Exploratory figures for biomass modeling effort

Alice Stears

2025-10-20

Contents

Predict relative and absolute cover from the climate/weather/soils data that corresponds to the biomass data we have **3**

Modeled, relative cover **3**

These figures show the relationship between *modeled, relative* cover by functional group when the cover values have been relativized and scaled 3

These figures show the relationship between *modeled, relative* cover by functional group for the 'tier one' groups' when the cover values have been relativized and scaled 5

Modeled, absolute cover **6**

These figures show the relationship between *modeled, absolute* cover by functional group (before relativizing but after scaling according to ecoregion) 6

These figures show the relationship between **modeled, absolute* cover by 'tier one' functional groups (before relativizing but after scaling according to ecoregion) 8

Raw cover **9**

These figures show the relationship between *raw* cover by functional group 9

These figures show the relationship between *raw* cover by functional group for the 'tier one' groups' 11

These figures compare total tree cover (both modeled and raw) to total tree biomass from FIA **11**

These figures compare total herbaceous cover (both modeled and raw) to total herbaceous biomass from RAP **12**

Why are high biomass values associated with more intermediate cover values in many cases? **13**

relationship of high biomass points to total tree and herbaceous cover (modoeled relative cover) . . 13

spatial locations of high biomass points 14

are the predictors associated with high biomass in a particular part of the distributions of the possible predictors? 15

Residuals for the final, relativized and scaled predictions from models 18

Compare observed cover to final modeled cover and modeled absolute cover, color-coded by biomass **19**

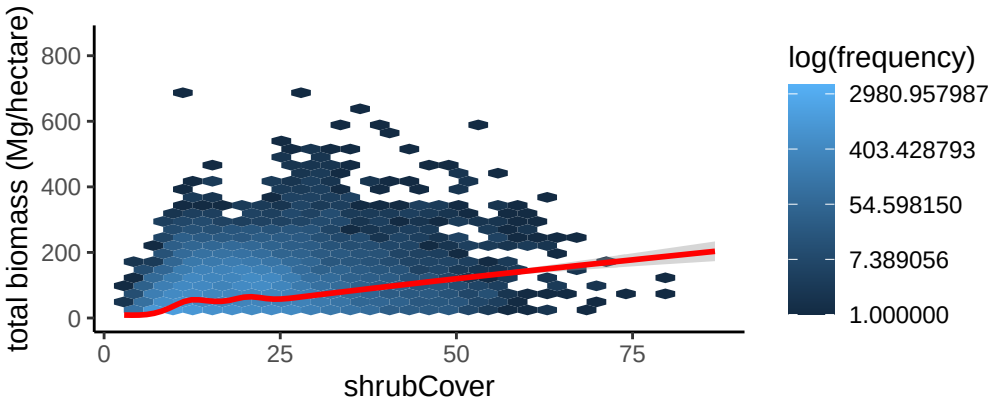
This document contains figures to explore the underlying relationships between biomass and cover in the data we're using to fit biomass models.

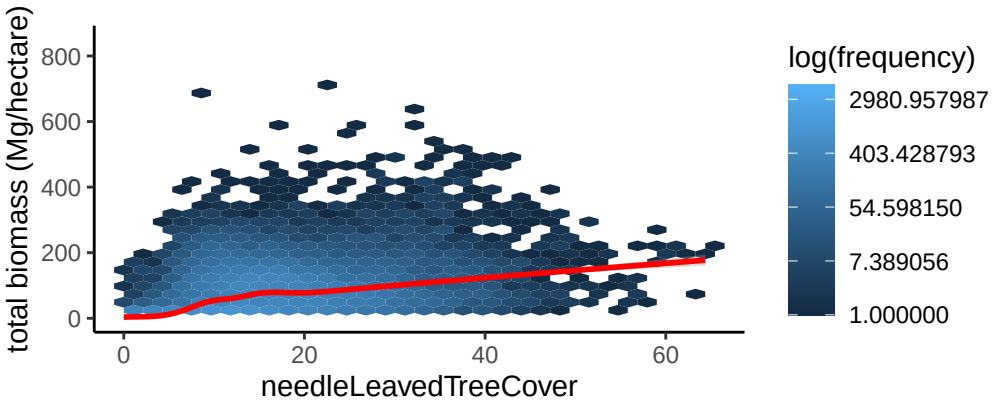
```
# Set user defined parameters
knitr::opts_chunk$set(echo=FALSE)
knitr::opts_chunk$set(warning=FALSE)
knitr::opts_chunk$set(message=FALSE)
#coverType <- params$coverType
ecoregion <- params$ecoregion
trimPreds <- params$trimPreds
curtailResponse <- params$curtailResponse
trimThreshold <- params$trimThreshold
# print
#print(paste0("For this model run, the ecoregion is ", ecoregion," and the cover type used as a predict
#if(trimPreds == TRUE) {
#  print(paste0("Also, skewed predictors (carbon, coarse, precip of wettest month and precip of driest
#}
```

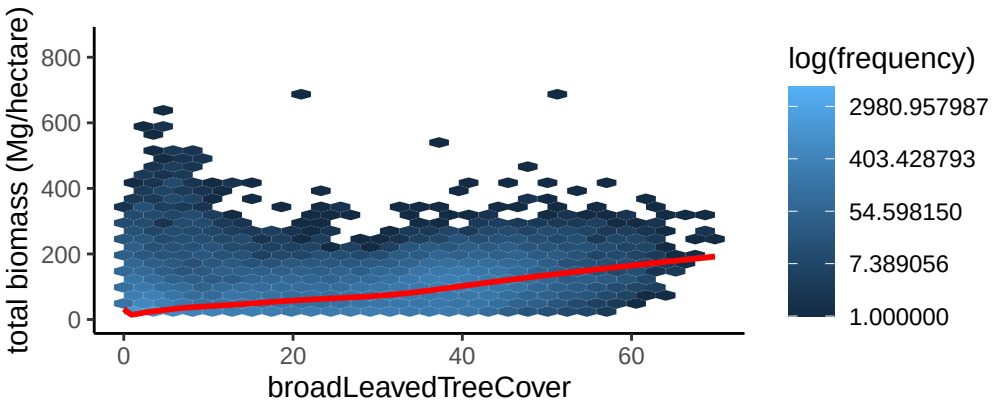
Predict relative and absolute cover from the climate/weather/soils data that corresponds to the biomass data we have

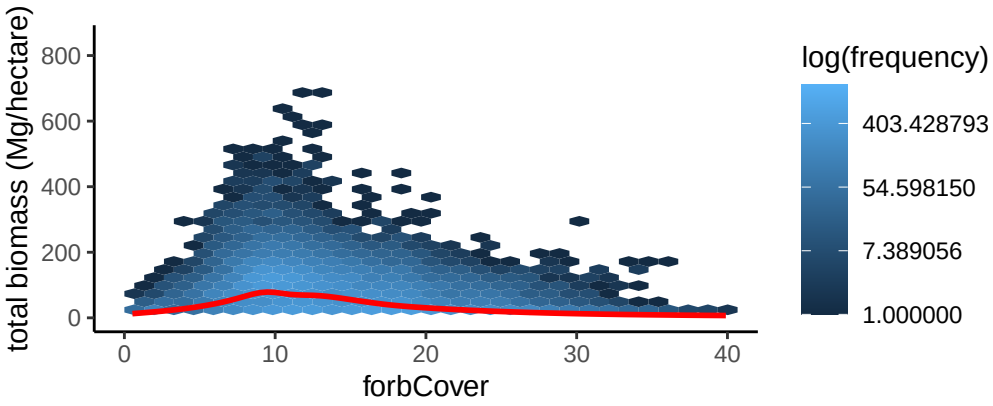
Modeled, relative cover

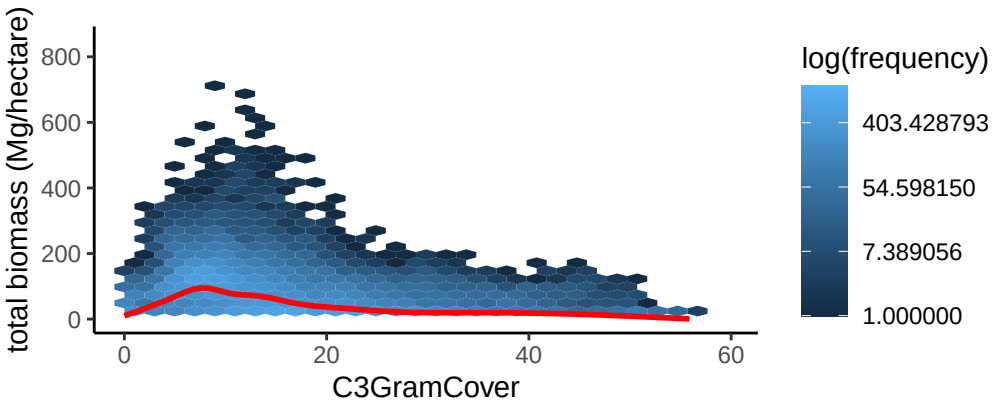
These figures show the relationship between *modeled, relative* cover by functional group when the cover values have been relativized and scaled

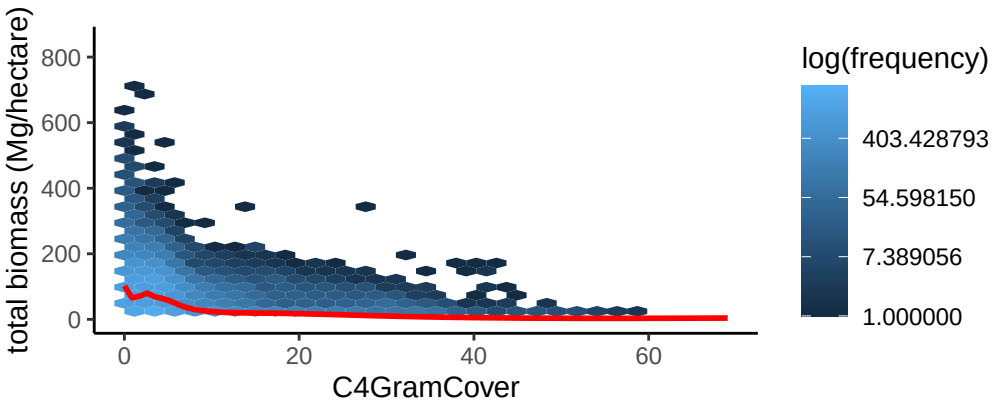




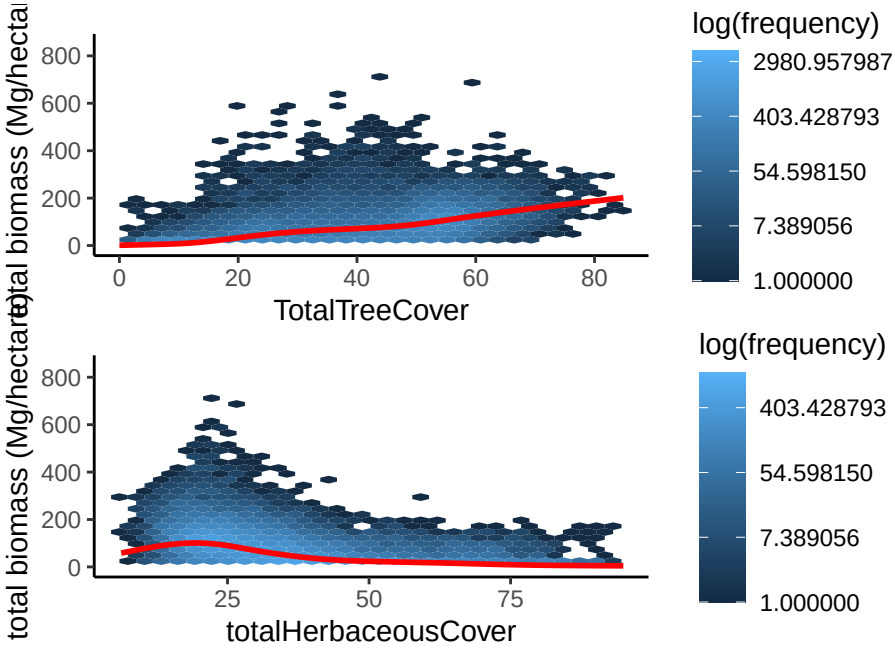



total biomass (Mg/hectare)
800
600
400
200
0
0
10
20
30
40
forbCover
log(frequency)
403.428793
54.598150
7.389056
1.000000


total biomass (Mg/hectare)
800
600
400
200
0
0
20
40
60
C3GramCover
log(frequency)
403.428793
54.598150
7.389056
1.000000

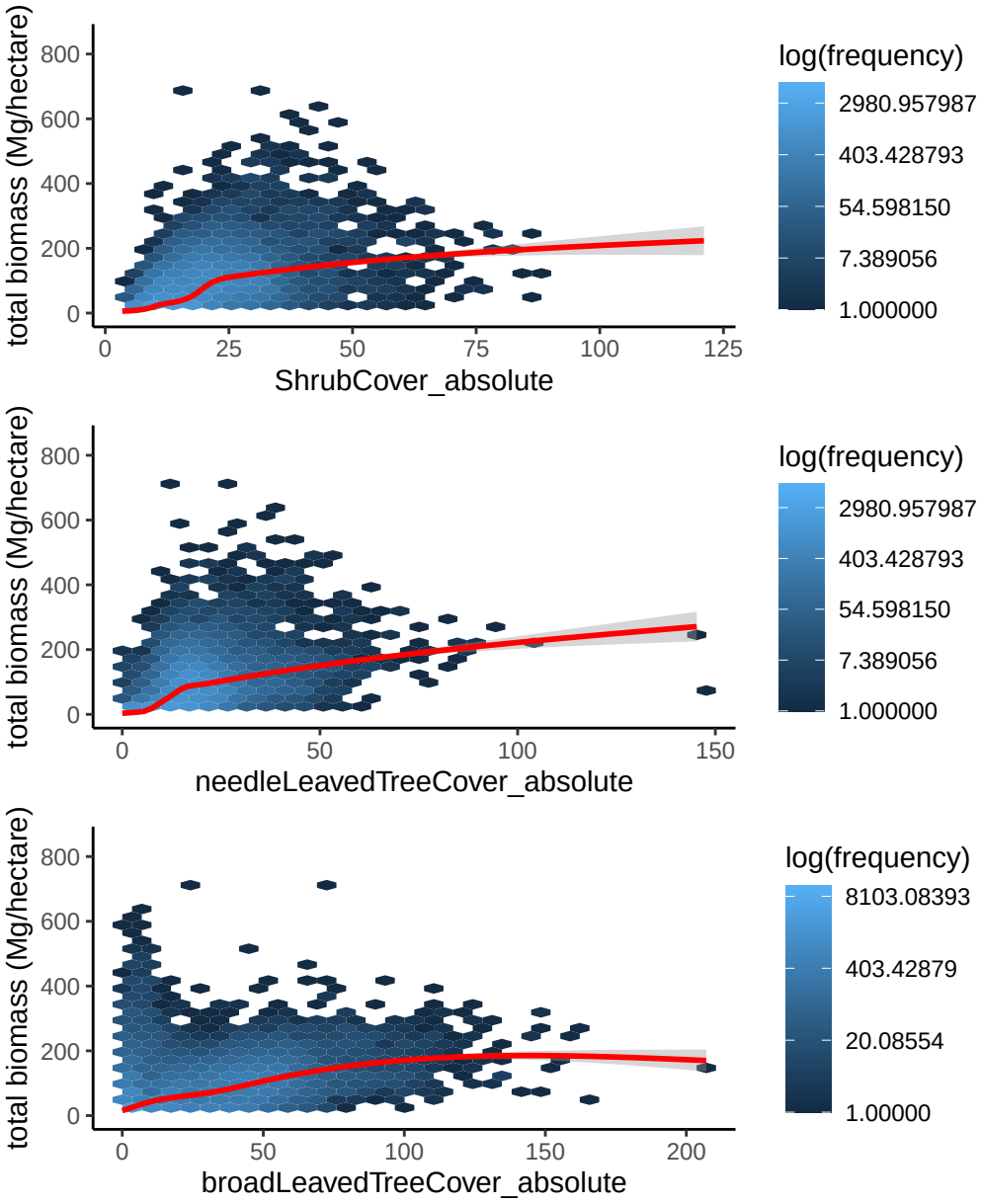

total biomass (Mg/hectare)
800
600
400
200
0
0
20
40
60
C4GramCover
log(frequency)
403.428793
54.598150
7.389056
1.000000

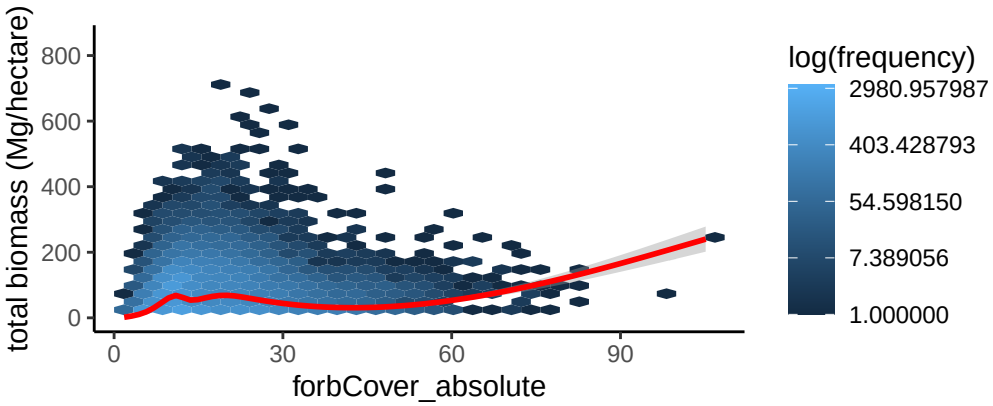
These figures show the relationship between *modeled, relative* cover by functional group for the 'tier one' groups' when the cover values have been relativized and scaled

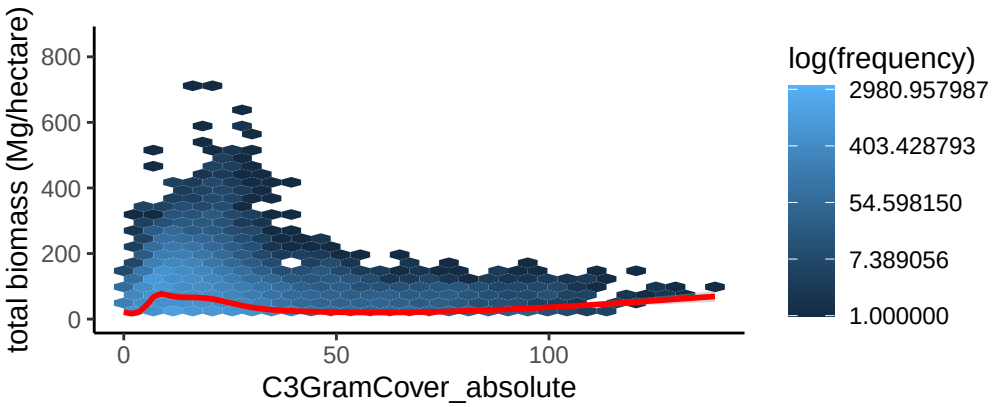


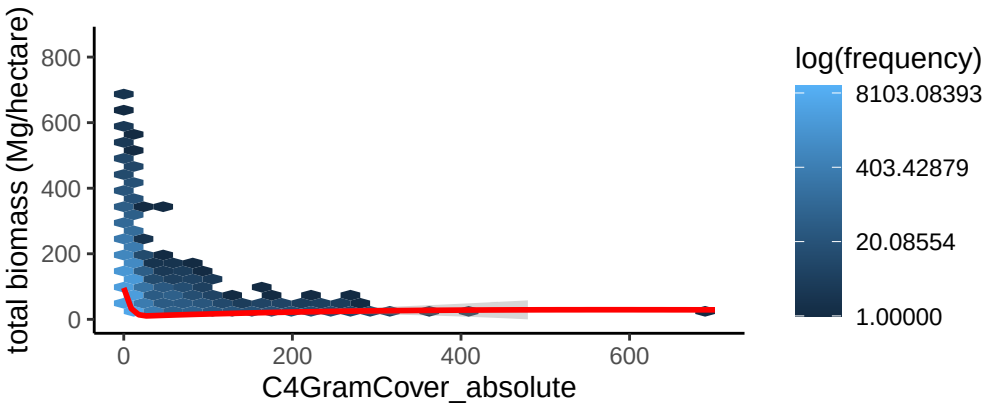
Modeled, absolute cover

These figures show the relationship between *modeled, absolute* cover by functional group (before relativizing but after scaling according to ecoregion)

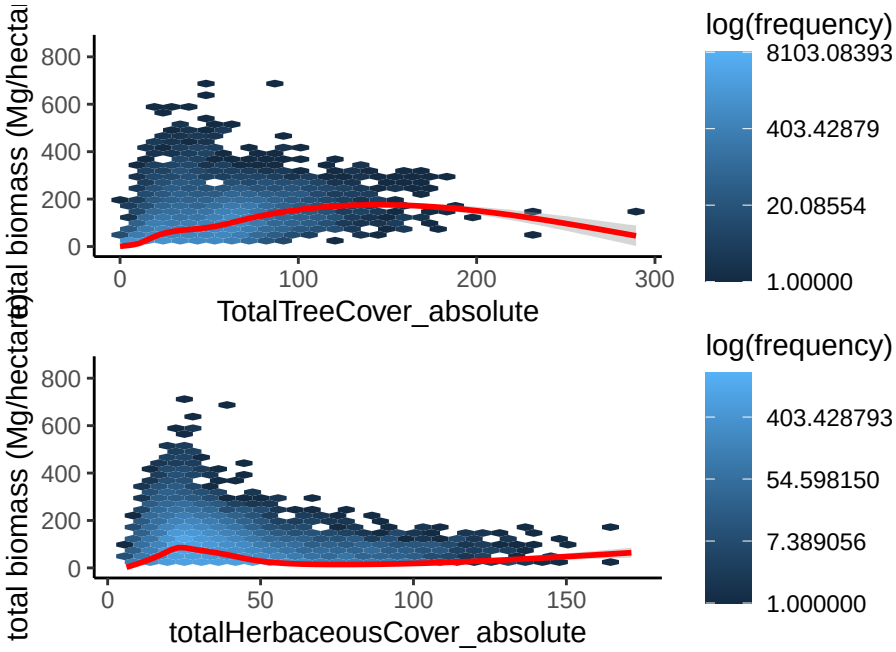



total biomass (Mg/hectare)
800
600
400
200
0
0
30
60
90
forbCover_absolute
log(frequency)
2980.957987
403.428793
54.598150
7.389056
1.000000


total biomass (Mg/hectare)
800
600
400
200
0
0
50
100
C3GramCover_absolute
log(frequency)
2980.957987
403.428793
54.598150
7.389056
1.000000

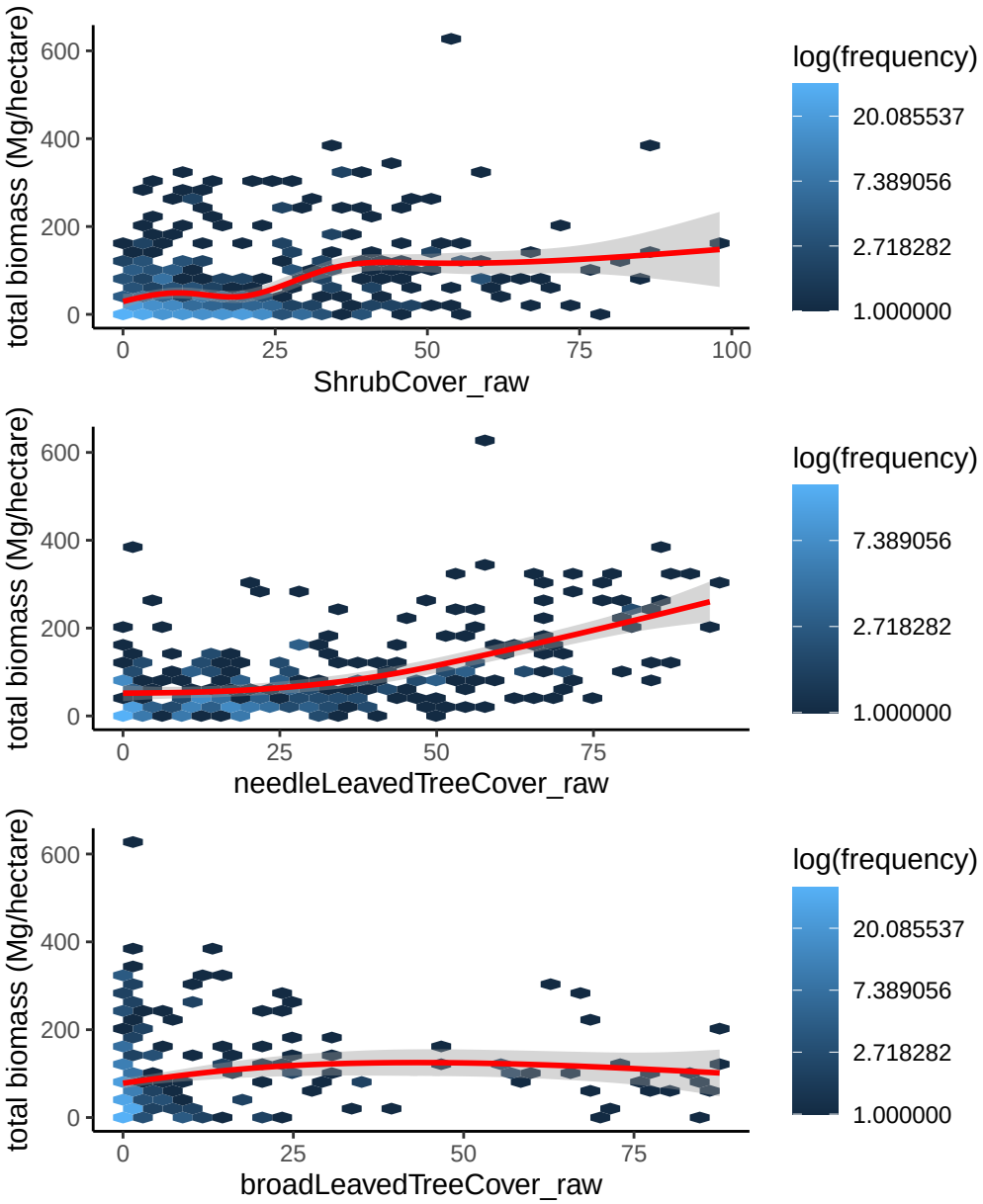

total biomass (Mg/hectare)
800
600
400
200
0
0
200
400
600
C4GramCover_absolute
log(frequency)
8103.08393
403.42879
20.08554
1.00000

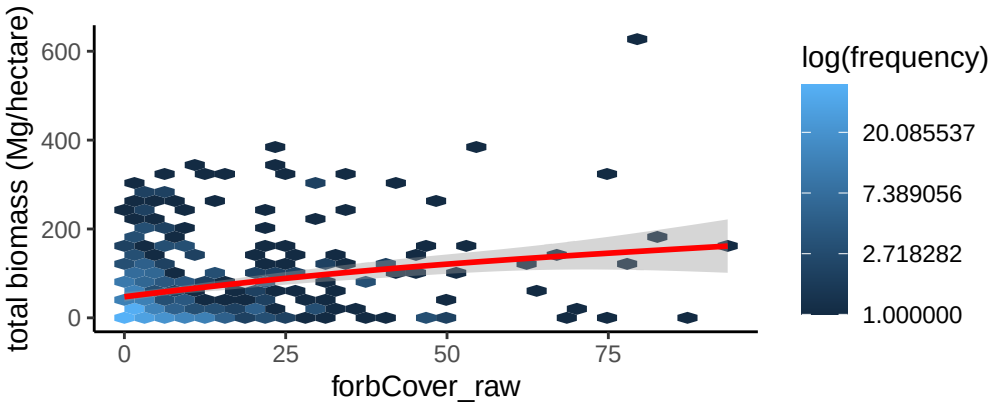
These figures show the relationship between **modeled, absolute* cover by 'tier one' functional groups (before relativizing but after scaling according to ecoregion)

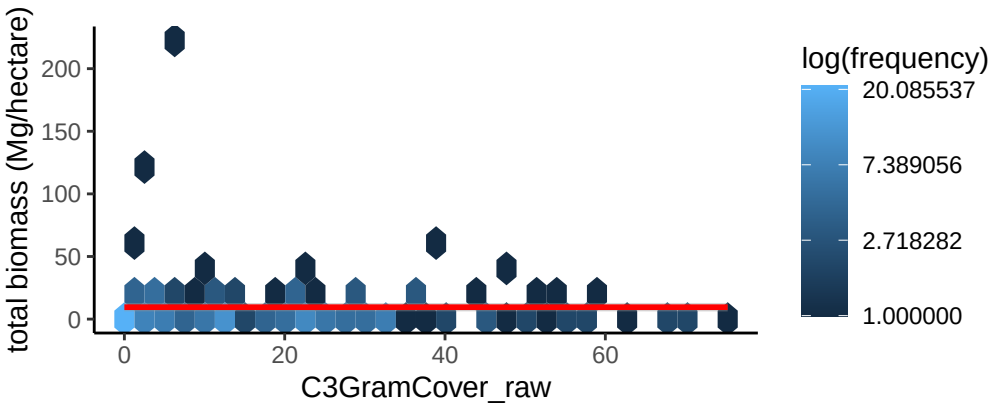


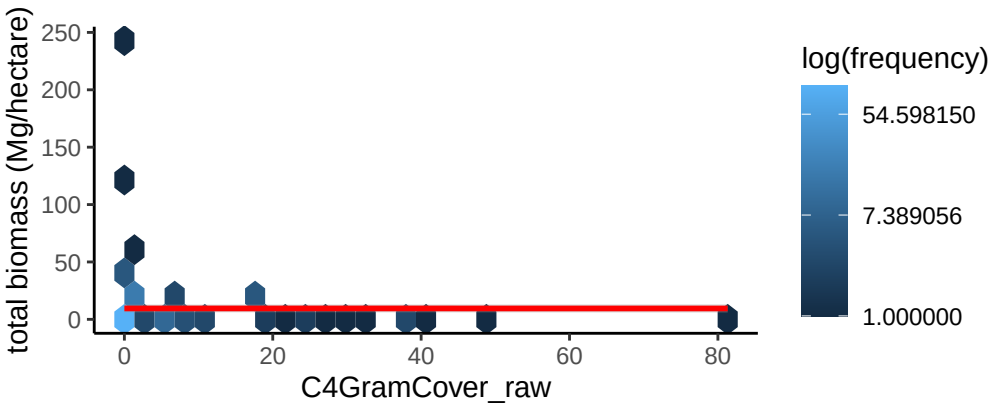
Raw cover

These figures show the relationship between *raw* cover by functional group



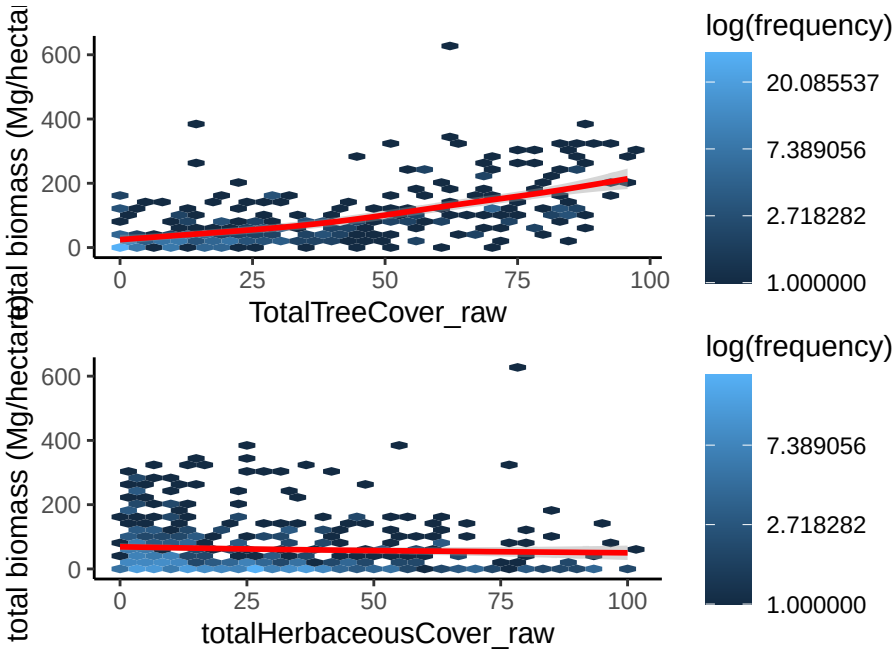




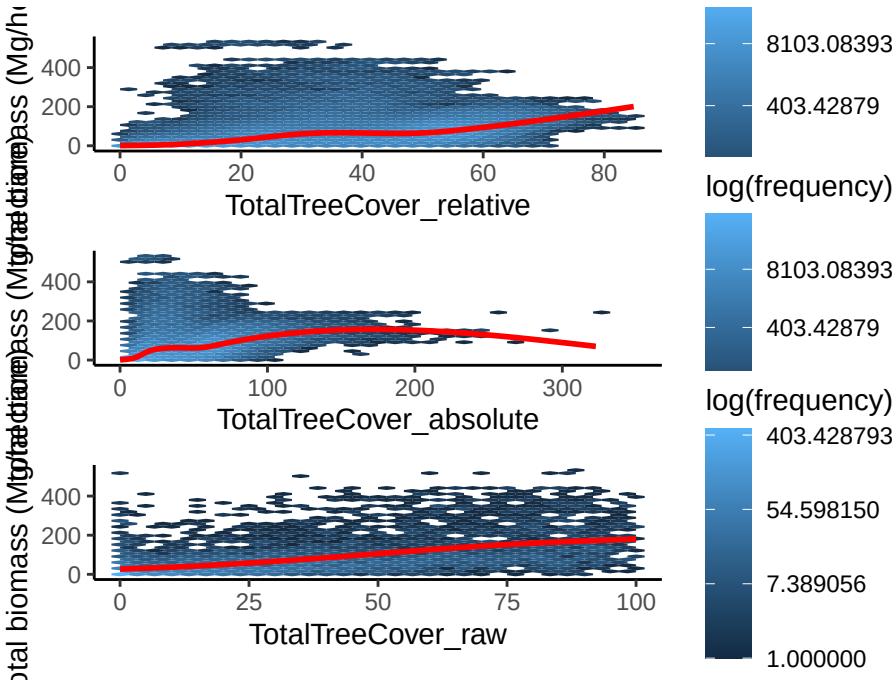


- Note that the above figures of C4 and C3 grass have huge hexagons because there are far fewer data points for those functional types

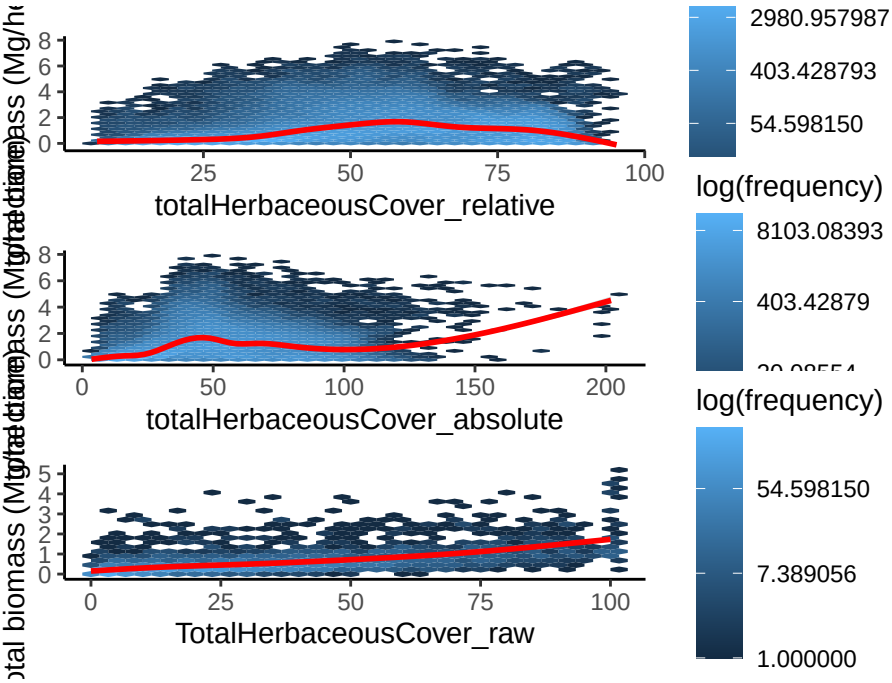
These figures show the relationship between *raw* cover by functional group for the 'tier one' groups'



These figures compare total tree cover (both modeled and raw) to total tree biomass from FIA

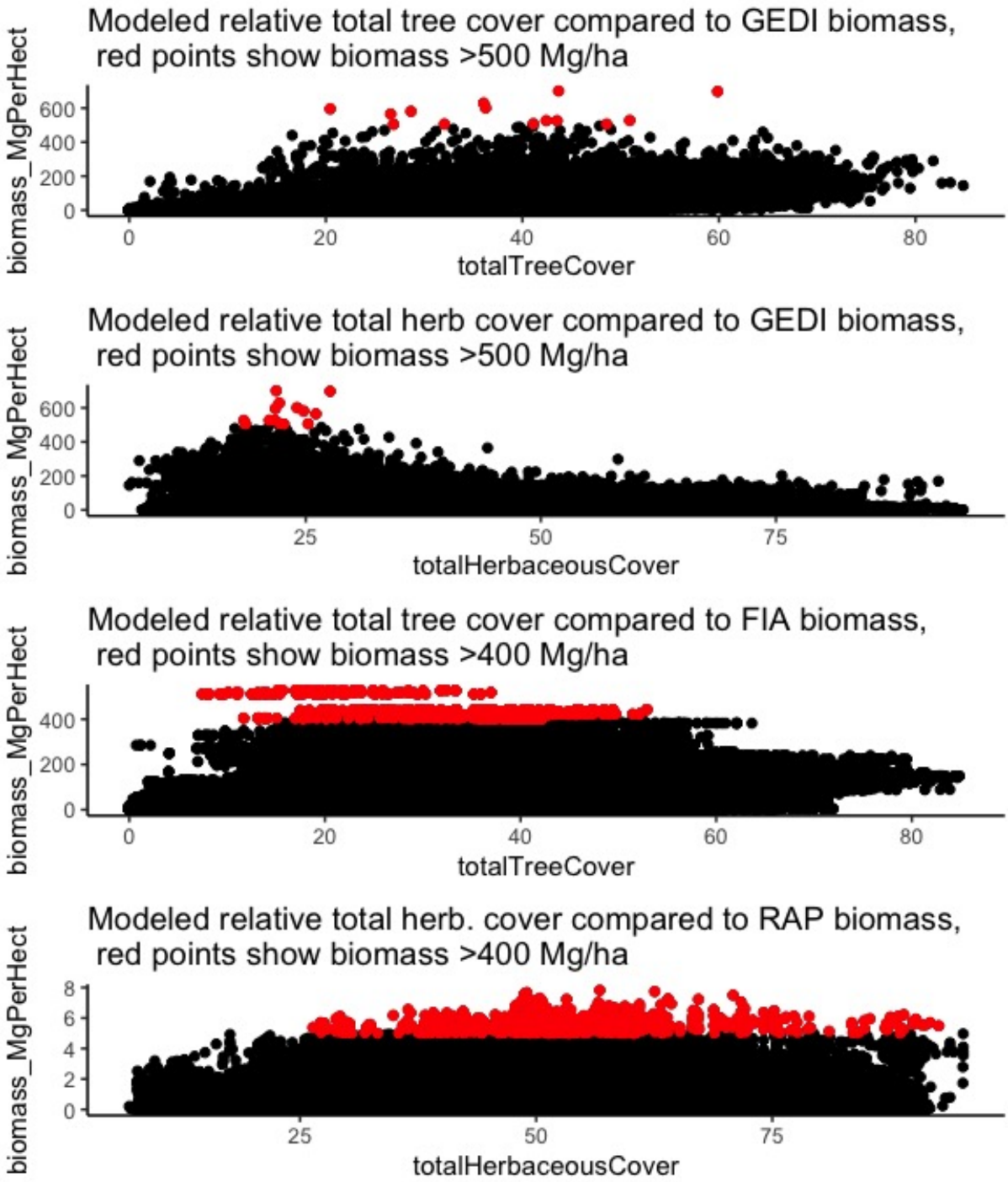


These figures compare total herbaceous cover (both modeled and raw) to total herbaceous biomass from RAP

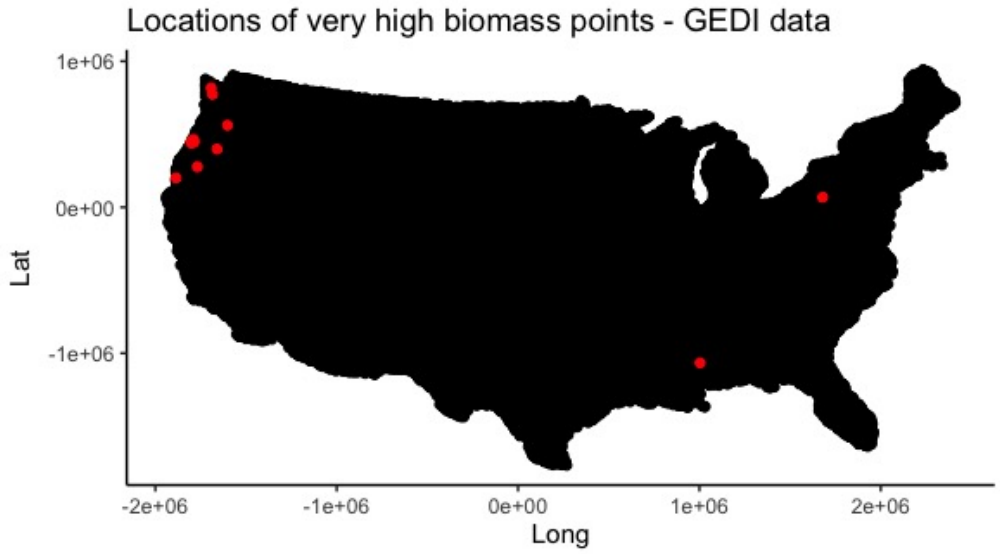


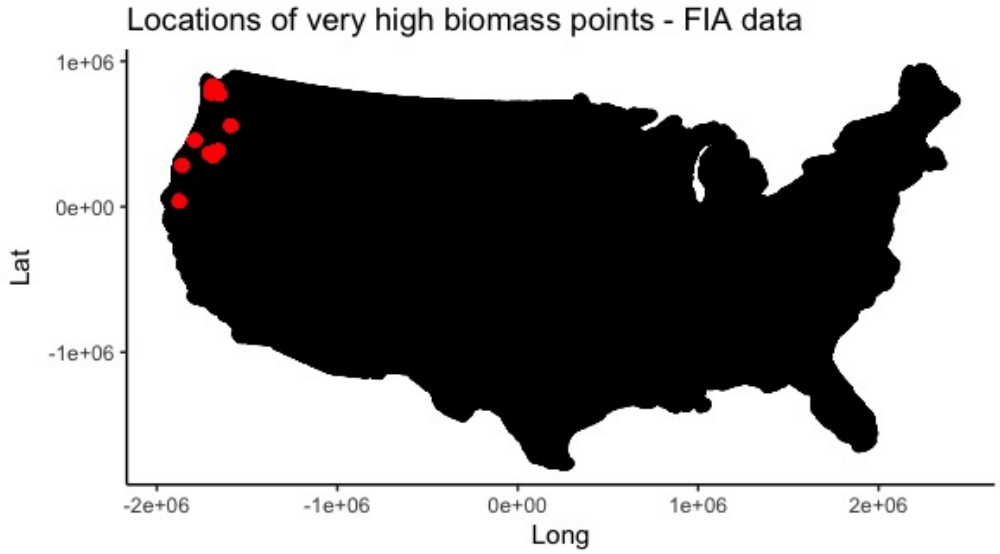
Why are high biomass values associated with more intermediate cover values in many cases?

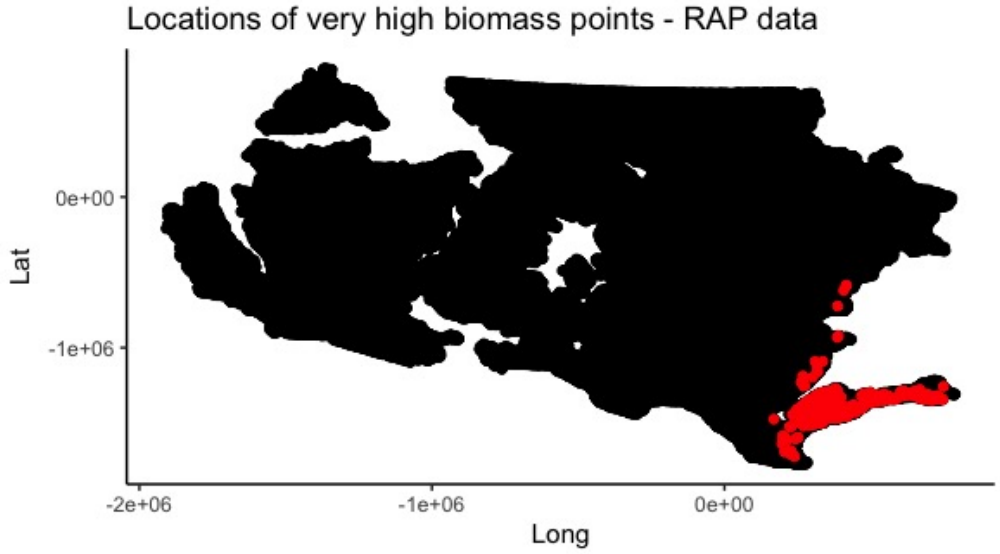
relationship of high biomass points to total tree and herbaceous cover (modoeled relative cover)



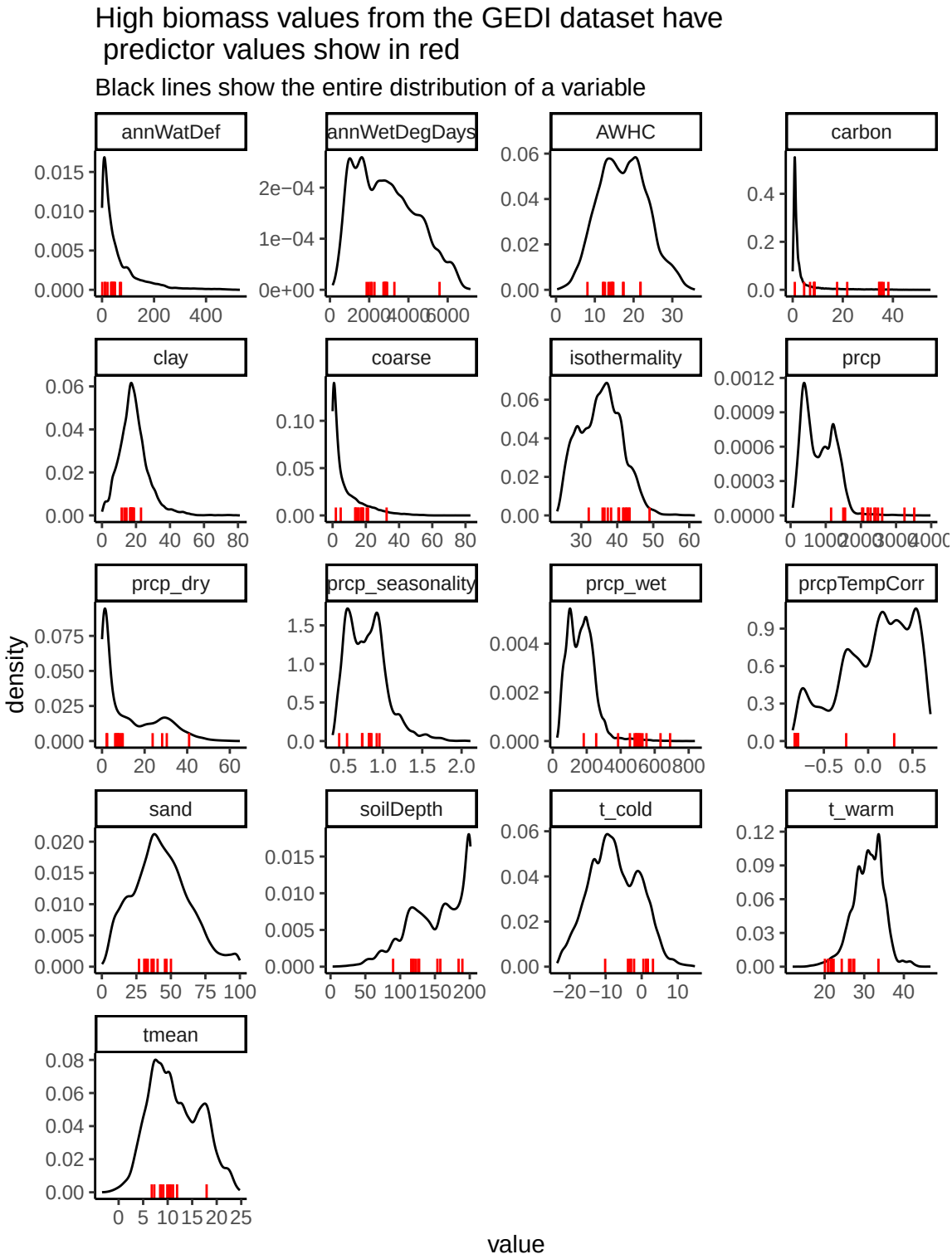
spatial locations of high biomass points

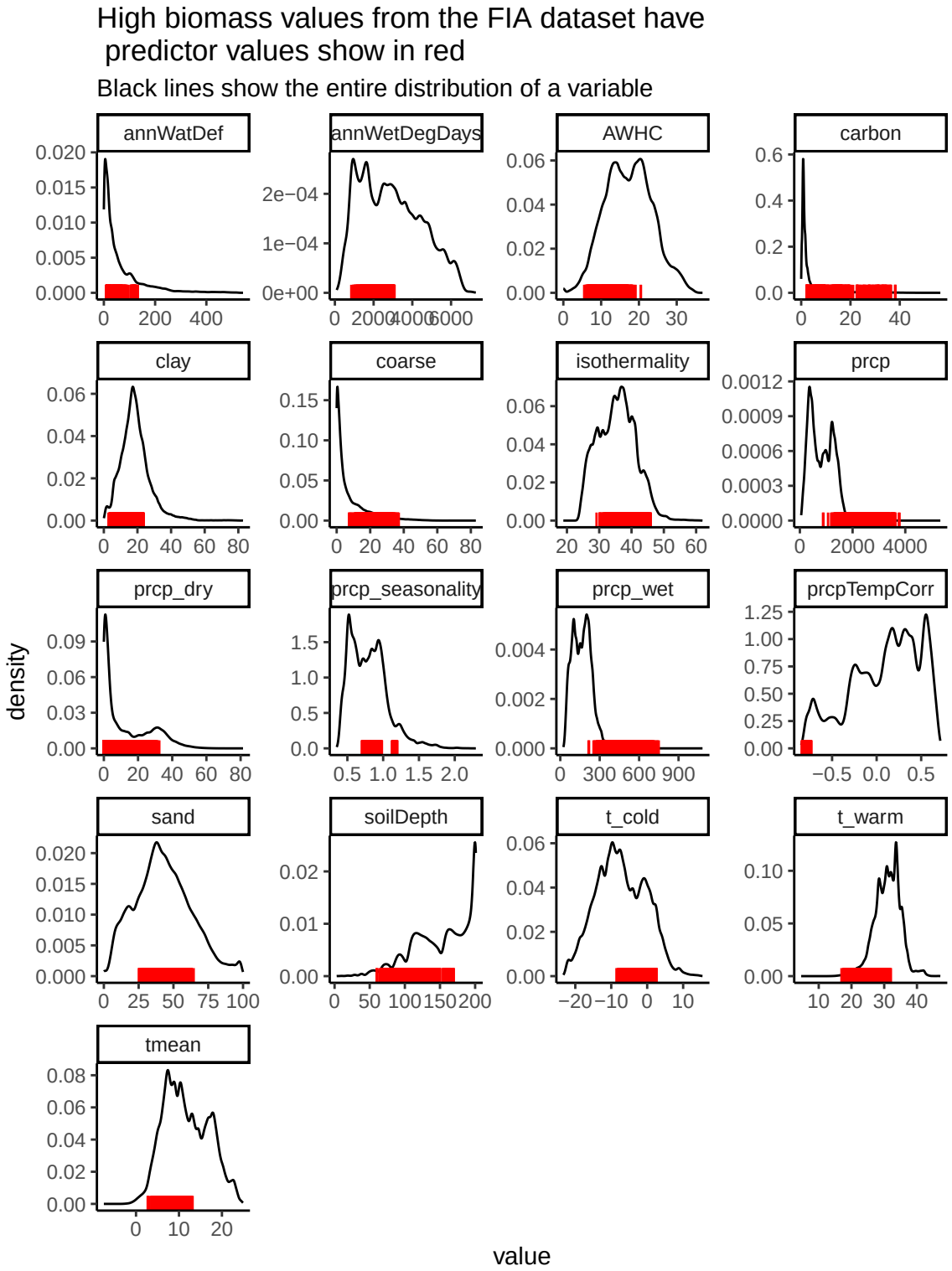


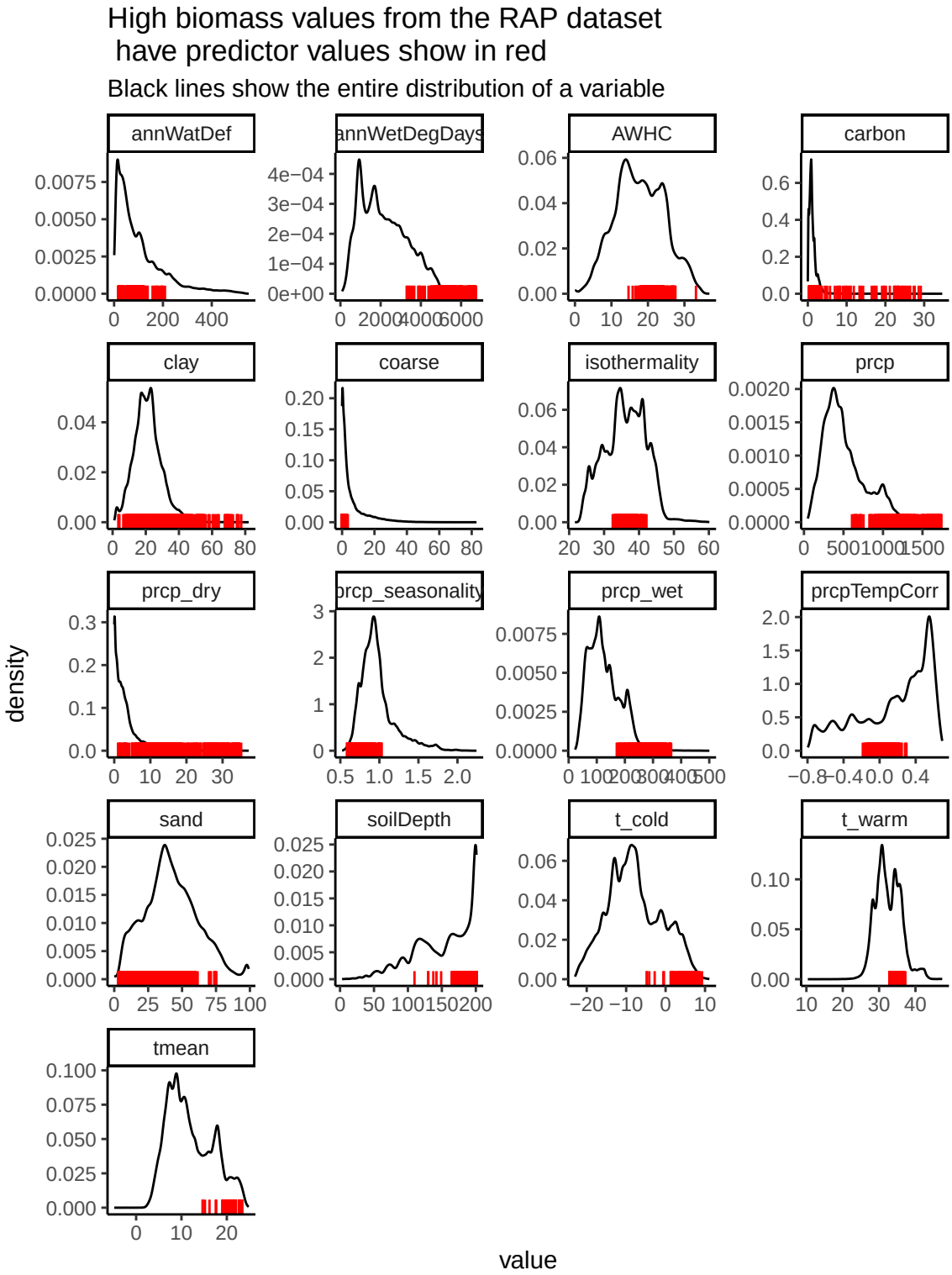




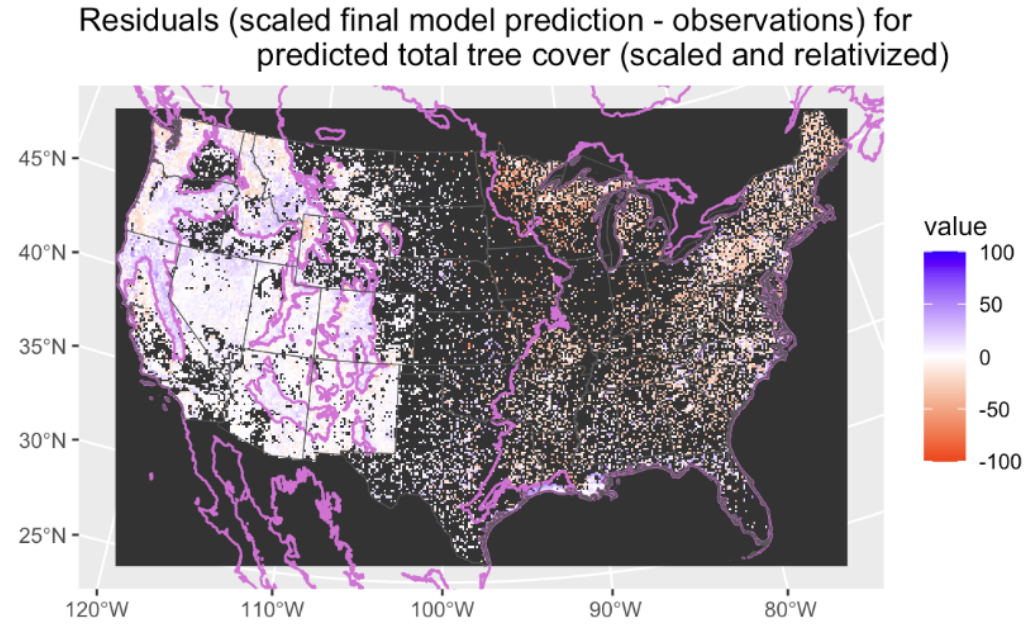
are the predictors associated with high biomass in a particular part of the distributions of the possible predictors?

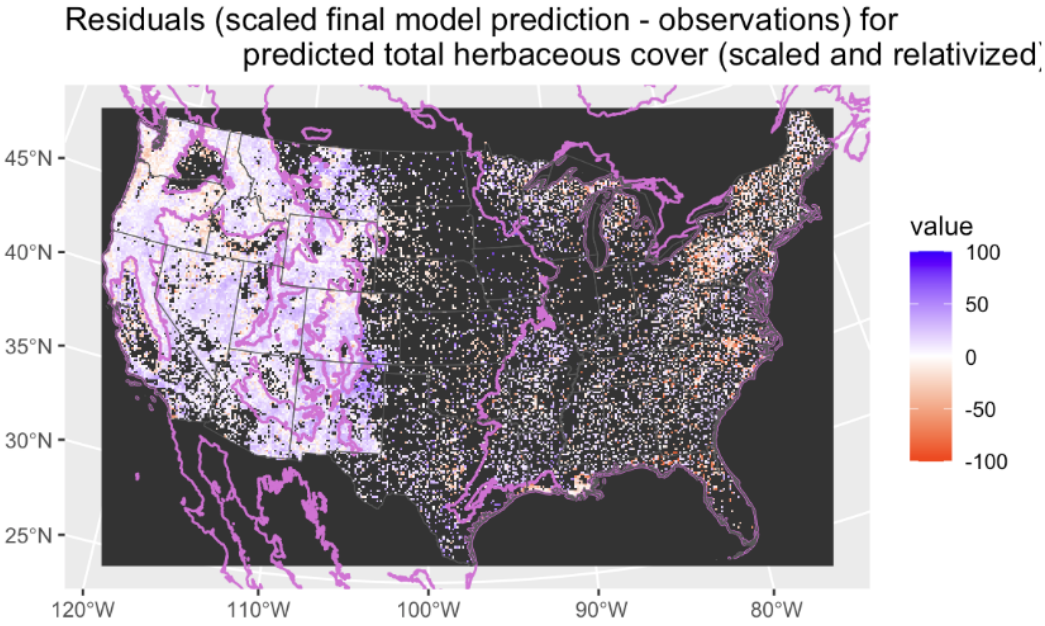



High biomass values from the FIA dataset have predictor values show in red
Black lines show the entire distribution of a variable
annWatDef
annWetDegDays
AWHC
carbon
clay
coarse
isothermality
prcp
prcp_dry
prcp_seasonality
prcp_wet
prcpTempCorr
sand
soilDepth
t_cold
t_warm
tmean
density
value


High biomass values from the RAP dataset
have predictor values show in red
Black lines show the entire distribution of a variable
annWatDef
annWetDegDays
AWHC
carbon
clay
coarse
isothermality
prcp
prcp_dry
prcp_seasonality
prcp_wet
prcpTempCorr
sand
soilDepth
t_cold
t_warm
tmean
density
value

Residuals for the final, relativized and scaled predictions from models





Compare observed cover to final modeled cover and modeled absolute cover, color-coded by biomass