Modeling Population Decline of Endangered Species

Link to Git repo: https://github.com/ST541-Fall2018/boydpe-project-populationdecline

Peter Boyd

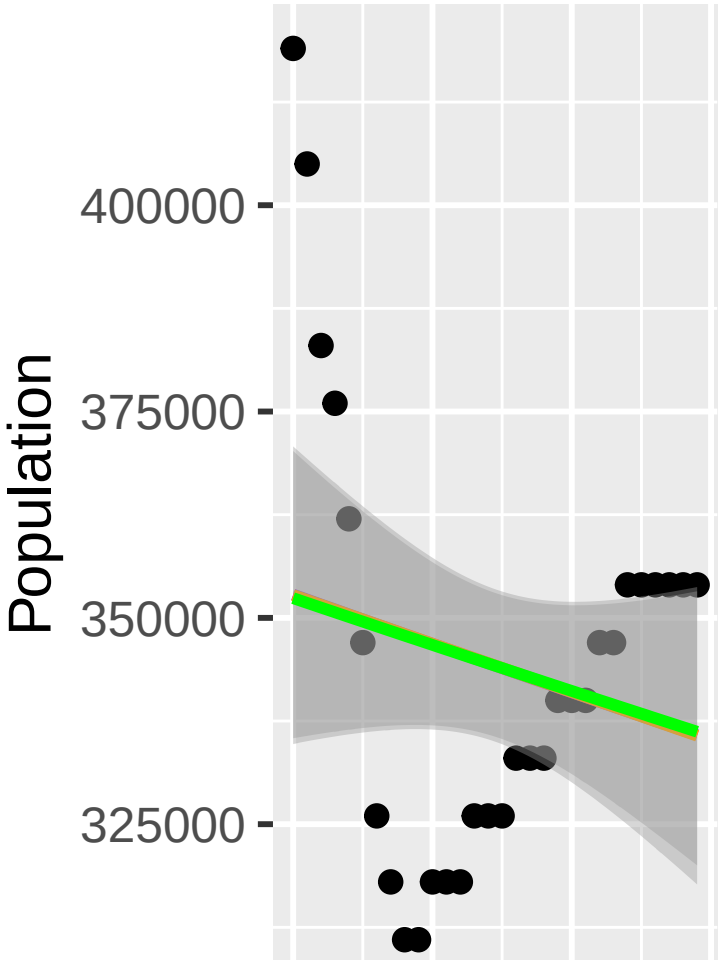
11/26/2018

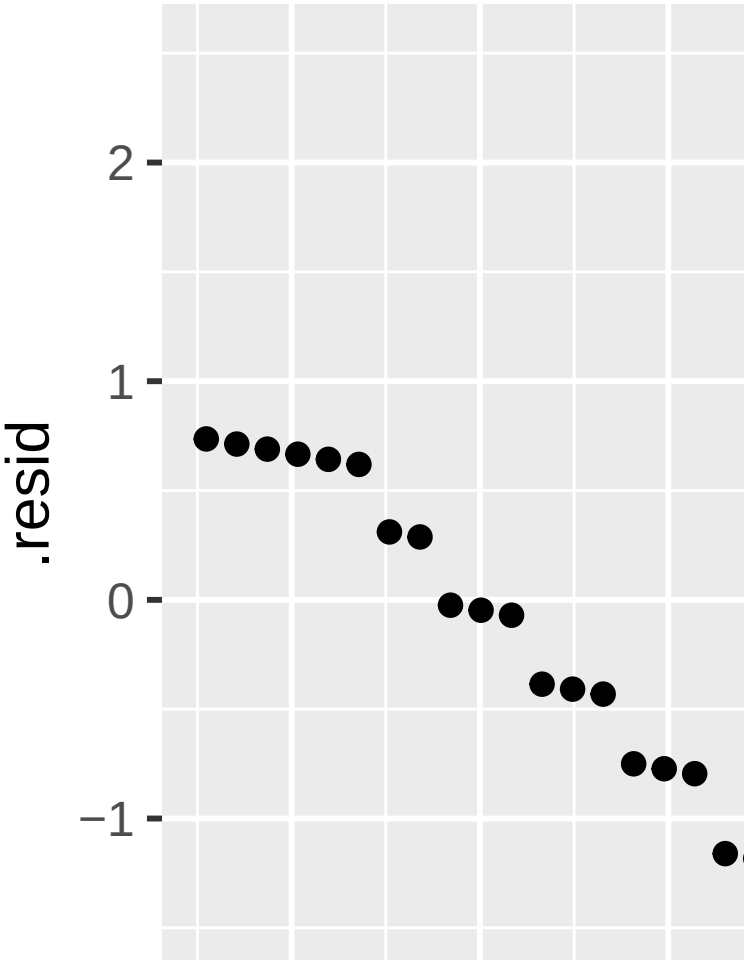
Data and Implementation

- Data: any dataset containing columns titled "Year" and "Population"
- Function steps:
  1) Fits several different models
  2) Selects the best model by comparing AIC values
  3) Using fitted values from the best model, simulate many versions of new data
  4) Refit glm's, using original year values and simulated population
  5) Average fits, roughly estimate when population is zero
  6) Show graphically the fit of various models and the residual plot of best model
- `pop.decline(df = whale, ntimes = 100)`

Example for Whale data set

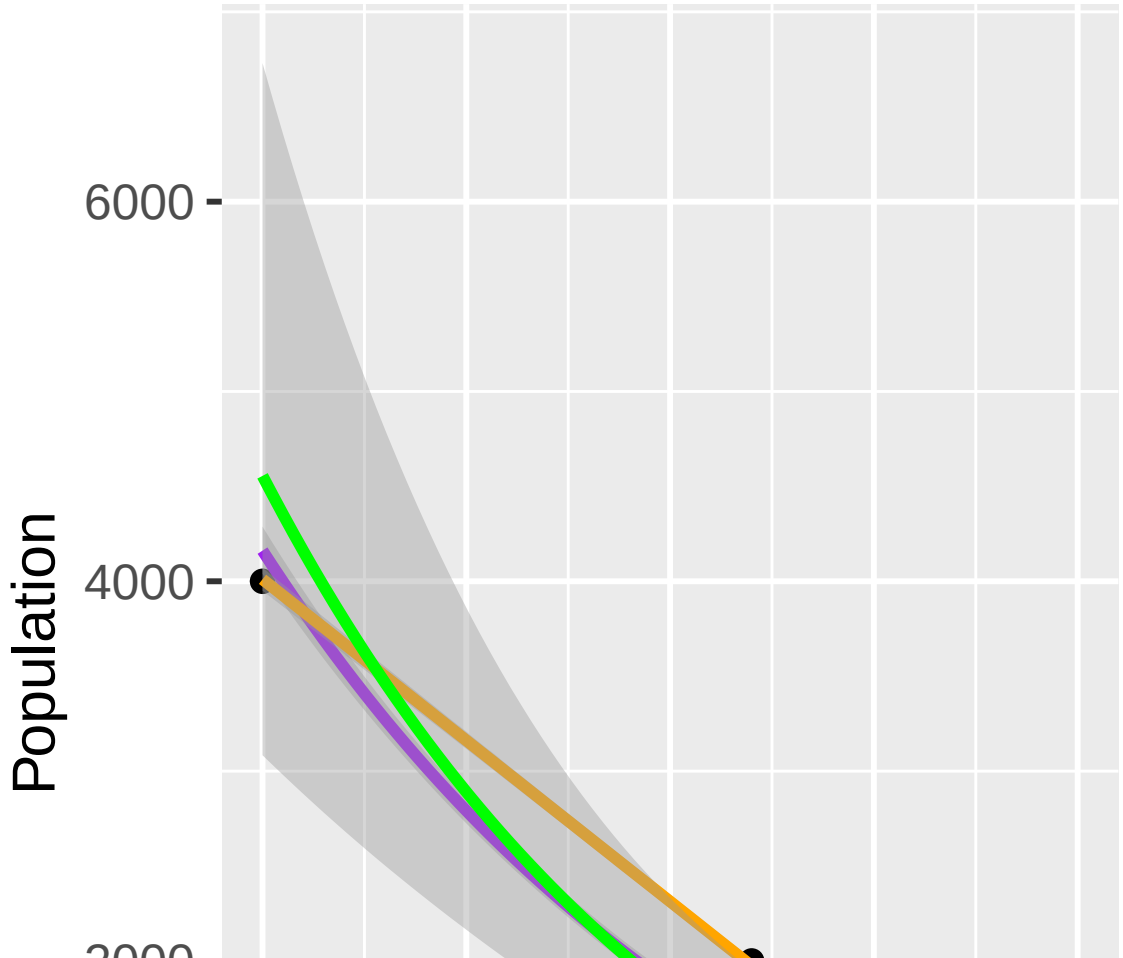
```
## AIC for Each Model
##  Linear Model :  698.5794
##  Poisson :  53225.4
##  Negative Binomial :  697.0227
## Predicted Extinction:  2113.952
```

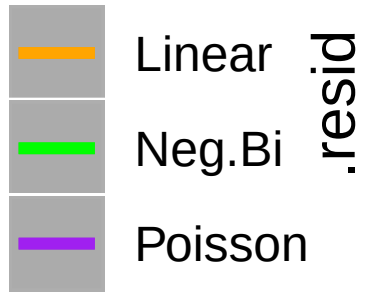




Example for Addax data set

```
## AIC for Each Model
##  Linear Model :  32.09494
##  Poisson :  210.3932
##  Negative Binomial :  49.82695
## Predicted Extinction:  1990.352
```





Ideas for Future Work

- Could add complexity to model by considering a carrying capacity variable in the function
- Attempted to iteratively predict new values until population is extinct, R said “nah”