

Developing an Assisted Migration Plan for the Superior National Forest

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Overview:

- National forests are interested to implement assisted migration as a climate change adaptation strategy to help forests cope with changing conditions, but no national policy exists on how assisted migration should be carried out.
- The Superior National Forest (Minnesota) is working with partners to create a formal Assisted Migration Plan to ensure that the forest pursues assisted migration decisions in a consistent, informed, and coordinated manner.
- This example will be a useful model for other national forests and land management agencies to tailor to their own specific needs.

Summary:

The Superior National Forest (SNF) is preparing forest ecosystems for the challenges of continued climate change. Covering over 3 million acres in northern Minnesota, the SNF consists of boreal-temperate transition forests including several species expected to decline over the next century, such as jack pine, black spruce, and quaking aspen. As one possible adaptation action, silviculturists on the SNF have been implementing small-scale pilot projects to test assisted migration of tree species, including reforestation with new seed sources of existing species as well as introducing novel species to the forest. These pilot efforts have been limited by a lack of consistent guidance and direction. To ensure that the SNF pursues assisted migration decisions in a consistent, informed, and coordinated manner, SNF is working with partners to create a formal Assisted Migration Plan (AMP). This plan is designed to help SNF staff determine areas on the forest that are appropriate for assisted migration, tree species that may be most suitable for assisted migration, monitoring and logistical considerations, and effective processes for engaging tribal nations and other partners. This presentation will describe the process of creating the AMP, the contents of the plan, and recommendations for



other national forests interested to pursue a similar effort. Assisted migration has the potential to gradually reshape forest ecosystems as we know them, and collaborative planning processes can help ensure that National Forests continue to meet the needs of all partners when deciding how to go forward with these actions.

Silvicultural Concepts:

- Assisted migration is *the human-assisted movement of species in response to climate change*. This general term encompasses different types of assisted migration, including:
 - Assisted population migration (assisted gene flow) = moving seed sources or populations to new locations within the historical species range. This is viewed as relatively low-risk and is not a big departure from current practice on the SNF.
 - Assisted range expansion = moving seed sources or populations from their current range to suitable areas just beyond the historical species range, facilitating or mimicking natural dispersal. This is viewed as a moderate risk and departure from current practice on the SNF.
 - Assisted species migration (species rescue, or managed relocation) = moving seed sources or populations far outside the historical species range, beyond locations accessible by natural dispersal. This is viewed as relatively high risk and would be a significant departure from current practice on the SNF.
- Assisted migration can support a variety of adaptation options. Assisted population migration of new seed sources can contribute to “Resistance” actions by attempting to maintain the current species composition. Assisted range expansion can contribute to “Resilience” or “Transition” actions by introducing additional species diversity into a stand or landscape.
- Contributors to this plan are summarizing existing information on the patterns of genetic diversity of key species and publishing seed transfer guidance in Tree Planter’s Notes (see example in References).

Management Applications:

- Climate change is challenging the assumption that “local is best” when it comes to seed sources for reforestation. Conventional reforestation practices may no longer be adequate to meet forest management objectives.
- The Forest Service Eastern Region updated guidance in 2019 to expand tree seed collection boundaries for National Forests based on climate change projections.
- The SNF AMP focuses on the reforestation program. The SNF anticipates higher demand for reforestation with more damaging pest and disease outbreaks and more frequent wildfires.

- The AMP is internal guidance for SNF project planning teams and silviculturists. It does not alter management objectives and it functions within the scope of the existing Forest Plan, and therefore does not require a formal plan amendment.
- Assisted migration guidelines could help sustain priority forest types and ecological functions on the SNF. For example, importing jack pine seed from farther south in Minnesota could introduce more drought- and heat-tolerant genetics for this commonly seeded species.
- Several working groups contributed to sections of the AMP, including Genetic Information, Implementation Guidelines, Seed Sourcing Logistics, and Cultural Considerations.
- The input of partners was critical for the development of the AMP. Key partners included staff from Forest Service's Northern Research Station, academic institutions, Tribes, State agencies, nongovernmental organizations, and forest industry groups.
- Developing the AMP highlighted several needs for collaboration, such as developing new agreements to facilitate seed collection outside the National Forest boundary and discussing assisted migration during formal and informal consultation with Tribal nations.

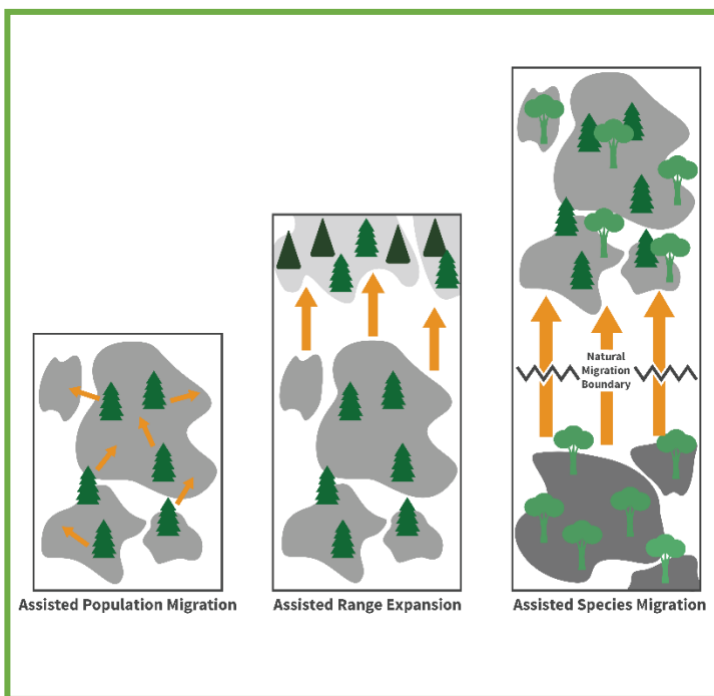


Figure 1—Illustrations of three distinct forms of assisted migration, from the Climate Change Resource Center (Handler et al. 2018).

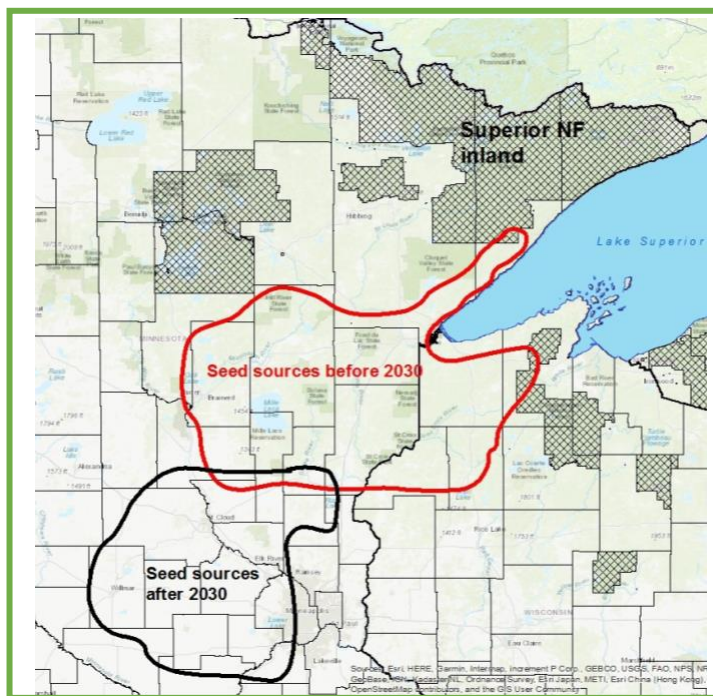


Figure 2—Illustration of revised seed collection zones for the inland portions of the Superior National Forest, from the 2019 revision of the Eastern Region Tree Seed guidebook. Prior collection boundaries followed the forest boundary and limited seed transfer between east and west districts.

Table 1—An overview of several working groups that contributed to the development of the Superior National Forest Assisted Migration Plan.

Working group	Guiding questions	Involved partners
Genetic considerations	<ul style="list-style-type: none"> What information exists about the patterns of genetics for focal tree species across the region? What knowledge gaps exist? 	Forest Service State & Private Forestry, University of Minnesota, Minnesota Tree Improvement Cooperative, Minnesota Department of Natural Resources
Cultural considerations	<ul style="list-style-type: none"> How might assisted migration affect cultural resources and tribal treaty rights? How can the SNF involve Tribal nations in assisted migration decisions? 	Fond du Lac Band of Lake Superior Chippewa, Grand Portage Band of Lake Superior Chippewa, Bois Forte Band of Chippewa, 1854 Treaty Authority, Great Lakes Indian Fish and Wildlife Commission, University of Minnesota, Northern Research Station, Bureau of Indian Affairs
Seed sourcing logistics	<ul style="list-style-type: none"> How can the SNF integrate assisted migration into existing seed collection protocols? How can the SNF work with nurseries and seed collectors? 	Chippewa National Forest, Ottawa National Forest, Chequamegon-Nicolet National Forest, Oconto River Seed Orchard, The Nature Conservancy, Minnesota Counties
Implementation guidelines	<ul style="list-style-type: none"> How will the SNF decide when and where assisted migration is appropriate? 	Northern Research Station, Pacific Northwest Research Station, University of Minnesota, Minnesota Forest Industries, Minnesota Department of Natural Resources, The Nature Conservancy, Sustainable Forests Education Cooperative
Research and monitoring	<ul style="list-style-type: none"> What are priority research questions related to assisted migration? Will the SNF require additional monitoring of assisted migration efforts? 	Northern Research Station, University of Minnesota, University of MN-Duluth, Minnesota Forest Resources Council, The Nature Conservancy, Fond du Lac Band of Lake Superior Chippewa, Minnesota Department of Natural Resources
Communications	<ul style="list-style-type: none"> How should the SNF share and discuss this work with partners? How can the SNF integrate assisted migration into existing reforestation protocols? 	Sustainable Forests Education Cooperative
Silviculture program logistics	<ul style="list-style-type: none"> What new steps or agreements will be required? 	

References

- Berrang, P. 2019. Eastern region guidebook: tree seed program. Unpublished document. Milwaukee, WI: USDA Forest Service Eastern Region. 58 p.
- Handler, S.; Pike, C.; St. Clair, B. 2018. Assisted migration. USDA Forest Service Climate Change Resource Center. <https://www.fs.usda.gov/ccrc/topics/assisted-migration>.
- Pike, C.C. 2021. Jack pine: guidance for seed transfer within the Eastern United States. Tree Planter's Notes. 64: 2. <https://rngr.net/publications/tpn/64-2>.