Kevin S. Baldwin: Statement of Research or Professional Works

As a biologist, I am interested in the physiological effects that parasites have on their hosts. For my dissertation, I examined effects of mites that live on lizards. Much of the work was done in the field. More recently (in the relatively reptile-free midwest), I have utilized a lab system, with a colony of Madagascar Hissing Cockroaches, which are naturally infected with gregarine parasites (these are like coccidia for inverts and are closely related to malaria by virtue having an apical complex). This system has many advantages. A large population can be maintained in a few 10 gallon aquaria and be sustained for a year on a small bag of dogfood. With a minimal budget and no support staff, this is an ideal model system for testing drug efficacy. It also a wonderful opportunity to introduce students to observing and handling arthropods, which is generally absent from everyday experience in 21st Century North America. More than a few have initially recoiled in fear when presented with giant roaches and then after some time, fully embraced them as fellow organisms. On the rare occasions when I can source fresh carrot greens, students can witness what can only be described as insect ecstasy as the roaches excitedly sense then devour them. Students have tested the efficacy of several different drugs on the parasites, and resulting effects on the growth and physiological performance (measured with force transducers) of the roaches. One student has begun looking at the roach microbiome. Another, pre-vet student examined effects of diet on the roaches' growth and reproduction.

Another lab system I've developed is using fathead minnows to look at the effects pharmaceuticals on the behavior of aquatic organisms. About 20 years ago, medications from wastewater sources started showing up in freshwater systems in measurable quantities. Given that a sizable fraction of our population is taking meds for anxiety and depression, this seemed like an opportunity to see how medications designed to modulate our behavior would affect other species. My students have found that SSRI's slow fish reaction times to disturbances and alter feeding behavior. More recently a student found that Adderall affects the spacing of the fish schools. This is tractable work that gets students thinking about medications, mechanisms and dosages, but also provides links to larger, ecological questions.

I don't necessarily intend to bring these systems to Deep Springs, but merely offer them as examples of what can be done given a set of constraints like locality, climate, facilities, budget, etc. I would be curious to learn more about what Deep Springs has to offer in terms of facilities and research opportunities. I would love to get back to reptile field ecology. With flexibility and imagination, much fun and learning are possible.