

CBLSWaterTables_WQ_Tracking

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Set Up

```
#Load libraries and data files
```

```
# load packages
library(ggplot2)
library(cowplot)
library(dplyr)
library(reshape2)
library(ggpubr)
library(lubridate)
library(here)
```

```
here
```

```
## function (...)
## {
##   .root_env$root$f(...)
## }
## <bytecode: 0x7ff85a3d8800>
## <environment: namespace:here>
```

```
# load data
dat <- read.csv("../data/CBLS_watertables_waterquality_tracking.csv")
```

```
dat$date <- as.factor(dat$date)
```

```
#format date using lubridate package
dat$date <- mdy(dat$date)
```

```
#Summarize
```

```
#temp data across date summarized
dat.grouped <- dat %>%
  group_by(date, tank, WQ.type) %>% #tells to group by treatment
  summarise(mean=mean(measurement), se=sd(measurement)/sqrt(n())) #calculates mean and se
dat.grouped
```

```
## # A tibble: 99 x 5
## # Groups:   date, tank [32]
##   date      tank      WQ.type mean    se
##   <date>    <chr>    <chr>  <dbl>  <dbl>
## 1 2022-01-17 blue tank 1 light    60.6  3.36
## 2 2022-01-17 blue tank 1 sal.psu  36.6  0.0250
```

```
## 3 2022-01-17 blue tank 1 temp      25.9  0
## 4 2022-01-17 blue tank 2 light     60.1  3.70
## 5 2022-01-17 blue tank 2 sal.psu   36.5  0.00500
## 6 2022-01-17 blue tank 2 temp      25.9  0.0200
## 7 2022-01-17 quarantine light      81.5  4.99
## 8 2022-01-17 quarantine sal.psu    34.1 NA
## 9 2022-01-17 quarantine temp       23.9 NA
## 10 2022-01-18 blue tank 1 light     64.6  3.63
## # ... with 89 more rows
```

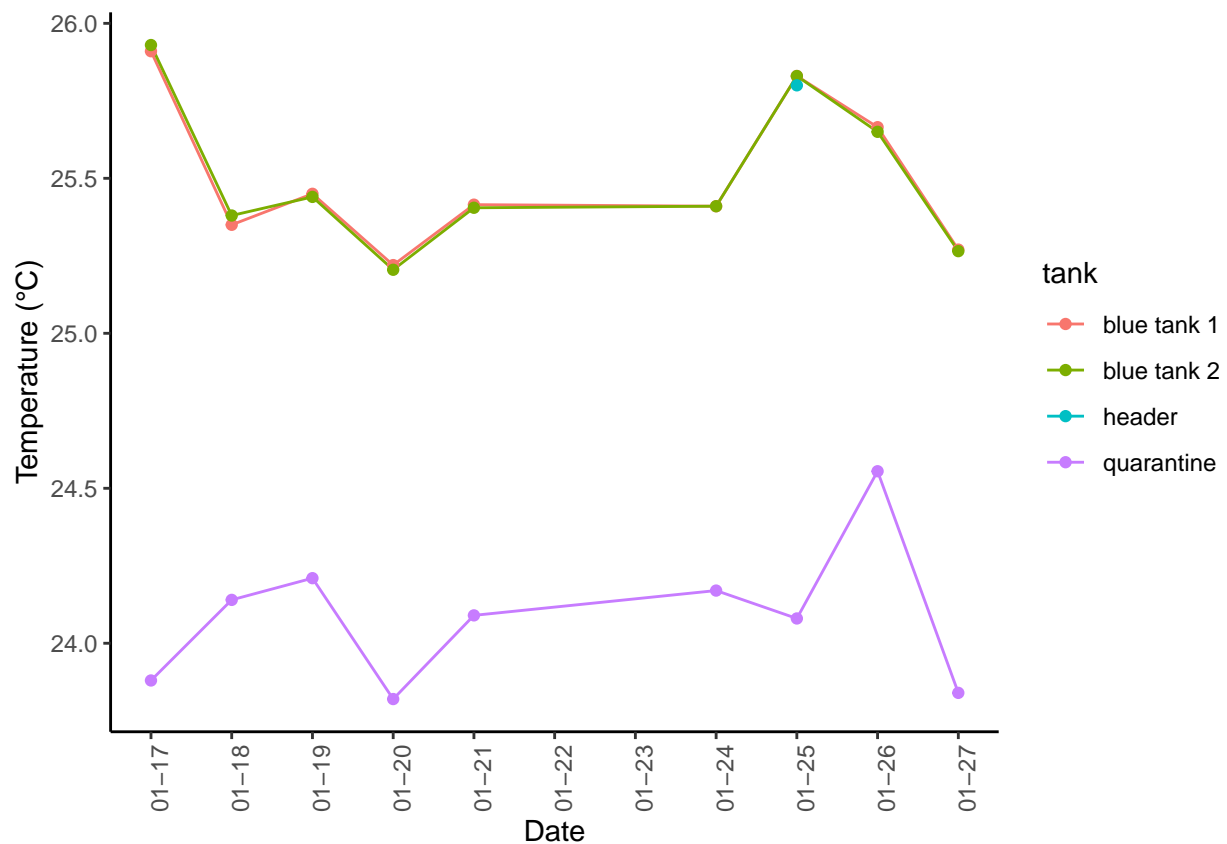
```
#Temperature plot
```

```
#filter for just temp data
```

```
temp.dat <- filter(dat.grouped, WQ.type == "temp")
```

```
#plot mean temp per day by date
```

```
temp_plot <- temp.dat %>%
  ggplot(aes(x=date, y=mean, color = tank))+
  geom_line() +
  geom_point() +
  scale_x_date(date_breaks = "1 day", date_labels = "%m-%d") +
  theme_classic()+
  theme(axis.text.x = element_text(angle = 90)) +
  ylab("Temperature (°C)")+
  xlab("Date");temp_plot
```



```
ggsave(filename="../figures/temperature.plot.pdf", plot=temp_plot, width=10, height=5, units="in")
```

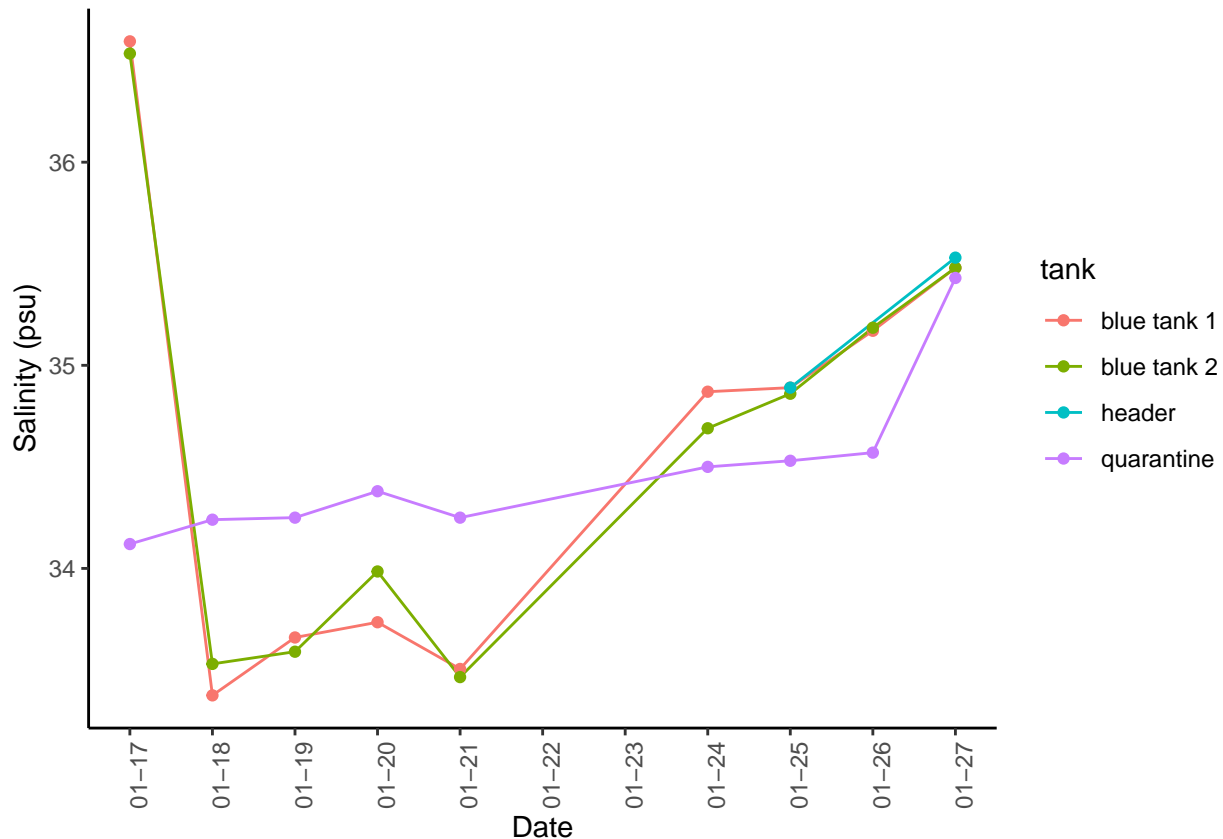
```
#Salinity plot
```

```
#filter for just temp data
```

```
sal.dat <- filter(dat.grouped, WQ.type == "sal.psu")
```

```
#plot mean temp per day by date
```

```
sal_plot <- sal.dat %>%
  ggplot(aes(x=date, y=mean, color = tank))+
  geom_line() +
  geom_point() +
  scale_x_date(date_breaks = "1 day", date_labels = "%m-%d") +
  theme_classic()+
  theme(axis.text.x = element_text(angle = 90)) +
  ylab("Salinity (psu)")+
  xlab("Date");sal_plot
```



```
ggsave(filename="../figures/salinity.plot.pdf", plot=sal_plot, width=10, height=5, units="in")
```

```
#Light plot
```

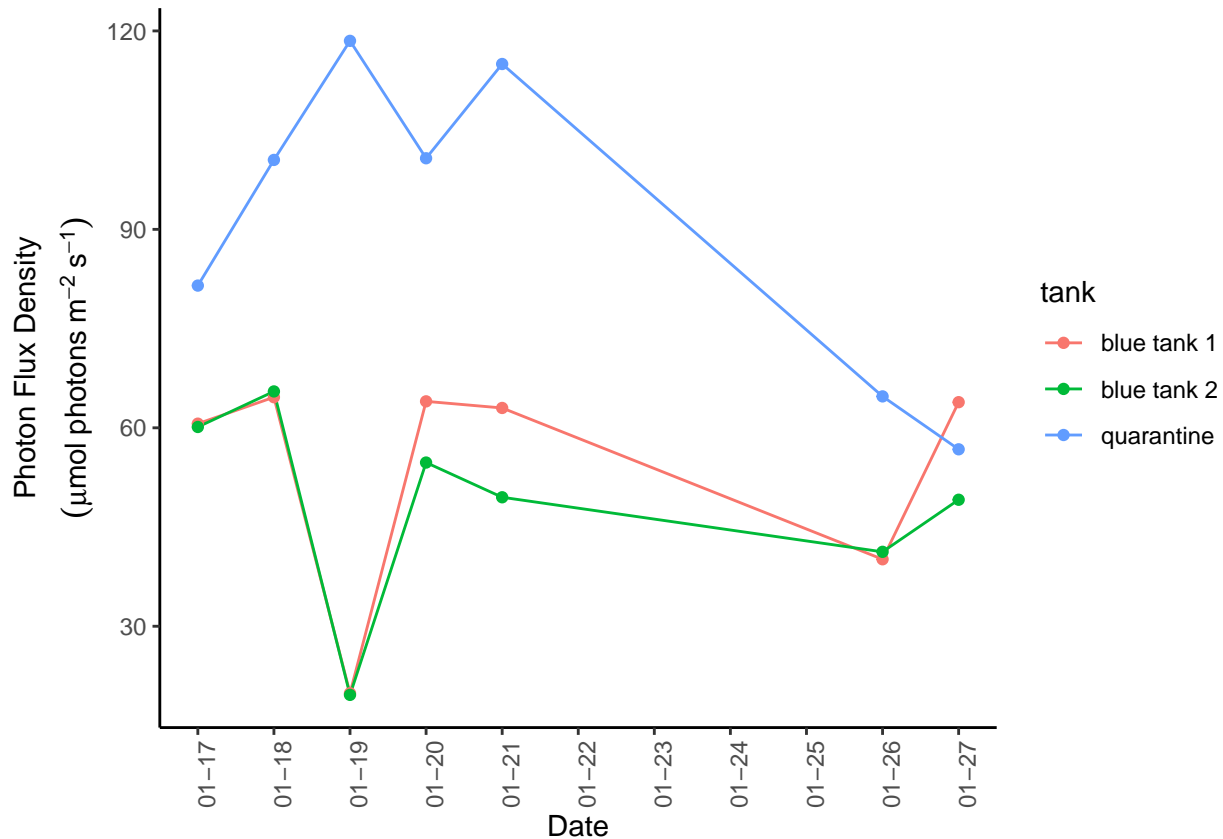
```
#filter for just temp data
```

```
light.dat <- filter(dat.grouped, WQ.type == "light")
```

```

#plot mean temp per day by date
light_plot <- light.dat %>%
  ggplot(aes(x=date, y=mean, color = tank))+
  geom_line() +
  geom_point() +
  scale_x_date(date_breaks = "1 day", date_labels = "%m-%d") +
  theme_classic()+
  theme(axis.text.x = element_text(angle = 90)) +
  ylab(expression(atop("Photon Flux Density", (mu*mol~photons~m^{-2}~s^{-1})))) +
  xlab("Date");light_plot

```



```

ggsave(filename="../figures/light.plot.pdf", plot=light_plot, width=10, height=5, units="in")

```

Total alkalinity plot

```

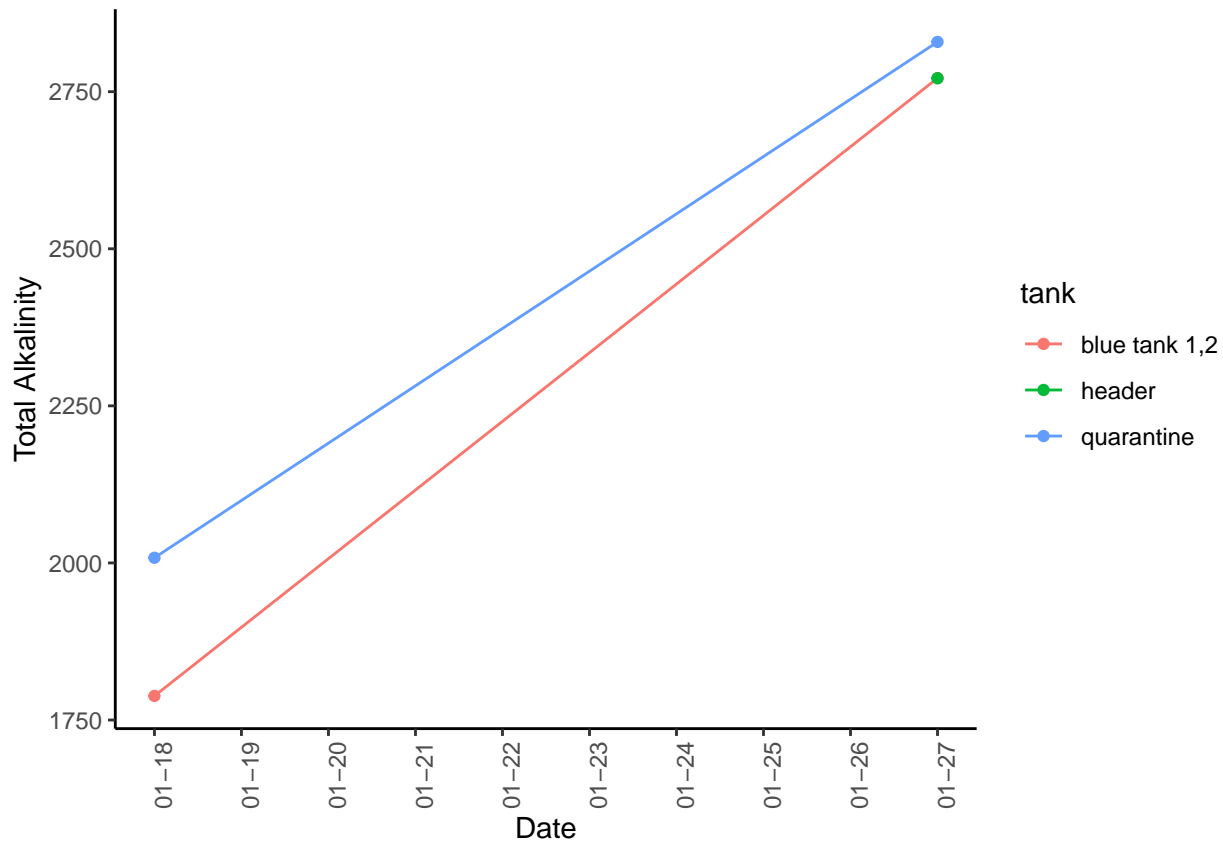
#filter for just temp data

TA.dat <- filter(dat.grouped, WQ.type == "TA")

#plot mean temp per day by date
TA_plot <- TA.dat %>%
  ggplot(aes(x=date, y=mean, color = tank))+
  geom_line() +

```

```
geom_point() +
scale_x_date(date_breaks = "1 day", date_labels = "%m-%d") +
theme_classic()+
theme(axis.text.x = element_text(angle = 90)) +
ylab("Total Alkalinity") +
xlab("Date");TA_plot
```



```
ggsave(filename="../figures/TA.plot.pdf", plot=TA_plot, width=10, height=5, units="in")
```

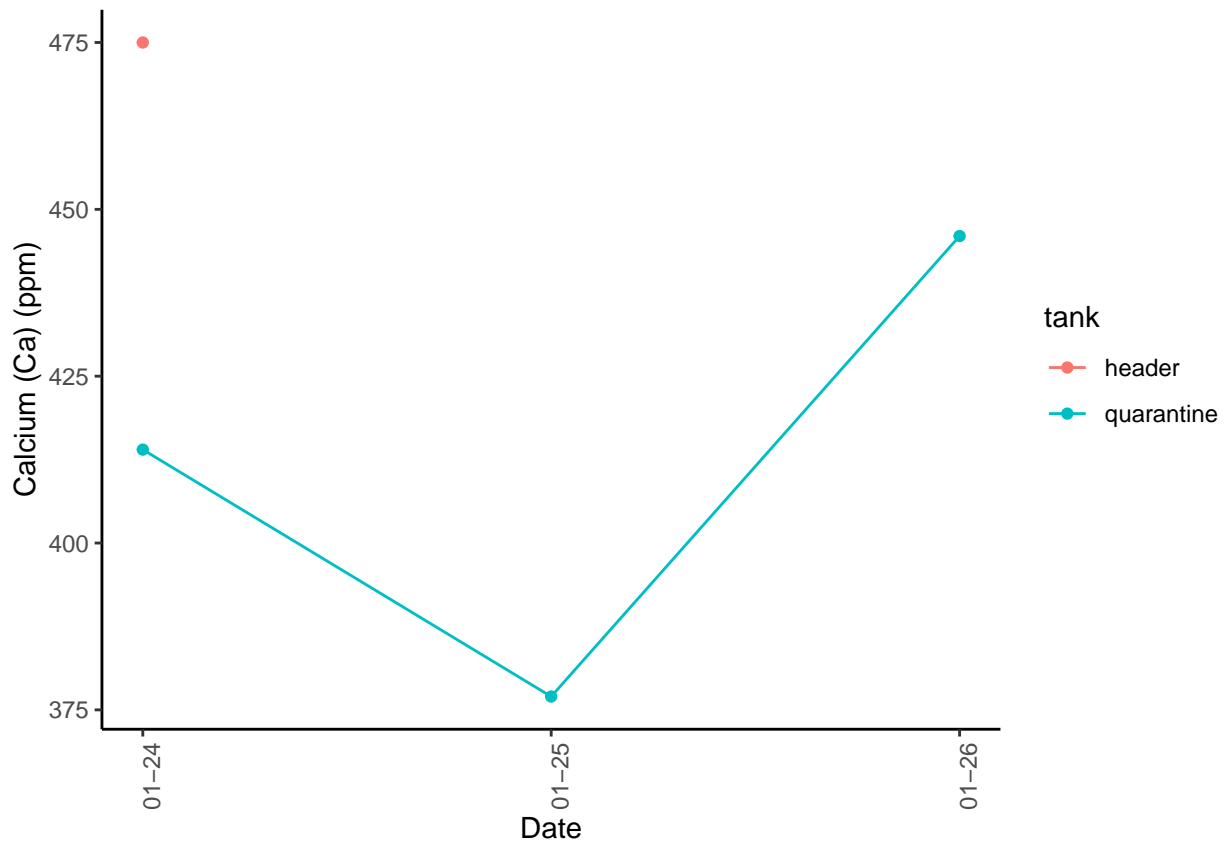
calcium alkalinity plot

```
#filter for just temp data

ca.dat <- filter(dat.grouped, WQ.type == "ca")

#plot mean temp per day by date
ca_plot <- ca.dat %>%
  ggplot(aes(x=date, y=mean, color = tank))+
  geom_line() +
  geom_point() +
  scale_x_date(date_breaks = "1 day", date_labels = "%m-%d") +
  theme_classic()+
  theme(axis.text.x = element_text(angle = 90)) +
  ylab("Calcium (Ca) (ppm)") +
```

```
xlab("Date");ca_plot
```



```
ggsave(filename="../figures/ca.plot.pdf", plot=ca_plot, width=10, height=5, units="in")
```

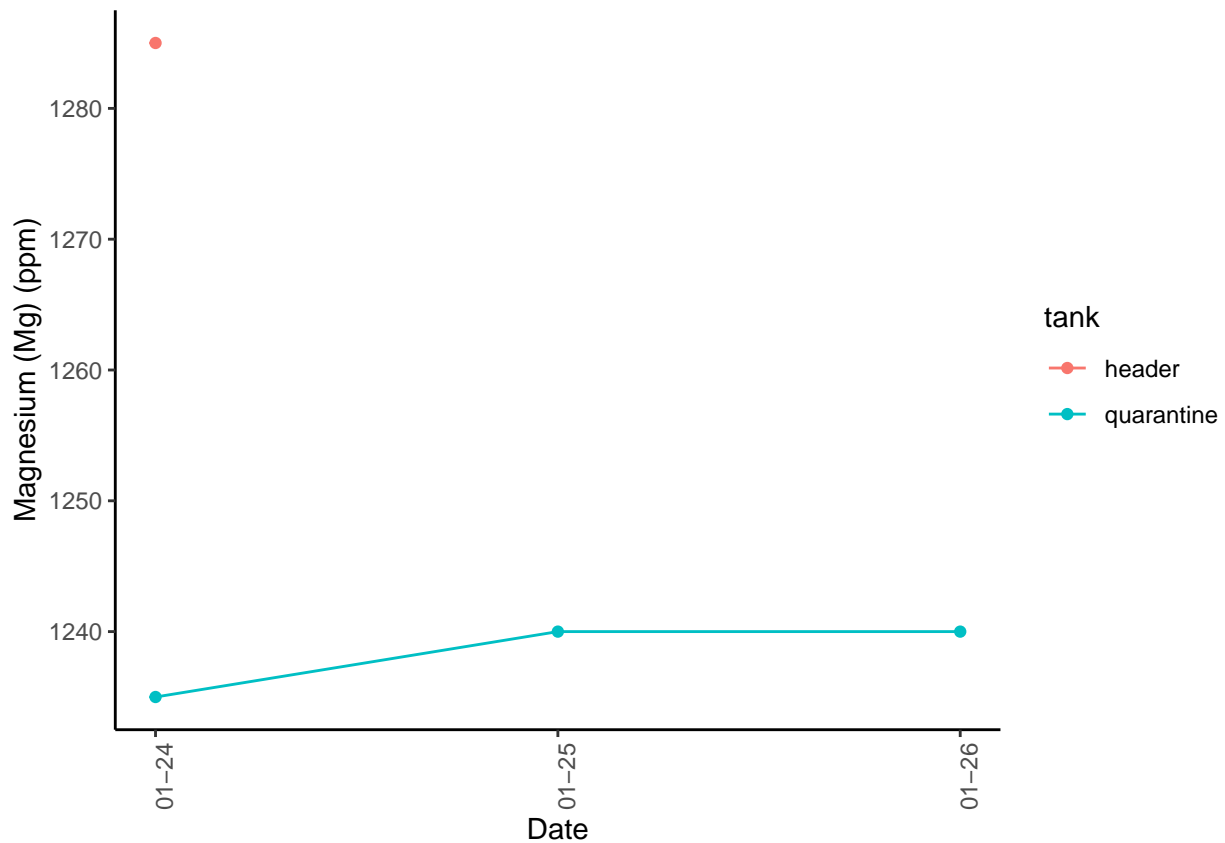
magnesium plot

```
#filter for just temp data
```

```
mg.dat <- filter(dat.grouped, WQ.type == "mg")
```

```
#plot mean temp per day by date
```

```
mg_plot <- mg.dat %>%
  ggplot(aes(x=date, y=mean, color = tank))+
  geom_line() +
  geom_point() +
  scale_x_date(date_breaks = "1 day", date_labels = "%m-%d") +
  theme_classic()+
  theme(axis.text.x = element_text(angle = 90)) +
  ylab("Magnesium (Mg) (ppm)") +
  xlab("Date");mg_plot
```



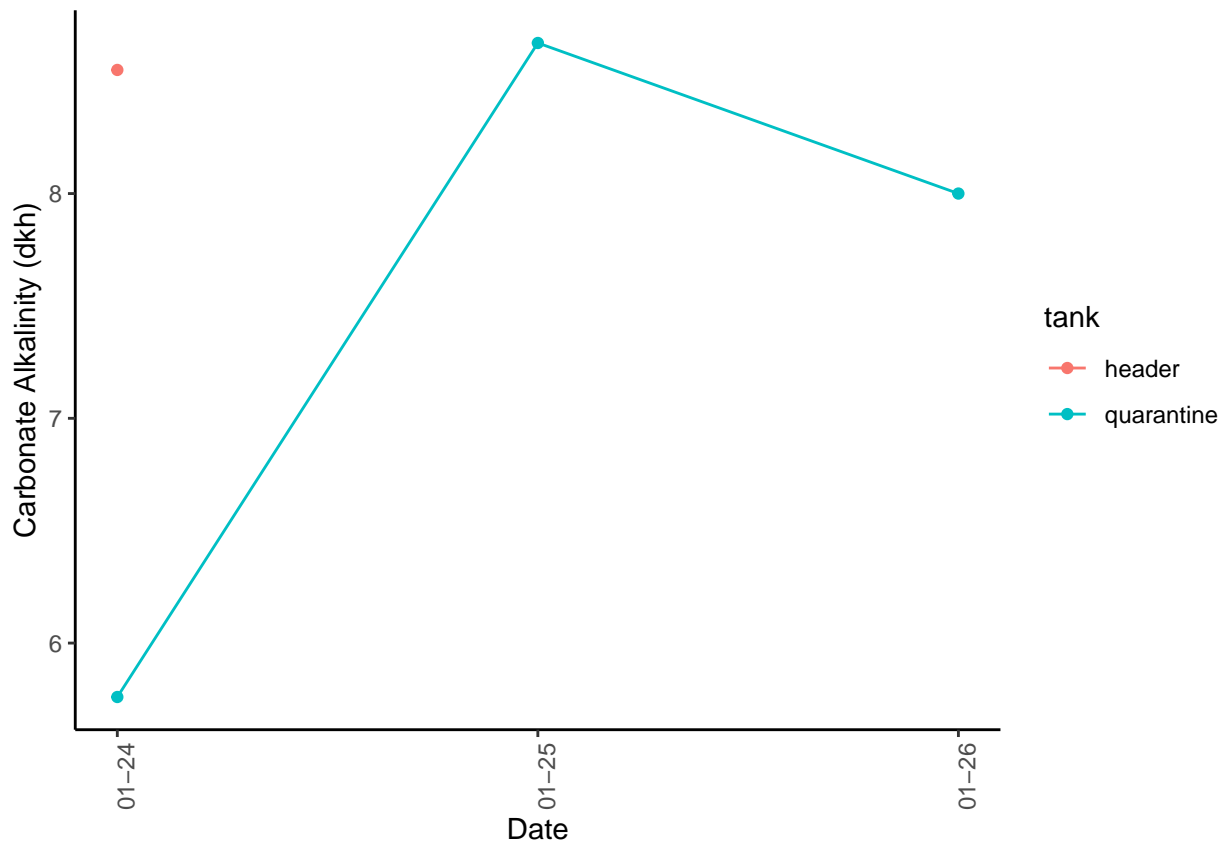
```
ggsave(filename="../figures/mg.plot.pdf", plot=mg_plot, width=10, height=5, units="in")
```

carbonate alkalinity plot

```
#filter for just temp data

alk.dat <- filter(dat.grouped, WQ.type == "alk")

#plot mean temp per day by date
alk_plot <- alk.dat %>%
  ggplot(aes(x=date, y=mean, color = tank))+
  geom_line() +
  geom_point() +
  scale_x_date(date_breaks = "1 day", date_labels = "%m-%d") +
  theme_classic()+
  theme(axis.text.x = element_text(angle = 90)) +
  ylab("Carbonate Alkalinity (dkh)") +
  xlab("Date");alk_plot
```



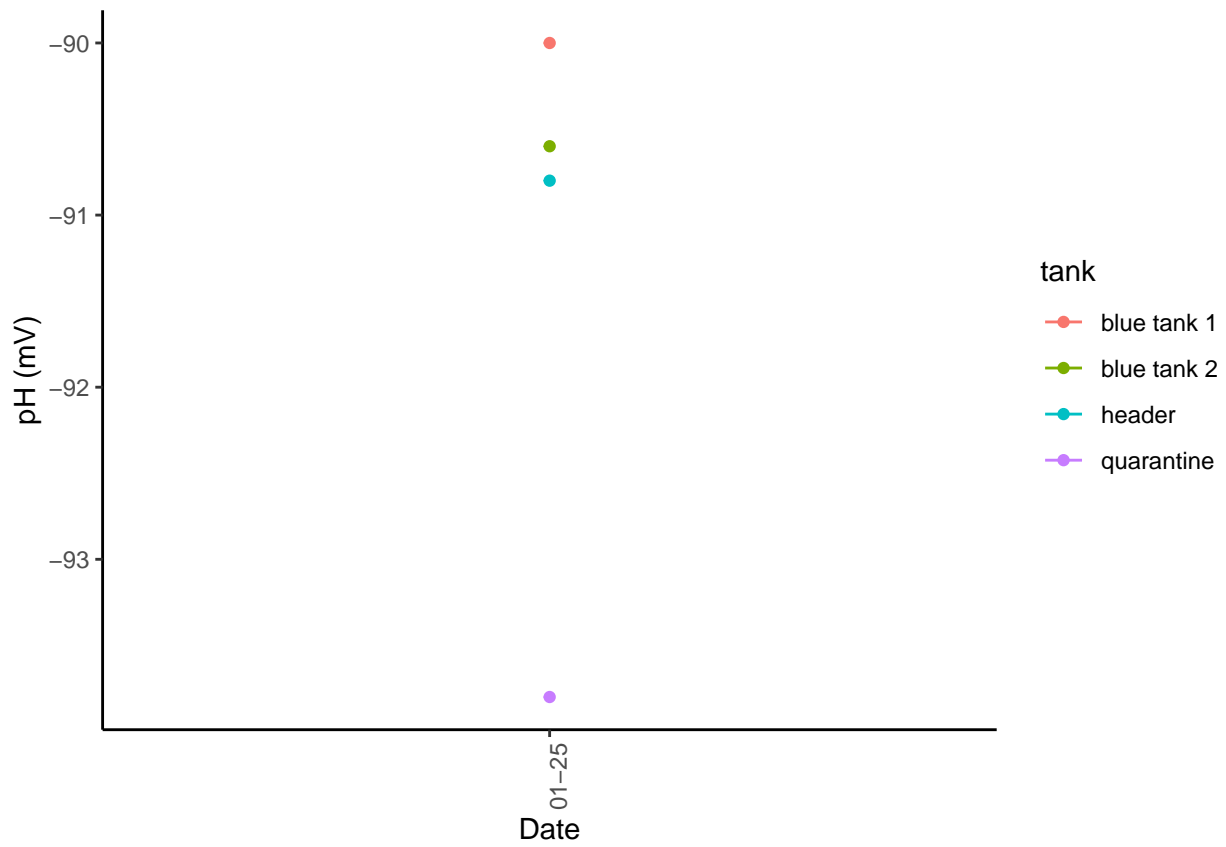
```
ggsave(filename="../figures/alk.plot.pdf", plot=alk_plot, width=10, height=5, units="in")
```

pH plot

```
#filter for just temp data

ph.dat <- filter(dat.grouped, WQ.type == "pH")

#plot mean temp per day by date
ph_plot <- ph.dat %>%
  ggplot(aes(x=date, y=mean, color = tank))+
  geom_line() +
  geom_point() +
  scale_x_date(date_breaks = "1 day", date_labels = "%m-%d") +
  theme_classic()+
  theme(axis.text.x = element_text(angle = 90)) +
  ylab("pH (mV)") +
  xlab("Date");ph_plot
```

```
ggsave(filename="../figures/ph.plot.pdf", plot=ph_plot, width=10, height=5, units="in")
```