



NSC 2017 Winter Conference:

Common Ground: Silvicultural Tools and Tactics for Diverse Ecosystems and Management Goals

February 20-21, 2017

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Young Stand Monitoring Forest Analysis & Inventory Branch

February 21, 2017

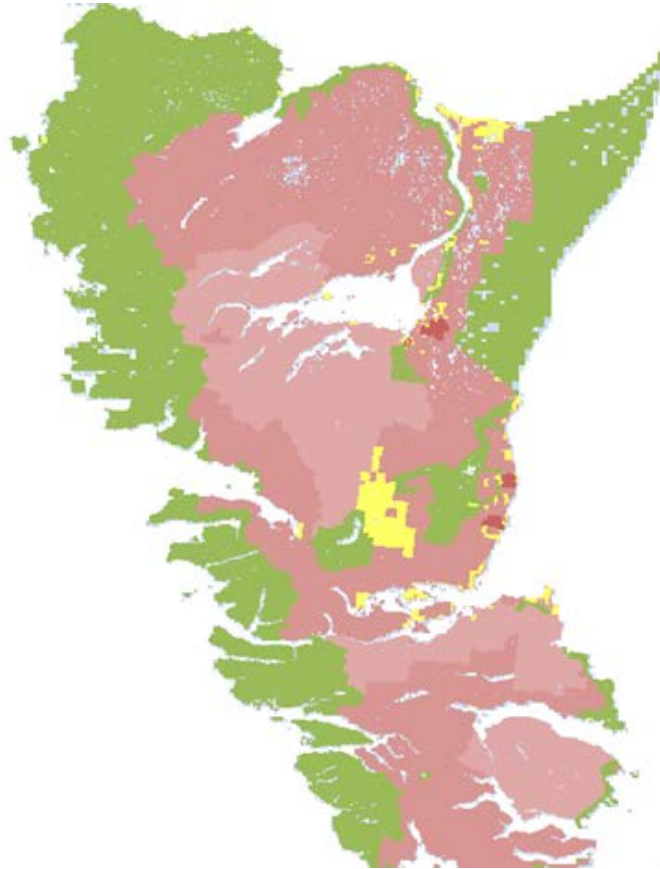
R. de Jong

YSM Program

- A “Change Monitoring Inventory” program in young stands
- Describes characteristics and structure
- Quantify change (growth, ingress, mortality)
- Tests management plan assumptions
- Over 18 TSA-based programs established since 2011.

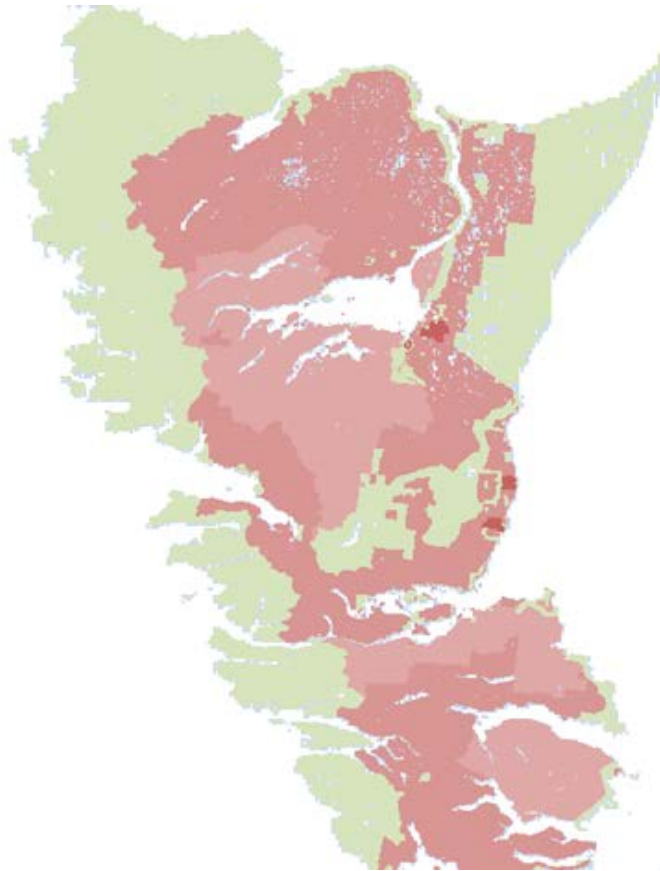
YSM Program

- Target population defined from Phase-1 VRI polygons 15 - 50 years old in the Crown forested landbase
- Sample points located on a fixed grid (intensification of NFI 20km grid)
- Fixed-radius permanent sample plots established and re-measured at each sample point location

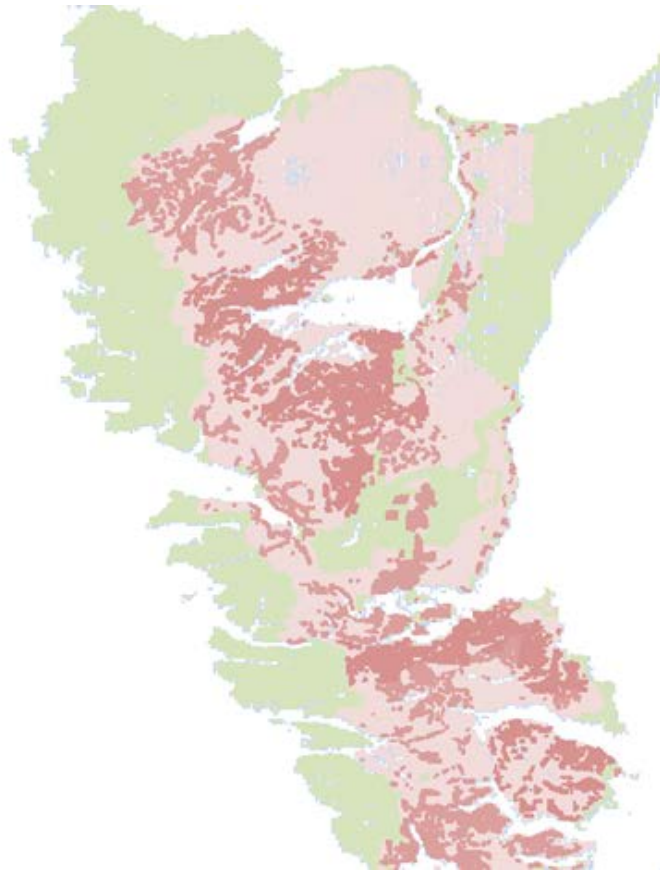


Defining Target Pop

**Describe TSA, TFL, Woodlot / Community forest / Park /
Protected area / Private land.**

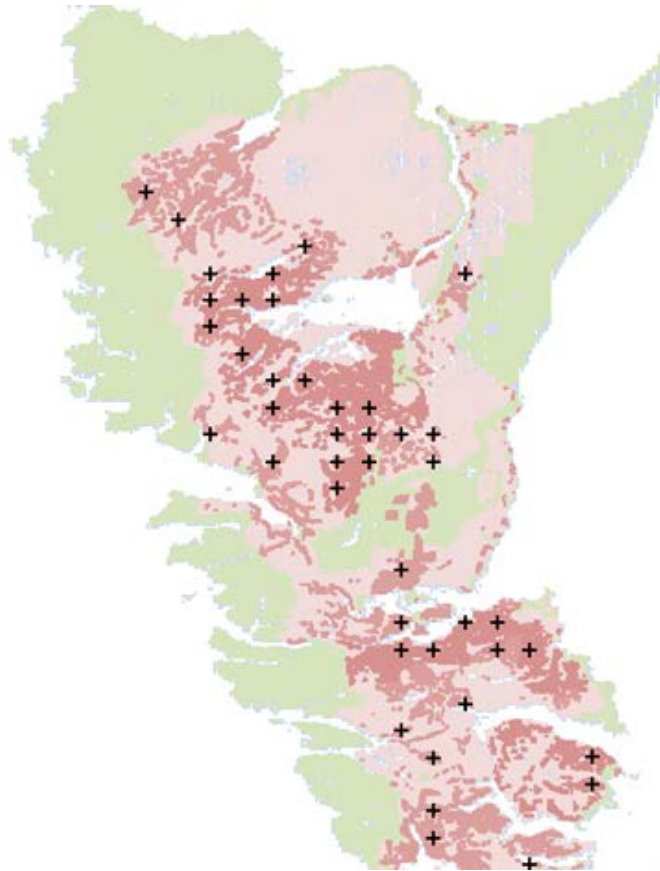


Defining Target Pop
Remove non-contributing areas



Defining Target Pop

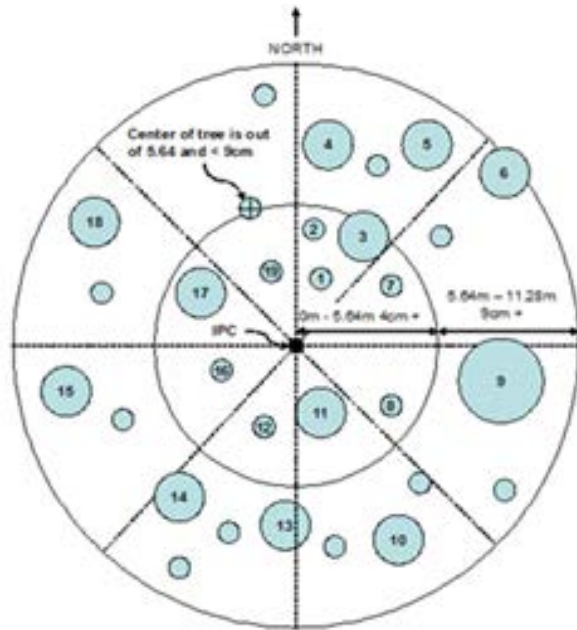
15 – 50 years old in the Phase 1 VRI rank 1 layer.



Defining Sample Pop

eg., 43 grid points on a 5km*5km grid in target pop

Ground Sample Measurements



- CMI Sampling Standards
- Fixed area : 0.04 ha
- Trees $\geq 4.0\text{cm}$ DBH permanently tagged
- DBH
- Height
- Forest health incidence and severity
- Loss indicators
- Site trees in 0.01ha quad
- Count-plots for trees $<4\text{cm}$

Date & Time: Fri Jun 17 06:06:04 PDT 2016
Position: 8 N 69992 837651
Altitude: 48m
Datum: WGS-84
Azimuth/Bearing: 279.88171 6950mils True
Zoom: 1X
49-W



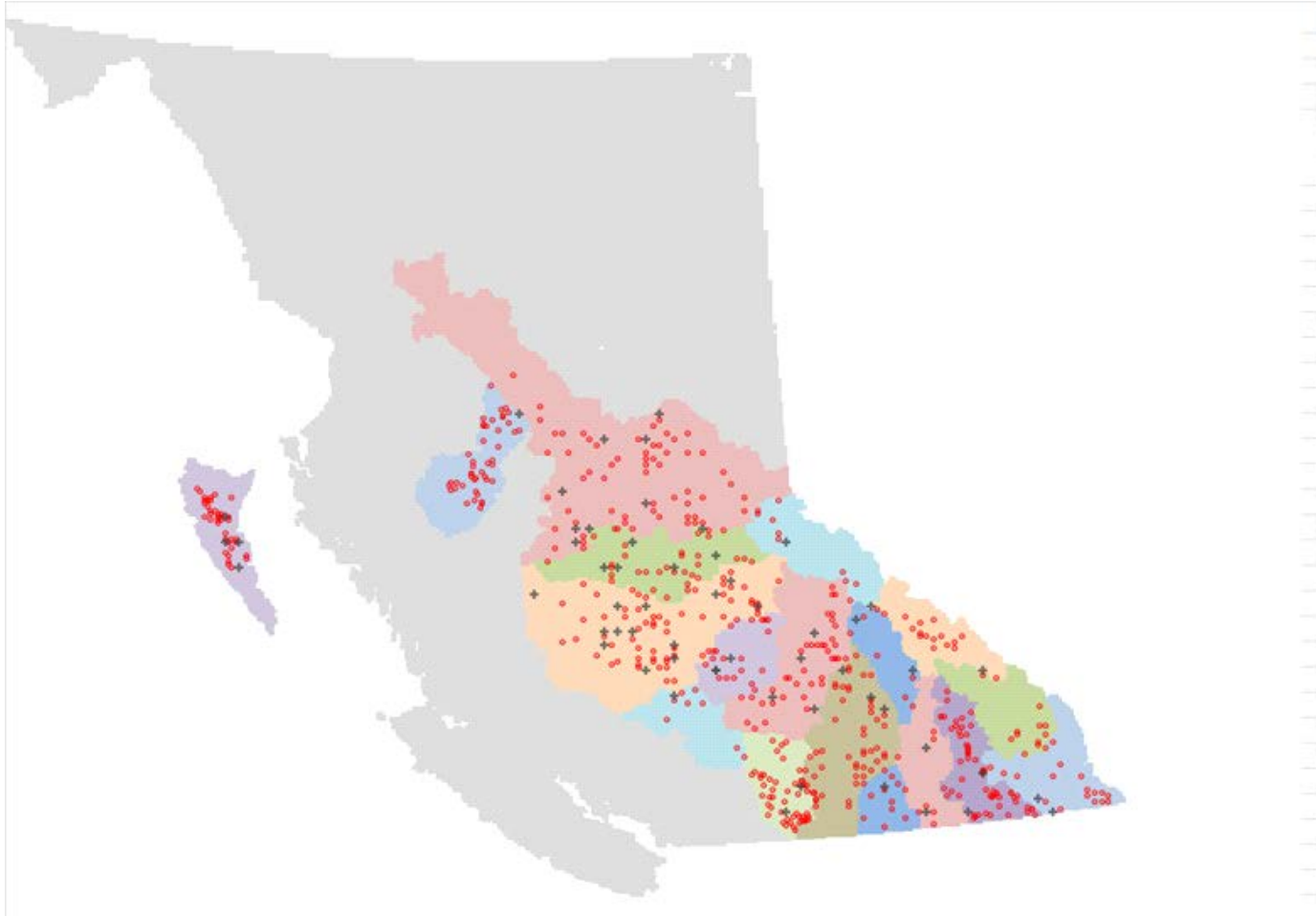
YSM Ground Samples Established 2011-2016

TSA	Grid Size	Total
TSA01_Arrow	5 * 10 km	10
TSA02_Boundary	5 * 10 km	12
TSA05_Cranbrook	5 * 10 km	20
TSA07_Golden	5 * 10 km	20
TSA09_Invermere	5 * 10 km	11
TSA11_Kamloops	5 * 10 km	46
TSA13_Kootenay_Lake	Other	59
TSA15_Lillooet	5 * 10 km	9
TSA17_Robson_Valley	5 * 10 km	8
TSA18_Merritt	Other	57
TSA20_Morice	Other	45
TSA22_Okanagan	5 * 10 km	45
TSA23_100_Mile_House	5 * 10 km	24
TSA24_Prince_George	10 * 10 km	77
TSA25_Haida_Gwaii	5 * 5 km	43
TSA26_Quesnel	5 * 10 km	34
TSA27_Revelstoke	5 * 10 km	7
TSA29_Williams_Lake	5 * 10 km	72
Total		599

YSM Programs Completed 2011-2016

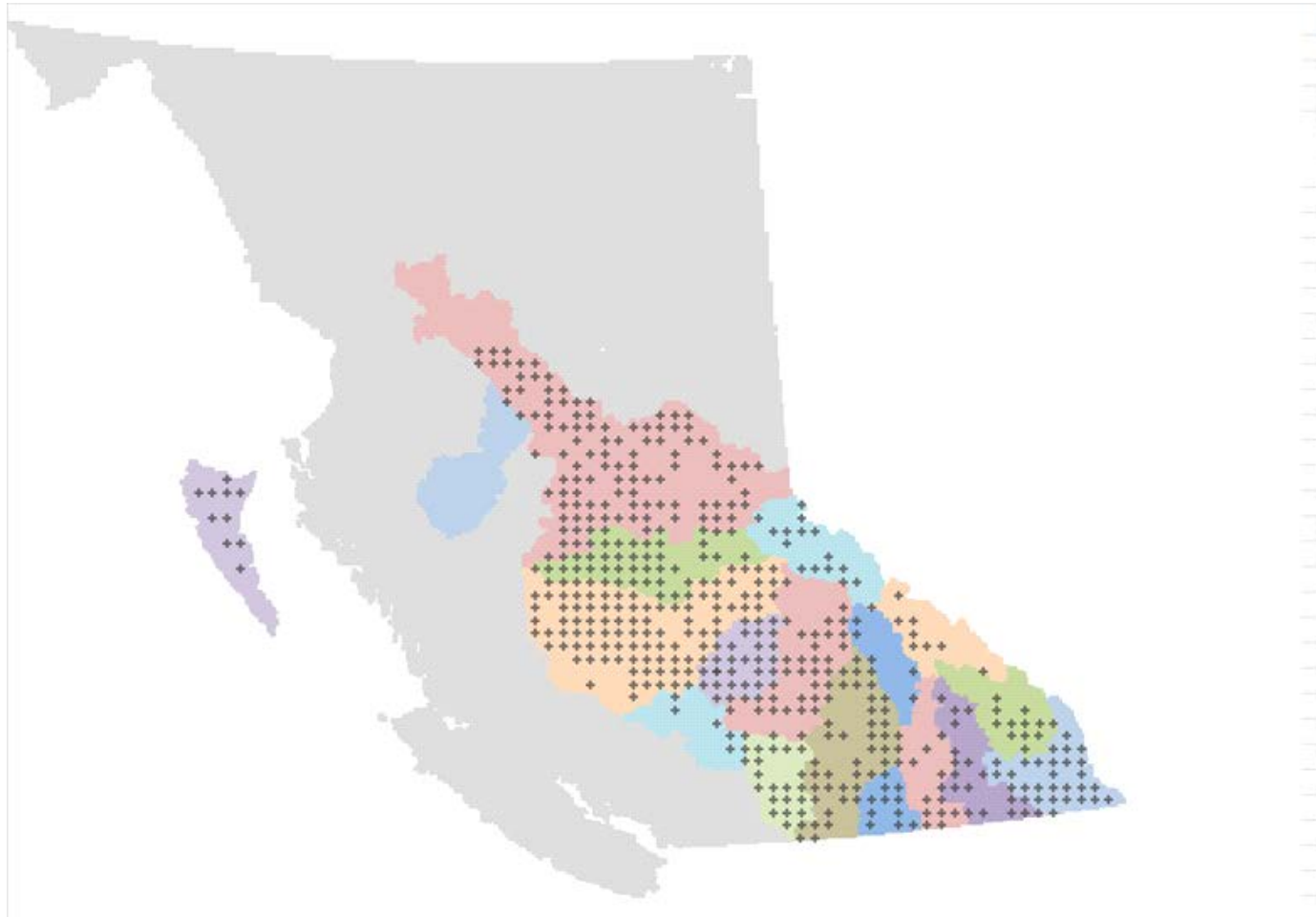
YSM ground samples on intensified NFI grid (**red**)

CMI ground samples on 20km NFI grid (black)



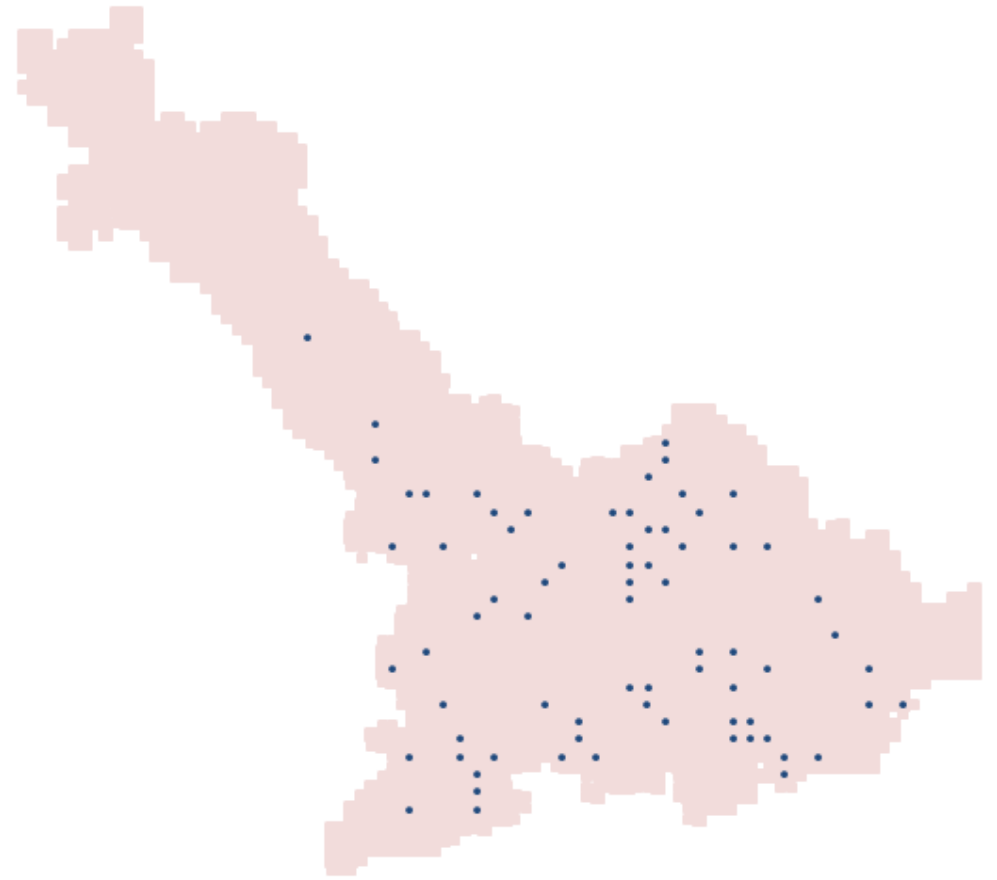
CMI Program Completed 2011-2016

ground samples on 20km NFI Grid



Prince George YSM

- Estab. 2014
- 10*10km grid
- 73 samples
- TSA



TSA-based Summaries

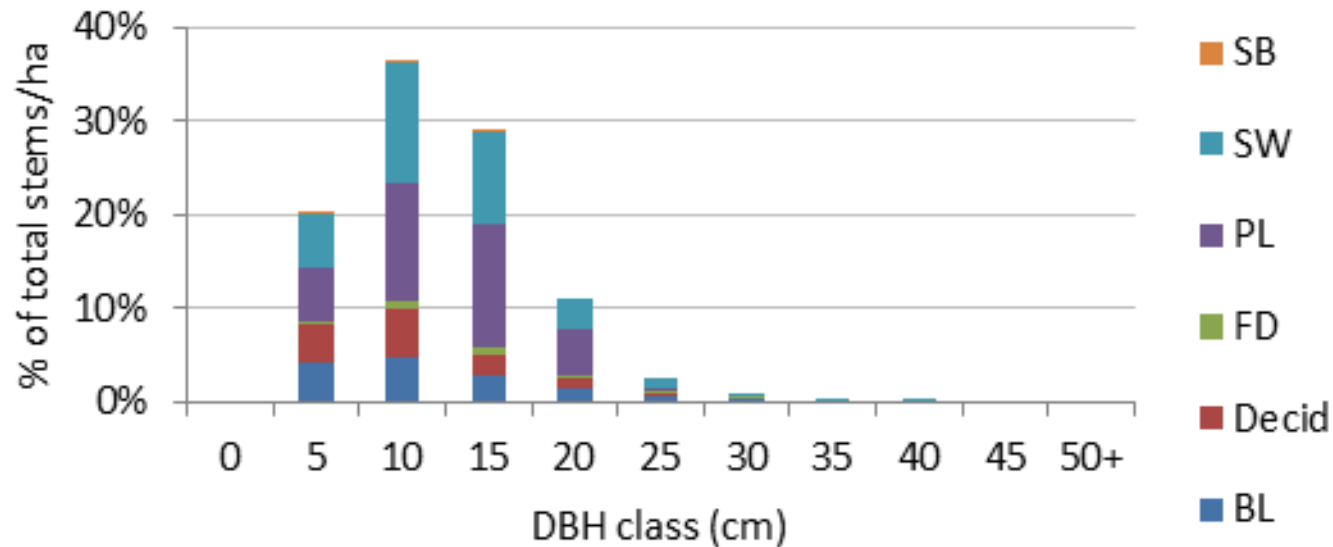
1. Describe stand characteristics
2. Quantify forest health Incidence
3. Compare leading species
4. Compare site index
5. Separate managed vs. residual component
6. Quantify sources of volume bias
7. Test TSR assumptions

Stand attributes

				n	Live				Dead
					Avg	Min	Max	SD	Avg
<i>Basal Area (m²/ha)</i>				73	15	0	40	9	1
<i>Total Stems (#/ha)</i>				73	1,135	0	4,953	747	52
<i>Quadratic Mean DBH (cm)</i>				73	13				16
<i>Whole Stem Vol. (m³/ha)</i>				73	80	0	294	61	6
<i>Net Merch Vol. (m³/ha)</i>				73	50	0	239	49	4

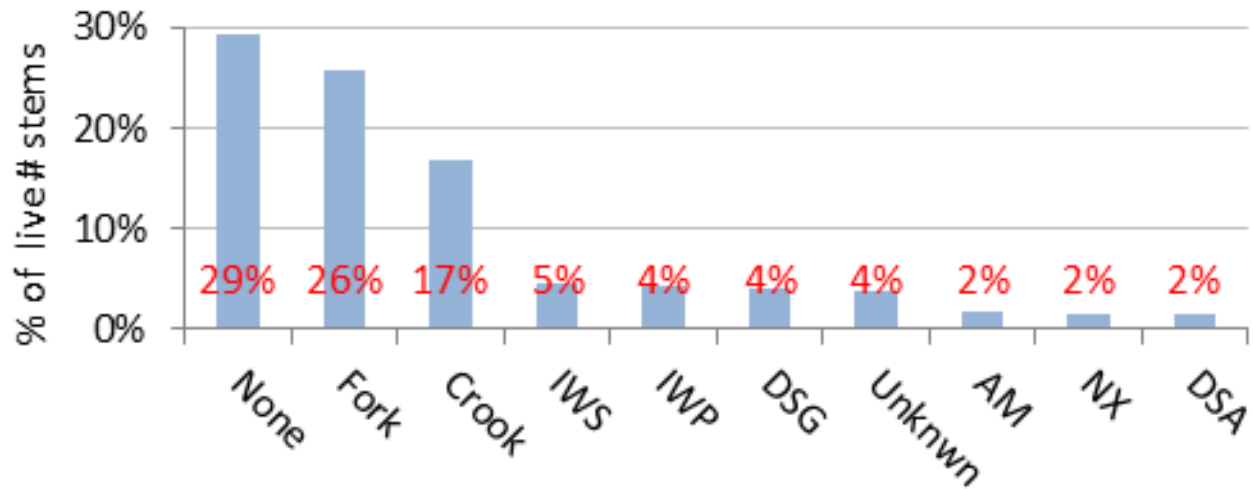
Stand Table Distribution

- *live trees*



Forest health Incidence

- *live trees*



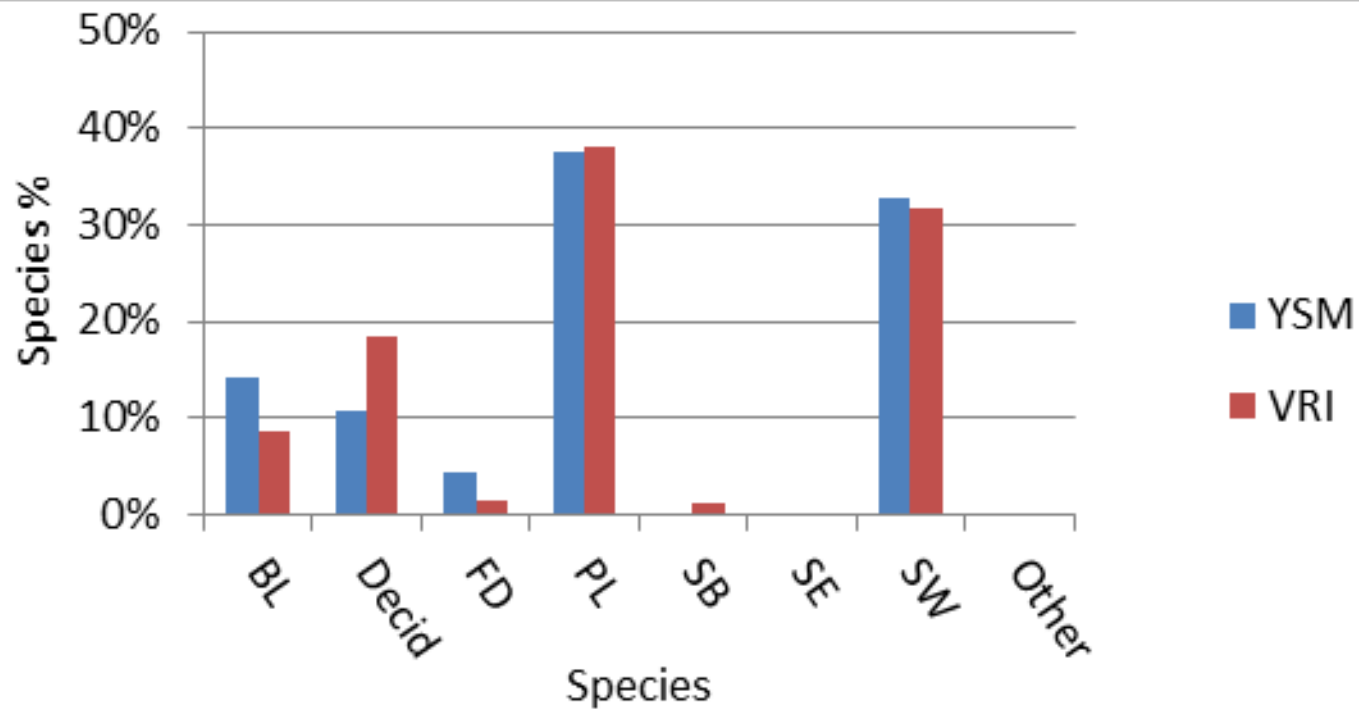
Leading species

- *YSM vs. VRI phase 1*

YSM \ VRI	BL	Decid	FD	PL	SW	Null	Total
BL	2			1			3
Decid	1	2		2	2		7
FD					1		1
PL	2	1	1	17	2	2	25
SW	3	5	1	9	19		37
Total	8	8	2	29	24	2	73
Correct Leading Species Classification Rate =							55%

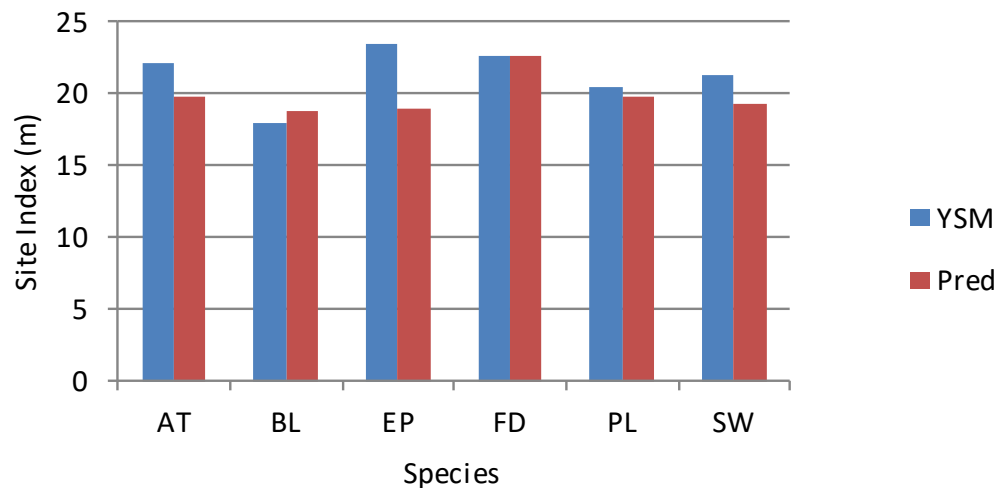
Species Composition

- *YSM vs. VRI phase 1*



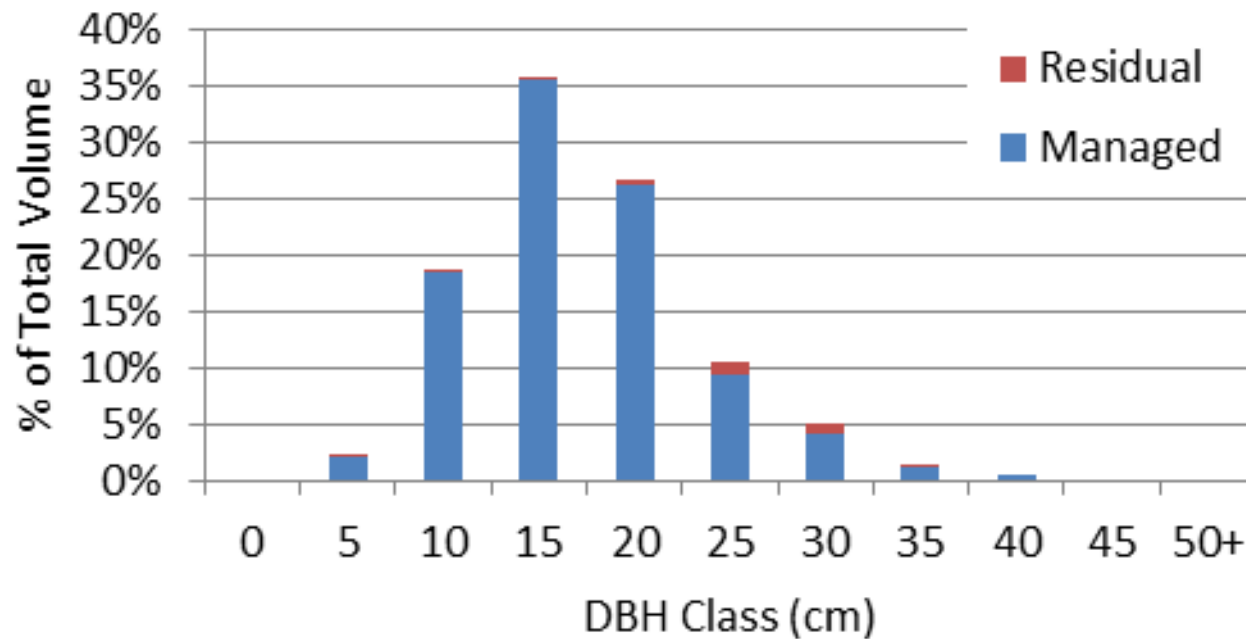
Site Index

- *YSM vs. Provincial Site Productivity Layer*

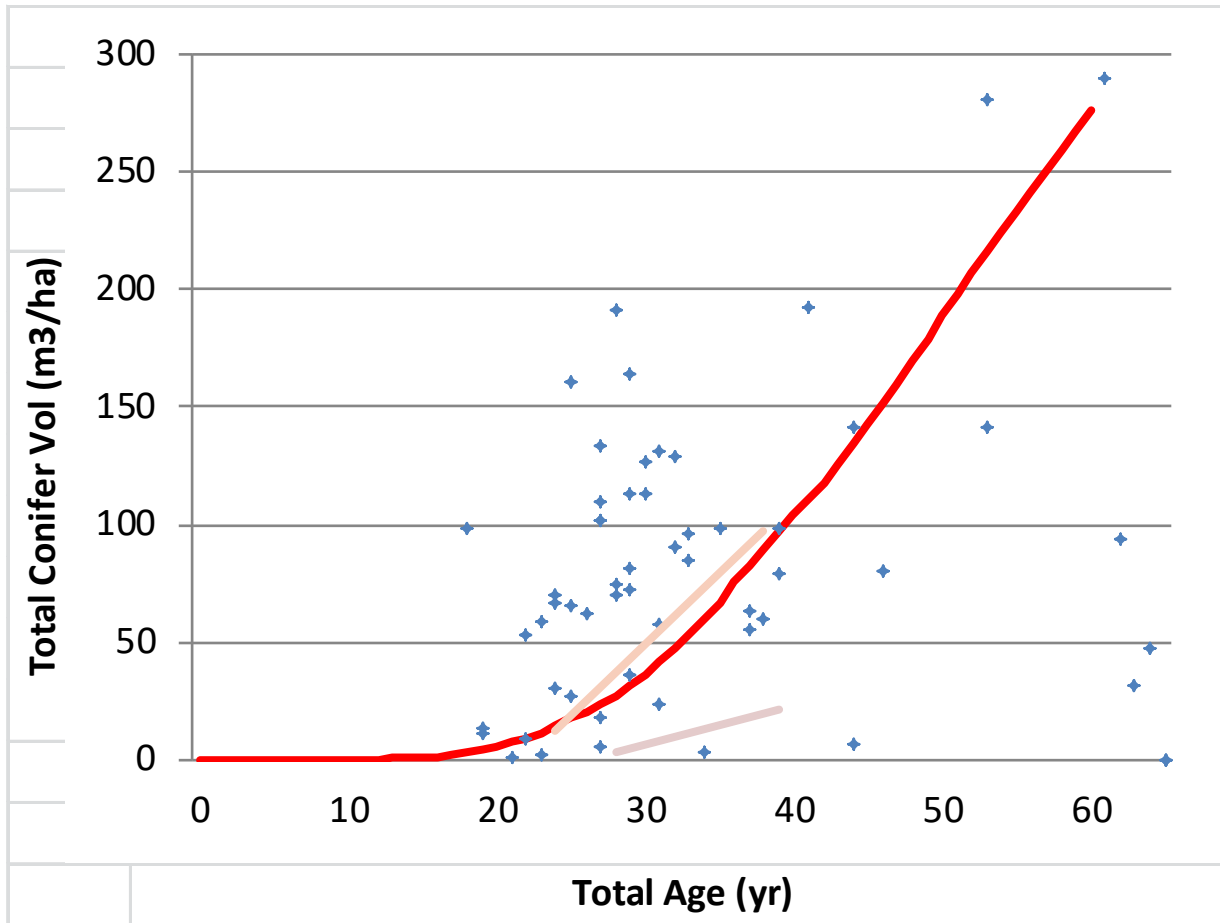


	Spc	#Pairs n	YSM BH Age (yr)			SI (m)		ROM	Sig (95%)
			Avg	Min	Max	YSM	Pred		
	AT	8	26	13	41	22.2	19.9	1.12	
	BL	13	35	18	59	17.9	18.8	0.95	
	EP	4	26	9	43	23.5	18.9	1.24	
	FD	3	32	24	41	22.6	22.7	1.00	
	PL	38	21	8	35	20.4	19.7	1.03	
	SW	34	26	9	86	21.2	19.3	1.10	Y

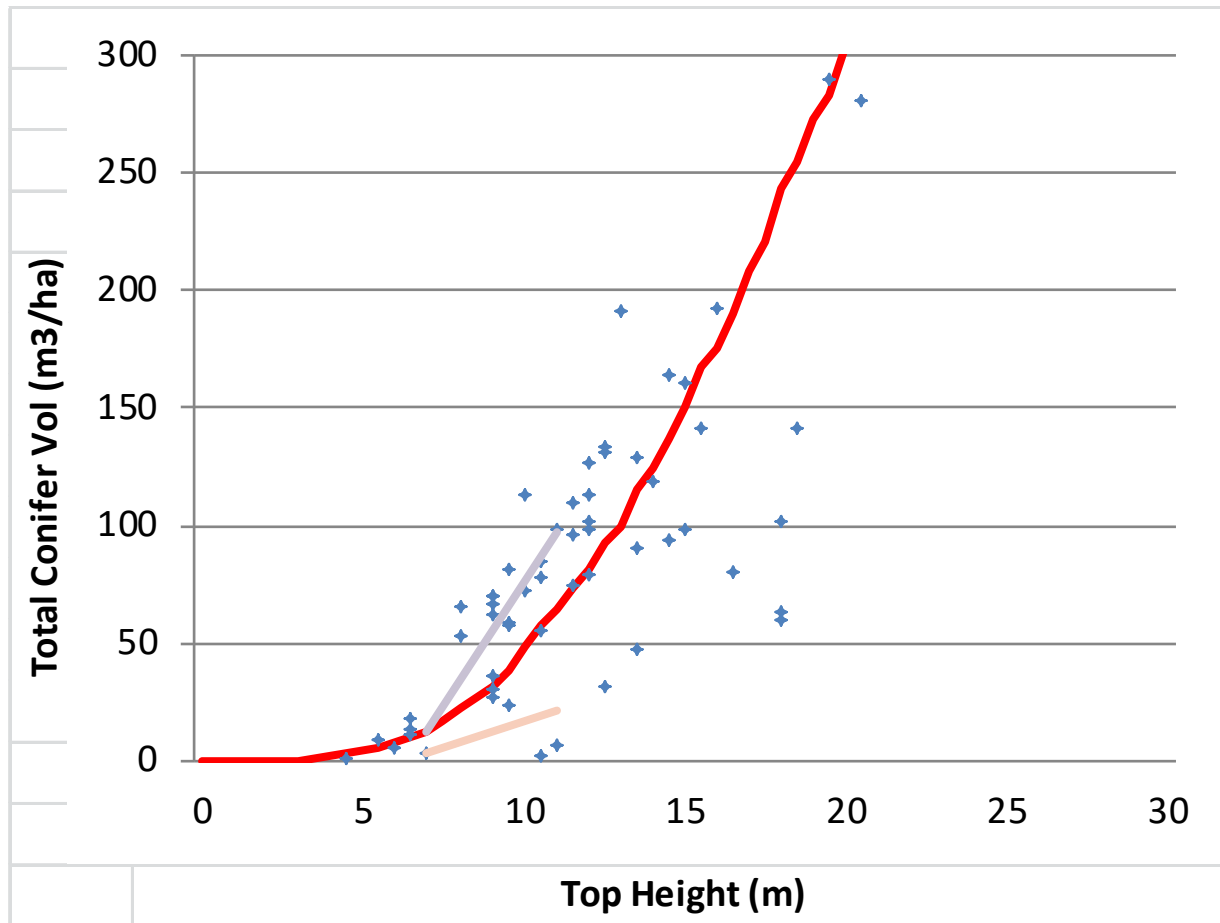
Managed vs. residuals



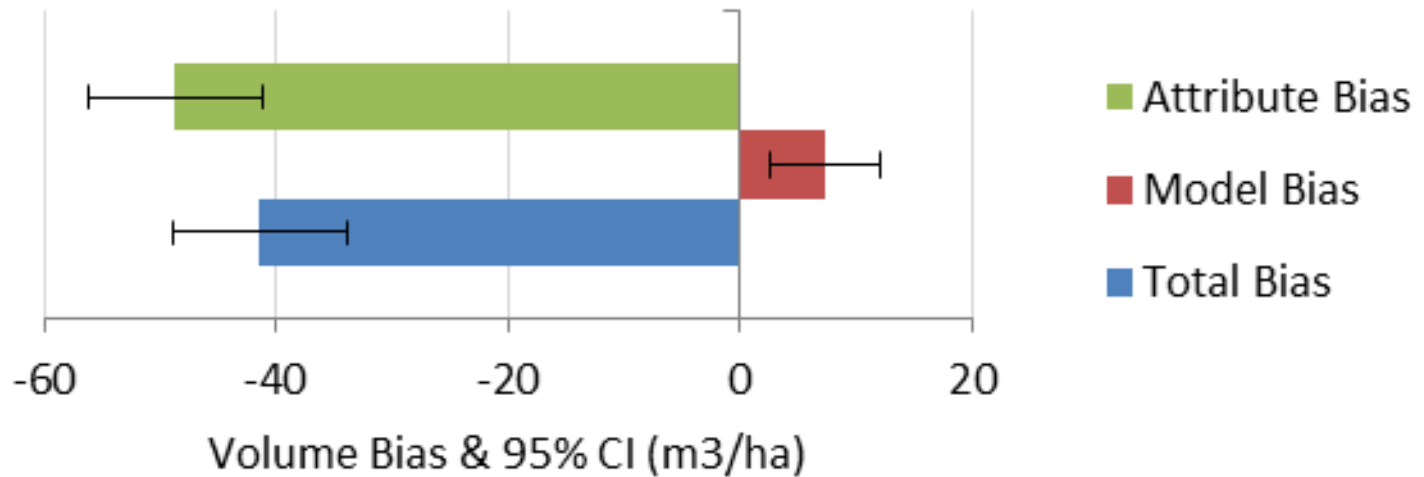
YSM Volume vs TIPSY



YSM Volume vs. TIPSy



Components of BIAS



Test on meeting TSR expectations

- Project YSM samples to rotation
 - *use TIPSYS & YSM ground based inputs.*
- Use YSM info to modify OAF1 & OAF2
 - *empty plots, FH incidence, residual overstory impacts.*
- Compare with TSR at each YSM location
 - *Existing yield tables a combination of managed & natural depending on TSR assumptions.*

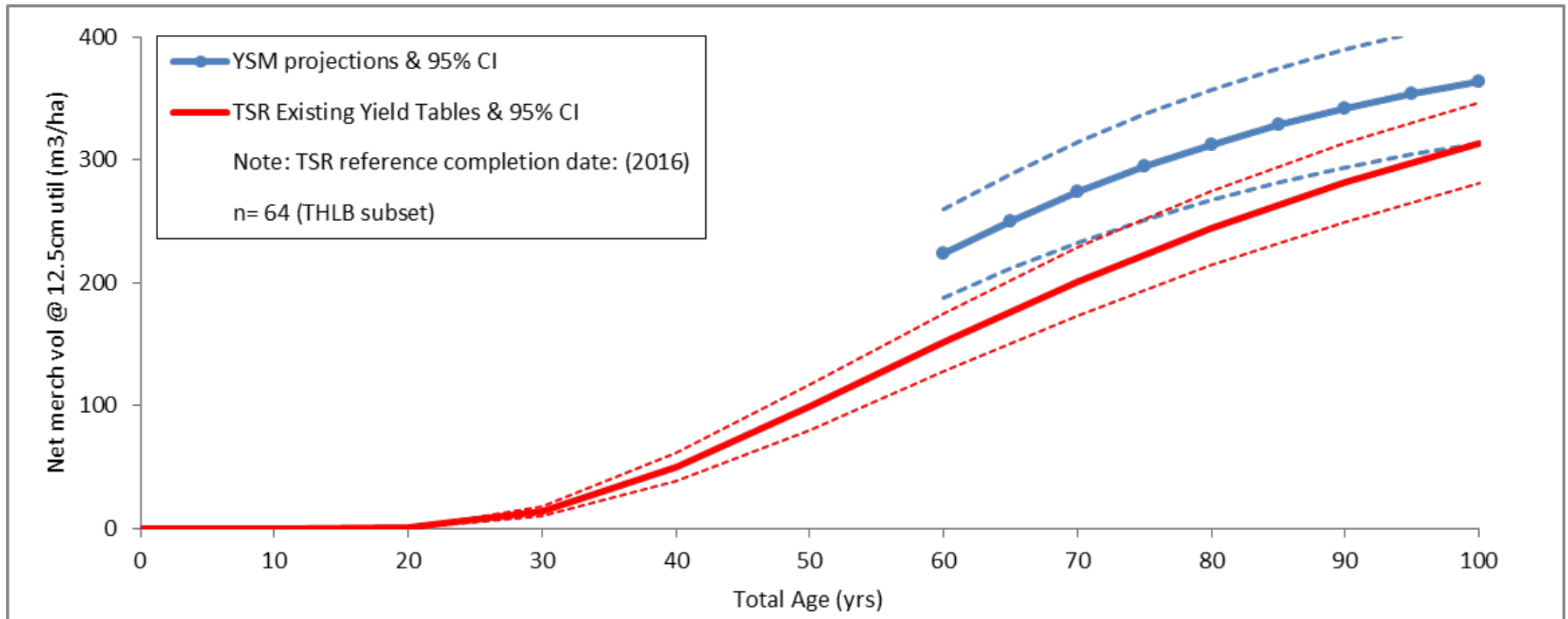
Test on meeting TSR expectations

- *OAF1 & OAF2 @ 100 years:*

OAF1 <i>empty plots</i>	1.6%
<i>other</i>	13.4%
<hr/>	
	15.0%

OAF2 <i>default</i>	5.0%
<i>+residual overstory retn</i>	0.6%
<i>+DSG impact</i>	0.7%
<i>+DSC & DSS impact</i>	0.3%
<i>+IBM impact</i>	0.1%
<hr/>	
	6.7%

Test on meeting TSR expectations



Test on meeting TSR expectations

Limitations

- Single vs. repeated measurement
 - *Only re-measurements will provide change in growth and mortality*
- TIPSYS vs. TASS2 to project YSM
 - *TASS2 models mixed species & planted + ingress combinations, generates log distributions*
- Other
 - *Additional FH impacts*

Planned YSM Sampling for 2017

- Lakes TSA
- Morice TSA (5yr re-measurement)
- Bulkley TSA
- Fraser TSA
- Conditional on approved budgets