FUEL FOR THOUGHT:
How Fuel Treatments Tame The Flames

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INTRODUCTION

QUESTIONS

- **In the wildland-urban interface of Whistler, how do proactive treatments alter forest fuels and fire risk?**

- **What are proactive treatments?**
  - Remove subcanopy and some canopy trees
  - Prune lower branches of retained trees
  - Chip or pile and burn surface fuels

RESEARCH METHODS

FIELD METHODS

Fire Behavior Triangle

- Field data plots (n = 23)

- Topography measurements:
  - Location, elevation, slope angle, aspect

- Fuel measurements:
  - All trees diameter >7.5 cm
  - Canopy cover
  - Surface wood and ground fuels

- Weather inputs to model:
  - 90th percentile weather for August: 29.6°C, 24 % RH, 13.1 km/h wind speed

COMPARISON OF FOREST FUELS

- Classified fuel types based on forest structure
- Statistically compared key attributes

PREDICTIVE MODELLING

- Canadian Fire Behaviour Prediction System
- Crown Fire Initiation and Spread model

Learn more about the fire behaviour prediction models we used in this study:

FBP System

CFIS Model

FireSmart™

FireSmart™ at the community and individual home levels are instrumental to the reduction of crown fire initiation and spread in Whistler! Scan to learn more about FireSmart™

FOREST TYPE	FUEL LOADS	PREDICTED FIRE TYPE

Young Untreated Forest (n = 7)

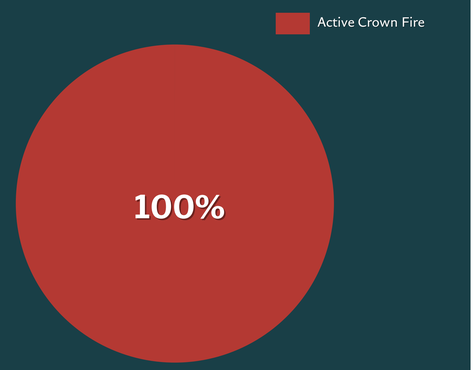
Tree cover = 90 ± 7%

Density = 1243 ± 350 trees/ha

Height to branches = 3.7 ± 1.8 m

Surface wood = 1.8 ± 0.5 kg/m²

Probability of crown fire = 87 ± 6%



Mature Untreated Forest (n = 5)

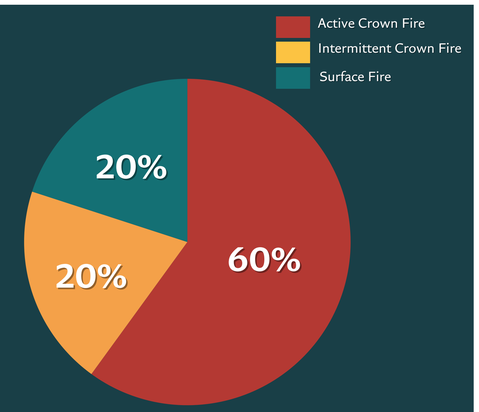
Tree cover = 67 ± 22%

Density = 540 ± 207 (trees/ha)

Height to branches = 5.3 ± 4.4 (m)

Surface wood = 2.0 ± 0.6 (kg/m²)

Probability of crown fire = 67 ± 19%



Mature Treated Forest (n = 11)

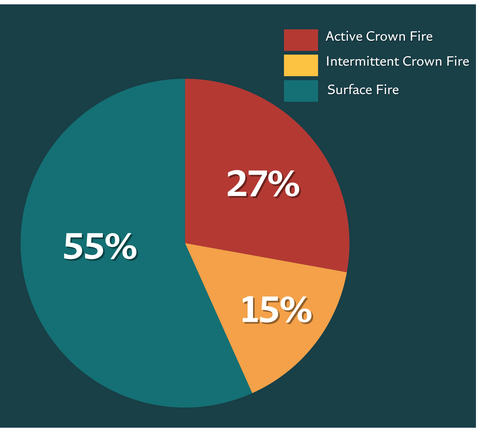
Tree cover = 82 ± 11%

Density = 564 ± 242 trees/ha

Height to branches = 8.2 ± 3.2 m

Surface wood = 1.6 ± 0.5 kg/m²

Probability of crown fire = 40 ± 10%



KEY FINDINGS

HOW DO FUEL TREATMENTS TAME THE FLAMES?

Thinning treatments transform young dense forests to resemble mature forests and shift predicted fire behaviour from active crown fire to surface fire

- **Young untreated forests…**
  - Are dense with short trees and low branches
  - Have abundant ladder and canopy fuels and the highest prediction of active crown fire (100%)

- **Mature treated forests…**
  - Have low tree density, tall trees, and high branches, with fewer canopy fuels
  - Have the lowest prediction of active crown fire (27%) and highest chance of surface fire (55%)

- **Proactive fuel treatments…**
  - Emulate and accelerate forest development from young to mature structures
  - Mitigate fuel loads and shift predicted fire behaviour from crown to surface fire
  - Increase forest resilience by reducing potential for severe crown fires in future

TAKE HOME MESSAGE

Our findings show proactive fuel treatments reduce chance of crown fire by half, increasing forest resilience in the wildland urban interface of Whistler.

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WHISTLER | Resort Municipality of Whistler