

# THE ABUNDANCE AND DIVERSITY OF STREAM SALAMANDERS ON MONTANE GOLF COURSES

Mark J. Mackey

Dr. Raymond D. Semlitsch

## ABSTRACT

Stream salamanders are often the most abundant vertebrates in headwater streams and they play an integral role as both predators and prey in these ecosystems. Because they often use both terrestrial and aquatic habitat and because of their susceptibility to a range of environmental disturbances, it is widely believed that stream salamanders are useful as biological indicators of ecosystem health. The first study in this thesis examines how stream substrate complexity influences both capture rates and observed species richness of stream salamanders of two common sampling techniques. We found that catch per unit effort (CPUE) did not differ significantly between litter bag sampling and visual encounter surveys (VES). Overall, we detected significantly more species in transects with complex substrate using both leaf litter bags and VES.

Recent studies indicate golf courses have a potential role in biodiversity conservation and management. We monitored larval and adult stream salamanders in reaches located upstream, on, and downstream of managed areas of 10 golf courses in western North Carolina, USA. We measured in-stream and riparian habitat characteristics and tested for fertilizer and pesticide chemicals to explain trends in salamander abundances and diversity. Salamander abundance and diversity did not differ in stream reaches located upstream and downstream of managed areas on golf courses (i.e. fairways). Reaches located on managed areas contained lower abundances and less diverse stream salamander communities.