

Comal Springs Riffle Beetle Habitat Connectivity Study



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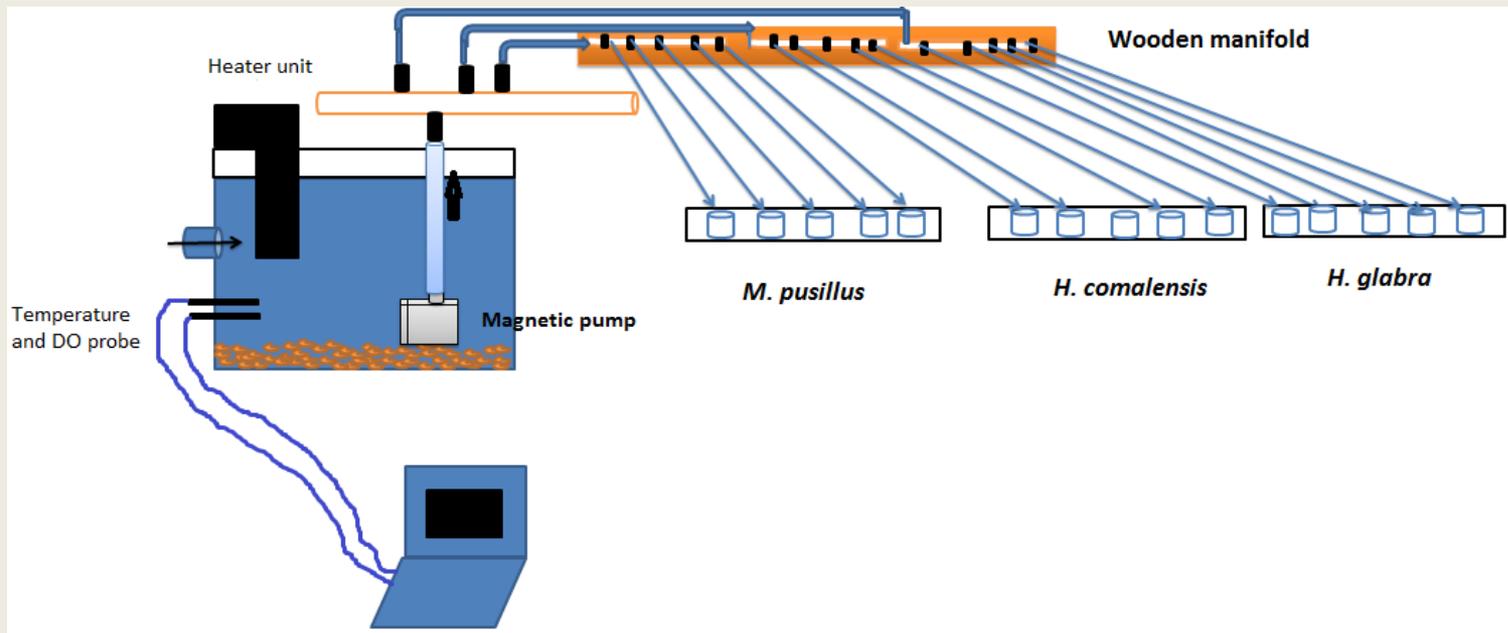


“Why study Comal Springs riffle beetle habitat connectivity?”

- Comal Springs riffle beetles (*Heterelmis comalensis*) are known to inhabit springs in spring runs and in springs along the shoreline of specific areas of Landa Lake.
- Low flow conditions may cause the water level in the spring runs and along the shoreline of Landa Lake to drop.
- As the water level drops, the sources of allochthonous organic materials are separated from the aquatic environment; thus, connectivity is lost.
- What is the potential impact on *H. comalensis* when connectivity is lost?

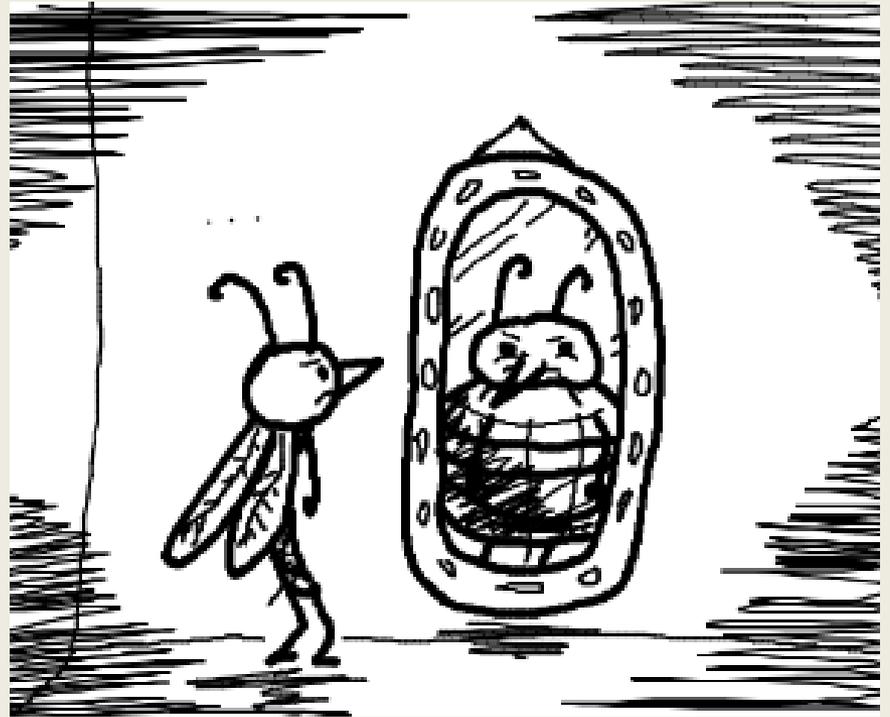
Initial testing included:

- Research facility and water quality monitoring.
- Die-offs of adult *H. comalensis* (not larvae) occurred at the FAB, but not at the SMARC.
 - Passing the water through a carbon filter appears to have alleviated the problem.
- *H. comalensis*, plus two, potential surrogate species (*Microcylloepus pusillus* & *Heterelmis glabra*) were evaluated for use in system trials.



“Potential surrogate” in this study should have similar:

- Life history
- Physiology
- Development patterns
- Trophic ecology
- Food preferences
- Habitat associations
- Dispersal ability
- Sensitivity to environmental conditions



Conclusions

- *M. pusillus* is found in the Comal system with *H. comalensis*, but was not the best physiological surrogate.
- *M. pusillus* feeds mostly on periphyton while *H. comalensis* preferred terrestrial-derived organic materials (preliminary isotope studies).
- *H. glabra* like *H. comalensis*, is a spring species, with more closely related physiology, preferring water with high CO₂, low DO and slightly lower pH when compared to surface water streams
- Passive sampling pits or wells and Bou-Rouch sampling was not efficient for monitoring *H. comalensis*.
- Cotton lures were the best method for collecting *H. comalensis* (and other invertebrates of concern); however, a lure may act as an attractant, skewing counts.

Still More Conclusions

- Beetles in upwelling habitat showed a greater survival rate in tests with organic material connectivity.
- Beetles were more active in treatments with organic material, visiting the organic matter frequently.
- Preliminary isotope work suggest that *H. comalensis* and the *Stygoparnus comalensis* (Comal Springs dryopid beetle) are connected to terrestrial organic matter sources for food.
- Preliminary isotope work suggests that *Stygobromus pecki* (Peck's cave amphipod) has the ability to switch to another food chain as environmental conditions fluctuate.
- Low-flow conditions could interfere with the essential transport of woody organic materials.
- Additional studies to establish “preferred” environmental stimuli conditions (water temp, organic matter connection or disconnection, levels of siltation, etc.) for maintaining wild and refuge populations were recommended.