**Analysis of Environmental Data – Lab 12**

**Olivia Dinkelacker**

**Q1 (2 pts.): Include your plot in your lab report.**

plot(

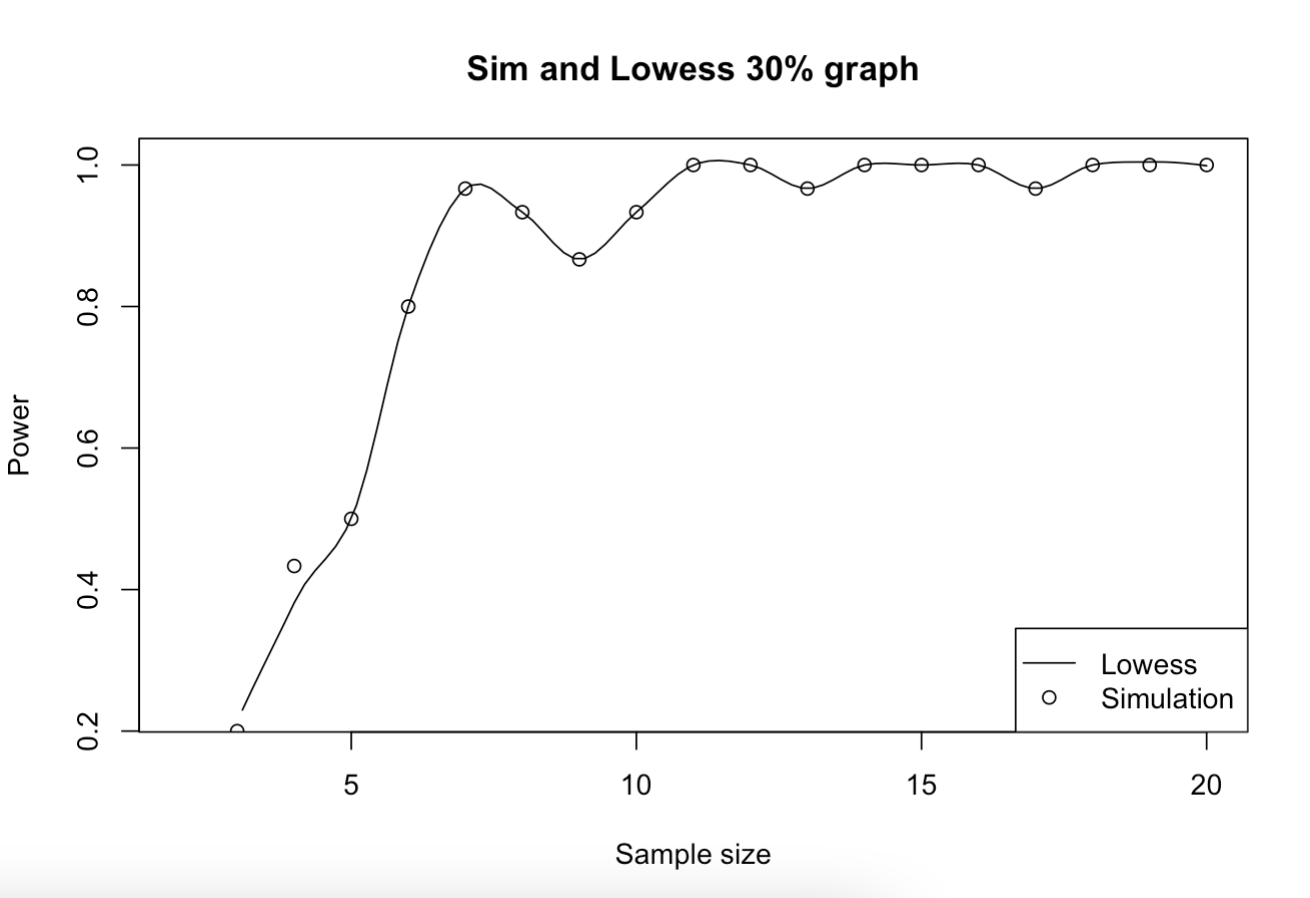
x = newdata\_sample\_size$sample\_size,

y = predict(fit\_lowess\_30, newdata = newdata\_sample\_size), type="l",xlab = 'Sample size', ylab = 'Power',main="Sim and Lowess 30% graph")

points(

power ~ sample\_size, data = sim\_sample\_size, type="p", main="Sim and Lowess 30% graph")

legend("bottomright", legend = c("Lowess", "Simulation"), lty = c(1,NA),pch=c(NA, 1), col = c("black"))



**Q2 (2 pts.): Include your plot in your lab report.**

fit\_exp\_nls = nls(

disp.rate.ftb ~ exp\_fun(dist.class, a, b),

data = dat\_dispersal,

start = list(b = 0, a = 1))

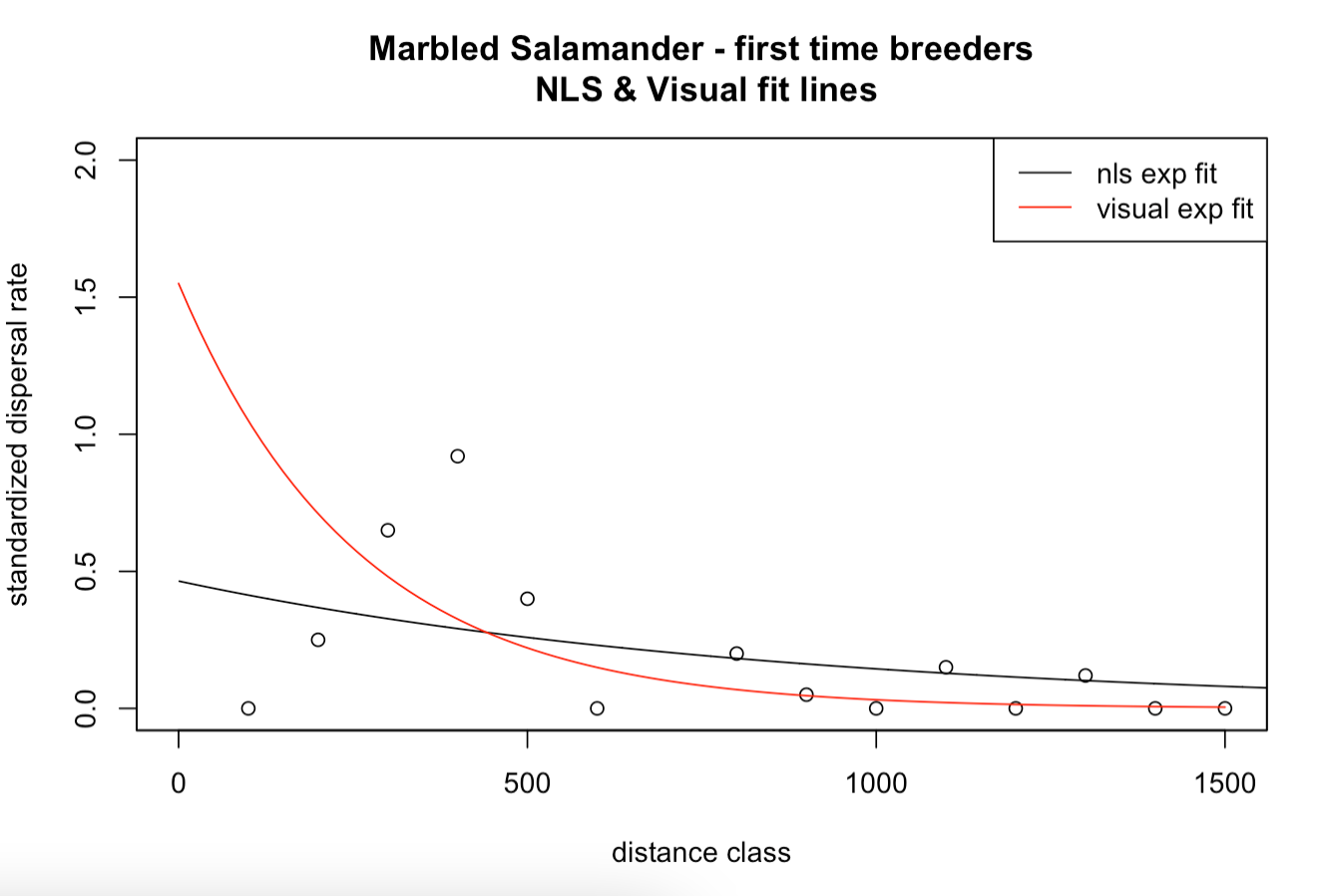
lines(predict(fit\_exp\_nls, newdata = dist\_newdata))

curve(

exp\_fun(x, 1.55, .0039), add = TRUE, from = 0, to = 1500,

ann = FALSE, axes = TRUE, ylab = "f(x)", col = "red"); box()

legend("topright", legend = c("nls exp fit", "visual exp fit"), lty = 1, col = c("black", "red"))



**Q3 (1 pt.): What are the AIC values for each of the 4 models?**

fit\_GCKI\_ba\_tot 1369.379

fit\_GCKI\_slope 1432.615

fit\_GCKI\_both\_additive 1355.951

fit\_GCKI\_both\_interactive 1353.007

**Q4 (1 pt.): Which model would you choose, and why?**

Model selection based on AICc:

K AICc Delta\_AICc AICcWt Cum.Wt LL

fit\_GCKI\_both\_interactive 4 1353.04 0.00 0.81 0.81 -672.50

fit\_GCKI\_both\_additive 3 1355.97 2.93 0.19 1.00 -674.98

fit\_GCKI\_ba\_tot 2 1369.39 16.35 0.00 1.00 -682.69

fit\_GCKI\_slope 2 1432.63 79.58 0.00 1.00 -714.31

fit\_GCKI\_both\_interactive , since it has the lowest AIC value.

**Q5 (1 pt.): Based on the model coefficient table of your chosen model, describe the direction and significance of the relationship(s) of the predictor variable or variables to the binary response. Make sure your answer is in terms of the ecological context.**

Coefficients:

Estimate Std. Error z value Pr(>|z|)

(Intercept) -0.2643673 0.2500615 -1.057 0.2904

slope -0.0040863 0.0045338 -0.901 0.3674

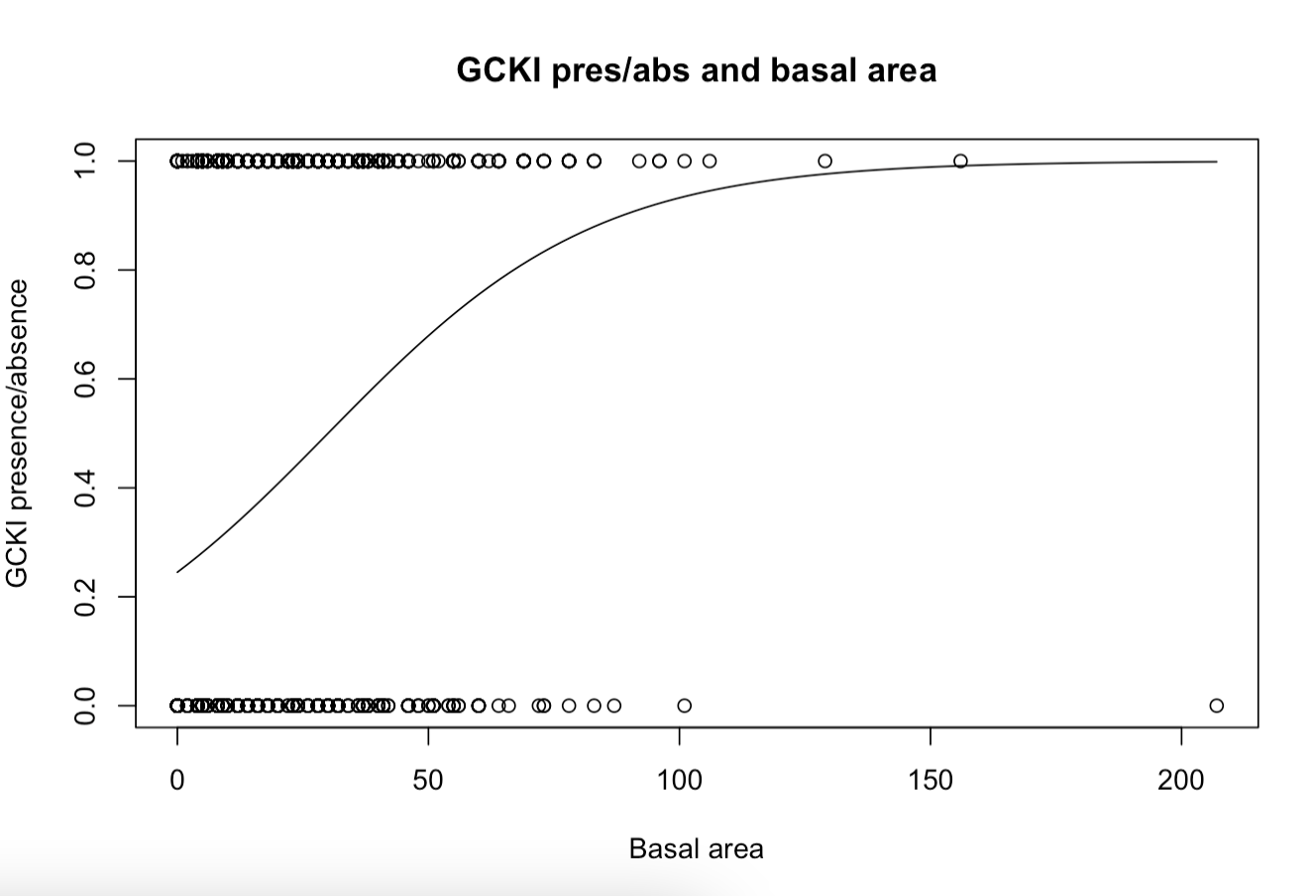
ba.tot 0.0532974 0.0109776 4.855 1.2e-06 \*\*\*

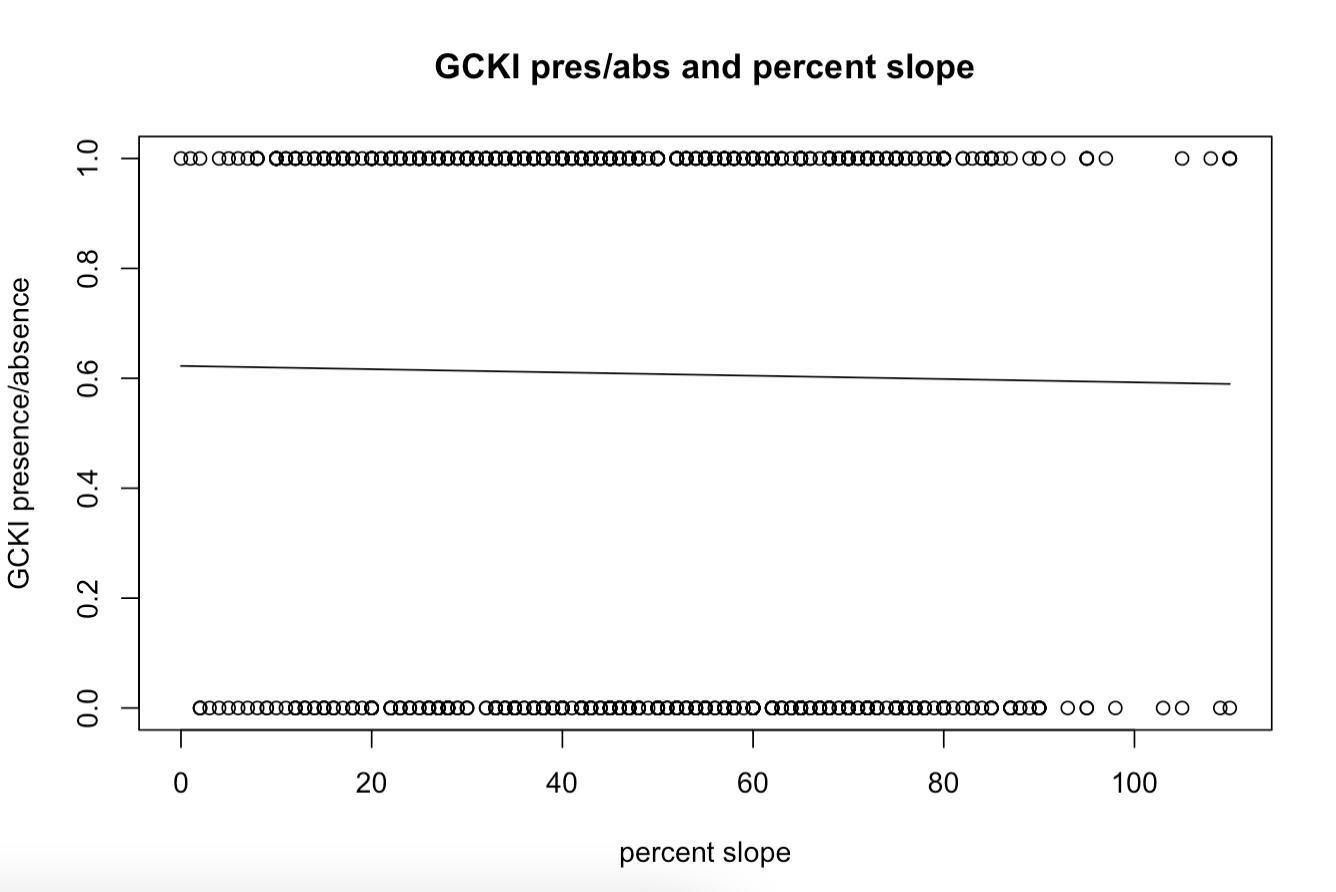
slope:ba.tot -0.0004131 0.0001866 -2.214 0.0269 \*

Significant codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

This is the best fit because the coefficient table shows that when slope and total basal area are combined into a model and compared with all of the GCKI data, the model has a slightly negative relationship, meaning that this model will represent the GCKI-dataset as a whole when fitting model predictions.

**Q6 (2 pts.): Include your two single-predictor model plots in your report**





**Q7 (4 pts.): Include contour plots (or interactive 3D perspective plots) in your report.**

