



Survivorship of the Turtle population in Cougar Lake

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Introduction

Worldwide, reptile populations are in decline due to habitat destruction and human disturbances. Turtles in Illinois are no exception, as six of the seventeen species commonly found here are listed as threatened or endangered (Illinois 2011). They use a variety of habitats including prairie, wetlands, lakes, and rivers. A majority of the semi-aquatic turtles, such as red-eared sliders (*Trachemys scripta*), painted turtles (*Chrysemys picta*), and common snapping turtles (*Chelydra serpentina*), rely on lakes with riparian forest as their primary habitat (Burbrink 1998). These semi-aquatic turtle species occupy an important niche in water systems as predators and scavengers, so determining the demographics of a local population is important. A healthy turtle population would have some species diversity, high abundance, and have ample recruitment of new generations.

The primary objective of this study was to examine the survivorship of the local turtle population in Cougar Lake. The hypothesis to be tested was that the Cougar Lake turtle population would show a Type II survivorship curve. Healthy populations of turtles normally show this type of survivorship curve, where there is nearly equal probability of death for all ages (Frazer 1991). A Type II survivorship curve is linear, with a negative slope. This type of curve, with young individuals present in high numbers, would show that there is ample recruitment of new generations to replace dying individuals. In addition to plotting the survivorship curve for this population, other data was examined. The relative species abundance and sex ratios for each species were calculated. It was expected that all species captured would show a 1:1 ratio of males to females, however research has shown that most populations will show an unequal number of males to females (Nazdrowicz 2008).

Materials and Methods

This research project was conducted on Cougar Lake, which is located on the Southern Illinois University at Edwardsville campus about 30km northeast of St. Louis. The lake is surrounded mostly by deciduous forest, which provides plenty of fallen trees for turtles to bask on. Air temperatures during the sampling times were mild and ranged from 15 C to 27 C. Water temperatures near the traps stayed nearly constant at an average of 19C and only fluctuated by about 1C.

Using a canoe and chest waders, five hoop nets were planted near the edges of the lake in locations with about three feet of water and nearby fallen logs. The hoop nets were suspended on 3 foot stakes, so that about one third of the trap was exposed to air. This ensured that the turtles could reach the surface for air during their time spent in the traps. Canned cat food, tuna, and frozen fish were all used as bait, with varying success for each. The bait was placed in old film canisters with holes drilled through the sides, then tied to the top of the inside of each net. Finally, using a handheld GPS, the location of each of the trap positions was recorded so that they may be plotted later. The traps were checked at least once a day either in the morning at 10am or afternoon at 4pm, and were sometimes checked at both times.

Mark and recapture sampling was used on the turtles trapped since this is one of the most efficient ways to establish an approximate abundance of a species in a particular body of water (Rizkalla 2006). Upon emptying the traps, individual's carapace length, plastron length, shell height, shell width, and weight were then taken using vernier calipers and spring scale. Age was then determined by counting growth rings of scutes on the carapace. Next, sex of the turtle was determined by examining the tail and length of the claws. Male turtles have long claws and a longer, thicker tail with the cloaca closer to the tail tip in comparison to females, which have short claws and a narrower, shorter tail. Finally, a triangular file was used to mark the turtles' carapace using a notch system designed by Kurt Buhlmann shown in Figure 2, and the turtles were released.

Hypothesis: The turtle population of Cougar Lake will follow a Type II Survivorship curve, in which the probability of an individual surviving is the same for every age.

Results

Table 1: Relative species abundance, sex ratios, average age, and average mass for painted turtles and red-eared sliders found in Cougar Lake.

<i>Chrysemys picta</i>				<i>Trachemys scripta</i>			
Total Captured	12			Total Captured	22		
Relative Species Abundance	35.30%			Relative Species Abundance	64.70%		
	Male	Female	Total		Male	Female	Total
Percent	66.7	33.3	100	Percent	63.6	36.4	100
Average Age	2.75	2.75	2.75	Average Age	4.25	11.6	7.3
Average Mass (grams)	218	371.3	269.1	Average Mass (grams)	713.3	1400.2	963.1

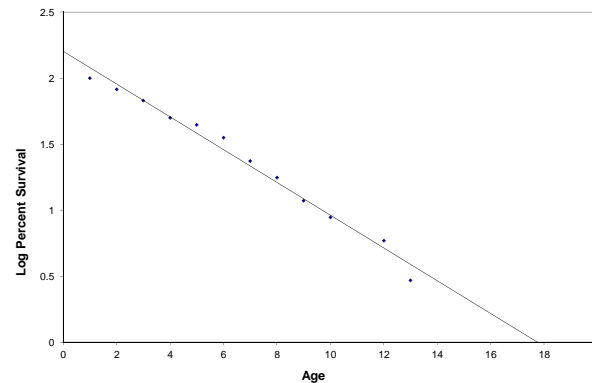


Figure 1: Log percent survivorship curve for turtle population sampled in Cougar Lake.

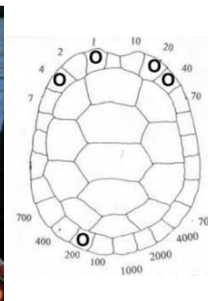


Figure 2: Marking system used in this study. On the left is a picture of marked turtle 301. On the right is a diagram of the marking system used showing a turtle marked 265.

A total of 34 turtles were caught, of which 12 were painted turtles, and 22 were red-eared sliders. Table 1 contains the relative abundance for each species in the population, sex ratios, average age, and average weight. Red-eared sliders had the highest relative abundance, at 64.7 percent, while painted turtles made up only 35.3 percent of the population. In both species, the females were generally larger than the males, but were found in fewer numbers. Both species had about 65 percent males, to 35 percent females.

Figure 1 shows the log scale of percent turtle survivorship on the y axis, by age on the x axis. A nearly linear relationship of percent survival with age can be seen, indicating a Type II survivorship curve. The maximum age depicted was 19 years, while the youngest found was 2 years old.

Discussion

In Cougar Lake, the turtle population showed low species richness, with only two species: red-eared sliders, and painted turtles documented. The relative abundance of the local assemblage reflects what is commonly seen throughout Illinois ponds, with red-eared and painted turtles making up a large portion of the population, in this case nearly the entire population (Cagle 1942). In addition to the turtles collected, a common snapping turtle was observed nearby, which is also commonly found in this type of habitat. The average masses by sex show that females were generally larger for both species documented. This is similar to the results of research which has been published (Frazer 1991).

The hypothesis that the local population of turtles in Cougar Lake would follow a Type II survivorship curve was completely supported by the data (Figure 1). This type of survivorship curve indicates that turtles have about the same probability of surviving to the next year throughout their entire lives. The survivorship curve depicted shows nearly the same results as the journal by Frazer, Gibbons, and Greene for painted turtles. The presence of young individuals in the data (two or three years old) indicates that there is a good chance that the population has sufficient recruitment of new generations. Further support comes from the data showing that both males and females of each species found are present, even though not in a 1:1 ratio. This indicates that the Cougar Lake population is likely a breeding one, and will continue to thrive.

For future studies, it may be beneficial to use more traps, and different kinds of traps. It may also be helpful to move them every day, as they stopped catching turtles after about two days.

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