

EFFECTS OF SPATIAL SUBSIDIES AND CANOPY COVER ON POND
COMMUNITIES AND MULTIPLE LIFE STAGES IN AMPHIBIANS

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Abstract

Spatial subsidies are resources that move from one ecosystem to another. In aquatic systems, canopy cover determines both light availability and subsidy input in the form of senescing leaves. This phenomenon has been well studied in streams, and general patterns of ecosystem production, community structure, and the reciprocal export of animals have been discovered. I was interested in whether these patterns also occurred in ponds. I examined these patterns using experimental pond mesocosms and supported the results using an observational study of natural ponds. For the pond mesocosm experiment, I placed mesocosms along a canopy cover gradient and manipulated spatial subsidy input. I found a shift from net heterotrophy in closed canopy mesocosms to a balance between heterotrophy and autotrophy in open canopy mesocosms. The macroinvertebrate community structure responded to both canopy cover and subsidy input in mesocosms. The biomass of collectors (detritivores) was highest in mesocosms with litter input and increased with canopy cover, a pattern also present in natural ponds. Finally, I found that litter input increased the reciprocal export of amphibian biomass compared to no input. Amphibian biomass also decreased with increases in primary productivity. This research highlights the importance of spatial subsidies that connect different ecosystem types. Conserving these ecosystem connections will help maintain biodiversity and ecosystem function.