
Salamander Density in Barton Springs Pool is Positively Correlated with Proximity to Spring Outlets

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Tom Devitt, Jacob Owen, Nathan Bendik
City of Austin
Watershed Protection Department
Environmental Resource Management Division

Abstract

City of Austin biologists began monitoring salamanders in Barton Springs Pool in July of 1993 using monthly counts. Salamander density is usually highest near the main spring outlets during baseflow conditions, though this relationship has not been quantified. We analyzed monthly count data from Barton Springs pool from 2010 to 2012 to investigate this relationship. Salamanders were classified by size (<1 in., 1–2 in., > 2 in.), and the distance from spring was recorded and mapped for every individual. A total of 1,080 salamanders were observed over 26 surveys. The majority (97%) of salamander observations occurred within 25 ft. of a spring outlet; 91% were observed within 20 ft. and 81% were observed within 15 ft. Salamanders were observed up to forty feet downstream of the spring outlets.

City of Austin biologists began monitoring salamanders in Barton Springs Pool in front of Parthenia Spring in July of 1993 using surface counts (City of Austin 1997). Monitoring from 1993–2002 consisted of monthly surveys using SCUBA. Only a portion of the habitat was searched, usually in front of the springs where salamander density was highest but also along the “beach” along the north shore (Fig. 1). Surveys were initially performed using quadrats and transects. In 2003, the quadrat-transect sampling method was changed to a “modified drive method” where divers oriented themselves facing the current and moved forward in tandem while searching through all non-embedded substrate for salamanders (City of Austin 2013). Results from 1993–1997 surveys are summarized in the Barton Creek Report (City of Austin 1997). An analysis of population trends from 2004–2011 for *E. sosorum* using generalized multivariate auto-regressive state-space (MARSS) models and generalized linear regression models (GLMs) was performed by Bendik and Turner (2011). Additional information on population trends is summarized in the City’s HCP (City of Austin 2013).

Previous counts have suggested that salamander density in Barton Springs is usually highest near the main spring outlets during baseflow conditions, though this relationship has not been quantified. We analyzed location data from Barton Springs pool from 2010 to 2012 to investigate this relationship. Salamanders were classified by size (<1 in., 1–2 in., > 2 in.), and the distance from spring was recorded and mapped for every individual on a 5 ft grid.

A total of 1,080 salamanders were observed over 26 surveys. Results are summarized in Figure 2. The majority (97%) of salamander observations occurred within 25 ft. of a spring outlet; 91% were observed within 20 ft. and 81% were observed within 15 ft. Salamanders were observed up to forty feet downstream of the spring outlets (the extent of the survey area).

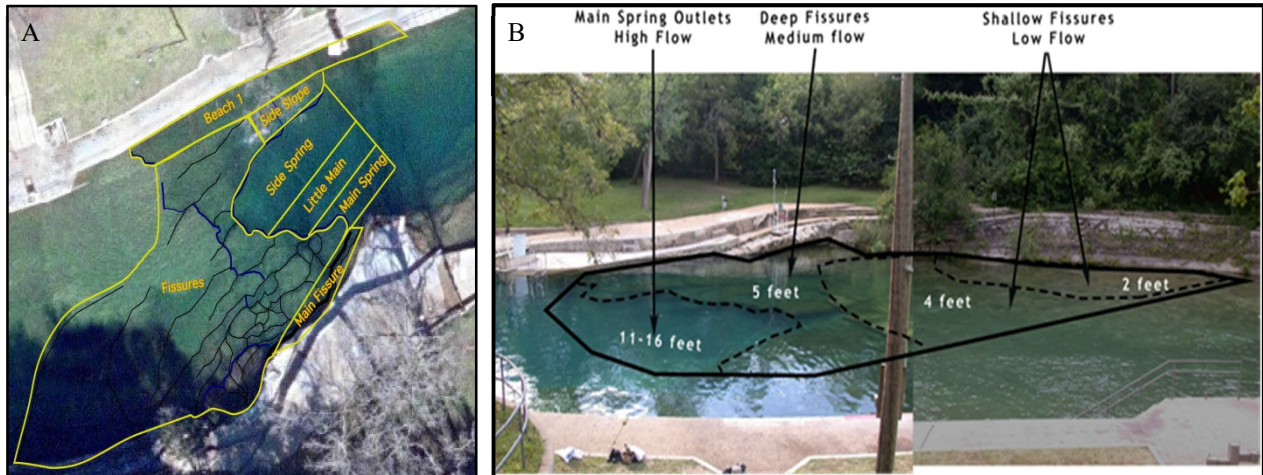


Figure 1. A) Aerial view of the central portion of Barton Springs Pool showing the location of the fissures area, springs, and beach 1. B) Composite photograph looking south showing same area. Typical water depths are shown for each area.

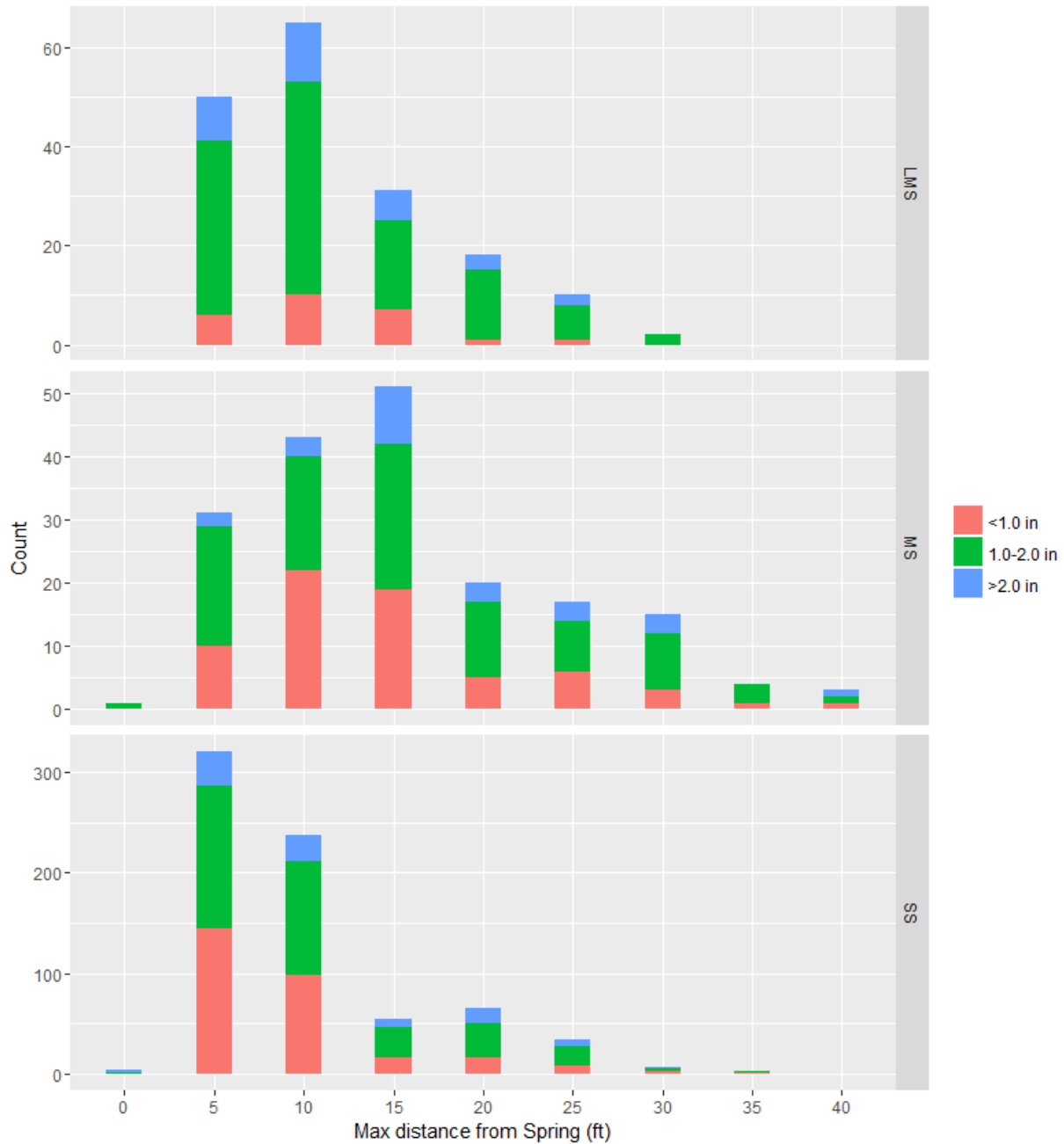


Figure 2. Histogram of the number of *E. sosorum* observed at 5 ft intervals from each spring opening (SS = Side Spring, MS = Main Spring, LMS = Little Main Spring) during 26 surveys at Parthenia Spring from 2010–2012. Observations were recorded according to a 5 x 5 ft grid. Individuals observed in the 0 –5 ft. grid are represented here as being observed a maximum of 5 ft. from the spring origin. A small number of individuals were observed within the spring opening itself (distance = 0 ft.).

Literature Cited

City of Austin (1997) The Barton Creek Report. *Water Quality Report Series, COA-ERM/ 1*, 335pp.

City of Austin (2013) Major Amendment and Extension of the Habitat Conservation Plan for the Barton Springs Salamander (*Eurycea sosorum*) and the Austin Blind Salamander (*Eurycea waterlooensis*) to allow for the Operation and Maintenance of Barton Springs and Adjacent Springs. Austin, Texas.