Gray Wolf Population Project – MIC SUPPORT REQUESTED TO CONTINUE FOR 2016

The gray wolf has returned to its former range in the Upper Peninsula of Michigan (UP). Since 1989, the Department has monitored wolf population growth and range expansion. As Michigan's wolf population size increased and exceeded levels that required Federal and State agencies to protect the wolves under endangered species statutes, wildlife managers increasingly found themselves responding to wolf-related conflicts. This change in focus prompted the Department to update the state's wolf management plan. The Department revised the management plan again in 2015.

As the wolf population increased, the Department developed a program of research to aid in monitoring their recovery and management. An important component of this work has been the capture and tagging of wolves with radio collars to determine their survival, cause-specific mortality, movements, and pack and territory size. Over 400 wolves have been captured and radio-collared to provide this important information. Given the intense public debate over wolf hunting, decision-makers will request predictions on the effect of various harvest scenarios on Michigan's wolf population. Biologists can use a population modeling approach to develop these predictions. However, population modeling requires inputs of wolf population vital rates. Important inputs needed include estimates of survival rate, mortality factors, and dispersal dynamics. Biologists commonly estimate these rates and factors by monitoring the fates of radio-collared individuals. In addition, biologists need to understand causes of mortality and dispersal dynamics in order to consider their relative effects and determine which factors management might be able to manipulate to cause desired changes in wolf populations. In cooperation with Michigan Technological University, we have initiated a comprehensive analysis of our wolf movement and survival data to provide the needed information.

In 2015, the focus has been on assessing habitat selection patterns at the territory level from the early 1990s – 2013 with emphasis on how these patterns have changed as wolf density increased across the study area. A key finding was that habitat selection by wolves was density dependent; early in the study, wolves selected for the greatest deer densities and lowest human densities (represented by impervious surfaces) but by the end of the study (greatest wolf density) the strength of these effects had weakened. For example, at densities > 10 wolves / 1000 km^2 wolves selected for areas with much lower deer densities (measured by buck harvest indices) than previously. Early in the study (< 5 wolves / 1000 km^2), these areas had been avoided. In addition, wolves selected areas closer to humans (greater % impervious surface) at greater densities. Other landscape variables influencing wolf habitat selection included forest-open edge density (positive effect, i.e. selection for), distance to deer wintering complexes (selection for areas closer to DWCs), elevation (positive effect), stream densities (positive effect), ruggedness (positive effect; coefficient of variation in elevation), slope (negative effect, i.e. avoidance of greater slopes), and water/wetlands (negative effect). Modelling spatiotemporal habitat selection as a function of wolf density resulted in better predictive accuracy over time. Density-dependent wolf habitat selection implies source-

sink habitat dynamics, which we will explore in future models involving survival rates and specific mortality sources.

The project has also begun to explore the relative fitness gained from different habitats and expected variation in wolf densities resulting from high potential vs. low potential habitats. Results will potentially have greater inferential power in our ability to detect the effects of different habitat types on wolf fitness.

The information collected from our sample of radio collared wolves also continues to be critical to our population surveys. Most importantly, the movement information and identification of pack territories allows us to interpret our winter tracks surveys to estimate wolf abundance. Without a doubt, estimates of wolf abundance are the most important piece of information we collect on this population. We are currently estimating wolf abundance in the Upper Peninsula every other year and did not conduct a survey in winter 2015. We are preparing to conduct the abundance survey in winter 2016.

Partners: Safari Club International-MIC, USDA Wildlife Services, Michigan Technological University

Time Line and Budget: This project started in 1999 and will continue for at least five years following Federal delisting, and annual monitoring will likely be needed to support any potential wolf harvest seasons. Thus, we need to maintain a sample of radio-collared wolves. Total project costs are greater than $800,000.