Adaptive Silviculture for Climate Change in the Mississippi National River and Recreation Area, an Urban National Park in the Twin Cities Area, Minnesota

Mary C. Hammes
Mississippi Park Connection, mhammes@parkconnection.org

Leslie Brandt
US Forest Service, leslie.brandt@usda.gov

Linda Nagel
Colorado State University, Linda.Nagel@colostate.edu

Courtney Peterson
Colorado State University, Courtney.Peterson@colostate.edu

Marcella Windmuller-Campione
University of Minnesota, mwind@umn.edu

Adaptive Silviculture for Climate Change in the Mississippi National River and Recreation Area, an Urban National Park in the Twin Cities Area, Minnesota

The Adaptive Silviculture for Climate Change (ASCC) Network is a collaborative effort to establish a series of experimental silvicultural trials across different forest ecosystem types. A variety of partners have developed trial sites as part of this multi-regional study researching long-term ecosystem responses to a range of climate change adaptation actions. We are currently implementing an affiliate trial within the Mississippi National River and Recreation Area, a national park along the Mississippi River in the Twin Cities Metro Area of Minnesota.

Keywords

Authors

Mary C. Hammes, Leslie Brandt, Linda Nagel, Courtney Peterson, Marcella Windmuller-Campione, and Rebecca A. Montgomery

INTRODUCTION

The Adaptive Silviculture for Climate Change (ASCC) Network is a collaborative effort to establish a series of experimental silvicultural trials across different forest ecosystem types. A variety of partners have developed trial sites as part of this multi-regional study researching long-term ecosystem responses to a range of climate change adaptation actions. We are currently implementing an affiliate trial within the Mississippi National River and Recreation Area, a national park along the Mississippi River in the Twin Cities Metro Area of Minnesota.

Image 1. Floodplain forest in the Mississippi River's national park.

CONTEXT

The Mississippi National River and Recreation Area (MNRRA) is an urban national park along the river in the Minneapolis-Saint Paul metropolitan area. The park extends over 54,000 acres along 72 miles of river and is visited by an estimated 9 million people annually. Mississippi Park Connection (MPC), a non-profit partner to the national park, and MNRRA have been working with 25 cities, five counties, two state agencies, and three federal agencies on habitat restoration along the river since the park was established in 1988.

Starting in 2009, the forests of MNRRA have been impacted by the invasive insect emerald ash borer (EAB). Some areas of the park are up to forty percent ash cover and at risk of 99 percent mortality. In addition, increases in heavy rain events have led to prolonged and severe flooding in the area, impeding natural regeneration of alternative species. Managers of the park are interested in helping these forests adapt to these changes to maintain a healthy canopy. The possibility of an ASCC installation within the park was introduced to managers at MNRRA and MPC in 2017 by staff from the Northern Institute for Applied Climate Science (NIACS) and

Colorado State University as a way of finding the best management practices to address these issues.

The installation in Saint Paul is the first Affiliate ASCC project to be planned and implemented in an urban setting. The ASCC project will help restore lost canopy and provide vital information about best practices for areas impacted by both EAB and climate change. All ASCC sites follow a co-development process involving both managers and scientists, with each site utilizing the same experimental approach and study design framework for treatment types and spatial/temporal factors. Flexibility was needed for replicating this process in an urban area, including smaller treatment areas, which is why this project is called an affiliate.

Image 2. Team of researchers and managers scoping plot location in area with high ash mortality and invasive herbaceous vines.

GOAL

The goal of the MNRRA ASCC project is to better understand how to manage healthy forest systems as they transition to future conditions that include EAB and the impacts of climate change. Treatments and findings from this long-term study are part of an active network of long-term research, creating a model experimental design focused on forest adaptation to climate change, and helping inform future management decisions. A key component of this project will be continued community engagement, with an overarching goal of creating an educated, engaged public involved in local climate-adaptation efforts.

APPROACH USED

Planning

The project started with a survey of land-managing partners in 2017, which found that the majority were so busy managing tree loss on streets, boulevards, and sidewalks that they didn't have the capacity to address natural forested areas. Managers were also asking questions about how to prioritize their work and how it fits into other work along the river. The MNRRA created a Forest Management Plan that includes data rich GIS layers: habitat quality, erodibility, ash presence, and projected climate change impacts As a next step, the MNRRA and MPC engaged with the staff at Colorado State University and NIACS to design and implement an ASCC project to test alternative management strategies in alignment with the Forest Management Plan. In spring of 2019, a workshop brought together 30 representatives across multiple science and management organizations along the river to discuss climate change impacts and define three alternative management strategies to test on replicated 1/10 acre permanent plots. The resistance strategy will focus on restoring the forest to its native habitat type and re-introducing American elm that had been previously lost from Dutch elm disease. The resilience treatment will focus on enhancing diversity of the tree canopy and introducing native species not currently found on the site. The transition strategy will focus on introducing floodplain tree species that are native to the Mississippi River in parts of Iowa, Illinois, and Missouri.

Implementation

Baseline data collection and experimental design began in July 2019 following an extended flood season. This step involved analysis and collection of pre-treatment data, environmental assessments, finalizing treatment prescriptions, and selecting the final treatment locations. Site preparation, including harvest and fencing, will begin in winter 2020, with planting planned for spring 2020.

The urban setting of this study provides an opportunity to engage park visitors and the public, partners in forest management and climate change adaptation, and citizen science volunteers. Marketing and communications will include developing signage, online resources, and educational components. As the project moves forward we will convene key stakeholder groups to share out early results.

RESOURCES

- Funding provided by the Wildlife Conservation Society through its Climate Adaptation Fund through a grant by the Doris Duke Charitable Foundation.
- Partnerships include Northern Institute for Applied Climate Science, Colorado State University, National Park Service, Saint Paul Natural Resources, and the University of Minnesota.

KEY RESULTS

- Project is still in planning phase with implementation set to begin in fall/winter of 2019.

Expected Outcomes

- Some preliminary results will be available as early as 2022. These can help inform management actions by other partners working along the river.
- Published results will feed into the larger ASCC data set and inform folks nationwide.
- The ASCC Network silvicultural trials are helping managers and scientists understand and evaluate management options designed to enable forests to respond to a changing climate while meeting local management goals and objectives.
- Outreach and engagement will connect local community to climate change adaptation work.

ADDITIONAL RESOURCES

https://www.adaptivesilviculture.org/project-site/mississippi-national-river-and-recreation-area