MEMORANDUM

TO:	Nathan Pence and Rick Illgner
FROM:	Ed Oborny (BIO-WEST)
DATE:	September 13, 2013
SUBJECT:	EA HCP Bio-monitoring Update – Week 5

Gentlemen,

BIO-MONITORING UPDATES

Comal System:

The total system discharge at Comal Springs is ≈ 111 cfs. Total discharge below 120 cfs triggered HCP Section 6.4.3 specific Comal Springs riffle beetle and Comal Springs salamander surveys this week. We will continue to conduct these surveys every other week until total system discharge rebounds above 120 cfs. Weekly habitat evaluations continue to occur and will do so until total spring flow increases above 150 cfs. A full system critical period sampling is not scheduled until total springflow declines below 100 cfs. Fall comprehensive sampling is scheduled to occur in late October / early November.

San Marcos System:

The total system discharge for San Marcos Springs is ≈ 101 cfs. As described in previous memorandums, no critical period sampling for the San Marcos system is scheduled until total springflow declines below 95 cfs (Texas wild-rice physical measurements) or below 85 cfs (full Critical Period sampling event). Fall comprehensive sampling is scheduled for mid-October.

WEEK 5 CONDITIONS AND ACTIVITIES:

Comal: Weekly habitat observations and photo documentation were conducted on Thursday, September 12th. Additionally, Comal Spring riffle beetle surveys were conducted on September 10th, 12th and will be completed on Sunday (15th). Comal Springs salamander surveys were conducted on Thursday, September 12th along with discharge measurements at the fixed Bio-monitoring transects.

RESULTS:

During all full sampling and critical period events, we collect discharge data at HCP Bio-monitoring locations to relate directly to biological monitoring activities being conducted. We conducted discharge measurements Thursday afternoon (September 12th) with the results of that trip and the August 9th and 23rd data presented below:

Date:	**August 9th**	**August 23rd**	**Sept. 12th**
		Discharge (cfs)	
Spring Run 1 –	4.1	1.7	1.3
Spring Run 2 –	0.6	0.3	0.9
Spring Run 3 –	13.3	12.1	11.5
Old Channel –	57.1	60.6	53.3
Upper Spring Run –	4.8	3.1	0.76
Total USGS Gage – Daily Average	136	129	111

As evident in the Table above, flow within the spring runs continues to be quite low. As in weeks past, flow continues to go subsurface near the headwaters of spring runs 1 and 2. The following figure highlights the difference in the Spring Run 1 headwater from August 21st to September 12th.

Figure 1: Spring Run 1 comparison (August 21st versus September 12th, 2013).

Spring run 3 continues to maintain upwelling and horizontal flow from the headwaters with surface connectivity to the entire spring run. It was again visually evident that upwelling flow is still coming from the Upper Spring Run reach. However, as documented in the Table above, flow in the upper reach has dropped to below 1 cfs. This is also very evident by the algal buildup that has occurred since last week's habitat evaluation (Figure 2). Note: All photographs were taken on Thursday, September 12th unless otherwise noted.

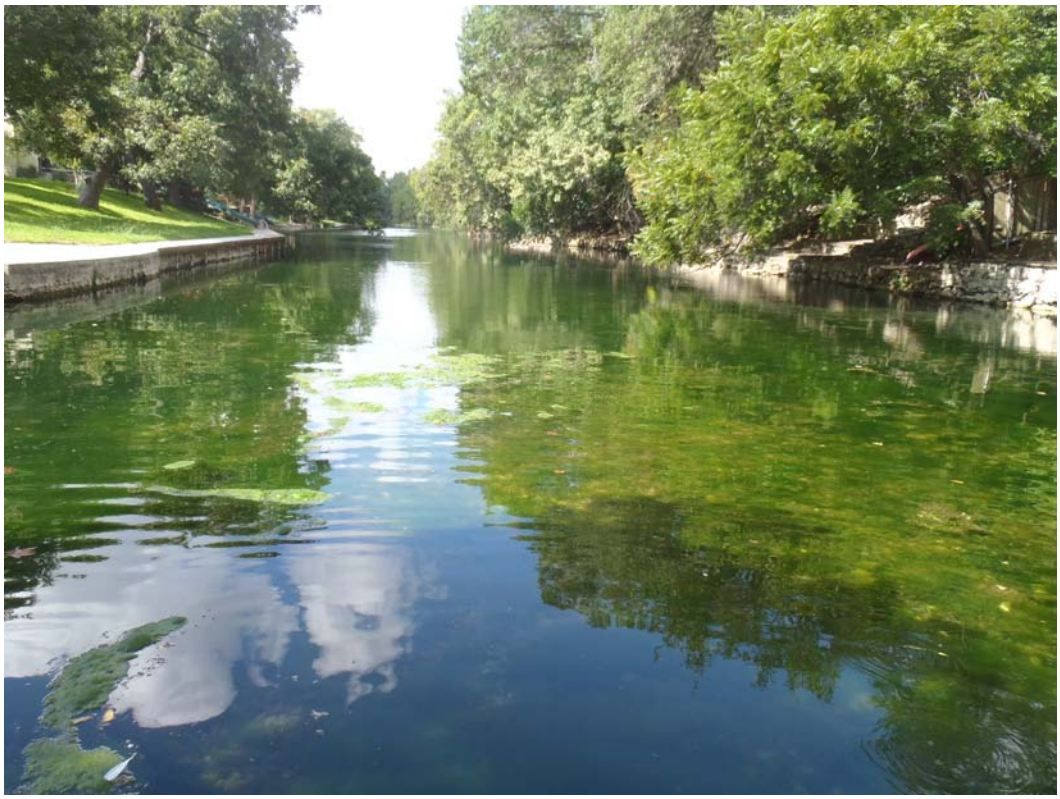

Figure 2: Algal build up adjacent to and downstream of Spring Run 5 in the upper spring run reach.

Neither Spring Run 5 (Upper Spring run reach) nor either the northern and southern runs of Spring Run 6 (Spring Island) had surface flow. Although no surface flow was evident, Figure 3 shows the small pool that continues to maintain wetted area at the headwaters of Spring Run 6. Water temperatures in this pool remain cool and a Comal Springs salamander was observed in this pool during surveys this week.

Week 5 biological activities at Comal Springs included 1) conducting Comal Springs salamander surveys in Spring Run 1, Spring Run 3, and the Spring Island area and 2) retrieving cotton lures at 10 sites each within the Spring Run 3, Western Shoreline, and Spring Island areas. Comal Springs salamander surveys in all representative areas were conducted on August 16th and again on September 12th. Although shallow water made sampling difficult, Comal Springs salamanders (Figure 4) were found in all surveyed locations.

Figure 3: Small pool in headwaters of Spring Run 6.

Figure 4: Salamander surveys in Spring Run 3.

Table 1 shows the long-term average as well as recent counts of salamanders in each of the sample locations. As expected, because of the reductions in available surface habitat, lower than average numbers of Comal Springs salamanders are being counted in Spring Run 1 and the spring runs on Spring Island.

Table 1: Comal Springs timed salamander counts

Survey Date	Salamander Counts			
	Spring Run 1	Spring Run 3	Spring Island (runs)	Spring Island – Eastern outfall
Long-term average (2002-2013)	24	12	3	10
April 18th Spring sampling	16	17	0	4
August 16th	8	12	0	8
September 12th	6	13	1	11

For the Comal Springs riffle beetle surveys, cotton lures were originally placed on August 14-16 at spring upwellings or openings to conduits that are known, historically, to be habitat for a variety of beetle species, including Comal Springs riffle beetle (*Heterelmis comalensis*). During collections this week (Figures 5-7), Comal Springs riffle beetles were the most abundant beetle collected. Peck's Cave amphipods (*Stygobromus pecki*) were also collected at both representative study reaches (Spring Run 3 [16 individuals] and Spring Island [2 individuals]). As discussed earlier, the 10 lures in the Western Shoreline reach will be retrieved this Sunday. The comprehensive sampling protocol requires a 4-week collection period to allow the detritus and algae to build up on the cotton lures to attract invertebrates. This week represents our first 4-week count during the Critical Period sampling this summer for comparison to comprehensive sampling efforts. Table 2 shows the total counts per representative sample reach over time and in recent collections.

Table 2: Comal Springs riffle beetles – Total Counts per area

Survey Date	Riffle Beetle Total Counts		
	Spring Run 3	Western Shoreline	Spring Island
Long-term average (2004-2013)	152	146	132
May / June 2013 Spring sampling	124	68	97
August / Sept. 2013 Critical period	118	To be collected (Sunday – 15th)	47
Lowest count since going to cotton lures	53 (May 2010)	20 (May 2012)	20 (May 2010)

As evident in Table 2, the total Comal Springs riffle beetle counts in both reaches sampled this week (prior to this memorandum) were less than average but more than double the lowest recorded sample over the years. We have duplicate sets of cotton lures placed within the study reaches enabling us to document 4-week counts every 2-weeks until total system discharge rebounds above 120 cfs.

Figure 5: Cotton lure retrieval at Spring Island upwellings.

Figure 6: Cotton lure from Spring Island after a four-week set.

Figure 7: New cotton lure reset at Spring Island Upwelling.

Similar to each previous August/September memorandum, fountain darter habitat conditions in Landa Lake remain favorable with multiple spring upwellings and bryophyte patches both on their own and intermixed within other vegetation types. The City of New Braunfels conducted floating vegetation mat removal with notable improvements (Figure 8) this week but additional attention is still needed. In addition to the lake, fountain darter habitat continues to prosper in the Old Channel (Figure 9) and New Channel (Figure 10 – note the *Cabomba* patch in the background of the suckermouth catfish). As per the Section 6.3.4 of the HCP (< 150 cfs trigger), presence absence dip netting for the fountain darter will next occur in October, or when total discharge declines below 100 cfs.

In summary, the Comal system continues to support quality fountain darter habitat conditions in Landa Lake and Old and New Channels. With the declining flows and algal build up, fountain darter habitat in the Upper Spring Run reach is in extremely poor condition. As stated in previous weeks, impacts to endangered Comal invertebrate surface habitat continue to occur in the main spring runs and Spring Island area. The most notable impacts to both Comal Springs riffle beetle and Comal Springs salamander habitats are in Spring Run 1.

San Marcos

As mentioned in the introduction, no critical period sampling activities have been triggered this summer on the San Marcos system. As discussed in previous memorandums, impacts to aquatic habitat continue to occur in the San Marcos system but have not approached the magnitude documented in 2009.

As always, please don't hesitate to contact me if you have any questions or concerns. Ed

Figure 8: Vegetation mat clearing in Landa Lake.

Figure 9: Restored aquatic vegetation in Old Channel.

Figure 10: Non-native catfish eating algae off the concrete wall in the New Channel.