Assignment 3 ggplot

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5/18/2017

Loadig Data

I've used the following data sets: sierraclim, resthin.shallow, and resthin.deep. I've merged resthin.shallow and resthin.deep to obtain one single data base, which I've called thin_data

```r
other <-  data.frame(month = seq (1,12),
                      month_names = month.abb,
                      season =c("Winter","Winter","Spring",
                                "Spring","Spring","Summer","Summer",
                                "Summer","Fall","Fall","Fall","Winter"))

climate_Data <- read.table("./data/sierraclim.txt", header= T) %>%
  left_join(other)
```

```
## Joining, by = "month"
```

```r
thinshallow <- read.table("./data/resthin.shallow.txt", header = T) %>%
plyr::rename(c(trans = "transhallow",
               evap = "evapshallow",
               psn = "psnshallow",
               plantc = "plantshallow"))

thin_data <- read.table("./data/resthin.deep.txt", header = T) %>%
plyr::rename(c(trans = "transdeep",
               evap = "evapdeep",
               psn = "psndeep",
               plantc = "plantdeep")) %>%
  left_join(thinshallow, by = c("scen","thin","shared","day","month","wy"))
```

Useful function

By the time I made this graph I did not know how to make functions in R so I took this one from stackoverflow

```r
get_legend<-function(myggplot){
  tmp <- ggplot_gtable(ggplot_build(myggplot))
  leg <- which(sapply(tmp$grobs, function(x) x$name) == "guide-box")
  legend <- tmp$grobs[[leg]]
  return(legend)
}
```

Plot 1

```r
biomass_Pery1 <-  thin_data %>%
  select(scen, thin,  plantdeep, plantshallow) %>%
```

```r
  gather(type, biomass, 3:4) %>%
  filter(thin == .05)

A <- ggplot(biomass_Pery1, aes(as.factor(x = scen), y = biomass, fill = type)) +
    geom_boxplot(col = "black") +
    stat_summary(geom ="point", fun.y = "mean", color ="indianred1") +
    xlab("Year") +
    ylab("Biomass") +
    theme_bw() +
    removeGrid(x=TRUE, y=TRUE) +
    scale_fill_manual(values = c("turquoise1","turquoise4"), labels = c("Deep","Shallow"))+
    theme(legend.direction = "horizontal",legend.text = element_text(size = 9, face = "bold")) +
    theme(legend.title = element_text(face = "bold")) +
    annotate ("text", x=1.3, y=6, label="Thin = 0.05", colour="black", size=5, hjust=0.5) +
    theme(axis.text = element_text(face ="bold", colour="black", size=9))


legend <- get_legend(A)

A <- A +
    theme(legend.position="none")

biomass_Pery2 <-  thin_data %>%
  select(scen, thin,  plantdeep, plantshallow) %>%
  gather(type, biomass, 3:4) %>%
  filter(thin == 40.00)

B <- ggplot(biomass_Pery2, aes(as.factor(x = scen), y = biomass, fill = type)) +
    geom_boxplot(col = "black") +
    stat_summary(geom="point", fun.y = "mean", color="indianred1") +
    xlab("Year") +
    ylab("Biomass") +
    theme_bw() +
    removeGrid(x=TRUE, y=TRUE) +
    scale_fill_manual(values = c("turquoise1","turquoise4"), labels = c("Deep","Shallow"))+
    theme(legend.position="none") +
    annotate("text", x=1.2, y=6, label="Thin = 40", colour="black", size=5, hjust=0.5)+
    theme(axis.text = element_text(face ="bold", colour="black", size=9))
```

```
grid.arrange(A, B, legend, ncol=2, nrow = 2,
             layout_matrix = rbind(c(1,2), c(3,3)),
             widths = c(2.7, 2.7), heights = c(2.5, 0.2))
```
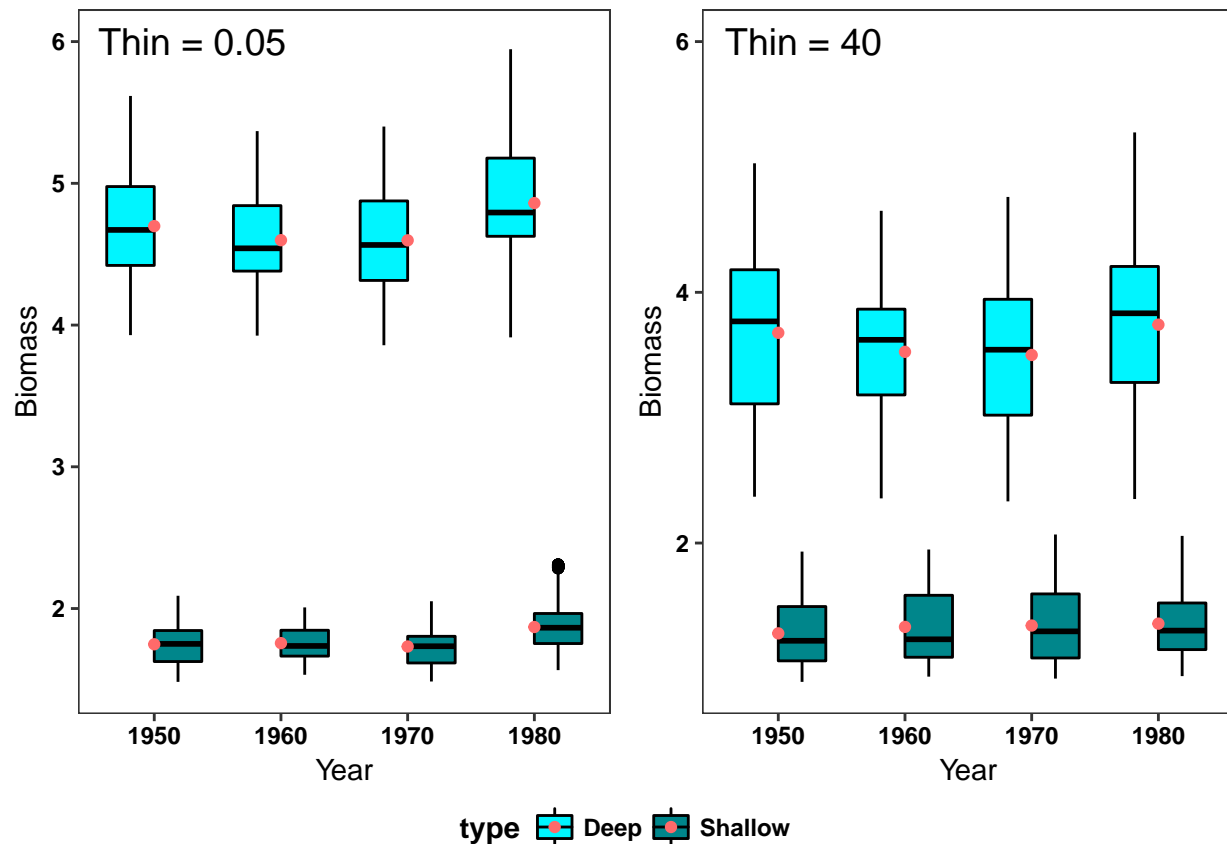

Figure 1: Plant Biomass for deep and shallow locations over the period of study. Red dots inicicate the biomass mean

Plot 2 - 3

```
temp <- climate_Data %>%
  select(tmin,tmax, year, month_names, season) %>%
  filter(year == 1960 | year == 2013)

C <- ggplot(temp, aes(tmin, tmax))+
  geom_point(aes(shape = factor(season),colour = factor(year))) +
  xlab("Minimum Temperature (°C)") +
  ylab("Maximum Temperature (°C)") +
  theme_bw() +
  removeGrid(x=TRUE, y=TRUE) +
  labs(shape = "Season", colour = "Year")+
  scale_color_manual(values=c("lightsteelblue4", "orange2")) +
  theme(legend.box = "horizontal",legend.text = element_text(size = 9, face = "bold")) +
  theme(legend.title = element_text(face = "bold")) +
  theme(axis.text = element_text(face ="bold", colour="black", size=9))
```

```r
legend2 <- get_legend(C)

C <- C +  theme(legend.position="none")

D <- ggplot(temp, aes(tmin))+
  geom_density(aes(fill=factor(year)), size = 0.8, alpha =0.5 ) +
  xlab("Minimum Temperature (°C)") +
  ylab("Frequency") +
  theme_bw() +
  removeGrid (x=TRUE, y=TRUE) +
  theme(legend.position = "none") +
  theme(axis.text = element_text(face ="bold", colour="black", size=9)) +
  scale_fill_manual(values=c("lightsteelblue4", "orange2"))

E <- ggplot(temp, aes(tmax))+
  geom_density(aes(fill=factor(year)), size = 0.8, alpha =0.5 ) +
  xlab("Maximum Temperature (°C)") +
  ylab("Frequency") +
  theme_bw() +
  removeGrid(x=TRUE, y=TRUE) +
  theme(legend.position = "none") +
  theme(axis.text = element_text(face ="bold", colour="black", size=9)) +
  scale_fill_manual(values=c("lightsteelblue4", "orange2"))
```

```
grid.arrange(D, legend2, C, E, ncol=2, nrow=2,
             widths=c(2.8, 1.8), heights=c(2.5, 3))
```
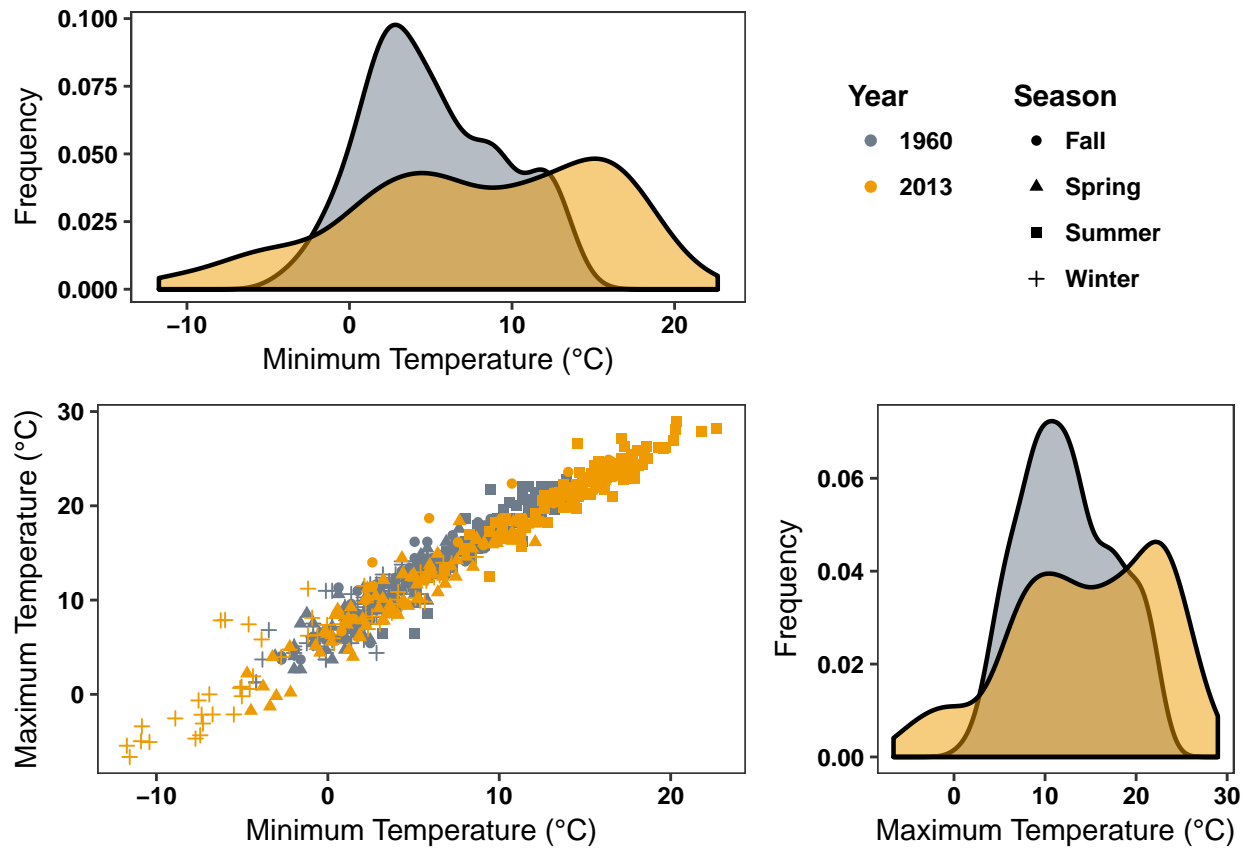

Figure 2: Minimum Temperature (°C) vs Maximum Temperature (°C) for the years 1960 and 2013

Plot 4

```
bar_data <-  thin_data %>%
  select(scen, thin,  plantdeep, plantshallow) %>%
  group_by(scen, thin) %>%
  summarise(Meandeep = mean(plantdeep), Mindeep = min(plantdeep), Maxdeep = max(plantdeep),
            MeanS = mean(plantshallow), MinS = min(plantshallow), MaxS = max(plantshallow))

tn <-  c("None","Low","Med","High")

Fe <-ggplot(bar_data, aes(as.factor(x = scen),
                     y = Meandeep, ymin = Mindeep, ymax = Maxdeep, fill= factor(thin))) +
                   geom_bar(stat="identity", position=position_dodge()) +
                   geom_errorbar(stat = "identity",position=position_dodge()) +
                   labs(title = "Deep") +
                   xlab("Years") +
                   ylab("Biomass") +
                   scale_fill_brewer(type = "seq", palette = "GnBu",
```

```
                        name = "Thin", labels = tn) +
                        theme_bw() +
                        removeGrid (x=TRUE, y=TRUE) +
                        theme(legend.text = element_text(size = 9, face = "bold")) +
                        theme(legend.title = element_text(face = "bold")) +
                        theme(axis.text = element_text(face ="bold", colour="black", size=9))



G <-ggplot(bar_data, aes(as.factor(x = scen),
                        y = MeanS, ymin = MinS, ymax = MaxS, fill= factor(thin))) +
                        geom_bar(stat="identity", position=position_dodge()) +
                        geom_errorbar(stat = "identity",position=position_dodge()) +
                        labs(title = "Shallow") +
                        xlab("Years") +
                        ylab("Biomass") +
                        scale_fill_brewer(type = "seq", palette = "RdPu", name = "Thin",
                        labels = tn) +
                        theme_bw() +
                        removeGrid (x=TRUE, y=TRUE) +
                        theme(legend.text = element_text(size = 9, face = "bold")) +
                        theme(legend.title = element_text(face = "bold")) +
                        theme(axis.text = element_text(face ="bold", colour="black", size=9))
```

```
grid.arrange(Fe, G, ncol=1, nrow=2,
              widths= 3.5, heights=c(6, 6))
```
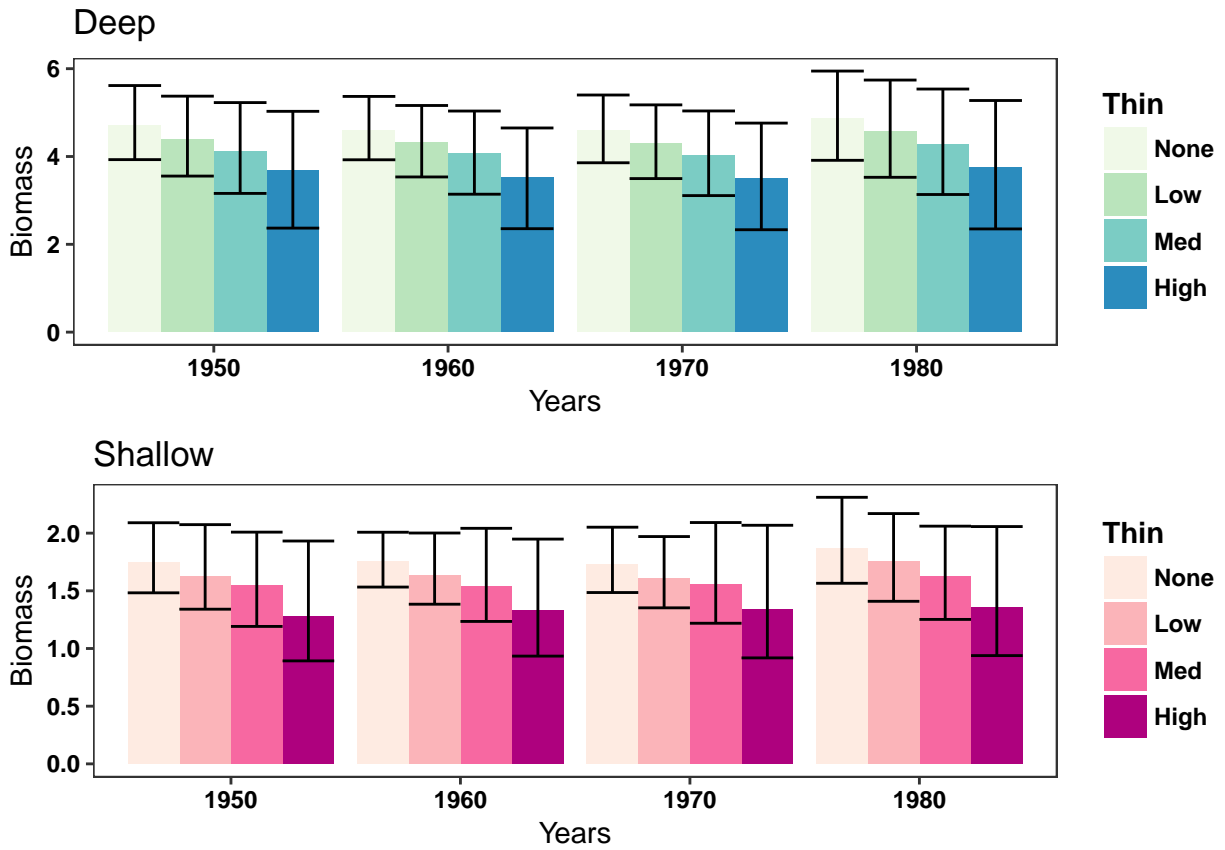

Figure 3: Biomass for all thin levels in deep and shallow locations