SUPPLEMENTARY MATERIALS

for

Herbicide Application Improves Plethodontid Salamander Habitat Conditions in Regenerating Clear-cut Forests

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The supplementary materials contain preliminary information we used to guide study design, and information on the diversity of salamander species we found during our study during our surveys. It also includes figures to support analytical details in the manuscript about survey methodology (Figure S1) and body condition estimation (Table S3 and Figure S2).

Preliminary Study

To assess the feasibility of studying salamanders in conifer-replanted areas, we conducted a preliminary comparison of salamander presence across deciduous, coniferous, and mixed-wood forests near our study site. These forest types differ in habitat characteristics and have shown varying effects on Eastern Red-backed Salamander (*Plethodon cinereus*) abundance in previous, yet conflicting, studies (Degraaf and Rudis 1990; Mathewson 2009). In May and June 2023, we randomly sampled 11 plots in Gagetown, NB during daytime, and documented salamander presence (Table S1). The salamander community was dominated by Eastern Red-backed Salamanders, though we also found two Eastern Newts and one Spotted Salamander in coniferous forest. These results suggest that coniferous forests have sufficient salamander abundance detected using the survey methods utilised in our study.

Salamander Species in Surveyed Forests

During surveys we observed three salamander species: Eastern Red-backed Salamanders, Spotted Salamanders (*Ambystoma maculatum*), and Eastern Newts (*Notophthalmus viridescens*). Eastern Red-backed Salamanders were found in all blocks and was the only species found in 25

of 30 blocks (Table S2). More than one species was detected in five blocks: three control stands had one Spotted Salamander each, one control stand had one Eastern Newt (eft phase), and one untreated block had one Spotted Salamander.

References

Degraaf R.M., Rudis D.D. 1990. Herpetofaunal species composition and relative abundance among three New England forest types. For. Ecol. Manag. **32**: 155–165.

Mathewson B. 2009. The relative abundance of Eastern Red-Backed Salamanders in Eastern Hemlock-dominated and mixed deciduous forests at Harvard Forest. Northeast. Nat. **16**: 1–12.

Supplementary Tables

Table S1. Results from a preliminary study assessing salamander presence between deciduous, coniferous, and mixed wood forest types that were surveys during the day. The number of plots sampled, total number of salamanders counted, and species richness in each forest type are presented.

Forest treatment	*Number of plots*	*Number of salamanders*	*Species richness*
Coniferous	5	12	3
Deciduous	3	10	1
Mixed wood	3	7	1

Table S2. Species richness of salamanders by forest treatment in our study, including Eastern Red-backed Salamander (*Plethodon cinereus*), Spotted Salamander (*Ambystoma maculatum*), and Eastern Newt (*Notophthalmus viridescens*).

Forest treatment	***Eastern Red-backed Salamander***	***Spotted Salamander***	***Eastern Newt***
Control	183	3	1
Untreated	13	1	0
Treated	42	0	0

Table S3. Comparison of ordinary least squares (OLS) and robust regression models used to predict body mass from snout-vent length (SVL) in Eastern Red-backed Salamanders. Model fit was assessed using root mean squared error (RMSE) and Akaike's information criterion (AIC). The OLS model had a slightly lower AIC and similar RMSE compared to the robust regression model, supporting its selection for body condition estimation.

Model	***RMSE***	***AIC***
OLS Regression	0.175	-63.29
Robust Regression	0.176	-62.64

Supplementary Figures

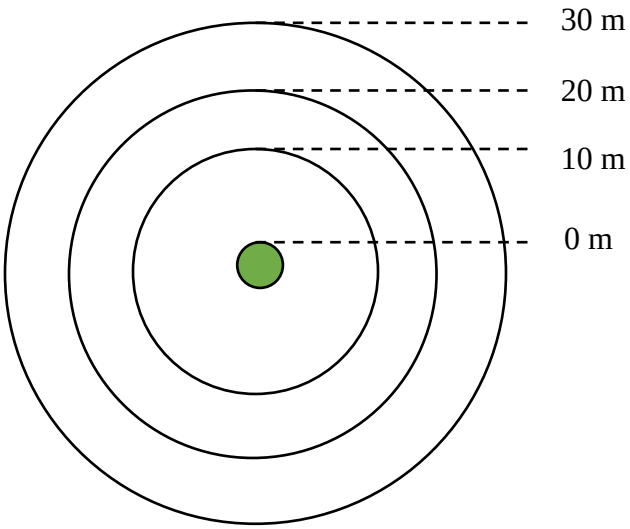

Figure S1. A diagram of the standardized concentric sampling method. The center point of the survey is represented by the green circle. The circular transects the researchers walked are represented by the black solid lines. Researchers looked under cover objects within 5 m on both sides of the survey transects.

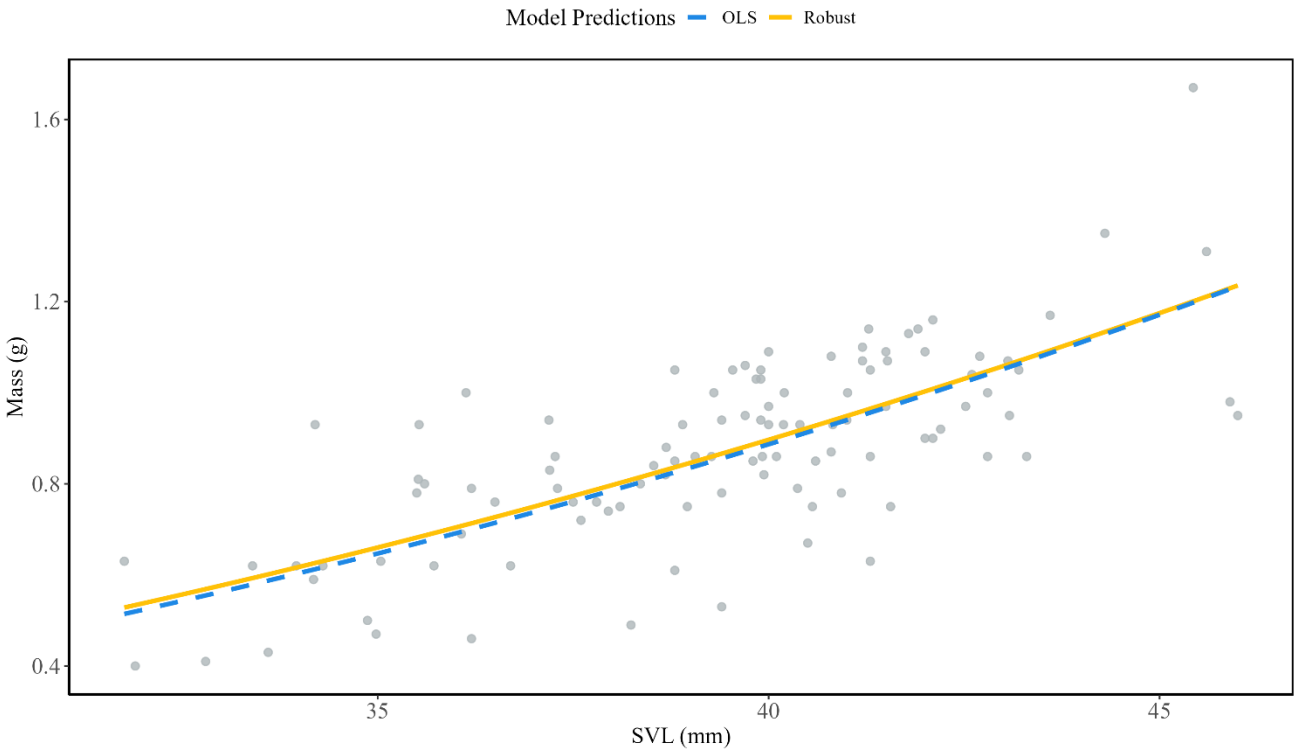

Figure S2. Lines of best fit show the predicted body condition estimation curves using an ordinary least square (blue dashed line) (Peig and Green 2009) versus robust regression (yellow solid line) (Maronna et al. 2019) of body mass against snout-vent length. Points represent raw data of Eastern Red-backed Salamanders. These are two different methods of estimating the scaled mass index of body condition, which accounts for allometric scaling of animals (Peig and Green 2009). We visually inspected this plot to assess fit, and determined that the ordinary least square regression estimation method appeared to follow the trend better for salamanders of small size (i.e., less than 35 mm in length).