WV Spring Salamander Genetic Info and Threats

Frantz, Mack W <Mack.W.Frantz@wv.gov>

Tue 3/20/2018 2:40 PM

To: Douglas, Barbara <barbara_douglas@fws.gov>
Cc: Jeff.J.Hajenga@wv.gov <Jeff.J.Hajenga@wv.gov>; Oxenrider, Kevin J <Kevin.J.Oxenrider@wv.gov>; Craig.W.Stihler@wv.gov <Craig.W.Stihler@wv.gov>

Hi Barb,

Jeff has asked me to look into current knowledge regarding the taxonomic status of the WV Spring Salamander. Forwarded below is info from Brian Miller since he is one of the few to work with this taxa previously. What Brian says lines up with all previous and current literature I have read on *Gyrinophilus*. Share with the coordination team what you need, and once I hear anything else from others (e.g. Niemiller) I'll let you know.

Best,
Mack

From: Brian Miller <Brian.Miller@mtsu.edu>
Sent: Monday, March 19, 2018 10:53:10 AM
To: Frantz, Mack W; mniemill@utk.edu
Subject: Re: Introduction and WV Spring Salamander

Hi Mack,

My experience with the WV Spring Salamander is limited. Because of restricted access, I visited General Davis Cave only once (during 2007). Thus, I have not conducted any work since publication of the article you mention. That said, I do have experience working with *Gyrinophilus* in other cave systems (though not as much as Matt anymore). Nonetheless, I will give my opinions on the topic as I try to answer your questions.

I think that additional genetic work **is required** to better determine the relationship of the WV Spring Salamander to other lineages of *Gyrinophilus*. I had hoped more than a decade ago when I first attempted to get access to the cave and the salamanders therein that we would be able to collect tissue samples for genetic analyses, but because of concerns of potential injury to salamanders, were were eventually allowed access, but we were not able to extract tissue (tail tips). Although allozyme and morphology data are suggestive that the population might represent a distinct lineage, a more definitive genetic analysis and subsequent characterization of the population would be beneficial. Also, if the population is indeed genetically distinct, then genetic analyses could also determine if hybridization with Spring Salamanders poses a threat to the population. A situation similar this these might be occurring with the Berry Cave Salamander and Spring Salamander in caves of East Tennessee--Matt will be able to provide more information on that situation.

In addition to potential hybridization, another threat is destruction of the cave system, particularly modification of the terrestrial habitat associated with the watershed supplying the water for the stream in the cave. I am not certain if logging of the watershed has occurred as was proposed a decade or more ago, but any major alteration of the terrestrial landscape could affect sediment burden of the water flowing into the cave. Increase of sediment could potential restrict or bury nesting sites (which are unknown, but probably in interstices of the cave floor, or in chambers too small for humans to enter) and negatively impact all species of salamanders in the cave that breed in the stream system. Regardless of the systematics of the populations, *Gyrinophilus* inhabiting General Davis are unique--and the watershed needs as much if not more protection that the cave itself to conserve the populations.

So, I encourage you to allow someone to perform genetic analyses on *Gyrinophilus* in General Davis Cave, and if efforts are not yet underway, attempt to protect terrestrial landscape within the immediate watershed of the cave.

Please let me know if I can provide any additional comments. Good luck with your work!

Brian

Brian T. Miller, Ph.D.
Professor
Department of Biology
Middle Tennessee State University
Murfreesboro, Tennessee 37132

Mack W. Frantz
WVDNR Zoologist
mack.w.frantz@wv.gov
304-637-0245 ext. 2052
"*Conservation will ultimately boil down to rewarding the private landowner who conserves the public interest*." -Aldo Leopold