Tuesday Lecture

2024-10-15

**Used-Available (Presence-Only) Data: Resource Selection Functions, Part I**

Quiz:

Why is a multi-level habitat selection study inherently multi-scale? *Each level is at a different spatial scale*

You are interested in the habitat associations of ringtail cats in Saguaro National Park East. You attach GPS collars to a sample of ringtails and record their locations every hour. The Parl has a very good vegetation map that classifies the entire park into eight categories. You calculate the **proportion of each ringtail’s home range that is within each vegetation category** and then compare these proportions to the overall proportions in the park. You have examined ringtail cat habitat selection at which of Johnson’s four orders of selection? *2nd. You have compared what is being used at the level of the home range with what is available within some larger study area, hence you have quantified selection of home ranges within a larger study area.*

**What is selection?**

Use relative to what is available.

* Selection occurs when use is positively disproportionate to availability
  + statistical function that we observe

If a species selects a resource, can we call this preference?

* No, depends on accessibility of different options
* Preference as defined by Johnson
  + Selection when all options are equally present and available
* Selection simply infers to proportionate use based on availability
* What we see an animal use is constrained by what is available, even though it may prefer something else that is not available
* Preference can be important to take into account in conservation management
  + Translocation of species. If they are placed somewhere with preferrable resources they may be less likely to leave the area than if they were placed somewhere with resources they could select for, but may not prefer.

**Rattle snake study – habitat associations**

How can we calculate selection from frequency (%) of use-available data?

* Divide used by available
  + ~1, proportional use
  + >1, selection
  + <1, avoidance

**Be careful with selection findings…**

Proportional use to availability may not always mean the species do not select for that feature.

Example, Mt. Graham red squirrels

* Available: 90% forest, Used: 18 of 20 = 90%, Selection: 0.9 / 0.9 = 1.00
  + Because feature is so widely available, even if it is important for the species, the animal can meet its needs just by randomly walking around the landscape.
* Available: 45% forest, Used: 9 of 10 = 90%, Selection: 0.9 / 0.45 = 2.00
  + Here, where forest is not widely available, selection is indicating a limiting resource
* Also illustrates why hierarchical selection evaluation is important.
  + Selection for forest may be happening at a higher hierarchical order, so you may not see the selection for forest at a lower hierarchical order because that selection has already occurred. So you should be looking at finer scale (tree species, cone production, etc.)

**Lab Notes:**

Evaluating sensitivity of parameter estimates based on number of random points sampled.

* Looking for your parameter estimates to stabilize as you draw random points
* Slope estimates start to stabilize at 10 random points per used point (unbiased estimates), greater than that it becomes more precise
  + Important for highly heterogeneous study area: a lot of variation in what is available, you may want more random samples to better characterize that heterogeneity