SWB_Discharge Estimates

SWB Discharge Baseflow Calculations

```
setwd('C:/Users/Emily/Documents/gnv_streams/SWB_Discharge')
library(tidyverse)
```

```
## -- Attaching packages ---------------------------------------------------------------------------
```

```
## v ggplot2 3.3.2     v purrr   0.3.4
## v tibble  3.0.3     v dplyr   1.0.0
## v tidyr   1.1.0     v stringr 1.4.0
## v readr   1.3.1     v forcats 0.5.0
```

```
## -- Conflicts ------------------------------------------------------------------------------------
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

```
library(tibbletime)
```

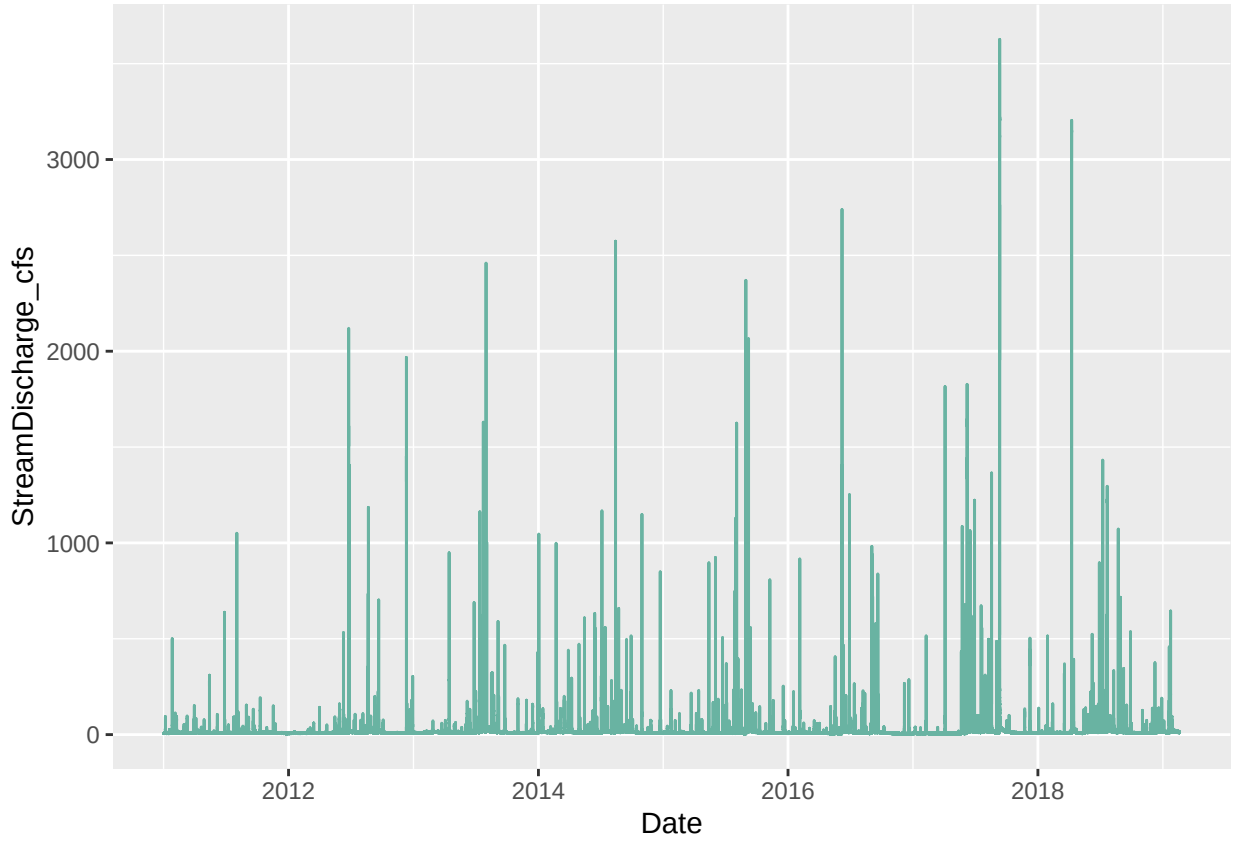
```
##
## Attaching package: 'tibbletime'
```

```
## The following object is masked from 'package:stats':
##
##     filter
```

```
SWB = read_csv('~/gnv_streams/SWB_Discharge/SWB_SJRWMD_2011_2019.csv')
```

```
## Parsed with column specification:
## cols(
##   Date = col_datetime(format = ""),
##   StreamDischarge_cfs = col_double()
## )
```

```
SWB %>%
  ggplot(aes(x = `Date`)) +
  geom_line(aes(y = `StreamDischarge_cfs`), color = "#69b3a2")
```

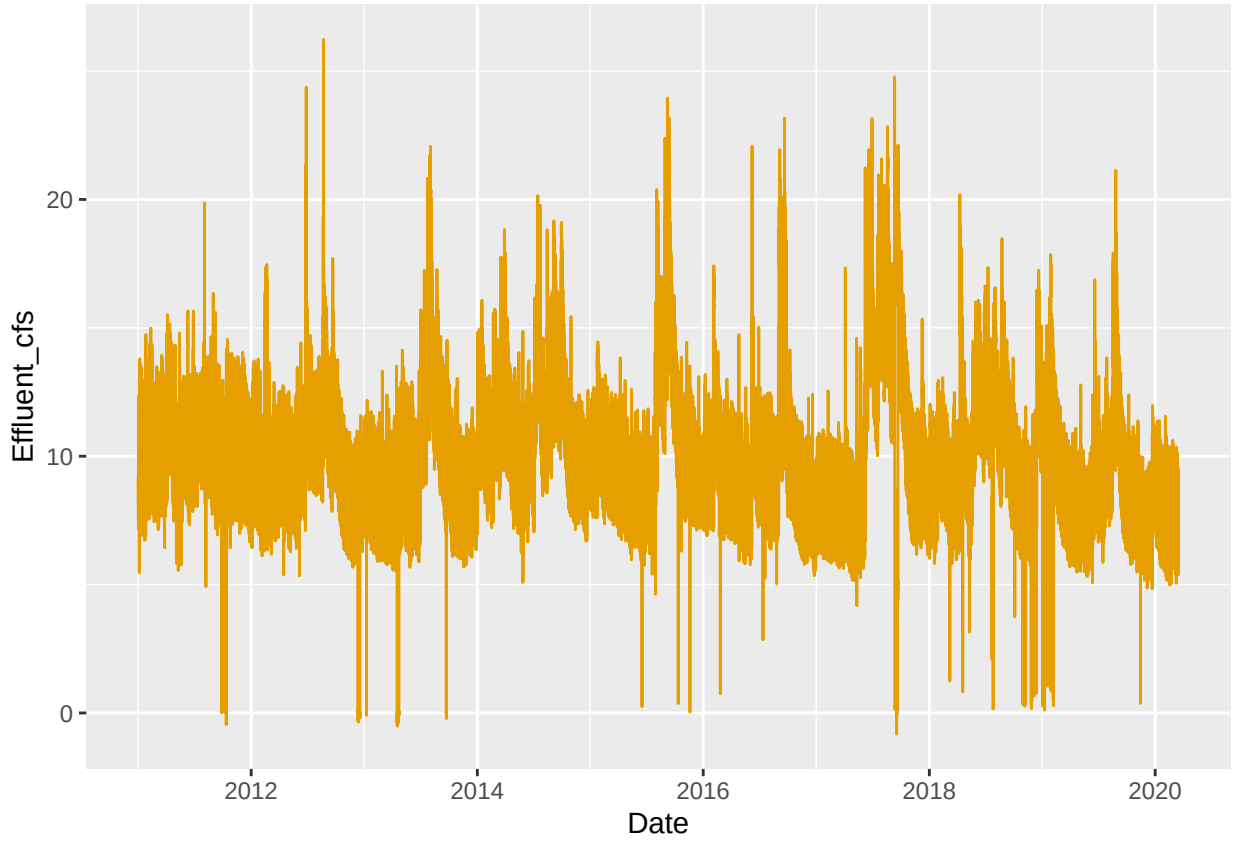



```
WWTP = read_csv('~/gnv_streams/SWB_Discharge/SWB_WWTP_2011_2019.csv')
```

```
## Parsed with column specification:
## cols(
##   Date = col_datetime(format = ""),
##   Effluent_cfs = col_double()
## )
```

```
WWTP %>%
  ggplot(aes(x = `Date`)) +
           geom_line(aes( y = `Effluent_cfs`), color = "#E69F00")
```

```
## Warning: Removed 2 row(s) containing missing values (geom_path).
```




```
SWB = as_tbl_time(SWB, index = Date)
WWTP = as_tbl_time(WWTP, index = Date)

SWB_Hourly = SWB %>%
  mutate(var = StreamDischarge_cfs) %>%
  collapse_by("hourly") %>%
  group_by(Date = lubridate::floor_date(Date, unit = "hour")) %>%
  summarise(mean_discharge = mean(var))
```

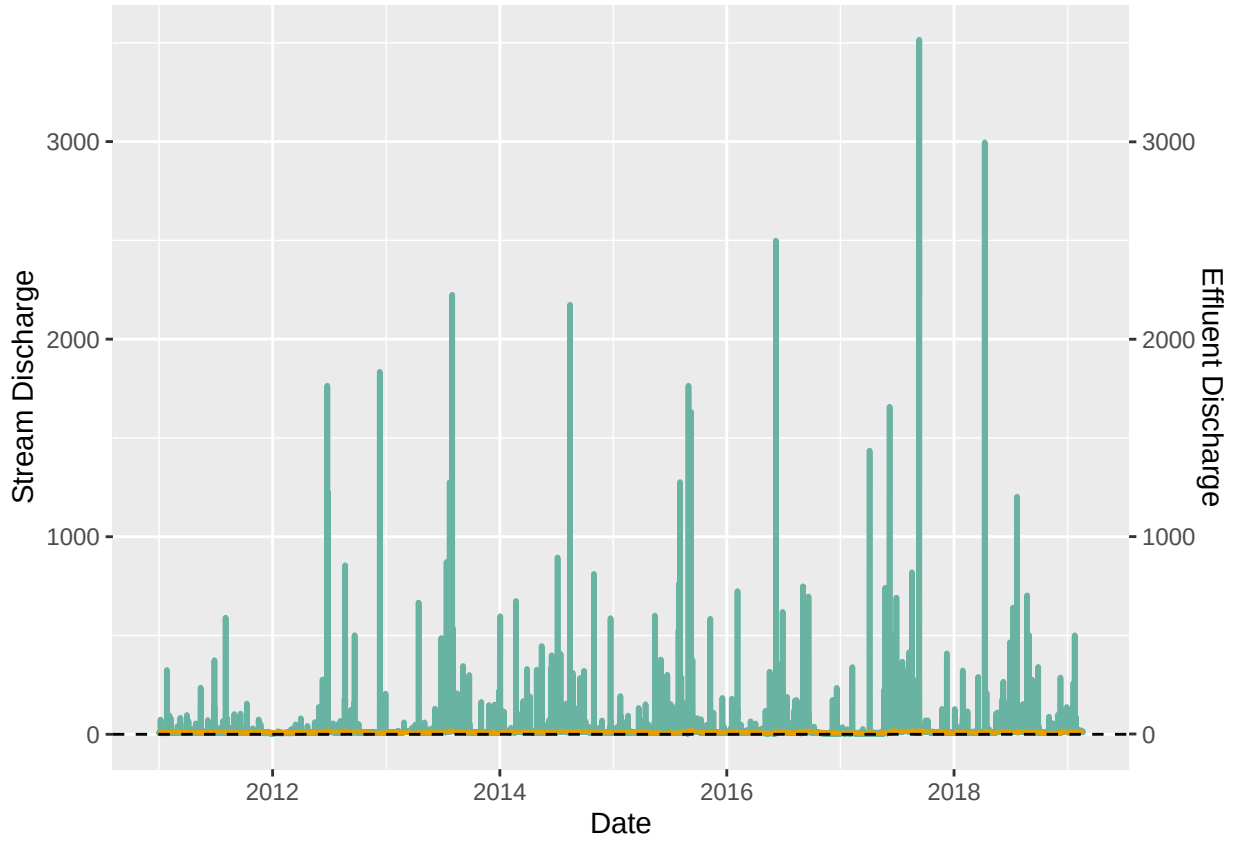
```
## `summarise()` ungrouping output (override with `.groups` argument)
```

```
All_Stns = left_join(SWB_Hourly, WWTP)
```

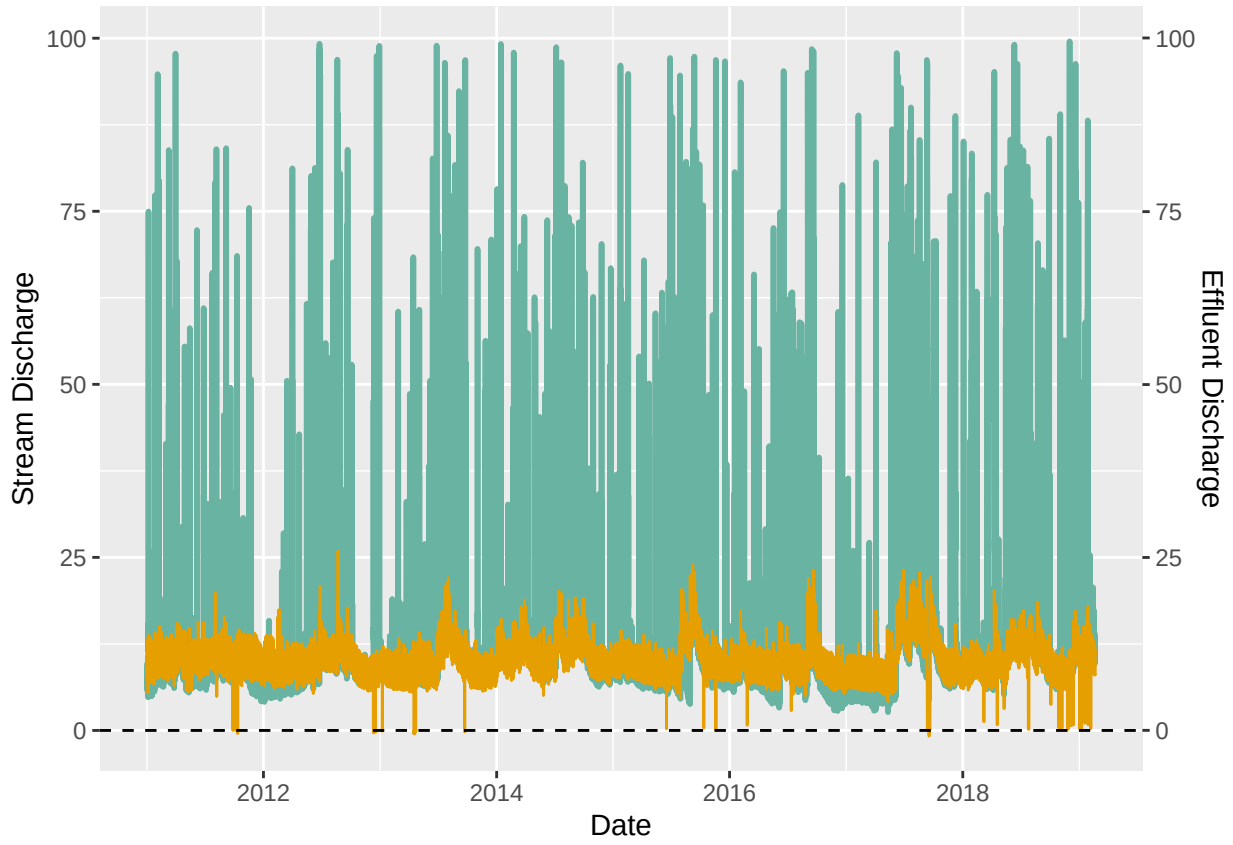
```
## Joining, by = "Date"
```

```
ggplot(All_Stns, aes(x=Date)) +
  geom_line( aes(y = mean_discharge), size = 1, color = "#69b3a2") +
  geom_line( aes(y = Effluent_cfs), size = 0.5, color = "#E69F00") +
  geom_hline(aes(yintercept=0), colour="#000000", linetype="dashed") +
  scale_y_continuous(

    # Features of the first axis
    name = "Stream Discharge",
```

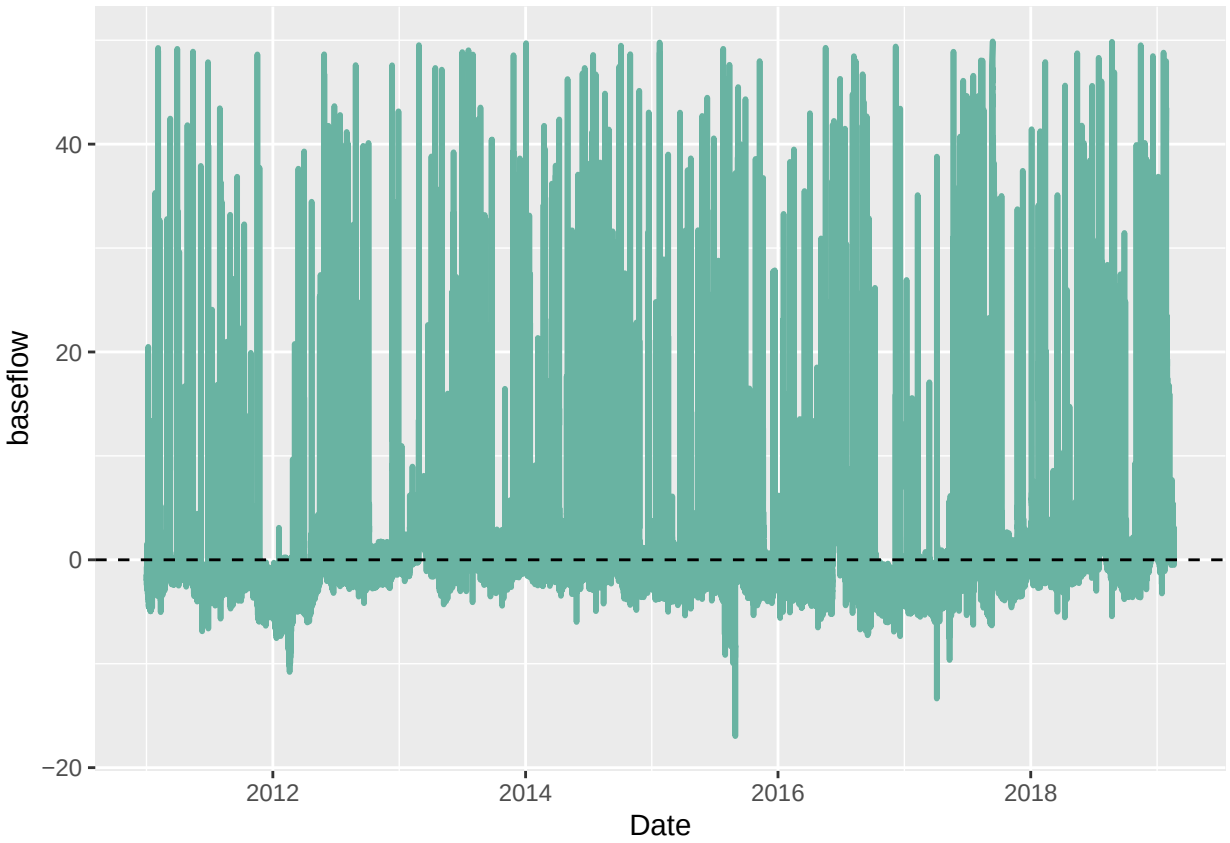
```
    # Add a second axis and specify its features
    sec.axis = sec_axis(~., name="Effluent Discharge")
  )
```




```
All_Stns_low = All_Stns %>%
  filter(mean_discharge <100)


ggplot(All_Stns_low, aes(x=Date)) +
  geom_line( aes(y = mean_discharge), size = 1, color = "#69b3a2") +
  geom_line( aes(y = Effluent_cfs), size = 0.5, color = "#E69F00") +
  geom_hline(aes(yintercept=0), colour="#000000", linetype="dashed") +
  scale_y_continuous(

    # Features of the first axis
    name = "Stream Discharge",

    # Add a second axis and specify its features
    sec.axis = sec_axis(~., name="Effluent Discharge")
  )
```




```
baseflow = All_Stns %>%
  mutate(baseflow = mean_discharge - Effluent_cfs)

base = baseflow %>%
  filter(baseflow <50)

ggplot(base, aes(x = Date)) +
  geom_line(aes (y = baseflow), size = 1, color = "#69b3a2") +
  geom_hline(aes(yintercept=0), colour="#000000", linetype="dashed")
```


baseflow
40
20
0
−20
2012
2014
2016
2018
Date