Section 6 (Texas Traditional) Report Review

Attachment to letter dated APR 2 8 2008

TPWD signature date on report 29 Nov 2007

Project Title: Habitat Renovation/Enhancement at Phantom Lake Spring, Jeff Davis Co.

Final or Interim Report? Final

Grant #: E-53

Reviewer Station: Austin ESFO

Lead station was contacted and concurs with the following comments:
☐ Yes ☐ No ☒ Not applicable (reviewer is from lead station)

Interim Report (check one):

☐ is acceptable as is

☐ is acceptable as is, but comments below need to be addressed in the next report

☐ needs revision (see comments below)

Final Report (check one):

☒ is acceptable as is

☐ is acceptable, but needs minor revision (see comments below)

☐ needs major revision (see comments below)

Comments:

FINAL REPORT

As Required by

THE ENDANGERED SPECIES PROGRAM

TEXAS

Grant No. E - 53

Endangered and Threatened Species Conservation

Habitat Renovation/Enhancement at Phantom Lake Spring, Jeff Davis County

Prepared by:

John Karges

Robert Cook
Executive Director

Mike Berger
Division Director, Wildlife

November 29, 2007

FINAL REPORT

STATE: Texas **GRANT NUMBER:** E - 53

PROJECT TITLE: Habitat Renovation/Enhancement at Phantom Lake Spring, Jeff Davis County

REPORTING PERIOD: 1 September 2004 to 31 October 2007

OBJECTIVE(S):

Construction of a new pumping system to enhance aquatic habitat at Phantom Lake Spring to prevent extirpation of five species at risk.

Segment Objectives:

1. Establish a contract with a private engineering firm to oversee and manage all construction actions for the Project;
2. Host a preconstruction meeting with the contractor and all Project partners;
3. Construct the proposed habitat enhancement features;

Summary Of Progress:

See Attachment A (electronic file in .pdf)

Significant Deviations:

None.

Location: Phantom Lake Spring, Jeff Davis County, Texas.

Cost: _____

Prepared by: Craig Farquhar **Date:** November 29, 2007

Approved by: _____ **Date:** 29 Nov 07
C. Craig Farquhar

Section 6 Grant E-53 Final Report
TPWD Contract Number 173071
Habitat Renovation/Enhancement at Phantom Lake Spring,
Jeff Davis County

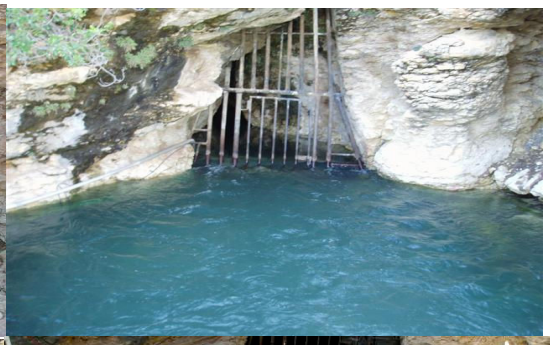
Restoration project partnership of
U. S. Fish and Wildlife Service (USFWS)
U. S. Bureau of Reclamation (BOR)
Texas Parks and Wildlife Department (TPWD)
The Nature Conservancy (TNC)
Aspen Environmental, Inc., Austin, TX

Reported 28 September 2007 by
The Nature Conservancy

Representing The Nature Conservancy as Principal Investigator
Project Manager and Contact Person: John Karges
Phone: (432) 426-2390, ext. 3 email: jkarges@tnc.org

June 2002

October 2004



May 2006

September 2007

Executive Summary

The restoration and habitat enhancement of Phantom Spring has been a multi-year project involving multiple partners and several agency funding processes. The basic premise has been to insure the delivery of aquifer water from within the cave to re-establish some volume of the historic outflow or discharge, thereby sustaining the imperiled and endemic aquatic biota of the cave mouth pool, including the federally endangered Comanche Springs Pupfish (*Cyprinodon elegans*), Pecos Gambusia (*Gambusia nobilis*) and a small suite of aquatic invertebrates (snails and amphipods).

The ~17-acre site is owned and managed by the U.S. Bureau of Reclamation (BOR) and because of the federally-listed species and other species at risk, the U.S. Fish and Wildlife Service (FWS) responds to additional conservation and monitoring aspects concerning the aquatic species. The FWS rendered a Biological Opinion on Construction of a Dam and Pumping System at Phantom Lake Spring (Consultation No. 2-15-04F-0284) that defined the ecological context, situation for the present project and was on-site or in communication throughout the implementation phase.

Since May 2001, an electrical pump installed within the pool inside the cave has provided discharge water to the cave mouth pool and immediate downstream area to sustain the fish and invertebrates. Additional protective measures included installation of a sand-bag backflow dam at the cave mouth gate to reduce the likelihood of declining aquifer height within the cave from redrawing water volume back into the underground reservoir as a result of differential gradients between the water level elevations. Such a decline is perceived as an imperilment to the fragile cave mouth animals. Figure 1 depicts the general configuration and situation of the local site.

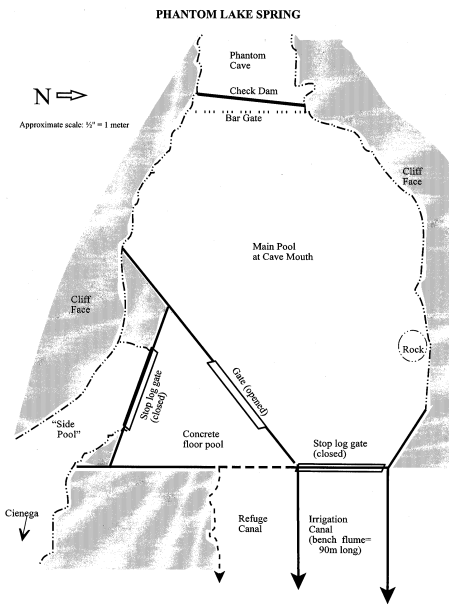


Fig. 1a

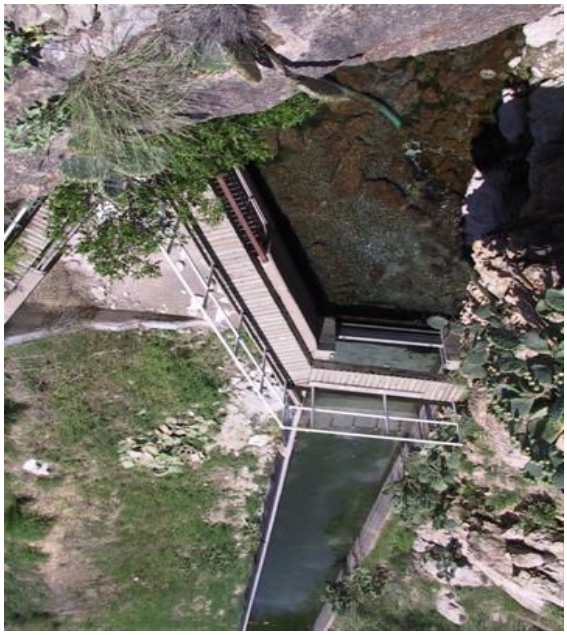


Fig. 1b – inverted to match to Fig. 1a

Figure 1a depicts the site configuration and context; figure 1b is a down-on view of the configuration from above the cave mouth looking downstream in outflow direction.

The FWS and Texas Parks and Wildlife Department (TPWD) funded an engineering analysis for improving the pumping system to Mitch Young, then with Kleinfelder, an engineering consulting firm from Austin. The initial engineering and design of the remedial pumping and improved water management infrastructure was drafted in conjunction with Texas Parks and Wildlife Department Infrastructure Division in final schematic drafts produced in March 2004.

Concurrently, BOR acquired some of the direct purchase items to be included in the project plans (including the replacement pumps, back-up generator, and stop-log frame) for installation into the enhanced system. BOR also committed staff oversight and participation in the construction and completion of the project (Austin Ecological Services Field Office briefing statement, April, 2004).

In April 2004, FWS requested that The Nature Conservancy (TNC) assume administrative oversight of the Federal Section 6 grant monies allocated to the project including subcontracting and coordination with all concerned entities. The Conservancy then scheduled and participated in coordination meetings between the principals including FWS, BOR, TPWD (Balmorhea State Park staff who has had some on-site response at Phantom Spring and who agreed to store accumulating materials and supplies for the project), Mitch Young (who had left Kleinfelder and formed his own company, Aspen Environmental Inc.{Aspen}) and TNC. Preconstruction meetings were held in March and July 2005 and high spring flows throughout 2004-2005 precluded any construction progress (November 2005 Interim Project Report).

In summer, 2006, Bureau of Reclamation installed a concrete slab for the generator at the designated location approximately 100 m downstream from the cave mouth. The generator and propane tank are on site but not connected. Additionally, the protective container building for the electronic controls (panels, switches and wiring) was positioned on-site for all control installations, connections and some storage capacity.

Access to Phantom Springs by TNC, Mitch Young and his subcontractors was granted in Bureau of Reclamation Permit ALB-422 LND-6.00 titled *Balmorhea Project – Permit to use United States Property at Phantom Lake Spring, Jeff Davis County, Texas* issued and received on July 14, 2006, and a revised Memorandum of Agreement between TPWD and TNC was executed in February of 2007 with a completion date of all contractual actions to end in October of 2007.

Work commenced in earnest in June 2007 with site preparations and July with the installation of the new stop-log water containment wall just outside the cave mouth's gate. Concurrently, in a totally serendipitous circumstance, the existing pump failed completely around July 10^{th}-12^{th} and one of the replacement pumps was needed and used to replace it, keeping the crucial water volume flowing.

The U. S. Fish and Wildlife Service's representative Nathan Allan, who has been involved with the project since its inception and design phases, was present through the initial on-the-ground action and instrumental in overseeing certain environmental safeguards and precautions to minimize ecological damage during the process. Additionally, West Texas FWS representative Aimee Roberson attended the installation of the fish barrier netting and was available for oversight or counsel as needed.

In the meantime, property owner BOR attended to various aspects of the electrical power source(s) connections and securing the pumps within the cave for operation, along with BOR contracted cave diver, Bill Tucker. Tucker and BOR's Gary Dean made several late-summer visits to the site to deliver supplies and begin making power connections in August. It is important to note here that BOR has taken responsibility for finalizing all power connections to make the system functional and effective. This responsibility in fact, supplants some of the contractual obligations between TNC and Aspen, which will be detailed further below, but also results in considerable cost savings to the existing Section 6 funding through TPWD to TNC and its subcontractor and the construction companies he has enlisted.

Finally, Aspen Environmental Inc. completed the earthen berm works in early September through a construction subcontractor to truncate the refugium pool from its original length as called for by the consented engineering document to USFWS and TPWD. This action completes the funded portion that can and will be accomplished by Aspen under subcontract with TNC through the present Section 6 award, with the final connections and installations to be completed by BOR.

Summary of Actions

Obligation 1a (contract with a private engineering firm to oversee and manage all construction actions): In March 2007, TNC entered into an contractual agreement with Aspen Environmental Inc. for the construction phases of the restoration of Phantom Spring/Cave and the outflow discharge into the cave mouth pool with water management and control structures. The contract was let for the competitive bid of $19,500, below the initial cost projections of $21,000 proposed during the initial Phase I engineering analysis, done prior to the current Section 6 contract (Memorandum of Agreement between Texas Parks and Wildlife Department and The Nature Conservancy). This contract provided Aspen with permission to solicit, enlist and pay construction contractors to implement the two primary on-site construction actions of: a) the water containment structure with a prefabricated stop-log frame and b) to shorten the pre-existing refugium pool with a newly constructed reinforced berm immediately below the cave mouth pool as per the Phase I engineering plan designed under FWS supervision and to complete all power connections and installations to operational function (see additional details below). The construction of the water management gate just outside of the cave gate was implemented in July, with some ecological concerns about lime-sediment loading and site disturbance in the cave mouth pool (see below).

Additionally, as many pupfish and Pecos gambusia as possible were captured during this process and relocated into the "de facto" refuge of unimpaired waters in the cement lined agricultural canal. Suspended sediments persisted for only a short while with all the activity involving constructing forms and pouring the concrete around the prefabricated stop-log frame. These soon settled to the bottom coating vegetation, rocks and other substrate with a fine particulate coating. Fish were stressed during this process and some mortalities of all three native fish species did occur, but many individuals of both endangered species were translocated downstream where substantial numbers of both species persist for repopulating the cave mouth pool following all construction and installation disturbances.

Obligation 1b (host preconstruction meetings): Several meetings were held throughout 2005 to the present with several of the principals present on-site to discuss and review plans, details and process, including those involving BOR to secure the necessary access permit for TNC and its subcontractors, which was received as signed on July 14, 2006.

Obligation 1c (habitat construction/implementation): The first two actions were by BOR tied into the project as part of the Bureau's commitment to the pump restoration and water management project. The Bureau had been accumulating necessary materials specified by the engineering analysis, and storing them at Balmorhea State Park. In the summer of 2006, BOR prepared the designated site outside of the cave mouth for the infrastructure and delivered and positioned the generator, the propane tank and modular cargo shed (Fig. 2).

Figure 2 – 2006 Power equipment installations

The next on-site action was initiated by BOR proactively in May-June 2007, to deliver additional plumbing and electrical hardware in advance and to install netting across the irrigation canal (Fig. 3a), to isolate pupfish for ease of capture and relocation back into the cave mouth pool following all of the construction and power installation actions of this project.

Work was to commence on the subcontracted components of the project but high water discharges in May-June (Fig. 3B) precluded any installation of structures at the cave mouth, which was actually good for the rare elements but another delay to construction and other actions. Young, Karges, and a construction subcontractor met on site in late May to detail the final proposed construction aspects. The cave mouth pool volume was so high it precluded draining in preparation for constructing the forms and installing the new concrete stop-log gate.

Fig. 3a – BOR netting

Fig. 3b – High water on 14 June 2007

Work began in earnest in mid-July, fortunately just after the 12 July discovery that the existing pump had completely failed (Fig. 4a).The failure could have been ecologically catastrophic had the discovery timing not been so coincidental with the project team's on-site attention and attendance. Because BOR had delivered the replacement pumps and some wiring and plumbing supplies on-site, TNC was able to install a "survival" pump and aerated pipe discharge system to sustain water discharge into the cave mouth pool (Fig. 4b) and into the irrigation canal with the bulk of the pupfish population, which has persisted throughout the construction phases.

Fig. 4a - 12 July – discovery of pump failure

Fig. 4b – 13 July – installed survival system

Fig. 5a – installing concrete forms

Fig. 5b –installed stop-log gate

Installation of the concrete forms and pouring of the concrete for the stop-log gate at the cave mouth, just outside the gate, occurred during the week of 16-19 July under the supervision and oversight of Aspen (Mitch Young) and TNC (Karges), figures 5a&b and fig. 6.

A **B** **C**

Fig. 6 – time sequence of stop-log gate installation and cave mouth pool situation; A – 16 July, before construction; B – 19 July – sediment disturbance during construction, and C – 20 July – following construction, sediment deposition

In August and early September, BOR and their contract cave diver Bill Tucker worked on pump installations and some of the electrical connections and preparations in advance of all the final connections which will be installed by BOR as the responsible agency and landowner. This was committed as recorded per the following excerpted portions of an 18 September 2007 email from Gary Dean of the Bureau with a contracted electrician separate from and independent of this current Section 6 funded project:

…Bill and his crew are expected to be down there this weekend, completing installation of the pump system. He will connect them to the existing circuits, but Dave (electrician) and I will have to complete the electrical hookup later on in October.

In 2003 when we bought the Generator, a hookup and maintenance agreement came with the generator for a few years. As I understand it, that was in Mitch's contract for him to hook it up. When I became involved in purchasing the generator, the original generator specs were not adequate. The specs for the proposed generator were for a home unit and we were told that we must purchase a commercial unit or risk not having a warranty for the generator. Since we had purchased the generator with the hookup/maintenance agreement, I didn't see any need for Mitch to be responsible for hooking it up. Well, we didn't exactly get the generator in by 2003 and now both then hookup and maintenance agreement are voided. And since I had to have Dave to connect to our electrical source anyway, I just decided to hire him to do all of the hookup. Basically, I have relieved Mitch from having to hook it up. It seems to be pretty straight forward anyway.

The problem now is that we can not find the Generator Transfer Switch Box that talks to the generator and tells it when to come on when the power goes down. If we can find it, I may be able to make a trip down there before Oct 1. If we can't find it, I may have to order a new switch box. That's going to take a couple of weeks, after Oct 1st. I can not spend money till Oct 1. Hopefully, we can get the Park to look in on Phantom once a week just to make sure things are running smoothly. Bill will directly wire the pumps into the existing pump box and that should run the pumps as before. The one pump is running on that system now. … Gary Dean, US Bureau of Reclamation, 555 Broadway, Suite 100, Albuquerque, NM 87102

This will result in considerable cost savings to the grant.

The final on-site action as part of the obligation and implementation of the current project was the construction of the berm across the existing 'refugium" canal, as designed as additional pupfish habitat as part of the engineering design. This was completed under Aspen's supervision of a construction contractor (Figs. 7a&b).

Fig. 7a & b– construction of refugium canal berm

The entire pump restoration and water management project is very near completion, with the remaining power and plumbing connections to be completed under the direction and implementation by the Bureau of Reclamation. The BOR has enlisted an electrician and contracted with the cave diver to finalize the system. Upon power installation, connection and testing in the very near future, the entire project will accomplish the objectives and desired conservation efficacy envisioned at the outset.

Follow-through biological aspects will take two forms with the operation of the system. If the Comanche Springs pupfish have not migrated sufficiently from the irrigation canal back into the cave mouth pool on their own, a reasonable number will be captured and translocated under the direct actions of permitted USFWS and BOR personnel. Subsequent monitoring and assessment of three rare invertebrates will also be needed on a periodic basis, to ensure that they have maintained sufficient population levels and distribution in the recovering submerged vegetation in the cave mouth pool, through this restoration project that was done also for their conservation.