17 Extramural III: Doctoral Dissertation Research Improvement Grant

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The following proposal was submitted to the National Science Foundation's (NSF) Doctoral Dissertation Research Improvement (DDRI) Grant Program (BCS 0000281). DDRI proposals are written in conjunction with your graduate advisor. Because NSF only awards grants to faculty, the advisor is the Principle Investigator (PI) and has responsibility for the grant. The student is the second PI and expected to contribute most of the work and intellectual input to the project. The DDRI can be submitted twice a year and can ask for up to $12,000.

This DDRI proposal was funded on the second submission of the proposal. The first submission was rejected but the reviewers provided much good input for how the project could be improved. With incorporating these comments and having another year to advance the preliminary findings of the work, we were able to submit a stronger grant proposal. NSF often funds grant proposals that can defend the success of the concept in the proposal. Because of this, much of the work towards the project must be completed before a strong proposal can be submitted.

17.1 Long-term reconstruction of oak mast in the southern Appalachian region

Van Dersal (1940) reported that oak is utilized as a food source by more wildlife than any other genus of woody plant. Some of the more prominent game species that feed on acorns in the southeastern United States, are white-tailed deer *(Odocoileus virginianus),* turkeys *(Meleagris gallopavo),* black bear *(Ursa americanus),* and European hogs *(Sus scrofa).* Oaks *(Quercus spp.)* now serve a critical role for wildlife as producers of calorie-rich "hard" mast in late summer and fall. Historically, this role was shared by American Chestnut *(Castanea dentata)* in the Southern Appalachian region, but near-extinction of chestnut in this century has left oaks alone. Oak trees produce mast (acorns) during most years. At intervals, however, almost all individual trees throughout a region fruit very heavily in unison, producing what is known as an extreme mast event. A long-term record of extreme mast events could provide wildlife managers with a better understanding of natural variation in the mast cycle and insight into past fluctuations in wildlife populations. But thus far, no such record of mast cycles exists.

Schweingruber (1996) suggests that tree-ring analysis can provide a record of past fluctuations in the mast cycle. He notes that no mast reconstruction has yet been