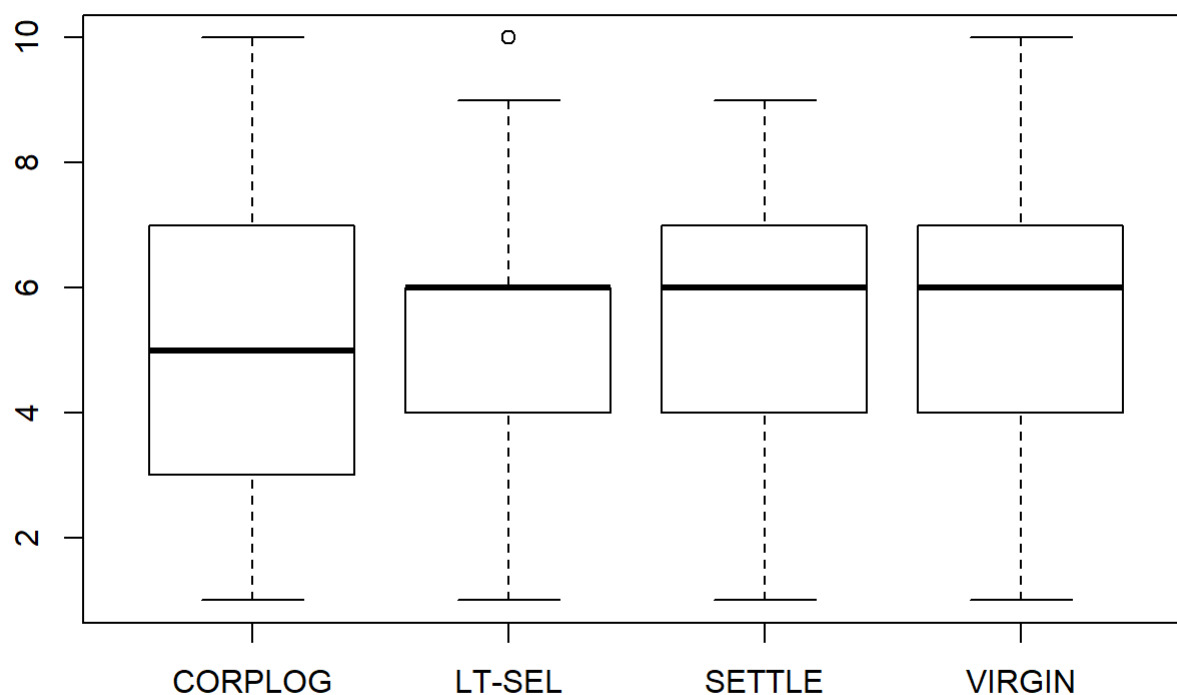


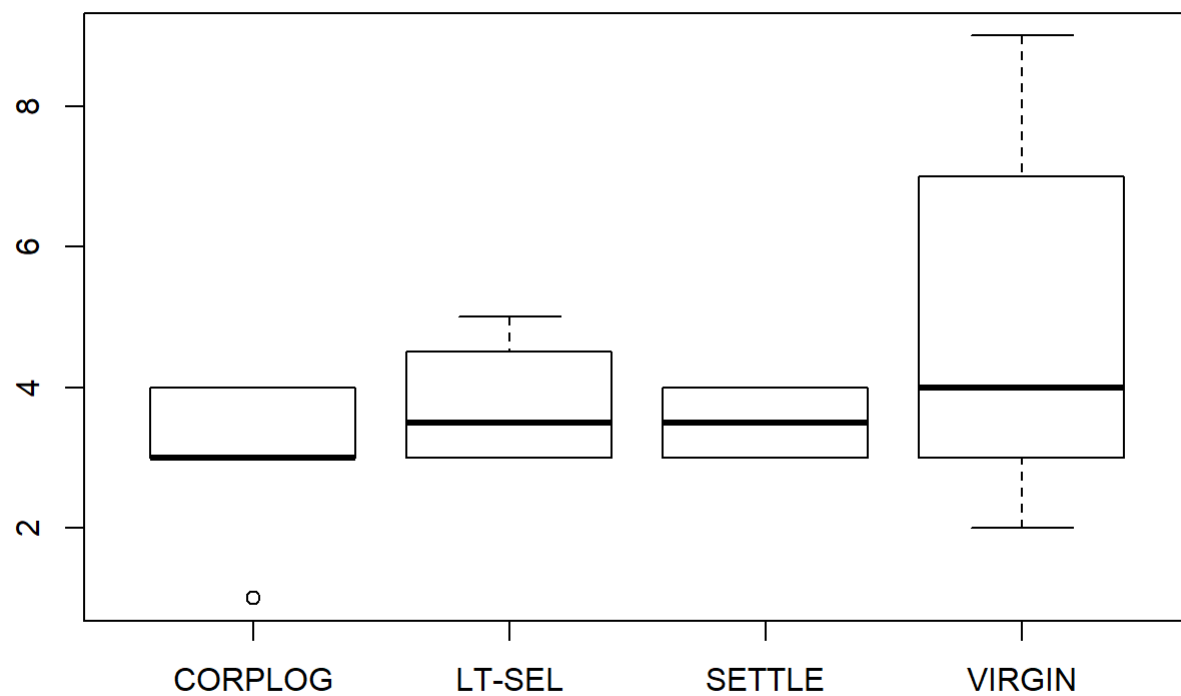
```
trees <- read.csv("treedata.csv")
```

So I understand that we should take into account absence of a species from a plot, but I don't understand how to reformat the data in a way to then be able to make a model from. The datasheet could have just had every plot listed with all species marked for their respective cover. Only way I know how to reformat that is to do it in excel and that would take a long time. Also, the values for the cover does not make sense. How can 1 = trace but 2 = 0-1% ?. Shouldn't 1 be absent from that plot? Just a little confused there. With that in mind, I just worked with the regular data sheet since we didn't go into converting data in the lessons.

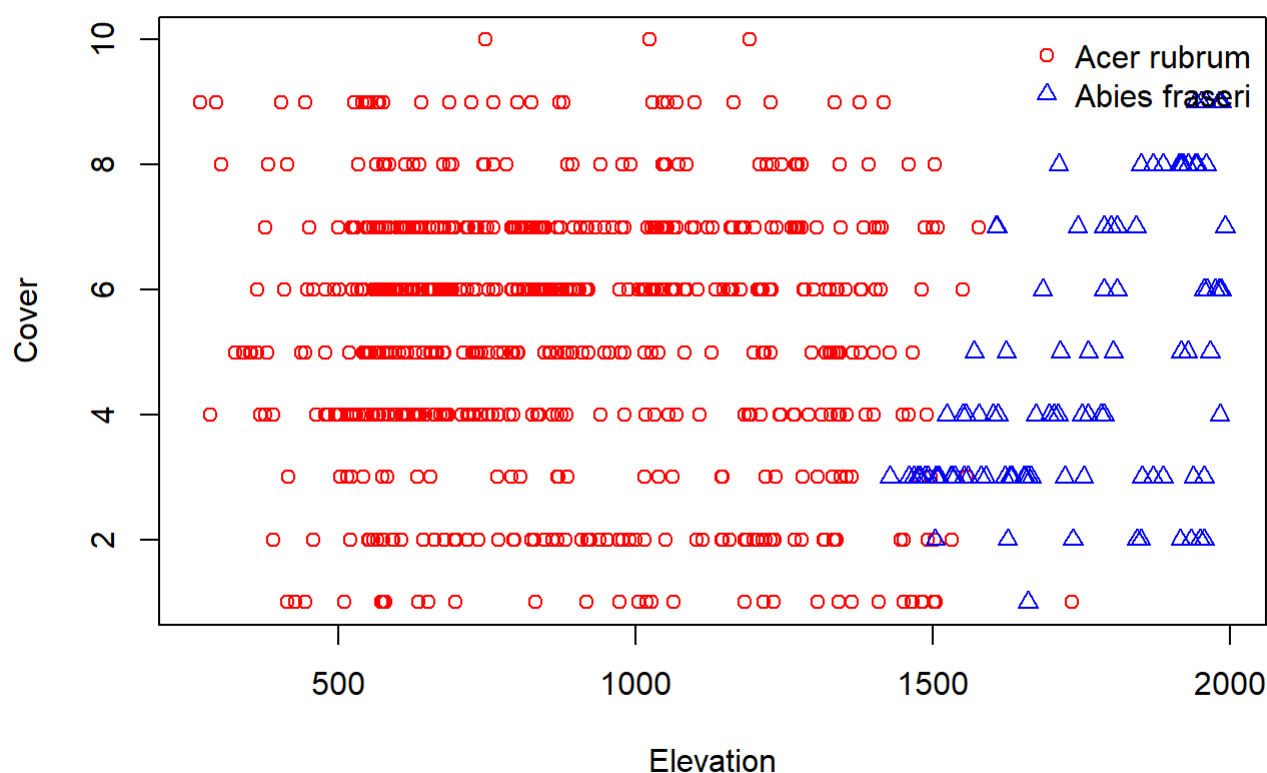
```
boxplot(cover ~ disturb, data = trees, subset = species == "Acer rubrum")
```



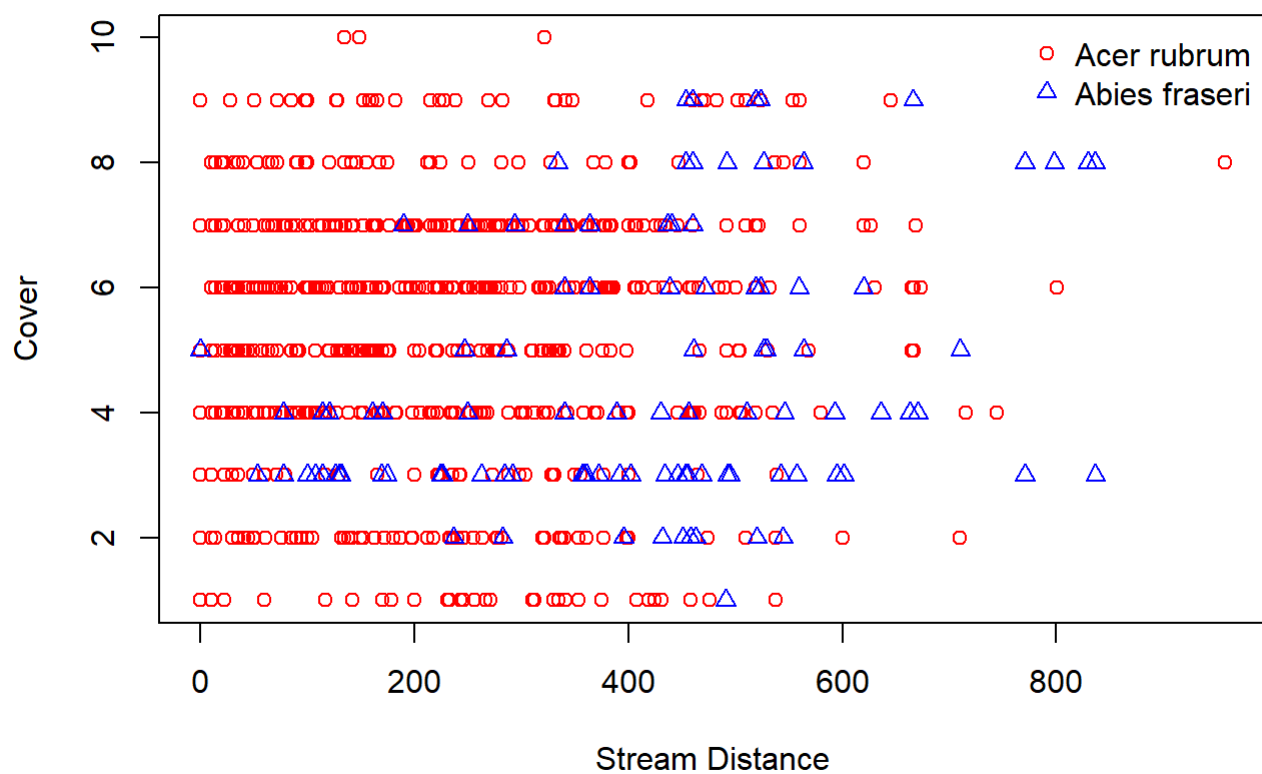
```
boxplot(cover ~ disturb, data = trees, subset = species == "Abies fraseri")
```



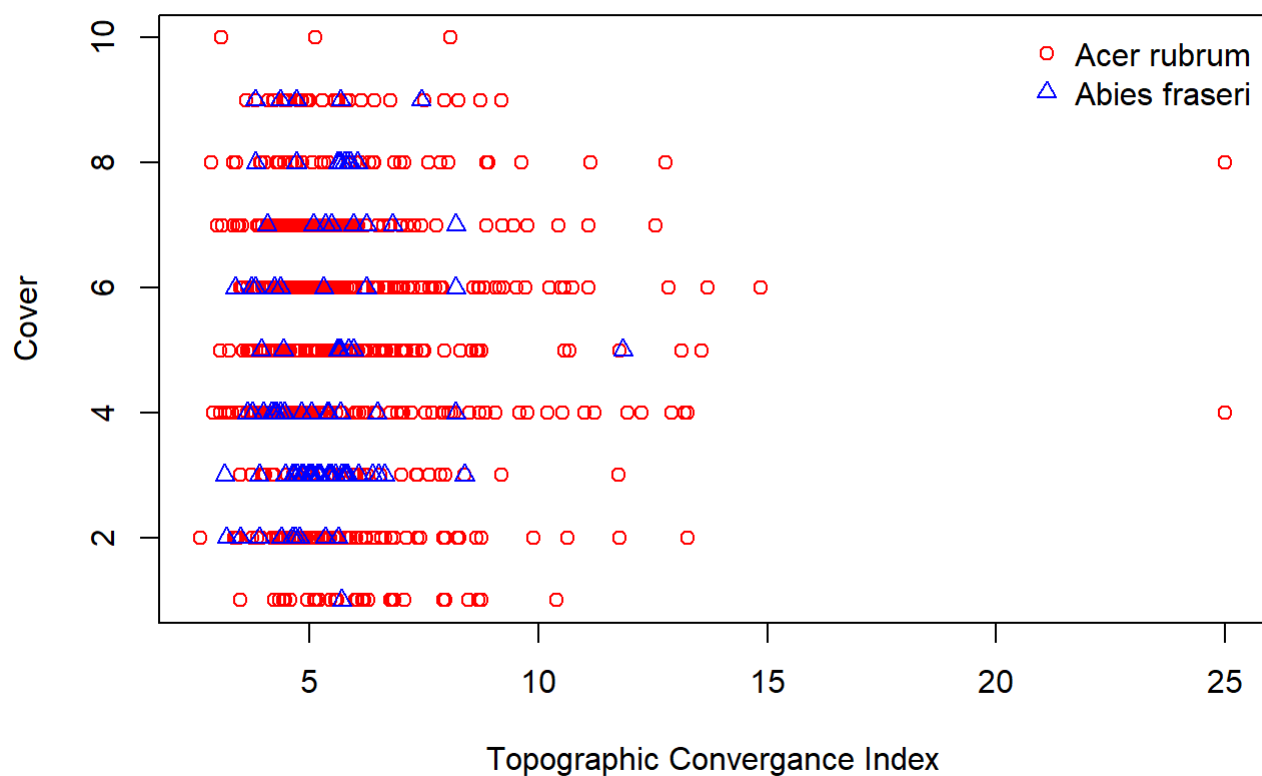
```
plot(cover ~ elev, data = trees, type = 'n',  
     xlab = 'Elevation', ylab = 'Cover')  
points(cover ~ elev, data = trees, subset = species == "Acer rubrum",  
       pch = 1, col = 'red')  
points(cover ~ elev, data = trees, subset = species == "Abies fraseri",  
       pch = 2, col = 'blue')  
legend('topright', c('Acer rubrum', 'Abies fraseri'), col = c('red', 'blue'),  
       pch = c(1, 2), bty = 'n')
```



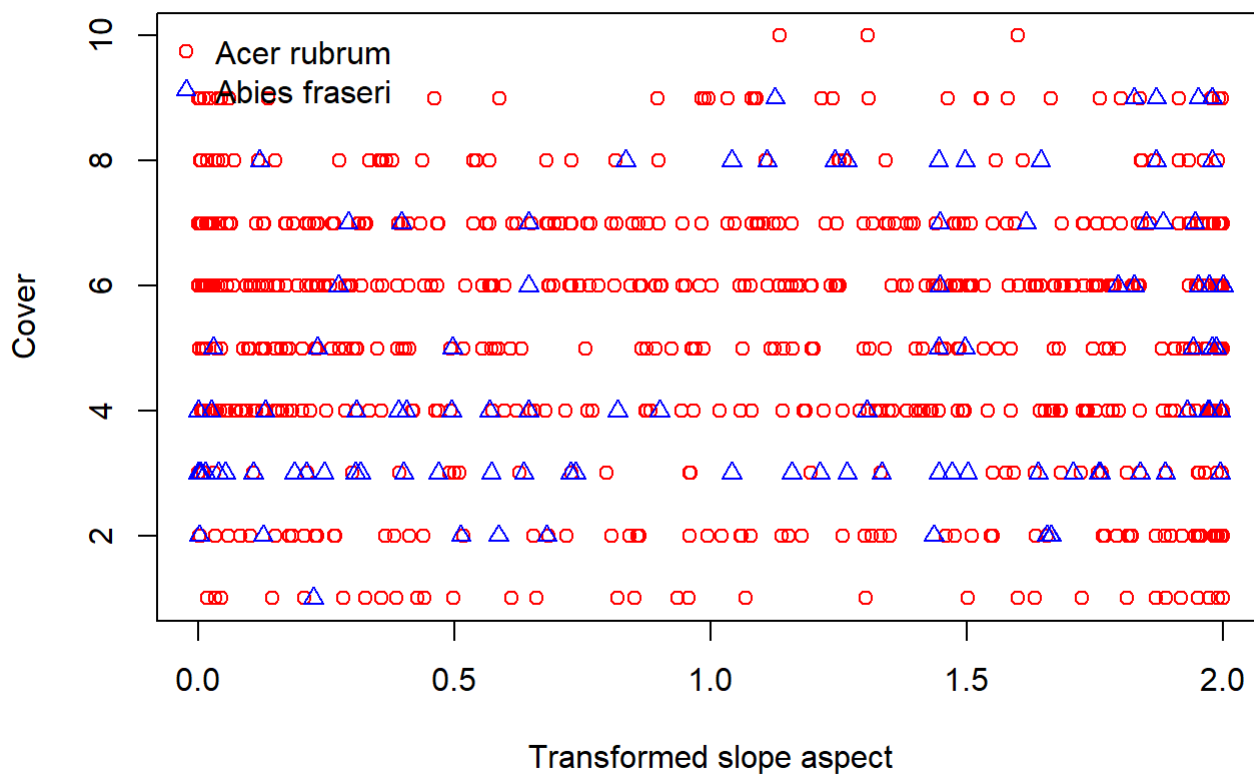
```
plot(cover ~ streamdist, data = trees, type = 'n',
     xlab = 'Stream Distance', ylab = 'Cover')
points(cover ~ streamdist, data = trees, subset = species == "Acer rubrum",
       pch = 1, col = 'red')
points(cover ~ streamdist, data = trees, subset = species == "Abies fraseri",
       pch = 2, col = 'blue')
legend('topright', c('Acer rubrum', 'Abies fraseri'), col = c('red', 'blue'),
       pch = c(1, 2), bty = 'n')
```



```
plot(cover ~ tci, data = trees, type = 'n',
     xlab = 'Topographic Convergence Index', ylab = 'Cover')
points(cover ~ tci, data = trees, subset = species == "Acer rubrum",
       pch = 1, col = 'red')
points(cover ~ tci, data = trees, subset = species == "Abies fraseri",
       pch = 2, col = 'blue')
legend('topright', c('Acer rubrum', 'Abies fraseri'), col = c('red', 'blue'),
       pch = c(1, 2), bty = 'n')
```



```
plot(cover ~ beers, data = trees, type = 'n',
     xlab = 'Transformed slope aspect', ylab = 'Cover')
points(cover ~ beers, data = trees, subset = species == "Acer rubrum",
       pch = 1, col = 'red')
points(cover ~ beers, data = trees, subset = species == "Abies fraseri",
       pch = 2, col = 'blue')
legend('topleft', c('Acer rubrum', 'Abies fraseri'), col = c('red', 'blue'),
       pch = c(1, 2), bty = 'n')
```



```
red_mod1 <- lm(formula = cover ~ elev + tci + streamdist + disturb + beers, data = trees, subset = species == "Acer rubrum")
red_mod2 <- lm(formula = cover ~ plotsize + utme + utmn + elev + tci + streamdist + disturb + beers, data = trees, subset = species == "Acer rubrum")
red_mod3 <- lm(formula = cover ~ plotsize + utmn + elev + streamdist + beers, data = trees, subset = species == "Acer rubrum")
red_int <- lm(formula = cover ~ plotsize * utme * utmn * elev * tci * streamdist * disturb * beers, data = trees, subset = species == "Acer rubrum")
summary(red_int)
```

```
##
## Call:
## lm(formula = cover ~ plotsize * utme * utmn * elev * tci * streamdist *
##      disturb * beers, data = trees, subset = species == "Acer rubrum")
##
## Residuals:
##      Min        1Q    Median        3Q        Max
## -4.4108 -0.6062  0.0000  0.6485  4.2496
##
## Coefficients: (186 not defined because of singularities)
##                                     Estimate
## (Intercept)                        2.515e+11
## plotsize                        -2.515e+08
## utme                            1.706e+07
## utmn                            3.773e+04
## elev                            2.639e+09
## tci                             -6.840e+11
## streamdist                       -2.275e+10
## disturbLT-SEL                    -1.542e+12
## disturbSETTLE                    -6.364e+11
## disturbVIRGIN                    -7.743e+12
## beers                            7.748e+09
## plotsize:utme                    -1.706e+04
## plotsize:utmn                    -3.773e+01
## utme:utmn                        -4.709e+00
## plotsize:elev                    -2.639e+06
## utme:elev                        -2.058e+04
## utmn:elev                        -7.095e+02
## plotsize:tci                     6.840e+08
## utme:tci                         1.453e+06
## utmn:tci                         1.624e+05
## elev:tci                         8.772e+06
## plotsize:streamdist              2.275e+07
## utme:streamdist                  8.696e+04
## utmn:streamdist                  5.747e+03
## elev:streamdist                 -1.194e+06
## tci:streamdist                   2.594e+07
## plotsize:disturbLT-SEL           1.542e+09
## plotsize:disturbSETTLE           6.364e+08
## plotsize:disturbVIRGIN           7.743e+09
## utme:disturbLT-SEL               -8.575e+06
## utme:disturbSETTLE               -1.532e+07
## utme:disturbVIRGIN               7.668e+06
## utmn:disturbLT-SEL               2.903e+05
## utmn:disturbSETTLE               5.581e+04
## utmn:disturbVIRGIN               1.824e+06
## elev:disturbLT-SEL               3.929e+09
## elev:disturbSETTLE               3.028e+09
## elev:disturbVIRGIN               3.656e+09
## tci:disturbLT-SEL               -5.175e+10
## tci:disturbSETTLE                3.254e+11
## tci:disturbVIRGIN                3.864e+11
## streamdist:disturbLT-SEL         1.820e+07
```

```

## streamdist:disturbSETTLE -7.236e+05
## streamdist:disturbVIRGIN -4.904e+05
## plotsize:beers -7.748e+06
## utme:beers -1.749e+04
## utmn:beers -1.048e+03
## elev:beers 3.520e+05
## tci:beers 9.811e+07
## streamdist:beers -2.089e+04
## disturbLT-SEL:beers -1.516e+08
## disturbSETTLE:beers 8.652e+08
## disturbVIRGIN:beers 4.565e+08
## plotsize:utme:utmn 4.709e-03
## plotsize:utme:elev 2.058e+01
## plotsize:utmn:elev 7.095e-01
## utme:utmn:elev 5.376e-03
## plotsize:utme:tci -1.453e+03
## plotsize:utmn:tci -1.624e+02
## utme:utmn:tci -3.270e-01
## plotsize:elev:tci -8.772e+03
## utme:elev:tci 6.618e+00
## utmn:elev:tci -2.836e+00
## plotsize:utme:streamdist -8.696e+01
## plotsize:utmn:streamdist -5.747e+00
## utme:utmn:streamdist -2.196e-02
## plotsize:elev:streamdist 1.194e+03
## utme:elev:streamdist -8.073e-03
## utmn:elev:streamdist 3.017e-01
## plotsize:tci:streamdist -2.594e+04
## utme:tci:streamdist -6.819e+01
## utmn:tci:streamdist -2.148e+00
## elev:tci:streamdist 1.415e+03
## plotsize:utme:disturbLT-SEL 8.575e+03
## plotsize:utme:disturbSETTLE 1.532e+04
## plotsize:utme:disturbVIRGIN -7.668e+03
## plotsize:utmn:disturbLT-SEL -2.903e+02
## plotsize:utmn:disturbSETTLE -5.581e+01
## plotsize:utmn:disturbVIRGIN -1.824e+03
## utme:utmn:disturbLT-SEL 2.553e+00
## utme:utmn:disturbSETTLE 4.282e+00
## utme:utmn:disturbVIRGIN -1.426e+00
## plotsize:elev:disturbLT-SEL -3.929e+06
## plotsize:elev:disturbSETTLE -3.028e+06
## plotsize:elev:disturbVIRGIN -3.656e+06
## utme:elev:disturbLT-SEL -6.617e+02
## utme:elev:disturbSETTLE -6.284e+02
## utme:elev:disturbVIRGIN -8.990e+02
## utmn:elev:disturbLT-SEL -9.528e+02
## utmn:elev:disturbSETTLE -7.265e+02
## utmn:elev:disturbVIRGIN -8.660e+02
## plotsize:tci:disturbLT-SEL 5.175e+07
## plotsize:tci:disturbSETTLE -3.254e+08
## plotsize:tci:disturbVIRGIN -3.864e+08
## utme:tci:disturbLT-SEL -1.521e+05
## utme:tci:disturbSETTLE -1.698e+05

```



```

## utme:tci:disturbVIRGIN -1.925e+05
## utmn:tci:disturbLT-SEL 2.360e+04
## utmn:tci:disturbSETTLE -7.092e+04
## utmn:tci:disturbVIRGIN -8.469e+04
## elev:tci:disturbLT-SEL 3.888e+05
## elev:tci:disturbSETTLE 5.351e+05
## elev:tci:disturbVIRGIN -8.635e+00
## plotsize:streamdist:disturbLT-SEL -1.820e+04
## plotsize:streamdist:disturbSETTLE 7.359e+02
## plotsize:streamdist:disturbVIRGIN 4.937e+02
## utme:streamdist:disturbLT-SEL -6.926e+01
## utme:streamdist:disturbSETTLE -4.056e-02
## utme:streamdist:disturbVIRGIN -1.934e-02
## utmn:streamdist:disturbLT-SEL -1.372e-03
## utmn:streamdist:disturbSETTLE -3.101e-03
## utmn:streamdist:disturbVIRGIN -8.374e-04
## elev:streamdist:disturbLT-SEL -5.381e+00
## elev:streamdist:disturbSETTLE -2.115e+01
## elev:streamdist:disturbVIRGIN 3.179e-01
## tci:streamdist:disturbLT-SEL -8.625e+02
## tci:streamdist:disturbSETTLE -1.981e+03
## tci:streamdist:disturbVIRGIN -2.357e+02
## plotsize:utme:beers 1.749e+01
## plotsize:utmn:beers 1.048e+00
## utme:utmn:beers -3.118e-07
## plotsize:elev:beers -3.517e+02
## utme:elev:beers -1.080e-03
## utmn:elev:beers -7.994e-05
## plotsize:tci:beers -9.806e+04
## utme:tci:beers -1.698e-01
## utmn:tci:beers -1.232e-02
## elev:tci:beers -6.046e+01
## plotsize:streamdist:beers 2.781e+01
## utme:streamdist:beers -2.690e-02
## utmn:streamdist:beers -1.756e-03
## elev:streamdist:beers -6.744e+00
## tci:streamdist:beers -1.313e+03
## plotsize:disturbLT-SEL:beers 1.521e+05
## plotsize:disturbSETTLE:beers -8.644e+05
## plotsize:disturbVIRGIN:beers -4.559e+05
## utme:disturbLT-SEL:beers -2.180e+00
## utme:disturbSETTLE:beers -2.619e+00
## utme:disturbVIRGIN:beers -3.301e+00
## utmn:disturbLT-SEL:beers -1.439e-01
## utmn:disturbSETTLE:beers -2.056e-01
## utmn:disturbVIRGIN:beers -1.521e-01
## elev:disturbLT-SEL:beers -6.068e+02
## elev:disturbSETTLE:beers -1.238e+03
## elev:disturbVIRGIN:beers 1.550e+02
## tci:disturbLT-SEL:beers -7.691e+04
## tci:disturbSETTLE:beers -8.835e+04
## tci:disturbVIRGIN:beers 1.474e+04
## streamdist:disturbLT-SEL:beers -7.747e+03
## streamdist:disturbSETTLE:beers -1.865e+03

```

```

## streamdist:disturbVIRGIN:beers 3.489e+02
## plotsize:utme:utmn:elev -5.376e-06
## plotsize:utme:utmn:tc1 3.270e-04
## plotsize:utme:elev:tc1 -6.618e-03
## plotsize:utmn:elev:tc1 2.835e-03
## utme:utmn:elev:tc1 3.933e-11
## plotsize:utme:utmn:streamdist 2.196e-05
## plotsize:utme:elev:streamdist 8.059e-06
## plotsize:utmn:elev:streamdist -3.017e-04
## utme:utmn:elev:streamdist 3.394e-12
## plotsize:utme:tc1:streamdist 6.819e-02
## plotsize:utmn:tc1:streamdist 2.148e-03
## utme:utmn:tc1:streamdist 4.724e-10
## plotsize:elev:tc1:streamdist -1.416e+00
## utme:elev:tc1:streamdist 2.653e-06
## utmn:elev:tc1:streamdist 1.846e-07
## plotsize:utme:utmn:disturbLT-SEL -2.553e-03
## plotsize:utme:utmn:disturbSETTLE -4.282e-03
## plotsize:utme:utmn:disturbVIRGIN 1.426e-03
## plotsize:utme:elev:disturbLT-SEL 6.616e-01
## plotsize:utme:elev:disturbSETTLE 6.284e-01
## plotsize:utme:elev:disturbVIRGIN 8.989e-01
## plotsize:utmn:elev:disturbLT-SEL 9.528e-01
## plotsize:utmn:elev:disturbSETTLE 7.265e-01
## plotsize:utmn:elev:disturbVIRGIN 8.660e-01
## utme:utmn:elev:disturbLT-SEL 7.632e-10
## utme:utmn:elev:disturbSETTLE 3.445e-09
## utme:utmn:elev:disturbVIRGIN 1.337e-09
## plotsize:utme:tc1:disturbLT-SEL 1.521e+02
## plotsize:utme:tc1:disturbSETTLE 1.698e+02
## plotsize:utme:tc1:disturbVIRGIN 1.925e+02
## plotsize:utmn:tc1:disturbLT-SEL -2.360e+01
## plotsize:utmn:tc1:disturbSETTLE 7.092e+01
## plotsize:utmn:tc1:disturbVIRGIN 8.469e+01
## utme:utmn:tc1:disturbLT-SEL 9.323e-08
## utme:utmn:tc1:disturbSETTLE 3.252e-07
## utme:utmn:tc1:disturbVIRGIN 2.698e-07
## plotsize:elev:tc1:disturbLT-SEL -3.889e+02
## plotsize:elev:tc1:disturbSETTLE -5.357e+02
## plotsize:elev:tc1:disturbVIRGIN NA
## utme:elev:tc1:disturbLT-SEL 4.531e-04
## utme:elev:tc1:disturbSETTLE 2.271e-03
## utme:elev:tc1:disturbVIRGIN 3.197e-04
## utmn:elev:tc1:disturbLT-SEL 2.964e-05
## utmn:elev:tc1:disturbSETTLE 1.669e-04
## utmn:elev:tc1:disturbVIRGIN 2.077e-06
## plotsize:utme:streamdist:disturbLT-SEL 6.924e-02
## plotsize:utme:streamdist:disturbSETTLE NA
## plotsize:utme:streamdist:disturbVIRGIN NA
## plotsize:utmn:streamdist:disturbLT-SEL NA
## plotsize:utmn:streamdist:disturbSETTLE NA
## plotsize:utmn:streamdist:disturbVIRGIN NA
## utme:utmn:streamdist:disturbLT-SEL 5.297e-09
## utme:utmn:streamdist:disturbSETTLE 1.029e-08

```

```

## utme:utm:streamdist:disturbVIRGIN 4.875e-09
## plotsize:elev:streamdist:disturbLT-SEL NA
## plotsize:elev:streamdist:disturbSETTLE NA
## plotsize:elev:streamdist:disturbVIRGIN NA
## utme:elev:streamdist:disturbLT-SEL 2.045e-05
## utme:elev:streamdist:disturbSETTLE 6.998e-05
## utme:elev:streamdist:disturbVIRGIN 4.783e-06
## utmn:elev:streamdist:disturbLT-SEL 1.366e-06
## utmn:elev:streamdist:disturbSETTLE 5.368e-06
## utmn:elev:streamdist:disturbVIRGIN -8.758e-08
## plotsize:tci:streamdist:disturbLT-SEL NA
## plotsize:tci:streamdist:disturbSETTLE NA
## plotsize:tci:streamdist:disturbVIRGIN NA
## utme:tci:streamdist:disturbLT-SEL 3.336e-03
## utme:tci:streamdist:disturbSETTLE 6.558e-03
## utme:tci:streamdist:disturbVIRGIN 2.561e-03
## utmn:tci:streamdist:disturbLT-SEL 2.189e-04
## utmn:tci:streamdist:disturbSETTLE 5.027e-04
## utmn:tci:streamdist:disturbVIRGIN 5.815e-05
## elev:tci:streamdist:disturbLT-SEL 9.938e-01
## elev:tci:streamdist:disturbSETTLE 3.577e+00
## elev:tci:streamdist:disturbVIRGIN -3.907e-01
## plotsize:utme:utm:beers NA
## plotsize:utme:elev:beers NA
## plotsize:utm:elev:beers NA
## utme:utm:elev:beers 2.742e-10
## plotsize:utme:tci:beers NA
## plotsize:utm:tci:beers NA
## utme:utm:tci:beers 4.307e-08
## plotsize:elev:tci:beers NA
## utme:elev:tci:beers 2.124e-04
## utmn:elev:tci:beers 1.534e-05
## plotsize:utme:streamdist:beers NA
## plotsize:utm:streamdist:beers NA
## utme:utm:streamdist:beers 6.823e-09
## plotsize:elev:streamdist:beers NA
## utme:elev:streamdist:beers 2.583e-05
## utmn:elev:streamdist:beers 1.712e-06
## plotsize:tci:streamdist:beers NA
## utme:tci:streamdist:beers 5.134e-03
## utmn:tci:streamdist:beers 3.333e-04
## elev:tci:streamdist:beers 1.368e+00
## plotsize:utme:disturbLT-SEL:beers NA
## plotsize:utme:disturbSETTLE:beers NA
## plotsize:utme:disturbVIRGIN:beers NA
## plotsize:utm:disturbLT-SEL:beers NA
## plotsize:utm:disturbSETTLE:beers NA
## plotsize:utm:disturbVIRGIN:beers NA
## utme:utm:disturbLT-SEL:beers 5.529e-07
## utme:utm:disturbSETTLE:beers 6.655e-07
## utme:utm:disturbVIRGIN:beers 8.352e-07
## plotsize:elev:disturbLT-SEL:beers NA
## plotsize:elev:disturbSETTLE:beers NA
## plotsize:elev:disturbVIRGIN:beers NA

```

```

## utme:elev:disturbLT-SEL:beers 2.339e-03
## utme:elev:disturbSETTLE:beers 3.993e-03
## utme:elev:disturbVIRGIN:beers 4.799e-04
## utmn:elev:disturbLT-SEL:beers 1.540e-04
## utmn:elev:disturbSETTLE:beers 3.145e-04
## utmn:elev:disturbVIRGIN:beers -3.999e-05
## plotsize:tci:disturbLT-SEL:beers NA
## plotsize:tci:disturbSETTLE:beers NA
## plotsize:tci:disturbVIRGIN:beers NA
## utme:tci:disturbLT-SEL:beers 2.960e-01
## utme:tci:disturbSETTLE:beers 2.590e-01
## utme:tci:disturbVIRGIN:beers 1.780e-01
## utmn:tci:disturbLT-SEL:beers 1.951e-02
## utmn:tci:disturbSETTLE:beers 2.246e-02
## utmn:tci:disturbVIRGIN:beers -3.881e-03
## elev:tci:disturbLT-SEL:beers 9.730e+01
## elev:tci:disturbSETTLE:beers 1.683e+02
## elev:tci:disturbVIRGIN:beers -1.437e+02
## plotsize:streamdist:disturbLT-SEL:beers NA
## plotsize:streamdist:disturbSETTLE:beers NA
## plotsize:streamdist:disturbVIRGIN:beers NA
## utme:streamdist:disturbLT-SEL:beers 3.051e-02
## utme:streamdist:disturbSETTLE:beers 3.106e-03
## utme:streamdist:disturbVIRGIN:beers 2.109e-03
## utmn:streamdist:disturbLT-SEL:beers 1.966e-03
## utmn:streamdist:disturbSETTLE:beers 4.783e-04
## utmn:streamdist:disturbVIRGIN:beers -9.516e-05
## elev:streamdist:disturbLT-SEL:beers 7.178e+00
## elev:streamdist:disturbSETTLE:beers -3.622e-01
## elev:streamdist:disturbVIRGIN:beers -1.309e+00
## tci:streamdist:disturbLT-SEL:beers 1.456e+03
## tci:streamdist:disturbSETTLE:beers 4.659e+02
## tci:streamdist:disturbVIRGIN:beers -4.009e+01
## plotsize:utme:utmn:elev:tci NA
## plotsize:utme:utmn:elev:streamdist NA
## plotsize:utme:utmn:tci:streamdist NA
## plotsize:utme:elev:tci:streamdist NA
## plotsize:utmn:elev:tci:streamdist NA
## utme:utmn:elev:tci:streamdist -6.739e-13
## plotsize:utme:utmn:elev:disturbLT-SEL NA
## plotsize:utme:utmn:elev:disturbSETTLE NA
## plotsize:utme:utmn:elev:disturbVIRGIN NA
## plotsize:utme:utmn:tci:disturbLT-SEL NA
## plotsize:utme:utmn:tci:disturbSETTLE NA
## plotsize:utme:utmn:tci:disturbVIRGIN NA
## plotsize:utme:elev:tci:disturbLT-SEL NA
## plotsize:utme:elev:tci:disturbSETTLE NA
## plotsize:utme:elev:tci:disturbVIRGIN NA
## plotsize:utmn:elev:tci:disturbLT-SEL NA
## plotsize:utmn:elev:tci:disturbSETTLE NA
## plotsize:utmn:elev:tci:disturbVIRGIN NA
## utme:utmn:elev:tci:disturbLT-SEL -1.149e-10
## utme:utmn:elev:tci:disturbSETTLE -5.761e-10
## utme:utmn:elev:tci:disturbVIRGIN -8.072e-11

```

```

## plotsize:utme:utmn:streamdist:disturbLT-SEL NA
## plotsize:utme:utmn:streamdist:disturbSETTLE NA
## plotsize:utme:utmn:streamdist:disturbVIRGIN NA
## plotsize:utme:elev:streamdist:disturbLT-SEL NA
## plotsize:utme:elev:streamdist:disturbSETTLE NA
## plotsize:utme:elev:streamdist:disturbVIRGIN NA
## plotsize:utmn:elev:streamdist:disturbLT-SEL NA
## plotsize:utmn:elev:streamdist:disturbSETTLE NA
## plotsize:utmn:elev:streamdist:disturbVIRGIN NA
## utme:utmn:elev:streamdist:disturbLT-SEL -5.190e-12
## utme:utmn:elev:streamdist:disturbSETTLE -1.776e-11
## utme:utmn:elev:streamdist:disturbVIRGIN -1.187e-12
## plotsize:utme:tc:streamdist:disturbLT-SEL NA
## plotsize:utme:tc:streamdist:disturbSETTLE NA
## plotsize:utme:tc:streamdist:disturbVIRGIN NA
## plotsize:utmn:tc:streamdist:disturbLT-SEL NA
## plotsize:utmn:tc:streamdist:disturbSETTLE NA
## plotsize:utmn:tc:streamdist:disturbVIRGIN NA
## utme:utmn:tc:streamdist:disturbLT-SEL -8.468e-10
## utme:utmn:tc:streamdist:disturbSETTLE -1.665e-09
## utme:utmn:tc:streamdist:disturbVIRGIN -6.437e-10
## plotsize:elev:tc:streamdist:disturbLT-SEL NA
## plotsize:elev:tc:streamdist:disturbSETTLE NA
## plotsize:elev:tc:streamdist:disturbVIRGIN NA
## utme:elev:tc:streamdist:disturbLT-SEL -3.796e-06
## utme:elev:tc:streamdist:disturbSETTLE -1.195e-05
## utme:elev:tc:streamdist:disturbVIRGIN -2.018e-08
## utmn:elev:tc:streamdist:disturbLT-SEL -2.524e-07
## utmn:elev:tc:streamdist:disturbSETTLE -9.079e-07
## utmn:elev:tc:streamdist:disturbVIRGIN 1.005e-07
## plotsize:utme:utmn:elev:beers NA
## plotsize:utme:utmn:tc:beers NA
## plotsize:utme:elev:tc:beers NA
## plotsize:utmn:elev:tc:beers NA
## utme:utmn:elev:tc:beers -5.391e-11
## plotsize:utme:utmn:streamdist:beers NA
## plotsize:utme:elev:streamdist:beers NA
## plotsize:utmn:elev:streamdist:beers NA
## utme:utmn:elev:streamdist:beers -6.557e-12
## plotsize:utme:tc:streamdist:beers NA
## plotsize:utmn:tc:streamdist:beers NA
## utme:utmn:tc:streamdist:beers -1.303e-09
## plotsize:elev:tc:streamdist:beers NA
## utme:elev:tc:streamdist:beers -5.287e-06
## utmn:elev:tc:streamdist:beers -3.474e-07
## plotsize:utme:utmn:disturbLT-SEL:beers NA
## plotsize:utme:utmn:disturbSETTLE:beers NA
## plotsize:utme:utmn:disturbVIRGIN:beers NA
## plotsize:utme:elev:disturbLT-SEL:beers NA
## plotsize:utme:elev:disturbSETTLE:beers NA
## plotsize:utme:elev:disturbVIRGIN:beers NA
## plotsize:utmn:elev:disturbLT-SEL:beers NA
## plotsize:utmn:elev:disturbSETTLE:beers NA
## plotsize:utmn:elev:disturbVIRGIN:beers NA

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## utme:utmn:elev:disturbLT-SEL:beers -5.933e-10
## utme:utmn:elev:disturbSETTLE:beers -1.015e-09
## utme:utmn:elev:disturbVIRGIN:beers -1.195e-10
## plotsize:utme:tc1:disturbLT-SEL:beers NA
## plotsize:utme:tc1:disturbSETTLE:beers NA
## plotsize:utme:tc1:disturbVIRGIN:beers NA
## plotsize:utmn:tc1:disturbLT-SEL:beers NA
## plotsize:utmn:tc1:disturbSETTLE:beers NA
## plotsize:utmn:tc1:disturbVIRGIN:beers NA
## utme:utmn:tc1:disturbLT-SEL:beers -7.511e-08
## utme:utmn:tc1:disturbSETTLE:beers -7.934e-05
## utme:utmn:tc1:disturbVIRGIN:beers -4.468e-08
## plotsize:elev:tc1:disturbLT-SEL:beers NA
## plotsize:elev:tc1:disturbSETTLE:beers NA
## plotsize:elev:tc1:disturbVIRGIN:beers NA
## utme:elev:tc1:disturbLT-SEL:beers -3.779e-04
## utme:elev:tc1:disturbSETTLE:beers -5.233e-04
## utme:elev:tc1:disturbVIRGIN:beers 3.035e-04
## utmn:elev:tc1:disturbLT-SEL:beers -2.469e-05
## utmn:elev:tc1:disturbSETTLE:beers -4.275e-05
## utmn:elev:tc1:disturbVIRGIN:beers 3.662e-05
## plotsize:utme:streamdist:disturbLT-SEL:beers NA
## plotsize:utme:streamdist:disturbSETTLE:beers NA
## plotsize:utme:streamdist:disturbVIRGIN:beers NA
## plotsize:utmn:streamdist:disturbLT-SEL:beers NA
## plotsize:utmn:streamdist:disturbSETTLE:beers NA
## plotsize:utmn:streamdist:disturbVIRGIN:beers NA
## utme:utmn:streamdist:disturbLT-SEL:beers -7.741e-09
## utme:utmn:streamdist:disturbSETTLE:beers -8.110e-10
## utme:utmn:streamdist:disturbVIRGIN:beers -5.100e-10
## plotsize:elev:streamdist:disturbLT-SEL:beers NA
## plotsize:elev:streamdist:disturbSETTLE:beers NA
## plotsize:elev:streamdist:disturbVIRGIN:beers NA
## utme:elev:streamdist:disturbLT-SEL:beers -2.783e-05
## utme:elev:streamdist:disturbSETTLE:beers 8.068e-06
## utme:elev:streamdist:disturbVIRGIN:beers 1.355e-06
## utmn:elev:streamdist:disturbLT-SEL:beers -1.822e-06
## utmn:elev:streamdist:disturbSETTLE:beers 8.489e-08
## utmn:elev:streamdist:disturbVIRGIN:beers 3.377e-07
## plotsize:tc1:streamdist:disturbLT-SEL:beers NA
## plotsize:tc1:streamdist:disturbSETTLE:beers NA
## plotsize:tc1:streamdist:disturbVIRGIN:beers NA
## utme:tc1:streamdist:disturbLT-SEL:beers -5.764e-03
## utme:tc1:streamdist:disturbSETTLE:beers -9.728e-04
## utme:tc1:streamdist:disturbVIRGIN:beers -8.457e-04
## utmn:tc1:streamdist:disturbLT-SEL:beers -3.694e-04
## utmn:tc1:streamdist:disturbSETTLE:beers -1.192e-04
## utmn:tc1:streamdist:disturbVIRGIN:beers 1.155e-05
## elev:tc1:streamdist:disturbLT-SEL:beers -1.421e+00
## elev:tc1:streamdist:disturbSETTLE:beers -3.391e-01
## elev:tc1:streamdist:disturbVIRGIN:beers 2.553e-01
## plotsize:utme:utmn:elev:tc1:streamdist NA
## plotsize:utme:utmn:elev:tc1:disturbLT-SEL NA
## plotsize:utme:utmn:elev:tc1:disturbSETTLE NA

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|  |            |
|--|------------|
| ## plotsize:utme:utmn:elev:tci:disturbVIRGIN         | NA         |
| ## plotsize:utme:utmn:elev:streamdist:disturbLT-SEL  | NA         |
| ## plotsize:utme:utmn:elev:streamdist:disturbSETTLE  | NA         |
| ## plotsize:utme:utmn:elev:streamdist:disturbVIRGIN  | NA         |
| ## plotsize:utme:utmn:tci:streamdist:disturbLT-SEL   | NA         |
| ## plotsize:utme:utmn:tci:streamdist:disturbSETTLE   | NA         |
| ## plotsize:utme:utmn:tci:streamdist:disturbVIRGIN   | NA         |
| ## plotsize:utme:elev:tci:streamdist:disturbLT-SEL   | NA         |
| ## plotsize:utme:elev:tci:streamdist:disturbSETTLE   | NA         |
| ## plotsize:utme:elev:tci:streamdist:disturbVIRGIN   | NA         |
| ## plotsize:utmn:elev:tci:streamdist:disturbLT-SEL   | NA         |
| ## plotsize:utmn:elev:tci:streamdist:disturbSETTLE   | NA         |
| ## plotsize:utmn:elev:tci:streamdist:disturbVIRGIN   | NA         |
| ## utme:utmn:elev:tci:streamdist:disturbLT-SEL       | 9.642e-13  |
| ## utme:utmn:elev:tci:streamdist:disturbSETTLE       | 3.033e-12  |
| ## utme:utmn:elev:tci:streamdist:disturbVIRGIN       | NA         |
| ## plotsize:utme:utmn:elev:tci:beers                 | NA         |
| ## plotsize:utme:utmn:elev:streamdist:beers          | NA         |
| ## plotsize:utme:utmn:tci:streamdist:beers           | NA         |
| ## plotsize:utme:elev:tci:streamdist:beers           | NA         |
| ## plotsize:utmn:elev:tci:streamdist:beers           | NA         |
| ## utme:utmn:elev:tci:streamdist:beers               | 1.342e-12  |
| ## plotsize:utme:utmn:elev:disturbLT-SEL:beers       | NA         |
| ## plotsize:utme:utmn:elev:disturbSETTLE:beers       | NA         |
| ## plotsize:utme:utmn:elev:disturbVIRGIN:beers       | NA         |
| ## plotsize:utme:utmn:tci:disturbLT-SEL:beers        | NA         |
| ## plotsize:utme:utmn:tci:disturbSETTLE:beers        | 7.927e-08  |
| ## plotsize:utme:utmn:tci:disturbVIRGIN:beers        | NA         |
| ## plotsize:utme:elev:tci:disturbLT-SEL:beers        | NA         |
| ## plotsize:utme:elev:tci:disturbSETTLE:beers        | NA         |
| ## plotsize:utme:elev:tci:disturbVIRGIN:beers        | NA         |
| ## plotsize:utmn:elev:tci:disturbLT-SEL:beers        | NA         |
| ## plotsize:utmn:elev:tci:disturbSETTLE:beers        | NA         |
| ## plotsize:utmn:elev:tci:disturbVIRGIN:beers        | NA         |
| ## utme:utmn:elev:tci:disturbLT-SEL:beers            | 9.591e-11  |
| ## utme:utmn:elev:tci:disturbSETTLE:beers            | -1.261e-08 |
| ## utme:utmn:elev:tci:disturbVIRGIN:beers            | -7.749e-11 |
| ## plotsize:utme:utmn:streamdist:disturbLT-SEL:beers | NA         |
| ## plotsize:utme:utmn:streamdist:disturbSETTLE:beers | NA         |
| ## plotsize:utme:utmn:streamdist:disturbVIRGIN:beers | NA         |
| ## plotsize:utme:elev:streamdist:disturbLT-SEL:beers | NA         |
| ## plotsize:utme:elev:streamdist:disturbSETTLE:beers | NA         |
| ## plotsize:utme:elev:streamdist:disturbVIRGIN:beers | NA         |
| ## plotsize:utmn:elev:streamdist:disturbLT-SEL:beers | NA         |
| ## plotsize:utmn:elev:streamdist:disturbSETTLE:beers | NA         |
| ## plotsize:utmn:elev:streamdist:disturbVIRGIN:beers | NA         |
| ## utme:utmn:elev:streamdist:disturbLT-SEL:beers     | 7.065e-12  |
| ## utme:utmn:elev:streamdist:disturbSETTLE:beers     | -2.014e-12 |
| ## utme:utmn:elev:streamdist:disturbVIRGIN:beers     | -3.648e-13 |
| ## plotsize:utme:tci:streamdist:disturbLT-SEL:beers  | NA         |
| ## plotsize:utme:tci:streamdist:disturbSETTLE:beers  | NA         |
| ## plotsize:utme:tci:streamdist:disturbVIRGIN:beers  | NA         |
| ## plotsize:utmn:tci:streamdist:disturbLT-SEL:beers  | NA         |
| ## plotsize:utmn:tci:streamdist:disturbSETTLE:beers  | NA         |

|    |   |                    |
|----|---|--------------------|
| ## | plotsize:utmn:tc:streamdist:disturbVIRGIN:beers           | NA                 |
| ## | utme:utmn:tc:streamdist:disturbLT-SEL:beers               | 1.463e-09          |
| ## | utme:utmn:tc:streamdist:disturbSETTLE:beers               | 2.513e-10          |
| ## | utme:utmn:tc:streamdist:disturbVIRGIN:beers               | 2.094e-10          |
| ## | plotsize:elev:tc:streamdist:disturbLT-SEL:beers           | NA                 |
| ## | plotsize:elev:tc:streamdist:disturbSETTLE:beers           | NA                 |
| ## | plotsize:elev:tc:streamdist:disturbVIRGIN:beers           | NA                 |
| ## | utme:elev:tc:streamdist:disturbLT-SEL:beers               | 5.554e-06          |
| ## | utme:elev:tc:streamdist:disturbSETTLE:beers               | -2.345e-08         |
| ## | utme:elev:tc:streamdist:disturbVIRGIN:beers               | 1.738e-08          |
| ## | utmn:elev:tc:streamdist:disturbLT-SEL:beers               | 3.609e-07          |
| ## | utmn:elev:tc:streamdist:disturbSETTLE:beers               | 8.727e-08          |
| ## | utmn:elev:tc:streamdist:disturbVIRGIN:beers               | -6.596e-08         |
| ## | plotsize:utme:utmn:elev:tc:streamdist:disturbLT-SEL       | NA                 |
| ## | plotsize:utme:utmn:elev:tc:streamdist:disturbSETTLE       | NA                 |
| ## | plotsize:utme:utmn:elev:tc:streamdist:disturbVIRGIN       | NA                 |
| ## | plotsize:utme:utmn:elev:tc:streamdist:beers               | NA                 |
| ## | plotsize:utme:utmn:elev:tc:disturbLT-SEL:beers            | NA                 |
| ## | plotsize:utme:utmn:elev:tc:disturbSETTLE:beers            | 1.275e-11          |
| ## | plotsize:utme:utmn:elev:tc:disturbVIRGIN:beers            | NA                 |
| ## | plotsize:utme:utmn:elev:streamdist:disturbLT-SEL:beers    | NA                 |
| ## | plotsize:utme:utmn:elev:streamdist:disturbSETTLE:beers    | NA                 |
| ## | plotsize:utme:utmn:elev:streamdist:disturbVIRGIN:beers    | NA                 |
| ## | plotsize:utme:utmn:tc:streamdist:disturbLT-SEL:beers      | NA                 |
| ## | plotsize:utme:utmn:tc:streamdist:disturbSETTLE:beers      | NA                 |
| ## | plotsize:utme:utmn:tc:streamdist:disturbVIRGIN:beers      | NA                 |
| ## | plotsize:utme:elev:tc:streamdist:disturbLT-SEL:beers      | NA                 |
| ## | plotsize:utme:elev:tc:streamdist:disturbSETTLE:beers      | NA                 |
| ## | plotsize:utme:elev:tc:streamdist:disturbVIRGIN:beers      | NA                 |
| ## | plotsize:utmn:elev:tc:streamdist:disturbLT-SEL:beers      | NA                 |
| ## | plotsize:utmn:elev:tc:streamdist:disturbSETTLE:beers      | NA                 |
| ## | plotsize:utmn:elev:tc:streamdist:disturbVIRGIN:beers      | NA                 |
| ## | utme:utmn:elev:tc:streamdist:disturbLT-SEL:beers          | -1.410e-12         |
| ## | utme:utmn:elev:tc:streamdist:disturbSETTLE:beers          | NA                 |
| ## | utme:utmn:elev:tc:streamdist:disturbVIRGIN:beers          | NA                 |
| ## | plotsize:utme:utmn:elev:tc:streamdist:disturbLT-SEL:beers | NA                 |
| ## | plotsize:utme:utmn:elev:tc:streamdist:disturbSETTLE:beers | NA                 |
| ## | plotsize:utme:utmn:elev:tc:streamdist:disturbVIRGIN:beers | NA                 |
| ## |   | Std. Error t value |
| ## | (Intercept)   | 7.300e+12 0.034    |
| ## | plotsize  | 7.300e+09 -0.034   |
| ## | utme  | 1.273e+08 0.134    |
| ## | utmn  | 2.393e+06 0.016    |
| ## | elev  | 1.431e+10 0.184    |
| ## | tc  | 3.694e+12 -0.185   |
| ## | streamdist  | 1.128e+11 -0.202   |
| ## | disturbLT-SEL   | 2.709e+12 -0.569   |
| ## | disturbSETTLE   | 3.638e+12 -0.175   |
| ## | disturbVIRGIN   | 3.616e+13 -0.214   |
| ## | beers   | 6.130e+10 0.126    |
| ## | plotsize:utme   | 1.273e+05 -0.134   |
| ## | plotsize:utmn   | 2.393e+03 -0.016   |
| ## | utme:utmn   | 3.442e+01 -0.137   |
| ## | plotsize:elev   | 1.431e+07 -0.184   |



|                             |           |        |
|-----------------------------|-----------|--------|
| ## utme:elev                | 1.156e+05 | -0.178 |
| ## utmn:elev                | 3.864e+03 | -0.184 |
| ## plotsize:tc              | 3.694e+09 | 0.185  |
| ## utme:tc                  | 7.754e+06 | 0.187  |
| ## utmn:tc                  | 8.753e+05 | 0.185  |
| ## elev:tc                  | 4.659e+07 | 0.188  |
| ## plotsize:streamdist      | 1.128e+08 | 0.202  |
| ## utme:streamdist          | 4.319e+05 | 0.201  |
| ## utmn:streamdist          | 2.849e+04 | 0.202  |
| ## elev:streamdist          | 6.199e+06 | -0.193 |
| ## tc:streamdist            | 1.837e+08 | 0.141  |
| ## plotsize:disturbLT-SEL   | 2.709e+09 | 0.569  |
| ## plotsize:disturbSETTLE   | 3.638e+09 | 0.175  |
| ## plotsize:disturbVIRGIN   | 3.616e+10 | 0.214  |
| ## utme:disturbLT-SEL       | 7.514e+07 | -0.114 |
| ## utme:disturbSETTLE       | 1.114e+08 | -0.138 |
| ## utme:disturbVIRGIN       | 1.800e+07 | 0.426  |
| ## utmn:disturbLT-SEL       | 6.327e+05 | 0.459  |
| ## utmn:disturbSETTLE       | 1.445e+06 | 0.039  |
| ## utmn:disturbVIRGIN       | 8.405e+06 | 0.217  |
| ## elev:disturbLT-SEL       | 2.215e+10 | 0.177  |
| ## elev:disturbSETTLE       | 1.750e+10 | 0.173  |
| ## elev:disturbVIRGIN       | 2.093e+10 | 0.175  |
| ## tc:disturbLT-SEL         | 3.675e+11 | -0.141 |
| ## tc:disturbSETTLE         | 1.787e+12 | 0.182  |
| ## tc:disturbVIRGIN         | 2.080e+12 | 0.186  |
| ## streamdist:disturbLT-SEL | 9.919e+07 | 0.184  |
| ## streamdist:disturbSETTLE | 3.301e+06 | -0.219 |
| ## streamdist:disturbVIRGIN | 2.382e+06 | -0.206 |
| ## plotsize:beers           | 6.130e+07 | -0.126 |
| ## utme:beers               | 8.569e+04 | -0.204 |
| ## utmn:beers               | 1.129e+04 | -0.093 |
| ## elev:beers               | 1.920e+06 | 0.183  |
| ## tc:beers                 | 5.254e+08 | 0.187  |
| ## streamdist:beers         | 1.686e+05 | -0.124 |
| ## disturbLT-SEL:beers      | 5.917e+08 | -0.256 |
| ## disturbSETTLE:beers      | 4.671e+09 | 0.185  |
| ## disturbVIRGIN:beers      | 2.415e+09 | 0.189  |
| ## plotsize:utme:utmn       | 3.442e-02 | 0.137  |
| ## plotsize:utme:elev       | 1.156e+02 | 0.178  |
| ## plotsize:utmn:elev       | 3.864e+00 | 0.184  |
| ## utme:utmn:elev           | 3.021e-02 | 0.178  |
| ## plotsize:utme:tc         | 7.754e+03 | -0.187 |
| ## plotsize:utmn:tc         | 8.753e+02 | -0.185 |
| ## utme:utmn:tc             | 1.738e+00 | -0.188 |
| ## plotsize:elev:tc         | 4.659e+04 | -0.188 |
| ## utme:elev:tc             | 2.864e+01 | 0.231  |
| ## utmn:elev:tc             | 1.458e+01 | -0.195 |
| ## plotsize:utme:streamdist | 4.319e+02 | -0.201 |
| ## plotsize:utmn:streamdist | 2.849e+01 | -0.202 |
| ## utme:utmn:streamdist     | 1.091e-01 | -0.201 |
| ## plotsize:elev:streamdist | 6.199e+03 | 0.193  |
| ## utme:elev:streamdist     | 3.603e-02 | -0.224 |
| ## utmn:elev:streamdist     | 1.562e+00 | 0.193  |

|                                      |           |        |
|--------------------------------------|-----------|--------|
| ## plotsize:tci:streamdist           | 1.837e+05 | -0.141 |
| ## utme:tci:streamdist               | 3.515e+02 | -0.194 |
| ## utmn:tci:streamdist               | 2.393e+01 | -0.090 |
| ## elev:tci:streamdist               | 7.107e+03 | 0.199  |
| ## plotsize:utme:disturbLT-SEL       | 7.514e+04 | 0.114  |
| ## plotsize:utme:disturbSETTLE       | 1.114e+05 | 0.138  |
| ## plotsize:utme:disturbVIRGIN       | 1.800e+04 | -0.426 |
| ## plotsize:utmn:disturbLT-SEL       | 6.327e+02 | -0.459 |
| ## plotsize:utmn:disturbSETTLE       | 1.445e+03 | -0.039 |
| ## plotsize:utmn:disturbVIRGIN       | 8.405e+03 | -0.217 |
| ## utme:utmn:disturbLT-SEL           | 2.116e+01 | 0.121  |
| ## utme:utmn:disturbSETTLE           | 3.046e+01 | 0.141  |
| ## utme:utmn:disturbVIRGIN           | 2.484e+00 | -0.574 |
| ## plotsize:elev:disturbLT-SEL       | 2.215e+07 | -0.177 |
| ## plotsize:elev:disturbSETTLE       | 1.750e+07 | -0.173 |
| ## plotsize:elev:disturbVIRGIN       | 2.093e+07 | -0.175 |
| ## utme:elev:disturbLT-SEL           | 3.793e+03 | -0.174 |
| ## utme:elev:disturbSETTLE           | 3.587e+03 | -0.175 |
| ## utme:elev:disturbVIRGIN           | 5.021e+03 | -0.179 |
| ## utmn:elev:disturbLT-SEL           | 5.368e+03 | -0.177 |
| ## utmn:elev:disturbSETTLE           | 4.202e+03 | -0.173 |
| ## utmn:elev:disturbVIRGIN           | 4.967e+03 | -0.174 |
| ## plotsize:tci:disturbLT-SEL        | 3.675e+08 | 0.141  |
| ## plotsize:tci:disturbSETTLE        | 1.787e+09 | -0.182 |
| ## plotsize:tci:disturbVIRGIN        | 2.080e+09 | -0.186 |
| ## utme:tci:disturbLT-SEL            | 8.251e+05 | -0.184 |
| ## utme:tci:disturbSETTLE            | 9.324e+05 | -0.182 |
| ## utme:tci:disturbVIRGIN            | 1.041e+06 | -0.185 |
| ## utmn:tci:disturbLT-SEL            | 1.500e+05 | 0.157  |
| ## utmn:tci:disturbSETTLE            | 3.896e+05 | -0.182 |
| ## utmn:tci:disturbVIRGIN            | 4.555e+05 | -0.186 |
| ## elev:tci:disturbLT-SEL            | 2.025e+06 | 0.192  |
| ## elev:tci:disturbSETTLE            | 2.784e+06 | 0.192  |
| ## elev:tci:disturbVIRGIN            | 4.443e+02 | -0.019 |
| ## plotsize:streamdist:disturbLT-SEL | 9.919e+04 | -0.183 |
| ## plotsize:streamdist:disturbSETTLE | 3.301e+03 | 0.223  |
| ## plotsize:streamdist:disturbVIRGIN | 2.382e+03 | 0.207  |
| ## utme:streamdist:disturbLT-SEL     | 3.773e+02 | -0.184 |
| ## utme:streamdist:disturbSETTLE     | 2.600e-02 | -1.560 |
| ## utme:streamdist:disturbVIRGIN     | 1.139e-02 | -1.698 |
| ## utmn:streamdist:disturbLT-SEL     | 6.062e-04 | -2.263 |
| ## utmn:streamdist:disturbSETTLE     | 1.836e-03 | -1.689 |
| ## utmn:streamdist:disturbVIRGIN     | 9.349e-04 | -0.896 |
| ## elev:streamdist:disturbLT-SEL     | 2.326e+00 | -2.313 |
| ## elev:streamdist:disturbSETTLE     | 1.227e+01 | -1.723 |
| ## elev:streamdist:disturbVIRGIN     | 3.503e+00 | 0.091  |
| ## tci:streamdist:disturbLT-SEL      | 4.080e+02 | -2.114 |
| ## tci:streamdist:disturbSETTLE      | 1.178e+03 | -1.682 |
| ## tci:streamdist:disturbVIRGIN      | 4.646e+02 | -0.507 |
| ## plotsize:utme:beers               | 8.569e+01 | 0.204  |
| ## plotsize:utmn:beers               | 1.129e+01 | 0.093  |
| ## utme:utmn:beers                   | 3.238e-07 | -0.963 |
| ## plotsize:elev:beers               | 1.920e+03 | -0.183 |
| ## utme:elev:beers                   | 1.299e-03 | -0.832 |

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| ## utmn:elev:beers                  | 8.073e-05 | -0.990 |
| ## plotsize:tci:beers               | 5.254e+05 | -0.187 |
| ## utme:tci:beers                   | 1.897e-01 | -0.895 |
| ## utmn:tci:beers                   | 1.174e-02 | -1.049 |
| ## elev:tci:beers                   | 4.554e+01 | -1.327 |
| ## plotsize:streamdist:beers        | 1.686e+02 | 0.165  |
| ## utme:streamdist:beers            | 9.008e-03 | -2.986 |
| ## utmn:streamdist:beers            | 5.781e-04 | -3.038 |
| ## elev:streamdist:beers            | 1.953e+00 | -3.453 |
| ## tci:streamdist:beers             | 3.824e+02 | -3.435 |
| ## plotsize:disturbLT-SEL:beers     | 5.918e+05 | 0.257  |
| ## plotsize:disturbSETTLE:beers     | 4.671e+06 | -0.185 |
| ## plotsize:disturbVIRGIN:beers     | 2.415e+06 | -0.189 |
| ## utme:disturbLT-SEL:beers         | 1.508e+00 | -1.445 |
| ## utme:disturbSETTLE:beers         | 2.943e+00 | -0.890 |
| ## utme:disturbVIRGIN:beers         | 7.448e+00 | -0.443 |
| ## utmn:disturbLT-SEL:beers         | 9.304e-02 | -1.547 |
| ## utmn:disturbSETTLE:beers         | 1.947e-01 | -1.056 |
| ## utmn:disturbVIRGIN:beers         | 4.732e-01 | -0.321 |
| ## elev:disturbLT-SEL:beers         | 3.949e+02 | -1.537 |
| ## elev:disturbSETTLE:beers         | 1.175e+03 | -1.054 |
| ## elev:disturbVIRGIN:beers         | 1.921e+03 | 0.081  |
| ## tci:disturbLT-SEL:beers          | 5.960e+04 | -1.290 |
| ## tci:disturbSETTLE:beers          | 9.216e+04 | -0.959 |
| ## tci:disturbVIRGIN:beers          | 3.208e+05 | 0.046  |
| ## streamdist:disturbLT-SEL:beers   | 2.389e+03 | -3.243 |
| ## streamdist:disturbSETTLE:beers   | 3.016e+03 | -0.618 |
| ## streamdist:disturbVIRGIN:beers   | 3.393e+03 | 0.103  |
| ## plotsize:utme:utm:elev           | 3.021e-05 | -0.178 |
| ## plotsize:utme:utm:tci            | 1.738e-03 | 0.188  |
| ## plotsize:utme:elev:tci           | 2.864e-02 | -0.231 |
| ## plotsize:utm:elev:tci            | 1.458e-02 | 0.195  |
| ## utme:utm:elev:tci                | 6.562e-11 | 0.599  |
| ## plotsize:utme:utm:streamdist     | 1.091e-04 | 0.201  |
| ## plotsize:utme:elev:streamdist    | 3.603e-05 | 0.224  |
| ## plotsize:utm:elev:streamdist     | 1.562e-03 | -0.193 |
| ## utme:utm:elev:streamdist         | 2.022e-12 | 1.678  |
| ## plotsize:utme:tci:streamdist     | 3.515e-01 | 0.194  |
| ## plotsize:utm:tci:streamdist      | 2.393e-02 | 0.090  |
| ## utme:utm:tci:streamdist          | 3.635e-10 | 1.300  |
| ## plotsize:elev:tci:streamdist     | 7.107e+00 | -0.199 |
| ## utme:elev:tci:streamdist         | 1.412e-06 | 1.878  |
| ## utmn:elev:tci:streamdist         | 9.012e-08 | 2.048  |
| ## plotsize:utme:utm:disturbLT-SEL  | 2.116e-02 | -0.121 |
| ## plotsize:utme:utm:disturbSETTLE  | 3.046e-02 | -0.141 |
| ## plotsize:utme:utm:disturbVIRGIN  | 2.484e-03 | 0.574  |
| ## plotsize:utme:elev:disturbLT-SEL | 3.793e+00 | 0.174  |
| ## plotsize:utme:elev:disturbSETTLE | 3.587e+00 | 0.175  |
| ## plotsize:utme:elev:disturbVIRGIN | 5.021e+00 | 0.179  |
| ## plotsize:utm:elev:disturbLT-SEL  | 5.368e+00 | 0.177  |
| ## plotsize:utm:elev:disturbSETTLE  | 4.202e+00 | 0.173  |
| ## plotsize:utm:elev:disturbVIRGIN  | 4.967e+00 | 0.174  |
| ## utme:utm:elev:disturbLT-SEL      | 5.632e-10 | 1.355  |
| ## utme:utm:elev:disturbSETTLE      | 1.796e-09 | 1.919  |

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| ## utme:utmn:elev:disturbVIRGIN           | 2.494e-09 | 0.536  |
| ## plotsize:utme:tcidisturbLT-SEL         | 8.251e+02 | 0.184  |
| ## plotsize:utme:tcidisturbSETTLE         | 9.324e+02 | 0.182  |
| ## plotsize:utme:tcidisturbVIRGIN         | 1.041e+03 | 0.185  |
| ## plotsize:utmn:tcidisturbLT-SEL         | 1.500e+02 | -0.157 |
| ## plotsize:utmn:tcidisturbSETTLE         | 3.896e+02 | 0.182  |
| ## plotsize:utmn:tcidisturbVIRGIN         | 4.555e+02 | 0.186  |
| ## utme:utmn:tcidisturbLT-SEL             | 8.861e-08 | 1.052  |
| ## utme:utmn:tcidisturbSETTLE             | 1.876e-07 | 1.734  |
| ## utme:utmn:tcidisturbVIRGIN             | 4.338e-07 | 0.622  |
| ## plotsize:elev:tcidisturbLT-SEL         | 2.025e+03 | -0.192 |
| ## plotsize:elev:tcidisturbSETTLE         | 2.784e+03 | -0.192 |
| ## plotsize:elev:tcidisturbVIRGIN         | NA        | NA     |
| ## utme:elev:tcidisturbLT-SEL             | 3.812e-04 | 1.189  |
| ## utme:elev:tcidisturbSETTLE             | 1.269e-03 | 1.790  |
| ## utme:elev:tcidisturbVIRGIN             | 1.669e-03 | 0.192  |
| ## utmn:elev:tcidisturbLT-SEL             | 2.307e-05 | 1.285  |
| ## utmn:elev:tcidisturbSETTLE             | 9.013e-05 | 1.852  |
| ## utmn:elev:tcidisturbVIRGIN             | 1.128e-04 | 0.018  |
| ## plotsize:utme:streamdist:disturbLT-SEL | 3.773e-01 | 0.184  |
| ## plotsize:utme:streamdist:disturbSETTLE | NA        | NA     |
| ## plotsize:utme:streamdist:disturbVIRGIN | NA        | NA     |
| ## plotsize:utmn:streamdist:disturbLT-SEL | NA        | NA     |
| ## plotsize:utmn:streamdist:disturbSETTLE | NA        | NA     |
| ## plotsize:utmn:streamdist:disturbVIRGIN | NA        | NA     |
| ## utme:utmn:streamdist:disturbLT-SEL     | 2.449e-09 | 2.163  |
| ## utme:utmn:streamdist:disturbSETTLE     | 6.594e-09 | 1.561  |
| ## utme:utmn:streamdist:disturbVIRGIN     | 2.894e-09 | 1.685  |
| ## plotsize:elev:streamdist:disturbLT-SEL | NA        | NA     |
| ## plotsize:elev:streamdist:disturbSETTLE | NA        | NA     |
| ## plotsize:elev:streamdist:disturbVIRGIN | NA        | NA     |
| ## utme:elev:streamdist:disturbLT-SEL     | 9.454e-06 | 2.163  |
| ## utme:elev:streamdist:disturbSETTLE     | 4.344e-05 | 1.611  |
| ## utme:elev:streamdist:disturbVIRGIN     | 9.322e-06 | 0.513  |
| ## utmn:elev:streamdist:disturbLT-SEL     | 5.903e-07 | 2.314  |
| ## utmn:elev:streamdist:disturbSETTLE     | 3.113e-06 | 1.724  |
| ## utmn:elev:streamdist:disturbVIRGIN     | 8.943e-07 | -0.098 |
| ## plotsize:tcidisturbLT-SEL              | NA        | NA     |
| ## plotsize:tcidisturbSETTLE              | NA        | NA     |
| ## plotsize:tcidisturbVIRGIN              | NA        | NA     |
| ## utme:tcidisturbLT-SEL                  | 1.655e-03 | 2.016  |
| ## utme:tcidisturbSETTLE                  | 4.211e-03 | 1.557  |
| ## utme:tcidisturbVIRGIN                  | 1.994e-03 | 1.284  |
| ## utmn:tcidisturbLT-SEL                  | 1.035e-04 | 2.116  |
| ## utmn:tcidisturbSETTLE                  | 2.987e-04 | 1.683  |
| ## utmn:tcidisturbVIRGIN                  | 1.184e-04 | 0.491  |
| ## elev:tcidisturbLT-SEL                  | 4.306e-01 | 2.308  |
| ## elev:tcidisturbSETTLE                  | 2.015e+00 | 1.775  |
| ## elev:tcidisturbVIRGIN                  | 3.510e-01 | -1.113 |
| ## plotsize:utme:utmn:beers               | NA        | NA     |
| ## plotsize:utme:elev:beers               | NA        | NA     |
| ## plotsize:utmn:elev:beers               | NA        | NA     |
| ## utme:utmn:elev:beers                   | 3.297e-10 | 0.832  |
| ## plotsize:utme:tcidisturbVIRGIN         | NA        | NA     |

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| ## plotsize:utm:tc:beers                   | NA        | NA     |
| ## utme:utm:tc:beers                       | 4.812e-08 | 0.895  |
| ## plotsize:elev:tc:beers                  | NA        | NA     |
| ## utme:elev:tc:beers                      | 1.877e-04 | 1.132  |
| ## utmn:elev:tc:beers                      | 1.156e-05 | 1.328  |
| ## plotsize:utme:streamdist:beers          | NA        | NA     |
| ## plotsize:utm:streamdist:beers           | NA        | NA     |
| ## utme:utm:streamdist:beers               | 2.284e-09 | 2.987  |
| ## plotsize:elev:streamdist:beers          | NA        | NA     |
| ## utme:elev:streamdist:beers              | 7.713e-06 | 3.349  |
| ## utmn:elev:streamdist:beers              | 4.956e-07 | 3.455  |
| ## plotsize:tc:streamdist:beers            | NA        | NA     |
| ## utme:tc:streamdist:beers                | 1.513e-03 | 3.393  |
| ## utmn:tc:streamdist:beers                | 9.696e-05 | 3.437  |
| ## elev:tc:streamdist:beers                | 3.471e-01 | 3.943  |
| ## plotsize:utme:disturbLT-SEL:beers       | NA        | NA     |
| ## plotsize:utme:disturbSETTLE:beers       | NA        | NA     |
| ## plotsize:utme:disturbVIRGIN:beers       | NA        | NA     |
| ## plotsize:utm:disturbLT-SEL:beers        | NA        | NA     |
| ## plotsize:utm:disturbSETTLE:beers        | NA        | NA     |
| ## plotsize:utm:disturbVIRGIN:beers        | NA        | NA     |
| ## utme:utm:disturbLT-SEL:beers            | 3.826e-07 | 1.445  |
| ## utme:utm:disturbSETTLE:beers            | 7.460e-07 | 0.892  |
| ## utme:utm:disturbVIRGIN:beers            | 1.890e-06 | 0.442  |
| ## plotsize:elev:disturbLT-SEL:beers       | NA        | NA     |
| ## plotsize:elev:disturbSETTLE:beers       | NA        | NA     |
| ## plotsize:elev:disturbVIRGIN:beers       | NA        | NA     |
| ## utme:elev:disturbLT-SEL:beers           | 1.632e-03 | 1.433  |
| ## utme:elev:disturbSETTLE:beers           | 4.450e-03 | 0.897  |
| ## utme:elev:disturbVIRGIN:beers           | 7.659e-03 | 0.063  |
| ## utmn:elev:disturbLT-SEL:beers           | 1.002e-04 | 1.536  |
| ## utmn:elev:disturbSETTLE:beers           | 2.979e-04 | 1.056  |
| ## utmn:elev:disturbVIRGIN:beers           | 4.874e-04 | -0.082 |
| ## plotsize:tc:disturbLT-SEL:beers         | NA        | NA     |
| ## plotsize:tc:disturbSETTLE:beers         | NA        | NA     |
| ## plotsize:tc:disturbVIRGIN:beers         | NA        | NA     |
| ## utme:tc:disturbLT-SEL:beers             | 2.476e-01 | 1.195  |
| ## utme:tc:disturbSETTLE:beers             | 3.496e-01 | 0.741  |
| ## utme:tc:disturbVIRGIN:beers             | 1.274e+00 | 0.140  |
| ## utmn:tc:disturbLT-SEL:beers             | 1.512e-02 | 1.291  |
| ## utmn:tc:disturbSETTLE:beers             | 2.337e-02 | 0.961  |
| ## utmn:tc:disturbVIRGIN:beers             | 8.141e-02 | -0.048 |
| ## elev:tc:disturbLT-SEL:beers             | 6.499e+01 | 1.497  |
| ## elev:tc:disturbSETTLE:beers             | 1.447e+02 | 1.163  |
| ## elev:tc:disturbVIRGIN:beers             | 3.363e+02 | -0.427 |
| ## plotsize:streamdist:disturbLT-SEL:beers | NA        | NA     |
| ## plotsize:streamdist:disturbSETTLE:beers | NA        | NA     |
| ## plotsize:streamdist:disturbVIRGIN:beers | NA        | NA     |
| ## utme:streamdist:disturbLT-SEL:beers     | 9.496e-03 | 3.213  |
| ## utme:streamdist:disturbSETTLE:beers     | 1.210e-02 | 0.257  |
| ## utme:streamdist:disturbVIRGIN:beers     | 1.036e-02 | 0.204  |
| ## utmn:streamdist:disturbLT-SEL:beers     | 6.057e-04 | 3.246  |
| ## utmn:streamdist:disturbSETTLE:beers     | 7.640e-04 | 0.626  |
| ## utmn:streamdist:disturbVIRGIN:beers     | 8.643e-04 | -0.110 |

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| ## elev:streamdist:disturbLT-SEL:beers         | 2.151e+00 | 3.336  |
| ## elev:streamdist:disturbSETTLE:beers         | 4.696e+00 | -0.077 |
| ## elev:streamdist:disturbVIRGIN:beers         | 2.544e+00 | -0.515 |
| ## tci:streamdist:disturbLT-SEL:beers          | 4.080e+02 | 3.568  |
| ## tci:streamdist:disturbSETTLE:beers          | 2.915e+02 | 1.599  |
| ## tci:streamdist:disturbVIRGIN:beers          | 5.284e+02 | -0.076 |
| ## plotsize:utme:utmn:elev:tci                 | NA        | NA     |
| ## plotsize:utme:utmn:elev:streamdist          | NA        | NA     |
| ## plotsize:utme:utmn:tci:streamdist           | NA        | NA     |
| ## plotsize:utme:elev:tci:streamdist           | NA        | NA     |
| ## plotsize:utmn:elev:tci:streamdist           | NA        | NA     |
| ## utme:utmn:elev:tci:streamdist               | 3.585e-13 | -1.880 |
| ## plotsize:utme:utmn:elev:disturbLT-SEL       | NA        | NA     |
| ## plotsize:utme:utmn:elev:disturbSETTLE       | NA        | NA     |
| ## plotsize:utme:utmn:elev:disturbVIRGIN       | NA        | NA     |
| ## plotsize:utme:utmn:tci:disturbLT-SEL        | NA        | NA     |
| ## plotsize:utme:utmn:tci:disturbSETTLE        | NA        | NA     |
| ## plotsize:utme:utmn:tci:disturbVIRGIN        | NA        | NA     |
| ## plotsize:utme:elev:tci:disturbLT-SEL        | NA        | NA     |
| ## plotsize:utme:elev:tci:disturbSETTLE        | NA        | NA     |
| ## plotsize:utme:elev:tci:disturbVIRGIN        | NA        | NA     |
| ## plotsize:utmn:elev:tci:disturbLT-SEL        | NA        | NA     |
| ## plotsize:utmn:elev:tci:disturbSETTLE        | NA        | NA     |
| ## plotsize:utmn:elev:tci:disturbVIRGIN        | NA        | NA     |
| ## utme:utmn:elev:tci:disturbLT-SEL            | 9.668e-11 | -1.189 |
| ## utme:utmn:elev:tci:disturbSETTLE            | 3.218e-10 | -1.790 |
| ## utme:utmn:elev:tci:disturbVIRGIN            | 4.237e-10 | -0.191 |
| ## plotsize:utme:utmn:streamdist:disturbLT-SEL | NA        | NA     |
| ## plotsize:utme:utmn:streamdist:disturbSETTLE | NA        | NA     |
| ## plotsize:utme:utmn:streamdist:disturbVIRGIN | NA        | NA     |
| ## plotsize:utme:elev:streamdist:disturbLT-SEL | NA        | NA     |
| ## plotsize:utme:elev:streamdist:disturbSETTLE | NA        | NA     |
| ## plotsize:utme:elev:streamdist:disturbVIRGIN | NA        | NA     |
| ## plotsize:utmn:elev:streamdist:disturbLT-SEL | NA        | NA     |
| ## plotsize:utmn:elev:streamdist:disturbSETTLE | NA        | NA     |
| ## plotsize:utmn:elev:streamdist:disturbVIRGIN | NA        | NA     |
| ## utme:utmn:elev:streamdist:disturbLT-SEL     | 2.399e-12 | -2.164 |
| ## utme:utmn:elev:streamdist:disturbSETTLE     | 1.102e-11 | -1.612 |
| ## utme:utmn:elev:streamdist:disturbVIRGIN     | 2.378e-12 | -0.499 |
| ## plotsize:utme:tci:streamdist:disturbLT-SEL  | NA        | NA     |
| ## plotsize:utme:tci:streamdist:disturbSETTLE  | NA        | NA     |
| ## plotsize:utme:tci:streamdist:disturbVIRGIN  | NA        | NA     |
| ## plotsize:utmn:tci:streamdist:disturbLT-SEL  | NA        | NA     |
| ## plotsize:utmn:tci:streamdist:disturbSETTLE  | NA        | NA     |
| ## plotsize:utmn:tci:streamdist:disturbVIRGIN  | NA        | NA     |
| ## utme:utmn:tci:streamdist:disturbLT-SEL      | 4.196e-10 | -2.018 |
| ## utme:utmn:tci:streamdist:disturbSETTLE      | 1.068e-09 | -1.559 |
| ## utme:utmn:tci:streamdist:disturbVIRGIN      | 5.031e-10 | -1.280 |
| ## plotsize:elev:tci:streamdist:disturbLT-SEL  | NA        | NA     |
| ## plotsize:elev:tci:streamdist:disturbSETTLE  | NA        | NA     |
| ## plotsize:elev:tci:streamdist:disturbVIRGIN  | NA        | NA     |
| ## utme:elev:tci:streamdist:disturbLT-SEL      | 1.745e-06 | -2.175 |
| ## utme:elev:tci:streamdist:disturbSETTLE      | 7.103e-06 | -1.682 |
| ## utme:elev:tci:streamdist:disturbVIRGIN      | 2.193e-08 | -0.920 |

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| ## utmn:elev:tc:streamdist:disturbLT-SEL        | 1.093e-07 | -2.310 |
| ## utmn:elev:tc:streamdist:disturbSETTLE        | 5.112e-07 | -1.776 |
| ## utmn:elev:tc:streamdist:disturbVIRGIN        | 9.034e-08 | 1.113  |
| ## plotsize:utme:utmn:elev:beers                | NA        | NA     |
| ## plotsize:utme:utmn:tc:beers                  | NA        | NA     |
| ## plotsize:utme:elev:tc:beers                  | NA        | NA     |
| ## plotsize:utmn:elev:tc:beers                  | NA        | NA     |
| ## utme:utmn:elev:tc:beers                      | 4.764e-11 | -1.132 |
| ## plotsize:utme:utmn:streamdist:beers          | NA        | NA     |
| ## plotsize:utme:elev:streamdist:beers          | NA        | NA     |
| ## plotsize:utmn:elev:streamdist:beers          | NA        | NA     |
| ## utme:utmn:elev:streamdist:beers              | 1.957e-12 | -3.350 |
| ## plotsize:utme:tc:streamdist:beers            | NA        | NA     |
| ## plotsize:utmn:tc:streamdist:beers            | NA        | NA     |
| ## utme:utmn:tc:streamdist:beers                | 3.837e-10 | -3.395 |
| ## plotsize:elev:tc:streamdist:beers            | NA        | NA     |
| ## utme:elev:tc:streamdist:beers                | 1.371e-06 | -3.856 |
| ## utmn:elev:tc:streamdist:beers                | 8.809e-08 | -3.944 |
| ## plotsize:utme:utmn:disturbLT-SEL:beers       | NA        | NA     |
| ## plotsize:utme:utmn:disturbSETTLE:beers       | NA        | NA     |
| ## plotsize:utme:utmn:disturbVIRGIN:beers       | NA        | NA     |
| ## plotsize:utme:elev:disturbLT-SEL:beers       | NA        | NA     |
| ## plotsize:utme:elev:disturbSETTLE:beers       | NA        | NA     |
| ## plotsize:utme:elev:disturbVIRGIN:beers       | NA        | NA     |
| ## plotsize:utmn:elev:disturbLT-SEL:beers       | NA        | NA     |
| ## plotsize:utmn:elev:disturbSETTLE:beers       | NA        | NA     |
| ## plotsize:utmn:elev:disturbVIRGIN:beers       | NA        | NA     |
| ## utme:utmn:elev:disturbLT-SEL:beers           | 4.141e-10 | -1.433 |
| ## utme:utmn:elev:disturbSETTLE:beers           | 1.128e-09 | -0.899 |
| ## utme:utmn:elev:disturbVIRGIN:beers           | 1.944e-09 | -0.061 |
| ## plotsize:utme:tc:disturbLT-SEL:beers         | NA        | NA     |
| ## plotsize:utme:tc:disturbSETTLE:beers         | NA        | NA     |
| ## plotsize:utme:tc:disturbVIRGIN:beers         | NA        | NA     |
| ## plotsize:utmn:tc:disturbLT-SEL:beers         | NA        | NA     |
| ## plotsize:utmn:tc:disturbSETTLE:beers         | NA        | NA     |
| ## plotsize:utmn:tc:disturbVIRGIN:beers         | NA        | NA     |
| ## utme:utmn:tc:disturbLT-SEL:beers             | 6.281e-08 | -1.196 |
| ## utme:utmn:tc:disturbSETTLE:beers             | 4.183e-04 | -0.190 |
| ## utme:utmn:tc:disturbVIRGIN:beers             | 3.233e-07 | -0.138 |
| ## plotsize:elev:tc:disturbLT-SEL:beers         | NA        | NA     |
| ## plotsize:elev:tc:disturbSETTLE:beers         | NA        | NA     |
| ## plotsize:elev:tc:disturbVIRGIN:beers         | NA        | NA     |
| ## utme:elev:tc:disturbLT-SEL:beers             | 2.713e-04 | -1.393 |
| ## utme:elev:tc:disturbSETTLE:beers             | 5.292e-04 | -0.989 |
| ## utme:elev:tc:disturbVIRGIN:beers             | 1.330e-03 | 0.228  |
| ## utmn:elev:tc:disturbLT-SEL:beers             | 1.649e-05 | -1.498 |
| ## utmn:elev:tc:disturbSETTLE:beers             | 3.671e-05 | -1.165 |
| ## utmn:elev:tc:disturbVIRGIN:beers             | 8.535e-05 | 0.429  |
| ## plotsize:utme:streamdist:disturbLT-SEL:beers | NA        | NA     |
| ## plotsize:utme:streamdist:disturbSETTLE:beers | NA        | NA     |
| ## plotsize:utme:streamdist:disturbVIRGIN:beers | NA        | NA     |
| ## plotsize:utmn:streamdist:disturbLT-SEL:beers | NA        | NA     |
| ## plotsize:utmn:streamdist:disturbSETTLE:beers | NA        | NA     |
| ## plotsize:utmn:streamdist:disturbVIRGIN:beers | NA        | NA     |

|   |           |        |
|---|-----------|--------|
| ## utme:utmn:streamdist:disturbLT-SEL:beers         | 2.408e-09 | -3.215 |
| ## utme:utmn:streamdist:disturbSETTLE:beers         | 3.063e-09 | -0.265 |
| ## utme:utmn:streamdist:disturbVIRGIN:beers         | 2.636e-09 | -0.193 |
| ## plotsize:elev:streamdist:disturbLT-SEL:beers     | NA        | NA     |
| ## plotsize:elev:streamdist:disturbSETTLE:beers     | NA        | NA     |
| ## plotsize:elev:streamdist:disturbVIRGIN:beers     | NA        | NA     |
| ## utme:elev:streamdist:disturbLT-SEL:beers         | 8.592e-06 | -3.239 |
| ## utme:elev:streamdist:disturbSETTLE:beers         | 1.811e-05 | 0.445  |
| ## utme:elev:streamdist:disturbVIRGIN:beers         | 6.741e-06 | 0.201  |
| ## utmn:elev:streamdist:disturbLT-SEL:beers         | 5.459e-07 | -3.338 |
| ## utmn:elev:streamdist:disturbSETTLE:beers         | 1.189e-06 | 0.071  |
| ## utmn:elev:streamdist:disturbVIRGIN:beers         | 6.489e-07 | 0.520  |
| ## plotsize:tci:streamdist:disturbLT-SEL:beers      | NA        | NA     |
| ## plotsize:tci:streamdist:disturbSETTLE:beers      | NA        | NA     |
| ## plotsize:tci:streamdist:disturbVIRGIN:beers      | NA        | NA     |
| ## utme:tci:streamdist:disturbLT-SEL:beers          | 1.628e-03 | -3.540 |
| ## utme:tci:streamdist:disturbSETTLE:beers          | 1.183e-03 | -0.822 |
| ## utme:tci:streamdist:disturbVIRGIN:beers          | 1.967e-03 | -0.430 |
| ## utmn:tci:streamdist:disturbLT-SEL:beers          | 1.035e-04 | -3.571 |
| ## utmn:tci:streamdist:disturbSETTLE:beers          | 7.388e-05 | -1.613 |
| ## utmn:tci:streamdist:disturbVIRGIN:beers          | 1.345e-04 | 0.086  |
| ## elev:tci:streamdist:disturbLT-SEL:beers          | 3.912e-01 | -3.634 |
| ## elev:tci:streamdist:disturbSETTLE:beers          | 1.492e-01 | -2.273 |
| ## elev:tci:streamdist:disturbVIRGIN:beers          | 2.281e-01 | 1.119  |
| ## plotsize:utme:utmn:elev:tci:streamdist           | NA        | NA     |
| ## plotsize:utme:utmn:elev:tci:disturbLT-SEL        | NA        | NA     |
| ## plotsize:utme:utmn:elev:tci:disturbSETTLE        | NA        | NA     |
| ## plotsize:utme:utmn:elev:tci:disturbVIRGIN        | NA        | NA     |
| ## plotsize:utme:utmn:elev:streamdist:disturbLT-SEL | NA        | NA     |
| ## plotsize:utme:utmn:elev:streamdist:disturbSETTLE | NA        | NA     |
| ## plotsize:utme:utmn:elev:streamdist:disturbVIRGIN | NA        | NA     |
| ## plotsize:utme:utmn:tci:streamdist:disturbLT-SEL  | NA        | NA     |
| ## plotsize:utme:utmn:tci:streamdist:disturbSETTLE  | NA        | NA     |
| ## plotsize:utme:utmn:tci:streamdist:disturbVIRGIN  | NA        | NA     |
| ## plotsize:utme:elev:tci:streamdist:disturbLT-SEL  | NA        | NA     |
| ## plotsize:utme:elev:tci:streamdist:disturbSETTLE  | NA        | NA     |
| ## plotsize:utme:elev:tci:streamdist:disturbVIRGIN  | NA        | NA     |
| ## plotsize:utmn:elev:tci:streamdist:disturbLT-SEL  | NA        | NA     |
| ## plotsize:utmn:elev:tci:streamdist:disturbSETTLE  | NA        | NA     |
| ## plotsize:utmn:elev:tci:streamdist:disturbVIRGIN  | NA        | NA     |
| ## utme:utmn:elev:tci:streamdist:disturbLT-SEL      | 4.429e-13 | 2.177  |
| ## utme:utmn:elev:tci:streamdist:disturbSETTLE      | 1.802e-12 | 1.683  |
| ## utme:utmn:elev:tci:streamdist:disturbVIRGIN      | NA        | NA     |
| ## plotsize:utme:utmn:elev:tci:beers                | NA        | NA     |
| ## plotsize:utme:utmn:elev:streamdist:beers         | NA        | NA     |
| ## plotsize:utme:utmn:tci:streamdist:beers          | NA        | NA     |
| ## plotsize:utme:elev:tci:streamdist:beers          | NA        | NA     |
| ## plotsize:utmn:elev:tci:streamdist:beers          | NA        | NA     |
| ## utme:utmn:elev:tci:streamdist:beers              | 3.481e-13 | 3.856  |
| ## plotsize:utme:utmn:elev:disturbLT-SEL:beers      | NA        | NA     |
| ## plotsize:utme:utmn:elev:disturbSETTLE:beers      | NA        | NA     |
| ## plotsize:utme:utmn:elev:disturbVIRGIN:beers      | NA        | NA     |
| ## plotsize:utme:utmn:tci:disturbLT-SEL:beers       | NA        | NA     |
| ## plotsize:utme:utmn:tci:disturbSETTLE:beers       | 4.183e-07 | 0.189  |



|   |           |        |
|---|-----------|--------|
| ## plotsize:utme:utmn:tc:disturbVIRGIN:beers              | NA        | NA     |
| ## plotsize:utme:elev:tc:disturbLT-SEL:beers              | NA        | NA     |
| ## plotsize:utme:elev:tc:disturbSETTLE:beers              | NA        | NA     |
| ## plotsize:utme:elev:tc:disturbVIRGIN:beers              | NA        | NA     |
| ## plotsize:utmn:elev:tc:disturbLT-SEL:beers              | NA        | NA     |
| ## plotsize:utmn:elev:tc:disturbSETTLE:beers              | NA        | NA     |
| ## plotsize:utmn:elev:tc:disturbVIRGIN:beers              | NA        | NA     |
| ## utme:utmn:elev:tc:disturbLT-SEL:beers                  | 6.884e-11 | 1.393  |
| ## utme:utmn:elev:tc:disturbSETTLE:beers                  | 7.789e-08 | -0.162 |
| ## utme:utmn:elev:tc:disturbVIRGIN:beers                  | 3.376e-10 | -0.230 |
| ## plotsize:utme:utmn:streamdist:disturbLT-SEL:beers      | NA        | NA     |
| ## plotsize:utme:utmn:streamdist:disturbSETTLE:beers      | NA        | NA     |
| ## plotsize:utme:utmn:streamdist:disturbVIRGIN:beers      | NA        | NA     |
| ## plotsize:utme:elev:streamdist:disturbLT-SEL:beers      | NA        | NA     |
| ## plotsize:utme:elev:streamdist:disturbSETTLE:beers      | NA        | NA     |
| ## plotsize:utme:elev:streamdist:disturbVIRGIN:beers      | NA        | NA     |
| ## plotsize:utmn:elev:streamdist:disturbLT-SEL:beers      | NA        | NA     |
| ## plotsize:utmn:elev:streamdist:disturbSETTLE:beers      | NA        | NA     |
| ## plotsize:utmn:elev:streamdist:disturbVIRGIN:beers      | NA        | NA     |
| ## utme:utmn:elev:streamdist:disturbLT-SEL:beers          | 2.180e-12 | 3.241  |
| ## utme:utmn:elev:streamdist:disturbSETTLE:beers          | 4.586e-12 | -0.439 |
| ## utme:utmn:elev:streamdist:disturbVIRGIN:beers          | 1.720e-12 | -0.212 |
| ## plotsize:utme:tc:streamdist:disturbLT-SEL:beers        | NA        | NA     |
| ## plotsize:utme:tc:streamdist:disturbSETTLE:beers        | NA        | NA     |
| ## plotsize:utme:tc:streamdist:disturbVIRGIN:beers        | NA        | NA     |
| ## plotsize:utmn:tc:streamdist:disturbLT-SEL:beers        | NA        | NA     |
| ## plotsize:utmn:tc:streamdist:disturbSETTLE:beers        | NA        | NA     |
| ## plotsize:utmn:tc:streamdist:disturbVIRGIN:beers        | NA        | NA     |
| ## utme:utmn:tc:streamdist:disturbLT-SEL:beers            | 4.129e-10 | 3.543  |
| ## utme:utmn:tc:streamdist:disturbSETTLE:beers            | 2.996e-10 | 0.839  |
| ## utme:utmn:tc:streamdist:disturbVIRGIN:beers            | 4.989e-10 | 0.420  |
| ## plotsize:elev:tc:streamdist:disturbLT-SEL:beers        | NA        | NA     |
| ## plotsize:elev:tc:streamdist:disturbSETTLE:beers        | NA        | NA     |
| ## plotsize:elev:tc:streamdist:disturbVIRGIN:beers        | NA        | NA     |
| ## utme:elev:tc:streamdist:disturbLT-SEL:beers            | 1.566e-06 | 3.545  |
| ## utme:elev:tc:streamdist:disturbSETTLE:beers            | 7.173e-09 | -3.269 |
| ## utme:elev:tc:streamdist:disturbVIRGIN:beers            | 1.396e-08 | 1.245  |
| ## utmn:elev:tc:streamdist:disturbLT-SEL:beers            | 9.927e-08 | 3.635  |
| ## utmn:elev:tc:streamdist:disturbSETTLE:beers            | 3.805e-08 | 2.293  |
| ## utmn:elev:tc:streamdist:disturbVIRGIN:beers            | 5.867e-08 | -1.124 |
| ## plotsize:utme:utmn:elev:tc:streamdist:disturbLT-SEL    | NA        | NA     |
| ## plotsize:utme:utmn:elev:tc:streamdist:disturbSETTLE    | NA        | NA     |
| ## plotsize:utme:utmn:elev:tc:streamdist:disturbVIRGIN    | NA        | NA     |
| ## plotsize:utme:utmn:elev:tc:streamdist:beers            | NA        | NA     |
| ## plotsize:utme:utmn:elev:tc:disturbLT-SEL:beers         | NA        | NA     |
| ## plotsize:utme:utmn:elev:tc:disturbSETTLE:beers         | 7.788e-11 | 0.164  |
| ## plotsize:utme:utmn:elev:tc:disturbVIRGIN:beers         | NA        | NA     |
| ## plotsize:utme:utmn:elev:streamdist:disturbLT-SEL:beers | NA        | NA     |
| ## plotsize:utme:utmn:elev:streamdist:disturbSETTLE:beers | NA        | NA     |
| ## plotsize:utme:utmn:elev:streamdist:disturbVIRGIN:beers | NA        | NA     |
| ## plotsize:utme:utmn:tc:streamdist:disturbLT-SEL:beers   | NA        | NA     |
| ## plotsize:utme:utmn:tc:streamdist:disturbSETTLE:beers   | NA        | NA     |
| ## plotsize:utme:utmn:tc:streamdist:disturbVIRGIN:beers   | NA        | NA     |
| ## plotsize:utme:elev:tc:streamdist:disturbLT-SEL:beers   | NA        | NA     |

|   |           |        |
|---|-----------|--------|
| ## plotsize:utme:elev:tci:streamdist:disturbSETTLE:beers      | NA        | NA     |
| ## plotsize:utme:elev:tci:streamdist:disturbVIRGIN:beers      | NA        | NA     |
| ## plotsize:utmn:elev:tci:streamdist:disturbLT-SEL:beers      | NA        | NA     |
| ## plotsize:utmn:elev:tci:streamdist:disturbSETTLE:beers      | NA        | NA     |
| ## plotsize:utmn:elev:tci:streamdist:disturbVIRGIN:beers      | NA        | NA     |
| ## utme:utmn:elev:tci:streamdist:disturbLT-SEL:beers          | 3.976e-13 | -3.547 |
| ## utme:utmn:elev:tci:streamdist:disturbSETTLE:beers          | NA        | NA     |
| ## utme:utmn:elev:tci:streamdist:disturbVIRGIN:beers          | NA        | NA     |
| ## plotsize:utme:utmn:elev:tci:streamdist:disturbLT-SEL:beers | NA        | NA     |
| ## plotsize:utme:utmn:elev:tci:streamdist:disturbSETTLE:beers | NA        | NA     |
| ## plotsize:utme:utmn:elev:tci:streamdist:disturbVIRGIN:beers | NA        | NA     |
| ##  | Pr(> t )  |        |
| ## (Intercept)  | 0.972535  |        |
| ## plotsize   | 0.972535  |        |
| ## utme   | 0.893397  |        |
| ## utmn   | 0.987429  |        |
| ## elev   | 0.853808  |        |
| ## tci  | 0.853174  |        |
| ## streamdist   | 0.840231  |        |
| ## disturbLT-SEL  | 0.569527  |        |
| ## disturbSETTLE  | 0.861216  |        |
| ## disturbVIRGIN  | 0.830544  |        |
| ## beers  | 0.899474  |        |
| ## plotsize:utme  | 0.893397  |        |
| ## plotsize:utmn  | 0.987429  |        |
| ## utme:utmn  | 0.891234  |        |
| ## plotsize:elev  | 0.853808  |        |
| ## utme:elev  | 0.858695  |        |
| ## utmn:elev  | 0.854405  |        |
| ## plotsize:tci   | 0.853174  |        |
| ## utme:tci   | 0.851485  |        |
| ## utmn:tci   | 0.852936  |        |
| ## elev:tci   | 0.850751  |        |
| ## plotsize:streamdist  | 0.840231  |        |
| ## utme:streamdist  | 0.840524  |        |
| ## utmn:streamdist  | 0.840228  |        |
| ## elev:streamdist  | 0.847356  |        |
| ## tci:streamdist   | 0.887741  |        |
| ## plotsize:disturbLT-SEL                                     | 0.569527  |        |
| ## plotsize:disturbSETTLE                                     | 0.861216  |        |
| ## plotsize:disturbVIRGIN                                     | 0.830544  |        |
| ## utme:disturbLT-SEL   | 0.909197  |        |
| ## utme:disturbSETTLE   | 0.890648  |        |
| ## utme:disturbVIRGIN   | 0.670256  |        |
| ## utmn:disturbLT-SEL   | 0.646616  |        |
| ## utmn:disturbSETTLE   | 0.969203  |        |
| ## utmn:disturbVIRGIN   | 0.828335  |        |
| ## elev:disturbLT-SEL   | 0.859308  |        |
| ## elev:disturbSETTLE   | 0.862713  |        |
| ## elev:disturbVIRGIN   | 0.861424  |        |
| ## tci:disturbLT-SEL  | 0.888078  |        |
| ## tci:disturbSETTLE  | 0.855630  |        |
| ## tci:disturbVIRGIN  | 0.852685  |        |
| ## streamdist:disturbLT-SEL                                   | 0.854481  |        |

|                                |          |
|--------------------------------|----------|
| ## streamdist:disturbSETTLE    | 0.826573 |
| ## streamdist:disturbVIRGIN    | 0.836956 |
| ## plotsize:beers              | 0.899469 |
| ## utme:beers                  | 0.838333 |
| ## utmn:beers                  | 0.926109 |
| ## elev:beers                  | 0.854627 |
| ## tci:beers                   | 0.851967 |
| ## streamdist:beers            | 0.901438 |
| ## disturbLT-SEL:beers         | 0.797972 |
| ## disturbSETTLE:beers         | 0.853146 |
| ## disturbVIRGIN:beers         | 0.850152 |
| ## plotsize:utme:utmn          | 0.891234 |
| ## plotsize:utme:elev          | 0.858695 |
| ## plotsize:utmn:elev          | 0.854405 |
| ## utme:utmn:elev              | 0.858833 |
| ## plotsize:utme:tci           | 0.851485 |
| ## plotsize:utmn:tci           | 0.852936 |
| ## utme:utmn:tci               | 0.850837 |
| ## plotsize:elev:tci           | 0.850752 |
| ## utme:elev:tci               | 0.817339 |
| ## utmn:elev:tci               | 0.845860 |
| ## plotsize:utme:streamdist    | 0.840524 |
| ## plotsize:utmn:streamdist    | 0.840228 |
| ## utme:utmn:streamdist        | 0.840524 |
| ## plotsize:elev:streamdist    | 0.847355 |
| ## utme:elev:streamdist        | 0.822810 |
| ## utmn:elev:streamdist        | 0.846961 |
| ## plotsize:tci:streamdist     | 0.887743 |
| ## utme:tci:streamdist         | 0.846260 |
| ## utmn:tci:streamdist         | 0.928519 |
| ## elev:tci:streamdist         | 0.842243 |
| ## plotsize:utme:disturbLT-SEL | 0.909197 |
| ## plotsize:utme:disturbSETTLE | 0.890648 |
| ## plotsize:utme:disturbVIRGIN | 0.670256 |
| ## plotsize:utmn:disturbLT-SEL | 0.646616 |
| ## plotsize:utmn:disturbSETTLE | 0.969203 |
| ## plotsize:utmn:disturbVIRGIN | 0.828335 |
| ## utme:utmn:disturbLT-SEL     | 0.904012 |
| ## utme:utmn:disturbSETTLE     | 0.888255 |
| ## utme:utmn:disturbVIRGIN     | 0.566070 |
| ## plotsize:elev:disturbLT-SEL | 0.859308 |
| ## plotsize:elev:disturbSETTLE | 0.862713 |
| ## plotsize:elev:disturbVIRGIN | 0.861424 |
| ## utme:elev:disturbLT-SEL     | 0.861585 |
| ## utme:elev:disturbSETTLE     | 0.861030 |
| ## utme:elev:disturbVIRGIN     | 0.857983 |
| ## utmn:elev:disturbLT-SEL     | 0.859193 |
| ## utmn:elev:disturbSETTLE     | 0.862799 |
| ## utmn:elev:disturbVIRGIN     | 0.861672 |
| ## plotsize:tci:disturbLT-SEL  | 0.888078 |
| ## plotsize:tci:disturbSETTLE  | 0.855630 |
| ## plotsize:tci:disturbVIRGIN  | 0.852685 |
| ## utme:tci:disturbLT-SEL      | 0.853791 |
| ## utme:tci:disturbSETTLE      | 0.855546 |

```

## utme:tc:disturbVIRGIN 0.853441
## utmn:tc:disturbLT-SEL 0.875080
## utmn:tc:disturbSETTLE 0.855628
## utmn:tc:disturbVIRGIN 0.852563
## elev:tc:disturbLT-SEL 0.847871
## elev:tc:disturbSETTLE 0.847670
## elev:tc:disturbVIRGIN 0.984505
## plotsize:streamdist:disturbLT-SEL 0.854524
## plotsize:streamdist:disturbSETTLE 0.823687
## plotsize:streamdist:disturbVIRGIN 0.835869
## utme:streamdist:disturbLT-SEL 0.854433
## utme:streamdist:disturbSETTLE 0.119427
## utme:streamdist:disturbVIRGIN 0.090215 .
## utmn:streamdist:disturbLT-SEL 0.024095 *
## utmn:streamdist:disturbSETTLE 0.091893 .
## utmn:streamdist:disturbVIRGIN 0.370823
## elev:streamdist:disturbLT-SEL 0.021153 *
## elev:streamdist:disturbSETTLE 0.085463 .
## elev:streamdist:disturbVIRGIN 0.927733
## tci:streamdist:disturbLT-SEL 0.035062 *
## tci:streamdist:disturbSETTLE 0.093217 .
## tci:streamdist:disturbVIRGIN 0.612194
## plotsize:utme:beers 0.838322
## plotsize:utmn:beers 0.926103
## utme:utmn:beers 0.336074
## plotsize:elev:beers 0.854754
## utme:elev:beers 0.406097
## utmn:elev:beers 0.322560
## plotsize:tci:beers 0.852039
## utme:tci:beers 0.371202
## utmn:tci:beers 0.294525
## elev:tci:beers 0.185000
## plotsize:streamdist:beers 0.869047
## utme:streamdist:beers 0.002978 **
## utmn:streamdist:beers 0.002513 **
## elev:streamdist:beers 0.000604 ***
## tci:streamdist:beers 0.000646 ***
## plotsize:disturbLT-SEL:beers 0.797240
## plotsize:disturbSETTLE:beers 0.853282
## plotsize:disturbVIRGIN:beers 0.850345
## utme:disturbLT-SEL:beers 0.149128
## utme:disturbSETTLE:beers 0.373978
## utme:disturbVIRGIN:beers 0.657877
## utmn:disturbLT-SEL:beers 0.122566
## utmn:disturbSETTLE:beers 0.291474
## utmn:disturbVIRGIN:beers 0.748116
## elev:disturbLT-SEL:beers 0.125077
## elev:disturbSETTLE:beers 0.292549
## elev:disturbVIRGIN:beers 0.935705
## tci:disturbLT-SEL:beers 0.197545
## tci:disturbSETTLE:beers 0.338197
## tci:disturbVIRGIN:beers 0.963367
## streamdist:disturbLT-SEL:beers 0.001266 **
## streamdist:disturbSETTLE:beers 0.536650

```

```

## streamdist:disturbVIRGIN:beers 0.918144
## plotsize:utme:utmn:elev 0.858833
## plotsize:utme:utmn:tc1 0.850837
## plotsize:utme:elev:tc1 0.817334
## plotsize:utmn:elev:tc1 0.845860
## utme:utmn:elev:tc1 0.549235
## plotsize:utme:utmn:streamdist 0.840524
## plotsize:utme:elev:streamdist 0.823096
## plotsize:utmn:elev:streamdist 0.846961
## utme:utmn:elev:streamdist 0.094017 .
## plotsize:utme:tc1:streamdist 0.846265
## plotsize:utmn:tc1:streamdist 0.928523
## utme:utmn:tc1:streamdist 0.194367
## plotsize:elev:tc1:streamdist 0.842163
## utme:elev:tc1:streamdist 0.060953 .
## utmn:elev:tc1:streamdist 0.041083 *
## plotsize:utme:utmn:disturbLT-SEL 0.904012
## plotsize:utme:utmn:disturbSETTLE 0.888255
## plotsize:utme:utmn:disturbVIRGIN 0.566071
## plotsize:utme:elev:disturbLT-SEL 0.861586
## plotsize:utme:elev:disturbSETTLE 0.861033
## plotsize:utme:elev:disturbVIRGIN 0.857984
## plotsize:utmn:elev:disturbLT-SEL 0.859193
## plotsize:utmn:elev:disturbSETTLE 0.862799
## plotsize:utmn:elev:disturbVIRGIN 0.861672
## utme:utmn:elev:disturbLT-SEL 0.176022
## utme:utmn:elev:disturbSETTLE 0.055641 .
## utme:utmn:elev:disturbVIRGIN 0.592044
## plotsize:utme:tc1:disturbLT-SEL 0.853791
## plotsize:utme:tc1:disturbSETTLE 0.855547
## plotsize:utme:tc1:disturbVIRGIN 0.853442
## plotsize:utmn:tc1:disturbLT-SEL 0.875080
## plotsize:utmn:tc1:disturbSETTLE 0.855628
## plotsize:utmn:tc1:disturbVIRGIN 0.852563
## utme:utmn:tc1:disturbLT-SEL 0.293285
## utme:utmn:tc1:disturbSETTLE 0.083662 .
## utme:utmn:tc1:disturbVIRGIN 0.534361
## plotsize:elev:tc1:disturbLT-SEL 0.847826
## plotsize:elev:tc1:disturbSETTLE 0.847483
## plotsize:elev:tc1:disturbVIRGIN NA
## utme:elev:tc1:disturbLT-SEL 0.235143
## utme:elev:tc1:disturbSETTLE 0.074106 .
## utme:elev:tc1:disturbVIRGIN 0.848200
## utmn:elev:tc1:disturbLT-SEL 0.199555
## utmn:elev:tc1:disturbSETTLE 0.064673 .
## utmn:elev:tc1:disturbVIRGIN 0.985320
## plotsize:utme:streamdist:disturbLT-SEL 0.854476
## plotsize:utme:streamdist:disturbSETTLE NA
## plotsize:utme:streamdist:disturbVIRGIN NA
## plotsize:utmn:streamdist:disturbLT-SEL NA
## plotsize:utmn:streamdist:disturbSETTLE NA
## plotsize:utmn:streamdist:disturbVIRGIN NA
## utme:utmn:streamdist:disturbLT-SEL 0.031039 *
## utme:utmn:streamdist:disturbSETTLE 0.119142

```

```

## utme:utm:streamdist:disturbVIRGIN 0.092718 .
## plotsize:elev:streamdist:disturbLT-SEL NA
## plotsize:elev:streamdist:disturbSETTLE NA
## plotsize:elev:streamdist:disturbVIRGIN NA
## utme:elev:streamdist:disturbLT-SEL 0.031084 *
## utme:elev:streamdist:disturbSETTLE 0.107843
## utme:elev:streamdist:disturbVIRGIN 0.608120
## utmn:elev:streamdist:disturbLT-SEL 0.021089 *
## utmn:elev:streamdist:disturbSETTLE 0.085294 .
## utmn:elev:streamdist:disturbVIRGIN 0.922031
## plotsize:tci:streamdist:disturbLT-SEL NA
## plotsize:tci:streamdist:disturbSETTLE NA
## plotsize:tci:streamdist:disturbVIRGIN NA
## utme:tci:streamdist:disturbLT-SEL 0.044361 *
## utme:tci:streamdist:disturbSETTLE 0.120066
## utme:tci:streamdist:disturbVIRGIN 0.199680
## utmn:tci:streamdist:disturbLT-SEL 0.034874 *
## utmn:tci:streamdist:disturbSETTLE 0.093001 .
## utmn:tci:streamdist:disturbVIRGIN 0.623676
## elev:tci:streamdist:disturbLT-SEL 0.021430 *
## elev:tci:streamdist:disturbSETTLE 0.076509 .
## elev:tci:streamdist:disturbVIRGIN 0.266125
## plotsize:utme:utm:beers NA
## plotsize:utme:elev:beers NA
## plotsize:utm:elev:beers NA
## utme:utm:elev:beers 0.406106
## plotsize:utme:tci:beers NA
## plotsize:utm:tci:beers NA
## utme:utm:tci:beers 0.371240
## plotsize:elev:tci:beers NA
## utme:elev:tci:beers 0.258403
## utmn:elev:tci:beers 0.184931
## plotsize:utme:streamdist:beers NA
## plotsize:utm:streamdist:beers NA
## utme:utm:streamdist:beers 0.002961 **
## plotsize:elev:streamdist:beers NA
## utme:elev:streamdist:beers 0.000877 ***
## utmn:elev:streamdist:beers 0.000601 ***
## plotsize:tci:streamdist:beers NA
## utme:tci:streamdist:beers 0.000750 ***
## utmn:tci:streamdist:beers 0.000641 ***
## elev:tci:streamdist:beers 9.28e-05 ***
## plotsize:utme:disturbLT-SEL:beers NA
## plotsize:utme:disturbSETTLE:beers NA
## plotsize:utme:disturbVIRGIN:beers NA
## plotsize:utm:disturbLT-SEL:beers NA
## plotsize:utm:disturbSETTLE:beers NA
## plotsize:utm:disturbVIRGIN:beers NA
## utme:utm:disturbLT-SEL:beers 0.149136
## utme:utm:disturbSETTLE:beers 0.372783
## utme:utm:disturbVIRGIN:beers 0.658762
## plotsize:elev:disturbLT-SEL:beers NA
## plotsize:elev:disturbSETTLE:beers NA
## plotsize:elev:disturbVIRGIN:beers NA

```

```

## utme:elev:disturbLT-SEL:beers 0.152570
## utme:elev:disturbSETTLE:beers 0.369967
## utme:elev:disturbVIRGIN:beers 0.950062
## utmn:elev:disturbLT-SEL:beers 0.125092
## utmn:elev:disturbSETTLE:beers 0.291671
## utmn:elev:disturbVIRGIN:beers 0.934651
## plotsize:tci:disturbLT-SEL:beers NA
## plotsize:tci:disturbSETTLE:beers NA
## plotsize:tci:disturbVIRGIN:beers NA
## utme:tci:disturbLT-SEL:beers 0.232504
## utme:tci:disturbSETTLE:beers 0.459163
## utme:tci:disturbVIRGIN:beers 0.888954
## utmn:tci:disturbLT-SEL:beers 0.197386
## utmn:tci:disturbSETTLE:beers 0.337087
## utmn:tci:disturbVIRGIN:beers 0.961995
## elev:tci:disturbLT-SEL:beers 0.135003
## elev:tci:disturbSETTLE:beers 0.245356
## elev:tci:disturbVIRGIN:beers 0.669240
## plotsize:streamdist:disturbLT-SEL:beers NA
## plotsize:streamdist:disturbSETTLE:beers NA
## plotsize:streamdist:disturbVIRGIN:beers NA
## utme:streamdist:disturbLT-SEL:beers 0.001405 **
## utme:streamdist:disturbSETTLE:beers 0.797447
## utme:streamdist:disturbVIRGIN:beers 0.838769
## utmn:streamdist:disturbLT-SEL:beers 0.001256 **
## utmn:streamdist:disturbSETTLE:beers 0.531607
## utmn:streamdist:disturbVIRGIN:beers 0.912376
## elev:streamdist:disturbLT-SEL:beers 0.000917 ***
## elev:streamdist:disturbSETTLE:beers 0.938545
## elev:streamdist:disturbVIRGIN:beers 0.607141
## tci:streamdist:disturbLT-SEL:beers 0.000397 ***
## tci:streamdist:disturbSETTLE:beers 0.110577
## tci:streamdist:disturbVIRGIN:beers 0.939549
## plotsize:utme:utmn:elev:tci NA
## plotsize:utme:utmn:elev:streamdist NA
## plotsize:utme:utmn:tci:streamdist NA
## plotsize:utme:elev:tci:streamdist NA
## plotsize:utmn:elev:tci:streamdist NA
## utme:utmn:elev:tci:streamdist 0.060772 .
## plotsize:utme:utmn:elev:disturbLT-SEL NA
## plotsize:utme:utmn:elev:disturbSETTLE NA
## plotsize:utme:utmn:elev:disturbVIRGIN NA
## plotsize:utme:utmn:tci:disturbLT-SEL NA
## plotsize:utme:utmn:tci:disturbSETTLE NA
## plotsize:utme:utmn:tci:disturbVIRGIN NA
## plotsize:utme:elev:tci:disturbLT-SEL NA
## plotsize:utme:elev:tci:disturbSETTLE NA
## plotsize:utme:elev:tci:disturbVIRGIN NA
## plotsize:utmn:elev:tci:disturbLT-SEL NA
## plotsize:utmn:elev:tci:disturbSETTLE NA
## plotsize:utmn:elev:tci:disturbVIRGIN NA
## utme:utmn:elev:tci:disturbLT-SEL 0.235102
## utme:utmn:elev:tci:disturbSETTLE 0.074090 .
## utme:utmn:elev:tci:disturbVIRGIN 0.848989

```

```

## plotsize:utme:utmn:streamdist:disturbLT-SEL      NA
## plotsize:utme:utmn:streamdist:disturbSETTLE      NA
## plotsize:utme:utmn:streamdist:disturbVIRGIN      NA
## plotsize:utme:elev:streamdist:disturbLT-SEL      NA
## plotsize:utme:elev:streamdist:disturbSETTLE      NA
## plotsize:utme:elev:streamdist:disturbVIRGIN      NA
## plotsize:utmn:elev:streamdist:disturbLT-SEL      NA
## plotsize:utmn:elev:streamdist:disturbSETTLE      NA
## plotsize:utmn:elev:streamdist:disturbVIRGIN      NA
## utme:utmn:elev:streamdist:disturbLT-SEL          0.031002 *
## utme:utmn:elev:streamdist:disturbSETTLE          0.107561
## utme:utmn:elev:streamdist:disturbVIRGIN          0.617730
## plotsize:utme:tc:streamdist:disturbLT-SEL      NA
## plotsize:utme:tc:streamdist:disturbSETTLE      NA
## plotsize:utme:tc:streamdist:disturbVIRGIN      NA
## plotsize:utmn:tc:streamdist:disturbLT-SEL      NA
## plotsize:utmn:tc:streamdist:disturbSETTLE      NA
## plotsize:utmn:tc:streamdist:disturbVIRGIN      NA
## utme:utmn:tc:streamdist:disturbLT-SEL          0.044152 *
## utme:utmn:tc:streamdist:disturbSETTLE          0.119710
## utme:utmn:tc:streamdist:disturbVIRGIN          0.201318
## plotsize:elev:tc:streamdist:disturbLT-SEL      NA
## plotsize:elev:tc:streamdist:disturbSETTLE      NA
## plotsize:elev:tc:streamdist:disturbVIRGIN      NA
## utme:elev:tc:streamdist:disturbLT-SEL          0.030103 *
## utme:elev:tc:streamdist:disturbSETTLE          0.093228 .
## utme:elev:tc:streamdist:disturbVIRGIN          0.358065
## utmn:elev:tc:streamdist:disturbLT-SEL          0.021334 *
## utmn:elev:tc:streamdist:disturbSETTLE          0.076351 .
## utmn:elev:tc:streamdist:disturbVIRGIN          0.266413
## plotsize:utme:utmn:elev:beers                  NA
## plotsize:utme:utmn:tc:beers                    NA
## plotsize:utme:elev:tc:beers                    NA
## plotsize:utmn:elev:tc:beers                    NA
## utme:utmn:elev:tc:beers                        0.258337
## plotsize:utme:utmn:streamdist:beers            NA
## plotsize:utme:elev:streamdist:beers            NA
## plotsize:utmn:elev:streamdist:beers            NA
## utme:utmn:elev:streamdist:beers                0.000873 ***
## plotsize:utme:tc:streamdist:beers              NA
## plotsize:utmn:tc:streamdist:beers              NA
## utme:utmn:tc:streamdist:beers                  0.000744 ***
## plotsize:elev:tc:streamdist:beers              NA
## utme:elev:tc:streamdist:beers                  0.000131 ***
## utmn:elev:tc:streamdist:beers                  9.26e-05 ***
## plotsize:utme:utmn:disturbLT-SEL:beers         NA
## plotsize:utme:utmn:disturbSETTLE:beers         NA
## plotsize:utme:utmn:disturbVIRGIN:beers         NA
## plotsize:utme:elev:disturbLT-SEL:beers         NA
## plotsize:utme:elev:disturbSETTLE:beers         NA
## plotsize:utme:elev:disturbVIRGIN:beers         NA
## plotsize:utmn:elev:disturbLT-SEL:beers         NA
## plotsize:utmn:elev:disturbSETTLE:beers         NA
## plotsize:utmn:elev:disturbVIRGIN:beers         NA

```



```

## utme:utmn:elev:disturbLT-SEL:beers      0.152598
## utme:utmn:elev:disturbSETTLE:beers      0.368849
## utme:utmn:elev:disturbVIRGIN:beers      0.951003
## plotsize:utme:tc1:disturbLT-SEL:beers   NA
## plotsize:utme:tc1:disturbSETTLE:beers   NA
## plotsize:utme:tc1:disturbVIRGIN:beers   NA
## plotsize:utmn:tc1:disturbLT-SEL:beers   NA
## plotsize:utmn:tc1:disturbSETTLE:beers   NA
## plotsize:utmn:tc1:disturbVIRGIN:beers   NA
## utme:utmn:tc1:disturbLT-SEL:beers      0.232368
## utme:utmn:tc1:disturbSETTLE:beers      0.849666
## utme:utmn:tc1:disturbVIRGIN:beers      0.890146
## plotsize:elev:tc1:disturbLT-SEL:beers   NA
## plotsize:elev:tc1:disturbSETTLE:beers   NA
## plotsize:elev:tc1:disturbVIRGIN:beers   NA
## utme:elev:tc1:disturbLT-SEL:beers      0.164319
## utme:elev:tc1:disturbSETTLE:beers      0.323242
## utme:elev:tc1:disturbVIRGIN:beers      0.819647
## utmn:elev:tc1:disturbLT-SEL:beers      0.134888
## utmn:elev:tc1:disturbSETTLE:beers      0.244753
## utmn:elev:tc1:disturbVIRGIN:beers      0.668104
## plotsize:utme:streamdist:disturbLT-SEL:beers   NA
## plotsize:utme:streamdist:disturbSETTLE:beers   NA
## plotsize:utme:streamdist:disturbVIRGIN:beers   NA
## plotsize:utmn:streamdist:disturbLT-SEL:beers   NA
## plotsize:utmn:streamdist:disturbSETTLE:beers   NA
## plotsize:utmn:streamdist:disturbVIRGIN:beers   NA
## utme:utmn:streamdist:disturbLT-SEL:beers      0.001395 **
## utme:utmn:streamdist:disturbSETTLE:beers      0.791300
## utme:utmn:streamdist:disturbVIRGIN:beers      0.846685
## plotsize:elev:streamdist:disturbLT-SEL:beers   NA
## plotsize:elev:streamdist:disturbSETTLE:beers   NA
## plotsize:elev:streamdist:disturbVIRGIN:beers   NA
## utme:elev:streamdist:disturbLT-SEL:beers      0.001285 **
## utme:elev:streamdist:disturbSETTLE:beers      0.656167
## utme:elev:streamdist:disturbVIRGIN:beers      0.840807
## utmn:elev:streamdist:disturbLT-SEL:beers      0.000911 ***
## utmn:elev:streamdist:disturbSETTLE:beers      0.943127
## utmn:elev:streamdist:disturbVIRGIN:beers      0.603007
## plotsize:tc1:streamdist:disturbLT-SEL:beers   NA
## plotsize:tc1:streamdist:disturbSETTLE:beers   NA
## plotsize:tc1:streamdist:disturbVIRGIN:beers   NA
## utme:tc1:streamdist:disturbLT-SEL:beers      0.000440 ***
## utme:tc1:streamdist:disturbSETTLE:beers      0.411409
## utme:tc1:streamdist:disturbVIRGIN:beers      0.667514
## utmn:tc1:streamdist:disturbLT-SEL:beers      0.000393 ***
## utmn:tc1:streamdist:disturbSETTLE:beers      0.107336
## utmn:tc1:streamdist:disturbVIRGIN:beers      0.931561
## elev:tc1:streamdist:disturbLT-SEL:beers      0.000310 ***
## elev:tc1:streamdist:disturbSETTLE:beers      0.023473 *
## elev:tc1:streamdist:disturbVIRGIN:beers      0.263581
## plotsize:utme:utmn:elev:tc1:streamdist      NA
## plotsize:utme:utmn:elev:tc1:disturbLT-SEL    NA
## plotsize:utme:utmn:elev:tc1:disturbSETTLE    NA

```

|  |              |
|--|--------------|
| ## plotsize:utme:utmn:elev:tc:disturbVIRGIN          | NA           |
| ## plotsize:utme:utmn:elev:streamdist:disturbLT-SEL  | NA           |
| ## plotsize:utme:utmn:elev:streamdist:disturbSETTLE  | NA           |
| ## plotsize:utme:utmn:elev:streamdist:disturbVIRGIN  | NA           |
| ## plotsize:utme:utmn:tc:streamdist:disturbLT-SEL    | NA           |
| ## plotsize:utme:utmn:tc:streamdist:disturbSETTLE    | NA           |
| ## plotsize:utme:utmn:tc:streamdist:disturbVIRGIN    | NA           |
| ## plotsize:utme:elev:tc:streamdist:disturbLT-SEL    | NA           |
| ## plotsize:utme:elev:tc:streamdist:disturbSETTLE    | NA           |
| ## plotsize:utme:elev:tc:streamdist:disturbVIRGIN    | NA           |
| ## plotsize:utmn:elev:tc:streamdist:disturbLT-SEL    | NA           |
| ## plotsize:utmn:elev:tc:streamdist:disturbSETTLE    | NA           |
| ## plotsize:utmn:elev:tc:streamdist:disturbVIRGIN    | NA           |
| ## utme:utmn:elev:tc:streamdist:disturbLT-SEL        | 0.029974 *   |
| ## utme:utmn:elev:tc:streamdist:disturbSETTLE        | 0.092968 .   |
| ## utme:utmn:elev:tc:streamdist:disturbVIRGIN        | NA           |
| ## plotsize:utme:utmn:elev:tc:beers                  | NA           |
| ## plotsize:utme:utmn:elev:streamdist:beers          | NA           |
| ## plotsize:utme:utmn:tc:streamdist:beers            | NA           |
| ## plotsize:utme:elev:tc:streamdist:beers            | NA           |
| ## plotsize:utmn:elev:tc:streamdist:beers            | NA           |
| ## utme:utmn:elev:tc:streamdist:beers                | 0.000131 *** |
| ## plotsize:utme:utmn:elev:disturbLT-SEL:beers       | NA           |
| ## plotsize:utme:utmn:elev:disturbSETTLE:beers       | NA           |
| ## plotsize:utme:utmn:elev:disturbVIRGIN:beers       | NA           |
| ## plotsize:utme:utmn:tc:disturbLT-SEL:beers         | NA           |
| ## plotsize:utme:utmn:tc:disturbSETTLE:beers         | 0.849791     |
| ## plotsize:utme:utmn:tc:disturbVIRGIN:beers         | NA           |
| ## plotsize:utme:elev:tc:disturbLT-SEL:beers         | NA           |
| ## plotsize:utme:elev:tc:disturbSETTLE:beers         | NA           |
| ## plotsize:utme:elev:tc:disturbVIRGIN:beers         | NA           |
| ## plotsize:utmn:elev:tc:disturbLT-SEL:beers         | NA           |
| ## plotsize:utmn:elev:tc:disturbSETTLE:beers         | NA           |
| ## plotsize:utmn:elev:tc:disturbVIRGIN:beers         | NA           |
| ## utme:utmn:elev:tc:disturbLT-SEL:beers             | 0.164201     |
| ## utme:utmn:elev:tc:disturbSETTLE:beers             | 0.871437     |
| ## utme:utmn:elev:tc:disturbVIRGIN:beers             | 0.818537     |
| ## plotsize:utme:utmn:streamdist:disturbLT-SEL:beers | NA           |
| ## plotsize:utme:utmn:streamdist:disturbSETTLE:beers | NA           |
| ## plotsize:utme:utmn:streamdist:disturbVIRGIN:beers | NA           |
| ## plotsize:utme:elev:streamdist:disturbLT-SEL:beers | NA           |
| ## plotsize:utme:elev:streamdist:disturbSETTLE:beers | NA           |
| ## plotsize:utme:elev:streamdist:disturbVIRGIN:beers | NA           |
| ## plotsize:utmn:elev:streamdist:disturbLT-SEL:beers | NA           |
| ## plotsize:utmn:elev:streamdist:disturbSETTLE:beers | NA           |
| ## plotsize:utmn:elev:streamdist:disturbVIRGIN:beers | NA           |
| ## utme:utmn:elev:streamdist:disturbLT-SEL:beers     | 0.001278 **  |
| ## utme:utmn:elev:streamdist:disturbSETTLE:beers     | 0.660699     |
| ## utme:utmn:elev:streamdist:disturbVIRGIN:beers     | 0.832059     |
| ## plotsize:utme:tc:streamdist:disturbLT-SEL:beers   | NA           |
| ## plotsize:utme:tc:streamdist:disturbSETTLE:beers   | NA           |
| ## plotsize:utme:tc:streamdist:disturbVIRGIN:beers   | NA           |
| ## plotsize:utmn:tc:streamdist:disturbLT-SEL:beers   | NA           |
| ## plotsize:utmn:tc:streamdist:disturbSETTLE:beers   | NA           |

```
## plotsize:utm:tc:streamdist:disturbVIRGIN:beers      NA
## utme:utm:tc:streamdist:disturbLT-SEL:beers          0.000436 ***
## utme:utm:tc:streamdist:disturbSETTLE:beers          0.401943
## utme:utm:tc:streamdist:disturbVIRGIN:beers          0.674858
## plotsize:elev:tc:streamdist:disturbLT-SEL:beers     NA
## plotsize:elev:tc:streamdist:disturbSETTLE:beers     NA
## plotsize:elev:tc:streamdist:disturbVIRGIN:beers     NA
## utme:elev:tc:streamdist:disturbLT-SEL:beers         0.000432 ***
## utme:elev:tc:streamdist:disturbSETTLE:beers         0.001159 **
## utme:elev:tc:streamdist:disturbVIRGIN:beers         0.213720
## utm:elev:tc:streamdist:disturbLT-SEL:beers          0.000308 ***
## utm:elev:tc:streamdist:disturbSETTLE:beers          0.022262 *
## utm:elev:tc:streamdist:disturbVIRGIN:beers          0.261520
## plotsize:utme:utm:elev:tc:streamdist:disturbLT-SEL  NA
## plotsize:utme:utm:elev:tc:streamdist:disturbSETTLE  NA
## plotsize:utme:utm:elev:tc:streamdist:disturbVIRGIN  NA
## plotsize:utme:utm:elev:tc:streamdist:beers          NA
## plotsize:utme:utm:elev:tc:disturbLT-SEL:beers       NA
## plotsize:utme:utm:elev:tc:disturbSETTLE:beers       0.870072
## plotsize:utme:utm:elev:tc:disturbVIRGIN:beers      NA
## plotsize:utme:utm:elev:streamdist:disturbLT-SEL:beers NA
## plotsize:utme:utm:elev:streamdist:disturbSETTLE:beers NA
## plotsize:utme:utm:elev:streamdist:disturbVIRGIN:beers NA
## plotsize:utme:utm:tc:streamdist:disturbLT-SEL:beers NA
## plotsize:utme:utm:tc:streamdist:disturbSETTLE:beers NA
## plotsize:utme:utm:tc:streamdist:disturbVIRGIN:beers NA
## plotsize:utme:elev:tc:streamdist:disturbLT-SEL:beers NA
## plotsize:utme:elev:tc:streamdist:disturbSETTLE:beers NA
## plotsize:utme:elev:tc:streamdist:disturbVIRGIN:beers NA
## plotsize:utm:elev:tc:streamdist:disturbLT-SEL:beers NA
## plotsize:utm:elev:tc:streamdist:disturbSETTLE:beers NA
## plotsize:utm:elev:tc:streamdist:disturbVIRGIN:beers NA
## utme:utm:elev:tc:streamdist:disturbLT-SEL:beers     0.000429 ***
## utme:utm:elev:tc:streamdist:disturbSETTLE:beers     NA
## utme:utm:elev:tc:streamdist:disturbVIRGIN:beers     NA
## plotsize:utme:utm:elev:tc:streamdist:disturbLT-SEL:beers NA
## plotsize:utme:utm:elev:tc:streamdist:disturbSETTLE:beers NA
## plotsize:utme:utm:elev:tc:streamdist:disturbVIRGIN:beers NA
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.588 on 468 degrees of freedom
## (1 observation deleted due to missingness)
## Multiple R-squared:  0.6433, Adjusted R-squared:  0.3956
## F-statistic: 2.597 on 325 and 468 DF,  p-value: < 2.2e-16
```

```
summary(red_mod3)
```

```
##
## Call:
## lm(formula = cover ~ plotsize + utmn + elev + streamdist + beers,
##     data = trees, subset = species == "Acer rubrum")
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -5.1034 -1.3526  0.3934  1.4278  5.2249
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  1.404e+02  5.645e+01   2.486 0.013113 *
## plotsize    -2.969e-04  1.212e-04  -2.450 0.014492 *
## utmn        -3.403e-05  1.431e-05  -2.377 0.017691 *
## elev        -9.376e-04  2.504e-04  -3.745 0.000194 ***
## streamdist   1.386e-03  4.373e-04   3.170 0.001584 **
## beers       -2.846e-01  1.020e-01  -2.790 0.005398 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.999 on 788 degrees of freedom
## (1 observation deleted due to missingness)
## Multiple R-squared:  0.04819,    Adjusted R-squared:  0.04215
## F-statistic: 7.979 on 5 and 788 DF,  p-value: 2.385e-07
```

```
summary(red_mod1)
```

```
##
## Call:
## lm(formula = cover ~ elev + tci + streamdist + disturb + beers,
##     data = trees, subset = species == "Acer rubrum")
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -4.8054 -1.2410  0.3613  1.4124  5.1442
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   6.0776176   0.4347601  13.979 < 2e-16 ***
## elev         -0.0007668   0.0002960  -2.590  0.00977 **
## tci           -0.0590939   0.0330850  -1.786  0.07446 .
## streamdist    0.0011543   0.0004597   2.511  0.01224 *
## disturbLT-SEL  0.1865060   0.2096571   0.890  0.37397
## disturbSETTLE  0.1963689   0.2605137   0.754  0.45121
## disturbVIRGIN  0.3431481   0.2419342   1.418  0.15648
## beers         -0.3193888   0.1044973  -3.056  0.00232 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 2.013 on 786 degrees of freedom
## (1 observation deleted due to missingness)
## Multiple R-squared:  0.03802,    Adjusted R-squared:  0.02945
## F-statistic: 4.438 on 7 and 786 DF,  p-value: 7.48e-05
```

```
summary(red_mod2)
```

```
##
## Call:
## lm(formula = cover ~ plotsize + utme + utmn + elev + tci + streamdist +
##      disturb + beers, data = trees, subset = species == "Acer rubrum")
##
## Residuals:
##      Min        1Q    Median        3Q        Max
## -4.9579 -1.2800  0.3535  1.3976  5.2067
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   1.308e+02  6.089e+01   2.148  0.03206 *
## plotsize      -2.749e-04  1.238e-04  -2.221  0.02664 *
## utme          -3.276e-06  4.612e-06  -0.710  0.47780
## utmn          -3.135e-05  1.553e-05  -2.018  0.04389 *
## elev          -9.178e-04  3.496e-04  -2.626  0.00882 **
## tci           -4.194e-02  3.338e-02  -1.256  0.20937
## streamdist     1.128e-03  4.771e-04   2.364  0.01832 *
## disturbLT-SEL  8.829e-02  2.102e-01   0.420  0.67460
## disturbSETTLE  1.892e-01  2.678e-01   0.706  0.48022
## disturbVIRGIN  3.915e-01  2.416e-01   1.621  0.10550
## beers         -2.844e-01  1.043e-01  -2.727  0.00653 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.999 on 783 degrees of freedom
## (1 observation deleted due to missingness)
## Multiple R-squared:  0.05409,    Adjusted R-squared:  0.04201
## F-statistic: 4.477 on 10 and 783 DF,  p-value: 3.636e-06
```

```
AIC(red_mod1)
```

```
## [1] 3373.879
```

```
AIC(red_mod2)
```

```
## [1] 3366.508
```

```
AIC(red_mod3)
```

```
## [1] 3361.444
```

```
AIC(red_int)
```

```
## [1] 3222.135
```

```
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
```

```
Anova(red_mod1, type = 3)
```

```
## Anova Table (Type III tests)
##
## Response: cover
##           Sum Sq Df F value    Pr(>F)
## (Intercept)  791.5  1 195.4193 < 2.2e-16 ***
## elev          27.2  1   6.7090  0.009770 **
## tci           12.9  1   3.1902  0.074465 .
## streamdist    25.5  1   6.3055  0.012236 *
## disturb       8.4   3   0.6950  0.555222
## beers        37.8  1   9.3418  0.002316 **
## Residuals    3183.6 786
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
Anova(red_mod2, type = 3)
```

```
## Anova Table (Type III tests)
##
## Response: cover
##           Sum Sq Df F value    Pr(>F)
## (Intercept)  18.44  1  4.6119 0.032057 *
## plotsize     19.72  1  4.9328 0.026637 *
## utme          2.02  1  0.5044 0.477797
## utmn         16.29  1  4.0741 0.043885 *
## elev         27.56  1  6.8938 0.008818 **
## tci           6.31  1  1.5783 0.209374
## streamdist    22.34  1  5.5885 0.018322 *
## disturb      11.56  3  0.9639 0.409207
## beers        29.73  1  7.4373 0.006532 **
## Residuals    3130.39 783
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
Anova(red_mod3, type = 3)
```

```
## Anova Table (Type III tests)
##
## Response: cover
##           Sum Sq Df F value    Pr(>F)
## (Intercept)  24.71  1  6.1819 0.0131126 *
## plotsize     24.00  1  6.0037 0.0144925 *
## utmn         22.59  1  5.6502 0.0176911 *
## elev         56.05  1 14.0220 0.0001938 ***
## streamdist   40.17  1 10.0483 0.0015838 **
## beers        31.12  1  7.7840 0.0053984 **
## Residuals    3149.91 788
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
par(mfrow = c(2,2))
plot(red_int)
```

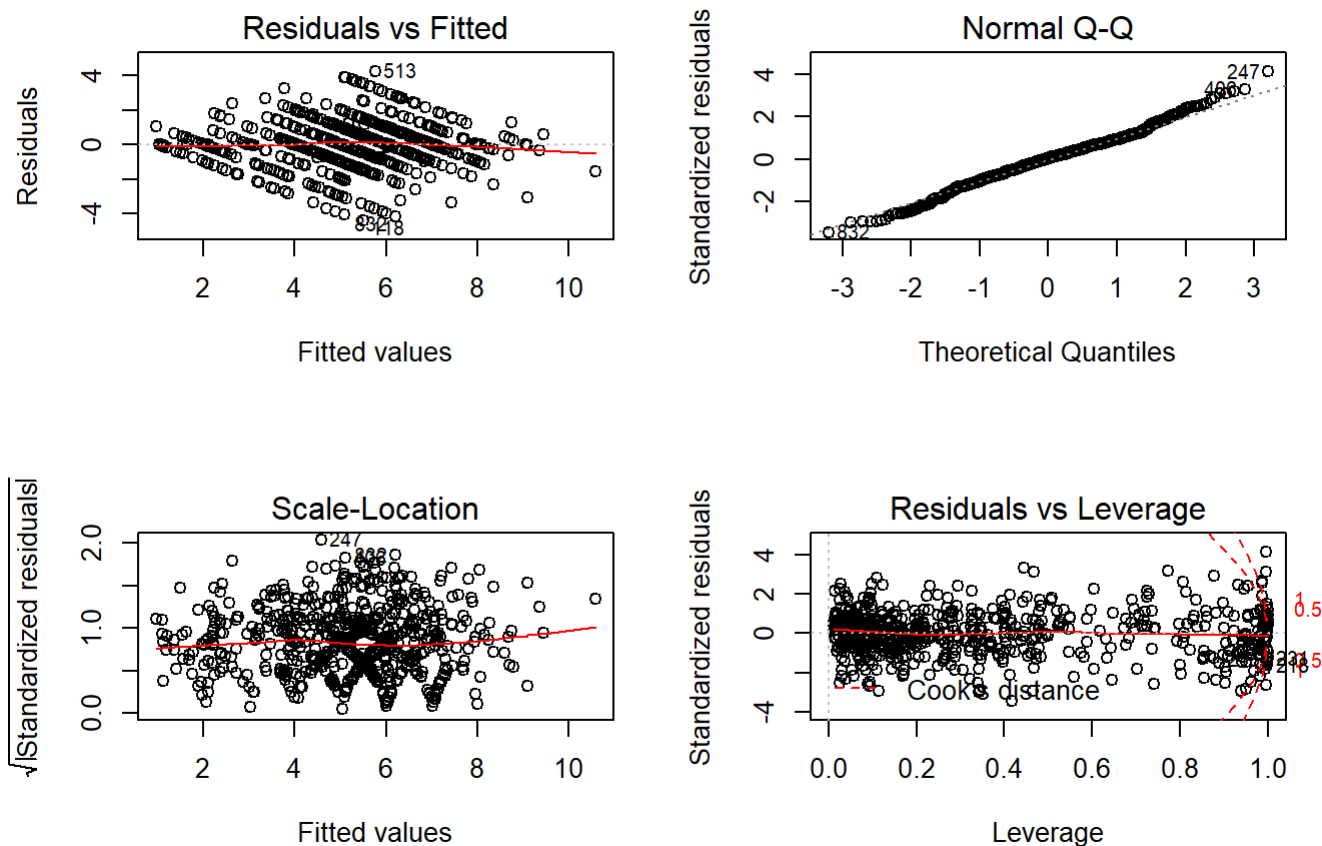
```
## Warning: not plotting observations with leverage one:
## 25, 35, 37, 38, 39, 40, 41, 78, 79, 80, 81, 82, 83, 84, 97, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 111, 113, 114, 115, 116, 117, 118, 119, 121, 122, 123, 124, 126, 595, 605, 608, 621, 625, 626, 627, 637, 638, 641, 643, 649, 654, 656, 657, 658, 663, 665, 674, 678, 679, 682, 684, 690, 692, 704, 794

## Warning: not plotting observations with leverage one:
## 25, 35, 37, 38, 39, 40, 41, 78, 79, 80, 81, 82, 83, 84, 97, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 111, 113, 114, 115, 116, 117, 118, 119, 121, 122, 123, 124, 126, 595, 605, 608, 621, 625, 626, 627, 637, 638, 641, 643, 649, 654, 656, 657, 658, 663, 665, 674, 678, 679, 682, 684, 690, 692, 704, 794
```

```
## Warning in sqrt(crit * p * (1 - hh)/hh): NaNs produced
```

```
## Warning in sqrt(crit * p * (1 - hh)/hh): NaNs produced
```





It would appear that the interaction model explains cover the best for the red maple.

The most important interactions were: `utmn:streamdist:disturbLT-SEL`, `tci:streamdist:disturbLT-SEL`, `elev:streamdist:disturbLT-SEL`, `plotsize:streamdist:beers`, `utme:streamdist:beers`, `utmn:streamdist:beers`, `elev:streamdist:beers`, `tci:streamdist:beers`, `streamdist:disturbLT-SEL:beers`, and `utmn:elev:tci:streamdist`.

If you look at `mod3`, which was the next best one, the important variables are `plotsize`, `utmn`, `elev`, `streamdist`, and `beers`.

I don't notice any glaring issues violations in OLM. Maybe some issues with leverage, but there is also an error in the plots, not sure how to correct that

```
fir_mod1 <- lm(formula = cover ~ plotsize + utme + utmn + elev + tci + streamdist + disturb + be
ers, data = trees, subset = species == "Abies fraseri")
summary(fir_mod1)
```

```
##
## Call:
## lm(formula = cover ~ plotsize + utme + utmn + elev + tci + streamdist +
##      disturb + beers, data = trees, subset = species == "Abies fraseri")
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -3.5762 -1.1241  0.2109  1.1104  3.0206
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   6.116e+02  2.257e+02   2.709  0.00806 **
## plotsize     -1.977e-05  1.305e-04  -0.151  0.87992
## utme          4.804e-05  3.373e-05   1.424  0.15776
## utmn         -1.623e-04  5.858e-05  -2.770  0.00679 **
## elev          8.006e-03  1.557e-03   5.141 1.55e-06 ***
## tci           6.341e-01  1.497e-01   4.236 5.43e-05 ***
## streamdist    1.417e-03  1.047e-03   1.353  0.17941
## disturbLT-SEL 2.699e-02  1.040e+00   0.026  0.97936
## disturbSETTLE -4.207e-01  1.412e+00  -0.298  0.76652
## disturbVIRGIN 1.401e+00  6.452e-01   2.171  0.03254 *
## beers         7.075e-01  2.583e-01   2.739  0.00741 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.633 on 91 degrees of freedom
## Multiple R-squared:  0.49, Adjusted R-squared:  0.434
## F-statistic: 8.745 on 10 and 91 DF, p-value: 6.882e-10
```

```
fir_mod2 <- lm(formula = cover ~ utmn + elev + tci + disturb + beers, data = trees, subset = spe
cies == "Abies fraseri")
summary(fir_mod2)
```

```
##
## Call:
## lm(formula = cover ~ utmn + elev + tci + disturb + beers, data = trees,
##     subset = species == "Abies fraseri")
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -3.8295 -1.2212  0.1645  0.9892  4.2303
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   4.971e+02  2.125e+02   2.339 0.021448 *
## utmn          -1.299e-04  5.437e-05  -2.389 0.018894 *
## elev           8.595e-03  1.339e-03   6.420 5.51e-09 ***
## tci            5.659e-01  1.419e-01   3.987 0.000132 ***
## disturbLT-SEL  4.295e-01  9.865e-01   0.435 0.664275
## disturbSETTLE -4.194e-01  1.287e+00  -0.326 0.745325
## disturbVIRGIN  1.340e+00  6.365e-01   2.105 0.037933 *
## beers         6.625e-01  2.581e-01   2.567 0.011840 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.644 on 94 degrees of freedom
## Multiple R-squared:  0.4664, Adjusted R-squared:  0.4267
## F-statistic: 11.74 on 7 and 94 DF,  p-value: 1.187e-10
```

```
fir_int <- lm(formula = cover ~ utmn * elev * tci * disturb * beers, data = trees, subset = species == "Abies fraseri")
summary(fir_int)
```

```
##
## Call:
## lm(formula = cover ~ utmn * elev * tci * disturb * beers, data = trees,
##     subset = species == "Abies fraseri")
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -3.8913 -0.6692  0.0000  0.8306  3.6029
##
## Coefficients: (31 not defined because of singularities)
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   -3.930e+05  1.979e+06  -0.199   0.843
## utmn           9.987e-02  5.028e-01   0.199   0.843
## elev          9.235e+01  5.858e+02   0.158   0.875
## tci           5.168e+04  1.774e+05   0.291   0.772
## disturbLT-SEL  4.978e+04  2.109e+05   0.236   0.814
## disturbSETTLE -9.028e+06  2.366e+07  -0.382   0.704
## disturbVIRGIN  3.389e+05  1.981e+06   0.171   0.865
## beers         4.336e+04  5.108e+04   0.849   0.399
## utmn:elev     -2.349e-05  1.489e-04  -0.158   0.875
## utmn:tci      -1.314e-02  4.508e-02  -0.291   0.772
## elev:tci      -5.480e+00  7.838e+00  -0.699   0.487
## utmn:disturbLT-SEL -1.267e-02  5.368e-02  -0.236   0.814
## utmn:disturbSETTLE  2.294e+00  6.012e+00   0.382   0.704
## utmn:disturbVIRGIN -8.614e-02  5.035e-01  -0.171   0.865
## elev:disturbLT-SEL  2.548e-02  1.592e-01   0.160   0.873
## elev:disturbSETTLE      NA         NA      NA      NA
## elev:disturbVIRGIN -6.112e+01  5.881e+02  -0.104   0.918
## tci:disturbLT-SEL  1.052e+01  4.521e+01   0.233   0.817
## tci:disturbSETTLE      NA         NA      NA      NA
## tci:disturbVIRGIN -4.187e+04  1.772e+05  -0.236   0.814
## utmn:beers     -1.099e-02  1.300e-02  -0.845   0.401
## elev:beers     -2.286e+01  2.467e+01  -0.927   0.357
## tci:beers      -7.396e+03  8.015e+03  -0.923   0.359
## disturbLT-SEL:beers      NA         NA      NA      NA
## disturbSETTLE:beers      NA         NA      NA      NA
## disturbVIRGIN:beers -2.908e+03  3.093e+04  -0.094   0.925
## utmn:elev:tci  1.398e-06  1.991e-06   0.702   0.485
## utmn:elev:disturbLT-SEL      NA         NA      NA      NA
## utmn:elev:disturbSETTLE      NA         NA      NA      NA
## utmn:elev:disturbVIRGIN  1.556e-05  1.495e-04   0.104   0.917
## utmn:tci:disturbLT-SEL      NA         NA      NA      NA
## utmn:tci:disturbSETTLE      NA         NA      NA      NA
## utmn:tci:disturbVIRGIN  1.065e-02  4.504e-02   0.236   0.814
## elev:tci:disturbLT-SEL      NA         NA      NA      NA
## elev:tci:disturbSETTLE      NA         NA      NA      NA
## elev:tci:disturbVIRGIN -2.851e-02  5.705e-02  -0.500   0.619
## utmn:elev:beers  5.789e-06  6.248e-06   0.927   0.357
## utmn:tci:beers   1.877e-03  2.031e-03   0.924   0.359
## elev:tci:beers   4.104e+00  4.741e+00   0.866   0.390
## utmn:disturbLT-SEL:beers      NA         NA      NA      NA
## utmn:disturbSETTLE:beers      NA         NA      NA      NA
## utmn:disturbVIRGIN:beers  7.224e-04  7.939e-03   0.091   0.928
```

```
## elev:disturbLT-SEL:beers      NA      NA      NA      NA
## elev:disturbSETTLE:beers      NA      NA      NA      NA
## elev:disturbVIRGIN:beers      4.392e-02  1.911e-01  0.230  0.819
## tci:disturbLT-SEL:beers      NA      NA      NA      NA
## tci:disturbSETTLE:beers      NA      NA      NA      NA
## tci:disturbVIRGIN:beers      -5.979e-01  1.638e+01 -0.036  0.971
## utmn:elev:tci:disturbLT-SEL    NA      NA      NA      NA
## utmn:elev:tci:disturbSETTLE    NA      NA      NA      NA
## utmn:elev:tci:disturbVIRGIN    NA      NA      NA      NA
## utmn:elev:tci:beers          -1.041e-06  1.202e-06 -0.867  0.389
## utmn:elev:disturbLT-SEL:beers  NA      NA      NA      NA
## utmn:elev:disturbSETTLE:beers  NA      NA      NA      NA
## utmn:elev:disturbVIRGIN:beers  NA      NA      NA      NA
## utmn:tci:disturbLT-SEL:beers   NA      NA      NA      NA
## utmn:tci:disturbSETTLE:beers   NA      NA      NA      NA
## utmn:tci:disturbVIRGIN:beers   NA      NA      NA      NA
## elev:tci:disturbLT-SEL:beers   NA      NA      NA      NA
## elev:tci:disturbSETTLE:beers   NA      NA      NA      NA
## elev:tci:disturbVIRGIN:beers   NA      NA      NA      NA
## utmn:elev:tci:disturbLT-SEL:beers  NA      NA      NA      NA
## utmn:elev:tci:disturbSETTLE:beers  NA      NA      NA      NA
## utmn:elev:tci:disturbVIRGIN:beers  NA      NA      NA      NA
##
## Residual standard error: 1.608 on 69 degrees of freedom
## Multiple R-squared:  0.6251, Adjusted R-squared:  0.4513
## F-statistic: 3.596 on 32 and 69 DF,  p-value: 4.324e-06
```

```
AIC(fir_mod1)
```

```
## [1] 401.8911
```

```
AIC(fir_mod2)
```

```
## [1] 400.5094
```

```
AIC(fir_int)
```

```
## [1] 414.4951
```

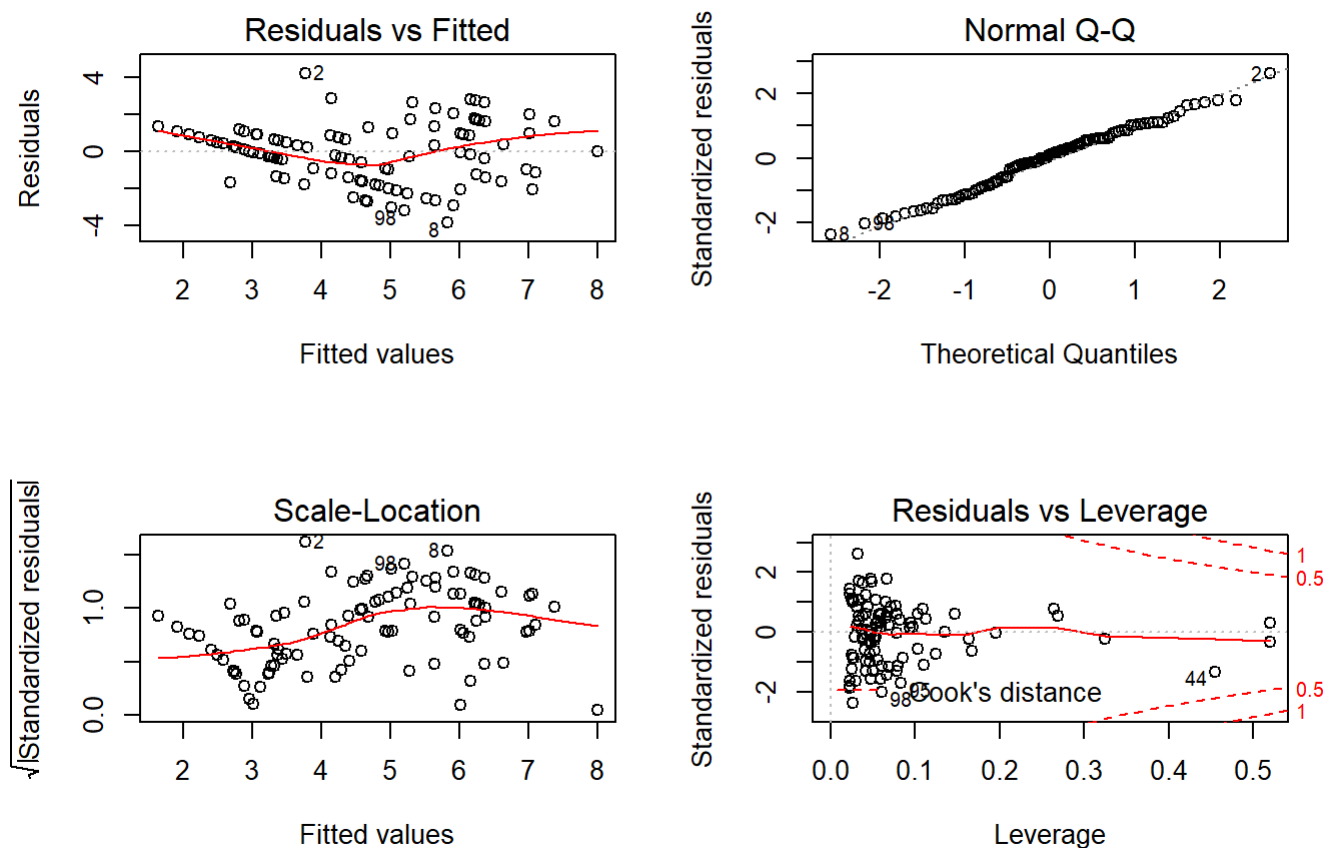
```
Anova(fir_mod1, type = 3)
```

```
## Anova Table (Type III tests)
##
## Response: cover
##           Sum Sq Df F value    Pr(>F)
## (Intercept) 19.576  1  7.3395  0.00806 **
## plotsize     0.061  1  0.0229  0.87992
## utme         5.411  1  2.0288  0.15776
## utmn        20.469  1  7.6743  0.00679 **
## elev        70.500  1 26.4318 1.554e-06 ***
## tci         47.870  1 17.9471 5.430e-05 ***
## streamdist   4.883  1  1.8306  0.17941
## disturb     17.398  3  2.1742  0.09645 .
## beers       20.013  1  7.5033  0.00741 **
## Residuals   242.720 91
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
Anova(fir_mod2, type = 3)
```

```
## Anova Table (Type III tests)
##
## Response: cover
##           Sum Sq Df F value    Pr(>F)
## (Intercept) 14.782  1  5.4714 0.0214483 *
## utmn        15.419  1  5.7071 0.0188937 *
## elev       111.351  1 41.2147 5.512e-09 ***
## tci         42.938  1 15.8928 0.0001324 ***
## disturb     14.739  3  1.8184 0.1491170
## beers       17.802  1  6.5890 0.0118398 *
## Residuals   253.963 94
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
par(mfrow = c(2,2))
plot(fir_mod2)
```



For the fir tree, the best model was model 2, but there really wasn't a difference between that and model 1.

The most important variables for the fir tree are utmn, elev, tci, and beers

I don't see any violations with the fir model either. Might be a homoscedasticity issue. The top left graph has a few values following the line.

It seems to be easier to explain the variance for the fir trees than the maples. This could be due to their smaller sample size or they could be habitat specialist, while red maples are a generalist species.

This wouldn't work for an interaction, so I ran mod3 for red maples

```
acer_poi = glm(cover ~ plotsize + utmn + elev + streamdist + beers, data = trees, subset = speci
es == "Acer rubrum",
              family='poisson')
summary(acer_poi)
```

```
##
## Call:
## glm(formula = cover ~ plotsize + utmn + elev + streamdist + beers,
##      family = "poisson", data = trees, subset = species == "Acer rubrum")
##
## Deviance Residuals:
##      Min        1Q    Median        3Q        Max
## -2.5812  -0.6277   0.1531   0.5871   2.0854
##
## Coefficients:
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept)  2.702e+01  1.236e+01   2.186  0.02882 *
## plotsize    -8.239e-05  3.676e-05  -2.242  0.02499 *
## utmn        -6.382e-06  3.136e-06  -2.035  0.04181 *
## elev        -1.812e-04  5.517e-05  -3.284  0.00102 **
## streamdist   2.642e-04  9.381e-05   2.816  0.00486 **
## beers       -5.440e-02  2.248e-02  -2.420  0.01554 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for poisson family taken to be 1)
##
##      Null deviance: 721.46  on 793  degrees of freedom
## Residual deviance: 689.40  on 788  degrees of freedom
## (1 observation deleted due to missingness)
## AIC: 3410.5
##
## Number of Fisher Scoring iterations: 4
```

```
pseudo_r2 = function(acer_poi) {
  1 - acer_poi$deviance / acer_poi$null.deviance
}
```

```
fir_poi = glm(cover ~ utmn + elev + tci + disturb + beers, data = trees, subset = species == "Abies fraseri",
              family='poisson')
summary(fir_poi)
```



```
##
## Call:
## glm(formula = cover ~ utmn + elev + tci + disturb + beers, family = "poisson",
##      data = trees, subset = species == "Abies fraseri")
##
## Deviance Residuals:
##      Min       1Q   Median       3Q      Max
## -1.80760  -0.56081   0.04007   0.45691   1.95219
##
## Coefficients:
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept)  1.059e+02  5.830e+01   1.817  0.06916 .
## utmn        -2.757e-05  1.492e-05  -1.848  0.06457 .
## elev         1.863e-03  3.872e-04   4.812  1.5e-06 ***
## tci          1.200e-01  3.916e-02   3.065  0.00218 **
## disturbLT-SEL 6.784e-02  3.247e-01   0.209  0.83451
## disturbSETTLE -6.497e-02  4.178e-01  -0.156  0.87642
## disturbVIRGIN 2.998e-01  2.044e-01   1.467  0.14240
## beers         1.448e-01  7.600e-02   1.906  0.05669 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for poisson family taken to be 1)
##
##      Null deviance: 98.822  on 101  degrees of freedom
## Residual deviance: 50.857  on  94  degrees of freedom
## AIC: 405.38
##
## Number of Fisher Scoring iterations: 4
```

```
pseudo_r2 = function(fir_poi) {
  1 - fir_poi$deviance / fir_poi$null.deviance
}
```

The GLM gave a slightly better r2 value for both of the models

3. Conclusions: From these analyzes, you can conclude that the data really needs to be formatted better from the start. But you can also conclude that red maples are likely generalists and have more difficult variance to model, while frasier firs are specialists and have easier variance to model.