Natural Regeneration in Reforestation. What's it's role as we move forward ?

- SISCO Workshop
- Improving our Silviculture Practice
- Kamloops, March 4/5 2025

Presentation Outline

1. What is the status of our recently established forests?

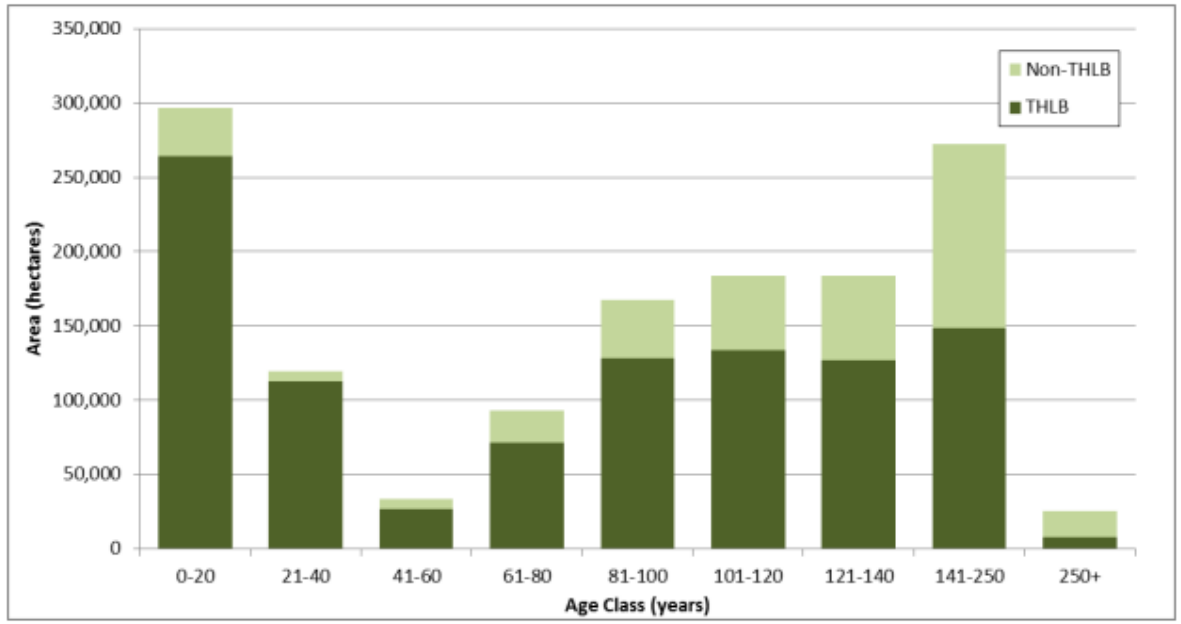
2. A quick review of natural regeneration in the southern interior

3. Wildfire and natural regeneration

4. Climate Change considerations

1. An Industry based upon taking advantage of Natural Stands
2. Highest quality wood from slow grown stands established from high densities
3. A large amount is fire origin (!)

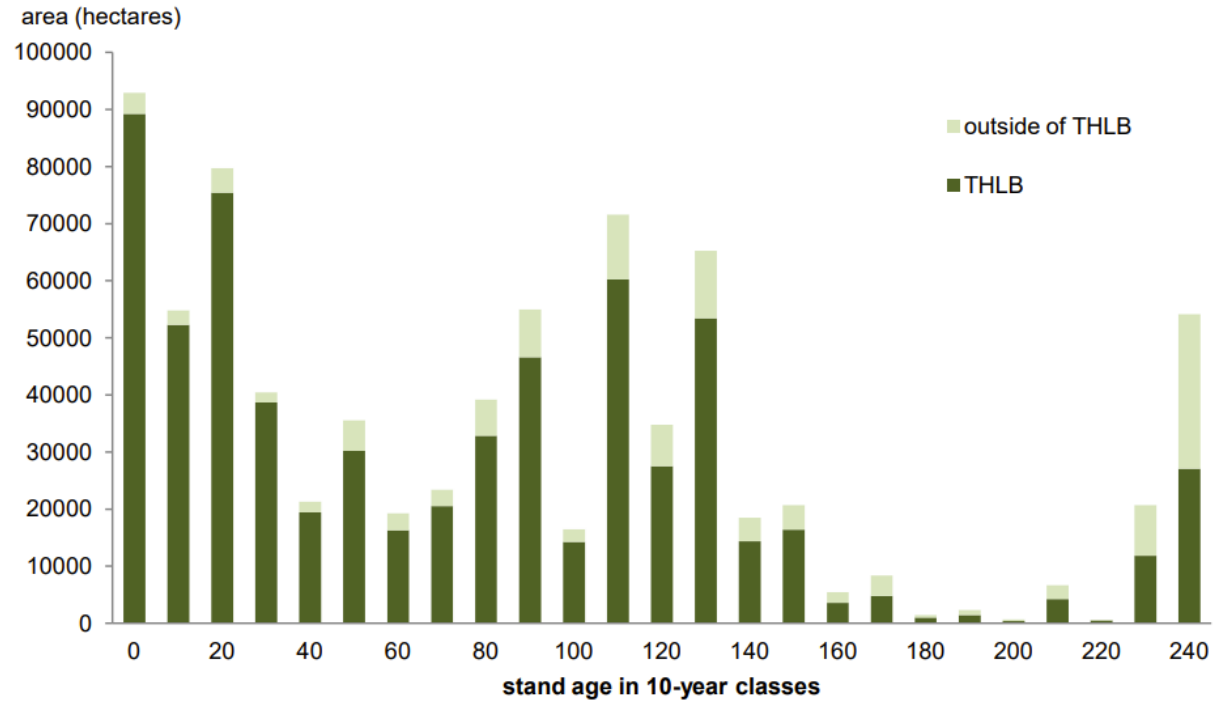
What do some of our current inventories look like?

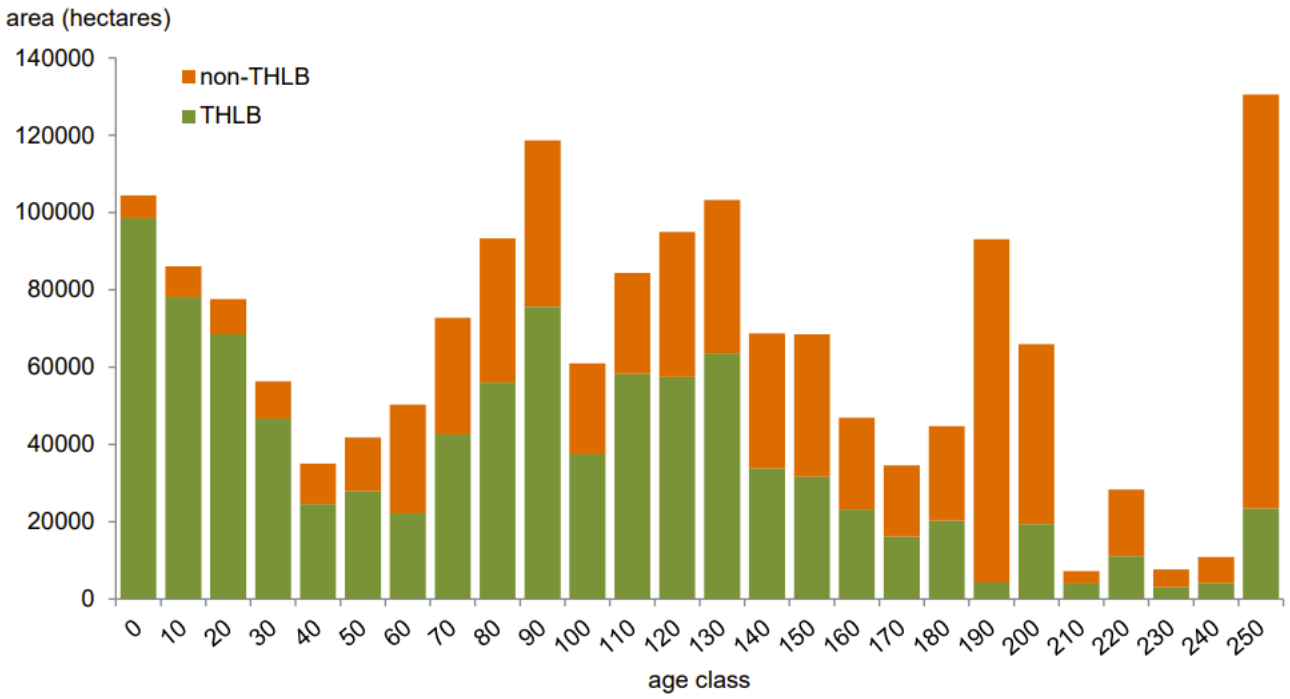


Age class distribution for the Crown forest management land base in the Quesnel TSA.

Quesnel TSA

Hundred Mile House

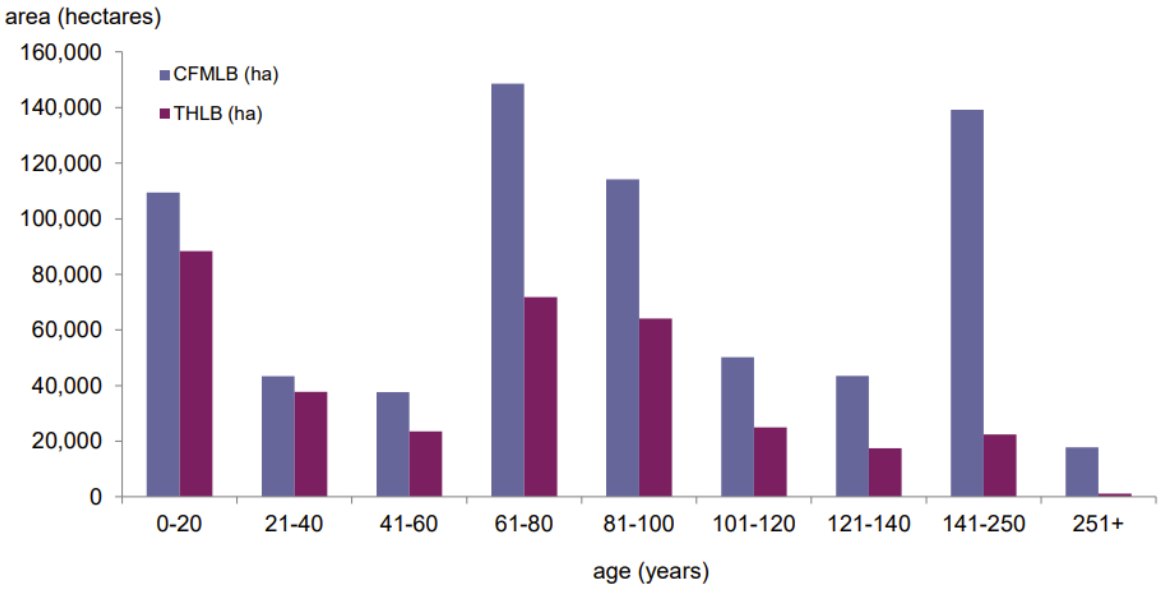




Age class distribution for the Crown managed forest land base in the Kamloops TSA.

Cranbrook TSA

Kamloops TSA

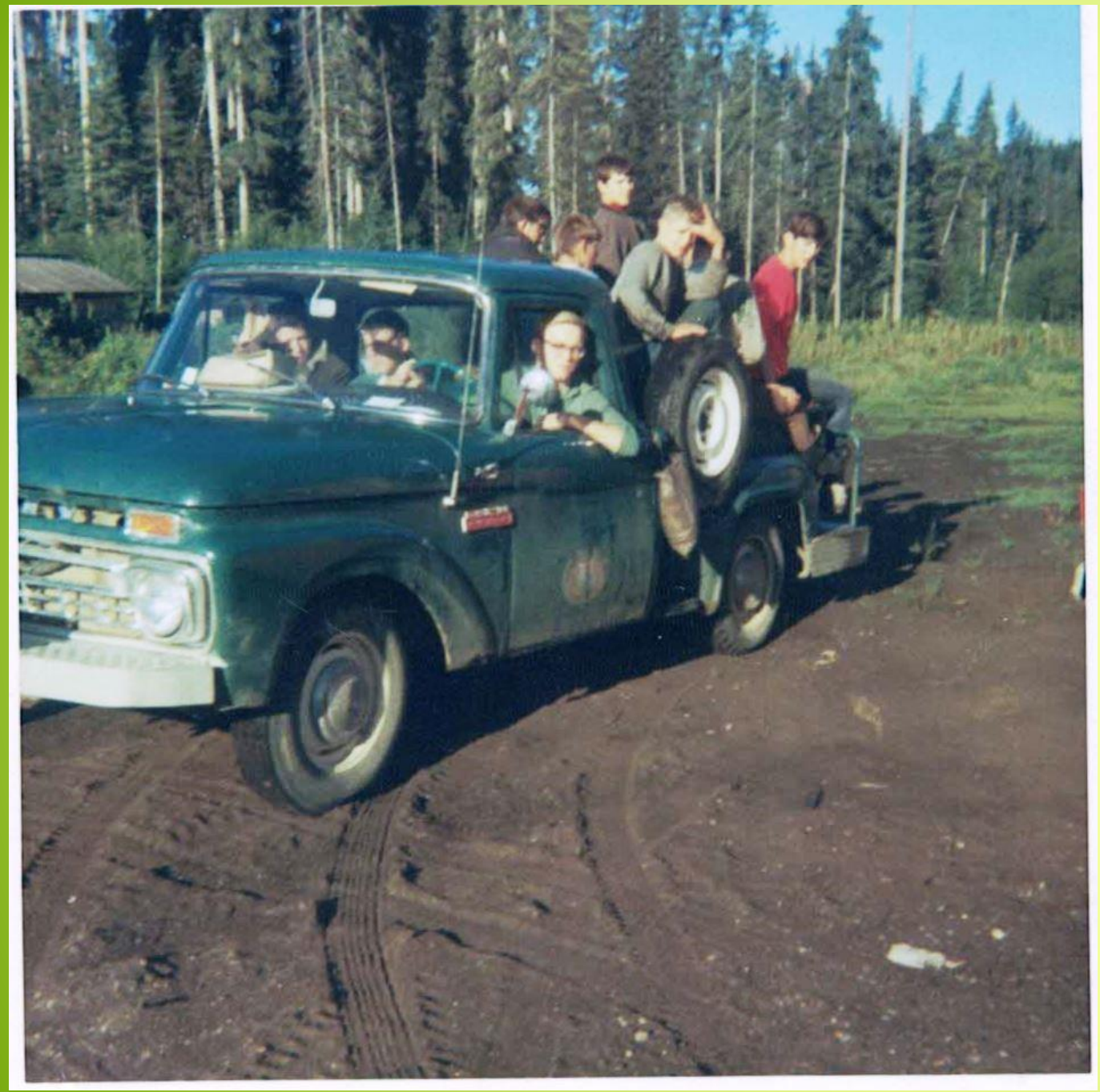


. *Age class distribution for the CFMLB of the Cranbrook TSA (hectares).*

Development of Planting in the Southern Interior

Logging builds from the 1960s but tree planting only really gets going in the 1970s.
Backlog NSR was a real problem until industry took over reforestation in 1987 and planting became more of the standard
Lodgepole pine still primarily managed through natural regeneration

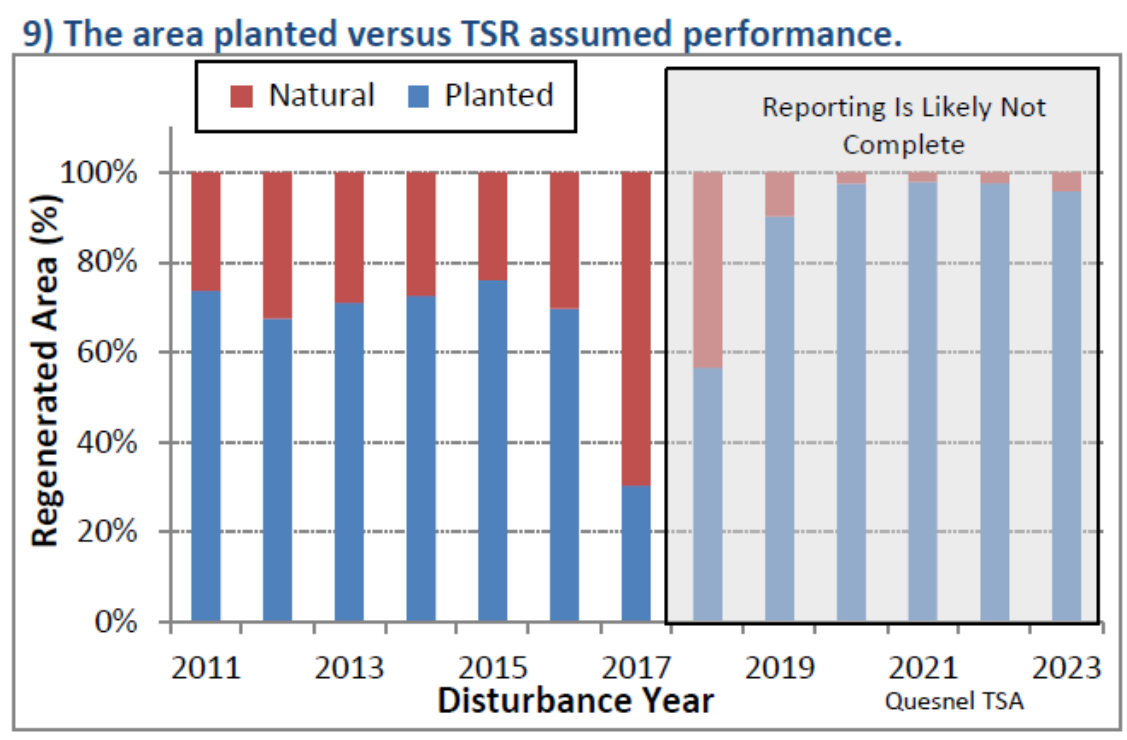
Over the last 20 years the Rule of Thumb is:
80% of our harvested blocks are replanted
20% are left for natural regeneration



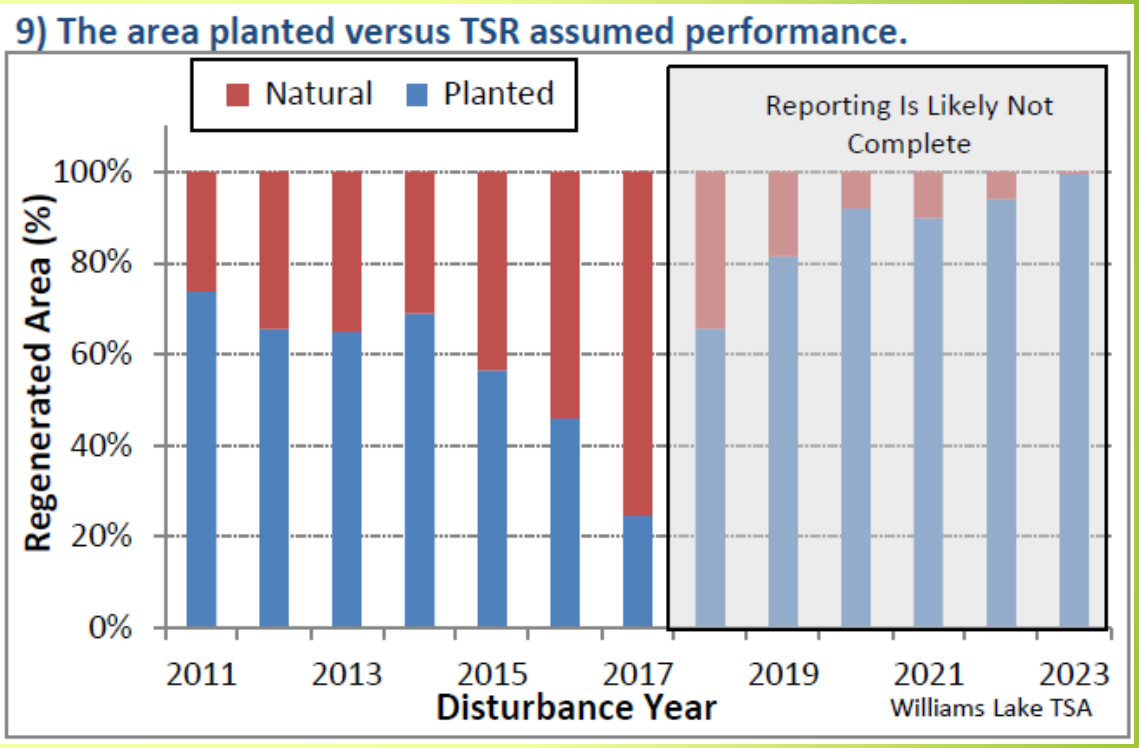
Don Pigott on his first cone picking expedition with a crew of students, north of Prince George Summer 1968

Photo courtesy of Don Pigott !!

How much Natural Regen are we really relying on?



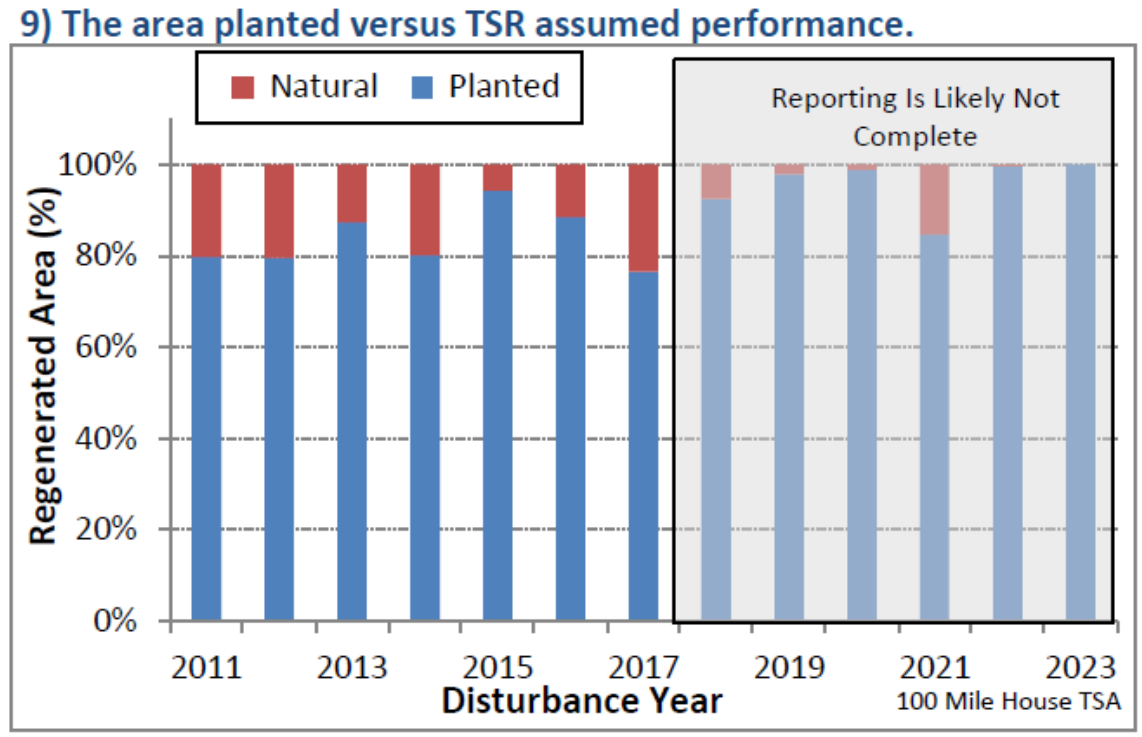
Quesnel TSA

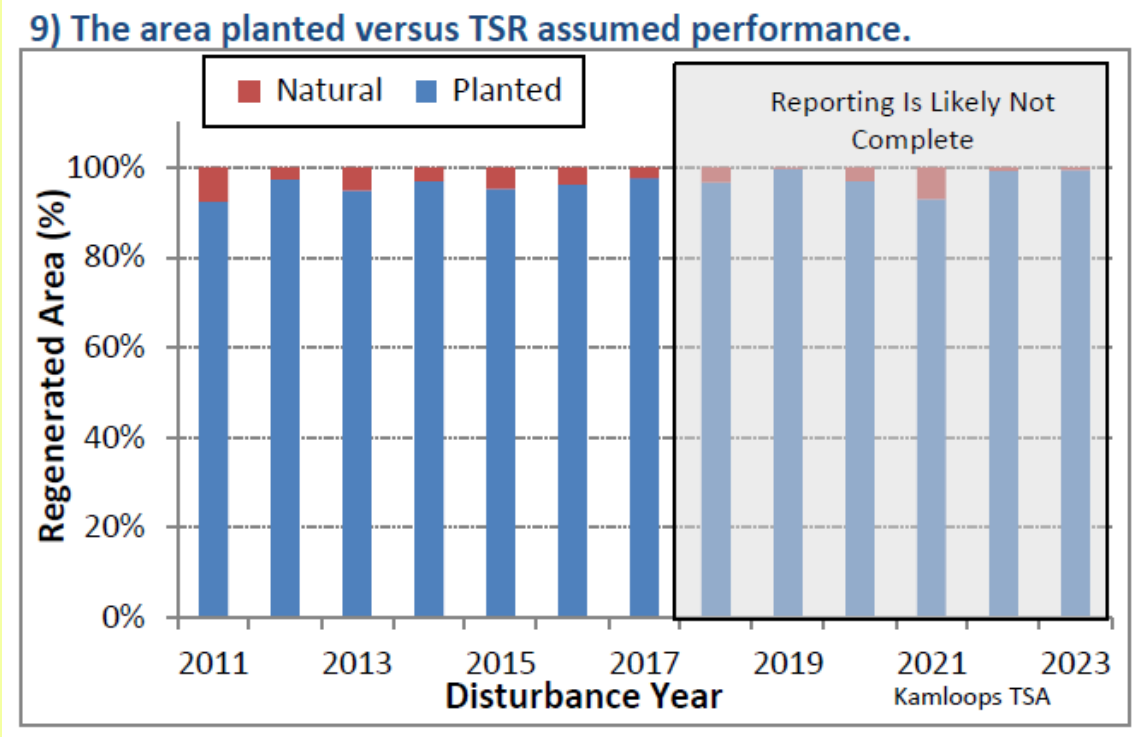


Williams Lake TSA

Source Results Planting reports 17/07/2024

How much Natural Regen are we really relying on?

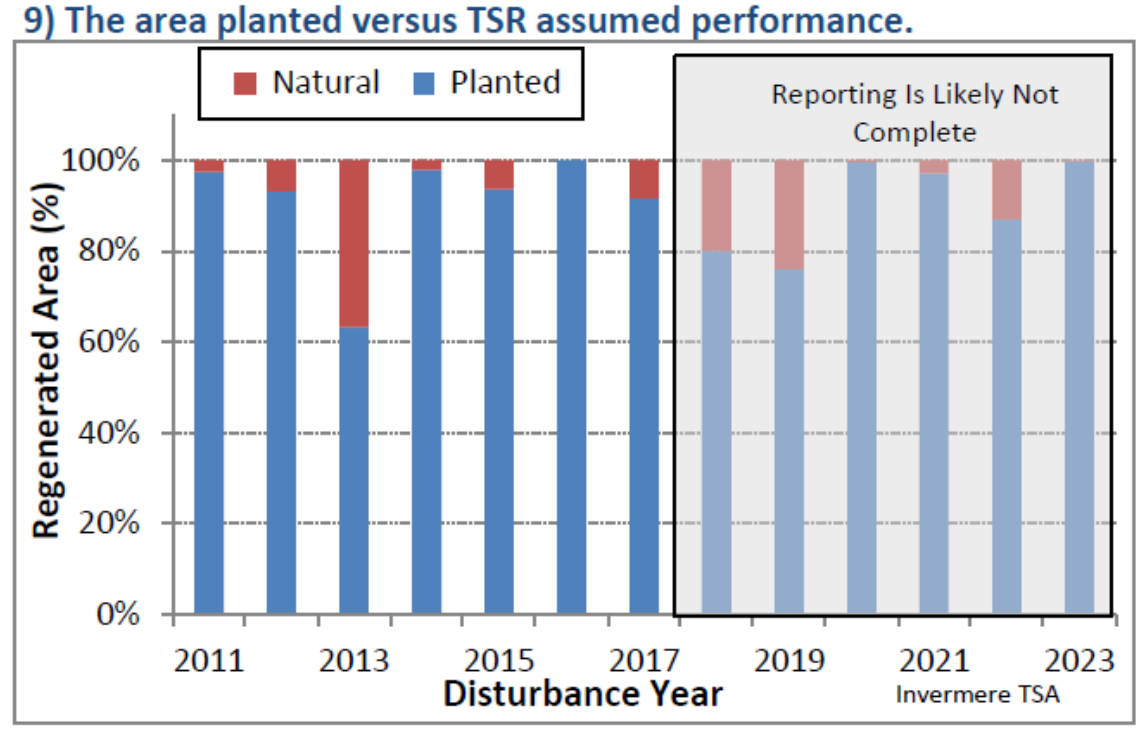


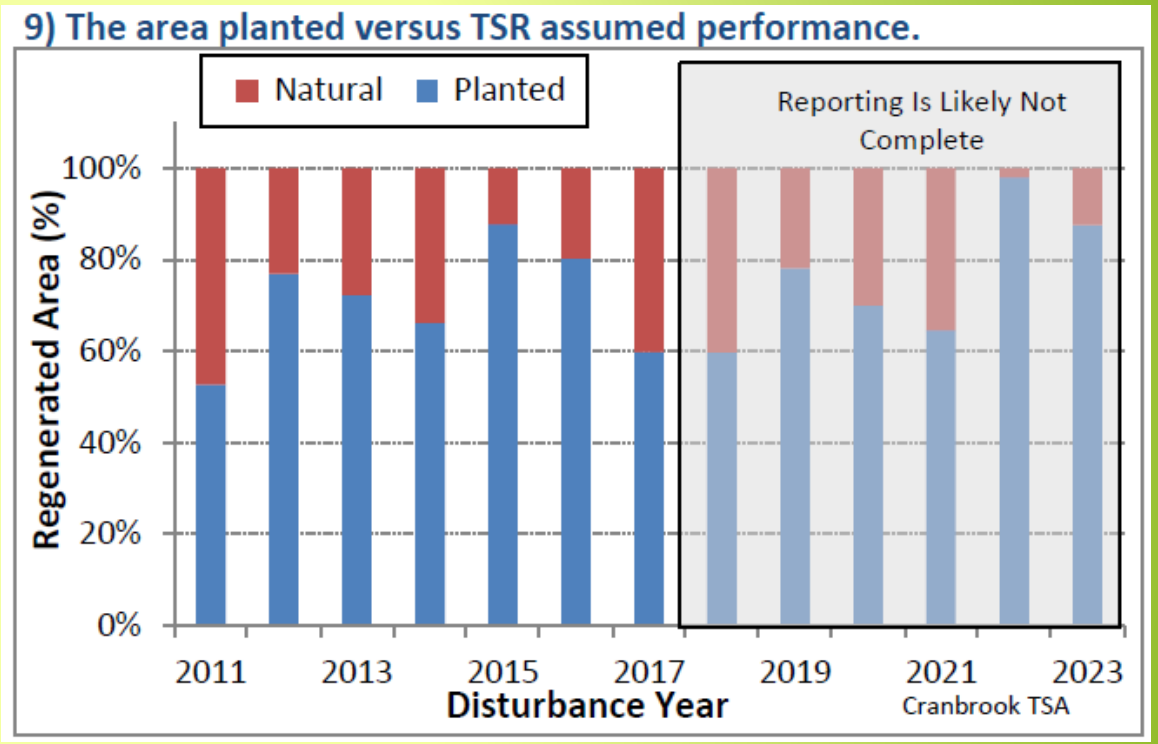


Hundred Mile House TSA

Kamloops TSA

How much Natural Regen are we really relying on?

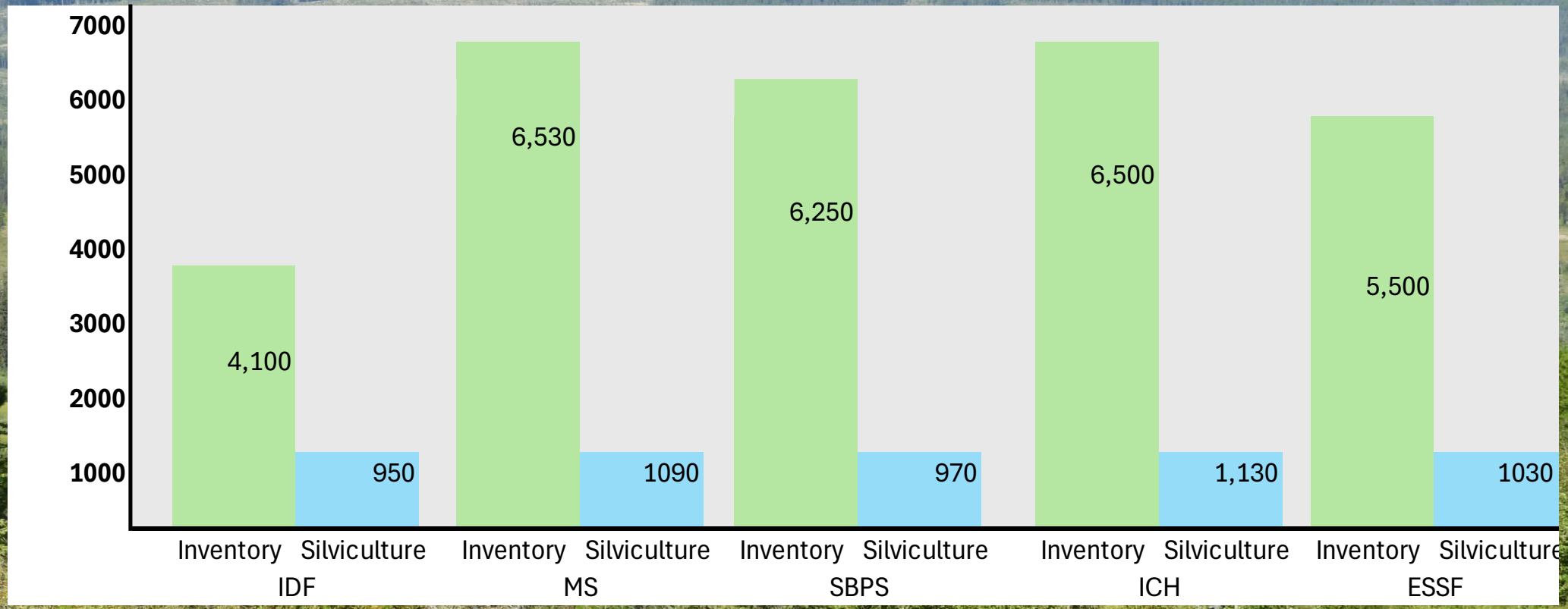




Invermere TSA

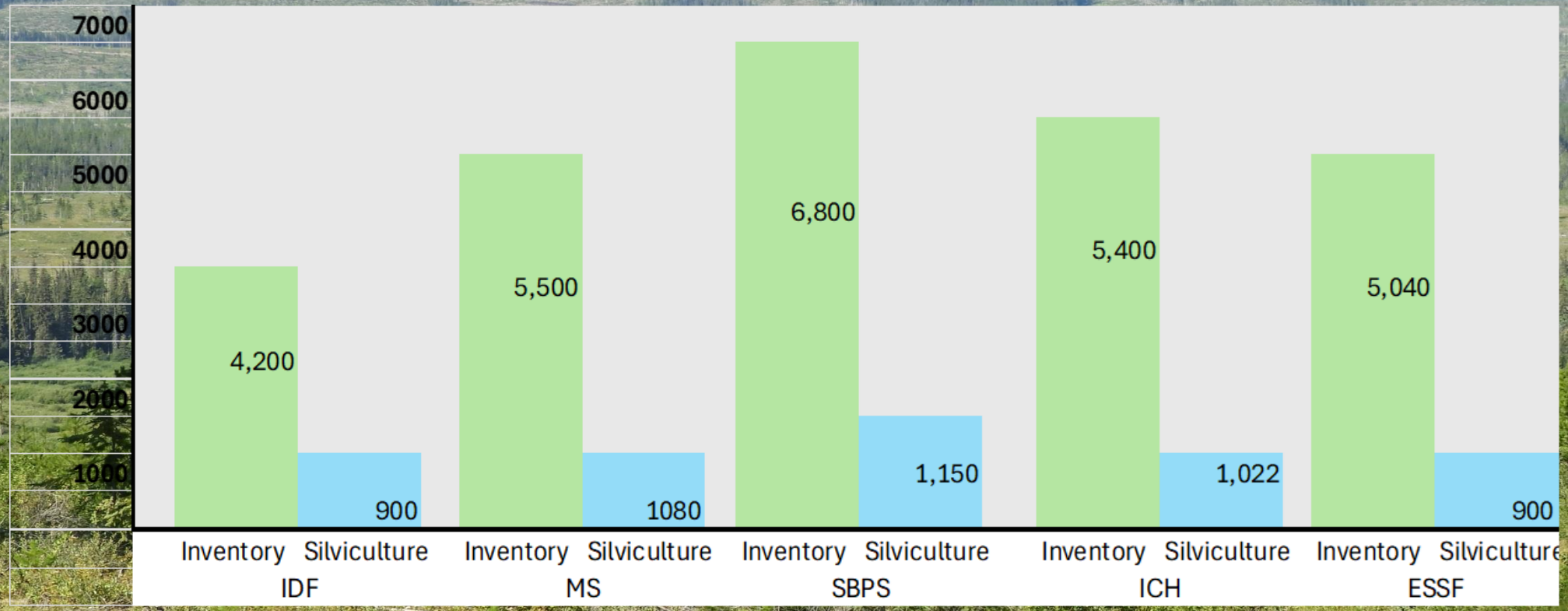
Cranbrook TSA

What do our actual inventory labels look like??



DMH Forest Cover Reporting 2010 - 2019

What do our actual inventory labels look like??



DKA Forest Cover Reporting 2010 - 2019

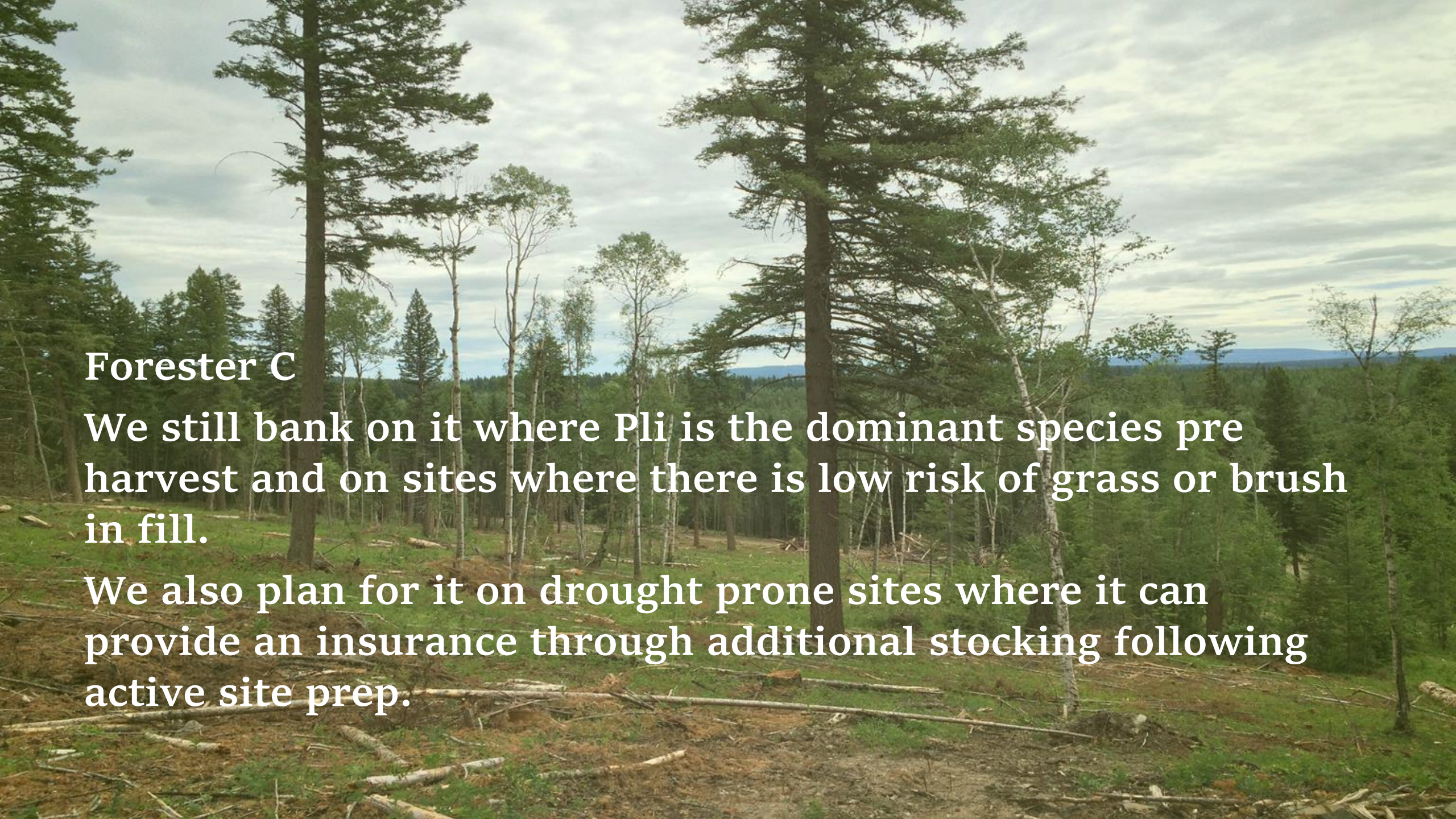
Post Mountain Pine Beetle. What are we doing Now??

Forester A

We still have some specific sites where we can rely on naturals and that is our first choice, but mostly we want the shorter regen delay and to get improved A class seed on site.

Forester B

We are not in the MS anymore! In the ESSF we plant everything with A class Sx but expect some naturals for insurance. Same in the ICH where we can occasionally get some Fdi. In the IDF we are moving to heavy retention and I am hoping for some regen but am prepared for fill planting.

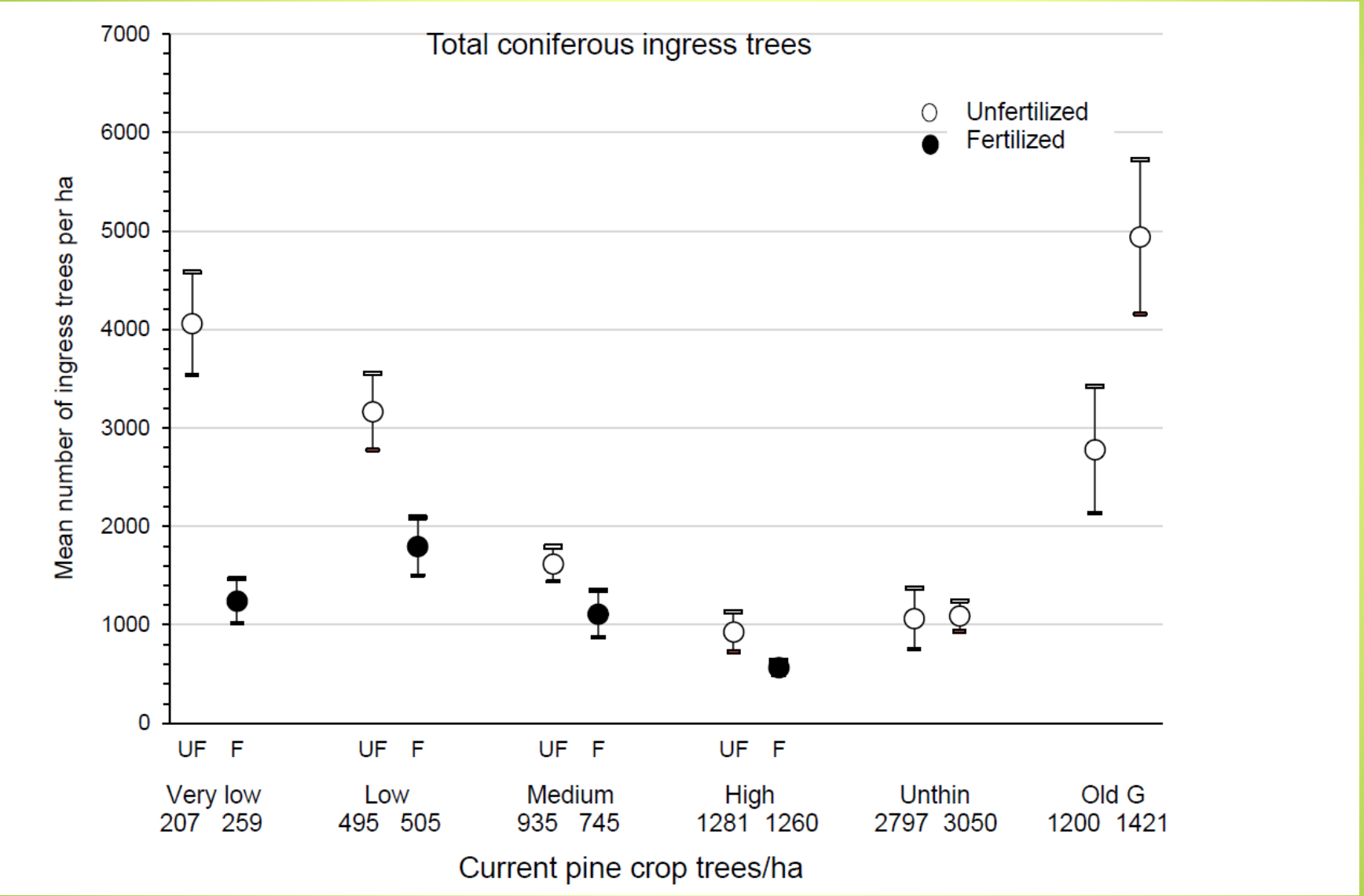


Forester C

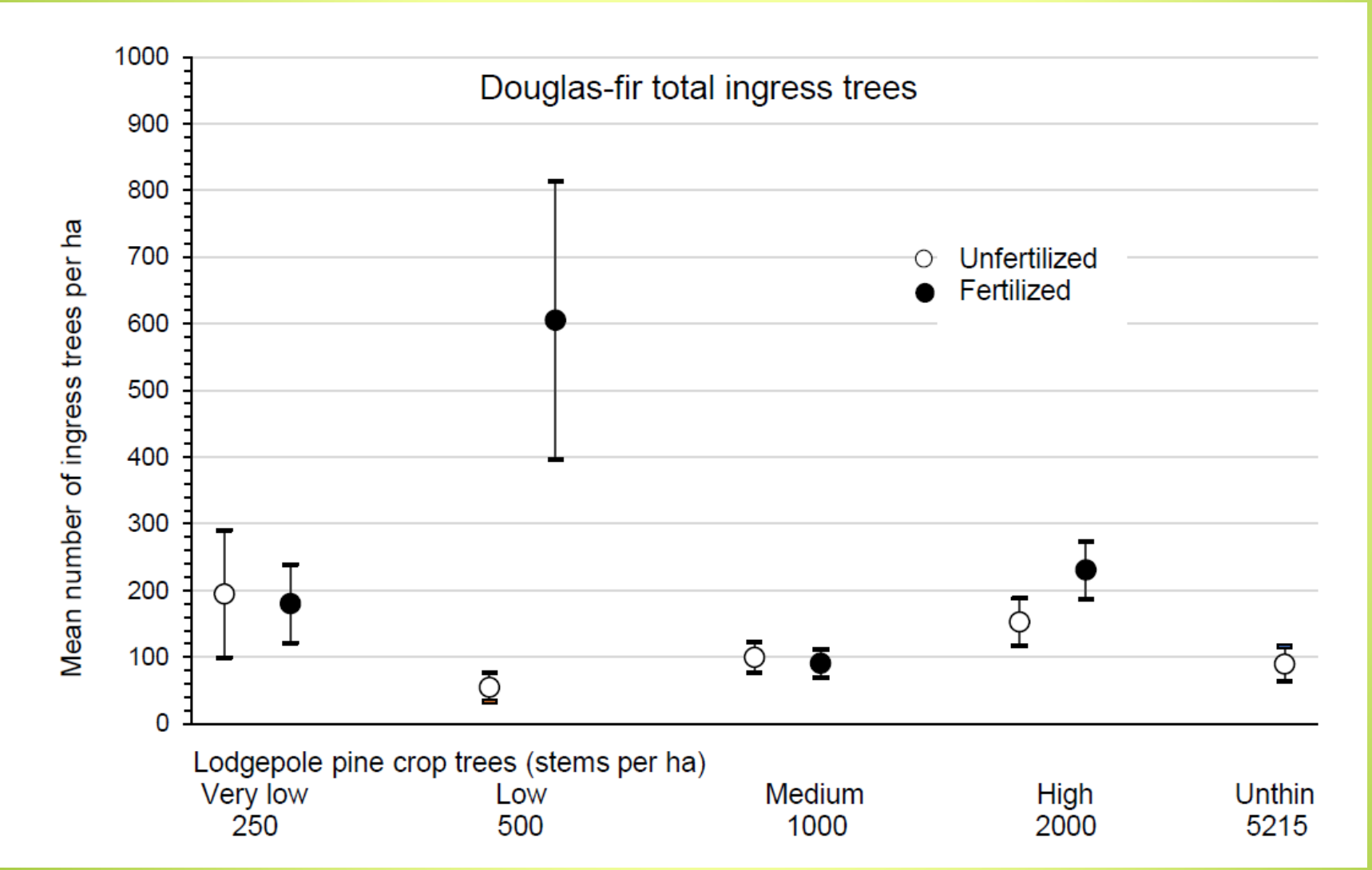
We still bank on it where Pli is the dominant species pre harvest and on sites where there is low risk of grass or brush in fill.

We also plan for it on drought prone sites where it can provide an insurance through additional stocking following active site prep.

Conifer Ingress at a 30 year old silviculture trial near Summerland



Douglas fir ingress - Summerland



Wildfire and Natural Regeneration

From Black to Green

2003 Okanagan Fires

Total regeneration densities of over 500,000 sph in places

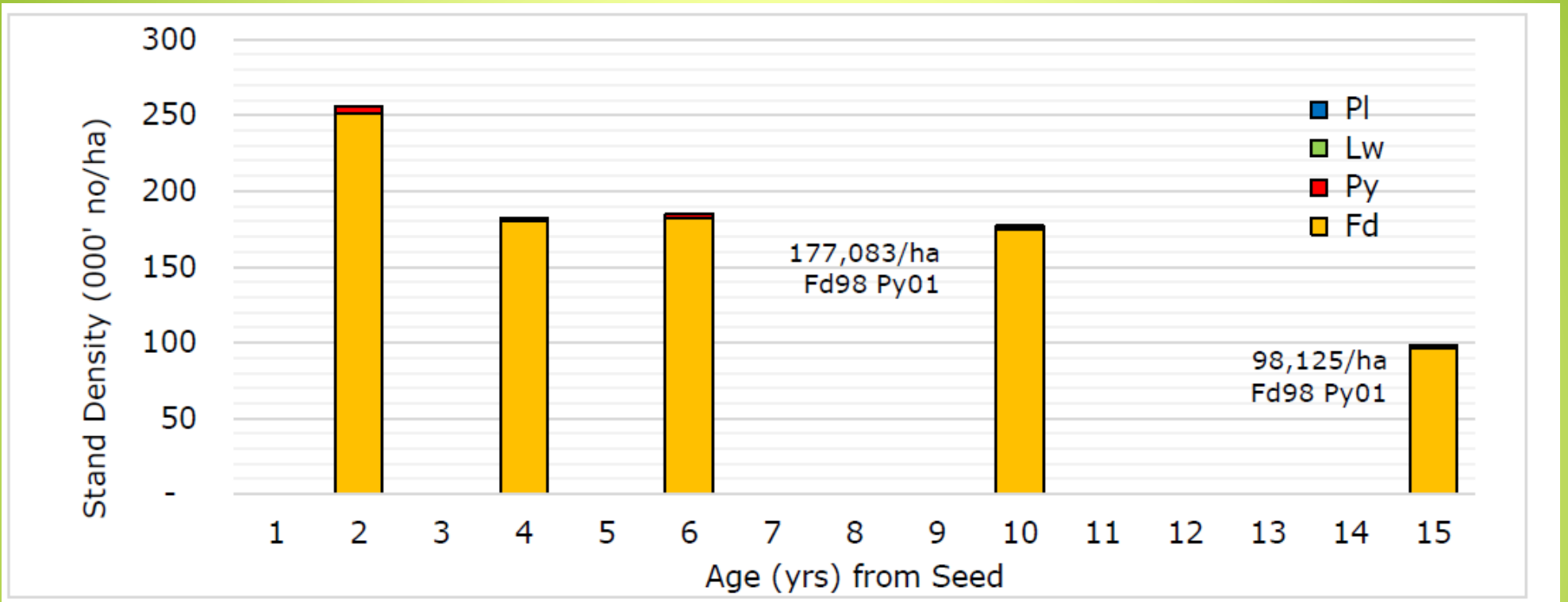


Figure 2. Site 1 (Fd leading) - stand density (average for all sample points). Labels beside the 10- and 15-year bars show stand density and species composition.

Douglas fir dominated site

Thanks to Weyerhaeuser Princeton for the data

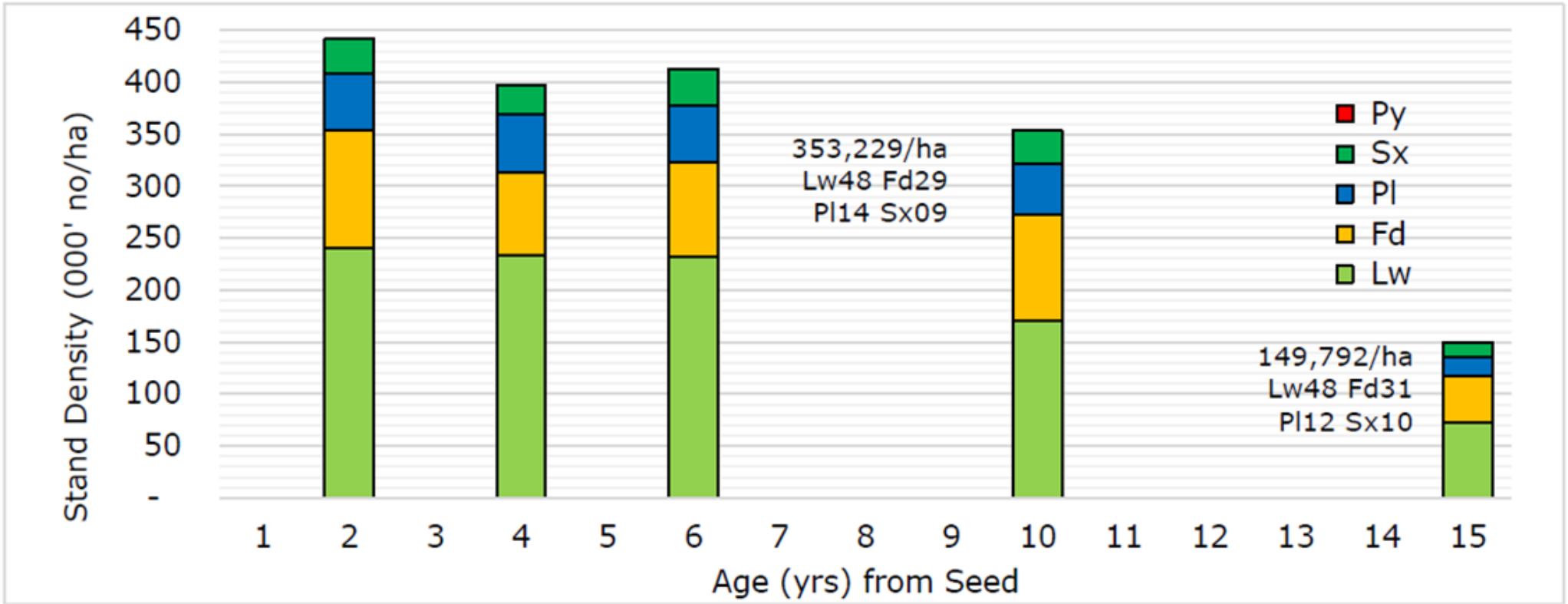


Figure 5. Site 2 (Lw leading) - stand density (average for all sample points). Labels beside the 10- and 15-year bars show stand density and species composition.

Western larch dominated site

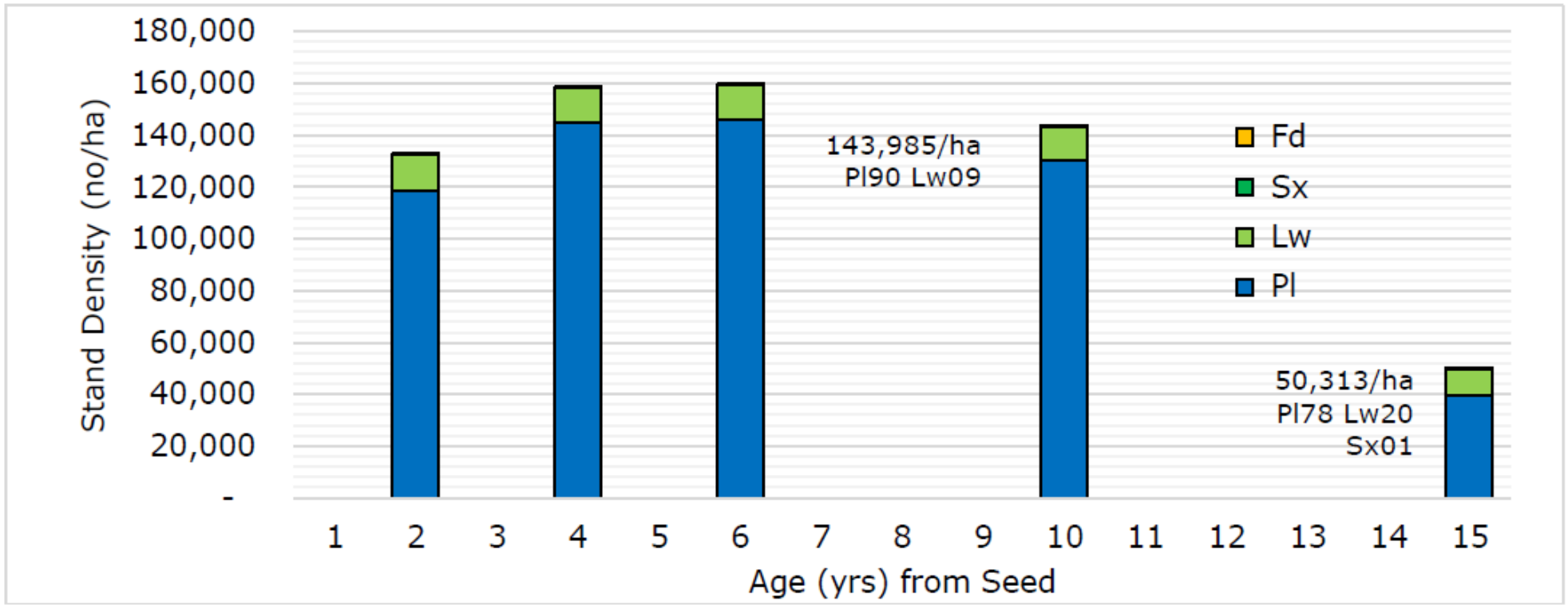
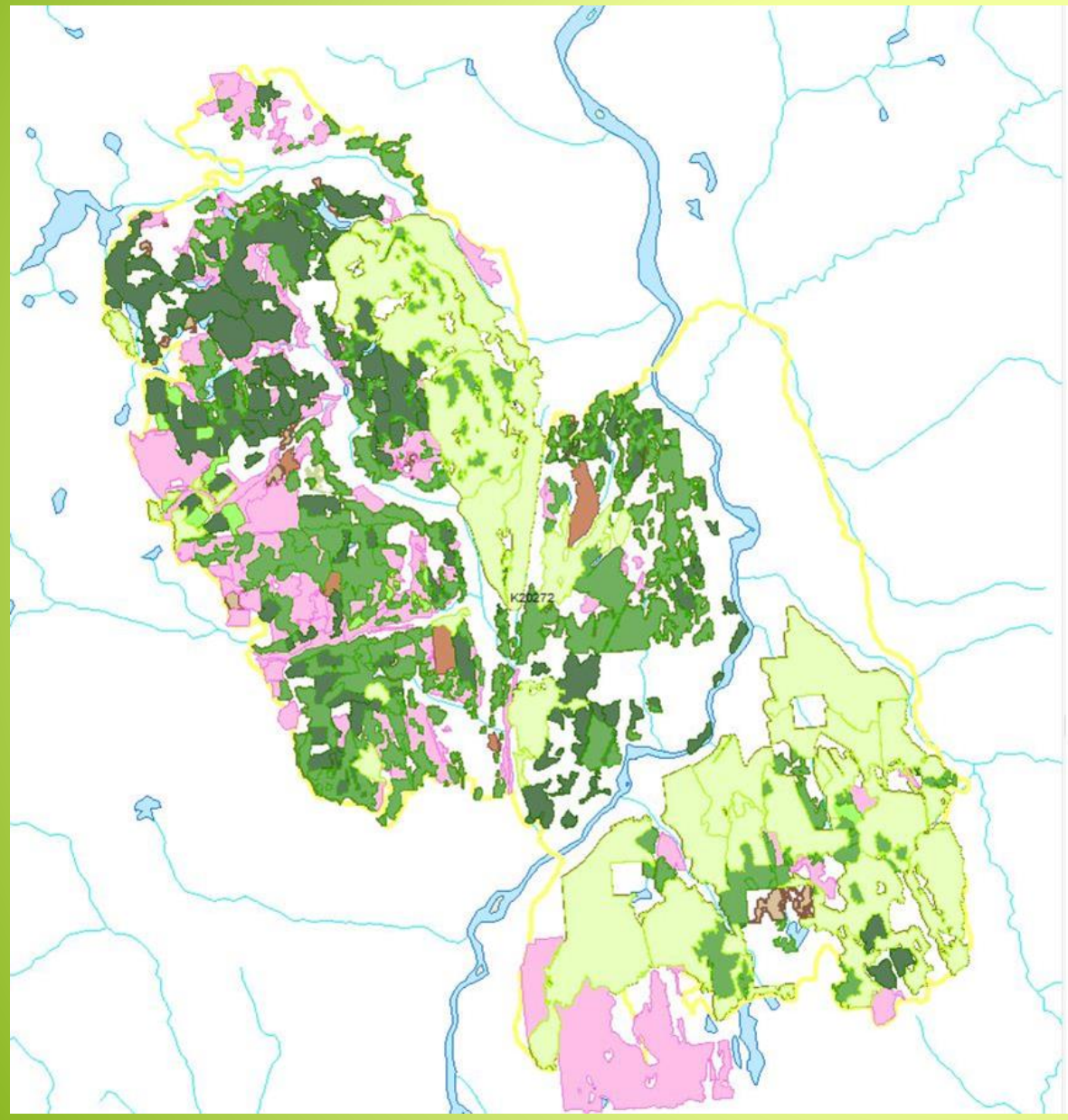


Figure 8. Site 3 (Pl leading) – stand density at the most recent (15 year) and previous measurements. Labels beside the 10- and 15-year bars show stand density and species composition.

Lodgepole pine dominated site

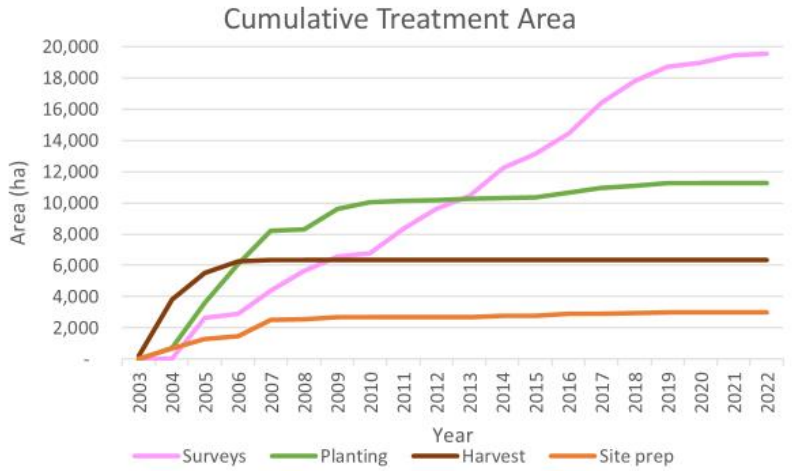
Post Wildfire Reforestation



McLure Fire (2003)

Gross fire area (ha): 27,137
THLB (ha): 10,289

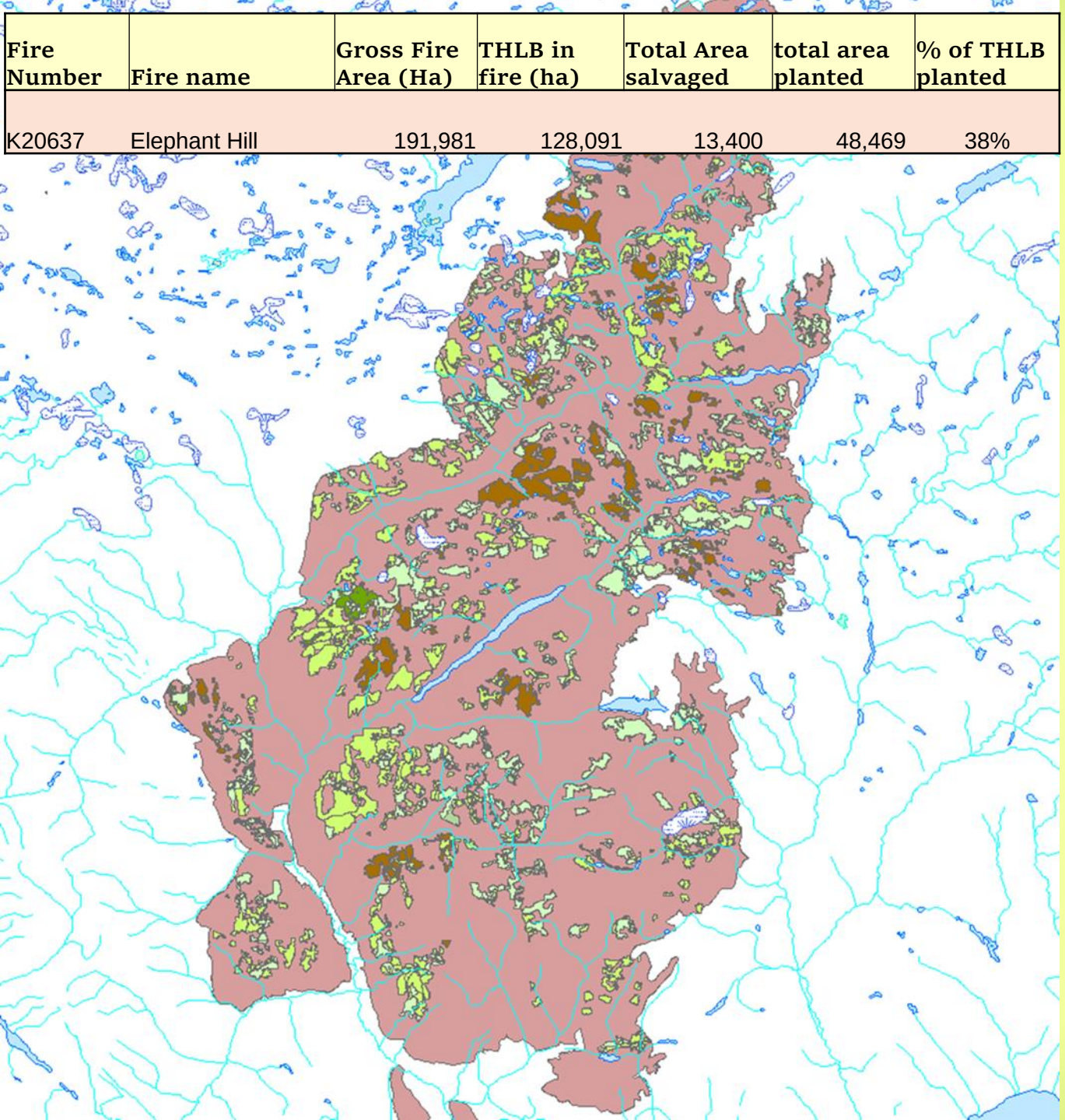
Activity	Area (ha)	% of THLB
Harvest	6,175	60%
Surveys	7,516	73%
Site prep	2,506	24%
Planting	8,997	87%



Silviculture Activity on more recent fires

Fire Number	Fire name	Gross Fire Area (Ha)	THLB within fire (ha)	Approx Unburned Area	Total Area salvaged	total area planted	approx. % of unburned THLB planted
2017							
C10784	Plateau fire	520,797	400,707	39%	5,159	34,893	15%
C50647	Hanceville fire	239,337	132,139	25%	9,631	34,380	35%
K20637	Elephant Hill	191,981	128,091	17%	13,400	48,469	45%
2018							
R11498	Shovel Lake	92,691	67,292	24%	3,065	13,342	26%
R21721	Nadina lake	88,082	57,071	20%	5,453	16,610	36%

Fire Number	Fire name	Gross Fire Area (Ha)	THLB in fire (ha)	Total Area salvaged	total area planted	% of THLB planted
K20637	Elephant Hill	191,981	128,091	13,400	48,469	38%



Total Planted area	48,469 ha
Planned replanting	15,000 ha
Potential Total Planted	~65,000 ha
Area with FC update From survey (not planted)	15,000 ha
Area leading broadleaf	4,283 ha
Remaining THLB	~ 43,000 ha
Approximate unburned inside fire perimeter	17%

UBC ecosystem recovery monitoring at Elephant Hill

!: Mean and median live conifer stems per ha (<1.3 m) in 2021

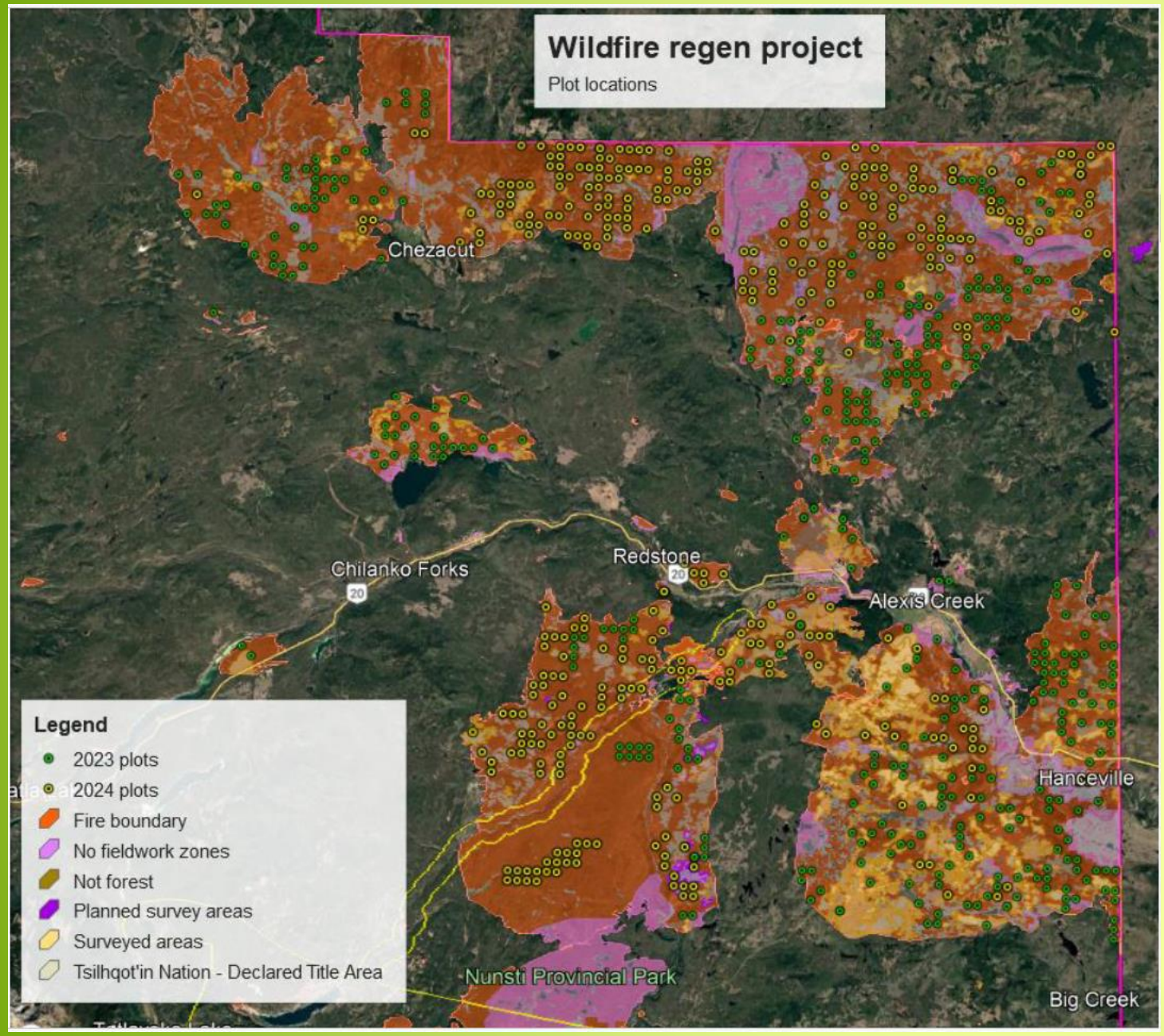
Mean (median) conifer stems per ha			
	Unburned	Low-Mod severity	High severity
Ponderosa pine	377 (0)	90 (31.5)	16 (0)
Interior Douglas-fir	628 (288)	8574 (670)	2534 (117)
'Spruce' (MS, ESSF, SBPS)	2,943 (1451)	11,130 (13,234)	12,682 (17,212)

Note: most regeneration in 'Spruce' BEC zones was lodgepole pine.

- 104 plots establish in 2018 across the fire
- Data collected in 2019, 2021 and again in 2024
- Main focus understory plant communities but excellent forest cover development
- Snag fall rate data being collected.

Data courtesy of Sarah Dickson-Hoyle and Lori Daniels UBC

Wildfire and Natural Regeneration
Chilcotin Plateau – 2023/24 inventory update



Take aways

1. Overall, this area has successful natural regeneration
    1. Planting has targeted regen failure areas
2. Pine is most abundant
3. Overstocking might be more of an issue than regen failure
4. Fir and spruce are much smaller than pine and aspen
5. Fir is mainly in the IDF and more abundant in low severity burn patches – needs protection and live mature fir for seed source

BEC and species

BEC	Sp	N	Ave seedlings	Ave stems/ha	Ave seedlings >30cm	Ave >30cm stems/ha
IDF	AT	140	23	4686	21	4237
	FDI	173	127	25471	3	695
	PLI	163	39	7712	23	4665
	SX	23	15	3078	3	670
MS	AT	11	23	4527	18	3527
	PLI	43	233	46600	134	26735
	SX	2	3	600	0	0
SBPS	AT	139	28	5508	24	4872
	FDI	22	13	2600	1	145
	PLI	461	203	40513	137	27496
	SX	64	19	3822	3	588

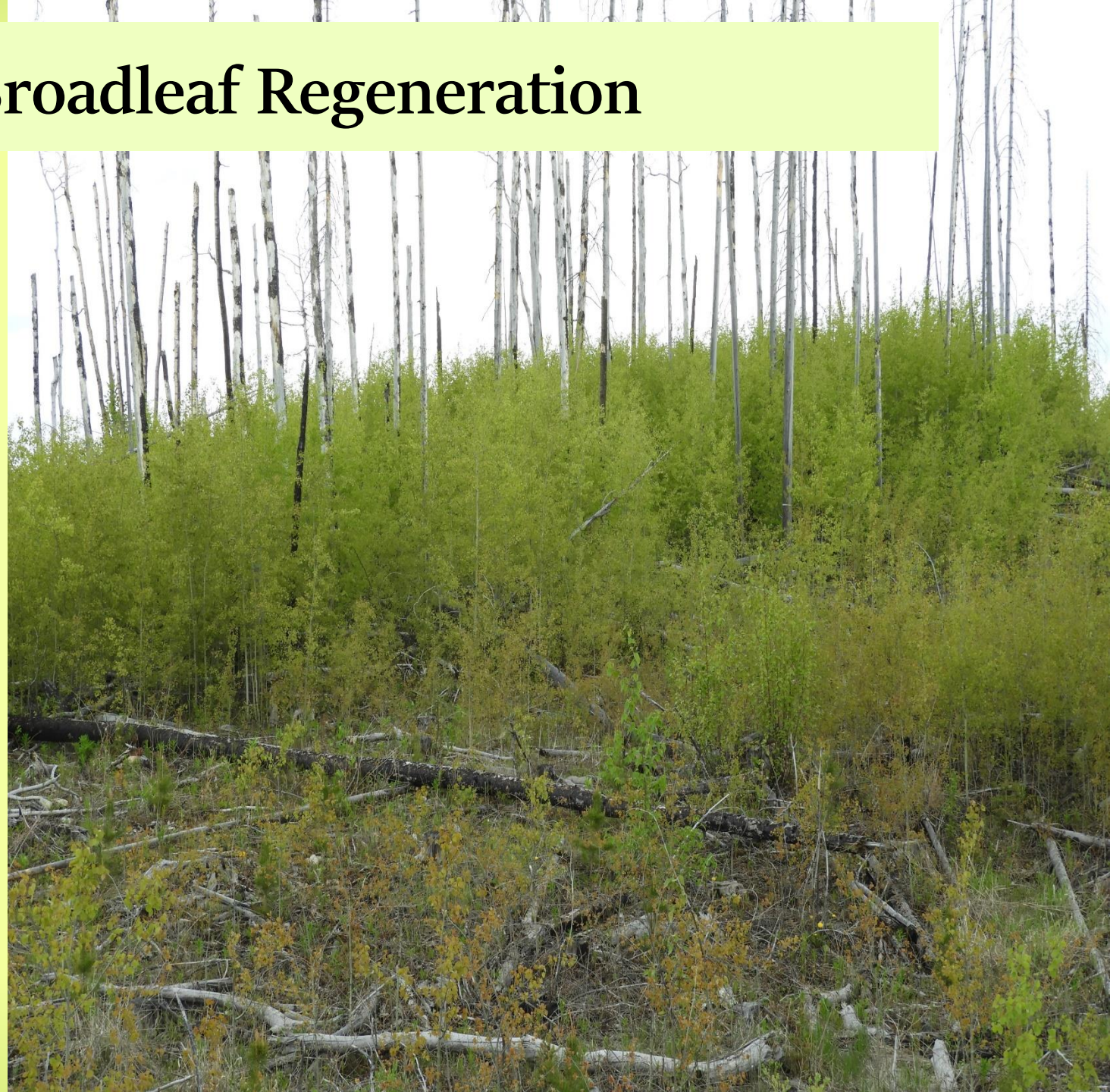
*Pine and aspen are larger. Fir and spruce smaller.

*Pine is the most abundant species.

*Fir is mostly in the IDF, none in the MS.

Wildfire and Broadleaf Regeneration

- Broadleaves an important part of ecosystem recovery
- Assess landscape level objectives
- Passive or Active Management ?
- May depend on competition dynamics
- Consider targets

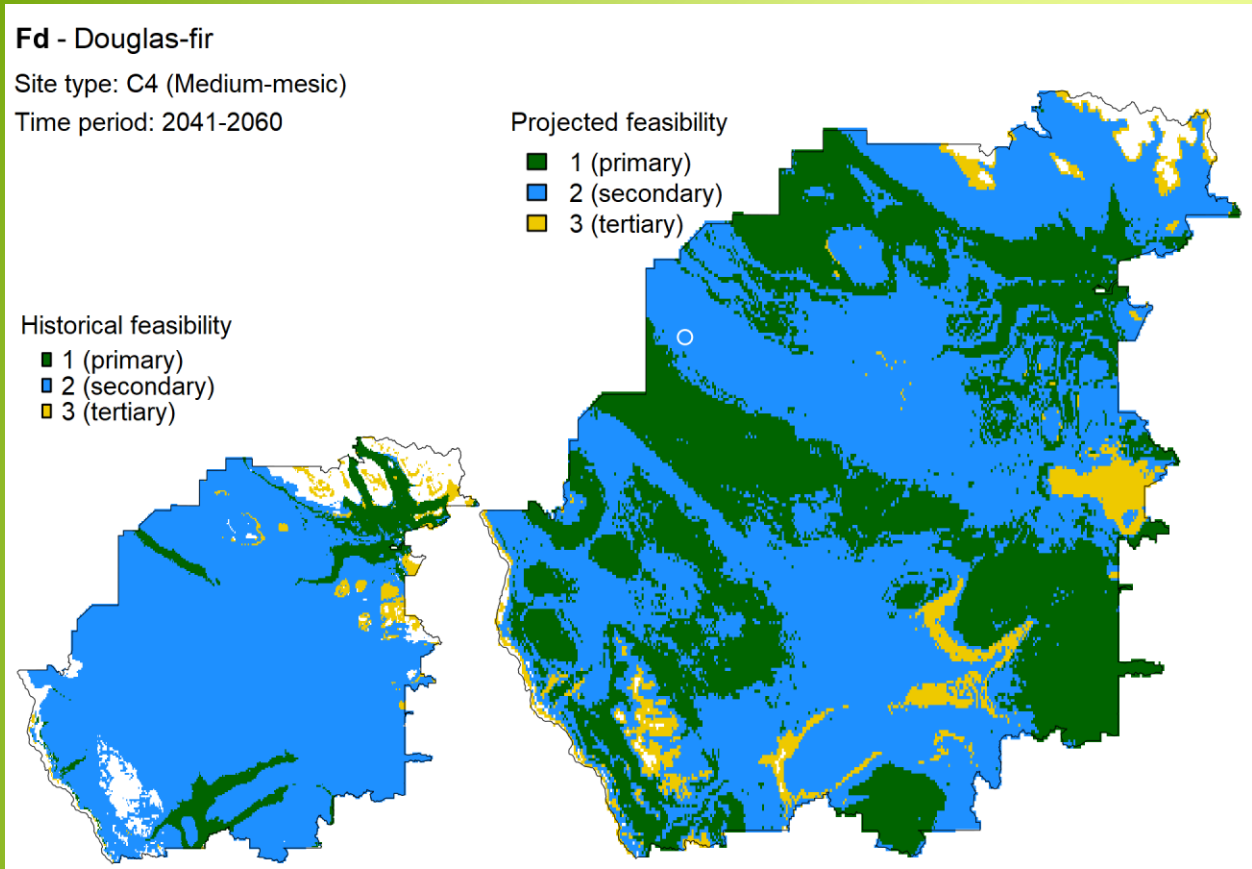


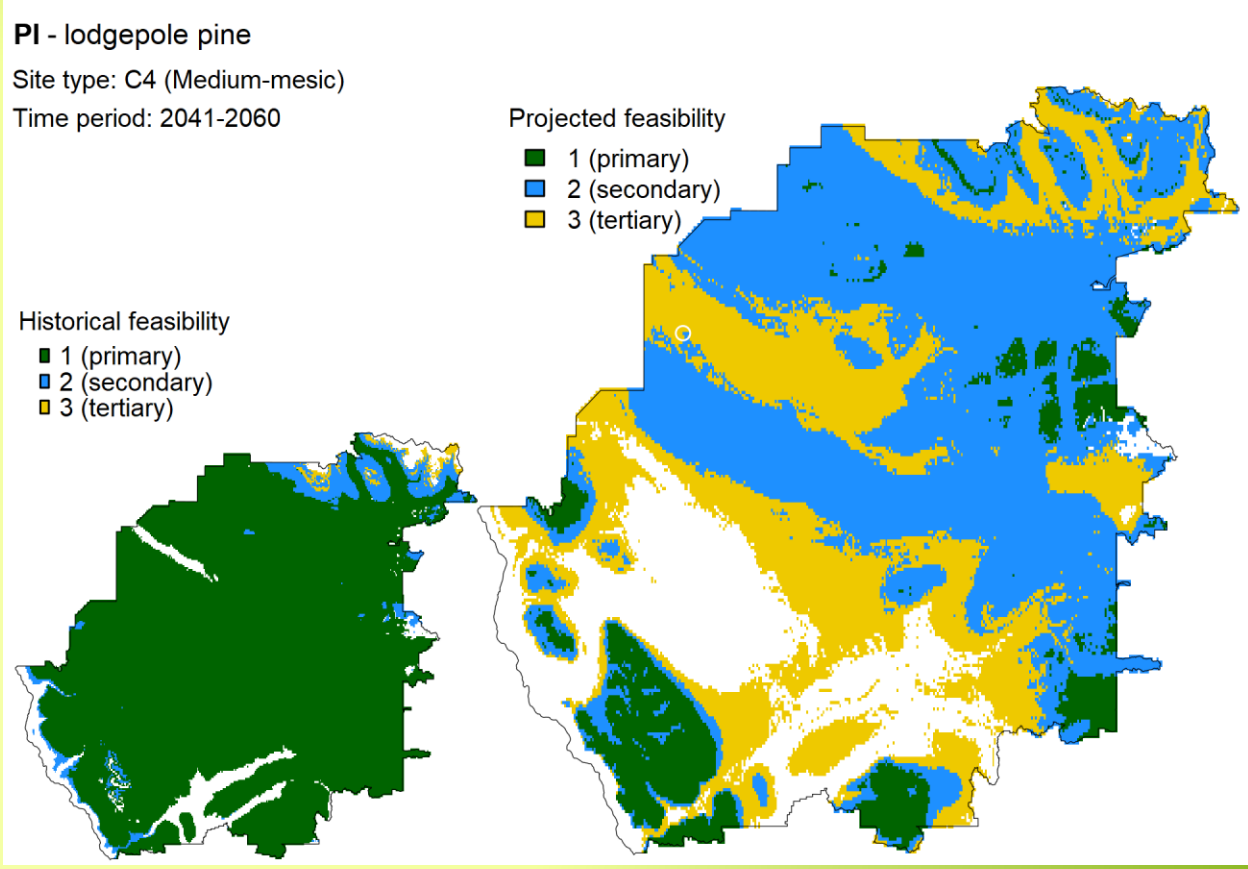
Natural Regeneration and Climate Change Considerations

- Climate Based Seed Transfer
- Climate Informed Species Selection Tool

- Maladaptation ?
- Drought ?

- Resilience ?





Projected feasibility Changes in 100 Mile House

Thanks to Colin Mahony and CCISS for graphic

Drought and Natural Regeneration

1. Our western forests are drying out, trees are more stressed
2. Keeping fire out for 100 years has led to large increase in stocking
3. Fewer trees should equal better moisture status and health
4. Climate adapted and planted trees or naturals ?

- Natural Regeneration is still prevalent in our managed forests
- We still often need it to meet our management goals
- Increasingly we want less density in our forests due to drought and fire risk
- You are going to have to develop local solutions for your situation !!

Discussion Time

Species and burn severity

Sp.	Severity	N	Ave seedlings	Ave stems/ha	Ave seedlings >30cm	Ave >30cm stems/ha
AT	High	10	31	6100	30	5960
	Medium	119	23	4612	20	3998
	Low	89	33	6580	29	5847
	Unburned	12	25	4900	20	4083
FDI	High	6	8	1633	1	167
	Medium	55	70	14022	2	309
	Low	61	180	36075	4	872
	Unburned	15	219	43867	3	533
PLI	High	18	300	59900	234	46800
	Medium	261	219	43782	140	27987
	Low	160	132	26443	70	14063
	Unburned	22	104	20745	29	5755
SX	Medium	29	19	3759	1	186
	Low	41	17	3351	2	429
	Unburned	13	9	1754	2	354

*FDI is the only sp negatively affected by severity = cones are not serotinous, so needs living seed trees

*Again, spruce and fir are mainly in the smaller height classes