

## Week 2 Reading Assignment Questions

**Question 1:** My research interests are in the effects of climate change on high elevation butterflies. Studying the White Mountain Fritillary and White Mountain Arctic I use a combination of descriptive and predictive modeling from scope and approach. In order to complete a Species Assessment report, I need to descriptive data and modeling to show the current habitat use, location, and key habitat features. To utilize that data with climate change I need to be able to use predictive models to show where things may shift within the habitat. The descriptive model is more mathematical and is less random, where the predictive model has more noise and takes into consideration randomness within the data.

**Question 2:** Bias that is happening in the high elevation bird nesting habitat testimonials is that climate change is the only thing that could be affecting the migration of the blackpole warblers to higher elevations. This can be seen as a scientific bias.

The reason it is scientific is because the science is there for climate change to be affecting high elevation fauna, so it makes sense for that to be the cause of the shift. In the first three defenses of their data, they do not take into consideration the possibility of some other environmental issue being the cause. It is only after they look at other possible hypotheses and apply other models to their data with a larger scope that they are awarded funding. The researcher had to widen the scope of possibilities to create a stronger statistically sound argument for a more pinpointed answer to the nesting habitat shift.

Without ruling out other possible causes for the shift to higher elevation, if the researcher were to be funded after the first attempt, they may have been looking for the answer in the wrong place while collecting the wrong data. Their research could be found as insignificant because of the model the research was built around was not correct.

**Question 3:** Deterministic functions (mathematical) and probability distributions (statistical) are the two components that make up the Dual Model Paradigm in statistics. Deterministic modeling is used more on the mathematical side of the paradigm because it gives you the same output every time if it is being given the same input. This makes for less noise and uncertainty in your model. Probability distributions are stochastic and have more noise in their output. They tend to show the randomness of data compared to the more pinpoint output of deterministic functions.

When looking at population data of butterflies, collecting that information with mark-release-recapture is more deterministic because you are being a more precise number with less noise. Collecting population data for butterflies used a Pollard-Yates walking methods will give you more of a stochastic output because there are more variables and more noise. You will be getting a wider estimate range of the population than you would with mark-release-recapture.

**Question 4:** A biological population includes all individuals within that species populations in an area that interact with each other, a statistical population is a selected group from within the

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Worked with: N/A

biological population that you wish to use statistics, and an ecological population includes all individuals of the same species that may interact with one another but don't necessarily.

The statistical population will vary depending on where you determine your survey area to be. When measuring a population, you cannot feasibly count every individual in the population, so a survey area needs to be set and used so statistics.

**Question 5:** Group Scenario: Cascade's Snowpack

Data Types and Scales:

1. Categorical, nominal variable - In the Cascade's snowpack scenario a categorical, nominal variable would be a list of habitat types for each area studied; hemlock forest, white pine forest, krummholz, etc.
2. Numerical variable on an interval scale – Using an interval scale to look at the percentage of canopy cover in measured snowpack areas would be a good way to use numerical variable on an interval scale in the Cascade's snowpack scenario.