AUBURN
UNIVERSITY

COLLEGE OF SCIENCES AND MATHEMATICS

DEPARTMENT OF BIOLOGICAL SCIENCES

January 20, 2022

Re: Tissue Loan Request

Dear Dr. Carol Spencer,

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

MVZ 137738 Anaxyrus hemiophrys	MVZ 223384 Anaxyrus woodhousii
MVZ 143036 Anaxyrus woodhousii	MVZ 229168 Anaxyrus microscaphus
MVZ 143046 Anaxyrus speciosus	MVZ 229169 Anaxyrus microscaphus
MVZ 145241 Anaxyrus terrestris	MVZ 235861 Anaxyrus woodhousii
MVZ 150028 Anaxyrus californicus	MVZ 239859 Anaxyrus woodhousii
MVZ 150029 Anaxyrus californicus	MVZ 239919 Anaxyrus woodhousii
MVZ 175975 Anaxyrus californicus	MVZ 240020 Anaxyrus woodhousii
MVZ 222507 Anaxyrus retiformis	MVZ 241481 Anaxyrus woodhousii
MVZ 222508 Anaxyrus retiformis	MVZ 244068 Anaxyrus woodhousii
MVZ 223356 Anaxyrus debilis	MVZ 275494 Anaxyrus cognatus

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,

Jamie Oaks
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