Exam: Population Ecology

Develop a 4-year long PhD project on the topic of: population ecology of rare plants in response to climate change. Specifically, consider one or more plant species and design a project that asks how climate change might threaten this species. This can be hypothetical (don’t get too distracted by picking the perfect species- you can instead think about what features you would be looking for in the ideal study system). I want to see that you understand the population models well enough to justify decisions you make in how you design your data collection and create your population model.

What is your study species and why did you choose it?

How can you consider the effect of climate drivers on the population dynamics of the species in a 4-year phd? You won’t have 15 years to capture many years with different climates, like I had for *Lupinus tidestromii*, so you might want to study the species across environmental that naturally vary in climate (e.g., across latitudes or altitudes) or experimentally alter climate.

How do you design your research to address your question? For example, will you work in the field or in a greenhouse/laboratory? What treatments will have? Will these be natural or experimental treatments? What will you measure?

How will you design your population model to test your question? I assume you will use a structured population model, as most plant and animal populations have some sort of age/stage/or size structure. Will you use a matrix population model or an integral projection model? Why? Will you incorporate environmental stochasticity or density dependence into your model? Explain and justify your choices.

Draw a hypothetical example of what results of your study might look like and interpret them.