

Effects of Forest Clearcutting on Spotted Salamander Migration

Jessica Veysey and Dr. Kimberly Babbitt
 Department of Natural Resources • University of New Hampshire



Fig. 1. Adult spotted salamander



Fig. 3. View across clearcut towards buffer.



Fig. 5. One of our vernal pools.



Fig. 6. Radiotracking

Introduction

- Amphibians that breed in vernal pools spend up to 99% of their lives in uplands surrounding their breeding pools, yet the upland habitat needs of these amphibians are poorly understood.
- Upland buffer zones are a common management strategy for these amphibians, but the effectiveness or width requirements of such buffer zones are unclear.
- This research is part of the first large-scale, field experiment to test amphibian buffer-width requirements.
- Spotted salamanders (*Ambystoma maculatum*) breed in vernal pools throughout eastern North America.



Fig. 2. Surgical removal of radio implant from spotted salamander.

Movements of Four Salamanders at one Wetland

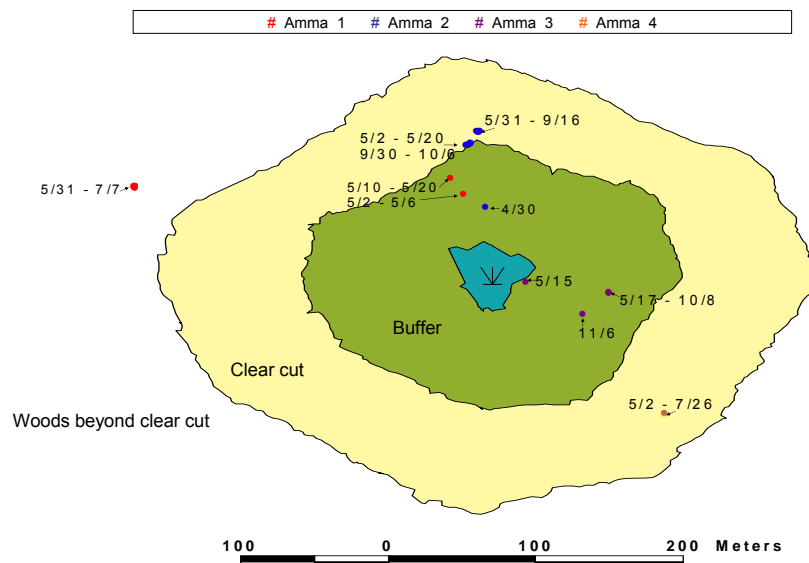


Fig. 4. Depiction of four patterns of migration behavior at a 100-m-buffer wetland. Amma 1 moved through the buffer and clearcut into woods beyond the clearcut. Amma 2 lingered near the clearcut edge, spent the summer in the clearcut, and returned to the edge during the fall. Amma 3 stayed in the buffer for the entire season. Amma 4 bolted through the buffer, and spent the rest of the time it was tracked in the clear cut.

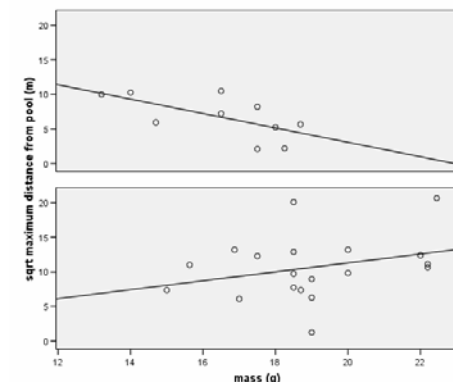


Fig. 7. Maximum distance from breeding pool vs. mass for tracked salamanders. Data are from April to mid-July. Differences between sexes and between years were significant.

Experimental Design

- Northern hardwood forest of central Maine.
- 12 natural vernal pools.
- 100-m-diameter clearcuts used to create buffer zones at pools.
- 4 pools per cutting treatment:
 - 30-m buffer
 - 100-m buffer
 - reference (uncut)

Methods

- Used radiotelemetry to study spotted salamander migration through a buffer / forest clearcut matrix.
- Surgically implanted radios in post-breeding salamanders.
- Tracked 40 adults native to the pools:
 - 21 in 2004; 19 in 2005
 - 25 females; 15 males
 - from April to November

Summary Statistics

	Range	Mean
Max. distance from pool (m)	1.6 → 427.6	105.9
Cumulative distance moved (m)	6.0 → 593.0	140.4
Distance at final location (m)	1.0 → 405.9	99.1
Max. migration rate (m/d)	0 → 75.5	21.9
Percent of time in clearcut	0 → 99	23
Longest duration in clearcut (d)	11 → 164	65.6

Further Analyses

- We are modeling daily movements with:
 - a) mixed-effects Poisson regressions
 - b) ZIP regressions
- Initial results indicate significance effects / interactions for:
 - day of year
 - precipitation*min temp
 - maximum temperature
 - precipitation*day of year
 - precipitation
 - maxtemp*day of year
 - maxtemp*min temp

Acknowledgments

- This project was supported by: The National Research Initiative of the USDA Cooperative State Research, Education, and Extension Service; Grant # 2003-35101-12922.
- We appreciate the cooperation of International Paper / Sustainable Forest Technologies; the counsel of Matthew Baber, Andrew Cooper, Mark Ducey, and Bryan Windmiller; and the help of our dedicated field crew.

