

Introduction to the reality and challenges of the Coast-Interior Transition Zone

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Objective:

Identify silvicultural challenges in the CTZ; topics to be developed in subsequent presentations

Thanks:

I'm an operational forester. Every good idea I have was explained to me by somebody more clever than I. I'll name some in my presentation. Forgive me for those I miss.

Approach:

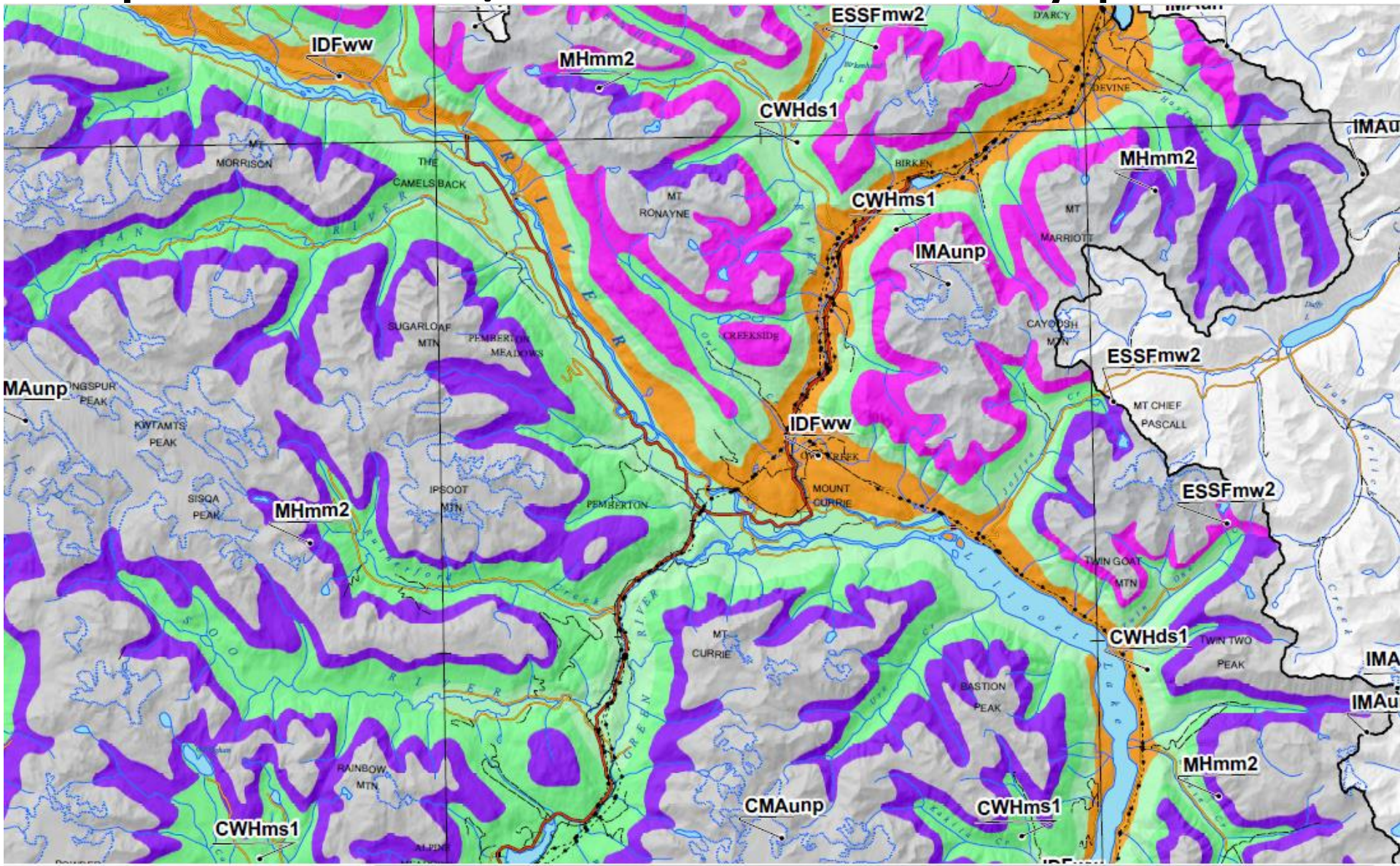
I get great satisfaction from silvicultural challenges. I recommend investing your time and intellect in an area; site specific and intensive management.

Where is
the Coast-
Interior
Transition
Zone?



The Coast-Interior Transition Zone

Squamish FD / Whistler – D'Arcy portion



4.18 IDFww - Wet Warm Interior Douglas-fir Subzone

DISTRIBUTION: The IDFww has limited distribution in the Vancouver Forest Region. It occurs at low elevations in major drainages near the eastern limits of the Region. It is more commonly distributed along southwest-facing slopes. In the southern portion it is present discontinuously from the Lillooet River to the Skagit River. In the northern part of the region it occurs in the Klinaklini and Atnarko river valleys. The elevational limits range from approximately 100 to 1200 m.

CLIMATE (Table 20): The IDFww has a continental climate that is transitional to a maritime climate because of its proximity to the Pacific Ocean. Summers are warm and dry, while winters are cool and relatively moist, with moderate snowfall. Growing season water deficits are very pronounced. This subzone represents the wettest and mildest part of the IDF zone, which is more extensive in the interior of the province.

4.3 CWHds1 - Southern Dry Submaritime Coastal Western Hemlock Variant

DISTRIBUTION: The CWHds1 occurs at lower elevations in drainages of the upper Fraser River east and north of Chilliwack, and in the eastern portion of the Coast Mountains from upper Harrison Lake to the Homathko River. Elevational limits range from valley bottom to approximately 650 m.

CLIMATE (Table 20): The CWHds1 has a climate transitional between the coast and interior, characterized by warm, dry summers and moist, cool winters with moderate snowfall. Growing seasons feature water deficits on zonal sites. Compared to the CWHdm, the CWHds1 has less precipitation, more pronounced water deficits, cooler temperatures, and more snowfall.

4.7 CWHms1 - Southern Moist Submaritime Coastal Western Hemlock Variant

DISTRIBUTION: The CWHms1 occurs at higher elevations in drainages of the upper Fraser River east and north of Chilliwack, and in the eastern portion of the Coast Mountains from upper Harrison Lake to the Homathko River. Elevational limits range from approximately 650 to 1200 m in maritime areas, and from 900 to 1350 m in subcontinental areas further to the east.

CLIMATE (Table 20): The CWHms1 has a climate transitional between the coast and interior, characterized by moist, cool winters, and cool but relatively dry summers. Historically, dry summers have resulted in stand-replacing wildfires, which have contributed to the abundance of Fd in this variant. Snowfall is relatively heavy, particularly in the upper elevational ranges of the variant.

Silvicultural challenges in the CTZ

roughly from greatest to least risk in my opinion

ESTABLISHMENT PERIOD

About 50% to 70% crop tree survival to free-growing (Helmar Hann, Jim Hunt, Rob Scagel)

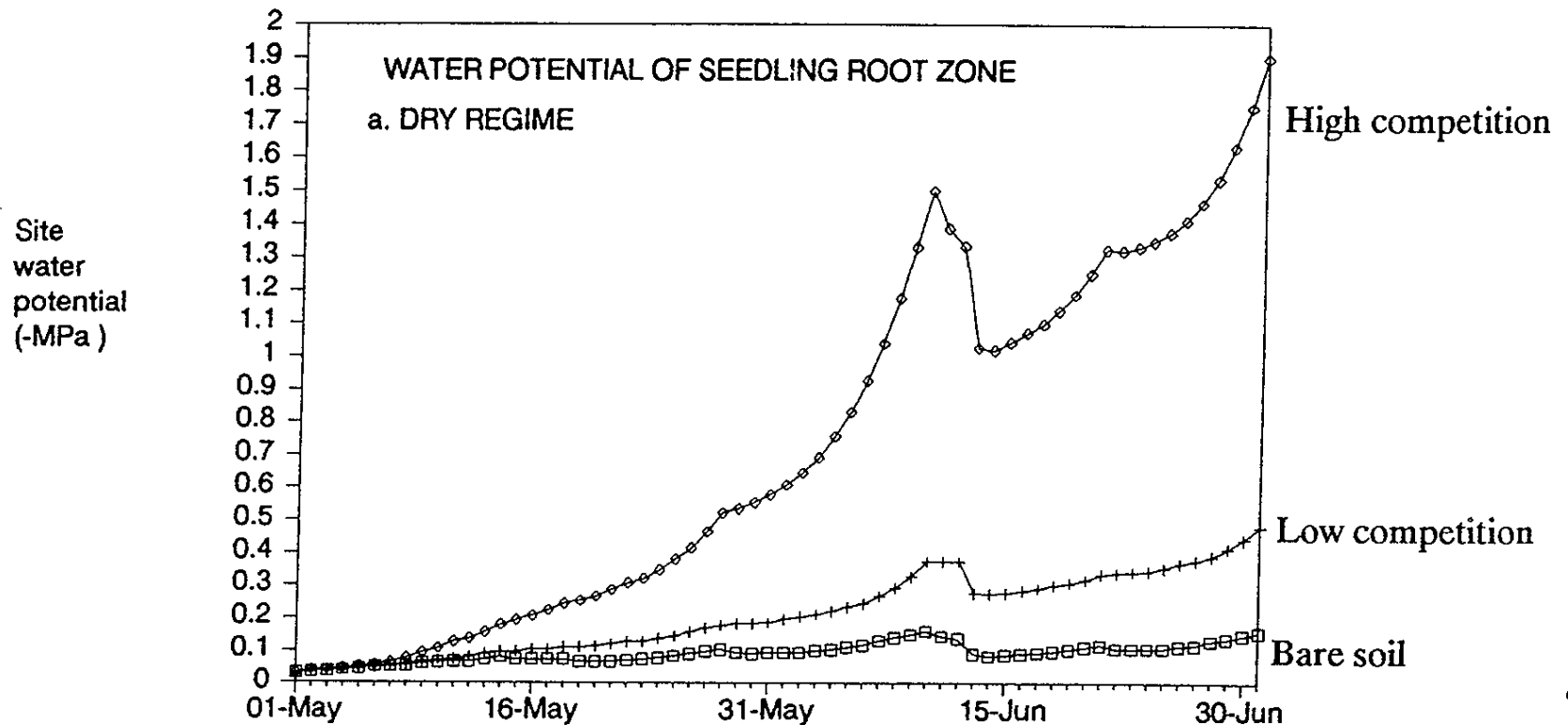
Largest losses occur in the first two years after planting (Frank Pendl, Brian D'Anjou, Jim Hunt).

- Drought during establishment period
- Deer / Rodents
- Vegetation competition

Losses due to drought during the establishment period

At the request of the Transition Zone Working Group (Mike O'Neill, John Clarke, Doug Bacala and me), this topic was further investigated in the early-mid '80s by the Vancouver Regional Research Section (Karl Klinka, Bob Green, Fred Nuszdorfer) and Ministry Research Branch (Dave Spittlehouse, Rob Scagel, Mike Goldstein).
Primary research site Ryan River: 350 m elev;
CWHds1; SL; 35% CF; 15% slope; SE aspect

Some harsh reality from the Ryan River



Evaluating the seedling moisture environment after site preparation. D.L.Spittlehouse & S.W.Childs. 1990. In: S.P.Gessel,D.S.Lacate,G.F.Weetman,R.F.Powers. Sustained Productivity of Forest Soils. Proceedings of the 7th N.A. Soils Conf. UBC

Some harsh reality from the Ryan River

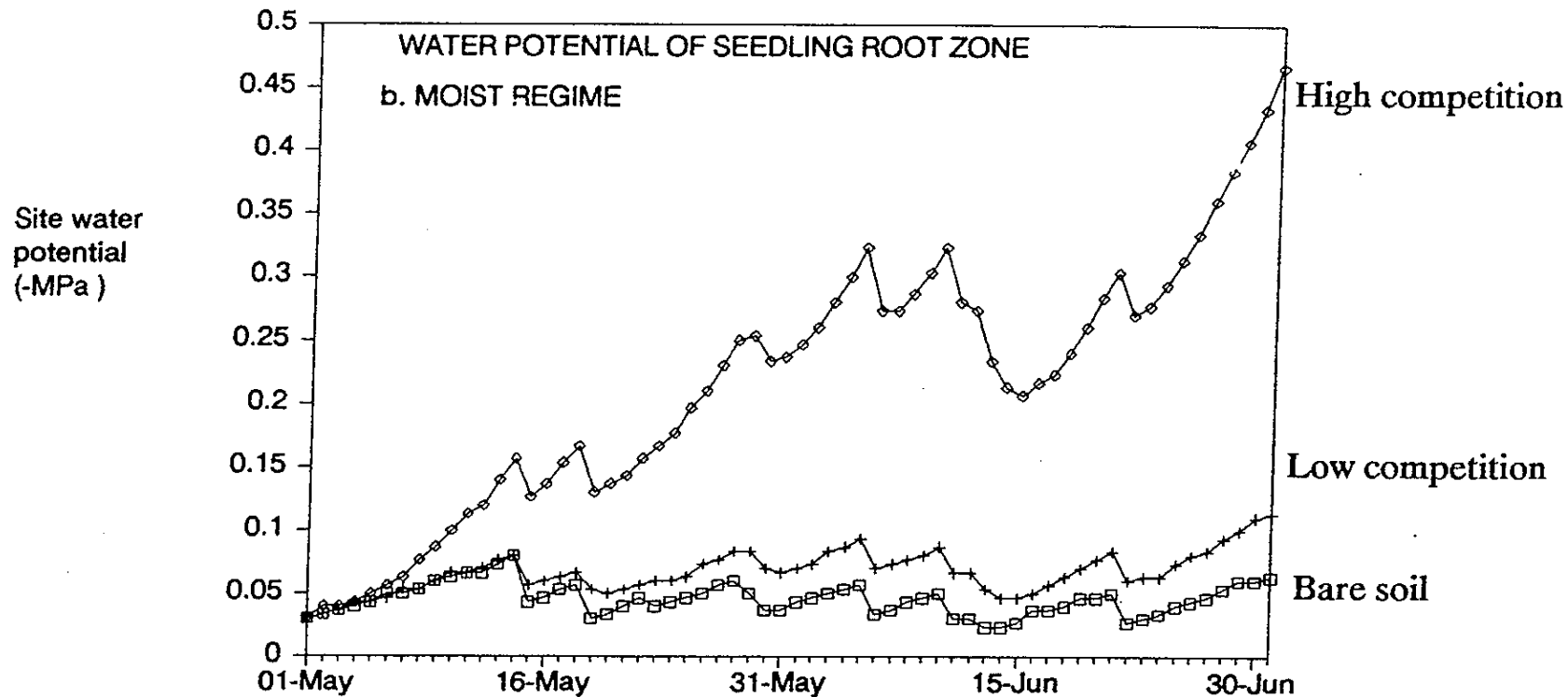


Fig. 4. Modelled soil water potential of the 0.05 to 0.2 m layer during May and June at Ryan River site for a bare soil and low and high levels of vegetation competition. For a. the lower limit of the dry rainfall regime; and b. a moist rainfall regime. The y-axis is scaled differently in the two figures.

Some harsh reality from the Ryan River

Table 4. Occurrence of rainfall regimes and resultant soil moisture categories for May and June, Pemberton Meadows, 1908-1965. Data are percentages rounded off so as to sum to 100. Percentage occurrence of the three soil moisture categories determined from combinations of the rainfall regime shown in Table 3.

		JUNE			
		Extr. dry	Dry	Moist	Wet
MAY	Extr. dry	TOO DRY			
	Dry	17%	MARGINAL		
	Moist	50%		ADEQUATE	
	Wet			33%	

Weather data 1905 – 1968 Pemberton Meadows

Bare soil

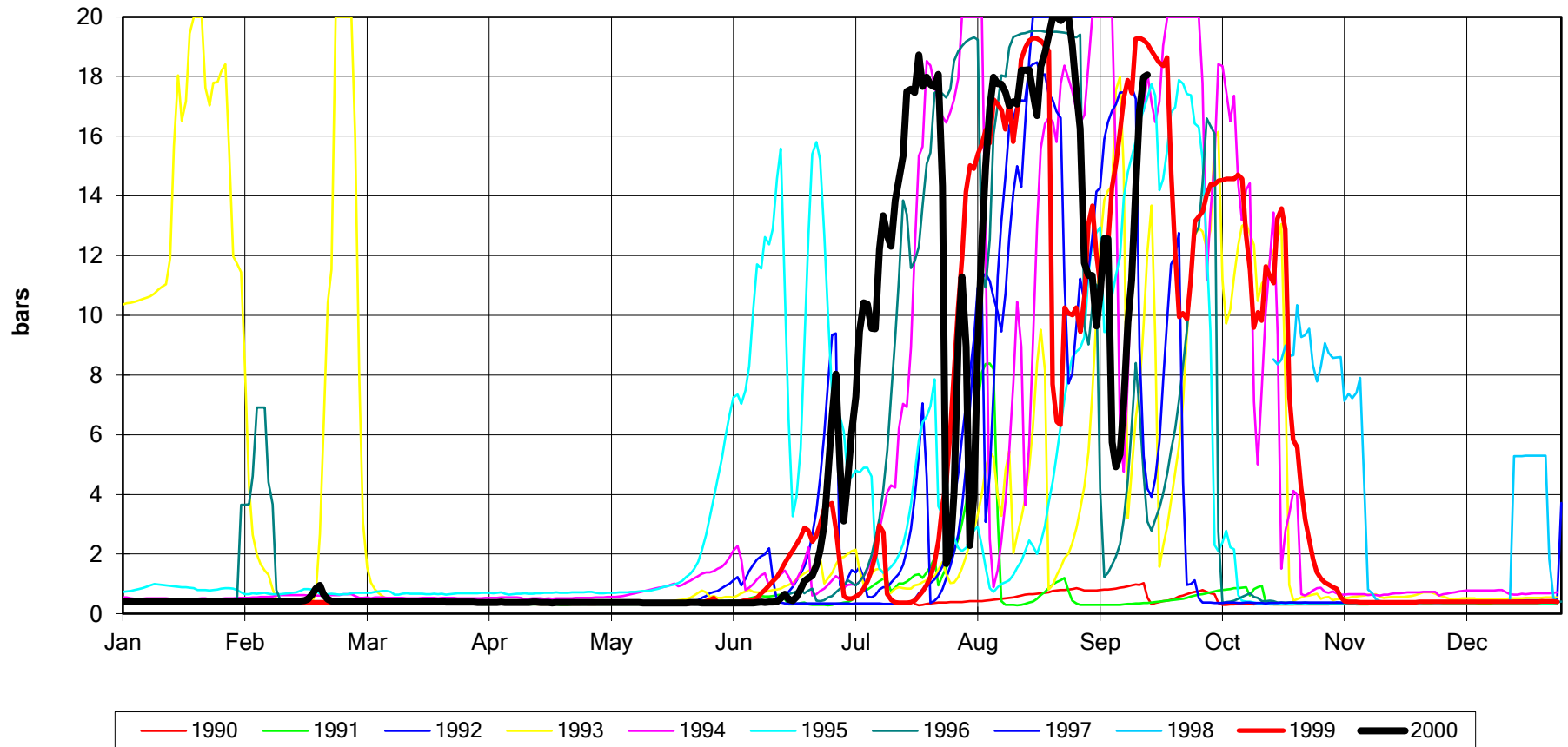
Top 20 cm soil

Rainfall well distributed throughout the months of May & June

IDFww01 soil moisture 1990 - 2000

(Scagel, Runnals)

Darcy Mean Soil Moisture Tension



1 bar = 10 x MPa

Ryan 0.1 MPa adequate and 0.5 MPa cessation of growth

More about vegetation competition and establishment

You're probably aware but to be sure:

- Herbaceous vegetation (especially grass) is much more competitive for available soil moisture in surface soil layers than are shrubs or trees
- 20% surface coverage by herbaceous vegetation is approximately 100% below ground occupancy
- There's generally enough available soil moisture to sustain seedling growth throughout the summer if there's no competing vegetation
- Most problematic sites are south-facing, steep, coarse textured, high CF%

Strategies for successful establishment

- Identify the problem sites and strategy before commencement
- Use selection or shelterwood if high cost or failure from clearcut not acceptable
- Log over a short time period and outside of growing season
- Prompt planting if that will allow establishment in low veg competition environments; otherwise site prep
- Microsite selection for deep soil, mineral soil contact, intact forest floor, shade, low coarse fragments
- Use drought tolerant species
- Frozen-stored stocktypes planted early in the spring on warm spots (Dave Lloyd)
- Big plug, large caliper, branches to base, short
- Survey before next spring and fill-plant as necessary

Site Prep and available soil moisture

(Spittlehouse and Childs, 1990)

Table 1. Effect of site preparation methods on the physical environment for seedlings. Increase or decrease refers to a change relative to no treatment of competing vegetation. The first four factors refer to the soil water budget. Headings are one dimensional water budget terms.

[illegible]

Birkenhead fiasco

IDFww

Logged 1987-88

Planted Sp
1989

700 to 1100 m
elev

70% to 80%
slope

SW aspect

L texture

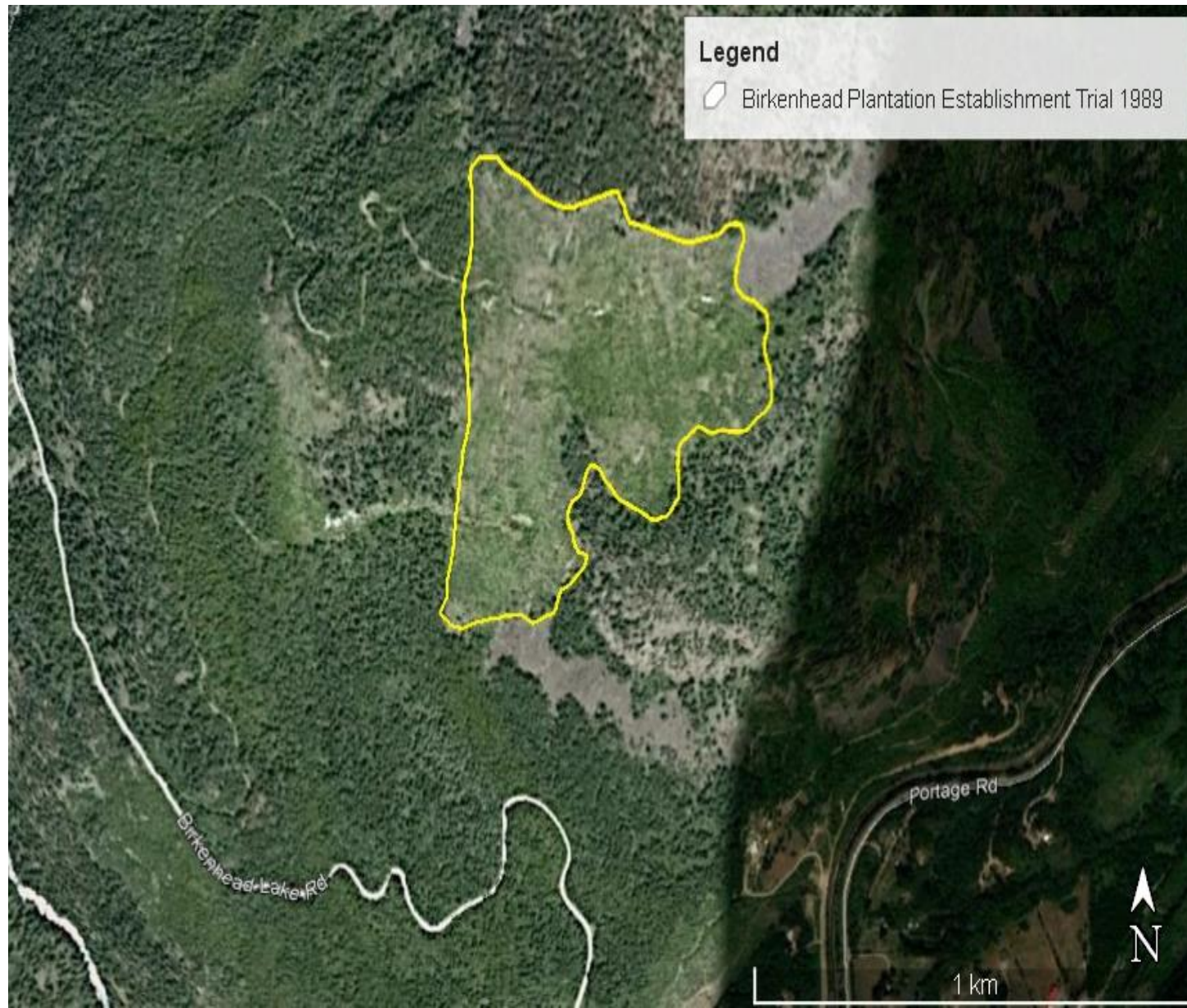
70% – 90% CF

2nd year

survival

Control 30% to
70%

(J.M.Gilliam)



And just when you thought you had
the crop established (Shannon & voles)



Silvicultural challenges in the CTZ

roughly from greatest to least risk in my opinion

AFTER ESTABLISHMENT TO FREE-GROWING AND BEYOND)

- deer / rodents / hares
- snow / ice
- vegetation competition
- insects / diseases
- fire / wind
- social

Deer / Rodents / Hares

20% of planted seedlings were browsed, mostly in the first 2 years after planting (Jim Hunt 2002, Squamish FD Ex Note 03).

- Monitor, fill-plant, protect, control (eat more deer)

Snow / Ice

Seedlings are damaged by snow creep and snow press, the latter usually associated with high height / diameter ratios. This often is the result of tall herbaceous (i.e. fireweed) competition on mesic and better sites in the CWHms1. Current practitioners are concerned it may be associated with high genetic gain.

- Vegetation control
- Species selection on sites where this happens more often than once or twice a rotation

Vegetation Competition

The crop / competing vegetation dynamic affects not only survival but quality and yield.

Often it's an economic decision whether or not to treat.

I have had reason to study this in depth and I'm convinced that pro-active treatments, often with herbicides, are best. From my auditing, I confidently state that we are losing too much potential yield due to vegetation competition.

- Develop treatment thresholds
- Monitor
- Treat when and where necessary using the most cost/effective approach

Insects / Diseases

Mountain Pine Beetle marched through the CTZ during the 80's and 90's despite extraordinary effort to halt it's advance. I wouldn't count on Pl crops. Spruce leader weevil obviated Ss as a crop until weevil-resistant material was developed. It's hammering Sx / Se now in the eastern end of the CTZ. Careful deployment of resistant material is necessary to not encourage the weevil.

White Pine Blister Rust has done unacceptable damage to my old purportedly resistant plantations and, in my opinion, the current resistant material needs very careful deployment just as does spruce.

Spruce Budworm was a localized problem in the eastern part of the CTZ. I just avoided creating multi-canopy layer stands in those areas. I've seen more damage over a larger area in recent years.

Swiss Needle Cast disease, not a problem during my time in the CTZ, is moving in from the coast. At WL0007 in Maple Ridge it's slowing Fdc on CWHdm05 Site Units to the point where Cw and Hw outgrow the Fdc.

- Develop specific management strategies - research
- Monitor
- Treat when and where necessary using the most cost/effective approach

Fire / Wind / Social

With increasing frequency and severity of fire and wind events you will have to go far beyond the usual, conventional management that I have experienced.

You will have to develop and maintain unconventional stands in terms of species and structure designed with yield of forest products as a secondary objective.

Social objectives such as recreation, water, appearance, wildlife and cultural uses as well as wildfire risk will be primary.

I recommend you should approach this as an exciting and rewarding professional opportunity. I wish I could be part.