Lesson 1

Why Space?

Spacing – Legal and Other Reasons we Would Space

105 minutes

Objectives:

1. To link density management with higher level plans; and
2. To link density management with specific objectives.

Equipment Needs:

- Flip chart
- Overhead projector

Method:

Group input – lecturette

Allow group input to ID why we space.

Go into more detail on how higher level plans may influence where to space and to what levels.

Note: The video *Juvenile Spacing in British Columbia* may be of interest to those who will be organizing spacing crews. Be sure to introduce it to participants.

Juvenile Spacing

Why space?

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Overhead: **Why Space?**

Facilitator: Ask the question and have the group turn to their neighbour and come up with a minimum of four reasons to space. Ask them to be as specific as possible. (5–10 minutes).

Turn to your neighbor exercise

Here is a list of possible reasons to space:

- The stand is above maximum density, therefore it is a legal requirement to space.
- The higher level plan indicates a piece size and rotation length that is only achievable through spacing,
- Your block is in critical coastal grizzly bear habitat and requires spacing to provide room for forage production.
- Your block is in a caribou movement corridor and requires reduced densities to allow for ease of movement.
- Your block is in a critical winter range area for mule or white tail deer and wider-spaced trees are desired as they will provide greater snow interception per tree and ease of movement.
- You plan on pruning the block and therefore you space to the desired number to reduce unnecessary pruning.
- You are planning on commercial thinning the stand but wish to reduce the time until merchantability, so you space it.
- To increase the vigour of your stand through removal of diseased or misshapen stems.
- Earlier stand operability to alleviate age class distribution problem.

Note: Add examples here created from the course exercise.

- e.g., employment of displaced workers…
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-
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Why Space?


More options for:
• Habitat and non-timber vegetation
• Future generations
• Earlier harvests
• End products

Overhead: Why Space? – More Options

Facilitator: What follows are a number of overheads that reinforce points that were likely brought up during the first exercise:

- Use the overheads to provide guidance in a lecturette format. Cover the points identified in the facilitator guide.

The intent of this section is to familiarize everyone with the intent of spacing. Points to bring out are:

- Spacing of dense stands provides opportunities to create larger logs, which translates into more chances for a range of end products due to larger piece sizes (some controversy here from TASS but in general other research confirms the concept).
- Harvesting – based on piece size constraints and adjacency limitations there will be opportunities to harvest stands earlier than would be possible without density control.
- Lumber recovery – larger piece sizes have greater lumber recovery (10–15%) depending upon size differences.
- Economic harvest – logging costs may not cover logging smaller timber. For example on the coast, logging costs of $\$80.00/m^3$ will not be profitable for low periods of J or lower grades while H grade commands $\$200.00+/m^3$.
- Future generations – by leaving lower density stands, future generations will have more options for intermediate entries – if appropriate densities are left to provide space for crowns and additional windfirmness.
- Creating diverse habitats – For example, spacing can create space needed for the growth of understory vegetation, providing forage. It also allows crowns to increase, providing snow interception and allowing easier winter movement for ungulates. It can also provide for greater structural diversity providing habitat for a range of life forms.
- Forest health – spacing may be undertaken to improve the health and vigor of stands by removing deformed or infected trees.

Note: This section is provided to frame the reasons for spacing. It is not meant to be overly specific or exhaustive. Use the group for input.

Why Space?


B.C.'s competitive advantage
• Most of our pulp wood is from chips
• Wood quality on the coast
• Commodities in the interior

Overhead: Why Space – B.C.'s Competitive Advantage

Facilitator: Note this section may be contentious depending upon the views of the participants. Point out the sources of information and try to keep objective.

Coastal example: In the report *Canada's Forest Industry – Volume IV Wood Products the Next Twenty Years* by Woodbridge Reed and Associates 1988 (page 47) they state:

- "There is still substantial growth potential on the Coast, in terms of the value of the products that can be extracted from the available fibre, even though it must be acknowledged that the proportion of second growth timber is steadily increasing."
- "It must also be noted that there is effectively no growth potential resulting from increased log harvest. In fact…harvests are likely to decline, and there will be a drop in the proportion of saw-log quality timber (even including second growth)."
- **"Consequently, the future development of the BC coastal lumber industry cannot depend on volume growth and must focus on value growth."**

Interior example: Again from the Woodbridge Reed report (page 56) they state:

- "Growth opportunities for the BC Interior lie in two very different directions. In overall terms, there is unlikely to be any substantial increase in the availability of softwood fibre. The options are essentially:
  - produce commodity grades even more competitively and improve yields further, and
  - develop other grades and specifications that capitalize on the unique characteristics of the available fibre."

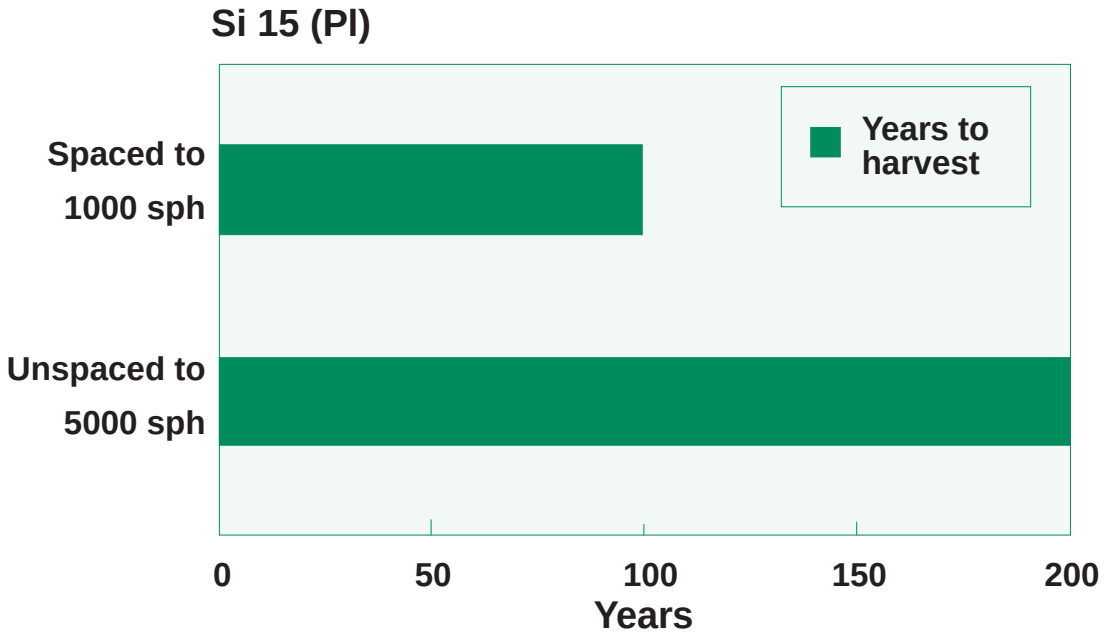
Remember also with commodity lumber there is a price premium for larger dimension wood – for example, on a board foot basis 2×10 by 14′ will typically have a price premium of 10 to 30% over a similar length 2×4 (See Madison's Canadian Lumber Reporter for up-to-date selling prices by commodity – phone 681-6838 to order).

Pulp fiction: We must be careful if we put too much faith in pulp logs as a final product. Presently about 5% of pulp is from roundwood and the value of pulpwood is variable and may not cover logging costs.

Why Space?

Interior Example

Time to reach average 25 cm dbh and 185 m³/ha



It is a matter of timing!

Overhead: **Timber Supply – Interior Example**

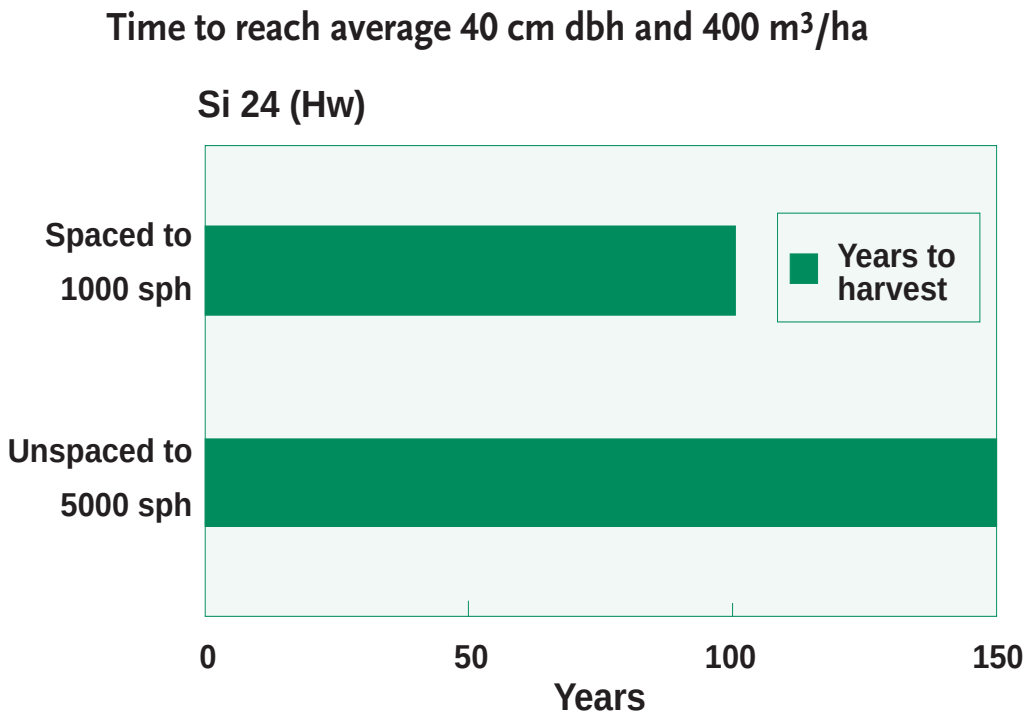
Facilitator: TIPSY RUN of two spacing densities and the resultant time it takes to achieve a specified target diameter and volume.

▲ Based on the assumptions provided, the two runs shown indicate an available harvest approximately 100 years sooner with spacing than without. This assumes a dbh target and target yield. These assumptions are the basis of most if not all timber supply reviews.

Note: Spacing creates larger piece sizes faster. The key issue is timing. How long are you willing to wait for a merchantable crop? Our timber supply projections are based on specific rotation lengths and volume, and in many cases, piece size estimates. Dense stands do not achieve the target sizes within the assumed time frames.

Why Space?

Coastal Example



It is a matter of timing!

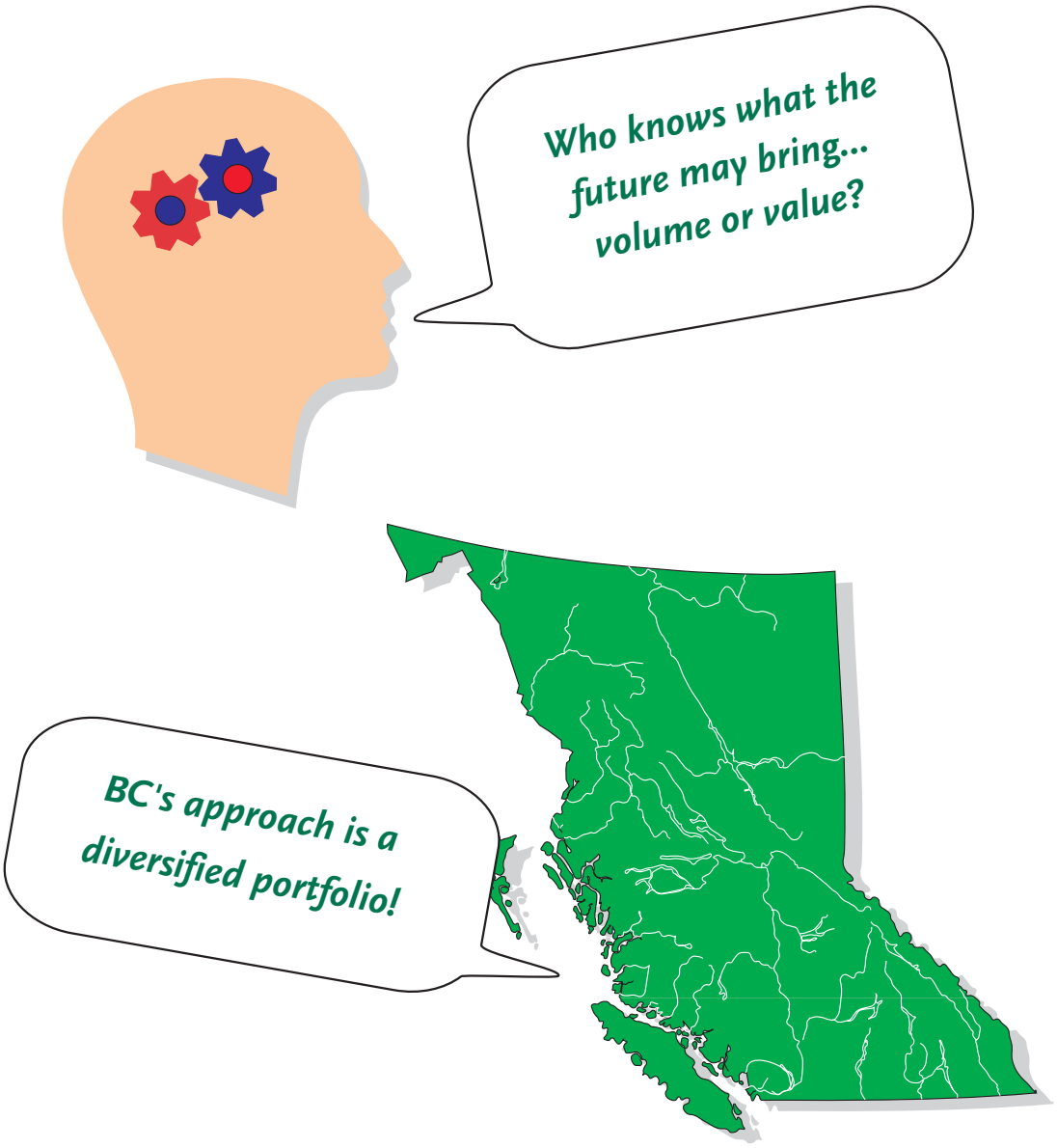
Overhead: **Timber Supply – Coastal Example**

Facilitator: TIPSY RUN of two spacing densities and the resultant time it takes to achieve a specified target diameter and volume.

▲ Based on the assumptions provided, the two runs shown indicate an available harvest approximately 100 years sooner with spacing than without. This assumes a dbh target and target yield. These assumptions are the basis of most if not all timber supply reviews.

Note: Spacing creates larger piece sizes faster. The key issue is timing. How long are you willing to wait for a merchantable crop? Our timber supply projections are based on specific rotation lengths and volume, and in many cases, piece size estimates. Dense stands do not achieve the target sizes within the assumed time frames.

Spacing to Meet Higher Level Plans



Overhead: Spacing to Meet Higher Level Plans

Facilitator: It is true we do not have a crystal ball to determine what will be considered more valuable in the future. But here are some ideas to discuss:

- Presently there are two schools of thought (at a minimum), regarding B.C.'s timber future in providing value vs. volume. The volume side does not advocate any added expense for growing of larger trees as it sees the use of manufactured products (such as glue-lam and the like) to take over the market niche of the larger piece sizes. It also sees technology and necessity as the engines of creating products that will match whatever we produce.
- The other camp believes there will be a price premium on larger dimension wood, due to increased product diversity from larger dimensioned logs, reduced handling costs and greater wood recovery making the cost of thinning some stands cost effective.
- The B.C. Ministry of Forests planning strategy suggests hedging our position, thus the approach is similar to other forms of investment – that is, creating a diversified portfolio.

Usually it is not up to you or I to determine what should or should not be created unless we are part of the planning process. Instead, we should get guidance from strategic plans and then set up regimes to meet the goals set out in the plan. When plans are not available, use local guidance and input from interested parties to decide upon areas and spacing regimes.

Note: Districts should consider setting up general regimes to provide a mix of products and habitats (target conditions or stands) when higher level plans are not available. If they are interested, they can contact Branch to get some ideas to get them started.

Presently, in the Cariboo, there is a Silviculture Investment Steering Committee, which is mandated to set objectives for incremental investments – this is a direct offshoot or result of the Cariboo–Chilcotin Land Use Plan. Their work should lead to specific regimes to achieve identified objectives.

Spacing to Meet Higher Level Plans

For example:

Soo TSA Product Objectives

Site index (BHA 50)	Stand objectives	Desired log grades	Grade criteria
13–17	Target height 25 m  Target 250 trees/ha >30 cm dbh and 150 trees/ha >17.5 cm dbh	6 m top 5–10 m U grade log 5–12 m J grade sawlog 0.3 m stump	Min. top db 10 cm Min. length 3.8–5 m Max. knot size 4–14 cm 50–75% lumber/ 35% merch.
18–22	Target height 30 m  Target 250 trees/ha >30 cm dbh and 150 trees/ha >17.5 cm dbh	6 m top 5–10 m U grade log 5–12 m J grade sawlog 0.3 m stump	Min. top db 16 cm Max. knot size 6 cm Min. length 5 m 75% lumber/ 50% merch.
23–27	Target height 35 m  Target 125 trees/ha >45 cm dbh and 375 trees/ha >30 cm dbh	6 m top 5–10 m U grade log 5–12 m J grade sawlog 5–12 m H grade sawlog 0.3 m stump	Min. top db 38 cm Max. knot size 4–8 cm Min. length 5 m Min. 2.5 rings/cm outer 1/3 50–75% lumber/ 65% merch.

Overhead: Spacing to Meet Higher Level Plans

Facilitator: The intent here is to point out the link between end product and density. We use the 1994 Soo TSA Timber Supply Area Forest Management Strategy* as an example. Technically it is not a higher level plan under the Code, but offers guidance on selection of regimes. Within it they indicate product objectives by site index – on page 49 they state:

Goal: "To produce forest products and values which will optimize the long-term use of the forest land base for the benefit of society, stability of the forest industry, communities and employment. Determination of product objectives is critical to maintain this goal and to provide objectives for silviculture treatment planning, budgeting and harvest scheduling."

They go on to state:

"Where feasible, target stocking levels, rotation ages and silviculture treatments will be planned to achieve the log grade specifications…"

The product objectives rationale is that J grade logs would break even with the average delivered log cost of $\$50.00/m^3$. Higher grades have to compensate for lower grades that are extracted at a loss. They have assumed that profit was important to the land owners (us) and to the industry harvesting the timber.

Various ranges of site index were assessed using TIPSY runs to determine which log grades were feasible in a timely fashion. The rotation length was set up to minimize MAI reductions. A 5% reduction was considered acceptable as the shorter rotations would provide a better return interval for incremental activities.

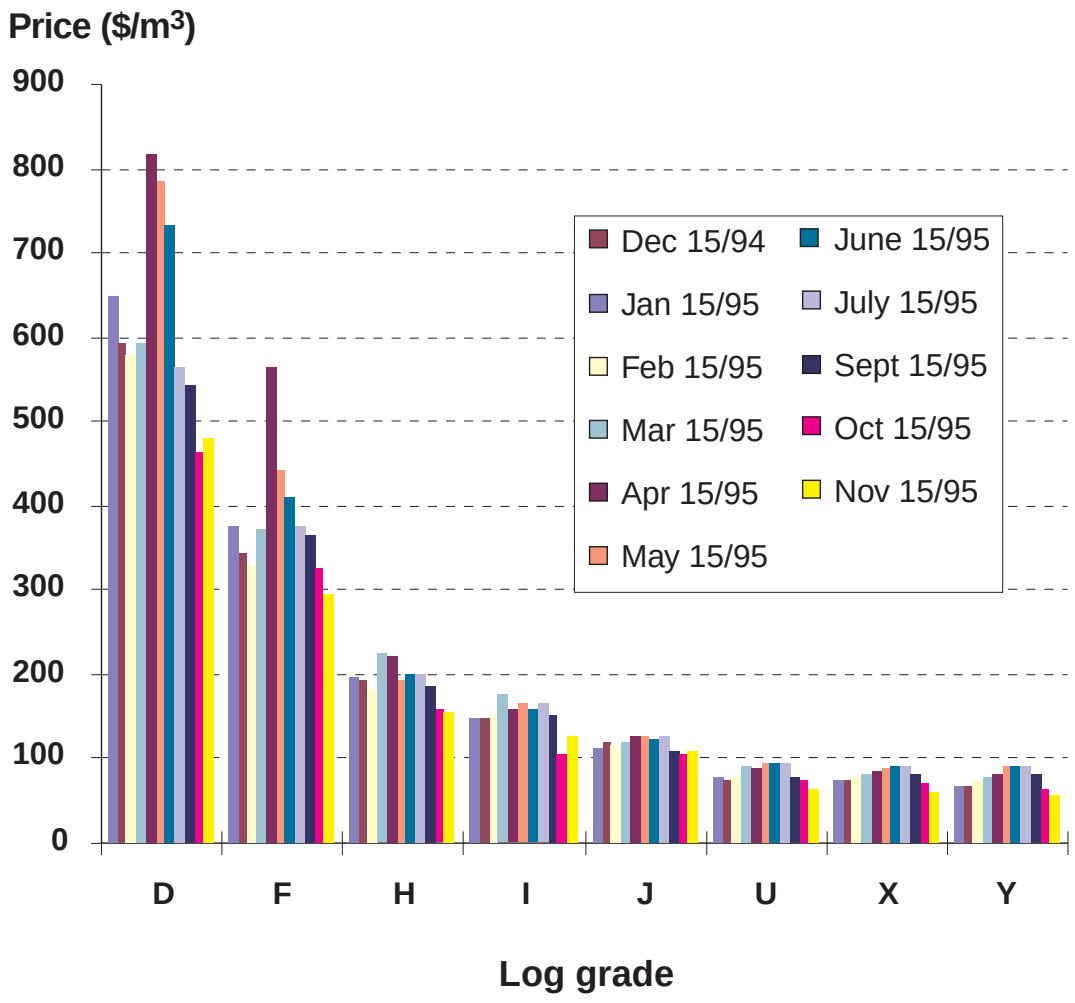
Different site classes were given different target height and target numbers of trees above a minimum dbh. The better the site, the greater the height and diameter targets. For example, the SI (bha 50) 23–27 Fd site showed a target height of 35 m (which is achieved at about 100 years with a SI of 25) and 125 trees per ha with dbh > 45 cm and 375 trees with dbh >30 cm. These specifications translate into a U grade log at the top, a J grade log below, and a H grade sawlog as the butt log.

Stress this point: These products assume final densities of approximately 400 stems per ha. Any treatment to the stand should be aware of this objective.

* Presently, the Soo TSA report is one of the few plans where this level of detail is provided. Copies are available from the Squamish Forest District. Phone (604) 898-2100.

Spacing to Meet Higher Level Plans

Log values by grade



Overhead: Log Values by Grade (Reasons for Spacing)

Facilitator: This overhead shows how value differs by log grade. This is done on the coast with a move towards it in the interior through the use of log yards such as the one in Lumby. You may wish to use local examples of grades from a log yard if there is one in your area.

STRESS the cutoff points for the various log grades (i.e., the diameter inside bark – dib – for the top of the log).

Go over the value of the various log grades and give a brief discussion of what the limits are for each grade:

U grade – min top dib = 10 cm; min length; max knot size 4–14 cm; 50–75% lumber/35% merchantable.

▲ 1995 average selling price = $\$82.32/m^3$

J grade (gang) min top dib 16 cm; max knot size 6 cm; min length is 5 m; 75% lumber/50% merchantable.

▲ 1995 average selling price = $\$117.30/m^3$

H grade is likely the best grade you will get in a 'normal' timber rotation length.

H grade sawlog – min top dib = 38 cm, max knot size is 4–8 cm; min length of the log is 5 m; min of 2.5 rings/cm in the outer one-third of the log – and 50–75% lumber/65% merchantable.

▲ 1995 average selling price = $\$191.34/m^3$

F grade sawlog – min top dib is 60 cm; max knot size 4 cm; min 75% of the surface is clear; min length is 5 m; min of 3 rings/cm in the outer one third of the log; with a min of 75% merchantable and 25% clear.

▲ 1995 average selling price = $\$381.15/m^3$

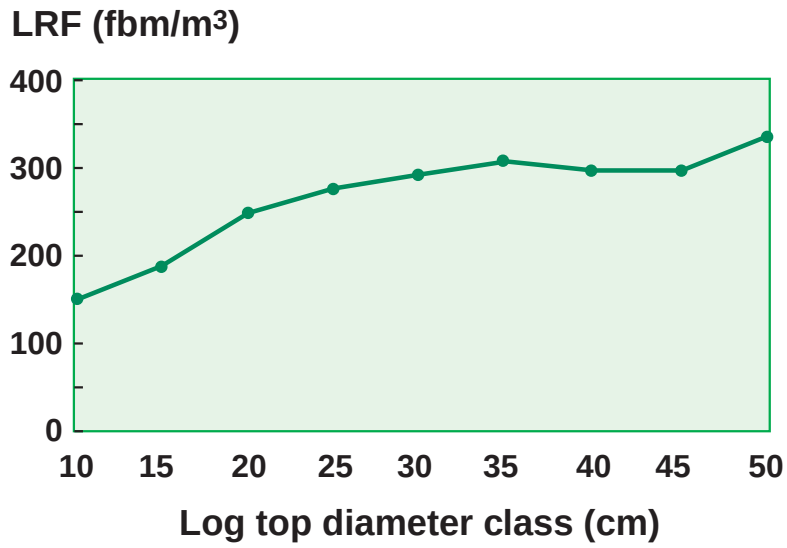
D grade sawlog – min top dib is 76 cm; min 90% of the surface is clear; min length is 5 m; min of 3 rings/cm in the outer one-third of the log; with a min of 75% merchantable and 50% clear. This class has not been targeted due to its very large size and clear requirements – this is an 'old growth' grade or taken from reserves that grow for more than a standard rotation length.

▲ 1995 average selling price = $\$617.41/m^3$

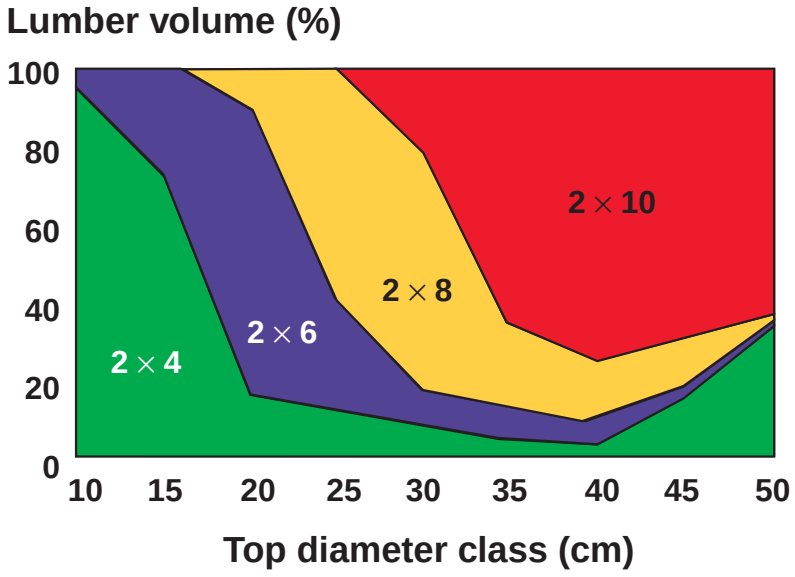
Note: Log prices are highly volatile. The information presented here is from the Vancouver Log Market, which only deals with a proportion of all sales on the coast. You should become familiar with the characteristics that demand a price premium (i.e., higher densities, tight or no knots, dense ring configurations, etc.) when setting regimes.

Spacing – Some More Reasons

Lumber recovery



Lumber dimension yields by log size



Source: Jozsa and Middleton, 1994. SP–34, pg. 36.

Overhead: Lumber Recovery Factors and Commodities

Facilitator: The purpose of this overhead is to show how diameter can influence lumber recovery and affect which commodities can be produced by a specific top diameter.

Note how as the top diameter goes up from 10 to 40 cm plus, the lumber recovery factor increases from 150 board feet per cubic metre to over double that figure. This means it takes twice as many cubic metres of small wood to create the same amount of lumber as bigger wood – this can be significant. The range is from 6.7 (small trees) to 3.3 cubic metres (bigger trees) needed to create 1000 board feet.

The lower graph shows how, as diameter increases, the option to create a larger commodity increases. While the actual price per thousand may not be significantly greater for the larger commodity sizes, there are significant savings in the milling and handling of the larger sizes.

Note: Wood quality can become an issue when creating large wood fast (juvenile wood). Participants should be familiar with the publication these graphs were taken from.

Jozsa, and Middleton. 1994. A discussion of wood quality attributes and their practical implications. FRDA II Special Publication – SP–34.

Hold up a copy and have a few on hand to pass out if they do not already have a copy. (This booklet was provided as part of the SMP training package, so if they had SMP training, they should already have a copy).

Spacing to Meet Higher Level Plans

Survey results from 29 TSA and TFL timber supply analyses

RESOURCE MANAGEMENT

TIMBER SUPPLY REVIEW

BRITISH COLUMBIA

Percent of the 29 TSRs that cited these attributes:

Merchantable volume objectives	75%
Average stand diameter objectives	35%
Assumed some form of density control or spacing	66%

Overhead: Timber Supply Analyses

Facilitator: The Ministry of Forests surveyed 29 TSA and TFL timber supply analyses assumptions. The survey found:

- 75% of the analyses had set merchantable volume objectives
- 35% had set an average stand diameter objective for harvest
- 66% assumed some form of density control or spacing based on their current densities and rotation length objectives.
  - For example, Williams Lake TSA assumes 1600 sph in its analyses.

Stress: When a timber supply analysis has density assumptions built-in these assumptions should spill over into operational plans to create the stands being used in the analyses – or the analyses should better reflect what is occurring on the ground.

Presently, maximum density is being used to create stands that will meet the assumptions for future wood supply for a majority of present analyses.

Note: Future timber supply calculations will likely be more closely tied to the ground as operational plans must meet the objectives of higher level plans as outlined in the Forest Practices Code.