MEMORANDUM

TO:	Nathan Pence
FROM:	Ed Oborny (BIO-WEST)
DATE:	**April 25, 2014**
SUBJECT:	EA HCP Biological Monitoring – **Week 2**

BIOLOGICAL MONITORING UPDATES

COMAL SYSTEM:

The Spring 2014 Comprehensive Biological Monitoring effort continued this week. At the time of this memorandum, the total system discharge at Comal Springs was 143 cfs. As mentioned in the Week 1 memo, the routine monitoring effort is being conducted in conjunction with the < 150 cfs full Critical Period sampling event. The two monitoring events complement each other in every aspect, with the exception of additional water quality grab samples noted below. To date the following activities associated with Comal HCP biological monitoring have been conducted:

- Placement of cotton lures for Comal Springs riffle beetle sampling on April 3-4th.
- Aquatic vegetation mapping of the four (Upper Spring Run, Landa Lake, Old Channel, and New Channel) study reaches was conducted April 7-15th.
- Fixed-station photography was conducted on April 16th.
- Fountain darter presence/absence dipnetting was conducted on April 17th (standard) and 21st (fixed), with timed surveys conducted on April 23rd.
- Fish Community sampling via SCUBA was initiated the week of April 14-18 and continued the week of April 21-25.
- Fountain darter drop netting at all four study reaches was conducted 21-24 April.
- Water quality grab samples at 12 established stations (plus required duplicates) were conducted longitudinally down the system on April 23rd.
- Thermister downloading was completed throughout the week.
- Cross–sectional discharge measurements at established transects were conducted on April 23rd.
- Comal Springs salamander surveys were conducted on April 25th.
- Comal invertebrate sampling using drift nets was conducted on April 24-25.
- Fountain darter SCUBA transect survey in Landa Lake was conducted on April 24th.

As Comal Springs remained below 150 cfs for a continuous week, the < 150 cfs weekly habitat evaluation was conducted on April 24th. Spring comprehensive monitoring activities on the Comal system should be concluded next week (28 April – 2 May) with the following activities:

- Benthic macroinvertebrate sampling in aquatic vegetation throughout study sections.
- Retrieval of cotton lures for Comal Springs riffle beetle sampling following their 4-week set at designated sampling locations.
- Flow partitioning evaluation in Landa Lake.

Weekly habitat evaluations and memorandums will continue to occur until total system discharge at Comal Springs/River increases above 150 cfs.

SAN MARCOS SYSTEM:

The total system discharge for San Marcos Springs≈is 118 cfs. As part of Critical Period monitoring, Texas wild-rice physical measurements were conducted on Wednesday, April 23rd when discharge was reported at 120 cfs. A full critical period sampling event for the San Marcos system does not trigger until 100 cfs. The Spring 2014 Comprehensive sampling was initiated this past week with aquatic vegetation mapping at the three intensive study sites. Comprehensive sampling activities scheduled for next week (28 April through 2 May) include:

- Completion of aquatic vegetation mapping (Spring Lake Dam, City Park, and I-35 study reaches).
- Fountain darter presence/absence dipnetting (standard and fixed method).
- Fountain darter timed dipnet surveys.
- Thermister downloading.

As part of critical period monitoring, Texas wild-rice physical measurements will be conducted every 5 cfs decline (below 120 cfs), not to exceed one event per week. The remaining sampling components for the Spring comprehensive sampling event in the San Marcos system will be conducted the next couple of weeks.

COMAL SPRINGS/RIVER - WEEK 2 CONDITIONS:

Weekly habitat observations and photo documentation associated with HCP triggered sampling were conducted on Thursday, April 24th. All pictures in this memorandum were taken on that date.

OBSERVATIONS AND ACTIVITIES:

The total system discharge at Comal Springs is≈ 143 cfs (Figure 1). During all full sampling events, discharge data is collected at HCP designated locations to relate directly to biological monitoring activities being conducted. On August 23rd, discharge conditions at the EAA HCP locations were as follows:

Date: April 23rd	**Discharge (cfs)**
Spring Run 1 –	3.1
Spring Run 2 –	2.5
Spring Run 3 –	16.9
Old Channel –	52.2
Upper Spring Run –	2.3
Total USGS Gage – Daily Average	143.0

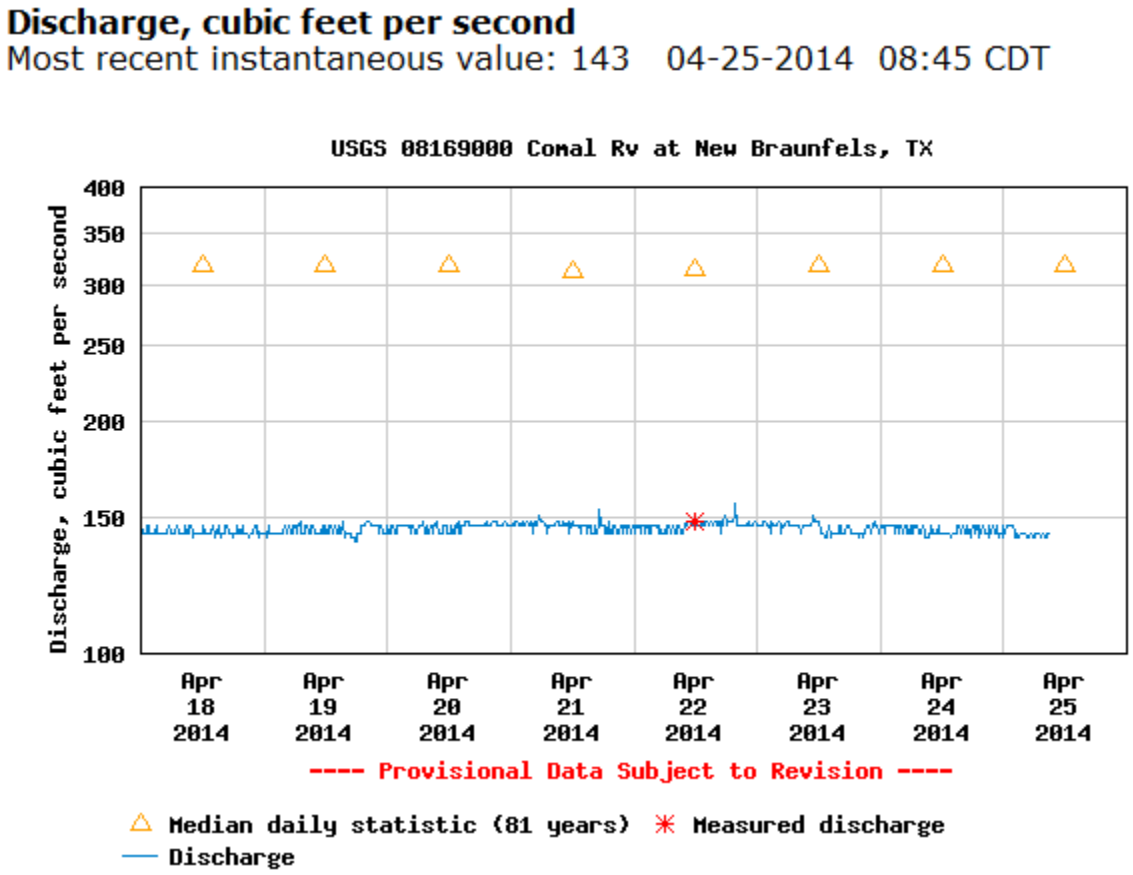

Figure 1: Screen shot of USGS webpage for the ***COMAL*** gage (08169000) showing total system discharge over the past week.

Surface water flow in Spring Run 1 is low but continues to issue from the major headwater spring orifices (Figure 2) as well as extend across the entire spring run flowing downstream. Note the drift net in the upper right corner of the photo being used to collect invertebrates over a 24 hour period. Spring Run 2 is maintaining flow and was experiencing considerably improved conditions in the kiddie pool area relative to last week. (Figure 3). Spring Run 3 continues to maintain connectivity throughout the run (Figure 4).

Algae continues to expand in portions of the Upper Spring run reach (Figure 5) but no where near the levels experienced last summer. The surface water level in the Spring Island area held farily constant from last week as total system discharge changed only slightly (Figure 6). Fountain darter habitat conditions in Landa Lake continue to look great with abundant and healthy bryophytes (Figure 7) and flourishing aquatic vegetation. However, floating vegetation mats in Landa Lake continue to accumulate (Figure 8). In addition to the lake, fountain darter habitat continues to thrive in the Old and New channels.

Figure 2: Spring Run 1 main orifices (April 24th)

Figure 3: Spring Run 2 – Improved conditions in designated kiddie pool area

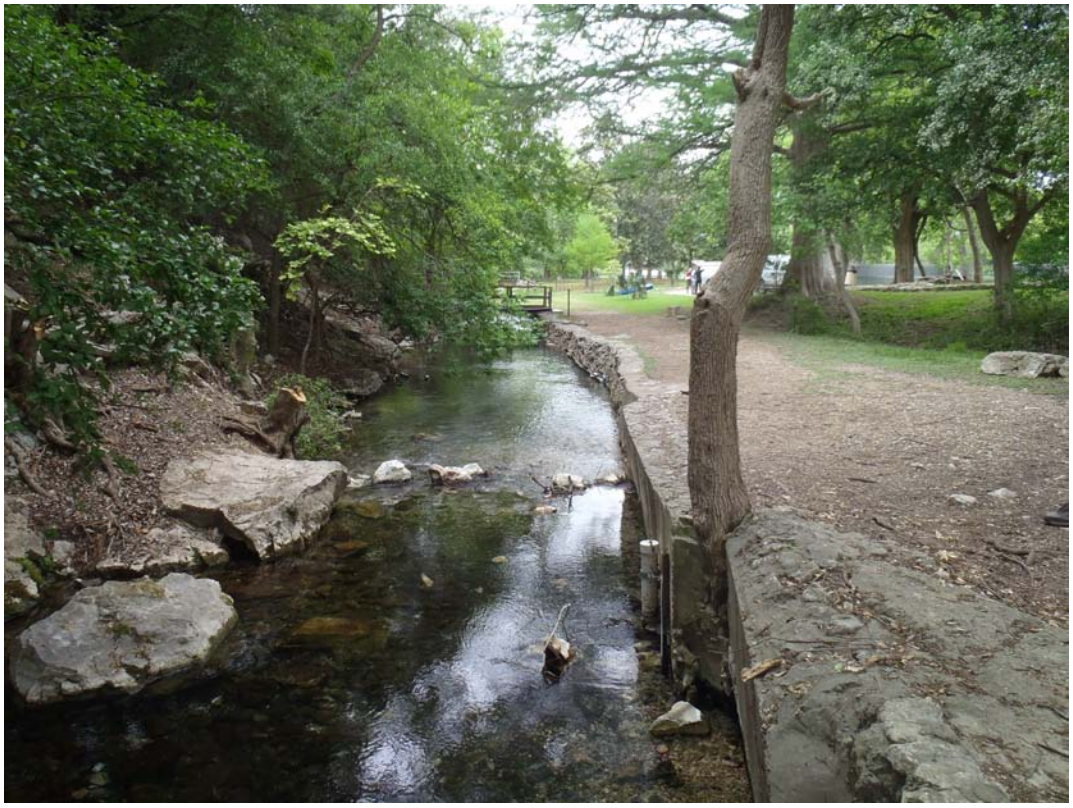

Figure 4: Spring Run 3 – looking downstream towards Landa Lake

Figure 5: Upper Spring Run reach – algae and bryophytes interspersed

Figure 6: Exposed habitat adjacent to Spring Island area

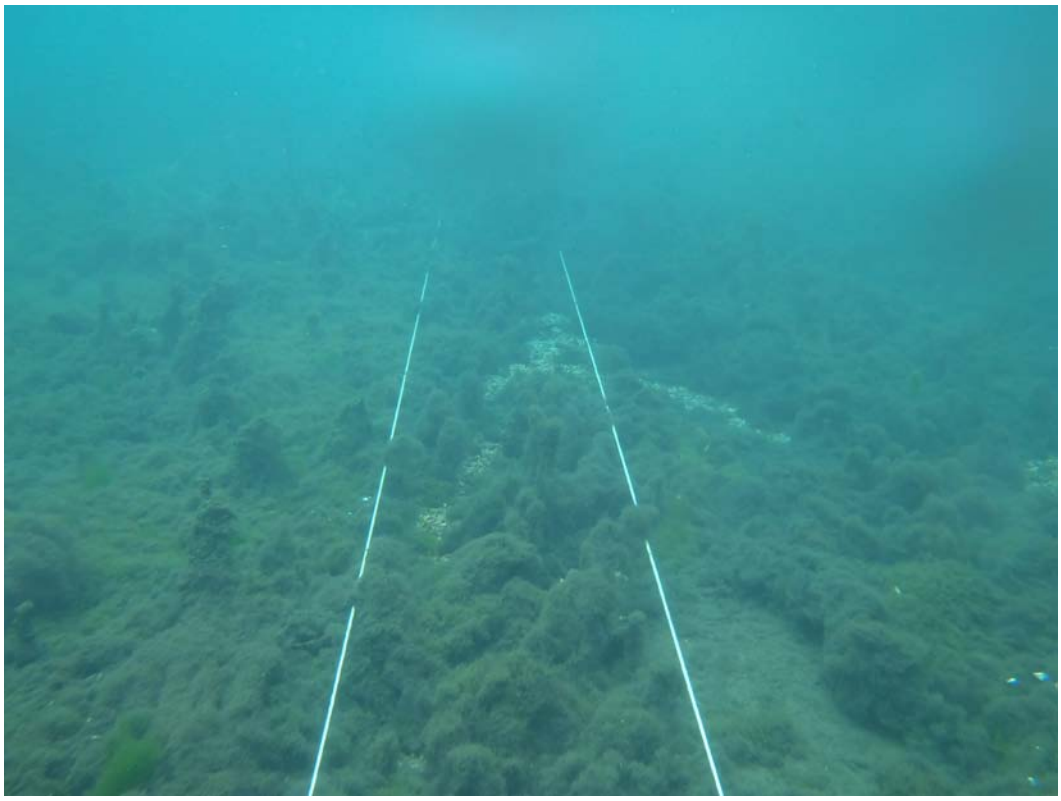

Figure 7: Bryophtes within fountain darter transect in the deepest portion of Landa Lake.

Figure 8: Floating vegetation mats in Landa Lake

As outlined above, a number of biological sampling activities were conducted at Comal Springs this week. Figure 9 shows Jeremy Webster leading the drop net sampling effort in the Old Channel while Figure 10 shows Melissa Fontenot and Nick Porter collecting water quality grab samples just upstream of Elizabeth street. Figures 11 and 12 show a drift net in Spring Run 3 and the drift net installer (Randy Gibson), respectively. In addition to these activities, Ed Oborny led the fountain darter SCUBA transect dive survey effort; Brad Littrell led the fountain darter dip net activities (fixed station presence/absence and timed surveys); and Brad L. and Jeremy W. also conducted Comal Springs salamander surveys. Finally, Figure 13 shows Brad Littrell, the Texas State University crew, and Dr. Ken Ostrand (USFWS ARC) conducting sampling associated with the 2014 HCP applied research fecundity study. Needlesstosay, a fun-filled, action-packed week of sampling.

In Summary, the Comal Springs/River continues to support quality fountain darter habitat conditions throughout most of the system, with some deteriation of habitat occurring in the Upper Spring Run section. Floating vegetation mats continue to accumulate and need attention. Surface habitat for the endangered Comal invertebrates remained fairly stable with nearly consistent total system discharge over the past week. As always, please don't hesitate to contact me if you have any questions or concerns.

Ed

Figure 9: Drop net sampling in the Old Channel.

Figure 10: Water quality sampling above Elizabeth street (Old Channel).

Figure 11: Drift net set in Spring Run 3.

Figure 12: Randy Gibson posing with knee pads after just setting the above drift net in SR3.

Figure 13: Fecundity study crew sampling in the Old Channel, Comal River.