



NSC 2018 Winter Conference:

Managing for resilience and mid-term timber supply
on a dynamic landbase

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Challenges and Strategies to Regenerating Spruce in the BC Interior Wetbelt



BC Interior Wetbelt

- When I speak of the BC Interior Wetbelt, I am referring predominantly to the Very Wet Cool Sub-Boreal Spruce Zone (SBSvk). I've worked in numerous Sub-Boreal Spruce subzones within the BC interior and still find the SBSvk to be the most challenging of its' kind, bar none! For those of you who don't remember, the SBSvk was previously called the SBSf. I believe that was for a reason.

Climate of the SBSvk

- Wettest biogeoclimatic unit within the Bowron Valley and McGregor Plateau,
- Highest annual precipitation and highest growing season precipitation,

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Climate of the SBSvk

- Lowest mean annual temperature of the SBS units, only the ESSF is colder,



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Forests of the SBSvk

- Predominantly a mix of Hybrid White spruce and Subalpine fir with Lodgepole pine dominating the driest sites and the wettest sites,
- Paper birch, Cottonwood and Western hemlock can form minor components of the tree canopy,

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Challenges associated with the SBSvk

Competing Vegetation

- Competing vegetation includes an abundant array of well developed shrubs, including; Black twinberry, Red elderberry, thimbleberry, fireweed, raspberry, ferns, Devil's club, grass, Black huckleberry, Oval-Leaved blueberry, Douglas maple, Mountain(Sitka) alder, Black gooseberry, Highbush cranberry and Goat's beard,

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Challenges associated with the SBSvk

Cold soils

- Cold soils are one of the most critical site factors in the SBSvk,
- Low soil temperatures significantly reduce the mineralization of Nitrogen and site productivity,
- Soils seldom exceed 14-16 degrees C during the warmest summer months,
- To put that into perspective, little root growth in conifer seedlings occur at less than 10 degrees C,

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Challenges associated with the SBSvk

Cold soils

- Rooting soil temperatures should reach, at least, 20 degrees C for optimum root development (a huge challenge in the SBSvk),

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Challenges associated with the SBSvk Soil Types

- Sites with thick organic horizons, reducing spring & summer soil temperatures, slowing further root development,
- Sites with saturated soils and high water tables leading to poor aeration,
- Fine textured soils vulnerable to compaction,

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Challenges associated with the SBSvk Snow & Vegetation Press

- During a normal winter snow pack can exceed 3 meters,
- Dense accumulations of competing vegetation,
- Combine both for a drastic effect on newly planted conifer seedlings (mechanical damage),

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Challenges associated with the SBSvk

Steep Slopes and Excessive Slash

- Slopes in excess of 40% combined with excessive slash from open grown, mature, Sx and Bl,



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Challenges associated with the SBSvk

Limited Summer Access

- Fine textured, organic type soils limit summer access, therefore conducting MSP and other activities during the winter & spring months,



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Challenges associated with the SBSvk

Disease and Pathogens

- *Pissodes strobi*, known as the **White pine leader weevil** ,
- Very common in the SBSvk,
- Adults lay eggs in punctures which they chew in the bark of the year-old leader during the spring. Larvae feed beneath the bark, working downwards and destroying phloem as they go. Consequent wilting or suppression of new leader results in the axis of the Sx tree becoming deformed, forked or bushy,

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Challenges associated with the SBSvk

Disease and Pathogens

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Challenges associated with the SBSvk

Disease and Pathogens

- Heavy attack on previous year's leader can result in the loss of 3 or 4 years of height growth. Laterals compete for dominance, resulting in forking and heavy branching,

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Challenges associated with the SBSvk

Disease and Pathogens



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Challenges associated with the SBSvk

Disease and Pathogens



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Challenges associated with the SBSvk Bears and Bugs (the most dreaded ones)



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Treatment Regimes / Considerations for Success

(be proactive rather than reactive and consider the need for treatment based on our understanding of silviculture, not undue influence from external parties)

Post Harvest Assessments

- Conduct post harvest assessments as early as possible after harvesting in order to:
 - plan for site preparation,
 - select appropriate stock types, species, planting season & planting densities,
 - determine planting costs,
 - access management,

Treatment Regimes / Considerations for Success

Regen Delay

- Reduce regen delay as much as possible, planting as soon as possible after harvest (sometimes one year or less after harvest),
- Don't let these "hard to manage" sites get away on you, as they will cost you nothing but money if they do,

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Treatment Regimes for Success

Mechanical Site Preparation (MSP)

- On subhygric and wetter sites, conduct excavator mounding in order to raise soil temperatures, improve aeration and create good quality planting microsites,
- Remember, planting larger stock types or increasing densities is not an alternative for site preparation,
- When it comes to site preparation, there is no grey area, the site either needs it or it doesn't,

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Treatment Regimes for Success

Mechanical Site Preparation (MSP)



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Treatment Regimes for Success

Broadcast Burning

- Very little, if any, broadcast burning is done today,
- It was heavily relied upon in the past and, I still believe, it was one of the most effective and efficient site preparation tools we ever had,
- We, as foresters, should work closely with Government to bring broadcast burning back to life again,
- Prevention strategies for Spruce beetle included broadcast burning, sanitizing the site of host material such as large stumps and tops > 10 cm in diameter,

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Treatment Regimes for Success

Broadcast Burning



Treatment Regimes for Success

Regeneration

- Again, I can't stress enough, reduce regen delay as much as possible on these sites,
- Risk tolerance decreases as consequence increases so don't take a lot of risks on these sites,
- Mixed planting isn't much of an option on these sites:

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Treatment Regimes for Success Regeneration

- Pli succumbs to mechanical damage and is prone to Dothistroma needle blight (don't waste your money planting it on these sites as you will regret it),
- Fdi easily succumbs to frost and mechanical damage, again, not an option,

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Treatment Regimes for Success Regeneration

- Bl is acceptable on these sites and, even though we don't plant Bl on these sites, it occurs naturally in the way of regen and residual retention (10 – 20 % of inventory),

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Treatment Regimes for Success

Regeneration

- Select a large, Sx stock type with good caliper and branching; preferably a 2+0 summer stock type, but no need to get too carried away (a PSB 2+0 412B should do the job),
- Select an “A” class Sx seedlot that is leader weevil tolerant, almost to the point of being resistant,
- Summer plant so that seedling resources are put into roots and stem growth, not shoot elongation,

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Treatment Regimes for Success

Regeneration

- Manage for target stocking standards during initial establishment,
- Strive to incorporate / maintain more hardwoods over the landscape, especially birch,

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Treatment Regimes for Success

Regeneration

- I believe the key to a successful summer plant is communication, both with the selected planting contractor and grower,
- Ensure that the selected planting contractor conveys summer plant lift volumes to the nursery,
- Let the nursery know what your objectives are and stay in touch (early summer ship, specs, over runs, lift volumes / schedules & transportation to name a few),

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Treatment Regimes for Success

Regeneration

- Ideally, an early summer ship 2+0 Sx, starting lift around June 21st-25 for out planting, works very well,

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Treatment Regimes for Success

Monitoring

- Don't forget to monitor your investment after establishment, conduct regular surveys (plotted & walkthroughs) and respond accordingly,

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Treatment Regimes for Success

Brushing

- Brushing is another very important consideration for success,
- As you can remember from a previous slide, I described some of the competing vegetation; Black twinberry, Red elderberry, thimbleberry, fireweed, ferns, Devil's club, grass, Black huckleberry, Oval-Leaved blueberry, Douglas maple, Mountain(Sitka) alder and Goat's beard,

Treatment Regimes for Success

Brushing

- Don't let competing herbaceous species colonize these sites, act early, and assess brush competition at the same time as summer planting, or at the latest, one season after summer planting,
- As you can well imagine, the most effective brushing method is with a glyphosate based herbicide, usually an aerial application,

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Treatment Regimes for Success

Brushing



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Treatment Regimes for Success

Brushing



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Treatment Regimes for Success

Secondary Stand Structure Retention

- Another consideration for success includes secondary stand structure retention, retaining good quality Sx and Bl saplings, poles and sub canopy trees in conjunction with harvesting,
- This is nothing new, we've just paid less attention to it than we did in the past, prior to the Mountain pine beetle epidemic,

Treatment Regimes for Success

Secondary Stand Structure Retention

- Although opportunities don't exist on all sites for retention, we should have a process to identify potential sites,
- There are a lot of tangibles and intangibles when it comes to Secondary Stand Structure Retention, including;
 - potential cost savings,
 - improves public perception,
 - opportunity for increased natural ingress,

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Treatment Regimes for Success

Secondary Stand Structure Retention

- contributes to wildlife habitat,
- better age class distribution,
- decreased site disturbance,
- faster hydrological and visual green-up,
especially in and around Fisheries Sensitive
Watersheds,
- species diversification,

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Treatment Regimes for Success

Secondary Stand Structure Retention



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Treatment Regimes for Success

Secondary Stand Structure Retention



Treatment Regimes for Success

- One other very important key to success is to “have fun” while you are managing these difficult site,

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Treatment Regimes for Success

Questions??????