

APPENDIX A: REVEGETATION PLAN

Revegetation Plan Grand Portage National Monument Mile Creek Road Re-Route and Bridge Construction

Draft Date: January 10, 2023

Park Unit: Grand Portage National Monument (GRPO)

Project Title: Mile Creek Road Re-Route and Bridge Construction

PMIS Number: 317984

Estimated Total Area for Revegetation: 4.5 acres

Anticipated Construction Dates: Summer 2023

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Project Purpose: This document describes the strategy for revegetation of the disturbed area associated with the Mile Creek Road re-route and bridge construction, constructed by Minnesota Department of Transportation. The project will disturb about 3.6 acres, defined by the Limits of Disturbance (LOD) boundary on the 90% plan set. Restoration area is planned for 4.5 acres to include any incidental areas not accounted for on plans and for any areas where seed did not germinate.

Park Location and Description: Grand Portage National Monument (GRPO) is in northeast Minnesota, on the shore of Lake Superior. It is 710 acres, consisting of the fur trade depot, 8.5 miles of portage trail to Fort Charlotte, located at the intersection of the Pigeon River which is the US/Ontario, Canada border. GRPO preserves the history of the cross-cultural interaction and exchange between the Ojibwe people and early Europeans during the eighteenth-century expansion of the Great Lakes fur trading business.

GRPO has an agreement with the Grand Portage Band of the Lake Superior Chippewa (the Band), where the maintenance of the Monument is done by Band employees. The Band will take on the role of outplanting, watering, and seeding on this project.

Project Description: Mile Creek is a Cook County managed road on the tribal lands of the Grand Portage Band of Lake Superior Chippewa that runs through GRPO. This project aims to protect the historic bridge and create a safer corridor for pedestrian and auto traffic. Construction is scheduled to begin in 2023.

Revegetation Goals:

- Re-establish all ethnobotanically significant plant communities/species that occurred in the Limit of Disturbance (LOD)
- Control invasive plant introduction and movement through the salvage of topsoil, exposed mineral soil, and cleaning of contaminated equipment used in construction.
- Mitigate the impacts to rare plant species.
- Maintain the natural landscape.

- Maintain the park vegetation diversity by using locally sourced seed of native species and outplanting nursery-grown shrubs and grasses started from locally sourced seed.
- Contain point-source pollution by properly storing topsoil.
- Minimize soil erosion using native vegetation.

Special Considerations: There will be some loss of Douglas hawthorn in the project area, which is considered a species of special concern for the Grand Portage Trust Lands Agency. Mitigations are addressed in the “Greenhouse” section of this document. Additionally, the Park has recently restored a sweetgrass meadow which is near the project LOD; the proximity to the construction disturbance creates a pathway for invasive species, such as reed canary grass (*Phalaris arundinacea*), to re-establish and invade the restored meadow. Controlling reed canary grass invasion within the LOD is high priority due to its high invasion and establishment potential.

Black Hawthorn: A portion of the current stand of black hawthorn will be removed to accommodate the new bridge. The park mapped all hawthorns in the construction zone; approximately 50 plants will be impacted. Live, nursery raised hawthorns will be placed in the disturbed area near the new bridge, approximately 50-100 trees will be planted near the new bridge. The environmental conditions will be adequate to support a 1:1 replacement of hawthorns (accounting for some mortality) within the LOD or other areas of the park if so determined. No hawthorns will be planted adjacent to the road.

Native Roses: Live, nursery raised roses will be planted in the areas near the new bridge, further from the water table than the hawthorns. Roses will be on both sides of the bridge near the stream. Fifty to 80 roses will be planted on about 0.1 ac.

Sweetgrass: Live, nursery raised sweetgrass plugs will be placed in sunny areas with coarse, gravelly soils. Likely locations will be the lowest point in the road ditches. Number of plugs to be determined at the time of restoration (fall 2023). The goal of the plantings is to have plant density similar to undisturbed or restored populations.

Out-planting Nursery materials: The Band or Band hired contractor will pick-up and deliver the live plants to the planting site. An “X” will be cut into the erosion control mat large enough for the live plants, but small enough that wind will not lift the mat during the winter months. Live plants will be protected with mulch layer and supplementally watered as needed. Watering times and amount will be dictated by weather. Following planting, any excess or loose erosion control mat will be secured with ground staples or other appropriate method.

Seed Mix: Native, local ecotype seed is available commercially from local vendors and be purchased by the Government. A custom seed mix will be created and ordered to meet Park specifications. Two different seed mixes will be used, one for open forested areas and another for riparian. Seed will be used to restore about 3.5 acres.

This is an example Native Riparian and Floodplain seed mix from Shooting Star Native Seeds:

Common Name	Scientific Name	% of Mix	Seeds/Ft	Rate/Acre
Grasses				
American Sloughgrass	Beckmannia syzigachne	25.00%	27.5	1.50 PLS Lbs
Blue Joint Grass	Calamagrostis canadensis	1.00%	6.2	0.06 PLS Lbs

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American Manna Grass	Glyceria grandis	3.00%	4.6	0.18 PLS Lbs
Fowl Manna Grass	Glyceria striata	2.00%	7.1	0.12 PLS Lbs
Rice Cut Grass	Leersia oryzoides	4.00%	3.0	0.24 PLS Lbs
Annual Rye	Lolium italicum	15.00%	5.0	0.90 PLS Lbs
Fowl Bluegrass	Poa palustris	30.00%	86.0	1.80 PLS Lbs

Sedges & Rushes

Tussock Sedge	Carex stricta	1.00%	1.2	0.06 PLS Lbs
Brown Fox Sedge	Carex vulpinoidea	5.00%	11.0	0.30 PLS Lbs
Green Bulrush	Scirpus atrovirens	1.00%	10.1	0.06 PLS Lbs
Woolgrass	Scirpus cyperinus	0.10%	3.7	0.01 PLS Lbs
River Bulrush	Scirpus fluviatilis	4.00%	0.4	0.24 PLS Lbs
Softstem Bulrush	Scirpus validus	2.00%	1.4	0.12 PLS Lbs

Wildflowers

Swamp Milkweed	Asclepias incarnata	2.00%	0.2	0.12 PLS Lbs
Flat-topped Aster	Aster umbellatus	0.50%	0.7	0.03 PLS Lbs
Joe Pye Weed	Eupatorium maculatum	0.50%	1.0	0.03 PLS Lbs
Boneset	Eupatorium perfoliatum	0.40%	1.4	0.02 PLS Lbs
Sneezeweed	Helenium autumnale	0.40%	1.1	0.02 PLS Lbs
Spotted Touch-me-not	Impatiens capensis	1.00%	0.1	0.06 PLS Lbs
Great Blue Lobelia	Lobelia siphilitica	0.20%	2.2	0.01 PLS Lbs
Monkey Flower	Mimulus ringens	0.10%	5.1	0.01 PLS Lbs
Mountain Mint	Pycnanthemum virginianum	0.20%	1.0	0.01 PLS Lbs
Giant Goldenrod	Solidago gigantea	0.40%	2.2	0.02 PLS Lbs
Blue Vervain	Verbena hastata	0.60%	1.2	0.04 PLS Lbs
Common Ironweed	Vernonia fasciculata	0.60%	0.3	0.04 PLS Lbs

This is an example of Dry Forest opening mix from Shooting Star Native Seeds:

Grasses

Slender Wheatgrass	Agropyron trachycaulum	18.00%	6.8	2.70 PLS Lbs
Oats	Avena sativa	34.00%	2.2	5.10 PLS Lbs
Poverty Oats	Danthonia spicata	7.00%	9.6	1.05 PLS Lbs
Canada Wild Rye	Elymus canadensis	20.00%	5.7	3.00 PLS Lbs
Annual Rye	Lolium italicum	6.00%	5.0	0.90 PLS Lbs

Wildflowers

Anise Hyssop	Agastache foeniculum	1.50%	7.4	0.23 PLS Lbs
Large-leaved Aster	Aster macrophyllus	1.50%	2.2	0.23 PLS Lbs
Upland White Aster	Aster ptarmicoides	1.50%	5.3	0.23 PLS Lbs
Northern Bedstraw	Gallium boreale	0.50%	1.9	0.08 PLS Lbs
Showy Sunflower	Helianthus laetiflorus	2.00%	0.4	0.30 PLS Lbs
Early Wild Rose	Rosa blanda	2.00%	0.3	0.30 PLS Lbs
Black-eyed Susan	Rudbeckia hirta	3.50%	17.7	0.53 PLS Lbs
Gray Goldenrod	Solidago nemoralis	0.50%	8.3	0.08 PLS Lbs
Stiff Goldenrod	Solidago rigida	1.00%	2.3	0.15 PLS Lbs

Heartleaf Alexanders

Zizia aptera

1.00%

0.7

0.15 PLS
Lbs

Seeding Methods: The aforementioned seed mixes would be applied to the disturbed lands at a rate of 80 seeds per square foot in a mix of species and proportions similar to those listed. Seeding will occur in conjunction with the live shrubs, to create understory species community.

The method of seeding will be via one of the following four types: 1) hand broadcast seeding with erosion control blanket, 2) hydraulic application of seed with erosion control blanket, 3) hand broadcast seeding with hydromulch, 4) hydraulic application of seed with hydromulch. Seeding methods area described below. ***NOTE: One or more of these seeding methods may be removed from the specifications as the details of the project are refined.***

Erosion Control Blanket

After seed has been placed, by hand or hydraulically, erosion control blanket (ECB) will be installed over the top of the seed. The ECB shall be composed of certified weed free processed all-natural fibers (straw is not acceptable) mechanically bound between two all-natural fiber nettings to form a continuous matrix with a minimum dry weight of 0.4 pounds per square yard according to ASTM D 6475. Ensure materials are protected from weather and/or handling damage prior to install. Utilize U-shaped wire staples with a minimum of 12-inch-long legs and 8-gauge thickness to facilitate installation without bending.

Two-Step Hydroseed Method

First Application (Seed):

Hydroseed Application: In order to ensure that the seed is being applied at the correct rate areas to be seeded shall be marked off/flagged at a minimum of half acre increments prior to seeding. Add 500 lbs/acre of tracer material consisting of virgin wood fiber mulch to the water/seed in the hydraulic equipment to provide visible evidence of uniform application. Adding this 500 lbs/acre during seeding, means that only 1500 lbs/acre will be added during the second application of just mulch, which would result in a total of 2,400 lbs/acre of mulch applied.

Hand Broadcast/Rake/Hydromulch Method (for slopes flatter than 2H:1V)

First Application (Seed):

Hand Application: In order to ensure that the seed is being applied at the correct rate areas to be seeded shall be marked off/flagged at a minimum of half acre increments prior to seeding. Seed shall be applied by hand or with hand seeders such as a belly grinder. Seed will be distributed in such a way as to assure all species in the seed mix are evenly distributed across the area, regardless of seed size. Lightly rake the seed into the soil to a depth of ¼". Do not smooth with the backside of the rake, light furrows in the soil are desired.

Second Application (Mulch):

2,400 lbs./acre of long strand virgin wood fiber and;

Apply mulch with a non-toxic, and natural and biodegradable plant-based psyllium/alpha plantago tackifier. Depending on product apply per the manufacturer's specifications, generally at a rate of 80 lbs. per acre on slopes less than 3H:1V and apply at a rate of 100 lbs./acre on slopes greater than 3H:1V. Apply mulch with a non-toxic, 100% environmentally safe tracer dye material applied per the manufacturer's specification generally at a rate of around 200-300 pounds per acre to provide visible evidence of uniform application.

The hydromulcher must be equipped with a built-in continuous agitation and recirculation system of sufficient operating capacity to produce homogeneous slurry and a discharge system that will apply slurry to the designated areas at a continuous and uniform rate. No fertilizers, mycorrhizae, or other amendments shall be added to the hydroseed slurry.

The Contractor shall spray designated areas with the slurry in a sweeping motion and in an arched stream until a uniform coat is achieved, with no slumping or shadowing, as the material is spread at the required rate. The hydromulch slurry should float down from the arched stream, as opposed to being shot directly at the ground. During hydromulching the existing native vegetation must be protected from damage (including, but not limited to, coating with mulch, damage by direct spray, and dragging hose). Notify the CO/DSC three weeks before hydromulching to ensure that NPS oversight of seeding operations can be coordinated.

Hydroseed/Hydromulch Method (for slopes steeper than 2H:1V)

First Application (Seed):

Hydroseed Application Hydroseed Application: In order to ensure that the seed is being applied at the correct rate areas to be seeded shall be marked off/flagged at a minimum of half acre increments prior to seeding. Add 500 lbs/acre of tracer material consisting of virgin wood fiber mulch to the water/seed in the hydraulic equipment to provide visible evidence of uniform application. Adding this 500 lbs/acre during seeding, means that only 1,900 lbs/acre will be added during the second application of just mulch, which would result in a total of 2,400 lbs/acre of mulch applied.

The hydroseeding shall proceed following the specifications above for the hydromulch application on top of broadcast seed.

Second Application (Mulch):

1,900 lbs./acre of long strand virgin wood fiber and;

Apply mulch with a non-toxic, and natural and biodegradable plant-based psyllium/alpha plantago tackifier. Depending on product, apply at manufacture's specification or at a rate of 80 lbs. per acre on slopes less than 3H:1V and apply at a rate of 100 lbs./acre on slopes greater than 3H:1V.

Apply mulch with a non-toxic, 100% environmentally safe tracer dye material applied per the manufacturer's specification or at a rate of around 200-300 pounds per acre to provide visible evidence of uniform application.

The hydromulching shall proceed following the specifications above for the hydromulch application on top of broadcast seed.

Point-source pollution: To address the potential for point source pollution related to stockpiled soil, the Park has identified a location for temporary storage. The soil must be covered to prevent erosion and movement of soil into stream and lake.



Non-native and invasive Species Control will be executed by the NPS Great Lakes Invasive Plant Management Team, based out of St. Croix Falls, MN. Focus on pre-construction removal of all undesired species, and post-construction removal of reed canary grass.

Site Prep: The road contractors will bring all surfaces to grade and leave soil in condition for planting, with no rocks, all clods less than 3" diameter.

Erosion Control: Excelsior erosion control mat will be used anywhere the grade is greater than 3:1.

Seeding: Seeding will be done by a Conservation Crew or contracted by the Band. Erosion control mat placed on top of seed to protect from winter erosion.

Acres	Pounds	Number of Seeds ft2
Riparian Mix, 2 ac	12	80
Open Forest Mix, 2.5 ac	38	80