Univariate Assignment

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```
library(car)
```

```
## Warning: package 'car' was built under R version 3.5.3
```

```
## Loading required package: carData
```

```
## Warning: package 'carData' was built under R version 3.5.3
```

```
library(ggplot2)
```

```
## Warning: package 'ggplot2' was built under R version 3.5.3
```

```
library(gridExtra)
```

```
## Warning: package 'gridExtra' was built under R version 3.5.3
```

```
library(scatterplot3d)
```

```
## Warning: package 'scatterplot3d' was built under R version 3.5.2
```

```
library(MASS)
```

```
## Warning: package 'MASS' was built under R version 3.5.3
```

```
trees <- read.csv('https://raw.githubusercontent.com/dmcglinn/quant_methods/gh-pages/data/treeda
ta_subset.csv')
head(trees)
```

```
##         plotID  spcode       species cover elev       tci streamdist
## 1 ATBN-01-0403 ABIEFRA Abies fraseri     1 1660  5.701460      490.9
## 2 ATBN-01-0532 ABIEFRA Abies fraseri     8 1712  3.823586      454.0
## 3 ATBN-01-0533 ABIEFRA Abies fraseri     3 1722  3.893762      453.4
## 4 ATBN-01-0536 ABIEFRA Abies fraseri     3 1754  3.145527      492.5
## 5 FRID-01-0003 ABIEFRA Abies fraseri     5 1570 11.850000        0.0
## 6 PITT-01-0045 ABIEFRA Abies fraseri     2 1504  4.373741      237.1
##   disturb     beers
## 1 CORPLOG 0.2244286
## 2  VIRGIN 0.8340878
## 3  LT-SEL 1.3332586
## 4  SETTLE 1.4712484
## 5  LT-SEL 0.4961189
## 6  VIRGIN 1.6558421
```

```
dim(trees)
```

```
## [1] 8038    9
```

```
summary(trees)
```

```
##           plotID         spcode                        species    
##  UFRL-02-0160:  62   ACERRUB: 723   Acer rubrum            : 723  
##  UFRL-01-0090:  58   TSUGCAN: 653   Tsuga canadensis       : 653  
##  UFRL-01-0091:  56   QUERRUB: 556   Quercus rubra          : 556  
##  UFRL-01-0093:  54   LIRITUL: 469   Liriodendron tulipifera: 469  
##  UFRL-02-0164:  54   NYSSSYL: 422   Nyssa sylvatica        : 422  
##  UFRL-02-0177:  54   MAGNFRA: 382   Magnolia fraseri       : 382  
##  (Other)     :7700   (Other):4833   (Other)                :4833  
##      cover             elev             tci           streamdist    
##  Min.   : 1.000   Min.   : 266.7   Min.   : 2.610   Min.   :  0.00  
##  1st Qu.: 2.000   1st Qu.: 592.6   1st Qu.: 4.567   1st Qu.: 76.16  
##  Median : 4.000   Median : 791.4   Median : 5.254   Median :198.00  
##  Mean   : 3.959   Mean   : 849.8   Mean   : 5.840   Mean   :229.50  
##  3rd Qu.: 6.000   3rd Qu.:1061.0   3rd Qu.: 6.418   3rd Qu.:340.60  
##  Max.   :10.000   Max.   :1992.0   Max.   :25.000   Max.   :957.50  
##                                                                     
##     disturb         beers         
##  CORPLOG:1501   Min.   :0.000106  
##  LT-SEL :3924   1st Qu.:0.317933  
##  SETTLE :1299   Median :1.089389  
##  VIRGIN :1314   Mean   :1.029020  
##                 3rd Qu.:1.685997  
##                 Max.   :1.999999  
## 
```

```
str(trees)
```

```
## 'data.frame':    8038 obs. of  9 variables:
##  $ plotID    : Factor w/ 734 levels "ATBN-01-0303",..: 20 53 54 56 109 188 452 471 471 471
...
##  $ spcode    : Factor w/ 52 levels "ABIEFRA","ACERNEG",..: 1 1 1 1 1 1 1 1 1 1 ...
##  $ species   : Factor w/ 51 levels "Abies fraseri",..: 1 1 1 1 1 1 1 1 1 1 ...
##  $ cover     : int  1 8 3 3 5 2 4 8 8 5 ...
##  $ elev      : num  1660 1712 1722 1754 1570 ...
##  $ tci       : num  5.7 3.82 3.89 3.15 11.85 ...
##  $ streamdist: num  491 454 453 492 0 ...
##  $ disturb   : Factor w/ 4 levels "CORPLOG","LT-SEL",..: 1 4 2 3 2 4 4 4 4 4 ...
##  $ beers     : num  0.224 0.834 1.333 1.471 0.496 ...
```

```
mean.trees <- with(trees, tapply(X = cover, INDEX = species, FUN = mean))
any(is.na(trees))
```

```
## [1] FALSE
```

```
agg.trees <- aggregate(cbind(cover, elev, tci, streamdist, disturb, beers) ~ species, mean, data
=trees)
head(agg.trees)
```

```
##                  species    cover     elev      tci streamdist  disturb
## 1          Abies fraseri 6.022727 1832.932 5.543887   486.7091 3.818182
## 2           Acer negundo 3.500000  430.900 8.371854    56.0550 2.500000
## 3            Acer nigrum 5.000000  678.000 4.215001   600.8000 1.000000
## 4            Acer rubrum 5.132780  857.595 5.836534   218.6932 2.271093
## 5    Ailanthus altissima 9.000000  266.700 9.187430   645.6000 2.000000
## 6 Betula alleghaniensis 4.897361 1223.166 6.117989   242.7621 2.381232
##       beers
## 1 1.2581966
## 2 0.3125636
## 3 1.9955941
## 4 1.0243090
## 5 0.9961008
## 6 1.2930917
```

```
A.fras <- subset(trees, agg.trees$species == "Abies fraseri", select = -c(plotID, spcode, specie
s))
A.rub <- subset(trees, agg.trees$species == "Acer rubrum", select = -c(plotID, spcode, species))
```

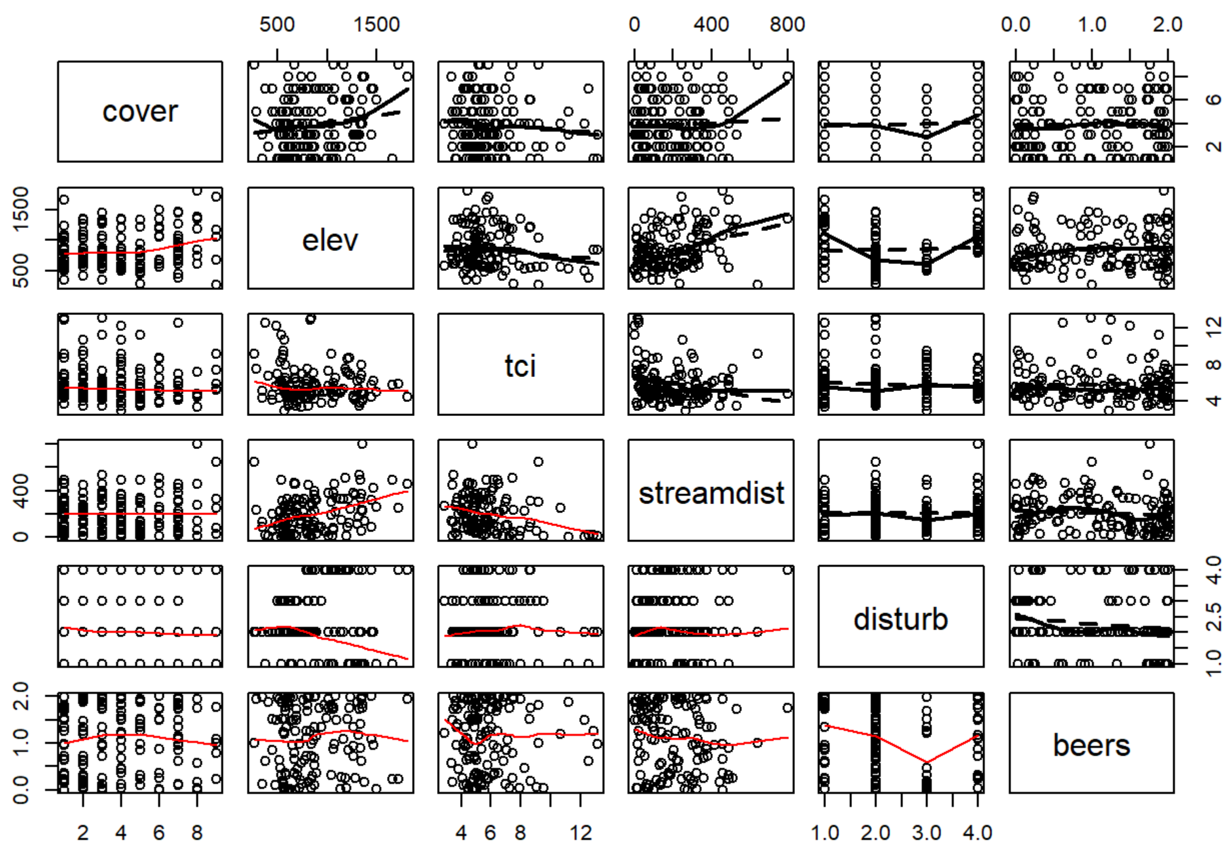
```
head(A.fras)
```

```
##     cover   elev      tci streamdist disturb     beers
## 1       1 1660.0 5.701460     490.90 CORPLOG 0.2244286
## 52      5  477.0 5.587310     134.20  LT-SEL 0.1009244
## 103     8  746.2 3.340252     141.40 CORPLOG 0.5675920
## 154     2 1145.0 5.125635     152.30  VIRGIN 0.2658602
## 205     7  613.4 4.983655      36.06  LT-SEL 1.8583102
## 256     7  750.6 7.009051     301.50  LT-SEL 0.1292216
```

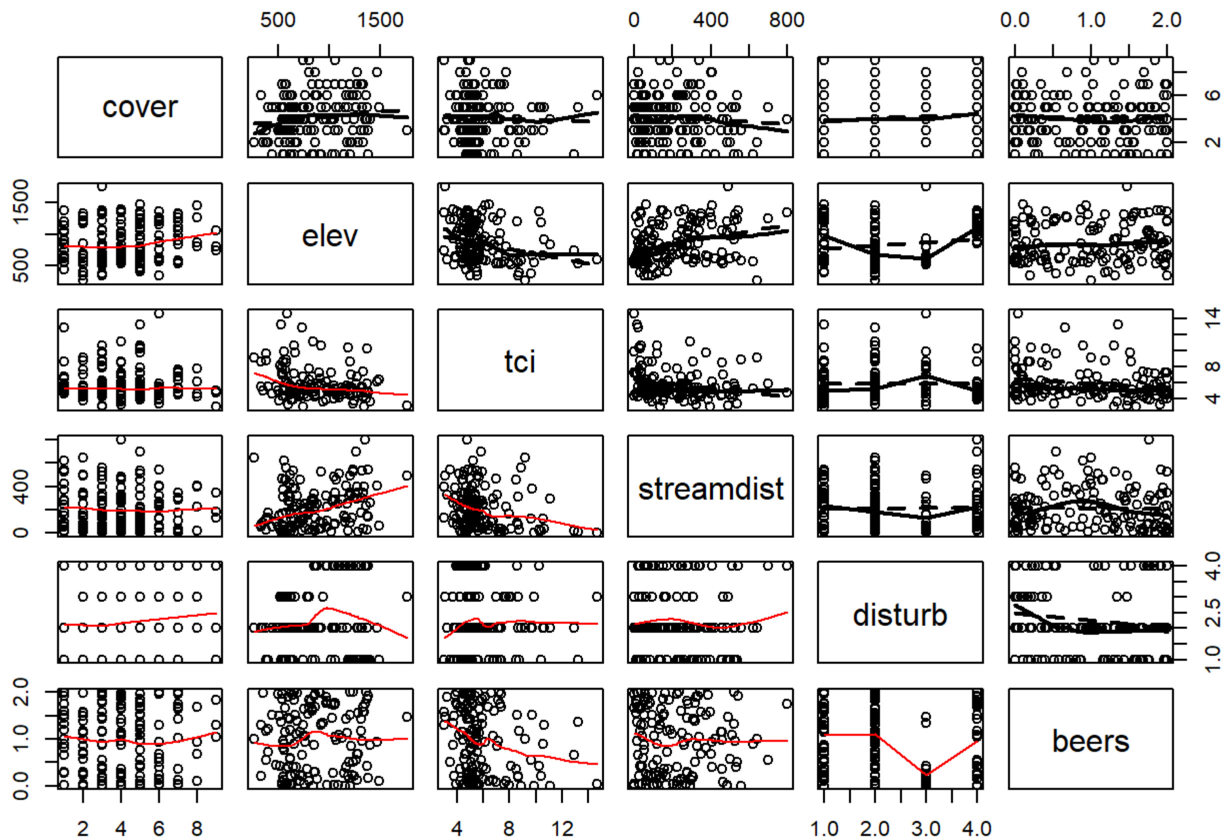
```
head(A.rub)
```

```
##     cover   elev      tci streamdist disturb      beers
## 4       3 1754.0 3.145527      492.5  SETTLE 1.47124839
## 55      7 1200.0 4.520043      346.6  VIRGIN 1.99930537
## 106     4 1401.0 3.720331      261.7 CORPLOG 0.87426198
## 157     7 1121.0 5.363821      281.6  LT-SEL 1.03253949
## 208     4  717.4 4.514725      460.0  LT-SEL 1.14009523
## 259     5  752.9 4.587803      205.2  LT-SEL 0.03474157
```

```
pairs(A.fras, lower.panel = panel.smooth, upper.panel = panel.car, pch = 1, col = 'black')
```



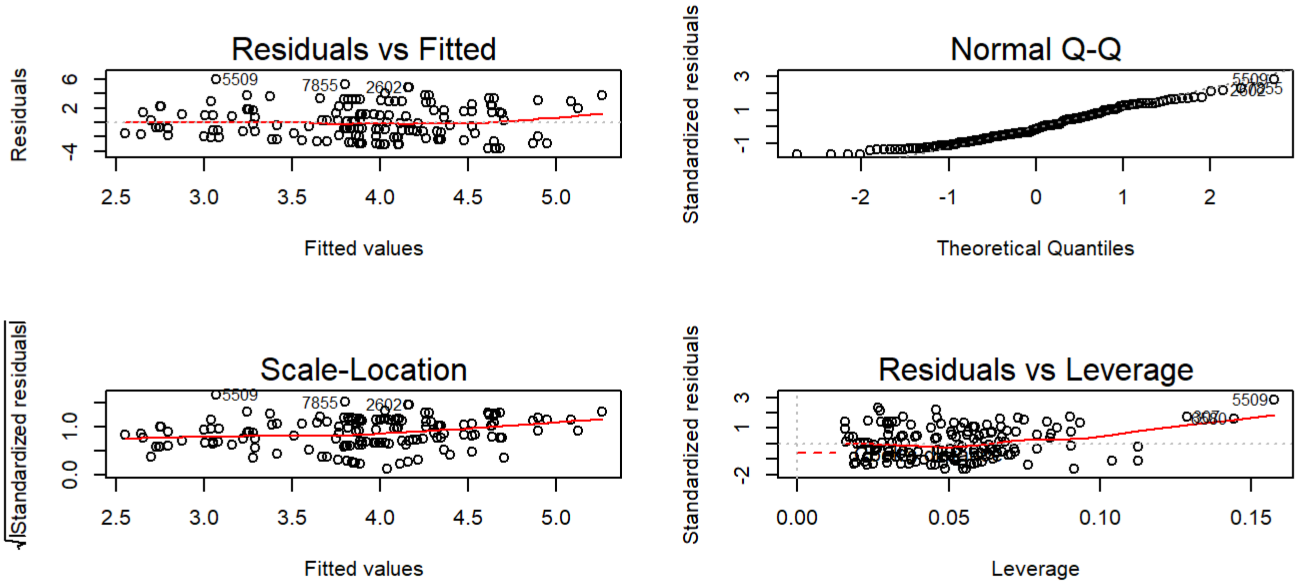

```
pairs(A.rub, lower.panel = panel.smooth, upper.panel = panel.car, pch = 1, col = 'black')
```

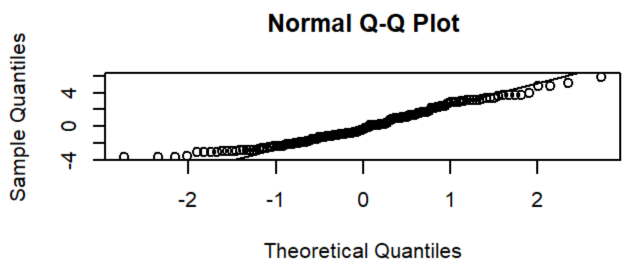



```
AfrasLM = lm(cover ~ elev + tci + streamdist + disturb + beers, data = A.fras)
AfrasLM
```

```
##
## Call:
## lm(formula = cover ~ elev + tci + streamdist + disturb + beers,
##     data = A.fras)
##
## Coefficients:
##   (Intercept)           elev            tci     streamdist  disturbLT-SEL
##     4.1595468      0.0007148     -0.0856756     -0.0004225     -0.0616512
## disturbSETTLE  disturbVIRGIN          beers
##    -1.0032160      0.5198924     -0.1599607
```

```
par(mfrow = c(3,2))
plot(AfrasLM)
qqnorm(resid(AfrasLM))
qqline(resid(AfrasLM))
```






```
summary(AfrasLM)
```

```
##
## Call:
## lm(formula = cover ~ elev + tci + streamdist + disturb + beers,
##     data = A.fras)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -3.6847 -1.8666 -0.3381  1.6775  5.9307
##
## Coefficients:
##                 Estimate Std. Error t value Pr(>|t|)
## (Intercept)    4.1595468  1.1746619   3.541 0.000531 ***
## elev           0.0007148  0.0007454   0.959 0.339128
## tci           -0.0856756  0.0937649  -0.914 0.362326
## streamdist    -0.0004225  0.0013292  -0.318 0.751022
## disturbLT-SEL -0.0616512  0.5604376  -0.110 0.912552
## disturbSETTLE -1.0032160  0.7370060  -1.361 0.175490
## disturbVIRGIN  0.5198924  0.6399305   0.812 0.417838
## beers         -0.1599607  0.2682253  -0.596 0.551829
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 2.282 on 150 degrees of freedom
## Multiple R-squared:  0.06192,    Adjusted R-squared:  0.01814
## F-statistic: 1.414 on 7 and 150 DF,  p-value: 0.2035
```

```
Anova(AfrasLM, type = 3)
```

```
## Anova Table (Type III tests)
##
## Response: cover
##             Sum Sq  Df F value    Pr(>F)
## (Intercept)  65.27   1 12.5391 0.0005312 ***
## elev          4.79   1  0.9196 0.3391276
## tci           4.35   1  0.8349 0.3623261
## streamdist    0.53   1  0.1010 0.7510220
## disturb      22.21   3  1.4225 0.2384907
## beers         1.85   1  0.3557 0.5518292
## Residuals   780.84 150
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

The p-values generated by A.fran are for the more part very similar between the summary and the anova

How well does the exploratory model appear to explain cover?

the R-squared values suggest this model does not fit our data very well, and none of the p-values are significant apart from the intercept. The F-statistic is rather low (1.414) suggesting there is no relationship between our predictor variable (cover) and the tested response variables thru this model. With this in mind, it seems that this exploratory model does not explain cover very well.

Which explanatory variables are the most important?

While none appear to be of statistically significant importance as seen through this model, elevation and disturbance have the lowest p-values and highest correlation when looked at graphically

Do model diagnostics indicate any problems with violations of OLS assumptions?

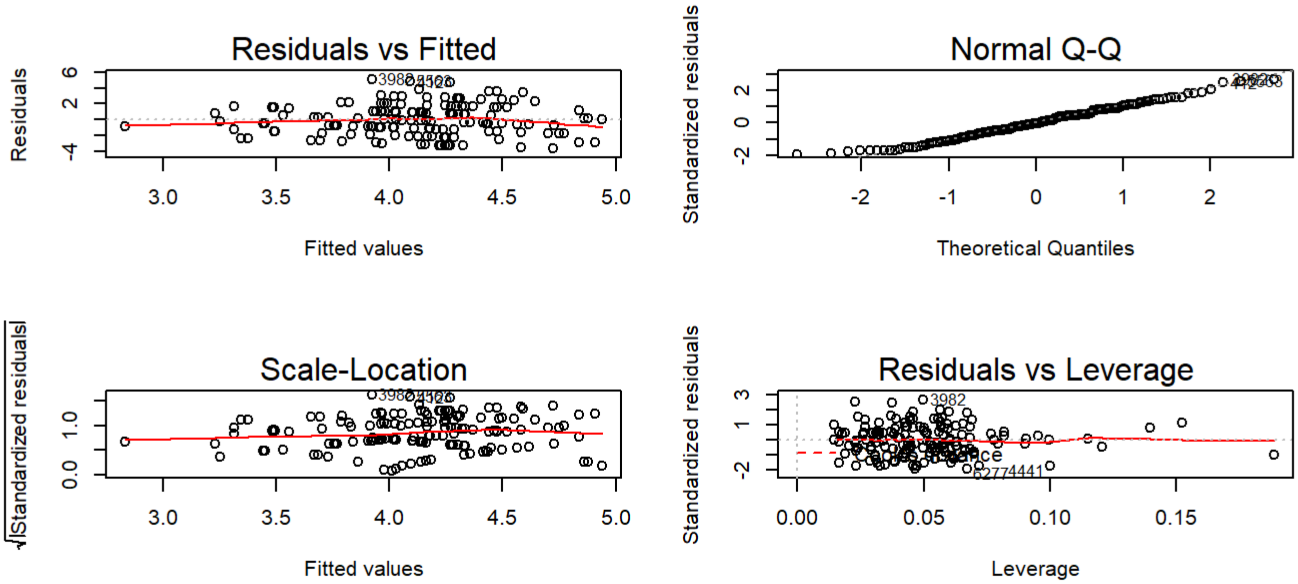
From observing plots of the residuals, it appears that residuals are normal and show heteroscedasticity indicating that also our data do not violate the assumptions for an OLS model

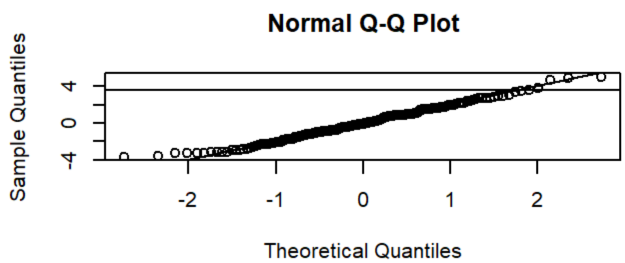
```
ArubLM = lm(cover ~ elev + tci + streamdist + disturb + beers, data = A.rub)
ArubLM
```

```
##
## Call:
## lm(formula = cover ~ elev + tci + streamdist + disturb + beers,
##     data = A.rub)
##
## Coefficients:
##   (Intercept)           elev            tci     streamdist  disturbLT-SEL
##      3.573589       0.001096      -0.034586      -0.001386       0.317671
## disturbSETTLE  disturbVIRGIN          beers
##      0.265225       0.320307      -0.136327
```

```
par(mfrow = c(3,2))
plot(ArubLM)
qqnorm(resid(ArubLM))
qqline(resid(ArubLM))
abline(ArubLM)
```

```
## Warning in abline(ArubLM): only using the first two of 8 regression
## coefficients
```





Data appears to fit the requirements for linear regression without further modification to the raw data. Resids are normal etc

```
summary(ArubLM)
```

```
##
## Call:
## lm(formula = cover ~ elev + tci + streamdist + disturb + beers,
##     data = A.rub)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -3.7248 -1.3064 -0.0779  1.4407  5.0778
##
## Coefficients:
##                  Estimate Std. Error t value Pr(>|t|)
## (Intercept)    3.5735888  0.9565743   3.736 0.000265 ***
## elev           0.0010965  0.0006190   1.771 0.078559 .
## tci           -0.0345862  0.0851375  -0.406 0.685145
## streamdist    -0.0013856  0.0009586  -1.446 0.150396
## disturbLT-SEL  0.3176706  0.4214969   0.754 0.452227
## disturbSETTLE  0.2652251  0.6186734   0.429 0.668757
## disturbVIRGIN  0.3203072  0.5036252   0.636 0.525744
## beers         -0.1363265  0.2499898  -0.545 0.586338
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.963 on 150 degrees of freedom
## Multiple R-squared:  0.03662,    Adjusted R-squared:  -0.008336
## F-statistic: 0.8146 on 7 and 150 DF,  p-value: 0.5765
```

R squared is very small, indicating this is not a good linear fit for our data. The F-statistic is also very small (less than 1) suggesting there is no relationships between our predictor variables and the tested response variable thru this model. Likewise the p-value is very large, suggesting we can't reject the null hypothesis.

```
Anova(ArubLM, type = 3)
```

```
## Anova Table (Type III tests)
##
## Response: cover
##             Sum Sq  Df F value    Pr(>F)
## (Intercept)  53.78   1 13.9563 0.0002653 ***
## elev         12.09   1  3.1371 0.0785588 .
## tci           0.64   1  0.1650 0.6851454
## streamdist    8.05   1  2.0896 0.1503958
## disturb       2.60   3  0.2249 0.8789588
## beers         1.15   1  0.2974 0.5863376
## Residuals   577.98 150
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Once again the p-values in the ANOVA table are very similar to the p-values in the summary output

Are you able to explain variance in once species better than another? Why might this be the case?

Neither model seems to fit the data or the question being asked in either speices, however it does appear to fit the data for A. fraseri (habitat specialist) slightly better than it does for A. rubrum (habitat generalist). THis could be due to A. fraseri being a habitat specialist - the response variable (cover) is more sensitive to changes in predictor variables than the cover in A. rubrum, a habitat generalist.

2. GLM model with a Poisson error term

```
AfrasGLM = glm(cover ~ elev + tci + streamdist + disturb + beers, data = A.fras, family = 'poiss
on')
pseudo_r2 = function(glm_mod) {
                1 -  glm_mod$deviance / glm_mod$null.deviance
            }

summary(AfrasGLM)
```

```
##
## Call:
## glm(formula = cover ~ elev + tci + streamdist + disturb + beers,
##     family = "poisson", data = A.fras)
##
## Deviance Residuals:
##     Min       1Q   Median       3Q      Max
## -2.0685  -1.0839  -0.1829   0.7353   2.6941
##
## Coefficients:
##                  Estimate Std. Error z value Pr(>|z|)
## (Intercept)    1.4366587  0.2578514   5.572 2.52e-08 ***
## elev           0.0001776  0.0001623   1.094   0.2739
## tci           -0.0234679  0.0217454  -1.079   0.2805
## streamdist    -0.0001098  0.0002950  -0.372   0.7097
## disturbLT-SEL -0.0152891  0.1229170  -0.124   0.9010
## disturbSETTLE -0.2943660  0.1737327  -1.694   0.0902 .
## disturbVIRGIN  0.1181305  0.1336178   0.884   0.3766
## beers         -0.0402311  0.0593253  -0.678   0.4977
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for poisson family taken to be 1)
##
##     Null deviance: 217.35  on 157  degrees of freedom
## Residual deviance: 203.82  on 150  degrees of freedom
## AIC: 703.11
##
## Number of Fisher Scoring iterations: 5
```

```
pseudo_r2(AfrasGLM)
```

```
## [1] 0.06224132
```

```
ArubGLM = glm(cover ~ elev + tci + streamdist + disturb + beers, data = A.rub, family = 'poisso
n')

pseudo_r2 = function(glm_mod) {
                1 -  glm_mod$deviance / glm_mod$null.deviance
            }
summary(ArubGLM)
```

```
##
## Call:
## glm(formula = cover ~ elev + tci + streamdist + disturb + beers,
##     family = "poisson", data = A.rub)
##
## Deviance Residuals:
##      Min        1Q    Median        3Q       Max
## -2.09471  -0.71323  -0.03282   0.67887   2.19707
##
## Coefficients:
##                 Estimate Std. Error z value Pr(>|z|)
## (Intercept)    1.2787877  0.2417615   5.289 1.23e-07 ***
## elev           0.0002703  0.0001548   1.746   0.0809 .
## tci           -0.0090598  0.0216677  -0.418   0.6759
## streamdist    -0.0003487  0.0002472  -1.410   0.1584
## disturbLT-SEL  0.0811570  0.1081854   0.750   0.4532
## disturbSETTLE  0.0702465  0.1559190   0.451   0.6523
## disturbVIRGIN  0.0786087  0.1244104   0.632   0.5275
## beers         -0.0326060  0.0620862  -0.525   0.5995
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for poisson family taken to be 1)
##
##     Null deviance: 154.81  on 157  degrees of freedom
## Residual deviance: 149.41  on 150  degrees of freedom
## AIC: 665.52
##
## Number of Fisher Scoring iterations: 4
```

```
pseudo_r2(ArubGLM)
```

```
## [1] 0.03489415
```

Compare your qualatitive assessment of which variables were most important in each model. Does it appear that changing the error distribution changed the results much? In what ways?

It appears that the p-values for the important variables (elevation, distubance) decreased slightly for both species, but not enough to show statistical signficiance even with a different model.

```
anova(AfrasGLM, AfrasLM)
```

```
## Analysis of Deviance Table
##
## Model: poisson, link: log
##
## Response: cover
##
## Terms added sequentially (first to last)
##
##
##            Df Deviance Resid. Df Resid. Dev
## NULL                        157     217.35
## elev        1   6.3065       156     211.04
## tci         1   0.9888       155     210.06
## streamdist  1   0.1382       154     209.92
## disturb     3   5.6356       151     204.28
## beers       1   0.4591       150     203.82
```

```
anova(ArubGLM, ArubLM)
```

```
## Analysis of Deviance Table
##
## Model: poisson, link: log
##
## Response: cover
##
## Terms added sequentially (first to last)
##
##
##            Df Deviance Resid. Df Resid. Dev
## NULL                        157     154.81
## elev        1  2.43407       156     152.38
## tci         1  0.00118       155     152.38
## streamdist  1  1.95747       154     150.42
## disturb     3  0.73380       151     149.69
## beers       1  0.27550       150     149.41
```

3. Provide a plain English summary (i.e., no statistics) of what you have found and what conclusions we can take away from your analysis?

We have found that neither model fits the data for either species very well when trying to explain cover. This could be to the narutre of the data (maybe log transforming would help). It would be best to try other models or perhaps look into transforming the data somehow to really look at the question we are trying to ask with these data. However, while neither model seems to fit the data or the question being asked in either speices, it does appear to fit the data for A. fraseri (habitat specialist) slightly better than it does for A. rubrum (habitat generalist). And there are suggestions even through these ill-fitting models that some relationship exists in both these species between elevation and cover, and distubance and cover. These variables could be worth focusing on in altered models to check for further statistical significance.

4.

```
stepAIC(AfrasLM)
```

```
## Start:  AIC=268.45
## cover ~ elev + tci + streamdist + disturb + beers
##
##              Df Sum of Sq    RSS    AIC
## - streamdist  1    0.5260 781.37 266.56
## - beers       1    1.8514 782.69 266.82
## - disturb     3   22.2144 803.06 266.88
## - tci         1    4.3462 785.19 267.33
## - elev        1    4.7870 785.63 267.42
## <none>                    780.84 268.45
##
## Step:  AIC=266.56
## cover ~ elev + tci + disturb + beers
##
##           Df Sum of Sq    RSS    AIC
## - beers    1    1.6676 783.04 264.89
## - disturb  3   22.2022 803.57 264.98
## - tci      1    3.9229 785.29 265.35
## - elev     1    4.2664 785.63 265.42
## <none>                 781.37 266.56
##
## Step:  AIC=264.89
## cover ~ elev + tci + disturb
##
##           Df Sum of Sq    RSS    AIC
## - disturb  3   20.6502 803.69 263.00
## - tci      1    4.0281 787.06 263.70
## - elev     1    4.2897 787.33 263.75
## <none>                 783.04 264.89
##
## Step:  AIC=263
## cover ~ elev + tci
##
##        Df Sum of Sq    RSS    AIC
## - tci   1    3.6013 807.29 261.71
## <none>              803.69 263.00
## - elev  1   22.1836 825.87 265.31
##
## Step:  AIC=261.71
## cover ~ elev
##
##        Df Sum of Sq    RSS    AIC
## <none>              807.29 261.71
## - elev  1    25.092 832.38 264.55
```

```
##
## Call:
## lm(formula = cover ~ elev, data = A.fras)
##
## Coefficients:
## (Intercept)         elev
##    2.847627     0.001242
```

```
stepAIC(ArubLM)
```

```
## Start:  AIC=220.92
## cover ~ elev + tci + streamdist + disturb + beers
##
##              Df Sum of Sq    RSS    AIC
## - disturb     3    2.5999 580.58 215.63
## - tci         1    0.6359 578.61 219.09
## - beers       1    1.1459 579.12 219.23
## <none>                    577.98 220.92
## - streamdist  1    8.0514 586.03 221.10
## - elev        1   12.0880 590.07 222.19
##
## Step:  AIC=215.63
## cover ~ elev + tci + streamdist + beers
##
##              Df Sum of Sq    RSS    AIC
## - tci         1    0.6473 581.23 213.80
## - beers       1    1.4199 582.00 214.01
## <none>                    580.58 215.63
## - streamdist  1    8.3550 588.93 215.88
## - elev        1   13.8307 594.41 217.35
##
## Step:  AIC=213.8
## cover ~ elev + streamdist + beers
##
##              Df Sum of Sq    RSS    AIC
## - beers       1    1.0788 582.30 212.09
## <none>                    581.23 213.80
## - streamdist  1    7.7762 589.00 213.90
## - elev        1   15.4899 596.72 215.96
##
## Step:  AIC=212.09
## cover ~ elev + streamdist
##
##              Df Sum of Sq    RSS    AIC
## <none>                    582.30 212.09
## - streamdist  1    7.5409 589.85 212.13
## - elev        1   14.8571 597.16 214.08
```

```
##
## Call:
## lm(formula = cover ~ elev + streamdist, data = A.rub)
##
## Coefficients:
## (Intercept)         elev   streamdist
##    3.503032     0.001049    -0.001308
```

```
stepAIC(AfrasGLM)
```

```
## Start:  AIC=703.11
## cover ~ elev + tci + streamdist + disturb + beers
##
##              Df Deviance    AIC
## - streamdist  1   203.96 701.25
## - beers       1   204.28 701.57
## - tci         1   205.01 702.30
## - elev        1   205.02 702.31
## <none>            203.82 703.11
## - disturb     3   209.88 703.17
##
## Step:  AIC=701.25
## cover ~ elev + tci + disturb + beers
##
##           Df Deviance    AIC
## - beers    1   204.38 699.67
## - elev     1   205.02 700.31
## - tci      1   205.04 700.33
## <none>         203.96 701.25
## - disturb  3   210.03 701.32
##
## Step:  AIC=699.67
## cover ~ elev + tci + disturb
##
##           Df Deviance    AIC
## - elev     1   205.44 698.73
## - tci      1   205.49 698.78
## - disturb  3   210.06 699.35
## <none>         204.38 699.67
##
## Step:  AIC=698.73
## cover ~ tci + disturb
##
##           Df Deviance    AIC
## - tci      1   207.06 698.35
## <none>         205.44 698.73
## - disturb  3   215.63 702.92
##
## Step:  AIC=698.35
## cover ~ disturb
##
##           Df Deviance    AIC
## <none>         207.06 698.35
## - disturb  3   217.35 702.64
```

```
##
## Call:  glm(formula = cover ~ disturb, family = "poisson", data = A.fras)
##
## Coefficients:
##   (Intercept)  disturbLT-SEL  disturbSETTLE  disturbVIRGIN
##       1.40399       -0.04828       -0.33480        0.14534
##
## Degrees of Freedom: 157 Total (i.e. Null);  154 Residual
## Null Deviance:       217.4
## Residual Deviance: 207.1     AIC: 698.4
```

```
stepAIC(ArubGLM)
```

```
## Start:  AIC=665.52
## cover ~ elev + tci + streamdist + disturb + beers
## 
##              Df Deviance    AIC
## - disturb     3   150.08 660.19
## - tci         1   149.59 663.70
## - beers       1   149.69 663.80
## <none>            149.41 665.52
## - streamdist  1   151.44 665.55
## - elev        1   152.42 666.54
## 
## Step:  AIC=660.19
## cover ~ elev + tci + streamdist + beers
## 
##              Df Deviance    AIC
## - tci         1   150.25 658.37
## - beers       1   150.42 658.53
## <none>            150.08 660.19
## - streamdist  1   152.16 660.27
## - elev        1   153.45 661.57
## 
## Step:  AIC=658.37
## cover ~ elev + streamdist + beers
## 
##              Df Deviance    AIC
## - beers       1   150.51 656.63
## - streamdist  1   152.17 658.29
## <none>            150.25 658.37
## - elev        1   154.02 660.13
## 
## Step:  AIC=656.63
## cover ~ elev + streamdist
## 
##              Df Deviance    AIC
## - streamdist  1   152.38 656.49
## <none>            150.51 656.63
## - elev        1   154.13 658.24
## 
## Step:  AIC=656.49
## cover ~ elev
## 
##        Df Deviance    AIC
## <none>      152.38 656.49
## - elev  1   154.81 656.93
```

```
##
## Call:  glm(formula = cover ~ elev, family = "poisson", data = A.rub)
##
## Coefficients:
## (Intercept)         elev
##    1.244641     0.000198
##
## Degrees of Freedom: 157 Total (i.e. Null);  156 Residual
## Null Deviance:       154.8
## Residual Deviance: 152.4     AIC: 656.5
```