

# Stream temperatures

Charlotte Wickham

```
library(tidyverse)
library(lubridate)
knitr::opts_chunk$set(fig.height = 3)
```

Explore stream temperatures for the sites:

- GSWS01 Andrews Lookout Creek Gaging Station
- GSMACK Andrews Mack Creek Gaging Station
- GSWS01 Andrews Watershed 1 Gaging Station

*This is where we finished last time*

## Functions

```
# Calculate useful data coverage summaries
coverage_summary <- function(data){
  data %>%
  summarise(
    n_obs = n(),
    n_days = n_distinct(date),
    n_missing = sum(is.na(watertemp_mean_day))
  )
}

# Plot watertemp_day time series
plot_temperature <- function(data){
  title <- data$sitecode[1]
  data %>%
  ggplot(aes(date, watertemp_mean_day)) +
  geom_line(aes(color = watertemp_method)) +
  scale_color_brewer("Method", palette = "Set2") +
  labs(x = "", y = "Water temperature (C)",
       title = title)
}
```

## Data Import

```
streams <- read_csv("data/HT00441_v8.csv")
names(streams) <- tolower(names(streams))
```

Filter to time period of interest, and set observations with anything other than “Accepted” quality to missing:

```
streams <- streams %>%
  filter(year(date) > 2000, year(date) < 2020) %>%
  mutate(
    watertemp_mean_day = ifelse(watertemp_mean_flag != "A",
      NA, watertemp_mean_day) %>%
  select(sitecode, date, watertemp_mean_day, watertemp_method)
```

## GSLOOK

Get site data:

```
gslook <- streams %>%
  filter(sitecode == "GSLOOK")
```

Checks on data quality/coverage:

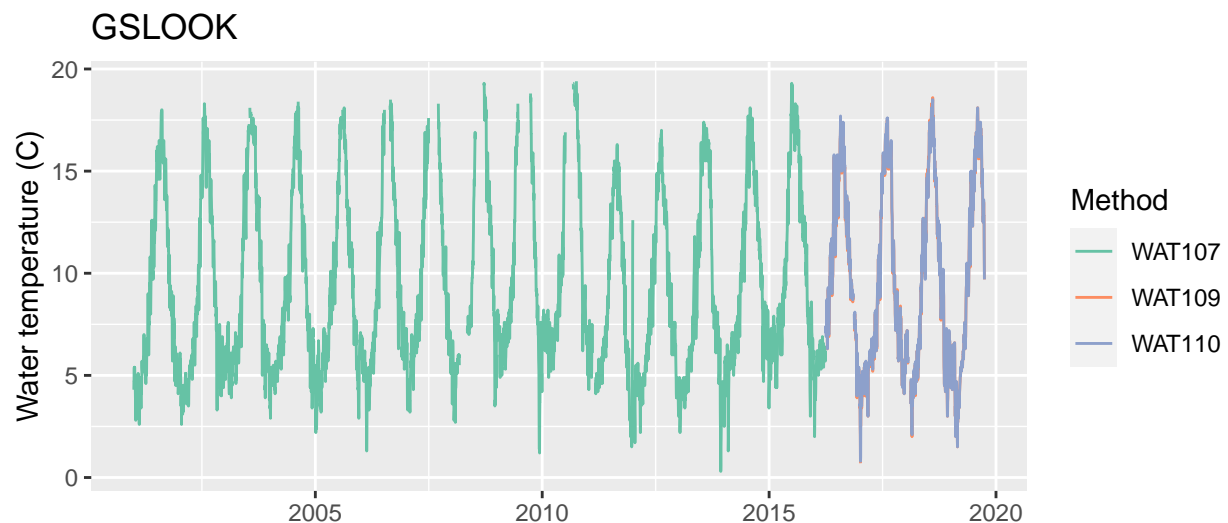
```
gslook %>% coverage_summary()
```

```
## # A tibble: 1 x 3
##   n_obs n_days n_missing
##   <int> <int>    <int>
## 1   8120   6841       543
```

Plot site stream temperature over time:

```
gslook %>% plot_temperature()
```

```
## Warning: Removed 5 row(s) containing missing values (geom_path).
```



## GSMACK

Get site data:

```
gsmack <- streams %>%  
  filter(sitecode == "GSMACK")
```

Checks on data quality/coverage:

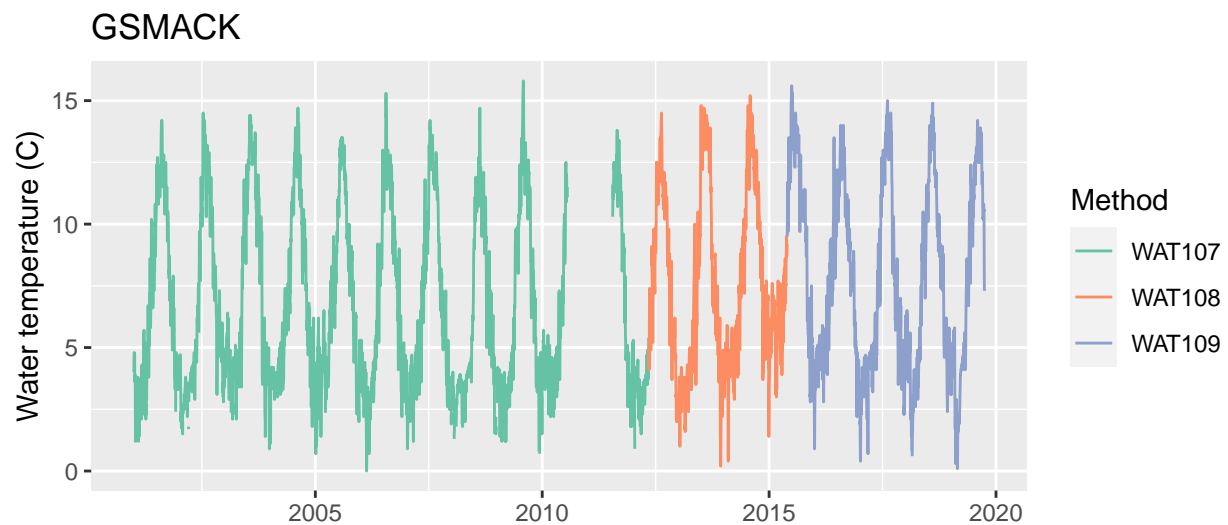
```
gsmack %>% coverage_summary()
```

```
## # A tibble: 1 x 3  
##   n_obs n_days n_missing  
##   <int> <int>   <int>  
## 1  6847  6847     428
```

Plot site stream temperature over time:

```
gsmack %>% plot_temperature()
```

```
## Warning: Removed 1 row(s) containing missing values (geom_path).
```



## GSWS01

Get site data:

```
gsws01 <- streams %>%  
  filter(sitecode == "GSWS01")
```

Checks on data quality/coverage:

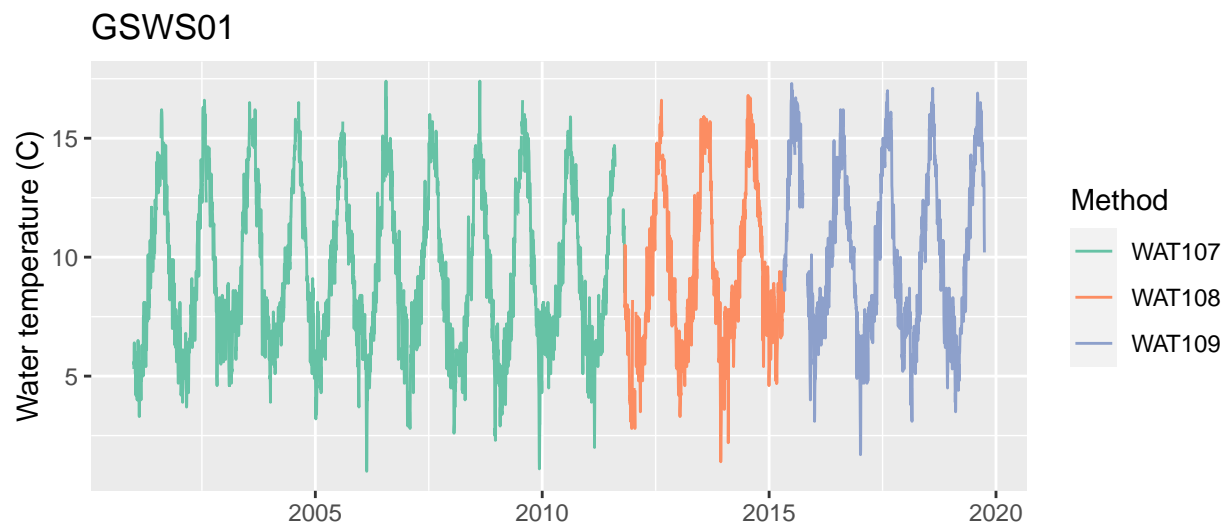
```
gsws01 %>% coverage_summary()
```

```
## # A tibble: 1 x 3
##   n_obs n_days n_missing
##   <int> <int>   <int>
## 1  6847  6847     223
```

Plot site stream temperature over time:

```
gsws01 %>% plot_temperature()
```

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



```
streams %>%
  nest_by(sitecode)
```

```
## # A tibble: 12 x 2
## # Rowwise:   sitecode
##   sitecode      data
##   <chr>    <list<tbl_df[,3]>>
## 1 GSLOOK      [8,120 x 3]
## 2 GSMACK      [6,847 x 3]
## 3 GSWS01      [6,847 x 3]
## 4 GSWS02      [6,847 x 3]
## 5 GSWS03      [6,847 x 3]
## 6 GSWS06      [6,847 x 3]
## 7 GSWS07      [6,847 x 3]
## 8 GSWS08      [6,847 x 3]
## 9 GSWS10      [6,847 x 3]
## 10 TSLOMA     [11,976 x 3]
## 11 TSLOOK     [5,989 x 3]
## 12 TSMCRA     [5,427 x 3]
```