Seed Planning Basics

Dave Kolotelo

Seed Planning Inputs

- Sowing Guidelines
  - Review input variables
- Seed Efficiency
- Seed Pricing
- Big Picture simplicity
- Seed Planning Zone complications
- Variables to Consider
- Seedlot Selection

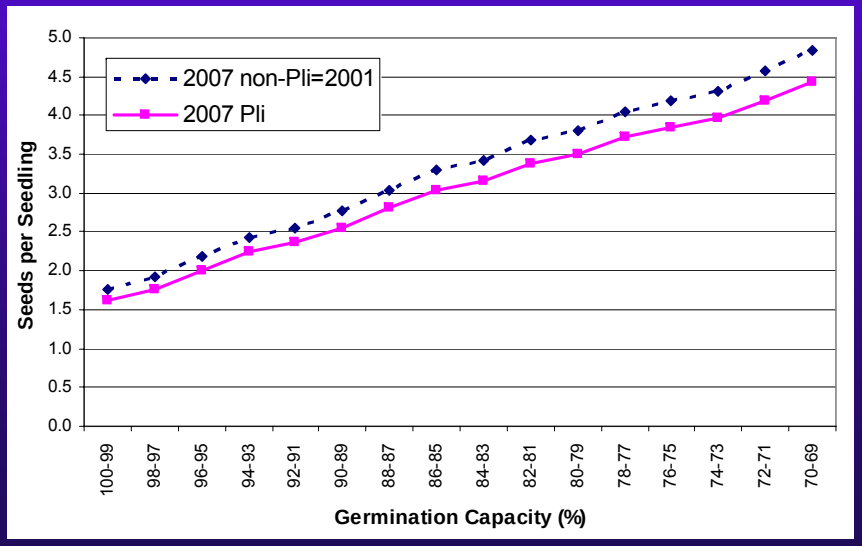
Sowing Guidelines

- SPAR default method of calculating Potential seedlings
  - Amount of seed
  - Seeds per gram
  - Seeds per seedling (from a table based on 2% GC results)

Germination Capacity (%)	Sowing Factor	Correction (Oversow) Factor	Nursery Handling Factor	Seeds Supplied Per Seedling
100-99	1.2	1.25	0.20	1.76
98-97	1.4	1.27	0.20	1.91
96-95	1.6	1.27	0.20	**2.18**
94-93	1.7	1.28	0.20	2.42
92-91	1.9	1.27	0.20	2.56
90-89	2.0	1.26	0.20	2.78

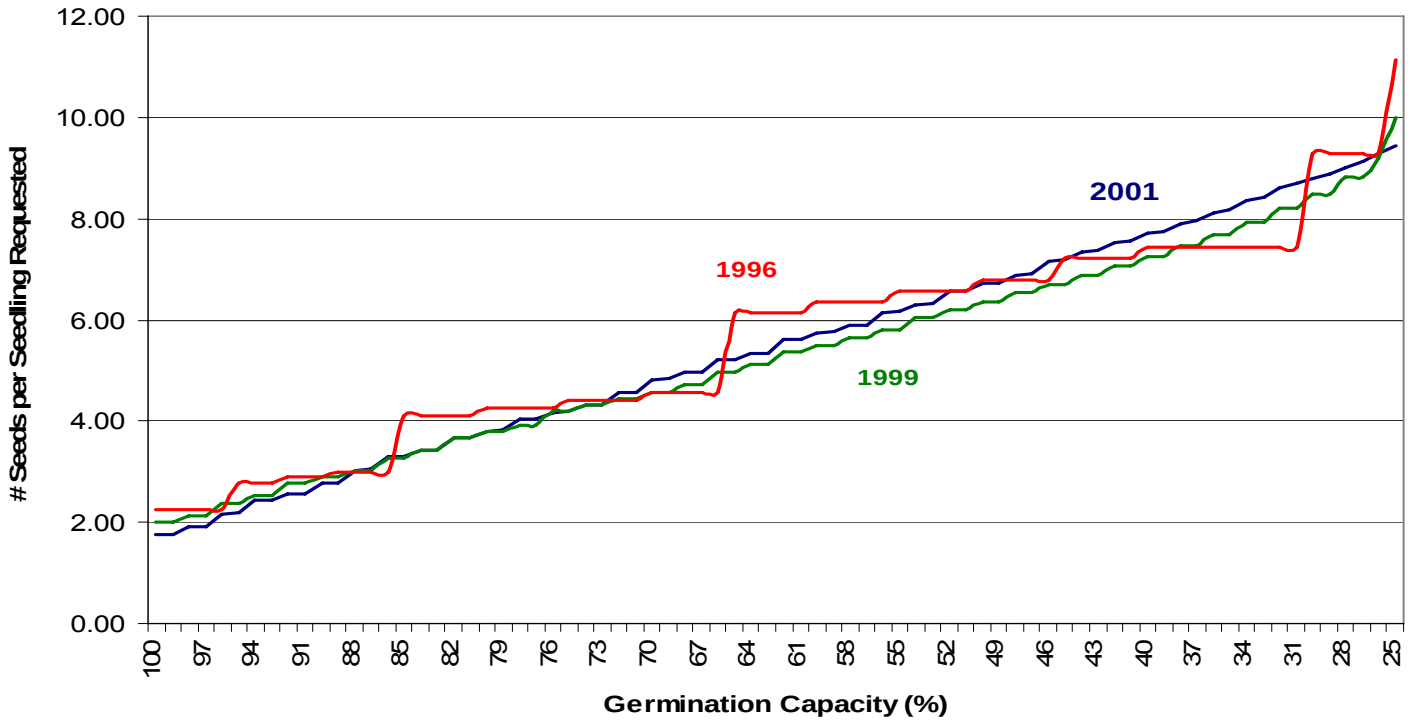
Guidelines are not different for "A" and "B" class seed

- 2007 Adjustments for Pli
- Improved ease to adjust grams
- Encourage gram adjustments (only order what you will sow!)



http://www.for.gov.bc.ca/hti/spar/2007_sowing_guidelines.htm

1996, 1999 and 2001 Comparison



- 1996 stepwise allotment streamlined
  - introduced fractional sowing factors
  - refined changes in GC (2% *vs*. 5%)
  - refined changes in oversow (1% *vs*. 5%)
  - refined changes in sowing factor (0.1 *vs*. 1.0)

How do the Sowing Guidelines Work?

- You need to know
  - Weight of seed or seedlings desired
  - seeds per gram (SPG) of seedlot
  - germination capacity (GC) of seedlot

Germination Capacity (%)	Sowing Factor	Correction (Oversow) Factor	Nursery Handling Factor	Seeds Supplied Per Seedling
100-99	1.2	1.25	0.20	1.76
98-97	1.4	1.27	0.20	1.91
96-95	1.6	1.27	0.20	2.18
94-93	1.7	1.28	0.20	2.42
92-91	1.9	1.27	0.20	2.56
90-89	2.0	1.26	0.20	2.78

- Obtain seeds supplied per seedling from Table 1
- Insert into the following equation
- grams= $\frac{\text{\# seedlings needed} * \text{Seeds/seedling}}{\text{Seeds per Gram}}$

- 50 000 seedlings GC = 96% SPG = 509
- from Table 1 we determine that 2.18 seeds are supplied per seedling.

- grams= $\frac{50\,000 * 2.18}{509}$ = 214.1 grams

  SPAR will round up to nearest gram = **215**

Seed Size

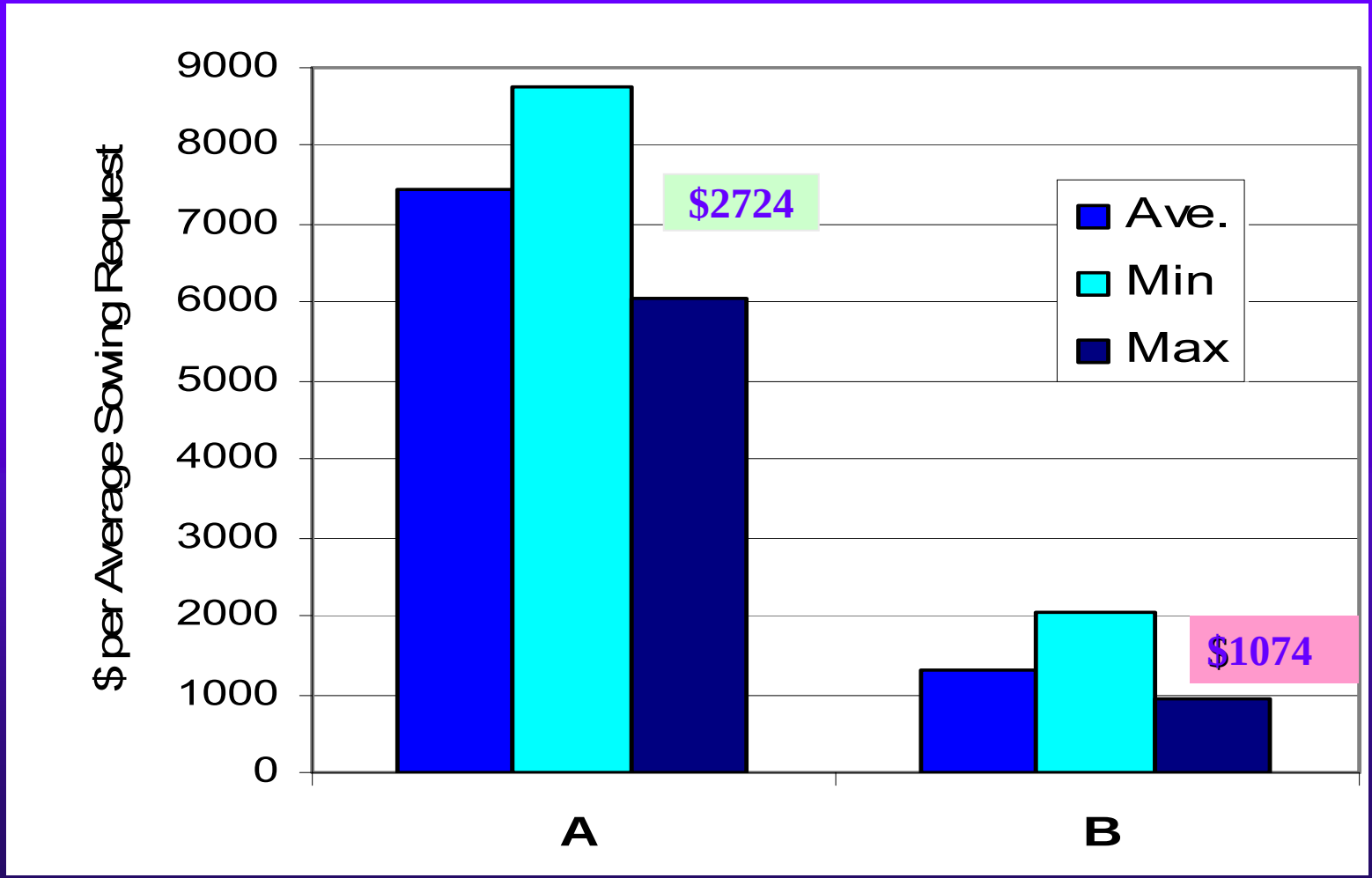
- Seeds per gram is not considered in seed pricing
- Do people consider SPG (all else equal)?

- Is there good evidence to indicate larger seeds –
  - Increase sowing efficiency ✓
  - Germinate 'better' ☒
    - Seed size only explains 3.7% of the variation in germination capacity
    - Seed size only explains 4.6 % of variability in germination rate
  - Result in higher # recoverable seedlings **? Fdc NO - ???**

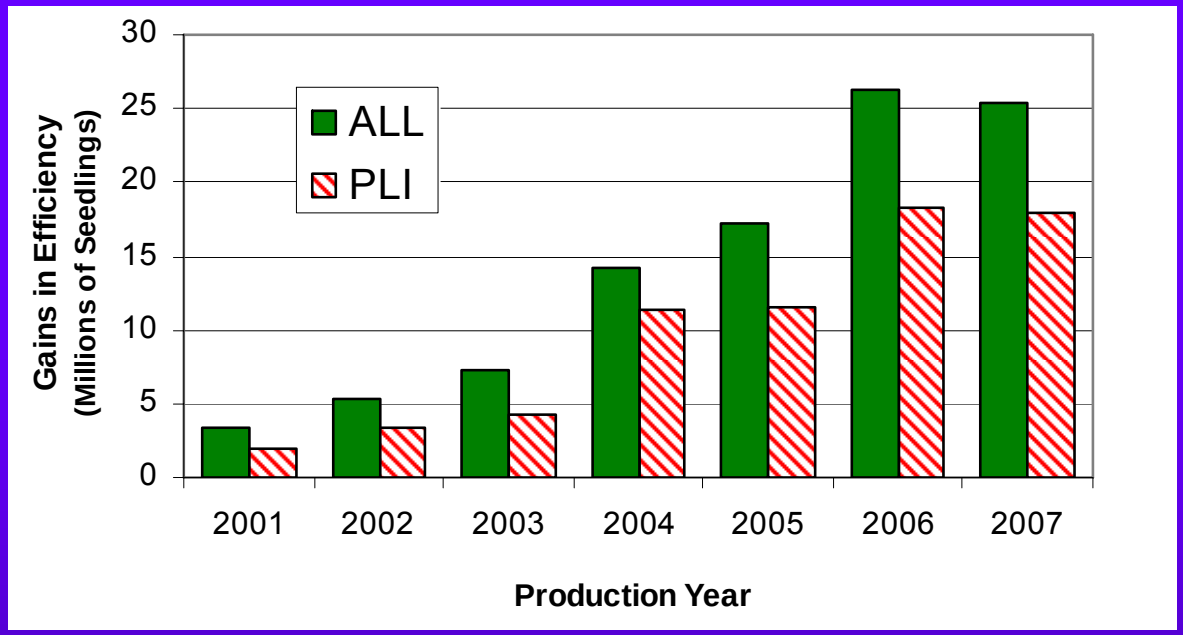
- Is there any cost advantage?

PLI	A	B
# lots	51	1569
Ave.	**251**	**338**
Min	213	216
Max	309	458

Seed Cost of an Average SRQ



Seed Efficiency



We do not want to reduce seedling production!

We want to increase seed efficiency (order only seed you will sow!)

- Efficiency measured as difference between requested and calculated
- calculated is based on gram adjustments (savings)
  - How much seed we save (in terms of potential seedlings)

- 2007 Pli 125 M requested – 107 M calculated =18 M saved

Thank you to everyone who reduced grams, but more important reduced the amount of returned seed

Seed Pricing

- Seed owned by the MFR and identified as SURPLUS on SPAR is sold according to the following price schedule

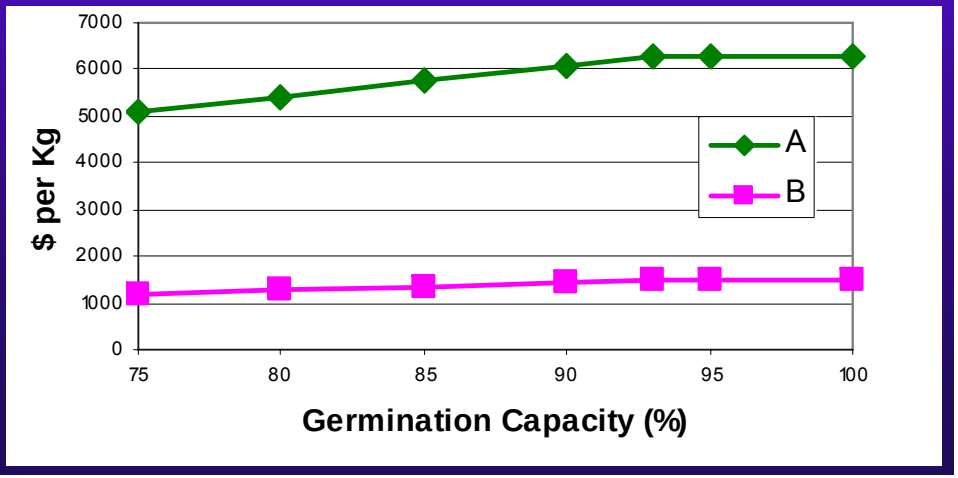
  Ministry Surplus Seed Price Schedule

  http://www.for.gov.bc.ca/TIP/publications/updates/vol2no1.pdf

  - details the pricing structure for Ministry-owned tree seed
- Privately owned seed can be sold at any price, some follow the Ministry prices, some don't
- MFR price list also provides price reduction

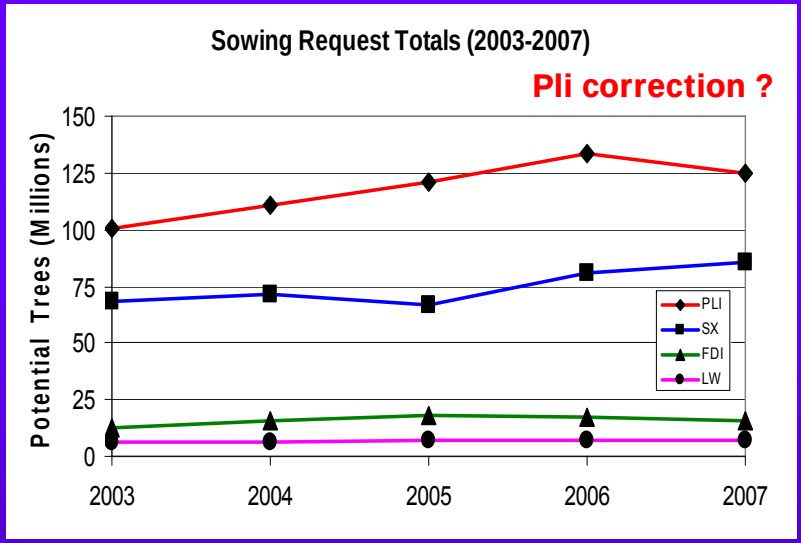
  % of seedlot Pli i.e 88/93*1482 = $1402

  Species average %



Seed Supply +Demand – BIG Picture

- Potential Trees - 5 Year average (2003-2007) 21/3/07



Pli – 118 M = 18 years

Sx – 75 M = 44 years

Fdi – 16 M = 16 years

Lw – 7 M = 16 years

Overall 27 years

Demand Uncertainties

MPB → further AAC increases ?

Species selection choices ? Stocking levels ?

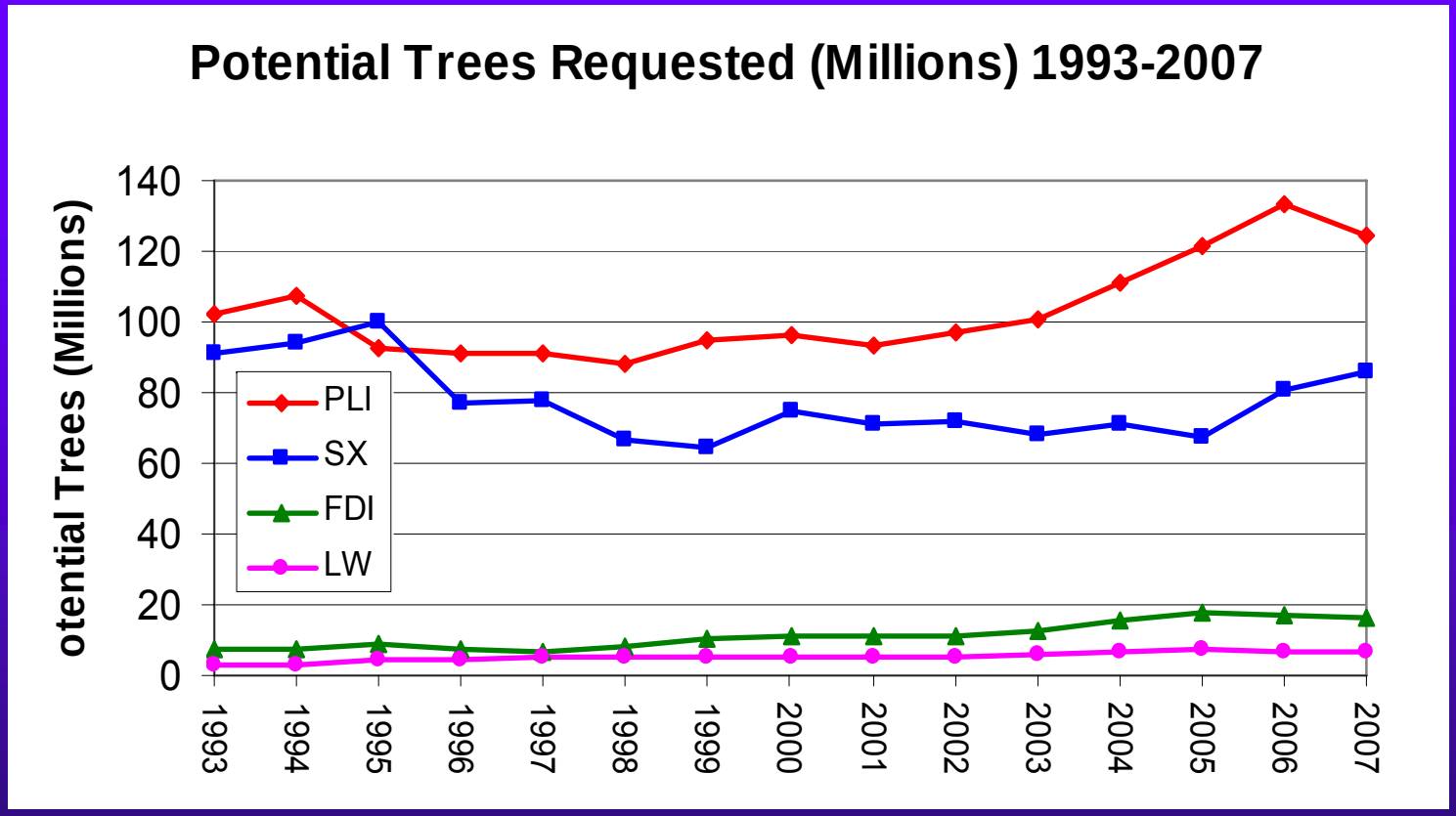
Degree of reliance on natural regeneration ?

Wildfires – new/increased pest problems

Climate Change

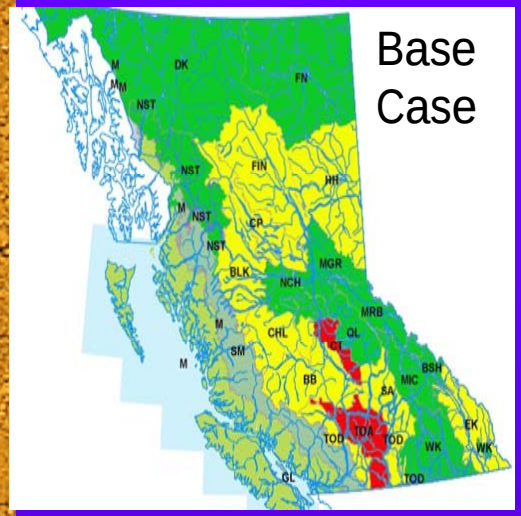
Demand Uncertainties

- **Looking to the Past ???** **New Game**



Sensitivity analysis – predicting range of outcomes

MPB Seed Analysis - Pli



Years supply colour coded by SPZ

>20 years supply

10 to 20 years supply

<10 years supply

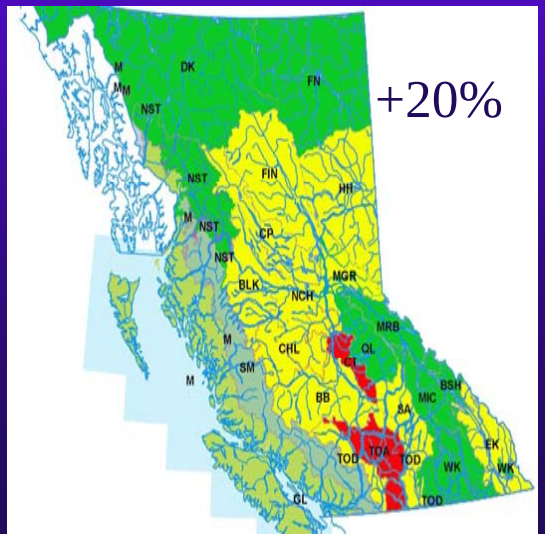
Assumptions

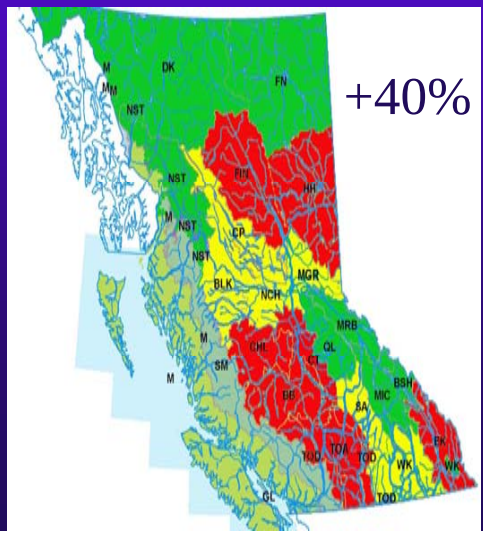
- Only B-seed = 98.5% of Pli inventory
- Seedlots w/multiple SPZ divided equally (B+ & others)
- 2004-2006 Pli average request by SPZ used as demand
- Inventory based on August 26
- Inventory /demand results in estimates of years supply

Does not represent availability

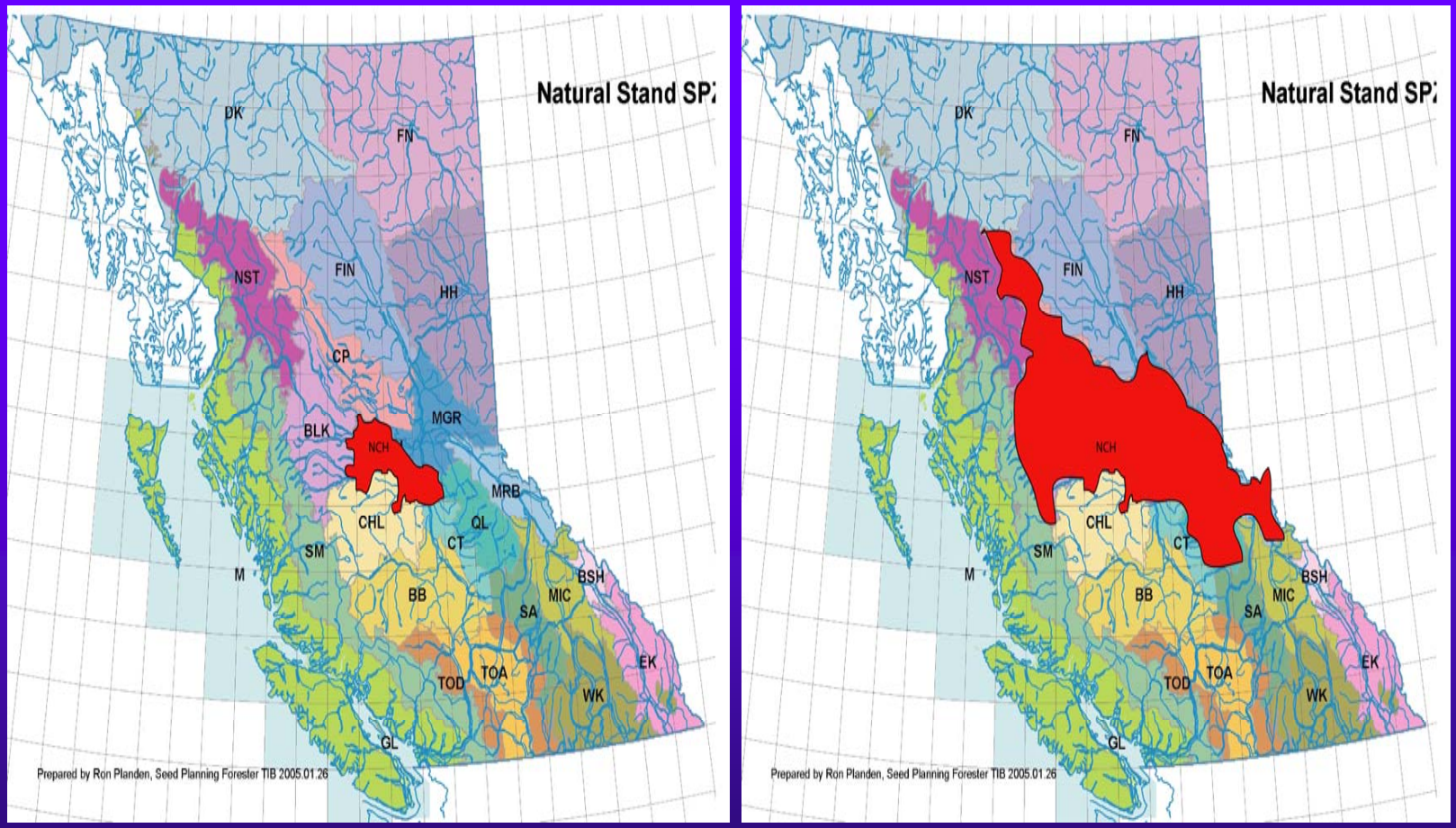
92% Pli seed "Reserved"

Base case is based on Inventory demand
+20% and+40% increase in demand scenarios





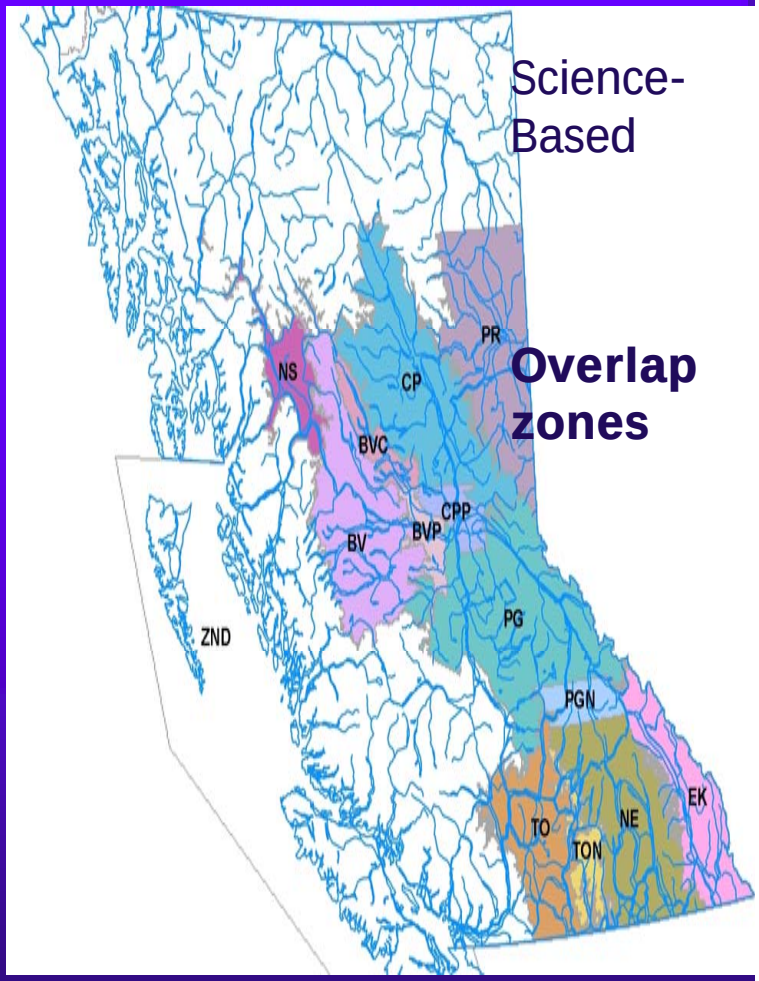
B+ Seed Transfer Advantage



Nechako River example – BLK, CP, MGR,MRB, **NCH**, QL

SPZ Complications

Administrative



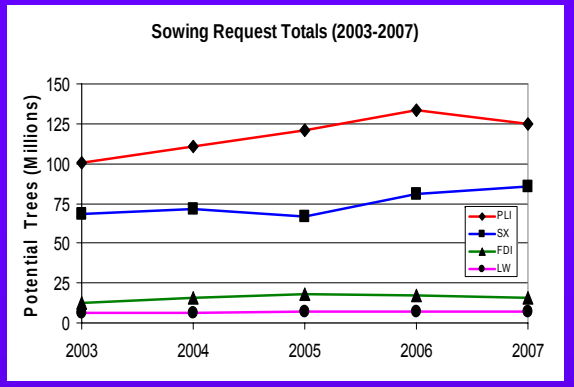
Overlap zones

Natural Stand SPZ (all species)

Orchard Seed SPZ (Pli – sp. Specific)

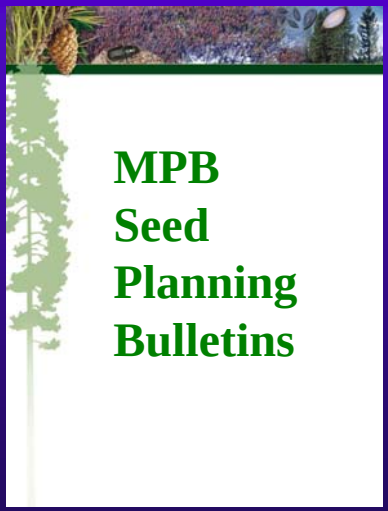
How to deal with SPZ issue?

- SPU Demand (Sowing Requests) are assigned to both Natural and Orchard SPZ
  - Can summarize Potential trees either way
  - Natural SPZ = Total provincial coverage
  - Orchard SPZ = Area under orchard coverage
- Same total trees two different lenses



- Three regressive lenses
  - Inventory of A-class seed by SPU
  - Expected orchard production by SPU 2007-2030 [FGC]
  - Inventory of B-class seed by natural stand SPZ

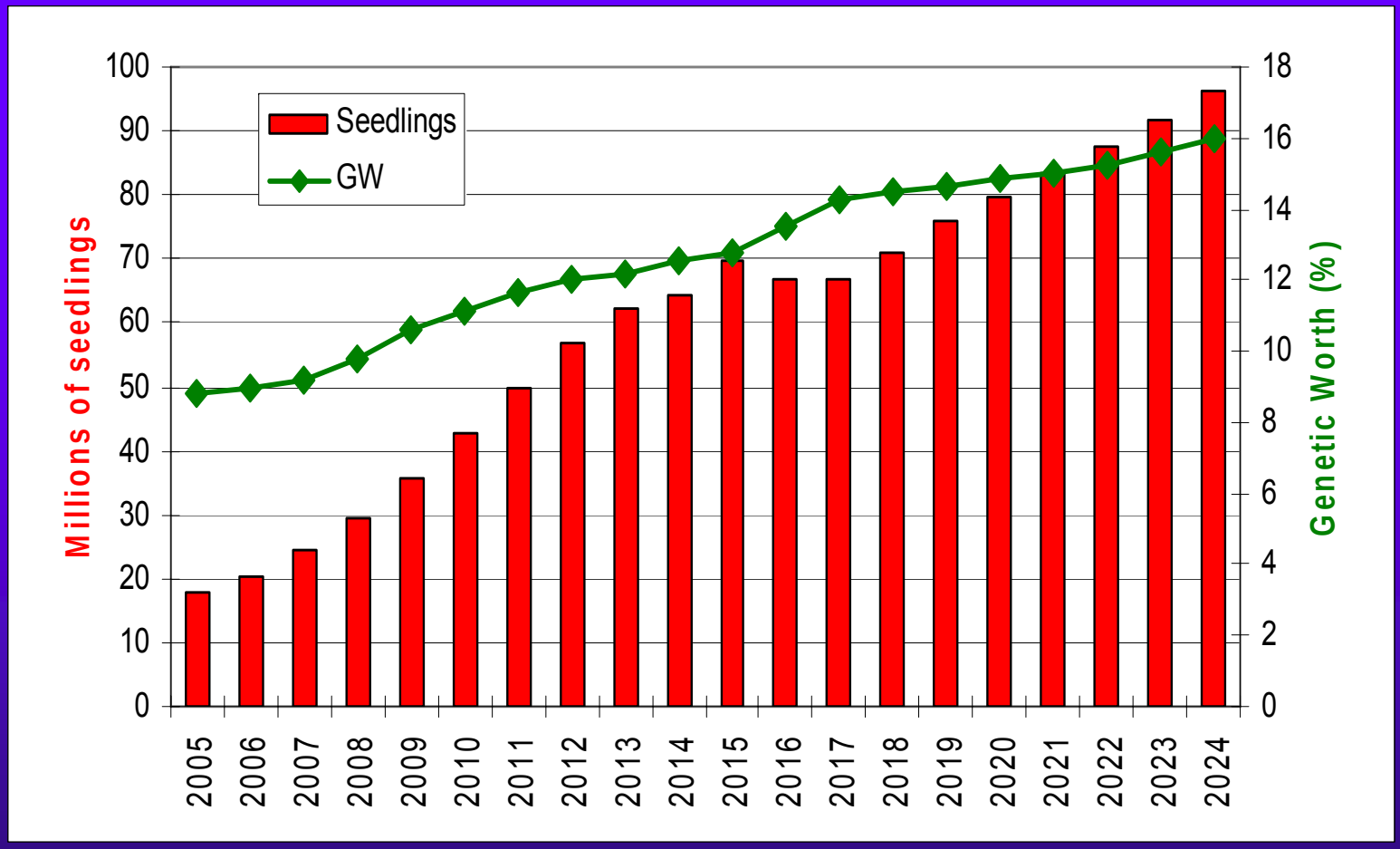
- BC interior - No surprises
- Sx, Lw –lots of surplus A class seed GW↑
- Fdi – orchards starting / GW ↑ ↑ /
- Pli – orchard production issues
  - LARGE current investments
  - LARGE natural stand inventories (TOA exception)

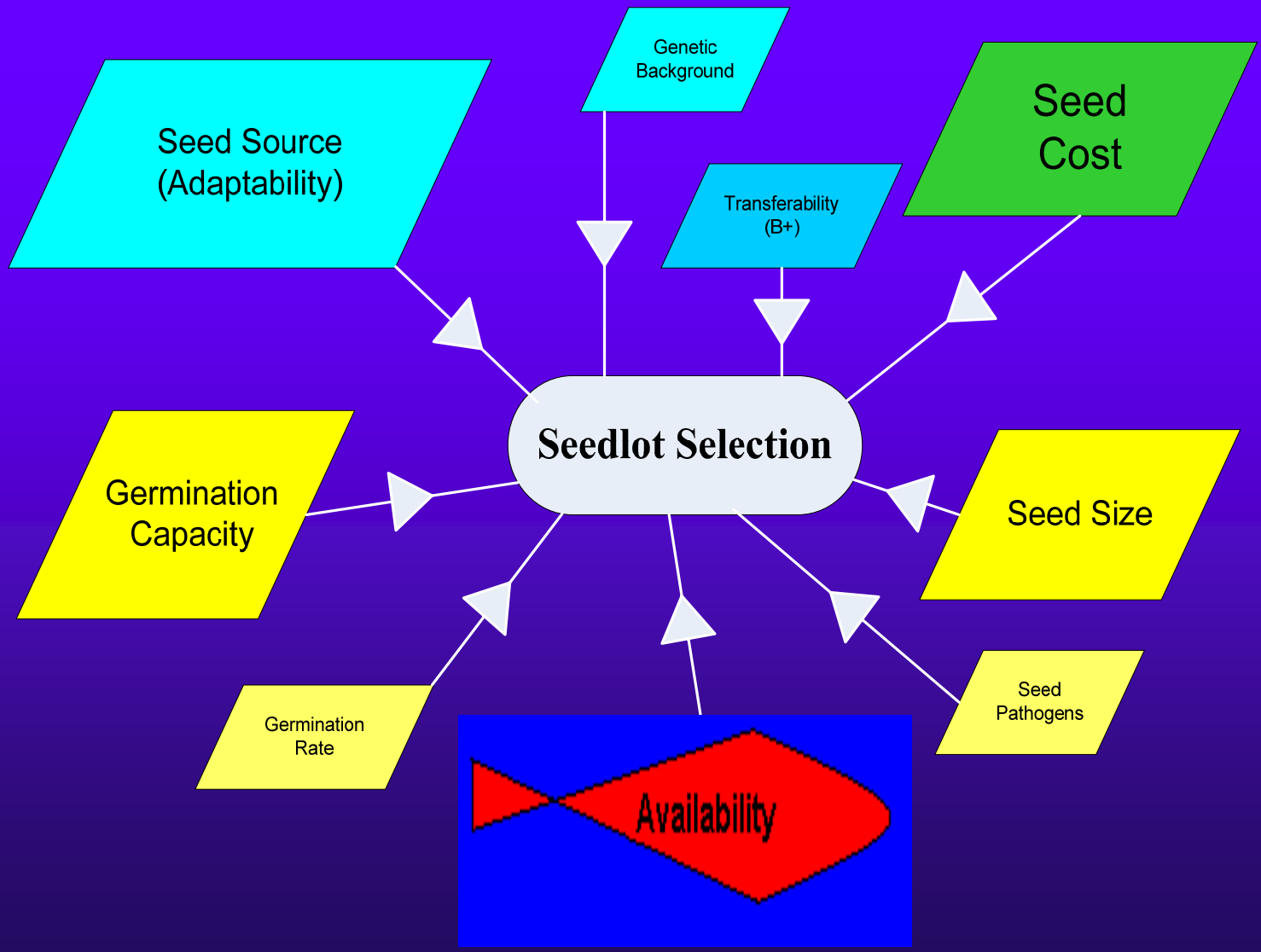


Supply – Genetic Considerations

	PLI	SX	FDI	LW
# Seedlots	71	103	9	16
Pot. Trees **M**	24	**295**	0.6	34
Pot. > GW 5	19	**250**	0.6	30
% A-seed inventory	1.2%	9.0%	0.2%	30.6%
% A seed Use-5Yr	10.6	78.4	3.6	70.9
% A Seed Use- 07	12.2	82.2	10.1	70.0
% A SURPLUS	**0.2%**	**83.6%**	**0.0%**	**61.0%**
GW ave.	9.2	12.7	19.8	14.6
GW wt. POT	7.3	15.5	23.1	12.9
GW MAX	17%	30%	28%	34%
% ZND	7.6%	7.6%	**25.8%**	4.5%

Pli Orchard Production and Gain




Seed Source (Adaptability)
Genetic Background
Seed Cost
Transferability (B+)
Seedlot Selection
Germination Capacity
Seed Size
Germination Rate
Availability
Seed Pathogens