

ENVIRONMENTAL INFLUENCES ON POND-BREEDING LARVAL AMPHIBIAN

ABUNDANCE

BY

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## Abstract

During 2000 and 2001, I used dip net surveys to assess densities of pond-breeding amphibian tadpoles and macroinvertebrates throughout that portion of Rhode Island, USA, west of Narragansett Bay. I investigated relationships between pond hydroperiod, amphibian larval population size, presences of fish, and macroinvertebrates. Additionally, I investigated the potential role of macroinvertebrates and certain amphibians in reducing larval populations of Wood Frogs and Spotted Salamanders. I surveyed 119 ponds in 2000 and 46 ponds in 2001, with 28 ponds sampled both years. I detected 12 species of amphibians, with Wood Frog (*Rana sylvatica*) and Spotted Salamander (*Ambystoma maculatum*) the most commonly encountered species. Abundance estimates for several amphibians and macroinvertebrates exhibited significant variation across the hydroperiod gradient and were significantly reduced in ponds with fish.

In contrast, I found little evidence of negative relationships between any macroinvertebrate group and any amphibian species. Multiple regression models revealed that fish were the strongest influence on larval populations of Wood Frogs and Spotted Salamanders. In the absence of fish, Green Frog (*Rana clamitans*) tadpole abundance produced a negative effect on both Wood Frogs and Spotted Salamanders. No invertebrate variable produced a significant negative effect on either species.

I also assessed the reliability of using dip nets to quantify the abundance of pond-breeding amphibian larval populations. I detected significant correlations between estimates of abundance between egg masses and dip net surveys for both Spotted Salamanders (maximum  $r = 0.59$ ) and Wood Frogs (maximum  $r = 0.74$ ), with relationships generally stronger for Wood Frogs. These results suggest that, although dip

net surveys are useful to assess the abundance of these two species of pond-breeding amphibians, egg mass counts represent a more reliable technique to assess long-term population trends. Dip net surveys may be a reliable method of generating quantitative data on larval populations for which egg mass counts are not possible.