



MEMORANDUM

TO: Nathan Pence
FROM: Ed Oborny (BIO-WEST)
DATE: **September 12, 2014**
SUBJECT: EA HCP Biological Monitoring – **Week 22**

BIOLOGICAL MONITORING UPDATES

COMAL SYSTEM:

At the time of this memorandum, the total system discharge at Comal Springs was 70 cfs, slightly higher than last week's value following a small bump in the hydrograph with some scattered showers last weekend (Figure 1). This week marks the twenty-second consecutive week below 150 cfs, and therefore, the required weekly habitat evaluation was conducted on September 11th. Weekly habitat evaluations and memorandums will continue to occur until total system discharge at Comal Springs/River increases and consistently stays above 150 cfs. HCP species specific trigger (< 80 cfs) activities continue to be performed on their respective schedules. The next full system Critical Period monitoring effort will be triggered when total system discharge consistently declines below 50 cfs.

The following activities associated with HCP Biological Monitoring at Comal Springs were completed this week and are anticipated for next week:

CRITICAL PERIOD MONITORING

- September 8-14
 - Flow partitioning transects in the Upper Spring Run area and Landa Lake on September 10th.
 - Comal springs salamander sampling on September 11th.
 - Comal springs discharge measurements on September 11th.
 - Weekly photo documentation and habitat evaluation on September 11th.
 - Comal Springs riffle beetle collections and reset of lures on September 11th.
 - Spatial water quality measurements (standard parameters and carbon dioxide) were taken throughout Upper Spring Run area and Landa Lake on September 11th.
 - Thermistors were downloaded.
- September 15-21 (assuming total system discharge remains below 120 cfs)
 - Flow partitioning transects in the Upper Spring Run area and Landa Lake
 - Comal springs salamander sampling.
 - Comal springs discharge measurements.
 - Weekly photo documentation and habitat evaluation.

SAN MARCOS SYSTEM:

The total system discharge for San Marcos Springs/River is approximately 107 cfs. At present there are no Critical Period monitoring activities being conducted on the San Marcos system.

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.

Discharge, cubic feet per second

Most recent instantaneous value: 70 09-12-2014 07:45 CDT



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

COMAL SPRINGS/RIVER - WEEK 22 CONDITIONS:

Weekly habitat observations and photo documentation associated with HCP triggered sampling were conducted on Thursday, September 11th.

OBSERVATIONS AND ACTIVITIES:

The slight increase in total system discharge this week (Figure 1) resulted in a slight increase at both Spring Run 3 and the Old Channel (Table 1). Upwellings and some surface discharge are still evident in Spring Run 1 and the Upper Spring Run reach but too minimal to measure with a traditional cross-sectional method. Surface habitat conditions at Spring Run 1 (Figure 2) and Spring Run 2 are extremely limited or non-existent throughout extended stretches of each run. Spring Run 3 looks similar to last week with drying of surface habitat at the headwaters and the channel constricting in several locations downstream. Although Spring Run 3 continues to support the most discharge of any of the major spring runs at this time, it too is impacted with a considerable reduction in surface habitat, which is starting to become evident in both the salamander and riffle beetle sample results discussed below.

Table 1. Comparison of discharge (cfs) throughout Comal Springs during 2014.

Date	April 23	July 17	July 31	August 14	August 28	Sept. 4	Sept. 11
Spring Run 1	3.1	0.7	1.1	0.2	0.06	0*	0*
Spring Run 2	2.5	1.4	1.8	0.1	0	0	0
Spring Run 3	16.9	10.0	12.2	5.8	2.1	2.1	3.2
Old Channel	52.2	52.7	53.9	54.4	47.9	48.7	50.9
Upper Spring Run	2.3	0.6	2.1	0*	0*	0*	0*
Total USGS Gage	143.0	113.0	109.0	85.0	66.0	66.0	70.0

* Not measureable although still visual evidence of spring upwelling in select areas



Figure 2: Extremely limited surface water habitat in Spring Run 1 downstream of Landa Drive.

Fountain darter habitat continues to be in very poor condition in the Upper Spring Run but actually experienced a slight improvement this past week (Figure 3). Despite minimal habitat and very poor apparent overall conditions, movement study night snorkeling this week confirmed that darters are still present in this area. The surface water level in the Spring Island area this week is similar to that observed last week with exposed surface habitat along large portions of the eastern and northern side of the island (Figure 4).

Table 2 shows the long-term average as well as recent counts of Comal Springs salamanders in each of the sample locations. No salamanders were found in the extremely limited surface habitat in Spring Run 1 or in the dried up spring runs on Spring Island. Salamander numbers decreased slightly at the eastern outfall to Spring Island but are still maintaining close to long-term average conditions. The biggest change this week was the collection of only three salamanders in Spring Run 3 which represents the lowest collection in this sampling site since the inception of the monitoring program in 2000. As mentioned above, Spring Run 3 has started experiencing considerable reductions in surface habitat over the past three weeks. The ability of Comal Springs salamanders to occupy and persist in sub-surface habitats is unknown; therefore, continued monitoring under these rare conditions will help fill important data gaps for this species. Although the Comal Springs salamander is listed in the HCP and Incidental Take Permit (ITP), the conditions in the ITP are not presently active for this species as it is not listed as threatened or endangered with this directly acknowledged (Item H: 7-9) in the ITP.



Figure 3: Conditions slightly improved in places this week in the Upper Spring Run reach.



Figure 4: Exposed surface habitat adjacent to Spring Island remains similar.

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	17	15	0	4
August 16, 2013	8	12	0	8
September 12, 2013	6	13	1	11
October 29, 2013	7	9	2	6
April 25, 2014	12	23	3	7
July 17, 2014	16	24	0	8
July 31, 2014	27	27	0	11
August 14, 2014	1	6	0	7
August 28, 2014	0	8	0	11
September 4, 2014	1	13	0	10
September 11, 2014	0	3	0	7

For the Comal Springs riffle beetle surveys, Table 3 shows the results of 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. During the September 2014 sampling effort both adults and larvae were collected at each of the study locations. As evident in Table 3, counts are declining in each of the three study reaches with counts in Spring Run 3 representing the lowest observed over the course of this monitoring program. Additionally, the total count across all stations was the lowest observed since the inception of cotton lure sampling in 2004.

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	124	68	97	289
August / Sept. 2013	118	119	100	337
September 2013	109	188	66	363
October 2013	78	63	88	229
April / May 2014	146	104	40	290
May 2014	138	98	42	278
June 2014	119	130	34	283
July 15 th 2014	146	143	*	NA
July 28 th 2014	77	220	57	354
August 13 th 2014	46**	52**	*	NA
September 11, 2014	37	67	30	134
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.

** Six lures at each sample reach had to be moved due to sites becoming too shallow or dry.

Overall, quality fountain darter habitat persists in Landa Lake but impacts are occurring. In order to get a better feel for what water temperature and dissolved oxygen are doing spatially and vertically right now throughout Landa Lake and the rest of the Comal System, BIO-WEST deployed a crew yesterday (September 11th) from Blieders Creek all the way down the system monitoring standard parameters (water temperature, dissolved oxygen [DO], pH and conductivity) along with carbon dioxide. Other than water temperatures getting quite warm (near 30° C just downstream of the confluence with Blieders creek in shallow habitat areas, the system continues to

hold well. There was vertical stratification of both temperature and DO in the deeper hole across from Heidelberg lodge, but that was essentially the only area that was exhibiting notable water column stratification. Water temperatures and DO from Spring Island through Landa Lake and down through the Old Channel and New Channel all are maintaining conditions quite suitable (23.5 to 27 °C and >6 mg/L DO) for fountain darters. Of course, please remember this is a snapshot during the day time in a very productive system, when one would expect DO to be quite high and it was. Dissolved oxygen conditions at the fixed water quality sonde in the middle of Landa Lake have been recording DO values <2 mg/L during night time hours. As such, the aerators in Landa Lake were activated during night time hours this past week. It was encouraging that the measurements around the placement of that fixed Landa Lake sonde were not notably different than throughout the majority of the main portion of Landa Lake during yesterday's evaluation. This confirms that the sonde data is representative of what is happening throughout the main body of the Lake during the day.

On a less positive note, floating mats of aquatic vegetation continue to build up at these lower than average discharge conditions and are at considerable high levels right now (Figure 5). Coupled with the lower than average water levels in the lake right now, this coverage is having impacts on the underlying aquatic vegetation in both restored and existing areas and likely also contributing to the low DOs during the night as this material decays.

The Old Channel continues to support high quality fountain darter habitat with thriving restored native aquatic vegetation (Figure 6). The New Channel continues to support aquatic vegetation throughout most of the reach above the confluence of the Old Channel, but fountain darter habitat remains of lesser quality than in either Landa Lake or the Old Channel at this time. It is encouraging that water temperature and DO conditions continue to be maintained at levels supportive of fountain darters even at the most downstream extent of each channel.

In summary, total system discharge and water level conditions remained relatively stable or slightly improved over the past week. Endangered invertebrate habitat continues to be impacted for surface dwelling invertebrates with the duration of these conditions possibly causing the reduction in counts observed this week. Fountain darters continue to persist in the Upper Spring Run reach although habitat is very minimal and water temperatures are approaching 30° C within this area. Impacts continue in Landa Lake with shading of rooted aquatic vegetation by thick mats of floating aquatic vegetation. Low DO measurements are also being recorded on a nightly basis in the main body of Landa Lake, but there has not been a corresponding biological response documented via monitoring to date. Decreased flows in the New Channel continue to impact fountain darter habitat conditions in this reach. However, the Old Channel continues to support high quality fountain darter habitat especially within the HCP restored reaches. This latter observation is extremely encouraging as this was the HCP intent for extensive restoration activities and flow split management components specific to the Old Channel.

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



Figure 5: Floating vegetation mats near Landa Lake fishing pier (upper photo) and in the main body of Landa Lake (lower photo).

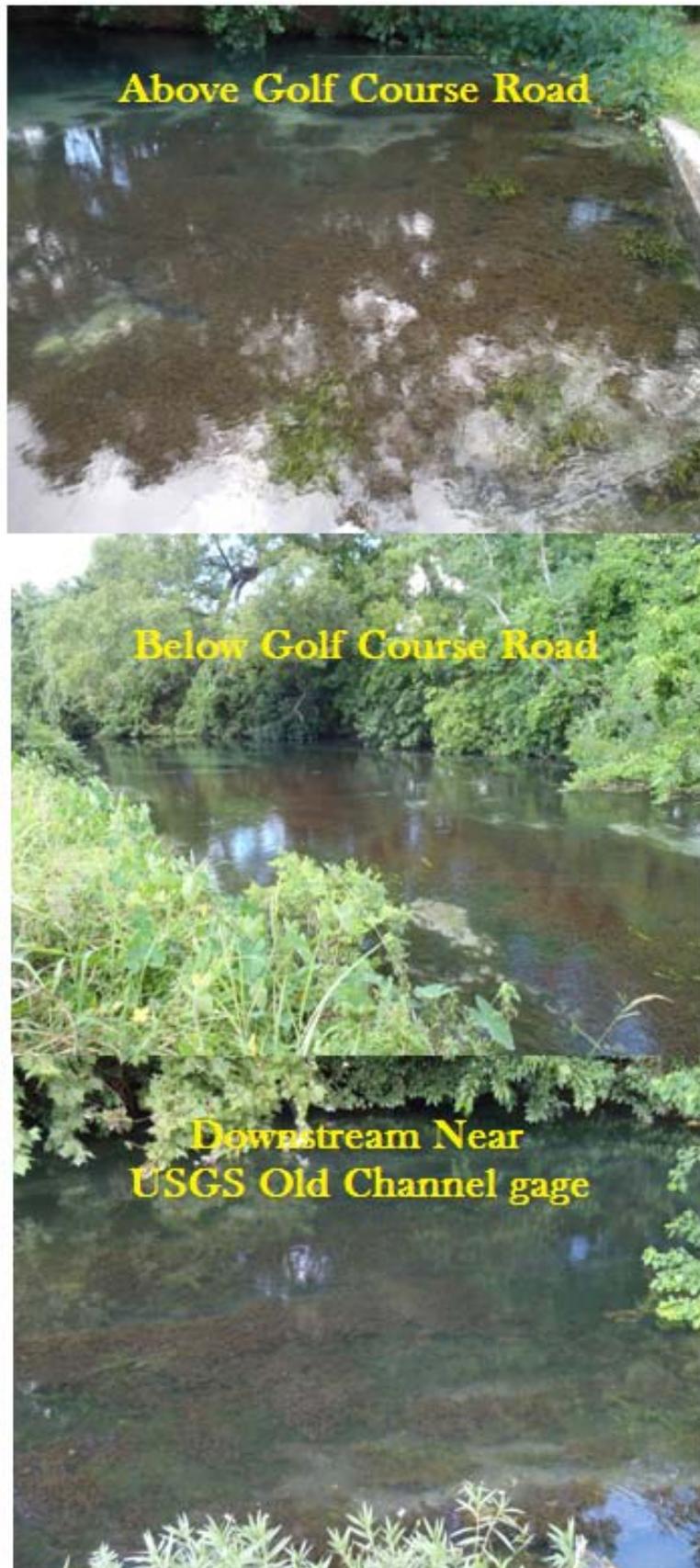


Figure 6: Restored native aquatic vegetation in Old Channel.