ML 2015, Ch 76, Art. 2, Sec. 6a Project Abstract
For the Period Ending December 31, 2021

PROJECT TITLE: Subproject #11: Will Future Weather Favor Minnesota's Woody Invaders?
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FUNDING SOURCE: Environment and Natural Resources Trust Fund
LEGAL CITATION:
MINNESOTA INVASIVE TERRESTRIAL PLANTS AND PESTS CENTER
ML 2015, Ch. 76, Art. 2, Sec. 6a

APPROPRIATION AMOUNT: $514,325
AMOUNT SPENT: $514,325
AMOUNT REMAINING: $0

Sound bite of Project Outcomes and Results

Our findings tell the story of how exotic honeysuckle and buckthorn have invaded Minnesota forests, how and why new areas are likely to be invaded in the future, and how we may be able to mitigate invasion using native tree species.

Overall Project Outcome and Results

Glossy buckthorn, common buckthorn, tatarian honeysuckle, and morrow's honeysuckle are woody species that have been introduced to Minnesota forests from other continents. All four species frequently dominate forests and exclude native plant species. Warming temperatures and continued dispersal of these species are likely to significantly increase their abundance throughout Minnesota, especially in northern Minnesota. However, most effort by researchers and managers alike has been given to reactive measures against invasion instead of increased understanding of invasion processes and/or preventative measures. This project evaluated the climate sensitivity of these four invasive species in a way that provides for more accurate threat assessment of each throughout the state and provides tools for Minnesotans to potentially slow invasion into new areas and protect Minnesota's forests. We analyzed growth rings of 274 trees to determine how quickly invasive species spread and characterize how native and invasive species have responded to past growing conditions. We found that growth rates of invasive buckthorn and honeysuckle are most similar to native cherries and ashes in southern Minnesota, but that the invasive species already are growing much faster than those native species in northern Minnesota. Within a forest, we found that buckthorn tended first to invade hilltops and subsequently spread to low-lying areas at a rate of 3-4m yr^{-1} (slower than honeysuckle, which spread at 6 m yr^{-1}). We experimentally assessed 10 native species in addition to the four invaders to determine which are favored by changing temperature and rainfall patterns (i.e. their responses to future climate). We found invasive and more southern native species to be favored by warming conditions in terms of their growth and survival, whereas more northern native species were often strongly disfavored. We established programs to detect current invasion at fine-scale spatial resolution and predict future invasion based on the findings above, and set up long-term experiments to test the ability of tree plantings to slow invasion into new areas.

Project Results Use and Dissemination

Results from this project were disseminated through multiple avenues, including conference presentations, journal articles, and popular media. Principally, dissemination efforts focused on academic journals. We have submitted one manuscript detailing results from Activity 2 for peer review. Three other manuscripts related to the project are in preparation and will be submitted during the spring of 2022. We are also collaborating with National Geographic for a feature on work supported by this grant, primarily results associated with Activity 2.