MEMORANDUM

TO:	Nathan Pence
FROM:	Brad Littrell (BIO-WEST)
DATE:	**June 20, 2014**
SUBJECT:	EA HCP Biological Monitoring – **Week 10**

BIOLOGICAL MONITORING UPDATES

COMAL SYSTEM:

At the time of this memorandum, the total system discharge at Comal Springs was 136 cfs. This is a considerable drop since last week's memo when flow was 148 cfs. This makes the tenth consecutive week below 150 cfs, and therefore, the required weekly habitat evaluation was conducted on June 19th. 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 is to be conducted every other month when total system discharge is below 150 cfs. Since flows have been below 150 cfs since April, these activities are currently being conducted. Presence/absence dip netting (stratified random approach) was conducted on June 19th, and fixed station presence/absence dip netting will be conducted on June 20th. Additionally, aquatic vegetation mapping of the study reaches began this week, and will extend into next week. 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 148 cfs. This is only slightly lower than the past two week's memos (151 cfs), demonstrating that discharge at San Marcos remains pretty steady. At the 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 10 CONDITIONS:

Weekly habitat observations and photo documentation associated with HCP triggered sampling were conducted on Thursday, June 19th.

OBSERVATIONS AND ACTIVITIES:

This week, the J17 water level reached a high of 642' on Sunday June 15th following rain over the area on the night of June 12-13. However, as hot and dry summer conditions have persisted all week, the level has since dropped steadily and is currently 638'. As a result, total system discharge at Comal Springs has also declined (Figure 1), and the resulting drop in water surface elevation is notable relative to last week in the Spring Island area.

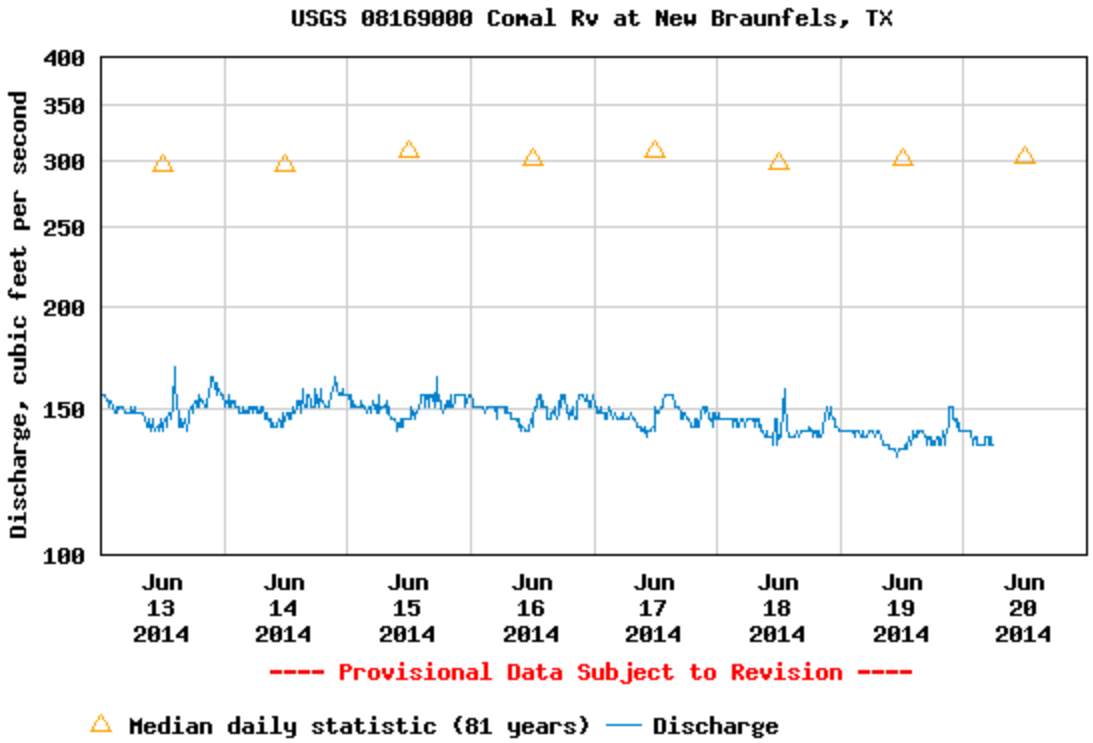

Figure 1: Screen shot of USGS webpage for the ***COMAL*** gage (08169000) showing total system discharge over the past week.

Although water levels are slightly lower than last week, the two major orifices at Spring Run 1 both maintained surface discharge (Figure 2) with the Spring Run 1 channel also maintaining complete surface flow connectivity (Figure 3). Spring Run 2 continues to maintain surface flow for the main portion of the channel (Figure 4) and Spring Run 3 continues to maintain connectivity throughout the run. With the increased hot summer sun and decreased discharge, algae are beginning to proliferate and outcompete bryophytes in the Upper Spring Run reach (Figure 5). Unless there is a significant change in flow conditions, this will likely only get worse in coming weeks, as previous experience has shown that algae coverage is worst during the hottest part of the summer. However, fountain darter dip netting in this area confirmed that darters are still relatively common in the area. The surface water level in the Spring Island area dropped slightly since last week, resulting in increased exposed surface habitat in the area along the eastern side of the island (Figure 6). Additionally, although the southern spring run on the island remains wet, the northern spring run is beginning to dry up with only a few surface puddles left and no observable surface flow throughout much of the run (Figure 7). Although increased algae was observed growing on restored *Ludwigia* in Landa Lake (Figure 8), the bryophytes in the upper portion of the lake are still doing well, and in general fountain darter habitat conditions look good. However, floating vegetation mats in Landa Lake are increasing and will soon require attention to prevent impacts to underlying habitat (Figure 9).

In addition to the lake, fountain darter habitat continues to thrive throughout the Old Channel. Ongoing aquatic vegetation restoration work continues to improve darter habitat conditions in this reach. Despite increased summer recreational traffic, the New Channel above Clemens Dam continues to maintain extensive patches of *Cabomba* which provide high quality fountain darter habitat (Figure 10).

Figure 2: Spring Run 1 main orifices.

Figure 3: Spring Run 1 main channel looking downstream.

Figure 4: Surface flow throughout Spring Run 2.

Figure 5: Algae beginning to proliferate in the Upper Spring Run Reach.

Figure 6: Increased exposed surface habitat compared to last week at Spring Island.

Figure 7: Surface flow at the northern spring run on Spring Island beginning to disappear.

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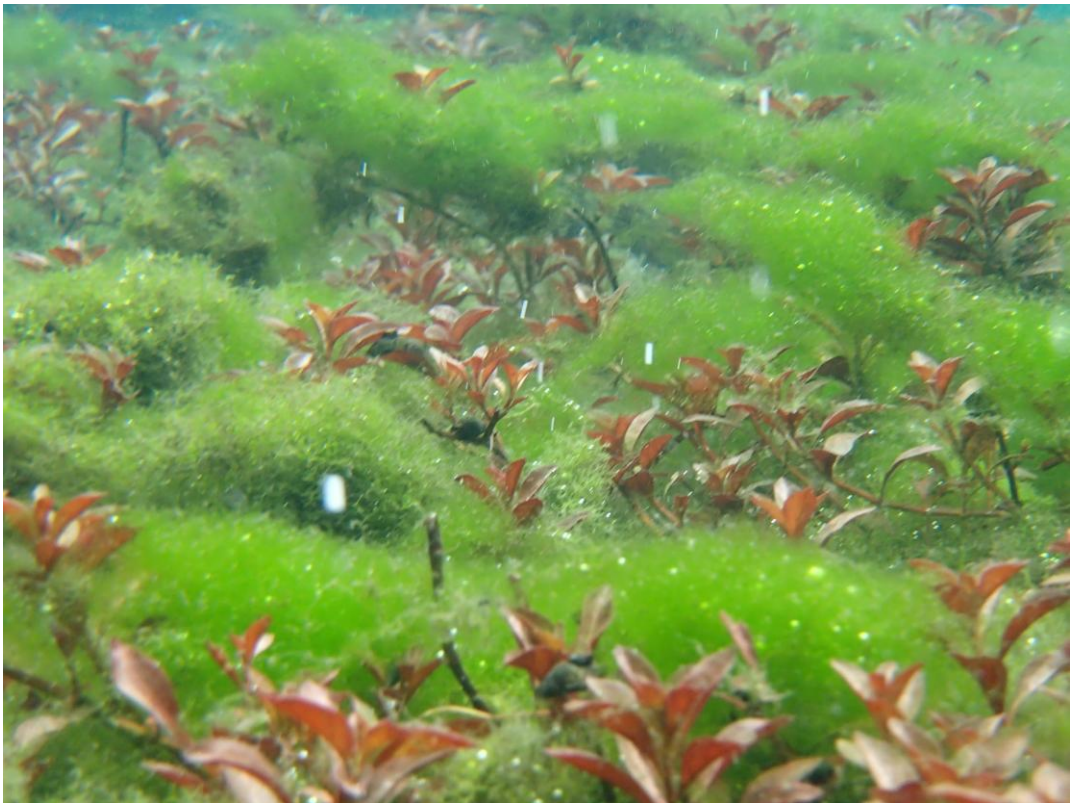

Figure 8: Algae growing on restored *Ludwigia* in Landa Lake.

Figure 9: Floating vegetation mats in Landa Lake.

Figure 10: Thick *Cabomba* in the New Channel interspersed with open areas along far bank.

Relative to last week's memo, endangered species habitat conditions in the Comal Springs/River have declined slightly. This is largely due to two observations. First, the increased photoperiod and hot summer temperatures combined with little springflow in the Upper Spring Run reach have resulted in algae beginning to dominate in this reach. Second, declining water levels over the last week have resulted in slightly more exposed surface habitat near Spring Island, thus slightly limiting surface habitat for endangered invertebrate species in the area. Despite these observations, 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.

To expand on the typical visual assessment, Figure 14 demonstrates presence/absence dipnet data collected since 2005, including this week's collection. Fountain darter dip net sampling conducted this week confirms that darters remain abundant throughout the system. In fact, 92% of sites sampled contained fountain darters. This is the highest value observed to date. Increases in this value during recent sample periods are likely influenced by the lack of recent scour events leading to an abundance of aquatic vegetation in all reaches. Additionally, restoration efforts have improved habitat conditions in some areas.

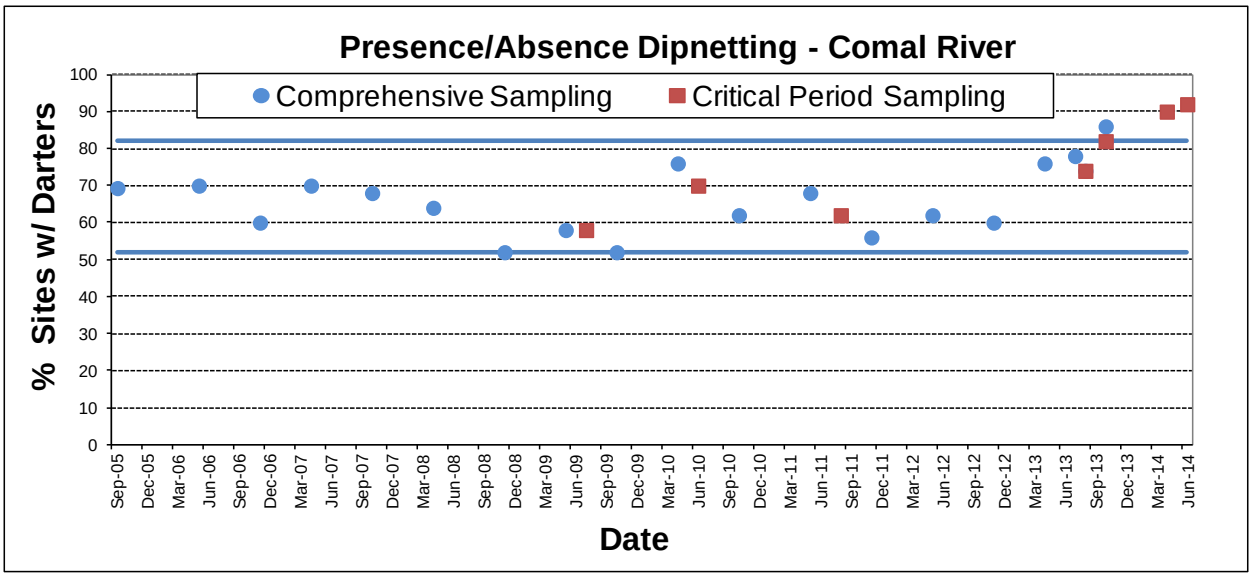

Figure 14: Percentage of sites (N=50) where fountain darters were present during stratified random presence/absence dipnetting. Solid blue lines mark 5th and 95th percentiles of Comprehensive Period data.

Please let me know if you have any questions. Have a great weekend!

Thanks,

Brad Littrell