

**Environmental and Ontogenetic Changes in Detection Probability of
Pond-Breeding Salamanders in the Georgia Piedmont**

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Amphibian declines have prompted research into effective means to monitor amphibian populations. As estimates of species abundance are costly, presence-absence data are more frequently used for landscape-level monitoring efforts. Because aquatic salamanders are difficult to sample using opportunistic methods, the implications of using alternate sampling strategies to estimate patch occupancy must be rigorously assessed before these estimates can be considered valid. Estimates of detection probability are necessary for accurate interpretation of trends based on these data. Eight wetlands in Clarke County, Georgia were intensively sampled for pond-breeding salamanders using aquatic traps and opportunistic searches, to test effects of season, sympatry and pond permanence on detectability. Using program PRESENCE, detection probability was estimated for neotenic and adult forms of these species in fall, winter and spring. The amount of sampling effort required to infer absence with 95% confidence for each species was also estimated to obtain an index of survey quality. Inter- and intraspecific variation in detectability across wetlands were compared. Expected correlates between detection probability and wetland characteristics included a positive association between pond ephemerality and presence of neotenic forms, a negative interaction between adult *Notophthalmus* and *Ambystoma* larvae, and seasonal effects concurrent with known breeding intervals. These results emphasize that extensive effort must be employed to infer absence of cryptic species, so that their presence is not overlooked in conservation and management decisions. The importance of incorporating parameterized detection probabilities into patch occupancy estimates is crucial when species negatively impact one another or are absent in some seasons.