



NOTICE OF OPEN MEETING
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MARCH 11, 2016 MEETING MINUTES – REVISED MAY 13, 2016

1. Call to order.

Doyle Mosier called the meeting to order at 9:03 a.m.

2. Public comment.

None.

3. Approval of November 10, 2015 Science Committee meeting minutes.

Approved without comment.

4. Receive report from the Program Manager.

- **Springflow and index well update**

Daniel Large provided an update to the Committee.

- **Update from National Academy of Sciences Science Review Panel February 3 and 4, 2016 meetings**

Nathan Pence provided an update to the Committee. Some National Academy of Sciences committee members who did not tour the systems in October 2015 were taken on a glass-bottom boat tour to the San Marcos spring system. Meetings discussed the ecological and hydrological models. Conservation measures were discussed. One deliverable to report will be an expedited report focusing on the ecological model build that will help inform the development of that project in a timely fashion.

- **EAHCP Biological and Water Quality Monitoring Program Work Groups**

Alicia Reinmund-Martinez provided an update to the Committee, discussing its creation, charge, members, and meeting schedule, meeting from March-May with a final report to be produced at the end of May, which will be reviewed at the EAHCP Implementing Committee meeting in May, 2016. Doyle Mosier asked to what extent the WQ program is synced with Texas Clean Rivers Program; Pence responded that having Mike Urrutia of GBRA who does Clean Rivers work will help inform the Work Group about that issue.

- **Developing Standard Operating Procedures for Comal Springs Riffle Beetle Sampling**

Bob Hall presented the SOP development plan to the Committee, providing an overview of the membership of the subcommittee convened for this purpose, its strategy, and the issues to be addressed.

- **2015 Final Reports (Biological and Water Quality Monitoring, Ecological Model)**

Reinmund-Martinez provided an update to the Committee, noting that the members had been distributed a copy of the final reports when they were released for their review. Reinmund-Martinez stated the staff would like any feedback if the members have any questions or concerns.

- **Update on development of integrated EAHCP database**

Reinmund-Martinez provided an update on the EAHCP database research and procurement process, including the data needs assessment that will be distributed to the Committee members and other “data constituents” whose data needs the EAHCP would like to take under consideration in the development of the database. Conrad Lamon recommended for NAS Committee members to be included in the mail-out of the assessment.

5. **Presentation and discussion of the proposed methodology for the 2016 Applied Research study: Evaluation of the long-term elevated temperature and low dissolved oxygen tolerances of larvae and adult Comal Springs Riffle Beetle.**

Weston Nowlin, as Principal Investigator (PI), provided this methods presentation to the Committee, exploring the effects of long-term elevated temps and low dissolved oxygen in isolation and combination on the CSRB, as well as to compare these effects between different life stages as well as possible surrogate species including other Elmids. Stated it was not feasible to let DO drift with temperature due to the fact that DO at baseline temp for the CSRB is 4 mg/L, which cannot be reduced except by raising temps to around 40 degrees C, which would simply kill the beetles and not provide any interesting information. Mosier asked if Nowlin had considered DO modulations occurring as a result of decaying vegetation-induced hypoxia; Nowlin stated this experiment does not take decaying veg-level effects into account, but it would be interesting to look at. Lamon recommends looking at hetero/homoskedasticity when interpreting the data to be used in the ANOVA. Will evaluate historical environmental conditions and compare to experimental thresholds identified by this study. Charlie Kreitler asked how much the study cost; Nathan Pence emphasized the EAHCP is investing in the invertebrates at this time as the state of knowledge for these species is 30-years behind in comparison with Texas Wild-rice and Fountain Darters.

6. **Presentation and discussion of the proposed methodology for the 2016 Applied Research study: Evaluation of the trophic level status and functional feeding group categorization of larvae and adult Comal Springs Riffle Beetle.**

Nowlin, as PI, provided this methods presentation to the Committee, which is focused on determining what the CSRB feeds on, using stable isotope analysis. Floyd Weckerly points out in preliminary graph that adults and larvae appear to inhabit different niches based on isotope analysis results in a small-sample study. Chad Norris asks where roots fall on the N/C chart, Nowlin states they did not discriminate between different types of rotten wood. Study found 69-84% of CSRB diet consisted of terrestrial organic matter, but could not

subtype within this broad category. SI fingerprinting will identify amino acids that cannot be biosynthesized, providing higher resolution data on diet. Will do microbial identification on bio-films as well. Weckerly asks whether there haven't been prior attempts to identify bio-films on cotton lures; Randy Gibson answers this was approached but not followed through on. Kreitler asks whether N isotope data is seen close to 0 due to N fixing bacteria in the environment; Nowlin states it gets close, but no; however, one must be circumspect about setting baselines for N given that values can be highly variable especially for high-turnover species.

7. Presentation and discussion of the proposed methodology for the 2016 Applied Research study: Evaluation of the life history of the Comal Springs Riffle Beetle from egg to adult.

Nowlin, as project collaborator, provided this methods presentation for Year 1 of the project to the Committee. Nowlin introduced Gibson as a project lead and Dr. Don Sada of the Desert Research Institute as another collaborator on the team. Problem being, at this time only general information on the life history of the CSRБ is understood. Particulars, such as the conditions required to support pupation in the lab, are "basically unknown." Weckerly asks whether this species is likely monogamous or polygynous; interest being that for polygynous species, certain male/female thresholds must be met in order to induce breeding. Gibson answers it is expected to be a "polygamous" species. Norris asks, if sexing is unsuccessful, what is the back-up plan? Nowlin answers the pairings will then be based on sex ratios identified in the wild. Lamon suggests making above water-line habitat available in the treatment containers examining habitat preferences. Kreitler asks the cost of this study. Kreitler asks the Committee, does this sound like we're increasing knowledge necessary for management for the CSRБ? Weckerly answers that this sounds like we're increasing it by an order of magnitude.

8. Presentation on the 2015 Take Estimate & Habitat Disturbance Report.

Hall provided the presentation to the Committee, providing an overview of the purpose for the estimate, the methods, calculations, and findings. Norris asks whether Peck's or Dryopids are included in this assessment, since they do inhabit surface environments—Hall answers that at the time that this assessment methodology was established with the Service, the state of knowledge on invertebrates supported this methodology and it has continued since then. Hall stated he would check with Ed Oborny of BIO-WEST, which conducted this assessment, about this as well.

9. Presentation of the 2015 Refugia results: Development of husbandry and captive propagation techniques for invertebrate species covered under the EAHCP.

Nowlin, as PI, introduced McLain Worsham as the lab technician, now BIO-WEST employee, to present this study. Worsham presented the purpose for the study, methods, and findings, overviewing anesthesia, light response, holding trials, and mating trials. Noted anesthesia may have longer-term effects on growth or fecundity that would be important to understand before making definitive recommendations on anesthesia methods. Kreitler asks to make slides larger to make them easier to read. No other questions.

10. Presentation of the 2015 Applied Research results: *Comal Springs Riffle Beetle habitat connectivity study.*

Hall provided the presentation to the Committee for this study looking at CSRB habitat connectivity during low flows. Norris asked whether definitive agent underlying mortality in the FAB lab was ever identified; Nowlin answered it never was, but CSRB are now surviving with and without inline charcoal filters and they are using the filters from now on as a safety precaution. Nowlin commented that Peck's Cave Amphipod is shown by this study to be a predator capable of eating a wide range of prey items; states it is likely in the surface environment eating Hyallela.

11. Presentation of the 2015 Applied Research results: *Ludwigia repens interference plant competition study.*

Hall provided the presentation to the Committee for this study looking at the effects of competing plant species on Ludwigia, a preferred Fountain Darter habitat plant species. There were no questions.

12. Presentation of the 2015 Applied Research results: *Algae dynamics study.*

Hall provided the presentation to the Committee for this study looking at the effects of algal mat accumulation on aquatic vegetation and dissolved oxygen levels. Nowlin asks whether the N:P ration observed (221) was molar or by mass. Norris asks whether we have DO data collected along strata of the water column like this—Lamon states we could calibrate a model based on the existing data. Kreitler recommends making sure tiny text is large enough to be legible, Lamon recommends one graph per slide.

13. Consider future meetings, dates, locations, and agendas. – Science Committee Meeting, April 8, 2016, San Marcos Activity Center.

Reinmund-Martinez discussed the plan for the next upcoming meeting, as well as presenting a slide on the schedule for the review and approval of the EAHCP Work Plans for 2017 for Conservation Measures that would benefit from having scientific input. The Hardy Suspended sediment impacts study will also be presented at an upcoming meeting. Pence updated the Committee on the ongoing vegetation methods analysis being conducted by Hardy and Oborny, advising the Committee that this report should be presented around June for their review and input.

14. Questions and comments from the public.

None.

15. Adjourn.

1:07 p.m.