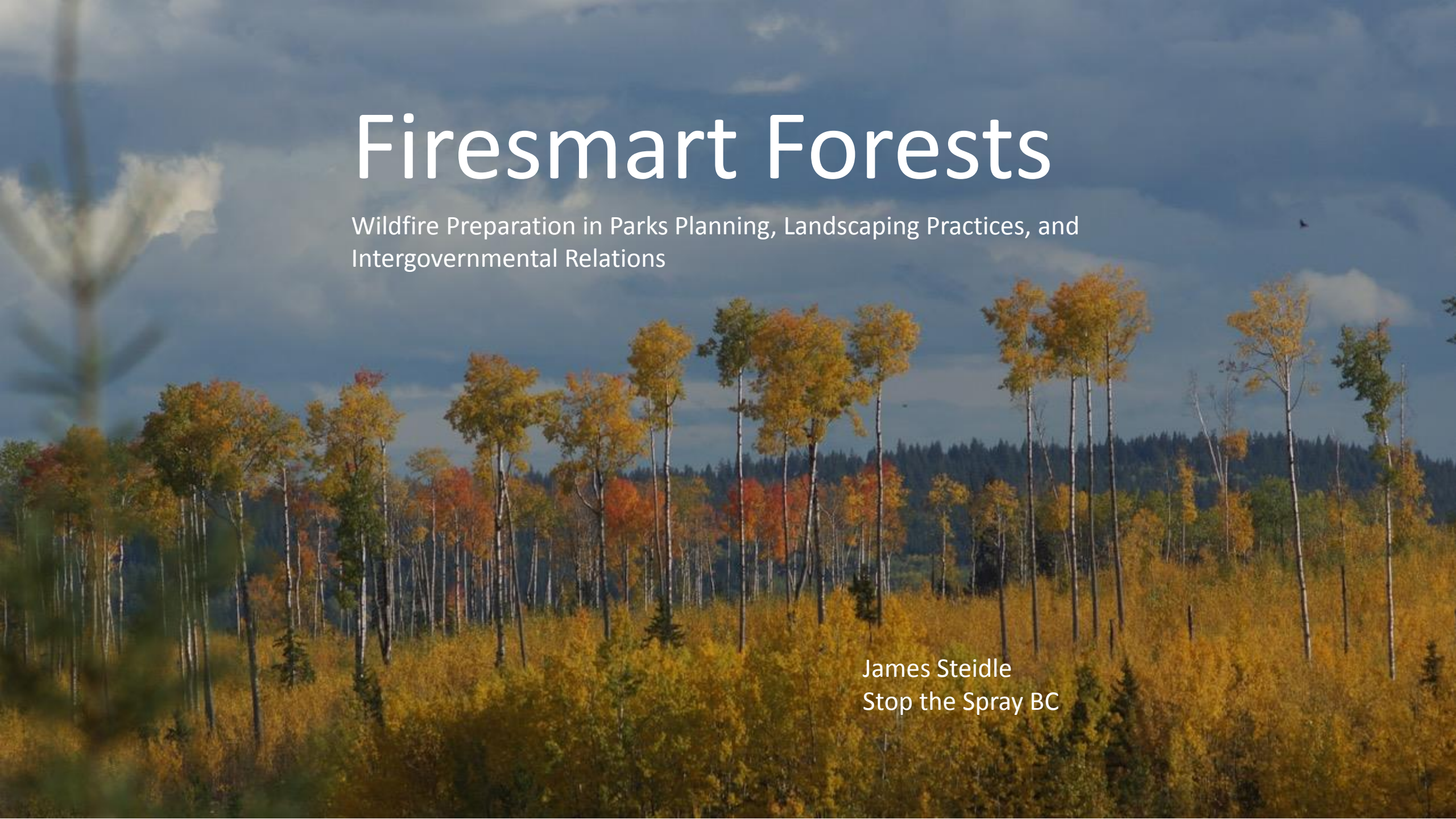


Firesmart Forests

Wildfire Preparation in Parks Planning, Landscaping Practices, and Intergovernmental Relations

James Steidle
Stop the Spray BC

Coniferous trees

- small, needle-like leaves

Deciduous trees

- broad, flat leaves

- Local Conifer
  - Lodgepole pine
  - Spruce
  - Douglas fir
  - Sub alpine fir

- Local Deciduous
  - Trembling Aspen
  - Cottonwood
  - Paper Birch
  - Alder, Douglas maple, saskatoon, willows

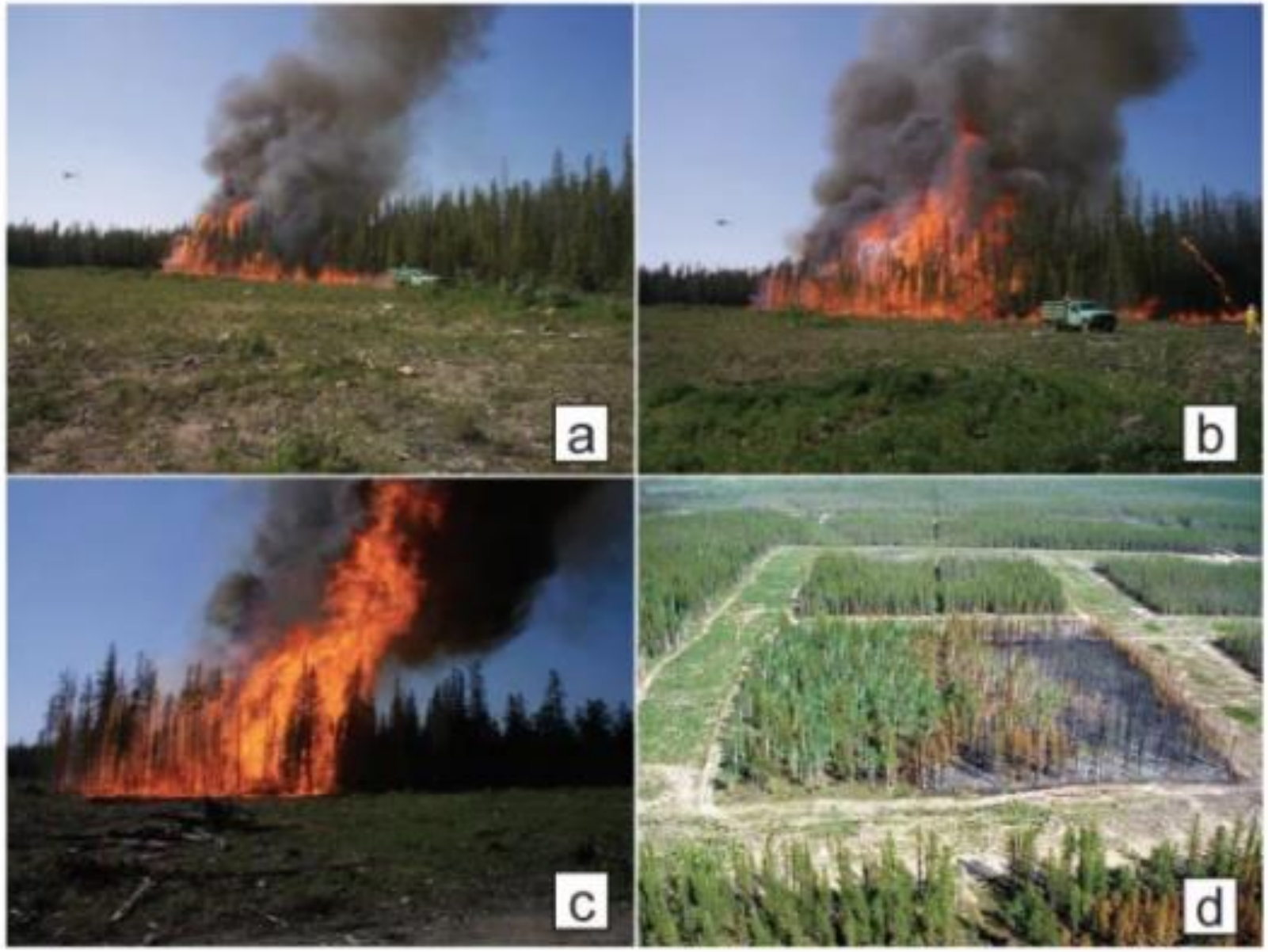
Fire Management today

Volume 73 • No. 4 • 2014

Synthesis on Crown Fire Behavior in Conifer Forests

USDA

United States Department of Agriculture
Forest Service



A test burn conducted by a federal fire behaviour specialist shows, at bottom right, how aspen can resist a wildfire spreading through jack pine and black spruce. (The Forestry Chronicle)

Reduced Flammability

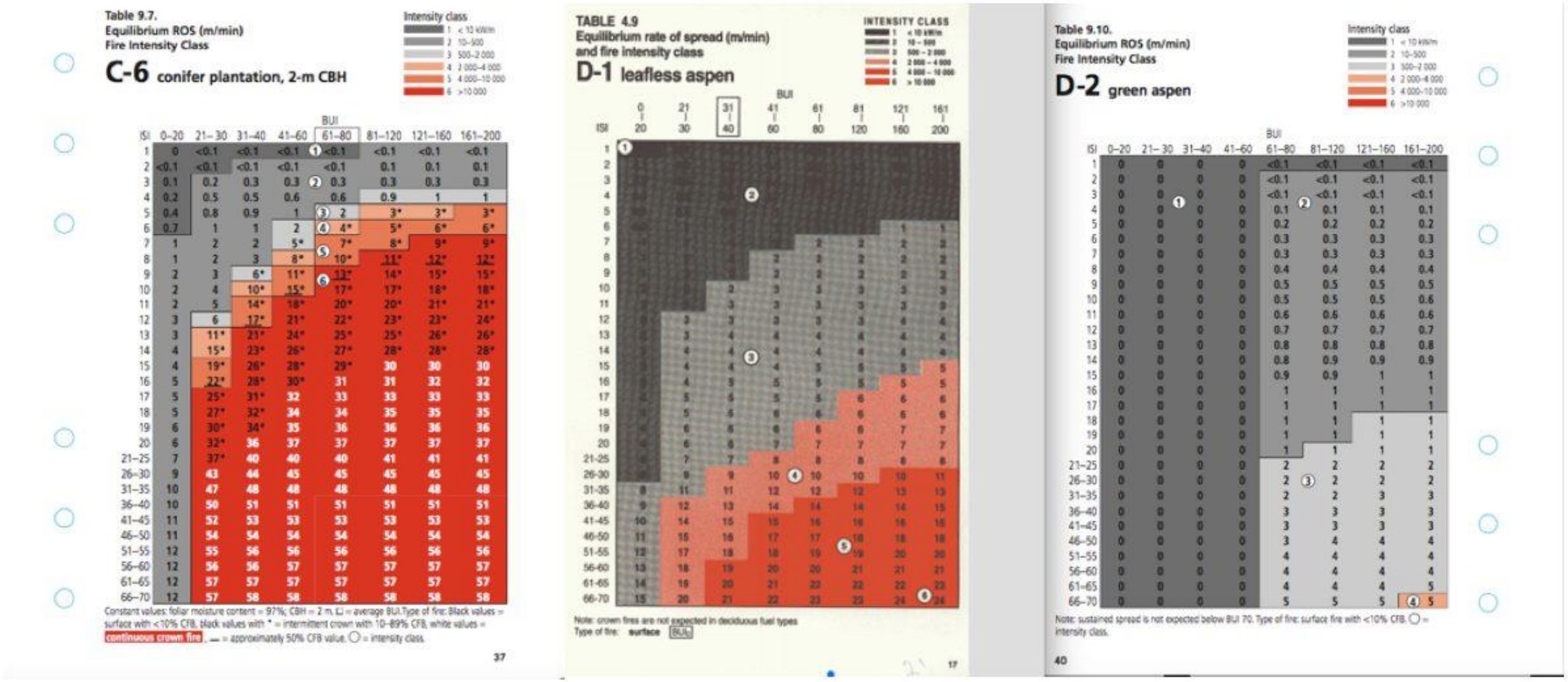


Table 9.7.
Equilibrium ROS (m/min)
Fire Intensity Class

C-6 conifer plantation, 2-m CBH

Intensity class
1 < 10 kW/m
2 10–500
3 500–2 000
4 2 000–4 000
5 4 000–10 000
6 >10 000

ISI \ BUI	0–20	21–30	31–40	41–60	61–80	81–120	121–160	161–200
1	0	<0.1	<0.1	<0.1	① <0.1	<0.1	<0.1	<0.1
2	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	0.1
3	0.1	0.2	0.3	0.3	② 0.3	0.3	0.3	0.3
4	0.2	0.5	0.5	0.6	0.6	0.9	1	1
5	0.4	0.8	0.9	1	③ 2	3*	3*	3*
6	0.7	1	1	2	④ 4*	5*	6*	6*
7	1	2	2	5*	7*	8*	9*	9*
8	1	2	3	8*	⑤ 10*	11*	12*	12*
9	2	3	6*	11*	⑥ 13*	14*	15*	15*
10	2	4	10*	15*	17*	17*	18*	18*
11	2	5	14*	18*	20*	20*	21*	21*
12	3	6	17*	21*	22*	23*	23*	24*
13	3	11*	21*	24*	25*	25*	26*	26*
14	4	15*	23*	26*	27*	28*	28*	28*
15	4	19*	26*	28*	29*	30	30	30
16	5	22*	28*	30*	31	31	32	32
17	5	25*	31*	32	33	33	33	33
18	5	27*	32*	34	34	35	35	35
19	6	30*	34*	35	36	36	36	36
20	6	32*	36	37	37	37	37	37
21–25	7	37*	40	40	40	41	41	41
26–30	9	43	44	45	45	45	45	45
31–35	10	47	48	48	48	48	48	48
36–40	10	50	51	51	51	51	51	51
41–45	11	52	53	53	53	53	53	53
46–50	11	54	54	54	54	54	54	54
51–55	12	55	56	56	56	56	56	56
56–60	12	56	56	57	57	57	57	57
61–65	12	57	57	57	57	57	57	57
66–70	12	57	58	58	58	58	58	58

Constant values: foliar moisture content = 97%; CBH = 2 m. ○ = average BUI. Type of fire: Black values = surface with <10% CFB, black values with * = intermittent crown with 10–89% CFB, white values = continuous crown fire, — = approximately 50% CFB value. ○ = intensity class.

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TABLE 4.9
Equilibrium rate of spread (m/min)
and fire intensity class

D-1 leafless aspen

INTENSITY CLASS
1 < 10 kW/m
2 10 – 500
3 500 – 2 000
4 2 000 – 4 000
5 4 000 – 10 000
6 > 10 000

ISI \ BUI	0–20	21–30	31–40	41–60	61–80	81–120	121–160	161–200
1	①							
2							1	1
3						2	2	2
4			②			2	2	2
5					2	3	3	3
6				2	3	3	3	3
7			3	3	3	3	4	4
8		3	3	3	4	4	4	4
9		3	4	4	4	4	4	4
10		4	4	③ 4	4	4	4	4
11		4	4	4	5	5	5	5
12	3	4	5	5	5	5	5	5
13	3	5	5	5	5	6	6	6
14	4	5	5	6	6	6	6	6
15	4	5	6	6	6	6	7	7
16	4	6	6	7	7	7	7	7
17	5	6	7	7	7	8	8	8
18	5	6	7	8	8	8	8	8
19	6	7	8	8	8	8	9	9
20	6	7	8	8	9	9	9	10
21–25	7	8	9	9	④ 10	10	10	11
26–30	9	9	10	10	11	11	12	12
31–35	8	11	11	12	12	12	13	13
36–40	9	12	13	14	14	14	14	15
41–45	10	14	15	15	16	16	16	16
46–50	11	15	16	17	17	⑤ 18	18	18
51–55	12	17	18	18	19	19	20	20
56–60	13	18	19	20	20	21	21	21
61–65	14	19	20	21	22	22	22	⑥ 23
66–70	15	20	21	22	23	23	24	24

Note: crown fires are not expected in deciduous fuel types
Type of fire: surface BUI

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Table 9.10.
Equilibrium ROS (m/min)
Fire Intensity Class

D-2 green aspen

Intensity class
1 < 10 kW/m
2 10–500
3 500–2 000
4 2 000–4 000
5 4 000–10 000
6 >10 000

ISI \ BUI	0–20	21–30	31–40	41–60	61–80	81–120	121–160	161–200
1	0	0	0	0	<0.1	<0.1	<0.1	<0.1
2	0	0	0	0	<0.1	<0.1	<0.1	<0.1
3	0	0	① 0	0	<0.1	② <0.1	<0.1	<0.1
4	0	0	0	0	0.1	0.1	0.1	0.1
5	0	0	0	0	0.2	0.2	0.2	0.2
6	0	0	0	0	0.3	0.3	0.3	0.3
7	0	0	0	0	0.3	0.3	0.3	0.3
8	0	0	0	0	0.4	0.4	0.4	0.4
9	0	0	0	0	0.5	0.5	0.5	0.5
10	0	0	0	0	0.5	0.5	0.5	0.6
11	0	0	0	0	0.6	0.6	0.6	0.6
12	0	0	0	0	0.7	0.7	0.7	0.7
13	0	0	0	0	0.8	0.8	0.8	0.8
14	0	0	0	0	0.8	0.9	0.9	0.9
15	0	0	0	0	0.9	0.9	1	1
16	0	0	0	0	1	1	1	1
17	0	0	0	0	1	1	1	1
18	0	0	0	0	1	1	1	1
19	0	0	0	0	1	1	1	1
20	0	0	0	0	1	1	1	1
21–25	0	0	0	0	2	2	2	2
26–30	0	0	0	0	2	③ 2	2	2
31–35	0	0	0	0	2	2	3	3
36–40	0	0	0	0	3	3	3	3
41–45	0	0	0	0	3	3	3	3
46–50	0	0	0	0	3	4	4	4
51–55	0	0	0	0	4	4	4	4
56–60	0	0	0	0	4	4	4	4
61–65	0	0	0	0	4	4	4	5
66–70	0	0	0	0	5	5	5	④ 5

Note: sustained spread is not expected below BUI 70. Type of fire: surface fire with <10% CFB. ○ = intensity class.

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Canadian Forest Service, *Field Guide to the Canadian Forest Fire Behaviour Prediction System*


Surviving aspen Bobtail fire, 2015

Fire Hazards

Common Name	Scientific Name	High Risk	Higher Risk	Highest Risk	Leaf Type
Arborvitae (Cedar)	Thuja spp.				C
Broom	Genista spp.				B
Cedrus	Cedar spp.				C
Douglas Fir	Pseudotsuga menziesii				C
Firs	Abies spp.				C
Fountain Grass	Pennisetum spp.				
Holly	Ilex spp.				B
Juniper	Juniperus spp.				C
Pampas Grass	Cortaderia selloana				
Pine	Pinus spp.				C
Ponderosa Pine	Pinus ponderosa				C
Spruce	Picea spp.				C
Larch	Larix spp.				D
Yew	Taxus spp.				C

Comments:

Ponderosa Pine: Thicker bark helps to protect this tree.

Larch: Higher moisture content of foliage makes this tree slighlty less risky.

Firesmart BC Guide

Why? The Trees Themselves Burn Less

- Most conifer are based on resinous saps full of flammable terpenes and oils
- Broadleaves like aspen have water-based sap
- Conifer are less efficient at photosynthesis and have up to 5X the leaf volume compared to aspen, so have much more fuel and fine branches in canopies
- Aspen, birch and cottonwood usually have branchless lower trunks with little to no ladder fuel
- Aspen and cottonwood have thick, fire-resistant bark

Why? Deciduous Forests are Moister

- Because of less leaf volume, aspen forests intercept much less rain and snow compared to conifer
- Up to 40% of snow doesn’t even make it to forest floor under conifer
- Aspen forests collect up to 3X the snow pack as nearby conifer
- Understory has more deciduous vegetation that builds rich soil that collects and holds on to water better
- Dense conifer forests often have drier understories of pine needles.

- **Aspen: Ecology and management in the western United States 1985, USDA edited by Norbert Debyle**

North

Stopping wildfires with trees: How thousands of aspen seedlings could help protect Whitehorse

Tree planters are hard at work this spring in the Whitehorse South fuel break

Andrew Hynes · CBC News · Posted: Jun 08, 2025 3:00 AM PDT | Last Updated: June 8

The Yukon government began work on the Whitehorse South fuel break in 2020, near the Mary Lake subdivision. It's intended to protect the city from wildfire by creating a natural barrier. (Gord Loverin/CBC)

Planting aspen trees may reduce forest fire risk

By Duane McCartney

Reading Time: 6 minutes

Published: November 16, 2023
News

This area had been reseeded with aspen seedlings several years ago. Now the tree canopy shades out the native grass, thus reducing the effects of future wildfires. | Duane McCartney photo

FireSmart program intended to help landowners increase property's resilience to wildfire and minimize negative impacts

Wildfire evidence of aspen effectiveness

Willow River, Northwest Territories, 1979
Photo by Rick Lanoville. GNWT

City of Prince George
Wildland/Urban Interface
Wildfire Management Strategy:

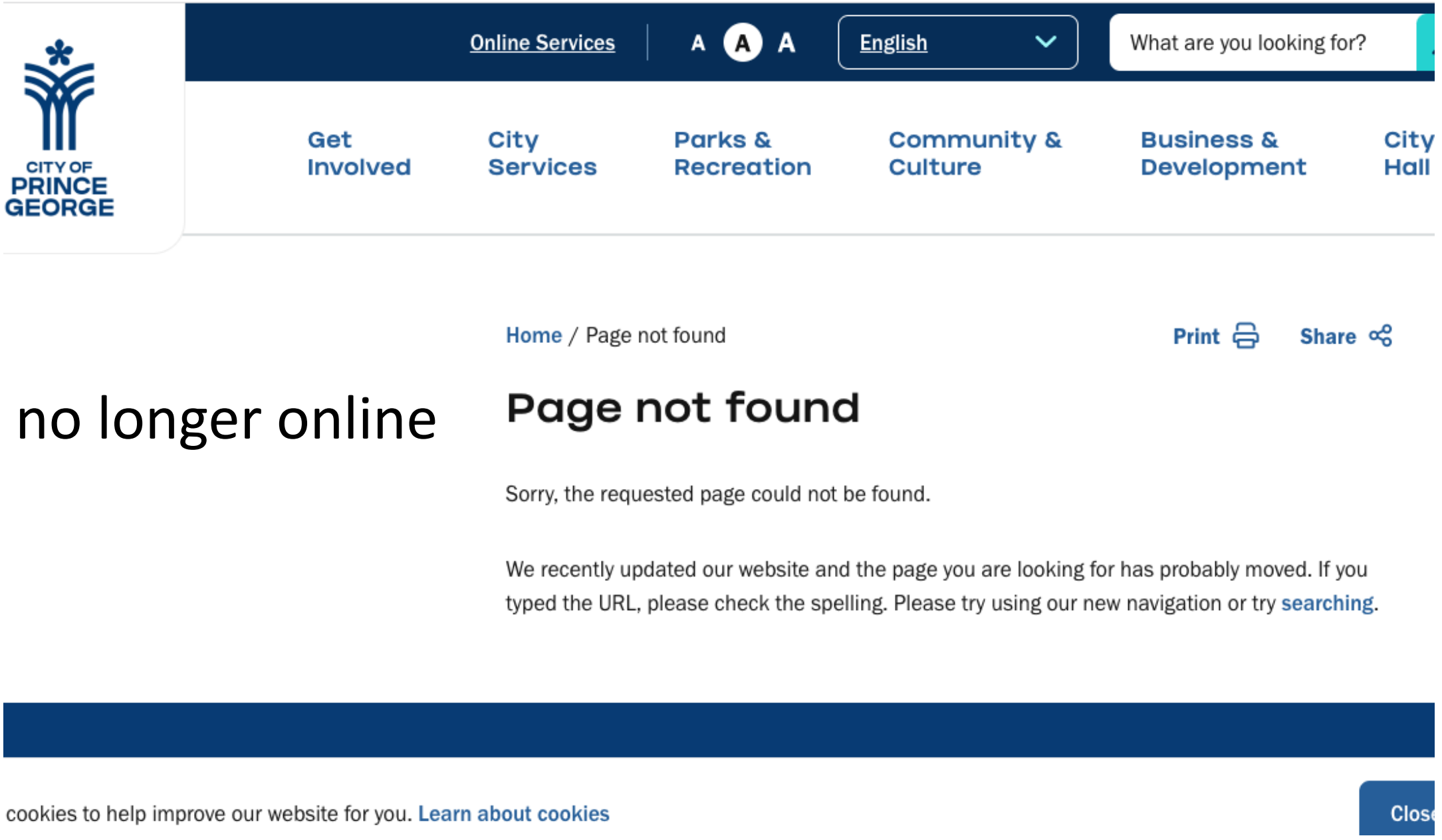
June, 2005

Prepared by:

Diamond Head Consulting Ltd.
3205 West 13th Ave
Vancouver BC
V6K 2V6

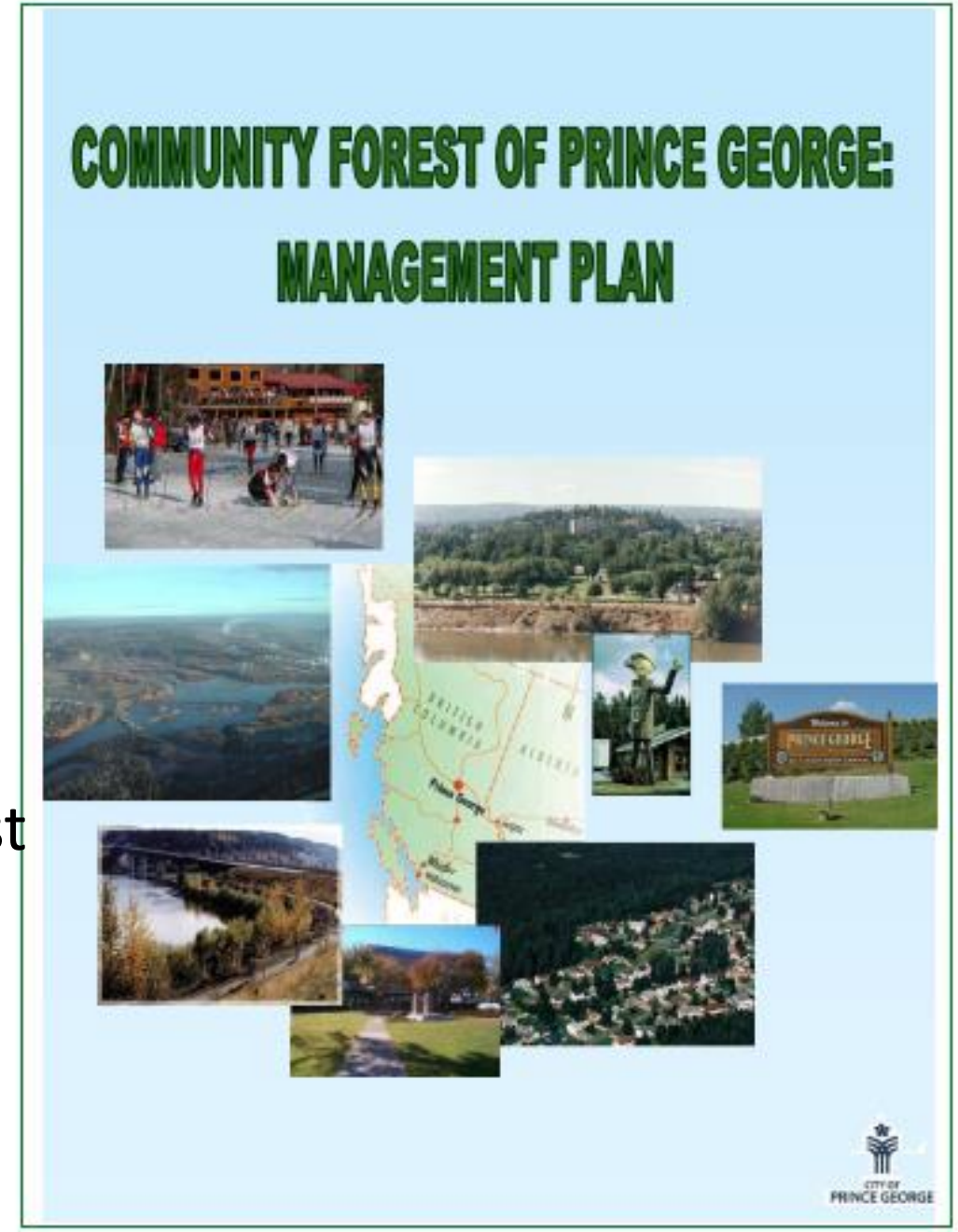
Key findings:

- 63% of Prince George forests are deciduous
- "in terms of fire-behaviour potential, these stands will all have a relatively low spread rate potential."
- "The wildfire hazard to the east of the University is less of a concern as there are large deciduous stands that act as buffers between this area and the City’s main urban interface



Report no longer online

Report
from 2006
When we had
A community forest



7.3.5 Reforestation

The typical purpose of a silviculture program is to promptly reforest harvested sites to produce desired crop trees within specific time frames. The purpose of the PGCFA however is not the production of timber. A proactive approach to future pest outbreaks includes creating mixed species stands; fire prevention techniques consist of decreasing the number of stems per hectare in a stand as well as incorporating a deciduous component. Therefore, alternative stocking standards for the Community Forest are contained within the FSP.

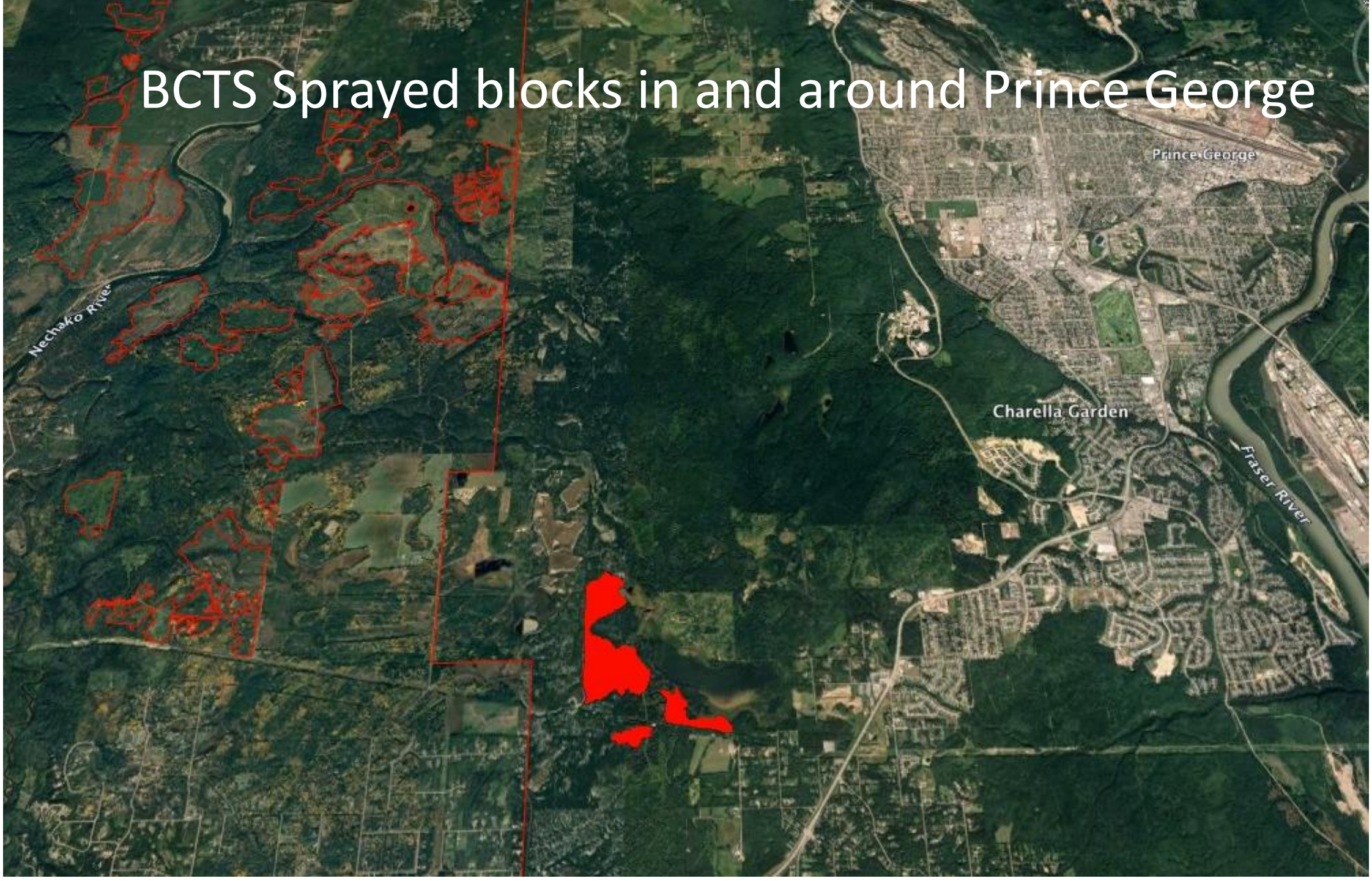
The most unique provision in these alternative standards is an increased stand composition of deciduous trees. In order to reduce the fire hazard in interface areas, the stocking standards include a deciduous component. Deciduous species have been identified as less flammable than coniferous trees. Living deciduous leaves tend to have higher moisture content than conifer leaves. Paper birch, trembling aspen and back cottonwood have been identified as acceptable species, and in some instances preferred species for retention and restocking. Figure 8 provides examples of existing mixed deciduous/coniferous landscapes in close proximity to down town Prince George.

Density requirements in interface zones may be lowered in order to assist with limiting fuel loading in the urban interface zones.

Intergovernmental Relations

- Provincial reforestation practices in and around Prince George did not consider fire risk like our community forest did
- Many BC Timber Sales blocks were sprayed and brushed directly west of Prince George where a fire will likely advance
- Some blocks were aerially sprayed inside PG city limits in 2009 and 2010.

BCTS Sprayed blocks in and around Prince George




Shelley
Shady Valley
Miworth
Fraser River
Foreman
Prince George
Fraser River
Bonnet Hill
Charella Garden
Pineview


1 year after spraying
9 years after spraying


Bear Lake
Summit Lake
Vanderhoof
Weneez
Salmon Valley
Isle Pierre
Upper Fraser
Prince George
Charella Garden
Pineview
Red Rock
Stoner
Hixon
Blackwater
Sprayed and
Brushed cutblocks
Around Prince George

Before treatment: threatened

Several years after treatment: free-growing

Intergovernmental Suggestions

- Request changes to provincial stocking standards to legalize ALL deciduous species in regional forests
- Fire resistance of the landbase is a greater value than corporate profits
- Recognizing that BC Timber Sales has sprayed forests in and around Prince George to increase fire hazard, while the Prince George Community Forest did not, request a Community Forest be re-initiated to manage forests in and around Prince George
- As a city in one of the most heavily sprayed places in Canada, add your voice to request chemical herbicide spraying in forests be banned

Landscaping Practices

- City zoning bylaw prioritizes conifer trees around homes and developments
- ”Fire smart” principles are mentioned but do not specify preferred tree types


Prince George Golf and Curling Club perimeter


Future pine berm around PG Golf and Curling Club

Future wall of pine around development on Tyner

SmartCentres removing fire resistant deciduous and keeping fire prone pine/spruce


Walmart
CANADIAN TIRE
carter's
OSHKOSH
H&R BLOCK
Vie en Rose

8.6.4	Large blank building walls along highways are to be avoided.
8.6.5	Uses should be designed to minimize queuing that will interfere with traffic on adjacent highways or pedestrians on adjacent sidewalks.
8.6.6	Parking should be provided at the rear or side of buildings.
8.6.7	Every off-street parking or loading area that is illuminated should have all lighting, positioned in such a manner that undesirable light falling onto abutting properties and highways is minimized.
8.6.8	Landscaping strips at least 1.5 m wide, with shrubbery height at least 0.75 m or acceptable fencing, should be provided where parking is adjacent to the highway.
8.6.9	Landscaping materials should be chosen to provide colour in the winter. A suggested planting ratio is 60% coniferous and 40% deciduous.
8.6.10	Front yards shall be landscaped with grass, trees, and shrubbery.
8.6.11	In addition to meeting the requirements of the Sign Bylaw, signs should be integrated with the building façade through colour and graphic style.

Guidelines

8.10.2 The guidelines in The Home Owners Fire Smart Manual (B.C. Edition) shall apply to Wildfire Interface Development Permit Areas as follows:

a) in Priority Zones 1 (within 10.0 m from structures), remove fuel and convert vegetation to fire resistance species to produce an environment that does not support combustion.
b) in Priority Zones 2 (10.0 – 30.0 m from structures), increase fuel modified area by reducing flammable vegetation through thinning and pruning and produce an environment that will only support low-intensity surface fires.
c) in Priority Zones 3 (30.0 – 100.0 m+ from structures), eliminate the potential for a high- intensity crown fire through thinning and pruning, thereby slowing the approach of a fire approach towards structures.
d) fire resistant roofing materials (Class A or B) such as metal, clay tile, asphalt shingles and treated wooden shingles should be used on all buildings and structures;
e) fire resistant exterior walls materials such as stucco, metal, brick, rock, and concrete should be used on all buildings and structures. Logs and heavy timbers, although less effective, are also permitted;
f) roof vents should be closed in and screened;
g) decks, porches and balconies should be sheathed with fire resistant materials;
h) chimneys should have approved spark arrestors; and
i) vegetation should be cleared 3.0 m back from power lines and propane tanks.

8.10.3 Subdivisions should be designed to provide adequate access for

		City.
	8.8.11	Dwellings fronting on a highway should have screened outdoor areas to provide privacy to residents.
	8.8.12	All areas not covered by buildings, structures and parking shall be fully landscaped.
	8.8.13	Garbage and recycling containers should be effectively screened behind a sight-obscuring fence on a minimum of three sides.
	8.8.14	Noise attenuation should ensure the livability of the residential development along arterials and highways.
	8.8.15	Landscaping materials should be chosen to provide colour in the winter. A suggested planting ratio is 60% coniferous and 40% deciduous.
	8.8.16	In areas that have risk of bears, landscaping should be designed and selected to minimize conflict between bears and people.
Bylaw 8256	8.8.17	For development with a residential density of 124 dwellings/ha or less, the usable open space shall be provided at a minimum rate of 10.0 m^2 per studio dwelling, 20.0 m^2 per 1 bedroom dwelling, 40.0 m^2 per 2 bedroom dwelling, and 50.0 m^2 per dwelling with 3 or more bedrooms.
	8.8.18	For development with a residential density of 125 dwellings/ha. or greater, usable open space shall be provided at a minimum of 20% of the site area. A maximum of 25% of the required outdoor recreation space may be provided on the roof of a principle building.

Landscaping Suggestions

- Change the zoning bylaw to encourage 100% deciduous around developments and properties
- Require only fire-resistant conifer (ponderosa pine, larch, maybe douglas fir)
- Clarify and strengthen Fire Smart references in zoning bylaw to eliminate things like highly flammable walls of pure pine
- Maintain native deciduous cover and root systems for ease of maintenance and growth

Parks Planning

- Pine and spruce have been long prioritized in city parks
- Aspen is often seen as a weed and is not prioritized
- Brushing projects to remove brush smaller than 3” diameter often leaves pine unscathed and removes fire-resistant deciduous


Pine wall Foothills and 5th


FORESTS FOR
THE WORLD
CITY OF
PRINCE GEORGE
Failure to comply with bylaws may result in a fine.
For park enquiries, call 311.

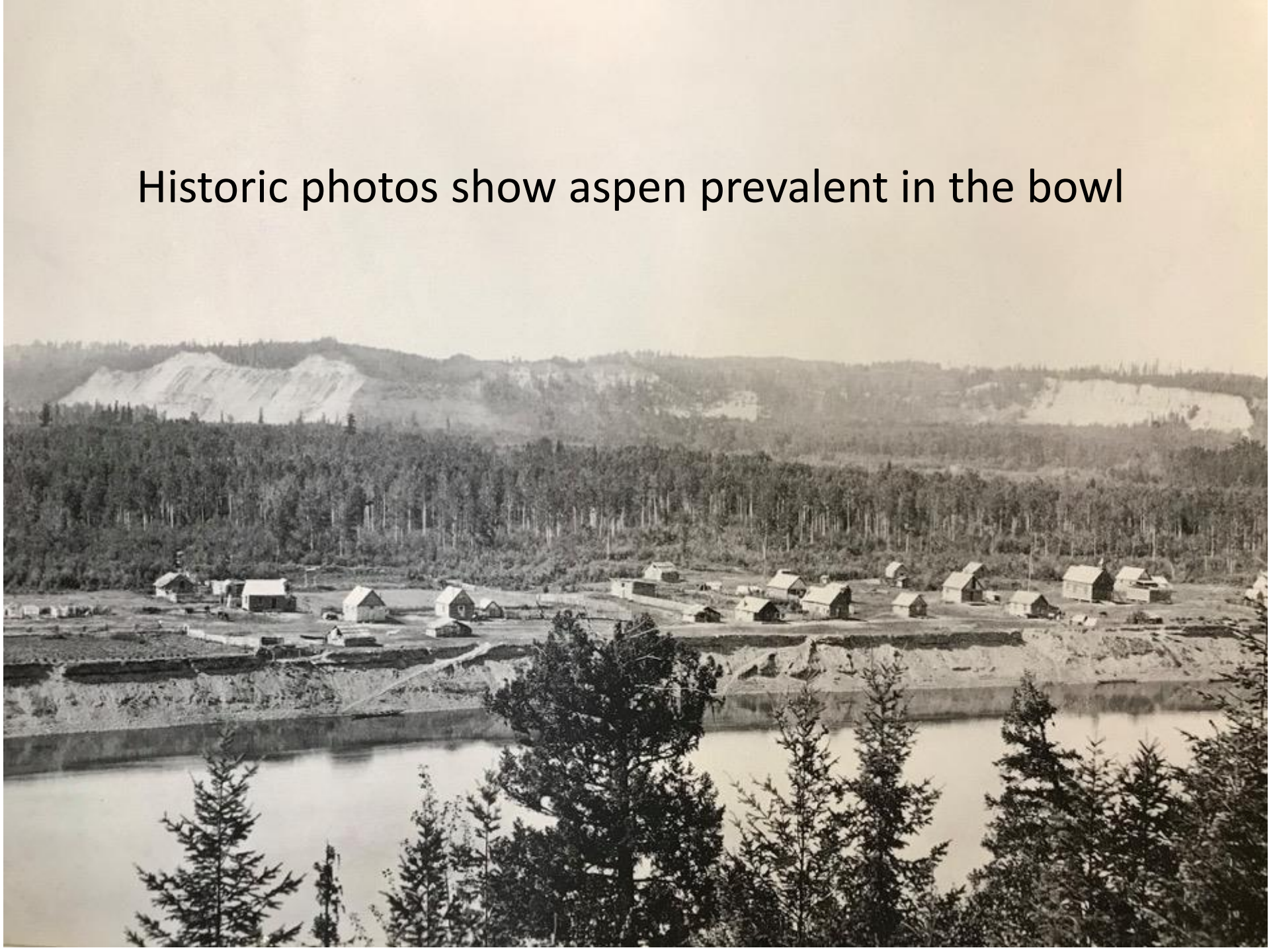
In the 1980's large deciduous areas were cleared and replaced with conifer plantations


Recently brushed pine stand on Rainbow

This aspen was not allowed to regenerate and is now long gone, leaving conifer

Prioritizing deciduous would mean no-mow zones around preferred fire-smart aspen for natural regeneration

Historic photos show aspen prevalent in the bowl



Parks Planning Suggestions

- Prioritize aspen, birch and deciduous vegetation, not pine
- 3” policy in brushing treatments biases against deciduous vegetation and leaves mostly pine/conifer
- More No-mow zones to encourage natural regeneration from root-stock to save money on tree planting
- Many old aspen on Connaught Hill, Lheidli T’enneh Park, Foothills Boulevard etc. that are nearing end of life and can be replaced naturally if we let them

Thanks for watching!