Winter chilling
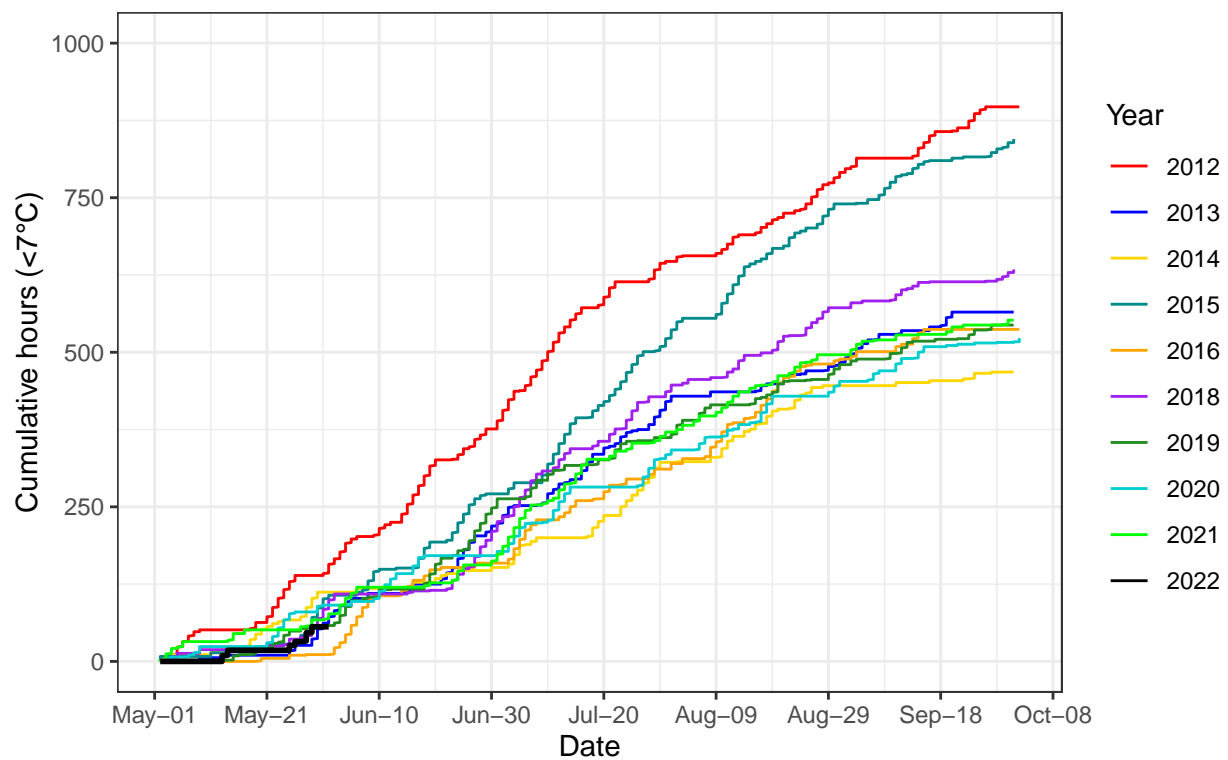
Patrick Snelgar

02 June 2022

```
## Warning: `guides(<scale> = FALSE)` is deprecated. Please use `guides(<scale> =
## "none")` instead.
```
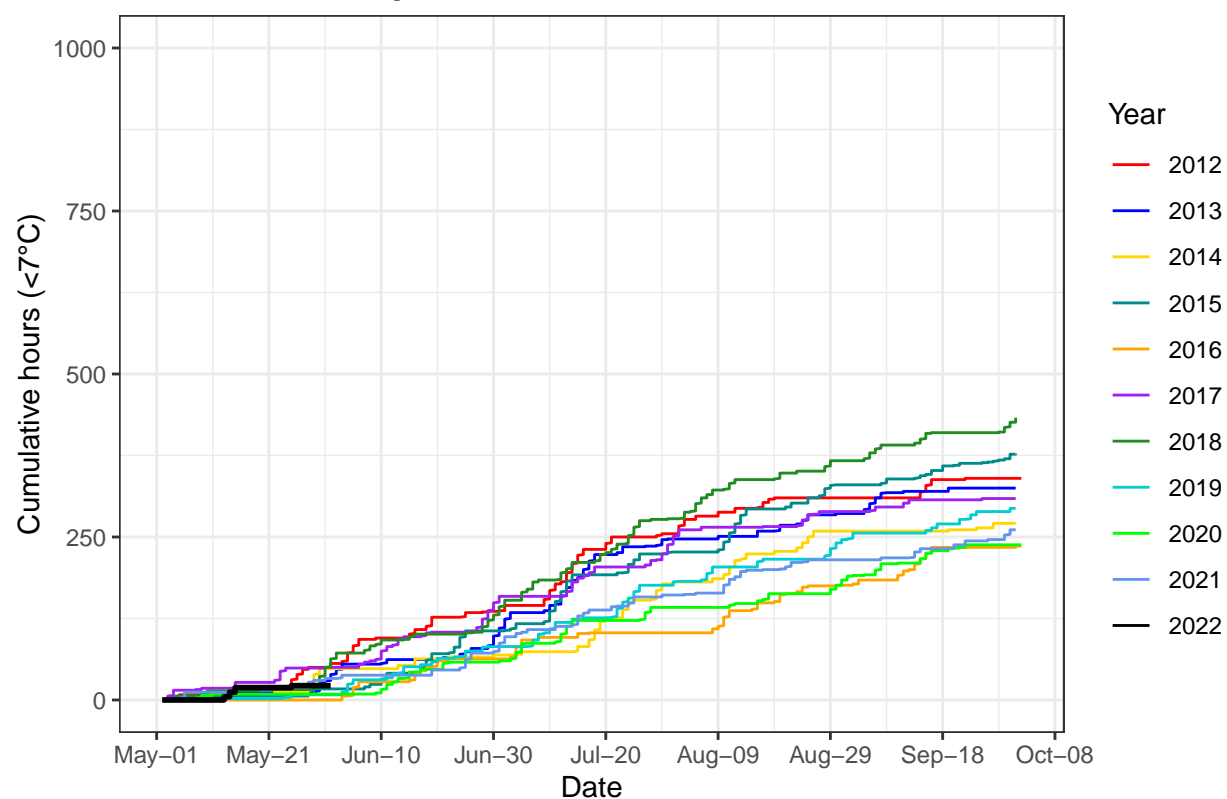
Cumulative chilling hours – Te Puke 2022

2017 is excluded due to sensor error
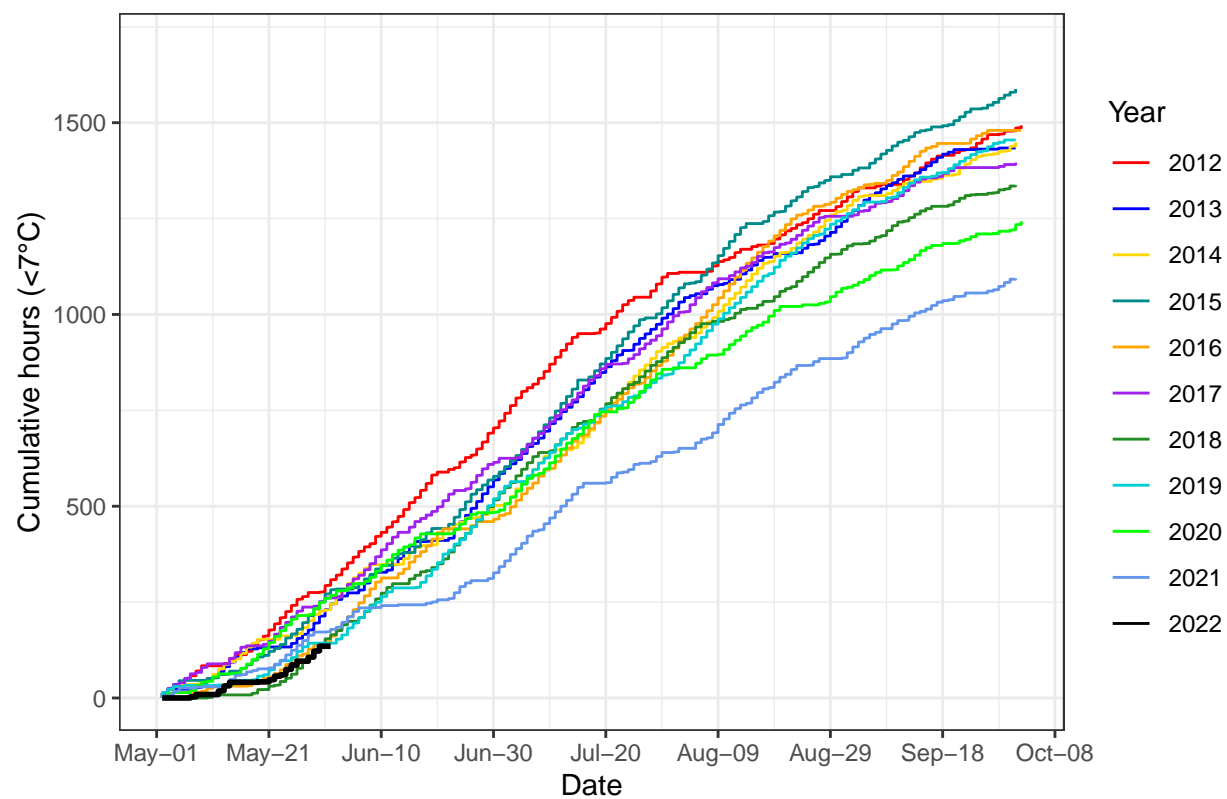
```
## Warning: `guides(<scale> = FALSE)` is deprecated. Please use `guides(<scale> =
## "none")` instead.
```
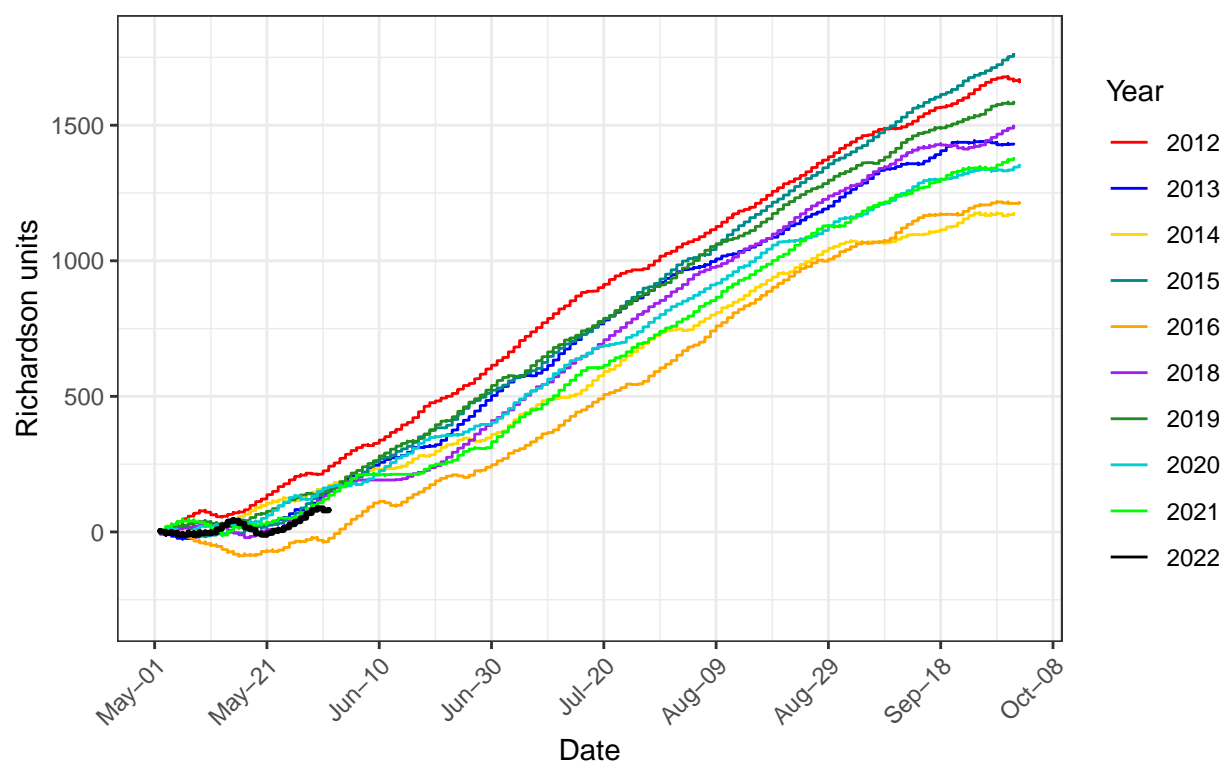
Cumulative chilling hours – Kerikeri 2022


```
## Warning: `guides(<scale> = FALSE)` is deprecated. Please use `guides(<scale> =
## "none")` instead.
```

Cumulative chilling hours – Riwaka 2022

```
## Warning: `guides(<scale> = FALSE)` is deprecated. Please use `guides(<scale> =
## "none")` instead.
```
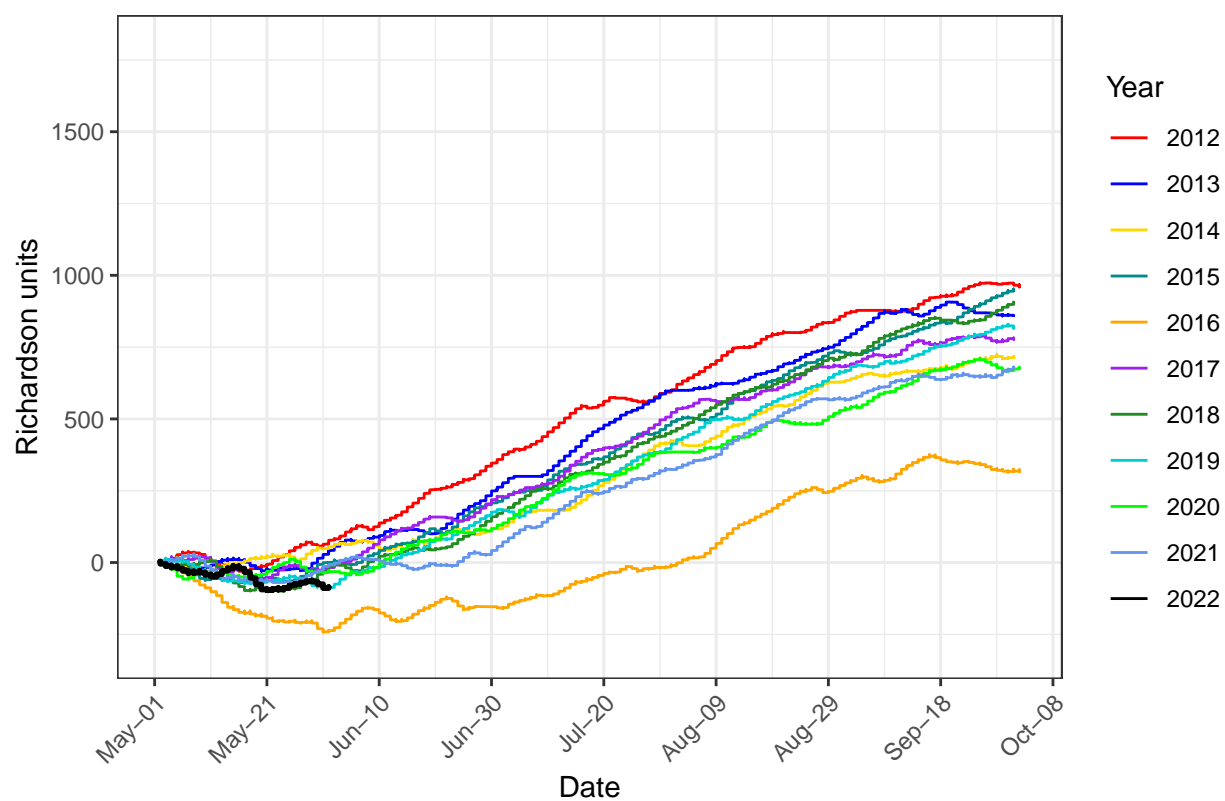
Cumulative Richardson chill units – Te Puke 2022

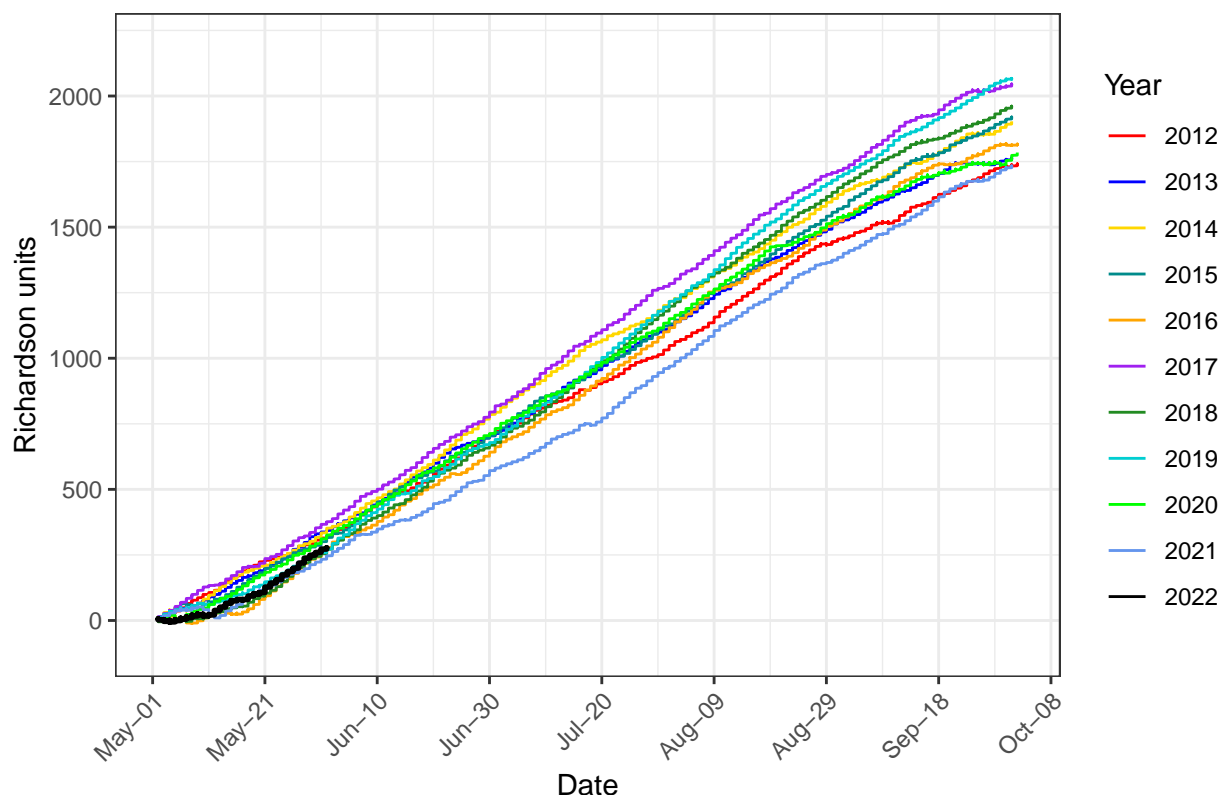2017 is excluded due to sensor error

```
## Warning: `guides(<scale> = FALSE)` is deprecated. Please use `guides(<scale> =
## "none")` instead.
```

Cumulative Richardson chill units – Kerikeri 2022


```
## Warning: `guides(<scale> = FALSE)` is deprecated. Please use `guides(<scale> =
## "none")` instead.
```

Cumulative Richardson chill units – Riwaka 2022


```
# Have to exclude 2017 data for TPK due to sensor error
historical <-
    by_site %>%
    mutate(doy = yday(StopDate)) %>%
    filter(StationID %in% c("TPK", "KER", "RIR")
           & year(StopDate) > current_year - 5
           & !(StationID == "TPK" & year(StopDate) == 2017)
           & doy >= 121 & doy <= 273
           & year(StopDate) != current_year) %>%
    group_by(StationID, year(StopDate)) %>%
    mutate(chilling_hours = cumsum(IsBelowSevenC))

# any missing data?
historical %>%
    summarise(d = c(NA, diff(yday(StopDate))), date = StopDate) %>%
    filter(d > 1)
```

```
## `summarise()` has grouped output by 'StationID', 'year(StopDate)'. You can
## override using the `.groups` argument.
```

```
## # A tibble: 0 x 4
## # Groups:   StationID, year(StopDate) [0]
## # ... with 4 variables: StationID <chr>, year(StopDate) <dbl>, d <dbl>,
## #   date <dttm>
```
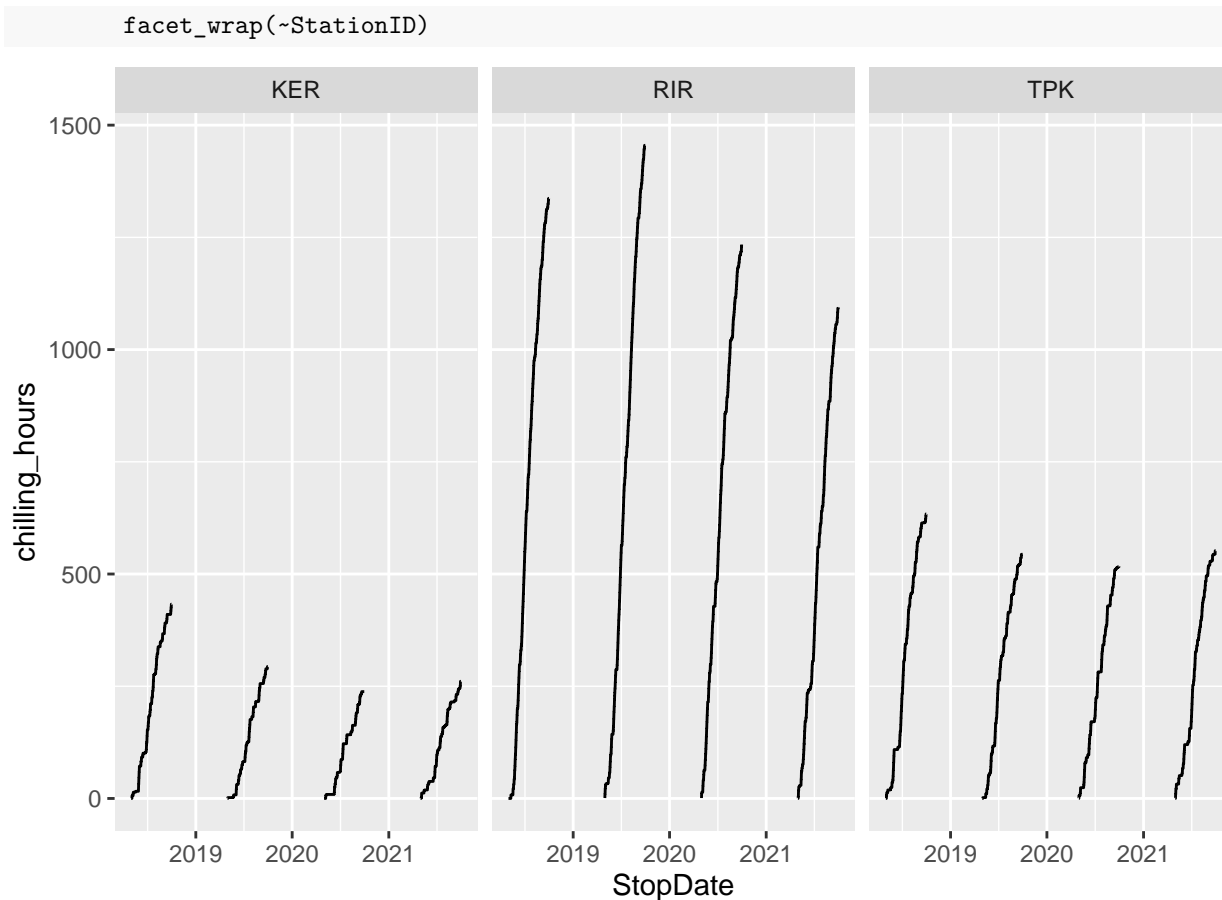
```
historical %>%
    ggplot() +
        geom_line(aes(StopDate, chilling_hours, group = year(StopDate))) +
```

```
facet_wrap(~StationID)
```



```
five_year_chill <-
    historical %>%
    group_by(StationID, Year, doy) %>%
    arrange(doy) %>%
    summarise(day_chill = max(chilling_hours, na.rm = TRUE)) %>%
    group_by(StationID, doy) %>%
    summarise(historical_chill_hours = mean(day_chill))
```

```
## `summarise()` has grouped output by 'StationID', 'Year'. You can override using
## the `.groups` argument.
## `summarise()` has grouped output by 'StationID'. You can override using the
## `.groups` argument.
```

```
# five_year_chill %>%
#   ggplot() +
#       geom_line(aes(doy, chill_hours, colour = StationID)) +
#       scale_x_continuous(breaks = pretty_breaks(30))

historical_ticks <-
    as.Date(seq(min(five_year_chill$doy) - 1, max(five_year_chill$doy), by = 7,)), origin = "2021-01-01")

chill_colours <- brewer_pal("qual", 7, 1)(7)

by_site %>%
    filter(StationID %in% c("TPK", "KER", "RIR"))
```

```
                & Year == current_year
                & DayOfYear >= 121 & DayOfYear <= 273) %>%
    ggplot() +
        geom_line(aes(DayOfYear, ChillingHoursCumulative, colour = StationID)) +
        geom_line(aes(doy, historical_chill_hours, colour = "5 year mean"), data = five_year_chill) +
        facet_wrap(~StationID, labeller = labeller(StationID = c("KER" = "Kerikeri", "RIR" = "Riwaka",
        scale_y_continuous(breaks = pretty_breaks(20)) +
        scale_x_continuous(breaks = yday(historical_ticks), labels = format(historical_ticks, "%b-%d"))
        scale_colour_manual(values = c("5 year mean" = "black", "TPK" = chill_colours[5], "KER" = chill
                            labels = c("KER" = "Kerikeri", "RIR" = "Riwaka", "TPK" = "Te Puke")) +
        labs(colour = "Site", x = "Date", y = "Cumulative chilling hours (< 7°C)") +
        ggtitle(paste("Cumulative chilling hours -", current_year)) +
        theme_bw() +
        theme(axis.text.x = element_text(angle = 45, hjust = 1, vjust = 1))
```

Cumulative chilling hours – 2022
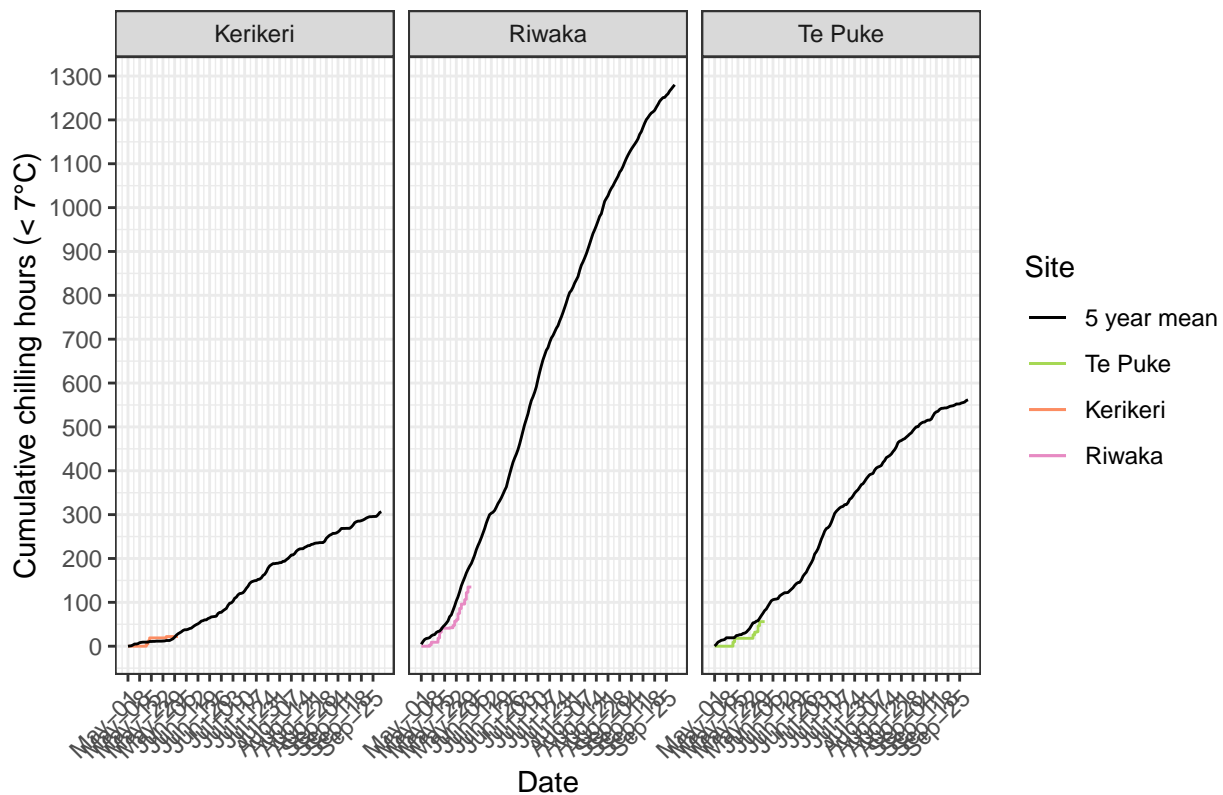

```
ggsave(here(paste0("output/Three sites vs 5 year mean - ", current_year, ".png")), width = 14, height =
```