Department of Natural Resources
SCI-MIC Supported Research Projects
2017 Progress Reports

Wolf Population Management Project

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 initiated a comprehensive analysis of our wolf movement and survival data to provide the needed information.

In 2017, the research focus has been on completing our assessment of wolf survival rates from the large dataset (n = 365 individual collared wolves) we have accumulated from 1992-2013. This work showed that wolf survival rates varied spatially and declined over time. The long-term change in survival was density dependent (i.e., related to wolf density); early colonizers chose the safest areas and as the population increased some wolves had to use riskier sites. The density dependent maps we developed indicated that risk increased in areas with greater proportions of agriculture and increasing edge densities. Consideration of the causes of wolf mortality with the spatially explicit survival estimates indicates that declines in wolf survival on portions the landscape corresponded to increased potential for wolf-human conflict. Our 2013 wolf season was a conflict-based hunt and while we didn't have the benefit of these analyses at the time, the hunt units we identified captured areas where wolves had lower survival rates due to conflicts.

Overall, our estimate of annual wolf survival (0.75 ± 0.05) was similar to other U.S. populations. At the individual level, males had a greater risk of mortality than females and wolves associated with a known pack territory had less risk than transient animals. The model also suggested that wolves captured by coyote trappers had greater mortality risk than research-trapped wolves (although the effect size was relatively weak). This is likely due to the differences in the frequency of trap check and type of equipment used.

From a big picture standpoint, this work demonstrates the importance of long-term data sets and establishing a link between habitat components and individual fitness which provides important information beyond what we can usually infer from traditional habitat selection studies.

The information collected from our sample of radio-collared wolves also continues to be critical to our bi-annual population surveys. Most importantly, the movement information and identification of pack territories allows us to interpret winter tracks survey data to estimate wolf abundance. Without a doubt, estimates of wolf abundance are the most important piece of information we collect on this population. In 2017, we began preparation for the 2018 winter wolf survey.

We are nearing the completion of our transition from deploying VHF collars to GPS collars that transmit data through satellites. The GPS collars provide more frequent and more accurate locations without the need and expense of aerial relocation flights. At the end of 2017 we were monitoring 30 GPS collared wolves.

Partners: Safari Club International-MIC, Michigan Technological University (MTU).

Timeframe and budget: Wolf population monitoring began in 1989 and work continues annually Total annual costs in years without a survey are approximately $60,000 and annual costs increase to over $100,00 when a survey is conducted. The MTU project was completed in 2017 with a total cost of $135,000.