Forest Research

The UK Timber Resource and Future Supply Chain

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Forest Research

Timber availability

- The landscape of timber availability in Great Britain and the United Kingdom is moving through a period of significant change
- Conifer 'biological' availability is set to increase over the next 15 years to 18 million m3 obs by 2031, returning to levels similar to current domestic production of 12 million m3 obs by 2047
- There are almost 'unnoticed' forest resources in a hardwood annual increment of circa 6 million m3 obs
- Yet Britain is not fully utilising these resources and at face value it appears that the scale of wood product utilisation and processing capacity is not commensurate with potential wood supply
- How do we know this?

The National Forest Inventory

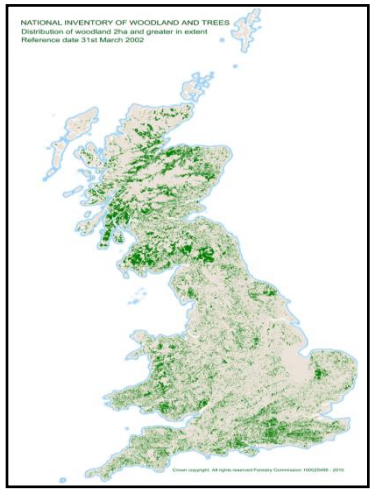
- Evidence base for the sector
- To inform and influence:
  - Policy makers
  - Politicians
  - Decision makers within the sector
  - Investors
  - The public
  - The scientific community

The National Forest Inventory

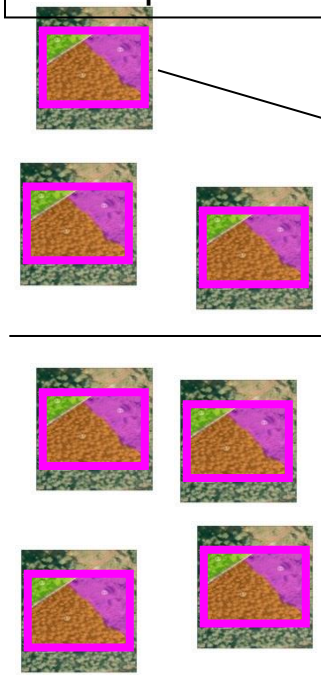
- Started in 2009 the NFI is a rolling programme of forest and woodland monitoring
- It replaces the previous series of ‘one off snapshot’ inventories conducted by the FC every 10 years or so since 1924
- The application of new technologies and approaches have enabled a much deeper and broader picture of woodlands to be drawn
- The rolling nature enables for accurate and up to date statistics as well as change monitoring

NFI design

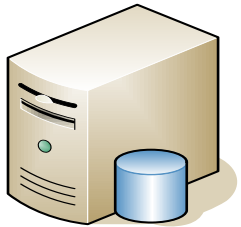
1. Forest Map



2. 15,000 one Ha Survey Squares

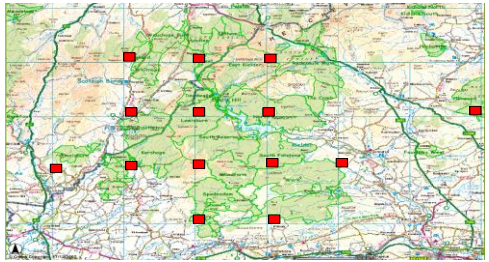


3. Map + Squares brought together in the NFI DB

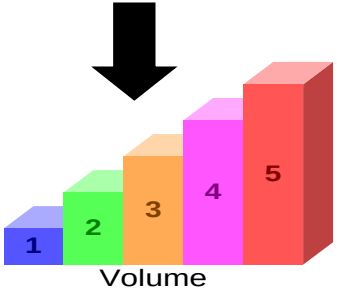


X

4. Survey Square details multiplied up to the NFI map area

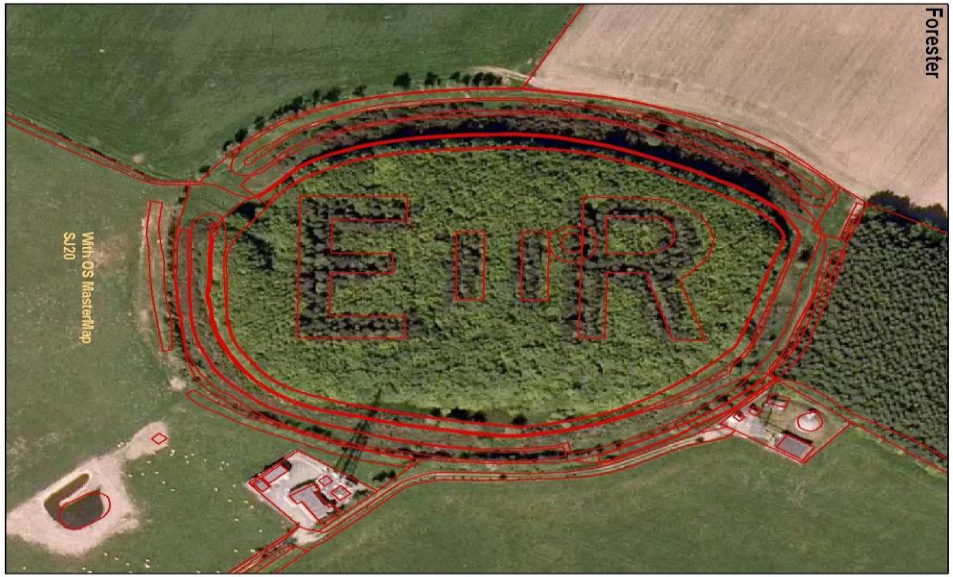


5. NFI Information Produced

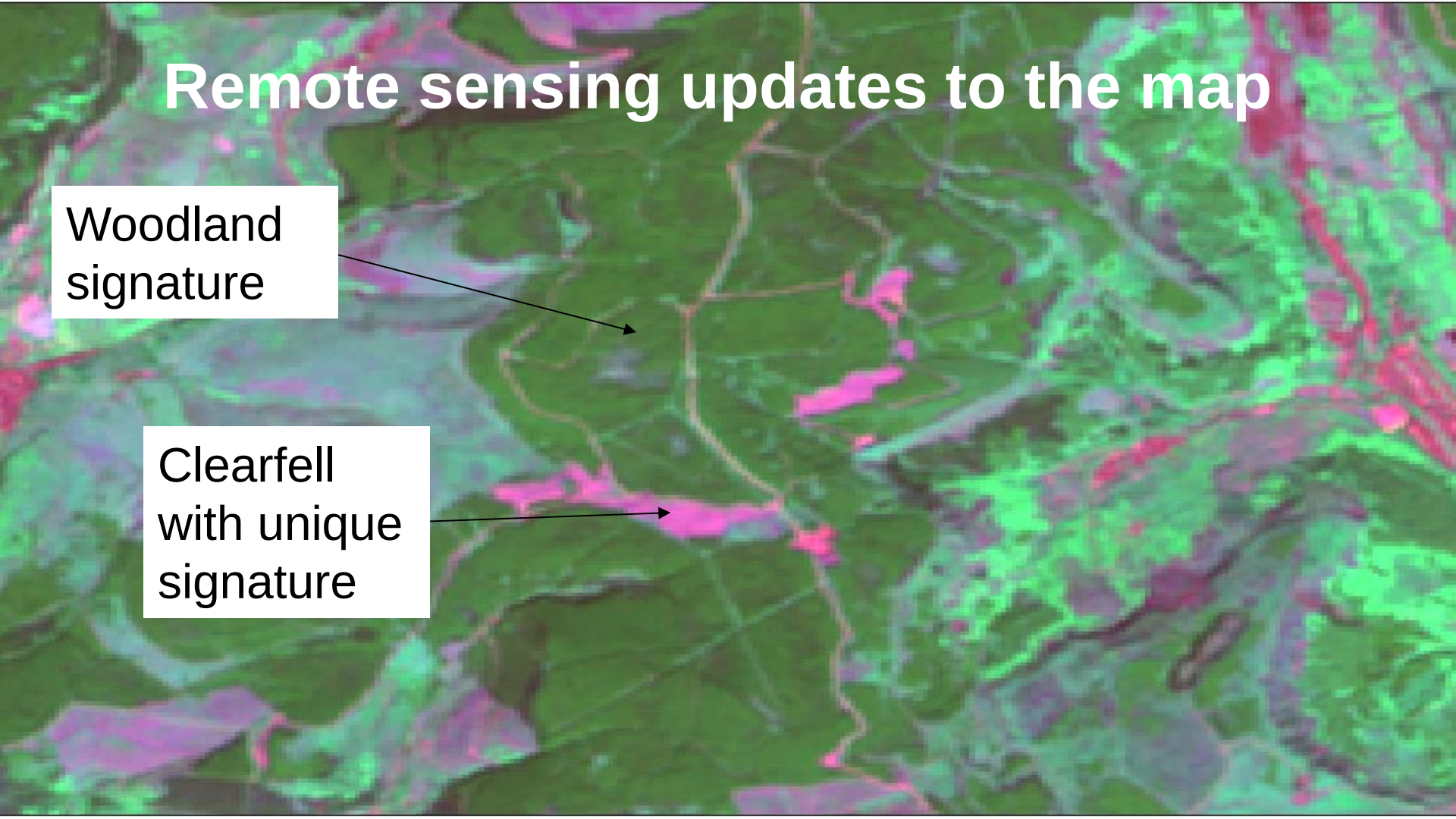


Annually updated map – the backbone of woodland gain and loss statistics

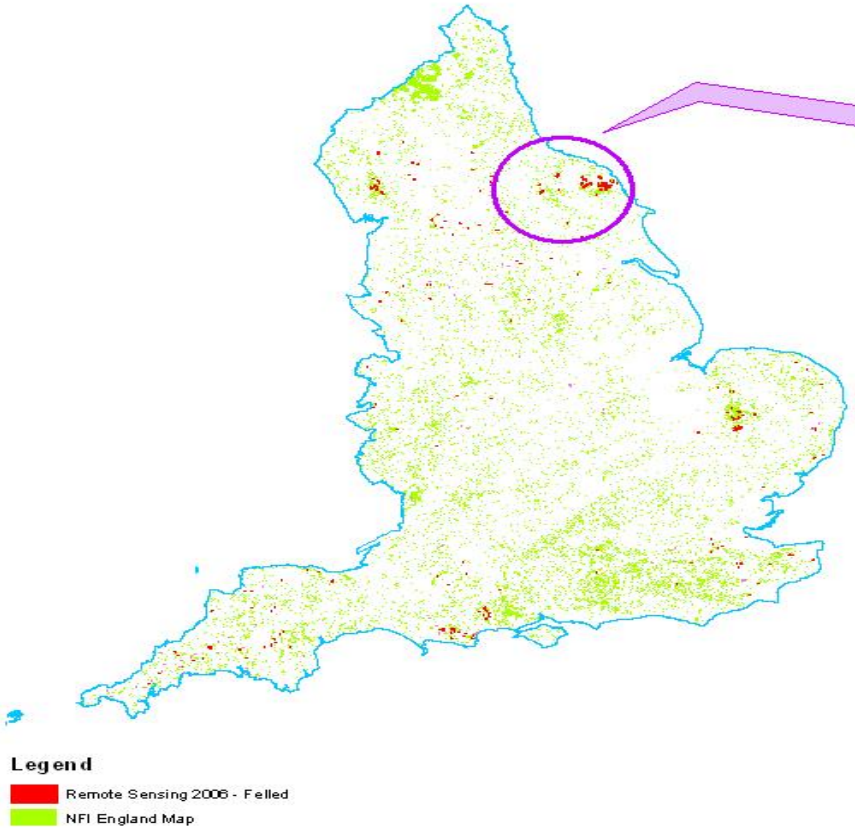
Forest Boundaries from Aerial Photography

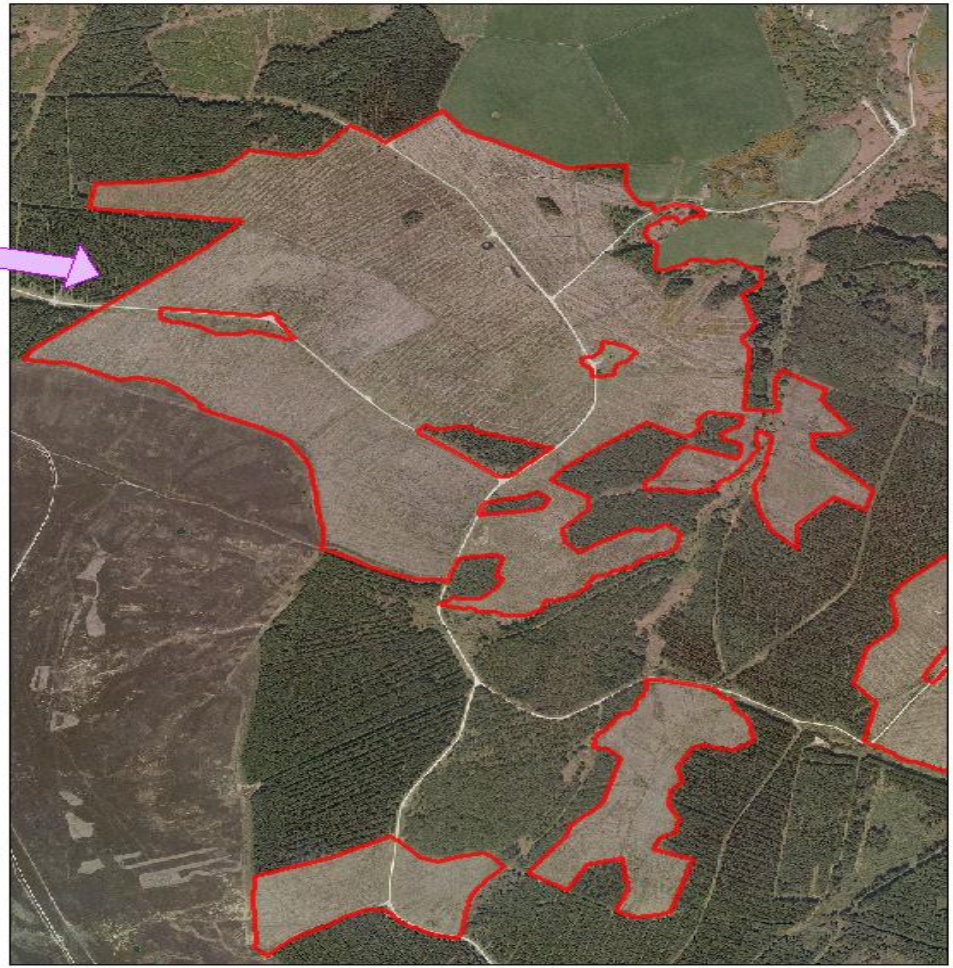


Remote sensing updates to the map



RS clearfell Detection



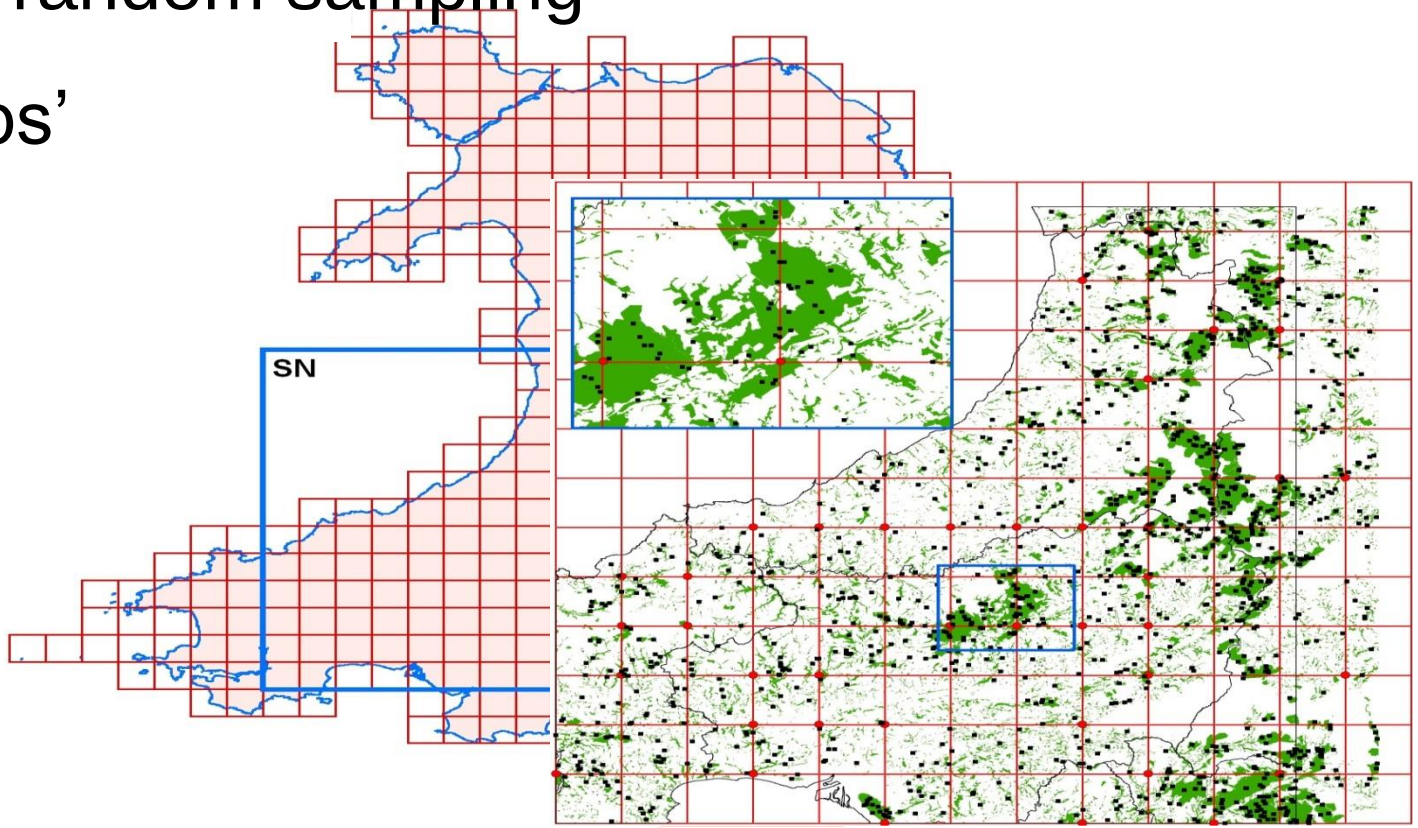


RS clearfell Detection

ote Sensing 2006 - Felled

Sample survey design

- Systematic random sampling
- Plus ‘top ups’



Field Sample Locations

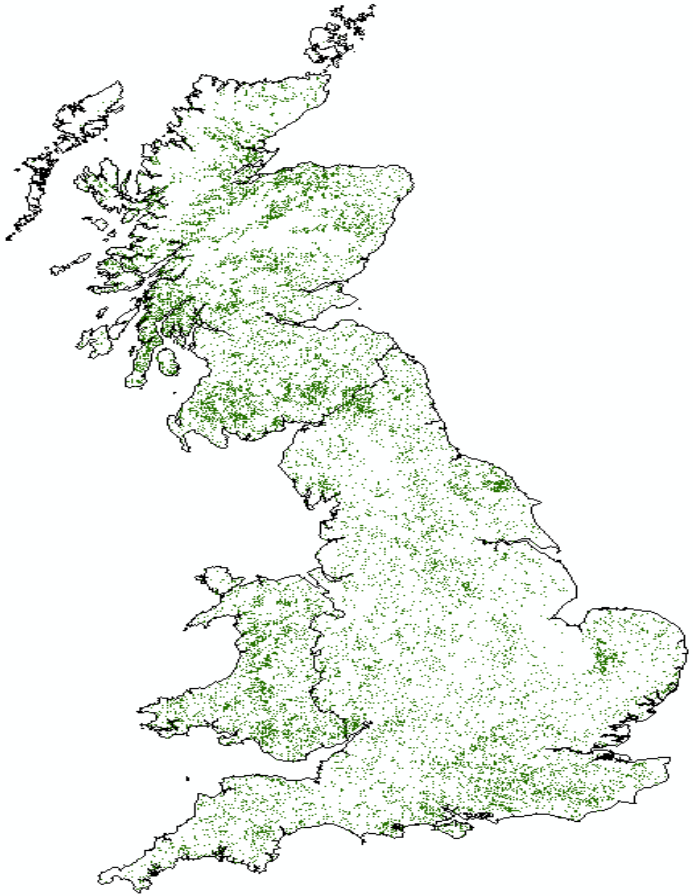
Fieldwork

First Cycle

- 5 of 5 years complete
- 15000 sample squares
- Around 25,000 stands & 521,000 trees measured

Second Cycle

- First year of 5 underway
- 1000 re measures taken



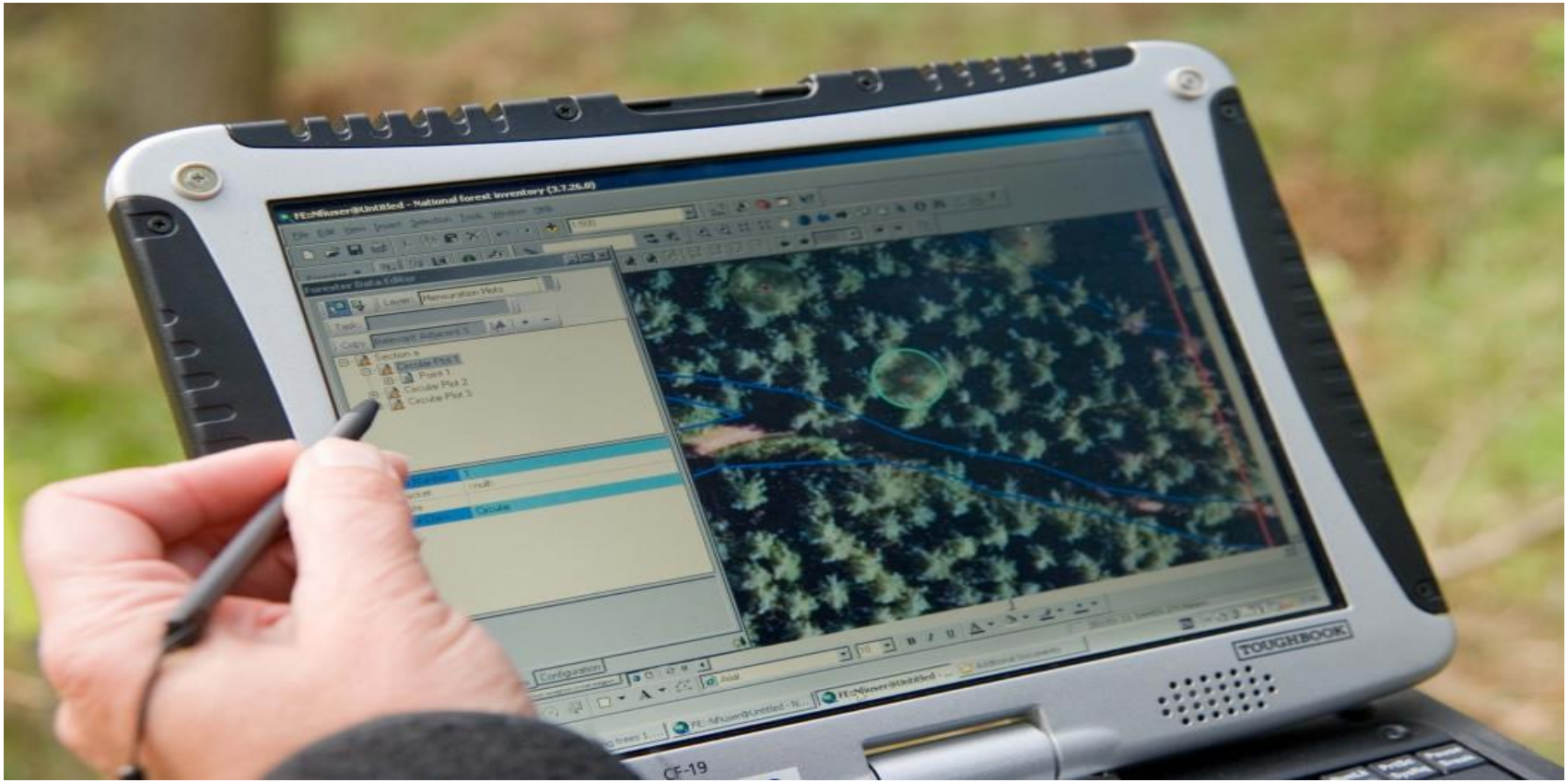
Forest Research

Survey at each square

- Forest type & landuse
- Gross / net area
- Habitat type & condition
- Silvicultural Systems
- Species
- Canopy structure
- Planting year
- Recent Treatment
- Management Practice
- Thinning history
- Access & ease of harvesting
- Boundary & cultural features
- Micro-Habitats & veteran trees
- Recreation & social factors

- Mensuration assessments:
  - dbh
  - height measurements
  - crown widths and depths
  - stocking
  - species
  - straightness (conifers)
  - live / dead
- Natural Regeneration
- NVC & ground, field & shrub layer vegetation
- General health
- Dead wood
- Invasive Species

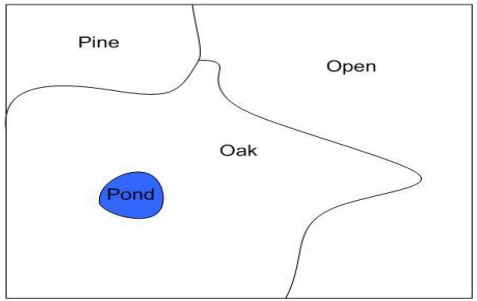
Fully digital data logging



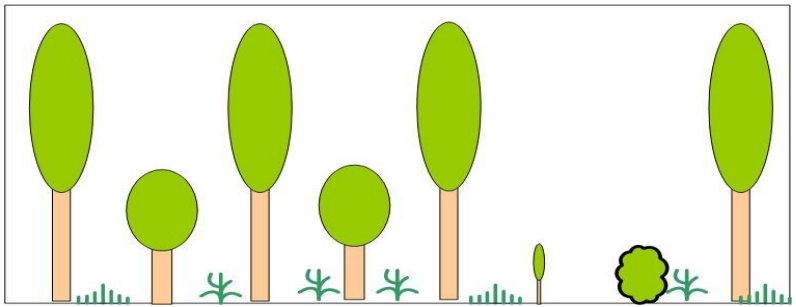
Woodland Structure

Quantifying Vertical and Horizontal Structure in Forests

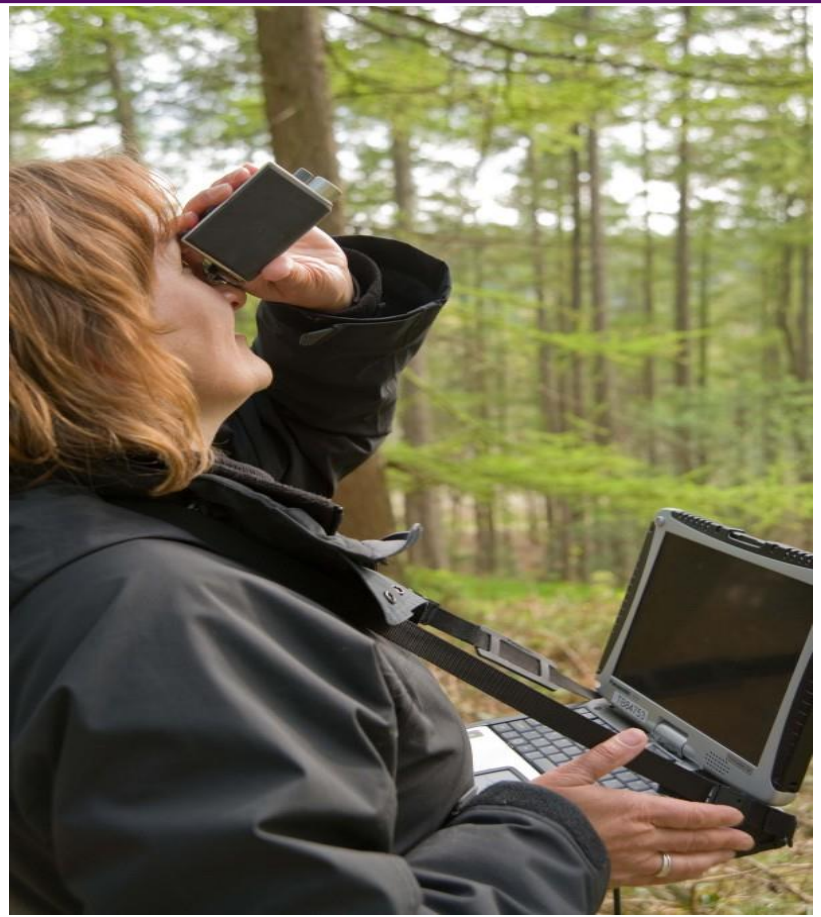
Horizontal or Planar Structure
"looking down"



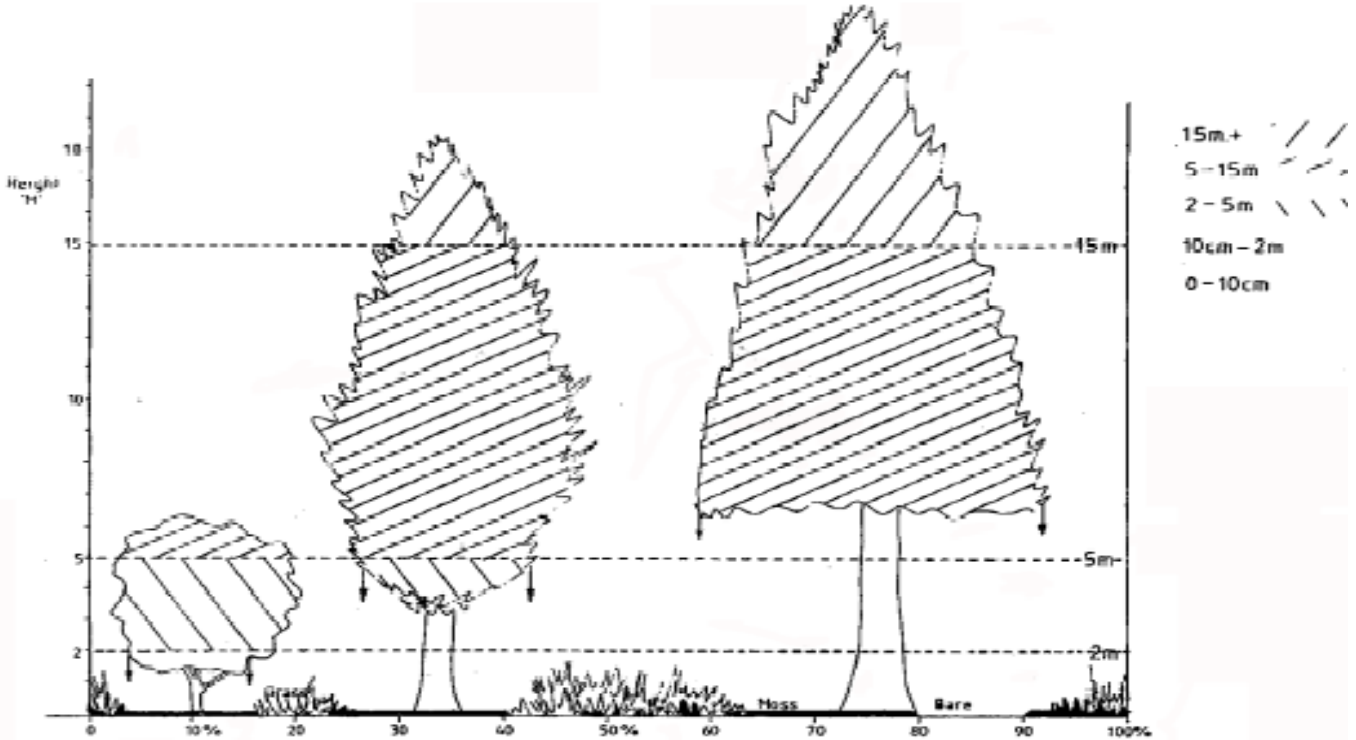
Vertical Structure
"looking within"



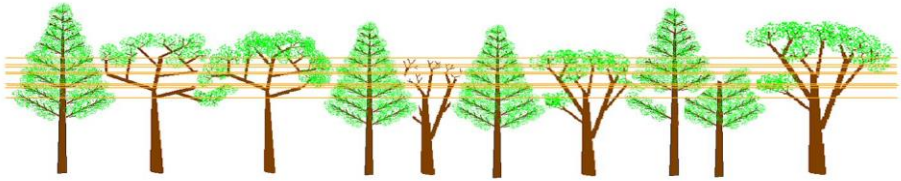
Tree Heights

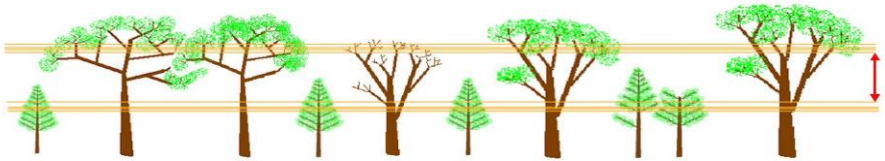


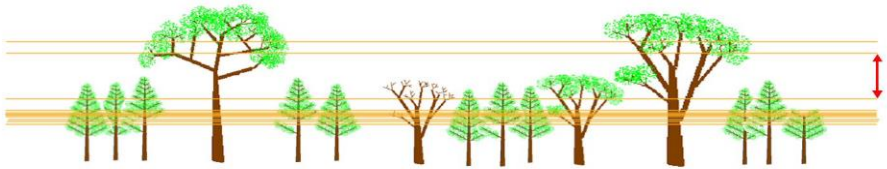
Vertical structure



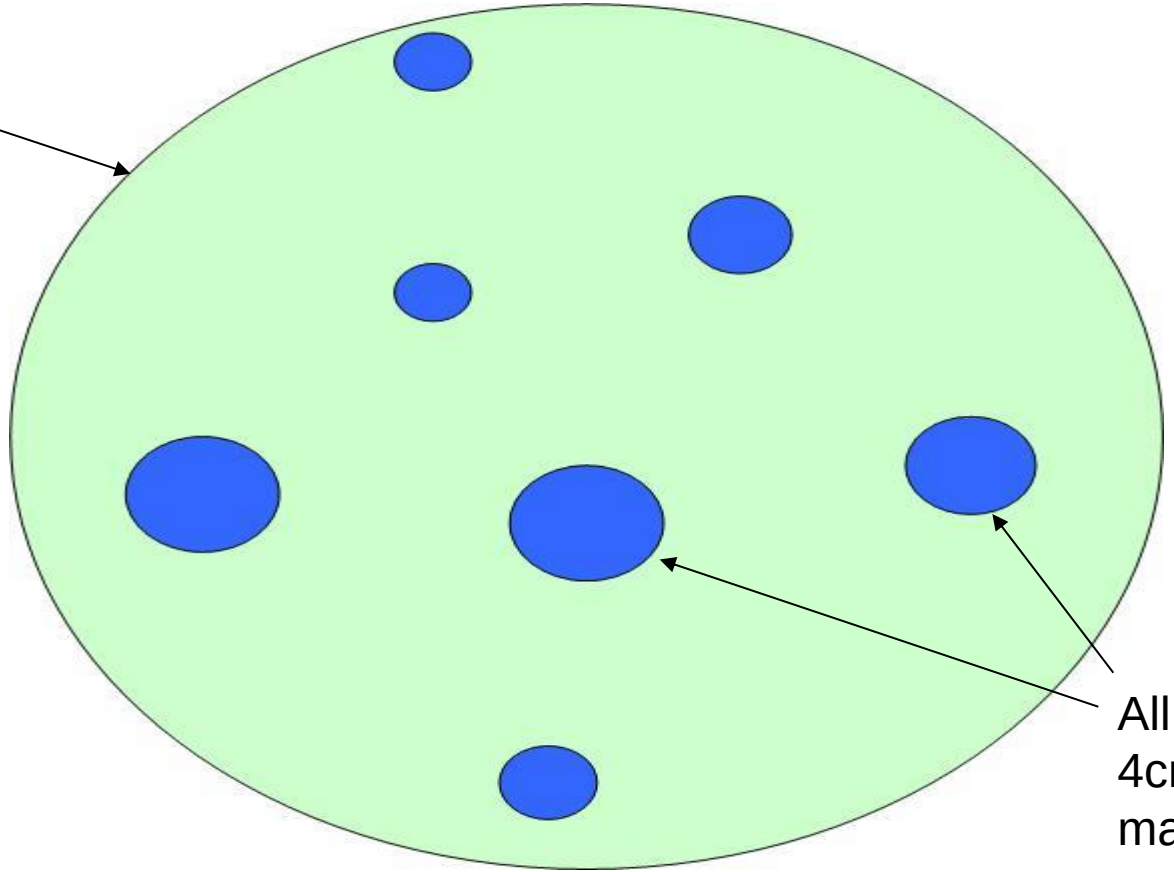
Canopy Stratification



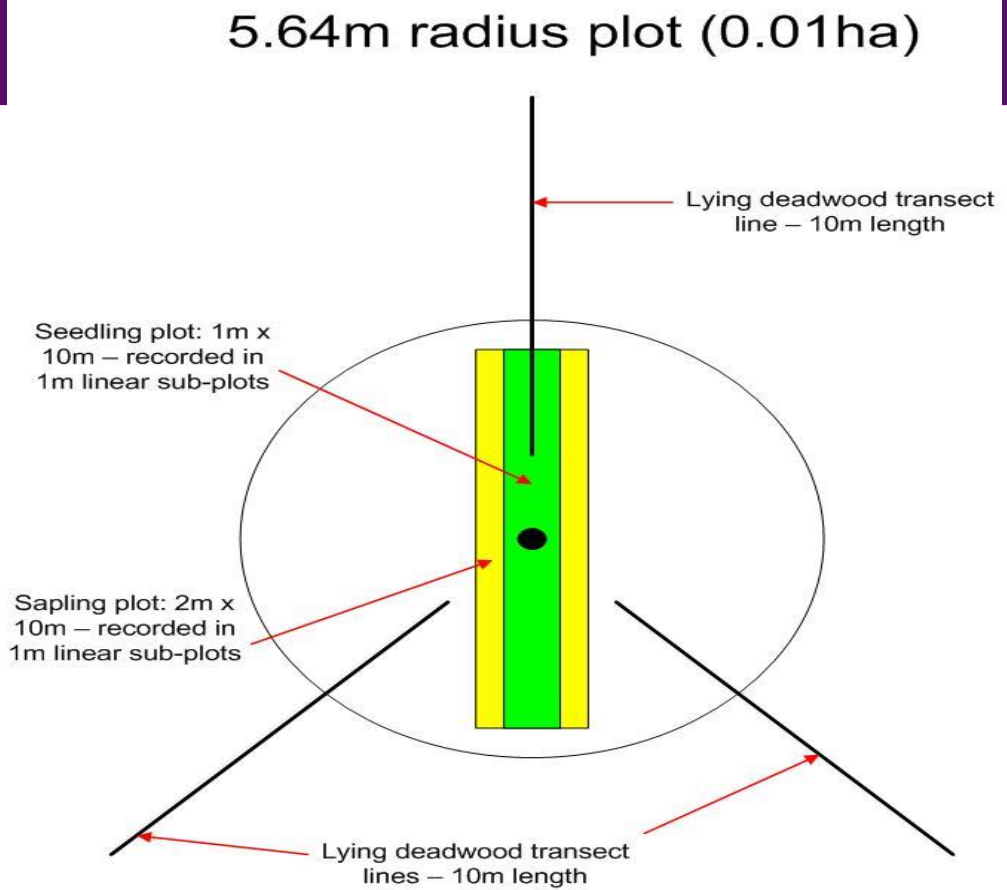




Sample plot with sample trees



Seedling, sapling and dead wood transects within the sample plot



Seedling: any tree <50cm tall
Sapling: any tree ≥50cm tall and < 4cm DBH

Lying Deadwood: Coarse Woody Debris ≥7Cm diameter where the transect line crosses it

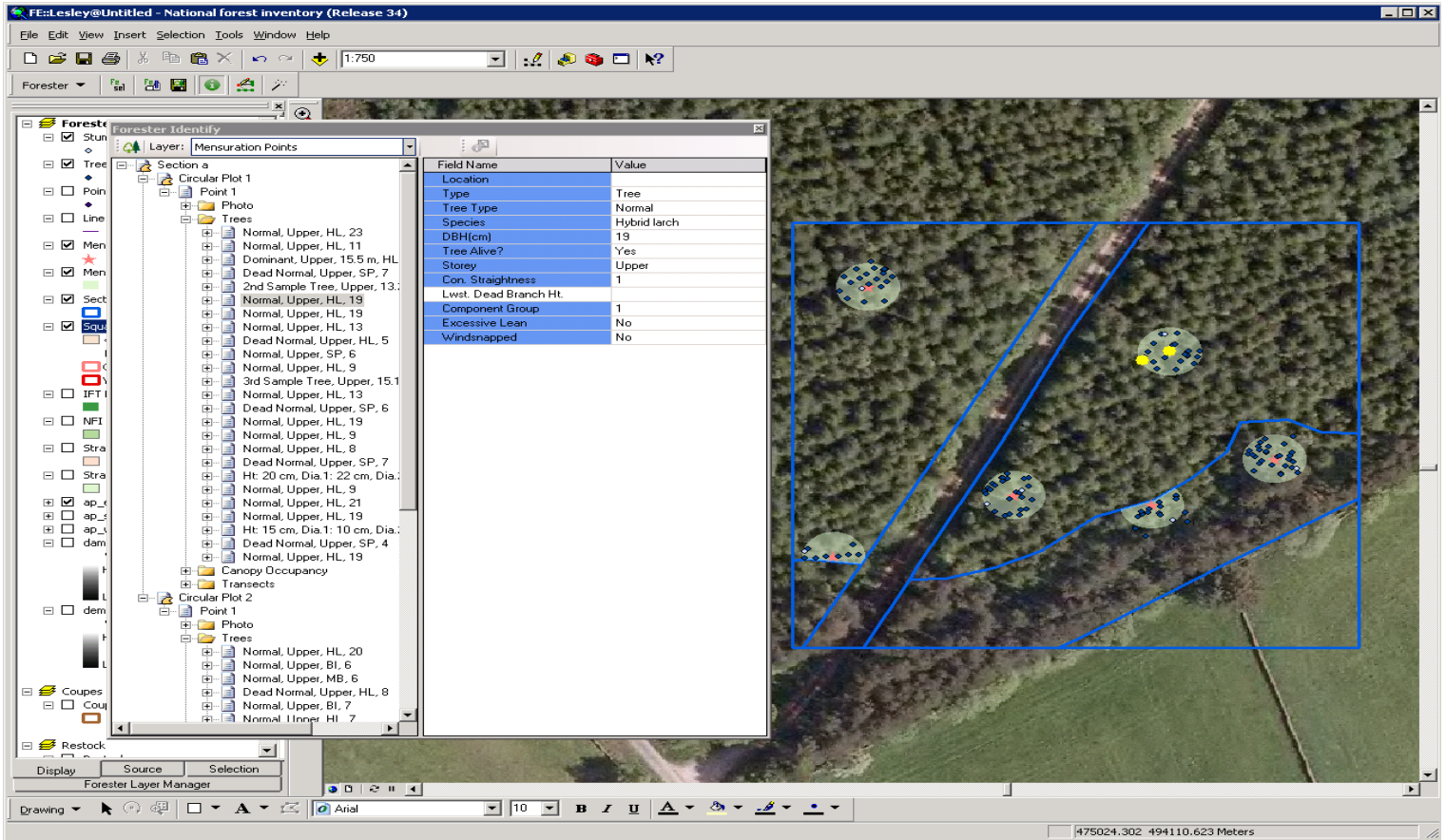
Tree in or out of plot

Tree location

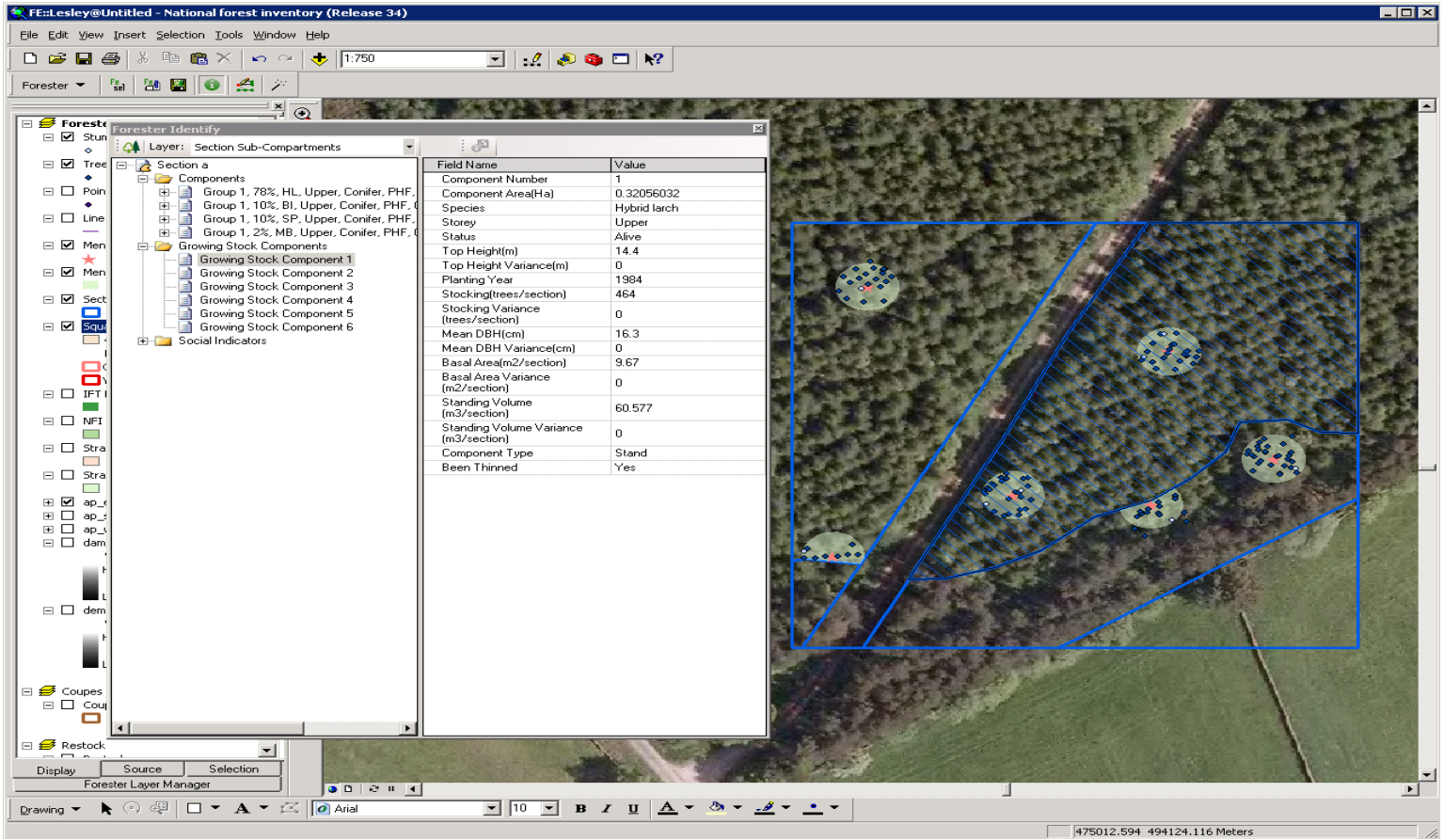
Tree Diameter

GPS trace of NFI surveyor

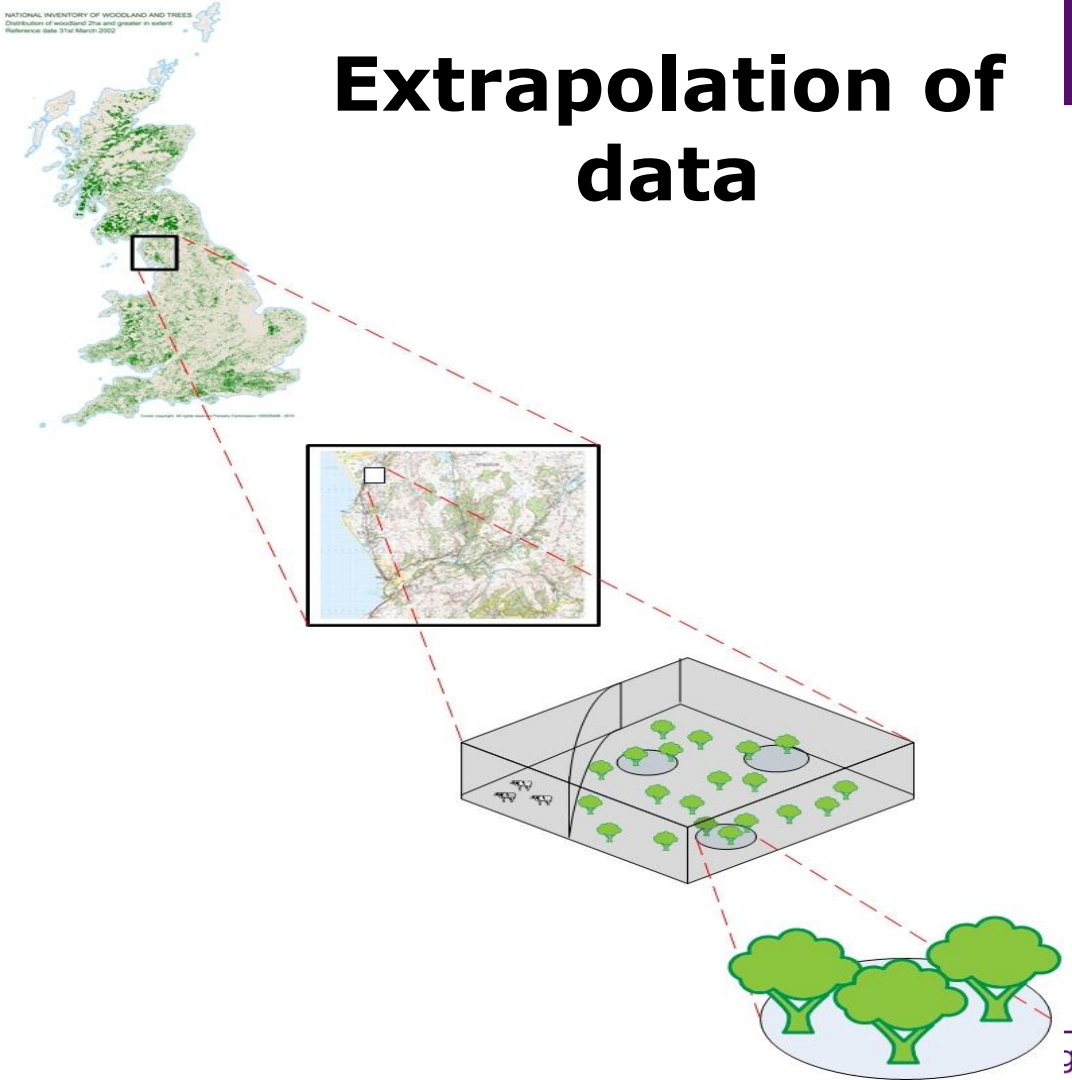
Individual tree measures



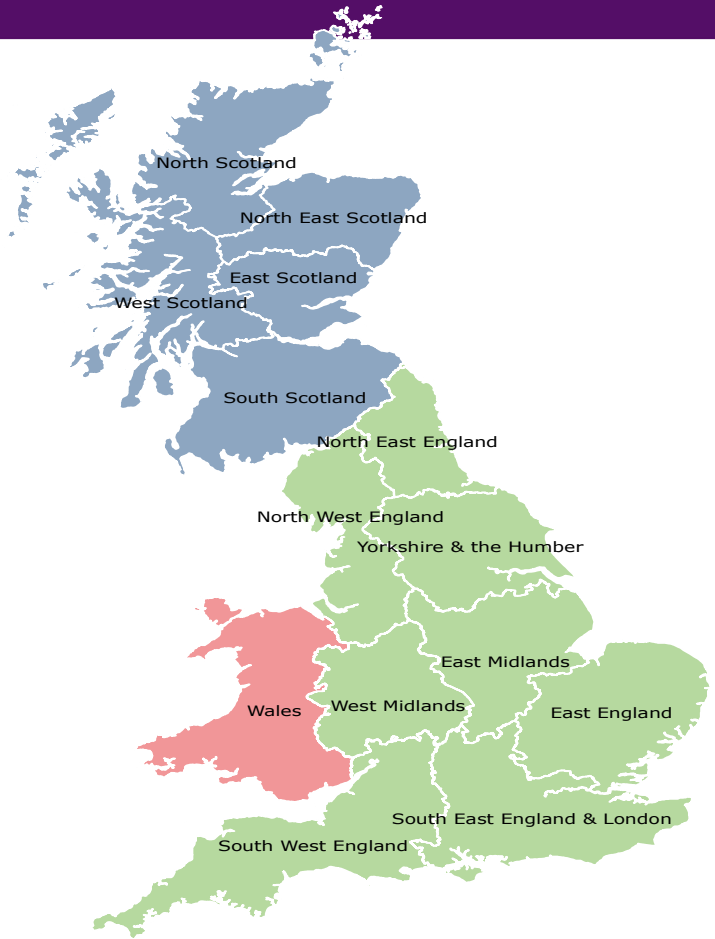
Derived data / Growing stock



Extrapolation of data



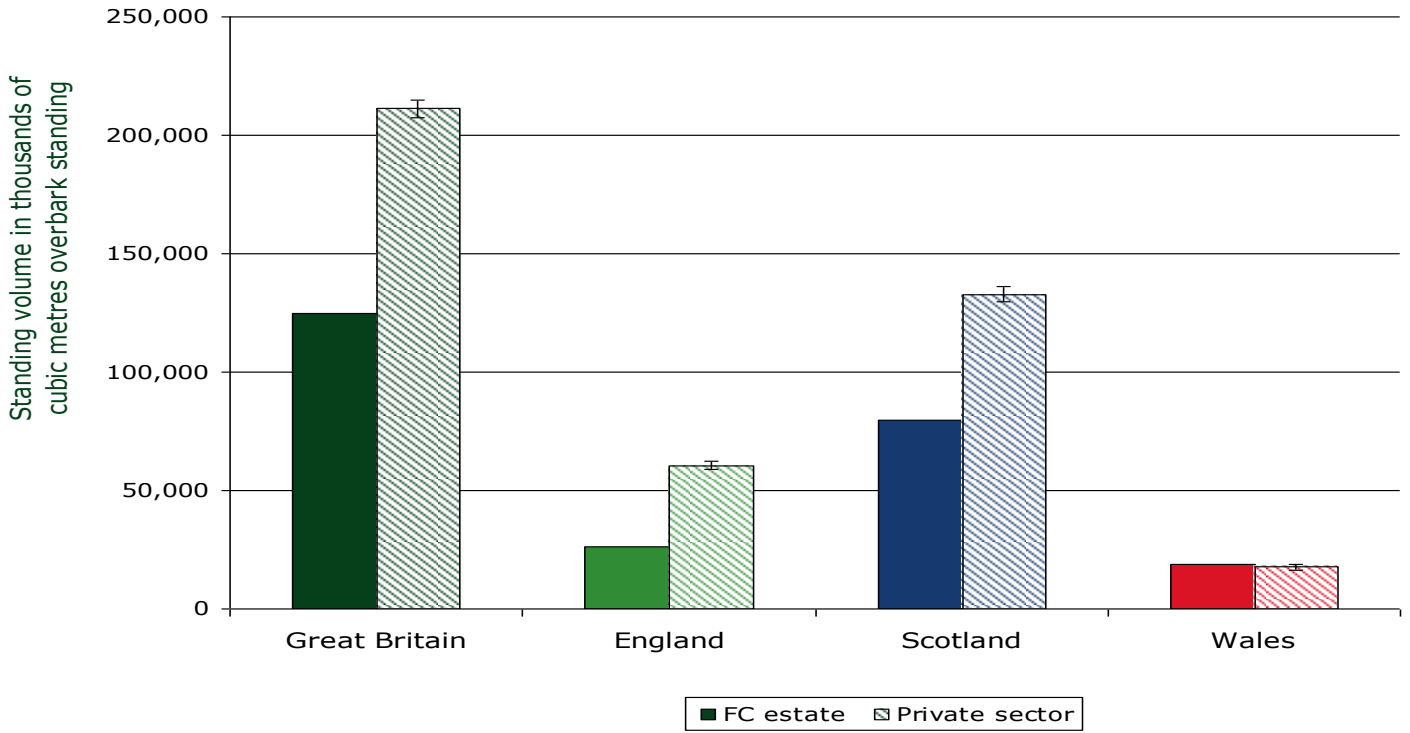
NFI Regions



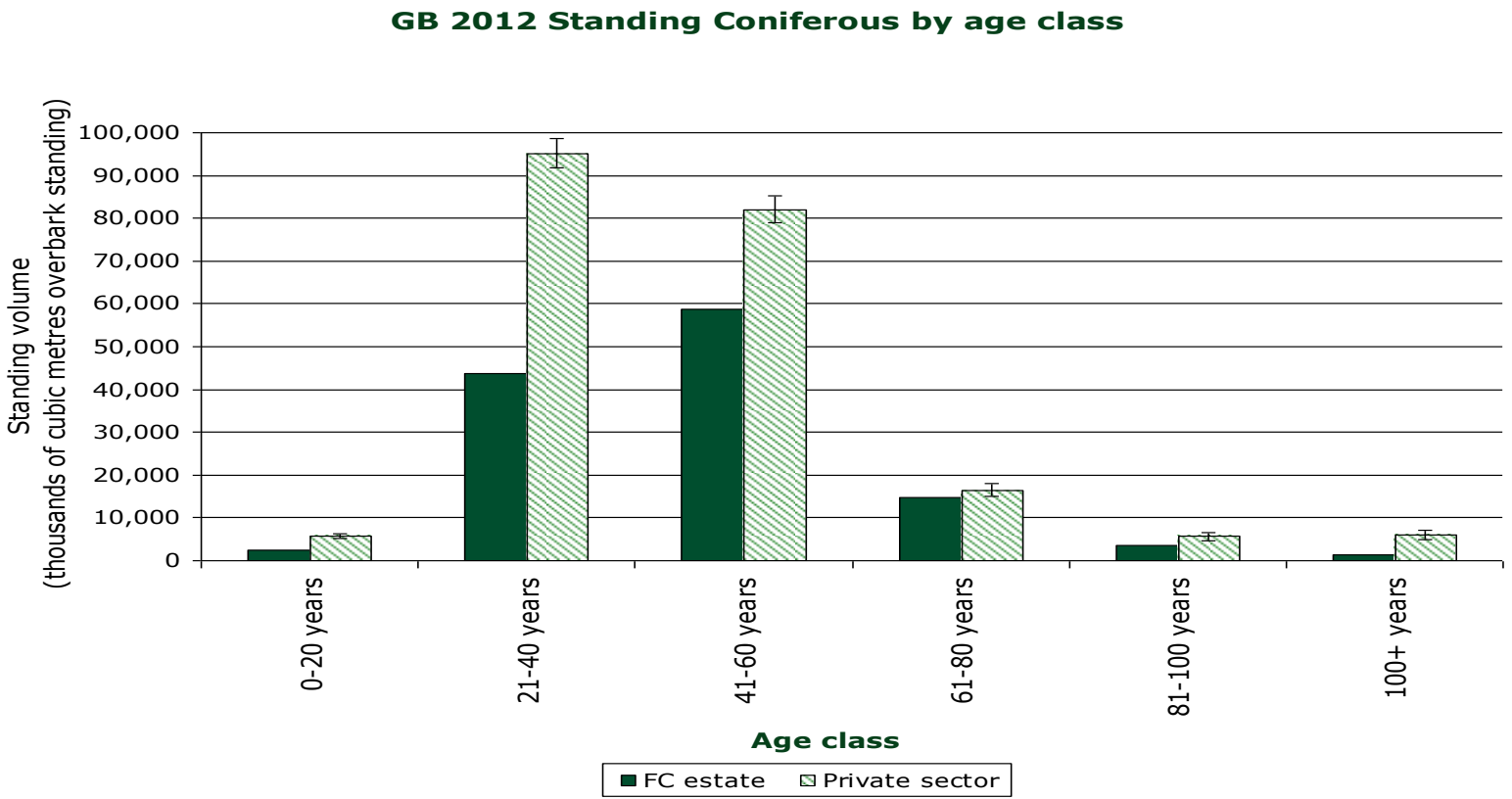
Conifer species distributions in stocked area

Principal species	FC area (000 ha)	Private sector area (000 ha)	Private sector SE%	Total area (000 ha)
England				
All conifers	**127.5**	**191.2**	***2***	**318.7**
Sitka spruce	47.8	33.3	*7*	**81.1**
Scots pine	16.6	48.0	*5*	**64.6**
Corsican pine	27.1	15.8	*11*	**43.0**
Norway spruce	6.9	22.2	*8*	**29.1**
Larches	10.1	34.1	*5*	**44.2**
Douglas fir	9.8	15.8	*9*	**25.5**
Lodgepole pine	4.5	3.6	*16*	**8.1**
Other conifers	4.8	18.5	*9*	**23.3**
Scotland				
All conifers	**374.1**	**524.9**	***2***	**899.1**
Sitka spruce	229.3	289.3	*2*	**518.6**
Scots pine	45.1	116.2	*4*	**161.3**
Corsican pine	1.6	1.4	*41*	**3.0**
Norway spruce	10.9	14.9	*12*	**25.8**
Larches	26.4	41.6	*7*	**68.0**
Douglas fir	5.4	5.2	*19*	**10.6**
Lodgepole pine	52.1	49.1	*16*	**101.2**
Other conifers	3.3	6.4	*19*	**9.7**
Wales				
All conifers	**81.4**	**49.8**	***4***	**131.1**
Sitka spruce	49.5	27.8	*8*	**77.3**
Scots pine	2.0	1.7	*48*	**3.7**
Corsican pine	1.9	0.8	*41*	**2.7**
Norway spruce	5.2	1.6	*35*	**6.8**
Larches	12.3	8.7	*16*	**21.0**
Douglas fir	5.0	4.5	*23*	**9.5**
Lodgepole pine	2.6	1.6	*30*	**4.2**
Other conifers	2.9	2.9	*26*	**5.7**
Great Britain				
All conifers	**583.0**	**765.9**	***1***	**1,349.0**
Sitka spruce	326.6	350.4	*2*	**677.0**
Scots pine	63.8	165.9	*3*	**229.7**
Corsican pine	30.6	18.0	*10*	**48.7**
Norway spruce	23.0	38.7	*7*	**61.7**
Larches	48.8	84.4	*4*	**133.2**
Douglas fir	20.1	25.5	*8*	**45.6**
Lodgepole pine	59.1	54.3	*15*	**113.5**
Other conifers	11.0	27.7	*8*	**38.7**

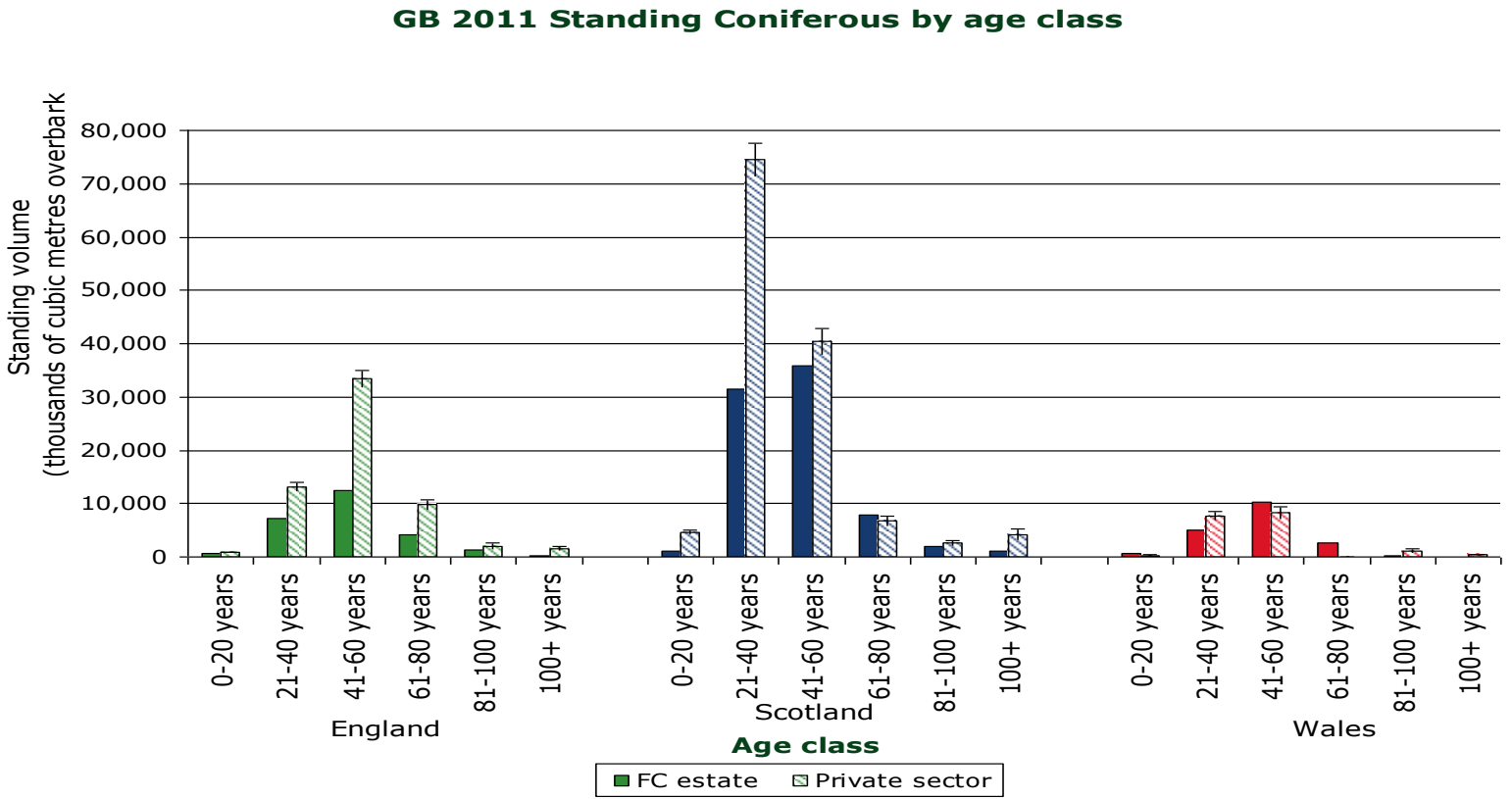
Standing Volume



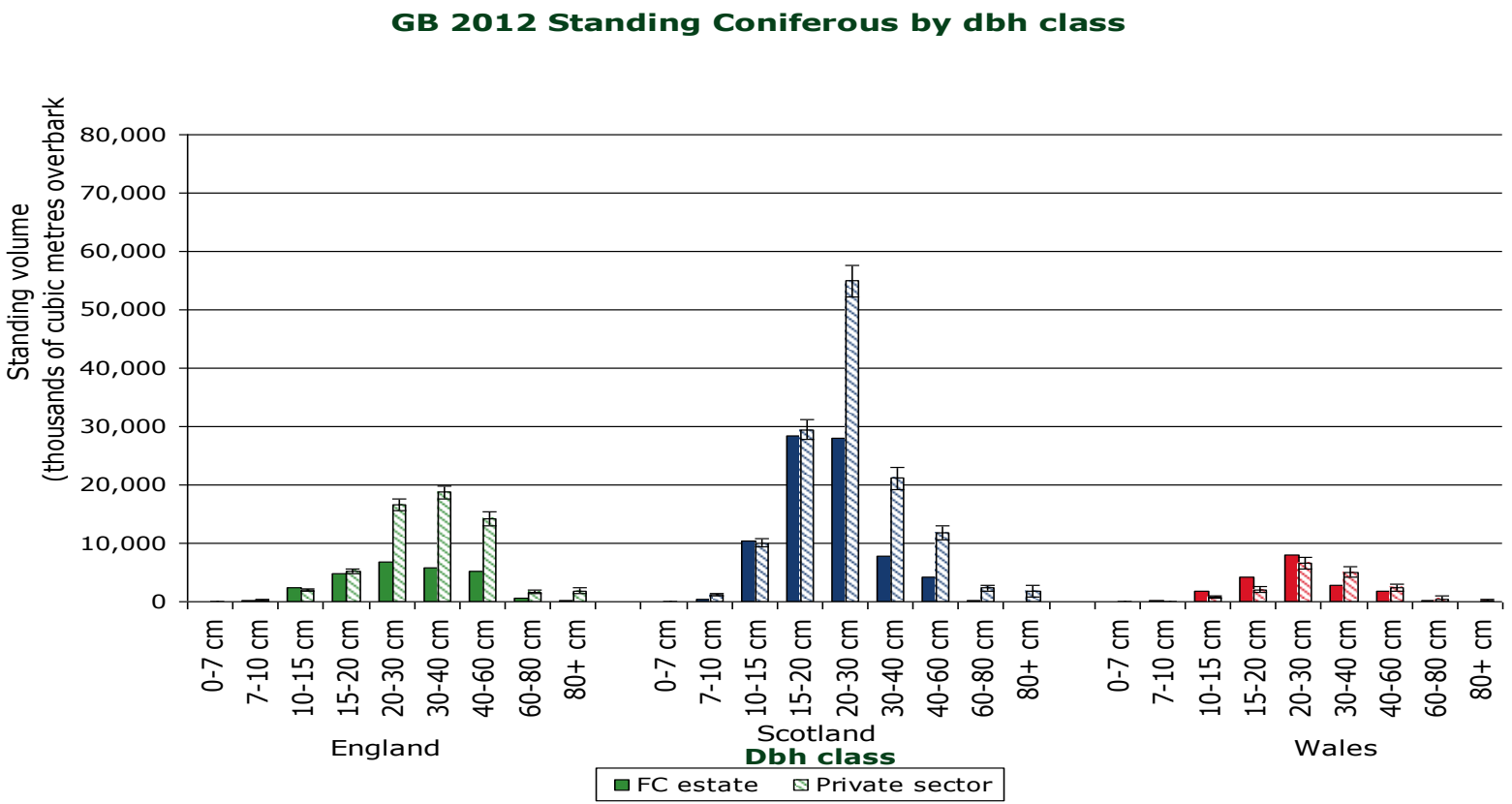
SV by age class by GB



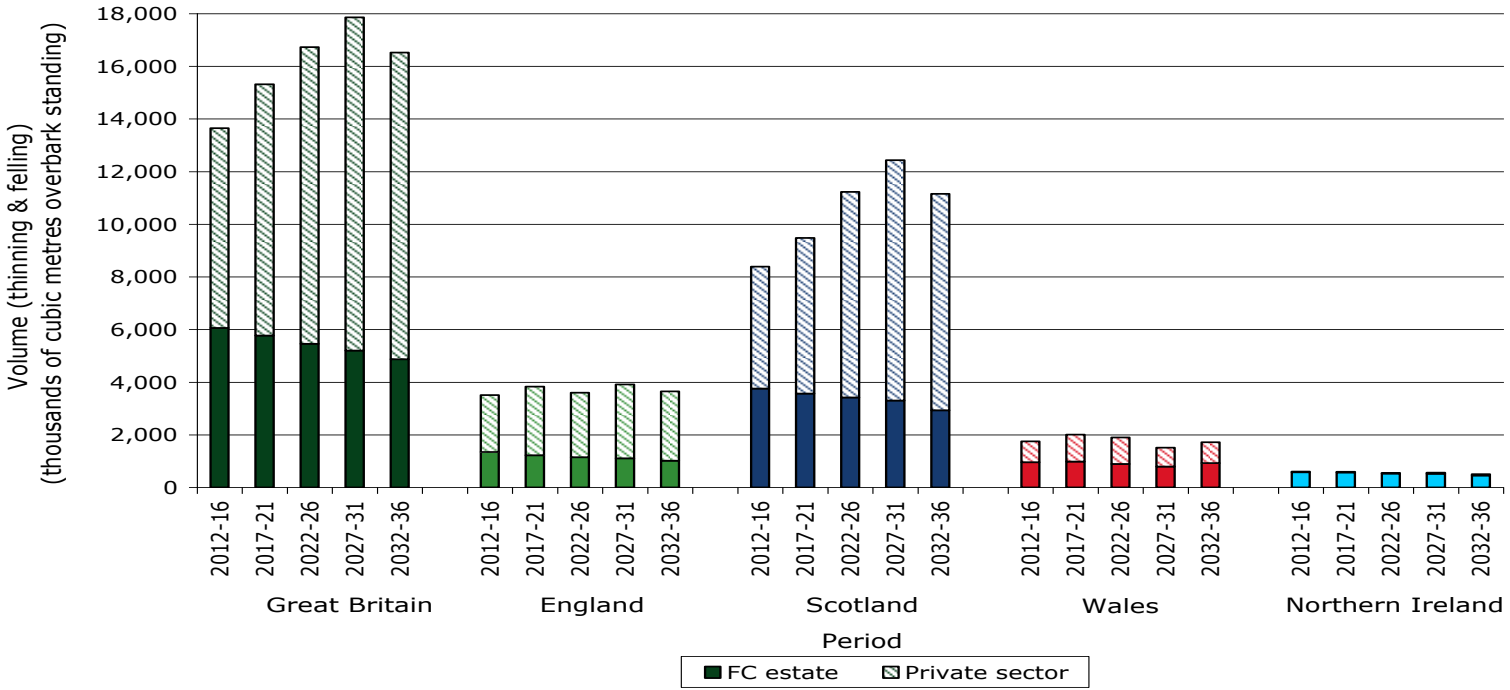
SV by age class by country



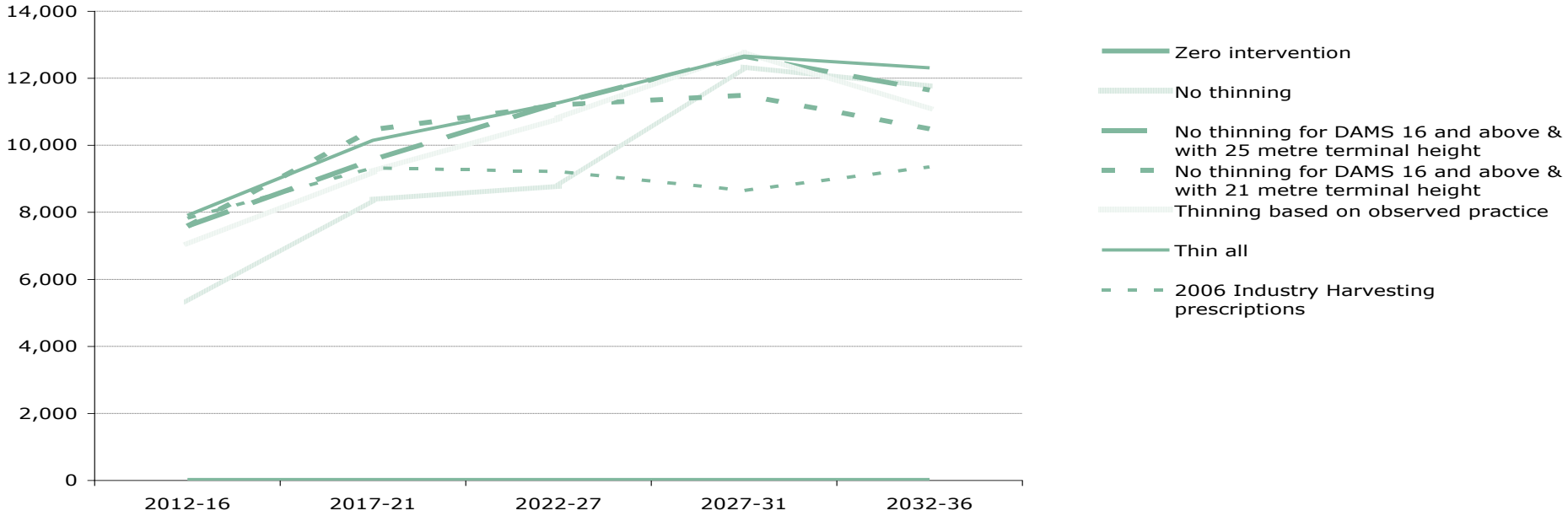
SV by dbh class by country



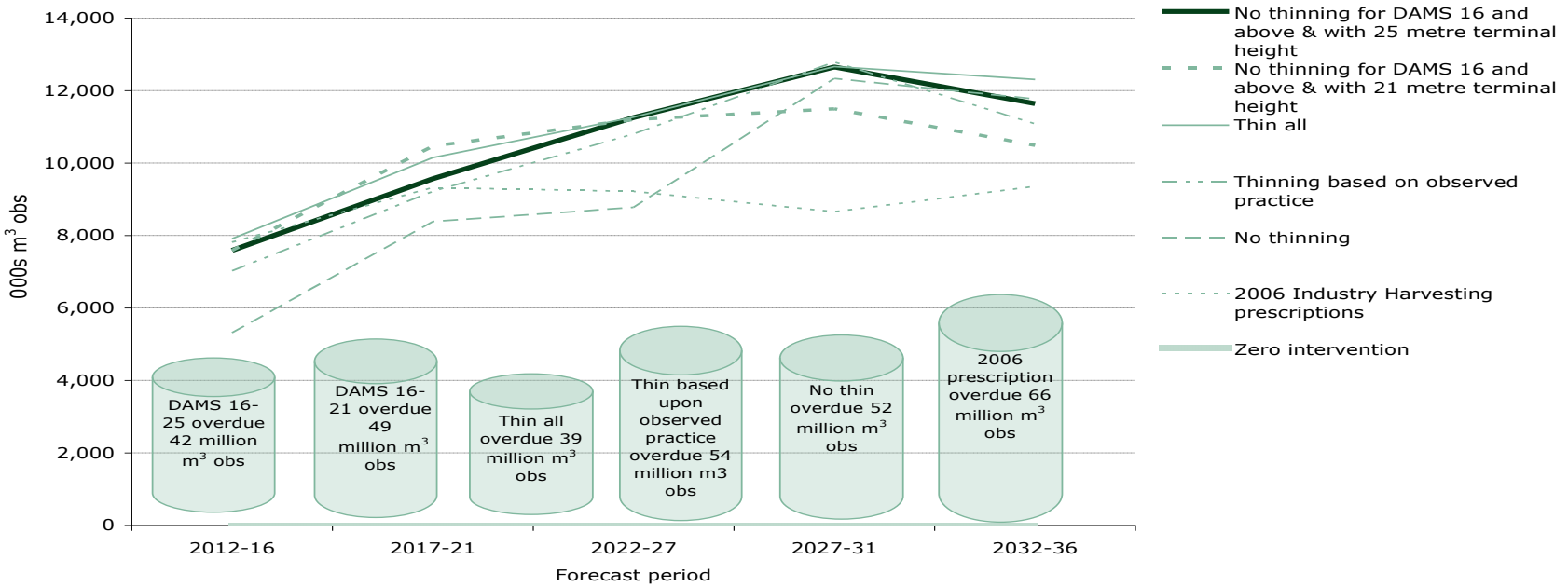
25-yr Softwood Availability



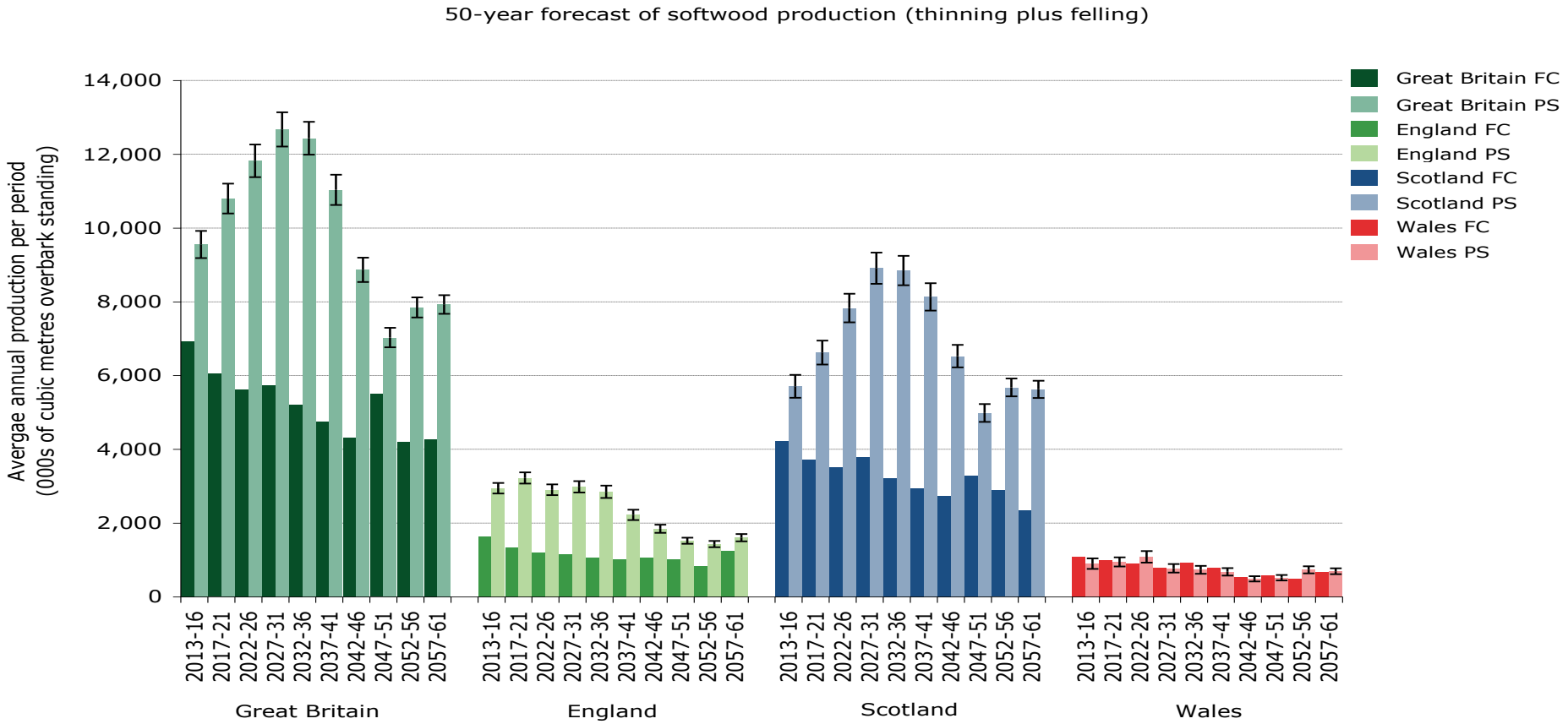
Private sector conifer harvesting scenarios



Conifer overdue timber

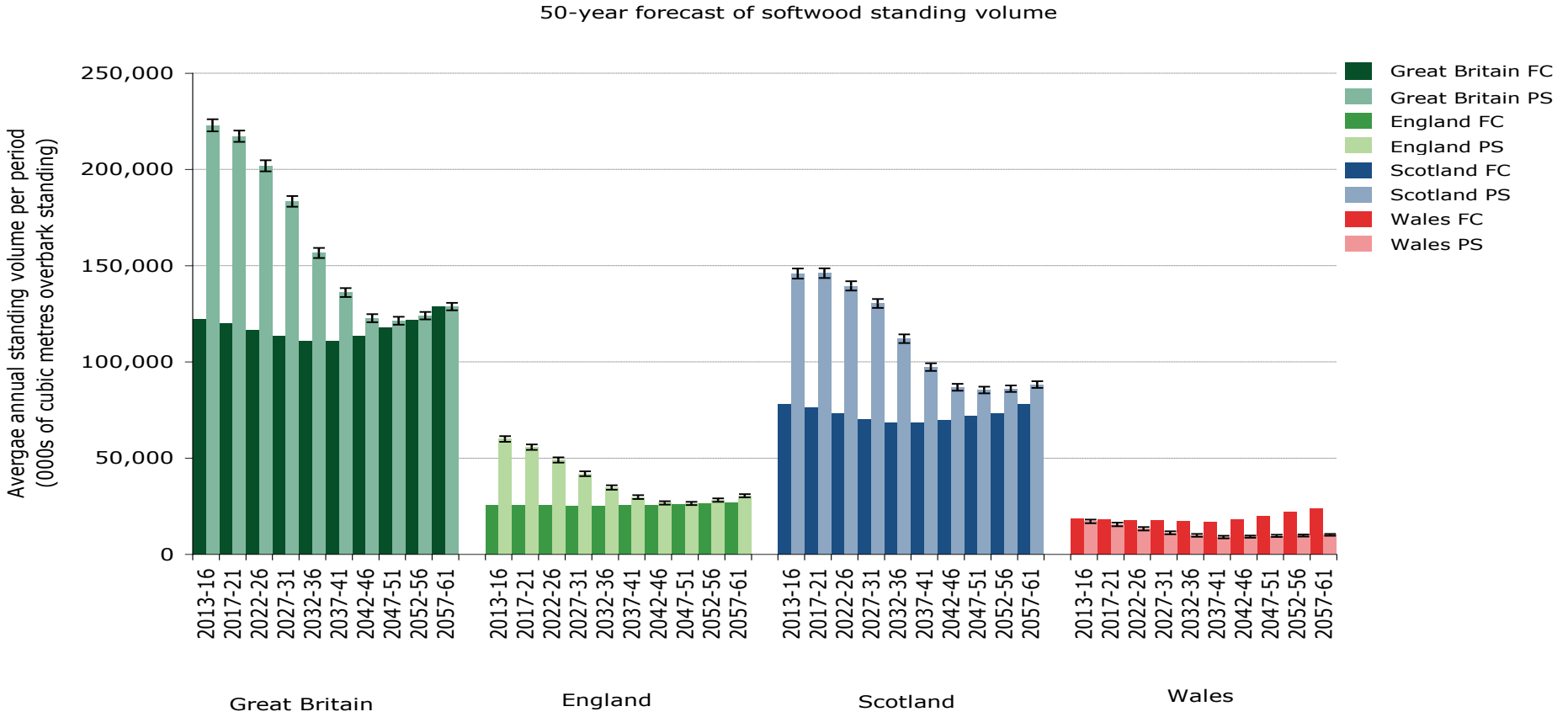


50 yr. conifer forecast

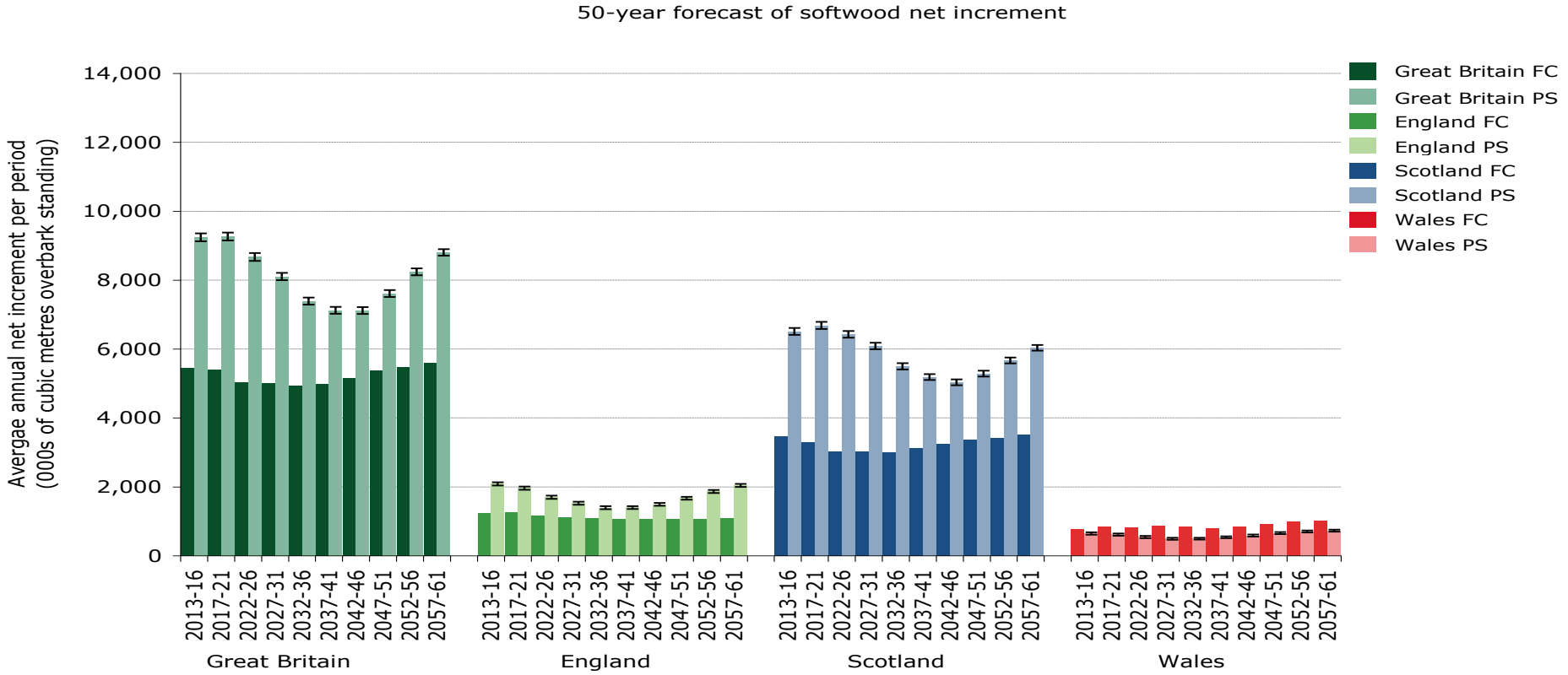


Forest Research

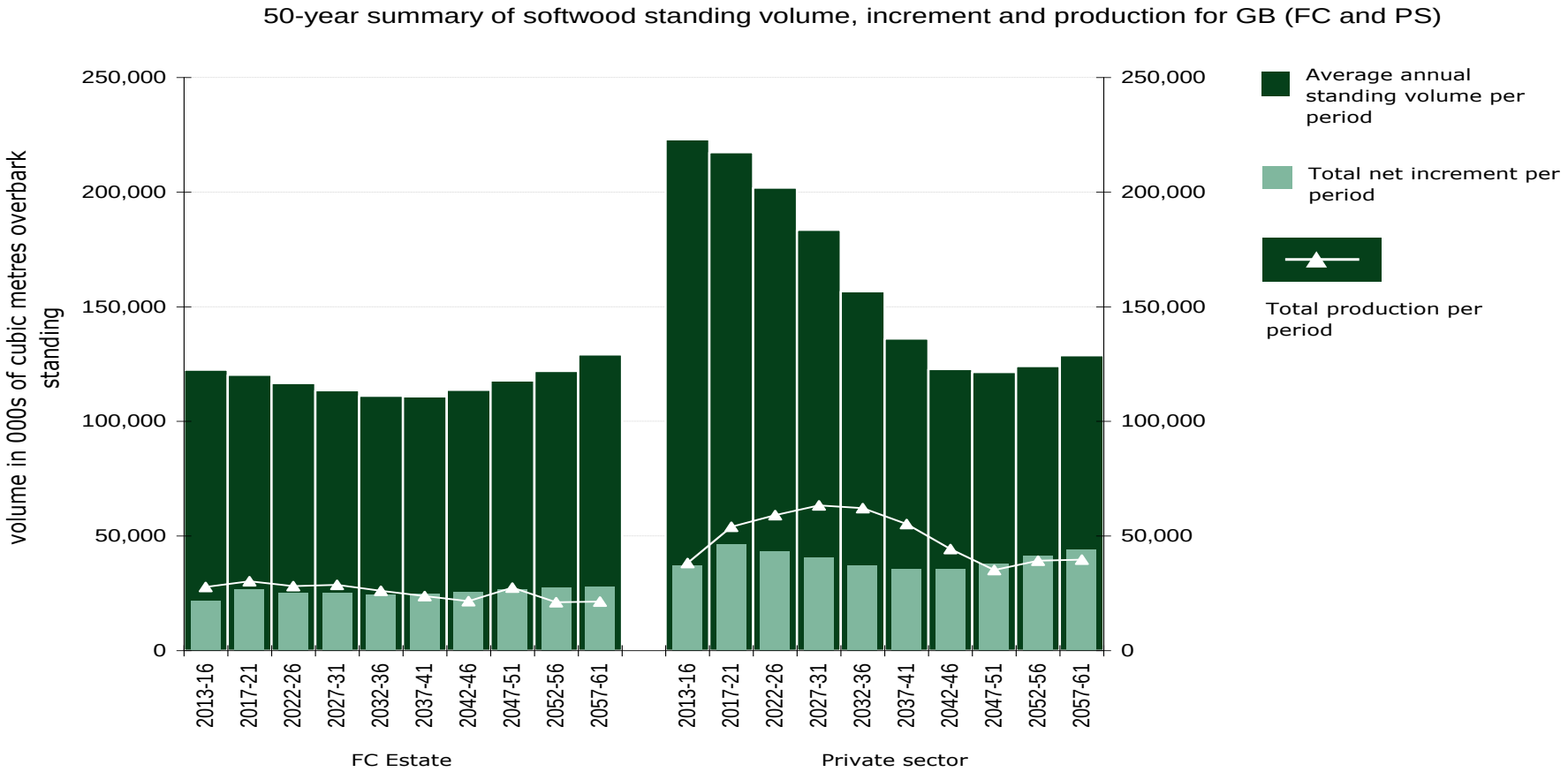
50 years of standing volume



50 yr. increment forecast



Comparing the three

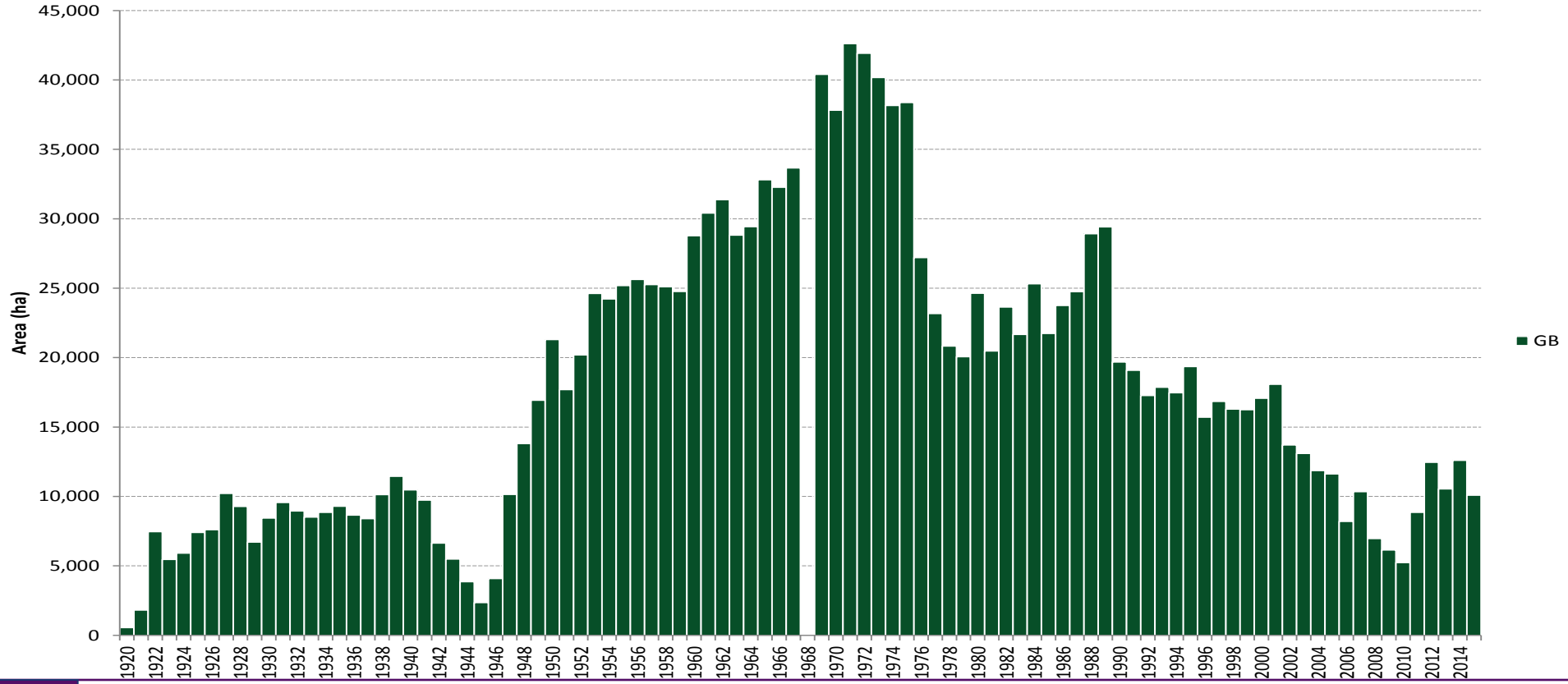


Causes

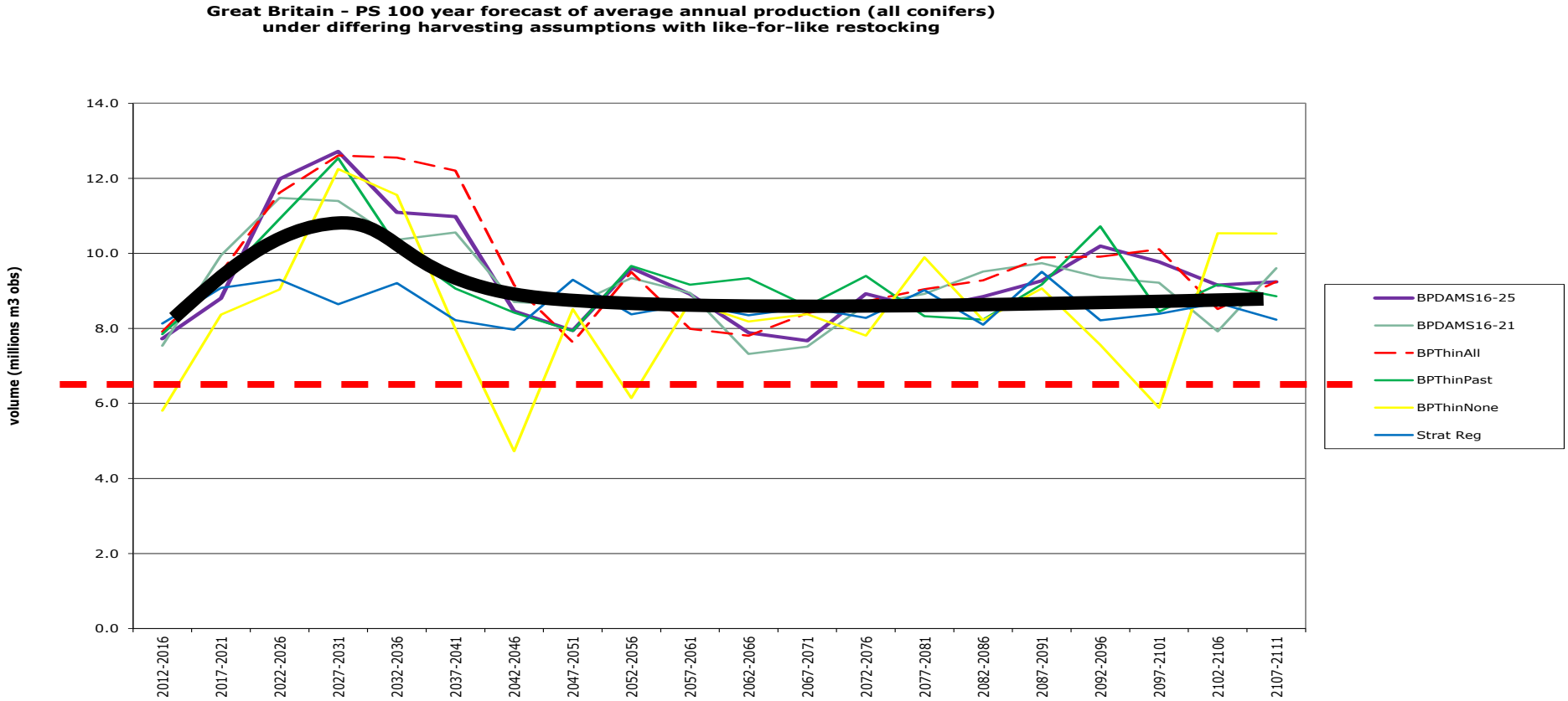
- Why does this uneven profile of availability occur?

- History or creating a new plantation resource

Area of new planting GB 1920-2015
(FC & non-FC, grant aided & non-grant aided)



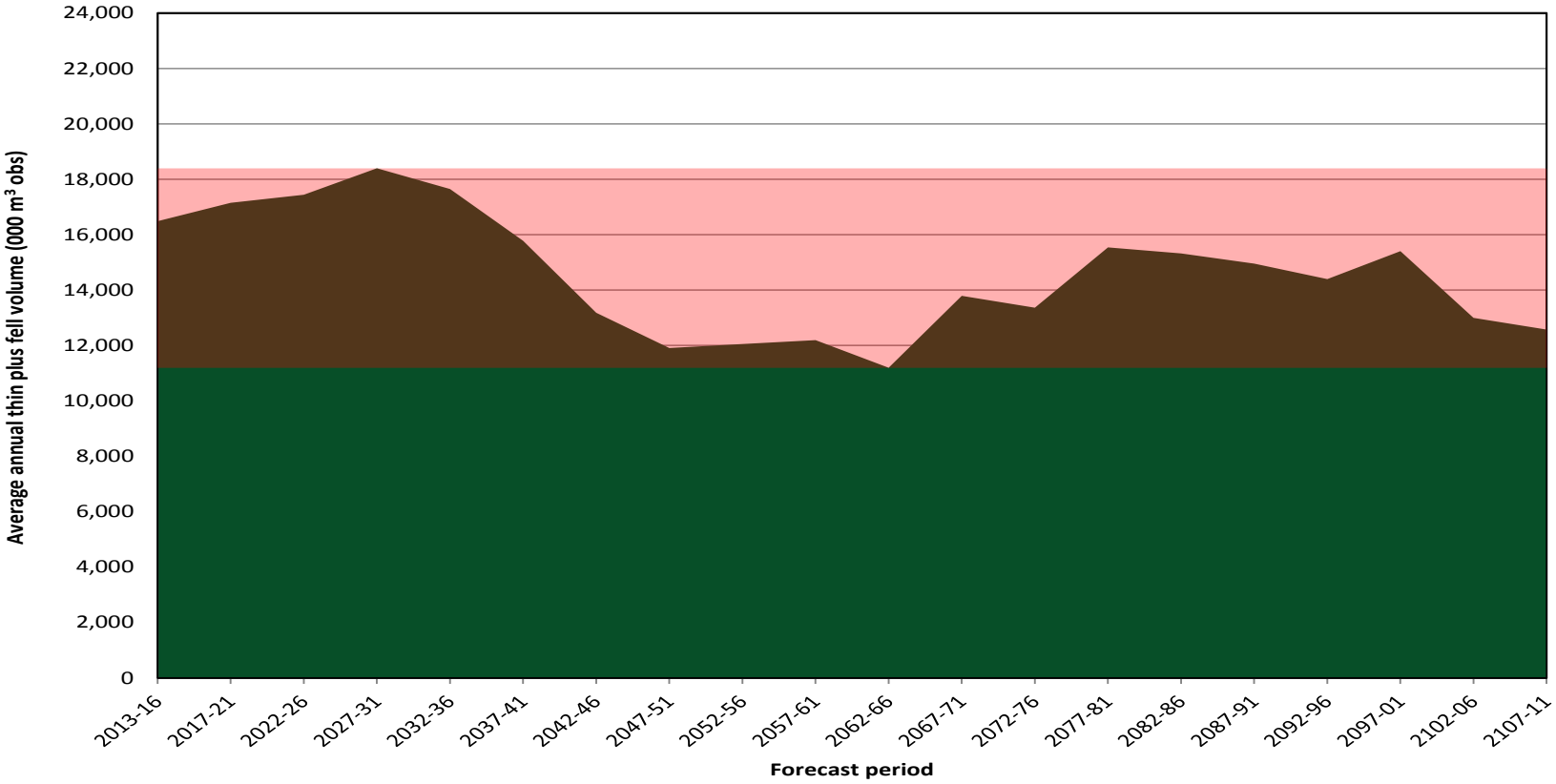
Private sector scenarios - basic



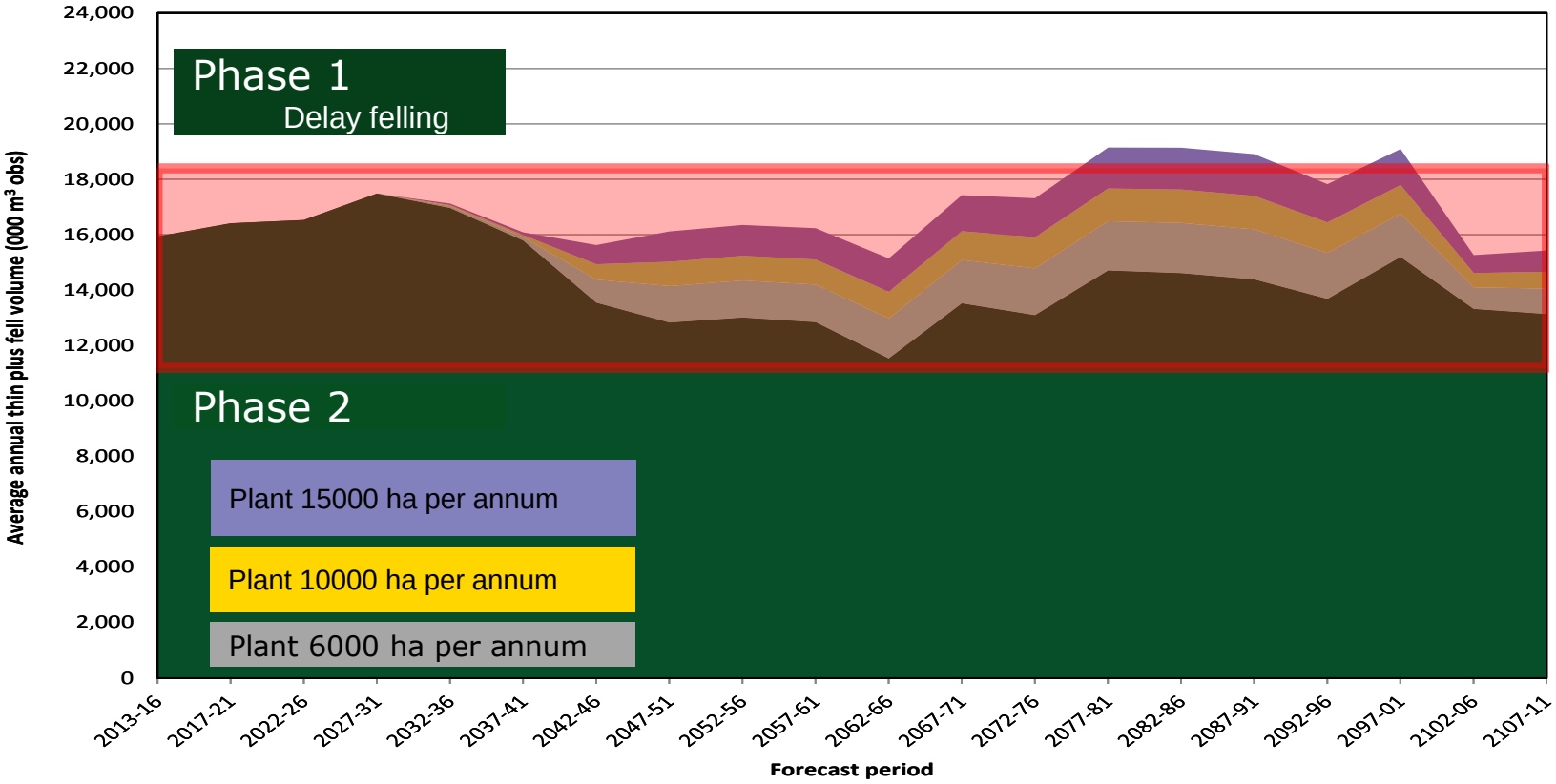
Consequences

- What scale should the conifer sector scale itself to; 12 million or 13, 14 or more?
- How long will the uncut timber stand around, will it continue to grow and accrue value or will it depreciate and blow over or succumb to disease?
- Mitigations?

Timber production forecast



30 years of mitigation



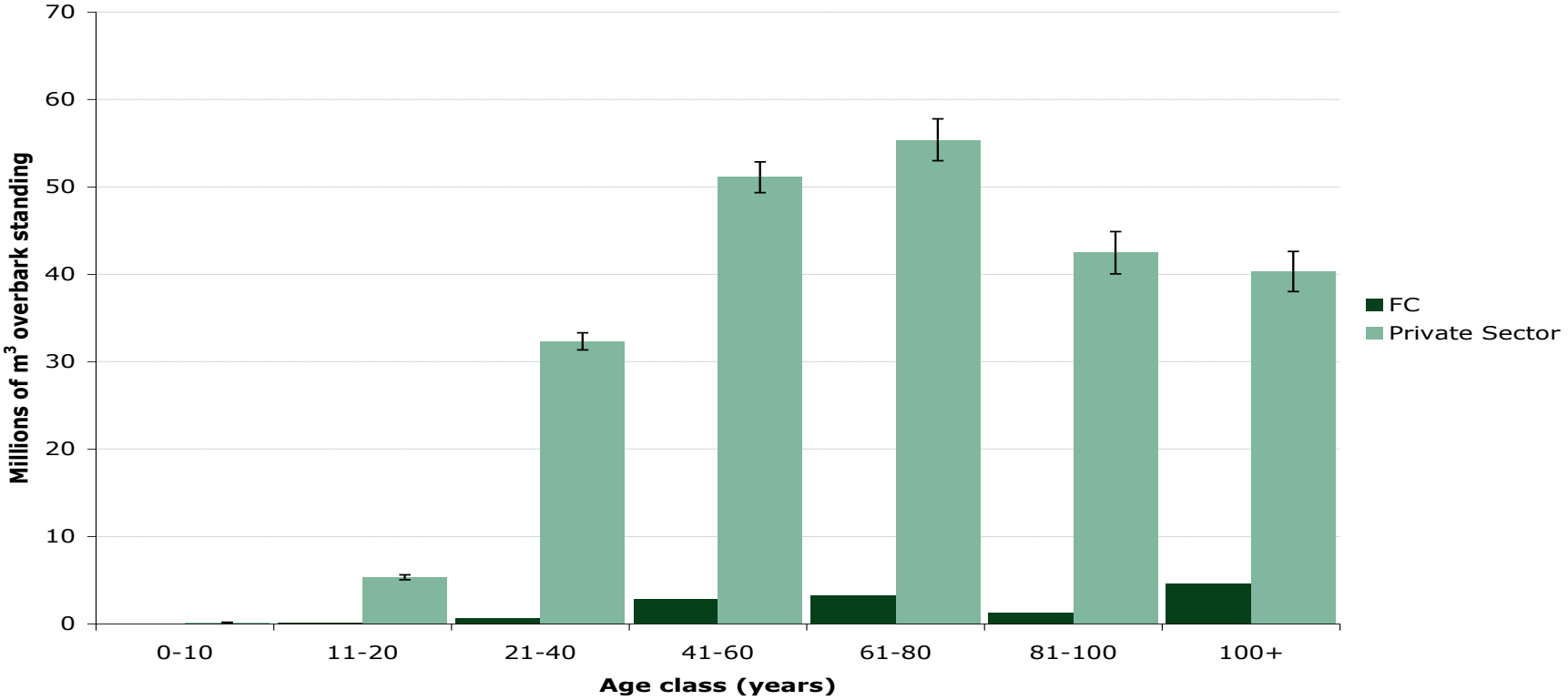
Impact of 30 years planting

GB Landuse	Current % landuse share 2015	% Share by 2045		
		Share under 6,000 ha	Share under 10,000 ha	Share under 15,000 ha
Rural & open	78.5	77.7	77.2	76.6
Urban	8.2	8.2	8.2	8.2
Woodland	13.3	14.1	14.6	15.3

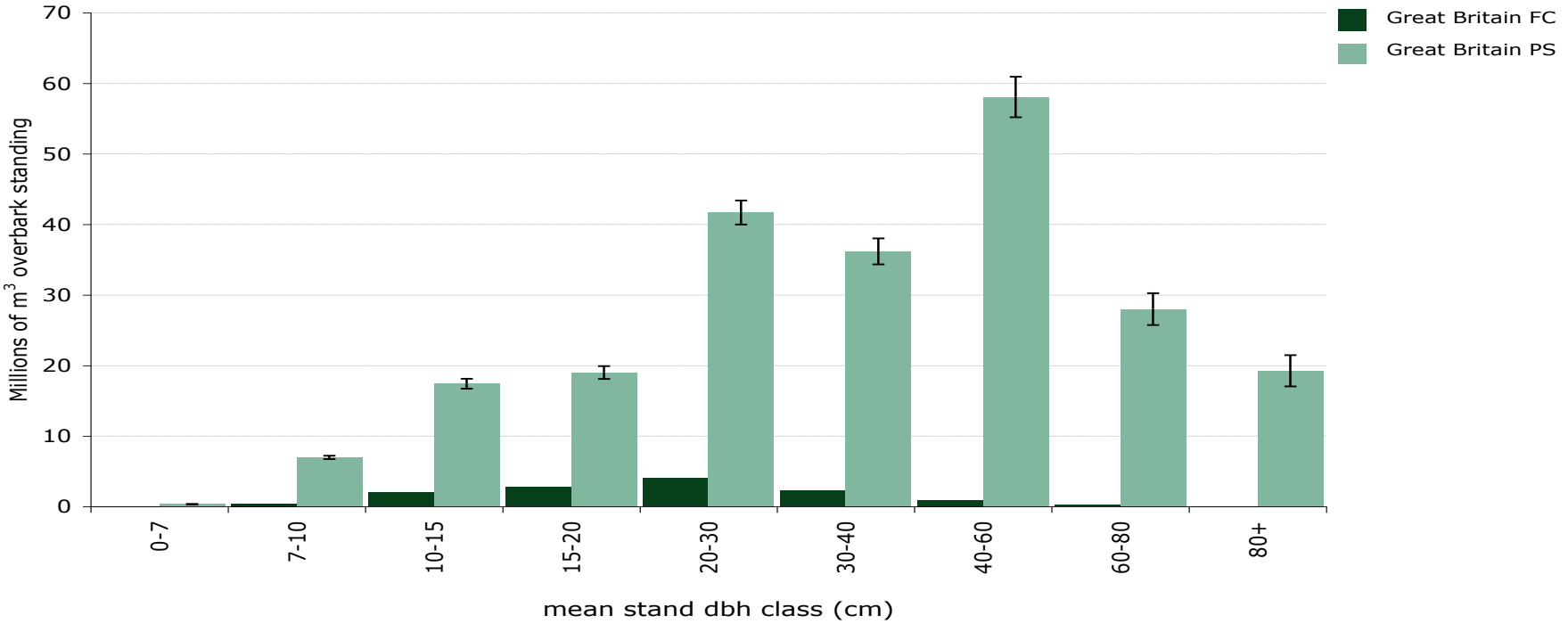
Broadleaved species distributions in stocked area

Principal species	FC area (000 ha)	Private sector area (000 ha)	Private sector SE%	Total area (000 ha)
England				
All broadleaves	**50.0**	**835.8**	***1***	**885.8**
Oak	15.5	163.0	*3*	**178.5**
Beech	12.7	68.0	*5*	**80.7**
Sycamore	1.1	80.8	*5*	**81.8**
Ash	2.7	107.7	*4*	**110.4**
Birch	4.5	93.7	*4*	**98.1**
Sweet chestnut	0.8	27.0	*9*	**27.8**
Hazel	0.3	68.8	*5*	**69.1**
Hawthorn	0.0	49.4	*6*	**49.4**
Alder	0.5	29.2	*8*	**29.7**
Willow	0.0	33.0	*8*	**33.0**
Other broadleaves	12.0	115.2	*4*	**127.2**
Scotland				
All broadleaves	**27.3**	**237.5**	***2***	**264.9**
Oak	2.5	24.1	*11*	**26.6**
Beech	0.6	13.7	*13*	**14.3**
Sycamore	0.3	17.6	*15*	**17.9**
Ash	0.4	13.1	*12*	**13.5**
Birch	9.2	108.5	*4*	**117.8**
Sweet chestnut	0.0	0.0	*0*	**0.0**
Hazel	0.2	5.7	*20*	**6.0**
Hawthorn	0.0	6.0	*21*	**6.0**
Alder	0.6	13.7	*13*	**14.2**
Willow	0.0	8.6	*11*	**8.6**
Other broadleaves	13.5	26.0	*8*	**39.5**
Wales				
All broadleaves	**13.6**	**112.6**	***3***	**126.2**
Oak	2.4	22.5	*10*	**24.9**
Beech	1.7	6.1	*20*	**7.8**
Sycamore	0.1	9.9	*16*	**9.9**
Ash	0.4	17.2	*11*	**17.6**
Birch	1.1	10.3	*13*	**11.4**
Sweet chestnut	0.0	0.4	*77*	**0.5**
Hazel	0.0	12.8	*13*	**12.8**
Hawthorn	0.0	5.4	*20*	**5.4**
Alder	0.1	9.0	*15*	**9.1**
Willow	0.0	8.9	*17*	**8.9**
Other broadleaves	7.8	10.4	*13*	**18.2**
Great Britain				
All broadleaves	**91.0**	**1,185.9**	***1***	**1,276.9**
Oak	20.4	209.6	*3*	**230.0**
Beech	14.9	87.8	*5*	**102.7**
Sycamore	1.5	108.2	*4*	**109.6**
Ash	3.5	138.1	*3*	**141.6**
Birch	14.8	212.5	*3*	**227.3**
Sweet chestnut	0.8	27.4	*9*	**28.2**
Hazel	0.6	87.3	*5*	**87.9**
Hawthorn	0.0	60.8	*6*	**60.8**
Alder	1.1	51.9	*6*	**53.1**
Willow	0.0	50.5	*6*	**50.5**
Other broadleaves	33.3	151.6	*3*	**184.9**

Standing Volume by Age Class

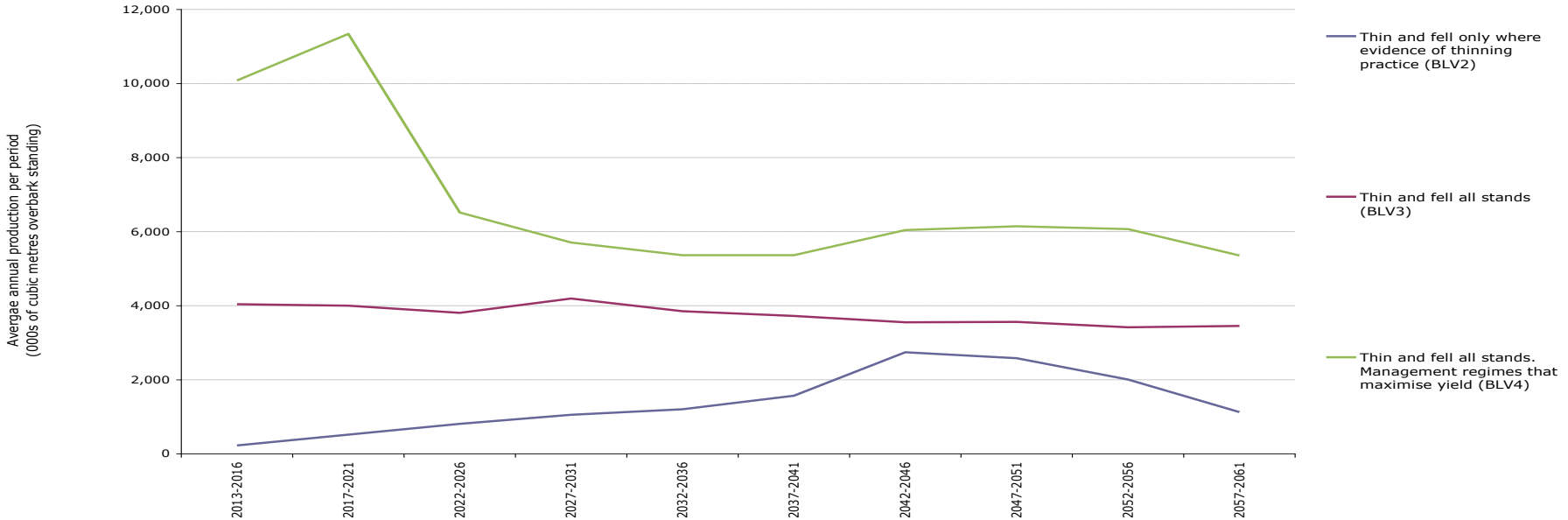


Blvd. Standing Volume by Size

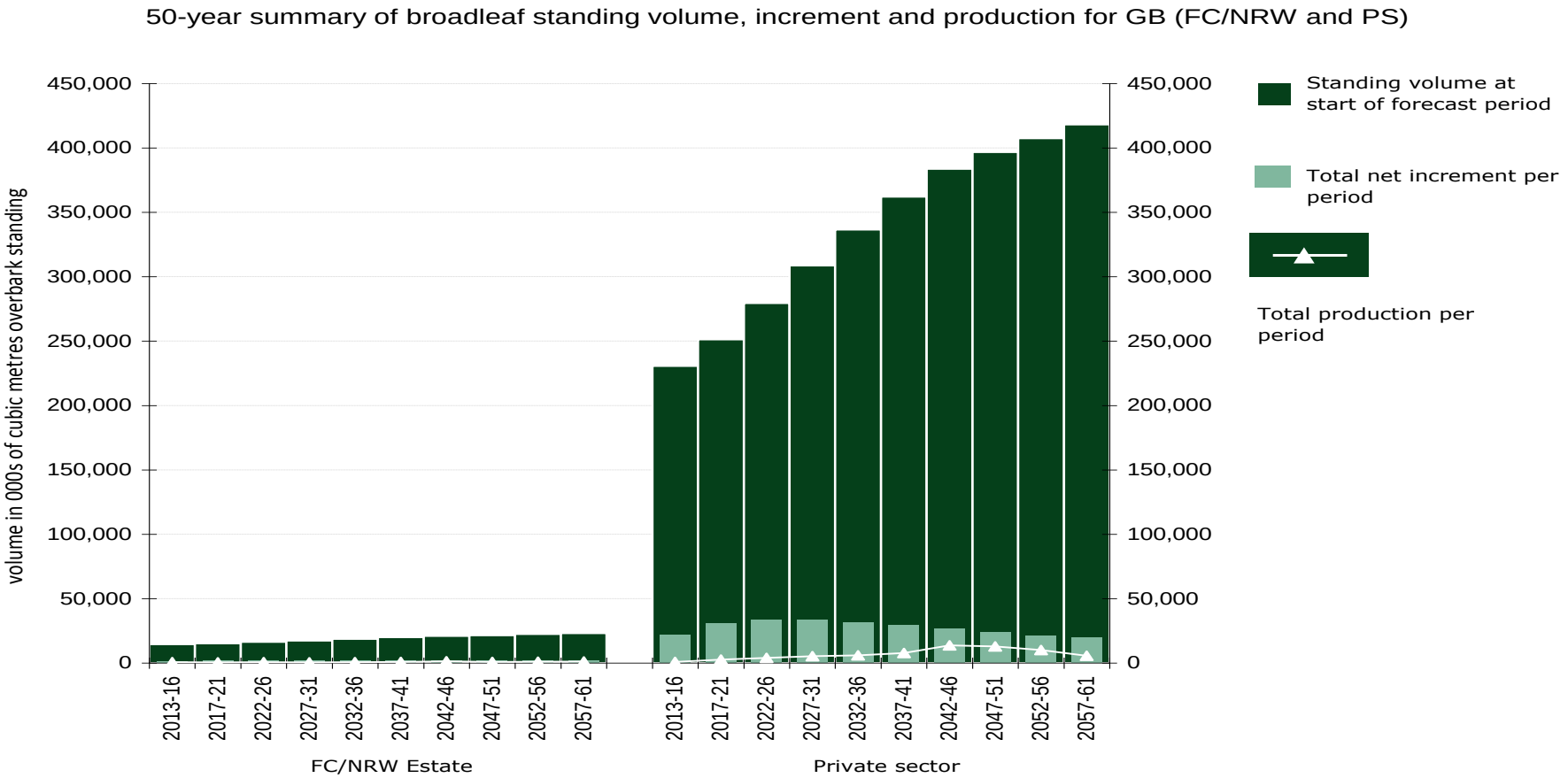


Scenarios for hardwoods

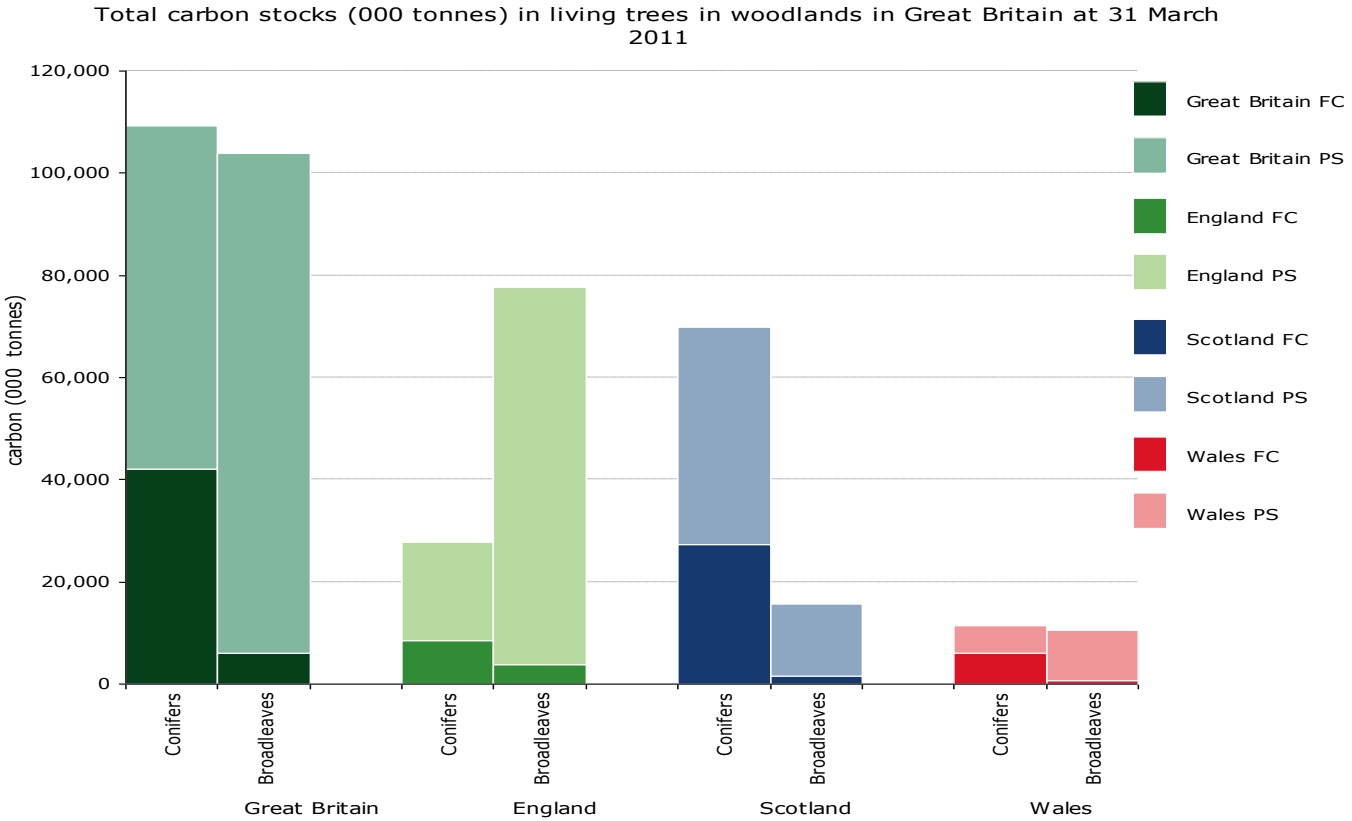
The impact of different harvesting scenarios upon 50-year timber potential for the Private sector (GB).



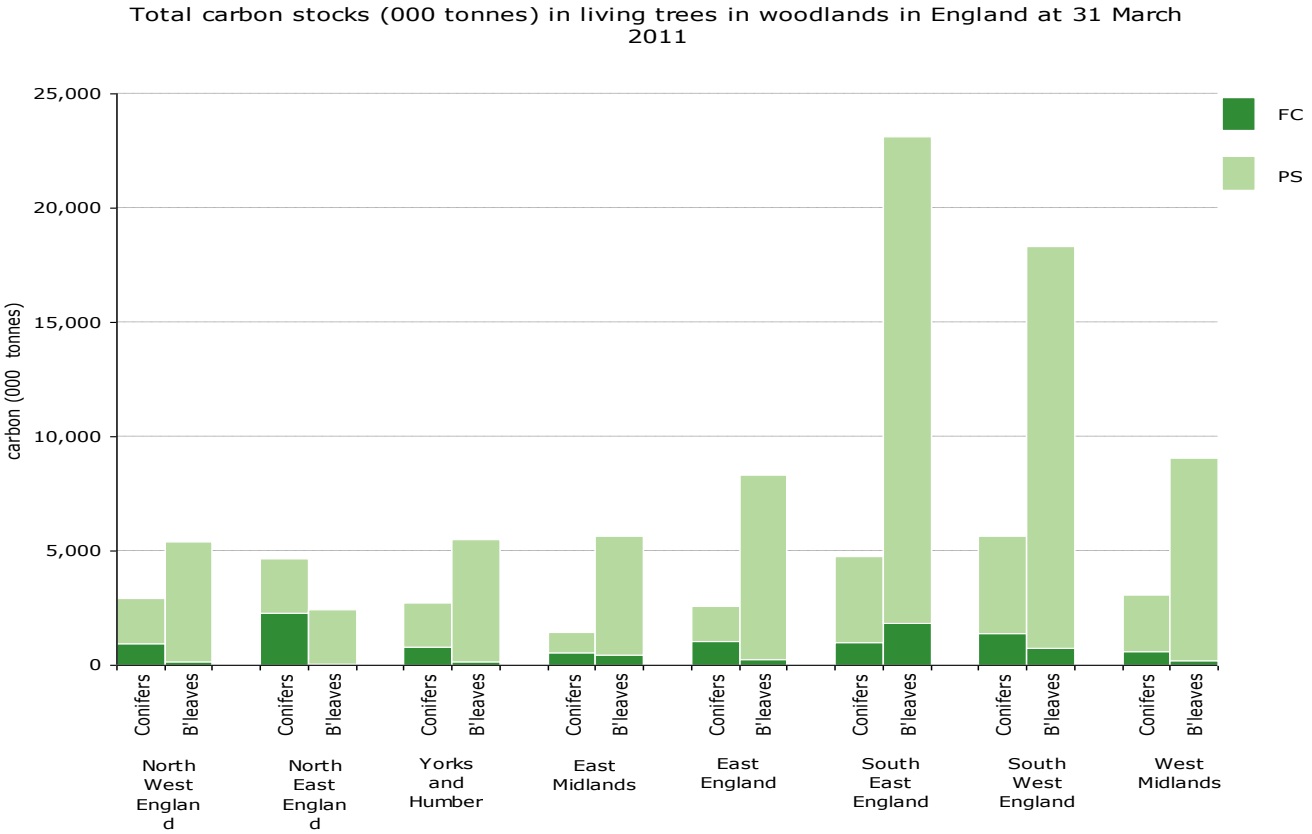
SV/I/T&F)



Carbon Stocks



Carbon Stocks



Conclusions

- Removals are below increment in GB and UK, especially for broadleaves
- This disparity will grow, as our relatively young trees mature
- Uneven availability over short, medium and long terms
- We already have a significant stock of trees over due for felling, this will only be added to
- Large volume of increment without commensurate processing capacity
- Mitigations; delayed felling, new planting and additional processing?

More Information

- Questions?
- For information on the NFI:

http://www.forestry.gov.uk/forestry/INFD-89PJU5

- Or Google ‘National Forest Inventory’
- Contact:

National.Forest.Inventory@forestry.gsi.gov.uk

Forest Research

The UK Timber Resource and Future Supply Chain

Ben Ditchburn

Forest Research