Forest roads and streams as potential barriers in movement of red-backed salamanders (*Plethodon cinereus*)

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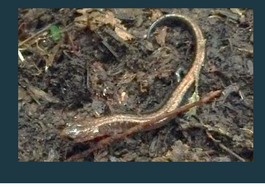

Introduction

- Habitat alteration can fragment territories and create barriers for species with poor movement abilities. Such obstacles can create variability in distribution patterns (Ewers and Didham 2005).
- Several studies have shown that roads serve as obstacles in salamander movement (Marsh *et al*. 2005).
- The red-backed salamander, *Plethodon cinereus*, (RBS) is an abundant and widely distributed species in central Pennsylvania. RBS can serve as a model for other *Plethodon* salamanders in understanding how barriers impact their movement (Marsh *et al.* 2008).
- RBS are territorial and are capable of returning to their home territory after being displaced up to 90 meters (Kleeberger and Werner 1982).
- Juvenile homing behavior and differences between sexes in return rate are topics on which little is known (Ousterhout and Liebgold 2010).

Questions

- Are streams and forest roads obstacles in the return of red-backed salamanders to their territories?
- Will male RBS return more often than females to their site of origin?
- Will juvenile RBS return less often than adults to their site of origin?

Figure 1. Cover board array with forest road barrier

Site Overview

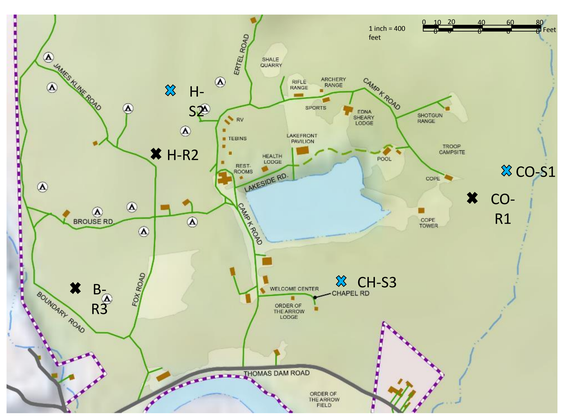

Figure 2. Camp Karoondinha, Millmont, Pennsylvania study site with plots. Sampled once a week, starting June 2015. Site locations in camp are indicated by X. Stream sites indicated in blue, road sites in black.

Methods

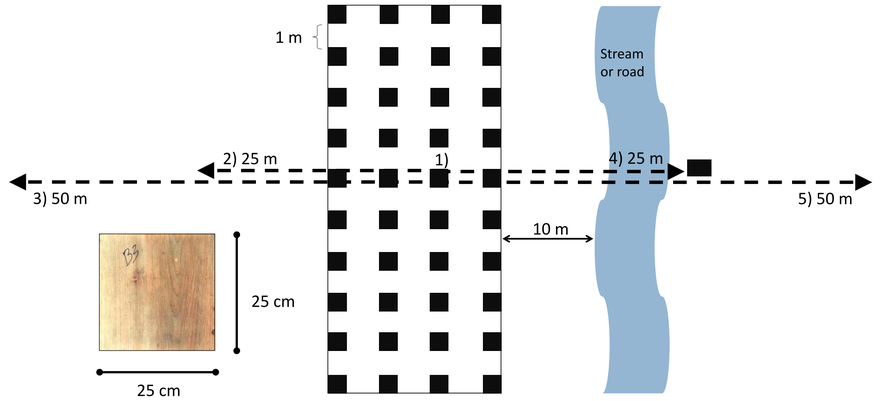

Figure 3. Plot set-up with cover board array and treatment options. Treatments are shown with distance and direction of displacement. (1: Control, 2: 25m into forest, 3: 50m into forest, 4: 25m across barrier, 5: 50m across barrier).

Field Methods

- Abiotic data collected
- Capture
  - Place in bag
  - Check for marks
  - Displaced boards observed for two weeks
- Measurement
  - SVL, TL
  - Sex (male – vas deferens, cirri; female – count for # of eggs; or unknown)
- Marking
  - Visual Implant Elastomer (VIE) tagging
  - Mark-recapture method

Figure 4. Visual Implant Elastomer colors

Figure 5. Salamander marking diagram (ventral)

Figure 6. Marking with VIE for identification

Preliminary Results

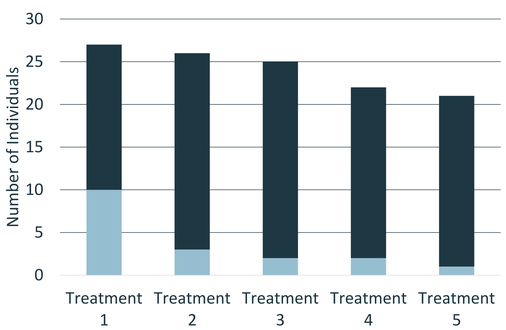

Figure 7. Number of individuals in study that received treatment across five study site plots. Whole bar represents total number caught; light represents number recaptured.

- 120 individuals have been marked and included in the study
- 17.64% of total number of individuals in study were recaptured
- If a salamander has been recaptured after previously receiving a treatment, it receives the control treatment for the remainder of the experiment.
- 6 individuals have been recaptured more than once
- RBS activity varies with seasons
- Possible competitive interactions with *Plethodon glutinosis* (Slimy Salamander) in plots

Preliminary Results

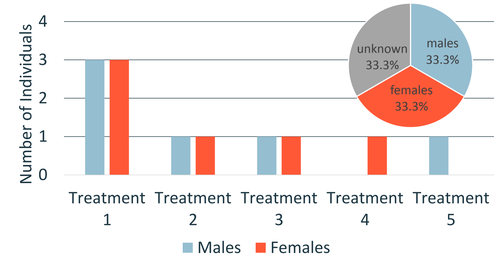

Figure 8. Male and female recaptures with corresponding treatment

- Data suggests no difference in return between males and females
- Salamanders of unknown sex were recaptured after receiving treatments 2 and 4
- Females that returned from treatments 2 and 4 had > 10 eggs

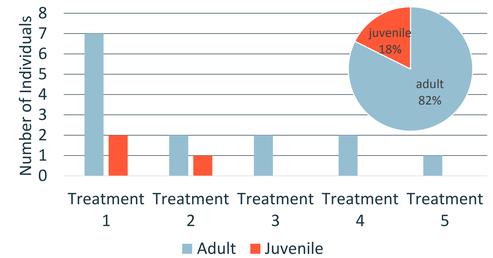

Figure 9. Adult and juvenile recaptures with corresponding treatment

- Data suggests a possible difference in return rates between adult and juvenile life stages
- Juveniles are individuals with SVL < 35 mm
- 1 juvenile was found at its displaced board the following week

Preliminary Conclusions

- With ongoing data collection, we expect a greater sample size and improved ability to evaluate the impacts of roads and streams on RBS movement.

Literature Cited

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