September 20, 2016

Ms. Tanya Sommer
United States Fish and Wildlife Services
Austin Ecological Services Field Office
107011 Burnet Road, Suite 200
Austin, Texas 78758

RE: Clarification to the specified vegetation in Table 4-1 of the Edwards Aquifer Habitat Conservation Plan (EAHCP) Biological Goals for fountain darter habitat in the Comal River for the Incidental Take Permit (#TE-63663A-1).

On behalf of the City of New Braunfels (CoNB), the City of San Marcos (CoSM), Edwards Aquifer Authority (EAA), the San Antonio Water System (SAWS), and Texas State University (collectively the Permittees of the Incidental Take Permit #TE-63663A-1), I am providing a clarification to the Edwards Aquifer Habitat Conservation Plan (EAHCP) to remove non-native aquatic vegetation goals in Tables 4-1 (p. 4-4) and replace them with native aquatic vegetation goals for the Comal Springs ecosystem. As a result of these changes, adjustments to the coverage of the specific native aquatic vegetation has also been altered to respond to lessons learned in restoring fountain darter habitat.

Section 4.1.1 of the EAHCP discusses the Biological Goals and Objectives associated with the Covered Species. Table 4-1 provides guidance to the permittees in square meter coverage of specified aquatic vegetation for designated Long-term Biological Goal (LTBG) Reaches[1] for the Comal Springs ecosystem. It is proposed that certain changes to Table 4-1 (Exhibit 1) are warranted to properly maintain a diverse community of native aquatic vegetation and maximize fountain darter habitat. These changes include the complete removal of all filamentous algae and non-native *Hygrophila polysperma* from the Biological Goals and replace these goals with native *Potamogeton illinoensis*.

In order to find the most adequate distribution of ideal habitat for the fountain darter, the proposed goals have additional native vegetation and an altered distribution for all vegetation types originally identified in Table 4-1. As a result of this change, the estimated relative abundance of fountain darters within respective reaches will increase by 568.

Since December 2015, the EAHCP has pursued an analysis of the current programs for submerged aquatic vegetation restoration in the San Marcos and Comal Springs systems. In this analysis, lessons learned as well as proposed revisions were brought forward and ultimately reviewed by subject matter and regional experts, as well as the EAHCP Committee members. A Scientific Evaluation Report (SER) was produced and adopted by the Science Committee to provide any necessary directive in regards to the Adaptive Management Proposal (Exhibit 3) which was later supported by the Stakeholder Committee and adopted by the Implementing Committee on September 15th. This process was in accordance with the Adaptive

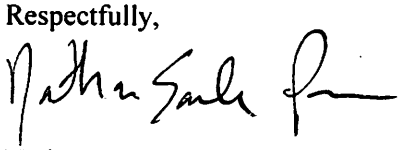
[1] The Long-term Biological Goal (LTBG) Reaches refer to the reaches specified in the EAHCP that determine our Biological Goals for the aquatic vegetation restoration and fountain darter habitat (Table 4-1).

Management Process outlined in the Funding and Management Agreement (FMA) and results in this request to clarify the EAHCP outlined in the final Nonroutine Adaptive Management Proposal (Exhibit 2).

With that said, to further ensure transparency in the implementation of the EAHCP, the Implementing Committee provided the public the opportunity to comment on this clarification during its September 15, 2016 meeting. All meeting agendas and minutes from this process have been provided in Exhibit 4.

The Permittees seek your formal acceptance of this clarification to allow alterations to Table 4-1 of the EAHCP to reflect removal of all non-native aquatic vegetation in the Comal Springs ecosystem in order to most effectively limit the re-establishment of non-native aquatic vegetation. Your approval of this clarification will allow the Permittees to implement this critical aspect of the EAHCP. We look forward to your formal acceptance of this clarification and appreciate your consideration and response on this issue.

Respectfully,



Nathan Pence
Program Manager
Edwards Aquifer Habitat Conservation Plan

TABLE 4-1

FOUNTAIN DARTER HABITAT (AQUATIC VEGETATION) IN METERS SQUARED (M2) AND FOUNTAIN DARTER MEDIAN DENSITY (NUMBER/M2) PER HABITAT TYPE

Fountain darter habitat (aquatic vegetation) goal in meters squared (m^2)

Study Reach	*Bryophytes*	~~*Hygrophila*~~ *Potamogeton*	*Ludwigia*	*Cabomba*	~~Fil. Algae~~	*Sagittaria*	*Vallisneria*
Upper Spring Run Reach	~~1,850~~ 1,750	~~650~~ 0	~~150~~ 25	~~0~~ 25	~~0~~	~~600~~ 850	0
Landa Lake	~~4,000~~ 3,950	~~250~~ 25	900	500	~~0~~	~~1250~~ 2,250	~~13,500~~ 12,500
Old Channel	~~150~~ 550	~~200~~ 0	~~1,500~~ 425	~~0~~ 180	~~300~~	~~0~~ 450	0
New Channel	150	~~1,350~~ 0	~~0~~ 100	~~350~~ 2,500	~~0~~	0	0
TOTAL	~~6,150~~ 6,400	~~2,450~~ 25	~~2,550~~ 1,450	~~850~~ 3,205	~~300~~	~~1850~~ 3,550	~~13,500~~ 12,500

Fountain darter median density number/m^2

	Bryophytes	~~*Hygrophila*~~ *Potamogeton*	*Ludwigia*	*Cabomba*	~~Fil. Algae~~	*Sagittaria*	*Vallisneria*
	20	~~4~~ 3.3	7	7	~~14~~	1	1

EXHIBIT 2

Edwards Aquifer Habitat Conservation Plan
Nonroutine Adaptive Management Proposal

All relevant reports, citations, and analysis can be found at www.eahcp.org.

To: **EAHCP Committees**
From: **Nathan Pence, Program Manager**
Date: **September 1, 2016**
Re: **Submerged Aquatic Vegetation Restoration Programs**

Abstract

After four years of implementing Conservation Measures associated with the restoration of submerged aquatic vegetation in the Comal and San Marcos Edwards Aquifer Habitat Conservation Plan (EAHCP) Long-term Biological Goal (LTBG) reaches, unanticipated developments, issues, and challenges associated with the EAHCP restoration programs have been realized by the Spring Communities through their accumulated experience and expertise. In November 2015, the Implementing Committee commissioned a report (SAV Report) to study these issues and recommend possible adaptations to management. This report identified several proposed modifications to the Long-term Biological Goals associated with the fountain darter (*Etheostoma fonticola*) as well as to the management of the flow-split infrastructure in the Old Channel of the Comal River. Having received this report, the EAHCP Program Manager facilitated a stakeholder-driven process to review the SAV Report's recommendations and chart a course for formal Nonroutine Adaptive Management to incorporate the proposed modifications as part of a revised EAHCP program. This document presents (1) an introduction to the issues encountered with the SAV restoration programs in the Comal and San Marcos rivers; (2) a discussion of the analysis and recommendations emerging from the SAV Report commissioned to study these issues; (3) the account of the stakeholder-driven process facilitated by the Program Manager to vet the report recommendations and to develop a consensus-based proposal for Nonroutine Adaptive Management; and (4) the Program Manager's final formal proposal for Nonroutine Adaptive Management, submitted here for consideration by the EAHCP committee review process following the procedure laid out in the Funding and Management Agreement for Nonroutine Adaptive Management.

Introduction

Since its inception in 2013, the Edwards Aquifer Habitat Conservation Plan (EAHCP) has accumulated four years of experience and expertise implementing Conservation Measures involving the restoration of submerged aquatic vegetation (SAV) for the enhancement of fountain darter (*Etheostoma fonticola*) habitat in the Comal and San Marcos river EAHCP Long Term Biological Goal (LTBG) reaches. Given this experience, the EAHCP is now capable, through analysis of data and best professional judgment,

of carrying out an evaluation of these programs, in support of adapting existing goals and methods (if appropriate) to improve efficiencies and overcome challenges.

Several unanticipated developments, issues, and/or challenges with implementing the existing conservation measures for the restoration of SAV in the Comal and San Marcos have been realized over the first 4 years of implementation. Among them are the following:

1. Higher than anticipated rates of success in removing non-native SAV species *(Hydrilla* and *Hygrophila*), inviting consideration of whether areal coverage targets for non-native SAV species should be eliminated from the LTBGs of the EAHCP altogether (i.e., why maintain target levels of exotics if they can be eliminated completely?);
2. Competition for and limitations of physical space between areal coverage of SAV species, Texas wild-rice (*Zizania texana*) and river access points as set by the EAHCP LTBGs and Conservation Measures;
3. The determination that prescribed flow rates for the Old Channel of the Comal River would (a) scour established SAV at the higher range of flows, and (b) potentially cause Comal Springs riffle beetle (CSRB; *Heterelmis comalensis*) habitat around Spring Island to go dry at lower flows;
4. The lack of a timeline, with annual milestones, to ensure the EAHCP meets its SAV LTBGs within the term of the Incidental Take Permit;
5. The lack of an implementation plan for the EAHCP requirement for “proportional expansion” (EAHCP §§4.1.1.1 and 4.1.1.2);
6. The need to establish which vegetation mapping event would be used for the purpose of reporting progress and compliance to the United States Fish & Wildlife Service (USFWS); and
7. The lack of success with *Ludwigia* restoration in certain conditions in the San Marcos River.

These issues raised the possibility that the LTBGs associated with fountain darter habitat in the Comal and San Marcos LTBG reaches, as well as the flow requirements that ensure optimal fountain darter habitat in the Old Channel of the Comal, might need to be revised. In light of these issues, it became clear that a thorough study of the SAV restoration programs was in order to properly address these issues and possibly pursue corrective action through the Adaptive Management Process (AMP) laid out by the Funding and Management Agreement (FMA).

Report: SAV Analysis and Recommendations, Oborny and Hardy 2016

In support of the AMP, in November 2015, the EAHCP Implementing Committee commissioned BIO-WEST, Inc. and Watershed Systems Group, Inc. to conduct an analysis that would evaluate the various

developments, issues, and/or challenges identified with the EAHCP's SAV restoration programs, and provide recommendations that could possibly serve as the basis for a Nonroutine AMP proposal.

The analysis of data for the report required several steps, involving the: evaluation of existing parameters, consideration of historical hydraulic and habitat model runs for different flow rates, and the compilation of numerous aquatic vegetation map files over time. Resulting scenarios and recommendations take into account all of these factors, biotic and abiotic, as affecting assembly of the submerged aquatic vegetation communities for each system (Moyle & Light, 1996; Keddy, 1999; Weiher, Clarke, & Keddy, 1998).

From an administrative perspective, the SAV Report authors were charged with:

1. Forging consensus-based recommendations for both the Comal and San Marcos SAV restoration programs.
2. Producing recommendations that took into account the funding allowances established by Table 7.1 of the EAHCP.
3. Producing multiple scenarios formatted as recommendations, allowing for flexibility in management decisions.
4. Producing timelines for each scenario with annual milestones.

The final report that resulted from this exercise is titled *Submerged Aquatic Vegetation Analysis and Recommendations* (SAV Report), released in June 2016. An addendum to this report, featuring a revision to one section of the analysis, along with a revision to the appendix associated that section, was released in August 2016.

Based on the findings of their analysis, the authors of the SAV Report provided three distinct management scenarios, termed Scenario 1 ("existing"), Scenario 2 ("proposed"), and Scenario 3 ("proposed combined"). Each scenario reflected varying levels of adaptation of management, ranging from maintaining status quo (Scenario 1) to adopting all recommendations (Scenario 3). The publication of the addendum to the report in August 2016 introduced Scenario 4, which used *Hydrocotyle* as a replacement for *Hydrilla* and *Hygrophila* in the San Marcos SAV restoration program, rather than *Heteranthera*, as originally had been proposed in Scenarios 2 and 3.

Edwards Aquifer Habitat Conservation Plan
Nonroutine Adaptive Management Proposal

All relevant reports, citations, and analysis can be found at www.eahcp.org.

Constraints on SAV Restoration – Spatial Analysis

A key finding from the SAV Report is that based on the amount of confined space in each LTBG reach, the LTBGs, as represented by m^2 of SAV, cannot be met. Original reach calculations for areal coverage goals for different SAV species were based on historical maxima for each plant species within the given reaches. The limited amount of space available was over-committed when Conservation Measures were established independently. Examples of this include (1) the establishment of EAHCP's permanent access points, that dedicate space to access, rather than SAV restoration; (2) the Texas Wild-rice Enhancement and Restoration Conservation Measure, which is treated separately in the EAHCP from restoration for other SAV species; and (3) SAV restoration to establish fountain darter habitat. Figure 1 (below) illustrates the overlap between each of these Conservation Measures.

Figure 1. *Effect of Spatial Constraints on Achievement of Existing EAHCP Conservation Measures*

Development of the Nonroutine Adaptive Management Proposal

A proposal to amend the EAHCP's LTBGs and/or modify significantly Conservation Measures triggers the Nonroutine AMP per the procedures set out by the Funding and Management Agreement (2012).

Given that this proposal is submitted by the Program Manager, in the following sections, the Program Manager provides his account of the process by which the Nonroutine AMP proposal was developed, and finally, the proposal itself.

This Nonroutine AMP Proposal reflects consideration by the Program Manager of the following sources of information and input:

1. *Submerged Aquatic Vegetation Analysis and Recommendations* (BIO-WEST, Inc. & Watershed Systems Group, Inc., 2016)
2. Input from the Science, Stakeholder and Implementing Committees
3. Discussions with USFWS
4. Discussions with Texas Parks & Wildlife Department (TPWD)
5. The original EAHCP aquatic vegetation analysis, conducted back in 2009, for the creation of the LTBGs (EAHCP, 2012);
6. Hydraulic models and habitat suitability criteria for individual plant species, performed by Hardy, which show preferred habitat based on depth, velocity, and substrate (EAHCP, 2012);
7. Historical aquatic vegetation maps over time for the LTBG reaches, combined to generate a persistence factor for each vegetation type (BIO-WEST, Inc. Biological Monitoring, 2000-2015);
8. Knowledge gained through restoration experiences to date for each proposed LTBG reach (E. Oborny and T. Hardy, personal communication, July 2016)

Stakeholder input is crucial to all EAHCP processes, and the evaluation of SAV restoration and the vetting of the SAV Report duly reflect a stakeholder-driven process. In mid-2015, I as Program Manager met with the City of New Braunfels, the City of San Marcos, and Texas State University--as the three Implementing Committee members responsible for implementation of SAV restoration--to discuss potential solutions to the challenges and strategies that would allow the SAV restoration teams capitalize on unanticipated successes listed above in the introduction.

Out of these initial meetings with the Springs Communities, a plan for gathering data and a strategy to utilize the AMP process was formed. These concepts were presented to USFWS for collaboration purposes. At that point, USFWS stated that it was their belief that the SAV evaluation exercise represented an appropriate use of adaptive management, without endorsing any specific modification. The initial proposal of the strategy to utilize AMP was presented to the Implementing Committee in November 2015, and to the Stakeholder Committee in December 2015. Based on these presentations,

the Implementing Committee directed me to work with Ed Oborny and Thom Hardy to conduct an analysis of the Conservation Measures and to provide recommendations.

Following the release of the resulting SAV Report in June 2016, I first met again with USFWS to vet key concepts and substantive changes contained within the report. After ensuring USFWS support, I began consultation with stakeholders and subject matter experts through a series of informal meetings held in July and August, 2016. The first follow-up meetings on July 19th and July 25th were with the City of San Marcos, Texas State University, and the City of New Braunfels, as the Implementing Committee members with jurisdiction over the SAV restoration programs. Following these initial discussions, additional collaboration included two meetings with TPWD biologists. After developing an executive summary and further shaping some potential recommendations, EAHCP staff and I met with nearly every member of the Science, Stakeholder, and Implementing committees.

This consultation process with USFWS, TPWD, subject matter experts, and EAHCP committee members, resulted in a more thorough and carefully vetted approach to the development of this Nonroutine AMP proposal. Specifically, meetings with committee members resulted in the following additions or modifications to the Nonroutine AMP Proposal:

1. Providing a range of target flows in the Old Channel, rather than set specific flows
2. Consultation, for the purpose of transparency and buy-in, with community stakeholders
3. *Heteranthera*, as originally proposed, should be replaced with *Hydrocotyle*
4. Consultation with as many committee members and subject matter experts as possible
5. Testing SAV species other than *Hydrocotyle*, as a proactive measure, in the event that *Hydrocotyle* establishment is inadequate for the purposes of the SAV restoration program.

Nonroutine Adaptive Management Proposal

With all the before mentioned stated, I, the EAHCP Program Manager, propose that the following two sets of modifications be considered via the Nonroutine AMP:

Modifications to the SAV Conservation Measures and fountain darter LTBGs in the Comal and San Marcos rivers that would (based on Scenario 4 of the SAV Report):

1. Remove non-native plant species (*Hydrilla and Hygrophila*) from the LTBGs for fountain darter habitat, replacing them with native plant species (*Hydrocotyle* and *Zizania* in the San Marcos system, and *Potamogeton* in the Comal system; Exhibit A). Through a review of the literature on

the historical aquatic flora community of the upper San Marcos River, it was determined that *Hydrocotyle* would complement the other native vegetation being planted and fill an empty niche among the plants being restored (BIO-WEST, Inc., 2002; Devall, 1940; Espey Huston & Assoc., 1975; Hannah & Doris, 1970; Lemke, 1989; Owens, Madsen, Smart, & Stewart, 2001). Suitability of *Hydrocotyle* as fountain darter habitat will continue to be assessed through ongoing bio-monitoring efforts conducted by BIO-WEST, Inc.

2. Adjust areal coverage targets for SAV to be consistent with Scenario 4 in the *Submerged Aquatic Vegetation Analysis and Recommendations* and *SAV Addendum* (BIO-WEST, Inc. & Watershed Systems Group, Inc., 2016; Exhibit A).

3. Recognize Texas wild-rice as fountain darter habitat, not just an endangered plant to be restored, by including Texas wild-rice as one of the SAV restoration plants associated with the LTBGs for fountain darter habitat in the San Marcos River.

4. Have the City of San Marcos and Texas State University, in minimal amounts, proactively field-test two other native SAV species to replace *Hydrocotyle*, in the event it is unsuccessful. The two species to be tested will be determined through collaboration between the City of San Marcos, Texas State University, the Program Manager, and TPWD. If *Hydrocotyle* is not succeeding by 2019, without utilizing the AMP process, one of the two test species will be used as a replacement for *Hydrocotyle*, after meeting the following criteria:
    a. The test species is identified as native in existing literature and research
    b. The test species is endorsed as an appropriate replacement species by the EAHCP Science Committee
    c. The test species is endorsed as an appropriate replacement species by USFWS
    d. The Implementing Committee approves submittal of the appropriate documentation associated with the substitution, if necessary, to the USFWS

5. Clarify “proportional expansion,” as required by EAHCP §§4.1.1.1 and 4.1.1.2., with quantifiable and measurable metrics:
    - Amounts and species of vegetation to be restored (Exhibit B)

- Identification of geographic locations of restoration reaches[1] (Exhibit C). These locations were chosen to complement existing LTBG reaches (prevent fragmentation and reestablishment of non-natives) and to address areas of concern (large stands of non-natives).

6. Follow successful suggested field methodologies for implementation that have been realized through four years of "lessons learned" as documented in §2.1.3 of the SAV Report, including the recommendation that these methodologies should be incorporated into Annual Work Plans by Permittees as appropriate.

7. Utilize the Fall Comprehensive Vegetation Mapping event, from the Biomonitoring Program, to quantify vegetation amounts reported in the EAHCP Annual Reports.

8. Adoption of Scenario 4 impacts the number of estimated fountain darters, as modeled, that the SAV habitat can support, specifically resulting in a decrease of an estimated 5,055 fountain darters in the San Marcos LTBG reaches and an increase of an estimated 568 fountain darters in the Comal LTBG reaches (Table 1). The restoration reaches more than make up for any decrease in the San Marcos system.

Table 1

San Marcos - Estimated Number of Fountain Darters, as Modeled			
Scenario	LTBG Reaches	Restoration Reaches	Total
HCP	34,325		34,325
Scenario 4	29,270	9,940	39,210
Comal - Estimated Number of Fountain Darters, as Modeled			
Scenario	LTBG Reaches	Restoration Reaches	Total
HCP	176,150		176,150
Scenario 4	176,718	3,462	180,180

[1] Active native vegetation restoration and protection will be implemented in Landa Lake and the Old Channel (Comal) and in all three representative study reaches (San Marcos). Restoration activities will extend beyond the study reaches in equal proportion to effort expended per study area in relation to the total area of the river segment. By the establishment of known "restoration reaches" in addition to the current study reaches, aquatic vegetation will include the majority of key fountain darter habitat in areas (1) upstream and downstream of the Landa Lake study reach as well as the entire stretch of the Old Channel from the Landa Lake dam to the existing Old Channel study reach (Comal); as well as (2) the majority of key fountain darter habitat in areas upstream and downstream of the City Park study reach, as well as the entire stretch of the river from downstream of the IH-35 study reach to the IH-35 bridge (San Marcos).

A modification to the Flow-split Conservation Measure in the Comal system that would:

9. Revise Table 5-3, *Flow-split Management for Old and New Channels* to provide maximum benefit to sustaining fountain darter habitat in the Old Channel and keeping CSRB habitat around Spring Island wetted (Exhibit D). This revision:
    - lowers the high flow rates in the Old Channel in the Fall/Winter from 80 cubic feet per-second (cfs) to 65 cfs
    - does not decrease the minimum flow targets to the Old Channel during times of total system flow of 30 cfs.
    - establishes a flow requirement ranging from 35-40 cfs at total system flows of 60 cfs and 50 cfs. The actual flow would be set by the City of New Braunfels in collaboration with the Program Manager, and will be set to provide wetted CSRB habitat around Spring Island, while maintaining the maximum possible flow to the Old Channel. In the event that flow reduction to 35 cfs in the Old Channel does not add benefit to CSRB habitat, Old Channel flow shall be set at 40 cfs to benefit fountain darter habitat by maintaining the maximum flow possible to the Old Channel. Benefit (wetted versus exposed CSRB habitat around Spring Island and maximum flows to the Old Channel) will be determined and balanced based on the data and observations provided by the Biological Monitoring Program conducted by BIO-WEST, Inc.

This Nonroutine AMP proposal relates to the following sections of the EAHCP:

- City of New Braunfels
    - 4.1.1.1 Long-term Biological Goals & Objectives – Comal Springs
    - 5.2.1 Flow-Split Management in the Old and New Channel
    - 5.2.2 Native Aquatic Vegetation Restoration and Maintenance

- City of San Marcos
    - 4.1.1.2 Long-term Biological Goals & Objectives - San Marcos Springs
    - 5.3.1 Texas Wild-Rice Enhancement and Restoration
    - 5.3.8 Control of Non-Native Plant Species

- Texas State University
    - 4.1.1.2 Long-term Biological Goals & Objectives - San Marcos Springs

- 5.4.1 Texas Wild-Rice Enhancement and Restoration
- 5.4.12 Control of Non-Native Plant Species

Fiscal Impact

From the beginning of this evaluation, this exercise was designed to respect the funding allowances established by the FMA and Table 7.1 of the EAHCP. Adoption of this Proposal will not result in any budget deviations from Table 7.1 of the EAHCP. It should be noted, that this Proposal does include the monitoring of the "restoration reaches," which will add approximately $10,000 to the bio-monitoring budget annually.

References - *All relevant reports, citations, and analysis can be found at* www.eahcp.org.

BIO-WEST, Inc. & Watershed Systems Group, Inc. (2016). Submerged aquatic vegetation analysis and recommendations. Including SAV Addendum (Section 3.1.2) and revised Appendix B. Prepared for Edwards Aquifer Authority, San Antonio, TX.

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Devall, L.L. 1940. A comparative study of plant dominance in a spring fed lake. Unpubl. M.A. thesis, Southwest Texas State University, San Marcos, TX.

Espey, Huston and Associates, Inc. 1975. Investigation of flow requirements from Comal and San Marcos Springs to maintain associated aquatic ecosystems (Guadalupe River basin). Edwards Underground Water Conservation District Report #7503 (EH&A Job #0072).

Hannan, H.H., and C.T. Dorris. 1970. Succession of a macrophyte community in a constant temperature river. *Limnol. and Oceanogr*., 15:442-453.

Keddy, P. (1999). Wetland restoration: the potential for assembly rules in the service of conservation. *Wetlands*, 19(4), 716-732.

Lemke, D.E. 1989. Aquatic macrophytes of the upper San Marcos River, Hays Co., Texas. *The Southwestern Naturalist*, V34, 2:289-291.

Moyle, P. B., & Light, T. (1996). Biological invasions of fresh water: empirical rules and assembly theory. *Biological Conservation*, *78*(1), 149-161.

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Weiher, E., Clarke, G. P., & Keddy, P. A. (1998). Community assembly rules, morphological dispersion, and the coexistence of plant species. *Oikos*, 309-322.

EXHIBIT 2

Edwards Aquifer Habitat Conservation Plan
Nonroutine Adaptive Management Proposal

All relevant reports, citations, and analysis can be found at www.eahcp.org.

EXHIBIT A

Revised Long-term Biological Goals for the Submerged Aquatic Vegetation Habitat Restoration for the Fountain Darter in the Comal River.

FOUNTAIN DARTER HABITAT (AQUATIC VEGETATION) IN METERS SQUARED (M2) AND FOUNTAIN DARTER MEDIAN DENSITY (NUMBER/M2) PER HABITAT TYPE

Fountain darter habitat (aquatic vegetation) goal in meters squared (m^2)

Study Reach	*Bryophytes*	~~*Hygrophila*~~ *Potamogeton*	*Ludwigia*	*Cabomba*	~~Fil. Algae~~	*Sagittaria*	*Vallisneria*
Upper Spring Run Reach	~~1,850~~ 1,750	~~650~~ 0	~~150~~ 25	~~0~~ 25	~~0~~	~~600~~ 850	0
Landa Lake	~~4,000~~ 3,950	~~250~~ 25	900	500	~~0~~	~~1250~~ 2,250	~~13,500~~ 12,500
Old Channel	~~150~~ 550	~~200~~ 0	~~1,500~~ 425	~~0~~ 180	~~300~~	~~0~~ 450	0
New Channel	150	~~1,350~~ 0	~~0~~ 100	~~350~~ 2,500	~~0~~	0	0
TOTAL	~~6,150~~ 6,400	~~2,450~~ 25	~~2,550~~ 1,450	~~850~~ 3,205	~~300~~	~~1850~~ 3,550	~~13,500~~ 12,500

Fountain darter median density number/m^2

	Bryophytes	~~*Hygrophila*~~ *Potamogeton*	*Ludwigia*	*Cabomba*	~~Fil. Algae~~	*Sagittaria*	*Vallisneria*
	20	~~4~~ 3.3	7	7	~~14~~	1	1

Edwards Aquifer Habitat Conservation Plan
Nonroutine Adaptive Management Proposal

All relevant reports, citations, and analysis can be found at www.eahcp.org.

EXHIBIT A (continued)

Revised Long-term Biological Goals for the Submerged Aquatic Vegetation Habitat Restoration for the Fountain Darter in the San Marcos River.

FOUNTAIN DARTER HABITAT (AQUATIC VEGETATION) IN METERS SQUARED (M2) AND FOUNTAIN DARTER MEDIAN DENSITY (NUMBER/M2) PER HABITAT TYPE

Fountain darter habitat (aquatic vegetation) goal in meters squared (m^2)								
Study Reach	~~*Hygrophila*~~	*Ludwigia*	*Cabomba*	~~*Hydrilla*~~	*Potamogeton*	*Sagittaria*	~~*Vallisneria*~~ *Hydrocotyle**	*Zizania*
Spring Lake Dam	~~50~~	~~200~~ 100	~~25~~ 50	~~100~~	~~1,000~~ 200	~~100~~ 200	~~125~~ 50	700
City Park	~~200~~	~~1,000~~ 150	~~50~~ 90	~~500~~	~~2,000~~ 1,450	300	~~50~~ 10	1,750
IH-35	~~50~~	~~200~~ 50	~~300~~ 50	~~100~~	~~300~~ 250	~~100~~ 150	~~25~~ 50	600
TOTAL	~~300~~	~~1,400~~ 300	~~375~~ 190	~~700~~	~~3,300~~ 1,900	~~500~~ 650	~~200~~ 110	3,050
Fountain darter median density number/m^2								
	~~*Hygrophila*~~	*Ludwigia*	*Cabomba*	~~*Hydrilla*~~	*Potamogeton*	*Sagittaria*	~~*Vallisneria*~~ *Hydrocotyle**	*Zizania*
	~~4~~	7	7	~~5~~	5	1	~~1~~ 4	5

* Include flexibility that if, after two years of implementing (2019), *Hydrocotyle* is not succeeding in the San Marcos system, that other native submerged aquatic vegetation (SAV) be considered for the fountain darter Long-term Biological Goals, as long as the replacement species meets the certain criteria.

Edwards Aquifer Habitat Conservation Plan
Nonroutine Adaptive Management Proposal

All relevant reports, citations, and analysis can be found at www.eahcp.org.

EXHIBIT B

Species and amounts of submerged aquatic vegetation to be restored under proportional expansion in the Comal River.

FOUNTAIN DARTER HABITAT (AQUATIC VEGETATION) IN METERS SQUARED AND MEDIAN DENSITY (NUMBER/M²) PER HABITAT TYPE TO DEFINE "RESTORATION REACHES" IN THE COMAL RIVER

Fountain darter habitat (aquatic vegetation) in meters squared (m^2)							
Study Reach	*Bryophytes*	*Potamogeton*	*Ludwigia*	*Cabomba*	*Sagittaria*	*Vallisneria*	TOTAL
Landa Lake UP[A]	5,500		25	250	250		6,025
Landa Lake DOWN[B]	500		50	125	100	22,500	23,275
Old Channel UP[C]	1,250	100	850	200	750	750	3,900
Total	7,250	100	925	575	1,100	23,250	33,200
Fountain darter median density (number/m^2)							
	Bryophytes 20	*Potamogeton* 3.3	*Ludwigia* 7	*Cabomba* 7	*Sagittaria* 1	*Vallisneria* 1	*TOTAL*
# darters *veg total	145,000	330	6,475	5,025	1,100	23,250	180,180

[A] Landa Lake LTBG reach to downstream boundary of Spring Island
[B] Landa Lake LTBG reach to weir across from City of New Braunfels Park Office
[C] Old Channel from LTBG reach upstream to Landa Lake Dam

Edwards Aquifer Habitat Conservation Plan
Nonroutine Adaptive Management Proposal

All relevant reports, citations, and analysis can be found at www.eahcp.org.

EXHIBIT B (continued)

Species and amounts of submerged aquatic vegetation to be restored under proportional expansion in the San Marcos River.

FOUNTAIN DARTER HABITAT (AQUATIC VEGETATION) IN METERS SQUARED AND MEDIAN DENSITY (NUMBER/M^2) PER HABITAT TYPE TO DEFINE "RESTORATION REACHES" IN THE SAN MARCOS RIVER

Fountain darter habitat (aquatic vegetation) in meters squared (m^2)							
Study Reach	*Ludwigia*	*Cabomba*	*Potamogeton*	*Sagittaria*	*Hydrocotyle*	*Zizania*	TOTAL
Sewell Park	25	25	152	25	10	1,100	1,335
Below Sewell to City Park[A]	50	50	500	700	20	2,300	3,620
Hopkins Street – Snake Island	50	50	475	750	10	950	2,285
Cypress Island – Rio Vista	50	50	150	50	0	350	650
IH-35 Expanded[B]	50	100	250	450	50	450	1,350
Total	225	275	1,525	1,975	90	5,150	9,240
Fountain darter median density (number/m^2)							
	Ludwigia 7	*Cabomba* 7	*Potamogeton* 5	*Sagittaria* 1	*Hydrocotyle* 4	*Zizania* 5	*TOTAL*
# darters *veg total	1,575	1,925	7,625	1,975	360	25,750	39,210

[A] Sewell Park to the upstream boundary of the City Park LTBG reach
[B] Immediately downstream of the established IH-35 LTBG reach to IH-35

Edwards Aquifer Habitat Conservation Plan
Nonroutine Adaptive Management Proposal

All relevant reports, citations, and analysis can be found at www.eahcp.org.

EXHIBIT C

Defined “restoration reaches” to define “proportional expansion” in the Comal River.

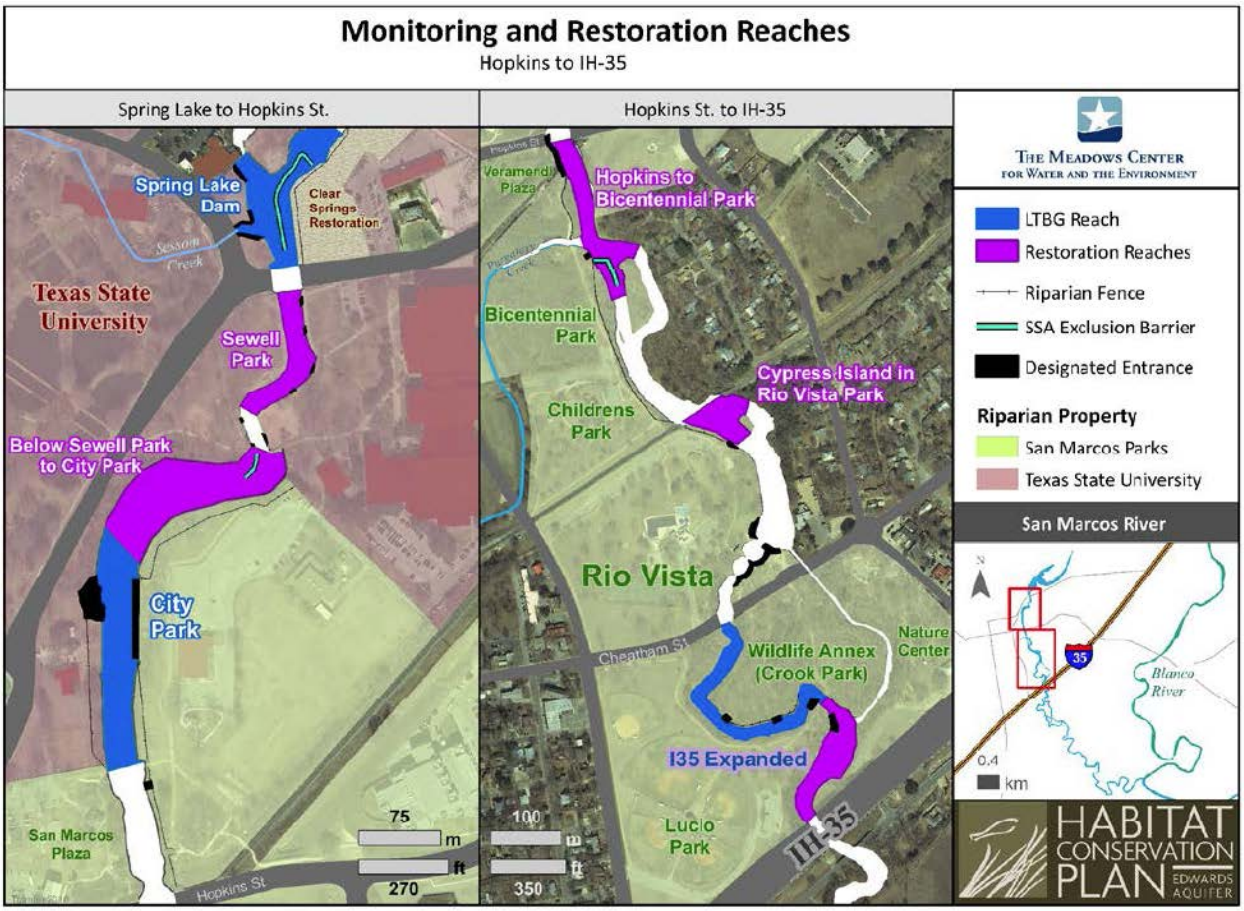
Long-term Biological Goal reaches and proposed “restoration reaches” for the Comal system.

Edwards Aquifer Habitat Conservation Plan
Nonroutine Adaptive Management Proposal

All relevant reports, citations, and analysis can be found at www.eahcp.org.

EXHIBIT C (continued)

Defined “restoration reaches” to define “proportional expansion” in the San Marcos River.



Long-term Biological Goal Reaches and proposed “restoration reaches” for the San Marcos system.

EXHIBIT 2

Edwards Aquifer Habitat Conservation Plan
Nonroutine Adaptive Management Proposal

All relevant reports, citations, and analysis can be found at www.eahcp.org.

EXHIBIT D

Revised Table 5-3, Flow-Split Management for Old and New Channels.

Table 1: Proposed revisions for the Flow-Split Management for the Old and New Channels (Table 5-3):

Total Comal Springflow (cfs)	Old Channel (cfs)		New Channel (cfs)	
	Fall, Winter	Spring, Summer	Fall, Winter	Spring, Summer
350+	~~80~~ 65	60	~~270+~~ 280+	290+
300	~~80~~ 65	60	~~220~~ 235	240
250	~~80~~ 60	~~60~~ 55	~~170~~ 190	~~190~~ 195
200	~~70~~ 60	~~60~~ 55	~~130~~ 140	~~140~~ 145
150	~~60~~ 55		~~90~~ 95	
100	~~60~~ 50		~~40~~ 50	
80	~~50~~ 45		~~30~~ 35	
70	~~50~~ 40		~~20~~ 30	
60*	~~40~~ 40-35		~~10~~ 25	
50*	~~40~~ 40-35		~~10~~ 15	
40	30		10	
30	20		10	

*This revision will raise the Old Channel flow to a range of 35-40 cfs at total system flows of 60 and 50 cfs, with the caveat that, ensuring all control valves have been manipulated to provide the maximum benefit to CSRB habitat around Spring Island as possible, while maintaining the maximum flow possible to the Old Channel.

Nonroutine Adaptive Management Proposal
Edwards Aquifer Habitat Conservation Plan
EAHCP Stakeholder Committee Report
September 15, 2016

Overview

This Report is issued in response to the Nonroutine Adaptive Management proposal submitted by the Program Manager of the Edwards Aquifer Habitat Conservation Plan (EAHCP), dated September 1, 2016. According to the Funding & Management Agreement, the EAHCP Stakeholder Committee is responsible for reviewing and making recommendations to the Implementing Committee for proposals submitted through the Nonroutine Adaptive Management Process (AMP). This Report presents the final recommendation of the EAHCP Stakeholder Committee concerning this Adaptive Management proposal.

1. Summary of the Nonroutine Adaptive Management Proposal

On September 1, 2016, the EAHCP Program Manager submitted the attached Nonroutine Adaptive Management proposal to the Science, Stakeholder, and Implementing Committees. It involves modifications to the submerged aquatic vegetation (SAV) restoration programs affecting the Long-term Biological Goals (LTBGs) for the fountain darter (*Etheostoma fonticola*) in the Comal and San Marcos systems, and the flow-split management of the Old and New Channels of the Comal River.

2. Summary of September 15, 2016 Stakeholder Committee Discussion

Overview

At the September 15, 2016 Stakeholder Committee meeting, EAHCP Program Manager Nathan Pence provided a comprehensive presentation, *Submerged Aquatic Vegetation Nonroutine Adaptive Management* to the Committee. This presentation covered (1) the background to the AMP built into the EAHCP; (2) the commissioning of the *Submerged Aquatic Vegetation Analysis and Recommendations* report (SAV Report; BIO-WEST, Inc. & Watershed Systems Group, Inc., 2016); (3) the findings of the SAV report; (4) the stakeholder-driven process whereby the eventual Nonroutine AMP proposal was developed; (4) the elements of the Nonroutine AMP proposal itself; and (5) the Science Committee's Scientific Evaluation Report, including that Committee's scientific recommendations concerning the Nonroutine AMP proposal.

The following sections provide a lightly edited summary of the Stakeholder Committee's discussion of the Nonroutine AMP proposal. This summary is organized according to the main themes that emerged over the course of the Stakeholders' discussion.

This section concludes with the final motions made by the Stakeholder Committee concerning (1) recommending the Nonroutine AMP proposal to the Implementing Committee for approval and adoption, and concerning (2) approving an expedited process to prepare and submit this Nonroutine AMP Stakeholder Report to the Implementing Committee.

Opening Comments

As co-facilitator along with Vice-Chairman Myron Hess (National Wildlife Federation), Chairman Steve Raabe (San Antonio River Authority) provided an introduction to the Stakeholders' discussion concerning the Nonroutine AMP proposal. Vice-Chairman Hess also provided opening comments concerning the significance of the Nonroutine AMP proposal, and commending the efforts of the EAHCP staff in facilitating this process, before the Committee began to discuss any specifics. Mr. Raabe thanked the Committee members for their attendance, and noted that EAHCP staff would capture their comments concerning the proposal for the record.

General Issues Concerning the Nonroutine AMP Proposal

Roger Biggers (New Braunfels Utilities) asked Mr. Pence for clarification concerning the estimated number of fountain darters that would be produced under proposed revised SAV restoration scenarios. His question specifically inquired whether original estimations accounted for the fact that Texas wild-rice (*Zizania texana*) provides habitat for the darter. In reply, Mr. Pence confirmed that Mr. Biggers was correct in stating the original calculations did not factor in Texas wild-rice as darter habitat, as well as that the proposed readjustment for factoring in Texas wild-rice, along with adjusting SAV areal coverage targets, does result in a net loss in overall estimated darters. Dianne Wassenich (San Marcos River Foundation) noted that scientists have encountered some difficulty in precisely measuring darter density within Texas wild-rice as compared to other SAV species, due to the fact that it is not possible to disturb Texas wild-rice due to restrictions on taking because it is a protected species.

Carol Patterson (Edwards Aquifer Authority) added a comment concerning restoration reaches. Mrs. Patterson pointed out that the restoration reaches would add additional habitat for the fountain darter that should also be taken into account when considering the impact of the Nonroutine AMP proposal on the overall numbers of fountain darters. Mrs. Patterson also commended the proposal for achieving significant expansion of SAV restoration activities while keeping the budget within the limitations set by Table 7.1

Mr. Hess expressed his support for the proposal as a realistic initiative, expressly mentioning the fact that original components of the EAHCP were not quantified, and that through this exercise, these undefined elements are now being quantified. Thus, although this results in fewer estimated darters overall, this can be considered an artifact of unrealistic assumptions built into the EAHCP, that this AMP exercise is now correcting. Cindy Loeffler (Texas Parks & Wildlife Department) joined, emphasizing Mr. Hess' comment that the darter numbers are estimations; she recommended that this fact should be kept in mind, as well as the fact that the proposal expands their

habitat, thus making supporting the proposal moving in the right direction for the program overall.

Tom Taggart (City of San Marcos) added to Mr. Hess' earlier commendations of the staff for facilitating this effort. Mr. Taggart commented that in relation to the number of darters, it may also be helpful to show what percentage the change in darters represents of the darters' total population. He noted that overall, this Nonroutine AMP proposal impacts a small percentage change to the darter' total population—recognizing that, while it's a conservative estimate, and the fact that it's only an estimate, it is nevertheless a small change.

Gary Spence (Guadalupe Basin Coalition) asked Mr. Pence if the proposal would provide more stable habitat; Mr. Pence stated that he would not generally characterize the proposed modifications to the SAV restorations as providing more stable habitat, it would be higher quality and more optimal habitat, and that possibly in the case of the Old Channel of the Comal River, adjustments to the flow requirements for the flow-split infrastructure there would result in decreased scouring and hence, some measure of added stability.

Impacts of Rain Events on EAHCP Restoration Activities

Mr. Taggart also recommended that the effect of floods on scouring SAV restoration, (especially since flooding events often coincide with fall biological monitoring/take analysis), be included in reports to the U.S. Fish & Wildlife Service (USFWS) to provide context. Related to Mr. Taggart's suggestion, Gary Middleton added that when reporting on flood events, it would be helpful to use a standard reporting system that provides an objective measure of the severity of such events (e.g., 10-year events, 100-year events, or 10-inch rains, 15-inch rains). Mr. Pence noted there have been at least three times in the past few years that significant flooding events occurred that impacted EAHCP activities in the spring and river systems. He went on to state that while 1-3-inch rains may not result in noticeable flooding, even moderately increased flows can still impact the ecosystems (e.g., through dislodging propagules of non-natives). Adding to this discussion, Gary Middleton (South Central Texas Water Advisory Committee) asked whether sediment removal could be included under the ecosystem impacts that are produced by flooding events; Mr. Pence stated that the characteristics of the flood event determine a given flood's impact on the removal of sediment, and some may deposit more sediment than they take away.

Colette Barron-Bradsby (Texas Parks & Wildlife Department) suggested a record of flooding events could supplement monitoring data collected, since even brief storms that are high intensity could have significant impact on the systems and that this may be an important variable for understanding ecological dynamics. Mrs. Barron-Bradsby commented that the EAHCP's data management initiative would also help with the collection and management of this data. Mr. Pence stated that this is done to some

extent in the EAHCP's Annual Reports, and that this would be the place to include this information, granting that such information could be elaborated in the future to provide more information along the lines suggested by Mrs. Barron-Bradsby.

Question Concerning SAV Monitoring in Spring Lake

A Stakeholder asked whether the SAV in Spring Lake is monitored through the EAHCP monitoring program. Mr. Pence replied that while this is done every 5 years through the EAHCP's monitoring efforts, SAV monitoring in Spring Lake is also complemented by Meadows Center for Water and the Environment's (Texas State University) efforts, as they also monitor the lake, and on a more frequent basis.

Implementation of the Proposed Nonroutine AMP

Patrick Shriver (San Antonio Water System) asked whether work would be anticipated this or next year if the proposed Nonroutine AMP proposal passes. Mr. Pence replied that, assuming the proposal is approved by the Implementing Committee later in the afternoon, a set of clarifications and amendments would be communicated to the USFWS, and that consequently amended Work Plans and Funding Applications reflecting the proposed changes will go before the Implementing Committee in October 2016, with the intention being to implement this proposal beginning in January 2017.

Mr. Raabe asked if there were any further questions or comments. Mr. Hess noted that the flow-split should be considered under the rubric of storm events since it plays a crucial role in the avoidance of scouring events in the Old Channel, and that the proposal does address management of this flow-split infrastructure. There were no further questions or comments.

Final Motions by the Committee

- Recommending the Nonroutine AMP Proposal to the Implementing Committee for Approval and Adoption

  Mr. Middleton motioned to accept the Nonroutine AMP proposal as presented. Mrs. Patterson seconded the motion.

  Mr. Raabe asked whether there were any comments. Mr. Hess commented that there is a typo in the proposal that should be noted for the record (the second table in Exhibit A should be labeled the San Marcos system, not the Comal system).

  Con Mims (Nueces River Authority) made a corrective motion proposing that Mr. Middleton's motion be amended to state specifically that the Committee recommend the proposal to the Implementing Committee for approval and

adoption, rather than simply "accepting" the proposal; Mr. Middleton accepted the amendment, as did Mrs. Patterson.

Mr. Raabe asked if there were any objections to the motion as amended and moved. There were no objections. The Nonroutine AMP proposal was recommended for approval and adoption by the Implementing Committee by consensus.

- ❖ Approving the Process to Develop, Approve, and Submit the Stakeholder Report to the Implementing Committee

Mrs. Wassenich motioned to approve the process by which Mr. Raabe and Mr. Hess would be authorized to approve the report. Glenn Lord (Dow Chemical) seconded the motion. Mr. Raabe asked whether there were any comments; having heard none, the process to develop, approve, and submit this Stakeholder Report to the Implementing Committee was approved by consensus.

3. Nature of Stakeholder Committee Decision

Twenty-four members of the Committee were in attendance at the September 15, 2016 meeting, achieving the quorum requirement for the meeting. Both Committee votes concerning the Nonroutine AMP proposal were by consensus; there were no competing positions regarding the Nonroutine AMP proposal as presented.

In reaching its decision on this Nonroutine AMP proposal, the Stakeholder Committee discussed the following as points to be summarized in this report:

- *Acknowledge that this proposal is realistic*—This proposal is realistic, in that it establishes achievable, quantifiable goals for the fountain darter that reflect the realities in each of the system. Additionally, by defining the restoration reaches, this proposal provides a realistic plan for the proportional expansion of SAV restoration efforts in the Comal and San Marcos systems.

- *Acknowledge that the loss of fountain darter habitat is minimal in the systems*—By implementing the proposed modifications to the SAV restoration programs in each of the systems, this proposal would result in a 2% estimated reduction of fountain darters relative to the total population of the species.

- *Acknowledge and document the impacts of rains, flooding, and droughts to the systems and to the SAV restoration programs*—With regard to the impacts of rains, flooding, and droughts to the systems and to the SAV restoration programs, EAHCP biological monitoring should include standardized documentation of the impacts of these phenomena at the time of monitoring.

- *Correct the error on Exhibit A of the Nonroutine AMP proposal*—Exhibit A of the proposal should be corrected to show that the revised LTBGs depicted are for the San Marcos system, and not the Comal system.

4. Recommendation

By consensus, the Stakeholder Committee recommends the Nonroutine AMP proposal to the Implementing Committee for approval and adoption.

5. References

BIO-WEST, Inc. & Watershed Systems Group, Inc. 2016. *Submerged aquatic vegetation analysis and recommendations*. Including *SAV Addendum* (revised Section 3.1.2 and revised *Appendix B*). Prepared for Edwards Aquifer Authority, San Antonio, TX.

6. Attachments

- Nonroutine Adaptive Management proposal dated September 1, 2016
- Nonroutine Adaptive Management Scientific Evaluation Report, EAHCP Science Committee, September 9, 2016
- Minutes from the September 15, 2016 Stakeholder Committee Meeting

EXHIBIT 3

Science Committee of the
Edwards Aquifer Habitat Conservation Plan

Scientific Evaluation Report:
Nonroutine Adaptive Management Proposal for the
EAHCP Submerged Aquatic Vegetation Restoration Programs

September 9, 2016

Introduction

According to the Funding and Management Agreement, the Adaptive Management Science Committee (Science Committee) is tasked with evaluating all Nonroutine Adaptive Management (AMP) proposals. These evaluations result in a "Scientific Evaluation Report" for presentation to the Stakeholder Committee. The Stakeholder Committee considers this report in their decision whether to recommend the Nonroutine AMP proposal to the Implementing Committee for final approval.

This Scientific Evaluation Report is issued in response to the Nonroutine AMP proposal[1] submitted by the Program Manager, dated September 1, 2016 related to the submerged aquatic vegetation (SAV) restoration programs in the Comal and San Marcos systems. The following sections in this report summarize the Science Committee's evaluation of this Nonroutine AMP proposal.

Once approved by the Chair and Vice-Chair of the Science Committee following the September 9, 2016 Science Committee meeting, this Scientific Evaluation Report will be presented to the Stakeholder Committee at its meeting on September 15, 2016.

Nonroutine Adaptive Management Proposal

On September 1, 2016, the EAHCP Program Manager submitted the attached Nonroutine AMP proposal to the Science, Stakeholder and Implementing Committees. It involves modifications to the SAV restoration programs which affect the Long-term Biological Goals (LTBGs) for the fountain darter (*Etheostoma fonticola*) in the Comal and San Marcos systems and which affects the flow-split in the Old and New Channels of the Comal system.

[1] This Nonroutine AMP proposal reflects the consideration by the Program Manager of several different sources of information, including: (1) *Submerged Aquatic Vegetation Analysis and Recommendations* (BIO-WEST, Inc. & Watershed Systems Group, Inc., 2016); (2) Input from the Science, Stakeholder, and Implementing Committees; (3) Discussions with the United States Fish & Wildlife Service (USFWS); (4) Discussions with Texas Parks & Wildlife Department (TPWD); (5) The original EAHCP SAV analysis, conducted back in 2009, for the creation of the Long-term Biological Goals (LTBGs; Recon Environmental, Inc., Hicks & Company, Zara Environmental, LLC, & BIO-WEST, Inc. 2012); (6) Hydraulic models and habitat suitability criteria for individual plant species, performed by Hardy, which show preferred habitat based on depth, velocity, and substrate (Recon Environmental, Inc., Hicks & Company, Zara Environmental, LLC, & BIO-WEST, Inc. 2012); (7) Historical aquatic vegetation maps over time for the LTBG reaches, combined to generate a persistence factor for each vegetation type (BIO-WEST, Inc. Biological Monitoring, 2000-2015); (8) Knowledge gained through restoration experiences to date for each proposed LTBG reach (E. Oborny & T. Hardy, personal communication, July 2016).

Scientific Evaluation of the Nonroutine Adaptive Management Proposal

The purpose of this report is to provide the Science Committee's evaluation of the merits of the proposed modifications presented in the Nonroutine AMP proposal, as compared to possible alternatives. Possible alternatives were explicitly developed in the *Submerged Aquatic Vegetation Analysis and Recommendations* ("SAV Report;" BIO-WEST, Inc. & Watershed Systems Group, Inc., 2016), as "scenarios."

The SAV Report identifies three scenarios—Scenarios "1," "2," and "3." A fourth scenario, "Scenario 4," was produced in an addendum to the SAV Report. As will be discussed in greater detail later in this section, comparison between each of these four scenarios provides the basis for the Science Committee's evaluation of this Nonroutine AMP proposal.

Background

The following summarizes all four SAV restoration scenarios evaluated by the Science Committee, plus the adjustment to the flow-split management for the Old and New Channels of the Comal system. The accompanying table (Table 1) summarizes the estimated fountain darter counts that would be achieved through each of the following scenarios.

1. **Scenario 1 -** Status Quo
    - Includes planting and maintenance of non-native SAV species
        - *Hydrilla verticillata, Hygrophila polysperma,* and *Vallisneria* sp. are non-native species in the San Marcos system
        - *Hygrophila polysperma* is a non-native species in the Comal system
    - Not achievable due to competition between *Zizania texana* (Texas wild-rice) and other SAV species for physical space
    - Cannot be achieved within the term of the Incidental Take Permit (ITP) due to space limitations
    - Potential for an estimated 34,325 fountain darters in the three San Marcos system Long-term Biological Goal (LTBG) reaches (see Table 1)
    - Potential for an estimated 176,150 fountain darters in the four Comal system LTBG reaches (see Table 1)

2. **Scenario 2 –** Removes Non-Native Requirements
    - Removes non-natives in the San Marcos system from the LTBGs (*Hydrilla verticillata*, *Hygrophila polysperma*, and *Vallisneria* sp.) and replaces them with natives (*Heteranthera dubia* and *Zizania texana*)
    - Integrates *Zizania texana* and SAV restoration for a realistic and achievable regime
    - Removes a non-native in the Comal system from the LTBGs (*Hygrophila polysperma*) and replaces it with a native (*Potamogeton illinoensis*)
    - Potential for an estimated 29,300 fountain darters in the San Marcos system LTBG reaches (see Table 1)

  - Represents a potential decrease of an estimated 5,025 darters in the three San Marcos LTBG reaches
- Potential for an estimated 176,718 fountain darters in the four Comal system LTBG reaches (see Table 1)
  - Represents a potential increase of an estimated 568 darters in the Comal LTBG reaches

3. **Scenario 3 –** Includes Additional Restoration Reaches
   - All of Scenario 2, plus the below
   - Maintains the lower-end of the range (9,480 m^2) of the *Zizania texana* LTBGs
   - Defines "proportional expansion" as required by the Key Management Objectives as additional restoration in newly created "restoration reaches"
     - Adds five restoration reaches to the San Marcos system
       - Potential for an estimated 10,925 additional fountain darters in the San Marcos system within the restoration reaches beyond LTBG numbers (see Table 1)
     - Adds three restoration reaches to the Comal system
       - Potential for an estimated 3,462 additional fountain darters in the Comal system within the restoration reaches beyond LTBG numbers (see Table 1)

4. **Scenario 4 –** Includes Additional Restoration Reaches and *Hydrocotyle*
   - All of Scenario 3, with the following changes (applicable only to San Marcos):
   - *Hydrocotyle umbellata* as a replacement for *Hydrilla verticillata, Hygrophila polysperma*, and *Vallisneria* sp., rather than *Heteranthera dubia*
   - Potential for an estimated 29,270 fountain darters in the San Marcos system LTBG reaches (see Table 1)
     - Represents a potential decrease of an estimated 5,055 darters in the San Marcos LTBG reaches
   - Add five restoration reaches in the San Marcos system
     - Potential for an estimated 9,910 additional fountain darters in the San Marcos system within the restoration reaches beyond LTBG numbers (see Table 1)

Table 1. Fountain Darter Counts by Restoration Scenario

Comal System			
Scenario	LTBG Reaches	Restoration Reaches	Total
EAHCP	176,150	N/A	176,150
Scenario 1	176,150	N/A	176,150
Scenario 2	176,718	N/A	176,718
Scenario 3	176,718	3,462	180,180
Scenario 4	176,718	3,462	180,180
Proposal	176,718	3,462	180,180
San Marcos System			
Scenario	LTBG Reaches	Restoration Reaches	Total

EAHCP	34,325	N/A	34,325
Scenario 1	34,325	N/A	34,325
Scenario 2	29,300	N/A	29,300
Scenario 3	29,300	10,925	40,225
Scenario 4	29,270	9,940	39,210
Proposal	29,270	9,940	39,210

5. Adjustment to Flow-Split Management of the Old and New Channels

- Involves a modification to the flow requirements set by EAHCP Table 5-3
- The maximum controlled flow in the Old Channel would be reduced from 80 cfs to 65 cfs
- The minimum controlled flow in the Old Channel would remain the same - 20 cfs

Evaluation

As a strategy for evaluating the merits of this Nonroutine AMP proposal, the Science Committee identified a list of criteria by which each of the four scenarios, as well as the proposed modifications to the flow-split management in the Comal system, could be evaluated according to the scientific merit inherent to each. The following discussion presents the Science Committee's rationale associated with each of the selected criteria used to evaluate the restoration scenarios in comparison with the Nonroutine AMP proposal (Proposal).

- **Responds to issues/challenges/obstacles** refers to whether the scenario seeks to proactively address challenges encountered by implementation (as opposed to adhering to the status quo). The Science Committee endorses responsiveness to challenges and as such, adaptation-responsive management actions are viewed more highly than those which are not (e.g., Scenario 1).

- **Utilizes an appropriate native SAV in San Marcos (SM) system** refers to the use of *Hydrocotyle umbellata* as a replacement for *Hydrilla verticillata, Hygrophila polysperma*, and *Vallisneria* sp. in the San Marcos SAV restoration program, rather than *Heteranthera dubia*, as originally had been proposed. Given (1) the growth habit of *Heteranthera dubia*, which make it a suspected competitor with other SAV species such as *Zizania texana*, as well as (2) the lack of documentation of *Heteranthera dubia* ever having naturally occurred in the upper San Marcos River (Lemke, 1989; Espey, Huston and Associates, Inc. 1975), the Science Committee believes *Heteranthera dubia* would be an inappropriate choice for the San Marcos SAV restoration program. By contrast, *Hydrocotyle umbellata* features a growth habit that appears to make it less likely competitor with other SAV species, and importantly, has historically been recorded as a native component of the SAV community of the upper San Marcos River (Espey, Huston and Associates, Inc. 1975).

- **Addresses spatial limitations** refers to the finding that it may not be possible to ever meet the original LTBGs in certain reaches of the Comal and San Marcos. Original calculations for areal coverage goals for different SAV species by reach were based on historical maxima for each plant species within the given reaches. Although these historically-recorded data provided aspirational goals for the SAV restoration programs, they did not consider conflicting factors outside the immediate scope of the SAV restoration activities. Examples include the eventual establishment of the permanent access points in the San Marcos system, which interact with restoration areas due to recreationist traffic patterns, as well as competing goals from other Conservation Measures, such as "Texas Wild-rice Enhancement and Restoration," which is treated separately in the EAHCP from other SAV species. Again, the Science Committee endorses responsiveness to the challenges of implementation.

- **Treats *Zizania texana* as fountain darter habitat** refers to the fact that existing EAHCP programs do not acknowledge that *Zizania texana* provides habitat for the fountain darter (i.e., *Zizania texana* is left out of the LTBGs for SAV areal coverage for fountain darter habitat). This fails to account for a significant portion of restored fountain darter habitat that created through the Texas Wild-rice Enhancement and Restoration Conservation Measure. The Science Committee recognizes that Texas wild-rice provides habitat for the fountain darter.

- **Plants only appropriate natives** refers to removing non-native plant species (*Hydrilla verticillata*, *Hygrophila polysperma*, and *Vallisneria* sp.) from the LTBGs for fountain darter habitat, and replacing them with native plant species (*Hydrocotyle umbellata* and *Zizania texana* in the San Marcos system, and *Potamogeton illinoensis* in the Comal system.) As part of an ecological restoration project, programs restoring only native vegetation are to be preferred, as opposed to programs supporting non-native, exotic species which may have deleterious effects on the ecological community including threatened and endangered species. The Science Committee recognizes a diversity of native vegetation as optimal habitat for both systems.

- **Removes non-natives** refers to the same as the above. The Science Committee recognizes a diversity of native vegetation as optimal habitat for both systems.

- **Proportional Expansion: "Restoration Reaches"** refers to geographically defining the reaches to which the term "proportional expansion" applies. This term is used in the HCP, but is not fully defined. For example, in discussing the LTBGs for the fountain darter in both systems (EAHCP §§4.1.1.1 and 4.1.1.2), the HCP specifies that SAV restoration is to "extend beyond the study reaches in equal proportion to effort expended per study area in relation to the total area of" the river segment (e.g., Landa Lake study area/ Landa Lake, IH-35 study area/Rio Vista Dam to IH-35 reach). The Science Committee recognizes the benefits of geographically identifying the restoration reaches as the proportional expansion because, when implemented, it will contribute significantly to the SAV restoration programs in both systems.

- **Provides a timeline for implementation** refers to having a detailed schedule which lays out targets for SAV restoration progress with annual milestones through the end of the ITP (2028). The existing SAV restoration programs (Scenario 1) do not have a timeline for implementation.

- **Reflects consultation with stakeholders** refers to the input received from EAHCP Committee members concerning the proposed recommendations for adaptive management. This process allows for all sides to be considered in the process of developing a final Nonroutine AMP proposal, ultimately helping to ensure a more balanced and sustainable outcome. The Science Committee recognizes the importance of this input.

- **Includes flexibility if *Hydrocotyle* unsuccessful** refers to having the City of San Marcos and Texas State University, in minimal amounts, proactively field test two other native SAV species to replace *Hydrocotyle umbellata* in the event it is unsuccessful. The two species to be tested will be determined through collaboration between the City of San Marcos, Texas State University, the Program Manager, and Texas Parks & Wildlife Department. If *Hydrocotyle umbellata* is not succeeding by 2019, without utilizing the AMP process, one of the two test species will be used as a replacement for *Hydrocotyle umbellata*, after meeting the following criteria:
    1. The test species is identified as native in existing literature and research
    2. The test species is endorsed as an appropriate replacement species by the EAHCP Science Committee
    3. The test species is endorsed as an appropriate replacement species by the United States Fish & Wildlife Service (USFWS)
    4. The Implementing Committee approves submittal of the appropriate documentation associated with the replacement, if necessary, to the USFWS

- **EAHCP Long-term Biological Goals achievable** refers to scenarios for which those constraints which would preclude the attainment of the LTBGs by the end of the ITP period in 2028 are accounted for. The SAV Report determined that existing LTBGs would likely not be attainable; thus, the Science Committee endorses the revised LTBGs for the fountain darter as a more viable option to pursue.

- **Improves efficiencies/benefit to Old Channel** refers to establishing a flow management system for the Old and New Channels of the Comal system that is geared to avoid scouring or otherwise unduly disturbing restored SAV in the Old Channel streambed, while also ensuring that flow management does not unduly impact Spring Island, which lies upstream of the Old Channel in Landa Lake, and provides important habitat for the Comal Springs riffle beetle (CSRB; *Heterelmis comalensis*).

- **Protects CSRB habitat around Spring Island** refers to the same as the above.

The following table, (Table 2) presents each of these criteria, alongside whether each scenario and the Proposal fulfills (✓), lacks (X), is uncertain (?) or is not applicable (NA) with regards to the given criterion.

As stated, the Proposal involves modifications to the SAV restoration programs which affect the LTBGs for the fountain darter in the Comal and San Marcos systems, and which affects the flow-split in the Old and New Channels in the Comal system. Specifically, these modifications are based on Scenario 4 of the SAV Report. Additionally, the Proposal includes flexibility if *Hydrocotyle umbellata* is not succeeding in the San Marcos system, and includes modifications to the flow-split management in the Comal system to provide maximum benefit to sustaining fountain darter habitat in the Old Channel, while keeping CSRB habitat around Spring Island wetted. Refer to Attachment 1—Nonroutine Adaptive Management Proposal for the Submerged Aquatic Vegetation Restoration Programs—for a complete description.

Table 2. Analysis Matrix

Evaluation Criteria	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Proposal
Responds to issues/challenges/obstacles	X	X	✓	✓	✓
Utilizes an appropriate native SAV in SM system	X	X	X	✓	✓
Addresses spatial limitations	X	✓	✓	✓	✓
Treats *Zizania texana* as fountain darter habitat	X	✓	✓	✓	✓
Plants only appropriate natives	X	?	?	✓	✓
Removes non-natives	X	✓	✓	✓	✓
Proportional Expansion: "Restoration Reaches"	X	X	✓	✓	✓
Provides a timeline for implementation	X	✓	✓	✓	✓
Reflects consultation with stakeholders	X	X	X	✓	✓
Includes flexibility if *Hydrocotyle* unsuccessful	X	X	X	X	✓
EAHCP Long-term Biological Goals achievable	X	X	✓	✓	✓
Improves efficiencies/benefit to Old Channel	NA	NA	NA	NA	✓
Protects CSRB habitat around Spring Island	NA	NA	NA	NA	✓

Recommendation of the Science Committee

Based on the assessment presented in the previous section, the Science Committee recommends the Nonroutine AMP Proposal (listed as “Proposal” in Table 2).

References

BIO-WEST, Inc. & Watershed Systems Group, Inc. 2016. Submerged aquatic vegetation analysis and recommendations. Including SAV Addendum (Section 3.1.2) and revised Appendix B. Prepared for Edwards Aquifer Authority, San Antonio, TX.

Recon Environmental, Inc., Hicks & Company, Zara Environmental, LLC, & BIO-WEST, Inc. 2012. Edwards Aquifer Recovery Implementation Program: Habitat Conservation Plan – November 2012. Prepared for Edwards Aquifer Recovery Implementation Program, San Antonio, TX.

List of Attachments

- Nonroutine Adaptive Management proposal dated September 1, 2016
- Minutes from the September 9, 2016 Science Committee Meeting
- *Submerged Aquatic Vegetation Analysis and Recommendations and Addendum* (BIOWEST, Inc. & Watershed Systems Group, Inc., 2016)

Summary of Science Committee Discussion of the Proposal

Overview

At the September 9, 2016 Science Committee, EAHCP Program Manager Nathan Pence provided a comprehensive presentation, *Submerged Aquatic Vegetation Nonroutine Adaptive Management* to the Science Committee. This presentation covered (1) the background to the AMP built into the EAHCP, (2) the commissioning of the SAV Report, (3) the findings of the SAV report, (4) the stakeholder-driven process, whereby the eventual Nonroutine AMP proposal was developed, and finally, (4) the elements of the Nonroutine AMP proposal itself.

The following sections provide a lightly-edited summary of the Science's Committee's discussion of the Nonroutine AMP proposal, organized according to the main themes that emerged over the course of the discussion. This section concludes with the final motions (including associated final recommendations) made by the Science Committee concerning the Nonroutine AMP proposal and this Scientific Evaluation Report.

Acknowledging Zizania texana as Fountain Darter Habitat

In the course of the presentation, Mr. Pence pointed out that one of the issues the SAV Report took into account was the fact that the original EAHCP SAV LTBGs for fountain darter habitat did not include habitat created by *Zizania texana* EAHCP restoration activities (treated separately within the Texas Wild-rice Enhancement & Restoration Conservation Measure). Dr. Tom Arsuffi expressed surprise that USFWS reviewers did not capture this oversight during the approval process for the HCP.

To this comment, Jackie Poole stated that, to the contrary, she remembered that in early research in the spring system, early data ranked *Zizania texana* among some of the poorer SAV species for fountain darter habitat. Mr. Pence responded that through the long-term biological monitoring program, we now have more and higher quality data supporting *Zizania texana* as a viable SAV species for fountain darter habitat. Doyle Mosier added that a modeling report was produced for *Zizania texana* that also provided indirect support for this SAV species as fountain darter habitat, since the habitat requirements in terms of flow for *Zizania texana* are compatible with those of the fountain darter. Mr. Pence acknowledged that, overall, although the data show that *Zizania texana* may not be one of the top-ranking SAV species for fountain darter habitat, *Zizania texana* does provide fountain darter habitat nonetheless.

Regarding revisions to the *Zizania texana* LTBGs presented in the proposal, Dr. Jacquelyn Duke asked for clarification whether by "lower range," what is meant is that the existing goals would not be being changed, but rather, the lower range of the existing goals would be attained. Mr. Pence confirmed that this was indeed the correct interpretation of the proposal as presented.

Considerations Concerning Fountain Darter SAV Density

Concerning sources of data for *Zizania texana*, Dr. Conrad Lamon asked Mr. Pence if Dr. Thom Hardy of the Texas State University Meadows Center for Water and the Environment would have this data; Mr. Pence answered that besides the EAHCP's biological monitoring program, the San Marcos Observation System (SMOS) might be a source of ongoing data collection with bearing on *Zizania texana* in the San Marcos system.

Concerning the density values used in the SAV Report for average number of darters per SAV type, Dr. Lamon asked if the calculation of these density values was produced using a model akin to those developed by Dr. Hardy in other contexts, to, for example, model for the density of fountain darters within *Zizania texana*. Mr. Pence responded that a model was not used for the density values, but clarified that the *Zizania texana* density values in the scenarios presented by the SAV Report did incorporate new data. Mr. Pence also clarified that the fountain darter LTBGs in the SAV Report scenarios do not represent maxima for SAV coverage by reach, as had been the case in the original coverage LTBGs set in the EAHCP.

Concerning the table comparing the EAHCP LTBGs with estimated fountain darter counts that are potentially achievable under Scenario 4, Dr. Lamon asked for clarification whether, since the EAHCP value was based on the maximum historically-recorded areal coverage of SAV species, the Scenario 4 fountain darter count estimations can be considered to not actually represent a real loss. Mr. Pence confirmed this was indeed the case.

Dr. Janis Bush asked whether the SAV density values included *Hydrocotyle umbellata*. Mr. Pence replied that yes, this was included. Chad Norris asked Mr. Pence about his

comment that we already have data on *Hydrocotyle umbellata* observed fountain darter density. Mr. Pence confirmed that this data has been collected through the biological monitoring program, and that the EAHCP will continue monitoring this habitat type going forward.

Dr. Glenn Longley commented that he is skeptical whether SAV type is as important as it is purported to be in the SAV restoration program, citing the robust population growth of fountain darters kept in raceways at the Texas State University Freeman Aquatic facility. These raceways only had water and some algae and yet, from a starter stock of a few darters, they could reproduce to number in the hundreds. Based on this experience, Dr. Longley stated that he is not convinced that fountain darters need a variety of specific plants—perhaps, as long as darters are provided with the right flow conditions and food source, they can withstand considerable perturbations in their environment.

Dr. Lamon commented that differences in fountain darter density observed by SAV type could be due to different plant species featuring different detection probabilities (for example, due to differing morphological characteristics between species). Using a hierarchical analysis approach that would split this factor out could give a better reading on actual SAV preferences among darters. Mr. Pence noted previous work has been done demonstrating that preferred plant types hold preferred food sources for darters, which supports existing knowledge of SAV preferences among darters.

Dr. Lamon asked whether information on the standard error or standard deviation of fountain darters per SAV type is available. Mr. Norris replied that we already use the median. Dr. Lamon stated that it would be helpful to examine the original data collected by Dr. Hardy in the studies used during the development of the EAHCP. Mr. Norris commented that he believed Dr. Hardy's reports were based on data collected through the biological monitoring program, through drop-net sampling for the darters.

Identifying Species Names

Referencing a slide in Mr. Pence's presentation that listed SAV genera without identifying species names, Mr. Mosier noted the importance of identifying species names in the EAHCP process. Mr. Pence stated that staff had incorporated this recommendation (which had come up in earlier meetings) throughout other documents already drafted in support of this Nonroutine AMP action, and that although incorporated elsewhere, the species identifications had not made it to the slides in the presentation. Dr. Longley asked what particular species of *Potamogeton* was used for the SAV restoration programs; Daniel Large replied that *Potamogeton illinoensis* was the species used.

Community Assembly Rules

Dr. Arsuffi brought up the importance of considering ecological community assembly rules when dealing with issues of SAV restoration program design. Dr. Arsuffi stated

that he identified this as a deficiency in the SAV report. Considering community assembly rules, such as succession, functional traits, niche partitioning, and other elements will, in general, improve the effectiveness and the efficiency of a variety of studies concerning the ecology of the springs systems. Mr. Pence stated that in talking with the authors of the SAV Report, issues of the type Dr. Arsuffi referred to have been considered, but perhaps not to the extent to which Dr. Arsuffi was advocating. Dr. Arsuffi commented that having gone through the exercise of justifying replacement species (as would have been done if community assembly were considered) might have helped avoid the selection of *Heteranthera dubia*, which ultimately proved to have been a problematic choice of SAV for the San Marcos SAV restoration program.

There was more discussion concerning the inclusion of *Heteranthera dubia* in the SAV Report as a replacement native SAV species in the San Marcos system. Dr. Arsuffi asked for clarification whether the authors of the SAV Report had only considered SAV selection criteria *after* the Science Committee had raised concerns about the appropriateness of using *Heteranthera dubia* (as had come up at one of its previous meetings). Mr. Pence replied that the report authors had taken SAV selection criteria into account from the start of their analysis; however, as Program Manager, he communicated the concerns of the Science Committee to the authors, leading them to revise their plans. *Heteranthera dubia* had originally appeared to be “low hanging fruit” for the SAV restoration program, as it is a plant that the SAV restoration team in San Marcos had some experience with previously. Mr. Mosier commented that due to the various exotics that have been introduced in the San Marcos system over the years, there can be a lack of clarity concerning the native SAV community, which could add difficulty to the task of selecting appropriate species to plant in the system.

Mr. Mosier asked if there is active removal of *Colocasia esculenta* in the San Marcos system, since this plant would invade the habitat preferred by *Hydrocotyle umbellata* and likely outcompete it. Mr. Pence answered yes, that while efforts to remove *Colocasia esculenta* in the San Marcos are ongoing, efforts to date have nearly eradicated this exotic invasive plant species above IH-35. Dr. Duke asked if any of the *Heteranthera dubia* that was already planted has been removed; Mr. Pence replied that no, it has not been removed, but that planting has stopped going forward.

Comment on the SAV Restoration Reaches

During Mr. Pence’s discussion of the establishment of geographically defined restoration reaches for the proportional expansion of the SAV restoration efforts, Dr. Duke commented that the proposed expansion appears to be quite a significant increase in the areas that will receive SAV restoration, which Mr. Pence agreed.

Acknowledging the Ecological Dynamism of the Springs Systems

As an overarching recommendation concerning the SAV restoration programs and other ecology-related EAHCP activities, Dr. Arsuffi emphasized the importance of recognizing that the river systems are inherently dynamic. Dr. Arsuffi expressed the concern that we

are trying to “over-engineer” the systems by assuming that we can attain stable levels of different plant species, when in reality, plant populations will inevitably ebb and flow with the incursion of various system disturbances. Given this, Dr. Arsuffi recommended the EAHCP should incorporate greater consideration of inherent variability (e.g., changing abundances of SAV species over time). Mr. Pence countered that the EAHCP needs to have defined metrics to establish compliance, but acknowledged that Dr. Arsuffi’s point was well made, and that how to balance defined metrics with ecological dynamism in practice is the challenge.

Dr. Arsuffi suggested ranges (+/-) associated with goals as one possible strategy to accommodate for dynamism versus measuring compliance. Dr. Floyd Weckerly commented that this could also be accomplished using quartiles or standard deviation values for the goals. Dr. Lamon noted that effectively using defined, discrete values for goals requires an understanding of the probability of attainment/compliance—and that without uncertainty analyses, using discrete values is on tenuous footing. Mr. Pence suggested adding wording to the Scientific Evaluation Report that would represent the Science Committee’s concern that the inherent flux of the systems should be accounted for, and that staff could try to revisit this in the future. Mr. Pence made the point to commend USFWS for being understanding of the variability the EAHCP faces in attaining compliance within the Comal and San Marcos systems.

Dr. Weckerly suggested establishing an experimental reach where EAHCP suspends restoration activities to provide a control environment that would facilitate comparison of how the ecological community changes between EAHCP restoration areas and the “untreated” area. Melani Howard expressed concern that if this is done before all of the *Hydrilla* and *Hygrophila* is removed from the system, we already know what the end point will be in such an experiment—total invasion by the exotic invasive SAV species. Once removed, she noted, only then might there be a point to establishing such an experimental reach.

Dr. Duke asked if the management adaptations being proposed would be revisited. Mr. Pence answered that yes, on our end, we’re considering this through the biological monitoring program.

Details of Flow-split Infrastructure Management

Mr. Mosier asked what valves are present within the Landa Lake flow infrastructure that permit the management of the flows from the lake to the Old and New Channels of the Comal River. Mr. Pence answered that there is (1) a culvert from around the 1990s; (2) another in the spring-fed swimming pool; and (3) two pipes, currently capped, that are being repaired, for a total of four pipes that control flows from the lake to the Comal River. There is also a small weir across from the parks office on the lake, which has a bypass valve that can also be manipulated for the purposes of the program. By pinching this particular valve, the level of the lake can be manipulated.

Discussion of Table 2 (Analysis Matrix)

Dr. Arsuffi presented Table 2 as part of the Scientific Evaluation Report to the Committee. He stated that, by illustrating the benefits and drawbacks of each of the different scenarios, Table 2 makes the choice of final recommendation very clear. Dr. Arsuffi invited his colleagues on the Committee to chime in if they have questions concerning any of the criteria. There were no questions.

Final Motions by the Committee

Dr. Longley motioned to recommend the Nonroutine AMP proposal as presented, with the inclusion of the following Science Committee recommendations:

(1) That species names in EAHCP documents and processes be identified whenever possible;

(2) That consideration of community assembly rules is incorporated in the future, where appropriate, in activities involving ecological issues within the Comal and San Marcos systems (e.g., the selection of SAV species);

(3) That the dynamic nature of the Comal and San Marcos rivers as natural systems is considered in the future, such as by considering expressing goals as +/- ranges, or some other means;

(4) That establishing an experimental reach as a control, in which EAHCP restoration activities would be suspended, is investigated as a possible project; and

(5) That the relatively resilient nature of the fountain darter in the face of habitat fluctuations be recognized.

Provided the recommendations as stated above, Dr. Weckerly seconded Dr. Longley's motion to recommend the Nonroutine AMP proposal. There were no further comments. All were in favor. Motion passed.

Dr. Duke motioned to endorse the expedited process to prepare and submit this Nonroutine AMP Scientific Evaluation Report to the Stakeholder Committee. Dr. Weckerly seconded Dr. Duke's motion. All were in favor. Motion passed.

Following the meeting, this draft of the Scientific Evaluation Report was approved by the Chair and Vice-Chair of the Science Committee for submission to the Stakeholder Committee.

EXHIBIT 4

NOTICE OF OPEN MEETING

Available at eahcp.org

As required by Section 7.9.3 of the Funding and Management Agreement (FMA), an interlocal agreement made pursuant to Texas Government Code Chapter 791 by and among the Edwards Aquifer Authority (EAA), the City of New Braunfels (New Braunfels), the City of San Marcos (San Marcos), the City of San Antonio acting by and through its San Antonio Water System (SAWS), Texas State University, and the Guadalupe-Blanco River Authority (GBRA), a meeting of the **Science Committee** for the Edwards Aquifer Habitat Conservation Plan Program is scheduled for **Friday, September 9, 2016, at 9 a.m. at the Dunbar Recreation Center, 801 W. Martin Luther King Drive, San Marcos, Texas, 78666.** Lunch will not be provided; the meeting is expected to end around noon.

Members of this committee include: Tom Arsuffi, Janis Bush, Jacquelyn Duke, Charles Kreitler, Conrad Lamon, Glenn Longley, Robert Mace, Doyle Mosier, Chad Norris, Jackie Poole, and Floyd Weckerly. Committee members are asked to please RSVP to dlarge@edwardsaquifer.org.

At this meeting, the following business may be considered and recommended for committee action:

1. Call to order.

2. Public comment.

3. Approval of June 22, 2016 Science Committee meeting minutes (Attachment 1).

4. Receive report from the Program Manager.
   - Springflow and Index Well Update
   - Introduction of new EAHCP staff member

5. Presentation, discussion, and possible recommendation of the Nonroutine Adaptive Management proposal related to the submerged aquatic vegetation Conservation Measures in the Comal and San Marcos to the Stakeholder Committee (Attachments 2, 3, 4, and 5).
   Purpose: To provide the opportunity for the Science Committee to discuss and possibly recommend the Nonroutine Adaptive Management proposal related to the submerged aquatic vegetation Conservation Measures in the Comal and San Marcos to the Stakeholder Committee to the Stakeholder Committee.
   Action: To possibly recommend the Nonroutine Adaptive Management proposal to the Stakeholder Committee.

6. Presentation and possible endorsement of an expedited process to prepare and to submit the Nonroutine Adaptive Management Scientific Evaluation Report to the Stakeholder Committee.

Purpose: To provide the opportunity for the Science Committee to discuss and possibly endorse a process to prepare and to submit the Nonroutine Adaptive Management Scientific Evaluation Report to the Stakeholder Committee.
Action: To possibly endorse the expedited process for preparing the Nonroutine Adaptive Management Scientific Evaluation Report and for submitting it to the Stakeholder Committee.

7. Discussion of the proposals received for the EAHCP 2017 Applied Research Program (Attachment 6).
   Purpose: To provide the opportunity for the Science Committee to discuss their review of the proposals received for the 2017 Applied Research Program.
   Action: No action required.

8. Presentation of the Standard Operating Procedure (SOP) for Sampling the Comal Springs Riffle Beetle (CSRB; Attachment 7).
   Purpose: To provide the Science Committee an opportunity to discuss the SOP developed for sampling the CSRB.
   Action: No action required

9. Consider future meetings, dates, locations, and agendas. – November 10, 2016 at the San Marcos Activity Center (Multipurpose Room).

10. Questions and comments from the public.

11. Adjourn.

EXHIBIT 4

SEPTEMBER 9, 2016
Draft - MEETING MINUTES

1. **Call to order** – *9:00 am*
Members present included: Tom Arsuffi, Jacquelyn Duke, Conrad Lamon, Glenn Longley, Doyle Mosier, Chad Norris, Jackie Poole, and Floyd Weckerly. Janis Bush participated via phone.

2. **Public comment.**
No comment.

3. **Approval of June 22, 2016 Science Committee meeting minutes.**
Dr. Duke motioned to approve the minutes. Dr. Longley seconded. There were no objections.

4. **Receive report from the Program Manager.**
   - **Springflow and Index Well Update**
   Dr. Chad Furl, Chief Science Officer, provided a brief hydrologic update for the region.

   - **Introduction of new EAHCP staff member**
   Dr. Furl introduced Kristina Tolman as the new HCP Coordinator.

5. **Presentation, discussion, and possible recommendation of the Nonroutine Adaptive Management proposal related to the submerged aquatic vegetation Conservation Measures in the Comal and San Marcos to the Stakeholder Committee.**
Nathan Pence, EAHCP Program Manager, provided a presentation to the Science Committee regarding the Submerged Aquatic Vegetation Analysis and the Nonroutine Adaptive Management proposal. The committee took a 15-minute break during this agenda item. A full summary of the Science Committee's discussion is provided as a section within the Scientific Evaluation Report (a report produced by the Committee pursuant to the Nonroutine AMP procedures laid out in the Funding & Management Agreement). Dr. Longley motioned to recommend the Nonroutine AMP proposal as presented, with the inclusion of the following Science Committee recommendations:

   (1) That species names in EAHCP documents and processes be identified whenever possible;

   (2) That consideration of community assembly rules is incorporated in the future, where appropriate, in activities involving ecological issues within the Comal and San Marcos systems (e.g., the selection of SAV species);

   (3) That the dynamic nature of the Comal and San Marcos rivers as natural systems is considered in the future, such as by considering expressing goals as +/- ranges, or some other means;

   (4) That establishing an experimental reach as a control, in which EAHCP restoration activities would be suspended, is investigated as a possible project; and

(5) That the relatively resilient nature of the fountain darter in the face of habitat fluctuations be recognized.

Provided the recommendations as stated above, Dr. Weckerly seconded Dr. Longley's motion to recommend the Nonroutine AMP proposal. There were no further comments. All were in favor. Motion passed.

6. **Presentation and possible endorsement of an expedited process to prepare and to submit the Nonroutine Adaptive Management Scientific Evaluation Report to the Stakeholder Committee.**
Dr. Duke motioned to endorse the expedited process to prepare and submit this Nonroutine AMP Scientific Evaluation Report to the Stakeholder Committee. Dr. Weckerly seconded Dr. Duke's motion. All were in favor. Motion passed.

7. **Discussion of the proposals received for the EAHCP 2017 Applied Research Program.**
Dr. Furl provided an update to the Science Committee concerning the proposals received for the 2017 Applied Research Program and the Science Committee's review process. A summary of points of discussion concerning each project is provided below.

   - ***Evaluation of the effects of sedimentation on Comal Springs riffle beetle:***
   Mr. Norris mentioned that there has been a lot of research done on the Comal Springs riffle beetle (CSRB) habitat preferences. He concluded that the proposed field study would not provide significant information for the EAHCP. Dr. Arsuffi communicated issues with the specific methodologies on both laboratory and field experiments in the proposal received. Mr. Pence asked the committee whether this project should be pursued in 2017. The committee supported tabling this study to pursue more important research on other topics related to the CSRB.

   - ***Statistical analysis of the San Marcos & Comal Springs aquatic ecosystems biomonitoring dataset:***
   The committee discussed the proposals received and how they determined their criteria for evaluation. Dr. Weckerly stated that the proposal provided him the impression that it is important to understand the relationship between different aspects of the system, as well as an understanding of how the data can communicate the information. Dr. Arsuffi found issue with all the proposals regarding the lack of a literature review specifically.

8. **Presentation of the Standard Operating Procedure (SOP) for Sampling the Comal Springs Riffle Beetle (CSRB).**
Bob Hall, Sr. Project Coordinator, presented the CSRB SOP that has been developed in order to streamline and bring synergy to CSRB data collection efforts. Dr. Lamon mentioned that it could be helpful to collect information on the data collectors' company/organization affiliation. The committee had questions about the general goals and various specifics of the data form. There were no issues with the form or the SOP. The final SOP will be posted on eahcp.org.

9. **Consider future meetings, dates, locations, and agendas. – November 10, 2016 at the San Marcos Activity Center (Multipurpose Room).**

10. **Questions and comments from the public.**
None received.

11. **Adjourn.** - *11:55 a.m.*

EXHIBIT 4

NOTICE OF OPEN MEETING
Available at eahcp.org

As required by Section 7.8.4 of the Funding and Management Agreement (FMA), an interlocal agreement made pursuant to Texas Government Code Chapter 791 by and among the Edwards Aquifer Authority (EAA), the City of New Braunfels (New Braunfels), the City of San Marcos (San Marcos), the City of San Antonio acting by and through its San Antonio Water System (SAWS), Texas State University, and the Guadalupe-Blanco River Authority (GBRA), a meeting of the **Stakeholder Committee** of the **Edwards Aquifer Habitat Conservation Plan Program** is scheduled for **9:00 am on Thursday, September 15th, 2016 at the Edwards Aquifer Authority, 900 E. Quincy, San Antonio, TX.**

1. Call to order--Establish that all Committee members are present or represented- 9:00 am.

2. Public Comment.

3. Approval of minutes from March 19, 2015 Stakeholder Committee meeting and presentation of minutes from the December 17, 2015 Joint Committee meeting (approved at the January 21 Implementing Committee Meeting) (Attachment 1 & 2).

4. Receive report from the Program Manager on general topics related to the implementation of the Habitat Conservation Plan and operation of the Implementing Committee.
    - EAHCP staff introduction (Attachment 3)
    - Missouri River Recovery Implementation Plan (MRRIP)
    - ASR Leasing Update (Attachment 4)
    - Edwards Aquifer 2015 Recharge Estimate (Attachment 5)
    - NAS Update
    - Database Update
    - Refugia Update

5. Discussion and possible recommendation on the Submerged Aquatic Vegetation (SAV) Nonroutine Adaptive Management (AMP) Proposal (Attachments 6-10).
   Purpose: To provide an opportunity for the Stakeholder Committee to discuss a recommendation on the SAV Nonroutine AMP Proposal.
   Action: To make a recommendation on the SAV Nonroutine AMP Proposal to the Implementing Committee.

6. Discussion and decision regarding expedited process to develop and approve submission of the Nonroutine AMP Stakeholder Report to the Implementing Committee (Attachment 11).

Purpose: To present a potential expedited process to develop and submit the written report reflecting the Stakeholder Recommendation on the SAV Nonroutine AMP Proposal.
Action: To approve a process to develop, approve, and submit the Stakeholder Report to the Implementing Committee.

7. Presentation on the implementation of the Water Quality and Biological Monitoring Work Group Report (Attachment 12).
   Purpose: To present the final report of the Water Quality and Biological Monitoring Work Group.
   Action: No action required.

8. Presentation from EAA staff regarding the EAA 5-year financial forecast and projected Aquifer Management Fee (AMF) rates.
   Purpose: To provide a description of the EAA 5-year financial forecast.
   Action: No action required.

9. Consider future meetings, dates, locations, and agendas.
   - Next Stakeholder Committee meeting is scheduled for Thursday, December 15th at the Edwards Aquifer Authority.

10. Questions from the public.

11. Adjourn.

September 15, 2016
Draft - MEETING MINUTES

1. **Call to order-- 9:00 am.**
   Steve Raabe, called role in order to establish a quorum. A quorum of the committee was reached prior to agenda item number 5.

2. **Public Comment.**
   No comment

3. **Approval of minutes from March 19, 2015 Stakeholder Committee meeting and presentation of minutes from the December 17, 2015 Joint Committee meeting (approved at the January 21 Implementing Committee Meeting).**
   Gary Spence moved to approve the minutes. Cindy Loeffler seconded. There were no objections.

4. **Receive report from the Program Manager on general topics related to the implementation of the Habitat Conservation Plan and operation of the Implementing Committee.**
   - EAHCP staff introduction
     Nathan Pence, Program Manager, introduced the new members of the EAHCP staff.
   - Missouri River Recovery Implementation Plan (MRRIP)
     Mr. Pence provided a brief summary of the representation of the EAHCP/EARIP in Missouri to discuss the MRRIP.
   - ASR Leasing Update
     Rick Illgner, EAA staff, presented an update and general summary of the EAHCP ASR program enrollment. Myron Hess asked how forbearance and leases are distinguished in the current enrollment numbers. Mr. Illgner described the current strategy has been to fully enroll leases and not focus on ASR Forbearance Tiers yet.
   - Edwards Aquifer 2015 Recharge Estimate
   - NAS Update
     Alicia Reinmund-Martinez, EAHCP Director, provided a brief update on the status of the National Academy of Sciences.
   - Database Update
     Dr. Chad Furl, EAHCP Chief Science Officer, provided a brief update on the status of the Database program. Database construction will be completed by the end of 2016.
   - Refugia Update
     Mr. Pence provided a brief update on the EAHCP Refugia program and Roland Ruiz discussed the Long-term Refugia contract status.

5. **Discussion and possible recommendation on the Submerged Aquatic Vegetation (SAV) Nonroutine Adaptive Management (AMP) Proposal.**
Mr. Pence presented the SAV Nonroutine AMP Proposal. The full presentation can be found on eahcp.org.

Following the presentation Steve Raabe continued by facilitating a discussion regarding this proposal. Mr. Raabe mentioned the committee reached a quorum (24 members).

Myron Hess began the discussion with a brief comment. Mr. Hess described this process as very important for the EAHCP by establishing the first AMP. Additionally, he identified that this process has been done in a particularly accelerated process in order to provide time to incorporate changes into the 2017 budget process.

Roger Biggers asked about the reduction of the SAV coverage in the San Marcos regarding the impact to fountain darter densities and Texas wild-rice being counted as habitat. Mr. Pence described that even with adding Texas wild-rice and other natives as habitat to the Long-term Biological Goals, the fountain darter densities do not match the original goals in the EAHCP because the densities observed in the additional vegetation types is slightly lower than the original table in the EAHCP (Table 4-1 and 4-21). Carol Patterson mentioned that the Restoration Reaches seem to double the restoration areas and that the fountain darter density numbers seem to be very conservative.

Mr. Hess provided a perspective that the proposal is specifically reducing the overall goals and objectives in terms of vegetation coverage and fountain darter densities but the point of this proposal is to provide “realistic” and “achievable” goals. Cindy Loeffler complemented Myron’s comments by specifying that the fountain darter density numbers are estimates.

Tom Taggart commented that it may be helpful to provide a perspective in the letters to USFWS about the percentage change in order to show a net increase and decrease. Additionally, Mr. Taggart suggested that a dialogue should begin with USFWS to provide explanation to seasonal changes and weather events that effect overall habitat coverage.

Gary Spence asked if this proposal will provide more stable habitat. Mr. Pence described that this proposal would provide a healthier habitat but he is unable to guarantee a more stable habitat due to the nature of the ecosystem.

Gary Middleton seconded Mr. Taggart’s comment by describing the importance of measuring the floods/drought and its severity in order to give a historical perspective. Colette Barron-Bradsby continued this discussion by mentioning the importance of recording the severity of the specific events.

Gary Middleton motioned to favorably recommend the SAV Nonroutine AMP Proposal to the Implementing Committee for approval. Carol Patterson seconded. There were no objections.

Mr. Hess made a comment editing a specific typo in the AMP Proposal to be changed. Additionally, Patrick Shriver asked Mr. Pence to provide a brief summary of how things will

move forward after this action. Mr. Pence provided a description of the specific changes to the 2017 Work Plans and Funding Application in order to begin official implementation in January 2017.

6. **Discussion and decision regarding expedited process to develop and approve submission of the Nonroutine AMP Stakeholder Report to the Implementing Committee.**
Mr. Raabe introduced the topic and asked Alicia Reinmund-Martinez to describe the specific process to submit the Stakeholder Committee Report to the Implementing Committee. Ms. Reinmund-Martinez summarized a few comments made during the discussion that were included into the report.

   Mr. Raabe described that at the conclusion of the Committee meeting, the Draft Stakeholder Report will be provided for the Committee Chair and Vice-chair to review and accept on behalf of the entire Stakeholder Committee.

   Dianne Wassinech motioned to approve a process to develop, approve, and submit the Stakeholder Report to the Implementing Committee. Gary Lord seconded. There were no objections.

   Carl Adkins complemented Mr. Pence and the EAHCP staff for the preliminary meetings on this proposal and how well the process was presented to the Stakeholders.

7. **Presentation on the implementation of the Water Quality and Biological Monitoring Work Group Report.**
Mr. Pence presented a summary of the Water Quality and Biological Monitoring Work Group Report. The full presentation can be found on eahcp.org.

   Con Mims identified that the monitoring programs exceed the EAHCP 7.1 budget. Mr. Mims asked how this will possibly effect the long-term picture. Mr. Pence described the excess will be spent within the overall budget due to savings in other measures.

8. **Presentation from EAA staff regarding the EAA 5-year financial forecast and projected Aquifer Management Fee (AMF) rates.**
Roland Ruiz provided an introduction to the presentation and described that the AMF rates will be divided differently between EAA operations and EAHCP funding.

   Shelly Hendrix, EAA Chief Financial Officer, presented the EAA 5-year financial forecast. Full presentation can be found on eahcp.org.

   Mr. Hess asked about the reduction of the EAHCP Reserve over the next few years. Tom Taggart recalled some of the rationale regarding the EAHCP Reserve funds and the goals to ultimately reduce the AMF Rates once the reserve cap ($46 million) was met. He continued by asking why there was a change in the rate distribution now to avoid AMF rate increase rather than allow the EAHCP reserve to meet the cap and thus make appropriate changes. Andy Sansom reiterated Mr. Taggart's comments and vocalized an issue with the unilateral decision

to make such a change to the distribution of the AMF rate and ultimately draw-down the EAHCP Reserve. Mr. Ruiz described that the $46 million reserve cap is not a goal but a cap.

Mr. Ruiz asked Darcy Frownfelter, EAHCP General Council, to clarify the EAA requirements with funding the EAHCP. Mr. Frownfelter clarified that the EAA's obligation is to fully fund the EAHCP based on Table 7.1 and be prepared to fund the contingency that ASR and VISPO trigger in any given year through the EAHCP Reserve budget. Mr. Taggart and Mr. Frownfelter discussed the genesis of the AMF rates. Darren Thompson, SAWS, mentioned the reserve cap was decided due to fully fund both a triggering of ASR as well as VISPO in any given year. Mr. Ruiz continued by describing the overall goal is to show fiscal responsibility as well as maintain consistent AMF rates.

Carol Patterson mentioned that the $300 million of federal funds previously described as available based on other HCPs has been absorbed by the community. She continued by reiterating Mr. Ruiz's point that the $46 million should not be seen as a pot of money to store up for later use.

Mr. Taggart stressed that the issue is that the reserve was designed to fund the EAHCP during the Drought of Record and if reducing the reserve over a period of years would potentially cause AMF rate increase during the Drought of Record which is what the reserve was designed to avoid. The discussion continued. Mr. Ruiz added that the AMF rates are also funding the annual budget ($20 million) which is a conservative estimate in order to prepare for the worst case scenario.

Todd Vottler mentioned the potential to pursue possible federal money. Gary Spence reiterated the issue that the EARIP was led to believe federal dollars would help fund the implementation of the EAHCP.

Dianne Wassenich asked if there is anything that could be said to reassure the Stakeholders that if a Drought of Record occurred it will be funded through the EAA General Fund. Carl Adkins mentioned the worry is that the EAHCP Reserve will be borrowed from again. Mr. Ruiz explained that if this situation arises again the AMF rates may have to be raised. Rodger Biggers and Mr. Ruiz discussed the annual budgeting process.

Colette Barron-Bradsby asked if the commitment that funding will be "reasonably certain to occur." Mr. Frownfelter mentioned that the EAA will always be prepared to fund their obligation. Myron Hess mentioned that such a situation should not be left to raise the AMF to fit the required funding for a severe event.

Roland concluded by saying that the EAA General Fund took a significant hit ($4.5 million) through takings claim lawsuit.

9. **Consider future meetings, dates, locations, and agendas.**
    - Next Stakeholder Committee meeting (Joint Meeting) is scheduled for Thursday, December 15th at the Edwards Aquifer Authority at 9am

10. **Questions from the public.**
No comment.

11. **Adjourn – 12:27 pm**

X Dianne H Wassinech

Dianne Wassinech
Secretary

EXHIBIT 4

NOTICE OF OPEN MEETING
Available at eahcp.org

As required by Section 7.7.4 of the Funding and Management Agreement (FMA), an interlocal agreement made pursuant to Texas Government Code Chapter 791 by and among the Edwards Aquifer Authority (EAA), the City of New Braunfels (New Braunfels), the City of San Marcos (San Marcos), the City of San Antonio acting by and through its San Antonio Water System (SAWS), Texas State University, and the Guadalupe-Blanco River Authority (GBRA), a meeting of the **Implementing Committee** of the **Edwards Aquifer Habitat Conservation Plan Program** is scheduled for **1:00 pm on Thursday, September 15th, 2016 at the Edwards Aquifer Authority, 900 E. Quincy, San Antonio, TX.**

Members of this committee include: Tom Taggart (San Marcos), Roland Ruiz (EAA), Steve Ramsey (New Braunfels), Darren Thompson (SAWS), Andrew Sansom (Texas State University), and Todd Votteler (GBRA). At this meeting, the following business may be considered and recommended for committee action:

1. Call to order--Establish that all Committee members are present or represented- 1:00 pm.

2. Public Comment.

3. Approval of minutes from the June 23rd Implementing Committee meeting (Attachment 1).

4. Receive report from the Program Manager on general topics related to the implementation of the Habitat Conservation Plan and operation of the Implementing Committee.
    - Budget Report (Attachments 2 & 3)
    - 2017 Annual Report Schedule

5. Discussion and possible approval of the proposal for the Submerged Aquatic Vegetation (SAV) Nonroutine Adaptive Management (AMP) Proposal submitted to the Implementing Committee in the Stakeholder Committee Report (Attachment 4-9).
   Purpose: To discuss and possibly approve the Stakeholder Committee Recommendation.
   Action: To approve the Stakeholder Committee Recommendation for the SAV Nonroutine AMP Proposal.

6. Possible approval to direct the Program Manager to submit the necessary documentation to USFWS based on the approved AMP Proposal on behalf of the Implementing Committee (Attachment 10-13).
   Purpose: To present the amendments and clarifications drafted for submittal to the USFWS based on the SAV Nonroutine AMP Stakeholder Report.

Action: To direct the Program Manager to submit the necessary documentation to USFWS based on the approved AMP Proposal.

7. Consider future meetings, dates, locations, and agendas.
    - Next Implementing Committee meeting is scheduled for Thursday, October 20th at the Edwards Aquifer Authority.

8. Questions from the public.

9. Adjourn.

EXHIBIT 4

HABITAT CONSERVATION PLAN EDWARDS AQUIFER

MEETING MINUTES
September 15, 2016

1. **Call to order-- 1:10 pm.**
   All Committee members were present or represented: Tom Taggart (San Marcos), Roland Ruiz (EAA), Steve Ramsey (New Braunfels), Darren Thompson (SAWS), and Todd Votteler (GBRA). Melani Howard sat in as a voting member for Texas State University.

2. **Public Comment.**
   No Comment

3. **Approval of minutes from the June 23rd Implementing Committee meeting.**
   Darren Thompson motioned to approve the minutes. Tom Taggart seconded. There were no objections.

4. **Receive report from the Program Manager on general topics related to the implementation of the Habitat Conservation Plan and operation of the Implementing Committee.**
   - Budget Report
   - 2016 Annual Report Schedule
     Nathan Pence presented the Annual Report Timeline and described that all review and edits will be handled the same way as the previous two reports.
   - Presentation of an appreciation award to Steve Ramsey for his participation on the Implementing Committee from 2012 through 2016.

5. **Discussion and possible approval of the proposal for the Submerged Aquatic Vegetation (SAV) Nonroutine Adaptive Management Process (AMP) Proposal submitted to the Implementing Committee in the Stakeholder Committee Report.**
   Mr. Pence briefly summarized the Nonroutine AMP Proposal as presented to the Stakeholder Committee.

   Steve Ramsey motioned to approve the Stakeholder Committee recommendation for the SAV Nonroutine AMP Proposal. Tom Taggart seconded. There were no objections.

6. **Possible approval to direct the Program Manager to submit the necessary documentation to USFWS based on the approved AMP Proposal on behalf of the Implementing Committee.**
   Mr. Pence summarized the specific correspondence necessary to communicate the Nonroutine AMP Proposal to the USFWS.

Melani Howard motioned to approve the Program Manager to submit the necessary documentation to USFWS based on the approved AMP Proposal. Steve Ramsey seconded. There were no objections. Multiple Implementing Committee members complimented the Program Manager and EAHCP staff on the summaries and level of outreach.

7. **Consider future meetings, dates, locations, and agendas.**
   - Roland Ruiz stated that the next Implementing Committee meeting is scheduled for Thursday, October 20th at the Edwards Aquifer Authority. Nathan Pence mentioned that the 2017 Funding Applications will be presented to the Committee for approval.

8. **Questions from the public.**
   Roland Ruiz and Tom Taggart thanked Steve Ramsey for all his work with the EAHCP and service on the Implementing Committee. Mr. Taggart also commented how important this AMP was for establishing the groundwork for any future Nonroutine AMP proposals.

9. **Adjourn-1:30 pm**

Darren Thompson
Secretary