

**EAHCP
PROGRAM
DOCUMENTS
ADDENDUM
2012-2018**

EACHP PROGRAM DOCUMENTS ADDENDUM

This Addendum captures all changes and corrections to the Program Documents associated with the Edwards Aquifer Habitat Conservation Plan (EAHCP)¹ Program. The Program Documents include: (1) the Incidental Take Permit (ITP);² (2) the Implementing Agreement (IA);³ (3) the EAHCP; and (4) the Funding and Management Agreement (FMA).⁴ The source of the changes and corrections are those as communicated to the U.S. Fish & Wildlife Service (USFWS) through Annual Reports, Informational Memoranda, Minor Amendments (Administrative), Substantive Amendments, or Clarifications for the years 2012-2018, and, for legal corrections, as identified and compiled by the Edwards Aquifer Authority's General Counsel in 2017. Corrections presented here are for internal reference only and have not been approved by USFWS as amendments to the EAHCP.

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¹ RECON Environmental, Inc. *et al.*, Edwards Aquifer Recovery Implementation Program Habitat Conservation Plan (November 2012).

² Incidental Take Permit No. TE63663 A-1 (amended January 21, 2015). The original permit number was TE63663 A-0 and was issued on February 5, 2013 to be effective March 18, 2013.

³ Implementation Agreement by and among the Edwards Aquifer Authority, the City of New Braunfels, the City of San Marcos, the City of San Antonio acting by and through its San Antonio Water System Board of Trustees, Texas State University – San Marcos, and the Texas Parks and Wildlife Department and United States Fish and Wildlife Service to implement the Habitat Conservation Plan for the Edwards Aquifer Recovery Implementation Program (effective March 4, 2013).

⁴ Funding and Management Agreement by and among the Edwards Aquifer Authority, the City of New Braunfels, the City of San Marcos, the City of San Antonio acting by and through its San Antonio Water System Board of Trustees, and Texas State University – San Marco to fund and manage the Habitat Conservation Plan for the Edwards Aquifer Recovery Implementation Program (effective January 1, 2012).

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15. Scientific Evaluation Report: Nonroutine Adaptive Management Proposal for the EAHCP Submerged Aquatic Vegetation Restoration Programs, September 9, 2016
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38. Implementing Committee Minutes, May 17, 2018
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47. Nonroutine Adaptive Management Proposal, “Proposed Advantageous Substitution of Sedimentation Ponds Prescribed for “Minimizing Impacts of Contaminated Runoff” Recovery Measure (HCP §5.7.4),” March 6, 2017

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- 48.** Adaptive Management Science Committee Minutes, March 8, 2017
- 49.** Scientific Evaluation Report: Nonroutine Adaptive Management Proposal to Substitute the Sedimentation Ponds Prescribed in the EAHCP for the Minimizing Impacts of Contaminated Runoff Recovery Measure, March 8, 2017
- 50.** Stakeholder Committee Minutes, March 16, 2017
- 51.** EAHCP Stakeholder Committee Report on a Nonroutine Adaptive Management Proposal, March 16, 2017
- 52.** Implementing Committee Minutes, March 16, 2017
- 53.** Program Manager memorandum to the USFWS, dated March 17, 2017, "RE: Amendment to Minimizing Impacts of Contaminated Runoff mitigation measure 5.7.4 of the Edwards Aquifer Habitat Conservation Plan (EAHCP) and Incidental Take Permit (#TE-63663A-1)."
- 54.** USFWS memorandum response to March 17, 2017 Program Manager memorandum, dated April 10, 2017, Reference Number: "FWS/R2/AFO"
- 55.** San Marcos Water Quality Protection Work Group Minutes, July 18, 2017
- 56.** Nonroutine Adaptive Management Proposal, "Re: Proposed Strategy to Improve the City of San Marcos and Texas State University Sediment Removal Conservation Measures (EAHCP §5.3.6, §5.4.4) and Introduce Low-Impact Development through City Water Quality Protection Plans as an aspect of the Impervious Cover & Water Quality Protection Measure (EAHCP §5.7.6)," August 1, 2017
- 57.** Adaptive Management Science Committee Minutes, August 7, 2017
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- 59.** Stakeholder Committee Minutes, September 21, 2017
- 60.** Stakeholder Committee Report on a Nonroutine Adaptive Management Proposal, September 21, 2017
- 61.** Implementing Committee Minutes, September 21, 2017
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- 63.** USFWS memorandum response to October 20, 2017 Program Manager memorandum, dated December 12, 2017
- 64.** Implementing Committee Minutes, October 17, 2013
- 65.** Program Manager memorandum to the USFWS, dated October 18, 2013, "RE: Informational Memo related to the Edwards Aquifer Habitat Conservation Plan (EAHCP) for Incidental Take Permit #TE-63663A-0 (ITP)"

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- 66.**Program Manager memorandum to the USFWS, dated October 10, 2014, “RE: SUMMARY OF OCTOBER 1, 2014 MEETING BETWEEN USFWS AND EACHP STAFF”
- 67.**Implementing Committee Minutes, May 16, 2013
- 68.**Amendment No. 1 to the Funding and Management Agreement by and among the Permittees, executed September 26, 2013
- 69.**Implementing Committee Minutes, November 21, 2013
- 70.**Program Manager memorandum to the USFWS, dated November 22, 2013, “RE: Amendment related to the Edwards Aquifer Habitat Conservation Plan (EAHCP) for Incidental Take Permit #TE-63663A-0 (ITP)”

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1.1 ITP Changes

1.1.1 Clarification: Condition M (Suspending Activity under Reduced Flows)

- **Summary of the Change to the EAHCP Program Document:** This change took the form of a clarification to the USFWS. Issued by memorandum September 23, 2014, this action sought to clarify the interpretation of Condition M in the Incidental Take Permit (ITP) #TE63663A-0. The Permittees did not wish to change the substance of Condition M, but wished to seek clarification on Condition M, paragraphs 1.b and 2.b, in order for the Permittees to implement habitat restoration and riparian restoration activities during reduced flows while maintaining compliance with the conditions in the ITP.
- **History:** Condition M, paragraphs 1.b. and 2.b. specifies that Permittees suspend activities that may disturb substrates, water quality, or plants, animals or invertebrates when flows with the Comal and San Marcos River systems fall below 130 cubic feet per second (cfs), and 120 cfs, respectively. This requirement was incorporated into the ITP to ensure that the impact of taking upon listed species is minimized to the maximum extent practicable. Based on numerous discussions with USFWS biologists who advised the intent of Condition M was to ensure the Covered Species were protected especially during reduced flows, the Permittees sought to clarify Condition M with respect to which habitat mitigation and restoration activities should not be suspended, but should continue at reduced flows in order to protect the Covered Species (see Exhibit 1: Clarification of ITP# TE-63663A-0 Condition M attached to the September 23, 2014 letter for specific activities listed). In previous years, variance requests had been submitted to the USFWS to obtain permission to continue certain activities during reduced flows.
- **Rationale for the Change:** Clarification of Condition M was sought in order to continue certain pre-approved habitat mitigation and restoration activities at reduced flows in order to protect the Covered Species.
- **Formal EAHCP Implementing Committee Action:** At the September 18, 2014 Implementing Committee meeting, Andy Sansom motioned to approve the Clarification of Condition M with a text change corresponding to a section of the table found in Exhibit 1, which described the boating activities in Spring Lake, which needed to be changed to read, “no further details needed.” Steve Ramsey seconded the motion. There were no objections; the motion passed.
- **USFWS Response:** In a letter dated September 30, 2014, the USFWS responded “We support continuation of these beneficial activities with the understanding that the permittees shall make every effort to minimize disturbance and reduce effects such

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as turbidity and siltation that could adversely impact the covered species at all times, and especially during low flow conditions. We recommend that efforts employed to minimize effects of take during low flow conditions are documented, that the effectiveness of these measures are determined, and that recommendations for further minimization of potential impacts are described in the EAHCP Annual Report and form the basis against which future low flow minimization efforts can be measured.”

- **Applicable EAHCP Program Document Section(s):** This change relates to ITP Condition M, paragraphs 1.b. and 2.b.
- **Revisions to Original EAHCP Program Document (as applicable):** None.
- **EAHCP Program Implementation of the Change:** Pursuant to this change, Permittees implemented habitat mitigation and restoration activities as described in the table contained in Exhibit 1: Clarification of ITP# TE-63663A-0 Condition M (see first attachment to September 23, 2014 letter).
- **Documents Related to the Change (see Appendix):**
 1. Implementing Committee Minutes, June 19, 2014
 2. Implementing Committee Minutes, August 21, 2014
 3. Implementing Committee Minutes, September 18, 2014
 4. Program Manager memorandum to the USFWS, dated September 23, 2014, “RE: Clarification of Condition M of the Incidental Take Permit #TE-63663A-0”
 5. USFWS memorandum response, dated September 30, 2014, “RE: Clarification of Condition M of the Incidental Take Permit #TE-63663A-0”

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1.1.2 Minor Amendment: Condition K (Refugia)

- **Summary of the Change to the EAHCP Program Document:** This change took the form of an amendment request to the USFWS issued by memorandum December 4, 2014. This request sought USFWS approval of a minor administrative amendment to both the Incidental Take Permit (ITP; #TE-63663A-0) and the EAHCP to allow the Edwards Aquifer Authority (EAA) to contract with entities other than the USFWS for a functioning refugia program for the EAHCP Covered Species.
- **History:** Condition K of the ITP and Section 5.1.1 of the EAHCP both state the EAA will support and coordinate with the USFWS on the work relating to the San Marcos Aquatic Resource Center's operation and maintenance of off-site refugia at the USFWS' San Marcos, Uvalde and Inks Dam facilities. Since March 2012, the EAA and the USFWS had been working towards a mutual agreement on a contract, scope of work and budget for off-site refugia to be operated and maintained by the USFWS at its facilities. During this process, the EAA, in consultation with its general counsel, expressed concerns relating to the ownership of new facilities and payment methods required by the USFWS and thus determined that it may not have the legal authority to contract with the USFWS under the terms and conditions as proposed by the USFWS. The Permittees sought USFWS formal acceptance of a minor amendment to allow the EAA to develop a refugia program with contractors potentially other than the USFWS, while maintaining compliance with the EAHCP and ITP.
- **Rationale for the Change:** This minor amendment sought to allow the EAA to contract with entities other than the USFWS for a functioning refugia program for the EAHCP Covered Species, in order to maintain compliance with EAA's commitments laid out in Section 5.1.1 of the EAHCP and Condition K of the ITP. This would allow EAA to (1) establish off-site refugia in accordance with its commitments, while (2) avoiding potential legal issues associated with EAA's authority to contract with USFWS under the terms and conditions proposed by the USFWS.
- **Formal EAHCP Implementing Committee Action:** At the November 20, 2014 Implementing Committee meeting, Roland Ruiz motioned for approval of the amendment letter to be sent to USFWS. Tom Taggart seconded the motion. There were no objections; the motion passed.
- **USFWS Response:** In a letter dated January 21, 2015, the USFWS issued an amendment to the ITP, effective January 20, 2015, featuring amended language to Condition K pertaining to off-site refugia allowing the EAA to contract with entities other than the USFWS for this purpose.

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- **Applicable EAHCP Program Document Section(s):** This action relates to Section 5.1.1 of the EAHCP and Condition K of the ITP.
- **Revisions to Original EAHCP Program Document (as applicable):** The following specific amended language to “Condition K” pertaining to Refugia appeared in the Fish and Wildlife Service - Endangered Species Act - Incidental Take Permit amendment (TE63663A-1) attached to the January 21, 2015 USFWS memorandum:

“The EAA will support, and coordinate with the U.S. Fish and Wildlife Service (Service) on, a series of off-site refugia (Section 6.4 of the HCP). The support of the refugia will augment the existing financial and physical resources of the Service, provide supplementary resources for appropriate research activities, as necessary, to house, and protect adequate populations of Covered Species and expanded knowledge of their biology, life histories, and effective reintroduction techniques. The use of this support will be limited to the Covered Species in the EARIP HCP.”

- **EAHCP Program Implementation of the Change:** Pursuant to this change, the EAA proceeded with plans to procure services through a bid process open to entities in addition to the USFWS.
- **Documents Related to the Change (see Appendix):**
 6. Implementing Committee Minutes, October 16, 2014
 7. Implementing Committee Minutes, November 20, 2014
 8. Program Manager memorandum to the USFWS, dated December 4, 2014, “RE: Minor Administrative Amendment of the Edwards Aquifer Habitat Conservation Plan (EAHCP) and the Incidental Take Permit (ITP) #TE-63663A-0 related to the Refugia Program”
 9. USFWS memorandum response to December 4, 2014 Program Manager memorandum, including attached ITP amendment, dated January 21, 2015, Reference Number: “FWS/R2/ES-ER/059284”

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- 1.2 **IA Changes** [Note: During 2012-2018, there were no changes to the IA.]

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1.3 EAHCP Changes

1.3.1 Covered Species Analysis

1.3.1.1 Minor Amendment: Comal Springs/River Ecosystem Biological Goals and Objectives (SAV)

- **Summary of the Change to the EAHCP Program Document:** This change took the form of a clarification request, but was more in the nature of a minor amendment request to the USFWS. Issued in a letter dated September 20, 2016, this change sought USFWS approval for a minor administrative amendment to EAHCP Table 4-1 which specifies areal coverage vegetation Biological Goals by vegetation type for fountain darter habitat in the Comal system. Under the EAHCP, the Permittees committed to implementing Table 4-1 through submerged aquatic vegetation (SAV) restoration and related measures. Over the course of implementing this work, issues with the areal coverage amounts specified in Table 4-1 became apparent, and this change addressed those issues. In the Comal system, the changes included removal of all filamentous algae and non-native *Hygrophila polysperma* from the Biological Goals, and replacing these goals with native *Potamogeton illinoensis*. In addition, the changes included altered distributions for vegetation types by reach from amounts originally identified.
- **History:** A report was commissioned by the Implementing Committee at its November 19, 2015 meeting to address issues identified over the first few years of implementing the EAHCP. Among these issues were technical problems associated with the submerged aquatic vegetation Biological Goals set out in Table 4-1. Accordingly, one of the report's charges was to reevaluate Table 4-1, and to recommend revisions to better support accomplishment of EAHCP Biological Goals and Objectives. The report, published in June 2016, recommended a revised Table 4-1 (BIO-WEST & Watershed Systems Group, 2016). The recommended changes were adopted internally, pending final USFWS approval, after following the process for a Nonroutine Adaptive Management action (EARIP, 2012b).
- **Rationale for the Change:** The changes were proposed to properly maintain a diverse community of native aquatic vegetation and maximize fountain darter habitat, as well as to find the most adequate distribution of ideal habitat for the fountain darter in the Comal and San Marcos River systems where the EAHCP identifies restoration activity to be carried out (see September 20, 2016 clarification letter).
- **Formal EAHCP Implementing Committee Action:** At the September 15, 2016 Implementing Committee meeting, Steve Ramsey motioned to approve the Stakeholder Committee recommendation for the SAV Nonroutine AMP Proposal. Tom Taggart seconded the motion. There were no objections; the motion passed. For

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USFWS submittal, 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; the motion passed.

- **USFWS Response:** In its October 24, 2016 response, the USFWS stated it agreed to the revisions to Table 4-1.
- **Applicable EAHCP Program Document Section(s):** This action relates to EAHCP Section 4.1.1.1 Comal Springs/River Ecosystem Biological Goals and Objectives.
- **Revisions to Original EAHCP Program Document (as applicable):** The revision associated with this change occurs to the values set by Table 4-1 (EARIP, 2012a). For the revised Table, refer to the first Exhibit in the September 20, 2016 Program Manager memoranda submitted to the USFWS (table not included here due to size).
- **EAHCP Program Implementation of the Change:** Activities associated with SAV restoration began to follow revised Table 4-1 beginning in 2017.
- **Documents Related to the Change (see Appendix):**

10. Implementing Committee minutes, November 19, 2015

11. Program Manager informational memorandum to the USFWS, dated November 30, 2015, "RE: Information Regarding the Edwards Aquifer Habitat Conservation Plan (EAHCP) and the Incidental Take Permit (ITP) #TE-63663A-1, related to Vegetation Restoration in the Comal and San Marcos Springs systems"

12. USFWS memorandum in response to November 30, 2015 Program Manager informational memorandum, dated January 15, 2016

13. Nonroutine Adaptive Management Proposal, "Re: Submerged Aquatic Vegetation Restoration Programs," September 1, 2016

14. Adaptive Management Science Committee minutes, September 9, 2016

15. Scientific Evaluation Report: Nonroutine Adaptive Management Proposal for the EAHCP Submerged Aquatic Vegetation Restoration Programs, September 9, 2016

16. Stakeholder Committee minutes, September 15, 2016

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17. EAHCP Stakeholder Committee Report on a Nonroutine Adaptive Management Proposal, September 15, 2016
18. Implementing Committee minutes, September 15, 2016
19. Program Manager memorandum to the USFWS, dated September 20, 2016, "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).
20. USFWS memorandum response to September 20, 2016, Program Manager memoranda, dated October 24, 2016, Reference Number: "FWS/R2ES/AFO"

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1.3.1.2 Minor Amendment: San Marcos Springs/River Ecosystem Biological Goals and Objectives (SAV)

- Summary of the Change to the EAHCP Program Document:** This change took the form of a clarification request, but was more in the nature of a minor amendment request to the USFWS. Issued in a letter dated September 20, 2016, this change sought USFWS approval for a minor administrative amendment to EAHCP Table 4-21 which specifies areal coverage vegetation Biological Goals by vegetation type for fountain darter habitat in the San Marcos system. Under the EAHCP, the Permittees committed to implementing Table 4-21 through submerged aquatic vegetation (SAV) restoration and related measures. Over the course of implementing this work, issues with the areal coverage amounts specified in Table 4-21 became apparent, and this change addressed those issues. In the San Marcos system, the changes included the complete removal of all non-native aquatic vegetation (*Hygrophila polysperma*, *Hydrilla verticillata*, and *Vallisneria spiralis*) from the Biological Goals, and replacing these goals with native vegetation (*Hydrocotyle umbellata* and *Zizania texana*). In addition, the changes included altered distributions for vegetation types by reach from amounts originally identified.
- History:** A report was commissioned by the Implementing Committee at its November 19, 2015 meeting to address issues identified over the first few years of implementing the EAHCP. Among these issues were technical problems associated with the submerged aquatic vegetation Biological Goals set out in Table 4-21. Accordingly, one of the report's charges was to reevaluate Table 4-21, and to recommend revisions to better support accomplishment of EAHCP Biological Goals and Objectives. The report, published in June 2016, recommended a revised Table 4-21 (BIO-WEST & Watershed Systems Group, 2016). The recommended changes were adopted internally, pending final USFWS approval, after following the process for a Nonroutine Adaptive Management action (EARIP, 2012b).
- Rationale for the Change:** The changes were proposed to properly maintain a diverse community of native aquatic vegetation and maximize fountain darter habitat, as well as to find the most adequate distribution of ideal habitat for the fountain darter in the Comal and San Marcos River systems where the EAHCP identifies restoration activity to be carried out (see September 20, 2016 clarification letter).
- Formal EAHCP Implementing Committee Action:** At the September 15, 2016 Implementing Committee meeting, Steve Ramsey motioned to approve the Stakeholder Committee recommendation for the SAV Nonroutine AMP Proposal. Tom Taggart seconded the motion. There were no objections; the motion passed. For USFWS submittal, Melani Howard motioned to approve the Program Manager to

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submit the necessary documentation to USFWS based on the approved AMP Proposal. Steve Ramsey seconded. There were no objections; the motion passed.

- **USFWS Response:** In its October 24, 2016 response, the USFWS stated it agreed to the revisions to Table 4-21.
- **Applicable EAHCP Program Document Section(s):** This action relates to EAHCP Section 4.1.1.2, San Marcos Springs/River Ecosystem Biological Goals and Objectives.
- **Revisions to Original EAHCP Program Document (as applicable):** The revision associated with this change occurs to the values set by Table 4-21 (EARIP, 2012a). For the revised Table, refer to the first Exhibit in the September 20, 2016 Program Manager memoranda submitted to the USFWS (table not included here due to size).
- **EAHCP Program Implementation of the Change:** Activities associated with SAV restoration began to follow revised Table 4-21 beginning in 2017.
- **Documents Related to the Change (see Appendix):**

10. Implementing Committee minutes, November 19, 2015

11. Program Manager informational memorandum to the USFWS, dated November 30, 2015, "RE: Information Regarding the Edwards Aquifer Habitat Conservation Plan (EAHCP) and the Incidental Take Permit (ITP) #TE-63663A-1, related to Vegetation Restoration in the Comal and San Marcos Springs systems"

12. USFWS memorandum in response to November 30, 2015 Program Manager informational memorandum, dated January 15, 2016

13. Nonroutine Adaptive Management Proposal, "Re: Submerged Aquatic Vegetation Restoration Programs," September 1, 2016

14. Adaptive Management Science Committee minutes, September 9, 2016

15. Scientific Evaluation Report: Nonroutine Adaptive Management Proposal for the EAHCP Submerged Aquatic Vegetation Restoration Programs, September 9, 2016

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20. USFWS memorandum response to September 20, 2016, Program Manager memoranda, dated October 24, 2016, Reference Number: "FWS/R2ES/AFO"

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1.3.1.3 Minor Amendment: Comal Springs/River Ecosystem Biological Goals and Objectives (Estimate of Relative Abundance of Fountain Darters)

- **Summary of the Change to the EAHCP Program Document:** This change took the form of a clarification request, but was more in the nature of a minor amendment request to the USFWS. Issued in a letter dated September 20, 2016, this change sought USFWS approval for a minor administrative amendment to EAHCP Table 4-1 which specifies areal coverage vegetation Biological Goals by vegetation type for fountain darter habitat in the Comal system. As a result of the altered distribution of vegetation types introduced under this amendment, the relative abundance of fountain darters within respective reaches was estimated to increase by approximately 15% from the original EAHCP Biological Goal set for the Comal system.
- **History:** A report was commissioned by the Implementing Committee at its November 19, 2015 meeting to address issues identified over the first few years of implementing the EAHCP. Among these issues were technical problems associated with the submerged aquatic vegetation Biological Goals set out in Table 4-1. Accordingly, one of the report's charges was to reevaluate Table 4-1, and to recommend revisions to better support accomplishment of EAHCP Biological Goals and Objectives. The report, published in June 2016, recommended a revised Table 4-1 (BIO-WEST & Watershed Systems Group, 2016). The recommended changes were adopted internally, pending final USFWS approval, after following the process for a Nonroutine Adaptive Management action (EARIP, 2012b).
- **Rationale for the Change:** The change came as a result of the effort to amend EAHCP Table 4-1, which was proposed to properly maintain a diverse community of native aquatic vegetation and maximize fountain darter habitat, as well as to find the most adequate distribution of ideal habitat for the fountain darter in the Comal and San Marcos River systems where the EAHCP identifies restoration activity to be carried out (see September 20, 2016 clarification letter).
- **Formal EAHCP Implementing Committee Action:** At the September 15, 2016 Implementing Committee meeting, Steve Ramsey motioned to approve the Stakeholder Committee recommendation for the SAV Nonroutine AMP Proposal. Tom Taggart seconded the motion. There were no objections; the motion passed. For USFWS submittal, 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; the motion passed.

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- **USFWS Response:** In its October 24, 2016 response, the USFWS stated the requested amendment was consistent with the EAHCP Biological Goals and Objectives.
- **Applicable EAHCP Program Document Section(s):** This action relates to EAHCP Section 4.1.1.1 Comal Springs/River Ecosystem Biological Goals and Objectives.
- **Revisions to Original EAHCP Program Document (as applicable):** The revision associated with this change occurs to the values set by Table 4-1 (EARIP, 2012a), which in turn modify estimated relative abundance of fountain darter by area of vegetation type. For the revised Table, refer to the first Exhibit in the September 20, 2016 Program Manager memorandum submitted to the USFWS (table not included here due to size).
- **EAHCP Program Implementation of the Change:** Activities associated with SAV restoration began to follow revised Table 4-1 beginning in 2017.
- **Documents Related to the Change (see Appendix):**

10. Implementing Committee minutes, November 19, 2015

11. Program Manager informational memorandum to the USFWS, dated November 30, 2015, "RE: Information Regarding the Edwards Aquifer Habitat Conservation Plan (EAHCP) and the Incidental Take Permit (ITP) #TE-63663A-1, related to Vegetation Restoration in the Comal and San Marcos Springs systems"

12. USFWS memorandum in response to November 30, 2015 Program Manager informational memorandum, dated January 15, 2016

13. Nonroutine Adaptive Management Proposal, "Re: Submerged Aquatic Vegetation Restoration Programs," September 1, 2016

14. Adaptive Management Science Committee minutes, September 9, 2016

15. Scientific Evaluation Report: Nonroutine Adaptive Management Proposal for the EAHCP Submerged Aquatic Vegetation Restoration Programs, September 9, 2016

16. Stakeholder Committee minutes, September 15, 2016

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17. EAHCP Stakeholder Committee Report on a Nonroutine Adaptive Management Proposal, September 15, 2016
18. Implementing Committee minutes, September 15, 2016
19. Program Manager memorandum to the USFWS, dated September 20, 2016, "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).
20. USFWS memorandum response to September 20, 2016, Program Manager memoranda, dated October 24, 2016, Reference Number: "FWS/R2ES/AFO"

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**1.3.1.4 Minor Amendment: San Marcos Springs/River Ecosystem
Biological Goals and Objectives (Estimate of Relative
Abundance of Fountain Darters)**

- **Summary of the Change to the EAHCP Program Document:** This change took the form of a clarification request, but was more in the nature of a minor amendment request to the USFWS. Issued in a letter dated September 20, 2016, this change sought USFWS approval for a minor administrative amendment to EAHCP Table 4-21 which specifies areal coverage vegetation Biological Goals by vegetation type for fountain darter habitat in the San Marcos system. As a result of the altered distribution of vegetation types introduced under this amendment, the relative abundance of fountain darters within respective reaches was estimated to decrease by approximately 15% from the original EAHCP Biological Goal for the San Marcos system.
- **History:** A report was commissioned by the Implementing Committee at its November 19, 2015 meeting to address issues identified over the first few years of implementing the EAHCP. Among these issues were technical problems associated with the submerged aquatic vegetation Biological Goals set out in Table 4-21. Accordingly, one of the report's charges was to reevaluate Table 4-21, and to recommend revisions to better support accomplishment of EAHCP Biological Goals and Objectives. The report, published in June 2016, recommended a revised Table 4-21 (BIO-WEST & Watershed Systems Group, 2016). The recommended changes were adopted internally, pending final USFWS approval, after following the process for a Nonroutine Adaptive Management action (EARIP, 2012b).
- **Rationale for the Change:** The change came as a result of the effort to amend EAHCP Table 4-21, which was proposed to properly maintain a diverse community of native aquatic vegetation and maximize fountain darter habitat, as well as to find the most adequate distribution of ideal habitat for the fountain darter in the Comal and San Marcos River systems where the EAHCP identifies restoration activity to be carried out (see September 20, 2016 clarification letter).
- **Formal EAHCP Implementing Committee Action:** At the September 15, 2016 Implementing Committee meeting, Steve Ramsey motioned to approve the Stakeholder Committee recommendation for the SAV Nonroutine AMP Proposal. Tom Taggart seconded the motion. There were no objections; the motion passed. For USFWS submittal, 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; the motion passed.

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- **USFWS Response:** In its October 24, 2016 response, the USFWS stated the requested amendment was consistent with the EAHCP Biological Goals and Objectives.
- **Applicable EAHCP Program Document Section(s):** This action relates to EAHCP Section 4.1.1.2, San Marcos Springs/River Ecosystem Biological Goals and Objectives.
- **Revisions to Original EAHCP Program Document (as applicable):** The revision associated with this change occurs to the values set by Table 4-21 (EARIP, 2012a), which in turn modify estimated relative abundance of fountain darter by area of vegetation type. For the revised Table, refer to the first Exhibit in the September 20, 2016 Program Manager memorandum submitted to the USFWS (table not included here due to size).
- **EAHCP Program Implementation of the Change:** Activities associated with SAV restoration began to follow revised Table 4-21 beginning in 2017.
- **Documents Related to the Change (see Appendix):**

10. Implementing Committee minutes, November 19, 2015

11. Program Manager informational memorandum to the USFWS, dated November 30, 2015, "RE: Information Regarding the Edwards Aquifer Habitat Conservation Plan (EAHCP) and the Incidental Take Permit (ITP) #TE-63663A-1, related to Vegetation Restoration in the Comal and San Marcos Springs systems"

12. USFWS memorandum in response to November 30, 2015 Program Manager informational memorandum, dated January 15, 2016

13. Nonroutine Adaptive Management Proposal, "Re: Submerged Aquatic Vegetation Restoration Programs," September 1, 2016

14. Adaptive Management Science Committee minutes, September 9, 2016

15. Scientific Evaluation Report: Nonroutine Adaptive Management Proposal for the EAHCP Submerged Aquatic Vegetation Restoration Programs, September 9, 2016

16. Stakeholder Committee minutes, September 15, 2016

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17. EAHCP Stakeholder Committee Report on a Nonroutine Adaptive Management Proposal, September 15, 2016
18. Implementing Committee minutes, September 15, 2016
21. Program Manager memorandum to the USFWS, dated September 20, 2016, "RE: Clarification to the specified vegetation in Table 4-21 of the Edwards Aquifer Habitat Conservation Plan (EAHCP) Biological Goals for fountain darter habitat and amendment regarding the estimated relative abundance of fountain darters within respective reaches in the San Marcos River for the Incidental Take Permit (#TE-63663A-1)."
20. USFWS memorandum response to September 20, 2016, Program Manager memoranda, dated October 24, 2016, Reference Number: "FWS/R2ES/AFO"

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1.3.1.5 Minor Amendment: Comal Springs/River & San Marcos Springs/River Ecosystems Biological Goals and Objectives (“Proportional Expansion” & “Restoration Reaches”)

- **Summary of the Change to the EAHCP Program Document:** This change took the form of a “clarification” to the USFWS, but was more in the nature of a minor amendment. Issued in a letter dated September 20, 2016, this action sought to clarify the EAHCP Key Management Objective of “proportional expansion” for the Comal and San Marcos Springs ecosystems (EAHCP § 4.1.1.1 and § 4.1.1.2). This change also involved defining what the quantitative contribution of vegetation restoration effort would amount to be following the clarified definition of proportional expansion.
- **History:** A report was commissioned by the Implementing Committee at its November 19, 2015 meeting to address issues identified over the first few years of implementing the EAHCP. The need to define proportional expansion and associated restoration reaches arose from the analysis contained in this report.
- **Rationale for the Change:** A EAHCP key management objective for fountain darter protection called for extending aquatic vegetation restoration “effort” in equal proportion beyond the established Long-term Biological Goal (LTBG) Reaches. This management objective was not geographically or quantitatively defined in the EAHCP, therefore, the Permittees identified the need to provide a clarification to specifically establish a definition of “proportional expansion” found in § 4.1.1.1 and § 4.1.1.2 for the Comal and San Marcos Rivers respectively. This change also entailed identifying the specific “restoration reaches” along which said proportional expansion restoration activities would take place going forward.
- **Formal EAHCP Implementing Committee Action:** At the September 15, 2016 Implementing Committee meeting, Steve Ramsey motioned to approve the Stakeholder Committee recommendation for the SAV Nonroutine AMP Proposal. Tom Taggart seconded the motion. There were no objections; the motion passed. For USFWS submittal, 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; the motion passed.
- **USFWS Response:** In its October 24, 2016 response, the USFWS stated, “The identification of the restoration is consistent with the EAHCP requirement for expanded restoration proportional to the amount of restoration in the study reaches.”

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- **Applicable EAHCP Program Document Section(s):** This change relates to EAHCP Sections 4.1.1.1 and 4.1.1.2.
- **Revisions to Original EAHCP Program Document (as applicable):** Two revisions arose related to this change. The first occurred to the text of the Key Management Objectives sections on EAHCP pages 4-5 and 4-27 (Comal and San Marcos rivers, respectively; EARIP, 2012a). The second involved the inclusion of new tables 4-1-1 and 4-21-1, identifying “Fountain Darter Habitat (Aquatic Vegetation) in Meters Squared and Median Density (Number/M²) Per Habitat Type to Define ‘Restoration Reaches’” in the Comal and San Marcos rivers, respectively. For these revisions, refer to Exhibits 1 and 2 in the September 20, 2016 Program Manager memorandum submitted to the USFWS (tables not included here due to size).
- **EAHCP Program Implementation of the Change:** Activities associated with SAV restoration began following revised Tables 4-1 and 4-21 beginning in 2017.
- **Documents Related to the Change (see Appendix):**
 - 10. Implementing Committee Minutes, November 19, 2015
 - 13. Nonroutine Adaptive Management Proposal, “Re: Submerged Aquatic Vegetation Restoration Programs,” September 1, 2016
 - 14. Adaptive Management Science Committee minutes, September 9, 2016
 - 15. Scientific Evaluation Report: Nonroutine Adaptive Management Proposal for the EAHCP Submerged Aquatic Vegetation Restoration Programs, September 9, 2016
 - 16. Stakeholder Committee minutes, September 15, 2016
 - 17. EAHCP Stakeholder Committee Report on a Nonroutine Adaptive Management Proposal, September 15, 2016
 - 18. Implementing Committee Minutes, September 15, 2016
 - 22. Program Manager memorandum to the USFWS, dated September 20, 2016, “RE: Clarification to the Edwards Aquifer Habitat Conservation Plan (EAHCP) Key Management Objective of “proportional expansion” and creation of “restoration reaches” for the Comal and San Marcos River for the Incidental Take Permit (#TE-63663A-1).”

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20. USFWS memorandum response to September 20, 2016, Program Manager memoranda, dated October 24, 2016, Reference Number: "FWS/R2ES/AFO"

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1.3.2 Flow Protection Measures

1.3.2.1 Informational: Use of the SAWS ASR for Springflow Protection (Regional Advisory Group)

- **Summary of the Change to the EAHCP Program Document:** This change took the form of a “clarification” to the USFWS, but was more in the nature of an informational filing. Issued in a letter dated May 23, 2016, this action sought to provide information regarding the stated frequency of the ASR Regional Advisory Group meetings (EAHCP §5.5.1).
- **History:** The EAHCP originally provided for the Regional Advisory Group to meet “as needed but no less than quarterly.” However, based on experience implementing the EAHCP, Permittees and the members of the Regional Advisory Group agreed that the Regional Advisory Group need only meet annually unless circumstances warrant more frequent meetings.
- **Rationale for the Change:** The Advisory Group had maintained a quarterly meeting schedule, but along with the Implementing Committee, determined such frequency was not specifically necessary.
- **Formal EAHCP Implementing Committee Action:** At the May 19, 2016 Implementing Committee meeting, Andy Sansom motioned to authorize the Program Manager to submit a letter of clarification to USFWS pertaining to the meeting frequency of the ASR Regional Advisory Group. Darren Thompson seconded the motion. There were no objections; the motion passed.
- **USFWS Response:** In its June 13, 2016 response, the USFWS stated that the USFWS approves of the request “to amend the EAHCP Section 5.2.1” as indicated in the Program Manager May 23, 2016 letter, “specifically that the frequency of meetings of the Regional Advisory Group will be as needed but no less than annually.”
- **Applicable EAHCP Program Document Section(s):** This change relates to EAHCP Section 5.5.1.
- **Revisions to Original EAHCP Program Document (as applicable):** The following specific language clarifying this issue in §5.5.1 was discussed and voted on unanimously at the Regional Advisory Group March 21, 2016 meeting:

“The Advisory Group will meet as needed but no less than ~~quarterly~~ annually.”

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- **EAHCP Program Implementation of the Change:** Pursuant to this change, meetings of the Regional Advisory Group began to be held no less than annually.

- **Documents Related to the Change (see Appendix):**

23. SAWS ASR Regional Advisory Group Agenda, March 21, 2016

24. Implementing Committee Minutes, May 19, 2016

25. Program Manager memorandum to the USFWS, dated May 23, 2016, "RE: Clarification of Aquifer Storage and Recovery (ASR) Regional Advisory Group Meeting Frequency (#TE-63663A-1)"

26. USFWS memorandum response to May 23, 2016 Program Manager memorandum, dated June 13, 2016

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1.3.2.2 Minor Amendment: Use of the SAWS ASR for Springflow Protection (Leasing & Forbearance)

- **Summary of the Change to the EAHCP Program Document:** This change took the form of an amendment request to the USFWS. Issued in a memorandum dated February 12, 2018, this request sought USFWS approval of a minor administrative amendment to the Use of the SAWS ASR for Springflow Protection Measure (EAHCP §5.5.1) in the EAHCP. In order to optimize the ASR Program's success, the EAA proposed to amend the leasing structure by (1) replace the current, three-tiered leasing/lease option structure with a simplified two-tiered leasing/forbearance agreement structure that coordinates existing long-term leases with new, long-term forbearance agreements (together providing control of the necessary 50,000 acre-feet per year of Edwards Aquifer groundwater); and (2) revise the Ten-Year Rolling Average of Estimated Recharge threshold used for triggering forbearance for EAA-controlled groundwater withdrawal rights to 500,000 acre-feet.
- **History:** At the time the amendment letter requesting this change was submitted to the USFWS, the ASR Program had been in operation for over four years. During the course of implementation, firsthand experiences with implementation challenges and successes, as well as market responses to proposed leasing and lease-option products contributed to the identification of opportunities to improve the operational and financial efficiencies of the EAA's water acquisition responsibilities under the ASR Program while providing the same or greater benefit to springflow protection.
- **Rationale for the Change:** Throughout 2016 and early 2017, the EAA internally vetted the issues identified with the ASR Program, and initially identified two potential advantageous modifications to the design of the Program. It was generally assumed that the two modifications would (1) provide a more understandable and marketable product that will achieve long-term control of 50,000 acre-feet per year of Edwards Aquifer groundwater for forbearance by the EAA during the drought conditions that trigger the ASR Program; and (2) provide greater springflow during a repeat of such drought through the use of a more impactful, J-17 level-based forbearance trigger.
- **Formal EAHCP Implementing Committee Action:** At the February 8, 2018 Implementing Committee meeting, Roland Ruiz motioned to approve the ASR AMP as amended (he had noted a typographical error in the ASR proposal that needed correction). Tom Taggart seconded the motion. There were no objections; the motion passed.
- **USFWS Response:** In its February 23, 2018 response, the USFWS stated "Chapter 6 and Appendix R of the EAHCP describe the Adaptive Management Process that allows the Permittees to make experience-based improvements to the program...All

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the steps in the process were followed and each committee has approved of the revisions to the EAHCP, and the public was provided with opportunities to comment on the proposal.”

- **Applicable EAHCP Program Document Section(s):** This change relates to EAHCP Section 5.5.1.
- **Revisions to Original EAHCP Program Document (as applicable):** The following specific language clarifying this issue in §5.5.1 was included in the February 12, 2018 Program Manager amendment letter to the USFWS:

“EAA will acquire through both lease and option forbearance agreements 50,000 ac-ft/yr of EAA issued Final Initial Regular Permits. The EAA may use SAWS as its agent for this purpose. The leases and ~~options~~ forbearance agreements will be acquired by EAA to fill, idle, and maintain a portion of the capacity of the SAWS ASR Project for subsequent use, to protect springflows during identified drought-of-record conditions as described below.

The lease/forbearance agreement program is comprised of ~~three~~ two components. The first ~~one-third~~, a sliding scale approximating 10,000 to 16,667 ac-ft of permits, will be leased for immediate storage in the ASR. The remaining pumping rights will be placed under forbearance agreements ~~a lease option~~. ~~One third (16,667 ac-ft)~~ The second, a sliding scale approximating 33,333 to 40,000 ac-ft of the total, will be options forbearance agreements exercised in the year after the 10-year moving annual average of Edwards recharge falls below ~~572,000~~500,000 ac-ft/yr, as determined by the EAA (see Section 6.2.3), and is likely to continue to decrease. ~~The last one-third will be options exercised when the 10-year moving recharge average is less than 472,000 ac-ft/yr, as determined by the EAA (see Section 6.2.3).~~ When the leases are in place, this water will either be pumped to fill the SAWS ASR or not pumped for any reason. When the forbearance agreements are in place, this water will not be pumped for any reason when the identified drought conditions are triggered. When the ASR is in recovery mode (i.e., when water is being returned from the ASR), the leased water will not be pumped. The water to fill the SAWS ASR is generally provided by SAWS from ~~their~~ its existing Edwards supplies and the ~~first one-third of the~~ regional leases water (10,000 to 16,667 ac-ft) which will be maintained at all times throughout the HCP duration. SAWS will store its own unused Edwards permits in addition to the HCP leases ~~and lease options~~ in the ASR when possible. SAWS, with the assistance of the Regional Advisory Group will describe in the Annual Report the storage and recovery activities. Trigger levels for implementation of ASR management in accordance with the HCP will be 630 ft-MSL at the J-17 index well during an identified repeat of drought conditions similar to the drought of record as indicated by the ten-year rolling average of Edwards recharge of 500,000 ac-ft, as determined by the EAA.

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When triggered, the ASR or other supplies capable of utilizing shared infrastructure will be activated to deliver up to 60 million gallons per day to SAWS distribution system during a repeat of drought of record-like conditions. When the monthly average groundwater levels at J-17 are below 630 ft-MSL and the ten-year rolling average of Aquifer recharge is 500,000 ac-ft or less, pumping of selected wells on the northeast side of SAWS water distribution system will be reduced in an amount that on a monthly basis equals the amount of water returned from the ASR only to the extent of the Aquifer water provided by the EAA for storage in the ASR. SAWS will use up to 100 percent of the conveyance capacity of existing SAWS ASR facilities to off-set SAWS' Edwards Aquifer demand."

- **EAHCP Program Implementation of the Change:** New terms and rate structure will go into effect January 2019.
- **Documents Related to the Change (see Appendix):**
 - 27. SAWS ASR Regional Advisory Group Minutes, February 14, 2017
 - 28. SAWS ASR Regional Advisory Group Minutes, January 19, 2018
 - 29. Nonroutine Adaptive Management Proposal, "Re: Proposed Adaptive Modifications to "Use of the SAWS ASR for Springflow Protection Measure (EAHCP §5.5.1)," January 22, 2018
 - 30. Adaptive Management Science Committee minutes, January 31, 2018
 - 31. Scientific Evaluation Report: Nonroutine Adaptive Management Proposal for the Proposed Adaptive Modifications to the Use of the San Antonio Water System Aquifer Storage and Recovery for Springflow Protection, February 2, 2018
 - 32. Stakeholder Committee minutes, February 8, 2018
 - 33. EAHCP Stakeholder Committee Report on a Nonroutine Adaptive Management Proposal, February 8, 2018
 - 34. Implementing Committee Minutes, February 8, 2018
 - 35. Program Manager memorandum to the USFWS, dated February 12, 2018, "RE: Amendment to "Use of the SAWS ASR for Springflow Protection" Measure (EAHCP §5.5.1)"

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36. USFWS memorandum response to February 12, 2018 Program Manager memorandum, dated February 23, 2018

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1.3.2.3 Clarification: Voluntary Irrigation Suspension Program Option (Pricing Terms)

- **Summary of the Change to the EAHCP Program Document:** This change took the form of a clarification to the USFWS. Issued in a memorandum dated May 17, 2018, this action sought to clarify the Edwards Aquifer Authority's (EAA) ability to deviate from the compensation schedule associated with the Voluntary Irrigation Suspension Program Option (VISPO) program, as defined in the EAHCP (§5.1.2.3)
- **History:** The details of the five- and 10-year VISPO programs were developed by the EARIP VISPO Work Group to ensure prompt enrollment in 2013. Payment structures stated in the EAHCP were not intended to lock-in price points of VISPO groundwater for the term of the ITP, but rather encourage initial participation in the program. As the first set of five-year VISPO forbearance agreements approached expiration, this clarification was sought to obtain USFWS' confirmation that the original compensation terms were intended only for rollout, and that the EAA may adjust pricing in future years to respond to market conditions as may be warranted to ensure sustained full enrollment in the VISPO program for the duration of the ITP period.
- **Rationale for the Change:** To maintain the VISPO program's competitive nature within the regional water market and this ensure continued full enrollment in the VISPO program for the duration of the ITP, the Permittees sought (1) affirmation of the ability to deviate from the original compensation schedule for VISPO; and (2) to make pricing adjustments accordingly.
- **Formal EAHCP Implementing Committee Action:** At the May 17, 2018 Implementing Committee meeting, Roland Ruiz motioned to approve the VISPO memo of clarification and the authorization for the Program Manager to submit the memo to USFWS. Tom Taggart seconded the motion. There were no objections; the motion passed.
- **USFWS Response:** In its May 29, 2018 response, the USFWS stated the "level of compensation is at the discretion of the permittees so long as the program is operating and achieving the water conservation goals intended to be protective of the species covered under the Endangered Species Act section 10(a)(1)(B) incidental take permit (TE-63663A-1)." The USFWS therefore concurred with the request for "clarifying that the Permittees may, as needed, make changes to the VISPO compensation schedule to be responsive to varying market conditions."
- **Applicable EAHCP Program Document Section(s):** This change relates to EAHCP Section 5.1.2.3.

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- **Revisions to Original EAHCP Program Document (as applicable):** None.
- **EAHCP Program Implementation of the Change:** New terms and rate structure will go into effect January 2019.
- **Documents Related to the Change (see Appendix):**
 - 37. Implementing Committee Minutes, March 22, 2018
 - 38. Implementing Committee Minutes, May 17, 2018
 - 39. Program Manager memorandum to the USFWS, dated May 17, 2018, "RE: Clarification to the Voluntary Irrigation Suspension Program Option (VISPO) Program Compensation Schedule of the Edwards Aquifer Habitat Conservation Plan (EAHCP §5.1.2.3)."
 - 40. USFWS memorandum response to May 17, 2018 Program Manager memorandum, dated May 29, 2018

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1.3.3 Habitat Protection Measures

1.3.3.1 Minor Amendment: Sediment Removal below Sewell Park, in Spring Lake, and from Spring Lake Dam to City Park in the San Marcos Springs/River Ecosystem (Methodology)

- **Summary of the Change to the EAHCP Program Document:** This change took the form of an “informational” memorandum to the USFWS, but was more in the nature of a minor amendment. Issued in a memorandum dated October 20, 2014, this memorandum informed the USFWS regarding a minor methodology modification to sediment removal that differed from what was described in the EAHCP.
- **History:** In Sections 5.3.6 (Sediment Removal below Sewell Park) and 5.4.4 (Sediment Removal in Spring Lake and from Spring Lake dam to City Park), the EAHCP identifies that silt will be vacuumed using a hose that has a screen to prevent suctioning biota greater than 0.25 inch in diameter. Initial efforts in 2013 and 2014, during suction dredging with a .25 inch mesh screen, utilized numerous techniques to minimize Take of Fountain Darters and other biota. During initial efforts in 2013 and 2014, this protocol resulted in the Take (detection and relocation) of only 10 individual Fountain Darters. No Fountain Darters were detected in the effluent or in the immediate area during suctioning. As these initial measures to minimize Take were so successful, the Permittees determined that the 0.25” screen on the end of the suction dredge was not preventing any additional Take beyond the initial measures.
- **Rationale for the Change:** The 0.25” screen impeded progress of carrying out sediment removal and resulted in frequent clogging and equipment malfunctions. For these reasons, it was determined that future suction dredging in the San Marcos River would be conducted without a screen on the end of the suction dredge.
- **Formal EAHCP Implementing Committee Action:** This topic was discussed by the Implementing Committee at three different meetings (August 15, 2013; September 19, 2013; October 16, 2014). At the October 16, 2014 Implementing Committee meeting, the Program Manager presented a letter to be submitted to the USFWS regarding this issue. The minutes state no action was “required by the Committee because they had approved the submittal at a previous meeting.”
- **USFWS Response:** In its October 21, 2014 response, the USFWS stated, “Since operating the suction dredge without screening the intake is not expected to increase take, we have no comments on the change. If results in the field indicate otherwise, the screen should be reinstalled or other protective measures should be considered for use.”

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- **Applicable EAHCP Program Document Section(s):** This change relates to EAHCP Sections 5.3.6 and 5.4.4.
- **Revisions to Original EAHCP Program Document (as applicable):** None.
- **EAHCP Program Implementation of the Change:** Pursuant to this change, suction dredging in the San Marcos River began to be conducted without a screen on the end of the suction dredge, following the precautions identified in the October 20, 2014 Program Manager memorandum.
- **Documents Related to the Change (see Appendix):**
 - 41. Implementing Committee Minutes, August 15, 2013
 - 42. Implementing Committee Minutes, September 19, 2013
 - 6. Implementing Committee Minutes, October 16, 2014
 - 43. Program Manager memorandum to the USFWS, dated October 20, 2014, "RE: Informational Memo related to the Edwards Aquifer Habitat Conservation Plan (EAHCP) for Incidental Take Permit #TE-63663A-0 (ITP)"
 - 44. USFWS e-mail response to October 20, 2014 Program Manager memorandum, dated October 21, 2014

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1.3.3.2 Minor Amendment: Flow-Split Management in the Old and New Channels in the Comal Springs/River Ecosystem (Flow Regime)

- **Summary of the Change to the EAHCP Program Document:** This change involved an amendment request to the USFWS. Issued in a memorandum dated September 20, 2016, this request sought USFWS approval of a minor administrative amendment to EAHCP Table 5-3 (EARIP, 2012a). Under the EAHCP, the City of New Braunfels committed to implementing Table 5-3 guidelines for maintaining flows to the Old and New Channels of the Comal River. Over the course of implementing Table 5-3, however, certain flow values were determined to be detrimental to maintenance of restored submerged aquatic vegetation in the Old Channel downstream. This change adjusted Table 5-3 flow values to obtain a flow regime that would provide desired ecological effects while avoiding excessive scouring effects.
- **History:** In light of scouring that would result from Table 5-3-recommended seasonal flow increases, on November 10, 2015 the Adaptive Management Science Committee recommended delaying continued implementation of existing Table 5-3 until analysis could be conducted to recommend a revised flow regime. On November 30, 2015, the Program Manager sent a memorandum to the USFWS requesting concurrence on suspending implementation of Table 5-3 to avoid scouring flows, and, instead, to conduct an analysis to revise Table 5-3 to “determine if a new regime of flows should be implemented.” On January 15, 2016, the USFWS responded to this letter, stating “...we concur that determining a new flow management regime consistent with the EAHCP Flow-Split objectives is reasonable, and that maintaining flows at 65 cfs to protect habitat in the Old Channel is prudent at this time.” Subsequently, a report was commissioned by the Implementing Committee at its November 19, 2015 meeting to address issues identified over first few years of implementing the EAHCP. Among these issues was the potential for scouring produced by the existing Table 5-3 flow regime. Accordingly, one of the report’s charges was to reevaluate Table 5-3, and to recommend a revised regime that would support accomplishment of EAHCP Biological Goals and Objectives. The report, published in June 2016, recommended a revised Table 5-3 (BIO-WEST & Watershed Systems Group, 2016). The change was adopted internally, pending final USFWS approval, after following the process outlined in the Funding and Management Agreement for a Nonroutine Adaptive Management action (EARIP, 2012b). On September 20, 2016, the Program Manager submitted a letter to the United States Fish & Wildlife Services (USFWS) requesting the recommended amendment to EAHCP Table 5-3.
- **Rationale for the Change:** Over the course of implementing the EAHCP, it was observed that flow values set by the existing Table 5-3 scoured the streambed of the Old Channel, setting back establishment of restored submerged aquatic vegetation

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planted to support fountain darter (*Etheostoma fonticola*) populations. Additionally, during 2014, when total system flows dropped to as low as 60 cubic feet per second (cfs) and Table 5-3 required 40 cfs be diverted to the Old Channel, Comal Springs riffle beetle (*Heterelmis comalensis*) habitat around Spring Island was dewetted. The change adjusted Table 5-3 flow values to lessen risk of scouring, dewetting, and to promote desired ecological benefits in support of EAHCP Biological Goals and Objectives.

- **Formal EAHCP Implementing Committee Action:** At the November 19, 2015 Implementing Committee, Tom Taggart motioned to approve authorizing the Program Manager to submit a letter to USFWS regarding the (1) evaluation of native aquatic vegetation restoration, (2) the source of data for calculating the compliance of Texas wild-rice coverage, and (3) the delay in implementing the flow manipulation in the Old Channel of the Comal River. Darren Thompson seconded the motion. There were no objections; the motion passed. At the September 15, 2016 Implementing Committee meeting two actions related to this change were taken. First, Steve Ramsey motioned to approve the Stakeholder Committee recommendation for the SAV Nonroutine AMP Proposal. Tom Taggart seconded the motion. There were no objections; the motion passed. Second, 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; the motion passed.
- **USFWS Response:** In its October 24, 2016 response, the USFWS stated it agreed “with...requested changes to the management of the Flow-Split structure in Table 5.3 to reduce scouring of the Old Channel.”
- **Applicable EAHCP Program Document Section(s):** This change relates to EAHCP Section 5.2.1.

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- **Revisions to Original EAHCP Program Document (as applicable):** This change affects the values set by Table 5-3 (EARIP, 2012a). The revised version, with existing values stricken, is provided below.

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 35-40		10 25
50		40 35-40		10 15
40		30		10
30		20		10

- **EAHCP Program Implementation of the Change:** The City of New Braunfels has followed the revised Table 5-3 flow regime since receipt of the USFWS agreement with the requested change.
- **Documents Related to the Change (see Appendix):**
 45. Adaptive Management Science Committee Minutes, November 10, 2015
 10. Implementing Committee Minutes, November 19, 2015
 11. Program Manager memorandum to the USFWS, dated November 30, 2015, "RE: Information Regarding the Edwards Aquifer Habitat Conservation Plan (EAHCP) and the Incidental Take Permit (ITP) #TE-63663A-1, related to Vegetation Restoration in the Comal and San Marcos Springs systems"
 12. USFWS memorandum in response to November 30, 2015 Program Manager memorandum, dated January 15, 2016
 13. Nonroutine Adaptive Management Proposal, "Re: Submerged Aquatic Vegetation Restoration Programs," September 1, 2016
 14. Adaptive Management Science Committee minutes, September 9, 2016

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15. Scientific Evaluation Report: Nonroutine Adaptive Management Proposal for the EAHCP Submerged Aquatic Vegetation Restoration Programs, September 9, 2016
16. Stakeholder Committee minutes, September 15, 2016
17. EAHCP Stakeholder Committee Report on a Nonroutine Adaptive Management Proposal, September 15, 2016
18. Implementing Committee Minutes, September 15, 2016
46. Program Manager memorandum to the USFWS, dated September 20, 2016, "RE: Amendment to Table 5-3 of the Edwards Aquifer Habitat Conservation Plan (EAHCP) Flow-Split Management for the Old and New Channel of the Comal River for the Incidental Take Permit (#TE-63663A-1)."
20. USFWS memorandum response to September 20, 2016, Program Manager memoranda, dated October 24, 2016, Reference Number: "FWS/R2ES/AFO"

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1.3.4 Other Measures

1.3.4.1 Minor Amendment: Refugia

- **Summary of the Change to the EAHCP Program Document:** This change took the form of an amendment request to the USFWS. Issued by memorandum December 4, 2014, this request sought USFWS approval of a minor administrative amendment to both the Incidental Take Permit (ITP; #TE-63663A-0) and the EAHCP to allow the Edwards Aquifer Authority (EAA) to contract with entities other than the USFWS for a functioning refugia program for the EAHCP Covered Species.
- **History:** Condition K of the ITP and Section 5.1.1 of the EAHCP both state the EAA will support and coordinate with the USFWS on the work relating to the San Marcos Aquatic Resource Center's operation and maintenance of off-site refugia at the USFWS' San Marcos, Uvalde and Inks Dam facilities. Since March 2012, the EAA and the USFWS had been working towards a mutual agreement on a contract, scope of work and budget for off-site refugia to be operated and maintained by the USFWS at its facilities. During this process, the EAA, in consultation with its general counsel, expressed concerns relating to the ownership of new facilities and payment methods required by the USFWS and thus determined that it may not have the legal authority to contract with the USFWS under the terms and conditions as proposed by the USFWS. The Permittees sought USFWS formal acceptance of a minor amendment to allow the EAA to develop a refugia program with contractors potentially other than the USFWS, while maintaining compliance with the EAHCP and ITP.
- **Rationale for the Change:** This minor amendment sought to allow the EAA to contract with entities other than the USFWS for a functioning refugia program for the EAHCP Covered Species, in order to maintain compliance with EAA's commitments laid out in Section 5.1.1 of the EAHCP and Condition K of the ITP. This would allow EAA to (1) establish off-site refugia in accordance with its commitments, while (2) avoiding potential legal issues associated with EAA's authority to contract with USFWS under the terms and conditions proposed by the USFWS.
- **Formal EAHCP Implementing Committee Action:** At the November 20, 2014 Implementing Committee meeting, Roland Ruiz motioned for approval of the amendment letter to be sent to USFWS. Tom Taggart seconded the motion. There were no objections; the motion passed.
- **USFWS Response:** In a letter dated January 21, 2015, the USFWS issued an amendment to the ITP, effective January 20, 2015, featuring amended language to Condition K pertaining to off-site refugia allowing the EAA to contract with entities other than the USFWS for this purpose.

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- **Applicable EAHCP Program Document Section(s):** This action relates to Section 5.1.1 of the EAHCP and Condition K of the ITP.
- **Revisions to Original EAHCP Program Document (as applicable):** The following text revisions were provided to the USFWS in the December 4, 2014 Program Manager memorandum to the USFWS:

~~“Edwards Aquifer Habitat Conservation Plan §5.1.1 San Marcos National Fish Hatchery and Technology Center, Uvalde National Fish Hatchery, and Inks Dam National Fish Hatchery—Refugia~~

~~The EAA will support and coordinate with the USFWS on the work relating to the San Marcos NFHTC’s operation and maintenance of a series of off-site refugia at USFWS’s San Marcos, Uvalde, and Inks Dam facilities. (See Section 6.4). The limited geographic distribution of these species leaves the populations vulnerable to extirpation throughout all or a significant part of their range. A series of refugia, with back-up populations at other facilities, will preserve the capacity for these species to be re-established in the event of the loss of population due to a catastrophic event such as the unexpected loss of springflow or a chemical spill.~~

~~The support of the refugia will augment the existing financial and physical resources of these facilities—USFWS, and provide supplementary resources for appropriate research activities, as necessary, to house and protect adequate populations of Covered Species and expanded knowledge of their biology, life histories, and effective reintroduction techniques. The use of this support will be limited to the Covered Species in this HCP.”~~

- **EAHCP Program Implementation of the Change:** Pursuant to this change, the EAA proceeded with plans to procure services through a bid process open to other entities besides the USFWS.
- **Documents Related to the Change (see Appendix):**
 6. Implementing Committee Minutes, October 16, 2014
 7. Implementing Committee Minutes, November 20, 2014
 8. Program Manager memorandum to the USFWS, dated December 4, 2014, “RE: Minor Administrative Amendment of the Edwards Aquifer Habitat Conservation Plan (EAHCP) and the Incidental Take Permit (ITP) #TE-63663A-0 related to the Refugia Program”

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9. USFWS memorandum response to December 4, 2014 Program Manager memorandum, including attached ITP amendment, dated January 21, 2015, Reference Number: "FWS/R2/ES-ER/059284"

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1.3.4.2 Minor Amendment: Minimizing Impacts of Contaminated Runoff in the San Marcos Springs/River Ecosystem (Sedimentation Ponds)

- **Summary of the Change to the EAHCP Program Document:** This change took the form of an amendment request to the USFWS issued by memorandum March 17, 2017. This request sought USFWS approval of a minor administrative amendment to the Edwards Aquifer Habitat Conservation Plan (EAHCP) Minimizing Impacts of Contaminated Runoff mitigation measure required for the City of San Marcos (COSM) in the EAHCP (Section 5.7.4). The amendment would substitute sedimentation ponds planned in the EAHCP for two superior alternatives: (1) a pre-existing, non-functioning, sedimentation pond (“Downtown Pond”) drainage system upgrade, located on COSM property at the corner of N. C.M. Allen Parkway and E. Hutchison St.; and (2) a sedimentation pond retrofit (“City Park Pond”) located on COSM property in City Park, adjacent to the San Marcos Recreation Hall parking lot.
- **History:** The EAHCP required two specific sedimentation ponds to be constructed along the San Marcos River to reduce contaminated runoff from being deposited into the river, and to slow the velocity of stormwater to reduce bank erosion. The first pond required by the EAHCP was to be located in Veramendi Park, beside Hopkins Street bridge (“Veramendi Pond”); and the second was to be located alongside Hopkins St. to consist of widened extant drainage ditches running parallel to either side of Hopkins (“Hopkins Pond”). During the creation and implementation of the COSM Impervious Cover/Water Quality Protection measure (5.7.6), COSM staff developed a Water Quality Protection Plan (WQPP), which evaluated and prioritized several best management practices (BMP). It was during this time that City staff determined that the two alternative ponds proposed in this amendment would provide increased water quality protection benefits relative to the original provisions in the EAHCP.
- **Rationale for the Change:** The change was informed by WQPP analysis showing that two alternative ponds would provide increased water quality protection benefits relative to the original provisions in the EAHCP. Additionally, financial contributions from the COSM Capital Improvement department and 319 grant funds were committed help leverage EAHCP funds to most effectively protect the San Marcos ecosystem.
- **Formal EAHCP Implementing Committee Action:** At the March 16, 2017 Implementing Committee meeting, Roland Ruiz motioned to approve the AMP proposal as presented and recommended by the Stakeholder Committee. Tom Taggart seconded the motion. There were no objections; the motion passed.

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- **USFWS Response:** In its April 10, 2017 response, the USFWS stated it agreed “that the substitution projects will have a greater positive impact on water quality by reducing the amount sediment entering the river, and therefore lowering the total suspended solids.”
- **Applicable EAHCP Program Document Section(s):** This change relates to EAHCP Section 5.7.4.
- **Revisions to Original EAHCP Program Document (as applicable):**

“5.7.4 Minimizing Impacts of Contaminated Runoff

The City of San Marcos will construct two sedimentation ponds along the river to help reduce the amount of contaminated materials that enters the river as a result of rain events. The ponds will also reduce runoff velocity which will help to reduce bank erosion, and subsequently the amount of sediment that enters the river. The sedimentation ponds will be constructed by excavating and stabilizing a specified area, and building a controlled-release structure. Water source for the ponds is solely runoff from rain events. Specific details for all ponds will be submitted through the AMP as each pond is contracted for design. Each construction area will be surrounded by silt fence/rock berm to minimize runoff. Sediment controls will be monitored daily during construction and the construction area will be covered with a tarp in the event of rain.

The first pond will be located in ~~Veremendi Park beside Hopkins Street Bridge adjacent to Downtown San Marcos~~. This area receives a large amount of street runoff from ~~three different storm drains~~ a large urbanized area with 100% impervious cover. The first pond will be designed to remove sediment and street pollutants from runoff prior to entering the river. The size, shape, and depth ~~will be~~ has been determined based on an analysis of the volume of water discharging from the ~~storm drains downtown area~~. The City of San Marcos will detain as much as possible for treatment purposes. The City of San Marcos will undertake required maintenance of the sedimentation ponds on a regular basis. The area is easily accessible and sediment will be dredged and carried to ~~the City of San Marcos’s~~ an existing composting site. ~~at the Wastewater Treatment Plant.~~

The second pond will be ~~created by widening of drainage ditches that run alongside Hopkins Street and cut directly to the San Marcos River~~ completed by restoring an unfinished sedimentation pond located at City Park adjacent to the Rec Hall parking lot. ~~Widened areas~~ The sedimentation pond will be designed to store water for a short period of time, but long enough to collect sediments and associated pollutants from roadway runoff.”

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- **EAHCP Program Implementation of the Change:** At the time of USFWS approval, for the “Downtown Pond” retrofit, EAHCP funded a redesign to address known structural functionality issues. The construction phase for this project was to begin in early 2018. The “City Park Pond” needed final excavation, construction, and landscaping to become operational. At the close of 2017, the project was bid and awarded, with construction to begin in January 2018.
- **Documents Related to the Change (see Appendix):**
 - 47. Nonroutine Adaptive Management Proposal, “Proposed Advantageous Substitution of Sedimentation Ponds Prescribed for “Minimizing Impacts of Contaminated Runoff” Recovery Measure (HCP §5.7.4),” March 6, 2017
 - 48. Adaptive Management Science Committee Minutes, March 8, 2017
 - 49. Scientific Evaluation Report: Nonroutine Adaptive Management Proposal to Substitute the Sedimentation Ponds Prescribed in the EAHCP for the Minimizing Impacts of Contaminated Runoff Recovery Measure, March 8, 2017
 - 50. Stakeholder Committee Minutes, March 16, 2017
 - 51. EAHCP Stakeholder Committee Report on a Nonroutine Adaptive Management Proposal, March 16, 2017
 - 52. Implementing Committee Minutes, March 16, 2017
 - 53. Program Manager memorandum to the USFWS, dated March 17, 2017, “RE: Amendment to Minimizing Impacts of Contaminated Runoff mitigation measure 5.7.4 of the Edwards Aquifer Habitat Conservation Plan (EAHCP) and Incidental Take Permit (#TE-63663A-1).”
 - 54. USFWS memorandum response to March 17, 2017 Program Manager memorandum, dated April 10, 2017, Reference Number: “FWS/R2/AFO”

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1.3.4.3 Minor Amendment: Sediment Removal in the San Marcos Springs/River Ecosystem (Proactive Strategy)

- Summary of the Change to the EAHCP Program Document:** This change took the form of an amendment request to the USFWS. Issued by memorandum October 20, 2017, this request sought USFWS approval of a minor administrative amendment to the EAHCP Sediment Removal (§§5.3.6 and 5.4.4) measure. Specifically, the requested amendment involved limiting the activities of the Sediment Removal measure. Instead, these activities would be redirected to develop *proactive, sediment mitigation* projects identified through Water Quality Protection Plans (WQPPs) that had been developed by the City of New Braunfels and the City of San Marcos pursuant to their commitments under the Impervious Cover & Water Quality Protection (§5.7.6) measure (for additional details, see “Section 1.3.16. Minor Amendment: Impervious Cover and Water Quality Protection in the Comal Springs/River & San Marcos Springs Ecosystems (Proactive Strategy”).
- History:** Over the course of implementing the Sediment Removal measures (§§5.3.6 and 5.4.4), the reactive removal approach to sediment management was found to be costly and ineffective. While the EAHCP specified removal as the strategy to manage sediment in the San Marcos River, removal was ineffective in addressing sources of excess sediment that continued to be deposited in the river through contributing creeks. This amendment was pursued in order to implement alternative strategies deemed more efficient and effective at addressing both sediment deposition and nonpoint source pollution.
- Rationale for the Change:** Experience implementing sediment removal gained since 2013 showed sediment removal to be costly and ineffective. Water Quality Protection Plans (WQPPs) commissioned by the City of San Marcos and the City of New Braunfels identified alternative strategies for proactively addressing both sediment loading at the source in the San Marcos, as well as nonpoint source pollution in both systems that would be more efficient and effective (John Gleason LLC, 2017; Alan Plummer Associates, INC., 2017). Beyond the WQPP recommendations, EAHCP staff internally analyzed Sediment Removal efforts through the EAHCP Annual Report, as well as through discussions with the Adaptive Management Science Committee. A work group convened to discuss the proposed changes. The Adaptive Management Science Committee produced and adopted a Scientific Evaluation Report (SER) concerning the proposed changes. This SER was supported by the Stakeholder Committee and adopted by the Implementing Committee.
- Formal EAHCP Implementing Committee Action:** At the September 21, 2017 Implementing Committee meeting, Tom Taggart motioned to approve the Stakeholder Committee recommendation for the Sediment Removal and Impervious Cover/Water

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Quality Protection Nonroutine AMP Proposal. Roland Ruiz seconded the motion. There were no objections; the motion passed.

- **USFWS Response:** In its October 20, 2017 response, the USFWS stated, “The Service approves the requested revisions to sections 5.3.6 and 5.4.4 of the EAHCP.”
- **Applicable EAHCP Program Document Section(s):** This change relates to EAHCP Sections 5.3.6 and 5.4.4.
- **Revisions to Original EAHCP Program Document (as applicable):** The following text revisions were provided to the USFWS as an exhibit attached to the October 20, 2017 Program Manager memorandum:
 - “5.3.6 Sediment ~~Removal~~ Management below Sewell Park
In order to manage sediment deposition into the San Marcos river, the City of San Marcos, in partnership with Texas State University, may implement a proactive approach to mitigating sediment impacts by designing and constructing low impact development (LID) best management practices (BMPs) in priority watersheds to benefit the Covered Species. These BMPs can include natural streambed restoration, sediment ponds or retention basins, as well as other effective approaches to managing sediment loads into the San Marcos river. In development of construction plans, the Science Committee (or subcommittee of specialized perspectives) are to provide justification of site selections as well as BMPs proposed.

~~The City of San Marcos will remove sediment from the river bottom at various locations from City Park to IH-35 below Sewell Park. These areas include but are not limited to reaches of the river in City Park, Veramendi Park, Bicentennial Park, Rio Vista Park, and Ramon Lucio Park. Sediment has accumulated at these locations due to the installation of flood control dams, urbanization, and natural processes. These accumulations have altered the river's morphology and natural flow patterns. In addition, when deposition of sediments on or around Texas wild-rice stands causes direct mortality by smothering or burying strands. In addition, the City of San Marcos may remove sediment from key areas of Texas wild-rice habitat below Sewell Park to minimize and mitigate the impacts of incidental take from recreation and pumping during low flow periods, complement the planting and gardening of submerged aquatic vegetation, or to mitigate impacts of sediment on Texas wild-rice caused specifically by floods or other extreme weather events that deposit large amounts of sediment in one area. Upon site identification, the EAHCP Science Committee (or appropriate subcommittee) will be consulted prior to the annual Work Plan submission.~~

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~~To minimize and mitigate the impacts of incidental take from recreation and pumping during low flow periods, the City of San Marcos will remove sediment from key areas of Texas wild-rice habitat below Sewell Park.~~

~~Depending on location and desired outcome, hydrosuction or mechanical removal will may be used to help remove accumulations of sediment. The silt will be vacuumed using a hose that has screen to prevent suction biota greater than 0.25 inch in diameter. The divers doing the hydrosuctioning. Those removing sediment will take the following measures to minimize loss/harm of biota in the area. Divers They will fin disturb the area to be suctioned treated to encourage the darters and other biota to move out of the area. Divers They will be trained to recognize all stages of listed species from larval to adult. If hydrosuctioning, the nozzle of the vacuum will be kept down in the soil and not allowed to swing through the water column during the operation. In addition, placement of stakes around the area to be suctioned treated will keep divers away from protect stands of Texas wild-rice. An observer will be on the bank to monitor the effluent for presence of listed species and all other biota, as well as for the safety of the diver.~~

Sediment samples will be sent to TCEQ for contaminant testing per TCEQ requirements.”

- “5.4.4 Sediment Removal Management in Spring Lake and from Spring Lake Dam to City Park

In order to manage sediment deposition into the San Marcos river, Texas State University, in partnership with the City of San Marcos, may implement a proactive approach to mitigating sediment impacts by designing and constructing low impact development (LID) best management practices (BMPs) in priority watersheds to benefit the Covered Species. These BMPs can include natural streambed restoration, sediment ponds or retention basins, as well as other effective approaches to managing sediment loads into the San Marcos river. In development of construction plans, the Science Committee (or subcommittee of specialized perspectives) are to provide justification of site selections as well as BMPs proposed.

Monitoring of the San Marcos River since 1990 reveals that sediment production has increased from 160 m³ /yr to 920 m³ /yr due to a combination of upstream flood control dams and sediment inflow increases (Earl and Wood 2002). Deposition of sediments on or around Texas wild-rice stands causes direct mortality by smothering or burying stands. Texas State University ~~will~~ may mitigate the impacts of incidental take from diving activities, research activities, recreation

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and pumping during low flow periods by removing sediment from key areas of Texas wild-rice habitat in Spring Lake and from Spring Lake Dam to City Park.

Texas State University may implement a reactive approach by removing sediment from the river bottom at various locations when deposition of sediments on or around Texas wild-rice stands causes direct mortality by smothering or burying strands. Texas State University may remove sediment from key areas of Texas wild-rice habitat in Spring Lake and from Spring Lake Dam to City Park to minimize and mitigate the impacts of incidental take from recreation and pumping during low flow periods, complement the planting and gardening of submerged aquatic vegetation, or to mitigate impacts of sediment on Texas wild-rice caused specifically by floods or other extreme weather events that deposit large amounts of sediment in one area. Upon site identification, the EAHCP Science Committee (or appropriate subcommittee) will be consulted prior to the annual Work Plan submission.

Depending on location and desired outcome, hydrosuction or mechanical removal will ~~may~~ be used to ~~help~~ remove accumulations of sediment. The silt will be vacuumed using a hose that has an end piece covered by a 0.25-inch mesh screen to prevent suctioning biota greater than 0.25 inch in diameter. The divers doing the hydrosuctioning Those removing sediment will take the following measures to minimize loss/harm of biota in the area. Vegetation will be ~~finned~~ disturbed before turning on the pump ~~sediment removal~~ Finning will to encourage the darters and other biota to move out of the area. ~~Divers~~ They will be trained to recognize all stages of listed species from larval to adult. If hydrosuctioning, the nozzle of the vacuum will be kept down in the soil and not allowed to swing through the water column during the operation. In addition, placement of stakes around the area to be ~~suctioned~~ treated will ~~keep divers away from~~ protect stands of Texas wild-rice. An observer will be on the bank to monitor the effluent for presence of listed species and all other biota, as well as for ~~the safety of the diver~~.

Sediment samples will be sent to TCEQ for contaminant testing per TCEQ requirements.”

- **EAHCP Program Implementation of the Change:** In 2017, no funds were expended for sediment removal. Beginning in 2018, it was proposed for sediment to be removed only as needed to support aquatic planting.
- **Documents Related to the Change (see Appendix):**

48. Adaptive Management Science Committee Minutes, March 8, 2017

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- 55. San Marcos Water Quality Protection Work Group Minutes, July 18, 2017
- 56. Nonroutine Adaptive Management Proposal, "Re: Proposed Strategy to Improve the City of San Marcos and Texas State University Sediment Removal Conservation Measures (EAHCP §5.3.6, §5.4.4) and Introduce Low-Impact Development through City Water Quality Protection Plans as an aspect of the Impervious Cover & Water Quality Protection Measure (EAHCP §5.7.6)," August 1, 2017
- 57. Adaptive Management Science Committee Minutes, August 7, 2017
- 58. Scientific Evaluation Report: Nonroutine Adaptive Management Proposal to Improve the Sediment Removal Conservation Measures and Introduce Low-Impact Development through City Water Quality Protection Plans as an aspect of the Impervious Cover & Water Quality Protection Measure, August 25, 2017
- 59. Stakeholder Committee Minutes, September 21, 2017
- 60. Stakeholder Committee Report on a Nonroutine Adaptive Management Proposal, September 21, 2017
- 61. Implementing Committee Minutes, September 21, 2017
- 62. Program Manager memorandum to the USFWS, dated October 20, 2017, "RE: Amendment to the City of San Marcos and Texas State University Sediment Removal Conservation Measures (EAHCP §5.3.6, §5.4.4) as well as the Impervious Cover & Water Quality Protection Measure (EAHCP §5.7.6) (#TE-63663A-1)."
- 63. USFWS memorandum response to October 20, 2017 Program Manager memorandum, dated December 12, 2017

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1.3.4.4 Minor Amendment: Impervious Cover and Water Quality Protection in the Comal Springs/River & San Marcos Springs/River Ecosystems (Proactive Strategy)

- **Summary of the Change to the EAHCP Program Document:** This change took the form of an amendment request to the USFWS. Issued by memorandum March 17, 2017, this request sought USFWS approval of a minor administrative amendment to the EAHCP Impervious Cover & Water Quality Protection (§5.7.6) measures. Specifically, the requested amendment involved forgoing certain initial concepts of the Impervious Cover/Water Quality Protection measure. Instead, these original activities would be redirected to develop *proactive, sediment mitigation* projects identified through Water Quality Protection Plans (WQPPs) that had been developed by the City of New Braunfels and the City of San Marcos pursuant to their commitments under the Impervious Cover & Water Quality Protection (§5.7.6) measure.
- **History:** Regarding the impervious cover criteria and low-impact development (LID) incentives programs to be developed under Impervious Cover & Water Quality Protection (§5.7.6), in both San Marcos and New Braunfels, city employees found little private interest in the programs. This amendment was pursued in order to implement alternative strategies deemed more efficient and effective at addressing both sediment deposition and nonpoint source pollution.
- **Rationale for the Change:** Efforts by city staff to develop incentives programs for LID also found limited private interest in the programs. Water Quality Protection Plans (WQPPs) commissioned by the City of San Marcos and the City of New Braunfels identified alternative strategies for proactively addressing both sediment loading at the source in the San Marcos, as well as nonpoint source pollution in both systems that would be more efficient and effective (John Gleason LLC, 2017; Alan Plummer Associates, INC., 2017). Beyond the WQPP recommendations, EAHCP staff internally analyzed the Impervious Cover & Water Quality Protection programs through the EAHCP Annual Report, as well as through discussions with the Adaptive Management Science Committee. A work group convened to discuss the proposed changes. The Adaptive Management Science Committee produced and adopted a Scientific Evaluation Report (SER) concerning the proposed changes. This SER was supported by the Stakeholder Committee and adopted by the Implementing Committee.
- **Formal EAHCP Implementing Committee Action:** At the September 21, 2017 Implementing Committee meeting, Tom Taggart motioned to approve the Stakeholder Committee recommendation for the Sediment Removal and Impervious Cover/Water Quality Protection Nonroutine AMP Proposal. Roland Ruiz seconded the motion. There were no objections; the motion passed.

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- **USFWS Response:** In its October 20, 2017 response, the USFWS stated, “The Service approves the requested revisions to this section of the EAHCP.”
- **Applicable EAHCP Program Document Section(s):** This change relates to EAHCP Section 5.7.6.
- **Revisions to Original EAHCP Program Document (as applicable):** The following text revisions were provided to the USFWS as an exhibit attached to the October 20, 2017 Program Manager memorandum:

- **“5.7.6 Impervious Cover/Water Quality Protection**
Most potential water quality problems are linked to nonpoint source pollution such as fertilizer runoff and chemicals washed in from adjacent streets; however, spills and leaks from industrial and municipal infrastructure also present hazards. The potential for accidents and nonpoint source pollution to affect the Covered Species may be exacerbated during below average flows since chemicals and nutrients would be less diluted when a lower volume of water is present. Runoff and spills originating even at long distances from the spring opening also can affect water quality at the springs.

The EAHCP originally contemplated establishing incentive criteria for private landowners in proximity of the San Marcos and Comal springs ecosystems to implement low-impact development (LID) best management practices (BMPs) on their property. It was identified that due to lack of interest, and limited overall impact of private property, the incentive program was de-prioritized. In its place, a Water Quality Protection Plan (WQPP) was developed for both the City of San Marcos and City of New Braunfels. These WQPPs provide the cities a list of proposed BMPs that could be implemented to protect water quality from the impacts of nonpoint source pollution. Therefore, both the City of San Marcos and City of New Braunfels will focus their efforts in implementing the water quality management strategies included in their WQPPs.

For the City of New Braunfels stormwater runoff prevention/reduction impacting Landa Lake and the Old Channel is of primary concern. BMPs will be selected that demonstrate the highest load reduction potential. The City of New Braunfels will use the prepared WQPP to assist in prioritizing locations and appropriate BMPs. Upon selection, the EAHCP Science Committee (or appropriate subcommittee) will be consulted prior to the annual Work Plan submission and selected BMPs implemented.

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For the City of San Marcos, as referenced in 5.3.6, sediment prevention/reduction is a primary concern. BMPs will be selected in priority watersheds that demonstrate abnormal erosion issues and cause disproportionate sedimentation into the San Marcos river threatening Texas wild-rice and other Covered Species habitat. Thus, the City of San Marcos will implement water quality protection measures that directly improve sediment load reductions, and protect water quality from other potential contaminants. The City of San Marcos will use the prepared WQPP to assist in prioritizing locations and appropriate BMPs. Upon selection, the EAHCP Science Committee (or appropriate subcommittee) will be consulted prior to the annual Work Plan submission.

Additionally, the City of New Braunfels will may establish criteria related to desired impervious cover and provide incentives to reduce existing impervious cover on public and private property in New Braunfels. The City of New Braunfels will may establish criteria and incentives for the program based upon the low impact development (LID)/Water Quality Work Group Final Report (Appendix Q) recommendations for Implementation Strategies and best management practices (BMPs).

~~The City of San Marcos will establish a program to protect water quality and reduce the impacts of impervious cover (such as through LID). The City of San Marcos will develop criteria and incentives for the program based upon the LID/Water Quality Work Group Final Report (Appendix Q) recommendations for Implementation Strategies and BMPs.~~

The EAA will put together material regarding the value of a ban on the use of coal tar sealants and work with local governments to explore and encourage their consideration of such a ban.”

- **EAHCP Program Implementation of the Change:**

- *Impervious Cover & Water Quality Protection (San Marcos):* A Sessom Creek Middle Reach Restoration project is intended to mitigate stream erosion that is generating high sediment loads, which impact critical habitat (Figure 3.3-43). A draft of the Preliminary Engineering Report (PER) was completed in 2017 for the Sessom Creek water quality improvement project.
- *Impervious Cover & Water Quality Protection (New Braunfels):* In 2018, the City of New Braunfels will implement select water quality protection measures identified in the WQPP. Specifically, the CONB will design and construct a stormwater treatment system (i.e. rain garden/ bioretention basin) at the end of North Houston Ave. to treat stormwater runoff prior to entering the Upper Spring

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Run of Landa Lake. The City of New Braunfels will also design a measure to treat stormwater runoff from the Landa Park Golf Course parking lot. The proposed measure is to replace the existing impermeable asphalt surface with a permeable parking surface that will allow reduce runoff volume and provide for the filtration of stormwater runoff.

- **Documents Related to the Change (see Appendix):**

48. Adaptive Management Science Committee Minutes, March 8, 2017

55. San Marcos Water Quality Protection Work Group Minutes, July 18, 2017

56. Nonroutine Adaptive Management Proposal, "Re: Proposed Strategy to Improve the City of San Marcos and Texas State University Sediment Removal Conservation Measures (EAHCP §5.3.6, §5.4.4) and Introduce Low-Impact Development through City Water Quality Protection Plans as an aspect of the Impervious Cover & Water Quality Protection Measure (EAHCP §5.7.6)," August 1, 2017

57. Adaptive Management Science Committee Minutes, August 7, 2017

58. Scientific Evaluation Report: Nonroutine Adaptive Management Proposal to Improve the Sediment Removal Conservation Measures and Introduce Low-Impact Development through City Water Quality Protection Plans as an aspect of the Impervious Cover & Water Quality Protection Measure, August 25, 2017

59. Stakeholder Committee Minutes, September 21, 2017

60. Stakeholder Committee Report on a Nonroutine Adaptive Management Proposal, September 21, 2017

61. Implementing Committee Minutes, September 21, 2017

62. Program Manager memorandum to the USFWS, dated October 20, 2017, "RE: Amendment to the City of San Marcos and Texas State University Sediment Removal Conservation Measures (EAHCP §5.3.6, §5.4.4) as well as the Impervious Cover & Water Quality Protection Measure (EAHCP §5.7.6) (#TE-63663A-1)."

63. USFWS memorandum response to October 20, 2017 Program Manager memorandum, dated December 12, 2017

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1.3.5 Adaptive Management Research & Modeling

1.3.5.1 Clarification: Biological Monitoring (Texas Wild-rice Coverage Calculation)

- **Summary of the Change to the EAHCP Program Document:** This change took the form of an informational notice to the USFWS that was more in the nature of a clarification. In a memorandum dated November 30, 2015, the Program Manager informed the USFWS regarding issues relating to vegetation restoration in the EAHCP, in this case, specifically including the methodology for calculation of Texas wild-rice (*Zizania texana*) coverage.
- **History:** Through the Comprehensive Biological Monitoring program, the Edwards Aquifer Authority (EAA) historically conducted an annual assessment of Texas wild-rice coverage in the San Marcos springs system. This monitoring was required in the EAHCP, but has been conducted for the last 15 years with consistent methodologies and professional staff. The EAA was aware that the USFWS San Marcos Aquatic Resource Center (SMARC) also had begun monitoring of Texas wild-rice coverage. Per the EAHCP, the EAA intended to use the EAHCP-generated coverage amounts for the purposes of reporting and compliance.
- **Rationale for the Change:** EAHCP's decision to continue with the regular practice of assessing Texas wild-rice coverage in the San Marcos springs system through the EAA Comprehensive Biological Monitoring Program was based on its intention to maintain consistency with the established historical monitoring routine.
- **Formal EAHCP Implementing Committee Action:** At the November 19, 2015 Implementing Committee meeting, Tom Taggart motioned to approve authorizing the EAHCP Program Manager to submit a letter to USFWS regarding the 1) evaluation of native aquatic vegetation restoration, 2) the source of data for calculating the compliance of Texas wild-rice coverage [the subject of this change], and 3) the delay in implementing the flow manipulation in the Old Channel of the Comal River. Darren Thompson seconded the motion. There were no objections; the motion passed.
- **USFWS Response:** In its January 15, 2016 response, the USFWS stated, "The EAHCP is perhaps concerned about the discrepancy between the results of the two 2015 surveys [one conducted by EAA, the other by the SMARC]. The SMARC is in its first year of surveying Texas wild and relies on a survey team composed of mostly of volunteers. We expect that over time the two surveys will likely generate Texas wild rice survey results that are more consistent with each other. To that end we would like to invite the biologists from both teams to discuss survey methods and to collaboratively consider ways to reduce the variation in the results. We agree with the

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EAHCP that it should use the coverage estimates it generates for reporting and permit compliance purposes.”

- **Applicable EAHCP Program Document Section(s):** This informational notice relates to EAHCP Section 6.3.1.
- **Revisions to Original EAHCP Program Document (as applicable):** None.
- **EAHCP Program Implementation of the Change:** The EAHCP continued using the Texas wild-rice coverage estimates it generates through the EAA monitoring program for reporting and permit compliance purposes.
- **Documents Related to the Change (see Appendix):**

10. Implementing Committee Minutes, November 19, 2015

11. Program Manager informational memorandum to the USFWS, dated November 30, 2015, “RE: Information Regarding the Edwards Aquifer Habitat Conservation Plan (EAHCP) and the Incidental Take Permit (ITP) #TE-63663A-1, related to Vegetation Restoration in the Comal and San Marcos Springs systems”

12. USFWS memorandum in response to November 30, 2015 Program Manager memorandum, dated January 15, 2016

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1.4 FMA Changes

1.4.1 Informational: Membership & Meetings of the Science Review Panel

- **Summary of the Change to the EAHCP Program Document:** This change took the form of an informational memorandum to the United States Fish & Wildlife Service (USFWS). Issued October 18, 2013, this memorandum provided information regarding minor variations from the Funding and Management Agreement (FMA; EARIP, 2012b), in relation to the Science Review Panel (Panel or SRP). These changes were the result of discussions with the National Academy of Science (NAS) and involved efforts to provide the most efficient, scientifically objective, and fiscally responsible scientific review possible. The specific changes were: (1) to compose the Panel of 12-15 members instead of five members as provided in the FMA; and (2) for the Panel to meet on an as-needed basis instead of a quarterly basis until the determinations have been made under Subsection 7.13.7, as was provided in the FMA.
- **History:** The language in the FMA was drafted prior to the start of negotiations to retain NAS for services in fulfillment of the SRP function set out by the FMA. Although the SRP contract was not yet executed at the time of this change, discussions had commenced with NAS and it was deemed prudent to proceed with these changes to allow the EAHCP to benefit from the prestige and expertise available at NAS, while operating in the most efficient manner possible.
- **Rationale for the Change:** The change in membership composition was taken in order to more sufficiently address the broad scientific nature of the requested scientific review. NAS requires convening a committee with expertise in all related disciplines. The change in meeting frequency was taken based on discussions with NAS, in which it was determined that having the Panel meet on an as-needed basis would be a more efficient and productive strategy.
- **Formal EAHCP Implementing Committee Action:** At the October 17, 2013 Implementing Committee meeting, Tom Taggart moved to approve submittal of the informational memorandum to USFWS with no additional changes. Steve Ramsey seconded the motion. There were no objections; the motion passed.
- **USFWS Response:** There was no direct official response to this informational memorandum by the USFWS. However, in a memorandum to the USFWS dated October 10, 2014, the Program Manager summarized the outcomes of an October 1, 2014 meeting between the Program Manager and the USFWS, stating, "USFWS has accepted the informational memorandum related to the National Academy of Science submitted by the EAHCP Permittees on October 18, 2013. As no additional Take will

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be created, USFWS has approved of these changes. No further action or communication is needed related to this topic.”

- **Applicable EAHCP Program Document Section(s):** This change relates to FMA Sections 7.10.1 and 7.10.2.
- **Revisions to Original EAHCP Program Document (as applicable):** None.
- **EAHCP Program Implementation of the Change:** These changes were incorporated in the Scope of Work for the NAS contract for SRP services.
- **Documents Related to the Change (see Appendix):**

64. Implementing Committee Minutes, October 17, 2013

65. Program Manager memorandum to the USFWS, dated October 18, 2013, “RE: Informational Memo related to the Edwards Aquifer Habitat Conservation Plan (EAHCP) for Incidental Take Permit #TE-63663A-0 (ITP)”

66. Program Manager memorandum to the USFWS, dated October 10, 2014, “RE: SUMMARY OF OCTOBER 1, 2014 MEETING BETWEEN USFWS AND EACHP STAFF”

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1.4.2 Informational: Limitations on Use of Funds—Employee & Administrative Costs

- **Summary of the Change to the EAHCP Program Document:** This change took the form of an amendment request to the USFWS but is more in the nature of an informational filing. Issued by memorandum November 22, 2013, this request sought USFWS approval of a minor administrative amendment to the Funding and Management Agreement (FMA; EARIP, 2012b) providing language to allow employees of Texas State University (TXST) to receive compensation for work on EAHCP projects as long as they meet pre-determined conditions specified in the amended FMA language (see “Revisions to Original EAHCP” below). The FMA as originally written did not allow for the funding of employees of any of the Permittees.
- **History:** Once implementation of the EAHCP was underway it quickly became apparent that, in the special case of TXST, existing FMA restrictions on awarding EAHCP compensation to Permittees would be prohibitive to accomplishing Applied Research program objectives. In light of TXST researchers’ expertise regarding the Covered Species and the spring systems, it was deemed prudent to make TXST employees eligible to receive EAHCP compensation under certain circumstances.
- **Rationale for the Change:** Realizing that it is in the best interest of the EAHCP to utilize all available resources and scientific expertise available at TXST in support of the EAHCP, the Implementing Committee agreed to amend the FMA by adding a provision to Section 5.6.5 that allows employees of TXST to receive compensation for work on EAHCP projects as long as they meet pre-determined conditions.
- **Formal EAHCP Implementing Committee Action:** At the November 21, 2013 Implementing Committee meeting, Steve Ramsey moved to submit the memo to USFWS. Andrew Sansom seconded the motion. There were no objections; the motion passed.
- **USFWS Response:** There was no direct official response to this informational memorandum by the USFWS. However, in a memorandum to the USFWS dated October 10, 2014, the Program Manager summarized the outcomes of an October 1, 2014 meeting between the Program Manager and the USFWS, stating, “USFWS has accepted the Minor Amendment related to Appendix R of the EAHCP (FMA) submitted by the EAHCP Permittees on November 22, 2013. As no additional Take will be created, USFWS has approved of this amendment. No further action or communication is needed related to this topic.”

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- **Applicable EAHCP Program Document Section(s):** This change does not affect the EAHCP; however, it did result in amendments to language in FMA Sections 5.6.5.1, 5.6.5.2, and 5.6.5.3.
- **Revisions to Original EAHCP Program Document (as applicable):** The following text revisions were provided to the USFWS in the “Amendment No. 1” document attached to the November 22, 2013 Program Manager memorandum to the USFWS:
 - 45. Existing FMA Section 5.6.5 (EARIP, 2012b, pp. 22-23) was renumbered as 5.6.5.1, but language was not amended. In addition, two new subsections were added. These subsections were “5.6.5.2. Special Exemption,” and “5.6.5.3 Conduct of Texas State Contractor/Employees.” The language for these two new subsections is provided in the “Amendment No. 1” document attached to the November 22, 2013 Program Manager memorandum to the USFWS.
- **EAHCP Program Implementation of the Change:** Pursuant to this change, TXST became eligible to receive compensation for work on EAHCP Applied Research projects.
- **Documents Related to the Change (see Appendix):**
 - 67. Implementing Committee Minutes, May 16, 2013
 - 68. Amendment No. 1 to the Funding and Management Agreement by and among the Permittees, executed September 26, 2013
 - 69. Implementing Committee Minutes, November 21, 2013
 - 70. Program Manager memorandum to the USFWS, dated November 22, 2013, “RE: Amendment related to the Edwards Aquifer Habitat Conservation Plan (EAHCP) for Incidental Take Permit #TE-63663A-0 (ITP)”
 - 66. Program Manager memorandum to the USFWS, dated October 10, 2014, “RE: SUMMARY OF OCTOBER 1, 2014 MEETING BETWEEN USFWS AND EACHP STAFF”

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2. LEGAL CORRECTIONS TO THE EAHCP

These changes have not been submitted to the USFWS for approval and therefore are not to be incorporated into the EAHCP until USFWS approval.

No.	§	Page	Reference in the Text	Corrected Text
1	1.1 .3	1-5	² Senate Bill 3 (Act of May 28, 2007.), 80 th Leg. R. S. ch 1430, §§ 12.01-12.12, 2007 Tex. Gen. Laws 5848, 5901.	² Senate Bill 3 (Act of May 28, 2007), 80 th Leg. R.S. ch. 1430, §§ 12.01-12.12, 2007 Tex. Gen. Laws 5848, 5901.
2	1.1 .3	1-6	The legislation also stipulated that “[b]eginning September 1, 2007, the authority [EAA] may not require the volume of permitted withdrawals to be less than an annualized rate of 340,000 acre-feet, under critical period Stage IV.” (EAA Act § 1.26A(d)).	The legislation also stipulated that “[b]eginning September 1, 2007, the authority [EAA] may not require the volume of permitted withdrawals to be less than an annualized rate of 340,000 acre-feet, under critical period Stage IV.” (EAA Act § 1.26(d)).
3	1.1 .3	1-7	The HCP must take effect December 31, 2012. (<i>Id.</i> at § 1.26A.(d)(3))	The HCP must take effect December 31, 2012. (<i>Id.</i> at § 1.26A(d)(3))
4	1.4	1-10	... Mexican fanwnsfoot (<i>Truncilla cognata</i>) ³ http://earip.org/WhoopingCrane/FINAL%20Tech%20Memo%203-8-2010%20%28HICKS%29.pdf ; see also http://www.earip.org/MeetingArchive.aspx (April 8, 2010)(Comments on Technical Memorandum)	... Mexican fawnsfoot (<i>Truncilla cognata</i>). ³ http://earip.org/WhoopingCrane/FINAL%20Tech%20Memo%203-8-2010%20%28HICKS%29.pdf ; see also http://www.earip.org/MeetingArchive.aspx (April 8, 2010)(Comments on Technical Memorandum). [LINKS DON'T WORK]
5	1.5 .3. 1	1-12	Section 9 of the ESA prohibits the “take” of threatened and endangered species, including the attempt or action to “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture,	Section 9 of the ESA prohibits the “take” of threatened and endangered species, including the attempt or action to “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect” such species. (16 U.S.C. §§ 1532(19), 1538(a)).

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No.	§	Page	Reference in the Text	Corrected Text
			or collect” such species. (16 U.S.C. § 1532).	
6	1.5 .3. 1	1-12	“[W]ith respect to endangered species of plants, it is unlawful to: import or export; remove the species from areas under federal jurisdiction or maliciously damage or destroy it in those areas; remove, cut, dig up, damage or destroy the species in any other area in violation of state law or in the course of criminal trespass; deliver, receive, carry, transport, ship, sell or offer for sale in interstate or foreign commerce; violate any regulation pertaining to a threatened or endangered plant species.” (16 U.S.C. § 1538(a)(2)(A) through (E)).	With respect to endangered species of plants, it is unlawful to: import or export; remove the species from areas under federal jurisdiction or maliciously damage or destroy it in those areas; remove, cut, dig up, damage or destroy the species in any other area in violation of state law or in the course of criminal trespass; deliver, receive, carry, transport, ship, sell or offer for sale in interstate or foreign commerce; violate any regulation pertaining to a threatened or endangered plant species. (16 U.S.C. § 1538(a)(2)(A) through (E))
7	1.5 .2. 2	1-12	⁴ http://www.edwardsaquifer.org/display_policies_rules.php	⁴ http://www.edwardsaquifer.org/display_policies_rules.php [LINK DOESN'T WORK]
8	1.5 .3. 2	1-13	.... (16 U.S.C. § 1539(a)(2)(A)(i)-(iv); 50 C.F.R. § 17.22(b)(iii)).	.... (16 U.S.C. § 1539(a)(2)(A)(i)-(iv); 50 C.F.R. § 17.22(b)(1)(iii)).
9	1.5 .3. 2	1-13	.... (16 U.S.C. § 10(a)(2)(B); 50 C.F.R. §§ 17.22(b)(2) and 17.32(b)(2)).	.... (16 U.S.C. § 1539(a)(2)(B); 50 C.F.R. §§ 17.22(b)(2) and 17.32(b)(2)).
10	1.5 .3. 2	1-13 (USFWS 1996(c) at 3-20; 65 FR 35,243, (June 1, 2000)) (USFWS 1996c at 3-20; 65 FR 35,243, (June 1, 2000))

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No.	§	Page	Reference in the Text	Corrected Text
11	1.5 .3. 3	1-14	USFWS regulations identify the “constituent elements” of critical habitat to include “those that are essential to the conservation of the species,” such as “roost sites, nesting grounds, spawning sites, feeding sites, seasonal wetland or dryland, water quality or quantity, host species or plant pollinator, geological formation, vegetation type, tide, and specific soil types.” (50 C.F.R. § 424.12).	USFWS regulations provide that the USFWS will “[i]dentify physical and biological features essential to the conservation of the <u>species</u> at an appropriate level of specificity using the best available scientific data. This analysis will vary between <u>species</u> and may include consideration of the appropriate quality, quantity, and spatial and temporal arrangements of such features in the context of the life history, status, and conservation needs of the <u>species</u> .”(50 C.F.R. § 424.12(b)(1)(ii)). [RULE AMENDED IN 2016]
12	1.5 .4. 1	1-14	Texas wild-rice is listed as an endangered plant by the Texas Parks and Wildlife Department (TPWD). (TPW Code § 88.003.) No person may take for commercial sale, possess for commercial sale, or sell all or part of an endangered plant from public land; these actions are also prohibited on private land unless authorized by a permit issued by TPWD. (TPW Code §88.008.) Endangered plants may be taken from public lands by qualified persons for propagation, education, or scientific study under a collection permit issued by TPWD. (<i>Id.</i> ; Texas Administrative Code, Chapter 31, § 69.1; see also TPW Code § 88.001 (defining “take” to mean “to collect, pick, cut, dig up, or remove.”)).	Texas wild-rice is listed as an endangered plant by the Texas Parks and Wildlife Department (TPWD). (Title 31 of the Texas Administrative Code, Chapter 69, § 69.8(a); see TPW Code § 88.003.) No person may take for commercial sale, possess for commercial sale, or sell all or part of an endangered plant from public land; these actions are also prohibited on private land unless authorized by a permit issued by TPWD. (TPW Code § 88.008.) Endangered plants may be taken from public lands by qualified persons for propagation, education, or scientific study under a collection permit issued by TPWD. (<i>Id.</i> ; Title 31 of the Texas Administrative Code, Chapter 69, § 69.1; see also TPW Code § 88.001 (defining “take” to mean “to collect, pick, cut, dig up, or remove.”)).

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No.	§	Page	Reference in the Text	Corrected Text
13	1.5 .4. 2	1-15	On March 29, 2012, the TPWD adopted a rule creating the San Marcos River State Scientific Area. (31 TAC § 57.901).	On March 29, 2012, the TPWD adopted a rule creating the San Marcos River State Scientific Area. (31 TAC § 57.910). (See Section 5.6.1).
14	1.5 .5	1-15	The Council on Environmental Quality regulations define “major federal action” as an action with “effects that may be major and which are potentially subject to federal control and responsibility” including “projects and programs entirely or partly financed, assisted, conducted, regulated, or approved by federal agencies.” (40 C.F.R. § 1508.17).	The Council on Environmental Quality regulations define “major federal action” as an action with “effects that may be major and which are potentially subject to federal control and responsibility” including “projects and programs entirely or partly financed, assisted, conducted, regulated, or approved by federal agencies.” (40 C.F.R. § 1508.18).
15	1.6	1-15	Under the ESA Section 10(a)(2)(A)(iii), the HCP must specify “the alternative actions to such [incidental] taking the applicant considered and the reasons why such alternatives are not being utilized.	Under the ESA Section 10(a)(2)(A)(iii), the HCP must specify the “alternative actions to such [incidental] taking the applicant considered and the reasons why such alternatives are not being utilized.”
16	2.2 .1	2-2	... Term Permits, Emergency Permits, and Recharge Recovery Permits. (See <i>id.</i> §§ 1.16, 1.19, 1.20 and EAA rules § 711.260).	... Term Permits, Emergency Permits, and recharge recovery contracts. (See <i>id.</i> §§ 1.16, 1.19, 1.20 and 1.44).

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No.	§	Page	Reference in the Text	Corrected Text
17	2.2 .1. 2	2-4	<p>Recharge Recovery Permits</p> <p>The EAA has implemented this statutory authority in its rules to authorize the recovery from the Aquifer of groundwater that is in storage due to the recharge efforts of the Authority or another political subdivision. The EAA's Aquifer Recharge, Storage, and Recovery Program rules are found at subchapter J of Chapter 711. As presently implemented, Recharge Recovery Permits may be issued pursuant to Aquifer storage and recovery projects conducted to increase the yield of the Aquifer, protect springflows, and ensure minimum springflows of the Comal and San Marcos Springs. The EAA has developed Aquifer recharge, storage and recovery rules to allow entities to conduct approved Aquifer storage and recharge activities. Aquifer withdrawals made pursuant to Recharge Recovery Permits are not subject to or limited by the Aquifer-wide withdrawal cap that is discussed above in relation to Initial Regular Permits. EAA seeks incidental take coverage for its authorization of any withdrawals under Recharge Recovery</p>	<p>Recharge Recovery Contracts</p> <p>The EAA has implemented this statutory authority in its rules to authorize the recovery from the Aquifer of groundwater that is in storage due to the recharge efforts of the Authority or another political subdivision. The EAA's Aquifer Recharge, Storage, and Recovery Program rules are found at subchapter J of Chapter 711. As presently implemented, recharge recovery contracts may be entered into pursuant to Aquifer storage and recovery projects conducted to increase the yield of the Aquifer, or protect springflows and ensure minimum springflows of the Comal and San Marcos Springs. The EAA has developed Aquifer recharge, storage and recovery rules to allow entities to conduct approved Aquifer storage and recharge activities by entering into contracts under Section 1.44 of the EAA Act with other political subdivisions to recharge the Aquifer. Withdrawals made pursuant to recharge recovery contracts are not subject to or limited by the Aquifer-wide withdrawal cap that is discussed above in relation to Initial Regular Permits. EAA seeks incidental take coverage for its authorization of any withdrawals under recharge recovery contracts in the future and for the owners or lessees of the water making the authorized withdrawals under any recharge recovery contract. The manner in which those withdrawals will be addressed is discussed in the Changed Circumstances provisions of Section 8.1.</p>

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No.	§	Page	Reference in the Text	Corrected Text
			<p>Permits and for the owners or lessees of the water making the authorized withdrawals under any Recharge Recovery Permit. The manner in which those withdrawals will be addressed is discussed in the Changed Circumstances provisions of Section 8.1.</p>	

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No.	§	Page	Reference in the Text	Corrected Text
18	2.2 .1. 2	2-4 – 2-5	Exempt wells are those wells that are exempt from the duty to obtain a groundwater withdrawal permit from the EAA and to meter withdrawals. (EAA Act §§ 1.15, 1.16c, and 1.33). A well qualifies for exempt well status if: “(1) it is capable of producing no more than 25,000 gallons of water a day; (2) it will be used solely for domestic or livestock use; and (3) it is not within or serving a subdivision requiring platting; or (4) the well is located on and operated by, or for the benefit of, a federal facility, and prior to September 1, 2003, the EAA has not approved the transfer of ownership of an application for an Initial Regular Permit related to the well from the federal facility to another person.” (EAA Rules §§ 702.1(b)(24) and 71.20).	Exempt wells are those wells that are exempt from the duty to obtain a groundwater withdrawal permit from the EAA and, in some cases, to meter withdrawals. (EAA Act §§ 1.15, 1.16(c), and 1.33). A well qualifies for exempt well status if it is: “(1) capable of producing no more than 25,000 gallons of water a day; (2) used solely for domestic or livestock use; and (3) not serving a subdivision requiring platting; or (4) located on and operated by, or for the benefit of, a federal facility, and prior to September 1, 2003, the [EAA] has not approved the transfer of ownership of an application for an initial regular permit related to the well from the federal facility to another person.” (EAA Rules § 711.20). Additionally, a well is exempt from permitting if it qualifies as a limited production well because: “(1) the well was drilled on or before June 1, 2013; (2) withdrawals from the well are placed to a beneficial use; and (3) the well is limited in production because the well: (A) is not capable of producing more than 1,250 gallons of water per day; or (B) is metered and does not produce more than 1.4 acre-feet of water in any calendar year.” (<i>Id.</i> § 711.61).
19	2.2 .2. 2	2-5	... is bifurcated between an “unrestricted” amount and a “base” amount, (EAA Act § 1.34(c); EAA Rules §§ 702.1(29) and (199)).	... is bifurcated between an “unrestricted” amount and a “base” amount, (EAA Act § 1.34(c); EAA Rules §§ 702.1(24) and (199)).
20	2.2 .2. 2	2-7	... under critical period Stage IV.” (EAA Act § 1.26(a)(d)).	... under critical period Stage IV.” (EAA Act § 1.26(d)).

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No.	§	Page	Reference in the Text	Corrected Text
21	3.1 .5. 3	3-16	SOURCE: http://www.nass.usda.gov/Statistics_by_State/Texas/Charts_&_Maps/cwmap1.htm	SOURCE: http://www.nass.usda.gov/Statistics_by_State/Texas/Charts_&_Maps/cwmap1.htm [LINK DOESN'T WORK]
22	3.3 .2	3-39	.... (See EAA Rules Chapter 713 (Water Quality), Subchapters B General Provisions), C (Well construction, Operation and Maintenance), and D (Well Closures).	.... (See EAA Rules Chapter 713 (Water Quality), Subchapters B General Provisions), C (Well Construction, Operation and Maintenance), and D (Well Closures).
23	3.4 .3	3-55	Fern Bank Springs is designated as Critical Habitat for the Comal Springs riffle beetle, Comal Springs dryopid beetle, and Peck's cave amphipod. (72 FR 39.247 (July 17, 2007))	Fern Bank Springs is designated as Critical Habitat for the Comal Springs dryopid beetle. (72 FR 39,247 (July 17, 2007)).
24	3.5	3-55 – 3-56	Fountain darter (<i>Etheostoma fonticola</i>) (35 FR 16,047 (Oct. 13, 1970)) Comal Springs riffle beetle (<i>Heterelmis comalensis</i>) (62 FR 66,295 (Dec. 18, 1997)) Comal Springs dryopid beetle (<i>Stygoparnus comalensis</i>) (62 FR 66,295 (Dec. 18, 1997)) Peck's Cave amphipod (<i>Stygobromus pecki</i>) (62 FR 66,295 (Dec. 18, 1997)) Texas wild-rice (<i>Zizania texana</i>) (43 FR 17,910 (Apr. 26, 1978))	Fountain darter (<i>Etheostoma fonticola</i>) (35 FR 16,047 (date of listing Oct. 13, 1970)) Comal Springs riffle beetle (<i>Heterelmis comalensis</i>) (62 FR 66,295 (date of listing Jan. 20, 1998)) Comal Springs dryopid beetle (<i>Stygoparnus comalensis</i>) (62 FR 66,295 (date of listing Jan. 20, 1998)) Peck's Cave amphipod (<i>Stygobromus pecki</i>) (62 FR 66,295 (date of listing Jan. 20, 1998)) Texas wild-rice (<i>Zizania texana</i>) (43 FR 17,910 (date of listing Apr. 26, 1978))

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No.	§	Page	Reference in the Text	Corrected Text
			San Marcos Gambusia ((<i>Gambusia georgei</i>) (35 FR 16047 (Oct. 13, 1970))	San Marcos Gambusia ((<i>Gambusia georgei</i>) (45 FR 47,355 (date of listing Aug. 14, 1980)
25	4.0	4-1	... recovery of the species in the wild.” (16 U.S.C. § 1539(1)(a)(1)(B)(iv)).	... recovery of the species in the wild.” (16 U.S.C. § 1539(a)(2)(B)(iv)).
26	4.0	4-1	FWS must make these determinations “using the best scientific and commercial data available.”	FWS must make these determinations “using the best scientific and commercial data available.” <i>Id.</i>
27	4.0	4-1	.... 65 FR at 35,250	(65 FR 35,250).
28	4.0	4-1	.... (<i>Id.</i> at 32,250-51).	..... (<i>Id.</i> at 35,250-51).
29	4.1 .1. 2	4-17	Total San Marcos Discharge (cfs) ^a	Total San Marcos Discharge (cfs)
30	4.1 .1. 2	4-17	140	140 ^a

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No.	§	Page	Reference in the Text	Corrected Text
31	4.2	4-36	As part of a February 1, 1993, Judgment (as amended on May 26, 1993) in the case of <i>Sierra Club v. Babbitt</i> (No. MO-91-CA-069, U.S. Dist. Ct., W.D. Texas),	As part of a February 1, 1993, Judgment (as amended on May 26, 1993) in the case of <i>Sierra Club v. Babbitt</i> , No. MO-91-CA-069 (W.D. Tex. Feb. 1, 1993),
32	4.2 .1. 2	4-46	Figure 4-7. http://earip.org/MeetingArchive.aspx?MeetingType=EARIPMeetings	Figure 4-7. http://earip.org/MeetingArchive.aspx?MeetingType=EARIPMeetings s [LINK DOESN'T WORK]
33	4.2 .1. 2	4-48	.... (See 50 C.F.R. § 402.02 (defining the environmental baseline" as the "past and present <u>impacts</u> of all Federal State and private actions and other human activities in the action area.")	.... (See 50 C.F.R. § 402.02 (defining the "environmental baseline" as the "past and present <u>impacts</u> of all Federal State and private actions and other human activities in the action area.")
34	4.2 .1. 3	4-55	However, the improvement of minimum flows relative to historical conditions and the overall projected habitat remaining along the western shoreline and around Spring Island (see Section 4.2.2.3) is considered sufficient to support the survival of the Comal Springs riffle beetle in the Comal system during Phase I AMP activities.	However, the improvement of minimum flows relative to historical conditions and the overall projected habitat remaining along the western shoreline and around Spring Island (see Section 4.2.2.3) is considered sufficient to support the survival of the Comal Springs riffle beetle in the Comal system during Phase I.
35	5.0	5-1	... mitigate the impacts of such taking." (<i>Id.</i> at § 1539(a)(2)(A)(B)(ii)).	... mitigate the impacts of such taking." (<i>Id.</i> at § 1539(a)(2)(B)(ii)).
36	5.1 .4. 1	5-9 – 5-10	For the San Antonio Pool, Stage V would be triggered by a combination of monthly average J-17 levels below 625 feet or springflows of either 45 cfs based on a ten-day rolling average at	For the San Antonio Pool, Stage V would be triggered by a combination of the ten-day rolling average of the maximum daily well level at J-17 level being below 625 feet or springflows of either less than 45 cfs based on a ten-day rolling average at Comal Springs or less

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			Comal Springs or 40 cfs based on a three-day rolling average.	than 40 cfs based on a three-day rolling average. [CONFORMS TO ACTUAL EAA RULE]
37	5.2 .3	5-14	"2) Pursuant to Section 9.2 of the IA, the City of New Braunfels will issue Certificates of Inclusion"	"2) Pursuant to Resolution and Order No. 08-12-001 of the EAHCP Implementing Committee, the City of New Braunfels will issue Certificates of Inclusion"
38	5.3 .2. 1	5-24	"2) Pursuant to Section 9.2 of the IA, the City of San Marcos will issue Certificates of Inclusion"	"2) Pursuant to Resolution and Order No. 08-12-001 of the EAHCP Implementing Committee, the City of New Braunfels will issue Certificates of Inclusion"
39	5.5 .1	5-38	When the monthly average groundwater levels at J-17 are below 630 ft-MSL and the ten-year rolling average of Aquifer recharge is 500,000 ac-ft or less, pumping of selected wells on the northeast side of SAWS water distribution system will be reduced in an amount that on a monthly basis equals the amount of water returned from the ASR only to the extent of the Aquifer water provided by the EAA for storage in the ASR.	When the ten-day rolling average groundwater levels at J-17 are below 630 ft-MSL and the ten-year rolling average of Aquifer recharge is 500,000 ac-ft or less, pumping of selected wells on the northeast side of SAWS water distribution system will be reduced in an amount that on a monthly basis equals the amount of water returned from the ASR only to the extent of the Aquifer water provided by the EAA for storage in the ASR. [CONFORMS TO EAA-SAWS ASR CONTRACT]
40	5.6 .1	5-40	..... (30 TAC 57.910).	..... (31 TAC 57.910).
41	5.8 .1	5-44	The baseline scenario used in that simulation assumes that all of the Initial Regular Permits are being fully pumped (573,037 ac-ft) and all of the projected exempt domestic and livestock wells (13,296 ac-ft) and unpermitted federal wells (6,907 ac-ft) are being pumped to the maximum	The baseline scenario used in that simulation assumes that all of the Initial Regular Permits are being fully pumped (572,000 ac-ft) and all of the projected exempt domestic and livestock wells (13,296 ac-ft) and unpermitted federal wells (6,907 ac-ft) are being pumped to the maximum extent, subject to applicable critical period management rules. (HDR 2011). This assumption results in a

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			extent, subject to applicable critical period management rules. (HDR 2011). This assumption results in a projected theoretical maximum pumping of 593,240 ac-ft in each year. (<i>Id.</i>)	projected theoretical maximum pumping of 592,203 ac-ft in each year. (<i>Id.</i>) [SEC. 1.14(c) CAPS PERMITS AT 572,000 AF/yr.]
42	5.9	5-56	Section 1.115(e) of the EAA Regulations provides that the Board of Directors of the EAA may adopt emergency rules “in anticipation of imminent harm to human health, safety, or welfare, or if compliance with [normal rulemaking] procedures . . .	Section 1.115(e) of the EAA Act provides that the Board of Directors of the EAA may adopt emergency rules “in anticipation of imminent harm to human health, safety, or welfare, or if compliance with the [normal rulemaking] procedures . . .
43	6.1	6-1	.... 65 FR 35,242, 35,252 (June 1, 2000).	..... 65 FR 35,242-52 (June 1, 2000).
44	6.3 .6	6-13	Based on that system-wide survey, a decision will be made following the process set out in the AMP Agreement as to whether an initial system-wide removal effort is necessary, and if so, how to facilitate the performance of that effort;	Based on that system-wide survey, a decision will be made following the process set out in the Article 7 of the FMA as to whether an initial system-wide removal effort is necessary, and if so, how to facilitate the performance of that effort;
45	7.1 .2	7-5	The funding levels that are required to “fully fund” the implementation of the HCP for each year of the term of the ITP are the amounts shown in Table 7.1. (<i>See id.</i> §§ 3.2, 5.2.1). (<i>See id.</i> §§ 4.5, 5.2.1, 7.7.5, 7.7.6, 7.11.4, 7.12.4.d., 7.14.5.a.).	The funding levels that are required to “fully fund” the implementation of the HCP for each year of the term of the ITP are the amounts shown in Table 7.1. (<i>See</i> FMA §§ 3.2, 5.2.1). (<i>See id.</i> §§ 4.5, 5.2.1, 7.7.5, 7.11.4, 7.12.3.d., 7.14.4.a.).
46	8.1 .1	8-6	Exempt wells: The EAA registers additional wells exempt from the metering and reporting	Exempt wells: The EAA registers additional wells exempt from the permitting and metering requirements under the EAA Act

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			requirements under the EAA Act (see Section 1.33) that cause the amount of actual annual pumping for a particular year or years to exceed the theoretical maximum modeled pumping used for modeling purposes (see Section 5.8.1).	(see Section 1.33) that cause the amount of actual annual pumping for a particular year or years to exceed the theoretical maximum modeled pumping used for modeling purposes (see Section 5.8.1).
47	8.1 .1	8-6	Recharge Recovery Permits: The EAA issues a recharge recovery permit(s) under the EAA Act (see Section 1.44) and its rules that causes the amount of actual annual pumping for a particular year or years to exceed the theoretical maximum modeled pumping used for modeling purposes (see Section 5.8.1).	Recharge Recovery Contracts: The EAA enters into recharge recovery contracts under the EAA Act (see Section 1.44) and its rules that causes the amount of actual annual pumping for a particular year or years to exceed the theoretical maximum modeled pumping used for modeling purposes (see Section 5.8.1).
48	8.1 .1	8-6	<i>Prior to the EAA's issuing any such recharge recovery permit, the AMP will be used to determine what modifications, if any, are needed to the minimization and mitigation measures such that the anticipated levels of impacts in the event of a recurrence of the drought of record of record expected in this HCP will not be exceeded.</i>	<i>Prior to the EAA's entering into any such recharge recovery contract, the AMP will be used to determine what modifications, if any, are needed to the minimization and mitigation measures such that the anticipated levels of impacts in the event of a recurrence of the drought of record of record expected in this HCP will not be exceeded.</i>
49	8.1 .1	8-6	Phase II presumptive measure: The the Phase II presumptive measure is unable to function as expected within the stated assumptions.	Phase II presumptive measure: The Phase II presumptive measure is unable to function as expected within the stated assumptions.
50	8.2	8-7 (50 C.F.R. §17.3). (50 C.F.R. § 17.3).

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No.	§	Page	Reference in the Text	Corrected Text
51	8.2	8-8	... agreed upon for the species covered by the conservation plan without the consent of the permittee.” (50 C.F.R. § 17.22(b)(5)(iii); 50 C.F.R. § (b)(5)(iii)).	... agreed upon for the species covered by the conservation plan without the consent of the permittee.” (50 C.F.R. § 17.22(b)(5)(iii)(A); 50 C.F.R. § 17.32(b)(5)(iii)(A)).
52	8.2	8-8	When these unforeseen circumstances necessitate additional conservation and mitigation measures, USFWS “may require additional measures of the permittees where the [HCP] is being properly implemented, but only if such measures are limited to modifications within the conserved habitat areas, if any, or to the [HCP’s] operating conservation program for affected species, and maintain the original terms of the [HCP] to the maximum extent possible... .” (<i>Id.</i> at 17.22(b)(5)(iii)(A)).	When these unforeseen circumstances necessitate additional conservation and mitigation measures, USFWS “may require additional measures of the permittee[s] where the [HCP] is being properly implemented, but only if such measures are limited to modifications within the conserved habitat areas, if any, or to the [HCP’s] operating conservation program for the affected species, and maintain the original terms of the [HCP] to the maximum extent possible... .” (<i>Id.</i> at 17.22(b)(5)(iii)(B); 17.32(b)(5)(iii)(B)).
53	8.2	8-8	² A drought is worse than the drought of record if the average recharge for any seven-year period less than 168,700 ac-ft. From 1950 through 1956, the average recharge was 168,700 ac-ft.	² A drought is worse than the drought of record if the average recharge for any seven-year period less than 168,700 ac-ft. From 1951 through 1956, the average recharge was 168,700 ac-ft.

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**3. COMPILATION OF REPLACEMENT PAGES FOR PROGRAM
DOCUMENTS AS CHANGED**

3.1 ITP

Marcos Springs, if and when this species is listed as threatened or endangered and as long as the HCP is fully implemented. Take limits will be exceeded if these minimum flow rates are not met.

8. Incidental take of the Texas troglobitic water slater will be provided for individuals of the species killed, harmed, or harassed by springflows with monthly averages above 50.5 cfs (1.43 cms) during HCP Phase I; and by springflows with monthly averages above 51.2 cfs (1.45 cms) during Phase II at San Marcos Springs, if and when this species is listed as threatened or endangered and as long as the HCP is fully implemented. Take limits will be exceeded if these minimum flow rates are not met.
9. Incidental take of the Comal Springs salamander will be provided for individuals of the species killed, harmed, or harassed by springflows with monthly averages above 27 cfs (0.76 cms) during HCP Phase I and by continuous springflows to 45 cfs (1.27 cms) during Phase II at Comal Springs if and when this species is listed as threatened or endangered, as long as the HCP is fully implemented. Take limits will be exceeded if these minimum flow rates are not met.
- I. The endangered San Marcos gambusia has not been collected since 1982 and may no longer exist in the wild, but the Service will provide incidental take coverage for individuals of this species resulting from the covered activities if the species is located or becomes established within the Permit Area, as long as the HCP is fully implemented.
- J. COVERED AREA: This permit only authorizes incidental take of covered species within all of Bexar, Medina, and Uvalde counties, and parts of Atascosa, Comal, Caldwell, Hays, and Guadalupe counties (Permit Area).
- K. The EAA will support and coordinate with the U.S. Fish and Wildlife Service (Service) on ~~the work relating to the San Marcos Aquatic Resource Center's operation and maintenance of~~ a series of off-site refugia ~~at the Service's San Marcos, Uvalde, and Inks Dam facilities~~ (Section 6.4 of the HCP). The support of the refugia will augment the existing financial and physical resources of ~~these facilities~~ the Service, and provide supplementary resources for appropriate research activities, as necessary, to house and protect adequate populations of Covered Species and expanded knowledge of their biology, life histories, and effective reintroduction techniques. The use of this support will be limited to the Covered Species in the EARIP HCP.
- L. COVERED ACTIVITIES — BY PERMITTEE
 1. Edwards Aquifer Authority (EAA) — Covered activities for which incidental take is authorized:
 - a. Programs that implement the statutory functions of the EAA Act, including:
 - i. Authorization of withdrawals by persons who are both authorized under the EAA Act and the EAA's rules to withdraw groundwater from the Edwards Aquifer within the jurisdictional boundaries of the EAA.
 - ii. Authorization of withdrawals from the Edwards Aquifer pursuant to a change in permit under the EAA's permit administration rules in subchapter L of Chapter 711 and for owners and lessees making withdrawals under such a change in permit.
 - iii. Withdrawals due to the authorization of a "conversion" of "base" water into "unrestricted" water (EAA Rules §§ 711.338-.342) from the irrigator installing water conservation equipment such that less water is required for irrigation of the historically irrigated land (EAA Act § 1.34(b)) or when the historically irrigated lands that provided the basis for the issuance of the initial regular permit have been developed and are no longer farmed under the circumstances described in the EAA rules.

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3.2 EAHCP

In addition to the above functions, the EAA Act gives the EAA the authority to conduct research on topics relevant to regional water resources management. This authority includes the ability to conduct or contract for research on topics including water quality, water resources management, the augmentation of springflow, and the development of additional water supplies. The EAA began developing regulations in 1996 to implement the EAA Act.

The EAA's powers apply only to the use and management of the Aquifer within the EAA's boundaries. Except for water quality, as described below, the EAA has no regulatory powers over portions of the Aquifer outside of its boundaries, or over other groundwater within its boundaries. Moreover, the EAA has no authority over surface water resources. The EAA's water quantity jurisdiction is limited to the Aquifer within its boundaries, including all of Bexar, Medina, and Uvalde counties, and parts of Atascosa, Comal, Caldwell, Hays, and Guadalupe counties. This is the Plan (or Permit) Area proposed for coverage by the incidental take provisions of the HCP.

Additionally, the EAA has extraterritorial water quality jurisdiction within a buffer zone extending five miles from its boundaries. Although the EAA's regulatory authority is limited to its jurisdictional boundaries and the five-mile buffer zone, the use and management of the Aquifer affects a much larger area. In addition to being the primary water source for over two million users within the EAA's boundaries, discharges from the Aquifer are also believed to supply a significant portion of the flow in the Guadalupe River Basin downstream of Comal and San Marcos Springs, particularly in drought conditions.

In 2007, the Texas Legislature passed of Senate Bill 3 (SB 3)² amending the EAA Act to, among other things, provide that "... for the period beginning January 1, 2008, the amount of permitted withdrawals from the aquifer may not exceed or be less than 572,000 acre-feet (ac-ft) of water per calendar year . . ." subject to adoption and enforcement of a Critical Period Management (CPM) plan with withdrawal reduction percentages in the amounts indicated in Tables 1 and 2 of Section 1.26(b) of the EAA Act. Withdrawals are managed according to the index well levels or the Comal or San Marcos Springs flow, as applicable, for a total withdrawal reduction in Critical Period Stage IV of 40 percent of the permitted withdrawals under Table 1-1 for the San Antonio Pool and 35 percent under Table 1-2 for the Uvalde Pool.

**TABLE 1-1
CRITICAL PERIOD WITHDRAWAL REDUCTION STAGES FOR THE SAN ANTONIO POOL**

Critical Period Stage	Comal Springs Flow (cfs)	San Marcos Springs Flow (cfs)	Index Well J-17 Level (MSL)	Withdrawal Reduction - San Antonio Pool
I	<225	<96	<660	20%
II	<200	<80	<650	30%
III	<150	N/A	<640	35%
IV	<100	N/A	<630	40%

cfs = cubic feet per second; MSL = mean sea level

²Senate Bill 3 (Act of May 28, 2007-), 80th Leg. R.-S. ch. 1430, §§ 12.01-12.12, 2007 Tex. Gen. Laws 5848, 5901.

TABLE 1-2
CRITICAL PERIOD WITHDRAWAL REDUCTION STAGES
FOR THE UVALDE POOL

Critical Period Stage	Index Well J-27 Level (MSL)	Withdrawal Reduction Uvalde Pool
I	N/A	N/A
II	<850	5%
III	<845	20%
IV	<842	35%

MSL = mean sea level; NA== not applicable

The legislation also stipulated that “[b]eginning September 1, 2007, the authority [EAA] may not require the volume of permitted withdrawals to be less than an annualized rate of 340,000 acre-feet, under critical period Stage IV.” (EAA Act § 1.26A(d)). Further, “[a]fter January 1, 2013, the [EAA] may not require the volume of permitted withdrawals to be less than an annualized rate of 320,000 acre-feet, under critical period Stage IV unless, after review . . . the [EAA] determines that a different volume of withdrawals is consistent with . . . maintaining protection for federally listed threatened and endangered species associated with the aquifer to the extent required by federal law.” (*Id.* at (e)).

As another requirement of the Senate Bill 3 legislation, the EAA must cooperatively develop a Recovery Implementation Program (RIP) through a facilitated, consensus-based process that involves input from the USFWS, other appropriate federal agencies, and all interested stakeholders, including those listed under Section 1.26A(e)(1) of the EAA Act. SB 3 further directed the EAA and other state agencies to participate in the EARIP and to jointly prepare, along with other stakeholders, a “program document that may be in the form of a habitat conservation plan used in the issuance of an incidental take permit.” (EAA Act § 1.26A(d)). The EARIP stakeholders agreed that the program document would be an HCP in support of an ITP.

SB 3 requires that this program document:

- (1) Provide recommendations for withdrawal adjustments based on a combination of spring discharge rates of the San Marcos and Comal springs and levels at the J-17 and J-27 index wells during critical periods to ensure that federally listed, ~~th~~reatened, and endangered species associated with the Aquifer will be protected at all times, including throughout a repeat of the drought of record;
- (2) Include provisions to pursue cooperative and grant funding to the extent available from all state, federal, and other sources for eligible programs included in the cooperative agreement under SB 3, including funding for a program director; and
- (3) Be approved and executed by the EAA, the Texas Commission on Environmental Quality (TCEQ), the Texas Parks and Wildlife Department (TPWD), the Texas Department of Agriculture, the Texas Water Development Board (TWDB), and the USFWS not later than September 1, 2012.

(*Id.* at § 1.26A(d)(1)-(3)). The HCP must take effect December 31, 2012. (*Id.* at § 1.26A-(d)(3))

1.2 Permit Area

The Plan Area (also the Permit Area) is the area in which pumping from the Aquifer is regulated by the EAA and affects the springs and spring ecosystems used by the proposed Covered Species identified in Section 1.4 of this HCP (Figure 1-2). This is where the Covered Activities identified in Chapter 2 will occur as well as the adaptive management and minimization and mitigation measures. The Permit Area also includes recreational and other areas in which non-pumping-related impacts to Covered Species will occur including the Comal Springs and River ecosystems and San Marcos Springs and River ecosystems that are under the jurisdiction of the City of New Braunfels, the City of San Marcos, and Texas State University.

1.3 Permit Holders and Permit Duration

1.3.1 Permit Holders

The EAA, SAWS, City of San Marcos, Texas, City of New Braunfels, Texas, and Texas State University will be joint holders of the ITP.

1.3.2 Permit Duration

The Applicants are requesting an ITP term of 15 years to be divided into two phases. Phase I will begin with the issuance of the ITP and include the implementation of: (1) all habitat

**TABLE 1-3
SPECIES PROPOSED FOR COVERAGE IN THE HCP**

Common Name	Scientific Name	ESA Status
Fountain Darter	<i>Etheostoma fonticola</i>	Endangered
Comal Springs Riffle Beetle	<i>Heterelmis comalensis</i>	Endangered
San Marcos Gambusia	<i>Gambusia georgei</i>	Endangered
Comal Springs Dryopid Beetle	<i>Stygoparnus comalensis</i>	Endangered
Peck's Cave Amphipod	<i>Stygobromus pecki</i>	Endangered
Texas Wild Rice	<i>Zizania texana</i>	Endangered
Texas Blind Salamander	<i>Eurycea</i> [formerly <i>Typhlomolge</i>] <i>rathbuni</i>	Endangered
San Marcos Salamander	<i>Eurycea nana</i>	Threatened
Edwards Aquifer Diving Beetle	<i>Haideoporus texanus</i>	Petitioned
Comal Springs Salamander	<i>Eurycea</i> sp.	Petitioned
Texas Troglitic Water Slater	<i>Lirceolus smithii</i>	Petitioned

The work group considered six mussel species: Texas fatmucket (*Lamspilis bracteata*), golden orb (*Quadrula aurea*), Texas pimpleback (*Quadrula petrina*), false spike mussel (*Quincuncina mitchelli*), Salina mucket (*Disconaias salinasensis*), and Mexican fatwonsfoot (*Truncilla cognata*). The first four overlap most with the area of influence of the Covered Activities. Based on the criteria listed above, the work group concluded that seeking coverage for these six mussel species was not warranted. While the likelihood of listing during the permit term maybe high, the extent to which limitations to or modifications of Covered Activities will benefit the species is unclear as they do not occur in the headwaters of the two major springs and intervening activities that affect those species are not under the control of the Applicants. In addition the habitat, life cycle, and other biological parameters (e.g., tolerance of varying flow regimes) for these species are not sufficiently understood to determine whether the HCP will meet the issuance criteria with respect to the species.

The whooping crane was considered for coverage in the HCP, but was not included. (See EARIP Technical Memorandum, "Collection of Pertinent Data Regarding Whooping Cranes and Instream Flows," (March 2010)).³ Factors affecting the crane and its habitat are not under the control of the Applicants for the ITP or affected adversely by their Covered Activities. In addition, the minimization and mitigation measures developed for the activities covered by the proposed permit should provide greater stability in the flows emerging from the spring systems at Comal and San Marcos Springs and, therefore, are expected to provide a potential net benefit to the habitat conditions for the ecosystem used by the crane.

The springflow protection measures in the HCP increase the water available in the San Marcos and Comal rivers. For example, simulations by HDR Engineers show that, compared to current baseline conditions, the springflow in the worst year of a repeat of the drought of record, results in an additional 19,819 ac-ft of water in the San Marcos Springs and an additional 36,102 ac-ft

³ <http://earip.org/WhoopingCrane/FINAL%20Tech%20Memo%203-8-2010%20%28HICKS%29.pdf> [link inoperable]; see also http://www.eahcp.org/index.php/administration/earip_meetings <http://www.earip.org/MeetingArchive.aspx> (April 8, 2010)(Comments on Technical Memorandum 4-13-10 comment re: crane bibliography for EARIP).

1.5.2.2 Rules of the Edwards Aquifer Authority

As authorized by the EAA Act, the EAA has promulgated “rules that, among other things, require permits for withdrawing water from the [A]quifer, set standards for the construction and maintenance of wells, [and] restrict certain activities on the recharge zone to protect the [A]quifer from pollution, and others.”⁴

1.5.3 Federal Endangered Species Act

1.5.3.1 Section 9

Section 9 of the ESA prohibits the “take” of threatened and endangered species, including the attempt or action to “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect” such species. (16 U.S.C. §§ 1532(19), 1538(a)). The term “harm” is defined to include any act “which actually kills or injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.” (50 C.F.R. § 17.3). The term “harass” is defined as “an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering.” (50 C.F.R. § 17.3).

The ESA does not prohibit “take” of listed plants (e.g., Texas wild-rice) on private lands, but landowners must comply with state laws protecting imperiled plants. “[W]ith respect to endangered species of plants, it is unlawful to: import or export; remove the species from areas under federal jurisdiction or maliciously damage or destroy it in those areas; remove, cut, dig up, damage or destroy the species in any other area in violation of state law or in the course of criminal trespass; deliver, receive, carry, transport, ship, sell or offer for sale in interstate or foreign commerce; violate any regulation pertaining to a threatened or endangered plant species.” (16 U.S.C. § 1538(a)(2)(A) through (E)).

The requirement for compliance with state laws would apply to the State Scientific Areas established for Texas wild-rice as discussed in Section 5.6. Furthermore, the USFWS will analyze impacts in its Biological Opinion on the issuance of the ITP to ensure the Covered Activities do not jeopardize the continued existence of Texas wild-rice.

1.5.3.2 Section 10

Section 10(a)(1)(B) authorizes the issuance of permits for non-federal activities for take that may occur incidentally to otherwise lawful measures with the provision of an HCP. The term “incidental take” is defined as take that is “incidental to, and not the purpose of, the carrying out of an otherwise lawful activity.” (16 U.S.C. § 1539(a)(1)(B); 50 C.F.R. § 402.02).

⁴ <https://www.edwardsaquifer.org/eea/legislation-and-rules/eea-rules>
http://www.edwardsaquifer.org/display_policies_rules.php

An HCP submitted in support of a Section 10 permit application must specify:

- . The impact that will likely result from the taking;
- . Steps the applicant will take to monitor, minimize, and mitigate such impacts; the funding available to implement such steps; and the procedures to be used to deal with unforeseen circumstances;
- . Alternative actions to such taking considered by the applicant and the reasons why such alternatives are not proposed to be used; and
- . Other measures that may be required as necessary or appropriate for the purposes of the plan.

(16 U.S.C. § 1539(a)(2)(A)(i)-(iv); 50 C.F.R. § 17.22(b)(1)(iii)). To issue an incidental take permit, USFWS must find that:

- . The taking will be incidental;
- . The applicant will, to the maximum extent practicable, minimize and mitigate the impacts of such taking;
- . The applicant will ensure that adequate funding for the conservation plan and procedures to deal with unforeseen circumstances will be provided;
- . The taking will not appreciably reduce the likelihood of survival and recovery of the species in the wild; and
- . The applicant will ensure that other measures as may be required by USFWS as necessary or appropriate for the purposes of the HCP will be implemented.

(16 U.S.C. § ~~1539~~40(a)(2)(B); 50 C.F.R. §§ 17.22(b)(2) and 17.32(b)(2)).

The USFWS believes that the biological goals and objectives should be consistent with recovery but in a manner that is commensurate with the scope of the HCP. Under section 10 of the ESA, the USFWS does not explicitly require an HCP to recover listed species or contribute to the recovery objectives outlined in a recovery plan, however, USFWS discourages HCPs that might preclude a significant recovery option. (USFWS 1996(c) at 3-20; 65 FR 35,243, (June 1, 2000)). This approach reflects the intent of the section 10(a)(1)(B) incidental take permit process to provide for authorization of incidental take, not to mandate recovery. (*Id.*).

The *HCP Handbook Addendum* (USFWS and National Marine Fisheries Service [NMFS] 2000), referred to as the "5-point policy," provides additional guidance and recommendations for the development of HCPs. The five points are as follows:

1. Defined conservation goals and objectives;
2. An adaptive management strategy;
3. Compliance and effectiveness monitoring;

4. An established permit duration; and
5. Opportunities for public participation.

(65 FR at 35,250-56).

1.5.3.3 Section 7

Issuance of an ITP is a federal action subject to Section 7 of the ESA. Section 7(a)(2) requires all federal agencies, in consultation with the USFWS, to ensure that any action “authorized, funded, or carried out” by an agency is “not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification” of designated critical habitat.

The ESA describes Critical Habitat as those areas which contain the “physical or biological features (1) essential to the conservation of the species and (2) which may require special management considerations or protection.” (16 U.S.C. § 1532(5)(A)(i)). USFWS regulations provide that the USFWS will “[i]dentify the constituent elements” of critical habitat to include “those that are essential to the conservation of the species,” such as “roost sites, nesting grounds, spawning sites, feeding sites, seasonal wetland or dryland, water quality or quantity, host species or plant pollinator, geological formation, vegetation type, tide, and specific soil types.” physical and biological features essential to the conservation of the species at an appropriate level of specificity using the best available scientific data. This analysis will vary between species and may include consideration of the appropriate quality, quantity, and spatial and temporal arrangements of such features in the context of the life history, status, and conservation needs of the species. (50 C.F.R. § 424.12(b)(1)(ii)).

Although the HCP does not cover actions with a federal nexus, Section 7 and its regulations require several considerations in the HCP process, including an analysis of indirect effects, effects on federally-listed plants, and effects on Critical Habitat. The results of the Section 7 consultation are documented in Biological Opinions developed by the USFWS. A Biological Opinion is generally produced near the end of the ESA permitting process to document conclusions regarding the likelihood of jeopardizing the continued existence of, or destroying or adversely modifying designated Critical Habitat for, any listed species.

1.5.4 Texas Parks and Wildlife Code

1.5.4.1 Chapter 88

Texas wild-rice is listed as an endangered plant by the Texas Parks and Wildlife Department (TPWD). (Title 31 of the Texas Administrative Code, Chapter 69, § 69.8(a); see TPW Code § 88.003.) No person may take for commercial sale, possess for commercial sale, or sell all or part of an endangered plant from public land; these actions are also prohibited on private land unless authorized by a permit issued by TPWD. (TPW Code §88.008.) Endangered plants may be taken from public lands by qualified persons for propagation, education, or scientific study under a collection permit issued by TPWD. (*Id.*; Title 31 of the Texas Administrative Code, Chapter 69, § 69.1; see also TPW Code § 88.001 (defining “take” to mean “to collect, pick, cut, dig up, or remove.”)).

1.5.4.2 Chapter 81

Texas Parks and Wildlife Department has the authority to establish state “scientific areas” for the purposes of education, scientific research, and preservation of flora and fauna of scientific or educational value. (TPW Code § 81.501). TPWD may make rules and regulations necessary for the management and protection of scientific areas. (TPW Code § 81.502). On March 29, 2012, the TPWD adopted a rule creating the San Marcos River State Scientific Area. (31 TAC § 57.9010). (See Section 5.6.1).

1.5.5 National Environmental Policy Act

The National Environmental Policy Act (NEPA), 42 U.S.C. §§ 4371 *et seq.*, is one of the primary laws governing the environmental protection process. It is a decision-making requirement that applies to proposals for major federal actions. The Council on Environmental Quality regulations define “major federal action” as an action with “effects that may be major and which are potentially subject to federal control and responsibility” including “projects and programs entirely or partly financed, assisted, conducted, regulated, or approved by federal agencies.” (40 C.F.R. § 1508.187). NEPA requires any federal agency undertaking a “major federal action” likely to “significantly affect the human environment” to prepare an Environmental Impact Statement (EIS). An EIS must provide a “detailed statement” of the environmental impacts of the action, possible alternatives, and measures to mitigate adverse effects of the proposed actions. (42 U.S.C. § 4332(C)). While NEPA does not mandate any particular result, it requires the federal agency to follow particular procedures in its decision-making process. The purpose of these procedures is to ensure that the agency has the best possible information to make an “intelligent, optimally beneficial decision” and to ensure that the public is fully apprised of any environmental risks that may be associated with the preferred action.

Issuance of an ITP under Section 10(a)(1)(B) is a federal action subject to NEPA compliance. Although ESA and NEPA requirements overlap considerably, the scope of NEPA goes beyond that of the ESA by considering the impacts of a federal action not only on fish and wildlife resources, but also on other resources such as water quality, socioeconomics, air quality, and cultural resources. The EIS process culminates in issuance of a Record of Decision (ROD). (40 C.F.R. § 1505.2). The ROD documents the alternative selected for implementation as well as any conditions that may be required and summarizes the impacts expected to result from the action.

1.6 Alternatives Considered during the Development of the HCP

Under the ESA Section 10(a)(2)(A)(iii), the HCP must specify “the alternative actions to such [incidental] taking the applicant considered and the reasons why such alternatives are not being utilized.” (16 U.S.C. § 1539(a)(2)(A); 50 C.F.R. §§ 17.22(b)(1) and 17.32(b)(1)). USFWS explained that two alternatives commonly included were: “(1) any specific alternative ... that would reduce such take below take levels anticipated for the project proposal; and (2) a ‘no action’ alternative, which means that no permit would be issued and take would be avoided or that the project would not be constructed or implemented. (USFWS 1996(c)).

boundaries of the EAA and in compliance with the Act and rules. It does not seek incidental take coverage for any federal facility which withdraws groundwater from the Aquifer for the benefit of the federal facility. Finally, EAA seeks coverage for the minimization and mitigation measures that either it will implement or for which it bears responsibility for having implemented as identified in Chapter 5 of this HCP. The activities for which the EAA seeks coverage are described in more detail as follows.

2.2.1 Groundwater Withdrawal Program

2.2.1.1 In General

The EAA Act recognizes three categories of groundwater rights to withdraw and place to beneficial use water withdrawn from the Aquifer: (1) interim authorizations; (2) permits; and (3) exempt wells. Interim authorization rights are temporal groundwater rights that existed from the effective date of the EAA Act on June 28, 1996, for a limited period of time to provide a transitional bridge from the Texas common law to the statutory-based permit system established under the EAA Act. (*See generally* EAA Act § 1.17). Interim authorization rights became superseded upon entry of final orders by the EAA on applications for initial regular permits, or upon the failure of a well owner to timely file by December 30, 1996, a declaration for historical use for the well. (*See id* § 1.17(d)). The EAA does not currently recognize any interim authorization groundwater rights in the Aquifer. However, on rare occasions the EAA has had to place a well owner back on interim authorization status to address an unusual factual scenario, but does not anticipate in the future having to place a well owner back on interim authorization status.

The second category of Aquifer groundwater rights is groundwater withdrawal permits. These include Initial Regular Permits (and their derivative Regular Permits), Term Permits, Emergency Permits, and ~~r~~Recharge ~~r~~Recovery ~~Permits~~contracts. (*See id.* §§ 1.16, 1.19, 1.20 and ~~EAA-rules § 711.2601.44~~). The final category of groundwater rights in the Aquifer are wells which are exempt from the permitting and metering requirements. (*See id.* § 1.33). The EAA's rules that implement its groundwater withdrawal program are found at Chapter 711.

2.2.1.2 Authorized Groundwater Withdrawals

Initial Regular Permits

Withdrawals under Initial Regular Permits, and derivative permits due to transfers of these permits which are known as "Regular Permits," are subject to the annual statutory cap on Aquifer withdrawals. In 2007, the Texas Legislature limited total withdrawals under all regular permits to 572,000 ac-ft/yr. (Section 1.14(c) of the EAA Act).

Although the EAA Act provides in Section 1.18 that the EAA may also issue Additional Regular Permits, this portion of the Act cannot be implemented because no additional water is available for permitting under the 572,000 ac-ft/yr cap established by the Legislature in 2007.

In the event the EAA may encounter an emergency condition that justifies the issuance of an emergency permit during the term of the ITP, EAA seeks incidental take coverage for its authorization of any withdrawals under an emergency permit and for the owners or lessees making the authorized withdrawals under any emergency permit. The manner in which those withdrawals will be addressed is discussed in the Changed Circumstances provisions of Section 8.1.

Recharge Recovery ~~Permits~~Contracts

The EAA has implemented this statutory authority in its rules to authorize the recovery from the Aquifer of groundwater that is in storage due to the recharge efforts of the Authority or another political subdivision. The EAA's Aquifer Recharge, Storage, and Recovery Program rules are found at subchapter J of Chapter 711. As presently implemented, ~~r~~Recharge ~~r~~Recovery ~~Permits~~ contracts may be ~~issued-entered into~~ pursuant to Aquifer storage and recovery projects conducted to increase the yield of the Aquifer, ~~or~~ protect springflows, and ensure minimum springflows of the Comal and San Marcos Springs. The EAA has developed Aquifer recharge, storage and recovery rules to allow entities to conduct approved Aquifer storage and recharge activities ~~by entering into contracts under Section 1.44 of the EAA Act with other political subdivisions to recharge the-~~ Aquifer. ~~w~~Withdrawals made pursuant to ~~r~~Recharge ~~r~~Recovery ~~Permits~~ contracts are not subject to or limited by the Aquifer-wide withdrawal cap that is discussed above in relation to Initial Regular Permits.

EAA seeks incidental take coverage for its authorization of any withdrawals under ~~r~~Recharge ~~r~~Recovery ~~Permits~~ contracts in the future and for the owners or lessees of the water making the authorized withdrawals under any ~~r~~Recharge ~~r~~Recovery ~~Permit~~contract. The manner in which those withdrawals will be addressed is discussed in the Changed Circumstances provisions of Section 8.1.

Exempt Wells

Exempt wells are those wells that are exempt from the duty to obtain a groundwater withdrawal permit from the EAA and, in some cases, to meter withdrawals. (EAA Act §§ 1.15, 1.16(c), and 1.33). A well qualifies for exempt well status if it is: "(1) ~~it is~~ capable of producing no more than 25,000 gallons of water a day; (2) ~~it will be~~ used solely for domestic or livestock use; and (3) ~~it is~~ not ~~within or~~ serving a subdivision requiring platting; or (4) ~~the well is~~ located on and operated by, or for the benefit of, a federal facility, and prior to September 1, 2003, the [EAA] has not approved the transfer of ownership of an application for an ~~i~~nitial ~~r~~Regular ~~p~~Permit related to the well from the federal facility to another person." (EAA Rules §§ ~~702.1(b)(24) and 711.20~~). Additionally, a well is exempt from permitting if it qualifies as a limited production well because: "(1) the well was drilled on or before June 1, 2013; (2) withdrawals from the well are placed to a beneficial use; and (3) the well is limited in production because the well: (A) is not capable of producing more than 1,250 gallons of water per day; or (B) is metered and does not produce more than 1.4 acre-feet of water in any calendar year." (Id. § 711.61). Further, Aquifer withdrawals made from exempt wells are not subject to or limited by the Aquifer-wide withdrawal cap that is discussed above in relation to Initial Regular Permits. However, the EAA requires owners of exempt wells to register the well. In so doing, the EAA can be sure that the well qualifies for exempt status.

It is estimated that in 2010, 13,605 ac-ft of withdrawals were made from domestic and livestock exempt wells.(EAA 2011b). The mean amount of water withdrawn annually from these exempt wells between 2000 and 2010 was calculated to be 13,700 ac-ft. (*Id.*). The total withdrawal by

exempt federal facilities in 2010 was 5,126 ac-ft. (*Id.*) Thus, the total withdrawal from exempt wells in 2010 was 18,731 ac-ft.¹

EAA seeks incidental take coverage for its determination that a well qualifies for exempt status and withdrawals from the Aquifer from a well that the EAA has determined to qualify for exempt status. Any “take” of federally listed species resulting from the withdrawal of water from the Aquifer by a federal entity is not included as a Covered Activity in this HCP. The manner in which any significant change in those withdrawals will be addressed is discussed in the Changed Circumstances provisions of Section 8.1.

2.2.2 Permit Administration

2.2.2.1 Permit Transfers and Amendments

The ownership, point of withdrawal, purpose of use, place, of use, and maximum rate of withdrawal for a permit may be changed by a transfer or amendment process (EAA Rules Ch. 711, subch. L). The EAA seeks incidental take coverage for its authorization of withdrawals from the Aquifer pursuant to a change in permit under the EAA's permit administration rules in subchapter L of Chapter 711 and for owners and lessees making withdrawals under such a change in permit.

2.2.2.2 Conversion of Base Irrigation Groundwater

The groundwater withdrawal amount for an Initial Regular Permit issued for irrigation purposes is bifurcated between an “unrestricted” amount and a “base” amount, (EAA Act § 1.34(c); EAA Rules §§ 702.1(249) and (199)). The place and purpose of use of the “unrestricted” portion is generally transferable. The “base” portion, however, is not freely transferable and must be used in accordance with the place of use and purpose of use for irrigation as set out in the originally issued Initial Regular Permit. By rule, the EAA has authorized the “conversion” of “base” water into “unrestricted” in certain limited circumstances. Upon conversion, the purpose of use and place of use for the “base” water becomes as freely transferable as that for “unrestricted” water (EAA Rules §§ 711.338-.342). A conversion is authorized in only two circumstances: first, if the irrigator installs water conservation equipment such that less water is required for irrigation of the historically irrigated land (EAA Act § 1.34(b)); and, second, if the historically irrigated lands that provided the basis for the issuance of the Initial Regular Permit have been developed and are no longer farmed under the circumstances described in the EAA rules.

¹ In the modeling of springflow, HDR assumed the total withdrawal from exempt wells was 20,203 ac-ft. See Section 5.8.1 below.

The legislation also stipulated that “[b]eginning September 1, 2007, the [EAA] may not require the volume of permitted withdrawals to be less than an annualized rate of 340,000 acre-feet, under critical period Stage IV.” (EAA Act § 1.26(a)(d)). Further, “[a]fter January 1, 2013, the [EAA] may not require the volume of permitted withdrawals to be less than an annualized rate of 320,000 acre-feet, under critical period Stage IV unless, after review and consideration of the recommendations provided under Section 1.26A [of the Act] the [EAA] determines that a different volume of withdrawals is consistent with . . . maintaining protection for federally listed threatened and endangered species associated with the Aquifer to the extent required by federal law.” (*Id.* at (e)).

The EAA seeks incidental take coverage for withdrawals from the Aquifer as may be reduced pursuant to the final CPM plan described above and in Section 5.1.4 of the HCP.

2.2.3 Minimization and Mitigation Measures

The following Covered Activities constitute minimization and mitigation measures and measures specifically intended to contribute to recovery under the HCP that will be implemented by the EAA. These measures are further detailed in Chapter 5.

- Support of USFWS refugia (Section 5.1.1)
- Voluntary Irrigation Suspension Program Option (Section 5.1.2)
- Regional Water Conservation Program (Section 5.1.3)
- Critical Period Management - - Stage V (Section 5.1.4)
- Expanded Water Quality Monitoring (Section 5.7.5)

2.3 City of New Braunfels

The Comal Springs, Landa Lake, and the Comal River are located within the boundaries of the City of New Braunfels. The City has the authority to manage the ecosystems of the Comal Springs, Landa Lake, and the Comal River within its geographical boundaries. These ecosystems are also used for recreational activities that are regulated in part by the City. Further, the City of New Braunfels diverts surface water from the Comal River.

As described below, the City seeks incidental take coverage for the recreational activities within its jurisdiction, the management of the ecosystems of the Comal Springs, Landa Lake, and Comal River and the diversion of water from the Comal River. Finally, the City of New Braunfels seeks coverage for the minimization and mitigation measures that it will either implement or have responsibility for having implemented.

These Covered Activities are described in more detail below and in Chapter 5.

TABLE 3-1
ANNUAL RAINFALL RECORDS FROM TEXAS CLIMATE DIVISION 6

Year	Annual Rainfall (inches)	Year	Annual Rainfall (inches)	Year	Annual Rainfall (inches)
1895	27.68	1934	17.95	1973	26.84
1896	25.79	1935	41.91	1974	30.86
1897	23.11	1936	35.93	1975	24.90
1898	19.48	1937	25.48	1976	29.75
1899	24.04	1938	21.65	1977	18.96
1900	41.98	1939	23.39	1978	23.43
1901	18.12	1940	33.16	1979	21.68
1902	30.44	1941	34.83	1980	24.11
1903	32.80	1942	25.98	1981	30.70
1904	27.91	1943	21.88	1982	20.29
1905	36.84	1944	34.04	1983	20.16
1906	28.43	1945	27.32	1984	20.29
1907	28.93	1946	27.53	1985	22.96
1908	26.65	1947	19.61	1986	33.13
1909	18.26	1948	20.21	1987	29.53
1910	17.61	1949	33.03	1988	18.14
1911	23.02	1950	19.97	1989	18.76
1912	19.54	1951	13.74	1990	29.29
1913	28.59	1952	24.58	1991	31.77
1914	37.02	1953	18.84	1992	30.00
1915	29.05	1954	12.89	1993	19.27
1916	20.36	1955	19.68	1994	24.71
1917	11.67	1956	11.22	1995	22.03
1918	22.43	1957	37.23	1996	22.46
1919	44.89	1958	32.05	1997	29.42
1920	29.33	1959	31.30	1998	25.24
1921	23.20	1960	25.90	1999	16.02
1922	26.98	1961	24.30	2000	25.44
1923	34.49	1962	17.62	2001	23.20
1924	20.97	1963	16.78	2002	26.48
1925	20.11	1964	23.35	2003	23.56
1926	30.89	1965	24.53	2004	38.31
1927	20.54	1966	21.93	2005	22.72
1928	22.81	1967	20.74	2006	17.12
1929	24.65	1968	27.07	2007	37.81
1930	24.91	1969	30.43	2008	17.09
1931	30.73	1970	18.64	2009	23.87
1932	36.53	1971	27.99	2010	25.76
1933	17.53	1972	23.47		

SOURCE: [http://www.nass.usda.gov/Statistics by State/Texas/Charts & Maps/cwmap1.htm](http://www.nass.usda.gov/Statistics_by_State/Texas/Charts_&_Maps/cwmap1.htm) [link inoperable]

The distribution of this data was assessed using Microsoft Excel 2010 and the SYSTAT 11 statistical software package. The annual rainfall data was compared with a number of statistical

prior to certain types of activity in the recharge, transition, or contributing zones of the Aquifer. For proposed development including any regulated construction-related activity over the Recharge Zone, a water pollution abatement plan (WPAP) is required. The WPAP must include a geological assessment report identifying pathways for movement of contaminants to the Aquifer, and a report on best management practices and measures to prevent pollution of the Aquifer. After the plan is approved, notice must also be filed in the county deed records that the property is subject to an approved Aquifer protection plan. Certain facilities are also prohibited from being built in the recharge or transition zones such as Type 1 municipal solid waste landfills and waste disposal wells. Subchapter B applies to regulated activities in the Aquifer's contributing zone. All activities that disturb the ground or alter a site's topographic, geologic, or existing recharge characteristics are subject to regulation, which would require either sediment and erosion controls or a contributing zone plan (CZP) to protect water quality during and after construction. Exemptions include construction of single-family residences on lots larger than five acres, where no more than one single-family residence is located on each lot; agricultural activities; oil and gas exploration, development, and production under the jurisdiction of the Texas Railroad Commission; clearing of vegetation without soil disturbance; and maintenance of existing structures not involving additional site disturbance. 30 TAC § 213.22(6).

The EAA has implemented a water quality protection program through rulemaking. Well construction rules have been adopted that regulate the construction, operation, maintenance, abandonment, and closure of wells. (See EAA Rules Chapter 713 (Water Quality), Subchapters B General Provisions), C (Well Construction, Operation and Maintenance), and D (Well Closures). The EAA also regulates the reporting of spills (Subchapter E), storage of certain regulated substances (Subchapter F) on the recharge zone and the contributing zone of the Aquifer and the installation of tanks on the recharge zone of the Aquifer (Subchapter G)). The City of San Marcos has also enacted regulations to protect water quality over the Aquifer recharge zone.

Primary Drinking Water Standards

These standards are enforceable for public water supply systems and are often referred to as maximum contaminant levels (MCLs) or primary drinking water standards. The MCL for a contaminant is the maximum permissible level in water that is delivered to any user of a public water system. MCLs protect drinking water quality by limiting levels of specific contaminants that can adversely affect public health and are known or anticipated to occur in public water systems. The primary standards are based on concentrations published in Title 30 of the Texas Administrative Code, Chapter 290, Subchapter, and Chapter 350. This concentration is the value estimated to be protective of human health and the environment.

Secondary Drinking Water Standards

These standards are non-enforceable and are set for contaminants that may affect aesthetic qualities of drinking water, such as odor or appearance.

Psephenus texanus, surface dwelling amphipods, oligochaetes, caddisfly larvae, crayfish, clams, snails, aquatic isopods, three species of copepod (*Acanthocyclops vernalis*, *Mesocyclops edax* and *Skistodiaptomus* sp.), hypogean amphipods (*Stygobromus russelli*) (Zara 2003), an aquifer salamander (possibly *Eurycea rathbuni*), and the federally listed Peck's Cave amphipod *Stygobromus pecki* (Barr 1993).

Fern Bank Springs Ecosystem

Fern Bank Springs is a series of small perennial springs and seeps that flow from the base of a bluff on the south bank of the Blanco River in Hays County. While the source of the water for Fern Bank Springs is undetermined, it may originate from the upper member of the Glen Rose Formation, from drainage from the Aquifer recharge zone, from water lost from the Blanco River, or from some combination of those sources (USFWS 2007). A recent dye tracer study performed by the EAA showed a connection from a sinkhole in the Edwards. (EAA 2010a). The springs themselves have been minimally altered, except for the installation of water collection containers below the spring orifices and an intake box and pipes near the uppermost orifice, where a pool inside of a small cave was previously utilized as a source of drinking water. A small orifice on the hillside to the east of the uppermost orifice is a known locality for Comal Springs dryopid beetle. Other taxa known from the site include hypogean amphipods (*Stygobromus russelli*), the spring-associated Fern Bank salamander *Eurycea pterophila*, and several aquatic epigean species. Fern Bank Springs is designated as Critical Habitat for the Comal Springs riffle beetle, Comal Springs dryopid beetle, and Peck's cave amphipod. (72 FR 39,247 (July 17, 2007)).

3.5 Listed Species Covered by the ESA Section 10(a)(1)(B) Incidental Take Permit

Eight species are currently listed as endangered or threatened by the USFWS that depend entirely on the Aquifer and associated springs. Incidental take may be allowed for seven of these species if covered by an ESA Section 10(a)(1)(B) Permit. The ESA does not prohibit take of listed plants except on federal lands [16 U.S.C. § 1532(8) and § 1532(14)]. Additionally, although the last known sighting of the San Marcos gambusia from the San Marcos River occurred in 1983 and the species is now thought to be extinct (McKinney and Sharp 1995), this species is nonetheless proposed for incidental take coverage in the HCP.

Listed species addressed in the HCP (and date of listing) include:

Endangered

- Fountain darter (*Etheostoma fonticola*) (35 FR 16,047 (date of listing Oct. 13, 1970))
- Comal Springs riffle beetle (*Heterelmis comalensis*) (62 FR 66,295 (date of listing Jan. 20, 1998 (~~Dec. 18, 1997~~)))
- Comal Springs dryopid beetle (*Stygoparnus comalensis*) (62 FR 66,295 (date of listing Dec. 18, 1997 (~~Jan. 20, 1998~~)))
- Peck's Cave amphipod (*Stygobromus pecki*) (62 FR 66,295 (~~Dec. 18, 1997~~)date of listing Jan. 20, 1998))

- Texas wild-rice (*Zizania texana*) (43 FR 17,910 ([date of listing](#) Apr. 26, 1978))
- Texas blind salamander (*Eurycea* [formerly *Typhlomolge*] *rathbuni*) (32 FR 4,001 (Mar. 11, 1967))
- San Marcos Gambusia ((*Gambusia georgei*) (~~35 FR 16047~~[45 FR 47,355](#) ([date of listing](#) ~~Oct. 13, 1970~~[Aug. 14, 1980](#)))

Threatened

- San Marcos salamander (*Eurycea nana*) (45 FR 47,355 (July 14, 1980))

A brief life history of each species covered in the HCP is provided below.

3.5.1 Fountain Darter (*Etheostoma fonticola*)

The fountain darter, a member of the family *Percidae*, is endemic to the San Marcos and Comal rivers. This species was first collected in 1884 in the San Marcos River just below its confluence with the Blanco River and in 1891 in the Comal River (Schenck and Whiteside 1976). The historic range of this species on the San Marcos River extends from Spring Lake downstream to just below its confluence with the Blanco River, and in the Comal River from the headwaters downstream to its confluence with the Guadalupe River (Schenck and Whiteside 1976). Currently the fountain darter can be found in the upper portions of the Comal River including Landa Lake and in the San Marcos River system from Spring Lake downstream to the outfall of the San Marcos City wastewater treatment plant. (McKinney and Sharp 1995; Schenck and Whiteside 1976).

Between 1954 and 1973, the original population of fountain darters was extirpated from the Comal River (Linam *et al.* 1993; Schenck and Whiteside 1976). It is believed that a combination of a rotenone treatment by the Texas Fish, Game, and Oyster Commission in 1951 [to remove non-native Rio Grande cichlids (*Cichlasoma cyanoguttatum*)], temperature variations due to the springs ceasing to flow for a six-month period in 1956, and a flood from Blieders Creek in 1971 all contributed to the die off of the fountain darter. (Linam *et al.* 1993; Schenck and Whiteside 1976). Beginning in 1975, a total of 457 fountain darters from San Marcos were re-introduced into the Comal River, from which the present Comal population is descended. (Linam *et al.* 1993; Schenck and Whiteside 1976).

Fountain darters are small (usually <1.0 inch), olive-green in color, with dark markings along the lateral line, dark spots at the base of the tail, opercule, dorsal fin, and around the eye. (Gilbert 1887; Schenck and Whiteside 1976). Competing theories have been reported in the literature regarding the wild fountain darters reproductive cycles; some researchers support continuous spawning (Strawn 1955, Hubbs 1985) while others have noted seasonal peaks in reproductive activity. (Schenck and Whiteside 1977b). Fecundity is believed to be lower in fountain darters than other species of darters and appears to be controlled by both environmental and genetic factors including the influence of repeated spawnings throughout the year. This species exhibits sexual dimorphism, with the males having four morphological forms differing in size, color, and shape. (Schenck and Whiteside 1977b). Females deposit eggs in aquatic vegetation which are

Chapter 4 Covered Species Analysis

4.0 Introduction

Issuance criteria under section 10(a) of the ESA require, among other things, that the incidental take resulting from the Covered Activities will “not appreciably reduce the likelihood of the survival and recovery of the species in the wild.” (16 U.S.C. § 1539(1)(a)(2)(B)(iv)). Furthermore, ~~b~~, because the ITP is an action authorized by a Federal agency, section 7(a)(2) of the ESA requires that the issuance of the permit is not likely to “jeopardize the continued existence of” any federally-listed species or to result in the “destruction or adverse modification of” designated critical habitat. (*Id.* at 1536(a)(2)).¹ FWS must make these determinations “using the best scientific and commercial data available.” *Id.*

Further, under USFWS’s 5-Point policy, an applicant must “clearly and consistently define the expected outcome (*i.e.*, biological goal(s))” of the HCP. (65 FR ~~at~~ 35,250). These goals are intended to create “parameters and benchmarks for developing conservation measures” and “determine the focus of the adaptive management strategy.” (*Id.* at 352,250-51).

The purpose of this chapter is to: (1) establish the biological goals and objectives for the HCP; (2) estimate the amount of incidental take that may result from the Covered Activities; and (3) evaluate the impact of that take on the likelihood of the survival and recovery of the Covered Species.

¹ The term “jeopardize the continued existence of” means “to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of the species in the wild by reducing the reproduction numbers, or distribution of that species.” (50 C.F.R. § 402.02). This standard is obviously very similar to the “appreciable reduction” issuance criterion. The jeopardy and critical habitat analysis will be done by USFWS as part of its Section 7(a)(2) Biological Opinion. Accordingly, the jeopardy and critical habitat analysis will not be specifically addressed in this chapter.

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 (m²)							
Study Reach	Bryophytes	<i>Hygrophila</i> <i>Potamogeton</i>	<i>Ludwigia</i>	<i>Cabomba</i>	Fl. Algae	<i>Sagittaria</i>	<i>Vallisneria</i>
Upper Spring Run Reach	1,850 <u>1,750</u>	650 <u>0</u>	150 <u>25</u>	0 <u>25</u>	0	600 <u>850</u>	0
Landa Lake	4,000 <u>3,950</u>	250 <u>25</u>	900	500	0	1,250 <u>2,250</u>	13,500 <u>12,500</u>
Old Channel	150 <u>550</u>	200 <u>0</u>	1500 <u>425</u>	0 <u>180</u>	300	0 <u>450</u>	0
New Channel	150	1,350 <u>0</u>	0 <u>100</u>	350 <u>2,500</u>	0	0	0
TOTAL	6,150 <u>6,400</u>	2,450 <u>25</u>	2,550 <u>1,450</u>	850 <u>3,205</u>	300	1,850 <u>3,550</u>	13,500 <u>12,500</u>
Fountain darter median density goal (number/m²)							
	Bryophytes	<i>Hygrophila</i> <i>Potamogeton</i>	<i>Ludwigia</i>	<i>Cabomba</i>	Fl. Algae	<i>Sagittaria</i>	<i>Vallisneria</i>
	20	4 <u>3.3</u>	7	7	14	1	1

Key Management Objectives

The long-term biological goals are accompanied by two key management objectives needed to achieve the long-term biological goals. The management objectives for the fountain darter in the Comal Springs/River Ecosystem are (in no particular order):

- Active native vegetation restoration and protection will be implemented in Landa Lake and the Old Channel. Restoration activities will extend beyond the study reaches in equal proportion to effort expended per study area in relation to the total area of Landa Lake and Old Channel. 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 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. For example, if 50 percent of the Old Channel study reach was restored, 50 percent of the entire Old Channel would be subsequently restored. See Table 4-1-1 and Figure 4-1-1 for specified goals and locations associated with this key management objective.

TABLE 4-1-1
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)							TOTAL
Study Reach	<i>Bryophytes</i>	<i>Potamogeton</i>	<i>Ludwigia</i>	<i>Cabomba</i>	<i>Sagittaria</i>	<i>Valisneria</i>	
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)							TOTAL
	<i>Bryophytes</i>	<i>Potamogeton</i>	<i>Ludwigia</i>	<i>Cabomba</i>	<i>Sagittaria</i>	<i>Valisneria</i>	
	20	3.3	7	7	1	1	
# of 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

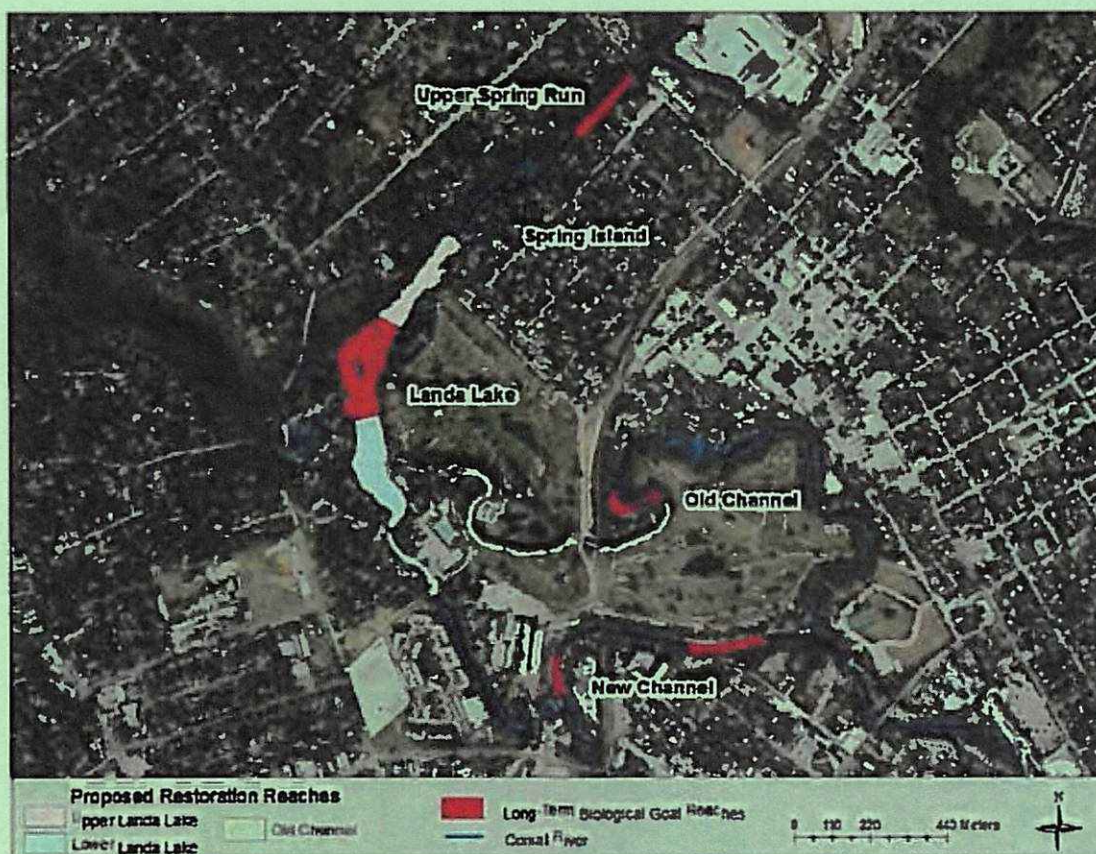


Figure 4-1-1. Long-Term biological goal reaches and proposed “restoration reaches” for the Comal System.

- Surface water quality within the Comal River should not exceed a 10 percent deviation (daily average) from historically recorded water quality conditions (long-term average) as measured at the fifteen EAA Variable Flow Study water quality monitoring locations (Figure 4-1). This includes water quality constituents currently measured in the EAA Variable Flow Study except water temperature and dissolved oxygen. This objective assumes that a 10 percent deviation in average conditions would be acceptable; however, more extensive work to evaluate and assess water quality tolerances of the fountain darter will be addressed as part of the AMP. Water temperature and dissolved oxygen will be monitored and evaluated on an instantaneous basis within the four representative study reaches with established thresholds. Water temperatures $<25^{\circ}\text{C}$ will be maintained throughout the Comal system as to not inhibit fountain darter reproduction and recruitment over time. Dissolved oxygen concentrations $> 4.0 \text{ mg/L}$ will be maintained throughout fountain darter habitat.

Flow-related Objectives

The current level of uncertainty associated with the habitat-based long-term biological goals and the associated restoration and water quality management objectives necessitate the flow-related objectives in Table 4-2.

TABLE 4-2
LONG-TERM AVERAGE AND MINIMUM TOTAL COMAL DISCHARGE MANAGEMENT OBJECTIVES

Description	Total Comal Discharge (cfs) ^a	Time-step
Long-term average	225	Daily average
Minimum	30 ^b	Daily average

^aAssumes a minimum of a 50-year modeling period that includes the drought of record

^bNot to exceed six months in duration followed by 80 cfs (daily average) flows for 3 months.

To track progress towards the long-term goals and learn more about the cause-and-effect relationships responsible for the variability in the habitat and population measures, the Applicants will monitor key components (*i.e.*, aquatic vegetation, the species themselves, water quality, non-native species, gill parasites, etc.) and conduct applied research and ecological modeling as part of the AMP. (See Section 6.3). The monitoring, applied research, and ecological modeling will be clearly described and defined as the AMP is further developed and implemented as any changes to the long-term biological goals will be based on the best available science.

Historical and Present Day Perspective

Aquatic vegetation and fountain darters have been routinely monitored within these four representative study reaches since fall 2000. The aquatic vegetation and subsequent fountain darter densities have varied over that period (BIO-WEST 2002a-2011a). An example of bryophytes areal coverage in the Upper Spring Run Reach and Landa Lake, and *Hygrophila* areal coverage in the Old and New channels over time is presented below in Table 4-3.

TABLE 4-3
EXAMPLE OF BRYOPHYTES AREAL COVERAGE IN THE UPPER SPRING RUN REACH AND LANDA LAKE, AND *HYGROPHILA* AREAL COVERAGE IN THE OLD AND NEW CHANNELS OVER TIME

Sampling Period	Bryophytes (m ²)		<i>Hygrophila</i> (m ²)	
	Upper Spring Run Reach	Landa Lake	Old Channel	New Channel
Spring 2002	457	3,985	3	3,158
Fall 2002	1,156	3,964	2	2,310
Spring 2003	2,476	4,190	21	3,011

Fall 2003	2,201	3,305	133	3,291
Spring 2004	1859	1,971	493	3,300
Fall 2004	712	735	648	620
Spring 2005	1,386	2,801	953	18
Fall 2005	1,195	1,055	1,326	220
Spring 2006	1,850	2,114	1,444	310
Fall 2006	1,251	929	1,292	715
Spring 2007	2,358	2,779	1,373	1,108
Fall 2007	2,407	2,601	1,519	1,300
Spring 2008	2,760	3,364	1,349	1,340
Fall 2008	1,057	176	1,350	2,131
Spring 2009	1,068	2,789	1,526	1,991
Fall 2009	853	386	1,569	100
Spring 2010	1,872	2,587	1,587	113
Fall 2010	16	412	1,338	181
Long-term Average	1,526	2,230	996	1,401

Table 4-4 breaks out the “current” (spring and fall 2010) areal coverage of aquatic vegetation within each of the four reaches (BIO-WEST 2011a).

From review of these tables, it is evident that the aquatic vegetation in the Comal system can vary considerably (most notable in Upper Spring Run Reach and New Channel) within any given year. For example, in 2010, the considerable reduction in aquatic vegetation in the Upper Spring Run Reach and New Channel, as well as for bryophytes in Landa Lake was due to the intense flooding event experienced in June. For a more comprehensive description of aquatic vegetation in the Comal study reaches over the past decade see EARIP (2009) or BIO-WEST (2002a-2011a)).

Methods and Discussion

Data collected over the past 10 years for the EAA Variable Flow Study was used for this analysis. For this approach, the maximum amount of each aquatic vegetation type per study reach was selected independent of year and vegetation type. For instance, 2003 had the highest areal coverage of bryophytes in Landa Lake, but 2009 had the highest amount of *Sagittaria*. As a starting point, both maximums were used even though they did not occur concurrently. Table 4-5 shows

Sagittaria. As a starting point, both maximums were used even though they did not occur concurrently. Table 4-5 shows the maximum areal coverage per vegetation type within each study reach over the ten-year study period.

Downstream of IH-35	120	4
TOTAL	3,550	100

TABLE 4-12
RECREATION AWARENESS THROUGHOUT THE WHOLE RIVER AT ALL FLOWS WITH
DESIGNATED CONTROL IN THE FOLLOWING HIGH QUALITY HABITAT AREAS WHEN
FLOW IS BELOW 100 CFS TOTAL SAN MARCOS DISCHARGE

Combined River Segment	TPWD Individual Segments
Spring Lake Dam to Rio Vista Dam	B, C
Rio Vista Dam to IH-35	F
Downstream of IH-35	K

Flow-related Objectives

The long-term biological goals for Texas wild-rice are defined as areal coverage over a spatial extent of the San Marcos River (see Table 4-10). However, because of the uncertainty associated with the long-term biological goals, the associated management objectives necessitate the flow-related objectives presented above in Table 4-13.

TABLE 4-13
LONG-TERM AVERAGE AND MINIMUM TOTAL
SAN MARCOS DISCHARGE OBJECTIVES

Description	Total San Marcos Discharge (cfs) ^a	Time-step
Long-term average	140 ^a	Daily average
Minimum	45 ^b	Daily average

^a Assumes a minimum of a 50-year modeling period that includes the drought of record

^b Not to exceed six months in duration followed by 80 cfs (daily average) flows for 3 months.

Historical and Present Day Perspective

Whole system monitoring for Texas wild-rice in the San Marcos River was initiated in 1976 and TPWD has conducted annual monitoring since 1989. (EARIP 2009). The TPWD 1976 to 2009 data set (EARIP 2009) was used for this analysis. During this time period the largest amount of Texas wild-rice in the San Marcos River was 4,277.5 m² measured in 2007. The areal coverage and percentage breakdown per combined river segment for the 2009 TPWD data is presented in Table 4-14.

TABLE 4-20
COMPARISON OF BIOLOGICAL GOALS USING DIFFERENT METHODOLOGIES

	Proposed Goals (Maximum Area Possible)				USFWS (1996) Recommended Areal Coverage (no minimum goal specified)	
	Long-term Goal		Minimum Goal		Long-term Goal*	
	Areal coverage (m ²)	Reach % of Total areal coverage	Areal coverage (m ²)	Reach % of Total areal coverage	Areal coverage (m ²)	Reach % of Total areal coverage
River Segment*						
Spring Lake Dam to Rio Vista Dam	5,180	83	2,490	83%	7,500	72
Spring Lake Dam to IH-35	910	13	390	13%	1,500	14
Rio Vista Dam to IH-35	280	4	120	4%	1,430	14
Downstream of IH-35						
Total	7,000	100	3,000	100%	10,430	100

*USFWS (1996) also recommended 1,500 m² for Spring Lake bringing the overall total to 11,930 m².

TABLE 4-21
**FOUNTAIN DARTER HABITAT (AQUATIC VEGETATION) IN METERS SQUARED (m²) AND
FOUNTAIN DARTER DENSITY (NUMBER/m²) PER HABITAT TYPE**

Fountain darter habitat (aquatic vegetation) in meters squared (m ²)								
Study Reach	<i>Hygrophila</i>	<i>Ludwigia</i>	<i>Cabomba</i>	<i>Hydrilla</i>	<i>Potamogeton</i>	<i>Sagittaria</i>	<i>Vallisneria</i> <i>Hydrocotyle</i>	<i>Zizania</i>
Spring Lake Dam	50	200	25	400	4,000	400	425	700
		100	50		200	200	50	
City Park	200	4,000	50	500	2,000	300	50	1,750
		150	90		1,450		10	
IH-35	50	200	300	400	300	400	25	600
		50	50		250	150	50	
TOTAL	300	4,400	375	700	3,300	500	200	3,050
		300	190		1,900	650	110	
Fountain darter median density (number/m ²)								
	<i>Hygrophila</i>	<i>Ludwigia</i>	<i>Cabomba</i>	<i>Hydrilla</i>	<i>Potamogeton</i>	<i>Sagittaria</i>	<i>Vallisneria</i> <i>Hydrocotyle</i>	<i>Zizania</i>
	4	7	7	5	5	1	4 4	5

Key Management Objectives

The long-term biological goals are accompanied by two key management objectives needed to achieve the long-term biological goals. The management objectives for the fountain darter in the San Marcos Springs/River Ecosystem are (in no particular order):

- Active native vegetation restoration and protection will be implemented in all three representative study reaches. Restoration activities will extend beyond the study reaches in equal proportion to effort expended per study reach in relation to the total river segment. By the establishment of known "restoration reaches" (Figure 4-3-1) in addition to the current study reaches, aquatic vegetation will include 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. For example, if 50 percent of the IH-35 study reach was restored, 50 percent of the area from Rio Vista Dam to IH-35 would be subsequently restored. See Table 4-21-1 and Figure 4-3-1 for specified goals and locations associated with this key management objective.

TABLE 4-21-1
FOUNTAIN DARTER HABITAT (AQUATIC VEGETATION) IN METERS SQUARED AND
MEDIAN DENSITY (NUMBER/M²) PER HABITAT TYPE TO DEFINE RESTORATION
REACHES^a IN THE SAN MARCOS RIVER

Fountain darter habitat (aquatic vegetation) in meters squared (m ²)							TOTAL
Study Reach	<u>Ludwigia</u>	<u>Cabomba</u>	<u>Potamogeton</u>	<u>Sagittaria</u>	<u>Hydrocotyle</u>	<u>Zizania</u>	
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)							TOTAL
	<u>Ludwigia</u>	<u>Cabomba</u>	<u>Potamogeton</u>	<u>Sagittaria</u>	<u>Hydrocotyle</u>	<u>Zizania</u>	
# darters *veg total	7	7	5	1	4	5	39,210
	1,575	1,925	7,625	1,975	360	25,750	

^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

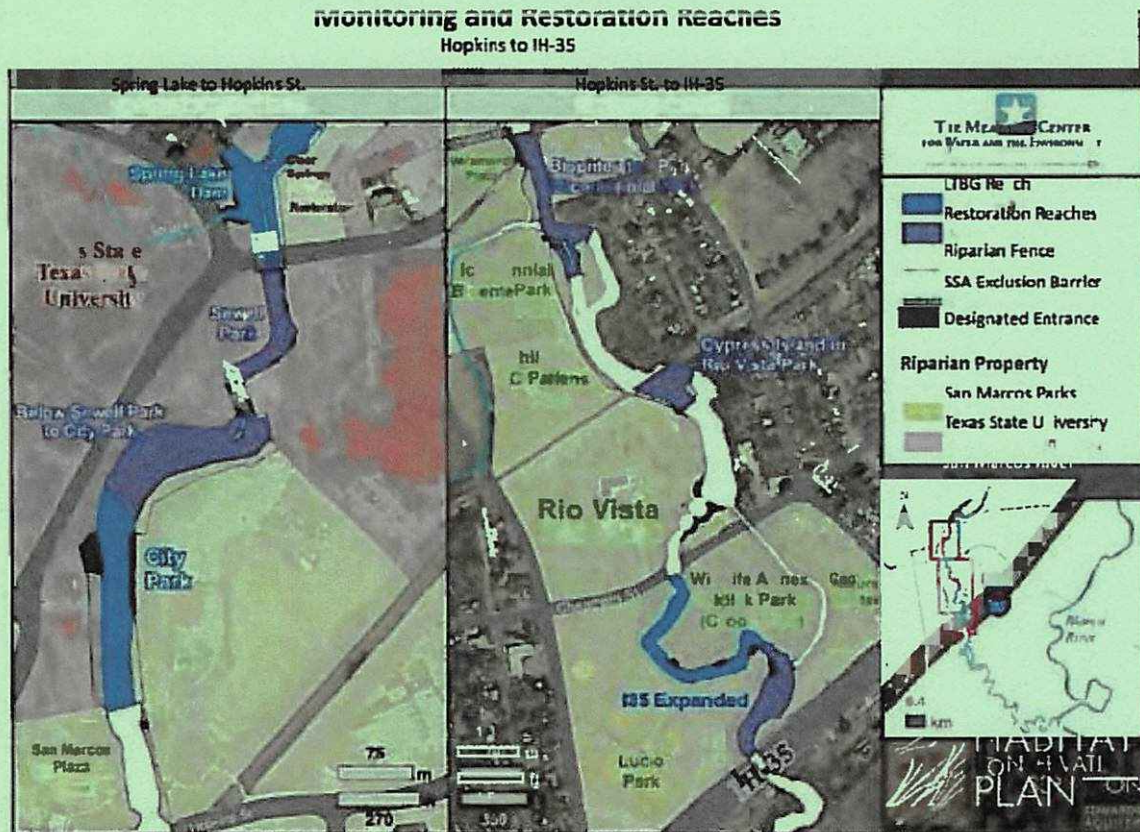


Figure 4-3-1. Long-Term biological goal reaches and proposed "restoration reaches" for the San Marcos System

- Active native vegetation restoration and protection will be implemented in all three representative study reaches. Restoration activities will extend beyond the study reaches in equal proportion to effort expended per study reach in relation to the total river segment. For example, if 50 percent of the IH-35 study reach was restored, 50 percent of the area from Rio Vista Dam to IH-35 would be subsequently restored.
- Surface water quality within the San Marcos River should not exceed a 10 percent deviation (daily average) from historically recorded water quality conditions (long-term average) as measured at the water quality monitoring stations for the EAA Variable Flow Study (Figure 4-3). This includes water quality constituents currently measured in the EAA Variable Flow Study to be monitored per Section 5.7.2, excluding water temperature and dissolved oxygen. This objective assumes that a 10 percent deviation in average conditions would be acceptable, however, more extensive work to evaluate the validity of that assumption and to assess water quality tolerances of the fountain darter will be addressed as part of the AMP. Water temperature and dissolved oxygen will be monitored within the representative study reaches and evaluated on an instantaneous basis with established thresholds. Water temperatures

<25°C will be maintained throughout the San Marcos system as to not inhibit fountain darter reproduction and recruitment over time. Dissolved oxygen concentrations >4.0 mg/L will be maintained throughout fountain darter habitat.

Flow-related Objectives

The current level of uncertainty associated with the habitat-based long-term biological goals and the associated restoration and water quality management objectives necessitate the incorporation of flow-related objectives in Table 4-13 above.

Historical and Present Day Perspective

Aquatic vegetation and fountain darters have been routinely monitored within the representative study reaches (Figure 4-3) since fall 2000. The aquatic vegetation and subsequent fountain darter densities have varied over that period (BIO-WEST 2002b-2011b). Table 4-22 breaks out the most current (spring and fall 2010) areal coverage of aquatic vegetation within each reach. (BIO-WEST 2011b).

flow-related goals presented in Table 4-13 would be protective of this species, until such time as additional information is available. This is a reasonable assumption in that the Comal Springs riffle beetle inhabits similar areas to the San Marcos salamander with similar habitat requirements, and as such, protection of the salamander and its habitat coupled with water quality protection of the aquifer should similarly protect this species. As part of the HCP long-term monitoring program, Comal Springs riffle beetles at San Marcos Springs will be monitored semi-annually over time with additional monitoring triggered by either high-flow or low-flow events as described in the EAA Variable Flow Study.

4.2 Potential Impacts to and Incidental Take of Covered Species

The HCP must provide information as to the impacts likely to result from the incidental take of Covered Species for which ITP coverage is requested. (16 U.S.C. § 1539(a)(2)(A)(i)). As part of the review of the ITP application, the USFWS must find that “the [incidental] taking will not appreciably reduce the likelihood of survival and recovery of the species in the wild.” (16 U.S.C. § 1539(a)(2)(B)(iv)). In addition, the USFWS in its biological opinion issued to address the incidental take must make the finding that the ITP is not likely to jeopardize listed species or result in destruction or adverse modification of their critical habitat. (16 U.S.C. § 1536(a)(2)).

Section 9 of the ESA prohibits the “take” of threatened and endangered species, including the attempt or action to “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect” such species. (16 U.S.C. § 1532). Habitat modification can result in take if either it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering (See 50 C.F.R. § 17.3 (definitions of the term “harm”)).

As part of a February 1, 1993, Judgment (as amended on May 26, 1993) in the case of *Sierra Club v. Babbitt*, (No. MO-91-CA-069, ~~(U.S. Dist. Ct., W.D. Tex. Feb. 3, 1993as)~~), the Court ordered the USFWS ___ to make, within 45-days, determinations relative to: (1) the springflow levels at which take of fountain darters and Texas blind salamanders begins at Comal and San Marcos springs, (2) springflows necessary to avoid appreciable diminution of the value of critical habitat of any listed species; (3) the springflow at which Texas wild-rice begins to be damaged or destroyed; (4) the minimum springflow to avoid jeopardy for the fountain darter, San Marcos gambusia, San Marcos salamander and Texas blind salamander; and (5) the springflow levels at which take of San Marcos gambusia and the San Marcos salamander begins at San Marcos Springs. Table 4-___28 summarizes the USFWS determinations.

Because the minimization and mitigation Measures are new, additional measures designed to reduce existing adverse impacts on water quality, invasive animal and plant species, recreation, and sedimentation, the aspects of the baseline conditions addressed by those measures can reasonably be expected to improve relative to the existing conditions.

4.2.1.2 Role of the Environmental Baseline in the “Appreciable Reduction” Analysis

Figure 4-7 is a depiction of a generic approach for the analytic process for the “appreciable reduction in the likelihood of survival and recovery” issuance criterion. To determine whether the effects of the incidental take will appreciably reduce the likelihood of the survival and recovery of the Covered Species, the effects of the Covered Activities and minimization and mitigation measures and the cumulative effects are aggregated with the environmental baseline.

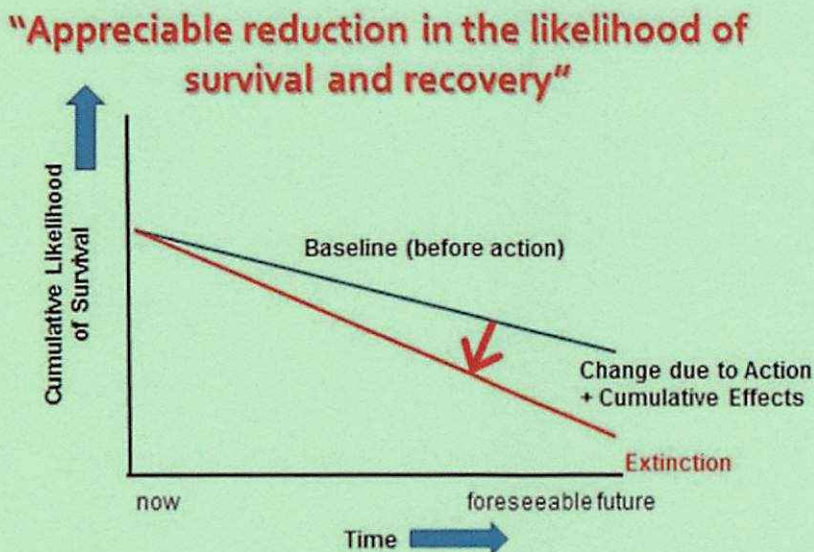


Figure 4-7. <http://www.eahcp.org/files/uploads/05-18-~1.PDF>
<http://earip.org/MeetingArchive.aspx?MeetingType=EARIPMeetings> (Adapted from presentation of Adam Zerrener, May 18, 2010).

As discussed below, as a general matter, the characterization of a reasonable baseline is a key factor in such an analysis. The generic approach to this analysis works very well where a new proposed action is being added to the baseline. It is more difficult here where the current status of the Covered Species can fluctuate dramatically depending on the amount of recharge and pumping.

Table 4-29 sets out the total withdrawals from the Aquifer from 2000 through 2010. In response to the Court's judgment in *Sierra Club v. Lujan*, in May 1993, the Texas Legislature directed EAA to cap the withdrawals authorized by permits to 450,000 ac-ft annually, but required EAA to

implemented but that pumping at the full amount allowed by SB 3 (572,000 ac-ft) will occur subject to the existing critical period management requirements and that non-permitted exempt pumping will also occur.⁶ The assumption of full pumping of the permitted amount does not reflect current pumping levels.

In this respect, the “No Action” Baseline does not fall squarely within the definition of environmental baseline. While it is a past state action, the SB 3 withdrawal cap currently has had no impacts that can be evaluated in the baseline. (See 50 C.F.R. § 402.02 (defining the “environmental baseline” as the “past and present impacts of all Federal, State, and private actions and other human activities in the action area.”)(emphasis added)) Further, the 572,000 ac-ft pumping cap neither contributes to a “snapshot” of the current health of the species nor is it a factor that “[lead] to the current status of the species.” (See, *supra*, n. 3).⁷

To provide a comparison of the effects of the Covered Activities with the flow protection minimization and mitigation measures in place to a baseline that more realistically reflects the current impacts of past and present pumping, a second baseline, the “Existing Baseline,” was developed. This baseline assumes total pumping of 381,000 ac-ft, the average total level of pumping over the period from 2000-2010.

4.2.1.3. Comparisons of the Hydrographs of the No Action and Existing Baselines with the HCP

Comal Springs

Figure 4-8 compares the modeled, total monthly average springflow projected at Comal Springs for the 1947-2000 time period for the No Action Baseline, Existing Baseline, and the Phase 1-Covered Activities with springflow protection measures. (HDR 2011). For comparison, the actual historical monthly average springflows at Comal Springs are also presented. The HCP Phase II results are not depicted in Figure 4-8 for the entire modeled period as they essentially mirror the Phase I results outside of the drought of record.

⁶ As discussed above in Section 1.6, this approach also is not a true “no action” alternative because EAA’s enabling legislation requires it, by December 31, 2012, to “implement and enforce management practices, procedures, and methods to ensure that, not later than December 31, 2012, the continuous minimum springflows of the Comal Springs and the San Marcos Springs are maintained to protect endangered and threatened species to the extent required by federal law.” (EAA Act § 1.14(h)). That deadline has not arrived, and the EAA has not made a specific determination as to how it would satisfy this requirement. Thus, it is difficult to substitute a flow number in the “No Action” Baseline as a surrogate for the continuous minimum flow requirement. (See Section 1.6).

⁷ As discussed further below, a simulation of the hydrograph of the historical record shows that with the “No Action” Baseline, the Covered Species, at least at Comal Springs, are likely to be extirpated because the springs cease to flow for approximately 38 months and will be significantly adversely affected, if not extirpated, at San Marcos Springs. Accordingly, almost any Covered Activities with minimization and mitigation measures which ensures minimum continuous springflow probably would not appreciably reduce the likelihood of the survival and recovery of the Covered Species even if the effects of those actions and measures would themselves jeopardize the survival and recovery of those species.

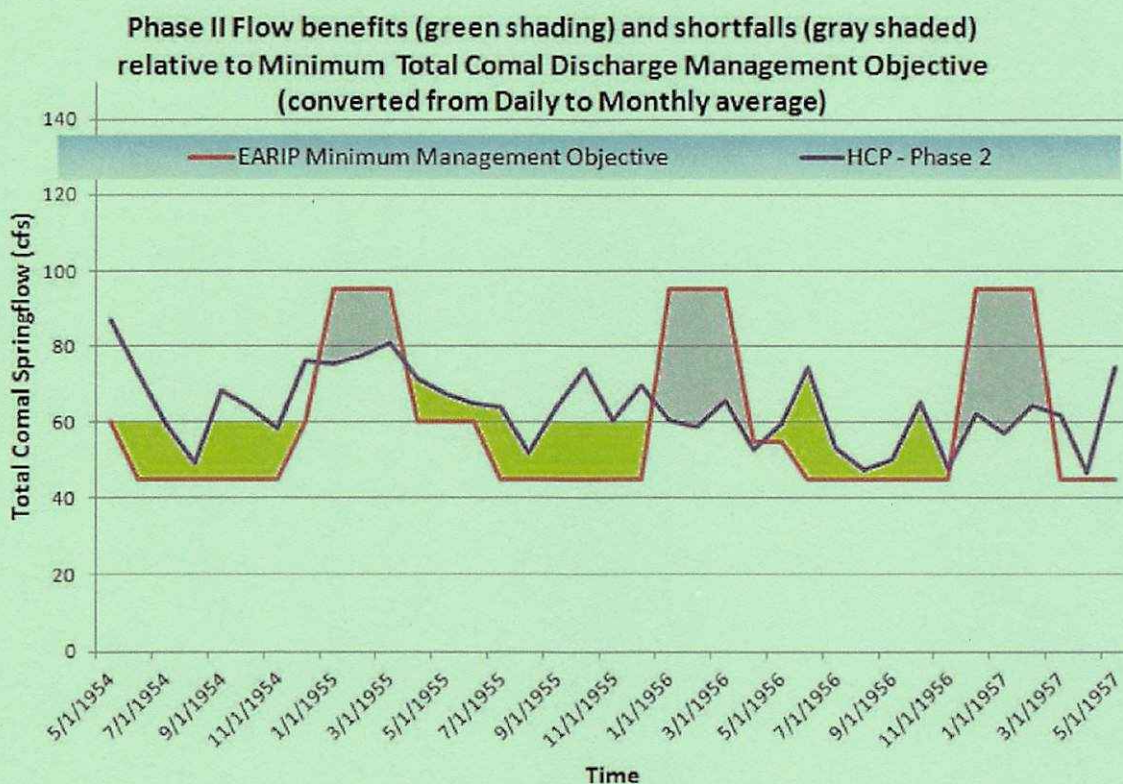


Figure 4-9c. Modeled HCP – Phase II Comal Total Discharge relative to the minimum flow management objective.

During the historical conditions, the fountain darter was extirpated from the Comal system but the other Covered Species were not. The shortfalls described in Figures 4-9b and 4-9c are not considered to be a detriment to the Comal Springs dryopid beetle, Edwards Aquifer diving beetle, Peck's Cave amphipod, or Comal Springs salamander. A key reason for the 80 cfs higher flow periods following extended minimum conditions is to provide surface flow in Spring Run 3 and break up the periods of extended low flows in the system. As discussed in the longterm average section below, the results of this flow management objective shortfall (Figures 4-9b and 4-9c) is currently unknown relative to the Comal Springs riffle beetle spring run populations. However, the improvement of minimum flows relative to historical conditions and the overall projected habitat remaining along the western shoreline and around Spring Island (see Section 4.2.2.3) is considered sufficient to support the survival of the Comal Springs riffle beetle in the Comal system during Phase I ~~AMP activities~~.

Relative to the fountain darter, the high quality habitat to be maintained in the Old Channel ERPA and in Landa Lake during this three year period will be adequate to support seasonal reproduction and survival of the fountain darter. Further, the documented ability for fountain darter habitat to recover quickly with a return to more normal discharge conditions was a key factor in determining the potential for recovery. An additional factor is that within the seven years of Phase I, it is not possible to have multiple, extended drought of record-like conditions.

Long-Term Average Flows

Chapter 5 Minimization and Mitigation Measures; Measures Specifically Intended to Contribute to Recovery

The ESA requires the HCP to specify what steps the applicants will take to minimize and mitigate the impacts which will likely result from the anticipated incidental take associated with the Covered Activities. (16 U.S.C. § 1539(a)(2)(A)). In order to issue an incidental take permit, USFWS must find that the applicants “will, to the maximum extent practicable, minimize and mitigate the impacts of such taking.” (*Id.* at § 1539(a)(2)(~~A~~)(B)(ii)).

This chapter describes the measures that the Applicants commit to carry out to minimize and mitigate the incidental take resulting from the Covered Activities to the maximum extent practicable. Additionally, some measures identified in the Sections below go beyond the “minimize and mitigate” standard and actually contribute to the recovery of the Covered Species. This chapter identifies the impact of the anticipated incidental take to be addressed by each measure and how that measure positively addresses that impact. The overall management of the implementation of these measures is set out in Chapter 9.

5.0 Approach to the Implementation of the Minimization and Mitigation Measures

The HCP will be implemented in two phases. In the first phase of the HCP, habitat minimization and mitigation measures and measures to maintain continuous minimum springflow during a repeat of the drought of record (see Table 5-1) will be put into place promptly on issuance of the ITP. This Phase I package will be implemented throughout the permit term unless modified by the AMP. Other components of Phase I will include implementation of measures designed to contribute to recovery of the species, and a robust AMP. Information developed in the AMP during Phase I will inform decisions regarding whether it is necessary to implement any flow protection measures during Phase II of the HCP beyond those implemented in Phase I.

objectives, while recognizing the uncertainty associated with those objectives, Applicants commit to implement a “presumptive” measure that is adequate to achieve the flow-related objectives for attaining the biological goals. If needed, the use of the expanded capacity of the SAWS ASR will be the “presumptive” additional measure to meet the biological objectives with critical period reductions in Stage V beyond those in Phase I, if necessary. (See Section 5.5.2).

Applicants will include in the Annual Report a description of the status of implementation of the minimization and mitigation measures and an evaluation of the effectiveness of those measures.

5.1 Edwards Aquifer Authority

5.1.1 ~~San Marcos National Fish Hatchery and Technology Center, Uvalde National Fish Hatchery, and Inks Dam National Fish Hatchery—Refugia~~

The EAA will support and coordinate with the USFWS on ~~the work relating to the San Marcos NFHTC’s operation and maintenance of~~ a series of off-site refugia at USFWS’s San Marcos, Uvalde, and Inks Dam facilities. (See Section 6.4). The limited geographic distribution of these species leaves the populations vulnerable to extirpation throughout all or a significant part of their range. A series of refugia, with back-up populations at other facilities, will preserve the capacity for these species to be re-established in the event of the loss of population due to a catastrophic event such as the unexpected loss of springflow or a chemical spill.

The support of the refugia will augment the existing financial and physical resources of ~~these facilities~~ the Service, and provide supplementary resources for appropriate research activities, as necessary, to house and protect adequate populations of Covered Species and expanded knowledge of their biology, life histories, and effective reintroduction techniques. The use of this support will be limited to the Covered Species in this HCP.

5.1.2 Voluntary Irrigation Suspension Program Option

The EAA will administer the Voluntary Irrigation Suspension Program Option (VISPO) program. As discussed below in Section 5.8, VISPO is intended to minimize and mitigate the impacts of incidental take from low springflows by suspending the use of Aquifer water for irrigation purposes during drought.

The use of Aquifer water for irrigation accounts for over 30 percent of the annual pumping. This use typically occurs between January and July. The concentrated use of the Aquifer can contribute to substantial drawdown in Aquifer levels. This measure will require EAA irrigation permit-holders who voluntarily participate in the program to suspend the use of Aquifer water for irrigation purposes during drought to maintain springflow.

5.1.2.1 Target Volume, Distribution & Eligible Permits

The volume goal for the VISPO program is 40,000 ac-ft/yr. Irrigation permit-holders in Atascosa, Bexar, Comal, and Hays counties will be approached for enrollment in the program first because these counties are closest to the springs where temporarily suspending pumping is

5.1.3.2.4 Water Reclamation for Efficient Water Use

This portion of the Regional Water Conservation Program will be operated by the EAA and target exempt well owners.

Staff person(s) involved will be technically proficient in a number of related technologies including condensate collection, gray water use, rainwater collection, xeriscaping, self-contained water systems, and drip irrigation. Her/his goal would be to identify rural residents that were willing to implement these technologies with a small subsidy from the sponsoring entity. The subsidy of \$300 or \$400 per ac-ft saved is the same as that for the other conservation programs but is unlikely to cover a significant portion of the total cost of the technology. Nevertheless, people regularly approach various water conservation information events throughout the region inquiring about these practices. A participant will have to commit to leaving 50 percent of the water savings in the Aquifer for 15 years.

In an urban setting, opportunities for this activity are mostly confined to new construction or large scale rehabilitations or conversions. In such a setting, the EAA will require a commitment by the appropriate water purveyor to leave one-half of the savings unutilized for the permit term.

5.1.3.3 Initial Commitment

Municipal water purveyors which utilize the Aquifer and have had success at implementing water conservation measures will initially commit an amount approximating 10,000 ac-ft/yr of permitted Aquifer water for municipal use immediately upon implementation of this measure, which will not be utilized, but will still be owned and controlled by the purveyor, as follows:

- ☐ San Antonio Water System: 8,000 ac-ft/yr
- ☐ TBD: 2,000 ac-ft/yr

As participating water purveyors and exempt well-owners achieve new water savings, the volume of conserved water committed by the new participants will be off-set against the initial commitment, allowing the initial commitment to revert to the control of the original permit-holder proportionally until the Regional Water Conservation Program achieves 20,000 ac-ft of savings, 10,000 ac-ft of which would remain unutilized by the new participating entities during the term of the HCP.

5.1.4 Critical Period Management – Stage V

5.1.4.1 Stage V Emergency Withdrawal Reductions

By December 31, 2012, EAA will amend its Critical Period Management Program to add a new emergency Stage V reduction of 44 percent applicable in both the San Antonio and Uvalde pools. Stage V is designed to be triggered only when other measures have not proven sufficiently effective in maintaining springflow during drought conditions. For the San Antonio Pool, Stage V would be triggered by a combination of the ten-day rolling average of the maximum daily well level at monthly average J-17 level beings below 625 feet or springflows of either less than 45 cfs based on a ten-day rolling average at Comal Springs or less than 40 0

cfs based on a three-day rolling average.

The Uvalde Pool would trigger Stage V using the Uvalde County Index Well (J-27) water level of 840 ft-MSL.¹

5.1.4.2 Stage V Emergency Water Supply

It is anticipated that during Stage V, all outdoor use of groundwater withdrawn from the Aquifer will be prohibited, except for limited circumstances, such as foundation watering, watering from a hand held hose, and emergency uses such as firefighting. It is possible that some of the smaller municipal water providers who are entirely dependent on the Aquifer may not have sufficient water supplies to meet public health and safety needs with Stage V critical period reductions. In such cases, municipal water providers will not be denied the use of groundwater from the Aquifer to meet public health and safety needs, but they will incur substantial fines and penalties as determined by the EAA pursuant to its enforcement rules and policies if they do not achieve the reductions. With such fines or penalties for overuse, it is anticipated that it would be more cost effective for small municipal providers who are entirely dependent to ensure that they have sufficient supplies available through lease arrangements than to pay the penalties for overuse during Stage V reductions.

To facilitate the leasing of water under these types of emergency situations, the Applicants may, with the support of the EARIP, seek a legislative amendment of § 1.34 of the EAA Act to allow irrigation permit holders to lease “Base Irrigation Groundwater” to municipal and irrigation users within the same county as the place of use for the irrigation permit during severe drought conditions.

5.2 City of New Braunfels

5.2.1 Flow-Split Management in the Old and New Channel

Presently, the culverts governing flow from Landa Lake into the Old Channel are inoperable. As a result, a constant level of springflow proceeds through the culverts and into the Old Channel. Over time, this has led to the scouring of preferred native vegetation types for fountain darters, and the establishment and eventual dominance by non-native non-preferred aquatic vegetation. Flow-split management is intended to complement the ecological restoration of aquatic vegetation in the Old Channel, by reducing long-duration high flows and allowing for more seasonal variability to be maintained, mimicking a more natural flow pattern.

To minimize and mitigate the impacts of low flows, the City of New Braunfels staff will manipulate at least once monthly the valves and culverts to the Old Channel and New Channel of the Comal River for the protection of existing and restored native aquatic vegetation in the river, based on EAA's real-time flow gauges in these channels and as often as appropriate for the maintenance of a beneficial hydrologic condition of the Old Channel habitat. Prior to this, the City of New Braunfels will replace and repair existing gates and control mechanisms to restore the operability of all four water paths to the Old Channel from Landa Lake: the two small

5-10 ¹ See also Section 5.5.2.

culverts, the one large culvert, and the Springfed Pool inlet. This repair will allow for the manipulation of water flow per the flow split strategy in Table 5-3 and the prevention of sustained high flows in the Old Channel that resulted in scouring.

A second objective is to maximize the quality of habitat in the Old Channel. This will be accomplished by: (1) providing an appropriate level of flow variability during average to high flow conditions; and (2) allowing proportionally more water to flow through the Old Channel versus the New Channel during periods of critically low-flow with the ultimate goal of preserving high quality fountain darter habitat within the Old Channel as long as possible.

A detailed description of flow-split management is described in BIO-WEST (2011c). Based on the analysis conducted to date, the desired goal for maximizing fountain darter habitat in upper portions of the Old Channel at all times is to maintain 40–80 cfs. Extremely uniform suitable habitat is present in the New Channel under modeled (10–300 cfs) flows (Hardy 2011). Table 5-3 describes the flow-split for total Comal springflow conditions. During average to high flow conditions the focus is on a seasonal flow split in order to optimize habitat conditions in the Old Channel over time. Slightly higher flows during the fall and winter will provide some channel maintenance benefit while not hindering overall fountain darter habitat. Optimal habitat conditions are proposed for spring and summer to provide the best opportunity for fountain darter recruitment.

TABLE 5-3
FLOW-SPLIT MANAGEMENT FOR OLD AND NEW CHANNELS

Total Comal Springflow (cfs)	Old Channel (cfs)		New Channel (cfs)	
	Fall, Winter	Spring, Summer	Fall, Winter	Spring, Summer
350+	8065	60	270+	290+
300	8065	60	220	240
250	8065	60	170	190
200	7065	60	130	140
150		60		90
100		60		40
80		50		30
70		50		20
60		40		20
50		40		10
40		30		10
30		20		10

When total Comal springflow flows drop to 150 cfs, the flow split will be shifted to protecting the maximum amount of habitat within the Old Channel year-round, while continuing to provide flow in the New Channel at all times (see Table 5-3). Additionally, when total Comal springflow drops below 100 cfs, if necessary, the City of New Braunfels staff will manipulate the valves and culverts more frequently to maintain the flow split ratio as detailed in Table 5-3.

culverts, the one large culvert, and the Springfed Pool inlet. This repair will allow for the manipulation of water flow per the flow split strategy in Table 5-3 and the prevention of sustained high flows in the Old Channel that resulted in scouring.

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A detailed description of flow-split management is described in BIO-WEST (2011c). Based on the analysis conducted to date, the desired goal for maximizing fountain darter habitat in upper portions of the Old Channel at all times is to maintain 40–80 cfs. Extremely uniform suitable habitat is present in the New Channel under modeled (10–300 cfs) flows (Hardy 2011). Table 5-3 describes the flow-split for total Comal springflow conditions. During average to high flow conditions the focus is on a seasonal flow split in order to optimize habitat conditions in the Old Channel over time. Slightly higher flows during the fall and winter will provide some channel maintenance benefit while not hindering overall fountain darter habitat. Optimal habitat conditions are proposed for spring and summer to provide the best opportunity for fountain darter recruitment.

TABLE 5-3
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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 35-40		20 25
50		40 35-40		40 15
40		30		10
30		20		10

When total Comal springflow flows drop to 150 cfs, the flow split will be shifted to protecting the maximum amount of habitat within the Old Channel year-round, while continuing to provide flow in the New Channel at all times (see Table 5-3). Additionally, when total Comal springflow drops below 100 cfs, if necessary, the City of New Braunfels staff will manipulate the valves and culverts more frequently to maintain the flow split ratio as detailed in Table 5-3.

portion of the Comal River between Last Tubers Exit and the confluence of the Guadalupe River and portions of the Comal River that allow for protection on one side of the river and safe passage of recreators on the other side of the river. Once the habitat has been established, TPWD will pursue creation of State Scientific Areas to protect fountain darter habitat.

5.2.2.3 Native Aquatic Vegetation Maintenance

Restoring native vegetation within the Comal system will benefit the Covered Species, but will be unsuccessful or likely very limited in success if it is not monitored and protected over time. One-time restoration contradicts the purpose for these activities which is to provide better habitat conditions for the ecological community over time and in particular, upon entering into critical low-flow periods. To sustain these conditions prior to entering into low-flow periods, the City of New Braunfels will conduct yearly maintenance of native aquatic vegetation restoration sites in Landa Lake and the Old Channel, and the flow-split management discussed above in Section 5.2.1.

Native aquatic vegetation maintenance consists of actively monitoring and maintaining planted stands of native vegetation. Temporal monitoring will incorporate some form of quantitative measurement system to assess whether plantings are increasing, decreasing, or remaining stable. Additionally, intensive non-native vegetation control in the adjacent areas will be implemented until the native vegetation is well-established. It will include additional activities following natural disturbances such as floods, periods of limited recharge, and/or herbivory, as well as anthropogenic disturbances such as recreation or vandalism. Anytime a disturbance is observed, the monitoring/maintenance schedule will be modified temporarily in order to provide the stability for the native vegetation re-establishment.

5.2.3 Management of Public Recreational Use of Comal Springs and River Ecosystems

To minimize and mitigate the impacts of recreation, the City of New Braunfels will manage recreational use of the Comal Springs and Comal River Ecosystem through two methods:

- 1) The City of New Braunfels will not reduce current protections provided by City Ordinance or Policy and will continue to enforce these regulations, including:
 - a. Limiting recreation on Landa Lake to Paddle Boats
 - b. Prohibiting recreational access to the Spring Runs in Landa Park to the Wading Pool in Spring Run 2.
 - c. Prohibiting water recreation on the Old Channel; with the exception of Schlitterbahn operations within its present location.
- 2) Pursuant to Section 9.2 of the IAR Resolution and Order No. 08-12-001 of the EAHCP Implementing Committee, the City of New Braunfels will issue Certificates of Inclusion (COIs) to those commercial outfitting businesses that facilitate recreational activities on the Comal River (Outfitters) that comply with the requirements of the COI program established in this section. Outfitters that opt into the COI program and receive a COI will receive incidental take coverage during the term of the COI, which

- h. Lecture series at Texas State University.
 - i. Stencils on rented tubes.
4. Reduce turbidity and sedimentation through the establishment of watershed management strategies. This will decrease erosion and subsequent sedimentation and filter runoff to enhance water quality. Remove silt and accumulated sediment from designated areas within the river to more closely match historical conditions.
 5. The development of a partnership between the City and the University to enforce suggested measures and educate river users, and the use of officers dedicated to enforcing environmental regulations working both in and along the river.

Pursuant to Resolution and Order No. 08-12-001 of the EAHCP Implementing Committee~~Section 9.2 of the IA~~, the City of San Marcos will issue Certificates of Inclusion (COIs) to those commercial outfitting businesses (businesses and nonprofit entities that rent tubes, canoes, kayaks, or similar equipment to facilitate recreational activities on the San Marcos River) (Outfitters) that comply with the requirements of the COI program established in this section. Outfitters that opt into the COI program and receive a COI will receive incidental take coverage during the term of the COI, which shall not extend beyond the Permit term. The City is not required to regulate the recreational activities of those Outfitters that choose not to participate through the COI process beyond the minimization and mitigation activities the City of San Marcos has committed to undertake in this HCP.

Outfitters can apply for a COI when the ITP is issued and every two years thereafter. For those Outfitters that voluntarily participate in order to obtain incidental take coverage for their recreational activities, the COI will contractually require those Outfitters to comply with and implement listed minimum standards set out below. The City of San Marcos will not reduce or eliminate any of the listed minimum standards during the 15-year ITP term but reserves the right to add additional standards in the future. COIs from the City will be issued based on a two-year term; so that every two years conditions of the COI may be increased if necessary to further promote mitigation activities, San Marcos policy or ordinance as related to protection of habitat or address new information established through the best science available as related to the species. The City will provide each year to the Program Manager for incorporation into the Annual Report a copy of all COIs issued during that year and information regarding the Outfitters compliance with the minimum standards.

COI Outfitter Standards

- 1) Provide litter bags to all customers
- 2) Sponsor at least one San Marcos River Cleanup annually. An Outfitter may sponsor an existing river cleanup or may organize its own. Services and resources provided as a sponsor must exceed \$1,000 in direct payments or in-kind services.

5.3.4 Prohibition of Hazardous Materials Transport Across the San Marcos River and Its Tributaries

Hazardous materials transported by truck across the watershed of the San Marcos River and its tributaries presents the possibility of accidental spills or releases into the environment. The limited geographic distribution of the endangered species at San Marcos Springs could cause the species to be highly impacted by such a spill.

The City of San Marcos will coordinate with the Texas Department of Transportation to designate hazardous materials routes which minimize the potential for spills entering the San Marcos River. This effort will include legislation, if necessary, and additional signage.

5.3.5 Reduction of Non-Native Species Introduction

Introducing non-native species into the San Marcos Springs and River results in predators and competitors for the listed species in the ecosystem. To mitigate the impacts of recreation and pumping from the aquifer during drought, the City of San Marcos will stop or substantially reduce the introduction of non-native species from aquarium dumps.

Dumping aquariums into the San Marcos River and its tributaries will be minimized through education, including signage and brochures, and offering alternative disposal to citizens wanting to get rid of unwanted aquatic pets. The City of San Marcos will partner with the River Systems Institute, Texas State University, and local citizen groups to help distribute educational materials. Partnerships with the school districts will also be considered. Educational materials will also be provided to local pet shops.

5.3.6 Sediment Removal below Sewell Park

The City of San Marcos will remove sediment from the river bottom at various locations from City Park to IH-35. These areas include but are not limited to reaches of the river in City Park, Veramendi Park, Bicentennial Park, Rio Vista Park, and Ramon Lucio Park. Sediment has accumulated at these locations due to the installation of flood control dams, urbanization, and natural processes. These accumulations have altered the river's morphology and natural flow patterns. In addition, deposition of sediments on or around Texas wild-rice stands causes direct mortality by smothering or burying strands.

To minimize and mitigate the impacts of incidental take from recreation and pumping during low flow periods, the City of San Marcos will remove sediment from key areas of Texas wild-rice habitat below Sewell Park.

Hydrosuction will be used to remove accumulations of sediment. The silt will be vacuumed using a hose ~~that has without a screen on the end of the suction dredge to prevent suctioning biota greater than 0.25 inch in diameter.~~ The divers doing the hydrosuctioning will take the following measures to minimize loss/harm of biota in the area. Divers will fin the area to be suctioned to encourage the darters and other biota to move out of the area. Divers will be trained to recognize all stages of listed species from larval to adult. The nozzle of the vacuum will be kept down in the soil and not allowed to swing through the water column during the operation. In addition, placement of stakes around the area to be suctioned will keep divers away from stands of Texas wild-rice. An observer will be on the

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Dumping aquariums into the San Marcos River and its tributaries will be minimized through education, including signage and brochures, and offering alternative disposal to citizens wanting to get rid of unwanted aquatic pets. The City of San Marcos will partner with the River Systems Institute, Texas State University, and local citizen groups to help distribute educational materials. Partnerships with the school districts will also be considered. Educational materials will also be provided to local pet shops.

5.3.6 Sediment Removal Management below Sewell Park

In order to manage sediment deposition into the San Marcos river, the City of San Marcos, in partnership with Texas State University, may implement a proactive approach to mitigating sediment impacts by designing and constructing low impact development (LID) best management practices (BMPs) in priority watersheds to benefit the Covered Species. These BMPs can include natural streambed restoration, sediment ponds or retention basins, as well as other effective approaches to managing sediment loads into the San Marcos river. In development of construction plans, the Science Committee (or subcommittee of specialized perspectives) are to provide justification of site selections as well as BMPs proposed.

The City of San Marcos will may implement a reactive approach by removing remove sediment from the river bottom at various locations from City Park to IH-35. These areas include but are not limited to reaches of the river in City Park, Veramendi Park, Bicentennial Park, Rio Vista Park, and Ramon Lucio Park. Sediment has accumulated at these locations due to the installation of flood control dams, urbanization, and natural processes. These accumulations have altered the river's morphology and natural flow patterns. In addition, deposition of sediments on or around Texas wild-rice stands causes direct mortality by smothering or burying strands. The City of San Marcos may remove sediment from key areas of Texas wild-rice habitat below Sewell Park to minimize and mitigate the impacts of incidental take from recreation and pumping during low flow periods, complement the planting and gardening of submerged aquatic vegetation, or to mitigate impacts of sediment on Texas wild-rice caused

specifically by floods or other extreme weather events that deposit large amounts of sediment in one area. Upon site identification, the EAHCP Science Committee (or appropriate subcommittee) will be consulted prior to the annual Work Plan submission.

~~To minimize and mitigate the impacts of incidental take from recreation and pumping during low flow periods, the City of San Marcos will remove sediment from key areas of Texas wild-rice habitat below Sewell Park.~~

Depending on location, and desired outcome, H~~hydrosuction or mechanical removal~~ will ~~may~~ be used to help remove accumulations of sediment. ~~The silt will be vacuumed using a hose that has screen to prevent suctioning biota greater than 0.25 inch in diameter. The divers doing the hydrosuctioning~~ Those removing sediment will take the following measures to minimize loss/harm of biota in the area. ~~Divers~~ They will fin the area to be suctioned to encourage the darters and other biota to move out of the area. ~~Divers~~ They will be trained to recognize all stages of listed species from larval to adult. If hydrosuctioning, ~~the~~ nozzle of the vacuum will be kept down in the soil and not allowed to swing through the water column during the operation. In addition, placement of stakes around the area to be suctioned will keep divers away from stands of Texas wild-rice. An observer will be on the

5.4.4 Sediment Removal in Spring Lake and from Spring Lake Dam to City Park

Monitoring of the San Marcos River since 1990 reveals that sediment production has increased from 160 m³/yr to 920 m³/yr due to a combination of upstream flood control dams and sediment inflow increases (Earl and Wood 2002). Deposition of sediments on or around Texas wild-rice stands causes direct mortality by smothering or burying stands. Texas State University will mitigate the impacts of incidental take from diving activities, research activities, recreation and pumping during low flow periods by removing sediment from key areas of Texas wild-rice habitat in Spring Lake and from Spring Lake Dam to City Park.

Hydrosuction will be used to remove accumulations of sediment. The silt will be vacuumed using a hose ~~that has an end piece covered by a 0.25-inch mesh~~ without a screen on the end of the suction dredge to prevent suctioning biota greater than 0.25-inch in diameter. The divers doing the hydrosuctioning will take the following measures to minimize loss/harm of biota in the area. Vegetation will be finned before turning on the pump. Finning will encourage the darters and other biota to move out of the area. Divers will be trained to recognize all stages of listed species from larval to adult. The nozzle of the vacuum will be kept down in the soil and not allowed to swing through the water column during the operation. In addition, placement of stakes around the area to be suctioned will keep divers away from stands of Texas wild-rice. An observer will be on the bank to monitor the effluent for presence of listed species and all other biota, as well as for the safety of the diver.

Sediment samples will be sent to TCEQ for contaminant testing per TCEQ requirements.

5.4.5 Diversion of Surface Water

Under TCEQ Certificates 18-3865 and 18-3866, Texas State University's total diversion rate from the headwaters of the San Marcos River for consumptive use is limited to 8.1 cfs. (See Section 2.5.5). The total diversion rate from Spring Lake is limited to 4.88 cfs; the total diversion rate from the San Marcos River at Sewell Park is limited to 3.22 cfs. (See Section 2.5.5.1 and 2.5.5.2 respectively). To minimize the impacts of these diversions, when flow at the USGS gauge at the University Bridge reaches 80 cfs, Texas State University will reduce the total rate of surface water diversion by 2 cfs, *i.e.*, to a total of approximately 6.1 cfs. This reduction in pumping will occur at the pump just below Spring Lake Dam in order to maximize the benefits to salamanders, Texas wild-rice, and other aquatic resources in the San Marcos River below Spring Lake Dam. The University will reduce the total rate of surface water diversion by an additional 2 cfs when the USGS gauge reaches 60 cfs. The additional 2 cfs reduction will be made from the pumps located in the slough arm of Spring Lake, and, therefore, maximize the benefits to the aquatic resources within the main stem San Marcos River below Spring Lake Dam. When the USGS gauge reaches 49 cfs, Texas State University will reduce the total diversion rate to 1 cfs. This further reduction will be made by restricting the pumps located in the Sewell Park reach. The diversion of water will be suspended when the springflow reaches 45 cfs.

5.4.4 Sediment Removal Management in Spring Lake and from Spring Lake Dam to City Park

In order to manage sediment deposition into the San Marcos river, Texas State University, in partnership with the City of San Marcos, may implement a proactive approach to mitigating sediment impacts by designing and constructing low impact development (LID) best management practices (BMPs) in priority watersheds to benefit the Covered Species. These BMPs can include natural streambed restoration, sediment ponds or retention basins, as well as other effective approaches to managing sediment loads into the San Marcos river. In development of construction plans, the Science Committee (or subcommittee of specialized perspectives) are to provide justification of site selections as well as BMPs proposed.

Monitoring of the San Marcos River since 1990 reveals that sediment production has increased from 160 m³/yr to 920 m³/yr due to a combination of upstream flood control dams and sediment inflow increases (Earl and Wood 2002). Deposition of sediments on or around Texas wild-rice stands causes direct mortality by smothering or burying stands. Texas State University will mitigate the impacts of incidental take from diving activities, research activities, recreation and pumping during low flow periods by removing sediment from key areas of Texas wild-rice habitat in Spring Lake and from Spring Lake Dam to City Park.

~~Texas State University will may implement a reactive approach by removing remove sediment from the river bottom at various locations from City Park to IH-35. These areas include but are not limited to reaches of the river in City Park, Veramendi Park, Bicentennial Park, Rio Vista Park, and Ramon Lucio Park. Sediment has accumulated at these locations due to the installation of flood control dams, urbanization, and natural processes. These accumulations have altered the river's morphology and natural flow patterns. In addition, deposition of sediments on or around Texas wild-rice stands causes direct mortality by smothering or burying strands. Texas State University may remove sediment from key areas of Texas wild-rice habitat below Sewell Park to minimize and mitigate the impacts of incidental take from recreation and pumping during low flow periods, complement the planting and gardening of submerged aquatic vegetation, or to mitigate impacts of sediment on Texas wild-rice caused specifically by floods or other extreme weather events that deposit large amounts of sediment in one area. Upon site identification, the EAHCP Science Committee (or appropriate subcommittee) will be consulted prior to the annual Work Plan submission.~~

Depending on location, and desired outcome, Hhydro suction or mechanical removal will may be used to help remove accumulations of sediment. The silt will be vacuumed using a hose that has screen to prevent suctioning biota greater than 0.25 inch in diameter. The divers doing the hydrosuctioning Those removing sediment will take the following measures to minimize loss/harm of biota in the area. Divers They will fin the area to be suctioned to encourage the darters and other biota to move out of the area. Divers They will be trained to recognize all stages of listed species from larval to adult. If hydrosuctioning, the nozzle of the vacuum will be kept down in the soil and not allowed to swing through the water column during the operation. In addition, placement of stakes around the area to be suctioned will keep divers away from stands of Texas wild-rice. An observer will be on the bank to monitor the effluent for presence of listed species and all other biota, as well as for the safety of the diver.

Sediment samples will be sent to TCEQ for contaminant testing per TCEQ requirements.

5.4.5 Diversion of Surface Water

Under TCEQ Certificates 18-3865 and 18-3866, Texas State University's total diversion rate from the headwaters of the San Marcos River for consumptive use is limited to 8.1 cfs. (See Section 2.5.5). The total diversion rate from Spring Lake is limited to 4.88 cfs; the total diversion rate from the San Marcos River at Sewell Park is limited to 3.22 cfs. (See Section 2.5.5.1 and 2.5.5.2 respectively). To minimize the impacts of these diversions, when flow at the USGS gauge at the University Bridge reaches 80 cfs, Texas State University will reduce the total rate of surface water diversion by 2 cfs, *i.e.*, to a total of approximately 6.1 cfs. This reduction in pumping will occur at the pump just below Spring Lake Dam in order to maximize the benefits to salamanders, Texas wild-rice, and other aquatic resources in the San Marcos River below Spring Lake Dam. The University will reduce the total rate of surface water diversion by an additional 2 cfs when the USGS gauge reaches 60 cfs. The additional 2 cfs reduction will be made from the pumps located in the slough arm of Spring Lake, and, therefore, maximize the benefits to the aquatic resources within the main stem San Marcos River below Spring Lake Dam. When the USGS gauge reaches 49 cfs, Texas State University will reduce the total diversion rate to 1 cfs. This further reduction will be made by restricting the pumps located in the Sewell Park reach. The diversion of water will be suspended when the springflow reaches 45 cfs.

VISPO and municipal conservation layers). It utilizes the SAWS ASR facility for storage and delivery of Aquifer water leased by the EAA. When triggers are reached, as described below, SAWS will use water stored in the ASR to serve as a baseload supply in its service area near to the springs. As described below, an amount equivalent to the water recovered from the ASR will be used to offset SAWS's Edwards demand.

EAA will acquire through lease and option 50,000 ac-ft/yr of EAA-issued Final Initial Regular Permits. The EAA may use SAWS as its agent for this purpose. The leases and options will be acquired by EAA to fill, idle, and maintain a portion of the capacity of the SAWS ASR Project for subsequent use to protect springflows during identified drought-of-record conditions as described below.

The lease program is comprised of three components. The first one-third, approximating 16,667 acre-feet of permits, will be leased for immediate storage in the ASR. The remaining pumping rights will be placed under a lease option. One-third (16,667 ac-ft) of the total will be options exercised in the year after the 10-year moving annual average of Edwards recharge falls below 572,000 ac-ft/yr, as determined by the EAA (see Section 6.2.3), and is likely to continue to decrease. The last one-third will be options exercised when the 10-year moving recharge average is less than 472,000 ac-ft/yr, as determined by the EAA (see Section 6.2.3). When the leases are in place, this water will either be pumped to fill the SAWS ASR or not pumped for any reason. When the ASR is in recovery mode (*i.e.*, when water is being returned from the ASR), the leased water will not be pumped. The water to fill SAWS ASR is generally provided by SAWS from their existing Edwards supplies and the first one-third of the regional leases water (16,667 ac-ft) which will be maintained at all times throughout the HCP duration. SAWS will store its own unused Edwards permits in addition to the HCP leases and lease-options in the ASR when possible. SAWS, with the assistance of the Regional Advisory Group will describe in the Annual Report the storage and recovery activities.

Trigger levels for implementation of ASR management in accordance with the HCP will be 630 ft-MSL at the J-17 index well during an identified repeat of drought conditions similar to the drought of record as indicated by the ten-year rolling average of Edwards recharge of 500,000 ac-ft, as determined by the EAA. When triggered, the ASR or other supplies capable of utilizing shared infrastructure will be activated to deliver up to 60 million gallons per day to SAWS distribution system during a repeat of drought of record-like conditions. When the monthly-ten-day rolling average groundwater levels at J-17 are below 630 ft-MSL and the ten-year rolling average of Aquifer recharge is 500,000 ac-ft or less, pumping of selected wells on the northeast side of SAWS water distribution system will be reduced in an amount that on a monthly basis equals the amount of water returned from the ASR only to the extent of the Aquifer water provided by the EAA for storage in the ASR. SAWS will use up to 100 percent of the conveyance capacity of existing SAWS ASR facilities to off-set SAWS' Edwards Aquifer demand.

SAWS will attempt, to the extent practicable, to mimic the pattern of delivery developed by HDR Engineering (HDR 2011). That pattern of delivery, however, was intended to represent how the water in the ASR would have been managed in the drought of record in the 1950s. Future droughts of similar duration and magnitude undoubtedly will differ in the timing and pattern of

VISPO and municipal conservation layers). It utilizes the SAWS ASR facility for storage and delivery of Aquifer water leased by the EAA. When triggers are reached, as described below, SAWS will use water stored in the ASR to serve as a baseload supply in its service area near to the springs. As described below, an amount equivalent to the water recovered from the ASR will be used to offset SAWS's Edwards demand.

EAA will acquire through both lease and option forbearance agreements 50,000 ac-ft/yr of EAA-issued Final Initial Regular Permits. The EAA may use SAWS as its agent for this purpose. The leases and ~~options~~ forbearance agreements will be acquired by EAA to fill, idle, and maintain a portion of the capacity of the SAWS ASR Project for subsequent use to protect springflows during identified drought-of-record conditions as described below.

The lease/forbearance agreement program is comprised of ~~three~~ two components. The first ~~one-third~~, approximating 10,000 to 16,667 acre-feet of permits, will be leased for immediate storage in the ASR. The remaining pumping rights will be placed under ~~a lease option~~ forbearance agreements. ~~One-third (16,667 ac-ft)~~ The second, a sliding scale approximating 33,333 to 40,000 ac-ft. of the total, will be ~~options~~ forbearance agreements exercised in the year after the 10-year moving annual average of Edwards recharge falls below ~~572,000~~ 500,000 ac-ft/yr, as determined by the EAA (see Section 6.2.3), ~~and is likely to continue to decrease. The last one-third will be~~ options exercised when the 10-year moving recharge average is less than 472,000 ac-ft/yr, as determined by the EAA (see Section 6.2.3). When the leases are in place, this water will either be pumped to fill the SAWS ASR or not pumped for any reason. When the forbearance agreements are in place, this water will not be pumped for any reason when the identified drought conditions are triggered. When the ASR is in recovery mode (*i.e.*, when water is being returned from the ASR), the leased water will not be pumped. The water to fill the SAWS ASR is generally provided by SAWS from ~~their~~ its existing Edwards supplies and the ~~first one-third of the regional leases~~ water (10,000 to 16,667 ac-ft) which will be maintained at all times throughout the HCP duration. SAWS will store its own unused Edwards permits in addition to the HCP leases ~~and lease options~~ in the ASR when possible. SAWS, with the assistance of the Regional Advisory Group will describe in the Annual Report the storage and recovery activities.

Trigger levels for implementation of ASR management in accordance with the HCP will be 630 ft-MSL at the J-17 index well during an identified repeat of drought conditions similar to the drought of record as indicated by the ten-year rolling average of Edwards recharge of 500,000 ac-ft, as determined by the EAA. When triggered, the ASR or other supplies capable of utilizing shared infrastructure will be activated to deliver up to 60 million gallons per day to SAWS distribution system during a repeat of drought of record-like conditions. When the monthly average groundwater levels at J-17 are below 630 ft-MSL and the ten-year rolling average of Aquifer recharge is 500,000 ac-ft or less, pumping of selected wells on the northeast side of SAWS water distribution system will be reduced in an amount that on a monthly basis equals the amount of water returned from the ASR only to the extent of the Aquifer water provided by the EAA for storage in the ASR. SAWS will use up to 100 percent of the conveyance capacity of existing SAWS ASR facilities to off-set SAWS' Edwards Aquifer demand.

SAWS will attempt, to the extent practicable, to mimic the pattern of delivery developed by HDR Engineering (HDR 2011). That pattern of delivery, however, was intended to represent how the

water in the ASR would have been managed in the drought of record in the 1950s. Future droughts of similar duration and magnitude undoubtedly will differ in the timing and pattern of

recharge in a given year. Thus, the actual pattern of delivery of water from the ASR may differ from that HDR used in its modeling simulations depending on the actual course of the drought. (See HDR 2011). Decisions as to the actual pattern of delivery will be determined by SAWS in conjunction with the Regional Advisory Group described below.

The use of the SAWS ASR is predicated on an assumption informed by HDR Engineers' groundwater modeling that the SAWS ASR will be utilized to deliver approximately 126,000 ac-ft of water to SAWS distribution system during a decadal drought similar to the drought of record. It is further predicated on the assumption from HDR 2011 that the maximum amount of HCP water that will be delivered in a given year is 46,300 ac-ft.

The management of the ASR to protect spring flow necessarily involves some judgment and flexibility. SAWS will make the day-to-day decisions necessary to fulfill the ASR commitment. A 12-person Regional Advisory Group consisting of four representatives of SAWS, the Program Manager, and one representative each from EAA, EAA permit holder for irrigation purposes, small municipal pumpers, the Spring cities, environmental (including Texas Parks and Wildlife), industrial pumpers, and downstream interests will provide advice to SAWS regarding the implementation of the program. The Advisory Group will meet as needed but no less than quarterly annually. SAWS will organize and facilitate the Advisory Group.

Future droughts may not mimic the historic drought of record. SAWS, in consultation with the Regional Advisory Committee, will address future drought situations by reviewing the rolling-average recharge triggers which may result in potentially accelerating the activation of the lease-options, based on relevant indicators.

5.5.2 Phase II Expanded Use of the SAWS ASR and Water Resources Integration Program Pipeline

Based on the best available science currently available, the management objectives required to foster achievement of the biological goals include maintain daily average flows of no lower than 30 cfs (45 cfs monthly average) for no longer than a period of 6 months at a time at Comal Springs and daily average flows of no lower than 45 cfs (52 cfs monthly average) for no longer than 6 months at a time at San Marcos Springs. (See Section 4.2). During Phase I, additional studies on the effects of low flows on the species and their habitat will be conducted and the MODFLOW model used to simulate the effects of the Phase I Package will be improved and a new model developed. (See Section 6.4). Until the AMP decision-making process is complete, it is not known whether additional flow protection measures are required. Similarly, the duration and amount of additional flows that might be needed are equally unknown. To address the need now to demonstrate the ability and commitment to achieve the existing long-term biological objectives while recognizing the uncertainty associated with those objectives, the Applicants commit to implement a "presumptive" action that, when combined with the Phase I activities, is adequate to achieve the current biological objectives if such an action is needed. (See FMA § 7.14).

The presumptive action for Phase II of the HCP involves the use of the SAWS ASR with a planned construction of the WRIP Pipeline that is currently in the design stages and is

scheduled for completion by 2020. The WRIP consists of approximately 45 miles of water transmission pipeline and a pump station that will convey water from the SAWS ASR, Carrizo, and Brackish Desalination programs located at the Twin Oaks Facility property in south Bexar County to new and existing facilities in western and northwestern Bexar County. The pipeline generally follows a north-northwest alignment from south Bexar County, through the far west portions of Bexar County to SAWS' Anderson Pump Station near the intersection of Loop 1604 and Highway 151. The WRIP will link the existing facilities and new water supplies located at the ASR site in southern Bexar County with the southwestern and western portions of San Antonio.

SAWS' ability to expand the use of the ASR as a presumptive Phase II measure, if required, assumes that: (1) no additional water beyond those required for the Phase I use of the ASR will need to be stored; (2) the total amount of water to be returned from the ASR over the term of the permit will not exceed 126,000 ac-ft during the drought and 46,300 ac-ft in the worst year; and (3) no more than 40 percent of the capacity of the WRIP distribution system will be utilized at any time for HCP purposes.

To the extent that such a project cannot actually be designed and implemented to achieve the goals within the above-described assumptions, additional springflow protection will be obtained through additional CPM pumping cuts in Stage V or other measures that provide an equivalent measure of springflow protection to the Covered Species. The current science suggests that Stage V pumping cuts of 47 percent would be required along with the presumptive measure. (See Section 5.8.2).

5.6 Texas Parks and Wildlife Department

5.6.1 State Scientific Areas

A major concern regarding Texas wild-rice is recreational activity in high-quality habitat areas of the San Marcos River. Several types of recreation occur traditionally on the San Marcos River, including swimming, snorkeling, scuba, boating, tubing, wading, fishing, and recreating with dogs. All these activities can impact Covered Species and their habitat, some to a greater degree than others and while exact impacts are unknown, as discharge decreases, a greater percentage of plants are exposed to potential negative consequences.

Texas Parks and Wildlife Department (TPWD) has the authority to establish state "scientific areas" for the purposes of education, scientific research, and preservation of flora and fauna of scientific or educational value. (TPW Code § 81.501). To minimize the impacts of recreation, TPWD has created a two mile segment of the public waters of the San Marcos River as a State Scientific Area in the San Marcos Springs ecosystem. (310 TAC 57.910). This scientific area is designed to protect Texas wild-rice by restricting recreation in these areas during flow conditions below 120 cfs. The rule makes it unlawful for any person (1) to move, deface, alter, or destroy any sign, bouy, boom or other such marking delineating the boundaries of the area; (2) uproot Texas wild-rice within the area; and (3) enter an area that is marked. The regulations are intended to preserve at least 1,000 m² of Texas wild-rice.

will also reduce runoff velocity which will help to reduce bank erosion, and subsequently the amount of sediment that enters the river. The sedimentation ponds will be constructed by excavating and stabilizing a specified area, and building a controlled-release structure. Water source for the ponds is solely runoff from rain events. Specific details for all ponds will be submitted through the AMP as each pond is contracted for design. Each construction area will be surrounded by silt fence/rock berm to minimize runoff. Sediment controls will be monitored daily during construction and the construction area will be covered with a tarp in the event of rain.

The first pond will be located in ~~Veramendi Park beside Hopkins Street bridge~~ adjacent to Downtown San Marcos. This area receives a large amount of street runoff from ~~three different storm drains~~ a large urbanized area with 100% impervious cover. The first pond will be designed to remove sediment and street pollutants from runoff prior to entering the river. The size, shape, and depth ~~will be~~ has been determined based on an analysis of the volume of water discharging from the ~~storm drains~~ downtown area. The City of San Marcos will detain as much as possible for treatment purposes. The City of San Marcos will undertake required maintenance of the sedimentation ponds on a regular basis. The area is easily accessible and sediment will be dredged and carried to ~~the City of San Marcos's~~ an existing composting site, ~~at the Wastewater Treatment Plant.~~

The second pond will be ~~created by widening of drainage ditches that run alongside Hopkins Street and cut directly to the San Marcos River~~ completed by restoring an unfinished sedimentation pond located at City Park adjacent to the Rec Hall parking lot. ~~Widened areas~~ The sedimentation pond will be designed to store water for a short period of time, but long enough to collect sediments and associated pollutants from roadway runoff.

5.7.5 Management of Household Hazardous Wastes

To date, water quality in the Aquifer and at the spring openings remains very good. However, as levels of development continue to increase over the recharge zone, transition zone, and even the contributing zone, the threats to water quality will increase. To reduce the potential for future water quality problems, the City of New Braunfels will initiate a hazardous household waste (HHW) program that will include accepting prescription drugs and Freon, through the TCEQ and/or the waste disposal division of the City of New Braunfels. The City of New Braunfels will establish a four-times-a-year program that could be recognized in the City's anticipated MS4 compliance and storm water permit as a contributing activity.

The City of San Marcos also will maintain a HHW program that involves the periodic collection of HHW and its disposal.

5.7.6 Impervious Cover/Water Quality Protection

Most potential water quality problems are linked to nonpoint source pollution such as fertilizer runoff and chemicals washed in from adjacent streets; however, spills and leaks from industrial and municipal infrastructure also present hazards. The potential for accidents and nonpoint source pollution to affect the Covered Species may be exacerbated during below average flows since chemicals and nutrients would be less diluted when a lower volume of water is present.

Runoff and spills originating even at long distances from the spring openings also can affect water quality at the springs.

The EAHCP originally contemplated establishing incentive criteria for private landowners in proximity of the San Marcos and Comal springs ecosystems to implement low-impact development (LID) best management practices (BMPs) on their property. It was identified that due to lack of interest, and limited overall impact of private property, the incentive program was de-prioritized. In its place, a Water Quality Protection Plan (WQPP) was developed for both the City of San Marcos and the City of New Braunfels. These WQPP provided the cities a list of proposed BMPs that could be implemented to protect water quality and mitigate for the impacts of nonpoint source pollution.

However, for the City of New Braunfels stormwater runoff prevention/reduction impacting Landa Lake and the Old Channel is of primary concern. BMPs will be selected that demonstrate the highest load reduction potential. The City of New Braunfels will use the prepared WQPP to assist in prioritizing locations and appropriate BMPs. Upon selection, the EAHCP Science Committee (or appropriate subcommittee) will be consulted prior to the annual Work Plan submission and selected BMPs will be implemented.

For the City of San Marcos, as referenced in 5.3.6, sediment prevention/reduction is a primary concern. BMPs will be selected in priority watersheds that demonstrate abnormal erosion issues and cause disproportionate sedimentation into the San Marcos river threatening Texas wild-rice and other Covered Species habitat. Thus, the City of San Marcos will perform water quality protection measures that directly improve sediment load reductions, and protect against other potential contaminants, into the San Marcos river. The City of San Marcos will use the prepared WQPP to assist in prioritizing locations and appropriate BMPs. Upon selection, the EAHCP Science Committee (or appropriate subcommittee) will be consulted prior to the annual Work Plan submission.

The City of New Braunfels will establish criteria related to desired impervious cover and provide incentives to reduce existing impervious cover on public and private property in New Braunfels. The City of New Braunfels will establish criteria and incentives for the program based upon the low impact development (LID)/Water Quality Work Group Final Report (Appendix Q) recommendations for Implementation Strategies and best management practices (BMPs).

The City of San Marcos will establish a program to protect water quality and reduce the impacts of impervious cover (such as through LID). The City of San Marcos will develop criteria and incentives for the program based upon the LID/Water Quality Work Group Final Report (Appendix Q) recommendations for Implementation Strategies and BMPs.

The EAA will put together materials regarding the value of a ban on the use of coal tar sealants and work with local governments to explore and encourage their consideration of such a ban.

5.8 HDR's Analysis of the Springflow Protection Measures

5.8.1 Modeled Springflow with the Phase I Package

The flow protection measures included in the Phase I package are detailed in Sections 5.1.2 (VISPO), 5.1.3 (Conservation Program); 5.5.1 (SAWS ASR), and 5.1.4 (Stage V Emergency Withdrawal Reductions). Each element in the package is intended to contribute to maintaining an adequate level of continuous springflows during a repeat of the drought of record conditions. The elements are intended to work in a cumulative manner to provide sufficient springflow protection during a repeat of the drought of record conditions during Phase I.

To evaluate the effectiveness of the flow protection measures, the EARIP retained HDR Engineering, Inc. and Todd Engineers (collectively HDR) to simulate the springflows at Comal and San Marcos springs during a recurrence of drought of record conditions under baseline conditions and with sequential addition of each flow protection element of the Phase I measures to the baseline conditions. HDR used the U.S. Geological Survey's MODFLOW groundwater model (Lindgren *et al.* 2004) in the simulations. The details of the model and the simulation results are set out in HDR, Inc. and Todd Engineers, "Evaluation of Water Management Programs and Alternatives for Springflow Protection of Endangered Species at Comal and San Marcos Springs," October 2011 (HDR 2011).

The baseline scenario used in that simulation assumes that all of the Initial Regular Permits are being fully pumped (573,037,572,000 ac-ft) and all of the projected exempt domestic and livestock wells (13,296 ac-ft) and unpermitted federal wells (6,907 ac-ft) are being pumped to the maximum extent, subject to applicable critical period management rules. (HDR 2011). This assumption results in a projected theoretical maximum pumping of 593,240,592,203 ac-ft in each year. (*Id.*) The baseline simulations also assume that the critical period management pumping restrictions set out in SB 3 are in place, but do not assume that the continuous minimum springflow__ requirement of state law is implemented.

The assumption regarding the annual pumping level probably is conservative. The highest actual recorded annual level of pumping was 542,400 ac-ft, which occurred in 1989 before the

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The baseline scenario used in that simulation assumes that all of the Initial Regular Permits are being fully pumped (573,037 ac-ft) and all of the projected exempt domestic and livestock wells (13,296 ac-ft) and unpermitted federal wells (6,907 ac-ft) are being pumped to the maximum extent, subject to applicable critical period management rules. (HDR 2011). This assumption results in a projected theoretical maximum pumping of 593,240 ac-ft in each year. (*Id.*) The baseline simulations also assume that the critical period management pumping restrictions set out in SB 3 are in place, but do not assume that the continuous minimum springflow requirement of state law is implemented.

The assumption regarding the annual pumping level probably is conservative. The highest actual recorded annual level of pumping was 542,400 ac-ft, which occurred in 1989 before the

extended periods of drought. A single strategy that would rely only on restricting pumping at a level that would assure springflows considered protective of the listed species would create serious adverse impacts to human health and safety. Other programs for establishing alternative water supply sources for use in recharge augmentation or displacement of pumping were evaluated. The preliminary cost estimates associated with these programs were considered to be impractical due to costs ranging into the many hundreds of millions of dollars and potential regulatory, technical, or political impediments to their implementation.

Based on the predicted effectiveness of the springflow protection measures and other conservation measures, the substantial financial commitment required of municipal and industrial pumpers, and the excessive cost of alternate approaches identified, the Applicants believe that minimization and mitigation measures in this HCP satisfy the "maximum extent practicable" requirement for issuance of the ITP.

5.9 EAA's Authority to Implement Measures to Maintain Springflow Prior to the Complete Implementation of the Phase I Package

The Plan Area at the time of the preparation of this HCP is experiencing drought conditions. While the Applicants at this time are unable to identify the exact nature, extent, or severity of the drought conditions, the potential exists that on the effective date of the Permit (in the event the Service approves the ITP application), the Plan Area will be in drought conditions of sufficient magnitude that immediate actions are required prior to the time that the Applicants are able to fully implement the minimization and mitigation measures described in Chapter 5. If so, EAA has the authority to take appropriate actions to protect the Covered Species while the Applicants are taking steps to fully implement their respective minimization and minimization measures under Chapter 5.

The EAA is a conservation and reclamation district created pursuant to Article XVI, Section 59 of the Texas Constitution. As such, the EAA is a political subdivision which has those powers expressly granted by statute and those necessarily implied as incident to its express powers. The EAA Act grants express power to the Authority to take action to protect the Covered Species and their habitat outside of the context of the HCP. Section 1.14(h) of the EAA Act provides that the EAA "through a program, shall implement and enforce water management practices, procedures, and methods to ensure that, not later than December 31, 2012, the continuous minimum springflows of the Comal Springs and the San Marcos Springs are maintained to protect endangered and threatened species to the extent required by federal law and to achieve other purposes provided by Subsection (a) of this section" The relevant parts of subsections (a)(6) and (7) of Section 1.14 provide that the EAA is to, among other things, protect aquatic and wildlife habitat, and listed threatened or endangered species. In support of this broad authority to protect species, Section 1.115(e) of the EAA Regulations-Act provides that the Board of Directors of the EAA may adopt emergency rules "in anticipation of imminent harm to human health, safety, or welfare, or if compliance with the [normal rulemaking] procedures . . . would prevent an effective response to emergency aquifer or springflow

Chapter 6 Adaptive Management

6.1 Adaptive Management Process

The adaptive management process (AMP) is designed to enhance the effectiveness of the HCP by addressing uncertainty in the conservation of a species by an HCP. 65 FR 35,242, ~~35,252~~ (June 1, 2000). The AMP proactively addresses the level of uncertainty that often exists in the management of natural resources through a process of experimentation and verification. Specifically, the AMP envisioned in the HCP is a process for examining alternative strategies for meeting the biological goals and objectives, and then, if necessary adjusting the minimization and mitigation measures in Chapter 5 according to what has been learned through the AMP.

USFWS' 5-Point Policy regarding HCPs addresses five issues: (1) biological goals and objectives; (2) adaptive management; (3) monitoring; (4) permit duration; and (5) public participation. (*Id.* at 32,250-256) The AMP described in this chapter covers the elements of adaptive management in USFWS' 5-Point Policy: (1) upfront identification of the uncertainty for a particular species, biological goal or objective, or efficacy of a minimization or mitigation measure; (2) the identification and incorporation of a possible range of alternatives for addressing the uncertainty; (3) implementation of a monitoring program to evaluate the probable success of the alternatives; and (4) providing for an interactive decision-making process based on the results of the monitoring program from which changes or adjustments should be made, if necessary, to the existing minimization and mitigation measures that are initially implemented. (65 FR at 35,252).

It is not the intent of the Applicants that the AMP should substitute for the implementation of minimization and mitigation measures reasonably expected to meet the long-term biological goals and objectives in Section 4.1 of the HCP, or to delay addressing difficult or intractable issues. On the contrary, the minimization and mitigation measures have undergone considerable scrutiny and evaluation. The measures will, based on the best scientific evidence available at the time of the issuance of the ITP, result in minimization and mitigation of impacts of the incidental take stemming from the Covered Activities to the maximum extent practicable, and will appreciably increase the likelihood of the survival and recovery of the Covered Species in the wild.

The details of the AMP for the HCP and its governance are found in Article Seven of the Funding and Management Agreement (FMA) that is attached hereto and incorporated herein for all purposes at Attachment R.

6.2 Monitoring

The Applicants and the USFWS will develop and oversee a monitoring program designed to identify and assess potential impacts from Covered Activities while also providing a better understanding and knowledge of desirable water quality- and springflow-related habitat

- The model should be capable of simulating the dynamics of both terrestrial and aquatic ecosystems, at the appropriate time scales, and integrate both types of ecosystems on a landscape-scale where appropriate.
- The model should be capable of including plant, animal, hydrological, climatic, and management variables, and simulating interactions among all of these components.
- The model should be capable of simulations on spatial scales ranging from 1 m² to the entire Edwards Aquifer region.
- The model should be capable of being linked to the groundwater model(s), so that simulations can be conducted for integrated surface and groundwater systems.
- The model should be sufficiently flexible that changes in algorithms can be made as needed, based on new data and improved understanding of the ecological dynamics of the Comal and San Marcos ecosystems. Revisions to the parameter values used in the model data base should be possible in a user-friendly manner such that routine upgrades to this data base can be made as additional site-specific data become available.
- The model should be capable of being run on commercially available PC hardware and using commercially available software operating systems.
- The model should have a history of producing accurate (80-90 percent) simulations of ecological dynamics in groundwater-influenced ecosystems, as demonstrated by field validation studies.
- The model should have user-friendly interfaces such that it can be used by a range of experienced personnel, upon completion of some degree of specific training on the use of the model.

6.3.4 Applied Research Facility Experimental Channel at the ~~USFWS National Fish Hatchery and Technology Center~~ Freeman Aquatic Building

6.3.4.1 Description of the Applied Research Facility

As discussed throughout this HCP, applied research coupled with ecological modeling is a valuable component of the Phase I package. During Phase I, applied research will be conducted to better understand the ecological dynamics of the Comal system, particularly under low flow conditions. Initially, an on-site research channel at Landa Park in the Comal system for conducting these experiments was considered to limit costs and maximize effectiveness. BIO-WEST (2011c). However, an appropriate site could not be obtained in the Comal ecosystem. Accordingly, an applied research experimental facility will be constructed at the ~~USFWS National Fish Hatchery and Technology Center (NFHTC)~~ Freeman Aquatic Building (FAB) at Texas State University in San Marcos, Texas. ~~The NFHTC has FAB will have the existing infrastructure (Aquifer exempt wells, ponds, containment areas, recirculation and reuse capabilities, etc.)~~ to allow for construction and operation of an applied research

facility to inform Phase II decisions regarding the Covered Species and, to the extent possible, adjustments to conservation Measures during Phase I.

Although termed "applied research facility," the conceptual design is a series of man-made channels ~~with earthen substrate~~ intertwined with the existing ponds available at the NFHTC FAB. This will allow water use and reuse through the plumbing already in place and to be installed while allowing the flexibility to pump water through several research channels for experimentation. To recreate the natural environment to the extent possible, considerable effort will be needed to simulate channel configuration, substrate, instream debris, riparian zone structure (trees, shrubs, grass), aquatic vegetation, and other natural and anthropogenic conditions present in the Comal River. These components will be carefully designed and constructed to provide the most authentic simulation practicable. A riffle beetle upwelling and spring run area (similar to that proposed in BIO-WEST 2011c) will be created at the headwaters of two of the research channels.

The EAA will support and coordinate the NFHTC's construction and maintenance of the Applied Research Center. EAA will contract for the research activities in the Applied Research Center identified in this Section or developed as part of the AMP. The Program Manager will coordinate, supervise and oversee the implementation of all such research.

6.3.4.2 Research in the Experimental Channels

The main focus of the research channels will be to evaluate the effects of low-flow on Covered Species and their habitat. This evaluation will include springflow conditions that bracket the range of 5 cfs to 100 cfs. Considering the Phase I schedule and the need to first get this facility designed, permitted, and constructed, it is likely that only five years will be available for Phase I experimentation. As such, key questions will need to be addressed during this time period, which will require a strict schedule and intense focus. The applied research at the NFHTC facility for Phase I will focus on the fountain darter relative to Comal (although research should be transferable to the San Marcos system) and the Comal Spring riffle beetle, as these are the two species with the greatest potential for impact relative to the Phase I package. This applied research will be further divided into three tiers. Tier A will focus on habitat requirements and responses; Tier B will focus on low-flow impacts directly on the fountain darter and Comal Springs riffle beetle; and Tier C will investigate the implications of the timing, frequency, and duration of multiple events in varying sequences and include specific research efforts designed to assess ecological model predictions (e.g., model validation). The experimental design for the research will be prepared prior to the initiation of the research. The experimental design for the research will receive input from the Science Committee prior to its initiation and on issues that arise during the conduct of the research. (FMA Section 7.13.2),

Tier A – Fountain Darter Habitat and Food Supply

□ Low-flow effects on native aquatic vegetation

A key unknown is the tolerance of native aquatic vegetation to reduced flow conditions in these systems. The timing and duration of these low-flow events will be studied relative to the native vegetation, starting with the plant species identified in the long-term biological goals for the

Informal observations suggest that the density of *C. formosanus* cercariae in the water column increases as stream discharge decreases and vice versa (T. Brandt, USFWS, personal communication), but there has been little definitive proof of this. If this relationship does exist between *C. formosanus* cercariae and discharge in the Comal River, there are concerns that increased levels of infection pressure would exacerbate the other stresses of low-flow periods on the fountain darter. Elimination of the parasite from the river probably cannot be accomplished. However, a possible practical approach to managing the parasite in the Comal River might be to control the parasite's snail host, *M. tuberculata*. USFWS and U.S. Environmental Protection Agency (EPA) authorizations to use chemicals known to be lethal to the snail likely cannot be obtained for the Comal River. Therefore, alternative methods need to be explored for decreasing abundances of *M. tuberculata* and the associated parasite.

In 2010, the EARIP funded a study (USFWS NFHTC and BIO-WEST 2011) to determine the effectiveness of *M. tuberculata* removal by physical methods on lowering drifting gill parasite numbers in the Comal River. The results from the study support the hypothesis that removing *M. tuberculata* from the Comal River correlates with a decrease in *C. formosanus* in the water column. These results support *M. tuberculata* control as an important HCP measure. However, there are several management and research questions still unanswered that may play a role in snail/parasite control and the relationship between the snails and the cercariae they release. The following activities to address these uncertainties will be conducted.

The initial activity will be the evaluation of alternative methods for snail removal so that removal can be accomplished in the most effective, yet least destructive manner. The second activity deals with understanding the magnitude of snail removal necessary to affect downstream cercaria concentrations in the water column. Once the magnitude of snail removal for effective control of water column cercaria is identified, a study is necessary to evaluate the long-term benefits of that removal. For instance, it is important to understand if the snails repopulate the area within a short period of time and cercaria concentrations quickly return to near original levels, or if both snail populations and cercaria counts stay suppressed for an extended period of time.

Additionally, although cercarial densities may be abating in the Comal system (Johnson *et al.* 2011), *C. formosanus* still poses a threat to fountain darters in the Comal River, especially during low-flows. As such, continued monitoring is essential and the following activities are included within this HCP conservation measure:

- A system-wide survey of snail population density and cercarial concentrations will be conducted to provide a baseline condition;
- Based on that system-wide survey, a decision will be made following the process set out in the [AMP Agreement Article 7 of the FMA](#) as to whether an initial system-wide removal effort is necessary, and if so, how to facilitate the performance of that effort;
- Based on the system-wide survey, a gill parasite monitoring program will be designed and implemented. Cercarial concentrations will be monitored in multiple areas along the Comal River on at least a semi-annual basis, and more frequently when spring flow drops initially

7.1.2 Funding Assurances

Funding to implement the HCP will come from two sources: (1) “aquifer management fees” (“AMF”) assessed by the EAA; and (2) third-party contributions. Through AMFs, the EAA will “fully fund” the implementation of the HCP during both Phase I and Phase II of the term of the ITP. (See FMA §§ 3.2, 5.2.1). Section 1.29 of the EAA Act authorizes the EAA to assess aquifer management fees to finance its administrative expenses and authorized programs. Among the expenses and programs authorized by the EAA Act is the implementation of the HCP. (See EAA Act §§ 1.11(d)(9), 1.14(h), and 1.26A). In addition to AMFs assessed by the EAA to fund its non-HCP programs and expenses, the EAA will also assess a separate AMF to fund the costs of implementing the HCP. (See FMA §§ 1.1.41, 5.1, 5.2.2). This AMF is referred to as the “Program Aquifer Management Fee.” (*Id.* § 1.1.41).

Third-party contributions will be remitted to the EAA by other entities who are not users of the Aquifer and, therefore, do not pay AMFs. (See Joint Funding Agreement (JFA). These other entities include at this time the City of Victoria, Guadalupe-Blanco River Authority (“GBRA”), City Public Service Energy of the City of San Antonio,¹ San Antonio River Authority, Union Carbide Corporation, and the Guadalupe Basin Coalition. The aggregate of the third-party contributions will total at least \$ 735,000 annually towards the costs of the implementation of the HCP. Of that amount, GBRA and Union Carbide Corporation initially will contribute \$400,000 and \$200,000 annually. This amount may be increased by an amount not to exceed 2 percent over the prior year’s amount for a calendar year during the term of the JFA based on an increase in the costs of implementing the HCP as certified by the EAA. (See JFA § 4(c)). Similarly, the amount may also be reduced but not below the initial amount. (*Id.*). These commitments are legally enforceable as reflected in Section 10 of the JFA.

The funding levels that are required to “fully fund” the implementation of the HCP for each year of the term of the ITP are the amounts shown in Table 7.1. (See ~~id.~~ FMA §§ 3.2, 5.2.1). The funding levels in Table 7.1 are estimated costs and may be adjusted up or down in light of experience acquired over time in the field and through the securing of actual implementation costs through the procurement process. (See *id.* § 5.2.1). However, the EAA will not be required to provide annual funding from AMFs for Phase I or Phase II in excess of the amount shown in Table 7.1 for 2013 “adjusted for a 2 percent increase, compounded annually, for the years that have elapsed since 2013.” (*Id.*). The actual amount for any particular year during the term of the ITP to be budgeted and funded by the EAA will be set by the EAA based on a recommendation of the Implementing Committee through the unanimous vote of all of the Parties to the FMA with the agreement of the Board of Directors of the EAA. (See *id.* §§ 4.5, 5.2.1, 7.7.5, ~~7.7.6~~, 7.11.4, 7.12.34.d., 7.14.45.a.). The amount of funding provided by the EAA for any particular year during the term of ITP is referred to as the “Annual Funding Obligation” which will correlate with the “Annual Program Budget.” (*Id.* §§ 1.1.4, 1.1.5, 4.5, 5.2.1).

¹ CPS Energy is actually a user of the Aquifer and holds groundwater withdrawal permits issued by the EAA, and, therefore, pays AMFs to the EAA. It is also a downstream surface water user.

**TABLE 8-1
CHANGED CIRCUMSTANCES AND RESPONSE MEASURES**

Changed Circumstance	Responsive Measures
Section 5.8.1).	
<p>Recharge Recovery PermitsContracts: The EAA issues-enters into a recharge recovery permitcontract(s) under the EAA Act (see Section 1.44) and its rules that causes the amount of actual annual pumping for a particular year or years to exceed the theoretical maximum modeled pumping used for modeling purposes (see Section 5.8.1).</p>	<p><i>Prior to the EAA's issuing-entering into any such recharge recovery permitcontract, the AMP will be used to determine what modifications, if any, are needed to the minimization and mitigation measures such that the anticipated levels of impacts in the event of a recurrence of the drought of record of record expected in this HCP will not be exceeded. If the AMP determines that no modifications to the minimization and mitigation measures are necessary, the EAA will report to the USFWS on the permit issuance in the annual report provided for in Section 9.3. If the AMP determines that modifications to the minimization and mitigation measures are necessary, the Applicants will implement any such modifications prior to EAA's issuing any recharge recovery permit.</i></p>
<p>Exempt wells: The EAA registers additional wells exempt from the permitting and metering and-reporting requirements under the EAA Act (see Section 1.33) that cause the amount of actual annual pumping for a particular year or years to exceed the theoretical maximum modeled pumping used for modeling purposes (see Section 5.8.1).</p>	<p><i>The AMP will be used to determine what modifications, if any, are needed to the minimization and mitigation measures such that the anticipated levels of impacts expected in this HCP and in the event of a recurrence of the drought of record will not be exceeded.</i></p>
<p>Financial Assurance for any Phase II Measure: Because of the uncertainty regarding whether the Phase II presumptive measure will be necessary and what additional costs, if any, there may be, no decision has been made regarding the sources of any additional funds.</p>	<p><i>If it is determined through the AMP that additional funds are required for Phase II that exceed the financial assurances made in Section 7.1.2 as limited by Sections 3.2 and 5.2.1 of the FMA, any necessary additional funding assurances will be provided promptly after that decision has been made.</i></p>
<p>Phase II presumptive measure: The the Phase II presumptive measure is unable to</p>	<p><i>The AMP will be used to alter the conservation measures outlined in Chapter 5 and/or</i></p>

**TABLE 8-1
CHANGED CIRCUMSTANCES AND RESPONSE MEASURES**

Changed Circumstance	<i>Responsive Measures</i>
function as expected within the stated assumptions.	<i>increased Stage V Critical Period Management reductions.</i> Thus, the commitment of the expanded use of the SAWS ASR defines the maximum obligation for funding of Phase II of the HCP under the No Surprises Rules.

8.1.2 Changed Circumstances Not Provided for in the HCP

If additional conservation and mitigation measures are deemed necessary to respond to changed circumstances and such measures were not provided for in the plan's operating conservation program, the USFWS "will not require any conservation and mitigation measures in addition to those provided for in the plan without the consent of the permittee, provided the plan is being properly implemented." (50 C.F.R. § 17.22(b)(5)(ii)).

All Covered Species are considered adequately addressed by this HCP for the purposes of the No Surprises Rule. Thus, changed circumstances not addressed in Section 8.1.1 shall be considered "changed circumstances not provided for in the plan" for the purposes of the No Surprises Rule. An example of a changed circumstance not provided for in the HCP includes:

- Invasion by exotic species and/or habitat-specific or species-specific disease that threaten Covered Species or their habitats and which cannot be effectively controlled by currently available methods or technologies or which cannot be effectively controlled without resulting in greater harm to other Covered Species than to the affected Covered Species.

8.2 Unforeseen Circumstances

USFWS defines the term "unforeseen circumstances" to mean "changes in circumstances affecting a species or geographic area covered by [the HCP] ... that could not reasonably have been anticipated by plan ... developers and the Service at the time of [the HCP's] negotiation and development, and that result in a substantial and adverse change in status of the covered species." (50 C.F.R. § 17.3). "In negotiating unforeseen circumstances, [USFWS] will not require the commitment of additional land, water, or financial compensation or additional restrictions on the use of land, water, or other natural resources beyond the level otherwise

agreed upon for the species covered by the conservation plan without the consent of the permittee.” (50 C.F.R. § 17.22(b)(5)(iii)(A); 50 C.F.R. § 17.32(b)(5)(iii)(A)).

When these unforeseen circumstances necessitate additional conservation and mitigation measures, USFWS “may require additional measures of the permittee[s] where the [HCP] is being properly implemented, but only if such measures are limited to modifications within the conserved habitat areas, if any, or to the [HCP’s] operating conservation program for the affected species, and maintain the original terms of the [HCP] to the maximum extent possible... .” (*Id.* at 17.22(b)(5)(iii)(BA); 17.32(b)(5)(iii)(B)). Any such additional measures “will not involve the commitment of additional land, water or financial compensation or additional restrictions on the use of land, water, or other natural resources ... without the consent of the permittee.” (*Id.*)

For the purposes of this HCP, “unforeseen circumstances” are any events not identified as a changed circumstance and specifically include:

- Natural catastrophic events such as fire, droughts worse than the drought of record² (or equivalent to the drought of record in duration and extent but occurring more than once during the 15-year term of ITP), hurricanes, tornados, severe wind or water erosion, flood events with a peak streamflow greater than 31,300 cfs, and landslides (including landslides, faulting, or alteration of the springs or aquifer as a result of earthquakes) of a magnitude exceeding that expected to occur during the term of the ITP.

Prior to making a determination regarding the occurrence of any unforeseen circumstances, the USFWS shall comply with the following procedure:

8.2.1 Notice to Applicants and Participants

The USFWS shall provide written notice to the Applicants together with a detailed statement of the facts regarding the unforeseen circumstance involved, the anticipated impact thereof on the Covered Species and its habitat, and all information and data that supports the allegation. In addition, the notice shall include any proposed conservation measure(s) that is believed would address the unforeseen circumstance, an estimate of the cost of implementing such conservation measure, and the likely effects upon (a) the Applicants and its permittees and (b) the existing plans and policies of any involved Federal or State agencies.

8.2.2 Response through the Adaptive Management Plan

The Applicants, in consultation with the USFWS, may choose to perform an expedited AMP analysis of the Covered Species or its habitat affected by the alleged unforeseen circumstance and to modify or redirect existing conservation measures to mitigate the effects of the unforeseen circumstance, within the scope of existing funded conservation actions. To the

² A drought is worse than the drought of record if the average recharge for any seven-year period less than 168,700 ac-ft. From 1950 through 1956, the average recharge was 168,700 ac-ft.

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3.3 FMA

Section 5.6. Uses of Funds in the HCP Program Account.

Except as provided in Subsection 5.6.1 with regard to certain costs incurred by the EAA in 2012, funds deposited in the HCP Program Account may be used only for Program Expenditures as described in this Section that have been approved in the Annual Program Budget.

5.6.1. Use of Funds in 2012.

Funds may be used for Program Administration Costs incurred by the EAA from the Effective Date through December 31, 2012, up to the total amount of \$375,000.

5.6.2. Costs of Conservation Measures.

Funds may be used for the costs of implementation of the Conservation Measures.

5.6.3. AMP Costs.

Funds may be used for the costs of the AMP described in Article Seven, including activities described in Chapter 6 of the HCP.

5.6.4. Federal Program Participation Costs.

Funds may be used for the costs of qualification for participation in any federal program that may provide funding for the Program.

5.6.5.1 Limitations on Use of Funds - Employees and Administrative Costs.

With the exception of Program Administration Costs of the EAA, funds may not be used for: (a) costs of any Party's employees; or (b) any Party's administrative costs, such as costs of overhead, management, administration, research, planning, engineering, or legal

services, or any other ancillary costs that are not directly required for the Program.

5.6.5.2 Special Exception

Notwithstanding anything in Section 5.6.5.1(a), an employee of Texas State University may submit a proposal for consideration and may be awarded a contract for work associated with the implementation of a Conservation Measure in Chapter 5 or Program activity in Chapter 6 of the HCP assigned to any Party in an approved Work Plan and Funding Application as long as each of the following conditions are met:

(a) The costs for the measures are not used to fund an increase in Texas State's permanent Staff or for work that is historically operational in nature;

(b) The contract for the project has been awarded through a competitive procurement process that considers cost, contractor qualifications, and merits of the contractor's proposal, and through which the selected contractor's proposal was determined to be competitive with respect to each of these criteria; and

(c) After the contractor has been selected, the EAA will issue those contracts for which Texas State or the City of San Marcos is responsible under which a Texas State Employee will be paid, and the HCP Program Manager will manage those contracts.

5.6.5.3 Conduct of Texas State Contactor/Employees.

Any employee of Texas State who is paid from HCP Funds shall:

(a) Give first priority to the purposes and goals of the HCP as reflected by the entire Implementing Committee over the individual purposes and goals of the employee's employer;

(b) Conduct his or her work and communications in an open and transparent manner and in a manner that avoids a conflict of interest or the appearance of a conflict of interest;

(c) Not use the employee's Party's status as a member of the Implementing Committee or information that is not publicly available to obtain an advantage in the procurement process; and

(d) Not advocate, directly or indirectly, a particular decision or participate in discussions of policy matters unless expressly requested to participate by the Program Manager and the Implementing Committee. Nothing herein precludes the employee, when requested by the Implementing Committee, from discussing scientific data and conclusions with the Science Review Panel and Science Committee.

Failure to strictly comply with the requirements of Section 5.6.5.3 may be the basis for the termination of the Special Exception with respect to future contracts involving that employee or, if the non-compliance warrants, a recommendation to terminate the employee's participation in an existing contract. In any vote of the Implementing Committee with regard to such recommendation of termination, Texas State shall abstain, and a decision to terminate must be unanimous among the remaining four voting members of the Implementing Committee.

5.6.6. Limitations on Use of Funds – MS4 Permit Costs.

Funds may not be used for the cost of measures required to be undertaken by any Party in order to obtain a Small Municipal Separate Storm Sewer System (MS4) permit under the Texas Pollution Discharge Elimination System Program as required by the Texas Commission on Environmental Quality (TCEQ) or the laws of the State of Texas. However, funds may be used for the cost of measures and activities included in a MS4 program to the extent that they implement Conservation Measures which exceed minimum requirements for obtaining the MS4 permit.

Article Six – Applications for Program Funding

Section 6.1. Applications from a Party for Program Funding.

A Program Funding Application from a Party to the EAA to implement a Conservation Measure or other Program activity which it is the duty of the Party to implement may be made and will be considered for approval by the EAA only as provided in this Article.

6.1.1. Required Contents.

The Program Funding Application will be filed in writing in affidavit form and include the following information:

- a. the name and contact information of the applicant and its principal offices;
- b. a resolution of the applicant representing that the filing of the application has been duly authorized by the governing body or other appropriate official of the applicant;

Committee will have one vote towards consensus until participation is resigned, or forfeited by absence from three consecutive meetings. A quorum for any meeting of the Science Committee will be three-fourths of the total number of members for whom the Program Manager has received the notification of acceptance described in Subsection 7.9.1.b. The Science Committee will elect a chair person and a vice chair and adopt procedures to govern its activities.

7.9.6. EAA Funding.

The EAA, after consulting with the Implementing Committee, may enter into contracts with members of the Science Committee as, in the judgment of the EAA, are necessary and reasonable to secure the members' services.

Section 7.10. Creation of the Science Review Panel.

Not later than December 31, 2013, the EAA will enter into a contract with the National Academies of the National Academy of Science to establish an independent Science Review Panel (SRP), select its members, and undertake the ongoing role of overseeing the SRP activities. If the National Academies declines to enter into a contract that is reasonable in the judgment of the Implementing Committee, the Program Manager will consult with the Implementing Committee and the Stakeholder Committee in order to develop a consensus recommendation to the EAA on another comparable organization to select, and contract to fulfill that role. The Implementing Committee, in its discretion and after receiving the recommendation of the Stakeholder Committee, may recommend to the EAA that it contract with one organization for selection of SRP members, and contract with another organization for the ongoing role of overseeing SRP activities.

7.10.1. Membership of the Science Review Panel.

The SRP will have ~~five~~twelve (12) to fifteen (15) members, chosen on the basis of their expertise in the scientific areas most relevant to resolution of issues expected to arise in

the AMP. The members need not have specific knowledge about the Covered Species or the Edwards Aquifer and must not have pre-conceived positions on the appropriate resolution of the issues expected to be presented to the SRP.

7.10.2. Meetings of the Science Review Panel.

From the time that the SRP is established until determinations have been made under Subsection 7.13.7, the SRP will meet ~~quarterly~~ on an as needed basis at various locations within the jurisdiction of the EAA. After determinations under Subsection 7.13.7 have been made, the Program Manager will request the SRP to meet on an as-needed basis for the remainder of the Permit Term. To the maximum extent practicable, such meetings will be open to the public and will be recorded, with the recordings included in the administrative record. As part of its meetings, the SRP is expected to tour various sites and facilities in order to obtain first-hand knowledge and insights about key issues and challenges to be addressed through the AMP. Such tours need not be recorded or open to the public.

7.10.3. Role of the Science Review Panel.

The SRP will serve as a formal review body as requested by the Program Manager to provide scientific advice to the Program Manager, Implementing Committee, Stakeholder Committee, and Science Committee on issues related to the AMP. The SRP will provide ongoing comments on the modeling, studies, and data collection and analyses performed pursuant to the HCP. The SRP will provide resolution of major scientific issues involved in the HCP and the AMP (including without limitation, changes to a Biological Goal or Biological Objective), and, upon request by the Project Manager, will definitively determine if the Scientific Record establishes each of the conclusions required in Subsection 7.13.7 and explain its determinations.

Section 7.11. Procedures for Routine AMP Decisions.

Routine AMP Decisions will be made in accordance with the procedures stated in this Section.

EACHP PROGRAM DOCUMENTS ADDENDUM

REFERENCES CITED

- Alan Plumber Associates, Inc. 2017. Edwards Aquifer Habitat Conservation Plan Impervious Cover and Water Quality Protection – 5.7.6 Water Quality Protection Plan: Phase I.
- BIO-WEST, I., & Watershed Systems Group, I. (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.
- John Gleason LLC. 2017. Water Quality Protection Plan for the City of San Marcos and Texas State University. Prepared for the City of San Marcos.
- EARIP. (2012a). *Edwards Aquifer Recovery Implementation Program Habitat Conservation Plan*.
- EARIP. (2012b). *Funding and Management Agreement...to Fund and Manage the Habitat Conservation Plan for the Edwards Aquifer Recovery Implementation Program*.

EACHP PROGRAM DOCUMENTS ADDENDUM

ADDENDUM APPENDIX

Note: The appendices to follow include EAHCP Adaptive Management Reports (i.e., Nonroutine Adaptive Management Proposals, Nonroutine Adaptive Management Scientific Evaluation Reports, and Stakeholder Committee Reports) and associated correspondence. Each appendix was referenced in the description of EAHCP amendments presented in this report. The appendices to follow do not include the attachments or exhibits to letters and correspondence when those attachments are already included as appendices here.



IMPLEMENTING COMMITTEE MEETING MINUTES

June 19, 2014

1. **Call to order--Establish that all Committee members are present or represented-** 9:10 a.m.
In attendance were: Tom Taggart (Chair), City of San Marcos; Chuck Ahrens, San Antonio Water System (SAWS), Juan Guerra represented Texas State University for Andy Samson; Steve Ramsey, City of New Braunfels; Roland Ruiz, Edwards Aquifer Authority (EAA); and Todd Votteler, Guadalupe-Blanco River Authority.
2. **Public Comment.**
No comment.
3. **Approval of minutes from the May 29, 2014 Implementing Committee meeting.**
Chuck Ahrens requested removing the word "that" from item 8 on page 3. With that change, Chuck Ahrens motioned for approval of the May 29, 2014 minutes. Juan Guerra 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.**
 - **River and Index Well Levels.**
Nathan Pence provided the Implementing Committee with current aquifer levels and springflows. The committee discussed the differences in current agricultural activities and also discussed the good condition of the habitat as reported in Bio-West's biological monitoring reports.
 - **May Expense Report.**
No questions on the May budget.
 - **Update on City of New Braunfels Flow-Split Infrastructure Installation.**
Nathan Pence gave a presentation to the committee about progress in New Braunfels' Flow-Split Management Project.
 - **Applied Research RFP Process.**
EAA General Manager Roland Ruiz provided a presentation to the committee about the process for the 2015 Applied Research request for proposals (RFPs). Specifically, he stated that EAA decided not allow Science Committee members to propose in future research projects. Discussion followed.
 - **Stakeholder ASR/VISPO Work Group.**
The first meeting of this Work Group was on June 17, 2014 where the Work Group approved their charge and schedule for future meetings.
 - **ASR update.**
Julia Velez gave a presentation about current enrollment. The acquisition for 2014 leases has stopped.
5. **Staff Presentation: VISPO update.**
Nathan Pence provided information about VISPO numbers and an update on how these numbers are represented in the monthly agenda update. Discussion followed.

6. Consider approval of the 2014 Drought Outreach Press Packet.

John Boggess with Boggess Communications presented the committee with an overview of the Drought Outreach Work Group's Press Packet. The Committee members commented on the clarity and utility of this press packet. Chuck Ahrens recommended removing the language regarding Provision M's waiver/variance. Roland Ruiz moved to approve with the changes recommended. Steve Ramsey seconded. There were no objections.

7. Staff Presentation: ITP Provision M

Nathan Pence presented a detailed explanation of the origins of Provision M from the Incidental Take Permit (ITP) and the issues and potential changes the Implementing Committee could propose.

A discussion followed on the rationale for last year's precedent of approving a waiver/variance request in 2013. There was a decision to request further documentation about the rationale for Provision M as well as request for the United States Fish and Wildlife Service (USFWS) to attend the next Implementing Committee meeting. Discussion followed. The Committee asked for a clear record of current and future conditions of the restoration projects and requested future communication with the USFWS include documentation of the communication.

Roland Ruiz proposed an option to simply add language to the current Provision to include a waiver/variance process. The Committee requested the Science Committee provide an opinion, supported by literature on the systems, on a rationale for a more realistic trigger. Nathan Pence listed the detailed steps for staff regarding Provision M clarification. Additionally, any endorsement or recommendation from the Science Committee on July 9th will be placed on the agenda to help define the steps for moving forward. Nathan Pence stated he will draft an email for Committee review requesting information needed from USFWS.

8. Consider approval of the New Braunfels Low Impact Development Program.

Zac Martin with the City of New Braunfels provided the Committee with some additional edits to the 2015 City of New Braunfels Work Plan concerning the New Braunfels Low Impact Development (LID) program. He stated discussions with SAWS provided more clarity about the details of the separation of the City's Municipal Separate Stormwater Sewer Systems (MS4) and LID programs. Chuck Ahrens moved for approval for the New Braunfels LID program. Roland Ruiz seconded. There were no objections.

9. Consider approval of all 2015 EAHCP Work Plans.

Alicia Reinmund-Martinez presented the process and timeline for approval of the 2015 Work Plans. The packet provided to the committee included the changes to the work plans previously presented. Nathan Pence provided additional detail on the specific comments received. Discussion followed.

Chuck Ahrens commented on the addition of quantifiable acre-foot goals to the Regional Water Conservation Program (RWCP) Work Plan. He added the focus of the RWCP should not include finding other sources of water but rather on using current sources more efficiently. Discussion followed.

Juan Guerra motioned for the approval of all EAHCP Work Plans with the condition the RWCP Work Plan be edited per recommendations from a subcommittee comprised of EAA and SAWS. Chuck Ahrens seconded. There were no objections.

Break

After the break Roland Ruiz and Chuck Ahrens asked the committee to reconsider the former motion and move to approve all Work Plans, including the RWCP with the following edits: strike

performance measure #7 and keep performance measure #8. Juan Guerra made a motion for final approval; Chuck Ahrens seconded the motion. There were no objections.

10. Consider and take possible action on the creation of and charge for a Science Committee Member Nomination Work Group.

Alicia Reinmund-Martinez provided information about the former Science Committee Appointment Work Group. She asked the Committee to consider adopting the former Work Group's charge and revise its membership in order to solicit recommendations and provide nominations for this year's Science Committee appointment. The Committee recommended replacing Patrick Shriver (SAWS) with John Waugh (SAWS) and replacing Myron Hess (National Wildlife Federation) with Tyson Broad (Sierra Club).

Tom Taggart motioned for approval of new membership and proposed charge. Steve Ramsey seconded the motion. There were no objections.

11. SWIFT Money- Region L.

Alicia Reinmund-Martinez presented information on the TWDB's State Water Implementation Fund for Texas (SWIFT) compiled for the Committee's review. Program manager, Nathan Pence explained since this program is a loan program, it is not specifically applicable for the EAHCP but may be useful for communities participating in the Regional Water Conservation Program.

12. Probability analysis of future recharge.

EAA staff Jim Winterle presented his probability analysis for future Edwards Aquifer recharge as requested by the Implementing Committee. Tom Taggart mentioned that USFWS could use this information to give them an idea of the probability of triggering Provision M.

13. Presentation of legal implications of 7.1 and budget forecast

Darcy Frownfelter gave a legal background on the EAHCP budget table "Table 7.1" and Nathan Pence presented the modified version of table 7.1, titled "7.2."

14. Consider future meetings, dates, locations, and agendas.

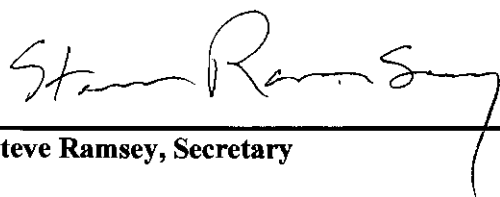
- The next Implementing Committee Meeting is scheduled for July 17th at the Edwards Aquifer Authority.
 - Information distribution process to Implementing Committee and Stakeholder Committee.
 - USFWS to provide additional information about Provision M
 - Implementing Committee's approval of a Texas State University application for United States Department of Agriculture (USDA) funding to study crops in the Uvalde area.

15. Questions from the public.

No comment.

16. Adjourn.

12:38 p.m.



Steve Ramsey, Secretary

Exhibit 6 - Implementing Committee Meeting - 8/21/14 Minutes
EAHCP STAFF

September 12, 2014



MEETING MINUTES
Available at eahcp.org

Thursday, August 21, 2014, 1:00 p.m., at the New Braunfels Civic Center

1. **Call to order - Establish that all Committee members are present or represented-1:04 p.m.**
In attendance were: Tom Taggart (Chair), City of San Marcos; Chuck Ahrens, San Antonio Water System, Juan Guerra represented Texas State University for Andy Samson; Steve Ramsey, City of New Braunfels; Roland Ruiz, Edwards Aquifer Authority; and Todd Votteler, Guadalupe-Blanco River Authority.
2. **Public Comment.**
No comment.
3. **Approval of minutes from the June 19, 2014 Implementing Committee meeting.**
Chuck Ahrens moved to approve the June 19, 2014 minutes. Roland Ruiz seconded. There were no objections.
4. **Receive report from the Program Manager on general topics related to the implementation of the Edwards Aquifer Habitat Conservation Plan (EAHCP) and operation of the Implementing Committee.**
Nathan Pence, Program Manager, began with an update describing how EAA is in the process of modeling the benefits of the Edwards Aquifer Habitat Conservation Plan. EAA will present to the Implementing Committee the results of the model as soon as possible.
 - **River and Index Well Levels.**
Nathan Pence provided the Implementing Committee with current aquifer levels and springflow conditions. There was no discussion.
 - **J-17 Forecast.**
Nathan Pence briefly presented EAA's forecast for the remainder of 2014 for the J-17 San Antonio pool index well. Three forecasts were presented. There was no discussion.
 - **Aquifer Storage and Recovery (ASR) and Voluntary Irrigation Suspension Program Option (VISPO) updates.**
EAA staff, Rick Illgner, gave an update on VISPO and presented a positive outlook on 2014 enrollment. Julia Velez, from San Antonio River Authority presented the updated ASR acquisition numbers.

EAHCP STAFF

September 12, 2014

- **June and July Expense Report.**
EAA staff, Shelly Hendrix presented the EAHCP June and July expense reports. There was no discussion.
- **EAHCP Reserve Projection.**
Shelly Hendrix also gave a presentation on the EAHCP budget reserve projection. Her report included what it would look like if the trigger¹ for the VISPO Implementation payments is or is not reached.
- **Refugia Research update.**
Nathan Pence presented an update on what is currently underway in the Request for Proposals (RFP) process for Refugia Research. Mr. Pence discussed the importance of the program to stay in compliance with the Incidental Take Permit (ITP). Roland Ruiz discussed the current request from the Texas Attorney General on an opinion on EAA's contract with U.S. Fish and Wildlife Service (USFWS) on Refugia.
- **Tour of spring systems.**
Nathan Pence discussed the idea of a tour of the spring systems for all committees on September 18 – the next scheduled meeting of the Implementing Committee meeting. The Committee expressed a general consensus on the benefit of a systems tour, but was hesitant to replace a September meeting if current springflow conditions continue. The Committee agreed to an abbreviated official agenda on September 18 following the systems tour.

5. Presentation and discussion pertaining to Provision M of the Incidental Take Permit (ITP) by USFWS.

Kevin Connally, of the USFWS, gave a presentation on the details and rationale behind the threshold springflows defined in Condition M of the Incidental Take Permit. Condition M was meant to reduce the harm to the species during low springflow conditions. He stated the condition was never meant to be a "whole-sale" stop of all activities. For example the removal of vegetation mats on the surface of Texas Wild Rice, should not stop because this activity provides a benefit to the species at all flows. He stated a clarification can be constructed to identify the proper interpretation of what activities can continue at reduced springflows.

6. Discussion and possible action pertaining to Provision M.

Mr. Pence identified the committee could direct him to coordinate with USFWS to construct language for a clarification of Condition/Provision M to be presented and approved by the Implementing Committee before submitted.

Steve Ramsey moved to direct Nathan Pence to coordinate with USFWS in constructing a clarification letter on Provision M of the ITP. Juan Guerra seconded. There were no objections.

¹ If the water level at the J-17 index well in San Antonio is at or below 635 feet on October 1, EAA will notify VISPO program participants to suspend the use of the enrolled water for the following year, resulting in EAA's payment to participants for their temporary suspension of pumping.

EAHCP STAFF

September 12, 2014

7. Presentation of the Stakeholder Committee ASR/VISPO Work Group recommendations and possible action to approve suite of recommendations provided to be considered and implemented by the EAA.

Myron Hess, chair of the Stakeholder Committee ASR/VISPO Work Group, presented the Work Group's Recommendations Report which had been approved by the Stakeholder Committee for recommendation to the Implementing Committee.

The Implementing Committee discussed the EAA conducting further investigation of all recommendations represented in the Work Group's report and coordinating with SAWS to analyze specific details when necessary. The Committee further discussed that when proper investigation and analysis is complete, EAA will present to the Implementing Committee, the final recommendations with implementation details, including market analysis, via a Work Plan, budget, or informational report. Tom Taggart suggested some of the recommendations be brought back to the Implementing Committee sooner rather than later.

The Implementing Committee decided to make approval for each recommendation one- by- one:

- *ASR Recommendation #1: July-November Lease Option – when SAWS is in Recovery.* Committee approved for further investigation. There were no objections.
- *ASR Recommendation #2: July-November Lease Option – when SAWS is Injecting.* Committee approved for further investigation. There were no objections.
- *ASR Recommendation #3: Pooling Un-Pumped Withdrawal Rights.* Committee approved for further investigation. There were no objections.
- *ASR Recommendation #4: Long term Lease Escalator.* Committee approved for further investigation. There were no objections.
The Committee discussed the intent of this recommendation was to provide a more attractive leasing option for ground water rights holders. The Committee discussed the option of raising payment rates to allow flexibility with the market rather than locking the program in an automatic price escalator.
- *ASR Recommendation #5: Implementation of Additional Tiers Beyond Tier 1.* Committee approved for further investigation. There were no objections
- *ASR Recommendation #6: Compensation Alternatives and Tax Deductions.* Committee approved for further investigation. There were no objections.
- *VISPO Recommendation #1: Distribution of a VISPO Marketing Message.* Committee approved with no further investigation needed. There were no objections.
- *VISPO Recommendation #2: Extend VISPO Enrollment Past October 1, if VISPO Triggers.* Committee approved for further investigation. There were no objections.
- *VISPO Recommendation #3: Compensation Alternatives and Tax Deductions.* Committee approved for further investigation. There were no objections.

EAHCP STAFF

September 12, 2014

8. Presentation from the Science Committee Nomination Work Group for possible action to approve the recommended candidate for the Science Committee.

Tyson Broad, Science Committee Nomination Work Group member, presented the Work Group's recommendation of Dr. Conrad Lamon as the replacement for the ecological modeling specialist for the EAHCP Science Committee. Roland Ruiz motioned approval of the Work Group's recommendation. Chuck Ahrens seconded. There were no objections.

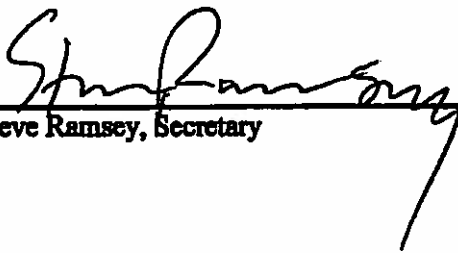
9. Consider future meetings, dates, locations, and agendas.

The next Implementing Committee Meeting is scheduled for Thursday, September 18 at Landa Haus after the tour of the spring systems. Possible agenda items include the 2015 meeting dates and Provision M clarification. Additionally, Nathan Pence mentioned the upcoming National Academy of Sciences report and it will be analyzed and developed.

10. Questions from the public.

Dianne Wassenich mentioned to the Implementing Committee about the consideration of constructing a Regional Water Conservation Program Work Group.

11. Adjourn- 2:28 p.m.



Steve Ramsey, Secretary

**MEETING MINUTES****September 18, 2014**Available at eahcp.org

1. **Call to order - Establish that all Committee members are present. - 3:00 p.m.**
In attendance were: Tom Taggart (Chair), City of San Marcos; Chuck Ahrens, San Antonio Water System (SAWS); Steve Ramsey, City of New Braunfels; Roland Ruiz, Edwards Aquifer Authority (EAA); Andy Samson, Texas State University and Todd Votteler, Guadalupe-Blanco River Authority (GBRA).
2. **Public Comment**
Tyson Broad, Lone Star Chapter of the Sierra Club, made a comment to thank EAA for the coordination of the systems tour. He also mentioned the need to communicate specific information about Landa Lake and current conditions in the Comal System, specifically the ongoing construction around sensitive habitat. Tim Lookingbill, a member of the community, made specific comments about the importance of a study pertaining to Comal system turbidity.
3. **Approval of minutes from the August 21, 2014 Implementing Committee meeting**
Andy Sansom motioned for approval. Chuck Ahrens seconded. There was no objection.
4. **Receive report from the Program Manager on general topics related to the implementation of the Edwards Aquifer Habitat Conservation Plan (EAHCP) and operation of the Implementing Committee.**
 - **ASR/VISPO Update**
Nathan Pence, Program Manager, presented the current numbers of the ASR program. Rick Illgner, EAA Staff, gave updated figures of VISPO enrollment. The expected number for VISPO enrollment to be presented next month will exceed 35,000 acre-feet out of the 40,000 acre-foot goal.
 - **ASR/VISPO Work Group Implementation Update**
Mr. Pence mentioned status of coordination between EAA Staff and SAWS.
 - **Budget Update**
Mr. Pence opened the floor to any question about the budget. No comments were made.
 - **Annual Report Process**
Alicia Reinmund-Martinez, EAHCP Director, introduced this year's contractor for the drafting of the 2014 Annual Report, Blanton and Associates. She also presented the current timeline of all deliverables. No comments were made.
 - **Funding Application Submittal**

Mr. Pence mentioned that the 2015 funding applications from the permittees are due on October 1st.

- **Update Benefits of Edwards Aquifer Programs**

Roland Ruiz, EAA General Manager, presented an update on a report being prepared by EAA that will attempt to quantify the general benefits of all Edwards Aquifer Authority's EAHCP programs. This report is expected to be presented at the October Implementing Committee meeting.

- **Additional updates**

Mr. Pence mentioned the recent conference in Kansas City where he and several other integral members of the EAHCP planning and implementation process had presented and participated in a panel discussion about successes and challenges of the EAHCP.

In anticipation of the storm-event on September 17th SWCA, the consultant hired to perform the monitoring for the HCP this year, was mobilized. The group demobilized because rains never came, and missed a large water quality sampling opportunity when the storm developed in the early morning hours.

It was reported HDR has been contracted to ensure that all EAHCP activities are properly covered and permitted with the appropriate entities. A general summary of this effort will be brought back to the committee at a later date.

5. Presentation of and possible approval authorizing the EAHCP Program Manager to submit a Clarification to Condition M of the Incidental Take Permit to the USFWS.

Mr. Pence summarized past conversations the Implementing Committee has had with staff and USFWS about the draft Clarification of Condition M. Discussion followed.

Mr. Pence summarized the content of the letter and mentioned a section of the table found in Exhibit 1, which described the boating activities in Spring Lake, which needed to be changed to read "no further details needed." Andy Sansom motioned to approve the Clarification of Condition M with the text change. Steve Ramsey seconded. There was no objection.

6. Consider creation of a Regional Water Conservation Program (RWCP) Work Group, possible appointment of members and approval of draft Work Group Charge.

Mr. Pence explained the rationale for creating the RWCP Work Group and how the draft of the Work Group Charge reads. Additionally, the proposed membership for this Work Group was presented to the committee as well. Roland Ruiz asked how staff will go about replacing any members proposed that are not willing to participate. Mr. Pence described some back-up individuals that could be considered if the others are not willing to serve.

Mr. Pence described this action item will require: a motion to approve creation of the Work Group, a motion to approve the charge, and a motion to approve the membership as presented.

Mr. Pence read off the names found in the Draft Work Group Charge: Possible members could include the following: an EAA representative (*Rick Illgner*), a Large Municipality representative (*Karen Guz, SAWS*), Small Municipality representatives (*Joe Cardeñas, City*

of Uvalde, if Mr. Cardenas cannot participate, EAHCP staff will contact representatives from Universal City, Avery Lunsford, or Randy Luensmann, for a small municipality), an Environmental Group representative (*Dianne Wassenich*), an Industrial representative (*Dr. Richard Szecsy*, Texas Aggregate and Concrete Association), an at-large representative (*Dr. Dante Fenolio* - San Antonio Zoo) and a representative from another non-profit organization (*Tyson Broad* - Sierra Club). If any of those presented are not willing to participate, new possible members will be brought back for committee consideration.

After committee discussion Tom Taggart proposed to include Colette Barron-Bradsby, Texas Parks and Wildlife, in the Work Group, and Todd Votteler proposed to add Charlie Hickman, Guadalupe-Blanco River Authority.

Roland Ruiz motioned to approve. Tom Taggart seconded. There was no objection.

7. Discussion pertaining to the spring systems tour.

Mr. Pence presented the current Index Wells and Springflow measurements.

The committee had a discussion pertaining to the Systems Tour conducted throughout the day. Tom Taggart mentioned the potential benefits an annual systems tour could have on committee perspective and community involvement. Steve Ramsey discussed how clear it is that some restoration activities that have been stopped should be continued, specifically vegetation mat removal. Discussion followed.

8. Consider future meetings, dates, locations, and agendas.

- The next Implementing Committee Meeting is scheduled for October 16th at the Edwards Aquifer Authority. The Committee discussed the need to change the meeting date for October. Staff will be providing proposed dates soon.

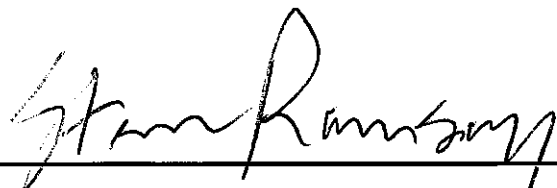
Some agenda items to consider:

- Summary of benefits of the EAA EAHCP programs
- Drought outlook
- VISPO Trigger discussion.

9. Questions from the public

Steve Ramsey moved to adjourn. Andy Sansom seconded. There was no objection.

10. Adjourn-3:40 pm



Steve Ramsey, Secretary



September 23, 2014

Mr. Adam Zerrenner
United States Fish and Wildlife Services
Austin Ecological Services Field Office
107011 Burnet Road, Suite 200
Austin, Texas 78758

RE: Clarification of Condition M of the Incidental Take Permit #TE-63663A-0

On behalf of the Edwards Aquifer Authority, the City of New Braunfels, the City of San Marcos, the San Antonio Water System, and Texas State University, (the Permittees), I am seeking a Clarification on our interpretation of Condition M in the Incidental Take Permit (ITP) #TE-63663A-0. The Permittees do not wish to change the substance of Condition M, but wish to seek clarification on Condition M, paragraphs 1.b and 2.b, in order for the Permittees to implement habitat restoration and riparian restoration activities during reduced flows while maintaining compliance with the conditions in the ITP.

In general, the Permittees seek your response on their interpretation of Condition M as it applies to habitat mitigation and restoration activities as identified in Chapter 5 of the Edwards Aquifer Habitat Conservation Plan (EAHCP). Currently, the Permittees have suspended implementing all habitat mitigation and restoration activities. Exhibit 1 includes the details of the Permittees' interpretation of Condition M.

To ensure transparency in the implementation of the EAHCP, the Implementing Committee¹ provided the public the opportunity to comment on the clarification of Condition M during its June 19, 2014, August 21, 2014 and September 18, 2014 meetings. The agendas from these meetings are included as Exhibits 2, 3 and 4 and the minutes from the meetings are included as Exhibits 5, 6 and 7.

The Implementing Committee also requested input to the Clarification from the EAHCP Science Committee to help clarify the issues with Condition M. At their August 6, 2014 meeting, the Science Committee discussed and considered the intent of Condition M and endorsed the need for a clarification of Condition M. Additionally, the Science Committee recommended what and how

¹ The Implementing Committee is comprised of the five Permittees as voting members and the Guadalupe-Blanco River Authority as a non-voting member.

specific habitat mitigation and restoration activities should be continued during reduced flows, while maintaining compliance with Condition M. I have included all of the Science Committee's input in Exhibit 1. The agenda and minutes from the August 6, 2014 Science Committee meeting are included as Exhibits 8 and 9.

Finally, the Implementing Committee acknowledges the numerous conversations and meetings the U.S. Fish and Wildlife Service (USFWS) had with the Permittees where Condition M was discussed. The Committee would also like to thank Mr. Kevin Connally for his attendance at their August 21, 2014 meeting.

The reduced springflows in both the Comal and San Marcos systems for several weeks calls attention to the need for clarifying Condition M of the ITP. With this said, the Implementing Committee and I believe this letter and its exhibits clarifies our interpretation of Condition M as it relates to the implementation of habitat mitigation and restoration activities during reduced flows. We appreciate your consideration and response on this issue.

Respectfully,



Nathan Pence
Program Manager
Edwards Aquifer Habitat Conservation Plan

cc: EAHCP Implementing Committee

Exhibit 1: Clarification of ITP# TE-63663A-0 Condition M

The Permittees understand the USFWS's need to include reasonable and prudent measures, such as Condition M, to minimize the incidental take of the covered species. However, based on our numerous discussions with USFWS biologists who advised us that the intent of Condition M was to ensure the Covered Species were protected especially during reduced flows, the Permittees offer the following Clarification of Condition M that specifies which habitat mitigation and restoration activities should not be suspended, but should continue at reduced flows in order to protect the Covered Species.

The Permittees interpret that the following specific habitat mitigation and restoration activities will either not disturb the substrate, water quality, plants, and animals or invertebrates, or will reduce the amount of disturbance when it is unavoidable to the substrate, water quality, plants, and animals or invertebrates. The tables below separate the Clarification by each Springs system.

Comal Springs System

For the Comal Springs system, the Permittees provide the following details on our interpretation of Condition M, which include those habitat mitigation and restoration activities, specifically designed to benefit the Covered Species during reduced flows and that may continue at all flows.

Comal Springs Conservation Measure	Interpretation	Specific activities that may continue at all flows.
Management of river flow between old and new channels of the Comal River (Section 5.2.1)	The actual management of the flow that is split between the New Channel and the Old Channel is designed to minimize and mitigate the impacts of incidental take in reduced flow conditions.	Manipulation of gates in accordance with the City of New Braunfels flow-split system standard operating procedures to be in accordance with EAHCP Table 5.3.
Restoration and maintenance of native aquatic vegetation (Section 5.2.2)	Maintenance of native aquatic vegetation includes gardening to increase preferred fountain darter habitat during reduced flow conditions.	Gardening, such as removal of non-native vegetation, in previously restored areas such as in the Old Channel and Landa Lake. Extra precautions, such as minimizing the number of gardeners in water, working from downstream to upstream and not tilling the substrate to remove vegetation will be employed to reduce disturbance of sediment.

Comal Springs Conservation Measure	Interpretation	Specific activities that may continue at all flows.
Management of public recreational use (Section 5.2.3)	Continuing management of public recreation areas assures minimal impact and disturbance from recreational users.	Printing and distribution of educational materials, signage, and workshops.
Removal of decaying vegetation and dissolved oxygen management (Section 5.2.4)	The removal of the vegetative mats and the implementation of a dissolved oxygen management program helps to maintain healthy, preferred fountain darter habitat during reduced flows.	Gardening, such as the removal of decaying vegetation by working from a flat-bottom boat or kayak when practical, minimizing the number of workers in the water and working upstream to downstream to limit increased disturbance, such as pushing floating vegetative mats downstream. When Comal springflows drop below 80 cfs, the City of New Braunfels will deploy artificial aerators.
Management of harmful non-native animal species (Sections 5.2.5 and 5.2.9)	Low flow conditions reduce the area that non-native fish have, making it easier to spear or net them. Greater numbers will be removed from the system at a time when they are most likely to cause damage.	Spear and bow fishing of non-native animals from bank, flat-bottom boat, or barge.
Prohibition of hazardous material transport (Section 5.2.7)	Not conducted in the aquatic ecosystem.	No further detail needed.
Live bait prohibition (Section 5.2.9)	Not conducted in the aquatic ecosystem.	No further detail needed.
Litter collection and floating vegetation management (Section 5.2.10)	The removal of litter and removal of floating vegetation management has a positive effect on the system by helping to maintain habitat with a very limited impact on the substrate.	Removal of floating vegetation and litter by working from a barge, flat-bottom boat or kayak when practical, with a minimum number of workers in the water that limits increased disturbance, such as pushing floating vegetative mats downstream. All areas for maintenance will be represented in vegetation maps.

Comal Springs Conservation Measure	Interpretation	Specific activities that may continue at all flows.
Management of golf course diversions and operations (Section 5.2.11)	Continued planning and management of the Golf Course assures minimal impact or disturbance of the aquatic ecosystem.	No further detail needed.
Management of household hazardous wastes (Section 5.7.5)	Management of household, hazardous wastes is a terrestrial activity.	No further detail needed.

San Marcos Springs System

For the San Marcos Springs system, the Permittees provide the following details on our interpretation of Condition M, which include those habitat mitigation and restoration activities, specifically designed to benefit the Covered Species during reduced flows and that may continue at all flows.

San Marcos Springs Conservation Measure	Interpretation	Specific activities that may continue at all flows.
Enhancement and restoration of Texas Wild Rice (Sections 5.3.1 and 5.4.1)	Suspending gardening and maintenance of restored areas will allow non-native plants to regrow, negating the work already done.	Gardening, such as the removal of non-native plant regrowth, in previously restored areas, Sewell and City Park, in a manner that limits increased disturbance.
Management of public recreational use (Sections 5.3.2 and 5.4.2)	Continuing management of public recreation areas assures minimal impact and disturbance from recreational users.	University students are trained to assist the public, increase the awareness of the issues.
Management of aquatic vegetation and litter below Sewell Park (Section 5.3.3 and 5.4.3)	The removal of litter and removal of floating vegetation management has a positive effect on the system by helping to maintain habitat with a very limited impact on the substrate.	Removal of floating vegetation and litter by working from a barge, flat-bottom boat or kayak when practical, with a minimum number of workers in the water to limit increased disturbance, such as pushing floating vegetative mats downstream. All areas for maintenance will be represented on vegetation maps.
Prohibition of hazardous materials transport (Section 5.3.4)	Management of household, hazardous wastes is a terrestrial activity	No further detail needed.

San Marcos Springs Conservation Measure	Interpretation	Specific activities that may continue at all flows.
Reduction of non-native species introduction (Section 5.3.5 and 5.4.11)	Not conducted in the aquatic ecosystem.	No further detail needed.
Management of non-native plant species (Sections 5.3.8 and 5.4.12)	Removal of non-native plants is more efficient during low flows. Suspending this activity will allow non-native plants to regrow, negating work already done.	Gardening, such as removing one-meter sections adjacent to restored Texas Wild Rice stands from Spring Lake to Ramon Lucio park. All areas for maintenance will be represented on vegetation maps.
Management of harmful non-native and predator species (Sections 5.3.9 and 5.4.13)	Low flow conditions reduce the area that non-native fish have, making it easier to spear or net them. Greater numbers will be removed from the system at a time when they are most likely to cause damage.	Bow fishing of non-native animals from shore or flat-bottom boats. Spear fishing will be done in the water.
Research programs in Spring Lake (Section 5.4.8)	Continuing review and education of researchers to ensure there is no impact on the Covered Species.	No further detail needed.
Management of golf course and grounds (Section 5.4.9)	Continued planning and management of the Golf Course assures minimal impact or disturbance of the aquatic ecosystem.	No further detail needed.
State Scientific Areas (Section 5.6.1)	Continuing management of public recreation assures minimal impact or disturbance of the aquatic system at reduced flows.	Maintenance and installation of signage and barriers, by standing from a boat.
Implementation of septic system registration and permitting program (Section 5.7.3)	Not conducted in the aquatic ecosystem.	No further detail needed.
Management of potentially contaminated runoff (Section 5.7.4)	Construction of two sedimentation ponds to help reduce contaminated materials will not disturb covered species habitat.	No further detail needed.
Management of household hazardous wastes (Section 5.7.5)	Management of household, hazardous wastes is a terrestrial activity.	No further detail needed.

Exhibit 2 - Implementing Committee Meeting - 6/19/14 Agenda

**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 (TSU), and the Guadalupe-Blanco River Authority (GBRA), a meeting of the **Implementing Committee of the Edwards Aquifer Habitat Conservation Plan Program** is scheduled for **Thursday, June 19, 2014, 9:00 a.m., at the New Braunfels Civic Center, 375 S. Castell Ave.**

Members of this committee include: Roland Ruiz (EAA), Steve Ramsey (New Braunfels), Tom Taggart (San Marcos), Chuck Ahrens (SAWS), Andrew Sansom (TSU), 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- 9:00 a.m.
2. Public Comment.
3. Approval of minutes from the May 15, 2014 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.
 - River and Index Well Levels.
 - May Expense Report (Attachment 2)
 - Update on City of New Braunfels Flow Split Infrastructure Installation.
 - Applied Research RFP Process.
 - ASR update (Attachment 3).
5. Staff Presentation: VISPO update (Attachment 4).

Purpose: To provide the Implementing Committee more details about current enrollment.

Action: None required.
6. Consider approval of the 2014 Drought Outreach Press Packet (Attachment 5)

Purpose: To consider approval of the provided Press Packet for outreach use.

Action: To approve the suggested Press Packet as provided by the 2014 Drought Outreach Work Group.
7. Staff Presentation: ITP Provision M

Purpose: To provide the Implementing Committee members the latest details pertaining to Provision M.

Action: Give directive for moving forward.

8. Consider approval of the New Braunfels Low Impact Development Program.
Purpose: To provide the Implementing Committee the opportunity to make comments and possibly approve the City of New Braunfels' LID program plans as previously presented and discussed.
Action: To approve the City of New Braunfels' implementation of their LID program as proposed.
9. Consider approval of all 2015 EAHCP Work Plans (Attachment 6-8).
Purpose: To consider approval of the presented Work Plans for 2015.
Action: To approve the 2015 EAHCP Work Plans.

Break

10. Consider and take possible action on the creation of and charge for a Science Committee Member Nomination Work Group (Attachment 9).
Purpose: To construct a work group to explore candidates to fill the vacancy in the Science Committee.
Action: To approve a membership and charge for the workgroup.
11. SWIFT Money- Region L (Attachment 10).
Purpose: To provide further information about the possibility of acquiring state funds for future HCP projects.
Action: None required.
12. Probability analysis of future recharge.
Purpose: To provide the Implementing Committee with the requested information on potential recharge estimates.
Action: None required
13. Presentation of legal implications of 7.1 and budget forecast
Purpose: To present to the Implementing Committee information pertaining to Table 7.1 of the HCP.
Action: None required.
14. Consider future meetings, dates, locations, and agendas.
 - The next Implementing Committee Meeting is scheduled for July 17th at the Edwards Aquifer Authority.
 - Information distribution process to Implementing Committee and Stakeholder Committee.
15. Questions from the public.
16. Adjourn.

Exhibit 3 - Implementing Committee Meeting - 8/21/14 Agenda

**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 **Thursday, August 21, 2014, 1:00 p.m.**, at the **New Braunfels Civic Center, 375 S. Castell Ave, New Braunfels, TX.**

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

17. Call to order--Establish that all Committee members are present or represented- 1:00 a.m.
18. Public Comment.
19. Approval of minutes from the June 19, 2014 Implementing Committee meeting (Attachment 1).
20. Receive report from the Program Manager on general topics related to the implementation of the Habitat Conservation Plan and operation of the Implementing Committee.
 - River and Index Well Levels
 - J-17 Forecast (Attachment 2)
 - ASR and VISPO update (Attachment 3 & 4)
 - June and July Expense Report (Attachment 5 & 6)
 - HCP Reserve Projection (Attachment 7)
 - Refugia research update
 - Tour of spring systems
21. Presentation and discussion pertaining to Provision M of the Incidental Take Permit (ITP) by USFWS.

Purpose: To provide the Implementing Committee the rationale for current springflow numbers found in the provision and specific intent used in protecting the species.

Action: None required

22. Discussion and possible action pertaining to Provision M.

Purpose: To allow the Implementing Committee the ability to discuss and provide direction to the Program Manager regarding the clarification of Provision M for the Comal and San Marcos Spring systems' habitat restoration and riparian restoration activities.

Action: Agree to next steps pertaining to Provision M.

23. Presentation of the Stakeholder Committee ASR/VISPO Work Group recommendations and possible action to approve suite of recommendations provided to be considered and implemented by the EAA (Attachment 8).

Purpose: To provide the Implementing Committee an opportunity to comment on suite of recommendations compiled and approved by the Stakeholder Work Group.

Action: To consider approval of suite of recommendations for EAA and implementation.

24. Presentation from the Science Committee Nomination Work Group for possible action to approve the recommended candidate for the Science Committee (Attachment 9).

Purpose: To present the Implementing Committee with the Science Committee Nomination Work Group Report.

Action: To consider approval of the recommended candidate for the Ecological Modeling position on the Science Committee.

25. Consider future meetings, dates, locations, and agendas.

- The next Implementing Committee Meeting is scheduled for September 18th at the Edwards Aquifer Authority.
 - Tour of systems in Fall
 - HCP Amendments
 - 2015 Meeting Dates

26. Questions from the public.

27. Adjourn.

Exhibit 4 - Implementing Committee Meeting - 9/18/14 Agenda

**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 **3:00 pm on Thursday, September 18, 2014 at the City of New Braunfels Landa House, 360 Aquatic Cir., New Braunfels, TX.**

Members of this committee include: Roland Ruiz (EAA), Steve Ramsey (New Braunfels), Tom Taggart (San Marcos), Chuck Ahrens (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- 2:30 pm.
2. Public Comment.
3. Approval of minutes from the August 21, 2014 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.
 - ASR/VISPO Update (Attachment 2 & 3)
 - ASR/VISPO Work Group Implementation Update
 - Budget Update (Attachment 4)
 - Annual Report Process (Attachment 5)
 - Funding Application Submittal
 - Update Benefits of Edwards Aquifer Programs
5. Presentation of and possible approval authorizing the EAHCP Program Manager to submit a Clarification to Condition M of the Incidental Take Permit to the USFWS.

Purpose: To provide the Implementing Committee with a draft Clarification to Condition M to be considered for submission to the USFWS.

Action: To approve submission of the Clarification of Condition M.
6. Consider creation of a Regional Water Conservation Program (RWCP) Work Group, possible appointment of members and approval of draft Work Group Charge.

Purpose: To determine whether a Work Group is necessary to acquire more Edwards Water into the RWCP, who will be appointed to the Work Group, and agree on a charge.

Action: To consider creation of a RWCP Work Group, appointment of members, and approval of charge.

7. Discussion pertaining to the spring systems tour.

Purpose: To allow all committee members a chance to comment on specific aspects of the systems' condition and HCP projects currently underway.

Action: None required.

8. Consider future meetings, dates, locations, and agendas.

- The next Implementing Committee Meeting is scheduled for October 16th at the Edwards Aquifer Authority.

9. Questions from the public.

10. Adjourn.

Exhibit 5 - Implementing Committee Meeting - 6/19/14 Minutes
EAHCP STAFF

July 18, 2014



IMPLEMENTING COMMITTEE MEETING MINUTES June 19, 2014

1. **Call to order—Establish that all Committee members are present or represented- 9:10 a.m.**
In attendance were: Tom Taggart (Chair), City of San Marcos; Chuck Ahrens, San Antonio Water System (SAWS), Juan Guerra represented Texas State University for Andy Samson; Steve Ramsey, City of New Braunfels; Roland Ruiz, Edwards Aquifer Authority (EAA); and Todd Votteler, Guadalupe-Blanco River Authority.
2. **Public Comment.**
No comment.
3. **Approval of minutes from the May 29, 2014 Implementing Committee meeting.**
Chuck Ahrens requested removing the word "that" from item 8 on page 3. With that change, Chuck Ahrens motioned for approval of the May 29, 2014 minutes. Juan Guerra 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.**
 - **River and Index Well Levels.**
Nathan Pence provided the Implementing Committee with current aquifer levels and springflows. The committee discussed the differences in current agricultural activities and also discussed the good condition of the habitat as reported in Bio-West's biological monitoring reports.
 - **May Expense Report.**
No questions on the May budget.
 - **Update on City of New Braunfels Flow-Split Infrastructure Installation.**
Nathan Pence gave a presentation to the committee about progress in New Braunfels' Flow-Split Management Project.
 - **Applied Research RFP Process.**
EAA General Manager Roland Ruiz provided a presentation to the committee about the process for the 2015 Applied Research request for proposals (RFPs). Specifically, he stated that EAA decided not allow Science Committee members to propose in future research projects. Discussion followed.
 - **Stakeholder ASR/VISPO Work Group.**
The first meeting of this Work Group was on June 17, 2014 where the Work Group approved their charge and schedule for future meetings.
 - **ASR update.**
Julia Velez gave a presentation about current enrollment. The acquisition for 2014 leases has stopped.
5. **Staff Presentation: VISPO update.**
Nathan Pence provided information about VISPO numbers and an update on how these numbers are represented in the monthly agenda update. Discussion followed.

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6. Consider approval of the 2014 Drought Outreach Press Packet.

John Boggess with Boggess Communications presented the committee with an overview of the Drought Outreach Work Group's Press Packet. The Committee members commented on the clarity and utility of this press packet. Chuck Ahrens recommended removing the language regarding Provision M's waiver/variance. Roland Ruiz moved to approve with the changes recommended. Steve Ramsey seconded. There were no objections.

7. Staff Presentation: ITP Provision M

Nathan Pence presented a detailed explanation of the origins of Provision M from the Incidental Take Permit (ITP) and the issues and potential changes the Implementing Committee could propose.

A discussion followed on the rationale for last year's precedent of approving a waiver/variance request in 2013. There was a decision to request further documentation about the rationale for Provision M as well as request for the United States Fish and Wildlife Service (USFWS) to attend the next Implementing Committee meeting. Discussion followed. The Committee asked for a clear record of current and future conditions of the restoration projects and requested future communication with the USFWS include documentation of the communication.

Roland Ruiz proposed an option to simply add language to the current Provision to include a waiver/variance process. The Committee requested the Science Committee provide an opinion, supported by literature on the systems, on a rationale for a more realistic trigger. Nathan Pence listed the detailed steps for staff regarding Provision M clarification. Additionally, any endorsement or recommendation from the Science Committee on July 9th will be placed on the agenda to help define the steps for moving forward. Nathan Pence stated he will draft an email for Committee review requesting information needed from USFWS.

8. Consider approval of the New Braunfels Low Impact Development Program.

Zao Martin with the City of New Braunfels provided the Committee with some additional edits to the 2015 City of New Braunfels Work Plan concerning the New Braunfels Low Impact Development (LID) program. He stated discussions with SAWS provided more clarity about the details of the separation of the City's Municipal Separate Stormwater Sewer Systems (MS4) and LID programs. Chuck Ahrens moved for approval for the New Braunfels LID program. Roland Ruiz seconded. There were no objections.

9. Consider approval of all 2015 EAHCP Work Plans.

Alicia Reinmund-Martinez presented the process and timeline for approval of the 2015 Work Plans. The packet provided to the committee included the changes to the work plans previously presented. Nathan Pence provided additional detail on the specific comments received. Discussion followed.

Chuck Ahrens commented on the addition of quantifiable acre-foot goals to the Regional Water Conservation Program (RWCP) Work Plan. He added the focus of the RWCP should not include finding other sources of water but rather on using current sources more efficiently. Discussion followed.

Juan Guerra motioned for the approval of all EAHCP Work Plans with the condition the RWCP Work Plan be edited per recommendations from a subcommittee comprised of EAA and SAWS. Chuck Ahrens seconded. There were no objections.

Break

After the break Roland Ruiz and Chuck Ahrens asked the committee to reconsider the former motion and move to approve all Work Plans, including the RWCP with the following edits: strike

2

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performance measure #7 and keep performance measure #8. Juan Guerra made a motion for final approval; Chuck Ahrens seconded the motion. There were no objections.

10. Consider and take possible action on the creation of and charge for a Science Committee Member Nomination Work Group.

Alicia Reinmund-Martinez provided information about the former Science Committee Appointment Work Group. She asked the Committee to consider adopting the former Work Group's charge and revise its membership in order to solicit recommendations and provide nominations for this year's Science Committee appointment. The Committee recommended replacing Patrick Shriver (SAWS) with John Waugh (SAWS) and replacing Myron Hess (National Wildlife Federation) with Tyson Broad (Sierra Club).

Tom Taggart motioned for approval of new membership and proposed charge. Steve Ramsey seconded the motion. There were no objections.

11. SWIFT Money- Region L.

Alicia Reinmund-Martinez presented information on the TWDB's State Water Implementation Fund for Texas (SWIFT) compiled for the Committee's review. Program manager, Nathan Pence explained since this program is a loan program, it is not specifically applicable for the EAHCP but may be useful for communities participating in the Regional Water Conservation Program.

12. Probability analysis of future recharge.

EAA staff Jim Winterle presented his probability analysis for future Edwards Aquifer recharge as requested by the Implementing Committee. Tom Taggart mentioned that USFWS could use this information to give them an idea of the probability of triggering Provision M.

13. Presentation of legal implications of 7.1 and budget forecast

Darcy Frownfelter gave a legal background on the EAHCP budget table "Table 7.1" and Nathan Pence presented the modified version of table 7.1, titled "7.2."

14. Consider future meetings, dates, locations, and agendas.

- The next Implementing Committee Meeting is scheduled for July 17th at the Edwards Aquifer Authority.
 - Information distribution process to Implementing Committee and Stakeholder Committee.
 - USFWS to provide additional information about Provision M
 - Implementing Committee's approval of a Texas State University application for United States Department of Agriculture (USDA) funding to study crops in the Uvalde area.

15. Questions from the public.

No comment.

16. Adjourn.

12:38 p.m.



Steve Ramsey, Secretary

Exhibit 6 - Implementing Committee Meeting - 8/21/14 Minutes
EAHCP STAFF

September 12, 2014



MEETING MINUTES
Available at eahcp.org

Thursday, August 21, 2014, 1:00 p.m., at the New Braunfels Civic Center

1. **Call to order - Establish that all Committee members are present or represented-1:04 p.m.**
In attendance were: Tom Taggart (Chair), City of San Marcos; Chuck Ahrens, San Antonio Water System, Juan Guerra represented Texas State University for Andy Samson; Steve Ramsey, City of New Braunfels; Roland Ruiz, Edwards Aquifer Authority; and Todd Votteler, Guadalupe-Blanco River Authority.
2. **Public Comment.**
No comment.
3. **Approval of minutes from the June 19, 2014 Implementing Committee meeting.**
Chuck Ahrens moved to approve the June 19, 2014 minutes. Roland Ruiz seconded. There were no objections.
4. **Receive report from the Program Manager on general topics related to the implementation of the Edwards Aquifer Habitat Conservation Plan (EAHCP) and operation of the Implementing Committee.**
Nathan Pence, Program Manager, began with an update describing how EAA is in the process of modeling the benefits of the Edwards Aquifer Habitat Conservation Plan. EAA will present to the Implementing Committee the results of the model as soon as possible.
 - **River and Index Well Levels.**
Nathan Pence provided the Implementing Committee with current aquifer levels and springflow conditions. There was no discussion.
 - **J-17 Forecast.**
Nathan Pence briefly presented EAA's forecast for the remainder of 2014 for the J-17 San Antonio pool index well. Three forecasts were presented. There was no discussion.
 - **Aquifer Storage and Recovery (ASR) and Voluntary Irrigation Suspension Program Option (VISPO) updates.**
EAA staff, Rick Illgner, gave an update on VISPO and presented a positive outlook on 2014 enrollment. Julia Velez, from San Antonio River Authority presented the updated ASR acquisition numbers.

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- **June and July Expense Report.**
EAA staff, Shelly Hendrix presented the EAHCP June and July expense reports. There was no discussion.
- **EAHCP Reserve Projection.**
Shelly Hendrix also gave a presentation on the EAHCP budget reserve projection. Her report included what it would look like if the trigger¹ for the VISPO Implementation payments is or is not reached.
- **Refugia Research update.**
Nathan Pence presented an update on what is currently underway in the Request for Proposals (RFP) process for Refugia Research. Mr. Pence discussed the importance of the program to stay in compliance with the Incidental Take Permit (ITP). Roland Ruiz discussed the current request from the Texas Attorney General on an opinion on EAA's contract with U.S. Fish and Wildlife Service (USFWS) on Refugia.
- **Tour of spring systems.**
Nathan Pence discussed the idea of a tour of the spring systems for all committees on September 18 – the next scheduled meeting of the Implementing Committee meeting. The Committee expressed a general consensus on the benefit of a systems tour, but was hesitant to replace a September meeting if current springflow conditions continue. The Committee agreed to an abbreviated official agenda on September 18 following the systems tour.

5. Presentation and discussion pertaining to Provision M of the Incidental Take Permit (ITP) by USFWS.

Kevin Connally, of the USFWS, gave a presentation on the details and rationale behind the threshold springflows defined in Condition M of the Incidental Take Permit. Condition M was meant to reduce the harm to the species during low springflow conditions. He stated the condition was never meant to be a "whole-sale" stop of all activities. For example the removal of vegetation mats on the surface of Texas Wild Rice, should not stop because this activity provides a benefit to the species at all flows. He stated a clarification can be constructed to identify the proper interpretation of what activities can continue at reduced springflows.

6. Discussion and possible action pertaining to Provision M.

Mr. Pence identified the committee could direct him to coordinate with USFWS to construct language for a clarification of Condition/Provision M to be presented and approved by the Implementing Committee before submitted.

Steve Ramsey moved to direct Nathan Pence to coordinate with USFWS in constructing a clarification letter on Provision M of the ITP. Juan Guerra seconded. There were no objections.

¹ If the water level at the J-17 index well in San Antonio is at or below 635 feet on October 1, EAA will notify VISPO program participants to suspend the use of the enrolled water for the following year, resulting in EAA's payment to participants for their temporary suspension of pumping.

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7. Presentation of the Stakeholder Committee ASR/VISPO Work Group recommendations and possible action to approve suite of recommendations provided to be considered and implemented by the EAA.

Myron Hess, chair of the Stakeholder Committee ASR/VISPO Work Group, presented the Work Group's Recommendations Report which had been approved by the Stakeholder Committee for recommendation to the Implementing Committee.

The Implementing Committee discussed the EAA conducting further investigation of all recommendations represented in the Work Group's report and coordinating with SAWS to analyze specific details when necessary. The Committee further discussed that when proper investigation and analysis is complete, EAA will present to the Implementing Committee, the final recommendations with implementation details, including market analysis, via a Work Plan, budget, or informational report. Tom Taggart suggested some of the recommendations be brought back to the Implementing Committee sooner rather than later.

The Implementing Committee decided to make approval for each recommendation one- by- one:

- *ASR Recommendation #1: July-November Lease Option – when SAWS is in Recovery.* Committee approved for further investigation. There were no objections.
- *ASR Recommendation #2: July-November Lease Option – when SAWS is Injecting.* Committee approved for further investigation. There were no objections.
- *ASR Recommendation #3: Pooling Un-Pumped Withdrawal Rights.* Committee approved for further investigation. There were no objections.
- *ASR Recommendation #4: Long term Lease Escalator.* Committee approved for further investigation. There were no objections.
The Committee discussed the intent of this recommendation was to provide a more attractive leasing option for ground water rights holders. The Committee discussed the option of raising payment rates to allow flexibility with the market rather than locking the program in an automatic price escalator.
- *ASR Recommendation #5: Implementation of Additional Tiers Beyond Tier 1.* Committee approved for further investigation. There were no objections
- *ASR Recommendation #6: Compensation Alternatives and Tax Deductions.* Committee approved for further investigation. There were no objections.
- *VISPO Recommendation #1: Distribution of a VISPO Marketing Message.* Committee approved with no further investigation needed. There were no objections.
- *VISPO Recommendation #2: Extend VISPO Enrollment Past October 1, if VISPO Triggers.* Committee approved for further investigation. There were no objections.
- *VISPO Recommendation #3: Compensation Alternatives and Tax Deductions.* Committee approved for further investigation. There were no objections.

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8. Presentation from the Science Committee Nomination Work Group for possible action to approve the recommended candidate for the Science Committee.

Tyson Broad, Science Committee Nomination Work Group member, presented the Work Group's recommendation of Dr. Conrad Lamon as the replacement for the ecological modeling specialist for the EAHCP Science Committee. Roland Ruiz motioned approval of the Work Group's recommendation. Chuck Ahrens seconded. There were no objections.

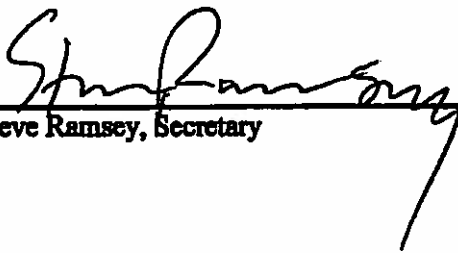
9. Consider future meetings, dates, locations, and agendas.

The next Implementing Committee Meeting is scheduled for Thursday, September 18 at Landa Haus after the tour of the spring systems. Possible agenda items include the 2015 meeting dates and Provision M clarification. Additionally, Nathan Pence mentioned the upcoming National Academy of Sciences report and it will be analyzed and developed.

10. Questions from the public.

Dianne Wassenich mentioned to the Implementing Committee about the consideration of constructing a Regional Water Conservation Program Work Group.

11. Adjourn- 2:28 p.m.



Steve Ramsey, Secretary

Exhibit 7 - Implementing Committee Meeting - 9/18/14 Minutes
EAHCP STAFF

September 22, 2014



MEETING MINUTES

September 18, 2014

Available at eahcp.org

1. **Call to order - Establish that all Committee members are present. - 3:00 p.m.**
In attendance were: Tom Taggart (Chair), City of San Marcos; Chuck Ahrens, San Antonio Water System (SAWS); Steve Ramsey, City of New Braunfels; Roland Ruiz, Edwards Aquifer Authority (EAA); Andy Samson, Texas State University and Todd Votteler, Guadalupe-Blanco River Authority (GBRA).
2. **Public Comment**
Tyson Broad, Lone Star Chapter of the Sierra Club, made a comment to thank EAA for the coordination of the systems tour. He also mentioned the need to communicate specific information about Landa Lake and current conditions in the Comal System, specifically the ongoing construction around sensitive habitat. Tim Lookingbill, a member of the community, made specific comments about the importance of a study pertaining to Comal system turbidity.
3. **Approval of minutes from the August 21, 2014 Implementing Committee meeting**
Andy Sansom motioned for approval. Chuck Ahrens seconded. There was no objection.
4. **Receive report from the Program Manager on general topics related to the implementation of the Edwards Aquifer Habitat Conservation Plan (EAHCP) and operation of the Implementing Committee.**
 - **ASR/VISPO Update**
Nathan Pence, Program Manager, presented the current numbers of the ASR program. Rick Illgner, EAA Staff, gave updated figures of VISPO enrollment. The expected number for VISPO enrollment to be presented next month will exceed 35,000 acre-feet out of the 40,000 acre-foot goal.
 - **ASR/VISPO Work Group Implementation Update**
Mr. Pence mentioned status of coordination between EAA Staff and SAWS.
 - **Budget Update**
Mr. Pence opened the floor to any question about the budget. No comments were made.
 - **Annual Report Process**
Alicia Reinmund-Martinez, EAHCP Director, introduced this year's contractor for the drafting of the 2014 Annual Report, Blanton and Associates. She also presented the current timeline of all deliverables. No comments were made.
 - **Funding Application Submittal**

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Mr. Pence mentioned that the 2015 funding applications from the permittees are due on October 1st.

- **Update Benefits of Edwards Aquifer Programs**

Roland Ruiz, EAA General Manager, presented an update on a report being prepared by EAA that will attempt to quantify the general benefits of all Edwards Aquifer Authority's EAHCP programs. This report is expected to be presented at the October Implementing Committee meeting.

- **Additional updates**

Mr. Pence mentioned the recent conference in Kansas City where he and several other integral members of the EAHCP planning and implementation process had presented and participated in a panel discussion about successes and challenges of the EAHCP.

In anticipation of the storm-event on September 17th SWCA, the consultant hired to perform the monitoring for the HCP this year, was mobilized. The group demobilized because rains never came, and missed a large water quality sampling opportunity when the storm developed in the early morning hours.

It was reported HDR has been contracted to ensure that all EAHCP activities are properly covered and permitted with the appropriate entities. A general summary of this effort will be brought back to the committee at a later date.

5. Presentation of and possible approval authorizing the EAHCP Program Manager to submit a Clarification to Condition M of the Incidental Take Permit to the USFWS.

Mr. Pence summarized past conversations the Implementing Committee has had with staff and USFWS about the draft Clarification of Condition M. Discussion followed.

Mr. Pence summarized the content of the letter and mentioned a section of the table found in Exhibit 1, which described the boating activities in Spring Lake, which needed to be changed to read "no further details needed." Andy Sansom motioned to approve the Clarification of Condition M with the text change. Steve Ramsey seconded. There was no objection.

6. Consider creation of a Regional Water Conservation Program (RWCP) Work Group, possible appointment of members and approval of draft Work Group Charge.

Mr. Pence explained the rationale for creating the RWCP Work Group and how the draft of the Work Group Charge reads. Additionally, the proposed membership for this Work Group was presented to the committee as well. Roland Ruiz asked how staff will go about replacing any members proposed that are not willing to participate. Mr. Pence described some back-up individuals that could be considered if the others are not willing to serve.

Mr. Pence described this action item will require: a motion to approve creation of the Work Group, a motion to approve the charge, and a motion to approve the membership as presented.

Mr. Pence read off the names found in the Draft Work Group Charge: Possible members could include the following: an EAA representative (*Rick Illgner*), a Large Municipality representative (*Karen Guz*, SAWS), Small Municipality representatives (*Joe Cardeñas*, City

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of Uvalde, if Mr. Cardenas cannot participate, EAHCP staff will contact representatives from Universal City, Avery Lunsford, or Randy Luensmann, for a small municipality), an Environmental Group representative (*Dianne Wassenich*), an Industrial representative (*Dr. Richard Szecsy*, Texas Aggregate and Concrete Association), an at-large representative (*Dr. Dante Fenolio* - San Antonio Zoo) and a representative from another non-profit organization (*Tyson Broad* - Sierra Club). If any of those presented are not willing to participate, new possible members will be brought back for committee consideration.

After committee discussion Tom Taggart proposed to include Colette Barron-Bradsby, Texas Parks and Wildlife, in the Work Group, and Todd Votteler proposed to add Charlie Hickman, Guadalupe-Blanco River Authority.

Roland Ruiz motioned to approve. Tom Taggart seconded. There was no objection.

7. Discussion pertaining to the spring systems tour.

Mr. Pence presented the current Index Wells and Springflow measurements.

The committee had a discussion pertaining to the Systems Tour conducted throughout the day. Tom Taggart mentioned the potential benefits an annual systems tour could have on committee perspective and community involvement. Steve Ramsey discussed how clear it is that some restoration activities that have been stopped should be continued, specifically vegetation mat removal. Discussion followed.

8. Consider future meetings, dates, locations, and agendas.

- The next Implementing Committee Meeting is scheduled for October 16th at the Edwards Aquifer Authority. The Committee discussed the need to change the meeting date for October. Staff will be providing proposed dates soon.

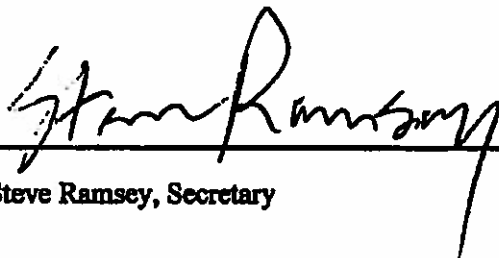
Some agenda items to consider:

- Summary of benefits of the EAA EAHCP programs
- Drought outlook
- VISPO Trigger discussion.

9. Questions from the public

Steve Ramsey moved to adjourn. Andy Sansom seconded. There was no objection.

10. Adjourn-3:40 pm



Steve Ramsey, Secretary

Exhibit 8 - Science Committee Meeting - 8/6/14 Agenda

**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 Science Committee for the Edwards Aquifer Habitat Conservation Plan Program is scheduled for Wednesday, August 6, 2014, at 9:00 a.m. at the San Marcos Rec Hall (Lions Club Tube Rental at City Park), 170 Charles Austin Dr., San Marcos, TX. Lunch will be available.

Members of this committee include: Tom Arsuffi, Doyle Mosier, Charles Kreidler, Jacquelyn Duke, Jackie Poole, Floyd Weckerly, Chad Norris, Glenn Longley, Janis Bush, and Robert Mace. At this meeting, the following business may be considered and recommended for committee action:

1. Call to Order.
2. Public Comment.
3. Approval of minutes from the May 8th and May 12th Science Committee meetings (Attachment 1 & 2).
4. Receive Report from the EAHCP Program Manager.
 - NAS update
 - 2015 Science Committee Dates
 - 2015 Applied Research Request for Proposals
 - Science Committee Field Tour
 - Science Committee Nomination Process update
 - Science Committee Approach and Participation
5. Presentation of the 2014 Water Quality Monitoring update.
 Purpose: To provide an update on the 2014 Water Quality Monitoring program.
 Action: None required.
6. Presentation of the 2013 Biological Monitoring Report (Attachment 3 & 4).
 Purpose: To present information and data gathered in the 2013 Biological Monitoring program.
 Action: None required.
7. Introduction to Provision M of the Incidental Take Permit (ITP) and its implication on the implementation of the Habitat Conservation Plan (Attachment 5-8).

Purpose: To provide the Science Committee with information about the ITP and Provision M.

Action: None required

8. **Presentation and discussion on restoration activities specific to the San Marcos System for Science Committee's input and possible action for Implementing Committee recommendation (Attachment 9).**

Purpose: To provide the Implementing Committee with scientific input and advice related to the clarification of Provision M and the implementation of restoration activities in the San Marcos system defined in Chapter 5 of the HCP.

Action: Agree on input, advice and recommendations to the Implementing Committee about various restoration activities in the San Marcos system.

9. **Presentation and discussion on restoration activities specific to the Comal System for Science Committee's input and possible action for Implementing Committee recommendation (Attachment 9).**

Purpose: To provide the Implementing Committee with scientific input and advice related to the clarification of Provision M and the implementation of restoration activities in the Comal system defined in Chapter 5 of the HCP.

Action: Agree on input, advice and recommendations to the Implementing Committee about various restoration activities in the Comal system.

10. **Future agenda items and meeting dates.**

- The next Science Committee meeting is scheduled for **September 11th** at the San Marcos Rec Hall.

11. **Questions and comments from the public.**

12. **Adjourn**

Exhibit 9 - Science Committee Meeting - 8/6/14 Minutes

**MEETING MINUTES****Wednesday, August 6, 2014**Available at eahcp.org

Members of Edwards Aquifer Habitat Conservation Plan (EAHCP) Science Committee include: Tom Arsuffi, Doyle Mosier, Charles Kreidler, Jacquelyn Duke, Jackie Poole, Floyd Weckerly, Chad Norris, Glenn Longley, Janis Bush, and Robert Mace. At this meeting, the following business may be considered and recommended for committee action:

1. **Call to order- 9:09 am**
Tom Arsuffi, Doyle Mosier, Charles Kreidler participating via Skype, Jacquelyn Duke, Jackie Poole, Floyd Weckerly, Chad Norris, and Glenn Longley were present. A quorum was confirmed.
2. **Public Comment**
There was no public comment.
3. **Approval of Minutes**
Dr. Weckerly motioned to approve both the May 8, 2014 and the May 12, 2014 minutes. The motion was seconded by Dr. Longley. The motion passed.
4. **Project Manager Report**
Nathan Pence, EAHCP Program Manager provided the following updates:
 - The National Academy of Science (NAS) meeting in August will be a closed meeting in Washington D.C.
 - The 2015 meetings dates will be compiled soon. The committee was asked if they had any specific input on meeting dates.
 - The Stakeholder and Implementing committees have expressed interest in a field tour. There will be a tour date sometime this fall.
 - Alicia Reinmund-Martinez, Director of the EAHCP reported that the Science Committee Nomination Work Group unanimously decided to recommend Dr. Conrad Lamon to the Science Committee. This recommendation will be presented to the Implementing Committee for their consideration at their next meeting on August 21.
 - Nathan Pence, discussed the future approach the EAHCP staff will bring materials to the Science Committee. Future meetings with the committee will focus on asking for scientific input rather than formal approval.
 - The 2015 Applied Research RFPs will be distributed soon. To prevent any conflict of interests, Science Committee members will be prohibited from being considered for any Applied Research project from this date forward.

5. Water Quality Monitoring Presentation

EAA staff gave a presentation about the status of the 2014 Water Quality monitoring program. Powerpoint slides are posted on the Science Committee meeting website.

6. Biological Monitoring Presentation

Ed Oborny with Bio-West presented the results of the 2013 and 2014 Biological Monitoring program. Powerpoint slides are posted on the Science Committee meeting website.

There was specific comments from the committee about pursuing subsurface sampling near dry spring runs. The committee had questions pertaining to the continued representativeness of the Rio Vista to I-35 reach. Mr. Oborny explained the reduction of vegetation after Rio Vista dam construction was completed.

7. Provision M of ITP Presentation

Alicia Reinmund-Martinez gave a presentation about Provision M of the Incidental Take Permit and what EAHCP staff is requesting from the Science Committee. Powerpoint slides are posted on the Science Committee meeting website.

8. San Marcos System Activities

Melani Howard from the City of San Marcos/Texas State University gave a presentation of a list of activities found to be appropriate to continue at any flows. Powerpoint slides are posted on the Science Committee meeting website.

Ms. Howard and the Science Committee provided the following comments and feedback:

- Sessom Creek Sand Bar Removal- a finite project. Will not begin until flow normalize above 120 cfs.
- Bank Stabilization- complete but maintenance will continue.
- Riparian Restoration- a finite project but maintenance is long term.

Comments from the above activities are seen to have no effect by flow.

Question about the methods of riparian restoration and how moving forward, how San Marcos/Texas State University can mitigate the woody debris. Jackie Poole requested a clarification on the methods used in the protection of riparian restoration.

The level of maintenance experienced in recent days can give reason to take maintenance on the bank stabilization at a case-by-case basis. Dr. Duked states that if maintenance is done on a continual basis, rather than only at flows above 120 cfs, there would be less negative impact. The longer maintenance is left undone the more negative impact the system would experience.

- Invasive plant species removal- If work is stopped than the work already completed will be reversed. Jackie Poole discussed the increased sediment when removing plants like elephant ears. Dr. Duke made the distinction about maintenance of elephant ears on the banks of the river is much less disruptive than large scale removal elsewhere. This would be a project that would not include beginning new areas of concern, just maintenance of previously removed stands. (Maintenance and Gardening).
- Floating Vegetation and litter collection- Melani Howard mentioned this program is specifically important in low-flow conditions. Doyle Mosier mentioned including a net

downstream to collect any lost vegetation to limit increased disturbance, "manage loss of mats downstream." This particular project does not disrupt wild rice stands but rather leaving vegetation mats could cause excess damage.

- Invasive species removal- spear fishing and bow fishing would not necessarily disrupt sediment. The committee stated that this particular project may not be effective enough to continue as it currently stands. Yet, there is not a concern in low flows.
- Dredging- obvious disturbance of sediment. Not considered for clarification.
- Aquatic Vegetation Planting- To significantly lower the disturbance of sediment the removal of vegetation should not be considered. There was a recommendation to continue maintenance with extra thought to be done on what plants are considered and where these plants are going. All areas for maintenance will be represented by vegetation maps.
- Conservation Crew - Education, litter removal,
- State Scientific Area (SSA) maintenance and maintenance of riparian areas. Committee agrees with Dr. Kreitler that this is a maintenance activity that is particularly important once flows drop (high use during summer times). SSAs are actually required to be placed at 120 cfs so preventing the maintenance of these barriers would harm broader goals.
- Household Hazardous Waste- No particular reason to suspend this project at any flow.
- Golf Course Management- No particular reason to suspend this project at any flow.
- Reducing Non-native species- No particular reason to suspend this project at any flow.
- Spring Lake Activities- Research Programs, Diving Classes, Boating. All programs are up for clarification except for boating.
- Clarification that the following activities should go on at any flow (short term or long term):
 1. Texas Wild-Rice Enhancement and Restoration: Should continue planting using discretion at all flows. No objections
 2. Management of Recreation in Key Areas: should continue due to the importance at low flows. No objections
 3. Management of Aquatic Vegetation and Litter Below Sewell Park: More critical at low flow
 4. Prohibition of Hazardous Materials Transport Across the San Marcos River and its Tributaries: unable to disrupt sediment
 5. Reduction of Non-Native Species Introduction: continue at all flows
 6. Control of Non-Native Plant Species: Gardening and maintenance only
 7. Texas Wild-Enhancement and Restoration: Gardening and maintenance only
 8. Management of Recreation in Key Areas: continues at all flows
 9. Management of Vegetation: Gardening and maintenance only
 10. Diversion of Surface Water: continues at all flows
 11. Research Programs in Spring Lake: not effected by flows due to the location. Motion for Dr. Hardy to pull together a list of current and future research project. No objections
 12. Management of Golf Course and Grounds: Needs to continue. No possible disruptive.
 13. Reduction of Non-Native Species Introduction: Continue at all flows
 14. Control of Non-Native Plant Species: Continue at all flows
 15. Control of Harmful Non-Native and Predator Species: Continue at all flows
 16. State Scientific Areas: Continue at all flows
 17. Expanded Water Quality Monitoring: Continue at all flows

- 18. Septic System Registration and Permitting Program: Continue at all flows
- 19. Minimizing Impacts of Contaminated Runoff: Continue at all flows
- 20. Management of Household Hazardous Wastes: Continue at all flows

9. Comal System Activities

Zackary Martin from the City of New Braunfels gave a presentation of a list of activities found to be appropriate to continue throughout any flows. Powerpoint slides are posted on the Science Committee meeting website.

Zac Martin and the Science Committee provided the following comments and feedback:

- Gill Parasite- a request to continue water column sampling. Tom Arsuffi stated that this specific problem will only become more apparent at lower flows thus could increase the need for continued sampling. Dr. Longely stated that contractors should use the most non-intrusive way as possible.
- Non-native species removal- No reason to suspend.
- Decaying Vegetation Removal and DO management- recommendations to continue maintenance only.
- Riparian Improvements: CSRB Habitat- Restoration and maintenance of slope along water line to protect CSRB habitat. Recommendations to continue maintenance of this project with additional prudence to include protection of runoff (ex. mulch sock) in case of major rain event.
- Bank Stabilization- Because the Old Channel is managed at 50 cfs until system drop below 80 cfs it may give a reason to continue work in the Old Channel despite full system flow drop. Dr. Kreidler did mention the concern that flows may drop below 80 cfs, which may affect the Old Channel, while construction is underway. The committee ultimately decided to put this project on hold till flow conditions normalize above 130 cfs.
- Flow Split Management- manipulation of the system will never disrupt sediment due valve use. The committee agrees to maintain this project despite flows.
- HCP Internal projects which include the hazardous waste program, golf course management plan, education and signage, and hazardous materials transportation routes is requested to continue despite flows.
- Floating Vegetation- typical methods do not include any walking or disruption of sediment.
- The following programs should be continued at all flows:
 1. Flow-Split Management in the Old and New Channel
 2. Native Aquatic Vegetation Restoration and Maintenance
 3. Management of Public Recreational Use of Comal Springs and River Ecosystems
 4. Decaying Vegetation Removal and Dissolved Oxygen Management
 5. Control of Harmful Non-Native Animal Species
 6. Monitoring and Reduction of Gill Parasites
 7. Prohibition of Hazardous Material Transport Across the Comal River and its Tributaries
 8. Reduction of Non-Native Species Introduction and Live Bait Prohibition
 9. Litter Collection and Floating Vegetation Management
 10. Management of Golf Course Diversions and Operations
 11. State Scientific Areas

12. Expanded Water Quality Monitoring

13. Management of Household Hazardous Wastes

10. Future Meeting dates

Sessom Creek Sand Bar removal methodology up for committee comment.

11. Questions from the public

There were no comments.

12. Adjourn- 1:22 pm



United States Department of the Interior

FISH AND WILDLIFE SERVICE

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512 490-0057

FAX 490-0974



Mr. Nathan Pence
Program Manager
Edwards Aquifer Habitat Conservation Plan
c/o Edwards Aquifer Authority
900 East Quincy
San Antonio, TX 78215

SEP 30 2014

RE: Clarification of Condition M of Incidental Take Permit # TE-63663A-0

Dear Mr. Pence,

Thank you for your September 23, 2014, letter seeking clarification of the terms and conditions of the Edwards Aquifer Habitat Conservation Plan (EAHCP) Incidental Take Permit. Condition M, paragraphs 1.b and 2.b, specifies that Permittees suspend activities that may disturb substrates, water quality, or plants, animals or invertebrates when flows within the Comal and San Marcos River systems fall below 130 cubic feet per second (cfs), and 120 cfs, respectively. As we have discussed, this requirement was incorporated into the permit to ensure that the impact of taking upon listed species is minimized to the maximum extent practicable.

Consultation and Habitat Conservation Planning Branch Chief Tanya Sommer and Fish and Wildlife Biologist Kevin Connally met with you and representatives from Texas State University, the City of San Marcos, and the City of New Braunfels to discuss concerns related to this requirement. Mr. Connally provided additional background information and addressed questions about this matter at the August 21, 2014, EAHCP Implementing Committee meeting.

Your letter lists habitat restoration and management commitments described in the EAHCP and how these actions can be implemented in keeping with the goals of permit condition M. We support continuation of these beneficial activities with the understanding that the permittees shall make every effort to minimize disturbance and reduce effects such as turbidity and siltation that could adversely impact the covered species at all times, and especially during low flow conditions.

We recommend that efforts employed to minimize the effects of take during low flow conditions are documented, that the effectiveness of these measures are determined, and that recommendations for further minimization of potential impacts are described in the EAHCP

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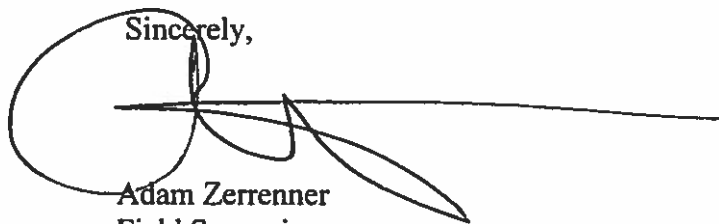
Mr. Pence

2

Annual Report and form the basis against which future low flow minimization efforts can be measured.

We applaud your pursuit of the best available science to identify methods that can further reduce impacts to listed species and their habitats. Thank you for your cooperation and your ongoing efforts to conserve and protect the wildlife of the Edwards Aquifer and our communities. If there are any further questions about this matter, please contact Tanya Sommer (512-490-0057 ext. 222) or Kevin Connally (512-490-0057 ext. 234).

Sincerely,



Adam Zerrenner
Field Supervisor



IMPLEMENTING MEETING MINUTES

October 16, 2014

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

In attendance were: Tom Taggart (Chair), City of San Marcos; Chuck Ahrens, San Antonio Water System (SAWS); Steve Ramsey, City of New Braunfels; Roland Ruiz, Edwards Aquifer Authority (EAA); Andy Samson, Texas State University and Todd Votteler, Guadalupe-Blanco River Authority (GBRA).

2. **Public Comment.**

No comment.

3. **Approval of minutes from the September 18, 2014 Implementing Committee meetings.**

This item was postponed due to a lack of a quorum. Andrew Sansom and Todd Votteler arrived later in the meeting and a motion was made at that time. See item #11 below.

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.**

Nathan Pence, Program Manager, updated the Implementing Committee on the following topics:

- 2015 Implementing Committee Meeting Dates.
- Update on meeting with United States Fish and Wildlife Services (USFWS) on October 1st.
- ASR Work Group Recommendations Update.
- Budget Update.
- Springflows and Index Well Levels.
- Aquifer Storage Recovery (ASR) Update.
- Regional Water Conservation Program (RWCP) Work Group Update.
- Implementation Permits Update.

Chuck Ahrens discussed briefly the impacts of limited rainfall on the aquifer levels this time of year and its comparison to historical data.

Chuck Ahrens gave an update on SAWS ASR. Tom Taggart discussed some of the initiatives the City of San Marcos is undertaking to assist in EAHCP ASR program.

Mr. Pence discussed the effort Edwards Aquifer Habitat Conservation Plan (EAHCP) staff has initiated with HDR Inc. to rectify all permit issues experienced by the City of San Marcos/Texas State University and the City of New Braunfels.

- Submittal of a letter to USFWS regarding the change in methodology in San Marcos/Texas State University Sessom Creek Sediment Sand Bar Removal Project. Mr. Pence presented the draft Informational Memorandum. There was no action required by the Committee because they had approved the submittal at a previous meeting.
- Mr. Pence provided the Committee the submittal dates for the 2014 Annual Report and an update on the National Academy of Science expected completion of its first report.

5. Staff Report: Voluntary Irrigation Suspension Program Option (VISPO) implementation and status.

Rick Illgner presented an overview of the triggering of VISPO on October 1st. This presentation is available on the EAHCP website (eahcp.org). The Committee asked Mr. Illgner to explain the difference in the enrollment by county and the HCP goals for each county. Enrollment in Uvalde County exceeded its HCP goal by 177%, while enrollment in the eastern counties, collectively reached only 29% of their goal.

Mr. Pence discussed the success of the current VISPO program and if enrollment were able to continue, it could enhance meeting overall springflow protection program goals as a whole. Chuck Ahrens mentioned, due to ASR system capacity, the overall benefit experienced from the SAWS ASR program this year will continue in future years.

Tom Taggart mentioned the partnership the City of San Marcos and EAA is building for an ASR commitment. Mr. Taggart recognized the success of VISPO enrolment and program initiation this year and suggested a possible modeling exercise to determine benefits for continued enrollment.

6. Staff Report: Presentation of the benefits Edwards Aquifer programs have had on the Aquifer levels and Springflows.

This presentation was tabled until the next meeting.

7. Staff Report: Clarifications and Amendments acceptance/approval by USFWS.

Mr. Pence updated the Implementing Committee about written and verbal response on the following Clarification letters.

- i. Condition M Clarification Letter: September 23, 2014, Approval was received from USFWS on September 30, 2014.
- ii. NAS Clarification Letter: October 18, 2013. USFWS provided a verbal agreement. They conveyed that no written confirmation is necessary.
- iii. FMA Amendment: November 22, 2013. USFWS provided verbal agreement. They conveyed that no written confirmation is necessary.

8. Presentation and possible action to approve pursuing a contract with Boggess Communications to draft and distribute quarterly EAHCP newsletters.

This presentation was tabled until the next meeting.

9. Presentation and possible action to approve the City of New Braunfels amended 2015 Work Plan.

Mr. Pence introduced this agenda item and the rationale for the amended Work Plan. Mark Enders, the City of New Braunfels, presented the details of the amended Work Plan to the Implementing Committee. The presentation can be found on the EAHCP website (eahcp.org).

Ed Oborny expanded on the Gill Parasite initiative and the rational for completing the study and collecting additional data on parasites.

Andy Sansom moved to approve the City of New Braunfels amended Work Plan. Chuck Ahrens seconded. There was no objection.

10. Presentation and possible action to approve the 2015 Funding Applications to be submitted to the EAA Board.

Mr. Pence presented the 2015 Funding Application for all EAHCP programs to be submitted to the EAA Board.

Steve Ramsey pointed out that the funds allocated for the City of New Braunfels project as being neutral is appropriate for all items except for the Dissolved Oxygen Aerator projects. This item is an actual increase in funds. The change was noted.

Steve Ramsey moved to approve the 2015 Funding Application to be submitted to the EAA Board. Tom Taggart seconded. There was no objection.

Break

11. Approval of minutes from the September 18, 2014 Implementing Committee meetings.

Andy Sansom moved to approve the September 18th meeting minutes. Tom Taggart seconded. There was no objection.

12. Staff report: Update and possible action on the current status of Refugia implementation.

Mr. Pence gave a presentation on the Refugia program and where implementation is in relation to the goals of the EAHCP. The presentation can be found on the EAHCP website (eahcp.org).

Andy Sansom asked about the EAHCP's responsibility under the Endangered Species Act if the species held in the Refugia facility become extinct in the wild. EAHCP staff and USFWS will discuss this point and revisit the question at a later date.

Adam Zerrenner, USFWS, made a comment about the process to amend the contracted services for Refugia stated in the EAHCP.

Darcy Frownfelter, EAA General Counsel, expanded on the possible response from the Texas Attorney General regarding EAA's questions on entering into a contract with USFWS.

Andy Sansom motioned to direct the Program Manager to prepare an amendment to the EAHCP and Incidental Take Permit (ITP) to allow EAHCP staff to contract with someone else other than the USFWS. Tom Taggart seconded. There was no objection.

13. Consider future meetings, dates, locations, and agendas.

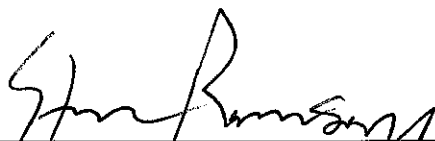
The next Implementing Committee Meeting is scheduled for November 20th at the Edwards Aquifer Authority. Items on the agenda could include:

- 2015 Refugia Work Plan.
- Options from various NAS reports.
- Approval to contract HDR to model for VISPO continuation.
- Edwards Aquifer Program Benefits
- Contract with Bogges Communications for a quarterly Newsletter.

14. Questions from the public.

Todd Votteler mentioned some details about the first Hill Country Water Summit on December 5th. An agenda will be distributed soon.

15. Adjourn – 11:49 a.m.



Steve Ramsey, Secretary



MEETING MINUTES

NOVEMBER 20, 2014

1. **Call to order**--Establish that all Committee members are present or represented- 9:03 am.
Members present included: Tom Taggart (San Marcos), Roland Ruiz (Edwards Aquifer Authority (EAA)), Steve Ramsey (New Braunfels), Chuck Ahrens (San Antonio Water System, (SAWS)), Juan Guerra representing Andrew Sansom (Texas State University), and Charlie Hickman representing Todd Votteler (Guadalupe-Blanco River Authority).
2. **Public Comment.**
No comment.
3. **Approval of minutes from the October 16, 2014 Implementing Committee meetings.**
Chuck Ahrens moved for approval. Roland Ruiz seconded. There was no objection.
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 Update**
Nathan Pence, EAHCP Program Manager, explained the details of the October 2014 budget.
 - **Springflows and Index Well Levels.**
Mr. Pence presented to the Implementing Committee current springflow and index well levels. The Committee discussed anticipated 2015 conditions in comparison to the January 1, 2014 levels.
 - **Aquifer Storage and Recovery (ASR) Enrollment Update and SAWS ASR Operations Update.**
Chuck Ahrens told the Implementing Committee that SAWS recently began storage into the ASR facility at about 30 million gallons a day. This facility has eased the overall pumping of the Edwards Aquifer. Currently, there are 68,761 AF stored in the ASR. Mr. Ahrens stated SAWS expects to have a heavy "Recovery" year in 2015.
 - **ASR Work Group Recommendation implementation update.**
Mr. Pence discussed current discussions about the "Pooling" recommendation which was a recommendation developed by the ASR Work Group. This recommendation proposes to utilize year-end excess permitted water for the ASR leasing program.
 - **Annual Report Update.**
Alicia Reinmund-Martinez, EAHCP Director, explained the timeline of the Annual Report deliverables.
 - **USFWS response to the informational memo related to methodologies for removal of sediment from the San Marcos River.** Mrs. Reinmund-Martinez discussed the

USFWS response indicating no concern with the methodology change because it did not result in additional Take of the Covered Species.

- Additional items:
 - National Academy of Sciences - Mr. Pence updated the Implementing Committee on the status of the report due at the beginning of 2015. EAHCP staff expects the report in February and will present the information to the Implementing Committee soon after it is received.
 - Schlitterbahn HCP- Mr. Pence indicated a HCP process for Schlitterbahn has begun and is in its infancy. A public meeting is scheduled for November 25, 2014.
 - Edwards Aquifer Historical Conflicts- Texas State University Geography program will be hosting a conference on this topic on January 20, 2015.

5. Discussion and possible action authorizing the Program Manager to execute a contract with HDR, Inc. for hydrological modeling associated with the ASR and VISPO springflow protection measures.

Mr. Pence presented to the Implementing Committee the details of an HDR proposal to explore the comparative benefits in increasing Voluntary Irrigation Suspension Program Option (VISPO) water and decreasing ASR water to ensure the program maintains compliance with the Incidental Take Permit. Mr. Pence's presentation is available online at eahcp.org.

There was discussion about budget implications with changes to either the VISPO or ASR programs. Mr. Pence indicated a "worst-case-scenario" analysis is being done on the budget to determine the effects if various springflow protection measures are triggered. Discussion followed.

Mr. Ahrens communicated he will support the primary modeling proposal but would not support the optional or second part of modeling proposal at this time. He expressed concern on using a trigger analysis based on J-17 well levels rather than the rolling average recharge amounts. Discussion followed.

There was a discussion pertaining to the development of the modeling proposals. The committee wanted to identify various options for a refined proposal.

The Implementing Committee finally decided they would like staff to refine the proposal before considering going forward.

6. Presentation of and possible action to authorize the Program Manager to execute a contract with Boggess Communications for a quarterly EAHCP Newsletter.

Mrs. Reinmund-Martinez presented the proposal provided by Boggess Communication to begin an outreach effort through a quarterly electronic Newsletter. The intended audience and goals of this Newsletter was discussed. Also, Mrs. Reinmund-Martinez stated this is an additional effort to inform the public about HCP activities and not for compliance to the ITP.

Chuck Ahrens moved for approval. Roland Ruiz seconded. There was no objection.

7. Presentation and possible action to approve the amended methodology in calculating the annual Take Estimate.

Mr. Pence presented the potential affect of the proposed amended methodology used in calculating the annual Take estimate. Mr. Ed Oborny with BioWest Inc. provided additional technical information. Presentation is available online at eahcp.org.

Steve Ramsey moved to approve the methodology change as presented. Tom Taggart seconded. There was no objection.

8. Presentation and possible action approving the amended City of San Marcos/Texas State University 2015 Work Plan to include the Sessom Creek Sand Bar Removal project.

Melani Howard, City of San Marcos/Texas State University, presented the amendment, which includes adding the remaining work for the Sand Bar Removal project to their 2015 Work Plan. She indicated the amendment will not change the overall budget. Additionally, Ms. Howard presented the modified methodology to remove the Sessom Creek Sand Bar. She stated this modification was approved by the Science Committee at its November 5 meeting.

Tom Taggart moved for approval of the amended 2015 Work Plan. Juan Guerra seconded. There was no objection.

9. Presentation and possible action to approve the EAA 2015 Refugia Work Plan.

Mr. Pence presented the details of the 2015 EAA Refugia Work Plan which was developed to reflect recent conversations between USFWS and EAHCP staff. Presentation is available online at eahcp.org.

Chuck Ahrens moved to approve the Work Plan. Roland Ruiz seconded. There was no objection.

10. Presentation of and possible action to authorize the Program Manager to submit a minor amendment to the EACHP and the ITP pertaining to Refugia.

Mr. Pence presented the draft-Minor Amendment letter pertaining to Refugia services. There was discussion of how EAA's procurement process for Refugia services would be affected if the Texas Attorney General's opinion concluded the EAA could contract with the USFWS. Discussion followed.

Roland Ruiz moved for approval of the amendment letter to be sent to USFWS. Tom Taggart seconded. There was no objection.

11. Consider future meetings, dates, locations, and agendas.

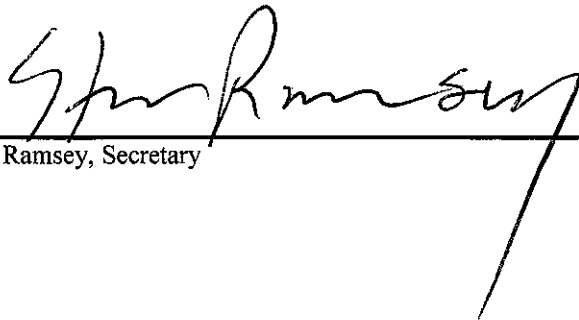
- December 18 will be the annual joint meeting of the Stakeholder Committee, Science Committee, and Implementing Committee. The annual joint meeting will summarize 2014 activities and the 2015 work plans.

- Benefits of Edwards Programs and the EAHCP.
- J-17 forecast and an update on drought conditions.

12. Questions from the public.

Lynn Fahlquest, USGS, asked if the modeling proposed by HDR will have any sort of sensitivity analysis. Larry Land, HDR, said there was no plan to do so due to the amount of work required.

13. Adjourn. 11:10 am



Steve Ramsey, Secretary



December 04, 2014

Mr. Adam Zerrenner
United States Fish and Wildlife Services
Austin Ecological Services Field Office
107011 Burnet Road, Suite 200
Austin, Texas 78758

RE: Minor Administrative Amendment of the Edwards Aquifer Habitat Conservation Plan (EAHCP) and the Incidental Take Permit (ITP) #TE-63663A-0 related to the Refugia Program

This letter, submitted on behalf of the Edwards Aquifer Authority (EAA), the City of New Braunfels (CoNB), the City of San Marcos (CoSM), the San Antonio Water System (SAWS), and Texas State University (collectively the Permittees), seeks a minor administrative amendment to both the Edwards Aquifer Habitat Conservation Plan (EAHCP) and the Incidental Take Permit #TE-63663A-0 to allow the EAA to contract with entities other than the USFWS (Service) for a functioning Refugia Program for the EAHCP Covered Species. This letter is submitted pursuant to Section 9.2.1 of the EAHCP.

Section 5.1.1 of the EAHCP and Condition K of the ITP both state the EAA will support and coordinate with the Service on the work relating to the San Marcos Aquatic Resource Center's operation and maintenance of off-site Refugia at the Service's San Marcos, Uvalde and Inks Dam facilities. The Permittees seek your formal acceptance on this minor amendment to allow the EAA to develop a Refugia Program with contractors potentially other than the Service, while maintaining compliance with the EAHCP and ITP. Exhibit 1 includes the specific amendment language for Section 5.1.1. of the EAHCP and for Condition K of the ITP.

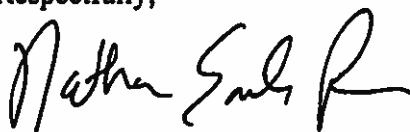
Since December 2012, the EAA and the Service have been working towards a mutual agreement on a contract, scope of work and budget for off-site Refugia to be operated and maintained by the Service at its facilities. During this process, the EAA, in consultation with its general counsel, expressed concerns relating to the ownership of new facilities and payment methods required by the Service and thus determined that it may not have the legal authority to contract with the Service under the terms and conditions as proposed by the Service.

This minor administrative amendment is not a substantive change in the EAHCP or the ITP, as it does not change the requirement to provide a series of Refugia, with back-up populations, to house and protect adequate populations of the Covered Species. Nor does this amendment result in additional Take of the Covered Species.

To ensure transparency in the implementation of the EAHCP, the Implementing Committee¹ provided the public the opportunity to comment on this minor administrative amendment during its October 16, 2014 and November 20, 2014 meetings. The agendas from these meetings are included as Exhibits 2 and 3 and the minutes from the meetings are included as Exhibits 4 and 5.

The reduced springflows in both the Comal and San Marcos systems for several weeks calls attention to the need for expediting the development of a Refugia Program. Your approval of this amendment will allow the EAA to implement this critical aspect of the EAHCP. With this said, the EAA, the Implementing Committee, and I look forward to your formal acceptance of this amendment. We appreciate your consideration and response on this issue.

Respectfully,



Nathan Pence
Program Manager
Edwards Aquifer Authority
Habitat Conservation Plan

¹ The Implementing Committee (representing the five Permittees and the Guadalupe-Blanco River Authority as a non-voting member) unanimously approved this letter at their meeting on November 20, 2014.

Exhibit 1: Administrative Amendment of the Edwards Aquifer Habitat Conservation Plan,
Section 5.1.1. And ITP# TE-63663A-0 Condition K

The following excerpted paragraphs from the EAHCP and the ITP are amended with
strikethrough (eliminated) text and with bolded (added) text.

Edwards Aquifer Habitat Conservation Plan

~~§5.1.1 San Marcos National Fish Hatchery and Technology Center, Uvalde National Fish
Hatchery, and Inks Dam National Fish Hatchery—~~ Refugia

~~“The EAA will support and coordinate with the USFWS on the work relating to the San Marcos
NFHTC’s operation and maintenance of a series of off-site refugia at USFWS’s San Marcos,
Uvalde, and Inks Dam facilities. (See Section 6.4). The limited geographic distribution of these
species leaves the populations vulnerable to extirpation throughout all or a significant part of
their range. A series of refugia, with back-up populations at other facilities, will preserve the
capacity for these species to be re-established in the event of the loss of population due to a
catastrophic event such as the unexpected loss of springflow or a chemical spill.~~

The support of the refugia will augment the existing financial and physical resources of ~~these
facilities~~ **USFWS**, and provide supplementary resources for appropriate research activities, as
necessary, to house and protect adequate populations of Covered Species and expanded
knowledge of their biology, life histories, and effective reintroduction techniques. The use of this
support will be limited to the Covered Species in this HCP.”

ITP# TE-63663A-0

Condition K

~~“The EAA will support and coordinate with the U.S. Fish and Wildlife Service (Service) on the
work relating to the San Marcos NFHTC’s operation and maintenance of a series of off-site
refugia at USFWS’s San Marcos, Uvalde, and Inks Dam facilities. (Section 6.4 of the HCP). The
support of the refugia will augment the existing financial and physical resources of these
facilities the Service, and provide supplementary resources for appropriate research activities, as
necessary, to house and protect adequate populations of Covered Species and expanded
knowledge of their biology, life histories, and effective reintroduction techniques. The use of this
support will be limited to the Covered Species in the EARIP HCP.”~~



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 9:00 am on **Thursday, October 16, 2014 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), Chuck Ahrens (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- 9:00 am.
2. Public Comment.
3. Approval of minutes from the September 18, 2014 Implementing Committee meetings (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.
 - 2015 Implementing Committee Meeting Dates (Attachment 2)
 - Update on meeting with USFWS on October 1st.
 - ASR Work Group Recommendations Update.
 - Budget Update (Attachment 3).
 - Springflows and Index Well Levels.
 - ASR Update (Attachment 4)
 - RWCP Work Group Update.
 - Implementation Permits Update.
 - Submittal of a letter to USFWS regarding the change in methodology in San Marcos/TXState Sediment Removal Project (Attachment 5).
 - Permittee material submittal dates for the 2014 Annual Report (Attachment 6).
5. Staff Report: VISPO implementation and status (Attachment 7 & 8).

Exhibit 1

Purpose: To inform the Implementing Committee members of the triggering and current enrollment of VISPO 2015 forbearance as well as the budget impacts.

Action: None required.

6. **Staff Report: Presentation of the benefits Edwards Aquifer programs have had on the Aquifer levels and Springflows (Attachment 9).**

Purpose: To provide the Implementing Committee with modeled results showing quantifiable benefits of Edwards Aquifer programs.

Action: None required.

7. **Staff Report: Clarifications and Amendments acceptance/approval by USFWS.**

i. **Condition M Clarification Letter:** September 23, 2014, Approval received on September 30, 2014 (Attachment 10).

ii. **NAS Clarification Letter:** October 18, 2013.

iii. **FMA Amendment:** November 22, 2013.

Purpose: To provide the Implementing Committee members an update on communications between EAHCP staff and USFWS on response for amendments and clarifications.

Action: None required.

8. **Presentation and possible action to approve pursuing a contract with Boggess Communications to draft and distribute quarterly EAHCP newsletters (Attachment 11).**

Purpose: To provide the Implementing Committee a chance to discuss and possibly approve the use of Boggess Communication in drafting and distributing quarterly newsletters for the EAHCP program.

Action: To consider possible approval for the Program Manager to enter into a contract with Boggess Communication to produce EAHCP newsletters.

9. **Presentation and possible action to approve the City of New Braunfels amended 2015 Work Plan (Attachment 12).**

Purpose: To provide the Implementing Committee the opportunity to review and discuss the City of New Braunfels amended 2015 Work Plan.

Action: To consider possible approval the City of New Braunfels amended 2015 Work Plan.

10. **Presentation and possible action to approve the 2015 Funding Applications to be submitted to the EAA Board (Attachment 13-16).**

Purpose: To provide the Implementing Committee to opportunity to review and discuss the 2015 EAHCP Funding Application.

Action: To consider possible approval to submit the 2015 Funding Applications to the EAA Board.

11. **Staff report: Update and possible action on the current status of Refugia implementation.**

Purpose: To inform the Implementing Committee members of the steps taken on implementing Refugia.

Action: None required.

12. Consider future meetings, dates, locations, and agendas.

- i. The next Implementing Committee Meeting is scheduled for November 20th at the Edwards Aquifer Authority.**
 - o 2015 Refugia Work Plan.**
 - o Options from various NAS reports.**

13. Questions from the public.**14. Adjourn.**



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 **9:00 am on Thursday, November 20, 2014 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), Chuck Ahrens (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- 9:00 am.
2. Public Comment.
3. Approval of minutes from the October 16, 2014 Implementing Committee meetings (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 Update (Attachment 2).
 - Springflows and Index Well Levels.
 - ASR Enrollment Update and SAWS ASR Operations Update (Attachment 3)
 - ASR Work Group Recommendation implementation update
 - Annual Report Update
 - USFWS response to the informational memo related to methodologies for removal of sediment from the San Marcos River.
5. Discussion and possible action authorizing the Program Manager to execute a contract with HDR, Inc. for hydrological modeling associated with the ASR and VISPO springflow protection measures. (Attachment 4)
Purpose: To allow for discussion on modeling approach, assumptions and deliverables included in the Scope of Work provided by HDR, Inc.
Action: Authorize the Program Manager to enter into a modeling contract with HDR, Inc.

6. Presentation of and possible action to authorize the Program Manager to execute a contract with Boggess Communications for a quarterly EAHCP Newsletter (Attachment 5).
Purpose: To provide the Implementing Committee the opportunity to comment on utilizing Boggess Communications for quarterly Newsletters.
Action: To possibly approve contracting with Boggess Communications for a quarterly Newsletter.
7. Presentation and possible action to approve the amended methodology in calculating the annual Take Estimate.
Purpose: To provide the Implementing Committee with the rationale behind including Texas Wild Rice in calculating the Take of Fountain Darters.
Action: To possibly approve the proposed methods in calculating Take.
8. Presentation and possible action approving the amended City of San Marcos/Texas State University 2015 Work Plan to include the Sessom Creek Sand Bar Removal project (Attachment 6).
Purpose: To provide the Implementing Committee the opportunity to comment on and discuss the amended Work Plan by the City of San Marcos/Texas State University.
Action: To possibly approve the amended Work Plan as presented.
9. Presentation and possible action to approve the EAA 2015 Refugia Work Plan (Attachment 7 & 8)
Purpose: To present the proposed 2015 Refugia Work Plan for Implementing Committee comment and discussion.
Action: To possibly approve the 2015 Refugia Work Plan.
10. Presentation of and possible action to authorize the Program Manager to submit a minor amendment to the EAHCP and the ITP pertaining to Refugia (Attachment 9).
Purpose: To present to the Implementing Committee the proposed amendment for Refugia.
Action: To possibly approve the proposed amendment.
11. Consider future meetings, dates, locations, and agendas.
 - Annual Meeting Stakeholder Committee, Science Committee, and Implementing Committee – past years activities and next year's work plans
 - Benefits of Edwards Programs and the EAHCP
12. Questions from the public.
13. Adjourn.



IMPLEMENTING MEETING MINUTES

October 16, 2014

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

In attendance were: Tom Taggart (Chair), City of San Marcos; Chuck Ahrens, San Antonio Water System (SAWS); Steve Ramsey, City of New Braunfels; Roland Ruiz, Edwards Aquifer Authority (EAA); Andy Samson, Texas State University and Todd Votteler, Guadalupe-Blanco River Authority (GBRA).

2. **Public Comment.**

No comment.

3. **Approval of minutes from the September 18, 2014 Implementing Committee meetings.**
This item was postponed due to a lack of a quorum. Andrew Sansom and Todd Votteler arrived later in the meeting and a motion was made at that time. See item #11 below.

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.**

Nathan Pence, Program Manager, updated the Implementing Committee on the following topics:

- 2015 Implementing Committee Meeting Dates.
- Update on meeting with United States Fish and Wildlife Services (USFWS) on October 1st.
- ASR Work Group Recommendations Update.
- Budget Update.
- Springflows and Index Well Levels.
Chuck Ahrens discussed briefly the impacts of limited rainfall on the aquifer levels this time of year and its comparison to historical data.
- Aquifer Storage Recovery (ASR) Update.
Chuck Ahrens gave an update on SAWS ASR. Tom Taggart discussed some of the initiatives the City of San Marcos is undertaking to assist in EAHCP ASR program.
- Regional Water Conservation Program (RWCP) Work Group Update.
- Implementation Permits Update.

Mr. Pence discussed the effort Edwards Aquifer Habitat Conservation Plan (EAHCP) staff has initiated with HDR Inc. to rectify all permit issues experienced by the City of San Marcos/Texas State University and the City of New Braunfels.

- Submittal of a letter to USFWS regarding the change in methodology in San Marcos/Texas State University Sessom Creek Sediment Sand Bar Removal Project. Mr. Pence presented the draft Informational Memorandum. There was no action required by the Committee because they had approved the submittal at a previous meeting.
- Mr. Pence provided the Committee the submittal dates for the 2014 Annual Report and an update on the National Academy of Science expected completion of its first report.

5. Staff Report: Voluntary Irrigation Suspension Program Option (VISPO) implementation and status.

Rick Illgner presented an overview of the triggering of VISPO on October 1st. This presentation is available on the EAHCP website (eahcp.org). The Committee asked Mr. Illgner to explain the difference in the enrollment by county and the HCP goals for each county. Enrollment in Uvalde County exceeded its HCP goal by 177%, while enrollment in the eastern counties, collectively reached only 29% of their goal.

Mr. Pence discussed the success of the current VISPO program and if enrollment were able to continue, it could enhance meeting overall springflow protection program goals as a whole. Chuck Ahrens mentioned, due to ASR system capacity, the overall benefit experienced from the SAWS ASR program this year will continue in future years.

Tom Taggart mentioned the partnership the City of San Marcos and EAA is building for an ASR commitment. Mr. Taggart recognized the success of VISPO enrolment and program initiation this year and suggested a possible modeling exercise to determine benefits for continued enrollment.

6. Staff Report: Presentation of the benefits Edwards Aquifer programs have had on the Aquifer levels and Springflows.

This presentation was tabled until the next meeting.

7. Staff Report: Clarifications and Amendments acceptance/approval by USFWS.

Mr. Pence updated the Implementing Committee about written and verbal response on the following Clarification letters.

- i. Condition M Clarification Letter: September 23, 2014, Approval was received from USFWS on September 30, 2014.
- ii. NAS Clarification Letter: October 18, 2013. USFWS provided a verbal agreement. They conveyed that no written confirmation is necessary.
- iii. FMA Amendment: November 22, 2013. USFWS provided verbal agreement. They conveyed that no written confirmation is necessary.

8. Presentation and possible action to approve pursuing a contract with Boggess Communications to draft and distribute quarterly EAHCP newsletters.

This presentation was tabled until the next meeting.

9. Presentation and possible action to approve the City of New Braunfels amended 2015 Work Plan.

Mr. Pence introduced this agenda item and the rationale for the amended Work Plan. Mark Enders, the City of New Braunfels, presented the details of the amended Work Plan to the Implementing Committee. The presentation can be found on the EAHCP website (eahcp.org).

Ed Oborny expanded on the Gill Parasite initiative and the rationale for completing the study and collecting additional data on parasites.

Andy Sansom moved to approve the City of New Braunfels amended Work Plan. Chuck Ahrens seconded. There was no objection.

10. Presentation and possible action to approve the 2015 Funding Applications to be submitted to the EAA Board.

Mr. Pence presented the 2015 Funding Application for all EAHCP programs to be submitted to the EAA Board.

Steve Ramsey pointed out that the funds allocated for the City of New Braunfels project as being neutral is appropriate for all items except for the Dissolved Oxygen Aerator projects. This item is an actual increase in funds. The change was noted.

Steve Ramsey moved to approve the 2015 Funding Application to be submitted to the EAA Board. Tom Taggart seconded. There was no objection.

Break

11. Approval of minutes from the September 18, 2014 Implementing Committee meetings.

Andy Sansom moved to approve the September 18th meeting minutes. Tom Taggart seconded. There was no objection.

12. Staff report: Update and possible action on the current status of Refugia implementation.

Mr. Pence gave a presentation on the Refugia program and where implementation is in relation to the goals of the EAHCP. The presentation can be found on the EAHCP website (eahcp.org).

Andy Sansom asked about the EAHCP's responsibility under the Endangered Species Act if the species held in the Refugia facility become extinct in the wild. EAHCP staff and USFWS will discuss this point and revisit the question at a later date.

Adam Zerrenner, USFWS, made a comment about the process to amend the contracted services for Refugia stated in the EAHCP.

Darcy Frownfelter, EAA General Counsel, expanded on the possible response from the Texas Attorney General regarding EAA's questions on entering into a contract with USFWS.

Andy Sansom motioned to direct the Program Manager to prepare an amendment to the EAHCP and Incidental Take Permit (ITP) to allow EAHCP staff to contract with someone else other than the USFWS. Tom Taggart seconded. There was no objection.

13. Consider future meetings, dates, locations, and agendas.


The next Implementing Committee Meeting is scheduled for November 20th at the Edwards Aquifer Authority. Items on the agenda could include:

- o 2015 Refugia Work Plan.
- o Options from various NAS reports.
- o Approval to contract HDR to model for VISPO continuation.
- o Edwards Aquifer Program Benefits
- o Contract with Boggess Communications for a quarterly Newsletter.

14. Questions from the public.

Todd Votteler mentioned some details about the first Hill Country Water Summit on December 5th. An agenda will be distributed soon.

15. Adjourn – 11:49 a.m.



Steve Ramsey, Secretary

**MEETING MINUTES**

NOVEMBER 20, 2014

1. **Call to order**--Establish that all Committee members are present or represented- 9:03 am.
Members present included: Tom Taggart (San Marcos), Roland Ruiz (Edwards Aquifer Authority (EAA)), Steve Ramsey (New Braunfels), Chuck Ahrens (San Antonio Water System, (SAWS)), Juan Guerra representing Andrew Sanson (Texas State University), and Charlie Hickman representing Todd Votteler (Guadalupe-Blanco River Authority).
2. **Public Comment.**
No comment.
3. **Approval of minutes from the October 16, 2014 Implementing Committee meetings.**
Chuck Ahrens moved for approval. Roland Ruiz seconded. There was no objection.
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 Update**
Nathan Pence, EAHCP Program Manager, explained the details of the October 2014 budget.
 - **Springflows and Index Well Levels.**
Mr. Pence presented the Implementing Committee current springflow and index well levels. The Committee discussed anticipated 2015 conditions in comparison to the January 1, 2014 levels.
 - **Aquifer Storage and Recovery (ASR) Enrollment Update and SAWS ASR Operations Update.**
Chuck Ahrens told the Implementing Committee that SAWS recently began storage into the ASR facility at about 30 million gallons a day. This facility has eased the overall pumping of the Edwards. Currently, there are 68,761 AF stored in the ASR. Mr. Ahrens stated SAWS expects to have a heavy "Recovery" year in 2015.
 - **ASR Work Group Recommendation implementation update.**
Mr. Pence discussed current discussions about the "Pooling" recommendation which was a recommendation developed by the ASR Work Group. This recommendation proposes to utilize year-end excess permitted water for the ASR leasing program.
 - **Annual Report Update.**
Alicia Reinmund-Martinez, EAHCP Director, explained the timeline of the Annual Report deliverables.
 - **USFWS response to the informational memo related to methodologies for removal of sediment from the San Marcos River.** Mrs. Reinmund-Martinez discussed the USFWS

response of no concern the methodology change because it did not result in additional Take of the Covered Species.

- Additional items:
 - National Academy of Sciences - Mr. Pence updated the Implementing Committee on the status of the report due at the beginning of 2015. EAHCP staff will expect the report in February and will present the information received to the Implementing Committee as soon as it is received.
 - Schlitterbahn HICP- Mr. Pence discussed that a HICP process for Schlitterbahn has begun and is in its infancy. A public meeting is scheduled for November 25, 2014.
 - Edwards Aquifer Historical Conflicts- Texas State University Geography program will be hosting a conference on this topic on January 20, 2015.

5. Discussion and possible action authorizing the Program Manager to execute a contract with HDR, Inc. for hydrological modeling associated with the ASR and VISPO springflow protection measures.

Mr. Pence presented to the Implementing Committee the details of an HDR proposal to explore the comparative benefits in increasing Voluntary Irrigation Suspension Program Option (VISPO) water and decreasing ASR water to ensure the program maintains compliance with the Incidental Take Permit. Mr. Pence's presentation is available online at eahcp.org.

There was discussion about budget implications with changes to either the VISPO or ASR programs. Mr. Pence discussed that a "worst-case-scenario" analysis is being done with the budget to determine what the effect there will be if various springflow protection measures are triggered. Discussion followed.

Mr. Ahrens communicated that he will support the primary modeling proposal but would not support the optional or second part of modeling proposal at this time. He expressed concern on using a trigger analysis based on J-17 well levels rather than the rolling average recharge amounts. Discussion followed.

There was a discussion pertaining to the development of the modeling proposals. The committee wanted to identify various options for a refined proposal.

The Implementing Committee finally decided that they would like staff to refine this proposal before they approve going forward.

6. Presentation of and possible action to authorize the Program Manager to execute a contract with Boggess Communications for a quarterly EAHCP Newsletter.

Mrs. Reinmund-Martinez presented the proposal provided by Boggess Communication to begin an outreach effort through a quarterly electronic Newsletter. The intended audience and goals of this Newsletter was discussed. Also, Mrs. Reinmund-Martinez stated that this is an additional effort to inform the public about HICP activities and not for compliance to the ITP.

Chuck Ahrens moved for approval. Roland Ruiz seconded. There was no objection.

7. Presentation and possible action to approve the amended methodology in calculating the annual Take Estimate.

Mr. Pence presented the potential affect of the proposed amended methodology used in calculating the annual Take estimate. Mr. Ed Oborny with BioWest Inc. provided additional technical information. Presentation is available online at eahcp.org.

Steve Ramsey moved to approve the methodology change as presented. Tom Taggart seconded. There was no objection.

8. Presentation and possible action approving the amended City of San Marcos/Texas State University 2015 Work Plan to include the Sessom Creek Sand Bar Removal project.

Melani Howard, City of San Marcos/Texas State University, presented the amendment, which includes adding the remaining work for the Sand Bar Removal project to their 2015 Work Plan. She expressed that the amendment will not change the overall budget. Additionally, Ms. Howard presented the modified methodology to remove the Sessom Creek Sand Bar. She stated this modification was approved by the Science Committee at its November 5 meeting.

Tom Taggart moved for approval of the amended 2015 Work Plan. Juan Guerra seconded. There was no objection.

9. Presentation and possible action to approve the EAA 2015 Refugia Work Plan.

Mr. Pence presented the details of the 2015 EAA Refugia Work Plan which was developed to reflect recent conversations between USFWS and EAHCP staff. Presentation is available online at eahcp.org.

Chuck Ahrens moved to approve the Work Plan. Roland Ruiz seconded. There was no objection.

10. Presentation of and possible action to authorize the Program Manager to submit a minor amendment to the EAHCP and the ITP pertaining to Refugia.

Mr. Pence presented the draft-Minor Amendment letter pertaining to Refugia services. There was discussion of how EAA's procurement process for Refugia services would be affected if the Texas Attorney General's opinion concluded that EAA could contract with the USFWS. Discussion followed.

Roland Ruiz moved for approval of the amendment letter to be sent to USFWS. Tom Taggart seconded. There was no objection.

11. Consider future meetings, dates, locations, and agendas.

- December 18 will be the annual joint meeting of the Stakeholder Committee, Science Committee, and Implementing Committee. The annual joint meeting will summarize 2014 activities and the 2015 work plans.
- Benefits of Edwards Programs and the EAHCP.
- J-17 forecast.

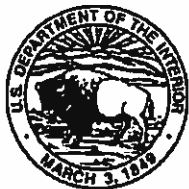
12. Questions from the public.

Lynn Fahlquest, USGS, asked if the modeling proposed by HDR will have any sort of sensitivity analysis. Larry Land, HDR, said there was no plan to do so due to the amount of work that it would require.

13. Adjourn. 11:10 am

Steve Ramsey, Secretary

DRAFT



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Post Office Box 1306
Albuquerque, New Mexico 87103



In Reply Refer To:
FWS/R2/ES-ER/059284

JAN 21 2015

Mr. Karl J. Dreher
Edwards Aquifer Recovery Implementation Program
dba EARIP
1615 N. St. Mary's Street
San Antonio, Texas 78215

Dear Mr. Dreher:

Enclosed is your Fish and Wildlife Service – Endangered Species Act – Incidental Take Permit amendment (TE63663A-1). We would like to extend our sincere appreciation for your participation in the Habitat Conservation Program. Conserving, and ultimately recovering, threatened and endangered species must be a cooperative endeavor, and we thank you for your stewardship efforts.

If you have any comments or questions, please contact Adam Zerrenner at the Austin Ecological Services Field Office of the U.S. Fish and Wildlife Service at 512-490-0057. Thank you again for your commitment to the conservation of endangered species.

Sincerely,

Assistant Regional Director
Ecological Services

Enclosures



DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE

FEDERAL FISH AND WILDLIFE PERMIT

3-201
(1/97)

2. AUTHORITY-STATUTES
16 USC 1539(a)(1)(B)
REGULATIONS (Attached)
50 CFR §§ 13 & 17

3. NUMBER
TE-63663A-1

4. RENEWABLE
[x] YES
[] NO

5. MAY COPY
[x] YES
[] NO

6. EFFECTIVE
1/20/2015

7. EXPIRES
3/31/2028

1. PERMITTEE

Edwards Aquifer Recovery Implementation Program
dba EA RIP
1615 N St Mary's Street
San Antonio, Texas 78215

8. NAME AND TITLE OF PRINCIPAL OFFICER (if #1 is a business)
Karl J. Dreher
General Manager

9. TYPE OF PERMIT
Endangered & Threatened Species – Incidental
Take – Habitat Conservation Plan

10. LOCATION WHERE AUTHORIZED ACTIVITY MAY BE CONDUCTED: Within Bexar, Medina, Atascosa, Comal, Caldwell, Hays, and Guadalupe counties, Texas.

11. CONDITIONS AND AUTHORIZATIONS:

- A. General conditions set out in subpart d of 50 CFR 13, and specific conditions contained in Federal regulations cited in block #2, above, are hereby made a part of this permit. All activities authorized herein must be carried out in accordance with and for the purposes described in the application submitted. Continued validity, or renewal, of this permit is subject to complete and timely compliance with all applicable conditions, including the filing of all required information and reports.
- B. The validity of this permit is also conditioned upon strict observance of all applicable foreign, state, local or other federal law. This permit does not waive the obligation to abide by other foreign, state, local or federal law in carrying out authorized activities.
- C. Valid for use by permittees named above.

12. REPORTING REQUIREMENTS: Annual Report due March 31 of each year the permit is in effect.

ISSUED BY: *Michelle Shaughnessy*
Michelle Shaughnessy

TITLE
ARD – Ecological Services

DATE
1/21/15

PERMIT TERMS & CONDITIONS – EA RIP HCP

TE63663A-1

The Edwards Aquifer Recovery Implementation Plan (EARIP) consists of the Edwards Aquifer Authority (EAA); the City of San Antonio, acting by and through its San Antonio Water System, (hereinafter SAWS); the City of San Marcos; the City of New Braunfels; and Texas State University (Permittees).

- D. Acceptance of the permit serves as evidence that the Permittees agree to abide by all conditions stated. Terms and conditions of the permit are inclusive. Any activity not specifically permitted is prohibited. Please read through these conditions carefully as violations of permit terms and conditions could result in your permit being suspended or revoked. Violations of your permit terms and conditions that contribute to a violation of the Endangered Species Act (ESA) could also subject Permittees to criminal or civil penalties.
- E. The authorization granted by this Permit will be subject to full and complete compliance with, and implementation of, the EARIP HCP and all specific conditions contained herein. The Permit terms and conditions shall supersede and take precedence over any inconsistent provisions in the HCP or other program documents.
- F. This permit does not include incidental take coverage for any federal facility which withdraws groundwater from the Edwards Aquifer.
- G. **COVERED SPECIES:** This permit only authorizes incidental take of animal species, or impacts to plant species of the following 11 species:

<u>Common Name</u>	<u>Scientific Name</u>	<u>ESA Status</u>
Fountain Darter	<i>Etheostoma fonticola</i>	Endangered
San Marcos Gambusia	<i>Gambusia georgei</i>	Endangered
Comal Springs Dryopid Beetle	<i>Stygoparnus comalensis</i>	Endangered
Comal Springs Riffle Beetle	<i>Heterelmis comalensis</i>	Endangered
Peck's Cave Amphipod	<i>Stygobromus pecki</i>	Endangered
Texas Wild Rice	<i>Zizania texana</i>	Endangered
Texas Blind Salamander	<i>Eurycea (=Typhlomolge) rathbuni</i>	Endangered
San Marcos Salamander	<i>Eurycea nana</i>	Threatened
Texas cave diving beetle	<i>Haideoporus texanus</i>	Petitioned
Comal Springs Salamander	<i>Eurycea sp.</i>	Petitioned
Texas Troglotic Water Slater	<i>Lirceolus smithii</i>	Petitioned

PERMIT TERMS & CONDITIONS – EA RIP HCP

TE63663A-1

H. **INCIDENTAL TAKE AUTHORIZATION:** The following amount of incidental take is authorized by this permit over the 15 year permit term:

1. No more than 797,000 fountain darters in Comal Springs, Landa Lake and the Comal River, and no more than 549,129 fountain darters in the San Marcos Springs, Spring Lake, and San Marcos River.
2. No more than 11,179 Comal Springs riffle beetles.
3. No more than 1,543 Comal Springs dryopid beetles.
4. No more than 18,224 Peck's cave amphipod.
5. No more than 10 Texas Blind salamanders.
6. No more than 263,857 San Marcos salamanders.
7. Incidental take of the Texas cave diving beetle will be provided for individuals of the species killed, harmed, or harassed by springflows with monthly averages above 50.5 cfs (1.43 cms) during HCP Phase I; and by springflows with monthly averages above 51.2 cfs (1.45 cms) during Phase II at San Marcos Springs, if and when this species is listed as threatened or endangered and as long as the HCP is fully implemented. Take limits will be exceeded if these minimum flow rates are not met.
8. Incidental take of the Texas troglobitic water slater will be provided for individuals of the species killed, harmed, or harassed by springflows with monthly averages above 50.5 cfs (1.43 cms) during HCP Phase I; and by springflows with monthly averages above 51.2 cfs (1.45 cms) during Phase II at San Marcos Springs, if and when this species is listed as threatened or endangered and as long as the HCP is fully implemented. Take limits will be exceeded if these minimum flow rates are not met.
9. Incidental take of the Comal Springs salamander will be provided for individuals of the species killed, harmed, or harassed by springflows with monthly averages above 27 cfs (0.76 cms) during HCP Phase I and by monthly averages above 45 cfs (1.27 cms) during Phase II at Comal Springs if and when this species is listed as threatened or endangered, as long as the HCP is fully implemented. Take limits will be exceeded if these minimum flow rates are not met.

I. The endangered San Marcos gambusia has not been collected since 1982 and may no longer exist in the wild, but the Service will provide incidental take coverage for individuals of this species resulting from the covered activities if the species is located or becomes re-established within the Permit Area, as long as the HCP is fully implemented.

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- J. **COVERED AREA:** This permit only authorizes incidental take of covered species within all of Bexar, Medina, and Uvalde counties, and parts of Atascosa, Comal, Caldwell, Hays, and Guadalupe counties (Permit Area), Figure 1.2 in the HCP.
- K. The EAA will support, and coordinate with the U.S. Fish and Wildlife Service (Service) on, a series of off-site refugia (Section 6.4 of the HCP). The support of the refugia will augment the existing financial and physical resources of the Service and provide supplementary resources for appropriate research activities, as necessary, to house and protect adequate populations of Covered Species and expanded knowledge of their biology, life histories, and effective reintroduction techniques. The use of this support will be limited to the Covered Species in the EARIP HCP.
- L. **COVERED ACTIVITIES – BY PERMITTEE**
1. **Edwards Aquifer Authority (EAA) – Covered activities for which incidental take is authorized:**
 - a. **Programs that implement the statutory functions of the EAA Act, including:**
 - i. Authorization of withdrawals by persons who are both authorized under the EAA Act and the EAA's rules to withdraw groundwater from the Edwards Aquifer within the jurisdictional boundaries of the EAA.
 - ii. Authorization of withdrawals from the Edwards Aquifer pursuant to a change in permit under the EAA's permit administration rules in subchapter L of Chapter 711 and for owners and lessees making withdrawals under such a change in permit.
 - iii. Withdrawals due to the authorization of a "conversion" of "base" water into "unrestricted" water (EAA Rules §§ 711.338-.342) from the irrigator installing water conservation equipment such that less water is required for irrigation of the historically irrigated land (EAA Act § 1.34(b)) or when the historically irrigated lands that provided the basis for the issuance of the initial regular permit have been developed and are no longer farmed under the circumstances described in the EAA rules.
 - iv. Withdrawals from the Edwards Aquifer pursuant to the Critical Period Management Plan described in Section 5.1.4 of the HCP.
 - b. **The minimization and mitigation measures that the EAA will either implement, or for which it bears responsibility for having implemented, as identified in Chapter 5 of the HCP include:**
 - i. Voluntary Irrigation Suspension Program Option (Section 5.1.2).
 - ii. Regional Water Conservation Program (Section 5.1.3).
 - iii. Critical Period Management – Stage V (Section 5.1.4).
 - iv. Expanded Water Quality Monitoring (Section 5.7.5).
 - v. Impervious Cover/Water Quality Protection (Section 5.7.6)
 2. **City of New Braunfels – Covered activities for which incidental take is authorized:**

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- a. Recreational activities within the City of New Braunfels's jurisdiction that are facilitated in any respect by the City of New Braunfels, including, but not limited to swimming, wading, tubing, boating, canoeing, kayaking, scuba diving, snorkeling, and fishing, in accordance with all applicable laws and regulations (Section 2.3.1 of the HCP).
 - i. The City of New Braunfels will limit recreational access to the spring runs to the Wading Pool in Spring Run 2; and prohibit recreation within the old channel with the exception of Schlitterbahn operations within its present location (Section 5.2.3 of the HCP).
 - ii. Where recreation is facilitated by commercial outfitting businesses, the City of New Braunfels will extend their incidental take coverage to participating businesses through Certificates of Inclusion (Section 5.2.3 of the HCP).
- b. Management of the ecosystems of Comal Springs, Landa Lake, and the Comal River. The City operates gates, culverts, and dam structures from Landa Lake to the Old Channel (three culverts), New Channel U.S. Geological Survey (USGS) Weir, Springfed Pool Inlet, Wading Pool Weir, Clemens Dam, USGS Weir (known as "Stinky Falls"), Golf Course Weir, and Mill Pond Dam (joint New Braunfels Utility and City of New Braunfels operation) to maintain constant flow in the Comal River, maintain constant elevations of large pools, and regulate flow regimes in the old and new channels during high and low flow events (Sections 2.3.2 and 2.3.3 of the HCP).
- c. Diversion of water from the Comal River in accordance with State law. The City of New Braunfels is authorized to divert 8 acre feet (9,868 cubic meters) per year of water from the Old Channel and impound it in the pool (TCEQ Permit 18-3826) as a non-consumptive use because the water is returned to the Old Channel (Section 2.3.4 of the HCP).
- d. Maintenance and operation of the spring-fed pool (including routine cleaning, algae removal, chemical application pursuant to label instructions, and filling/emptying) in accordance with the HCP (Section 2.3.4 of the HCP).
- e. The City of New Braunfels' operation of boats on the Comal River and Landa Lake for research, enforcement, litter collection, and maintenance activities (section 2.3.5 of the HCP).
- f. The minimization and mitigation measures that the City of New Braunfels will either implement, or has responsibility for having implemented, as identified in Chapter 5 of the HCP include:
 - i. Management of river flow between old and new channels of the Comal River (Section 5.2.1)
 - ii. Restoration and maintenance of native aquatic vegetation (Section 5.2.2)
 - iii. Management of public recreational use of Comal Springs and the Comal River (Section 5.2.3)

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- iv. Removal of decaying vegetation and dissolved oxygen management (Section 5.2.4)
- v. Management of harmful non-native animal species (Sections 5.2.5 and 5.2.9)
- vi. Monitoring and management of the non-native introduced trematode *Centrocestus formosanus* that parasitizes the fountain darter (Sections 5.2.6 and 6.3.6 of the HCP).
- vii. Prohibition of hazardous materials transport across the Comal River and its tributaries (Section 5.2.7)
- viii. Restoration of native riparian vegetation (Section 5.2.8 and 5.7.1)
- ix. Reduction of non-native species introduction and live bait prohibitions (Section 5.2.9)
- x. Litter Collection and Floating Vegetation Management (Section 5.2.10)
- xi. Management of Golf Course Diversions and Operations (5.2.11)
- xii. Management of Household Hazardous Wastes (Section 5.7.5)
- xiii. Impervious Cover/Water Quality Protection (Section 5.7.6)
- xiv. Removal of sediment (Section 5.2.2.1)

3. City of San Marcos – Covered activities for which incidental take is authorized:

- a. Recreational activities within the City of San Marcos's jurisdiction, including, but not limited to, swimming, wading, tubing, boating, canoeing, kayaking, golfing, snorkeling, SCUBA diving, and fishing, in accordance with all applicable laws and regulations (Section 2.4. of the HCP).
 - i. Establishment of permanent access points for recreation and closure of unauthorized access points (Sections 5.3.2 and 5.3.7 of the HCP).
 - ii. Where recreation is facilitated by commercial outfitting businesses, the City of San Marcos will extend their incidental take coverage to participating businesses through Certificates of Inclusion (Section 5.3.2.1 of the HCP).
 - iii. The City of San Marcos will enforce trespassing laws to prevent the public from accessing the river via private property, without property owner's permission (Section 5.3.2.1 of the HCP).
 - iv. The City of San Marcos will create an appropriate buffer zone by location to keep picnic tables, pop-up tents, shelters, and portable grills away from the river to reduce litter in the river and decrease bank compaction and /or erosion (Section 5.3.2.1 of the HCP).
 - v. The City of San Marcos will educate river users and the community about applicable regulations and the importance of protecting the area's natural resources (section 5.3.2.1 of the HCP).
- b. The City of San Marcos' operation of boats on the San Marcos River and Spring Lake for research, enforcement, litter collection, and maintenance activities (section 2.4.2 of the HCP). Only electric trolling motors are permitted and no gasoline or petroleum fueled boats are allowed on Spring Lake.
- c. Routine, minor repairs of infrastructure and facilities associated with or located on City of San Marcos property that are adjacent to or directly affect the San Marcos

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Springs and River ecosystem (Section 2.4.3 of the HCP). Routine, minor repairs would include activities such as repairs to access points along the river, but would not involve any activity requiring a U.S. Army Corps of Engineers (USACE) § 404 permit or authorization which may require a section 7 consultation by the USACE.

- d. The mitigation and minimization measures that the City of San Marcos will either implement, or has the responsibility of having implemented, as identified in Chapter 5 of the HCP include:
 - i. Enhancement and restoration of Texas Wild-rice (Section 5.3.1 of the HCP)
 - ii. Management of public recreation at San Marcos Springs and the San Marcos River (Section 5.3.2 of the HCP)
 - iii. Management of aquatic vegetation and litter below Sewell Park (Section 5.3.3)
 - iv. Prohibition of hazardous materials transport across the San Marcos River and its tributaries (Section 5.3.4 of the HCP)
 - v. Reduction of non-native species introduction (Section 5.3.5 of the HCP)
 - vi. Removal of harmful erosion-related sediment below Sewell Park (Section 5.3.6 of the HCP)
 - vii. Designation of permanent access points and bank stabilization (Section 5.3.7 of the HCP)
 - viii. Management of non-native plant species (Section 5.3.8 of the HCP)
 - ix. Management of harmful non-native and predator species (Section 5.3.9 of the HCP)
 - x. Restoration of native riparian vegetation (Section 5.7.1 of the HCP)
 - xi. Implementation of a City of San Marcos septic system registration and permitting program (Section 5.7.3 of the HCP)
 - xii. Management of potentially contaminated runoff (Section 5.7.4 of the HCP)
 - xiii. Implementation of a City of San Marcos household hazardous waste program (Section 5.7.5 of the HCP)
 - xiv. Implementation of water quality protection and an impervious cover limitation program (Section 5.7.6 of the HCP)

4. Texas State University – Covered activities for which incidental take is authorized:

- a. Recreational activities within the University's jurisdiction in the San Marcos River and Spring Lake; including, but not limited to, swimming, wading, tubing, boating, canoeing, kayaking, golf, diving, snorkeling and fishing, in accordance with all applicable laws and regulations (Section 2.5.1 of the HCP).
 - i. Establishment of permanent access points for recreation, and closure of unauthorized access points (Section 5.4.2 of the HCP).
 - ii. Remove floating vegetation mats and litter from the River (Section 5.4.3.1 of the HCP).
 - iii. Inorganic litter will be picked up weekly from the San Marcos River from Sewell Park to City Park during the recreational season (Memorial Day to Labor Day) and monthly during off-season (Section 5.4.3.2 of the HCP).

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- iv. Operation and management of boating and kayaking activities at Spring Lake (Section 5.4.10 of the HCP).
- b. Educational activities, including:
 - i. Diving for Science Program – trains volunteers to SCUBA in Spring Lake in a manner that protects listed species in order to assist with ecosystem maintenance activities including, but not limited to, algae and litter removal. Participants are required to be under the supervision of the Diving Supervisor, who will be an employee or representative of the Permittee (Texas State University) (Section 2.5.3.1 of the HCP).
 - ii. Texas State University Continuing Education SCUBA Classes – use of Spring Lake for no more than 10 check-out dives per semester. This use is limited to the Dive Training Area (approximately 0.5 acres [2,140 square meters] in size) (Section 2.5.3.2 in the HCP).
 - iii. Texas State University SCUBA Classes – SCUBA classes limited to a maximum of 3 classes per day, with no more than 12 students per class. This use is limited to the Dive Training Area (Section 2.5.3.3 of the HCP).
 - iv. Research activities in Spring Lake, in accordance with all applicable laws and regulations (Section 2.5.4 of the HCP).
 - v. Texas State University canoeing and kayaking classes in Spring Lake and Sewell Park (Section 2.5.7 of the HCP).
- c. Management of the ecosystems of the San Marcos River and Springs, its boating activities in Spring Lake and Sewall Park.
- d. The permitted diversion of water from Spring Lake and the San Marcos River in accordance with applicable laws and regulations (Section 2.5.5 of the HCP).
- e. Ongoing operation and maintenance of the existing nine-hole University golf course and grounds (section 2.5.6 of the HCP).
- e. Minimization and mitigation measures that the University will either implement, or has responsibility for having implemented, as identified in Chapter 5 of the HCP include:
 - i. Enhancement and restoration of Texas Wild-rice (Sections 5.3.1 & 5.4.1 of the HCP)
 - ii. Management of public recreation at San Marcos Springs and in the San Marcos River (Section 5.4.2 of the HCP)
 - iii. Management of aquatic vegetation from Sewell Park to City Park (Section 5.4.3 of the HCP)
 - iv. Removal of harmful erosion-related sediment in Spring Lake and from Spring Lake Dam to City Park (Section 5.4.4 of the HCP)
 - v. Management of surface water diversion (Section 5.4.5 of the HCP)
 - vi. Restoration of native riparian vegetation (Section 5.7.1 of the HCP)

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- vii. Removal of harmful erosion-related sand bar in Sessom Creek Sand (Section 5.4.6 of the HCP)
 - viii. Management of research programs in Spring Lake (Section 5.4.8 of the HCP)
 - ix. Reduction of non-native species introduction (Sections 5.4.11 & 5.7.1 of the HCP)
 - x. Management of non-native plant species (Section 5.4.12 of the HCP)
 - xi. Management of harmful non-native and predator species (Section 5.4.13 of the HCP)
- 5. San Antonio Water System (SAWS) – Covered activities for which incidental take is authorized:
 - a. Pumping from the Edwards Aquifer and for use and operation of the SAWS ASR (Section 2.6 of the HCP).
 - b. Minimization and mitigation measures and measures that SAWS will either implement, or has responsibility for having implemented, as identified in Chapter 5 of the HCP include:
 - i. Use of the SAWS ASR for Springflow Protection. (Section 5.5.1).
 - ii. Phase II Expanded Use of the SAWS ASR and Water Resources Integration Program Pipeline. (Section 5.5.2).
- M. The Permittees are jointly responsible for the following measures that specifically contribute to recovery and for which incidental take is authorized:
 - 1. Comal Springs, Landa Lake, and the Comal River:
 - a. The Permittees will limit disturbance of the (a) substrate, (b) water quality, (c) plants, and (d) animals, including invertebrates, of the Comal Springs, Landa Lake, and Comal River to no more than 10% of the occupied habitat on an annual basis when implementing HCP measures such as habitat and riparian restoration efforts that may directly or indirectly affect species considered here; and,
 - b. The Permittees will suspend activities such as habitat restoration and riparian restoration that may result in disturbance of the (a) substrate, (b) water quality, (c) plants, and (d) animals, including invertebrates, of the Comal Springs, Landa Lake, and the Comal River when Comal Springflows decline to 130 cfs or lower.
 - 2. San Marcos Springs, Spring Lake, and the San Marcos River:
 - a. The Permittees will limit disturbance of the (a) substrate, (b) water quality, (c) plants, and (d) animals, including invertebrates, of the San Marcos Springs, Spring Lake, and the San Marcos River to no more than 10% of the occupied habitat on an annual basis when implementing HCP measures such as habitat and riparian restoration efforts that may directly or indirectly affect species considered here; and,

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- b. The Permittees will suspend activities such as habitat restoration and riparian restoration that may result in disturbance of the (a) substrate, (b) water quality, (c) plants, and (d) animals, including invertebrates, of the San Marcos Springs, Spring Lake, and the San Marcos River when San Marcos Springflows decline to 120 cfs or lower.
- N. Upon locating a dead, injured, or sick individual of the covered species, or any other endangered or threatened species, the Permittee is required to contact the Service's Law Enforcement Office in Austin, Texas, (512) 490-0948 for care and disposition instructions. Extreme care should be taken in handling sick or injured individuals to ensure effective and proper treatment. Care should also be taken in handling dead specimens to preserve biological materials in the best possible state for analysis of cause of death. In conjunction with the care of sick or injured endangered/threatened species, or preservation of biological materials from a dead specimen, the Permittee and any contractor/subcontractor has the responsibility to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed.
- O. Conditions of the permit shall be binding on, and for the benefit of, the Permittees and any successors and/or assignees. If the permit requires an amendment because of change of ownership, the Service will process it in accordance with regulations (50 CFR 13.23). Any new Permittee must meet issuance criteria per regulations at 50 CFR 13.25. The covered activities proposed or in progress under the original permit may not be interrupted, provided the conditions of the permit are being followed and authorized incidental take limits will not be exceeded (See Term and Condition Q).
- P. If, during the tenure of the permit, the project design and/or the extent of the habitat impacts is altered, such that there may be an increase in the anticipated take of covered species, the Permittees are required to contact the Service's Austin Ecological Services Office (ESFO) and obtain an amendment to this permit before commencing any construction or other activities that might result in take beyond that authorized by this permit. If authorized take is exceeded, all activities that are shown to cause take must immediately cease and any take above that authorized shall be reported to the Austin Ecological Services Field Office (505/490-0057) within 48 hours.
- Q. If actions associated with implementation of the EARIP HCP are shown to result in incidental take of listed species not covered by this permit, those activities that are shown to cause take must immediately cease and any take that has occurred shall be reported to the Austin Ecological Services Field Office (505/490-0057) within 48 hours.
- R. CHANGED CIRCUMSTANCES
1. The EARIP provides measures for the following changed circumstances (Section 8.8.1 – Table 8-8 of the HCP):
 - a. New species listings or new critical habitat designations
 - b. Covered Species adversely affected by an acute pollution event

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- c. Covered Species adversely affected by invasive species
- d. Covered Species adversely affected by flooding
- e. Inability to use the Phase I SAWS ASR as set out in Section 5.5 to achieve springflow protection
- f. Recreational activities having adverse effects
- g. Provision of financial assurances for any necessary Phase II measures
- h. The Phase II presumptive measure is unable to function as expected within the stated assumptions.
- i. EAA-Specific Changed Circumstances regarding water withdrawal (i.e. pumping) permits:
 - i. EAA authorization of withdrawals from the Edwards Aquifer for the owners or lessees making such withdrawals pursuant to a term permit (Section 8.1 of the HCP).
 - ii. EAA authorization of any withdrawals under an emergency permit and for the owners or lessees making the authorized withdrawals under any emergency permit (Section 8.1 of the HCP).
 - iii. EAA authorization of any withdrawals under recharge recovery permits and for the owners or lessees of the water making the authorized withdrawals under any recharge recovery permit (Section 8.1 of the HCP).
- 2. Changed Circumstances not provided for in the HCP (Section 8.1.2):
 - a. Invasion by exotic species and/or habitat-specific or species-specific disease that threaten Covered Species or their habitats and which cannot be effectively controlled by currently available methods or technologies or which cannot be effectively controlled without resulting in greater harm to other Covered Species than to the affected Covered Species.

T. MONITORING REQUIREMENTS

- 1. The Permittees will monitor compliance with the HCP and provide an annual report as described below.
- 2. The Permittees will develop a monitoring program to determine whether progress is being made toward meeting the long-term biological goals and objectives.
- 3. The Permittees will develop and oversee a monitoring program to identify and assess potential impacts, including incidental take, from Covered Activities and provide a better

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understanding and knowledge of the species' life cycles and desirable water quality- and springflow-related habitat requirements of the Covered Species (section 6.3 of the HCP).

U. Annual Reporting:

1. The EARIP Applicants will provide an annual report, due on March 31 of each year, to:

U.S. Fish and Wildlife Service
Austin Ecological Services Field Office
10711 Burnet Road, Suite 200
Austin, Texas 78758

U.S. Fish and Wildlife Service, Region 2
Habitat Conservation Plans and Research Permits
P.O. Box 1306, Room 6034
Albuquerque, New Mexico 87103

2. The report will document the Permittees' activities and permit compliance for the previous year, thus documenting progress toward the goals and objectives of the EARIP HCP and demonstrating compliance with the terms and conditions of this incidental take permit. The annual report will include:
 - a. EAA Permitted withdrawals
 - b. Reference well levels
 - c. Springflows at Comal and San Marcos Springs
 - d. Aquifer recharge
 - e. Aquifer discharge from wells and springflow
 - f. Critical period management reductions
 - g. Water quality data
 - h. Location of sampling sites
 - i. Methods for data collection and variables measured
 - j. Frequency, timing, and duration of sampling for the variables
 - k. Description of the data analysis and who conducted the analysis
3. The report will document HCP Management activities, including:
 - a. Adaptive management activities undertaken during the year

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- b. Expenditures by the EAA on implementation activities
 - c. Proposed activities for the next year
 - d. Report on the status of implementation of minimization and mitigation measures and their effectiveness
 - e. Interim updates and final copies of any research, thesis or dissertation, or published studies accomplished in association with the EARIP or HCP
 - f. Description of species-specific research and management actions undertaken with specific reference to the biological goals and objectives identified for each species
 - g. Any changes to the Biological Goals and Key Management and Flow-related Objectives of the HCP and the reasons for such changes
 - h. Any changes to the objectives for the monitoring program
 - i. Effects on the Covered Species or Permit Area
 - j. Evaluation of progress toward achieving the Biological Goals and Objectives.
 - k. Any recommendations regarding actions to be taken
4. Information provided in the annual report will be used to determine what, if any, adaptive management strategies should be implemented to most effectively implement the conservation program outlined in the EARIP HCP and to ensure that management changes in response to new, appropriate data are implemented in a timely fashion.

***** End of Permit TE-63663A-1 *****



MEETING MINUTES

November 19, 2015

1. Call to order.

Todd Votteler was not present. GBRA did not have representation. All others members were present or represented. Juan Guerra was present for Andy Sansom, Texas State University.

2. Public comment.

No comment.

3. Approval of October 15, 2015 Implementing Committee meeting minutes.

Darren Thompson, SAWS, identified a change to item 9, replace language about “completion of project” to “bid of project.” Revised minutes can be found at eahcp.org.

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.

- Summary of Flood Impacts to EAHCP Restoration in the Comal and San Marcos springs systems.
Nathan Pence, EAHCP Program Manager, reported the current status of springflows and Index Well levels as well as reported on the work done to assess the impacts of the October flood. Mark Enders, City of New Braunfels, reported on the direct impacts of the flood on the Comal River system. Melani Howard, City of San Marcos/Texas State University, reported on the direct impacts of the flood on the San Marcos River system. Both Mr. Pence as well as Tom Taggart, City of San Marcos, explained the impacts to the EAHCP projects. Mr. Pence communicated that the ITP does not require mitigation of Take in the event of a flood but rather only drought directly or indirectly caused by pumping. Mr. Taggart explained that the impacts could have been far worse had it not been for EAHCP projects.
- ASR Operations by SAWS
SAWS is currently storing at 20 MGD. HCP total storage is 17,974 AF as of October 19th. All HCP water made available to SAWS was stored as of mid-October. Mr. Pence reported that EAA has been receiving calls for 2016 leasing.
- Budget Update – There was no discussion.
- National Academy of Sciences October 2015 Meeting Summary
Mr. Pence summarized the most recent visit if the NAS committee. Roland Ruiz, EAA, expressed concern about the tone of the discussion during the October 29th meeting.
- 2015 EAHCP Annual Report Timeline
Mr. Pence summarized the current timeline of deliverables for the 2015 Annual Report.

5. Presentation and discussion on an EAA summary of well permitting and pumping history from 2008 to 2014.

Earl Parker, EAA, reported the background of EAA regulatory pumping framework as well as the pumping summary of 2008 through 2014. Mr. Parker showed despite the highest Critical Period Reductions (35% in San Antonio Pool and 44% in Uvalde Pool), total pumping was below authorized volume by more than 50,000 acre-feet. For 2015, estimated Critical Period Reductions are expected to be approximately 20% for both San Antonio and Uvalde Pool. The full presentation can be found at eahcp.org.

It was recommended for the presentation in the future to include a breakout depiction of VISPO contribution to water conserved/pumped tables and to show recharge rankings (e.g., 2008 was the 8th lowest year on record for recharge). It was asked approximately how much water was associated with exempt wells; Mr. Parker stated he did not know offhand but could find out for the Committee.

6. Presentation and possible approval of a proposed Scope of Work to evaluate methodologies and develop timelines for the EAHCP restoration of native vegetation in the San Marcos and Comal ecosystems as it pertains to achieving the Biological Goals.

Mr. Pence provided the Committee a background of how the FMA describes the Adaptive Management process in terms of the proposed Scope of Work. The Scope of Work described an analysis of current Biological Goals and Objectives of native aquatic vegetation restoration in the San Marcos and Comal systems.

The presentation included additional language to be included in the Scope of Work to provide flexibility for the Program Manager as well as the Implementing Committee to resolve any conflicting recommendations between the two contractors selected for this analysis. Mr. Taggart discussed the rationale for including additional flexibility in the Scope of Work to provide a compromise between the two researchers selected for the analysis. Mr. Pence explained how the funding for this contract will come out of the Program Management budget specifically allocated for Adaptive Management.

Steve Ramsey motioned to adopt the Scope of Work to produce a contract to be executed. Seconded by Juan Guerra. There were no objections.

7. Presentation of and possible approval authorizing the EAHCP Program Manager to submit a letter to USFWS informing them about operational issues and future plans related to: 1) the evaluation of native aquatic vegetation restoration, 2) the source of data for calculating the compliance of Texas wild-rice coverage, and 3) the delay in implementing the flow manipulation in the Old Channel of the Comal River.

Mr. Pence presented the details of a letter to USFWS is to inform them of approaching Adaptive Management Decision Making as well as:

1. The vegetation analysis being done in both San Marcos and Comal springs systems.
2. The reference to TWR coverage numbers from BIO-WEST Inc. and not USFWS.
3. The requirement to increase in flows to the Old Channel of the Comal, described in the HCP, could be harmful. An analysis will be done to determine the best step forward. The letter will request concurrence to the delay in increased flows to the Old Channel so scour will not occur.

Steve Ramsey, City of New Braunfels, asked whether staff has communicated Old Channel flow manipulation subject to USFWS. Mr. Pence said that this motion is to initiate the process to submit formal communication, but there had already been conversation with USFWS prior to developing this request.

Adam Zerrenner with USFWS stated that the EAHCP is doing well and reassured the Committee current work and potential changes are routine and acceptable.

Tom Taggart motioned to approve authorizing the EAHCP Program Manager to submit a letter to USFWS regarding the 1) evaluation of native aquatic vegetation restoration, 2) the source of data for calculating the compliance of Texas wild-rice coverage, and 3) the delay in implementing the flow manipulation in the Old Channel of the Comal River. The motion was seconded by Darren Thompson. There were no objections.

8. Presentation and discussion about a strategic approach for optimizing EAHCP research programs.

Mr. Pence presented the rationale of the Applied Research Work Group based on the NAS Recommendations Review Work Group. The EAHCP conducts research in a variety of different programs including Applied Research, Ecological Modeling, Refugia and Hydrologic Modeling. Mr. Pence described the need was to provide the most productive way to conduct research between all programs within the EAHCP in a collaborative way. Mr. Taggart recommended the importance of cross referencing all research between various programs in the Annual Report.

9. Presentation and possible adoption of the Report of the 2015 Applied Research Work Group for implementation.

Mr. Pence introduced the Work Group's chair, Dr. Tom Arsuffi, to present the Work Group report. Dr. Arsuffi began by commending the Implementing Committee for putting together a Work Group membership that provided productive discussion as well as a great product. Details of the report can be found at eahcp.org.

Darren Thompson motioned to adopt the Applied Research Work Group report. Seconded by Steve Ramsey. There were no objections.

10. Presentation and possible direction authorizing the EAHCP Program Manager to initiate a phased approach for procuring a database for EAHCP data and for conducting a statistical analysis of EAHCP data.

Alicia Reinmund-Martinez, EAHCP Director, presented the details of building an EAHCP database and statistical analysis plan. The full presentation can be found on eahcp.org.

Mr. Taggart said he thought this type of work is very important. He suggested staff begin developing the details to insure long-term administrative success. He also asked about the funding source of this database as well as the "usability" of the product.

Mr. Pence answered that the work will be done through the 2016 funds through various line items dependent on budget expectations. The Scope of Work will include long-term management training for in-house employees. In terms of a usable database, Mrs. Reinmund-Martinez

described various examples of a user friendly interface in addition to a full data center to allow simple searching.

Juan Guerra, Texas State University, asked if a multi-year project cost will be established. Mr. Taggart continued by stating that database management is important in planning for year to year activities.

Juan Guerra motioned to approve the Program Manager to move forward in developing a database management and statistical analysis contract. Tom Taggart seconded. There were no objections.

11. Presentation and possible action to approve the amended 2015 EAA Funding Application to be submitted to the EAA Board.

Mr. Ruiz presented the summary of the 2015 EAA Funding Application to reflect changes to the overall budget to account for NAS invoices received this year for last year's work. All budget increases are within the overall budget.

Tom Taggart motioned to approve the amended 2015 EAA Funding Application as presented. Darren Thompson seconded. There were no objections.

12. Consider future meetings, dates, locations, and agendas.

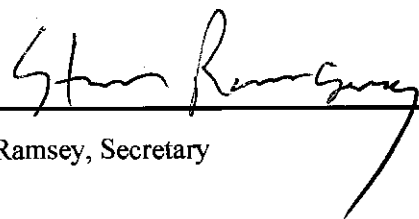
Joint Meeting, December 17, 2015 at the Edwards Aquifer Authority.

- Summary of 2015 work
- Introduction of the Adaptive Management Process

13. Questions from the public.

No comment.

14. Adjourn. 11:55 am



Steve Ramsey, Secretary

9171 9690 0935 0105 1791 41



November 30, 2015

Mr. Adam Zerrenner
United States Fish and Wildlife Services
Austin Ecological Services Field Office
107011 Burnet Road, Suite 200
Austin, Texas 78758

RE: Information Regarding the Edwards Aquifer Habitat Conservation Plan (EAHCP) and the Incidental Take Permit (ITP) #TE-63663A-1, related to Vegetation Restoration in the Comal and San Marcos Springs systems

Dear Adam:

The purpose of this letter is to inform you of issues relating to vegetation restoration in the EAHCP: calculation of Texas Wild-rice coverage, initiation of Adaptive Management for vegetation restoration, and adjustments to flow-split infrastructure operations to the Old Channel of the Comal River.

Calculation of Texas Wild-rice Coverage

Through the Comprehensive Biological Monitoring program, the Edwards Aquifer Authority (EAA) conducts an annual assessment of Texas Wild-rice coverage (TWR) in the San Marcos springs system. This monitoring is required in the EAHCP, but has been conducted for the last 15 years with consistent methodologies and professional staff. We are aware that the San Marcos Aquatic Resource Center (SMARC) also has begun monitoring of TWR coverage. Per the EAHCP, we intend to use the EAHCP generated coverage amounts for the purposes of reporting and compliance.

Native Aquatic Vegetation Restoration and Non-native Species Control

Since 2013, the City of New Braunfels and the City of San Marcos/Texas State University have been removing non-native aquatic vegetation and replacing it with native aquatic vegetation. As would be expected, there have been successes and challenges. To utilize lessons learned and ensure we achieve the goals established in the EAHCP for fountain darter habitat for both the Comal and San Marcos springs system and Texas Wild-rice in the San Marcos system, we have initiated for the first time, formal Adaptive Management as established by the EAHCP and supporting documents. The Permittees have engaged a contractor to perform an analysis of current progress, establish a schedule to accomplish the vegetation restoration Biological Goals in the EAHCP, and make any recommendations for changes needed, based on experience since beginning implementation of the EAHCP. Information derived from this contract will be used by the Implementing Committee to establish needed modifications, if necessary.

Flow-Split Management in the Old and New Channels of the Comal River

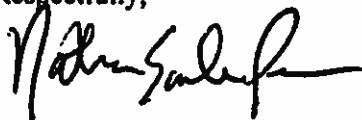
Since the development of Table 5-3 (Flow-split management for Old and New Channels), the past four years of data collection (habitat, flow and darter densities), indicates that increases in flow above 65 cfs to the Old Channel via the Flow-split will not benefit endangered species habitat but conversely start causing destruction of significant amounts of existing habitat. In fact, it is believed that increasing flows to 70 or 80 cfs in the Old Channel will be detrimental to fountain darter habitat especially in the highly restored areas above Elizabeth Street.

With the EAHCP Science Committee support and recommendation, the Permittees will not be increasing the flows in the Old Channel above 65 cfs as currently required by Table 5-3.

The Permittees will use information generated from the Adaptive Management contract above to determine if a new regime of flows for the Old Channel should be implemented.

I am submitting this letter at the direction of the EAHCP Permittees. With this said, the Implementing Committee and I look forward to your concurrence, in writing, to these courses of action on these issues.

Respectfully,



Nathan Pence
Executive Director/Program Manager
Edwards Aquifer Habitat Conservation Plan



United States Department of the Interior

FISH AND WILDLIFE SERVICE

10711 Burnet Road, Suite 200

Austin, Texas 78758

512 490-0057

FAX 490-0974

JAN 15 2016



Edwards Aquifer Habitat Conservation Plan
Nathan Pence, Executive Director/Program Manager
900 E. Quincy
San Antonio, Texas 78215

Dear Mr. Pence:

This letter is in response to your November 30, 2015, letter to the U.S. Fish and Wildlife Service (Service) in which you request the Service to concur with the Edwards Aquifer Habitat Conservation Plan (EAHCP), also known as the Edwards Aquifer Recovery Implementation Program, on three issues clarifying how the EAHCP intends to implement the conservation plan and comply with the Incidental Take Permit (TE-63663A-1). The Service welcomes opportunities like this to assist the EAHCP with understanding and clarifying the terms of the Permit. We have considered the three issues you describe in your letter in the context of both the EAHCP and the Permit.

Firstly, the EAHCP states that it will continue to monitor Texas wild rice in the San Marcos springs system using the same methods that the Edwards Aquifer Authority has previously used for 15 years. It uses the results of the survey to calculate the extent of Texas wild rice in the San Marcos system. The San Marcos Aquatic Resource Center (SMARC) has also started monitoring Texas wild rice annually. The EAHCP is perhaps concerned about the discrepancy between the results of the two 2015 surveys. The SMARC is in its first year of surveying Texas wild and relies on a survey team composed of mostly of volunteers. We expect that over time the two surveys will likely generate Texas wild rice survey results that are more consistent with each other. To that end we would like to invite the biologists from both teams to discuss survey methods and to collaboratively consider ways to reduce the variation in the results. We agree with the EAHCP that it should use the coverage estimates it generates for reporting and permit compliance purposes.

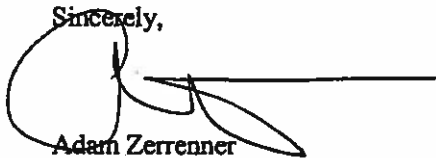
Adaptive management is a required component of every habitat conservation plan. Chapter 6 of EAHCP and Article 7 of the Funding and Management Agreement describe how adaptive management will be incorporated into this habitat conservation program. With respect to native vegetation restoration and the control of non-native species, we agree that the use of adaptive management as described in the EAHCP is appropriate for determining needed modifications. New information may indicate that different plant species or restoration methods may be more effective than those deemed best at the time that the EAHCP was being developed. It is for the EAHCP to determine if additional consulting services are needed to evaluate existing information or conduct additional research.

Finally, regarding the management of the Flow-Split structure, we agree that increasing flows to those in Table 3-3 of the EAHCP may cause scouring and removal of fountain darter habitat. One of the EAHCP objectives for installing the Flow-Split structure is to maximize the quality of habitat in the Old Channel. Therefore, we concur that determining a new flow management regime consistent with the EAHCP Flow-Split objectives is reasonable, and that maintaining flows at 65 cfs to protect habitat in the Old Channel is prudent at this time.

**TAKE PRIDE
IN AMERICA** 

We continue to appreciate the efforts of the EAHCP program towards the conservation of Edwards Aquifer dependent species. Please contact Tanya Sommer at 512-490-0057 if you wish to further discuss these issues.

Sincerely,

A handwritten signature in dark ink, appearing to read 'Adam Zerrenner', with a long horizontal line extending to the right.

Adam Zerrenner
Field Supervisor



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,



Edwards Aquifer Habitat Conservation Plan Nonroutine Adaptive Management Proposal

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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



Edwards Aquifer Habitat Conservation Plan Nonroutine Adaptive Management Proposal

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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

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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 m² 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).

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Edwards Aquifer Habitat Conservation Plan Nonroutine Adaptive Management Proposal

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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,



Edwards Aquifer Habitat Conservation Plan Nonroutine Adaptive Management Proposal

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

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



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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)



Edwards Aquifer Habitat Conservation Plan Nonroutine Adaptive Management Proposal

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

- Identification of geographic locations of restoration reaches¹ (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).



Edwards Aquifer Habitat Conservation Plan Nonroutine Adaptive Management Proposal

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

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 CSRБ 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 CSRБ 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 CSRБ 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 CSRБ 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



Edwards Aquifer Habitat Conservation Plan Nonroutine Adaptive Management Proposal

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- 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.*

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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.



Edwards Aquifer Habitat Conservation Plan Nonroutine Adaptive Management Proposal

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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	<i>Bryophytes</i>	<i>Hygrophila</i> <i>Potamogeton</i>	<i>Ludwigia</i>	<i>Cabomba</i>	<i>Fil. Algae</i>	<i>Sagittaria</i>	<i>Vallisneria</i>
Upper Spring Run Reach	1,850	650	150	0	0	600	0
	1,750	0	25	25		850	
Landa Lake	4,000	250	900	500	0	1250	13,500
	3,950	25				2,250	12,500
Old Channel	150	200	1,500	0	300	0	0
	550	0	425	180		450	
New Channel	150	1,350	0	350	0	0	0
		0	100	2,500			
TOTAL	6,150	2,450	2,550	850	300	1850	13,500
	6,400	25	1,450	3,205		3,550	12,500
Fountain darter median density number/m ²							
	<i>Bryophytes</i>	<i>Hygrophila</i> <i>Potamogeton</i>	<i>Ludwigia</i>	<i>Cabomba</i>	<i>Fil. Algae</i>	<i>Sagittaria</i>	<i>Vallisneria</i>
	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 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	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	4 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)							TOTAL
Study Reach	<i>Bryophytes</i>	<i>Potamogeton</i>	<i>Ludwigia</i>	<i>Cabomba</i>	<i>Sagittaria</i>	<i>Vallisneria</i>	
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)							
	<i>Bryophytes</i>	<i>Potamogeton</i>	<i>Ludwigia</i>	<i>Cabomba</i>	<i>Sagittaria</i>	<i>Vallisneria</i>	TOTAL
	20	3.3	7	7	1	1	
# 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/M²) PER HABITAT TYPE TO DEFINE "RESTORATION REACHES" IN THE SAN MARCOS RIVER

Fountain darter habitat (aquatic vegetation) in meters squared (m ²)							TOTAL
Study Reach	<i>Ludwigia</i>	<i>Cabomba</i>	<i>Potamogeton</i>	<i>Sagittaria</i>	<i>Hydrocotyle</i>	<i>Zizania</i>	
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)							
	<i>Ludwigia</i> 7	<i>Cabomba</i> 7	<i>Potamogeton</i> 5	<i>Sagittaria</i> 1	<i>Hydrocotyle</i> 4	<i>Zizania</i> 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.

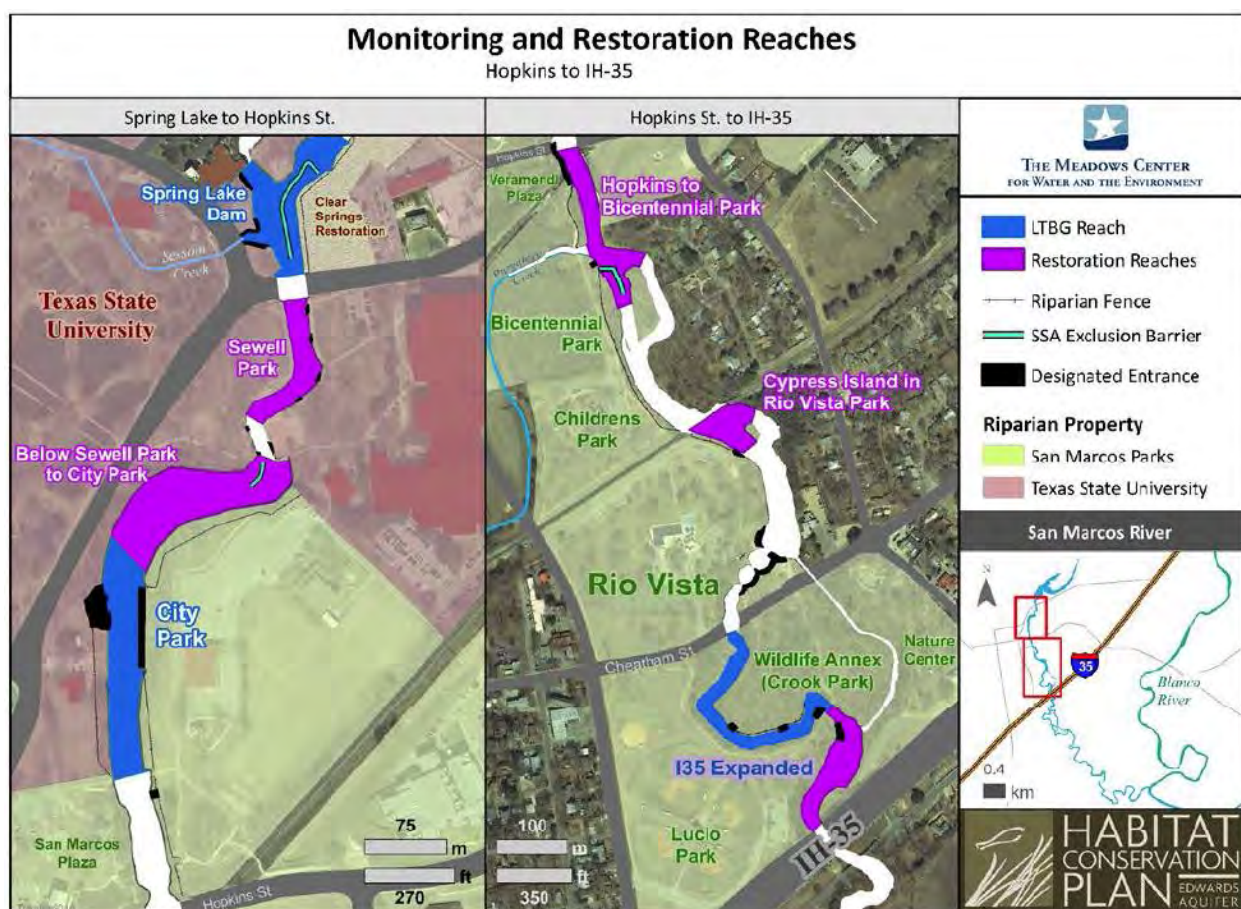


Edwards Aquifer Habitat Conservation Plan Nonroutine Adaptive Management Proposal

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.



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.



SEPTEMBER 9, 2016 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.

**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 proposal¹ 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 m²) 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 <i>Zizania texana</i> 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 <i>Hydrocotyle</i> 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.



MEETING MINUTES
September 15, 2016

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 Wassinech
Secretary

**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.

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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

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Edwards Aquifer Habitat Conservation Plan
EAHCP Stakeholder Committee Report
September 15, 2016**



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

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Edwards Aquifer Habitat Conservation Plan
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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

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



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.

**Nonroutine Adaptive Management Proposal
Edwards Aquifer Habitat Conservation Plan
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- *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



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.

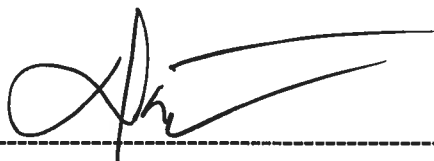
7. Consider future meetings, dates, locations, and agendas.

- 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



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) Reaches¹ 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

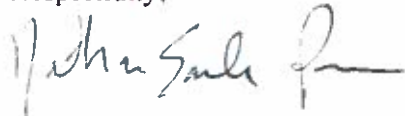
¹ The Long-term Biological Goal (LTBG) Reaches refer to the reaches specified in the EAHCP that determine our Biological Goals for the aquatic vegetation restoration and fountain darter habitat (Table 4-1).

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

EXHIBIT 1

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 Polamogeton	Ludwigia	Cabomba	Fil. Algae	Sagittaria	Vallisneria
Upper Spring Run Reach	4,850 1,750	650 0	450 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	450 550	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 Polamogeton	Ludwigia	Cabomba	Fil. Algae	Sagittaria	Vallisneria
	20	4 3.3	7	7	14	1	1



United States Department of the Interior

FISH AND WILDLIFE SERVICE

10711 Burnet Road, Suite 200

Austin, Texas 78758

512 490-0057

FAX 490-0974



OCT 24 2016

In Reply Refer To:
FWS/R2ES/AFO

Nathan Pence, Program Manager
Edwards Aquifer Habitat Conservation Plan
900 East Quincy
San Antonio, Texas 78215

Dear Mr. Pence:

This letter is in response to your letters dated September 20, 2016, requesting on behalf of the Permittees, to amend the Edwards Aquifer Recovery Implementation Plan Habitat Conservation Plan (EAHCP). The City of New Braunfels, the City of San Marcos, Texas State University, San Antonio Water System, and the Edwards Aquifer Authority (collectively the Permittees) hold an Endangered Species Act permit (TE-63663A-1) and together implement the EAHCP. We appreciate the level communication and documentation that the Permittees have provided with regard to these requests. You discussed your proposals with my staff on several occasions including a meeting on July 7, 2016. In addition, my staff attended meetings of the Science Committee, Stakeholder Committee, and Implementing Committee where these proposals were considered by the permittees, stakeholders, and the public. Recognizing that the Permittees utilized the adaptive management process in the EAHCP to fully consider these changes, we have based the following responses to your letters on the June 2016 *Submerged Aquatic Vegetation Analysis and Recommendations Report* and other information available to us.

1. Amendments to Table 5-3 of the EAHCP

The Flow-Split Management of the Old and New Channel in the Comal River system is intended to complement the ecological restoration of aquatic vegetation, mitigate the impact of low flows, and maximize the quality of fountain darter habitat in the Old Channel (EAHCP section 5.2). By monitoring the effects of Flow-Split Management at different flow levels, the Permittees have refined management of this program to meet the flow management objectives in the EAHCP. Therefore, we agree with your requested changes to the management of the Flow-Split structure in Table 5.3 to reduce scouring of the Old Channel.

2. Amendments to the EAHCP to Define Proportional Expansion and Restoration Reaches

In the context of the EAHCP, the phrase “proportional expansion” refers to the EAHCP objective to restore additional habitat beyond the identified study reaches in equal proportion to the habitat restored in the study reaches (EAHCP section 4.1.1.1 and 4.1.1.2). At the time that the EAHCP was developed, these required additional restoration areas were not identified. The current proposal amends the EAHCP to define specifically where these expanded restoration areas will be located in both the Comal and San Marcos Rivers. The “restoration reaches” will be in addition to the habitat restoration efforts currently underway in the study reaches. The identification of the restoration reaches allows the Permittees to begin planning, budgeting, and implementing restoration in the identified reaches. The identification of the restoration is consistent with the EAHCP requirement for expanded restoration proportional to the amount of restoration implemented in the study reaches.

3. Amendments to the EAHCP Table 4-1 and 4-21

Tables 4-1 and 4-21 in the EAHCP list specific plant species to be used in the restoration of aquatic habitat. The Permittees have found through experience that certain species of aquatic plants are more effective for habitat restoration; therefore, the Permittees propose to make substitutions and additions to the plant species listed in tables 4-1 and 4-21 to maximize restoration efficiency. For example, *Potamogeton* is substituted for *Hydrophila* in the Comal River (Table 4-1), and Texas wild rice is added to the list in the San Marcos system (Table 4-21). Each plant species is associated with an estimated density of fountain darters. Overall, this change will result in approximately 15 percent less estimated fountain darters in the San Marcos River and approximately 15 percent more estimated fountain darters in the Comal River. The requested amendments will improve the sustainability of the habitat restoration efforts, increase Texas wild rice coverage in the San Marcos River, and are consistent with the EAHCP Biological Goals and Objectives. Therefore, we agree to the revisions to Table 4-1 and Table 4-21.

These amendments to the EAHCP do not change the terms and conditions of the U.S. Fish and Wildlife Service permit TE-63663A-1 or change any impacts previously described in the EAHCP, the EAHCP Environmental Impact Statement, or the Service’s Endangered Species Act Section 7 biological opinion. Thank you for your continued commitment to conserving the native species of the Edwards Aquifer.

Sincerely,



Adam Zerrenner
Field Supervisor



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 4-21 of the Edwards Aquifer Habitat Conservation Plan (EAHCP) Biological Goals for fountain darter habitat and amendment regarding the estimated relative abundance of fountain darters within respective reaches in the San Marcos 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 4-21 (p. 4-24) and replace them with native aquatic vegetation goals for the San Marcos 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. Additionally, we seek an amendment to the Biological Goals in regards to a reduction of estimated fountain darter density in the San Marcos Springs ecosystem as a result of this clarification. This letter is submitted pursuant to Section 9.2.1 of the EAHCP.

Clarification: Section 4.1.1 of the EAHCP discusses the Biological Goals and Objectives associated with the Covered Species. Table 4-21 provides guidance to the permittees in square meter coverage of specified aquatic vegetation for designated Long-term Biological Goal (LTBG) Reaches¹ in the San Marcos springs ecosystems. It is proposed that certain changes to Table 4-21 (Exhibit 1) are warranted to properly maintain a diverse community of native aquatic vegetation to maximize fountain darter habitat. These changes include the complete removal of all non-native aquatic vegetation (*Hygrophila polysperma*, *Hydrilla verticillata* and *Vallisneria spiralis*) from the Biological Goals and replacing these goals with native vegetation (*Hydrocotyle umbellata* and *Zizania texana*).

Amendment: As a result of this change, the overall vegetation coverage, and the estimated relative abundance of fountain darters within respective reaches, has been altered. The original table (4-21 in the EAHCP) was calculated to provide habitat for 34,325 estimated fountain darters. Therefore, despite the proposed alterations being beneficial to the overall coverage of native vegetation throughout the system, the estimated densities associated with each vegetation type finds the revised table is calculated to provide habitat for 29,270 estimated fountain darters (a reduction of 5,055 or approximately 15% of the original EAHCP Goal for the San Marcos River). Please note, as a separate clarification, the EAHCP Permittees

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 4-21).

have requested the establishment of "restoration reaches." These additional areas, if accepted, will provide an estimated fountain darter density of 39.210 above our current goals (approximately a 15% increase of the original EAHCP Goal for the San Marcos River).

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 Management Process outlined in the Funding and Management Agreement (FMA) and results in this request to clarify and amend 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 amendment 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 and amendment to allow alterations to Table 4-21 of the EAHCP to reflect removal of all non-native aquatic vegetation in both systems in order to most effectively limit the re-establishment of non-native aquatic vegetation and reduce the associated estimated fountain darter density goals by 5.055. Your approval of this amendment will allow the Permittees to implement this critical aspect of the EAHCP. We look forward to your formal acceptance of the clarification and amendment and appreciate your consideration and response on this issue.

Respectfully,



Nathan Pence

Program Manager

Edwards Aquifer Habitat Conservation Plan

EXHIBIT 1

TABLE 4-21
FOUNTAIN DARTER HABITAT (AQUATIC VEGETATION) IN METERS SQUARED (M2) AND FOUNTAIN DARTER MEDIAN DENSITY
(NUMBER/M2) PER HABITAT TYPE

Study Reach	Fountain darter habitat (aquatic vegetation) goal in meters squared (m ²)							Zizania
	<i>Hygrophila</i>	<i>Ludwigia</i>	<i>Cabomba</i>	<i>Hydrilla</i>	<i>Potamogeton</i>	<i>Sagittaria</i>	<i>Vallisneria Hydrocotyle</i>	
Spring Lake Dam	50	200 100	25 50	400	4,000 200	400 200	425 50	700
City Park	200	4,000 150	50 90	500	2,000 1,450	300	50 10	1,750
IH-35	50	200 50	300 50	400	300 250	400 150	25 50	600
TOTAL	300	4,400 300	375 190	700	3,300 1,900	500 650	200 110	3,050
Fountain darter median density number/m ²								
	<i>Hygrophila</i>	<i>Ludwigia</i>	<i>Cabomba</i>	<i>Hydrilla</i>	<i>Potamogeton</i>	<i>Sagittaria</i>	<i>Vallisneria Hydrocotyle</i>	<i>Zizania</i>
	4	7	7	5	5	1	4 4	5



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 Edwards Aquifer Habitat Conservation Plan (EAHCP) Key Management Objective of "proportional expansion" and creation of "restoration reaches" for the Comal and San Marcos River for the Incidental Take Permit (#TE-63663A-1).

On behalf of the City of New Braunfels, the City of San Marcos, Edwards Aquifer Authority, the San Antonio Water System, and Texas State University (collectively the Permittees of the Incidental Take Permit #TE-63663A-1), I am providing a clarification to the to the Edwards Aquifer Habitat Conservation Plan (EAHCP) Key Management Objective of "proportional expansion" for the Comal and San Marcos Springs ecosystems (EAHCP § 4.1.1.1 and § 4.1.1.2).

One EAHCP key management objective for fountain darter protection calls for extending aquatic vegetation restoration "effort" in equal proportion beyond the established Long-term Biological Goal (LTBG) Reaches¹. This management objective is not geographically or quantitatively defined in the EAHCP, therefore the Permittees are providing a clarification to specifically establish a definition of "proportional expansion" found in § 4.1.1.1 and § 4.1.1.2 for the Comal and San Marcos Rivers respectively. The tables in Exhibits 1 establish estimated aquatic vegetation coverage for the proposed "restoration reaches." Additionally, it is important to note, the aquatic vegetation considered for the "restoration reaches" correspond to the vegetation covered in the proposed clarification and amendment letter simultaneously submitted to your office and not those found in the original EAHCP Tables 4-1 and 4-21.

Additionally, it has been determined that the establishment of the "restoration reaches" will result in additional monitoring. Currently the EAHCP requires the EAA to maintain a comprehensive biological monitoring plan for the term of the ITP (§ 6.3.1). The scope of the Biological Monitoring program currently requires aquatic vegetation mapping of "select reaches." These reaches will, as a result of this clarification, include monitoring of the "restoration reaches" defining "proportional expansion" as well as the LTBG Reaches.

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

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.

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 recommendations 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 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 amendment 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 define the key management objective of "proportional expansion" and establish "restoration reaches" for both the Comal and San Marcos systems. The Permittees 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

cc: EAHCP Implementing Committee

EXHIBIT 1

Key Management Objectives

The long-term biological goals are accompanied by two key management objectives needed to achieve the long-term biological goals. The management objectives for the fountain darter in the Comal Springs/River Ecosystem are (in no particular order):

- Active native vegetation restoration and protection will be implemented in Landa Lake and the Old Channel. Restoration activities will extend beyond the study reaches in equal proportion to effort expended per study area in relation to the total area of Landa Lake and Old Channel. 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 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. For example, if 50 percent of the Old Channel study reach was restored, 50 percent of the entire Old Channel would be subsequently restored. See Table 4-1-1 and Figure 4-1-1 for specified goals and locations associated with this key management objective.

**TABLE 4-1-1
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)							TOTAL
Study Reach	<i>Bryophytes</i>	<i>Potamogeton</i>	<i>Ludwigia</i>	<i>Cabomba</i>	<i>Sagittaria</i>	<i>Vallisneria</i>	
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)							
	<i>Bryophytes</i>	<i>Potamogeton</i>	<i>Ludwigia</i>	<i>Cabomba</i>	<i>Sagittaria</i>	<i>Vallisneria</i>	TOTAL
# darters *veg total	20	3.3	7	7	1	1	
	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

EXHIBIT 1

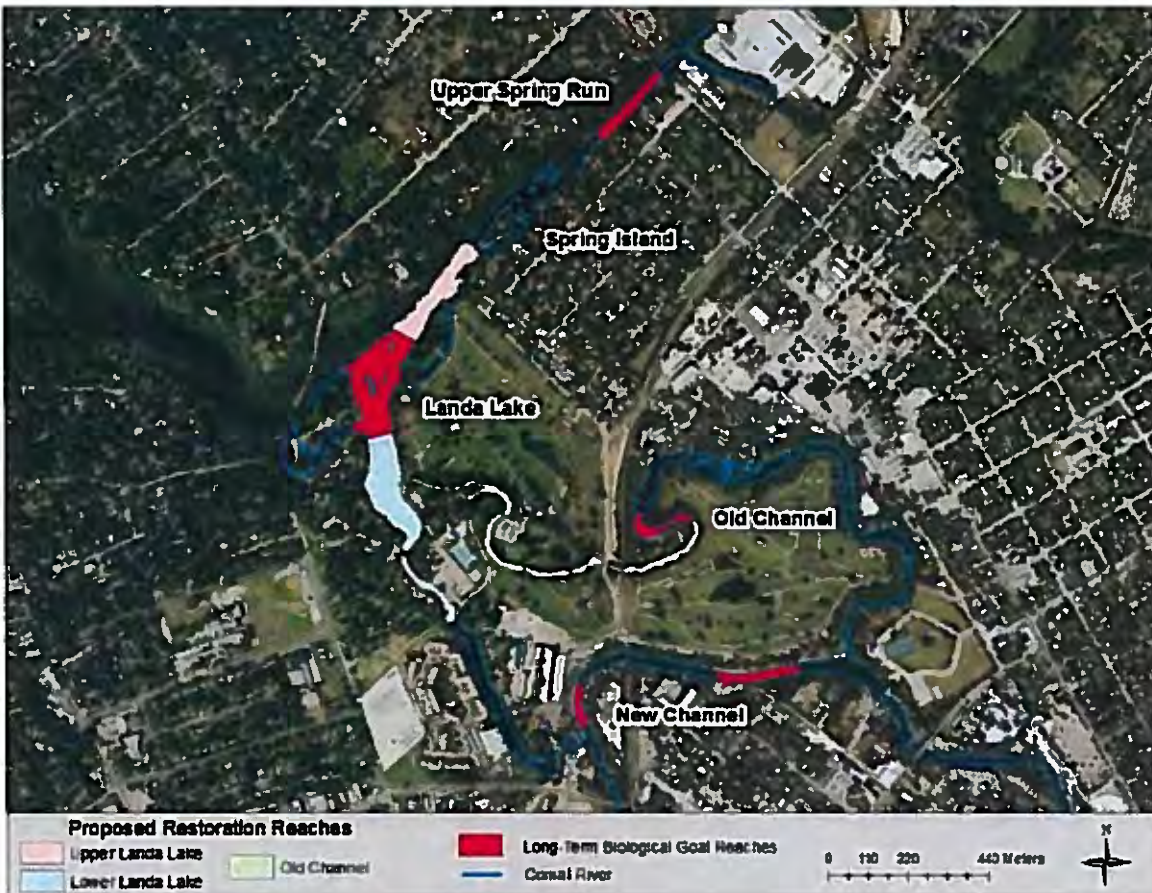


Figure 4-1-1. Long-Term biological goal reaches and proposed “restoration reaches” for the Comal System.

EXHIBIT 1

Key Management Objectives

The long-term biological goals are accompanied by two key management objectives needed to achieve the long-term biological goals. The management objectives for the fountain darter in the San Marcos Springs/River Ecosystem are (in no particular order):

- Active native vegetation restoration and protection will be implemented in all three representative study reaches. Restoration activities will extend beyond the study reaches in equal proportion to effort expended per study area in relation to total river segment. By the establishment of known "restoration reaches" (Figure 4-3-1) in addition to the current study reaches, aquatic vegetation will include 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. For example, if 50 percent of the IH-35 study reach was restored, 50 percent of the area from Rio Vista Dam to IH-35 would be subsequently restored. See Table 4-21-1 and Figure 4-3-1 for specified goals and locations associated with this key management objective.

**TABLE 4-21-1
FOUNTAIN DARTER HABITAT (AQUATIC VEGETATION) IN METERS SQUARED AND
MEDIAN DENSITY (NUMBER/M²) PER HABITAT TYPE TO DEFINE "RESTORATION
REACHES" IN THE SAN MARCOS RIVER**

Fountain darter habitat (aquatic vegetation) in meters squared (m ²)							TOTAL
Study Reach	<i>Ludwigia</i>	<i>Cabomba</i>	<i>Potamogeton</i>	<i>Sagittaria</i>	<i>Hydrocotyle</i>	<i>Zizania</i>	
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)							
	<i>Ludwigia</i> 7	<i>Cabomba</i> 7	<i>Potamogeton</i> 5	<i>Sagittaria</i> 1	<i>Hydrocotyle</i> 4	<i>Zizania</i> 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

EXHIBIT 1

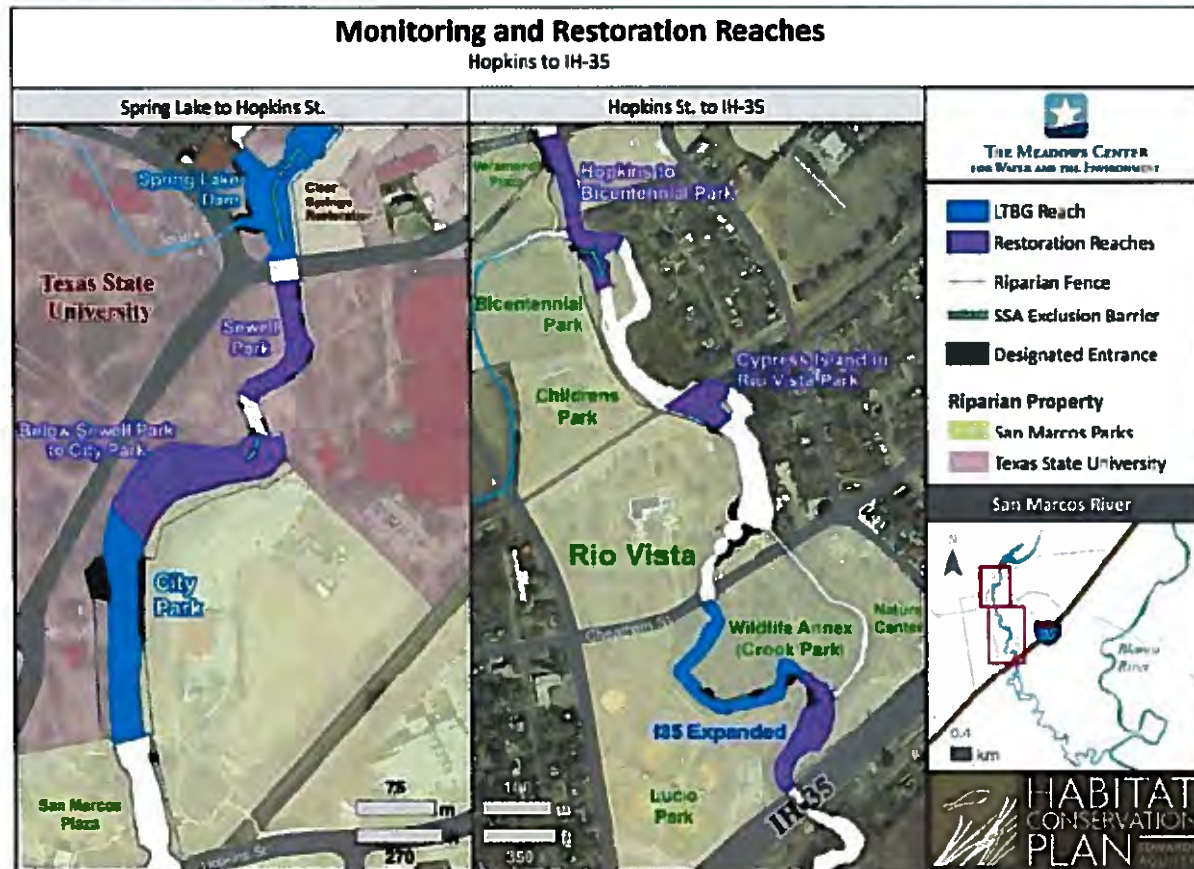


Figure 4-3-1. Long-Term biological goal reaches and proposed "restoration reaches" for the San Marcos System

AGENDA FOR THE
**San Antonio Water System Aquifer Storage and
Recovery Regional Advisory Group**

In support of

The Edwards Aquifer Habitat Conservation Plan

Customer Service Building
2800 U.S. Highway 281 North
San Antonio, Texas, 78213

Monday March 21st, 2016
3:00 PM – 4:00 AM
Multipurpose Room

1. Welcome and Administrative Matters – Thompson
2. Program Manager's Remarks – Pence
3. Discussion of Aquifer Levels and Weather Outlook – SAWS & EAA
4. Discussion of Current Regional & SAWS Activities – Regional Advisory Group
5. Discussion of Storage of 2016 HCP Groundwater – Regional Advisory Group
6. Report on Leasing Activities – EAA
7. Report on EAHCP ASR accounting balance –Bereyso
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9. Discussion of Recharge Conditions – EAA
10. Discussion of Meeting Semi-Annually – Regional Advisory Group
11. Concluding Remarks – Thompson
12. Future Meeting Topics



**MEETING MINUTES
MAY 19, 2016**

1. Call to order-- 9:00 am

All Committee members were present- Tom Taggart (San Marcos), Roland Ruiz (EAA), Steve Ramsey (New Braunfels), Darren Thompson (SAWS), Andrew Sansom (Texas State University), and Todd Votteler (GBRA).

2. Public Comment.

Dianne Wassenich presented a photo book with information and underwater photos of the San Marcos Springs. Additionally, Dianne provided the Implementing Committee a summary of the removal of Capes Dam in San Marcos. She communicated that the City of San Marcos decided to remove the dam and the San Marcos River Foundation supports this decision. Roland Ruiz, EAA, and the Chair of the Implementing Committee, communicated that this issue was presented to the EAA Board and their position was that the EAA has no jurisdiction on this dam. Andy Sansom, states the science on this issue is clear and removing the dam is a responsible decision. Nathan Pence, EAHCP Program Manager, mentioned that the HCP officially has no stance on this issue.

Bob Wolf, Resident of New Braunfels, wanted to thank the Committee for the work of the EAHCP in and around the Comal River.

3. Approval of minutes from the March 17th Implementing Committee meeting.

Tom Taggart moved to approve the minutes. Darren Thompson seconded. There was no objection.

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.

- Springflows and Index Well Levels
- EAHCP Staff Introduction – Chad Furl
- Budget Reports
- USFWS San Marcos River Tour

Mr. Pence informed the Implementing Committee of a tour by USFWS staff to observe the conservation measures being implemented in the San Marcos River.

- CSRB Sampling Protocol
EAHCP Staff met with individuals to standardize the sampling methods for the Comal Springs riffle beetle (CSRB).
- CSRB Research
Bob Hall, EAHCP Staff, presented the most recent progress in successfully determining gender and captive reproduction of the CSRB.
- 2015 Recharge Estimate

Mr. Pence presented the 2015 Recharge Estimate received from the USGS of 1,358,100 acre-feet. The committee discussed the current strategy for ASR and how contemplating program discussions should be done when our rainfall conditions are so high.

- **EAA ASR leasing update**
Rick Illgner, EAA, presented the current leasing total of 31,602.330 acre-feet for the EAHCP Aquifer Storage and Recovery (ASR) program.
- **ASR Operations by SAWS**
Darren Thompson, SAWS, provided an update on the SAWS ASR operations. Current total storage of 105,000 acre-feet, 34,000 acre-feet of which is for the EAHCP. Typical storage rate of 40MGD has been maintained until recently due to technical issues that have been repaired. Full storage is estimated to be approximately 200,000 acre-feet.
- **Mr. Thompson provided a brief update on SAWS leak repair program with the Regional Water Conservation Program.** SAWS has begun repairs that go above and beyond work that current staff is able to handle.
- **Mr. Pence mentioned that the EAA's EAHCP Water Quality Monitoring Program contractor, SWCA, was able to capture another stormwater event for the Water Quality Monitoring Program.**
- **Mr. Pence presented a letter from the USFWS to EAHCP staff, which communicated their completed review of the 2014 and 2015 Annual Reports.** The USFWS acknowledged that both Annual Reports meet the requirements of the ITP and that the implementation of the EAHCP has been successful thus far.
- **Bank Stabilization Project Update**
Mark Enders, City of New Braunfels, presented a short update on the Bank Stabilization project and a possible field change.
- **TCEQ Environmental Excellence Award**
Melani Howard, provided a brief update on the Texas Environmental Excellence Award which the City of San Marcos and Texas State University received from TCEQ in May.

5. Discussion and possible action to authorize the Program Manager to submit a letter of clarification to the U.S. Fish and Wildlife Service (USFWS) pertaining to the meeting frequency of the Aquifer Storage and Recovery (ASR) Advisory Committee.

Mr. Pence provided a summary of a decision made amongst the ASR Regional Advisory Group to not meet as frequently. The EAHCP specifically states the requirements are to meet quarterly. EAHCP staff has communicated to USFWS the Group's decision to reduce the frequency requirements to meet "as needed," but no less than annually.

Andy Sansom moved to authorize the Program Manager to submit a letter of clarification to USFWS pertaining to the meeting frequency of the ASR Regional Advisory Group. Darren Thompson seconded. There were no objections.

6. Presentation on the EAHCP Database Management progress, program timeline, and approach.

Alicia Reinmund-Martinez, EAHCP Director, gave a brief overview of the Data Management Program. Jared Morris, EAA, presented the steps involved in selecting a contractor and the data migration plan moving forward.

7. Presentation and possible approval of the Edwards Aquifer Authority 2017 Work Plans.

Mr. Pence presented a brief overview of the Work Plan process and overall budget. Additionally, due to the pending Work Group Report and Submerged Aquatic Vegetation Analysis Report many of the current Work Plans will be brought back to the Committee for Amendments.

Rick Illgner, EAA, presented the 2017 EAA Work Plans.

Steve Ramsey, moved to approve the EAA's Work Plans, Andy Sansom seconded. Darren Thompson asked to table the approval of all Work Plans till June in order to allow further review and incorporation of amendments and results of pending studies. The motion was withdrawn and approval has been proposed for the June 16th meeting.

8. Presentation and possible approval of the City of New Braunfels' 2017 Work Plans.

Mark Enders presented the 2017 New Braunfels Work Plans.

Mr. Ruiz made a comment suggesting using the Table 7.1 budget for those Work Plans that have pending 2017 amendments.

The committee took this time to determine cancelling the June 16th Implementing Committee meeting and rescheduling for June 23rd in order to allow additional time to complete all reports and pending goals for 2017.

9. Presentation and possible approval of the Texas State University and City of San Marcos' 2017 Work Plans.

Melani Howard presented the 2017 San Marcos/Texas State Work Plans.

The committee discussed having a presentation that shows the impact and progress each of the conservation measures have achieved. Tom Taggart mentioned several complementary efforts throughout the City and that the presentation could feature some of those projects as well.

10. Consider future meetings, dates, locations, and agendas.

- Next Implementing Committee meeting is a joint meeting with the Stakeholder Committee scheduled for Thursday, June 23rd.

11. Questions from the public.

Dianne Wassenich summarized the Hays-Trinity Groundwater Conservation District meeting and mentioned that there is a high-level of contribution from Onion Creek into Barton Springs and San Marcos Springs.

12. Adjourn - 11:59 am



Darren Thompson, Secretary



May 23, 2016

Mr. Adam Zerrenner
United States Fish and Wildlife Services
Austin Ecological Services Field Office
10701 I Burnet Road, Suite 200
Austin, Texas 78758

RE: Clarification of Aquifer Storage and Recovery (ASR) Regional Advisory Group Meeting Frequency
(#TE-63663A-1)

On behalf of the Edwards Aquifer Authority, the City of New Braunfels, the City of San Marcos, the San Antonio Water System, and Texas State University, (the Permittees), I am providing a clarification on the stated frequency of the ASR Regional Advisory Group (EAHCP § 5.5.1). The Permittees do not wish to change the substance of this chapter, but wish to provide clarification in order for the Permittees to conduct these meetings as needed, but no less than annually.

The following includes the specific language clarifying this issue in §5.5.1 that was discussed and voted on unanimously at the groups March 21st meeting (Exhibit 1):

“A 12-person Regional Advisory Group consisting of The Advisory Group will meet as needed but no less than ~~quarterly~~ annually. SAWS will organize and facilitate the Advisory Group.”

Currently, the Advisory Group has been meeting quarterly and identified such frequency as not specifically necessary.

To ensure transparency in the implementation of the EAHCP, the Implementing Committee discussed and unanimously approved this clarification at its May 19, 2016 meeting. At this meeting the committee also provided the public an opportunity to comment on the clarification of §5.5.1 of the EAHCP. The agenda and the minutes from this meeting are included as Exhibit 2 & 3.

Respectfully,

Nathan Pence
Program Manager
Edwards Aquifer Habitat Conservation Plan

cc: EAHCP Implementing Committee

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United States Department of the Interior

FISH AND WILDLIFE SERVICE

10711 Burnet Road, Suite 200

Austin, Texas 78758

512 490-0057

FAX 490-0974



JUN 13 2016

Nathan Pence, Program Manager
Edwards Aquifer Habitat Conservation Plan
900 East Quincy
San Antonio, Texas 78215

Dear Mr. Pence:

This letter is in response to your May 23, 2016 letter requesting to amend the Edwards Aquifer Recovery Implementation Plan Habitat Conservation Plan (EAHCP). Chapter 5 *Minimization and Mitigation Measures; Measures Specifically Intended to Contribute to Recovery* includes a commitment by the Edwards Aquifer Authority, City of New Braunfels, City of San Marcos, San Antonio Water System, and Texas State University (Permittees) to convene a Regional Advisory Group to advise the San Antonio Water System regarding implementation of the Aquifer Storage and Recovery Program. The EAHCP section 5.2.1 states that the 12-member Regional Advisory Group will meet no less than quarterly. The Permittees and the members of the Regional Advisory Group have agreed based experience implementing the EAHCP and the Section 10(a)(1)(B) permit that the Regional Advisory Group need only meet annually unless circumstances warrant more frequent meetings.

This amendment to the EAHCP does not change the terms and conditions of the U.S. Fish and Wildlife Service permit TE-63663A-1 or change any impacts previously described in the EAHCP, the EAHCP Environmental Impact Statement, or the Service's Endangered Species Act Section 7 biological opinion. Therefore, we approve of your request to amend the EAHCP section 5.2.1 as requested in your letter, specifically that the frequency of meetings of the Regional Advisory Group will be as needed but no less than annually.

Sincerely,

Adam Zerrenner
Field Supervisor

TAKE PRIDE
IN AMERICA

San Antonio Water System Aquifer Storage and Recovery Regional Advisory Group

Minutes – February 14, 2017

1. Welcome and Administrative Matters
All member groups were present, with the exception of the springs communities representative (Rodger Biggers).
2. Discussion of Aquifer Levels, Weather Outlook, and ASR Accounting Balance
Darren Thompson, SAWS, provided a brief Aquifer update and SAWS ASR operations summary.
3. Discussion of Potential EAHCP Adaptive Management Process to Establish ASR Strategy Improvement Opportunities
Roland Ruiz, EAA, provided an in-depth description of the possible improvements to the EAA ASR Leasing program.
Patrick Shriver mentioned the ASR Work Group and the ASR/VISPO trade-off discussion.
Adam Y. asked about the NAS Report 2 recommendations
Nathan Pence, EAHCP Program Manager, provided an overview of what the EAHCP Adaptive Management Process requires.
Buck Benson motioned to endorse the proposed process to begin the EAHCP AMP in order to explore opportunities for leasing improvements. Bruce Alexander seconded. There were no objections.
4. Discussion of Current Regional & SAWS Activities
Mr. Thompson opened the floor to any ASR Operations information. He mentioned the SAWS desal facility is currently operational.
5. Discussion of Storage of 2017 HCP Groundwater
6. Report on Leasing Activities – EAA
Javier Hernandez, EAA, provided an EAA leasing update. Roland Ruiz mentioned that EAA is no longer accepting any additional contracts.
7. Concluding Remarks

The vacant positions will be discussed between EAA and SAWS to designate appropriate representatives.

8. Future Meeting Topics

SAN ANTONIO WATER SYSTEM
INTEROFFICE MEMORANDUM

TO: Darren Thompson, Director, Water Resources
FROM: Brandon Payne, Planner III, Water Resources
COPY: Patrick Shriver, Project Coordinator, Water Resources
DATE: 01/26/2018
SUBJECT: ASRAG

SAWS staff present: Darren Thompson, Patrick Shriver, Rene Gonzales

Meeting Summary

First quarter of the Aquifer Storage and Recovery Advisory Group (ASRAG). Update on Aquifer levels, Weather Outlook and ASR, discussion of Current Regional/SAWS activities, ASR Adaptive Management Plan (ASR AMP)

Meeting Notes

Meeting began at 10:08 a.m.

- Darren Thompson gave an update on the Aquifer levels, Weather Outlook and ASR
 - Roland Ruiz inquired about the expectation of brackish
 - Running ~7 MGD or ~9,000 AF
 - Local Carrizo was running ~7 MGD
 - Approximately 2,163 AF was stored as of 1/17/2018
 - There should not be any issue storing the 16,666 AF
- Marc Friberg gave a presentation over the proposed ASR AMP Lease/Forbearance program
 - Darren Thompson asked how much of the \$35 million was allocated from previous years
 - Marc Friberg replied he didn't have a specific number but it was approximately \$11 – 13 million
 - Discussion over the terms of the agreements and how it effects different Stakeholders
 - Bruce Alexander said that it really wasn't a good fit for his situation
 - Buck Benson stated that it wasn't a good fit for his clients
 - Bruce Alexander and Buck Benson both stated that they would be better off to "Contract Down"

- Darren Thompson asked if there had been any consideration on M&I lease/forbearance rate versus Ag. Rate
- Nathan Pence gave an outline of process that lies ahead for the AMP
 - EAA submits AMP Proposal
 - Take it before the Science Committee on 1/31/18
 - Ask the Science Committee if the science is right
 - Secure a recommendation
 - Take it to the Stakeholder and IC on 2/8/2018
 - Look at the AMP in its entirety
 - Secure approval
 - Submit to USFWS to consider the change
- Nathan asked for a motion to recommend the AMP going forward
 - Cindy Loeffler did not want to take formal action at this time
 - Irrigator representatives were not present for the vote and wanted them included
 - Wanted to see the formal proposal
 - Hear from the Science Committee to see if the Science was right
 - Buck Benson and Bruce Alexander didn't feel comfortable taking a formal vote because of who they each represented and could not support it because of the financial reasons
 - There was support shown about the concept
- Darren Thompson was asked if he would attend the Science Committee meeting or other committees to say a few words

Meeting adjourned at 11:22 a.m.

EXHIBIT 2



**Edwards Aquifer Habitat Conservation Plan
Nonroutine Adaptive Management Proposal**

To: EAHCP Implementing, Stakeholder, and Science Committees
From: Roland Ruiz, General Manager, Edwards Aquifer Authority
Date: January 22, 2018/**Revised January 31, 2018/Amended February 8, 2018**
Re: Proposed Adaptive Modifications to “Use of the SAWS ASR for Springflow Protection” Measure (EAHCP §5.5.1)

PREAMBLE

The Edwards Aquifer Habitat Conservation Plan (“EAHCP”) currently includes a springflow protection program (“ASR Program or “Program”) that utilizes the San Antonio Water System (“SAWS”) Aquifer Storage and Recovery Facility (“ASR Facility”) for storage and recovery of leased Edwards Aquifer water. Broadly, the current program is based on the acquisition by the Edwards Aquifer Authority (“EAA”) of 50,000 acre-feet (A/F) per year of leases and lease options of Edwards Aquifer groundwater withdrawal permits to be utilized to fill, idle, and maintain in storage a portion of the capacity of the ASR Facility for subsequent use to protect springflows during identified drought-of-record conditions. When specific triggers (described in the EAHCP) are reached: (1) SAWS is obligated to forbear on its rights to make withdrawals at specific amounts from the Edwards Aquifer pursuant to its Edwards Aquifer groundwater withdrawal permits; (2) water stored in the ASR Facility is available to SAWS for recovery to offset its forbearance in order to meet customer demand; and (3) the EAA, when not utilizing leased water to fill the ASR Facility, is obligated to forbear pumping of the entirety of its leased or lease option water (50,000 acre feet). This combination of SAWS and EAA forbearance contributes significantly to protecting flows at the Comal and San Marcos spring systems during the periods of drought conditions for which this program is triggered.

This document presents a formal proposal for a Nonroutine Adaptive Management action (“Nonroutine AMP”) involving administrative modifications to the ASR Program from its original design in the EAHCP. The proposal, if approved, does not modify in any way the Biological Goals or Objectives contained in the EAHCP. Rather, the proposal presents a preferred alternative to the process currently identified in the EAHCP by which those goals and objectives are achieved and implemented. Specifically, in order to optimize the Program's success, the EAA proposes to amend the leasing structure of the Program and implement the following:

1. Replace the current, three-tiered leasing/lease option structure with a simplified two-tiered leasing/forbearance agreement structure that coordinates existing long-term leases with new, long-term forbearance agreements (together providing control of the necessary 50,000 A/F per year of Edwards Aquifer groundwater); and

2. Revise the Ten-Year Rolling Average of Estimated Recharge threshold used for triggering forbearance for EAA-controlled groundwater withdrawal rights to 500,000 A/F.

BACKGROUND AND OVERVIEW

The ASR Program has been in operation for over four years. During the course of implementation, firsthand experiences with implementation challenges, as well as market responses to proposed leasing and lease-option products have contributed to the identification of opportunities to improve the operational and financial efficiencies of the EAA's water acquisition responsibilities under the ASR Program while providing the same or greater benefit to springflow protection.

On January 12, 2017, the EAA General Manager submitted a memorandum entitled *An Opportunity for ASR Improvement* (Exhibit A) to both the Implementing and Stakeholder Committees of the EAHCP. The memo cited programmatic issues related to the implementation of the ASR Program that could serve as targets to be addressed through potential Nonroutine AMP. Of the issues and potential solutions identified in the memo, the following five are particularly relevant to this proposal:

- 1. Only unrestricted water rights [irrigation, municipal, and industrial] are eligible for enrollment into ASR; agriculture permits tied to the land [restricted irrigation permits] could be used for forbearance in ASR, if appropriate modifications were made;*
- 2. Triggers for Tier II and Tier III (10-year rolling average recharge) are unfamiliar to permit holders; the ASR program will be more successful if it uses a familiar and comfortable trigger (i.e. J-17);*
- 3. The current tiered system is not fiscally efficient; lease rates, rather than forbearance agreement rates, are paid for water that will, in some cases, more than likely, never be injected;*
- 4. The ASR is almost full; therefore, maintaining an account of 50,000 ac-ft. of unrestricted water rights, eligible for injection, is unnecessary and fiscally inefficient; and*
- 5. The current ASR program anticipated continued filling/injecting during the early years of the DOR, which is likely to create conflict perception issues in the region (i.e. SAWS pumping from the aquifer at the request of the EAA while other permit holders are required to cut back withdrawals), and filling/injecting during this time runs counter to the overall objective of sustaining aquifer levels to ensure continuous minimum springflows. The same or, more likely, greater benefit could be achieved if the full amount required for storage was injected prior to the drought such that no injection had to occur after the onset of the DOR.*

Throughout 2016 and early 2017, the EAA internally vetted the issues identified with the ASR Program, and initially identified two potential advantageous modifications to the design of the Program. These proposed modifications were also presented to the SAWS ASR Regional Advisory Group at their February 14, 2017, meeting, and were met with general support from the group. The two potential advantageous modifications were:

- To consolidate the current three-tiered leasing approach into a simplified two-pronged leasing/forbearance program; and*
- To use J-17 levels as a more recognizable trigger for forbearance of EAA permits.*

It was generally assumed that the two modifications would achieve the following desired outcomes:

1. Provide a more understandable and marketable product that will achieve long-term control of 50,000 A/F of Edwards Aquifer groundwater for forbearance by the EAA during the drought conditions that trigger the ASR Program; and
2. Provide greater springflow during a repeat of such drought through the use of a more impactful, J-17 level-based forbearance trigger.

Performance Comparison:

A simulation using an updated version¹ of the Edwards Aquifer MODFLOW groundwater model was performed in order to compare the springflow results achieved with implementation of the ASR Program as described in the EAHCP to the springflow results achieved with implementation of the Program using the above-described modifications. The results of the exercise are summarized below in the following table Table 1.-

TABLE 1: COMPARISON OF POTENTIAL FORBEARANCE TRIGGERS – COMAL SPRINGS

POTENTIAL FORBEARANCE TRIGGERS	SPRINGFLOW ACHIEVED (CFS) AT COMAL SPRINGS
Current EAHCP triggers (three-tiered system): 10-year rolling recharge average of 572,000 A/F per year (Tier 2); and 10-year rolling recharge average of 472,000 A/F per year (Tier 3)	29.71
J-17 at 635 (msl) on Aug. 1	28.64
J-17 at 636 (msl) on Aug. 1	29.32
J-17 at 637 (msl) on Aug. 1	29.32
J-17 at 641 (msl) on Aug. 1	29.8

As demonstrated by the simulation results, impacts within the model were not as sensitive to a J-17 level-based trigger as presumed originally. While the modeled results showed desirable springflow impacts could be achieved with higher J-17 level-based triggers (e.g. 641(msl) and above), the resulting increased frequency of required forbearance is highly likely to significantly diminish the marketability of such a forbearance agreement option, and would thus render the program ineffective in achieving the desired goals and objectives of the EAHCP.

Therefore, with long-term control of Edwards Aquifer groundwater still a critical need under the EAHCP, EAA staff reconsidered a revised 10-year-average rolling recharge trigger. Ultimately, a modeled analysis of a 10-year rolling recharge average of 500,000 A/F per annum for a forbearance trigger showed to provide similar springflow protection as the current ASR Program under a simplified forbearance approach using a recognizable and understandable forbearance trigger. The results of this secondary analysis are summarized below in the following table Table 2:-

¹ For more information regarding the EAA's updated Edwards Aquifer MODFLOW groundwater model, please see *Updates to the MODFLOW Groundwater Model of the San Antonio Segment of the Edwards Aquifer* available at: http://www.edwardsaquifer.org/documents/2017_Liu-et al_UpdatestotheMODFLOWGroundwaterModeloftheSanAntonioSegmentoftheEdwardsAquifer.pdf.pdf

TABLE 2: SECONDARY ANALYSIS OF POTENTIAL FORBEARANCE TRIGGER – ROLLING RECHARGE

FORBEARANCE TRIGGERS	SPRINGFLOW ACHIEVED (CFS) AT COMAL SPRINGS
Current EAHCP triggers (three-tiered system): 10-year rolling recharge average of 572,000 A/F per year; and 10-year rolling recharge average of 472,000 A/F per year	29.71
Proposed 10-year rolling recharge average of 500,000 A/F per year (two-tiered system)	29.8

Put simply, the study determined that the ASR Program could be modified in a manner that provided both a simplified, two-tiered leasing/forbearance approach at an equivalent or stronger springflow benefit as the current ASR Program if a 10-year rolling recharge average of at or below 500,000 acre-feet per annum was used as a forbearance trigger. Therefore, this demonstration of equivalent program efficacy is consistent with the intent of the HCP and the Incidental Take Permit for the Program. A representative table of the modeling results is attached as Exhibit B.

In addition, considering the EAA has a sufficient amount of long-term lease commitments to ensure that the storage assumptions contained in the EAHCP and the Interlocal Agreement between SAWS and the EAA are satisfied, it would be more efficient to administer the two tiers of leases and forbearance agreements through a “sliding scale approach.” SAWS currently has approximately 80,000 A/F of EAHCP regionally-leased groundwater stored on behalf of the EAHCP in its ASR Facility. Assuming the EAA makes an average of 12,000 A/F of leased rights available to SAWS for injection into the ASR Project each year, full storage of 126,000 A/F of groundwater can be achieved by 2021. Therefore, a reasonable “sliding scale” for each tier (based on EAA’s long-term leases and their expiration dates) ~~would be as follows:~~ [is represented in Table 3.](#)

TABLE 3: REPRESENTATIVE “SLIDING SCALE” OF LEASES AND FORBEARANCE AGREEMENTS (2018-2027)

DATE	LEASE AGREEMENTS (A/F)	FORBEARANCE AGREEMENTS (A/F)	TOTAL LEASE/FORBEARANCE AGREEMENTS (A/F)
2018	40,594.303	0	40,594.303
2019	16,674.753	33,325.247	50,000.000
2020	15,924.077	34,075.923	50,000.000
2021	14,561.797	35,438.203	50,000.000
2022	12,837.627	37,162.373	50,000.000
2023	12,754.164	37,245.836	50,000.000
2024	12,753.164	37,246.836	50,000.000
2025	11,486.018	38,513.982	50,000.000
2026	10,864.898	39,135.102	50,000.000
2027	10,263.498	39,736.502	50,000.000

In summary, revisiting the five relevant goals listed above:

1. *Only unrestricted water rights are eligible for enrollment into ASR; agriculture permits tied to the land [restricted irrigation permits] could be used for forbearance in ASR, if appropriate modifications were made.*

Current legal limitations on restricted irrigation permits prohibit the use of the water for withdrawal and injection into the ASR Facility for municipal purposes. However, this proposed amendment would allow the EAA to enroll such permits into the Program because the forbearance agreement approach would not require the permitted water to be withdrawn; only forborne. Thus, this provides a larger pool of Edwards groundwater to be available to the ASR Program.

2. *Triggers for Tier II and Tier III (10-year rolling average recharge) are unfamiliar to permit holders; the ASR program will be more successful if it uses a familiar and comfortable trigger (i.e. J-17).*

Considering what was learned from the EAA's modeling exercises, permit holder familiarity with a J-17 trigger is outweighed by the marketability and springflow protection benefits associated with the revised 10-year rolling recharge average trigger of less than 500,000 acre-feet per year.

In addition, this trigger matches the recharge average trigger in the EAHCP that is currently associated with SAWS' obligation to forbear its Edwards Aquifer groundwater withdrawal permit. Therefore, as an added benefit, the proposed amendment would result in the EAHCP utilizing one common rolling recharge average trigger – which simplifies overall administration.

3. *The current tiered system is not fiscally efficient; lease rates, rather than forbearance agreement rates, are paid at a greater premium for water that will, in some cases, more than likely, never be injected.*

The proposed amendment would allow the EAA to set a rate for the forbearance agreements that is appropriate for the benefit received and is within the EAHCP's Table 7.1 estimated budget.

4. *The ASR is almost full; therefore, maintaining an account of 50,000 ac-ft. of unrestricted water rights, eligible for injection, is unnecessary and fiscally inefficient.*

The proposed amendment recognizes a key distinction in the EAA's two major obligations under the ASR Program – the duty to provide Edwards water to SAWS to fill the ASR Facility at the required levels, and the duty to forbear 50,000 AF/yr when the drought conditions triggering SAWS' forbearance obligations under the ASR Program are met. In light of the fact that the EAA's responsibilities to deliver Edwards water to SAWS for injection associated with the ASR Program are certain to be met by 2021, this amendment would enable the EAA to adjust its water acquisition initiatives accordingly, prioritizing efforts on long-term forbearance commitments.

5. *The current ASR program anticipated continued filling/injecting during the early years of the DOR, which is likely to create conflict perception issues in the region (i.e. SAWS pumping from the aquifer at the request of the EAA while other permit holders are required to cut back withdrawals), and filling/injecting*

during this time runs counter to the overall objective of sustaining aquifer levels to ensure continuous minimum springflows. The same or, more likely, greater benefit could be achieved if the full amount required for storage was injected prior to the drought such that no injection had to occur after the onset of the DOR.

Due to the fact that the injection responsibilities associated with the ASR Program are certain to be met by 2021, concerns related to this conflict perception are alleviated.

PROPOSED NONROUTINE ADAPTIVE MANAGEMENT ACTION

Due to the firsthand experiences of program administrators described in this document, current results of the EAA leasing program, and the results of an internal EAA modeling exercise that represents the level of research and development underpinning this proposed Nonroutine AMP, the EAA respectfully requests that certain proposed amendments to the ASR Program be approved. The information used to develop the proposed amendment is an advancement over the scientific and commercial data available at the time of the writing of the EAHCP.

Specifically, the EAA proposes to amend the leasing structure of the ASR Program to:

1. Replace the current, three-tiered leasing/lease option structure with a two-tiered leasing/forbearance structure that coordinates existing long-term leases with new, long-term forbearance agreements (together providing control of the necessary 50,000 acre-feet per year of Edwards Aquifer groundwater required under the current ASR Program); and
2. Exercise (trigger) forbearance by the EAA in years following a recognition of the Ten-year Rolling Average of the Estimated Annual Recharge to the Aquifer declining to amounts at or below 500,000 acre-feet per annum.

A redlined version of Section 5.5.1 of the EAHCP, showing edits that would occur upon approval of this proposal, is attached for reference as Exhibit C.

BUDGETARY IMPLICATIONS AND FISCAL IMPACT

All EAHCP programming, including the ASR Program, is subject to the funding limitations and funding processes described in EAHCP Table 7.1 and the Funding and Management Agreement. Given limited resources and responsibility for stewarding public funds, a budgetary exercise was conducted by EAA staff to determine the budgetary and fiscal impacts of the proposed ASR Program modifications.

Fiscal Impact:

Adoption of this proposal will not result in any deviations from the funding allowances prescribed in Table 7.1 of the EAHCP. Furthermore, the proposed Nonroutine AMP action would remain consistent with the assumptions made in HDR's October 2011 *Evaluation of Water Management Programs and Alternatives for Springflow*

EXHIBIT 2

*Protection of Endangered Species at Comal and San Marcos Springs.*² Specifically the Program will remain within the budgetary confines of Table 7.1 of the EAHCP by utilizing a price point that falls below the average lease rate assumed in HDR's analysis of \$125 and above the ten-year standby rate for the Voluntary Irrigation Suspension Program Option (VISPO) of \$70.20.

Budgetary Implications:

The sole budgetary implication related to this proposal is that full funding for the acquisition of portions of the groundwater rights associated with the ASR Program (Tier 2 and Tier 3) will no longer be dependent upon Reserve Funds. All funding will be associated with long-term contractual commitments that are paid annually. Unlike VISPO, the "triggers" within the contracts are intended to only be associated with the act of forbearance. The price point associated with the agreements will remain the same, regardless of whether or not forbearance is exercised under the agreement.

² HDR's October 2011 *Evaluation of Water Management Programs and Alternatives for Springflow Protection of Endangered Species at Comal and San Marcos Springs* may be found at: <http://www.eahcp.org/documents/Appendix%20K.pdf>

GLOSSARY OF TERMS

As used in this proposal for a Nonroutine Adaptive Management action and this Glossary, the following terms have the following meanings:

“Forbearance” means the complete curtailment of all or part of a right to make withdrawals under a specific Edwards Aquifer Authority Groundwater Withdrawal Permit.

“Forbearance Agreement” is a contractual agreement whereby a party agrees to terms whereby the complete curtailment of all or part of the party’s right to make withdrawals under a specific Edwards Aquifer Authority Groundwater Withdrawal Permit is required when certain conditions, commonly referred to as “triggers” are met.

“Trigger” means to cause an event or situation to happen or exist. In the case of a Forbearance Agreement, a trigger would be a condition that causes or requires the curtailment of all or part of the right to make withdrawals under a specific Edwards Aquifer Authority Groundwater Withdrawal Permit.

“Curtail” or “Curtailment” means the act of reducing or restricting something. In the case of a Forbearance Agreement, the right to withdrawal under an Edwards Aquifer Authority Groundwater Withdrawal Permit would be reduced or restricted.

“Edwards Aquifer Authority Groundwater Withdrawal Permit” means an Initial Regular Permit or Regular Permit issued by the Edwards Aquifer Authority.

“Initial Regular Permit” means an Edwards Aquifer Authority Groundwater Withdrawal Permit issued by the Edwards Aquifer Authority under Subsection 1.16(d) of the Edwards Aquifer Authority Act.

“Edwards Aquifer Authority Act” means the Act of May 30, 1993, 73rd Leg., R.S., ch. 626, 1993 Tex. Gen. Laws 2350, as amended.

“Regular Permit” means an Edwards Aquifer Authority Groundwater Withdrawal Permit issued by the Edwards Aquifer Authority after August 12, 2008, resulting from the sale or amendment of an Initial Regular Permit or the consolidation of two or more such permits.

“Withdrawal” means an act that results in taking groundwater from the Edwards Aquifer by or through man-made facilities, including pumping.

“Lease Option” means a type of contractual agreement whereby a party has the option to lease property when certain conditions are met. In the context of the Edwards Aquifer Habitat Conservation Plan, the Edwards Aquifer Authority is charged with entering into such contracts with the option to lease an Edwards Aquifer Authority Groundwater Withdrawal Permit becoming actionable upon the existence of a specific ten-year rolling recharge average. The difference between a Lease Option and a Forbearance Agreement is that a Lease Option is a

EXHIBIT 2

contractual agreement to lease property rights under certain conditions and a Forbearance Agreement is an contractual agreement to curtail withdrawal of an Edwards Aquifer Authority Groundwater Withdrawal Permit under certain conditions.

“Ten-year Rolling Average” or “10-year Rolling Average” means the unweighted arithmetic mean of the ten (10) most recent consecutive years at any given time.

“Estimated Annual Recharge” Annual recharge is estimated by the United States Geological Survey using a water-balance method that: (1) relies on precipitation and streamflow measurements in the nine (9) drainage basins indicated in "Method of Estimating Natural Recharge to the Edwards Aquifer in the San Antonio Area, Texas," 1978, USGS WRI-7810, by Celso Puente; (2) considers only precipitation and stream flow that originates over the Contributing Zone and Recharge Zone of the Edwards Aquifer; and (3) excludes interformational flows from adjacent aquifers.

“Ten-year Rolling Average Recharge” or “10-year Rolling Average Recharge” means the unweighted arithmetic mean of annual recharge to the Edwards Aquifer over the ten (10) most recent consecutive years at any given time.



**01-31-2018 Science Committee
Meeting Minutes**

Available at eahcp.org

1. Call to order.

Chair, Dr. Weckerly called the meeting to order at 9:05 a.m. Members present include: Janis Bush, Jacquelyn Duke, Conrad Lamon, Glenn Longley, Robert Mace, Doyle Mosier, Chad Norris, Floyd Weckerly, Tom Arsuffi, and Charles Kreidler; Jackie Poole was unable to attend.

2. Public comment.

No comments from the public.

3. Approval of the Science Committee meeting minutes (Attachment 1).

Dr. Mace motioned to approve the minutes as written; Dr. Longley seconded. No opposition.

4. Receive report from the Program Manager.

- Spring systems and index well update
- The National Academy of Sciences EAHCP Science Review Panel's Report 3, meeting 2 overview
- Contractor selection for the Sessom Creek 2018 Applied Research project
- 2017 Incidental take assessment (Attachment 2)

Dr. Kreidler inquired why the Comal Spring riffle beetle had the highest total percent take compared to the other species. Mr. Pence and Mr. Oborny explained that in 2014 the Comal system reached a low flow of 65 cfs, exposing CSRB habitat.

5. Presentation, discussion, and possible recommendation of the Nonroutine Adaptive Management proposal related to the Aquifer Storage and Recovery program (Attachments 3 and 4).

Dr. Lamon asked why there was no difference between the J-17 index well trigger level of 636 ft and the 637 ft scenarios. Mr. Friberg replied that during the drought of record scenario runs, modeled conditions did not stay below 641 ft long enough to trigger the ASR forbearance package.

Dr. Lamon asked about whether the 10-year rolling recharge average was protective enough of springflow. He also asked for an explanation of the calculation of the 10-year rolling average. Mr. Friberg stated that the EARIP stakeholders agreed to using the 10-year rolling average in the EAHCP. Mr. Pence, EAHCP Program Manager, that during the EARIP process, the Science subcommittee looked at all types of triggers and learned that using a J-17 index well trigger level did not provide the same long-term protection as using the 10-year rolling recharge average.

Dr. Duke asked for a further explanation as to not using a J-17 index well trigger level. Mr. Friberg said that springflow is volatile and that the ASR program is intended to provide protection to springflow during the long-term drought of record conditions – explaining the use of the 10-year rolling recharge average.

Dr. Arsuffi asked that the proposal should identify more clearly the benefits of the proposed changes. He had thought the goal was to achieve the 30 cfs in the Comal Springs, but now understands that the goal of this proposal is to change how the 50,000 AF/year requirement is achieved. Mr. Pence stated that the 30 cfs goal will be addressed in the second phase of the EAHCP.

Dr. Kreidler and Dr. Mace both discussed with the Committee their understanding of the benefit of the proposed changes per their one on one meeting with Mr. Pence. They said that after this meeting, they had a better understanding of forbearance of all springflow protection measures such as the VISPO and Critical Period Management programs. Mr. Friberg further added, that 2014 was similar to the drought of record conditions. Mr. Pence responded that a new drought of record conditions will be addressed in the roll-over of the Incidental Take Permit.

Mr. Friberg also told the Committee that another benefit of the program is that it would be attractive to many of the permit holders that have omitted to the one-year ASR lease agreements. He also stated that under EAA's rules, restricted irrigated water permit-holders are not eligible to participate in the ASR program. However, with these proposed changes – to add a forbearance tier- the restricted irrigated water would be able to participate

Dr. Weckerly and Dr. Arsuffi recommended that the ASR AMP proposal include a glossary of terms as well as a description for each of the tables.

Dr. Mace motioned to endorse the Nonroutine Adaptive Management proposal with the added glossary of terms and table legends; Dr. Bush seconded. No opposition.

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. Arsuffi motioned to endorse the expedited process to prepare and submit the Scientific Evaluation Report to the Stakeholder Committee; Dr. Longley seconded. No opposition.

7. Presentation of the 2017 Biological Monitoring Reports (Attachments 5 and 6).

Mr. Oborny presented a comprehensive overview of the 2017 biological monitoring results for each of the EAHCP biological monitoring datasets.

2017 was the first year of the rapid bioassessment which adhered to standard rapid bioassessment practices. Dr. Arsuffi proposed that someone analyze the RBP and IBI to see how the two indices line-up. Mr. Norris noted that at least 3 years of this dataset are needed to analyze the existing conditions which will help assess conditions for the invertebrate species.

In regard to the fountain darter dropnet data, Dr. Lamon emphasized that the biological goals are based on the median and not the average, therefore, the data could be improved by taking the log of the data and untransforming it back into the median. The confidence level will not be symmetric, but it would be a better indicator to compare with the EAHCP fountain darter goals. Mr. Oborny agreed and will incorporate it into their analysis.

Mr. Oborny then presented the findings of the first year of the fish tissue sampling which use samples from the headwaters and the lower reaches of the river. Dr. Mace asked if the emerging contaminants found within the fish tissue have also been found within the artesian springs or wells. Mr. Pence replied that yes, sampling has found that the contaminants are not just from runoff, but also found within wells in the artesian zone of the aquifer. Other members agreed that studies conducted throughout the US are finding these contaminants within other aquifers; they are everywhere.

Dr. Weckerly requested that the annual Biomonitoring report include descriptions about the sampling methodologies employed. Dr. Furl replied that there is a standard operating procedures document for the biomonitoring program that can be attached to the report.

8. Presentation and discussion of the proposed 2018 Work Plan Amendments for the Refugia, Biomonitoring, and the Applied Research Programs (Attachments 7, 8 and 9).

Dr. Furl presented the proposed amendments to the 2018 Work Plans for the Refugia, Biological Monitoring, and Applied Research Programs.

Dr. Kreidler requested the number for the Sessom Creek Proposal that was selected. EAHCP Staff will follow-up and provide.

Mr. Mosier motioned to approve the 2018 Work Plan Amendments; Dr. Duke seconded. No opposition.

9. Presentation and discussion of the formation and goals of the Research Work Group to discuss the Comal Springs riffle beetle biomonitoring program.

Dr. Furl facilitated the discussion of the formation and need for a Comal Springs riffle beetle Biomonitoring Work Group. Based on input from the Science Committee, National Academy

of Sciences, and the 2017 CSRB biomonitoring findings, the EAHCP goals for the CSRB are not being met. 2017 biomonitoring data have shown a decline in CSRB which may be attributed to many factors such as, but not limited to, over-sampling, ineffective cotton lures, or movement into unsampled reaches. If additional reaches are added to the CSRB sampling, it may result in cutting funds for sampling of other biomonitoring datasets.

Dr. Lamon requested that the CSRB data be analyzed before additional CSRB reaches are added at the cost of ending another biomonitoring dataset.

Dr. Weckerly suggested a 2-4 year study to compare our existing information and practices to other studies on similar species. He emphasized the need for a controlled study of the cotton lure within a laboratory setting, but also countered that the conditions would not resemble that of the wild so it may need to be more of an in-situ study. There are many unknowns about the cotton lure that need to be analyzed.

All members agree that a CSRB biomonitoring Work Group is needed. Dr. Furl will put together a charge for the group that will define its goals related to the Refugia and Biological Monitoring programs.

10. Consider future meetings, dates, locations, and agendas.

Science Committee Meeting, Thursday, March 8th at 9 a.m. at the San Marcos Activity Center (Multipurpose Room).

11. Questions and comments from the public.

12. Adjourn: 12:02 pm

**Science Committee of the
Edwards Aquifer Habitat Conservation Plan***Scientific Evaluation Report:**Nonroutine Adaptive Management Proposal for the Proposed Adaptive Modifications to the Use of the San Antonio Water System Aquifer Storage and Recovery for Springflow Protection*

February 2, 2018

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 submitted by Roland Ruiz, General Manager of the Edwards Aquifer Authority (EAA), dated January 22, 2018, related to use of the San Antonio Water System (SAWS) Aquifer Storage and Recovery (ASR or ASR Facility) for Springflow Protection ("the Program or ASR Program"). The following sections in this report summarize the Science Committee's evaluation of this AMP proposal.

Once approved by the Chair and Vice-Chair of the Science Committee, and following the January 31, 2018, Science Committee meeting, this Scientific Evaluation Report will be presented to the Stakeholder Committee at its meeting on February 8, 2018.

Overview

The Edwards Aquifer Habitat Conservation Plan ("EAHCP") currently utilizes the SAWS ASR Facility for storage and recovery of leased Edwards Aquifer water. Broadly, the current program is based on the acquisition by the EAA of 50,000 acre-feet per year of leases and lease options of Edwards Aquifer groundwater withdrawal permits to be utilized to fill, idle, and maintain in storage a portion of the capacity of the ASR Facility for subsequent use to protect springflows during identified drought-of-record conditions. When specific triggers (described in the EAHCP) are reached: (1) SAWS is obligated to forbear on its rights to make withdrawals at specific amounts from the Edwards Aquifer pursuant to its Edwards Aquifer groundwater withdrawal permits; (2) water stored in the ASR Facility is available to SAWS for recovery to offset its forbearance in order to meet customer demand; and (3) the EAA, when not utilizing leased water to fill the ASR Facility, is obligated to forbear pumping of the entirety of its leased or lease option water (50,000 acre-feet). This combination of SAWS and EAA forbearance contributes significantly to

Scientific Evaluation Report: Nonroutine AMP Proposal - Use of SAWS ASR for Springflow Protection

protecting flows at the Comal and San Marcos spring systems during the periods of drought conditions for which this program is triggered.

The ASR Program has been in operation for over four years. During the course of implementation, firsthand experiences with implementation challenges, as well as market responses to proposed leasing and lease-option products have contributed to the identification of opportunities to improve the operational and financial efficiencies of the EAA's water acquisition responsibilities under the ASR Program while providing the same or greater benefit to springflow protection.

Proposal

Specifically, the EAA proposes to amend the leasing structure of the ASR Program to:

1. Replace the current, three-tiered leasing/lease option structure with a two-tiered leasing/forbearance structure that coordinates existing long-term leases with new, long-term forbearance agreements (together providing control of the necessary 50,000 acre-feet per year of Edwards Aquifer groundwater required under the current ASR Program); and
2. Exercise (trigger) forbearance by the EAA in years following a recognition of the Ten-year Rolling Average of the Estimated Annual Recharge to the Aquifer declining to amounts at or below 500,000 acre-feet per annum.

Scientific Evaluation

This AMP proposes no changes to the springflow protection goals and objectives of the EAHCP. The proposal is strictly related to policy and administrative amendments to the Program. However, the basis for some of the amendments is grounded in the use of the updated Edwards Aquifer MODFLOW groundwater model. A simulation was performed in order to compare the springflow results achieved with implementation of the Program as described in the EAHCP to the springflow results achieved with implementation of the Program using several potential modifications. The results of the exercise are summarized in Table 1.

Scientific Evaluation Report: Nonroutine AMP Proposal - Use of SAWS ASR for Springflow Protection

Table 1: Comparison of Potential Forbearance Triggers – Comal Springs

POTENTIAL FORBEARANCE TRIGGERS	SPRINGFLOW ACHIEVED (CFS) AT COMAL SPRINGS
Current EAHCP triggers (three-tiered system): 10-year rolling recharge average of 572,000 A/F per year (Tier 2); and 10-year rolling recharge average of 472,000 A/F per year (Tier 3)	29.71
J-17 at 635 (msl) on Aug. 1	28.64
J-17 at 636 (msl) on Aug. 1	29.32
J-17 at 637 (msl) on Aug. 1	29.32
J-17 at 641 (msl) on Aug. 1	29.8

As indicated by the simulation results, impacts within the model were not very sensitive to a J-17 Index Well level-based trigger. While the modeled results showed desirable springflow impacts could be achieved with higher J-17 Index Well level-based triggers (e.g. 641(msl) and above), the resulting increased frequency of required forbearance is highly likely to significantly diminish the marketability of such a forbearance agreement option, and would thus render the program ineffective in achieving the desired goals and objectives of the EAHCP.

Therefore, with long-term control of Edwards Aquifer groundwater still a critical need under the EAHCP, EAA staff reconsidered a revised 10-year-average rolling recharge trigger. Ultimately, a modeled analysis of a 10-year rolling recharge average of 500,000 acre-feet per annum for a forbearance trigger should provide similar springflow protection as the current ASR Program under a simplified forbearance approach using a recognizable and understandable forbearance trigger. The results of this secondary analysis are summarized in Table 2.

Scientific Evaluation Report: Nonroutine AMP Proposal - Use of SAWS ASR for Springflow Protection

Table 2: Secondary Analysis of Potential Forbearance Trigger – Rolling Recharge

FORBEARANCE TRIGGERS	SPRINGFLOW ACHIEVED (CFS) AT COMAL SPRINGS
Current EAHCP triggers (three-tiered system): 10-year rolling recharge average of 572,000 acre-feet per year; and 10-year rolling recharge average of 472,000 acre-feet per year	29.71
Proposed 10-year rolling recharge average of 500,000 acre-feet per year (two-tiered system)	29.8

Put simply, the study indicated that the ASR Program could be modified in a manner that provided both a simplified, two-tiered leasing/forbearance approach at an equivalent or stronger springflow benefit as the current ASR Program if a 10-year rolling recharge average of at or below 500,000 acre-feet per annum was used as a forbearance trigger. Therefore, this indication of equivalent program efficacy is consistent with the intent of the HCP and the Incidental Take Permit for the Program.

Evaluation of Information Provided

Because of the policy and administrative nature of this Nonroutine AMP proposal, the role of the Science Committee is largely limited to an analysis of whether or not the proposal is based on a decision-making process that uses the best scientific information available – in this case, the updated Edwards Aquifer MODFLOW groundwater model. Also, the Science Committee acknowledges that this Nonroutine AMP proposal does not change the springflow protection goal, but only changes the current three-tier leasing structure to achieve expeditiously EAA's long-term commitment in the ASR Program.

Conclusion

The Science Committee concludes that the ASR AMP proposal is based on a decision-making process that uses the best scientific information available, and the proposed amendment provides the same or greater springflow protection as afforded by the current Program.

Scientific Evaluation Report: Nonroutine AMP Proposal - Use of SAWS ASR for Springflow Protection

References

Liu, Troshanov, Winterle, Zhang and Eason, 2017, "Updates to the MODFLOW Groundwater Model of the San Antonio Segment of the Edwards Aquifer", Edwards Aquifer Authority, San Antonio, TX. http://www.edwardsaquifer.org/documents/2017_Liu-et-al_UpdatestotheMODFLOWGroundwaterModeloftheSanAntonioSegmentoftheEdwardsAquifer.pdf.pdf

Summary of Science Committee Discussion of the Proposal

Overview

At the January 31, 2018 meeting of the Science Committee, Marc Friberg, EAA Executive Director of Intergovernmental Relations provided a presentation on the ASR Nonroutine Adaptive Management (AMP) proposal to modify the use of the SAWS ASR for Springflow protection measure. This presentation covered a summary of the (1) the current ASR program including the long-term goals and three-tiered system (2) the marketability problems of the current tier system, (3), and finally the elements of the Nonroutine AMP proposal itself that would address these problems.

The following sections provide a lightly-edited summary of the Science 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.

Analysis of Triggers

Mr. Friberg provided the Committee a summary of the comparison of the current trigger system using the 10-year rolling recharge average and potential J-17 Index Well level forbearance triggers. Dr. Conrad Lamon asked why there was no difference in the results for the Comal springflow when a J-17 Index Well trigger level of 636 ft and 637 ft was modeled. Both Mr. Friberg and Mr. Jim Winterle stated that the model is not sensitive to this one-foot difference. Mr. Winterle added that the modeled springflow at Comal Springs does not respond positively until a J-17 Index Well trigger level of 641 ft.

Use of the 10-year Rolling Recharge Average

Dr. Lamon asked about whether the 10-year rolling recharge average was protective enough of springflow. He also asked for an explanation of the calculation of the 10-year rolling average. Mr. Friberg stated that the EARIP stakeholders agreed to using the 10-year rolling average in the EAHCP. Nathan Pence, EAHCP Program Manager, that during the EARIP process, the Science subcommittee looked at all types of triggers and learned that using a J-17 Index Well trigger level did not provide the same long-term protection as using the 10-year rolling recharge average.

Scientific Evaluation Report: Nonroutine AMP Proposal - Use of SAWS ASR for Springflow Protection

Dr. Jacquelyn Duke asked for a further explanation as to not using a J-17 Index Well trigger level. Mr. Friberg said that springflow is volatile and that the ASR program is intended to provide protection to springflow during the long-term drought of record conditions – explaining the use of the 10-year rolling recharge average.

Benefit of the Proposed Changes

Dr. Tom Arsuffi asked that the proposal should identify more clearly the benefits of the proposed changes. He had thought the goal was to achieve the 30 cfs in the Comal Springs, but now understands that the goal of this proposal is to change how the 50,000 acre-feet per year requirement is achieved. Mr. Pence stated that the 30 cfs goal will be addressed in the second phase of the EAHCP.

Dr. Charlie Kreidler and Dr. Robert Mace both discussed with the Committee their understanding of the benefit of the proposed changes per their one on one meeting with Mr. Pence. They said that after this meeting, they had a better understanding of forbearance of all springflow protection measures such as the VISPO and Critical Period Management programs. Mr. Friberg further added, that 2014 was similar to drought of record conditions. Mr. Pence responded that a new drought of record conditions will be addressed in the roll-over of the Incidental Take Permit.

Mr. Friberg also told the Committee that another benefit of the program is that it would be attractive to many of the permit holders that have participated in the one-year ASR lease agreements. He also stated that under EAA's rules, restricted irrigated water permit-holders are not eligible to participate in the ASR program. However, with these proposed changes – to add a forbearance tier- the restricted irrigated water would be able to participate.

Critique of the Proposal

Dr. Butch Weckerly and Dr. Arsuffi stated that proposal was confusing to those that are not familiar with the ASR program and the terminology. Dr. Arsuffi requested EAA include a glossary of key terms – such as forbearance in the proposal. He also stated that the tables in the proposal need to include titles and references in the text of the proposal. Mr. Friberg responded with a definition of forbearance and stated that a glossary of key terms can be included and modifications to the tables can be made.

Motion and Recommendation

Mr. Pence reminded the Committee their role in the Nonroutine AMP proposal process and the options they have in making their recommendations to the Stakeholder Committee. With that stated, Dr. Mace made the motion that the Science Committee recommend the Nonroutine AMP proposal to the Stakeholder Committee, but to add to the proposal a glossary of key terms and ensure that every table in the proposal includes a title and reference. Dr. Janis Bush seconded the motion. There was unanimous support of the motion.

Scientific Evaluation Report: Nonroutine AMP Proposal - Use of SAWS ASR for Springflow Protection

Attachments

Attachment 1: Minutes from the January 31, 2018, Science Committee Meeting – Unofficial



NOTICE OF OPEN MEETING

Available at eahcp.org

1. Call to order.

Chair, Dr. Weckerly called the meeting to order at 9:05 a.m. Members present include: Janis Bush, Jacquelyn Duke, Conrad Lamon, Glenn Longley, Robert Mace, Doyle Mosier, Chad Norris, Floyd Weckerly, Tom Arsuffi, and Charles Kreidler; Jackie Poole was unable to attend.

2. Public comment.

No comments from the public.

3. Approval of the Science Committee meeting minutes (Attachment 1).

Dr. Mace motioned to approve the minutes as written; Dr. Longley seconded. No opposition.

4. Receive report from the Program Manager.

- Spring systems and index well update
- The National Academy of Sciences EAHCP Science Review Panel's *Report 3*, meeting 2 overview
- Contractor selection for the Sessom Creek 2018 Applied Research project
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5. Presentation, discussion, and possible recommendation of the Nonroutine Adaptive Management proposal related to the Aquifer Storage and Recovery program (Attachments 3 and 4).

Dr. Lamon asked why there was no difference between the J-17 index well trigger level of 636 ft and the 637 ft scenarios. Mr. Friberg replied that during the drought of record scenario runs, modeled conditions did not stay below 641 ft long enough to trigger the ASR forbearance package.

Scientific Evaluation Report: Nonroutine AMP Proposal - Use of SAWS ASR for Springflow Protection

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Dr Weckerly and Dr. Arsuffi recommended that the ASR AMP proposal include a glossary of terms as well as a description for each of the tables.

Dr. Mace motioned to endorse the Nonroutine Adaptive Management proposal with the added glossary of terms and table legends; Dr. Bush seconded. No opposition.

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. Arsuffi motioned to endorse the expedited process to prepare the Scientific Evaluation Report to the Stakeholder Committee; Dr. Longley seconded. No opposition.

Scientific Evaluation Report: Nonroutine AMP Proposal - Use of SAWS ASR for Springflow Protection

7. Presentation of the 2017 Biological Monitoring Reports (Attachments 5 and 6).

Mr. Oborny presented a comprehensive overview of the 2017 biological monitoring results for each of the EAHCP biological monitoring datasets.

2017 was the first year of the rapid bioassessment which adhered to standard rapid bioassessment practices. Dr. Arsuffi proposed that someone analyze the RBP and IBI to see how the two indices line-up. Mr. Norris noted that at least 3 years of this dataset are needed to analyze the existing conditions which will help assess conditions for the invertebrate species.

In regard to the fountain darter dropnet data, Mr. Lamon emphasized that the biological goals are based on the median and not the average, therefore, the data could be improved by taking the log of the data and untransforming it back into the median. The confidence level will not be symmetric, but it would be a better indicator to compare with the EAHCP fountain darter goals. Mr. Oborny agreed and will incorporate it into their analysis.

Mr. Oborny then presented the findings of the first year of the fish tissue sampling which use samples from the headwaters and the lower reaches of the river. Dr. Mace asked if the emerging contaminants found within the fish tissue have also been found within the artesian springs or wells. Mr. Pence replied that yes, sampling has found that the contaminants are not just from runoff, but also found within wells in the artesian zone of the aquifer. Other members agreed that studies conducted throughout the US are finding these contaminants within other aquifers; they are everywhere.

Dr. Weckerly requested that the annual Biomonitoring report include descriptions about the sampling methodologies employed. Dr. Furl replied that there is a standard operating procedures document for the biomonitoring program that can be attached to the report.

8. Presentation and discussion of the proposed 2018 Work Plan Amendments for the Refugia, Biomonitoring, and the Applied Research Programs (Attachments 7, 8 and 9).

Dr. Furl presented the proposed amendments to the 2018 Work Plans for the Refugia, Biological Monitoring, and Applied Research Programs.

Dr. Kreidler requested the number for the Sessom Creek Proposal that was selected. EAHCP Staff will follow-up and provide.

Mr. Mosier motioned to approve the 2018 Work Plan Amendments; Dr. Duke seconded. No opposition.

9. Presentation and discussion of the formation and goals of the Research Work Group to discuss the Comal Springs riffle beetle biomonitoring program.

Scientific Evaluation Report: Nonroutine AMP Proposal - Use of SAWS ASR for Springflow Protection

Dr. Furl facilitated the discussion of the formation and need for a Comal Springs riffle beetle biomonitoring work group. Based input from the Science Committee, National Academy of Sciences, and the 2017 CSRB biomonitoring findings, the EAHCP goals for the CSRB are not being met. 2017 biomonitoring data have shown a decline in CSRB which may be attributed to many factors such as, but not limited to, over-sampling, ineffective cotton lures, or movement into unsampled reaches. If additional reaches are added to the CSRB sampling, it may result in cutting funds for sampling of other biomonitoring datasets.

Dr. Lamon requested that the CSRB data be analyzed before additional CSRB reaches are added at the cost of ending another biomonitoring dataset.

Dr. Weckerly suggested a 2-4 year study to compare our existing information and practices to other studies on similar species. He emphasized the need for a controlled study of the cotton lure within a laboratory setting, but also countered that the conditions would not resemble that of the wild so it may need to be more of an in-situ study. There are many unknowns about the cotton lure that need to be analyzed.

All members agree that a CSRB biomonitoring Work Group is needed. Dr. Furl will put together a charge for the group that will define its goals related to the Refugia and Biological Monitoring programs.

10. Consider future meetings, dates, locations, and agendas.

Science Committee Meeting, Thursday, March 8th at 9 a.m. at the San Marcos Activity Center (Multipurpose Room).

11. Questions and comments from the public.

12. Adjourn: 12:02 pm

Scientific Evaluation Report: Nonroutine AMP Proposal - Use of SAWS ASR for Springflow Protection

Attachment 2 – Glossary of Terms

As used in the Nonroutine AMP proposal and this Glossary, the following terms have the following meanings:

“Forbearance” means the complete curtailment of all or part of a right to make withdrawals under a specific Edwards Aquifer Authority Groundwater Withdrawal Permit.

“Forbearance Agreement” is a contractual agreement whereby a party agrees to terms whereby the complete curtailment of all or part of the party’s right to make withdrawals under a specific Edwards Aquifer Authority Groundwater Withdrawal Permit is required when certain conditions, commonly referred to as “triggers” are met.

“Trigger” means to cause an event or situation to happen or exist. In the case of a Forbearance Agreement, a trigger would be a condition that causes or requires the curtailment of all or part of the right to make withdrawals under a specific Edwards Aquifer Authority Groundwater Withdrawal Permit.

“Curtail” or “Curtailment” means the act of reducing or restricting something. In the case of a Forbearance Agreement, the right to withdrawal under an Edwards Aquifer Authority Groundwater Withdrawal Permit would be reduced or restricted.

“Edwards Aquifer Authority Groundwater Withdrawal Permit” means an Initial Regular Permit or Regular Permit issued by the Edwards Aquifer Authority.

“Initial Regular Permit” means an Edwards Aquifer Authority Groundwater Withdrawal Permit issued by the Edwards Aquifer Authority under Subsection 1.16(d) of the Edwards Aquifer Authority Act.

“Edwards Aquifer Authority Act” means the Act of May 30, 1993, 73rd Leg., R.S., ch. 626, 1993 Tex. Gen. Laws 2350, as amended.

“Regular Permit” means an Edwards Aquifer Authority Groundwater Withdrawal Permit issued by the Edwards Aquifer Authority after August 12, 2008, resulting from the sale or amendment of an Initial Regular Permit or the consolidation of two or more such permits.

“Withdrawal” means an act that results in taking groundwater from the Edwards Aquifer by or through man-made facilities, including pumping.

“Lease Option” means a type of contractual agreement whereby a party has the option to lease property when certain conditions are met. In the context of the Edwards Aquifer Habitat Conservation Plan, the Edwards Aquifer Authority is charged with entering into such contracts with the option to lease an Edwards Aquifer Authority Groundwater

Scientific Evaluation Report: Nonroutine AMP Proposal - Use of SAWS ASR for Springflow Protection

Withdrawal Permit becoming actionable upon the existence of a specific ten-year rolling recharge average. The difference between a Lease Option and a Forbearance Agreement is that a Lease Option is a contractual agreement to lease property rights under certain conditions and a Forbearance Agreement is an contractual agreement to curtail withdrawal of an Edwards Aquifer Authority Groundwater Withdrawal Permit under certain conditions.

“Ten-year Rolling Average” or “10-year Rolling Average” means the unweighted arithmetic mean of the ten (10) most recent consecutive years at any given time.

“Estimated Annual Recharge” Annual recharge is estimated by the United States Geological Survey using a water-balance method that: (1) relies on precipitation and streamflow measurements in the nine (9) drainage basins indicated in "Method of Estimating Natural Recharge to the Edwards Aquifer in the San Antonio Area, Texas," 1978, USGS WRI-7810, by Celso Puente; (2) considers only precipitation and stream flow that originates over the Contributing Zone and Recharge Zone of the Edwards Aquifer; and (3) excludes interformational flows from adjacent aquifers.

“Ten-year Rolling Average Recharge” or “10-year Rolling Average Recharge” means the unweighted arithmetic mean of annual recharge to the Edwards Aquifer over the ten (10) most recent consecutive years at any given time.



**Stakeholder Committee
Meeting Minutes
February 8, 2018**

1. **Call to order -- 9:00 a.m.**
Myron Hess called order; a quorum was present.
2. **Public Comment.**
No comments.
3. **Approval of minutes from the September 21st Stakeholder Committee meeting and December 14th Joint Committee meeting.**

Con Mims made a motion to approve meeting minutes; the motion was seconded. There were no objections.

4. **Report from the Program Manager on general updates about the Habitat Conservation Plan.**

- **Springflow and Index Well levels**

Dr. Chad Furl provided a brief hydrologic update on the springflows and index well levels. Diane Wassenich asked when the data for the historical averages began. Dr. Furl answered that the historical averages contains data prior to the 1950's.

- **The National Academy of Sciences EAHCP Science Review Panel's *Report 3*, meeting 2 overview.**

Dr. Chad Furl updated the committee on the third and final National Academy of Sciences (NAS) EAHCP report. *Report 3* will be a holistic review of the HCP as well as an analysis on the relationships between the conservation measures, biological objectives and biological goals. During the January visit, the NAS committee had the opportunity to tour the Comal System restoration sites and SMARC refugia complex. *Report 3* is expected to be completed by Fall 2018.

Glenn Lord asked if it was the same NAS committee that has reviewed the HCP over the course of the program. Nathan Pence answered that it has been the same NAS committee, apart from a few committee member changes, over the past 5 years to review the HCP.

- **EAHCP 2017 Annual Report Update**

Shaun Payne provided the committee a timeline of the 2017 EAHCP Annual Report. A second opportunity to review and provide comments on the draft Annual Report will begin February 9th. The final Annual Report will be submitted March 26th and a hard copy will be made available at the next Implementing Committee meeting. Nathan Pence mentioned plans to produce a high level executive summary of the Annual Report that would be appropriate for stakeholder groups, city council members and interested individuals.

- **Contractor Selection for the Sessom Creek 2018 Applied Research Project**

Dr. Chad Furl provided updates on the Sessom Creek Project. Texas State University and Texas A&M University AgriLife have been selected as the contractors for this project. The Scope of Work will include data collection on sediment loading, calculating sediment/constituent loading curves and data analysis on contributing factors to sediment exports.

- **Comal Springs Riffle Beetle (CSRB) Work Group update**

Dr. Chad Furl presented recent updates to the CSRB 2018 Work Group initiative. Suggestions made by the Science Committee and Texas Parks and Wildlife Department include additional monitoring through the Biomonitoring program, a CSRB distribution and abundance study and additional sampling locations. However, many overarching questions concerning riffle beetle sampling remain. Proposed next steps of the CSRB Work Group intend to address many of those concerns and discuss development of the data driven Work Group.

Carol Patterson asked if there were any plans to sample for the CSRB in the center of Landa Lake. Dr. Furl answered that sampling in the center of the lake was not considered a priority because riffle beetles are not typically found more 50 meters away from a spring orifice. Nathan Pence noted the heavy amount of sampling that already occurs in the spring system by various groups aside from the HCP. The CSRB work group intends to provide recommendations on monitoring and sampling frequency.

5. **Presentation of the 2017 Net Disturbance and Incidental Take Assessment.**

Nathan Pence presented the Incidental Take Permit (ITP) 2017 Report, the significance of the ITP and its relation to the HCP. The 2017 Report concluded that EAHCP activities did not exceed the 10% habitat disturbance rule, the fountain darter experienced less take in 2017 than in 2016 and that the EAHCP is in good standing relative to the ITP.

Jim Bower asked about the relationship between the take of a covered species and the take of habitat. Mr. Pence answered that the ratio and formula for take of the species and habitat is different for each covered species. Kimberly Meitzen added that attachment 3 of the stakeholder committee packet illustrates the total habitat relative to take. Tom Taggart recommended using a chart to clarify the descriptions of take and habitat. Con Mims asked how many years were left on the ITP and if drought was taken into consideration when

determining the take of species. Mr. Pence answered that the permit expires in 2027 and that the USFWS accommodated estimates of take based on historical drought data.

6. Discussion and possible recommendation on the Aquifer Storage and Recovery (ASR) Nonroutine Adaptive Management (AMP) Proposal.

Myron Hess introduced the ASR AMP proposal to the committee.

Marc Friberg provided a presentation on the current ASR program requirements, past ASR leasing options, analysis on ASR lease trigger scenarios, proposed program amendments from a three-tiered approach to a two tiered system and a budget analysis. The proposed amendment intends to facilitate long term commitment and spring flow protection during drought while maintaining a budget within Table 7.1 estimates.

Con Mims asked about the percentage of the total amount of agricultural water that will be targeted for the ASR program. Mr. Friberg communicated the amount of available agricultural water, but that municipal and industrial water would also be targeted. Myron Hess asked to clarify the locational aspect of the ASR. Mr. Friberg provided an example that permit holders that pump near springs, such as the New Braunfels Utilities (NBU), have a significant impact on ASR during forbearance.

Darren Thompson asked if price points were determined on the type of water usage. Mr. Friberg answered that the EAA is open to these conversations but at this moment one-price point has been discussed.

Adam Yablonski asked about the process moving forward to adjust to the market. Mr. Friberg answered that public outreach, communication with the EAA Board of Directors and market analysis will be deliberated moving forward with the ASR. Price points will be considered as part of the discussion to pursue long term lease commitments and maintaining the EAA's obligations. Nathan Pence clarified that the goal is to fulfill the program's responsibilities and develop a model that can be applied to future use. Myron Hess asked to clarify the estimated budget. Mr. Friberg answered that ASR budget will not exceed the 2018 estimates determined in Table 7.1.

Roland Ruiz noted that meeting with individuals, committee members and small groups has been very helpful and thanked the committee on their continued efforts to improve the program.

Javier Hernandez made a motion to approve the ASR AMP as amended. Carol Patterson seconded the motion. There were no objections.

7. Discussion and decision regarding expedited process to develop and approve submission of the Nonroutine AMP Stakeholder Report to the Implementing Committee.

Alicia Reinmund-Martinez presented the purpose of the expedited process to develop and approve submission of the Nonroutine AMP Stakeholder Report to the Implementing Committee

Patrick Shriver made a motion to approve the expedited process. Cindy Loeffler seconded the motion. There were no objections.

8. Consider future meetings, dates, locations, and agendas.

The next meeting will be held on June 21, 2018 at the City of New Braunfels City Hall. Nathan Pence noted that the next meeting will provide committee members a presentation on the bottom up package of all HCP programs. Additionally, members of all HCP committees are invited to attend a tour of the Comal Springs during the next Science Committee meeting. Carol Patterson asked when the next Science Committee meeting will be held. Dr. Chad Furl answered the next meeting will be on May 9th.

9. Questions from the public.

Roland Ruiz informed the committee on a lawsuit that has recently been filed by the Uvalde County Underground Water Conservation District against the EAA over recent changes to the Base Irrigation Rules. Mr. Ruiz assured the committee that the lawsuit will not affect the activities and operations of the HCP.

10. Adjourn: 10:40am



Patrick Shriver, Secretary 6-4-2018

**Nonroutine Adaptive Management Proposal
Edwards Aquifer Habitat Conservation Plan
EAHCP Stakeholder Committee Report
February 8, 2018**



Overview

This Report is issued in response to the Nonroutine AMP proposal submitted by the General Manager of the Edwards Aquifer Authority (EAA), dated January 22, 2018 (revised January 31, 2018), related to use of the San Antonio Water System (SAWS) Aquifer Storage and Recovery (ASR or ASR Facility) for Springflow Protection (“the Program or ASR Program”). According to the Funding and Management Agreement (FMA), the EAHCP Stakeholder Committee is responsible for reviewing and making recommendations to the Implementing Committee for proposals submitted through the Nonroutine Adaptive Management process. This Report presents the final recommendation of the EAHCP Stakeholder Committee concerning this Adaptive Management proposal.

Summary of the Nonroutine Adaptive Management Proposal

The Edwards Aquifer Habitat Conservation Plan (“EAHCP”) currently utilizes the SAWS ASR Facility for storage and recovery of leased Edwards Aquifer water. Broadly, the current program is based on the acquisition by the EAA of 50,000 acre-feet per year of leases and lease options of Edwards Aquifer groundwater withdrawal permits to be utilized to fill, idle, and maintain in storage a portion of the capacity of the ASR Facility for subsequent use to protect springflows during identified drought-of-record conditions. When specific triggers (described in the EAHCP) are reached: (1) SAWS is obligated to forbear on its rights to make withdrawals at specific amounts from the Edwards Aquifer pursuant to its Edwards Aquifer groundwater withdrawal permits; (2) water stored in the ASR Facility is available to SAWS for recovery to offset its forbearance in order to meet customer demand; and (3) the EAA, when not utilizing leased water to fill the ASR Facility, is obligated to forbear pumping of the entirety of its leased or lease option water (50,000 acre-feet). This combination of SAWS and EAA forbearance contributes significantly to protecting flows at the Comal and San Marcos spring systems during the periods of drought conditions for which this program is triggered.

The ASR Program has been in operation for over four years. During the course of implementation, firsthand experiences with implementation challenges, as well as market responses to proposed leasing and lease-option products have contributed to the identification of opportunities to improve the operational and financial efficiencies of the EAA’s water acquisition responsibilities under the ASR Program while providing the same or greater benefit to springflow protection.

Specifically, the EAA proposes to amend the leasing structure of the ASR Program to:

1. Replace the current, three-tiered leasing/lease option structure with a two-tiered leasing/forbearance structure that coordinates existing long-term leases with new,

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long-term forbearance agreements, together providing control of the necessary 50,000 acre-feet per year of Edwards Aquifer groundwater required under the current ASR Program; and

2. Exercise (trigger) forbearance by the EAA in years following a recognition of the Ten-year Rolling Average of the Estimated Annual Recharge to the Aquifer declining to amounts at or below 500,000 acre-feet per annum.

Summary of February 8, 2018 Stakeholder Committee Discussion

At the February 8, 2018 Stakeholder Committee meeting, Marc Friberg, EAA, provided a presentation – *Use of the SAWS ASR for Springflow Protection: Optimization through Proposed Adaptive Management* – to the Committee. This presentation covered the following: (1) the current program requirements; (2) past ASR lease options; (3) a bottom-up analyses results for ASR lease trigger scenarios; (4) proposed program amendments; and (5) and outreach efforts.

Following this presentation, the Stakeholder Committee had a short discussion on the merits of the proposal. This section provides a summary of the discussion. It also includes the final motions taken by the Committee.

Determination of the Price Point and Marketing for this New ASR Program

Mr. Con Mims first asked about the percentage of the total amount of agricultural water that will be targeted for this program. Mr. Friberg communicated the amount of available agricultural water, but that municipal and industrial water would also be targeted.

Mr. Roland Ruiz, EAA General Manager, mentioned there was an edit to the ASR AMP proposal which was presented to the Committee as an amendment to the ASR AMP proposal, clarifying the estimated price-point drafted in the proposal.

Mr. Darren Thompson asked if there has been any price point analysis done between municipal and industrial versus irrigation water. Mr. Friberg said that EAA is open to these conversations but at this point one price-point has been discussed.

Mr. Adam Yablonski asked what the process going forward in marketing this product will be. Mr. Freiberg commented that, assuming the AMP gets approved a conversation, internally and between staff and the EAA board, will begin the deliberation of what the proper price point for these agreements will be in order to fully enroll the program. He added that \$100/acre-feet has been thrown around as a price for this program. This has been in consideration to the mechanism of payment/triggering. Mr. Ruiz mentioned the price point in the proposal was provided to increase transparency to the committees, and

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not necessarily for USFWS. EAA's primary commitment is to fulfill the needed lease and forbearance amounts and stay within the EAHCP Table 7.1 budget.

Final Overall Comments

Mr. Ruiz thanked the committee members for their willingness to participate in the conversation. He stated it was very helpful for staff to have these conversations.

Mr. Myron Hess commented that what we are doing today (in regards to the current ASR program) is not working very well, and this change is an attempt to adapt to how this product is being received and increase the likelihood of EAA to reach enrollment obligations.

Final Motions by the Committee

Mr. Javier Hernandez made a motion to approve the Nonroutine ASR AMP proposal as amended to be submitted to the Implementing Committee. Carol Patterson seconded. There was no objection and the motion was approved by consensus. Mr. Nathan Pence EAHCP Program Manager, communicated that this motion recommends the ASR AMP Proposal to the Implementing Committee for their consideration.

Nature of Stakeholder Committee Decision

Twenty-three members of the Committee attended the February 8th, 2018 meeting in attainment of a quorum for the meeting. Votes for both Committee actions concerning the Nonroutine AMP proposal were by consensus; there were no competing options.

Stakeholder Recommendation

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

Attachments

- Nonroutine Adaptive Management revised proposal dated January 31, 2018 as amended February 8, 2018.
- Nonroutine Adaptive Management Scientific Evaluation Report, EAHCP Science Committee, February 2, 2018.
- Minutes (unofficial) from the February 8, 2018 Stakeholder Committee Meeting



**Implementing Committee Meeting Minutes
February 8, 2018**

Members of this committee include: Tom Taggart (San Marcos), Roland Ruiz (EAA), Greg Malatek (New Braunfels), Darren Thompson (SAWS), Kimberly Meitzen for Andrew Sansom (Texas State University), and Jonathan Stinson (GBRA).

1. Call to order – 11:00am

Darren Thompson called roll for the Committee; a quorum was present.

2. Public Comment.

No Comment.

3. Approval of minutes from the October 19th Implementing Committee meeting.

Tom Taggart made a motion to approve the meeting minutes. Roland Ruiz seconded the motion. There were no objections.

4. Discussion and possible approval of the Aquifer Storage and Recovery (ASR) Nonroutine Adaptive Management (AMP) Proposal.

Tom Taggart commented, expressing that while the ASR conservation measure proposal results in a better program, it still was not perfect. He pointed out that the trigger was still based on a rolling recharge average and that there remains some uncertainty around recharge calculations. Darren Thompson mentioned the price point for the new ASR product was important so as to not skew the market. Nathan Pence provided a brief description of the attachments presented in the Implementing Committee packet, including the report submitted by the Stakeholder Committee. Roland Ruiz pointed out a typographical error in the ASR proposal that needed correction.

Roland Ruiz made a motion to approve the ASR AMP as amended. Tom Taggart seconded the motion. There were no objections.

5. Discussion and 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.

Tom Taggart made a motion to direct the Program Manager to submit the necessary documentation to the USFWS regarding the ASR AMP Proposal. Roland Ruiz seconded. There were no objections.

Nathan Pence provided a brief timeline for submitting the USFWS documentation stating the actions taken by the Committee and the intent to move forward with the ASR program. Roland Ruiz noted that there is not a hard deadline for termination of the current short-term leases in the ASR program, but that EAA hopes to conclude those leases and begin the transition to the new ASR program before July.

6. Presentation and possible action to approve the amended 2018 Refugia, Biomonitoring, and Applied Research Program Work Plans.

Chad Furl presented proposed amendments made to the 2018 Refugia, Biomonitoring and Applied Research Program work plans.

Gregg Malatek made a motion to approve the 2018 work plan amendments. Roland Ruiz seconded the motion. There were no objections.

7. Presentation and possible action to approve the amended 2018 EAA Funding Application.

Alicia Reinmund-Martinez presented the request to amend the 2018 EAA Funding Application based on the amended Refugia work plan.

Gregg Malatek made a motion to approve the amended funding application. Tom Taggart seconded the motion. There were no objections.

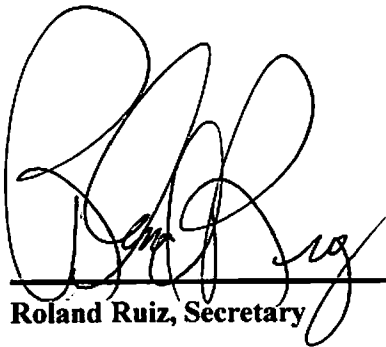
8. Consider future meetings, dates, locations, and agendas.

The next Implementing Committee meeting is scheduled for March 22, 2018 at the Edwards Aquifer Authority in San Antonio, TX.

9. Questions from the public.

No Comment.

10. Adjourn: 11:15am



Roland Ruiz, Secretary



February 12, 2018

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

RE: Amendment to “Use of the SAWS ASR for Springflow Protection” Measure (EAHCP §5.5.1)

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 an amendment to the Edwards Aquifer Habitat Conservation Plan (EAHCP) to revise the *Use of the SAWS ASR for Springflow Protection* Measure (EAHCP §5.5.1) in the EAHCP. This letter is submitted pursuant to Section 9.2.1 of the EAHCP.

The Edwards Aquifer Habitat Conservation Plan (EAHCP) currently includes a springflow protection program (ASR Program or Program) that utilizes the San Antonio Water System (SAWS) Aquifer Storage and Recovery Facility (ASR Facility) for storage and recovery of leased Edwards Aquifer water. Broadly, the current program is based on the acquisition by the Edwards Aquifer Authority (EAA) of 50,000 acre-feet per year of leases and lease options of Edwards Aquifer groundwater withdrawal permits to be utilized to fill, idle, and maintain in storage a portion of the capacity of the ASR Facility for subsequent use to protect springflows during identified drought-of-record conditions. When specific triggers (described in the EAHCP) are reached the EAA, when not utilizing leased water to fill the ASR Facility, is obligated to forbear pumping of the entirety of its leased or lease option water (50,000 acre-feet per year). This combination of SAWS and EAA forbearance contributes significantly to protecting flows at the Comal and San Marcos spring systems during the periods of drought conditions for which this program is triggered. The ASR Program has been in operation for over four years. During the course of implementation, firsthand experiences with implementation challenges and successes, as well as market responses to proposed leasing and lease-option products have contributed to the identification of opportunities to improve the operational and financial efficiencies of the EAA’s water acquisition responsibilities under the ASR Program while providing the same or greater benefit to springflow protection.

This amendment does not modify in any way the Biological Goals or Objectives contained in the EAHCP, nor does it alter the requirements for SAWS. Rather, this amendment presents a preferred alternative to the process currently identified in the EAHCP by which those goals and objectives are achieved and implemented. Specifically, in order to optimize the Program’s success, the EAA proposes to amend the leasing structure by (1) replace the current, three-tiered leasing/lease option structure with a simplified two-tiered leasing/forbearance agreement structure that coordinates existing long-term leases with new, long-term forbearance agreements (together providing control of the necessary 50,000 acre-feet per year of Edwards Aquifer groundwater); and (2) revise the Ten-Year Rolling Average of Estimated Recharge

threshold used for triggering forbearance for EAA-controlled groundwater withdrawal rights to 500,000 A/F. Language change to the current measure in the EAHCP is provided in Exhibit 1.

Throughout 2016 and early 2017, the EAA internally vetted the issues identified with the ASR Program, and initially identified two potential advantageous modifications to the design of the Program. It was generally assumed that the two modifications would (1) provide a more understandable and marketable product that will achieve long-term control of 50,000 A/F of Edwards Aquifer groundwater for forbearance by the EAA during the drought conditions that trigger the ASR Program; and (2) provide greater springflow during a repeat of such drought through the use of a more impactful, J-17 level-based forbearance trigger.

These proposed modifications were also presented to the SAWS ASR Regional Advisory Group at their February 14, 2017 and January 19, 2018 meetings, and were met with general support from the group. A Scientific Evaluation Report (SER) was produced and adopted by the Science Committee on January 31, 2018 to provide any necessary directive regarding the Adaptive Management Proposal (Exhibit 3) which was later supported by the Stakeholder Committee and adopted by the Implementing Committee on February 8, 2018. This process was in accordance with the Adaptive Management Process outlined in the Funding and Management Agreement (FMA) and results in this request to clarify and amend the EAHCP outlined in the final Nonroutine Adaptive Management Proposal and Stakeholder Report (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 amendment during its February 8, 2018 meeting. All meeting agendas and minutes from this process have been provided in Exhibit 4.

The Permittees seek your formal acceptance of this amendment to allow alterations to *Use of the SAWS ASR for Springflow Protection Measure* (EAHCP §5.5.1) Measure in the EAHCP. Your approval of this amendment will allow the Permittees to implement this critical aspect of the EAHCP. We look forward to your formal acceptance of the amendment and appreciate your consideration and response on this issue.

Respectfully,

A handwritten signature in black ink, appearing to read "Nathan E. Pence", with a long horizontal flourish extending to the right.

Nathan E. Pence
Program Manager
Edwards Aquifer Habitat Conservation Plan

EXHIBIT 1

5.5.1 Use of the SAWS ASR for Springflow Protection

EAA will acquire through both lease and option forbearance agreements 50,000 ac-ft/yr of EAA-issued Final Initial Regular Permits. The EAA may use SAWS as its agent for this purpose. The leases and ~~options~~ forbearance agreements will be acquired by EAA to fill, idle, and maintain a portion of the capacity of the SAWS ASR Project for subsequent use, to protect springflows during identified drought-of-record conditions as described below.

The lease/forbearance agreement program is comprised of ~~three~~ two components. The first ~~one-third~~, a sliding scale approximating 10,000 to 16,667 ac-ft of permits, will be leased for immediate storage in the ASR. The remaining pumping rights will be placed under forbearance agreements ~~a lease option~~. ~~One third (16,667 ac-ft)~~ The second, a sliding scale approximating 33,333 to 40,000 ac-ft of the total, will be ~~options~~ forbearance agreements exercised in the year after the 10-year moving annual average of Edwards recharge falls below ~~572,000~~ 500,000 ac-ft/yr, as determined by the EAA (see Section 6.2.3), ~~and is likely to continue to decrease. The last one-third will be options exercised when the 10-year moving recharge average is less than 472,000 ac-ft/yr, as determined by the EAA (see Section 6.2.3).~~ When the leases are in place, this water will either be pumped to fill the SAWS ASR or not pumped for any reason. When the forbearance agreements are in place, this water will not be pumped for any reason when the identified drought conditions are triggered. When the ASR is in recovery mode (i.e., when water is being returned from the ASR), the leased water will not be pumped. The water to fill the SAWS ASR is generally provided by SAWS from ~~their~~ its existing Edwards supplies and the ~~first one-third of the regional leases water (10,000 to 16,667 ac-ft)~~ which will be maintained at all times throughout the HCP duration. SAWS will store its own unused Edwards permits in addition to the HCP leases ~~and lease options~~ in the ASR when possible. SAWS, with the assistance of the Regional Advisory Group will describe in the Annual Report the storage and recovery activities. Trigger levels for implementation of ASR management in accordance with the HCP will be 630 ft-MSL at the J-17 index well during an identified repeat of drought conditions similar to the drought of record as indicated by the ten-year rolling average of Edwards recharge of 500,000 ac-ft, as determined by the EAA. When triggered, the ASR or other supplies capable of utilizing shared infrastructure will be activated to deliver up to 60 million gallons per day to SAWS distribution system during a repeat of drought of record-like conditions. When the monthly average groundwater levels at J-17 are below 630 ft-MSL and the ten-year rolling average of Aquifer recharge is 500,000 ac-ft or less, pumping of selected wells on the northeast side of SAWS water distribution system will be reduced in an amount that on a monthly basis equals the amount of water returned from the ASR only to the extent of the Aquifer water provided by the EAA for storage in the ASR. SAWS will use up to 100 percent of the conveyance capacity of existing SAWS ASR facilities to off-set SAWS' Edwards Aquifer demand.

**Nonroutine Adaptive Management Proposal
Edwards Aquifer Habitat Conservation Plan
EAHCP Stakeholder Committee Report
February 8, 2018**



Overview

This Report is issued in response to the Nonroutine AMP proposal submitted by the General Manager of the Edwards Aquifer Authority (EAA), dated January 22, 2018 (revised January 31, 2018), related to use of the San Antonio Water System (SAWS) Aquifer Storage and Recovery (ASR or ASR Facility) for Springflow Protection (“the Program or ASR Program”). According to the Funding and Management Agreement (FMA), the EAHCP Stakeholder Committee is responsible for reviewing and making recommendations to the Implementing Committee for proposals submitted through the Nonroutine Adaptive Management process. This Report presents the final recommendation of the EAHCP Stakeholder Committee concerning this Adaptive Management proposal.

Summary of the Nonroutine Adaptive Management Proposal

The Edwards Aquifer Habitat Conservation Plan (“EAHCP”) currently utilizes the SAWS ASR Facility for storage and recovery of leased Edwards Aquifer water. Broadly, the current program is based on the acquisition by the EAA of 50,000 acre-feet per year of leases and lease options of Edwards Aquifer groundwater withdrawal permits to be utilized to fill, idle, and maintain in storage a portion of the capacity of the ASR Facility for subsequent use to protect springflows during identified drought-of-record conditions. When specific triggers (described in the EAHCP) are reached: (1) SAWS is obligated to forbear on its rights to make withdrawals at specific amounts from the Edwards Aquifer pursuant to its Edwards Aquifer groundwater withdrawal permits; (2) water stored in the ASR Facility is available to SAWS for recovery to offset its forbearance in order to meet customer demand; and (3) the EAA, when not utilizing leased water to fill the ASR Facility, is obligated to forbear pumping of the entirety of its leased or lease option water (50,000 acre-feet). This combination of SAWS and EAA forbearance contributes significantly to protecting flows at the Comal and San Marcos spring systems during the periods of drought conditions for which this program is triggered.

The ASR Program has been in operation for over four years. During the course of implementation, firsthand experiences with implementation challenges, as well as market responses to proposed leasing and lease-option products have contributed to the identification of opportunities to improve the operational and financial efficiencies of the EAA’s water acquisition responsibilities under the ASR Program while providing the same or greater benefit to springflow protection.

Specifically, the EAA proposes to amend the leasing structure of the ASR Program to:

1. Replace the current, three-tiered leasing/lease option structure with a two-tiered leasing/forbearance structure that coordinates existing long-term leases with new,

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long-term forbearance agreements, together providing control of the necessary 50,000 acre-feet per year of Edwards Aquifer groundwater required under the current ASR Program; and

2. Exercise (trigger) forbearance by the EAA in years following a recognition of the Ten-year Rolling Average of the Estimated Annual Recharge to the Aquifer declining to amounts at or below 500,000 acre-feet per annum.

Summary of February 8, 2018 Stakeholder Committee Discussion

At the February 8, 2018 Stakeholder Committee meeting, Marc Friberg, EAA, provided a presentation – *Use of the SAWS ASR for Springflow Protection: Optimization through Proposed Adaptive Management* – to the Committee. This presentation covered the following: (1) the current program requirements; (2) past ASR lease options; (3) a bottom-up analyses results for ASR lease trigger scenarios; (4) proposed program amendments; and (5) and outreach efforts.

Following this presentation, the Stakeholder Committee had a short discussion on the merits of the proposal. This section provides a summary of the discussion. It also includes the final motions taken by the Committee.

Determination of the Price Point and Marketing for this New ASR Program

Mr. Con Mims first asked about the percentage of the total amount of agricultural water that will be targeted for this program. Mr. Friberg communicated the amount of available agricultural water, but that municipal and industrial water would also be targeted.

Mr. Roland Ruiz, EAA General Manager, mentioned there was an edit to the ASR AMP proposal which was presented to the Committee as an amendment to the ASR AMP proposal, clarifying the estimated price-point drafted in the proposal.

Mr. Darren Thompson asked if there has been any price point analysis done between municipal and industrial versus irrigation water. Mr. Friberg said that EAA is open to these conversations but at this point one price-point has been discussed.

Mr. Adam Yablonski asked what the process going forward in marketing this product will be. Mr. Freiberg commented that, assuming the AMP gets approved a conversation, internally and between staff and the EAA board, will begin the deliberation of what the proper price point for these agreements will be in order to fully enroll the program. He added that \$100/acre-feet has been thrown around as a price for this program. This has been in consideration to the mechanism of payment/triggering. Mr. Ruiz mentioned the price point in the proposal was provided to increase transparency to the committees, and

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not necessarily for USFWS. EAA's primary commitment is to fulfill the needed lease and forbearance amounts and stay within the EAHCP Table 7.1 budget.

Final Overall Comments

Mr. Ruiz thanked the committee members for their willingness to participate in the conversation. He stated it was very helpful for staff to have these conversations.

Mr. Myron Hess commented that what we are doing today (in regards to the current ASR program) is not working very well, and this change is an attempt to adapt to how this product is being received and increase the likelihood of EAA to reach enrollment obligations.

Final Motions by the Committee

Mr. Javier Hernandez made a motion to approve the Nonroutine ASR AMP proposal as amended to be submitted to the Implementing Committee. Carol Patterson seconded. There was no objection and the motion was approved by consensus. Mr. Nathan Pence EAHCP Program Manager, communicated that this motion recommends the ASR AMP Proposal to the Implementing Committee for their consideration.

Nature of Stakeholder Committee Decision

Twenty-three members of the Committee attended the February 8th, 2018 meeting in attainment of a quorum for the meeting. Votes for both Committee actions concerning the Nonroutine AMP proposal were by consensus; there were no competing options.

Stakeholder Recommendation

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

Attachments

- Nonroutine Adaptive Management revised proposal dated January 31, 2018 as amended February 8, 2018.
- Nonroutine Adaptive Management Scientific Evaluation Report, EAHCP Science Committee, February 2, 2018.
- Minutes (unofficial) from the February 8, 2018 Stakeholder Committee Meeting

EXHIBIT 2



**Edwards Aquifer Habitat Conservation Plan
Nonroutine Adaptive Management Proposal**

To: EAHCP Implementing, Stakeholder, and Science Committees
From: Roland Ruiz, General Manager, Edwards Aquifer Authority
Date: January 22, 2018/Revised January 31, 2018/Amended February 8, 2018
Re: Proposed Adaptive Modifications to “Use of the SAWS ASR for Springflow Protection” Measure (EAHCP §5.5.1)

PREAMBLE

The Edwards Aquifer Habitat Conservation Plan (“EAHCP”) currently includes a springflow protection program (“ASR Program or “Program”) that utilizes the San Antonio Water System (“SAWS”) Aquifer Storage and Recovery Facility (“ASR Facility”) for storage and recovery of leased Edwards Aquifer water. Broadly, the current program is based on the acquisition by the Edwards Aquifer Authority (“EAA”) of 50,000 acre-feet (A/F) per year of leases and lease options of Edwards Aquifer groundwater withdrawal permits to be utilized to fill, idle, and maintain in storage a portion of the capacity of the ASR Facility for subsequent use to protect springflows during identified drought-of-record conditions. When specific triggers (described in the EAHCP) are reached: (1) SAWS is obligated to forbear on its rights to make withdrawals at specific amounts from the Edwards Aquifer pursuant to its Edwards Aquifer groundwater withdrawal permits; (2) water stored in the ASR Facility is available to SAWS for recovery to offset its forbearance in order to meet customer demand; and (3) the EAA, when not utilizing leased water to fill the ASR Facility, is obligated to forbear pumping of the entirety of its leased or lease option water (50,000 acre feet). This combination of SAWS and EAA forbearance contributes significantly to protecting flows at the Comal and San Marcos spring systems during the periods of drought conditions for which this program is triggered.

This document presents a formal proposal for a Nonroutine Adaptive Management action (“Nonroutine AMP”) involving administrative modifications to the ASR Program from its original design in the EAHCP. The proposal, if approved, does not modify in any way the Biological Goals or Objectives contained in the EAHCP. Rather, the proposal presents a preferred alternative to the process currently identified in the EAHCP by which those goals and objectives are achieved and implemented. Specifically, in order to optimize the Program's success, the EAA proposes to amend the leasing structure of the Program and implement the following:

1. Replace the current, three-tiered leasing/lease option structure with a simplified two-tiered leasing/forbearance agreement structure that coordinates existing long-term leases with new, long-term forbearance agreements (together providing control of the necessary 50,000 A/F per year of Edwards Aquifer groundwater); and

2. Revise the Ten-Year Rolling Average of Estimated Recharge threshold used for triggering forbearance for EAA-controlled groundwater withdrawal rights to 500,000 A/F.

BACKGROUND AND OVERVIEW

The ASR Program has been in operation for over four years. During the course of implementation, firsthand experiences with implementation challenges, as well as market responses to proposed leasing and lease-option products have contributed to the identification of opportunities to improve the operational and financial efficiencies of the EAA's water acquisition responsibilities under the ASR Program while providing the same or greater benefit to springflow protection.

On January 12, 2017, the EAA General Manager submitted a memorandum entitled *An Opportunity for ASR Improvement* (Exhibit A) to both the Implementing and Stakeholder Committees of the EAHCP. The memo cited programmatic issues related to the implementation of the ASR Program that could serve as targets to be addressed through potential Nonroutine AMP. Of the issues and potential solutions identified in the memo, the following five are particularly relevant to this proposal:

- 1. Only unrestricted water rights [irrigation, municipal, and industrial] are eligible for enrollment into ASR; agriculture permits tied to the land [restricted irrigation permits] could be used for forbearance in ASR, if appropriate modifications were made;*
- 2. Triggers for Tier II and Tier III (10-year rolling average recharge) are unfamiliar to permit holders; the ASR program will be more successful if it uses a familiar and comfortable trigger (i.e. J-17);*
- 3. The current tiered system is not fiscally efficient; lease rates, rather than forbearance agreement rates, are paid for water that will, in some cases, more than likely, never be injected;*
- 4. The ASR is almost full; therefore, maintaining an account of 50,000 ac-ft. of unrestricted water rights, eligible for injection, is unnecessary and fiscally inefficient; and*
- 5. The current ASR program anticipated continued filling/injecting during the early years of the DOR, which is likely to create conflict perception issues in the region (i.e. SAWS pumping from the aquifer at the request of the EAA while other permit holders are required to cut back withdrawals), and filling/injecting during this time runs counter to the overall objective of sustaining aquifer levels to ensure continuous minimum springflows. The same or, more likely, greater benefit could be achieved if the full amount required for storage was injected prior to the drought such that no injection had to occur after the onset of the DOR.*

Throughout 2016 and early 2017, the EAA internally vetted the issues identified with the ASR Program, and initially identified two potential advantageous modifications to the design of the Program. These proposed modifications were also presented to the SAWS ASR Regional Advisory Group at their February 14, 2017, meeting, and were met with general support from the group. The two potential advantageous modifications were:

- To consolidate the current three-tiered leasing approach into a simplified two-pronged leasing/forbearance program; and*
- To use J-17 levels as a more recognizable trigger for forbearance of EAA permits.*

It was generally assumed that the two modifications would achieve the following desired outcomes:

1. Provide a more understandable and marketable product that will achieve long-term control of 50,000 A/F of Edwards Aquifer groundwater for forbearance by the EAA during the drought conditions that trigger the ASR Program; and
2. Provide greater springflow during a repeat of such drought through the use of a more impactful, J-17 level-based forbearance trigger.

Performance Comparison:

A simulation using an updated version¹ of the Edwards Aquifer MODFLOW groundwater model was performed in order to compare the springflow results achieved with implementation of the ASR Program as described in the EAHCP to the springflow results achieved with implementation of the Program using the above-described modifications. The results of the exercise are summarized below in the following table Table 1.-

TABLE 1: COMPARISON OF POTENTIAL FORBEARANCE TRIGGERS – COMAL SPRINGS

POTENTIAL FORBEARANCE TRIGGERS	SPRINGFLOW ACHIEVED (CFS) AT COMAL SPRINGS
Current EAHCP triggers (three-tiered system): 10-year rolling recharge average of 572,000 A/F per year (Tier 2); and 10-year rolling recharge average of 472,000 A/F per year (Tier 3)	29.71
J-17 at 635 (msl) on Aug. 1	28.64
J-17 at 636 (msl) on Aug. 1	29.32
J-17 at 637 (msl) on Aug. 1	29.32
J-17 at 641 (msl) on Aug. 1	29.8

As demonstrated by the simulation results, impacts within the model were not as sensitive to a J-17 level-based trigger as presumed originally. While the modeled results showed desirable springflow impacts could be achieved with higher J-17 level-based triggers (e.g. 641(msl) and above), the resulting increased frequency of required forbearance is highly likely to significantly diminish the marketability of such a forbearance agreement option, and would thus render the program ineffective in achieving the desired goals and objectives of the EAHCP.

Therefore, with long-term control of Edwards Aquifer groundwater still a critical need under the EAHCP, EAA staff reconsidered a revised 10-year-average rolling recharge trigger. Ultimately, a modeled analysis of a 10-year rolling recharge average of 500,000 A/F per annum for a forbearance trigger showed to provide similar springflow protection as the current ASR Program under a simplified forbearance approach using a recognizable and understandable forbearance trigger. The results of this secondary analysis are summarized below in the following table Table 2:-

¹ For more information regarding the EAA's updated Edwards Aquifer MODFLOW groundwater model, please see *Updates to the MODFLOW Groundwater Model of the San Antonio Segment of the Edwards Aquifer* available at: http://www.edwardsaquifer.org/documents/2017_Liu-et al_UpdatestotheMODFLOWGroundwaterModeloftheSanAntonioSegmentoftheEdwardsAquifer.pdf.pdf

TABLE 2: SECONDARY ANALYSIS OF POTENTIAL FORBEARANCE TRIGGER – ROLLING RECHARGE

FORBEARANCE TRIGGERS	SPRINGFLOW ACHIEVED (CFS) AT COMAL SPRINGS
Current EAHCP triggers (three-tiered system): 10-year rolling recharge average of 572,000 A/F per year; and 10-year rolling recharge average of 472,000 A/F per year	29.71
Proposed 10-year rolling recharge average of 500,000 A/F per year (two-tiered system)	29.8

Put simply, the study determined that the ASR Program could be modified in a manner that provided both a simplified, two-tiered leasing/forbearance approach at an equivalent or stronger springflow benefit as the current ASR Program if a 10-year rolling recharge average of at or below 500,000 acre-feet per annum was used as a forbearance trigger. Therefore, this demonstration of equivalent program efficacy is consistent with the intent of the HCP and the Incidental Take Permit for the Program. A representative table of the modeling results is attached as Exhibit B.

In addition, considering the EAA has a sufficient amount of long-term lease commitments to ensure that the storage assumptions contained in the EAHCP and the Interlocal Agreement between SAWS and the EAA are satisfied, it would be more efficient to administer the two tiers of leases and forbearance agreements through a “sliding scale approach.” SAWS currently has approximately 80,000 A/F of EAHCP regionally-leased groundwater stored on behalf of the EAHCP in its ASR Facility. Assuming the EAA makes an average of 12,000 A/F of leased rights available to SAWS for injection into the ASR Project each year, full storage of 126,000 A/F of groundwater can be achieved by 2021. Therefore, a reasonable “sliding scale” for each tier (based on EAA’s long-term leases and their expiration dates) ~~would be as follows:~~ [is represented in Table 3.](#)

TABLE 3: REPRESENTATIVE “SLIDING SCALE” OF LEASES AND FORBEARANCE AGREEMENTS (2018-2027)

DATE	LEASE AGREEMENTS (A/F)	FORBEARANCE AGREEMENTS (A/F)	TOTAL LEASE/FORBEARANCE AGREEMENTS (A/F)
2018	40,594.303	0	40,594.303
2019	16,674.753	33,325.247	50,000.000
2020	15,924.077	34,075.923	50,000.000
2021	14,561.797	35,438.203	50,000.000
2022	12,837.627	37,162.373	50,000.000
2023	12,754.164	37,245.836	50,000.000
2024	12,753.164	37,246.836	50,000.000
2025	11,486.018	38,513.982	50,000.000
2026	10,864.898	39,135.102	50,000.000
2027	10,263.498	39,736.502	50,000.000

In summary, revisiting the five relevant goals listed above:

1. *Only unrestricted water rights are eligible for enrollment into ASR; agriculture permits tied to the land [restricted irrigation permits] could be used for forbearance in ASR, if appropriate modifications were made.*

Current legal limitations on restricted irrigation permits prohibit the use of the water for withdrawal and injection into the ASR Facility for municipal purposes. However, this proposed amendment would allow the EAA to enroll such permits into the Program because the forbearance agreement approach would not require the permitted water to be withdrawn; only forborne. Thus, this provides a larger pool of Edwards groundwater to be available to the ASR Program.

2. *Triggers for Tier II and Tier III (10-year rolling average recharge) are unfamiliar to permit holders; the ASR program will be more successful if it uses a familiar and comfortable trigger (i.e. J-17).*

Considering what was learned from the EAA's modeling exercises, permit holder familiarity with a J-17 trigger is outweighed by the marketability and springflow protection benefits associated with the revised 10-year rolling recharge average trigger of less than 500,000 acre-feet per year.

In addition, this trigger matches the recharge average trigger in the EAHCP that is currently associated with SAWS' obligation to forbear its Edwards Aquifer groundwater withdrawal permit. Therefore, as an added benefit, the proposed amendment would result in the EAHCP utilizing one common rolling recharge average trigger – which simplifies overall administration.

3. *The current tiered system is not fiscally efficient; lease rates, rather than forbearance agreement rates, are paid at a greater premium for water that will, in some cases, more than likely, never be injected.*

The proposed amendment would allow the EAA to set a rate for the forbearance agreements that is appropriate for the benefit received and is within the EAHCP's Table 7.1 estimated budget.

4. *The ASR is almost full; therefore, maintaining an account of 50,000 ac-ft. of unrestricted water rights, eligible for injection, is unnecessary and fiscally inefficient.*

The proposed amendment recognizes a key distinction in the EAA's two major obligations under the ASR Program – the duty to provide Edwards water to SAWS to fill the ASR Facility at the required levels, and the duty to forbear 50,000 AF/yr when the drought conditions triggering SAWS' forbearance obligations under the ASR Program are met. In light of the fact that the EAA's responsibilities to deliver Edwards water to SAWS for injection associated with the ASR Program are certain to be met by 2021, this amendment would enable the EAA to adjust its water acquisition initiatives accordingly, prioritizing efforts on long-term forbearance commitments.

5. *The current ASR program anticipated continued filling/injecting during the early years of the DOR, which is likely to create conflict perception issues in the region (i.e. SAWS pumping from the aquifer at the request of the EAA while other permit holders are required to cut back withdrawals), and filling/injecting*

EXHIBIT 2

during this time runs counter to the overall objective of sustaining aquifer levels to ensure continuous minimum springflows. The same or, more likely, greater benefit could be achieved if the full amount required for storage was injected prior to the drought such that no injection had to occur after the onset of the DOR.

Due to the fact that the injection responsibilities associated with the ASR Program are certain to be met by 2021, concerns related to this conflict perception are alleviated.

PROPOSED NONROUTINE ADAPTIVE MANAGEMENT ACTION

Due to the firsthand experiences of program administrators described in this document, current results of the EAA leasing program, and the results of an internal EAA modeling exercise that represents the level of research and development underpinning this proposed Nonroutine AMP, the EAA respectfully requests that certain proposed amendments to the ASR Program be approved. The information used to develop the proposed amendment is an advancement over the scientific and commercial data available at the time of the writing of the EAHCP.

Specifically, the EAA proposes to amend the leasing structure of the ASR Program to:

1. Replace the current, three-tiered leasing/lease option structure with a two-tiered leasing/forbearance structure that coordinates existing long-term leases with new, long-term forbearance agreements (together providing control of the necessary 50,000 acre-feet per year of Edwards Aquifer groundwater required under the current ASR Program); and
2. Exercise (trigger) forbearance by the EAA in years following a recognition of the Ten-year Rolling Average of the Estimated Annual Recharge to the Aquifer declining to amounts at or below 500,000 acre-feet per annum.

A redlined version of Section 5.5.1 of the EAHCP, showing edits that would occur upon approval of this proposal, is attached for reference as Exhibit C.

BUDGETARY IMPLICATIONS AND FISCAL IMPACT

All EAHCP programming, including the ASR Program, is subject to the funding limitations and funding processes described in EAHCP Table 7.1 and the Funding and Management Agreement. Given limited resources and responsibility for stewarding public funds, a budgetary exercise was conducted by EAA staff to determine the budgetary and fiscal impacts of the proposed ASR Program modifications.

Fiscal Impact:

Adoption of this proposal will not result in any deviations from the funding allowances prescribed in Table 7.1 of the EAHCP. Furthermore, the proposed Nonroutine AMP action would remain consistent with the assumptions made in HDR's October 2011 *Evaluation of Water Management Programs and Alternatives for Springflow*

EXHIBIT 2

*Protection of Endangered Species at Comal and San Marcos Springs.*² Specifically the Program will remain within the budgetary confines of Table 7.1 of the EAHCP by utilizing a price point that falls below the average lease rate assumed in HDR's analysis of \$125 and above the ten-year standby rate for the Voluntary Irrigation Suspension Program Option (VISPO) of \$70.20.

Budgetary Implications:

The sole budgetary implication related to this proposal is that full funding for the acquisition of portions of the groundwater rights associated with the ASR Program (Tier 2 and Tier 3) will no longer be dependent upon Reserve Funds. All funding will be associated with long-term contractual commitments that are paid annually. Unlike VISPO, the "triggers" within the contracts are intended to only be associated with the act of forbearance. The price point associated with the agreements will remain the same, regardless of whether or not forbearance is exercised under the agreement.

² HDR's October 2011 *Evaluation of Water Management Programs and Alternatives for Springflow Protection of Endangered Species at Comal and San Marcos Springs* may be found at: <http://www.eahcp.org/documents/Appendix%20K.pdf>

GLOSSARY OF TERMS

As used in this proposal for a Nonroutine Adaptive Management action and this Glossary, the following terms have the following meanings:

“Forbearance” means the complete curtailment of all or part of a right to make withdrawals under a specific Edwards Aquifer Authority Groundwater Withdrawal Permit.

“Forbearance Agreement” is a contractual agreement whereby a party agrees to terms whereby the complete curtailment of all or part of the party’s right to make withdrawals under a specific Edwards Aquifer Authority Groundwater Withdrawal Permit is required when certain conditions, commonly referred to as “triggers” are met.

“Trigger” means to cause an event or situation to happen or exist. In the case of a Forbearance Agreement, a trigger would be a condition that causes or requires the curtailment of all or part of the right to make withdrawals under a specific Edwards Aquifer Authority Groundwater Withdrawal Permit.

“Curtail” or “Curtailment” means the act of reducing or restricting something. In the case of a Forbearance Agreement, the right to withdrawal under an Edwards Aquifer Authority Groundwater Withdrawal Permit would be reduced or restricted.

“Edwards Aquifer Authority Groundwater Withdrawal Permit” means an Initial Regular Permit or Regular Permit issued by the Edwards Aquifer Authority.

“Initial Regular Permit” means an Edwards Aquifer Authority Groundwater Withdrawal Permit issued by the Edwards Aquifer Authority under Subsection 1.16(d) of the Edwards Aquifer Authority Act.

“Edwards Aquifer Authority Act” means the Act of May 30, 1993, 73rd Leg., R.S., ch. 626, 1993 Tex. Gen. Laws 2350, as amended.

“Regular Permit” means an Edwards Aquifer Authority Groundwater Withdrawal Permit issued by the Edwards Aquifer Authority after August 12, 2008, resulting from the sale or amendment of an Initial Regular Permit or the consolidation of two or more such permits.

“Withdrawal” means an act that results in taking groundwater from the Edwards Aquifer by or through man-made facilities, including pumping.

“Lease Option” means a type of contractual agreement whereby a party has the option to lease property when certain conditions are met. In the context of the Edwards Aquifer Habitat Conservation Plan, the Edwards Aquifer Authority is charged with entering into such contracts with the option to lease an Edwards Aquifer Authority Groundwater Withdrawal Permit becoming actionable upon the existence of a specific ten-year rolling recharge average. The difference between a Lease Option and a Forbearance Agreement is that a Lease Option is a

EXHIBIT 2

contractual agreement to lease property rights under certain conditions and a Forbearance Agreement is an contractual agreement to curtail withdrawal of an Edwards Aquifer Authority Groundwater Withdrawal Permit under certain conditions.

“Ten-year Rolling Average” or “10-year Rolling Average” means the unweighted arithmetic mean of the ten (10) most recent consecutive years at any given time.

“Estimated Annual Recharge” Annual recharge is estimated by the United States Geological Survey using a water-balance method that: (1) relies on precipitation and streamflow measurements in the nine (9) drainage basins indicated in "Method of Estimating Natural Recharge to the Edwards Aquifer in the San Antonio Area, Texas," 1978, USGS WRI-7810, by Celso Puente; (2) considers only precipitation and stream flow that originates over the Contributing Zone and Recharge Zone of the Edwards Aquifer; and (3) excludes interformational flows from adjacent aquifers.

“Ten-year Rolling Average Recharge” or “10-year Rolling Average Recharge” means the unweighted arithmetic mean of annual recharge to the Edwards Aquifer over the ten (10) most recent consecutive years at any given time.

**Science Committee of the
Edwards Aquifer Habitat Conservation Plan***Scientific Evaluation Report:**Nonroutine Adaptive Management Proposal for the Proposed Adaptive Modifications to the Use of the San Antonio Water System Aquifer Storage and Recovery for Springflow Protection*

February 2, 2018

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 submitted by Roland Ruiz, General Manager of the Edwards Aquifer Authority (EAA), dated January 22, 2018, related to use of the San Antonio Water System (SAWS) Aquifer Storage and Recovery (ASR or ASR Facility) for Springflow Protection ("the Program or ASR Program"). The following sections in this report summarize the Science Committee's evaluation of this AMP proposal.

Once approved by the Chair and Vice-Chair of the Science Committee, and following the January 31, 2018, Science Committee meeting, this Scientific Evaluation Report will be presented to the Stakeholder Committee at its meeting on February 8, 2018.

Overview

The Edwards Aquifer Habitat Conservation Plan ("EAHCP") currently utilizes the SAWS ASR Facility for storage and recovery of leased Edwards Aquifer water. Broadly, the current program is based on the acquisition by the EAA of 50,000 acre-feet per year of leases and lease options of Edwards Aquifer groundwater withdrawal permits to be utilized to fill, idle, and maintain in storage a portion of the capacity of the ASR Facility for subsequent use to protect springflows during identified drought-of-record conditions. When specific triggers (described in the EAHCP) are reached: (1) SAWS is obligated to forbear on its rights to make withdrawals at specific amounts from the Edwards Aquifer pursuant to its Edwards Aquifer groundwater withdrawal permits; (2) water stored in the ASR Facility is available to SAWS for recovery to offset its forbearance in order to meet customer demand; and (3) the EAA, when not utilizing leased water to fill the ASR Facility, is obligated to forbear pumping of the entirety of its leased or lease option water (50,000 acre-feet). This combination of SAWS and EAA forbearance contributes significantly to

Scientific Evaluation Report: Nonroutine AMP Proposal - Use of SAWS ASR for Springflow Protection

protecting flows at the Comal and San Marcos spring systems during the periods of drought conditions for which this program is triggered.

The ASR Program has been in operation for over four years. During the course of implementation, firsthand experiences with implementation challenges, as well as market responses to proposed leasing and lease-option products have contributed to the identification of opportunities to improve the operational and financial efficiencies of the EAA's water acquisition responsibilities under the ASR Program while providing the same or greater benefit to springflow protection.

Proposal

Specifically, the EAA proposes to amend the leasing structure of the ASR Program to:

1. Replace the current, three-tiered leasing/lease option structure with a two-tiered leasing/forbearance structure that coordinates existing long-term leases with new, long-term forbearance agreements (together providing control of the necessary 50,000 acre-feet per year of Edwards Aquifer groundwater required under the current ASR Program); and
2. Exercise (trigger) forbearance by the EAA in years following a recognition of the Ten-year Rolling Average of the Estimated Annual Recharge to the Aquifer declining to amounts at or below 500,000 acre-feet per annum.

Scientific Evaluation

This AMP proposes no changes to the springflow protection goals and objectives of the EAHCP. The proposal is strictly related to policy and administrative amendments to the Program. However, the basis for some of the amendments is grounded in the use of the updated Edwards Aquifer MODFLOW groundwater model. A simulation was performed in order to compare the springflow results achieved with implementation of the Program as described in the EAHCP to the springflow results achieved with implementation of the Program using several potential modifications. The results of the exercise are summarized in Table 1.

Scientific Evaluation Report: Nonroutine AMP Proposal - Use of SAWS ASR for Springflow Protection

Table 1: Comparison of Potential Forbearance Triggers – Comal Springs

POTENTIAL FORBEARANCE TRIGGERS	SPRINGFLOW ACHIEVED (CFS) AT COMAL SPRINGS
Current EAHCP triggers (three-tiered system): 10-year rolling recharge average of 572,000 A/F per year (Tier 2); and 10-year rolling recharge average of 472,000 A/F per year (Tier 3)	29.71
J-17 at 635 (msl) on Aug. 1	28.64
J-17 at 636 (msl) on Aug. 1	29.32
J-17 at 637 (msl) on Aug. 1	29.32
J-17 at 641 (msl) on Aug. 1	29.8

As indicated by the simulation results, impacts within the model were not very sensitive to a J-17 Index Well level-based trigger. While the modeled results showed desirable springflow impacts could be achieved with higher J-17 Index Well level-based triggers (e.g. 641(msl) and above), the resulting increased frequency of required forbearance is highly likely to significantly diminish the marketability of such a forbearance agreement option, and would thus render the program ineffective in achieving the desired goals and objectives of the EAHCP.

Therefore, with long-term control of Edwards Aquifer groundwater still a critical need under the EAHCP, EAA staff reconsidered a revised 10-year-average rolling recharge trigger. Ultimately, a modeled analysis of a 10-year rolling recharge average of 500,000 acre-feet per annum for a forbearance trigger should provide similar springflow protection as the current ASR Program under a simplified forbearance approach using a recognizable and understandable forbearance trigger. The results of this secondary analysis are summarized in Table 2.

Scientific Evaluation Report: Nonroutine AMP Proposal - Use of SAWS ASR for Springflow Protection

Table 2: Secondary Analysis of Potential Forbearance Trigger – Rolling Recharge

FORBEARANCE TRIGGERS	SPRINGFLOW ACHIEVED (CFS) AT COMAL SPRINGS
Current EAHCP triggers (three-tiered system): 10-year rolling recharge average of 572,000 acre-feet per year; and 10-year rolling recharge average of 472,000 acre-feet per year	29.71
Proposed 10-year rolling recharge average of 500,000 acre-feet per year (two-tiered system)	29.8

Put simply, the study indicated that the ASR Program could be modified in a manner that provided both a simplified, two-tiered leasing/forbearance approach at an equivalent or stronger springflow benefit as the current ASR Program if a 10-year rolling recharge average of at or below 500,000 acre-feet per annum was used as a forbearance trigger. Therefore, this indication of equivalent program efficacy is consistent with the intent of the HCP and the Incidental Take Permit for the Program.

Evaluation of Information Provided

Because of the policy and administrative nature of this Nonroutine AMP proposal, the role of the Science Committee is largely limited to an analysis of whether or not the proposal is based on a decision-making process that uses the best scientific information available – in this case, the updated Edwards Aquifer MODFLOW groundwater model. Also, the Science Committee acknowledges that this Nonroutine AMP proposal does not change the springflow protection goal, but only changes the current three-tier leasing structure to achieve expeditiously EAA's long-term commitment in the ASR Program.

Conclusion

The Science Committee concludes that the ASR AMP proposal is based on a decision-making process that uses the best scientific information available, and the proposed amendment provides the same or greater springflow protection as afforded by the current Program.

Scientific Evaluation Report: Nonroutine AMP Proposal - Use of SAWS ASR for Springflow Protection

References

Liu, Troshanov, Winterle, Zhang and Eason, 2017, "Updates to the MODFLOW Groundwater Model of the San Antonio Segment of the Edwards Aquifer", Edwards Aquifer Authority, San Antonio, TX. http://www.edwardsaquifer.org/documents/2017_Liu-et-al_UpdatestotheMODFLOWGroundwaterModeloftheSanAntonioSegmentoftheEdwardsAquifer.pdf.pdf

Summary of Science Committee Discussion of the Proposal

Overview

At the January 31, 2018 meeting of the Science Committee, Marc Friberg, EAA Executive Director of Intergovernmental Relations provided a presentation on the ASR Nonroutine Adaptive Management (AMP) proposal to modify the use of the SAWS ASR for Springflow protection measure. This presentation covered a summary of the (1) the current ASR program including the long-term goals and three-tiered system (2) the marketability problems of the current tier system, (3), and finally the elements of the Nonroutine AMP proposal itself that would address these problems.

The following sections provide a lightly-edited summary of the Science 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.

Analysis of Triggers

Mr. Friberg provided the Committee a summary of the comparison of the current trigger system using the 10-year rolling recharge average and potential J-17 Index Well level forbearance triggers. Dr. Conrad Lamon asked why there was no difference in the results for the Comal springflow when a J-17 Index Well trigger level of 636 ft and 637 ft was modeled. Both Mr. Friberg and Mr. Jim Winterle stated that the model is not sensitive to this one-foot difference. Mr. Winterle added that the modeled springflow at Comal Springs does not respond positively until a J-17 Index Well trigger level of 641 ft.

Use of the 10-year Rolling Recharge Average

Dr. Lamon asked about whether the 10-year rolling recharge average was protective enough of springflow. He also asked for an explanation of the calculation of the 10-year rolling average. Mr. Friberg stated that the EARIP stakeholders agreed to using the 10-year rolling average in the EAHCP. Nathan Pence, EAHCP Program Manager, that during the EARIP process, the Science subcommittee looked at all types of triggers and learned that using a J-17 Index Well trigger level did not provide the same long-term protection as using the 10-year rolling recharge average.

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Dr. Jacquelyn Duke asked for a further explanation as to not using a J-17 Index Well trigger level. Mr. Friberg said that springflow is volatile and that the ASR program is intended to provide protection to springflow during the long-term drought of record conditions – explaining the use of the 10-year rolling recharge average.

Benefit of the Proposed Changes

Dr. Tom Arsuffi asked that the proposal should identify more clearly the benefits of the proposed changes. He had thought the goal was to achieve the 30 cfs in the Comal Springs, but now understands that the goal of this proposal is to change how the 50,000 acre-feet per year requirement is achieved. Mr. Pence stated that the 30 cfs goal will be addressed in the second phase of the EAHCP.

Dr. Charlie Kreidler and Dr. Robert Mace both discussed with the Committee their understanding of the benefit of the proposed changes per their one on one meeting with Mr. Pence. They said that after this meeting, they had a better understanding of forbearance of all springflow protection measures such as the VISPO and Critical Period Management programs. Mr. Friberg further added, that 2014 was similar to drought of record conditions. Mr. Pence responded that a new drought of record conditions will be addressed in the roll-over of the Incidental Take Permit.

Mr. Friberg also told the Committee that another benefit of the program is that it would be attractive to many of the permit holders that have participated in the one-year ASR lease agreements. He also stated that under EAA's rules, restricted irrigated water permit-holders are not eligible to participate in the ASR program. However, with these proposed changes – to add a forbearance tier- the restricted irrigated water would be able to participate.

Critique of the Proposal

Dr. Butch Weckerly and Dr. Arsuffi stated that proposal was confusing to those that are not familiar with the ASR program and the terminology. Dr. Arsuffi requested EAA include a glossary of key terms – such as forbearance in the proposal. He also stated that the tables in the proposal need to include titles and references in the text of the proposal. Mr. Friberg responded with a definition of forbearance and stated that a glossary of key terms can be included and modifications to the tables can be made.

Motion and Recommendation

Mr. Pence reminded the Committee their role in the Nonroutine AMP proposal process and the options they have in making their recommendations to the Stakeholder Committee. With that stated, Dr. Mace made the motion that the Science Committee recommend the Nonroutine AMP proposal to the Stakeholder Committee, but to add to the proposal a glossary of key terms and ensure that every table in the proposal includes a title and reference. Dr. Janis Bush seconded the motion. There was unanimous support of the motion.

Scientific Evaluation Report: Nonroutine AMP Proposal - Use of SAWS ASR for Springflow Protection

Attachments

Attachment 1: Minutes from the January 31, 2018, Science Committee Meeting – Unofficial



NOTICE OF OPEN MEETING

Available at eahcp.org

1. Call to order.

Chair, Dr. Weckerly called the meeting to order at 9:05 a.m. Members present include: Janis Bush, Jacquelyn Duke, Conrad Lamon, Glenn Longley, Robert Mace, Doyle Mosier, Chad Norris, Floyd Weckerly, Tom Arsuffi, and Charles Kreitler; Jackie Poole was unable to attend.

2. Public comment.

No comments from the public.

3. Approval of the Science Committee meeting minutes (Attachment 1).

Dr. Mace motioned to approve the minutes as written; Dr. Longley seconded. No opposition.

4. Receive report from the Program Manager.

- Spring systems and index well update
- The National Academy of Sciences EAHCP Science Review Panel's *Report 3*, meeting 2 overview
- Contractor selection for the Sessom Creek 2018 Applied Research project
- 2017 Incidental take assessment (Attachment 2)

Dr. Kreitler inquired why the Comal Spring riffle beetle had the greatest percent take compared to the other species. Mr. Pence and Mr. Oborny explained that in 2014 the Comal system reached a low flow of 65 cfs, exposing CSRB habitat.

5. Presentation, discussion, and possible recommendation of the Nonroutine Adaptive Management proposal related to the Aquifer Storage and Recovery program (Attachments 3 and 4).

Dr. Lamon asked why there was no difference between the J-17 index well trigger level of 636 ft and the 637 ft scenarios. Mr. Friberg replied that during the drought of record scenario runs, modeled conditions did not stay below 641 ft long enough to trigger the ASR forbearance package.

Scientific Evaluation Report: Nonroutine AMP Proposal - Use of SAWS ASR for Springflow Protection

Dr. Lamon asked about whether the 10-year rolling recharge average was protective enough of springflow. He also asked for an explanation of the calculation of the 10-year rolling average. Mr. Friberg stated that the EARIP stakeholders agreed to using the 10-year rolling average in the EAHCP. Mr. Pence, EAHCP Program Manager, that during the EARIP process, the Science subcommittee looked at all types of triggers and learned that using a J-17 index well trigger level did not provide the same long-term protection as using the 10-year rolling recharge average.

Dr. Duke asked for a further explanation as to not using a J-17 index well trigger level. Mr. Friberg said that springflow is volatile and that the ASR program is intended to provide protection to springflow during the long-term drought of record conditions – explaining the use of the 10-year rolling recharge average.

Dr. Arsuffi asked that the proposal should identify more clearly the benefits of the proposed changes. He had thought the goal was to achieve the 30 cfs in the Comal Springs, but now understands that the goal of this proposal is to change how the 50,000 AF/year requirement is achieved. Mr. Pence stated that the 30 cfs goal will be addressed in the second phase of the EAHCP.

Dr. Kreidler and Dr. Mace both discussed with the Committee their understanding of the benefit of the proposed changes per their one on one meeting with Mr. Pence. They said that after this meeting, they had a better understanding of forbearance of all springflow protection measures such as the VISPO and Critical Period Management programs. Mr. Friberg further added, that 2014 was similar to drought of record conditions. Mr. Pence responded that a new drought of record conditions will be addressed in the roll-over of the Incidental Take Permit.

Mr. Friberg also told the Committee that another benefit of the program is that it would be attractive to many of the permit holders that have omitted to the one-year ASR lease agreements. He also stated that under EAA's rules, restricted irrigated water permit-holders are not eligible to participate in the ASR program. However, with these proposed changes – to add a forbearance tier- the restricted irrigated water would be able to participate

Dr. Weckerly and Dr. Arsuffi recommended that the ASR AMP proposal include a glossary of terms as well as a description for each of the tables.

Dr. Mace motioned to endorse the Nonroutine Adaptive Management proposal with the added glossary of terms and table legends; Dr. Bush seconded. No opposition.

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. Arsuffi motioned to endorse the expedited process to prepare the Scientific Evaluation Report to the Stakeholder Committee; Dr. Longley seconded. No opposition.

Scientific Evaluation Report: Nonroutine AMP Proposal - Use of SAWS ASR for Springflow Protection

7. Presentation of the 2017 Biological Monitoring Reports (Attachments 5 and 6).

Mr. Oborny presented a comprehensive overview of the 2017 biological monitoring results for each of the EAHCP biological monitoring datasets.

2017 was the first year of the rapid bioassessment which adhered to standard rapid bioassessment practices. Dr. Arsuffi proposed that someone analyze the RBP and IBI to see how the two indices line-up. Mr. Norris noted that at least 3 years of this dataset are needed to analyze the existing conditions which will help assess conditions for the invertebrate species.

In regard to the fountain darter dropnet data, Mr. Lamon emphasized that the biological goals are based on the median and not the average, therefore, the data could be improved by taking the log of the data and untransforming it back into the median. The confidence level will not be symmetric, but it would be a better indicator to compare with the EAHCP fountain darter goals. Mr. Oborny agreed and will incorporate it into their analysis.

Mr. Oborny then presented the findings of the first year of the fish tissue sampling which use samples from the headwaters and the lower reaches of the river. Dr. Mace asked if the emerging contaminants found within the fish tissue have also been found within the artesian springs or wells. Mr. Pence replied that yes, sampling has found that the contaminants are not just from runoff, but also found within wells in the artesian zone of the aquifer. Other members agreed that studies conducted throughout the US are finding these contaminants within other aquifers; they are everywhere.

Dr. Weckerly requested that the annual Biomonitoring report include descriptions about the sampling methodologies employed. Dr. Furl replied that there is a standard operating procedures document for the biomonitoring program that can be attached to the report.

8. Presentation and discussion of the proposed 2018 Work Plan Amendments for the Refugia, Biomonitoring, and the Applied Research Programs (Attachments 7, 8 and 9).

Dr. Furl presented the proposed amendments to the 2018 Work Plans for the Refugia, Biological Monitoring, and Applied Research Programs.

Dr. Kreidler requested the number for the Sessom Creek Proposal that was selected. EAHCP Staff will follow-up and provide.

Mr. Mosier motioned to approve the 2018 Work Plan Amendments; Dr. Duke seconded. No opposition.

9. Presentation and discussion of the formation and goals of the Research Work Group to discuss the Comal Springs riffle beetle biomonitoring program.

EXHIBIT 3

Scientific Evaluation Report: Nonroutine AMP Proposal - Use of SAWS ASR for Springflow Protection

Dr. Furl facilitated the discussion of the formation and need for a Comal Springs riffle beetle biomonitoring work group. Based input from the Science Committee, National Academy of Sciences, and the 2017 CSRB biomonitoring findings, the EAHCP goals for the CSRB are not being met. 2017 biomonitoring data have shown a decline in CSRB which may be attributed to many factors such as, but not limited to, over-sampling, ineffective cotton lures, or movement into unsampled reaches. If additional reaches are added to the CSRB sampling, it may result in cutting funds for sampling of other biomonitoring datasets.

Dr. Lamon requested that the CSRB data be analyzed before additional CSRB reaches are added at the cost of ending another biomonitoring dataset.

Dr. Weckerly suggested a 2-4 year study to compare our existing information and practices to other studies on similar species. He emphasized the need for a controlled study of the cotton lure within a laboratory setting, but also countered that the conditions would not resemble that of the wild so it may need to be more of an in-situ study. There are many unknowns about the cotton lure that need to be analyzed.

All members agree that a CSRB biomonitoring Work Group is needed. Dr. Furl will put together a charge for the group that will define its goals related to the Refugia and Biological Monitoring programs.

10. Consider future meetings, dates, locations, and agendas.

Science Committee Meeting, Thursday, March 8th at 9 a.m. at the San Marcos Activity Center (Multipurpose Room).

11. Questions and comments from the public.**12. Adjourn: 12:02 pm**

Scientific Evaluation Report: Nonroutine AMP Proposal - Use of SAWS ASR for Springflow Protection

Attachment 2 – Glossary of Terms

As used in the Nonroutine AMP proposal and this Glossary, the following terms have the following meanings:

“Forbearance” means the complete curtailment of all or part of a right to make withdrawals under a specific Edwards Aquifer Authority Groundwater Withdrawal Permit.

“Forbearance Agreement” is a contractual agreement whereby a party agrees to terms whereby the complete curtailment of all or part of the party’s right to make withdrawals under a specific Edwards Aquifer Authority Groundwater Withdrawal Permit is required when certain conditions, commonly referred to as “triggers” are met.

“Trigger” means to cause an event or situation to happen or exist. In the case of a Forbearance Agreement, a trigger would be a condition that causes or requires the curtailment of all or part of the right to make withdrawals under a specific Edwards Aquifer Authority Groundwater Withdrawal Permit.

“Curtail” or “Curtailment” means the act of reducing or restricting something. In the case of a Forbearance Agreement, the right to withdrawal under an Edwards Aquifer Authority Groundwater Withdrawal Permit would be reduced or restricted.

“Edwards Aquifer Authority Groundwater Withdrawal Permit” means an Initial Regular Permit or Regular Permit issued by the Edwards Aquifer Authority.

“Initial Regular Permit” means an Edwards Aquifer Authority Groundwater Withdrawal Permit issued by the Edwards Aquifer Authority under Subsection 1.16(d) of the Edwards Aquifer Authority Act.

“Edwards Aquifer Authority Act” means the Act of May 30, 1993, 73rd Leg., R.S., ch. 626, 1993 Tex. Gen. Laws 2350, as amended.

“Regular Permit” means an Edwards Aquifer Authority Groundwater Withdrawal Permit issued by the Edwards Aquifer Authority after August 12, 2008, resulting from the sale or amendment of an Initial Regular Permit or the consolidation of two or more such permits.

“Withdrawal” means an act that results in taking groundwater from the Edwards Aquifer by or through man-made facilities, including pumping.

“Lease Option” means a type of contractual agreement whereby a party has the option to lease property when certain conditions are met. In the context of the Edwards Aquifer Habitat Conservation Plan, the Edwards Aquifer Authority is charged with entering into such contracts with the option to lease an Edwards Aquifer Authority Groundwater

EXHIBIT 3

Scientific Evaluation Report: Nonroutine AMP Proposal - Use of SAWS ASR for Springflow Protection

Withdrawal Permit becoming actionable upon the existence of a specific ten-year rolling recharge average. The difference between a Lease Option and a Forbearance Agreement is that a Lease Option is a contractual agreement to lease property rights under certain conditions and a Forbearance Agreement is an contractual agreement to curtail withdrawal of an Edwards Aquifer Authority Groundwater Withdrawal Permit under certain conditions.

“Ten-year Rolling Average” or “10-year Rolling Average” means the unweighted arithmetic mean of the ten (10) most recent consecutive years at any given time.

“Estimated Annual Recharge” Annual recharge is estimated by the United States Geological Survey using a water-balance method that: (1) relies on precipitation and streamflow measurements in the nine (9) drainage basins indicated in "Method of Estimating Natural Recharge to the Edwards Aquifer in the San Antonio Area, Texas," 1978, USGS WRI-7810, by Celso Puente; (2) considers only precipitation and stream flow that originates over the Contributing Zone and Recharge Zone of the Edwards Aquifer; and (3) excludes interformational flows from adjacent aquifers.

“Ten-year Rolling Average Recharge” or “10-year Rolling Average Recharge” means the unweighted arithmetic mean of annual recharge to the Edwards Aquifer over the ten (10) most recent consecutive years at any given time.



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 is scheduled for **Wednesday January 31, 2018 at 9 a.m. at the San Marcos Activity Center (Multipurpose Room), 501 E. Hopkins, San Marcos, Texas, 78666**. Lunch will be provided. All attendees are encouraged to please RSVP to ktolman@edwardsaquifer.org by Monday, January 29, 2018.

Members of this committee include: Tom Arsuffi, Janis Bush, Jacquelyn Duke, Charles Kreidler, Conrad Lamon, Glenn Longley, Robert Mace, Doyle Mosier, Chad Norris, Jackie Poole, and Floyd Weckerly.

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

1. Call to order.
2. Public comment.
3. Approval of the Science Committee meeting minutes (Attachment 1).
4. Receive report from the Program Manager.
 - Spring systems and index well update
 - The National Academy of Sciences EAHCP Science Review Panel's *Report 3*, meeting 2 overview
 - Contractor selection for the Sessom Creek 2018 Applied Research project
 - 2017 Incidental take assessment (Attachment 2)
5. Presentation, discussion, and possible recommendation of the Nonroutine Adaptive Management proposal related to the Aquifer Storage and Recovery program (Attachments 3 and 4).

Purpose: To provide the opportunity for the Science Committee to discuss and possibly recommend the Nonroutine Adaptive Management proposal related to the Aquifer Storage and Recovery program 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. Presentation of the 2017 Biological Monitoring Reports (Attachments 5 and 6).

Purpose: To inform the Science Committee of the 2017 Biological Monitoring Reports.

Action: No action required.

8. Presentation and discussion of the proposed 2018 Work Plan Amendments for the Refugia, Biological Monitoring, and the Applied Research Programs (Attachments 7, 8 and 9).

Purpose: To provide the Science Committee the opportunity to review and comment on the science-related aspects of the proposed 2018 Work Plan Amendments for the Refugia, Biological Monitoring, and the Applied Research Programs.

Action: To possibly endorse the proposed 2018 Work Plan Amendments for the Refugia, Biological Monitoring, and the Applied Research Programs.

9. Presentation and discussion of the formation and goals of the Research Work Group to discuss the Comal Springs riffle beetle biomonitoring program.

Purpose: To provide the opportunity for the Science Committee to comment on the formation and goals of the Research Work Group related to the Comal Springs riffle beetle biomonitoring program.

Action: No action required.

10. Consider future meetings, dates, locations, and agendas.

- Science Committee Meeting, Thursday, March 8th at 9 a.m. at the San Marcos Activity Center (Multipurpose Room).

11. Questions and comments from the public.

12. Adjourn.



01-31-2018 Meeting Minutes

Available at eahcp.org

1. Call to order.

Chair, Dr. Weckerly called the meeting to order at 9:05 a.m. Members present include: Janis Bush, Jacquelyn Duke, Conrad Lamon, Glenn Longley, Robert Mace, Doyle Mosier, Chad Norris, Floyd Weckerly, Tom Arsuffi, and Charles Kreitler; Jackie Poole was unable to attend.

2. Public comment.

No comments from the public.

3. Approval of the Science Committee meeting minutes (Attachment 1).

Dr. Mace motioned to approve the minutes as written; Dr. Longley seconded. No opposition.

4. Receive report from the Program Manager.

- Spring systems and index well update
- The National Academy of Sciences EAHCP Science Review Panel's *Report 3*, meeting 2 overview
- Contractor selection for the Sessom Creek 2018 Applied Research project
- 2017 Incidental take assessment (Attachment 2)

Dr. Kreitler inquired why the Comal Spring riffle beetle had the greatest percent take compared to the other species. Mr. Pence and Mr. Oborny explained that in 2014 the Comal system reached a low flow of 65 cfs, exposing CSRB habitat.

5. Presentation, discussion, and possible recommendation of the Nonroutine Adaptive Management proposal related to the Aquifer Storage and Recovery program (Attachments 3 and 4).

Dr. Lamon asked why there was no difference between the J-17 index well trigger level of 636 ft and the 637 ft scenarios. Mr. Friberg replied that during the drought of record scenario runs, modeled conditions did not stay below 641 ft long enough to trigger the ASR forbearance package.

Dr. Lamon asked about whether the 10-year rolling recharge average was protective enough of springflow. He also asked for an explanation of the calculation of the 10-year rolling average. Mr. Friberg stated that the EARIP stakeholders agreed to using the 10-year

rolling average in the EAHCP. Mr. Pence, EAHCP Program Manager, that during the EARIP process, the Science subcommittee looked at all types of triggers and learned that using a J-17 index well trigger level did not provide the same long-term protection as using the 10-year rolling recharge average.

Dr. Duke asked for a further explanation as to not using a J-17 index well trigger level. Mr. Friberg said that springflow is volatile and that the ASR program is intended to provide protection to springflow during the long-term drought of record conditions – explaining the use of the 10-year rolling recharge average.

Dr. Arsuffi asked that the proposal should identify more clearly the benefits of the proposed changes. He had thought the goal was to achieve the 30 cfs in the Comal Springs, but now understands that the goal of this proposal is to change how the 50,000 AF/year requirement is achieved. Mr. Pence stated that the 30 cfs goal will be addressed in the second phase of the EAHCP.

Dr. Kreidler and Dr. Mace both discussed with the Committee their understanding of the benefit of the proposed changes per their one on one meeting with Mr. Pence. They said that after this meeting, they had a better understanding of forbearance of all springflow protection measures such as the VISPO and Critical Period Management programs. Mr. Friberg further added, that 2014 was similar to drought of record conditions. Mr. Pence responded that a new drought of record conditions will be addressed in the roll-over of the Incidental Take Permit.

Mr. Friberg also told the Committee that another benefit of the program is that it would be attractive to many of the permit holders that have omitted to the one-year ASR lease agreements. He also stated that under EAA's rules, restricted irrigated water permit-holders are not eligible to participate in the ASR program. However, with these proposed changes – to add a forbearance tier- the restricted irrigated water would be able to participate

Dr. Weckerly and Dr. Arsuffi recommended that the ASR AMP proposal include a glossary of terms as well as a description for each of the tables.

Dr. Mace motioned to endorse the Nonroutine Adaptive Management proposal with the added glossary of terms and table legends; Dr. Bush seconded. No opposition.

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. Arsuffi motioned to endorse the expedited process to prepare and submit the Scientific Evaluation Report to the Stakeholder Committee; Dr. Longley seconded. No opposition.

7. Presentation of the 2017 Biological Monitoring Reports (Attachments 5 and 6).

Mr. Oborny presented a comprehensive overview of the 2017 biological monitoring results for each of the EAHCP biological monitoring datasets.

2017 was the first year of the rapid bioassessment which adhered to standard rapid bioassessment practices. Dr. Arsuffi proposed that someone analyze the RBP and IBI to see how the two indices line-up. Mr. Norris noted that at least 3 years of this dataset are needed to analyze the existing conditions which will help assess conditions for the invertebrate species.

In regard to the fountain darter dropnet data, Mr. Lamon emphasized that the biological goals are based on the median and not the average, therefore, the data could be improved by taking the log of the data and untransforming it back into the median. The confidence level will not be symmetric, but it would be a better indicator to compare with the EAHCP fountain darter goals. Mr. Oborny agreed and will incorporate it into their analysis.

Mr. Oborny then presented the findings of the first year of the fish tissue sampling which use samples from the headwaters and the lower reaches of the river. Dr. Mace asked if the emerging contaminants found within the fish tissue have also been found within the artesian springs or wells. Mr. Pence replied that yes, sampling has found that the contaminants are not just from runoff, but also found within wells in the artesian zone of the aquifer. Other members agreed that studies conducted throughout the US are finding these contaminants within other aquifers; they are everywhere.

Dr. Weckerly requested that the annual Biomonitoring report include descriptions about the sampling methodologies employed. Dr. Furl replied that there is a standard operating procedures document for the biomonitoring program that can be attached to the report.

- 8. Presentation and discussion of the proposed 2018 Work Plan Amendments for the Refugia, Biomonitoring, and the Applied Research Programs (Attachments 7, 8 and 9).**
Dr. Furl presented the proposed amendments to the 2018 Work Plans for the Refugia, Biological Monitoring, and Applied Research Programs.

Dr. Kreidler requested the number for the Sessom Creek Proposal that was selected. EAHCP Staff will follow-up and provide.

Mr. Mosier motioned to approve the 2018 Work Plan Amendments; Dr. Duke seconded. No opposition.

- 9. Presentation and discussion of the formation and goals of the Research Work Group to discuss the Comal Springs riffle beetle biomonitoring program.**
Dr. Furl facilitated the discussion of the formation and need for a Comal Springs riffle beetle Biomonitoring Work Group. Based on input from the Science Committee, National Academy of Sciences, and the 2017 CSRB biomonitoring findings, the EAHCP goals for the CSRB are not being met. 2017 biomonitoring data have shown a decline in CSRB which may be attributed to many factors such as, but not limited to, over-sampling, ineffective cotton lures, or

movement into unsampled reaches. If additional reaches are added to the CSRB sampling, it may result in cutting funds for sampling of other biomonitoring datasets.

Dr. Lamon requested that the CSRB data be analyzed before additional CSRB reaches are added at the cost of ending another biomonitoring dataset.

Dr. Weckerly suggested a 2-4 year study to compare our existing information and practices to other studies on similar species. He emphasized the need for a controlled study of the cotton lure within a laboratory setting, but also countered that the conditions would not resemble that of the wild so it may need to be more of an in-situ study. There are many unknowns about the cotton lure that need to be analyzed.

All members agree that a CSRB biomonitoring Work Group is needed. Dr. Furl will put together a charge for the group that will define its goals related to the Refugia and Biological Monitoring programs.

10. Consider future meetings, dates, locations, and agendas.

Science Committee Meeting, Thursday, March 8th at 9 a.m. at the San Marcos Activity Center (Multipurpose Room).

11. Questions and comments from the public.

12. Adjourn: 12:02 pm



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, February 8th, 2018 at the City of San Marcos Activity Center (Room 3), 501 E. Hopkins, San Marcos, TX, 78666**. Lunch will be provided for committee members at 12:00 p.m.

1. Call to order--Establish that all Committee members are present or represented- 9:00 a.m.
2. Public Comment.
3. Approval of minutes from the September 21st Stakeholder Committee meeting and December 14th Joint Committee meeting (Attachment 1 & 2).
4. Receive report from the Program Manager on general updates about the Habitat Conservation Plan.
 - Springflow and Index Well levels
 - The National Academy of Sciences EAHCP Science Review Panel's *Report 3*, meeting 2 overview.
 - EAHCP 2017 Annual Report Update
 - Contractor Selection for the Sessoms Creek 2018 Applied Research Project
 - Comal Springs Riffle Beetle Work Group update
5. Presentation of the 2017 Net Disturbance and Incidental Take Assessment (Attachment 3)
Purpose: To provide the Stakeholder Committee a summary of the 2017 Net Disturbance and Incidental Take Assessment report.
Action: No action required.
6. Discussion and possible recommendation on the Aquifer Storage and Recovery (ASR) Nonroutine Adaptive Management (AMP) Proposal (Attachments 4, 5 & 6).
Purpose: To provide an opportunity for the Stakeholder Committee to discuss a recommendation on the ASR Nonroutine AMP Proposal.

Action: To make a recommendation on the ASR Nonroutine AMP Proposal to the Implementing Committee.

7. Discussion and decision regarding expedited process to develop and approve submission of the Nonroutine AMP Stakeholder Report to the Implementing Committee.

Purpose: To present a potential expedited process to develop and submit the written report reflecting the Stakeholder Recommendation on the ASR Nonroutine AMP Proposal.

Action: To approve a process to develop, approve, and submit the Stakeholder Report to the Implementing Committee.

8. Consider future meetings, dates, locations, and agendas.

- Next meeting will be held on June 21, 2018 at the City of New Braunfels City Hall.

9. Questions from the public.

10. Adjourn



**Stakeholder Committee
Meeting Minutes
February 8, 2018
(unofficial)**

1. **Call to order -- 9:00 a.m.**
Myron Hess called order; a quorum was present.
2. **Public Comment.**
No comments.
3. **Approval of minutes from the September 21st Stakeholder Committee meeting and December 14th Joint Committee meeting.**

Con Mims made a motion to approve meeting minutes; the motion was seconded. There were no objections.

4. **Report from the Program Manager on general updates about the Habitat Conservation Plan.**

- **Springflow and Index Well levels**

Dr. Chad Furl provided a brief hydrologic update on the springflows and index well levels. Diane Wassenich asked when the data for the historical averages began. Dr. Furl answered that the historical averages contains data prior to the 1950's.

- **The National Academy of Sciences EAHCP Science Review Panel's *Report 3*, meeting 2 overview.**

Dr. Chad Furl updated the committee on the third and final National Academy of Sciences (NAS) EAHCP report. *Report 3* will be a holistic review of the HCP as well as an analysis on the relationships between the conservation measures, biological objectives and biological goals. During the January visit, the NAS committee had the opportunity to tour the Comal System restoration sites and SMARC refugia complex. *Report 3* is expected to be completed by Fall 2018.

Glenn Lord asked if it was the same NAS committee that has reviewed the HCP over the course of the program. Nathan Pence answered that it has been the same NAS committee, apart from a few committee member changes, over the past 5 years to review the HCP.

- **EAHCP 2017 Annual Report Update**

Shaun Payne provided the committee a timeline of the 2017 EAHCP Annual Report. A second opportunity to review and provide comments on the draft Annual Report will begin February 9th. The final Annual Report will be submitted March 26th and a hard copy will be made available at the next Implementing Committee meeting. Nathan Pence mentioned plans to produce a high level executive summary of the Annual Report that would be appropriate for stakeholder groups, city council members and interested individuals.

- **Contractor Selection for the Sessom Creek 2018 Applied Research Project**

Dr. Chad Furl provided updates on the Sessom Creek Project. Texas State University and Texas A&M University AgriLife have been selected as the contractors for this project. The Scope of Work will include data collection on sediment loading, calculating sediment/constituent loading curves and data analysis on contributing factors to sediment exports.

- **Comal Springs Riffle Beetle (CSRB) Work Group update**

Dr. Chad Furl presented recent updates to the CSRB 2018 Work Group initiative. Suggestions made by the Science Committee and Texas Parks and Wildlife Department include additional monitoring through the Biomonitoring program, a CSRB distribution and abundance study and additional sampling locations. However, many overarching questions concerning riffle beetle sampling remain. Proposed next steps of the CSRB Work Group intend to address many of those concerns and discuss development of the data driven Work Group.

Carol Patterson asked if there were any plans to sample for the CSRB in the center of Landa Lake. Dr. Furl answered that sampling in the center of the lake was not considered a priority because riffle beetles are not typically found more 50 meters away from a spring orifice. Nathan Pence noted the heavy amount of sampling that already occurs in the spring system by various groups aside from the HCP. The CSRB work group intends to provide recommendations on monitoring and sampling frequency.

5. **Presentation of the 2017 Net Disturbance and Incidental Take Assessment.**

Nathan Pence presented the Incidental Take Permit (ITP) 2017 Report, the significance of the ITP and its relation to the HCP. The 2017 Report concluded that EAHCP activities did not exceed the 10% habitat disturbance rule, the fountain darter experienced less take in 2017 than in 2016 and that the EAHCP is in good standing relative to the ITP.

Jim Bower asked about the relationship between the take of a covered species and the take of habitat. Mr. Pence answered that the ratio and formula for take of the species and habitat is different for each covered species. Kimberly Meitzen added that attachment 3 of the stakeholder committee packet illustrates the total habitat relative to take. Tom Taggart recommended using a chart to clarify the descriptions of take and habitat. Con Mims asked

how many years were left on the ITP and if drought was taken into consideration when determining the take of species. Mr. Pence answered that the permit expires in 2020 and that the USFWS accommodated estimates of take based on historical drought data.

6. Discussion and possible recommendation on the Aquifer Storage and Recovery (ASR) Nonroutine Adaptive Management (AMP) Proposal.

Myron Hess introduced the ASR AMP proposal to the committee.

Marc Friberg provided a presentation on the current ASR program requirements, past ASR leasing options, analysis on ASR lease trigger scenarios, proposed program amendments from a three-tiered approach to a two tiered system and a budget analysis. The proposed amendment intends to facilitate long term commitment and spring flow protection during drought while maintaining a budget within Table 7.1 estimates.

Con Mims asked about the percentage of the total amount of agricultural water that will be targeted for the ASR program. Mr. Friberg communicated the amount of available agricultural water, but that municipal and industrial water would also be targeted. Myron Hess asked to clarify the locational aspect of the ASR. Mr. Friberg provided an example that permit holders that pump near springs, such as the New Braunfels Utilities (NBU), have a significant impact on ASR during forbearance.

Darren Thompson asked if price points were determined on the type of water usage. Mr. Friberg answered that the EAA is open to these conversations but at this moment one-price point has been discussed.

Adam Yablonski asked about the process moving forward to adjust to the market. Mr. Friberg answered that public outreach, communication with the EAA Board of Directors and market analysis will be deliberated moving forward with the ASR. Price points will be considered as part of the discussion to pursue long term lease commitments and maintaining the EAA's obligations. Nathan Pence clarified that the goal is to fulfill the program's responsibilities and develop a model that can be applied to future use. Myron Hess asked to clarify the estimated budget. Mr. Friberg answered that ASR budget will not exceed the 2018 estimates determined in Table 7.1.

Roland Ruiz noted that meeting with individuals, committee members and small groups has been very helpful and thanked the committee on their continued efforts to improve the program.

Javier Hernandez made a motion to approve the ASR AMP as amended. Carol Patterson seconded the motion. There were no objections.

7. Discussion and decision regarding expedited process to develop and approve submission of the Nonroutine AMP Stakeholder Report to the Implementing Committee.

Alicia Reinmund-Martinez presented the purpose of the expedited process to develop and approve submission of the Nonroutine AMP Stakeholder Report to the Implementing Committee

Patrick Shriver made a motion to approve the expedited process. Cindy Loeffler seconded the motion. There were no objections.

8. Consider future meetings, dates, locations, and agendas.

The next meeting will be held on June 21, 2018 at the City of New Braunfels City Hall. Nathan Pence noted that the next meeting will provide committee members a presentation on the bottom up package of all HCP programs. Additionally, members of all HCP committees are invited to attend a tour of the Comal Springs during the next Science Committee meeting. Carol Patterson asked when the next Science Committee meeting will be held. Dr. Chad Furl answered the next meeting will be on May 9th.

9. Questions from the public.

Roland Ruiz informed the committee on a lawsuit that has recently been filed by the Uvalde County Underground Water Conservation District against the EAA over recent changes to the Base Irrigation Rules. Mr. Ruiz assured the committee that the lawsuit will not affect the activities and operations of the HCP.

10. Adjourn: 10:40am

**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 **9:00am on Thursday, February 8th, 2018** at the **San Marcos Activity Center, 501 E. Hopkins, San Marcos, TX**. Lunch will be provided for committee members at 12:00 p.m.

Members of this committee include: Tom Taggart (San Marcos), Roland Ruiz (EAA), Greg Malatek (New Braunfels), Darren Thompson (SAWS), Andrew Sansom (Texas State University), and Jonathan Stinson (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 following the EAHCP Stakeholder Committee meeting.
2. Public Comment.
3. Approval of minutes from the October 19th Implementing Committee meeting (Attachment 1).
4. Discussion and possible approval of the Aquifer Storage and Recovery (ASR) Nonroutine Adaptive Management (AMP) Proposal. (Attachments 2, 3, 4, and 5).
Purpose: To discuss and possibly approve the Stakeholder Committee recommendation.
Action: To approve the Stakeholder Committee recommendation for the ASR Nonroutine AMP Proposal.
5. Discussion and 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 6).
Purpose: To provide an opportunity for the Implementing Committee to discuss and possibly approve the submission of a formal EAHCP Amendment to USFWS regarding the Nonroutine AMP Proposal.
Action: To direct the Program Manager to submit the necessary documentation to USFWS based on the approved AMP Proposal.
6. Presentation and possible action to approve the amended 2018 Refugia, Biomonitoring, and Applied Research Program Work Plans (Attachments 7, 8 and 9).
Purpose: To provide an opportunity for the Implementing Committee to review the proposed 2018 Work Plan Amendments for the Refugia, Biomonitoring, and Applied Research Programs.

Action: To approve the proposed 2018 Work Plan Amendments for the Refugia, Biomonitoring, and Applied Research Programs.

7. Presentation and possible action to approve the amended 2018 EAA Funding Application (Attachments 10 and 11).

Purpose: To provide the Implementing Committee the opportunity to review and discuss the amended 2018 EAA Funding Application.

Action: To consider possible approval to submit the amended 2018 EAA Funding Application.

8. Consider future meetings, dates, locations, and agendas.

- Next Implementing Committee meeting is scheduled for March 22nd at GBRA in Seguin, Tx

9. Questions from the public.

10. Adjourn.



**Implementing Committee Meeting Minutes
February 8, 2018
(unofficial)**

Members of this committee include: Tom Taggart (San Marcos), Roland Ruiz (EAA), Greg Malatek (New Braunfels), Darren Thompson (SAWS), Kimberly Meitzen for Andrew Sansom (Texas State University), and Jonathan Stinson (GBRA).

1. Call to order – 11:00am

Darren Thompson called roll for the Committee; a quorum was present.

2. Public Comment.

No Comment.

3. Approval of minutes from the October 19th Implementing Committee meeting.

Tom Taggart made a motion to approve the meeting minutes. Roland Ruiz seconded the motion. There were no objections.

4. Discussion and possible approval of the Aquifer Storage and Recovery (ASR) Nonroutine Adaptive Management (AMP) Proposal.

Tom Taggart commented on the ASR. There is concern regarding triggering based on a rolling recharge, while the most uncertain aspect of our program is calculating recharge. Saying this, he wanted to be sure that a better solution does not necessarily mean it is the perfect conclusion. Darren Thompson mentioned that it is important to consider the price point in order to not skew the market. Nathan Pence provided a brief description of the attachments presented in the Implementing Committee meeting packet and the report submitted by the Stakeholder Committee. Roland Ruiz addressed the typo that was corrected in the ASR proposal.

Roland Ruiz made a motion to approve the ASR AMP as amended. Tom Taggart seconded the motion. There were no objections.

5. Discussion and 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.

Tom Taggart motioned to approve the Program Manager to submit the necessary documentation to the USFWS regarding the ASR AMP Proposal. Roland Ruiz seconded. There were no objections.

Nathan Pence provided a brief timeline of submitting documentation to the USFWS stating the actions made by the Committee and the intent to move forward with the ASR program. Roland Ruiz noted that there is not a hard deadline for termination and transition of the current short-term leases in the ASR program, but that they hope to conclude those leases before July.

6. Presentation and possible action to approve the amended 2018 Refugia, Biomonitoring, and Applied Research Program Work Plans.

Chad Furl presented the amendments made to the 2018 Refugia, Biomonitoring and Applied Research Program work plans.

Gregg Malatek made a motion to approve the 2018 work plan amendments. Roland Ruiz seconded the motion. There were no objections.

7. Presentation and possible action to approve the amended 2018 EAA Funding Application.

Alicia Reinmund-Martinez presented the request to amend the 2018 EAA Funding Application Refugia budget.

Gregg Malatek made a motion to approve the amended funding application. Tom Taggart seconded the motion. There were no objections.

8. Consider future meetings, dates, locations, and agendas.

The next Implementing Committee meeting is scheduled for March 22nd at GBRA in Seguin, TX

9. Questions from the public.

No Comment.

10. Adjourn: 11:15am



United States Department of the Interior

FISH AND WILDLIFE SERVICE

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FEB 23 2018

Nathan Pence
Edwards Aquifer Habitat Conservation Plan
900 East Quincy Street
San Antonio, Texas 78215

Dear Mr. Pence:

This letter is in response to your February 21, 2018, letter requesting to amend the Edwards Aquifer Recovery Implementation Program Habitat Conservation Plan (EAHCP). The Edwards Aquifer Authority, City of San Marcos, Texas State University, City of New Braunfels, and the San Antonio Water System (collectively, the Permittees) are requesting changes to the EAHCP in section 5.5.1, Use of SAWS ASR (Aquifer Storage and Recovery) for Springflow Protection. Exhibit 1 of your letter includes specific revisions of text *verbatim* that the Permittees would like revised in the EAHCP. Exhibit 2 documents the Permittees use of the adaptive management process and provides supporting information. The Permittees have not requested to amend the Permit (TE-63663A-1).

The proposed revisions change section 5.5.1 of the EAHCP to simplify the ASR program's approach to groundwater leasing and lease options from three tiers to two tiers of leasing and forbearance. In addition, the amendment requires exercising agreements of forbearance of water withdrawal when the 10-year rolling average of estimated annual recharge declines to 500,000 acre-feet or less. Currently, the program operates under two 10-year rolling averages of 572,000 acre-feet and 472,000 acre-feet. The Permittees studied the effects of the proposed changes to springflows by comparing expected springflows under the current program with expected springflows under the modified program using the updated MODFLOW groundwater model. The model results indicate no decrease to expected springflows during critical periods of drought.

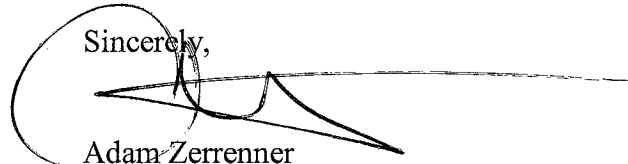
Chapter 6 and Appendix R of the EAHCP describe the Adaptive Management Process that allows the Permittees to make experience-based improvements to the program. The Adaptive Management Process includes review and acceptance by the Science Committee, Stakeholder Committee and the Implementing Committee. All the steps in the process were followed and each committee has approved of the revisions to the EAHCP, and the public was provided with opportunities to comment on the proposal.

No changes to the Permit have been requested or will be made. This amendment to the EAHCP will not increase the levels of incidental take of Covered Species because springflows will not be



decreased. As always, thank you for your continued contribution to the conservation and recovery of imperiled Texas native plants and animals.

Sincerely,



Adam Zerrenner
Field Supervisor



**Implementing Committee
Meeting Minutes
March 22, 2018**

Members of the committee included: Tom Taggart (San Marcos), Roland Ruiz (EAA), Mark Enders for Greg Malatek (New Braunfels), Darren Thompson (SAWS), Andrew Sansom (Texas State University), and Jonathan Stinson (GBRA).

1. Call to order -- 9:05am

Darren Thompson called order for the Committee. Mark Enders substituted for Greg Malatek. A quorum was present.

2. Public Comment:

No comments.

3. Approval of minutes from the February 8th Implementing Committee meeting.

Roland Ruiz addressed the revisions made to the February 8th IC meeting minutes. Mr. Ruiz made a motion to approve the meeting minutes as revised. Andrew Sansom seconded the motion. There were no objections.

4. Receive report from the Program Manager on general topics related to the Habitat Conservation Plan.

- **Springflow**

Dr. Chad Furl presented the springflow data on the Comal and San Marcos spring systems and an update on the Index Well levels.

Darren Thompson added that, in the absence of precipitation, J17 projections indicate Stage 1 conditions during the first week of April and possible Stage 3 conditions during mid-summer. Significant rain fall within the coming weeks could reset those projections.

Nathan Pence noted the significance of the drought forecast in relation to the HCP and the spring flow triggers associated with the Refugia Program.

Dr. Furl concluded the hydrological presentation with data on springflow averages and observed rainfall.

- **Tour of Comal Springs -- May 9th**

Dr. Furl invited committee members to attend a tour of the Comal Springs on May 9th. The tour will feature habitat restoration sites along the Old Channel and along the Comal Spring system. Dr. Furl asked that all those interested in attending to please RSVP by emailing EAHCP staff.

Mr. Pence added that a “save the date” email will be sent to all committee members with event details.

- **Comal Springs Riffle Beetle Work Group**

Dr. Furl provided a summary of the Comal Springs Riffle Beetle Work Group. The new work group will have three main areas of focus: 1) cotton lure sampling methodology 2) improving field activities to accomplish HCP biological and identifying non EAHCP activities, and 3) establishing long term biological goals of population and habitat of the riffle beetle. Currently, EAHCP staff are in the final stages of developing a draft charge and establishing final work group membership.

Andrew Sansom asked Dr. Furl to elaborate on non EAHCP activities. Dr. Furl answered that non EAHCP activities generally include research done by other agencies outside of the HCP in biological monitoring areas.

Mr. Sansom asked if there has been any measurable negative impact from the large amount of studies done in key habitat areas and, if so, are there any enforcement mechanisms to manage those activities. Mr. Pence answered that anyone collecting or doing research on endangered species is required to have a permit from the U.S Fish and Wildlife Service.

Darren Thompson asked who the candidates were for the Comal Springs Riffle Beetle Work Group. Dr. Furl answered that Work Group membership has yet to be determined. The goal is to have 5-8 experts, with varying experience, to participate. Dr. Furl added that the Work Group will not consist entirely of Science Committee members. Mr. Pence added the importance of finding an appropriate balance of scientific expertise.

- **Update on Construction of Refugia Buildings**

Dr. Furl presented updates on the construction of the Refugia Building in San Marcos. So far, construction is going well with no major issues. Construction is projected to be completed by Summer/Fall 2018. Additionally, a bid packet has been released for the renovations at the Uvalde National Fish Hatchery.

- **ASR Operations by SAWS**

Darren Thompson provided an update on ASR operations. 16,667 ac-ft of water was noticed to SAWS by the EAA. 6,900 ac-ft of water for that notice has been stored at a rate of 16 MGD. As of today, a total of 89,000 ac-ft of water has been stored on behalf of the EAHCP. In total, 161,000 ac-ft is in storage. The overall planned capacity is 200,000 ac-ft.

Mr. Pence asked is SAWS anticipated reaching the 200,00 ac-ft storage capacity at the end of the year. Mr. Thompson answered that, considering the possibility of drought and a 20% cut back, reaching the capacity is unlikely to occur this year.

Carol Patterson asked if there has there been any change in storage predictions based on the migration of water. Mr. Thompson answered that although there has been drift in the formation, the change has not been significant.

- **2019 Work Plans:**

Shaun Payne presented the EAHCP timeline for 2019 Work Plans and Funding Application submittals. So far, EAHCP staff has meet with all internal entities as well as the City of San Marcos and the City of New Braunfels to prepare for the upcoming Work Plan submittal. Work

Plans are to be submitted to the Program Manager by April 16. There may be changes to the methodology within the 2019 Work Plans, however, significant changes to the overall budget is not to be expected.

Mr. Pence added that specific changes to the submerged aquatic vegetation methodologies are to be expected in the spring community Work Plans and asked the committees to focus on areas that experience changes year to year.

Tom Taggart asked if the Budget Work Group will have the opportunity to review funding applications. Mr. Pence answered that there are plans for the Budget Work Group to reconvene in September.

Andrew Sansom suggested to revise the schedule presented at the meeting to include the Budget Work Group and resend to the committee.

Mr. Payne notified the committee of the recent update to the EAHCP digital newsletter. The April 2nd newsletter will contain a new format with updates and changes made for easier navigation and access to newsletter archives.

- **Budget Report (Attachment 3)**

Nathan Pence presented the EAHCP budget report to the committee. In summary, all projects remain within budget.

- **Update on the Strategic Adaptive Management Process Planning**

Mr. Pence presented the Strategic Adaptive Management Process Planning to the committee. Phase 1 is the first 7 years of the HCP, Phase 2 is the remaining 8 years of the program. A chance to review the HCP during that transition is afforded during the Strategic Adaptive Management Process Planning. Part of this review includes an evaluation of Phase 1 by the National Academy Sciences in their third and final report. Mr. Pence noted that the HCP is currently in that transition phase. To inform the committee on the Strategic Adaptive Management Process Planning, Mr. Pence is working on a white paper that will include details of the FMA and HCP, timelines and the procedure moving toward Phase 2.

Tom Taggart asked if there are any issues embedded in the Strategic Adaptive Management Process Planning report that would require additional funding. Mr. Pence answered that a consultant may be hired to document and write the report on the Strategic Adaptive Management Process for USFWS as well as a report for the administrative record. Modeling will be done by EAA staff and will not require additional funding. Overall, there are no anticipated changes to Table 7.1.

Mr. Taggart suggested making a brochure on the Strategic Adaptive Management Process Planning to provide to the public and governing entities.

- Mr. Pence presented the committee a brief EAHCP staffing update. The duties of the EAHCP coordinators have changed slightly to expand opportunities and utilize skill sets within the team. A job posting for an environmental scientist will be available soon. A new staff member will be joining the team next month to fill the contracting position.

- Lastly, the EAA is participating in the Big Give. A food truck is set up outside for all those interested in the fundraising event. A portion of proceeds will go to the Edwards Aquifer Conservancy.

5. Receive update from the EAA on the status of VISPO and the potential need for a Memorandum of Clarification to USFWS regarding price structure.

Roland Ruiz introduced the status of the VISPO program to the committee. The program offers long term commitments of forbearance either on a 5 or 10-year lease agreement. 5-year commitments are now approaching renewal period. The challenge for the EAA is that, in the HCP, the rate structure for the VISPO program includes very specific language that does not provide any flexibility for reenrollment.

Nathan Pence added that the memo of clarification will address our interpretation of the information on the VISPO program in the HCP so that the USFWS can respond to our interpretation. We will not be asking for approval but rather agreement on the interpretation of the language in the HCP.

Darren Thompson added that the memo of clarification will be used so that an official amendment will not be required. Mr. Pence agreed with Mr. Thompson. Mr. Ruiz added the memo will be presented at that the next Implementing Committee meeting.

Javier Hernandez presented to the committee an overview of the VISPO program. Currently, 62% of VISPO commitments are 5-year enrollments and 38% are 10-year enrollments. A majority of VISPO customers are approaching the end of the 5-year contracts. A letter of notice of reenrollment is going to be sent to permit holders soon.

Tom Taggart asked if there will be a significant difference between the potential benefits of a 5-year lease verses a 10-year lease. Mr. Hernandez explained the 10-year payment schedule marking the differences between the lease agreements. Adding to Mr. Hernandez's response, Mr. Taggart noted that, based on payment schedules, there will be enough differences between the 5 and 10-year agreements that the 5-year contracts will not be favored over the 10-year. Darren Thompson added that the 10-year leases will eventually be phased out. Andrew Sansom asked why the 10-year leases will be discontinued. Mr. Ruiz answered that the 10-year leases will not be offered a renewal opportunity because those contracts are not approaching expiration. Mr. Thompson clarified that as 10-year agreements begin to expire, 5-year agreements will be added to replace the loss. Mr. Thompson asked how many permittees the VISPO program currently has. Mr. Hernandez answered that there are at least 165 permittees currently enrolled in the program. Mr. Sansom asked to clarify the reasoning behind why expiring 5-year agreements will not be offered enrollment into a 10-year contract. Mark Friberg answered that one of the reasons is to limit competition of 10-year contracts between the new ASR forbearance agreement and VISPO. Mr. Thompson ask if there has been any issue in 5-year reenrollments without the opportunity to apply for a 10-year agreement. Mr. Hernandez answered that so far there have been no issues. Mr. Thompson added that the automatic payment escalators are difficult to manage as market conditions change. Mr. Pence added that, through internal conversations, it was determined that if the payment schedules continued as stated in the HCP, more customers would gradually favor payment options without an escalating payment schedule.

Mr. Thompson questioned whether the ASR and VISPO programs will experience competition since both are forbearance type agreements. Mr. Friberg answered that it is unlikely the two programs will experience competition due to the differences of the program terms. Mr. Thompson added that customers will have the option between choosing a program that has certainty versus one that has a

higher risk but greater reward. Mr. Pence added that most customers that are considering reenrollment are already comfortable with the VISPO program.

Carol Patterson asked if the farming industry has any significant effect on the VISPO program. Mr. Ruiz answered that, if anything, the program has added a level of financial certainty to the agricultural economy during drought conditions.

Mr. Pence informed the committee that the VISPO memo of clarification will be presented as an action item at the next Implementing Committee meeting in May.

Mr. Ruiz informed the committee that the process of reenrolling current 5-year VISPO customers has begun and enrollment forms will be distributed soon. He added that the goal is to provide certainty in through the Strategic AMP, so the focus will be on the rollover of the ITP.

6. Presentation and possible action to authorize Program Manager to submit the 2017 EAHCP Annual Report to be submitted to USFWS.

Shaun Payne presented the 2017 EAHCP Annual Report to the committee. Mr. Payne highlighted the timeline leading up to the final report and thanked everyone who helped write, contribute and review the document.

Melani Howard thanked Mr. Payne for his hard work in producing the EAHCP Annual Report.

Mr. Payne presented the new Annual Report Highlight brochure. The brochure is now available for pickup and distribution. Mr. Pence added that if any committee member wants more brochures for offices, public, organizations, etc., to email EAHCP staff with a requested amount.

Alicia Reinmund-Martinez presented to the committee recent comments made on the draft Annual Report that were not included in the most recent comment matrix.

Tom Taggart made a motion to approve the submission of the 2017 EAHCP Annual Report to the USFWS. Darren Thompson seconded. The motion was approved.

Mr. Payne announced that flash drives containing the 2017 EAHCP Annual Report and appendices will be made available at the next Implementing Committee meeting.

Tom Taggart thanked the consultants and everyone involved in producing the Annual Report.

7. Presentation and discussion of the 2017 Biological Monitoring and Water Quality Monitoring reports, schedule for contract renewals and long-term plans (Attachments 4a, 4b and 5).

Dr. Chad Furl presented the 2017 Biological Monitoring and Water Quality Monitoring reports to the committee. Overall, monitoring species and habitat remained in good condition during low flow conditions. In the Comal Springs, temperature and dissolved oxygen parameters remained within range throughout 2017. Non-native aquatic vegetation removal throughout the system continues to benefit those water quality parameters. Fountain darter populations continue to follow healthy trends in size and abundance. Comal salamanders were the highest observed to date. Fall of 2017 contained the highest sample of salamanders throughout the year. Comal Springs Riffle Beetle counts continue to be low throughout the system. In the San Marcos Spring system, Texas Wild-Rice coverage has been recorded at highest levels to date. Mr. Pence noted the concern on how well Texas Wild-Rice is growing in the San Marcos River and the competition it is pressing upon other native aquatic vegetation.

Carol Patterson asked if Texas Wild-Rice harvesting would be considered take of the species. Mr. Pence answered that “take” does not include plant species.

Dr. Furl presented to the committee a few findings from the fish tissue analysis that was conducted as part of the Biological Monitoring Program in the Comal and San Marcos spring systems. Fish tissue, plasma and water quality testing were also included in the analysis for the presence of pharmaceutical chemicals.

Mr. Pence added that the fish tissue analysis was included in the Biological Monitoring Program after the presence of certain contaminants were found in sediment testing.

Darren Thompson noted that the fish tissue analysis was only to be conducted on odd years. Dr. Furl confirmed the testing schedule and added that testing every other year provides the ability for better interpretation of the results.

Tom Taggart asked for clarification on the pharmaceutical analysis table. Dr. Furl answered that numbers used in the table are based on lab results and that the full report can be made available upon request. Mr. Pence added that EAHCP staff are open to a full, detailed presentation on the results from the fish tissue analysis.

Carol Patterson asked if the analysis included an assessment on the presence of PAH (Polycyclic Aromatic Hydrocarbons). Dr. Furl did not know the specifics of every analysis conducted but was available to discuss the details of the report with all those interested.

Ken Diehl asked if Dr. Brooks reviewed the results of the fish tissue analysis. Dr. Furl answered that Dr. Brooks has reviewed the results and provided feedback and interpretation on the data. Mr. Diehl asked if there had been any detections of PPCPs in the tissue samples and how that detection could indicate a leak in a sewer system. Mr. Pence answered that location of the tissue sample may have an impact on interpretation of the data.

Carol Patterson noted that the EAA Board recently passed a regulation of PAH in the spring systems and that it would be interesting to study its presence in the systems over time.

Johnathan Stinson asked when the samples were collected. Dr. Furl answered that the samples were collected May 2017.

Dr. Furl updated the committee on the Water Quality and Biological Monitoring contracts. Many of the contracts are set to expire at the end of 2018. The EAA is now accepting proposals through the term of the ITP for both monitoring programs. Much of the work will be very similar to what has been done in the past.

Andrew Sansom asked, that since Texas Wild-Rice has become a dominant species, is it possible that it could be removed from the Endangered Species list. Mr. Pence answered, that although it has become prevalent within the system, it is not likely that Texas Wild-Rice will be delisted due to its limited natural location.

Mr. Pence added that, based on commitments and conversations with the Stakeholder and Implementing committees, Zebra Mussel detection stations have been added to the Comal and San Marcos Spring Systems. However, it is highly unlikely that the presence of Zebra Mussels will be detected.

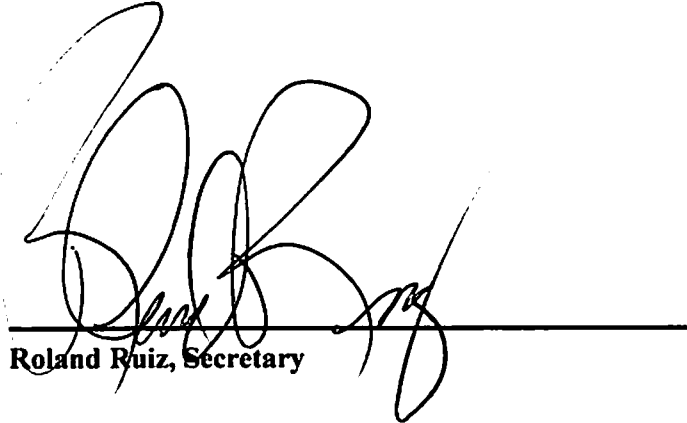
Johnathan Stinson added, due to the detection of Zebra Mussels in the Colorado River, the City of Austin is advising individuals to take all precautions when recreating.

8. Consider future meetings, dates, locations, and agendas.

- Next Implementing Committee meeting is scheduled for May 17th at the City of San Marcos Activity Center.

9. Questions from the public.

10. Adjourn: 10:56am



A handwritten signature in black ink, appearing to read 'Roland Ruiz', is written over a solid horizontal line. The signature is stylized with large loops and a long trailing stroke.

Roland Ruiz, Secretary



**Implementing Committee
Meeting Minutes
May 17, 2018**

Members of this committee include: Tom Taggart (San Marcos), Roland Ruiz (EAA), Greg Malatek (New Braunfels), Darren Thompson (SAWS), Robert Mace (Texas State University), and Jonathan Stinson (GBRA).

1. Call to order – 9:04am

Darren Thompson called order for the Committee. Melani Howard substituted for Robert Mace. A quorum was present.

2. Public Comment.

No comments.

3. Approval of minutes from the March 22nd Implementing Committee meeting (Attachment 1).

Tom Taggart made a motion to approve the meeting minutes. Roland Ruiz seconded the motion. There were no objections.

4. Receive report from the Program Manager on general topics related to the Habitat Conservation Plan.

- **Springflow and Index Level Update**

Dr. Chad Furl presented the springflow data on the Comal and San Marcos spring systems, an update on the Index Well levels and precipitation estimates of the region.

Nathan Pence noted the trend of low precipitation and demand for significant rainfall to deviate from future drought estimates.

- **J17 Forecast**

Dr. Furl presented the J17 forecast as of April 10th. There is a 25% chance of hitting Stage 1 before May 29th.

Mr. Thompson added the possible outlook of hitting Stage 1 next weekend and Stage 2 in late June. Conditions below Stage 2 are not expected; however, circumstances could change depending on the weather.

- **Stormwater sampling**

Dr. Furl presented the two stormwater sampling events that have occurred as part of the EAA's Water Quality Monitoring program.

Tom Taggart asked, in relation to stormwater sampling, is there any attempt to profile the rainfall that occurs during a storm. Dr. Furl answered that there are specifics in the contract that describe antecedent conditions to conduct stormwater sampling. Mr. Taggart asked if there

is any analysis to determine what types of runoff may occur based off rain intensity. Dr. Furl answered that although that type of analysis is not currently conducted, it is something that will be considered in the future.

Mr. Pence added that during the Science Committee meeting, individuals from Texas A&M AgriLife, Baylor University and Texas State University presented stormwater sampling data that included hydrological analysis along Sessoms Creek. Mr. Pence noted the possibility of incorporating that type of analysis into EAA's Water Quality Monitoring Program.

Dr. Furl presented water quality data collected at the Comal Springs during the latest stormwater event and the current Biological and Water Quality Monitoring contract process.

Mr. Thompson asked if the new two-year contracts will extend to 2028 or if they will require a new RFP. Dr. Furl clarified that the current process is asking for two-year contracts, once those contracts expire, new RFPs will be created to extend to 2028.

Johnathan Stinson asked if the current contractors are eligible to apply for the new long term contracts. Dr. Furl and Mr. Pence answered that the current contractors will have the opportunity to apply.

- **ASR Operations by SAWS**

Mr. Thompson provided an update on ASR operations. 16,667 ac-ft of water was noticed to SAWS by the EAA. 9,933 ac-ft of water for that notice has been stored. As of today, a total of 92,000 ac-ft of water has been stored on behalf of the EAHCP. Over the last week SAWS has stopped storing to conduct a test to ensure that pumps and pipes are working properly.

Mr. Taggart asked if this test was in preparation for a pipeline. Mr. Thompson answered that SAWS has begun placing the Western Integrated Pipeline and it is about half way near completion.

- **ASR Price Point Update**

Roland Ruiz provided an update on the ASR Price Point. The EAA Board has approved the updated price points to \$100. The updated ASR program is now on the market for customers. Marc Friberg added that a majority of customers have had questions about the recent change to the program and interest in re-enrollment.

Mr. Taggart asked how many acre-feet of water was removed from the ASR program with the termination of 1-year leases. Mr. Friberg answered about 20,000 acre-feet of water was been removed. Nathan Pence added that the removal of those 1-year leases are meant to be replaced with forbearance agreements that have been approved through adaptive management.

- **Budget Report (Attachment 2 and 3)**

Mr. Pence presented the March and April EAHCP budget reports.

- **NAS update**

Mr. Pence provided a brief update on Report 3 from the National Academy of Sciences. Report 3 is expected by late September 2018 and will be critical in the preparation of Phase 2 of the HCP. Mr. Pence shared that there is some concern that the report could be submitted later than expected however, conversations with NAS are working to fix that issue.

Mr. Thompson asked why the possible delay in receiving the report. Mr. Pence answered that there may be issues with staffing coordination that could delay the finalization of the report.

- **Zebra Mussel Monitoring Stations**

Mr. Pence provided an update on Zebra Mussel Monitoring along the San Marcos and Comal spring systems. EAA is now part of the TPWD statewide monitoring network. Based on the water quality of both systems, it is highly unlikely that Zebra Mussels will be present.

- **San Marcos Discovery Center**

Mr. Pence introduced the San Marcos Discovery Center's initiative to keep non-native fish out of the river by providing a place for individuals to release unwanted aquarium fish. Melani Howard highlighted the attention that the Discovery Center's pet fish pond as received. A video clip from a local news station was presented to the committee. Mr. Pence acknowledge the collaborative efforts to make project like this successful.

Mr. Taggart recommended sending the news clip to NAS.

- **IC Appointments (Attachment 4)**

Mr. Pence presented the updated Implementing Committee appointments. Robert Mace will be representing Texas State University, replacing Andrew Samson. Contact information can be made available upon request.

Mr. Thompson asked how Dr. Robert Mace's move to the Implementing Committee will impact the Science Committee. Mr. Pence answered that Dr. Mace has resigned from the Science Committee to serve on the Implementing Committee, leaving a Science Committee vacancy. The Implementing and Stakeholder Committees will appoint a member and agree by consensus to fill that vacancy.

Mr. Pence also spoke to the committee concerning changes to the EAHCP staff. Alicia Reinmund-Martinez will be leaving her position as HCP Director. Mr. Pence and the committee acknowledged Mrs. Reinmund-Martinez and thanked her for her years of service to the HCP program.

5. **Presentation of the 2017 Recharge Estimate and 10-year Rolling Recharge Average.**

Mr. Pence presented the 2017 recharge estimates provided to the EAA from the USGS. Mr. Pence reminded the committee on the importance of the recharge estimates and the impact on the ASR forbearance program. For example, anytime the recharge average drops below 500,000 acre-feet on the 10-year rolling recharge average, that would trigger a portion of the ASR program. In 2017, as calculated by the USGS, the recharge estimate reached about 486,637 acre-feet. Based on that estimate, 2019 will be a non-forbearance year. For 2018, a calculation determined that the recharge average must be no less than 194,563 acre-feet in order to make 2020 a non-forbearance year.

Dr. Furl presented a graph representing historical data of the USGS recharge estimates and the 10-year rolling recharge average.

Mr. Thompson noted that the only time recharge has dropped below 500,000 acre-feet was during the drought of record.

6. **Presentation of the Edwards Aquifer Authority 2019 Work Plans (Attachment 5).**

Mr. Pence introduced the EAHCP work plans to the committee. Many of the details within the work plans have become routine and repetitive. At the request of the committee, work plan presentations will highlight major projects and significant changes. Full work plans have been included as attachments in the meeting packets.

Shaun Payne presented the 2019 Edwards Aquifer Authority Work Plan to the committee. The EAA's work plan primarily consists of springflow protection measures, research projects, monitoring programs and program management.

Mr. Pence added that the overall budget is subject to change. EAA will submit a revised work plan in June and an updated funding application in October. Mr. Pence reminded the committee that the budget is approved during funding application review.

Mr. Thompson asked about the budget estimate for the applied research project. Mr. Payne clarified that the budget for the applied research will require funding taken from future years. The funding application will include a more refined budget table.

Mr. Thompson suggested making the work plan budget tables more consistent across the various work plans.

7. Presentation of the City of San Marcos/Texas State University 2019 Work Plans (Attachment 6).

Melani Howard presented the City of San Marcos/Texas State University 2019 Work Plan to the committee. The Texas Wild-Rice enhancement, control of non-native plant species, native riparian habitat restoration and impervious cover/water quality protection conservation measures will experience the most change in comparison to previous work plans.

Mr. Pence noted that the LTBG reaches in San Marcos follow the same compliance by the USFWS as in the Comal spring system.

Ms. Howard presented before and after pictures of habitat restoration along the San Marcos River. Mr. Pence noted the recruitment of the young bald cypress trees and recognized the work that the City of San Marcos has done to protect the banks of the river.

Ms. Howard concluded the presentation with details on water quality projects and the 2019 work plan budget.

Mr. Pence added that transfers and movement of money within the work plan budget are tracked and maintained by EAHCP staff.

Patrick Shriver asked if there will be any disturbance of endangered species in the Sessoms Creek Project area. Mr. Pence added that there are no endangered species within the Sessoms Creek habitat until the very bottom portion. Work will not be done in the portions that touch endangered species habitat.

8. Presentation of the City of New Braunfels 2019 Work Plans (Attachment 7).

Mark Enders presented the City of New Braunfels 2019 Work Plans to the committee. Aquatic vegetation restoration along the Old Channel, Landa Lake and Comal River will undergo several changes. Additionally, non-native species control, monitoring of gill parasite, native habitat restoration and impervious cover conservation measures will also include changes in comparison to previous work plans.

Mr. Enders concluded his presentation with the plans to install a stormwater treatment vault included in the impervious cover/water quality protection measure and the estimated budget for 2019.

Mr. Pence noted how the impervious cover project, specifically the stormwater treatment vault, will directly impact the endangered species.

Mr. Thompson asked what type of treatment will be used in the underground stormwater treatment vault. Mr. Enders answered that the vault will primarily be treating sediment and the material that accumulates in the sediment.

Mr. Pence presented to the committee a budget table that included the estimates for the EAHCP work plans and a timeline of the 2019 work plan and funding application approval process.

9. Presentation of the timeline and process to facilitate Strategic Adaptive Management (Attachment 8).

Mr. Pence introduced the strategic adaptive management process planning to the committee. The Strategic Adaptive Management Process Planning (SAMP) is the transition of Phase 1 of the HCP to Phase 2. Mr. Pence clarified the differences between Phase 2 and the transition to Phase 2, addressed the major questions that will arise during the transition phase, the use of the MODFLOW model and the possibility of additional conservation measures to be included in Phase 2.

Mr. Pence presented a table of the minimum springflow rates established for the protection of the endangered species in both the Comal and San Marcos Spring Systems.

Mr. Taggart noted that the variation between the high and low springflow estimates are very indicative of the health of the spring systems. Mr. Pence agreed with Mr. Taggart and expanded on the springflow numbers in the table.

Ms. Howard asked what differences in the new model produced those numbers. Mr. Pence answered that there has been a lot of research analyzing the Knippa Gap, Cibola Divide and porosity that have provided the data to refine the model. Dr. Furl added that seven criteria were added to the new model including additional wells and the change in the aquifer elevation.

Mr. Pence noted that some of the model estimates may be difficult to achieve and may require a rerun of the model itself.

Mr. Thompson added that the model estimates may be overly conservative. Mr. Pence added that the modeling assumes that the aquifer is used to full permitting capacity.

Mr. Pence presented the use of the MODFLOW Model in SAMP. The updated model will exclude original assumptions and include to date implementation of springflow protection measures. If needed, additional conservation measures may be added to achieve springflow protection.

Mr. Taggart suggested a process of presenting and highlighting modeling assumptions before implementing a model. Mr. Pence answered that the EAA will document very clearly what models runs were made and the assumptions that were included. Mr. Taggart added that it is important to have transparency about any assumptions made so to avoid topics of concerns. Mr. Pence added that anything raised as an issue today will be reviewed during the June IC meeting.

Mr. Ruiz asked if USFWS has had any concerns of the movement from Phase 1 to Phase 2 and the Strategic Adaptive Management process required. Mr. Pence answered that USFWS is not concerned and they are highly supportive of the EAHCP.

Mr. Taggart added that there are always underlying assumptions in modeling. The Phase 1/Phase 2 transition reflects those uncertainties.

Mr. Pence concluded the presentation with updates on the EcoModel, habitat restoration, NAS Report 3, contract development for the SAMP and the overall SAMP timeline.

10. Presentation and consideration to approve the Voluntary Irrigation Suspension Program Option (VISPO) memo of clarification and authorization for the Program Manager to submit the memorandum to U.S Fish and Wildlife Services (Attachment 9).

Mr. Friberg presented the VISPO memo of clarification to the committee. The EAA is asking USFWS to clarify that it can deviate from the original enrollment price structure outlined in the HCP for the VISPO program. This clarification applies only to price structure and does not pertain to the goals of the program. The primary concerns are associated with price points, the program term options and the escalators proposed in the original VISPO program. The EAA is seeking clarification that it has flexibility to adjust pricing in response to market conditions. Moving forward, the EAA will no longer offer 10-year enrollment options and instead work through two, five-year renewal options to the end of the current Incidental Take Permit.

Mr. Pence added that this clarification will allow for re-enrollment and the continued success of the VISPO program.

Mr. Ruiz made a motion to approve the VISPO memo of clarification and the authorization for the Program Manager to submit the memo to USFWS. Mr. Taggart seconded. There were no objections.

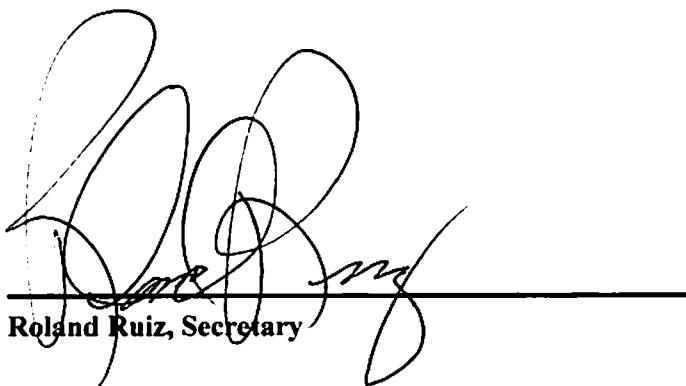
11. Consider future meetings, dates, locations, and agendas.

Mr. Thompson noted that the next Implementing Committee meeting is scheduled for June 21st at the City of New Braunfels City Hall.

12. Questions from the public.

No comments.

13. Adjourn -- 11:57 am



Roland Ruiz, Secretary



May 17, 2018

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 Voluntary Irrigation Suspension Program Option (VISPO) Program Compensation Schedule of the Edwards Aquifer Habitat Conservation Plan (EAHCP § 5.2.1.3).

This memorandum is submitted on behalf of the Edwards Aquifer Authority (EAA), the City of New Braunfels, the City of San Marcos, the San Antonio Water System and Texas State University (collectively the Permittees of Incidental Take Permit (ITP) #TE-63663A-1), in request of a clarification regarding the compensation schedule associated with the Voluntary Irrigation Suspension Program Option (VISPO) program, as defined in Chapter 5 of the Edwards Aquifer Habitat Conservation Plan (EAHCP § 5.2.1.3). More specifically, the Permittees seek affirmation of the ability to deviate from the original VISPO compensation schedule such as to make pricing adjustments to maintain the program's competitive nature within the regional water market and thus ensure continued full enrollment in the VISPO program for the duration of the ITP.

The VISPO program is a conservation measure within the EAHCP established to minimize and mitigate the impacts of pumping from the Edwards Aquifer during periods of low spring flow and regional drought by suspending the withdrawal of groundwater for irrigation purposes. The volume target for the VISPO program is to enroll 40,000 ac-ft/yr of permitted groundwater for suspension when the J-17 index well water level is at or below 635 ft-MSL on the annual trigger date of October 1st. Irrigation permit-holders that participate in the VISPO program are financially compensated during their time of suspended groundwater pumping and are presented the option of five- or ten-year forbearance agreement commitments.

The current five-year program, as defined in the EAHCP, outlines a standby fee of \$50/acre-foot of groundwater with a 1.5 percent annual increase to be paid to the enrollee every year of the term of their agreement, regardless of Aquifer conditions; and a fee of \$150/acre-foot of groundwater with a 1.5 percent annual increase to be paid to the enrollee each year when temporary pumping suspensions are required. Additionally, the current ten-year program outlines a standby fee of \$57.50/acre-foot for years 1-5 and \$70.20/acre-foot for years 6-10 to be paid to the enrollee every year of the term of their agreement, regardless of Aquifer conditions; and a fee of \$172.50/acre-foot of groundwater for years 1-5 and \$210.60 for years 6-10 to be paid each year when temporary pumping suspensions are required.

The details of the five- and 10- year programs were developed by the EARIP VISPO Work Group to ensure prompt enrollment in 2013. Payment structures stated in the EAHCP were not intended to lock in price points of VISPO groundwater for the term of the ITP but rather, encourage initial participation into the program. Now, as the first set of five-year VISPO forbearance agreements approach expiration, clarification is requested to confirm that the original compensation terms were intended only for rollout

and that the EAA may adjust pricing in future years to respond to market conditions as may be warranted to ensure sustained full enrollment in the VISPO program for the duration of the ITP period.

This clarification is only intended to affirm EAA's ability to deviate from the VISPO Program compensation schedule, as originally defined in the EAHCP. In all other respects, the VISPO program, including the target volume, program triggers, spring flow protection plans and the program funding defined in Table 7.1 of the EAHCP, remain unchanged.

Furthermore, in an effort to ensure transparency of process, the EAHCP program staff presented to the Stakeholder Committee the rationale for this VISPO Program Term clarification and provided the opportunity for input on the proposed changes to the pricing structure. Additionally, the Edwards Aquifer Authority has collaborated with current 5-year VISPO customers for feedback on the current Program Terms and the proposed modification.

On March 22, 2018, the EAA General Manager stated the need and rationale for a clarification of the VISPO Program Terms to the EAHCP Implementing Committee. On May 17, 2018, the Implementing Committee met again to discuss final proposals to the Program Term and approve this Clarification letter. All agendas and minutes from this process are included as Exhibits 1, 2, and 3.

The Permittees seek your formal concurrence with and acceptance of this clarification to allow for modification to the VISPO Program Terms as they relate to price structure such that it remains adaptable and responsive to varying market conditions. Approval of this clarification will encourage continued enrollment in the VISPO program and, most importantly, continued compliance with the spring flow conservation goals of the EAHCP.

We look forward to your formal acceptance of this clarification and appreciate your response on this issue.

Respectfully,

A handwritten signature in black ink, appearing to read "Nathan E Pence", written in a cursive style.

Nathan E Pence
EAHCP Program Manager



**Implementing Committee
Meeting Minutes
March 22, 2018**

Members of the committee included: Tom Taggart (San Marcos), Roland Ruiz (EAA), Mark Enders for Greg Malatek (New Braunfels), Darren Thompson (SAWS), Andrew Sansom (Texas State University), and Jonathan Stinson (GBRA).

1. Call to order -- 9:05am

Darren Thompson called order for the Committee. Mark Enders substituted for Greg Malatek. A quorum was present.

2. Public Comment:

No comments.

3. Approval of minutes from the February 8th Implementing Committee meeting.

Roland Ruiz addressed the revisions made to the February 8th IC meeting minutes. Mr. Ruiz made a motion to approve the meeting minutes as revised. Andrew Sansom seconded the motion. There were no objections.

4. Receive report from the Program Manager on general topics related to the Habitat Conservation Plan.

- **Springflow**

Dr. Chad Furl presented the springflow data on the Comal and San Marcos spring systems and an update on the Index Well levels.

Darren Thompson added that, in the absence of precipitation, J17 projections indicate Stage 1 conditions during the first week of April and possible Stage 3 conditions during mid-summer. Significant rain fall within the coming weeks could reset those projections.

Nathan Pence noted the significance of the drought forecast in relation to the HCP and the spring flow triggers associated with the Refugia Program.

Dr. Furl concluded the hydrological presentation with data on springflow averages and observed rainfall.

- **Tour of Comal Springs -- May 9th**

Dr. Furl invited committee members to attend a tour of the Comal Springs on May 9th. The tour will feature habitat restoration sites along the Old Channel and along the Comal Spring system. Dr. Furl asked that all those interested in attending to please RSVP by emailing EAHCP staff.

Mr. Pence added that a “save the date” email will be sent to all committee members with event details.

- **Comal Springs Riffle Beetle Work Group**

Dr. Furl provided a summary of the Comal Springs Riffle Beetle Work Group. The new work group will have three main areas of focus: 1) cotton lure sampling methodology 2) improving field activities to accomplish HCP biological and identifying non EAHCP activities, and 3) establishing long term biological goals of population and habitat of the riffle beetle. Currently, EAHCP staff are in the final stages of developing a draft charge and establishing final work group membership.

Andrew Sansom asked Dr. Furl to elaborate on non EAHCP activities. Dr. Furl answered that non EAHCP activities generally include research done by other agencies outside of the HCP in biological monitoring areas.

Mr. Sansom asked if there has been any measurable negative impact from the large amount of studies done in key habitat areas and, if so, are there any enforcement mechanisms to manage those activities. Mr. Pence answered that anyone collecting or doing research on endangered species is required to have a permit from the U.S Fish and Wildlife Service.

Darren Thompson asked who the candidates were for the Comal Springs Riffle Beetle Work Group. Dr. Furl answered that Work Group membership has yet to be determined. The goal is to have 5-8 experts, with varying experience, to participate. Dr. Furl added that the Work Group will not consist entirely of Science Committee members. Mr. Pence added the importance of finding an appropriate balance of scientific expertise.

- **Update on Construction of Refugia Buildings**

Dr. Furl presented updates on the construction of the Refugia Building in San Marcos. So far, construction is going well with no major issues. Construction is projected to be completed by Summer/Fall 2018. Additionally, a bid packet has been released for the renovations at the Uvalde National Fish Hatchery.

- **ASR Operations by SAWS**

Darren Thompson provided an update on ASR operations. 16,667 ac-ft of water was noticed to SAWS by the EAA. 6,900 ac-ft of water for that notice has been stored at a rate of 16 MGD. As of today, a total of 89,000 ac-ft of water has been stored on behalf of the EAHCP. In total, 161,000 ac-ft is in storage. The overall planned capacity is 200,000 ac-ft.

Mr. Pence asked is SAWS anticipated reaching the 200,00 ac-ft storage capacity at the end of the year. Mr. Thompson answered that, considering the possibility of drought and a 20% cut back, reaching the capacity is unlikely to occur this year.

Carol Patterson asked if there has there been any change in storage predictions based on the migration of water. Mr. Thompson answered that although there has been drift in the formation, the change has not been significant.

- **2019 Work Plans:**

Shaun Payne presented the EAHCP timeline for 2019 Work Plans and Funding Application submittals. So far, EAHCP staff has meet with all internal entities as well as the City of San Marcos and the City of New Braunfels to prepare for the upcoming Work Plan submittal. Work

Plans are to be submitted to the Program Manager by April 16. There may be changes to the methodology within the 2019 Work Plans, however, significant changes to the overall budget is not to be expected.

Mr. Pence added that specific changes to the submerged aquatic vegetation methodologies are to be expected in the spring community Work Plans and asked the committees to focus on areas that experience changes year to year.

Tom Taggart asked if the Budget Work Group will have the opportunity to review funding applications. Mr. Pence answered that there are plans for the Budget Work Group to reconvene in September.

Andrew Sansom suggested to revise the schedule presented at the meeting to include the Budget Work Group and resend to the committee.

Mr. Payne notified the committee of the recent update to the EAHCP digital newsletter. The April 2nd newsletter will contain a new format with updates and changes made for easier navigation and access to newsletter archives.

- **Budget Report (Attachment 3)**

Nathan Pence presented the EAHCP budget report to the committee. In summary, all projects remain within budget.

- **Update on the Strategic Adaptive Management Process Planning**

Mr. Pence presented the Strategic Adaptive Management Process Planning to the committee. Phase 1 is the first 7 years of the HCP, Phase 2 is the remaining 8 years of the program. A chance to review the HCP during that transition is afforded during the Strategic Adaptive Management Process Planning. Part of this review includes an evaluation of Phase 1 by the National Academy Sciences in their third and final report. Mr. Pence noted that the HCP is currently in that transition phase. To inform the committee on the Strategic Adaptive Management Process Planning, Mr. Pence is working on a white paper that will include details of the FMA and HCP, timelines and the procedure moving toward Phase 2.

Tom Taggart asked if there are any issues embedded in the Strategic Adaptive Management Process Planning report that would require additional funding. Mr. Pence answered that a consultant may be hired to document and write the report on the Strategic Adaptive Management Process for USFWS as well as a report for the administrative record. Modeling will be done by EAA staff and will not require additional funding. Overall, there are no anticipated changes to Table 7.1.

Mr. Taggart suggested making a brochure on the Strategic Adaptive Management Process Planning to provide to the public and governing entities.

- Mr. Pence presented the committee a brief EAHCP staffing update. The duties of the EAHCP coordinators have changed slightly to expand opportunities and utilize skill sets within the team. A job posting for an environmental scientist will be available soon. A new staff member will be joining the team next month to fill the contracting position.

- Lastly, the EAA is participating in the Big Give. A food truck is set up outside for all those interested in the fundraising event. A portion of proceeds will go to the Edwards Aquifer Conservancy.

5. Receive update from the EAA on the status of VISPO and the potential need for a Memorandum of Clarification to USFWS regarding price structure.

Roland Ruiz introduced the status of the VISPO program to the committee. The program offers long term commitments of forbearance either on a 5 or 10-year lease agreement. 5-year commitments are now approaching renewal period. The challenge for the EAA is that, in the HCP, the rate structure for the VISPO program includes very specific language that does not provide any flexibility for reenrollment.

Nathan Pence added that the memo of clarification will address our interpretation of the information on the VISPO program in the HCP so that the USFWS can respond to our interpretation. We will not be asking for approval but rather agreement on the interpretation of the language in the HCP.

Darren Thompson added that the memo of clarification will be used so that an official amendment will not be required. Mr. Pence agreed with Mr. Thompson. Mr. Ruiz added the memo will be presented at that the next Implementing Committee meeting.

Javier Hernandez presented to the committee an overview of the VISPO program. Currently, 62% of VISPO commitments are 5-year enrollments and 38% are 10-year enrollments. A majority of VISPO customers are approaching the end of the 5-year contracts. A letter of notice of reenrollment is going to be sent to permit holders soon.

Tom Taggart asked if there will be a significant difference between the potential benefits of a 5-year lease versus a 10-year lease. Mr. Hernandez explained the 10-year payment schedule marking the differences between the lease agreements. Adding to Mr. Hernandez's response, Mr. Taggart noted that, based on payment schedules, there will be enough differences between the 5 and 10-year agreements that the 5-year contracts will not be favored over the 10-year. Darren Thompson added that the 10-year leases will eventually be phased out. Andrew Sansom asked why the 10-year leases will be discontinued. Mr. Ruiz answered that the 10-year leases will not be offered a renewal opportunity because those contracts are not approaching expiration. Mr. Thompson clarified that as 10-year agreements begin to expire, 5-year agreements will be added to replace the loss. Mr. Thompson asked how many permittees the VISPO program currently has. Mr. Hernandez answered that there are at least 165 permittees currently enrolled in the program. Mr. Sansom asked to clarify the reasoning behind why expiring 5-year agreements will not be offered enrollment into a 10-year contract. Mark Friberg answered that one of the reasons is to limit competition of 10-year contracts between the new ASR forbearance agreement and VISPO. Mr. Thompson ask if there has been any issue in 5-year reenrollments without the opportunity to apply for a 10-year agreement. Mr. Hernandez answered that so far there have been no issues. Mr. Thompson added that the automatic payment escalators are difficult to manage as market conditions change. Mr. Pence added that, through internal conversations, it was determined that if the payment schedules continued as stated in the HCP, more customers would gradually favor payment options without an escalating payment schedule.

Mr. Thompson questioned whether the ASR and VISPO programs will experience competition since both are forbearance type agreements. Mr. Friberg answered that it is unlikely the two programs will experience competition due to the differences of the program terms. Mr. Thompson added that customers will have the option between choosing a program that has certainty versus one that has a

higher risk but greater reward. Mr. Pence added that most customers that are considering reenrollment are already comfortable with the VISPO program.

Carol Patterson asked if the farming industry has any significant effect on the VISPO program. Mr. Ruiz answered that, if anything, the program has added a level of financial certainty to the agricultural economy during drought conditions.

Mr. Pence informed the committee that the VISPO memo of clarification will be presented as an action item at the next Implementing Committee meeting in May.

Mr. Ruiz informed the committee that the process of reenrolling current 5-year VISPO customers has begun and enrollment forms will be distributed soon. He added that the goal is to provide certainty in through the Strategic AMP, so the focus will be on the rollover of the ITP.

6. Presentation and possible action to authorize Program Manager to submit the 2017 EAHCP Annual Report to be submitted to USFWS.

Shaun Payne presented the 2017 EAHCP Annual Report to the committee. Mr. Payne highlighted the timeline leading up to the final report and thanked everyone who helped write, contribute and review the document.

Melani Howard thanked Mr. Payne for his hard work in producing the EAHCP Annual Report.

Mr. Payne presented the new Annual Report Highlight brochure. The brochure is now available for pickup and distribution. Mr. Pence added that if any committee member wants more brochures for offices, public, organizations, etc., to email EAHCP staff with a requested amount.

Alicia Reinmund-Martinez presented to the committee recent comments made on the draft Annual Report that were not included in the most recent comment matrix.

Tom Taggart made a motion to approve the submission of the 2017 EAHCP Annual Report to the USFWS. Darren Thompson seconded. The motion was approved.

Mr. Payne announced that flash drives containing the 2017 EAHCP Annual Report and appendices will be made available at the next Implementing Committee meeting.

Tom Taggart thanked the consultants and everyone involved in producing the Annual Report.

7. Presentation and discussion of the 2017 Biological Monitoring and Water Quality Monitoring reports, schedule for contract renewals and long-term plans (Attachments 4a, 4b and 5).

Dr. Chad Furl presented the 2017 Biological Monitoring and Water Quality Monitoring reports to the committee. Overall, monitoring species and habitat remained in good condition during low flow conditions. In the Comal Springs, temperature and dissolved oxygen parameters remained within range throughout 2017. Non-native aquatic vegetation removal throughout the system continues to benefit those water quality parameters. Fountain darter populations continue to follow healthy trends in size and abundance. Comal salamanders were the highest observed to date. Fall of 2017 contained the highest sample of salamanders throughout the year. Comal Springs Riffle Beetle counts continue to be low throughout the system. In the San Marcos Spring system, Texas Wild-Rice coverage has been recorded at highest levels to date. Mr. Pence noted the concern on how well Texas Wild-Rice is growing in the San Marcos River and the competition it is pressing upon other native aquatic vegetation.

Carol Patterson asked if Texas Wild-Rice harvesting would be considered take of the species. Mr. Pence answered that “take” does not include plant species.

Dr. Furl presented to the committee a few findings from the fish tissue analysis that was conducted as part of the Biological Monitoring Program in the Comal and San Marcos spring systems. Fish tissue, plasma and water quality testing were also included in the analysis for the presence of pharmaceutical chemicals.

Mr. Pence added that the fish tissue analysis was included in the Biological Monitoring Program after the presence of certain contaminants were found in sediment testing.

Darren Thompson noted that the fish tissue analysis was only to be conducted on odd years. Dr. Furl confirmed the testing schedule and added that testing every other year provides the ability for better interpretation of the results.

Tom Taggart asked for clarification on the pharmaceutical analysis table. Dr. Furl answered that numbers used in the table are based on lab results and that the full report can be made available upon request. Mr. Pence added that EAHCP staff are open to a full, detailed presentation on the results from the fish tissue analysis.

Carol Patterson asked if the analysis included an assessment on the presence of PAH (Polycyclic Aromatic Hydrocarbons). Dr. Furl did not know the specifics of every analysis conducted but was available to discuss the details of the report with all those interested.

Ken Diehl asked if Dr. Brooks reviewed the results of the fish tissue analysis. Dr. Furl answered that Dr. Brooks has reviewed the results and provided feedback and interpretation on the data. Mr. Diehl asked if there had been any detections of PPCPs in the tissue samples and how that detection could indicate a leak in a sewer system. Mr. Pence answered that location of the tissue sample may have an impact on interpretation of the data.

Carol Patterson noted that the EAA Board recently passed a regulation of PAH in the spring systems and that it would be interesting to study its presence in the systems over time.

Johnathan Stinson asked when the samples were collected. Dr. Furl answered that the samples were collected May 2017.

Dr. Furl updated the committee on the Water Quality and Biological Monitoring contracts. Many of the contracts are set to expire at the end of 2018. The EAA is now accepting proposals through the term of the ITP for both monitoring programs. Much of the work will be very similar to what has been done in the past.

Andrew Sansom asked, that since Texas Wild-Rice has become a dominant species, is it possible that it could be removed from the Endangered Species list. Mr. Pence answered, that although it has become prevalent within the system, it is not likely that Texas Wild-Rice will be delisted due to its limited natural location.

Mr. Pence added that, based on commitments and conversations with the Stakeholder and Implementing committees, Zebra Mussel detection stations have been added to the Comal and San Marcos Spring Systems. However, it is highly unlikely that the presence of Zebra Mussels will be detected.

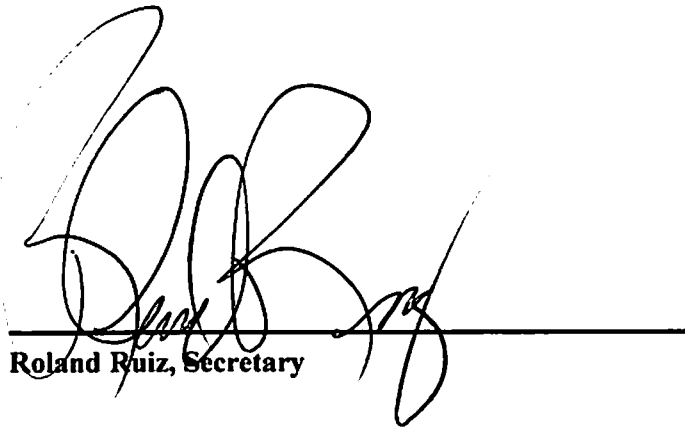
Johnathan Stinson added, due to the detection of Zebra Mussels in the Colorado River, the City of Austin is advising individuals to take all precautions when recreating.

8. Consider future meetings, dates, locations, and agendas.

- Next Implementing Committee meeting is scheduled for May 17th at the City of San Marcos Activity Center.

9. Questions from the public.

10. Adjourn: 10:56am



A handwritten signature in black ink, appearing to read 'Roland Ruiz', is written over a solid horizontal line. The signature is stylized with large loops and a long trailing stroke.

Roland Ruiz, Secretary

**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 **9:00 am on Thursday, May 17th, 2018** at the **City of San Marcos Activity Center, 501 E Hopkins St., San Marcos, TX, 78666**.

Members of this committee include: Tom Taggart (San Marcos), Roland Ruiz (EAA), Greg Malatek (New Braunfels), Darren Thompson (SAWS), Andrew Sansom (Texas State University), and Jonathan Stinson (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 – 9:00am
2. Public Comment.
3. Approval of minutes from the March 22nd Implementing Committee meeting (Attachment 1).
4. Receive report from the Program Manager on general topics related to the Habitat Conservation Plan.
 - Springflow and Index Level Update
 - J17 Forecast
 - Stormwater sampling
 - ASR Operations by SAWS
 - ASR Price Point Update
 - Budget Report (Attachment 2 and 3)
 - NAS update
 - Zebra Mussel Monitoring Stations
 - IC Appointments (Attachment 4)
5. Presentation of the 2017 Recharge Estimate and 10-year Rolling Recharge Average.
Purpose: To present to the Implementing Committee the 2017 Recharge estimate and subsequent 10-year rolling recharge average update.
Action: No action required.
6. Presentation of the Edwards Aquifer Authority 2019 Work Plans (Attachment 5).
Purpose: To provide the Implementing Committee the opportunity to review and comment on aspects of the Edwards Aquifer Authority 2019 Work Plan.
Action: No action required

7. Presentation of the City of San Marcos/Texas State University 2019 Work Plans (Attachment 6).
Purpose: To provide the Implementing Committee the opportunity to review and comment on aspects of the City of San Marcos/Texas State University 2019 Work Plan.
Action: No action required
8. Presentation of the City of New Braunfels 2019 Work Plans (Attachment 7).
Purpose: To provide the Implementing Committee the opportunity to review and comment on aspects of the City of New Braunfels 2019 Work Plan.
Action: No action required
9. Presentation of the timeline and process to facilitate Strategic Adaptive Management (Attachment 8).
Purpose: To present the Strategic Adaptive Management Process Planning White Paper to the Implementing Committee for comment and discussion.
Action: No action required
10. Presentation and consideration to approve the Voluntary Irrigation Suspension Program Option (VISPO) memo of clarification and authorization for the Program Manager to submit the memorandum to U.S Fish and Wildlife Services (Attachment 9).
Purpose: To present and obtain approval of the VISPO memo of clarification.
Action: To approve the submission of the VISPO memo of clarification.
11. Consider future meetings, dates, locations, and agendas.
 - Next Implementing Committee meeting is scheduled for June 21st at the City of New Braunfels City Hall.
12. Questions from the public.
13. Adjourn.



**Implementing Committee
Meeting Minutes
May 17, 2018**

Members of this committee include: Tom Taggart (San Marcos), Roland Ruiz (EAA), Greg Malatek (New Braunfels), Darren Thompson (SAWS), Robert Mace (Texas State University), and Jonathan Stinson (GBRA).

1. Call to order – 9:04am

Darren Thompson called order for the Committee. Melani Howard substituted for Robert Mace. A quorum was present.

2. Public Comment.

No comments.

3. Approval of minutes from the March 22nd Implementing Committee meeting (Attachment 1).

Tom Taggart made a motion to approve the meeting minutes. Roland Ruiz seconded the motion. There were no objections.

4. Receive report from the Program Manager on general topics related to the Habitat Conservation Plan.

- **Springflow and Index Level Update**

Dr. Chad Furl presented the springflow data on the Comal and San Marcos spring systems, an update on the Index Well levels and precipitation estimates of the region.

Nathan Pence noted the trend of low precipitation and demand for significant rainfall to deviate from future drought estimates.

- **J17 Forecast**

Dr. Furl presented the J17 forecast as of April 10th. There is a 25% chance of hitting Stage 1 before May 29th.

Darren Thompson added the possible outlook of hitting Stage 1 next weekend and Stage 2 in late June. Conditions below Stage 2 are not expected; however, circumstances could change depending on the weather.

- **Stormwater sampling**

Dr. Furl presented the two stormwater sampling events that have occurred as part of the EAA's Water Quality Monitoring program.

Tom Taggart asked, in relation to stormwater sampling, is there any attempt to profile the rainfall that occurs during a storm. Dr. Furl answered that there are specifics in the contract that describe antecedent conditions to conduct stormwater sampling. Mr. Taggart asked if

there is any analysis to determine what types of runoff may occur based off rain intensity. Dr. Furl answered that although that type of analysis is not currently conducted, it is something that will be considered in the future.

Nathan Pence added that during the Science Committee meeting, individuals from Texas A&M AgriLife, Baylor University and Texas State University presented stormwater sampling data that included hydrological analysis along Sessoms Creek. Mr. Pence noted the possibility of incorporating that type of analysis into EAA's Water Quality Monitoring Program.

Dr. Furl presented water quality data collected at the Comal Springs during the latest stormwater event and the current Biological and Water Quality Monitoring contract process.

Darren Thompson asked if the new two-year contracts will extend to 2028 or if they will require a new RFP. Dr. Furl clarified that the current process is asking for two-year contracts, once those contracts expire, new RFPs will be created to extend to 2028.

Johnathan Stinson asked if the current contractors are eligible to apply for the new long term contracts. Dr. Furl and Mr. Pence answered that the current contractors will have the opportunity to apply.

- **ASR Operations by SAWS**

Darren Thompson provided an update on ASR operations. 16,667 ac-ft of water was noticed to SAWS by the EAA. 9,933 ac-ft of water for that notice has been stored. As of today, a total of 92,000 ac-ft of water has been stored on behalf of the EAHCP. Over the last week SAWS has stopped storing to conduct a test to ensure that pumps and pipes are working properly.

Tom Taggart asked if this test was in preparation for a pipeline. Darren Thompson answered that SAWS has begun placing the Western Integrated Pipeline and it is about half way near completion.

- **ASR Price Point Update**

Roland Ruiz provided an update on the ASR Price Point. The EAA Board has approved the updated price points to \$100. The updated ASR program is now on the market for customers. Mark Friberg added that a majority of customers have had questions about the recent change to the program and interest in reenrollment.

Tom Taggart asked how many acre-feet of water was removed from the ASR program with the termination of 1-year leases. Mark Friberg answered about 20,000 acre-feet of water was been removed. Nathan Pence added that the removal of those 1-year leases are meant to be replaced with forbearance agreements that have been approved through adaptive management.

- **Budget Report (Attachment 2 and 3)**

Nathan Pence presented the March and April EAHCP budget reports.

- **NAS update**

Nathan Pence provided a brief update on Report 3 from the National Academy of Sciences. Report 3 is expected by late September 2018 and will be critical in the preparation of Phase 2

of the HCP. Mr. Pence shared that there is some concern that the report could be submitted later than expected however, conversations with NAS are working to fix that issue.

Darren Thompson asked why the possible delay in receiving the report. Mr. Pence answered that there may be issues with staffing coordination that could delay the finalization of the report.

- **Zebra Mussel Monitoring Stations**

Nathan Pence provided an update on Zebra Mussel Monitoring along the San Marcos and Comal spring systems. EAA is now part of the TPWD statewide monitoring network. Based on the water quality of both systems, it is highly unlikely that Zebra Mussels will be present.

- **San Marcos Discovery Center**

Nathan Pence introduced the San Marcos Discovery Center's initiative to keep non-native fish out of the river by providing a place for individuals to release unwanted aquarium fish. Melani Howard highlighted the attention that the Discovery Center's pet fish pond as received. A video clip from a local news station was presented to the committee. Mr. Pence acknowledge the collaborative efforts to make project like this successful.

Tom Taggart recommending sending the news clip to NAS.

- **IC Appointments (Attachment 4)**

Nathan Pence presented the updated Implementing Committee appointments. Robert Mace will be representing Texas State University, replacing Andrew Samson. Contact information can be made available upon request.

Darren Thompson asked how Robert Mace's move to the Implementing Committee will impact the Science Committee. Mr. Pence answered that Robert Mace has resigned from the Science Committee to serve on the Implementing Committee, leaving a Science Committee vacancy. The Implementing and Stakeholder Committees will appoint a member and agree by consensus to fill that vacancy.

Mr. Pence also spoke to the committee concerning changes to the EAHCP staff. Alicia Reinmund-Martinez will be leaving her position as HCP Director. Mr. Pence and the committee bid farewell to Mrs. Reinmund-Martinez and thanked her for her years of service to the HCP program.

5. **Presentation of the 2017 Recharge Estimate and 10-year Rolling Recharge Average.**

Nathan Pence presented the 2017 recharge estimates provided to the EAA from the USGS. Mr. Pence reminded the committee on the importance of the recharge estimates and the impact on the ASR forbearance program. For example, anytime the recharge average drops below 500,000 acre-feet on the 10-year rolling recharge average, that would trigger a portion of the ASR program. In 2017, as calculated by the USGS, the recharge estimate reached about 486,637 acre-feet. Based on that estimate, 2019 will be a non-forbearance year. For 2018, a calculation determined that the recharge average must be no less than 194,563 acre-feet in order to make 2020 a non-forbearance year.

Dr. Chad Furl presented a graph representing historical data of the USGS recharge estimates and the 10-year rolling recharge average.

Darren Thompson noted that the only time recharge has dropped below 500,000 acre-feet was during the drought of record.

6. Presentation of the Edwards Aquifer Authority 2019 Work Plans (Attachment 5).

Nathan Pence introduced the EAHCP work plans to the committee. Many of the details within the work plans have become routine and repetitive. At the request of the committee, work plan presentations will highlight major projects and significant changes. Full work plans have been included as attachments in the meeting packets.

Shaun Payne presented the 2019 Edwards Aquifer Authority Work Plan to the committee. The EAA's work plan primarily consists of springflow protection measures, research projects, monitoring programs and program management.

Mr. Pence added that the overall budget is subject to change. EAA will submit a revised work plan in June and an updated funding application in October. Mr. Pence reminded the committee that the budget is approved during funding application review.

Darren Thompson asked about the budget estimate for the applied research project. Mr. Payne clarified that the budget for the applied research will require funding taken from future years. The funding application will include a more refined budget table.

Mr. Thompson suggested making the work plan budget tables more consistent across the various work plans.

7. Presentation of the City of San Marcos/Texas State University 2019 Work Plans (Attachment 6).

Melani Howard presented the City of San Marcos/Texas State University 2019 Work Plan to the committee. The Texas Wild-Rice enhancement, control of non-native plant species, native riparian habitat restoration and impervious cover/water quality protection conservation measures will experience the most change in comparison to previous work plans.

Nathan Pence noted that the LTBG reaches in San Marcos follow the same compliance by the USFWS as in the Comal spring system.

Melani Howard presented before and after pictures of habitat restoration along the San Marcos River. Mr. Pence noted the recruitment of the young bald cypress trees and recognized the work that the City of San Marcos has done to protect the banks of the river.

Ms. Howard concluded the presentation with details on water quality projects and the 2019 work plan budget.

Mr. Pence added that transfers and movement of money within the work plan budget are tracked and maintained by EAHCP staff.

Patrick Shriver asked if there will be any disturbance of endangered species in the Sessoms Creek Project area. Mr. Pence added that there are no endangered species within the Sessoms Creek habitat until the very bottom portion. Work will not be done in the portions that touch endangered species habitat.

8. Presentation of the City of New Braunfels 2019 Work Plans (Attachment 7).

Mark Enders presented the City of New Braunfels 2019 Work Plans to the committee. Aquatic vegetation restoration along the Old Channel, Landa Lake and Comal River will undergo several changes. Additionally, non-native species control, monitoring of gill parasite, native habitat

restoration and impervious cover conservation measures will also include changes in comparison to previous work plans.

Mr. Enders concluded his presentation with the plans to install a stormwater treatment vault included in the impervious cover/water quality protection measure and the estimated budget for 2019.

Nathan Pence noted how the impervious cover project, specifically the stormwater treatment vault, will directly impact the endangered species.

Darren Thompson asked what type of treatment will be used in the underground stormwater treatment vault. Mr. Enders answered that the vault will primarily be treating sediment and the material that accumulates in the sediment.

Mr. Pence presented to the committee a budget table that included the estimates for the EAHCP work plans and a timeline of the 2019 work plan and funding application approval process.

9. Presentation of the timeline and process to facilitate Strategic Adaptive Management (Attachment 8).

Nathan Pence introduced the strategic adaptive management process planning to the committee. The Strategic Adaptive Management Process Planning (SAMP) is the transition of Phase 1 of the HCP to Phase 2. Mr. Pence clarified the differences between Phase 2 and the transition to Phase 2, addressed the major questions that will arise during the transition phase, the use of the MODFLOW model and the possibility of additional conservation measures to be included in Phase 2.

Mr. Pence presented a table of the minimum springflow rates established for the protection of the endangered species in both the Comal and San Marcos Spring Systems.

Tom Taggart noted that the variation between the high and low springflow estimates are very indicative of the health of the spring systems. Mr. Pence agreed with Mr. Taggart and expanded on the springflow numbers in the table.

Melani Howard asked what differences in the new model produced those numbers. Mr. Pence answered that there has been a lot of research analyzing the Knippa Gap, Cibolo Divide and porosity that have provided the data to refine the model. Dr. Chad Furl added that seven criteria were added to the new model including additional wells and the change in the aquifer elevation.

Mr. Pence noted that some of the model estimates may be difficult to achieve and may require a rerun of the model itself.

Darren Thompson added that the model estimates may be overly conservative. Mr. Pence added that the modeling assumes that the aquifer is used to full permitting capacity.

Mr. Pence presented the use of the MODFLOW Model in SAMP. The updated model will exclude original assumptions and include to date implementation of springflow protection measures. If needed, additional conservation measures may be added to achieve springflow protection.

Tom Taggart suggested a process of presenting and highlighting modeling assumptions before implementing a model. Mr. Pence answered that the EAA will document very clearly what models runs were made and the assumptions that were included. Mr. Taggart added that it is important to

have transparency about any assumptions made so to avoid topics of concerns. Mr. Pence added that anything raised as an issue today will be reviewed during the June IC meeting.

Roland Ruiz asked if USFWS has had any concerns of the movement from Phase 1 to Phase 2 and the Strategic Adaptive Management process required. Mr. Pence answered that USFWS is not concerned and they are highly supportive of the EAHCP.

Tom Taggart added that there are always underlying assumptions in modeling. The Phase 1/Phase 2 transition reflects those uncertainties.

Mr. Pence concluded the presentation with updates on the EcoModel, habitat restoration, NAS Report 3, contract development for the SAMP and the overall SAMP timeline.

10. Presentation and consideration to approve the Voluntary Irrigation Suspension Program Option (VISPO) memo of clarification and authorization for the Program Manager to submit the memorandum to U.S Fish and Wildlife Services (Attachment 9).

Marc Friberg presented the VISPO memo of clarification to the committee. The EAA is asking USFWS to clarify the specificities outlined in the HCP concerning the VISPO program. This clarification does not include deviating from the amount of water specified or the overall goals of the program. The primary concerns are associated with price points, the program term options and the escalators proposed in the original VISPO program. Essentially, the EAA is seeking clarification on those specifics and the flexibility to adjust to market conditions. Moving forward, the EAA will no longer offer 10-year enrollment options and instead work through two, five-year renewals options.

Nathan Pence added that this clarification will allow for reenrollment and the continuation of the VISPO program.

Roland Ruiz made a motion to approve the VISPO memo of clarification and the authorization for the Program Manager to submit the memo to USFWS. Tom Taggart seconded. There were no objections.

11. Consider future meetings, dates, locations, and agendas.

Darren Thompson noted that the next Implementing Committee meeting is scheduled for June 21st at the City of New Braunfels City Hall.

12. Questions from the public.

No comments.

13. Adjourn -- 11:57 am



United States Department of the Interior

FISH AND WILDLIFE SERVICE

10711 Burnet Road, Suite 200

Austin, Texas 78758

512 490-0057

FAX 490-0974

**MAY 29 2018**

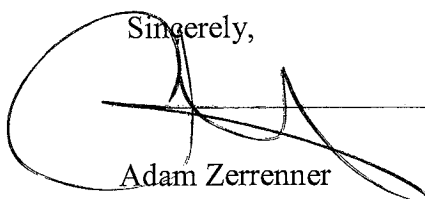
Nathan Pence, Program Manager
Edwards Aquifer Habitat Conservation Plan
900 E Quincy Street
San Antonio, TX 78215

Dear Mr. Pence:

I have received your May 17, 2018, request for clarification regarding the Voluntary Irrigation Suspension Program Option (VISPO) compensation schedule. The Edwards Aquifer Habitat Conservation Plan includes a voluntary program that allows the enrolled irrigation water users to be compensated for suspending the use of their water during certain drought conditions. The details of the VISPO are more fully explained in the *Edwards Aquifer Recovery Implementation Program Habitat Conservation Plan*. The level of compensation is at the discretion of the permittees so long as the program is operating and achieving the water conservation goals intended to be protective of the species covered under the Endangered Species Act section 10(a)(1)(B) incidental take permit (TE-63663A-1). Therefore, I concur with your request clarifying that the Permittees may, as needed, make changes to the VISPO compensation schedule to be responsive to varying market conditions.

Thank you for your significant contributions to the conservation of native species in the Edwards Aquifer.

Sincerely,



Adam Zerrenner
Field Supervisor

EAHCP Staff

September 09, 2013



Implementing Committee of the Edwards Aquifer Habitat Conservation Plan

Minutes of the August 15, 2013 Meeting

New Braunfels Civic Center, New Braunfels, Texas

1. **Call to Order** – The meeting was called to order at 9:05 a.m. A quorum was present for all purposes. All members of the Implementing Committee were represented (Mike Abbott represented TX State University).
2. **Public Comment**
Adam Yablonski, representing irrigated agriculture, discussed agenda item seven regarding the inclusion of municipal and industrial (M&I) water in the VISPO program. He explained that this inclusion was the intent of the VISPO workgroup and including M&I would resolve issues of equity identified in the program funding. He encouraged the Implementing Committee to include M&I water rights in the VISPO or provide a strong justification for not doing so.
3. **Approval of Minutes from the Implementing Committee meeting of July 18, 2013.**
Chuck Ahrens made a motion to approve the minutes with the word permit added to the language in agenda item number seven as follows:
“...the City of New Braunfels will commit to presenting their MS4 **permit** to the Implementing Committee prior to funding any related activities for LID/BMP, to ensure EAHCP funded programs are strictly related to the HCP”.
Steve Ramsey seconded the motion. There were no objections; thus, the motion passed.
4. **Receive report from the General Manager of the Edwards Aquifer Authority regarding EAHCP Program Management staffing and Acting Program Manager appointment pursuant to §2.3.3 of the Funding and Management Agreement.**
Roland Ruiz reported that the EAA has appointed Nathan Pence to be the Acting Program Manager until the Executive Director position is filled.
5. **Receive report from EAHCP Staff on general topics related to the implementation of the Habitat Conservation Plan and operation of the Implementing Committee.**
 - Nathan Pence reported that the EAA has a draft contract with the National Academy of Science for the creation of a Science Review Panel. The contract has been through the EAA internal review process and will now go to NAS for their review. The EAA will make the draft contract available to any Implementing Committee members wishing to provide comment.

EAHCP Staff

September 09, 2013

- Jenna Cantwell reported on the EAHCP educational initiatives attachment that was sent out in the IC packet. This report will be continuously updated and included in the USFWS Annual Report. Nathan Pence reported that Texas A&M and New Braunfels Utilities (NBU) will be added to the list.
- Nathan Pence reported the Amendment to 5.6.5 of the Funding and Management Agreement was approved by the SAWS Board on Tuesday, August 13, 2013; it is now complete and will be executed accordingly.
- Nathan Pence reported as a result of Amendment to 5.6.5 of the FMA being approved, the Freeman Aquatic Building contract will also be executed.
- Nathan Pence reported a meeting of the Science Committee (SC) occurred Wednesday, August 14, 2013. The SC discussed the following topics: 1) Review of final two applied research project methodologies by BIO-WEST; 2) Review of the City of New Braunfels Integrated Pest Control Management Plan for the Golf Course and 3) A discussion on Science Committee Operational Process.
- Steve Raabe (San Antonio River Authority) reported there has been no change to the total confirmed acre feet in the ASR program. Nathan Pence reported to-date VISPO is just over 11,000 ac/ft and identified that J-17 is currently below the VISPO trigger of 635 (MSL). Roland Ruiz reported the EAA will use October 1, 2013 as the deadline for irrigators to get into the program for 2014, and reported several public meetings will be held to inform the public of this date.
- Nathan Pence reported that the EAHCP Budget expenses through July 31, 2013 were included in the meeting packet.
- Nathan Pence reported that a pre-proposal meeting was held on Monday, August 12, 2013 for the Water Quality Monitoring RFP, and seven potential contractors attended. He also reported there are eight RFPs out for Applied Research. The Biological Monitoring RFP will go out for bid sometime next week.
- Nathan Pence reported 2014 Funding Applications are due to the EAA on October 1, 2013
- Nathan Pence reported the SAWS ASR contract has been approved by the EAA and SAWS.
- Nathan Pence reported that the Edwards Aquifer Recovery & Implementation Program (EARIP) was nominated for the Secretary Partnership in Conservation Award by USFWS and USGS. He also reported that TCEQ will be nominating the EARIP for the Environmental Excellence Award.

6. Discussion on Low-flow triggers in the Incidental Take Permit (ITP) and associated current spring flows.

In response to the ITP condition requiring a cease of mitigation activities in the San Marcos System if springflows go below 120cfs and Comal System if springflows go below 130cfs, the City of San Marcos has submitted a monthly memo to USFWS since flows hit 120cfs, and the City of New Braunfels will soon be submitting one as their flow levels dictate. The Implementing Committee requested that another drought contingency meeting be held to discuss the drought impacts in the region.

EAHCP Staff

September 09, 2013

7. Discuss and take possible action on the inclusion of permitted municipal and industrial water in the VISPO program.

After some discussion, the Committee took no action on this item and decided to revisit this issue after the October 1, 2013 VISPO trigger date when more information may be available about the program.

8. Present and discuss procedures for communicating changes to the EAHCP with USFWS.

Nathan Pence discussed the various options for communicating changes or deviations from the EAHCP to USFWS. He explained the differences between the following options:

1. Annual Report
2. Informational Memo
3. Clarification
4. Minor Administrative Amendment
5. Major Amendment

9. Discuss and take possible action authorizing the Program Manager to draft an “Informational Memo” to USFWS related to the following changes in the EAHCP:

Nathan Pence reported that each of the below items would be eligible for inclusion in an Informational Memo to USFWS. Tom Taggart discussed including a change to methodologies for sediment removal that would allow for more effective removal using a larger mesh screen size than what’s currently being used.

Roland Ruiz made a motion for EAHCP staff to prepare an Informational Memo including the list of items below:

- Refugia Program: § 5.1.1
- Stage V Emergency Water Supply: §5.1.4.1
- Applied Research Facility Experimental Channel at the USFWS National Fish Hatchery and Technology Center: § 6.3.4
- High-Efficiency Plumbing Fixtures & Toilet Distribution Program: § 5.1.3.2.2
- Commercial/Industrial Retrofit Rebate: § 5.1.3.2.3
- Water Reclamation for Efficient Water Use: § 5.1.3.2.4
- Management of Recreation in Key Areas: Section 5.4.2
- Section 5.6.5 of the Funding and Management Agreement
- Removal of ¼” mesh screen in sediment removal activities in the San Marcos River

Mike Abbott seconded the motion. There were no objections; thus, the motion passed.

10. Consider future meetings, dates, locations, and agendas

The next Implementing Committee Meeting is scheduled for September 19, 2013 at 9:00 a.m. located at the Edwards Aquifer Authority in San Antonio, TX.

a. Agenda will include:

i. Draft of Informational memo to USFWS

The next Stakeholder Committee meeting is scheduled for September 19, 2013 at 9:00 a.m. located at the Edwards Aquifer Authority in San Antonio, TX.

EAHCP Staff

September 09, 2013

11. Public Comment

Todd Votteler reported that Robert Mace, member of the EAHCP Science Committee, has been named the Interim Executive Director of the Texas Water Development Board.

Meeting Adjourned at 11:09 a.m.

A handwritten signature in dark ink, appearing to read 'Tom Taggart', is written over a horizontal line.

Tom Taggart

Chair of Implementing Committee

DRAFT

EAHCP Staff

10/11/2013



**EDWARDS AQUIFER
AUTHORITY**

Implementing Committee of the Edwards Aquifer Habitat Conservation Plan

Minutes of the September 19, 2013 Meeting

Located at the Edwards Aquifer Authority, San Antonio, Texas

1. **Call to Order** – The meeting was called to order at 9:05 a.m. A quorum was present for all purposes. All members of the Implementing Committee were represented.

2. **Public Comment**
None.

3. **Update on Implementing Committee membership and election of Secretary for the Implementing Committee.**

Todd Votteler made a motion to nominate Steve Ramsey for Secretary of the Implementing Committee. Tom Taggart seconded the motion. The Implementing Committee had no objections; thus, the motion passed.

4. **Approval of Minutes from August 15, 2013.**

Steven Ramsey made a motion to approve the minutes from the Implementing Committee meeting on August 15, 2013. Chuck Ahrens seconded the motion. There were no objections; thus, the motion passed.

5. **Discuss and take possible action regarding operational procedures of the Implementing Committee:**

Roland Ruiz discussed that it may be beneficial to have a Parliamentarian present during Implementing Committee meetings and offered Darcy Frownfelter for that position. Tom Taggart made a motion to designate Darcy Frownfelter as the Parliamentarian. Andrew Sansom seconded the motion. There were no objections; thus, the motion passed.

Roland Ruiz additionally expressed interest in recording meetings of the Implementing Committee to ease in the development of minutes by EAHCP staff. Recordings of the minutes would become public information. There were no objections from the Implementing Committee regarding recording meetings.

Roland Ruiz additionally reported that Nathan Pence would be offered the Program Manager position. The Implementing Committee discussed developing a resolution in support of this appointment to be approved at the next meeting.

EAHCP Staff

10/11/2013

6. Receive report from EAHCP Staff on general topics related to the implementation of the Habitat Conservation Plan and operation of the Implementing Committee.

- a. Rick Illgner provided an update that the cut-off date for enrollment in 2014 will be on Oct 1, 2013. Currently, 13,566 acre-feet are enrolled.
- b. Julia Velez with SARA reported that there were no changes to ASR enrollment since September, but that the EAA and SARA were discussing alternative lease terms and public outreach opportunities moving forward.
- c. Flow triggered Biological Monitoring reports will continue to be posted on the EAHCP website.
- d. Staff presented the Budget Report through August 2013; there were no questions.
- e. The Funding Application deadline for the spring cities and the EAA is October 1, 2013.
- f. Nathan Pence reported that several contracts for the Regional Water Conservation Program have gone to the EAA Board or will be going to the EAA board in the near future. These include a Contract with the City of Uvalde, a toilet distribution contract with SAWS, and a toilet purchasing contract with Moore. Additionally, Texas A&M contractors are communicating with Leon Valley, Maxwell Water Corporation (Hays), Live Oak and Converse to gauge interest and initiate the assessment process. Negotiations are also taking place with East Medina Water Utility and Hondo.
- g. Nathan Pence additionally pointed out that the Stakeholder Committee Meeting for September was cancelled, but that an update on activities had been sent to the Committee, and the group will meet at the joint-Committee meeting on December 19, 2013.

7. Receive report on current aquifer conditions, spring flow levels and related activities.

Geary Schindel from the EAA reported on current aquifer conditions. His presentation will be made available on the EAHCP website.

8. Receive report regarding drought contingencies meeting and related low-flow memorandums to-date.

Nathan Pence reported that a meeting to discuss drought contingencies was held on September 03, 2013, per the request of the Implementing Committee. The representatives at that meeting felt that ongoing conservation measures were having a net positive impact to the Comal and San Marcos systems. The group additionally felt that real-time observations, water-quality data, and biological monitoring reports should be used to determine the impacts of conservation measures instead of exclusively utilizing flow-based triggers. The Implementing Committee agreed that another drought contingency meeting should be held in early 2014 prior to the implementation of any 2014 measures.

9. Presentation of Water Quality Monitoring Data to-date.

Mark Hamilton from the EAA reported on water quality monitoring data to-date. His presentation will be made available on the EAHCP website.

10. Receive update on the status of the National Academy of Science Contract and take possible action on minor variations between the National Academy of Science Contract and the Funding and Management Agreement.

EAHCP Staff

10/11/2013

Nathan Pence reported that negotiations are nearly complete with the National Academy of Science for the Science Review Panel. Darcy Frownfelter discussed with the Committee deviations from the FMA that are present in the Contract with the National Academy of Science. Chuck Ahrens made a motion to draft an informational memorandum to FWS outlining these deviations.

Tom Taggart seconded the motion. There were no objections; thus, the motion passed.

11. Discuss and take possible action regarding the Science Committee's requests for improvements to the Science Committee meeting process to increase efficiency.

Jenna Cantwell presented the requests submitted by the Science Committee in regards to Science Committee meeting process. There were no objections from the Implementing Committee to EAHCP Staff working to their fullest ability to meet the requested procedures of the Science Committee moving forward.

12. Discuss and take possible action authorizing the Program Manager to submit an informational memorandum to FWS related to ongoing implementation activities.

Roland Ruiz moved to submit the provided informational memorandum to FWS with a modification to include language requiring FWS to provide regufia above historically funded levels. Chuck Ahrens seconded the motion. There were no objections; thus, the motion passed.

13. Presentation on the Annual Report draft timeline and draft outline.

Nathan Pence reported that EAHCP Staff had developed a draft timeline and outline for completion of the Annual Report. The EAA will be retaining a consultant to develop the Annual Report; the Parties of the EAHCP will still need to submit their respective sections to the EAA for submission to the Consultant and inclusion in the draft and final reports.

14. Public Comment.

Todd Votteler reported that Jason Kevin Patteson had been appointed the new Executive Administrator of the Texas Water Development Board.

15. Consider future meetings, dates, locations, and agendas.

- The next Implementing committee is scheduled for October 17, 2013, at the New Braunfels Civic Center

Meeting Adjourned at 11:37 a.m.



Steven Ramsey
Secretary of the Implementing Committee



MEMORANDUM
October 20, 2014

Tanya Sommer
United States Fish and Wildlife Service
Austin Ecological Services Field Office
10711 Burnet Road, Suite 200
Austin, Texas 78758

RE: Informational Memo related to the Edwards Aquifer Habitat Conservation Plan (EAHCP) for Incidental Take Permit #TE-63663A-0 (ITP)

Ms. Sommer,

This memorandum, submitted on behalf of the Edwards Aquifer Authority (EAA), the City of New Braunfels (CoNB), the City of San Marcos (CoSM), the San Antonio Water System (SAWS), and Texas State University (TXState) (collectively the Permittees),¹ is being provided for informational purposes regarding a minor methodology modification to sediment removal that differs from what is described in the EAHCP.

In Section 5.3.6 (*Sediment Removal below Sewell Park*) and 5.4.4 (*Sediment Removal in Spring Lake and from Spring Lake dam to City Park*), the EAHCP identifies that silt will be vacuumed using a hose that has a screen to prevent suctioning biota greater than 0.25 inch in diameter. Initial efforts in 2013 and 2014, during suction dredging with a .25 inch mesh screen, utilized numerous techniques to minimize Take of Fountain Darters and other biota, including:

1. Personnel first fanned the small area to be treated, then removed a small area of non-native aquatic vegetation in preparation for suctioning. This action minimized large open areas where Fountain Darters might be more susceptible to predation;
2. Personnel then removed all vegetation in the area to be treated (as per Section 5.3.8 of the EAHCP, *Control of Non-Native Plant Species*) and then scanned the area to ensure darters and other biota were not present. When removing any vegetation, all Fountain Darters observed were collected and immediately returned to the river upstream;
3. Divers were trained to successfully identify the life stages of listed species and to stop suctioning if their presence in the immediate area was detected;
4. Personnel strategically held the nozzle in the soil without free movement in the water to prevent incidental suction of species; and
5. Personnel were present along the bank to monitor the effluent for presence of listed species and other biota.

¹ The Implementing Committee (representing the five Permittees and the Guadalupe-Blanco River Authority as a non-voting member) unanimously approved the original version of this memorandum at their meeting on September 19, 2013 and reviewed an updated version at their October 16, 2014 meeting.

During initial efforts in 2013 and 2014, this protocol resulted in the Take (detection and relocation) of only 10 individual Fountain Darters. No Fountain Darters were detected in the effluent or in the immediate area during suctioning.

As these initial measures to minimize Take have been so successful, the Permittees determined that the .25" screen on the end of the suction dredge was not preventing any additional Take beyond the initial measures. However, the .25" screen did impede progress and resulted in frequent clogging and equipment malfunctions. Therefore, future suction dredging in the San Marcos River will be conducted without a screen on the end of the suction dredge.

This topic was discussed by the Implementing Committee at three different meetings², which allowed for three opportunities for public comment.

Since we have determined the .25" mesh screen is not critical in minimizing Take of Fountain Darters, nor will it cause any additional Take of Fountain Darters if removed, we would appreciate your consideration and response on this issue.

Thank you.



Nathan Pence
Program Manager
Edwards Aquifer Habitat Conservation Plan
npence@edwardsaquifer.org
210-477-8527

² August 15, 2013; September 19, 2013; October 16, 2014

Nathan Pence

From: Sommer, Tanya <tanya_sommer@fws.gov>
Sent: Tuesday, October 21, 2014 11:43 AM
To: Nathan Pence; Alicia Reinmund-Martinez
Cc: Adam Zerrenner
Subject: Re: EAHCP Informational Memo ITP#-63663A-0

Dear Nathan,

I have received your letter. Thank you for informing us of the changes. Since operating the suction dredge without screening the intake is not expected to increase take, we have no comments on the change. If results in the field indicate otherwise, the screen should be reinstalled or other protective measures should be considered for use.

Sincerely,
Tanya

On Mon, Oct 20, 2014 at 5:04 PM, Nathan Pence <npence@edwardsaquifer.org> wrote:

Ms. Sommer,

Please find attached an informational memo from the Permittees of the Edwards Aquifer Habitat Conservation Plan related to methodologies for the removal of sediment from the San Marcos River. Should you have any questions, please do not hesitate to call me.

The original is to follow via snail mail.

Nathan Pence

Executive Director - Habitat Conservation Program

(210) 477-8527, ext. 157

npence@edwardsaquifer.org



900 E. Quincy
San Antonio, TX 78215
www.edwardsaquifer.org





NOTICE OF OPEN MEETING

Available at eahcp.org

NOVEMBER 10 2015 MEETING MINUTES

1. Call to order.

9:02 a.m.

2. Public comment.

Herman Harris addressed the Committee. Mr. Harris stated he is seeking assistance with removing a diesel storage tank from the Guadalupe River which runs through his property. Alicia Reinmund-Martinez offered to send him the contact information for TCEQ Austin and/or San Antonio offices who may be able to assist him with the matter. No other public comments.

3. Approval of September 9, 2015 Science Committee meeting minutes.

Tom Arsuffi requested that the phrase, "Dr. Arsuffi asks about volume of water relative to aerator production and efficacy" be reworded to state "water volume efficiency" instead of "efficacy." No other comments. Jacquelyn Duke motioned to approve the minutes with Arsuffi's requested edit, Arsuffi seconded, no opposition.

4. Receive report from the Program Manager.

- **Springflow and index well update**

- *Daniel Large provided the update.*

- **Update on 2016 CSRB Applied Research projects**

- *Reinmund-Martinez presented on the 2016 Comal Springs Riffle Beetle (CSRB) Applied Research projects, announcing the contractors whom were selected to conduct each of the three projects, and provided an overview of the recommendations of the Science Committee concerning their scientific review of the proposals received. The Science Committee was thanked for their contribution to the selection process.*

- **National Academy of Sciences October 2015 meeting summary**

- *Nathan Pence provided a summary of National Academy of Sciences October 2015 meetings, along with the current status of the National Academy of Sciences Report 2 review process.*

5. Presentation and possible recommendation on delaying implementation of the flow manipulation in the Old Channel of the Comal River per EAHCP Table 5-3.

Mark Enders and Edmund Oborny gave a presentation titled, "Flow Split Management Comal River" presenting background information on the need to delay implementation of

Table 5-3 flow prescriptions to avoid scouring vegetation in the Old Channel. The adaptive function of pulse events in stream systems as well as the lack of data on which to base this decision were raised as concerns by Science Committee members. Reinmund-Martinez clarifies that the request before the Committee asks for their recommendation to delay the implementation of this table until such an evaluation, which would take the role of pulses and be based on data, can be conducted. Arsuffi motioned that the Committee recommend delaying the implementation of Table 5-3 until the analysis could be conducted; Glenn Longley seconded the motion, no opposition.

6. Presentation and discussion on the concept for a proposed SOW to evaluate methodologies and timelines for native vegetation restoration in the San Marcos and Comal ecosystems.

Pence gave a presentation titled, “Adaptive Management – Veg Restoration Information Gathering/Analysis” providing information concerning the proposed evaluation of EAHCP native vegetation restoration efforts. Committee input included the following points:

- Arsuffi recommended the literature on community assembly rules for aquatic vegetation to possibly inform this effort.*
- Janis Bush suggested that including a literature review as a contract task could help direct the evaluation; the literature on disturbance ecology in particular could be informative.*
- Arsuffi suggested that it might be worthwhile as part of this exercise to list possible interacting or compounding factors to take under consideration (e.g. removing trees may hurt riffle beetles).*
- Conrad Lamon suggested that trend analysis would be important to take under consideration to provide a basis for management recommendations.*
- Arsuffi recommended taking ecosystem succession into account. It is not productive to get hung up on specific states when realistically, the system is in flux; suggested it may be helpful to incorporate ranges (+/-) to manage for, to better accommodate this reality.*

7. Presentation and possible endorsement of the 2015 Applied Research Work Group Report.

Arsuffi provided a presentation on the 2015 Applied Research Work Group Report. Chad Norris suggests combining the CSRB, Comal Springs Dryopid Beetle, and Peck’s Cave Amphipod projects, listed separately on the schedule, into one project. Doyle Mosier motioned that the Committee endorse the report as presented; Duke seconded the motion, no opposition.

8. Presentation on a proposed Scope of Work (SOW) for a 2016 Applied Research project on the CSRB quantitative sampling methods.

Reinmund-Martinez gave a presentation on the proposed SOW for a 2016 Applied Research project on the CSRB quantitative sampling methods. Ultimately, it was decided that Arsuffi will work with Bob Hall to identify three methodologies to be included as part of the SOW for this project. Committee input included the following points:

- *Arsuffi recommends that the term “standardizing” should be reflected in the title, since establishing standardized methods is necessary to enable the evaluation of trends over time, and ultimately, for sampling to be biologically meaningful.*
- *Lamon makes the point that quantifying uncertainty inherent in the sampling method is an important component of this monitoring activity; Mosier states that this can help inform selecting a method that is actually meaningful—i.e. which method emerges as best relative to variability and or uncertainty*
- *Lamon recommends that a count model be used, and that existing CSRB data should be analyzed.*
- *Norris suggests sampling should be system-based, not just in representative reaches, to evaluate tool in multiple environments.*
- *Arsuffi recommends for the contractor to justify proposed procedures based on the literature.*

9. Presentation and discussion on the concept for a proposed SOW for the creation of an integrated database for the EAHCP.

Reinmund-Martinez gave a presentation on the proposed SOW for the creation of an integrated database for the EAHCP. Lamon emphasizes the importance of including metadata as part of the database to provide necessary context to data users. Robert Mace suggests final reports be included as a metadata component.

10. Presentation on the Research Plan for the Salvage Refugia Program.

Chris Collins provided a presentation on the Research Plan for the Salvage Refugia Program on behalf of the project team, discussing collection methods study for the CSDB, including cloth lures, Hester-Dendy, and novel air bubble trap methods. Arsuffi asked how reintroduction (as part of the refugia program) can be accomplished for the primary aquifer species.

11. Presentation on an update of the Ecological Model.

Oborny provided a presentation updating the Committee on the latest progress in the development of the Ecological Model.

12. Presentation and approval of the proposed 2016 Science Committee meeting schedule.

Duke stated certain dates may pose a schedule conflict for her; it was decided to send a revised schedule to the Committee.

13. Meetings:

- Joint Meeting, December 17, 2015 at the Edwards Aquifer Authority.
- Science Committee Meeting, January 13, 2016, location to be determined.

14. Questions and comments from the public.

None.

15. Adjourn.

12:25 p.m.



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: Amendment to Table 5-3 of the Edwards Aquifer Habitat Conservation Plan (EAHCP) Flow-Split Management for the Old and New Channel of the Comal River for the Incidental Take Permit (#TE-63663A-1).

On behalf of the City of New Braunfels, the City of San Marcos, Edwards Aquifer Authority, the San Antonio Water System, and Texas State University (collectively the Permittees of the Incidental Take Permit (#TE-63663A-1), I am providing an amendment to the Edwards Aquifer Habitat Conservation Plan (EAHCP) Flow-Split Management for the Comal River's Old and New Channel (Table 5-3). This letter is submitted pursuant to Section 9.2.1 of the EAHCP.

The Old Channel has been a particularly important, and successful, area for aquatic vegetation restoration. However, when the HCP requires flows measuring from 70 to 80 cubic feet per second (cfs) be diverted into the Old Channel, scour of previously restored areas has been observed. Additionally, during 2014, when total system flows dropped to as low as 60cfs and the HCP required 40cfs be diverted to the Old Channel, Comal Springs riffle beetle habitat around Spring Island became exposed and compromised. Therefore, based on observations, lessons learned from restoration conducted in the Old Channel of the Comal River, coupled with regular biological monitoring data, we request an amendment be considered to Table 5-3 of the EAHCP Flow-Split Management for the Old and New Channel of the Comal River (Exhibit 1).

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 ecosystems. 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 Management Process outlined

in the Funding and Management Agreement (FMA) and results in this request to amend 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 Committees provided the public the opportunity to comment on the Adaptive Management Proposal and this amendment during its September 9th and 15th, 2016 meetings. Agendas and minutes have been provided in Exhibit 4.

The Permittees seek your formal acceptance of this amendment to Table 5-3 of the EAHCP. The Permittees look forward to your formal acceptance of this amendment and appreciate your consideration and response on this issue.

Respectfully,

A handwritten signature in black ink, appearing to read "Nathan Pence", with a stylized flourish at the end.

Nathan Pence
Program Manager
Edwards Aquifer Habitat Conservation Plan

cc: EAHCP Implementing Committee

**TABLE 5-3
FLOW-SPIT MANAGEMENT FOR OLD AND NEW CHANNELS**

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		60 45		30 35
70		60 40		20 30
60		40 35-40		10 25
50		40 35-40		10 15
40		30		10
30		20		10



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, HCP Program Manager
Date: March 6, 2017
**Re: Proposed Advantageous Substitution of Sedimentation Ponds Prescribed for
“Minimizing Impacts of Contaminated Runoff” Recovery Measure (HCP §5.7.4)**

PREAMBLE

The Edwards Aquifer Habitat Conservation Plan (EAHCP) calls for the City of San Marcos to “construct two sedimentation ponds along the [San Marcos] river to help reduce the amount of contaminated materials that enters the river as a result of rain events” as a commitment under the “Minimizing Impacts of Contaminated Runoff” (HCP §5.7.4) Recovery Measure. The EAHCP prescribes two site-specific sedimentation ponds to be constructed under this measure; (1) one sedimentation pond to be located in Veramendi Park, beside Hopkins Street bridge (“Veramendi Pond”); and (2) a second sedimentation pond to be located alongside Hopkins St. to consist of widened extant drainage ditches running parallel to either side of Hopkins (“Hopkins Pond”).

This document presents a formal proposal for a Nonroutine Adaptive Management action (“Nonroutine AMP;” Funding & Management Agreement, “FMA” §7.6.2) involving the substitution of the Veramendi and Hopkins sedimentation ponds prescribed by the EAHCP for “Minimizing Impacts of Contaminated Runoff” (HCP §5.7.4). This proposal is submitted by the HCP Program Manager on behalf of the City of San Marcos (COSM); the development of this proposal was a collaborative effort by both parties. Below, a brief background is provided describing the process leading to this proposal, followed by the proposed Nonroutine AMP action, accompanied by a detailed description and justifications for the proposed Nonroutine AMP. Additional technical specifications and other supporting documentation associated with the proposal is included here as an appendix.

BACKGROUND

As with all Measures in the EAHCP, best available information was used to inform the selection of sedimentation ponds for construction under the EAHCP’s “Minimizing Impacts of Contaminated Runoff” (HCP §5.7.4) Recovery Measure. For this Measure, the best available contemporaneous information derived from an HCP planning process undertaken by the COSM in 2004 (COSM, 2004). Although this initiative was ultimately not implemented, the resulting draft HCP document identified both Veramendi Pond and the Hopkins Pond for water quality protection along the San Marcos River. Subsequently,



Edwards Aquifer Habitat Conservation Plan Nonroutine Adaptive Management Proposal

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

the Edwards Aquifer Recovery Implementation Program (EARIP) referred to this same information to determine COSM's commitment under "Minimizing Impacts of Contaminated Runoff" (HCP §5.7.4), hence the current EAHCP prescription also identifying the Veramendi and Hopkins ponds for implementation.

That said, since implementation of the EAHCP began in 2013, the COSM has carried out a research and development (R&D) process related to water quality protection. This R&D process supported the production of a water quality protection planning document to be used as the basis of COSM's implementation of a separate but related Recovery Measure calling for for the establishment of a comprehensive program "to protect water quality and reduce the impacts of impervious cover."¹ In the culmination of this effort, the final *Water Quality Protection Plan for the City of San Marcos and Texas State University* (WQPP) was published in 2015. A revision was published in 2017, and serves as the document of record for this proposal (John Gleason LLC, 2017).

Considerable research and technical analysis concerning the Spring Lake and Upper San Marcos River watershed, and how to best protect water quality in this watershed, went into the WQPP. Through this R&D exercise, the WQPP identifies and recommends an array of structural elements, design features, and planning mechanisms to provide a comprehensive water quality protection program that will contribute to the likelihood of the survival and recovery of the Covered Species (see "Measures that Specifically Contribute to Recovery," EAHCP §5.7).

Among the various water quality protection projects contemplated in the WQPP, both the Veramendi Pond and the Hopkins Pond² were evaluated and included, along with other sedimentation ponds that would provide benefit to water quality protection in the upper San Marcos River. The information featured in the WQPP concerning the sedimentation ponds represents an advancement over the information available at the time of the writing of the HCP, and thus this information serves as the basis for this Nonroutine AMP proposal.

¹ This program is carried out pursuant to COSM's commitment under the "Impervious Cover/Water Quality Protection" (HCP §5.7.6) Recovery Measure.

² Through the WQPP process it was determined that the only feasible site to construct the prescribed Hopkins Pond would be at the western side of the E. Hopkins St. bridge at river left (see Figure 1). Henceforth all metrics and discussion associated with the Hopkins Pond refer to this site.



Edwards Aquifer Habitat Conservation Plan Nonroutine Adaptive Management Proposal

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

PROPOSED NONROUTINE ADAPTIVE MANAGEMENT ACTION

Overview

In the course of reviewing the WQPP to inform the implementation of COSM/TXST's water quality protection commitments, COSM identified two potential advantageous alternatives to the Veramendi and Hopkins sedimentation ponds prescribed in the EAHCP for the "Minimizing Impacts of Contaminated Runoff" (HCP §5.7.4) Recovery Measure. These advantageous alternatives are:

- (1) A preexisting sedimentation pond ("Downtown Pond") drainage system upgrade, located on COSM property at the corner of N. C.M. Allen Parkway and E. Hutchison St. (202 N. C.M. Allen Pkwy); and
- (2) An unfinished sedimentation pond ("City Park Pond") located on COSM property in City Park, adjacent to the San Marcos Recreation Hall parking lot (also the Lions Club Tube Rental location; 170 Charles Austin Dr.).

Figure 1



Figure 1 displays the approximate locations of each of the four sedimentation ponds in relation to one another in the COSM.

The COSM, in coordination with the HCP Program Manager, took into account several metrics in evaluating the Downtown and City Park sedimentation ponds as potential substitutions for the Veramendi and Hopkins sedimentation ponds, respectively. The following subsections ("Performance Comparison," "Return on Investment Comparison," and "Fiscal Impact") detail the analyses conducted in support of this proposal.



Edwards Aquifer Habitat Conservation Plan Nonroutine Adaptive Management Proposal

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

Performance Comparison

Aspects of the estimated performance of the different sedimentation ponds were compared as part of the analysis conducted in support of this proposal. Specific performance metrics calculated and evaluated included drainage area (i.e., the extent of area from which runoff drains into the pond), percent impervious cover in drainage area, and total suspended solids (TSS) removed per year. TSS is understood to be a contributing factor to water quality impairment, with deleterious effects for aquatic ecosystems. Below, *Tables 1* and *2* illustrate the results of this comparative performance analysis in terms of drainage area, percent impervious cover in drainage area, and TSS between the original ponds prescribed in the EAHCP (Veramendi and Hopkins Proxy) and the Nonroutine AMP proposed replacement ponds (Downtown and City Park), respectively.

Table 1

PERFORMANCE METRIC	VERAMENDI POND	DOWNTOWN POND
<i>Drainage Area</i>	15 acres	30.24 acres
<i>% Impervious Cover in Drainage Area</i>	66.0%	81.3%
<i>TSS Removed/Year</i>	5,035 lbs.	6,910 lbs.

Table 2

PERFORMANCE METRIC	HOPKINS POND	CITY PARK POND
<i>Drainage Area</i>	9.67 acres	20.86 acres
<i>% Impervious Cover in Drainage Area</i>	72.4%	59.4%
<i>TSS Removed/Year</i>	3,679 lbs.	8,197 lbs.

Return on Investment Comparison

Relative to Veramendi and Hopkins sedimentation ponds, the Downtown and City Park sedimentation ponds presented opportunities to increase efficiency of EAHCP return on investment (ROI). Generally speaking, here, COSM defined ROI as function of EAHCP dollars spent relative water quality protection benefits obtained by the sedimentation ponds. Below, *Tables 3* and *4* illustrate the results of this comparative ROI analysis in terms of total capital cost estimate, cost per pound of TSS removed, EAHCP cost, and EAHCP cost per pound of TSS removed.



Edwards Aquifer Habitat Conservation Plan Nonroutine Adaptive Management Proposal

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

Table 3

ROI METRIC	VERAMENDI POND	DOWNTOWN POND
<i>Total Capital Cost Estimate</i>	\$192,360	\$93,000
<i>Cost Per Pound of TSS Removed</i>	\$3.13	\$1.22
<i>EAHCP Cost</i>	\$192,360	\$8,000
<i>EAHCP Cost Per Pound of TSS Removed</i>	\$3.13	\$0.07

Table 4

ROI METRIC	HOPKINS POND	CITY PARK POND
<i>Total Capital Cost Estimate</i>	\$111,504	\$324,245
<i>Cost Per Pound of TSS Removed</i>	\$2.99	\$2.68
<i>EAHCP Cost</i>	\$111,504	\$142,000
<i>EAHCP Cost Per Pound of TSS Removed</i>	\$2.99	\$1.20

Fiscal Impact

From the beginning of this evaluation, this exercise was designed to take into account the funding limitations for EAHCP program activities established by the FMA and Table 7.1 of the EAHCP. Adoption of this proposal will not result in any deviations from the funding allowances prescribed in Table 7.1 of the EAHCP. Furthermore, as a collaborative effort between and among the EAHCP, the COSM, and TXST, the proposed Nonroutine AMP action represents considerable cost efficiencies and savings in the service of stewarding EAHCP public funding compared to what would otherwise be possible implementing ponds currently contemplated by the EAHCP. The proposed Nonroutine AMP action achieves said efficiencies and savings by:

- (1) Leveraging the existing investment made by the COSM, through the Engineering & Capital Improvements Department, in funding the original design and construction of the Downtown Pond;
- (2) Incorporating TXST's pledge, through the Meadows Center for Water and the Environment 319 grant, to fund the design and construction of a repaired drainage system for the Downtown Pond (\$85,000); and



Edwards Aquifer Habitat Conservation Plan Nonroutine Adaptive Management Proposal

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

- (3) Incorporating the COSM's pledge, through the Engineering & Capital Improvements Department, to partially fund the construction of the City Park Pond (\$178,000).

NONROUTINE AMP PROPOSAL

With the foregoing justifications stated, the HCP Program Manager, on behalf of the COSM, proposes the Downtown and City Park sedimentation ponds be substituted via the Nonroutine AMP (FMA §7.6.2) to stand in place of the Veramendi and Hopkins sedimentation ponds, respectively, in fulfillment of COSM's commitment under the "Minimizing Impacts of Contaminated Runoff" (HCP §5.7.4) Recovery Measure.

REFERENCES

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

- City of San Marcos. 2004. *Environmental Assessment/Habitat Conservation Plan for Issuance of an Endangered Species Act Section 10(a)(1)(B) Permit for the Incidental Take of the Fountain Darter (*Etheostoma fonticola*), San Marcos salamander (*Eurycea nana*), and the Comal Springs riffle beetle (*Heterelmis comalensis*) During the Implementation of Projects in the Upper San Marcos River, San Marcos, Hays County, Texas.*
- Edwards Aquifer Authority, City of New Braunfels, City of San Marcos, City of San Antonio, acting by and through its San Antonio Water System Board of Trustees, and Texas State University – San Marcos. 2012. *Funding and Management Agreement...to Fund and Manage the Habitat Conservation Plan for the Edwards Aquifer Recovery Implementation Program.* [http://www.eahcp.org/files/uploads/Funding_and_Management_Agreement_\(Appendix_R\).pdf](http://www.eahcp.org/files/uploads/Funding_and_Management_Agreement_(Appendix_R).pdf)



**Edwards Aquifer Habitat Conservation Plan
Nonroutine Adaptive Management Proposal**

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

- Edwards Aquifer Recovery Implementation Program (EARIP). 2012. *Edwards Aquifer Recovery Implementation Program Habitat Conservation Plan*. [http://www.eahcp.org/files/uploads/Final%20HCP %20November%202012.pdf](http://www.eahcp.org/files/uploads/Final%20HCP%20November%202012.pdf)
- John Gleason LLC. 2017. *Water Quality Protection Plan for the City of San Marcos and Texas State University*. Prepared for the City of San Marcos.



MARCH 8, 2017 MEETING MINUTES

1. Call to order.

Dr. Arsuffi called the meeting to order at 9:05 a.m. Members present included Tom Arsuffi, Jacquelyn Duke, Charlie Kreidler, Conrad Lamon, Glenn Longley, Doyle Mosier, Chad Norris, and Jackie Poole. Janis Bush, Robert Mace, and Floyd Weckerly advised prior to the meeting that they would be unable to attend.

2. Public comment.

None.

3. Approval of November 10, 2017 Science Committee meeting minutes.

Mr. Mosier motioned to approve the minutes as written; Dr. Kreidler seconded. No opposition.

Dr. Arsuffi inquired the process followed by staff for attending to action items identified in the minutes. Nathan Pence (Program Manager) replied that action items are followed up by staff internally. Dr. Arsuffi asked specifically about action items corresponding to Dr. Thom Hardy's presentation from the previous meeting. Dr. Chad Furl (Chief Science Officer) replied that staff addressed these action items with Dr. Hardy, and that Dr. Hardy's report was revised to incorporate input received at the last Committee meeting. Dr. Furl stated he would get back to the Committee to apprise them of said revisions.

4. Receive report from the Program Manager.

▪ Spring Systems Hydrologic Update

Dr. Furl provided a presentation to the Committee on recent hydrology associated with the spring systems.

Dr. Lamon asked Dr. Furl's thoughts with respect to the 90-day rolling average, commenting that it might be appropriate for the window widths used to be reexamined. Dr. Furl stated he would consider Dr. Lamon's suggestion.

▪ Update on EAA-USFWS Refugia

Dr. Furl provided a presentation to the Committee updating the status of the EAA-USFWS Refugia Measure.

Dr. Arsuffi asked what measures are in place to ensure collection rates do not have an adverse effect on in-situ populations of the Covered Species given the lack of understanding of several species' population abundance. Dr. Furl replied that one of the strategies used to avoid overcollection is to collect from multiple sites to avoid

overcollection. Dr. Arsuffi asked whether there was any contingency built-in to the collection program—for example, whether sites are systematically analyzed to assess whether collection counts are diminishing over time. Dr. Furl replied that efforts are made to ensure the proper documentation of which springs sites are being collected from, and that staff work closely with Mr. Randy Gibson (USFWS) to identify and to ration springs collected. Mr. Pence added that as part of the cotton-lure SOP, GPS coordinates and locations for collections are being recorded in the database, enabling the visualization of collection sites on a map. Mr. Norris recommended documenting landmarks to supplement GPS coordinates; Mr. Bob Hall (EAA) replied that landmark information is being collected as part of the cotton-lure SOP.

Dr. Kreidler asked whether the theft of species created a problem related to collection, and more specifically, whether this event created a difficult position for the species. Mr. Pence explained that because the event occurred prior to executing the contract, it technically it had no effect; however, given the fact that once the contract began, existing stock rolled over into contract stock numbers, the theft event nevertheless did impact the baseline stock for the EAA-USFWS Refugia program. Mr. Pence went on to update the group that USFWS and FBI are still involved in an active investigation. The SMARC facility has undergone a security evaluation; now using key cards for access. Old keys no longer work. Cameras are being installed. Different buildings have different locks. Digitalized now. Upgrade was needed. With regards to the welfare of the species, Mr. Pence stated that if we were in a drought period, we would be very concerned; however, given current springflow rates, we have at least a couple of years to build up stock in anticipation of a possible future trigger.

▪ **2016 EAHCP Disturbance/Take, Salvage Refugia, Applied Research, & Monitoring Reports**

Mr. Hall provided an update concerning the 2016 net disturbance/incidental take assessment results; Dr. Furl provided the update concerning the remaining reports.

Following Mr. Hall's presentation on take, Dr. Longley stated it does not make sense not to retain any salamander that comes out of the spring openings or from a well for collection; given that those salamanders are for all intents and purposes lost to the surface anyway; they are going to be eaten. Dr. Longley recommended that this issue be discussed with USFWS to bring about a more reasonable policy concerning this issue.

Dr. Lamon asked about how the method of calculating take is determined, and whether it can be changed. Mr. Pence replied that it's set in an approved protocol with USFWS and that changes can potentially be made. For example, in the second year of the EAHCP, changes were made to some methods that proved problematic. Dr. Lamon asked whether there is a plan to use statistical analysis of data to inform the take assessment methodology. Dr. Furl replied it's a good point and something for staff to take under consideration. Dr. Lamon stated that using habitat as a proxy for counts may prove to be a weak link in the current calculation methodology. Mr. Pence offered to provide a presentation at the next Committee meeting on how calculations are made,

and to revisit this conversation again then with a view to making possible improvements. Mr. Mosier emphasized that making changes to this methodology is not a dynamic thing that can be changed overnight; Dr. Lamon replied that in the event some change turns out to be needed, having a peer-reviewed article in our hand would put us in a strong position to approach such a hypothetical conversation with USFWS.

With regards to the 2016 Salvage Refugia and Monitoring reports, Mr. Norris asked whether full presentations would be given. Dr. Furl replied that there will not be; however, the three 2016 Applied Research projects on the Comal Springs riffle beetle would be presented at the next meeting of the Committee. Mr. Norris asked whether there wasn't also a report that looked at the Comal Springs dryopid beetle; Dr. Furl replied that the dryopid beetle was examined in the Salvage Refugia report. Mr. Norris asked whether any follow up on reports is being undertaken, or whether the reports are simply being filed away. Dr. Furl replied that for all the reports a process is followed whereby the raw data collected in support of a given project is added to the database and the results of the report are reviewed internally.

▪ **Demo of EAHCP AQUARIUS Samples Database**

This presentation on this item was skipped in the interest of time.

Separately, Mr. Pence and Dr. Furl provided a brief update concerning the status of the hydrologic and ecological models. Mr. Pence stated the hydrologic model is done being built; it is now in-house at EAA and under a process of validation and calibration for use. Mr. Pence acknowledged that the National Academies of Sciences (NAS) had specific recommendations for a validation data set to be used for this process and this is now part of the validation exercise being conducted. Additionally, over the next 6 months, the hydrologic model will go through a 2-step peer review process. A group of groundwater modeling experts will be convened to produce a report covering the science of the hydrologic model. Mr. Pence identified a few of the anticipated Work Group members to impress to the group the caliber of the experts to be involved. The second part of the hydrologic model peer review will consist of a group of stakeholders (some Science Committee members included) to go through the expert technical document produced by the Work Group and produce recommendations for how the EAHCP program should be able to begin using the model to inform Phase 2 and answering ASR questions. Dr. Kreitler asked how this process would interface with the NAS review. Mr. Pence replied that the NAS recommendations will be discussed; some of NAS' validation recommendations are already being implemented, so there is some overlap there—but noted that many of NAS' recommendations also concern issues of how to build the model—and EAA is effectively done building the model at this point, and now it's time to use the model. Suggestions for continued development of the model are valuable and will be kept on hand to be considered in later phases. Dr. Kreitler asked whether EAA would not officially be reviewing the NAS recommendations. Nathan replied that this would be covered in an upcoming presentation at this meeting.

Regarding the ecological model, Dr. Furl updated the Committee that the expected ETA for final eco model report would be around mid-March and staff training will be

taking place sometime in April. The Committee will receive a full presentation on the outcome of this either in May or August, depending on these pending deliverables.

5. Presentation of Summary of the National Academy of Science's Report 2 Review of the EAHCP.

Mr. Pence provided this presentation to the Committee summarizing the National Academy of Science's Report 2 Review of the EAHCP. Mr. Pence explained that both a presentation by NAS Chair Dr. Danny Reible is upcoming, and a Report 2 public workshop, and encouraged the Committee to attend both for additional information and engagement with the Report 2 evaluation.

Dr. Kreidler asked if any NAS had any comments on the FEFLOW hydrologic model; Mr. Pence replied that NAS appreciates EAA going to one model under MODFLOW, and that lessons learned from FEFLOW should be incorporated into MODFLOW. Dr. Lamon cautioned that before we talk about using the model, there are still some significant hurdles before us (uncertainty analysis, validation, etc.); Dr. Lamon is sensitive to language suggesting that this is said and done, when it isn't.

Mr. Norris asked whether there were not also some recommendations by NAS concerning monitoring. Mr. Pence replied that there were recommendations made concerning population size but that this is another instance of something that isn't required for compliance with the HCP. Mr. Norris replied that issues of Covered Species distribution, abundance and population size represent basic information, and that he would just leave it at that.

Dr. Arsuffi asked about the meaning of forbearance. Given that this term is not in common parlance, Dr. Longley advised that this term should be defined whenever it is used.

6. Presentation and discussion of the proposed methodology for the 2017 Applied Research study: Statistical analysis of the San Marcos & Comal Springs aquatic ecosystems biomonitoring dataset (BIO-WEST).

Dr. Furl provided a brief overview of the strategy being followed in 2017 for this Applied Research project, namely retaining three separate contractors to study different aspects of the biomonitoring dataset. Dr. Furl welcomed Dr. Josh Perkin presenting on behalf of the BIO-WEST team. Dr. Perkin presented BIO-WEST's statistical analysis project.

Dr. Arsuffi encouraged all teams to take care to be clear about the ecological theory bases for their analyses, noting that, at least in Dr. Perkin's presentation for BIO-WEST, there was no mention of "disturbance ecology, the thermal equilibrium hypothesis, etc. and that an effort should be made to bridge the basic and theoretical with applied, e.g., comparing results with what would be expected from theory. Dr. Perkins replied that the dataset reflects dynamism, and looking more closely at the expansion and contraction of the habitat template will provide a rich area to apply ecological theory while also producing findings that are relevant to management.

Dr. Arsuffi also suggests the teams take care to mine the long-term ecological research (LTER) literature for lessons and techniques associated long term dataset management, statistical analysis, and trend analysis that would apply in this situation.

Dr. Lamon asked Dr. Perkins a series of question concerning choices of method, technical parameters, assumptions, and the interpretability of results. Dr. Arsuffi intervened, suggesting that in the interest of time, the conversation be deferred to after the meeting, possibly involving writing up Dr. Lamon's suggestions so that the BIO-WEST team can take them under consideration with ample time. Dr. Perkins volunteered to stick around to facilitate this follow-up conversation.

7. Presentation and discussion of the proposed methodology for the 2017 Applied Research study: Statistical analysis of the San Marcos & Comal Springs aquatic ecosystems biomonitoring dataset (Beaver Creek).

Dr. Furl welcomed Mr. Tony Miller presenting on behalf of the Beaver Creek team. Mr. Miller presented Beaver Creek's statistical analysis project. Mr. Miller emphasized that the choice of statistical techniques focused on by his firm are proven, exploratory methods that lend themselves to addressing applied problems. Beaver Creek specializes in applications related to aquatic restoration projects.

Dr. Kreitler commented that Mr. Miller demonstrates a poor understanding of how the system works, and that there needs to be greater integration in all the statistical analysis project teams of individuals knowledgeable in this area.

8. Presentation and discussion of the proposed methodology for the 2017 Applied Research study: Statistical analysis of the San Marcos & Comal Springs aquatic ecosystems biomonitoring dataset (UTSA).

Dr. Furl welcomed Dr. Jeffrey Hutchinson and Dr. Julie Foote presenting for the UTSA team. Dr. Hutchinson and Dr. Foote took turns presenting the UTSA statistical analysis project. The theoretical basis for their analysis would rely on the intermediate disturbance hypothesis; Dr. Arsuffi commended the team for this theory choice, saying that he has been saying for years that this should be looked at in conjunction with the systems.

Dr. Kreitler commented that the three separate projects need to be carefully coordinated both to ensure that there is not too much overlap and to ensure that each team properly understands the systems under investigation. Dr. Furl replied that he has been steadily working with all three teams since the contracts were awarded to address questions as they arise and to steer each of the teams to ensure the most productive possible management strategy for the three concurrent investigations.

9. Presentation and discussion on the possible creation and charge of a Science Committee Work Group ("Research Work Group") to review Refugia research projects and 2018/2019 Applied Research projects.

Dr. Furl presented on the possible creation and charge of a Science Committee Work Group ("Research Work Group"). Dr. Longley motioned to endorse the creation and charge of this Science Committee Work Group; Dr. Duke seconded the motion. There was no opposition. Dr.

Kreitler asked if there is a need to have EAA representatives on the Work Group; Mr. Pence replied that the Work Group can invite experts if they so choose.

10. Presentation and discussion regarding the first of two possible Adaptive Management Processes for 2017 associated with the City of San Marcos and Texas State University Water Quality Measures.

Mr. Pence provided an overview on the first possible 2017 AMP action involving the substitution of sedimentation ponds prescribed in the EAHCP for two advantageous alternative ponds. Mr. John Gleason (John Gleason LLC) provided an overview of the Water Quality Protection Plan (WQPP) that served as the basis for the proposed Nonroutine AMP.

- *Mr. Mosier asked whether the Downtown and Hopkins ponds shared the same drainage; Mr. Gleason replied that they do not.*
- *Ms. Jackie Poole asked about the rationale for moving the Hopkins comparison across the river. Mr. Gleason explained that of the original Hopkins measures in the HCP, one is entirely replaced by the City Park Pond (the northern “Hopkins ditch”) and the other is unfeasible (the southern “Hopkins ditch”).*
- *Dr. Lamon asked the runoff capture efficiencies for each of the various ponds. Mr. Lee Sherman (a subcontractor to John Gleason LLC in the project) replied that City Park (99%), Hopkins 1 (81%), Veramendi (87%), and Downtown (36%).*
- *Dr. Longley expressed concerns about maintenance of the ponds, noting upkeep with maintenance has been a major problem in Austin. Mr. Pence replied that in developing this proposal, staff worked with the City of San Marcos Engineering and Capital Improvements Department, which will take on maintenance responsibility for the features.*
- *Dr. Duke asked if the proposed replacement would be built anyway with or without the infusion of EAHCP funding and management. Mr. Pence replied in the negative; for example, none of this would have been built under the regular MS4 program in the City of San Marcos. Dr. Duke replied that this fact means it’s a win-win.*
- *Ms. Poole expressed concern about scouring flows from runoff associated with the BMPs; Mr. Gleason replied that the ponds would require 24-48 hours to drain, and that in each case, dissipaters are included to lessen the energy of water leaving the system precisely to avoid erosive flows.*

11. Presentation, discussion, and possible recommendation of the Nonroutine Adaptive Management proposal related to the “Minimizing Impacts of Contaminated Runoff” Recovery Measure for the City of San Marcos.

Mr. Pence presented the Nonroutine Adaptive Management proposal related to the “Minimizing Impacts of Contaminated Runoff” Recovery Measure to the Committee. Dr. Arsuffi asked the Committee if more discussion is needed before acting on the proposal.

- *Mr. Mosier expressed concern that the two ponds to be replaced be kept as future options. Mr. Pence replied that the ponds would not remain should this proposal be approved; however, the ponds would remain in the WQPP process.*
- *Dr. Arsuffi requested to add the full array of metrics taken under consideration in the evaluation of the various ponds (e.g., TSS removed) to the record as part of the supporting documentation in the proposal; Mr. Pence assured him that this would be no problem.*

Mr. Mosier motioned to recommend the Nonroutine Adaptive Management proposal to the Stakeholder Committee; Dr. Kreidler seconded this motion. There was no opposition.

12. Presentation and discussion on any ecological considerations, relevant to the Covered Species, associated with the proposed designs for the sedimentation ponds proposed in fulfillment of the “Minimizing Impacts of Contaminated Runoff” Recovery Measure for the City of San Marcos.

Mr. Gleason presented the proposed designs for the sedimentation ponds proposed in fulfillment of the “Minimizing Impacts of Contaminated Runoff” to the Committee.

- *Jackie expressed concern about the possibility for Bermuda becoming invasive in the river; Mr. Pence assured her that EAHCP staff and the City of San Marcos will consider this issue.*
- *Dr. Longley expressed concern about drainage, noting that mosquitoes may become a problem if the ponds do not drain in a timely fashion. Mr. Gleason replied that the ponds would drain in 24-48 hours, and because mosquitoes generally need 3-5 days to emerge, they should not be a problem.*
- *Dr. Kreidler reiterated concern that 64% of runoff is not being captured by the Downtown Pond. Ms. Melani Howard (City of San Marcos) replied that the site highly constrained and thus the pond itself cannot be modified to accommodate greater runoff; however, there are many other tools in the WQPP can be used to mitigate downtown stormwater runoff, including on CM Allen. Ms. Howard stated that after the City of San Marcos has done what it can on the river, they are going to do more downtown.*

13. Presentation and possible endorsement of an expedited process to prepare and to submit the Scientific Evaluation Report on the proposed Nonroutine Adaptive Management action, with Science Committee Chair and Vice-Chair approval, to the Stakeholder Committee.

Mr. Pence provided a presentation on the expedited process for the Science Committee to prepare and to submit the Scientific Evaluation Report. Dr. Duke motioned to endorse the expedited process for preparing the Scientific Evaluation Report; Dr. Kreidler seconded this motion. There was no opposition.

14. Presentation and discussion regarding the second of two possible Adaptive Management Processes for 2017 associated with the City of San Marcos and Texas State University Water Quality Measures.

Mr. Pence provided an overview on the second possible 2017 AMP action involving subsuming the City of San Marcos and Texas State University's sediment removal measures into the Impervious Cover/Water Quality Protection Measure, and targeting the middle Sessom Creek watershed for said water quality protection measure. Mr. John Gleason (John Gleason LLC) provided an overview of the aspects of this proposed action related to the Water Quality Protection Plan (WQPP), which served as the basis for the proposed Nonroutine AMP.

15. Presentation and discussion on the possible creation and charge of a Science Committee Work Group ("San Marcos Water Quality Protection Work Group") to review the City of San Marcos/Texas State University proposed water quality protection projects.

Mr. Pence presented the possible creation and charge of a Science Committee Work Group ("San Marcos Water Quality Protection Work Group"). Dr. Kreitler motioned to endorse the creation and charge of this Science Committee Work Group; Mr. Mosier seconded this motion. There was no opposition.

16. Consider future meetings, dates, locations, and agendas.

- **Science Committee Meeting, May 10, 2017, San Marcos Activity Center (Multipurpose Room).**

No comments.

17. Questions and comments from the public.

Mrs. Dianne Wassenich commented that "Sessom Creek is a disaster...storm drains have blown out mountains of dirt...taken the streambed down to bedrock...sewer line is a major disaster, ready to happen...in a big flood, the sewer line could just go;" Mrs. Wassenich stated she is encouraged by the proposed action by the EAHCP to look at getting Sessom Creek watershed more under control.

18. Adjourn.

Dr. Arsuffi motioned to adjourn the meeting at 2:45 p.m.; [REDACTED] seconded the motion. No opposition.

**Adaptive Management Science Committee of the
Edwards Aquifer Habitat Conservation Plan***Scientific Evaluation Report:**Nonroutine Adaptive Management Proposal to**Substitute the Sedimentation Ponds Prescribed in the EAHCP for the
Minimizing Impacts of Contaminated Runoff Recovery Measure*

March 8, 2017

OVERVIEW

This Scientific Evaluation Report¹ is issued in response to the Nonroutine Adaptive Management (AMP) proposal submitted by the HCP Program Manager dated March 6, 2017. The proposal calls for the substitution of the sedimentation ponds called for under the “Minimizing Impacts of Contaminated Runoff” (HCP §5.7.4) Recovery Measure in the EARIP HCP (“EAHCP;” EARIP, 2012) with two replacement ponds considered “advantageous alternatives” (p. 2). The following sections in this report summarize the Adaptive Management Science Committee’s (“Science Committee”) evaluation of this Nonroutine AMP proposal.

Once approved by the Chair and Vice-Chair or other designee of the Science Committee following the March 8, 2017 Science Committee meeting, this Scientific Evaluation Report will be presented for consideration by the Stakeholder Committee at its meeting on March 16, 2017.

SCIENTIFIC EVALUATION

The evaluation of this Nonroutine AMP proposal is based on the Science Committee’s analysis of (1) whether enough information, of sufficient quality, exists to properly ascertain that the proposed modifications meet the basic EAHCP objective for this Measure (“to help reduce the amount of contaminated materials that enters the river as a result of rain events”); and (2) whether, also based on the review of the information provided, the modifications reasonably represent an improvement over the current provisions for the “Minimizing Impacts of Contaminated Runoff” (HCP §5.7.4) Measure in the EAHCP. Here, “improvement” refers to both a relative increase in reducing contamination associated with stormwater runoff (the basic HCP objective), as well as a relative increase to the ecological benefit to the upper San Marcos River aquatic ecosystem.

Proposal

- *Current provision*

¹ According to the Funding and Management Agreement (2012), the Adaptive Management Science Committee is tasked with evaluating all Nonroutine Adaptive Management 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.

Scientific Evaluation Report: Nonroutine AMP Proposal - Sedimentation Ponds

The current provision for the “Minimizing Impacts of Contaminated Runoff” Measure in the EAHCP prescribes the following locations for the construction of two sedimentation ponds to help reduce the amount of contaminated stormwater runoff into the San Marcos River:

- (1) One sedimentation pond to be located in Veramendi Park, beside Hopkins Street bridge (“Veramendi Pond”); and
- (2) A second sedimentation pond to be located alongside Hopkins St. to consist of widened extant drainage ditches running parallel to either side of Hopkins (“Hopkins Pond”).

▪ ***Proposed replacement***

The Nonroutine AMP proposal calls for the Veramendi Pond and the Hopkins Pond to be replaced, in respective order, by the following two pond projects:

- (1) A drainage system upgrade to a preexisting sedimentation pond (“Downtown Pond”), located at the corner of N. C.M. Allen Parkway and E. Hutchison St. (202 N. C.M. Allen Pkwy); and
- (2) An unfinished sedimentation pond (“City Park Pond”) located in City Park, adjacent to the San Marcos Recreation Hall parking lot (also the Lions Club Tube Rental location; 170 Charles Austin Dr.).

Evaluation of Information Provided

Below, *Table 1* displays the performance metrics and accompanying data furnished in the proposal in support of the proposed replacement.

PERFORMANCE METRIC	Table 1			
	SWAP 1		SWAP 2	
	VERAMENDI POND	DOWNTOWN POND	HOPKINS POND	CITY PARK POND
<i>Drainage Area</i>	15 acres	30.24 acres	9.67 acres	20.86 acres
<i>% Impervious Cover in Drainage Area</i>	66.0%	81.3%	72.4%	59.4%
<i>TSS Removed/Year</i>	5,035 lbs.	6,910 lbs.	3,679 lbs.	8,197 lbs.

In terms of the performance of the replacement ponds (Downtown and City Park) versus the current ponds in the EAHCP (Veramendi and Hopkins), the data indicate that the proposed replacements will in both “swaps” (1) drain more than double the area than their intended predecessors, as well as (2) remove more than double the quantity of total suspended solids (TSS) per year than their intended predecessor sedimentation ponds.

Scientific Evaluation Report: Nonroutine AMP Proposal - Sedimentation Ponds

CONCLUSION

By these measures, relying on the recommendations of the design and engineering professionals who estimated these figures, as well as on the comprehensive analysis undertaken through the water quality protection planning exercise from which this proposed adaptive management originated (John Gleason LLC, 2017), the Science Committee finds that the proposed modifications meet the basic EAHCP objective for this Measure (“to help reduce the amount of contaminated materials that enters the river as a result of rain events”). Additionally, the Science Committee finds that the modifications represent an improvement over the current provisions for the “Minimizing Impacts of Contaminated Runoff” (HCP §5.7.4) Measure in the EAHCP, at least in terms of the basic performance of the sedimentation ponds.

Final recommendations

That said, the Science Committee also recommends the following additional considerations be taken under account, should the proposed adaptive management action be implemented. These additional recommendations should be viewed as protective, or precautionary measures intended to ensure that the replacement sedimentation ponds not only meet the basic stated objective in the EAHCP, but also take advantage of reasonable opportunities to increase wider ecological benefit for the upper San Marcos River aquatic ecosystem associated with the construction of these ponds:

- ***Future options***

The Committee expressed concern that the Hopkins and Veramendi ponds not be abandoned altogether despite being replaced under the proposed Nonroutine AMP action; the Committee is reassured that the Hopkins and Veramendi ponds (as well as other possible additional future BMPs) will continue to be considered and potentially pursued through the WQPP process outside the EAHCP.

- ***Site constraints***

The Committee expressed concern that the runoff capture efficiency for the Downtown Pond relative to the downtown catchment area is low, but understands that for this particular BMP, the site is highly constrained and thus is limited in attaining a higher capture efficiency on its own; for this reason, the Committee is highly supportive of future initiatives to be undertaken by the City of San Marcos to increase additional BMP actions within this downtown catchment area in order to mitigate the impacts of contaminated stormwater runoff from downtown.

- ***More metrics***

Noting that there was some information lacking from the Nonroutine AMP proposal itself, the Committee felt that it was important for the full array of performance and cost efficiency metrics included in the evaluation of all

Scientific Evaluation Report: Nonroutine AMP Proposal - Sedimentation Ponds

sedimentation ponds be included in the supporting documentation provided as part of this Nonroutine AMP process. For this reason, additional metric tables displaying this information are appended to this report.

- ***Native species encouraged***

The Committee is supportive of the use of native plants whenever possible for the landscaping needs associated with the sedimentation ponds to be built under the proposed Nonroutine AMP action. Particular care needs to be taken that any non-native plants species selected for landscaping purposes will not have harmful ecological impacts on the San Marcos ecosystem, especially the potential for invasion within the aquatic ecosystem.

REFERENCES

- Edwards Aquifer Authority, City of New Braunfels, City of San Marcos, City of San Antonio, acting by and through its San Antonio Water System Board of Trustees, and Texas State University – San Marcos. 2012. *Funding and Management Agreement...to Fund and Manage the Habitat Conservation Plan for the Edwards Aquifer Recovery Implementation Program*. [http://www.eahcp.org/files/uploads/Funding_and_Management_Agreement_\(Appendix_R\).pdf](http://www.eahcp.org/files/uploads/Funding_and_Management_Agreement_(Appendix_R).pdf)
- Edwards Aquifer Recovery Implementation Program (EARIP). 2012. *Edwards Aquifer Recovery Implementation Program Habitat Conservation Plan*. [http://www.eahcp.org/files/uploads/Final%20HCP %20November%202012.pdf](http://www.eahcp.org/files/uploads/Final%20HCP%20November%202012.pdf)
- John Gleason LLC. 2017. *Water Quality Protection Plan for the City of San Marcos and Texas State University*. Prepared for the City of San Marcos.

ATTACHMENTS

- Attachment 1: Nonroutine Adaptive Management proposal dated March 6, 2017
- Attachment 2: Draft minutes from the March 8, 2017 Science Committee Meeting
- Attachment 3: Table 2 – Full Array of Performance and ROI Metrics Taken Under Consideration in Evaluating the Proposed Nonroutine AMP Action (John Gleason LLC, 2017)

*Scientific Evaluation Report: Nonroutine AMP Proposal - Sedimentation Ponds***ATTACHMENT 1: NONROUTINE ADAPTIVE MANAGEMENT PROPOSAL DATED MARCH 6, 2017**

EAHCP Staff

Attachment 14

March 6, 2017

**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, HCP Program Manager
Date: March 6, 2017
Re: Proposed Advantageous Substitution of Sedimentation Ponds Prescribed for "Minimizing Impacts of Contaminated Runoff" Recovery Measure (HCP §5.7.4)

PREAMBLE

The Edwards Aquifer Habitat Conservation Plan (EAHCP) calls for the City of San Marcos to "construct two sedimentation ponds along the [San Marcos] river to help reduce the amount of contaminated materials that enters the river as a result of rain events" as a commitment under the "Minimizing Impacts of Contaminated Runoff" (HCP §5.7.4) Recovery Measure. The EAHCP prescribes two site-specific sedimentation ponds to be constructed under this measure; (1) one sedimentation pond to be located in Veramendi Park, beside Hopkins Street bridge ("Veramendi Pond"); and (2) a second sedimentation pond to be located alongside Hopkins St. to consist of widened extant drainage ditches running parallel to either side of Hopkins ("Hopkins Pond").

This document presents a formal proposal for a Nonroutine Adaptive Management action ("Nonroutine AMP;" Funding & Management Agreement, "FMA" §7.6.2) involving the substitution of the Veramendi and Hopkins sedimentation ponds prescribed by the EAHCP for "Minimizing Impacts of Contaminated Runoff" (HCP §5.7.4). This proposal is submitted by the HCP Program Manager on behalf of the City of San Marcos (COSM); the development of this proposal was a collaborative effort by both parties. Below, a brief background is provided describing the process leading to this proposal, followed by the proposed Nonroutine AMP action, accompanied by a detailed description and justifications for the proposed Nonroutine AMP. Additional technical specifications and other supporting documentation associated with the proposal is included here as an appendix.

BACKGROUND

As with all Measures in the EAHCP, best available information was used to inform the selection of sedimentation ponds for construction under the EAHCP's "Minimizing Impacts of Contaminated Runoff" (HCP §5.7.4) Recovery Measure. For this Measure, the best available contemporaneous information derived from an HCP planning process undertaken by the COSM in 2004 (COSM, 2004). Although this initiative was ultimately not implemented, the resulting draft HCP document identified both Veramendi Pond and the Hopkins Pond for water quality protection along the San Marcos River. Subsequently,

Page 1 of 7

Scientific Evaluation Report: Nonroutine AMP Proposal - Sedimentation Ponds

EAHCP Staff

Attachment 14

March 6, 2017



**Edwards Aquifer Habitat Conservation Plan
Nonroutine Adaptive Management Proposal**

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

the Edwards Aquifer Recovery Implementation Program (EARIP) referred to this same information to determine COSM's commitment under "Minimizing Impacts of Contaminated Runoff" (HCP §5.7.4), hence the current EAHCP prescription also identifying the Veramendi and Hopkins ponds for implementation.

That said, since implementation of the EAHCP began in 2013, the COSM has carried out a research and development (R&D) process related to water quality protection. This R&D process supported the production of a water quality protection planning document to be used as the basis of COSM's implementation of a separate but related Recovery Measure calling for for the establishment of a comprehensive program "to protect water quality and reduce the impacts of impervious cover."¹ In the culmination of this effort, the final *Water Quality Protection Plan for the City of San Marcos and Texas State University* (WQPP) was published in 2015. A revision was published in 2017, and serves as the document of record for this proposal (John Gleason LLC, 2017).

Considerable research and technical analysis concerning the Spring Lake and Upper San Marcos River watershed, and how to best protect water quality in this watershed, went into the WQPP. Through this R&D exercise, the WQPP identifies and recommends an array of structural elements, design features, and planning mechanisms to provide a comprehensive water quality protection program that will contribute to the likelihood of the survival and recovery of the Covered Species (see "Measures that Specifically Contribute to Recovery," EAHCP §5.7).

Among the various water quality protection projects contemplated in the WQPP, both the Veramendi Pond and the Hopkins Pond² were evaluated and included, along with other sedimentation ponds that would provide benefit to water quality protection in the upper San Marcos River. The information featured in the WQPP concerning the sedimentation ponds represents an advancement over the information available at the time of the writing of the HCP, and thus this information serves as the basis for this Nonroutine AMP proposal.

¹ This program is carried out pursuant to COSM's commitment under the "Impervious Cover/Water Quality Protection" (HCP §5.7.6) Recovery Measure.

² Through the WQPP process it was determined that the only feasible site to construct the prescribed Hopkins Pond would be at the western side of the E. Hopkins St. bridge at river left (see Figure 1). Henceforth all metrics and discussion associated with the Hopkins Pond refer to this site.

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**Edwards Aquifer Habitat Conservation Plan
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PROPOSED NONROUTINE ADAPTIVE MANAGEMENT ACTION

Overview

In the course of reviewing the WQPP to inform the implementation of COSM/TXST's water quality protection commitments, COSM identified two potential advantageous alternatives to the Veramendi and Hopkins sedimentation ponds prescribed in the EAHCP for the "Minimizing Impacts of Contaminated Runoff" (HCP §5.7.4) Recovery Measure. These advantageous alternatives are:

- (1) A preexisting sedimentation pond ("Downtown Pond") drainage system upgrade, located on COSM property at the corner of N. C.M. Allen Parkway and E. Hutchison St. (202 N. C.M. Allen Pkwy); and
- (2) An unfinished sedimentation pond ("City Park Pond") located on COSM property in City Park, adjacent to the San Marcos Recreation Hall parking lot (also the Lions Club Tube Rental location; 170 Charles Austin Dr.).

Figure 1



Figure 1 displays the approximate locations of each of the four sedimentation ponds in relation to one another in the COSM.

The COSM, in coordination with the HCP Program Manager, took into account several metrics in evaluating the Downtown and City Park sedimentation ponds as potential substitutions for the Veramendi and Hopkins sedimentation ponds, respectively. The following subsections ("Performance Comparison," "Return on Investment Comparison," and "Fiscal Impact") detail the analyses conducted in support of this proposal.

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Performance Comparison

Aspects of the estimated performance of the different sedimentation ponds were compared as part of the analysis conducted in support of this proposal. Specific performance metrics calculated and evaluated included drainage area (i.e., the extent of area from which runoff drains into the pond), percent impervious cover in drainage area, and total suspended solids (TSS) removed per year. TSS is understood to be a contributing factor to water quality impairment, with deleterious effects for aquatic ecosystems. Below, *Tables 1 and 2* illustrate the results of this comparative performance analysis in terms of drainage area, percent impervious cover in drainage area, and TSS between the original ponds prescribed in the EAHCP (Veramendi and Hopkins Proxy) and the Nonroutine AMP proposed replacement ponds (Downtown and City Park), respectively.

Table 1

PERFORMANCE METRIC	VERAMENDI POND	DOWNTOWN POND
<i>Drainage Area</i>	15 acres	30.24 acres
<i>% Impervious Cover in Drainage Area</i>	66.0%	81.3%
<i>TSS Removed/Year</i>	5,035 lbs.	6,910 lbs.

Table 2

PERFORMANCE METRIC	HOPKINS POND	CITY PARK POND
<i>Drainage Area</i>	9.67 acres	20.86 acres
<i>% Impervious Cover in Drainage Area</i>	72.4%	59.4%
<i>TSS Removed/Year</i>	3,679 lbs.	8,197 lbs.

Return on Investment Comparison

Relative to Veramendi and Hopkins sedimentation ponds, the Downtown and City Park sedimentation ponds presented opportunities to increase efficiency of EAHCP return on investment (ROI). Generally speaking, here, COSM defined ROI as function of EAHCP dollars spent relative water quality protection benefits obtained by the sedimentation ponds. Below, *Tables 3 and 4* illustrate the results of this comparative ROI analysis in terms of total capital cost estimate, cost per pound of TSS removed, EAHCP cost, and EAHCP cost per pound of TSS removed.

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Table 3

ROI METRIC	VERAMENDI POND	DOWNTOWN POND
<i>Total Capital Cost Estimate</i>	\$192,360	\$93,000
<i>Cost Per Pound of TSS Removed</i>	\$3.13	\$1.22
<i>EAHCP Cost</i>	\$192,360	\$8,000
<i>EAHCP Cost Per Pound of TSS Removed</i>	\$3.13	\$0.07

Table 4

ROI METRIC	HOPKINS POND	CITY PARK POND
<i>Total Capital Cost Estimate</i>	\$111,504	\$324,245
<i>Cost Per Pound of TSS Removed</i>	\$2.99	\$2.68
<i>EAHCP Cost</i>	\$111,504	\$142,000
<i>EAHCP Cost Per Pound of TSS Removed</i>	\$2.99	\$1.20

Fiscal Impact

From the beginning of this evaluation, this exercise was designed to take into account the funding limitations for EAHCP program activities established by the FMA and Table 7.1 of the EAHCP. Adoption of this proposal will not result in any deviations from the funding allowances prescribed in Table 7.1 of the EAHCP. Furthermore, as a collaborative effort between and among the EAHCP, the COSM, and TXST, the proposed Nonroutine AMP action represents considerable cost efficiencies and savings in the service of stewarding EAHCP public funding compared to what would otherwise be possible implementing ponds currently contemplated by the EAHCP. The proposed Nonroutine AMP action achieves said efficiencies and savings by:

- (1) Leveraging the existing investment made by the COSM, through the Engineering & Capital Improvements Department, in funding the original design and construction of the Downtown Pond;
- (2) Incorporating TXST's pledge, through the Meadows Center for Water and the Environment 319 grant, to fund the design and construction of a repaired drainage system for the Downtown Pond (\$85,000); and

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- (3) Incorporating the COSM's pledge, through the Engineering & Capital Improvements Department, to partially fund the construction of the City Park Pond (\$178,000).

NONROUTINE AMP PROPOSAL

With the foregoing justifications stated, the HCP Program Manager, on behalf of the COSM, proposes the Downtown and City Park sedimentation ponds be substituted via the Nonroutine AMP (FMA §7.6.2) to stand in place of the Veramendi and Hopkins sedimentation ponds, respectively, in fulfillment of COSM's commitment under the "Minimizing Impacts of Contaminated Runoff" (HCP §5.7.4) Recovery Measure.

REFERENCES

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

- City of San Marcos. 2004. *Environmental Assessment/Habitat Conservation Plan for Issuance of an Endangered Species Act Section 10(a)(1)(B) Permit for the Incidental Take of the Fountain Darter (*Etheostoma fonticola*), San Marcos salamander (*Eurycea nana*), and the Comal Springs riffle beetle (*Heterelmis comalensis*) During the Implementation of Projects in the Upper San Marcos River, San Marcos, Hays County, Texas.*
- Edwards Aquifer Authority, City of New Braunfels, City of San Marcos, City of San Antonio, acting by and through its San Antonio Water System Board of Trustees, and Texas State University – San Marcos. 2012. *Funding and Management Agreement...to Fund and Manage the Habitat Conservation Plan for the Edwards Aquifer Recovery Implementation Program.* [http://www.eahcp.org/files/uploads/Funding_and_Management_Agreement_\(Appendix_R\).pdf](http://www.eahcp.org/files/uploads/Funding_and_Management_Agreement_(Appendix_R).pdf)

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

- Edwards Aquifer Recovery Implementation Program (EARIP). 2012. *Edwards Aquifer Recovery Implementation Program Habitat Conservation Plan*. [http://www.eahcp.org/files/uploads/Final%20HCP %20November%202012.pdf](http://www.eahcp.org/files/uploads/Final%20HCP%20November%202012.pdf)
- John Gleason LLC. 2017. *Water Quality Protection Plan for the City of San Marcos and Texas State University*. Prepared for the City of San Marcos.

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ATTACHMENT 2: DRAFT MINUTES FROM THE MARCH 8, 2017 SCIENCE COMMITTEE MEETING



MARCH 8, 2017 MEETING MINUTES

1. Call to order.

Dr. Arsuffi called the meeting to order at 9:03 a.m. Members present included Tom Arsuffi, Jacquelyn Duke, Charlie Kreidler, Conrad Lamon, Glenn Longley, Doyle Mosier, Chad Norris, and Jackie Poole. Janis Bush, Robert Mace, and Floyd Weckerly advised prior to the meeting that they would be unable to attend.

2. Public comment.

None.

3. Approval of November 10, 2017 Science Committee meeting minutes.

Mr. Mosier motioned to approve the minutes as written; Dr. Kreidler seconded. No opposition.

Dr. Arsuffi inquired the process followed by staff for attending to "action items" as identified in the minutes. Nathan Pence (Program Manager) replied that action items are followed up by staff internally. Dr. Arsuffi asked specifically about action items corresponding to Dr. Thom Hardy's presentation from the previous meeting. Dr. Chad Furl (Chief Science Officer) replied that staff addressed these action items with Dr. Hardy, and that Dr. Hardy's report was revised to incorporate input received at the last Committee meeting. Dr. Furl stated he would get back to the Committee to apprise them of said revisions.

4. Receive report from the Program Manager.

▪ Spring Systems Hydrologic Update

Dr. Furl provided a presentation to the Committee on recent hydrology associated with the spring systems.

Dr. Lamon asked Dr. Furl's thoughts with respect to the 90-day rolling average, commenting that it might be appropriate for the window widths used to be reexamined. Dr. Furl stated he would consider Dr. Lamon's suggestion.

▪ Update on EAA-USFWS Refugia

Dr. Furl provided a presentation to the Committee updating the status of the EAA-USFWS Refugia Measure.

Dr. Arsuffi asked what measures are in place to ensure collection rates do not have an adverse effect on in-situ populations of the Covered Species given the lack of understanding of several species' population abundance. Dr. Furl replied that one of the strategies used to avoid overcollection is to collect from multiple sites to avoid

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overcollection. Dr. Arsuffi asked whether there was any contingency built-in to the collection program—for example, whether sites are systematically analyzed to assess whether collection counts are diminishing over time. Dr. Furl replied that efforts are made to ensure the proper documentation of which springs sites are being collected from, and that staff work closely with Mr. Randy Gibson (USFWS) to identify and to ration springs collected. Mr. Pence added that as part of the cotton-lure SOP, GPS coordinates and locations for collections are being recorded in the database, enabling the visualization of collection sites on a map. Mr. Norris recommended documenting landmarks to supplement GPS coordinates; Mr. Bob Hall (EAA) replied that landmark information is being collected as part of the cotton-lure SOP.

Dr. Kreidler asked whether the theft of species created a problem related to collection, and more specifically, whether this event created a difficult position for the species. Mr. Pence explained that because the event occurred prior to executing the contract, it technically it had no effect; however, given the fact that once the contract began, existing stock rolled over into contract stock numbers, the theft event nevertheless did impact the baseline stock for the EAA-USFWS Refugia program. Mr. Pence went on to update the group that USFWS and FBI are still involved in an active investigation. The SMARC facility has undergone a security evaluation. Old keys no longer work. Cameras are being installed. Different buildings have different locks. Upgrade was needed. With regards to the welfare of the species, Mr. Pence stated that if we were in a drought period, we would be very concerned; however, given current springflow rates, we have at least a couple of years to build up stock in anticipation of a possible future trigger.

▪ **2016 EAHCP Disturbance/Take, Salvage Refugia, Applied Research, & Monitoring Reports**

Mr. Hall provided an update concerning the 2016 net disturbance/incidental take assessment results; Dr. Furl provided the update concerning the remaining reports.

Following Mr. Hall's presentation on take, Dr. Longley stated it does not make sense not to retain any salamander that comes out of the spring openings or from a well for collection; given that those salamanders are for all intents and purposes lost to the surface anyway; they are going to be eaten. Dr. Longley recommended that this issue be discussed with USFWS to bring about a more reasonable policy concerning this issue.

Dr. Lamon asked about how the method of calculating take is determined, and whether it can be changed. Mr. Pence replied that it's set in an approved protocol with USFWS and that changes can potentially be made. For example, in the second year of the EAHCP, changes were made to some methods that proved problematic. Dr. Lamon asked whether there is a plan to use statistical analysis of data to inform the take assessment methodology. Dr. Furl replied it's a good point and something for staff to take under consideration. Dr. Lamon stated that using habitat as a proxy for counts may prove to be a weak link in the current calculation methodology. Mr. Pence offered to provide a presentation at the next Committee meeting on how calculations are made,

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and to revisit this conversation again then with a view to making possible improvements. Mr. Mosier emphasized that making changes to this methodology is not a dynamic thing that can be changed overnight; Dr. Lamon replied that in the event some change turns out to be needed, having a peer-reviewed article in our hand would put us in a strong position to approach such a hypothetical conversation with USFWS.

With regards to the 2016 Salvage Refugia and Monitoring reports, Mr. Norris asked whether full presentations would be given. Dr. Furl replied that there will not be; however, the three 2016 Applied Research projects on the Comal Springs riffle beetle would be presented at the next meeting of the Committee. Mr. Norris asked whether there wasn't also a report that looked at the Comal Springs *dryopid* beetle; Dr. Furl replied that the *dryopid* beetle was examined in the Salvage Refugia report. Mr. Norris asked whether any follow up on reports is being undertaken, or whether the reports are simply being filed away. Dr. Furl replied that for all the reports a process is followed whereby the raw data collected in support of a given project is added to the database and the results of the report are reviewed internally.

▪ **Demo of EAHCP AQUARIUS Samples Database**

This presentation on this item was skipped in the interest of time.

Separately, Mr. Pence and Dr. Furl provided a brief update concerning the status of the hydrologic and ecological models. Mr. Pence stated the hydrologic model is done being built; it is now in-house at EAA and under a process of validation and calibration for use. Mr. Pence acknowledged that the National Academies of Sciences (NAS) had specific recommendations for a validation data set to be used for this process and this is now part of the validation exercise being conducted. Additionally, over the next 6 months, the hydrologic model will go through a 2-step peer review process. A group of groundwater modeling experts will be convened to produce a report covering the science of the hydrologic model. Mr. Pence identified a few of the anticipated Work Group members to impress to the group the caliber of the experts to be involved. The second part of the hydrologic model peer review will consist of a group of stakeholders (some Science Committee members included) to go through the expert technical document produced by the Work Group and produce recommendations for how the EAHCP program should be able to begin using the model to inform Phase 2 and answering ASR questions. Dr. Kreidler asked how this process would interface with the NAS review. Mr. Pence replied that the NAS recommendations will be discussed; some of NAS' validation recommendations are already being implemented, so there is some overlap there—but noted that many of NAS' recommendations also concern issues of how to build the model—and EAA is effectively done building the model at this point, and now it's time to use the model. Suggestions for continued development of the model are valuable and will be kept on hand to be considered in later phases. Dr. Kreidler asked whether EAA would not officially be reviewing the NAS recommendations. Nathan replied that this would be covered in an upcoming presentation at this meeting.

Regarding the ecological model, Dr. Furl updated the Committee that the expected ETA for final eco model report would be around mid-March and staff training will be

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taking place sometime in April. The Committee will receive a full presentation on the outcome of this either in May or August, depending on these pending deliverables.

5. Presentation of Summary of the National Academy of Science's Report 2 Review of the EAHCP.

Mr. Pence provided this presentation to the Committee summarizing the National Academy of Science's Report 2 Review of the EAHCP. Mr. Pence explained that both a presentation by NAS Chair Dr. Danny Reible is upcoming, and a Report 2 public workshop, and encouraged the Committee to attend both for additional information and engagement with the Report 2 evaluation.

Dr. Kreidler asked if any NAS had any comments on the FEFLOW hydrologic model; Mr. Pence replied that NAS appreciates EAA going to one model under MODFLOW, and that lessons learned from FEFLOW should be incorporated into MODFLOW.

Regarding the ecological model, Dr. Lamon cautioned that before we talk about using the model, there are still some significant hurdles before us (uncertainty analysis, validation, etc.); Dr. Lamon is sensitive to language suggesting that this is said and done, when it isn't.

Mr. Norris asked whether there were not also some recommendations by NAS concerning monitoring. Mr. Pence replied that there were recommendations made concerning population size of the Comal Springs riffle beetle, but that this is another instance of something that isn't required for compliance with the HCP. Mr. Norris replied that issues of Covered Species distribution, abundance and population size represent basic information, and that he would just leave it at that.

Dr. Arsuffi asked about the meaning of forbearance. Given that this term is not in common parlance, Dr. Longley advised that this term should be defined whenever it is used.

6. Presentation and discussion of the proposed methodology for the 2017 Applied Research study: Statistical analysis of the San Marcos & Comal Springs aquatic ecosystems biomonitoring dataset (BIO-WEST).

Dr. Furl provided a brief overview of the strategy being followed in 2017 for this Applied Research project, namely retaining three separate contractors to study different aspects of the biomonitoring dataset. Dr. Furl welcomed Dr. Josh Perkin presenting on behalf of the BIO-WEST team. Dr. Perkin presented BIO-WEST's statistical analysis project.

Dr. Arsuffi encouraged all teams to take care to be clear about the ecological theory bases for their analyses, noting that, at least in Dr. Perkin's presentation for BIO-WEST, there was no mention of "disturbance ecology, the thermal equilibrium hypothesis, etc. and that an effort should be made to bridge the basic and theoretical with applied, e.g., comparing results with what would be expected from theory. Dr. Perkins replied that the dataset reflects dynamism, and looking more closely at the expansion and contraction of the habitat template will provide a rich area to apply ecological theory while also producing findings that are relevant to management.

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Dr. Arsuffi also suggests the teams take care to mine the long-term ecological research (LTER) literature for lessons and techniques associated long term dataset management, statistical analysis, and trend analysis that would apply in this situation.

Dr. Lamon asked Dr. Perkin a series of question concerning choices of method, technical parameters, assumptions, and the interpretability of results. Dr. Arsuffi intervened, suggesting that in the interest of time, the conversation be deferred to after the meeting, possibly involving writing up Dr. Lamon's suggestions so that the BIO-WEST team can take them under consideration with ample time. Dr. Perkin volunteered to stick around to facilitate this follow-up conversation.

7. Presentation and discussion of the proposed methodology for the 2017 Applied Research study: Statistical analysis of the San Marcos & Comal Springs aquatic ecosystems biomonitoring dataset (Beaver Creek).

Dr. Furl welcomed Mr. Tony Miller presenting on behalf of the Beaver Creek team. Mr. Miller presented Beaver Creek's statistical analysis project. Mr. Miller emphasized that the choice of statistical techniques focused on by his firm are proven, exploratory methods that lend themselves to addressing applied problems. Beaver Creek specializes in applications related to aquatic restoration projects.

Dr. Kreidler commented that Mr. Miller demonstrates a poor understanding of how the system works, and that there needs to be greater integration in all the statistical analysis project teams of individuals knowledgeable in this area.

8. Presentation and discussion of the proposed methodology for the 2017 Applied Research study: Statistical analysis of the San Marcos & Comal Springs aquatic ecosystems biomonitoring dataset (UTSA).

Dr. Furl welcomed Dr. Jeffrey Hutchinson and Dr. Julie Foote presenting for the UTSA team. Dr. Hutchinson and Dr. Foote took turns presenting the UTSA statistical analysis project. The theoretical basis for their analysis would rely on the intermediate disturbance hypothesis; Dr. Arsuffi commended the team for this theory choice, saying that he has been saying for years that this should be looked at in conjunction with the systems.

Dr. Kreidler commented that the three separate projects need to be carefully coordinated both to ensure that there is not too much overlap and to ensure that each team properly understands the systems under investigation. Dr. Furl replied that he has been steadily working with all three teams since the contracts were awarded to address questions as they arise and to steer each of the teams to ensure the most productive possible management strategy for the three concurrent investigations.

9. Presentation and discussion on the possible creation and charge of a Science Committee Work Group ("Research Work Group") to review Refugia research projects and 2018/2019 Applied Research projects.

Dr. Furl presented on the possible creation and charge of a Science Committee Work Group ("Research Work Group"). Dr. Longley motioned to endorse the creation and charge of this

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Science Committee Work Group; Dr. Duke seconded the motion. There was no opposition. Dr. Kreidler asked if there is a need to have EAA representatives on the Work Group; Mr. Pence replied that the Work Group can invite experts if they so choose.

10. Presentation and discussion regarding the first of two possible Adaptive Management Processes for 2017 associated with the City of San Marcos and Texas State University Water Quality Measures.

Mr. Pence provided an overview on the first possible 2017 AMP action involving the substitution of sedimentation ponds prescribed in the EAHCP for two advantageous alternative ponds. Mr. John Gleason (John Gleason LLC) provided an overview of the Water Quality Protection Plan (WQPP) that served as the basis for the proposed Nonroutine AMP.

- *Mr. Mosier asked whether the Downtown and Hopkins ponds shared the same drainage; Mr. Gleason replied that they do not.*
- *Ms. Jackie Poole asked about the rationale for moving the Hopkins comparison across the river. Mr. Gleason explained that of the original Hopkins measures in the HCP, one is entirely replaced by the City Park Pond (the northern "Hopkins ditch") and the other is unfeasible (the southern "Hopkins ditch").*
- *Dr. Lamson asked the runoff capture efficiencies for each of the various ponds. Mr. Lee Sherman (a subcontractor to John Gleason LLC in the project) replied that City Park (99%), Hopkins 1 (81%), Veramendi (87%), and Downtown (36%).*
- *Dr. Longley expressed concerns about maintenance of the ponds, noting upkeep with maintenance has been a major problem in Austin. Mr. Pence replied that in developing this proposal, staff worked with the City of San Marcos Engineering and Capital Improvements Department, which will take on maintenance responsibility for the features.*
- *Dr. Duke asked if the proposed replacement would be built anyway with or without the infusion of EAHCP funding and management. Mr. Pence replied in the negative; for example, none of this would have been built under the regular MS4 program in the City of San Marcos. Dr. Duke replied that this fact means it's a win-win.*
- *Ms. Poole expressed concern about scouring flows from runoff associated with the BMPs; Mr. Gleason replied that the ponds would require 24-48 hours to drain, and that in each case, dissipaters are included to lessen the energy of water leaving the system precisely to avoid erosive flows.*

11. Presentation, discussion, and possible recommendation of the Nonroutine Adaptive Management proposal related to the "Minimizing Impacts of Contaminated Runoff" Recovery Measure for the City of San Marcos.

Mr. Pence presented the Nonroutine Adaptive Management proposal related to the "Minimizing Impacts of Contaminated Runoff" Recovery Measure to the Committee. Dr. Arsuffi asked the Committee if more discussion is needed before acting on the proposal.

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14. Presentation and discussion regarding the second of two possible Adaptive Management Processes for 2017 associated with the City of San Marcos and Texas State University Water Quality Measures.

Mr. Pence provided an overview on the second possible 2017 AMP action involving subsuming the City of San Marcos and Texas State University's sediment removal measures into the Impervious Cover/Water Quality Protection Measure, and targeting the middle Sessom Creek watershed for said water quality protection measure. Mr. John Gleason (John Gleason LLC) provided an overview of the aspects of this proposed action related to the Water Quality Protection Plan (WQPP), which served as the basis for the proposed Nonroutine AMP.

15. Presentation and discussion on the possible creation and charge of a Science Committee Work Group ("San Marcos Water Quality Protection Work Group") to review the City of San Marcos/Texas State University proposed water quality protection projects.

Mr. Pence presented the possible creation and charge of a Science Committee Work Group ("San Marcos Water Quality Protection Work Group"). Dr. Kreidler motioned to endorse the creation and charge of this Science Committee Work Group; Mr. Mosier seconded this motion. There was no opposition.

16. Consider future meetings, dates, locations, and agendas.

- **Science Committee Meeting, May 10, 2017, San Marcos Activity Center (Multipurpose Room).**

No comments.

17. Questions and comments from the public.

Mrs. Dianne Wassenich commented that "Sessom Creek is a disaster....storm drains have blown out mountains of dirt...taken the streambed down to bedrock....sewer line is a major disaster, ready to happen...in a big flood, the sewer line could just go;" Mrs. Wassenich stated she is encouraged by the proposed action by the EAHCP to look at getting Sessom Creek watershed more under control.

18. Adjourn.

Dr. Arsuffi motioned to adjourn the meeting at 2:45 p.m. No opposition.

*Scientific Evaluation Report: Nonroutine AMP Proposal - Sedimentation Ponds***ATTACHMENT 3: FULL ARRAY OF PERFORMANCE AND ROI METRICS TAKEN UNDER CONSIDERATION IN EVALUATING THE PROPOSED NONROUTINE AMP ACTION (JOHN GLEASON LLC, 2017)****Table 2**

Comparing Hopkins Pond to City Park Pond							
Project	WQV (c.f.)	Annual TSS Removed (lbs.)	Annual TP Removed (lbs.)	Estimated Total Capital Cost	Overall Cost Eff.	HCP Funding	HCP Cost Eff.
Hopkins	18,584	3,679	5.1	\$111,504	\$2.99	\$111,504	\$2.99
City Park	83,869	8,197	18.2	\$324,245	\$2.68	\$142,000*	\$1.20

*Non-HCP funds are leveraged \$479,845

Table 3

Comparing Veramendi Pond to Downtown Pond							
Project	WQV (c.f.)	Annual TSS Removed (lbs.)	Annual TP Removed (lbs.)	Estimated Total Capital Cost	Overall Cost Eff.	HCP Funding	HCP Cost Eff.
Veramendi	32,060	5035	6.99	\$192,360	\$3.13	\$192,360	\$3.13
Downtown	15,382	6,910	15.33	\$93,000	\$1.22	\$8,000*	\$0.07

*Non-HCP funds are leveraged \$437,660

Table 4

Paired Project Analysis Comparing Hopkins/Veramendi Ponds (HCP Ponds) to City Park/Downtown Ponds (Adaptive Management)							
Project	Annual TSS Removed (lbs.)	Annual TP Removed (lbs.)	Estimated Total Capital Cost	Overall Cost Eff. \$/lb.	HCP Funding	HCP Cost Eff. \$/lb.	
Hopkins/Veramendi	8,714	12.09	\$303,864	\$3.07	\$303,864	\$3.07	
Downtown/City Park	15,107	33.53	\$417,245	\$1.98	\$150,000*	\$0.58	

*Non-HCP funds are leveraged \$917,505



MEETING MINUTES

March 16, 2017

1. **Call to order--Establish that all Committee members are present or represented- 9:00 a.m.**
Steve Raabe took role. There was a quorum of the Stakeholder Committee present.
2. **Public Comment.**
Jenna Cantwell commented that it is the 4th year of the ITP.
3. **Approval of minutes from the September 15th, 2016 Stakeholder Committee meeting** (*Minutes for December 15, 2016 Joint Meeting were adopted by the Implementing Committee and are available on the EAHCP website*).
No objection to approve the minutes, thus the minutes were approved.
4. **Receive report from the Program Manager on general updates about the Habitat Conservation Plan.**
 - Springflow and Index Well levels
Dr. Chad Furl, EAHCP Chief Science Officer, provided a brief hydrologic update on springflows and index well levels.
 - RWCP Finalization Memo
Nathan Pence, Program Manager, described the content found in the finalization memo and that the RWCP has reached the goals established in the EAHCP.
 - 2016 Take & Net Disturbance Memo
Bob Hall, EAHCP Staff, provided a presentation regarding the 2016 Take and Net Disturbance estimate.
5. **Receive presentation from Dr. Danny Reible, Chairman of the National Academy of Science (NAS) review panel, as well as a report on the review process adopted by the Implementing Committee for implementation of the NAS Report 2.**
Dr. Danny Reible, NAS Review Panel Chairman, presented a brief overview of the recommendations provided in Report 2 of the National Academy of Sciences. Full presentation can be found at eahcp.org.

Dr. Reible answered several questions regarding clarification on the hydrologic model recommendations including decision management tools and specific models that may assist the process.

Following Dr. Reible's presentation Mr. Pence presented the EAHCP process in discussing and implementation of recommendations from Report 2. This includes a Workshop and a Work Group that will help design an implementation plan to present to the Implementing Committee. Full presentation can be found at eahcp.org.
6. **Receive an update regarding the EAHCP Hydrologic Modeling effort.**
Mr. Pence presented an overview of the current status in developing and validating the hydrologic model. Full presentation can be found at eahcp.org.

Todd Vottler asked about the division of VISPO enrollment originating from the western counties. Mr. Vottler elaborated regarding the specific refinement of the new hydrologic model will provide more accurate understanding of the effectiveness of our springflow protection measures at lower flows. He added that this refinement could prove that the deficit currently shown in the bottom-up package could be increased or decreased.

Tom Taggart asked about how the exempt wells have been included into the hydrologic modeling efforts. Mr. Pence committed to finding that answer out and returning to the committee with more information.

Myron Hess, Stakeholder Committee Vice Chair, mentioned that the NAS Report 3 will be providing additional information to inform the EAHCP Phase II process.

Gary Spence, asked about how the information from the modeling effort will be distributed. Mr. Pence mentioned that there has been many requests for articles and other published information. He added that there has been specific correlation from recharge to springflow. (One foot at J-17 = 33k acre-feet of annual recharge = 5cfs at Comal Springs).

Carrol Patterson asked if by improving the springs habitat through the EAHCP activities would we be able to be less concerned about a 2 cfs delta found in the bottom-up package.

Mr. Hess commented that the more uncertainty analysis we engage in will provide the planners important information based on the model results. Mr. Pence communicated that current recharge calculations is the number one source of uncertainty in our modeling effort.

7. Receive presentation on an overview of 2017 EAHCP Nonroutine Adaptive Management Processes (AMP).

Mr. Pence presented an overview of three AMP proposed for the EAHCP. Full presentation can be found at eahcp.org.

8. Presentation, discussion, and possible recommendation of the Nonroutine Adaptive Management proposal related to the “Minimizing Impact of Contaminated Runoff” Mitigation Measure for the City of San Marcos.

Mr. Pence presented an overview of the proposed Nonroutine Adaptive Management proposal for Minimizing Impacts of Contaminated Runoff. The presentation includes technical and financial details regarding the proposed change to sedimentation pond construction. Full presentation can be found at eahcp.org.

The discussion related to this item was captured in full within the Stakeholder Report found at eahcp.org.

Steve Raabe opens the floor to a motion to approve the motion to recommend this proposal to the Implementing Committee. Gary Spence motioned. Dianne Wassinech seconded. There were no objections to the recommendation.

9. Presentation and possible endorsement of an expedited process to prepare and to submit the Nonroutine AMP Stakeholder Report, with Stakeholder Committee Chair and Vice-chair approval, to the Implementing Committee.

Myron Hess communicated the rationale behind an expedited process to complete the official Stakeholder Report to represent the committee’s official recommendation in regards to the Minimizing Impacts of Contaminated Runoff Adaptive Management Process.

Mr. Hess asked to get a motion regarding the expedited process as presented. Jim Bower motioned to approve the expedited process. Patrick Shriver seconded. There were no objections.

10. **Consider future meetings, dates, locations, and agendas.**

- NAS Report 2 Stakeholder Workshop will be held on April 18th at SAWS.
- The next meeting of the Stakeholder Committee is scheduled for June 15th.
- Refugia Update
- HCP Coalition

11. **Questions from the public.**

No comments.

12. **Adjourn – 12:11 p.m.**

X *Dianne H. Wassinech*

Dianne Wassinech
Secretary

**Adaptive Management Stakeholder Committee of the
Edwards Aquifer Habitat Conservation Plan**

*Adaptive Management Stakeholder Committee Report:
Nonroutine Adaptive Management Proposal to Substitute the Sedimentation Ponds
Prescribed in the EAHCP for the Minimizing Impacts of Contaminated Runoff Measure*

March 16, 2017

PREAMBLE

This Adaptive Management Stakeholder Committee Report¹ is issued in response to the Nonroutine Adaptive Management (AMP) proposal (“Proposal”) submitted by the Program Manager of the Edwards Aquifer Recovery Implementation Program Habitat Conservation Plan (“EAHCP;” EARIP, 2012), dated March 6, 2017. Having considered the attached Scientific Evaluation Report issued by the Adaptive Management Science Committee (“Science Committee”) regarding the Proposal, this report presents the final recommendation of the Adaptive Management Stakeholder Committee (“Stakeholder Committee”) concerning the proposed Nonroutine AMP action.

SUMMARY OF THE NONROUTINE AMP PROPOSAL

On March 6, 2017, the Program Manager submitted the attached Proposal to the Science, Stakeholder, and Implementing Committees. The Proposal calls for the substitution of the sedimentation ponds prescribed under the “Minimizing Impacts of Contaminated Runoff” (HCP §5.7.4) Recovery Measure in the EAHCP (EARIP, 2012) with two replacement ponds described in the proposal as “advantageous alternatives” (p. 2).

SUMMARY OF STAKEHOLDER COMMITTEE DISCUSSION

At the March 16, 2017 Stakeholder Committee meeting, Program Manager Nathan Pence provided a comprehensive presentation, *Proposed Nonroutine Adaptive Management Action: City of San Marcos “Minimizing Impacts of Contaminated Runoff”* to the Committee. This presentation covered (1) the AMP process; (2) the *Water Quality Protection Plan for the City of San Marcos and Texas State University* (“WQPP;” John Gleason LLC, 2017) which provided the technical analysis underlying the Proposal; (3) the Proposal itself; and (4) the Scientific Evaluation Report issued by the Science Committee in response to the Proposal. Following this presentation, the Stakeholder Committee discussed the merits of the proposal.

This section provides a lightly edited summary of the Stakeholder Committee’s discussion of the proposed Nonroutine AMP action, organized by themes that emerged over the course of the Stakeholders’ discussion. It also includes the final motions taken by the Committee.

¹ Per the Funding & Management Agreement (2012), the Adaptive Management Stakeholder Committee is responsible for the reviewing of, and making recommendations to the Implementing Committee concerning, proposals submitted through the Nonroutine Adaptive Management Process (AMP).

Stakeholder Report: Nonroutine AMP Proposal - Sedimentation Ponds

Responsibility for maintenance

Mr. Patrick Shriver asked if projects are all on City of San Marcos ("City") property, and whether the involvement of HCP would be limited to design and construction. Mr. Pence replied the City has assumed both the cost and responsibility for ongoing maintenance requirements of the proposed projects.

Reduction of contaminated runoff

Ms. Carol Patterson asked whether the proposed structures would impact the PAH levels identified through recent HCP water quality monitoring. Mr. Pence replied that the proposed ponds might indeed have a mitigating effect on future deposition of PAH following rain events; additionally, HCP is committed to continue monitoring PAH in the future. Mr. Tom Taggart added that the City policy requires only non-PAH compounds be included in materials used in roadwork and other projects.

Additionality

Mr. Myron Hess asked if these projects would happen anyway. Mr. Pence answered that the proposed work would not be required under an MS4 permit and hence there is no timeline or mandatory component to these projects. Mr. Pence informed that the City did not have the funding to complete the projects in the foreseeable future, and thus would represent the ponds as opportunities to obtain stormwater benefits in both a timely fashion and one that will provide enhanced benefit for fewer dollars than the original HCP provisions for this Measure.

Contingencies in the event the partnership is not fulfilled

Mr. Hess asked what measures are in place to ensure the partnership is fulfilled, since it requires the cooperation and coordination of multiple parties in funding, design, and construction. Mr. Pence replied that signals from the Upper San Marcos Watershed Protection Initiative (the stakeholder group for the Watershed Protection Plan responsible for the 319 grant) bode well for their continued collaboration in the proposed activities. In the event this support does not materialize, HCP would either complete the proposed projects, or amend the HCP to include different projects. Mr. Hess summarized that, even given the contingencies inherent in the arrangement, it would appear the parties are dependent on the partnership in order to see the projects to fruition. Ms. Dianne Wassenich added that as a member of the Upper San Marcos Watershed Protection Initiative stakeholder group, the body is eager to see its funds put to use and she is confident about support of the project. Mr. Taggart commented that the City was motivated to find leverage from outside sources while also pursuing its obligations under the HCP; Mr. Bower asked whether this would be considered a win-win for the City; Mr. Taggart replied in the affirmative and added that in his view it is also a win for the HCP.

Estimation of costs presented

Mr. Carl Adkins asked whether the estimated costs presented for the proposals should be considered "not to exceed amounts." Mr. Pence replied affirmatively.

Stakeholder Report: Nonroutine AMP Proposal - Sedimentation Ponds

Final motions by the Committee

- Mr. Gary Spence motioned to recommend the Nonroutine Adaptive Management proposal to the Implementing Committee; Ms. Wassenich seconded the motion. There was no opposition.
- An expedited process whereby this Nonroutine AMP Stakeholder Report, reflecting discussion of the Stakeholders concerned the proposed Nonroutine AMP action, would be approved by the Chair and Vice-Chair of the Stakeholder Committee was presented to the Committee for their consideration. Mr. Jim Bower motioned to endorse the expedited process as presented to prepare and to submit this Nonroutine AMP Stakeholder Report to the Implementing Committee; Mr. Patrick Shriver seconded the motion. There was no opposition.

NATURE OF STAKEHOLDER COMMITTEE DECISION

Twenty-three members of the Committee attended the March 16, 2017 meeting in attainment of quorum for the meeting. Votes for both Committee actions concerning the Proposal were by consensus; there were no competing positions.

STAKEHOLDER RECOMMENDATION

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

REFERENCES

- Edwards Aquifer Authority, City of New Braunfels, City of San Marcos, City of San Antonio, acting by and through its San Antonio Water System Board of Trustees, and Texas State University – San Marcos. 2012. *Funding and Management Agreement...to Fund and Manage the Habitat Conservation Plan for the Edwards Aquifer Recovery Implementation Program*. [http://www.eahcp.org/files/uploads/Funding_and_Management_Agreement_\(Appendix_R\).pdf](http://www.eahcp.org/files/uploads/Funding_and_Management_Agreement_(Appendix_R).pdf)
- Edwards Aquifer Recovery Implementation Program (EARIP). 2012. *Edwards Aquifer Recovery Implementation Program Habitat Conservation Plan*. [http://www.eahcp.org/files/uploads/Final%20HCP %20November%202012.pdf](http://www.eahcp.org/files/uploads/Final%20HCP%20November%202012.pdf)
- John Gleason LLC. 2017. *Water Quality Protection Plan for the City of San Marcos and Texas State University*. Prepared for the City of San Marcos

ATTACHMENTS

- Attachment 1: Nonroutine Adaptive Management Proposal Re: Proposed Advantageous Substitution of Sedimentation Ponds Prescribed for “Minimizing Impacts of Contaminated Runoff” Recovery Measure (HCP §5.7.4)

Stakeholder Report: Nonroutine AMP Proposal - Sedimentation Ponds

- Attachment 2: *Scientific Evaluation Report: Nonroutine Adaptive Management Proposal to Substitute the Sedimentation Ponds Prescribed in the EAHCP for the Minimizing Impacts of Contaminated Runoff Recovery Measure*
- Attachment 3: Draft minutes from the March 16, 2017 Stakeholder Committee Meeting



MEETING MINUTES
March 16, 2017

1. **Call to order--Establish that all Committee members are present or represented- 1:00 p.m.**
All members of this committee we present or represented by an alternate: Tom Taggart (San Marcos), Roland Ruiz (EAA), Greg Malatek represented by Mark Enders (New Braunfels), Darren Thompson represented by Patrick Shriver (SAWS), Andrew Sansom (Texas State University), and Todd Votteler (GBRA).
2. **Public Comment.**
No comments.
3. **Approval of minutes from the February 16th Implementing Committee meeting.**
Roland Ruiz 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.**
 - **ASR Operations by SAWS**
Patrick Shriver, SAWS, provided a brief ASR operations update.
 - **Budget Report**
5. **Discussion and possible approval of the Nonroutine Adaptive Management proposal related to the "Minimizing Impacts of Contaminated Runoff" Mitigation Measure for the City of San Marcos.**
Nathan Pence, Program manager, provided a brief summary of the discussion regarding the Nonroutine Adaptive Management Proposal discussed during the Stakeholder Committee. Many of the committee members were present during that discussion.

Roland motioned to approve the AMP proposal as presented and recommended by the Stakeholder Committee. Tom Taggart seconded. There were no objections.
6. **Discussion and 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 provided a summary of the next steps in processing the AMP proposal by submitting an official amendment letter to USFWS.

Tom Taggart motioned to authorized the Program Manager to submit the amendment letter to USFWS, Roland Ruiz seconded. There were no objections
7. **Presentation and possible action to approve the amended 2017 City of San Marcos/Texas State University Work Plans.**
Mr. Shaun Payne provided an overview of the amended Work Plans to the Committee. Mr. Sansom asked Mr. Myron Hess if he has any comments based on the Stakeholder Committee discussion in the

EAHCP STAFF

March 16, 2017

prior meeting. Mr. Hess represented that the proposal was favorably received by the Stakeholders as an improvement over the current provisions for the "Minimizing Impacts of Contaminated Runoff" Measure in the HCP. Mr. Sansom asked whether, since agenda items #7 and #8 are related, it would be appropriate to motion on them jointly. Mr. Roland Ruiz motioned to approve both the amended 2017 Work Plans and the Funding Application; Mr. Patrick Shriver seconded the motion. There was no opposition.

8. Presentation and possible action to approve the amended 2017 City of San Marcos/Texas State University Funding Application.

Mr. Payne provided an overview of the amended Funding Application to the Committee. Please refer to the prior agenda item for the motion made in relation to this item.

9. Presentation and possible action to approve the 2016 Annual Report to be submitted to USFWS.

Mr. Payne provided an overview of the 2016 Annual Report to be submitted to USFWS in relation to both the ITP requirements for compliance, and the commitment of the Partners to transparency in the EAHCP's activities. Mr. Pence informed the Committee the report work began back in September of 2016, and represents a months-long exercise for the staff of each of the Partners. As such, Mr. Pence thanked them and the staff involved for their contribution. Mr. Pence also recognized the involvement of Blanton for their contribution as the contractor for the Annual Report production. Mr. Ruiz acknowledged the HCP staff for their role in both pioneering and streamlining the production of the Annual Report. Mr. Sansom asked if an executive summary, or a PowerPoint version of the Annual Report is available; Mr. Taggart joined in commenting that a regular PowerPoint for governing councils of the various parties involved in the HCP process would prove to be a good resource to help with continuing education for new Council or Board members and to help keep partnerships fresh. Concerning an executive summary, Mr. Pence replied that staff have ensured to include this in the more recent editions of the Annual Report. Mr. Taggart moved to approve the 2016 Annual Report for submission to USFWS; Mr. Mark Enders seconded the motion. There was no opposition.

10. Consider future meetings, dates, locations, and agendas.

- NAS Report 2 Stakeholder Workshop will be held on April 18th at SAWS.
- Next Implementing Committee meeting is scheduled for April 20th.

11. Questions from the public.

No comment.

12. Adjourn - 1:34 p.m.

X

Greg Malatek
Secretary



March 17, 2017

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

RE: Amendment to Minimizing Impacts of Contaminated Runoff mitigation measure 5.7.4 of the Edwards Aquifer Habitat Conservation Plan (EAHCP) and Incidental Take Permit (#TE-63663A-1).

On behalf of the City of New Braunfels, the City of San Marcos, Edwards Aquifer Authority, the San Antonio Water System, and Texas State University (collectively the Permittees of the Incidental Take Permit (#TE-63663A-1), I am providing an amendment to the Edwards Aquifer Habitat Conservation Plan (EAHCP) Minimizing Impacts of Contaminated Runoff mitigation measure required for the City of San Marcos (COSM) in the EAHCP (Section 5.7.4). This letter is submitted pursuant to Section 9.2.1 of the EAHCP.

Minimizing impacts of contaminated runoff in San Marcos is an important aspect of maintaining water quality in the springs ecosystem. The EAHCP requires two specific sedimentation ponds to be constructed along the river to reduce contaminated runoff from being deposited into the river, and to slow the velocity of stormwater to reduce bank erosion. The first pond required by the EAHCP was to be located in Veramendi Park, beside Hopkins Street bridge ("Veramendi Pond"); and the second was to be located alongside Hopkins St. to consist of widened extant drainage ditches running parallel to either side of Hopkins ("Hopkins Pond").

During the creation and implementation of the COSM Impervious Cover/Water Quality Protection measure (5.7.6), COSM staff developed a Water Quality Protection Plan (WQPP) which evaluated and prioritized several best management practices (BMP). It was during this time that City staff determined that two alternative ponds would provide increased water quality protection benefits relative to the current provisions in the HCP.

The first of these is a pre-existing, non-functioning, sedimentation pond ("Downtown Pond") drainage system upgrade, located on COSM property at the corner of N. C.M. Allen Parkway and E. Hutchison St. The second of these involves designing and constructing a currently inoperable sedimentation pond ("City Park Pond") located on COSM property in City Park, adjacent to the San Marcos Recreation Hall parking lot.

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- FILE COPY -

Considerable research and technical analysis concerning the Spring Lake and Upper San Marcos River watershed, and how to best protect water quality in this watershed, went into the WQPP. Therefore, based on the development of the WQPP, as well as discussions with local experts, we request an amendment be considered to the City of San Marcos' Minimizing Impacts of Contaminated Runoff conservation measure 5.7.4 of the Edwards Aquifer Habitat Conservation Plan (**Exhibit 1**). Financial contributions from the COSM capital improvement department and 319 grant funds will help leverage EAHCP funds to most effectively protect the San Marcos ecosystem.

This process was in accordance with the Adaptive Management Process outlined in the Funding and Management Agreement (FMA) and results in this request to amend the EAHCP outlined in the final Non-routine Adaptive Management Proposal (**Exhibit 2**). 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 March 16th.

As part of the general operating procedure of the EAHCP, all deliberations regarding this proposed action were conducted as public meetings which provided the public the opportunity to comment on the Adaptive Management Proposal and this amendment during its March 9th and 16th, 2017 meetings. Agendas and minutes have been provided in **Exhibit 4**.

The Permittees seek your formal acceptance of this amendment to Mitigation of Contaminated Runoff mitigation measure (Section 5.7.4 of the EAHCP). The Permittees appreciate to your consideration of this amendment and response on this issue.

Respectfully,



Nathan Pence

Program Manager

Edwards Aquifer Habitat Conservation Plan

cc: EAHCP Implementing Committee

COPY

EXHIBIT 1

5.7.4 Minimizing Impacts of Contaminated Runoff

The City of San Marcos will construct two sedimentation ponds along the river to help reduce the amount of contaminated materials that enters the river as a result of rain events. The ponds will also reduce runoff velocity which will help to reduce bank erosion, and subsequently the amount of sediment that enters the river. The sedimentation ponds will be constructed by excavating and stabilizing a specified area, and building a controlled-release structure. Water source for the ponds is solely runoff from rain events. Specific details for all ponds will be submitted through the AMP as each pond is contracted for design. Each construction area will be surrounded by silt fence/rock berm to minimize runoff. Sediment controls will be monitored daily during construction and the construction area will be covered with a tarp in the event of rain.

The first pond will be located ~~in Veremendi Park beside Hopkins Street Bridge~~ adjacent to Downtown San Marcos. This area receives a large amount of street runoff from ~~three different storm drains~~ a large urbanized area with 100% impervious cover. The first pond will be designed to remove sediment and street pollutants from runoff prior to entering the river. The size, shape, and depth ~~will be~~ has been determined based on an analysis of the volume of water discharging from the ~~storm drains~~ downtown area. The City of San Marcos will detain as much as possible for treatment purposes. The City of San Marcos will undertake required maintenance of the sedimentation ponds on a regular basis. The area is easily accessible and sediment will be dredged and carried to ~~the City of San Marcos's~~ an existing composting site. ~~at the Wastewater Treatment Plant.~~

The second pond will be ~~created by widening of drainage ditches that run alongside Hopkins Street and cut directly to the San Marcos River~~ completed by restoring an unfinished sedimentation pond located at City Park adjacent to the Rec Hall parking lot. ~~Widened areas~~ The sedimentation pond will be designed to store water for a short period of time, but long enough to collect sediments and associated pollutants from roadway runoff.



United States Department of the Interior

FISH AND WILDLIFE SERVICE

10711 Burnet Road, Suite 200
Austin, Texas 78758
512 490-0057
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APR 10 2017

In Reply Refer To:
FWS/R2ES/AFO

Nathan Pence, Program Manager
Edwards Aquifer Habitat Conservation Plan
900 East Quincy
San Antonio, Texas 78215

Dear Mr. Pence:

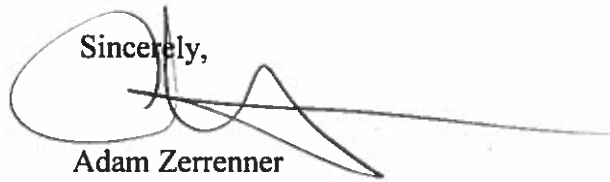
This letter is in response to your letter of March 17, 2017, requesting on behalf of the Permittees, to amend the Edwards Aquifer Recovery Implementation Plan Habitat Conservation Plan (EAHCP). The City of New Braunfels, the City of San Marcos, Texas State University, San Antonio Water System, and the Edwards Aquifer Authority (collectively the Permittees) hold an Endangered Species Act permit (TE-63663A-1) and together implement the EAHCP. We appreciate the communication and documentation that the Permittees have provided with this request. You discussed your proposals with us and at meetings of the Science Committee, Stakeholder Committee, and Implementing Committee held on March 8, 2017, and March 16, 2017. These meetings are posted and open to the public and we attended these meetings. The Permittees utilized the adaptive manage process as described in section 7.12 of the Funding and Management Agreement for nonroutine adaptive management decisions which includes an evaluation of the proposal by the Science Committee.

Your request is to make changes to the EAHCP in section 5.7.2 "Minimizing Impacts of Contaminated Runoff". As originally drafted, the Permittees committed to construct or modify two sedimentation ponds as a means to lower the amount of contamination that enters the San Marcos River as a result of rain events. Both projects, one located in Vermendi Park and the other along Hopkins Street, are in San Marcos, Texas. These projects would be replaced with two different projects, Downtown Pond and City Park Pond, which will accomplish the same goal as the original projects, but are each expected to capture a greater amount of sediment from a larger drainage area. Table 1 of Exhibit 2 compares the original projects with the proposed projects and the Science Committee's Evaluation Report (Exhibit 3 of your letter) recommends the substitution. We agree that the substitution projects will have a greater positive impact on water quality by reducing the amount sediment entering the river, and therefore lowering the total suspended solids.



This amendment to the EAHCP will not change the terms and conditions of the U.S. Fish and Wildlife Service permit (TE-63663A-1) or change any impacts previously described in the EAHCP, the EAHCP Environmental Impact Statement, or the Service's Endangered Species Act Section 7 biological opinion. Thank you for your continued commitment to conserving the native species of the Edwards Aquifer.

Sincerely,

A handwritten signature in black ink, appearing to read 'Adam Zerrenner', with a long horizontal flourish extending to the right.

Adam Zerrenner
Field Supervisor



SAN MARCOS WATER QUALITY PROTECTION WORK GROUP MEETING MINUTES – JULY 18, 2017

Available at eahcp.org

1. Call to order.

Nathan Pence called the meeting to order at 9:09. Mr. Pence provided opening comments and thanked the Work Group members for their participation and contribution to transparency and the public process.

2. Public comment.

There were no public comments.

3. Presentation of the San Marcos Water Quality Protection Work Group charge.

Alicia Reinmund-Martinez provided an overview of the Work Group charge, including an introduction to the EAHCP's adaptive management process. Dr. Chad Furl presented a review of the physical and ecological impacts associated with increased rates of sedimentation that is being experienced in the San Marcos River. Melani Howard provided a presentation of the City of San Marcos and Texas State University's performance data from EAHCP sediment removal efforts to date under measures 5.3.6 and 5.4.4. Dr. Furl and Ms. Reinmund-Martinez provided a summary stating that sediment removal efforts have proven time-intensive, costly, and problematic, and, overall, a reactive strategy to the problem of excessive sediment loading in the San Marcos. John Gleason introduced the Water Quality Protection Plan (WQPP) developed by his firm on behalf of the City of San Marcos in support of the City's EAHCP water quality protection measure. This WQPP provided the original basis for some of the ideas for retrofits that are being considered today by the Work Group, specifically, stream restoration and BMPs in the Sessom Creek watershed.

4. Presentation and possible endorsement of EAHCP staff recommendation of the Sessom Creek watershed as the priority for the City of San Marcos' "Impervious Cover/Water Quality Protection" (HCP §5.7.6) project implementation.

Dr. Furl provided an overview of the criteria used and analyses undertaken to prioritize which of the contributing watersheds to the San Marcos River (Sessom, Willow Springs, Purgatory, and Sink creek watersheds) should be targeted for EAHCP water quality protection implementation, identifying Sessom as exhibiting some of the highest problem indices (e.g., percent impervious cover, highly erodible land, average channel slope, etc.).

Dr. Ben Schwartz provided an overview of the nature of the watersheds in relation to the recharge zone as well as efforts to date to monitor sediment loading to the river. Dr. Schwartz did comment that in the lower Purgatory there is a well that gets inundated during large storm events in which endangered species have been recorded. Dr. Schwartz also commented that springs around lower Sessom discharge into a concrete channel which is not appropriate to be considered habitat; however, the springs do reflect connectivity into the aquifer (to a limited extent) suggesting this reach is not totally without habitat value.

Mr. Gleason introduced information on the existing conditions in the middle Sessom Creek watershed and presented his team members Pat Hartigan (primary white paper author and technical lead on the Sessom Creek analysis) and Lee Sherman (primary author of the retrofit section of the WQPP). Mr. Hartigan discussed exposed wastewater lines in the watershed and other geomorphological evidence observed in the watershed indicating major problems with instability and erosion.

Dr. Furl discussed the Sessom Creek confluence with the river, noting that the confluence flows into the Spring Lake dam reach which provides habitat for Texas wild-rice and is the only area of the river where the TPWD State Scientific Area stretches from bank to bank. Dr. Furl also presented the latest published bio-monitoring mapping for Texas wild-rice showing stands growing in the confluence area.

Mr. Hartigan provided an overview of the other watersheds, noting the Willow Springs, Purgatory, and Sink creek watersheds variously exhibit comparatively less instability and some retardation of flows from Soil Control Service dams.

Dr. Schwartz commented on Sink Creek, noting that the tributaries coming off Hillside Ranch Apartments (1 and 2; accessible off Ramsey Street) are like Sessom, rapidly downcutting and contributing to sediment flows to Spring Lake.

Shaun Condor commented that since the City will already be out working on the wastewater line project it would be good to get both projects (wastewater lines and water quality protection) done at the same time.

Charlie Kreidler commented that, although Sessom Creek watershed may be the priority for this exercise, the other watersheds should also be considered through the EAHCP process to head off the development of hydrologic problems in them that are like Sessom once they become more urbanized. Mr. Gleason commented that City of San Marcos land development regulations would govern this development.

Glenn Longley stated he has no problem prioritizing Sessom Creek watershed; Dr. Schwartz seconded Dr. Longley's endorsement. There was no opposition.

5. Presentation and possible endorsement of prioritizing the proposed list of water quality protection projects identified for implementation in the chosen watershed.

Ms. Reinmund-Martinez presented the proposed list of water quality protection projects identified for implementation in the chosen watershed. Dr. Furl provided an overview of the prioritization of the middle reach of the Sessom Creek watershed over either the upper or lower reaches of the watershed.

Mr. Hartigan discussed the proposed stream restoration for "Reach 2" (the middle reach), noting that the project would be based on natural design principles and that fluvial geomorphology and equilibrium theory will be applied to create stable channels.

Dr. Longley asked what specific techniques would be used to stabilize the channel. Dr. Aarin Teague asked what the Rosgen stream classification is; Mr. Sherman explained they are not proposing to use the Rosgen model, but rather a process-based methodology focused on the end goal of establishing a channel in equilibrium.

Dr. Teague asked what the proposed riparian buffer width would be; Mr. Sherman replied they do not know yet. Dr. Schwartz mentioned that there is extensive *Ligustrum* [an invasive exotic species] growth in the watershed just upstream from LBJ, would part of the plan involve removal? Ms. Howard answered that, on a volunteer basis, off the Windmill Tributary, for about 6 months they've been removing Chinese tallow, *Ligustrum*, and Chinaberry, and spreading seed, and thus far, it has been working—so she'd envision continuing these volunteer efforts.

Mr. Hartigan brought up that while stream restoration is a major focus, drainage issues and public safety will also require attention in the scope of the project. Mr. Hartigan reviewed the evaluation criteria used in the assessment of various water quality protection projects under consideration

(sediment loads and load reductions, cost, and cost effectiveness). Mr. Hartigan proceeded to present each of the individual projects under consideration and the various performance metrics calculated for them.

Dr. Teague commented that the research that went into the WERF guidelines was highly variable and based on a wide variety of case studies, meaning that following these guidelines should be understood to involve a high degree of uncertainty.

Ben Schwartz asked if there were any opportunities to install BMPs upstream of the middle reach to preemptively mitigate erosive flows hitting the middle reach. Mr. Hartigan answered that there were around a half a dozen smaller scale opportunities, including some major ones (e.g., “The Gulch” and “Sessom Creek Wet Pond”) that are under consideration through the Water Protection Plan (WPP) process. Dr. Schwartz commented that Dr. Weston Nowlin’s class studied the pond and found that there was no loss of loading in the pond and the average residence time was 12 minutes, with the caveat that this was an unpublished class project.

Open Intermission for Comments and Questions from the Public and the Work Group

Dr. Longley asked what the wastewater renovations plans are for the City. Mr. Condor answered that the City will put a stub out to the west of LBJ, bore a sewer line all the way west. Existing sewer will be cut out and filled with foam. Dr. Teague asked if the City has an MS4 permit; Ms. Howard answered that yes. Dr. Teague asked if the streets in the area affected provide the conveyance; Mr. Condor answered that there are no streets around the wastewater line work.

Ken Diehl commented that there is an MS4, 319, HCP, and funds from City for sewer relocation; there has been a significant effort to delineate those costs and activities, and this collaboration needs to be clear. Mr. Pence responded that as Program Manager it falls to him to ensure that HCP funds are being used appropriately; while the collaboration is complex and challenging, the team has been holding bimonthly planning and coordination meetings. It is on us as project managers to observe and maintain appropriate boundaries. While a challenge, Mr. Pence expressed he feels that this will pay off in the end.

Dr. Teague asked if there is a delineated floodplain associated with the project area (“AE zone” in FEMA terminology); Mr. Sherman responded that he does not believe there is, Mr. Condor and Mr. Hartigan also added that there is not. Dr. Teague asked about permitting costs and whether a Nationwide 27 permit would be required. Shaun Payne answered that the EAHCP is consulting with HDR to assess whether this will be necessary and it appears to be likely. Ms. Reinmund-Martinez added that this will become more clear over the course of the Preliminary Engineering Report exercise. Dr. Teague also asked whether any cultural resources are expected to be encountered during the work, which will also have impact on permitting. Ms. Reinmund-Martinez answered that the EAHCP is consulting with Amatererra to consider this question.

Dr. Kreitler commented that stream restoration addresses Sessom Creek, but does not address the urban runoff problem above the creek. Alicia answered that in the previous discussion the City would be considering projects in other areas upstream through 319 processes. Dr. Longley added the question of whether there have been any efforts to capture rainfall onto new development. Mr. Hartigan responded that there are some options being considered through other processes (besides EAHCP) but that overall the strategy of achieving equilibrium is itself a response to the reality of limitations on controlling existing hydrology.

Dr. Kreitler asked about the issue of flow velocity in relation to Texas wild-rice. Mr. Sherman responded it is not clear whether high or low velocity is the issue, since wild-rice may benefit from

clearing sediment. Ms. Howard commented that the primary problem at the confluence is not scouring, but rather deposition of sediment that can bury wild-rice stands.

Dr. Teague asked what a flood looks like in Sessom Creek; does the creek overbank? Dr. Schwartz responded that it goes quickly from no or base flow to inundating the road. When it overbanks, it's in the road in the lower reach. In the middle and upper reaches he has not observed how the creek behaves.

Mr. Diehl asked if there has been any consideration of land use restrictions associated with water quality protection (e.g., impervious cover limitations, conservation easements, etc.). Mr. Hartigan responded that the answer is yes in the recharge zone. The City has a 20% impervious cover limit in the recharge zone; San Marcos River Foundation (SMRF) also emphasizes land conservation. Dianne Wassenich stated the new Land Development Code which is being finalized should also include enhanced water quality protection measures, while SMRF is buying land above Spring Lake in rural areas. Mr. Hartigan commented that the City is adopting an increased focus on headwater protection which should play a role in preventing "future Sessoms."

Dr. Kreidler asked whether the group had consulted the City of Austin Department of Watershed Protection. Mr. Sherman answered that he has professional connections with the director of the department and is in correspondence with him.

Dr. Teague asked the elevation of the watershed. Mr. Sherman and Mr. Hartigan answered that they could provide this information to Dr. Teague later in the day if it would be helpful.

Dr. Schwartz asked if the City had talked to any of the apartment complexes to inquire whether they would be interested in working with the City on some of the smaller BMPs. Ms. Howard answered that there have been beginning efforts to engage the apartments with other projects (litter, etc.) but had not begun conversations about BMP work. Mr. Sherman commented that the situation is somewhat fortunate in that there is a lot of development left to go, allowing for some problems to be avoided. Once urbanization takes place, then all that is left is redevelopment regulations. Mr. Sherman added that he guessed he is hopeful for the day when we all have flying cars and streets can be taken out. Ms. Wassenich discussed redevelopment districts in the Land Development Code process and the problem with that is that even old apartment complexes are too profitable to incentivize redevelopment.

Mr. Hartigan commented that rigorous study was conducted by HDR for the City of Austin based on critical shear stress value for central Texas streams; if you capture this much volume and hold it for 48 hours, you obtain a stream protection curve factoring volume and stream protection and to control it for urbanization. A study is available, which Alicia will send to the Work Group along with the thesis referenced in the white paper.

Mr. Gleason noted that the majority proportion of sediment coming out of the watershed comes from the instream load and not upstream runoff, hence the strategic emphasis on stream restoration rather than upland sources.

Dr. Schwartz asked about the bike lane project and its relation to this work. Mr. Condor answered that the bike sidewalk will not run through the Sessom Creek watershed. Ms. Wassenich asked about whether pervious pavement was being considered; Mr. Condor answered that the City has been experiencing maintenance issues with this material, but is open to considering it. Mr. Sherman noted that current formulations are tricky to implement and he is not aware of satisfactory, cost effective substitutes. Mr. Diehl mentioned that load bearing has also cropped up as an issue with certain pervious pavement materials in relation to accessibility for large fire trucks, and that this should be considered.

Dr. Kreitler asked whether it might be an option to leave out option 3A since it seems least effective. Dr. Schwartz commented what happens if certain options are left out; would the City pick up the bill on what is left out? Ms. Howard and Ms. Reinmund-Martinez answered that the EAHCP could cover the cost of projects 2 and 3B.

Mr. Condor motioned to endorse the proposed prioritization of water quality protection projects; Jackie Poole seconded the motion. There was no opposition.

Mr. Diehl asked what the monitoring expectations are for the EAHCP; Dr. Furl answered that this is already underway through Expanded Water Quality Monitoring operations, but a specific project will also be undertaken through the Applied Research Program.

Dr. Schwartz commented that this comes down to Texas State University and the City continuing to work together and with the apartment complexes to retrofit existing sources of impervious cover. With the steep narrow stream channel, the issue of fixing the hydrology will persist.

6. Questions and comments from the public.

There were no public comments or questions.

7. Adjourn.

Ms. Reinmund-Martinez adjourned the meeting at 11:48 a.m.



Edwards Aquifer Habitat Conservation Plan Nonroutine Adaptive Management Proposal

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

To: EAHCP Implementing, Adaptive Management Stakeholder, and Adaptive Management Science Committees
From: Nathan Pence, EAHCP Program Manager
Date: August 1, 2017
Re: Proposed Strategy to Improve the City of San Marcos and Texas State University Sediment Removal Conservation Measures (EAHCP §5.3.6, §5.4.4) and Introduce Low-Impact Development through City Water Quality Protection Plans as an aspect of the Impervious Cover & Water Quality Protection Measure (EAHCP §5.7.6).

PREAMBLE

The Edwards Aquifer Habitat Conservation Plan (EAHCP; EARIP, 2012) prescribes that the City of San Marcos (COSM) and Texas State University (TXSTATE) will “remove sediment from the river bottom at various locations from City Park to IH-35” (§5.3.6), and “key areas of Texas wild-rice habitat in Spring Lake and from Spring Lake Dam to City Park” (§5.4.4).

Additionally, it was contemplated by the EAHCP (2012), that the COSM and City of New Braunfels (CONB) will mitigate impacts of nonpoint source pollution through the Impervious Cover & Water Quality Protection measure (§5.7.6). This measure requires that the COSM and CONB “will establish a program to protect water quality and reduce the impacts of impervious cover (such as through low-impact development (LID)).”

This document presents a formal proposal for a Nonroutine Adaptive Management action (“Nonroutine AMP;” Funding & Management Agreement, “FMA” §7.6.2) involving the above Sediment Removal measures (§5.3.6 and 5.4.4) and Impervious Cover & Water Quality Protection measure (§5.7.6) prescribed by the EAHCP.

This proposal is submitted by the EAHCP Program Manager (PM) on behalf of the CONB, COSM & TXSTATE. The development of this proposal was a collaborative effort by all parties. Below, a brief background is provided describing the process leading to this proposal, followed by a description of the proposed Nonroutine AMP action, accompanied



Edwards Aquifer Habitat Conservation Plan Nonroutine Adaptive Management Proposal

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by justifications for this proposal. Additional technical specifications and other supporting documentation associated with the proposal is included here as an appendix.

BACKGROUND

Sediment Removal

The EAHCP has identified increased rates of sedimentation, due in part to increased urbanization, in the San Marcos River. This is believed to threaten Texas wild-rice (*Zizania texana*), one of the EAHCP Covered Species (EARIP, 2012; see Earl & Wood, 2002). Sedimentation is thought to impact Texas wild-rice by smothering or burying stands, leading to increased mortality and reduction of suitable habitat. In response, through the EAHCP, the COSM & TXSTATE committed to implement measures to mitigate and minimize these impacts. Sediment removal (via hydrosuction) was the sole method contemplated in the EAHCP to reduce the threat sediment loading presents to Texas wild-rice survival and enhancement.

This reactive approach to sediment management has proven costly and ineffective. As experience in implementing this measure was gained since 2013, issues were identified and, in parallel, possible alternative strategies for addressing sediment loading at the source were developed. Since 2013, data has been collected through the EAHCP Annual Report that supports the need to pursue an alternative strategy. Such strategies include a proactive approach that attempts to prevent, and/or mitigate for, sediment runoff in the watershed to protect water quality and the Covered Species habitat.

While the EAHCP specified sediment removal as the recommended strategy to manage sediment in the San Marcos River, removal seems to not effectively address the sources of excess sediment which continues to be deposited through contributing creeks, specifically observed at Sessom Creek following the October 2015 flood – providing evidence that the effort, as currently contemplated, is not a sustainable use of funds. The sediment volume removed from 2013-2016, and the costs associated, can be seen in the data provided in **Table 1**.



Edwards Aquifer Habitat Conservation Plan Nonroutine Adaptive Management Proposal

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Table 1: Sediment Removal results (2013-2016)

Year	Volume Removed (m ³)	Annual Cost	Cost per m ³
2013	48	\$151,800.00	\$3,450.00
2014	20	\$180,000.00	\$9,000.00
2015	85	\$219,450.00	\$2,612.50
2016	28	\$193,042.00	\$6,894.36
Total	181	\$744,292.00	\$4,228.93
Average per year	45.25	\$186,073.00	\$4,228.93

A sediment mitigation strategy is proposed to focus on sediment removal at the source because prevention can have fewer impacts, and be more sustainable and cost effective. Sediment removal in the river does not address the actual sources of sediment, such as stream erosion, thus sedimentation impacts will likely be persistent and recurring. Sediment prevention techniques could include stream restoration using Natural Channel Design (NCD) methods, stabilization of eroding stream beds and banks, riparian enhancement, and stormwater best management practices (BMPs) that reduce erosive flows.

In identifying that a source control approach may be most effective in managing sediment loading in the San Marcos River, the EAHCP PM and the EAHCP Science Committee jointly determined to create the San Marcos Water Quality Protection Work Group. This Work Group was intended to provide scientific review and input on questions related to the COSM & TXSTATE's implementation of the EAHCP Sediment Removal measures, as well as the Impervious Cover/Water Quality Protection measure (§5.3.6, 5.4.4 & 5.7.6). This Work Group was comprised of members drawn from the Science Committee as well as external experts with experience related to water quality protection projects.

Work Group members¹ were presented with results from investigations by John Gleason LLC (JGLLC), as part of the San Marcos River Water Quality Protection Plan (WQPP), which provides strong evidence that Sessom Creek has a higher sediment loading rate

¹ Work Group members included: Glenn Longley, Charlie Kreidler, Jackie Poole, Shaun Condor, Ben Schwartz and Aarin Teague.



Edwards Aquifer Habitat Conservation Plan Nonroutine Adaptive Management Proposal

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than other watersheds that drain into the upper reaches of the San Marcos River north and just below of IH-35 (Appendix 1).

Impervious Cover/Water Quality Protection

The EAHCP contemplated mitigating for non-point source pollution through the Impervious Cover/Water Quality Protection Recovery measure (§5.7.6). According to this measure, the COSM and CONB are to implement low-impact development (LID) programs near the springs ecosystems. This effort was considered through the EARIP LID/Water Quality Work Group and recorded in their final report (Appendix Q of the EAHCP) (EAHCP Appendix Q). These programs were intended to mitigate for pollution from nonpoint sources such as parking lots and residential lawns; especially during periods of low-flow where pollutant presence could reduce the survivability of the Covered Species.

These LID programs, including an incentive program for private land owners, required in the EAHCP was suggested to not only improve the water quality protection near the springs, but also to gain public participation in the effort to protect the Covered Species. Unfortunately, in both San Marcos and New Braunfels city employees found little private interest in the program. Staff spent time developing criteria yet, due to the limited private residents along the San Marcos and Comal rivers, the incentive program was quickly replaced with a concentration on the implementation of strategic stormwater control measures that could maximize the effort and dollars allotted to improving water quality. Lists of control measures were developed for both the COSM and CONB in separate Water Quality Protection Plans (WQPPs).

In 2015, the COSM completed a WQPP (John Gleason LLC, 2017). This water quality protection planning document can be used as the basis of COSM's implementation of the measure calling for the establishment of a comprehensive program "to protect water quality and reduce the impacts of impervious cover". This program was carried out pursuant to COSM's commitment under the "Impervious Cover/Water Quality Protection" (§5.7.6) measure. Considerable research and technical analysis concerning the Spring Lake and Upper San Marcos River watershed, and how to best protect water quality, went into the WQPP. Additionally, a public vetting process was done by allowing the Stakeholder Committee for the Upper San Marcos River Watershed Protection Plan to



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comment on the suit of recommendations. Through this exercise, the WQPP identifies and recommends an array of structural elements, design features, and planning mechanisms to provide a comprehensive water quality protection program intended to enhance the survival and recovery of the Covered Species.

Similarly, the City of New Braunfels developed a WQPP (Alan Plummer Associates, INC., 2017). The primary intent of CONB's WQPP is to identify opportunities for the implementation of LID and stormwater control measures to treat runoff prior to entering Landa Lake and the Comal River system. As previously discussed, the criteria for a LID rebate program to offer financial incentives to private businesses and landowners was developed by CONB in the first years of EAHCP implementation. It became apparent that the program would require significant financial resources solely to administer the rebate program, thereby reducing the amount of EAHCP funds available for the actual implementation of control measures. It was also realized that publicly-owned infrastructure such as City parking lots, streets, and drainage ways had a greater potential to accumulate and transport sediment and pollutants to the Comal River system. In effect, the City abandoned the LID rebate program and is currently moving forward with implementing stormwater control measures identified in the WQPP.

Specifically, the CONB WQPP identifies seven water quality projects located within the Comal River watershed and in close proximity to the upper portions of the river system (i.e. Landa Lake and Upper Spring Run). The WQPP includes an analysis of project costs, pollutant removal efficiency, and maintenance requirements. All projects were presented to and approved by the Watershed Advisory Committee; an appointed committee that represents the public's interest. The CONB's WQPP also includes recommendations for pursuing funding opportunities outside the EAHCP to implement stormwater control measures that would protect water quality.

Ultimately, a source control approach; that is, reduce erosion and sedimentation in the watershed has been adopted by both COSM and CONB. This could be a less expensive and more sustainable approach than sediment removal for COSM & TXSTATE. Under the AMP, the goal of the sediment removal tasks in the river could be accomplished with source control measures; thus, this information serves as the basis for this Nonroutine AMP proposal.



Edwards Aquifer Habitat Conservation Plan Nonroutine Adaptive Management Proposal

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PROPOSED NONROUTINE ADAPTIVE MANAGEMENT ACTION

This proposed action is to limit the activities of Sediment Removal measures (§5.3.6 & §5.4.4) and to forgo the initial concepts of the Impervious Cover/Water Quality Protection measure (§5.7.6) as originally contemplated. This action proposes to instead use the majority of the resources allocated to these original programs to fund community-based WQPPs - which have been vetted through EAHCP Work Groups, EAHCP committees, City committees, and watershed planning stakeholder committees - to not only minimize and mitigate the impacts to the Covered Species, but to also contribute to the likelihood of their survival and recovery.

Sediment Removal

For the Sediment Removal measures (§5.3.6 & §5.4.4), removal efforts will be limited to the required maintenance of key Covered Species habitat areas, such as existing Texas wild-rice stands. These efforts will be performed using hydrosuction or mechanical equipment. Instead, the focus of these measures will be on implementing sediment mitigation and prevention strategies through the Impervious Cover/Water Quality Protection strategy.

Impervious Cover/Water Quality Protection

As stated above, in San Marcos, implementation of the Impervious Cover/Water Quality Protection measure should focus on sediment mitigation and/or prevention. This strategy, as discussed, will include the implementation of LID BMPs prioritized in both the WQPP as well as through an EAHCP water quality work group. Similarly, in New Braunfels, a strategy will include the implementation of LID BMPs - such as the construction of a stormwater treatment device - prioritized in a WQPP through a City advisory committee, to improve the quality of runoff into Landa Lake and the Comal River.

Whenever possible, the COSM and CONB will pursue interagency and/or external partnerships to leverage EAHCP funds with outside sources. Additionally, outside grants are a potential way to increase the effectiveness of the EAHCP efforts.

From the beginning of this evaluation, this exercise was designed to consider the funding limitations for EAHCP program activities established by the FMA and Table 7.1 of the



Edwards Aquifer Habitat Conservation Plan Nonroutine Adaptive Management Proposal

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EAHCP. Adoption of this proposal will not result in any deviations from the funding allowances prescribed in Table 7.1 of the EAHCP. Furthermore, as a collaborative effort between and among the EAHCP, COSM, TXSTATE, and CONB, the proposed Nonroutine AMP action could result in considerable cost efficiencies and savings in the service of stewarding EAHCP public funding by leveraging existing projects with outside funding sources. Also, the proposed action implements a management strategy that mitigates for sedimentation (COSM & TXSTATE) and other pollutants through more cost-effective means.

NONROUTINE AMP PROPOSAL

With the foregoing justifications stated, the EAHCP Program Manager, on behalf of the COSM and TXSTATE, proposes the “Sediment Removal” (EAHCP §5.3.6 & §5.4.4) Conservation Measures to be rewritten to focus on sediment prevention activities. Additionally, the COSM’s and CONB’s commitment under the “Impervious Cover/Water Quality Protection” (HCP §5.7.6) Recovery Measure will be rewritten to include work to be implemented regarding their respected Water Quality Protection Plans.



Edwards Aquifer Habitat Conservation Plan Nonroutine Adaptive Management Proposal

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REFERENCES

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

- Alan Plumber Associates, Inc. 2017. *Edwards Aquifer Habitat Conservation Plan Impervious Cover and Water Quality Protection – 5.7.6 Water Quality Protection Plan: Phase I*.
- City of San Marcos. 2004. *Environmental Assessment/Habitat Conservation Plan for Issuance of an Endangered Species Act Section 10(a)(1)(B) Permit for the Incidental Take of the Fountain Darter (*Etheostoma fonticola*), San Marcos salamander (*Eurycea nana*), and the Comal Springs riffle beetle (*Heterelmis comalensis*) During the Implementation of Projects in the Upper San Marcos River, San Marcos, Hays County, Texas*.
- EARIPa (Edwards Aquifer Recovery Implementation Program). 2012. *Edwards Aquifer Recovery Implementation Program Habitat Conservation Plan*. [http://www.eahcp.org/files/uploads/Final%20HCP %20November%202012.pdf](http://www.eahcp.org/files/uploads/Final%20HCP%20November%202012.pdf)
- EARIPb (Edwards Aquifer Recovery Implementation Program). 2012. *Funding and Management Agreement...to Fund and Manage the Habitat Conservation Plan for the Edwards Aquifer Recovery Implementation Program*. [http://www.eahcp.org/files/uploads/Funding_and_Management_Agreement_\(Appendix_R\).pdf](http://www.eahcp.org/files/uploads/Funding_and_Management_Agreement_(Appendix_R).pdf)
- John Gleason LLC. 2017. *Water Quality Protection Plan for the City of San Marcos and Texas State University*. Prepared for the City of San Marcos.



NOTICE OF OPEN MEETING

Available at eahcp.org

As jointly determined by the Implementing Committee and the Program Manager (FMA §7.9.3.b), the **San Marcos Water Quality Protection Work Group** has been formed to provide scientific review and input on questions related to the City of San Marcos' implementation of the Edwards Aquifer Habitat Conservation Plan (EAHCP) "Impervious Cover/Water Quality Protection" Measure (HCP §5.7.6). The San Marcos Water Quality Protection Work Group is comprised of members selected from the EAHCP Adaptive Management Science Committee as well as subject matter experts endorsed by the Science Committee for this purpose. A meeting of this Work Group for the EAHCP is scheduled for **Tuesday, July 18, 2017, at 9 a.m. at the San Marcos Activity Center (Room 1), 501 E. Hopkins St., San Marcos, Texas 78666**. Lunch will be provided; the meeting is expected to end by 4 p.m. Work Group members are asked to please RSVP to dlarge@edwardsaquifer.org.

Members of this Work Group include: Charlie Kreitler, Glenn Longley, Jackie Poole, Shaun Condor, Ben Schwartz, and Aarin Teague.

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

1. Call to order.
2. Public comment.
3. Presentation of the San Marcos Water Quality Protection Work Group charge (Attachment 1).
Purpose: To provide the Work Group with information on its charge.
Action: None required.
4. Presentation and possible endorsement of EAHCP staff recommendation of the Sessom Creek watershed as the priority for the City of San Marcos' "Impervious Cover/Water Quality Protection" (HCP §5.7.6) project implementation. (Attachment 2)
Purpose: To obtain input from the Work Group on the proposal to prioritize the Sessom Creek watershed for project implementation and to possibly obtain their endorsement of said proposal.
Action: To obtain Work Group input and to possibly endorse the proposed prioritization of the Sessom Creek watershed.
5. Presentation and possible endorsement of prioritizing the proposed list of water quality protection projects identified for implementation in the chosen watershed. (Attachment 2)
Purpose: To obtain input from the Work Group on the proposed prioritization of water quality protection projects identified for implementation and to possibly obtain their endorsement of said proposal.
Action: To obtain Work Group input and to possibly endorse the proposed prioritization of water quality protection projects
6. Questions and comments from the public.
7. Adjourn.



SAN MARCOS WATER QUALITY PROTECTION WORK GROUP MEETING MINUTES – JULY 18, 2017

Available at eahcp.org

1. Call to order.

Nathan Pence called the meeting to order at 9:09. Mr. Pence provided opening comments and thanked the Work Group members for their participation and contribution to transparency and the public process.

2. Public comment.

There were no public comments.

3. Presentation of the San Marcos Water Quality Protection Work Group charge.

Alicia Reinmund-Martinez provided an overview of the Work Group charge, including an introduction to the EAHCP's adaptive management process. Dr. Chad Furl presented a review of the physical and ecological impacts associated with increased rates of sedimentation that is being experienced in the San Marcos River. Melani Howard provided a presentation of the City of San Marcos and Texas State University's performance data from EAHCP sediment removal efforts to date under measures 5.3.6 and 5.4.4. Dr. Furl and Ms. Reinmund-Martinez provided a summary stating that sediment removal efforts have proven time-intensive, costly, and problematic, and, overall, a reactive strategy to the problem of excessive sediment loading in the San Marcos. John Gleason introduced the Water Quality Protection Plan (WQPP) developed by his firm on behalf of the City of San Marcos in support of the City's EAHCP water quality protection measure. This WQPP provided the original basis for some of the ideas for retrofits that are being considered today by the Work Group, specifically, stream restoration and BMPs in the Sessom Creek watershed.

4. Presentation and possible endorsement of EAHCP staff recommendation of the Sessom Creek watershed as the priority for the City of San Marcos' "Impervious Cover/Water Quality Protection" (HCP §5.7.6) project implementation.

Dr. Furl provided an overview of the criteria used and analyses undertaken to prioritize which of the contributing watersheds to the San Marcos River (Sessom, Willow Springs, Purgatory, and Sink creek watersheds) should be targeted for EAHCP water quality protection implementation, identifying Sessom as exhibiting some of the highest problem indices (e.g., percent impervious cover, highly erodible land, average channel slope, etc.).

Dr. Ben Schwartz provided an overview of the nature of the watersheds in relation to the recharge zone as well as efforts to date to monitor sediment loading to the river. Dr. Schwartz did comment that in the lower Purgatory there is a well that gets inundated during large storm events in which endangered species have been recorded. Dr. Schwartz also commented that springs around lower Sessom discharge into a concrete channel which is not appropriate to be considered habitat; however, the springs do reflect connectivity into the aquifer (to a limited extent) suggesting this reach is not totally without habitat value.

Mr. Gleason introduced information on the existing conditions in the middle Sessom Creek watershed and presented his team members Pat Hartigan (primary white paper author and technical lead on the Sessom Creek analysis) and Lee Sherman (primary author of the retrofit section of the WQPP). Mr. Hartigan discussed exposed wastewater lines in the watershed and other geomorphological evidence observed in the watershed indicating major problems with instability and erosion.

Dr. Furl discussed the Sessom Creek confluence with the river, noting that the confluence flows into the Spring Lake dam reach which provides habitat for Texas wild-rice and is the only area of the river where the TPWD State Scientific Area stretches from bank to bank. Dr. Furl also presented the latest published bio-monitoring mapping for Texas wild-rice showing stands growing in the confluence area.

Mr. Hartigan provided an overview of the other watersheds, noting the Willow Springs, Purgatory, and Sink creek watersheds variously exhibit comparatively less instability and some retardation of flows from Soil Control Service dams.

Dr. Schwartz commented on Sink Creek, noting that the tributaries coming off Hillside Ranch Apartments (1 and 2; accessible off Ramsey Street) are like Sessom, rapidly downcutting and contributing to sediment flows to Spring Lake.

Shaun Condor commented that since the City will already be out working on the wastewater line project it would be good to get both projects (wastewater lines and water quality protection) done at the same time.

Charlie Kreidler commented that, although Sessom Creek watershed may be the priority for this exercise, the other watersheds should also be considered through the EAHCP process to head off the development of hydrologic problems in them that are like Sessom once they become more urbanized. Mr. Gleason commented that City of San Marcos land development regulations would govern this development.

Glenn Longley stated he has no problem prioritizing Sessom Creek watershed; Dr. Schwartz seconded Dr. Longley's endorsement. There was no opposition.

5. Presentation and possible endorsement of prioritizing the proposed list of water quality protection projects identified for implementation in the chosen watershed.

Ms. Reinmund-Martinez presented the proposed list of water quality protection projects identified for implementation in the chosen watershed. Dr. Furl provided an overview of the prioritization of the middle reach of the Sessom Creek watershed over either the upper or lower reaches of the watershed.

Mr. Hartigan discussed the proposed stream restoration for "Reach 2" (the middle reach), noting that the project would be based on natural design principles and that fluvial geomorphology and equilibrium theory will be applied to create stable channels.

Dr. Longley asked what specific techniques would be used to stabilize the channel. Dr. Aarin Teague asked what the Rosgen stream classification is; Mr. Sherman explained they are not proposing to use the Rosgen model, but rather a process-based methodology focused on the end goal of establishing a channel in equilibrium.

Dr. Teague asked what the proposed riparian buffer width would be; Mr. Sherman replied they do not know yet. Dr. Schwartz mentioned that there is extensive *Ligustrum* [an invasive exotic species] growth in the watershed just upstream from LBJ, would part of the plan involve removal? Ms. Howard answered that, on a volunteer basis, off the Windmill Tributary, for about 6 months they've been removing Chinese tallow, *Ligustrum*, and Chinaberry, and spreading seed, and thus far, it has been working—so she'd envision continuing these volunteer efforts.

Mr. Hartigan brought up that while stream restoration is a major focus, drainage issues and public safety will also require attention in the scope of the project. Mr. Hartigan reviewed the evaluation criteria used in the assessment of various water quality protection projects under consideration

(sediment loads and load reductions, cost, and cost effectiveness). Mr. Hartigan proceeded to present each of the individual projects under consideration and the various performance metrics calculated for them.

Dr. Teague commented that the research that went into the WERF guidelines was highly variable and based on a wide variety of case studies, meaning that following these guidelines should be understood to involve a high degree of uncertainty.

Ben Schwartz asked if there were any opportunities to install BMPs upstream of the middle reach to preemptively mitigate erosive flows hitting the middle reach. Mr. Hartigan answered that there were around a half a dozen smaller scale opportunities, including some major ones (e.g., “The Gulch” and “Sessom Creek Wet Pond”) that are under consideration through the Water Protection Plan (WPP) process. Dr. Schwartz commented that Dr. Weston Nowlin’s class studied the pond and found that there was no loss of loading in the pond and the average residence time was 12 minutes, with the caveat that this was an unpublished class project.

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Dr. Longley asked what the wastewater renovations plans are for the City. Mr. Condor answered that the City will put a stub out to the west of LBJ, bore a sewer line all the way west. Existing sewer will be cut out and filled with foam. Dr. Teague asked if the City has an MS4 permit; Ms. Howard answered that yes. Dr. Teague asked if the streets in the area affected provide the conveyance; Mr. Condor answered that there are no streets around the wastewater line work.

Ken Diehl commented that there is an MS4, 319, HCP, and funds from City for sewer relocation; there has been a significant effort to delineate those costs and activities, and this collaboration needs to be clear. Mr. Pence responded that as Program Manager it falls to him to ensure that HCP funds are being used appropriately; while the collaboration is complex and challenging, the team has been holding bimonthly planning and coordination meetings. It is on us as project managers to observe and maintain appropriate boundaries. While a challenge, Mr. Pence expressed he feels that this will pay off in the end.

Dr. Teague asked if there is a delineated floodplain associated with the project area (“AE zone” in FEMA terminology); Mr. Sherman responded that he does not believe there is, Mr. Condor and Mr. Hartigan also added that there is not. Dr. Teague asked about permitting costs and whether a Nationwide 27 permit would be required. Shaun Payne answered that the EAHCP is consulting with HDR to assess whether this will be necessary and it appears to be likely. Ms. Reinmund-Martinez added that this will become more clear over the course of the Preliminary Engineering Report exercise. Dr. Teague also asked whether any cultural resources are expected to be encountered during the work, which will also have impact on permitting. Ms. Reinmund-Martinez answered that the EAHCP is consulting with Amatererra to consider this question.

Dr. Kreitler commented that stream restoration addresses Sessom Creek, but does not address the urban runoff problem above the creek. Alicia answered that in the previous discussion the City would be considering projects in other areas upstream through 319 processes. Dr. Longley added the question of whether there have been any efforts to capture rainfall onto new development. Mr. Hartigan responded that there are some options being considered through other processes (besides EAHCP) but that overall the strategy of achieving equilibrium is itself a response to the reality of limitations on controlling existing hydrology.

Dr. Kreitler asked about the issue of flow velocity in relation to Texas wild-rice. Mr. Sherman responded it is not clear whether high or low velocity is the issue, since wild-rice may benefit from

clearing sediment. Ms. Howard commented that the primary problem at the confluence is not scouring, but rather deposition of sediment that can bury wild-rice stands.

Dr. Teague asked what a flood looks like in Sessom Creek; does the creek overbank? Dr. Schwartz responded that it goes quickly from no or base flow to inundating the road. When it overbanks, it's in the road in the lower reach. In the middle and upper reaches he has not observed how the creek behaves.

Mr. Diehl asked if there has been any consideration of land use restrictions associated with water quality protection (e.g., impervious cover limitations, conservation easements, etc.). Mr. Hartigan responded that the answer is yes in the recharge zone. The City has a 20% impervious cover limit in the recharge zone; San Marcos River Foundation (SMRF) also emphasizes land conservation. Dianne Wassenich stated the new Land Development Code which is being finalized should also include enhanced water quality protection measures, while SMRF is buying land above Spring Lake in rural areas. Mr. Hartigan commented that the City is adopting an increased focus on headwater protection which should play a role in preventing "future Sessoms."

Dr. Kreidler asked whether the group had consulted the City of Austin Department of Watershed Protection. Mr. Sherman answered that he has professional connections with the director of the department and is in correspondence with him.

Dr. Teague asked the elevation of the watershed. Mr. Sherman and Mr. Hartigan answered that they could provide this information to Dr. Teague later in the day if it would be helpful.

Dr. Schwartz asked if the City had talked to any of the apartment complexes to inquire whether they would be interested in working with the City on some of the smaller BMPs. Ms. Howard answered that there have been beginning efforts to engage the apartments with other projects (litter, etc.) but had not begun conversations about BMP work. Mr. Sherman commented that the situation is somewhat fortunate in that there is a lot of development left to go, allowing for some problems to be avoided. Once urbanization takes place, then all that is left is redevelopment regulations. Mr. Sherman added that he guessed he is hopeful for the day when we all have flying cars and streets can be taken out. Ms. Wassenich discussed redevelopment districts in the Land Development Code process and the problem with that is that even old apartment complexes are too profitable to incentivize redevelopment.

Mr. Hartigan commented that rigorous study was conducted by HDR for the City of Austin based on critical shear stress value for central Texas streams; if you capture this much volume and hold it for 48 hours, you obtain a stream protection curve factoring volume and stream protection and to control it for urbanization. A study is available, which Alicia will send to the Work Group along with the thesis referenced in the white paper.

Mr. Gleason noted that the majority proportion of sediment coming out of the watershed comes from the instream load and not upstream runoff, hence the strategic emphasis on stream restoration rather than upland sources.

Dr. Schwartz asked about the bike lane project and its relation to this work. Mr. Condor answered that the bike sidewalk will not run through the Sessom Creek watershed. Ms. Wassenich asked about whether pervious pavement was being considered; Mr. Condor answered that the City has been experiencing maintenance issues with this material, but is open to considering it. Mr. Sherman noted that current formulations are tricky to implement and he is not aware of satisfactory, cost effective substitutes. Mr. Diehl mentioned that load bearing has also cropped up as an issue with certain pervious pavement materials in relation to accessibility for large fire trucks, and that this should be considered.

Dr. Kreitler asked whether it might be an option to leave out option 3A since it seems least effective. Dr. Schwartz commented what happens if certain options are left out; would the City pick up the bill on what is left out? Ms. Howard and Ms. Reinmund-Martinez answered that the EAHCP could cover the cost of projects 2 and 3B.

Mr. Condor motioned to endorse the proposed prioritization of water quality protection projects; Jackie Poole seconded the motion. There was no opposition.

Mr. Diehl asked what the monitoring expectations are for the EAHCP; Dr. Furl answered that this is already underway through Expanded Water Quality Monitoring operations, but a specific project will also be undertaken through the Applied Research Program.

Dr. Schwartz commented that this comes down to Texas State University and the City continuing to work together and with the apartment complexes to retrofit existing sources of impervious cover. With the steep narrow stream channel, the issue of fixing the hydrology will persist.

6. Questions and comments from the public.

There were no public comments or questions.

7. Adjourn.

Ms. Reinmund-Martinez adjourned the meeting at 11:48 a.m.



NOTICE OF OPEN MEETING

Available at eahcp.org

August 7, 2017 Meeting Minutes

1. Call to order.

Vice Chair, Dr. Weckerly called the meeting to order at 9:05 a.m. Members present include Janis Bush, Jacquelyn Duke, Conrad Lamon, Glenn Longley, Robert Mace, Doyle Mosier, Chad Norris, Jackie Poole, and Floyd Weckerly. Tom Arsuffi and Charles Kreidler advised prior to the meeting that they were unable to attend.

Dr. Weckerly proposed an agenda sequence change to move item 7 to the last item, due to the fact that a few members had already attended the previous EcoModel meetings and agenda adaptive management items 8 and 9 require a quorum from the group.

2. Public comment.

No public Comment

3. Approval of May 10, 2017 Science Committee meeting minutes (Attachment 1).

Dr. Longley motioned to approve the minutes as written; Dr. Mosier seconded. No opposition.

4. Receive report from the Program Manager.

- **Spring systems hydrologic update**

Dr. Furl provided a presentation to the committee on recent hydrologic conditions at the spring systems related to daily, monthly, and annual trends. The Edwards Aquifer region has received below average rainfall this year and is currently in Stage 1 Drought Restrictions. However, substantial flooding on the morning of this meeting may change aquifer levels in the coming days.

- **Response to Science Committee member questions from last meeting**

No pending questions from the prior meeting.

- **Hydrologic model update**

Dr. Furl presented a brief overview of the Edwards Aquifer Authority's modeling efforts. Their final interim report should be submitted in Fall 2017.

- **Refugia operations update**

Dr. Furl presented a summary of Refugia collection efforts and facility construction efforts. The construction request for proposals are available on the FedConnect portal.

- **National Academy of Science Report 2 Implementation Plan**

Mr. Pence presented the status and process for developing an EAHCP Implementation Plan based on the National Academy of Science Report 2 suggestions. The NAS 2 Work Group will present their Implementation Plan report to the Implementing Committee for potential adoption on August 17, 2017.

- **Potential changes to Comal Springs riffle beetle bio-monitoring sampling**

Dr. Furl discussed the recent changes to the Comal Springs riffle beetle sampling procedures.

5. Presentation of the 2016 Applied Research results: Evaluation of the trophic level status and functional feeding group categorization of larvae and adult Comal Springs riffle beetle (Attachment 2).

Dr. Nowlin presented an overview of his 2016 applied research on the trophic level status and functional feeding groups of the Comal Springs riffle beetle (CSRB). Through complex isotope analyses, findings suggest that the CSRB prefer woody debris or coarse organic material and have similar food preferences between larvae and adults.

Dr. Weckerly noted that for complex invertebrates, they generally have different feeding preferences at different life stages. Dr. Nowlin replied that it depends on the species and habitat conditions. CSRB larvae may eat similar materials to that consumed by adults, but there are slight differences in that the larvae prefer finer gravel while the adults are found in slightly larger gravel.

Dr. Weckerly inquired about people finding CSRB in wells, whereas, we generally find them at the springs. Dr. Nowlin replied that although they are an aquifer-dependent species, they still have eyes and respond to light which infers that they are not entirely a subterranean species; it depends on where you are within the aquifer. The complexity of the Comal Springs food webs play an important role in the distribution of the CSRB.

6. Presentation on 2018 Applied Research projects Scopes of Work (SOW) (Attachment 3).

Dr. Furl presented a list and proposed scopes of work for the applied research program. The evaluation of SAV treatment has been removed from the list due to project design and lack of ability to isolate and control the variables within the river.

Mr. Pence discussed the ecosystem services of the EAHCP analysis and the consensus from regional entities on the utility and need for one, however, the research project lacks the funding

necessary to conduct the research. The EAHCP supports research efforts if another entity finds the means to pay for the research.

Dr. Furl presented an overview of the new Sessom Creek scope of work. A new flow meter and radar station will be set-up on the creek to monitor and capture loading characteristics. Dr. Lamon noted the bias associated with load duration curves derived from short-term monitoring and suggested that the station be a more long-term installation to better assess general trends.

7. Presentation, discussion, and possible recommendation of the Nonroutine Adaptive Management proposal related to the City of San Marcos (COSM) and Texas State University's Sediment Removal Measures (§§5.3.6 and 5.4.4) and the Impervious Cover/Water Quality Protection Measure (§5.7.6).

Mr. Pence discussed the structure, status, and strategy for implementing a nonroutine adaptive management proposal for sediment loading mitigation. In San Marcos, sediment deposition can not only smother and displace, but also kill vulnerable stands of Texas Wild-rice. In Comal, the private landowner incentive program has had minimal interest. Through the nonroutine adaptive management process, funding will be reassigned and applied to more proactive measures instead of reactive.

Dr. Mace promoted the proactive approach and approved of AMP still allowing for hydrosuction if needed.

Dr. Lamon stated that it's a good approach to address the sedimentation issue closer to the source.

Dr. Duke noted that this measure is an excellent example of what the EAHCP is about. She also inquired about conservation measures for future development. Mr. Pence emphasized that the COSM and CONB watershed managers are working closely with the planning departments and have standards in place. Mr. Enders, CONB watershed manager, replied that they have restrictions for impervious cover on areas that are greater than or equal to 30 percent impervious cover or if the impervious area is equal to or greater than 5,000 m².

Dr. Weckerly motioned to approve recommendation of the Nonroutine Adaptive Management proposal to the Stakeholder Committee; Glenn Longley seconded. No opposition.

8. Presentation and possible endorsement of an expedited process to prepare and to submit the Nonroutine Adaptive Management Scientific Evaluation Report, with Science Committee Chair and Vice-Chair approval, to the Stakeholder Committee.

Dr. Weckerly motioned to approve recommendation of the Nonroutine Adaptive Management proposal to the Stakeholder Committee; Dr. Mace seconded. No opposition.

9. Presentation of the Ecological Model (EcoModel) workshop and EAHCP Phase 2 considerations.

Dr. Furl presented an overview of the EcoModel structure and utility. Dr. Lamon expressed concern about the need for an uncertainty analysis to help quantify the accuracy of the model. Mr. Pence explained that the model has been calibrated and the contract has expired, however, that does not preclude potential future improvements to the model if deemed necessary.

10. Consider future meetings, dates, locations, and agendas.

- Science Committee Meeting, November 8th, 2017, San Marcos Activity Center (Multipurpose Room).

11. Questions and comments from the public.

No questions or comments from the public.

12. Adjourn: 1:40 p.m.

**Adaptive Management Science Committee of the
Edwards Aquifer Habitat Conservation Plan***Scientific Evaluation Report:**Nonroutine Adaptive Management Proposal to*

Improve the Sediment Removal Conservation Measures and Introduce Low-Impact Development through City Water Quality Protection Plans as an aspect of the Impervious Cover & Water Quality Protection Measure.

August 25, 2017

OVERVIEW

This Scientific Evaluation Report¹ is issued in response to the Nonroutine Adaptive Management (AMP) proposal submitted by the HCP Program Manager dated August 1, 2017. The proposal calls to modify the activities of Sediment Removal measures (§5.3.6 & §5.4.4) and to forgo the initial concepts of the Impervious Cover/Water Quality Protection measure (§5.7.6) as originally contemplated. This action proposes to instead use the majority of the resources allocated to these original programs to fund community-based Water Quality Protection Plans (WQPPs) - which have been vetted through EAHCP Work Groups, EAHCP committees, City committees, and watershed planning stakeholder committees - to not only minimize and mitigate the impacts to the Covered Species, but to also contribute to the likelihood of their survival and recovery.

Once approved by the Chair and Vice-Chair or other designee of the Science Committee, this Scientific Evaluation Report will be presented for consideration by the Stakeholder Committee at its meeting on September 21, 2017.

SCIENTIFIC EVALUATION

The evaluation of this Nonroutine AMP proposal is based on the Science Committee's analysis of (1) whether enough information, of sufficient quality, exists to properly ascertain that the proposed modifications meet the basic EAHCP objective for this Measure, and (2) whether, also based on the review of the information provided, the modifications reasonably represent an improvement over the current provisions for the Sediment Removal and Impervious Cover/Water Quality Protection (HCP §5.3.6, §5.4.4 and §5.7.6) Measures in the EAHCP. Here, "improvement" refers to both an increase in reducing contamination associated with stormwater runoff and sedimentation that negatively affects Covered Species habitat (specifically Texas wild-rice).

EVALUATION OF INFORMATION PROVIDED

This reactive methodology has been the historical approach to sediment management and has proven costly and ineffective. As experience in implementing this measure was gained since 2013, issues were identified and, in parallel, possible alternative strategies

¹ According to the Funding and Management Agreement (2012), the Adaptive Management Science Committee is tasked with evaluating all Nonroutine Adaptive Management 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.

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for addressing sediment loading at the headwaters were developed. Since 2013, sediment removal data has been collected and presented in the EAHCP Annual Reports that support the need to pursue an alternative strategy. Such strategies include a proactive approach that prevents, and/or mitigates for, sediment runoff in the watershed before it reaches the river to protect water quality and the Covered Species habitat.



Figure 1: Accumulation of sediment at the confluence of Sessom Creek at the San Marcos River before (left) and after (right) the October 2015 flood.

While the EAHCP specified sediment removal as the recommended strategy to manage sediment in the San Marcos River, excess sediment continues to be deposited through contributing creeks. This has been observed at Sessom Creek following the October 2015 flood (Figure 1) –evidence that this effort, is not effective and best use of funds. The sediment volume removed from 2013-2016, and the costs associated, can be seen in the data provided in Table 1.

Table 1: Yearly Sediment Removals and Costs for Spring Lake and the San Marcos River (Gleason 2017).

Year	Area (m²)	Volume (m³)	Est. Load (lb)	Cost
2013	106	48	169,509	\$151,800
2014	77	20	70,629	\$180,000
2015	284	85	300,173	\$219,450
2016	92	28	98,880	\$193,042
TOTAL	559	181	639,192	\$744,292

A sediment mitigation strategy is proposed to focus on sediment management and prevention at the source resulting in fewer impacts, and to be more sustainable and cost effective. Sediment removal in the river does not address the actual sources of sediment, such as upland and bank erosion, thus sedimentation impacts will likely be persistent and

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recurring. Sediment prevention techniques could include stream restoration using Natural Channel Design (NCD) methods, stabilization of eroding stream beds and banks, riparian enhancement, and storm water best management practices (BMPs) that reduce erosive flows (see cost comparison in Table 2 below).

Table 2: Effectiveness of proposed restoration activities compared to Sediment Removal (Gleason 2017).

Metric	HCP Sediment Removal To Date	Proposed Stream Restoration and Stormwater BMPs
Pounds of TSS Removed per year	159,780	1.5x More
Total Capital Cost	\$744,292	Initial Investment 2x Greater
Annualized Cost (\$/yr.)	\$186,073	About Half the Cost
Annualized Cost per pound TSS removed	\$1.16	About One-third the Cost

In 2015, the COSM completed a WQPP (John Gleason LLC, 2017). This water quality protection planning document can be used as the basis of COSM's implementation of the measure calling for the establishment of a comprehensive program "to protect water quality and reduce the impacts of impervious cover". This program was carried out pursuant to COSM's commitment under the "Impervious Cover/Water Quality Protection" (§5.7.6) measure. Considerable research and technical analysis concerning the Spring Lake and Upper San Marcos River watershed, and how to best protect water quality, went into the WQPP. Additionally, a public vetting process was done by allowing the Stakeholder Committee for the Upper San Marcos River Watershed Protection Plan to comment on the suite of recommendations. Through this exercise, the WQPP identifies and recommends an array of structural elements, design features, and planning mechanisms to provide a comprehensive water quality protection program intended to enhance the survival and recovery of the Covered Species. The proposed restoration activities to proactively reduce sedimentation into the San Marcos river is included as a prioritized project under the COSM's WQPP.

Similarly, the City of New Braunfels developed a WQPP (Alan Plummer Associates, INC., 2017). The primary intent of CONB's WQPP is to identify opportunities for the implementation of low-impact development (LID) and storm water control measures to treat runoff prior to entering Landa Lake and the Comal River system. As previously discussed, the criteria for a LID rebate program to offer financial incentives to private businesses and landowners was developed by CONB in the first years of EAHCP implementation. It became apparent that the program would require significant financial resources solely to administer the rebate program, thereby reducing the amount of EAHCP funds available for the actual implementation of control measures. It was also

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realized that publicly-owned infrastructure such as City parking lots, streets, and drainage ways had a greater potential to accumulate and transport sediment and pollutants to the Comal River system. In effect, the City abandoned the LID rebate program and is currently moving forward with implementing storm water control measures identified in the WQPP.

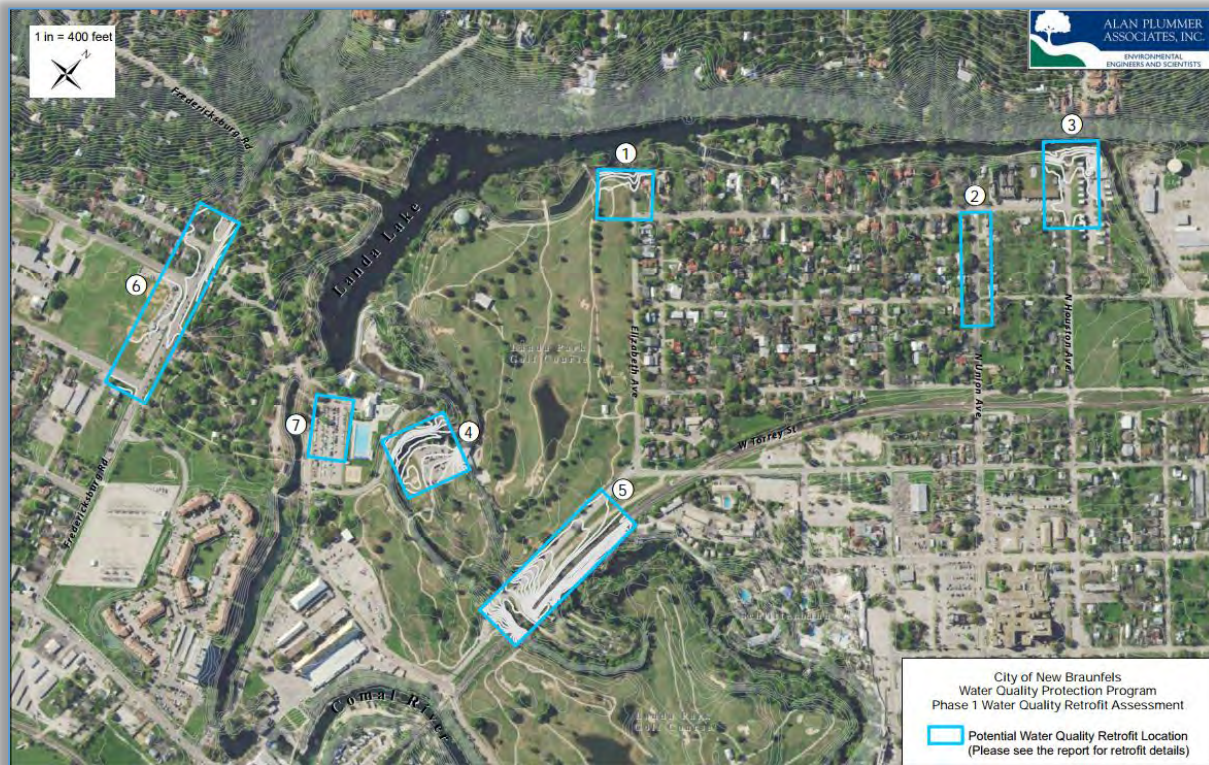


Figure 2: 2017 New Braunfels Water Quality Protection Plan (Alan Plummer 2017)

Specifically, the CONB WQPP identifies seven water quality projects (Figure 2) located within the Comal River watershed and in close proximity to the upper portions of the river system (i.e. Landa Lake and Upper Spring Run). The WQPP includes an analysis of project costs, pollutant removal efficiency, and maintenance requirements. All projects were presented to and approved by the CONB Watershed Advisory Committee; an appointed committee that represents the public's interest. The CONB's WQPP also includes recommendations for pursuing funding opportunities outside the EAHCP to implement storm water control measures that would protect water quality.

Ultimately, a source control approach; that is, reduce erosion and sedimentation in the watershed has been adopted by both COSM and CONB. This could be a less expensive and more sustainable approach than Instream sediment removal for COSM & TXSTATE.

PROPOSAL – SEDIMENT REMOVAL (§5.3.6 & §5.4.4)

- *Current provision:*

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The EAHCP has identified increased rates of sedimentation, due in part to increased urbanization, in the San Marcos River. This is believed to threaten Texas wild-rice (*Zizania texana*), one of the EAHCP Covered Species (EARIP, 2012; see Earl & Wood, 2002). Sedimentation is thought to impact Texas wild-rice by smothering or burying stands, leading to increased mortality and reduction of suitable habitat. In response, through the EAHCP, the City of San Marcos (COSM) & Texas State University (TXSTATE) committed to implement measures to mitigate and minimize these impacts. Sediment removal (via hydrosuction) was the sole method contemplated in the EAHCP to reduce the threat sediment loading presents to Texas wild-rice survival and enhancement.

- *Proposed replacement:*

Sediment Removal measures (§5.3.6 & §5.4.4), will be limited to the required maintenance of key Covered Species habitat areas, such as existing Texas wild-rice stands. These efforts will be performed using hydrosuction or mechanical equipment. Instead, the focus of sediment management measures will be on implementing sediment mitigation and prevention strategies through the Impervious Cover/Water Quality Protection strategy.

PROPOSAL – IMPERVIOUS COVER/WATER QUALITY PROTECTION (§5.7.6)

- *Current provision:*

The EAHCP contemplated mitigating for non-point source pollution through the Impervious Cover/Water Quality Protection Recovery measure (§5.7.6). According to this measure, the COSM and City of New Braunfels (CONB) are to implement low-impact development (LID) programs near the springs ecosystems. This effort was considered through the EARIP LID/Water Quality Work Group and recorded in their final report (Appendix Q of the EAHCP) (EAHCP Appendix Q). These programs were intended to mitigate for pollution from nonpoint sources such as parking lots and residential lawns; especially during periods of low-flow where pollutant presence could reduce the survivability of the Covered Species.

- *Proposed replacement:*

As stated above, in San Marcos, implementation of the Impervious Cover/Water Quality Protection measure will focus on sediment mitigation and/or prevention. This strategy, as discussed, will include the implementation of low impact development (LID) best management practices (BMPs) prioritized in both the WQPP as well as through an EAHCP water quality work group. Similarly, in New Braunfels, a strategy will include the implementation of LID BMPs - such as the construction of a stormwater treatment device - prioritized in a WQPP through a City advisory committee, to improve the quality of runoff into Landa Lake and the Comal River.

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CONCLUSION

Considering the information provided, and the lack of progress made in effectively removing sediment from the San Marcos river, as well as incentivizing private landowners to invest in storm water protection measures on their property in and around the Comal and San Marcos Springs, the Science Committee finds that the proposed modifications meet the basic EAHCP objective for this Measure. Additionally, the Science Committee finds that the modifications represent a significant improvement over the current provisions for the Sediment Removal and Impervious Cover/Water Quality Protection Measures in the EAHCP. See specific discussion in the transcript below:

Transcript from Science Committee Meeting on August 7, 2017:

Mr. Pence discussed the structure, status, and strategy for implementing a nonroutine adaptive management proposal for sediment loading mitigation.

In Comal, the private landowner incentive program has had minimal interest. Thus, through the nonroutine adaptive management proposal, funding will be reassigned and applied to investing in BMPs on City property.

In San Marcos, sediment deposition can not only smother and displace, but also kill vulnerable stands of Texas wild-rice. Through the nonroutine adaptive management process, funding will be reassigned and applied to more proactive measures for managing sediment loading in the San Marcos River. Dr. Mace promoted the proactive approach and approved of AMP still allowing for hydrosuction if needed. Dr. Lamon stated that it's a good approach to address the sedimentation issue closer to the source.

Dr. Duke noted that this measure is an excellent example of what the EAHCP is about. She also inquired about conservation measures for future development. Mr. Pence emphasized that the COSM and CONB watershed managers are working closely with the planning departments and have standards in place. Mr. Enders, CONB watershed manager, replied that they have restrictions for impervious cover on areas that are greater than or equal to 30 percent impervious cover or if the impervious area is equal to or greater than 5,000 m².

Scientific Evaluation Report: Nonroutine AMP Proposal - Sedimentation Ponds

REFERENCES

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

- Alan Plummer Associates, Inc. 2017. *Edwards Aquifer Habitat Conservation Plan Impervious Cover and Water Quality Protection – 5.7.6 Water Quality Protection Plan: Phase I.*
- City of San Marcos. 2004. *Environmental Assessment/Habitat Conservation Plan for Issuance of an Endangered Species Act Section 10(a)(1)(B) Permit for the Incidental Take of the Fountain Darter (*Etheostoma fonticola*), San Marcos salamander (*Eurycea nana*), and the Comal Springs riffle beetle (*Heterelmis comalensis*) During the Implementation of Projects in the Upper San Marcos River, San Marcos, Hays County, Texas.*
- EARIPa (Edwards Aquifer Recovery Implementation Program). 2012. *Edwards Aquifer Recovery Implementation Program Habitat Conservation Plan.* [http://www.eahcp.org/files/uploads/Final%20HCP %20November%202012.pdf](http://www.eahcp.org/files/uploads/Final%20HCP%20November%202012.pdf)
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- John Gleason LLC. 2017. *Water Quality Protection Plan for the City of San Marcos and Texas State University.* Prepared for the City of San Marcos.

ATTACHMENTS

- Attachment 1: Science Committee Agenda
- Attachment 2: Science Committee Minutes - Unofficial



STAKEHOLDER COMMITTEE MEETING MINUTES

SEPTEMBER 21, 2017

1. **Call to order--Establish that all Committee members are present or represented- 9:06 a.m.**
Steve Raabe, Chairman of the Stakeholder Committee, called roll. There was a quorum of the committee present.
2. **Public Comment.**
No comment.
3. **Approval of minutes from the March 16th and June 15th Stakeholder Committee meetings.**
Dianne Wassenich made a motion to approve. Myron Hess seconded the motion. There were no objections.
4. **Receive report from the Program Manager on general updates about the Habitat Conservation Plan.**
 - Springflow and Index Well levels
Chad Furl, Chief Science Officer for the EAHCP, provided a summary of recent hydraulics for the springs and aquifer.
 - Collaboration in Grant Funded Projects
Alicia Reinmund-Martinez, EAHCP Director, provided a brief presentation on some of the collaborative efforts to access some grants for EAHCP projects.
 - Hydrologic Modeling Workshop
Nathan Pence, EAHCP Program Manager, mentioned that a Hydrologic Model Workshop for the Stakeholders and Science Committee members sometime in the fall of 2017.
 - Modeling and Phase II timeline
Mr. Pence provided a brief description about the timeline regarding the hydrologic model and use through Phase II and Strategic AMP.
 - *NAS Report 3*
Mr. Pence provided a brief description of the *NAS Report 3* SRP membership, timeline, and scope of the final NAS report. Additionally, Mr. Pence describes how *Report 3* will provide specific feedback on Biological Goals.
Dianne Wassenich thanked EAHCP staff for including the Stakeholder Committee members in all NAS workshops and meetings.
 - 2018 Stakeholder and Implementing Committee meeting dates
Mrs. Reinmund-Martinez presented the proposed dates for the Stakeholder Committee meetings for 2018.
 - Zebra Mussel Monitoring
Mr. Pence discussed bringing together a group of Stakeholders that have jurisdiction in and around areas that are or could be affected by the presence of zebra mussels in the Guadalupe basin. Monitoring will be committed to but possibly proactive research could be a part of next

steps to protect the springs systems from future infection. There was a discussion regarding zebra mussel propagation and who are the agencies that currently monitor and research the zebra mussel. Todd Votteler, GBRA, mentioned the possible propagation issues through those who train for the Texas Water Safari. Additionally, Mr. Votteler mentioned a comprehensive look at this issues, including the quagga mussel.

Mr. Raabe mentioned that San Antonio River Authority will work with TPWD to start monitoring the San Antonio River.

- REI/LOOP Tour
Shaun Payne, EAHCP staff, presented some photos from a recent tour of the San Marcos system.

5. Discussion and possible recommendation on the Sediment Removal and Impervious Cover/Water Quality Protection Nonroutine Adaptive Management (AMP) Proposal.

Mrs. Reinmund-Martinez presented the details pertaining to the Sediment Removal and Impervious Cover/Water Quality Protection Nonroutine Adaptive Management Proposal. This proposal has been presented and approved by the Science Committee (resulting in the Scientific Evaluation Report). The full presentation can be found on eahcp.org.

Mr. Pence described that this AMP proposal includes limitation of sediment removal for “emergency” needs as well as expand sediment removal methods to include mechanical means not just suction dredge (as is currently stated in the EAHCP).

Carol Patterson asked about whether this cost, which is less annually than sediment removal, is also a shared cost between the City of San Marcos as well as utilization of other grant funds. Mrs. Reinmund-Martinez concurred. Mr. Pence clarified that this AMP proposal is not specifically about Sessom Creek or Landa Lake BMPs but rather a broader amendment that would affect LID work in San Marcos and New Braunfels. The specific details regarding these efforts will go through the proper annual Work Plan and Funding Application process.

One correction to the language in Nonroutine AMP Proposal to change “respected” to “respective.”

Dianne Wassenich made a motion to approve the AMP proposal. Carol Patterson seconded the motion. There were no objections.

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

Mrs. Reinmund-Martinez requested an action regarding the method of approval of the Stakeholder Report required to present to the Implementing Committee for final AMP approval.

Roger Biggers made a motion to approve the expedited process; Cindy Loeffler seconded the motion. There were no objections.

Mr. Pence provided a summary of the details associated with Sessom Creek restoration work intended to reduce sediment loading into the upper portion of the San Marcos River. Mr. Raabe

mentioned that the San Antonio River Authority has developed some regional material to restore watersheds much like Sessom Creek. Mr. Pence mentioned that Aarin Teague has volunteered to help develop some of the efforts in San Marcos.

Mr. Pence continued by explaining some of the WQPP efforts in New Braunfels that implement stormwater BMPs around Landa Lake. It was communicated that all efforts in both San Marcos and New Braunfels are above and beyond their MS4 requirements.

7. Presentation and discussion regarding the Aquifer Storage and Recovery (ASR) Nonroutine Adaptive Management Process (AMP) and timeline.

Mr. Pence began the presentation by communicating that Myron Hess, Vice Chair, communicated that it will be important to keep the Stakeholders involved as the changes to ASR are developed so that everyone is informed and confident in the changes before it is presented. The full presentation can be found at eahcp.org.

Tom Taggart asked how forbearance agreements, as expected to be implemented for future ASR water, can be regulated/enforced as well as the current lease structure is regulated. Mr. Pence communicated that permit forbearance agreements are enforced through typical well-logging and permitting regulation.

Buck Benson mentioned those he represents often put aside 44% of their permitted water every year in order to prepare for the worst-case scenario. Mr. Benson wanted to encourage EAA to find out how to utilize the water set aside for Critical Period Management (CPM). Bruce Alexander described the situation a small municipality is in when attempting to plan for possible drought or CPM reduction as well as maintaining leases in ASR all while needing to provide water for their customers.

Mr. Pence continued by presenting a tentative timeline to the ASR Adaptive Management Process. If all modeling checks-out, advertising of new product is planned to begin in 2018 and implementation in 2019.

Mr. Taggart asked how the Hydrologic Modeling timeline fits into the ASR AMP timeline. Mr. Pence mentioned the Hydrologic Model Workshop is the starting point for the ASR AMP. Mr. Taggart asked if there is enough time to adequately communicate and develop the new ASR product and move it through the amendment process. Mr. Pence answered by communicating the aggressive timeline is simply a starting point.

The committee had a 15-minute break.

8. Presentation of the Ecological Model workshop and EAHCP Strategic Adaptive Management considerations.

Mr. Pence described the Ecological Model workshop and what the Ecological Model showed. Dr. Furl presented the information regarding the Ecological Model and what the uses and end results are. The full presentation can be found at eahcp.org.

Mr. Pence communicated that the Ecological Model was developed for one reason, which was to test the numbers of fountain darters that survive through the drought of record due to our mitigation and minimization measures in the EAHCP. The model has shown exactly what the EAHCP hoped it would. Specifically, that our measures have provided the adequate protections to reach the goals established in the HCP.

Carol Patterson asked questions regarding the variations in the systems do not only include droughts, but also floods and periods of constant flow. Mrs. Patterson asked if this model can show effects of other extreme, or constant, springflow in regards to fountain darter numbers.

9. Presentation regarding the NAS *Report 2* Implementation Plan.

Cindy Loeffler, TPWD and Chair of the NAS *Report 2* Work Group, presented the details found in the NAS *Report 2* Implementation Plan. Full presentation is available at eahcp.org.

Dianne Wassenich spoke about the NAS recommendation on ASR and why those recommendations are not the EAHCP's responsibility. Mr. Pence reiterated that the specific recommendation was regarding ASR operations and not leasing. Patrick Shriver, SAWS, communicated that many of the concerns have been addressed and are being watched by SAWS staff.

Mr. Pence provided a summary of the next couple items. Lunch was provided and the committee took a break for 45 minutes.

10. Presentation and discussion of the National Academy of Sciences *Report 2* Recommendations Issues List.

Mr. Pence presented a series of issues that were brought up in NAS *Report 2*. Full presentation can be found at eahcp.org.

Jim Bower asked how far along are the CSRB efforts in comparison to where we would like to be. Mr. Pence communicated that we are about half-way to where we should be to maintain a functioning population of CSRB in captivity.

There was a discussion regarding what a third-party audit would look like and what exactly would be audited. Mr. Pence communicated that much of what the EAHCP does on an annual basis through a multitude of mechanisms.

There was a discussion regarding how climate change, and what information we may need to inform the committee, to adequately prepare for addressing it at the ITP renewal. Myron Hess stated that we should be cognizant not to wait too long to get adequate time to plan for the ITP renewal. Cindy Loeffler reminded the committee of the August Implementing Committee discussion regarding bringing in experts to present information regarding the Edwards Aquifer region and what climate change can affect the roll-over of the ITP. Mr. Pence suggested we wait until Strategic Adaptive Management changes has been made then take time to focus on this next issue.

Con Mims asked what the specific reason we would invest time and money into an uncertainty analysis. Mr. Pence communicated it would help inform the Aquifer Science team to know more about the system and improve the Hydrologic model. Mr. Mims commented that the HCP seems to be spending a lot of money and this could be a place to save funds. Roland Ruiz, EAA, communicated that he does not disagree with Mr. Mims but emphasized that recharge, for example, is a place where the EAA can improve their understanding. Myron Hess communicated that when moving into a new permit having increased confidence in the protection of springflow required in the HCP would make the planning effort much more acceptable to USFWS. This could eventually save money in the long-term by not doing more than necessary by being more precise in protection measures to meet specific springflow goals.

11. Presentation of the 2017 Budget Work Group Report.

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Mr. Pence presented the information regarding the 2017 Budget Work Group Report. Full presentation can be found at eahcp.org. Mr. Hess communicated about the importance of keeping an eye on VISPO/ASR triggers and the impacts to the budget.

12. Consider future meetings, dates, locations, and agendas.

- Next meeting will be held on December 14th at the Edwards Aquifer Authority.
 - ASR AMP
 - NAS Report 3 update
 - Hydrologic Modeling workshop update
 - Refugia update
 - Officer elections

13. Questions from the public.

No Comment from the public.

Steve Raabe communicated that the San Antonio River (Authority) received an international award due to cultural, natural and historical conservation that has been devoted to the San Antonio River and a formal announcement will be made on September 25, 2017.

14. Adjourn – 2:07 pm



Dianne Wassenich, Secretary

**Nonroutine Adaptive Management Proposal
Edwards Aquifer Habitat Conservation Plan
EAHCP Stakeholder Committee Report
September 21, 2017**



(Sediment Removal and Impervious Cover/Water Quality Protection Measures)

Overview

This Report is issued in response to the Nonroutine Adaptive Management Process (AMP) proposal submitted by the Program Manager of the Edwards Aquifer Habitat Conservation Plan (EAHCP), dated August 1, 2017. Per 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 AMP. This Report presents the final recommendation of the EAHCP Stakeholder Committee concerning this Nonroutine AMP proposal.

Summary of the Nonroutine Adaptive Management Proposal

On August 1, 2017, the EAHCP Program Manager submitted the attached Nonroutine AMP proposal to the Science, Stakeholder, and Implementing Committees. The proposal involves modifying the Sediment Removal measures with efforts to focus on sediment prevention activities (§5.3.6 and §5.4.4) and modifying the Impervious Cover & Water Quality Protection measure (§5.7.6) to include the implementation of Water Quality Protection Plan activities.

Summary of September 21, 2017 Stakeholder Committee Discussion

At the September 21, 2017 Stakeholder Committee meeting, Alicia Reinmund-Martinez, HCP Director, provided a presentation – *Proposed Nonroutine Adaptive Management Proposal: City of San Marcos/Texas State University Sediment Removal and City of San Marcos/City of New Braunfels Impervious Cover-Water Quality Protection* – to the Committee. This presentation covered the following: 1) the AMP process, 2) the challenges and opportunities of sediment removal; 3) a comparative analysis between implementing storm water BMPs and sediment removal, 4) a summary of the COSM and CONB Water Quality Protection Plans, and 5) the Scientific Evaluation Report issued by the Science Committee in response to the Proposal.

Following this presentation, the Stakeholder Committee had a short discussion on the merits of the proposal. This section provides a summary of this discussion. It also includes the final motions taken by the Committee.

1) Cost Effectiveness due to Cost Sharing

Ms. Carol Patterson asked about whether this annualized capital cost, which is less annually than sediment removal, is also a shared cost between the City of San Marcos as well as utilization of other grant funds. Mr. Reinmund-Martinez said yes, that it was a shared cost and could be used as match for federally-funded projects.

**Nonroutine Adaptive Management Proposal
Edwards Aquifer Habitat Conservation Plan
EAHCP Stakeholder Committee Report
September 21, 2017**



(Sediment Removal and Impervious Cover/Water Quality Protection Measures)

2) Specific Water Quality Protection Plan Projects

Mr. Nathan Pence clarified that this AMP proposal is not specifically about Sessom Creek or Landa Lake BMPs but rather a broader amendment that would affect Low Impact Development work in San Marcos and New Braunfels. The specific details regarding these efforts will go through the proper annual Work Plan and Funding Application process.

Mr. Myron Hess asked for clarification on the process for work plans and funding applications. Mr. Pence did correct his statement and confirmed that annual work plans and funding applications will go the prescribed review process - first through a Science Committee review and then through the Implementing Committee review. Mr. Pence stated that the Stakeholder Committee does not have a role in the work plan review, but if a Stakeholder Committee member has a request regarding a work plan, staff will always respond.

Final Motions by the Committee

Mr. Cary Betz provided a correction to the language in Nonroutine AMP Proposal to change the word “respected” to “respective.” With that correction, Ms. Dianne Wassenich made a motion to approve, Ms. Carol Patterson seconded. There were no objections.

An expedited process whereby this Nonroutine AMP Stakeholder Report, reflecting the discussion of the Stakeholders concerns the proposed Nonroutine AMP proposal, would be approved by the Chair and Vice-Chair of the Stakeholder Committee was presented to the Committee for their consideration. Mr. Roger Biggers made a motion to approve the expedited process, Ms. Cindy Loeffler seconded. There were no objections.

Nature of Stakeholder Committee Decision

Twenty-two members of the Committee attended the September 21, 2017 meeting in attainment of a quorum for the meeting. Votes for both Committee actions concerning the Nonroutine AMP proposal were by consensus; there were not competing positions.

Stakeholder Recommendation

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

Attachments

- Nonroutine Adaptive Management proposal dated August 1, 2017

**Nonroutine Adaptive Management Proposal
Edwards Aquifer Habitat Conservation Plan
EAHCP Stakeholder Committee Report
September 21, 2017**



(Sediment Removal and Impervious Cover/Water Quality Protection Measures)

- Nonroutine Adaptive Management Scientific Evaluation Report, EAHCP Science Committee, August 25, 2017
- Minutes from the September 21, 2017 Stakeholder Committee Meeting



**IMPLEMENTING COMMITTEE MEETING MINUTES
SEPTEMBER 21, 2017**

1. **Call to order--Establish that all Committee members are present or represented- 2:15 pm.**
Members of this committee present include: Tom Taggart (San Marcos), Roland Ruiz (EAA), Mark Enders on behalf of Greg Malatek (New Braunfels), Darren Thompson (SAWS), Kimberly Meitzen on behalf of Andrew Sansom (Texas State University), and Todd Votteler (GBRA).
2. **Public Comment.**
Darren Thompson asked if there was any public comment. There was none.
3. **Approval of minutes from the August 17th Implementing Committee meeting.**
Darren Thompson noted that on Item 5; the 4th paragraph "not" should be "no."
Tom Taggart made a motion to approve with the amendment; Roland Ruiz seconded the motion. There were no objections.
4. **Receive report from the Program Manager on general topics related to the Habitat Conservation Plan.**
 - Budget Report – Nathan Pence presented the EAHCP budget report for August 2017. There were no questions.
 - ASR Operations by SAWS & Injection Rate Change
Darren Thompson provided the committee with the following update: 32,500 acre-feet have been noticed to SAWS this year. Of that amount, 22,000 acre-feet have been stored, bringing the total HCP water stored to 73,000 acre-feet to date. SAWS is currently injecting about 41 MGD, which will add the remaining approximately 11,000 acre-feet of HCP water. This will bring close to 84,000 acre-feet of HCP water stored by the end of the year, totaling 150,000 acre-feet of water in the SAWS ASR facility – close to the 200,000 acre-feet capacity.
 - 2018 Stakeholder and Implementing Committee meeting dates – Alicia Reinmund-Martinez presented the proposed meeting dates for next year. There were no questions.
 - ASR Adaptive Management Process (AMP) proposal update – Nathan Pence presented a brief update on the status of this Nonroutine AMP. There were no questions.
5. **Discussion and possible approval of the proposal for Sediment Removal and Impervious Cover/Water Quality Protection Nonroutine Adaptive Management (AMP) Proposal submitted to the Implementing Committee in the Stakeholder Committee Report.**

No presentation was necessary.

Tom Taggart made a motion to approve the Stakeholder Committee recommendation for the Sediment Removal and Impervious Cover/Water Quality Protection Nonroutine AMP Proposal. Roland Ruiz seconded the motion.

There were no objections.

EAHCP STAFF

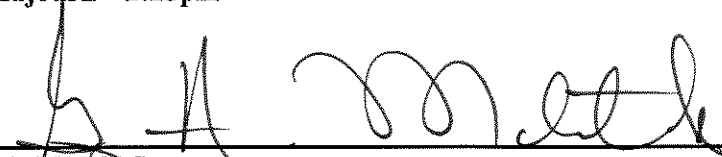
October 5, 2017

6. Future agenda items and topics of discussion.

- Next meeting will be held on October 19th at the Guadalupe-Blanco River Authority Annex Building.
 - Approval to submit the necessary documentation to USFWS based on the AMP Proposal.
 - 2018 EAHCP Funding Applications

7. Questions from the public.

No comment.

8. Adjourn – 2:25pm

Greg Malatek, Secretary



October 20, 2017

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

RE: Amendment to the City of San Marcos and Texas State University Sediment Removal Conservation Measures (EAHCP §5.3.6, §5.4.4) as well as the Impervious Cover & Water Quality Protection Measure (EAHCP §5.7.6) (#TE-63663A-1).

Dear Ms. Sommer:

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 an amendment to the Edwards Aquifer Habitat Conservation Plan (EAHCP) to revise the Sediment Removal (§5.3.6, §5.4.4) and Impervious Cover & Water Quality Protection (EAHCP §5.7.6) Conservation Measures in the EAHCP. This letter is submitted pursuant to Section 9.2.1 of the EAHCP.

Because of this change, the focus of Sediment Removal in the San Marcos system will be primarily through preventative means. Hydro-suction, and as proposed in Exhibit 1, mechanical removal of sediment will remain as a method in the event such means are determined necessary to target specific stands of Texas wild-rice or other fountain darter habitat. Additionally, the original intent of the Impervious Cover & Water Quality Protection measure was to develop an incentive program for private landowners to develop low-impact development (LID) best management practices (BMPs). This method of implementing BMPs has proven ineffective thus both the City of San Marcos and the City of New Braunfels have invested in developing a Water Quality Protection Plan (WQPP). In each WQPP, possible non-point source pollutant issues have been identified throughout both watersheds and plans were developed to identify public property that could benefit from the development of stormwater BMPs. These BMPs are above and beyond the requirements of their MS4 permits and represent unfunded projects identified by each entity. The amendment provided, as a complement to the revised methodology expressed in the Sediment Removal measure, also provides explicit direction to develop plans and prioritize BMPs proposed in both WQPPs.

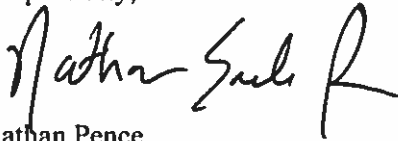
The EAHCP has analyzed the current programs for Sediment Removal and Impervious Cover & Water Quality Protection in the San Marcos and Comal Springs systems through the EAHCP Annual Report process as well as discussions with the Science Committee. In this analysis, lessons learned as well as proposed revisions were brought forward and ultimately reviewed by subject matter and regional experts, as well as the EAHCP Committee members. A work group of local experts were compiled to discuss potential solutions (minutes and agenda can be found in Exhibit 4) and a Scientific Evaluation Report (SER) was produced and adopted by the Science Committee to provide any necessary directive regarding the Adaptive Management Proposal (Exhibit 3) which was later supported by the Stakeholder Committee and adopted by the Implementing Committee on September 21, 2017. This process was in accordance with the Adaptive Management Process outlined in the Funding and Management Agreement (FMA) and results in

this request to clarify and amend the EAHCP outlined in the final Nonroutine Adaptive Management Proposal and Stakeholder Report (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 amendment during its September 21, 2017 meeting. All meeting agendas and minutes from this process have been provided in Exhibit 4.

The Permittees seek your formal acceptance of this amendment to allow alterations to the Sediment Removal (§5.3.6, §5.4.4) and Impervious Cover & Water Quality Protection (EAHCP §5.7.6) Conservation Measures in the EAHCP to reflect a redirection of effort to watershed protection and implementation of LID BMPs to reduce future sedimentation and other potential threats due to stormwater flows in both the San Marcos and Comal ecosystems. Your approval of this amendment will allow the Permittees to implement this critical aspect of the EAHCP. We look forward to your formal acceptance of the amendment and appreciate your consideration and response on this issue.

Respectfully,



Nathan Pence
Program Manager
Edwards Aquifer Habitat Conservation Plan

EXHIBIT 1

5.3.6 Sediment Removal Management below Sewell Park

In order to manage sediment deposition into the San Marcos river, the City of San Marcos, in partnership with Texas State University, may implement a proactive approach to mitigating sediment impacts by designing and constructing low impact development (LID) best management practices (BMPs) in priority watersheds to benefit the Covered Species. These BMPs can include natural streambed restoration, sediment ponds or retention basins, as well as other effective approaches to managing sediment loads into the San Marcos river. In development of construction plans, the Science Committee (or subcommittee of specialized perspectives) are to provide justification of site selections as well as BMPs proposed.

The City of San Marcos will ~~may~~ implement a reactive approach by removing ~~remove~~ sediment from the river bottom at various locations from City Park to IH-35. These areas include but are not limited to reaches of the river in City Park, Veramendi Park, Bicentennial Park, Rio Vista Park, and Ramon Lucio Park. Sediment has accumulated at these locations due to the installation of flood control dams, urbanization, and natural processes. These accumulations have altered the river's morphology and natural flow patterns. In addition, deposition of sediments on or around Texas wild-rice stands causes direct mortality by smothering or burying strands. The City of San Marcos may remove sediment from key areas of Texas wild-rice habitat below Sewell Park to minimize and mitigate the impacts of incidental take from recreation and pumping during low flow periods, complement the planting and gardening of submerged aquatic vegetation, or to mitigate impacts of sediment on Texas wild-rice caused by specifically by floods or other extreme weather events that deposit large amounts of sediment in one area. Upon site identification, the EAHCP Science Committee (or appropriate subcommittee) will be consulted prior to the annual Work Plan submission.

~~To minimize and mitigate the impacts of incidental take from recreation and pumping during low flow periods, the City of San Marcos will remove sediment from key areas of Texas wild-rice habitat below Sewell Park.~~

Depending on location and desired outcome, hydrosuction or mechanical removal will ~~may~~ be used to ~~help~~ remove accumulations of sediment. The silt will be vacuumed using a hose that has screen to prevent suction biota greater than 0.25 inch in diameter. The divers doing the hydrosuctioning. Those removing sediment will take the following measures to minimize loss/harm of biota in the area. Divers ~~They~~ will fin the area to be suctioned to encourage the darters and other biota to move out of the area. Divers ~~They~~ will be trained to recognize all stages of listed species from larval to adult. If hydrosuctioning the nozzle of the vacuum will be kept down in the soil and not allowed to swing through the water column during the operation. In addition, placement of stakes around the area to be suctioned will keep divers away from stands of Texas wild-rice. An observer will be on the bank to monitor the effluent for presence of listed species and all other biota, as well as for the safety of the diver.

Sediment samples will be sent to TCEQ for contaminant testing per TCEQ requirements.

EXHIBIT 1

5.4.4 Sediment Removal Management in Spring Lake and from Spring Lake Dam to City Park

In order to manage sediment deposition into the San Marcos river, Texas State University, in partnership with the City of San Marcos, may implement a proactive approach to mitigating sediment impacts by designing and constructing low impact development (LID) best management practices (BMPs) in priority watersheds to benefit the Covered Species. These BMPs can include natural streambed restoration, sediment ponds or retention basins, as well as other effective approaches to managing sediment loads into the San Marcos river. In development of construction plans, the Science Committee (or subcommittee of specialized perspectives) are to provide justification of site selections as well as BMPs proposed.

Monitoring of the San Marcos River since 1990 reveals that sediment production has increased from 160 m³/yr to 920 m³/yr due to a combination of upstream flood control dams and sediment inflow increases (Earl and Wood 2002). Deposition of sediments on or around Texas wild-rice stands causes direct mortality by smothering or burying stands. Texas State University will mitigate the impacts of incidental take from diving activities, research activities, recreation and pumping during low flow periods by removing sediment from key areas of Texas wild-rice habitat in Spring Lake and from Spring Lake Dam to City Park.

~~Texas State University will~~ may implement a reactive approach by removing remove sediment from the river bottom at various locations from City Park to IH-35. ~~These areas include but are not limited to reaches of the river in City Park, Veramendi Park, Bicentennial Park, Rio Vista Park, and Ramon Lucio Park. Sediment has accumulated at these locations due to the installation of flood control dams, urbanization, and natural processes. These accumulations have altered the river's morphology and natural flow patterns.~~ In addition, deposition of sediments on or around Texas wild-rice stands causes direct mortality by smothering or burying strands. Texas State University may remove sediment from key areas of Texas wild-rice habitat below Sewell Park to minimize and mitigate the impacts of incidental take from recreation and pumping during low flow periods, complement the planting and gardening of submerged aquatic vegetation, or to mitigate impacts of sediment on Texas wild-rice caused by specifically by floods or other extreme weather events that deposit large amounts of sediment in one area. Upon site identification, the EAHCP Science Committee (or appropriate subcommittee) will be consulted prior to the annual Work Plan submission.

Depending on location and desired outcome, hydrosuction or mechanical removal will ~~may~~ be used to help ~~remove~~ accumulations of sediment. ~~The silt will be vacuumed using a hose that has screen to prevent suction biota greater than 0.25 inch in diameter. The divers doing the hydrosuctioning.~~ Those removing sediment will take the following measures to minimize loss/harm of biota in the area. ~~Divers~~ They will fin the area to be suctioned to encourage the darters and other biota to move out of the area. ~~Divers~~ They will be trained to recognize all stages of listed species from larval to adult. If hydrosuctioning the nozzle of the vacuum will be kept down in the soil and not allowed to swing through the water column during the operation. In addition, placement of stakes around the area to be suctioned will keep divers away from stands of Texas wild-rice. An observer will be on the bank to monitor the effluent for presence of listed species and all other biota, as well as for the safety of the diver.

Sediment samples will be sent to TCEQ for contaminant testing per TCEQ requirements.

EXHIBIT 1

5.7.6 Impervious Cover/Water Quality Protection

Most potential water quality problems are linked to nonpoint source pollution such as fertilizer runoff and chemicals washed in from adjacent streets; however, spills and leaks from industrial and municipal infrastructure also present hazards. The potential for accidents and nonpoint source pollution to affect the Covered Species may be exacerbated during below average flows since chemicals and nutrients would be less diluted when a lower volume of water is present. Runoff and spills originating even at long distances from the spring opening also can affect water quality at the springs.

The EAHCP originally contemplated establishing incentive criteria for private landowners in proximity of the San Marcos and Comal springs ecosystems to implement low-impact development (LID) best management practices (BMPs) on their property. It was identified that due to lack of interest, and limited overall impact of private property, the incentive program was de-prioritized. In its place, a Water Quality Protection Plan (WQPP) was developed for both the City of San Marcos and City of New Braunfels. These WQPP provided the cities a list of proposed BMPs that could be implemented to protect water quality and mitigate for the impacts of nonpoint source pollution.

However, for the City of New Braunfels stormwater runoff prevention/reduction impacting Landa Lake and the Old Channel is of primary concern. BMPs will be selected that demonstrate the highest load reduction potential. The City of New Braunfels will use the prepared WQPP to assist in prioritizing locations and appropriate BMPs. Upon selection, the EAHCP Science Committee (or appropriate subcommittee) will be consulted prior to the annual Work Plan submission and selected BMPs will be implemented.

For the City of San Marcos, as reference in 5.3.6, sediment prevention/reduction is a primary concern. BMPs will be selected in priority watersheds that demonstrate abnormal erosion issues and cause disproportionate sedimentation into the San Marcos river threatening Texas wild-rice and other Covered Species habitat. Thus, the City of San Marcos will perform water quality protection measures that directly improve sediment load reductions, and protect against other potential contaminants, into the San Marcos river. The City of San Marcos will use the prepared WQPP to assist in prioritizing locations and appropriate BMPs. Upon selection, the EAHCP Science Committee (or appropriate subcommittee) will be consulted prior to the annual Work Plan submission.

The City of New Braunfels ~~will~~ may establish criteria related to desired impervious cover and provide incentives to reduce existing impervious cover on public and private property in New Braunfels. The City of New Braunfels ~~will~~ may establish criteria and incentives for the program based upon the low impact development (LID)/Water Quality Work Group Final Report (Appendix Q) recommendations for Implementation Strategies and best management practices (BMPs).

~~The City of San Marcos will establish a program to protect water quality and reduce the impacts of impervious cover (such as through LID). The City of San Marcos will develop criteria and incentives for the program based upon the LID/Water Quality Work Group Final Report (Appendix Q) recommendations for Implementation Strategies and BMPs.~~

The EAA will put together material regarding the value of a ban on the use of coal tar sealants and work with local governments to explore and encourage their consideration of such a ban.

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 Implementing, Adaptive Management Stakeholder, and Adaptive Management Science Committees
From: Nathan Pence, EAHCP Program Manager
Date: August 1, 2017
Re: Proposed Strategy to Improve the City of San Marcos and Texas State University Sediment Removal Conservation Measures (EAHCP §5.3.6, §5.4.4) and Introduce Low-Impact Development through City Water Quality Protection Plans as an aspect of the Impervious Cover & Water Quality Protection Measure (EAHCP §5.7.6).

PREAMBLE

The Edwards Aquifer Habitat Conservation Plan (EAHCP; EARIP, 2012) prescribes that the City of San Marcos (COSM) and Texas State University (TXSTATE) will “remove sediment from the river bottom at various locations from City Park to IH-35” (§5.3.6), and “key areas of Texas wild-rice habitat in Spring Lake and from Spring Lake Dam to City Park” (§5.4.4).

Additionally, it was contemplated by the EAHCP (2012), that the COSM and City of New Braunfels (CONB) will mitigate impacts of nonpoint source pollution through the Impervious Cover & Water Quality Protection measure (§5.7.6). This measure requires that the COSM and CONB “will establish a program to protect water quality and reduce the impacts of impervious cover (such as through low-impact development (LID)).”

This document presents a formal proposal for a Nonroutine Adaptive Management action (“Nonroutine AMP;” Funding & Management Agreement, “FMA” §7.6.2) involving the above Sediment Removal measures (§5.3.6 and 5.4.4) and Impervious Cover & Water Quality Protection measure (§5.7.6) prescribed by the EAHCP.

This proposal is submitted by the EAHCP Program Manager (PM) on behalf of the CONB, COSM & TXSTATE. The development of this proposal was a collaborative effort by all parties. Below, a brief background is provided describing the process leading to this proposal, followed by a description of the proposed Nonroutine AMP action, accompanied

EXHIBIT 2

**Edwards Aquifer Habitat Conservation Plan
Nonroutine Adaptive Management Proposal**

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

by justifications for this proposal. Additional technical specifications and other supporting documentation associated with the proposal is included here as an appendix.

BACKGROUND***Sediment Removal***

The EAHCP has identified increased rates of sedimentation, due in part to increased urbanization, in the San Marcos River. This is believed to threaten Texas wild-rice (*Zizania texana*), one of the EAHCP Covered Species (EARIP, 2012; see Earl & Wood, 2002). Sedimentation is thought to impact Texas wild-rice by smothering or burying stands, leading to increased mortality and reduction of suitable habitat. In response, through the EAHCP, the COSM & TXSTATE committed to implement measures to mitigate and minimize these impacts. Sediment removal (via hydrosuction) was the sole method contemplated in the EAHCP to reduce the threat sediment loading presents to Texas wild-rice survival and enhancement.

This reactive approach to sediment management has proven costly and ineffective. As experience in implementing this measure was gained since 2013, issues were identified and, in parallel, possible alternative strategies for addressing sediment loading at the source were developed. Since 2013, data has been collected through the EAHCP Annual Report that supports the need to pursue an alternative strategy. Such strategies include a proactive approach that attempts to prevent, and/or mitigate for, sediment runoff in the watershed to protect water quality and the Covered Species habitat.

While the EAHCP specified sediment removal as the recommended strategy to manage sediment in the San Marcos River, removal seems to not effectively address the sources of excess sediment which continues to be deposited through contributing creeks, specifically observed at Sessom Creek following the October 2015 flood – providing evidence that the effort, as currently contemplated, is not a sustainable use of funds. The sediment volume removed from 2013-2016, and the costs associated, can be seen in the data provided in **Table 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.

Table 1: Sediment Removal results (2013-2016)

Year	Volume Removed (m³)	Annual Cost	Cost per m³
2013	48	\$151,800.00	\$3,450.00
2014	20	\$180,000.00	\$9,000.00
2015	85	\$219,450.00	\$2,612.50
2016	28	\$193,042.00	\$6,894.36
Total	181	\$744,292.00	\$4,228.93
Average per year	45.25	\$186,073.00	\$4,228.93

A sediment mitigation strategy is proposed to focus on sediment removal at the source because prevention can have fewer impacts, and be more sustainable and cost effective. Sediment removal in the river does not address the actual sources of sediment, such as stream erosion, thus sedimentation impacts will likely be persistent and recurring. Sediment prevention techniques could include stream restoration using Natural Channel Design (NCD) methods, stabilization of eroding stream beds and banks, riparian enhancement, and stormwater best management practices (BMPs) that reduce erosive flows.

In identifying that a source control approach may be most effective in managing sediment loading in the San Marcos River, the EAHCP PM and the EAHCP Science Committee jointly determined to create the San Marcos Water Quality Protection Work Group. This Work Group was intended to provide scientific review and input on questions related to the COSM & TXSTATE's implementation of the EAHCP Sediment Removal measures, as well as the Impervious Cover/Water Quality Protection measure (§5.3.6, 5.4.4 & 5.7.6). This Work Group was comprised of members drawn from the Science Committee as well as external experts with experience related to water quality protection projects.

Work Group members¹ were presented with results from investigations by John Gleason LLC (JGLLC), as part of the San Marcos River Water Quality Protection Plan (WQPP), which provides strong evidence that Sessom Creek has a higher sediment loading rate

¹ Work Group members included: Glenn Longley, Charlie Kreidler, Jackie Poole, Shaun Condor, Ben Schwartz and Aarin Teague.

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

than other watersheds that drain into the upper reaches of the San Marcos River north and just below of IH-35 (Appendix 1).

Impervious Cover/Water Quality Protection

The EAHCP contemplated mitigating for non-point source pollution through the Impervious Cover/Water Quality Protection Recovery measure (§5.7.6). According to this measure, the COSM and CONB are to implement low-impact development (LID) programs near the springs ecosystems. This effort was considered through the EARIP LID/Water Quality Work Group and recorded in their final report (Appendix Q of the EAHCP) (EAHCP Appendix Q). These programs were intended to mitigate for pollution from nonpoint sources such as parking lots and residential lawns; especially during periods of low-flow where pollutant presence could reduce the survivability of the Covered Species.

These LID programs, including an incentive program for private land owners, required in the EAHCP was suggested to not only improve the water quality protection near the springs, but also to gain public participation in the effort to protect the Covered Species. Unfortunately, in both San Marcos and New Braunfels city employees found little private interest in the program. Staff spent time developing criteria yet, due to the limited private residents along the San Marcos and Comal rivers, the incentive program was quickly replaced with a concentration on the implementation of strategic stormwater control measures that could maximize the effort and dollars allotted to improving water quality. Lists of control measures were developed for both the COSM and CONB in separate Water Quality Protection Plans (WQPPs).

In 2015, the COSM completed a WQPP (John Gleason LLC, 2017). This water quality protection planning document can be used as the basis of COSM's implementation of the measure calling for the establishment of a comprehensive program "to protect water quality and reduce the impacts of impervious cover". This program was carried out pursuant to COSM's commitment under the "Impervious Cover/Water Quality Protection" (§5.7.6) measure. Considerable research and technical analysis concerning the Spring Lake and Upper San Marcos River watershed, and how to best protect water quality, went into the WQPP. Additionally, a public vetting process was done by allowing the Stakeholder Committee for the Upper San Marcos River Watershed Protection Plan to

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comment on the suit of recommendations. Through this exercise, the WQPP identifies and recommends an array of structural elements, design features, and planning mechanisms to provide a comprehensive water quality protection program intended to enhance the survival and recovery of the Covered Species.

Similarly, the City of New Braunfels developed a WQPP (Alan Plummer Associates, INC., 2017). The primary intent of CONB's WQPP is to identify opportunities for the implementation of LID and stormwater control measures to treat runoff prior to entering Landa Lake and the Comal River system. As previously discussed, the criteria for a LID rebate program to offer financial incentives to private businesses and landowners was developed by CONB in the first years of EAHCP implementation. It became apparent that the program would require significant financial resources solely to administer the rebate program, thereby reducing the amount of EAHCP funds available for the actual implementation of control measures. It was also realized that publicly-owned infrastructure such as City parking lots, streets, and drainage ways had a greater potential to accumulate and transport sediment and pollutants to the Comal River system. In effect, the City abandoned the LID rebate program and is currently moving forward with implementing stormwater control measures identified in the WQPP.

Specifically, the CONB WQPP identifies seven water quality projects located within the Comal River watershed and in close proximity to the upper portions of the river system (i.e. Landa Lake and Upper Spring Run). The WQPP includes an analysis of project costs, pollutant removal efficiency, and maintenance requirements. All projects were presented to and approved by the Watershed Advisory Committee; an appointed committee that represents the public's interest. The CONB's WQPP also includes recommendations for pursuing funding opportunities outside the EAHCP to implement stormwater control measures that would protect water quality.

Ultimately, a source control approach; that is, reduce erosion and sedimentation in the watershed has been adopted by both COSM and CONB. This could be a less expensive and more sustainable approach than sediment removal for COSM & TXSTATE. Under the AMP, the goal of the sediment removal tasks in the river could be accomplished with source control measures; thus, this information serves as the basis for this Nonroutine AMP proposal.

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

PROPOSED NONROUTINE ADAPTIVE MANAGEMENT ACTION

This proposed action is to limit the activities of Sediment Removal measures (§5.3.6 & §5.4.4) and to forgo the initial concepts of the Impervious Cover/Water Quality Protection measure (§5.7.6) as originally contemplated. This action proposes to instead use the majority of the resources allocated to these original programs to fund community-based WQPPs - which have been vetted through EAHCP Work Groups, EAHCP committees, City committees, and watershed planning stakeholder committees - to not only minimize and mitigate the impacts to the Covered Species, but to also contribute to the likelihood of their survival and recovery.

Sediment Removal

For the Sediment Removal measures (§5.3.6 & §5.4.4), removal efforts will be limited to the required maintenance of key Covered Species habitat areas, such as existing Texas wild-rice stands. These efforts will be performed using hydrosuction or mechanical equipment. Instead, the focus of these measures will be on implementing sediment mitigation and prevention strategies through the Impervious Cover/Water Quality Protection strategy.

Impervious Cover/Water Quality Protection

As stated above, in San Marcos, implementation of the Impervious Cover/Water Quality Protection measure should focus on sediment mitigation and/or prevention. This strategy, as discussed, will include the implementation of LID BMPs prioritized in both the WQPP as well as through an EAHCP water quality work group. Similarly, in New Braunfels, a strategy will include the implementation of LID BMPs - such as the construction of a stormwater treatment device - prioritized in a WQPP through a City advisory committee, to improve the quality of runoff into Landa Lake and the Comal River.

Whenever possible, the COSM and CONB will pursue interagency and/or external partnerships to leverage EAHCP funds with outside sources. Additionally, outside grants are a potential way to increase the effectiveness of the EAHCP efforts.

From the beginning of this evaluation, this exercise was designed to consider the funding limitations for EAHCP program activities established by the FMA and Table 7.1 of the

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EAHCP. Adoption of this proposal will not result in any deviations from the funding allowances prescribed in Table 7.1 of the EAHCP. Furthermore, as a collaborative effort between and among the EAHCP, COSM, TXSTATE, and CONB, the proposed Nonroutine AMP action could result in considerable cost efficiencies and savings in the service of stewarding EAHCP public funding by leveraging existing projects with outside funding sources. Also, the proposed action implements a management strategy that mitigates for sedimentation (COSM & TXSTATE) and other pollutants through more cost-effective means.

NONROUTINE AMP PROPOSAL

With the foregoing justifications stated, the EAHCP Program Manager, on behalf of the COSM and TXSTATE, proposes the "Sediment Removal" (EAHCP §5.3.6 & §5.4.4) Conservation Measures to be rewritten to focus on sediment prevention activities. Additionally, the COSM's and CONB's commitment under the "Impervious Cover/Water Quality Protection" (HCP §5.7.6) Recovery Measure will be rewritten to include work to be implemented regarding their respective Water Quality Protection Plans.

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REFERENCES

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

- Alan Plumber Associates, Inc. 2017. *Edwards Aquifer Habitat Conservation Plan Impervious Cover and Water Quality Protection – 5.7.6 Water Quality Protection Plan: Phase I.*
- City of San Marcos. 2004. *Environmental Assessment/Habitat Conservation Plan for Issuance of an Endangered Species Act Section 10(a)(1)(B) Permit for the Incidental Take of the Fountain Darter (*Etheostoma fonticola*), San Marcos salamander (*Eurycea nana*), and the Comal Springs riffle beetle (*Heterelmis comalensis*) During the Implementation of Projects in the Upper San Marcos River, San Marcos, Hays County, Texas.*
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EXHIBIT 2

**Nonroutine Adaptive Management Proposal
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September 21, 2017**



(Sediment Removal and Impervious Cover/Water Quality Protection Measures)

Overview

This Report is issued in response to the Nonroutine Adaptive Management Process (AMP) proposal submitted by the Program Manager of the Edwards Aquifer Habitat Conservation Plan (EAHCP), dated August 1, 2017. Per 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 AMP. This Report presents the final recommendation of the EAHCP Stakeholder Committee concerning this Nonroutine AMP proposal.

Summary of the Nonroutine Adaptive Management Proposal

On August 1, 2017, the EAHCP Program Manager submitted the attached Nonroutine AMP proposal to the Science, Stakeholder, and Implementing Committees. The proposal involves modifying the Sediment Removal measures with efforts to focus on sediment prevention activities (§5.3.6 and §5.4.4) and modifying the Impervious Cover & Water Quality Protection measure (§5.7.6) to include the implementation of Water Quality Protection Plan activities.

Summary of September 21, 2017 Stakeholder Committee Discussion

At the September 21, 2017 Stakeholder Committee meeting, Alicia Reinmund-Martinez, HCP Director, provided a presentation – *Proposed Nonroutine Adaptive Management Proposal: City of San Marcos/Texas State University Sediment Removal and City of San Marcos/City of New Braunfels Impervious Cover-Water Quality Protection* – to the Committee. This presentation covered the following: 1) the AMP process, 2) the challenges and opportunities of sediment removal; 3) a comparative analysis between implementing storm water BMPs and sediment removal, 4) a summary of the COSM and CONB Water Quality Protection Plans, and 5) the Scientific Evaluation Report issued by the Science Committee in response to the Proposal.

Following this presentation, the Stakeholder Committee had a short discussion on the merits of the proposal. This section provides a summary of this discussion. It also includes the final motions taken by the Committee.

1) Cost Effectiveness due to Cost Sharing

Ms. Carol Patterson asked about whether this annualized capital cost, which is less annually than sediment removal, is also a shared cost between the City of San Marcos as well as utilization of other grant funds. Mr. Reinmund-Martinez said yes, that it was a shared cost and could be used as match for federally-funded projects.

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(Sediment Removal and Impervious Cover/Water Quality Protection Measures)

2) Specific Water Quality Protection Plan Projects

Mr. Nathan Pence clarified that this AMP proposal is not specifically about Sessom Creek or Landa Lake BMPs but rather a broader amendment that would affect Low Impact Development work in San Marcos and New Braunfels. The specific details regarding these efforts will go through the proper annual Work Plan and Funding Application process.

Mr. Myron Hess asked for clarification on the process for work plans and funding applications. Mr. Pence did correct his statement and confirmed that annual work plans and funding applications will go the prescribed review process - first through a Science Committee review and then through the Implementing Committee review. Mr. Pence stated that the Stakeholder Committee does not have a role in the work plan review, but if a Stakeholder Committee member has a request regarding a work plan, staff will always respond.

Final Motions by the Committee

Mr. Cary Betz provided a correction to the language in Nonroutine AMP Proposal to change the word "respected" to "respective." With that correction, Ms. Dianne Wassenich made a motion to approve, Ms. Carol Patterson seconded. There were no objections.

An expedited process whereby this Nonroutine AMP Stakeholder Report, reflecting the discussion of the Stakeholders concerns the proposed Nonroutine AMP proposal, would be approved by the Chair and Vice-Chair of the Stakeholder Committee was presented to the Committee for their consideration. Mr. Roger Biggers made a motion to approve the expedited process, Ms. Cindy Loeffler seconded. There were no objections.

Nature of Stakeholder Committee Decision

Twenty-two members of the Committee attended the September 21, 2017 meeting in attainment of a quorum for the meeting. Votes for both Committee actions concerning the Nonroutine AMP proposal were by consensus; there were not competing positions.

Stakeholder Recommendation

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

Attachments

- Nonroutine Adaptive Management proposal dated August 1, 2017

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(Sediment Removal and Impervious Cover/Water Quality Protection Measures)

- Nonroutine Adaptive Management Scientific Evaluation Report, EAHCP Science Committee, August 25, 2017
- Minutes from the September 21, 2017 Stakeholder Committee Meeting

EXHIBIT 3

**Adaptive Management Science Committee of the
Edwards Aquifer Habitat Conservation Plan***Scientific Evaluation Report:**Nonroutine Adaptive Management Proposal to*

Improve the Sediment Removal Conservation Measures and Introduce Low-Impact Development through City Water Quality Protection Plans as an aspect of the Impervious Cover & Water Quality Protection Measure.

August 25, 2017

OVERVIEW

This Scientific Evaluation Report¹ is issued in response to the Nonroutine Adaptive Management (AMP) proposal submitted by the HCP Program Manager dated August 1, 2017. The proposal calls to modify the activities of Sediment Removal measures (§5.3.6 & §5.4.4) and to forgo the initial concepts of the Impervious Cover/Water Quality Protection measure (§5.7.6) as originally contemplated. This action proposes to instead use the majority of the resources allocated to these original programs to fund community-based Water Quality Protection Plans (WQPPs) - which have been vetted through EAHCP Work Groups, EAHCP committees, City committees, and watershed planning stakeholder committees - to not only minimize and mitigate the impacts to the Covered Species, but to also contribute to the likelihood of their survival and recovery.

Once approved by the Chair and Vice-Chair or other designee of the Science Committee, this Scientific Evaluation Report will be presented for consideration by the Stakeholder Committee at its meeting on September 21, 2017.

SCIENTIFIC EVALUATION

The evaluation of this Nonroutine AMP proposal is based on the Science Committee's analysis of (1) whether enough information, of sufficient quality, exists to properly ascertain that the proposed modifications meet the basic EAHCP objective for this Measure, and (2) whether, also based on the review of the information provided, the modifications reasonably represent an improvement over the current provisions for the Sediment Removal and Impervious Cover/Water Quality Protection (HCP §5.3.6, §5.4.4 and §5.7.6) Measures in the EAHCP. Here, "improvement" refers to both an increase in reducing contamination associated with stormwater runoff and sedimentation that negatively affects Covered Species habitat (specifically Texas wild-rice).

EVALUATION OF INFORMATION PROVIDED

This reactive methodology has been the historical approach to sediment management and has proven costly and ineffective. As experience in implementing this measure was gained since 2013, issues were identified and, in parallel, possible alternative strategies

¹ According to the Funding and Management Agreement (2012), the Adaptive Management Science Committee is tasked with evaluating all Nonroutine Adaptive Management 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.

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Scientific Evaluation Report: Nonroutine AMP Proposal - Sedimentation Ponds

for addressing sediment loading at the headwaters were developed. Since 2013, sediment removal data has been collected and presented in the EAHCP Annual Reports that support the need to pursue an alternative strategy. Such strategies include a proactive approach that prevents, and/or mitigates for, sediment runoff in the watershed before it reaches the river to protect water quality and the Covered Species habitat.



Figure 1: Accumulation of sediment at the confluence of Sessom Creek at the San Marcos River before (left) and after (right) the October 2015 flood.

While the EAHCP specified sediment removal as the recommended strategy to manage sediment in the San Marcos River, excess sediment continues to be deposited through contributing creeks. This has been observed at Sessom Creek following the October 2015 flood (Figure 1) —evidence that this effort, is not effective and best use of funds. The sediment volume removed from 2013-2016, and the costs associated, can be seen in the data provided in Table 1.

Table 1: Yearly Sediment Removals and Costs for Spring Lake and the San Marcos River (Gleason 2017).

Year	Area (m ²)	Volume (m ³)	Est. Load (lb)	Cost
2013	106	48	169,509	\$151,800
2014	77	20	70,629	\$180,000
2015	284	85	300,173	\$219,450
2016	92	28	98,880	\$193,042
TOTAL	559	181	639,192	\$744,292

A sediment mitigation strategy is proposed to focus on sediment management and prevention at the source resulting in fewer impacts, and to be more sustainable and cost effective. Sediment removal in the river does not address the actual sources of sediment, such as upland and bank erosion, thus sedimentation impacts will likely be persistent and

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Scientific Evaluation Report: Nonroutine AMP Proposal - Sedimentation Ponds

recurring. Sediment prevention techniques could include stream restoration using Natural Channel Design (NCD) methods, stabilization of eroding stream beds and banks, riparian enhancement, and storm water best management practices (BMPs) that reduce erosive flows (see cost comparison in Table 2 below).

Table 2: Effectiveness of proposed restoration activities compared to Sediment Removal (Gleason 2017).

Metric	HCP Sediment Removal To Date	Proposed Stream Restoration and Stormwater BMPs
Pounds of TSS Removed per year	159,780	1.5x More
Total Capital Cost	\$744,292	Initial Investment 2x Greater
Annualized Cost (\$/yr.)	\$186,073	About Half the Cost
Annualized Cost per pound TSS removed	\$1.16	About One-third the Cost

In 2015, the COSM completed a WQPP (John Gleason LLC, 2017). This water quality protection planning document can be used as the basis of COSM's implementation of the measure calling for the establishment of a comprehensive program "to protect water quality and reduce the impacts of impervious cover". This program was carried out pursuant to COSM's commitment under the "Impervious Cover/Water Quality Protection" (§5.7.6) measure. Considerable research and technical analysis concerning the Spring Lake and Upper San Marcos River watershed, and how to best protect water quality, went into the WQPP. Additionally, a public vetting process was done by allowing the Stakeholder Committee for the Upper San Marcos River Watershed Protection Plan to comment on the suite of recommendations. Through this exercise, the WQPP identifies and recommends an array of structural elements, design features, and planning mechanisms to provide a comprehensive water quality protection program intended to enhance the survival and recovery of the Covered Species. The proposed restoration activities to proactively reduce sedimentation into the San Marcos river is included as a prioritized project under the COSM's WQPP.

Similarly, the City of New Braunfels developed a WQPP (Alan Plummer Associates, INC., 2017). The primary intent of CONB's WQPP is to identify opportunities for the implementation of low-impact development (LID) and storm water control measures to treat runoff prior to entering Landa Lake and the Comal River system. As previously discussed, the criteria for a LID rebate program to offer financial incentives to private businesses and landowners was developed by CONB in the first years of EAHCP implementation. It became apparent that the program would require significant financial resources solely to administer the rebate program, thereby reducing the amount of EAHCP funds available for the actual implementation of control measures. It was also

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Scientific Evaluation Report: Nonroutine AMP Proposal - Sedimentation Ponds

realized that publicly-owned infrastructure such as City parking lots, streets, and drainage ways had a greater potential to accumulate and transport sediment and pollutants to the Comal River system. In effect, the City abandoned the LID rebate program and is currently moving forward with implementing storm water control measures identified in the WQPP.



Figure 2: 2017 New Braunfels Water Quality Protection Plan (Alan Plummer 2017)

Specifically, the CONB WQPP identifies seven water quality projects (Figure 2) located within the Comal River watershed and in close proximity to the upper portions of the river system (i.e. Landa Lake and Upper Spring Run). The WQPP includes an analysis of project costs, pollutant removal efficiency, and maintenance requirements. All projects were presented to and approved by the CONB Watershed Advisory Committee; an appointed committee that represents the public's interest. The CONB's WQPP also includes recommendations for pursuing funding opportunities outside the EAHCP to implement storm water control measures that would protect water quality.

Ultimately, a source control approach; that is, reduce erosion and sedimentation in the watershed has been adopted by both COSM and CONB. This could be a less expensive and more sustainable approach than Instream sediment removal for COSM & TXSTATE.

PROPOSAL – SEDIMENT REMOVAL (§5.3.6 & §5.4.4)

- *Current provision:*

EXHIBIT 3

Scientific Evaluation Report: Nonroutine AMP Proposal - Sedimentation Ponds

The EAHCP has identified increased rates of sedimentation, due in part to increased urbanization, in the San Marcos River. This is believed to threaten Texas wild-rice (*Zizania texana*), one of the EAHCP Covered Species (EARIP, 2012; see Earl & Wood, 2002). Sedimentation is thought to impact Texas wild-rice by smothering or burying stands, leading to increased mortality and reduction of suitable habitat. In response, through the EAHCP, the City of San Marcos (COSM) & Texas State University (TXSTATE) committed to implement measures to mitigate and minimize these impacts. Sediment removal (via hydrosuction) was the sole method contemplated in the EAHCP to reduce the threat sediment loading presents to Texas wild-rice survival and enhancement.

- *Proposed replacement:*

Sediment Removal measures (§5.3.6 & §5.4.4), will be limited to the required maintenance of key Covered Species habitat areas, such as existing Texas wild-rice stands. These efforts will be performed using hydrosuction or mechanical equipment. Instead, the focus of sediment management measures will be on implementing sediment mitigation and prevention strategies through the Impervious Cover/Water Quality Protection strategy.

PROPOSAL – IMPERVIOUS COVER/WATER QUALITY PROTECTION (§5.7.6)

- *Current provision:*

The EAHCP contemplated mitigating for non-point source pollution through the Impervious Cover/Water Quality Protection Recovery measure (§5.7.6). According to this measure, the COSM and City of New Braunfels (CONB) are to implement low-impact development (LID) programs near the springs ecosystems. This effort was considered through the EARIP LID/Water Quality Work Group and recorded in their final report (Appendix Q of the EAHCP) (EAHCP Appendix Q). These programs were intended to mitigate for pollution from nonpoint sources such as parking lots and residential lawns; especially during periods of low-flow where pollutant presence could reduce the survivability of the Covered Species.

- *Proposed replacement:*

As stated above, in San Marcos, implementation of the Impervious Cover/Water Quality Protection measure will focus on sediment mitigation and/or prevention. This strategy, as discussed, will include the implementation of low impact development (LID) best management practices (BMPs) prioritized in both the WQPP as well as through an EAHCP water quality work group. Similarly, in New Braunfels, a strategy will include the implementation of LID BMPs - such as the construction of a stormwater treatment device - prioritized in a WQPP through a City advisory committee, to improve the quality of runoff into Landa Lake and the Comal River.

EXHIBIT 3

Scientific Evaluation Report: Nonroutine AMP Proposal - Sedimentation Ponds**CONCLUSION**

Considering the information provided, and the lack of progress made in effectively removing sediment from the San Marcos river, as well as incentivizing private landowners to invest in storm water protection measures on their property in and around the Comal and San Marcos Springs, the Science Committee finds that the proposed modifications meet the basic EAHCP objective for this Measure. Additionally, the Science Committee finds that the modifications represent a significant improvement over the current provisions for the Sediment Removal and Impervious Cover/Water Quality Protection Measures in the EAHCP. See specific discussion in the transcript below:

Transcript from Science Committee Meeting on August 7, 2017:

Mr. Pence discussed the structure, status, and strategy for implementing a nonroutine adaptive management proposal for sediment loading mitigation.

In Comal, the private landowner incentive program has had minimal interest. Thus, through the nonroutine adaptive management proposal, funding will be reassigned and applied to investing in BMPs on City property.

In San Marcos, sediment deposition can not only smother and displace, but also kill vulnerable stands of Texas wild-rice. Through the nonroutine adaptive management process, funding will be reassigned and applied to more proactive measures for managing sediment loading in the San Marcos River. Dr. Mace promoted the proactive approach and approved of AMP still allowing for hydrosuction if needed. Dr. Lamon stated that it's a good approach to address the sedimentation issue closer to the source.

Dr. Duke noted that this measure is an excellent example of what the EAHCP is about. She also inquired about conservation measures for future development. Mr. Pence emphasized that the COSM and CONB watershed managers are working closely with the planning departments and have standards in place. Mr. Enders, CONB watershed manager, replied that they have restrictions for impervious cover on areas that are greater than or equal to 30 percent impervious cover or if the impervious area is equal to or greater than 5,000 m².

EXHIBIT 3

Scientific Evaluation Report: Nonroutine AMP Proposal - Sedimentation Ponds**REFERENCES**

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

- Alan Plummer Associates, Inc. 2017. *Edwards Aquifer Habitat Conservation Plan Impervious Cover and Water Quality Protection – 5.7.6 Water Quality Protection Plan: Phase I*.
- City of San Marcos. 2004. *Environmental Assessment/Habitat Conservation Plan for Issuance of an Endangered Species Act Section 10(a)(1)(B) Permit for the Incidental Take of the Fountain Darter (*Etheostoma fonticola*), San Marcos salamander (*Eurycea nana*), and the Comal Springs riffle beetle (*Heterelmis comalensis*) During the Implementation of Projects in the Upper San Marcos River, San Marcos, Hays County, Texas*.
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- John Gleason LLC. 2017. *Water Quality Protection Plan for the City of San Marcos and Texas State University*. Prepared for the City of San Marcos.

ATTACHMENTS

- Attachment 1: Science Committee Agenda
- Attachment 2: Science Committee Minutes - Unofficial

EXHIBIT 4

**NOTICE OF OPEN MEETING**Available at eahcp.org

As jointly determined by the Implementing Committee and the Program Manager (FMA §7.9.3.b), the **San Marcos Water Quality Protection Work Group** has been formed to provide scientific review and input on questions related to the City of San Marcos' implementation of the Edwards Aquifer Habitat Conservation Plan (EAHCP) "Impervious Cover/Water Quality Protection" Measure (HCP §5.7.6). The San Marcos Water Quality Protection Work Group is comprised of members selected from the EAHCP Adaptive Management Science Committee as well as subject matter experts endorsed by the Science Committee for this purpose. A meeting of this Work Group for the EAHCP is scheduled for **Tuesday, July 18, 2017, at 9 a.m. at the San Marcos Activity Center (Room 1), 501 E. Hopkins St., San Marcos, Texas 78666**. Lunch will be provided; the meeting is expected to end by 4 p.m. Work Group members are asked to please RSVP to dlarge@edwardsaquifer.org.

Members of this Work Group include: Charlie Kreidler, Glenn Longley, Jackie Poole, Shaun Condor, Ben Schwartz, and Aarin Teague.

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

1. Call to order.
2. Public comment.
3. Presentation of the San Marcos Water Quality Protection Work Group charge (Attachment 1).
Purpose: To provide the Work Group with information on its charge.
Action: None required.
4. Presentation and possible endorsement of EAHCP staff recommendation of the Sessom Creek watershed as the priority for the City of San Marcos' "Impervious Cover/Water Quality Protection" (HCP §5.7.6) project implementation. (Attachment 2)
Purpose: To obtain input from the Work Group on the proposal to prioritize the Sessom Creek watershed for project implementation and to possibly obtain their endorsement of said proposal.
Action: To obtain Work Group input and to possibly endorse the proposed prioritization of the Sessom Creek watershed.
5. Presentation and possible endorsement of prioritizing the proposed list of water quality protection projects identified for implementation in the chosen watershed. (Attachment 2)
Purpose: To obtain input from the Work Group on the proposed prioritization of water quality protection projects identified for implementation and to possibly obtain their endorsement of said proposal.
Action: To obtain Work Group input and to possibly endorse the proposed prioritization of water quality protection projects
6. Questions and comments from the public.
7. Adjourn.

EXHIBIT 4



SAN MARCOS WATER QUALITY PROTECTION WORK GROUP MEETING MINUTES – JULY 18, 2017

Available at eahcp.org

1. Call to order.

Nathan Pence called the meeting to order at 9:09. Mr. Pence provided opening comments and thanked the Work Group members for their participation and contribution to transparency and the public process.

2. Public comment.

There were no public comments.

3. Presentation of the San Marcos Water Quality Protection Work Group charge.

Alicia Reinmund-Martinez provided an overview of the Work Group charge, including an introduction to the EAHCP's adaptive management process. Dr. Chad Furl presented a review of the physical and ecological impacts associated with increased rates of sedimentation that is being experienced in the San Marcos River. Melani Howard provided a presentation of the City of San Marcos and Texas State University's performance data from EAHCP sediment removal efforts to date under measures 5.3.6 and 5.4.4. Dr. Furl and Ms. Reinmund-Martinez provided a summary stating that sediment removal efforts have proven time-intensive, costly, and problematic, and, overall, a reactive strategy to the problem of excessive sediment loading in the San Marcos. John Gleason introduced the Water Quality Protection Plan (WQPP) developed by his firm on behalf of the City of San Marcos in support of the City's EAHCP water quality protection measure. This WQPP provided the original basis for some of the ideas for retrofits that are being considered today by the Work Group, specifically, stream restoration and BMPs in the Sessom Creek watershed.

4. Presentation and possible endorsement of EAHCP staff recommendation of the Sessom Creek watershed as the priority for the City of San Marcos' "Impervious Cover/Water Quality Protection" (HCP §5.7.6) project implementation.

Dr. Furl provided an overview of the criteria used and analyses undertaken to prioritize which of the contributing watersheds to the San Marcos River (Sessom, Willow Springs, Purgatory, and Sink creek watersheds) should be targeted for EAHCP water quality protection implementation, identifying Sessom as exhibiting some of the highest problem indices (e.g., percent impervious cover, highly erodible land, average channel slope, etc.).

Dr. Ben Schwartz provided an overview of the nature of the watersheds in relation to the recharge zone as well as efforts to date to monitor sediment loading to the river. Dr. Schwartz did comment that in the lower Purgatory there is a well that gets inundated during large storm events in which endangered species have been recorded. Dr. Schwartz also commented that springs around lower Sessom discharge into a concrete channel which is not appropriate to be considered habitat; however, the springs do reflect connectivity into the aquifer (to a limited extent) suggesting this reach is not totally without habitat value.

Mr. Gleason introduced information on the existing conditions in the middle Sessom Creek watershed and presented his team members Pat Hartigan (primary white paper author and technical lead on the Sessom Creek analysis) and Lee Sherman (primary author of the retrofit section of the WQPP). Mr. Hartigan discussed exposed wastewater lines in the watershed and other geomorphological evidence observed in the watershed indicating major problems with instability and erosion.

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Dr. Furl discussed the Sessom Creek confluence with the river, noting that the confluence flows into the Spring Lake dam reach which provides habitat for Texas wild-rice and is the only area of the river where the TPWD State Scientific Area stretches from bank to bank. Dr. Furl also presented the latest published bio-monitoring mapping for Texas wild-rice showing stands growing in the confluence area.

Mr. Hartigan provided an overview of the other watersheds, noting the Willow Springs, Purgatory, and Sink creek watersheds variously exhibit comparatively less instability and some retardation of flows from Soil Control Service dams.

Dr. Schwartz commented on Sink Creek, noting that the tributaries coming off Hillside Ranch Apartments (1 and 2; accessible off Ramsey Street) are like Sessom, rapidly downcutting and contributing to sediment flows to Spring Lake.

Shaun Condor commented that since the City will already be out working on the wastewater line project it would be good to get both projects (wastewater lines and water quality protection) done at the same time.

Charlie Kreidler commented that, although Sessom Creek watershed may be the priority for this exercise, the other watersheds should also be considered through the EAHCP process to head off the development of hydrologic problems in them that are like Sessom once they become more urbanized. Mr. Gleason commented that City of San Marcos land development regulations would govern this development.

Glenn Longley stated he has no problem prioritizing Sessom Creek watershed; Dr. Schwartz seconded Dr. Longley's endorsement. There was no opposition.

5. Presentation and possible endorsement of prioritizing the proposed list of water quality protection projects identified for implementation in the chosen watershed.

Ms. Reinmund-Martinez presented the proposed list of water quality protection projects identified for implementation in the chosen watershed. Dr. Furl provided an overview of the prioritization of the middle reach of the Sessom Creek watershed over either the upper or lower reaches of the watershed.

Mr. Hartigan discussed the proposed stream restoration for "Reach 2" (the middle reach), noting that the project would be based on natural design principles and that fluvial geomorphology and equilibrium theory will be applied to create stable channels.

Dr. Longley asked what specific techniques would be used to stabilize the channel. Dr. Aarin Teague asked what the Rosgen stream classification is; Mr. Sherman explained they are not proposing to use the Rosgen model, but rather a process-based methodology focused on the end goal of establishing a channel in equilibrium.

Dr. Teague asked what the proposed riparian buffer width would be; Mr. Sherman replied they do not know yet. Dr. Schwartz mentioned that there is extensive *Ligustrum* [an invasive exotic species] growth in the watershed just upstream from LBJ, would part of the plan involve removal? Ms. Howard answered that, on a volunteer basis, off the Windmill Tributary, for about 6 months they've been removing Chinese tallow, *Ligustrum*, and Chinaberry, and spreading seed, and thus far, it has been working—so she'd envision continuing these volunteer efforts.

Mr. Hartigan brought up that while stream restoration is a major focus, drainage issues and public safety will also require attention in the scope of the project. Mr. Hartigan reviewed the evaluation criteria used in the assessment of various water quality protection projects under consideration

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(sediment loads and load reductions, cost, and cost effectiveness). Mr. Hartigan proceeded to present each of the individual projects under consideration and the various performance metrics calculated for them.

Dr. Teague commented that the research that went into the WERF guidelines was highly variable and based on a wide variety of case studies, meaning that following these guidelines should be understood to involve a high degree of uncertainty.

Ben Schwartz asked if there were any opportunities to install BMPs upstream of the middle reach to preemptively mitigate erosive flows hitting the middle reach. Mr. Hartigan answered that there were around a half a dozen smaller scale opportunities, including some major ones (e.g., "The Gulch" and "Sessom Creek Wet Pond") that are under consideration through the Water Protection Plan (WPP) process. Dr. Schwartz commented that Dr. Weston Nowlin's class studied the pond and found that there was no loss of loading in the pond and the average residence time was 12 minutes, with the caveat that this was an unpublished class project.

Open Intermission for Comments and Questions from the Public and the Work Group

Dr. Longley asked what the wastewater renovations plans are for the City. Mr. Condor answered that the City will put a stub out to the west of LBJ, bore a sewer line all the way west. Existing sewer will be cut out and filled with foam. Dr. Teague asked if the City has an MS4 permit; Ms. Howard answered that yes. Dr. Teague asked if the streets in the area affected provide the conveyance; Mr. Condor answered that there are no streets around the wastewater line work.

Ken Diehl commented that there is an MS4, 319, HCP, and funds from City for sewer relocation; there has been a significant effort to delineate those costs and activities, and this collaboration needs to be clear. Mr. Pence responded that as Program Manager it falls to him to ensure that HCP funds are being used appropriately; while the collaboration is complex and challenging, the team has been holding bimonthly planning and coordination meetings. It is on us as project managers to observe and maintain appropriate boundaries. While a challenge, Mr. Pence expressed he feels that this will pay off in the end.

Dr. Teague asked if there is a delineated floodplain associated with the project area ("AE zone" in FEMA terminology); Mr. Sherman responded that he does not believe there is, Mr. Condor and Mr. Hartigan also added that there is not. Dr. Teague asked about permitting costs and whether a Nationwide 27 permit would be required. Shaun Payne answered that the EAHCP is consulting with HDR to assess whether this will be necessary and it appears to be likely. Ms. Reinmund-Martinez added that this will become more clear over the course of the Preliminary Engineering Report exercise. Dr. Teague also asked whether any cultural resources are expected to be encountered during the work, which will also have impact on permitting. Ms. Reinmund-Martinez answered that the EAHCP is consulting with Amatererra to consider this question.

Dr. Kreitler commented that stream restoration addresses Sessom Creek, but does not address the urban runoff problem above the creek. Alicia answered that in the previous discussion the City would be considering projects in other areas upstream through 319 processes. Dr. Longley added the question of whether there have been any efforts to capture rainfall onto new development. Mr. Hartigan responded that there are some options being considered through other processes (besides EAHCP) but that overall the strategy of achieving equilibrium is itself a response to the reality of limitations on controlling existing hydrology.

Dr. Kreitler asked about the issue of flow velocity in relation to Texas wild-rice. Mr. Sherman responded it is not clear whether high or low velocity is the issue, since wild-rice may benefit from

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clearing sediment. Ms. Howard commented that the primary problem at the confluence is not scouring, but rather deposition of sediment that can bury wild-rice stands.

Dr. Teague asked what a flood looks like in Sessom Creek; does the creek overbank? Dr. Schwartz responded that it goes quickly from no or base flow to inundating the road. When it overbanks, it's in the road in the lower reach. In the middle and upper reaches he has not observed how the creek behaves.

Mr. Diehl asked if there has been any consideration of land use restrictions associated with water quality protection (e.g., impervious cover limitations, conservation easements, etc.). Mr. Hartigan responded that the answer is yes in the recharge zone. The City has a 20% impervious cover limit in the recharge zone; San Marcos River Foundation (SMRF) also emphasizes land conservation. Dianne Wassenich stated the new Land Development Code which is being finalized should also include enhanced water quality protection measures, while SMRF is buying land above Spring Lake in rural areas. Mr. Hartigan commented that the City is adopting an increased focus on headwater protection which should play a role in preventing "future Sessoms."

Dr. Kreitler asked whether the group had consulted the City of Austin Department of Watershed Protection. Mr. Sherman answered that he has professional connections with the director of the department and is in correspondence with him.

Dr. Teague asked the elevation of the watershed. Mr. Sherman and Mr. Hartigan answered that they could provide this information to Dr. Teague later in the day if it would be helpful.

Dr. Schwartz asked if the City had talked to any of the apartment complexes to inquire whether they would be interested in working with the City on some of the smaller BMPs. Ms. Howard answered that there have been beginning efforts to engage the apartments with other projects (litter, etc.) but had not begun conversations about BMP work. Mr. Sherman commented that the situation is somewhat fortunate in that there is a lot of development left to go, allowing for some problems to be avoided. Once urbanization takes place, then all that is left is redevelopment regulations. Mr. Sherman added that he guessed he is hopeful for the day when we all have flying cars and streets can be taken out. Ms. Wassenich discussed redevelopment districts in the Land Development Code process and the problem with that is that even old apartment complexes are too profitable to incentivize redevelopment.

Mr. Hartigan commented that rigorous study was conducted by HDR for the City of Austin based on critical shear stress value for central Texas streams; if you capture this much volume and hold it for 48 hours, you obtain a stream protection curve factoring volume and stream protection and to control it for urbanization. A study is available, which Alicia will send to the Work Group along with the thesis referenced in the white paper.

Mr. Gleason noted that the majority proportion of sediment coming out of the watershed comes from the instream load and not upstream runoff, hence the strategic emphasis on stream restoration rather than upland sources.

Dr. Schwartz asked about the bike lane project and its relation to this work. Mr. Condor answered that the bike sidewalk will not run through the Sessom Creek watershed. Ms. Wassenich asked about whether pervious pavement was being considered; Mr. Condor answered that the City has been experiencing maintenance issues with this material, but is open to considering it. Mr. Sherman noted that current formulations are tricky to implement and he is not aware of satisfactory, cost effective substitutes. Mr. Diehl mentioned that load bearing has also cropped up as an issue with certain pervious pavement materials in relation to accessibility for large fire trucks, and that this should be considered.

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Dr. Kreidler asked whether it might be an option to leave out option 3A since it seems least effective. Dr. Schwartz commented what happens if certain options are left out; would the City pick up the bill on what is left out? Ms. Howard and Ms. Reinmund-Martinez answered that the EAHCP could cover the cost of projects 2 and 3B.

Mr. Condor motioned to endorse the proposed prioritization of water quality protection projects; Jackie Poole seconded the motion. There was no opposition.

Mr. Diehl asked what the monitoring expectations are for the EAHCP; Dr. Furl answered that this is already underway through Expanded Water Quality Monitoring operations, but a specific project will also be undertaken through the Applied Research Program.

Dr. Schwartz commented that this comes down to Texas State University and the City continuing to work together and with the apartment complexes to retrofit existing sources of impervious cover. With the steep narrow stream channel, the issue of fixing the hydrology will persist.

6. Questions and comments from the public.

There were no public comments or questions.

7. Adjourn.

Ms. Reinmund-Martinez adjourned the meeting at 11:48 a.m.

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**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 **Monday August 7, 2017 at 9 a.m. at the San Marcos Activity Center (Multipurpose Room), 501 E. Hopkins, San Marcos, Texas, 78666**. The meeting is expected to end by 3 p.m. and will include a 30-minute lunch break. Lunch will be provided. To provide a head count, all attendees are asked to please RSVP to ktolman@edwardsaquifer.org by Wednesday, August 2nd.

Members of this committee include: Tom Arsuffi, Janis Bush, Jacquelyn Duke, Charles Kreidler, Conrad Lamon, Glenn Longley, Robert Mace, Doyle Mosier, Chad Norris, Jackie Poole, and Floyd Weckerly.

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

1. Call to order.
2. Public comment.
3. Approval of May 10, 2017 Science Committee meeting minutes (Attachment 1).
4. Receive report from the Program Manager.
 - Spring systems hydrologic update
 - Response to Science Committee member questions from last meeting
 - Hydro model update
 - Refugia operations update
 - National Academy of Science *Report 2 Implementation Plan*
 - Potential changes to Comal Springs riffle beetle bio-monitoring sampling

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5. Presentation of the 2016 Applied Research results: *Evaluation of the trophic level status and functional feeding group categorization of larvae and adult Comal Springs riffle beetle* (Attachment 2).
Purpose: To present the results of the Applied Research project.
Action: None required.
6. Presentation on 2018 Applied Research projects Scopes of Work (SOW) (Attachment 3).
Purpose: To provide the Science Committee the opportunity to review and comment on the science-related aspects of the 2018 Applied Research projects SOW.
Action: None required.
7. Presentation of the Ecological Model (EcoModel) workshop and EAHCP Phase 2 considerations.
Purpose: To provide the Science Committee with information on the EcoModel workshop and EAHCP Phase 2 considerations.
Action: None required.
8. Presentation, discussion, and possible recommendation of the Nonroutine Adaptive Management proposal related to the City of San Marcos (COSM) and Texas State University's Sediment Removal Measures (§§5.3.6 and 5.4.4) and the Impervious Cover/Water Quality Protection Measure (§5.7.6) (Attachment 4).
Purpose: To provide the opportunity for the Science Committee to discuss and possibly recommend the Nonroutine Adaptive Management proposal to the Stakeholder Committee.
Action: To possibly recommend the Nonroutine Adaptive Management proposal to the Stakeholder Committee.
9. Presentation and possible endorsement of an expedited process to prepare and to submit the Nonroutine Adaptive Management Scientific Evaluation Report, with Science Committee Chair and Vice-Chair approval, 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.
10. Consider future meetings, dates, locations, and agendas.
 - Science Committee Meeting, November 8th, 2017, San Marcos Activity Center (Multipurpose Room).
11. Questions and comments from the public.
12. Adjourn.

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**NOTICE OF OPEN MEETING**Available at eahcp.org**August 7, 2017 Meeting Minutes****1. Call to order.**

Vice Chair, Dr. Weckerly called the meeting to order at 9:05 a.m. Members present include Janis Bush, Jacquelyn Duke, Conrad Lamon, Glenn Longley, Robert Mace, Doyle Mosier, Chad Norris, Jackie Poole, and Floyd Weckerly. Tom Arsuffi and Charles Kreidler advised prior to the meeting that they were unable to attend.

Dr. Weckerly proposed an agenda sequence change to move item 7 to the last item, due to the fact that a few members had already attended the previous EcoModel meetings and agenda adaptive management items 8 and 9 are require a quorum from the group.

2. Public comment.

No public Comment

3. Approval of May 10, 2017 Science Committee meeting minutes (Attachment 1).

Dr. Longley motioned to approve the minutes as written; Dr. Mosier seconded. No opposition.

4. Receive report from the Program Manager.**▪ Spring systems hydrologic update**

Dr. Furl provided a presentation to the committee on recent hydrologic conditions at the spring systems including daily, monthly, and annual trends. The Edwards Aquifer region has received below average rainfall this year and is currently in Stage 1 Drought Restrictions. However, substantial flooding on the morning of this meeting may change aquifer levels in the coming days.

▪ Response to Science Committee member questions from last meeting

No pending questions from the prior meeting.

▪ Hydrologic model update

Dr. Furl presented a brief overview of the Edwards Aquifer Authority's hydrologic modeling efforts. Their final interim report should be submitted in August 2017.

▪ Refugia operations update

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Dr. Furl presented a summary of Refugia collection and facility construction efforts. The construction request for proposals (RFP) are available on the FedConnect portal.

- **National Academy of Science Report 2 Implementation Plan**

Mr. Pence presented the status and process for developing an EAHCP Implementation Plan based on the National Academy of Science Report 2 suggestions. The NAS 2 Work Group will present their Implementation Plan report to the Implementing Committee for potential adoption on August 17, 2017.

- **Potential changes to Comal Springs riffle beetle bio-monitoring sampling**

Dr. Furl discussed the recent changes to the Comal Springs riffle beetle sampling procedures.

5. Presentation of the 2016 Applied Research results: Evaluation of the trophic level status and functional feeding group categorization of larvae and adult Comal Springs riffle beetle (Attachment 2).

Dr. Nowlin presented an overview of his 2016 applied research on the trophic level status and functional feeding groups of the Comal Springs riffle beetle (CSRB). Through complex isotope analyses, findings suggest that the CSRB prefer woody debris or coarse organic material and have similar food preferences between larvae and adults.

Dr. Weckerly noted that for complex invertebrates, they generally have different feeding preferences at different life stages. Dr. Nowlin replied that it depends on the species and habitat conditions. CSRB larvae may eat similar materials to that consumed by adults, but there are slight differences in that the larvae prefer finer gravel while the adults are found in slightly larger gravel.

Dr. Weckerly inquired about people finding CSRB in wells, whereas, we generally find them at the springs. Dr. Nowlin replied that although they are an aquifer-dependent species, they still have eyes and respond to light which infers that they are not entirely a subterranean species; it depends on where you are within the aquifer. The complexity of the Comal Springs food webs play an important role in the distribution of the CSRB.

6. Presentation on 2018 Applied Research projects Scopes of Work (SOW) (Attachment 3).

Dr. Furl presented a list and proposed scopes of work for the applied research program. The evaluation of SAV treatment has been removed from the list due to project design and lack of ability to isolate and control the variables within the river.

Mr. Pence discussed the ecosystem services of the EAHCP analysis. There is consensus from regional entities on the utility and need for one, however, the research project lacks the funding

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necessary to conduct the analysis. The EAHCP supports research efforts if another entity finds the means to pay for the research.

Dr. Furl presented an overview of the new Sessom Creek scope of work. A new flow meter and radar station will be set-up on the creek to monitor and capture loading characteristics. Dr. Lamón noted the bias associated with load duration curves derived from short-term monitoring and suggested that the station be a more long-term installation to better assess general trends.

7. Presentation, discussion, and possible recommendation of the Nonroutine Adaptive Management proposal related to the City of San Marcos (COSM) and Texas State University's Sediment Removal Measures (§§5.3.6 and 5.4.4) and the Impervious Cover/Water Quality Protection Measure (§5.7.6).

Mr. Pence discussed the structure, status, and strategy for implementing a nonroutine adaptive management proposal for sediment loading mitigation. In San Marcos, sediment deposition can not only smother and displace, but also kill vulnerable stands of Texas Wild-rice. In Comal, the private landowner incentive program has had minimal interest. Through the nonroutine adaptive management process, funding will be reassigned and applied to more proactive measures instead of reactive.

Dr. Mace promoted the proactive approach and approved of AMP still allowing for hydrosuction if needed.

Dr. Lamón stated that it's a good approach to address the sedimentation issue closer to the source.

Dr. Duke noted that this measure is an excellent example of what the EAHCP is about. She also inquired about conservation measures for future development. Mr. Pence emphasized that the COSM and CONB watershed managers are working closely with the planning departments and have standards in place. Mr. Enders, CONB watershed manager, replied that they have restrictions for impervious cover on areas that are greater than or equal to 30 percent impervious cover or if the impervious area is equal to or greater than 5,000 m².

Dr. Weckerly motioned to approve recommendation of the Nonroutine Adaptive Management proposal to the Stakeholder Committee; Glenn Longley seconded. No opposition.

8. Presentation and possible endorsement of an expedited process to prepare and to submit the Nonroutine Adaptive Management Scientific Evaluation Report, with Science Committee Chair and Vice-Chair approval, to the Stakeholder Committee.

Dr. Weckerly motioned to approve recommendation of the Nonroutine Adaptive Management proposal to the Stakeholder Committee; Dr. Mace seconded. No opposition.

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9. Presentation of the Ecological Model (EcoModel) workshop and EAHCP Phase 2 considerations.

Dr. Furl presented an overview of the EcoModel structure and utility. Dr. Lamon expressed concern about the need for an uncertainty analysis to help quantify the accuracy of the model. Mr. Pence explained that the model has been calibrated and the contract has expired, however, that does not preclude potential future improvements to the model if deemed necessary.

10. Consider future meetings, dates, locations, and agendas.

- Science Committee Meeting, November 8th, 2017, San Marcos Activity Center (Multipurpose Room).

11. Questions and comments from the public.

No questions or comments from the public.

12. Adjourn: 1:40 p.m.

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**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 21st, 2017 at the City of San Marcos Activity Center (Room 1), 501 E. Hopkins, San Marcos, TX, 78666**. Lunch will be provided for committee members at 12:00 p.m.

1. Call to order--Establish that all Committee members are present or represented- 9:00 a.m.
2. Public Comment.
3. Approval of minutes from the March 16th and June 15th Stakeholder Committee meetings (Attachment 1 & 2).
4. Receive report from the Program Manager on general updates about the Habitat Conservation Plan.
 - Springflow and Index Well levels
 - Collaboration in Grant Funded Projects
 - Hydrologic Modeling Workshop
 - Modeling and Phase II timeline
 - NAS Report 3 (Attachment 3)
 - 2018 SH and IC meeting dates (Attachment 4)
 - Zebra Mussel Monitoring
5. Discussion and possible recommendation on the Sediment Removal and Impervious Cover/Water Quality Protection Nonroutine Adaptive Management (AMP) Proposal (Attachments 5 & 6).

Purpose: To provide an opportunity for the Stakeholder Committee to discuss a recommendation on the Sediment Removal and Impervious Cover/Water Quality Protection Nonroutine AMP Proposal.

Action: To make a recommendation on the Sediment Removal and Impervious Cover/Water Quality Protection 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 7).

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Purpose: To present a potential expedited process to develop and submit the written report reflecting the Stakeholder Recommendation on the Sediment Removal and Impervious Cover/Water Quality Protection Nonroutine AMP Proposal.

Action: To approve a process to develop, approve, and submit the Stakeholder Report to the Implementing Committee.

7. Presentation and discussion regarding the Aquifer Storage and Recovery (ASR) Nonroutine Adaptive Management Process (AMP) and timeline.

Purpose: To inform the Stakeholder Committee of the upcoming ASR AMP and to answer any questions the Committee may have.

Action: No action required

8. Presentation of the Ecological Model workshop and EAHCP Strategic Adaptive Management considerations.

Purpose: To provide the Committee an update on EAHCP staff's progress and the Ecological Modeling workshop.

Action: No action required

9. Presentation regarding the NAS *Report 2* Implementation Plan (Attachment 8 & 9).

Purpose: Present the Implementation Plan approved by the Implementing Committee.

Action: No action required.

10. Presentation and discussion of the National Academy of Sciences *Report 2* Recommendations Issues List.

Purpose: To provide the Implementing Committee information regarding issues from the NAS *Report 2* recommendations

Action: No action required.

11. Presentation of the 2017 Budget Work Group Report (Attachment 10).

Purpose: To present the 2017 Budget Work Group report to the Implementing Committee for possible approval.

Action: To approve the adoption of the 2017 Budget Work Group Report as presented

12. Consider future meetings, dates, locations, and agendas.

- Next meeting will be held on December 14th at the Edwards Aquifer Authority.

13. Questions from the public.

14. Adjourn

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**STAKEHOLDER COMMITTEE
MEETING MINUTES**

SEPTEMBER 21, 2017

1. **Call to order--Establish that all Committee members are present or represented- 9:06 a.m.**
Steve Raabe, Chairman of the Stakeholder Committee, called roll. There was a quorum of the committee present.
2. **Public Comment.**
No comment.
3. **Approval of minutes from the March 16th and June 15th Stakeholder Committee meetings.**
Dianne Wassenich made a motion to approve. Myron Hess seconded the motion. There were no objections.
4. **Receive report from the Program Manager on general updates about the Habitat Conservation Plan.**
 - **Springflow and Index Well levels**
Chad Furl, Chief Science Officer for the EAHCP, provided a summary of recent hydraulics for the springs and aquifer.
 - **Collaboration in Grant Funded Projects**
Alicia Reinmund-Martinez, EAHCP Director, provided a brief presentation on some of the collaborative efforts to access some grants for EAHCP projects.
 - **Hydrologic Modeling Workshop**
Nathan Pence, EAHCP Program Manager, mentioned that a Hydrologic Model Workshop for the Stakeholders and Science Committee members sometime in the fall of 2017.
 - **Modeling and Phase II timeline**
Mr. Pence provided a brief description about the timeline regarding the hydrologic model and use through Phase II and Strategic AMP.
 - **NAS Report 3**
Mr. Pence provided a brief description of the NAS Report 3 SRP membership, timeline, and scope of the final NAS report. Additionally, Mr. Pence describes how Report 3 will provide specific feedback on Biological Goals.
Dianne Wassenich thanked EAHCP staff for including the Stakeholder Committee members in all NAS workshops and meetings.
 - **2018 Stakeholder and Implementing Committee meeting dates**
Mrs. Reinmund-Martinez presented the proposed dates for the Stakeholder Committee meetings for 2018.
 - **Zebra Mussel Monitoring**
Mr. Pence discussed bringing together a group of Stakeholders that have jurisdiction in and around areas that are or could be affected by the presence of zebra mussels in the Guadalupe basin. Monitoring will be committed to but possibly proactive research could be a part of next

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steps to protect the springs systems from future infection. There was a discussion regarding zebra mussel propagation and who are the agencies that currently monitor and research the zebra mussel. Todd Votteler, GBRA, mentioned the possible propagation issues through those who train for the Texas Water Safari. Additionally, Mr. Votteler mentioned a comprehensive look at this issues, including the quagga mussel.

Mr. Raabe mentioned that San Antonio River Authority will work with TPWD to start monitoring the San Antonio River.

- **REI/LOOP Tour**

Shaun Payne, EAHCP staff, presented some photos from a recent tour of the San Marcos system.

5. Discussion and possible recommendation on the Sediment Removal and Impervious Cover/Water Quality Protection Nonroutine Adaptive Management (AMP) Proposal.

Mrs. Reinmund-Martinez presented the details pertaining to the Sediment Removal and Impervious Cover/Water Quality Protection Nonroutine Adaptive Management Proposal. This proposal has been presented and approved by the Science Committee (resulting in the Scientific Evaluation Report). The full presentation can be found on eahcp.org.

Mr. Pence described that this AMP proposal includes limitation of sediment removal for “emergency” needs as well as expand sediment removal methods to include mechanical means not just suction dredge (as is currently stated in the EAHCP).

Carol Patterson asked about whether this cost, which is less annually than sediment removal, is also a shared cost between the City of San Marcos as well as utilization of other grant funds. Mrs. Reinmund-Martinez concurred. Mr. Pence clarified that this AMP proposal is not specifically about Sessom Creek or Landa Lake BMPs but rather a broader amendment that would affect LID work in San Marcos and New Braunfels. The specific details regarding these efforts will go through the proper annual Work Plan and Funding Application process.

One correction to the language in Nonroutine AMP Proposal to change “respected” to “respective.”

Dianne Wassenich made a motion to approve the AMP proposal. Carol Patterson seconded the motion. There were no objections.

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

Mrs. Reinmund-Martinez requested an action regarding the method of approval of the Stakeholder Report required to present to the Implementing Committee for final AMP approval.

Roger Biggers made a motion to approve the expedited process; Cindy Loeffler seconded the motion. There were no objections.

Mr. Pence provided a summary of the details associated with Sessom Creek restoration work intended to reduce sediment loading into the upper portion of the San Marcos River. Mr. Raabe

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mentioned that the San Antonio River Authority has developed some regional material to restore watersheds much like Sessom Creek. Mr. Pence mentioned that Aarin Teague has volunteered to help develop some of the efforts in San Marcos.

Mr. Pence continued by explaining some of the WQPP efforts in New Braunfels that implement stormwater BMPs around Landa Lake. It was communicated that all efforts in both San Marcos and New Braunfels are above and beyond their MS4 requirements.

7. Presentation and discussion regarding the Aquifer Storage and Recovery (ASR) Nonroutine Adaptive Management Process (AMP) and timeline.

Mr. Pence began the presentation by communicating that Myron Hess, Vice Chair, communicated that it will be important to keep the Stakeholders involved as the changes to ASR are developed so that everyone is informed and confident in the changes before it is presented. The full presentation can be found at eahcp.org.

Tom Taggart asked how forbearance agreements, as expected to be implemented for future ASR water, can be regulated/enforced as well as the current lease structure is regulated. Mr. Pence communicated that permit forbearance agreements are enforced through typical well-logging and permitting regulation.

Buck Benson mentioned those he represents often put aside 44% of their permitted water every year in order to prepare for the worst-case scenario. Mr. Benson wanted to encourage EAA to find out how to utilize the water set aside for Critical Period Management (CPM). Bruce Alexander described the situation a small municipality is in when attempting to plan for possible drought or CPM reduction as well as maintaining leases in ASR all while needing to provide water for their customers.

Mr. Pence continued by presenting a tentative timeline to the ASR Adaptive Management Process. If all modeling checks-out, advertising of new product is planned to begin in 2018 and implementation in 2019.

Mr. Taggart asked how the Hydrologic Modeling timeline fits into the ASR AMP timeline. Mr. Pence mentioned the Hydrologic Model Workshop is the starting point for the ASR AMP. Mr. Taggart asked if there is enough time to adequately communicate and develop the new ASR product and move it through the amendment process. Mr. Pence answered by communicating the aggressive timeline is simply a starting point.

The committee had a 15-minute break.

8. Presentation of the Ecological Model workshop and EAHCP Strategic Adaptive Management considerations.

Mr. Pence described the Ecological Model workshop and what the Ecological Model showed. Dr. Furl presented the information regarding the Ecological Model and what the uses and end results are. The full presentation can be found at eahcp.org.

Mr. Pence communicated that the Ecological Model was developed for one reason, which was to test the numbers of fountain darters that survive through the drought of record due to our mitigation and minimization measures in the EAHCP. The model has shown exactly what the EAHCP hoped it would. Specifically, that our measures have provided the adequate protections to reach the goals established in the HCP.

EXHIBIT 4

Carol Patterson asked questions regarding the variations in the systems do not only include droughts, but also floods and periods of constant flow. Mrs. Patterson asked if this model can show effects of other extreme, or constant, springflow in regards to fountain darter numbers.

9. Presentation regarding the NAS *Report 2* Implementation Plan.

Cindy Loeffler, TPWD and Chair of the NAS *Report 2* Work Group, presented the details found in the NAS *Report 2* Implementation Plan. Full presentation is available at eahcp.org.

Dianne Wassenich spoke about the NAS recommendation on ASR and why those recommendations are not the EAHCP's responsibility. Mr. Pence reiterated that the specific recommendation was regarding ASR operations and not leasing. Patrick Shriver, SAWS, communicated that many of the concerns have been addressed and are being watched by SAWS staff.

Mr. Pence provided a summary of the next couple items. Lunch was provided and the committee took a break for 45 minutes.

10. Presentation and discussion of the National Academy of Sciences *Report 2* Recommendations Issues List.

Mr. Pence presented a series of issues that were brought up in NAS *Report 2*. Full presentation can be found at eahcp.org.

Jim Bower asked how far along are the CSRB efforts in comparison to where we would like to be. Mr. Pence communicated that we are about half-way to where we should be to maintain a functioning population of CSRB in captivity.

There was a discussion regarding what a third-party audit would look like and what exactly would be audited. Mr. Pence communicated that much of what the EAHCP does on an annual basis through a multitude of mechanisms.

There was a discussion regarding how climate change, and what information we may need to inform the committee, to adequately prepare for addressing it at the ITP renewal. Myron Hess stated that we should be cognizant not to wait too long to get adequate time to plan for the ITP renewal. Cindy Loeffler reminded the committee of the August Implementing Committee discussion regarding bringing in experts to present information regarding the Edwards Aquifer region and what climate change can affect the roll-over of the ITP. Mr. Pence suggested we wait until Strategic Adaptive Management changes has been made then take time to focus on this next issue.

Con Mims asked what the specific reason we would invest time and money into an uncertainty analysis. Mr. Pence communicated it would help inform the Aquifer Science team to know more about the system and improve the Hydrologic model. Mr. Mims commented that the HCP seems to be spending a lot of money and this could be a place to save funds. Roland Ruiz, EAA, communicated that he does not disagree with Mr. Mims but emphasized that recharge, for example, is a place where the EAA can improve their understanding. Myron Hess communicated that when moving into a new permit having increased confidence in the protection of springflow required in the HCP would make the planning effort much more acceptable to USFWS. This could eventually save money in the long-term by not doing more than necessary by being more precise in protection measures to meet specific springflow goals.

11. Presentation of the 2017 Budget Work Group Report.

EXHIBIT 4

EAHCP STAFF

September 21, 2017

Mr. Pence presented the information regarding the 2017 Budget Work Group Report. Full presentation can be found at cahep.org. Mr. Hess communicated about the importance of keeping an eye on VISPO/ASR triggers and the impacts to the budget.

12. Consider future meetings, dates, locations, and agendas.

- Next meeting will be held on December 14th at the Edwards Aquifer Authority.
 - ASR AMP
 - NAS Report 3 update
 - Hydrologic Modeling workshop update
 - Refugia update
 - Officer elections

13. Questions from the public.

No Comment from the public.

Steve Raabe communicated that the San Antonio River (Authority) received an international award due to cultural, natural and historical conservation that has been devoted to the San Antonio River and a formal announcement will be made on September 25, 2017.

14. Adjourn – 2:07 pm

Dianne Wassenich, 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 joint meeting of the **Implementing Committee** of the **Edwards Aquifer Habitat Conservation Plan Program** is scheduled for **1:00 pm on Thursday, September 21st, 2017 at the City of San Marcos Activity Center (Room 1), 501 E. Hopkins, San Marcos, TX, 78666**. Lunch will be provided for committee members at 12:00 p.m.

Members of this committee include: Tom Taggart (San Marcos), Roland Ruiz (EAA), Greg Malatek (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 August 17th Implementing Committee meeting (Attachment 1).
4. Receive report from the Program Manager on general topics related to the Habitat Conservation Plan.
 - Budget Report (Attachment 2)
 - ASR Operations by SAWS & Injection Rate Change
 - 2018 SH and IC meeting dates
 - ASR AMP Update
5. Discussion and possible approval of the proposal for Sediment Removal and Impervious Cover/Water Quality Protection Nonroutine Adaptive Management (AMP) Proposal submitted to the Implementing Committee in the Stakeholder Committee Report (Attachment 3-5).

Purpose: To discuss and possibly approve the Stakeholder Committee Recommendation.

Action: To approve the Stakeholder Committee Recommendation for the Sediment Removal and Impervious Cover/Water Quality Protection Nonroutine AMP Proposal.
6. Future agenda items and topics of discussion.
 - Next meeting will be held on October 19th at the Guadalupe-Blanco River Authority Annex Building.
 - Approval to submit the necessary documentation to USFWS based on the AMP Proposal.
7. Questions from the public.
8. Adjourn.

EXHIBIT 4

EAHCP STAFF

October 5, 2017



**IMPLEMENTING COMMITTEE MEETING MINUTES
SEPTEMBER 21, 2017**

1. **Call to order--Establish that all Committee members are present or represented- 2:15 pm.**
Members of this committee present include: Tom Taggart (San Marcos), Roland Ruiz (EAA), Mark Enders on behalf of Greg Malatek (New Braunfels), Darren Thompson (SAWS), Kimberly Meitzen on behalf of Andrew Sansom (Texas State University), and Todd Votteler (GBRA).
2. **Public Comment.**
Darren Thompson asked if there was any public comment. There was none.
3. **Approval of minutes from the August 17th Implementing Committee meeting.**
Darren Thompson noted that on Item 5; the 4th paragraph "not" should be "no."
Tom Taggart made a motion to approve with the amendment; Roland Ruiz seconded the motion.
There were no objections.
4. **Receive report from the Program Manager on general topics related to the Habitat Conservation Plan.**
 - **Budget Report** – Nathan Pence presented the EAHCP budget report for August 2017. There were no questions.
 - **ASR Operations by SAWS & Injection Rate Change**
Darren Thompson provided the committee with the following update: 32,500 acre-feet have been noticed to SAWS this year. Of that amount, 22,000 acre-feet have been stored, bringing the total HCP water stored to 73,000 acre-feet to date. SAWS is currently injecting about 41 MGD, which will add the remaining approximately 11,000 acre-feet of HCP water. This will bring close to 84,000 acre-feet of HCP water stored by the end of the year, totaling 150,000 acre-feet of water in the SAWS ASR facility – close to the 200,000 acre-feet capacity.
 - **2018 Stakeholder and Implementing Committee meeting dates** – Alicia Reinmund-Martinez presented the proposed meeting dates for next year. There were no questions.
 - **ASR Adaptive Management Process (AMP) proposal update** – Nathan Pence presented a brief update on the status of this Nonroutine AMP. There were no questions.
5. **Discussion and possible approval of the proposal for Sediment Removal and Impervious Cover/Water Quality Protection Nonroutine Adaptive Management (AMP) Proposal submitted to the Implementing Committee in the Stakeholder Committee Report.**

No presentation was necessary.

Tom Taggart made a motion to approve the Stakeholder Committee recommendation for the Sediment Removal and Impervious Cover/Water Quality Protection Nonroutine AMP Proposal. Roland Ruiz seconded the motion.

There were no objections.

EXHIBIT 4

EAHCP STAFF

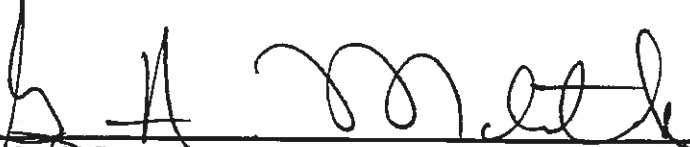
October 5, 2017

6. Future agenda items and topics of discussion.

- Next meeting will be held on October 19th at the Guadalupe-Blanco River Authority Annex Building.
 - Approval to submit the necessary documentation to USFWS based on the AMP Proposal.
 - 2018 EAHCP Funding Applications

7. Questions from the public.

No comment.

8. Adjourn – 2:25pm

Greg Malatek, Secretary



United States Department of the Interior

FISH AND WILDLIFE SERVICE

10711 Burnet Road, Suite 200

Austin, Texas 78758

512 490-0057

FAX 490-0974



DEC 12 2017

Nathan Pence
Edwards Aquifer Habitat Conservation Plan
900 East Quincy Street
San Antonio, Texas 78215

Dear Mr. Pence:

This letter is in response to your October 20, 2017, letter requesting to amend the Edwards Aquifer Recovery Implementation Program Habitat Conservation Plan (EAHCP). The Edwards Aquifer Authority, City of San Marcos, Texas State University, City of New Braunfels, and the San Antonio Water System (collectively, the Permittees) are requesting changes to the EAHCP in section 5.3.6 Sediment Removal Below Sewell Park, 5.4.4 Sediment Removal in Spring Lake and from Spring Lake Dam to City Park, and 5.7.6 Impervious Cover/Water Quality Protection. Exhibit 1 of your letter includes specific revisions of text *verbatim* that the Permittees would like revised in the EAHCP. The Permittees have not requested to amend the Permit (TE-63663A-1).

All of the requested revisions are to Chapter 5 of the EAHCP where the measures that will mitigate for the incidental take resulting from Covered Activities are described. Chapter 6 and Appendix R describe the Adaptive Management Process that allows the Permittees to make experience-based improvements to the program. It has become apparent to the Permittees that aspects of certain measures (5.3.6, 5.4.4, and 5.7.6) are not fully achieving their intended purposes of reducing harmful sediment accumulations and protecting water quality. The permittees have determined through their Adaptive Management Process that there are more efficient and cost-effective ways to reach these goals and increase the conservation benefits for the Covered Species.

Amendments to Section 5.3.6 Sediment Removal Below Sewell Park and Section 5.4.4. Sediment Removal in Spring Lake and from Spring Lake Dam to City Park

The Service approves the requested revisions to sections 5.3.6 and 5.4.4 of the EAHCP. Areas from which sediments have been removed will require repeated removal efforts resulting from redeposition if no other changes are made to reduce input. The Permittees have determined that a better approach is to stabilize sources of sediment and to capture sediment prior to entering the river. The requested amendments allow the City of San Marcos and Texas State University to utilize low impact development Best Management Practices (BMPs) in priority watersheds to minimize sediments that reach the San Marcos River. In most cases these BMPs will be used in lieu of hydrosuction or mechanical dredging. The selection and design of BMPs will be reviewed by the Science Committee or a subcommittee prior to implementation. Hydrosuction or dredging remains an option to target areas of sediment accumulation. If effective, these BMPs will benefit



listed species by improving water quality and habitat for Covered Species, in particular, Texas Wild Rice. Limiting the removal of sediment accumulations directly from the river by hydrosuction or other means will lessen temporary disturbance impacts to fountain darters.

Amendment to Section 5.7.6 Impervious Cover/Water Quality Protection

The Service approves the requested revisions to this section of the EAHCP. The revisions to this section allow the Permittees to utilize the 2017 *Water Quality Protection Plan for the City of San Marcos and Texas State University* and the 2017 *Edwards Aquifer Habitat Conservation Plan Impervious Cover and Water Quality Protection – 5.7.6 Water Quality Protection Plan Phase I*. Both plans include recommendations for projects and activities that will reduce non-point source pollution inputs. The Permittees will select projects from these plans for implementation in lieu of private landowner incentive programs which have had little success due to lack of participation by landowners. The Permittees have determined that using the Water Quality Protection Plans as the basis to select and fund on-the-ground projects will have a greater benefit and be more cost effective than the current incentive programs. Non-point source pollution conveyed to the rivers primarily by spills and runoff negatively impacts the Covered Species all of which are aquatic and require clean water for their survival. The amendment allows the Permittees to prioritize and select water quality protection projects that can be implemented and monitored by the Permittees giving the Permittees more control over this measure to increase its overall effectiveness.

These amendments to the EAHCP do not have the potential to increase the levels of incidental take of Covered Species and no changes to the Permit have been requested or will be made. We appreciate the efforts of the Permittees, and the communities that support them, in implementing the EAHCP.

Sincerely,



Adam Zerrenner
Field Supervisor

EAHCP Staff

October 17 2013



Implementing Committee of the Edwards Aquifer Habitat Conservation Plan

Minutes of the October 17, 2013 Meeting

Located at the New Braunfels Civic/Convention Center, New Braunfels, Texas

1. **Call to Order** – The meeting was called to order at 9:01 a.m. A quorum was present for all purposes. All members of the Implementing Committee were represented. Juan Guerra was present for Andrew Sansom.

2. **Public Comment**
None.

3. **Approval of minutes from September 19, 2013.**

Nathan Pence made the committee aware that minutes that were put on the website were incorrect and did not have Secretary signature, but were updated on Friday with Secretary signature. Tom Taggart moved to approve updated minutes. Roland Ruiz seconded the motion. There were no objections; motion passed.

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.**

Nathan introduced Rachel Mitchell, who will be assisting in the HCP department with minutes and any other areas where needed until further notice.

- a. **Update on National Academy of Science Board Meeting and contract.**

Roland Ruiz gave a brief update on how the EAA is working with the NAS as far as implementing a contract and presenting it at the next Board Meeting on November 12, 2013 for approval. Todd Votteler asked what the objection was to the contract. In response, Roland Ruiz informed the Committee that an EAA Board member had concerns with language in the contract that is outside the Scope of Work.

- b. **Update on the status of the ASR and VISPO programs.**

Nathan Pence stated the ASR amounts of water have not changed and EAA is working with SARA, the leasing agent for EAA, to offer some different terms to lease ASR water. In October 2013, SAWS was provided a notice of availability from the EAA to SAWS for 1,800 acre ft. of water to be injected into the ASR; SAWS does not have the obligation or responsibility to inject the water under contract. Chuck Ahrens stated that SAWS will be able to accommodate in putting water in and making it operational.

EAHCP Staff

October 17 2013

Nathan Pence stated the VISPO status has increased about 10,000 acre feet and we now have 22,427 acre-ft. in the VISPO program. VISPO did not trigger this year because we were above 635 feet at J-17 on Oct 1. EAA is not currently accepting any new water for 2014. On January 1st EAA will open enrollment back up for 2015.

c. 2013 Budget Report through September 30, 2013

Nathan Pence informed the Committee that budget reports are available monthly and Chris Abernathy is available to answer any questions in regards to the budget. Chuck Ahrens asked to add the reserve account balance on future budget reports.

d. Update on Annual Report drafting progress

Nathan Pence provided update that the EAA is in the process of entering into a contract with SWCA Environmental Consultants to assist the EAA in drafting and formatting the annual report. Largely they will be summarizing and formatting original writing. An internal meeting is scheduled on Oct 24th at the EAA with some of the stakeholders, implementing committee members and permittees who have a role in drafting the annual report.

e. Update on Recording of Implementing Committee Meetings

Nathan Pence stated there were errors with the technical equipment and the last meeting was not recorded. But things are back on track and the minutes will now be recorded.

f. Summary of effect of government shutdown on the EAHCP

Nathan reported that USGS will be back out in the field calibrating their flow meters gauges and real time recording systems that are displayed on the internet. These should be up and running now that the federal government is running again. The Refugia at USFWS was closed except for feeding animals to keep them alive. Salamander collections and research activities were suspended, but will start back up in a week or two. Communications with Kevin Connally have been reestablished, but USFWS personnel are expecting some lag time before they are back up and fully operating again.

g. Water Quality and Bio Monitoring Report.

Nathan Pence reported on Oct 5th there was a storm event in New Braunfels and EAA staff mobilized to sample the event on the Comal system, however there was not enough rain to complete the hydrograph needed to qualify for an effective storm water sample. The samples did not meet the criteria and were disposed of.

On Oct 8th there was a normally scheduled surface water sampling in New Braunfels and San Marcos systems, but results are not available yet.

EAHCP Staff

October 17 2013

On Oct. 13th another rain event occurred in the Comal system and the EAA staff mobilized to sample storm water. Conditions met the criteria and sampling was completed.

Nathan Pence additionally pointed out that he is continuing to receive bio monitoring updates from Bio-West. Bio-West will be conducting its comprehensive bio monitoring for the Comal system with regular sampling and not based on low flows. Bio-West provides weekly memos which have to do with the conditions due to drought and they are posted on the HCP website.

5. Receive report on current aquifer conditions, spring flow levels, and related activities.

Nathan Pence reported on current aquifer conditions. This presentation will be made available on the EAHCP website. Todd Vottler added that there was a new seasonal drought outlook and it looks better than last. Todd Vottler asked if it would be possible to share the technical briefing for J-27 in Uvalde. Roland Ruiz offered to share that presentation with the committee.

6. Presentation on activities related to the implementation of the Regional Water Conservation Program.

Nathan Pence stated that Section 5.1.3 of the HCP Regional Water Conservation Program establishes our goal is to preserve 20,000 acre-ft. of EAA withdrawals permitted or exempt with the goal being half of the water to stay in the Aquifer and remain unpumped. Section 5.1.3 also discusses the initial commitment contracts. Different entities were asked or volunteered to donate or loan water to this program up front. Currently, there are 8,400 acre ft. in initial commitments in this program. SAWS committed 8,000 acre ft. of water, San Marcos and Texas State University committed 300 and 100 acre ft. of water, respectively. This presentation will be made available on the EAHCP website. Discussion followed.

7. Presentation of the review of the Operational Procedures and Parliamentary Rules of Conduct of the Implementing Committee by the Parliamentarian.

Darcy Frownfelter from Kemp Smith reported on Operational Procedures and Parliamentary Rules of Conduct of the Implementing Committee and what it says in regards to these procedures. His presentation will be made available on the EAHCP website. Discussion followed. Juan Guerra moved to approve the Parliamentarian to present a redline markup of the Operational Procedures for the Implementing Committee to consider at its next meeting. Roland Ruiz seconded the motion. There were no objections; the motion passed.

8. Presentation of the 2014 Funding Applications submitted to the EAA by the permittees and take possible action approving the increased funding amounts for the EAA and City of New Braunfels.

Nathan Pence presented the funding application budgets that were submitted by all three entities and discussed the highlights.

Nathan presented two line items that exceeded the original amount approved in the work plan for EAA. Tom Taggart moved to approve the two line items exceeding the original amount for the work plan. Steve Ramsey seconded the motion. There were no objections; the motion passed.

EAHCP Staff

October 17 2013

Zac Martin, New Braunfels Watershed Manager, presented two line items for Flow Split Management and Bank Stabilization for the City of Braunfels that exceeded the original amount approved in the work plan for the City of New Braunfels. Chuck Ahrens moved to approve these two line items in the budget. Juan Guerra seconded the motion. There were no objections; the motion passed.

9. **Consideration of and possible action on adopting Resolution and Order No. 10-13-001 of the Implementing Committee of the Edwards Aquifer Habitat Conservation Plan Program ("EAHCP Program") regarding the selection of Nathan Pence as the preferred candidate for the position of Program Manager for the EAHCP Program of the Edwards Aquifer Authority.**

Roland Ruiz announced that Nathan Pence was selected as Program Manager of the EAHCP and it might be appropriate for the committee to adopt a Resolution endorsing him for that selection. Steve Ramsey moved to approve the Resolution in support of Nathan Pence as Program Manager for EAHCP. Tom Taggart seconded the motion. There were no objections; the motion passed.

10. **Consideration of an Informational Memo to be submitted to USFWS related to HCP implementation and possible action approving the Program Manager to submit the Informational Memo to USFWS.**

Nathan Pence recommended that this item be tabled until the next Implementing Committee Meeting. Roland moved to table the item. Steve Ramsey seconded the motion. There were no objections; the motion passed.

11. **Consideration of an Informational Memo to be submitted to USFWS related to minor variations of the National Academy of Science contract from the FMA.**

Nathan Pence stated that the Informational Memo for consideration was to inform the USFWS as to minor variations in the NAS contract from the FMA. Tom Taggart moved to approve submittal of the informational memo to USFWS with no additional changes. Steve Ramsey seconded the motion. There were no objections; the motion passed.

12. **Public Comment**

Nathan Pence announced that he was asked to add the HCP Reserve as a line item to the budget report in the future and provided the current balance of the HCP Reserve, \$23,156,000.

13. **Consider future meetings, dates, locations, and agendas.**

Next Implementing Committee meeting is scheduled for November 21, 2013, at the Edwards Aquifer Authority.

A joint meeting of the Implementing Committee, Stakeholder Committee, and Science Committee will be held on December 19, 2013, at the Edwards Aquifer Authority.

Meeting Adjourned at 10:49 a.m.

A handwritten signature in black ink, appearing to read "Steve Ramsey", is written over a horizontal line.

EAHCP Staff

October 17 2013

Steven Ramsey

Secretary of the Implementing Committee



**EDWARDS AQUIFER
AUTHORITY**

MEMORANDUM

October 18, 2013

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

RE: Informational Memo related to the Edwards Aquifer Habitat Conservation Plan (EAHCP) for
Incidental Take Permit #11-63663A-0 (ITP)

Mr. Connally,

Implementation of the Edwards Aquifer Habitat Conservation Plan (EAHCP) approved by the U.S. Fish and Wildlife Service (Service) on March 18, 2013, is underway. This memorandum, submitted on behalf of the Edwards Aquifer Authority (EAA), the City of New Braunfels (CoNB), the City of San Marcos (CoSM), the San Antonio Water System (SAWS), and Texas State University (TSU) (collectively the Permittees),¹ is being provided for informational purposes regarding minor variations from the EAHCP Appendix R, the Funding and Management Agreement (FMA), in relation to the Science Review Panel (Panel). These changes are the result of discussions with the National Academy of Science (NAS) and reflect efforts to provide the most efficient, scientifically objective, and fiscally responsible scientific review possible. Please review these modifications, and provide verification that implementing these minor variations is in compliance with our Incidental Take Permit.

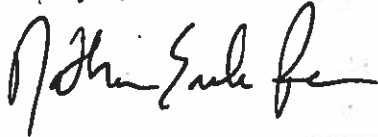
Section 7.10.1 of the FMA describes the membership of the Panel as including five members. In order to more sufficiently address the broad scientific nature of the requested scientific review, NAS requires a Panel with expertise in all related disciplines. Therefore, the Panel will be composed of 12-15 members.

Section 7.10.2 of the FMA describes the Panel as meeting on a quarterly basis until the determinations have been made under Subsection 7.13.7. Based on discussions with NAS, it was determined that having the Panel meet on an as-needed basis would be more efficient and productive. While EAHCP staff will maintain communication with the NAS throughout the intervals of time between meetings, providing regular updates and information as requested, to prevent unnecessary expenditure of funds and prevent unproductive meetings, the Panel will only convene when there are substantive items to be discussed. This variation allows for the most efficient operation and fiscally responsible use of the Panel.

¹ The Implementing Committee (representing the five Permittees and the Guadalupe-Blanco River Authority as a non-voting member) unanimously approved this memorandum at their meeting on October 17, 2013.

Approval of these minor variations will allow the EAHCP to benefit from the prestige and expertise available at NAS, while operating in the most efficient manner possible. We appreciate your time and consideration of these items.

Thank you,



Nathan Pence
Program Manager
Edwards Aquifer Habitat Conservation Program
npence@edwardsaquifer.org
210-477-8527



October 10, 2014

Ms. Tanya Sommer
Austin Ecological Services Field Office
U.S. Fish and Wildlife Services
10711 Burnet Road, Suite 200
Austin, Texas 78758

RE: SUMMARY OF OCTOBER 1, 2014 MEETING BETWEEN USFWS AND EAHCP STAFF

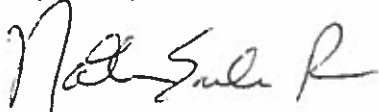
Dear Tanya,

As a follow up to our meeting on October 1, 2014, I would like to thank you for the opportunity to meet and discuss with you certain issues of mutual interest relating to the Edwards Aquifer Habitat Conservation Plan (EAHCP). As you may recall, the primary issues that we talked about were: 1) methods for calculating Take, 2) the National Academy of Sciences Informational Memorandum, 3) the Amendment to Appendix R of the EAHCP (the Funding and Management Agreement (FMA)), 4) recommended modifications to the 2013 EAHCP Annual Report, and 5) exempt well conservation inclusion in the Regional Water Conservation Program. A synopsis of the meeting and the resulting agreements and follow up action items can be summarized as follows:

1. The notes and agreed to Take calculation method modifications are summarized in Attachment 1 to this communication.
2. USFWS has accepted the informational memorandum related to the National Academy of Sciences submitted by the EAHCP Permittees on October 18, 2013. As no additional Take will be created, USFWS has approved of these changes. No further action or communication is needed related to this topic.
3. USFWS has accepted the Minor Amendment related to Appendix R of the EAHCP (FMA) submitted by the EAHCP Permittees on November 22, 2013. As no additional Take will be created, USFWS has approved of this amendment. No further action or communication is needed related to this topic.
4. USFWS provided a summary of suggested edits (Attachment 2) to the 2013 EAHCP Annual Report. These edits will be included as a 2013 errata sheet with the 2014 EAHCP Annual Report.
5. Edwards Aquifer water conserved as part of the EAHCP Regional Water Conservation Program (RWCP) will be included in the total water enrolled in the RWCP, so long as documentation of the implemented conservation BMP is provided in the Annual Report.

If you disagree with this summary of the meeting, or if you have a different opinion on any of the matters or conclusions stated herein, please advise me at your earliest opportunity. Again, thank you for your willingness to meet and work with us on these very important matters and we look forward to the continued successful implementation of the Edwards Aquifer Habitat Conservation Plan.

Respectfully,

A handwritten signature in dark ink, appearing to read "Nathan Pence", written in a cursive style.

Nathan Pence
HCP Executive Director

Attachment 1**EAHCP meeting with USFWS****October 1, 2014****Attendees: Nathan Pence and Alicia Reinmund-Martinez – EAA; Ed Oborny – BioWest; Kevin Connally and Tanya Sommer – USFWS.****Take Estimate**

- Include some statement in the 2014 report that the take methodology includes those species were identified in the take. – Errata sheet to be inserted into the 2014 report.
- Going forward that FD take will be included with TWR habitat take
Comment by Nathan Pence:
Nathan pointed out during the meeting that this will require Science and Implementing Committee approvals of new methods that differ from 2013 methods. This methodology change will be presented to the Science Committee at their November 6, 2014 meeting.
- Calculation of dry year take – describe the natural fluctuations through the year, but do not double count the dry areas that are the same from year to year. January 2013 is the baseline.
- Changes due to floods – must accommodate the destruction of TWR, but there is no take of the plants or of FD habitat. HCP will not be held accountable for this take, but it must be described. It must be monitored to document the changes.
- If there are significant rains – the baseline conditions will need to be revisited. It depends upon when the rain event occurs – 2 different take estimates.
- Using the phrases “permissible take” and “ITP permit remaining” are not good phrases. The perception by the environmental community could be that the ITP is a license to kill. Suggested phrasing – “Maximum permitted covered amount remaining”.

General comments on 2013 Annual Report

- The report cannot state that we are in compliance with the ITP. Only USFWS can state this. They will not tell us that we are in compliance, they will only tell us when we are in noncompliance. No news is good news. (ARM comment: We can state that we have not been told we are not in compliance.)
- Be careful with the wording of what the permit allows in take – it is not a license to kill.
- TPWD is not a permittee.
- One printed copy to Austin and 1 to Albuquerque. Appendices can be on flash drive or CD.

Attachment 2

Notes regarding EARIP 2013 Annual Report

10/6/14
*Shawn Minner**Issue date is effective date or is the same.*

Page ES-1: Document state that USFWS issued the ITP on February 5, 2013 (and this statement is repeated throughout the text: page 1, etc.). The ROD was announced in the Federal Register on February 15, 2013, and by regulation no permit can be issued less than 30 days after such public notification. The ITP was issued effective March 18, 2013. The permit was not issued before notification in the FR and the required 30 day public notification period.

Page ES-4: Please clarify that the generalized descriptions of the covered activities provided here a simplification of the activities consisting solely of those described in condition L of the ITP.

Refer for 2 to the ITP for Specific Cond.

Same page, clarify that "It is the Permit Holders' belief" (or something similar) that "Implementation of these activities in 2013 is in full compliance with the EAHCP...". Determining permit compliance is a regulatory function of the USFWS.

the USFWS.

Table ES-5: Prefer that "ITP Permit Amount" and "ITP Permit Remaining" be removed from this table or that text describing/clarifying these totals be incorporated. →

Page 1: Paragraph describing creation of the EAA describes "a springflow protection program, which included a habitat conservation plan as a component". Please clarify that this refers to efforts to develop an HCP, though no such plan was ever implemented and no ITP was issued as the result of these efforts until the EARIP/EAHCP was issued. *- add language. The refers that that was the only plan resulting in an ITP*
Next statement, same paragraph, ascribes USFWS motivation for actions ("... to further advance this process..."). Please strike this portion of this statement.

Approximately 40 stakeholders signed the MOA to participate in the EARIP process (See Appendix A of the HCP). Why does report state that there were 26? *- clarify this - include a statement that say 40 stakeholders were involved.*

Page 2: Please clarify that the generalized descriptions of the covered activities provided here a simplification of the activities consisting solely of those described in condition L of the ITP.

Page 3: "TPWD is covered for the implementation and management of the State Scientific Areas discussed in the HCP." This is an incorrect statement because TPWD is not a permittee. *TPWD has no coverage - they are not a permittee.*
In the description of the permit area, please help ensure consistency by following the language from the ITP which states that "This permit only authorizes incidental take of covered species within all of Bexar, Medina, and Uvalde Counties, and parts of Atascosa, Comal, Caldwell, Hays, and Guadalupe Counties" (Permit condition J).

that is not correct - use exact language or

Page 4: Please follow language from ITP regarding impacts to Texas Wild-rice (strike language referring to take of this species, as take is not defined for plans under the ESA).

*There is no take of plants with the ESA**Refer to the permit itself*

Attachment 2

not a license to kill

Please correct the statement "Authorized take permitted for the 15-year term..." to read "The maximum amount of covered incidental take anticipated over the 15-year term..."

It is not the "biological nature" of these species that makes determining take challenging (all species are by definition of "biological nature"). Please strike language referring to BD, as this document is specific to the Intra-Service consultation regarding issuance of the requested ITP. The habitat surrogates were used to determine the amount of incidental take anticipated to over the duration of the ITP. It is not the habitat surrogate that assumes that impacts will occur in the form of harm and harassment, but the Service's analysis that determined that these are the expected forms of take.

page 5

Tables 1.2-3: Suggest changing "Permissible Take" to "Maximum Amount of Covered Take" or something similar. It is important to make the distinction that an ITP is not a "License to Kill"... The permittees cannot simply take up to that number, but rather, if the contemplated conditions occur, this is the number expected to be taken for which the permittees will be held harmless so long as the permit is being properly implemented. Similarly, "Total" might be better represented as "Not to exceed" or something similar.

Page 9: The EARIP was dissolved? This may require discussion... I think it may be more appropriate to state that upon issuance of the ITP the Permit Holders chose to begin referring to the ongoing program as the EAHCP.
 not dissolved by the state legislation?
 Created by State Legislators, SB3 in 2007

Page 20: Section 3.1.1: Note that permit condition K reads:

"The EAA will support and coordinate with the U.S. Fish and Wildlife Service (Service) on the work relating to the San Marcos Aquatic Resource Center's operation and maintenance of a series of off-site refugia at the Service's San Marcos, Uvalde, and Inks Lake facilities (Section 6.4 of the HCP). The support of the refugia will augment the existing financial and physical resources of these facilities, and provide supplementary resources for appropriate research; activities, as necessary, to house and protect adequate populations of Covered Species and expanded knowledge of their biology, life histories, and effective reintroduction techniques. The use of this support will be limited to the Covered Species in the EARIP HCP."

Page 22: Section 3.1.3: Should the statement "...provides an opportunity for Edwards Aquifer permittees..." correctly read "...provides an opportunity for Edwards Aquifer Authority permittees..."?

Page 23: Section 3.1.3 repeatedly refers to exempt well users. It may be worth clarifying somewhere in this or future documents that water conservation savings achieved by these users will result in benefits above and beyond those expected of the permitted well users that are the subject of the HCP and the ITP (Because the EAA by definition cannot require exempt well users to participate or reduce pumping, the EAA did not rely on the water savings from these users when modeling EARIP measures including the RWCP). Any conservation benefits accrued through participation of exempt well users could be considered an additional safety buffer further protecting the region's water supplies.

You can't own the RWCP using exempt well owner ✓

Need to describe the ways we are getting savings from exempt well owners - this is valid, must be documented

Attachment 2

Page 32: Section 3.1.6: The biological and ecological monitoring program documents changes in the respective covered species' habitats resulting from covered activities but also from the conservation program being implemented by the permit holders. This element is an important part of documenting the success of the ongoing conservation efforts.

highlighted
the
document
of
success

Page 66: Section 3.2.13: Just a question. Is the impervious cover incentive program only targeting conversion of existing impervious surfaces? I seem to remember that there was discussion about balancing removal and conversion efforts with prevention activities (i.e., encouraging or incentivizing use of pervious materials over impervious surfaces in the first place).

Page 71: Section 3.3: The last statement in this section should be modified to read "The City of San Marcos believes..." (or something similar) that "Implementation of these measures in 2013 was in full compliance with the EAHCP..." Determining permit compliance is a regulatory function of the USFWS.

Page 101: Section 3.3.8: Are the fountain darters incidentally collected and returned to the river incorporated into the annual take estimate for the San Marcos System? How are darters harassed by "fanning" or "finning" of sediment in Spring Lake (page 135: Section 3.4.4, etc.) accounted for in the annual take estimate? (i.e., "Take" is not equivalent to mortality. The ESA defines take as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct". While we understand that the efforts to "fan" darters out of vegetation patches is intended to avoid or reduce mortality of individuals, this action in itself constitutes take. The permittees are explicitly covered for this take, but the total amount must be estimated and reported as part of the annual total. Please add language describing that this take is accounted for in the annual take estimation.)

USFWS
will
tell
us
when
we
are
not
in
compliance
with
the
TIP

Page 146: Section 3.4.12: Describes inadvertent collection of fountain darters and San Marcos salamander. These instances need to be documented as part of the annual take estimate.

Page 161: Section 4.1: The Service has no issues or concerns regarding the clarification of the number of panel members serving on the Science Review Panel or the requested FMA amendment allowing Texas state University employees to serve as contractors when working on EARIP projects, and considers these clarifications and requests approved.

are NB & SM - LID program

more information SM LID

NB-incentive & Rebate program

for existing and new development

Darcy provided Nathan the documentation of the NTS panel change



Implementing Committee of the Edwards Aquifer Habitat Conservation Plan

Minutes of the May 16, 2013 Meeting

New Braunfels Civic Center, New Braunfels, Texas

1. **Call to Order** – The meeting was called to order at 9:06 a.m. A quorum was present for all purposes. All members of the Implementing Committee were represented (Mike Abbott represented Texas State University).
2. **Public Comment** – no public comment
3. **Approval of Minutes from the Implementing Committee meeting of May 1, 2013.** Chuck Ahrens made a motion to approve the minutes with an amendment to paragraph 5 on page 1 of the minutes to read “The Implementing Committee agreed that no additional discussion of the substance of the EAA Work Plans was needed but reserved the right to submit written comments regarding Work Plan substance and consider the budgets for the plans at a later meeting.” Tom Taggart seconded the motion. There were no objections, and the minutes were approved with proposed change.
4. **Receive report from the Program Manager on topics related to the implementation of the Habitat Conservation Plan and operation of the Implementing Committee, including the following:**
 - Gulley updated the Committee on the status of Regional Water Conservation Program and discussed the Community Prioritization Matrix.
 - Gulley reported that the Science Committee met on May 9, 2013 and reviewed the City of San Marcos and City of New Braunfels Work Plans. City of San Marcos Work Plans have incorporated the recommendations of the Science Committee and the City of New Braunfels will incorporate the recommendations in its’ Work Plans prior to the next Implementing Committee meeting.
 - Rick Illgner reported that to-date we have obtained over 10,000 acre-feet of water for the VISPO program; 62% are 10 year commitments; 81% base and 19% un-restricted. He will be calling individuals in Bexar County to speak with them regarding the VISPO program.
 - Julie Velez reported that to-date 3,250 acre-feet of leases have been executed by the water right holder for the ASR program; 1,400 acre-feet of leases are pending.

5. Consider and take possible action on changes to Section 5.6.5 of the Funding and Management Agreement

Robert Gulley discussed the proposed amendment to Section 5.6.5 of the FMA. Chuck Ahrens asked whether Section 5.6.5.2 was intended to include work in both Chapter 5 and Chapter 6 of the EAHCP. Robert Gulley confirmed that it was. Chuck Ahrens made a motion to approve the Amendment with a change to the first paragraph of Section 5.6.5.2 adding the phrase "Conservation Measure in Chapter 5 or Program activity in Chapter 6 of HCP". Tom Taggart seconded the motion. There were no objections; thus, the motion passed.

6. Consider and take possible action on Freeman Aquatic Building (FAB) proposal for Applied Research.

Robert Gulley presented term sheet for use of the FAB. Following discussion Roland Ruiz moved to pursue FAB obtaining access to an Applied Research facility following the EAA procurement procedures. Tom Taggart seconded the motion. There were no objections; thus, the motion passed.

7. Receive report and take possible action on initiating the National Research Council Scientific Review Panel process in 2013.

Robert Gulley reported having discussions with the National Academy of Science (NAS) regarding the Scientific Review Panel. After further discussions, the Implementing Committee requested the Program Manager invite Dr. Jeffrey Jacobs, Program Director of the National Research Council Division on Earth & Life Studies Water Science Technology Board, to meet with the Implementing Committee (IC) as soon as convenient to discuss the Scientific Review Panel proposal. The IC agreed that the start date for NAS work and any necessary budget changes to retain NAS will be considered after the IC has met with Dr. Jacobs.

8. Consider and take possible action on the recommendation from the Science Committee Vacancy Work Group regarding filling the current Science Committee vacancy.

Colette Barron-Bradsby reported a comprehensive search was conducted for candidates to fill the Science Committee vacancy. The Science Committee Vacancy Work Group on May 3, 2013, recommended that Dr. Miguel Acevedo be asked to serve on the Science Committee (Attachment 6 to 5-16-13 Implementing Committee Agenda). Chuck Ahrens made a motion to accept Dr. Acevedo as the new Science Committee member. Mike Abbott seconded the motion. There were no objections; thus, the motion was passed.

9. Receive report from the Program Manager with regards to Stage V triggers in the Uvalde Pool.

Robert Gulley recommended postponing discussion of this issue until the next Implementing Committee meeting. Tom Taggart made a motion to table this topic until the next meeting. Roland Ruiz seconded the motion. There were no objections; thus, the motioned passed.

10. Presentation on City of San Marcos 2014 Draft Work Plans.

Melani Howard presented an overview of the City of San Marcos and Texas State University (TSU) 2014 Work Plans. The Implementing Committee agreed that no additional discussion of

EAHCP Staff

May 16, 2013

the substance of City of San Marcos Work Plans was needed but reserved the right to submit written comments regarding Work Plan substance and to discuss the budget.

11. Consider future meetings, dates, locations, and agendas

- Next scheduled Implementing Committee meetings is on May 30, 2013 at 9:00 a.m. at the San Marcos Dunbar Center in San Marcos, TX. Agenda will include:
 1. City of New Braunfels 2014 Work Plans
 2. Report on Incidental Take and ITP compliance issues
 3. Report on Stage V Triggers in Uvalde Pool
 4. Report on EAA Procurement Procedures and Policies
- June 3: Written comments on the City of San Marcos and Texas State University and Edwards Aquifer Authority Work Plans due
- June 10: Written comments on the City of New Braunfels Work Plans due
- June 11: Packets will be sent out containing City of San Marcos and Texas State University and Edwards Aquifer Authority revised Work Plans
- June 14: Distribute City of New Braunfels revised Work Plans
- June 18: IC meeting, 9 a.m. at New Braunfels Civic Center



Tom Taggart

Chair of Implementing Committee

EDWARDS AQUIFER HABITAT CONSERVATION PLAN PROGRAM**AMENDMENT NO. 1****TO THE FUNDING AND MANAGEMENT AGREEMENT****by and among**

**The Edwards Aquifer Authority, The City of New Braunfels,
The City of San Marcos,
The City of San Antonio, acting by and through its
San Antonio Water System Board of Trustees, and
Texas State University – San Marcos**

**to fund and manage the Habitat Conservation Plan
for the Edwards Aquifer Recovery Implementation Program**

This Amendment No. 1 to the Funding and Management Agreement (Amendment Agreement) is entered into to be effective on the date of execution by the last signing Party as indicated below (“Effective Date”), 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 (“San Antonio”), and Texas State University – San Marcos (“University”) (collectively, the “Parties,” and individually, “Party”).

RECITALS

WHEREAS, the Parties entered into that certain Funding and Management Agreement (“FMA”) with an Effective Date of January 1, 2012; and

WHEREAS, the Parties now desire to amend the FMA.

AGREEMENT

NOW, THEREFORE, for the mutual consideration expressed in this Amendment Agreement, the Parties agree as follows:

1. Amendment. As of the Effective Date, the Parties hereby amend the FMA as follows:

SUBSECTION 5.6.5 IS AMENDED TO READ AS FOLLOWS:

5.6.5.1 Limitation on Use of Funds – Employees and Administrative Costs.

With the exception of Program Administration Costs of EAA, funds may not be used for: (a) costs of any Party's employees; or (b) any Party's administrative costs, such as costs of overhead, management, administration, research, planning, engineering, or legal services, or any other ancillary costs that are not directly required for the Program.

5.6.5.2 Special Exception.

Notwithstanding anything in Section 5.6.5.1(a), an employee of Texas State University may submit a proposal for consideration and may be awarded a contract for work associated with the implementation of a Conservation Measure in Chapter 5 or Program activity in Chapter 6 of the HCP assigned to any Party in an approved Work Plan and Funding Application as long as each of the following conditions are met:

(a) The costs for the measures are not used to fund an increase in Texas State's permanent Staff or for work that is historically operational in nature;

(b) The contract for the project has been awarded through a competitive procurement process that considers cost, contractor qualifications, and merits of the contractor's proposal, and through which the selected contractor's proposal was determined to be competitive with respect to each of these criteria; and

(c) After the contractor has been selected, the EAA will issue those contracts for which Texas State or the City of San Marcos is responsible under which a Texas State Employee will be paid, and the HCP Program Manager will

manage those contracts.

5.6.5.3 Conduct of Texas State Contractor/Employees.

Any employee of Texas State who is paid from HCP Funds shall:

(a) Give first priority to the purposes and goals of the HCP as reflected by the entire Implementing Committee over the individual purposes and goals of the employee's employer;

(b) Conduct his or her work and communications in an open and transparent manner and in a manner that avoids a conflict of interest or the appearance of a conflict of interest;

(c) Not use the employee's Party's status as a member of the Implementing Committee or information that is not publicly available to obtain an advantage in the procurement process; and

(d) Not advocate, directly or indirectly, a particular decision or participate in discussions of policy matters unless expressly requested to participate by the Program Manager and the Implementing Committee. Nothing herein precludes the employee, when requested by the Implementing Committee, from discussing scientific data and conclusions with the Science Review Panel and Science Committee.

Failure to strictly comply with the requirements of Section 5.6.5.3 may be the basis for the termination of the Special Exception with respect to future contracts involving that employee or, if the non-compliance warrants, a recommendation to terminate the employee's participation in an existing contract. In any vote of the Implementing Committee with regard to such a recommendation of termination, Texas State shall abstain, and a decision to terminate must be unanimous among the remaining four voting members of the Implementing Committee.

2. No Effect on Remainder of the FMA. Except as provided in this Amendment Agreement, the FMA shall remain in full force and effect in all respects. This Amendment Agreement shall be governed by and construed under the terms of the FMA.

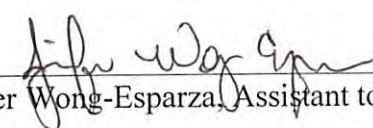
IN WITNESS WHEREOF, the Parties hereto acting under authority of their respective governing bodies have caused this Amendment Agreement to be duly executed as of the Effective Date.

EDWARDS AQUIFER AUTHORITY

By: 
Roland Ruiz, General Manager

Date: 9-26-13

ATTEST:

By: 
Jennifer Wong-Esparza, Assistant to Board Secretary

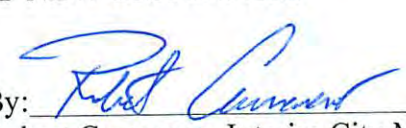
Date: 09-26-13

APPROVED AS TO FORM:

By: 
Darcy Alan Frownfelter, General Counsel

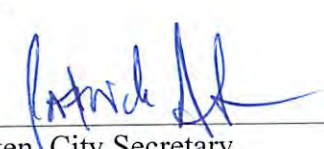
Date: 09/26/2013

CITY OF NEW BRAUNFELS

By: 
Robert Camareno, Interim City Manager

Date: 9-19-13

ATTEST:

By: 
Patrick Aten, City Secretary



Date: 9-19-13

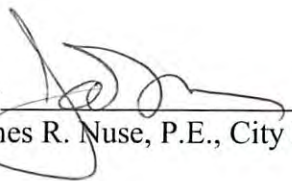
APPROVED AS TO FORM:

By: 
Valeria Acevedo, City Attorney

Date: 9/19/13

[additional signatures on next page]

CITY OF SAN MARCOS

By: 
James R. Nuse, P.E., City Manager


Date: 6-10-13

ATTEST:

By: 
Jamie Lee Pettijohn, City Clerk

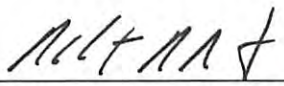
Date: 6-13-13

APPROVED AS TO FORM:

By: 
Michael Cosentino, City Attorney

Date: 6-13-13

CITY OF SAN ANTONIO,
ACTING BY AND THROUGH ITS SAN ANTONIO WATER SYSTEM

By: 
Robert R. Puente, President/CEO


Date: 9-25-13

ATTEST:

By: 
Becky Gonzalez, Executive Administrative Assistant

Date: 9-25-13

APPROVED AS TO FORM:

By: 
Phil Steven Kosub, Senior Water Resources Counsel

Date: 9/24/13

Signatures continue on next page

TEXAS STATE UNIVERSITY – SAN MARCOS

By: Denise M. Trauth
Denise M. Trauth, President

Date: 9-12-13

ATTEST:

By: William Nance
William Nance, Vice President for Finance and
Support Services, Texas State University-San Marcos

Date: 9-12-13

APPROVED AS TO FORM:

By: Diane Corley
Diane Corley, Associate General Counsel, Texas
State University System

Date: 9-9-13



Implementing Committee of the Edwards Aquifer Habitat Conservation Plan

Minutes of the November 21, 2013 Meeting

Located at the Edwards Aquifer Authority, San Antonio, Texas

1. **Call to Order.** The meeting was called to order at 9:09 a.m. A quorum was present for all purposes. All members of the Implementing Committee were represented. Darren Thompson was present for Chuck Ahrens.
2. **Public Comment.**
None
3. **Approval of minutes from October 17, 2013.**
Andrew Sansom moved to approve the minutes for October 17, 2013. Roland Ruiz seconded the motion. There were no objections; motion passed.
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.**

Mr. Nathan Pence announced new hire/HCP Administrative Assistant, Jeannette Flores. Mr. Pence handed out copies of Fish & Wildlife News Magazine provided by Kevin Connally of United States Fish and Wildlife Service with an article on EAHCP.

Mr. Pence updated the Committee that a contract with the City of Uvalde for the regional water conservation program had been executed and was underway. The City of Uvalde has hired a part-time Water Conservation Coordinator and; the first order of high-efficiency plumbing kits and toilets from Moore Supply has been made. Other Water Conservation Program items presented were updates on Universal City, the San Antonio Zoo, and Leon Valley.

Mr. Pence provided an update on the National Academy of Science contract approved by the EAA Board, stating that it is aggressive and fast moving process for 2014. Dr. Andrew Sansom questioned what he can do to assist in the process. Mr. Pence provide background documents, and informed the Committee that NAS will start requesting meetings with Implementing and Science Committees and request that they provide information as needed to them.

a. Update on the status of the ASR and VISPO programs

- **ASR:**

Julia Velez (SARA) provided a handout and discussion about ASR Leasing terms/offering shorter terms. Nathan Pence commented on positive response from the public in regards to the shorter terms.

- **VISPO:**-No additional water

b. 2013 Budget Report through October 30, 2013

- Nathan Pence commented that the reserve budget will fluctuate
- There were no questions or comments regarding the budget

c. Update on water quality sampling of storm event, October 31, 2013

- Rain Event 10/31/2013-EAA staff successfully sampled the San Marcos River. This was the 4th and last sample required by the HCP.

d. Receive report on USFWS revision of critical habitat for three EAHCP Covered Species: Comal Springs dryopid beetle, Comal Springs riffle beetle and Peck's cave amphipod

Nathan Pence met with Kevin Connally regarding new critical habitat criteria recently established by USFWS. The new criteria deal primarily with subterranean habitat and will not directly have an effect to the HCP Program. NEPA requires additional layers of reviews when federal dollars are spent; since the HCP program does not currently receive federal dollars there is no effect/impact. Mr. Steve Ramsey questioned subterranean depth/acreage and Nathan will research and provide information. Reference to (attachment 5/Federal Register)

e. Receive report on EAA Budget and 2014 HCP Funding Applications approval

November 12th Board Approved Funding Applications for a total budget of \$20,468,000. The Board also approved inter-local contracts for New Braunfels and San Marcos. Nathan Pence discussed San Marcos, Texas State, City of New Braunfels reimbursements and informed the Committee that the contract will self-execute with funding apps (7 years). Steve Ramsey announced, with regards to the Funding agreements, that New Braunfels Council will hold workshop. Ann Gabriel questioned current adopted budget/rates and requested clarification. Roland Ruiz confirmed rates.

5. Receive report on current aquifer conditions, spring flow levels, and related activities.

Nathan Pence discussed the Rain Event on October 31, 2013. Todd Votteler provided flows for the Blanco River 20 cfs to 100,000 cfs. Nathan Pence shared a Power Point Presentation on high water event on October 31st in New Braunfels and San Marcos (Attachment 6) provided by Bob

EAHCP Staff

November 21, 2013

Hall, (EAA) and also said that it was unfortunate that the rain did not fall into the recharge zone. PowerPoint/photos provided:

Tom Taggart shared that the San Marcos Daily had an aerial picture of Spring Lake with Sink Creek arm showing chocolate colored water flowing in comparison to clear springs and requested that Committee keep the photo from San Marcos Daily in archives.

6. Receive update on Annual Report – Outline and Timeline

Nathan Pence announced significant progress and on the annual report: there was an internal meeting, also SWCA (Christine, Crystal, and Jenna in attendance) will provide format/drafting/executive summary, and they have provided the majority of the information required. SWCA provided comment pages and SWCA will compile and incorporate them. Mr. Tom Taggart requested that a section for financial performance to date should also be included. Nathan Pence said if this is not included it will now be included. Nathan Pence stressed that the final drafts are due on December 22, 2013. Daren Thompson questioned the December 22, 2013 date and availability to provide updates. Nathan Pence reassured updates will be possible.

Nathan Pence asked if there were questions, there were none.

7. Consideration of and possible action on the DRAFT Operational Procedures and Parliamentary Rules of Conduct of the Implementing Committee.

Darcy Frownfelter explained all redlined items. Darren Thomson requested a copy. Andrew Sansom moved to approve Operational Procedures and Rules of Conduct. Tom Taggart seconded the motion. There were no objections; the motion passed.

8. Discussion and possible action accepting an Informational Memo from USFWS to the EAHCP Implementing Committee about Refugia commitments and responsibilities.

Tom Taggart reminded Committee of the "No surprises clause" provided on all correspondence as well as Appendix to contract. Roland Ruiz informed the Committees that the Refugia memo would be incorporated into the Refugia Contract as an appendix. (EAA & F&WS)

Tom Taggart moved to approve Informational Memo. Roland Ruiz seconded the motion. There were no objections; the motion passed.

9. Consideration of Informational Memo to be submitted to USFWS related to Amendment #1 of the Funding and Management Agreement and possible action approving the Program Manager to submit the Informational Memo to USFWS.

Nathan Pence commented that USFWS will be informed of the amendment of the Funding and Management Agreement. Steve Ramsey moved to submit the memo to USFWS. Andrew Sansom seconded the motion. There were no objections; the motion passed.

10. Discuss and take possible action approving modified designs to the City of New Braunfels Bank Stabilization project.

EAHCP Staff

November 21, 2013

Steve Ramsey discussed the design process Tom Taggart recommended that the item be referred to the Science Committee; all members of the Committee agreed. Les Boyd (FREESE & NICHOLS) replied "yes" regarding presentation to Science Committee.

11. Public Comment.

None

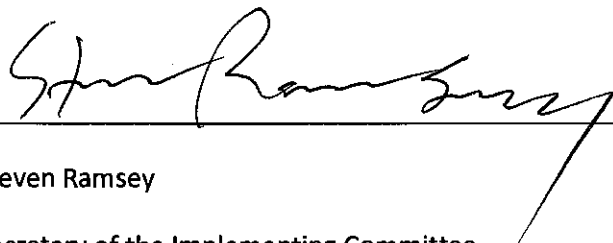
12. Consider future meetings, dates, locations, and agendas.

A meeting of the Implementing Committee will be held on December 19, 2013, at the Edwards Aquifer Authority at 9:00am.

A joint meeting of the Implementing Committee, Stakeholder Committee, and Science Committee will be held on December 19, 2013, at the Edwards Aquifer Authority at 9:30am. A luncheon and presentation in honor of Dr. Gulley is planned.

Steve Ramsey requested that an update on and discussion of drought conditions be included on the agenda for a meeting in early 2014.

Meeting Adjourned at 10:44 a.m.

A handwritten signature in black ink, appearing to read "Steven Ramsey", is written over a horizontal line. A long, thin diagonal stroke extends from the bottom right of the signature.

Steven Ramsey

Secretary of the Implementing Committee



MEMORANDUM
November 22, 2013

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

RE: Amendment related to the Edwards Aquifer Habitat Conservation Plan (EAHCP) for
Incidental Take Permit #TE-63663A-0 (ITP)

Mr. Connally,

Implementation of the EAHCP approved by the U.S. Fish and Wildlife Service (Service) on March 18, 2013, is underway. This memorandum, submitted on behalf of the Edwards Aquifer Authority (EAA), the City of New Braunfels (CoNB), the City of San Marcos (CoSM), the San Antonio Water System (SAWS), and Texas State University (TSU) (collectively the Permittees), is being provided to you regarding Amendment #1 to the Funding and Management Agreement (FMA) (Appendix R of the EAHCP). The amendment provides language that allows employees of TSU to receive compensation for work on EAHCP projects as long as they meet pre-determined conditions.

The following is provided for your review and consideration; the full amendment is included in this letter as Exhibit 1:

Section 5.6.5 of the Funding and Management Agreement (FMA)

The FMA as originally written did not allow for the funding of employees of any of the Permittees. Realizing that it is in the best interest of the EAHCP to utilize all available resources and scientific expertise available at TSU throughout this process, the Implementing Committee agreed to amend the FMA by adding a provision to section 5.6.5 that allows employees of TSU to receive compensation for work on EAHCP projects as long as they meet pre-determined conditions outlined in the Amendment.

Public Comment and Approval Process

In an effort to provide transparency to the administrative process of the EAHCP and in accordance with Chapter 9 of the EAHCP, the public was provided opportunity to be informed and provide comment on the draft Amendment prior to, and during, the May 16th Implementing Committee¹ meeting, where the Amendment was discussed and considered.

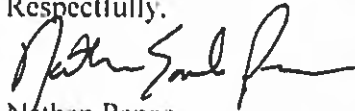
On May 9, 2013, the May 16th Implementing Committee meeting agenda and packet (Exhibit 2) were posted online at the EAHCP website²; a paper copy was posted at the Bexar County Courthouse kiosk and; the agenda and packet were noticed on the EAHCP listserv³.

During the May 16th Implementing Committee meeting, the agenda allowed for Public Comment at the opening of the meeting. Additionally, members of the audience were allowed to comment on specific agenda items as they were considered by the Committee. No substantive comments were received in regards to this amendment.

The Implementing Committee unanimously approved this Amendment to the FMA at their meeting on May 16, 2013, (see Exhibit 3 for Implementing Committee minutes) and unanimously approved the submittal of this memorandum during their meeting on November 21, 2013, (see Exhibit 4 for Implementing Committee minutes).

Approval of this amendment will allow the implementation of the EAHCP to continue in the most effective manner possible and we look forward to your formal acceptance of this Amendment. We appreciate your time and consideration of this issue.

Respectfully,



Nathan Pence
Program Manager
Edwards Aquifer Habitat Conservation Plan
npence@edwardsaquifer.org
210-477-8527

¹ The Implementing Committee is comprised of the five Permittees as voting members and the Guadalupe-Blanco River Authority as a non-voting member.

² http://www.eahcp.org/index.php/administration/implementing_committee/implementing_committee_meeting_documents

³ The EAHCP listserv currently has over 400 members who have specifically requested to receive information about the EAHCP.

EXHIBIT 1

EDWARDS AQUIFER HABITAT CONSERVATION PLAN PROGRAM**AMENDMENT NO. 1****TO THE FUNDING AND MANAGEMENT AGREEMENT**

by and among

**The Edwards Aquifer Authority, The City of New Braunfels,
The City of San Marcos,
The City of San Antonio, acting by and through its
San Antonio Water System Board of Trustees, and
Texas State University – San Marcos**

**to fund and manage the Habitat Conservation Plan
for the Edwards Aquifer Recovery Implementation Program**

This Amendment No. 1 to the Funding and Management Agreement (Amendment Agreement) is entered into to be effective on the date of execution by the last signing Party as indicated below ("Effective Date"), 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 ("San Antonio"), and Texas State University – San Marcos ("University") (collectively, the "Parties," and individually, "Party").

RECITALS

WHEREAS, the Parties entered into that certain Funding and Management Agreement ("FMA") with an Effective Date of January 1, 2012; and

WHEREAS, the Parties now desire to amend the FMA.

AGREEMENT

NOW, THEREFORE, for the mutual consideration expressed in this Amendment Agreement, the Parties agree as follows:

EXHIBIT 1

1. Amendment. As of the Effective Date, the Parties hereby amend the FMA as follows:

SUBSECTION 5.6.5 IS AMENDED TO READ AS FOLLOWS:

5.6.5.1 Limitation on Use of Funds – Employees and Administrative Costs.

With the exception of Program Administration Costs of EAA, funds may not be used for: (a) costs of any Party's employees; or (b) any Party's administrative costs, such as costs of overhead, management, administration, research, planning, engineering, or legal services, or any other ancillary costs that are not directly required for the Program.

5.6.5.2 Special Exception.

Notwithstanding anything in Section 5.6.5.1(a), an employee of Texas State University may submit a proposal for consideration and may be awarded a contract for work associated with the implementation of a Conservation Measure in Chapter 5 or Program activity in Chapter 6 of the HCP assigned to any Party in an approved Work Plan and Funding Application as long as each of the following conditions are met:

(a) The costs for the measures are not used to fund an increase in Texas State's permanent Staff or for work that is historically operational in nature;

(b) The contract for the project has been awarded through a competitive procurement process that considers cost, contractor qualifications, and merits of the contractor's proposal, and through which the selected contractor's proposal was determined to be competitive with respect to each of these criteria; and

(c) After the contractor has been selected, the EAA will issue those contracts for which Texas State or the City of San Marcos is responsible under which a Texas State Employee will be paid, and the HCP Program Manager will

EXHIBIT 1

manage those contracts.

5.6.5.3 Conduct of Texas State Contractor/Employees.

Any employee of Texas State who is paid from HCP Funds shall:

- (a) Give first priority to the purposes and goals of the HCP as reflected by the entire Implementing Committee over the individual purposes and goals of the employee's employer;
- (b) Conduct his or her work and communications in an open and transparent manner and in a manner that avoids a conflict of interest or the appearance of a conflict of interest;
- (c) Not use the employee's Party's status as a member of the Implementing Committee or information that is not publicly available to obtain an advantage in the procurement process; and
- (d) Not advocate, directly or indirectly, a particular decision or participate in discussions of policy matters unless expressly requested to participate by the Program Manager and the Implementing Committee. Nothing herein precludes the employee, when requested by the Implementing Committee, from discussing scientific data and conclusions with the Science Review Panel and Science Committee.

Failure to strictly comply with the requirements of Section 5.6.5.3 may be the basis for the termination of the Special Exception with respect to future contracts involving that employee or, if the non-compliance warrants, a recommendation to terminate the employee's participation in an existing contract. In any vote of the Implementing Committee with regard to such a recommendation of termination, Texas State shall abstain, and a decision to terminate must be unanimous among the remaining four voting members of the Implementing Committee.

2. No Effect on Remainder of the FMA. Except as provided in this Amendment Agreement, the FMA shall remain in full force and effect in all respects. This Amendment Agreement shall be governed by and construed under the terms of the FMA.

EXHIBIT 1

IN WITNESS WHEREOF, the Parties hereto acting under authority of their respective governing bodies have caused this Amendment Agreement to be duly executed as of the Effective Date.

EDWARDS AQUIFER AUTHORITY

By: [Signature]
Roland Ruiz, General Manager

Date: 9-26-13

ATTEST:

By: [Signature]
Jennifer Wong-Esparza, Assistant to Board Secretary

Date: 09-26-13

APPROVED AS TO FORM:

By: [Signature]
Darcy Alan Frowlfelter, General Counsel

Date: 09/26/2013

CITY OF NEW BRAUNFELS

By: [Signature]
Robert Camareno, Interim City Manager

Date: 9-19-13

ATTEST:

By: [Signature]
Patrick Aten, City Secretary

Date: 9-19-13

APPROVED AS TO FORM:

By: [Signature]
Valeria Acevedo, City Attorney

Date: 9/19/13

[additional signatures on next page]

CITY OF SAN MARCOS

By: [Signature]
James R. Nuse, P.E., City Manager

Date: 6-10-13

ATTEST:

By: [Signature]
Jame Lee Pettijohn, City Clerk

Date: 6-13-13

APPROVED AS TO FORM:

By: [Signature]
Michael Cosentino, City Attorney

Date: 6-13-13

CITY OF SAN ANTONIO,
ACTING BY AND THROUGH ITS SAN ANTONIO WATER SYSTEM

By: [Signature]
Robert R. Puente, President/CEO

Date: 9-25-13

ATTEST:

By: [Signature]
Becky Gonzalez, Executive Administrative Assistant

Date: 9-25-13

APPROVED AS TO FORM:

By: [Signature]
Phil Steven Kosub, Senior Water Resources Counsel

Date: 9/24/13

Signatures continue on next page

EXHIBIT 1

TEXAS STATE UNIVERSITY – SAN MARCOS

WMP By: Denise M. Trauth
Denise M. Trauth, President

Date: 9-12-13

ATTEST:

By: William Nance
William Nance, Vice President for Finance and
Support Services, Texas State University-San Marcos

Date: 7-12-13

APPROVED AS TO FORM:

By: Diane Corley by sk
Diane Corley, Associate General Counsel, Texas
State University System

Date: 9-9-13

EXHIBIT 2



EDWARDS AQUIFER
AUTHORITY

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 – San Marcos (TSU), and the Guadalupe-Blanco River Authority (GBRA), a meeting of the **Implementing Committee** for the Edwards Aquifer Habitat Conservation Plan Program is scheduled for **Thursday, May 16, 2013, at 9:00 a.m., at the New Braunfels Civic Center, 375 S. Castell Avenue, New Braunfels, TX . The meeting may last until 2:00 p.m. Lunch will be served.**

Members of this committee include: Roland Ruiz (EAA), Steven Ramsey (New Braunfels), Tom Taggart (San Marcos), Chuck Ahrens (SAWS), William Nance (TSU), and Todd Votteler (GBRA). At this meeting, the following business may be considered and recommended for committee action:

1. Call to order.
2. Public Comment.
3. Approval of previous meeting minutes
 - Implementing Committee - May 1, 2013 (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.
 - a. Status of the SAWS ASR Contract
 - b. May 8, 2013 Regional Water Conservation Monitoring Committee Meeting
 - c. May 9, 2013 Science Committee Meeting
 - d. Status of VISPO and ASR programs
 - e. Report on EAHCP Expenses as of April 30, 2013 (Attachment 2)
5. Consider and take possible action on changes to Section 5.6.5 of the Funding and Management Agreement (Attachments 3 & 4).
6. Consider and take possible action on Freeman Aquatic Building proposal for Applied Research (Attachment 5).
7. Receive report and take possible action on initiating the National Research Council Scientific Review Panel process in 2013.
8. Consider and take possible action on the recommendation from the Science Committee Vacancy Work Group regarding filling the current Science Committee vacancy (Attachment 6).
9. Receive report from the Program Manager with regards to Stage V triggers in the Uvalde Pool.
10. Presentation on City of San Marcos 2014 Draft Work Plans (Attachment 7).

EXHIBIT 2

11. Consider future meetings, dates, locations, and agendas.

- **Next Implementing Committee Meeting is scheduled for May 30, 2013, at 9:00 a.m. at the Dunbar Center in San Marcos, Texas.**
- **Agenda will include:**
 - **Consideration of City of New Braunfels 2014 Work Plans.**
 - **Report on Incidental Take and ITP compliance issues.**

EXHIBIT 3

**Implementing Committee of the Edwards Aquifer Habitat Conservation Plan****Minutes of the May 16, 2013 Meeting****New Braunfels Civic Center, New Braunfels, Texas**

- 1. Call to Order** – The meeting was called to order at 9:06 a.m. A quorum was present for all purposes. All members of the Implementing Committee were represented (Mike Abbott represented Texas State University).
- 2. Public Comment** – no public comment
- 3. Approval of Minutes from the Implementing Committee meeting of May 1, 2013.** Chuck Ahrens made a motion to approve the minutes with an amendment to paragraph 5 on page 1 of the minutes to read "The Implementing Committee agreed that no additional discussion of the substance of the EAA Work Plans was needed but reserved the right to submit written comments regarding Work Plan substance and consider the budgets for the plans at a later meeting." Tom Taggart seconded the motion. There were no objections, and the minutes were approved with proposed change.
- 4. Receive report from the Program Manager on topics related to the implementation of the Habitat Conservation Plan and operation of the Implementing Committee, including the following:**
 - Gulley updated the Committee on the status of Regional Water Conservation Program and discussed the Community Prioritization Matrix.
 - Gulley reported that the Science Committee met on May 9, 2013 and reviewed the City of San Marcos and City of New Braunfels Work Plans. City of San Marcos Work Plans have incorporated the recommendations of the Science Committee and the City of New Braunfels will incorporate the recommendations in its' Work Plans prior to the next Implementing Committee meeting.
 - Rick Illgner reported that to-date we have obtained over 10,000 acre-feet of water for the VISPO program; 62% are 10 year commitments; 81% base and 19% un-restricted. He will be calling individuals in Bexar County to speak with them regarding the VISPO program.
 - Julie Velez reported that to-date 3,250 acre-feet of leases have been executed by the water right holder for the ASR program; 1,400 acre-feet of leases are pending.

EXHIBIT 3

5. Consider and take possible action on changes to Section 5.6.5 of the Funding and Management Agreement

Robert Gulley discussed the proposed amendment to Section 5.6.5 of the FMA. Chuck Ahrens asked whether Section 5.6.5.2 was intended to include work in both Chapter 5 and Chapter 6 of the EAHCP. Robert Gulley confirmed that it was. Chuck Ahrens made a motion to approve the Amendment with a change to the first paragraph of Section 5.6.5.2 adding the phrase "Conservation Measure in Chapter 5 or Program activity in Chapter 6 of HCP". Tom Taggart seconded the motion. There were no objections; thus, the motion passed.

6. Consider and take possible action on Freeman Aquatic Building (FAB) proposal for Applied Research.

Robert Gulley presented term sheet for use of the FAB. Following discussion Roland Ruiz moved to pursue FAB obtaining access to an Applied Research facility following the EAA procurement procedures. Tom Taggart seconded the motion. There were no objections; thus, the motion passed.

7. Receive report and take possible action on initiating the National Research Council Scientific Review Panel process in 2013.

Robert Gulley reported having discussions with the National Academy of Science (NAS) regarding the Scientific Review Panel. After further discussions, the Implementing Committee requested the Program Manager invite Dr. Jeffrey Jacobs, Program Director of the National Research Council Division on Earth & Life Studies Water Science Technology Board, to meet with the Implementing Committee (IC) as soon as convenient to discuss the Scientific Review Panel proposal. The IC agreed that the start date for NAS work and any necessary budget changes to retain NAS will be considered after the IC has met with Dr. Jacobs.

8. Consider and take possible action on the recommendation from the Science Committee Vacancy Work Group regarding filling the current Science Committee vacancy.

Colette Barron-Bradsby reported a comprehensive search was conducted for candidates to fill the Science Committee vacancy. The Science Committee Vacancy Work Group on May 3, 2013, recommended that Dr. Miguel Acevedo be asked to serve on the Science Committee (Attachment 6 to 5-16-13 Implementing Committee Agenda). Chuck Ahrens made a motion to accept Dr. Acevedo as the new Science Committee member. Mike Abbott seconded the motion. There were no objections; thus, the motion was passed.

9. Receive report from the Program Manager with regards to Stage V triggers in the Uvalde Pool.

Robert Gulley recommended postponing discussion of this issue until the next Implementing Committee meeting. Tom Taggart made a motion to table this topic until the next meeting. Roland Ruiz seconded the motion. There were no objections; thus, the motioned passed.

10. Presentation on City of San Marcos 2014 Draft Work Plans.

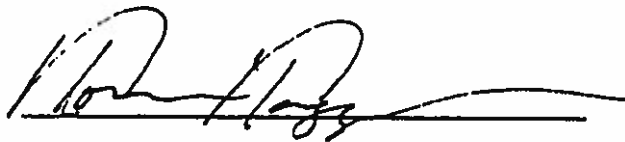
Melani Howard presented an overview of the City of San Marcos and Texas State University (TSU) 2014 Work Plans. The Implementing Committee agreed that no additional discussion of

EXHIBIT 3

the substance of City of San Marcos Work Plans was needed but reserved the right to submit written comments regarding Work Plan substance and to discuss the budget.

11. Consider future meetings, dates, locations, and agendas

- Next scheduled implementing Committee meetings is on May 30, 2013 at 9:00 a.m. at the San Marcos Dunbar Center in San Marcos, TX. Agenda will include:
 1. City of New Braunfels 2014 Work Plans
 2. Report on Incidental Take and ITP compliance issues
 3. Report on Stage V Triggers in Uvalde Pool
 4. Report on EAA Procurement Procedures and Policies
- June 3: Written comments on the City of San Marcos and Texas State University and Edwards Aquifer Authority Work Plans due
- June 10: Written comments on the City of New Braunfels Work Plans due
- June 11: Packets will be sent out containing City of San Marcos and Texas State University and Edwards Aquifer Authority revised Work Plans
- June 14: Distribute City of New Braunfels revised Work Plans
- June 18: IC meeting, 9 a.m. at New Braunfels Civic Center



Tom Taggart

Chair of Implementing Committee

SIGN-^{EXHIBIT 3}IN SHEET
EAHCP Implementing Committee
May 16, 2013



NAME	REPRESENTING	PHONE	E-MAIL
	F.A.I.		
BUREAU DIRECTOR'S OFFICE	I.P.W.F.	612 978 577	idell@state.tl.us
DIRECTOR			

SIGN-OUT SHEET

EAHCP Implementing Committee

May 16, 2013



NAME	REPRESENTING	PHONE	E-MAIL
Tom Tappan	CITY OF SAN ANTONIO	512 313-8383	ztappan@cityofsaw.org
Robert Gullett			
Nathan Rene			
Charles H. Huns	SAWS	210 233-3692	
Patrick Shriver	SAWS	210-233-3697	patrick.shriver@saws.org
Gene Boryso	SAWS	233-3702	
Adam Yablonski	irrigator	210 854 6536	adam.yablonski@gmail.com

EXHIBIT 4

**Implementing Committee of the Edwards Aquifer Habitat Conservation Plan****Minutes of the November 21, 2013 Meeting**

Located at the Edwards Aquifer Authority, San Antonio, Texas

- 1. Call to Order.** The meeting was called to order at 9:09 a.m. A quorum was present for all purposes. All members of the Implementing Committee were represented. Darren Thompson was present for Chuck Ahrens.
- 2. Public Comment.**
None
- 3. Approval of minutes from October 17, 2013.**
Andrew Sansom moved to approve the minutes for October 17, 2013. Roland Ruiz seconded the motion. There were no objections; motion passed.
- 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.**

Mr. Nathan Pence announced new hire/HCP Administrative Assistant, Jeannette Flores. Mr. Pence handed out copies of Fish & Wildlife News Magazine provided by Kevin Connally of United States Fish and Wildlife Service with an article on EAHCP.

Mr. Pence updated the Committee that a contract with the City of Uvalde for the regional water conservation program had been executed and was underway. The City of Uvalde has hired a part-time Water Conservation Coordinator and; the first order of high-efficiency plumbing kits and toilets from Moore Supply has been made. Other Water Conservation Program items presented were updates on Universal City, the San Antonio Zoo, and Leon Valley.

Mr. Pence provided an update on the National Academy of Science contract approved by the EAA Board, stating that it is aggressive and fast moving process for 2014. Dr. Andrew Sansom questioned what he can do to assist in the process. Mr. Pence provide background documents, and informed the Committee that NAS will start requesting meetings with Implementing and Science Committees and request that they provide information as needed to them.

EXHIBIT 4

a. Update on the status of the ASR and VISPO programs**• ASR:**

Julia Velez (SARA) provided a handout and discussion about ASR Leasing terms/offering shorter terms. Nathan Pence commented on positive response from the public in regards to the shorter terms.

• VISPO:-No additional water**b. 2013 Budget Report through October 30, 2013**

- Nathan Pence commented that the reserve budget will fluctuate
- There were no questions or comments regarding the budget

c. Update on water quality sampling of storm event, October 31, 2013

- Rain Event 10/31/2013-EAA staff successfully sampled the San Marcos River. This was the 4th and last sample required by the HCP.

d. Receive report on USFWS revision of critical habitat for three EAHCP Covered Species: Comal Springs dryopid beetle, Comal Springs riffle beetle and Peck's cave amphipod

Nathan Pence met with Kevin Connally regarding new critical habitat criteria recently established by USFWS. The new criteria deal primarily with subterranean habitat and will not directly have an effect to the HCP Program. NEPA requires additional layers of reviews when federal dollars are spent; since the HCP program does not currently receive federal dollars there is no effect/impact. Mr. Steve Ramsey questioned subterranean depth/acreage and Nathan will research and provide information. Reference to (attachment 5/Federal Register)

e. Receive report on EAA Budget and 2014 HCP Funding Applications approval

November 12th Board Approved Funding Applications for a total budget of \$20,468,000. The Board also approved inter-local contracts for New Braunfels and San Marcos. Nathan Pence discussed San Marcos, Texas State, City of New Braunfels reimbursements and informed the Committee that the contract will self-execute with funding apps (7 years). Steve Ramsey announced, with regards to the Funding agreements, that New Braunfels Council will hold workshop. Ann Gabriel questioned current adopted budget/rates and requested clarification. Roland Ruiz confirmed rates.

5. Receive report on current aquifer conditions, spring flow levels, and related activities.

Nathan Pence discussed the Rain Event on October 31, 2013. Todd Votteler provided flows for the Blanco River 20 cfs to 100,000 cfs. Nathan Pence shared a Power Point Presentation on high water event on October 31st in New Braunfels and San Marcos (Attachment 6) provided by Bob

Creek arm showing chocolate colored water flowing in comparison to clear springs and requested that Committee keep the photo from San Marcos Daily in archives.

6. Receive update on Annual Report – Outline and Timeline

Nathan Pence announced significant progress and on the annual report: there was an internal meeting, also SWCA (Christine, Crystal, and Jenna in attendance) will provide format/drafting/executive summary, and they have provided the majority of the information required. SWCA provided comment pages and SWCA will compile and incorporate them. Mr. Tom Taggart requested that a section for financial performance to date should also be included. Nathan Pence said if this is not included it will now be included. Nathan Pence stressed that the final drafts are due on December 22, 2013. Daren Thompson questioned the December 22, 2013 date and availability to provide updates. Nathan Pence reassured updates will be possible.

Nathan Pence asked if there were questions, there were none.

7. Consideration of and possible action on the DRAFT Operational Procedures and Parliamentary Rules of Conduct of the Implementing Committee.

Darcy Frownfelter explained all redlined items. Darren Thomson requested a copy. Andrew Sansom moved to approve Operational Procedures and Rules of Conduct. Tom Taggart seconded the motion. There were no objections; the motion passed.

8. Discussion and possible action accepting an Informational Memo from USFWS to the EAHCP Implementing Committee about Refugia commitments and responsibilities.

Tom Taggart reminded Committee of the "No surprises clause" provided on all correspondence as well as Appendix to contract. Roland Ruiz informed the Committees that the Refugia memo would be incorporated into the Refugia Contract as an appendix. (EAA & F&WS)

Tom Taggart moved to approve Informational Memo. Roland Ruiz seconded the motion. There were no objections; the motion passed.

9. Consideration of Informational Memo to be submitted to USFWS related to Amendment #1 of the Funding and Management Agreement and possible action approving the Program Manager to submit the Informational Memo to USFWS.

Nathan Pence commented that USFWS will be informed of the amendment of the Funding and Management Agreement. Steve Ramsey moved to submit the memo to USFWS. Andrew Sansom seconded the motion. There were no objections; the motion passed.

10. Discuss and take possible action approving modified designs to the City of New Braunfels Bank Stabilization project.

EXHIBIT 4

Steve Ramsey discussed the design process Tom Taggart recommended that the item be referred to the Science Committee; all members of the Committee agreed. Les Boyd (FREESE & NICHOLS) replied "yes" regarding presentation to Science Committee.

11. Public Comment.

None

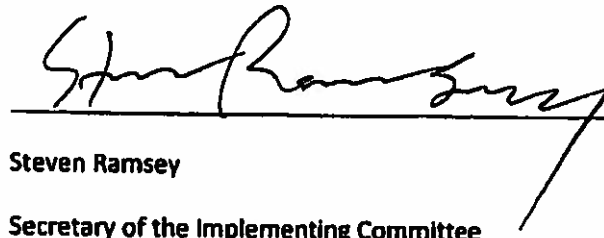
12. Consider future meetings, dates, locations, and agendas.

A meeting of the Implementing Committee will be held on December 19, 2013, at the Edwards Aquifer Authority at 9:00am.

A joint meeting of the Implementing Committee, Stakeholder Committee, and Science Committee will be held on December 19, 2013, at the Edwards Aquifer Authority at 9:30am. A luncheon and presentation in honor of Dr. Gulley is planned.

Steve Ramsey requested that an update on and discussion of drought conditions be included on the agenda for a meeting in early 2014.

Meeting Adjourned at 10:44 a.m.



Steven Ramsey

Secretary of the Implementing Committee