



MEMORANDUM

TO: Chad Furl, Jamie Childers
 FROM: Ed Oborny (BIO-WEST)
 DATE: **September 30, 2022**
 SUBJECT: EAHCP Critical Period Habitat Evaluation – 85 cfs – San Marcos System

SAN MARCOS SYSTEM: **85 cfs Habitat Evaluation**

As total system discharge continued to decline in September, the 85 cfs Habitat Evaluation was triggered. The 95 cfs Habitat Evaluation was completed on July 27th; the 90 cfs evaluation was completed on August 19th; and the 85 cfs evaluation was conducted on September 28th. Per requirement, the next habitat evaluation is scheduled for 80 cfs. As of this memorandum, the total system discharge in the San Marcos River is approximately 85 cfs (Figure 1).

Discharge, cubic feet per second

Most recent instantaneous value: 85.3 09-30-2022 07:45 CDT

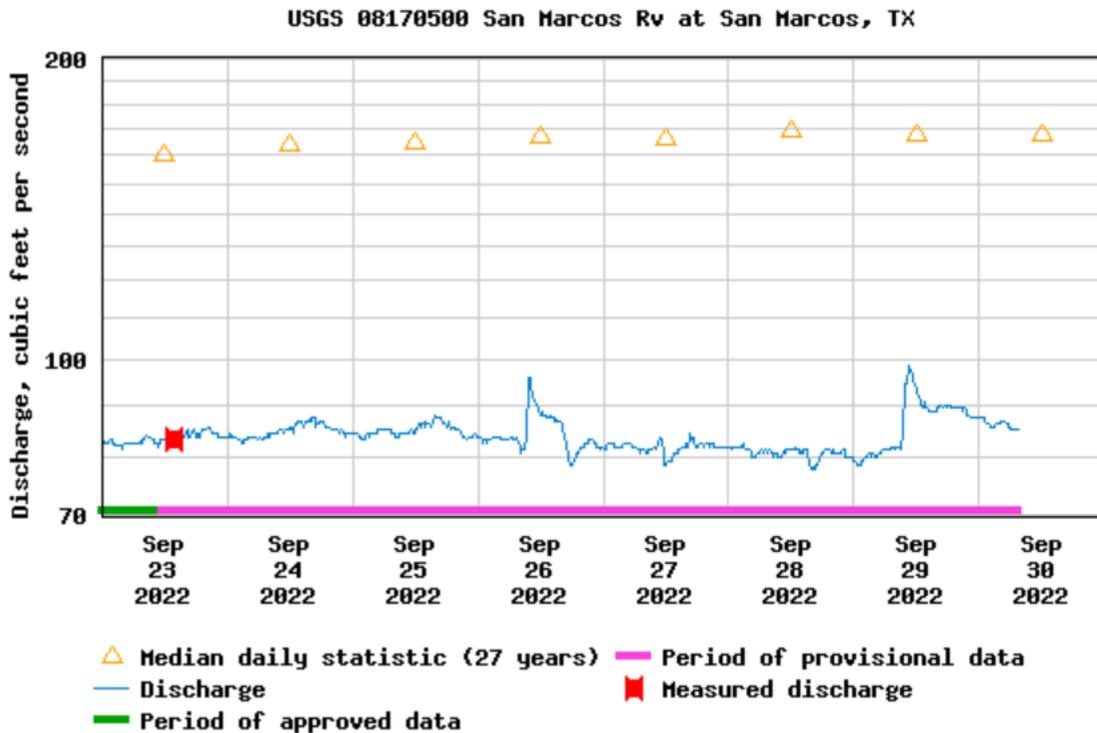


Figure 1. Total San Marcos River discharge over the past two weeks (USGS 08170500 at San Marcos, Texas).

Water temperature is a key component system-wide as it is an underlying driver of spring-related aquatic assemblages. Recent 7-day trends in water temperature (°C) for September Critical Period sampling were assessed using temperature data loggers (HOBO Tidbit v2 Temp Loggers) at 5 permanent monitoring stations in the upper San Marcos River. Data for each monitoring station are based on 10-minute intervals and dates for recent trends extended from the last day that each data logger was downloaded to 7 days prior. For all stations, 7-day trends were examined from September 9 – 15. Recent 7-day trends were compared to long-term water temperature data measured at 4-hour intervals in September from 2001 – 2021 or to the greatest temporal extent available. For analysis, 7-day trends were compared to long-term trends using boxplots to visualize differences in central tendency (i.e., median) and variation (e.g., interquartile range). Boxplots from August and July Critical Period 2022 sampling were also included for comparison. Similar to previous months, no water temperatures are noted as a concern at stations longitudinally down the San Marcos River at this time (Figure 2).

Table 1. Summary of boxplot descriptive statistics comparing recent 7-day and long-term trends in water temperature (°C) at 5 monitoring stations in the upper San Marcos Springs River for the month of September.

Station	Period	Lower Whisker	Lower Box	Median	Upper Box	Upper Whisker	Interquartile Range
Chute	7-day	22.11	22.37	22.61	23.11	23.86	0.74
Chute	Long-term	21.37	22.08	22.28	22.56	23.28	0.48
Spring Lake Dam	7-day	22.06	22.56	22.97	23.95	24.97	1.39
Spring Lake Dam	Long-term	20.64	21.81	22.24	22.65	23.89	0.83
City Park	7-day	21.63	22.51	23.21	24.90	25.99	2.39
City Park	Long-term	21.18	22.18	22.50	22.91	23.99	0.73
Thompson Island - Natural	7-day	21.96	22.73	23.38	24.41	25.26	1.68
Thompson Island - Natural	Long-term	20.92	22.34	22.86	23.60	25.45	1.25
Waste Water Treatment Plant	7-day	22.37	23.16	23.81	24.76	25.60	1.60
Waste Water Treatment Plant	Long-term	20.84	22.47	23.08	23.76	25.67	1.29

Aquatic vegetation mapping was conducted in late September as required by Task 3 and to subsequently serve as baseline establishment of the Fall Routine biological monitoring. Each of the three study reaches experienced a continued decline in aquatic vegetation coverage from mid-July to mid-September. This was most notable at the Spring Lake Dam reach (approximately a 16% decline) with lesser declines at the City Park reach (≈2%) and I35 reach (≈8%). Additionally, a Texas Wild-rice vulnerable stand survey was conducted on September 29th. Figure 3 highlights extensive root ball exposure that are presently occurring to Texas Wild-rice in these vulnerable areas. A full Routine Biological Monitoring event (Fall) is scheduled to start next week. To maximize efficiencies while minimizing disturbance during these low-flow conditions, the Fall Routine Event will double as the 85 cfs Critical Period Event.

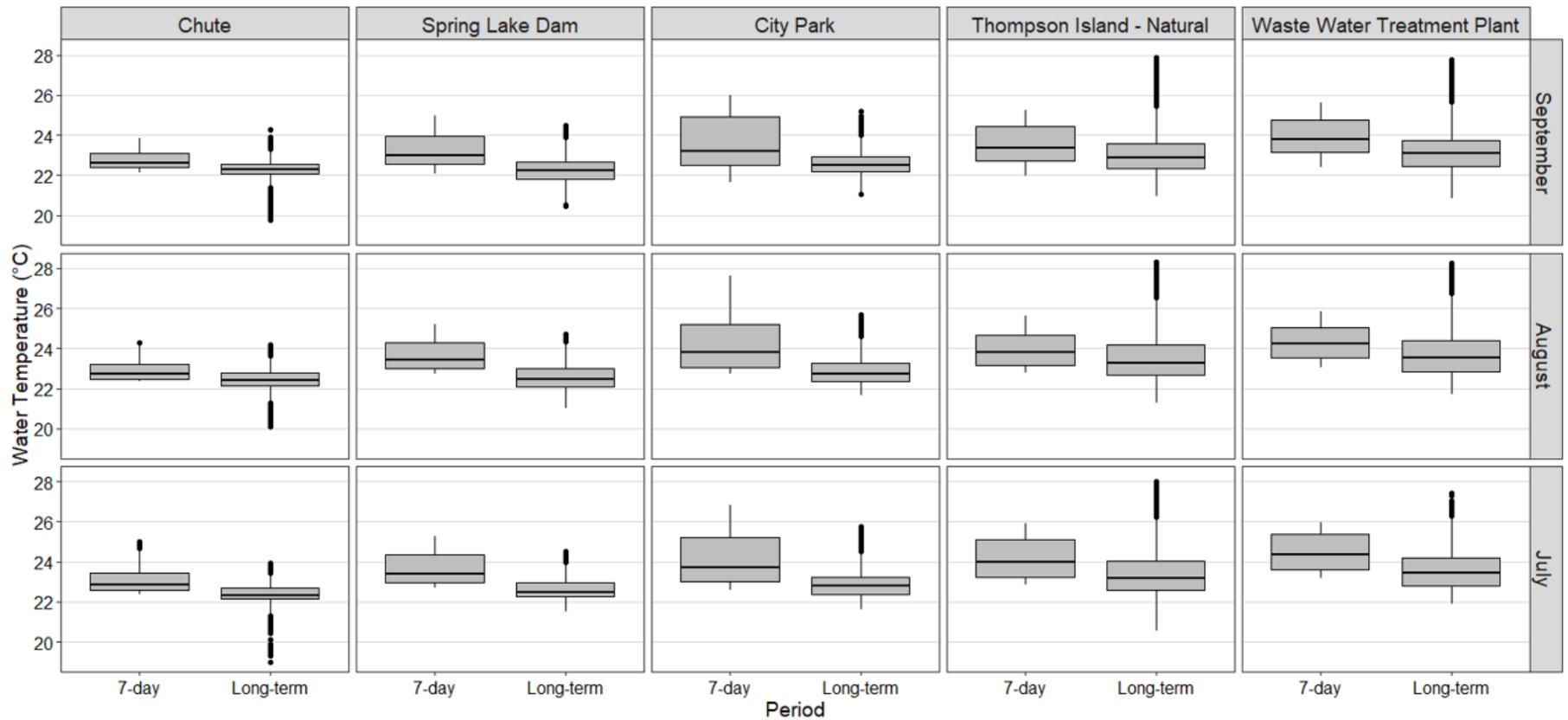


Figure 2. Boxplots comparing recent 7-day and long-term water temperature trends at five monitoring stations from the Chute (Spring Lake Dam western spillway) to the Waste Water Treatment Plant for the month of September. August and July results are also included for comparison. The thick horizontal line in each box is the median and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range, and outliers beyond this are designated with solid black circles.



Figure 3: Texas Wild-rice root ball exposure on September 29, 2022.

Another key factor is the condition of Spring Lake as it and the Spring Lake Dam spillway are the only two locations that support the presence all three listed species (Fountain Darter, San Marcos Salamander, and Texas Wild-rice). The following pictorial habitat evaluation highlights the current condition of Spring Lake, Spring Lake Dam and longitudinally down the San Marcos River with respect to threatened and endangered species habitat conditions.

SPRING LAKE AND SPRING LAKE DAM

Habitat conditions for San Marcos Salamanders and Fountain Darters in Spring Lake remain similar but slightly degraded compared to July and August. As noted last month, the reduced water flow throughout Spring Lake with lower discharge has resulted in higher-than-average levels of algal build up and siltation within San Marcos Salamander habitat. This was notably evident in September, but portions of the Hotel site salamander habitat is still supporting clear, clean substrate (Figure 4).

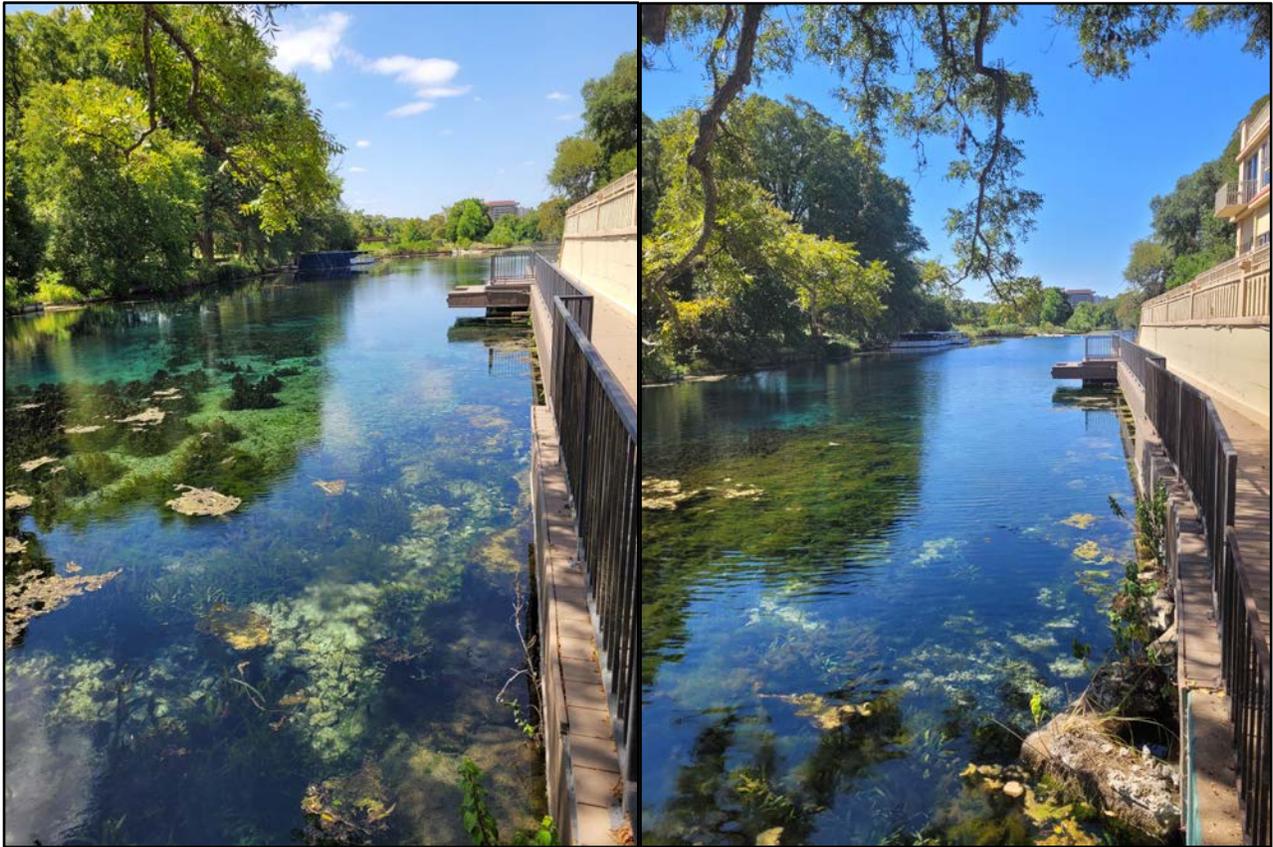


Figure 4: Headwaters of Spring Lake looking downstream at San Marcos Salamander Hotel study site on August 19 (left) and September 28, 2022 (right).

As evident in Figure 5, considerable San Marcos Salamander and Fountain Darter habitat are being maintained in the Spring Lake Dam study site. There continues to be evidence of recreational activities such as rock relocating which disturbs both species habitat. As previously mentioned, aquatic vegetation within the Spring Lake Dam (Figure 5 and 6) and City Park (Figure 7) study reaches continue to be dominated by Texas Wild-rice, while the I35 study reach (Figure 9) supports a more diverse aquatic vegetation community. The following photographs highlight Fountain Darter habitat conditions moving downstream in the San Marcos River.

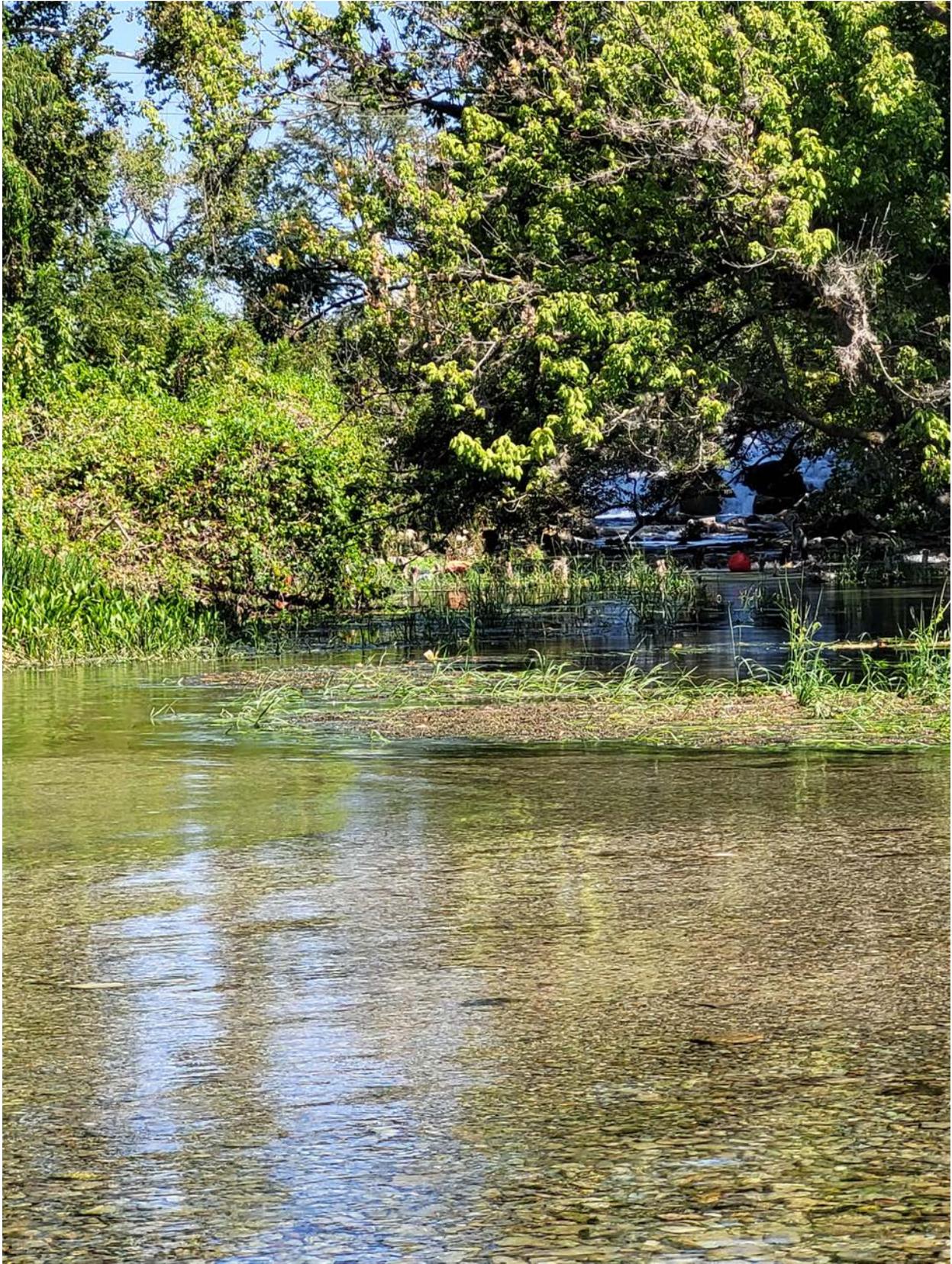


Figure 5: Spring Lake Dam spillway water level on September 28, 2022.



Figure 6: Spring Lake Dam Sessom's Island on September 28, 2022.

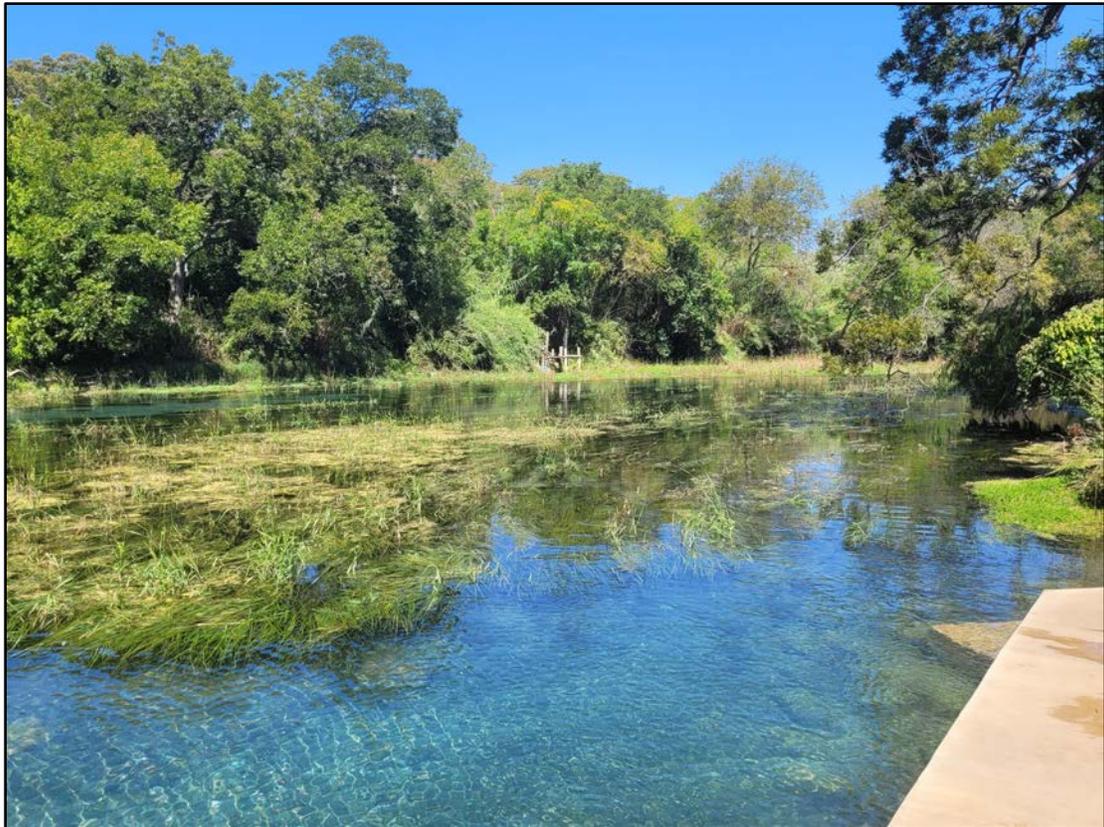


Figure 7: City Park habitat conditions looking upstream on September 28, 2022.

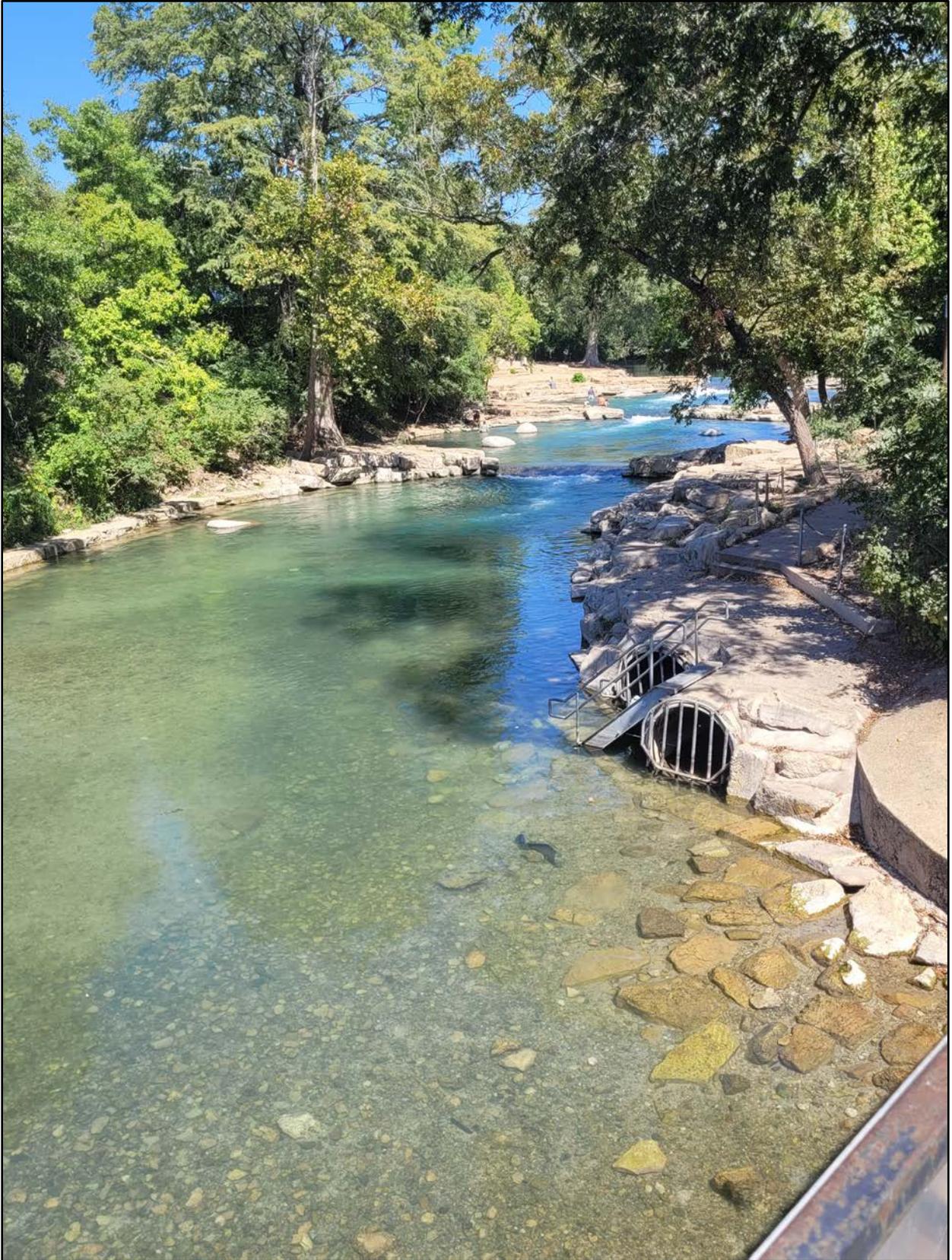


Figure 8: Rio Vista habitat conditions looking upstream on September 28, 2022.



Figure 9: I35 habitat conditions on September 28, 2022.

Overall, water levels and Covered Species habitat conditions remain similar to those observed in July and August. Lower-than-average water levels continue to expose wetted area to recreational activities that impact Covered Species habitat. However, with schools back in session and the start of Autumn, the river is experiencing less recreation than in previous summer-time months. Texas Wild-rice in vulnerable areas (i.e., low water depth) continues to be the Covered Species impacted to the greatest extent under these hydrological conditions. As noted in August, the turnover of Spring Lake is presently reduced causing increased algal growth and siltation at certain locations in the lake. However, San Marcos Salamander and Fountain Darter habitat within the lake and Eastern spillway remains suitable. The higher quality Fountain Darter habitat in the I35 study reach (compared to the Spring Lake Dam and City Park study reaches) remains shallow, but mostly wetted as shown in Figure 9. Should the extreme drought continue, monitoring activities are in place to continue to track habitat conditions for HCP covered species in the San Marcos River.

Please don't hesitate to contact me if you have any questions or concerns.

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