

Terrestrial Habit Use by Pond-breeding Amphibians on Golf Courses in Southern New England

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Objectives:

1. To quantify maximum dispersal distances of spotted salamanders from breeding ponds to identify "life zone" extent.
2. To determine if fairways affect salamander dispersal patterns.
3. To determine what factors may affect the phenology of migration.
4. To assess the effect of landscape composition on emigration behavior of spotted salamanders
5. To examine how disturbance associated with golf course construction might affect spotted salamander emigration.

Start Date: 2003

Project Duration: two years

Total Funding: \$60,000

During the 2003 field season, we monitored movements of radio-transmitting spotted salamanders to determine dispersal capabilities and habitat preferences of spotted salamanders on golf courses. The objectives of this study were to (1) quantify maximum dispersal distances of spotted salamanders from breeding ponds to identify "life zone" extent, (2) determine if fairways affected salamander dispersal patterns, (3) determine what factors may affect the phenology of migration, (4) assess the effect of landscape composition on emigration behavior of spotted salamanders, and (5) examine how disturbance associated with golf course construction might affect spotted salamander emigration.

Fieldwork was conducted at two golf courses: Shelter Harbor Golf Course in Westerly and Charlestown, which was under construction, and Beaver River GC in Richmond, Rhode Island, which opened in 2000, and The Nature Conservancy's Francis C. Carter Reserve in Charlestown



The movement of spotted salamanders was assessed at two golf courses and a nature reserve to assess how golf courses may affect dispersal patterns.

that served as a control site.

We radio-tagged and monitored movements of 30 spotted salamanders: 12 at Shelter Harbor GC; eight at Beaver River GC; and 10 animals at Carter. Radio transmitters (1.7 g, model BD-2H, Holohil Systems Ltd., Carp, Ontario, Canada) were surgically implanted. Less than 24 hours after surgery, we released the salamanders next to a suitable cover object at its breeding pond. The University of Rhode Island Animal Care and Use Committee approved all protocols (AN03-03-016). We radio-tracked animals from April through August, 2003.

Once released, we attempted to locate each animal at least once every three days using direct overhead localization. When animals were located, we conducted a brief search below the leaf litter around the fix to see if we could visually assess the salamander's location and condition. We recorded each animal's fix using a GPS unit. These fixes were subsequently entered into a geographic information systems (GIS) database and plotted in ArcView. Local weather data (e.g., precipitation, maximum and minimum temperatures) were obtained from the URI Weather station in Kingston, RI.

Of the 30 radio-tagged salamanders, there was no direct mortality due to transmitter implantation, but there were three presumed mortalities due to construction at Shelter Harbor GC when animals migrated into the construction zone. Mean migration distances at each of the three sites over a 95-day tracking period were comparable to previous studies: Shelter Harbor GC 186.9 m (77 - 456 m), Beaver River GC 120.4 m (44 - 164 m), and Carter 111.7 m (43 - 179 m). However, we did document one individual



Radio transmitters were surgically implanted in 30 spotted salamanders to accurately assess their movements. that traveled over 450 m, nearly twice as far as has been previously reported in the peer-reviewed literature.

We calculated that the life zone extent needed to protect 95% of adult spotted salamanders would be an area with radius 181.5 m surrounding the breeding pond. Preliminary analysis suggests that spotted salamanders will cross fairways and cleared areas, but will not reside in fairways. No significant difference was found in migration distances between the sexes or between the sites, which is contrary to previous research.

Summary Points

- Researchers radio-tagged and monitored movements of 30 spotted salamanders: 12 at Shelter Harbor GC; eight at Beaver River GC; and 10 animals at Carter Nature Reserve.
- Mean migration distances at each of the three sites over a 95-day tracking period were comparable to previous studies: Shelter Harbor GC 186.9 m (77 - 456 m), Beaver River GC 120.4 m (44 - 164 m), and Carter 111.7 m (43 - 179 m).
- Preliminary analysis suggests that spotted salamanders will cross fairways and cleared areas, but will not reside in fairways.