MEMORANDUM

TO:	Nathan Pence
FROM:	Ed Oborny (BIO-WEST)
DATE:	**October 24, 2014**
SUBJECT:	EA HCP Biological Monitoring – **Week 28**

BIOLOGICAL MONITORING UPDATES

COMAL SYSTEM:

The total system discharge at Comal Springs was 91 cfs (Figure 1) this morning following a USGS adjustment earlier this week. This week marks the 28th consecutive week below 150 cfs total system discharge, and therefore, the required weekly habitat evaluation was conducted on October 23rd. 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 low-flow monitoring activities continue to be driven by the <120 cfs trigger. Fall Comprehensive sampling at Comal Springs was initiated this week. The following activities associated with HCP Biological Monitoring at Comal Springs were completed this week and are anticipated for next week:

COMPREHENSIVE AND CRITICAL PERIOD MONITORING

- October 20-26
  - Benthic macroinvertebrate sampling in aquatic vegetation throughout study sections was completed on October 14th.
  - Weekly photo documentation and habitat evaluation.
  - Flow partitioning transects in the Upper Spring Run area and Landa Lake.
  - Comal Springs discharge measurements.
  - Comal Springs salamander sampling.
  - Aquatic vegetation mapping in intensive study reaches initiated.
  - Fish community sampling via SCUBA.
- October 27 – November 2
  - Weekly photo documentation and habitat evaluation.
  - Complete aquatic vegetation mapping.
  - Fountain darter drop netting at all intensive study reaches.
  - Fountain darter presence/absence dip netting (standard and fixed method).
  - Fountain darter timed dip net surveys.
  - Fixed station photography
  - Fountain darter visual SCUBA survey in Landa Lake.
  - Water quality grab samples and thermister downloading.
  - Fish community sampling via seine.

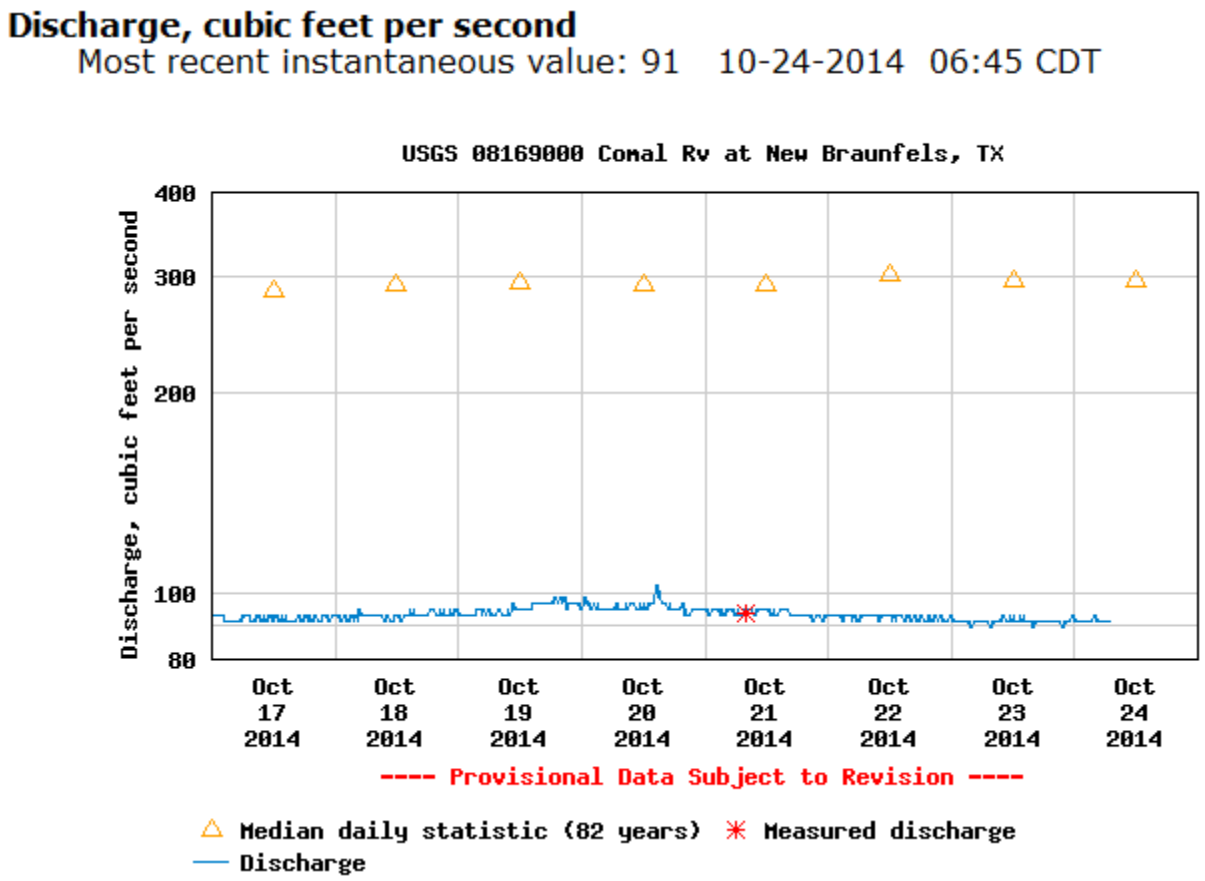

Figure 1: Screen shot of USGS webpage for the ***COMAL*** gage (08169000) showing total system discharge over the past week.

SAN MARCOS SYSTEM:

The total system discharge for San Marcos Springs/River is approximately 104 cfs this morning following a USGS adjustment earlier this week. No Critical period sampling activities were conducted this week or anticipated for next week. Fall Comprehensive sampling is in full production and should be completed this upcoming week. To date the following activities associated with San Marcos Fall Comprehensive HCP biological monitoring have been conducted:

- Aquatic vegetation mapping (Spring Lake Dam, City Park, and I-35 study reaches).
- Fish community sampling via seine and SCUBA throughout riverine study segments.
- Fountain darter presence/absence dip netting (standard and fixed method).
- Fountain darter timed dip net surveys were conducted.
- Benthic macroinvertebrate sampling in aquatic vegetation throughout study sections.
- Fountain darter drop netting at all intensive study reaches.
- Thermister downloading

San Marcos Comprehensive sampling activities scheduled for next week include:

- Texas wild-rice physical habitat measurements.
- Fixed-station photography.
- San Marcos salamander surveys.
- Fish community sampling via SCUBA in Spring Lake.

COMAL SPRINGS/RIVER - WEEK 28 CONDITIONS:
Weekly habitat observations and photo documentation associated with HCP triggered sampling were conducted on Thursday, October 23rd.

OBSERVATIONS AND ACTIVITIES:
Figure 2 highlights the beauty of Landa Lake early in the morning on a perfect autumn day. Discharge was very stable throughout the system this past week (Figure 1 ,Table 1). As such, surface habitat for the major spring runs, Upper Spring run and Spring Island areas remained similar relative to water level and discharge. Exposed surface area continues to be present in all three areas along with algae build-up at various levels in all three as well.

Figure 2: Comal Springs / Landa Lake from a kayak on a beautiful autumn day.

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

Date	April 23	July 17	July 31	Aug 14	Aug 28	Sept 4	Sept 11	Sept 25	Oct 2	Oct 9	Oct 23
Spring Run 1	3.1	0.7	1.1	0.2	0.06	0*	0*	0*	0.4	0.3	0.3
Spring Run 2	2.5	1.4	1.8	0.1	0	0	0	0.3	0.9	0.4	0.4
Spring Run 3	16.9	10.0	12.2	5.8	2.1	2.1	3.2	5.5	9.2	6.3	6.7
Old Channel	52.2	52.7	53.9	54.4	47.9	48.7	50.9	46.0	45.9	47.2	52.0
Upper Spring Run	2.3	0.6	2.1	0*	0*	0*	0*	0.6	2.0	1.3	0.6
Total USGS Gage	143.0	113.0	109.0	85.0	66.0	66.0	70.0	84.0	90.0	84.0	91.0

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

Per the < 120 cfs HCP species specific trigger and in conjunction with the Fall Comprehensive sampling, Comal Springs salamander surveys were conducted this week. Table 2 shows the long-term average as well as recent counts of Comal Springs salamanders in each of the sample locations. As exhibited since mid-July, no salamanders were found in the dried up spring runs on Spring Island. Identical to the last survey, four salamanders were counted this week in Spring Run 1. Spring Run 3 held steady while 17 salamanders were recorded at the eastern outfall study site. This continues to be encouraging with overall salamander counts going up for the second consecutive monitoring event.

Fountain darter habitat continues to be in poor condition in the Upper Spring Run reach. Quality fountain darter habitat continues to persist in Landa Lake but not without impacted areas. Figure 3 shows an extensive bryophyte field in the deeper portions of Landa Lake providing high quality fountain darter habitat. Figure 4 shows a restored patch of *Cabomba* in the lower-central portion of Landa Lake that is also thriving in an area that received extensive disturbance via bladder dams during the walls construction project. When photographs of this restored area were taken a ramshorn snail (a non-native species targeted for removal via the HCP) was spotted (Figure 6) and quickly collected for admittance into the rehabilitation program (Figure 7). In contrast to the high quality habitat in Landa Lake there are areas that continue to experience degraded conditions. Figure 8 shows shallow water conditions evident with *Sagittaria* going emergent. Figure 9 provides an underwater look at an area with high concentrations of green algae smothering bryophytes in Landa Lake.

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
September 25, 2014	0	5	0	4
October 8, 2014	4	10	0	12
October 24, 2014	4	9	0	17

The condition of floating aquatic vegetation mats in Landa Lake continues to be a concern. Personnel from BIO-WEST and the City of New Braunfels (Figure 9) conducted an evaluation of the floating mats on Thursday. With provision M addressed, the restored aquatic vegetation areas are actively being managed for these mats which is a huge plus, yet these mats continue to shade large areas of *Vallisneria* which is causing and extensive thinning of this native aquatic vegetation. As in all previous memos, the Old Channel continues to support high quality fountain darter habitat with thriving restored native aquatic vegetation (Figure 10).

Figure 3: Extensive fields of bryophytes in Landa Lake.

Figure 4: Restored *Cabomba* adjacent to the newly constructed wall in Landa Lake.

Figure 5: Non-native ramshorn snail hanging out in restored *Cabomba* in Landa Lake.

Figure 6: Non-native ramshorn snail entering the mandatory rehabilitation program.

Figure 7: Shallow water depths in Landa Lake with emergent vegetation and green algae.

Figure 8: Underwater view of green algae covering bryophytes in portions of Landa Lake.

Figure 9: Casey Williams (BIO-WEST – left) and Mark Enders (City of New Braunfels – right – examining floating aquatic vegetation mats on Thursday, October 23rd.

Figure 10: Restored native aquatic vegetation in Old Channel.

In summary, total system discharge, water level and habitat conditions were very stable this past week. Endangered invertebrate habitat continues to be impacted for surface dwelling invertebrates but it was encouraging to see overall increased counts of Comal Springs salamanders for the second straight collection event. Although not without impacts, fountain darter habitat throughout the Comal system continues to support darters, with the restored native aquatic vegetation areas in Landa Lake and the Old Channel in excellent condition. Fall Comprehensive sampling will be completed on the San Marcos system this upcoming week and will be in full swing on the Comal System.

Have a wonderful weekend!

Ed