YFT PS data for Stock Synthesis

Haikun Xu

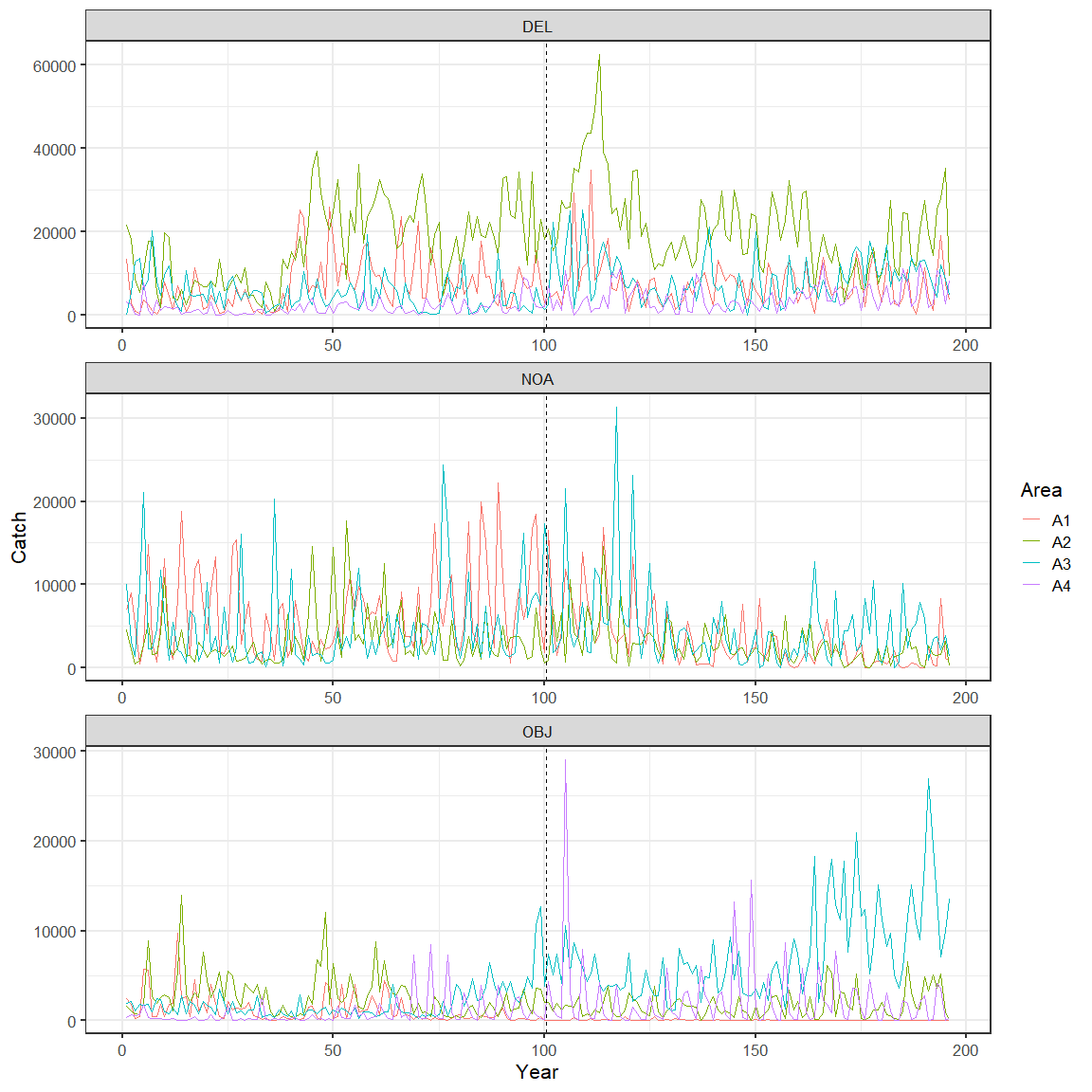
2024-09-26

This example code demonstrates how to compile the purse-seine catch and length composition data for the stock assessment of yellowfin tuna in the eastern Pacific Ocean.

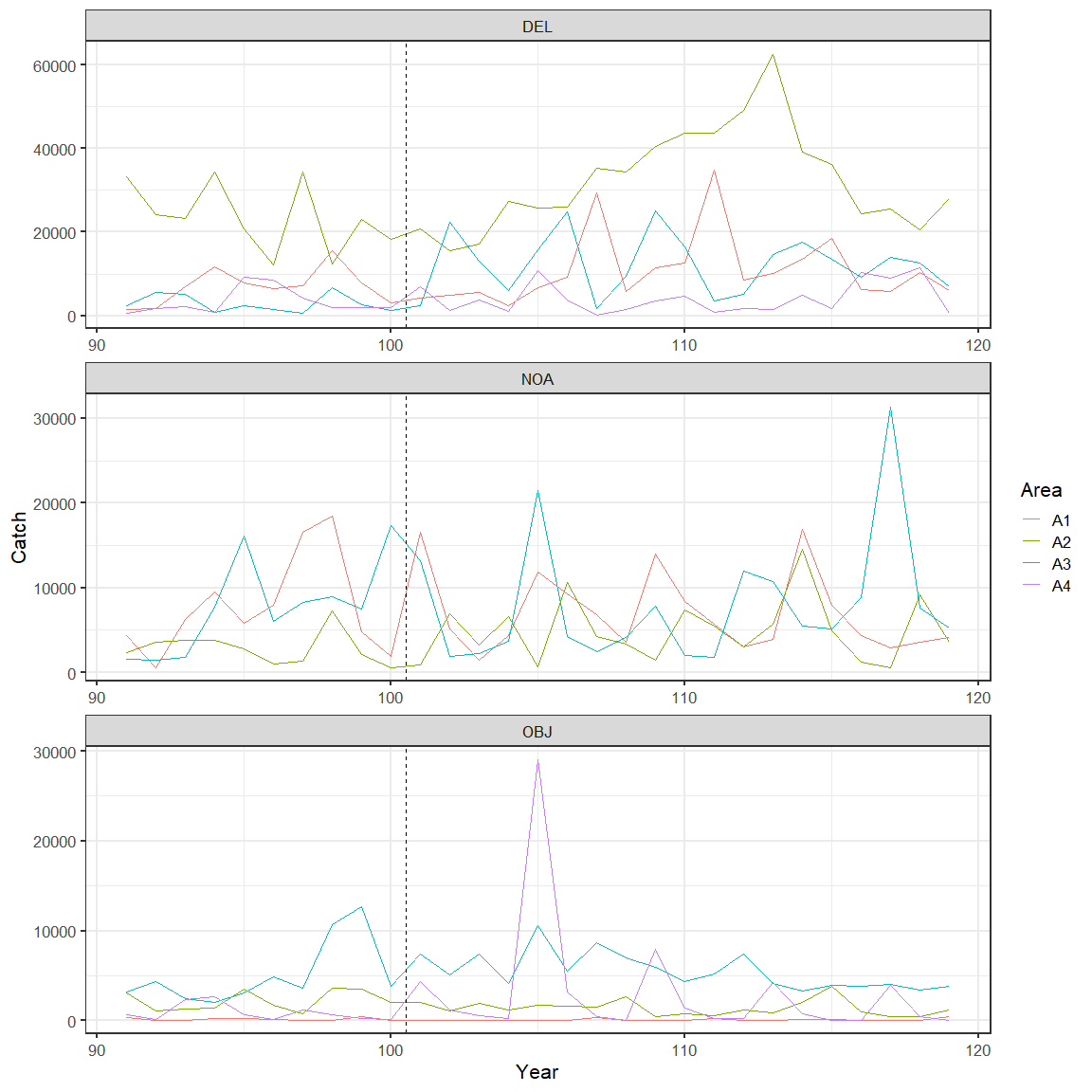
library(tidyverse)  
save\_dir <- "D:/OneDrive - IATTC/IATTC/2022/BSE stuff from Cleridy/YFT/"  
yr.end <- 2023  
  
YFT.OBJ.Catch.20002023 <- read.csv(paste0(save\_dir,"YFT.OBJ.Catch.20002023.csv"))  
YFT.OBJ.Catch.19751999 <- read.csv(paste0(save\_dir,"YFT.OBJ.Catch.19751999.csv"))  
  
YFT.NOA.Catch.20002023 <- read.csv(paste0(save\_dir,"YFT.NOA.Catch.20002023.csv"))  
YFT.NOA.Catch.19751999 <- read.csv(paste0(save\_dir,"YFT.NOA.Catch.19751999.csv"))  
  
YFT.DEL.Catch.20002023 <- read.csv(paste0(save\_dir,"YFT.DEL.Catch.20002023.csv"))  
YFT.DEL.Catch.19751999 <- read.csv(paste0(save\_dir,"YFT.DEL.Catch.19751999.csv"))

Year\_OBJ <- data.frame(Year = seq(1,(yr.end-1974)\*4),  
 Area = rep(c("A1","A2","A3","A4"), each = (yr.end-1974)\*4))  
  
YFT\_OBJ\_Catch <- rbind(YFT.OBJ.Catch.19751999,YFT.OBJ.Catch.20002023) %>%   
 mutate(Year=(year-1975)\*4+quarter) %>%  
 gather(3:6,key="Area",value="Catch") %>%   
 select(Year,Area,Catch)  
YFT\_OBJ\_Catch <- left\_join(Year\_OBJ,YFT\_OBJ\_Catch) %>%  
 mutate(Catch=ifelse(is.na(Catch),0,Catch),  
 Type="OBJ")  
  
Year\_NOA <- data.frame(Year = seq(1,(yr.end-1974)\*4),  
 Area = rep(c("A1","A2","A3"), each = (yr.end-1974)\*4))  
YFT\_NOA\_Catch <- rbind(YFT.NOA.Catch.19751999,YFT.NOA.Catch.20002023) %>%   
 mutate(Year=(year-1975)\*4+quarter) %>%  
 gather(3:5,key="Area",value="Catch") %>%   
 select(Year,Area,Catch)  
YFT\_NOA\_Catch <- left\_join(Year\_NOA,YFT\_NOA\_Catch) %>%  
 mutate(Catch=ifelse(is.na(Catch),0,Catch),  
 Type="NOA")  
  
Year\_DEL <- data.frame(Year = seq(1,(yr.end-1974)\*4),  
 Area = rep(c("A1","A2","A3","A4"), each = (yr.end-1974)\*4))  
YFT\_DEL\_Catch <- rbind(YFT.DEL.Catch.19751999,YFT.DEL.Catch.20002023) %>%   
 mutate(Year=(year-1975)\*4+quarter) %>%  
 gather(3:6,key="Area",value="Catch") %>%   
 select(Year,Area,Catch)  
YFT\_DEL\_Catch <- left\_join(Year\_DEL,YFT\_DEL\_Catch) %>%  
 mutate(Catch=ifelse(is.na(Catch),0,Catch),  
 Type="DEL")  
  
YFT\_PS\_Catch <- rbind(YFT\_OBJ\_Catch,YFT\_NOA\_Catch,YFT\_DEL\_Catch)  
write.csv(YFT\_PS\_Catch,file=paste0(save\_dir,"YFT\_PS\_Catch\_1975-",yr.end,".csv"),row.names = FALSE)

ggplot(data=YFT\_PS\_Catch) +  
 geom\_line(aes(x=Year,y=Catch,color=Area)) +  
 facet\_wrap(~Type,nrow=3,scales = "free") +  
 geom\_vline(xintercept = 100.5,linetype = "dashed") +  
 theme\_bw(16)



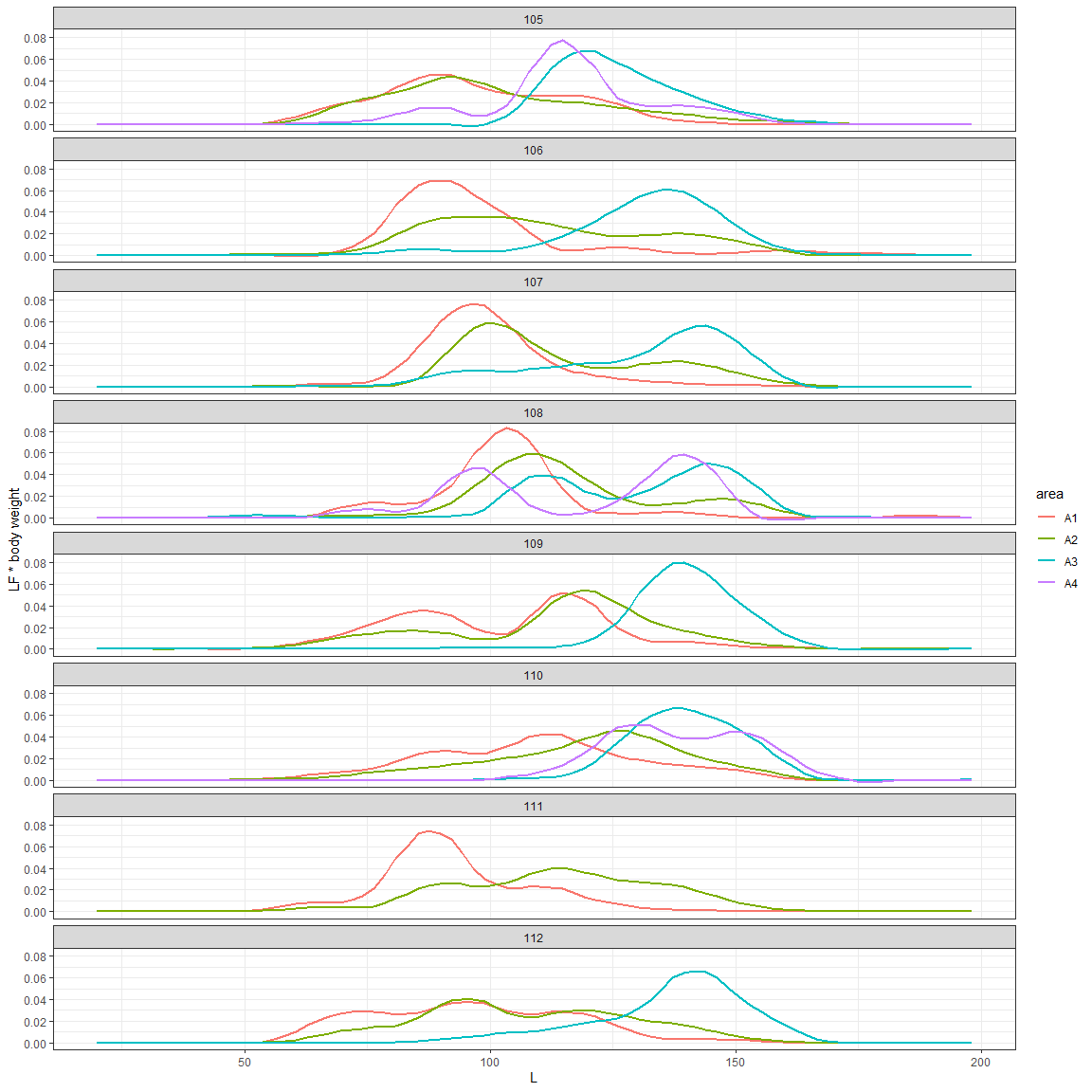
ggplot(data=YFT\_PS\_Catch %>% filter(Year > 90, Year < 120)) +  
 geom\_line(aes(x=Year,y=Catch,color=Area)) +  
 facet\_wrap(~Type,nrow=3,scales = "free") +  
 geom\_vline(xintercept = 100.5,linetype = "dashed") +  
 theme\_bw(16)



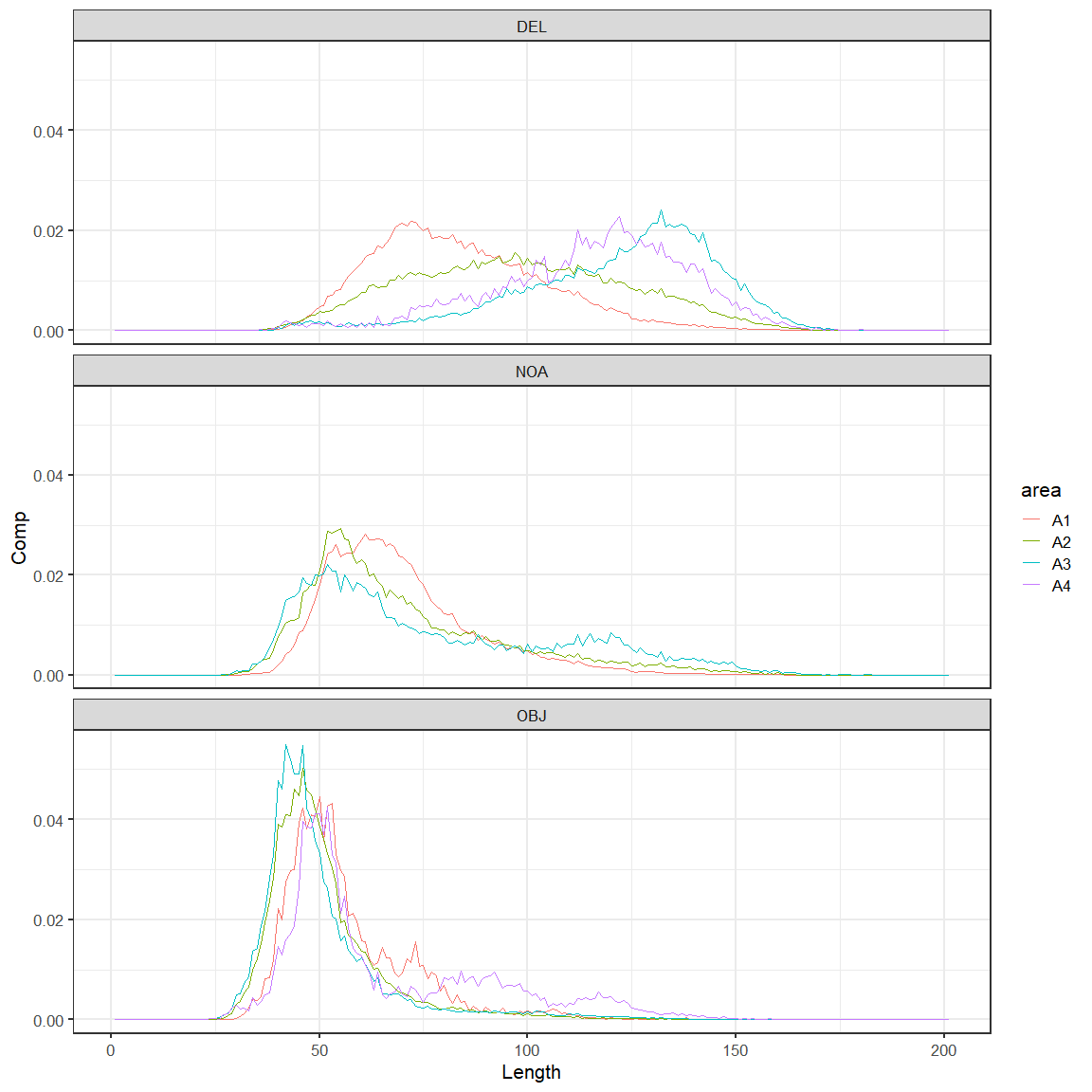
YFT.OBJ.Comp.20002023 <- read.csv(paste0(save\_dir,"YFT.OBJ.Comp.20002023.csv"))  
YFT.OBJ.Comp.19751999 <- read.csv(paste0(save\_dir,"YFT.OBJ.Comp.19751999.csv"))  
  
YFT.NOA.Comp.20002023 <- read.csv(paste0(save\_dir,"YFT.NOA.Comp.20002023.csv"))  
YFT.NOA.Comp.19751999 <- read.csv(paste0(save\_dir,"YFT.NOA.Comp.19751999.csv"))  
  
YFT.DEL.Comp.20002023 <- read.csv(paste0(save\_dir,"YFT.DEL.Comp.20002023.csv"))  
YFT.DEL.Comp.19751999 <- read.csv(paste0(save\_dir,"YFT.DEL.Comp.19751999.csv"))

YFT\_OBJ\_Comp <- rbind(YFT.OBJ.Comp.19751999,YFT.OBJ.Comp.20002023) %>%  
 mutate(Year=(year-1975)\*4+quarter, Type="OBJ") %>%  
 arrange(area,Year)  
YFT\_OBJ\_Comp <- YFT\_OBJ\_Comp[c(207,206,3:205)]  
  
YFT\_NOA\_Comp <- rbind(YFT.NOA.Comp.19751999,YFT.NOA.Comp.20002023) %>%  
 mutate(Year=(year-1975)\*4+quarter, Type="NOA") %>%  
 arrange(area,Year)  
YFT\_NOA\_Comp <- YFT\_NOA\_Comp[c(207,206,3:205)]  
  
YFT\_DEL\_Comp <- rbind(YFT.DEL.Comp.19751999,YFT.DEL.Comp.20002023) %>%  
 mutate(Year=(year-1975)\*4+quarter, Type="DEL") %>%  
 arrange(area,Year)  
YFT\_DEL\_Comp <- YFT\_DEL\_Comp[c(207,206,3:205)]  
  
YFT\_PS\_Comp <- rbind(YFT\_OBJ\_Comp,YFT\_NOA\_Comp,YFT\_DEL\_Comp)  
write.csv(YFT\_PS\_Comp,file=paste0(save\_dir,"YFT\_PS\_Comp\_1975-",yr.end,".csv"),row.names = FALSE)

names(YFT\_DEL\_Comp)[5:205] <- 1:201  
  
YFT\_DEL\_Comp\_Long <- YFT\_DEL\_Comp %>% gather(5:205,key="l",value="lf") %>%  
 mutate(L=cut(as.numeric(l), breaks = c(0,seq(22,198,2), Inf), right=F, labels = seq(20,198,2))) %>% na.omit() %>%  
 select(Year,area,L,lf) %>%  
 mutate(L = as.numeric(L)\*2+18) %>%  
 group\_by(area,Year,L) %>%  
 summarise(LF=sum(lf\*L^3)) %>%  
 group\_by(area, Year) %>%  
 mutate(LF2 = LF/sum(LF))  
  
ggplot(data=YFT\_DEL\_Comp\_Long %>% filter(Year>104, Year<113)) +  
 geom\_smooth(aes(x=L,y=LF2,color=area),span=0.2,se=FALSE) +  
 facet\_wrap(~Year, nrow = 8, dir= "v") +  
 ylab("LF \* body weight") +   
 theme\_bw()



names(YFT\_PS\_Comp)[5:205] <- 1:201  
YFT\_PS\_Comp\_mean <- YFT\_PS\_Comp %>%  
 gather(5:205,key="Length",value=comp) %>%  
 group\_by(Type,area,Length) %>%  
 summarise(Comp=sum(comp\*nwells)) %>%  
 group\_by(Type,area) %>%  
 mutate(Length=as.numeric(Length),Comp=Comp/sum(Comp))  
  
ggplot(data=YFT\_PS\_Comp\_mean) +  
 geom\_line(aes(x=Length,y=Comp,color=area)) +  
 facet\_wrap(~Type,nrow = 3) +  
 theme\_bw(16)



names(YFT\_PS\_Comp)[5:205] <- 1:201  
YFT\_PS\_Comp\_plot <- YFT\_PS\_Comp %>%  
 gather(5:205,key="Length",value=comp) %>%  
 mutate(Length = as.numeric(Length))  
  
ggplot(data=YFT\_PS\_Comp\_plot %>% filter(Type == "DEL")) +  
 geom\_tile(aes(x=Year,y=Length,fill=comp)) +  
 scale\_fill\_gradient(  
 low = "white",  
 high = "red",  
 na.value = "grey",  
 limits = c(0, 0.1)  
 ) +  
 coord\_cartesian(xlim = c(80,120), ylim = c(50,150)) +  
 facet\_wrap(~area,nrow=4)

