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## Symposium "Conservation of Amphibians on Managed Landscapes"

### Testing competing hypotheses regarding the effects of forest removal on postmetamorphic salamanders

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**Abstract:** A persistent challenge in studies of the effects of forest management practices on amphibians is relating changes in relative abundance to the behavioral and demographic processes that produced such effects. For example, reduced abundance following clearcutting may result from behavioral avoidance of harvested sites, reduced survival in clearcuts, or both. In spring of 2004, we harvested forest adjacent

to four wetlands on the Savannah River Site in South Carolina as part of the LEAP (Land-use Effects on Amphibian Populations) study. At each wetland, we randomly assigned 4-ha quadrants to each of four treatments: clearcutting with coarse woody debris removed (REM), clearcutting with coarse woody debris retained (RET), partially harvested (PAR, i.e., thinning), and unharvested control (CON) of mature pine. In the first two years post-harvest, we captured fewer adult marbled salamanders (*Ambystoma opacum*) and mole salamanders (*A. talpoideum*) in drift fence-pitfall trap arrays in clearcuts than in forested treatments. Simultaneously, we performed experiments to examine the potential mechanisms responsible for the differences in relative abundance. We investigated habitat selection of marbled salamanders by releasing adults on habitat edges and tracking their movements using fluorescent pigments. Approximately half of the salamanders entered clearcuts (RET or REM), suggesting they do not avoid harvested areas during migration. We used terrestrial enclosures to test an alternative hypothesis that differences in abundance among treatments are attributable to differences in survival. We recaptured fewer post-breeding salamanders in clearcut enclosures than in forested enclosures, implying that adults that settle in recent clearcuts have higher risks of mortality. Juvenile marbled and mole salamanders also experienced higher mortality in clearcuts in short-term enclosure studies. Juvenile mortality was largely attributed to desiccation and predation by fire ants (*Solenopsis invicta*). Overall, our data show that even-aged forest management results in patches of poor-quality habitat for ambystomatid salamanders.