

# **EFFECTS OF RIPARIAN RHODODENDRON REMOVAL AND TOP-DOWN CONTROL BY CRAYFISH ON DIATOM COMMUNITY STRUCTURE IN SOUTHERN APPALACHIAN STREAMS**

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Primary producers in headwater streams are controlled by both bottom-up (e.g., light, nutrients) and top-down (e.g., stream consumers) factors. In the southern Appalachians, Rhododendron maximum is a pervasive evergreen shrub in headwater riparian zones that severely limits light availability to algal communities year-round. Although rhododendron is native to the southern Appalachians, the U.S. Forest Service is interested in potentially removing it along stream banks to promote the growth and regeneration of hardwoods. Previous studies indicate that increased light conditions after rhododendron removal had a positive effect on algal growth, although algal consumption by macroconsumers mediated this effect. Studies of how crayfish affect algal community composition in this region have shown mixed results, and it is unclear to what extent these top-down effects interact with increased light levels resulting from rhododendron removal. In this study, we examine how top-down control by crayfish interacts with increased light availability created by reach-scale removal of riparian rhododendron to influence diatom community structure. We experimentally excluded crayfish from localized benthic areas using electric “fences.” Crayfish exclusion treatments were paired with crayfish access controls. We ran two 32-day experiments, pre-rhododendron/post-rhododendron removal, whereby diatoms at the conclusion of the experiment. Preliminary analyses indicate that pre-rhododendron removal, diatom communities were dominated by adnate forms (e.g., Eunotia and Nupela spp.) and crayfish exclusion had little effect on diatom community composition. Post rhododendron removal, crayfish exclusion shifted diatom community composition from adnate diatoms (e.g., Eunotia and Achnanidium spp.) in access plots to upright diatoms (e.g., Gomphonema and Encyonema spp.) in exclusion plots. These results suggest that crayfish have top-down effects on diatom community composition associated with different growth forms in this region, but this linkage may only occur under increased light availability, such as higher light conditions caused by rhododendron removal.