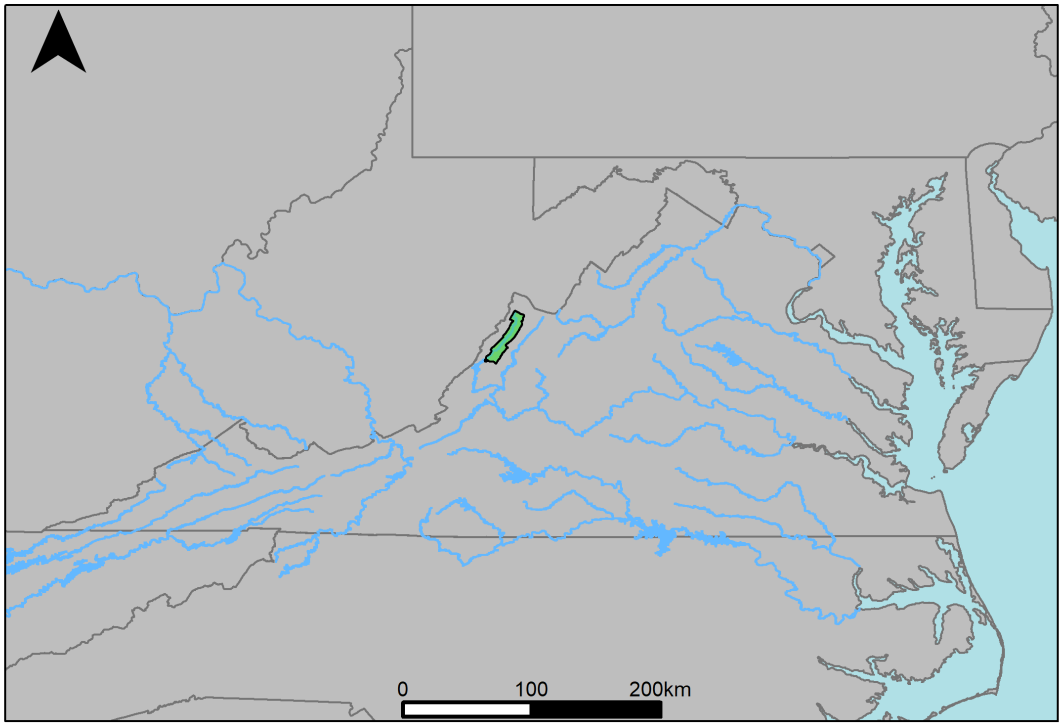
River Segment JU3_6380_6900: VA Hydro Run 14 vs. VA Hydro Run 15



The average daily discharge change between scenario 1 and scenario 2 for the 20 year timespan was 8.91089%, with 41.7% of its rolling three month time spans above 20% difference.

Table 1: Monthly Low Flows

	VA Hydro: CC: Precip 50, Temp 50	VA Hydro: CC: Precip 10, Temp 10	Pct. Difference
Jan. Low Flow	22.4	18.6	-17
Feb. Low Flow	45	33.6	-25.3
Mar. Low Flow	93.1	71	-23.7
Apr. Low Flow	110	82.8	-24.7
May Low Flow	117	82.8	-29.2
Jun. Low Flow	135	161	19.3
Jul. Low Flow	94.9	103	8.54
Aug. Low Flow	69.9	51.9	-25.8
Sep. Low Flow	30.1	36	19.6
Oct. Low Flow	19.5	19.1	-2.05
Nov. Low Flow	4.51	18.1	301
Dec. Low Flow	7.38	13.1	77.5

Table 2: Monthly Average Flows

	VA Hydro: CC: Precip 50, Temp 50	VA Hydro: CC: Precip 10, Temp 10	Pct. Difference
Overall Mean Flow	202	220	8.91
Jan. Mean Flow	325	338	4
Feb. Mean Flow	295	454	53.9
Mar. Mean Flow	376	600	59.6
Apr. Mean Flow	273	287	5.13
May Mean Flow	225	195	-13.3
Jun. Mean Flow	123	121	-1.63
Jul. Mean Flow	74.1	62.5	-15.7
Aug. Mean Flow	78.7	80.5	2.29
Sep. Mean Flow	116	97.4	-16
Oct. Mean Flow	109	73.4	-32.7
Nov. Mean Flow	200	131	-34.5
Dec. Mean Flow	236	212	-10.2

Table 3: Monthly High Flows

	VA Hydro: CC: Precip 50, Temp 50	VA Hydro: CC: Precip 10, Temp 10	Pct. Difference
Jan. High Flow	160	124	-22.5
Feb. High Flow	542	403	-25.6
Mar. High Flow	704	581	-17.5
Apr. High Flow	971	1460	50.4
May High Flow	708	1250	76.6
Jun. High Flow	973	2040	110
Jul. High Flow	727	771	6.05
Aug. High Flow	544	572	5.15
Sep. High Flow	265	430	62.3
Oct. High Flow	260	194	-25.4
Nov. High Flow	93.4	174	86.3
Dec. High Flow	123	157	27.6

Table 4: Period Low Flows

	VA Hydro: CC: Precip 50, Temp 50	VA Hydro: CC: Precip 10, Temp 10	Pct. Difference
Min. 1 Day Min	0.82	5.01	511
Med. 1 Day Min	2.64	9.23	250
Min. 3 Day Min	0.9	5.07	464
Med. 3 Day Min	2.93	9.5	224
Min. 7 Day Min	1.08	5.19	381
Med. 7 Day Min	3.51	10.2	191
Min. 30 Day Min	3.7	7.11	92.2
Med. 30 Day Min	13.3	17.1	28.6
Min. 90 Day Min	11.9	17	42.9
Med. 90 Day Min	47.3	39.2	-17.1
7Q10	7.05	11.7	66
Year of 90-Day Min. Flow	122	102	-16.4
Drought Year Mean	1.93	6.5	237
Mean Baseflow	91.6	92	0.44

Table 5: Period High Flows

	VA Hydro: CC: Precip 50, Temp 50	VA Hydro: CC: Precip 10, Temp 10	Pct. Difference
Max. 1 Day Max	7650	5930	-22.5
Med. 1 Day Max	2710	3160	16.6
Max. 3 Day Max	5420	4170	-23.1
Med. 3 Day Max	1940	2210	13.9
Max. 7 Day Max	2730	2160	-20.9
Med. 7 Day Max	1140	1390	21.9
Max. 30 Day Max	849	1190	40.2
Med. 30 Day Max	611	733	20
Max. 90 Day Max	616	859	39.4
Med. 90 Day Max	384	492	28.1

Table 6: Non-Exceedance Flows

	VA Hydro: CC: Precip 50, Temp 50	VA Hydro: CC: Precip 10, Temp 10	Pct. Difference
1% Non-Exceedance	1610	2140	32.9
5% Non-Exceedance	4.83	10.4	115
50% Non-Exceedance	1.25	5.51	341
95% Non-Exceedance	2000	2000	0
99% Non-Exceedance	93.5	137	46.5
Sept. 10% Non-Exceedance	675	787	16.6

Fig. 1: Hydrograph

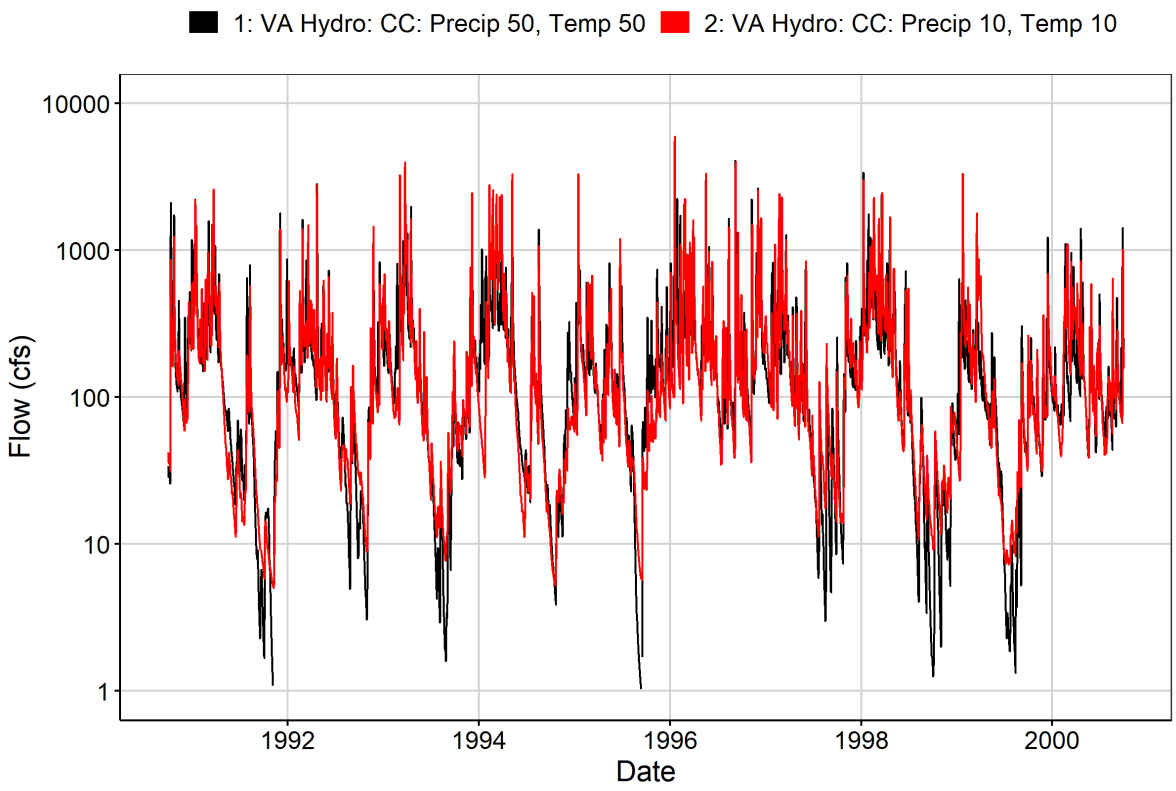


Fig. 2: Zoomed Hydrograph

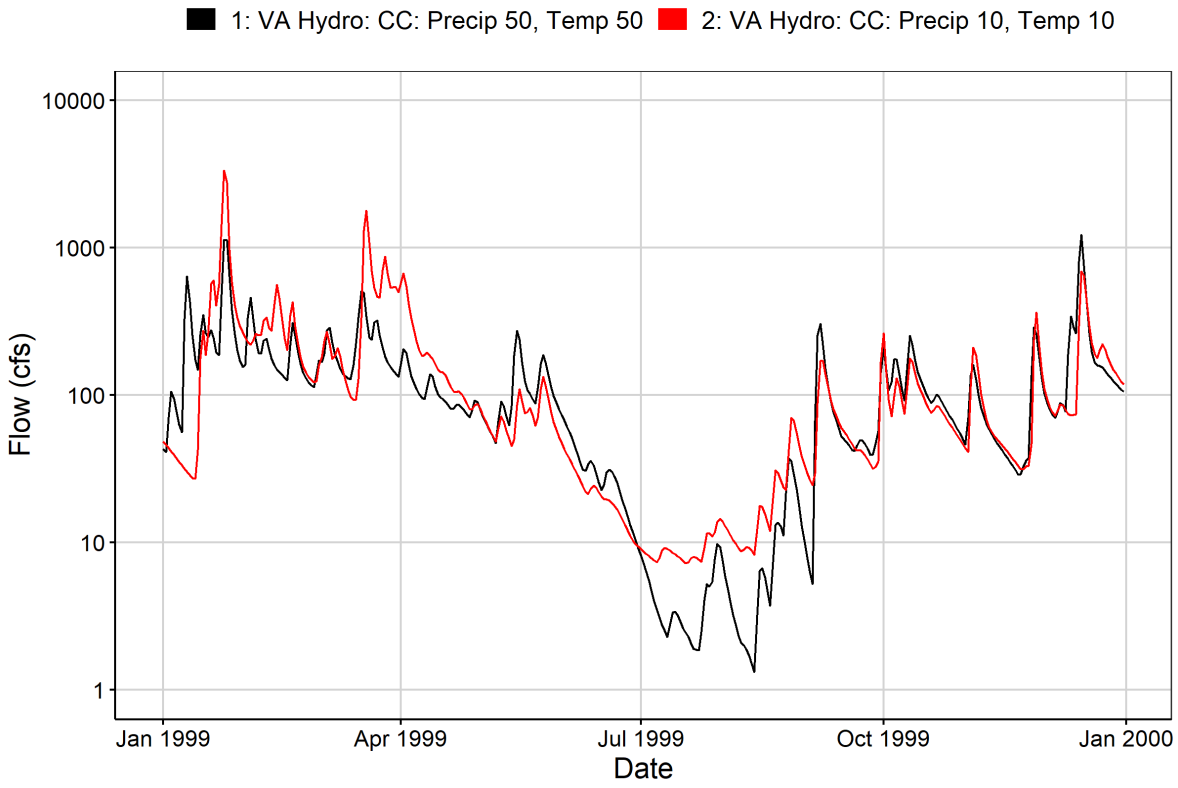


Fig. 3: Flow Exceedance

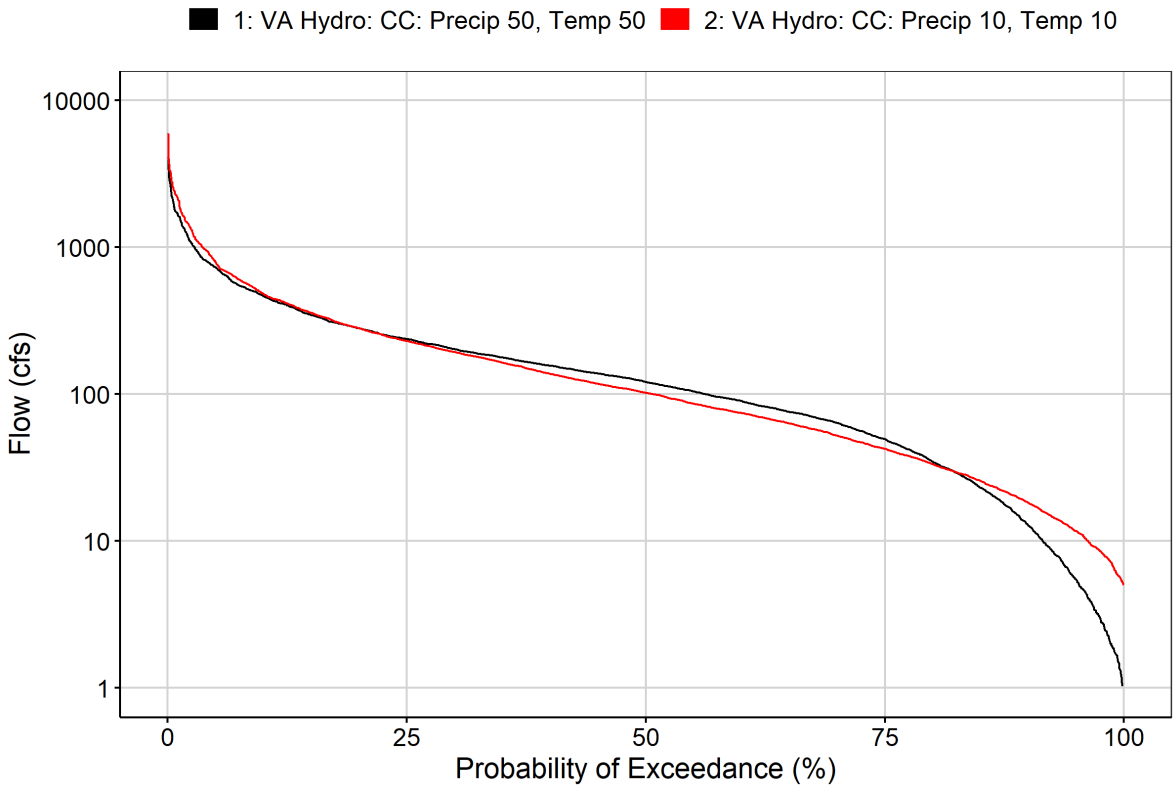


Fig. 4: Baseflow

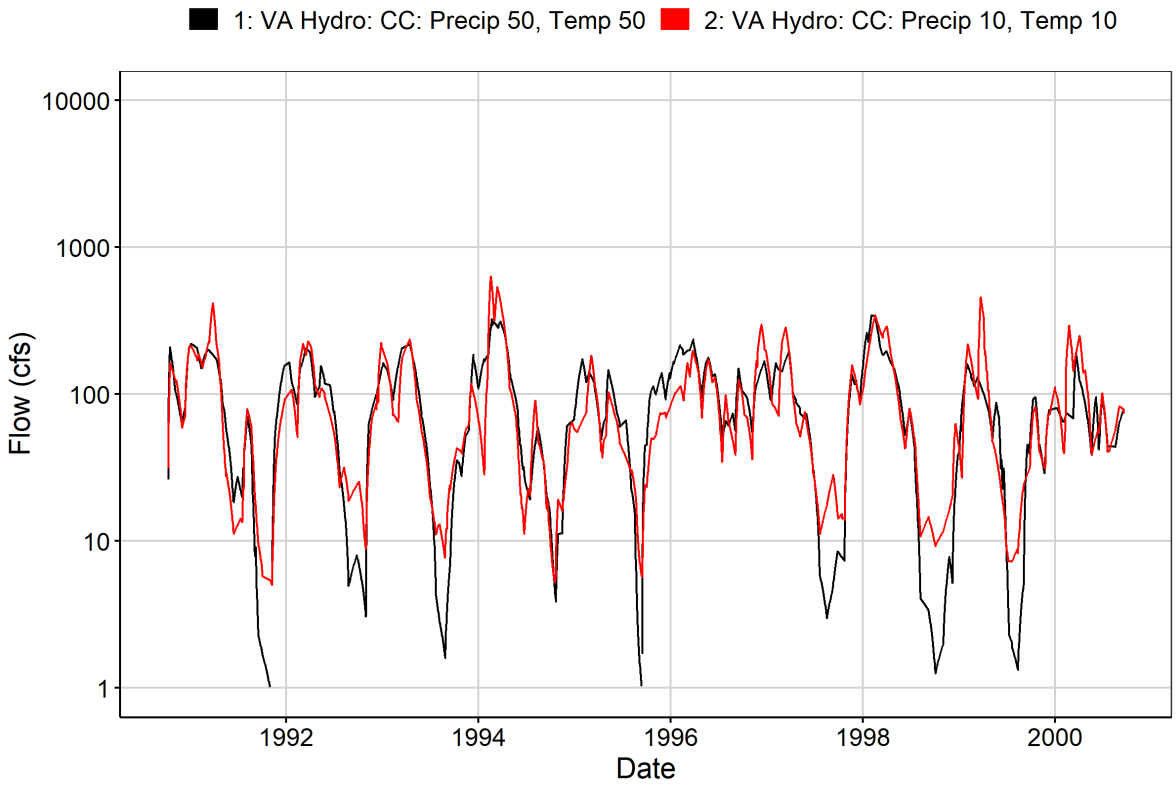


Fig. 5: Combined Baseflow

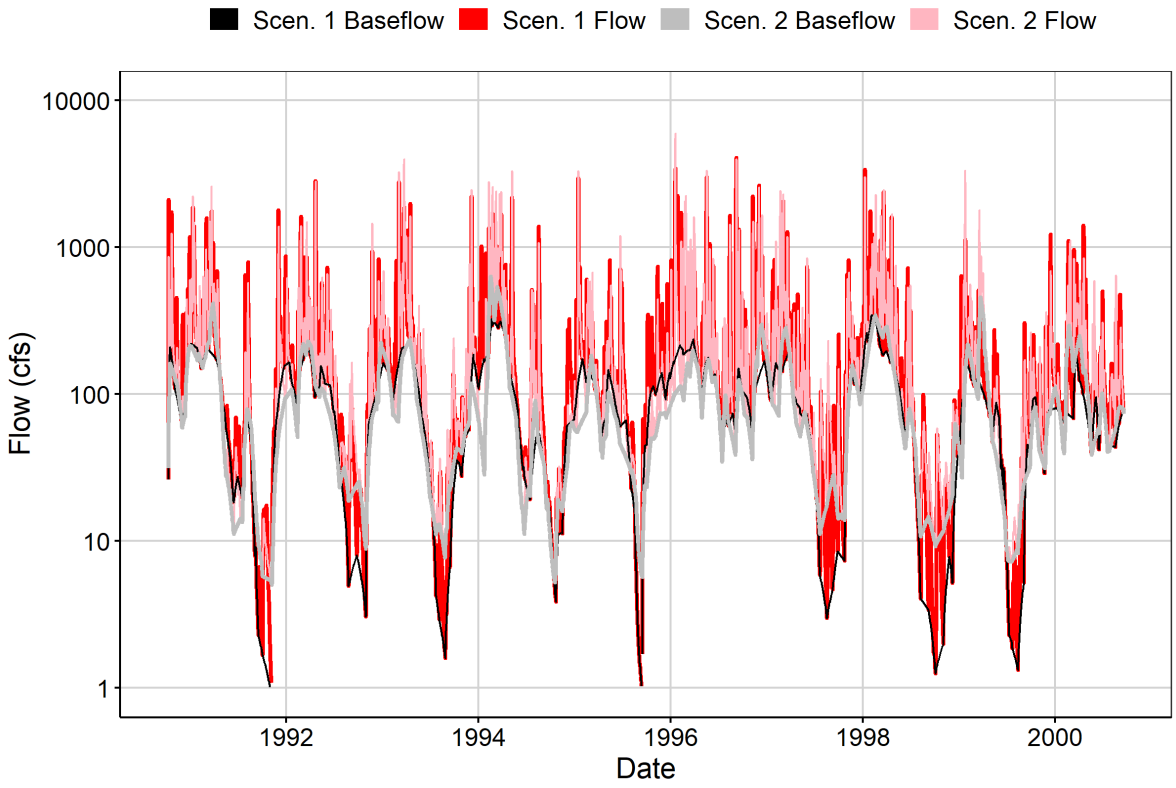


Fig. 6: Largest Difference Period

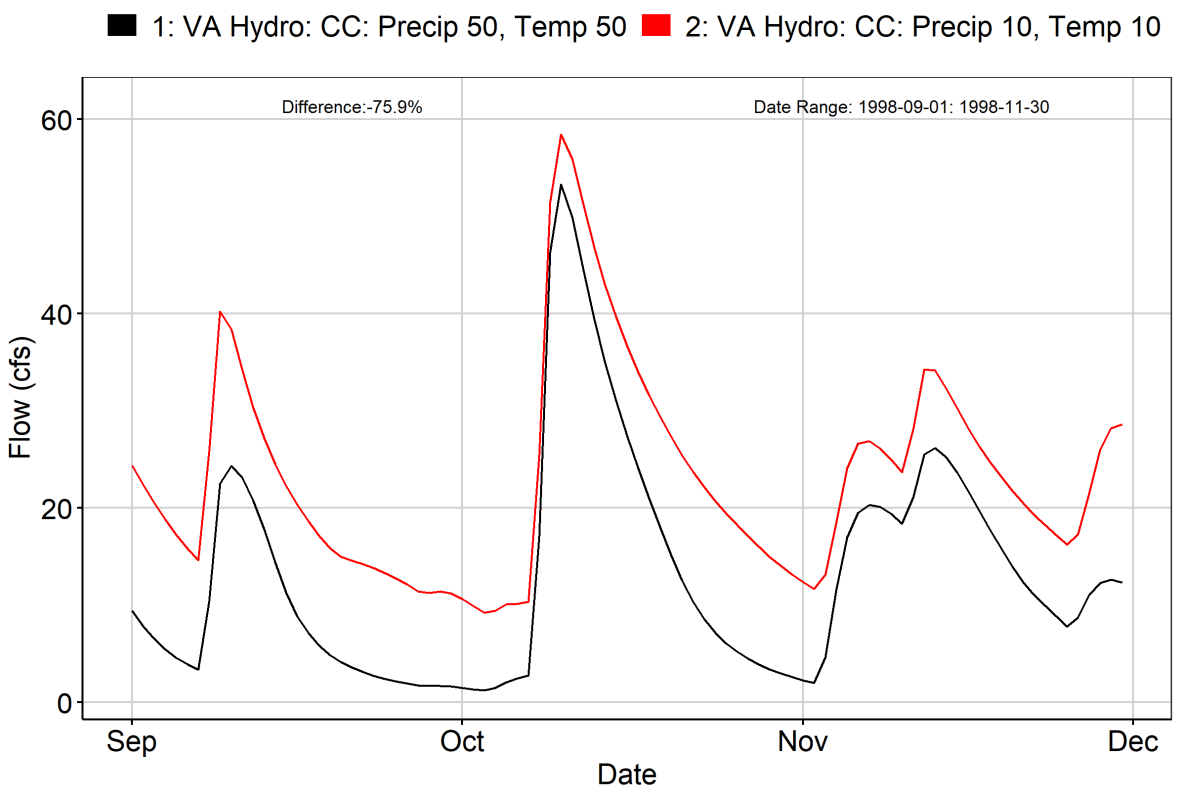


Fig. 7: Second Largest Difference Period

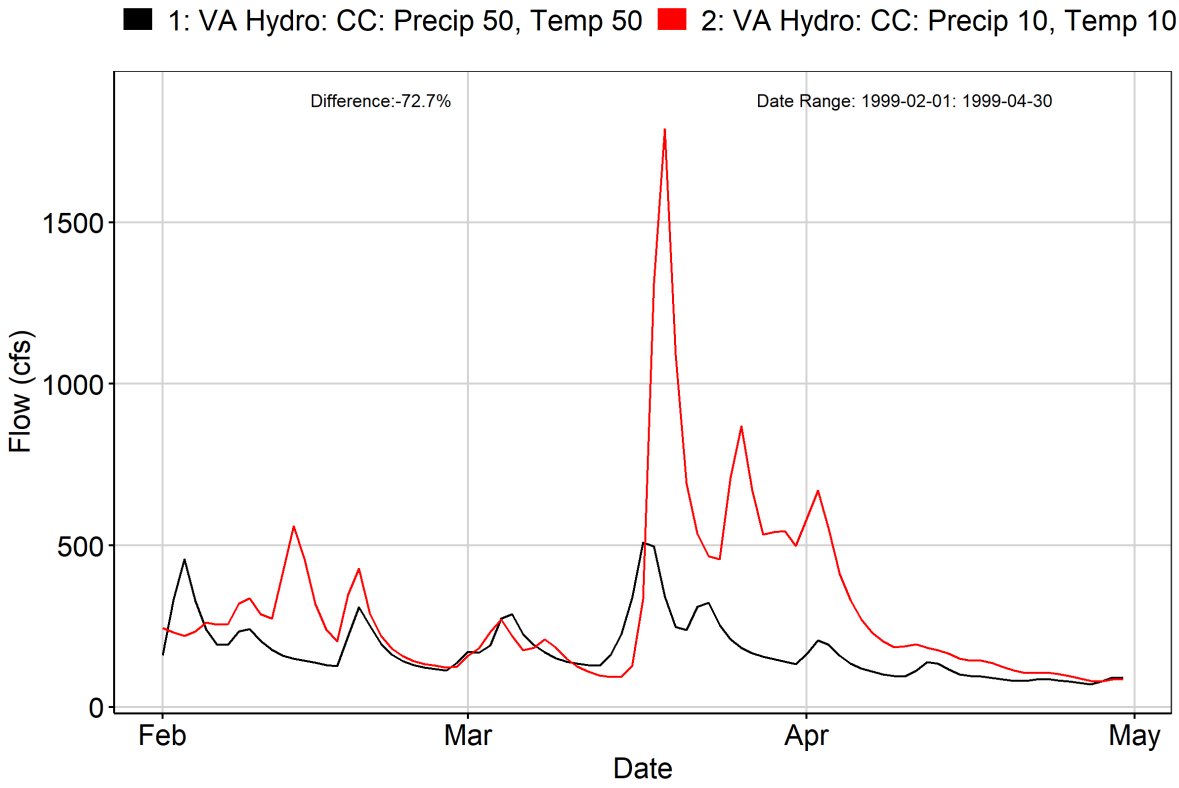


Fig. 8: Third Largest Difference Period

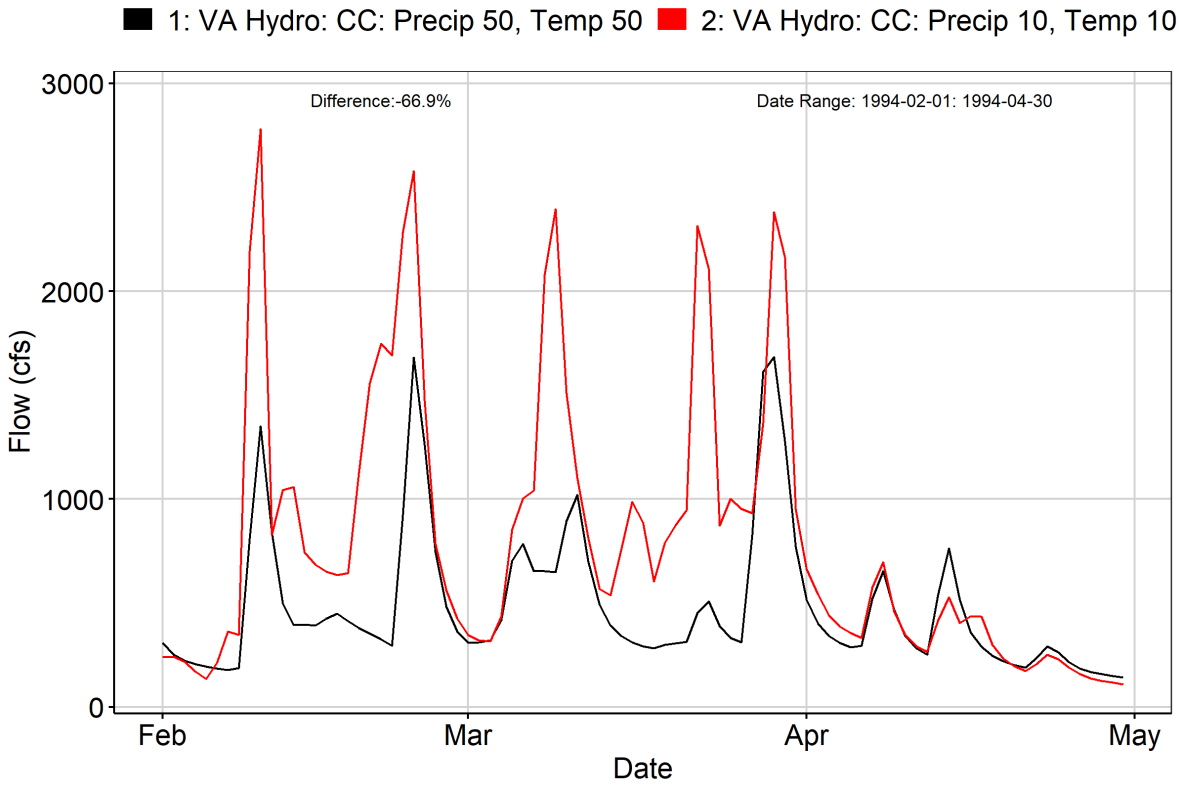


Fig. 9A: Residuals Plot

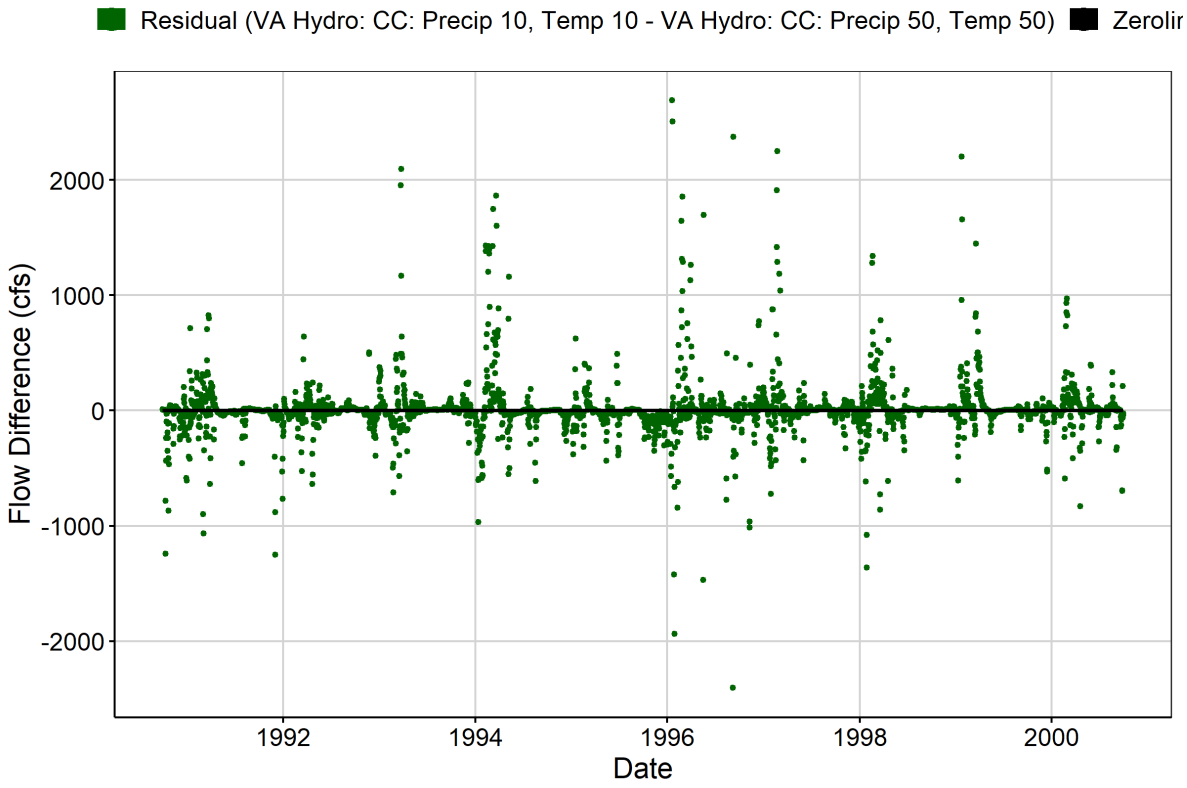


Fig. 9B: Area Weighted Residuals Plot

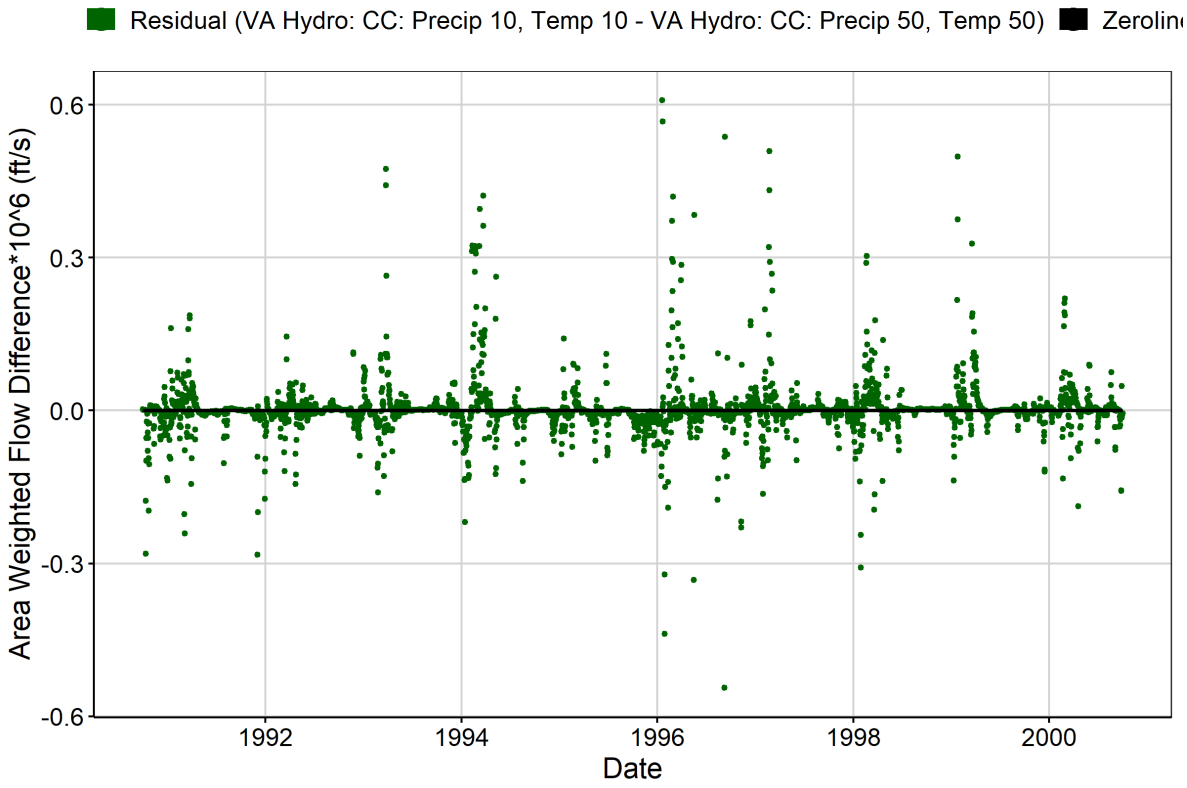
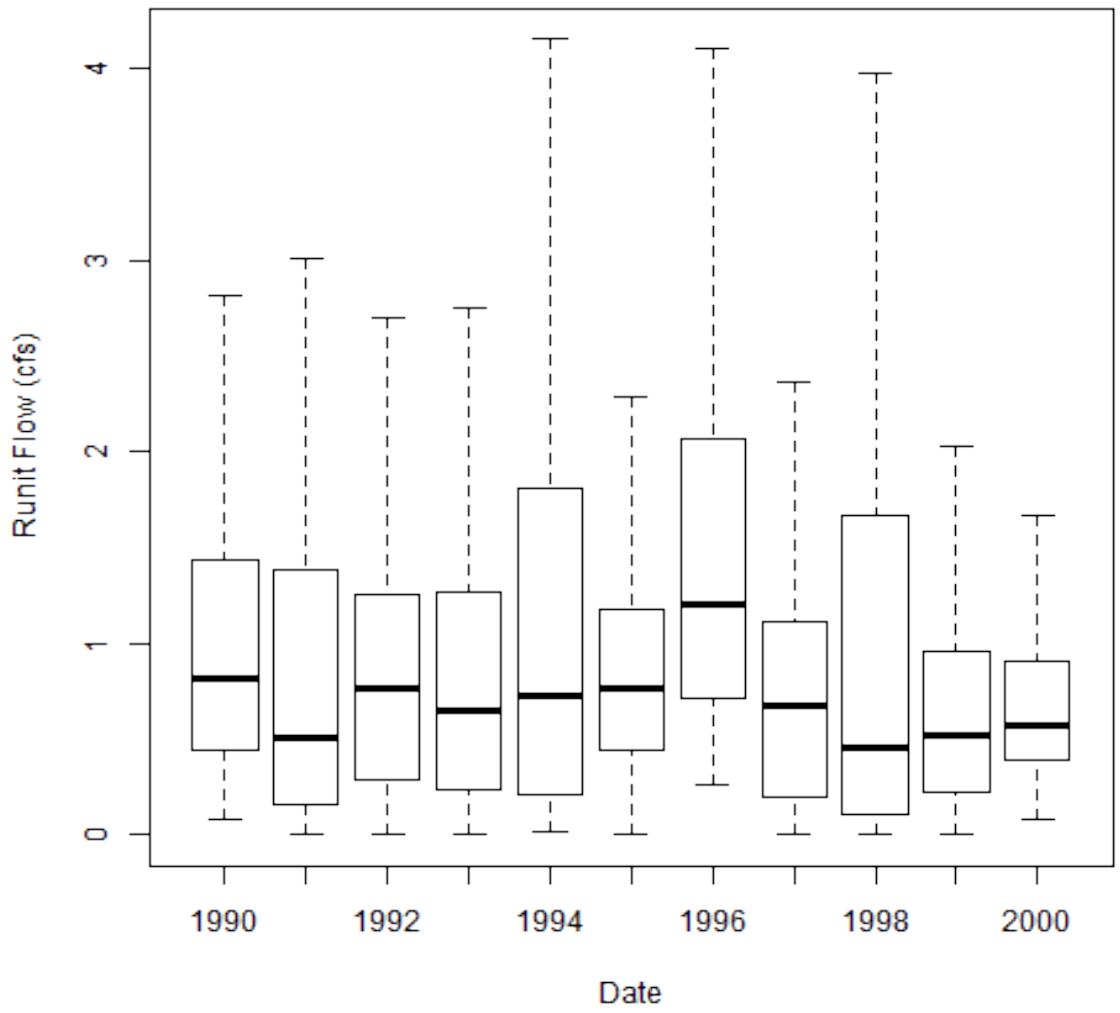


Fig. 10: VA Hydro Scen. 1 Runit Values (Outliers Excluded)



Tab: Annual IQR of Local Runoff Inflows

	IQR of Runit Flows (cfs/sq. mi) [25th, 75th]
1990	1 [0.438, 1.44]
1991	1.23 [0.155, 1.39]
1992	0.962 [0.298, 1.26]
1993	1.03 [0.233, 1.26]
1994	1.6 [0.206, 1.81]
1995	0.744 [0.436, 1.18]
1996	1.36 [0.714, 2.07]
1997	0.923 [0.197, 1.12]

	IQR of Runit Flows (cfs/sq. mi) [25th, 75th]
1998	1.56 [0.109, 1.67]
1999	0.74 [0.22, 0.96]
2000	0.509 [0.392, 0.901]

Fig. 11: Smallest Difference Period

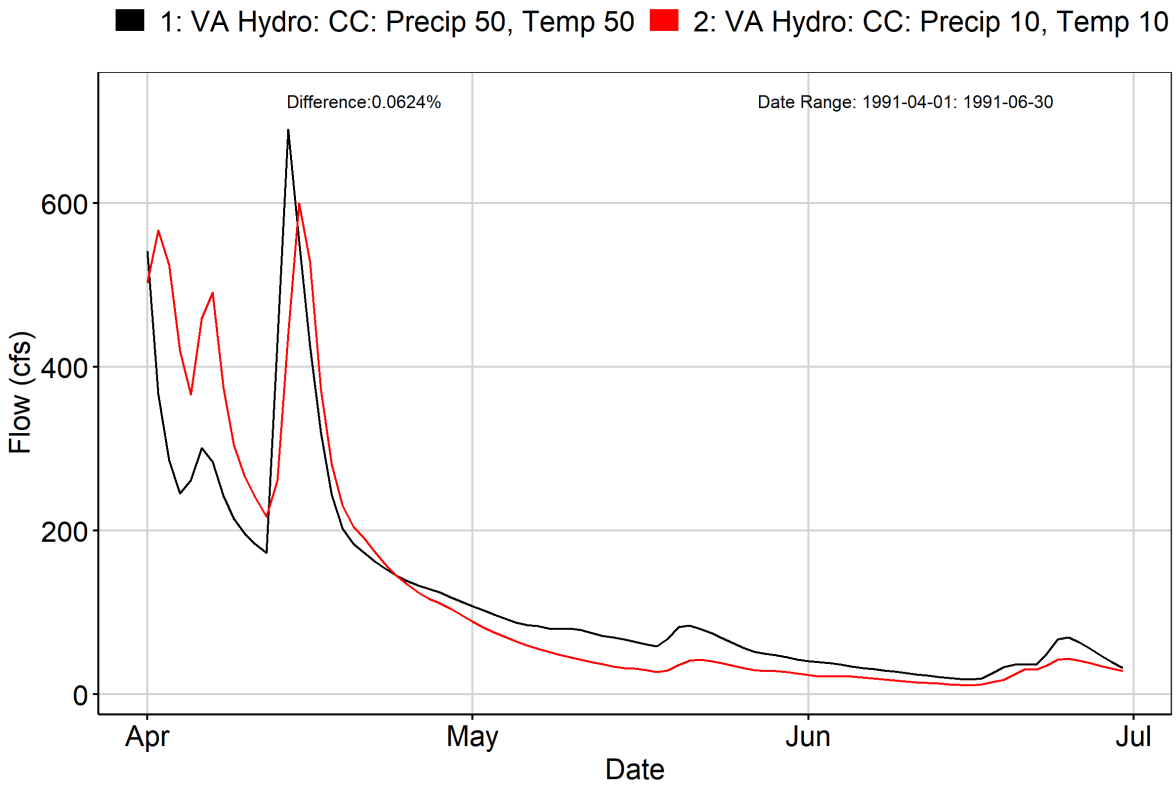


Fig. 12: Second Smallest Difference Period

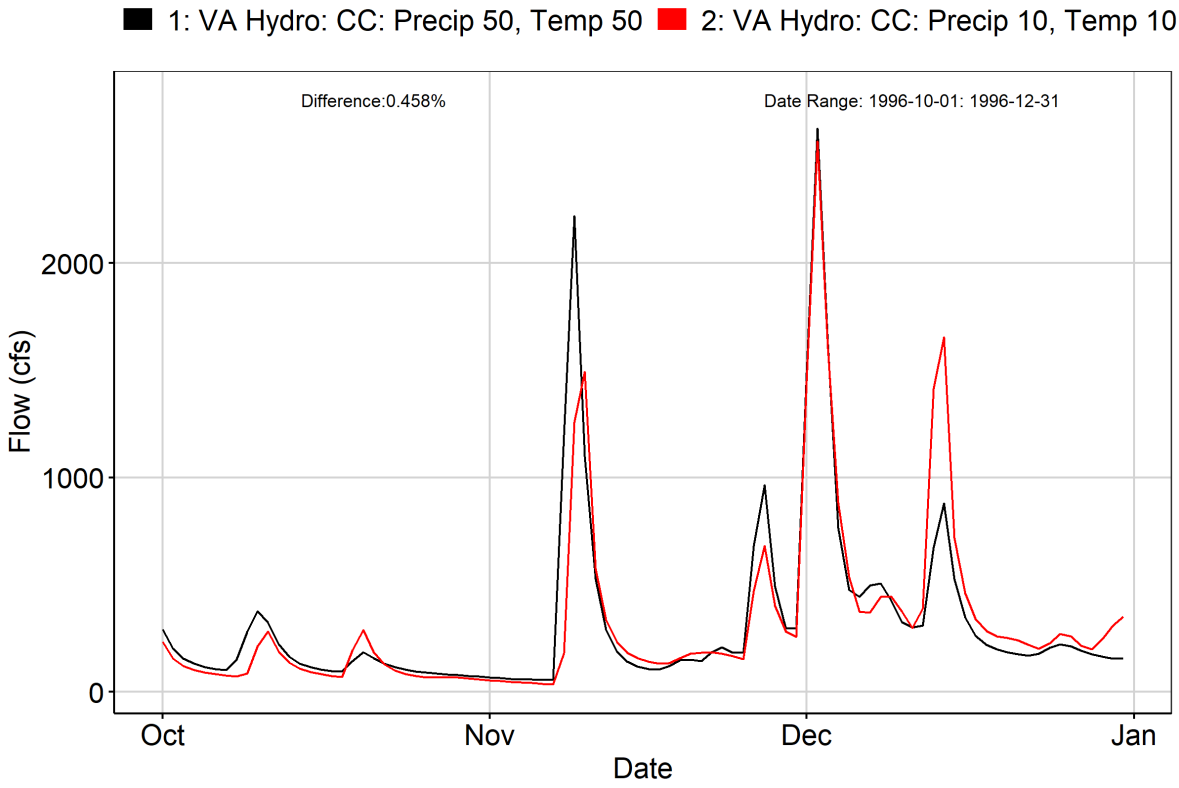
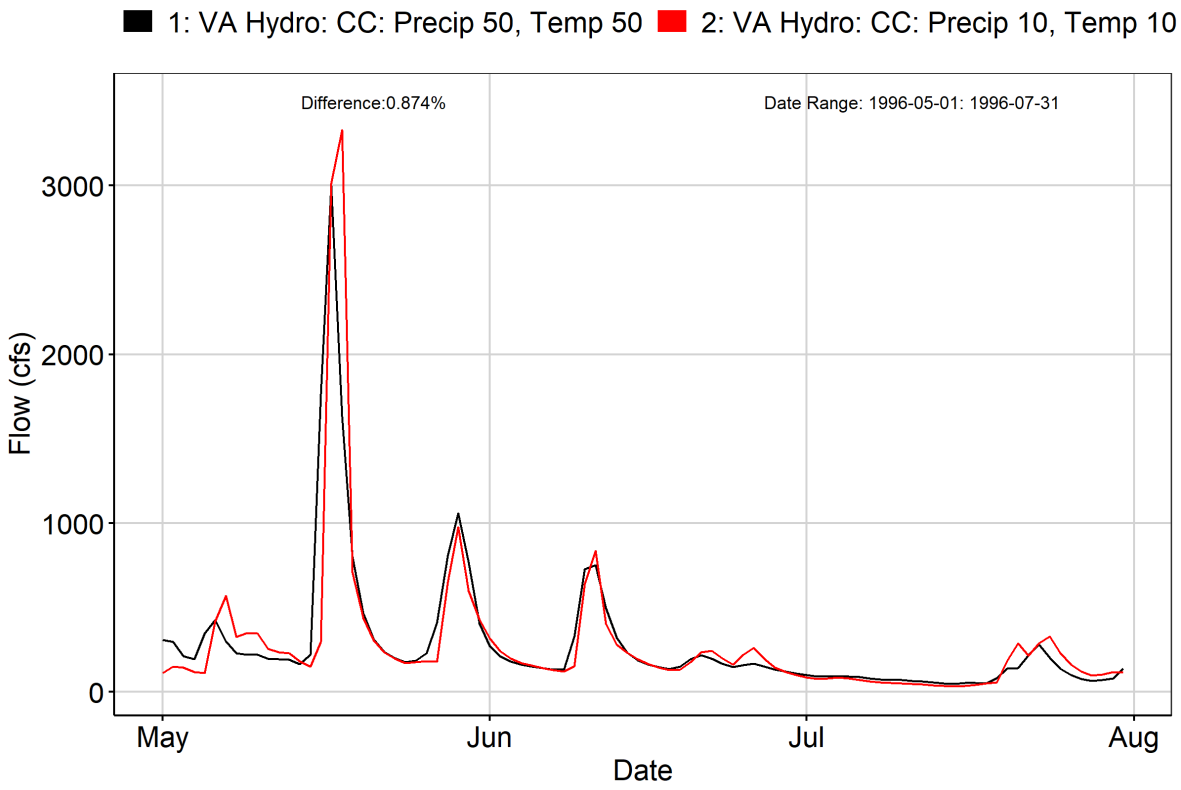


Fig. 13: Third Smallest Difference Period



Additional Tables: Land-River Segment Flow Metrics

Tab: Mean Flows by Flow Type: LR-Seg cbp6_N51017_JU3_6380_6900

	Mean Unit Flow (cfs/sq. mi)
SURface Outflow	0.00158
InterFloW Outflow	0.000384
Active GroundWater Outflow	0.000505

Tab: Ratio of Zero-Flow Days by Flow Type: LR-Seg cbp6_N51017_JU3_6380_6900

	Ratio of Days with Zero Flow to Total Days
SURface Outflow	0.647
InterFloW Outflow	0.49
Active GroundWater Outflow	0.332

Tab: IQR for SURface Outflow: LR-Seg cbp6_N51017_JU3_6380_6900

	IQR of Unit Flows (cfs/sq. mi) [25th, 75th]
1990	1.31e-05 [0, 1.31e-05]
1991	5.37e-06 [0, 5.37e-06]
1992	1.11e-05 [0, 1.11e-05]
1993	1.39e-05 [0, 1.39e-05]
1994	1.8e-05 [0, 1.8e-05]
1995	1.86e-05 [0, 1.86e-05]
1996	0.000101 [0, 0.000101]
1997	9.21e-06 [0, 9.21e-06]
1998	3.52e-06 [0, 3.52e-06]
1999	7.94e-07 [0, 7.94e-07]
2000	3.39e-06 [0, 3.39e-06]

Tab: IQR for InterFloW Outflow: LR-Seg cbp6_N51017_JU3_6380_6900

	IQR of Unit Flows (cfs/sq. mi) [25th, 75th]
1990	0.000156 [0, 0.000156]
1991	6.45e-05 [0, 6.45e-05]
1992	7.54e-05 [0, 7.54e-05]
1993	0.000107 [0, 0.000107]
1994	0.000102 [0, 0.000102]
1995	9.76e-05 [0, 9.76e-05]
1996	0.000288 [0, 0.000288]
1997	0.000113 [0, 0.000113]
1998	7.38e-05 [0, 7.38e-05]
1999	7.32e-05 [0, 7.32e-05]
2000	7.9e-05 [0, 7.9e-05]

Tab: IQR for Active GroundWater Outflow: LR-Seg cbp6_N51017_JU3_6380_6900

	IQR of Unit Flows (cfs/sq. mi) [25th, 75th]
1990	0.000912 [0, 0.000912]
1991	0.000851 [0, 0.000851]
1992	0.000936 [0, 0.000936]
1993	0.000926 [0, 0.000926]
1994	0.000937 [0, 0.000937]
1995	0.000804 [0, 0.000804]
1996	0.00117 [0, 0.00117]
1997	0.000749 [0, 0.000749]
1998	0.000879 [0, 0.000879]
1999	0.000571 [0, 0.000571]
2000	0.000692 [0, 0.000692]

Tab: Mean Flows by Land Use: LR-Seg cbp6_N51017_JU3_6380_6900

	Mean Unit Flow (cfs/sq. mi)
aop	0.0006
cch	0.000777
cci	0.00119
ccn	0.00081
cfr	0.000537
cir	0.00119
cmo	0.000563
cnr	0.00119
ctg	0.000777
dbl	0.000622
fnp	0.00119
for	0.000537
fsp	0.00119
gom	0.000622
gwm	0.000622
hfr	0.000642
lhy	0.0006
mch	0.000777
mci	0.00119
mcn	0.00081
mir	0.00119
mnr	0.00119
mtg	0.000777
nch	0.000777
nci	0.00119
nir	0.00119
nnr	0.00119
ntg	0.000777
oac	0.000622
ohy	0.0006
osp	0.000562
pas	0.0006
sch	0.000622
scl	0.000622
sgg	0.000622
sho	0.00119
som	0.000622
soy	0.000622
stb	0.00119
stf	0.00119
swm	0.000622
wfp	0.000537
wto	0.000537

Tab: Ratio of Zero-Flow Days by Land Use: LR-Seg cbp6_N51017_JU3_6380_6900

	Ratio of Days with Zero Flow to Total Days
aop	0.291
cch	0.293
cci	0.89
ccn	0.282
cfr	0.338
cir	0.89
cmo	0.303
cnr	0.89
ctg	0.293
dbl	0.285
fnp	0.89
for	0.342
fsp	0.89
gom	0.285
gwm	0.285
hfr	0.28
lhy	0.29
mch	0.293
mci	0.89
mcn	0.282
mir	0.89
mnr	0.89
mtg	0.293
nch	0.293
nci	0.89
nir	0.89
nnr	0.89
ntg	0.293
oac	0.285
ohy	0.29
osp	0.306
pas	0.29
sch	0.285
scl	0.285
sgg	0.285
sho	0.89
som	0.285
soy	0.285
stb	0.89
stf	0.89
swm	0.285
wfp	0.342
wto	0.342

Tab: Mean Flows by Flow Type: LR-Seg cbp6_N51091_JU3_6380_6900

	Mean Unit Flow (cfs/sq. mi)
SURface Outflow	0.0017
InterFloW Outflow	0.000619
Active GroundWater Outflow	0.000611

Tab: Ratio of Zero-Flow Days by Flow Type: LR-Seg cbp6_N51091_JU3_6380_6900

	Ratio of Days with Zero Flow to Total Days
SURface Outflow	0.613
InterFloW Outflow	0.441
Active GroundWater Outflow	0.37

Tab: IQR for SURface Outflow: LR-Seg cbp6_N51091_JU3_6380_6900

	IQR of Unit Flows (cfs/sq. mi) [25th, 75th]
1990	3.77e-05 [0, 3.77e-05]
1991	1.84e-05 [0, 1.84e-05]
1992	2.44e-05 [0, 2.44e-05]
1993	1.49e-05 [0, 1.49e-05]
1994	2.28e-05 [0, 2.28e-05]
1995	5.32e-05 [0, 5.32e-05]
1996	0.000519 [0, 0.000519]
1997	2.58e-05 [0, 2.58e-05]
1998	1.38e-05 [0, 1.38e-05]
1999	1.06e-05 [0, 1.06e-05]
2000	1.08e-05 [0, 1.08e-05]

Tab: IQR for InterFloW Outflow: LR-Seg cbp6_N51091_JU3_6380_6900

	IQR of Unit Flows (cfs/sq. mi) [25th, 75th]
1990	0.00047 [0, 0.00047]
1991	0.000181 [0, 0.000181]
1992	0.000221 [0, 0.000221]
1993	0.000195 [0, 0.000195]
1994	0.00025 [0, 0.00025]
1995	0.000347 [0, 0.000347]
1996	0.000904 [0, 0.000904]
1997	0.000334 [0, 0.000334]
1998	0.000188 [0, 0.000188]
1999	0.000183 [0, 0.000183]
2000	0.000211 [0, 0.000211]

Tab: IQR for Active GroundWater Outflow: LR-Seg cbp6_N51091_JU3_6380_6900

	IQR of Unit Flows (cfs/sq. mi) [25th, 75th]
1990	0.00105 [0, 0.00105]
1991	0.00105 [0, 0.00105]
1992	0.00111 [0, 0.00111]
1993	0.00101 [0, 0.00101]
1994	0.00124 [0, 0.00124]
1995	0.00115 [0, 0.00115]
1996	0.00136 [0, 0.00136]
1997	0.000794 [0, 0.000794]
1998	0.000854 [0, 0.000854]
1999	0.000843 [0, 0.000843]
2000	0.00087 [0, 0.00087]

Tab: Mean Flows by Land Use: LR-Seg cbp6_N51091_JU3_6380_6900

	Mean Unit Flow (cfs/sq. mi)
aop	0.000825
cch	0.000928
cci	0.00122
ccn	0.000952
cfr	0.000807
cir	0.00122
cmo	0.000811
cnr	0.00122
ctg	0.000928
dbl	0.000836
fnp	0.00122
for	0.000807
fsp	0.00122
gom	0.000836
gwm	0.000836
hfr	0.00085
lhy	0.000825
mch	0.000928
mci	0.00122
mcn	0.000952
mir	0.00122
mnr	0.00122
mtg	0.000928
nch	0.000928
nci	0.00122
nir	0.00122
nnr	0.00122
ntg	0.000928
oac	0.000836
ohy	0.000825
osp	0.000811
pas	0.000825
sch	0.000836
scl	0.000836
sgg	0.000836
sho	0.00122
som	0.000836
soy	0.000836
stb	0.00122
stf	0.00122
swm	0.000836
wfp	0.000807
wto	0.000807

Tab: Ratio of Zero-Flow Days by Land Use: LR-Seg cbp6_N51091_JU3_6380_6900

	Ratio of Days with Zero Flow to Total Days
aop	0.276
cch	0.287
cci	0.876
ccn	0.262
cfr	0.322
cir	0.876
cmo	0.284
cnr	0.876
ctg	0.287
dbl	0.266
fnp	0.873
for	0.331
fsp	0.873
gom	0.266
gwm	0.266
hfr	0.275
lhy	0.272
mch	0.287
mci	0.876
mcn	0.262
mir	0.876
mnr	0.876
mtg	0.287
nch	0.287
nci	0.876
nir	0.876
nnr	0.876
ntg	0.287
oac	0.266
ohy	0.272
osp	0.285
pas	0.272
sch	0.266
scl	0.266
sgg	0.266
sho	0.876
som	0.266
soy	0.266
stb	0.876
stf	0.876
swm	0.266
wfp	0.331
wto	0.331

Additional Figures: Land-River Segment Flow Boxplots

Fig: Annual SURO Flows for LR-seg cbp6_N51017_JU3_6380_6900

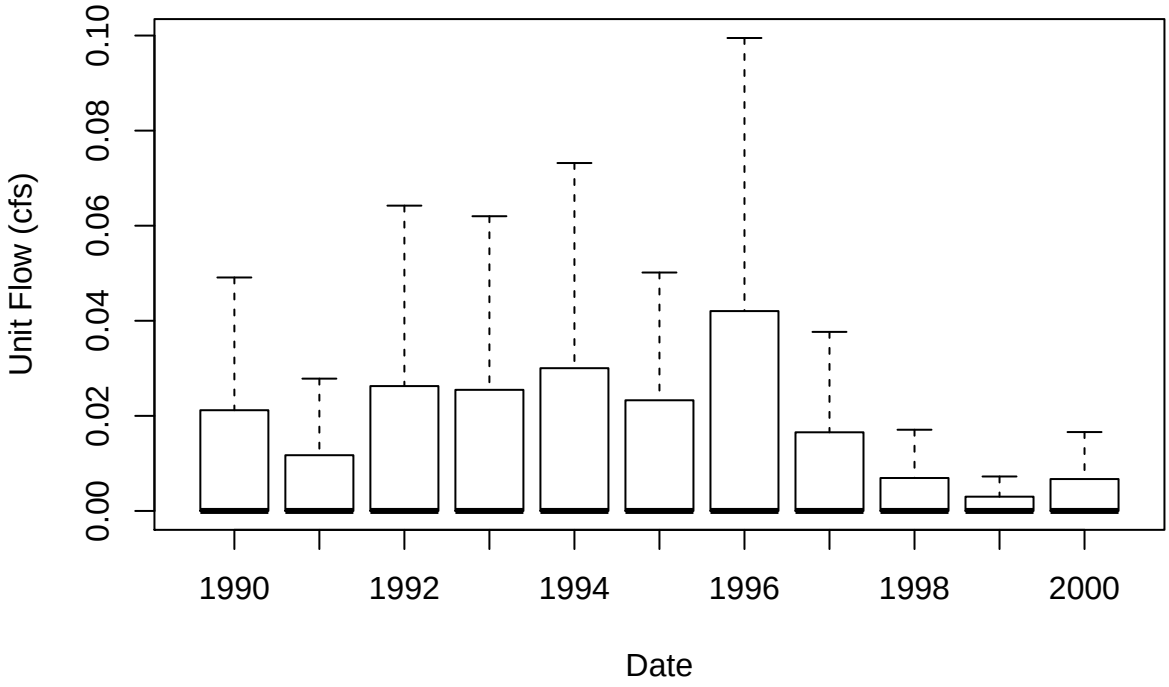


Fig: Annual IFWO Flows for LR-seg cbp6_N51017_JU3_6380_6900

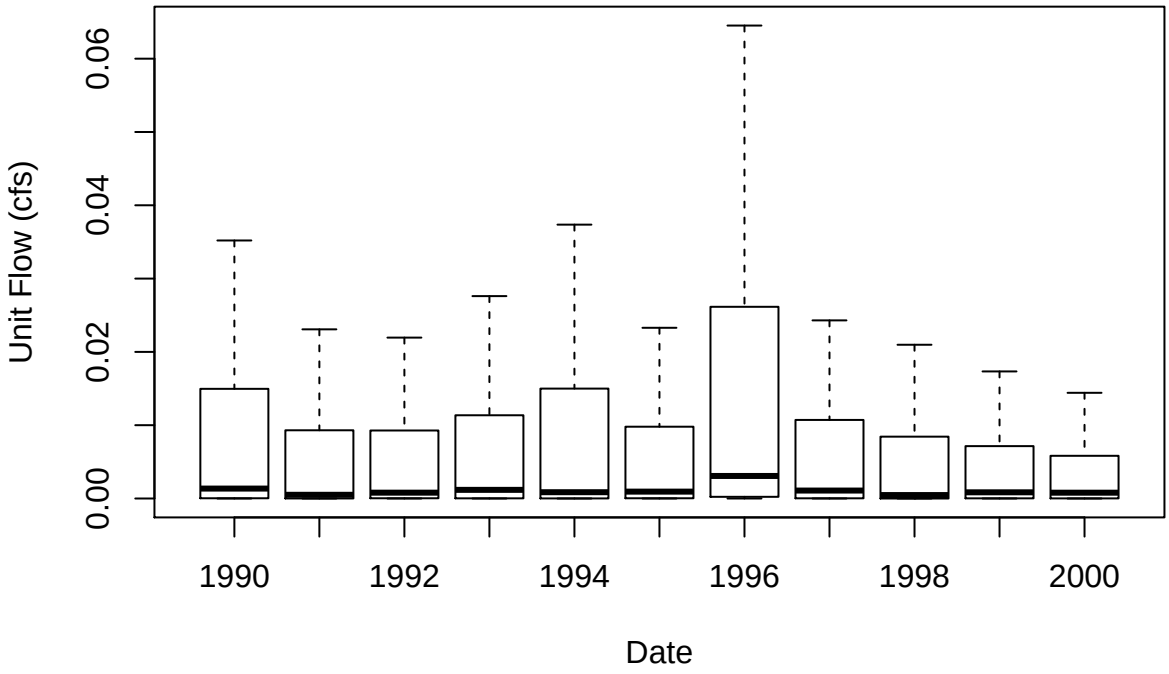


Fig: Annual AGWO Flows for LR-seg cbp6_N51017_JU3_6380_6900

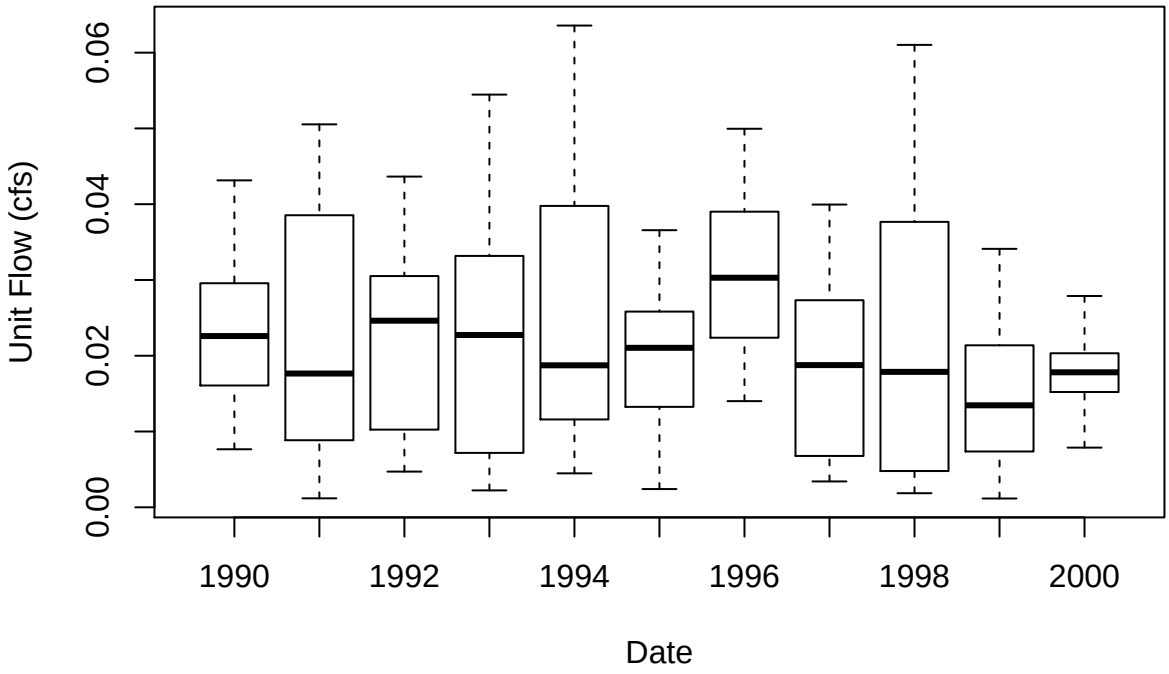


Fig: Annual SURO Flows for LR-seg cbp6_N51091_JU3_6380_6900

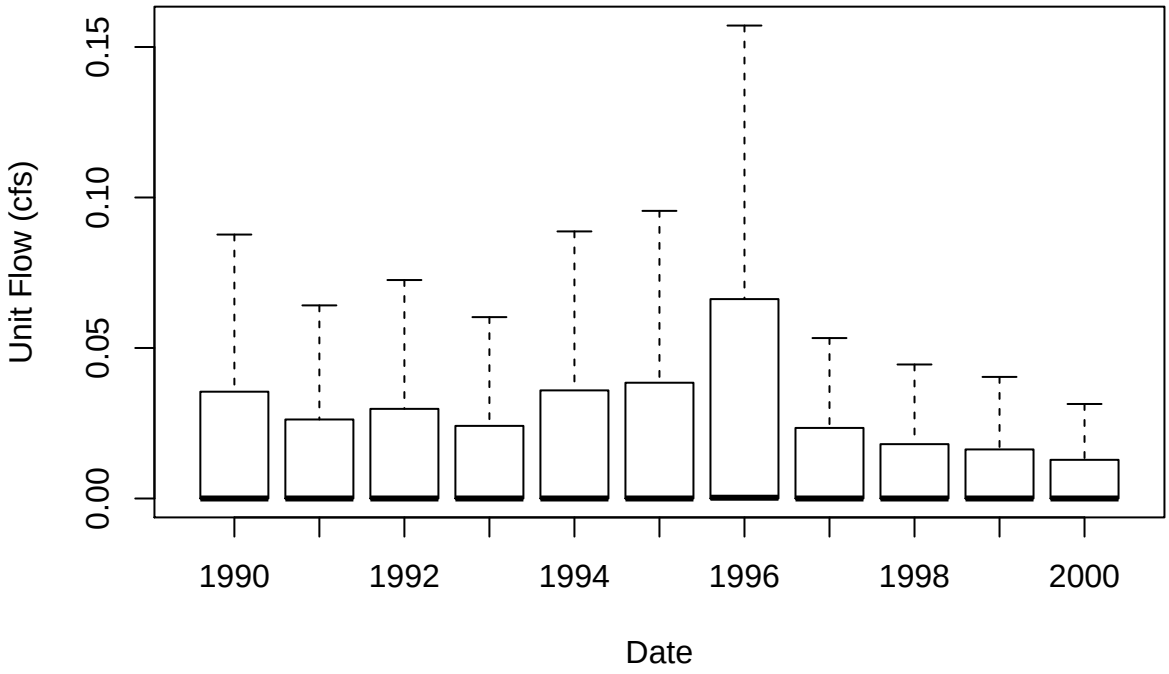


Fig: Annual IFWO Flows for LR-seg cbp6_N51091_JU3_6380_6900

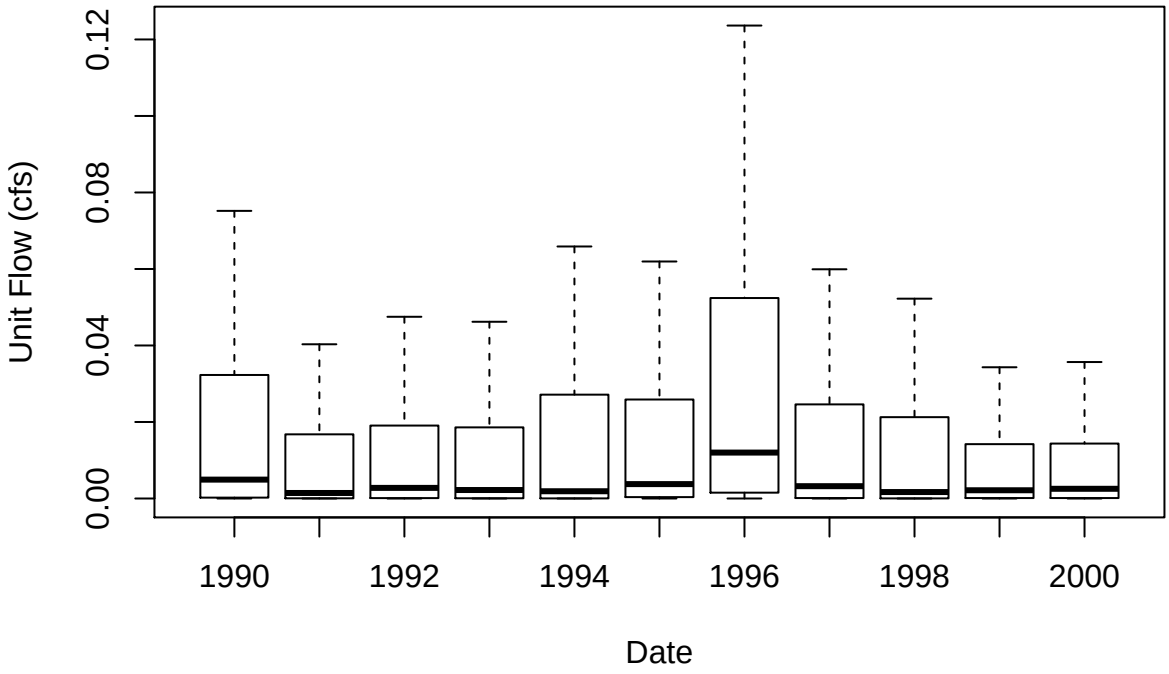


Fig: Annual AGWO Flows for LR-seg cbp6_N51091_JU3_6380_6900