Extreme year graphs

M. Ross Alexander 10/3/2016

```
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
                                                            1st Qu.:1945
##
                            Harvard
                                                    :11570
##
                            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
                                         TreeID
##
      fit.full
                         PlotID
                                                      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
                     00B
                         : 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
                             : 0.198633
                                          Max. :5.779e-02
##
   fit.dbh.recon
                       sd.dbh.recon
                                           fit.Year
##
##
  Min. :-2.34959
                            :0.003142
                      Min.
                                        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.:0.1677
                                      1st Qu.:0.1690
##
   1st Qu.:0.013775
                                                      1st Qu.:0.0000
   Median :0.024272
                      Median :0.2477
                                      Median :0.2469
                                                      Median: 0.2128
   Mean :0.027517
                                      Mean :0.2297
##
                      Mean :0.2300
                                                      Mean :0.2839
                                      3rd Qu.:0.3057
   3rd Qu.:0.035484
                      3rd Qu.:0.3053
                                                      3rd Qu.:0.5504
##
   Max. :0.165720
                     Max.
                            :0.8457
                                      Max. :0.8817
                                                      Max. :0.9971
##
##
    weight.Year
                                        factor.max
                                                         BA.inc
                        max
   Min.
         :0.0000
                    Min. :0.3334
                                    dbh.recon:24182
                                                     Min. : 0.000
                                                      1st Qu.: 2.528
##
   1st Qu.:0.0000
                    1st Qu.:0.4160
                                    precip
                                            : 5248
##
   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
                               1st Qu.: 2.43653
##
          :11192
                   F
                      :
                           0
                                                   1st Qu.:0.9946
##
   QURU
         : 7343
                   Ι
                      :10548
                               Median : 4.93500
                                                  Median :0.9974
   ACRU
         : 4860
                   S : 8780
                               Mean : 7.48753
                                                   Mean :0.9990
                               3rd Qu.: 9.13951
##
   QUAL
         : 4211
                   SNAG:
                           0
                                                   3rd Qu.:1.0116
   ACSA
         : 2720
                               Max. :148.68013
                                                   Max. :1.4603
##
   (Other):13570
##
                                     weight.tmean.bai.2 weight.precip.bai.2
     precip.bai
                       dbh.bai
                                                       Min. :0.09023
##
   Min.
          :0.9316
                          :0.09541
                                     Min.
                                          :0.09031
                    Min.
   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
           :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
                                                        Precip.Mark
##
                                           Temp.Mark
          : -7.9787
##
    Min.
                       Min.
                              :-33.8016
                                              :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)
```

```
##
                                                                      Year
                 Model
                                                     Site
##
    species_response:57086
                              Howland
                                                        :27900
                                                                 Min.
                                                                        :1895
##
                                                                 1st Qu.:1945
                              Harvard
                                                        :11570
##
                              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
           :-3.5612
                      HOW2
                              : 9573
                                       HOW1006: 118
##
    Min.
                                                        Min.
                                                                :-0.261350
    1st Qu.: 0.8906
                      HOW1
                              : 9256
                                       HOW1039:
                                                  118
                                                         1st Qu.:-0.005424
    Median: 1.5964
                       EWOH
                              : 9071
                                                        Median :-0.002604
##
                                       HOW1044:
                                                  118
##
    Mean
          : 1.5435
                       TP1
                              : 5815
                                       HOW1046:
                                                  118
                                                        Mean
                                                                :-0.003469
##
    3rd Qu.: 2.2126
                      TP2
                              : 5755
                                       HOW1049:
                                                  118
                                                        3rd Qu.: 0.011546
##
           : 5.0018
                              : 2868
                                       HOW1051:
                                                        Max.
                                                                : 0.378653
##
                       (Other):14748
                                        (Other):56378
##
       sd.tmean
                           fit.precip
                                                sd.precip
##
           :0.0000438
                                :-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.:6.978e-03
                         3rd Qu.: 0.001558
##
    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
          : 0.05041
                               :0.020860
##
    Mean
                        Mean
                                            Mean
                                                   :-0.07674
    3rd Qu.: 0.79419
                        3rd Qu.:0.027121
                                            3rd Qu.: 0.46579
##
    Max.
          : 2.19686
                        Max.
                               :0.173454
                                            Max.
                                                   : 2.23084
```

```
Min. :0.0000
   Min.
         :0.009944
                                      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
                                                      1st Qu.: 2.528
##
                                    precip : 5248
   Median :0.2579
                    Median :0.5024
                                                      Median : 5.351
                                     tmean
                                            : 4388
   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
                      :37758
                               Min. : 0.02841
                                                        :0.7700
##
                                                   Min.
                   D
   PCRU
                                1st Qu.: 2.43653
          :11192
                   F
                            0
                                                   1st Qu.:0.9946
                                                   Median :0.9974
##
   QURU
          : 7343
                   Ι
                       :10548
                               Median: 4.93500
   ACRU
         : 4860
                     : 8780
                               Mean
                                     : 7.48753
                                                   Mean :0.9990
   QUAL
         : 4211
                               3rd Qu.: 9.13951
##
                   SNAG:
                            0
                                                   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
         :1.2197
##
   Max.
                    Max.
                          :8.99669
                                     Max.
                                            :0.55599
                                                        Max.
                                                               :0.53430
##
##
   weight.dbh.bai.2
                                        factor.max2
                                                       State
                          max2
                     Min. :0.3334
   Min.
         :0.04206
                                     dbh.recon:28871
                                                       IN: 5659
                                     precip :11118
   1st Qu.:0.19228
                     1st Qu.:0.3940
                                                       MA:11570
  Median :0.34140
                     Median: 0.4401
                                              :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 : 0.0000
## Mean : 5.1278
   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="-"))
```

weight.precip

weight.dbh.recon

##

##

sd.Year

summary(gam2.weights)

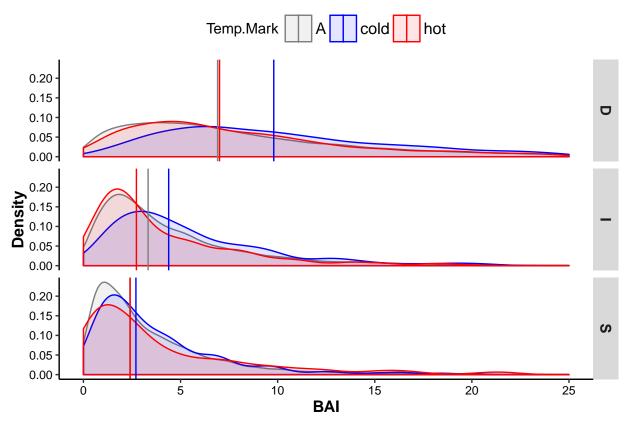
weight.tmean

```
##
                  Model
                                                      Site
                                                                       Year
    species_response:57086
##
                              Howland
                                                                          :1895
                                                        :27900
                                                                  Min.
                              Harvard
##
                                                        :11570
                                                                  1st Qu.:1945
##
                                                                  Median:1969
                              Missouri Ozark
                                                        : 6500
##
                              Morgan Monroe State Park: 5659
                                                                  Mean
                                                                         :1967
##
                               Oak Openings Toledo
                                                        : 5457
                                                                  3rd Qu.:1991
##
                               Austin Cary FL
                                                        :
                                                              0
                                                                  Max.
                               (Other)
                                                              0
##
##
       fit.full
                           PlotID
                                            TreeID
                                                           fit.tmean
           :-3.5612
                                                                 :-0.261350
##
    Min.
                       HOW2
                               : 9573
                                        HOW1006: 118
                                                         Min.
    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:
                                                         3rd Qu.: 0.011546
                                                   118
##
    Max.
           : 5.0018
                               : 2868
                                        HOW1051:
                                                   118
                                                         Max.
                                                                 : 0.378653
                       00B
##
                       (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
                                 :-0.000273
##
    Mean
           :0.0181754
                         Mean
                                              Mean
                                                      :5.726e-03
##
    3rd Qu.:0.0234406
                         3rd Qu.: 0.001558
                                               3rd Qu.:6.978e-03
##
    Max.
           :0.1443291
                                 : 0.198633
                                               Max.
                                                      :5.779e-02
                         Max.
##
##
                         sd.dbh.recon
    fit.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
                                :0.0000
                                          Min.
                                                 :0.0000
##
                        Min.
                                                            Min.
                                                                    :0.0000
##
    1st Qu.:0.013775
                        1st Qu.:0.1677
                                          1st Qu.:0.1690
                                                             1st Qu.:0.0000
    Median :0.024272
                                          Median :0.2469
##
                        Median: 0.2477
                                                            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
                                            factor.max
                                                                BA.inc
                           max
##
    Min.
           :0.0000
                              :0.3334
                                        dbh.recon:24182
                                                           Min.
                                                                  : 0.000
                      Min.
    1st Qu.:0.0000
                      1st Qu.:0.4160
                                                            1st Qu.: 2.528
##
                                        precip
                                                  : 5248
##
    Median :0.2579
                      Median :0.5024
                                        tmean
                                                  : 4388
                                                           Median: 5.351
                                                  :23268
    Mean
           :0.2563
                      Mean
                              :0.5316
                                        Year
                                                            Mean
                                                                   : 7.979
##
    3rd Qu.:0.4542
                      3rd Qu.:0.6167
                                                            3rd Qu.: 10.017
                                                                   :196.218
##
    Max.
           :0.9979
                      Max.
                             :0.9979
                                                           Max.
##
##
                     Canopy.Class
                                  fit.full.bai
                                                          tmean.bai
        group
##
    TSCA
           :13190
                         :37758
                                   Min.
                                             0.02841
                                                        Min.
                                                                :0.7700
##
    PCRU
           :11192
                     F
                              0
                                             2.43653
                                                        1st Qu.:0.9946
                                   1st Qu.:
    QURU
##
           : 7343
                     Ι
                         :10548
                                   Median :
                                             4.93500
                                                        Median : 0.9974
##
    ACRU
           : 4860
                     S
                         : 8780
                                   Mean
                                         :
                                             7.48753
                                                        Mean
                                                                :0.9990
                                   3rd Qu.:
##
    QUAL
           : 4211
                     SNAG:
                              0
                                             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
                          :0.09541
                                             :0.09031
                                                        Min.
                                                               :0.09023
## Min.
          :0.9316
                    Min.
                                      Min.
## 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.
                     Min. :0.3334
                                      dbh.recon:28871
                                                       IN: 5659
          :0.04206
## 1st Qu.:0.19228
                     1st Qu.:0.3940
                                      precip :11118
                                                       MA:11570
## Median :0.34140
                     Median :0.4401
                                               :17097
                                                       ME:27900
         :0.37089
                           :0.4782
                                                        MO: 6500
## Mean
                     Mean
   3rd Qu.:0.52628
                     3rd Qu.:0.5268
                                                        OH: 5457
## Max. :0.81907
                     Max. :0.8191
##
##
    BA.inc.Clim
                         Clim.Rel
                                                     Precip.Mark
                                         Temp.Mark
## Min. : -7.9787
                     Min. :-33.8016
                                        Α
                                            :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$Temp.Mark))</pre>
for(i in unique(gam2.weights$Temp.Mark)){
 median.temp.s[median.temp.s$type==i,"median"] <- median(gam2.weights[gam2.weights$Temp.Mark==i & gam2
median.temp.s$Canopy.Class <- as.factor("S")</pre>
median.temp.i <- data.frame(type= unique(gam2.weights$Temp.Mark))</pre>
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")</pre>
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")</pre>
median.temp <- rbind(median.temp.d, median.temp.i, median.temp.s)</pre>
```

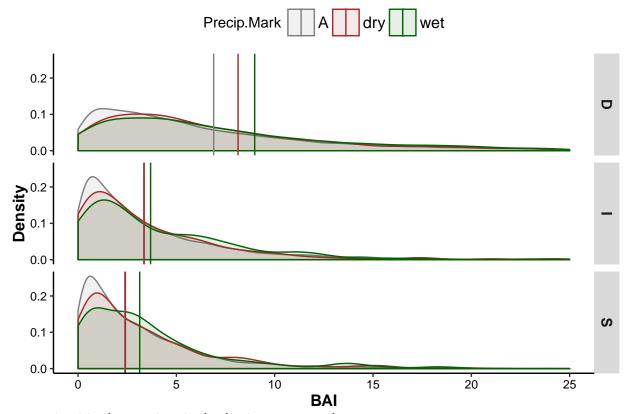
```
#############
# Precip
median.precip.s <- data.frame(type= unique(gam2.weights$Precip.Mark))</pre>
for(i in unique(gam2.weights$Precip.Mark)){
  median.precip.s[median.precip.s$type==i,"median"] <- median(gam2.weights[gam2.weights$Precip.Mark==i
median.precip.s$Canopy.Class <- as.factor("S")</pre>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