
BC CANFIRE:

EXAMINING CURRENT AND
FUTURE EFFECTS OF CLIMATE
AND FOREST CHANGES ON FUEL
MANAGEMENT TREATMENTS
FOR THE WILDLAND URBAN
INTERFACE IN THE SOUTH
CARIBOO, BRITISH COLUMBIA

Dominique 'Nikki' Manwaring

Thompson Rivers University

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Introduction

Graduate Student at Thompson Rivers University – Dr. Mike Flannigan
Allied Science Forest in Training (ASFIT)
Natural Resource Science Degree – Thompson Rivers University

B.C. Wildfire Service - 2016
Prince George, 100 Mile House, Kamloops

MY THESIS:

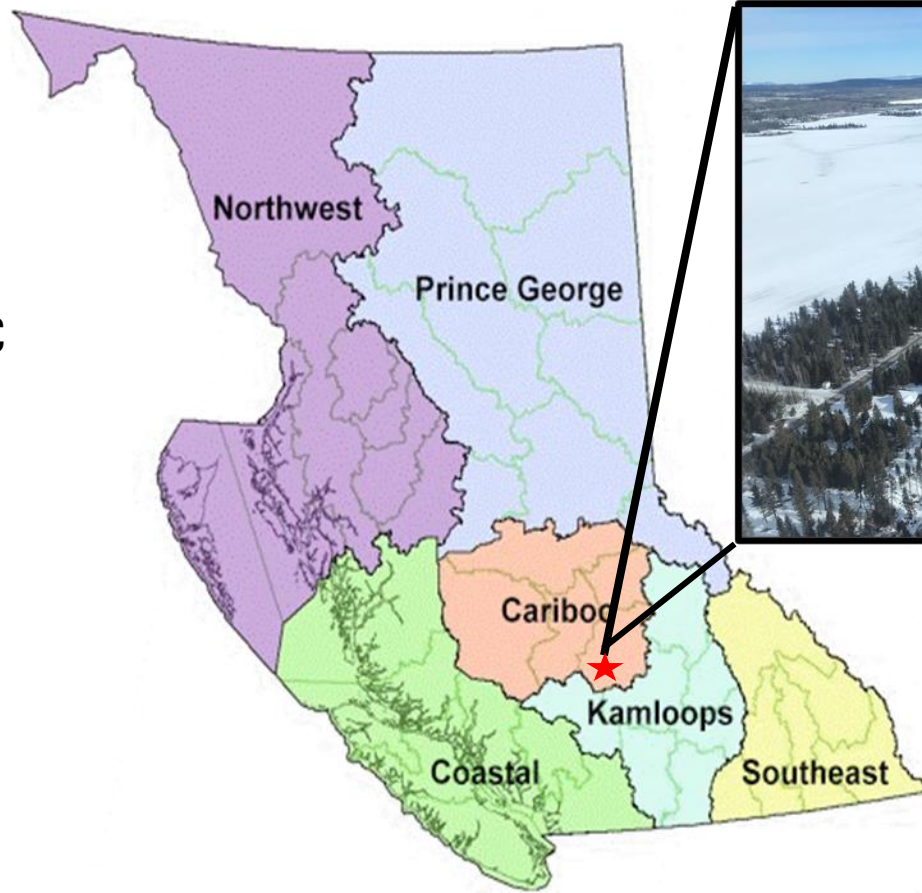
My thesis is looking to see if the fuel management practices on a Wildfire Risk Reduction project in the South Cariboo Interior Douglas-fir zone will reach the overall hazard abatement goals and the sites impact from climate change.

Goal 1: reduce overall stem density, surface fuel loading, and ladder fuels to reduce potential for crown fire initiation

Goal 2: provide an area to base suppression activities in order to protect private infrastructure north of the fuel break.

SITE

SOUTH GREEN LAKE, BC



74 hectares

Four Blocks

Aspen Parkland/Shaded Fuel
Break

TYPE AREA SUMMARY - FMP South Green						
TYPE	Plan	Label	Code	Block	Area	Total
A	7.0	PL/SL	200m	21.0	3	
B	7.0	PL/SL	200m	11.2	3	
BB	14.0	SL	200m	11.0	3	
FF	6.0	PL/SL	200m	11.0	3	
Total	22.0			21.0	99.0	99.0



Harvesting Prescriptions:

Focuses on layers, L1 – L4

block as a whole

Shaded Fuel Break:

50% removal of coniferous species

80% removal of coniferous species

*each scenario with no planting

*each with 4000 stems planted aspen
(196 stems/ha)

Aspen Parkland:

Keeping all aspen

< 100 stems/ha of coniferous species

BOTH:

10 m LCBH

0.1 kg/m² target for forest floor biomass
(preharvest = 0.6 kg/m²)

Harvesting Prescription Summary

TREE COMPOSITION

Aspen Block 1

- Douglas Fir
- Spruce
- Lodgepole
- Aspen

Aspen Block 2

- Lodgepole
- Aspen

Shaded Fuel Break

- Douglas Fir
- Spruce
- Lodgepole
- Aspen
-
- Douglas Fir
- Aspen

Aspen Block 3

- Douglas Fir
- Lodgepole
- Aspen

TO RUN BC CANFIRE...

- Harvest Prescription [before and after]
- Stand Biomass – **TIPSY**
- Weather [current and future] – **BCWS Wx Data/ClimateBC – 95th and 99th percentiles**
- Burn Data – **ClimateBC – July 15th**
- Forest Floor Fuel Loads – **Carbon Budget Model**

Shared Socioeconomic Pathways (SSPs)

2-4.5 – assumes moderate climate change, emissions, and economic mitigation trends

3-7.0 – absence of mitigation policies and linear increase rates of emissions



RESULTS

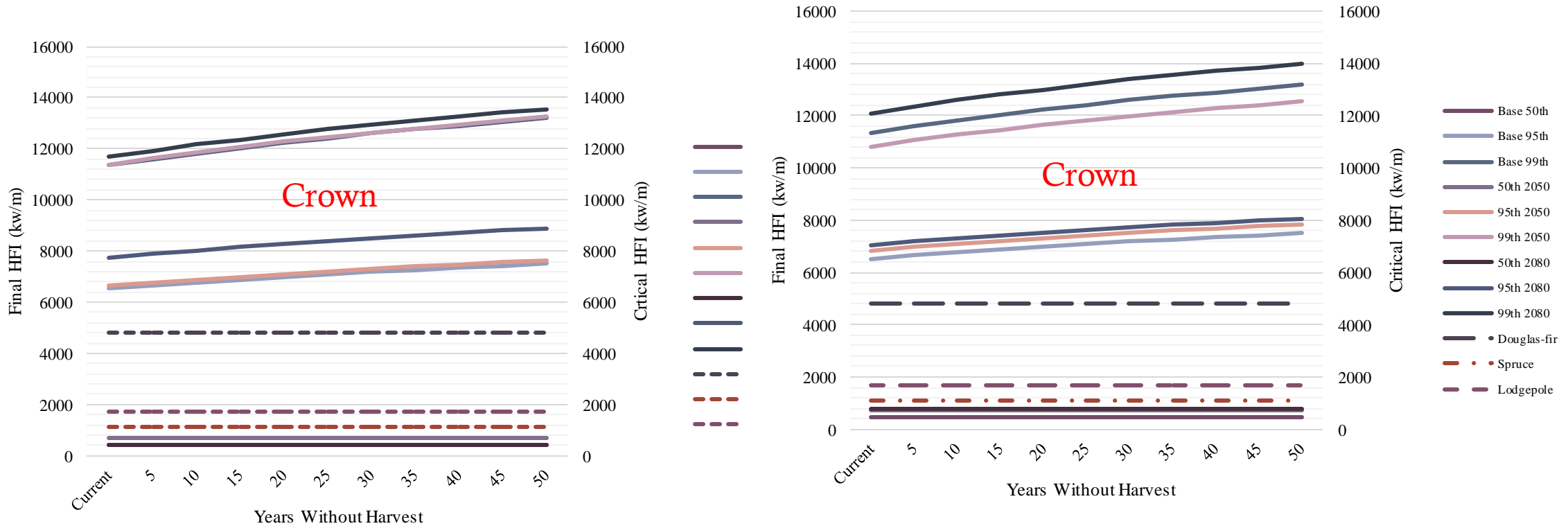
Will fuel management in the WUI reduce fire intensity and spread?

What is the shelf life of the site?

Will planting deciduous species reduce intensity and spread? Will it increase shelf life?



ASPEN PARKLAND BLOCK 1



Pre Harvest Conditions

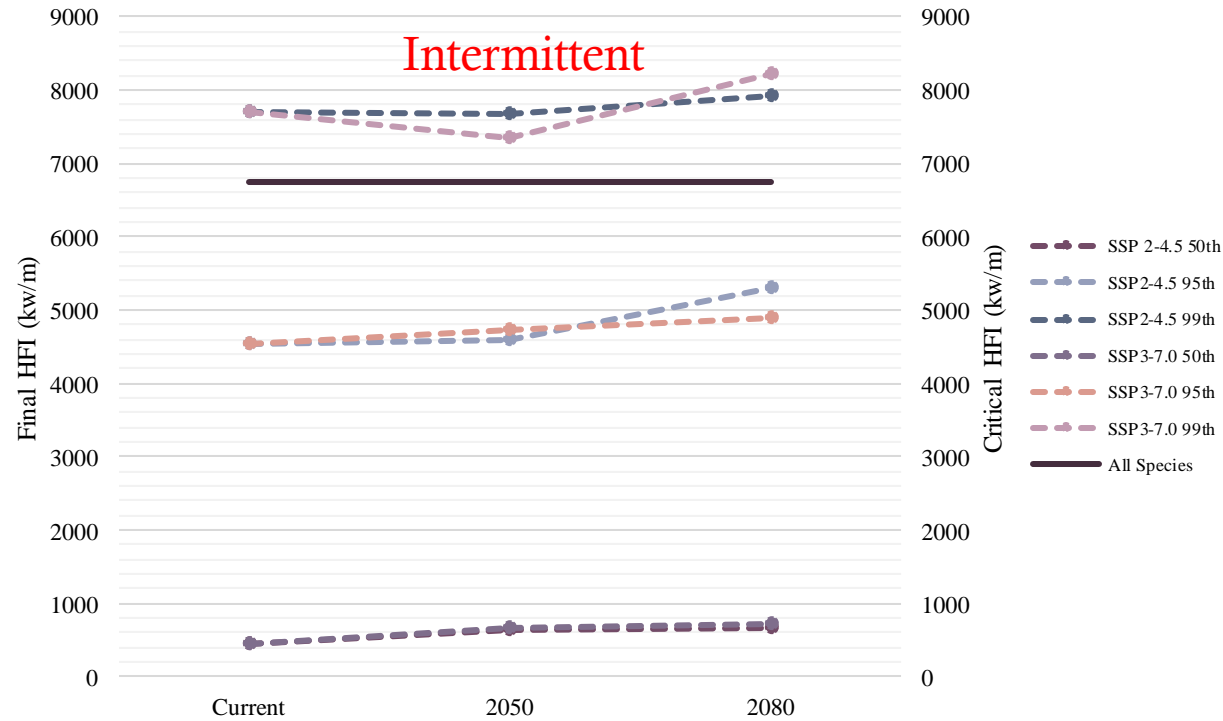
SSP2-4.5

SSP3-7.0

For BC CanFIRE: Crown fire means 50% of the stand can support a crown fire

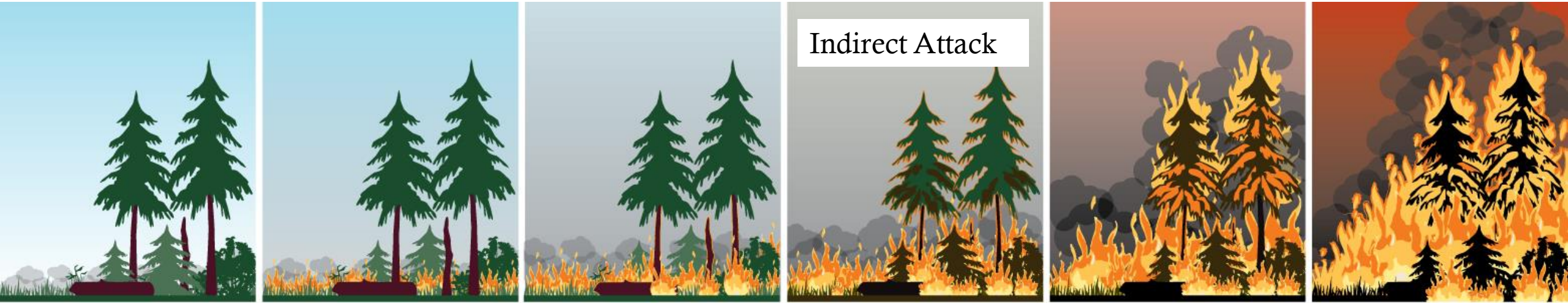
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Post Harvest Conditions



For the 95th:

Requires 2.0-3.5 kg/m² of forest floor biomass to have *Intermittent Crowning*



Intensity Class 1

Intensity Class 2

Intensity Class 3

Indirect Attack

Intensity Class 4

Intensity Class 5

Intensity Class 6

Rep PRE
2-45 PRE
3-70 PRE



2050:
Rep POST
2-4.5 POST
3-7.0 POST



2080:
Rep POST
2-4.5 POST
3-7.0 POST



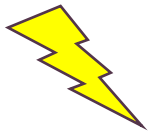
DECREASE!

50th percentile --- 95th percentile --- 99th percentile

ASPEN PARKLAND BLOCK 2



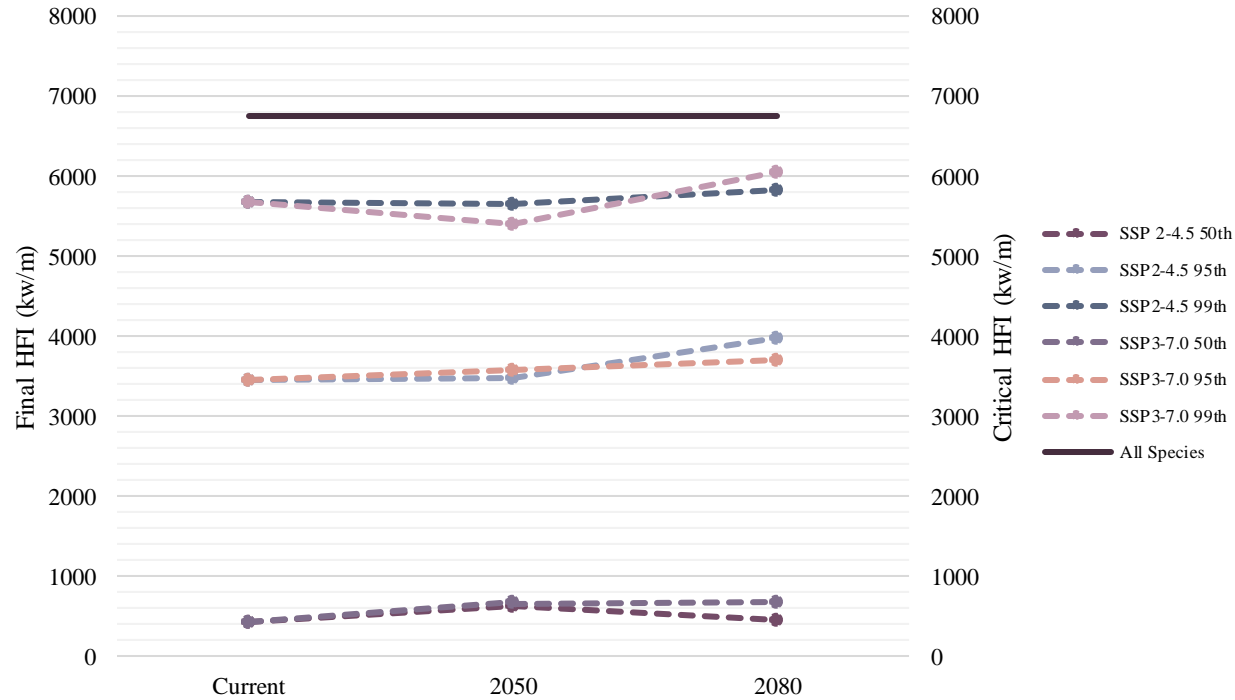
Pre Harvest Conditions
SSP2-4.5
SSP3-7.0



CONTINUED... ---

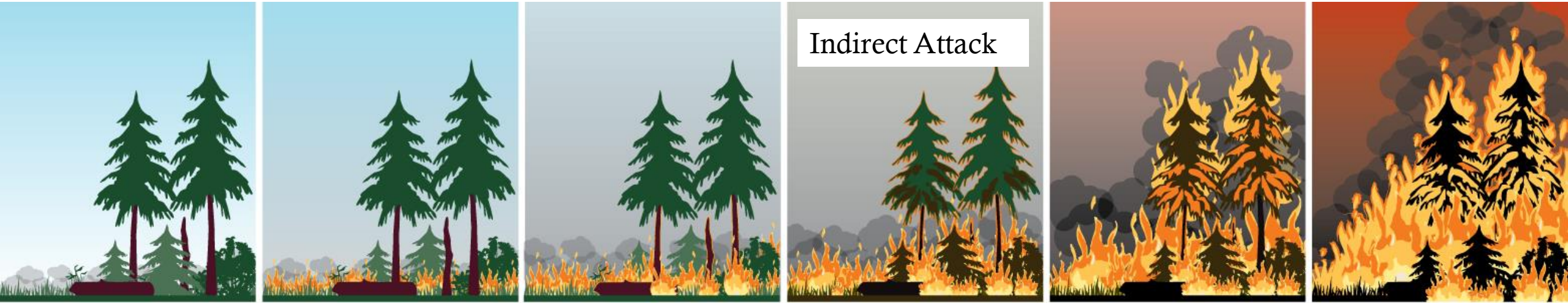
Post Harvest Conditions

No Crowning



For the 99th and 95th:
Requires 5.5-7.0 kg/m² of forest floor biomass to have *Intermittent Crowning*

This is the only Aspen Block with no crowning post harvest....



Intensity Class 1

Intensity Class 2

Intensity Class 3

Intensity Class 4

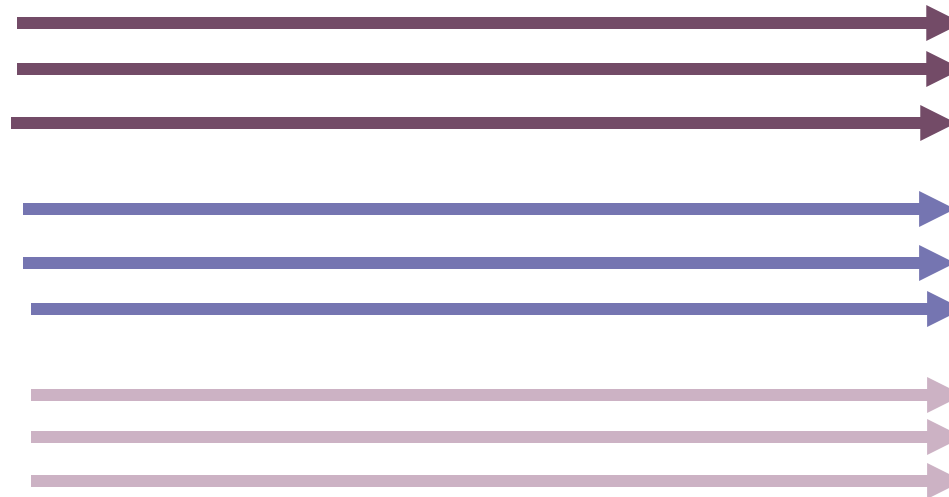
Intensity Class 5

Intensity Class 6

Rep PRE
2-45 PRE
3-70 PRE

2050:
Rep POST
2-45 POST
3-70 POST

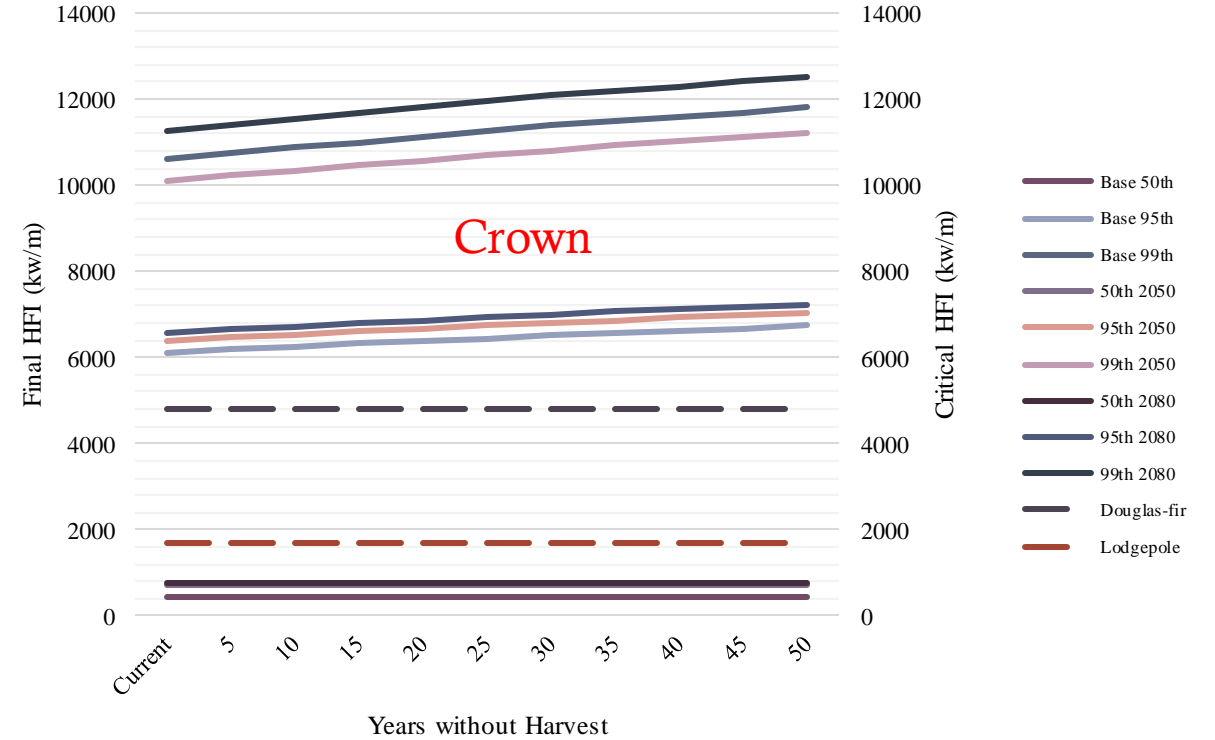
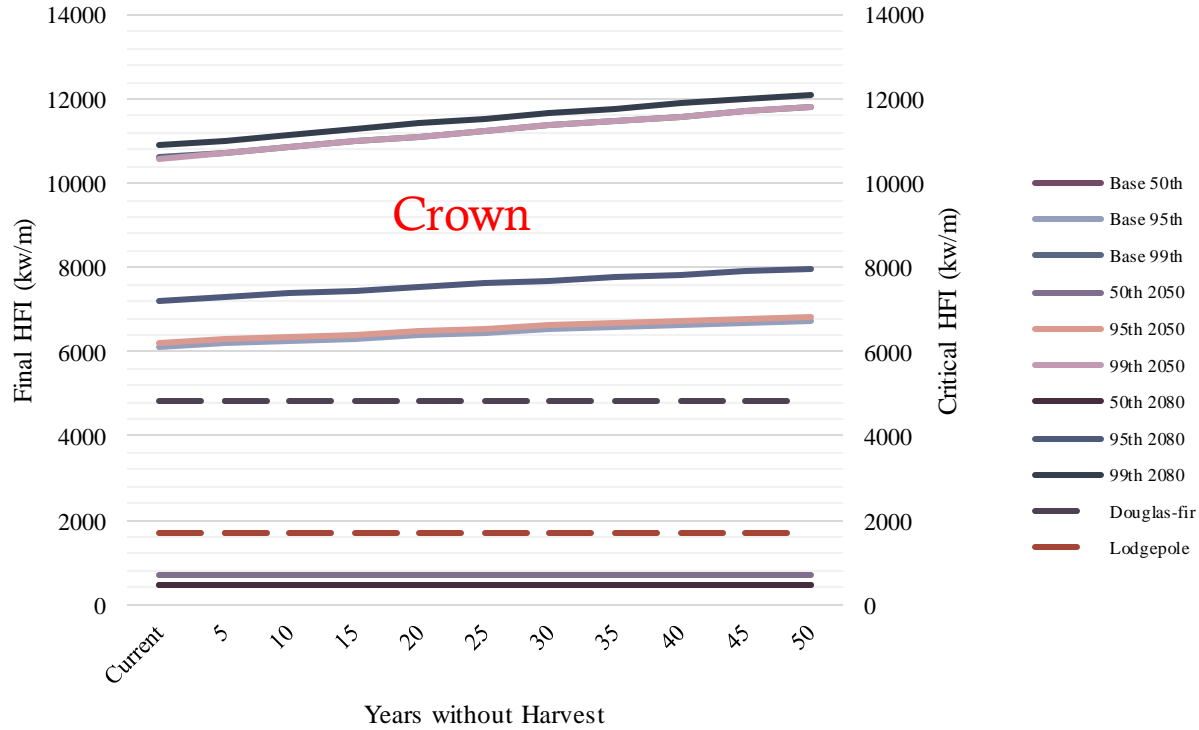
2080:
Rep POST
2-45 POST
3-70 POST



50th percentile --- 95th percentile --- 99th percentile

No change!

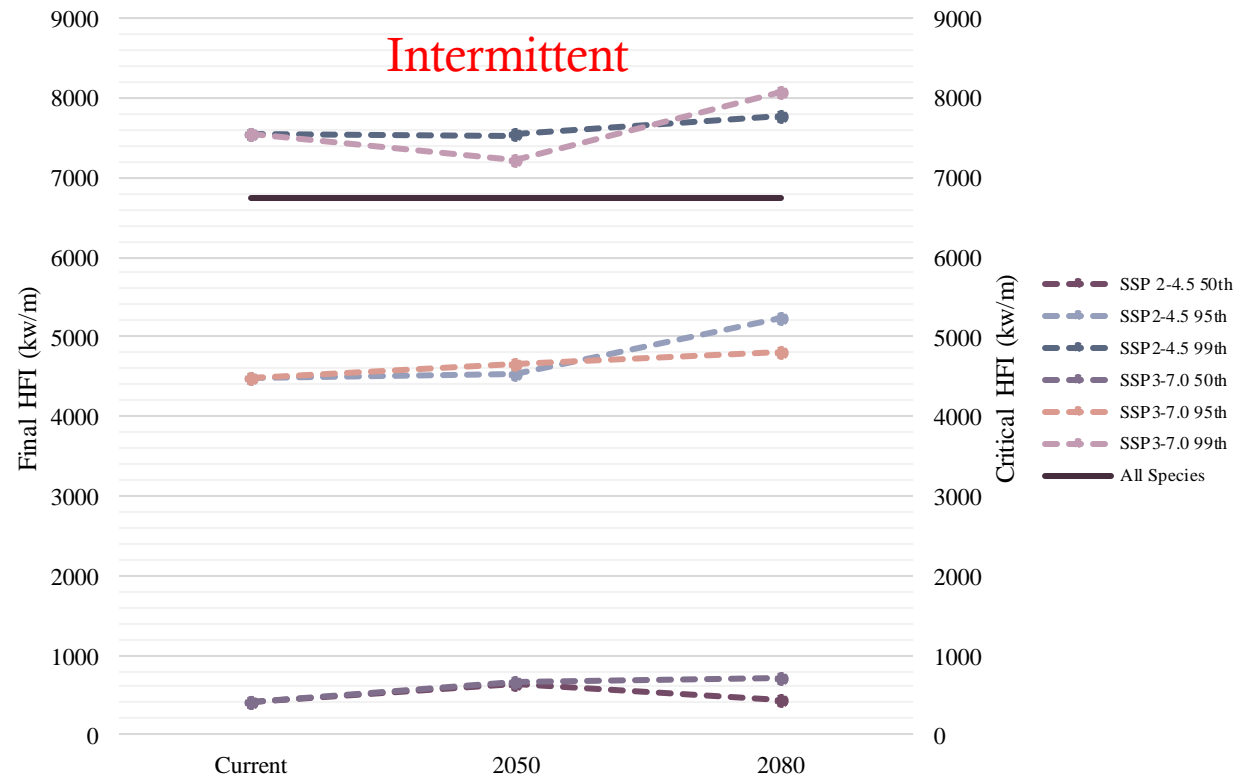
ASPEN PARKLAND BLOCK 3



Pre Harvest Conditions
SSP2-4.5
SSP3-7.0

CONTINUED...

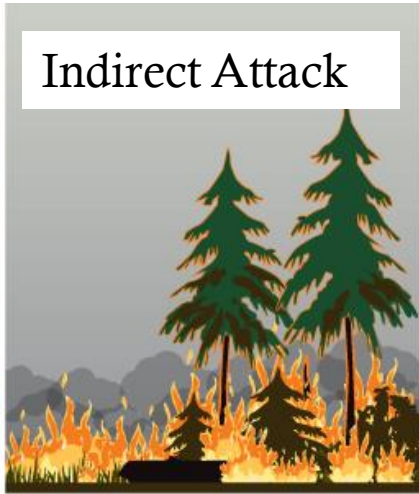
Post Harvest Conditions



For the 95th:

Requires 2.5 - 4.0 kg/m²
of forest floor biomass to
have *Intermittent Crowning*

Same as Block 1 !



Intensity Class 1

Intensity Class 2

Intensity Class 3

Intensity Class 4

Intensity Class 5

Intensity Class 6

Rep PRE
2-45 PRE
3-70 PRE



2050:
Rep POST
2-45 POST
3-70 POST



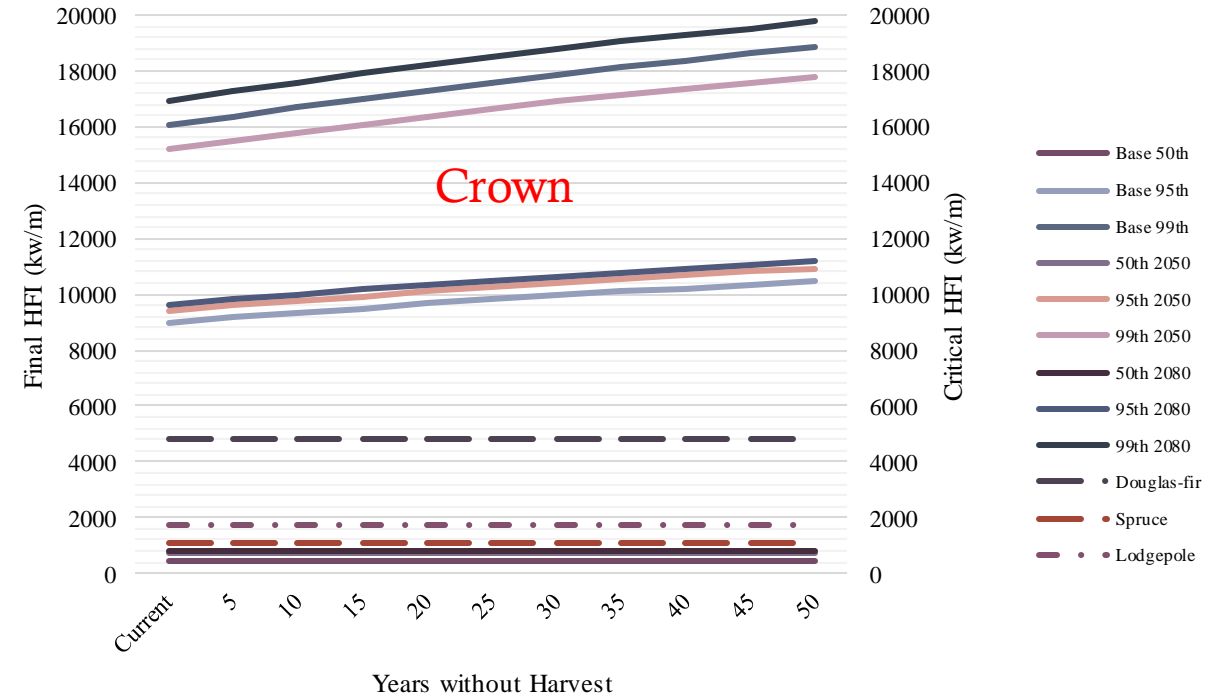
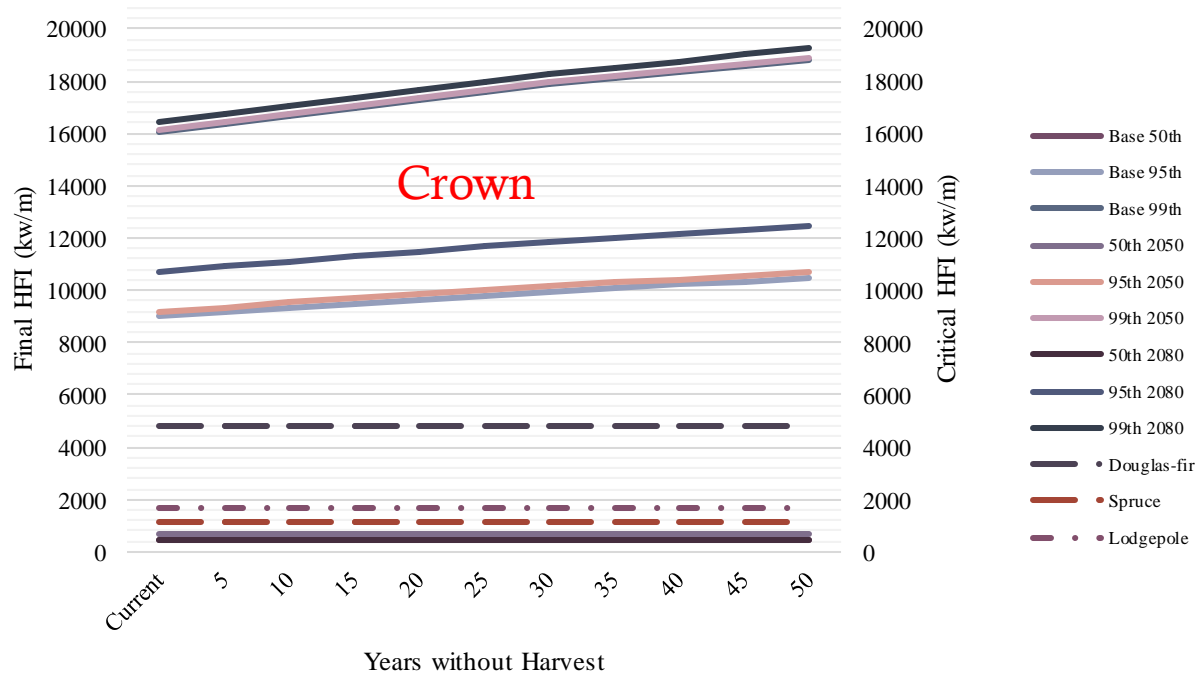
2080:
Rep POST
2-45 POST
3-70 POST



DECREASE!

50th percentile --- 95th percentile --- 99th percentile

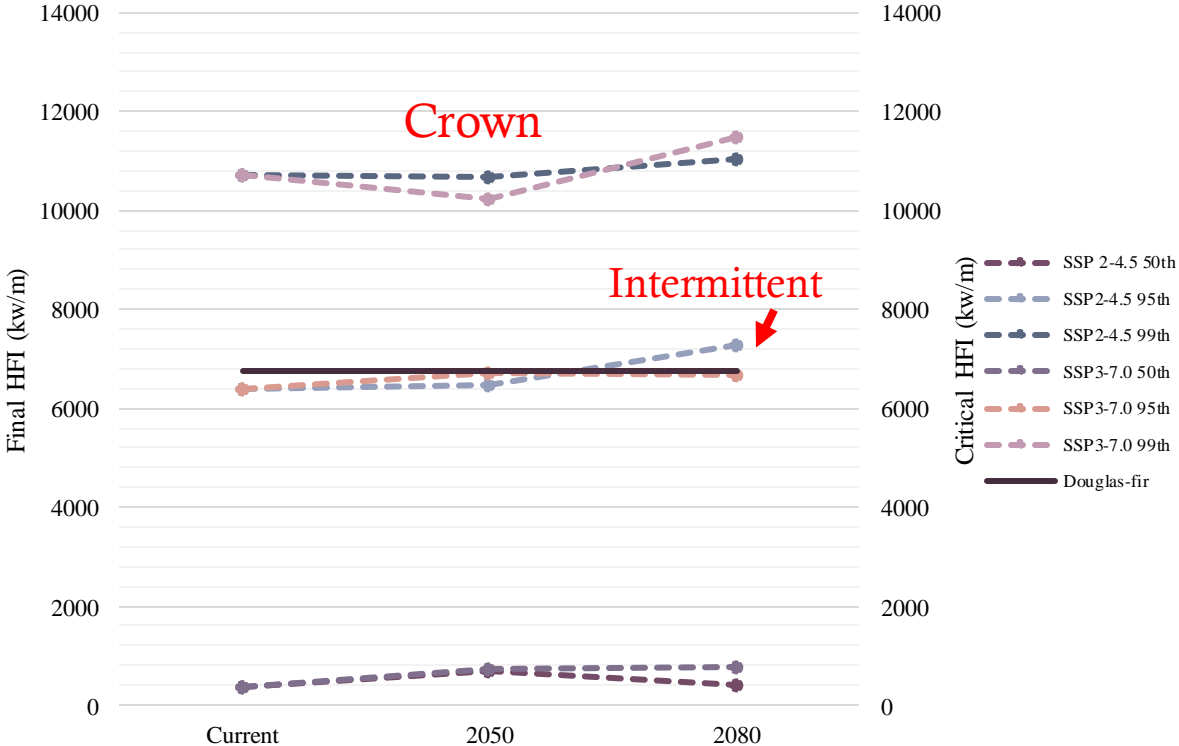
SHADED FUEL BREAK



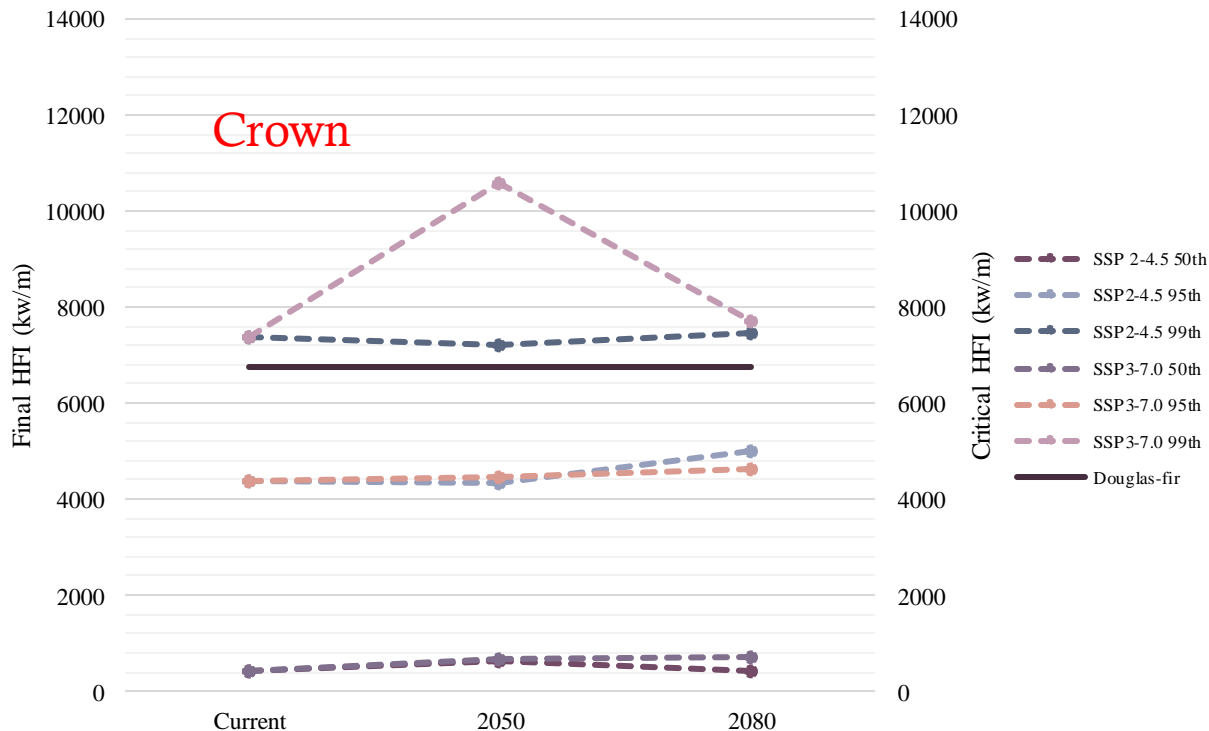
Pre-Harvest Conditions
SSP2-4.5
SSP3-7.0

POST - 50% REMOVAL

without planting



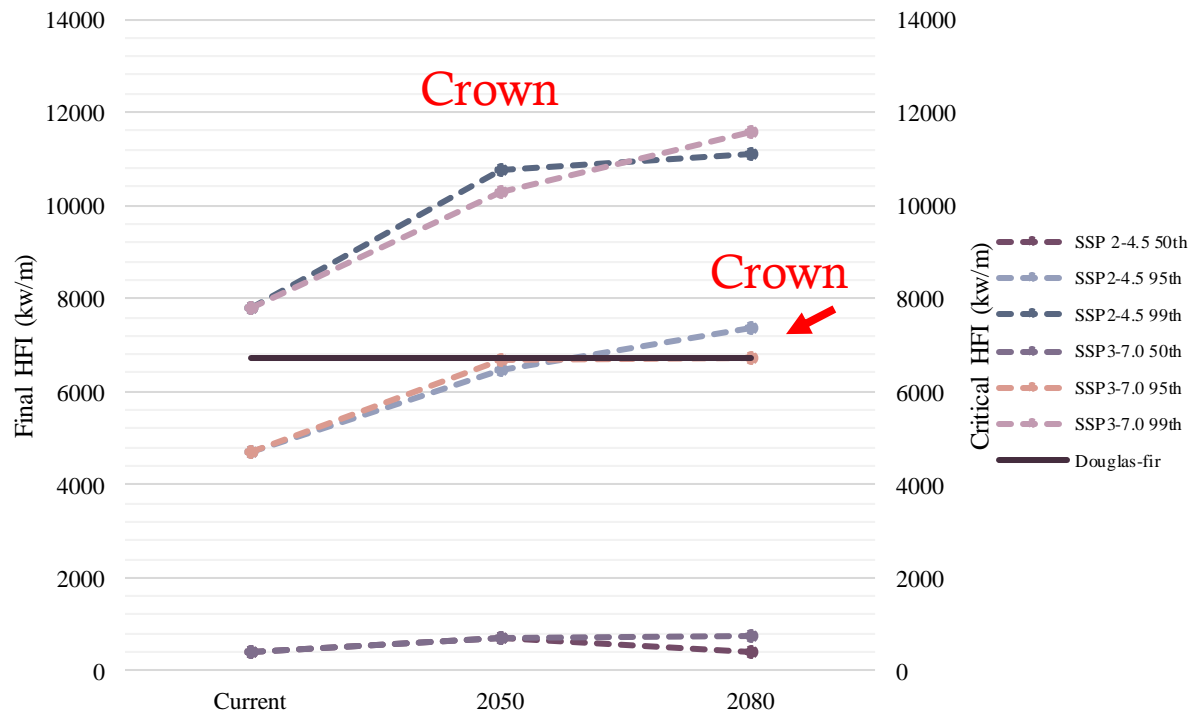
with planting



95th:
Needs a 1.1 – 4.0 kg/m² increase to see *Intermittent Crowning*

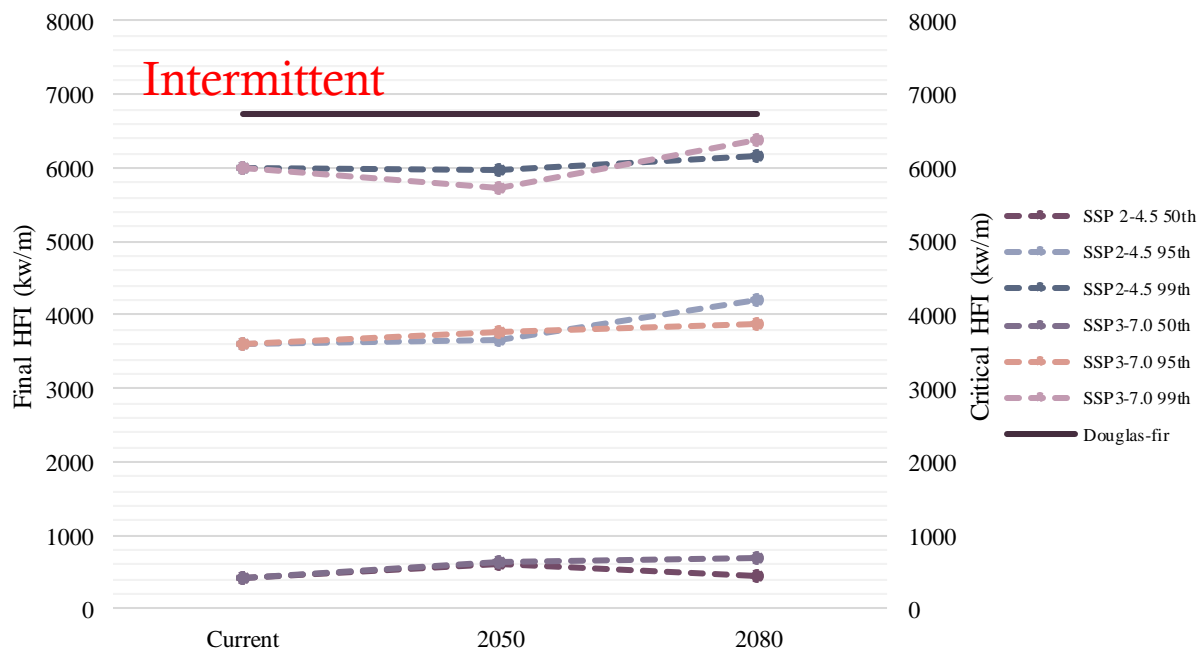
POST – 80% REMOVAL

without planting



95th:
Needs a 0.9 – 3.5 kg/m²
increase to see *Crowning*

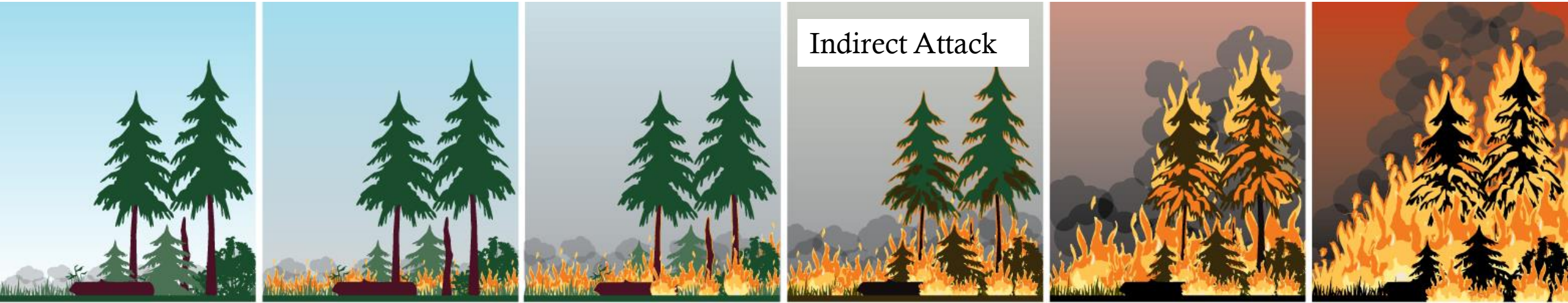
with planting



95th:
Needs a 4.0 - 6.5 kg/m²
increase to see *Intermittent*
Crowning

99th:
Needs a 1.0 – 1.5 kg/m²
increase to see *Intermittent*
Crowning

 **50% removal...**



Intensity Class 1

Intensity Class 2

Intensity Class 3

Intensity Class 4

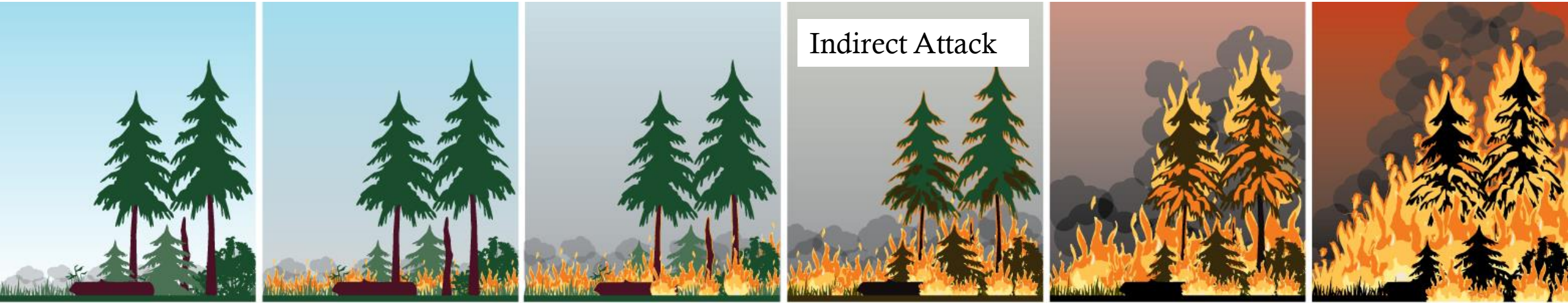
Intensity Class 5

Intensity Class 6



50th percentile --- 95th percentile --- 99th percentile

80% removal...



Intensity Class 1

Intensity Class 2

Intensity Class 3

Intensity Class 4

Intensity Class 5

Intensity Class 6

Rep PRE

2-4.5 PRE

3-7.0 PRE

Rep POST

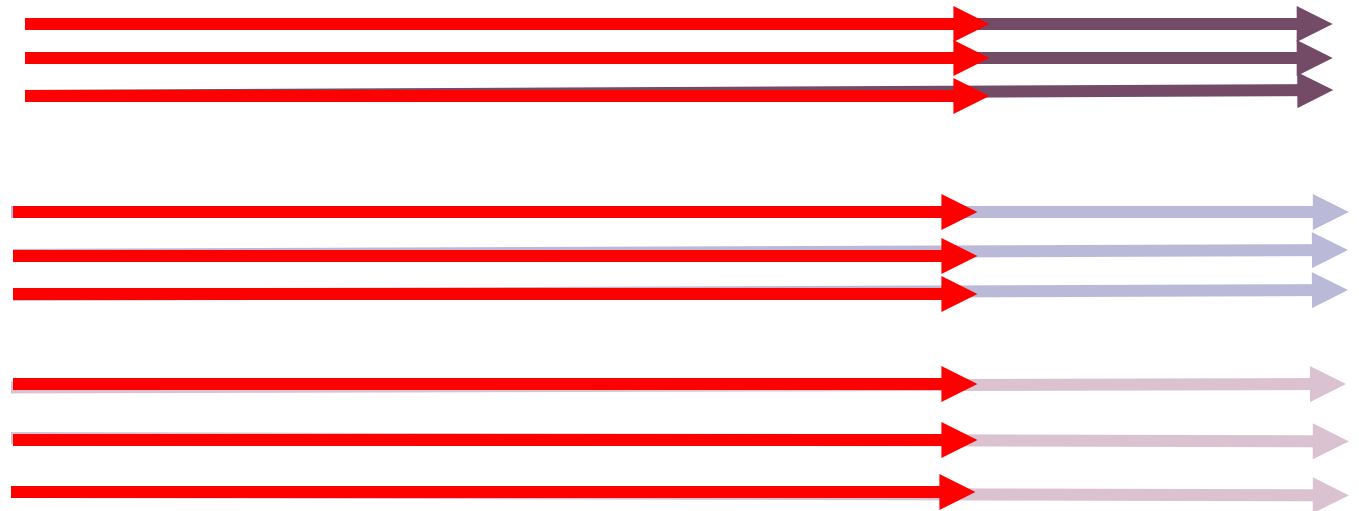
2-4.5 POST

3-7.0 POST

Rep POST

2-4.5 POST

3-7.0 POST



50th percentile --- 95th percentile --- 99th percentile

2050

2080

OVERALL, DID WE SEE A REDUCTION IN INTENSITY?

Marginally... went from Rank 6 to 5 @ the 99th

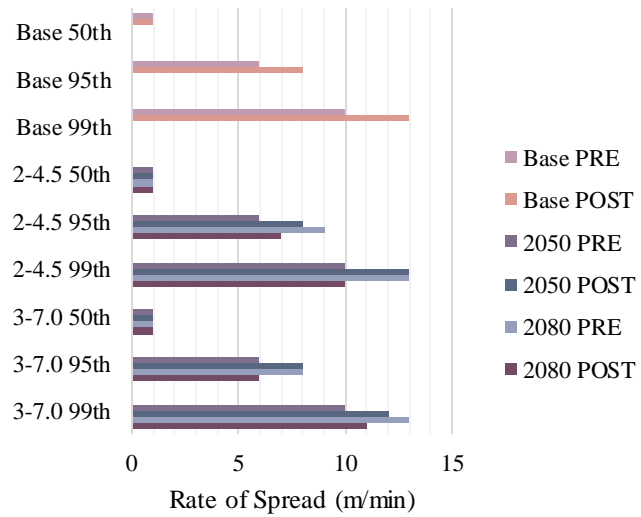
...went from Rank 4 to 3 @ the 95th

DID WE SEE A REDUCTION IN INTENSITY WITH PLANTING?

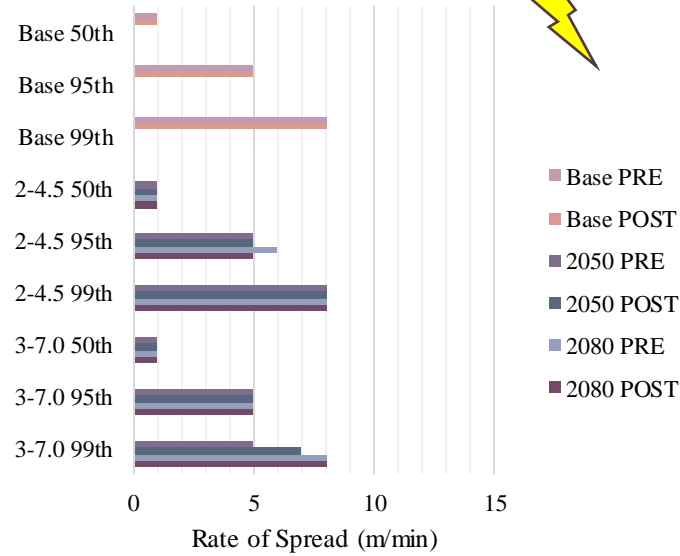
*Yes.... Sort of.
Decreases by one **Intensity Class**.*

**50% reduction still saw a crown fire with
planting.*

Block 1

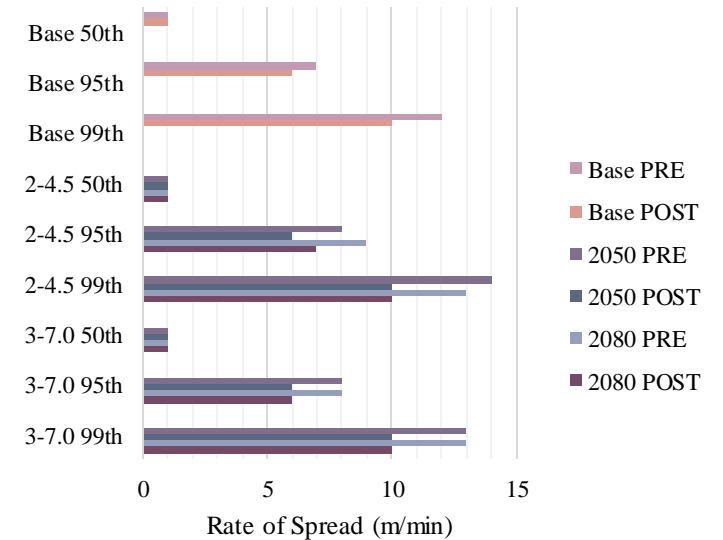


Block 2



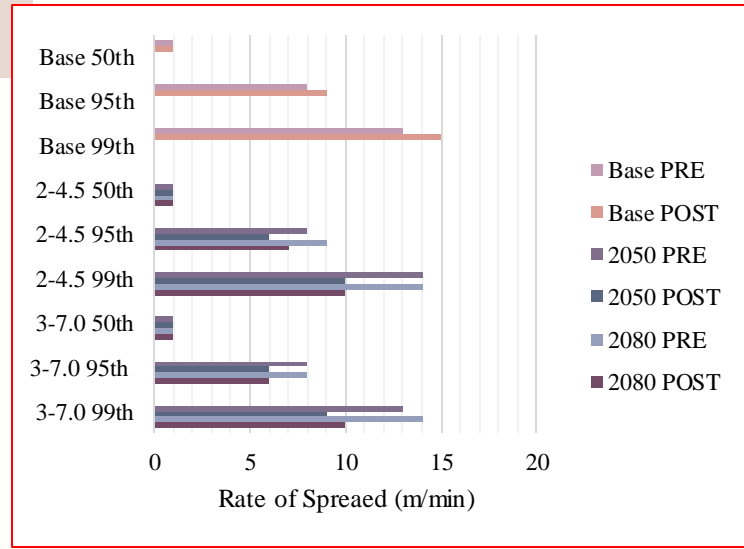
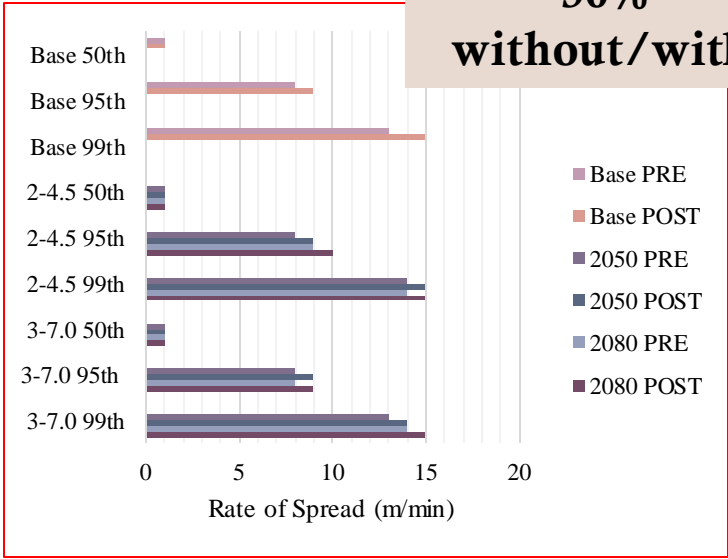
ASPEN PARKLAND RATE OF SPREAD

Block 3



Block 1 – Harvesting *did not* work at reducing ROS in 2050
 Block 2 – Harvesting had a null effect *except* the 99th percentile in 3-7.0
Block 3 – Harvesting reduced ROS

**50%
without/with**



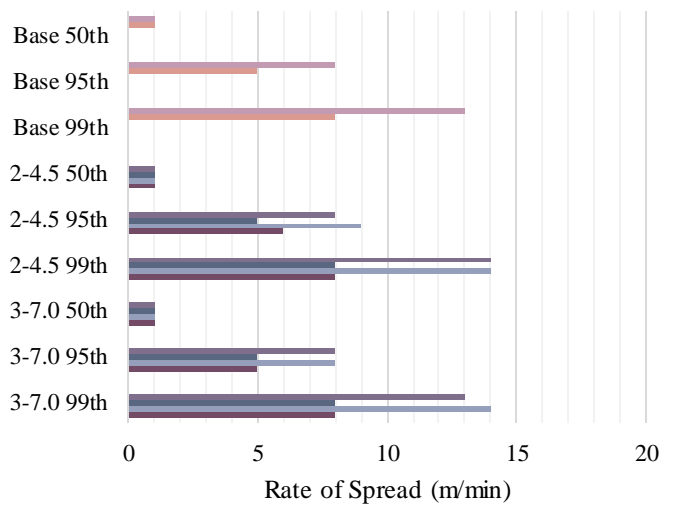
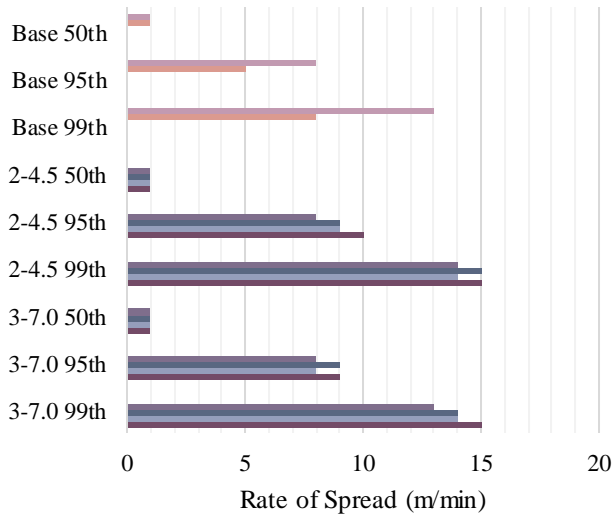
SHADED FUEL BREAK RATE OF SPREAD

Did planting work on reducing ROS?

You bet it did!

Reduced ROS from 1 – 5 m/min

**80%
without/with**



SHELF LIFE OF THE SITE?

Short term:

No concerns unless there
is a sudden influx of
CWD/DWD

Long term: ?



SUMMARY

Fuel management for this treatment area reduced fire intensity and spread... with the exceptions of...

Block 1 still saw *Intermittent crowning* at 99th percentile

Block 2 saw a *null effect and increase of ROS* at 99th 3-70

Block 3 still has *Intermittent Crowning* at 99th percentile.

Shaded Fuel Break – saw *crowning or intermittent crowning* in 2080

Planting worked with *reducing ROS* for 50% and 80% removal.

Planting worked with *reducing intensity* at 80% removal...

But didn't see a reduction in intensity with 50% removal.

Overall consensus... I would saw harvesting and planting deciduous worked, but... not by much.

THANKS!

QUESTIONS...?

Dominique Manwaring |

MSc Thompson Rivers University |

