NMDS-May

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NMDS Exploratory Analysis For May Habitat Sites

Data Input

Schema

- Canopy
- Shelter
- Vol
- Max_temp
- Max_DO
- Max_vel
- Max_RCTdepth

```
# Load Packages
library(tidyverse)
library(vegan)
library(lubridate)
# Set Working Directory
setwd("/Users/jiashuchen/salmon-research/sp23-salmon-research/analysis")
```

```
# Load Data Sets
lag21_hab_may_oct <- read_csv("LAG21_Habitat_May_Oct.csv")
lag21_shelter <- read_csv("LAG21_InstreamShelter.csv")

#Filter to retain only May sites
#Clean up data, calculate Vol, max_temp, max_do, max_vel, max_rctdepth
lag21_hab_may_oct[7, 2] = '02/05/21'
```

```r
#Remove space and parentheses
names(lag21_hab_may_oct)<-str_replace_all(names(lag21_hab_may_oct), c(" " = "", "\\(DD/MM/
#Remove space and parentheses
names(lag21_shelter)<-str_replace_all(names(lag21_shelter), c(" " = "", "\\(0\\-3\\)" = ""

#Clean up data and select useful data columns
###Replaced na with 0###
clean_lag21_hab_shelter <- lag21_hab_may_oct  %>%
  drop_na(Date) %>%
  mutate(Date = dmy(Date)) %>%
  filter(month(Date) == 5) %>%
  rowwise() %>%
  mutate(Max_vel = max(c_across(c(Vel0_ms,
                                  Vel1_ms,
                                  Vel2_ms,
                                  Vel3_ms,
                                  Vel4_ms,
                                  Vel5_ms)),
                       na.rm = T)) %>%
  mutate(across(c(Width3_m, Length_m), as.double)) %>%
  mutate(Median_width_m = median(c_across(c(Width0_m,
                                    Width1_m,
                                    Width2_m,
                                    Width3_m,
                                    Width4_m,
                                    Width5_m)),
                           na.rm = T)) %>%
  mutate(Median_depth_m = median(c_across(c(Depth0_cm,
                                    Depth1_cm,
                                    Depth2_cm,
                                    Depth3_cm,
                                    Depth4_cm,
                                    Depth5_cm)),
                           na.rm = T) / 100) %>%
  mutate(Vol_m3 = Length_m * Median_depth_m * Median_width_m) %>%
  inner_join(lag21_shelter,
             by = join_by(SiteName == SiteName),
             suffix = c('.hab', '.shelter')) %>%
  mutate(canopy_total = Canopy_Head + Canopy_Mid,
         DO_Percent = as.double(DO_Percent),
         Temperature_C = as.double(Temperature_C)) %>%
```

```
  select(SiteName, Date, Shelter_Value,
         Vol_m3, Temperature_C, DO_Percent,
         Max_vel, RCTdepth_cm) %>%
  mutate_all(~replace_na(., 0))
view(clean_lag21_hab_shelter)
```

```
#Random Initial Placement NMDS
#Shuffle rows
clean_lag21_hab_shelter <- clean_lag21_hab_shelter[sample(nrow(clean_lag21_hab_shelter)),]
nmds_lag21 <- clean_lag21_hab_shelter %>%
  select(-c(SiteName, Date)) %>%
  metaMDS(distance = "bray", k = 3, trymax = 200, plot = F)
```

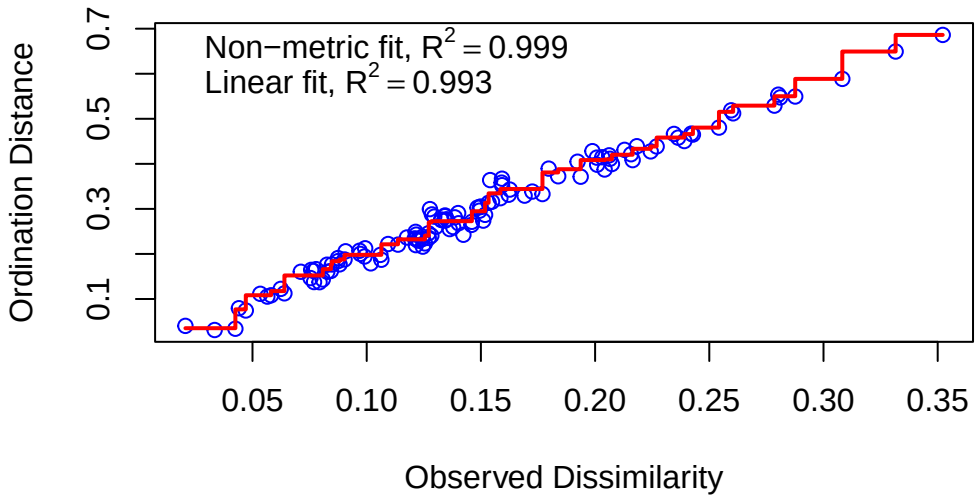
```
Square root transformation
Wisconsin double standardization
Run 0 stress 0.03316198
Run 1 stress 0.03422316
Run 2 stress 0.03316314
... Procrustes: rmse 0.0004776574  max resid 0.0009939718
... Similar to previous best
Run 3 stress 0.03610295
Run 4 stress 0.03316211
... Procrustes: rmse 0.0001277601  max resid 0.0002332293
... Similar to previous best
Run 5 stress 0.03316205
... Procrustes: rmse 8.026644e-05  max resid 0.000146333
... Similar to previous best
Run 6 stress 0.03316202
... Procrustes: rmse 0.0001225201  max resid 0.0002280097
... Similar to previous best
Run 7 stress 0.03422317
Run 8 stress 0.03422312
Run 9 stress 0.03422317
Run 10 stress 0.03316199
... Procrustes: rmse 1.766628e-05  max resid 3.52396e-05
... Similar to previous best
Run 11 stress 0.03316204
... Procrustes: rmse 7.29202e-05  max resid 0.0001280324
... Similar to previous best
Run 12 stress 0.03316211
... Procrustes: rmse 0.0001081005  max resid 0.0002114967
```

```
... Similar to previous best
Run 13 stress 0.03316211
... Procrustes: rmse 0.000123386  max resid 0.0002701204
... Similar to previous best
Run 14 stress 0.03422314
Run 15 stress 0.03610332
Run 16 stress 0.03316213
... Procrustes: rmse 0.0002770844  max resid 0.0006250494
... Similar to previous best
Run 17 stress 0.03316202
... Procrustes: rmse 5.2082e-05  max resid 8.541229e-05
... Similar to previous best
Run 18 stress 0.03316205
... Procrustes: rmse 0.0002133991  max resid 0.0004521205
... Similar to previous best
Run 19 stress 0.0361033
Run 20 stress 0.03422304
*** Best solution repeated 11 times
```

```
nmds_lag21
```

```

Call:
metaMDS(comm = ., distance = "bray", k = 3, trymax = 200, plot = F)

global Multidimensional Scaling using monoMDS

Data:     wisconsin(sqrt(.))
Distance: bray

Dimensions: 3
Stress:     0.03316198
Stress type 1, weak ties
Best solution was repeated 11 times in 20 tries
The best solution was from try 0 (metric scaling or null solution)
Scaling: centring, PC rotation, halfchange scaling
Species: expanded scores based on 'wisconsin(sqrt(.))'
```

```
stressplot(nmds_lag21)
```




```
ordiplot(nmds_lag21)
```