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Fire Behaviour in Mulched Fuel Types

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Wildland Fire Canada

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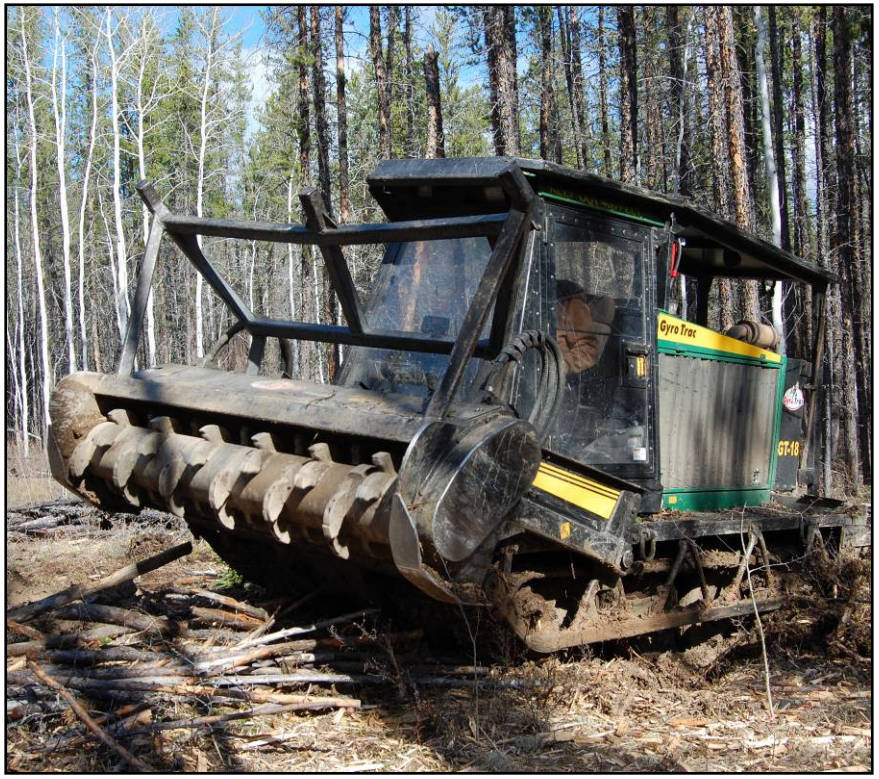
Why Mulch?

- Commonly used in the Oil & Gas industry
- Many types and models available
- Increased interest and availability

What Kind of Mulch?



Gyrotrac GT18 Mulcher

Rayco 87L Mulcher

What Kind of Mulch?

- Various teeth depending on terrain / fuel type
  - Hammer style
  - Cutter style

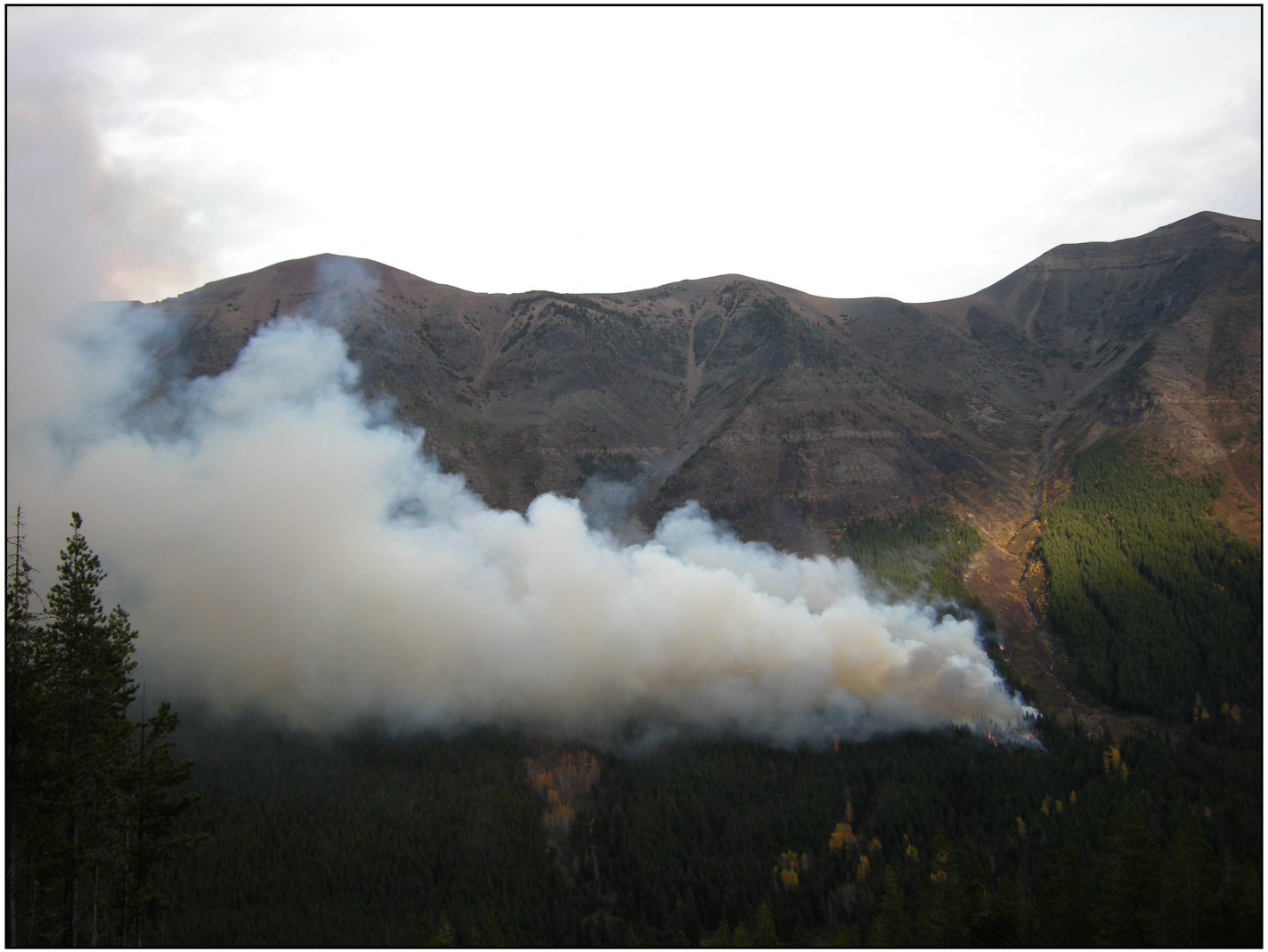
- Used rotary mulcher with hammer style teeth

Uses of Mulchers- Fuel Treatments

Uses of Mulchers- Fuel Treatments

Uses of Mulchers- Linear Corridors

Uses of Mulchers- Fireline Operations



Mulched Fuel

- Uses:
  - FireSmart treatments
  - Linear Corridors
  - Fireline

- Benefits:
  - Fuel manipulation
  - No smoke emissions
  - No control difficulties
  - No windrow (dozer line)

Problems / Unknowns

- Not a fuel reduction, but a re-arrangement of fuel configurations
- Fire Behaviour prediction models are not representative
- Lack of available data

Potential Control Difficulties

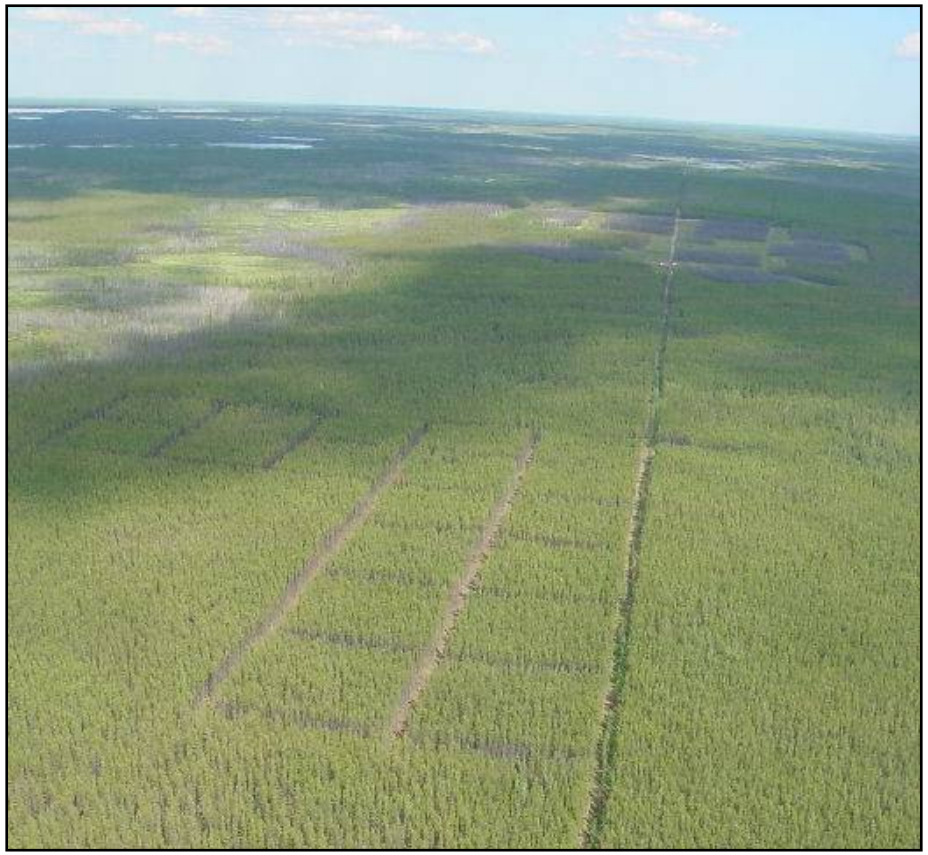
- Excursion in Peace River country

- Creeping surface / smouldering ground fire across mulched line created control difficulties

Preliminary Study- NWT

Several components

- Control line
- Grid-mulch effectiveness
- Ignition potential
  - Spot fire development
  - Fires starting within



Mulch Load Produced

- Depth (n = 12)
  - Range: 3.0 – 6.0 cm
  - **Mean: 4.26 cm**
  - St. dev: 1.11 cm
- Fuel Load (n = 15)
  - Range: 64.3 – 261.1 *kg/m3*
  - **Mean: 152.32 *kg/m3***
  - St. dev: 64.96 *kg/m3*
- Fuel Moisture (n = 12)
  - Range: 75% - 89%
  - **Mean: 83 %**
  - St. Dev: 5%

Ignition Results

- 2-minute tests (n = 6)

Temp	RH			Size (cm)	
C	%	FFMC	HFI	length	width
29.5	**35**	**90**	**1800**	**22**	**18**
28.0	**35**	**90**	**1800**	**18**	**12**
27.0	40	86	300		
30.0	**38**	**87**	**300**	**20**	**15**
29.0	45		300		
25.0	51	87	300		

Initial Impressions

- Fires in mulched fuel are strongly influenced by
  - fine fuels
  - humidity
- Depth of burn is not a problem in recent mulch
  - Fuel Moisture was 83%

    (Problems with averaging overall vertical profile of fuel moisture)

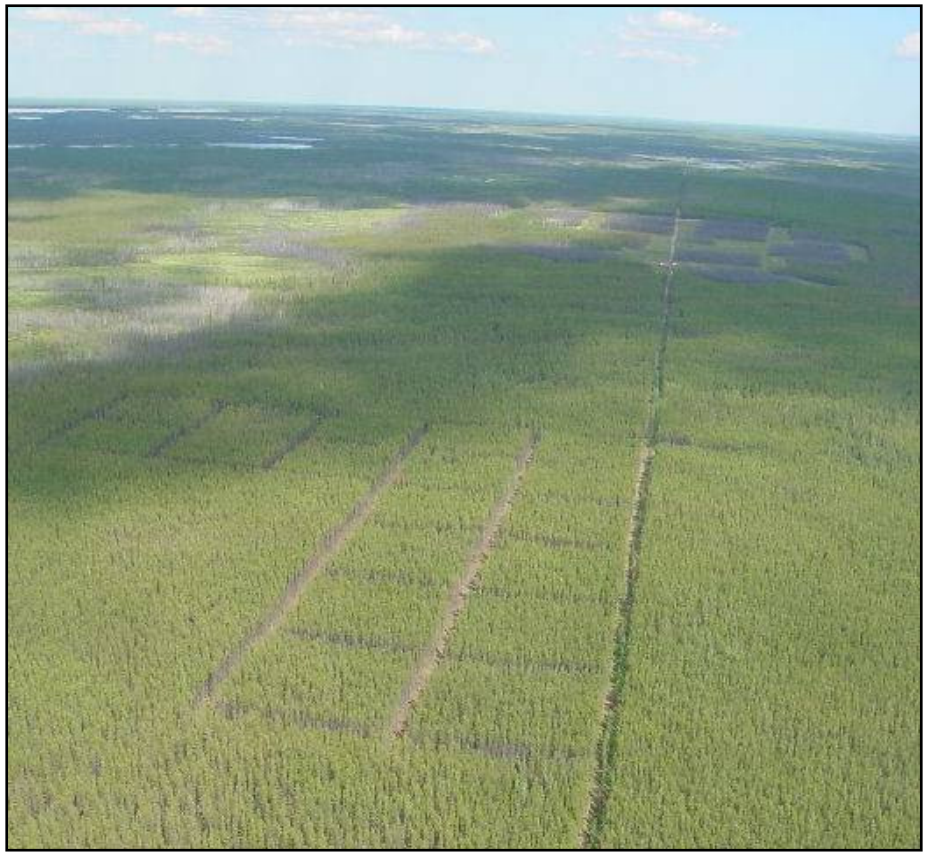
Next Phase

- Rainbow lake replication
  - Ignition
  - Control Lines
  - Grid-patterns
- Black Spruce fuel type, similar to current infrastructure treatments
- Ignition tests as opportunities present themselves

Next Phases- NWT

Returning to NWT with lessons learned

- Take advantage of frozen ground
- Create access / divide larger plots
- Create smaller plots
  - Regeneration timelines
  - Depth of mulch manipulation
  - Other opportunities



Thoughts / Comments / Questions / Ideas?