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## Effects of shade and predation on survival and growth of larval gray treefrogs (*Hyla versicolor*)

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Amphibians are experiencing population reductions and species extinctions on a worldwide scale and most biologists agree that loss or degradation of local habitats is the major factor causing declines. As part of the larger Land-use Effects on Amphibian Populations (LEAP) project, we examined some of the effects of timber harvest on the pond environment of larval gray treefrogs (*Hyla versicolor*). We manipulated shade and predator levels (dragonfly larvae; family Libellulidae) in cattle tanks to test the impact of clear-cutting on the tadpole populations. Survival and size of the metamorphosed frogs differed in response to shade and predation level, but larval period was unaffected. The percent survival in low shade treatments was 71.0% compared to 65.7% for high shade treatments and average mass at metamorphosis was 0.3347 g compared to 0.2960 g. This greater growth was supported by previous research and suggests open canopy ponds have more periphyton which tadpoles utilize as food. In the predator treatments, ponds that had no dragonfly larvae had a greater percent survival than the high predator density ponds (81.2% and 61.8%), however, the average mass of the zero and high predator treatments were similar and smaller than masses in the low and medium treatments. The smaller size at metamorphosis in the high predator treatments can be attributed to reduced feeding activity in order to avoid predators. The higher survival rate from the lack of predation in low treatments resulted in greater tadpole density and less resources available resulting in smaller average mass at metamorphosis. These results imply that clear-cutting does not negatively impact amphibian populations because the tadpoles seemed to thrive from the benefits of open canopy ponds. However, this is the only the first stage in their life history and would probably differ in canopy preference as the frogs mature and begin to use trees for refugia.