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Using an Individual-Based Model to Study the Spread and Control of Pseudo-rabies virus in Feral Hogs in Great Smoky Mountains National Park

For over two decades, the Park Service has been removing feral hogs from Great Smoky Mountains National Park (GSMNP) in an attempt to control the population. In 2005, the first seropositive cases of pseudo-rabies virus (PRV) were recorded in harvested individuals. We developed an individual-based model (IBM) for the feral hog population in Great Smoky Mountains National Park (GSMNP) and surrounding regions to test theories on the spread of pseudo-rabies virus (PRV) in GSMNP. Because there is limited understanding of the spread of the disease in feral populations, an IBM is well suited to test both modes and effectiveness of transmission. Another advantage of the IBM approach is the ability to model the efficiency of control methods (harvesting) for mitigating disease spread. IBMs can be used to compare changes in location, time, and effort to determine optimal control strategies. In this presentation I will describe the disease components of the model and present preliminary results on the effectiveness of the current harvesting strategy on the population density of hogs and the spread of PRV. Results suggest that although the year-to-year variation in fall hard mast is a natural population regulator, harvesting has had an impact on the population. This work is part of a NIMBioS Working Group that includes: Bill Stiver, Joseph Corn, Suzanne Lenhart, Chuck Collins, Marguerite Madden, Eric Carr, Brandon Schmidt, Ellen Kasari, Kurt VerCauteren, Agricola Odoi, Hamish McCallum, and Graham Hickling.