BET PS data for Stock Synthesis

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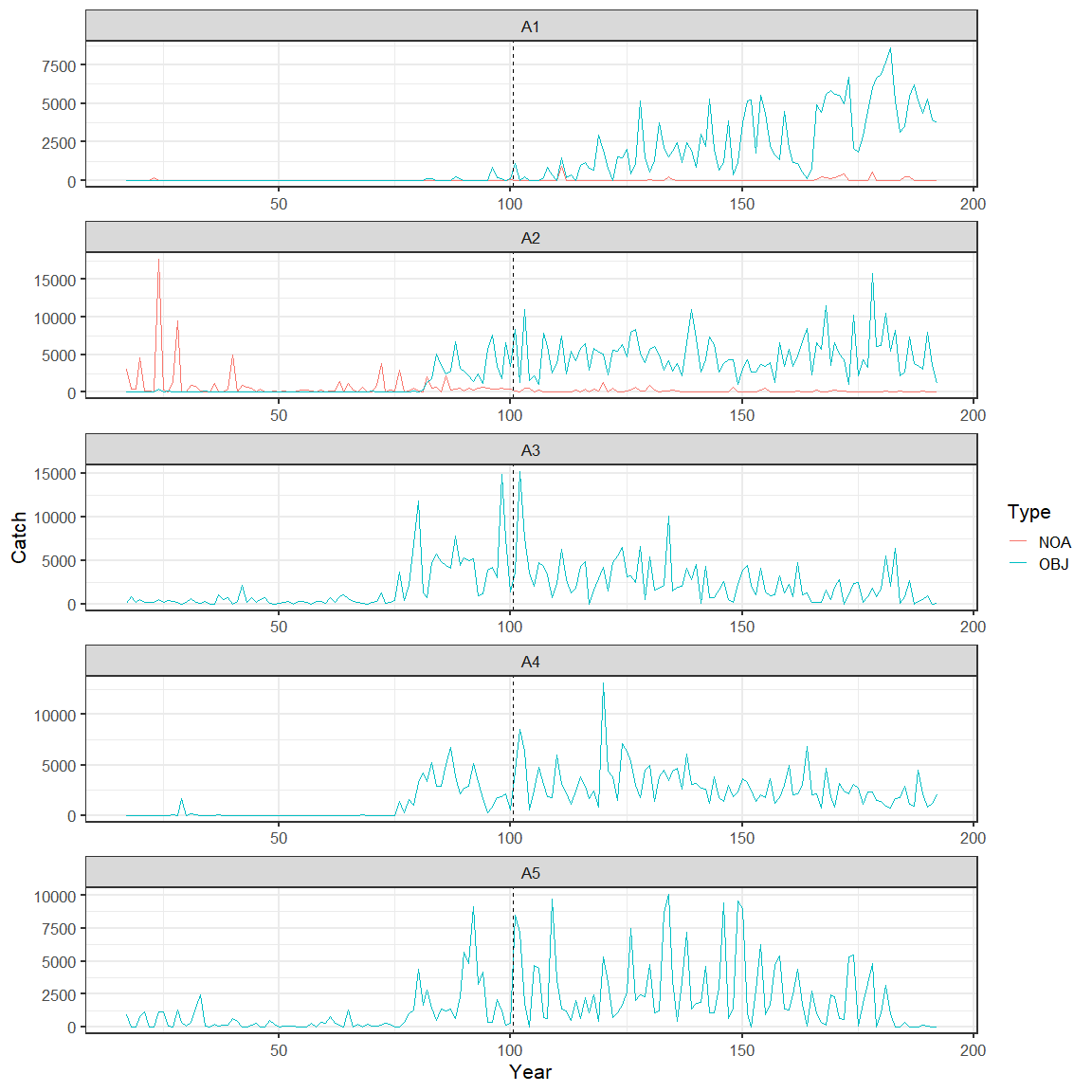
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This example code demonstrates how to compile the purse-seine catch and length composition data for the stock assessment of bigeye tuna in the eastern Pacific Ocean.

library(tidyverse)  
library(BSE)  
  
save\_dir <- "D:/OneDrive - IATTC/IATTC/2022/BSE stuff from Cleridy/BET/"  
yr.end <- 2022  
  
BET.OBJ.Catch.20002022 <- read.csv(paste0(save\_dir,"BET.OBJ.Catch.20002022.csv"))  
BET.OBJ.Catch.19751999 <- read.csv(paste0(save\_dir,"BET.OBJ.Catch.19751999.csv"))  
  
BET.NOA.Catch.20002022 <- read.csv(paste0(save\_dir,"BET.NOA.Catch.20002022.csv"))  
BET.NOA.Catch.19751999 <- read.csv(paste0(save\_dir,"BET.NOA.Catch.19751999.csv"))  
  
BET.DEL.Catch.20002022 <- read.csv(paste0(save\_dir,"BET.DEL.Catch.20002022.csv"))  
BET.DEL.Catch.19751999 <- read.csv(paste0(save\_dir,"BET.DEL.Catch.19751999.csv"))

Year\_OBJ <- data.frame(Year = seq(1,(yr.end-1974)\*4),  
 Area = rep(c("A1","A2","A3","A4","A5"), each = (yr.end-1974)\*4))  
  
BET\_OBJ\_Catch <- rbind(BET.OBJ.Catch.19751999,BET.OBJ.Catch.20002022) %>%   
 mutate(Year=(year-1975)\*4+quarter) %>%  
 gather(3:7,key="Area",value="Catch") %>%   
 select(Year,Area,Catch)  
BET\_OBJ\_Catch <- left\_join(Year\_OBJ,BET\_OBJ\_Catch) %>%  
 mutate(catch=ifelse(is.na(Catch),0,Catch),  
 Type="OBJ")  
  
# add discard to the OBJ catches  
BET\_OBJ\_Catch <- left\_join(BET\_OBJ\_Catch, OBJ\_discard\_rate\_BET)  
BET\_OBJ\_Catch <- BET\_OBJ\_Catch %>%  
 mutate(Catch = catch \* scaler) %>%  
 select(Year, Area, Catch, Type)  
  
# COVID year's catch adjustment based on the CART model  
BET\_OBJ\_Catch$Catch[which(BET\_OBJ\_Catch$Year==2020)] <- BET\_OBJ\_Catch$Catch[which(BET\_OBJ\_Catch$Year==2020)] \* 0.88  
BET\_OBJ\_Catch$Catch[which(BET\_OBJ\_Catch$Year==2021)] <- BET\_OBJ\_Catch$Catch[which(BET\_OBJ\_Catch$Year==2021)] \* 0.82  
  
Year\_NOA <- data.frame(Year = seq(1,(yr.end-1974)\*4),  
 Area = rep(c("A1","A2"), each = (yr.end-1974)\*4))  
BET\_NOA\_Catch <- rbind(BET.NOA.Catch.19751999,BET.NOA.Catch.20002022) %>%   
 mutate(Year=(year-1975)\*4+quarter) %>%  
 gather(3:4,key="Area",value="Catch") %>%   
 select(Year,Area,Catch)  
BET\_NOA\_Catch <- left\_join(Year\_NOA,BET\_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"), each = (yr.end-1974)\*4))  
BET\_DEL\_Catch <- rbind(BET.DEL.Catch.19751999,BET.DEL.Catch.20002022) %>%   
 mutate(Year=(year-1975)\*4+quarter) %>%  
 gather(3:4,key="Area",value="Catch") %>%   
 select(Year,Area,Catch)  
BET\_DEL\_Catch <- left\_join(Year\_DEL,BET\_DEL\_Catch) %>%  
 mutate(Catch=ifelse(is.na(Catch),0,Catch),  
 Type="DEL")  
  
BET\_NOA\_Catch$Catch <- BET\_NOA\_Catch$Catch + BET\_DEL\_Catch$Catch  
  
# prepare to the SS format  
BET\_PS\_Catch <- rbind(BET\_OBJ\_Catch, BET\_NOA\_Catch) %>%  
 mutate(Seas = 1,  
 CV = 0.01,  
 Fleet = paste0(Type, "-", Area)) %>%  
 select(Year, Seas, Fleet, Catch, CV, Type, Area) %>%  
 filter(Year>16)  
  
# add initial catch for each fishery  
BET\_PS\_Catch\_int <- BET\_PS\_Catch %>%  
 filter(Year == 100) %>%  
 mutate(Year = -999,  
 Catch = ifelse(Fleet == "OBJ-A5", 999, 0))  
  
BET\_PS\_Catch <- rbind(BET\_PS\_Catch, BET\_PS\_Catch\_int) %>%  
 arrange(Fleet, Year)  
  
write.csv(BET\_PS\_Catch,file=paste0(save\_dir,"BET\_PS\_Catch\_1975-",yr.end,".csv"),row.names = FALSE)

ggplot(data = BET\_PS\_Catch %>% filter(Year > 0)) +  
 geom\_line(aes(x = Year, y = Catch, color = Type)) +  
 facet\_wrap( ~ Area, nrow = 5, scales = "free") +  
 geom\_vline(xintercept = 100.5, linetype = "dashed") +  
 theme\_bw(16)



BET.OBJ.Comp.20002022 <- read.csv(paste0(save\_dir,"BET.OBJ.Comp.20002022.csv"))  
BET.OBJ.Comp.19751999 <- read.csv(paste0(save\_dir,"BET.OBJ.Comp.19751999.csv"))  
  
BET.NOA.Comp.20002022 <- read.csv(paste0(save\_dir,"BET.NOA.Comp.20002022.csv"))  
BET.NOA.Comp.19751999 <- read.csv(paste0(save\_dir,"BET.NOA.Comp.19751999.csv"))  
  
# BET.DEL.Comp.20002022 <- read.csv(paste0(save\_dir,"BET.DEL.Comp.20002022.csv"))  
# BET.DEL.Comp.19751999 <- read.csv(paste0(save\_dir,"BET.DEL.Comp.19751999.csv"))

BET\_OBJ\_Comp <- rbind(BET.OBJ.Comp.19751999,BET.OBJ.Comp.20002022) %>%  
 mutate(Year=(year-1975)\*4+quarter, Type="OBJ") %>%  
 arrange(area,Year)  
BET\_OBJ\_Comp <- BET\_OBJ\_Comp[c(207,206,3:205)]  
  
BET\_NOA\_Comp <- rbind(BET.NOA.Comp.19751999,BET.NOA.Comp.20002022) %>%  
 mutate(Year=(year-1975)\*4+quarter, Type="NOA") %>%  
 arrange(area,Year)  
BET\_NOA\_Comp <- BET\_NOA\_Comp[c(207,206,3:205)]  
  
BET\_PS\_Comp <- rbind(BET\_OBJ\_Comp,BET\_NOA\_Comp)  
  
# process PS LF data  
names(BET\_PS\_Comp)[5:205] <- 1:201  
  
Nwells <- BET\_PS\_Comp %>% select(Type,Year,area,nwells)  
   
BET\_PS\_Comp\_Long <- BET\_PS\_Comp %>% gather(5:205,key="l",value="lf") %>%  
 mutate(L=cut(as.numeric(l), breaks = c(seq(20,198,2), Inf), right=F, labels = seq(20,198,2))) %>% na.omit() %>%  
 select(Type,Year,area,L,lf) %>%  
 group\_by(Type,area,Year,L) %>%  
 summarise(LF=sum(lf))  
  
BET\_PS\_Comp\_Short <- BET\_PS\_Comp\_Long %>%  
 spread(L,LF)  
  
BET\_PS\_Comp\_Final <- left\_join(BET\_PS\_Comp\_Short,Nwells) %>%  
 filter(Year > 16, nwells > 4)  
  
BET\_PS\_Comp\_SS <- data.frame("Type" = BET\_PS\_Comp\_Final$Type,  
 "Year" = BET\_PS\_Comp\_Final$Year,  
 "Month" = 1,  
 "Fleet" = BET\_PS\_Comp\_Final$area,  
 "Sex" = 0,  
 "Part" = 0,  
 "Nsamp" = BET\_PS\_Comp\_Final$nwells)  
  
BET\_PS\_Comp\_SS <- cbind(BET\_PS\_Comp\_SS, BET\_PS\_Comp\_Final[,4:93], BET\_PS\_Comp\_Final[,4:93])  
   
write.csv(BET\_PS\_Comp\_SS,file=paste0(save\_dir,"BET\_PS\_Comp\_1975-",yr.end,".csv"),row.names = FALSE)

names(BET\_PS\_Comp)[5:205] <- 1:201  
BET\_PS\_Comp\_mean <- BET\_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=BET\_PS\_Comp\_mean) +  
 geom\_line(aes(x=Length,y=Comp,color=Type)) +  
 facet\_wrap(~area,nrow = 3) +  
 theme\_bw(16)

