Extreme year graphs

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```
library(ggplot2)
require(reshape)
```

```
## Loading required package: reshape
```

```
require(mgcv)
```

```
## Loading required package: mgcv

## Loading required package: nlme

## This is mgcv 1.8-12. For overview type 'help("mgcv-package")'.
```

```
require(lsmeans)
```

```
## Loading required package: lsmeans

## Loading required package: estimability
```

```
require(car)
```

```
## Loading required package: car
```

```
require(moments)
```

```
## Loading required package: moments
```

```
load("processed_data/gam2_weights_processed.Rdata")
summary(gam2.weights)
```

```
##               Model                                Site            Year     
##  species_response:57086   Howland                   :27900   Min.   :1895  
##                           Harvard                   :11570   1st Qu.:1945  
##                           Missouri Ozark            : 6500   Median :1969  
##                           Morgan Monroe State Park: 5659   Mean   :1967  
##                           Oak Openings Toledo       : 5457   3rd Qu.:1991  
##                           Austin Cary FL            :    0   Max.   :2013  
##                           (Other)                   :    0                 
##     fit.full           PlotID          TreeID        fit.tmean        
##  Min.   :-3.5612   HOW2   : 9573   HOW1006:  118   Min.   :-0.261350  
##  1st Qu.: 0.8906   HOW1   : 9256   HOW1039:  118   1st Qu.:-0.005424  
##  Median : 1.5964   HOW3   : 9071   HOW1044:  118   Median :-0.002604  
```

```
##  Mean   : 1.5435   TP1    : 5815   HOW1046:  118   Mean   :-0.003469
##  3rd Qu.: 2.2126   TP2    : 5755   HOW1049:  118   3rd Qu.: 0.011546
##  Max.   : 5.0018   OOB    : 2868   HOW1051:  118   Max.   : 0.378653
##                    (Other):14748   (Other):56378
##     sd.tmean           fit.precip          sd.precip
##  Min.   :0.0000438   Min.   :-0.070829   Min.   :4.567e-05
##  1st Qu.:0.0098388   1st Qu.:-0.006105   1st Qu.:2.878e-03
##  Median :0.0151772   Median :-0.002670   Median :4.413e-03
##  Mean   :0.0181754   Mean   :-0.000273   Mean   :5.726e-03
##  3rd Qu.:0.0234406   3rd Qu.: 0.001558   3rd Qu.:6.978e-03
##  Max.   :0.1443291   Max.   : 0.198633   Max.   :5.779e-02
##
##  fit.dbh.recon       sd.dbh.recon         fit.Year
##  Min.   :-2.34959   Min.   :0.003142   Min.   :-1.74605
##  1st Qu.:-0.74114   1st Qu.:0.009133   1st Qu.:-0.60955
##  Median : 0.03584   Median :0.017021   Median : 0.02304
##  Mean   : 0.05041   Mean   :0.020860   Mean   :-0.07674
##  3rd Qu.: 0.79419   3rd Qu.:0.027121   3rd Qu.: 0.46579
##  Max.   : 2.19686   Max.   :0.173454   Max.   : 2.23084
##
##     sd.Year           weight.tmean    weight.precip    weight.dbh.recon
##  Min.   :0.009944   Min.   :0.0000   Min.   :0.0000   Min.   :0.0000
##  1st Qu.:0.013775   1st Qu.:0.1677   1st Qu.:0.1690   1st Qu.:0.0000
##  Median :0.024272   Median :0.2477   Median :0.2469   Median :0.2128
##  Mean   :0.027517   Mean   :0.2300   Mean   :0.2297   Mean   :0.2839
##  3rd Qu.:0.035484   3rd Qu.:0.3053   3rd Qu.:0.3057   3rd Qu.:0.5504
##  Max.   :0.165720   Max.   :0.8457   Max.   :0.8817   Max.   :0.9971
##
##   weight.Year          max             factor.max        BA.inc
##  Min.   :0.0000   Min.   :0.3334   dbh.recon:24182   Min.   :  0.000
##  1st Qu.:0.0000   1st Qu.:0.4160   precip   : 5248   1st Qu.:  2.528
##  Median :0.2579   Median :0.5024   tmean    : 4388   Median :  5.351
##  Mean   :0.2563   Mean   :0.5316   Year     :23268   Mean   :  7.979
##  3rd Qu.:0.4542   3rd Qu.:0.6167                     3rd Qu.: 10.017
##  Max.   :0.9979   Max.   :0.9979                     Max.   :196.218
##
##      group       Canopy.Class  fit.full.bai         tmean.bai
##  TSCA   :13190   D   :37758   Min.   :  0.02841   Min.   :0.7700
##  PCRU   :11192   F   :    0   1st Qu.:  2.43653   1st Qu.:0.9946
##  QURU   : 7343   I   :10548   Median :  4.93500   Median :0.9974
##  ACRU   : 4860   S   : 8780   Mean   :  7.48753   Mean   :0.9990
##  QUAL   : 4211   SNAG:    0   3rd Qu.:  9.13951   3rd Qu.:1.0116
##  ACSA   : 2720                Max.   :148.68013   Max.   :1.4603
##  (Other):13570
##    precip.bai        dbh.bai        weight.tmean.bai.2 weight.precip.bai.2
##  Min.   :0.9316   Min.   :0.09541   Min.   :0.09031    Min.   :0.09023
##  1st Qu.:0.9939   1st Qu.:0.47657   1st Qu.:0.23544    1st Qu.:0.23749
##  Median :0.9973   Median :1.03649   Median :0.32746    Median :0.32899
##  Mean   :0.9998   Mean   :1.71408   Mean   :0.31405    Mean   :0.31506
##  3rd Qu.:1.0016   3rd Qu.:2.21264   3rd Qu.:0.40264    3rd Qu.:0.40249
##  Max.   :1.2197   Max.   :8.99669   Max.   :0.55599    Max.   :0.53430
##
##  weight.dbh.bai.2       max2           factor.max2    State
##  Min.   :0.04206   Min.   :0.3334   dbh.recon:28871   IN: 5659
```

```
##  1st Qu.:0.19228   1st Qu.:0.3940   precip   :11118   MA:11570
##  Median :0.34140   Median :0.4401   tmean    :17097   ME:27900
##  Mean   :0.37089   Mean   :0.4782                     MO: 6500
##  3rd Qu.:0.52628   3rd Qu.:0.5268                     OH: 5457
##  Max.   :0.81907   Max.   :0.8191
##
##   BA.inc.Clim          Clim.Rel        Temp.Mark    Precip.Mark
##  Min.   : -7.9787   Min.   :-33.8016   A   :52071   A  :52259
##  1st Qu.:  0.4559   1st Qu.: -0.8492   cold: 2531   dry: 2515
##  Median :  2.8239   Median : -0.2891   hot : 2484   wet: 2312
##  Mean   :  5.1278   Mean   :  0.0000
##  3rd Qu.:  6.8416   3rd Qu.:  0.5439
##  Max.   :187.5827   Max.   : 17.3503
##
```

probabity density functions for extreme years

```
load("processed_data/climate_markeryears.Rdata")
summary(gam2.weights)
```

```
##               Model                                Site            Year
##  species_response:57086   Howland                  :27900   Min.   :1895
##                           Harvard                  :11570   1st Qu.:1945
##                           Missouri Ozark           : 6500   Median :1969
##                           Morgan Monroe State Park: 5659   Mean   :1967
##                           Oak Openings Toledo      : 5457   3rd Qu.:1991
##                           Austin Cary FL           :    0   Max.   :2013
##                           (Other)                  :    0
##     fit.full           PlotID          TreeID        fit.tmean
##  Min.   :-3.5612   HOW2   : 9573   HOW1006:  118   Min.   :-0.261350
##  1st Qu.: 0.8906   HOW1   : 9256   HOW1039:  118   1st Qu.:-0.005424
##  Median : 1.5964   HOW3   : 9071   HOW1044:  118   Median :-0.002604
##  Mean   : 1.5435   TP1    : 5815   HOW1046:  118   Mean   :-0.003469
##  3rd Qu.: 2.2126   TP2    : 5755   HOW1049:  118   3rd Qu.: 0.011546
##  Max.   : 5.0018   OOB    : 2868   HOW1051:  118   Max.   : 0.378653
##                   (Other):14748   (Other):56378
##     sd.tmean           fit.precip          sd.precip
##  Min.   :0.0000438   Min.   :-0.070829   Min.   :4.567e-05
##  1st Qu.:0.0098388   1st Qu.:-0.006105   1st Qu.:2.878e-03
##  Median :0.0151772   Median :-0.002670   Median :4.413e-03
##  Mean   :0.0181754   Mean   :-0.000273   Mean   :5.726e-03
##  3rd Qu.:0.0234406   3rd Qu.: 0.001558   3rd Qu.:6.978e-03
##  Max.   :0.1443291   Max.   : 0.198633   Max.   :5.779e-02
##
##  fit.dbh.recon       sd.dbh.recon         fit.Year
##  Min.   :-2.34959   Min.   :0.003142   Min.   :-1.74605
##  1st Qu.:-0.74114   1st Qu.:0.009133   1st Qu.:-0.60955
##  Median : 0.03584   Median :0.017021   Median : 0.02304
##  Mean   : 0.05041   Mean   :0.020860   Mean   :-0.07674
##  3rd Qu.: 0.79419   3rd Qu.:0.027121   3rd Qu.: 0.46579
##  Max.   : 2.19686   Max.   :0.173454   Max.   : 2.23084
```

```
##
##     sd.Year          weight.tmean    weight.precip    weight.dbh.recon
##  Min.   :0.009944   Min.   :0.0000   Min.   :0.0000   Min.   :0.0000
##  1st Qu.:0.013775   1st Qu.:0.1677   1st Qu.:0.1690   1st Qu.:0.0000
##  Median :0.024272   Median :0.2477   Median :0.2469   Median :0.2128
##  Mean   :0.027517   Mean   :0.2300   Mean   :0.2297   Mean   :0.2839
##  3rd Qu.:0.035484   3rd Qu.:0.3053   3rd Qu.:0.3057   3rd Qu.:0.5504
##  Max.   :0.165720   Max.   :0.8457   Max.   :0.8817   Max.   :0.9971
##
##   weight.Year          max             factor.max        BA.inc
##  Min.   :0.0000   Min.   :0.3334   dbh.recon:24182   Min.   :  0.000
##  1st Qu.:0.0000   1st Qu.:0.4160   precip   : 5248   1st Qu.:  2.528
##  Median :0.2579   Median :0.5024   tmean    : 4388   Median :  5.351
##  Mean   :0.2563   Mean   :0.5316   Year     :23268   Mean   :  7.979
##  3rd Qu.:0.4542   3rd Qu.:0.6167                     3rd Qu.: 10.017
##  Max.   :0.9979   Max.   :0.9979                     Max.   :196.218
##
##      group       Canopy.Class  fit.full.bai         tmean.bai
##  TSCA   :13190   D   :37758   Min.   :  0.02841   Min.   :0.7700
##  PCRU   :11192   F   :    0   1st Qu.:  2.43653   1st Qu.:0.9946
##  QURU   : 7343   I   :10548   Median :  4.93500   Median :0.9974
##  ACRU   : 4860   S   : 8780   Mean   :  7.48753   Mean   :0.9990
##  QUAL   : 4211   SNAG:    0   3rd Qu.:  9.13951   3rd Qu.:1.0116
##  ACSA   : 2720                Max.   :148.68013   Max.   :1.4603
##  (Other):13570
##    precip.bai        dbh.bai        weight.tmean.bai.2 weight.precip.bai.2
##  Min.   :0.9316   Min.   :0.09541   Min.   :0.09031    Min.   :0.09023
##  1st Qu.:0.9939   1st Qu.:0.47657   1st Qu.:0.23544    1st Qu.:0.23749
##  Median :0.9973   Median :1.03649   Median :0.32746    Median :0.32899
##  Mean   :0.9998   Mean   :1.71408   Mean   :0.31405    Mean   :0.31506
##  3rd Qu.:1.0016   3rd Qu.:2.21264   3rd Qu.:0.40264    3rd Qu.:0.40249
##  Max.   :1.2197   Max.   :8.99669   Max.   :0.55599    Max.   :0.53430
##
##  weight.dbh.bai.2       max2          factor.max2    State
##  Min.   :0.04206   Min.   :0.3334   dbh.recon:28871   IN: 5659
##  1st Qu.:0.19228   1st Qu.:0.3940   precip   :11118   MA:11570
##  Median :0.34140   Median :0.4401   tmean    :17097   ME:27900
##  Mean   :0.37089   Mean   :0.4782                     MO: 6500
##  3rd Qu.:0.52628   3rd Qu.:0.5268                     OH: 5457
##  Max.   :0.81907   Max.   :0.8191
##
##   BA.inc.Clim          Clim.Rel        Temp.Mark    Precip.Mark
##  Min.   : -7.9787   Min.   :-33.8016   A   :52071   A  :52259
##  1st Qu.:  0.4559   1st Qu.: -0.8492   cold: 2531   dry: 2515
##  Median :  2.8239   Median : -0.2891   hot : 2484   wet: 2312
##  Mean   :  5.1278   Mean   :  0.0000
##  3rd Qu.:  6.8416   3rd Qu.:  0.5439
##  Max.   :187.5827   Max.   : 17.3503
##
```

```
# Making a combined temp/precip marker year
gam2.weights$mix.mark <- as.factor(paste(gam2.weights$Temp.Mark, gam2.weights$Precip.Mark, sep="-"))
summary(gam2.weights)
```

```
##               Model                                Site            Year
##  species_response:57086   Howland                  :27900   Min.   :1895
##                           Harvard                  :11570   1st Qu.:1945
##                           Missouri Ozark           : 6500   Median :1969
##                           Morgan Monroe State Park: 5659   Mean   :1967
##                           Oak Openings Toledo      : 5457   3rd Qu.:1991
##                           Austin Cary FL           :    0   Max.   :2013
##                           (Other)                  :    0
##     fit.full           PlotID          TreeID        fit.tmean
##  Min.   :-3.5612   HOW2   : 9573   HOW1006:  118   Min.   :-0.261350
##  1st Qu.: 0.8906   HOW1   : 9256   HOW1039:  118   1st Qu.:-0.005424
##  Median : 1.5964   HOW3   : 9071   HOW1044:  118   Median :-0.002604
##  Mean   : 1.5435   TP1    : 5815   HOW1046:  118   Mean   :-0.003469
##  3rd Qu.: 2.2126   TP2    : 5755   HOW1049:  118   3rd Qu.: 0.011546
##  Max.   : 5.0018   OOB    : 2868   HOW1051:  118   Max.   : 0.378653
##                    (Other):14748   (Other):56378
##     sd.tmean           fit.precip          sd.precip
##  Min.   :0.0000438   Min.   :-0.070829   Min.   :4.567e-05
##  1st Qu.:0.0098388   1st Qu.:-0.006105   1st Qu.:2.878e-03
##  Median :0.0151772   Median :-0.002670   Median :4.413e-03
##  Mean   :0.0181754   Mean   :-0.000273   Mean   :5.726e-03
##  3rd Qu.:0.0234406   3rd Qu.: 0.001558   3rd Qu.:6.978e-03
##  Max.   :0.1443291   Max.   : 0.198633   Max.   :5.779e-02
##
##  fit.dbh.recon       sd.dbh.recon         fit.Year
##  Min.   :-2.34959   Min.   :0.003142   Min.   :-1.74605
##  1st Qu.:-0.74114   1st Qu.:0.009133   1st Qu.:-0.60955
##  Median : 0.03584   Median :0.017021   Median : 0.02304
##  Mean   : 0.05041   Mean   :0.020860   Mean   :-0.07674
##  3rd Qu.: 0.79419   3rd Qu.:0.027121   3rd Qu.: 0.46579
##  Max.   : 2.19686   Max.   :0.173454   Max.   : 2.23084
##
##     sd.Year           weight.tmean    weight.precip    weight.dbh.recon
##  Min.   :0.009944   Min.   :0.0000   Min.   :0.0000   Min.   :0.0000
##  1st Qu.:0.013775   1st Qu.:0.1677   1st Qu.:0.1690   1st Qu.:0.0000
##  Median :0.024272   Median :0.2477   Median :0.2469   Median :0.2128
##  Mean   :0.027517   Mean   :0.2300   Mean   :0.2297   Mean   :0.2839
##  3rd Qu.:0.035484   3rd Qu.:0.3053   3rd Qu.:0.3057   3rd Qu.:0.5504
##  Max.   :0.165720   Max.   :0.8457   Max.   :0.8817   Max.   :0.9971
##
##   weight.Year           max             factor.max        BA.inc
##  Min.   :0.0000   Min.   :0.3334   dbh.recon:24182   Min.   :  0.000
##  1st Qu.:0.0000   1st Qu.:0.4160   precip   : 5248   1st Qu.:  2.528
##  Median :0.2579   Median :0.5024   tmean    : 4388   Median :  5.351
##  Mean   :0.2563   Mean   :0.5316   Year     :23268   Mean   :  7.979
##  3rd Qu.:0.4542   3rd Qu.:0.6167                     3rd Qu.: 10.017
##  Max.   :0.9979   Max.   :0.9979                     Max.   :196.218
##
##      group       Canopy.Class  fit.full.bai         tmean.bai
##  TSCA   :13190   D   :37758   Min.   :  0.02841   Min.   :0.7700
##  PCRU   :11192   F   :    0   1st Qu.:  2.43653   1st Qu.:0.9946
##  QURU   : 7343   I   :10548   Median :  4.93500   Median :0.9974
##  ACRU   : 4860   S   : 8780   Mean   :  7.48753   Mean   :0.9990
##  QUAL   : 4211   SNAG:    0   3rd Qu.:  9.13951   3rd Qu.:1.0116
```

```
##  ACSA    : 2720                Max.   :148.68013   Max.   :1.4603
##  (Other):13570
##    precip.bai        dbh.bai        weight.tmean.bai.2 weight.precip.bai.2
##  Min.   :0.9316   Min.   :0.09541   Min.   :0.09031    Min.   :0.09023
##  1st Qu.:0.9939   1st Qu.:0.47657   1st Qu.:0.23544    1st Qu.:0.23749
##  Median :0.9973   Median :1.03649   Median :0.32746    Median :0.32899
##  Mean   :0.9998   Mean   :1.71408   Mean   :0.31405    Mean   :0.31506
##  3rd Qu.:1.0016   3rd Qu.:2.21264   3rd Qu.:0.40264    3rd Qu.:0.40249
##  Max.   :1.2197   Max.   :8.99669   Max.   :0.55599    Max.   :0.53430
##
##  weight.dbh.bai.2       max2           factor.max2    State
##  Min.   :0.04206   Min.   :0.3334   dbh.recon:28871   IN: 5659
##  1st Qu.:0.19228   1st Qu.:0.3940   precip   :11118   MA:11570
##  Median :0.34140   Median :0.4401   tmean    :17097   ME:27900
##  Mean   :0.37089   Mean   :0.4782                     MO: 6500
##  3rd Qu.:0.52628   3rd Qu.:0.5268                     OH: 5457
##  Max.   :0.81907   Max.   :0.8191
##
##   BA.inc.Clim          Clim.Rel        Temp.Mark    Precip.Mark
##  Min.   : -7.9787   Min.   :-33.8016   A   :52071   A  :52259
##  1st Qu.:  0.4559   1st Qu.: -0.8492   cold: 2531   dry: 2515
##  Median :  2.8239   Median : -0.2891   hot : 2484   wet: 2312
##  Mean   :  5.1278   Mean   :  0.0000
##  3rd Qu.:  6.8416   3rd Qu.:  0.5439
##  Max.   :187.5827   Max.   : 17.3503
##
##     mix.mark
##  A-A    :48026
##  A-dry  : 1872
##  A-wet  : 2173
##  cold-A : 2531
##  hot-A  : 1702
##  hot-dry:  643
##  hot-wet:  139
```

```
# calculating median BAI for temp and precip
median.temp.s <- data.frame(type= unique(gam2.weights$Temp.Mark))
for(i in unique(gam2.weights$Temp.Mark)){
  median.temp.s[median.temp.s$type==i,"median"] <- median(gam2.weights[gam2.weights$Temp.Mark==i & gam2
}
median.temp.s$Canopy.Class <- as.factor("S")
median.temp.i <- data.frame(type= unique(gam2.weights$Temp.Mark))
for(i in unique(gam2.weights$Temp.Mark)){
  median.temp.i[median.temp.s$type==i,"median"] <- median(gam2.weights[gam2.weights$Temp.Mark==i & gam2
}
median.temp.i$Canopy.Class <- as.factor("I")

median.temp.d <- data.frame(type= unique(gam2.weights$Temp.Mark))
for(i in unique(gam2.weights$Temp.Mark)){
  median.temp.d[median.temp.s$type==i,"median"] <- median(gam2.weights[gam2.weights$Temp.Mark==i & gam2
}
median.temp.d$Canopy.Class <- as.factor("D")

median.temp <- rbind(median.temp.d, median.temp.i, median.temp.s)
```

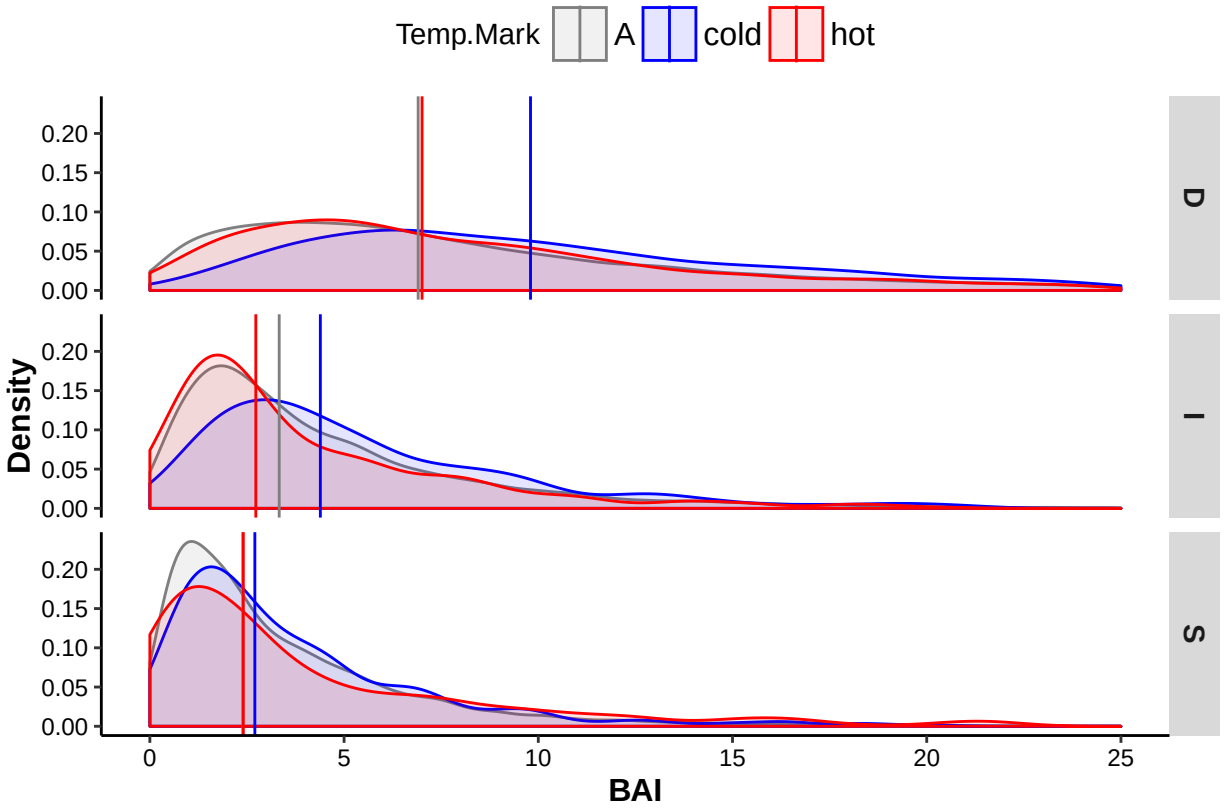
```
#############
# Precip
median.precip.s <- data.frame(type= unique(gam2.weights$Precip.Mark))
for(i in unique(gam2.weights$Precip.Mark)){
  median.precip.s[median.precip.s$type==i,"median"] <- median(gam2.weights[gam2.weights$Precip.Mark==i &
}
median.precip.s$Canopy.Class <- as.factor("S")
median.precip.i <- data.frame(type= unique(gam2.weights$Precip.Mark))
for(i in unique(gam2.weights$Precip.Mark)){
  median.precip.i[median.precip.s$type==i,"median"] <- median(gam2.weights[gam2.weights$Precip.Mark==i &
}
median.precip.i$Canopy.Class <- as.factor("I")

median.precip.d <- data.frame(type= unique(gam2.weights$Precip.Mark))
for(i in unique(gam2.weights$Precip.Mark)){
  median.precip.d[median.precip.s$type==i,"median"] <- median(gam2.weights[gam2.weights$Precip.Mark==i &
}
median.precip.d$Canopy.Class <- as.factor("D")

median.precip <- rbind(median.precip.d, median.precip.i, median.precip.s)
```

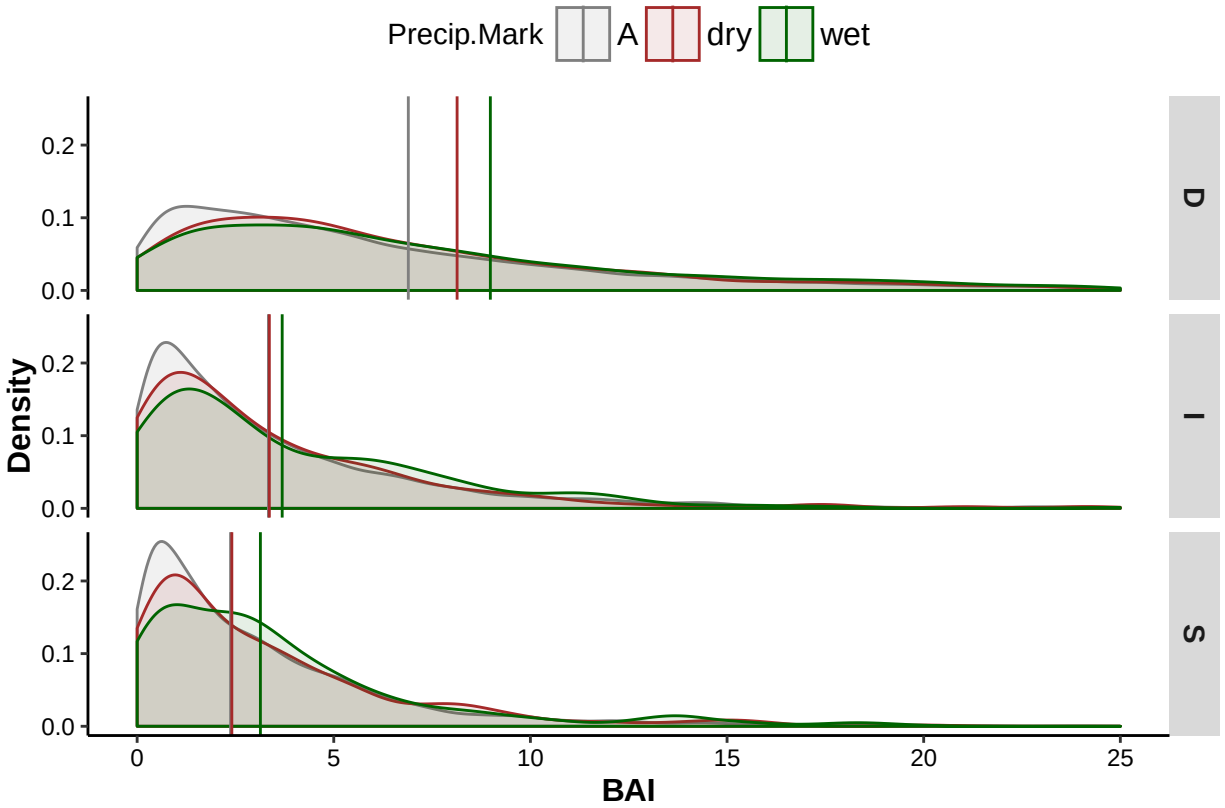
```
ggplot(gam2.weights) + facet_grid(Canopy.Class~.) +
    geom_density(aes(x=BA.inc,color=Temp.Mark, fill=Temp.Mark), alpha=0.1) +
  geom_vline(data=median.temp, aes(xintercept=median, color=type)) +
  scale_color_manual(values=c("grey50", "blue", "red")) +
    scale_fill_manual(values=c("grey50", "blue", "red")) +
    xlim(0,25) +
    labs(x= "BAI", y="Density") +
    theme(axis.line=element_line(color="black"),
        panel.grid.major=element_blank(),
        panel.grid.minor=element_blank(),
        panel.border=element_blank(),
        panel.background=element_blank(),
        axis.text.x=element_text(angle=0, color="black", size=rel(1)),
        axis.text.y=element_text(angle=0, color="black", size=rel(1)),
        strip.text=element_text(face="bold", size=rel(1.0)),
        axis.line.x = element_line(color="black", size = 0.5),
        axis.line.y = element_line(color="black", size = 0.5),
        legend.position="top",
        legend.key.size = unit(0.75, "cm"),
        legend.text = element_text(size=rel(1.1)),
        legend.key = element_rect(fill = "white")) +
        guides(color=guide_legend(nrow=1)) +
    theme(axis.title.y= element_text(size=rel(1.1), face="bold"))+
    theme(axis.title.x= element_text(size=rel(1.1), face="bold"))
```

```
## Warning: Removed 2568 rows containing non-finite values (stat_density).
```




```
ggplot(gam2.weights) + facet_grid(Canopy.Class~.) +
    geom_density(aes(x=BA.inc.Clim,color=Precip.Mark, fill=Precip.Mark), alpha=0.1) +
  geom_vline(data=median.precip, aes(xintercept=median, color=type)) +
  scale_color_manual(values=c("grey50", "brown", "darkgreen")) +
    scale_fill_manual(values=c("grey50", "brown", "darkgreen")) +
    xlim(0,25) +
    labs(x= "BAI", y="Density") +
    theme(axis.line=element_line(color="black"),
        panel.grid.major=element_blank(),
        panel.grid.minor=element_blank(),
        panel.border=element_blank(),
        panel.background=element_blank(),
        axis.text.x=element_text(angle=0, color="black", size=rel(1)),
        axis.text.y=element_text(angle=0, color="black", size=rel(1)),
        strip.text=element_text(face="bold", size=rel(1.0)),
        axis.line.x = element_line(color="black", size = 0.5),
        axis.line.y = element_line(color="black", size = 0.5),
        legend.position="top",
        legend.key.size = unit(0.75, "cm"),
        legend.text = element_text(size=rel(1.1)),
        legend.key = element_rect(fill = "white")) +
        guides(color=guide_legend(nrow=1)) +
    theme(axis.title.y= element_text(size=rel(1.1), face="bold"))+
    theme(axis.title.x= element_text(size=rel(1.1), face="bold"))
```

```
## Warning: Removed 12438 rows containing non-finite values (stat_density).
```



counterintuitive happeneings in the dominant canopy class