

Jollyville Plateau Salamander Monitoring During WTP4 Spicewood Shaft Construction

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Abstract

*Data are summarized from surveys of Jollyville Plateau salamanders (*Eurycea tonkawae*) along Tributary 4 of Bull Creek, Travis, County, Texas, adjacent to the City of Austin's Water Treatment Plant 4 transmission main Spicewood shaft drilling site. Surveys were conducted to assess any substantial changes in the salamander population during construction. Salamander counts were low in this area and we found no evidence for impacts of shaft construction to salamander populations.*

Introduction

The Jollyville Plateau salamander (*Eurycea tonkawae*) (JPS) was listed as federally threatened under the Endangered Species Act in October 2012 and were recently discovered in the lower section of Bull Creek Tributary 4, near the Water Treatment Plant 4 (WTP4) project's Spicewood Shaft construction site. This JPS site, which was not identified during pre-construction project site investigations, is located about 143 m (470 ft) southeast of the shaft location. Although the stream reaches in which the JPS population was found were subject to a water quality monitoring program (Water Treatment Plant #4 Environmental Monitoring Plan, 2011), WTP4 environmental commission (EC) team staff were concerned about the proximity of the population to shaft construction and requested monitoring of the JPS populations in this area for the duration of excavation. The study objectives were as follows:

1. To determine the relative abundance of JPS within the lower section of Tributary 4 of Bull Creek (downstream of Spicewood Springs Road culvert).
2. Document any catastrophic changes to the JPS population due to the construction of the Spicewood shaft.
3. Document any harmful effects to individual salamander health due to the Spicewood shaft construction

Methods

The sample area includes the section of Bull Creek Tributary 4 between the Spicewood Springs Road culvert and the confluence of Tributary 4 and the main branch of Bull Creek. The site is City of Austin #5626 "Bull Trib 4 @ Bull Creek." This section is approximately 340 m (1,115 ft) long. JPS have

previously been observed in two general areas within this section (Figure 1). Because we knew relatively little about the distribution of JPS in this area, the entire reach was subject to our survey method.

Excluding the large pools resulted in 250 m (820 ft) of searchable stream habitat, which was divided into 50 m (164 ft) sections. Each section was surveyed for 60 person-minutes using four observers (i.e., a 15 minute survey). The shaft excavation schedule can be seen in Table 1 and survey schedule in Table 2. The initially proposed schedule did not coincide with the excavation schedule, as there were delays in construction. Searches excluded a single deep pool located near the center of this reach (Figure 1) and another deep section located near the culvert, which could not be feasibly searched. Searches involved lifting cover objects such as rocks and leaves by hand and kick net sampling using hands to sweep through algae mats and undercut banks to capture salamanders.

In addition to relative JPS abundance, we examined salamander condition and noted any abnormalities such as trematode parasites, emaciated condition, missing limbs or other deformities. We examined captured individuals for gravidity, and estimate their total length by size categories <25 mm, 25-50 mm and >50 mm. Habitat data collected included the following: 1) JPS cover use and a visual estimate of percent cover for the following categories: leaf litter, algae, aquatic vegetation, cobble/boulders, open bedrock and gravel/sediment/sand; 2) approximate abundance of crayfish and fish (gambusia/minnow or predatory centrarchid fish); 3) wetted channel depth, width and stream-bottom flow velocity measurements every 10 m; 4) water quality parameters collected under a concurrent monitoring plan (Water Treatment Plant #4 Environmental Monitoring Plan, 2011): temperature, specific conductivity, oxidation-reduction potential, pH, turbidity, total suspended solids (TSS), standard anions and cations, nitrate, ammonia, phosphate, copper, chromium, zinc and total petroleum hydrocarbons.

Results and Discussion

Survey results are summarized in Table 2. We did not observe any physical deformities or other abnormalities of salamanders during our sampling. Salamander abundance was generally low and salamanders were not observed between either of the non-sampled pools (Figure 1). In general, the presence of salamanders was restricted to the locations where they were initially observed. Specifically, this includes (1) a mostly scoured bedrock section just upstream of the confluence of Trib 4 and the main stem of Bull Creek, (2) a riffle just downstream of the confluence with a tributary entering from the east (Figure 1), and (3) a riffle leading into a pool near a large gravel bed upstream of the small tributary and downstream of a large scour pool. We were unable to identify the specific qualities of this habitat that would explain the presence of salamanders, but suspect it likely has to do with the presence of small springs and seeps emerging from the exposed bedrock within the stream channel.

Crayfish, fish and tadpole abundance was locally high (> 50 individuals) during the summer in some sections. We noted the presence of centrarchid fish and catfish (likely predators of salamanders) in addition to mosquito fish. Algal mats were extensive in some sections, occasionally comprising the majority of surface cover within the stream. This reach also receives high-velocity scouring storm flow, which frequently resulted in movement of a large gravel bar in the center of the reach. We did not note any changes in the morphology of stream channel itself during this study, other than shifting gravel beds, as mentioned above.

The initial and final survey included an additional sampling effort to measure the glucocorticoid hormone corticosterone in salamanders found in Trib 4. This work was done in collaboration with the Gabor Lab at Texas State University. Preliminary results are available in interim reports produced for the Balcones Canyonlands Preserve as well as City of Austin data report DR-14-01 (http://www.austintexas.gov/watershed_protection/publications/document.cfm?id=206340).

Water chemistry and discharge data are summarized in [graphs](#) (starting on page 87) and in a [report](#).

During the course of construction on the Spicewood Shaft for the Jollyville Transmission Main, we did not document any catastrophic event that would have resulted in impacts to the Jollyville Plateau Salamander in this area. Differences in salamander abundance documented during the course of this study are likely due to changes in environmental conditions as well as changes in the detection probability of salamanders.

Table 1. Spicewood shaft excavation timeline.

Date	Event
9/28/2012	Spicewood shaft excavation begins
02/15/2013	Excavation complete
TBD	End of Construction

Table 2. Jollyville Plateau Salamander survey results.

Survey Date	# Sals Found	Observers
6/6/2012	10	NB, TP, MW, BS, MC (CORT sampling CG- Texas State)
7/6/2012	2	NB, TP, MW, BS
8/3/2012	0	NB, TP, MW, BS
9/28/2012	1	NB, TP, MW, BS
11/30/2012	1	NB, TP, MW, BS
2/7/2013	7	NB, TP, MW, BS
5/8/2013	6*	CORT sampling (NB, CG- Texas state)

*More intensive survey

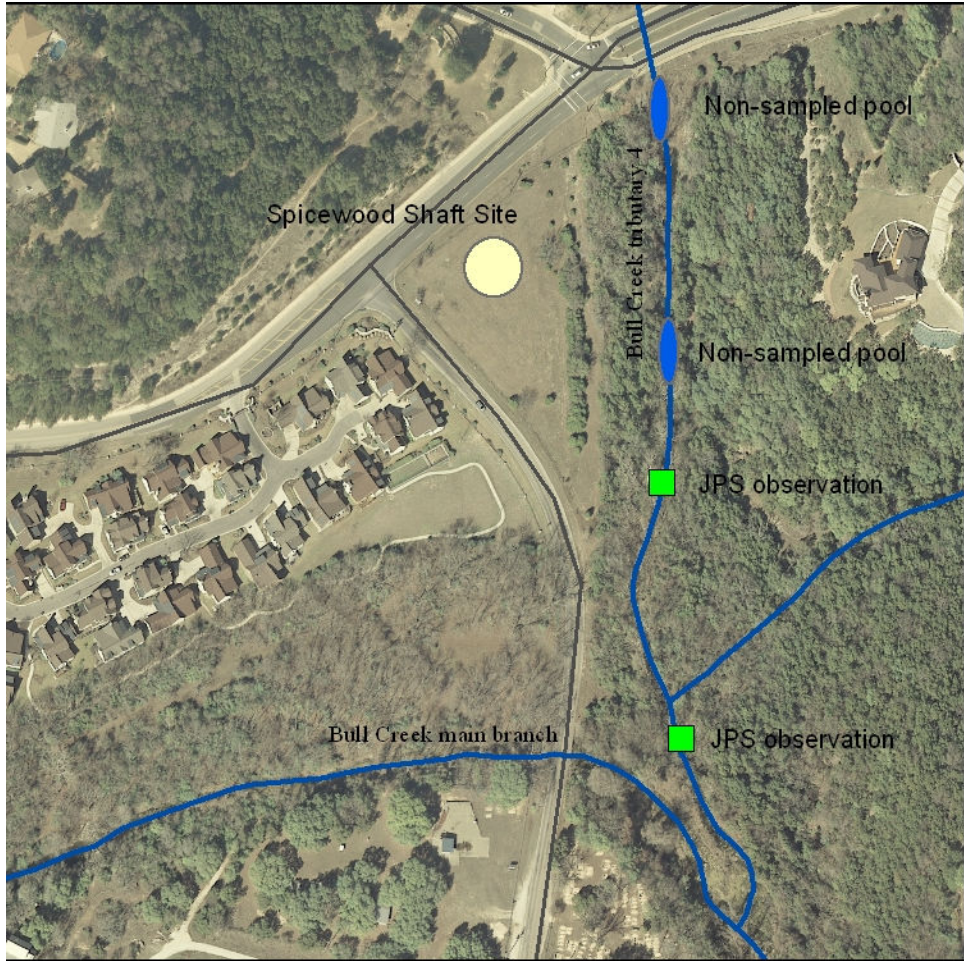


Figure 1. Map of sampling area near the WTP4 Spicewood access shaft site. The survey area included the stream channel from the confluence of Trib 4 and the main branch of Bull Creek to Spicewood Springs Road, but excluded the two large pools.