Exploratory Plots 20190113

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Data Prep from 1) Data Clean Script

```
## 1) script to clean and wrangle data
library(tidyverse, verbose = F)
```

```
## Warning: package 'tidyverse' was built under R version 3.5.2
```

```
## -- Attaching packages ---------------------------------------------------------------- tidyverse 1.2
```

```
## v ggplot2 3.0.0     v purrr   0.2.5
## v tibble  1.4.2     v dplyr   0.7.6
## v tidyr   0.8.1     v stringr 1.3.1
## v readr   1.1.1     v forcats 0.3.0
```

```
## Warning: package 'ggplot2' was built under R version 3.5.1
```

```
## Warning: package 'dplyr' was built under R version 3.5.1
```

```
## -- Conflicts ------------------------------------------------------------------- tidyverse_conflicts
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

```
library(ggplot2)
theme_mod <- function(){theme_bw() %+replace% theme(panel.grid = element_blank())}
theme_set(theme_mod())

## Data import
Data_Beck=read.csv("raw-data/Beck Data/Beck Data.csv")
Data_Elser=read.csv("raw-data/Elser-et-al-2007_Global-N-P-limitation/data/doi_10.5063_AA_nceasadmin.910
Data_Vanni=read.csv("raw-data/Vanni-et-al_2017_Animal-excretion/Aquatic_animal_excretion_data.csv")
Data_Vanni$Temperature..C.=as.numeric(as.character(Data_Vanni$Temperature..C.))
```

```
## Warning: NAs introduced by coercion
```

```
Data_Vanni$P.excretion.rate..ug.P.ind.h.=as.numeric(as.character(Data_Vanni$P.excretion.rate..ug.P.ind.
```

```
## Warning: NAs introduced by coercion
```

```
Data_Vanni$N.excretion.rate..ug.N.ind.h.=as.numeric(as.character(Data_Vanni$N.excretion.rate..ug.N.ind.
```

```
## Warning: NAs introduced by coercion
```

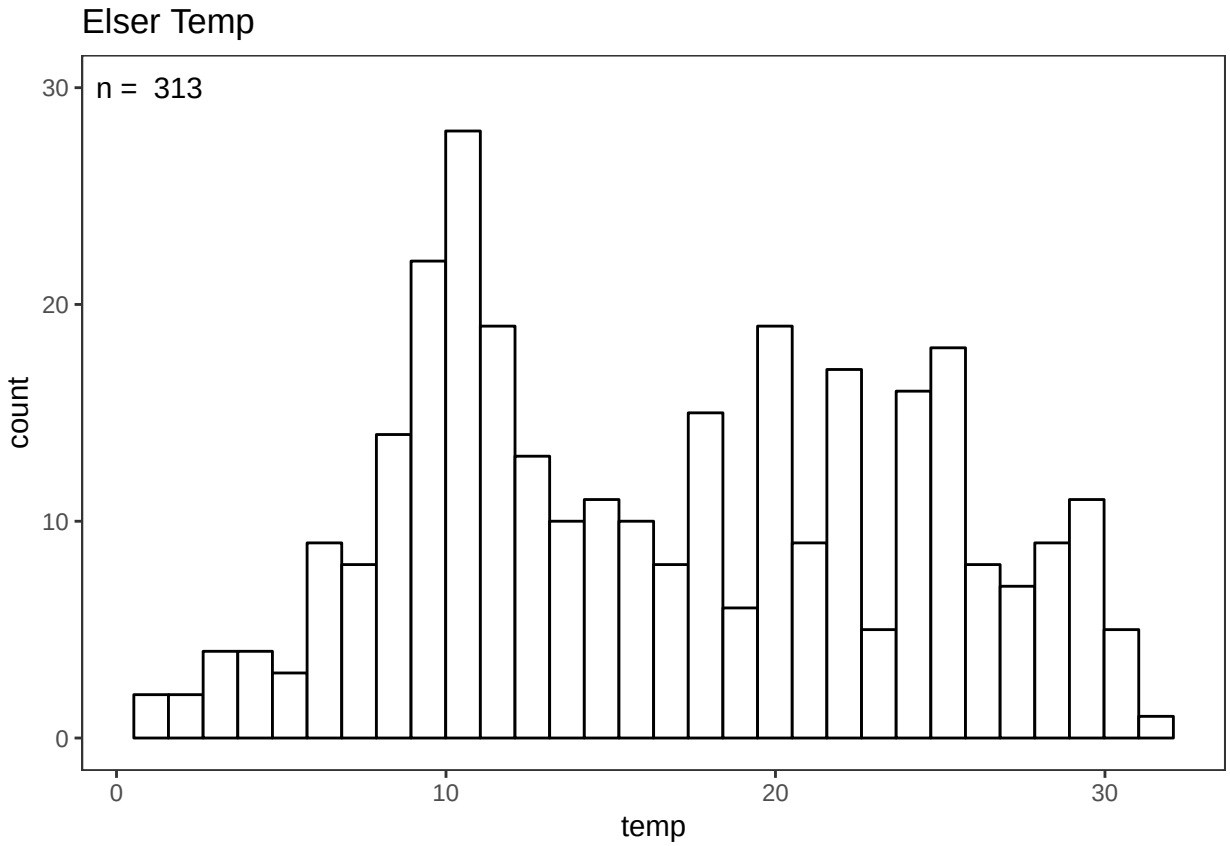
```
Data_Vanni$Excreted.N.P..molar.=as.numeric(Data_Vanni$Excreted.N.P..molar.)

## Elser: set variables of interest
var_names_Elser = c("id_study","system", "strata", "habitat", "cat", "tax_resp_class",
              "l.n.c","l.p.c","l.int.c","temp","n_avail","n_total","p_avail",
              "p_total", "light", "location", "latitud","longitud","elev","duration")

#Filter to variables of interest that have temperature values in aquatic systems
TempData_Elser <- Data_Elser %>%
  select(var_names_Elser) %>%
```

```
  filter(system %in% c("FRESHWATER", "MARINE")) %>%
  filter(!is.na(temp))

##Beck: set variables of interest
var_names_Beck=c("Ref", "Site.Name", "Latitude_GoogleEarth", "Longitude_GoogleEarth", "Days", "Nitrogen
                 "Phosphorus.Molarity", "Elevation_m", "Depth_m", "Canopy_Percent", "Canopy_Qual", "Temp
                 "NH4_ug_L", "NO3_ug_L", "DIN_ug_L", "TN_mg_L", "SRP_ug_L", "TP_ug_L", "NO3_SRP_Ratio",
                 "Control_mean_mg_m2", "Control.SE",
                 "N_mean_mg_m2", "N.SE", "N.LRR.Effect", "N.LRR.Variance",
                 "P_mean_mg_m2", "P.SE", "P.LRR.Effect", "P.LRR.Variance",
                 "NP_mean_mg_m2", "NP.SE", "NP.LRR", "NP.LRR.Variance")

#Filter to variables of interest that have temperature values
TempData_Beck <- Data_Beck %>%
  select(var_names_Beck) %>%
  filter(!is.na(Temp_C))

##Vanni: set variables of interest

#Many of these could be interesting to explore, and variable names are really strangely formatted
#so I'm going to leave as-is for now

TempData_Vanni <- Data_Vanni%>%
  filter(!is.na(Temperature..C.))
```

Elser Plots from 2) Exploratory script

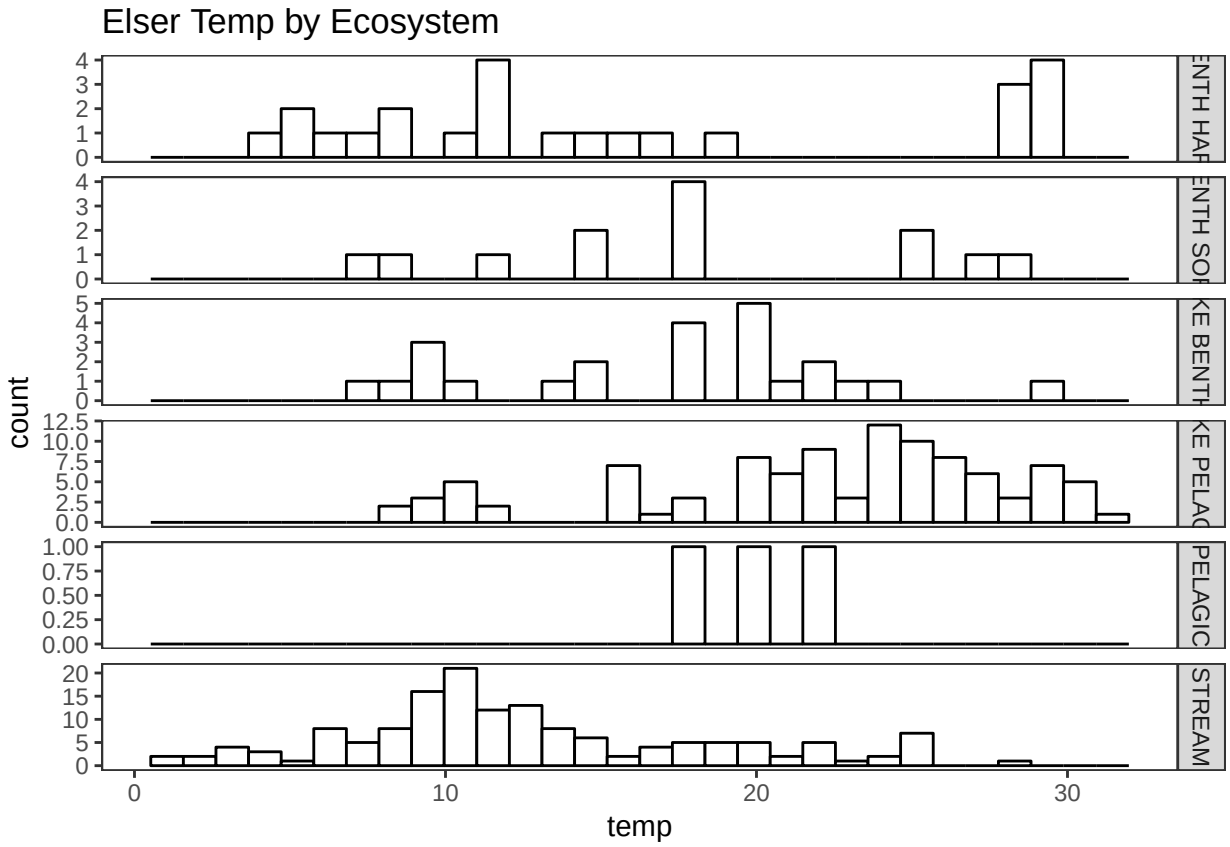
```
#Temperature Range

ggplot(TempData_Elser, aes(x = temp)) + geom_histogram(colour = 'black', fill = 'white')+
    annotate('text', x = 1, y = 30,label = paste("n = ", nrow(subset(TempData_Elser, temp!="NA"))))+
    ggtitle("Elser Temp")
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```




```
ggplot(TempData_Elser, aes(x = temp)) + geom_histogram(colour = 'black',fill = 'white') + facet_grid(ca
    ggtitle("Elser Temp by Ecosystem")
```

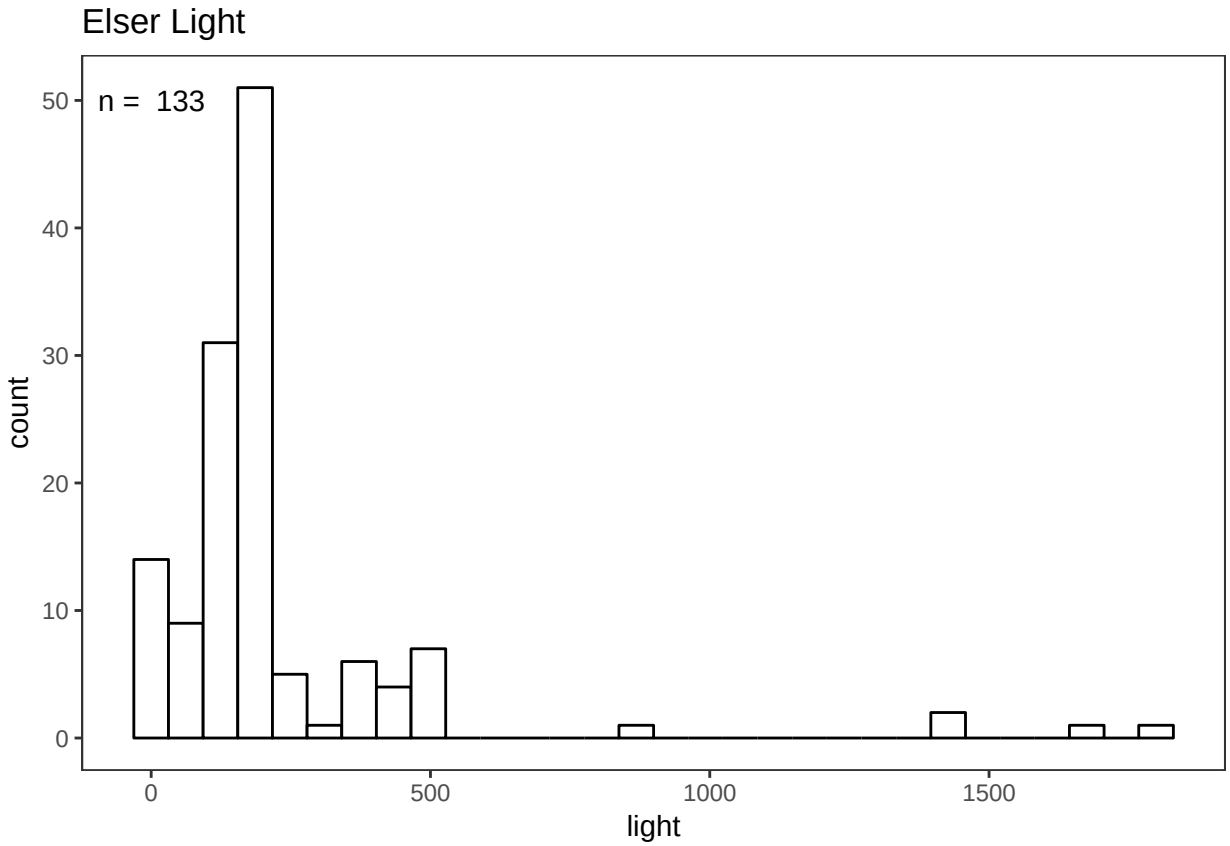
```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```




```
#Light Range

ggplot(TempData_Elser, aes(x = light)) + geom_histogram(colour = 'black', fill = 'white')+
  annotate('text', x = 1, y = 50,label = paste("n = ",nrow(subset(TempData_Elser, light!="NA"))))+
  ggtitle("Elser Light")
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

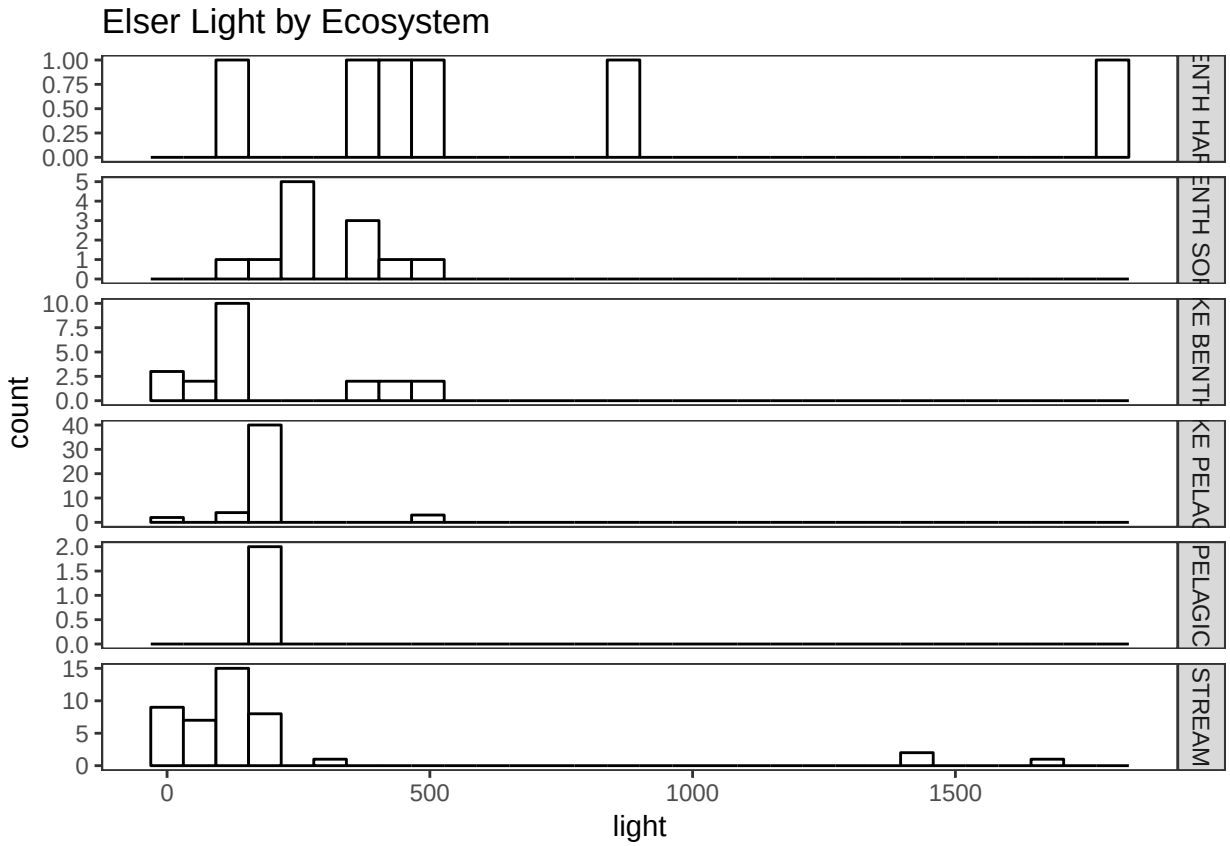
```
## Warning: Removed 180 rows containing non-finite values (stat_bin).
```




```
ggplot(TempData_Elser, aes(x = light)) + geom_histogram(colour = 'black',fill = 'white') + facet_grid(ca
  ggtitle("Elser Light by Ecosystem")
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```
## Warning: Removed 180 rows containing non-finite values (stat_bin).
```




```
#Avail N Range

Elser_log_n_avail = ggplotGrob(ggplot(TempData_Elser, aes(x = log10(n_avail))) + geom_histogram(colour =
```

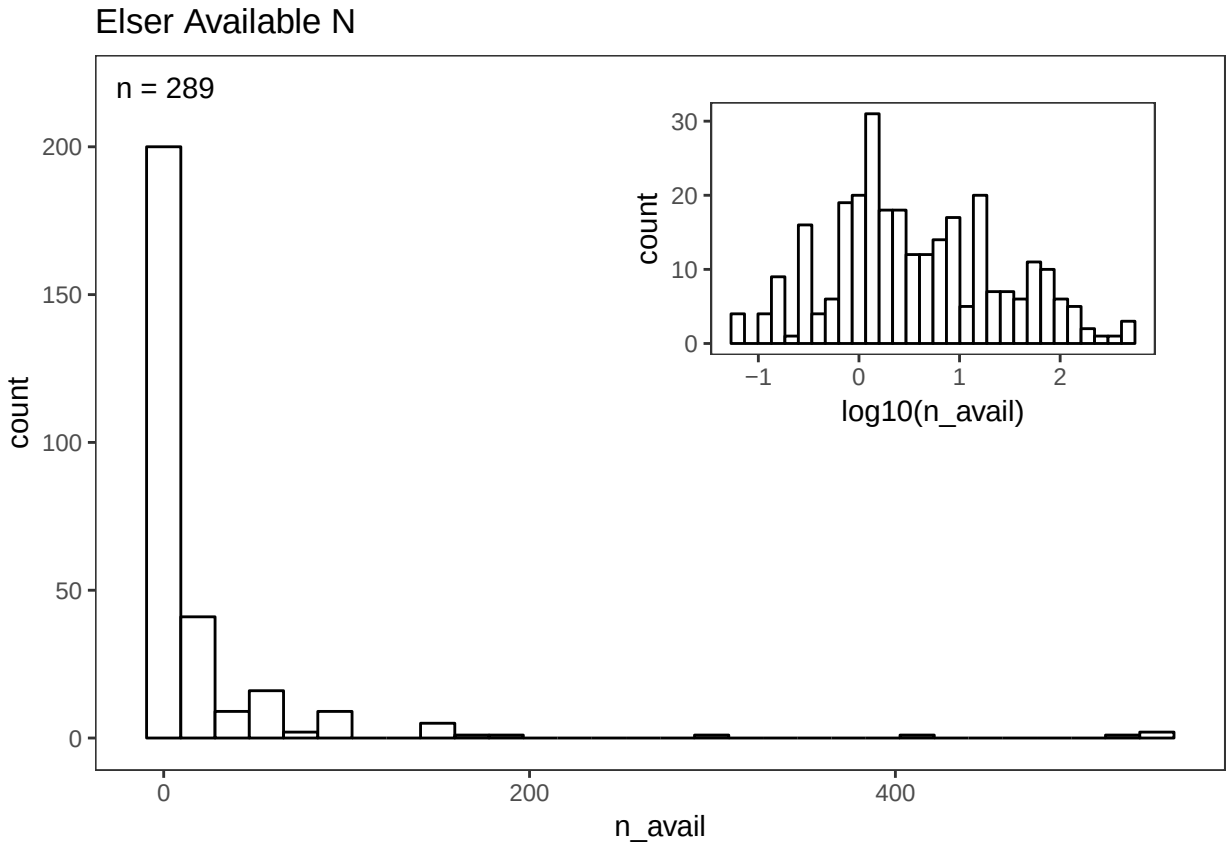
```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```
## Warning: Removed 24 rows containing non-finite values (stat_bin).
```

```
ggplot(TempData_Elser, aes(x = n_avail)) + geom_histogram(colour = 'black', fill = 'white') +
  annotate('text', x = 1, y = 220, label = paste("n =",nrow(subset(TempData_Elser, n_avail!="NA")))) +
  annotation_custom(grob = Elser_log_n_avail, xmin = 250, xmax = 550, ymin = 100, ymax = 220)+
  ggtitle("Elser Available N")
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

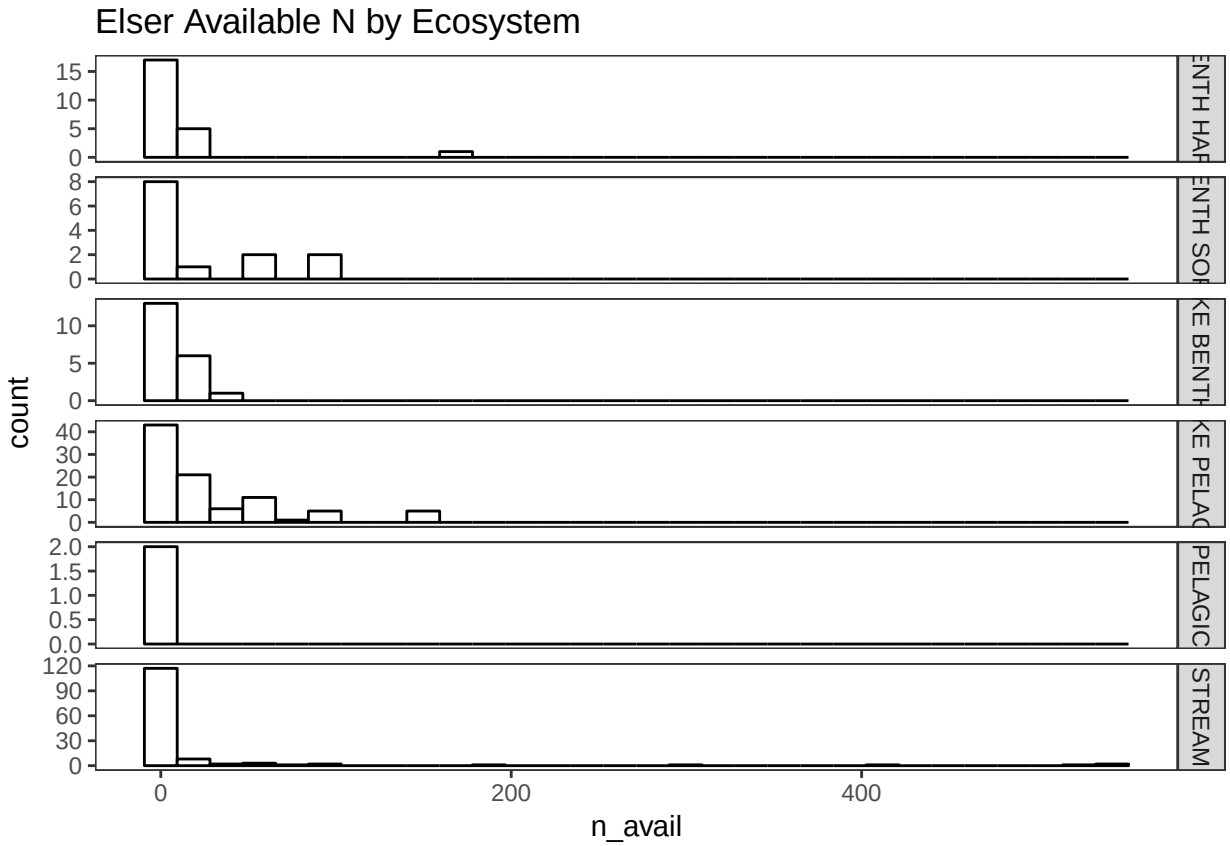
```
## Warning: Removed 24 rows containing non-finite values (stat_bin).
```




```
ggplot(TempData_Elser, aes(x = n_avail)) + geom_histogram(colour = 'black',fill = 'white') + facet_grid
  ggtitle("Elser Available N by Ecosystem")
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```
## Warning: Removed 24 rows containing non-finite values (stat_bin).
```




```
#Total N Range

Elser_log_n_total = ggplotGrob(ggplot(TempData_Elser, aes(x = log10(n_total))) + geom_histogram(colour =
```

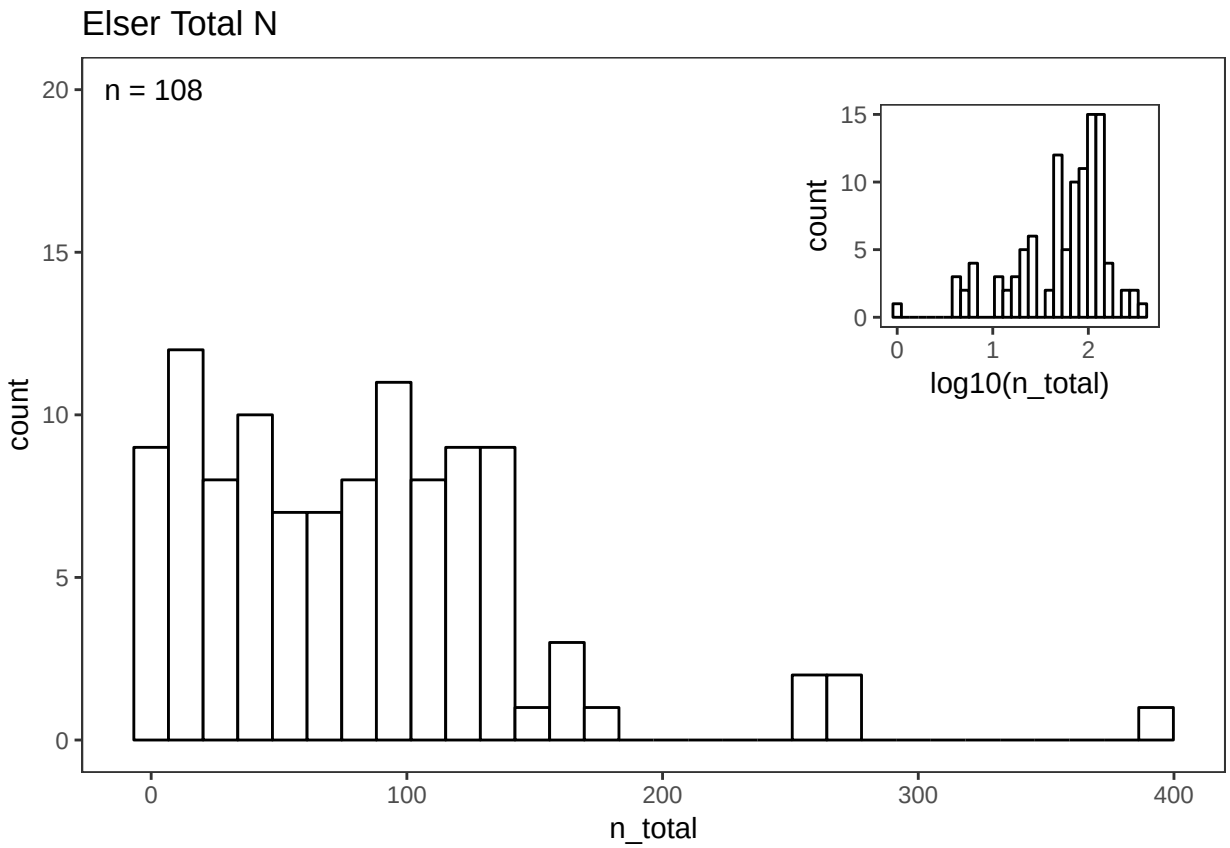
```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```
## Warning: Removed 205 rows containing non-finite values (stat_bin).
```

```
ggplot(TempData_Elser, aes(x = n_total)) + geom_histogram(colour = 'black', fill = 'white') +
  annotate('text', x = 1, y = 20, label = paste("n =", nrow(subset(TempData_Elser, n_total!="NA")))) +
  annotation_custom(grob = Elser_log_n_total, xmin = 250, xmax = 400, ymin = 10, ymax = 20)+
  ggtitle("Elser Total N")
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

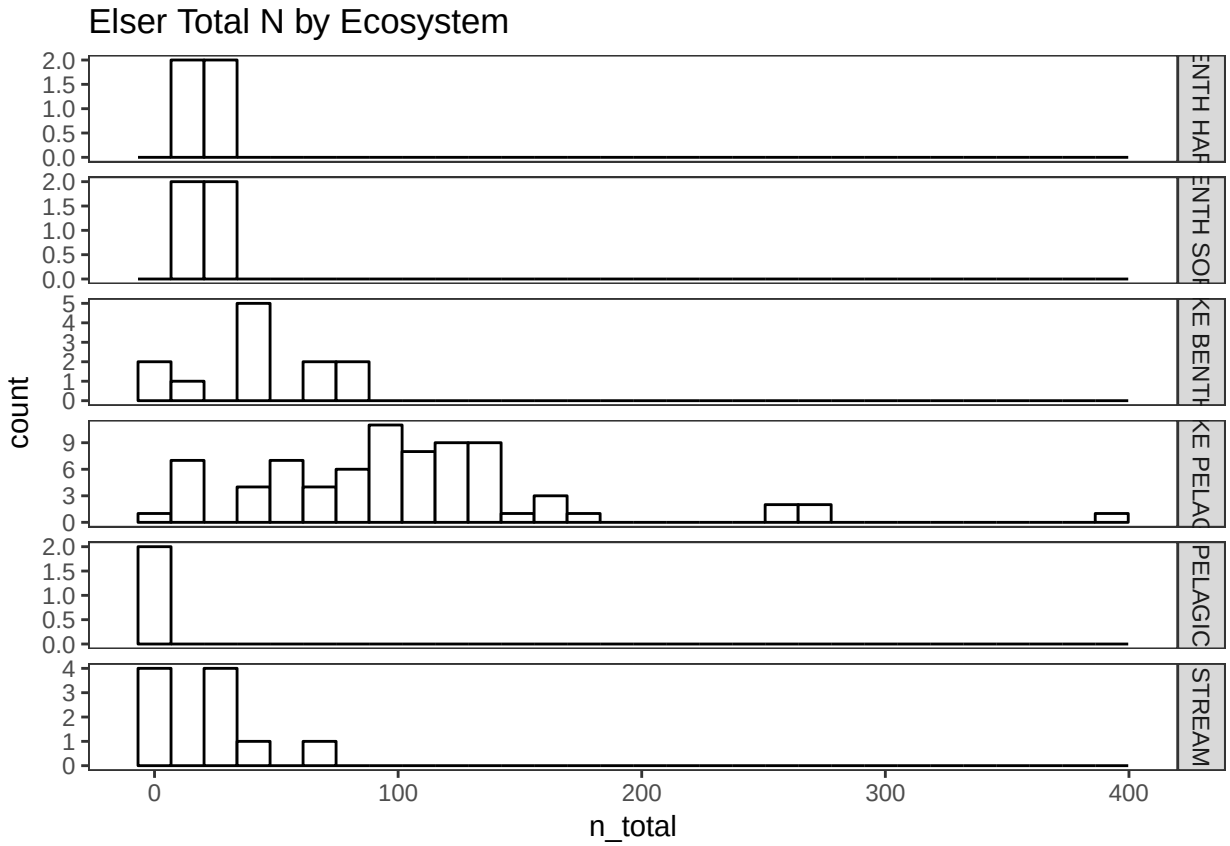
```
## Warning: Removed 205 rows containing non-finite values (stat_bin).
```




```
ggplot(TempData_Elser, aes(x = n_total)) + geom_histogram(colour = 'black',fill = 'white') + facet_grid
  ggtitle("Elser Total N by Ecosystem")
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```
## Warning: Removed 205 rows containing non-finite values (stat_bin).
```




```
#Avail P Range

Elser_log_p_avail = ggplotGrob(ggplot(TempData_Elser, aes(x = log10(p_avail))) + geom_histogram(colour =
```

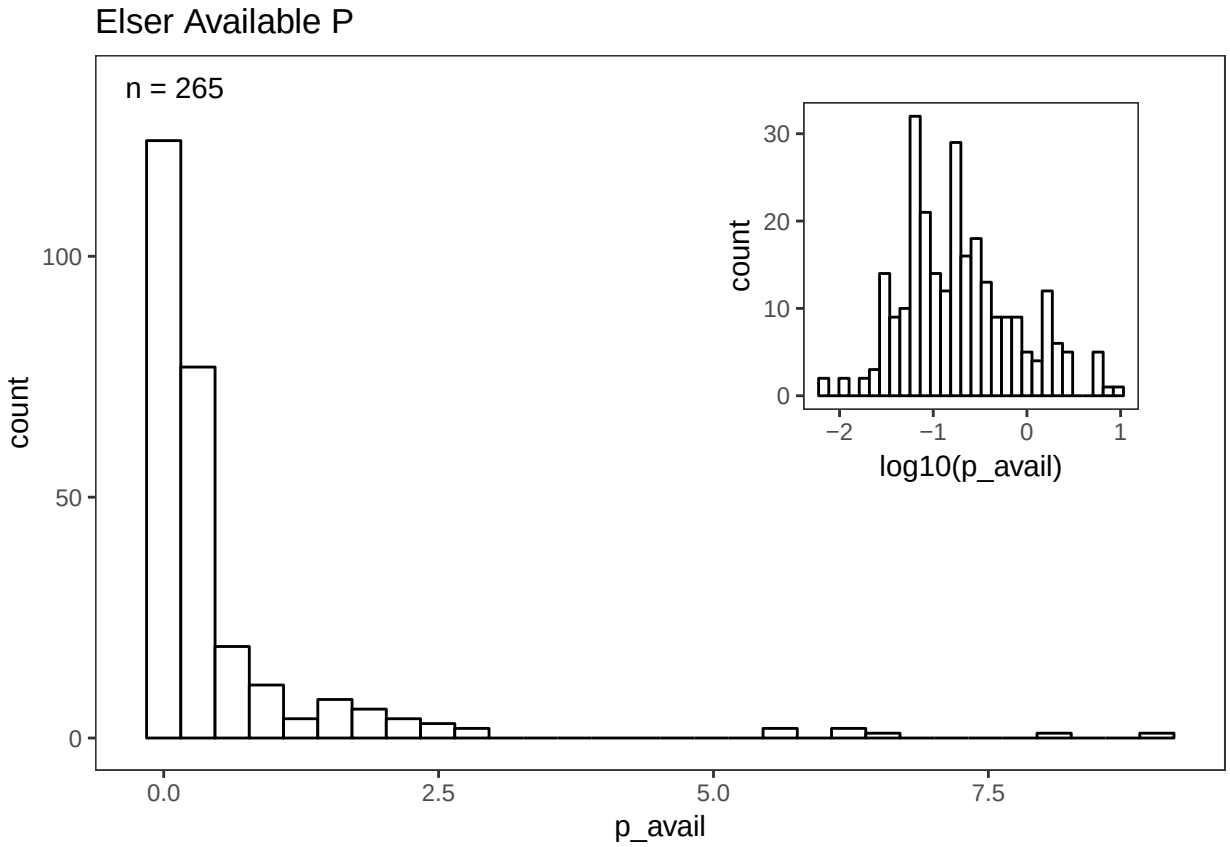
```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```
## Warning: Removed 50 rows containing non-finite values (stat_bin).
```

```
ggplot(TempData_Elser, aes(x = p_avail)) + geom_histogram(colour = 'black', fill = 'white') +
  annotate('text', x = .1, y = 135, label = paste("n =",nrow(subset(TempData_Elser, p_avail!="NA")))) +
  annotation_custom(grob = Elser_log_p_avail, xmin = 5, xmax = 9, ymin = 50, ymax = 135)+
  ggtitle("Elser Available P")
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

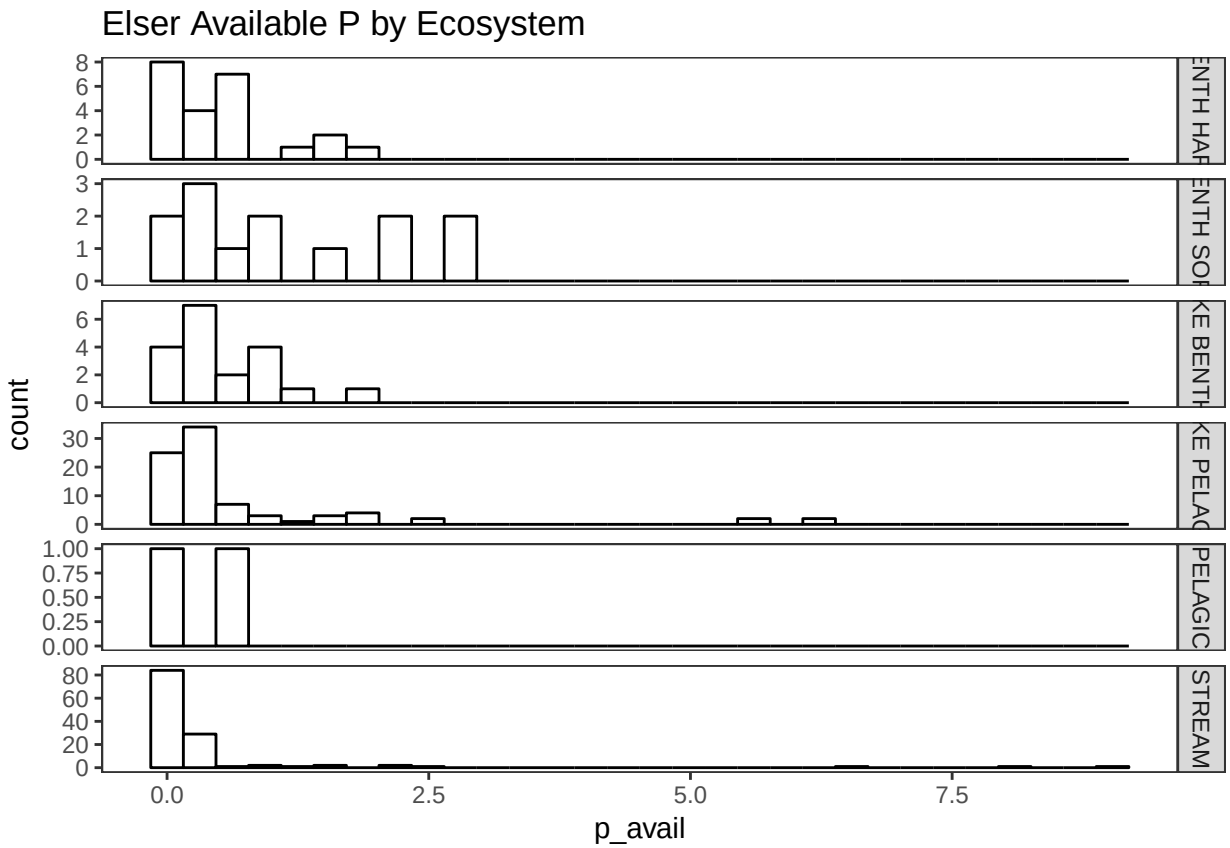
```
## Warning: Removed 48 rows containing non-finite values (stat_bin).
```




```
ggplot(TempData_Elser, aes(x = p_avail)) + geom_histogram(colour = 'black',fill = 'white') + facet_grid
  ggtitle("Elser Available P by Ecosystem")
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```
## Warning: Removed 48 rows containing non-finite values (stat_bin).
```




```
#Total P Range

Elser_log_p_total = ggplotGrob(ggplot(TempData_Elser, aes(x = log10(p_total))) + geom_histogram(colour =
```

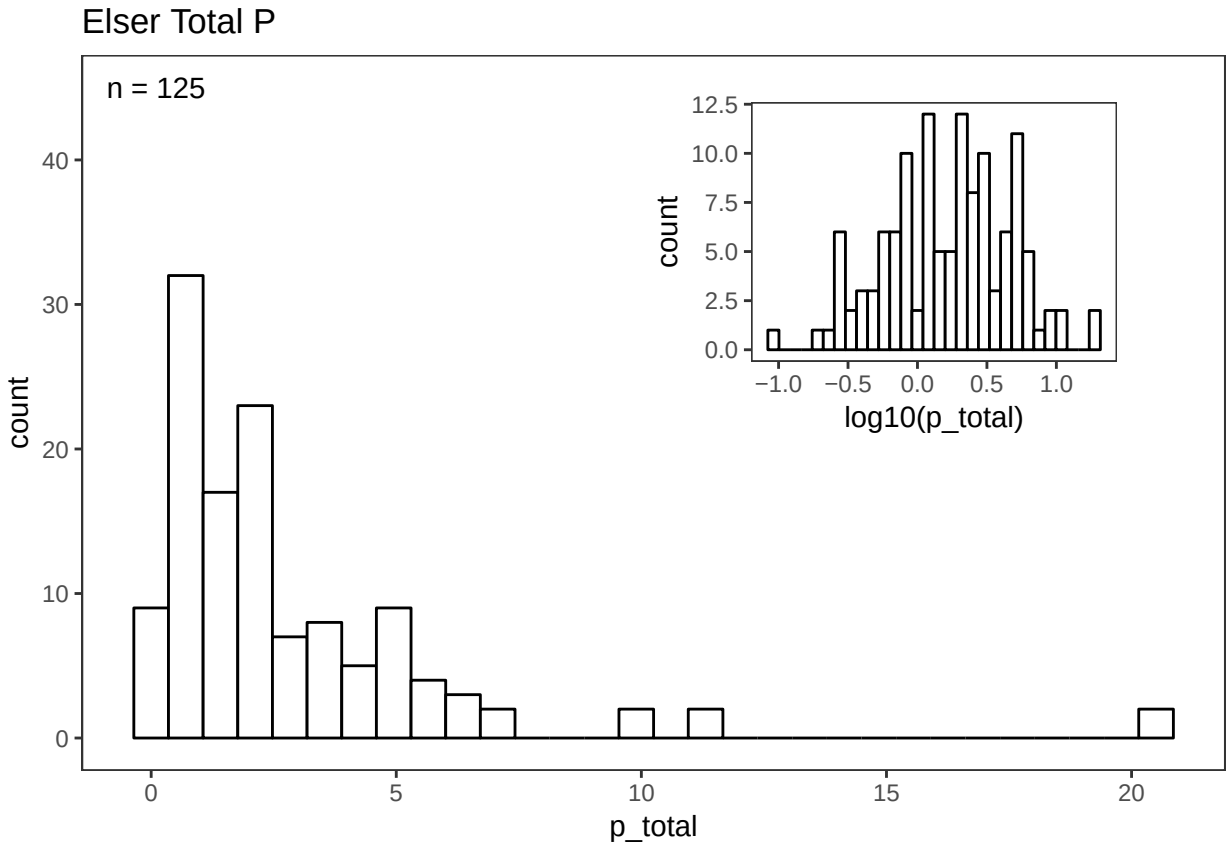
```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```
## Warning: Removed 188 rows containing non-finite values (stat_bin).
```

```
ggplot(TempData_Elser, aes(x = p_total)) + geom_histogram(colour = 'black', fill = 'white') +
  annotate('text', x = .1, y = 45, label = paste("n =",nrow(subset(TempData_Elser, p_total!="NA")))) +
  annotation_custom(grob = Elser_log_p_total, xmin = 10, xmax = 20, ymin = 20, ymax = 45)+
  ggtitle("Elser Total P")
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

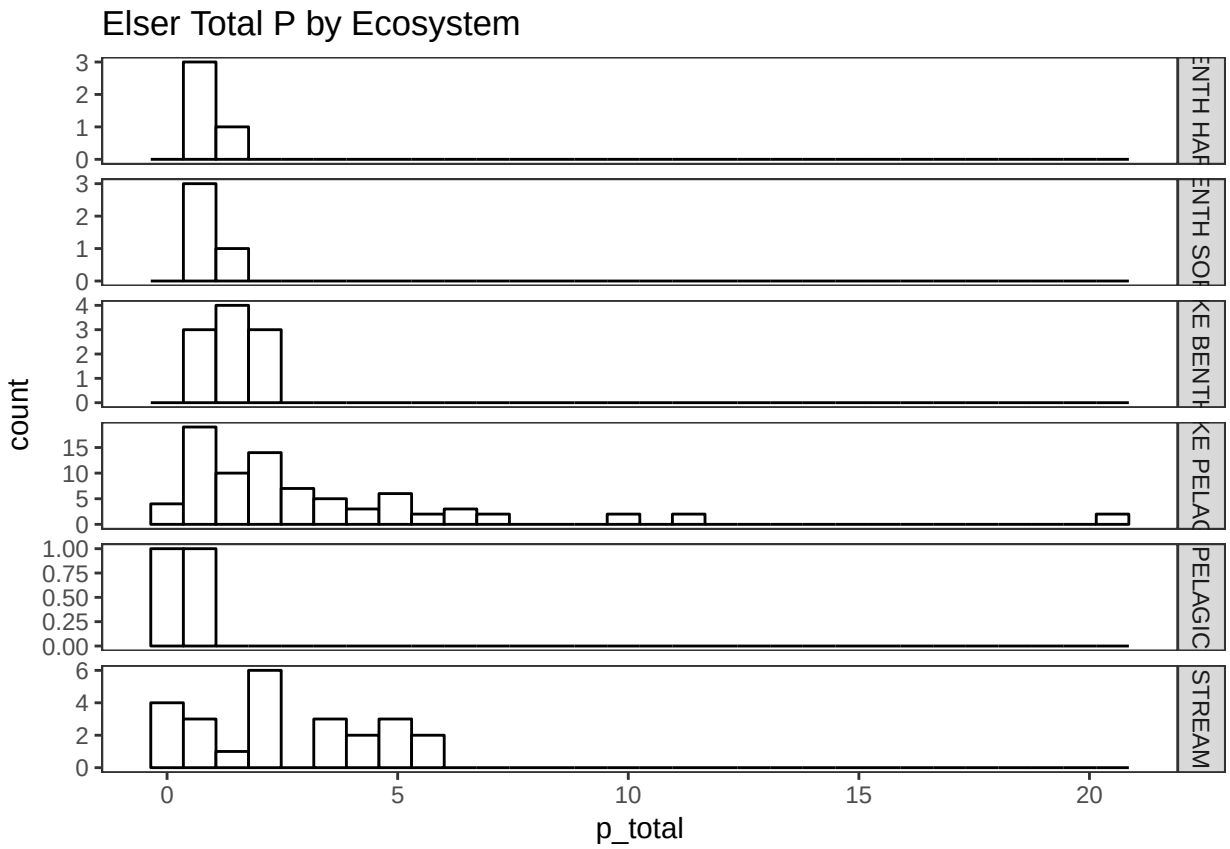
```
## Warning: Removed 188 rows containing non-finite values (stat_bin).
```




```
ggplot(TempData_Elser, aes(x = p_total)) + geom_histogram(colour = 'black',fill = 'white') + facet_grid
  ggtitle("Elser Total P by Ecosystem")
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```
## Warning: Removed 188 rows containing non-finite values (stat_bin).
```




```
# N_LRR
Elser_log_N_LRR = ggplotGrob(ggplot(TempData_Elser, aes(x = log10(l.n.c))) + geom_histogram(colour = 'bl
```

```
## Warning in FUN(X[[i]], ...): NaNs produced
```

```
## Warning in FUN(X[[i]], ...): NaNs produced
```

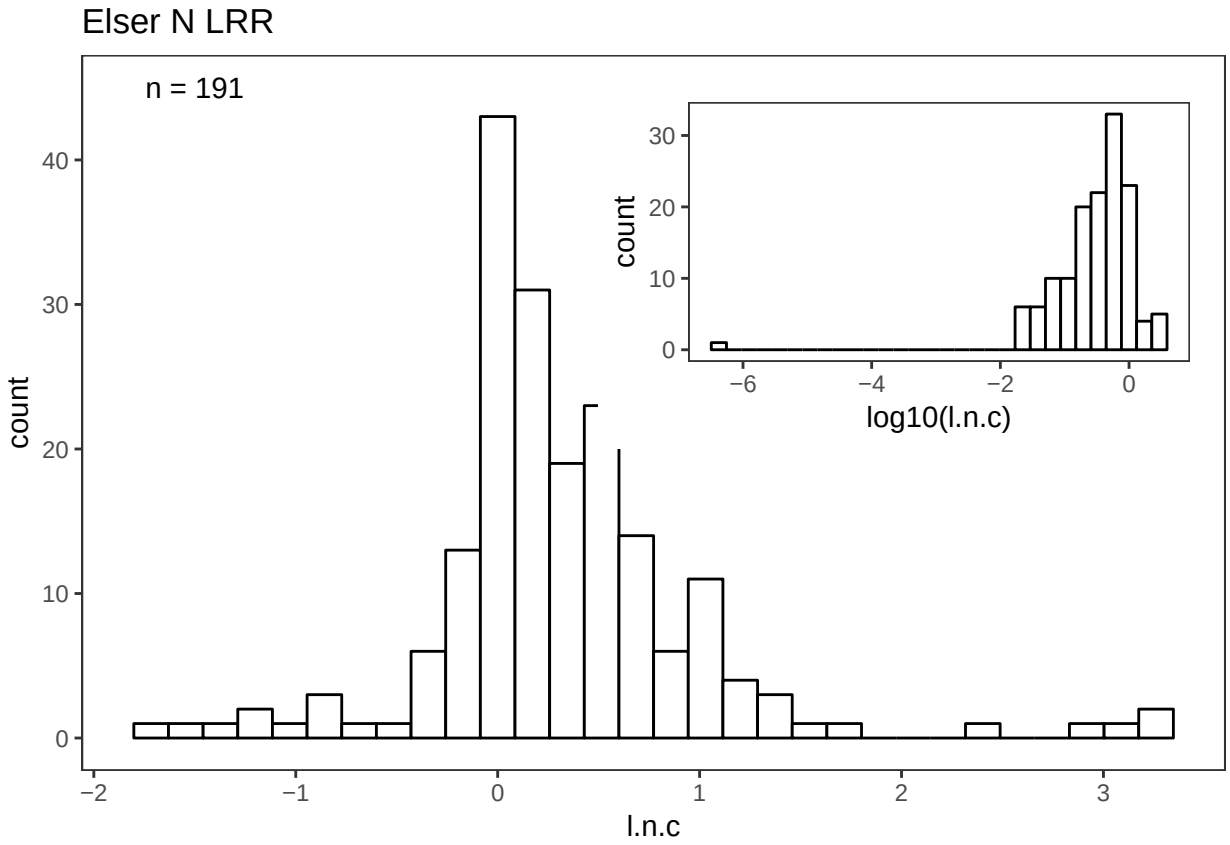
```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```
## Warning: Removed 173 rows containing non-finite values (stat_bin).
```

```
ggplot(TempData_Elser, aes(x = l.n.c)) + geom_histogram(colour = 'black', fill = 'white') +
  annotate('text', x = -1.5, y = 45, label = paste("n =",nrow(subset(TempData_Elser, l.n.c!="NA")))) +
  annotation_custom(grob = Elser_log_N_LRR, xmin = 0.5, xmax = 3.5, ymin = 20, ymax = 45)+
  ggtitle("Elser N LRR")
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

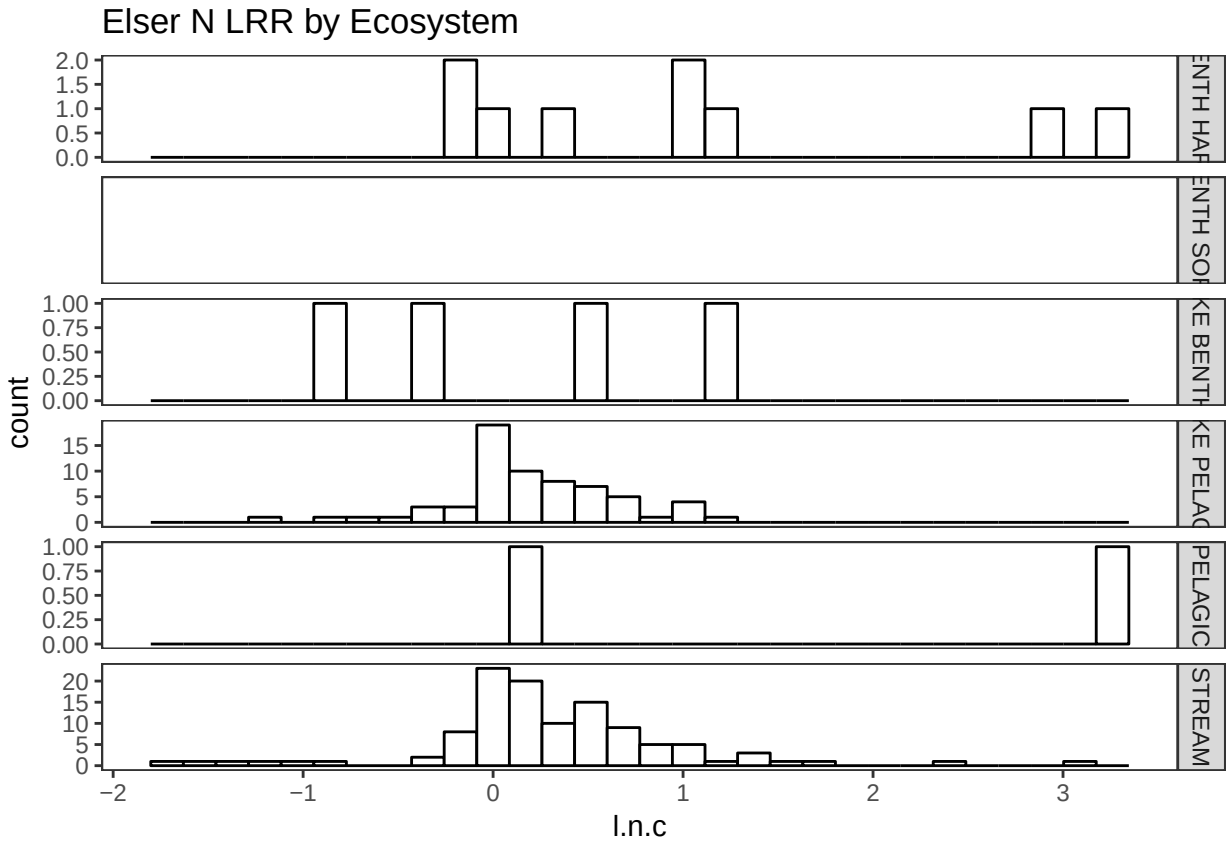
```
## Warning: Removed 122 rows containing non-finite values (stat_bin).
```




```
ggplot(TempData_Elser, aes(x = l.n.c)) + geom_histogram(colour = 'black',fill = 'white') + facet_grid(ca
  ggtitle("Elser N LRR by Ecosystem")
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```
## Warning: Removed 122 rows containing non-finite values (stat_bin).
```




```
# P_LRR
Elser_log_P_LRR = ggplotGrob(ggplot(TempData_Elser, aes(x = log10(l.p.c))) + geom_histogram(colour = 'bl
```

```
## Warning in FUN(X[[i]], ...): NaNs produced
```

```
## Warning in FUN(X[[i]], ...): NaNs produced
```

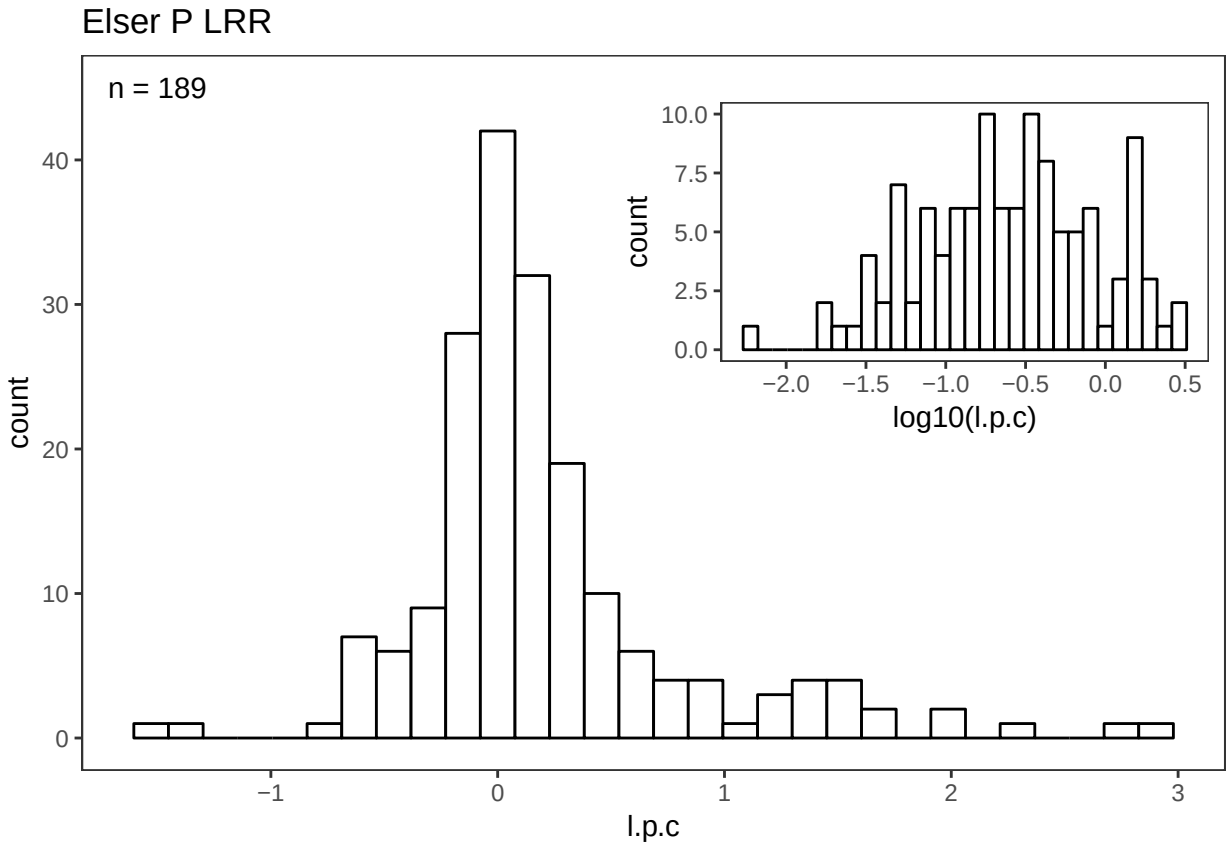
```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```
## Warning: Removed 196 rows containing non-finite values (stat_bin).
```

```
ggplot(TempData_Elser, aes(x = l.p.c)) + geom_histogram(colour = 'black', fill = 'white') +
  annotate('text', x = -1.5, y = 45, label = paste("n =",nrow(subset(TempData_Elser, l.p.c!="NA")))) +
  annotation_custom(grob = Elser_log_P_LRR, xmin = 0.5, xmax = 3.2, ymin = 20, ymax = 45)+
  ggtitle("Elser P LRR")
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

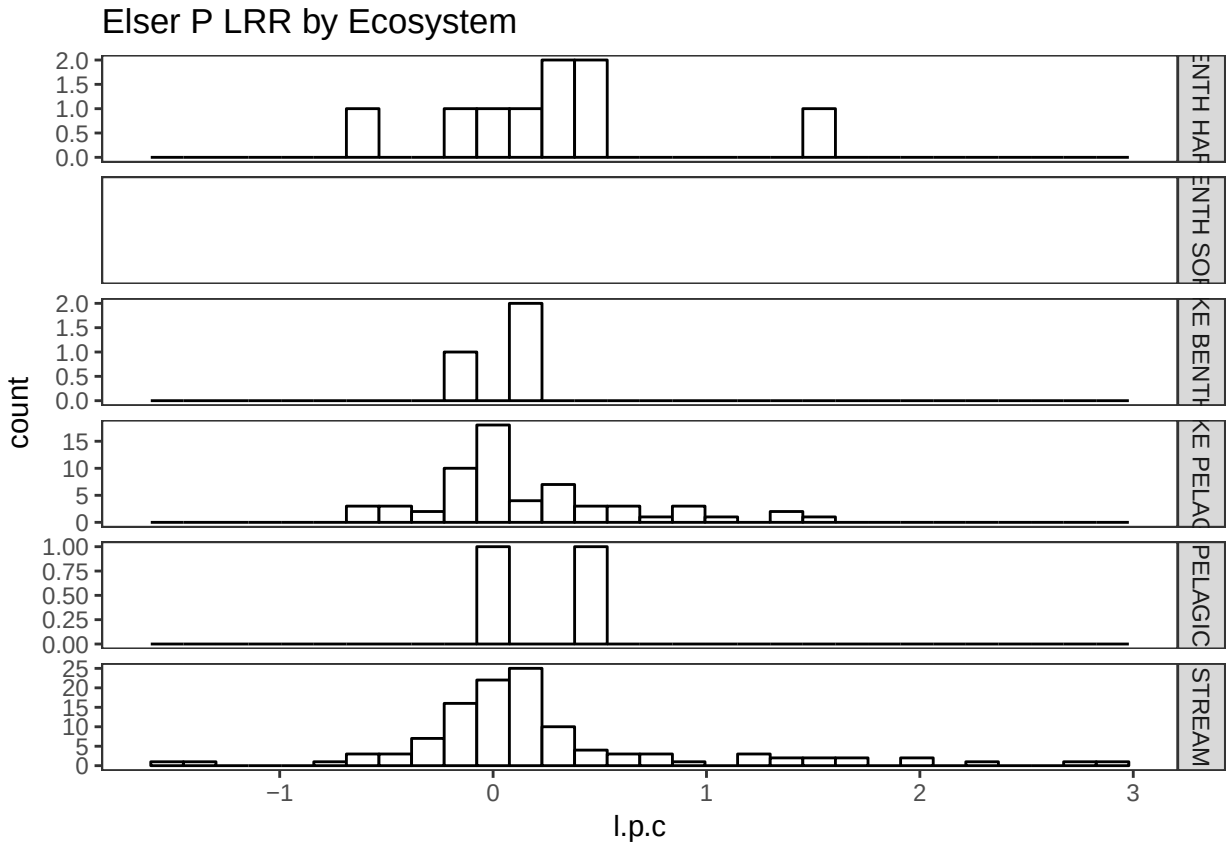
```
## Warning: Removed 124 rows containing non-finite values (stat_bin).
```




```
ggplot(TempData_Elser, aes(x = l.p.c)) + geom_histogram(colour = 'black',fill = 'white') + facet_grid(ca
  ggtitle("Elser P LRR by Ecosystem")
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```
## Warning: Removed 124 rows containing non-finite values (stat_bin).
```




```
# NP_LRR
Elser_log_NP_LRR = ggplotGrob(ggplot(TempData_Elser, aes(x = log10(l.int.c))) + geom_histogram(colour =
```

```
## Warning in FUN(X[[i]], ...): NaNs produced
```

```
## Warning in FUN(X[[i]], ...): NaNs produced
```

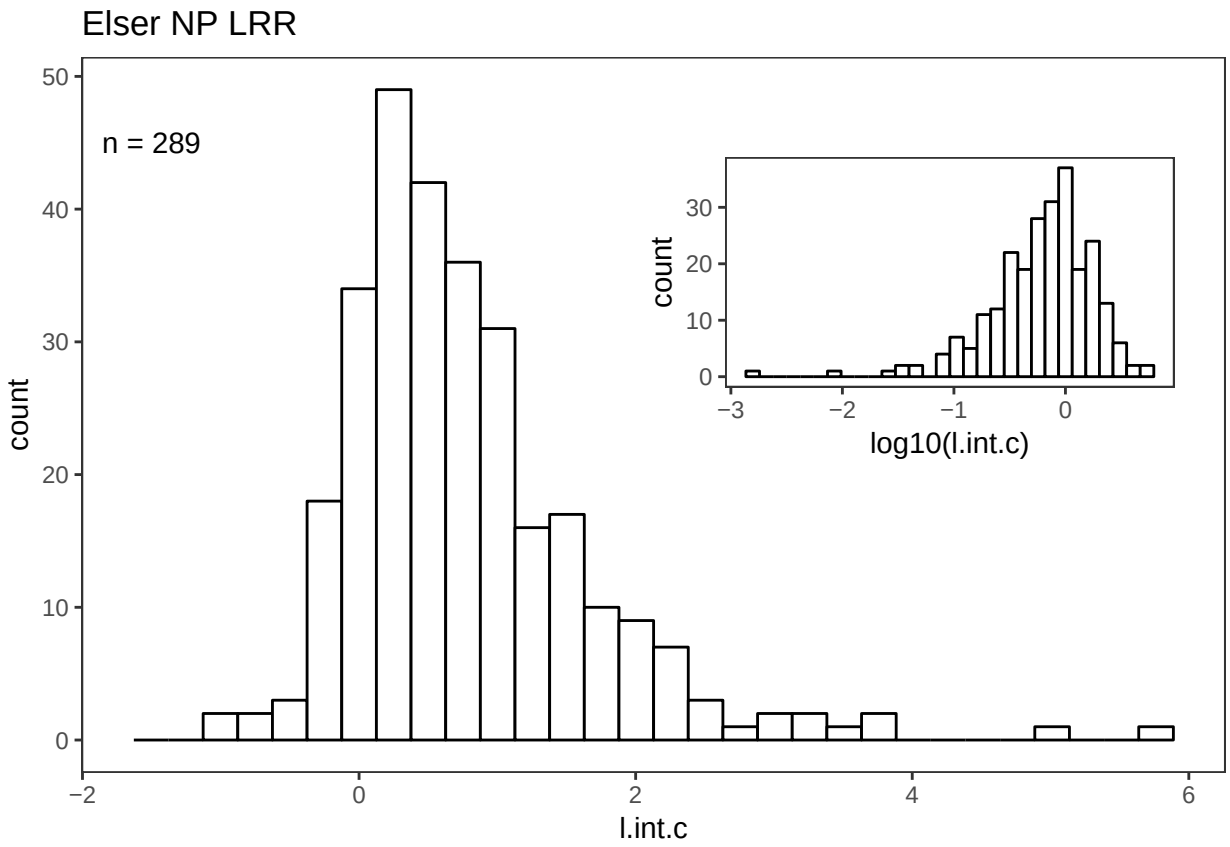
```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```
## Warning: Removed 64 rows containing non-finite values (stat_bin).
```

```
ggplot(TempData_Elser, aes(x = l.int.c)) + geom_histogram(colour = 'black', fill = 'white') +
  annotate('text', x = -1.5, y = 45, label = paste("n =",nrow(subset(TempData_Elser, l.int.c!="NA")))) +
  annotation_custom(grob = Elser_log_NP_LRR, xmin = 2, xmax = 6, ymin = 20, ymax = 45)+
  ggtitle("Elser NP LRR")
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

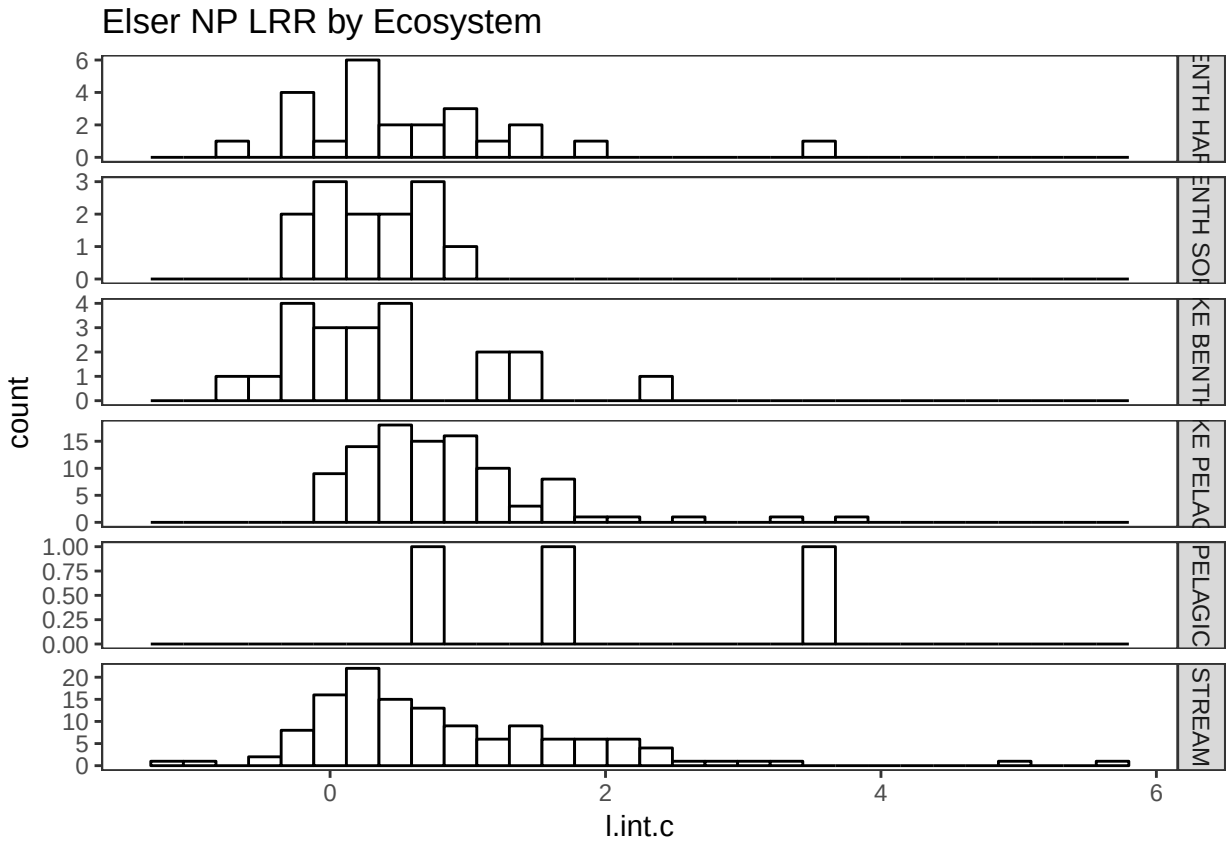
```
## Warning: Removed 24 rows containing non-finite values (stat_bin).
```




```
ggplot(TempData_Elser, aes(x = l.int.c)) + geom_histogram(colour = 'black',fill = 'white') + facet_grid
  ggtitle("Elser NP LRR by Ecosystem")
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

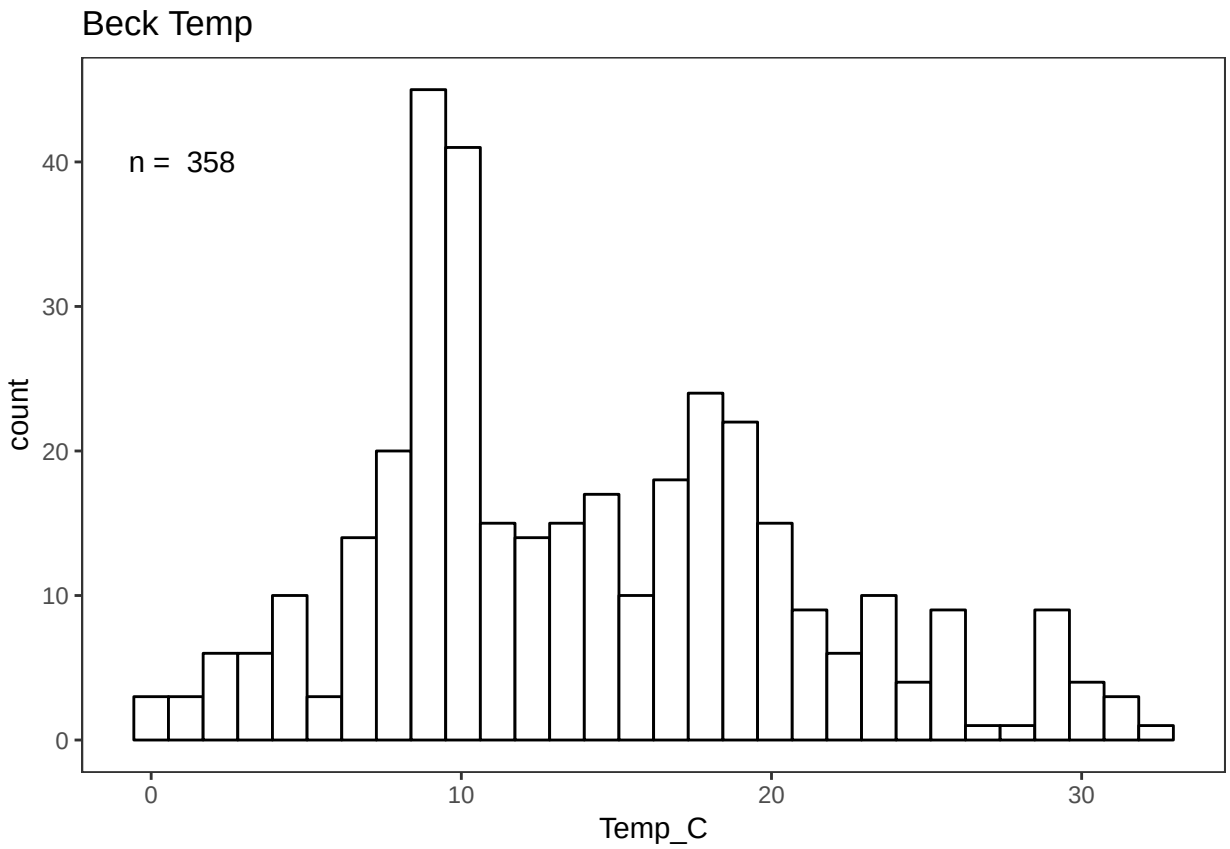
```
## Warning: Removed 24 rows containing non-finite values (stat_bin).
```



Beck Plots from 2) Exploratory script

```
##Beck Plots

#Temp Range

ggplot(TempData_Beck, aes(x = Temp_C)) + geom_histogram(colour = 'black', fill = 'white')+
  annotate('text', x = 1, y = 40,label = paste("n = ", nrow(subset(TempData_Beck, Temp_C!="NA"))))+
  ggtitle("Beck Temp")
```

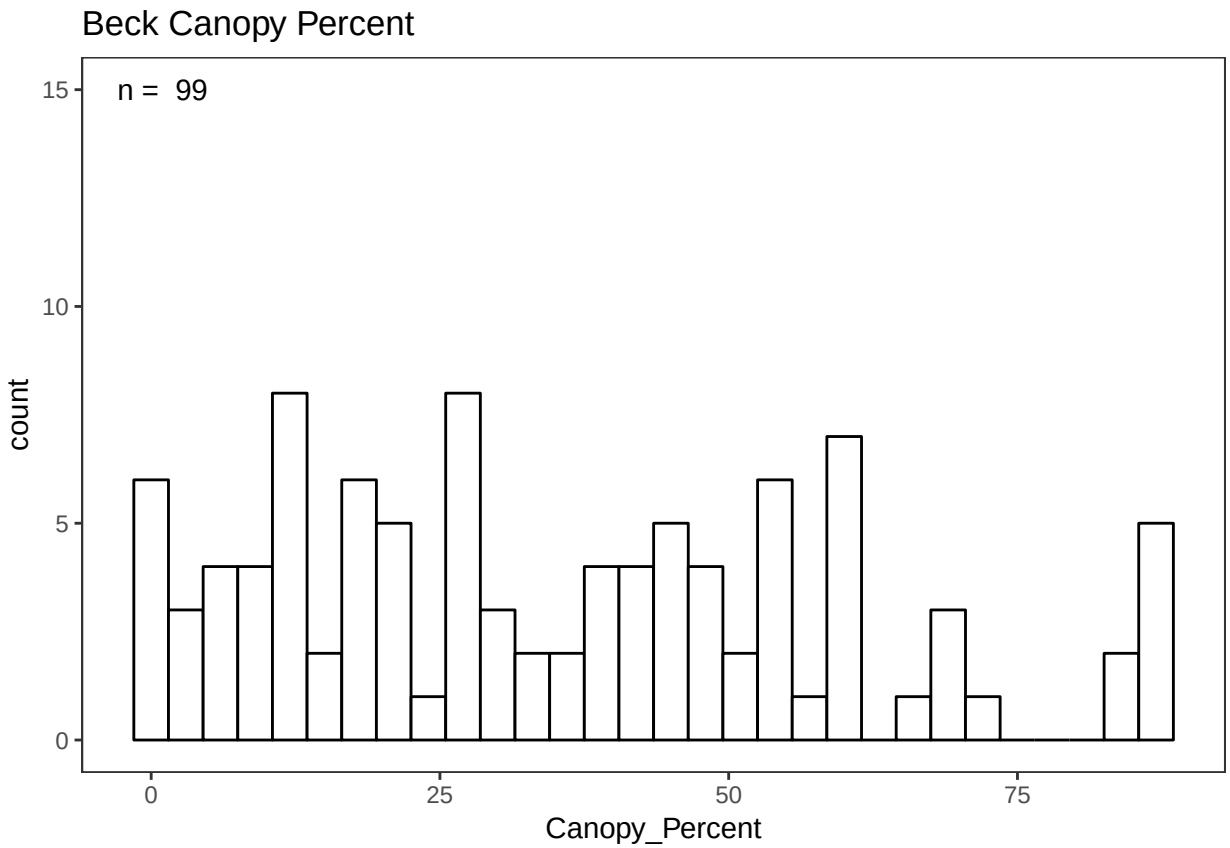
```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```




```
#Canopy % Range

ggplot(TempData_Beck, aes(x = Canopy_Percent)) + geom_histogram(colour = 'black', fill = 'white')+
  annotate('text', x = 1, y = 15,label = paste("n = ", nrow(subset(TempData_Beck, Canopy_Percent!="NA"))
  ggtitle("Beck Canopy Percent")
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```
## Warning: Removed 259 rows containing non-finite values (stat_bin).
```




```
#DIN Range

Beck_log_DIN = ggplotGrob(ggplot(TempData_Beck, aes(x = log10(DIN_ug_L))) + geom_histogram(colour = 'bla
```

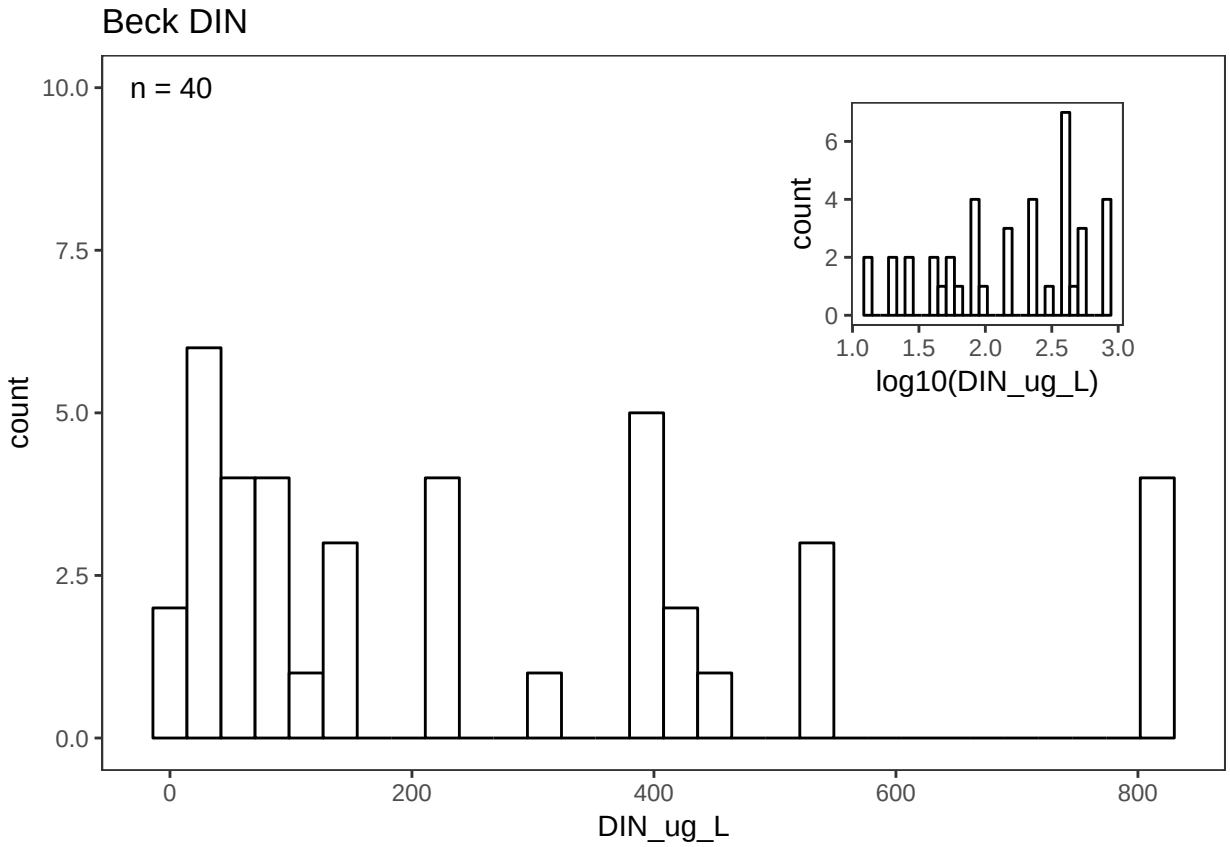
```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```
## Warning: Removed 318 rows containing non-finite values (stat_bin).
```

```
ggplot(TempData_Beck, aes(x = DIN_ug_L)) + geom_histogram(colour = 'black', fill = 'white') +
  annotate('text', x = 1, y = 10, label = paste("n =", nrow(subset(TempData_Beck, DIN_ug_L!="NA")))) +
  annotation_custom(grob = Beck_log_DIN, xmin = 500, xmax = 800, ymin = 5, ymax = 10)+
  ggtitle("Beck DIN")
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```
## Warning: Removed 318 rows containing non-finite values (stat_bin).
```




```
#TN Range

Beck_log_TN = ggplotGrob(ggplot(TempData_Beck, aes(x = log10(TN_mg_L))) + geom_histogram(colour = 'blac
```

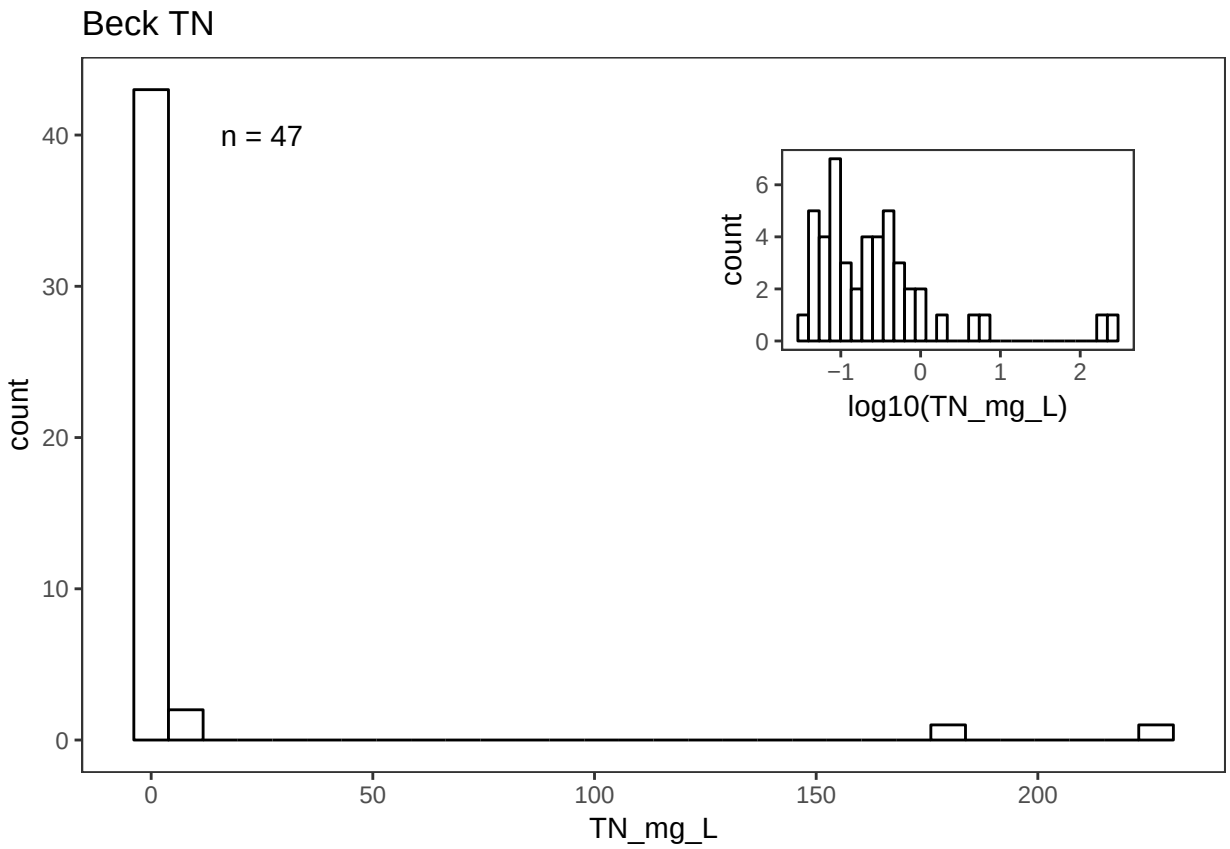
```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```
## Warning: Removed 311 rows containing non-finite values (stat_bin).
```

```
ggplot(TempData_Beck, aes(x = TN_mg_L)) + geom_histogram(colour = 'black', fill = 'white') +
  annotate('text', x = 25, y = 40, label = paste("n =", nrow(subset(TempData_Beck, TN_mg_L!="NA")))) +
  annotation_custom(grob = Beck_log_TN, xmin = 125, xmax = 225, ymin = 20, ymax = 40)+
  ggtitle("Beck TN")
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```
## Warning: Removed 311 rows containing non-finite values (stat_bin).
```




```
#SRP Range

Beck_log_SRP = ggplotGrob(ggplot(TempData_Beck, aes(x = log10(SRP_ug_L))) + geom_histogram(colour = 'bla
```

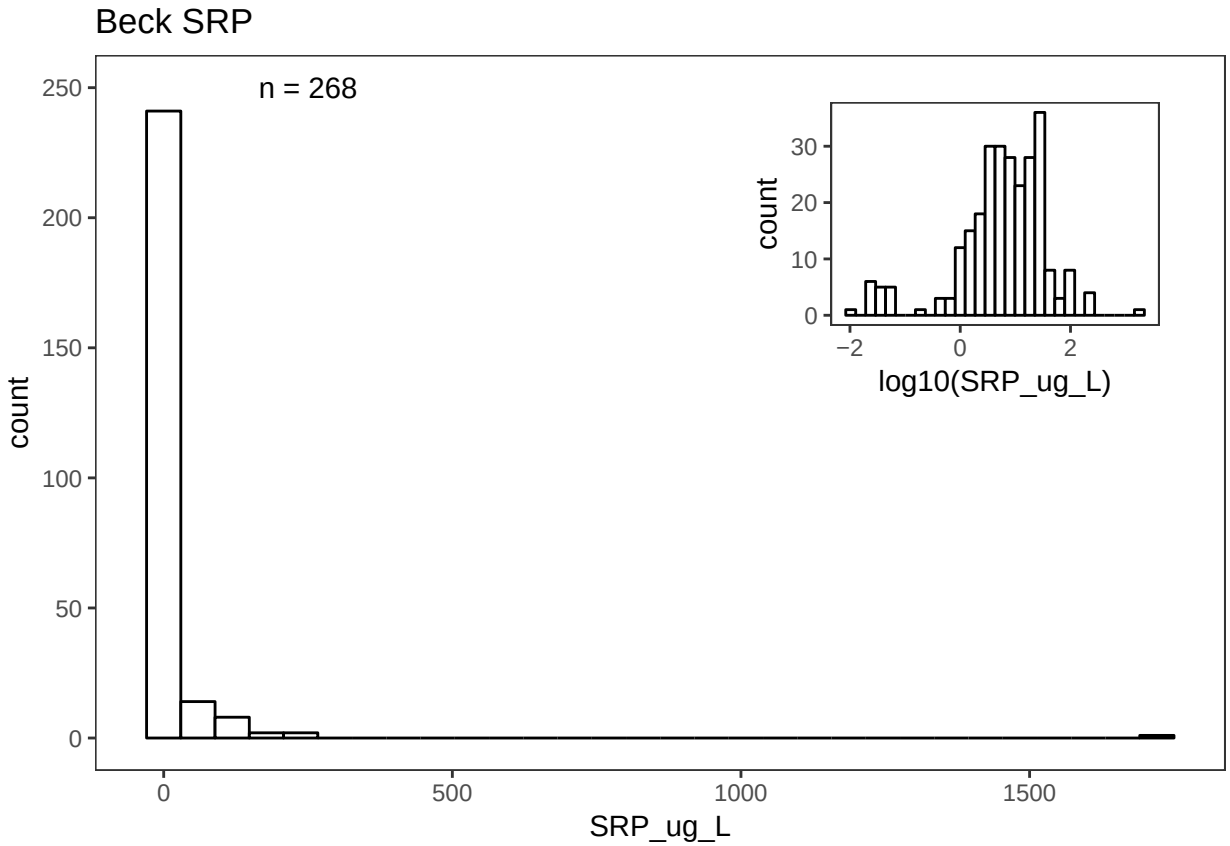
```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```
## Warning: Removed 90 rows containing non-finite values (stat_bin).
```

```
ggplot(TempData_Beck, aes(x = SRP_ug_L)) + geom_histogram(colour = 'black', fill = 'white') +
  annotate('text', x = 250, y = 250, label = paste("n =", nrow(subset(TempData_Beck, SRP_ug_L!="NA"))))
  annotation_custom(grob = Beck_log_SRP, xmin = 1000, xmax = 1750, ymin = 125, ymax = 250)+
  ggtitle("Beck SRP")
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```
## Warning: Removed 90 rows containing non-finite values (stat_bin).
```




```
#TP Range

Beck_log_TP = ggplotGrob(ggplot(TempData_Beck, aes(x = log10(TP_ug_L))) + geom_histogram(colour = 'blac
```

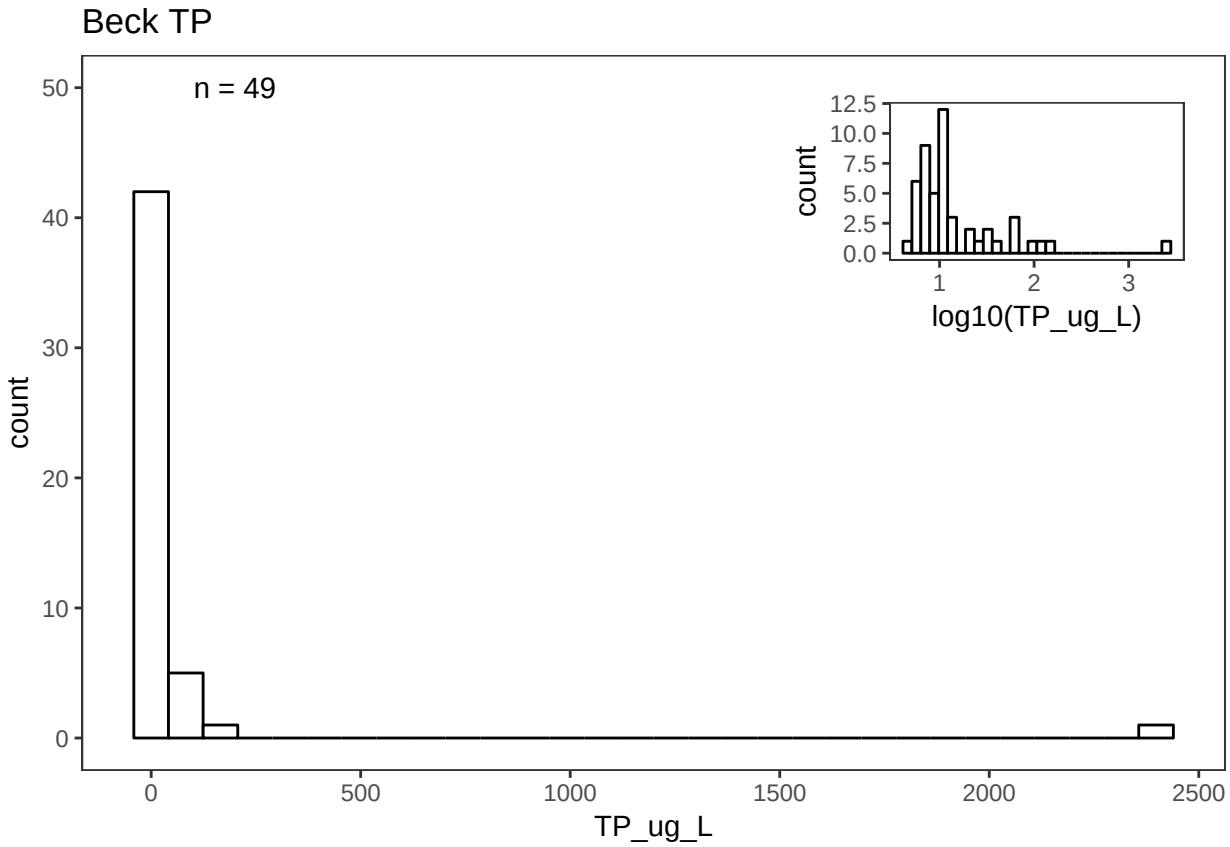
```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```
## Warning: Removed 309 rows containing non-finite values (stat_bin).
```

```
ggplot(TempData_Beck, aes(x = TP_ug_L)) + geom_histogram(colour = 'black', fill = 'white') +
  annotate('text', x = 200, y = 50, label = paste("n =", nrow(subset(TempData_Beck, TP_ug_L!="NA")))) +
  annotation_custom(grob = Beck_log_TP, xmin = 1500, xmax = 2500, ymin = 30, ymax = 50)+
  ggtitle("Beck TP")
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```
## Warning: Removed 309 rows containing non-finite values (stat_bin).
```

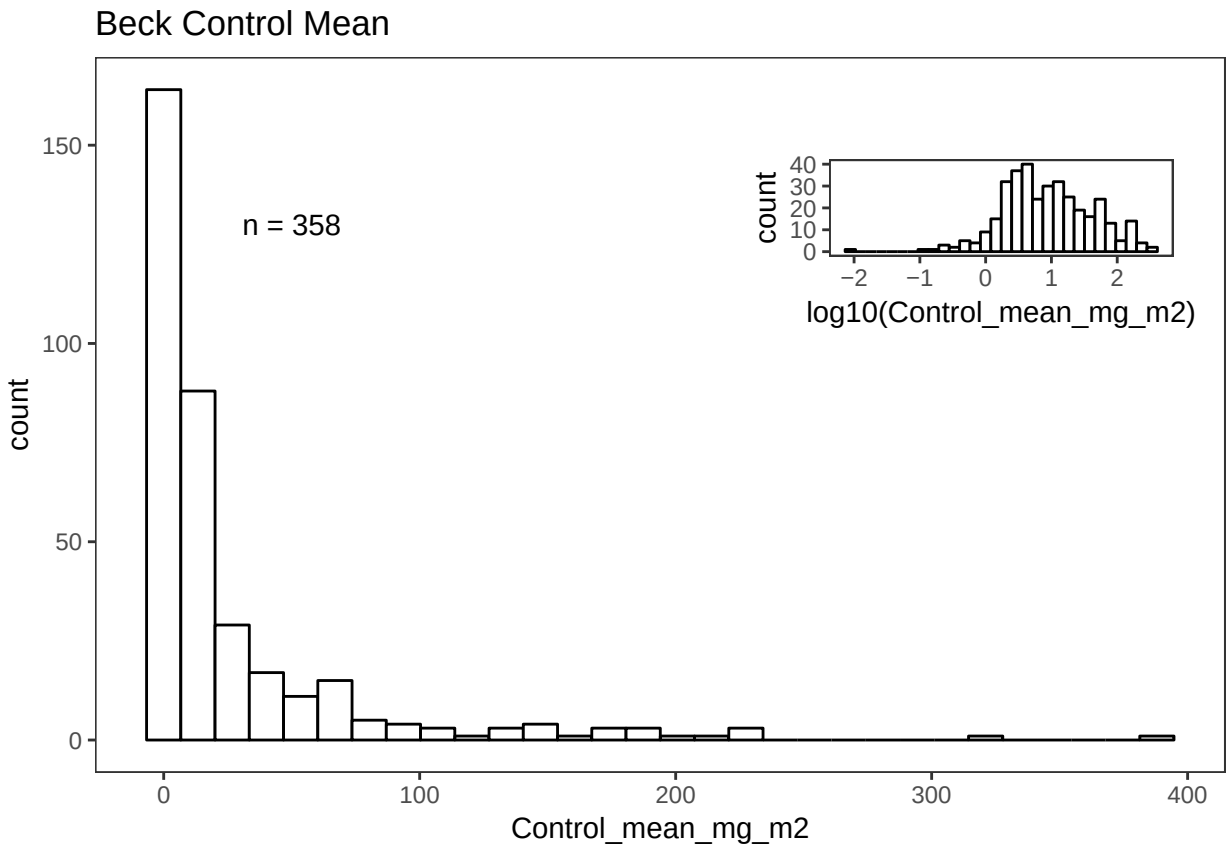



```
#Control mean Range

Beck_Control_Mean = ggplotGrob(ggplot(TempData_Beck, aes(x = log10(Control_mean_mg_m2))) + geom_histogra
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```
ggplot(TempData_Beck, aes(x = Control_mean_mg_m2)) + geom_histogram(colour = 'black', fill = 'white') +
  annotate('text', x = 50, y = 130, label = paste("n =", nrow(subset(TempData_Beck, Control_mean_mg_m2!=
  annotation_custom(grob = Beck_Control_Mean, xmin = 225, xmax = 400, ymin = 100, ymax = 150)+
  ggtitle("Beck Control Mean")
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```




```
#N_LRR Effect Size

Beck_N_LRR_Effect_Size = ggplotGrob(ggplot(TempData_Beck, aes(x = log10(N.LRR.Effect))) + geom_histogra
```

```
## Warning in FUN(X[[i]], ...): NaNs produced
```

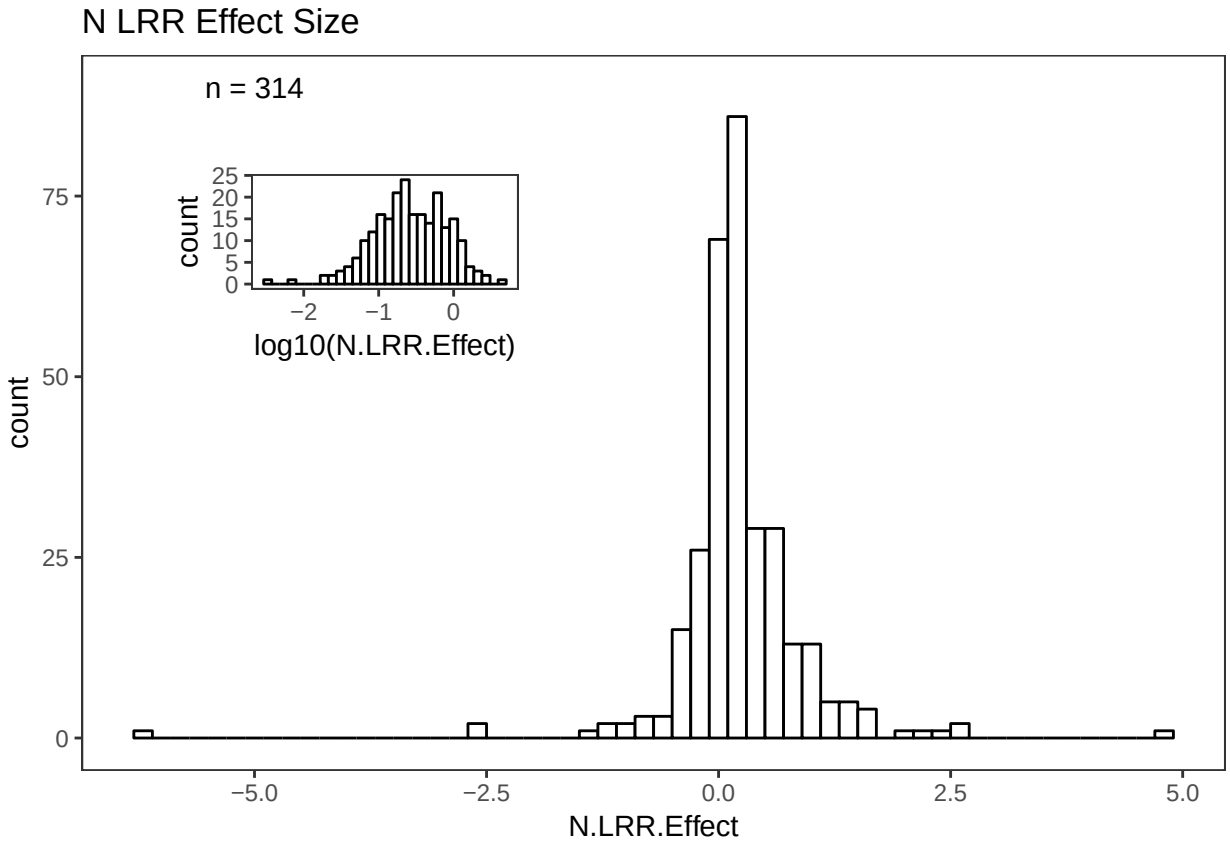
```
## Warning in FUN(X[[i]], ...): NaNs produced
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```
## Warning: Removed 126 rows containing non-finite values (stat_bin).
```

```
ggplot(TempData_Beck, aes(x = N.LRR.Effect)) + geom_histogram(binwidth=0.2, colour = 'black', fill = 'wh
  annotate('text', x = -5, y = 90, label = paste("n =", nrow(subset(TempData_Beck, N.LRR.Effect!="NA"))))
  annotation_custom(grob = Beck_N_LRR_Effect_Size, xmin = -6, xmax = -2, ymin = 50, ymax = 80)+
  ggtitle("N LRR Effect Size")
```

```
## Warning: Removed 44 rows containing non-finite values (stat_bin).
```




```
#P_LRR Effect Size

Beck_P_LRR_Effect_Size = ggplotGrob(ggplot(TempData_Beck, aes(x = log10(P.LRR.Effect))) + geom_histogra
```

```
## Warning in FUN(X[[i]], ...): NaNs produced
```

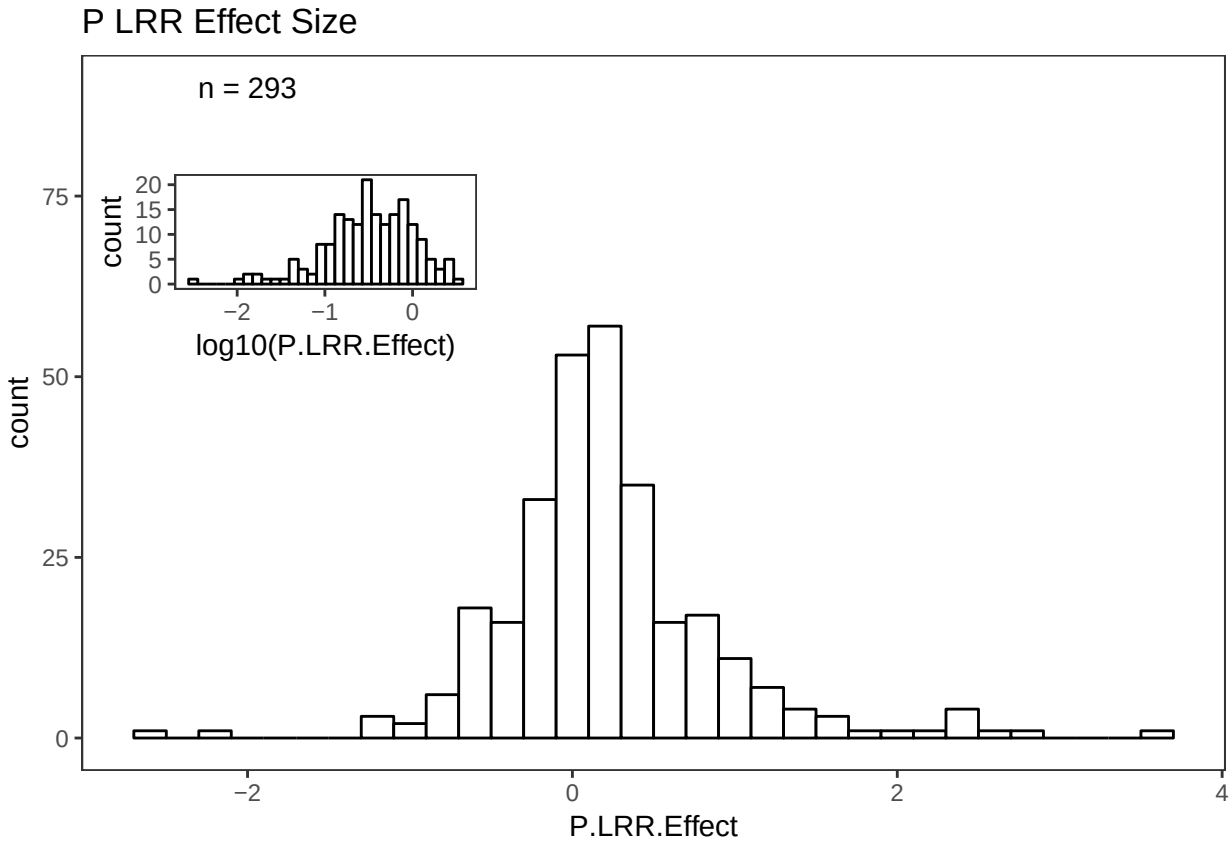
```
## Warning in FUN(X[[i]], ...): NaNs produced
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```
## Warning: Removed 171 rows containing non-finite values (stat_bin).
```

```
ggplot(TempData_Beck, aes(x = P.LRR.Effect)) + geom_histogram(binwidth=0.2, colour = 'black', fill = 'wh
  annotate('text', x = -2, y = 90, label = paste("n =", nrow(subset(TempData_Beck, P.LRR.Effect!="NA")))
  annotation_custom(grob = Beck_P_LRR_Effect_Size, xmin = -3, xmax = -0.5, ymin = 50, ymax = 80)+
  ggtitle("P LRR Effect Size")
```

```
## Warning: Removed 65 rows containing non-finite values (stat_bin).
```




```
#P_LRR Effect Size

Beck_NP_LRR_Effect_Size = ggplotGrob(ggplot(TempData_Beck, aes(x = log10(NP.LRR))) + geom_histogram(col
```

```
## Warning in FUN(X[[i]], ...): NaNs produced
```

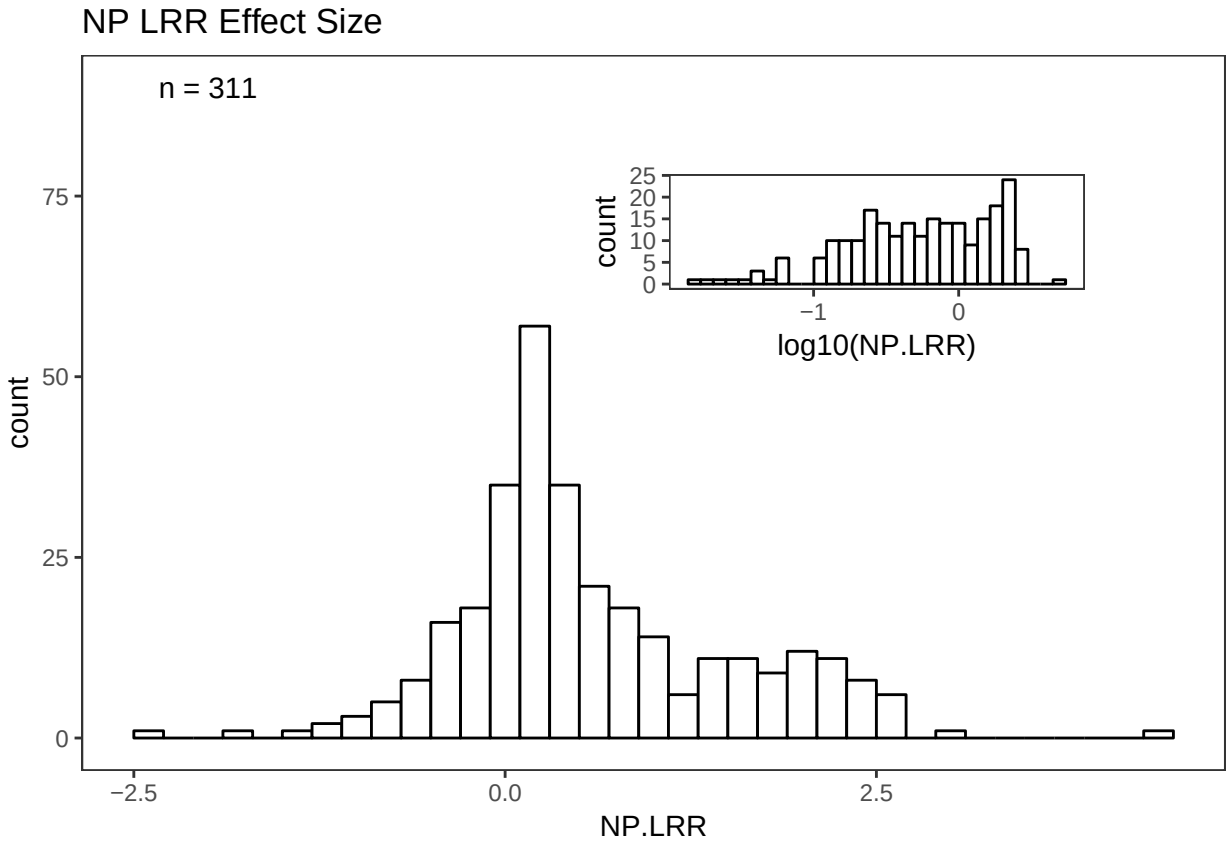
```
## Warning in FUN(X[[i]], ...): NaNs produced
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```
## Warning: Removed 122 rows containing non-finite values (stat_bin).
```

```
ggplot(TempData_Beck, aes(x = NP.LRR)) + geom_histogram(binwidth=0.2, colour = 'black', fill = 'white')
  annotate('text', x = -2, y = 90, label = paste("n =", nrow(subset(TempData_Beck, NP.LRR!="NA")))) +
  annotation_custom(grob = Beck_NP_LRR_Effect_Size, xmin = 0.5, xmax = 4, ymin = 50, ymax = 80)+
  ggtitle("NP LRR Effect Size")
```

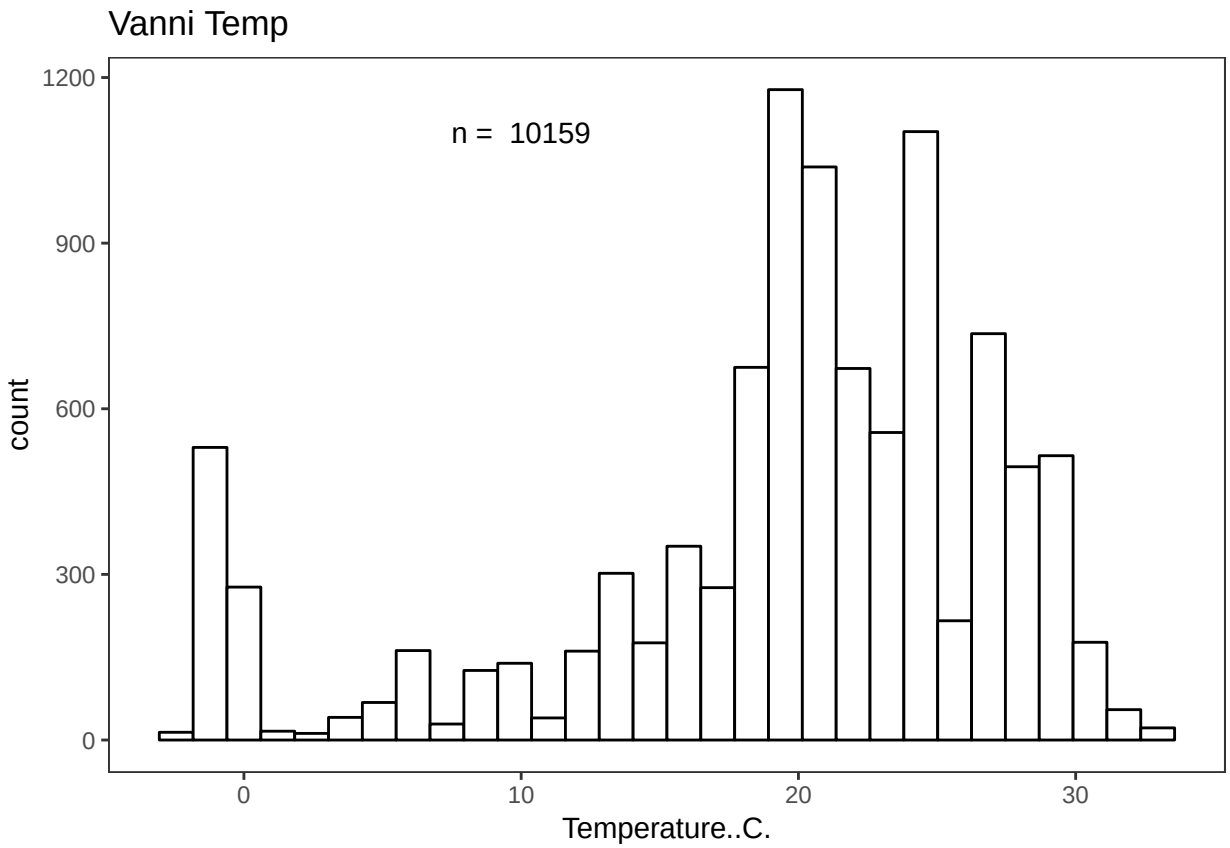
```
## Warning: Removed 47 rows containing non-finite values (stat_bin).
```



Vanni Plots from 2) Exploratory script

```
#Temp Range

ggplot(TempData_Vanni, aes(x = Temperature..C.)) + geom_histogram(colour = 'black', fill = 'white')+
  annotate('text', x = 10, y = 1100,label = paste("n = ", nrow(subset(TempData_Vanni, Temperature..C.!=
  ggtitle("Vanni Temp")
```

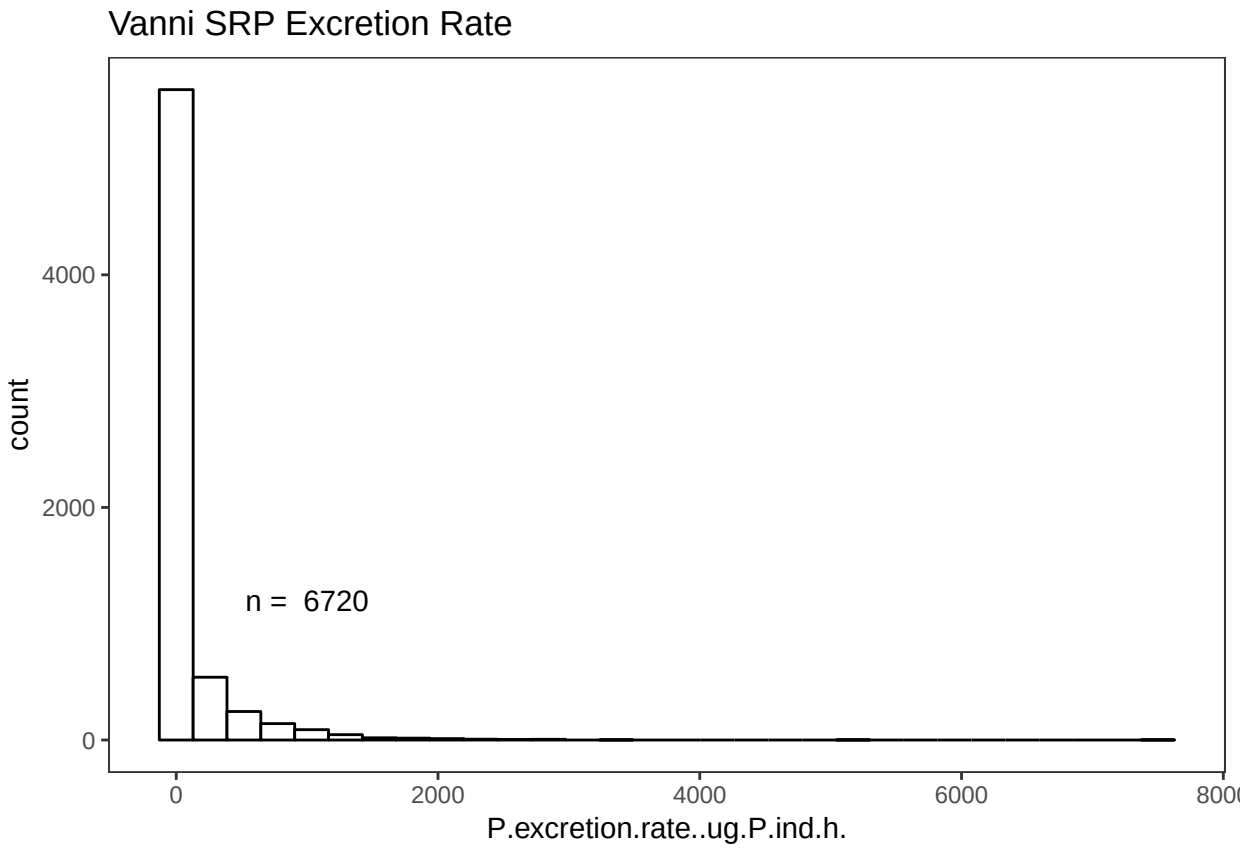
```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```




```
#Excretion SRP

ggplot(subset(TempData_Vanni, P.form=="SRP"), aes(x = P.excretion.rate..ug.P.ind.h.)) + geom_histogram(
  annotate('text', x = 1000, y = 1200,label = paste("n = ", nrow(subset(TempData_Vanni, P.form=="SRP"& I
  ggtitle("Vanni SRP Excretion Rate")
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

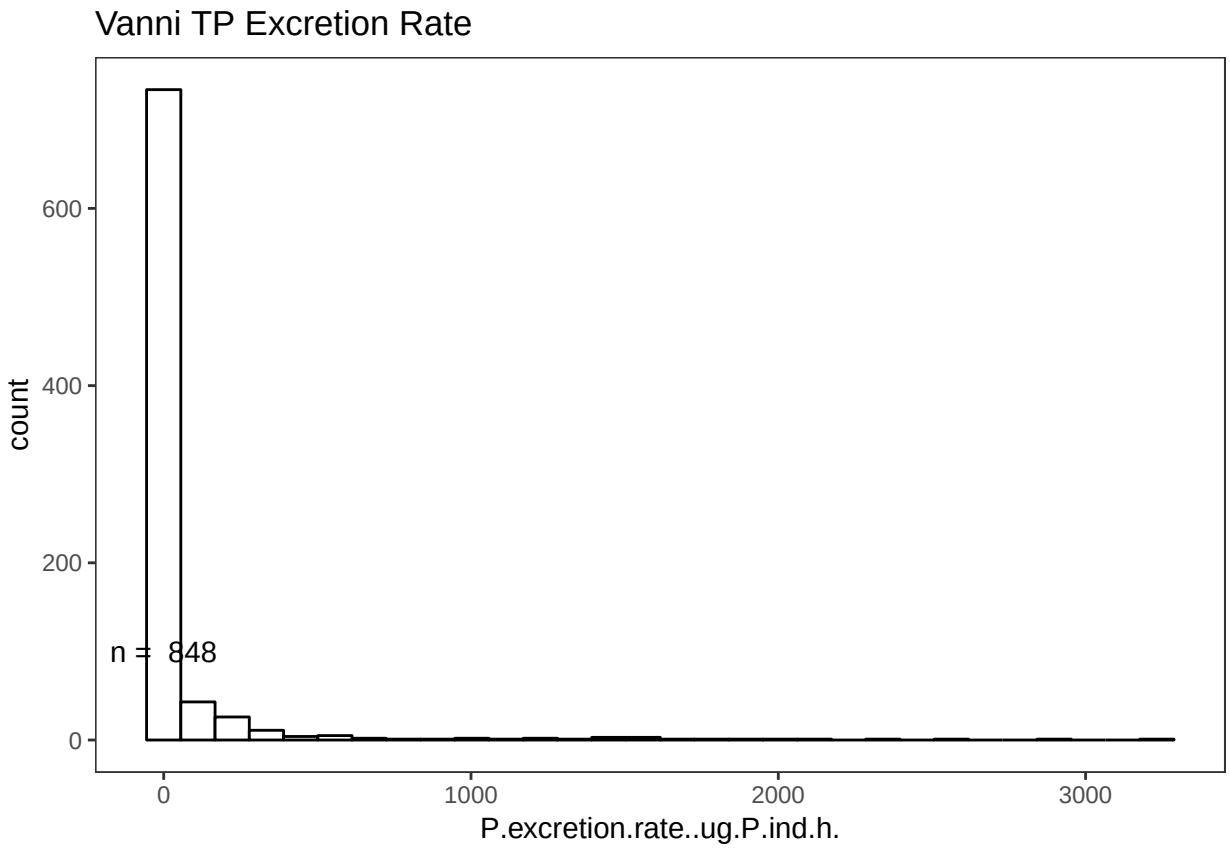
```
## Warning: Removed 1016 rows containing non-finite values (stat_bin).
```




```
#Excretion TP

ggplot(subset(TempData_Vanni, P.form=="TP"), aes(x = P.excretion.rate..ug.P.ind.h.)) + geom_histogram(co
  annotate('text', x = 0, y = 100,label = paste("n = ", nrow(subset(TempData_Vanni, P.form=="TP"& P.exc
  ggtitle("Vanni TP Excretion Rate")
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

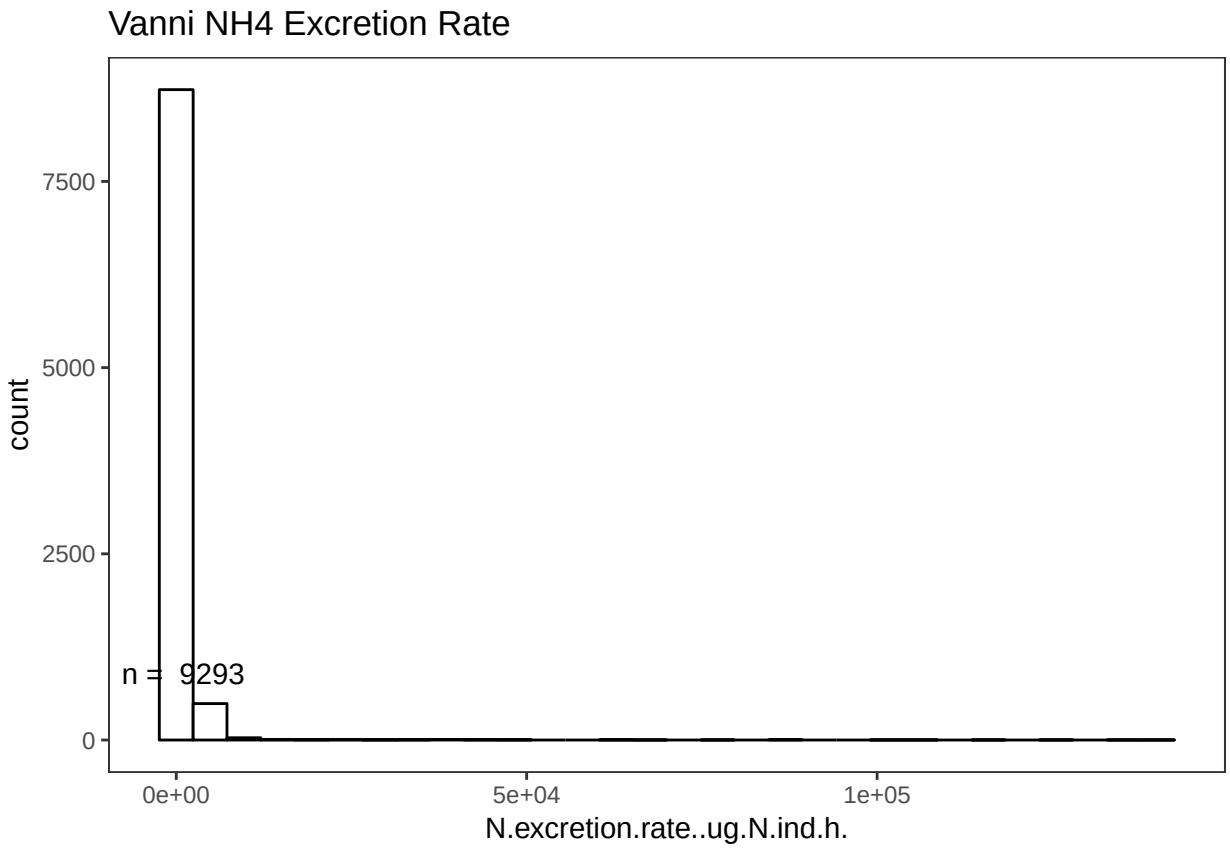
```
## Warning: Removed 17 rows containing non-finite values (stat_bin).
```




```
#Excretion Ammonium

ggplot(subset(TempData_Vanni, N.form=="NH4"), aes(x = N.excretion.rate..ug.N.ind.h.)) + geom_histogram(
  annotate('text', x = 1000, y = 900,label = paste("n = ", nrow(subset(TempData_Vanni, N.form=="NH4" &N
  ggtitle("Vanni NH4 Excretion Rate")
```

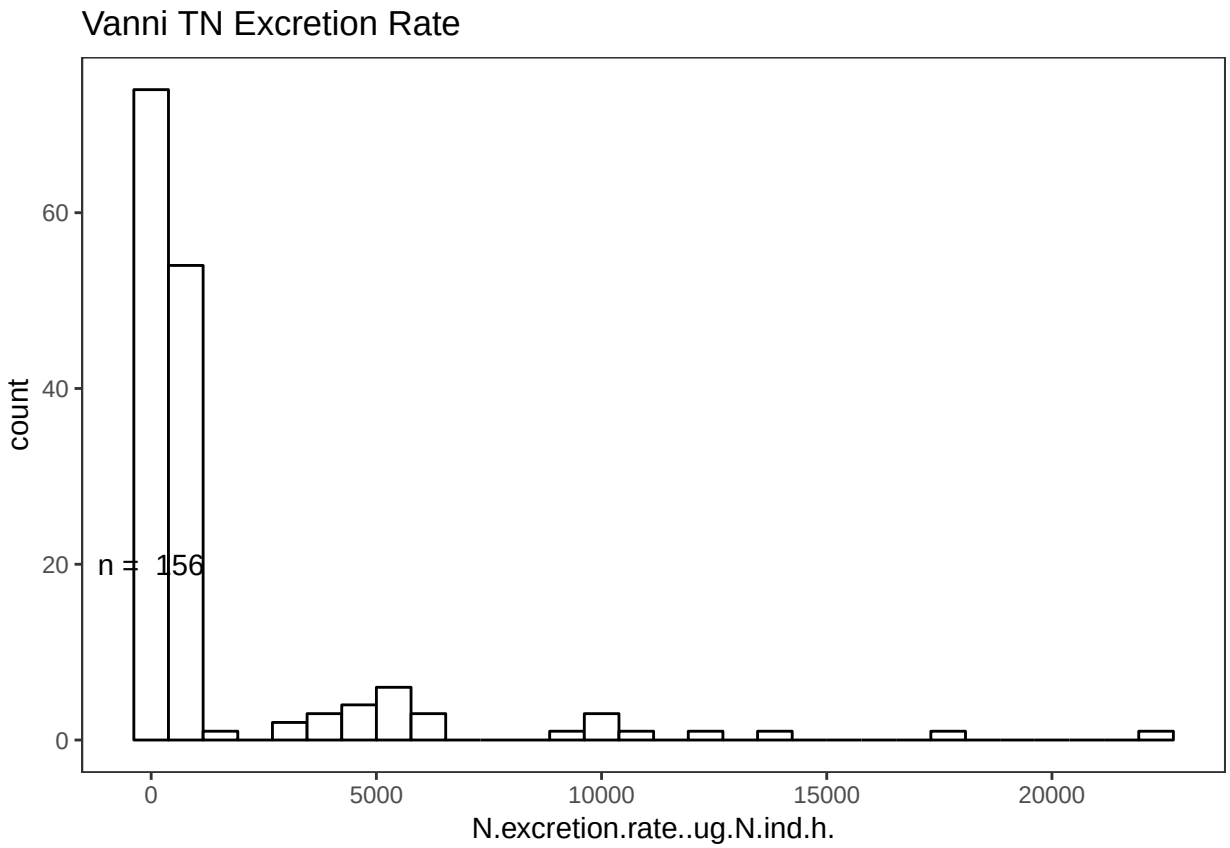
```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```
## Warning: Removed 250 rows containing non-finite values (stat_bin).
```

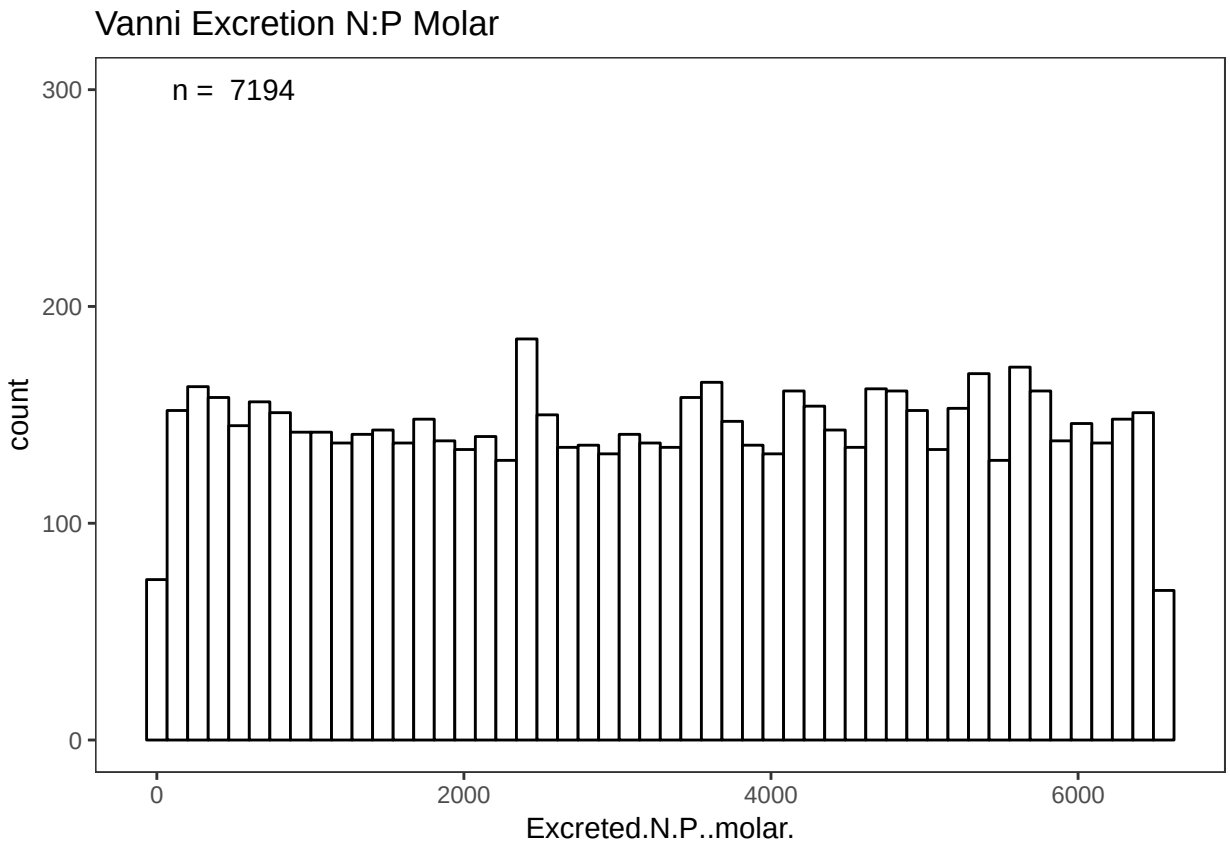



```
#Excretion TN

ggplot(subset(TempData_Vanni, N.form=="TN"), aes(x = N.excretion.rate..ug.N.ind.h.)) + geom_histogram(c
  annotate('text', x = 0, y = 20,label = paste("n = ", nrow(subset(TempData_Vanni, N.form=="TN" &N.excr
  ggtitle("Vanni TN Excretion Rate")
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```




```
#Excretion N:P (If N excretion or P excretion was NA, value was calculated as "1",
#so only included values >1)

ggplot(subset(TempData_Vanni, Excreted.N.P..molar.>1), aes(x = Excreted.N.P..molar.)) + geom_histogram(
  annotate('text', x = 500, y = 300,label = paste("n = ", nrow(subset(TempData_Vanni, Excreted.N.P..mola
    ggtitle("Vanni Excretion N:P Molar")
```


Vanni Excretion N:P Molar
n = 7194
count
300
200
100
0
0
2000
4000
6000
Excreted.N.P..molar.