

## Appendix ##: River Segment: BS1\_8730\_8540 : p532cal\_062211 vs. Scenario 2: p532cal\_062211

**{r, echo=FALSE, warning=FALSE, message=FALSE} # gis\_img #**

This river segment follows part of the flow of the Cranes Nest River, a tributary of the Big Sandy River. The gage is located in Dickenson County, VA (Lat 37<U+00B0>07'26", Long 82<U+00B0>26'20") approximately 17 miles northeast of Norton, VA. Drainage area is 66.5 sq. miles. This gage started taking data in 1963 and is still taking data. This area is not regulated and should not have any man-made alterations that could affect flow conditions. The average daily discharge change between scenario 1 and scenario 2 for the 20 year timespan was 0%, with 0% of its rolling three month time spans above 20% difference.

**Table 1: Monthly Low Flows**

	Scenario 1	Scenario 2	Pct. Difference
Jan. Low Flow	7.49	7.49	0
Feb. Low Flow	20.2	20.2	0
Mar. Low Flow	24.8	24.8	0
Apr. Low Flow	42.5	42.5	0
May Low Flow	55.2	55.2	0
Jun. Low Flow	50.6	50.6	0
Jul. Low Flow	36.7	36.7	0
Aug. Low Flow	23.3	23.3	0
Sep. Low Flow	13.8	13.8	0
Oct. Low Flow	11.4	11.4	0
Nov. Low Flow	13.8	13.8	0
Dec. Low Flow	8.02	8.02	0

**Table 2: Monthly Average Flows**

	Scenario 1	Scenario 2	Pct. Difference
Overall Mean Flow	83.3	83.3	0
Jan. Mean Flow	119	119	0
Feb. Mean Flow	177	177	0
Mar. Mean Flow	155	155	0
Apr. Mean Flow	112	112	0
May Mean Flow	81.2	81.2	0
Jun. Mean Flow	54.5	54.5	0
Jul. Mean Flow	36.6	36.6	0
Aug. Mean Flow	35.9	35.9	0
Sep. Mean Flow	34.4	34.4	0
Oct. Mean Flow	40.3	40.3	0
Nov. Mean Flow	61	61	0
Dec. Mean Flow	98.8	98.8	0

**Table 3: Monthly High Flows**

	Scenario 1	Scenario 2	Pct. Difference
Jan. High Flow	70.3	70.3	0
Feb. High Flow	200	200	0
Mar. High Flow	239	239	0
Apr. High Flow	309	309	0
May High Flow	561	561	0
Jun. High Flow	400	400	0
Jul. High Flow	266	266	0
Aug. High Flow	332	332	0
Sep. High Flow	77.3	77.3	0
Oct. High Flow	74.7	74.7	0
Nov. High Flow	72.4	72.4	0
Dec. High Flow	53.2	53.2	0

**Table 4: Period Low Flows**

	Scenario 1	Scenario 2	Pct. Difference
Min. 1 Day Min	0	0	NaN
Med. 1 Day Min	4.75	4.75	0
Min. 3 Day Min	0.01	0.01	0
Med. 3 Day Min	5.22	5.22	0
Min. 7 Day Min	0.33	0.33	0
Med. 7 Day Min	6.25	6.25	0
Min. 30 Day Min	4.15	4.15	0
Med. 30 Day Min	12.4	12.4	0
Min. 90 Day Min	8.69	8.69	0
Med. 90 Day Min	23.9	23.9	0
7Q10	1.35	1.35	0
Year of 90-Day Min. Flow	1988	1988	0
Drought Year Mean	32.79	32.79	0
Mean Baseflow	39.1	39.1	0

**Table 5: Period High Flows**

	Scenario 1	Scenario 2	Pct. Difference
Max. 1 Day Max	3090	3090	0
Med. 1 Day Max	1290	1290	0
Max. 3 Day Max	1800	1800	0
Med. 3 Day Max	681	681	0
Max. 7 Day Max	1130	1130	0
Med. 7 Day Max	463	463	0
Max. 30 Day Max	528	528	0
Med. 30 Day Max	254	254	0
Max. 90 Day Max	391	391	0
Med. 90 Day Max	171	171	0

**Table 6: Non-Exceedance Flows**

	Scenario 1	Scenario 2	Pct. Difference
1% Non-Exceedance	3.32	3.32	0
5% Non-Exceedance	7.88	7.88	0
50% Non-Exceedance	47.1	47.1	0
95% Non-Exceedance	254	254	0
99% Non-Exceedance	668	668	0
Sept. 10% Non-Exceedance	5.65	5.65	0

**Fig. 1: Hydrograph**

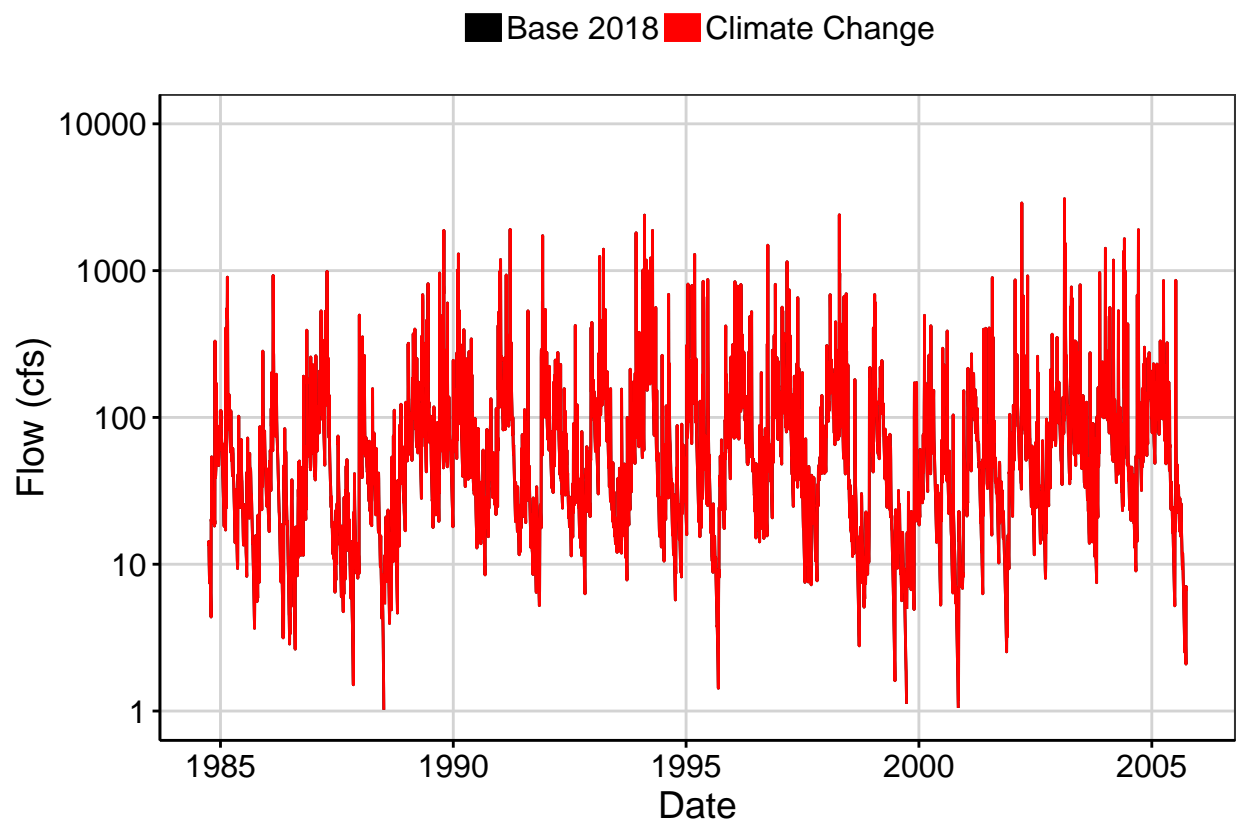


Fig. 2: Zoomed Hydrograph

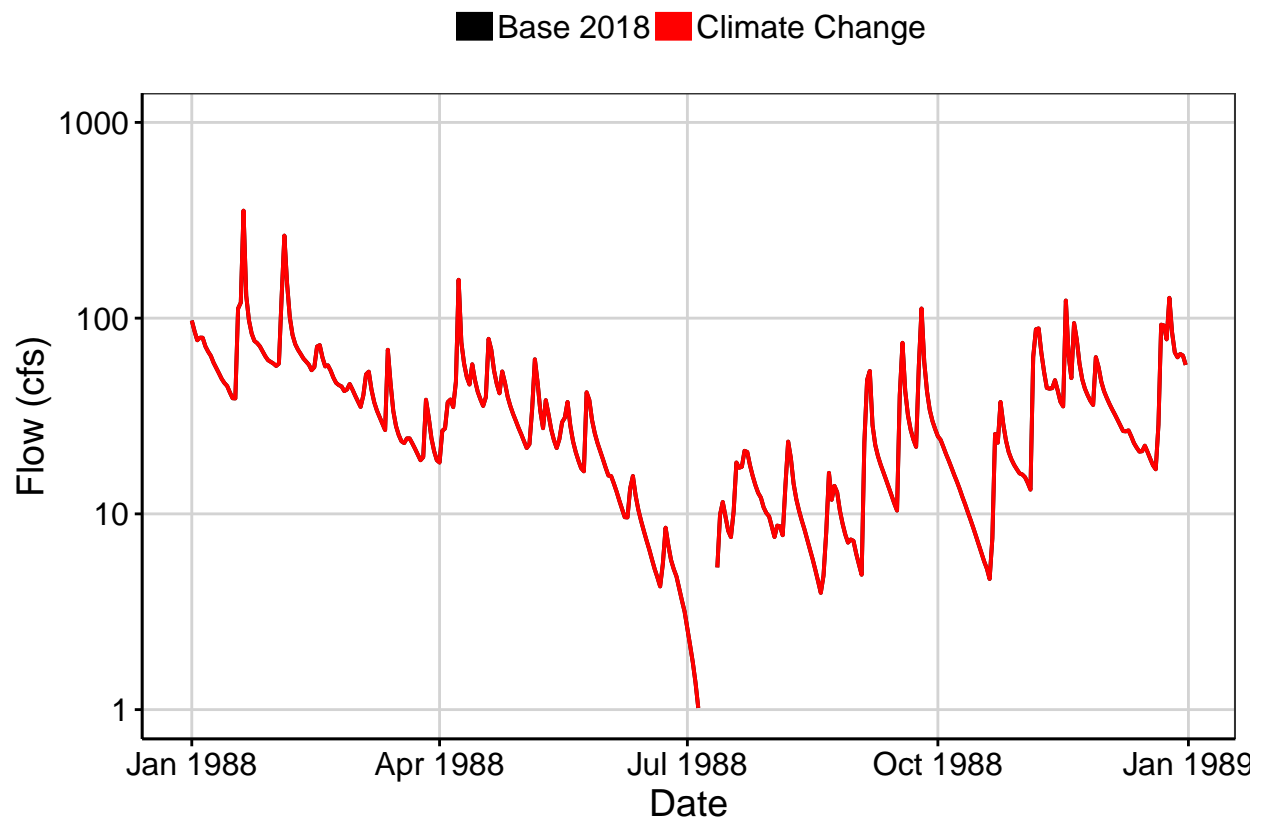


Fig. 3: Flow Exceedance

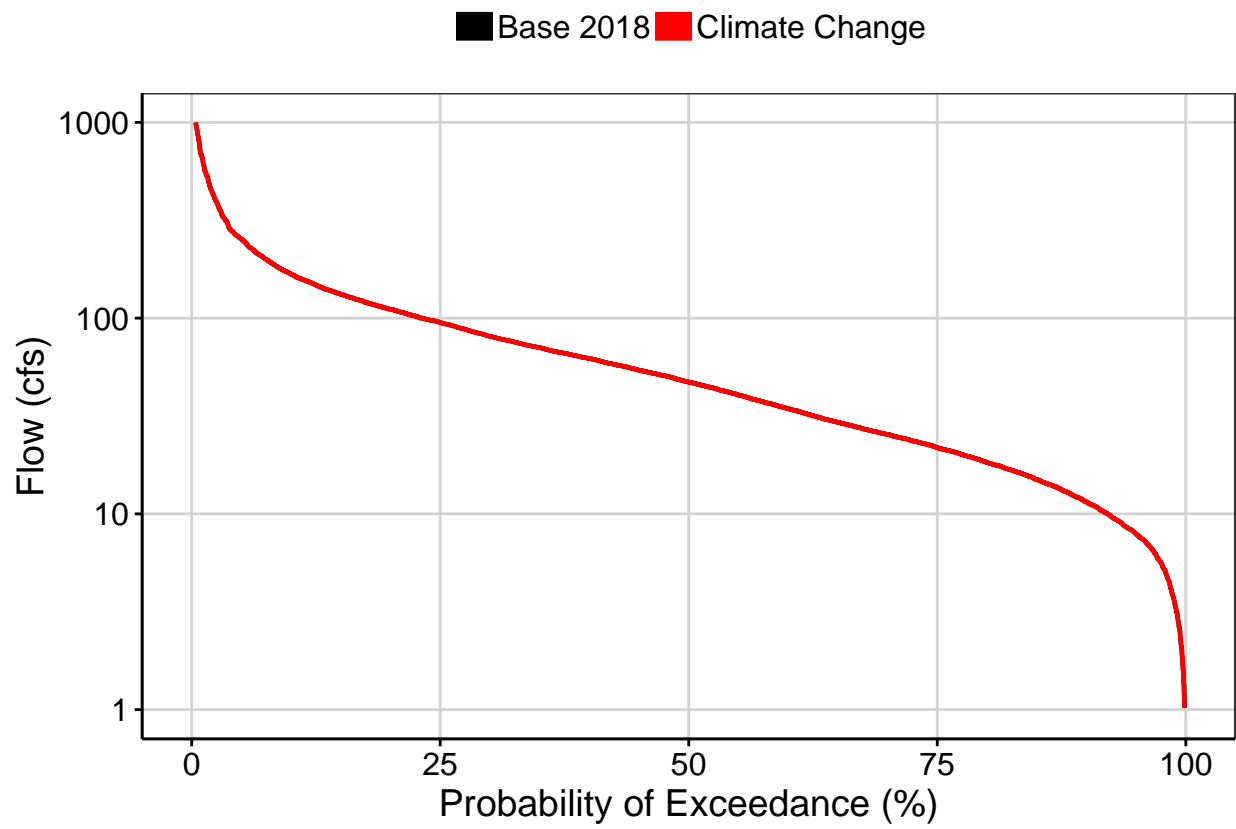


Fig. 4: Baseflow

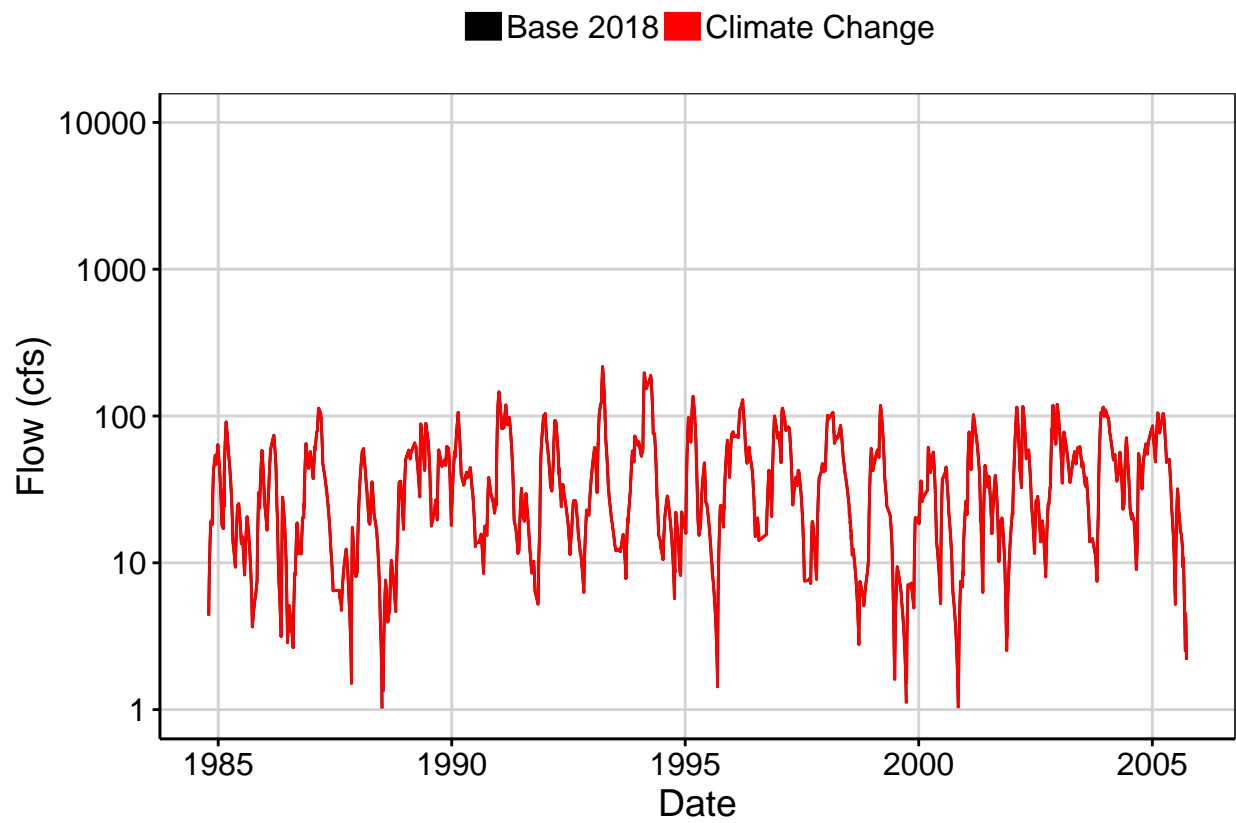


Fig. 5: Combined Baseflow

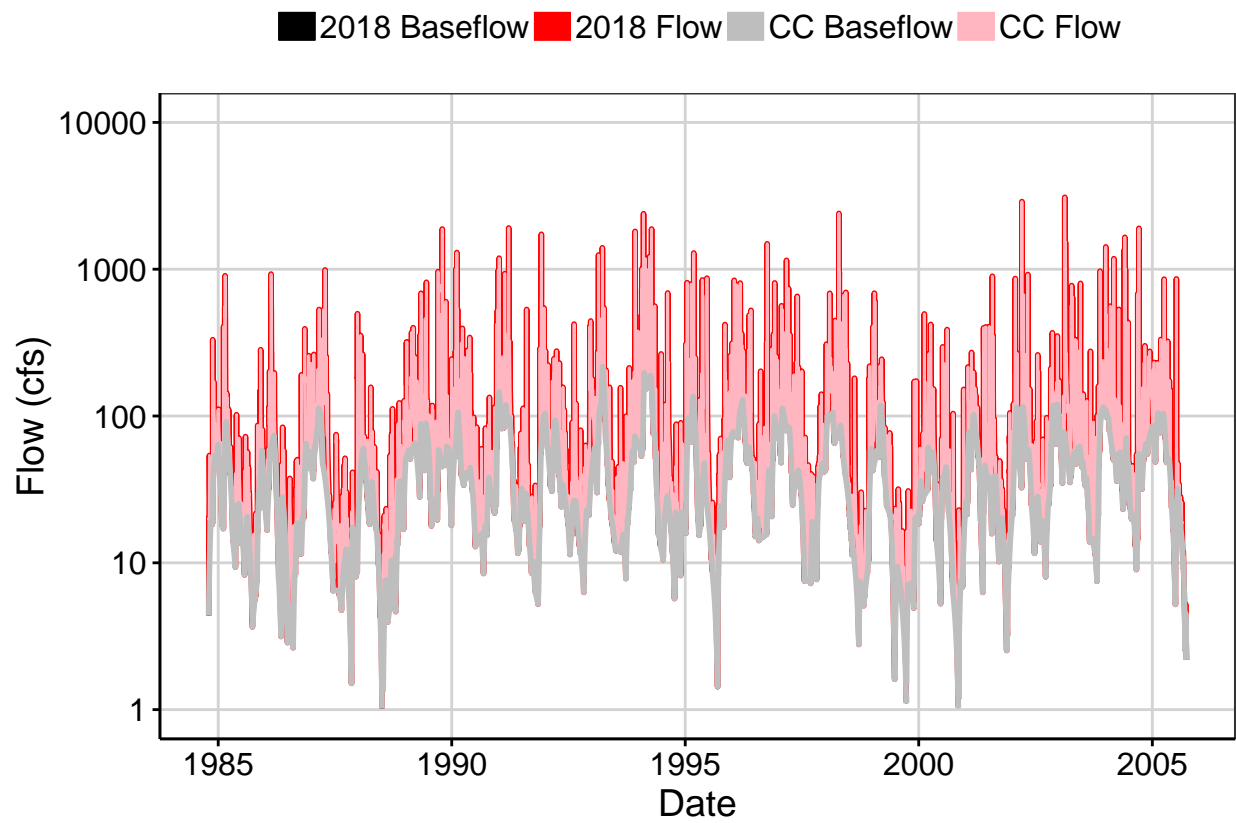




Fig. 6: Largest Difference Segment

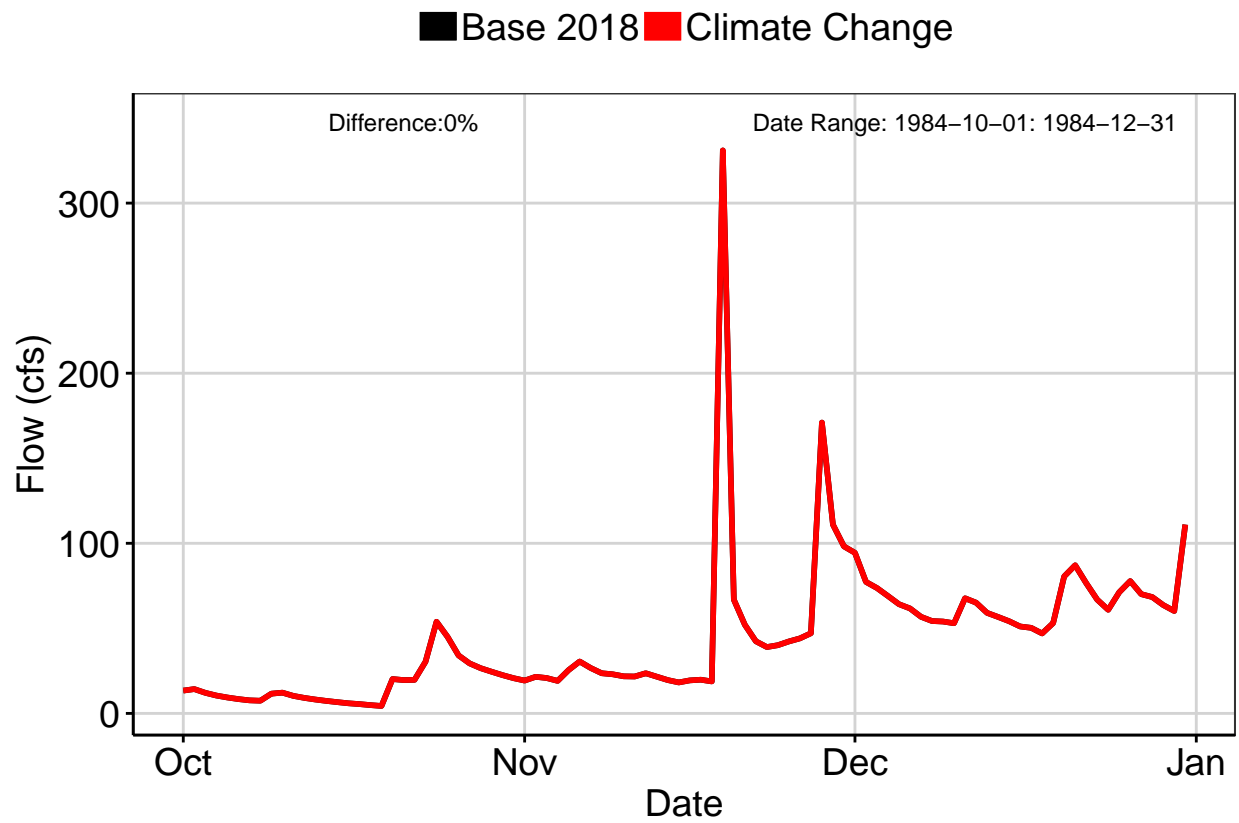


Fig. 7: Second Largest Difference Segment

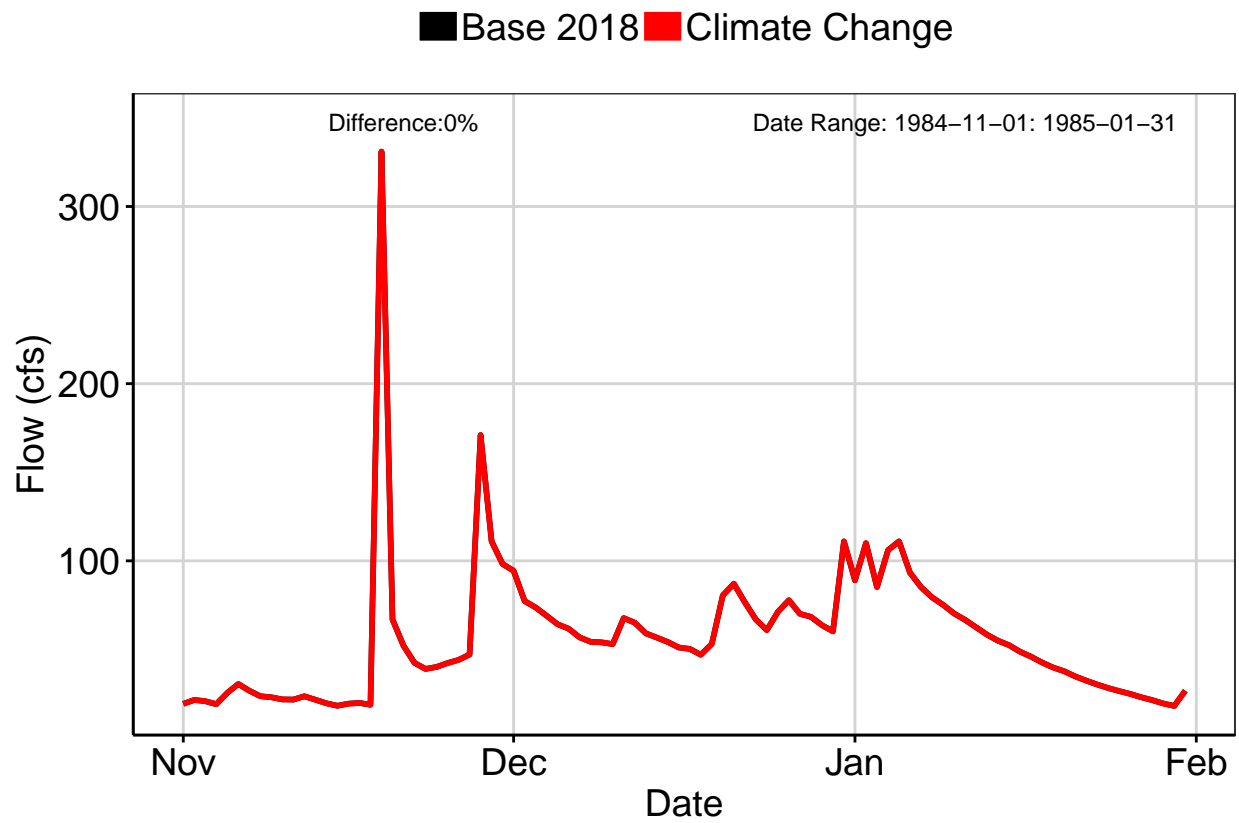


Fig. 8: Third Largest Difference Segment

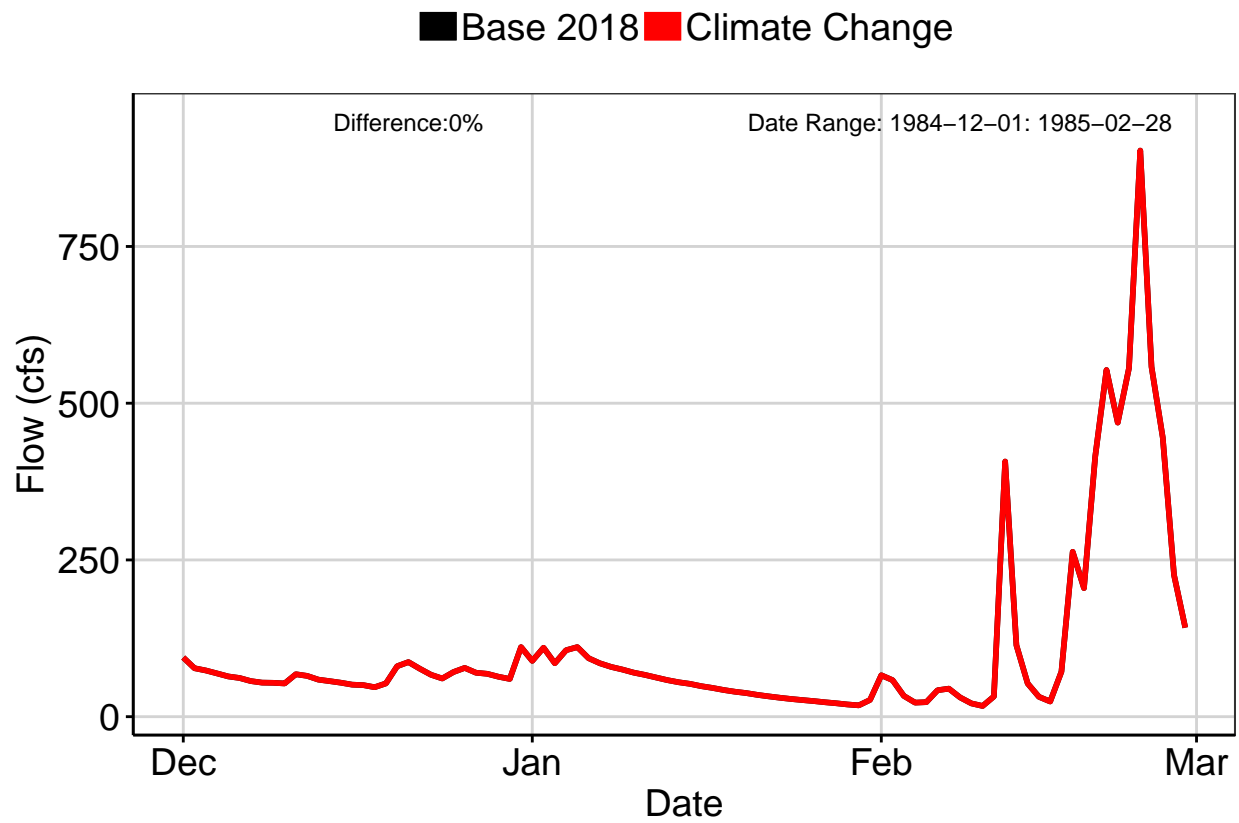


Fig. 9A: Residuals Plot

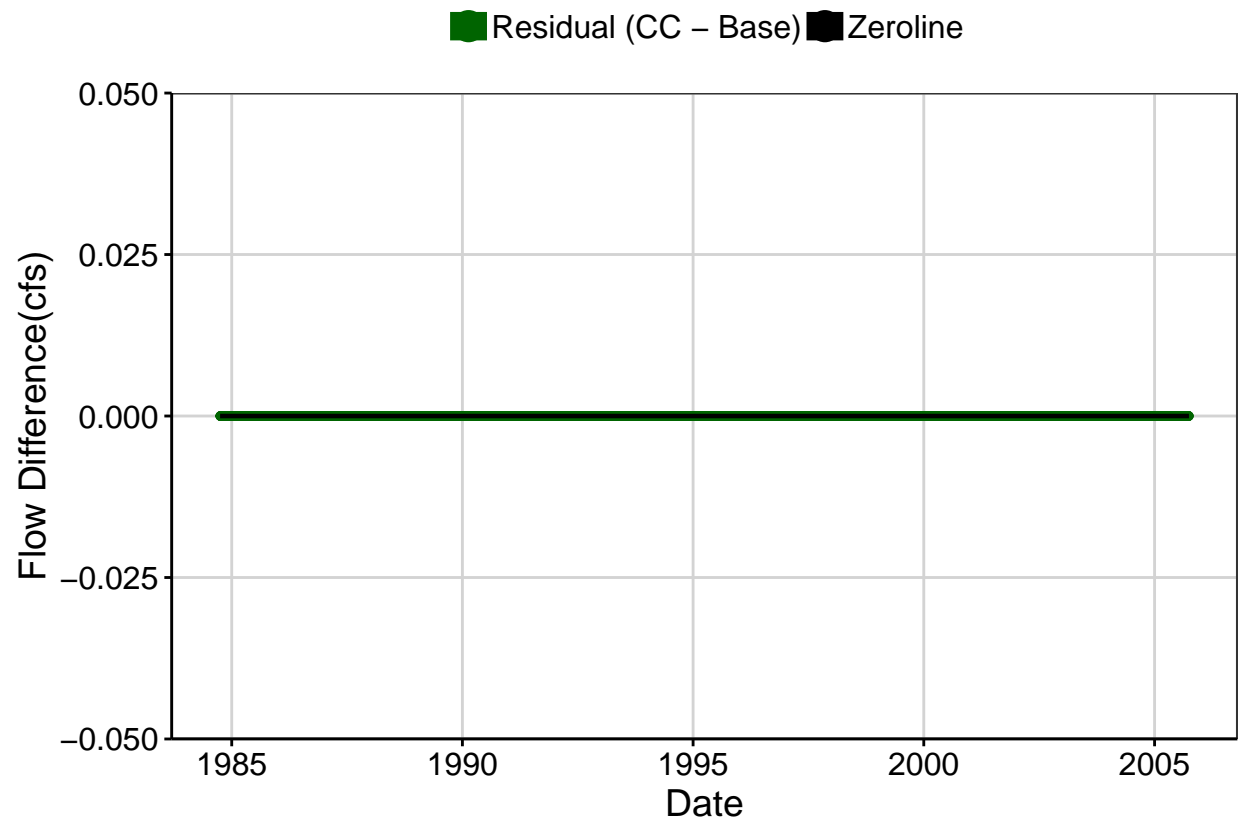


Fig. 9B: Area Weighted Residuals Plot

```
{r, echo=FALSE, warning=FALSE, message=FALSE} # # Setup for
Residuals # data <- all_data[complete.cases(all_data),] # data_weighted
<- data/area # resid <- (data_weighted$`Scenario 2 Flow` -
data_weighted$`Scenario 1 Flow`) # resid <- data.frame(data_weighted$Date,
resid) # # # Residuals plot for hydrograph # # zeroline <-
rep_len(0, length(data_weighted$Date)) # quantresid <- data.frame(signif(
digits=3)) # min <- min(resid$resid) # max <- max(resid$resid)
# names(quantresid) <- c('Percentiles') # # df <- data.frame(as.Date(resid$Date),
resid$resid, zeroline); # colnames(df) <- c('Date', 'Residual',
'Zeroline') # options(scipen=5, width = 1400, height = 950) #
myplot <- ggplot(df, aes(x=Date)) + # geom_point(aes(y=Residual,
color="Residual (CC - Base)", size=1) + # geom_line(aes(y=Zeroline,
color="Zeroline"), size=0.8)+ # scale_y_continuous(limits=c(min,max))+
# theme_bw()+ # theme(legend.position="top", # legend.title=
# legend.box = "horizontal", # legend.background
= element_rect(fill="white", #
linetype="solid", # colour
="white"), # legend.text=element_text(size=12), # axis.title=
colour="black"), # axis.title=element_text(size=14,
colour="black"), # axis.line = element_line(colour
= "black", # size = 0.5,
linetype = "solid"), # axis.ticks = element_line(colour="black")
# panel.grid.major=element_line(colour = "light grey"),
# panel.grid.minor=element_blank()+ # scale_colour_manual(values=c(
green","black"))+ # guides(colour = guide_legend(override.aes
= list(size=5)))+ # labs(y = "Flow Difference(cfs)") # myplot
#
```