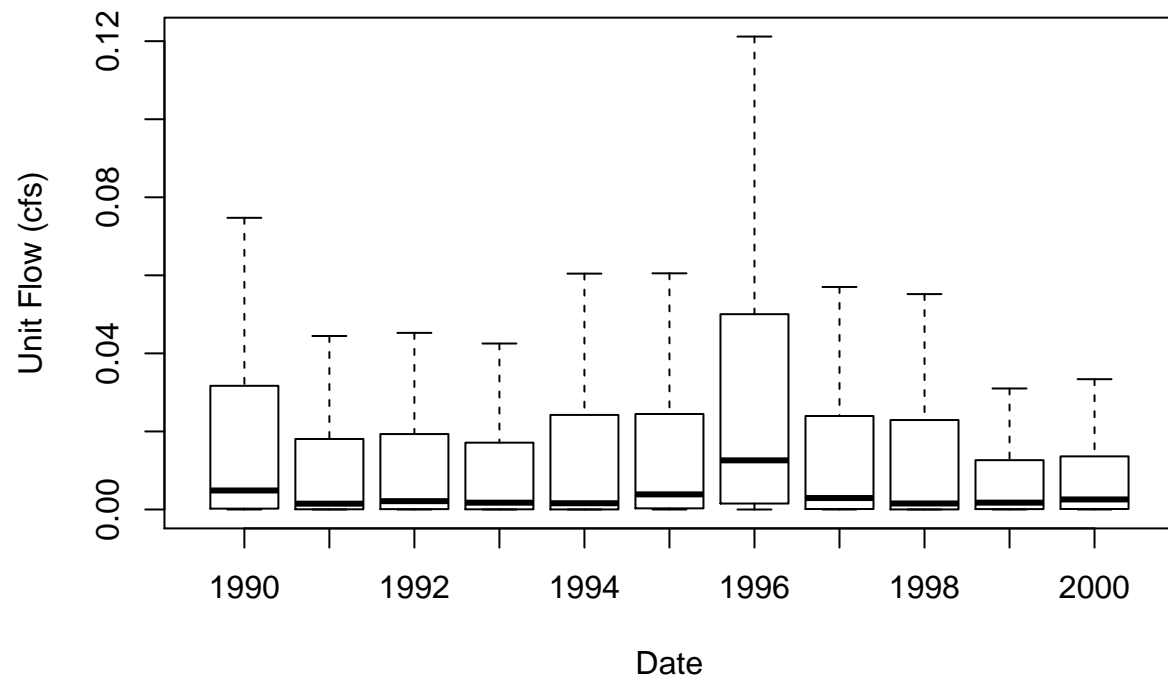
Fig: Annual IFWO Flows for LR-seg cbp6_N51091_JU1_6290_6590

Fig: Annual AGWO Flows for LR-seg cbp6_N51091_JU1_6290_6590