*30 word description:* Larch beetle has damaged nearly half of Minnesota’s tamarack forest. The ecological impacts are unknown. We propose surveying tree and bird populations to assess their response to widespread tree mortality.

**PROJECT TITLE:** Impacts from larch beetle to forests and wildlife

**I. PROJECT STATEMENT**

**Nearly half of Minnesota’s 1.1 million acres** of tamarack forests have been damaged by the native insect, eastern larch beetle (ELB), and **there is little data available** on the resulting impacts to ecosystem function.The current outbreak is occurring across the Upper Midwest and into Canada, and while some active research is helping us better understand how healthy tamarack forests function, **no one knows how tree and bird populations are responding to widespread tamarack mortality** caused by the eastern larch beetle. **The goal of this project** is to provide forest and wildlife managers needed information concerning plant community change and habitat quality of damaged tamarack forest. This project has two objectives aimed at restoring and conserving Minnesota’s tamarack forest, and they are:

* Evaluate status of natural tree regeneration in damaged stands (Activity 1)
* Survey native bird populations to assess habitat quality of damaged stands (Activity 1)

**Beetle damage and weak wood markets for tamarack make it difficult to renew these acres through harvest.**

ELB continues to expand in MN from Lake of the Woods to Aitkin County, resulting in significant mortality and disruption to natural tree regeneration cycles. Current forest inventory data from dead, damaged, unharvested forests are lacking. Without this information, it is difficult to justify management intervention, such as aerially seeding from helicopters – a proven method to regenerate tamarack forests when living seed trees are lacking.

**We seek to renew damaged acres to maintain the myriad ecosystem and economic benefits provided by these forests.** Tamarack forests are valuable for wildlife habitat, ecosystem services like clean water, and forest products like timber, fuelwood, and chemical extractives. The impact of this beetle outbreak on species, like the tamarack-dependent Connecticut warbler, and ecosystem services, such as the clean water our forested wetlands provide, are unknown. The future of tamarack, an iconic Minnesota species, is uncertain.

**II. PROJECT ACTIVITIES AND OUTCOMES**

**Activity 1:** *Assess plant and wildlife response in beetle-killed tamarack forests* **ENRTF BUDGET:** $195,107

We will identify 30 sites dominated by tamarack across ownerships. Sites will include healthy tamarack stands and stands impacted by ELB to be able to compare vegetation and wildlife habitat.

We will:

* Field inventory vegetation to determine whether tree seedlings are present that could replace dead tamarack
* Survey the bird community over the course of the season to evaluate habitat use

These activities will result in the following outcomes and products:

* Inventories will confirm whether or not regeneration, especially of tamarack, is occurring in beetle-damaged tamarack stands
* Information on overall vegetative communities and how vegetation and structure (dead standing trees and dead down trees) influence avian community use
* All findings will be summarized and shared via multiple venues including the MNDNR Division of Forestry Webpage, a regional source for forest management guidance, the SFEC Forest and Wildlife Research Review and MN Society of American Foresters conference, webinars, and peer-reviewed literature

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| **Outcome** | **Completion Date** |
| 1. *Identify 30 sample sites to conduct regeneration surveys*
 | *Feb. 2021* |
| 1. *Collect data on vegetation and native bird response*
 | *Oct. 2022* |
| 1. *Analyze, publish, and share findings with natural resource managers; incorporate findings into future restoration efforts*
 | *June 2023* |

**III. PROJECT PARTNERS:**

1. **Partners receiving ENRTF funding**

*Mike Reinikainen, Silviculture Coordinator, MNDNR, Division of Forestry, project manager and delivery*

*Paul Dubuque, Silviculture Consultant, MNDNR, Division of Forestry, site selection, technical adviser, and delivery*

*Dr. Windmuller-Campione, Assistant Professor, University of Minnesota, data collection, analysis, and delivery*

*Dr. Alexis Grinde, Wildlife Ecologist, Natural Resources Research Institure, data collection, analysis, and delivery*

1. **Partners NOT receiving ENRTF funding**

*Richard Moore, County Land Commissioner, Beltrami County, providing sites
Danae Schafer, Assistant County Land Commissioner, Koochiching County, providing sites
Sawyer Scherer, Forest Ecologist, UPM Blandin, providing sites*

**IV. LONG-TERM- IMPLEMENTATION AND FUNDING:**

Results will be incorporated into MNDNR Division of Forestry’s (DOF) tamarack forest management guidelines as it will represent the most robust source of information describing how these damaged tamarack forests are changing post-beetle infestation. The DOF has the capacity to implement these findings into our aerial seeding regeneration projects should intervention be required to ensure tamarack forests are regenerating after infestation. Further, we can track sites long-term using our enterprise geodatabase. Future reforestation funding if needed will be requested through the legislative process.

Results will influence how State, County, and Industry manage their vast tamarack resource in the wake of this unprecedented state-wide outbreak.

To ensure results are known and implemented both inside and outside of the partnering agencies, results will be delivered to regional natural resource managers through conferences (USFS Forest Health Workshop and SFEC Forest and Wildlife Research Review), webinars, and the MNDNR Forest Management Academy.