



May 12, 2014

Mr. Kevin Connally
United States Fish and Wildlife Service
Austin Ecological Services Field Office
10711 Burnet Road, Suite 200
Austin, Texas 78758

RE: VARIANCE REQUEST

Dear Mr. Connally:

Section M, 1b, of the Incidental Take Permit (ITP) for the Edwards Aquifer Habitat Conservation Plan (EAHCP) states: “The Permittees will suspend activities such as habitat restoration and riparian restoration that may result in disturbance of the (a) substrate, (b) water quality, (c) plants, and (d) animals or invertebrates of the Comal Springs, Landa Lake and the Comal River when Comal Springflows decline to 130 cfs or lower.” Likewise, Section M, 2b of the ITP for the EAHCP states: “The Permittees will suspend activities such as habitat restoration and riparian restoration that may result in disturbance of the (a) substrate, (b) water quality, (c) plants, and (d) animals or invertebrates of the San Marcos Springs, Spring Lake, and the San Marcos River when San Marcos Springflows decline to 120 cfs or lower.”

As of May 2, 2014, the springflows in the Comal and San Marcos spring systems were 130 cfs and 110 cfs, respectively. Since the conditions in Section M, 1b & 2b were met, as of May 2, 2014, all EAHCP applied research being conducted in the two systems was halted. This memo is to request a formal variance to continue three of the four applied research projects for the EAHCP that are scheduled to occur in both systems.

Background

Under similar flow conditions in both systems in 2013, the Implementing Committee convened a group of resident experts and contractors (January 2013 and September 2013) specifically to address the question of which activities permitted under the EAHCP might need to be suspended under drought conditions and at what flow rates any activity would be stopped. The unanimous consensus of the experts was that due to the nature of the work, the locations, small areas, and approved techniques for the EAHCP projects, the activities in the San Marcos system should be able to continue when spring flow rates are as low as ≈ 60 cfs, without significant impact to the species. These experts further determined that the activities in the Comal system should be based on field observations and the condition of the system at that time.

Variance Request to Continue Applied Research

Based on the limited impacts of the applied research projects to the systems, the necessity of the applied research to the EAHCP, and the timing of the development of the Ecological Model (EcoModel), the Edwards Aquifer Authority hereby requests a variance for three applied research

projects that have the possibility of *in-situ* sampling to allow them to continue as scheduled. These three applied research projects are described below. A fourth applied research project with more intensive *in-situ* sampling will remain on hold until the flow in the Comal system is once again >130 cfs.¹

The flow-triggered, species-specific component of the EAHCP's Biological Monitoring Program (BioMP) has been triggered by the current low flows. This monitoring is done by professional biologists and will continue until the flow exceeds trigger levels. In addition, during the *in-situ* portion of any applied research sampling, the conditions of the system will be observed by the professional biologists conducting the BioMP. EAHCP staff will rely on their professional judgment to determine if at any point their activities are placing undue or unusual stress on the substrates, water quality, plants, or animals in the system being sampled. In the event that EAHCP staff or the professional biologists performing the studies or BioMP determine that undue or unusual stress is being placed on the habitat or the species, the study will stop and will not resume until flows again reach ≤ 130 cfs for the Comal system, and/or ≤ 120 cfs for the San Marcos system.

Comal Springs System

1. "Effects of vegetation decay and water quality deterioration on fountain darter movement."

Every summer as ambient temperatures rise, the Upper Spring Run (USR) of the Comal River experiences an excessive filamentous green algae bloom. Although this bloom occurs every summer, it clearly is magnified during lower than average flow conditions. In a typical scenario, as summer temperatures rise, springflow decreases, water temperatures and sunlight intensity increase, the biomass of filamentous green algae explodes. The algae rapidly covers the aquatic vegetation within the USR reach. The first aquatic vegetation that is physically shaded and killed by the algal bloom is the resident bryophytes. Rooted macrophytes are more tolerant and persist for longer durations. The numbers of fountain darters in this area are known to decrease as the algal cover increases and the other aquatic vegetation dies and decays.

The fountain darter has been studied under normal conditions and it has been found to generally stay within a 50 meter range of suitable habitat. The movement of the fountain darter has not been studied under deteriorating habitat conditions. Therefore, it is unknown if the fountain darters are remaining and dying in the impaired habitat, or migrating from the area to more suitable habitat. This information is important to understanding the ecology of the fountain darter, its habitat, and in the development of the EcoModel.

The *in-situ* portion of this applied research investigates the effect of reduced springflow and subsequent habitat changes on fountain darter movement. Darters from the USR and

¹ "Estimate the Comal Springs riffle beetle population in Comal Springs/Landa Lake." Low flow conditions and the requisite, frequent sampling requirements at the springs increase the potential to place undue or unusual stress on the substrates, water quality, plants or animals in the system. In addition, under those conditions this study may interfere with the BioMP, specifically the EAHCP species specific triggered monitoring.

Blieder's Creek (BC) areas will be captured and cohort marked according to area of initial capture using fluorescent VIE.

Based on the following facts, a variance to allow this applied research study to continue during low-flow conditions is requested.

- The work done for this study will not interfere with the biological monitoring or the EAHCP species specific triggered sampling being conducted in accordance with the BioMP.
- The conditions best suited for this study occur during low flow conditions.
- Given current discharge conditions, springflow in this area is expected to decline throughout the summer months likely resulting in substantial changes to available habitat for fountain darters. Therefore, low-flows present the optimum conditions to collect real-time data.
- The Upper Spring Run experiences an extreme algal bloom and submerged aquatic plant die off every summer, even when flows exceed 130 cfs. Therefore, this study's *in-situ* activities in the USR and BC will not cause additional negative impacts to habitat during low-flow conditions as the habitat is already deteriorated. The fountain darter population of the USR will either move or die, regardless of the proposed study. Without the study, their movements will remain unknown.
- Monitoring movement of marked darters during this time period will allow for assessment of changes in habitat use under stressed low-flow conditions, and allow for determination of emigration from the area. EAHCP species-specific sampling for the fountain darter in the URS requires aquatic vegetation mapping and dip-net sampling every other month from ≤ 150 cfs or ≥ 80 cfs.
- The vegetation mapping requirement increases to monthly at ≤ 60 cfs and the dip-netting to weekly at ≤ 60 cfs.
- If EAHCP staff or the professional biologist contractors determine that continuing the applied research during the reduced flows is placing new or unusual stress on the fountain darters or their habitat, this applied research project will be put on hold until the Service is consulted
- This applied research will stop if any undue or unusual stress on the system related to this project is found.

San Marcos Springs system

The following two applied research projects have a field component for the San Marcos Springs system:

1. "Effects of low-flow on fountain darter fecundity."

Fecundity is important to long term survival of any species. It is unclear at this point what effect low flows may have on fountain darter fecundity. This study is intended to establish fountain darter reproductive success or limitations based on low flow conditions such as, habitat availability and type, water quality conditions, darter density, food availability, and other factors.

The objectives of the study are to quantify elements of fountain darter reproduction among available flow gradients ranging from low flow (10 to 30 cfs; Upper Spring Run, Landa Lake), moderate flow (50 to 60 cfs; Old Channel-Comal River, and 80 to 100 cfs; new channel-Comal River), and high flow (100 to 120 cfs; San Marcos River) conditions, as

well as among physical habitat types and substrates (open substrates, low-growing and tall-growing aquatic vegetation). The study should yield information regarding the reproductive readiness of fountain darters among base flows ranging from 10 to 120 cfs, and among substrates ranging in vertical depth from short (gravel and cobbles, no vegetation) to tall-growing vegetation.

The *in-situ* portion of this study requires monthly sampling of fountain darters (started February 2014) and will continue through September 2014. Up to 60 female fountain darters will be collected and euthanized for study each sampling trip. The data is necessary for better understanding the ecology of the fountain darter during low-flow conditions. In addition, it is necessary to the development of the EcoModel.

Based on the following facts, a variance to allow this applied research study to continue during low-flow conditions is requested.

- The work done for this study will not interfere with the biological monitoring or the EAHCP species specific triggered sampling being conducted in accordance with the BioMP.
- The conditions best suited for this study occur during low flow conditions.
- This study requires the continued monthly collection of up to 60 female fountain darters by professional biologists. The professional biologists will report their monthly observations on the condition of the habitat, the general abundance of fountain darters, the effort required to collect the 60 female darters, and the overall condition of the darters to the EAHCP staff.
- If EAHCP staff or the professional biologists determine that the monthly collections are causing undue or unusual harm to the habitat or the fountain darter population, collections will cease and the applied research project will be put on hold until the flow in the Comal system is ≤ 130 cfs (for collections in the Comal system), and/or the flow in the San Marcos system is ≤ 120 cfs (for collections in the San Marcos system).

2. “Effects of predation on fountain darter population size at various flow rates.”

Mechanisms for measuring decreases in the relative abundances and densities of spring-associated fishes, such as fountain darters, are speculative. It is likely that these decreases are attributable to a number of factors, including spring-associated fish physiology, habitat shifts, and increases in predation and competition from riverine fishes moving into the spring systems.

At present, predation pressures along a gradient of low to high flows are largely unknown for the fountain darter in the Comal and San Marcos rivers. It is assumed that varying springflow rates may have an effect on predation of fountain darters, possibly as a result of increased fountain darter density (clumping) or other response to habitat conditions caused by springflows.

This study evaluates the interaction of predator and prey (fountain darter) as a result of varying springflows and habitat availability to better quantify the occurrence of clumping and the net effect of springflow to the fountain darter population size. It will

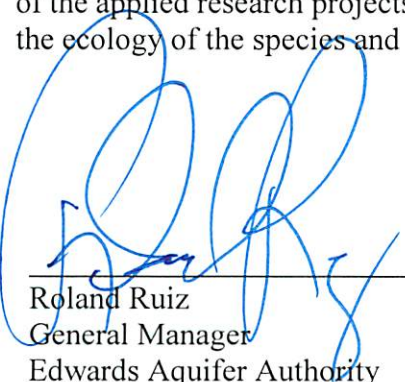
increase the knowledge of the ecology of the fountain darter and it benefits the EcoModel by testing fountain darter predator avoidance with respect to vegetation. Findings of this study will establish the basis for assessing how changes in flow may affect predation of the fountain darter. In addition, the results may be used to validate the importance of vegetation in the EcoModel.

Based on the following facts, a variance to allow this applied research study to continue during low-flow conditions is requested.

- The work done for this study will not interfere with the biological monitoring or the EAHCP species-specific triggered sampling being conducted in accordance with the BioMP.
- The conditions best suited for this study occur during low flow conditions.
- Fountain darters, crayfish and larger predator fish may be collected from the wild by professional biologists to use in the predation studies. These organisms will not need an artificial conditioning period to acclimate them to current conditions and therefore, will help reduce data variability.
- When collecting specimens for the study, the professional biologists will use their best judgment to select the best, most resilient habitat with the greatest number of specimens.
- The professional biologists will observe the condition of the habitat and the specimens collected, reporting their condition to the EAHCP Staff.
- If EAHCP staff or the professional biologists determine that the collections are causing undue or unusual harm to the habitat or the fountain darter population, collections will cease and the applied research project will be put on hold until the flow in the Comal system is ≤ 130 cfs (for collections in the Comal system), and/or the flow in the San Marcos system is ≤ 120 cfs (for collections in the San Marcos system).

Conclusion

The EAA is seeking a variance from Section M (1b & 2b) to allow three of the current applied research projects to continue based on professional biological opinion after consideration of the current conditions in the Comal and San Marcos aquatic ecosystems, a review of the *in-situ* portion of the applied research projects and the importance of the applied research to the understanding of the ecology of the species and the EcoModel.



Roland Ruiz
General Manager
Edwards Aquifer Authority

5-12-14

Date