



MEMORANDUM

TO: Nathan Pence
FROM: Ed Oborny (BIO-WEST)
DATE: **August 22, 2014**
SUBJECT: EA HCP Biological Monitoring – **Week 19**

BIOLOGICAL MONITORING UPDATES

The weekly habitat evaluation started off this week with a mostly smiling group of the species shown in the Figure below. It was a pleasure presenting to a group of professionals so committed to the protection of these two Springs ecosystems!



COMAL SYSTEM:

At the time of this memorandum, the total system discharge at Comal Springs was 78 cfs (Figure 1). As highlighted last week, this is the lowest recorded total system discharge condition since 1990 and only the fifth time (1990, 1989, 1971, and 1968) since the drought of record in the 50s that discharge has declined below 80 cfs. Additionally, this is the nineteenth consecutive week below 150 cfs, and therefore, the required weekly habitat evaluation was conducted on August 21st. Weekly habitat evaluations and memorandums will continue to occur until total system discharge at Comal Springs/River increases and consistently stays above 150 cfs. Critical period sampling associated with the below 100 cfs trigger was completed this week. A more detailed summary of monitoring results will be presented in next week's memorandum.

Discharge, cubic feet per second

Most recent instantaneous value: 78 08-22-2014 05:45 CDT

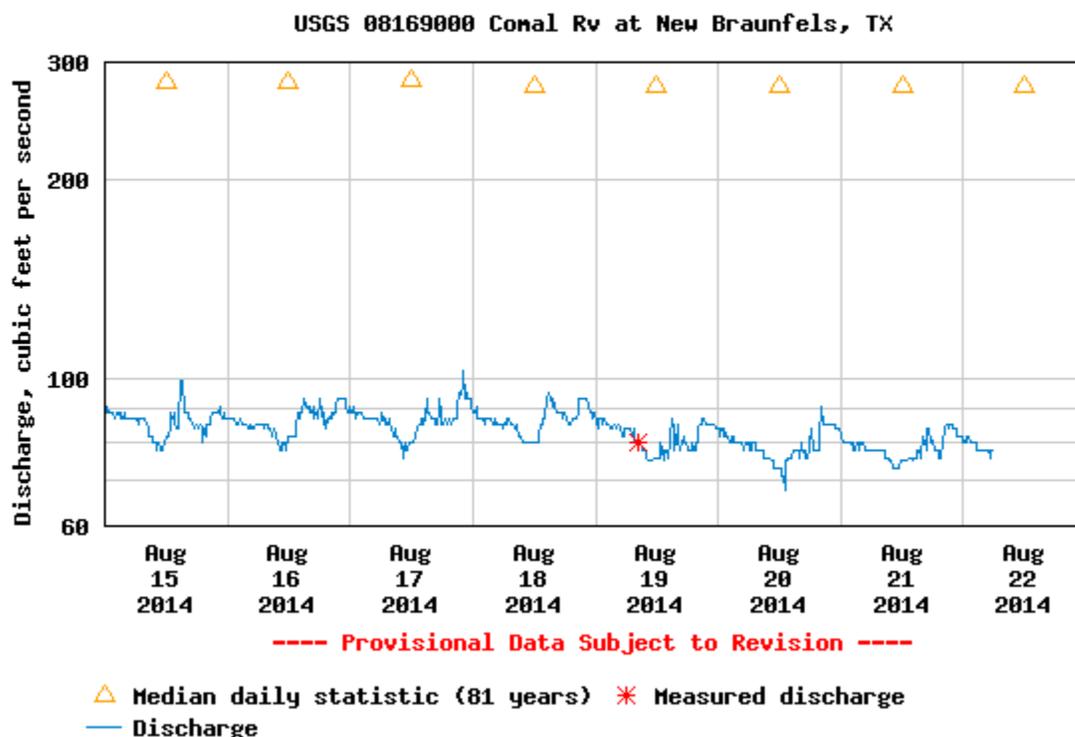


Figure 1: Screen shot of USGS webpage for the *COMAL* gage (08169000) showing total system discharge over the past week.

The following activities associated with HCP Biological Monitoring at Comal Springs were completed this week:

CRITICAL PERIOD MONITORING

- August 18-24
 - Aquatic vegetation mapping was completed at the intensive study reaches.
 - Gill Net – Predation evaluation was conducted on August 21-22.
 - Fixed Station photography was completed on August 20.
 - Fountain Darter visual SCUBA survey in the deeper portions of Landa Lake was completed on August 21.
 - Landa Lake thermisters downloaded

SAN MARCOS SYSTEM:

The total system discharge for San Marcos Springs/River is approximately 112 cfs. As discussed in the previous two memorandums, Texas wild-rice physical measurements in vulnerable stands will be restarted when total system discharge reaches 105 cfs. A Critical Period full sampling event is not triggered until total system discharge declines below 100 cfs. As part of COMPREHENSIVE monitoring, summer dip net fountain darter sampling and annual full-system mapping of Texas wild-rice will be completed next week.

COMAL SPRINGS/RIVER - WEEK 19 CONDITIONS:

Weekly habitat observations and photo documentation associated with HCP triggered sampling were conducted on Thursday, August 21st.

OBSERVATIONS AND ACTIVITIES:

The J17 water level at the time of photo documentation this week had declined to the 626's and total system discharge has continued to decline below 80 cfs. As the drought continues, each week sets a new all time low relative to the initiation of the biological monitoring program in fall 2000. Surface habitat conditions at all major spring runs, the Spring Island area and the Upper Spring run continue to deteriorate relative to flow, water level and exposed substrate. The headwaters of Spring Run 1 continue to be devoid of surface water (Figure 2) with an extended dry portion of surface habitat moving downstream (Figure 3) with a small surface water channel appearing just above the pedestrian bridge (Figure 4). Spring Run 2 continues to maintain a fraction of surface flow just upstream of the entrance road. Spring Run 3 continued to exhibit drying of surface habitat at the headwaters this week (Figure 5) but continues to support the most discharge of any of the major spring runs at this time.



Figure 2: No surface water in Spring Run 1 main headwater pool.



Figure 3: Spring Run 1 main channel looking upstream toward main orifices.



Figure 4: Spring Run 1 surface water channel looking downstream above pedestrian bridge.



Figure 5: Spring Run 3 headwaters.

The amount of green algae in the Upper Spring Run reach continues to be very low (Figure 6). This reduction in algae coupled with the loss of most bryophytes earlier this summer and small spatial extent of aquatic macrophytes in this reach has resulted in very low quality fountain darter habitat. However, a night dive on Thursday for the movement study confirmed recaptures of fountain darters (Figure 7) within the tagging sites again this week. The fact that darters continue to occupy this upper most reach and utilize less than optimal habitat conditions during such an extended period of low-flow continues to be impressive. Recreation in the shallow water remaining was also quite evident with the rock towers that showed up this week (Figure 8).

The surface water level in the Spring Island area this week continued to slowly decline with exposed surface habitat along large portions of the eastern and northern side of the island (Figure 9). In fact, water from springs on river left are actually flowing upstream and around the island on river right because surface flow has been blocked by exposed substrate all the way across the river left side. Both spring runs associated with Spring Island continue to remain completely dry on the surface with subsurface flow still evident at the base of the island. Figure 10 shows a column of bryophytes that was present within the fountain darter visual SCUBA transect during the survey conducted this week. The bryophytes condition within the deeper portions of Landa Lake continues to hold strong and support numerous darters as observed this week. Figure 11 shows a Comal Spring salamander observed in the deepest part of Landa Lake this week during the aforementioned SCUBA survey.

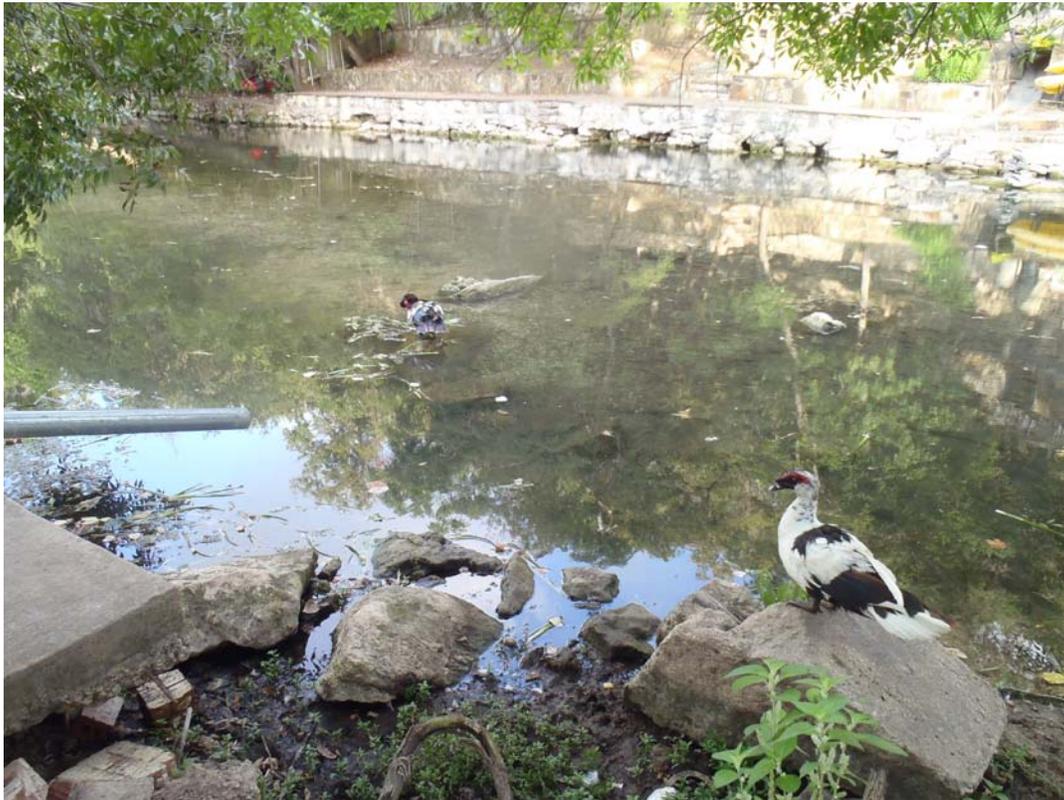


Figure 6: Algal coverage remains under control in the Upper Spring Run reach.



Figure 7: Marked fountain darter observed during night dive in the Upper Spring Run reach.



Figure 8: Rock tower art work in Upper Spring Run reach.



Figure 9: Continued exposed surface habitat adjacent to Spring Island.



Figure 10: Bryophyte column within fountain darter SCUBA survey transect.



Figure 11: Comal Springs salamander observed in Landa Lake during SCUBA survey.

Downstream in the main portion of Landa Lake, floating mats of aquatic vegetation continue to build up at these lower than average discharge conditions (Figure 12) and are in need of attention at this time. Certain areas within the main body of Landa Lake are also starting to be infiltrated by green algae (Figure 13), while other areas remaining pristine (Figure 14). Additionally, there are areas within the main portion of Landa Lake towards the middle that are extremely shallow (Figure 15) and aquatic vegetation such as *Sagittaria* (not shown in figure) that typically stays submerged in these areas is starting to go emergent. The restored habitat areas within Landa Lake are expanding nicely with thick native aquatic vegetation but they too are starting to be impacted by shallow water levels and build up of floating mats of aquatic vegetation on the surface. Overall, quality fountain darter habitat is still being supported in Landa Lake but impacts are becoming more pronounced.

The Old Channel continues to support the best fountain darter habitat in the system with thriving restored native aquatic vegetation (Figure 16). The New Channel continues to support aquatic vegetation throughout most of the reach above the confluence of the Old Channel, but fountain darter habitat is of lesser quality than in either Landa Lake or the Old Channel at this time.



Figure 12: Floating aquatic vegetation mat condition in the center of Landa Lake.



Figure 13: Green algae encroaching on bryophytes in Landa Lake.



Figure 14: High quality aquatic vegetation / fountain darter habitat in Landa Lake.



Figure 15: Patch of lily pads in the middle of Landa Lake extremely shallow.



Figure 16: Restored aquatic vegetation continues to thrive in the Old Channel.

In summary, total system discharge in the Comal System is approaching levels not witnessed in nearly 25 years. As discussed in last week's memorandum, if the downward trend continues, these lower discharges will continue to create worsening surface habitat conditions for the Comal Springs invertebrates. Endangered invertebrate habitat is clearly being impacted for surface dwelling invertebrates at this time. Impacts to fountain darter habitat in the Upper Spring run reach have been noted now for nearly four months, yet the darters continue to persist in this area. As discussed above, impacts are now creeping into Landa Lake and the New Channel, with only the Old Channel remaining in high quality condition. Should total system discharge continue to decline towards 60 cfs, flow split management will be triggered resulting in a necessary reduction of discharge within the Old Channel to support the rest of the system. The Comal system is an in situ low-flow experiment at this time and biological monitoring will continue to help us understand the story being told.

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