**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 Report[1] 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.

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

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

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:*

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.

**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 $m^2$.*

## 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

- 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

- 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