USDA Forest Service
U.S. DEPARTMENT OF AGRICULTURE

Pollinator Habitat in Log Landings

A Pollinator Habitat in Log Landings Project Fact Sheet

Background

Bees play a critical role in ecosystem health and sustainability across the globe. They pollinate flowers, trees, and other plants that provide food and habitat for other creatures, including humans. Their role in pollinating agricultural crops is invaluable. However, scientists have been observing for decades that many pollinating species, including native bees, are declining in range or abundance. The Midwest United States has among the lowest predicted bee populations.

Pesticide use, climate change, disease, and habitat loss are among the most serious threats to pollinator species. Lower pollinator numbers are related to reduced availability of flowering plants pollinators rely on. Improving the abundance, diversity, and continuity of floral resources and bee nesting sites may be one way to reverse this trend.

Log landings, open areas in forests where logs are processed and stacked before being loaded onto logging trucks, have been identified as sites with the potential to host floral resources and boost bee populations. On the Hoosier National Forest in Indiana, land managers have been leading an effort to establish ephemeral pollinator habitat on recent log landings; however, soil compaction, low soil fertility, erosion, residual mulch and logging debris, and competition from invasive plants have limited the establishment and growth of seeded species. Breaking up compacted soil and adding biochar (the lightweight, high-carbon black residue and ashes that remain after burning wood and other plant materials), coupled with enrichment plantings of native seeds, could increase success.

National Forest staff member Chad Menke spreading biochar across a log landing on the Shawnee National Forest. Biochar amendments can improve soil heath and increase vegetation growth. USDA Forest Service photo by Lauren Pile Knapp.

Key Takeaways

- Pollinator populations are declining worldwide, and bees in the midwestern United States are among the most threatened.
- Log landings can be ephemeral pollinator habitat if the soil is treated to reduce compaction and seeded with a native, pollinator-friendly plant mix.
- Amending soil with biochar can augment soils and improve their ability to support native vegetation and pollinator habitat.
- Properly managed, log landings can support diverse and abundant wild bees, including species of conservation concern, pollen specialists, and parasitic species.

The Research Study

Northern Research Station scientists and partners are conducting field experiments to address soil compaction and other issues that are preventing the growth of flowering plants in log landing soils.

Research is underway at three National Forests in the Midwest: the Hoosier National Forest in Indiana, the Shawnee National Forest in Illinois, and the Mark Twain National Forest in Missouri. On each forest, scientists selected five log landings to receive treatments, and five landings that will revegetate naturally as controls. On each treated landing, scientists are testing three approaches: (1) breaking up compacted soil, (2) breaking up compacted soil and adding biochar, and (3) adding biochar. Log Landing Standard Practices, including removing mulch and excess logging debris and installing erosion control measures, will be used to prepare all treated and untreated plots.

Biochar amendments have been used in other places to increase vegetation growth and improve soil health across a range of ecological systems and soil conditions. Biochar application has also been associated with reductions in invasive plant species. The pollinator seed mix selected for the experiments includes generalist, native flora that are adapted to a wide range of site conditions. Scientists will monitor all the study plots for vegetation and floral availability, soil characteristics, and presence of pollinators for 3 years.

The study will result in a General Technical Report (GTR) synthesis of the project outcomes and a management guide including best management practices (BMPs) for establishing ephemeral pollinator habitat in log landings. Management guidelines and BMPs will also be shared via webinars and site visits. Outreach to other forests and landowners will describe the results and impact of these restoration practices on pollinators (plants and insects), vegetation, and soil. The project will also result in two masters theses, one PhD dissertation, and several peer-reviewed publications.

Northern Research Station scientists and National Forest staff celebrate the completion of the soil treatment application for the PHiLL Project on the Shawnee National Forest. USDA Forest Service photo by Lauren Pile Knapp.

A log landing showing the multiple treatment combinations. On each forest, scientists selected five log landings to receive treatments and for comparison, and five landings to revegetate naturally. On each treated landing, scientists compared treatments, including subsoiling only, applying biochar only, a combination of subsoiling and applying biochar, and an untreated control, each with a native pollinator seed mix applied in half of the treatment unit. USDA Forest Service photo by Lauren Pile Knapp.

More Information

- Please visit the PHiLL website at webpage: https://www.fs.usda.gov/research/nrs/projects/phill
- This project is a collaboration between the Northern Research Station, National Forest System, University of Missouri, and University of Massachusetts.