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Reading Questions week two

I worked on these questions independently, with the exception of question one, which I discussed with Sarah Guitart.

- In 1 - 2 short paragraphs, explain the dichotomy in your own words and briefly describe how you might approach one of your research interests from each of the dichotomy endpoints.

The dichotomy rests on distinction in underlying formula assumptions, scale, and approach. On the left, the models described can be more broadly applied, are simpler, and take less conditions into account. They are designed to show processes that are built on ecological theory, with assumptions built in to simplify the model and make it loosely applicable to more systems/contexts. On the right, the models described are built on observable patterns with more subtleties and context-dependent conditions. They generally are applied to a smaller subset of data, because they are more tailored to the patterns in a specific study.

One of my research interests is the migration of birds. From the phenomenological side, I imagine looking at tracking data from individuals – where did an individual stop, how long did it take to get from A to B, and what environmental conditions were acting upon this bird's journey – did body mass, wind speed, or some other factor impact the distance flown? From a mechanistic side, the approach would look more at the theory of migration – given the tracking data, did all the birds departing from the same site fall into the category of capital or income migrant?

- Identify at least one source of bias or assumption (cultural, scientific, other). Hypothesize a practical impact these biases or assumptions might have on scientific communication and the effectiveness of management efforts? (1 - 3 paragraphs)

The most broad and impact bias that the scientific method contends with is the basis upon which it was created. There is a bias towards the western ideology – that is; the colonist, imperialist, and racist history of the construct of these systems. The method itself limits the type of information that is valued, the way the information is gathered, and the types of relationships that are assumed. It also perfectly segues into the type of conservation and management that prioritizes specific values that are descendants of this lineage of bias. What is left out is interconnectedness and methods of learning, communication and acting that fall outside the predicated on colonialism. The types of understanding, learning, and managing that we know has existed, and continues to exist on our natural landscapes for thousands of years.

I hypothesize that this bias has catastrophic effects on our capacity to understand, repair and steward our natural spaces because it limits the type of people and level of training that are included. Further, I hypothesize that the pace which with the scientific methods/ecological research/conservation management system moves is far outpaced by the pace of industries that are contributing to the multitude negative changes that the former system is trying to understand and prevent. The rigor required to proof that climate change is both happening and having devastating consequences on our systems is high – as illustrated by the several

testimonies required – and the resulting triumph is to money to continue to track these consequences.

In 1 - 2 short paragraphs, describe the following:

- Identify and briefly define the two primary components of a model constructed in the dual model paradigm.
- Give an example of the two components in the context of a system you are interested in studying.

The two components of a model in the dual-model paradigm are deterministic and stochastic. Deterministic components are useful in understanding and describing the basic pattern upon which the agents in the environmental system are following, while stochastic components take into account the noise, randomness, and degree of variance from the central pattern that the actual data demonstrates. In the context of bird migration, a deterministic approach might help me understand the main migratory strategies that birds are using to move southward – the types of stopover sites that are valuable, the general routes taken, and the speed with which journeys are made. The stochastic model will help place individually tracked birds onto that general map, and understand the choices that each bird made given the conditions and resources available.

In 1 - 2 short paragraphs, describe the difference between a statistical and biological or ecological population.

- Which of these populations may vary depending on the spatial or temporal scale of the research question?

A biological or ecological population is the entire population of a species or study feature, while a statistical population is the subset that you, as the data collector, have access in your experiment or question. Some examples of a biological or ecological population are all the American golden-plovers across their range in the world or all the subalpine lakes in volcanic mountain ranges in the world. The corresponding statistical populations might be, respectively, the breeding American golden-plovers on the Seward peninsula in Alaska, and the subalpine lakes in the Cascade range in Washington. The statistical population will vary depending on the scale of the research question, as well as be constrained by practicality and ability to sample.

Consider the scenario your group chose to use in the model thinking in-class activity:

- Cascades snow pack
- White pine blister rust
- Cattails

Choose 2 of the of the following data types and scales.

1. A continuous variable on an ratio scale

2. A categorical, nominal variable
3. A discrete variable
4. A numerical variable on an interval scale

For each of your chosen variable type/scale types:

- Propose an entity and/or variable in your scenario that you could measure using the data type/scale.
- Explain why the data type or scale is appropriate for the entity/variable you chose.

For example, if I were studying herbivory of of Monarch caterpillars on different species of Milkweeds (*Asclepias spp*) I might measure the host plant species on a categoical/nominal scale.

I could measure amount of herbivory on a ratio scale because a value of zero herbivory is meaningful.

Remember, you only need to chose 2 of the 4 variable types/scales.

If I were studying snowpack in the Cascades, I could measure the amount of snow cover categorically on a relative scale as low to high, or I could measure it numerically by percent of ground covered by snow, or height of snowbank. I could measure the amount of runoff from the melting snow on a ratio scale, as zero will mean there is no runoff, either from a lack of snow or conditions that don't allow snow to melt.