AUBURN
UNIVERSITY

COLLEGE OF SCIENCES AND MATHEMATICS

DEPARTMENT OF BIOLOGICAL SCIENCES

January 20, 2022

Re: Tissue Loan Request

Dear Dr. Lisa Barrow,

I am writing to request tissue samples from the following specimens in the Museum of Southwestern Biology collection:

MSB 100793 Anaxyrus microscaphus	MSB 104731 Anaxyrus woodhousii
MSB 100800 Anaxyrus woodhousii?	MSB 39651 Anaxyrus kelloggi
MSB 100913 Anaxyrus microscaphus	MSB 75646 Anaxyrus speciosus
MSB 104414 Anaxyrus fowleri	MSB 92689 Anaxyrus baxteri
MSB 104548 Anaxyrus woodhousii	MSB 92690 Anaxyrus baxteri
MSB 104570 Anaxyrus fowleri/woodhousii	MSB 92691 Anaxyrus baxteri
MSB 104571 Anaxyrus americanus	MSB 92692 Anaxyrus baxteri
MSB 104608 Anaxyrus americanus	MSB 96528 Anaxyrus debilis
MSB 104644 Anaxyrus americanus	MSB 98058 Anaxyrus woodhousii
MSB 104677 Anaxyrus cognatus	MSB 98065 Anaxyrus cognatus
MSB 104681 Anaxyrus hemiophrys	MSB 98144 Anaxyrus speciosus

These tissues will be used to obtain RADseq data for a phylogeographic study of North American toads in the genus *Anaxyrus*. The samples we are requesting will make up a broader sample of 109 tissues from other institutions, including 33 from the Auburn Museum of Natural History (see attached map) The aim of this study is to infer the relationships among species and populations in this genus using a large genome-wide data set. Previous estimates of the phylogeny of *Anaxyrus* from a small number of mitochondrial and nuclear loci have been inconsistent which suggests these limited data may not be sufficient. Furthermore, these data sets are not adequate for detecting historic admixture which may have been an important process in the evolution of *Anaxyrus*. Numerous instances of natural hybridization have been reported in the literature and breeding crosses have demonstrated reproductive compatibility between many species pairs that have overlapping or adjoining distributions.

This study will complement another ongoing study examining introgression at a hybrid zone between the American toad and Southern toad in central Alabama. We have collected 202 individuals from this hybrid zone and deposited them into the Auburn University Museum of Natural History. We will obtain RADseq data from these individuals to quantify the extent of introgression across this hybrid zone and test for variation in the rate of introgression across the genome due to selection. Inference of species relationships, relative timing of divergence, and historic admixture using the samples that we are requesting will provide important context for this hybrid zone study and unprecedented detail on the evolutionary history of this prominent group of vertebrates in North America.

Our lab has a significant amount of experience collecting RADseq data for phylogeographic studies. Our lab is equipped to collect these data and we have access to great computation resources for conducting analyses. This project will be funded by an NSF grant awarded in 2017. We will prepare libraries from the samples immediately and add them to already prepared libraries for sequencing before the end of the current semester. Analyses will be performed during the Summer and upcoming Fall semester. We plan to complete this project and publish the results by the end of this year.
Sincerely,

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