



CLEVELAND-CLIFFS INC.

Project Greenwood

Forestry Reclamation Approach

Jordan Erickson
Environmental Engineer
Hibbing Taconite Company

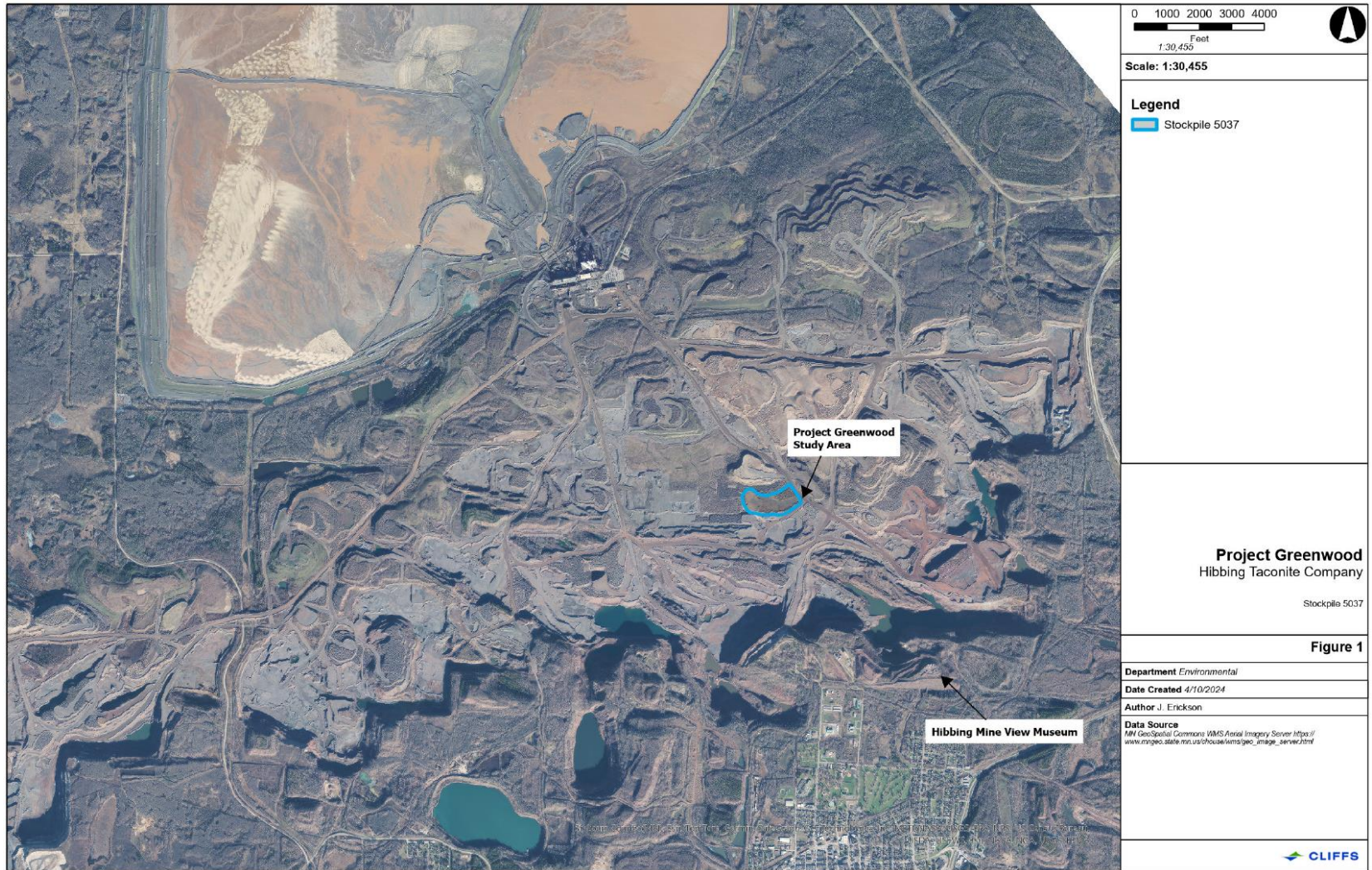
November 13, 2024

PROJECT GREENWOOD

Hibbing Taconite



HIBBING TACONITE FACILITY



PROJECT GREENWOOD

What's in a name?

- J.R.R. Tolkien
- Greenwood the Great



The Greenwood

Source: *Laurelin Archives*

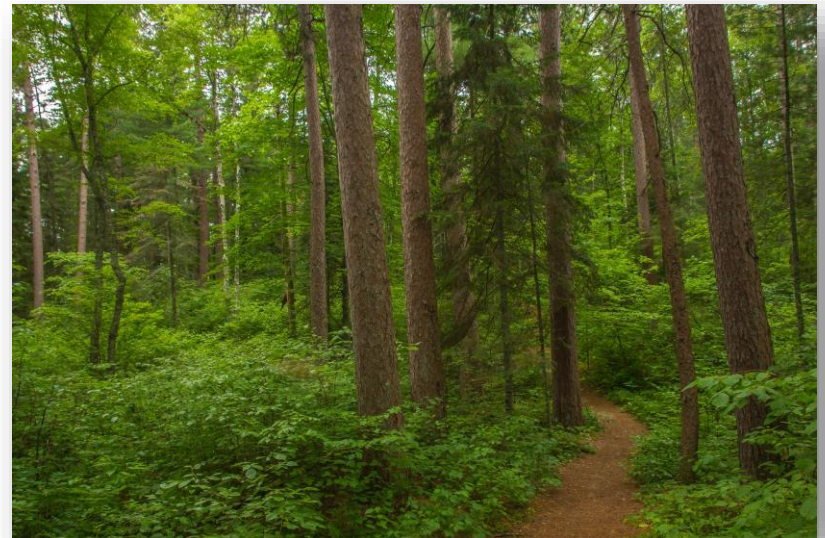
FORESTRY RECLAMATION APPROACH IN MINNESOTA

Benefits of the FRA

- Species richness
- Minimize non-native plant species
- Promote natural succession of forests
- Wildlife and pollinator habitat
- Soil stabilization
- Potential for CO2 sequestration



Stockpile 5037, Project Greenwood Study Area



*The Lost 40, Chippewa National Forest,
Itasca County, MN*

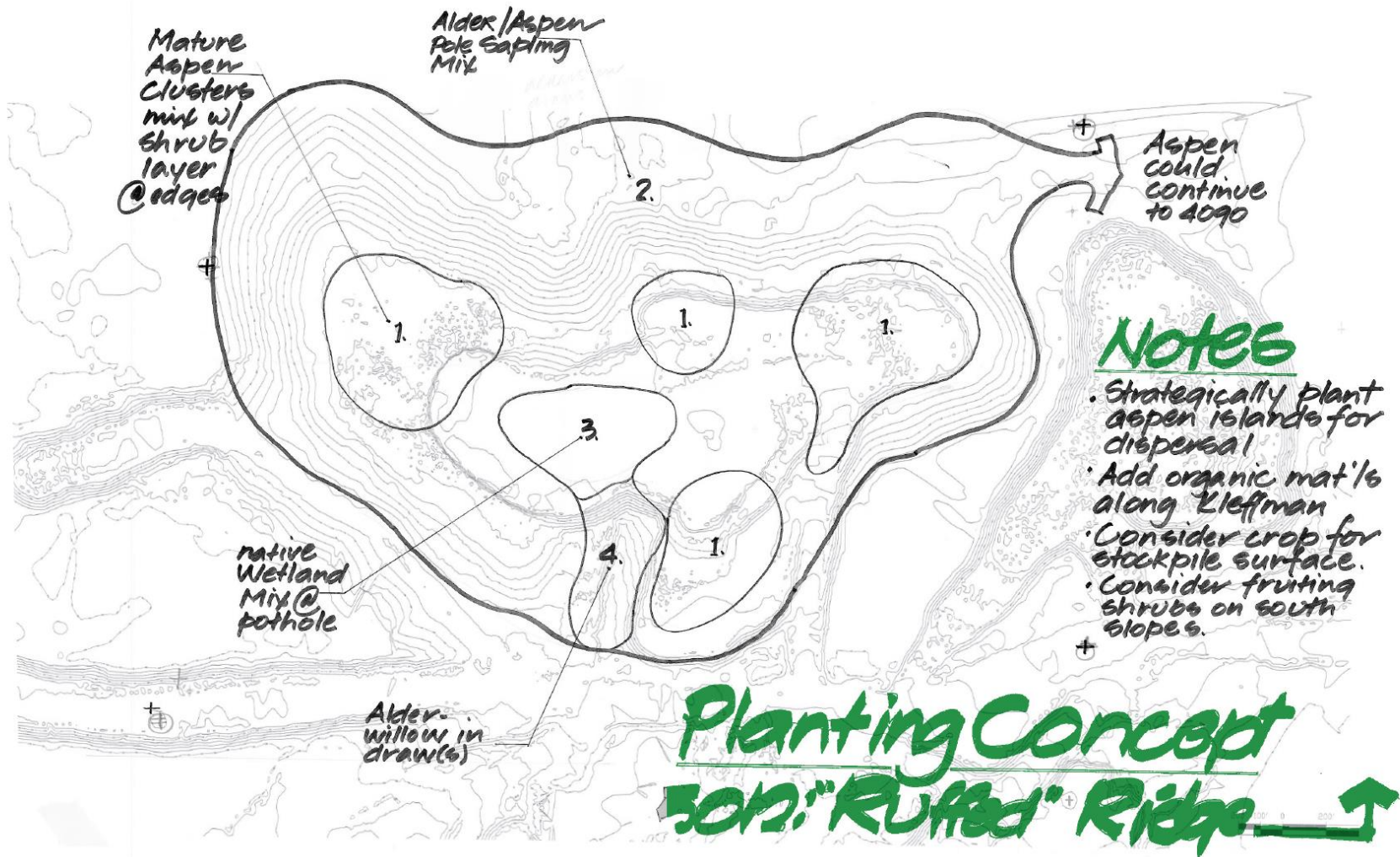
Source: Brett Whaley/ Flickr

PAST RECLAMATION



Looking south at HTC

PAST RECLAMATION



PAST RECLAMATION



5036 in 2013: Tree planting done by local 6th graders



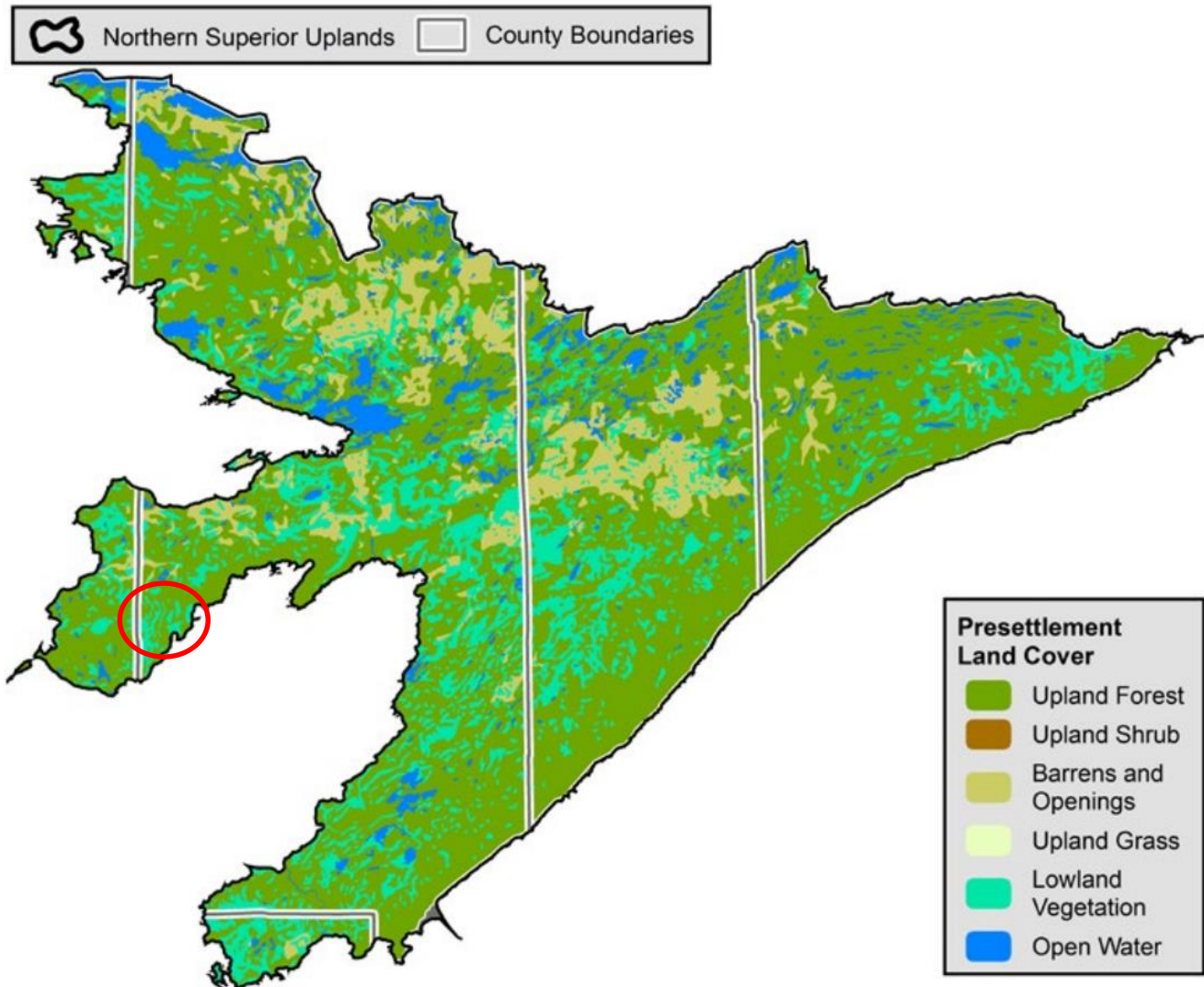
5036 in 2023: Trees, shrubs, and grasses grown in

VOLUNTEER VEGETATION



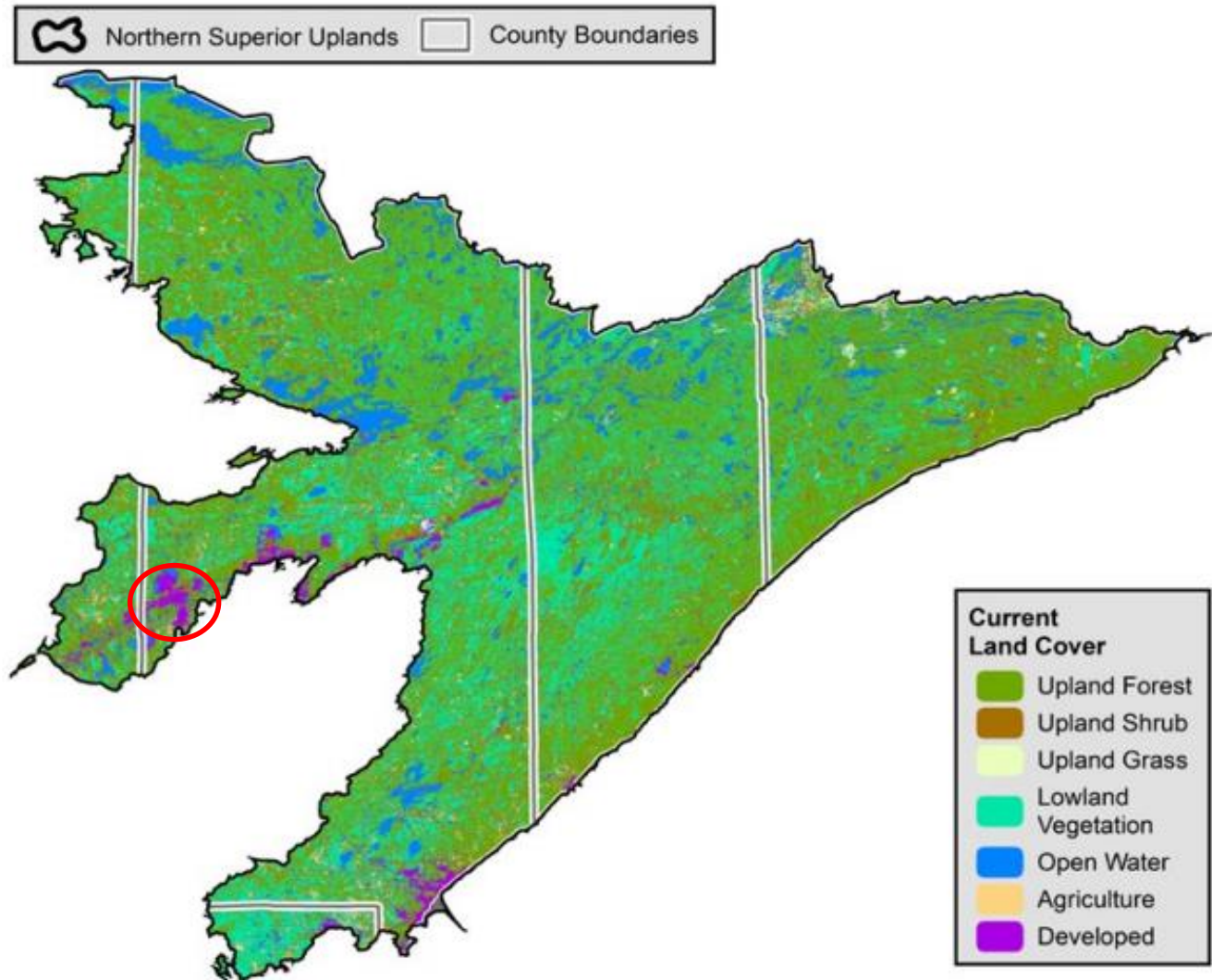
A historic stockpile on site at HTC, these stockpiles are pre 1980 reclamation requirements

PRE-SETTLEMENT LAND COVER



Source: MN DNR Woodlands of Minnesota Landowner Handbook

CURRENT LAND COVER



Source: MN DNR Woodlands of Minnesota Landowner Handbook

WHAT IS THE FORESTRY RECLAMATION APPROACH?

The FRA can be summarized in five steps:

1. Create a suitable rooting medium for good tree growth that is no less than 4 feet deep and comprised of topsoil, weathered sandstone and/or the best available material.
2. Loosely grade the topsoil or topsoil substitute established in step one to create a noncompacted growth medium.
3. Use ground covers that are compatible with growing trees.
4. Plant two types of trees--early successional species for wildlife and soil stability, and commercially valuable crop trees.
5. Use proper tree planting techniques.

HOW TO ACHIEVE THE FIVE STEPS

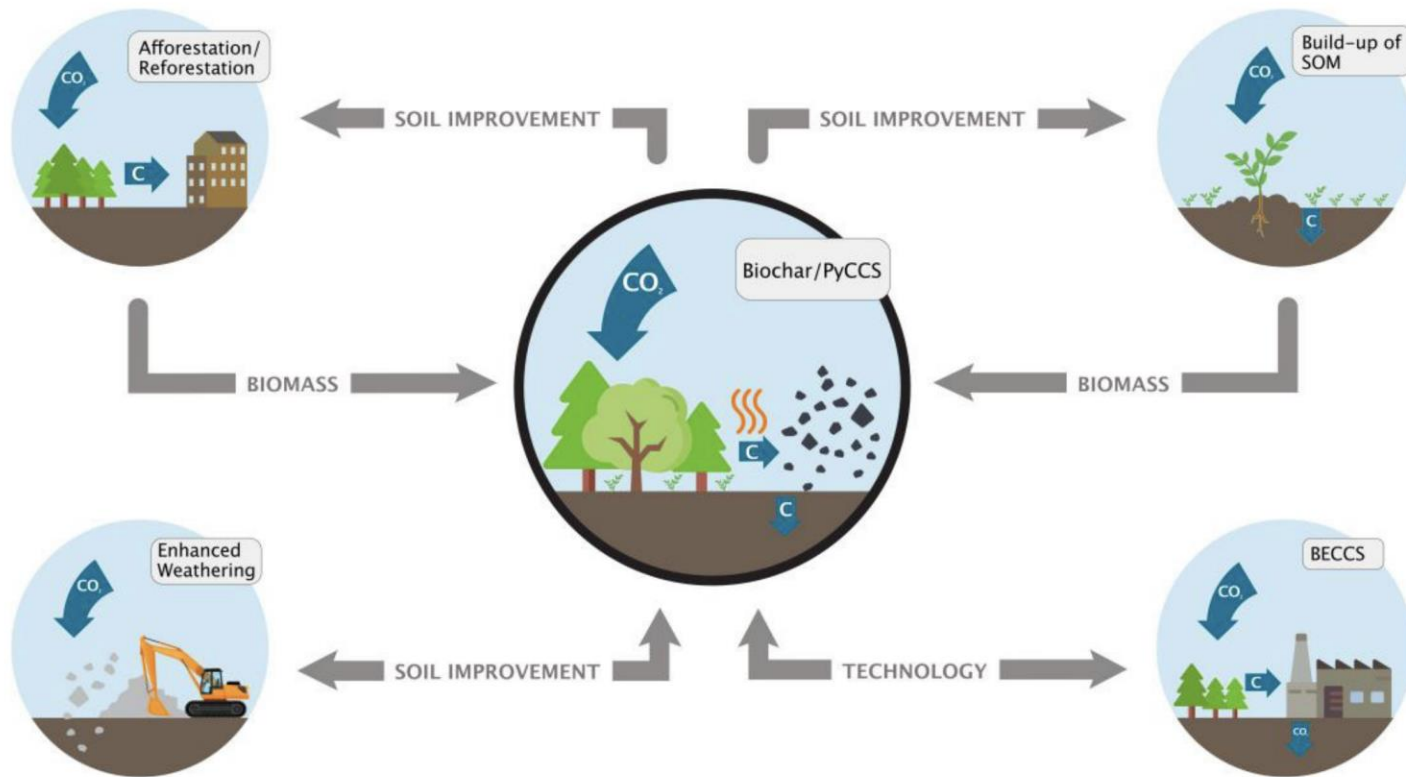
1. Create a suitable rooting medium for good tree growth that is no less than 4 feet deep and comprised of topsoil, weathered sandstone and/or the best available material.



Looking east at the project site, July 2024

HOW TO ACHIEVE THE FIVE STEPS

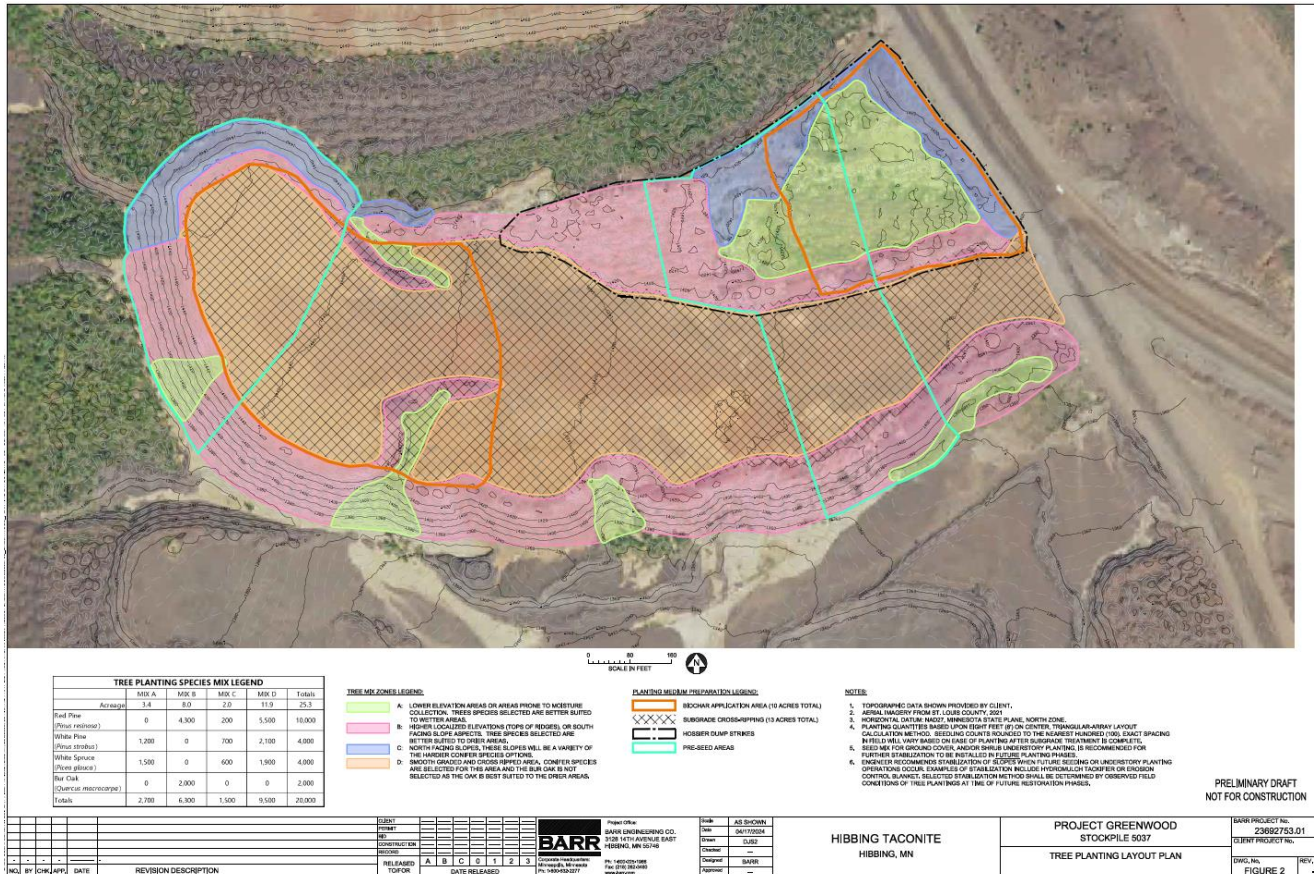
1. Create a suitable rooting medium for good tree growth that is no less than 4 feet deep and comprised of topsoil, weathered sandstone and/or the best available material.



Source: US Biochar Initiative

HOW TO ACHIEVE THE FIVE STEPS

1. Create a suitable rooting medium for good tree growth that is no less than 4 feet deep and comprised of topsoil, weathered sandstone and/or the best available material.



HOW TO ACHIEVE THE FIVE STEPS

2. Loosely grade the topsoil or topsoil substitute established in step one to create a noncompacted growth medium.

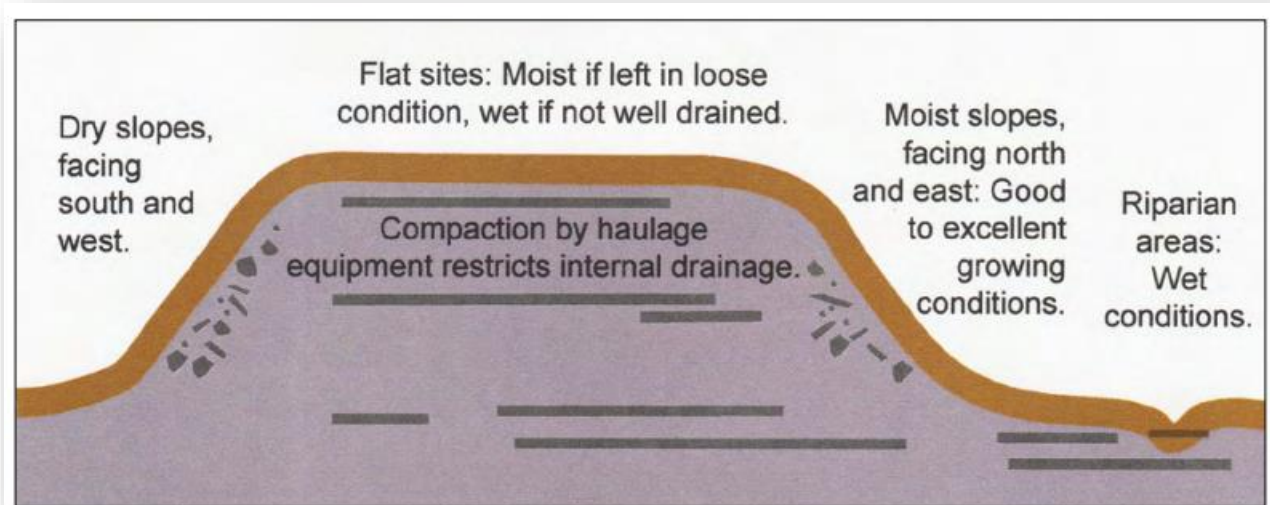


Photo source: USDA: *The Forestry Reclamation Approach: guide to successful reforestation of mined lands*

HOW TO ACHIEVE THE FIVE STEPS

2. Loosely grade the topsoil or topsoil substitute established in step one to create a noncompacted growth medium.



D11 striking hoosiers on April 10, 2024

HOW TO ACHIEVE THE FIVE STEPS

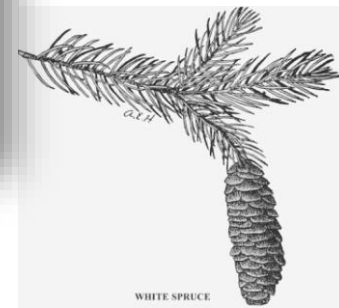
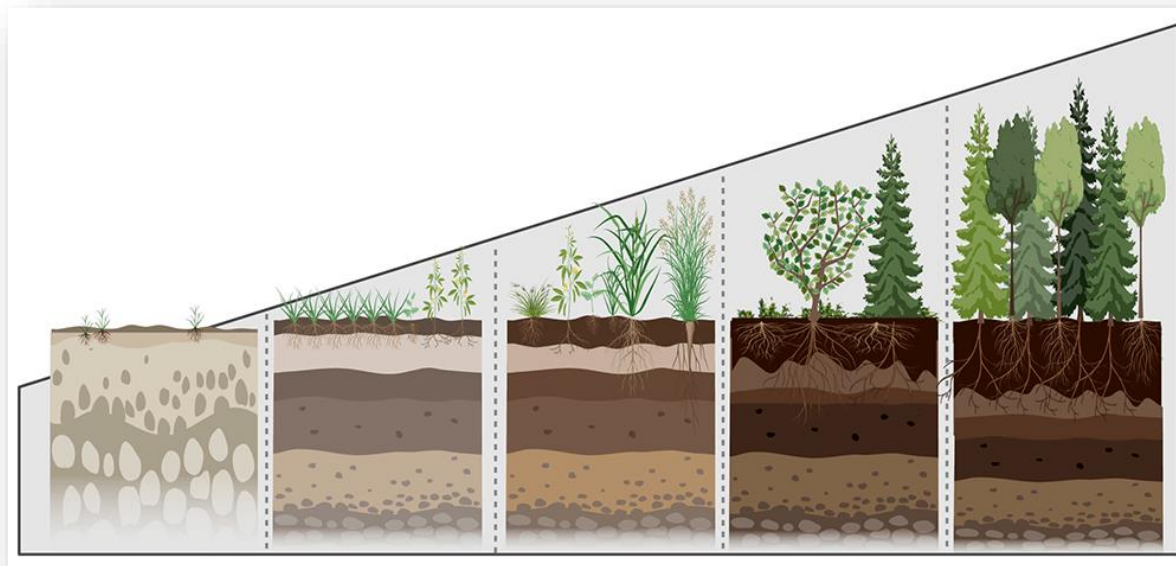
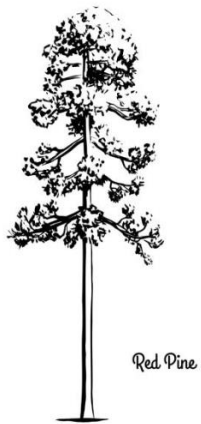
3. Use ground covers that are compatible with growing trees.



Lady Slippers, Gaultheria, and Bellworts in Superior National Forest

HOW TO ACHIEVE THE FIVE STEPS

4. Plant at least two types of trees -- early successional species for wildlife and soil stability, and commercially valuable crop trees.



HOW TO ACHIEVE THE FIVE STEPS

5. Use proper tree planting techniques.

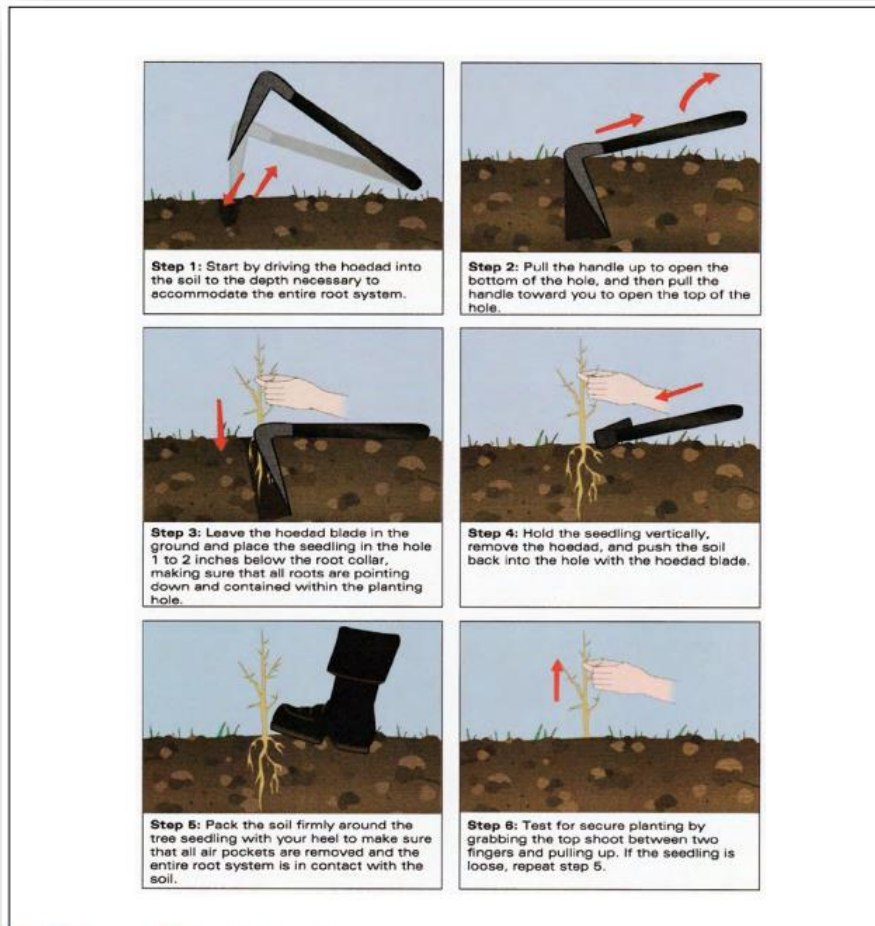


Figure 9-5.—Tree planting using a hoedad.

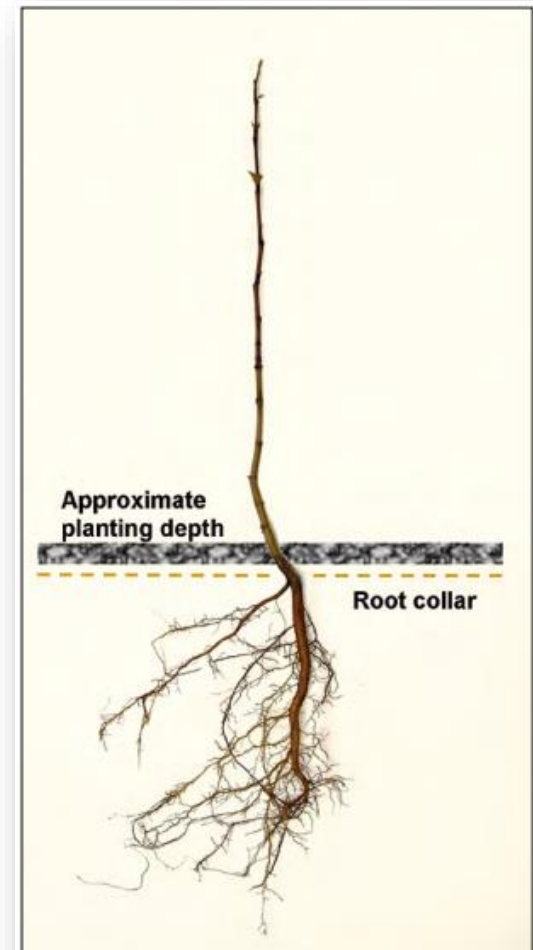


Figure 9-7.—A bare-root hardwood tree seedling before planting. The “root collar” is an area where the stem meets the roots, and is thicker than the stem above. The seedling should be planted 1 or 2 inches below the root collar, well above the highest root.

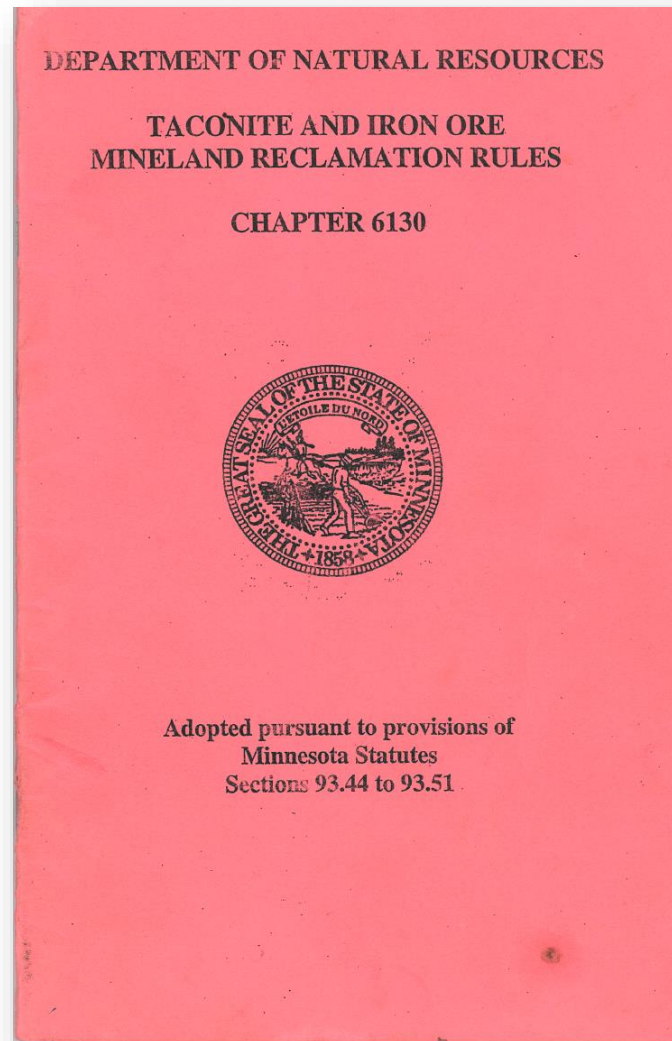
2023 WORK

The work to be done in summer 2024 is building off planting work completed in 2023.

In 2023, HTC planted 95,000 red pine trees with the help of the Rajala Foundation and Barr Engineering.



WHY THE FORESTRY RECLAMATION APPROACH



WHY THE FORESTRY RECLAMATION APPROACH

Flowers from Native Seed Reclamation



Virginia Rose



Completed Reclamation



“After three growing seasons following the point when according to the permit to mine, a surface, structure, facility, or element is no longer scheduled to be disturbed or used in a manner that would interfere with establishment and maintenance of vegetation, a **90 percent ground cover, consisting of living vegetation and its litter**, shall exist on all areas”.

POST PLANTING UPDATE

Oak planting among volunteer vegetation



Planting in progress

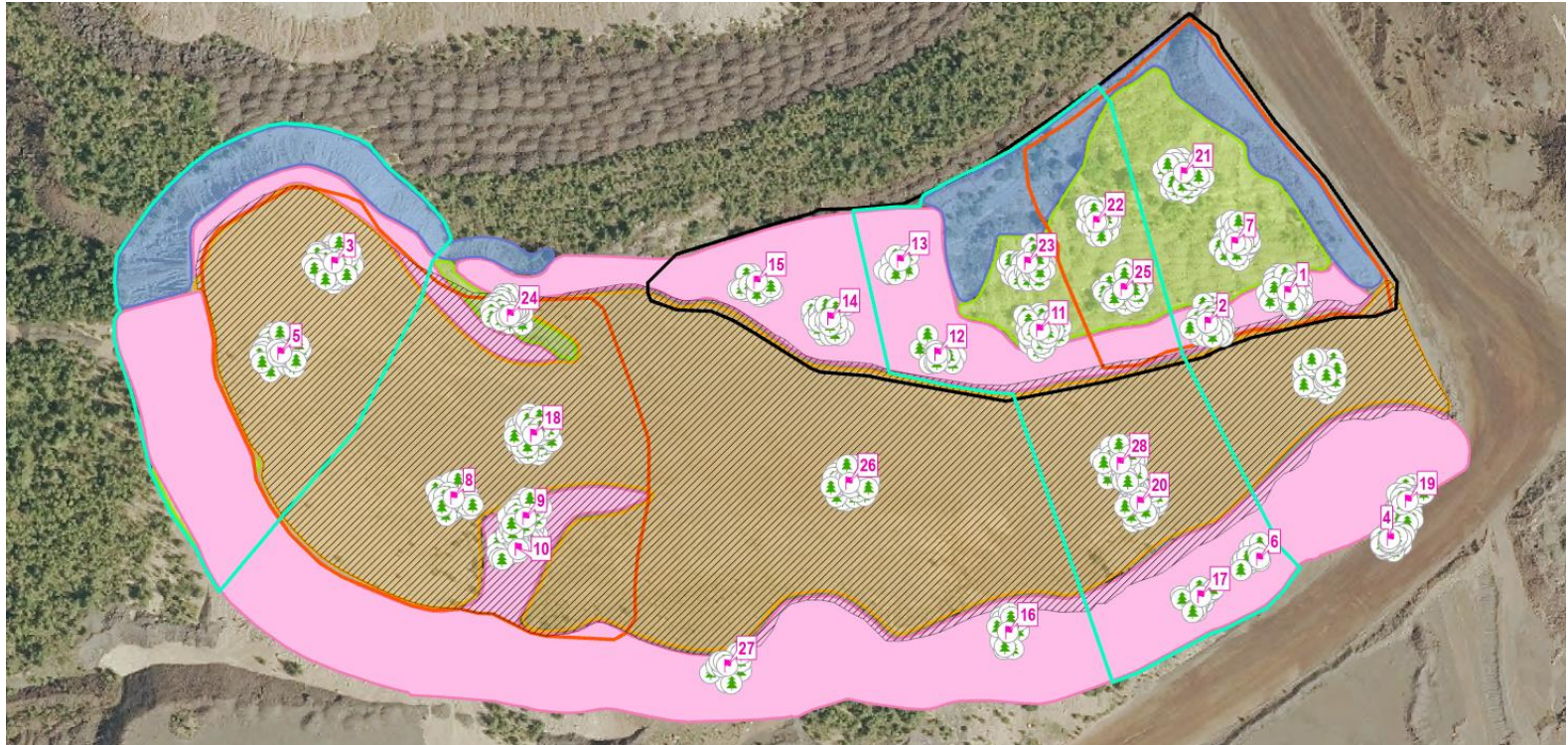


Red pine on the ripped area of the stockpile



POST PLANTING UPDATE

Monitoring locations



THANK YOU!

I would like to thank Pete Kero and Mehgan Blair from Barr Engineering. Kurt Anderson and Blake Francis from the Rajala foundation, and Kenton Sena from the University of Kentucky for their help and encouragement with this project.

Thank you to the IRRR for the Mineland Reclamation Grant Program and the City of Hibbing. This project can exist because of this program and partnerships within our community.

I would also like to send a big thank you to Tasha Niemi for her enthusiasm and support of this project. Also, thank you to the mine operations team at Hibbing Taconite for helping prep this site. It takes a village (with very large equipment) to make reclamation work!

Questions?

