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Week 2 Reading Questions

Worked with Jessica Bonin and Doug Bishop

1. Within the scope and approach framework that Bolker presents, the qualitative and quantitative dichotomy clearly demonstrates the description of the two columns being theoretical and applied. Qualitative models allow for more simple, generally descriptive modeling while quantitative models allow for more detail in what is being analyzed and interpreted. In practice qualitative models allow you to have data classes that may contain more than one variable in each class. I can see the application of qualitative modeling in my research when analyzing presence/absence data, looking at the distribution of certain cover classes throughout the study area, and looking at overall change in habitat use over time (were the turtles in this area of the wetland in 2020, 2010, or 2000). Quantitative modeling allows for the interpretation of individual integers. The application of my quantitative modeling to my research will be in analyzing the specific number of data points that I have for each turtle, looking at the individual turtles found throughout the year and comparing that to how many turtles were found in previous years, and looking at the recapture rate of individual turtles.
2. The greatest sources of assumption that I can identify in the bird nesting analysis example is that 10 years of data is enough to analyze and claim that climate change is impacting the species. An additional source of bias is that it does not seem that many additional influences were considered, such as the cyclical pattern sometimes observed in the population numbers of predators.

Taking into consideration these two potential influences, the data might show that when looking at the number of predators to the bird species identified it is possible to observe a circular scale with the rise of predators leading to a decline in birds and the opposite. Observing the data over a longer period of time, if available, could allow for greater confidence in the claim.

Another potential source of bias to be considered in this example is the application of the findings beyond the area studied. I am unclear if the claim that climate change is impacting the elevation at which birds are nesting is intended to only apply to the certain area in the Whites that was studied, across the entire National Forest, or across the greater range of the species. I would be cautious to extend the claim further than the survey area as the potential implications for managers may not apply in other regions.

3. The two components of a model constructed in the dual model paradigm are deterministic functions and probability distributions. A model constructed in this framework will contain both components. The deterministic piece being the purely idealistic pattern as you do not wish to have any errors. The probability distribution is the variation that arises in the data due to errors, because no science is perfect.

Applying these two pieces to my research I interpret the deterministic function to be a linear representation of turtles within the population over the course of the 30 year study. Given no influence of human interpretation, differences in survey effort, and area surveyed I expect to see a linear function of overall population. I expect that the probability distribution of the population model will be great though. I know that each year's surveys have not been held to a consistent survey effort, the people who completed the surveys have changed yearly, and the areas within the wetlands surveyed have changed over the course of the 30 years.

4. A statistical population consists of all collected observations pertinent to the study. A biological population is the total population, whether within or outside of the desired study area. This population may or may not be entirely represented within the statistical population, depending upon the spatial or temporal scale of the research.
5. For the invasive cattail example that my group decided to discuss, I would choose to use a continuous variable on a ratio scale and a categorical, nominal variable to collect and analyze the data. I would employ a continuous variable on a ratio scale to analyze the percent cover of cattails within each study unit of a wetland. The ratio scale would allow me to use a true zero, which is necessary when there are no cattails within the area. Additionally, the limitation of no negative values within a ratio scale is applicable to analyzing percent cover as it cannot be negative. The continuous variable is applicable to analyzing percent cover as, unless defined in certain ranges, it is not limited to a certain set of possible values.

The second variable type I would use to analyze the invasive cattails is a categorical, nominal variable to map the distribution of dominant species across the wetland. As discussed in the class assignment there are 3 species of cattail present in the area. This non-numerical data is best captured in the use of categorical, nominal variables. Additionally, as Bolker stated in chapter two, employing categorical data would me to determine if the distribution of species varies from expected.