Stream temperatures

Charlotte Wickham

```r
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

```r
# 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))
  )
}
```

```r
# Plot watertemp_day time series
plot_temperature <- function(data, title){
  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

```r
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:

```r
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:

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

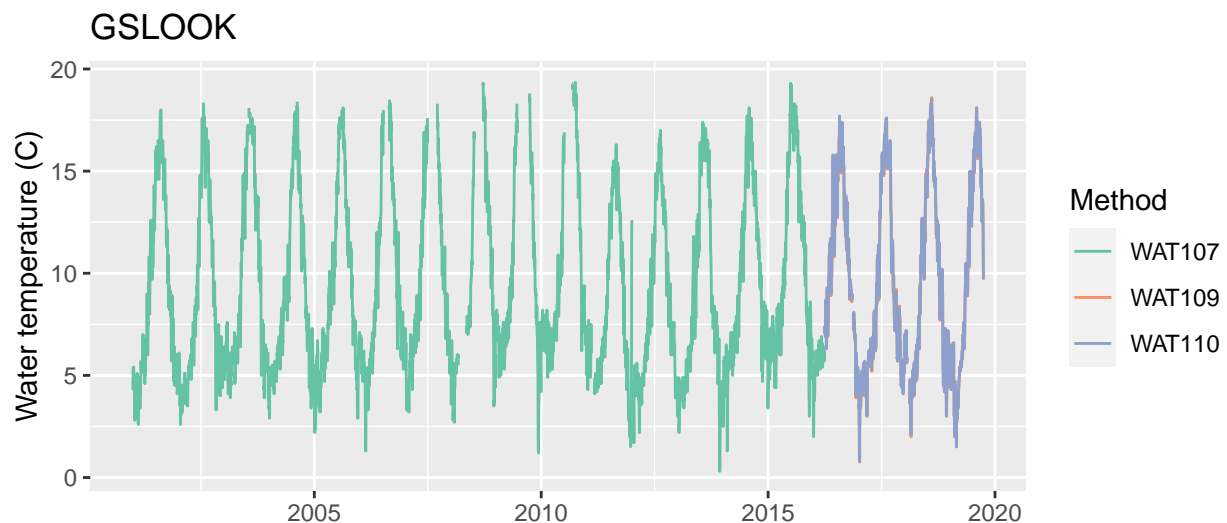Checks on data quality/coverage:

```r
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:

```r
gslook %>% plot_temperature("GSLOOK")
```

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

GSMACK

Get site data:

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

Checks on data quality/coverage:
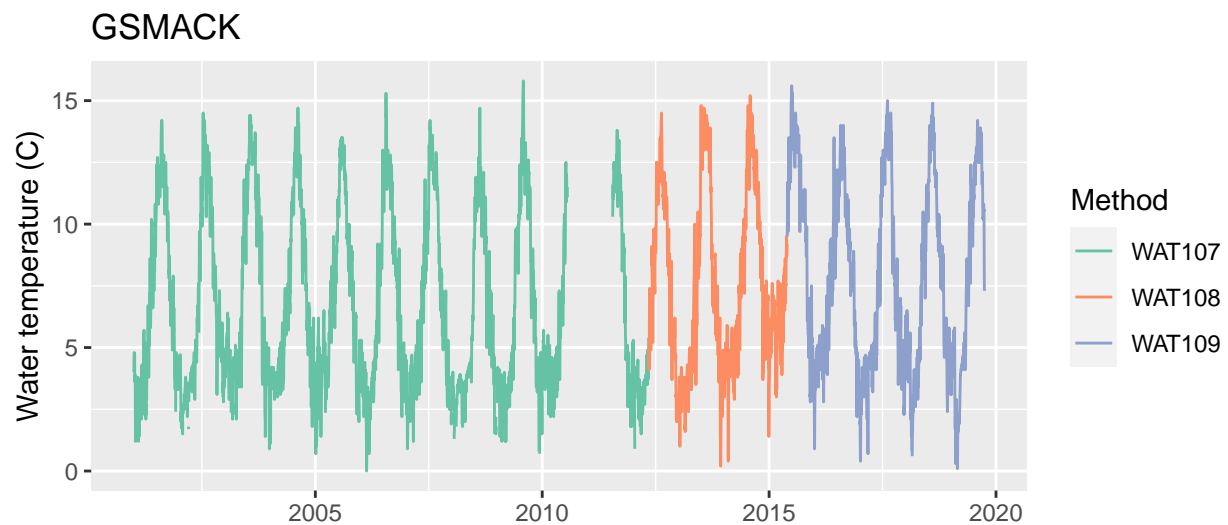
```
gsmack %>% coverage_summary()
```

```
## # 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("GSMACK")
```

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


GSWS01

Get site data:

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

Checks on data quality/coverage:
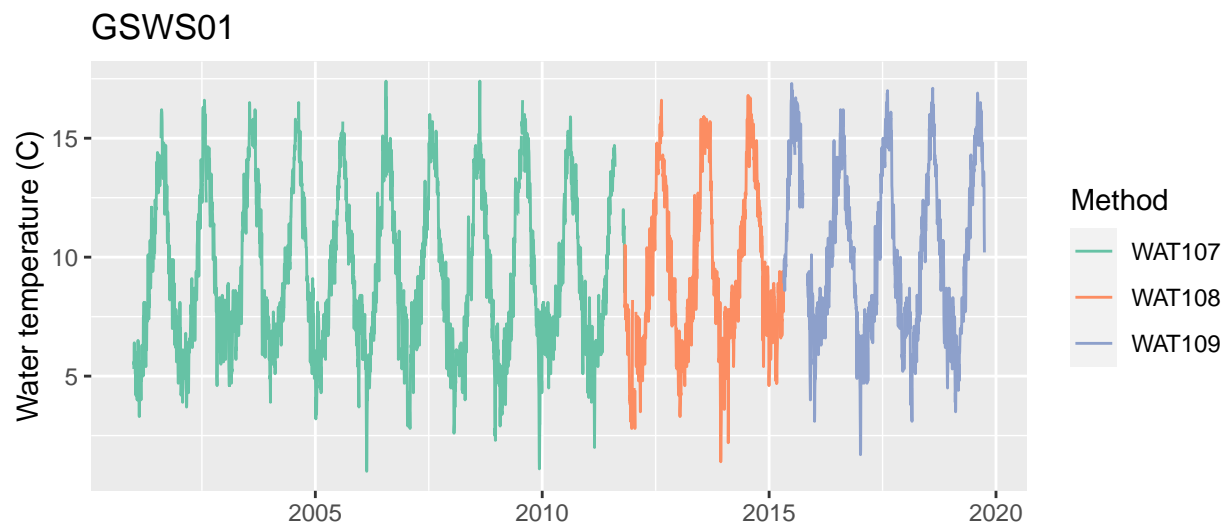
```
gsws01 %>% coverage_summary()
```

```
## # 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("GSWS01")
```

```
## 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]
```