Translocation of Radio-implanted Eastern tiger salamanders (Ambystoma tigrinum tigrinum) at Brookhaven National Laboratory

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INTRODUCTION

The Eastern tiger salamander (Ambystoma tigrinum tigrinum) is a widely distributed amphibian species ranging from Northern Florida to Long Island, New York. Due to increased urbanization and the resulting loss of breeding habitat, the New York range of tiger salamanders is only on Long Island, in Suffolk County. Presently, this species is listed as Endangered in New York State [1].

In an effort to rectify this status, conserve and recover A. tigrinum in New York, management decisions are being made. In an effort to reduce risk of extinction, a recently popular way of managing populations of endangered species in areas where they have been extirpated has been translocation [2]. Translocation of jeopardized species to restored wetlands is an option of combating deteriorating habitat that surrounds amphibian breeding ponds. This method is viewed as a way to save a species in decline. The endangered status of this particular species makes it a worthy candidate for translocation. But first information regarding the basic needs of this species and the monitoring of movement patterns is necessary to determine translocation a viable method of restoring a species. Amphibians can be found in similar areas throughout a given period and have specific habitat needs, such as vegetative structure, moisture requirements, and corridors for dispersal [3]. Translocation is believed to disrupt these movement patterns due to differences in habitat availability and familiarity.

This research attempts to validate translocation of Eastern tiger salamanders as a conservation management strategy by evaluating the impact of translocation on movement patterns. This study expects to achieve information that will be necessary when making land use and species management decisions.

MATERIALS AND METHODS

- The study took place from 7 July 2008 to 7 August 2008 in Upton, Suffolk County, Long Island, New York on Brookhaven National Laboratory property.
- Two breeding ponds were selected based on the presence of warm mesic in winter surveys. The selected ponds were within pitch pine (Pinus rigida) and/or (Quercus spp.) forests.
- Larval Eastern tiger salamanders (Ambystoma tigrinum tigrinum) were initially captured from Pond A and Pond B by seining or dip netting.
- Surgery procedures followed those outlined by Madison [3] and Facio [4]. For anesthesia, the salamanders were individually submerged in 0.25% solution of MS222 (3-Aminobenzoic acid ester methanesulfonate salt). Complete anesthesia occurred within 20 minutes, depending on body size and development of external gills. Hololotid BD-211 1-g transmitter with internal antennae were implanted. The antennae allowed for the tracking of movement patterns after pond emergence. Five individuals from Pond A were translocated to Pond B, while five were returned to Pond A. The individual collected from Pond B was implanted and returned to its collection site. All individuals were radio-tracked for four weeks to determine movement patterns and habitat selection through the recording of vegetation in a plot surrounding the individual’s location. Of the five individuals returned to their native pond, three were lost to predation, one died in the field, and one was lost when its signal became intransigible. The greatest distance traveled occurred by the salamanders placed at pond of original collections. Of the translocated individuals, four were preyed on. This indicates that the translocated individuals are more susceptible to predation. Additionally, translocated individuals at Pond B moved a shorter distance, in comparison to individuals at Pond A. This is indicative of stress and unfamiliarity with the area.
- A possible reason for the loss of all resident individuals at Pond A is likely due to the hydroperiod. R. catesbeiana is a species that is capable of facultative emigration and therefore will leave a drying-out pond at a smaller size [6]. This was the case for Pond A, since the natal pond dried out completely by 10 July 2008, forcing the larvae to metamorphose earlier at a smaller, more vulnerable, size. The small size would yield an unfavorable surface to volume ratio of the body of the salamander, hindering its ability to thermoregulate in the weeks of little precipitation.

DISCUSSION AND CONCLUSION

Transmitters allow for the location and observation not typically observable. It is difficult to test whether the tracked animal’s behavior is the same as that of an animal without a transmitter [5]. Although it is difficult to determine if the transmitter itself makes the animal more susceptible to fatality, the results show translocated individuals appear to be more susceptible predation. This may be due to exposure to different abundances of predators at Pond B in comparison to Pond A. This may also be attributed to the size of the metapopulational individual, which increases risk of predation as body size decreases.

A possible reason for the loss of all resident individuals at Pond A is likely due to the hydroperiod. A. t. tigrinum is a species that is capable of facultative emigration and therefore will leave a drying-out pond at a smaller size. This was the case for Pond A, since the natal pond dried out completely by 10 July 2008, forcing the larvae to metamorphose earlier at a smaller, more vulnerable, size. The small size would yield an unfavorable surface to volume ratio of the body of the salamander, hindering its ability to thermoregulate in the weeks of little precipitation.

Although these results indicate that A. t. tigrinum fare better when not translocated, the biotic and abiotic factors at each site seem to affect the results. Due to such circumstances, more research is necessary to determine translocation as an effective way of combating declining populations of this New York State endangered species [2].

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REFERENCES