MEMORANDUM

TO:	Nathan Pence
FROM:	Ed Oborny (BIO-WEST)
DATE:	**August 1, 2014**
SUBJECT:	EA HCP Biological Monitoring – **Week 16**

BIOLOGICAL MONITORING UPDATES

COMAL SYSTEM:

At the time of this memorandum, the total system discharge at Comal Springs was 107 cfs (Figure 1). This makes the sixteenth consecutive week below 150 cfs, and therefore, the required weekly habitat evaluation was conducted on July 30th. Weekly habitat evaluations and memorandums will continue to occur until total system discharge at Comal Springs/River increases and consistently stays above 150 cfs. As total system discharge remained below 120 cfs this week (every other week trigger) Comal Springs riffle beetle, Comal Springs salamander, and Comal discharge measurements/sampling were conducted. As described in previous weeks, the next Critical Period full sampling event is not triggered until the total system discharge declines below 100 cfs. Fountain darter summer dip netting was initiated this week as part of the scheduled routine monitoring.

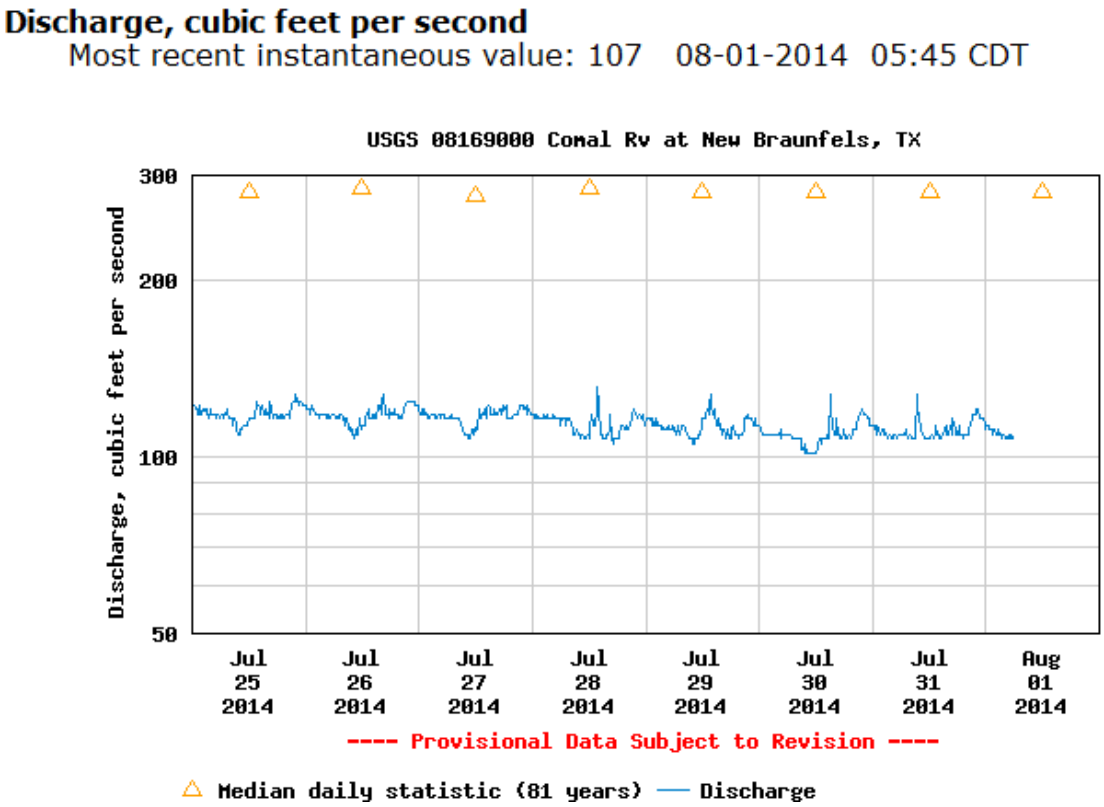

Figure 1: Screen shot of USGS webpage for the ***COMAL*** gage (08169000) showing total system discharge over the past week.

SAN MARCOS SYSTEM:
The total system discharge for San Marcos Springs/River is approximately 129 cfs. No critical period sampling for the San Marcos system is scheduled until total springflow declines below 120 cfs (Texas wild-rice physical measurements) or below 100 cfs (full Critical Period sampling event). Annual full-system mapping of Texas wild-rice is ongoing and fountain darter summer dip netting was initiated this week as part of the scheduled routine monitoring.

COMAL SPRINGS/RIVER - WEEK 16 CONDITIONS:
Weekly habitat observations and photo documentation associated with HCP triggered sampling were conducted on Wednesday, July 30th.

OBSERVATIONS AND ACTIVITIES:
The J17 water level at the time of photo documentation this week was in the 633's and has declined another foot at the time of submittal of this memorandum. During all full sampling events and select trigger events, discharge data is collected at HCP designated locations to relate directly to biological monitoring activities being conducted. On July 31st, discharge conditions at the EAA HCP locations are shown in Table 1.

Table 1. Comparison of discharge (cfs) throughout Comal Springs (Fall 2013 to Summer 2014)

	Discharge (cfs)			
Date	**Sept 12, 2013**	**April 23, 2014**	**July 17, 2014**	**July 31, 2014**
Spring Run 1 –	1.3	3.1	0.7	1.1
Spring Run 2 –	0.9	2.5	1.4	1.8
Spring Run 3 –	11.5	16.9	10.0	12.2
Old Channel –	53.3	52.2	52.7	53.9
Upper Spring Run –	0.8	2.3	0.6	2.1
Total USGS Gage -	111.0	143.0	113.0	109.0

Total system discharge is slightly below conditions experienced two weeks ago and observed for a short period last fall. Although slightly higher than the values from two weeks ago (Table 1), Spring Run 1, Spring Run 3, and the Upper Spring run are still exhibiting some of the lowest discharge conditions observed since the initiation of this monitoring program back in 2000. Not surprisingly, surface habitat conditions relative to flow, water level and exposed substrate in Spring Run 1 and the Spring Island area again declined this past week. At the time of photo documentation on Wednesday, only one of the two major orifices at Spring Run 1 exhibited a trickle of surface discharge. Immediately downstream of the main orifice pool, an extended portion of Spring Run 1 is again completely dry at the surface (Figure 2). Downstream of the dry surface portion, wetted surface water habitat reappears but the channel continues to be severely laterally constricted as one proceeds downstream until the confluence with Spring Run 2 outfall. Spring Run 2 continues to maintain surface flow for the main portion of the channel and as noted a few weeks back, is actually supporting greater surface discharge than Spring Run 1. Spring Run 3 continues to maintain connectivity throughout the run (Figure 3) but at these discharge levels it is also experiencing some reductions in lateral connectivity.

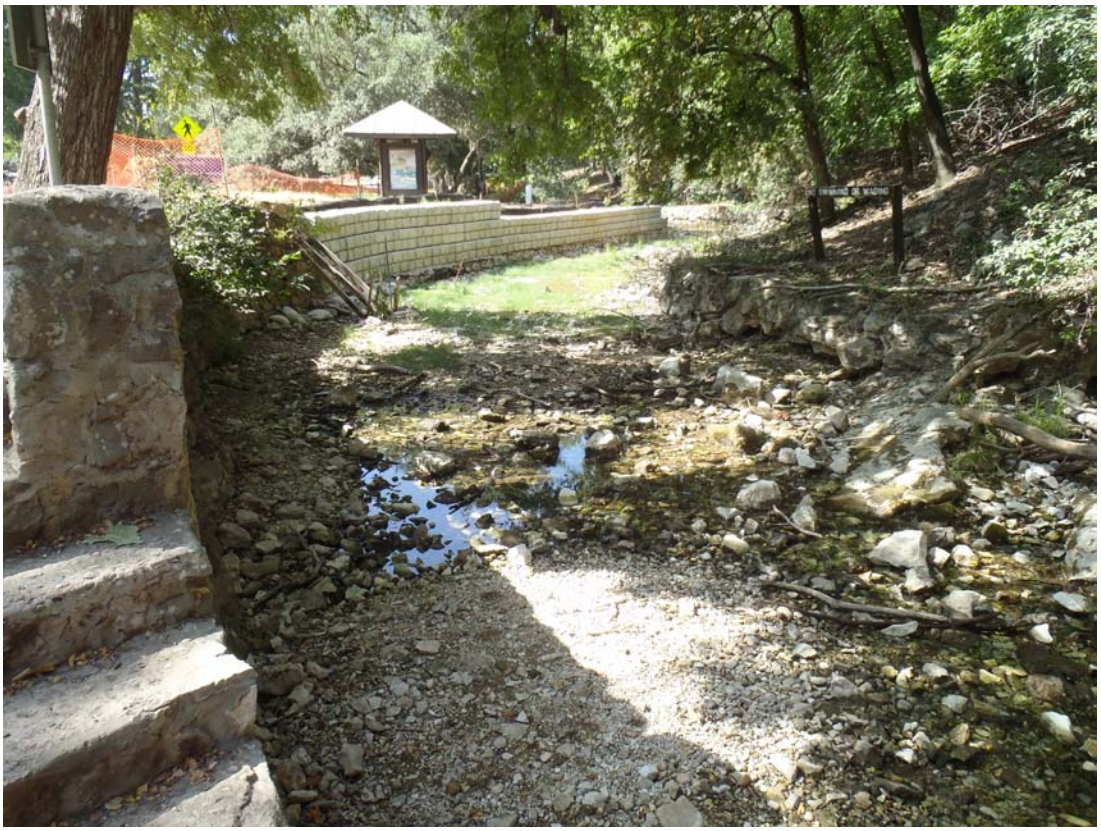

Figure 2: Spring Run 1 main channel looking downstream from main orifices).

Figure 3: Spring Run 3 looking downstream from mid channel.

As noted in last week's memorandum, the rains from a few weeks back provided some relief to the algae condition in the Upper Spring Run reach. This reprieve was still being experienced this week but was also assisted by heavy recreation pressure in this stretch of river during the summer (Figure 4). Again this week, fisheries biologists conducting night dives associated with the fountain darter movement study and confirmed the continued presence of fountain darters in this reach. However, even with the nice reprieve and unexpected lingering into a second week, reduced algae conditions will likely be short lived.

The surface water level in the Spring Island area this week was low with exposed surface habitat in the area along the eastern side of the island (Figure 5). Although some green algae is moving into this area, thick healthy bryophytes continue to be supported (Figure 6). Similar to two week ago, both spring runs associated with Spring Island were essentially dry on the surface (Figures 7 and 8) but subsurface flow remained evident. Table 2 shows the long-term average as well as recent counts of Comal Springs salamanders in each of the sample locations. All sites (excepting the Spring Island spring runs) exhibited higher numbers than two weeks ago and are all above the long-term study average numbers of Comal Springs salamanders per respective location. This is surprising for Spring Run 1 because of the notable reductions in available surface habitat at this location compared to average discharge conditions. As mentioned in the Week 14 memorandum, this may be explained by clumping in limited available habitat, but regardless, it is encouraging that salamanders are still present and using surface habitat in Spring Run 1.

Figure 4: Algal coverage not nearly as thick as previous weeks in the Upper Spring Run reach.

Figure 5: Continued exposed surface habitat adjacent to Spring Island.

Figure 6: Eastern outfall of Spring Island (green algae – middle toward surface and extensive bryophytes in the foreground and background).

Figure 7: Southern spring run nearly dry again.

Figure 8: Northern spring run on Spring Island completely dry on the surface.

Table 2: Comal Springs salamander timed counts

Survey Date	Salamander Counts			
	Spring Run 1	Spring Run 3	Spring Island (runs)	Spring Island – Eastern outfall
Long-term average (2002-2014)	22	13	3	9
April 18, 2013 Spring Comprehensive	17	15	0	4
August 16, 2013 Critical Period trigger	8	12	0	8
September 12, 2013 Critical Period trigger	6	13	1	11
October 29, 2013 Fall Comprehensive	7	9	2	6
April 25, 2014 Spring Comprehensive	12	23	3	7
July 17, 2014 Critical Period trigger	16	24	0	8
July 31, 2014 Critical Period trigger	27	27	0	11

For the Comal Springs riffle beetle surveys, cotton lures were placed at each of the designated sampling locations for Critical Period sampling in May, June, and July with two sets currently in place for every other week below 120 cfs HCP species-specific sampling. Table 3 shows the results of Comal Springs riffle beetles total counts over the past two years of lower than average flows along with the long-term average for all non-critical period sample events. As evident in Table 3, 2014 counts in the Spring Run 3 and Western shoreline locations are well above long-term averages. On the contrary, total counts in the Spring Island area in 2014 have all been below the long-term average, but remain above the historic low recorded during this program. All 10 lures for sampling were not available for the July 15th sample at Spring Island thus the asterisk in the table. All locations will be collected for each subsequent event with the next collection slated for next week.

Aquatic vegetation within Landa Lake, the Old Channel (Figure 9), and New Channel (Figure 10) continue to support quality fountain darter habitat. In summary, total system discharge in the Comal System is nearing levels that have not been witnessed since 1996. If the trend continues, these lower discharges will continue to create worsening surface habitat conditions each week for the Comal Springs invertebrates. Critical period monitoring will continue to be vital to track the success of the surface dwelling invertebrates in this reduced surface habitat at Comal Springs during this period. The good news is that the overall system continues to support quality fountain darter habitat conditions throughout most of its entirety even after nearly 4 months of lower than average discharge (including <5 cfs in the Upper Spring Run reach).

As always, if you have any questions, please give me a shout. Ed

Table 3: Comal Springs riffle beetle total counts (adult and larvae) per area the past two years.

Survey Date	Riffle Beetle Total Counts			
	Spring Run 3	Western Shoreline	Spring Island	Total
Long-term average (2004-2014)	116	78	75	269
May / June 2013 Spring sampling	124	68	97	289
August / Sept. 2013 Critical period	118	119	100	337
September 2013 Critical period	109	188	66	363
October 2013 Fall Comprehensive	78	63	88	229
April / May 2014 Spring sampling	146	104	40	290
May 2014 Critical Period	138	98	42	278
June 2014 Critical Period	119	130	34	283
July 2014 Critical Period	146	143	*	NA
Lowest count per individual reach since going to cotton lures	53 (May 2010)	20 (May 2012)	20 (May 2010)	--
Lowest Total count since going to cotton lures (May 2010)	53	110	20	183

*Lures not available for collection during this sample event

Figure 9: Restored native aquatic vegetation continues to thrive in the Old Channel.

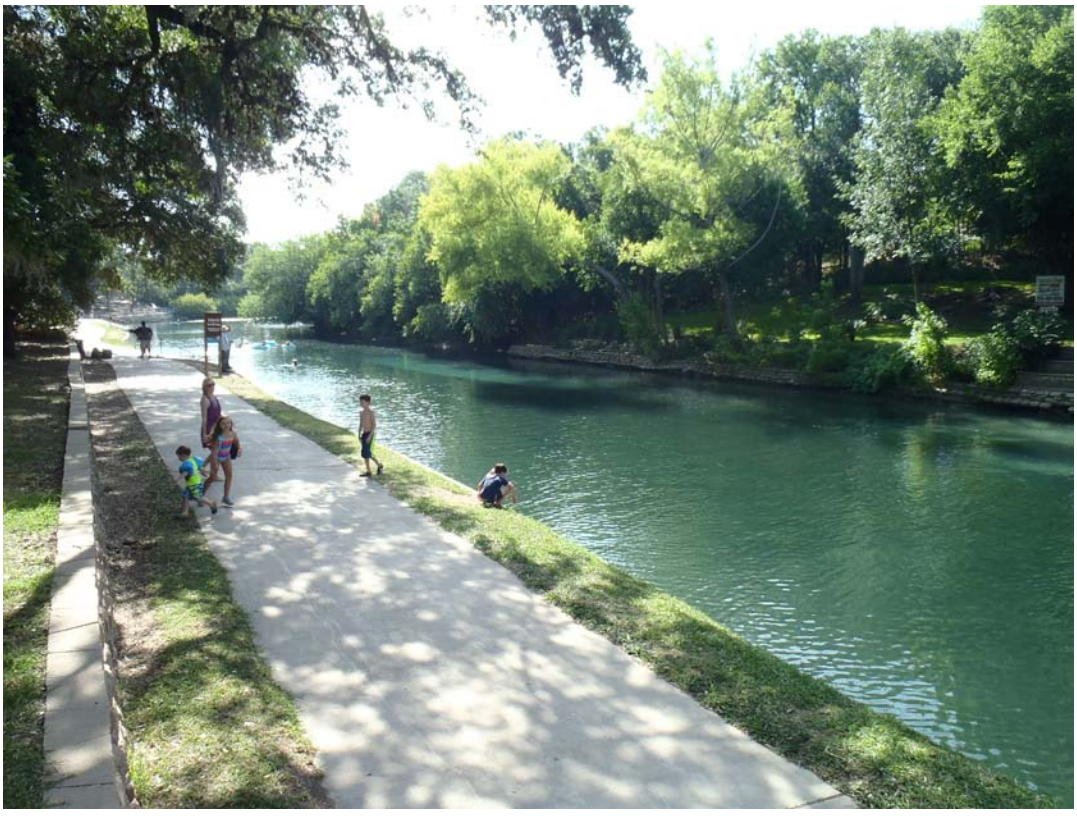

Figure 10: New Channel *Cabomba* continues to support quality fountain darter habitat.