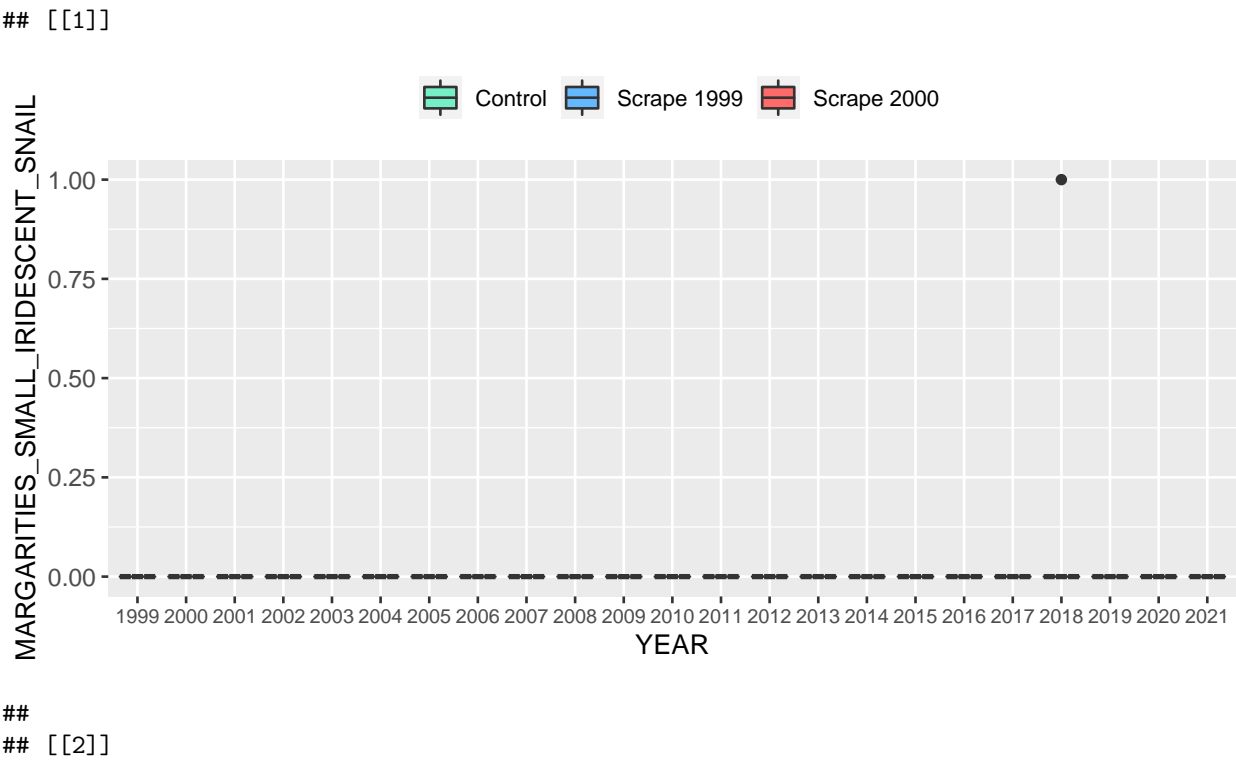


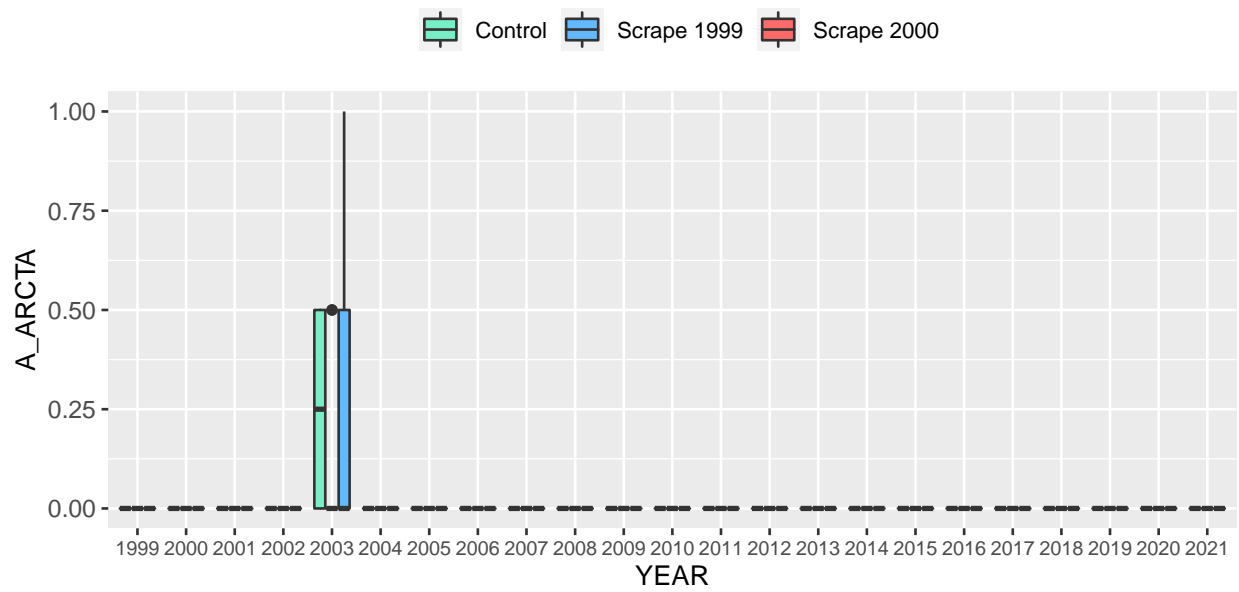
Data Visualization

Rachael E. Blake

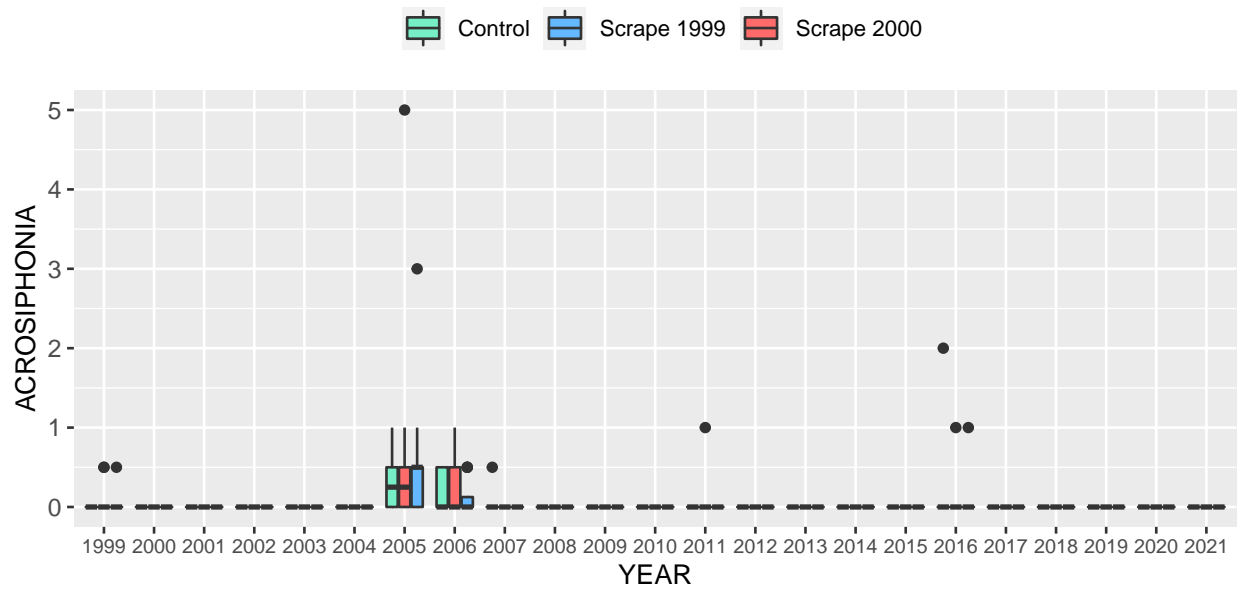
January 14, 2022

Invertebrates: Percent Cover Data

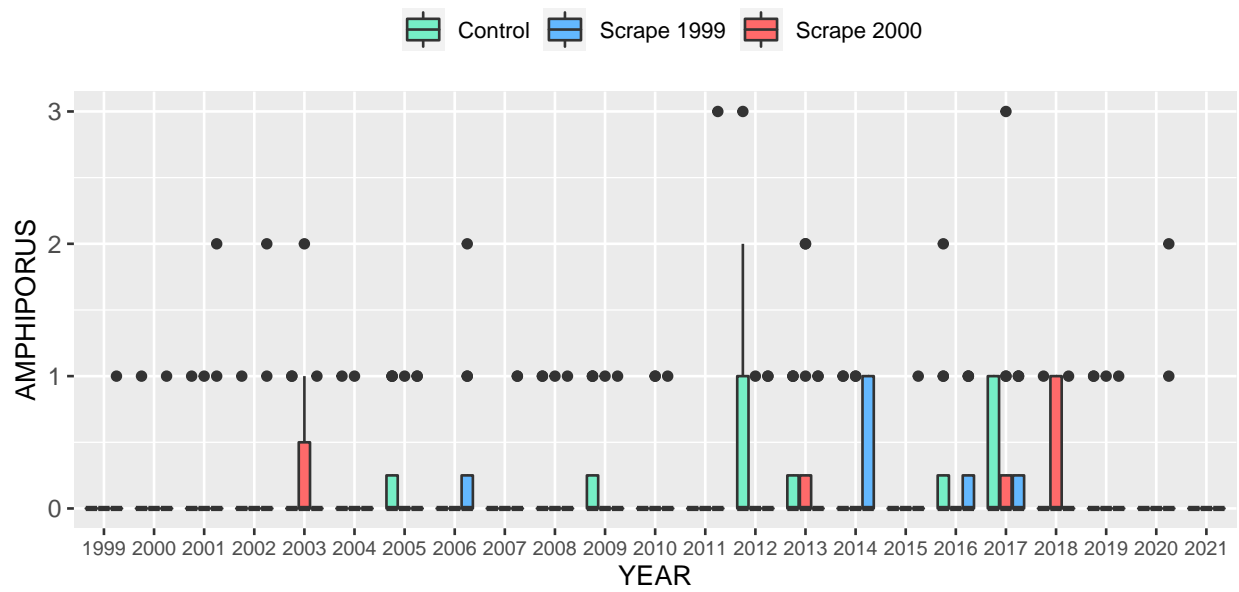




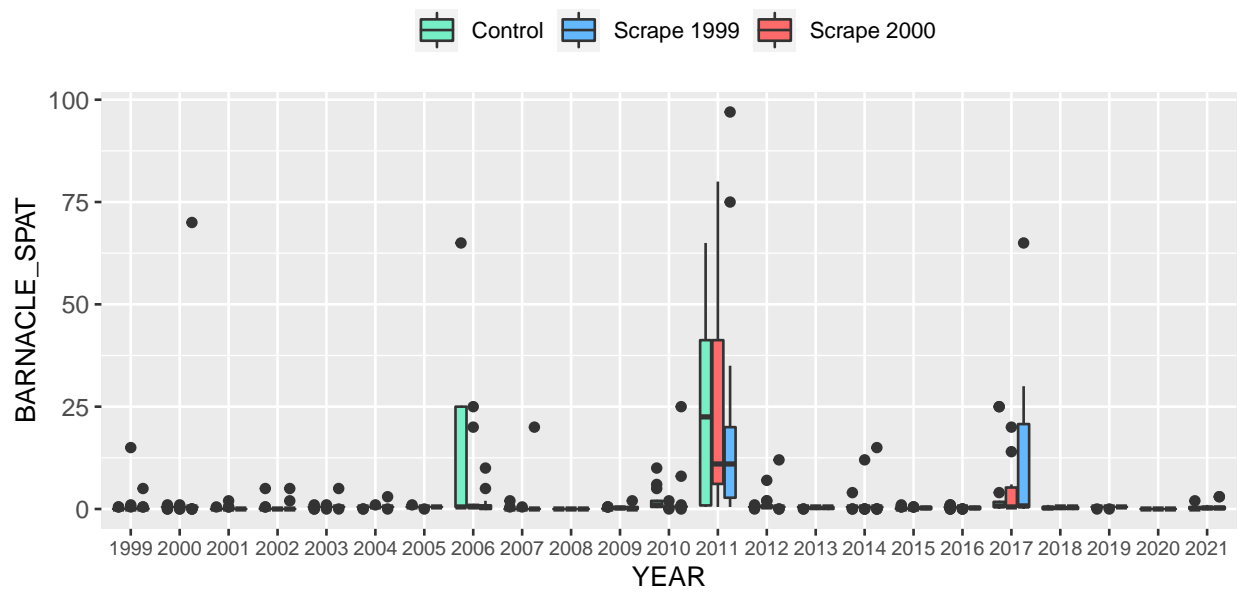
```
##
## [[3]]
```



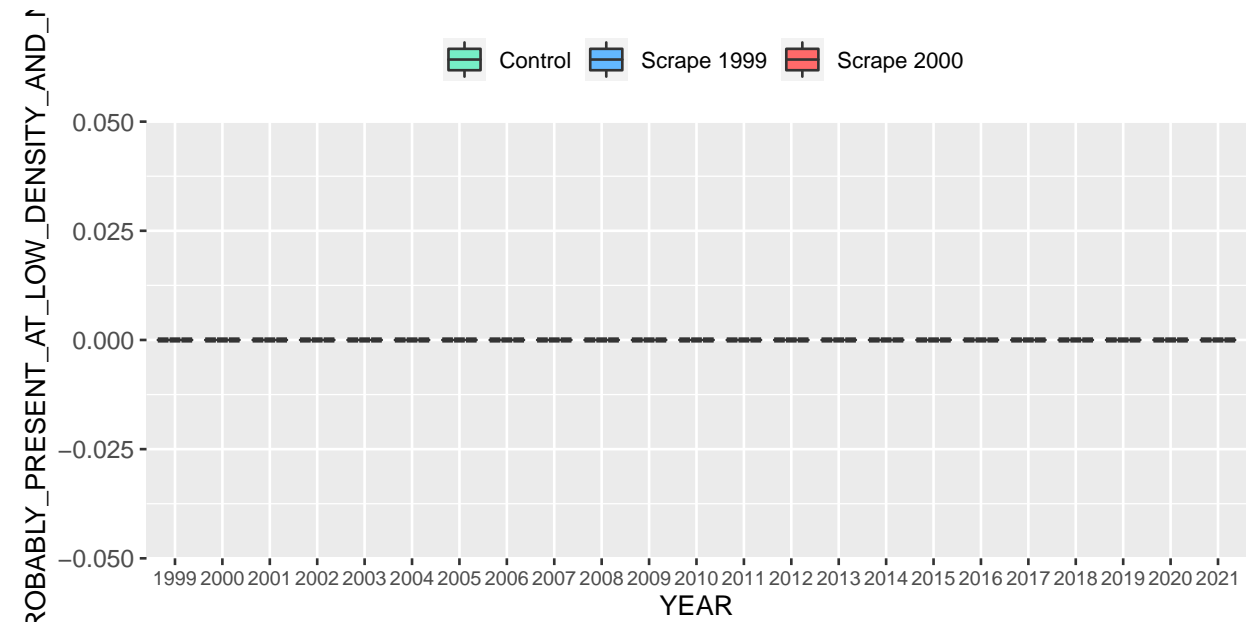
```
##
## [[4]]
```



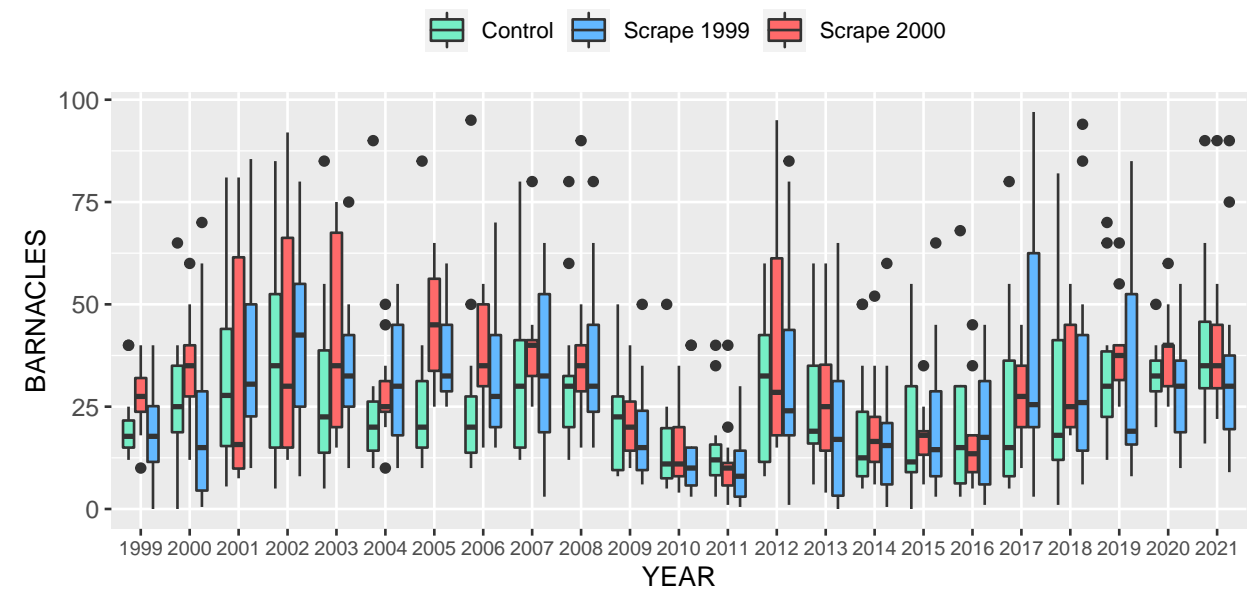
```
##
## [[5]]
```



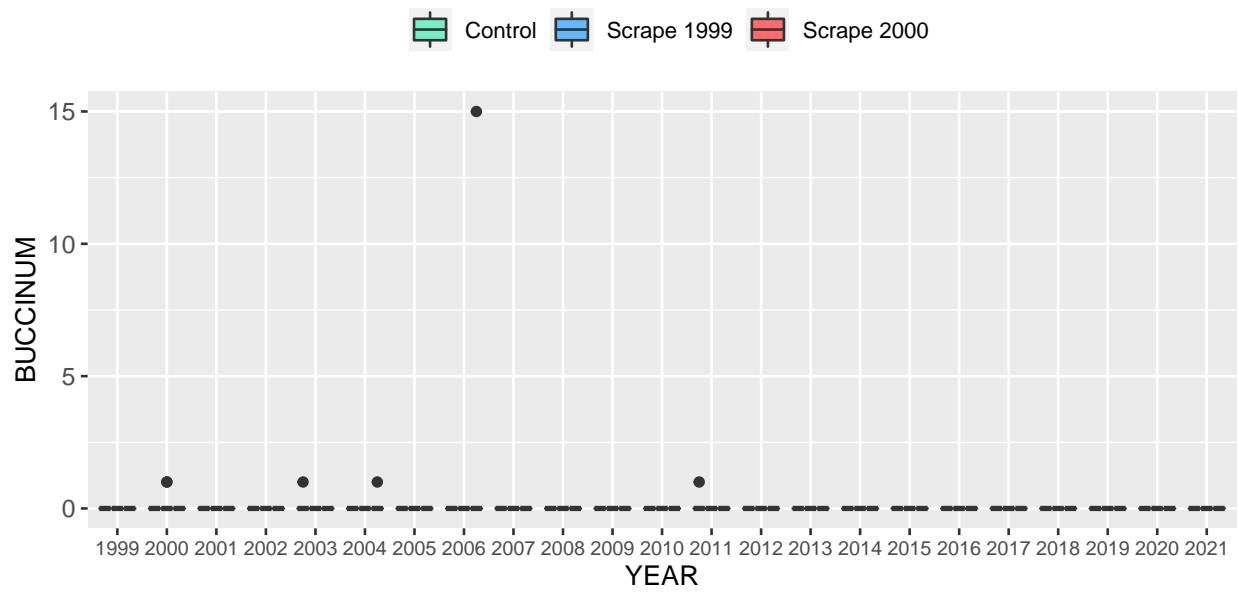
```
##
## [[6]]
```



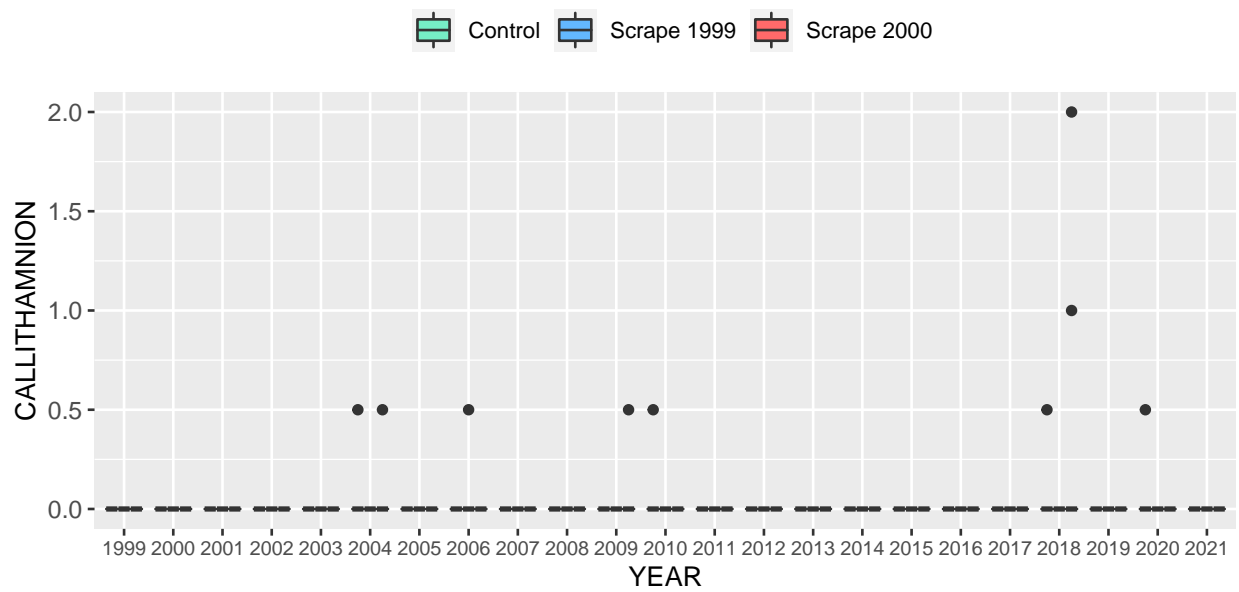
```
##
## [[7]]
```



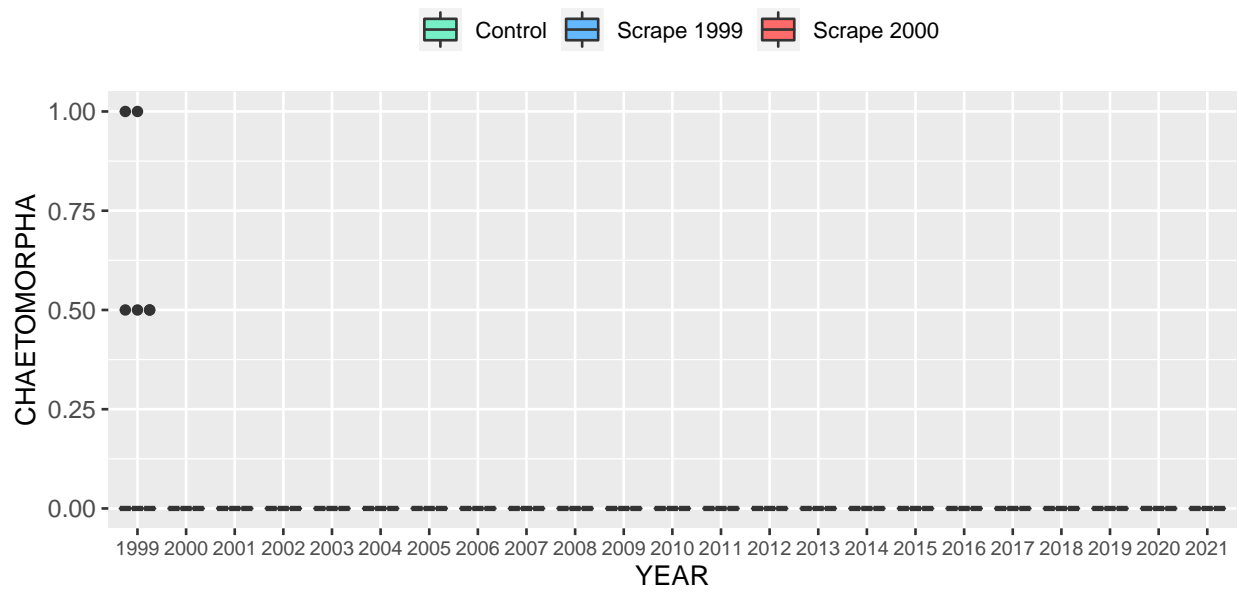
```
##
## [[8]]
```



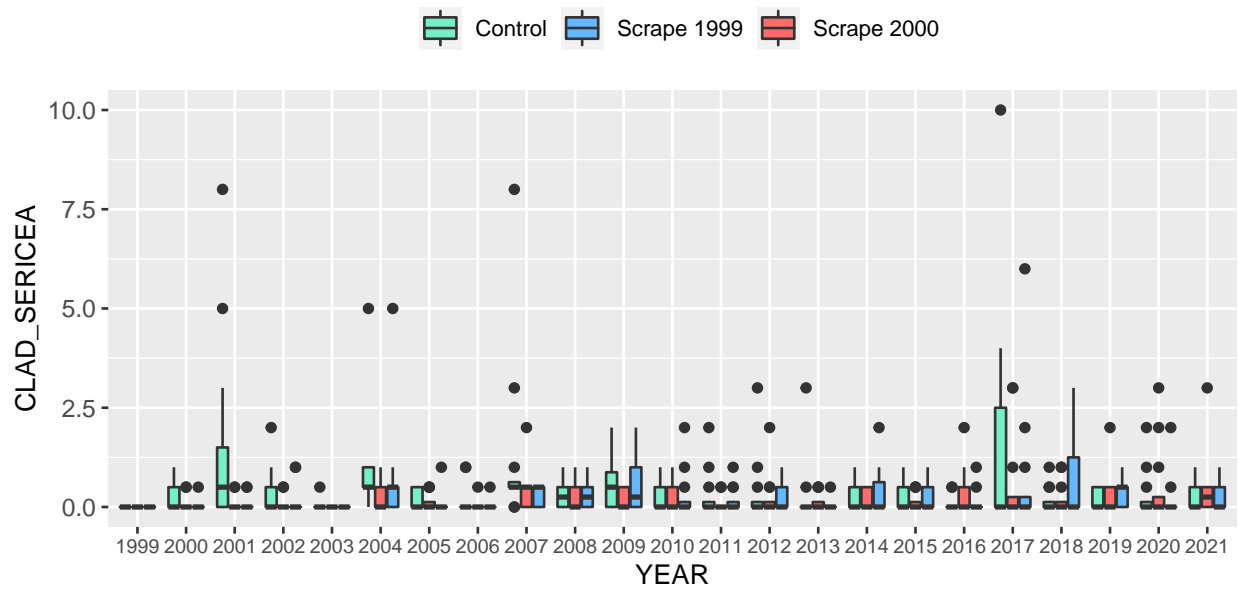
[[9]]



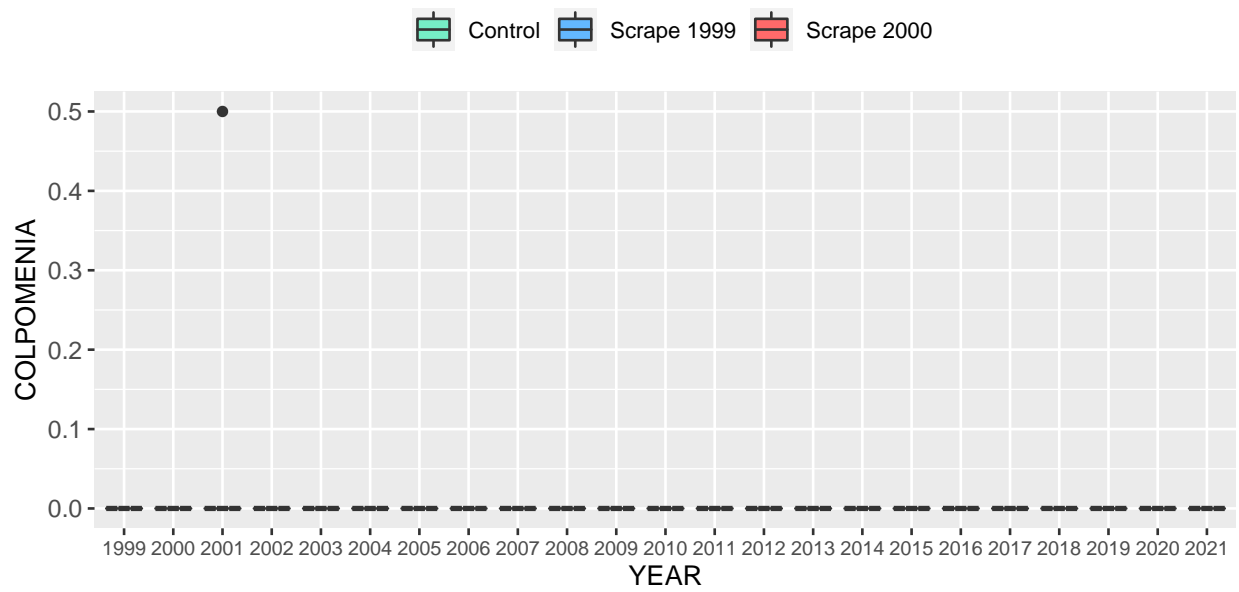
[[10]]



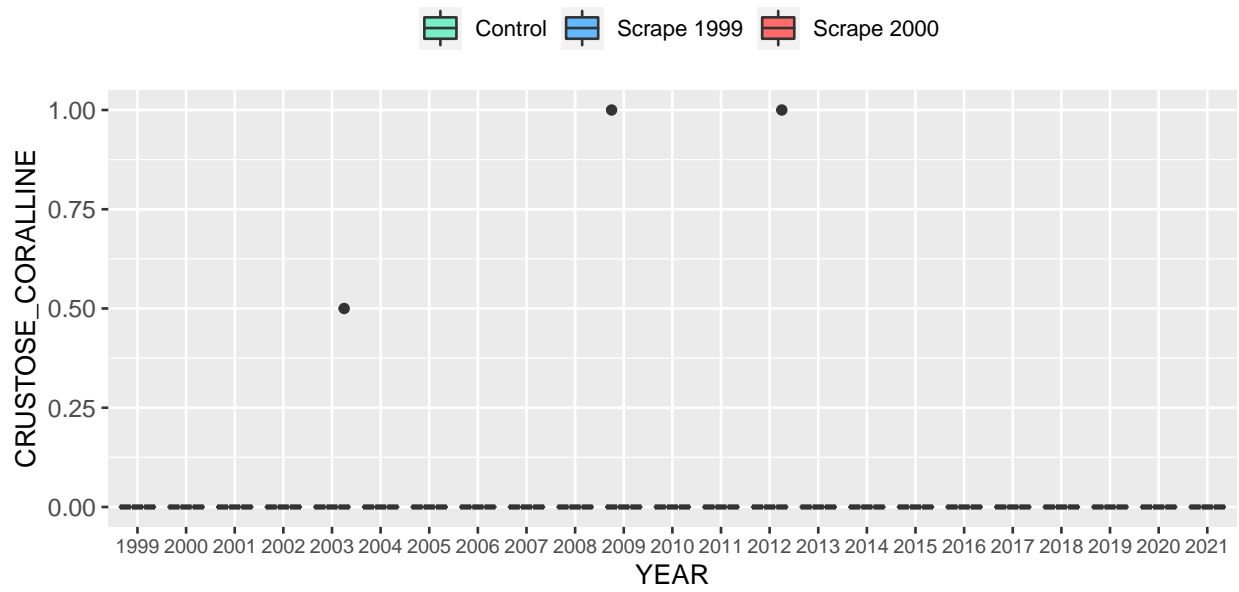
```
##
## [[11]]
```



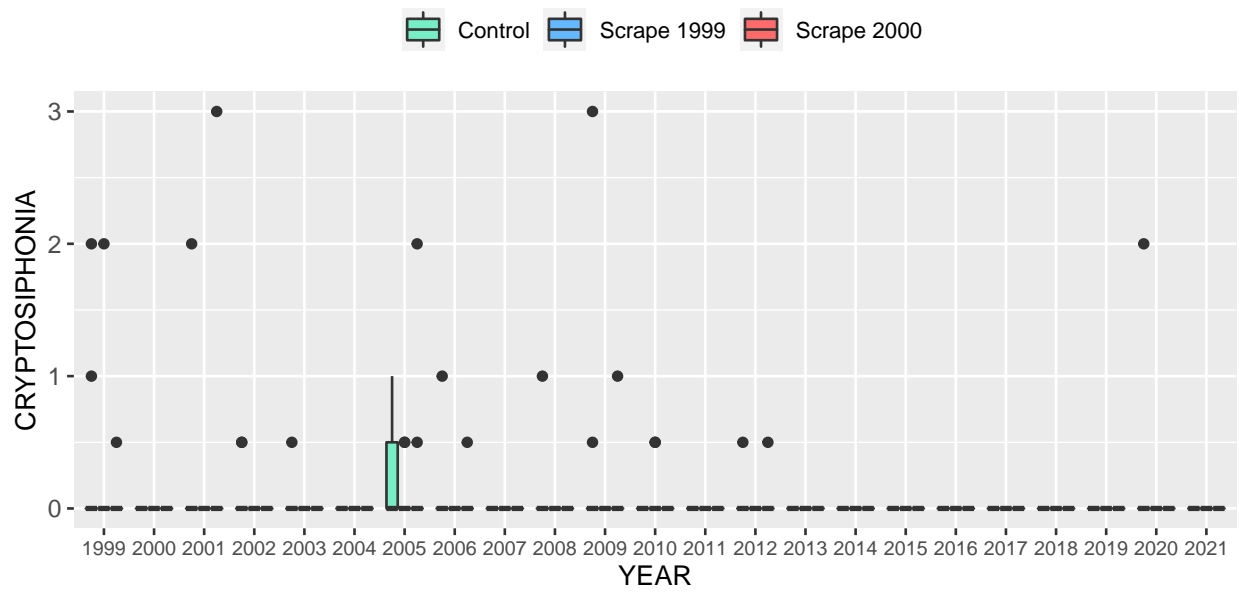
```
##
## [[12]]
```



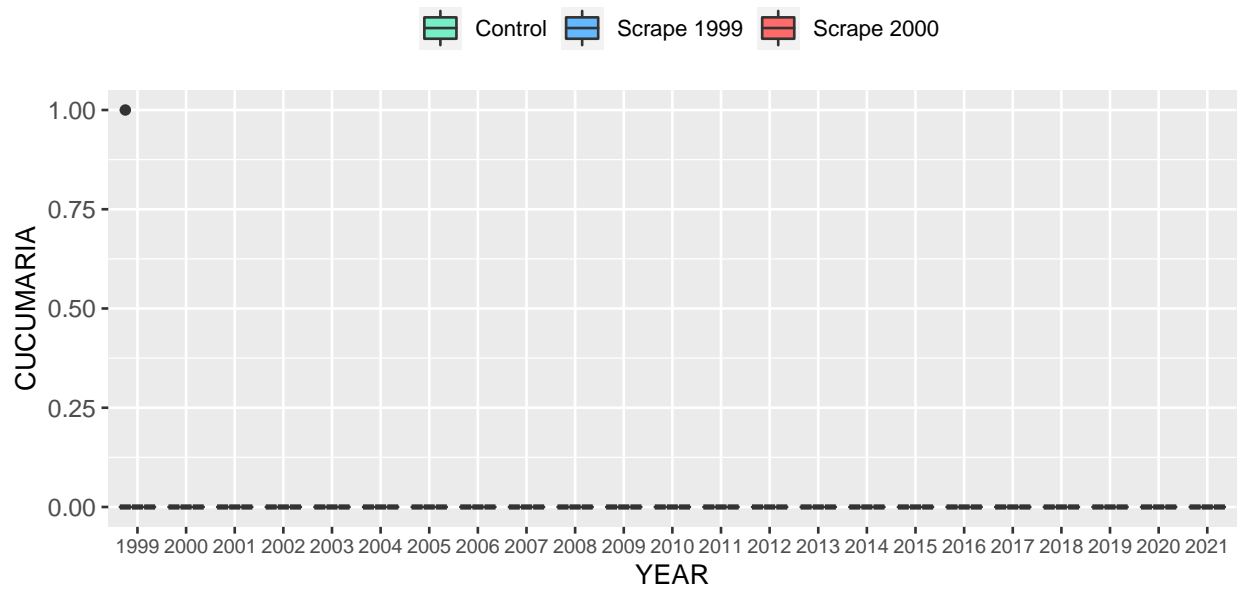
```
##
## [[13]]
```



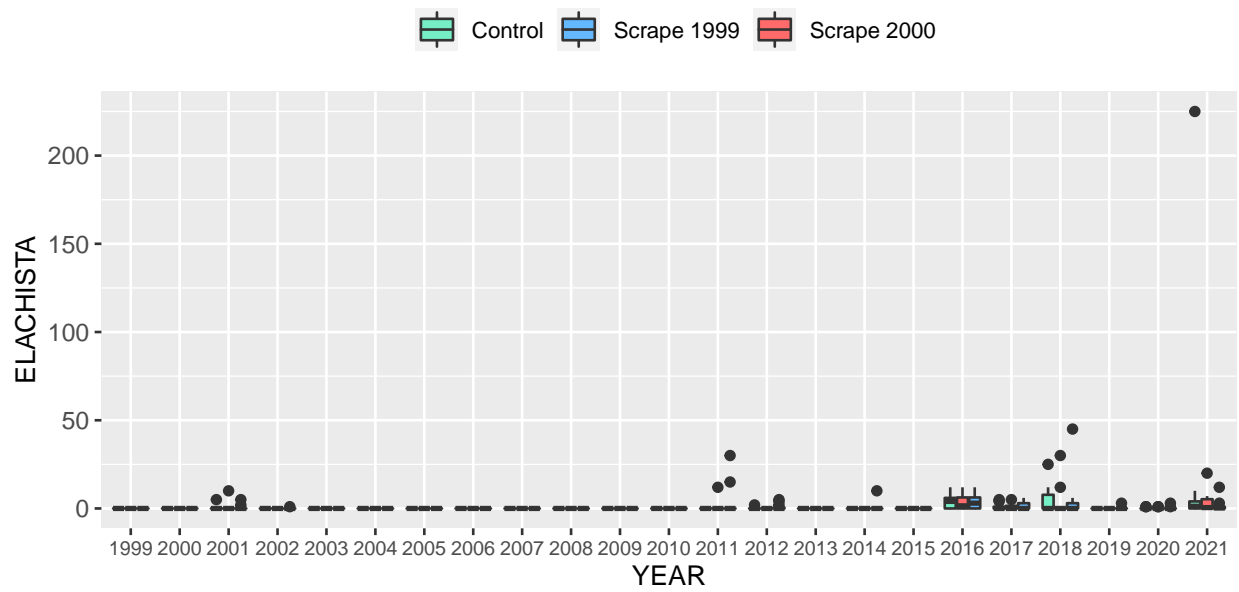
```
##
## [[14]]
```



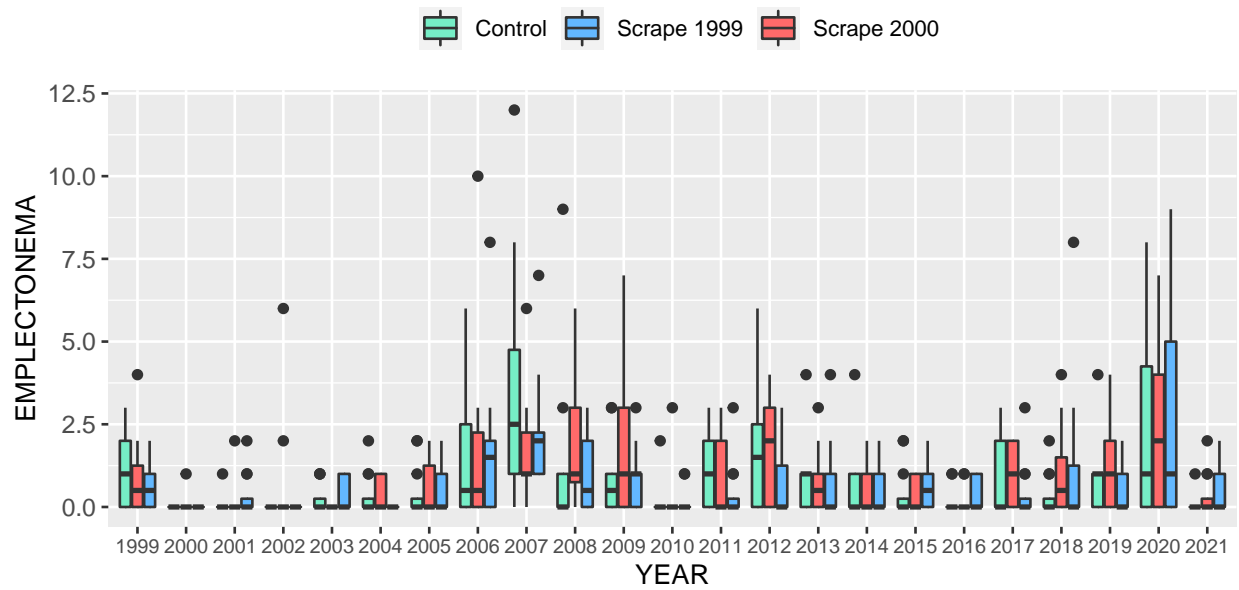
```
##
## [[15]]
```



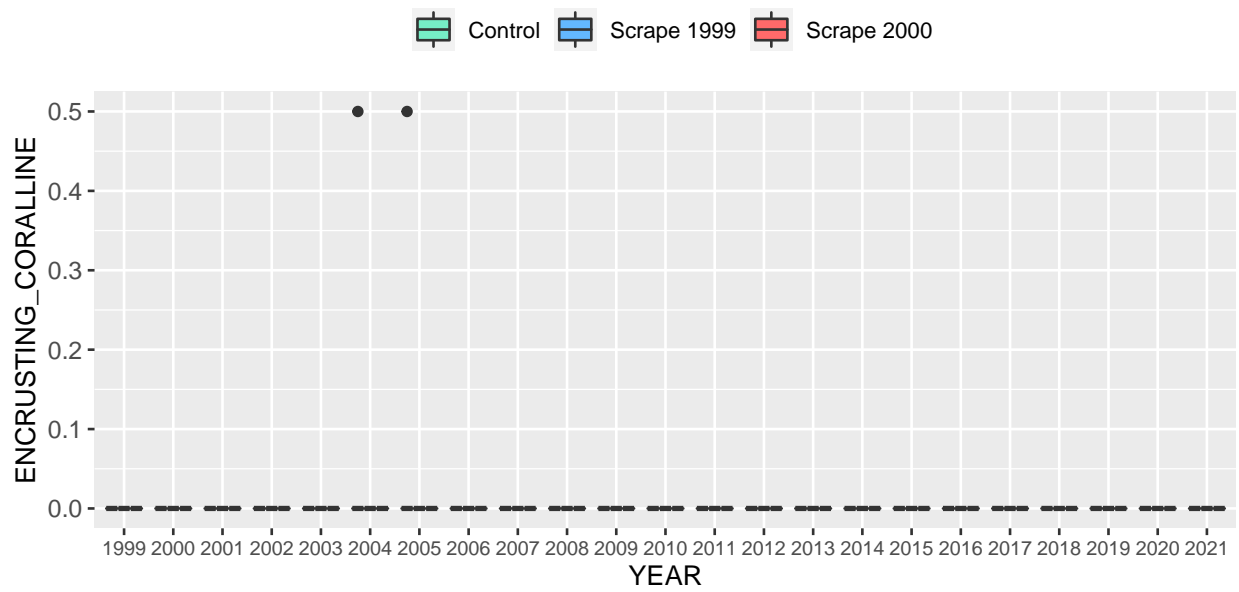
```
##
## [[16]]
```

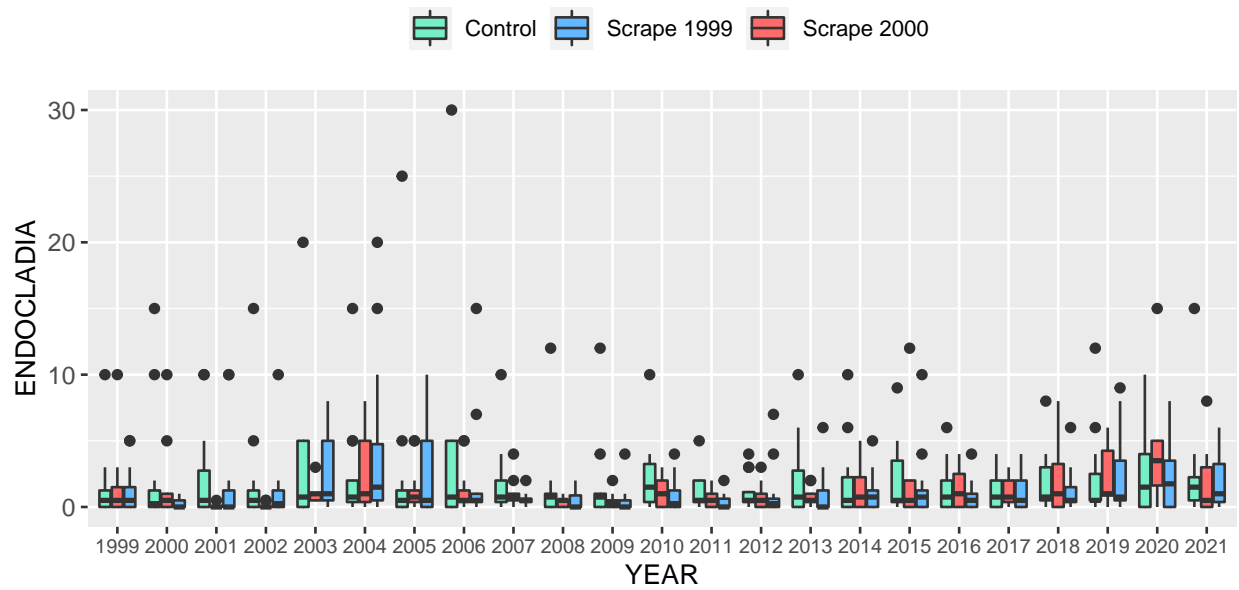
```
##
## [[17]]
```



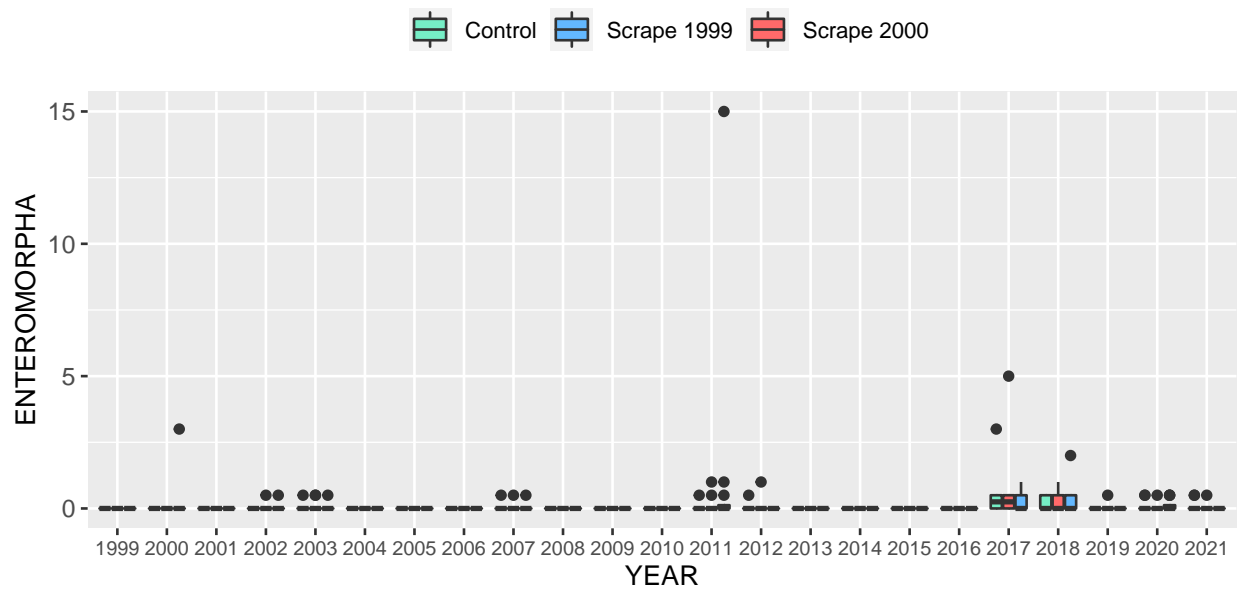
```
##
## [[18]]
```



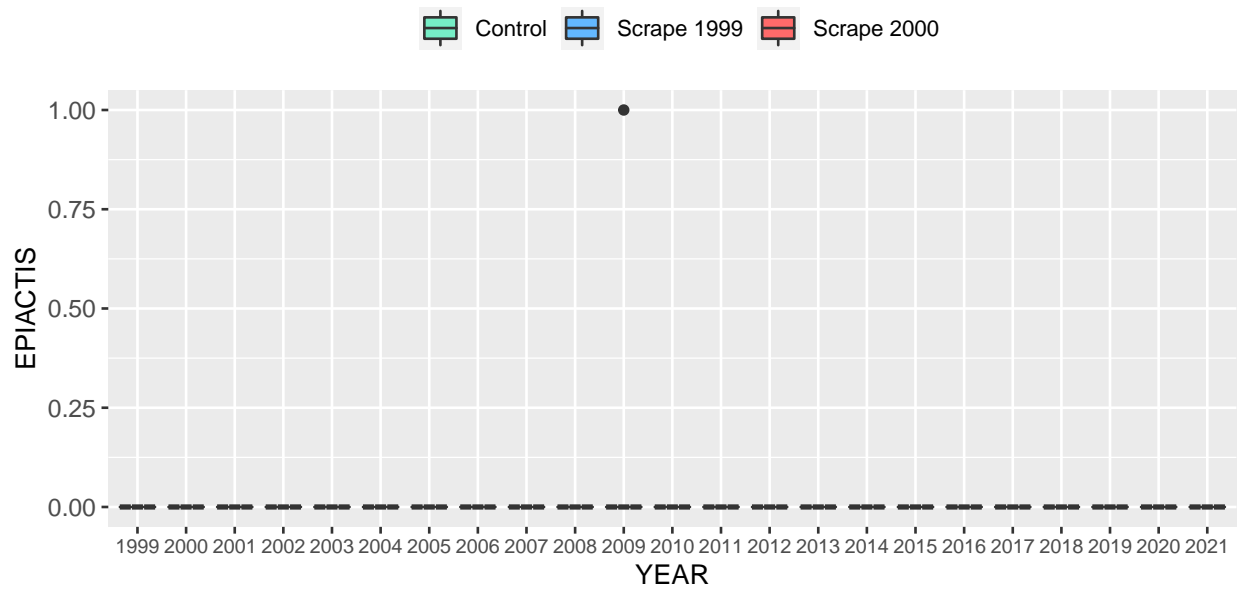
```
##
## [[19]]
```



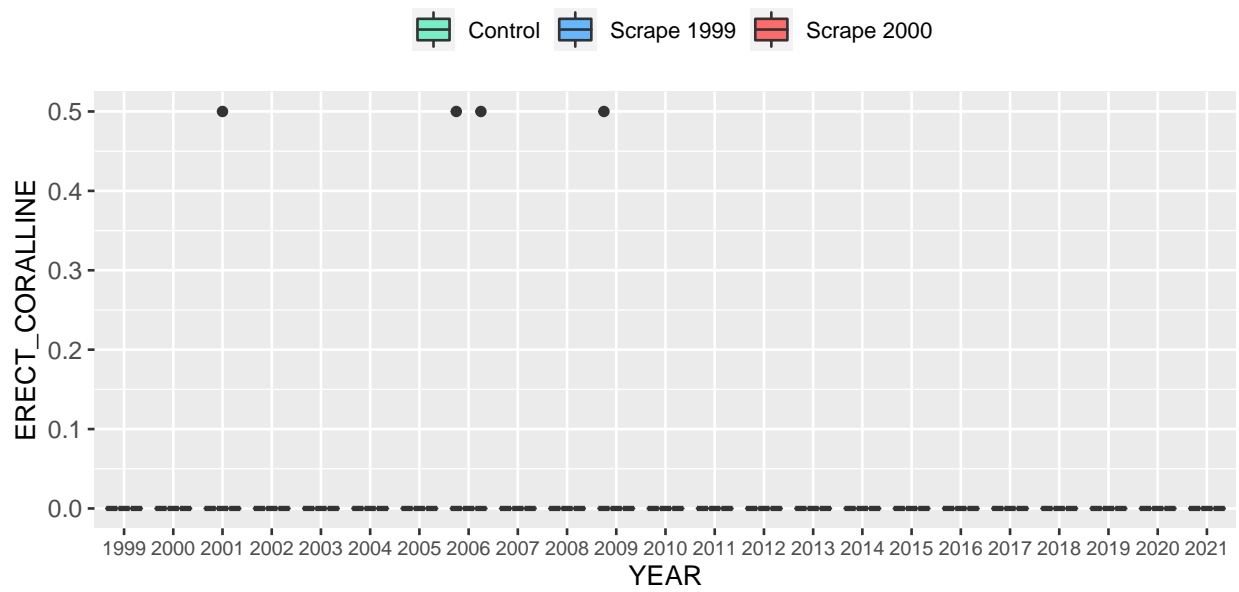
```
##
## [[20]]
```



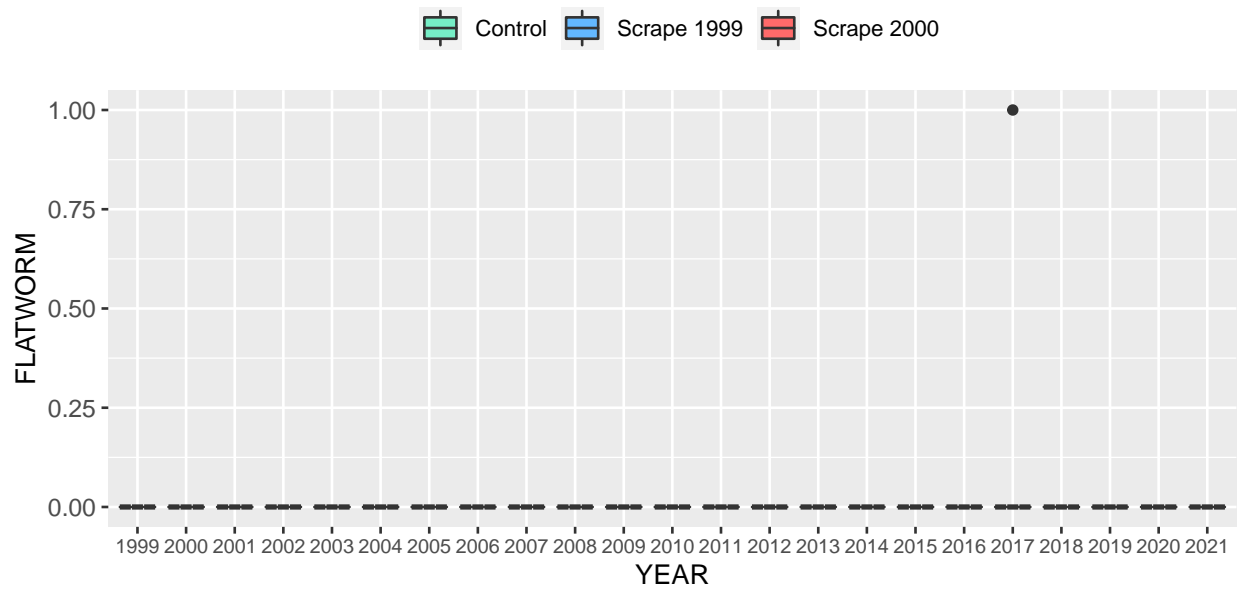
```
##
## [[21]]
```



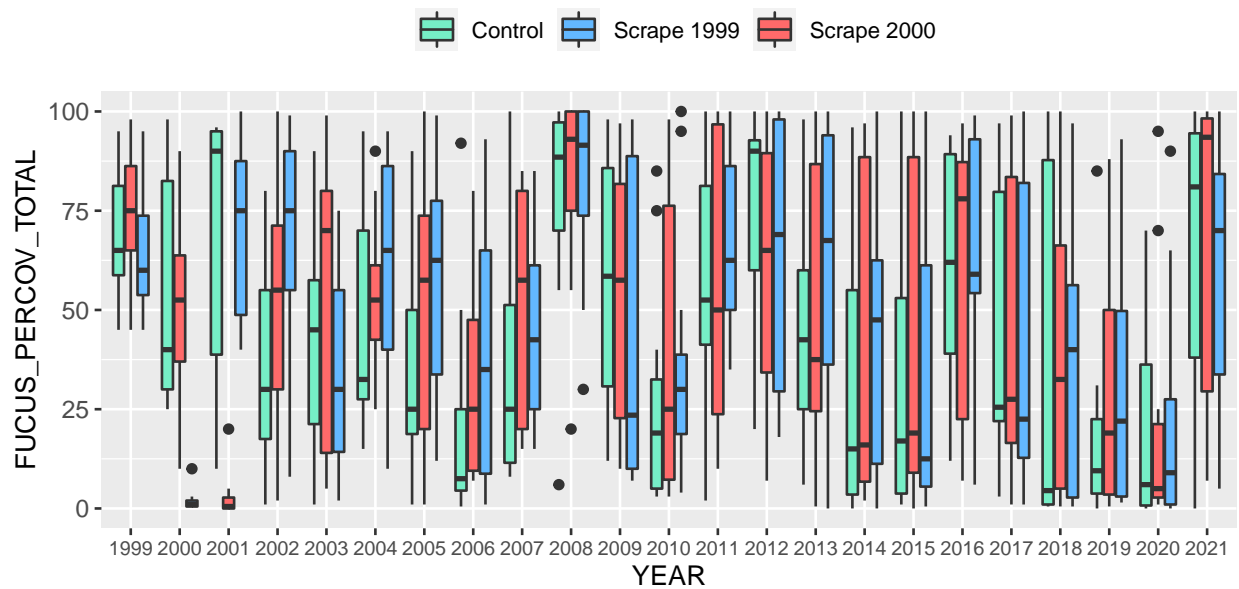
```
##
## [[22]]
```



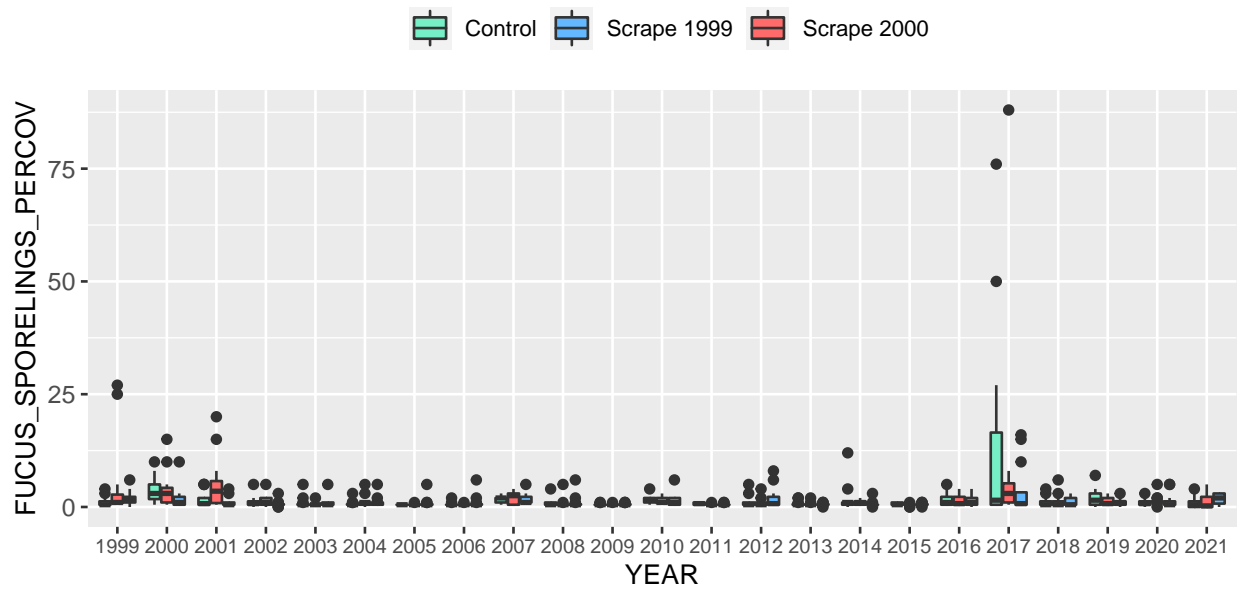
[[23]]



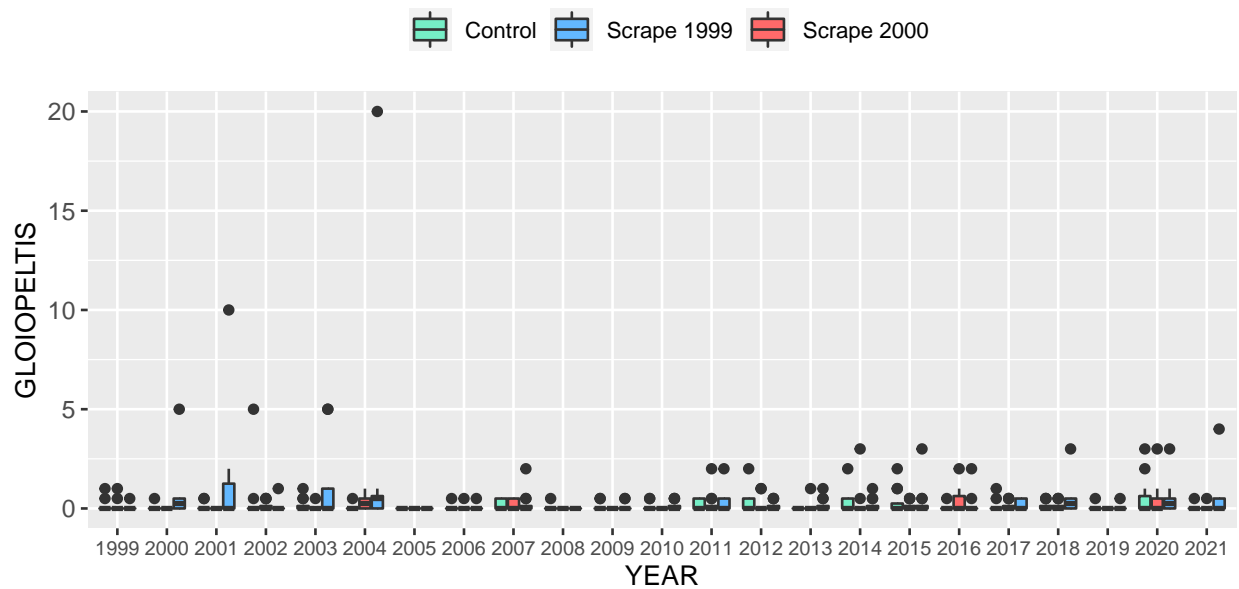
[[24]]



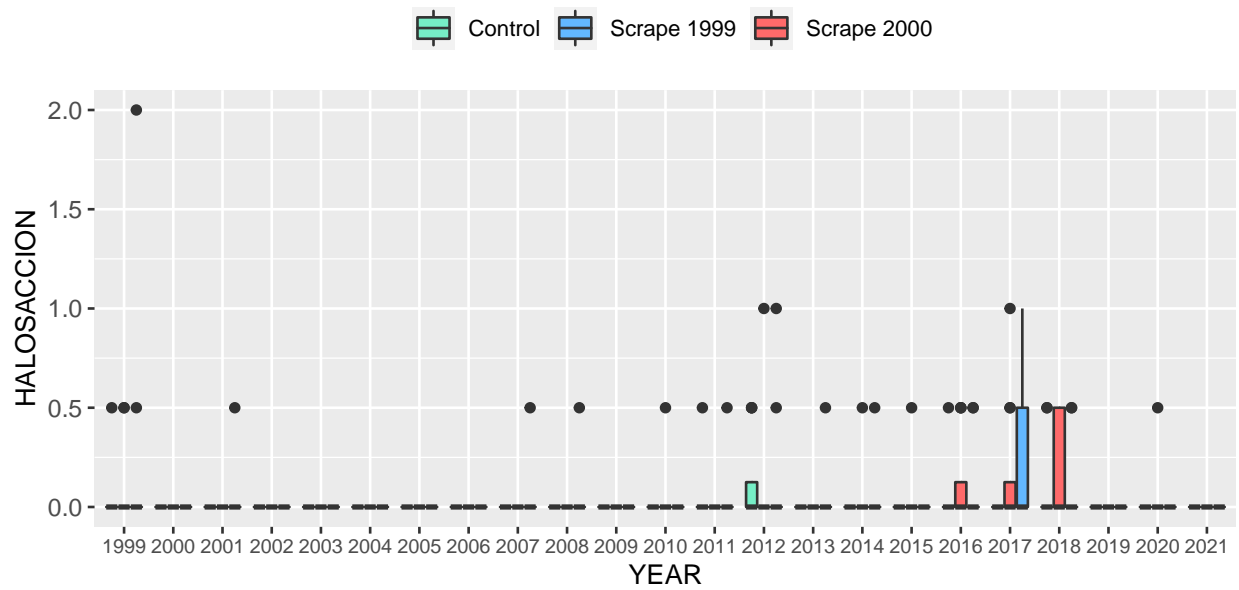
[[25]]



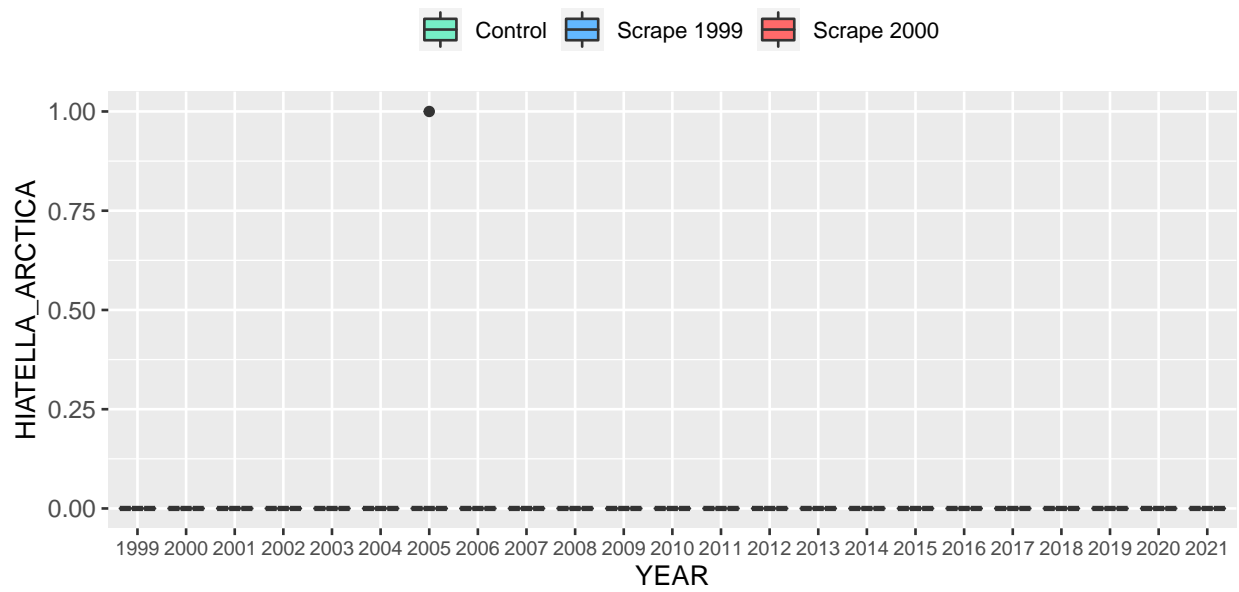
[[26]]



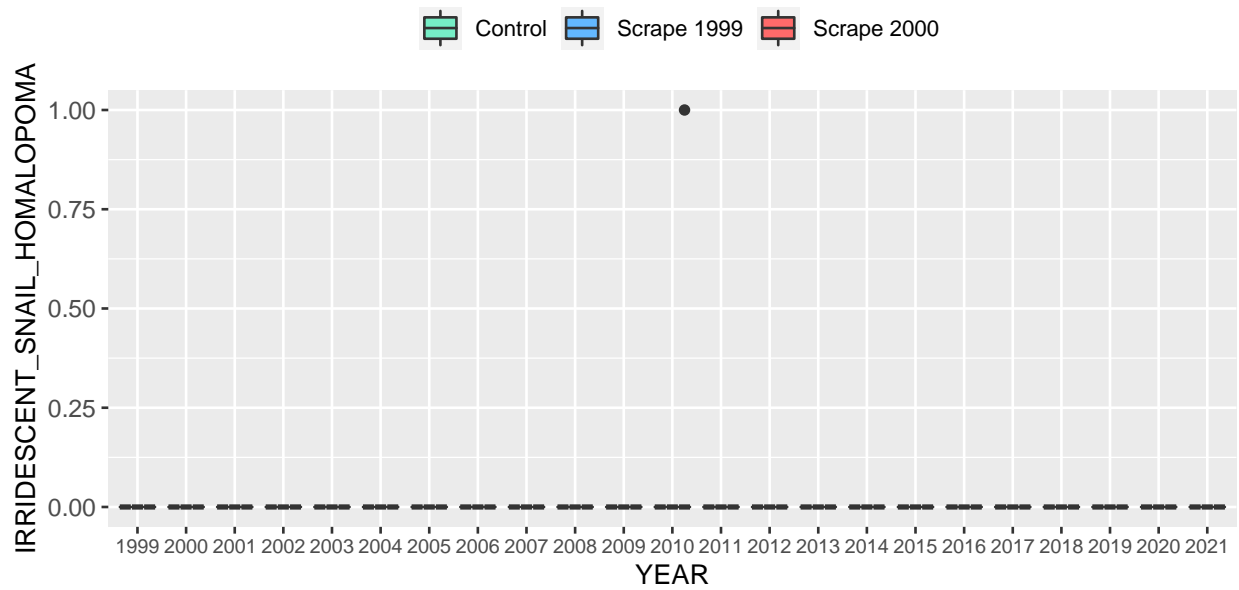
[[27]]



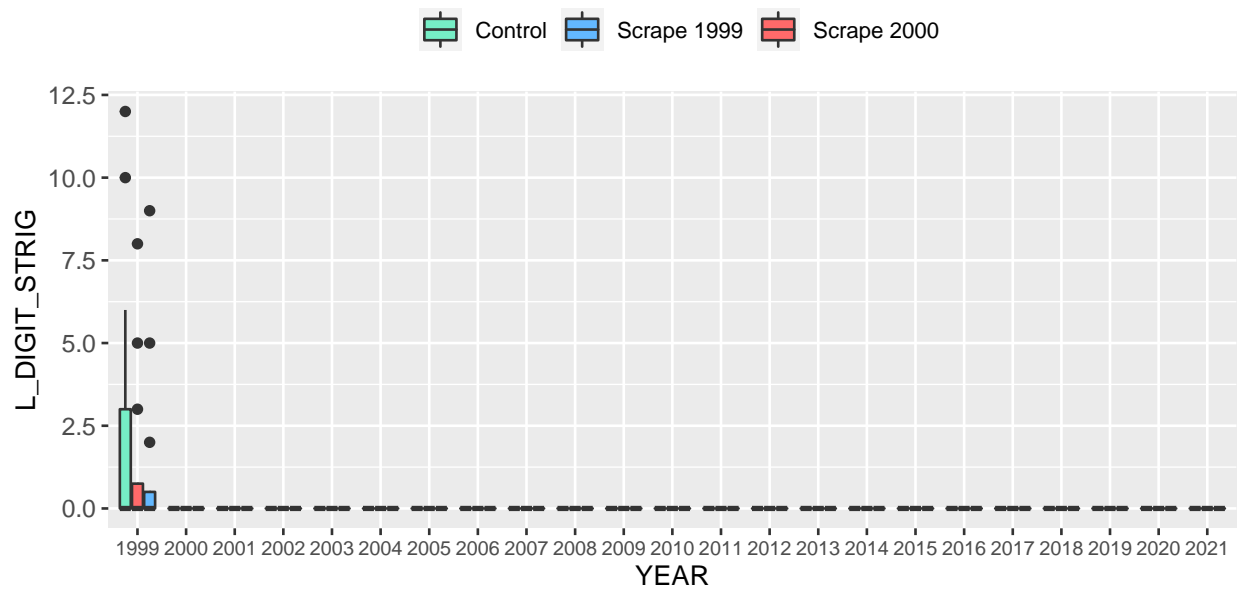
[[28]]



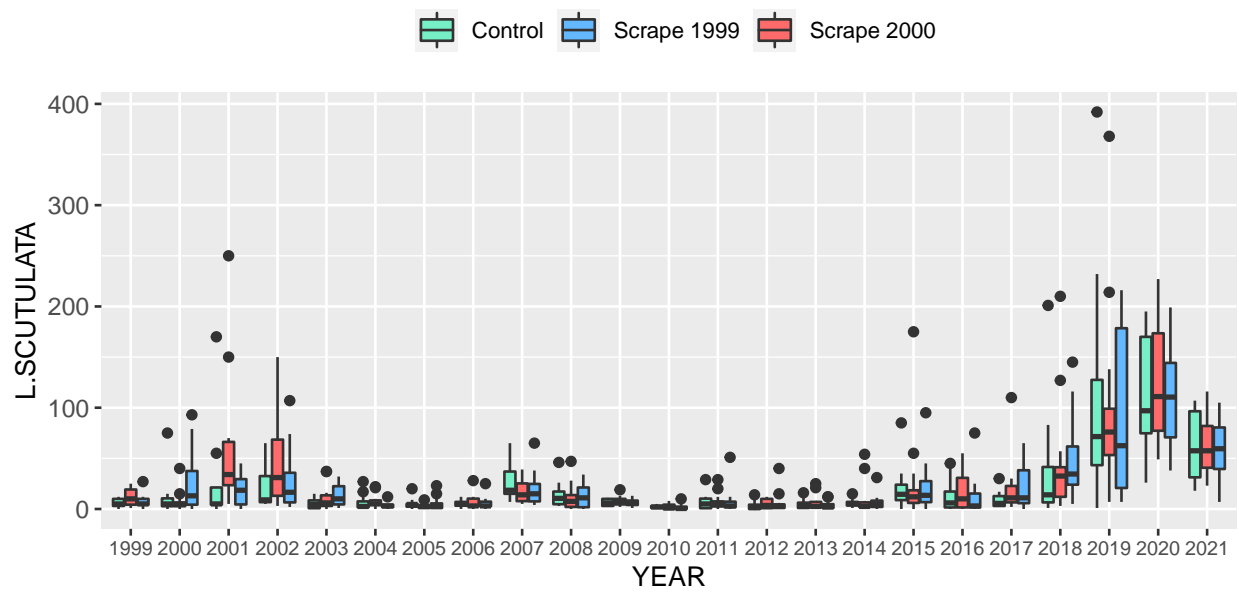
[[29]]



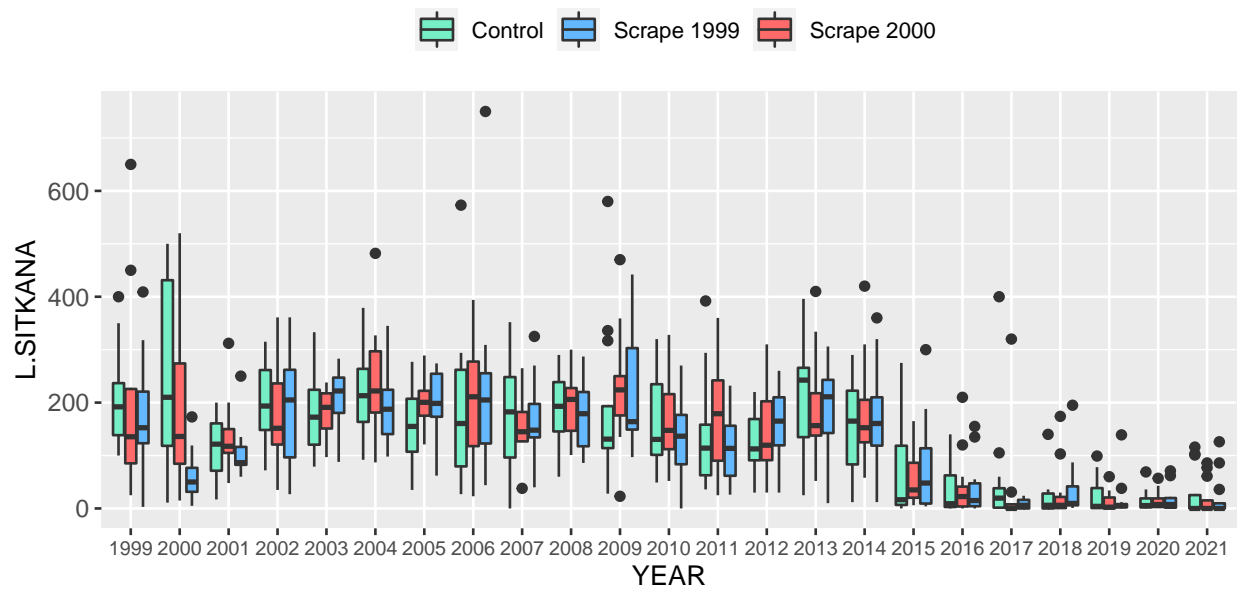
[[30]]



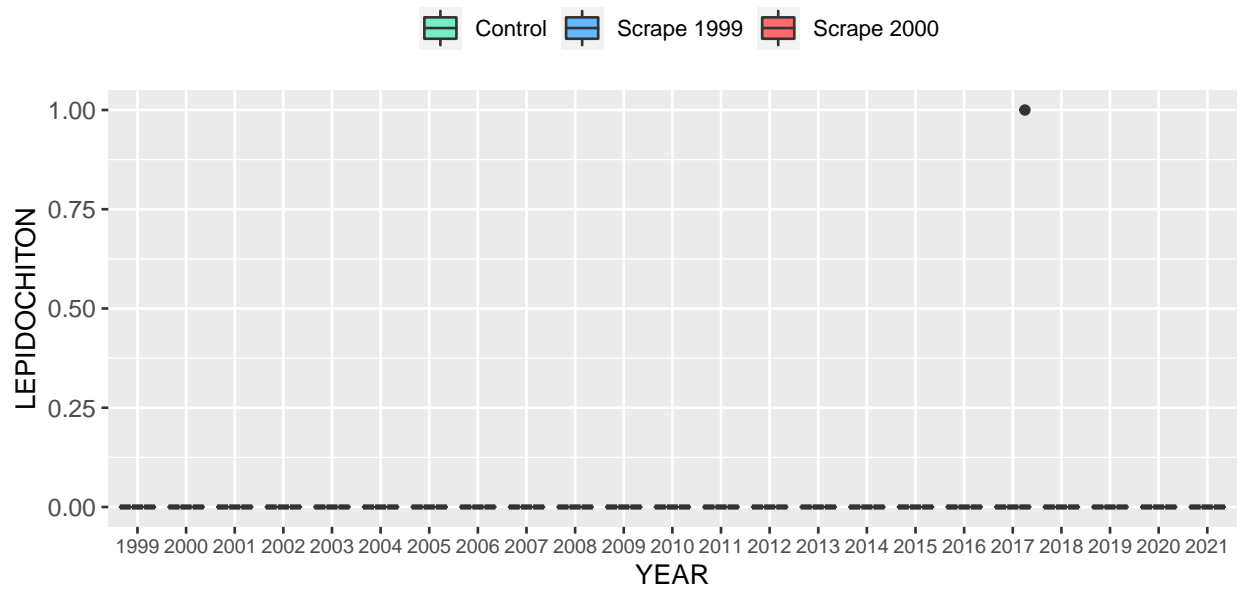
```
##
## [[31]]
```



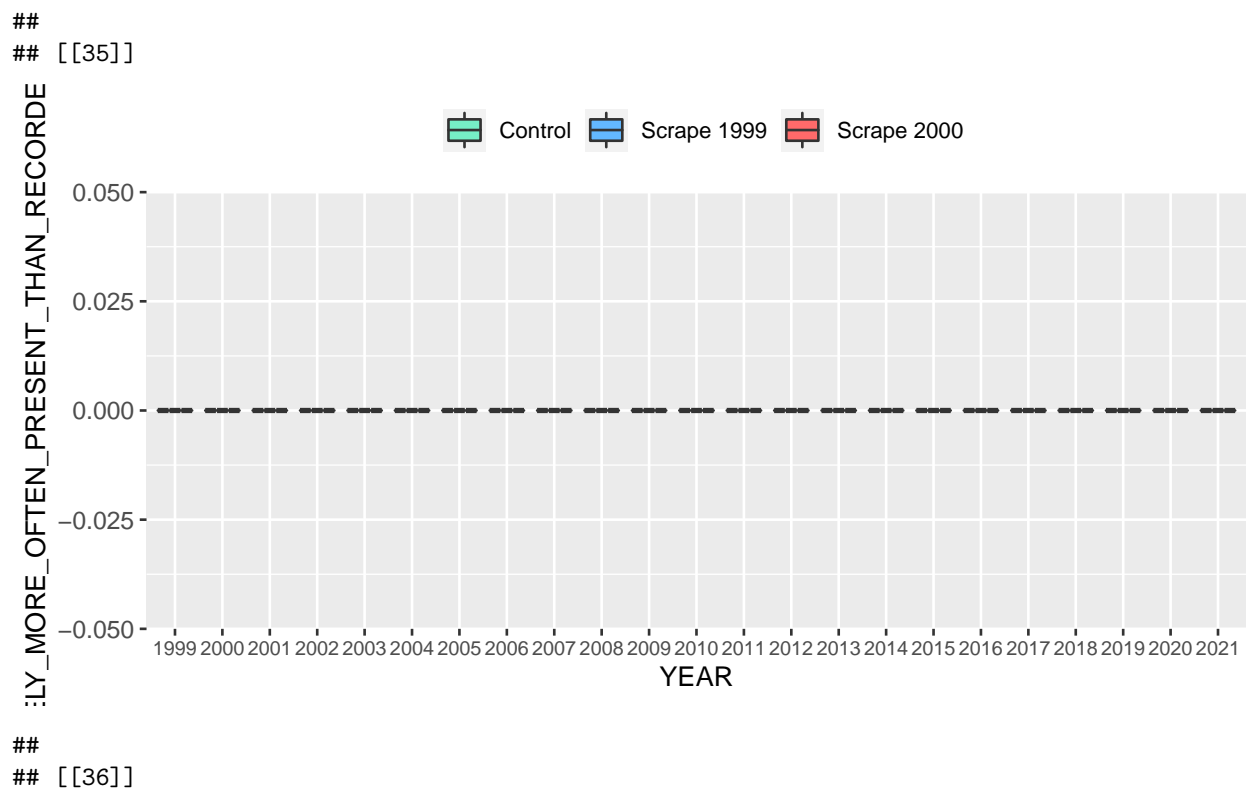
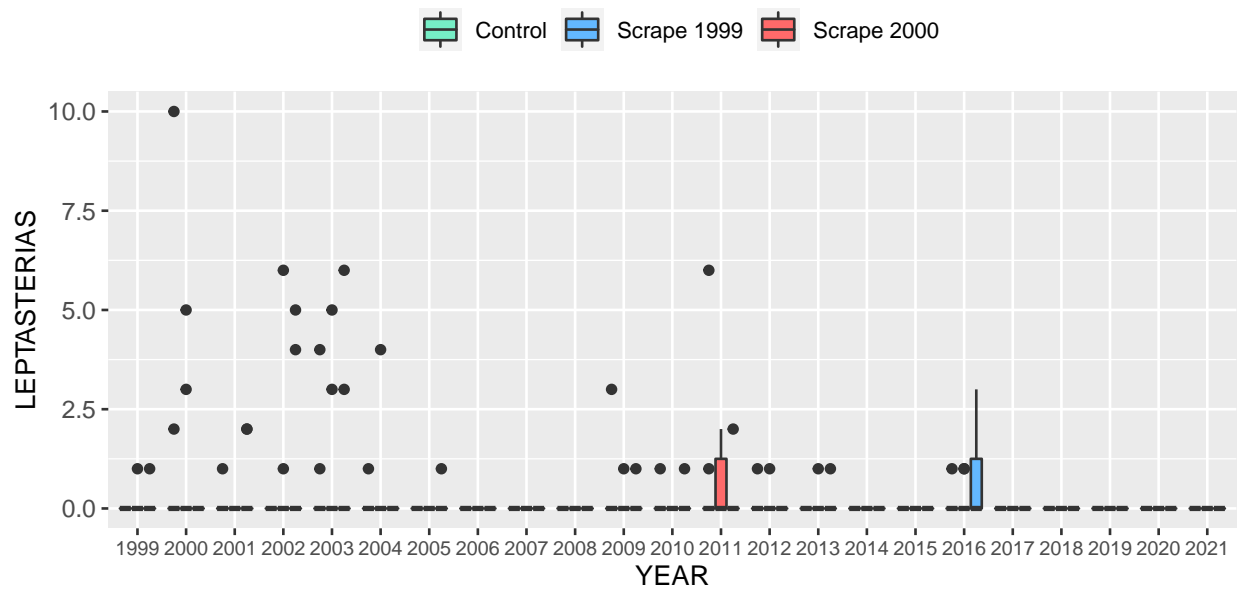
```
##
## [[32]]
```

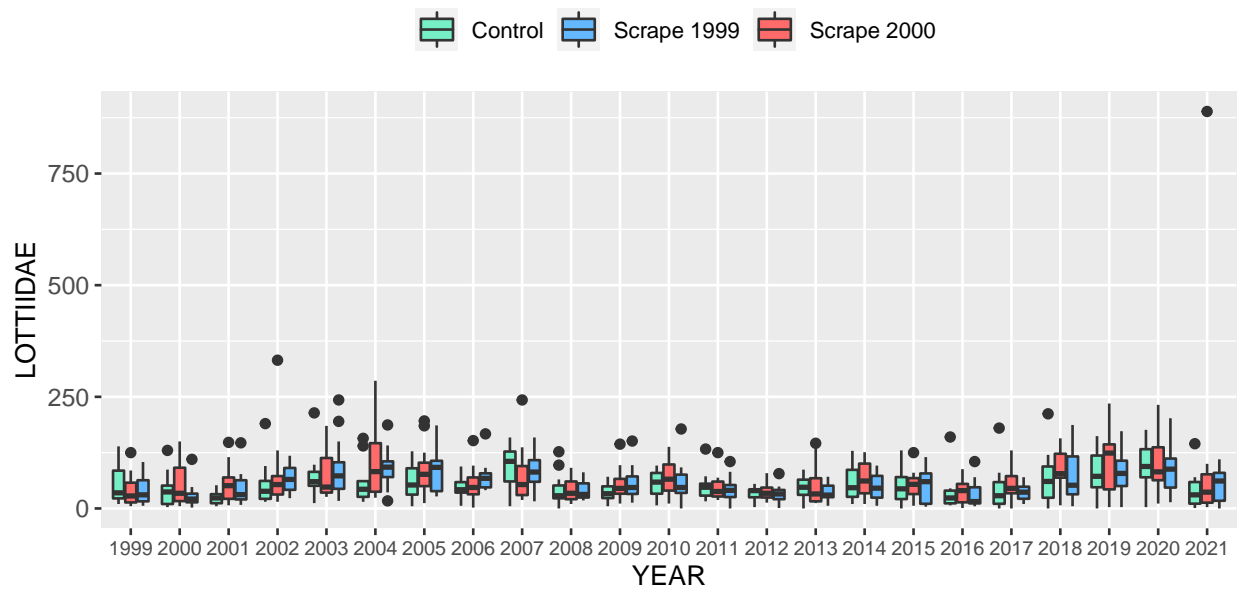



```
##
## [[33]]
```

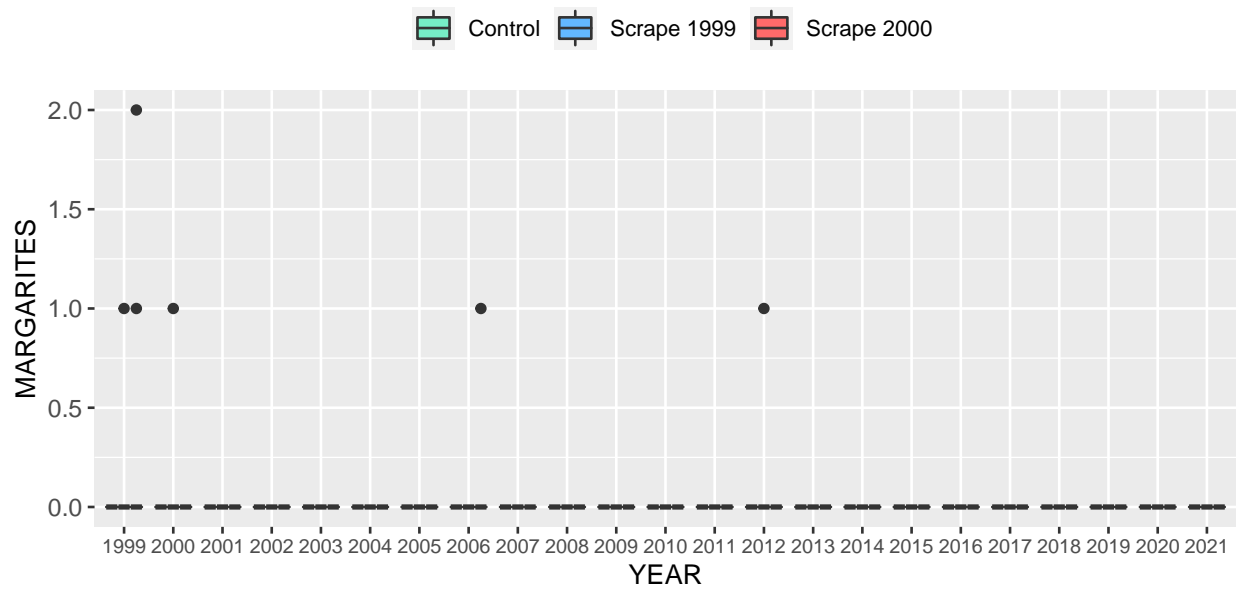


```
##
## [[34]]
```

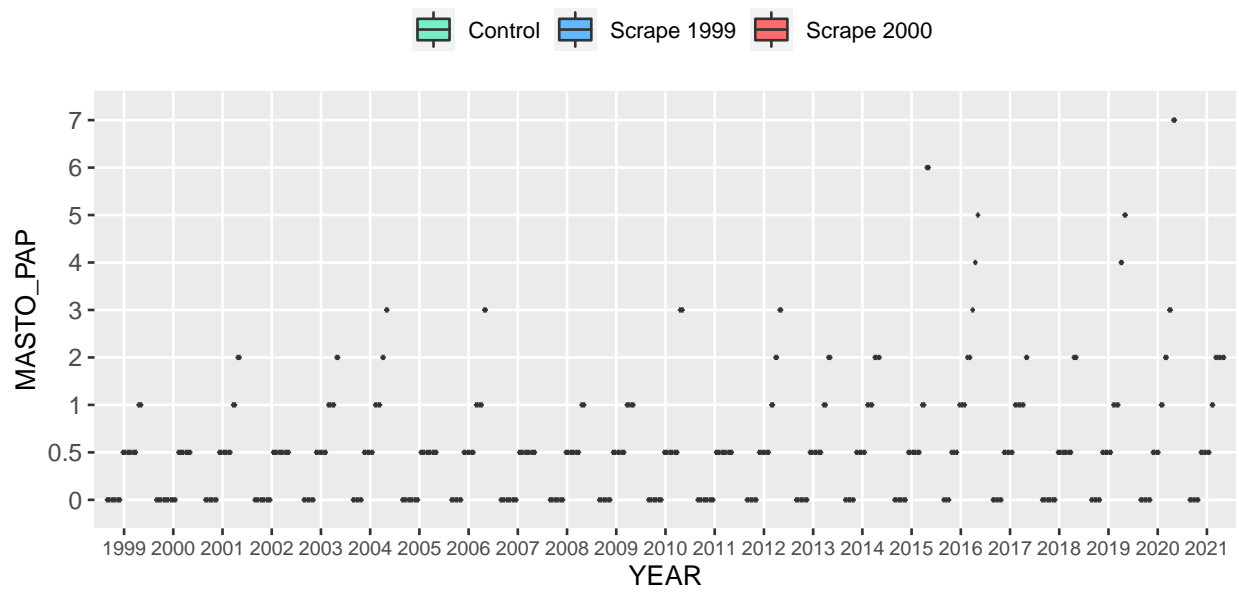




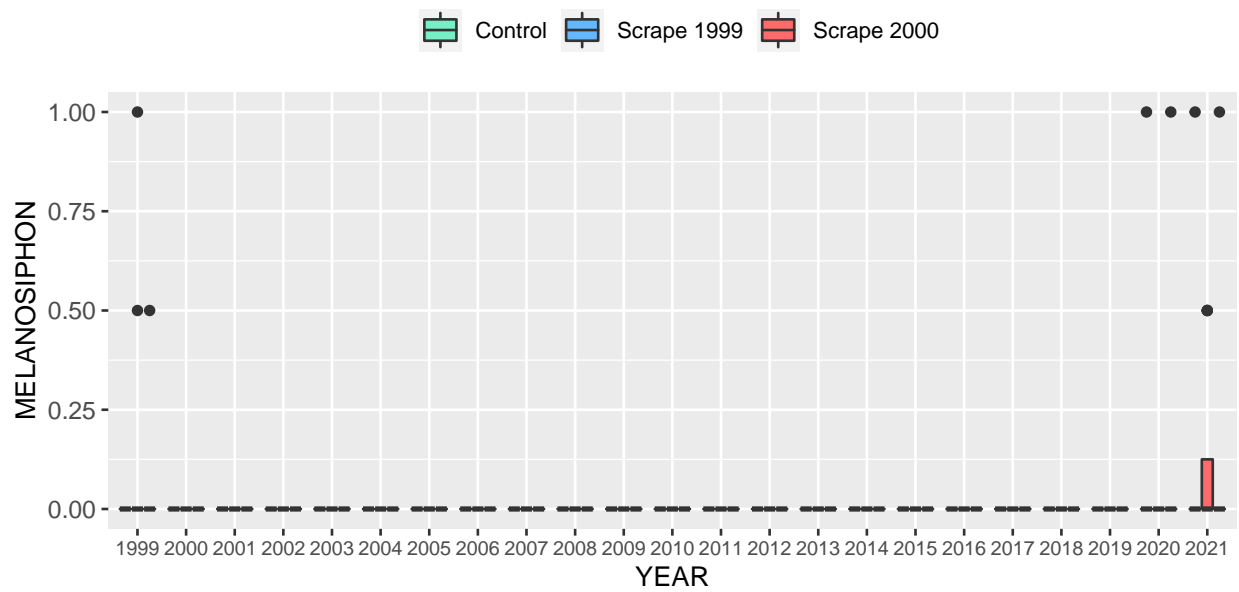
```
##
## [[37]]
```



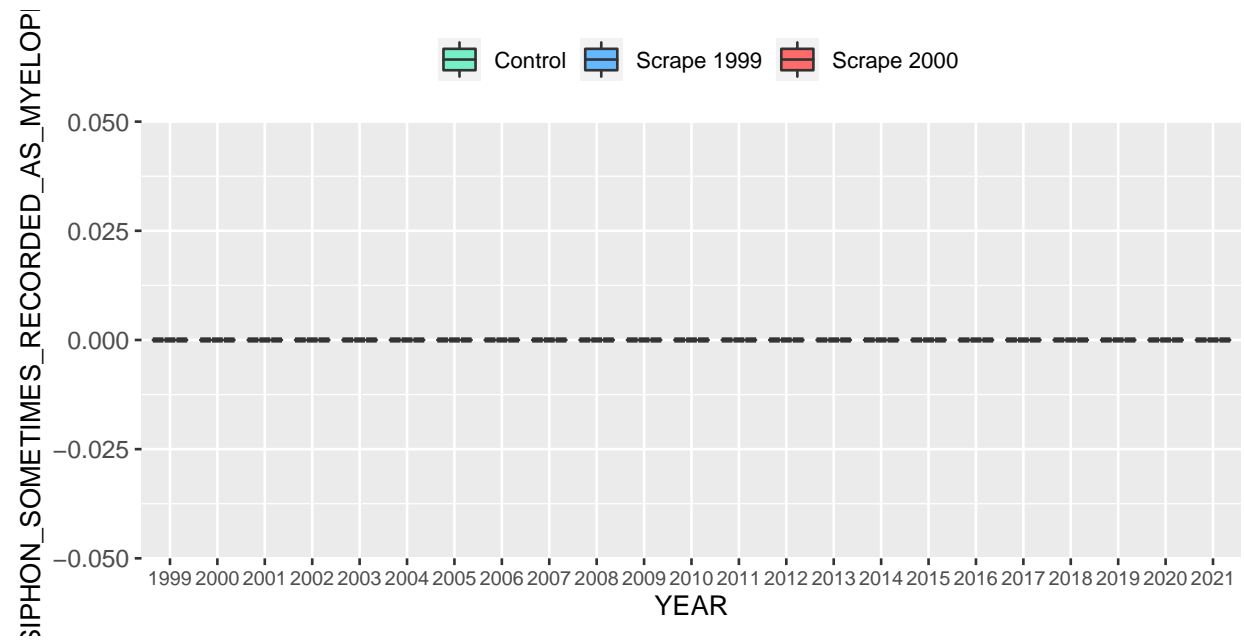
```
##
## [[38]]
```



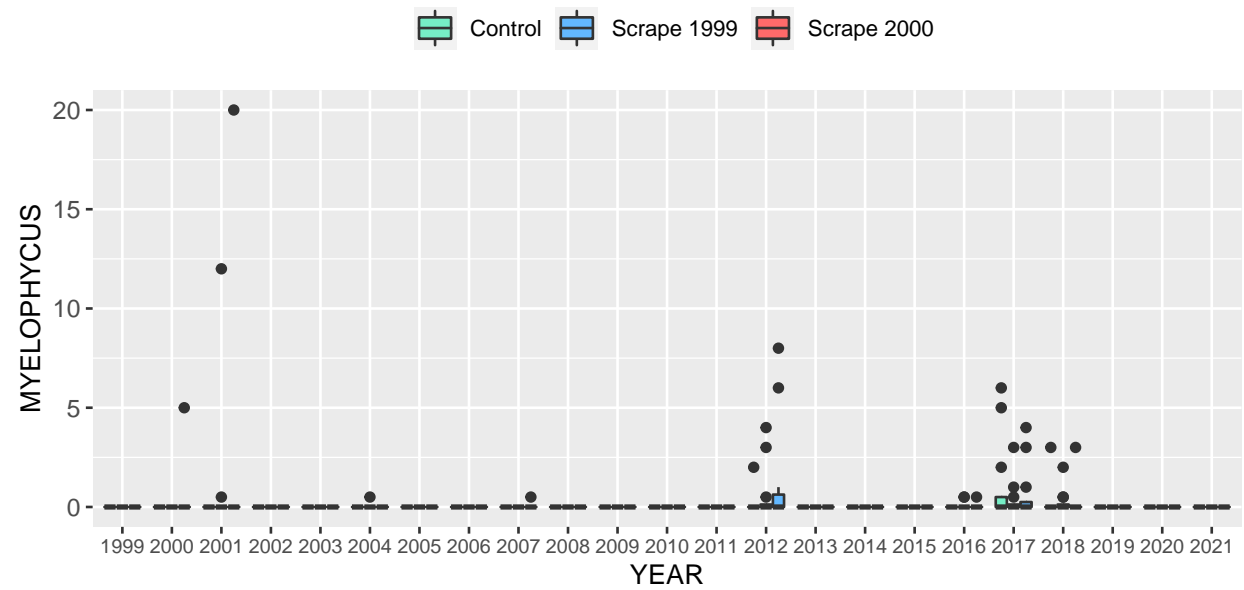
[[39]]



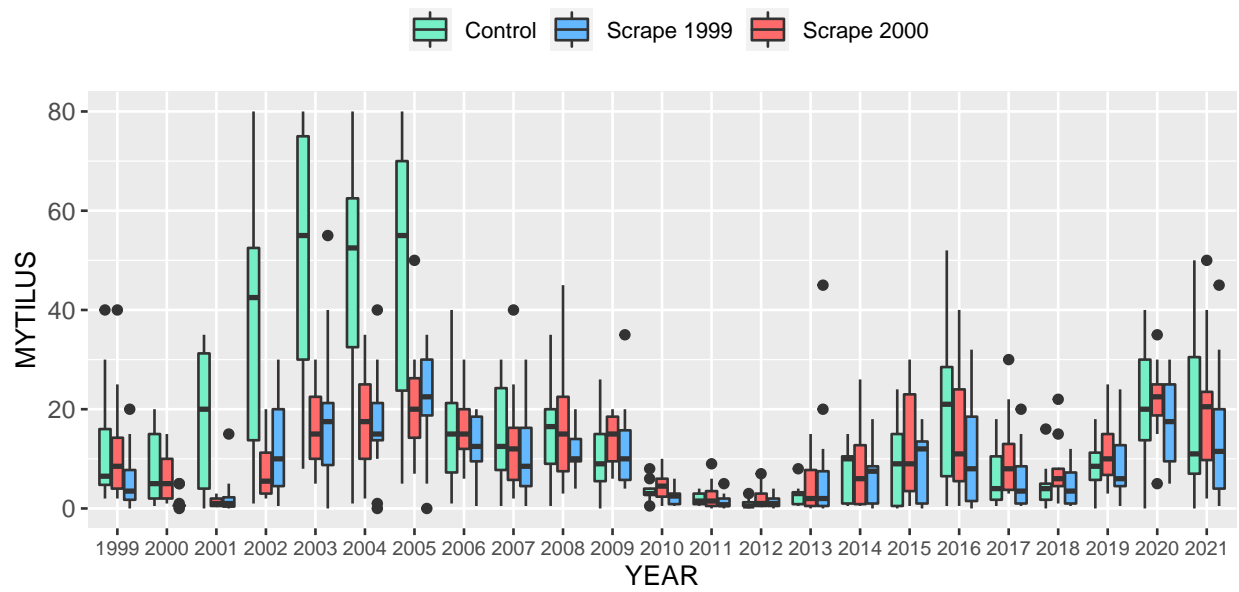
[[40]]



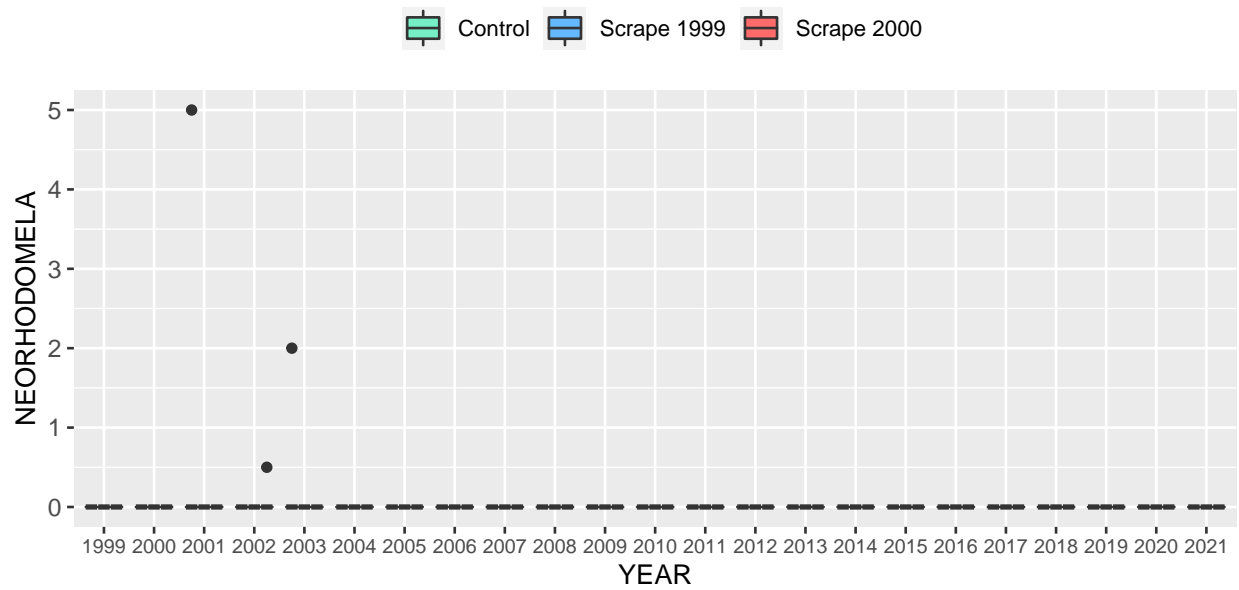
```
##
## [[41]]
```



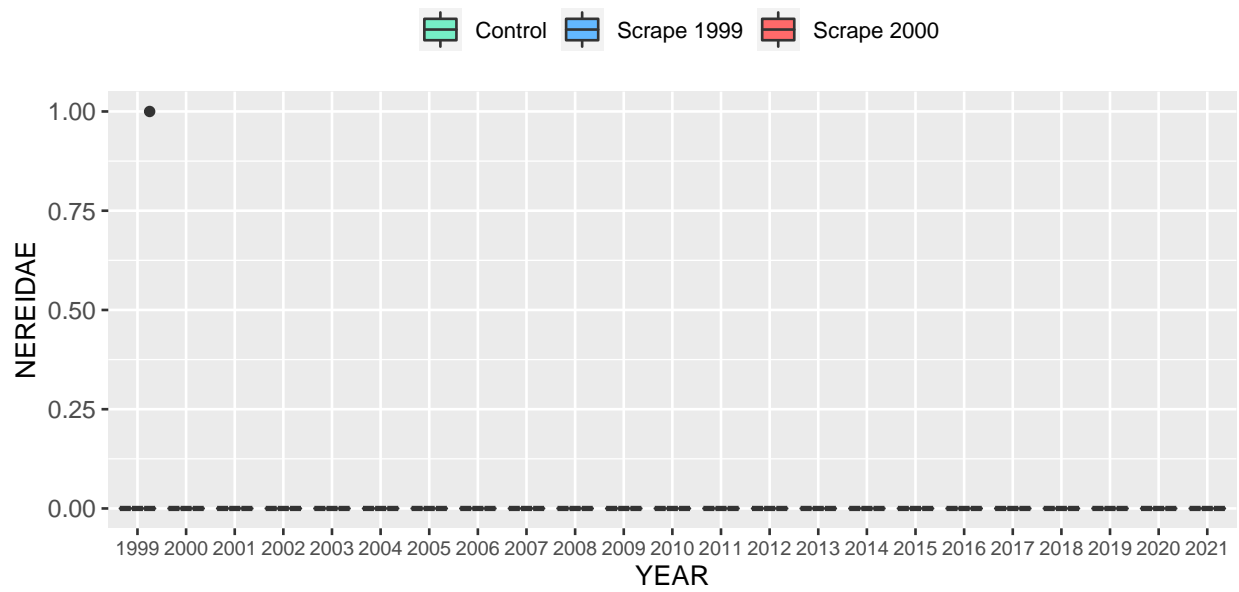
```
##
## [[42]]
```



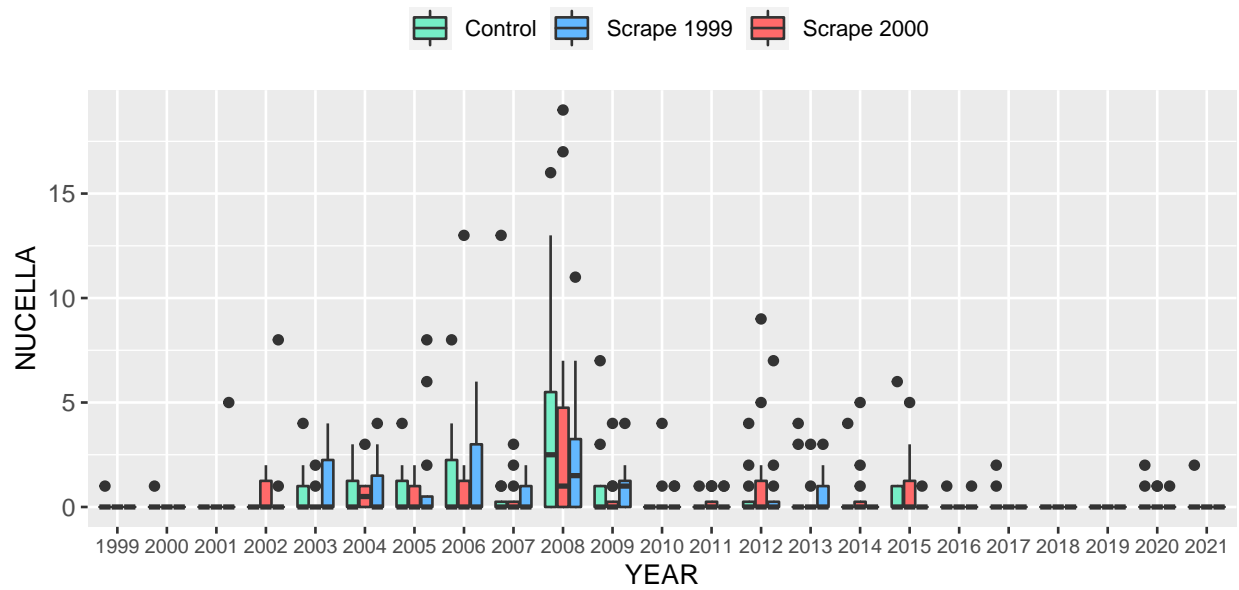
```
##
## [[43]]
```



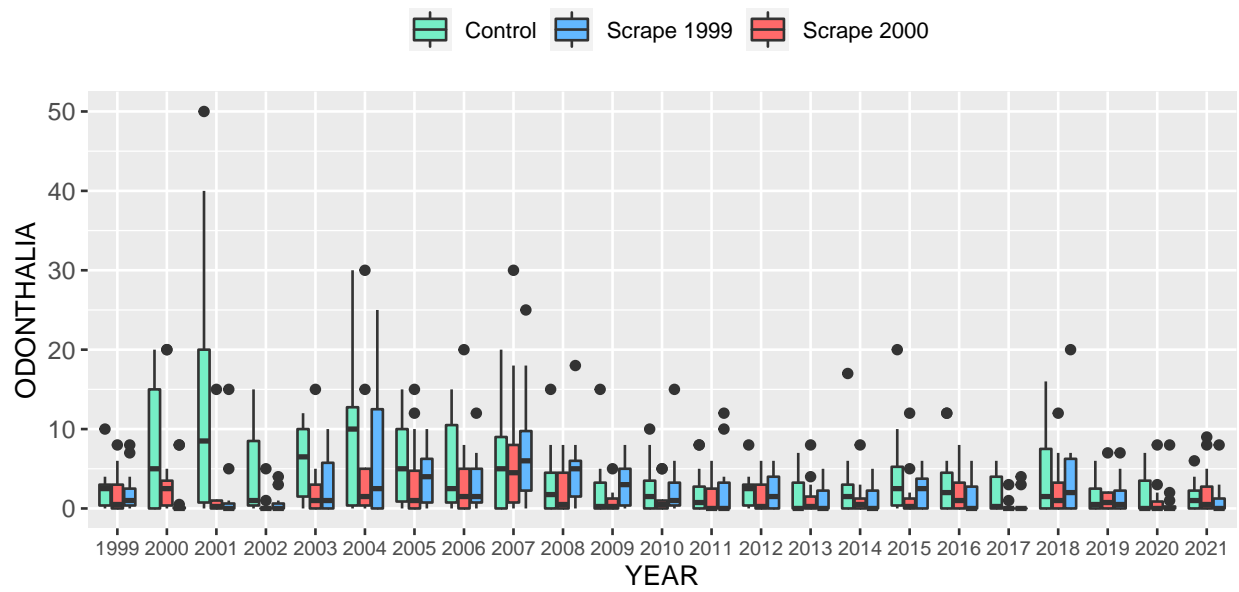
```
##
## [[44]]
```



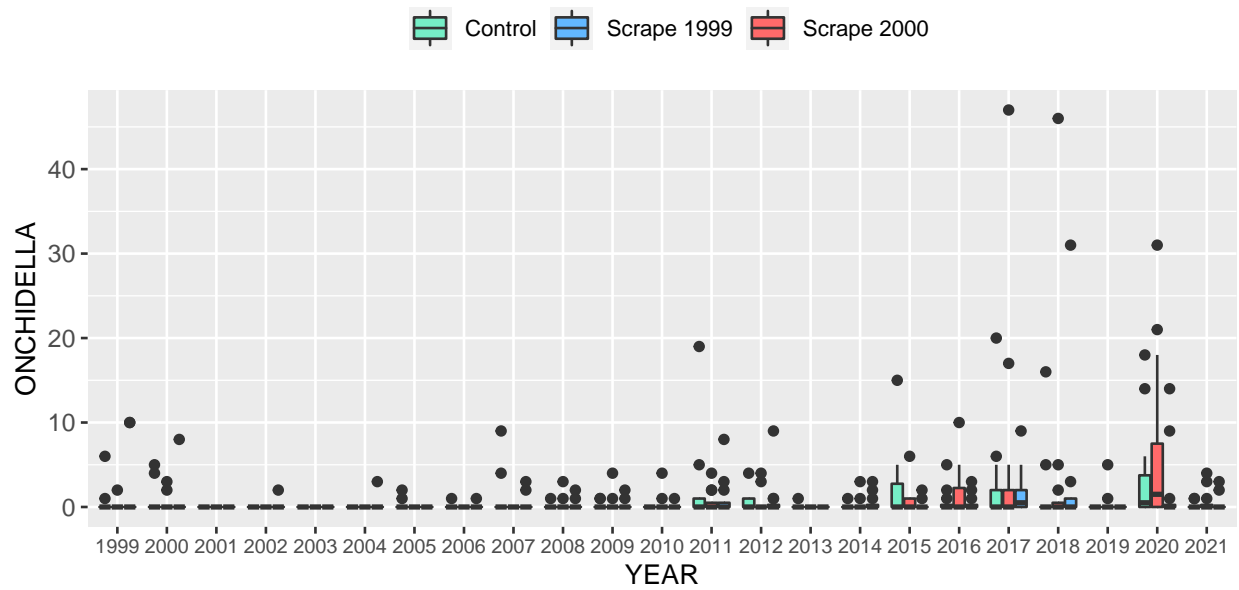
[[45]]



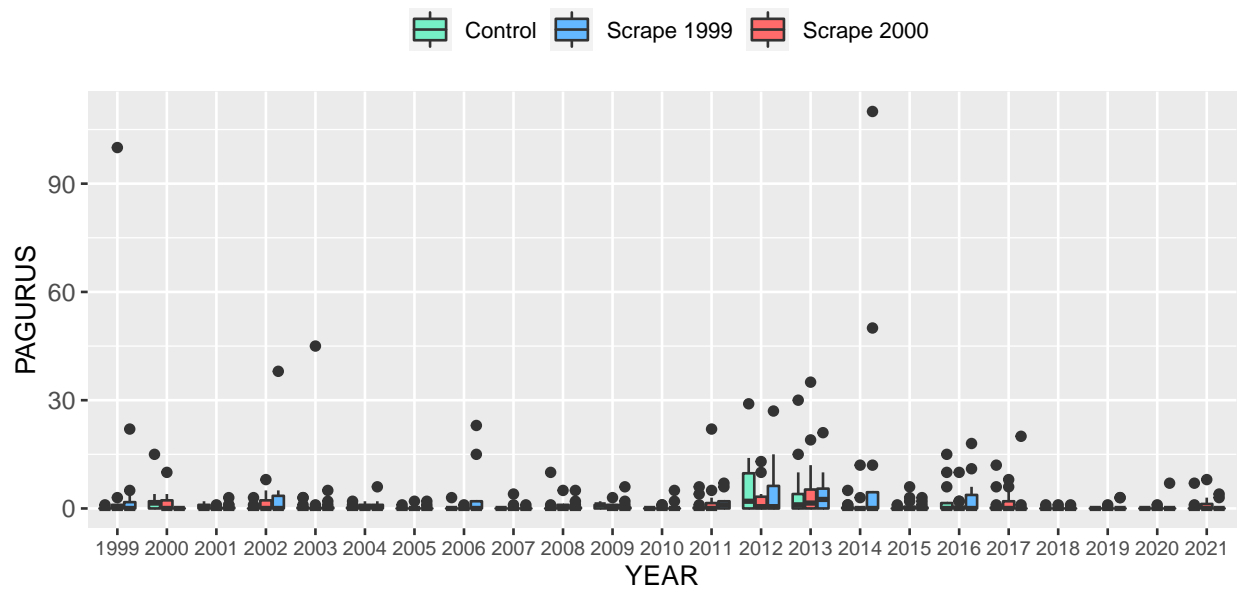
[[46]]



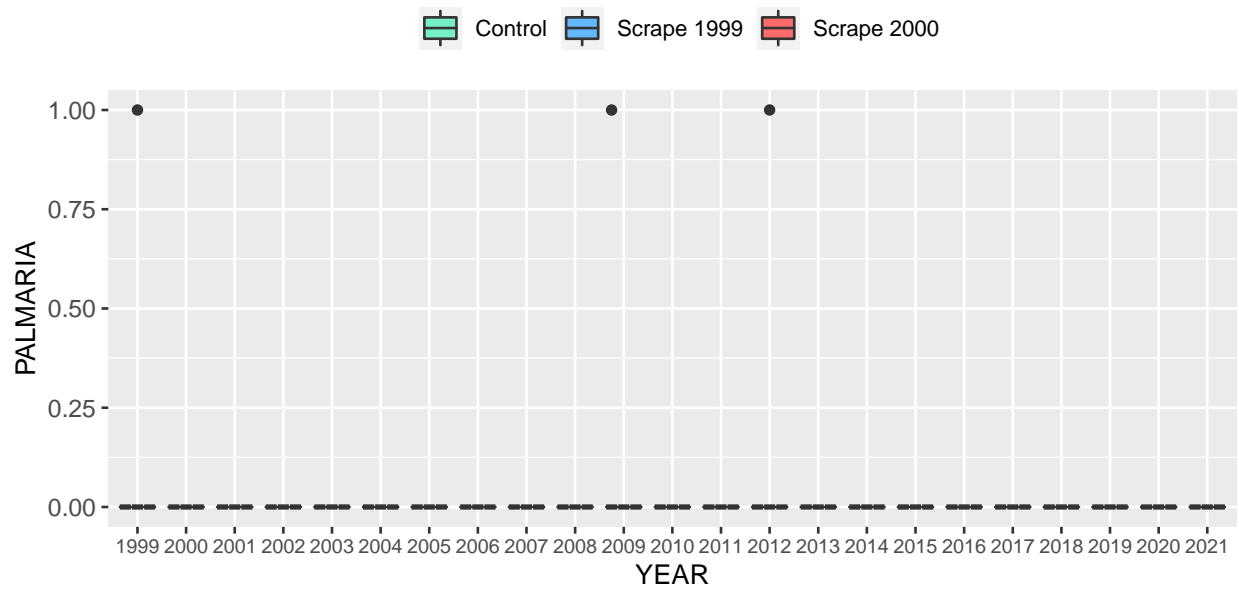
```
##
## [[47]]
```



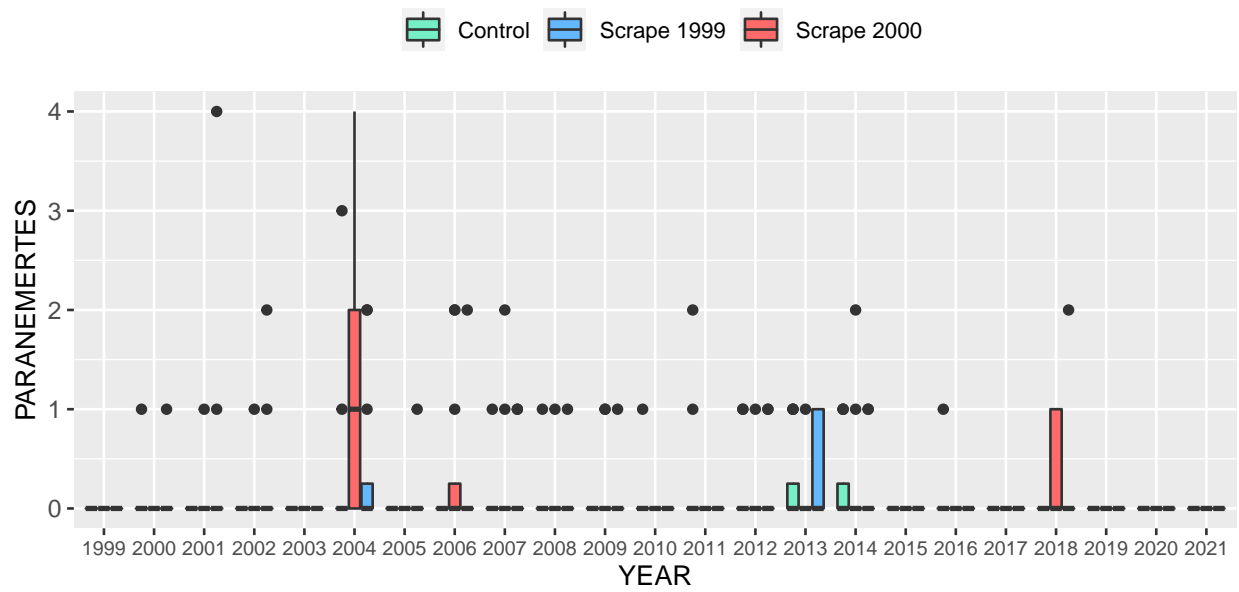
```
##
## [[48]]
```

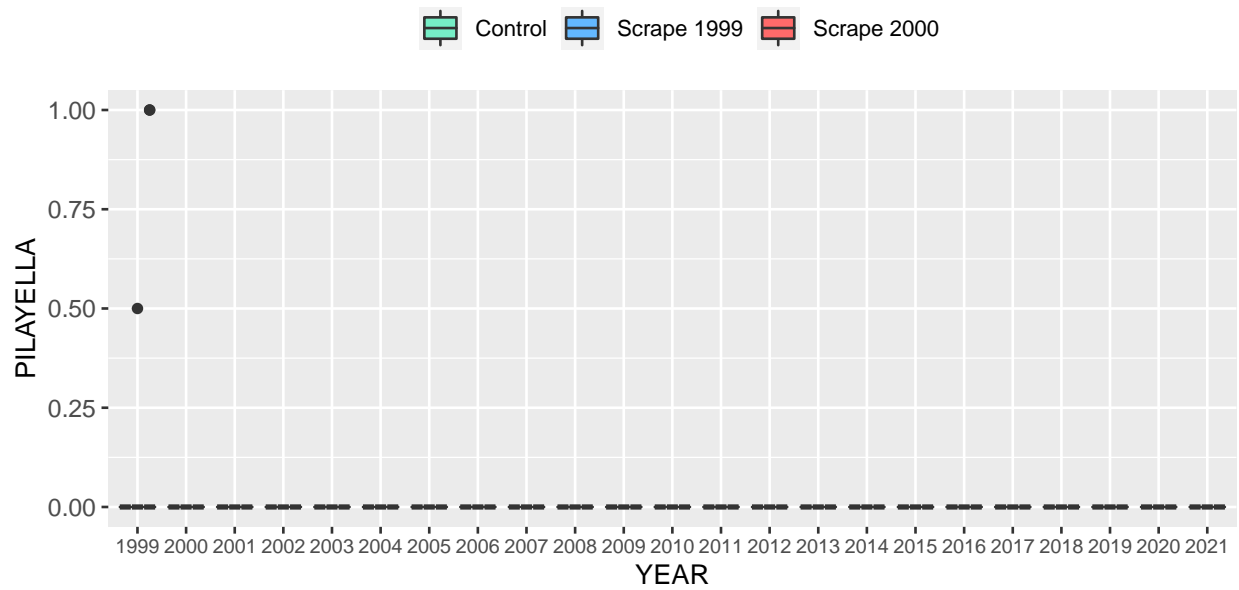
```
##
## [[49]]
```



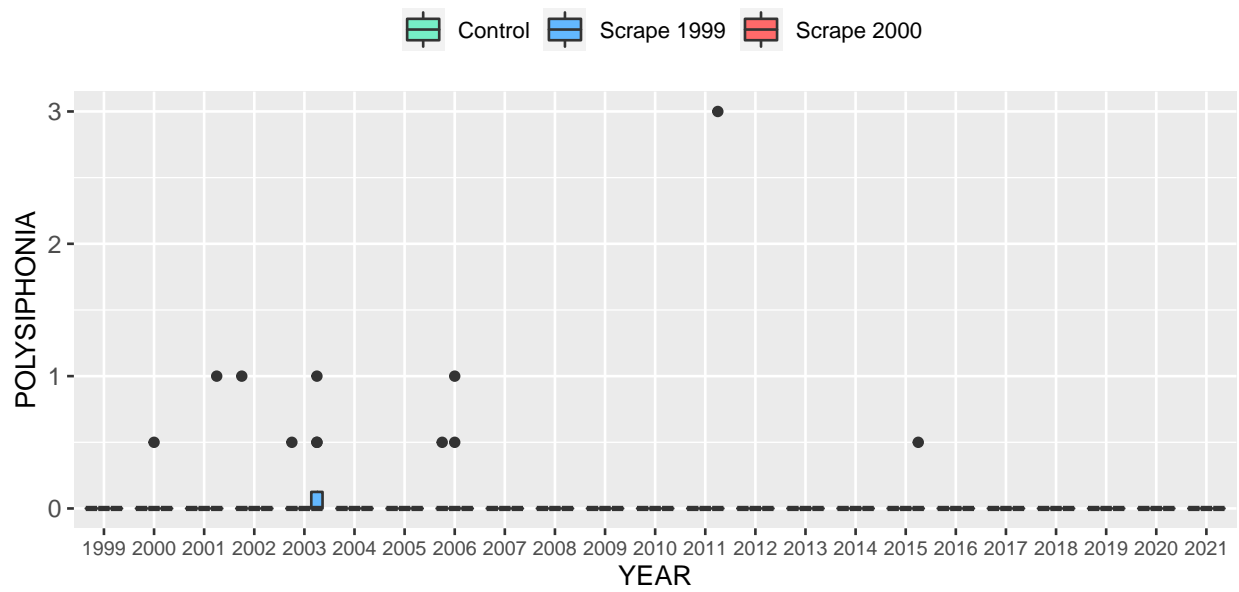
```
##
## [[50]]
```



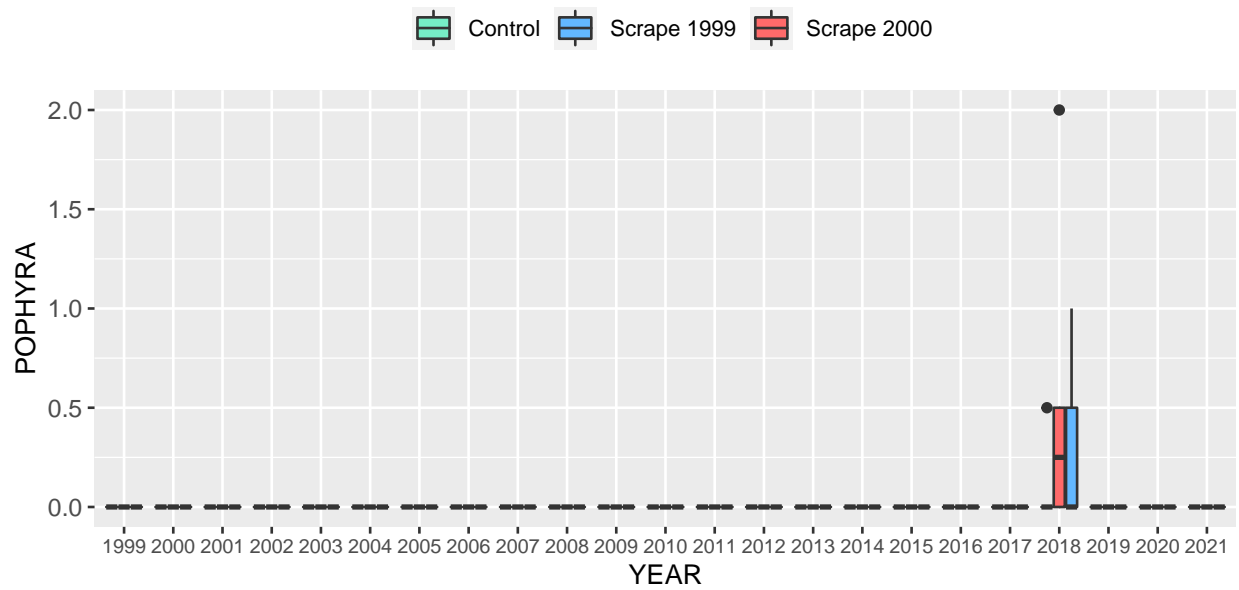
```
##
## [[51]]
```



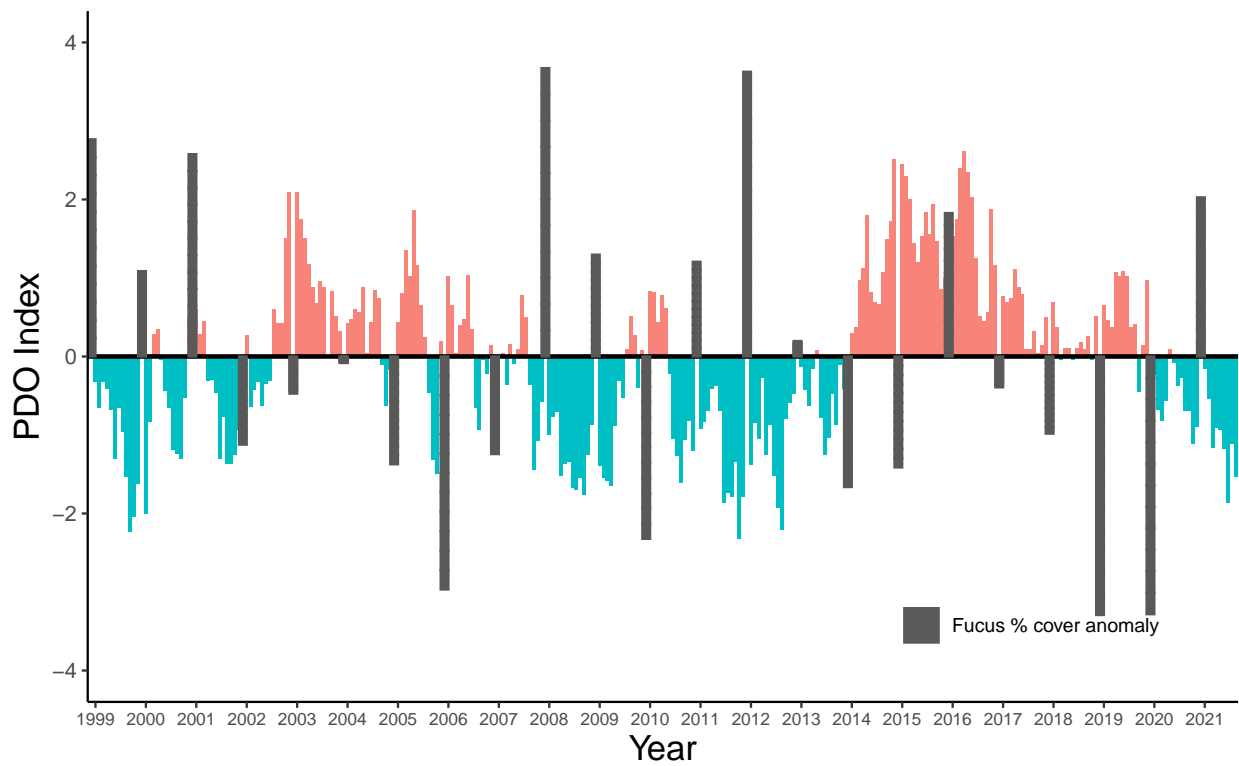
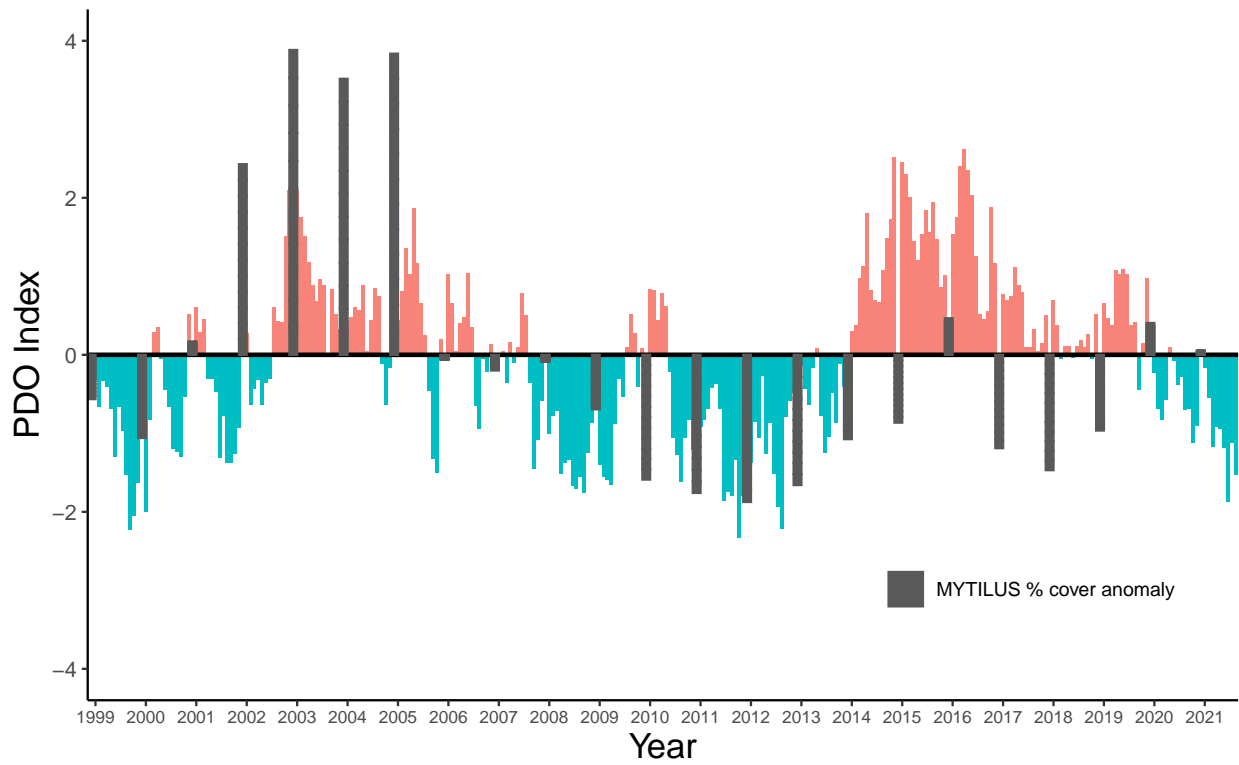
```
##
## [[52]]
```

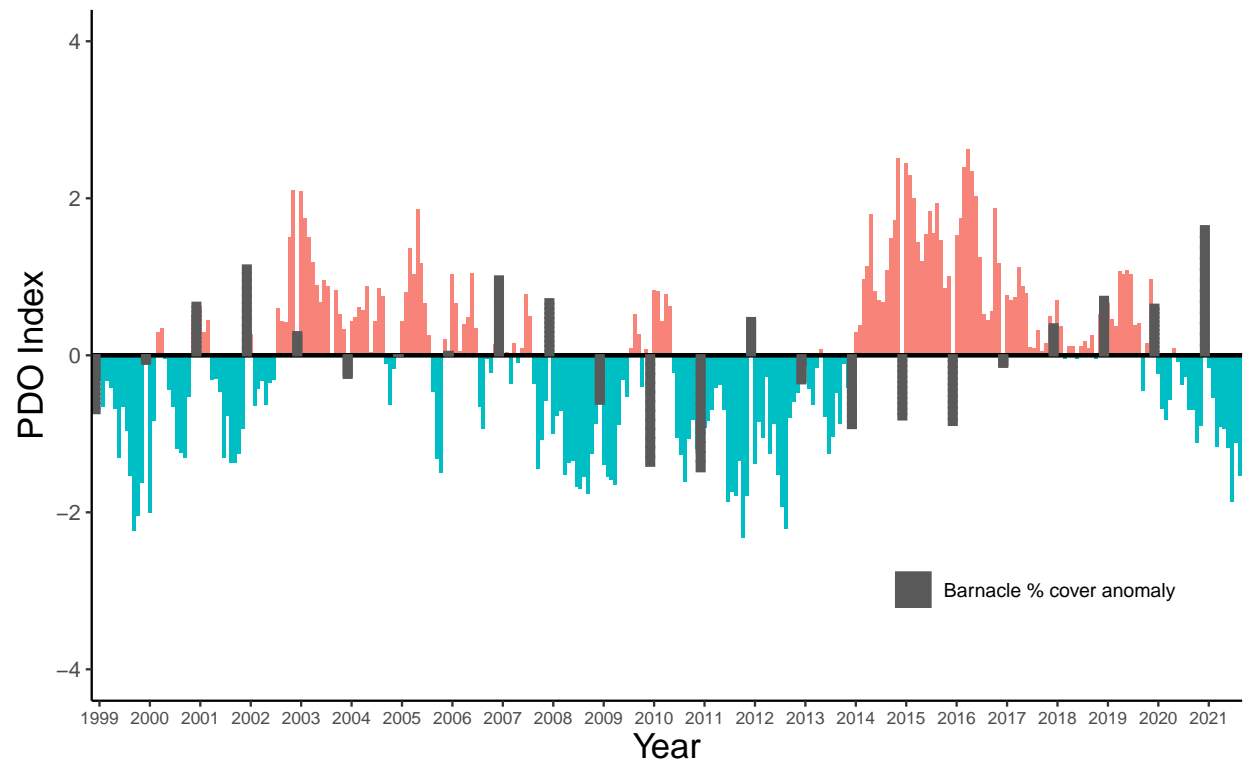


[[53]]

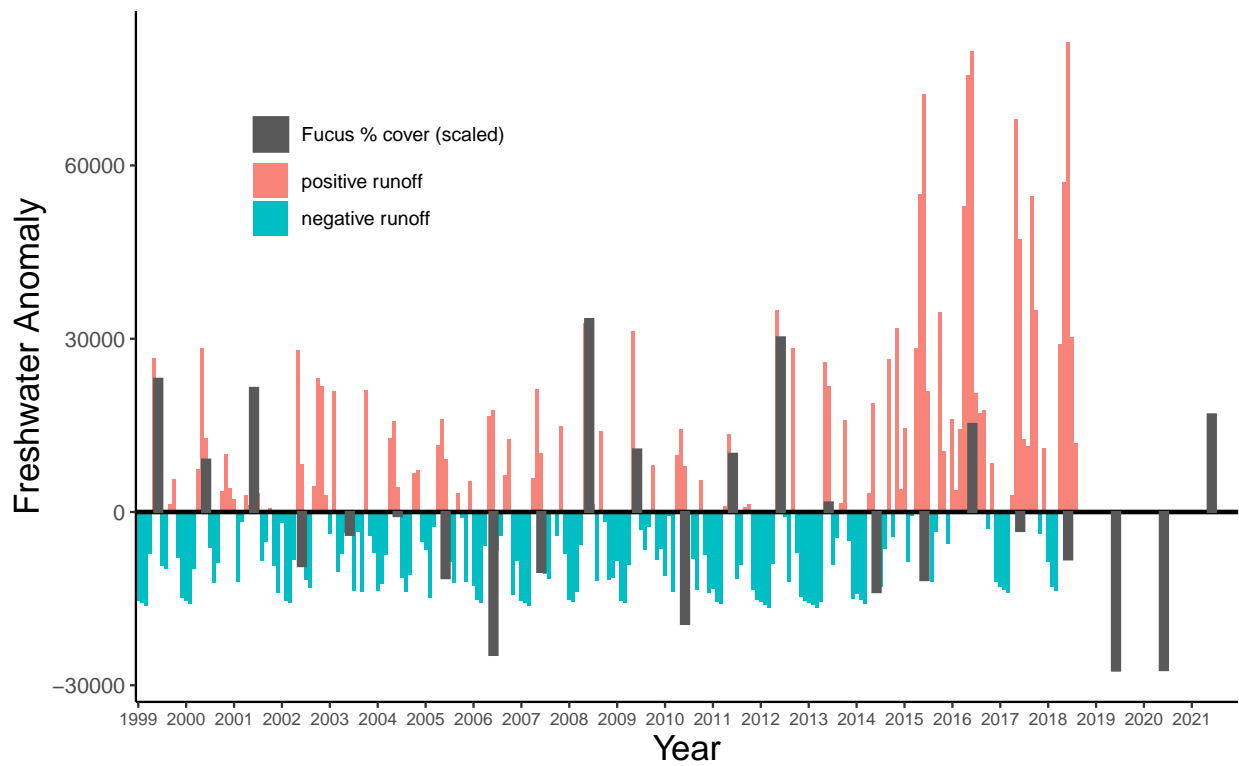
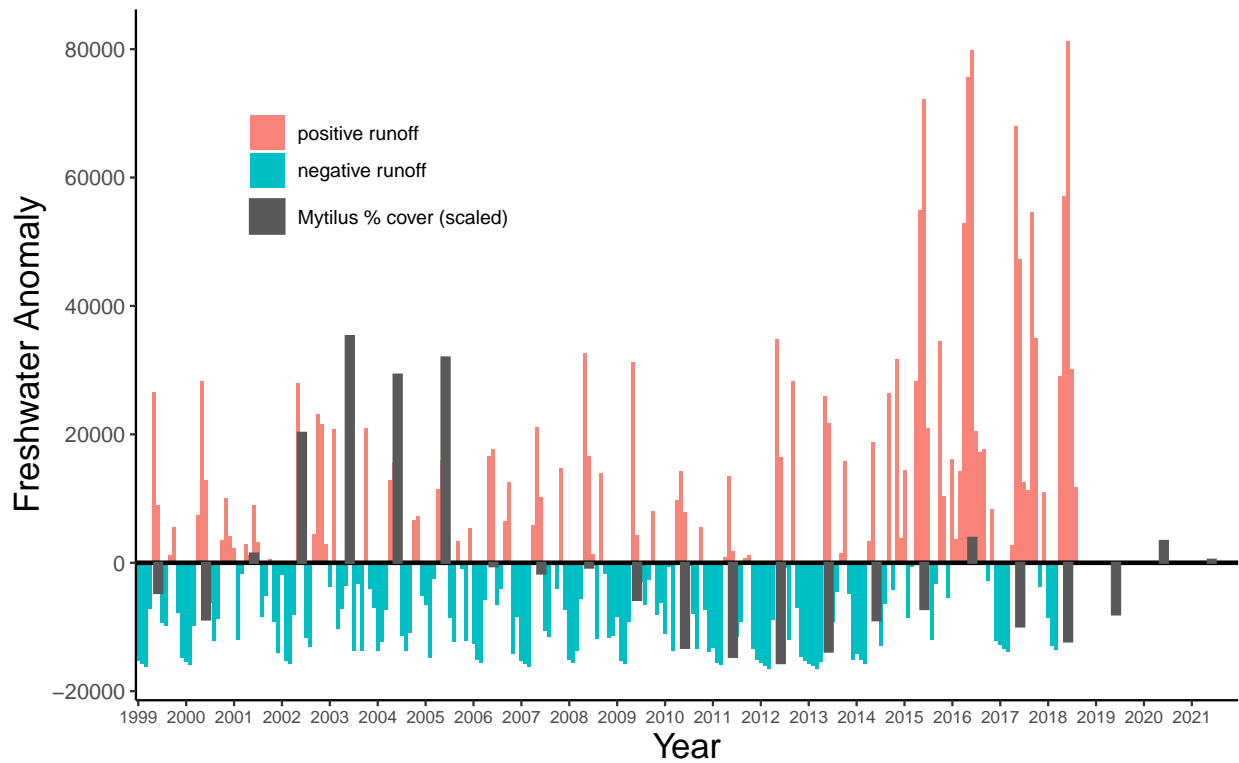


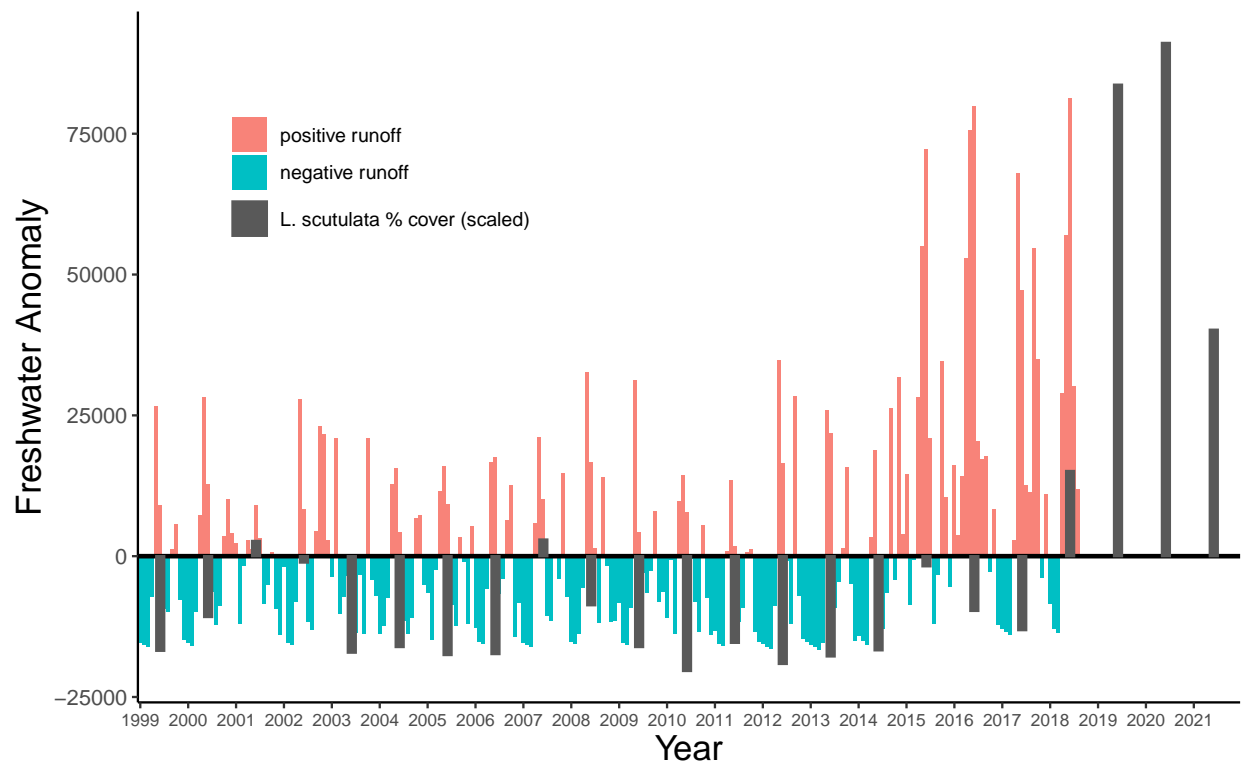
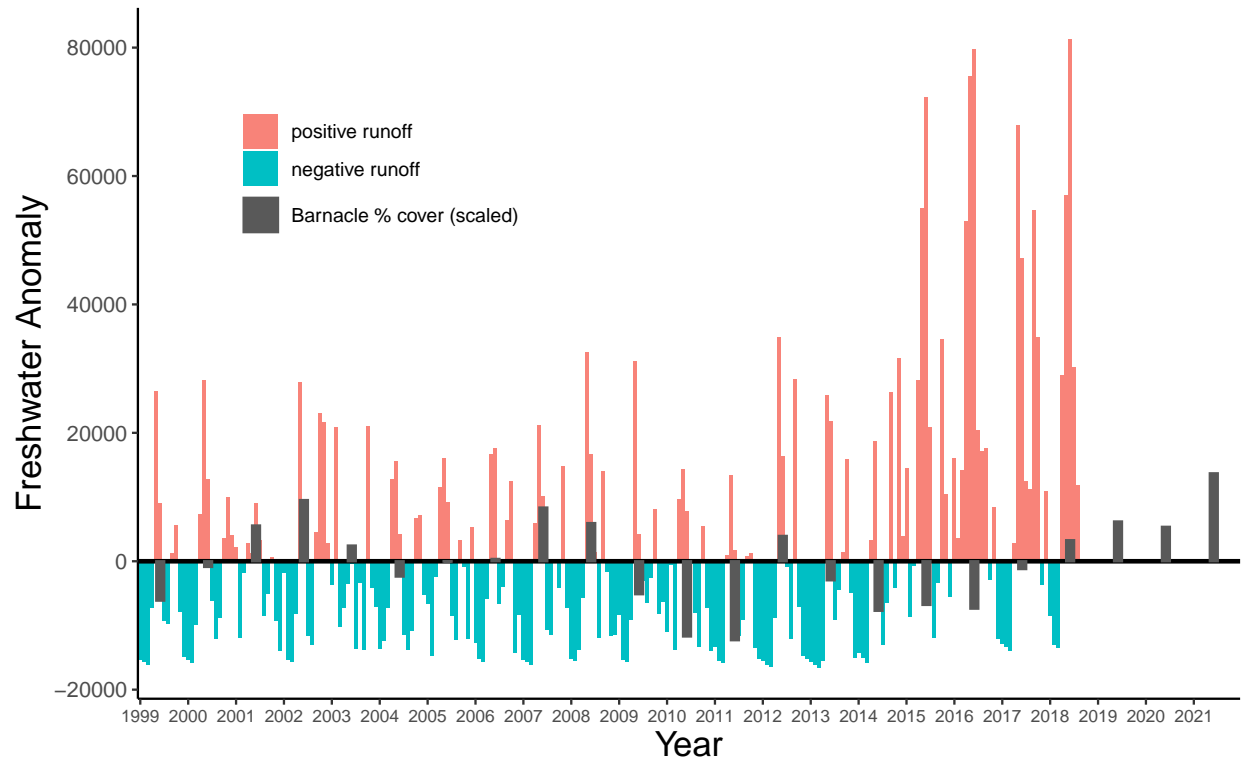
PDO phase plotted with mussel, fucus, and barnacle anomalies

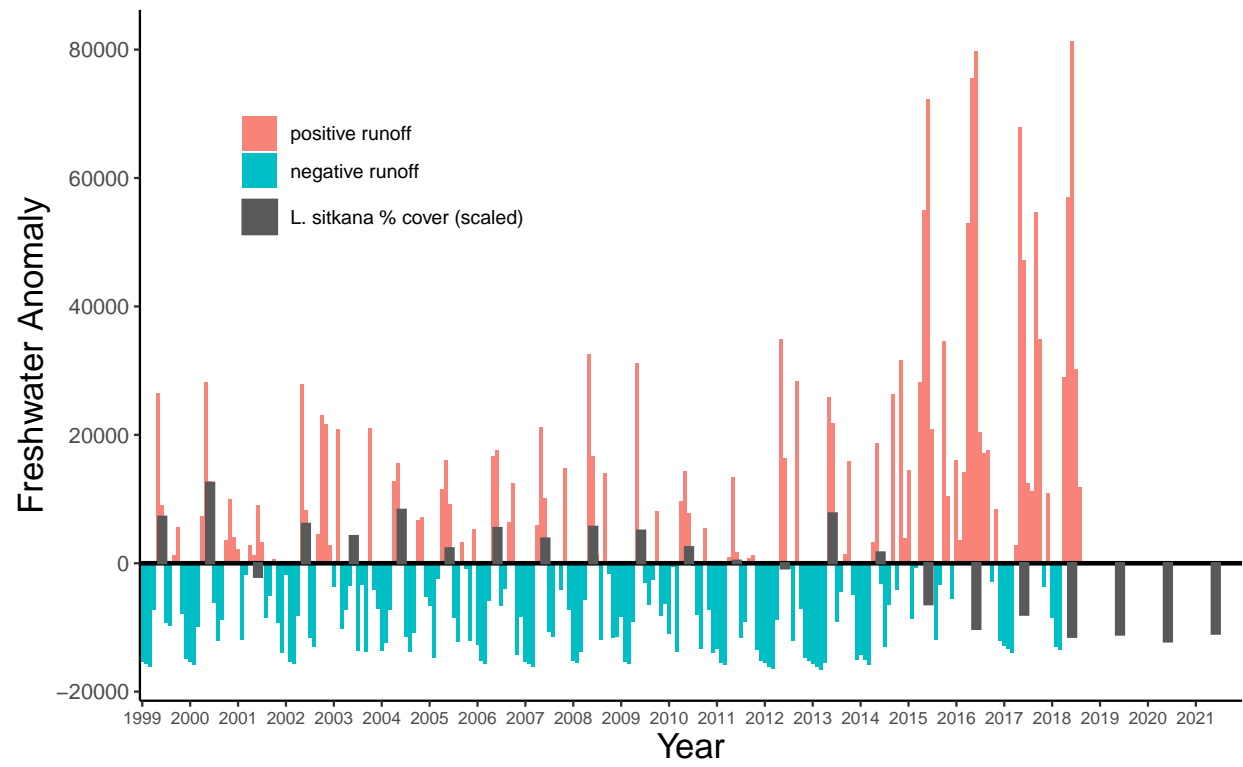




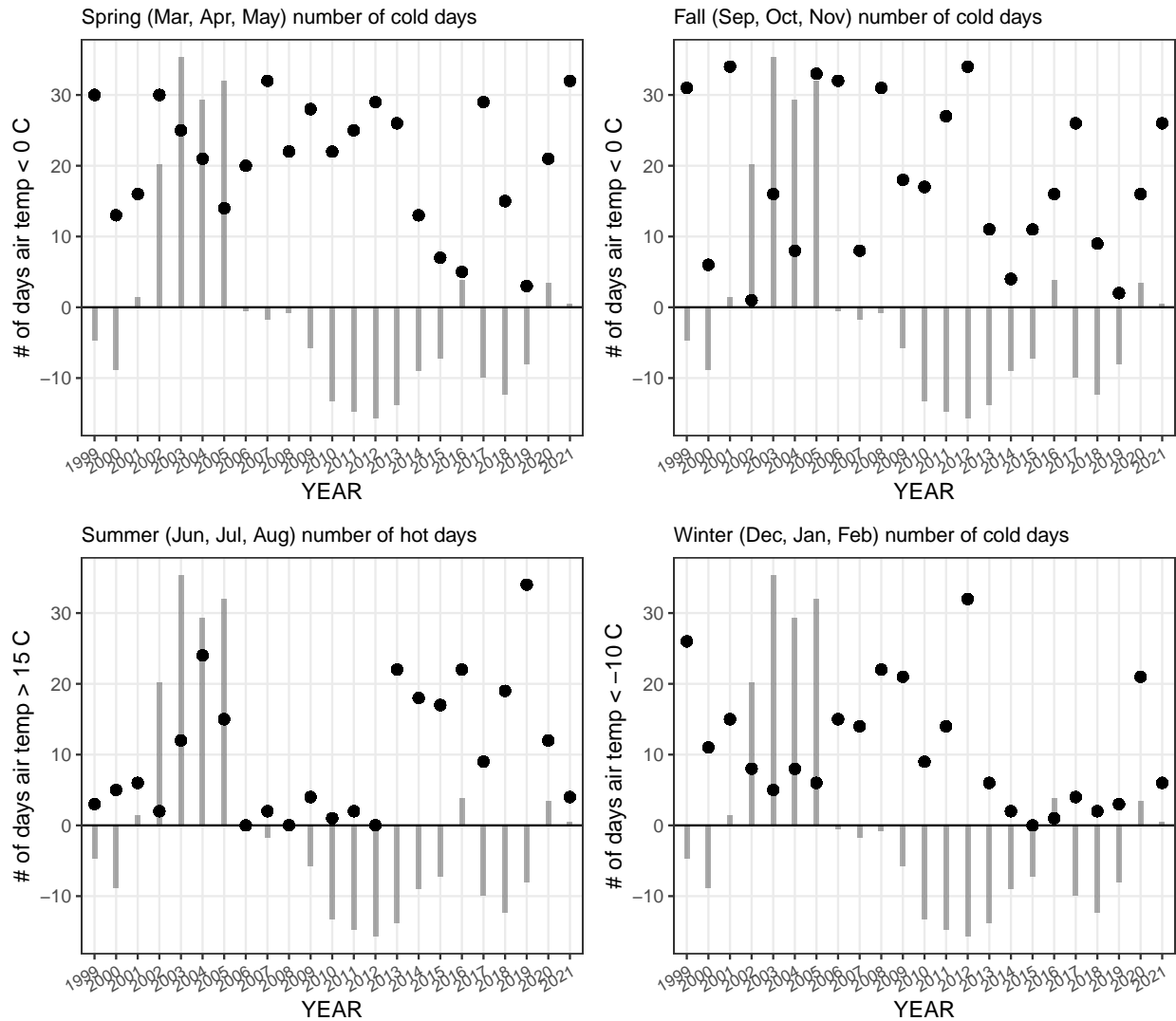
Freshwater discharge plotted with mussel, fucus, and barnacle anomalies



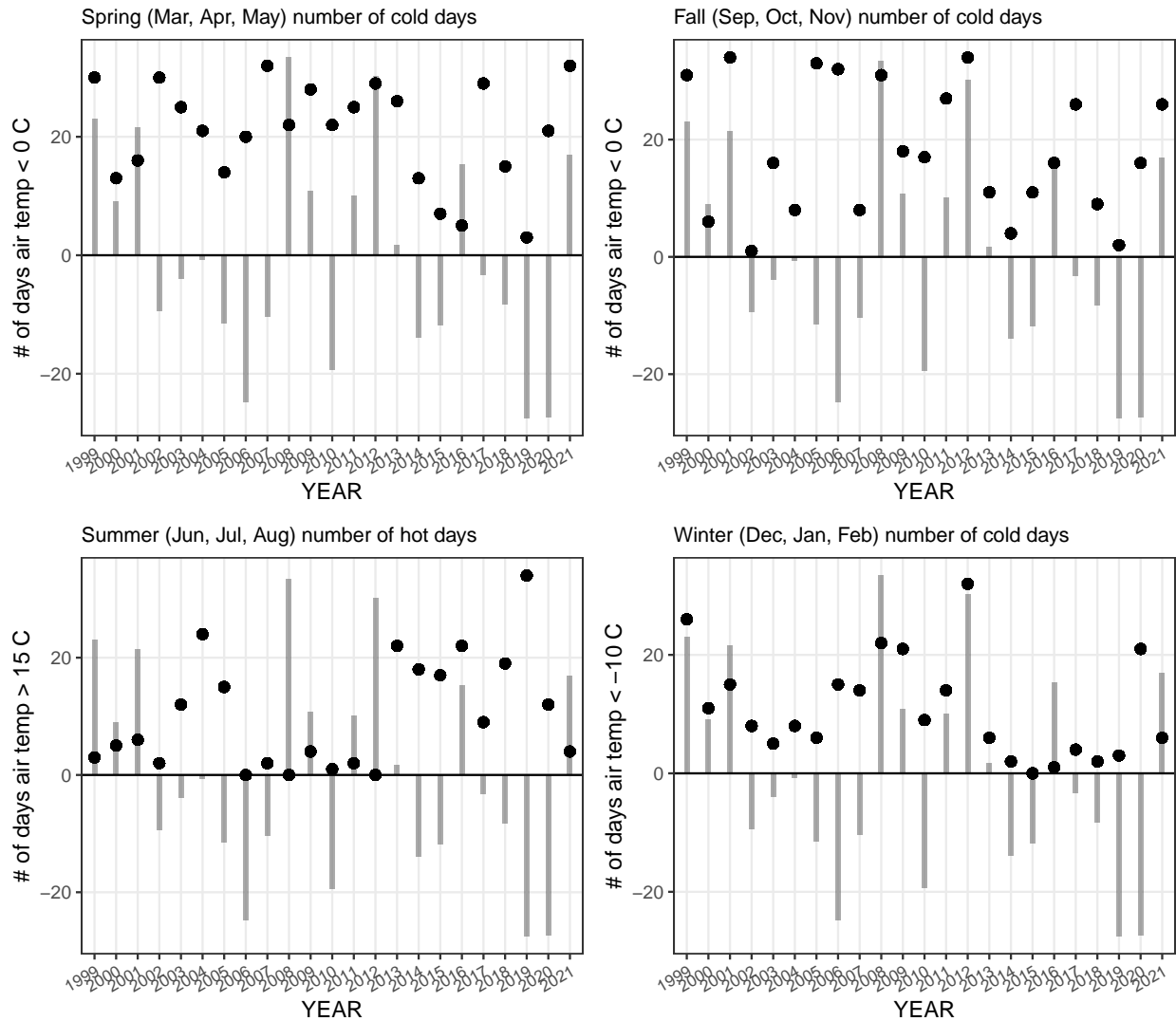




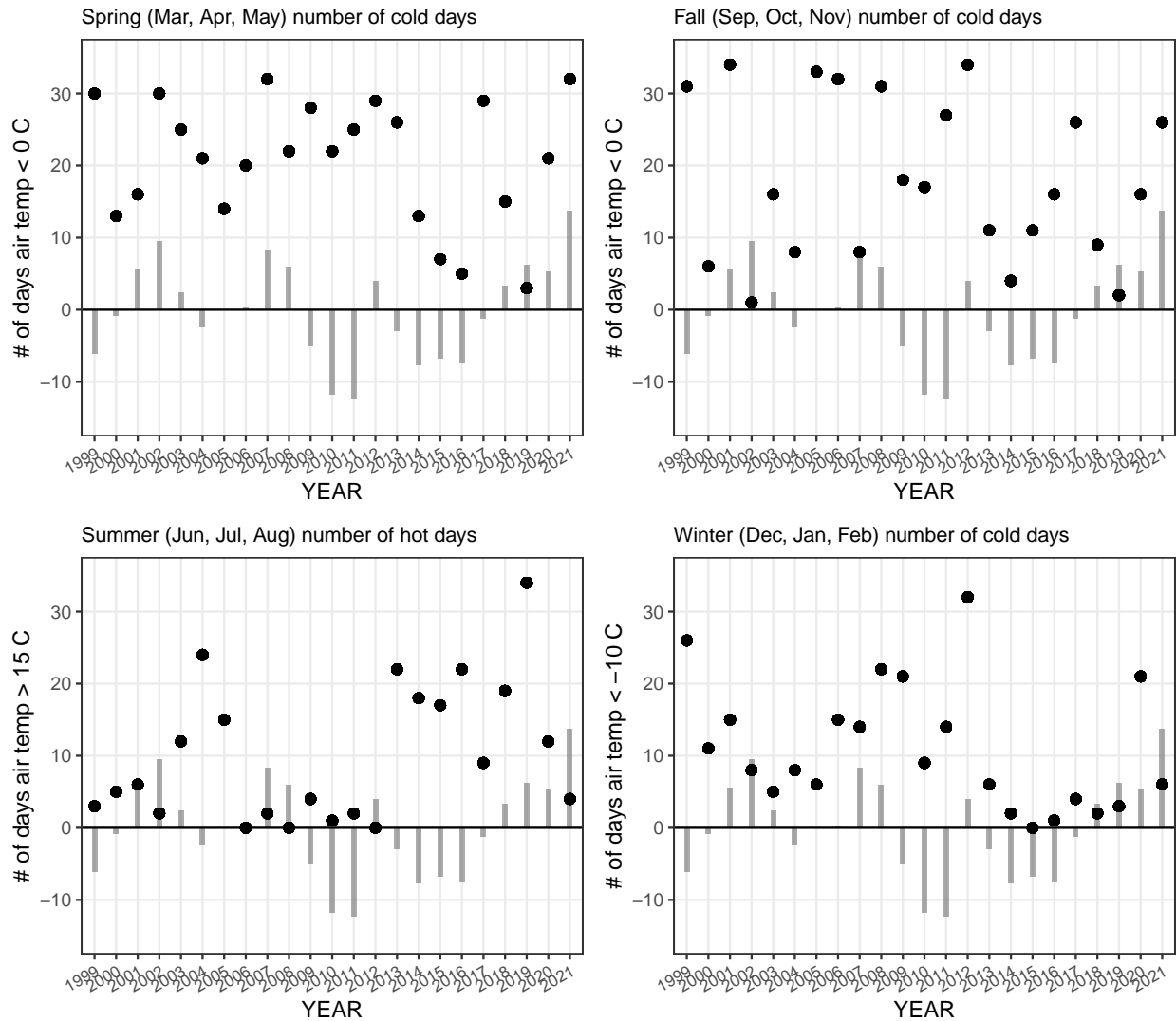
Mytilus Anomaly with Air Temp



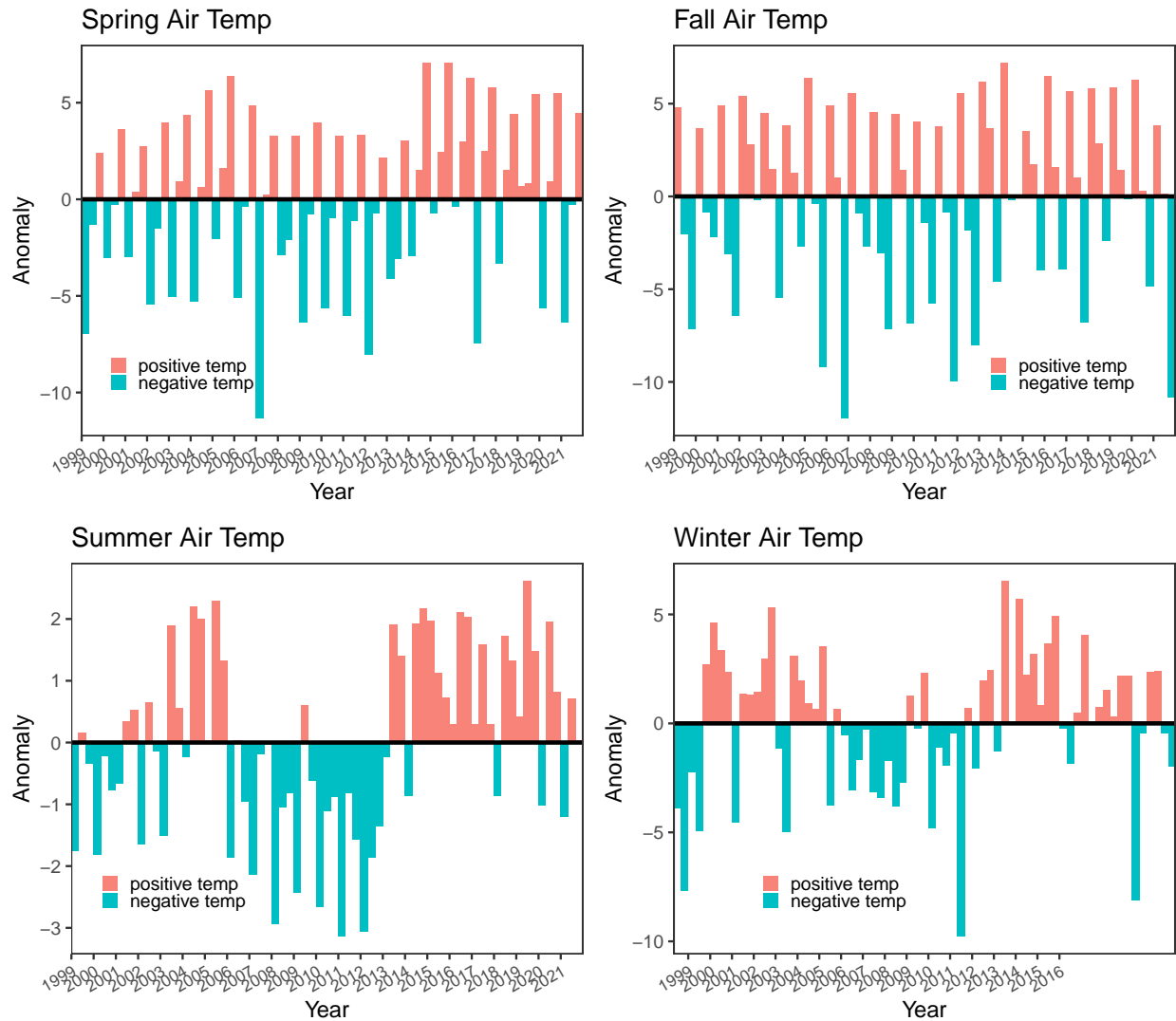
Fucus Anomaly with Air Temp



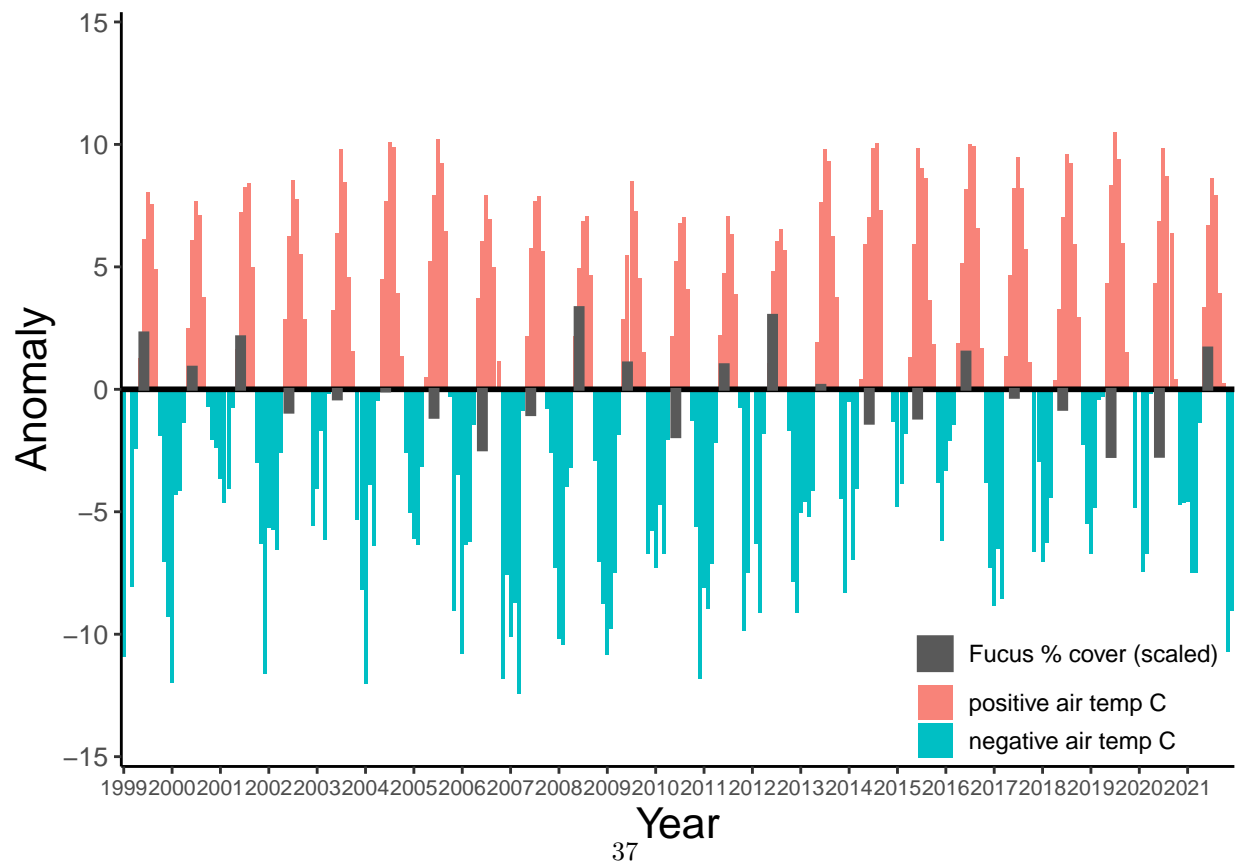
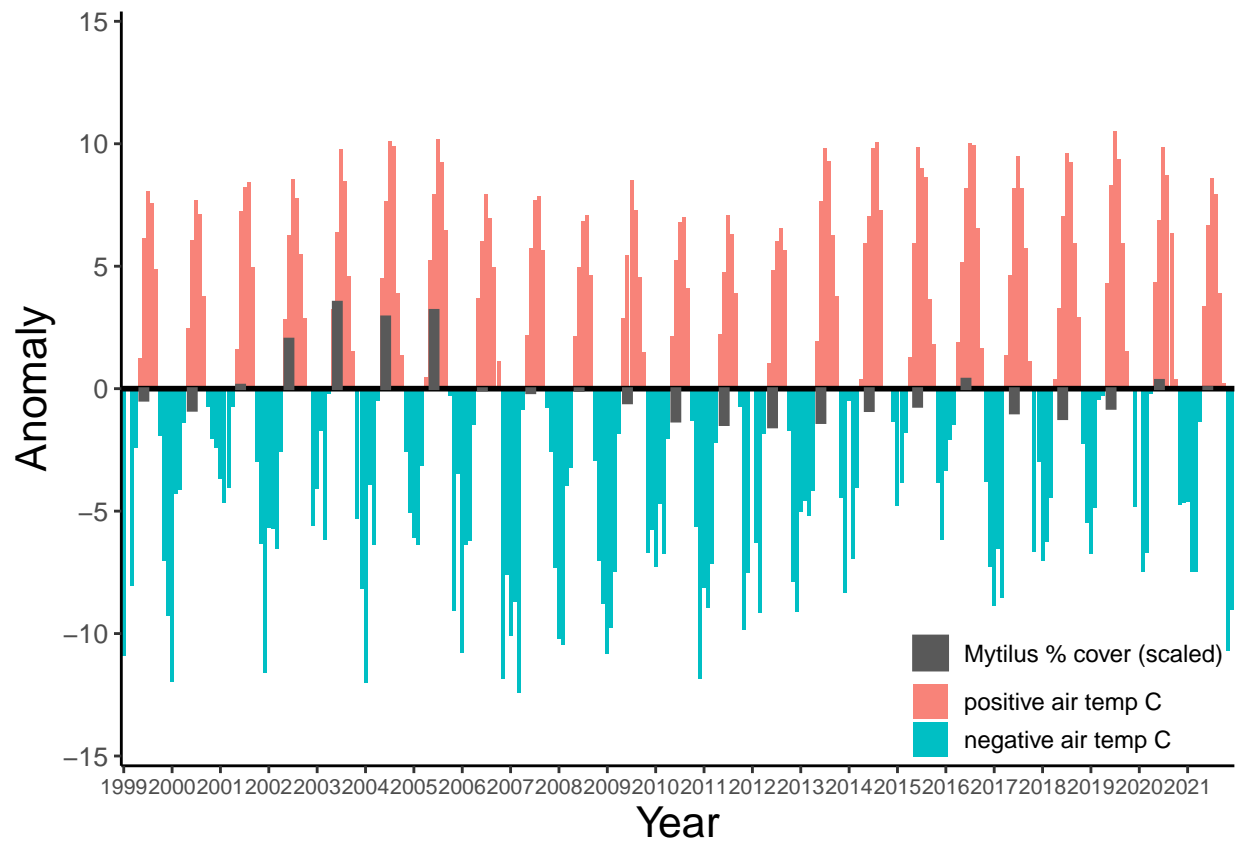
Barnacle Anomaly with Air Temp

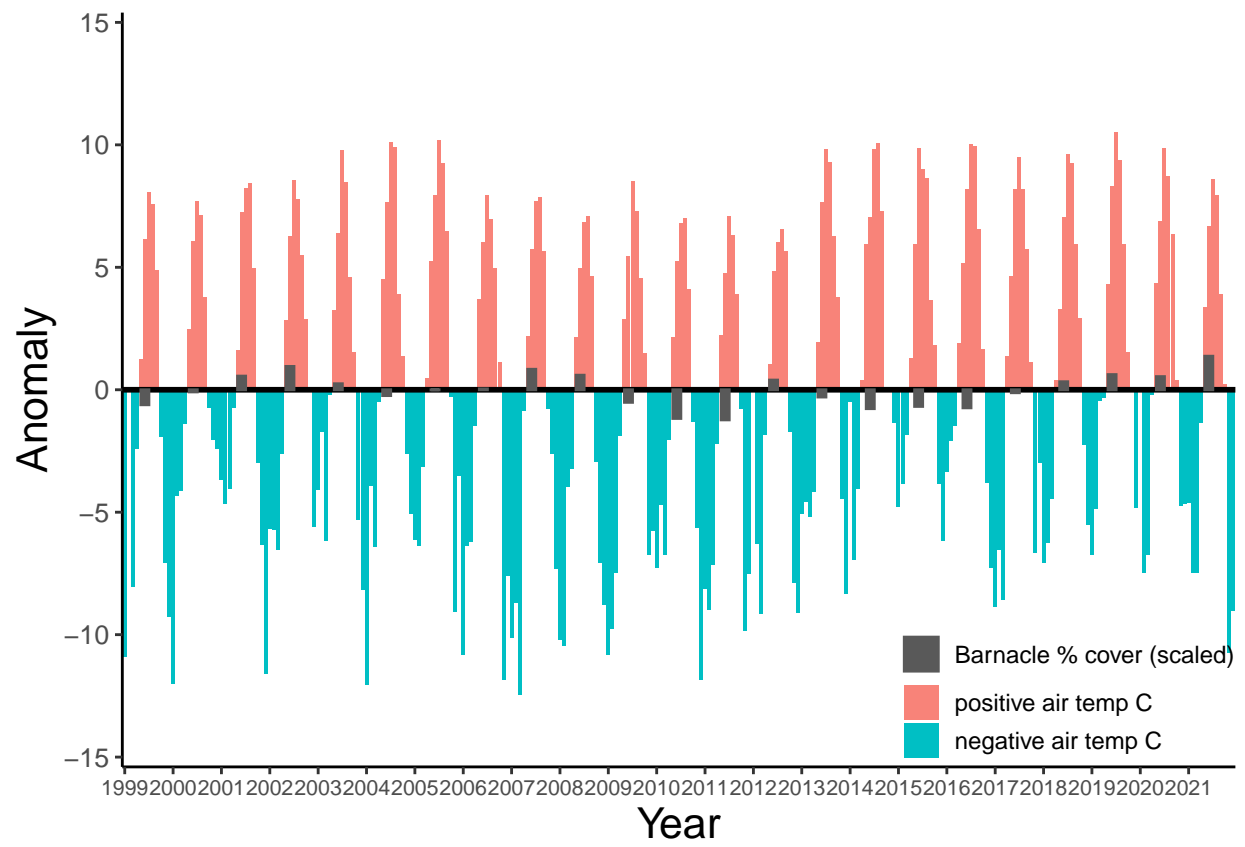


Air Temperature plots



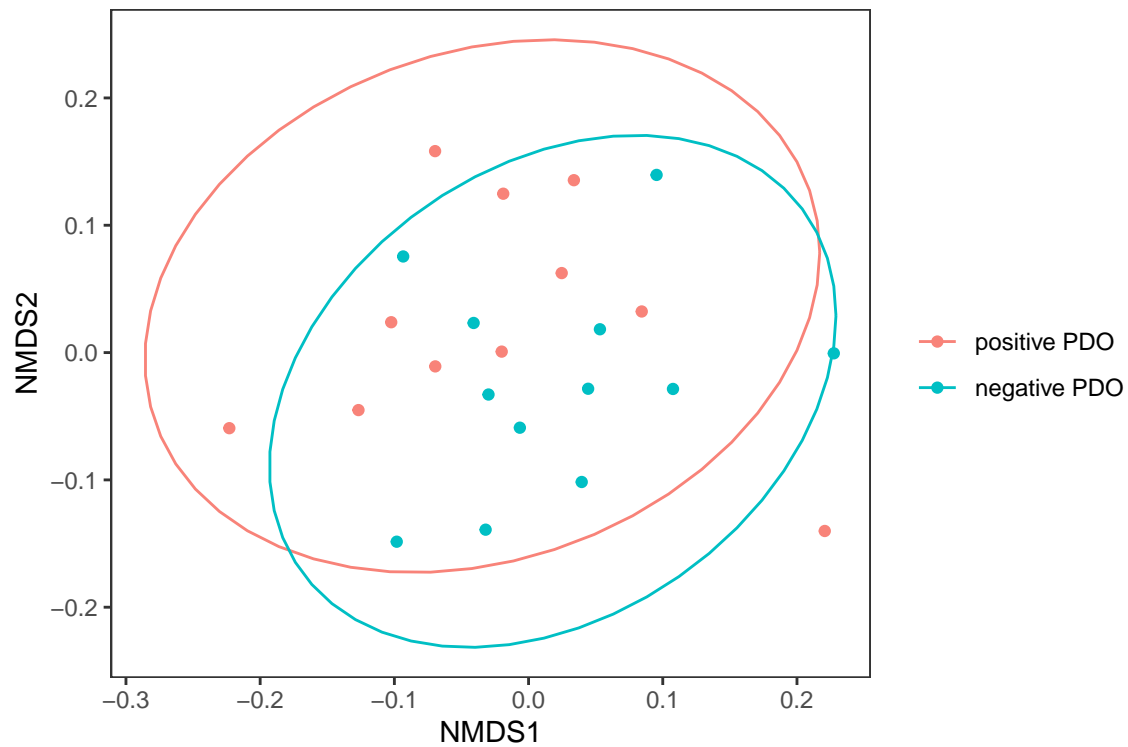
Air Temperature Anomalies with mussels, fucus, and barnacles





NMDS Plots

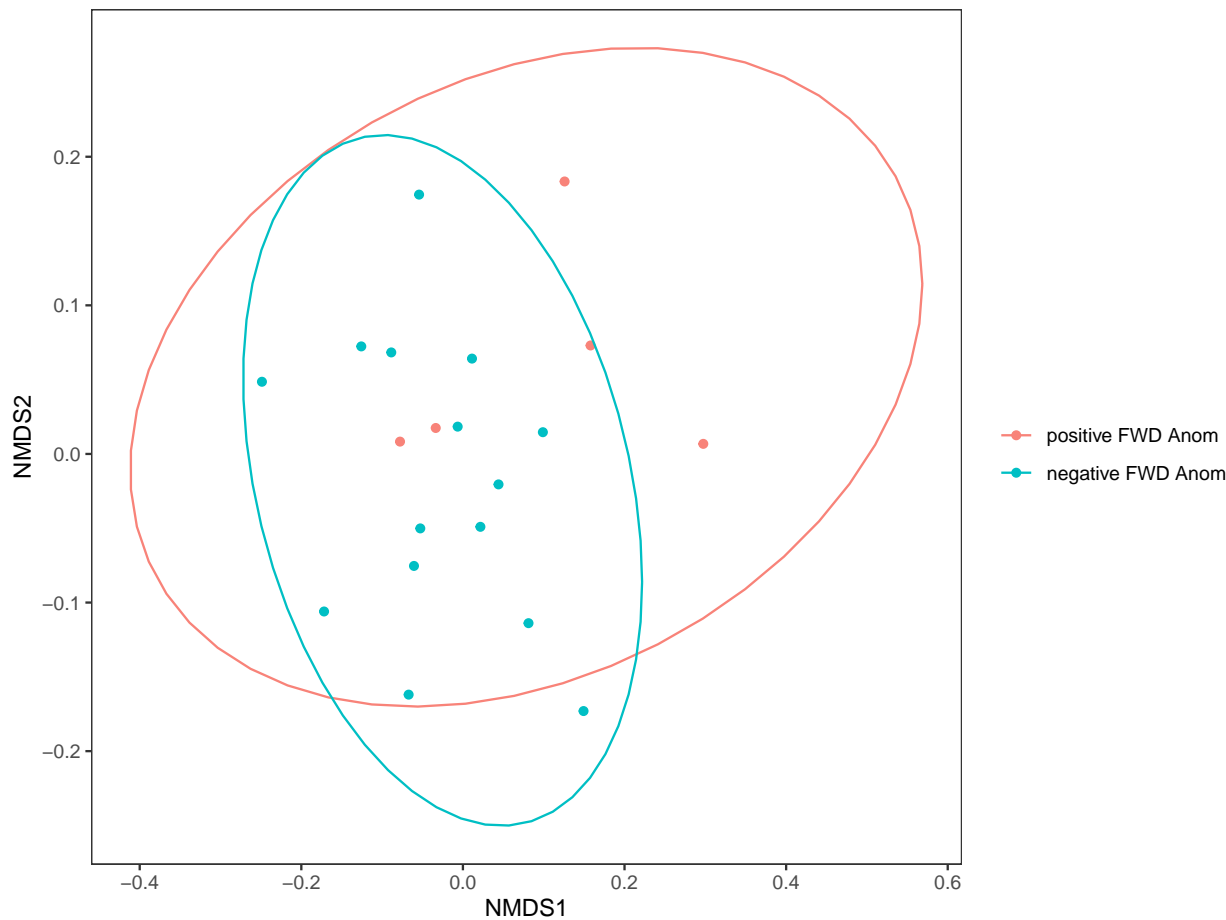
PDO



PDO Permanova Results

```
##
## Call:
## vegan::adonis(formula = sp_percov ~ PDO_anul_mn, data = pdo_treats,      permutations = 1000, method
##
## Permutation: free
## Number of permutations: 1000
##
## Terms added sequentially (first to last)
##
##              Df SumsOfSqs  MeanSqs F.Model    R2  Pr(>F)
## PDO_anul_mn   1   0.13842 0.138416  3.4099 0.13969 0.01499 *
## Residuals    21   0.85244 0.040592          0.86031
## Total        22   0.99085          1.00000
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

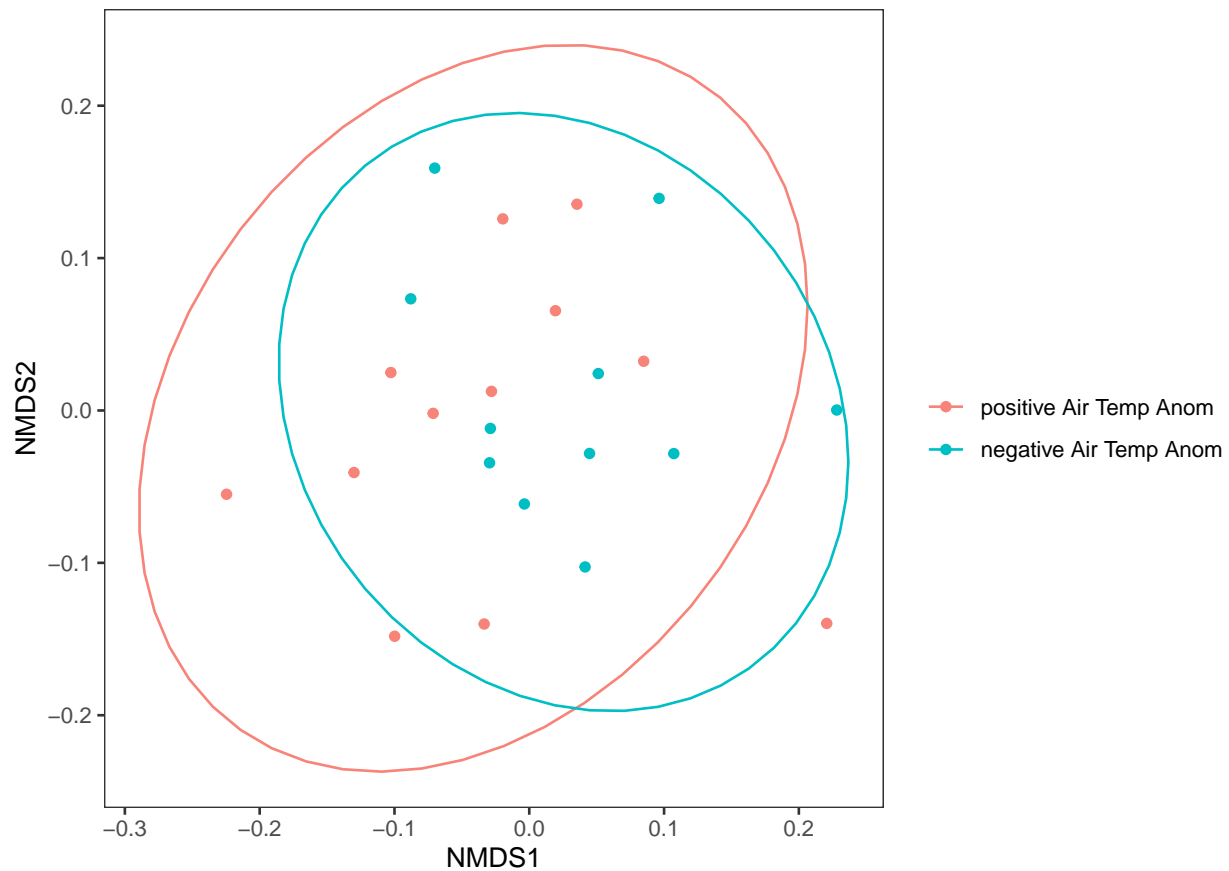
Freshwater Discharge



Freshwater Discharge Permanova Results

```
##
## Call:
## vegan::adonis(formula = sp_percov2 ~ mean_yearly_discharge_m3d1,      data = fresh_treats, permutati
##
## Permutation: free
## Number of permutations: 1000
##
## Terms added sequentially (first to last)
##
##              Df SumsOfSqs  MeanSqs F.Model    R2 Pr(>F)
## mean_yearly_discharge_m3d1  1   0.01886 0.018856 0.43699 0.0237 0.8192
## Residuals                18   0.77670 0.043150      0.9763
## Total                    19   0.79556      1.0000
```

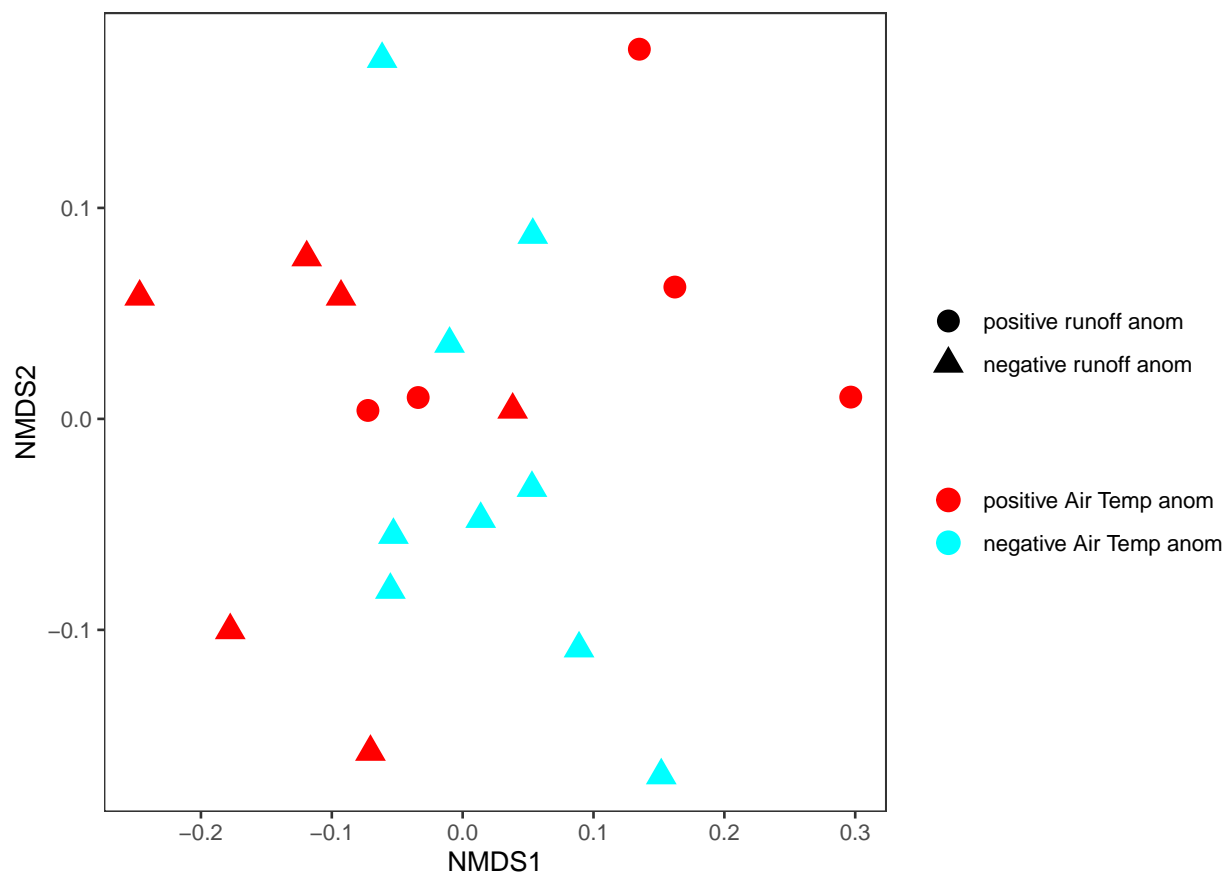

Air Temperature



Air Temp Permanova Results

```
##
## Call:
## vegan::adonis(formula = sp_percov3 ~ ATemp_yearMn, data = atemp_treats,      permutations = 1000, me
##
## Permutation: free
## Number of permutations: 1000
##
## Terms added sequentially (first to last)
##
##              Df SumsOfSqs  MeanSqs F.Model    R2  Pr(>F)
## ATemp_yearMn  1   0.10530  0.105297   2.497 0.10627 0.04496 *
## Residuals    21   0.88556  0.042169             0.89373
## Total        22   0.99085                1.00000
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

All env. variables

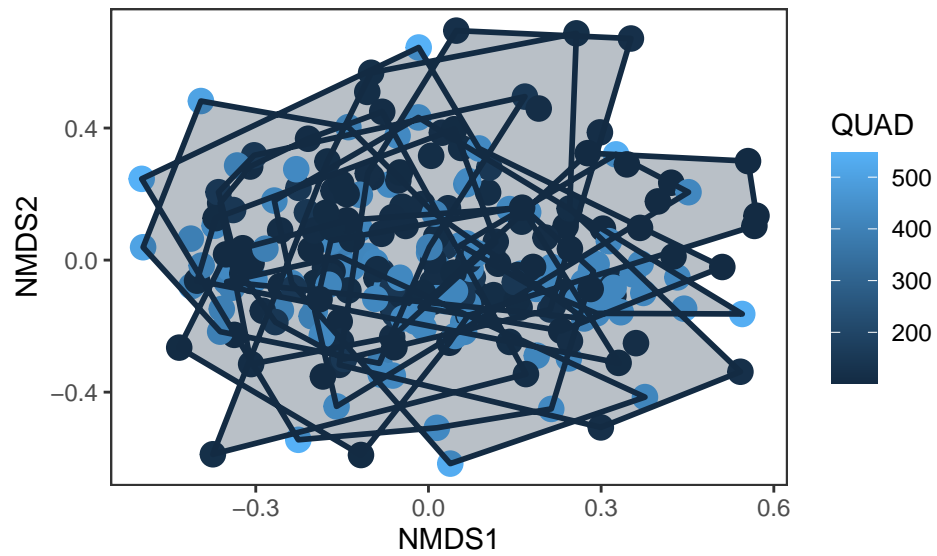


All env. variables Permanova Results

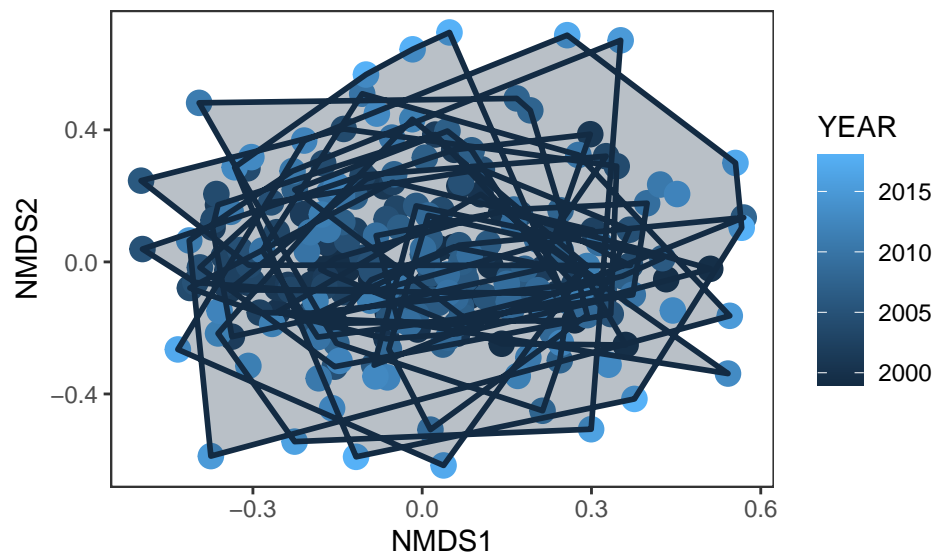
```
##
## Call:
## vegan::adonis(formula = sp_percov4 ~ ATemp_yearMn + mn_yr_discharge,      data = all_treats, permuta
##
## Permutation: free
## Number of permutations: 1000
##
## Terms added sequentially (first to last)
##
##              Df SumsOfSqs  MeanSqs F.Model    R2  Pr(>F)
## ATemp_yearMn   1   0.09312 0.093121  2.37670 0.11705 0.06693 .
## mn_yr_discharge 1   0.03636 0.036361  0.92803 0.04570 0.47453
## Residuals     17   0.66608 0.039181          0.83724
## Total         19   0.79556          1.00000
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Biological NMDS

Hulls representing each Quadrat

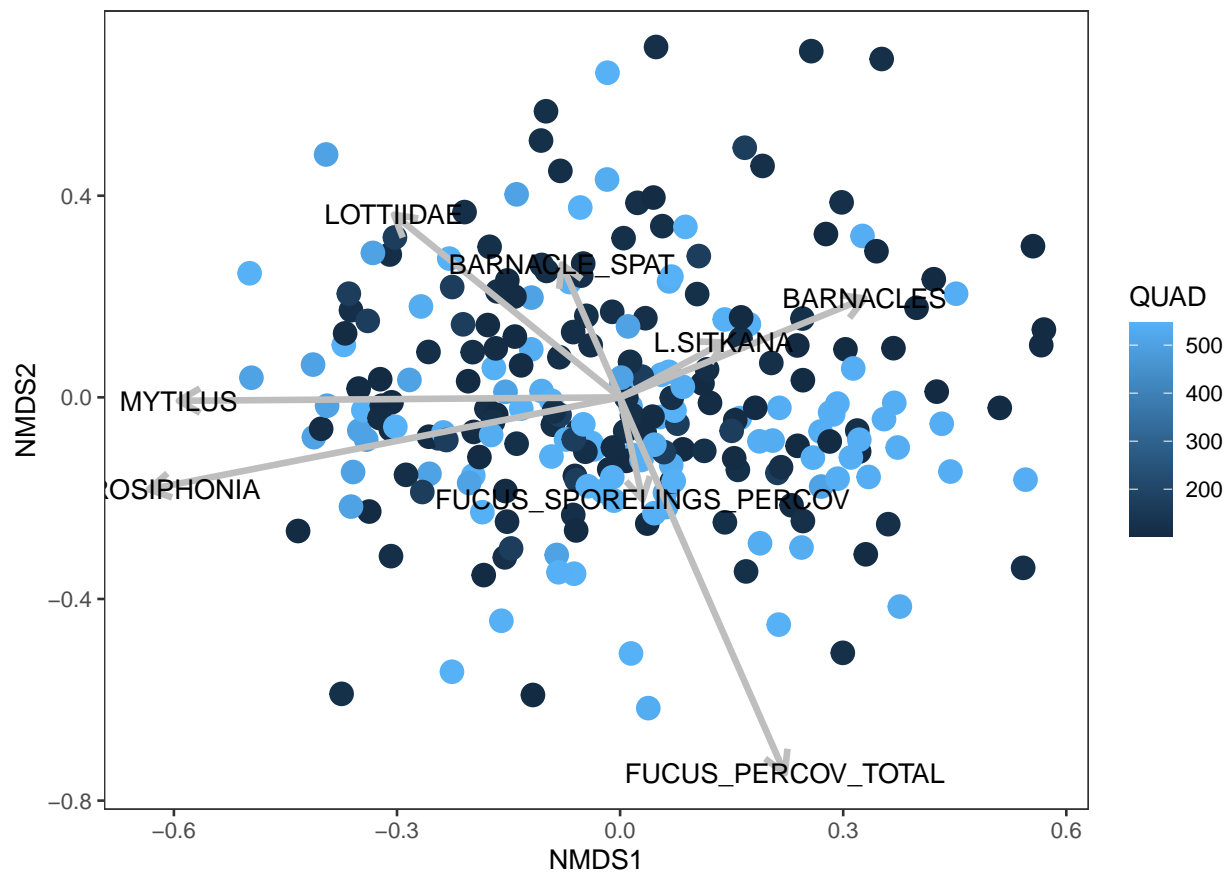


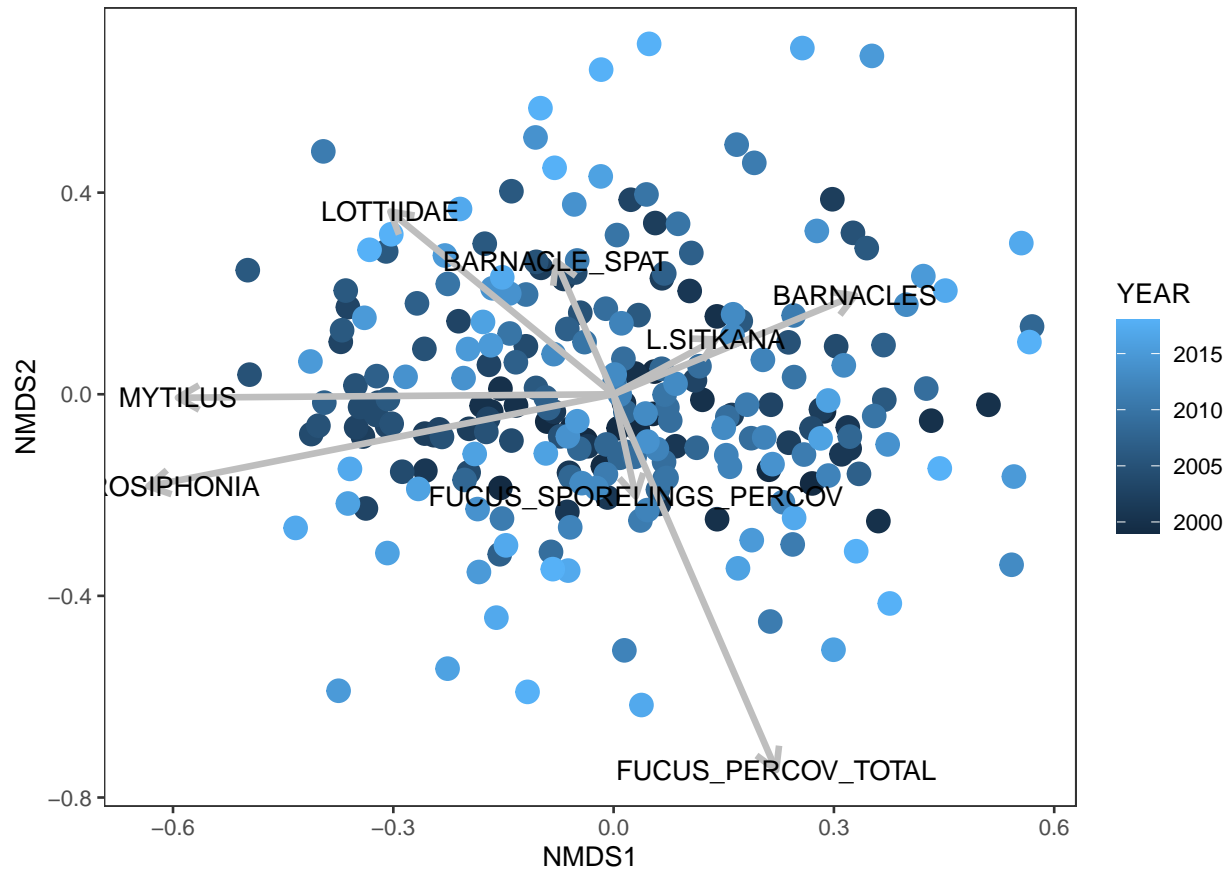
Hulls representing each Year



Ordinations with taxa vectors

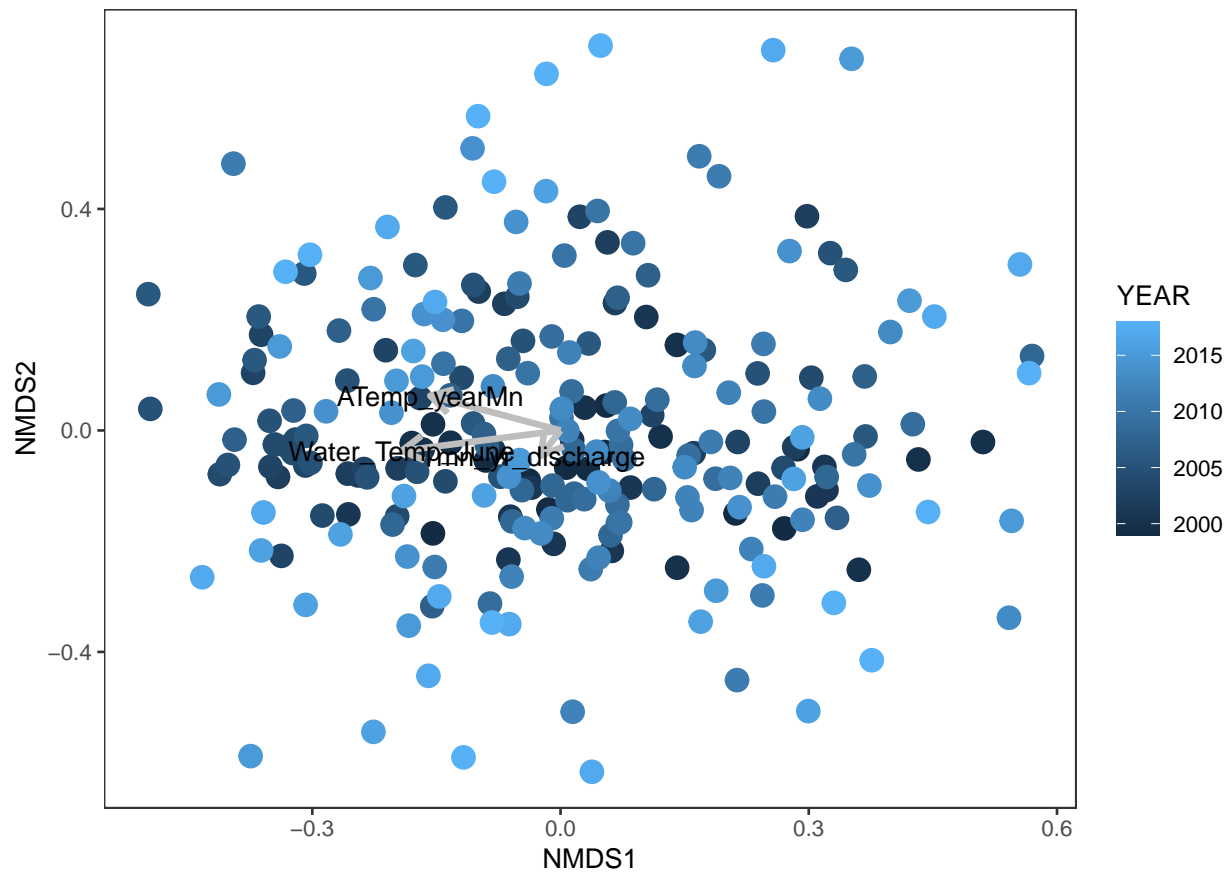
```
##
## ***VECTORS
##
##          MDS1      MDS2      r2    Pr(>r)
## FUCUS_PERCOV_TOTAL    0.28467 -0.95862 0.6050 0.000999 ***
## BARNACLES              0.85883  0.51226 0.1465 0.000999 ***
## MYTILUS                -0.99993 -0.01149 0.3522 0.000999 ***
## PTEROSIPHONIA          -0.96087 -0.27700 0.4349 0.000999 ***
## BARNACLE_SPAT          -0.28506  0.95851 0.0757 0.000999 ***
## FUCUS_SPORELINGS_PERCOV 0.14755 -0.98905 0.0420 0.005994 **
## LOTTIIDAE              -0.64277  0.76606 0.2238 0.000999 ***
## L.SITKANA              0.78767  0.61610 0.0312 0.023976 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## Permutation: free
## Number of permutations: 1000
```

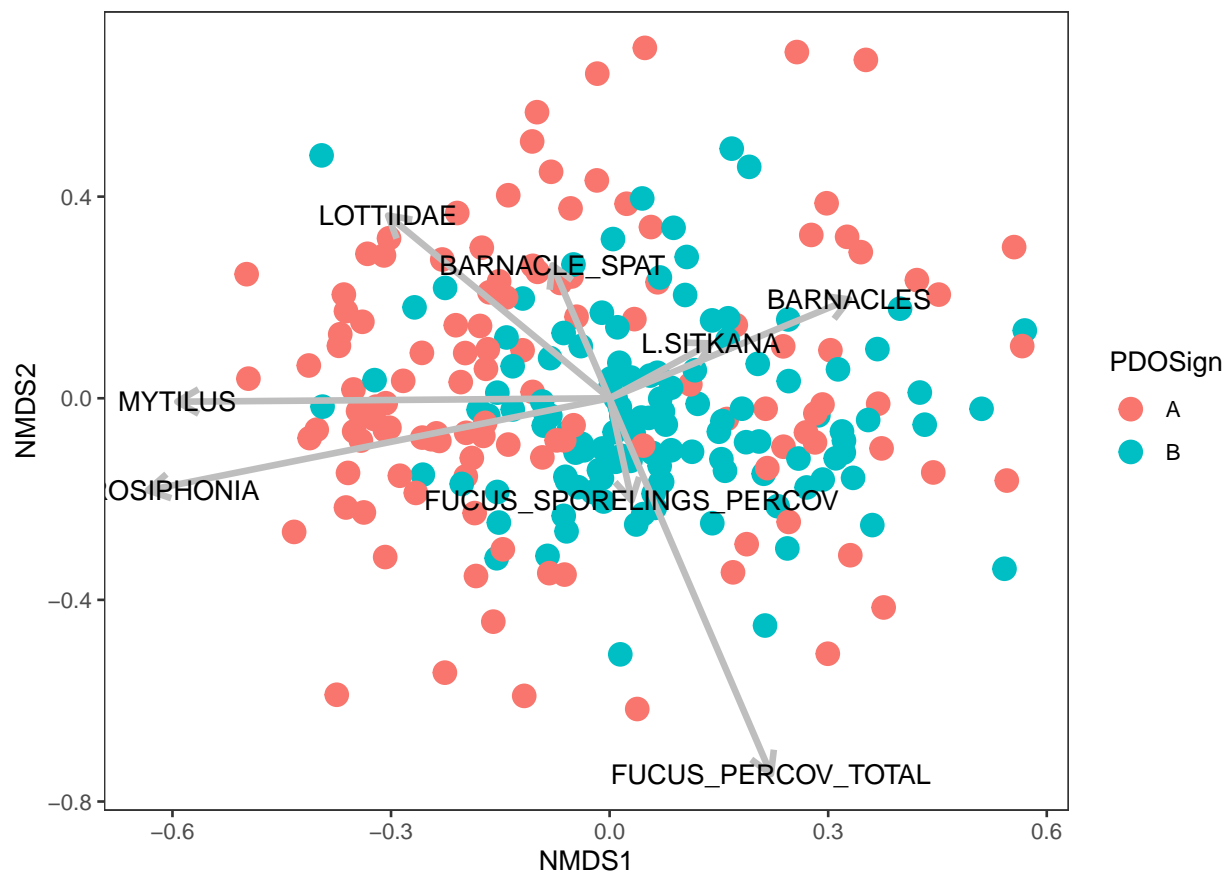




Ordinations with env. vectors

```
##
## ***VECTORS
##
##           MDS1      MDS2      r2  Pr(>r)
## mn_yr_discharge -0.46023 -0.88780 0.0026 0.75724
## ATemp_yearMn     -0.92925  0.36946 0.0287 0.03097 *
## Water_Temp_June  -0.98208 -0.18844 0.0382 0.01299 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## Permutation: free
## Number of permutations: 1000
```

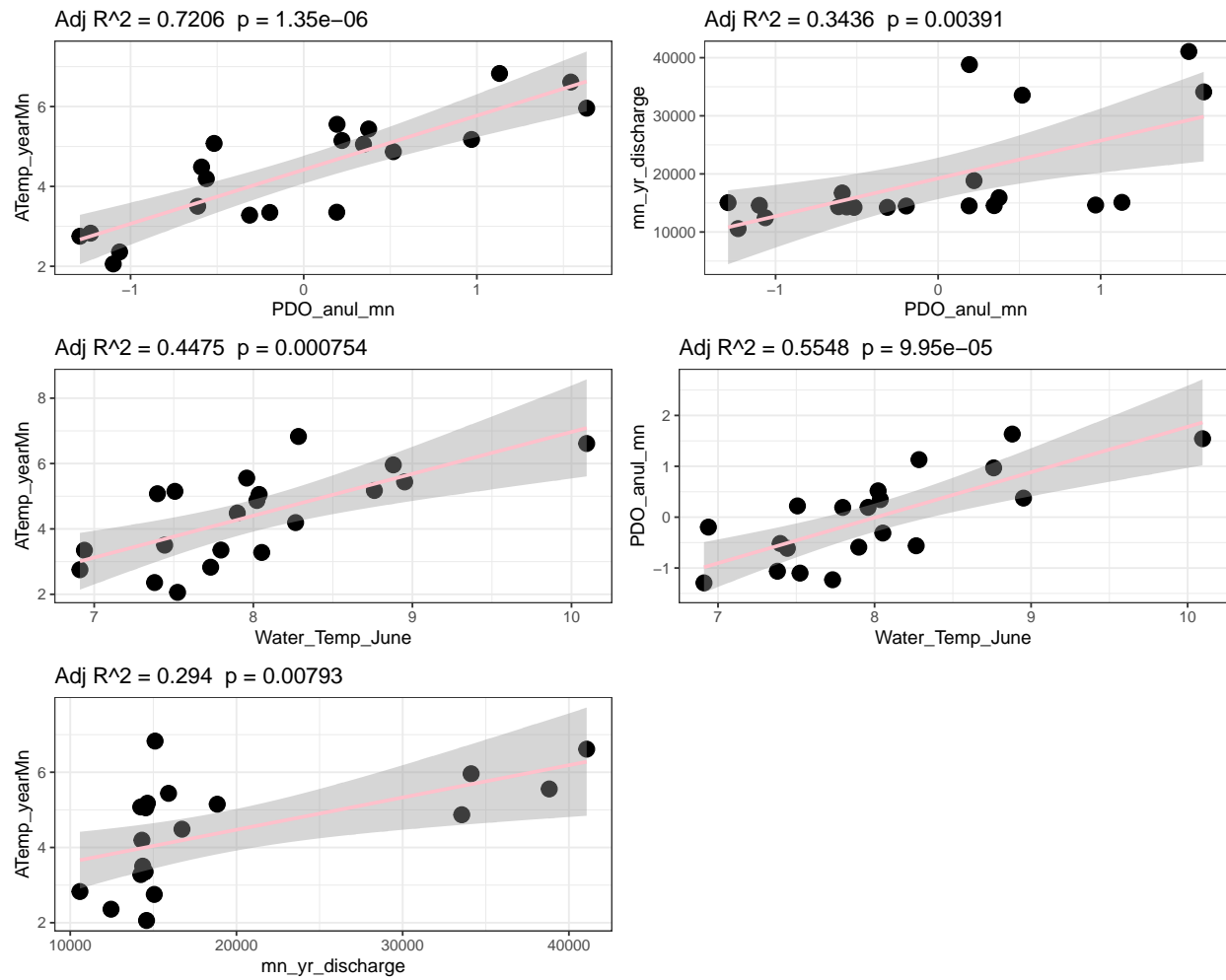




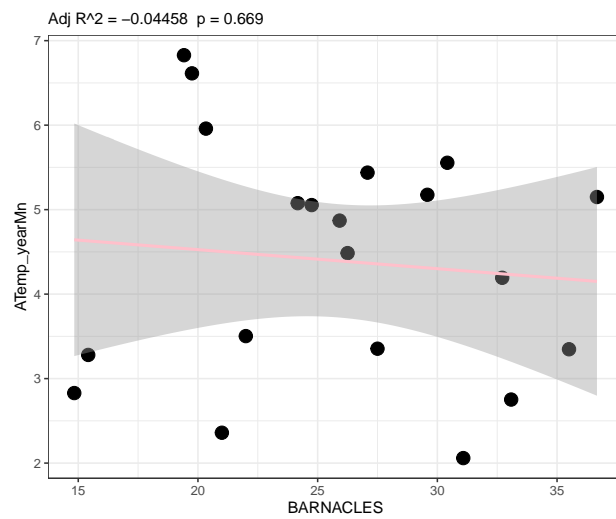
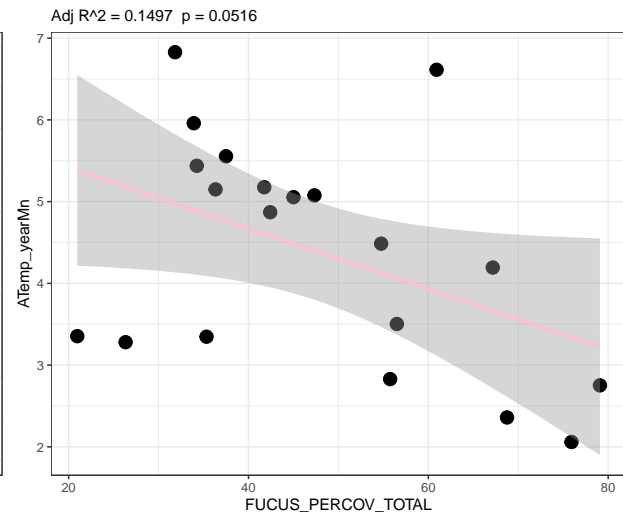
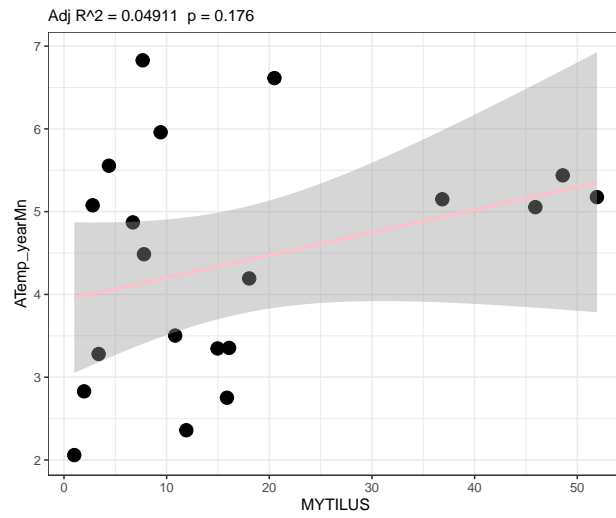
Env. vectors Permanova Results

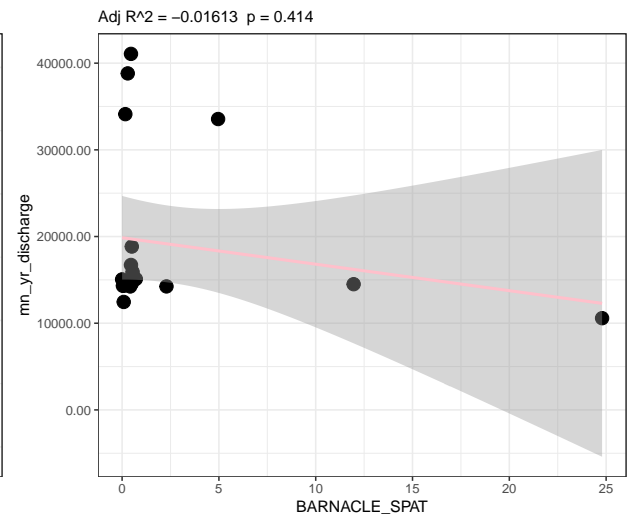
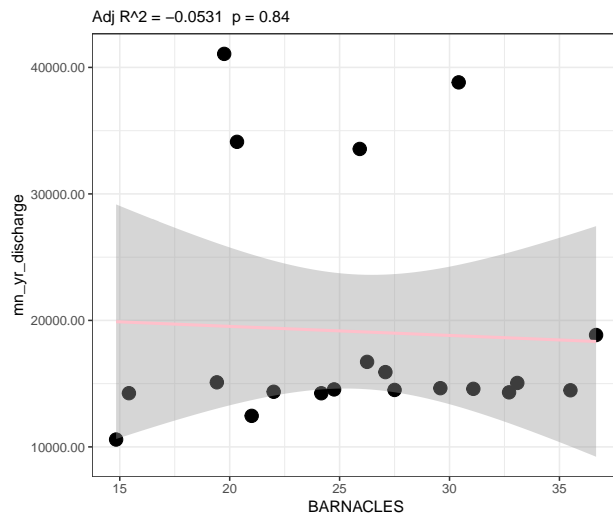
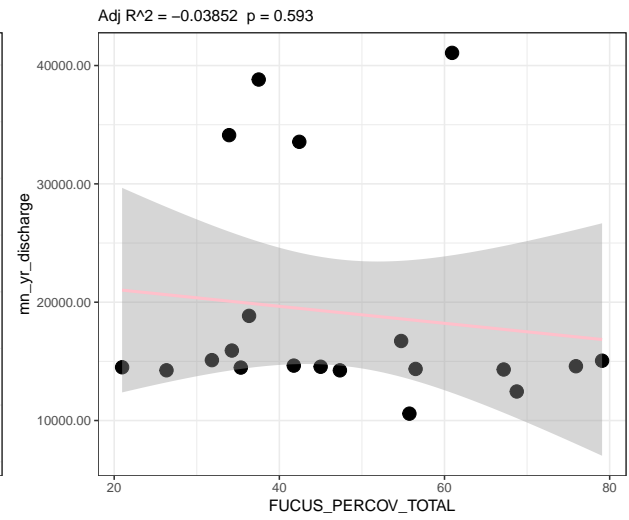
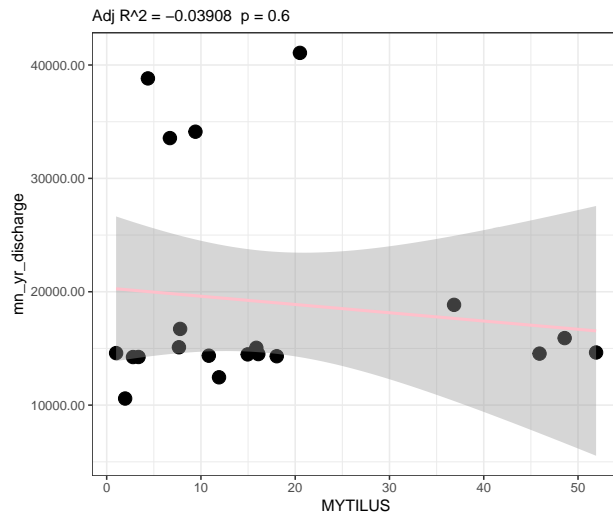
```
##
## Call:
## vegan::adonis(formula = sp_percov5 ~ ATemp_yearMn * mn_yr_discharge *      Water_Temp_June, data = a
##
## Permutation: free
## Number of permutations: 1000
##
## Terms added sequentially (first to last)
##
##              Df SumsOfSqs MeanSqs F.Model
## ATemp_yearMn      1      0.9871  0.9871   9.951
## mn_yr_discharge    1      3.1919  3.1919  32.178
## Water_Temp_June    1      0.3839  0.3839   3.871
## ATemp_yearMn:mn_yr_discharge    1      0.1628  0.1628   1.641
## ATemp_yearMn:Water_Temp_June    1      0.3082  0.3082   3.108
## mn_yr_discharge:Water_Temp_June    1      0.3586  0.3586   3.615
## ATemp_yearMn:mn_yr_discharge:Water_Temp_June    1      0.0775  0.0775   0.781
## Residuals          232      23.0129  0.0992
## Total              239      28.4830
##              R2    Pr(>F)
## ATemp_yearMn      0.03465 0.000999 ***
## mn_yr_discharge    0.11206 0.000999 ***
## Water_Temp_June    0.01348 0.006993 **
## ATemp_yearMn:mn_yr_discharge    0.00572 0.150849
## ATemp_yearMn:Water_Temp_June    0.01082 0.011988 *
## mn_yr_discharge:Water_Temp_June    0.01259 0.005994 **
## ATemp_yearMn:mn_yr_discharge:Water_Temp_June    0.00272 0.525475
## Residuals          0.80795
## Total              1.00000
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

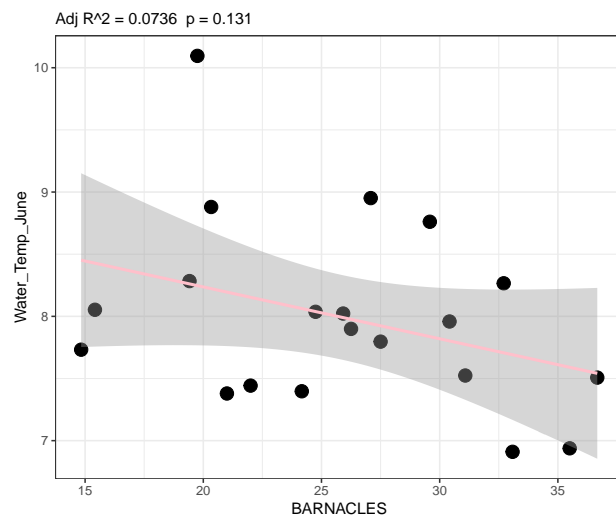
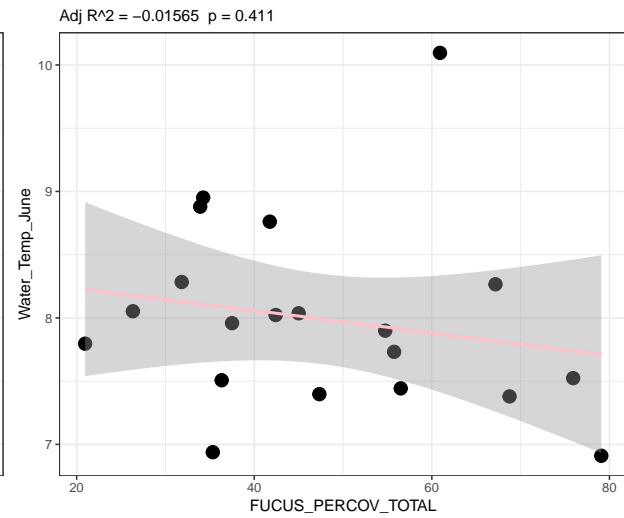
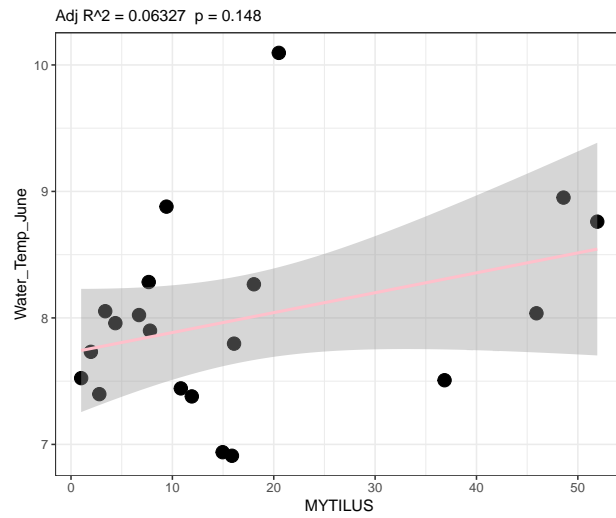

Correlations between env. variables



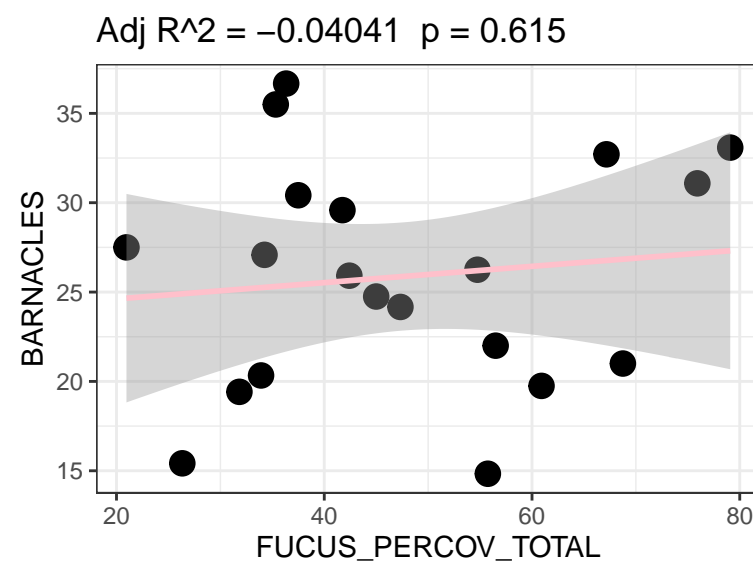
Correlations between other variables







`geom_smooth()` using formula 'y ~ x'



Looking at lagged June water temp

