



Jason Barrie + Matthew Pyper

LINEAR RESTORATION EQUIPMENT TRIAL

Improving Forest Restoration Treatment
Speed, Efficiency, and Technique

cenovus
ENERGY

AGENDA

- Restoration in General
- Restoration Prescriptions
- Current Restoration Challenges
- Goal of Equipment Trial
- Trial Design
- Trial Results
- Questions



WHAT IS RESTORATION

Restoration is a Return to Forest Cover and Function of the Adjacent Forest

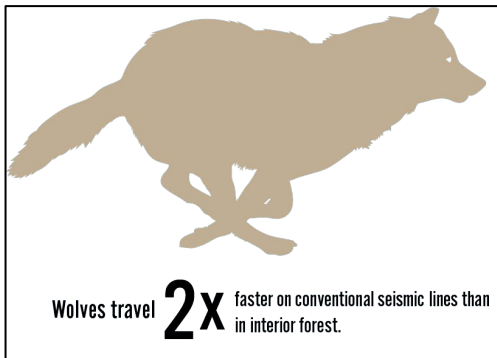
- No LFH
- Poor Microsites
- No CWD
- Soil Compaction?



- Other issues?

WHY RESTORATION

- Extend of Linear Features is Staggering
- 60% of these Lines do not Return to Forest Cover
- Caribou & Wolf Dynamic is Altered
- Impacts of Carbon Sequestration in Wetlands

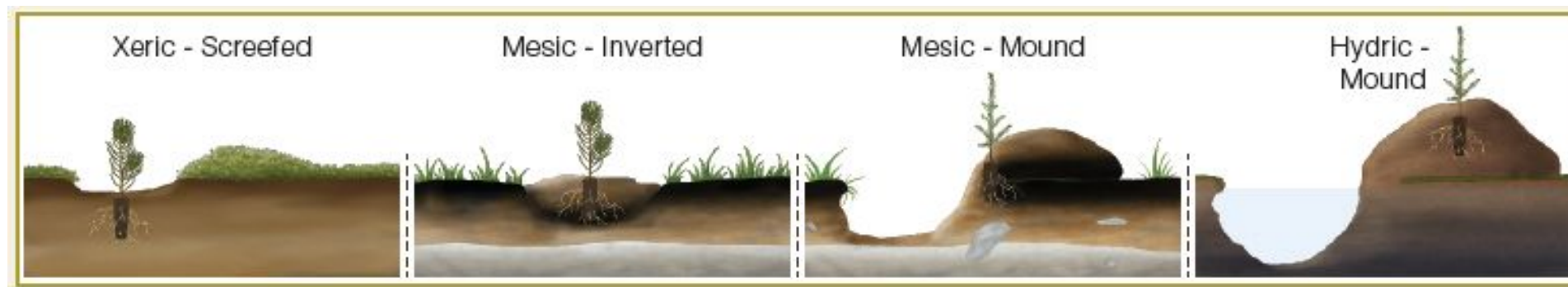


CARIBOU RESTORATION

Cenovus family of restoration projects...



RESTORATION PRESCRIPTION



- Average Microsite Density 1,200 / ha
- Average Mound Height 30 cm
- Average Planting Density 1,800 Stems / ha
- Stem Bending is 10%

RESTORATION TREATMENT



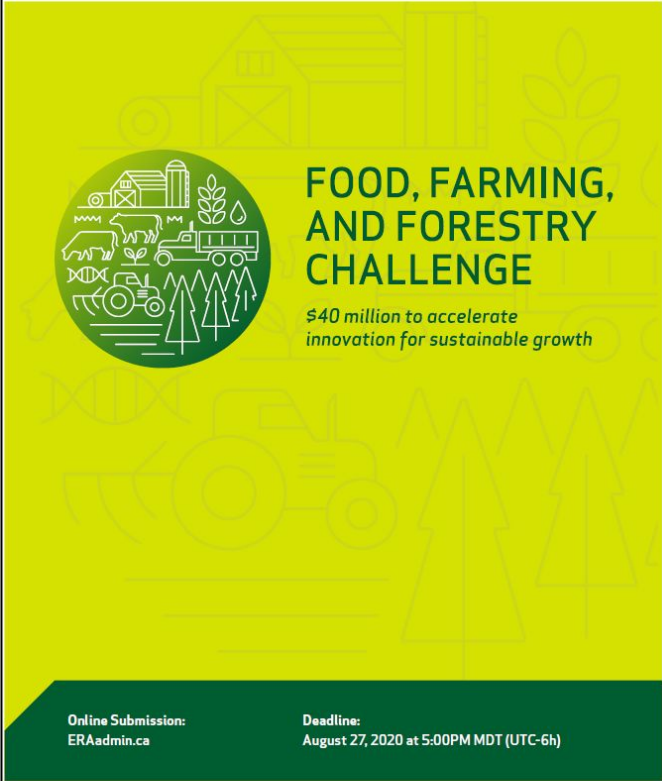
RESTORATION CHALLENGES

- High Costs
- Low Treatment Speed
- Limited Investment in Equipment



EMISSIONS REDUCTION ALBERTA (FUNDING SUPPORT)

- ERA Announced Food Farming Forestry Challenge 2020
- Identifies Solutions for Emissions Reduction
- Cenovus Application based on Improved Efficiency with Restoration Equipment and Wetland Carbon Sequestration
- Restoration Trial Funding is 50/50



The poster features a circular icon on the left containing icons for a farm, a tractor, a truck, a DNA helix, and trees. The background is yellow with faint icons of a house, a tree, and a gear.

**FOOD, FARMING,
AND FORESTRY
CHALLENGE**

*\$40 million to accelerate
innovation for sustainable growth*

Online Submission:
ERAadmin.ca

Deadline:
August 27, 2020 at 5:00PM MDT (UTC-6h)

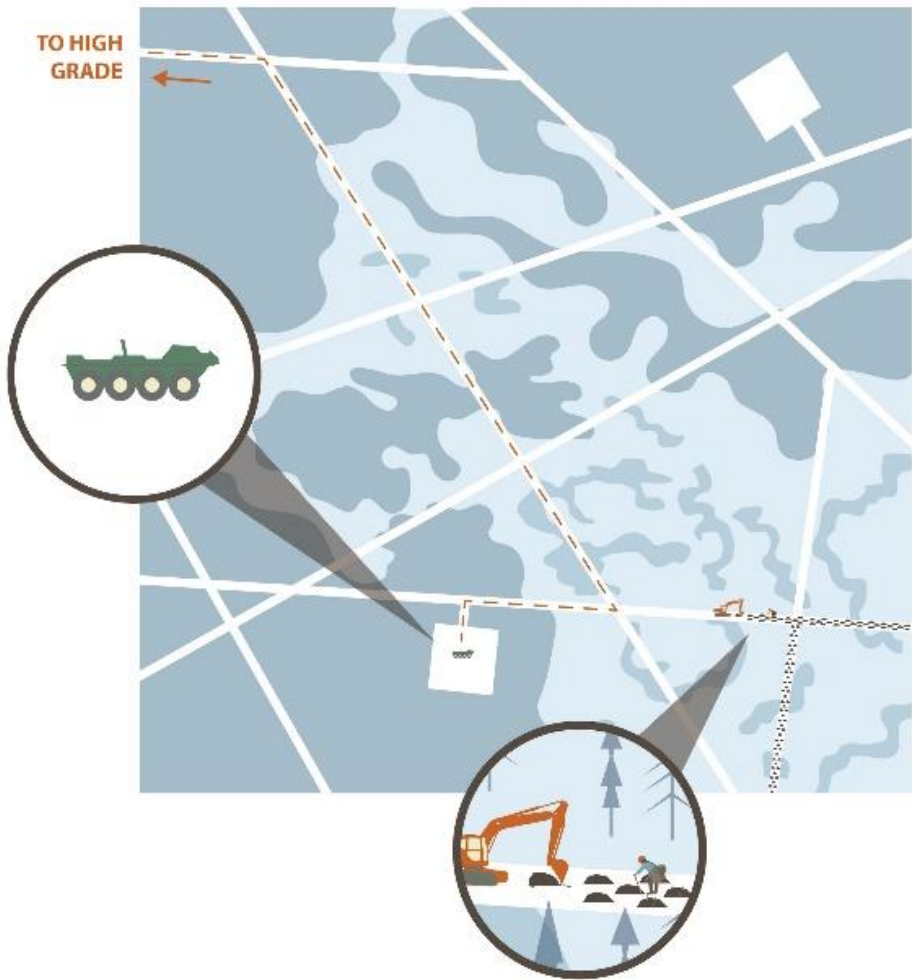
CALL FOR EXPRESSIONS OF INTEREST
GUIDELINES

EMISSIONS
REDUCTION
ALBERTA



IMPLEMENTATION OF ERA RESTORATION TRIAL

cenovus
ENERGY







Tow Behind
Drum



STUDY GOALS

- Treatment (microsite) Quality
- Treatment Efficiency
- Vegetation Response



RESTORATION TRIAL DESIGN



Upland Dry



Lowland



Mesic



Summary of equipment tested by site type and number of replicates.

	Site type		
Implement type	Lowland	Mesic	Upland
<u>Tow-behind Morooka</u>			
Box Blade	1	3	3
Disc	3	3	4
Line Restoration Drum	0	0	3
Harrows	0	0	1
<u>Excavator</u>			
Standard Mound	3	0	0
Upright Mound	5	0	1
Upright Tree Scoop	5		3
<u>Control</u>			
	3	4	5

A LOOK AT INITIAL MICROSITE RESULTS – MOUNDING



A LOOK AT INITIAL MICROSITE RESULTS – DISC



A LOOK AT INITIAL MICROSITE RESULTS – BOX BLADE



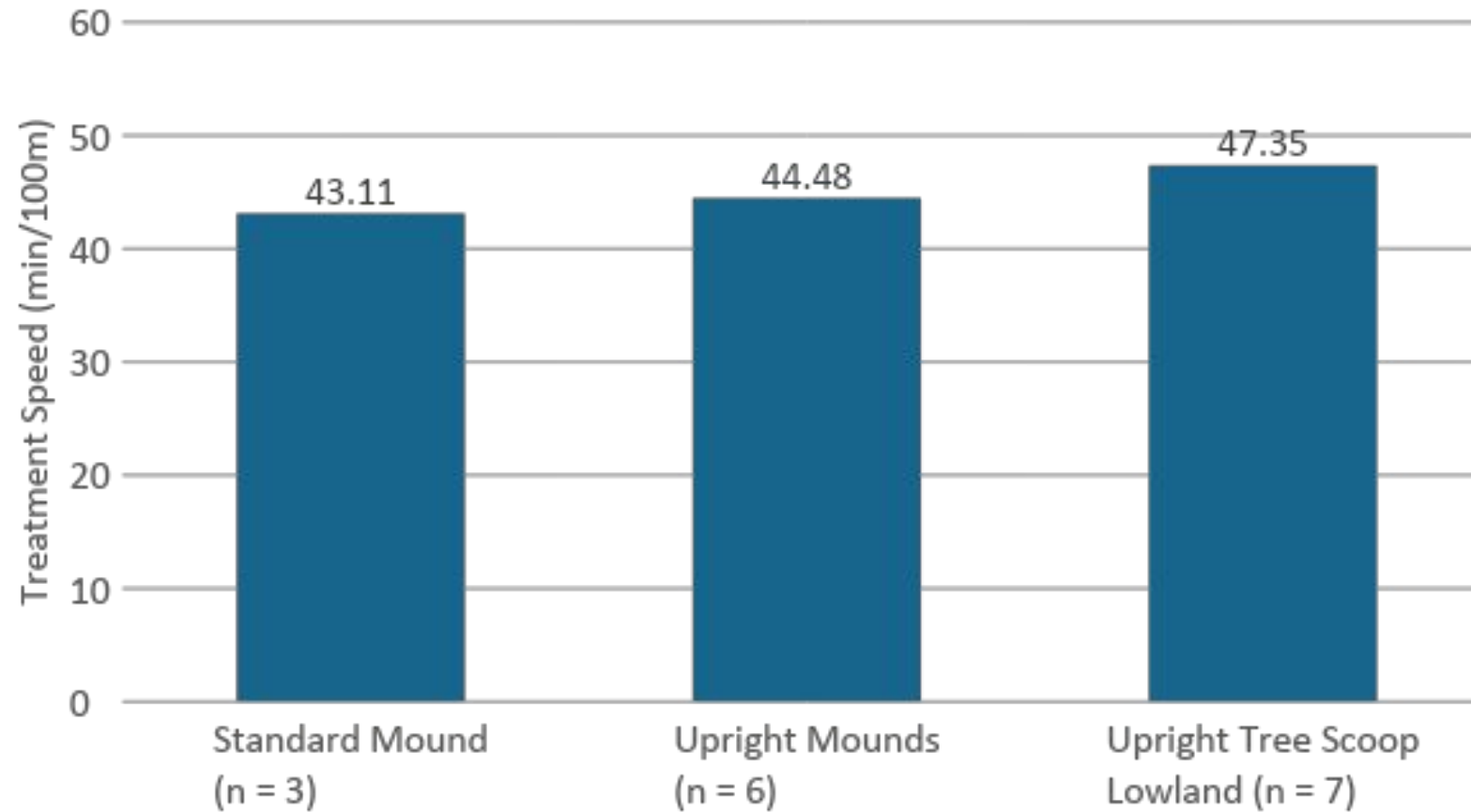
A LOOK AT INITIAL MICROSITE RESULTS – DRUM



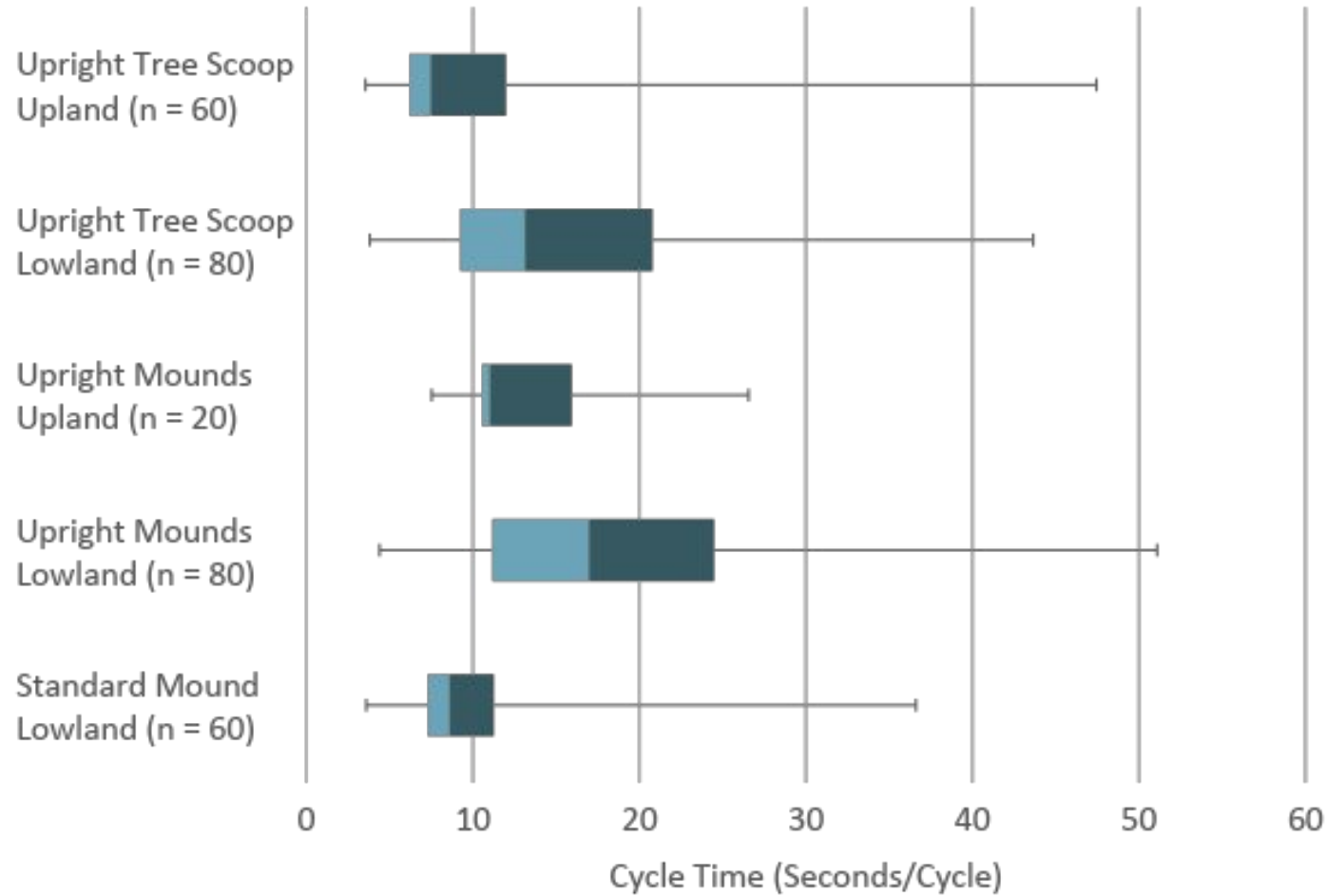
A LOOK AT INITIAL MICROSITE RESULTS – HARROWS



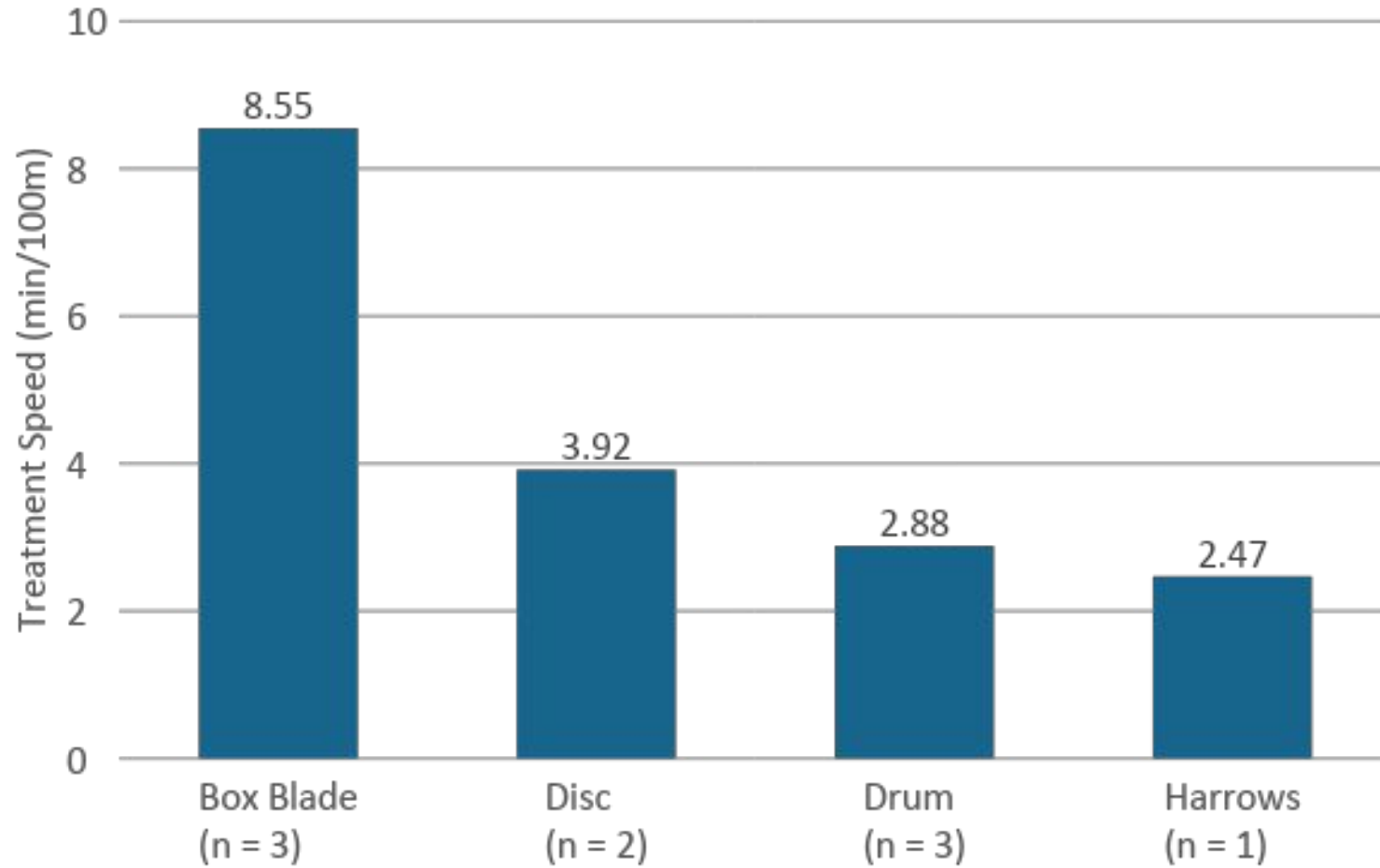
TREATMENT EFFICIENCY - MOUNDING



TREATMENT EFFICIENCY - MOUNDING



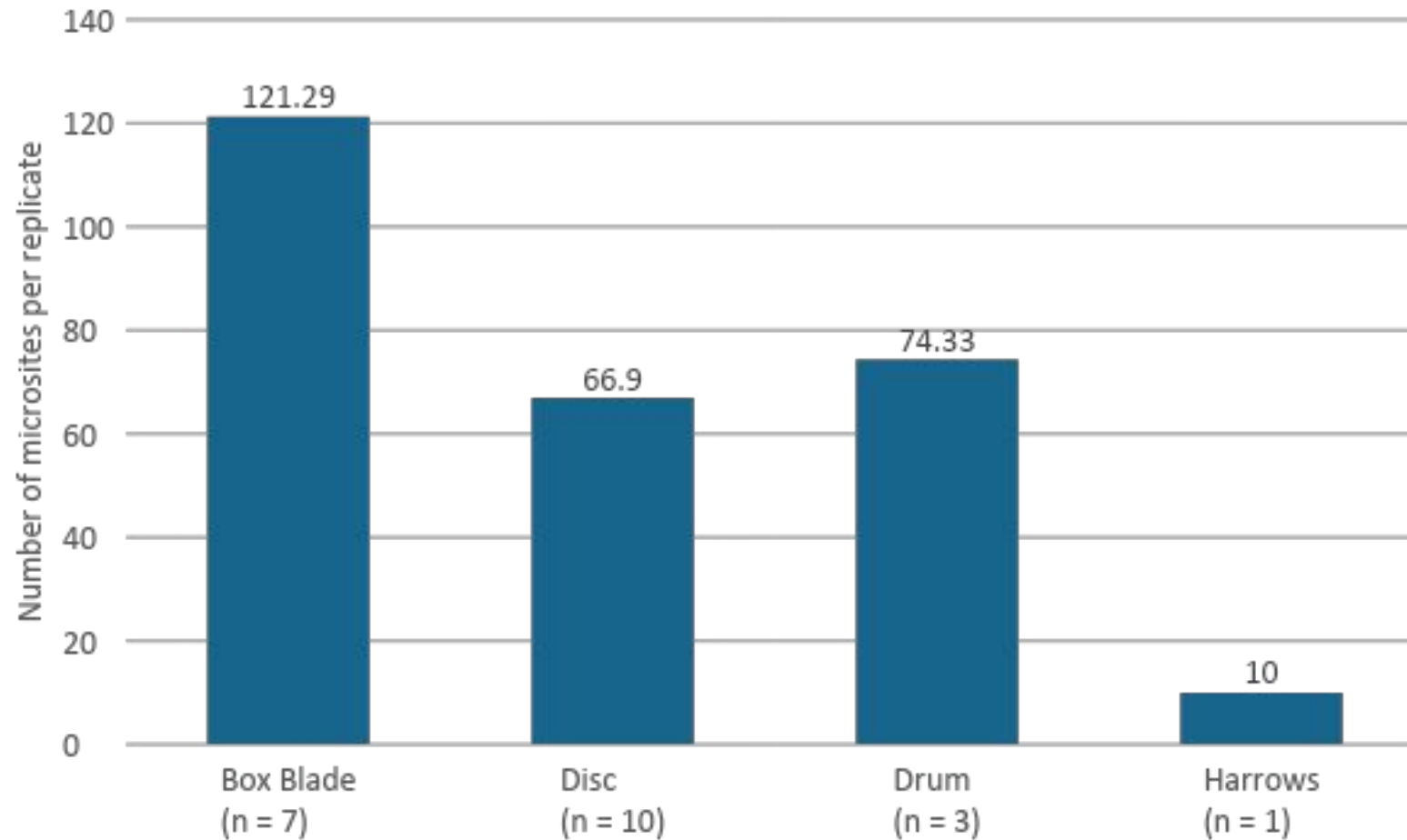
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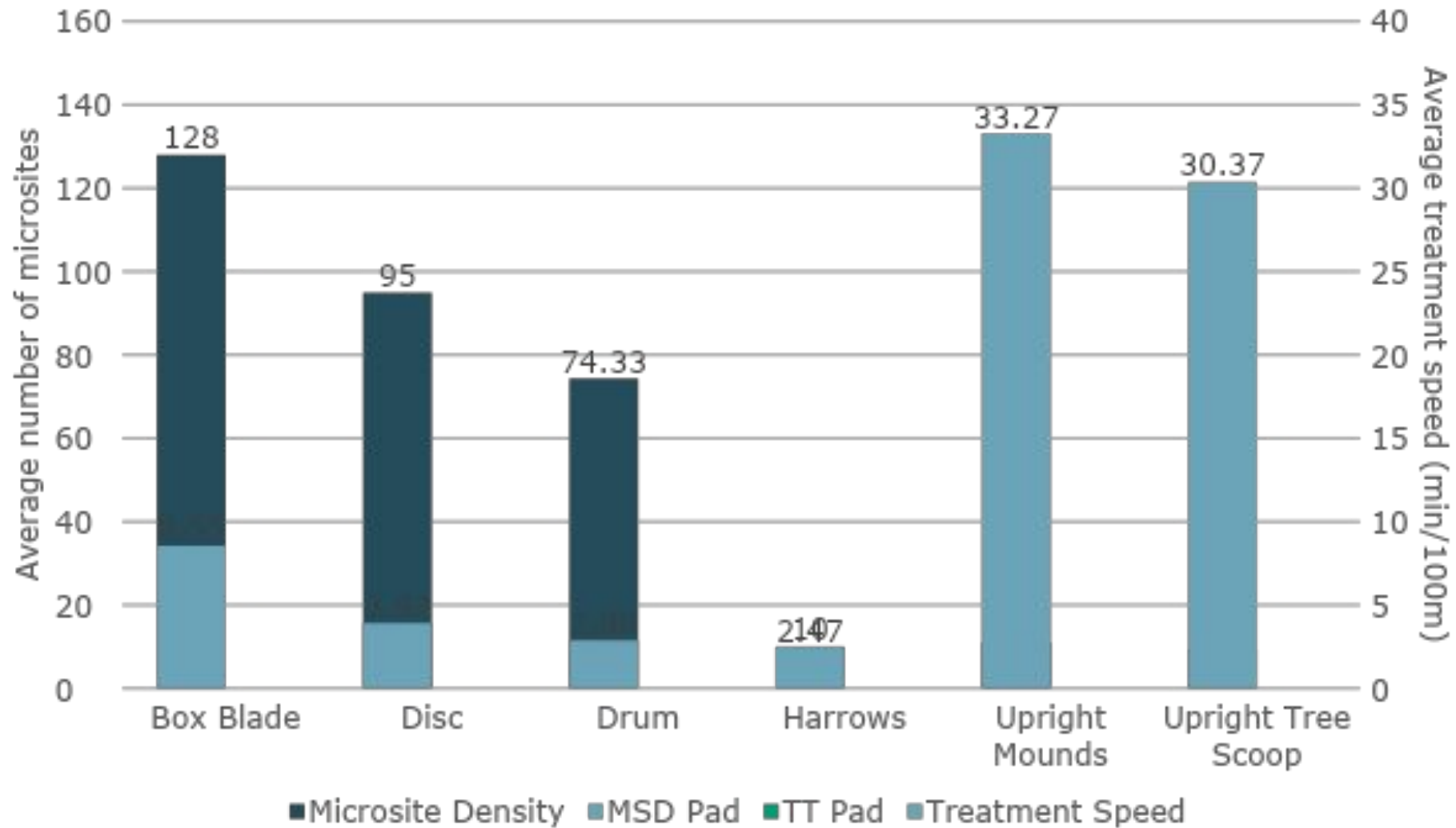
TREATMENT EFFICIENCY



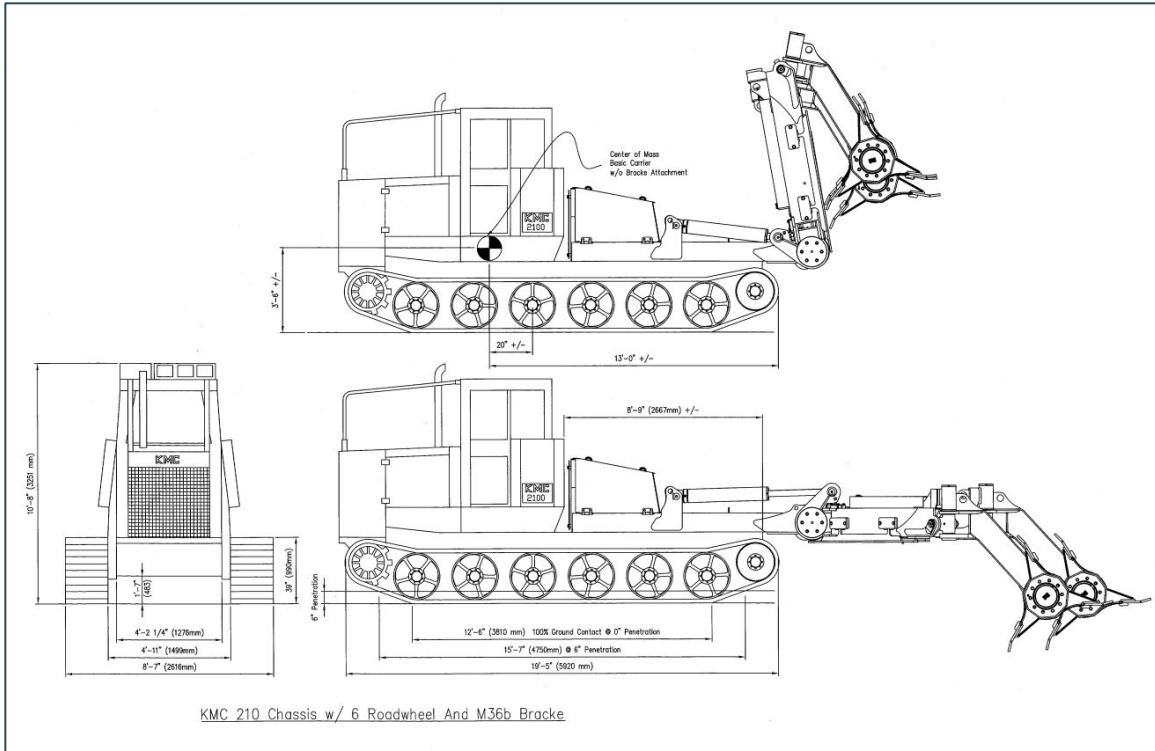
MICROSITE DENSITY AND QUALITY



BRINGING IT ALL TOGETHER



NEXT STEPS: BRACKE MOUNDER TRIAL



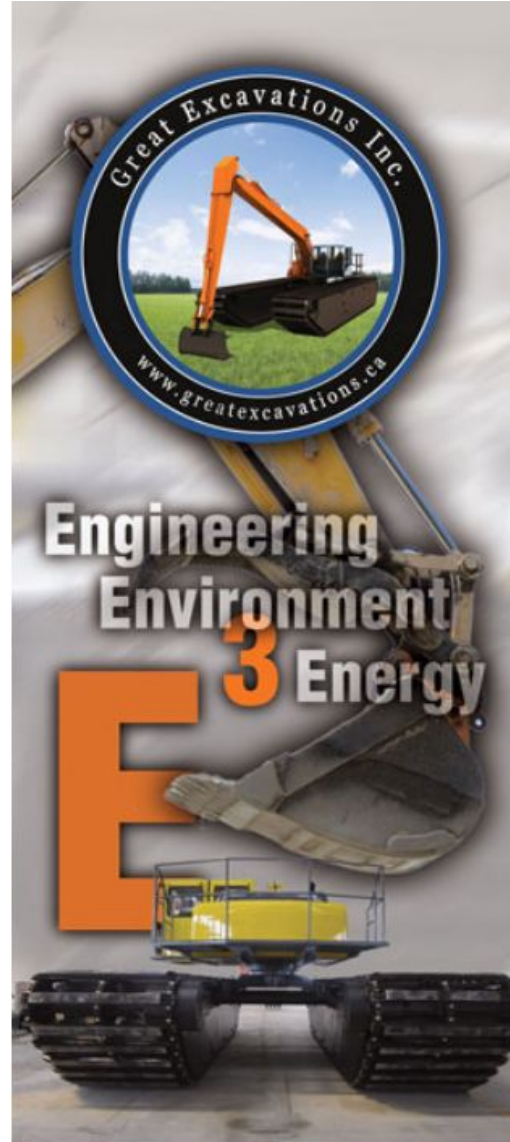


NEXT STEPS: VEGETATION MONITORING



THANK YOU

Great Excavations Inc.



QUESTIONS

