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

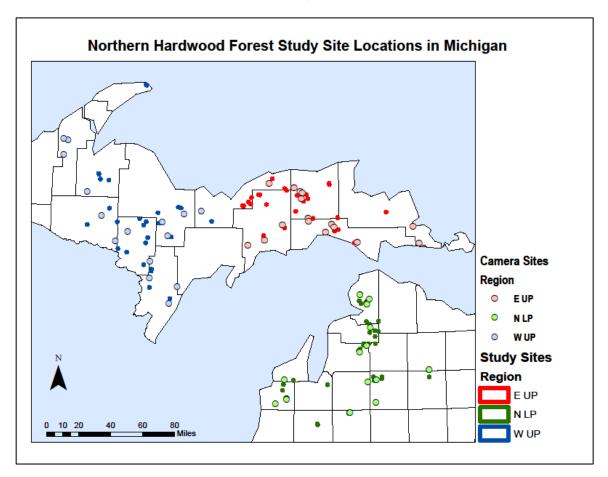**Deer and Northern Hardwoods in Michigan Project**

White-tailed deer are arguably the most important terrestrial wildlife species to the economy of the Great Lakes region. About 700,000 hunters pursue deer in Michigan each year, spending an estimated 9.75 million hunting days and generating over $1 billion in revenue. In general, the hunting community equates high deer densities to an improved hunting experience, thus harvest season quotas and land management practices that reduce deer numbers attract considerable public criticism. However, high deer densities can have negative economic and ecological consequences. For example, deer have been implicated in the decline of desirable northern hardwood forests (like oak, yellow birch and hemlock) in Michigan through browsing of tree seedlings and saplings. In some areas, herbivory by deer (and potentially snowshoe hare) undoubtedly have negative impacts on forest regeneration, which ultimately impacts future forest composition. However, the explanation for the decline of northern hardwood forests in many areas of Michigan is likely more complex than just deer herbivory. Other factors like past forest management (e.g., selection silviculture), forest insect and disease outbreaks, and a rapidly changing climate are also implicated in the decline.

Northern hardwood forests are one of the most valuable timber types in Michigan, both economically and for wildlife habitat. The Michigan Department of Natural Resources (MDNR) and forest products industry are interested in evaluating innovative silvicultural approaches to ensure desirable hardwood tree regeneration while minimizing deer browsing impacts. The proposed project will evaluate innovative silvicultural approaches to forest management that alter deer behavior in northern hardwood management areas to reduce browsing affects on tree regeneration. The premise is that these innovative prescriptions can be used to help mitigate deer herbivory impacts, improve seedbed quality, and provide competitive advantages for desirable tree species. The ultimate goal of the research is to identify cost-effective silvicultural techniques that allow regeneration of diverse northern hardwood forests in the presence of deer at densities that offer hunters reasonable opportunities for success.

Progress (2017): We finalized the timber treatments on 141 30-acre sites distributed throughout Michigan. These sites represent different combinations of site quality (i.e., tree growing potential) and deer densities (coarsely estimated). Pretreatment vegetation data were collected on all 141 sites during the summer and fall of 2017. We also conducted deer pellet count surveys on all these sites. On a subset (n=48) of the 141 sites (stratified randomly selected; Fig. 1), we collected pretreatment data on wildlife use using trail cameras, with an emphasis on deer. On average, we had 222 (NLP), 168 (EUP), and 152 (WUP) camera days for each site. We collected 10's of thousands of pictures that are currently being photo-tagged and archived for analysis.

Figure 1.

Northern Hardwood Forest Study Site Locations in Michigan

We also tested the reliability of our camera design for detecting deer if deer were known to occupy a 30-ac site. We deployed a 25-camera grid (a camera every 1.2 acres) and used resampling procedures to show that our 4-camera design was comparable to a grid with 25 cameras, although there was high variability.

Cameras were removed from the field as study sites became active for logging, with the last set of cameras pulled in December. Logging started in fall and will extend through March 2018. As logging is completed, we will redeploy cameras to continue monitoring deer response.

We used the generous 2017 SCI-MIC allocation to purchase a high-end drone that we can use to measure the cover of downed wood and the amount of scarified soil in timber harvest areas. Our two understory treatments included leaving treetops to deter deer herbivory and scarification/herbicides to create optimal growing conditions for tree seedlings. For the leave treetops treatment, the only efficient way to measure the amount of material is through aerial survey. The drone will allow us to economically photo (during leaf off) our sites, giving us high resolution imagery to quantify cover of woody debris.

Partners: Safari Club International-MIC, MDNR-Forest Resources and Wildlife Divisions, Michigan State University, Hancock Timber Resources Group, and GMO Renewable Resources

Timeframe and budget: Project started in the summer of 2016, with the first phase of the deer portion scheduled to end in the spring of 2021 (4+ years). The initial budget for deer work approved by MDNR-Wildlife Division was $283,777, with equipment costs projected to exceed that budget. The forest monitoring component of the project started in summer of 2016 and is projected to run for 10 years (the time frame required to ensure that tree regeneration is free to grow). The budget for forest monitoring from MDNR-Forest Resources Division is >$600,000.