



## **Unblocking the Eliza Spring Discharge Pipe**

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Eliza Spring is one of four primary outlets of the Barton Springs complex of springs. Located on the north side of Barton Springs Pool, the spring wells up in a man-made amphitheater and currently discharges through a 24 inch pipe to the bypass culvert adjacent to the pool 95 ft away. Eliza Spring contains habitat for the federally endangered Barton Springs (*Eurycea sosorum*) and Austin Blind (*Eurycea waterlooensis*) salamanders. To provide optimal habitat conditions, water levels are kept to 1–1.5 ft deep, allowing for strong directional flow favored by *Eurycea* salamanders. Water levels rose in February 2016, suggesting a partial blockage in the discharge pipe. A [camera survey](#) of the discharge pipe showed an obstruction of rocks against tree roots about 16 ft into the pipe. Additional obstructions further along the pipe were possible.

Prior to initiation of a project to remove the discharge pipe and restore the spring run, City of Austin staff wanted to remove the obstruction(s) to improve habitat conditions in the spring pool.

On June 28, 2016, staff broke through the obstructions using 56 feet of 1-inch threaded steel pipe as a makeshift battering ram. Over the course of approximately two minutes, a rapid drop in water level (~ 4 ft) occurred in the spring pool and stabilized just over the first step in the amphitheater. Data from the Barton Springs gauge in a well 500 ft southwest of Eliza Spring (Fig 1) maintained by the US Geological Survey indicated a nearly immediate water level drop of 0.2 ft (Fig 2). Depth data from a sensor in adjacent Barton Springs Pool was not available.

The rapid response to the water level change in the Eliza Spring pool in the Barton Springs gauge indicates the common connection between Eliza and main Barton Springs along the Barton Springs Fault. Other indicators of this common connection can be seen in similar water chemistry and similar concentrations and detection of tracers during aquifer-wide tracing studies.

Immediately following the water level drop, three staff observed seven salamanders stranded on the higher steps, all of which were placed back into the spring pool. All

newly exposed areas were subsequently hosed down using low-pressure recirculated spring water. This helped any unobserved salamanders reach the spring pool and washed excess sediment away.

Two biologists spent several hours the following day to clear excess sediment from within the spring pool. Sediment was 6 inches deep in some areas and rocky cover was completely embedded in most of the pool (e.g., Fig. 3 & Fig. 4). The only areas not completely embedded in sediment were directly in front of the spring outlets. Recirculating spring water was used to flush sediment, and in some areas where rocks were not embedded, sediment was scooped out by hand into buckets. On July 5<sup>th</sup>, 8<sup>th</sup>, and 11<sup>th</sup>, biologists performed capture-recapture surveys and flushed the remaining bulk of the sediment load out of the spring pool by hand (e.g., Fig. 5). Fewer than average salamanders were observed (average count = 45). This may have partly been a function of few available microhabitats for salamanders on account of the high sediment load and embedded rocky substrate.

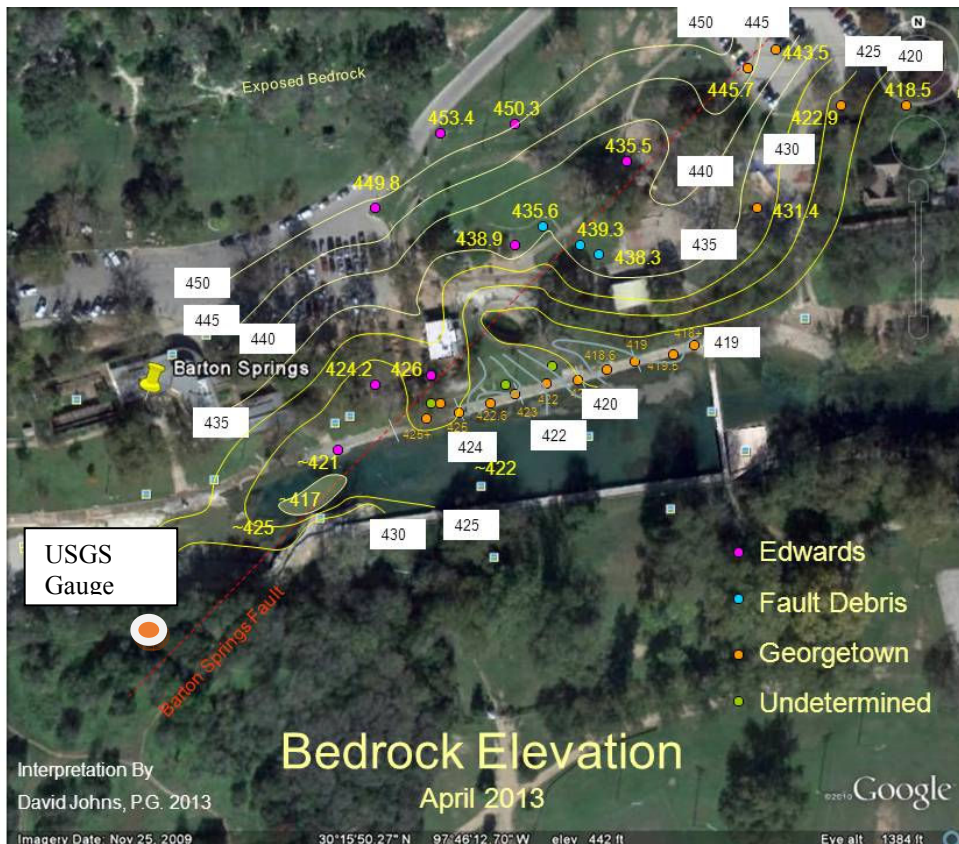


Figure 1. Image showing the location of the Barton Springs Fault in relation to Eliza Spring. The Barton Springs gauge used to measure water levels in the aquifer and calculate spring discharge is shown on the lower left.

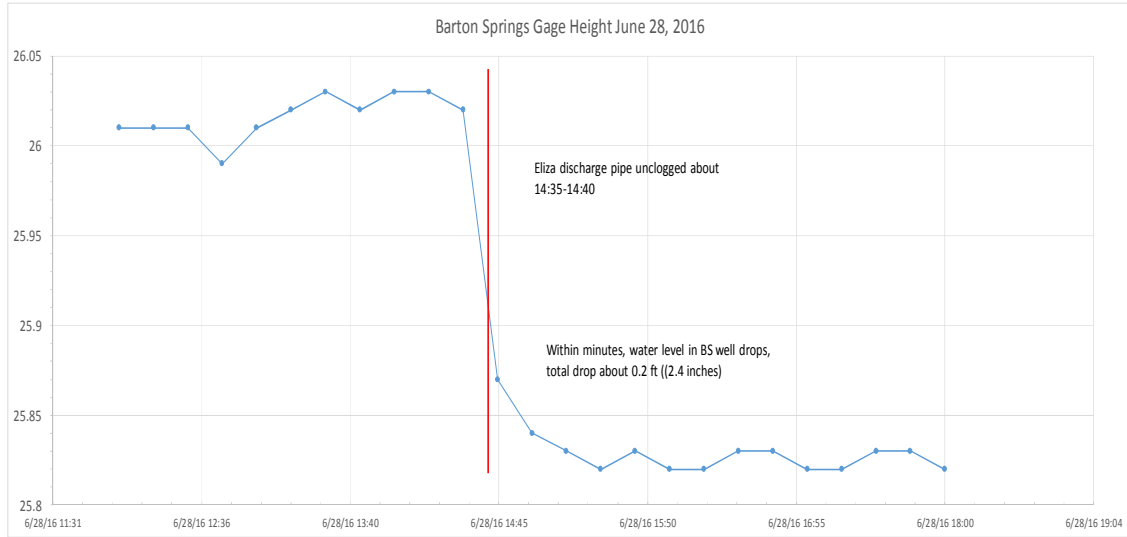


Figure 2. Water levels as measured in the USGS Barton Springs gauge while unblocking the Eliza Spring discharge pipe dropped 0.2 ft after the blockage was cleared.



Figure 3. Eliza Spring following drawdown, prior to sediment removal from the spring pool.



Figure 4. Quadrat demonstrating completely embedded substrate in the center of the spring.



Figure 5. Example of habitat post-sediment removal.