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 Kreitler, 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. Kreitler 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. Kreitler 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. Kreitler 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. Kreitler 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. Kreitler 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. Kreitler 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.; ____ seconded the motion. No opposition.