LVP Innovation Grant Research Update

Scram Tailings Mineland Reclamation Study

Presented to the IRRRB Laurentian Vision Partnership - January 11, 2017
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Research Overview

• Look at current scram mining operation and evaluate potential innovative vegetation techniques for future reclamation

• Goals:
  – Use of native vegetation to the region
  – Effective applications
  – Consider ecological resiliency
  – Costs
  – Test it – see what works!
Our research partners

– IRRRB
  • LVP Innovation Grant
  • City of Hibbing (fiscal agent)

– In-kind and direct services from
  • Mining Resources, LLC (location, ops., planting beds)
  • SEH (design, planting, research)
  • Prairie Restorations, Inc. (greenhouse space, seed & materials, planting)

Thank You to our research partners!
Scram Mining & Reclamation

• What is it? MR 6130.0100, Subp. 16.
  – Scram Mining Operation: “…produces iron ore or natural iron ore concentrates…from previously developed stockpiles, tailings basins, underground mine workings, or open pits…[in areas] no greater than 80 acres of land not previously affected by mining…”

• Why here? Why now?
  – We have some of these areas available, yes?!
  – New technologies to recover iron ore concentrate from previous iron mining waste – awesome!
Reclamation Research Focus

Q: How to “reset the ecological clock”?  
Q: What opportunities/challenges should we know about NOW before reclamation activities start?

- Native vegetation to the region – grasses & forbs  
  - quick & robust establishment
- Build soil*...a dynamic, living, organic and mineral content.  
  * Tailings are NOT soil!

- Success or failure…dependent on quality/quantity of soil in place at the time!
Research Plan - 2 Phases

Phase 1
Year 1 (2015) – Greenhouse

Phase 2
Year 2 (2016) – In-situ (field study) at Mining Resources’ facility in Chisholm

Year 3 (2017) – In-situ (field) – final year of monitoring
Research Plan – Phase 1 (2015)

20 gal. fine tailings, homogenized
1 sample sent to U of MN

<<< Org Matter | << N, P, K | Ca, Mg, S
pH range: 7.2 – 8.2

Reasonable assumption: not sufficient nutrients for long-term, sustainable plant growth

Test – 9 nutrient applications, 1 control
145 day greenhouse trial on
8 grasses, 8 forbs, 2 cover crops (oats/winter wheat)
Research Plan – Phase 2 (2016)

Taking best greenhouse results to the field!
- 1 custom fertilizer – applied at 2 rates
- 1 commercial fertilizer – applied at 1 rate
- Organic residues (cover crop, hydromulch, straw)
- 8 grasses, 8 forbs (+3 legumes), 1 cover crop (oats)

12 treatments x 2 replications
+ 2 hydromulch test applications

Hand-seeding test plots
Phase 2 preliminary results

Straw mulch + custom fertilizer = BEST growth!
Low growth with no fertilizer
No significant difference between lower or higher fertilizer amounts.

Straw + seed

Straw + seed + 250 lb/ac fert.

Straw + seed + 500 lb/ac fert.
Phase 2 - 2017 Activities

- Veg. growth monitoring, species abundance
- Report & recommendations
- Identify other issues (?)
- Consider costs, level of effort, standards of care = *practicability***
The Vision – and Future Research

• Test on larger site(s)?

• Test more processed scram tailings?

• Test native woody species?

Questions? Thank you!