
Springflow Habitat Protection Work Group

Meeting 17 Minutes
Wednesday July 21, 2021
2:00pm-4:00pm

1. **Confirm attendance**
All Work Group members were in attendance.
2. **Meeting logistics**
Jamie Childers provided an overview of virtual meeting logistics and meeting points of contact.
3. **Public comment**
There were no comments from the public.
4. **Approve Meeting Minutes**
A motion was made by Doris Cooksey, seconded by Charlie Kreidler, to approve the Meeting Minutes from the June 23, 2021, Springflow Habitat Projection Work Group. There was no discussion and no objections. In the absence of objection, the Meeting Minutes were approved by consensus.
5. ***Discuss results of initial individual ranking exercise for previously identified questions and seek agreement on a work-group prioritization***
The discussion was led by Myron Hess, Work Group Chair. The Work Group examined the results of the individual ranking question by question.

Jamie Childers reminded the group of the three ranking criteria.

1. Adds value in clarifying uncertainty in the Edwards Aquifer Habitat Conservation Plan flow objectives; particularly the need for 80 cfs or a similar increased flow periodically during prolonged drought.
2. Adds value in clarifying uncertainty in the Edwards Aquifer Habitat Conservation Plan biological goals and associated objectives.
3. Provides important new information to improve design of management measures for addressing impacts of extended periods of low flow on the Covered Species.

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 80 (cubic feet per second) cfs?

Myron noted his sense that, overall, the results ranked high across the three criteria.

Jacquelyn Duke commented that she was under the impression that the basic validation had been done and had ranked the question low. At 80 cfs, she recalled being answered by the experts that the system would still function normal. If the group is considering anything below 80 cfs there may need to be further discussion and analysis.

Charlie Kreidler agreed with Jacquelyn's comment. If validation of the Hardy Model below 80 cfs has not been studied, then it needs to be. For example, the Groundwater Model was reviewed two years ago and gave further strength and validation to the model. That said, the most recent drought condition data (2014) should be included in the Hardy Model in a validation analysis. Discussion indicated that the validation of that model using recent drought data, including 2014, has not been done.

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

In response to Charlie's observations about available data, Myron agreed that answering this question likely requires reliance on what data have been collected under recent low flow periods and on establishing protocols to collect data during future low flow conditions. Patrick Shriver indicated general agreement about the value of observations and noted the need to consider that invertebrate species have been found in varying locations, including away from spring openings, during periods of drought.

Kimberly suggested identifying a category for high priority monitoring on an opportunistic basis. Jamie Childers noted the importance of developing a monitoring plan in the near-term to guide execution of those monitoring opportunities. Myron commented that in addition to flow source and direct species correlation, there is another component of trying to understand where flow would emerge during drought, such as impacts based on assumptions about flow path in Landa Lake.

Colette Barron Bradsby recommended key factors to keep in mind while examining the results of the individual ranking exercise. For example, are these questions opportunity based, very expensive to implement, and extraordinarily

complex to analyze. Tom Arsuffi asked, in terms of cost effectiveness, can questions regarding springflow be added to contracts that already exist for monitoring during low flow periods.

Chad Furl noted his agreement that understanding prioritization for future monitoring would be valuable and that monitoring could be considered for addition to contracts.

Myron noted that the distinction on which springs will still be flowing during drought is an observational component whereas the effect on Covered Species would be more complex and expensive.

Patrick commented that some species exist in subterranean habitats, so this question is broader than just springflow observations. Chad also noted that even determination of flow emergence in some locations will require diving because some springs emerge below the surface.

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?

Myron remarked that this question did not rank particularly highly among the stakeholders, but could potentially be a monitoring effort during low flow periods. Charlie added that this question might be incorporated into Question 1-2, being that some flow is below the lake and water level, and easily could be made part of a monitoring program.

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?

Myron remarked that this question mostly had medium rankings across the three criteria. Noting that response, Myron indicated his impression that this question likely will end up in a low priority category.

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

Patrick noted that the Groundwater Model is a regional simulation and lacks the resolution of observational monitoring (spring orifices). He also noted that attempting to model specific emergences would be challenging. In general, the structural geology of the Groundwater Model doesn't change.

Charlie added that during the Groundwater Model analysis they used as much information as they had to piece together anything that might have been missed regarding predicting drought emergence. Drilling specific monitoring wells for a validation study would be costly.

Myron asked if it made sense to treat this one as not a current high priority but to revisit it depending on results of Question 1-1. Tom Arsuffi noted that broader peer-reviewed studies of water quality models were not included in the development of the Hardy Model. If Question 1-1 is pursued, recent papers should be evaluated with respect to criteria that were used in the Hardy Model. Tom suggested this question, or this aspect of (1-5), be added to Question 1-1. He indicated Hardy cites regional literature associated with the San Marcos and Comal Springs but there is a lot of literature associated with water quality models across different systems that could be used in a validation study.

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?

Myron noted that Work Group input mostly indicates high and medium prioritization. Charlie noted that the current Groundwater Model is based on the historical Drought of Record in the 1950's. The next Drought of Record may not look like the historical Drought of Record therefore, the model may not help determine which conservation measures and management strategies would be best to implement. Need a more proactive approach for addressing future droughts, but recognize that may be more appropriate for future phases.

Myron suggested that consideration of future drought scenarios might be something to be studied during the Incidental Take Permit renewal process in conjunction with addressing climate change. He noted that it is important to flag this now to ensure we have the information necessary to address it.

Tom noted that climate change is a really big factor and is advancing faster than earlier predictions. The HCP needs to be proactive in terms of changes relative to the Drought of Record, at least in terms of the next phase. Patrick noted the difficulty of forecasting future droughts. Doris Cooksey noted that she had not ranked particularly high because of complexity and this issue may be appropriate for farther down the road.

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?

Myron noted that this question was not ranked high across the three criteria—largely split between medium and low—and that it may be a complex undertaking. Charlie agreed that it would be expensive to get new data on the spring geology. Jacquelyn and Charlie noted that this question likely could be answered with opportunistic observations and monitoring rather than modeling.

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 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?

Myron noted variation in ranking across the three criteria but, overall, not ranking particularly high, with concerns expressed about undertaking new genetic studies. Myron commented that the initial phase contemplated in this question did not propose new studies but rather evaluation of results of ongoing genetic studies to help understand past drought effects on Comal Springs riffle beetles. Patrick noted the advantage of using non-invasive methods to gain insights, particularly for the future, and that this presents an opportunity. Charlie noted that there was no clear explanation of specifics of what to look for to understand low flow conditions.

Jacquelyn considered this question as low-hanging fruit because not recommending investing in new genetic studies but using existing studies for new insights. Research may provide insight on where the Comal Springs riffle beetles are going using genetic studies. Doris noted that she would now rank higher based on understanding reliance on existing studies.

Tom noted that simple non-invasive genetic studies can give insights on viability, stability, and help support learning about population changes and support the proposed population studies.

Chad commented, in response to a request from Brandon Payne, that a Comal Springs riffle beetle population study will occur in 2022-2023, using repeated surveys and numerical models will be used to understand surface populations. In addition, collected beetles, wherever found, will be archived. He also noted there are no future genetic studies planned at this juncture, however, want to be sure the EAHCP is in a position to do so in the future if determined appropriate.

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?

Myron noted the rankings across criteria appear fairly consistent with high and medium rankings, mostly medium. Patrick referenced the gardening and management of habitat in the spring systems as playing a key role in his

ranking. Chad noted that some studies of die-off were done in the early years and other efforts found oxygenating Landa Lake was not successful. Chad suggested that, if pursued, this question might be answered with observations and monitoring, because previous prediction efforts were not successful.

Tom commented that there is vast literature on decaying vegetation in freshwater systems. There are a lot of modeling tools that could be used to study effects of vegetation die-off. Jamie noted that such modeling would depend on having a well-calibrated hydro-dynamic model. Modeling vegetation die-off would be very expensive and complex and require strong data. Even then it is very difficult to do it well. Tom added that standing-crop biomass and changes in productivity would need to be measured to support a modeling effort and that is not something we are doing. Very complex undertaking, but there may be an opportunity to collect data in the near-term.

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

Myron noted that the rankings were predominantly in the medium category and were fairly consistent across the criteria. There was general agreement that this would be simple to do, but uncertainty about what to do in response to the information. Kimberly expressed concern about the salamander habitat downstream of the eastern spillway of Spring Lake Dam. As springflow decreases, it is unknown what could potentially happen in consideration to the bathymetry of the lake, with the lake bottom being higher upstream of the eastern spillway than other areas upstream of the dam. She expressed concerns that flow there might drop and her belief it would not be costly to approach the question.

Melani added that this question needs to be answered sooner rather than later. If results of a study indicate a need for a change to the dam, Texas State University would need to be advised and consulted.

Tom recommended that this question can be determined by changing the depths of the boards at Spring Lake Dam and observing response. Melani added that to a degree, at least conceptually, boards at the western spillway can be used to push water to the eastern spillway. Tom suggested that perhaps experimenting with use of boards might provide some insights on what to expect. Kimberly noted that moving boards at the dam could be an approach to address the issue however, this type of test will require a lot of logistics and coordination with Texas State University and is more complex than what may be assumed. Charlie noted that we might start with a testing scenario and then determine if modeling is needed.

In response to a question about when the dam went in, it was noted that it was the mid-1800s. Kimberly noted that the dam is a leaky structure so flow is not

just over the dam and recent modifications were aimed at reducing the leakage, so we don't know how things were altered. Kevin Mayes noted that in the early '90s, Texas Parks and Wildlife (TPWD) prepared a report analyzing changes in elevation at Spring Lake using boards at the dam and assessed effect on downstream flow, but did not look specifically at spillway flow. As Kimberly noted, the dam has likely changed due to significant infrastructure updates. He sent the TPWD report to the work group.

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?

Myron noted that there was quite a bit of similarity in rankings across Questions 3-3 through 3-5, with some suggestion of combining them. There seemed to be broad acknowledgment of recreation as an important factor to be addressed; Tom suggested combining the three. Charlie agreed and noted that the lack of a strong recreation management plan in advance of serious drought, when more people will be drawn to the river, could be a disaster. Kimberly seconded those observations and noted the need to further explore how exclusion areas should be situated which is an effort that should be data-supported and driven.

Melani commented that the City of San Marcos would need to be a partner in gathering data on recreational impacts to the Covered Species and preparing a plan. Additionally, currently there is little to no enforcement of recreational activities on the San Marcos River. Patrick noted that he would need to have time to consider lumping the three questions together. Colette asked that Texas Parks and Wildlife participate in discussions of enforcement of limiting recreation in the State Scientific Area.

Question 3-4: What locations and approaches would be most effective for closures 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?

Melani commented that the exclosures are losing their effectiveness and people are not staying out of them. Kimberly noted that even with signage people are disregarding the exclosures. There is a basic lack of enforcement and it is a big problem, beyond what we have seen before. Melani added that the Conservation Crew is continuing to educate people, however it does not seem to be working to influence behavior.

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?

Jacquelyn noted that based on the input from Melani and Kimberley, it seems to be a high priority to address these recreation issues.

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?

Myron noted that the responses appear fairly consistent across the three criteria; it is a two-part inquiry. The flow analysis has been done but might merit some elaboration, however evaluation of the significance of the duration of springflow makes this a complex question to answer. There were no additional comments from the Work Group.

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?

This question did not rank very highly. Myron noted that siltation is acknowledged in the EAHCP as likely the greatest threat to SM salamanders in Spring Lake. Brandon Payne asked if this question is still relevant considering that pulse flow would cause more detriment than sustained low flow. Myron answered he is not aware of a basis for dismissing this as a concern. Myron also indicated that monitoring might be the only viable approach to address the question rather than modeling.

In terms of moving forward, there was discussion about ways to summarize the results, including examples of how some folks had already done that. Jamie Childers indicated that on July 23 she would distribute to Work Group members various summaries of the initial rankings along with suggestions of how the input and discussion might be organized for submission of recommendations to the Implementing Committee. At the July 29 meeting, the group will discuss and seek agreement on presenting the information to the EAHCP Implementing Committee. Members were asked to provide ideas for organizing results they would like to propose for discussion to Jamie by Tuesday, July 27, so they can be shared in advance of the July 29 meeting. There was discussion about the difficulty of being able to reach full consensus, particularly on this timeline.

During the discussion, Patrick also noted concern that decisions not to assign a priority response to specific questions were not receiving adequate

consideration. Myron indicated that, because the reasons for not choosing to provide a prioritization likely vary, it would be difficult to appropriately factor that in.

4. ***As appropriate, plan for next steps in work-group prioritization process and in reporting results to the Edwards Aquifer Habitat Conservation Plan Implementing Committee***

As noted above, the Work Group will continue its efforts at the July 29 meeting and in the interim before that meeting.

5. **Public comment**

There were no public comments.

6. **Future meetings**

The next meeting will be Thursday, July 29 from 2:00-4:00pm.

7. **Adjourn 4:20PM**