

Effects of Prescribed Fire and Timber Harvest on Terrestrial Salamander Abundance, Detectability, and Microhabitat Use

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Abstract

Individual animals may respond to altered habitats in physiological, behavioral, or ecological ways that subsequently influence population-level dynamics such as survival rate and spatial distribution. Terrestrial salamanders are ecologically important animals that comprise large amounts of biomass and are key predators in forest-floor ecosystems. My dissertation has investigated (1) whether terrestrial salamander abundance and microhabitat use changed after timber harvest or prescribed fire, and (2) how individual salamanders respond behaviorally to prescribed fire.

In pre-treatment surveys, I found most salamanders within leaf litter (rather than under cover objects), but the proportion of leaf litter captures varied with time-since-rainfall. I also found that salamander capture frequency varied greatly with rainfall, which illustrates the importance of accounting for imperfect detection. Terrestrial salamanders reduced their surface activity in response to prescribed burn and timber harvest, but abundance did not change drastically in the short term. Using PIT-telemetry to relocate terrestrial salamanders in prescription-burned and unburned areas, salamander surface activity decreased in burned areas, but I found no evidence of direct salamander mortality.

Results from these studies indicate that terrestrial salamanders respond to post-fire and post-harvest conditions by spending more time belowground to avoid increased physiological stress. Though it appears that terrestrial salamanders can generally avoid direct consequences of prescribed fire, behavioral responses to post-fire micro-environmental conditions could affect salamander populations in ways that are not yet apparent.