Stand Development Monitoring

S D M

How are our Stands Performing Post Free Growing?

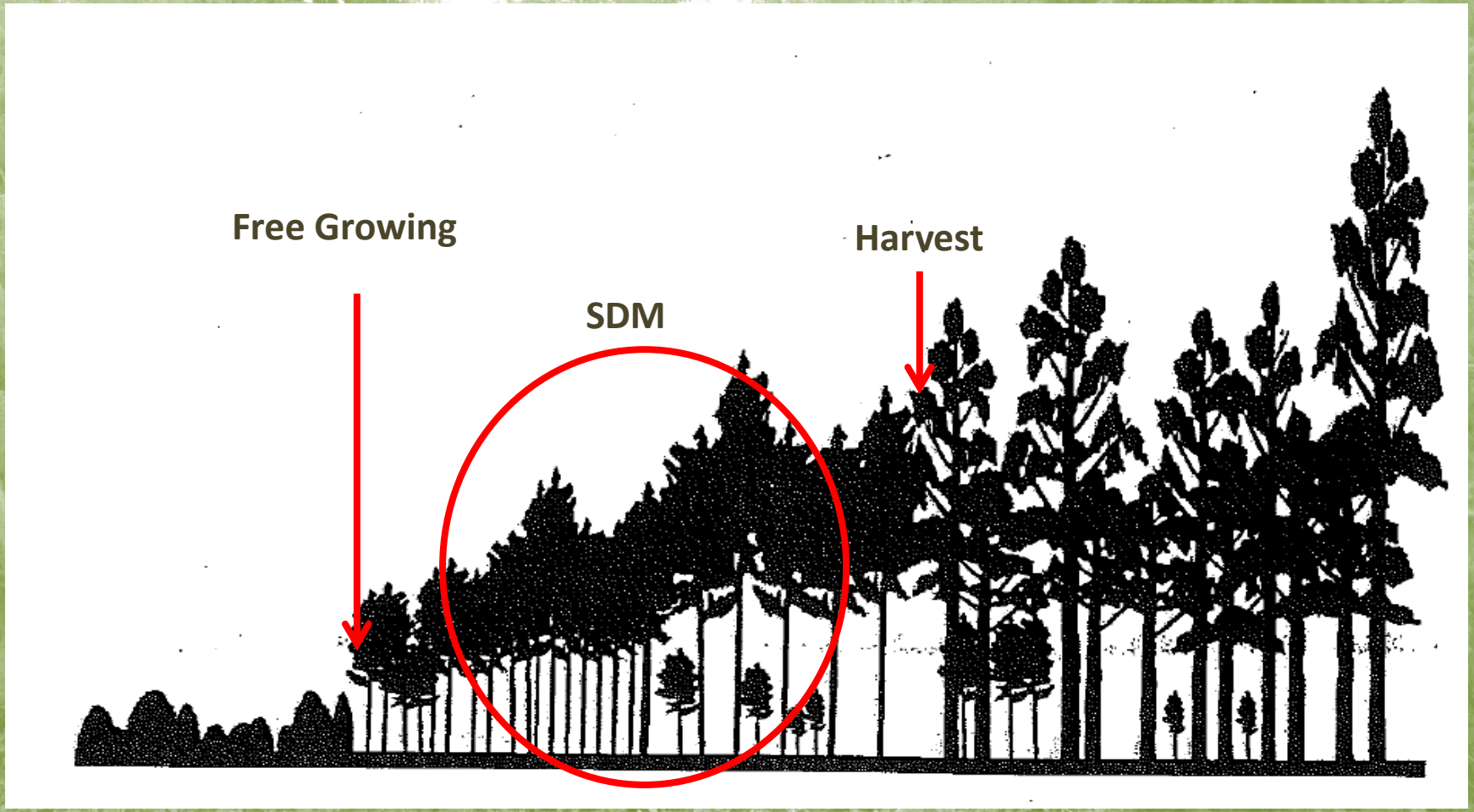
Early Coastal Experience - Stefan Zeglen & Dave Weaver

SDM Outline

- Brief Overview – Dave
  - History
  - Objectives
  - Sample Size and Population Selection
  - Field Procedures – Plots and Field Card
- Coastal Results and Findings to 2012 – Stefan
  - Data Processing
  - TSA Summaries
  - Other Products

U.S.S. ENTERPRISE
...to boldly go where no man has gone before.
^
government forester
THE LIGHT WORKS

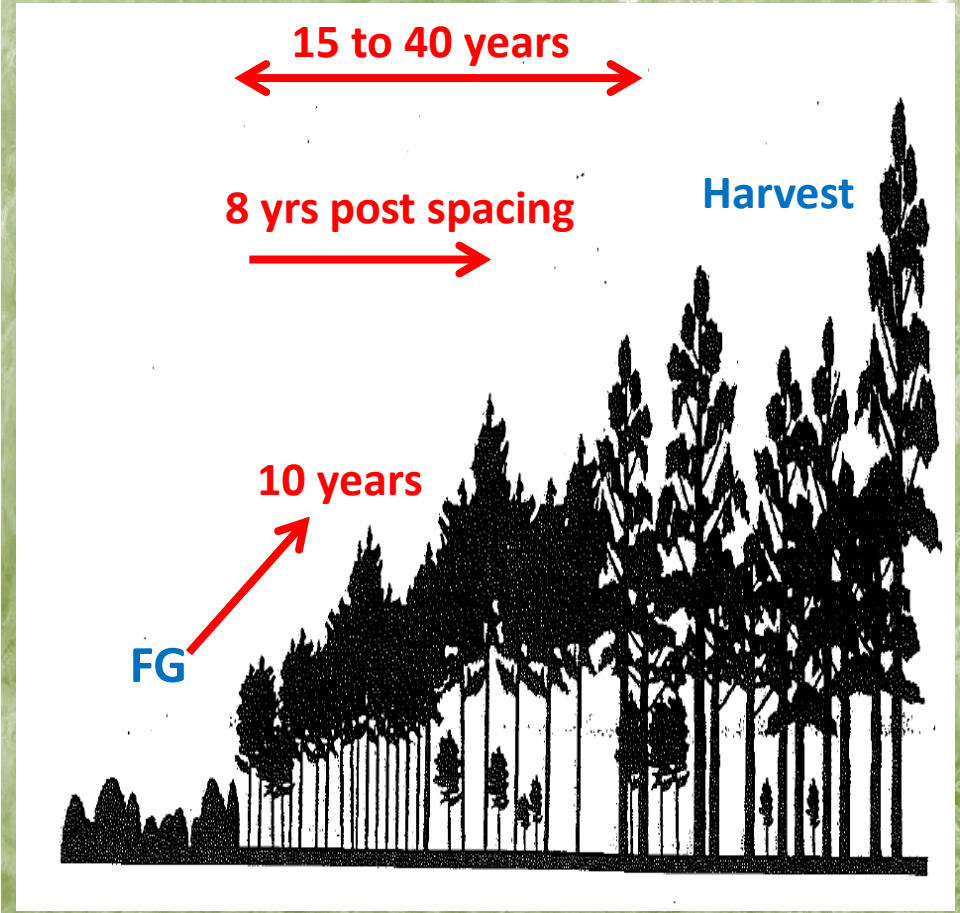
...to boldly go...



History

- 2005 - original concept from FREP to evaluate mid-rotation stands for Forest Health
- 2005 - Pilot Project in Lakes TSA
- 2006 - Piloted in Strathcona TSA and Okanagan TSA
- 2009 - SDM sampling goes “live”
- 2011 - Sampling protocol and field card revised
- 2012 - operational but voluntary for all TSA’s– target of 30 polygons per TSA for data summaries.

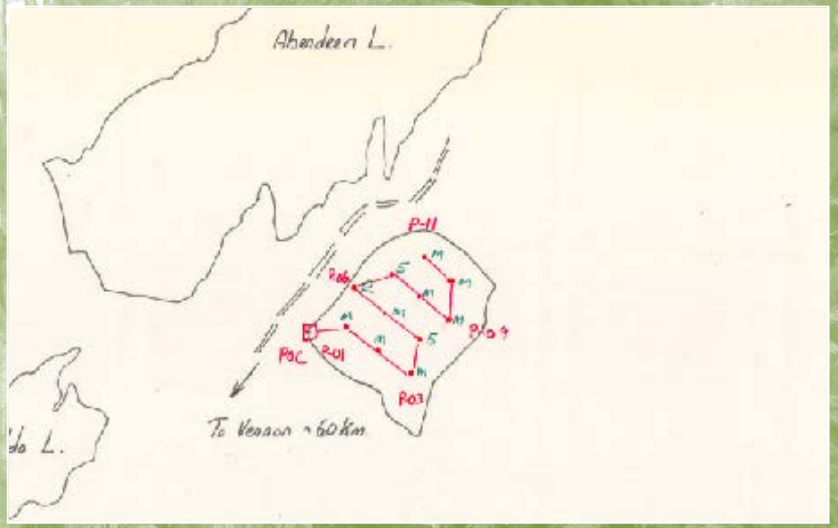
SDM Objectives

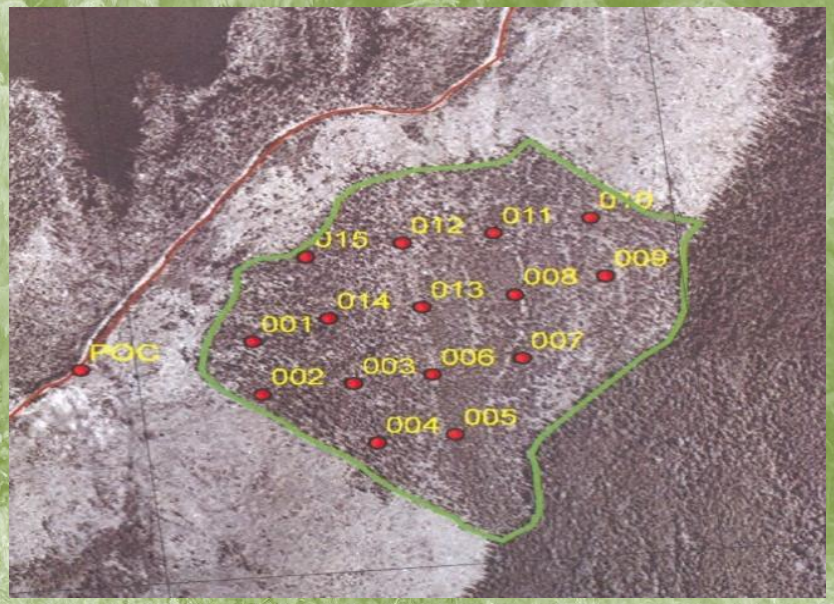


1. Assess the health and productivity of young stands
   a) 15 to 40 years old
   b) 8 years post treatment
   c) 10 years post FG
2. Review effectiveness of Government Policy and recommend change
3. Review effectiveness of forest management practices and adjust

Sample Size and Population

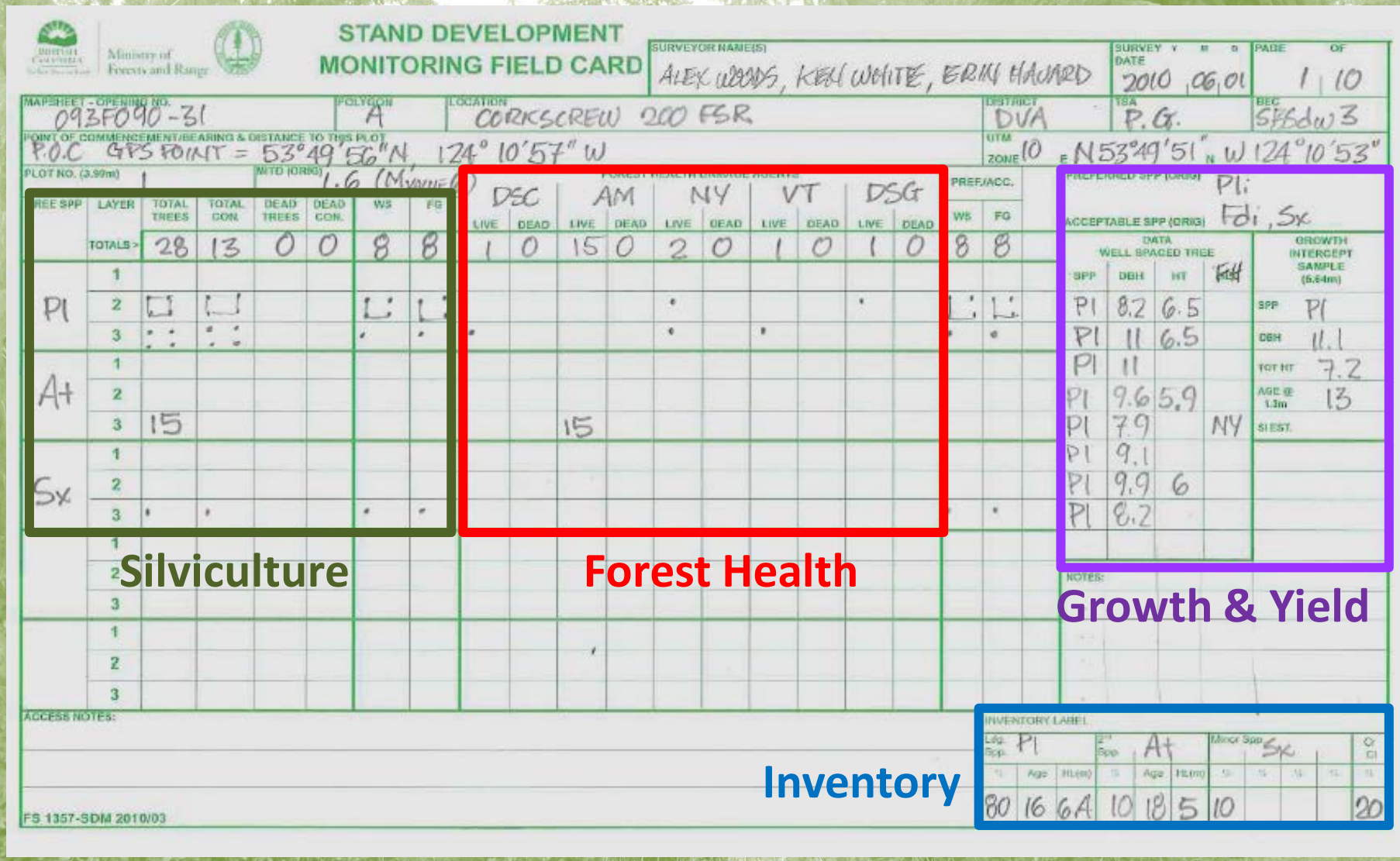
- Intent to sample 30+ RANDOM polygons per TSA for data summary
- Polygon-based sample unit – *not SU*
- ≥ 5 ha in size
- Reject only for safety reasons or multi-layer / uneven-aged
- 10 plots per polygon





Plot Data – its for everyone!!!

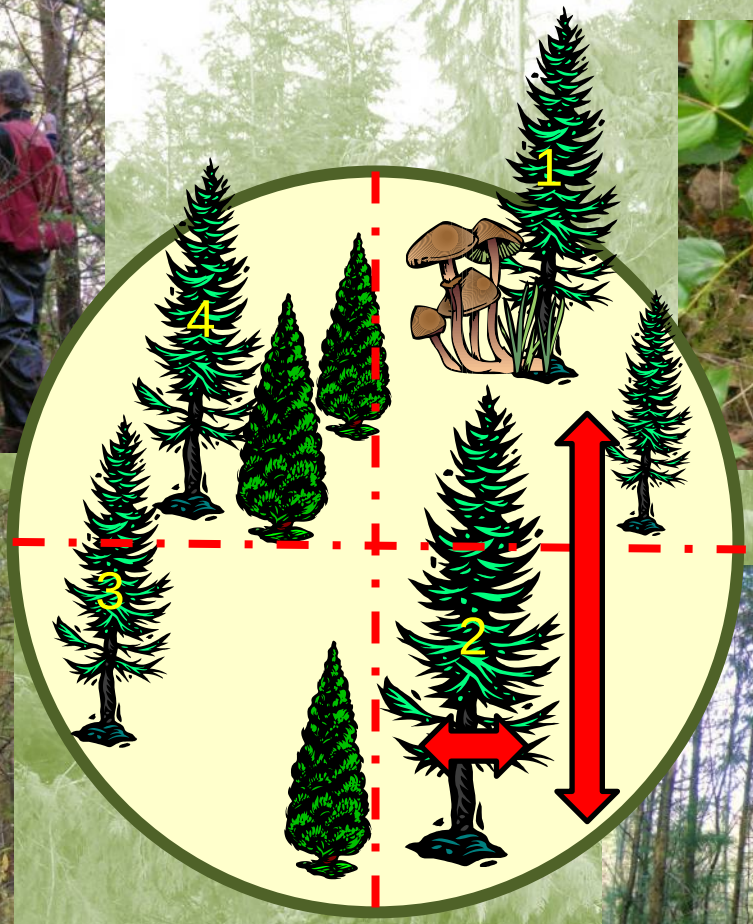
Fixed 3.99 m radius



SDM Data Collection

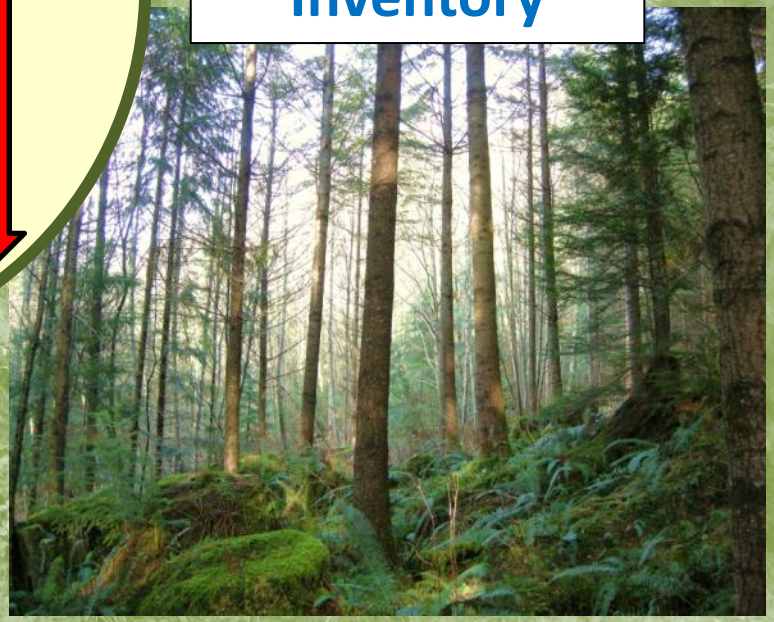
Silviculture

Forest Health



Growth & Yield

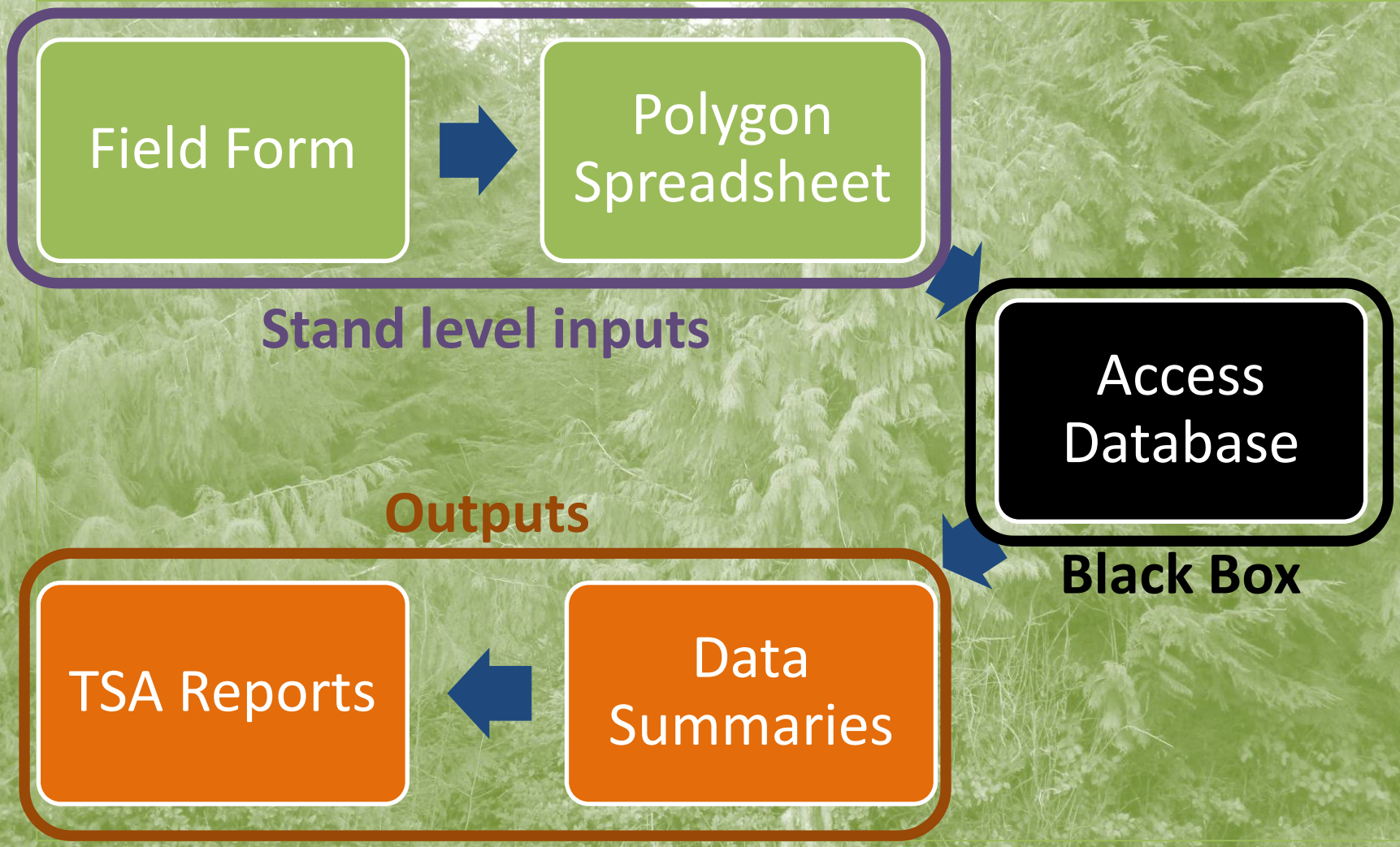
Inventory



Summary SDM Overview

- Started as Forest Health
  .....to boldly go.....
- FREP Protocol
  Post Free Growing
- 30 random samples per TSA
- 10 plots per Polygon
- Data:
  - Silviculture
  - Forest Health
  - Growth & Yield
  - Inventory
- Staff really like it!!!

Components of SDM Data



Playing with Data

SDM Data summarized by:

1. Overview statistics (context)
   - E.g., polygons sampled, polygon attributes, coverage, etc.
2. Forest Health
   - E.g., pest incidence by host and by BEC unit, etc.
3. Stand Density
   - E.g., changes in stocking (TT, WS and FG), etc.
4. Species Composition
   - E.g., changes in leading species, BA representation, etc.
5. Site Index

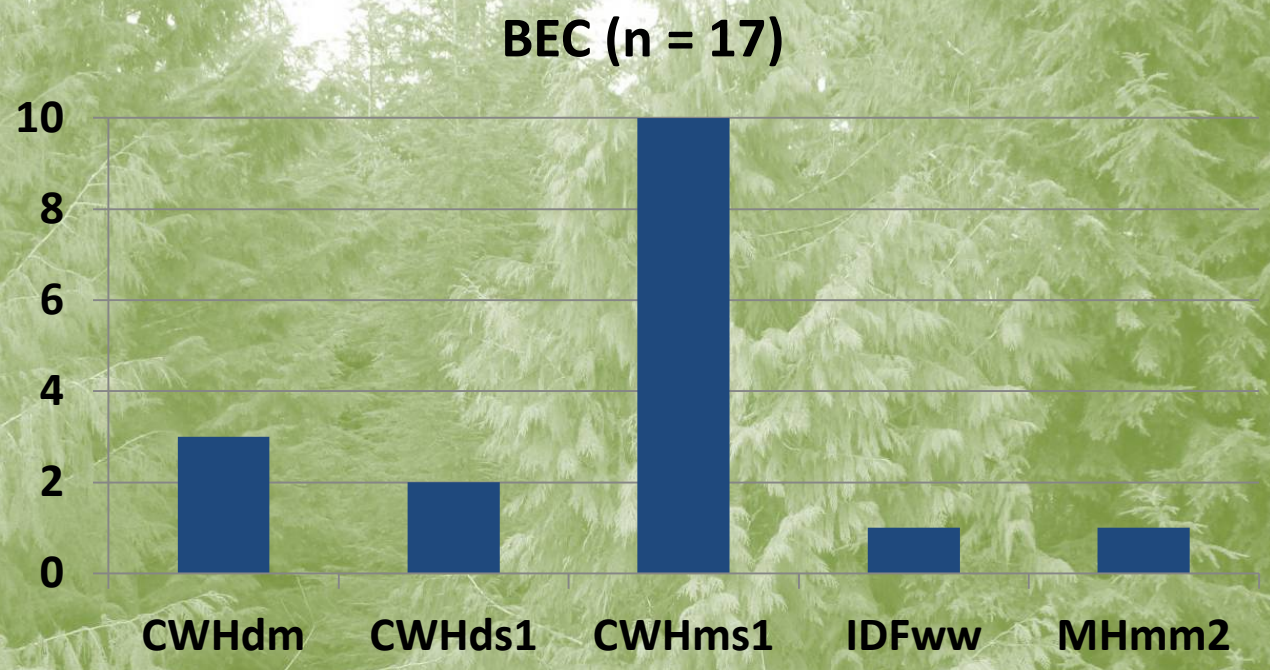
Sample Data Summary

Fraser TSA

Attribute	n	Mean	SD	Range
Polygon net area (ha)	17	13.1	±12.2	5 – 45
Stand Age (years)	17	28.4	±5.5	18 – 38
Harvest to Declaration (years)	14	14.6	±3.8	8 – 21
Planting to Declaration (years)	7	10.1	±4.5	1 – 15
Declaration to SDM (years)	14	13.1	±3.4	7 – 16

TSA	TSA polygon population (n)	Polygon population area (ha)	Number polygons ≥5 ha	Population polygon area (≥5 ha)	Polygons sampled (n)	Sampling intensity (% polygons)	Area sampled (≥5 ha)	Sampling intensity (% area)
Fraser	1919	20,183	1153	18,177	17	1.5	222	1.2
Mackenzie	1808	37,847	1278	36,522	30	2.3	791	2.2

Sample Data Summary



	Act	Ba	Bg	Cwc	Dr	Ep	Fdc	Hm	Hwc	Mb	Pl	Se	Vb	Yc	All
#	4	833	1	351	44	12	353	41	455	4	6	82	2	16	2204
%	0	38	0	16	2	1	16	2	21	0	0	4	0	1	100

Pest Incidence

By percent of trees in a BEC unit (e. g, CWHms1)

Layer	Live, no FHF	Live FHF	Dead FHF	DMH	NY	UF	UBT	UCR	VT	FHF
1 (n = 262)	87.4	11.8	0.8	3.4	5.7	0.4	0.8	0.4	0.4	12.6
2 (n = 296)	85.8	13.5	0.7	1.0	8.8	0.7	1.0	1.0	0.3	14.2
3 (n = 1152)	78.0	16.5	5.6	0.2	10.1	0.4	0.3	0.4	8.5	22.0
All (n = 1710)	80.8	15.3	3.9	0.8	9.2	0.4	0.4	0.5	5.8	19.2

Or by percent of host species affected (e. g., Fdc)

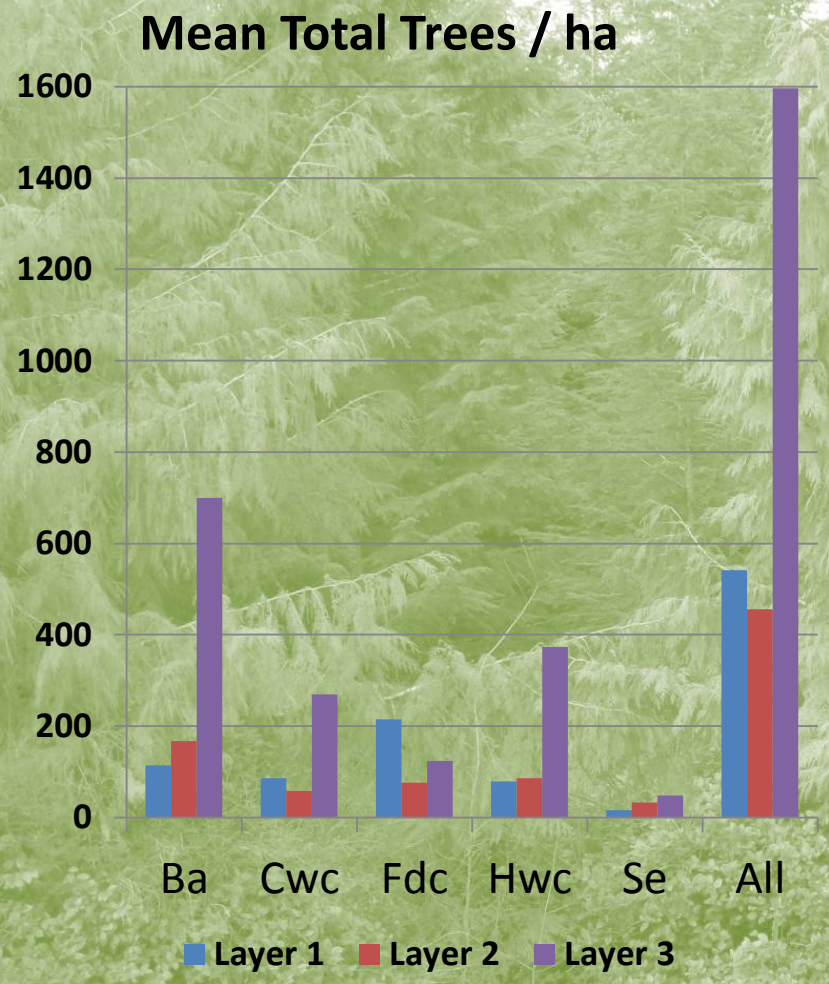
Layer	Live, no FHF	Live FHF	Dead FHF	DRA	DRL	NY	UF	UBT	VT	FHF
1 (n = 190)	90.5	5.8	3.7	1.1	1.6	1.6	2.1	0.5	2.1	9.4
2 (n = 75)	68.0	18.7	13.3	2.7	1.3	8.0	2.7	5.3	12.0	32.0
3 (n = 126)	44.4	38.8	16.7	0.8	-	23.0	0.8	-	27.8	55.6
All (n = 391)	71.4	18.9	9.7	1.3	1.0	9.7	1.8	1.3	12.3	28.6

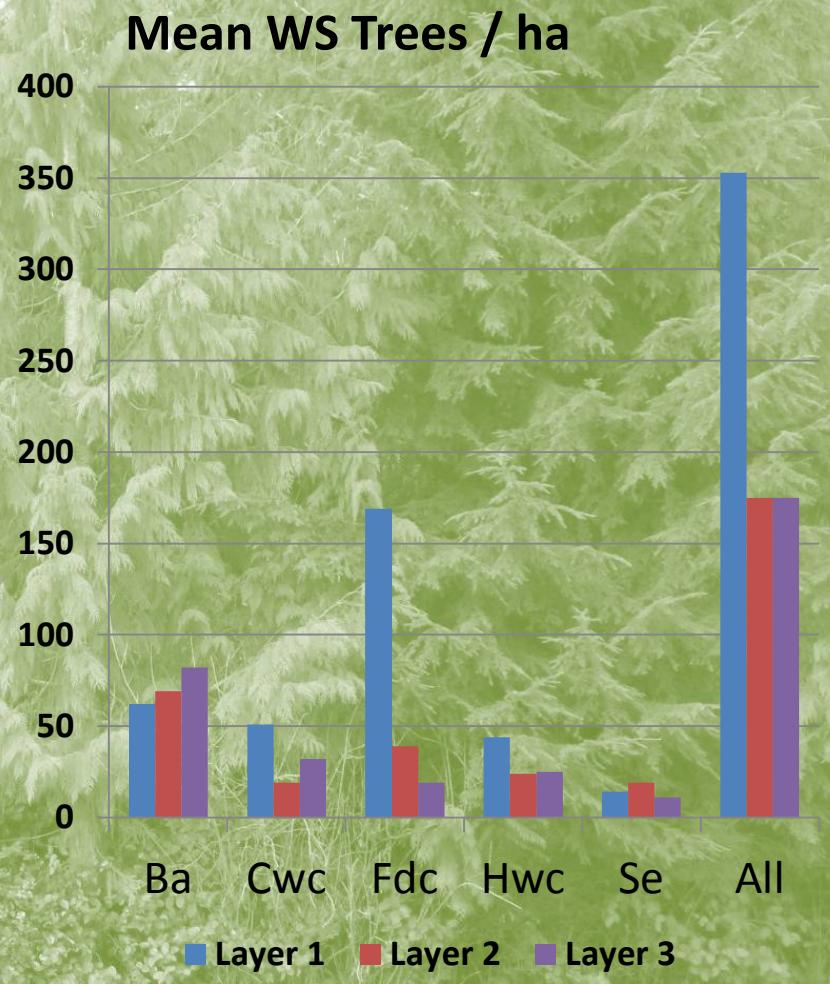
Stand Density

Stand density attributes by BEC unit pre-SDM and at SDM

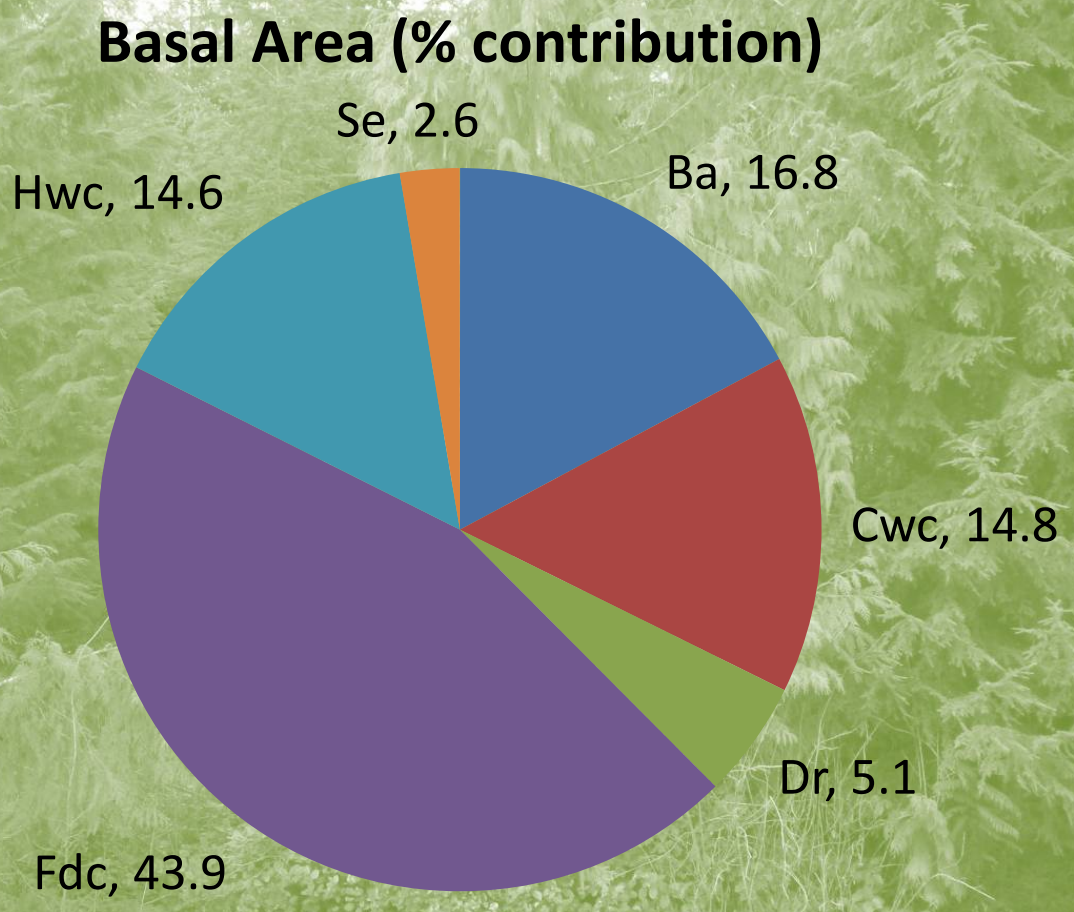
	CWHdm		CWHds1		CWHms1		ALL	
	N	Mean	N	Mean	N	Mean	N	Mean
Total Density pre-SDM (sph)	3	1755	2	1507	10	2509	17	2105
Total Density at SDM (sph)	3	1747	2	1260	10	3284	17	2593
Change in Total Density (sph)	3	-8	2	-247	10	775	17	488
Change in Total Density (%)	3	-0.5	2	-16.4	10	30.9	17	23.2
WS Density pre-SDM (sph)	3	681	2	686	10	683	17	682
WS Density at SDM (sph)	3	627	2	600	10	766	17	704
Change in WS Density (sph)	3	-54	2	-86	10	83	17	22
Change in WS Density (%)	3	-7.9	2	-12.5	10	12.2	17	3.2

Stand Density





Species Composition



Species Composition

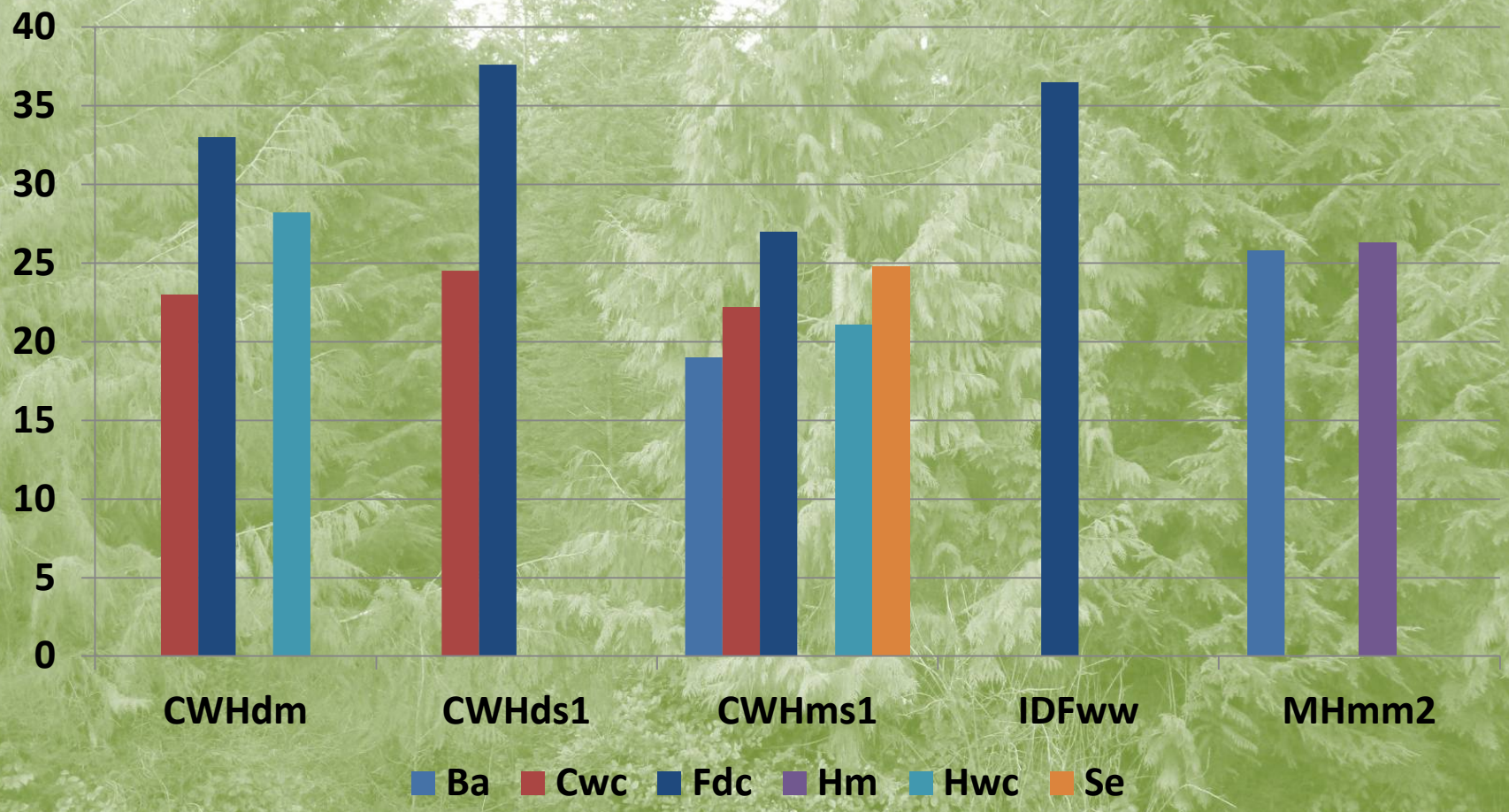
CWHms1 (n = 8)

	Pre-SDM			
SDM	Ba	Cw	Fd	Hw
Ba	3			
Cw				
Fd			4	
Hw		1		

Strathcona (n = 58)

	Pre-SDM				
SDM	Ba	Cw	Fd	Hw	Pl
Ba	1		1		
Cw		2		2	
Fd			9		
Hw			8	34	1
Pl					

Site Index



(n = 155)

“Aerial” FG Declarations

	Mean	SD	Range	df	t-value	*p*-value
Total sph at declaration						
• Aerial group	3580	±1396	2000-6000			
• Ground group	2700	±2129	566-9233	27	1.08	0.291
Total sph at SDM						
• Aerial group	3268	±1315	1173-5373			
• Ground group	3697	±2222	1533-9760	27	-0.51	0.615
WS sph at declaration						
• Aerial group	907	±109	813-1161			
• Ground group	789	±87	566-900	27	3.05	**0.005**
FG sph at declaration						
• Aerial group	899	±89	813-1100			
• Ground group	713	±136	270-900	27	3.58	**0.001**

Questions?