COASTAL SILVICULTURE COMMITTEE

Mitigating Projected Timber Supply Declines

2017 Summer Workshop
Mission / Maple Ridge
June 14 and 15, 2017

Aerial Fertilization

Cw 615A one growing season

Commercial Thinning

Fdc with Swiss Needle Cast

Photos courtesy of Kelly Cameron and Jack Sweeten

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Acknowledgements

The Coastal Silviculture Committee (CSC) wishes to thank the following people for contributing their time and efforts in organizing the 2017 Summer Workshop:

Co-chairs	Jack Sweeten	c-604-819-7423	Lauchlan Glen	c-604-831-7189
	Dave Weaver		Don Pigott	c-250-668-4635
	Craig Wickland		Margaret Symon	First Aid Contact
	Shaun Mason		Neil Hughes	
	Jocelin Teron		Chelsey Toth	
	Jacob Bapty		Tyler Rochon	

On behalf of the CSC, the organizing committee would like to thank all the presenters for taking the time out of their very demanding schedules and lives to share their experience and knowledge with the rest of us.

Mitigating Projected Timber Supply Declines
"The summer field review"

The 2017 Summer Workshop will be in the **Fraser Valley on June 14 and 15**. In keeping with the theme of the Winter Workshop**, "Mitigating Projected Timber Supply Declines,**" the Workshop will focus on opportunities to evaluate the impacts of silviculture and climate change on timber supply projections.

Day One will focus on young stand monitoring at the BCIT woodlot in Maple Ridge. Are second-growth stands meeting growth expectations? Lunch will be catered by BCIT. The afternoon will be spent on the Mission Tree Farm where field stops are arranged to view commercial thinning, aerial fertilization, regeneration with alternate species and the effects of Swiss Needle Cast on FDC plantation performance.
The evening dinner Keynote Speaker will be Del Williams from the Forest Practices Board. He will be sharing the highlights of the most recent report on the *Impact of Second Growth Harvesting* on timber supply.

Day Two is at the UBC Research Forest in Maple Ridge. Presentations will describe the projected effects of root rot, juvenile spacing, FDC progeny selection, and mixed-wood plantations on TSR. We will attempt to answer questions such as: Which FDC seedlots are best for mitigating AAC declines? Does spacing make a difference? Is there a TSR advantage with mixed-wood management?

Lunch on Day Two will be catered by the UBC Loon Lake Camp and buses will return to Mission Best Western by 4.00 PM.

Enjoy!!

COASTAL SILVICULTURE COMMITTEE

2017 Summer Workshop Program – <u>June 14 and 15 – Mission and Maple Ridge</u>

"Mitigating Projected Timber Supply Declines"

DAY ONE - MISSION – June 14th 2017 – *Jack Sweeten Host and Intros*

Time	Location	Activity - Topic	Presenter(s)
8:20 – 8:50 am	Registration (Craig & Don) at Best Western Mission – Welcome (Jack), and outline the day		
8:50 – 9:00 am	Boarding on the buses – via Margaret and Chelsey – *the time keepers*		
9:00 - 9:30 am	**Drive to BCIT Woodlot**		
9:30 – 10:30 am	**Stop #1**	<u>BCIT Woodlot</u> Growth Performance results from a 10-year-old species trial.	**Norm Caldicott** BCIT
10:30 – 10:55 am	**Coffee Break –** *Coffee, tea, muffins, etc.* **Note:** Swiss Needle Cast in 20 yr. stand adjacent to road (plus move to lunch stop)		
10:55 – 11:30 am	**Stop #2**	<u>Young Stand Monitoring (YSM)</u> Are second-growth stands meeting growth expectations? Early YSM Results from Haida Gwaii and plans for the Fraser TSA.	**Rene DeJong** FLNRO, FAIB
11:30 - 12:30 pm	**Lunch –** Catered by BCIT		
12:30 to 1:00 pm	**Drive to Mission**		
1:00 – 2:30 pm	**Stop #3** Large group divided in 3	<u>Swiss Needle Cast (SNC)</u> Is this the new TSR impact pest? 3 talks:	
		1) Hw as an alternative to Fdc with SNC.	**Elske von Hardenberg**, Consultant & **Rob Sandberg** Teal Jones
		2) District SNC ground and aerial monitoring.	**Lucy Stad** FLNRO, Chilliwack
		3) Climate change & monitoring of SNC.	**Stefan Zeglen** FLNRO, Nanaimo
2:30 – 2:45 pm	**Move to Sanders Road**		
2:45 – 3:15 pm	**Stop #4**	<u>Commercial Thinning</u> Is this the answer to mid-term decline? On site results presented.	**Kelly Cameron** Mission TFL
3:15 – 3:25	**Move to Junction of Branch S100/101**		
3:25 – 3:45 pm	**Coffee Break** - *Water, juice, snacks & fruit*		
3:45 – 4:50 pm	**Stop #5**	<u>Fertilization and Alternative Species</u>	
		1) Mid rotation Aerial Fertilization – What are the results via stem analysis?	**Aaron Bigsby** B.A.Blackwell Associates.
		2) Is it better to plant pure stands of alternative species?	**Kelly Cameron** Mission TFL
4:50 – 5:30 pm	**Return to Hotel in Mission**		
5:30 – 6:00 pm	**Social at the Best Western Mission**		
6:00 – 10:00 pm	**DINNER – Best Western Hotel Mission** **1) NEW CSC LOGO IDEAS –** Voting **– Margaret Symon** 2) **KEYNOTE SPEAKER – Del Williams** Forest Practices Board**–** Harvesting Young Stands of Timber on the BC Coast—Does Age Matter? **–** 30 mins and questions 3) **LOGISTICS DAY 2** – Lauchlan Glen		

COASTAL SILVICULTURE COMMITTEE
2017 Summer Workshop Program – <u>June 14 and 15 – Mission and Maple Ridge</u>

DAY TWO – MAPLE RIDGE – June 15th 2017 - *Lauchlan Glen Host and Intros*

Time	Location	Activity - Topic	Presenter(s)
8:00 – 8:10 am	Boarding on the buses– via Margaret and Chelsey		
8:10 - 9:00 am	**Drive to UBC Research Forest**		
9:00 – 10:45 am	**Stop #1**	<u>Root Rots, Juvenile Spacing and Second Growth removal</u> What are impacts on TSR? 3 talks:	
		1) The impact of various assumptions on the rate of harvest of second growth stands	**Doug Layden** FAIB FLNRO, Victoria
		2) The role Root Rot plays in TSR.	**Stefan Zeglen** FLNRO, Nanaimo
		3) What are the implications of the 2016 FFT Report on Juvenile Spacing?	**Monty Locke** FLNRO, Victoria
10:45 – 11:15 am	**Coffee Break -** *Coffee, tea, muffins, etc.*		
11:15 – 11:45 am	**Stop #2**	<u>Fdc Trials</u> Which Fdc seedlots are the best? *Provenance, Progeny, & Realized Gain* defined.	**Jack Woods** Select Seed Ltd., Vancouver
11:45 - 1:00 pm	**Lunch – Sponsored by Teal-Jones Group** (Catered by UBC Loon Lake Camp)		
1:00 to 1:15 pm	**Drive to G Branch**		
1:15 – 2:00 pm	**Stop #3**	<u>Spacing Challenge and Fdc Trials continued</u> Did spacing make any difference and what are the Fdc winners? 2 talks:	
		1) Forest Management Challenge Trial – latest G&Y projections.	**Mario Di Lucca FAIB** FLNRO, Victoria
		2) Review of the Oregon Douglas-fir provenance trial - 45 year results.	**Jack Woods** Select Seed Ltd., Vancouver
2:00 – 2:30 pm	**Coffee Break –** *Water, juice, snacks & fruit*		
2:30 – 2:45 pm	**Move to Stop #4**		
2:45 – 3:15 pm	**Stop #4**	<u>Mixedwood Trial</u> Is there a TSR advantage of Mixedwood management?	**Neil Hughes** FLNRO, Victoria
3:15 – 3:30 pm	**Closing**	CSC – Next Summer in Campbell River	**John Andres** FLNRO Campbell River
3:30 – 4:00 pm	**Bus returns to Best Western Hotel in Mission**		

Version 6 – May 31, 2017

Field Program – Day 1

Mission

Stop #1	Page	BCIT Woodlot	**Norm Caldicott** BCIT
Stop #2	Page	Young Stand Monitoring (YSM)	**Rene DeJong** FLNRO, FAIB
Stop #3	Page	Swiss Needle Cast (SNC)	
		1) Hw as an alternative to Fdc with SNC.	**Elske von Hardenberg**, Consultant & **Rob Sandberg** Teal Jones
		2) District SNC ground and aerial monitoring.	**Lucy Stad** FLNRO, Chilliwack
		3) Climate change & monitoring of SNC.	**Stefan Zeglen** FLNRO, Nanaimo
Stop #4	Page	Commercial Thinning	**Kelly Cameron** Mission TFL
Stop #5	Page	Fertilization and Alternative Species	
		1) Mid rotation Aerial Fertilization – What are the results via stem analysis?	**Aaron Bigsby** B.A.Blackwell Associates.
		2) Is it better to plant pure stands of alternative species?	**Kelly Cameron** Mission TFL
Dinner Keynote Speaker	Page	Harvesting Young Stands of Timber on the BC Coast—Does Age Matter? Forest Practices Board Report	**Del Williams** Forest Practices Board

Maps - Day 1 Mission

Stop #1
BCIT Woodlot – Growth Performance results from a 10-year-old species trial

Name: Norman Caldicott
Affiliation: BCIT / BCIT Forest Society
Position: BCIT Renewable Resources Instructor / Forest Society Director
Responsibilities: vegetation management with a focus on trees / woodlot management – silviculture with students
Academic training: BSc. BSF. Adv Dipl Silviculture
Previous employment: seems like I've been around forever

ABSTRACT:
10 years of plantation development and alternative crop tree species performance on a CWHdm 01/05 Site Unit – repeatedly assessed by students learning silviculture surveys and working on a long-term alternative crop species project.
Introduce BCIT Forest Society and WL0007 – Jonathan Smyth or Norm Caldicott.
Quick look at WL0007 silviculture and various student projects during walk-in to Block 9.
Discussion of opportunities for you to have student projects focus on your topic.
Self-guided walk through Block 9 and then presentation – discussion led by Norm Caldicott:

- quickly: site description, Basic Silviculture Obligation, silviculture treatments, cost, student projects on Block 9 and related topics
- focus: stand and species development over initial 10 years; data from silviculture surveys and individual tree monitoring of Fdc, Cw, Ss, Bg and Yc
- species performance expectation from SIBEC, growth-intercept and adjacent 100-year-old stand compared to actual
- disease and damage agents

Notes

Stop #2
Young Stand Monitoring (YSM)
Early YSM Results from Haida Gwaii and plans for the Fraser TSA

Name: René de Jong, RPF
Affiliation: Forest Analysis and Inventory Branch (FAIB) FLNRO, Victoria BC
Position: Growth and Yield Forester / Data Analyst
Responsibilities: Involved in most aspects of FAIB's ground sampling programs including preparation of project plans, data compilation, and client-driven analyses
Academic training: B.Sc.F., UBC
Previous employment: Timberline, J.S. Thrower, Haida Gwaii Natural Resource District

Young Stand Monitoring in B.C.
The young stand monitoring (YSM) program has been implemented across a number of management units in B.C. It is a change monitoring inventory program, where permanent sample plots are established and re-measured on a grid across a defined and mapped population (15-50 year old stands). Some key objectives of the YSM program are to:

- Describe the characteristics, structure, and change of young stands,
- Report on forest health conditions,
- Assess the accuracy of key attributes (such as species composition and site index) from various inventory data sets,
- Compare results against growth model projections, and
- Help evaluate if young stands will meet timber supply expectations.

Results are presented for one of FAIB's recently established YSM programs

Notes

Stop #3
Swiss Needle Cast (SNC)
Is this the new TSR impact pest? 3 talks

1) Hw as an alternative to Fdc with SNC.

Name: Elske von Hardenberg, RFT
Affiliation: Teal- Jones Group
Position: Contract Silviculturalist
Responsibilities: Ensuring blocks reach free growing
Academic training: Dipl: Forest Technologist**.**
Previous employment: Canfor- Silviculture Technician

Name: Rob Sandberg, RPF ATE
Affiliation: Teal- Jones Group
Position: Forester
Responsibilities: Silviculture, Planning, Operations
Academic training: UBC BSF 1988, SFU GDBA 1999
Previous employment: BA Blackwell (Associate); Weldwood – Quesnel & Coast; Interfor- Sechelt

An ongoing debate amongst foresters for over 30 years; the relegation of western hemlock to secondary or acceptable species status behind Douglas- fir and redcedar in the CWHdm 01 (3-4/A-C) and the CWH 05 (3-4/D-E). The Coastal Western Hemlock -dry maritime (CHWdm) is located throughout the lower Fraser Valley and Sunshine Coast and ranges from sea level to 650m.
Then along comes Swiss Needle Cast (Phaeocryptopus gaeumannii). This foliage disease is presumed to be native to the Pacific Northwest. Since the 1990's the disease has reached epidemic proportions. The current epidemic has slowly spread northward from Oregon impacting Douglas- fir along the way. In 2016, estimates put the disease impacts at almost 250,000ha. The disease is thought to have been influenced by both climate change and the abundance of pure Douglas-fir plantations. Mortality is slow to occur however in Oregon site productivity losses are well-documented.
Considering the influences of climate change and the recent Fraser Valley Roosevelt elk re-introductions; what is the role of hemlock in our zonal CHWdm plantations? Will hemlock be a reliable crop tree? What growth and yield results can we expect? If grown on these sites, what products will second growth hemlock trees produce?

At this stop we will:

- provide a brief overview of the CWHdm biogeoclimatic subzone, with particular emphasis on the 01 and 05 site series;
- provide an update on the Swiss Needle Cast epidemic and demonstrate implications of the disease on a free growing assessment;
- review hemlock growth and yield (along with Douglas- fir and redcedar) on CHWdm zonal sites; and
- discuss the commercial viability of hemlock on CWHdm zonal sites.

NOTES

Stop #3 *continued*

2) District SNC ground and aerial monitoring

Name: Lucy Stad RPF
Affiliation: MFLNRO
Position: Stewardship Forester
Responsibilities: District Forest Health, FSP review & decision recommendation, FREP and other Stewardship duties.
Academic training: BSF, University of Alberta
Previous employment: MFLNRO (& other iterations of the same ministry) since 1985. Various positions in Chilliwack District since 1991.

ABSTRACT:

Increased impacts of Swiss Needle Cast (SNC) on Douglas-fir have been noticed in the western part of the Chilliwack Natural Resource District. Beginning in 2012, the district has been investigating and establishing monitoring systems to quantify the impacts of SNC on Douglas-fir. Lucy will review monitoring data gathered so far and present some initial findings.
She will also describe plans for aerially mapping the impact of SNC throughout young Douglas-fir stands in the southern part of the District.

NOTES

Stop #3 continued
3) Climate change & monitoring of SNC.

Name: Stefan Zeglen, RPF
Affiliation: BC MFLNRO
Position: Forest Pathologist
Responsibilities: Dead trees
Academic training: B.Sc.(For.), M. S.
Previous employment:
1994 to present – regional forest pathologist, Nanaimo
1989 to 1994 – regional forest pathologist, Smithers

ABSTRACT:
Climate Change and Monitoring of Swiss Needle Cast

Phaeocryptopus gaeumannii, the causal agent of Swiss Needle Cast, is a native fungus that periodically causes defoliation of Douglas-fir. The disease causes two-year and older foliage to shed prematurely, potentially affecting tree growth. Although recognized and collected in BC since the 1930's, it is only in the last decade that the disease has been considered more than a pathological solo run. Why the change?
This talk will focus on the big picture – the SNC experience in Oregon, some of the research findings from the Swiss Needle Cast Co-operative run by Oregon State University, the changes in climate and reforestation choices here on the Coast and our understanding of the shift in risk for planting coastal Douglas-fir.

NOTES

Stop #4
Commercial Thinning
Is this the answer to mid-term decline?

Name: Kelly Cameron, RFT
Affiliation: Mission Tree Farm Licence 26 (1996 to present)
Position: Forest Technologist
Responsibilities: Silviculture Program, Site Plans, Cutting Permit applications, forest education, recreation planning, Forest Stewardship plans
Academic training: Diploma of Technology, BCIT, Applied Leadership – Justice Institute of BC
Previous employment:
1991-1996 – Chilliwack Forest District – Woodlot licence program

Topic and/or Title: Commercial Thinning of Douglas-fir Plantation
Tree Farm Licence 26 (TFL26) is located on the rural interface with the community of Mission, BC. The majority of its 10,500 ha is located within the CWHdm and vm1 zones with numerous areas of transition between the two subzones.
Kelly will discuss the pre and post commercial thinning stand conditions at a young Douglas-fir plantation, including the economic challenges faced under the Tree Farm Licence tenure.

NOTES

Stop #5
Fertilization and Alternative Species

1) Mid rotation Aerial Fertilization – What are the results via stem analysis?

Name: Aaron Bigsby RPF
Affiliation: B.A. Blackwell & Associates
Position: Associate
Responsibilities: Ecological mapping, Site Plan preparation, silviculture planning and prescription development, implementation of fertilization programs, engineering and layout work, forest health assessments and field research trials. Recently, his focus has been on coastal aerial fertilization programs in the Fraser TSA, Soo TSA, Texada Island and TFL 44. He has expertise in all phases of operational fertilization from the initial GIS analysis and landscape level planning through prescriptions development, stand-level financial analysis, to on-the-ground implementation including contractor management and quality control.
Academic training: He has a Bachelor of Science in Forestry and is a certified wildlife danger tree assessor
Previous employment:
Aaron joined B.A. Blackwell & Associates Ltd. in 2002
Prior to 2002, Aaron gained extensive experience supervising tree planting and thinning crews, and working as a wildland firefighter.

ABSTRACT:

Arron will speak to the importance of wood quality on the viability of aerial fertilization programs and summarize some of the challenges in the Fraser TSA with regards to the selection and access to target stands.

NOTES

Stop #5 continued
2) Is it better to plant pure stands of alternative species?

Name: Kelly Cameron, RFT
Affiliation: Mission Tree Farm Licence 26 (1996 to present)
Position: Forest Technologist
Responsibilities: Silviculture Program, Site Plans, Cutting Permit applications, forest education, recreation planning, Forest Stewardship plans
Academic training: Diploma of Technology, BCIT, Applied Leadership – Justice Institute of BC
Previous employment:
1991-1996 – Chilliwack Forest District – Woodlot licence program

Topic and/or Title: Alternative Species
Swiss needle cast has been identified back in the early 2000s, and continues to progress throughout various ages of Douglas-fir plantations, with Douglas-fir on medium to poor sites in the vm1 subzone being most affected.
As climatic conditions become wetter, Mission has been steadily increasing its cedar component, from 75% up to 100% in some units. Should Douglas-fir continue to decline in the future, it is hoped the value that western red cedar continues to fetch offsets potential losses.

NOTES

Dinner Keynote Speaker

Highlights of the most recent *Forest Practice Board* report - Harvesting Young Stands of Timber on the BC Coast—Does Age Matter?

Name: Del Williams RPF
Affiliation: BC Forest Practices Board
Position: Manager – Audits and Investigations
Responsibilities: Mainly special investigations
Academic training: Dip For, BSF
Previous employment:

- General Manager, Revelstoke Community Forest Corp.
- Operations Forester, RCFC
- Silviculturist, Haida Gwaii

In 2014, a retired forester contacted the Forest Practices Board with concerns about the harvest of a 38-year-old thinned and pruned stand in Squamish Natural Resource District. Based on this concern, the Board decided to look more broadly at the extent of young stand harvesting on the south coast. This presentation is an interim report on what the Board has observed in relation to stands harvested below minimum harvest criteria (MHC) in five coastal timber supply areas (TSAs) between 2007 and 2014. The Board is considering some key questions relating to the original concern including:

- What is the extent of young stand harvesting?
- How many of these stands have had silvicultural treatments?
- Are decisions about when to harvest consistent with timber supply review (TSR) assumptions for each TSA?

The Board used a consolidated cutblock layer to determine the areas harvested, and then overlaid it on VRI data to identify the population of stands harvested below MHC, as set out in the timber supply review for each TSA (age or volume). Cruise data were used to verify actual stand characteristics in a sub-sample of these young stands. RESULTS data was used to identify stand treatments in this population. Here are some preliminary findings:

- From 2007 to 2014, about 44,000 hectares of all stand ages were harvested from the five coastal TSAs
- The VRI data indicated that 18 percent, or almost 8000 hectares, of the harvested area was below the MHC
- However, the cruise volumes were much higher (83 percent greater) than volumes noted in the VRI and 75% higher than the minimum harvest criteria volumes
- Of the young stands harvested, many had been thinned, pruned or fertilized. This may be an issue if investments are made in silviculture activities but the stands are harvested before these treatments have had time to have an effect.

The Board expects to complete analysis of the data and provide a final report later in 2017.

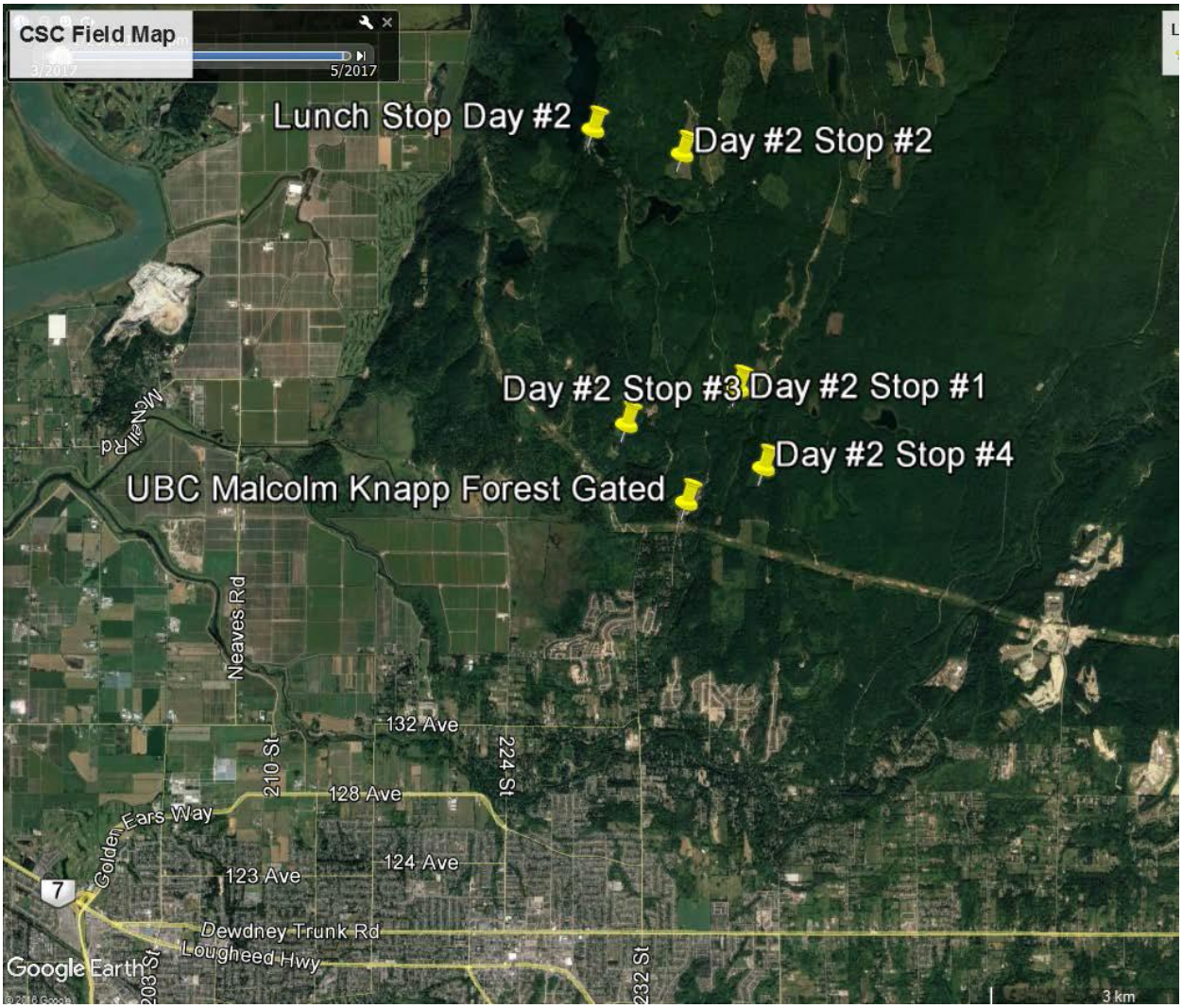
Notes

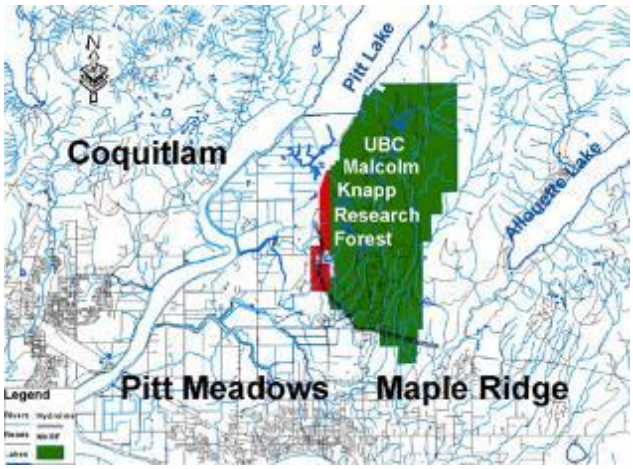
Field Program – Day 2

Maple Ridge

Stop #1	Page	Root Rots, Juvenile Spacing and 2nd Growth Removal	
		1) The impact of various assumptions on the rate of harvest of second growth stands	**Doug Layden** FAIB FLNRO, Victoria
		2) The role Root Rot plays in TSR.	**Stefan Zeglen** FLNRO, Nanaimo
		3) What are the implications of the 2016 FFT Report on Juvenile Spacing?	**Monty Locke** FLNRO, Victoria
Stop #2	Page	Fdc Trials	**Jack Woods** Select Seed Ltd., Vancouver
Stop #3	Page	Spacing Challenge and Fdc Trials continued	
		1) Major Licensee Spacing - Forest Management Challenge Trial– latest G&Y projections.	**Mario Di Lucca FAIB** FLNRO, Victoria
		2) Review of the Oregon Douglas-fir provenance trial - 45 year results.	**Jack Woods** Select Seed Ltd., Vancouver
Stop #4	Page	Mixedwood Trial	**Neil Hughes** FLNRO, Victoria

Map – Day 2 – Maple Ridge – UBC Research Forest





Stop #1
Root Rots, Juvenile Spacing & Old growth removal

1) The impact of various alternate management assumptions on the rate of harvest of second growth stands for coastal BC

Name: Doug Layden, RPF
Affiliation: Resource Analysis Section of the
Ministry of Forests, Lands, and Natural Resource Operations.
Position: Timber Supply Forester
Previous employment:
He has over 30 years of forestry experience in BC and
SE Asia and has worked for industry, as a consultant
and for government.

ABSTRACT:

Timber harvesting on the coast of British Columbia has declined by over 50% since 1987. Harvesting on public lands is projected to further decline by 11-14% over the next 40 years under current land base and management assumptions. The transition to second growth harvesting on the coast is well underway with about 35-45% of the cruising on public lands being of second growth stands in recent years. The transition provides opportunities to change how we regenerate and grow our forests to ameliorate the declining harvest level. Recently the Resource Analysis Section of the Forest Analysis and Inventory Branch has been examining the impact of various alternate management assumptions on the rate of harvest of second growth stands for coastal BC.

NOTES

Stop #1 continued
2)The role Root Rot plays in TSR

Name: Stefan Zeglen, RPF
Affiliation: BC MFLNRO
Position: Forest Pathologist
Responsibilities: Dead trees
Academic training: B.Sc.(For.), M. S.
Previous employment:
1994 to present – regional forest pathologist, Nanaimo
1989 to 1994 – regional forest pathologist, Smithers

ABSTRACT: Root Disease and Young Stands

You are eagerly anticipating thinning your beautiful juvenile Douglas-fir plantations in order to favour a preferred crop species, maximize piece size, reduce rotation age, improve wildlife habitat, etc. However, your junior assistant returns from doing the pre-treatment stand assessments and informs you that there are dead and dying crop trees in those young stands, likely a result of root disease. What do you do? Cancel your treatments? Fertilize the stands? Replace your junior trainee?
This talk will cover how you got here, how to decide if you have a problem, what your options are and what the impacts might be from the result of your choices. Our two most prominent root diseases – Armillaria and Phellinus – will be discussed and the commonalities and differences in identifying, quantifying, managing and accounting for their impacts will be explored.

NOTES

Stop #1 continued
3) What are the implications of the 2016 FFT Report on Juvenile Spacing?

Name: Monty Locke
Affiliation: FLNRO, Resource Practices Branch
Position: Forest Investment Specialist
Responsibilities: Forests for Tomorrow, Fertilization and Juvenile Spacing activities
Academic training: BSF (UBC)
Previous employment: Land Based Investment Delivery Branch

What are the implications from the Forests for Tomorrow (FFT) Review of Juvenile Spacing Investments?

Investments in juvenile spacing treatments have been made to make stands merchantable sooner to address estate level mid-term timber supply gaps or age class imbalance and to prepare stands for future treatments (e.g. fertilization, commercial thinning).

The review considered FFT juvenile spacing treatments carried out between 2010 and 2016. The project consisted of a review of treatment information in RESULTS, linkages to silviculture strategies, and assessment of treatment impacts. Not all possible stand types and treatment options were analysed. Some common themes from the report were:

- Spacing treatments are generally consistent with strategies and FFT funding criteria, however, criteria and strategies have been evolving and past treatments would not meet current criteria. Alignment with a forest level strategy ensures treatments address mid-term timber supply gaps.
- Changes in harvesting practices and regeneration practices (lower total establishment densities/and or the planting of genetically improved stock) are resulting in fewer stands that could potentially benefit from juvenile spacing.
- Although more analysis work is required, the review suggests that there are limited opportunities where juvenile spacing provides a 2% return on investment at the stand level. Provided certain conditions are met, Red Alder, repressed Lodgepole Pine, and multi-storied dry belt Douglas-fir stands can be candidates for juvenile spacing.
- Analyses for coastal Douglas-fir/Western Hemlock and Western Hemlock/Amabalis fir stands indicate that the spacing must result in both a large enough increase in value and a large enough decrease in harvest costs before spacing provides a 2% return at the stand level.
- Stand level financial analyses identified that the age at which the juvenile spacing treatments are harvested is critical in meeting the 2% return at the stand level. If harvested too soon, the stand level benefits are not achieved. This presents a significant problem as the government has no control over when stands are harvested.

Recommendations included further analysis work related to the FFT funding criteria, the updating of survey and prescription templates, and ensuring required information is provided (e.g. expected harvest age range)

NOTES

Stop #2
Fdc Trials

Name: Jack Woods, RPF
Affiliation: Select Seed Ltd., Vancouver - company owned by the Forest Genetics Council of BC (FGC).
Position: Program Manager
Responsibilities: Since late 2016, he has entered the world of semi-retirement and is supporting the transition of FGC management and Select Seed operations to a new lead.
Academic training: BSc F
Previous employment:
MFLNRO leading the Fdc genetics & breeding program until 2000; Over a 35-year career in forest genetics and tree improvement in BC, involved with research, tree breeding, and seed orchard programs for all species and areas of the province.

ABSTRACT:
Douglas-fir Genetics and Tree Improvement: Old and New Field Trials and Results

Not all trees are born equal. This is ensured by vast amounts of genetic diversity that we must understand and that we can take advantage of as part of managing forests. The following points will be discussed.

1. Genetic differences exist between populations of trees from different geographic areas and between individual trees within populations. Patterns of genetic diversity result from adaptive processes that are driven primarily by climate. This results in somewhat unique populations of a tree species in different areas. We recognize this through seed zones and seed transfer standards.
2. Provenance (seed source) testing, and more recent genomics work, help us understand the geographic patterns of genetic diversity.
3. Tree breeding programs reveal the genetic differences between individual parent trees and select those trees with higher commercial value (fast growth, pest resistance, good stem form, suitable wood properties) for seed production.
4. Seed orchards utilize the best trees from breeding programs to produce select seed for reforestation.
5. Genetic gains in growth rate and wood production for better orchard seed in coastal BC are now up to 20% for Douglas-fir, redcedar, and hemlock. Realized genetic-gain trials demonstrate these gains on an area-basis across a range of site quality (index) and stand spacing. Province-wide, these genetic gains are adding substantial value to provincial forests.

NOTES

Stop #3
Spacing Challenge and Fdc Trials continued

1) SYLVER Simulations – Volume vs. Value
Forest Management Challenge Trial

Name: Mario Di Lucca, MSc, RPF
Affiliation: FLNRO
Position: Growth and Yield Applications Specialist
Responsibilities: Applied research on tree and stand development, technical review of managed stand yield tables for timber supply applications, and transfer of growth and yield information.
Academic training: BF (La Plata, Argentina), MSc (UBC)

The Forest Management Challenge Trial established in 1987 at the Malcolm Knapp Research Forest provides a showcase to demonstrate how the corporate, government and academia policy at the time would affect the growth of planted Douglas-fir on high productivity sites. Each challenger designed and implemented silviculture regimes using various combinations of juvenile spacing, commercial thinning, fertilization and pruning treatments on a quarter hectare plot of land. The resulting stands varied greatly in structure, tree size and density.

Foresters are faced with many difficult decisions about forest stands and management regimes. What species to regenerate? What stand density should be established? Should an area be planted or would natural regeneration suffice? Should thinning be done? Should the stand be fertilized? Pruned? How might climate change affect forest management and forest carbon strategies? These and many other decisions influence stand volume and value. Does one preclude the other? How do we judge? Growth and yield research in MFLNRO supports the ongoing development of a suite of flexible computer models and tools that will be able to address current and future needs for projection and analysis.

In this presentation, we utilized a decision support system called SYLVER to evaluate the effect of Silviculture on Yield, Lumber Value and Economic Return of the Forest Management Challenge regimes forty years later to find out the "winner". This system (Figure 1) includes: TASS (Tree and Stand Simulator) that generates the growth and yield information; BUCK that

cuts each tree to maximize the value of logs; SAWSIM that applies cutting patterns to each log and selects the one that produces the maximum value based on the determined average market prices; GRADE that characterizes lumber by quality class using criteria including knot content, juvenile wood, dimensional lumber length, width and thickness; and FAN$IER (Financial Analysis System Including Economic Return) that integrates stand treatments, costs, benefits and product information to evaluate the impact of selected silvicultural treatments on the discounted value of end products. The model is calibrated using data from long-term measurements of about 15,000 permanent plots and the from over 500 destructively sampled trees that were X-ray scanned.

The results in the handout include a variety of factors, such as mean annual increment, harvest age, tree diameter and height, log and lumber by grade, total and merchantable volumes by grade, net present values (NPV) using discount rates of 4 and 6% respectively. The "winner" depends which of these factors is deemed to be the management goal, the target market and the assumptions built into the simulations. The objectives evaluated were: maximizing merchantable volume mean annual increment, maximizing the production of good quality sawlogs, maximizing NPV of logs, and maximizing the NPV of lumber.

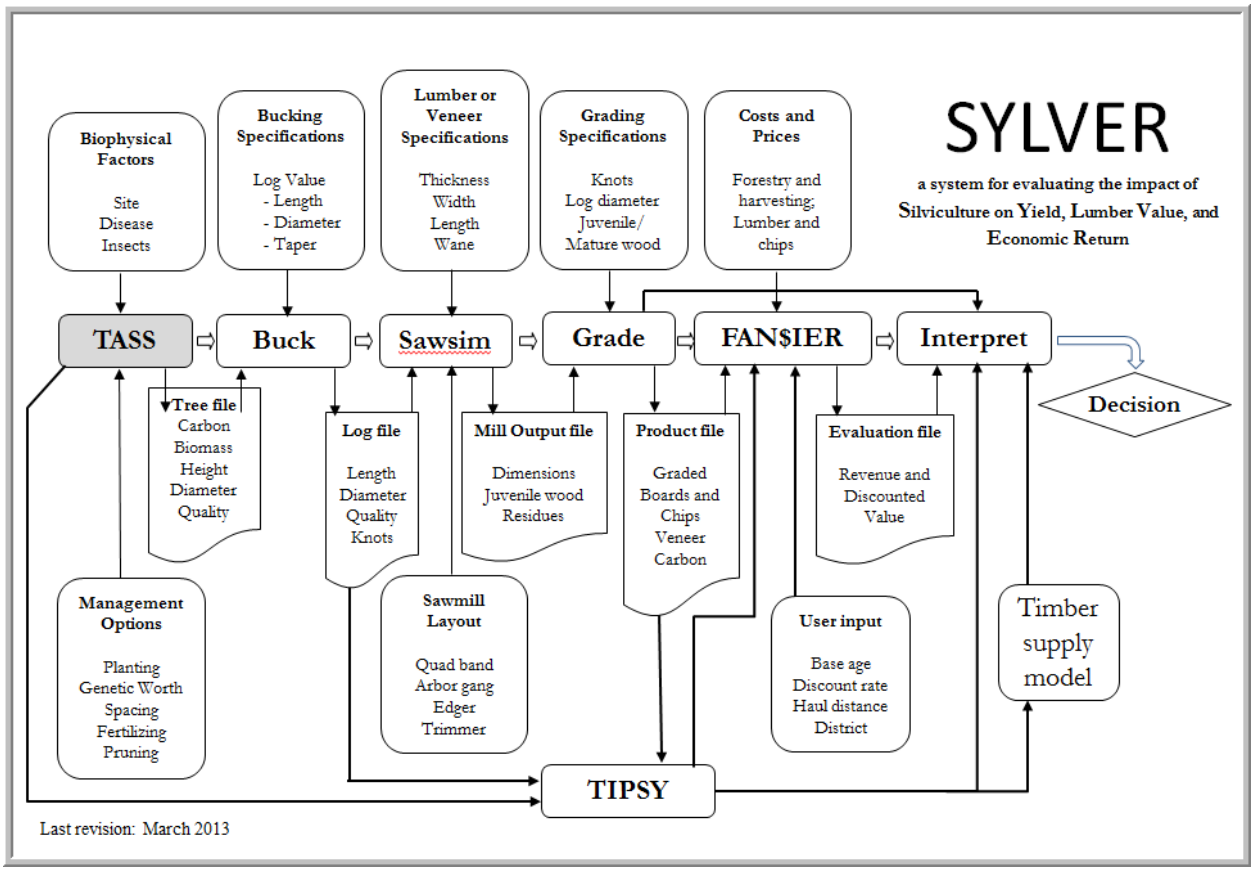


Figure 1. SYLVER flowchart

A little background information on the Forest Management Challenge Trial…

In 1987, many of the major companies in the forest industry agreed to work with UBC and the BC Ministry of Forests' Research Branch and Vancouver Forest Region to develop a research trial at the Malcolm Knapp Research Forest (Figure 1) to portray how the corporate and government management policy at the time would affect high site Douglas-fir plantations.

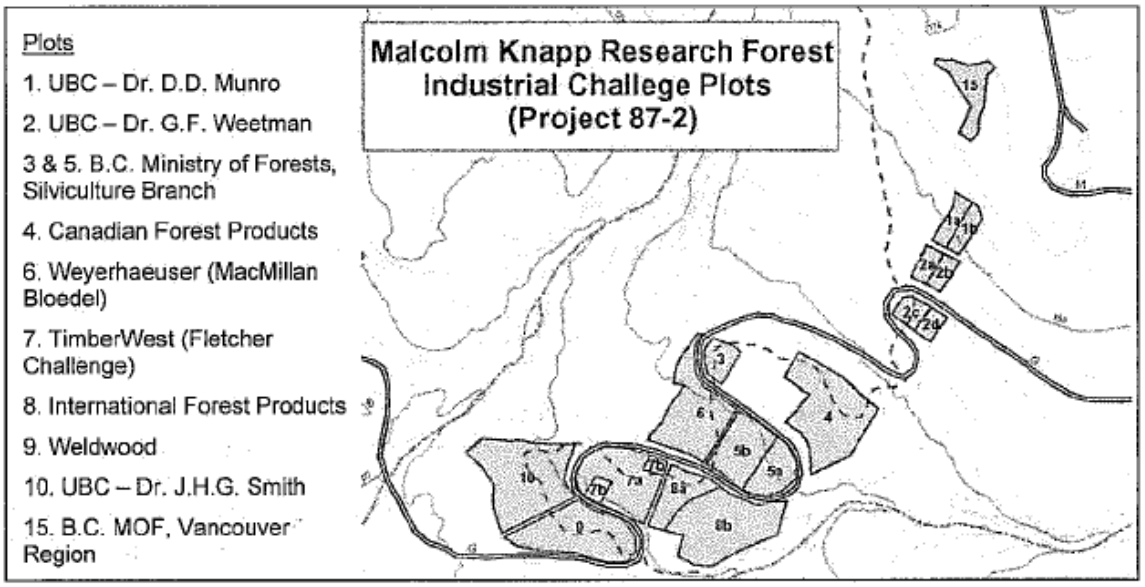


Figure 1. Project Map

Participants were asked to manage a ¼ hectare of land according to their organization's forestry policy (plot objectives are provided in table 1), and to maintain work records (silvicultural prescriptions – table 2), growth and yield forecasts, and financial forecasts. Until very recently, the majority of the sites had not been re-measured since the treatments prescribed by each of the participants were applied (actual treatments that were applied are provided in table 3); an exception is Weyerhaeuser's plot.

Table 1. Participant Objectives

Participant	Objective
UBC – Dr. D.D. Munro	To product tight growth increments and knots in a relatively slow grown stand.
UBC – Dr. G.F. Weetman	To provide nitrogen fertilization demonstrations in Douglas-fir plantations.
B.C. Ministry of Forests, Silviculture Branch	To provide growth and yield information on stands growing below currently accepted stocking levels under a regime of spacing and pruning.
Canadian Forest Products	Objective not provided.
Weyerhaeuser (MacMillan Bloedel)	To produce high volume and good quality timber for harvesting at or near 55 years of age.
TimberWest (Fletcher Challenge)	To product high quality sawlogs over a relatively short rotation at low costs.
International Forest Products	To maximize volume growth per hectare by maintaining stand density.
Weldwood	To produce a premium sawlog product within a 50 year rotation, at minimum cost.
UBC – Dr. J.H.G. Smith	To maximize growth in piece size and clear wood per hectare.
B.C. Ministry of Forests, Vancouver Region	To maximize quality timber production and minimize costs while producing a target diameter of 45 cm in 44 years.

UBC Malcolm Knapp Research Forest

Table 1. Original 1987 Treatments Prescribed by Industrial Silviculture Trials (Project #87-02) Participants.

Participant	Plot #	Spacing Age - Intensity	Pruning Age - Lift Height	Fertilization Age - Amount	Commercial Thinning Age – Intensity	Final Harvest Age
Dr. Munro UBC	1a	15 - 800	No pruning	15 - 250 kg N/ha	40	70
	1b	15 - 800	No pruning	No fertilization	40	70
Dr. Weetman UBC	2a	No spacing	14 – 1-1.5 m 16 – 2 to 3 m	16 - 200 kg N/ha	No CT	Not given
	2c	16 - 525 to 550	No pruning	16 - 200 kg N/ha	No CT	Not given
	2d	16 - 525 to 550	No pruning	No fertilization	No CT	Not given
Ministry of Forests Silviculture Branch	3	13 - 250	13 – 6 m	No fertilization	No CT	Not given
CANFOR	4	15 - 650	No pruning	20 - 200 kg N/ha 50 - 200 kg N/ha	45	85
Ministry of Forests Silviculture Branch	5a	11 - 200	11 - 4 m Age not given - 6 m	No fertilization	No CT	Not given
Weyerhaeuser	6	16 - 1198	16 - 2 m	No fertilization	27[1] - every 3rd row 40[1] 47[1]	55[1]
Timberwest	7a	15 - 600	No pruning	No fertilization	Unlikely	60
INTERFOR	8a	16 - 600 to 700	No pruning	Planned? but no info given	No CT	Not given
	8b	19 to 21 - not given	No pruning	Planned? but no info given	No CT	Not given
Weldwood	9	16 - 650	16 - 2 m	No fertilization	35 - remove 300-350 sph	50
Dr. Smith UBC	10	14 - 464	14 - 2m 16 - 4 m (largest 250 sph) 23[2] - 8 m (if not done at age 16) 26[2] - 11 m (previously high pruned trees)	14 - 200 kg N/ha 16 - if necessary 23[2] - 200 kg N/ha (if not done at age 16)	23[2] - leave 200 sph	50
Ministry of Forests Vancouver Region	15	15 - 500	No pruning	No fertilization	30 to 35	44

[1] Revisions suggest no commercial thin and harvest at age 35.
[2] Treatments should have been completed by this age but have not yet been done as of February 2004.

Note: despite original prescription, most plots have been low pruned 2m and some have been pruned as high as 4m.

NOTES

Stop #3 continued

2) Review of the Oregon Douglas-fir provenance trial - 45 year results.

And again:

Name: Jack Woods, RPF
Affiliation: Select Seed Ltd., Vancouver - company owned by the Forest Genetics Council of BC (FGC).

Supported by:

Name: Cheryl Power, RPF
Affiliation: UBC Malcolm Knapp Research Forest
Position: Resident Forester

Douglas-fir Genetics and Tree Improvement: Old and New Field Trials and Results

Not all trees are born equal. This is ensured by vast amounts of genetic diversity that we must understand and that we can take advantage of as part of managing forests. The following points will be discussed.

1. Genetic differences exist between populations of trees from different geographic areas and between individual trees within populations. Patterns of genetic diversity result from adaptive processes that are driven primarily by climate. This results in somewhat unique populations of a tree species in different areas. We recognize this through seed zones and seed transfer standards.
2. Provenance (seed source) testing, and more recent genomics work, help us understand the geographic patterns of genetic diversity.
3. Tree breeding programs reveal the genetic differences between individual parent trees and select those trees with higher commercial value (fast growth, pest resistance, good stem form, suitable wood properties) for seed production.
4. Seed orchards utilize the best trees from breeding programs to produce select seed for reforestation.
5. Genetic gains in growth rate and wood production for better orchard seed in coastal BC are now up to 20% for Douglas-fir, redcedar, and hemlock. Realized genetic-gain trials demonstrate these gains on an area-basis across a range of site quality (index) and stand spacing. Province-wide, these genetic gains are adding substantial value to provincial forests.

NOTES

Stop #4
Mixedwood Trial

Name: Neil Hughes, RPF
Affiliation: FLNRO, Resource Practices Branch
Position: Forest Establishment Leader
Responsibilities: Dealing with all this related to early stand development and looks after the Forests For Tomorrow program which is investing $48M annually.
Academic training:
BSc Honours Forestry, Aberdeen University,
MSc. Environment and Management RRU, RPF
Previous employment:

- 7 years as a professional forester in Scotland before coming to BC in 1994
- 21 years of coastal work in industry in a variety of roles mostly around silviculture and planning but including engineering and harvest supervision.
- For 15 years I was in the hardwood business and am the provincial advocate for red alder management.

ABSTRACT:

Traditionally BC has dealt heavily with managing second growth stands that are predominantly single species and our growth and yield models mostly reflect this with pure species featuring heavily in Analysis Units for TSR. However, more and more we find ourselves thinking about multiple objectives on the landbase; Visuals, wildlife, riparian, recreation and increasingly climate change adaptation and resilience. Managing mixedwoods and deciduous provides another option which can be very flexible for these resource values, but what are the implications for TSR and stand values? The Fraser valley has more low value mixed wood stands than the other coastal TSAs, so what can we or should we do with this resource?

NOTES

NEW CSC LOGO IDEAS – Voting

1a

1b

2a

2b

3

4 Current Logo

National Forest Week
September 24 - 30, 2017
150 YEARS OF CANADIAN FORESTRY: OUR STORIES, OUR FUTURE

HELP WANTED: National Forest Week Local Events

WHO YOU ARE: You are a keen resource professional who shares your passion for all things forestry. You are willing to host an event, collaborate on delivering events, or support a team in hosting an event. You live in a community that will benefit from greater appreciation of trees and forests.

WHO WE ARE: The BC National Forest Week Coalition aims to show the people of BC that we can enjoy time spent outdoors and learn about the uses of our forests, including forest recreation, wood products, and spiritual values. We provide support to local events planners – check out our tips for organizing local events on our web page (www.bcnfw.ca). We also have promotional items for your community event, and posters will soon be available. Our generous sponsors make this possible through donations of cash and in-kind contributions.

YOUR MISSION: You will deliver a National Forestry Week event and report the event to the Coalition. You will encourage youth to participate in the art contest. You will promote awareness of wild and urban forests and their importance to the social, environmental, and economic health and well-being of our province and people.

National Forest Week events come in all shapes and sizes. Volunteers can connect with a class or a community group to lead a single event (e.g. forest hike, presentation, demonstration, staff an event booth, etc.); join together with like-minded people to coordinate a suite of events for the week; or connect with existing events and bring your love of forests to new audiences.

For more information and for support for your event, please contact us at nationalforestweekbc@gmail.com.

We gratefully acknowledge the support of our 2016-17 sponsors:

∞ ABCFP ForesTrust ∞ Industrial Forestry Service Ltd. (IFS) ∞ BCIT ∞ Tolko ∞ BC Timber Sales ∞ Teal Jones Group ∞ CSC - Coastal Silviculture Committee ∞ FII (Forestry Innovation Investment) – BC ∞ DWB Consulting ∞ Island Timberlands ∞ District of Mission - Forestry Program ∞ Coastland Wood Industries ∞ Weyerhaeuser – Canada ∞ Canfor ∞ FPInnovations ∞ Princeton Wood Preservers ∞ Forsite Consultants ∞ Pacific Bioenergy ∞ Norbord/Ainsworth ∞ West Fraser Mills ∞ A&A Trading ∞ SISCO - Southern Interior Silviculture Committee ∞ ILMA - Interior Lumber Manufacturers' Assn ∞ Probyn Log Ltd. ∞ UBC Forestry ∞ Selkirk College Forestry Program ∞ Brisco Wood Preservers ∞ University of Northern BC ∞ IRL Supplies ∞ Arbutus Grove Nursery ∞ VIU Forestry Program ∞ Hancock Forest Management ∞ Western Canadian SFI Implementation Committee ∞ Domtar – Kamloops ∞ Conair ∞ Ledcor ∞ Gorman Bros. Lumber ∞ TimberWest ∞ BC Government and Service Employees' Union ∞ MFLNRO ∞ Western Forest Products ∞ Sylvan Vale Nursery ∞ Interfor Corporation ∞ Strategic Natural Resource Consultants ∞ Unifor ∞ TLA - Truck Loggers Association