Example of Analyses with `funrar`

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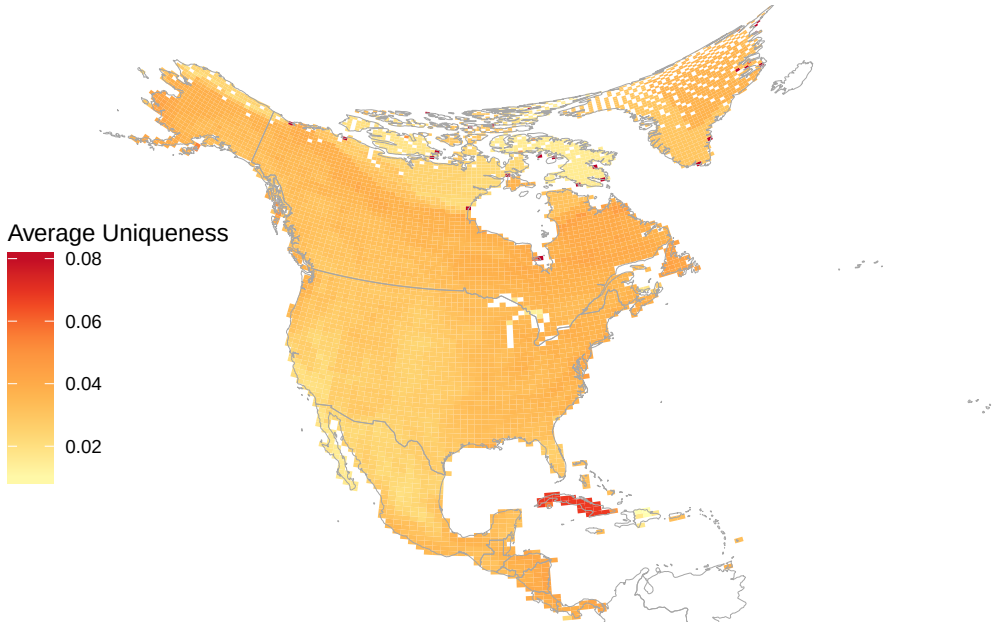
With `funrar` you can compute **Fun**ctional **Rar**ity indices. We are using a North American Mammals datasets to show the kind of questions you can come up with.

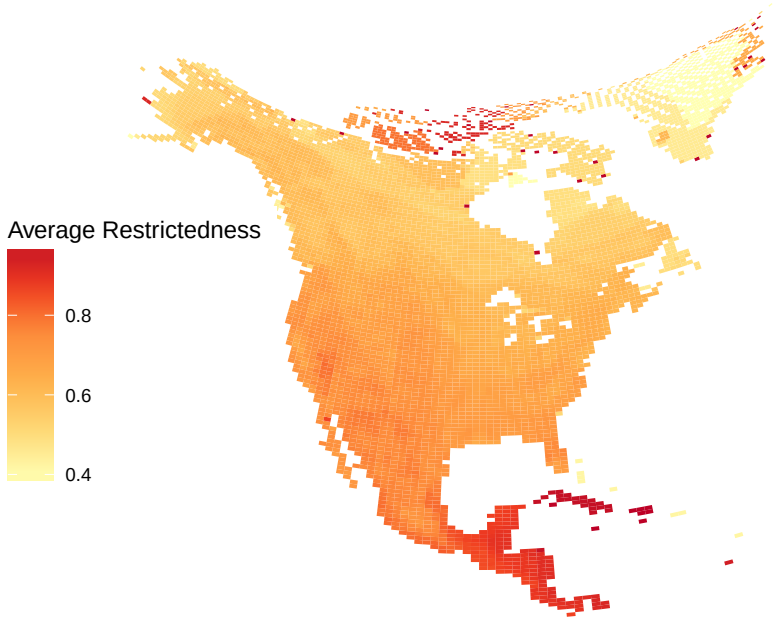
For example, you can try to map the hotspots of Regional Functional Uniqueness, i.e. the communities with highest number of functionally unique species (relatively to the whole species pool).

Hotspots

Functional Uniqueness

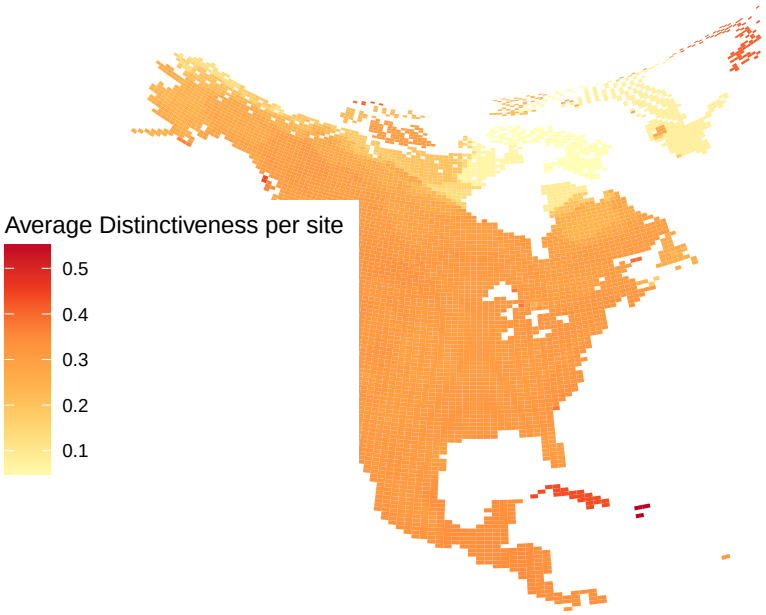


Geographical Restrictedness



Functional Distinctiveness

```
## Warning: Removed 552 rows containing non-finite values (stat_summary2d).
```



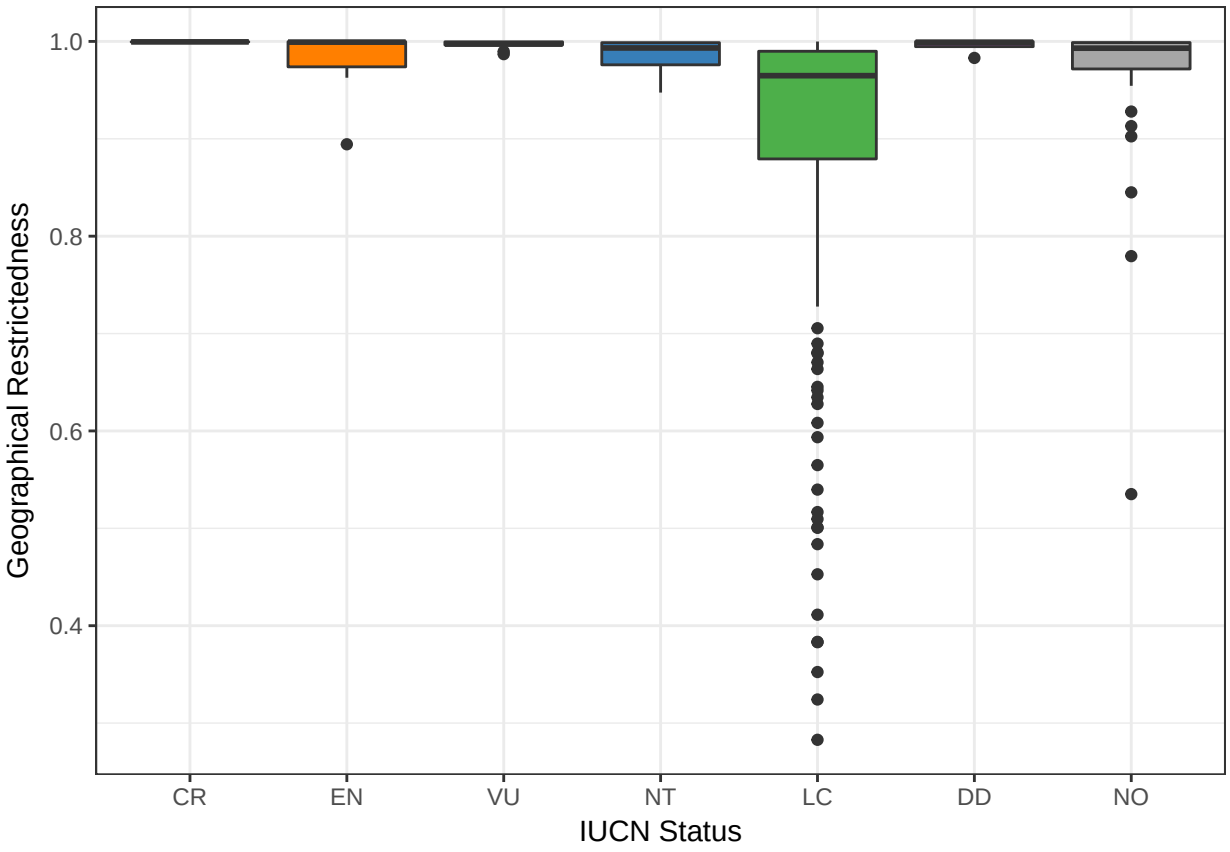
Relation between IUCN status and Functional Rarity Indices

with Geographical Restrictedness

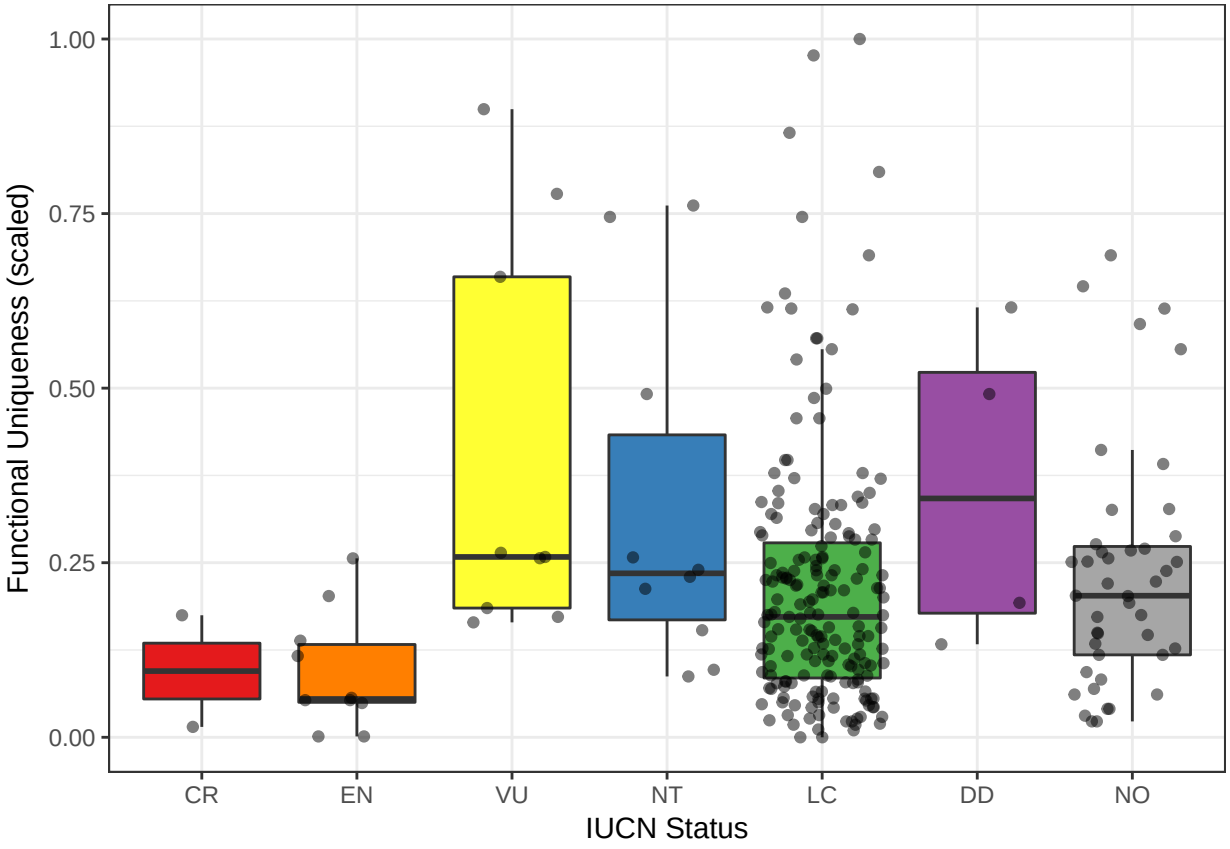
```
## Warning in inner_join_impl(x, y, by$x, by$y, suffix$x, suffix$y): joining
## factor and character vector, coercing into character vector
```

```
## Warning in inner_join_impl(x, y, by$x, by$y, suffix$x, suffix$y): joining
## character vector and factor, coercing into character vector
```

```
##    species                Ui             IUCN_status       Ri
##  Length:265         Min.   :0.0006121   CR:  2      Min.   :0.2828
##  Class :character   1st Qu.:0.0115721   EN: 10      1st Qu.:0.9242
##  Mode  :character   Median :0.0223622   VU:  9      Median :0.9787
##                     Mean   :0.0281722   NT: 10      Mean   :0.9174
##                     3rd Qu.:0.0344888   LC:187      3rd Qu.:0.9966
##                     Max.   :0.1243665   DD:  4      Max.   :0.9999
##                                         NO: 43
##      std_Ui
##  Min.   :0.00000
##  1st Qu.:0.08856
##  Median :0.17575
##  Mean   :0.22270
##  3rd Qu.:0.27374
##  Max.   :1.00000
##
```

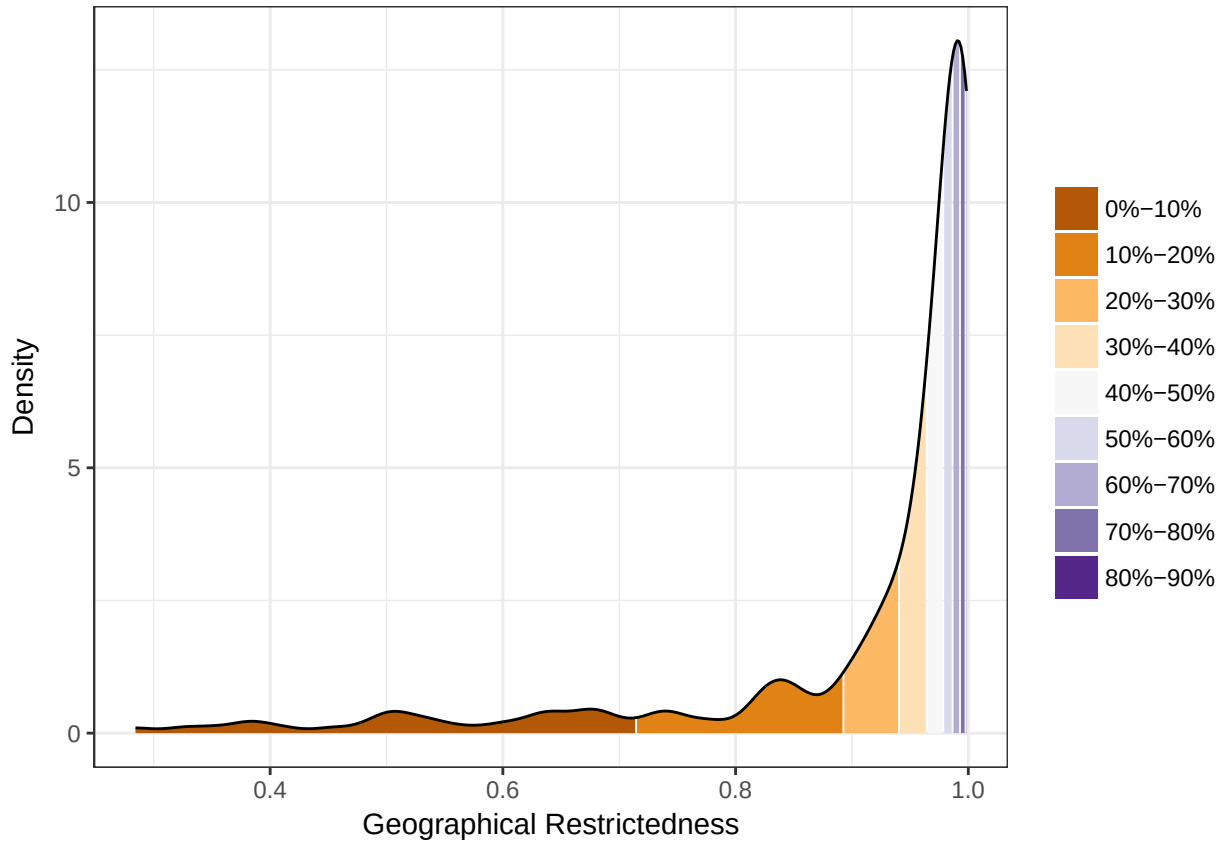

Geographical Restrictedness
1.0
0.8
0.6
0.4
CR
EN
VU
NT
LC
DD
NO
IUCN Status

with Functional Uniqueness

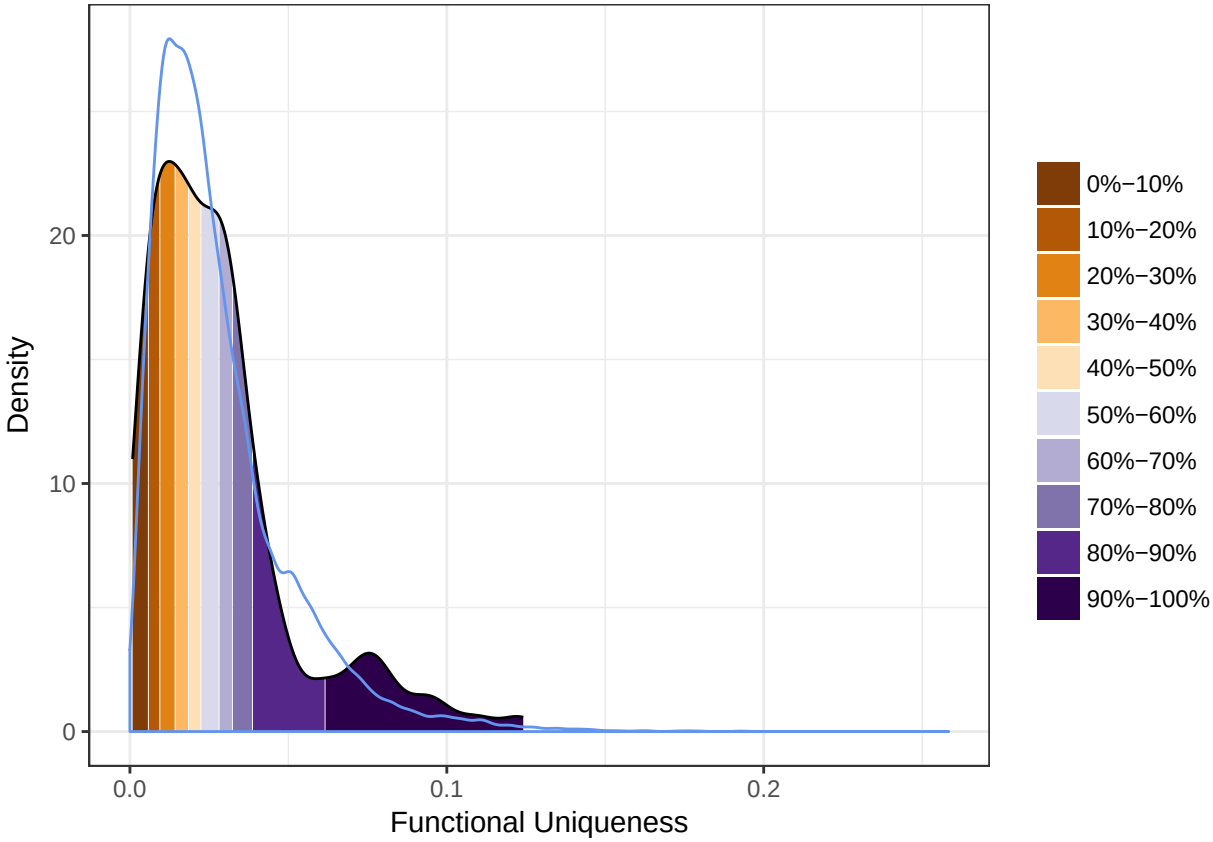


Total distribution of indices

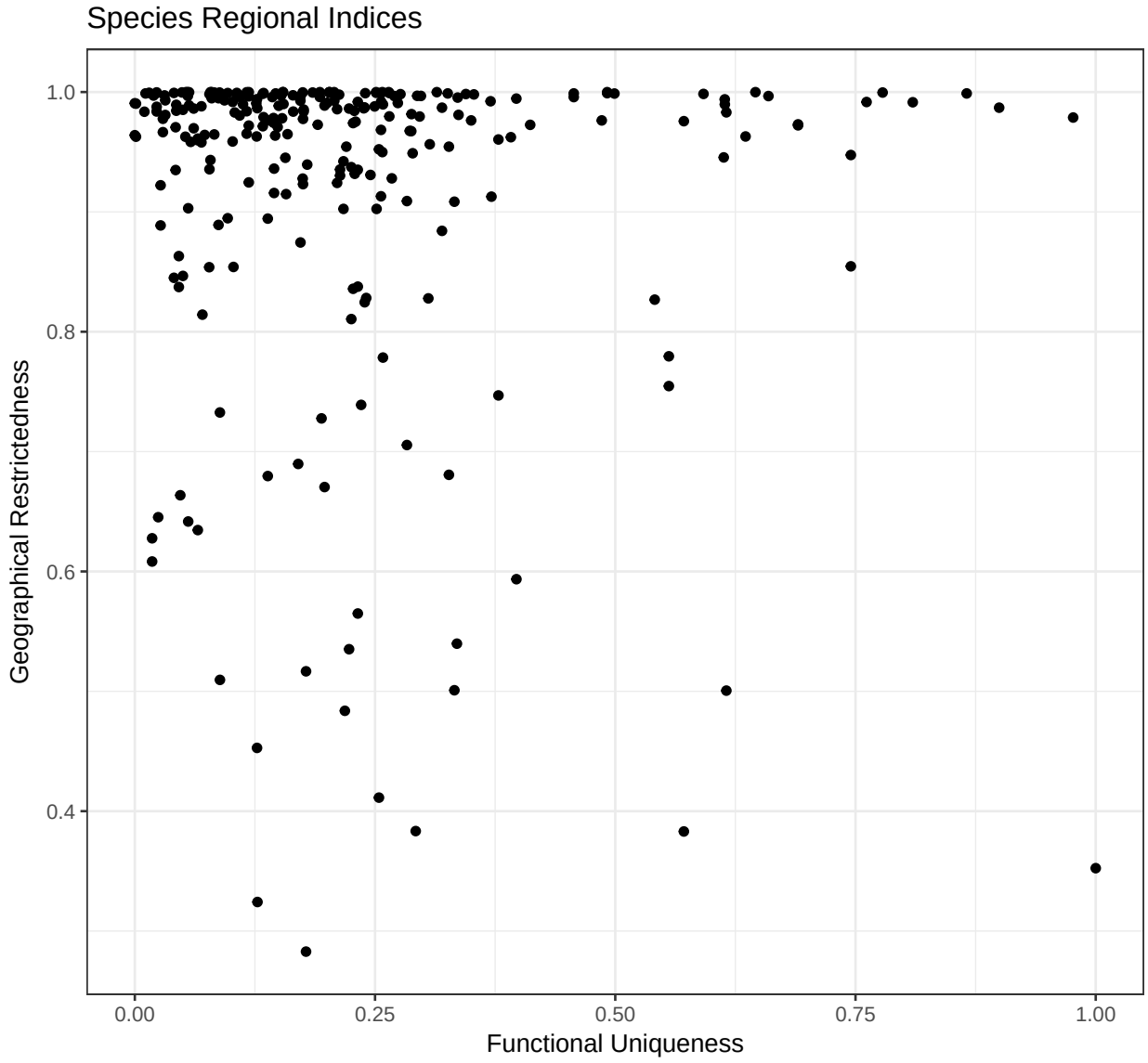
Geographical Restrictedness

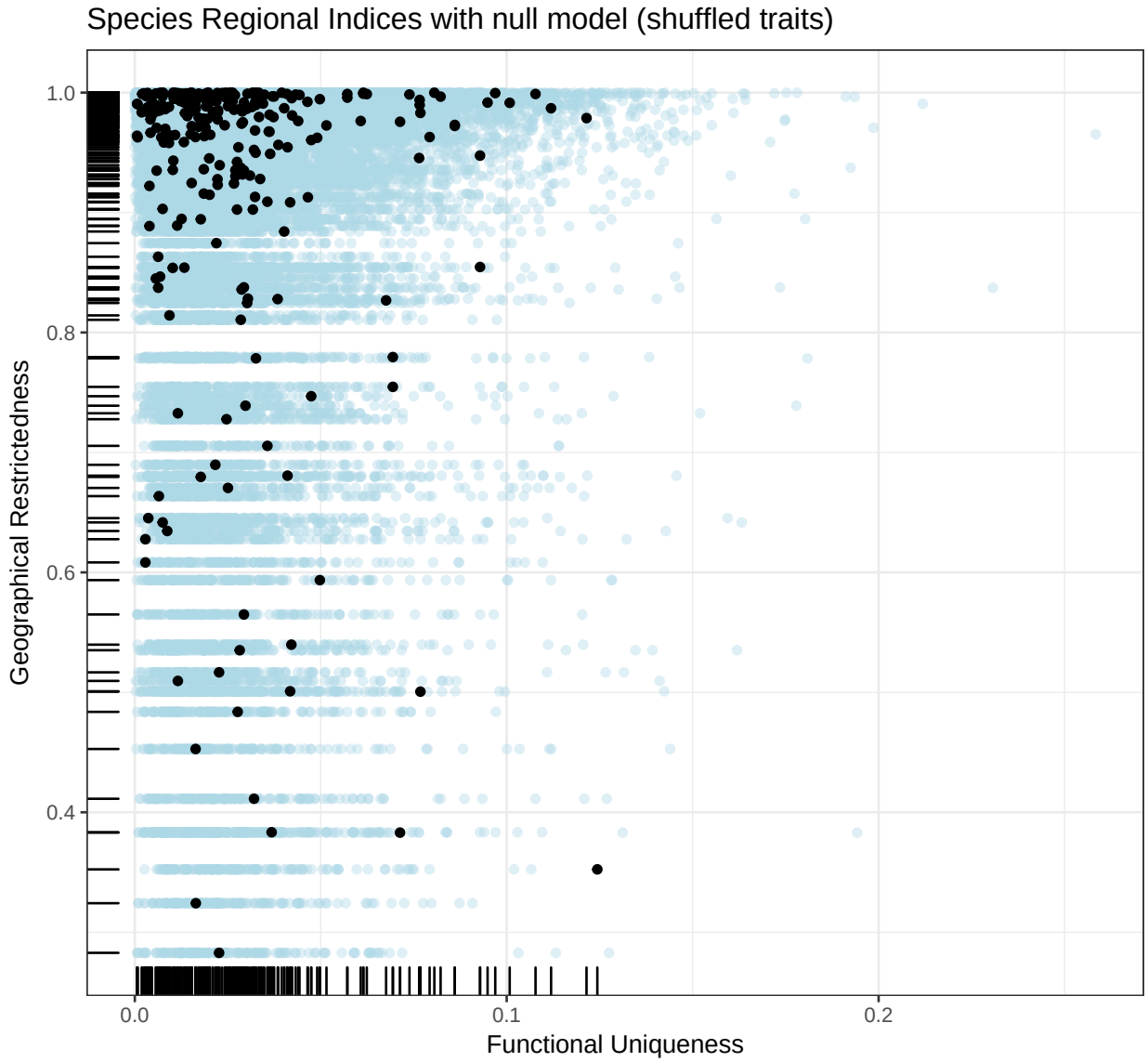


Functional Uniqueness

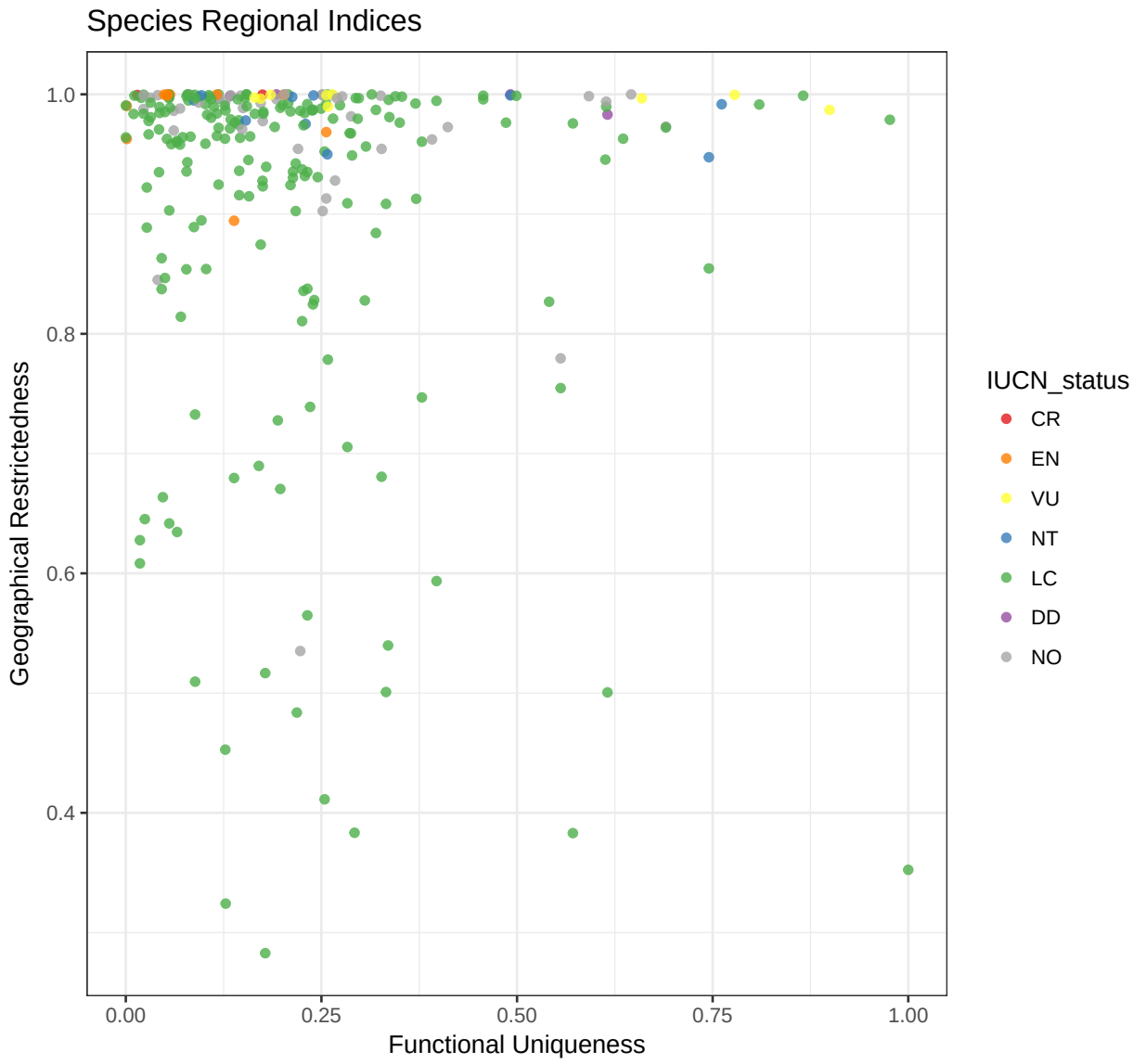


Biplot


Species Regional Indices
Geographical Restrictedness
1.0
0.8
0.6
0.4
0.00
0.25
0.50
0.75
1.00
Functional Uniqueness

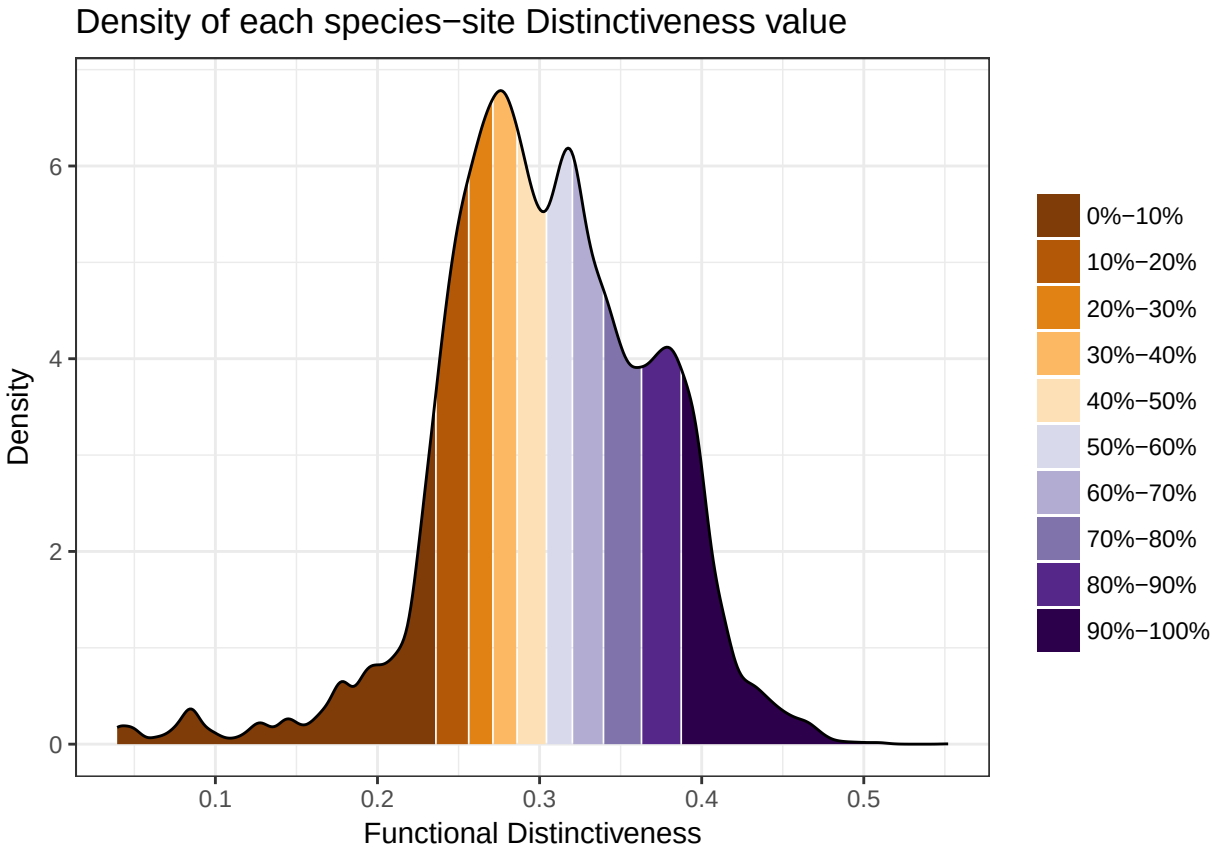


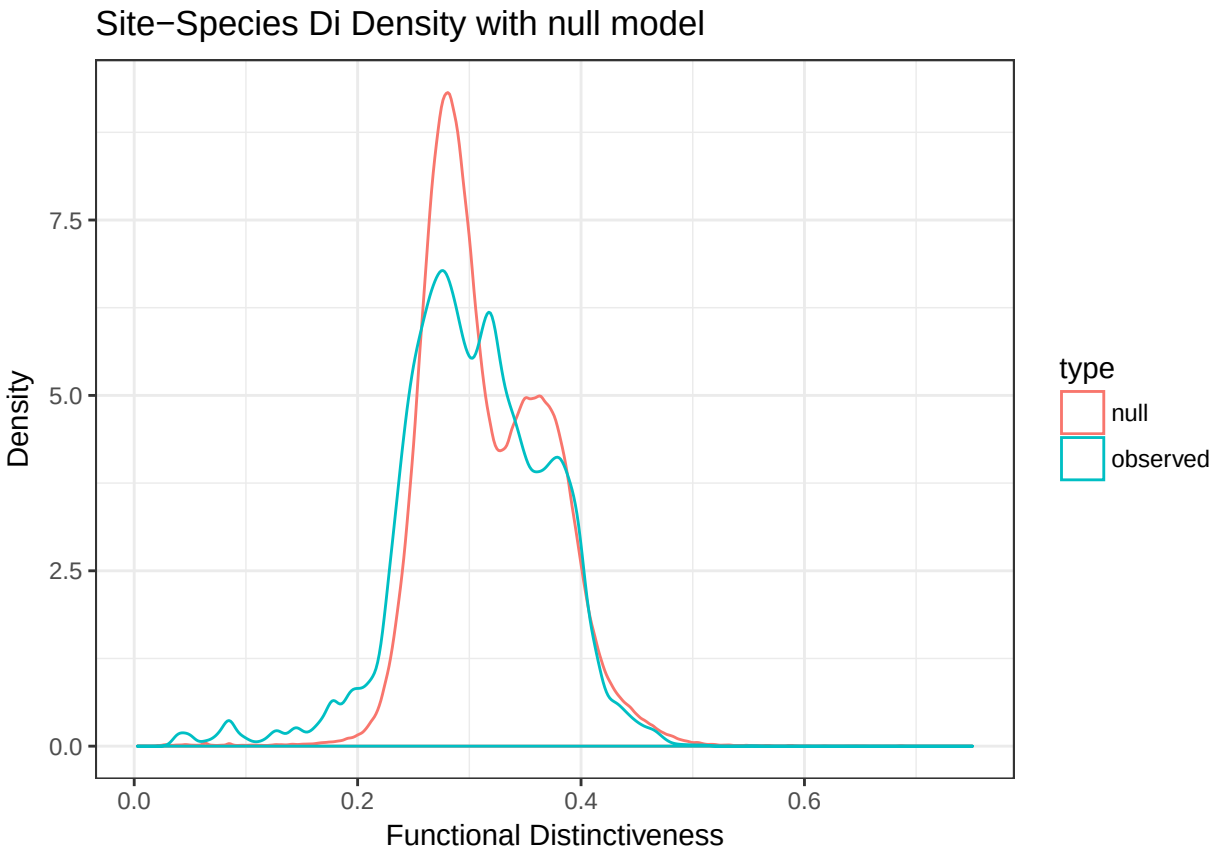
With IUCN status



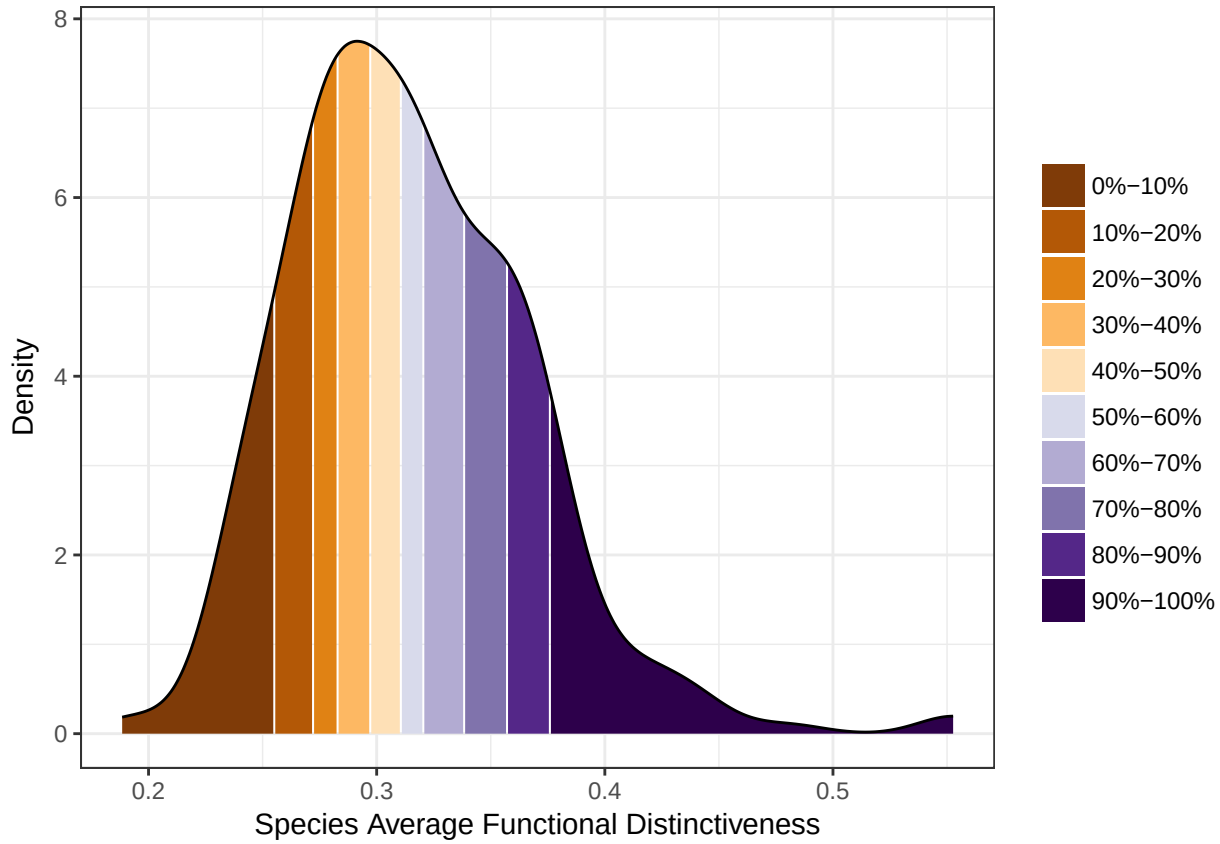
Functional Distinctiveness

For each site-species combination


Density of each species−site Distinctiveness value
Density
6
4
2
0
0.1
0.2
0.3
0.4
0.5
Functional Distinctiveness
0%−10%
10%−20%
20%−30%
30%−40%
40%−50%
50%−60%
60%−70%
70%−80%
80%−90%
90%−100%

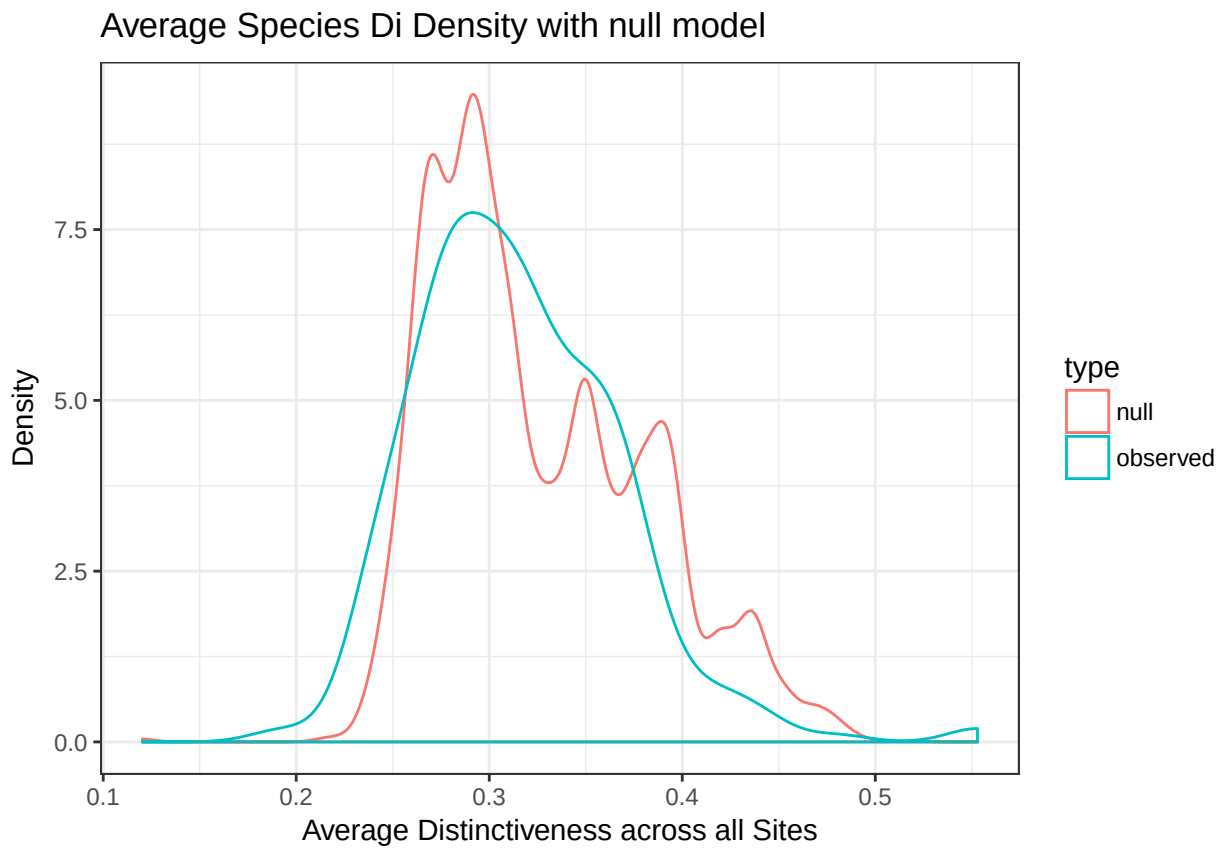


Average Distinctiveness of a species across all sites



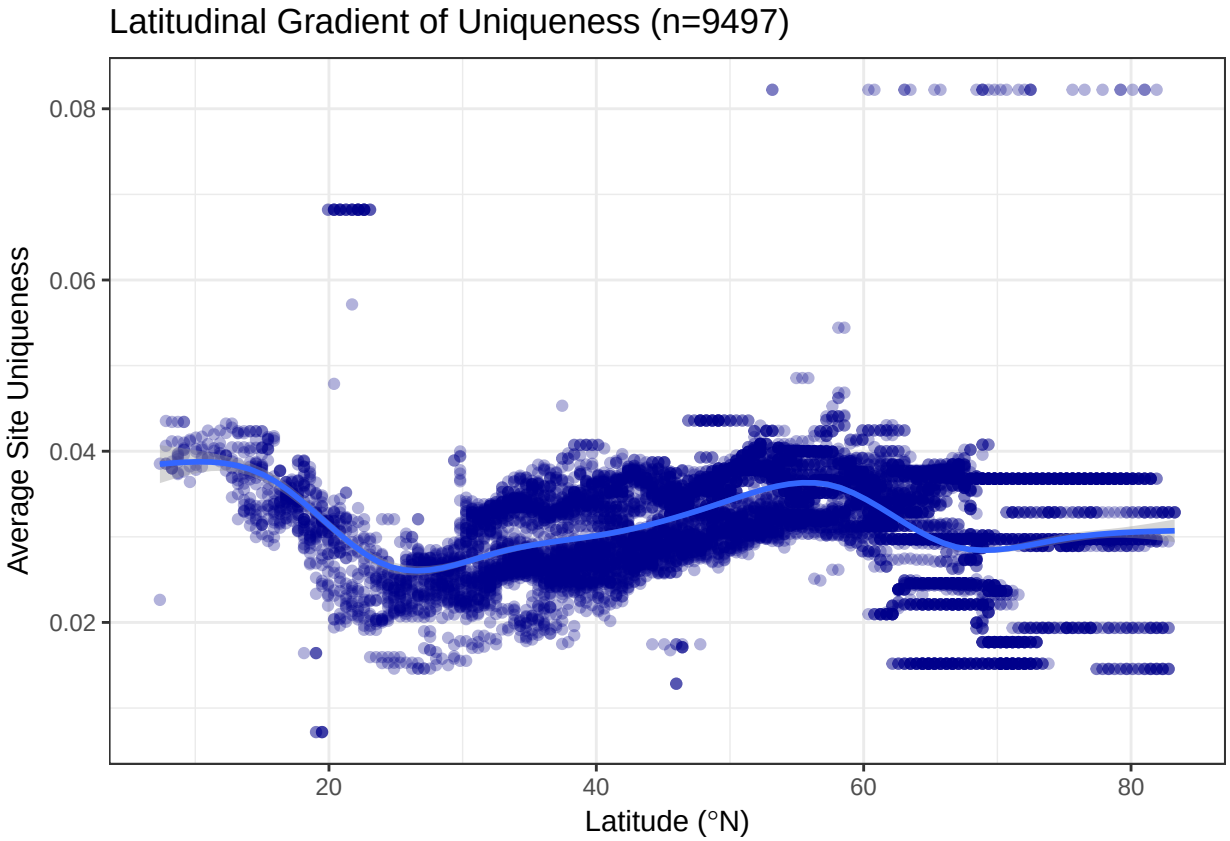

```
## Warning in bind_rows_(x, .id): binding factor and character vector,
## coercing into character vector
```

```
## Warning: Removed 1 rows containing non-finite values (stat_density).
```



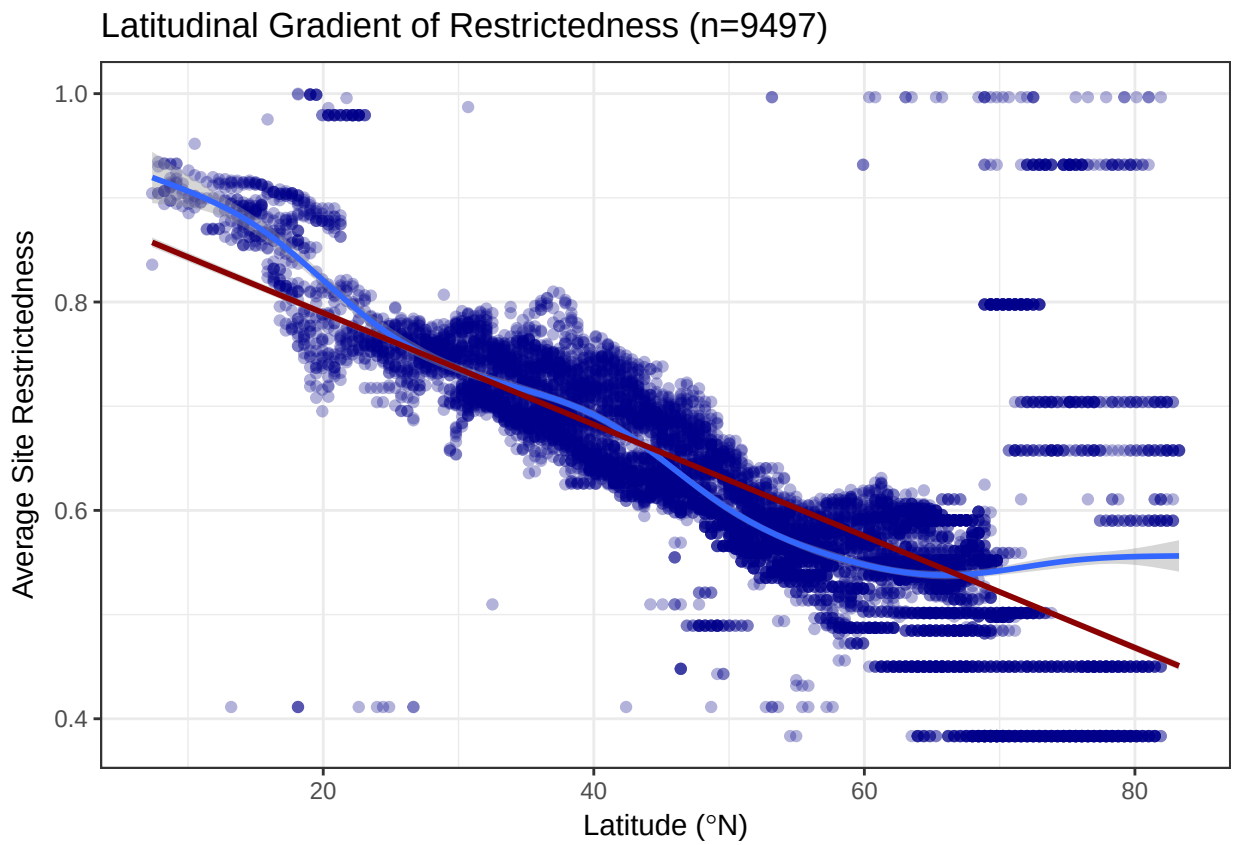
Functional Uniqueness

```
## `geom_smooth()` using method = 'gam'
```



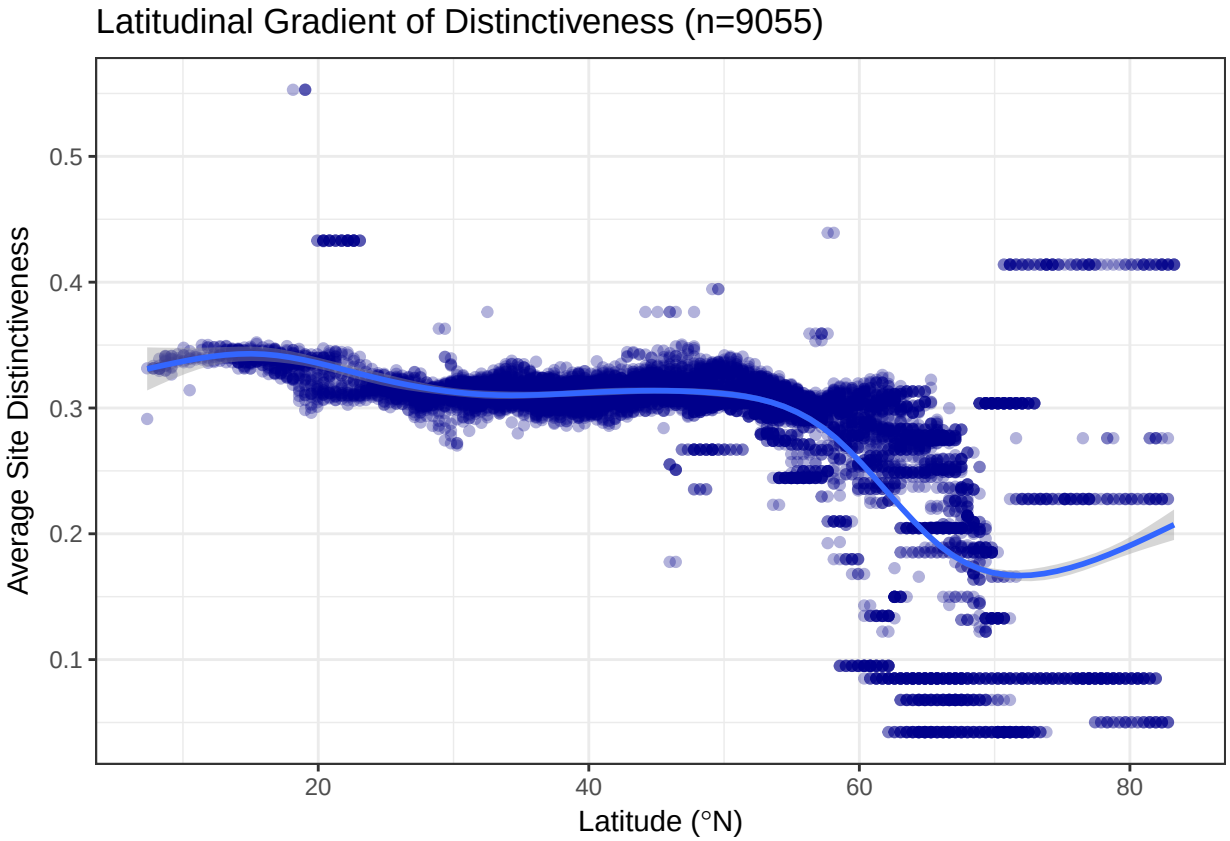
Geographical Restrictedness

```
## `geom_smooth()` using method = 'gam'
```



Functional Distinctiveness

```
## `geom_smooth()` using method = 'gam'
## Warning: Removed 552 rows containing non-finite values (stat_smooth).
## Warning: Removed 552 rows containing missing values (geom_point).
```


Latitudinal Gradient of Distinctiveness (n=9055)
Average Site Distinctiveness
0.5
0.4
0.3
0.2
0.1
20
40
60
80
Latitude (°N)