TEXAS PARKS & WILDLIFE

6/22/2007

FA-TEXAS

Joyce Johnson, Chief
Division of Federal Aid, Region II
U.S. Fish and Wildlife Service
P.O. Box 1306
Albuquerque, New Mexico 87103

Attention: Susan MacMullin

Joyce:

Enclosed is the annual performance report for **E-51-HP, *Barton Springs Edwards Aquifer Conservation District Habitat Conservation Plan***. Please contact me at (512) 389-4744, or by email at Timothy.Birdsong@tpwd.state.tx.us if you have any questions or concerns.

Regards,

Timothy W. Birdsong
Federal Aid Coordinator

TWB

4200 SMITH SCHOOL ROAD
AUSTIN, TEXAS 78744-3291
512.389.4800

www.tpwd.state.tx.us

Annual Performance Report

State of Texas

Traditional Endangered Species Grant E-51-HP

Barton Springs Edwards Aquifer Conservation District Habitat Conservation Plan

Prepared By: Kirk Holland

TEXAS PARKS & WILDLIFE

Robert Cook
Executive Director

Matt Wagner
Program Director, Wildlife Diversity

Mike Berger
Division Director, Wildlife

June 22, 2007

INTERIM PERFORMANCE REPORT

STATE: Texas **GRANT NUMBER:** E – 51H

GRANT TITLE: Barton Springs Edwards Aquifer Conservation District Habitat Conservation Plan

REPORTING PERIOD: 1 Mar 2006 to 31 May 2007

OBJECTIVE(S): To prepare draft Habitat Conservation Plan (HCP) and draft preliminary Environmental Impact Study (EIS) documents within 3 years characterizing the impacts of groundwater pumping on the species and identifying potential structural and non-structural Best Management Practices (BMPs) to minimize and mitigate for those impacts, including incidental take as a result of permitted pumpage.

Segment Objectives:

1. Finalize draft HCP and NEPA documents
2. Continue collecting data and biological monitoring and finalize the biological impact assessment
3. Finalize sustained yield data and run groundwater model with certified results
4. Finalize determination of species and habitat needs related to water quantity
5. Finalize District conservation and drought management plans
6. Conduct aquifer tests in injection/extraction well for ASR
7. Final Report (due no later than 28 April 2007).

SUMMARY OF PROGRESS: See Attachment A.

SIGNIFICANT DEVIATIONS:

See Attachment B. Barton Springs Edwards Aquifer Conservation District (BSEACD) unable to complete tasks for final report for reasons described in Attachment B, for which a four-month grant extension was requested and received. BSEACD has promised to ensure all deliverables will be completed and submitted on or before amended deadline of 31 August 2007.

LOCATION: Travis and Hays Counties, Texas

COST: Costs will be reported in the annual financial status report.

PREPARED BY: Craig Farquhar **DATE:** 13 June 2007

APPROVED BY: _____ **DATE:** 6/22/07

Timothy W. Birdsong
Federal Assistance Coordinator

ATTACHMENT A

May 25, 2007

Mr. C. Craig Farquhar
Section 6 Coordinator,
Wildlife Diversity Program
Texas Parks & Wildlife Department
3000 S. IH-35, Ste. 100
Austin, TX 78704

Subject: **Year Three Interim Report,** Draft Regional Habitat Conservation Plan & Preliminary Draft Environmental Impact Study, by Barton Springs/Edwards Aquifer Conservation District under TPWD Contract No. 136581

Dear Mr. Farquhar:

In accordance with your directions accompanying the approval of a time extension for the subject grant contract, the Barton Springs/Edwards Aquifer Conservation District herein provides its Year Three Interim Report to the Texas Parks & Wildlife Department. This report includes:

- Summary of Progress and Significant Deviations Statement, and
- Financial Performance Summary.

Reporting "Year Three" encompasses the period from April 1, 2006, through March 31, 2007. However, as with the preceding year, some progress and/or ongoing activities reported herein reflect work that occurred in the following months, here March-April 2007, for the sake of currency, completeness, and accuracy.

Please contact me if you have any questions or comments.

Sincerely,

W. F. (Kirk) Holland
General Manager and Project Manager for Lead Agency,
Barton Springs/Edwards Aquifer Conservation District

SUMMARY OF PROGRESS AND SIGNIFICANT DEVIATIONS STATEMENT
YEAR THREE (MARCH/APRIL 2006 – MARCH/APRIL 2007)

Barton Springs/Edwards Aquifer Conservation District
TPWD Contract No. 136581

Each of the Year Three program elements is characterized in this report in summary fashion, identifying progress made and any significant deviations from anticipated tasks encountered. Year Three elements as originally planned largely involved documentation of final results, but in practice also included a continuation of some of the investigative elements described the Year Two Interim Progress Report.

The HCP Project Team (the "HCP Team" or "Team") that was successfully deployed in Years One and Two has continued in the same roles throughout Year Three. This team comprises the District staff, led by General Manager W F (Kirk) Holland; Dr. Kent Butler, who serves as Project Coordinator; Mr. Roy Frye, Project Manager for the project's lead environmental contractor, Hicks & Company, along with Hicks staff members and the staff of its subcontractors, which include LBG-Guyton Associates, Inc., Bio-West, Inc., and Recon Environmental, Inc; and *ex-officio*, the District's Board of Directors. In addition to these resources, the Team contracted for research during Year Three on salamander ecology with the Integrative Biology section of the University of Texas. Mr. Kirk Holland, the District's General Manager, continues to serve as the District's Project Representative and has overall responsibility and accountability of the HCP grant project to both the District's Board and the TPWD. Operationally, Mr. Holland and Dr. Butler have continued as Co-Project Managers in Year Three, with Mr. Holland's being responsible for both administrative reporting and project management of activities involving District Staff, and Dr. Butler's being responsible for overall project management of activities involving contractors and coordination of stakeholder groups.

The rest of this section is organized according to the program elements for Year Three enumerated in the grant agreement, plus several additional elements continuing from Year Two.

A. Enumerated Program Elements in Memorandum of Understanding

There were seven program elements originally identified for Year Three in the MOU.

1. Finalize draft HCP and accompanying NEPA documents.

- **Progress Summary**

  At the end of Year Three, all chapters of the Draft HCP and the PDEIS existed in complete form as at least early drafts; most are in final review by the Team. The critical path element in both the assessment and the documentation has been

defining the final set of measures that will be included in the District's Preferred Alternative, which has incorporated certain elements of two different alternatives that were carried through the environmental and biological impact assessments. Some renumbering of measures and edits for correcting references to the measures was required. The Team made a special effort to incorporate the findings and conclusions of the *in vitro* laboratory studies of salamander toxicity, and their implications for behavior in the wild, in the biological impact assessment in an appropriate fashion. The CAC and BAT have been utilized heavily to review and comment on most of the information that is being included in the documents as it was being developed, and while there is not unanimity among all members of either advisory group, the Team anticipates that on balance the HCP will be accepted and the NEPA documentation supported by these stakeholders. The District's Board has also been involved in reviewing some of the key information being included in the documents, and while final approval of the draft documentation by the Board has not yet been sought, no difficulties in receiving such approval is likely.

- **Significant Deviations**

No significant deviations exist for this Year Three program element, beyond the schedule delays (associated with work in Program Element 3) that necessitated the no-cost time extension. One additional cycle of CAC and BAT review and response will be attempted, but experience suggests not all members of those advisory bodies will be able to participate in a timely fashion, if the new project schedule is to be maintained.

2. Continue collecting data and biological monitoring, and finalize the biological assessment.

- **Progress Summary**

As reported in the both of the earlier Interim Reports, the Team concluded after careful review that no additional biological monitoring was required for assessing baseline conditions. The ongoing biological investigations and the habitat and salamander population enhancement efforts of the City of Austin form an adequate basis for determining salamander population size and dynamics for impact assessment, at least within the context and time frame available for developing the HCP.

The HCP Team was supplemented in Year Three by contracting with The University of Texas's Department of Integrative Biology, with Dr. Art Woods and Dr. Mary Poteet as Co-Principal Investigators. These highly qualified scientists designed and executed a laboratory toxicity testing program to examine in a rigorous fashion the effects of changes in the dissolved oxygen levels and increased salinity in the habitat of the Barton Springs salamander. Their

experimental study program looked at behavioral and mortality aspects of such habitat changes on life stages of the Barton Springs salamander, *Eurycea sosorum*, using a closely related surrogate species selected for more intensive testing, *Eurycea nana*. That work is now complete and a final project report provided, although scientific papers reporting its methods, results, and conclusions are still in preparation and not yet submitted for peer review (beyond the BAT, which constitutes a rather impressive peer community itself).

The BAT suggested in Year Three, as it began reviewing the findings of the experimental study and its incorporation into other HCP efforts, that a true biological risk assessment, in a strict sense, was not possible or even required for the HCP. Rather, a biological impact assessment was indicated. The HCP Team took a two-pronged approach to this type assessment, in order to carry out some elements of the impact assessment before the laboratory work was completed. A first-approximation approach, reviewed and refined both by the internal team and by the City of Austin and the BAT, was used for the initial round of impact assessments. This approach utilized a step-wise risk category approach that linked prospective spring flows under various Alternatives and critical flow periods to well-documented physical habitat changes (principally habitat reduction (wetted perimeter), dissolved oxygen, and salinity). Late in Year Three, the results of the Salamander Toxicity Studies conducted by UT Integrative Biology Department became available and were incorporated, fine-tuning the prior results with the continuous response functions for DO effects. While the laboratory studies established an LC_{50} value of 2.1 mg/l, the ability to transfer the laboratory impact assessment to field conditions at extremely low flows was restricted by the absence of low flow vs. DO relationships, which hindered extrapolation of effects in the extreme-drought flow regime.

The above notwithstanding, the Project Team considers this program element essentially complete, except for responding to comments from external reviewers.

- **Significant Deviations**

As reported in the Year Two Interim Report, the District's HCP Team has determined that additional biological monitoring of the Barton Springs complex beyond what is currently being performed and planned by City of Austin biologists is not cost-effective. Rather, resources were re-directed and incorporated the ongoing monitoring into the HCP as in-kind services. The laboratory-based salamander toxicity testing program, rather than the field investigations, represent the additional biological "data collection" activity sponsored by the HCP project in Year Three. Because one of the Principal Investigators relocated out of state and the other Principal Investigator was out of the country for the Summer 2006, there was a delay in the incorporation of the results of the laboratory study into the impact assessment and subsequent

finalization of the draft documentation. This created the need for an extension on the overall project schedule.

3. Finalize sustained yield data and run groundwater model with certified results.

- **Progress Summary**

This program element, as originally envisioned, is now complete. The HCP Team and the hydrogeological-oriented Technical Advisory Team are confident that the existing, calibrated (i.e., certified) groundwater model that the District is now using provides reliable estimates of groundwater conditions and resultant flows at Barton Springs over a sufficiently wide range of flow conditions to enable its use for HCP impact assessment purposes. This model will almost certainly be the one used by the Texas Water Development Board, under the auspices of a new State of Texas law applicable to groundwater management state-wide, to determine the amount of "managed available groundwater under desired future conditions" in the Barton Springs segment, which will incorporate the requirements of ecological flows, among other constraints.

During Year Three, District hydrogeologists worked with third parties to use the extensive data collected on aquifer conditions in the Barton Springs segment for modeling the aquifer to help assess the potential utility of a new type of groundwater model, the so-called Dual Conductivity Model, in the segment. This assessment is still ongoing, but for purposes of the HCP, we have concluded that the new model will not be significantly different in its outputs at the low flows of primary interest to the HCP than the existing model being used. Current work is focusing on determining where and to what degree current well users might be adversely affected by a return of drought of record conditions, rather than the amount of discharge at Barton Springs under such conditions.

- **Significant Deviations**

No significant new deviations exist for Year Three program elements.

4. Finalize determination of species and habitat needs related to water quantity.

- **Progress Summary**

This work element is substantially complete. In Year Three, the project team established, to the extent possible with available data and information, the relationship between various water quality and chemistry parameters to the overall flow regime for the Springs complex that existed at the time of collection. It was determined, as an outgrowth of the Salamander Toxicity studies, that

dissolved oxygen but not salinity was of paramount importance as the water chemistry control on habitat quality.

A critical assessment was made toward the end of Year Three as to what hydrological, hydrochemical, and biological uncertainties continue to exist for using these relationships in the HCP. While there are lots of data, some of which was generated through the ongoing HCP investigations, there are also a lot of unanswered questions that ultimately affect the salamander's ability, certainly for individuals but also possibly as a population, to survive during low-flow conditions. For example, the Project Team has postulated that during low spring discharge conditions, the salamanders move in the subsurface to groundwater pathways that have higher water velocity, and thus less stressful conditions, than at the spring outlets, consistent with the dramatic short-term reductions in the observable number of individuals. The inability to observe individuals during such times isn't necessarily a direct measure of take, even though without a doubt the salamander is more stressed at low flows. The HCP impact assessment, however, takes a fairly conservative view about such a situation and considers spring discharge as directly related to amount of take, even though the scale of such take is not able to be reliably related to discharge amount.

- **Significant Deviations**

No significant new deviations exist for this Year Three program element.

5. Finalize District conservation and drought management plans.

- **Progress Summary**

The primary tasks associated with this work element are essentially complete.

Quite serendipitously, during Year Three of the HCP the District experienced a rather severe Critical Stage Drought that required implementation of mandatory, stringent water use reductions by its permittees and its permittees' end users. This provided an opportunity for the District to gauge how well (or not) some of the existing and new rules performed in a real-life drought management situation. On the basis of that experience and incorporating certain measures that were being considered for the HCP, additional rule changes were introduced toward the end of Year Three. These included establishing an Extreme Drought and Emergency Measures Period, which is in reality an extension of the drought trigger methodology that was previously developed under the HCP, and an Extreme Drought Withdrawal Limitation as a "soft cap" on the Freshwater Edwards Aquifer during extreme drought.

In addition to Rules changes, some of the HCP measures that were being considered in the earlier version of the District's Preferred Alternative would have required changes in the District's statutory authority. In late Year Three, the Texas Legislature convened its biennial law-making session, and the District was able to develop, introduce, and support legislation that would enable some of the proposed HCP measures to be implemented. As of this writing, those legislative changes have not yet been made into law, but the District remains optimistic about being able to do more than it otherwise would with respect to drought management under the prospective HCP. If such new statutory authority is made available, the District will include additional or revised drought management provisions in the HCP, either in the initial plan if feasible, or as adaptive management measures in the future.

- **Significant Deviations**

No significant new deviations exist for this Year Three program element.

6. Conduct aquifer tests in injection/extraction well for Aquifer Storage and Recovery (ASR).

- **Progress Summary**

The efficacy of such an ASR well and other saline-zone production/monitoring wells have been carefully considered previously, by both the Team and the District's Technical Advisory Committee. As reported in both the Year One and in the Year Two Interim Reports, this work element has been eliminated, on the basis of insufficient information (unlikely to change as a result of and in the timeframe of the HCP project), and on the basis of compelling concerns about this technology's capital requirements, cost-effectiveness and implementation feasibility for the HCP. Accordingly, once again no progress was made or even attempted on this program element in Year Three.

- **Significant Deviations**

The District continues to believe that the saline zone is deserving of additional investigations, especially to evaluate in a general sense the efficacy of directly utilizing this resource, including treatment of saline water to drinking water quality and substitution of such treated water for water supplies currently provided by increasingly scarce, naturally occurring fresh water from the Edwards Aquifer. But as indicated in the Year One and Year Two Interim Reports, we believe the valuable HCP resources should be expended for purposes other than ASR-specific studies and demonstrations, so therefore this program element was effectively terminated. Its resources in part have been re-programmed to consider adaptive management strategies involving the saline zone that relieve current and future demands on fresh Edwards water, as reported below in Section B.1 .

7. Final Report (due no later than 28 April 2007)

- **Progress Summary**

This Year Three Interim Report was completed as a substitute for the Final Report identified here, at the direction of the Texas Parks & Wildlife Department, for review and consideration in May 2007. However, the activities reported in this Year Three Report reflect those activities that are currently taking place and will have taken place at the conclusion of the project, now scheduled for August 31, 2007.

- **Significant Deviations**

The four-month time extension necessitated this Year Three Interim Report, in lieu of the Final Report. No other, new significant deviations exist for this Year Three program element.

B. Continuing Progress from Precursor Work Elements and Tasks

1. Saline Zone Studies

To evaluate a possible adaptive management strategy, preliminary work begun in Year Two was completed in Year Three on evaluating some innovative geophysical survey techniques applicable to the saline zone characterization, sponsored by the USGS. One of the serious shortcomings of studying saline zone groundwater is that there is a paucity of wells and data. But there are a number of surface-geophysical methods that provide a relatively quick and inexpensive means to characterize subsurface geologic and hydrogeologic properties. The Team, represented by District staff members, participated in a pilot program with USGS to demonstrate the efficacy and issues associated with using Time-Domain Electromagnetic (TDEM) geophysical technology for characterizing different levels of salinity in the Edwards Saline Zone in the District. (TDEM surface geophysical methods can be used to detect changes in the electrical resistivity of the subsurface, which in turn can be related to changes in the physical and chemical properties of soil, rock, and pore fluids hundreds and even thousands of feet in the subsurface.) Previously collected borehole geophysical logs were used to calibrate the TDEM soundings, and several transects from the freshwater zone into the saline zone in Travis and Hays County were made. The combined interpretation of TDEM soundings and available geophysical logs affords greater confidence in TDEM estimates of formation conductivity and thickness in areas where wells do not exist or are not accessible.

In addition, the HCP Team gathered new emerging operational information on brackish groundwater desalination conducted elsewhere in Texas as to technologies, issues, and costs. The upshot of this program element is that desalination of Edwards Saline Zone groundwater should be further evaluated, with particular attention paid to addressing reject wastewater disposal efficacy and the potential interaction between fresh and saline groundwater possibly induced by large volumes of saline water withdrawal.

2. Stream Gaging

The District is continuing to cooperate with the US Geological Survey on operating a stream gaging station on Onion Creek, just below the Recharge Zone, that is important to evaluating the amount of recharge that is occurring from this largest source.

3. Water Quality Studies

The District is continuing to cooperate with the Texas Water Development Board and the City of Austin on groundwater chemistry and quality in the District, to better understand the relationships between flow regime and water chemistry.

4. Dye Trace Studies

The District and the City of Austin continue to collaborate on the dye tracing of groundwater flow paths to elucidate preferential flow paths, water velocities, and land areas that may be more sensitive to the introduction of pollutants from exogenous sources that could adversely impact quality at Barton Springs.

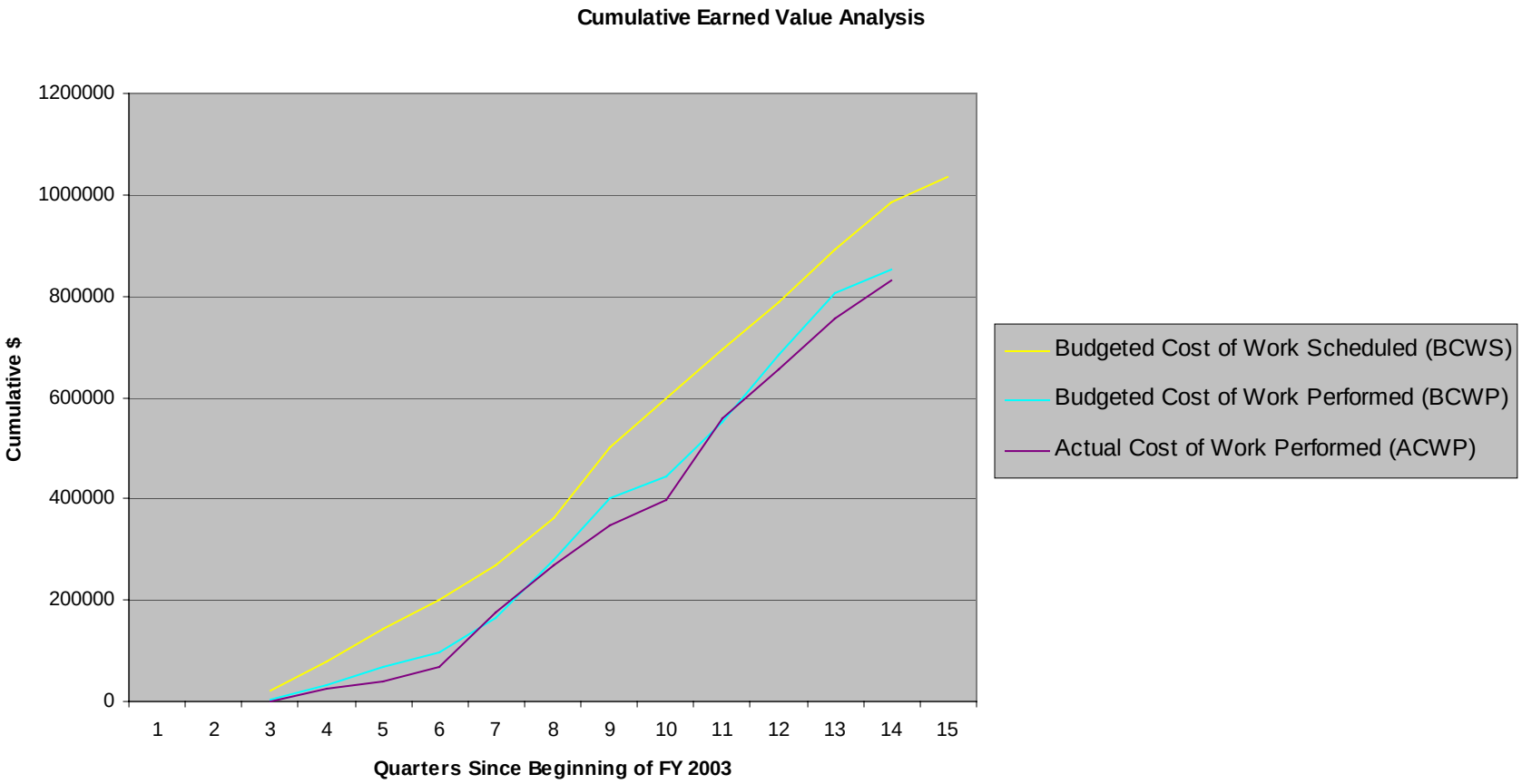
FINANCIAL PERFORMANCE AND STATUS
AT END OF YEAR THREE

Barton Springs/Edwards Aquifer Conservation District
TPWD Contract No. 136581

BSEACD-HCP Grant Financial Update*

Work Area	Project Budget TOTAL	Project Budget To Date	Actual Costs Incurred	Estimated Value To Date
Biological Studies	$185,000	$185,000	$138,872	$181,500
Hydrogeological Studies	$153,000	$145,500	$133,329	$148,340
Resource Policy and Planning	$138,000	$132,000	$156,816	$135,640
NEPA/HCP Documentation	$150,000	$135,000	$163,646	$141,000
Administration and Management	$165,500	$149,250	$229,299	$155,700
Supplies and Equipment	$0	$0	$8,591	$8,591
Unallocated In-Kind	$243,306	$239,000	$0	$89,056
Total	**$1,034,806**	**$985,750**	**$830,554**	**$859,827**

* through March 31, 2007 (End 2Q07)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800000
600000
400000
200000
0
Cumulative $
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2
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6
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14
15
Quarters Since Beginning of FY 2003
Budgeted Cost of Work Scheduled (BCWS)
Budgeted Cost of Work Performed (BCWP)
Actual Cost of Work Performed (ACWP)

ATTACHMENT B

Message From: Craig Farquhar
Sent: Tuesday, February 27, 2007 4:13 PM
To: 'Kirk Holland'
Subject: RE: Request to extend period of performance of the District's HCP Grant Project

Kirk, we have received the extension to the federal grant, now to expire on 31 Aug 2007. We are also preparing the state extension, which currently does not expire until 28 Apr 07, and will be amended to expire on 31 Aug 07. As soon as the extension of the state contract has been processed here and ready for signatures I'll let you know.

Craig

****

C. Craig Farquhar, Ph.D.
Avian Ecologist/Section 6 Program Coordinator
Wildlife Diversity Program
Texas Parks and Wildlife Department
4200 Smith School Road
Austin, Texas 78744
Off: (512) 389-4933
Fax: (512) 389-8043
Email: craig.farquhar@tpwd.state.tx.us
Website:. http://www.tpwd.state.tx.us/business/grants/

-----Original Message-----
From: Kirk Holland [mailto:kholland@bseacd.org]
Sent: Wednesday, February 21, 2007 12:38 PM
To: Craig Farquhar
Cc: Kirk Holland
Subject: Request to extend period of performance of the District's HCP Grant Project
Importance: High

Dear Craig,

Reference: TPWD Contract Number 136581

As we have discussed, circumstances have arisen during the course of the referenced grant project that prevent our ability to complete our grant project on its original schedule. We are seeking a no-cost time extension of four months. The following justification is provided for your use.

While some schedule buffer was built in to the original schedule, that buffer was consumed by a number of factors:

1.. A late project start, owing to contractual-execution and mobilization delays between: a) the District and TPWD, and more especially b) the District and its various contractors;

2.. More iterations than planned with the BAT and CAC, both as groups and subgroups, concerning Alternatives definitions and their physical effects that delayed the initiation of the impact/risk assessments; and

3.. More iterations with the BAT and CAC, both as groups and subgroups, concerning the biological risk assessment methodology to be employed that delayed the initiation of the risk assessment.

Even with these circumstances, we might have been able to meet the original project timeline if it weren't for one additional factor that was not able to be offset schedule-wise. In the original project schedule, a multi-faceted salamander toxicity study of long duration was not envisioned as being necessary. But after reviewing what was and wasn't known about this species, the BAT and project team agreed that some targeted, laboratory-based new research was desirable and even necessary to make a good judgment as to the biological risks. Since the results of this study were required to complete the risk assessment and establish the HCP, i.e., it was a critical path element, any delays introduced by this study would result in a delay to the overall project. Factors that introduced such delays included:

1.. Significantly more time in getting the selected offeror, the University of Texas Sponsored Research Programs, under a negotiated contract, due to university-specific terms that had to be negotiated to ensure useful output on budget and schedule;

2.. The unforeseen resignation of one of the Co-Principal Investigators after work was initiated, who left UT to go to the University of Montana;

3.. The absence of the other Co-Principal Investigator for most of the Summer 2006, since she had a teaching sabattical in Australia (during which time grad students in Austin maintained the salamander test populations but little testing was performed); and

4.. The inclusion of some additional testing campaigns, at the suggestion of the BAT, to include juveniles and some limited comparisons between Eurycea sosorum (the salamander of interest) and Eurycea nana (its surrogate).

Taken together, these factors created at least a four-month delay from the previously established schedule, and most of this delay occurred toward the end of the project, when there was little opportunity to "make it up", especially since the earlier delay factors had consumed the available buffer. The original timeline for the salamander toxicity study called for the results to be available in July 2006; in practice, the results were not available until December 2006. Nevertheless, in the intervening time, the project team proceeded down a dual path with respect to methodologies and risk assessments, incorporating the results of the salamander toxicity study where warranted and as they became available and vetted. This approach allowed some of the six-month time delay to be recovered, but not all of it.

Accordingly, we are requesting an extension of the period of performance, to now end on August 31, 2007. This would be a four-month extension to our contract with TPWD, and evidently a six- to seven-month extension of TPWD's contract with USFWS. Inasmuch as virtually all of this delay arises from critical path timing issues rather than work performance issues, at this time we believe that there is no requirement for

additional costs to accompany this requested extension. We consider this to be a realistic new timeline, and it provides some additional new buffer since the BAT and CAC still have upcoming review and comment roles on discussion drafts of both the PDEIS and the HCP, which conceivably might require more time to address in a coordinated fashion than was originally envisioned for the project completion stage.

Please contact me if you have questions or need additional information.

Kirk Holland
General Manager
Barton Springs/Edwards Aquifer Conservation District
1124 Regal Row
Austin, TX 78748
Tel. 512.282.8441
Fax 512.282.7016
kholland@bseacd.org