MEMORANDUM

TO:	Nathan Pence and Rick Illgner
FROM:	Ed Oborny (BIO-WEST)
DATE:	***October 4, 2013***
SUBJECT:	EA HCP Bio-monitoring Update – ***Week 8***

BIO-MONITORING UPDATES

Comal System:

The total system discharge at Comal Springs is ≈ 132 cfs. Weekly habitat evaluations continue to occur and will do so until total springflow increases above 150 cfs. The next full system critical period sampling is not scheduled until total springflow declines below 100 cfs. As per the Section 6.3.4 of the HCP (< 150 cfs trigger), presence absence dip netting for the fountain darter is to take place every other month below 150 cfs. The initial fountain darter presence/absence dipnet sampling was conducted in mid-August and subsequently earlier this week (October 1st). The corresponding aquatic vegetation mapping (to occur every other month as well) will be conducted in conjunction with the Fall Comprehensive sampling later this month for cost savings. We felt with the extended low-flow conditions the past 8 weeks, it was prudent to go ahead and get the fountain darter data collected to document on-going conditions. As overall change in aquatic vegetation over the past 8 weeks has been minimal, it made sense to wait an additional couple of weeks and conduct this measure in conjunction with the Fall Comprehensive sampling event.

As per the Section 6.3.4 of the HCP (< 120 cfs trigger), Comal Springs riffle beetle and Comal Springs salamander sampling is to take place every other week below 120 cfs. Critical Period sample events for the riffle beetle have been conducted twice over the past 4 weeks but are now suspended with flows increasing above 120 cfs. With that said, every other week sampling for the Comal Spring riffle beetle will extend through October as part of the Fall Comprehensive sampling. Comal Springs salamander sampling has been conducted one time subsequent to the < 120 cfs trigger. As flows last week were right around 120 cfs, no Comal Salamander sampling was conducted as we felt additional disturbance in the spring runs was not warranted. As total system discharge is presently > 120 cfs, Critical Period salamander sampling has been suspended. Should total system discharge decline below 120 cfs, both the riffle beetle and salamander Critical Period sampling components will be resumed. As mentioned in previous memorandums, Fall comprehensive sampling on the Comal system is scheduled to start on October 24th.

San Marcos System:

The total system discharge for San Marcos Springs is ≈ 110 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 to start on October 10th.

WEEK 8 (September 29 to October 4) CONDITIONS AND ACTIVITIES:

Comal: Weekly habitat observations and photo documentation were conducted on Thursday, October 3rd. Additionally, fountain darter presence/absence dipnetting was conducted on Tuesday, October 1st. Note: All photographs in this memorandum were taken on October 3rd unless otherwise noted on the photograph.

RESULTS:

Since last week memorandum, a nice rainfall event occurred over the weekend stimulating a small pulse through the Comal system. Additionally, a second smaller rain event occurred on Wednesday, October 2nd creating a small bump in the hydrograph. Both events are depicted in Figure 1 which is simply a screen capture from the USGS streamflow website. Following these two events, total system discharge has seemed to stabilize around 130 cfs.

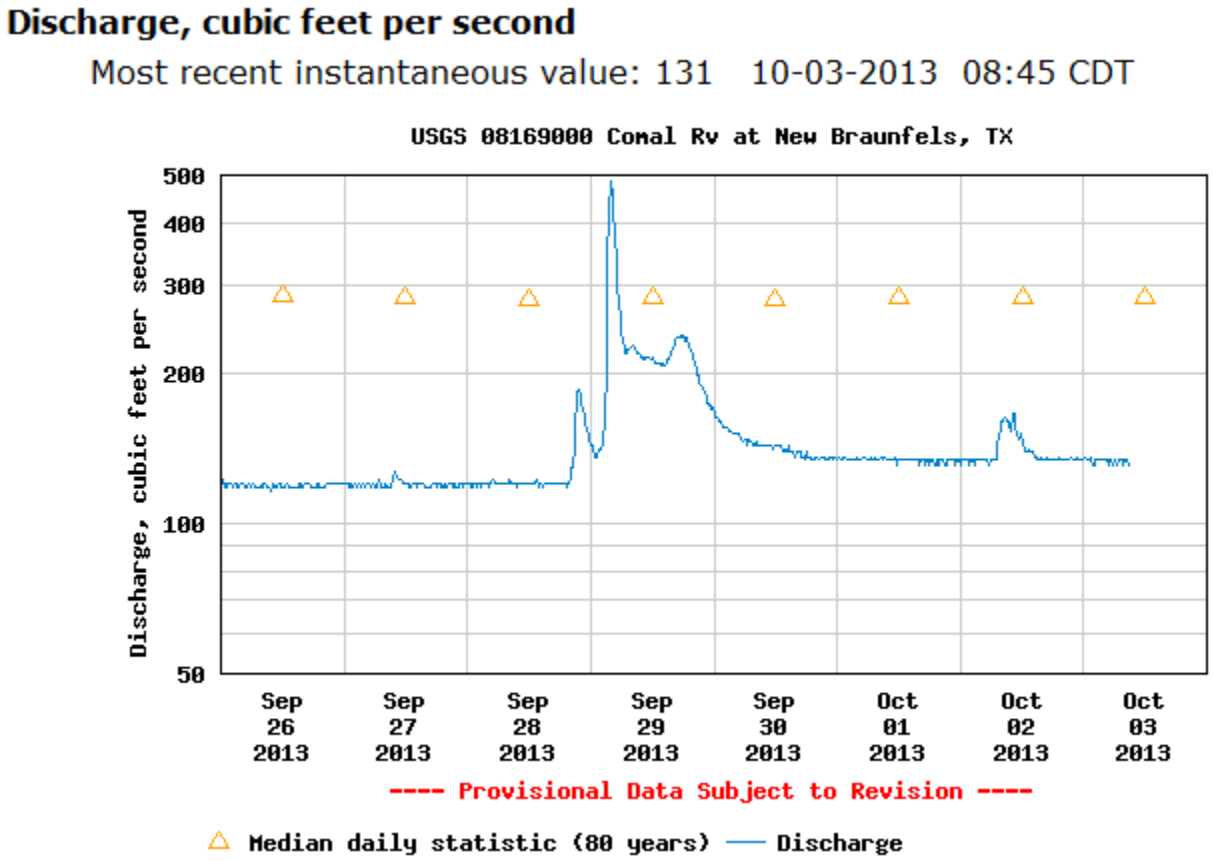

Figure 1: Screen shot of USGS webpage for the Comal gage (08169000) showing total system discharge over the past week.

As noted in previous memorandums, discharge data is routinely collected during Critical Period sampling at HCP Bio-monitoring locations to relate directly to biological monitoring activities being conducted. Although discharge measurements are not scheduled until next week, we would expect slight increases in each of the measurements presented in previous memorandums based on visual observations this week. In reference to those locations and previous total discharge conditions, I included the discharge information summarized in last week's memorandum below.

Date:	**August 9th**	**August 23rd**	**Sept. 12th**	**Sept. 26th**
		Discharge (cfs)		
Spring Run 1 –	4.1	1.7	1.3	2.2
Spring Run 2 –	0.6	0.3	0.9	0.9
Spring Run 3 –	13.3	12.1	11.5	15.7
Old Channel –	57.1	60.6	53.3	55.0
Upper Spring Run –	4.8	3.1	0.76	1.7
Total USGS Gage – Daily Average	136	129	111	120

Although slight improvements to springflow conditions in the main spring runs and at Spring Island were discussed in the Week 6 memorandum (when total system discharged increased from ≈110 cfs to 120 cfs), the improvements this week were considerably more impressive. Continuous surface water flow in Spring run 1 was evident for the first time in nearly a month (Figure 2). Figure 3 shows comparisons of the Spring Run 1 main orifice over the past 8 weeks. After the past month plus of no surface flow, observing water issuing from the Spring run 1 main orifices (Figure 4) was refreshing. Spring run 2 still did not maintain continuous surface water flow from the main orifice, but was close. As in all previous weeks, Spring run 3 continues to maintain connectivity throughout the run. Figure 5 shows some recent restoration work to prevent debris and sedimentation from impacting riffle beetle shoreline habitat in Spring run 3. Finally, I have included a couple of photos (Figures 6 and 7) of the Landa Lake walls construction project that is actively underway at the confluence of the combined Spring run 1 and 2 with Landa Lake.

Figure 2: Looking upstream toward Spring run 1 main orifice. Continuous surface flow on river right (left side of photo).

Figure 3: Spring run 1 main orifice over the Critical Period sampling thus far this summer/fall.

Figure 4: Close up shots at the two main orifices at Spring run 1 headwaters (both flowing).

Figure 5: Shoreline restoration efforts along Spring run 3.

Figure 6: Landa Lake walls construction project at the confluence of combined Spring run 1 and 2 with Landa Lake.

Figure 7: Siltation bag associated with the Landa Lake walls construction project.

The pulse of flow experienced last weekend had a positive effect of reducing the extensive algal buildup that has been prevalent in the Upper Spring run reach for some time now (Figure 8). An additional positive observed was there was no evidence of scour in any of the other vegetation types including the patch of bryophytes persisting within this reach. Some algae is still evident throughout the reach, and aquifer levels have not rebounded to the point yet to allow flow over the concrete structure at Spring run 5.

Considerable improvements in surface water level and flow were evident at Spring Island. Numerous spring upwellings were observed (Figure 9) and surface flow in both the northern (Figure 10) and southern (Figure 11) runs of Spring run 6 was occurring. These runs have not supported surface flow since mid-August.

Similar to the first 7 week's memorandums, fountain darter habitat conditions in Landa Lake continues to look good with large expanses of bryophytes both as individual patches and within the other vegetation types. The series of pulses this past week along with the continued hard work by the City of New Braunfels has the vegetation mat condition in Landa Lake looking much better (Figure 12). In addition to the lake, fountain darter habitat continues to prosper in the Old Channel (Figure 13) and New Channel (Figure 14).

Figure 8: Upper Spring run reach adjacent to Spring run 5 (Note clearer substrate than weeks past and upwelling [bubbles] in center of photo).

Figure 9: Upwelling flow around Spring Island.

Figure 10: Small amounts of surface flow in northern run of Spring run 6 (Spring Island)

Figure 11: Bank to bank surface flow in southern run at Spring run 6 (Spring Island).

Figure 12: Improved Vegetation Mat condition in Landa Lake.

Figure 13: Restored reach of the Old Channel below Golf Course road.

Figure 14: Extensive areas of *Cabomba* still present in the New Channel. Slight levels of turbidity still evident Thursday morning from the previous days rain fall event. Note: this site is just downstream of the confluence with Dry Comal Creek.

Week 8 biological activities at Comal Springs included fountain darter presence/absence dipnetting on October 1st. To expand on the visual habitat assessment, Figure 15 shows the results from the presence/absence dipnetting that was conducted on the Comal River since 2005 including the July 22nd, August 12th, and October 1st, 2013 events. The percentage of sites in which fountain darters were present was 78%, 74%, and 82% respectively; all above the long-term average of 65%. Figure 15 demonstrates the variance observed in this metric since 2005 and the solid blue lines represent the 5th and 95th percentiles on Non-Critical Period data.

As evident in Figure 15, the lowest percentage of fountain darters observed to date has been 52% recorded during Comprehensive sampling in Fall 2008 and Fall 2009. The October 1st 2013 value was 82% which is the highest value to date. Observations by the dipnet crew this week were as follows:

- Although there are only small patches of bryophytes in the Upper Spring run reach, they are packed with darters.
- The bryophytes in Landa Lake look great as does the restored *Ludwigia* around the islands.
- The Old Channel reach looked about the same, but a surprising number of darters were caught there. The fallen trees along that reach have caused current shifts that seem to have improved habitat diversity.
- Habitat conditions in the New Channel reach may be the best ever seen and most likely due to the lack of flood pulses coming down Dry Comal Creek during this extended

drought.

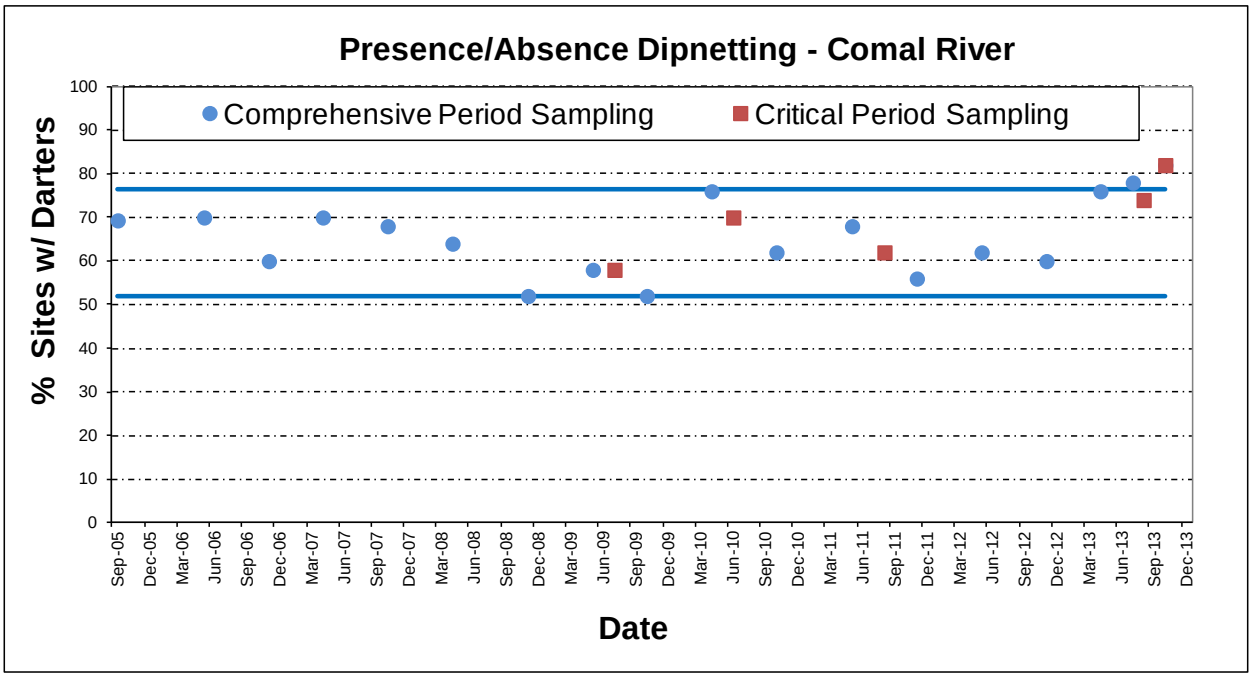

Figure 15: Percentage of sites (N = 50) in which fountain darters were present. Solid blue lines mark 5th and 95th percentiles for Comprehensive Period Sampling.

As a reminder, the presence/absence dip net technique represents ½ of the equation for potentially triggering refugia actions for the fountain darter at Comal Springs based on Section 6.4.3.1 of the HCP. As per that section, the proposed triggers levels for off-site refugia for the fountain darter are as follows:

- *Less than 50 percent mean aquatic vegetation (Landa Lake and Old Channel) AND less than 20 percent darter presence system-wide,*
  OR
- *Less than 25 percent mean aquatic vegetation (Landa Lake and Old Channel) AND less than 30 percent darter presence system wide.*

The highest presence/absence value recorded to date was likely caused by two separate factors. The first is the clumping of fountain darters in remaining habitat in the Upper Spring run reach which is a negative. The second is the expanses of quality habitat in Landa Lake, and the New and Old channels which is a positive. It is fascinating how Mother Nature tends to take care of herself in times of stress. The extended drought has clearly caused impacts to fountain darter habitat in the Upper Spring run reach. However, the outstanding conditions in the New Channel because of the lower flows seems to be more than compensating for the Upper Spring run reach loss at this time. It is important to note that 1) higher numbers are not always better (e.g. part of the elevated number this time was due to a negative condition) and still require interpretation and 2) we have only experienced these conditions for a total of 8 weeks at this time.

Regardless of the presence/absence value being somewhat elevated by a negative condition, this value is extremely encouraging after 8 weeks of total system discharge under 150 cfs. Another positive observation is that small darters (<15 mm) were fairly abundant in all reaches, suggesting

recent reproduction. It appears typical fall reproduction is occurring under good habitat conditions in Landa Lake, New Channel and Old Channel with fountain darter reproduction also occurring within the remaining habitat in the Upper Spring run reach.

Overall, the Comal system continues to support quality fountain darter habitat conditions in Landa Lake and Old and New Channels with numerous fountain darters present. Reduced fountain darter habitat conditions continue to persist in the Upper Spring Run reach. However, it is encouraging that fountain darters are still inhabiting this reach and reproducing in their typical fall fashion. Impacts to endangered Comal invertebrate surface habitat were alleviated to a modest degree with the recent increase in surface water level and springflows in the main spring runs and Spring Island area. However, relative to average flow conditions, impacts to invertebrate habitats are still occurring in these areas.

San Marcos

As mentioned in all previous updates related to the Comal system, no critical period sampling activities have been triggered this summer on the San Marcos system. Fall comprehensive sampling is scheduled to start towards the end of next week (October 10th).

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

Ed