

1. Descriptive vs predictive -- According to McGarigal, the dichotomy of descriptive vs predictive (or inference) describes the two major overarching purposes of statistics as a whole. Descriptive models can be understood as “describing” (surprise) patterns in the data, without trying to predict or infer beyond what is contained therein. Conversely, predictive models use the data at hand to make assumptions (or predictions) about circumstances beyond the data. For example, I am imagining a data set measuring the impact of outdoor cats on native wildlife populations, which may record the number of outdoor cats in a given area, the amount of time they spend outside, and presence or abundance of selected native animals. A descriptive model may seek to demonstrate the prevalence of a particular species in areas with many cats vs. no cats; a predictive model may extrapolate out to infer how the abundance of a particular rodent would change in a specific area if more cats were introduced.
2. One source of cultural bias that I identified in these quotes and the four testimonials relayed in McGarigal is the assumption that lawmakers are motivated by concepts like environmental conservation, climate change, and maintaining ecosystems. I am certainly showing my own bias in this response, but from my own observation of the legislative process and how lawmakers tend to act, the majority are not motivated by things like climate change and the “greater good” of maintaining an ecologically sound earth. Instead, they tend to be motivated by keeping their seat in office (usually by not making any “risky” legislative decisions that would risk their standing with what they view as the majority beliefs of their constituents), capitulating to wealthy lobbyists, and maintaining good standing with the corporations that fund their election (and re-election) campaigns.

Unfortunately, scientists and environmental lobbyists, at least in these examples, are operating under the assumption that if they can just prove effectively enough that there is a negative change happening, they will be able to secure funding and hopefully make a difference. If the bulk of time and effort is spent crafting an argument that assumes compassion and caring from lawmakers on these topics, the argument may be less effective than if a more economic motive was centered. On the other hand, maybe the bias that I am expressing here is the harmful one. Perhaps by assuming a profit and reelection motive, scientists are changing their communication to focus less on the climate change or environmental degradation angle, and are therefore less effective in their communication and management efforts.

3. The two primary components of a model constructed in the dual model paradigm are the deterministic model and the stochastic model. The deterministic model describes the average or expected pattern of a data set, without accounting for any randomness or error. The stochastic model on the other hand describes the assumed uncertainty within the model. For example, in the cat example I mentioned previously, the deterministic component might describe the relationship between the number of cats observed and the abundance of a particular rodent. A stochastic component may attempt to account for measurement error like, for example, if there are cats that doggedly (lol) avoid the camera traps set up to collect data.
4. A statistical population is the full group of entities or occurrences that you are attempting to analyze or model, whereas a biological or ecological population is the number of individuals of a specific species that live in a specific area at a specific time. A statistical population may be the same as a biological population in some cases, but it may also be larger or smaller depending on the scale of the research at hand. On that note, a statistical population can easily vary in size depending on what you are asking/attempting to model, whereas a biological population will only change through time (migration, birth/death rates, etc).
5. My group chose cattails for the model thinking in class activity.

The cattail species present in the study area could be measured categorically/nominally as species is not a numeric value, and there is no ranking associated with species.

The count of each species present could be measured as a discrete variable, because the only possible values are non-negative integers.