



# Operational Seed Use Efficiency with Coastal Douglas-fir

Bevin Wigmore  
TimberWest Forest Company



# Outline

- Background
- Why I think SPAR sowing guidelines are too generous
- Changes I have made to sowing guidelines
- Results and complications
- Looking forward



# TimberWest

- Both private and public lands
- Mainly on Vancouver Island and in the Johnstone Straits
- Annual planting of 4.5 – 6.5 million
- 85-90% of our planting is Douglas-fir



# TimberWest Douglas-fir Seed

- We produce enough seed at our Mt Newton seed orchard to meet our quantity needs
- We purchase some high gain seed from Weyerhaeuser to increase the genetic gain on our land base, which also allows us to sell lower gain seed
- The GW of seedlots that we plant ranges from 7 – 16%, and we target the best seed on private land; we sell seed with 5 – 7% genetic worth



# Nurseries

- All seedling growing is contracted out
- Currently we are using three main nurseries to grow about 90% of our seedlings, and we have small contracts with a few other nurseries for the remaining 10%
- All the nurseries that I grow with are working to improve their seed use efficiency and I appreciate everything that they are doing



# Evidence that SPAR provides too much seed...

1. Thinnings!
2. Very large handling factor
3. Other jurisdictions don't use as much seed



# Douglas-fir thinnings





# Dumpster full of Fdc thinnings





# Handling Factor Example – 2005

Request 100K 412B  
 Seedlot 61073 G+11 95% GC 90 seeds/gram

SPAR Sowing Guidelines	(SF x OF) + (0.2 x OF)	= Total
For 95% germ :	= (1.5 x 1.28) + (0.2 x 1.28)	
Seeds/seedling	= 1.92 + 0.256	
For 100K at 90 s/g	= 2133 g + 285 g	= 2418 g
At \$3850/kg	= \$8212 + \$1097	= \$9309
For 5 million seedlings:		~\$50,000

What I gave the nursery: 2275 g – a 6% reduction

What they produced: 113K – a 13% overrun

Seed use efficiency: 1.81 seeds/seedling



# Growing seedlings outside BC

- No government sowing guidelines
- More competitiveness in seed use efficiency?



# Example from Washington nursery #1

- The seedlot had 94% GC
- They asked for 1.3 seeds/cavity with 1.1 oversow, and NO handling factor = 1.43 seeds per requested seedling
- SPAR would have calculated  $1.7 \times 1.28$  plus large handling factor = 2.43 seeds per requested seedling





## Example from Washington nursery #2

- Seedlot has 92% germination
- Proprietary sowing and oversow factors, but the requested amount of seed worked out to 1.71 seeds per requested seedling.
- If this same seedlot was on SPAR the guidelines would have given 2.56 seeds per requested seedling.
- This works out to a couple of thousand dollars difference in seed cost on a sowing request of just 100,000K – **or \$100,000 difference in seed cost for 5 million seedlings**



## How I started reducing seed use

- Started in 2004 sowing season
- 2004: Reduced handling factor on highest gain Douglas-fir seedlots
- 2005: Reduced handling factor on ALL A-Class Douglas-fir seedlots
- 2006: Reduced sow factors as well as handling factors
- 2007: Reduced sow factors and eliminated handling factor



# My current sowing rules

- No real negotiation – pretty one-sided!
- From 2004 to 2008 continued to reduce SPAR sowing guidelines by 10%, then 12%, then 15%
- My current sowing rules that I used in 2008 and may or may not stick with in 2009 reduced seed by 15 to 18% depending on seedlot.



# Seedling Yield Outcomes

Weighted average of all orchard seedlots across all nurseries

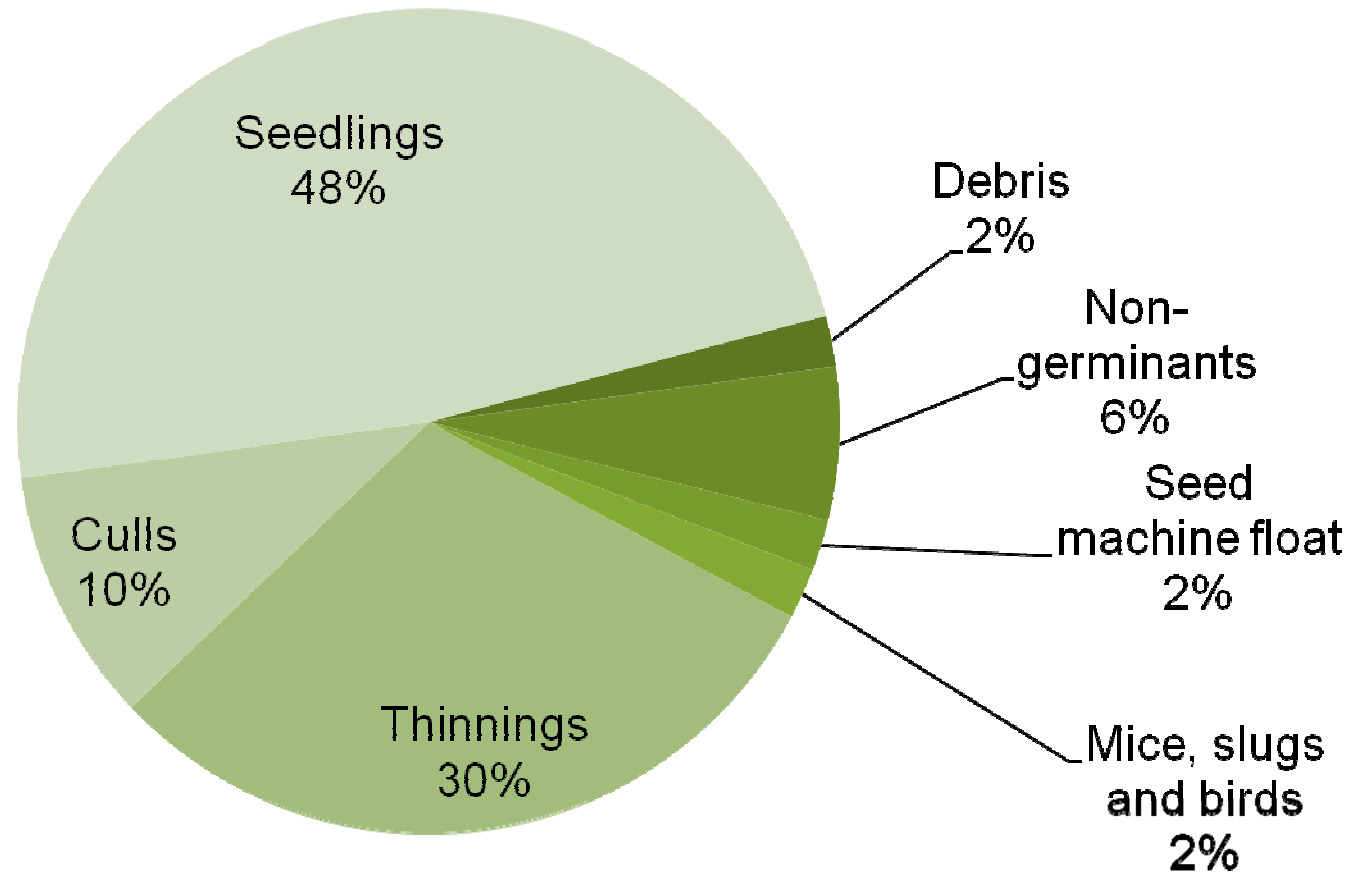
Seeds used per seedling produced				
	2004	2005	2006	2007
Unadjusted	2.38	2.23	2.07	2.18
Adjusted	2.11	2.18	2.05	2.07

- Complications –
  - Adjusting for nursery falldowns that are not seed-use related
  - Weather, eg poor September 2007

# Complications cont'd...Foresters



# At 2.07 seeds/seedling, where do the rest of the seeds go?







## Why do we thin?

- Because we need to make sure we have one germinated seed in every cavity (really?)
- Therefore we need to sow extra seed to make up for debris, non-germinants, pests, seeding machine inefficiency, and various other risks



## Other ways to improve cavity fill

- Transplant thinnings to empty cavities
- Slow the sowing line down and have workers put a seed in every empty cavity
- Invest in a more accurate seeding machine
- Mini-plug transplants
- Demand purer seed from the customer
- OR...Live with the empty cavities

# Thinning and transplanting





# Transplants exposed





# Dumpster full of Fdc thinnings





# Going forward

- Continue to find a way to consistently produce seedlings from more than half of our seed, i.e. use less than 2.0 seeds/seedling, aiming for 1.7-1.8.
- Continue to pursue single-sowing and reduced-sowing cost sharing arrangements that will benefit both us and the nursery.