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Lecture Assignment 2

2024-09-12

1. How does the Kellner *et al*. dichotomous definition of habitat suitability compare and contrast with classical definitions of habitat? Do not consider the Northrup *et al*. definition of habitat here; think back to our first Thursday lecture when we discussed “what is habitat?”.

The Kellner *et al*. definition of habitat touches on a couple of the aspects that we have discussed in class but is distinctly different. The authors do mention that a habitat is species specific and are thinking along the lines of promoting positive fitness over a temporal scale. However, the discussion of habitat being suitable or unsuitable, to me infers the potential for it to enable a fitness of zero. The authors also make no mention of residency/occupancy, spatial scale, resources, or conditions.

I see the biggest distinction between these two definitions as being based on a combination of behavior and demographics (residency, survival, and reproduction) vs. the outcome of relatively long-term demographic processes (expected lambda). They both use dichotomous definitions (it is or it isn't) but Kellner's "habitat suitability" is redundant according to our classical definition.

1. How do Kellner *et al*. define habitat quality? How is this different from habitat suitability?

The authors suggest the definition of habitat quality to be “the expected value of λ or E (λ)” within the context as they described the finite rate of population increase (λ=er) with the reasoning that it relates habitat quality directly to habitat suitability via rates of survival and reproduction. This definition differs from habitat suitability, as the latter depends on whether or not λ is ≥ 1 and is related to population density and carrying capacity.

1. Kellner *et al*. argue for the importance of long-term studies to evaluate habitat suitability. What value (if any) do you see in “short term” studies of habitat suitability (e.g., studies that take place over only a fraction of a species’ lifespan or life cycle)?

The described “short-term” ≤ 4-year studies are much more feasible than longer studies in terms of funding. Additionally, depending on the organism, they may only exhibit the type of behavior that a study focuses on at one point in their life, such as juvenile mountain lion dispersal from their natal home range. In the case of studies that would benefit from long-term data collection to reduce the “noise” and observe long-term trends, a snapshot is still informative and beneficial for our insight into the observed system. Reporting on trends with a shorter study is still justified, but should acknowledge the temporal limitations and potential causes of variation.