

# Modeling Population Decline of Endangered Species

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

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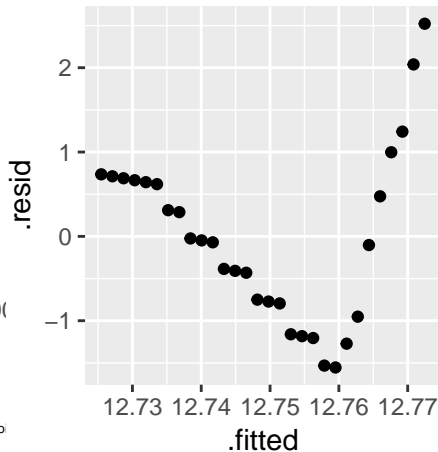
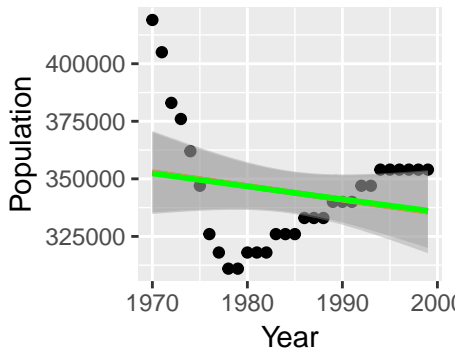
11/26/2018

# 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: 2109.418
```

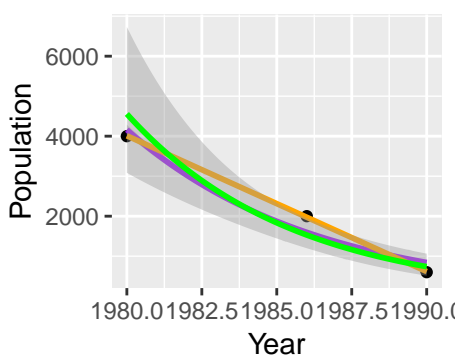


legend

	Linear		Neg.Bi		Poi
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## Example for Addax data set

```
## AIC for Each Model  
## Linear Model : 32.09494  
## Poisson : 210.3932  
## Negative Binomial : 49.82695  
## Predicted Extinction: 1990.355
```



legend



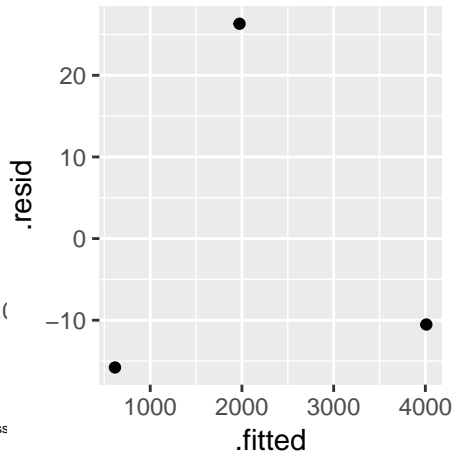
Linear



Neg.Bi



Poiss



# 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, but population kept converging to a nonzero count
- ▶ Questions?