TPWD Comments re: Long-Term Biological Goals for the EARIP draft HCP

May 6, 2011

TPWD staff has reviewed the initial draft "Edwards Aquifer Recovery Implementation Plan Habitat Conservation Plan" document dated February 2011 and offers the following comments addressing the proposed long-term biological goals for Texas wild-rice, fountain darter, Comal Springs riffle beetle, Comal Springs dyropid beetle and Peck's Cave amphipod. In summary, TPWD believes the proposed long-term biological goal for Texas wild-rice should be increased significantly to account for future restoration efforts in areas currently occupied by non-native vegetation. TPWD staff believes a combination of habitat-related goals is necessary to conserve the Comal Springs ecosystem and that some sort of density metric for fountain darters should be included as a long-term biological goal. TPWD staff supports the proposed long-term biological goals for the Comal Springs riffle beetle and believes semi-annual monitoring with cotton lures should be continued. While it would be difficult to formulate a meaningful density metric for the Comal Springs dryopid beetle since it is collected infrequently, the Peck's cave amphipod is captured in relatively large numbers and TPWD staff recommends incorporating some sort of metric related to their density as a long-term biological goal. Following are more detailed comments addressing the long-term biological goals for Texas wild-rice, fountain darter, Comal Springs riffle beetle, Comal Springs dyropid beetle and Peck's Cave amphipod.

Long-Term Biological Goals for Texas Wild-Rice

A long-term biological goal of 7000 m^2 for Texas wild-rice has been proposed by BIOWEST. At its February 28th, 2011 meeting the EARIP Steering Committee agreed to consider Jackie Poole's concerns regarding the 7000 m^2 goal for Texas wild-rice.

Subsequent to that meeting, Jackie Poole used relatively recent records (1976-2010) to determine that the total historic recorded maximum Texas wild-rice coverage by river segment was approximately 5400 m^2. Considering that much of the suitable habitat for Texas wild-rice in the San Marcos River in the recorded history was vegetated with non-native species, she used Thom Hardy's 2010 coverage of non-native species occupying suitable (habitat suitability greater than or equal to 0.45) Texas wild-rice habitat to calculate a total of over 26, 000 m^2 of habitat suitable for Texas wild-rice. Assuming that some of the suitable habitat should be restored to other native species, she reduced the total amount available for Texas wild-rice in a restored system by 50%, yielding approximately 13,000 m^2. The historic maximum Texas wild-rice coverage for each segment added to the suitable habitat potentially available gives an approximate total of 18,000 $m^{2.}$

In addition to the San Marcos River, Texas wild-rice has historically occurred in Spring Lake and a population of the plant has been reintroduced to the lake system. An estimate of the additional habitat available in Spring Lake is 1000 m^2. Adding the two totals, Jackie suggests using 19,000 m^2 as the long-term biological goal for Texas wild-rice after restoration efforts. Although additional work is needed to determine the post-invasive species composition of the river, this figure is probably close to the overall recovery goal.

It is also appropriate to consider interim goals to evaluate progress towards meeting the long term goal. If the HCP term is 15 years, there should be interim goals every five years. It is reasonable to assume that 4000-5000 m2 could be restored during each 5 year period resulting in a total of 15000 m2 by year 15. After all restoration is complete the system should be monitored for an additional 10-year period to ensure non-native species are under control and impacts from floods, droughts, and recreation are managed recreation.

The 7000 m^2 long-term biological goal proposed by BIO-WEST represents a 30% increase (1618 m^2) from the highest Texas wild-rice coverages from 1976 onward. However, 1618 m^2 represents only 6% of the potentially available suitable habitat. As a long-term goal, this seems to set the bar quite low and not contribute much to the recovery of the species

Long-Term Biological Goals for Comal Springs

Long-term biological goals for the Comal Springs ecosystem have been proposed (Chapter 7 of HCP). The HCP states that the USFWS believes the biological goals and objectives should be consistent with recovery of the species, but in a manner that is commensurate with the scope of the HCP.

Fountain Darter

Long-term biological goals for the fountain darter are quantified as aerial coverage of aquatic vegetation within four representative reaches in the Comal ecosystem. The proposed aerial coverages are presented below in meters squared.

Study Reach	**Bryophytes**	***Hygrophila***	***Ludwigia***	***Cabomba***	**Fil. Algae**	***Sagittaria***	***Vallisneria***
Upper Spring Run	1,850	650	150			600	
Landa Lake	4,000	250	900	500		1,250	13,500
Old Channel	150	200	1500		300		
New Channel	150	1,350		350			
TOTAL	6,150	2,450	2,550	850	300	1,850	13,500

The long-term biological goal is accompanied by two key objectives that will need to be achieved as follows:

- Water temperatures <25°C will be maintained throughout the Comal system as to not inhibit fountain darter reproduction and recruitment over time. This excludes infrequent (e.g., once per 10 years) extreme drought conditions.

- Active native vegetation restoration and protection will be implemented in Landa Lake and the Old Channel. Restoration activities will extend beyond the study reaches in proportion to level of effort expended and size of the study area in relation to the total area of Landa Lake or the Old Channel.

The current level of uncertainty associated with the long-term habitat-based biological goals and water quality and restoration objectives led to the proposal of a flow-related objective. The flow-related objective includes a long-term average discharge of 225 cfs and a minimum daily average discharge of 30 cfs (not to occur for more than 6 consecutive months and followed by an 80 cfs pulse for 3 months). The flow objective was proposed by EARIP consultants as a minimum flow regime that would meet long-term biological goals for the listed species assuming certain restoration and mitigation measures. It is important to note that this flow proposal differs from the flow criteria set forth by the EARIP Science Subcommittee which has the same long-term average flow of 225 cfs, but also includes a 6-month rolling average, and a 30 cfs minimum daily discharge for one month. However, the EARIP SSC flow criteria do not assume certain restoration and mitigation measures will occur.

TPWD staff believes a combination of habitat-related goals is necessary to conserve the Comal Springs ecosystem. The proposed goals related to water quality and quantity appear to be protective given the known thermal constraints of the fountain darter, modeling that has been conducted on various flow regimes, and restoration assumptions. Although some degree of uncertainty remains in regards to the details of a low-flow schedule, the success of restoration efforts, and the response of the Comal Springs ecosystem to the proposed low-flow criteria, TPWD staff believes the adaptive management process is intended to deal with these uncertainties.

TPWD staff has concerns in regards to the proposed long-term biological goal quantified as aerial coverage of aquatic vegetation within four representative reaches. The HCP proposes aerial coverage of aquatic vegetation as a quantitative long-term biological goal for the fountain darter in the Comal Springs ecosystem given the preference fountain darters display for aquatic vegetation, especially native vegetation. The proposed aerial coverage for the various types of vegetation are based on a combination of average measured coverage, maximum observed coverage, and certain restoration activities.

Of particular concern is the limit of the proposed coverages (and long-term biological goals) to the study reaches that have been monitored by BIO-WEST. While an additional proposed goal is to actively restore and protect native vegetation in Landa Lake and the Old Channel, the language used to describe such efforts (i.e. “restoration will extend beyond the study reaches in proportion to level of effort expended and size of the study area in relation to the total area of Landa Lake or Old Channel”) is vague and needs to be more precisely defined. This is troublesome for at least two reasons. First, a goal needs to be observable and measurable. Otherwise, it is difficult, if not impossible, to know if the goal has been achieved. It would be appropriate to approximate the aerial coverage of aquatic vegetation restoration in Landa Lake and the Old Channel to have a more well-defined goal. A quantified goal, applicable to the entire habitat areas represented by the study reaches, should be specified in Table 7-1 and Table 7-27. Second, from the proposed wording, it appears as though the long-term biological goals could be achieved without any restoration outside of the study reaches. TPWD staff recommends that the quantitative long-term biological goals include more accurate estimates of aerial coverage of aquatic vegetation that reflect the assumed restoration activities and Landa Lake and Old Channel ERPAs upon which low flows are contingent. Quantitative estimates should not be limited to the study reaches.

TPWD staff believes some sort of density metric for fountain darters should be included as a long-term biological goal. While TPWD staff recognizes that the focus of an HCP is on conserving habitat, some sort of estimate of fountain darter density or population size is needed to ensure efforts are benefitting the species and to help guide adaptive management.

It is also proposed that as part of the HCP long-term monitoring program, the representative reaches continue to be monitored semi-annually. To ensure the representative nature of each study reach in the Comal system, aquatic vegetation mapping of the entire system is proposed every five years. TPWD staff believes vegetation mapping should also occur in response to scouring flood events to inform adaptive management decisions in regards to native vegetation restoration efforts. The extent of mapping done in response to flood events should include the study reaches, but also include some sort of cursory system-wide evaluation to identify areas of concern.

Comal Springs Riffle Beetle

Long-term biological goals for the Comal Springs riffle beetle include habitat-based goals and a quantitative estimate of riffle beetle density. The proposed long-term biological goals have the following habitat-based goals:

- Aquifer water quality should not deviate more than 10 percent from historically recorded water quality conditions within the Edwards Aquifer as measured at the spring openings at Comal Springs. This includes all water quality constituents proposed for monitoring. This objective assumes that a 10 percent deviation would be acceptable. Clarification is needed as the whether the deviation should be assessed on an instantaneous basis or over some defined averaging period. In addition, more extensive work to evaluate and assess water quality tolerances of the Comal Springs riffle beetle is recommended.

- Active restoration of riparian habitat adjacent to spring openings (Spring Run 3 and western shoreline) will be implemented to limit sedimentation following rainfall events.

As with the fountain darter, a representative reach approach is proposed for the Comal Springs riffle beetle. The representative reaches include Spring Run 3, the western shoreline, and the Spring Island area. Long-term biological goals for the Comal Springs riffle beetle include maintaining a silt-free substrate within 2 meters of spring openings and upwellings, a density goal per cotton lure, and a recommended long-term average and minimum discharge of 225 cfs and 30 cfs, respectively (the same as proposed for the fountain darter). Semi-annual monitoring is also proposed at each of the three representative study reaches.

The quantitative portion of the long-term biological goals proposes the median number of riffle beetles per cotton lure (as calculated from historical data at the representative reaches) be used as a metric. Table 7-9 is incorrectly labeled as total number of beetles collected per lure when this data actually represents the total number of beetles captured per sampling event.

TPWD staff supports the proposed long-term biological goals for the Comal Springs riffle beetle and believes semi-annual monitoring with cotton lures should be continued.

Comal Springs Dryopid Beetle and Peck's Cave Amphipod

The Comal Springs dryopid beetle and Peck's cave amphipod are subterranean species inhabiting the Comal system. Given their affinity for subterranean habitats, it is assumed that they do not require substantial surface discharge from springs to survive and that springflow of sufficient water quality that continually covers the spring orifice should prevent harm to the populations. Given the lack of knowledge on the life history requirements of these species, TPWD staff recommends future research (laboratory and in the field) on the habitat requirements of these species be performed to aid in assessing the effectiveness of the proposed long-term biological goals in protecting the species.

The long-term biological goal for these subterranean species focuses on aquifer water quality. The proposed water quality goal is to not exceed a 10 percent deviation from historically recorded water quality conditions within the Edwards Aquifer as measured at the spring openings at Comal Springs. In addition, the same long-term average (225 cfs) and minimum (30 cfs) springflows are proposed.

No quantitative metrics are proposed for either the Peck's cave amphipod or the Comal Springs dryopid beetle. Because there is so little known about the life history or habitat use of either species and it is unclear if the proposed habitat-based goals are sufficient to protect the species, it seems prudent to incorporate some sort of density metric or population estimate. Both species have been collected in drift net samples as part of semi-annual monitoring in the Comal Springs ecosystem since 2003. A review of this data shows that the Peck's cave amphipod is the most abundant listed species collected through this method of sampling and that the dryopid beetle is rarely collected. Recognizing the rarity with which the Comal Springs dryopid beetle is captured, formulating a quantitative metric that is meaningful is difficult. However, the Peck's cave amphipod is captured in relatively large numbers and TPWD staff recommends incorporating some sort of quantitative metric as a long-term biological goal.

Formulating a meaningful long-term biological goal for the Peck's Cave amphipod will require a continuation of the drift net sampling that occurs twice a year within the spring runs and at an upwelling along the western shoreline. TPWD staff recommends the continuation of drift net sampling in these areas for several reasons. First, the spring run habitats are the first areas to be impacted as springflows recede so they could be considered the part of critical habitat most at risk. Second, the spring runs compose a significant portion of the known range of the listed species so it is important to monitor the population in this "high risk" habitat. Third, the drift net sampling that has been performed over the last 8 years is the most extensive dataset we have on the Peck's cave amphipod so it is the only "baseline" we have. Finally, continued monitoring of the species abundance along with habitat conditions (water quality and quantity) may provide valuable information on habitat requirements and use of the species.

Assuming drift net sampling continues, TPWD staff proposes the following as a long-term biological goal for the Peck's Cave amphipod:

- Number of individuals collected from each habitat (Spring Run 1, Spring Run 3, Upwelling) over the long-term (10-15 years) should be within 10% of the median number collected from 2003-2010. Based on TPWD analysis of drift data, the median number of Peck's cave amphipods collected from each habitat between 2003 and 2010 is as follows:
  - Spring Run 1 – 17.5
  - Spring Run 3 – 26.5
  - Upwelling – 49.5

TPWD staff recognizes that for any given year, or perhaps for several years, the goal may not be reached given the variability with which the amphipod has been collected. However, because this is a long-term goal TPWD staff believes it is reasonable to expect the median of the long-term dataset to be near that produced by eight years of collection. If a short-term or annual goal is desired, TPWD staff recommends using the 10^{th} or 25^{th} percentile.