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PLUG TRANSPLANT TRIAL

Interim Report:

Establishment and Assessment
After Two Growing Seasons

Silviculture Branch
83-01-26



Province of British Columbia
Ministry of Forests

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SILVICULTURE TRIALS and TESTS

REPORT SX 81104 Q

INTERIM

FINAL

DATE 83-01-19

TITLE PLUG TRANSPLANT TRIAL

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S. Willis & C. Clarke (Typed)

Report & Distribution Approved by: R. Brown (Signature)

R. Brown (Typed)

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(Typed) R.C. Jones

1. Location

C.P. 17, Block D, A04463 (Carrier Lumber), Wansa Lake, Prince George TSA (Willow River PSYU), F.D. 2, Prince George Region (see maps, Appendices 1 & 2).

2. Object

To compare the performance of Interior Spruce grown as transplanted plugs with that of PSB 313, 2+0 bareroot, and 2+1 bareroot, when planted on a brush prone site.

3. Treatment & Code

<u>Treatment</u>	<u>Label</u>
PSB 313	PSB
PBR 1+1(PSB 211+1)	PBR
2+0 bareroot	2+0
2+1 bareroot	2+1

4. Plot Layout

4 replications (plots) x 4 stock types x 2 lines per plot x 50 trees per line = 1600 trees in all.

Spacing within rows = 1.5 m; between rows = 3.0 m; between plots = 6 m.

5. Planting Dates & Weather

<u>Date</u>	<u>Conditions</u>
81-05-22	Rained previous night: Limited moisture in top 5 cm, uniformly damp in root zone. Sunny with cloudy periods. Winds 5-15 km/h. Temperature 12-19°C. Following planting: Cool with light showers.

6. Assessed

82-11-10

7. Seedlot #1856

Si 93G16/B2/850 m/Wansa Lake

8. Stock Handling & Condition

Picked up PSB 313 from Koksilah May 18/81.

Picked up remainder from Surrey May 19/81.

Bareroot stock was frozen in storage. Boxes stored in standing timber with tops partly open May 20-21. All planted May 22 by a 3-person hired crew; planting quality was very good.

Condition of stock was generally satisfactory except for some dry tops in 2+1 and some needle cast in the lower foliage of the 2+0.

Heights at planting:	Range	Average
2+0	11-35 cm	21
2+1	18-30	24
PBR	16-41	29
PSB 313	19-30	24

9. Site Factors

(a) Former stand: Spp	S + B P1 F
(b) Biogeoclimatic subzone	SBS
(c) Moisture	Med.
(d) Soil Nutrients	Med.
(e) Seedzone	6010
(f) Elevation, m	910
(g) History	L.79, B.80
(h) Slope % & Aspect	5-15, East
(i) Topography	Lower slope
(j) Soil Texture	Clay & gravel
(k) Organic layer (LFH)	5 cm but mostly absent
(l) Planting in, %	Mineral soil 70, duff, 25, mixed 5
(m) Vegetative competition	Light (in Spring '81)
(n) Slash: % cover & ht., cm.	10-50

10. Results

Table 1: Percent Survival of Four Si Stock Types Two Growing Seasons After Outplanting, by Quality Classes

Stock Type	Good	Condition*			Survival
		Fair	Poor	Dead	
PSB 313	96%	1%	-	3%	97%
2+0 BR	61%	1%	-	38%	62%
2+1 BR	95%	2%	-	3%	97%
PBR 1+1	87%	1%	-	12%	88%

*Good - without serious defect; Fair - with some conspicuous defect that the tree is likely to outgrow; Poor - so seriously damaged that it is unlikely to survive or develop into a merchantable tree.

Table 2: Total Height & Height Growth of the Four Stock Types after Two Growing Seasons

Stock Type	Total Height, cm At Planting	Total Height, cm After 2 Years	Duncan's Multiple Range Test For Height After 2 yrs.*	Height Growth, cm	% Increment
PSB 313	24	42 ¹	A	18	75
2+1 BR	24	34 ³	B	10	42
PBR 1+1	29	37 ²	B	8	28
2+0 BR	21	25 ⁴	C	4	19

*Means with the same letter are not significantly different at $p = 0.05$.

Comments:

- (a) PSB 313 was clearly the best performer, followed by the 2+1. Growth of 2+0 bareroot and PBR 1+1 was relatively low.

The performance of the PBR 1+1 was disappointing, failing to demonstrate the rapid initial growth of which it is purportedly capable. These results are consistent with those of EP 859 (Early growth and survival of interior spruce stock) authored by R. van den Driessche and R. McMinn and unpublished data provided by E. Van Eerden illustrating there are no performance increases to be gained by using PBR transplants over PSB container stock. Plantations in the Prince George and Smithers Forest Regions will be monitored over the next few years to determine if the use of PBR transplants is warranted.

Three reasons have been suggested for this apparent falldown in performance by plug-transplant stock. PSB's are outplanted with their fibrous root systems intact. Whereas PBR's are subject to root pruning at the nursery which has been found to lower Root Growth Capacity (RGC).

In PSB's the Nutrient Capital Reserve (NCR) is well balanced. However, when transplanted a redistribution of the NCR occurs. This redistribution of nutrients has also been found to lower RGC.

Finally, plug-transplants like bareroot stock are more susceptible to mishandling than PSB's. Further, being a relatively large stock type PBR's are also more likely to be poorly planted than PSB's.

- (b) The site received a hot slash burn in 1980 which significantly set back the growth of brush. After two years the average maximum height of the brush is 45-60 cm which is estimated to occupy 60-65% of the growing area. The main woody species are thimbleberry, raspberry, maple and elderberry.

11. Further Work

After five growing seasons a final assessment of survival, total height, height growth and free-to-grow status will be made. A final report will then be prepared to present the results.

Appendices

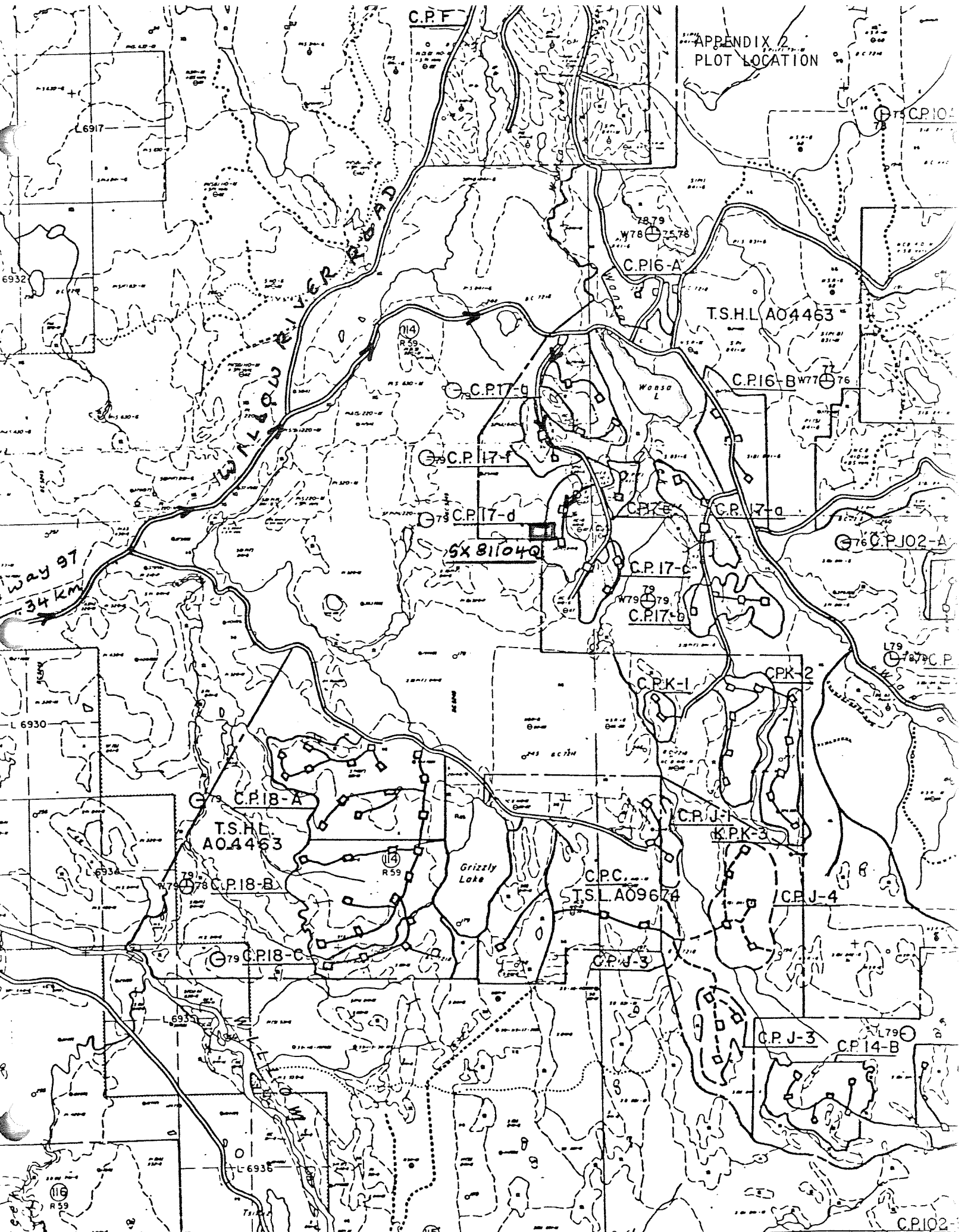
<u>Appendix Number</u>	<u>Subject</u>
1	Key map
2	Plot location
3	Illustrations of stock types
4	Illustrations of the trial site at time of planting and after one growing season.

APPENDIX 1 KEY MAP



Scale 1:250,000 Échelle

APPENDIX 2
PLOT LOCATION

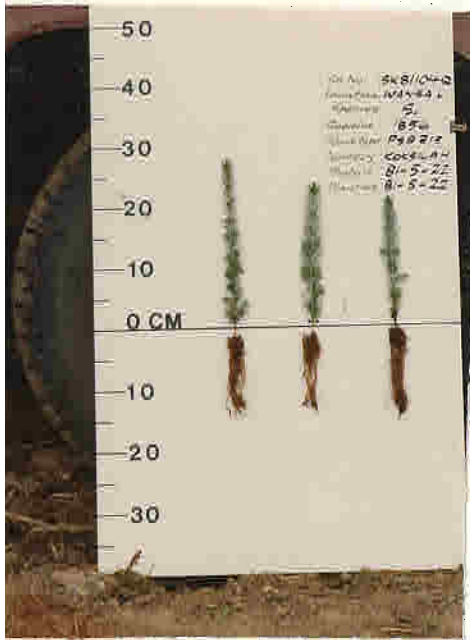


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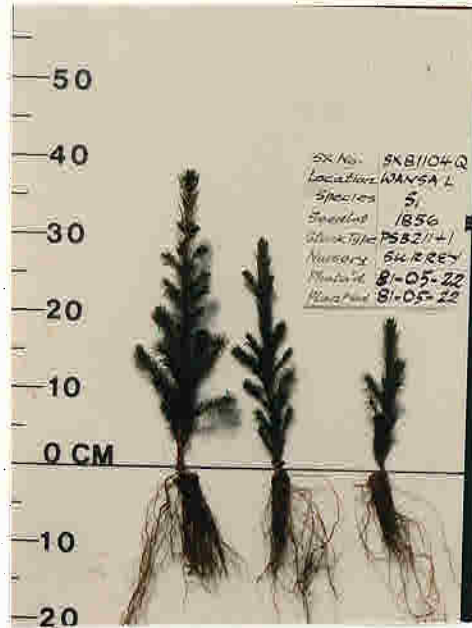
APPENDIX 3

ILLUSTRATIONS OF STOCK TYPES

PSB 313



PBR 1+1



2+1 BR



2+0 BR



SITE AT TIME OF PLANTING



SITE AFTER 1 GROWING SEASON

