WKHERRING - Multi fleet - split input data

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Split CANUM, WECA - maybe CATON, but is should be CANUM * WECA

Combined fleet A with fleet C - do we want to do that? No - keep them seperate (Henrik) - done

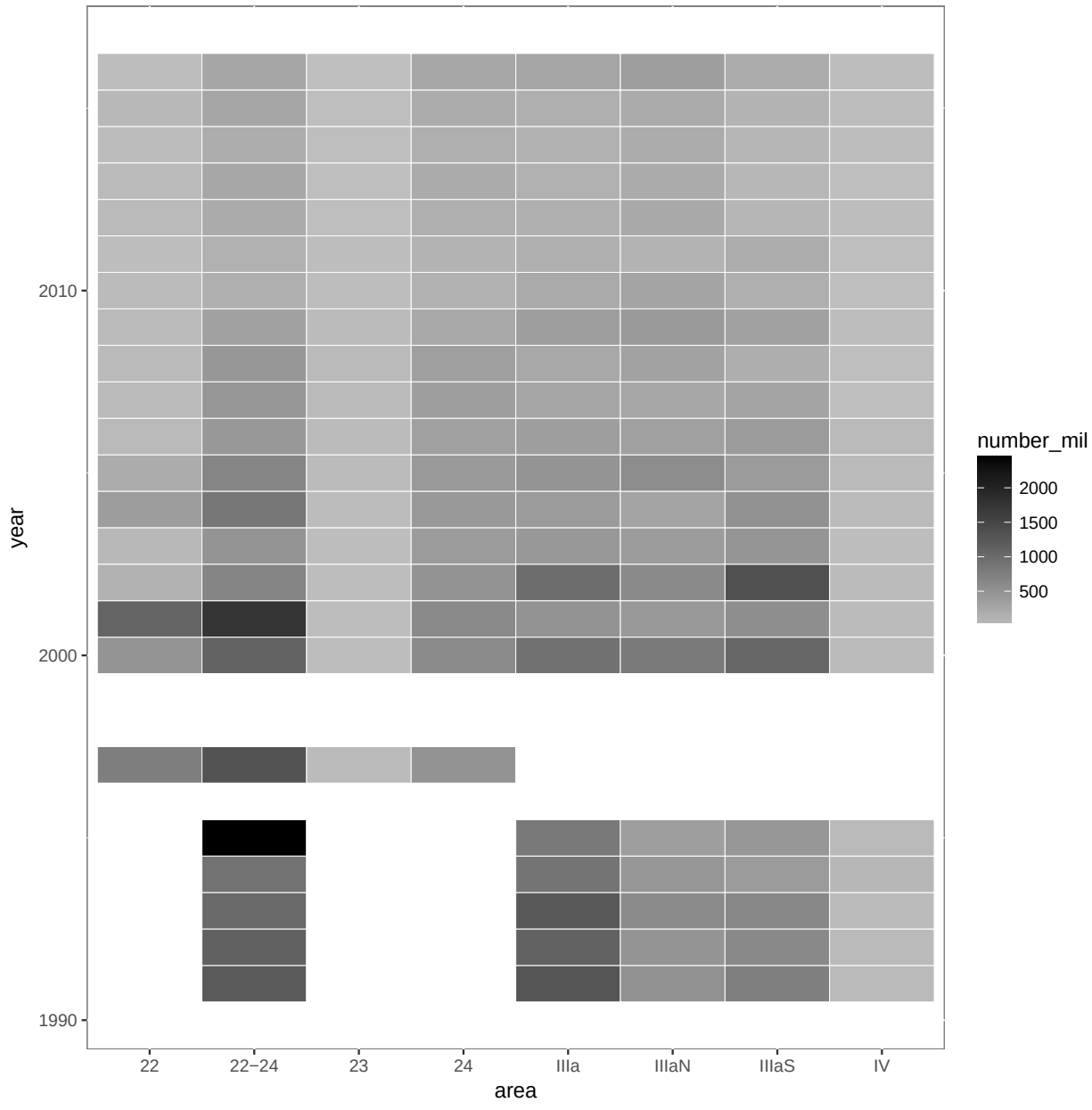
Input:

WBSSH & NSASH_Input_14.06.2017.xlsx - file from Tomas
Input files from assessment 2017 - from Valerio

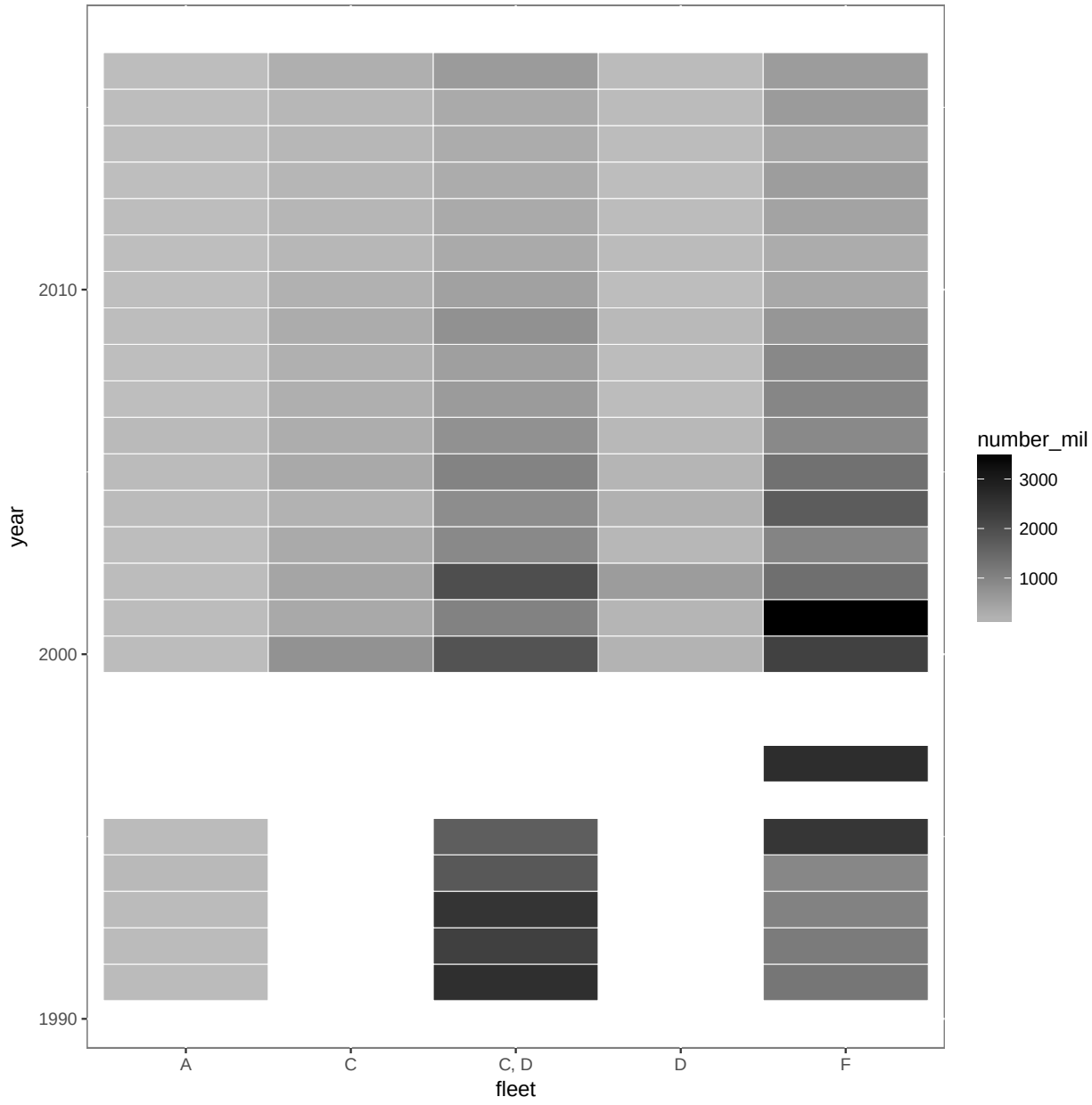
What do we have?

Overviews based on the spreadsheet

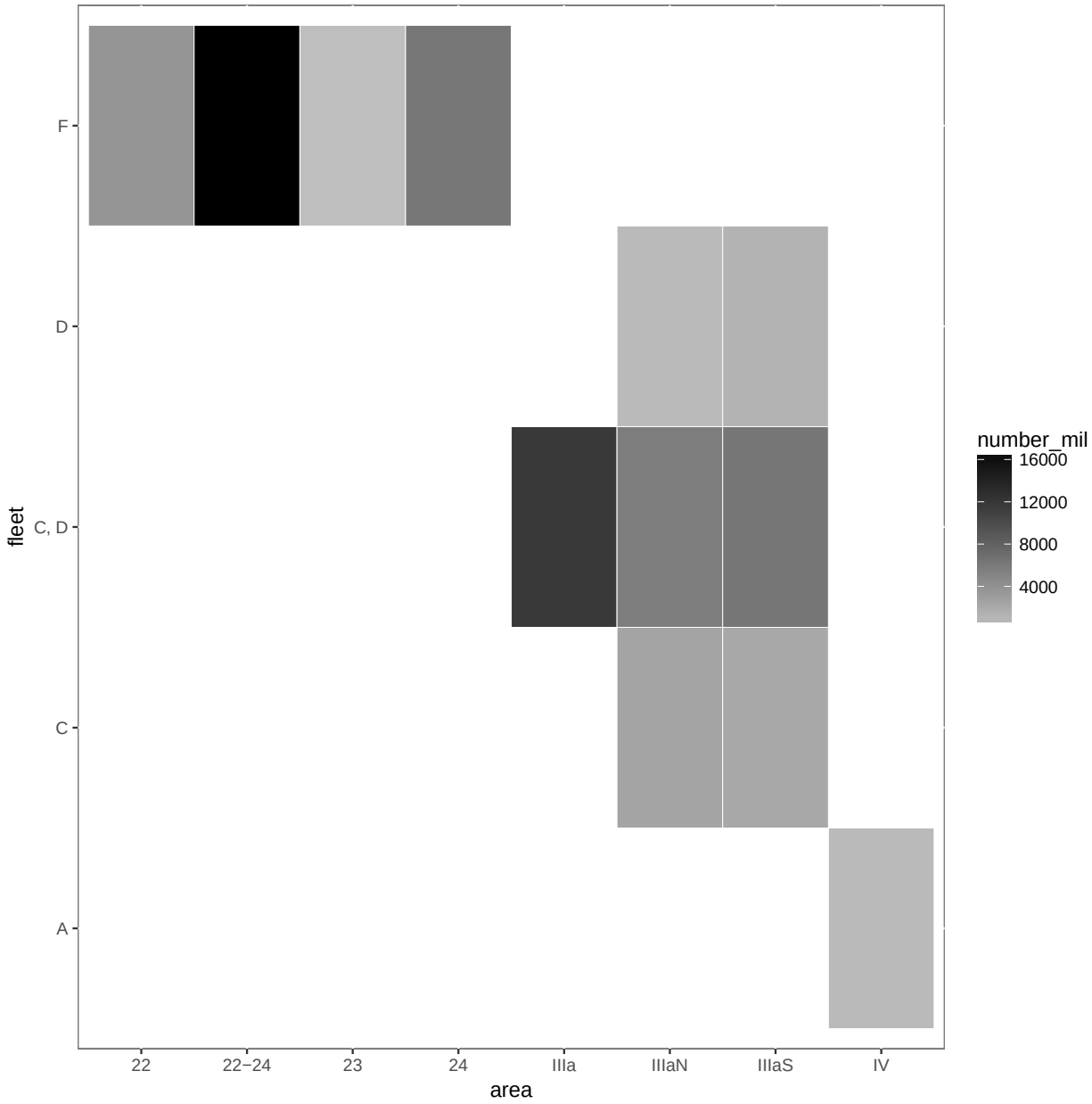
```
canump<-summarise(group_by(canumt, year, stock, area), number_mil=sum(number_mil))
canump[canump==0] <- NA
ggplot(canump, aes(area, year )) +
  geom_tile(aes(fill = number_mil), color="white") +
  scale_fill_gradient(na.value="white", low="grey", high="black") +
  theme(panel.background = element_rect(fill = "white", colour = "grey50"))
```



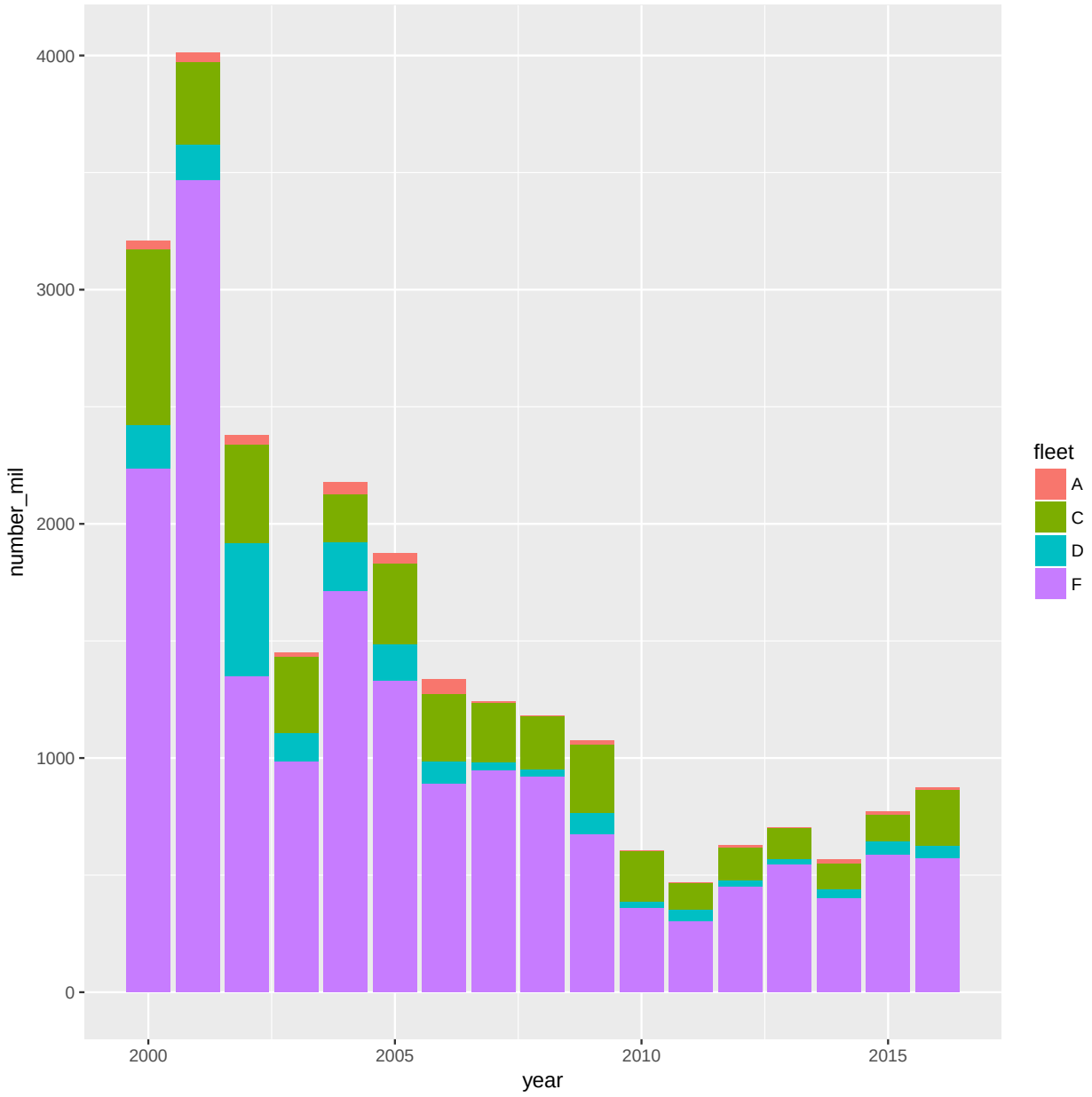

```
canump1<-summarise(group_by(canumt, year, stock, fleet), number_mil=sum(number_mil))
canump1[canump1==0] <- NA
ggplot(canump1, aes(fleet, year )) +
  geom_tile(aes(fill = number_mil), color="white") +
  scale_fill_gradient(na.value="white", low="grey", high="black") +
  theme(panel.background = element_rect(fill = "white", colour = "grey50"))
```




```
canump2<-summarise(group_by(canumt, area, stock, fleet), number_mil=sum(number_mil))
canump2[canump2==0] <- NA
ggplot(canump2, aes(area, fleet)) +
  geom_tile(aes(fill = number_mil), color="white") +
  scale_fill_gradient(na.value="white", low="grey", high="black") +
  theme(panel.background = element_rect(fill = "white", colour = "grey50"))
```




```
ggplot(subset(canump1, fleet %in% c("A","C","D","F") & year>1999), aes(year, number_mil, fill=fleet)) +
  geom_bar(stat = "identity")
```



CANUM & WECA

```
#read in original file

cn_txt = readLines(paste(dir_in, "cn.dat", sep=""),-1)
cn_txt1<-gsub(pattern = "\t", replace = "   ", x = cn_txt)

cw_txt = readLines(paste(dir_in, "cw.dat", sep=""),-1)
cw_txt1<-gsub(pattern = "\t", replace = "   ", x = cw_txt)

#Create new files
#canum & weca 1991-1999
```

```
cn_all<-cn_txt1
cn_all[1]=c("Herring in Sub-division 22-24 and Division IIIa (CANUM: Number in thousands), one fleet.
            Figures same as in input file 2017")
cn_all[3]=c("1991 1999")
cn_all<-cn_all[1:14]
write.table(cn_all, paste(dir_out, "cn_all.dat", sep=""), row.names=F, col.names=F, quote=FALSE)

cw_all<-cw_txt1
cw_all[1]=c("Herring in SD 22-24 and Division IIIa (spring-spawners)(WECA: Mean weight in kg), one flee
            Figures same as in input file 2017")
cw_all[3]=c("1991 1999")
cw_all<-cw_all[1:14]
write.table(cw_all, paste(dir_out, "cw_all.dat", sep=""), row.names=F, col.names=F, quote=FALSE)

#Per fleet 2000-2016
caton1<-subset(caton, !(area %in% c("22","23","24")) & !(fleet %in% c("C, D")) & year>1999)
distinct(caton1, area, fleet)
```

```
##    area fleet
## 1 22-24     F
## 2 IIIaN     C
## 3 IIIaN     D
## 4 IIIaS     C
## 5 IIIaS     D
## 6    IV     A
```

```
fak<-as.factor(caton1$fleet)

for(f in levels(fak)){catonf<-caton1[fak==f,]
cnf<-cn_txt1
cnf[1]=c(paste("Herring in Sub-division 22-24 and Division IIIa (CANUM: Number in thousands), fleet ", f
cnf[3]=c("2000 2016")
cnf<-cnf[1:5]

catonf[is.na(catonf)]<-0
catonf1<-summarise(group_by(catonf, year, stock, fleet, wr), number_mil=sum(number_mil))
catonft<-dcast(catonf1, year+stock+fleet~wr, sum)
catonft<-as.matrix(catonft[c(1:17),c(4:12)])*1000
catonft<-round(catonft, 0)
catonft1<-apply(catonft,1,paste, collapse="  ")
write.table(cnf, paste(dir_out, "cn_",f,".dat", sep=""), row.names=F, col.names=F, quote=FALSE)
write.table(catonft1, paste(dir_out, "cn_",f,".dat", sep=""), row.names=F, col.names=F, quote=FALSE, app

cwf<-cw_txt1
cwf[1]=c(paste("Herring in SD 22-24 and Division IIIa (spring-spawners)(WECA: Mean weight in kg), fleet
cwf[3]=c("2000 2016")
cwf<-cwf[1:5]

mwf<-summarise(group_by(catonf, year, stock, fleet, wr), mw_g=sum(t_1000)/sum(number_mil))
mw_ft<-dcast(mwf, year+stock+fleet~wr, sum)
mw_ft[is.na(mw_ft)]<-0
mw_ft<-as.matrix(mw_ft[c(1:17),c(4:12)])/1000
mw_ft<-round(mw_ft, 5)
mw_ft1<-apply(mw_ft,1,paste, collapse="  ")
```

```
write.table(cwf, paste(dir_out, "cw_",f,".dat", sep=""), row.names=F, col.names=F, quote=FALSE)
write.table(mw_ft1, paste(dir_out, "cw_",f,".dat", sep=""), row.names=F, col.names=F, quote=FALSE, appe

}
```

Check data

Compare with original input files

CANUM (CN)

```
cnorg<-read.table(paste(dir_in, "cn.dat", sep=""), skip=5)[c(10:26),]
colnames(cnorg)<-c("wr0","wr1","wr2","wr3","wr4","wr5","wr6","wr7","wr8")
cna<-read.table(paste(dir_out, "cn_A.dat", sep=""), skip=5)
cnc<-read.table(paste(dir_out, "cn_C.dat", sep=""), skip=5)
cnd<-read.table(paste(dir_out, "cn_D.dat", sep=""), skip=5)
cnf<-read.table(paste(dir_out, "cn_F.dat", sep=""), skip=5)

cnnew<-cna+cnc+cnd+cnf
colnames(cnnew)<-c("wr0","wr1","wr2","wr3","wr4","wr5","wr6","wr7","wr8")
cnnew1<-cnnew
cnnew1$year<-c(2000:2016)

#Sum of canum from input files with fleet - these figures should equal the figures in the spreadsheet
cnnew1
```

```
##       wr0    wr1    wr2    wr3    wr4    wr5   wr6   wr7   wr8 year
## 1  155410 935237 511101 200576 144221  79141 39920 14029 10851 2000
## 2  756314 534807 491346 258678 107955  67477 38583 18094  6610 2001
## 3  150271 659130 281840 321312 172285  57160 38532 13842  8328 2002
## 4   53488 126876 264855 161251 189432 103648 29117 17452  8820 2003
## 5  243555 457754 197813 164766  93213  91243 48956 14877 11014 2004
## 6  106906 305171 319224 177833 130393  60639 65695 31231 12620 2005
## 7    4306 134428 184143 228484 148953  97401 41967 32186 17279 2006
## 8   10720 172044 184735 143905 126863  64997 30199 21256 14759 2007
## 9    9610 175432 139503 137056  89134  85867 45300 17758 19779 2008
## 10  20734 181083 243006 101330  69936  48091 39750 20908 12528 2009
## 11  12394  75083 136419  82970  46834  29979 18589 10996 11262 2010
## 12  11812  98516  46282  38787  49324  27630 22631 12236  9334 2011
## 13   2000  76854 130802  64469  47321  35444 18170 11238 17001 2012
## 14   1029  72606  88827 114676  67175  33068 26719 11974 12004 2013
## 15  31156  66799  60111  66362  82074  26620 15751  8869  9088 2014
## 16  29980 103996 132719  59490  62543  44432 19713 10535 13017 2015
## 17  43891  49520 198982 136891  59012  42636 30671 14050 14806 2016
```

```
cncom<-cnorg-cnnew
cncom$year<-c(2000:2016)
#Difference in canum between the original input file and sum of input files per fleet
cncom
```

```
##      wr0    wr1    wr2    wr3    wr4   wr5   wr6  wr7   wr8 year
## 10 -2829   -692 -14705 -13961 -15596 -7414 -1658 -252  -162 2000
```

```
## 11   -29 -11644  -2530   -841    142   899   509  213    77 2001
## 12     0      0      0     -1      0     0     0    0     1 2002
## 13     1      0      0      0      0     0     0    0    -1 2003
## 14    -1      0     -1      0      1    -1     1   -1    -1 2004
## 15     0      0      1      0      1     0     0    0     0 2005
## 16  3640  14481   3531   4730   1701  1350   492  232    33 2006
## 17     1      0      0     -1     -2    -1     0    0     0 2007
## 18     0 -25996  -2515  -1303   3171  3569   630 -542 -2369 2008
## 19     0      0      1      0      1     0     0   -1     1 2009
## 20     0      0      0      0     -1     0     0    0     0 2010
## 21     1      0      0      0      0     0     1    0     1 2011
## 22     0      0      1     -1      1     0    -1    0     0 2012
## 23     0      0      0      0      0    -1    -1    0     1 2013
## 24     1      0     -1      0      0     0     0    0     0 2014
## 25    -1     -1      1     -1      0     0     0    0     1 2015
## 26     0      0     -1      1      0     0     1    0     1 2016
```

```
cncom_pct<-round(((cnorg-cnnew)/cnorg)*100, 2)
cncom_pct$year<-c(2000:2016)
#Pct. difference in canum between the original input file and sum of input files per fleet
cncom_pct
```

```
##       wr0    wr1   wr2   wr3    wr4    wr5   wr6   wr7    wr8 year
## 10 -1.85  -0.07 -2.96 -7.48 -12.13 -10.34 -4.33 -1.83  -1.52 2000
## 11  0.00  -2.23 -0.52 -0.33   0.13   1.31  1.30  1.16   1.15 2001
## 12  0.00   0.00  0.00  0.00   0.00   0.00  0.00  0.00   0.01 2002
## 13  0.00   0.00  0.00  0.00   0.00   0.00  0.00  0.00  -0.01 2003
## 14  0.00   0.00  0.00  0.00   0.00   0.00  0.00 -0.01  -0.01 2004
## 15  0.00   0.00  0.00  0.00   0.00   0.00  0.00  0.00   0.00 2005
## 16 45.81   9.72  1.88  2.03   1.13   1.37  1.16  0.72   0.19 2006
## 17  0.01   0.00  0.00  0.00   0.00   0.00  0.00  0.00   0.00 2007
## 18  0.00 -17.40 -1.84 -0.96   3.44   3.99  1.37 -3.15 -13.61 2008
## 19  0.00   0.00  0.00  0.00   0.00   0.00  0.00  0.00   0.01 2009
## 20  0.00   0.00  0.00  0.00   0.00   0.00  0.00  0.00   0.00 2010
## 21  0.01   0.00  0.00  0.00   0.00   0.00  0.00  0.00   0.01 2011
## 22  0.00   0.00  0.00  0.00   0.00   0.00 -0.01  0.00   0.00 2012
## 23  0.00   0.00  0.00  0.00   0.00   0.00  0.00  0.00   0.01 2013
## 24  0.00   0.00  0.00  0.00   0.00   0.00  0.00  0.00   0.00 2014
## 25  0.00   0.00  0.00  0.00   0.00   0.00  0.00  0.00   0.01 2015
## 26  0.00   0.00  0.00  0.00   0.00   0.00  0.00  0.00   0.01 2016
```

CATON

CATON has not been made by fleet, so testing CANUM*WECA against the CATON used in the model presently

```
ctorg<-read.table(paste(dir_in, "CATON.dat", sep=""), skip=5)[c(10:26),]
cwa<-read.table(paste(dir_out, "cw_A.dat", sep=""), skip=5)
cwc<-read.table(paste(dir_out, "cw_C.dat", sep=""), skip=5)
cwd<-read.table(paste(dir_out, "cw_D.dat", sep=""), skip=5)
cwf<-read.table(paste(dir_out, "cw_F.dat", sep=""), skip=5)

cta<-cna*cwa
ctc<-cnc*cwc
```

```
ctd<-cnd*cwd
ctf<-cnf*cwf

ctnew<-cta+ctc+ctd+ctf
colnames(ctnew)<-c("wr0","wr1","wr2","wr3","wr4","wr5","wr6","wr7","wr8")
ctnew1<-ctnew
ctnew1$year<-c(2000:2016)
ctnew1$totalNew<-ctnew1$wr0+ctnew1$wr1+ctnew1$wr2+ctnew1$wr3+ctnew1$wr4+ctnew1$wr5+ctnew1$wr6+ctnew1$wr
ctnew1$totalOrg<-ctorg
ctnew1$diffTon<-ctnew1$totalOrg-ctnew1$totalNew
ctnew1$diffPct<-(ctnew1$diffTon/ctnew1$totalOrg)*100

#Difference in CATON betweeen new and original input file
ctnew1[,c(10:14)]
```

```
##    year totalNew totalOrg    diffTon    diffPct
## 1  2000   118277   109914 -8362.7949 -7.6084893
## 2  2001   105803   105803     0.3811  0.0003602
## 3  2002   106189   106191     2.3356  0.0021994
## 4  2003    78310    78309    -0.5322 -0.0006796
## 5  2004    76814    76815     0.6292  0.0008191
## 6  2005    88404    88406     2.3260  0.0026310
## 7  2006    88931    90549  1618.1121  1.7870016
## 8  2007    68180    68997   817.0153  1.1841317
## 9  2008    69576    68484 -1091.7096 -1.5941090
## 10 2009    67261    67262     0.6459  0.0009602
## 11 2010    42214    42214     0.4877  0.0011553
## 12 2011    27771    27771    -0.2183 -0.0007861
## 13 2012    38648    38648     0.2423  0.0006269
## 14 2013    43829    43827    -2.3729 -0.0054143
## 15 2014    37358    37358    -0.3771 -0.0010094
## 16 2015    37491    37491     0.1566  0.0004178
## 17 2016    51298    51298    -0.0524 -0.0001021
```

WECA

```
cworg<-read.table(paste(dir_in, "cw.dat", sep=""), skip=5)[c(10:26),]
colnames(cworg)<-c("wr0","wr1","wr2","wr3","wr4","wr5","wr6","wr7","wr8")
cwnew<-(ctnew/cnnew)
colnames(cwnew)<-c("wr0","wr1","wr2","wr3","wr4","wr5","wr6","wr7","wr8")

cwcom<-round(cworg-cwnew, digits=5)
cwcom$year<-c(2000:2016)
#Difference in WECA between the original input file and sum of input files per fleet
cwcom
```

```
##         wr0      wr1      wr2      wr3      wr4      wr5      wr6      wr7
## 10 -0.00001 -0.00003 -0.00207 -0.00401 -0.00375 -0.00261 -0.00137 -0.00118
## 11  0.00000  0.00019  0.00008  0.00011  0.00013  0.00025  0.00034  0.00047
## 12  0.00000  0.00001  0.00000  0.00000  0.00000  0.00000 -0.00001  0.00001
## 13  0.00000  0.00000  0.00000  0.00000  0.00000  0.00001  0.00000 -0.00001
## 14  0.00000  0.00000  0.00000  0.00000  0.00000  0.00001 -0.00001  0.00001
## 15  0.00000  0.00000  0.00000  0.00001  0.00000  0.00000  0.00000  0.00001
```

```
## 16 -0.00416 -0.00139 -0.00023 -0.00002  0.00006  0.00008  0.00051 -0.00005
## 17  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000 -0.00001
## 18 -0.00001  0.00768  0.00057  0.00073  0.00016  0.00046  0.00054 -0.00218
## 19  0.00000 -0.00001  0.00000  0.00000 -0.00001 -0.00001  0.00000 -0.00001
## 20 -0.00001  0.00000  0.00000  0.00000  0.00000 -0.00001  0.00000 -0.00001
## 21 -0.00001  0.00000  0.00000 -0.00001  0.00000  0.00000  0.00000 -0.00001
## 22 -0.00001 -0.00001  0.00000  0.00000  0.00000 -0.00001  0.00000 -0.00001
## 23 -0.00001 -0.00001 -0.00001 -0.00001  0.00000 -0.00001 -0.00001  0.00000
## 24  0.00000  0.00000 -0.00001  0.00000  0.00000 -0.00001  0.00000  0.00000
## 25  0.00000  0.00000  0.00000  0.00000  0.00000 -0.00001 -0.00001 -0.00001
## 26  0.00000 -0.00001  0.00000  0.00001  0.00000  0.00000  0.00001  0.00000
##         wr8 year
## 10 -0.00085 2000
## 11  0.00041 2001
## 12  0.00000 2002
## 13  0.00000 2003
## 14  0.00000 2004
## 15  0.00000 2005
## 16 -0.00016 2006
## 17  0.00000 2007
## 18 -0.00577 2008
## 19  0.00000 2009
## 20  0.00000 2010
## 21  0.00000 2011
## 22 -0.00001 2012
## 23  0.00000 2013
## 24 -0.00001 2014
## 25  0.00000 2015
## 26  0.00000 2016
```

CATON

Files presently used in the model: Testing CANUMxWECA againt CATON

```
cncworg<-cnorg*cworg
colnames(cncworg)<-c("wr0","wr1","wr2","wr3","wr4","wr5","wr6","wr7","wr8")
cncworg$year<-c(2000:2016)
cncworg$caton_cnxcw<-cncworg$wr0+cncworg$wr1+cncworg$wr2+cncworg$wr3+cncworg$wr4+cncworg$wr5+cncworg$wr
cncworg$caton_CATON<-ctorg
cncworg$diffTon<-cncworg$caton_cnxcw-cncworg$caton_CATON
cncworg$diffPct<-(cncworg$diffTon/cncworg$caton_cnxcw)*100

#Difference in CATON betweeen the CATON file and cs*cn used presently
cncworg[,c(10:14)]
```

```
##    year caton_cnxcw caton_CATON   diffTon    diffPct
## 10 2000      109913      109914   -1.2731 -0.0011582
## 11 2001      105806      105803    2.5116  0.0023738
## 12 2002      106195      106191    4.1256  0.0038849
## 13 2003       78310       78309    1.2008  0.0015333
## 14 2004       76813       76815   -1.8688 -0.0024329
## 15 2005       88404       88406   -2.2381 -0.0025316
## 16 2006       90548       90549   -0.7037 -0.0007771
## 17 2007       68179       68997 -818.1416 -1.1999932
```

```
## 18 2008       69489       68484 1005.2962  1.4466921
## 19 2009       67259       67262   -3.0666 -0.0045594
## 20 2010       42214       42214   -0.2970 -0.0007035
## 21 2011       27771       27771   -0.2764 -0.0009953
## 22 2012       38646       38648   -1.6988 -0.0043957
## 23 2013       43827       43827   -0.3808 -0.0008688
## 24 2014       37358       37358   -0.4387 -0.0011742
## 25 2015       37490       37491   -1.3761 -0.0036707
## 26 2016       51299       51298    0.6424  0.0012523
```