MSBA 6120 - Project Proposal

July 12, 2018

**Statement of Issue:**

In this project, we will be examining the abundance of the Atlantic cod and how it is affected by the population of Atlantic herring, surface temperature, bottom temperature, and the depth of trawl. Because the data is given over multiple seasons, we will only focus on one season. This will take into account migration patterns.

**Why is it of interest:**

Of all the topics we could have chosen, this was the most interesting. The Atlantic cod have always been very popular and in high demand. In 1852, the biomass of Atlantic cod was around 1,260,000 metric tons. Due to the high demand in addition with an underestimate of mortality led to overﬁshing, and the Atlantic cod population eventually plummeted. For comparison, in 2005 the biomass of cod was estimated to be 50,000 metric tons. Currently, NOAA ﬁsheries reports that Atlantic cod are overﬁshed according to their 2017 stock assessment.

**How was the data obtained:**

The data was obtained through previous research with the NEFSC. They provided survey data from 1968 to 2013. This data is collected twice a year (spring and fall) over 640 different survey stations. These stations are solely located in the Northeast Continental Shelf. Each region of the shelf was subdivided into strata.

The data was collected through a bottom trawl survey at randomly selected strata, where each where each strata is an equally likely choice. In these bottom trawl surveys, a trawling boat goes to the preselected strata, drops a net, and drags it for 20 minutes along the ocean ﬂoor. After 20 minutes, the net is pulled up and the ﬁsh are sorted by species. Data such as abundance, total mass of the catch, surface and bottom temperature, and depth of trawl are recorded for each species.

**Variables of interest:**

* Mass\_C: this is the total mass of the Atlantic cod in kilograms. This variable will be our dependant variable predicted by the parameters below. We are using the biomass instead of count, because this is the standard.
* Mass\_H: this is the total mass of the Atlantic herring, in kilograms, which is most frequently consumed by cod. Thus the amount of herring could affect the amount of cod. We are using the biomass instead of count, because this is the standard.
* Surface Temperature: this is the temperature, measured in degrees Celsius, of the water’s surface when the trawl was taken. While cod often stay closer to the ocean floor, they have been known to approach the surface.
* Bottom Temperature: this is the temperature, measured in degrees Celsius, of the ocean floor when the trawl was taken. As was previously mentioned, cod often stay closer to the ocean floor.
* Depth of Trawl: this is the depth between the trawling boat and the ocean floor measured in meters. The depth varies depending on the proximity to the coast and thus the location of the cod.