Methods for model

Juliana Herrera, Serena Lomonico, Kat Millage, Iris Shin

February 3, 2016

Using the observed catch (Kg) data for Guanacaste between 1990 and 2013, and the observed CPUE (Kg/trip) data for Coyote and Bejuco between 2007 and 2013, we used a logistic model to predict biomass (B) of the whole stock for each year (1990 - 2013)

and

Where K is the carrying capacity of the population, and r is the intrinsic rate of our population (Coyote/Bejuco fishery). Based on the predicted biomass, we predicted CPUE since

therefore,

where C is catch, E is effort in kg/trip and q is the catchability coefficient.

In order to assess the fit of our model, we will compare observed CPUE with model predicted CPUE between 2007 and 2013 through

where -lnN is the Negative Log Likelihood (NLL).

When we minimize NLL, we can also omit the constant term

and since our uncertainty is fixed we can also omit the term

therefore,