

SMALL EQUIPMENT = BIG SAVINGS

ACHIEVING COST SAVINGS AND REDUCING ENVIRONMENTAL IMPACT USING INNOVATIVE MINI EQUIPMENT ON REMOTE RECLAMATION PROJECTS

PRESENTED BY:

Dave Lamberton

Manager of Business Development
360 Energy Liability Management

Lukas Frost

Environmental Scientist
360 Energy Liability Management



360 AND OWL RIVER ENVIRONMENTAL SERVICES

360 Energy Liability Management

- Environmental and Engineering firm specializes in full site closure
 - Liability Management
 - Abandonment & Decommissioning
 - Environmental Solutions
 - Emissions Monitoring & Well Integrity
- **Owl River Environmental Services**
 - Environmental Services and equipment provider based in Lac La Biche servicing Northern Alberta
 - Acquired by 360 in spring 2022



OVERVIEW OF MINI EQUIPMENT



- Innovative, light weight reclamation equipment which significantly reduces footprint compared to conventional equipment
- Designed, selected, and modified to be lightweight (<2,400 lbs)
- Mobilized to remote locations via helicopter or argo
- Fleet of includes over 20 pieces of equipment

THE GOAL = REDUCE TIME TO RCA

MAY 2020



SEPTEMBER 2020



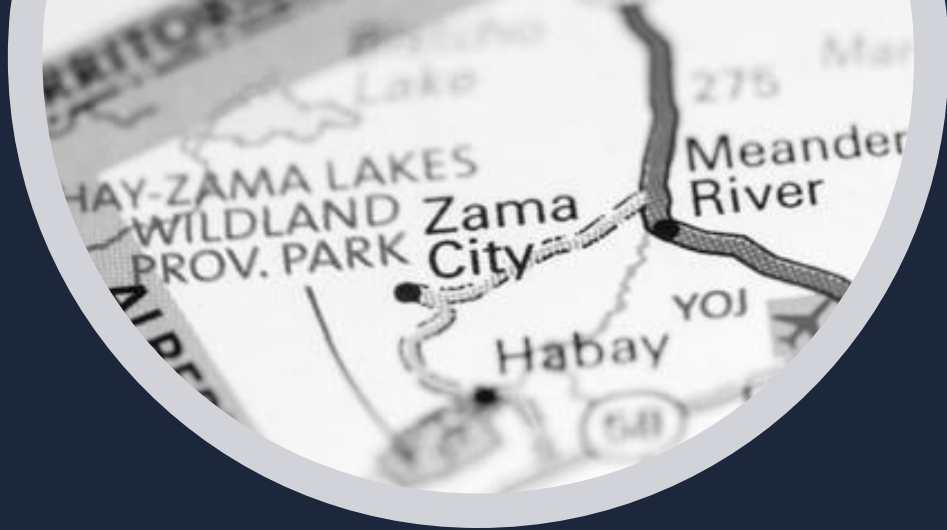
- In the Reclamation industry **Time is of the Essence** when savings are on the line
- Reclamation Certification Application can take years, averaging 13-15 years in some remote Boreal Forest regions

- Supplementing large multi-site remote programs with mini equipment in summer season is showing reduction in time to RCA to 2–4 years
- Expediated timeline = savings

HOW IS THIS ACHIEVED?



- 1) Mini reclamation equipment works best as a part of an integrated approach
- 2) Minimum site disturbance of woody vegetation upon abandonment
- 3) Major Reclamation following decommissioning in the same winter
- 4) Mini equipment repairs any landscape, contour or soil issues that may become apparent after abandonment and winter reclamation work
- 5) Weed management measures employed during abandonment and reclamation activities
- 6) Transplanting woody tree species from local plant stocks and promoting natural recovery of vegetation species on locations



ZAMA/RAINBOW LAKE PROJECT CASE STUDY

- Total of 67 sites in program
- 25 sites utilized mini equipment
- Assigned in 2018
- By 2022, 100% of the mini equipment sites have received **Reclamation Certificates**
- Access Savings = ~\$600,000
- Savings when factoring time to closure = >\$1MM



ACCESS COSTS



- Access can be up to 75% of project costs
- \$3,800 to \$4,000 per km (based on data from past 5 winter seasons and over 800km of access experience in Northern Alberta)
- By using mini equipment in summer season, and mobilizing via helicopter or argo, mini equipment can achieve savings of 60-80% over conventional reclamation methods

10-17-106-12W6 (Mackenzie County)

Mini-Equipment	
Consulting Costs	\$4,476
Rec Work with Mini-Equip.	\$13,353
Helicopter	\$27,328
Total	\$45,157

Conventional Estimate	
Access Costs	\$105,000 (27km @ \$3,888/km)
Consulting & Rec Work	\$20,000
Total	\$135,000

**67%
savings
(\$89,843)**



07-26-092-03W6 (Clear Hills County)

Mini-Equipment	
Consulting Costs	\$3,470
Rec Work with Mini-Equip.	\$6,894
Helicopter	\$6,993
Total	\$17,357

Conventional Estimate	
Access Costs	\$80,000 (20km @ \$4,000/km)
Consulting & Rec Work	\$20,000
Total	\$100,000

83% savings (\$82,643)



OPERATIONAL AND SAFETY BENEFITS

- Eliminates safety risk of heavy equipment on soft ground
- Reduces landowner challenges
- Water crossings bypassed when accessed via helicopter
- Eliminating winter access costs reduces AFE spend by 60-80%



REDUCE ENVIRONMENTAL IMPACT

- Helicopter or argo access reduces or eliminates:
 - Road Use
 - Proximity Agreements
 - Pipeline crossings
 - Ramps & matting
 - Water body crossings
- Summer operation allows:
 - Lower carbon footprint due to less fuel consumption
 - Ability to see ground unobstructed
 - Easier debris and garbage removal, unobscured by snowpack
 - Elimination of ripping time requirements related to frozen ground conditions
 - Established vegetation cover undisturbed





Complete 2 reclamation processes in 1 trip

- Repairs landscape, contour or soil deficiencies at a time of year when they are readily available
- Transplants and/or planting at the same time of final rec work



Low impact vegetation avoidance

- Small equipment doesn't require the same space to operate
- Allows for very targeted application of desired treatment
- Maximizes intact/area vegetation is performing well



Reduce or eliminate introduction of weed species

- Minimizing exposed/disturbed soils minimizes area available for weed species to colonize
- Reduces time to soil is exposed to weed propagules
- Small equipment = less time to clean = better results in cleaning

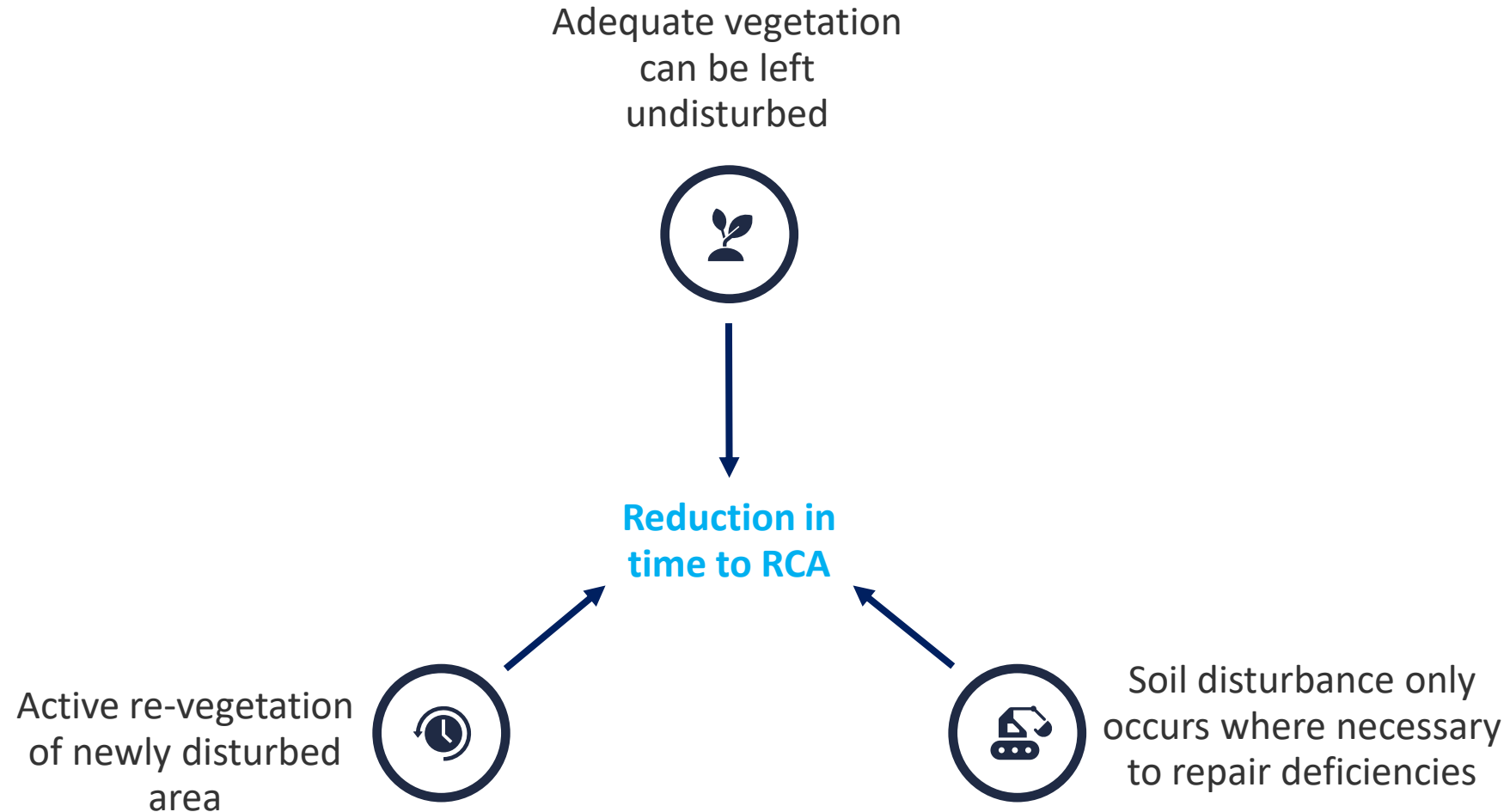


VEGETATION BENEFITS: SITE PREP

- Conventional reclamation leaves behind significant barriers to re-vegetation
 - Thick organic layers
 - Dense grass
- Mini-equipment allows us to address the issue without conventional equipment
- Reduce barriers to re-vegetation while minimizing disturbance



Mini Equipment Reclamation represents a hybrid model of Natural Recovery and Conventional Reclamation



SUMMARY

