

Population dynamics review

Starting in the 1970s, Burmese Pythons - beautiful snakes that are native to south-east Asia - started becoming common imports into the US as part of the exotic pet trade. In the following decades, released pythons started establishing a population in the Everglades of Florida, and in the years since, their populations have grown rapidly, with devastating consequences for various native animals and whole ecosystems. Experts call the invasion of these pythons as “of the most intractable invasive-species management issues across the globe” (Guzy et al., 2023).

For more information about this issue, which please watch [this video](#). *Note: This video contains footage of snakes.*

1. You are tasked with estimating the population size of Burmese Pythons in the area surrounding Lake Okeechobee, which represents the northern limit of the population (as of 2020). Estimating python populations is notoriously difficult, and you decide to develop an estimate using the Mark-Recapture method.
During your first week of field work, you capture and mark 7 pythons, which you release back into the population. A month later, you come back to the park and capture a total of 20 pythons, of which 4 are marked. Based on this information, what is your estimate of the total population size in this area?

2. What are 3 assumptions of the Mark-Recapture method, and how might they affect your estimate of the population size? In other words, do you think that violating each assumption would lead to an under-estimate or an over-estimate of population size?

3. So far in class, we have introduced several different ways to model population growth (exponential growth model; logistic growth model; transition matrices). Of these, which do you think would be most helpful in understanding and managing the Everglades population of Burmese Pythons? Why?

4. Watch [this video](#) about the invasion of rabbits in Australia. What are some similarities between these two case studies? What are some lessons we can learn from these? Based on these case studies, what kind of population growth do you think invasive species experience?

Note: This video includes some disturbing footage of “population control” methods that involve killing rabbits. If you are uncomfortable watching this, you can choose to read [this paper](#), focusing on the Abstract, Introduction, and Discussion sections.