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# Springflow Habitat Protection Work Group Part 1 Report and Proposed Part 2 Charge

## Summary of actions taken by the Work Group pursuant to Part 1 of the Work Group Charge

Part 1 of the Work Group charge focused on refining and clarifying overarching Issues 1 through 4 listed in the background section of the March 2020 charge. In response to that directive, the Work Group met 15 times in virtual meetings. In the initial 5 meetings, technical experts presented overviews of research, ongoing studies, and previous targeted beneficial studies addressing topics within overarching Issues 1, 2, and 3. In subsequent meetings, the Work Group members, as well as other participants, provided input on more specific topics for consideration under each of the overarching issues. For overarching Issue 4, based on a review of the text of the Edwards Aquifer Habitat Conservation Plan (EAHCP), references to specific study commitments were identified and compared to information about studies undertaken to date.

Work Group members then identified priority topic areas and associated topics to be carried forward into Part 2 of the Work Group process based on the information provided and on Work Group deliberations. Meeting agendas (Appendix A) and minutes (Appendix B) from the Part 1 meetings are attached for reference, along with documents summarizing the steps in the Work Group decision process. Consistent with previous direction from the Implementing Committee (IC), the Work Group developed a proposed Part 2 Charge as set out below. During Part 2 of the process, the Work Group, with assistance from EAHCP staff and, as determined appropriate, input from Science Committee members as well as other pertinent Work Groups, will continue to refine the topics under the questions presented in the Part 2 Charge in order to develop specific recommendations, including study proposals, for consideration by the IC.

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## Part 2 Charge

The Work Group should, during Part 2 of the study process, identify, from the topic areas and topics prioritized in Part 1 of the Work Group process and organized under the following questions listed under Issues 1 through 4, specific recommendations for requests for proposals (RFP's) to undertake studies. Those requests for proposals will be presented for consideration by the IC and processed through normal EAHCP procedures.<sup>1</sup> All such studies are acknowledged as part of the ongoing EAHCP adaptive management process intended to provide additional insight for Covered Species protection and inform the program for better permit management decisions.

In recognition of various practical constraints, including budgetary considerations, the Work Group should aim to further prioritize its study recommendations because it may not be possible to fully address all prioritized topic areas or topics in Part 2 of the Work Group process. Generally, studies are to be divided into two sets consistent with the “Set a” and “Set b” components of Part 2 of the Work Group process (Table 1). However, for topics for which no “Set a” study component is identified as a prerequisite for a “Set b” study component, the timeline for the “Set b” study component may be advanced to the extent consistent with available resources. The Work Group also should consider the results of past and ongoing studies and analyses in developing recommendations regarding potential adaptive management activities to be presented to the Stakeholder Committee and the IC.

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<sup>1</sup> As determined appropriate by EAHCP staff, some study components may be undertaken by staff.

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**Issue 1: The Implementing Committee should ensure a technical evaluation is undertaken of water quality impacts of predicted extended periods of flow below 80 cfs in both spring systems, either using the Hardy water quality model but calibrated and validated using data from recent low-flow periods or using an alternate approach.**

The topic areas prioritized in Part 1 of the Work Group process under Issue 1, but with relevance to topics prioritized under Issues 2 through 4, from which specific requests for study proposals will be developed are organized under the following questions:

*Question 1-1: Based on consideration of the results of a validation and sensitivity exercise using data collected during 2014 drought conditions, is the Hardy model effective and suitable to evaluate water quality (dissolved oxygen and water temperature) effects of springflows below 80cfs?*

*(Note: Data collected under low flow conditions in the Comal system in 2014 will be compared to model predictions as a validation exercise.)*

*Question 1-2: Which spring openings will still be flowing at various flow levels below 80cfs in the Comal and San Marcos springs systems and how does that relate to effects on Covered Species?*

*(Note: The focus for these efforts will be on getting a better understanding of actual flow distribution during periods of low flow to inform evaluations that previously were based on assumptions about the distribution.)*

*Question 1-3: How does the flow of cool water from spring openings in the Comal system travel through Landa Lake during extended periods of low flow and what is the potential for the cool water to bypass the Old Channel?*

*(Note: Because the documentation for the modeling referenced in Question 1-1 acknowledges uncertainty about the underlying assumption that cool water would not bypass the Old Channel during low flow periods, approaches for evaluating the potential for such a bypass of flow will be considered.)*

*Question 1-4: Is the available spring data being collected, consistent with the outcomes of the 2016 Expanded Water Quality Work Group adequate to inform how the physio-chemical aspects, chemistry, discharge, and spring locations change under low flow conditions?*

*(Note: Information collected to answer this question will be used to understand data gaps).*

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*Question 1-5: Depending on results of Question 1-1 regarding validation, what other modeling approaches should be considered for water quality impacts?*

*(Note: Particularly if the results from Question 1-1 raise questions about modeling accuracy, other water quality modeling approaches that have been applied more widely will be evaluated for suitability.)*

*Question 1-6: Do existing modeling and statistical tools and available data allow us to incorporate predictions for future drought conditions and make springflow management decisions during periods of extended low flows?*

*(Note: This question is intended to assess if, based on results of inquiries under other questions, tools and data need to be supplemented.)*

More specific information about what is included as potential topics and topic areas under these questions to be addressed through studies or analyses in Part 2 of the Work Group process is set out in Appendix C for Issue 1 Themes and Topics, Appendix D for Issue 2 Themes and Topics, Appendix E for Issue 3 Themes and Topics, and Appendix F for Issue 4.

**Issue 2: The Implementing Committee should ensure a technical evaluation is undertaken of potential impacts of predicted extended periods of flow below 80 cfs on Comal Springs riffle beetle (CSRB) populations.**

The topic areas prioritized in Part 1 of the Work Group process under Issue 2, but with relevance to topics prioritized under Issues 1, 3 and 4 as well, from which specific requests for study proposals will be developed are organized under the following questions:

*Question 2-1: What aquifer flow paths contribute to individual springs or spring emergence areas that are likely to be significant flow sources into the Comal and San Marcos systems during low flow periods and which fault block—upthrown block or downthrown block—are those flow paths associated with? And, are those springs habitat for, and occupied by, Covered Species?*

*(Note: This inquiry is intended to focus on gaining an improved understanding of which individual spring openings or discharge areas are likely to continue to flow during extended periods of low flow to help inform management approaches. Initial efforts will include assessing existing data and the results of inquiries under Question 1-2 and all efforts will be informed by recognition of the need to avoid potentially damaging study approaches.)*

*Question 2-2: How can results of ongoing genetic studies be used to inform our understanding of impacts of low flow periods on Comal Springs riffle beetle? If*

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*those results are not sufficiently helpful in understanding such impacts, how could variations on those studies or other genetic studies be used to provide useful insights?*

*(Note: Ongoing genetic studies may provide insights on the effects of previous low flow periods on riffle beetle populations and subpopulations. Those study results will be reviewed for insights and, if determined appropriate based on those results, follow-up analyses will be considered.)*

More specific information about what is included as potential topics under these topic areas to be addressed through studies or analyses in Part 2 of the Work Group process is set out in Appendix C for Issue 1 Themes and Topics, Appendix D for Issue 2 Themes and Topics, and Appendix E for Issue 3 Themes and Topics.

**Issue 3: The Implementing Committee should ensure that a technical evaluation is undertaken of potential impacts of predicted extended periods of flow below 80 cfs on San Marcos salamander populations, particularly for populations in the area below Spring Lake Dam, and on Texas wild-rice and other vegetation serving as habitat for fountain darters downstream of Spring Lake Dam, including consideration of impacts from recreation.**

The topic areas prioritized in Part 1 of the Work Group process under Issue 3, but with relevance to Issue 1 and vegetative die-off in the Comal system as well, from which specific requests for study proposals will be developed are organized under the following questions:

*Question 3-1: How are changes related to vegetative die-off expected to affect the dynamics of habitat, dissolved oxygen and vegetation loss during predicted low springflow in the future in both systems?*

*(Note: Water quality modeling reports note uncertainty about the effect of potential vegetative die-off during extended low flows. Although short periods of low flow have not been observed to cause die-off raising water quality concerns, further consideration of that potential during extended low-flow periods is contemplated.)*

*Question 3-2: Over what section of Spring Lake Dam does flow move during periods with flows below 80cfs?*

*(Note: Efforts will focus on gaining an improved understanding about where flow will pass over the Spring Lake Dam during periods of low flow in order to better inform management measures aimed at protecting San*

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*Marcos salamanders and other Covered Species located just downstream of the dam.)*

*Question 3-3: What specific recreational impacts exist and what are their data-supported impacts to Texas wild-rice, fountain darters, and San Marcos salamander and are impacts greater during lower flows?*

*(Note: Efforts will focus on gaining an improved understanding of the highly significant recreational impacts in the San Marcos River during periods of low flow to help guide recreation and vegetation management.)*

*Question 3-4: What locations and approaches would be most effective for exclosures in the State Scientific Area (SSA) to ensure protections for Texas wild-rice, fountain darter, and the San Marcos salamander habitat during low flow conditions?*

*(Note: Building on an improved understanding of flow exiting Spring Lake and of recreational impacts during periods of low flow, approaches and locations for exclosures will be reviewed and, if determined appropriate, recommendations for revising approaches and locations will be considered.)*

*Question 3-5: Based on existing and ongoing data collection, what areas within the San Marcos system represent habitat important for maintaining fountain darter populations that can be factored into management decisions, in particular designation of exclosures under the SSA, during periods of low flows?*

*(Note: Efforts will focus on achieving an improved understanding of location of fountain darter populations based on updated habitat conditions that could help inform management decisions, such as exclosure configuration, during periods of low flows.)*

More specific information about what is included as potential topics under these topic areas to be addressed through studies or analyses in Part 2 of the Work Group process is set out in Appendix C for Issue 1 Themes and Topics and Appendix E for Issue 3 Themes and Topics.

**Issue 4: The Implementing Committee should ensure that a rigorous review process, involving input from qualified experts in addition to the Science Committee, is undertaken, as soon as reasonably possible, to inform study design for each of the above-listed technical evaluations and to assess the extent to which adaptive management study commitments included in the EAHCP that are related to flow impacts have been met, will be met, or should be adjusted.**

Under Issue 4, the Work Group reviewed study commitments identified in the EAHCP that did not fit neatly under Issues 1 through 3. As the Work Group recognized in its deliberations, multiple factors affect when, and how, it will be appropriate to undertake specific studies described in the EAHCP. Accordingly, the Work Group's categorization of the status of specific studies is acknowledged as simply representing a snapshot in time as EAHCP implementation continues and as adaptive management adjustments are made. The Work Group considered the various studies described in Chapters 4 and 6 of the EAHCP, generally characterizing them, based on a preliminary review, into 3 categories: 1) studies apparently already undertaken with no obvious inconsistency with EAHCP commitments, 2) studies not yet obviously undertaken or completed as described in the EAHCP but not identified as a priority for this Work Group, and 3) studies not yet undertaken as described in the EAHCP that are identified as a priority for this Work Group process. The topic areas prioritized in Part 1 of the Work Group process under Issue 4 from which specific requests for proposals to undertake studies will be developed are organized under the following questions:

*Question 4-1: What consecutive periods of flows at or below specific identified flow levels between 80 cubic-feet-per-second (cfs) and the relevant minimum springflow level for each spring system are predicted using the updated mod-flow model reflecting implementation of the Phase 2 flow protection Work Plan measures? What is the significance of those durations in terms of impacts on the Covered Species?*

*(Note: A flow level of 80 cfs for a three-month period, as described in the flow-related objectives in the HCP, is not considered reasonably achievable. Other flow levels between 80 cfs and 30 cfs in the Comal system, and between 80 cfs and 45 cfs in the San Marcos system may be achievable for similar periods, although not in the form of an engineered pulse, and may have the potential to provide some of the benefits to Covered Species contemplated for the 80 cfs component. Accordingly, further review of existing Modflow model predictions will be undertaken to identify other such flow levels which will be assessed using the ecological model and other appropriate tools for potential benefits to the Covered Species, including*

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*through consideration of new insights gained through inquiries pursuant to other questions.)*

*Question 4-2: What is the likely effect of extended periods of springflows below 80 cfs in the San Marcos system on siltation around spring openings and, in turn, on the population of San Marcos salamanders?*

*(Note: The EAHCP identifies siltation around spring openings as likely the biggest detriment to the San Marcos salamander population in Spring Lake and downstream of Spring Lake Dam during low flow periods and, noting uncertainty because direct observations are lacking regarding siltation around those spring openings during low flows, indicates studies should be undertaken to assess the risk. Options for assessing that risk will be considered.)*

*Question 1-3: listed under Issue 1 above, also was identified as a Work Group priority under Issue 4.*

More specific information about what is included as potential topics under these questions to be addressed through studies or analyses in Part 2 of the Work Group process is included in Appendix F for Issue 4 and Appendix E for Issue 3. More information about the other EAHCP-listed studies identified during the Work Group process that were not included as Work Group priorities also is included in Appendix F.



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## Part 2 Process<sup>2</sup>

The Part 2 process is intended to result in scopes of work (SOW) designed to guide studies and analyses to address, on a prioritized basis, questions and topics identified in Part 1. The Work Group should base its prioritization of studies on the availability of funds in the HCP's fund for Applied Research<sup>3</sup> and on the feasibility of addressing questions based on the *best available science* and data. In recognition of the need for flexibility in scheduling, including consideration of sequencing of related studies, the timeframes listed in Table 1 represent aspirational targets rather than hard and fast deadlines. At this time, studies are anticipated to be divided into two sets consistent with the "Set a" and "Set b" components of Part 2 of the Work Group process, but the Work Group has flexibility to deviate from that format as appropriate. The anticipated steps for both parts of the process, with a revised timeline, are set out in **Table 1**.

The Work Group may make recommendations about actions to be taken in response to study results and about future studies based on questions that do not get addressed through this process. As previously stated, all such studies are acknowledged as part of the ongoing EAHCP adaptive management process intended to provide additional insight for Covered Species protection and position the program for better informed permit management decisions.

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<sup>2</sup> The initial process for Part 2 was developed from comments at the January 30, 2020 Implementing Committee meeting. The Part 2 process has been updated based on the outcome of the Part 1 process.

<sup>3</sup> At the discretion of EAHCP staff, some studies or analysis may be undertaken at the staff level.

**Table 1. Springflow Habitat Protection Work Group Tasks and Products**

Part	Task	Product	Timeframe
<b>Part 1</b>	Presentations by key scientists and participants (EAHCP staff will handle logistics)	Identification of issues that were anticipated to be addressed regarding extended periods of low flow	March 20 – November 30, 2020
	Work Group (WG) refines questions and issues to be addressed in Part 2	Proposed Part 2 of the Charge elaborating on species questions and issues to be addressed	Presented to Implementing Committee (IC) March 2021
<b>Part 2</b>	Set a: Develop scopes of work (SOW) for technical experts to identify data gaps and evaluate/review available tools (based on WG input, EAHCP staff develops draft SOW(s) for review by WG*)	SOW(s) to be presented to the IC for approval	Mar. 2021 – Oct. 2021
	Set a: RFP(s) and contracting (undertaken by EAHCP staff)	Award contracts, as determined appropriate	Aug. – December 2021
	Set a: Contractors present interim results	Presentations to WG	As needed
	Set a: Contractors present recommendations to WG	WG defines/prioritizes next steps*	2022 – 2023
	Set b: Develop SOW(s) for studies and/or tool development (based on WG input, EAHCP staff will develop draft SOW(s) for review by WG*)	SOW(s) to be presented to IC for approval	2022 - 2023
	Set b: RFP(s) and contracting (undertaken by EAHCP staff)	Award contracts for studies and/or tool development, as determined appropriate	2022 - 2023
	Set b: Contractors present to WG and SC. Results shared with Stakeholder Committee and IC	TBD	TBD
	WG recommendations for next steps based on results	Report to IC	TBD

\* EAHCP Adaptive Management Science Committee members on the Work Group will be relied upon to provide scientific input.