MEMORANDUM

TO:	Nathan Pence
FROM:	Ed Oborny (BIO-WEST)
DATE:	**June 6, 2014**
SUBJECT:	EA HCP Biological Monitoring – **Week 8**

BIOLOGICAL MONITORING UPDATES

COMAL SYSTEM:

At the time of this memorandum, the total system discharge at Comal Springs was 148 cfs. This is very consistent with last week's reported total system discharge. However, as Comal Springs remained below 150 cfs for an eighth consecutive week, the required weekly habitat evaluation was conducted on June 4th. Weekly habitat evaluations and memorandums will continue to occur until total system discharge at Comal Springs/River increases and consistently stays above 150 cfs. As per HCP triggered low-flow sampling requirements, aquatic vegetation mapping in study reaches and fountain darter presence/absence dip net sampling will take place in June to meet the every other month criteria below 150 cfs. These activities are currently scheduled for the week of 16 June. As described in previous weeks, the next Critical Period full sampling event is not triggered until the total system discharge declines below 100 cfs.

SAN MARCOS SYSTEM:

The total system discharge for San Marcos Springs/River is approximately 151 cfs. This is up nearly 10 cfs from last week's memo based on another upward adjustment conducted by the USGS. At these present total discharge conditions, the San Marcos River should not trigger any critical period biological monitoring for some time. The next scheduled routine monitoring is full-system Texas wild-rice mapping and fountain darter dip netting in late July.

COMAL SPRINGS/RIVER - WEEK 8 CONDITIONS:

Weekly habitat observations and photo documentation associated with HCP triggered sampling were conducted on Wednesday, June 4th.

OBSERVATIONS AND ACTIVITIES:

Although no rain this past week, the bump in J17 (up to 643'earlier this week but now dropping) following the recharge experienced from rains the previous weekend allowed springflow to stay fairly constant throughout the week (Figure 1). The consistent total system discharge maintained water surface elevation and flow in the individual spring runs and adjacent to Spring Island resulting in the maintenance of Comal Spring invertebrate habitat in these locations relative to last week's reported conditions.

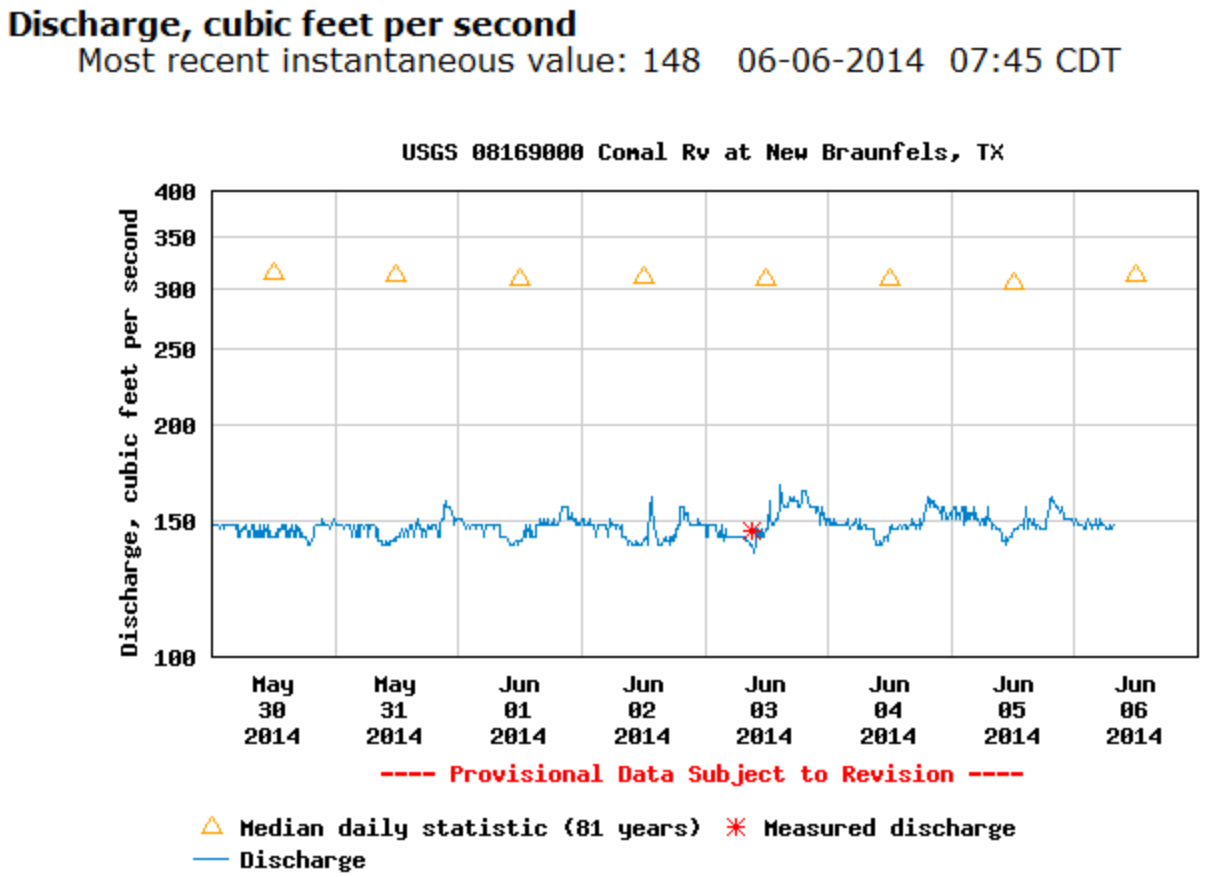

Figure 1: Screen shot of USGS webpage for the ***COMAL*** gage (08169000) showing total system discharge over the past week.

The two major orifices at Spring Run 1 maintained surface discharge (Figure 2) with the Spring Run 1 channel also maintaining extended areas of surface flow connectivity (Figure 3). Similar to all 2014 memos, Spring Run 2 continues to maintain surface flow for the main portion of the channel while Spring Run 3 continues to maintain connectivity throughout the run. Green algae in the Upper Spring Run reach was a bit more prevalent this week but was not heavily covering the remaining bryophyte patches or rooted aquatic macrophytes as is typical later in the summer (Figure 4). As in all previous weeks, fountain darters continue to occupy this upper reach. The surface water level in the Spring Island area remained constant with almost complete inundation of exposed habitat adjacent to the island (Figure 5). Although both the northern and the southern spring runs maintained surface flow, each was starting to experience some stagnant conditions (Figure 6). Fountain darter habitat conditions in Landa Lake continue to look great with the floating aquatic vegetation mats in pretty good shape at this time (Figure 7).

In addition to the lake, fountain darter habitat continues to thrive in the Old Channel (Figure 8). Figures 9-12 show some aquatic vegetation restoration work conducted in the Old Channel this past week. It was quite evident that summer is upon us in the New Channel with tubers showing up quite early in the morning, but aquatic vegetation and quality fountain darter habitat is being maintained (Figure 13).

Figure 2: Spring Run 1 main orifices.

Figure 3: Spring Run 1 main channel looking downstream from main orifice.

Figure 4: Upper Spring Run reach mix of bryophytes, macrophytes and slightly increasing algae.

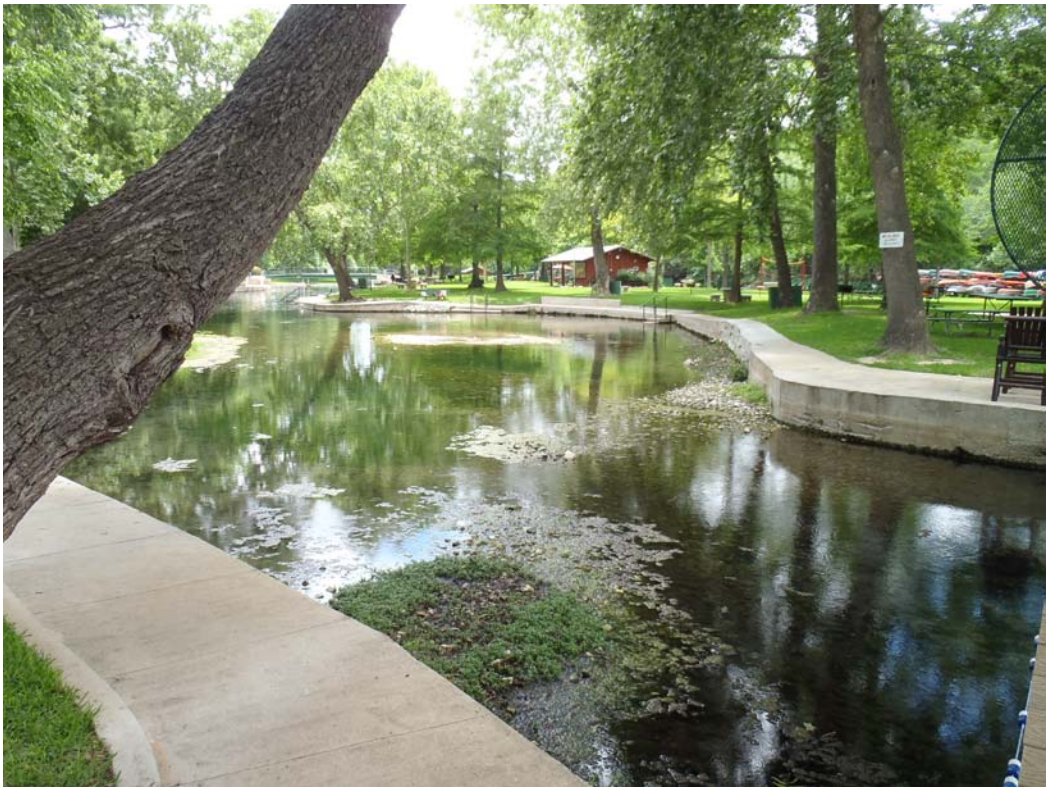

Figure 5: Continued limited exposed surface habitat adjacent to Spring Island area.

Figure 6: Southern channel of Spring Run 6 (surface algal build-up and grass clippings).

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Figure 7: Floating vegetation mat condition in Landa Lake.

Figure 8: Restored fountain darter habitat in the Old Channel.

Figure 9: Before picture (extensive *Hygrophila* [non-native] in the Old Channel).

Figure 10: Extensive *Hygrophila* relocated to the bank.

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Figure 11: After Picture (Native *Ludwigia* from Landa Lake MUPPT nursery being planted in the cleared section of the Old Channel).

Figure 12: End result – smiles!

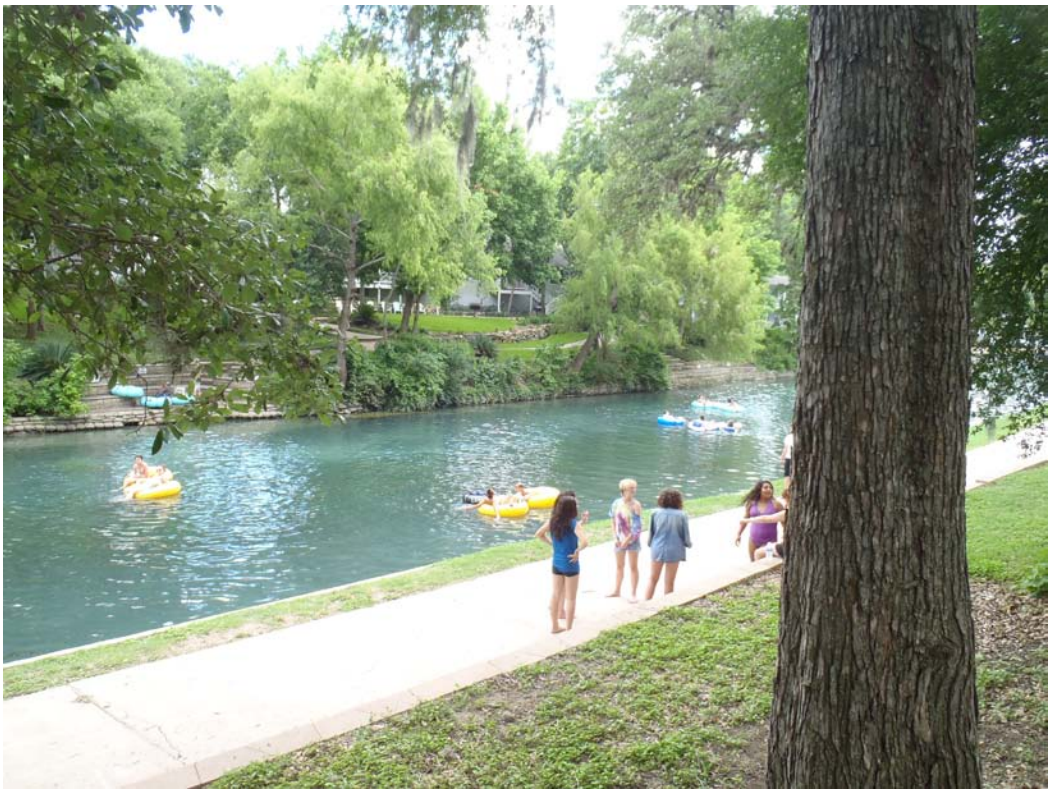

Figure 13: Extensive aquatic vegetation and a few tubers in the New Channel.

Relative to last week's memo, endangered species habitat conditions in the Comal Springs/River remained fairly constant. The system continues to support quality fountain darter habitat conditions throughout most of its entirety. Although slightly reduced habitat conditions remain in the Upper Spring Run reach relative to other portions of the system, fountain darters continue to persist in this reach. Floating vegetation mats in Landa Lake remained under control this week but will continue to need attention all summer. The maintenance of inundated areas and wetted area in individual spring runs this week translated into maintained surface habitat conditions for the endangered Comal invertebrates.

As discussed, I will be out for a few weeks (back June 23rd) but Brad Littrell will be conducting the weekly habitat assessments and continuing weekly memos in my absence.

Cheers!

Ed