Helen Casendino

FISH 454

Homework 8: Model Selection



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| **Model** | # Parameters | NLL | AIC | ∆AIC |
| Density Independent | 2 | 160.6871 | 325.3742 | 10.165 |
| Logistic (Density Dependent) | 3 | 154.6046 | 315.2092 | 0.000 |

Chart, scatter chart

Description automatically generated

1. These findings show that there is more evidence for density dependence, as opposed to density independence, in harbor seal populations. At first glance, the negative log likelihoods for each model point to support for the density independent model. However, the delta AIC values—which take into account both parameter number and negative log likelihood—are indicative of the opposite. The logistic model has the additional parameter for carrying capacity, K, meaning that an equal or close delta AIC value to that of the density independent model wouldn’t have been sufficient for support. The logistic model needed to have a lower delta AIC value than the other model to justify the inclusion of another parameter. One can also see from the graph that population numbers appear to level off around 7000. Thus, management decisions should be made off the basis that harbor seal populations will not continue to increase once this carrying capacity is reached.