

The UK Timber Resource and Future Supply Chain

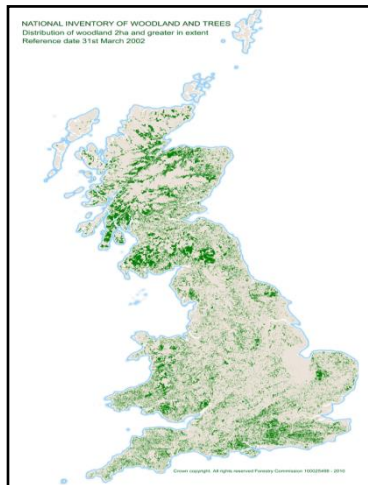
Ben Ditchburn
Forest Research

- 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?

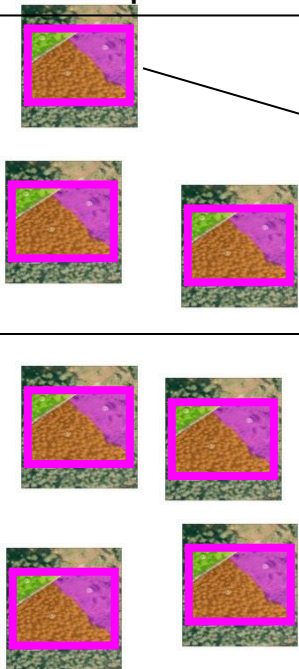
- Evidence base for the sector
- To inform and influence:
 - Policy makers
 - Politicians
 - Decision makers within the sector
 - Investors
 - The public
 - The scientific community

- 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

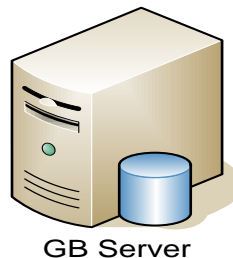
1. Forest Map



2. 15,000 one Ha Survey Squares

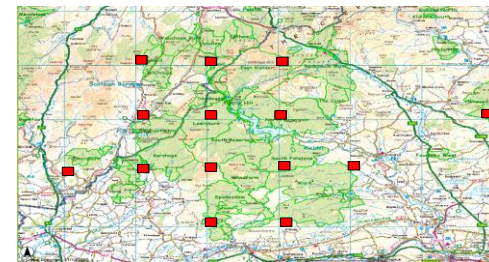


3. Map + Squares brought together in the NFI DB

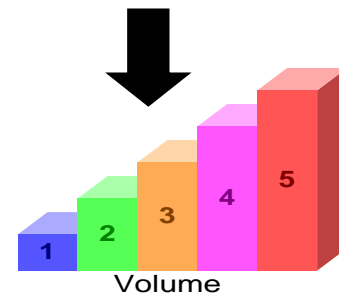


X

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**





Remote sensing updates to the map

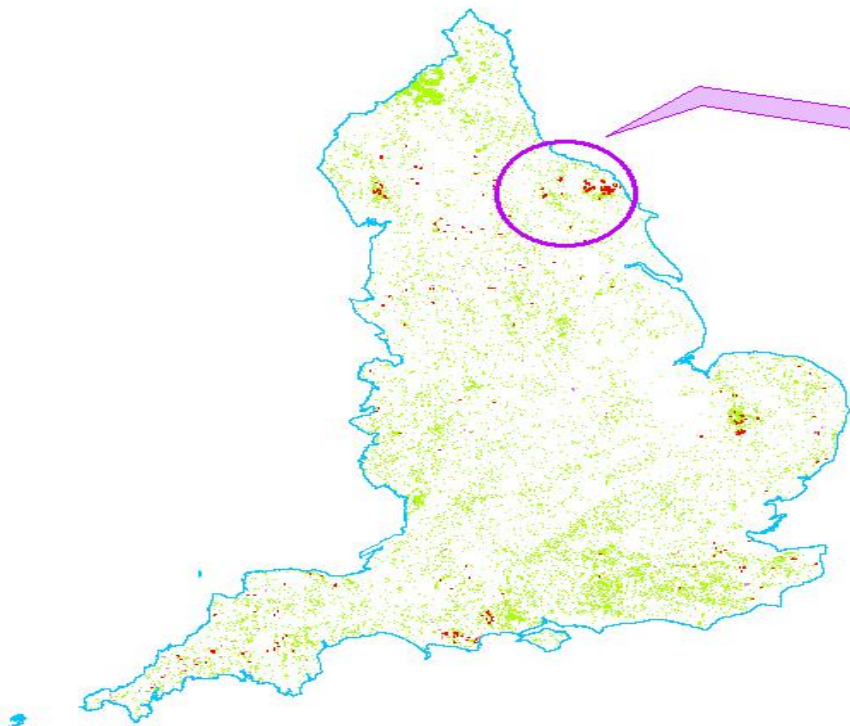
Woodland
signature



Clearfell
with unique
signature



RS clearfell Detection

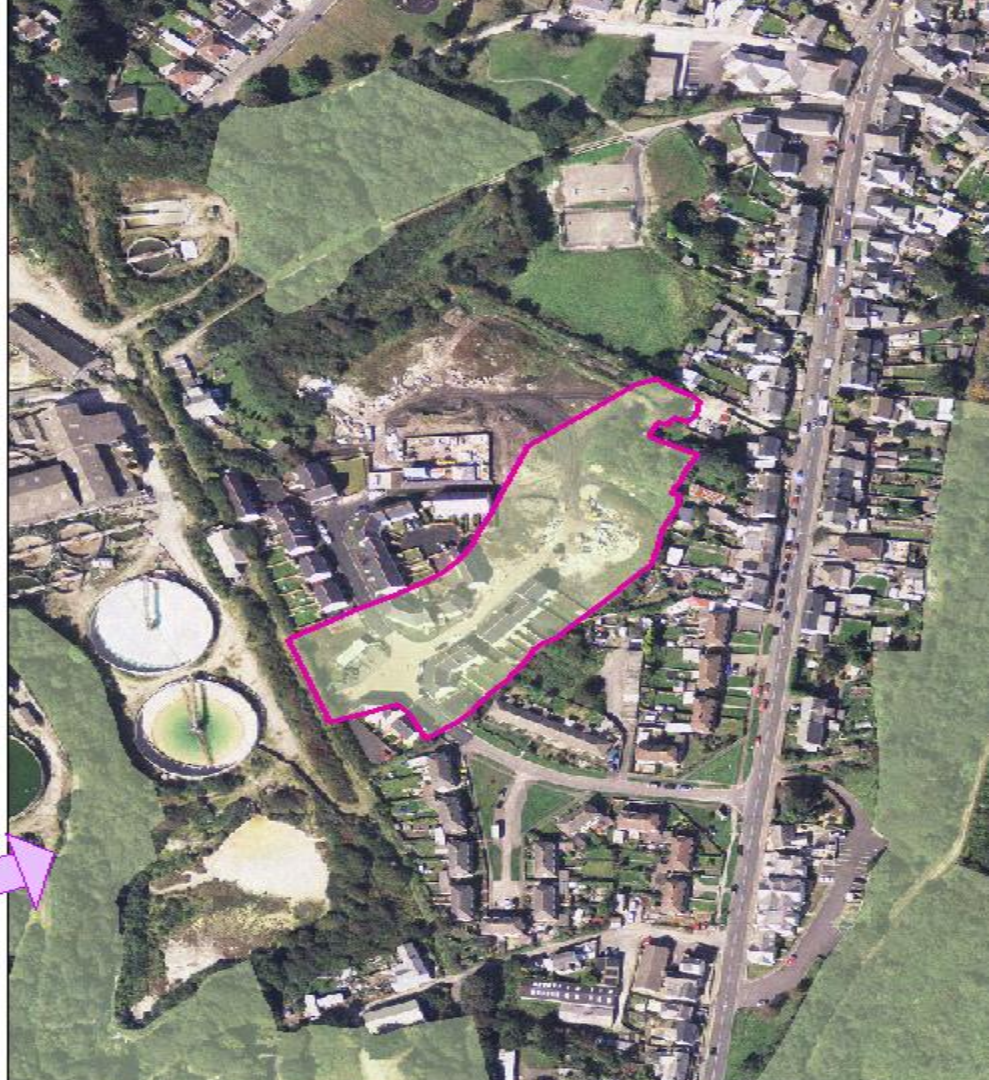
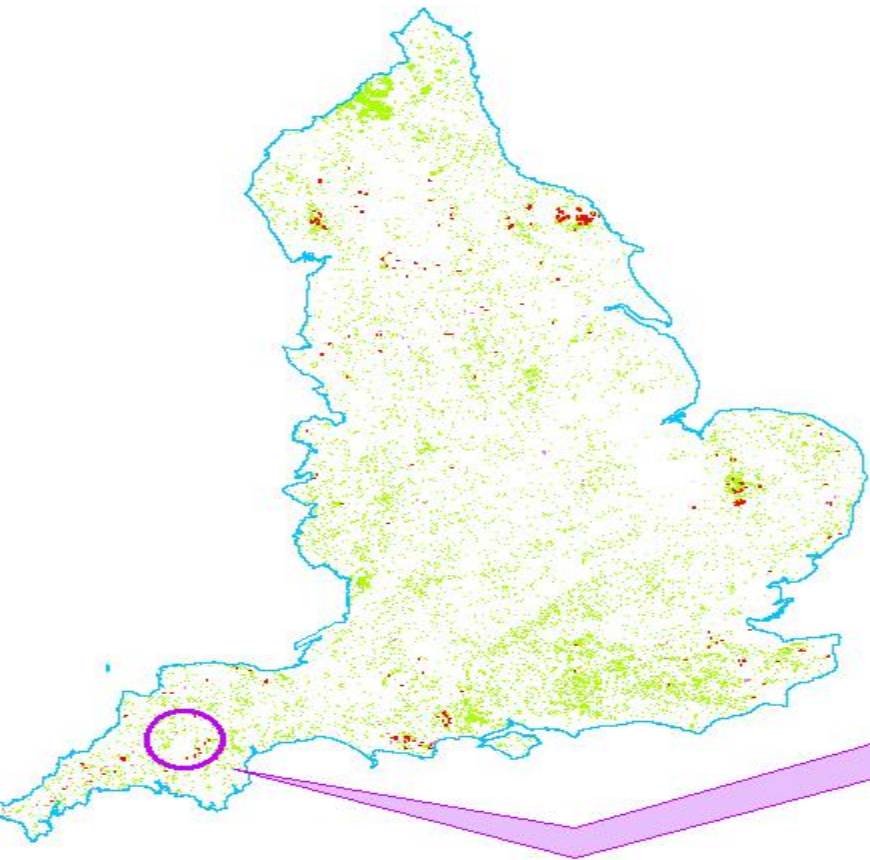


Legend

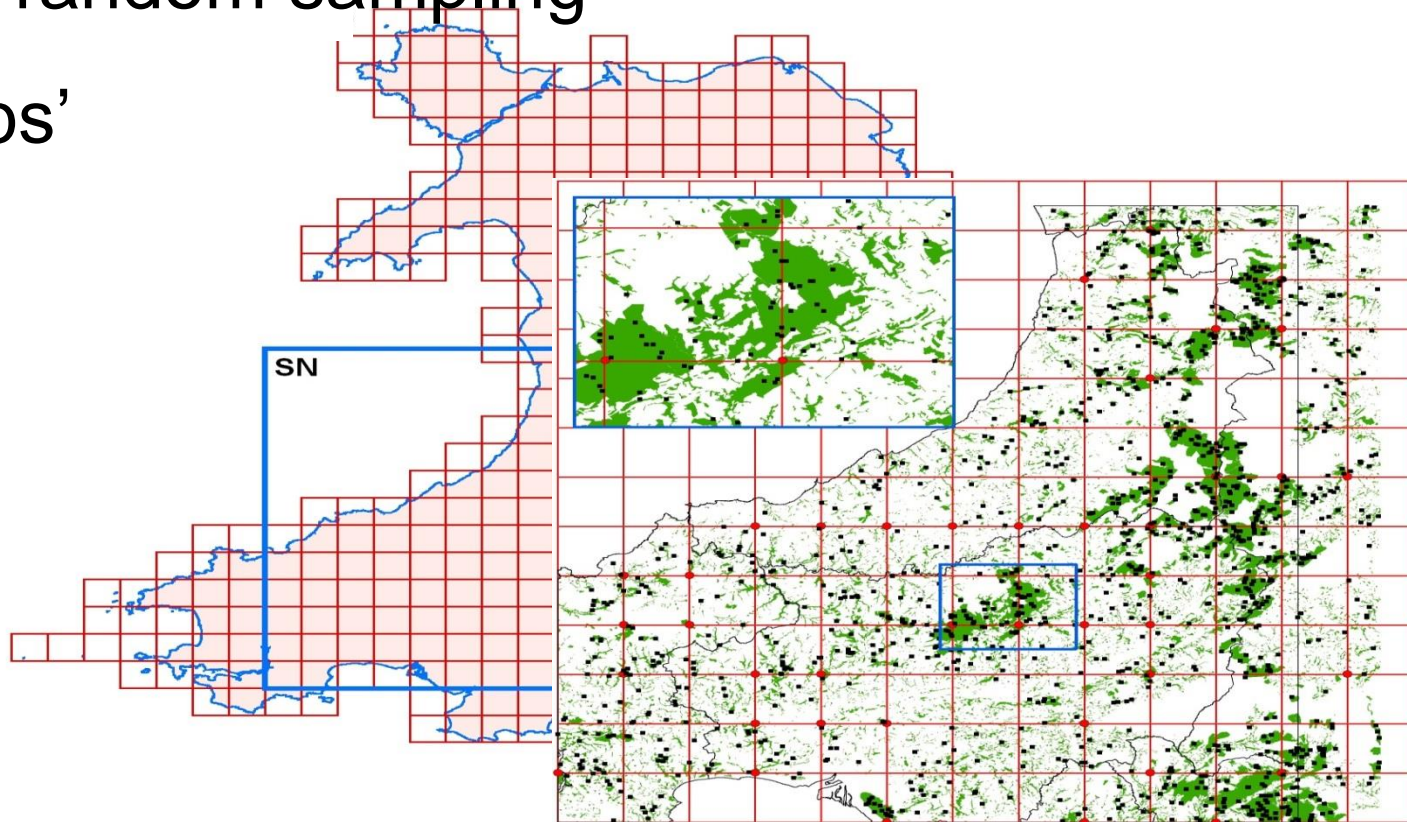
-  Remote Sensing 2006 - Felled
-  NFI England Map



RS clearfell Detection



- Systematic random sampling
- Plus 'top ups'



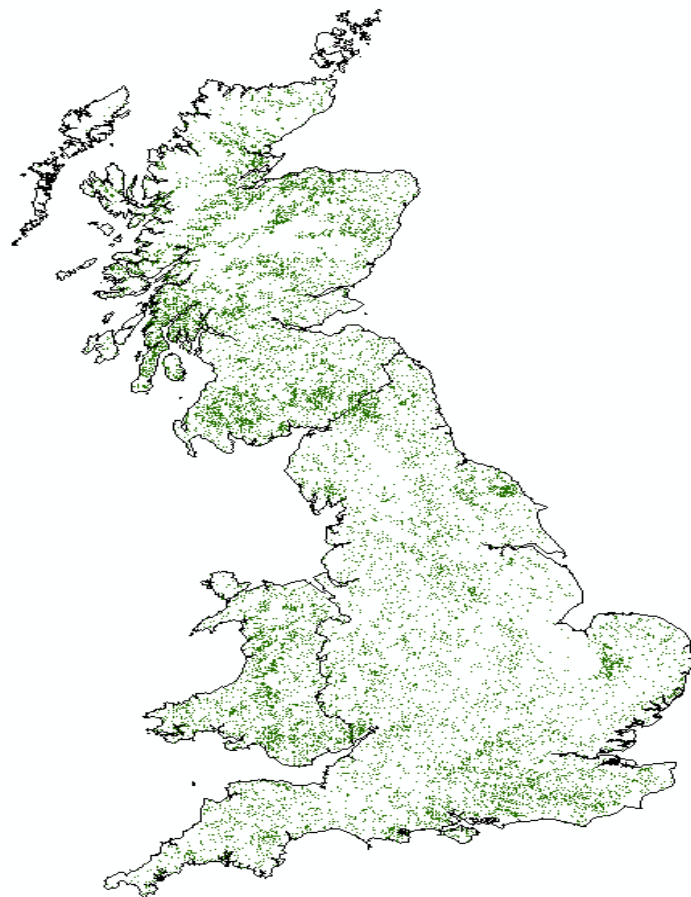
Fieldwork

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 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

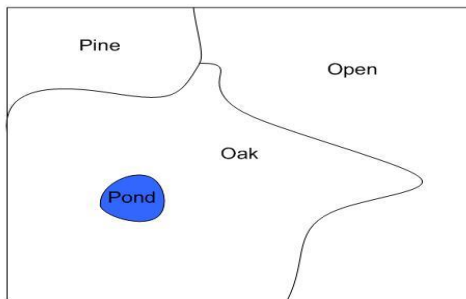
Dead wood

Invasive Species

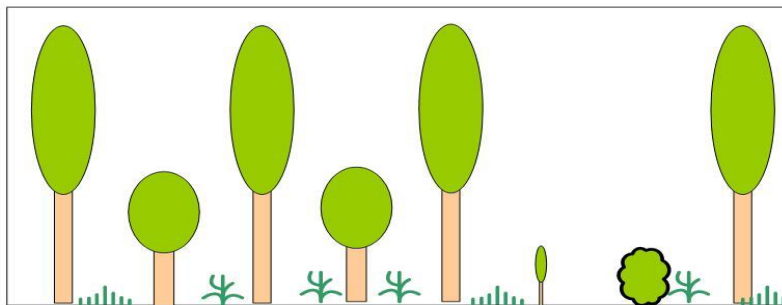


Quantifying Vertical and Horizontal Structure in Forests

Horizontal or Planar Structure
"looking down"

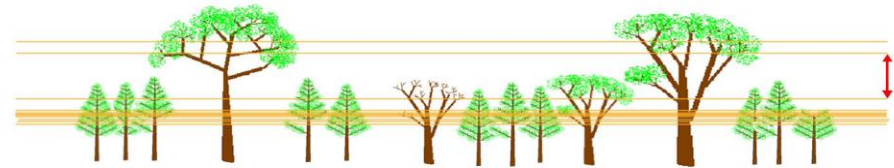
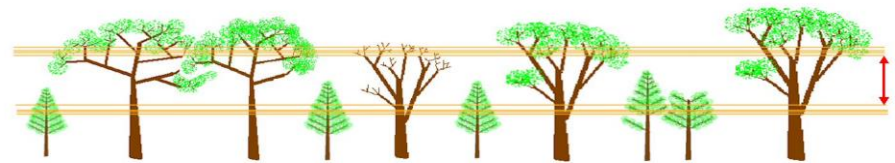
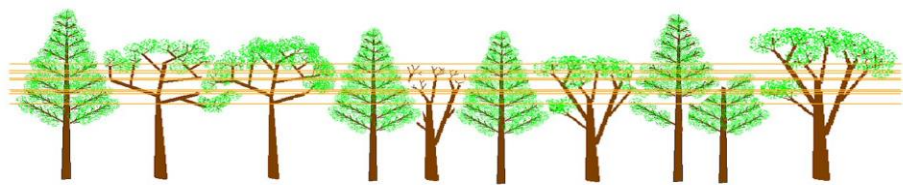


Vertical Structure
"looking within"



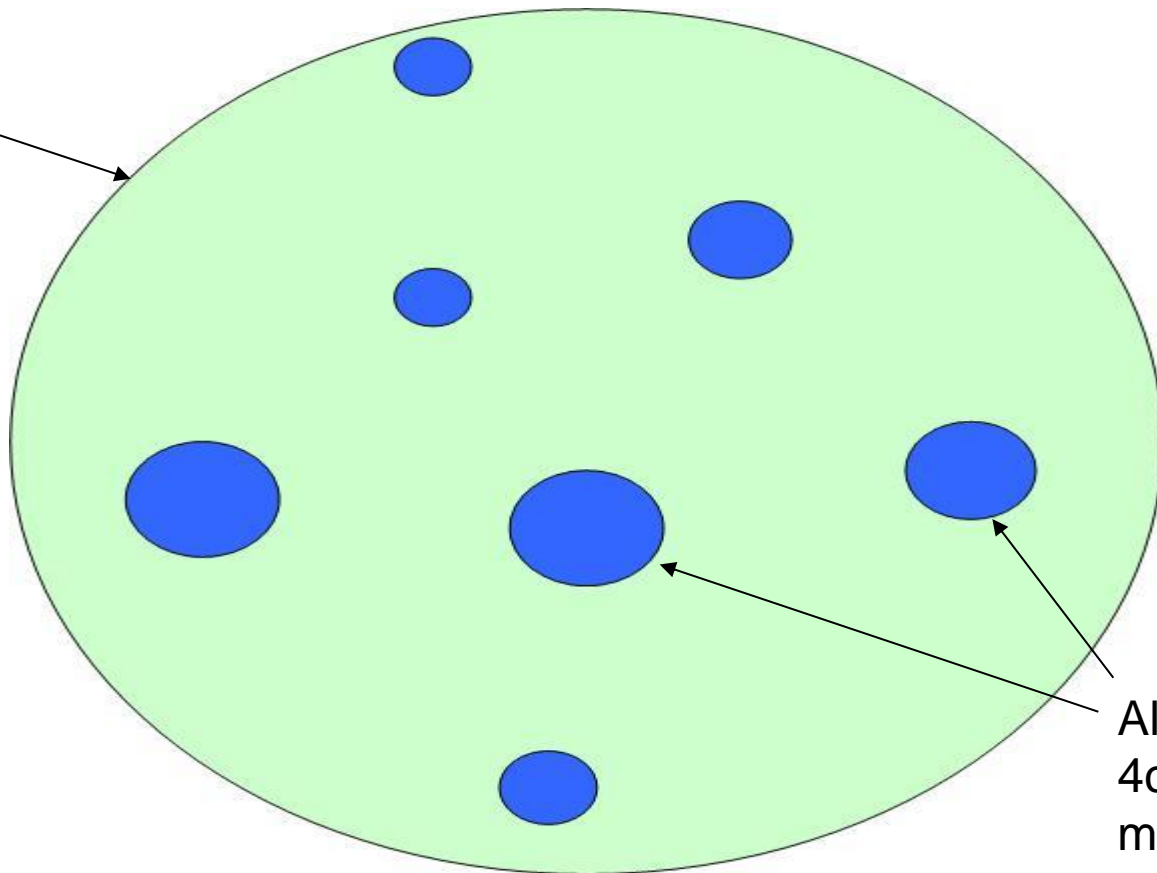






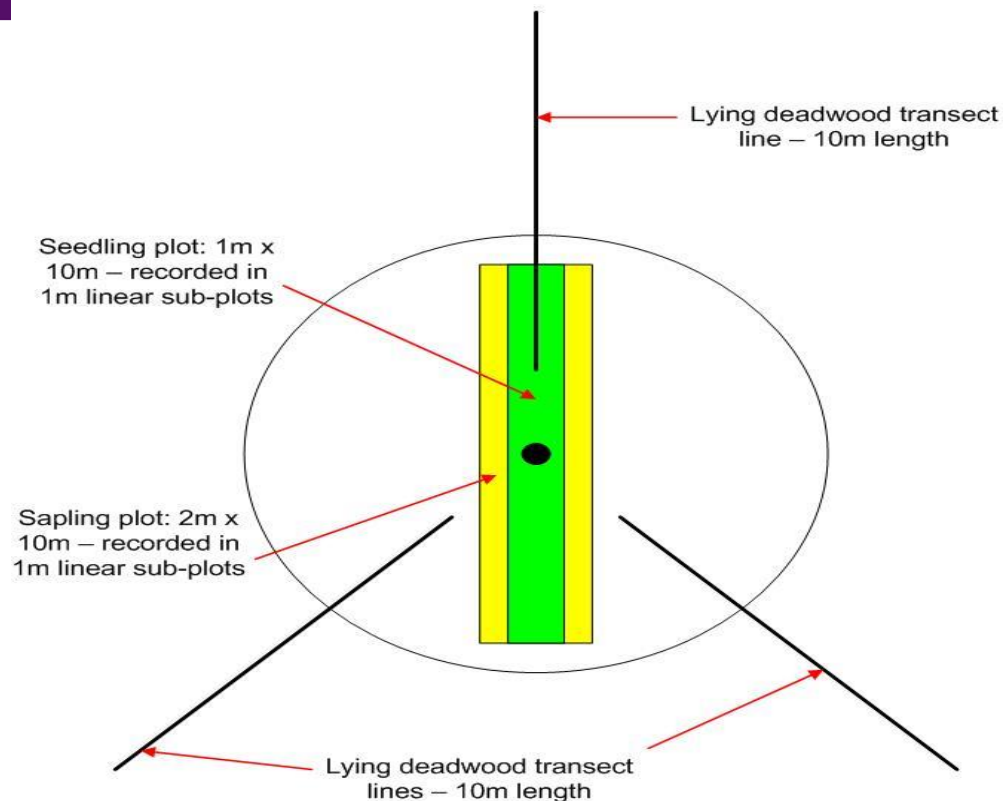
Sample plot with sample trees

5.64 m radius
sample plot



All trees above
4cm dbh
mapped and
measured

Seedling, sapling and dead wood transects within the sample plot



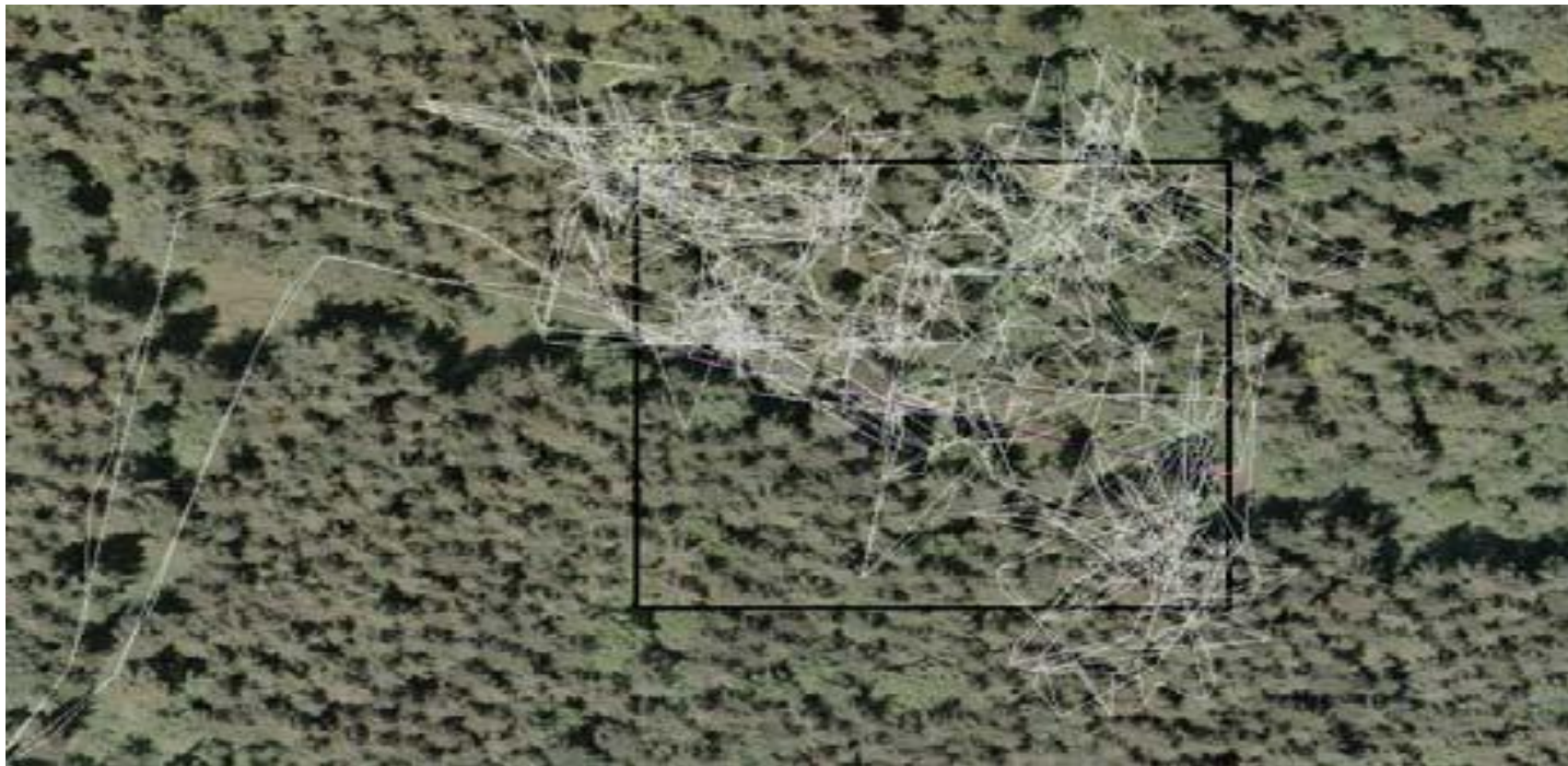
Seedling: any tree <50cm tall
Sapling: any tree \geq 50cm tall and < 4cm DBH

Lying Deadwood: Coarse Woody Debris \geq 7cm diameter where the transect line crosses it









FE:Lesley@Untitled - National forest inventory (Release 34)

File Edit View Insert Selection Tools Window Help

1:750


Forester

Forester Identify

Layer: Mensuration Points

- Section a
 - Circular Plot 1
 - Point 1
 - Photo
 - Trees
 - Normal, Upper, HL, 23
 - Normal, Upper, HL, 11
 - Dominant, Upper, 15.5 m, HL
 - Dead Normal, Upper, SP, 7
 - 2nd Sample Tree, Upper, 13.
 - Normal, Upper, HL, 13
 - Normal, Upper, HL, 19
 - Normal, Upper, HL, 13
 - Dead Normal, Upper, HL, 5
 - Normal, Upper, SP, 6
 - Normal, Upper, HL, 9
 - 3rd Sample Tree, Upper, 15.1
 - Normal, Upper, HL, 13
 - Dead Normal, Upper, SP, 6
 - Normal, Upper, HL, 19
 - Normal, Upper, HL, 9
 - Normal, Upper, HL, 8
 - Dead Normal, Upper, SP, 7
 - Ht: 20 cm, Dia.1: 22 cm, Dia.
 - Normal, Upper, HL, 9
 - Normal, Upper, HL, 21
 - Normal, Upper, HL, 19
 - Ht: 15 cm, Dia.1: 10 cm, Dia.
 - Dead Normal, Upper, SP, 4
 - Normal, Upper, HL, 19
 - Canopy Occupancy
 - Circular Plot 2
 - Point 1
 - Photo
 - Trees
 - Normal, Upper, HL, 20
 - Normal, Upper, BI, 6
 - Normal, Upper, MB, 6
 - Dead Normal, Upper, HL, 8
 - Normal, Upper, BI, 7
 - Normal Inner HI, 7

Field Name	Value
Location	
Type	Tree
Tree Type	Normal
Species	Hybrid larch
DBH(cm)	19
Tree Alive?	Yes
Storey	Upper
Con. Straightness	1
Lwst. Dead Branch Ht.	
Component Group	1
Excessive Lean	No
Windsnapped	No



Display Source Selection

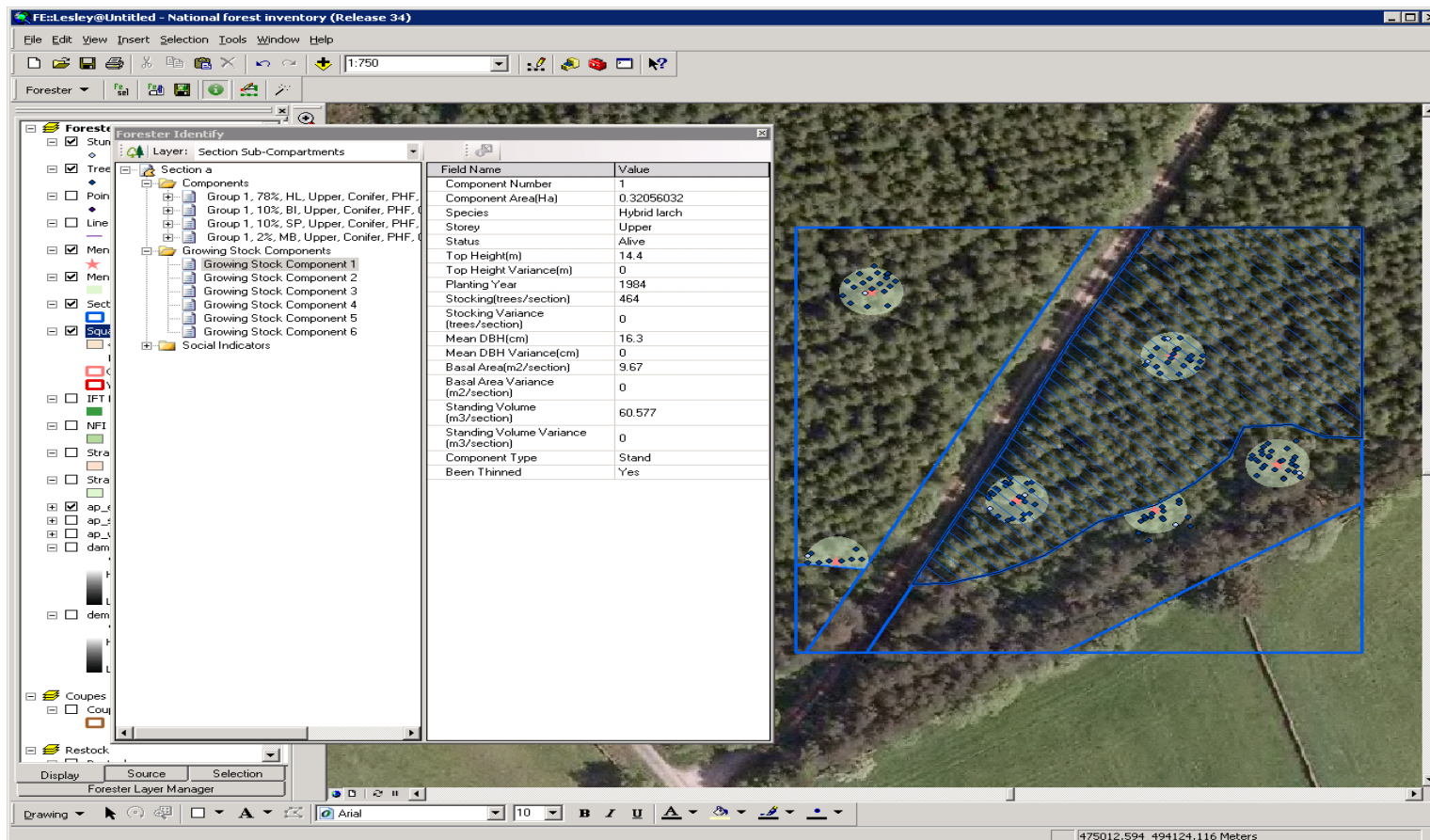
Forester Layer Manager

Drawing

10

Arial

475024.302 494110.623 Meters



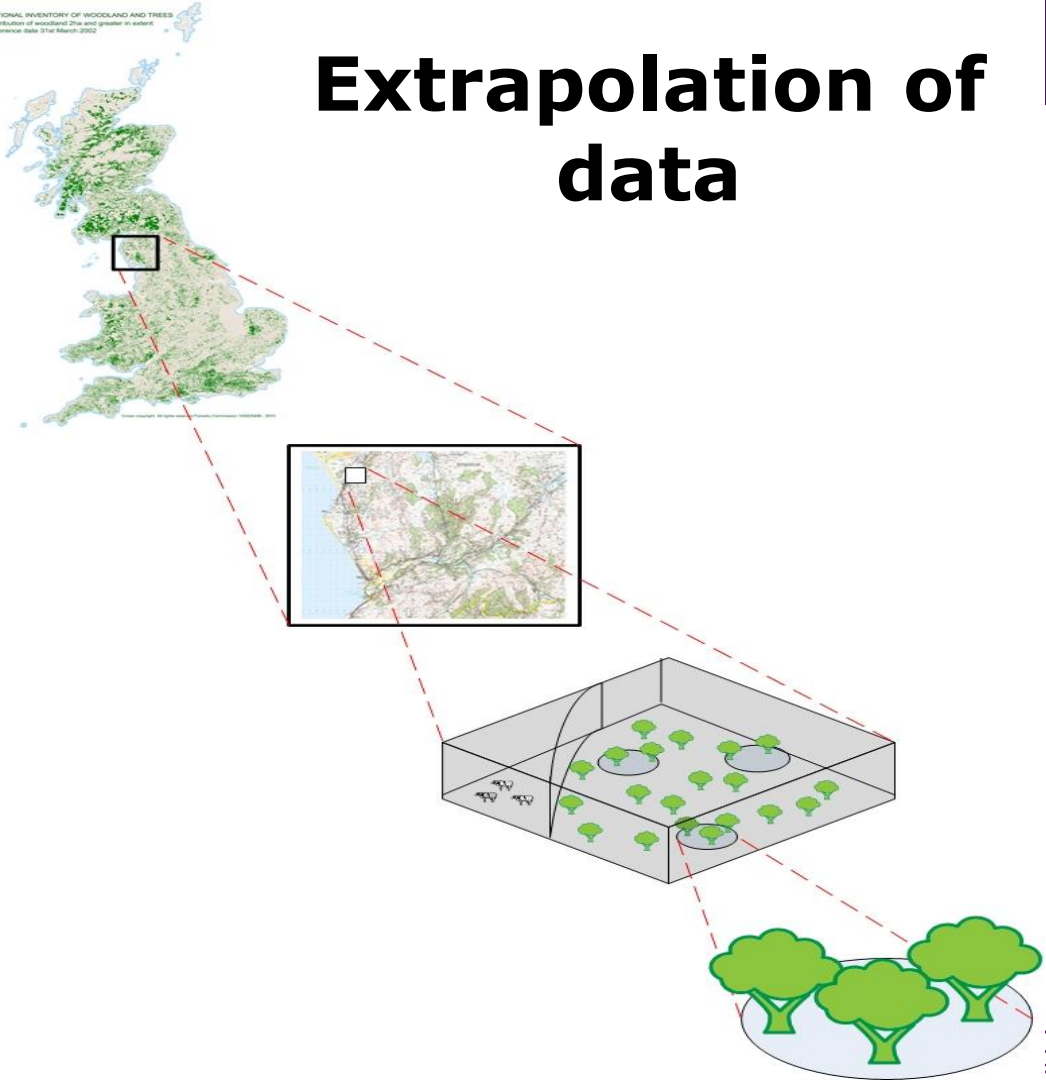
The screenshot shows a GIS application window titled "FE:Lesley@Untitled - National forest inventory (Release 34)". The interface includes a menu bar (File, Edit, View, Insert, Selection, Tools, Window, Help), a toolbar, and a "Forester" dropdown menu. A "Forester Identify" window is open, displaying a tree layer with various components and a data table for a selected section.

Forester Identify - Section a

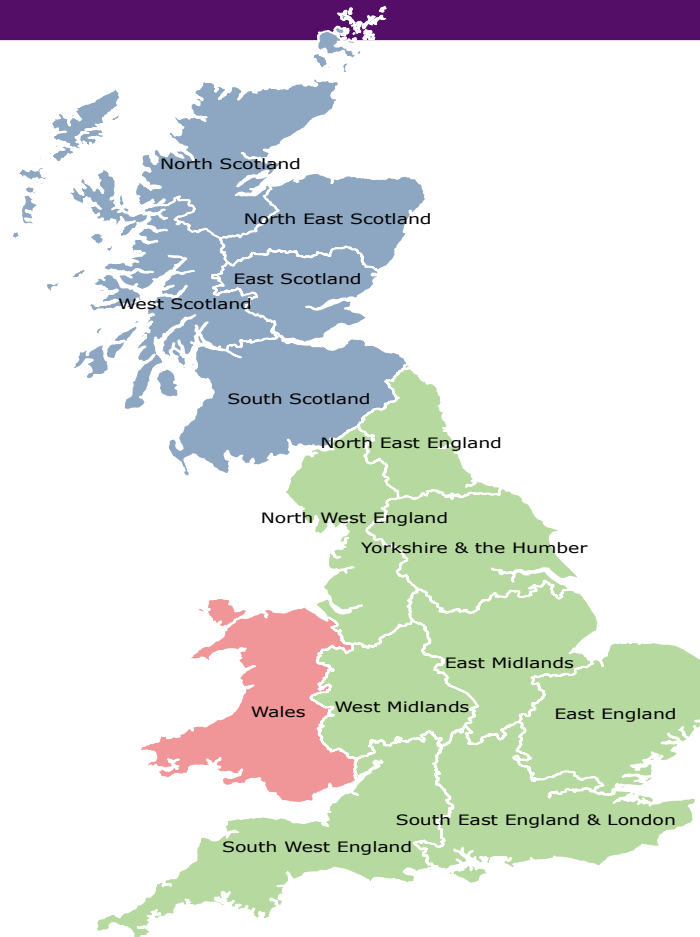
Field Name	Value
Component Number	1
Component Area(Ha)	0.32056032
Species	Hybrid larch
Storey	Upper
Status	Alive
Top Height(m)	14.4
Top Height Variance(m)	0
Planting Year	1984
Stocking(trees/section)	464
Stocking Variance (trees/section)	0
Mean DBH(cm)	16.3
Mean DBH Variance(cm)	0
Basal Area(m2/section)	9.67
Basal Area Variance (m2/section)	0
Standing Volume (m3/section)	60.577
Standing Volume Variance (m3/section)	0
Component Type	Stand
Been Thinned	Yes

The main map area shows an aerial view of a forest with a blue polygon highlighting a specific section. Several circular plots are visible within the section, each containing a small cluster of trees. The status bar at the bottom right indicates the coordinates "475012.594 494124.116 Meters".

Extrapolation of data

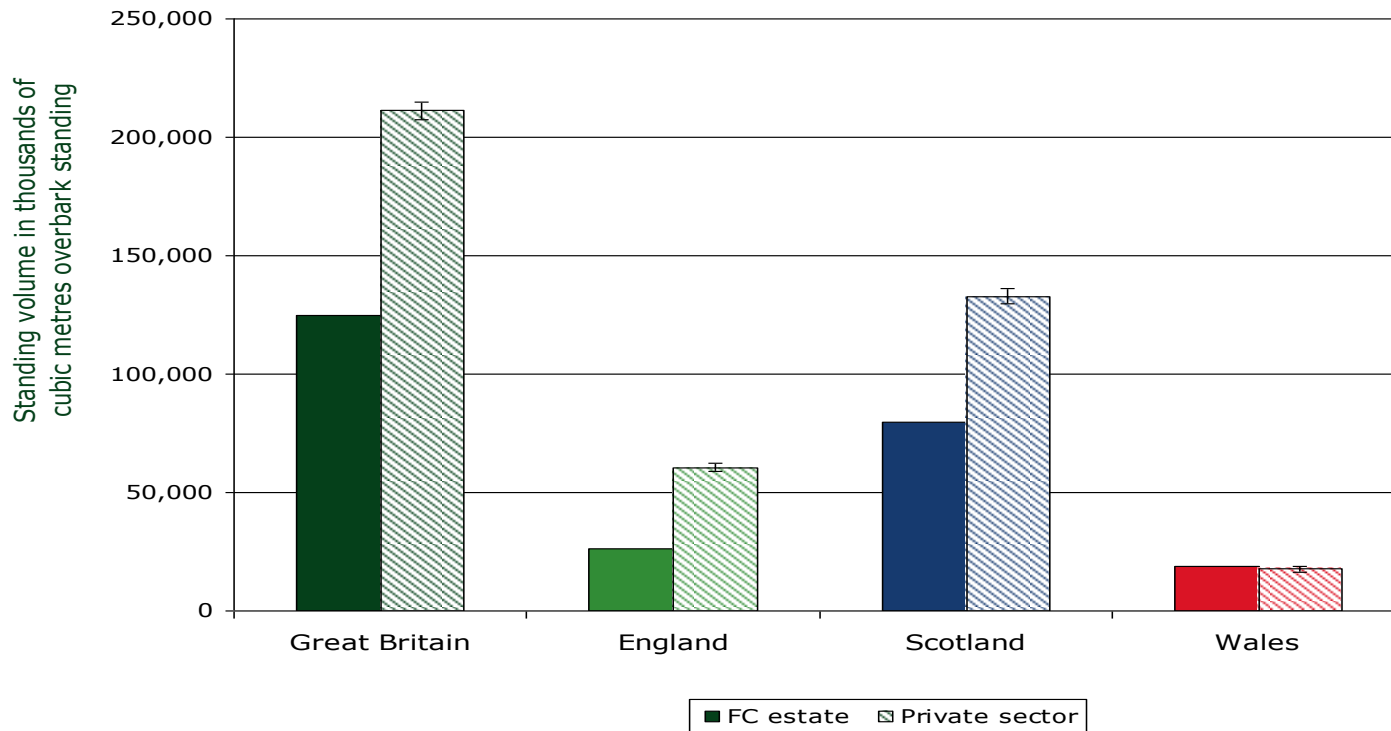


NFI Regions

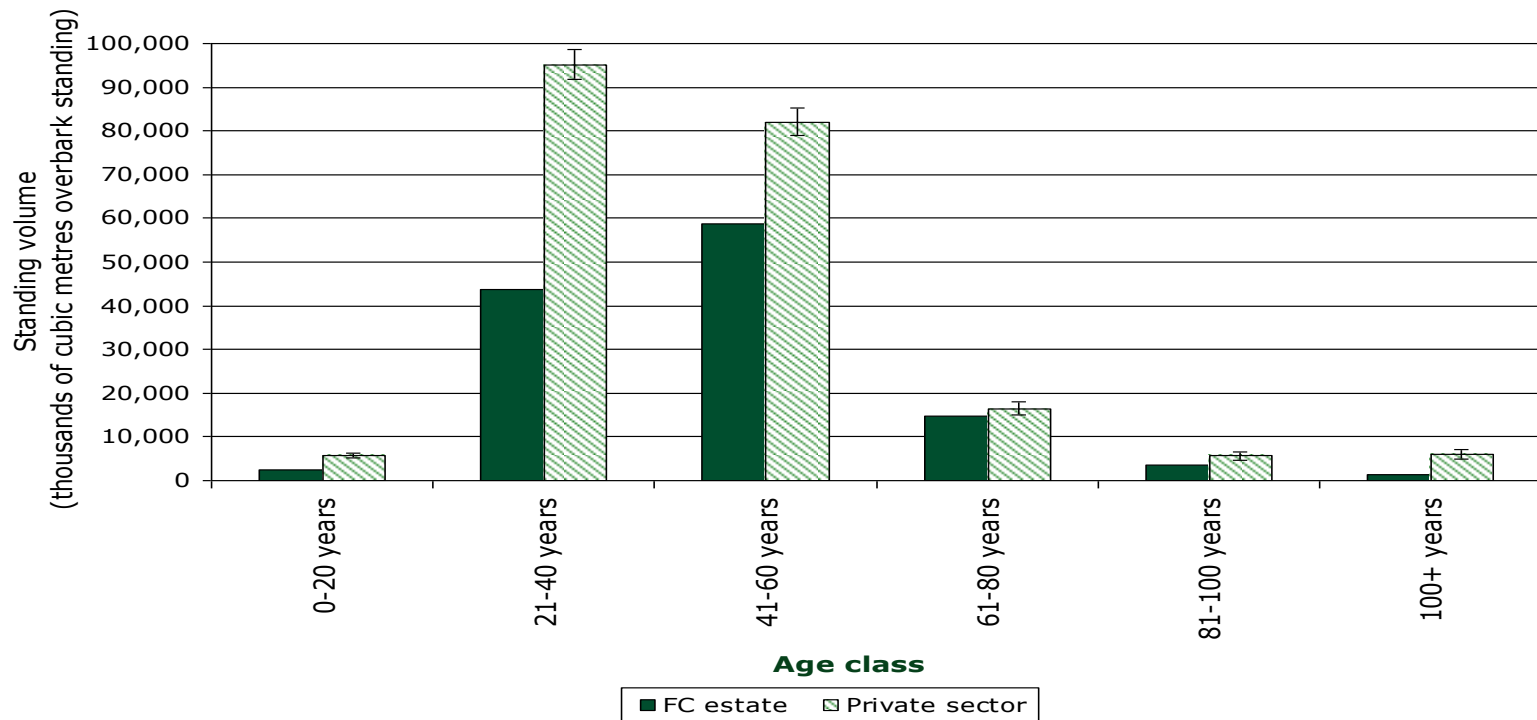


Conifer species distributions in stocked area

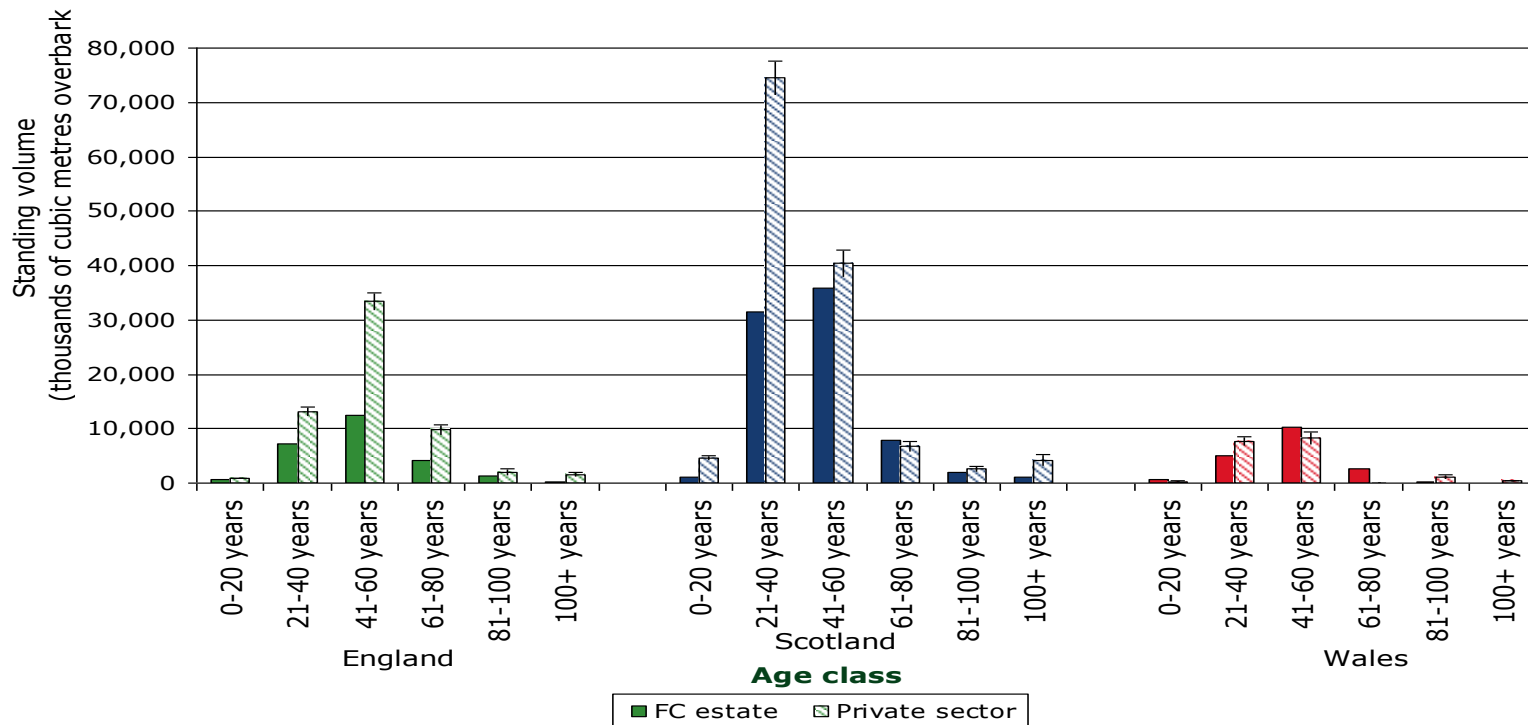
Principal species	FC	Private sector		Total
	area (000 ha)	area (000 ha)	SE%	area (000 ha)
England				
All conifers	127.5	191.2	2	318.7
Sitka spruce	47.8	33.3	7	81.1
Scots pine	16.6	48.0	5	64.6
Corsican pine	27.1	15.8	11	43.0
Norway spruce	6.9	22.2	8	29.1
Larches	10.1	34.1	5	44.2
Douglas fir	9.8	15.8	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



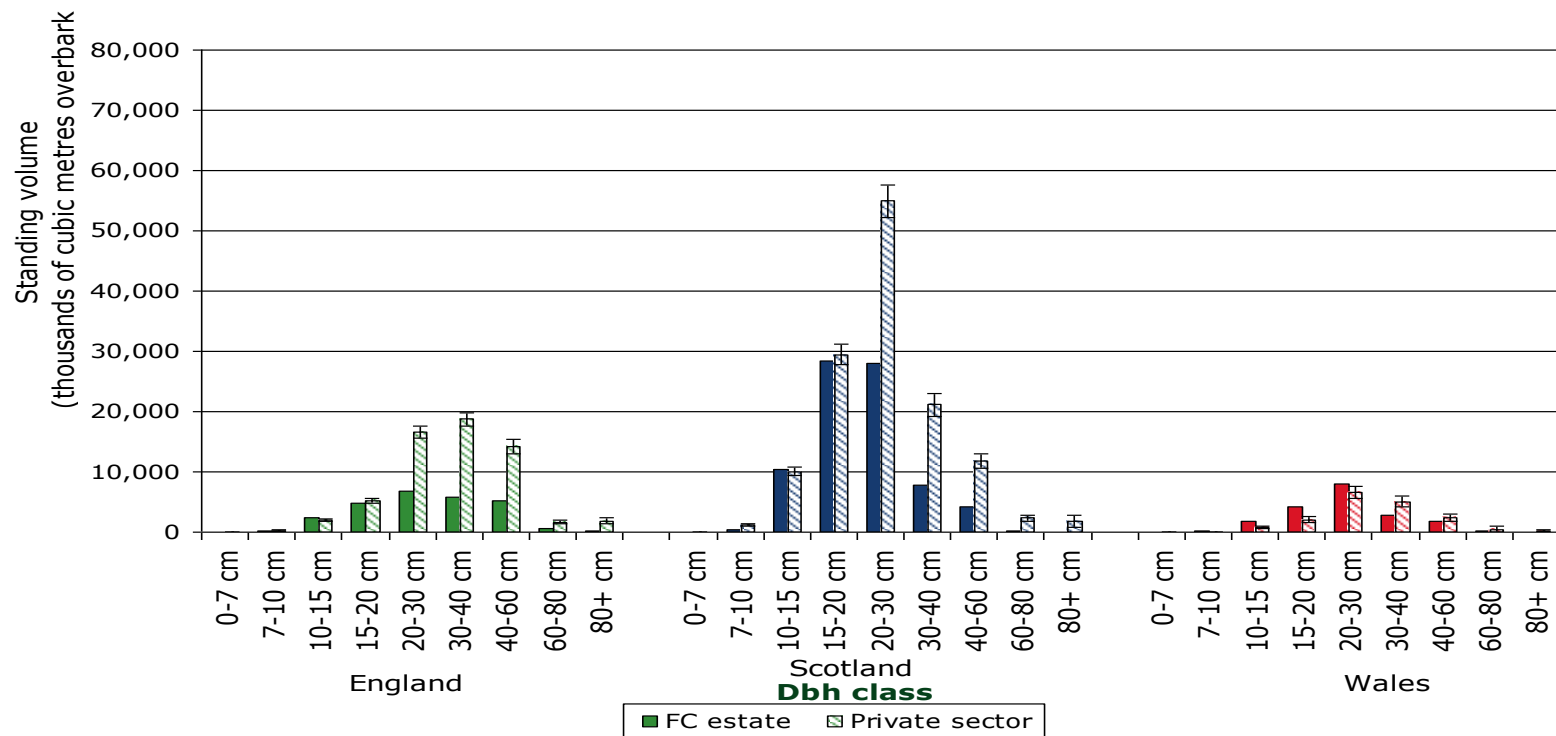
GB 2012 Standing Coniferous by age class

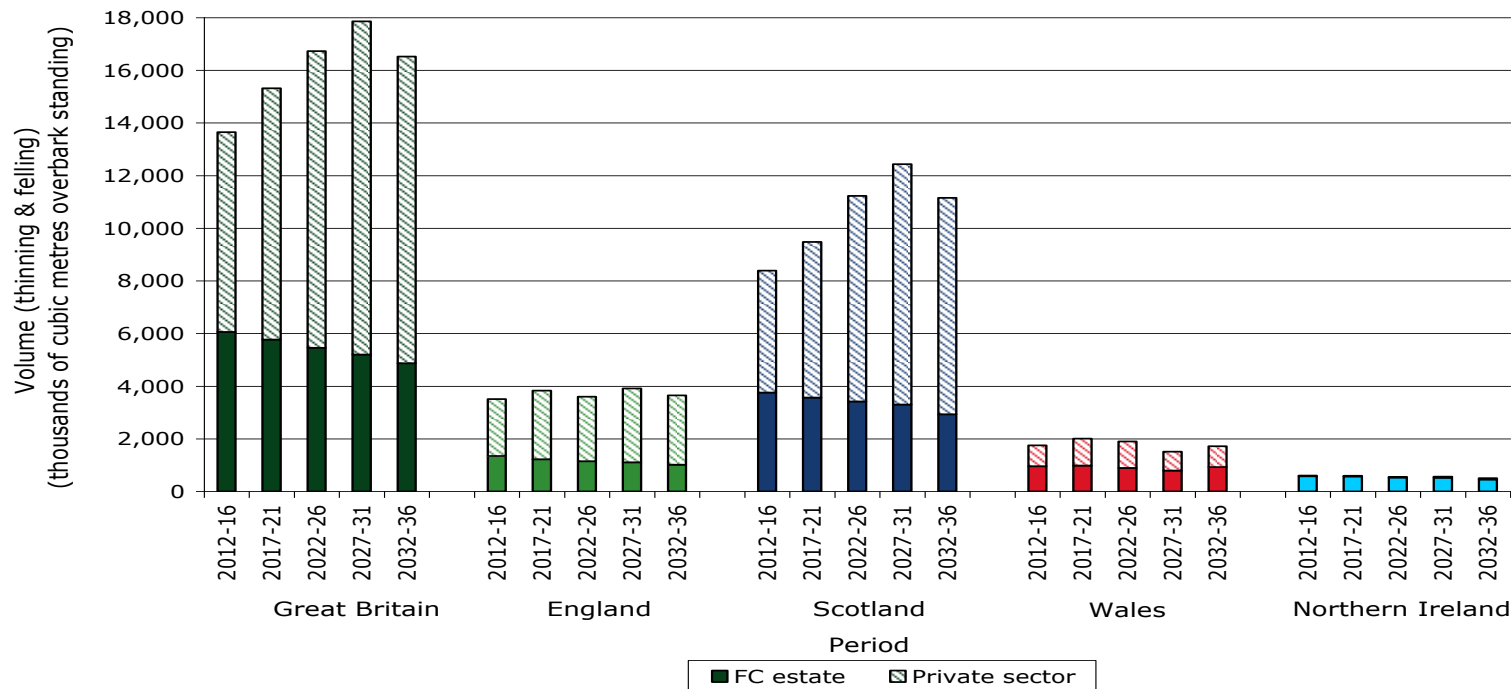


GB 2011 Standing Coniferous by age class

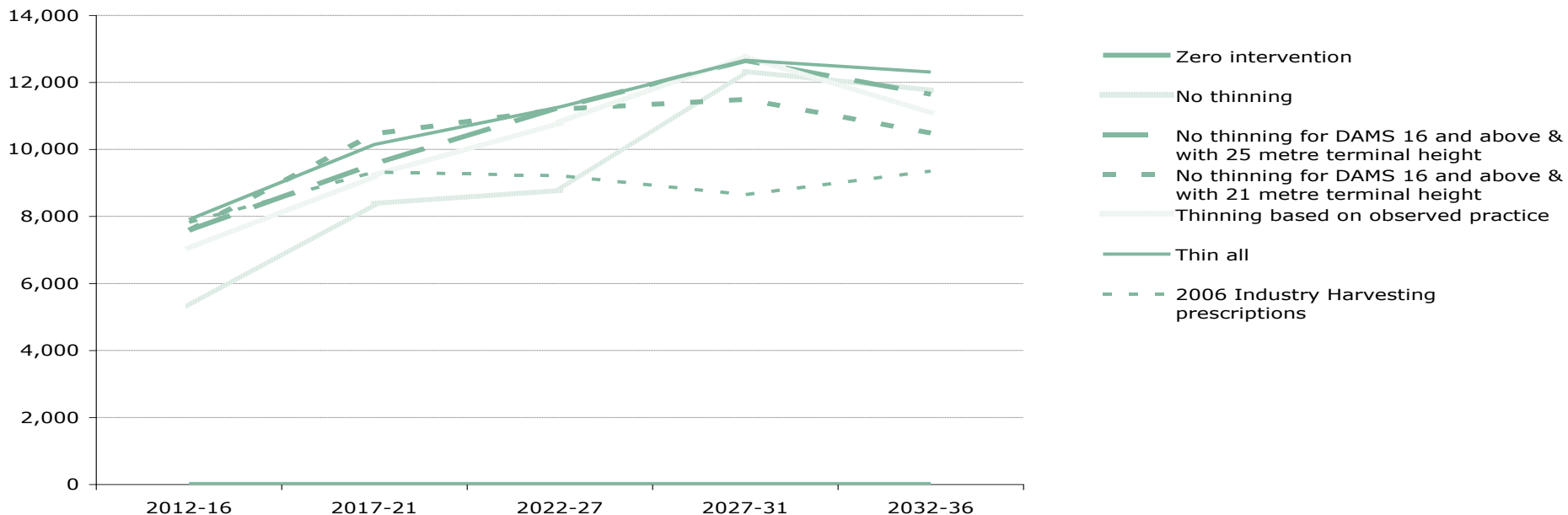


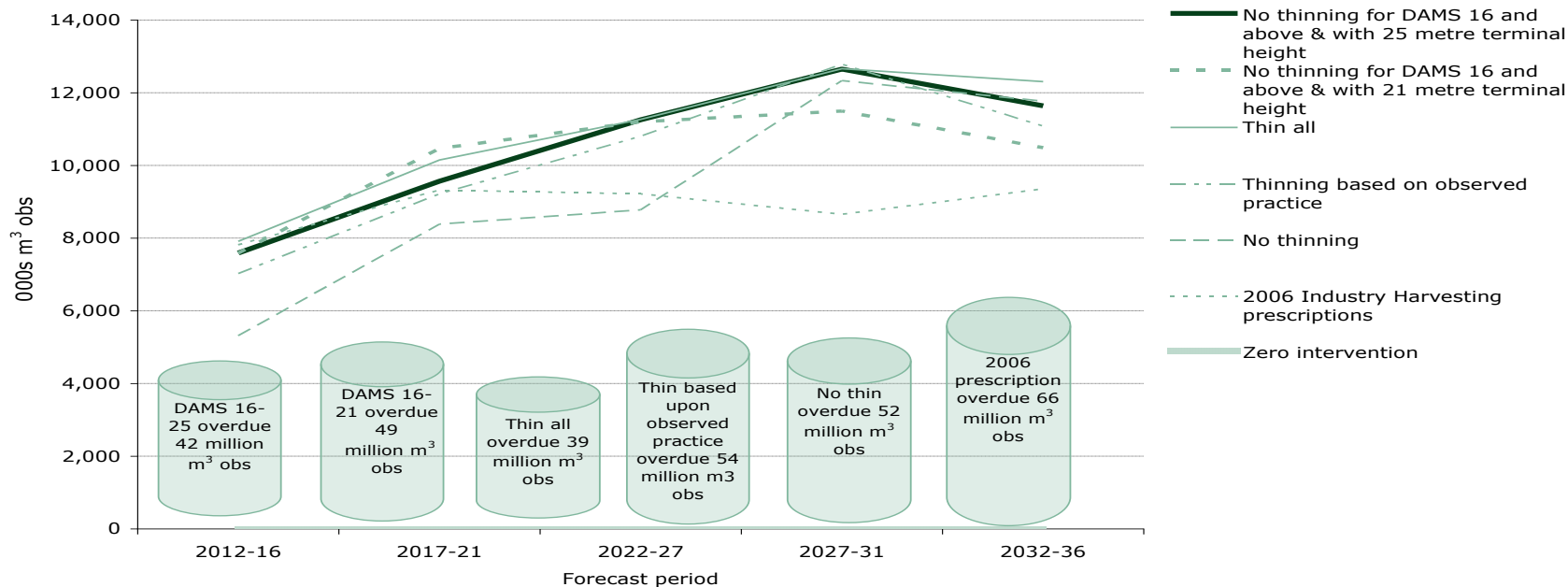
GB 2012 Standing Coniferous by dbh class



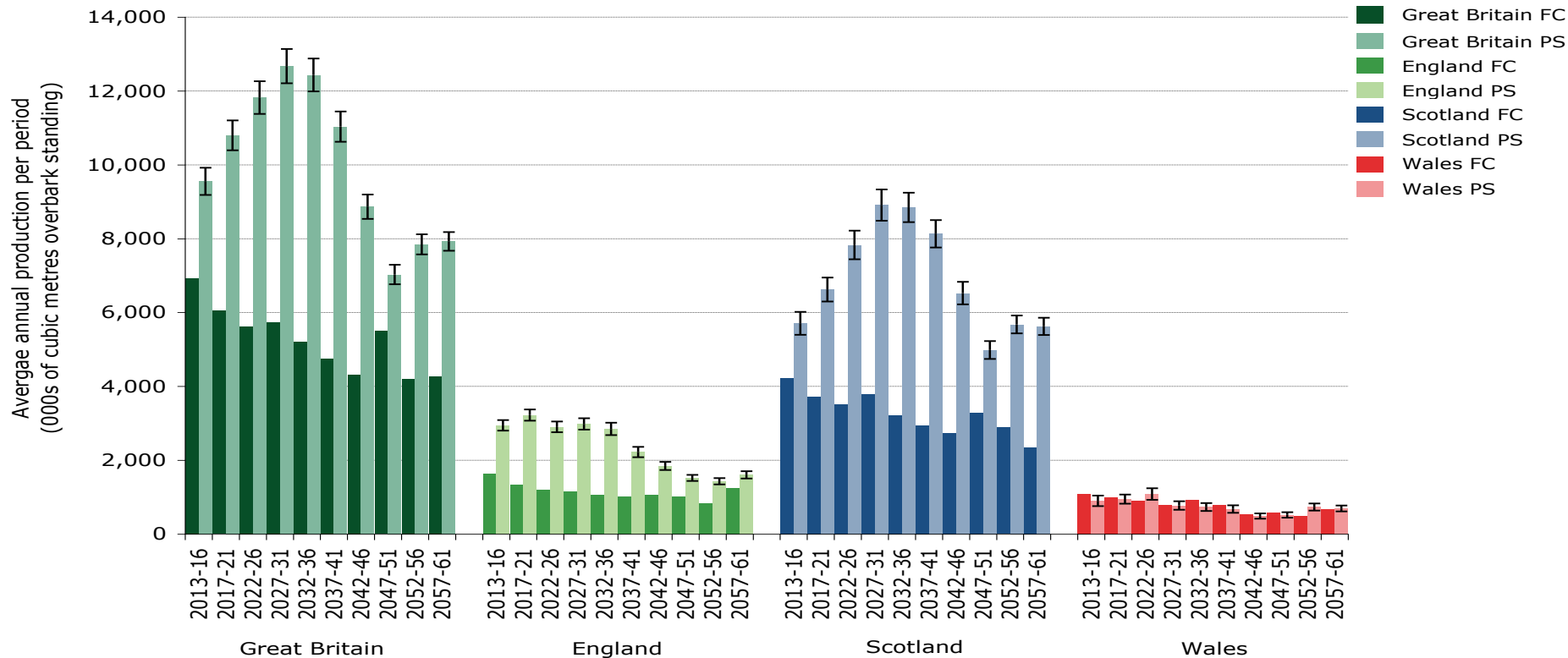


Private sector conifer harvesting scenarios



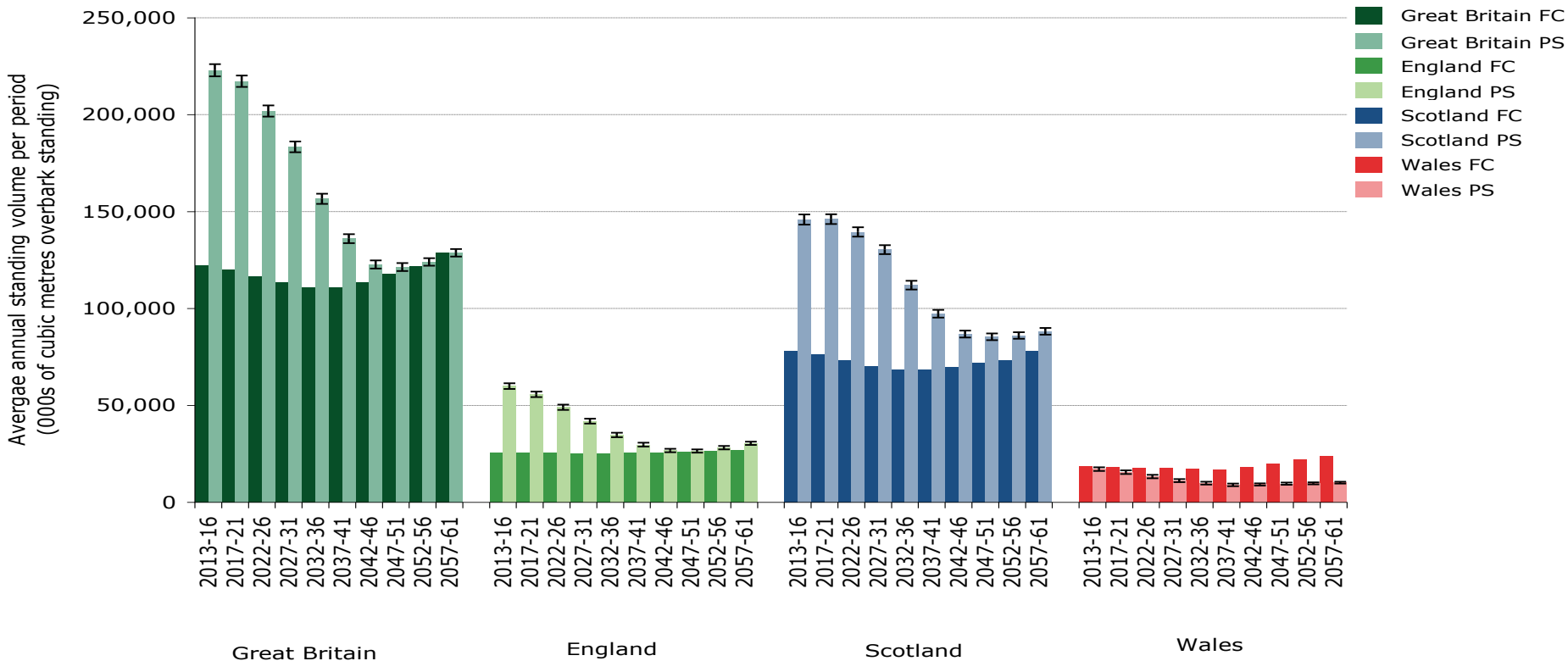


50-year forecast of softwood production (thinning plus felling)



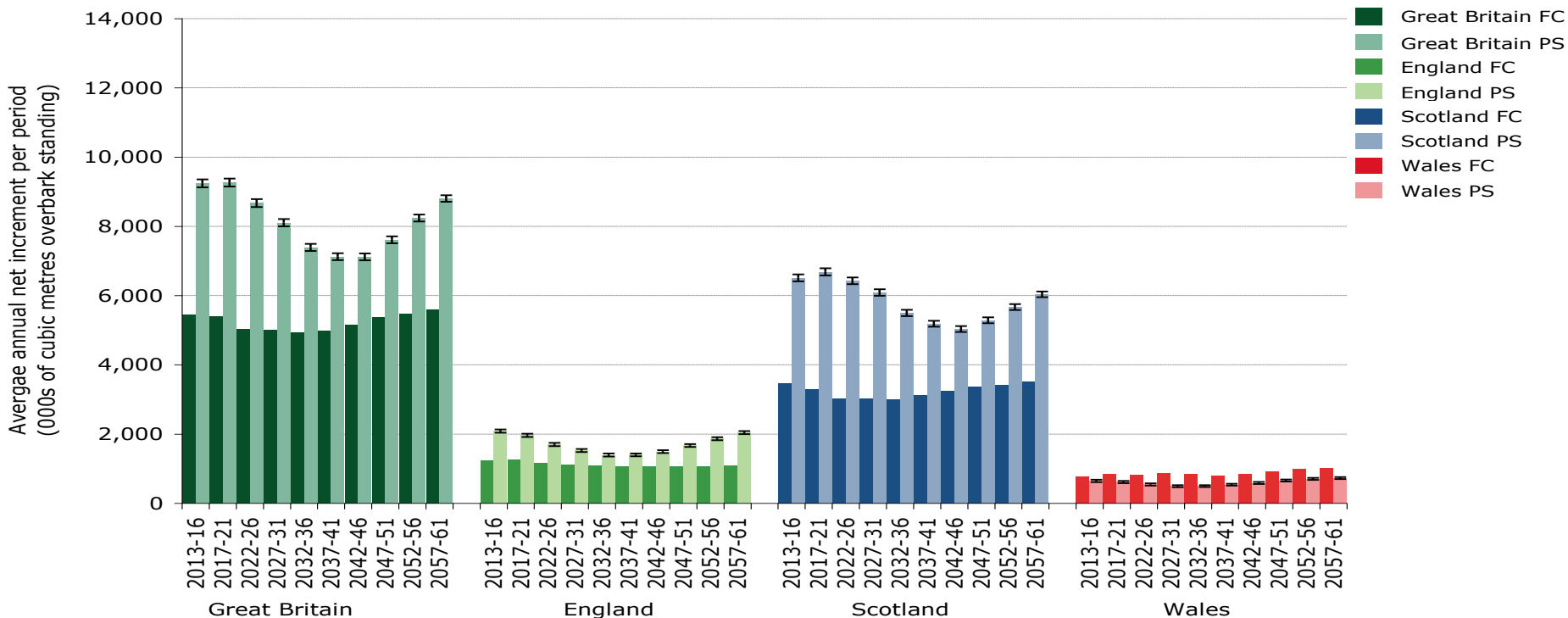
50 years of standing volume

50-year forecast of softwood standing volume

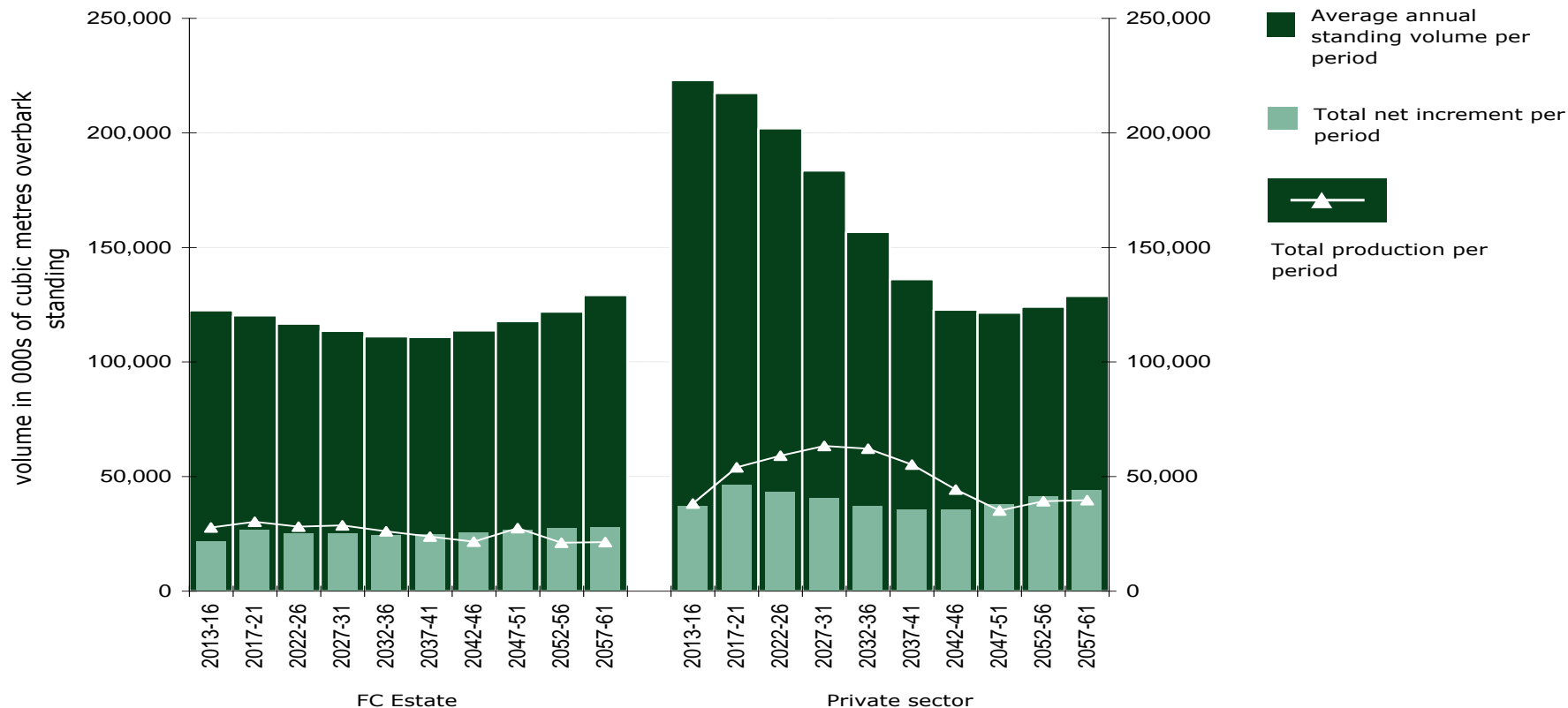


50 yr. increment forecast

50-year forecast of softwood net increment

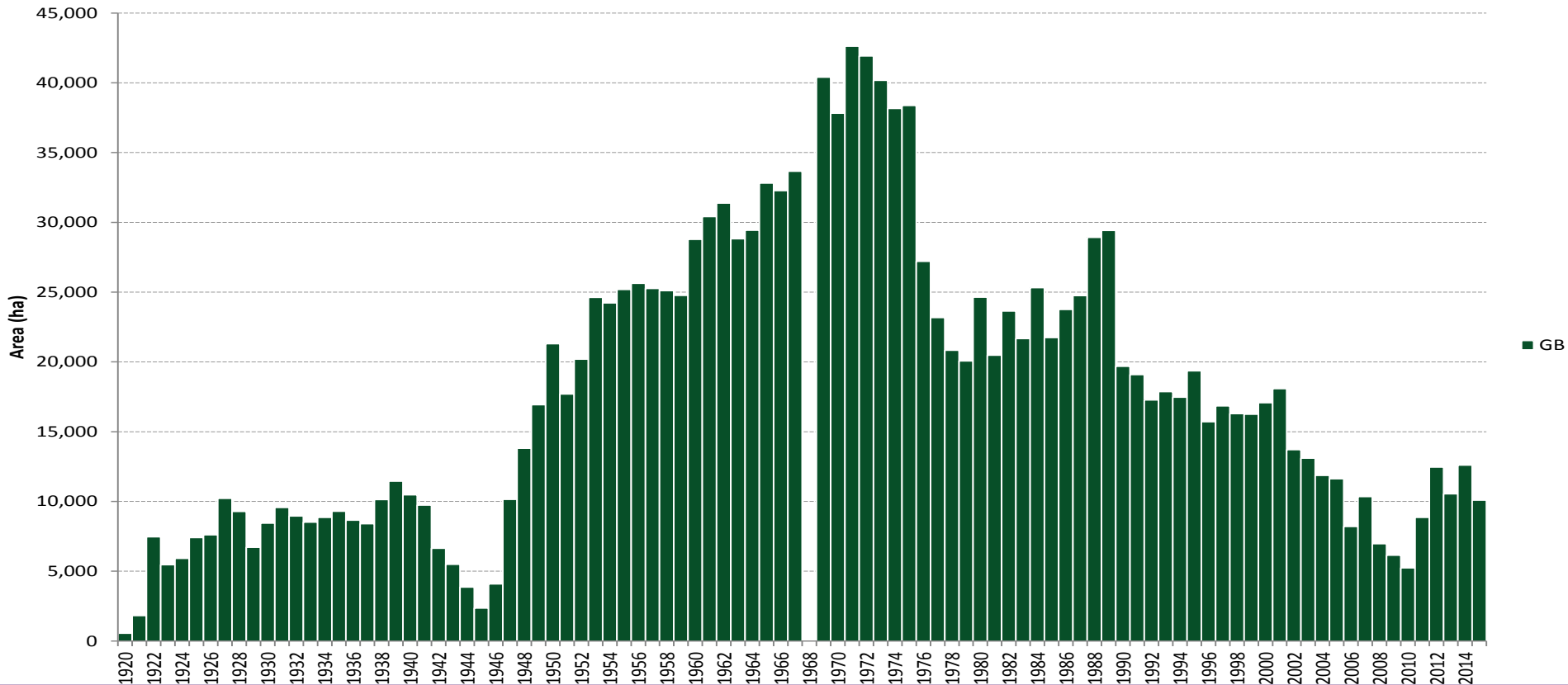


50-year summary of softwood standing volume, increment and production for GB (FC and PS)

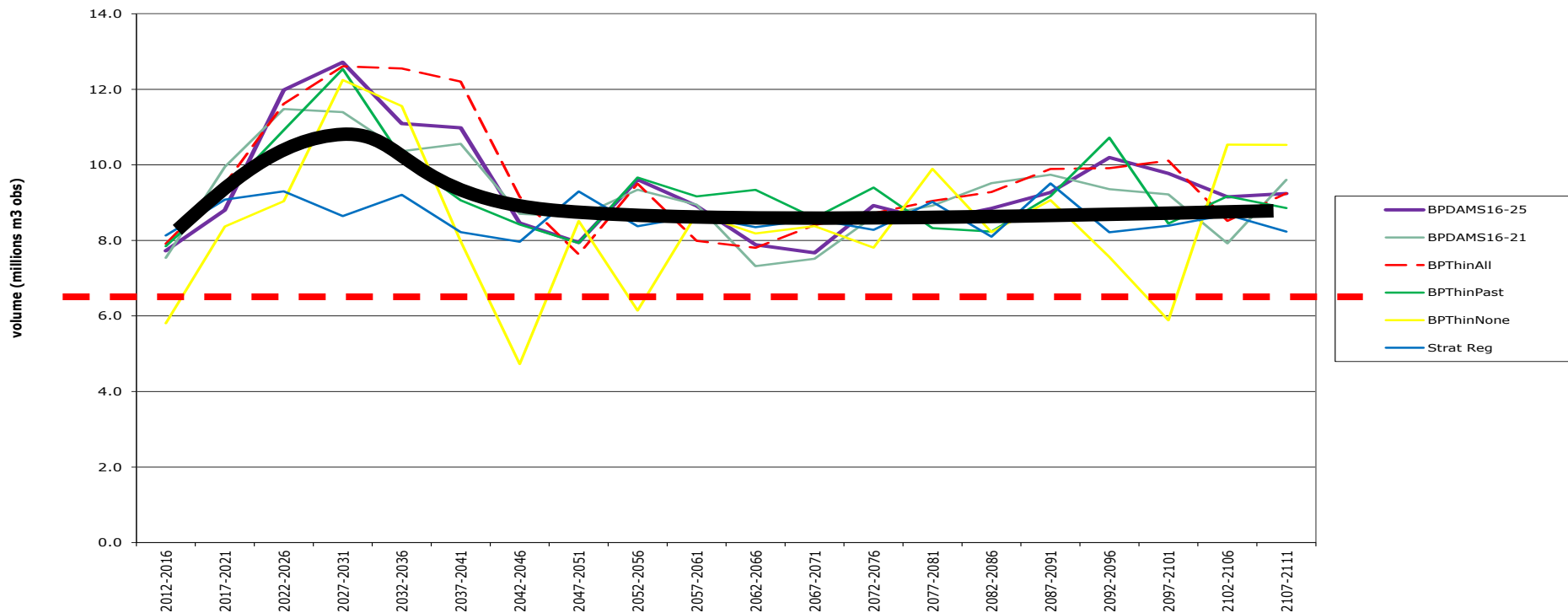


- Why does this uneven profile of availability occur?
- History or creating a new plantation resource

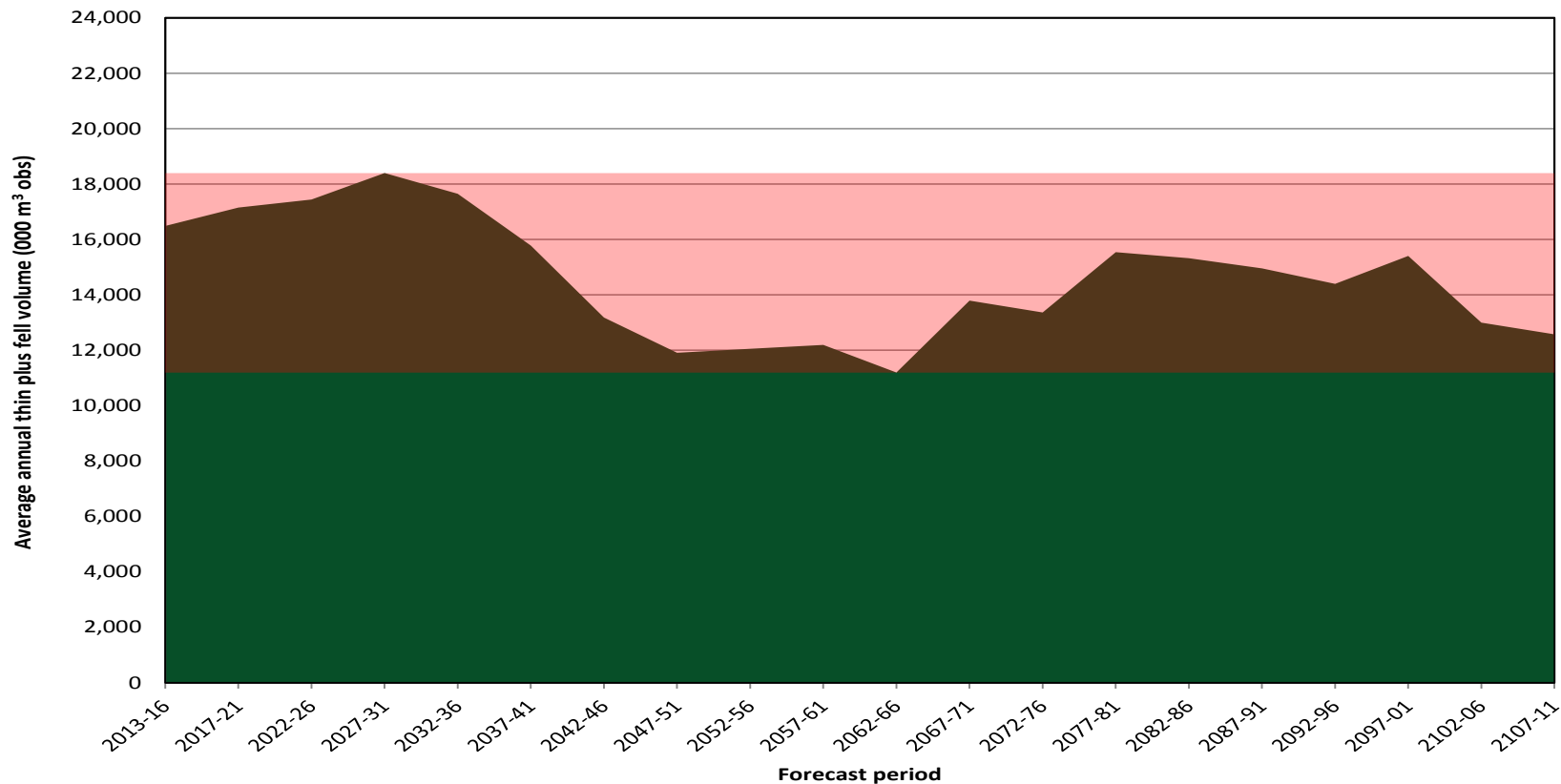
Area of new planting GB 1920-2015 (FC & non-FC, grant aided & non-grant aided)

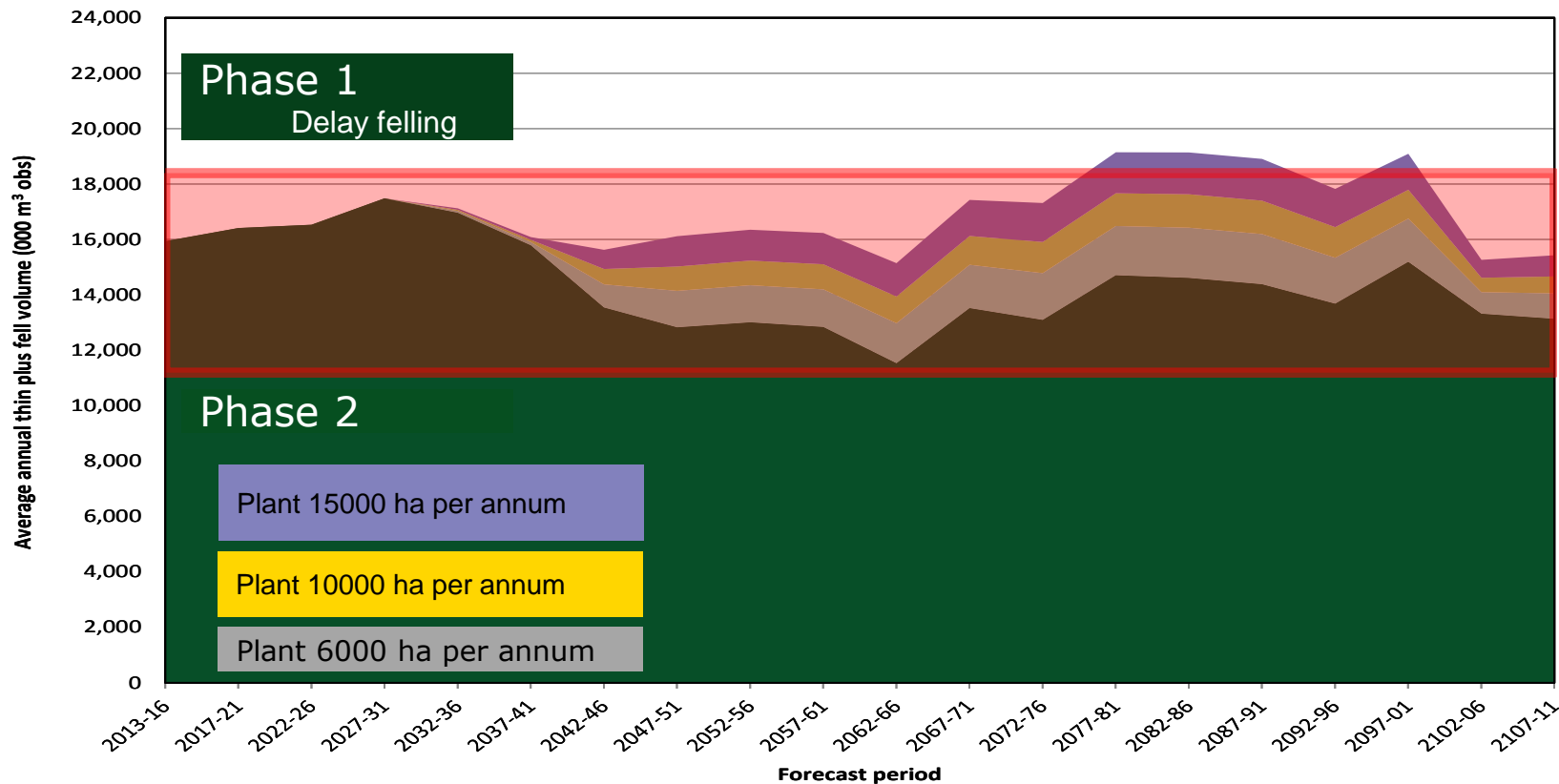


Great Britain - PS 100 year forecast of average annual production (all conifers)
under differing harvesting assumptions with like-for-like restocking



- 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?



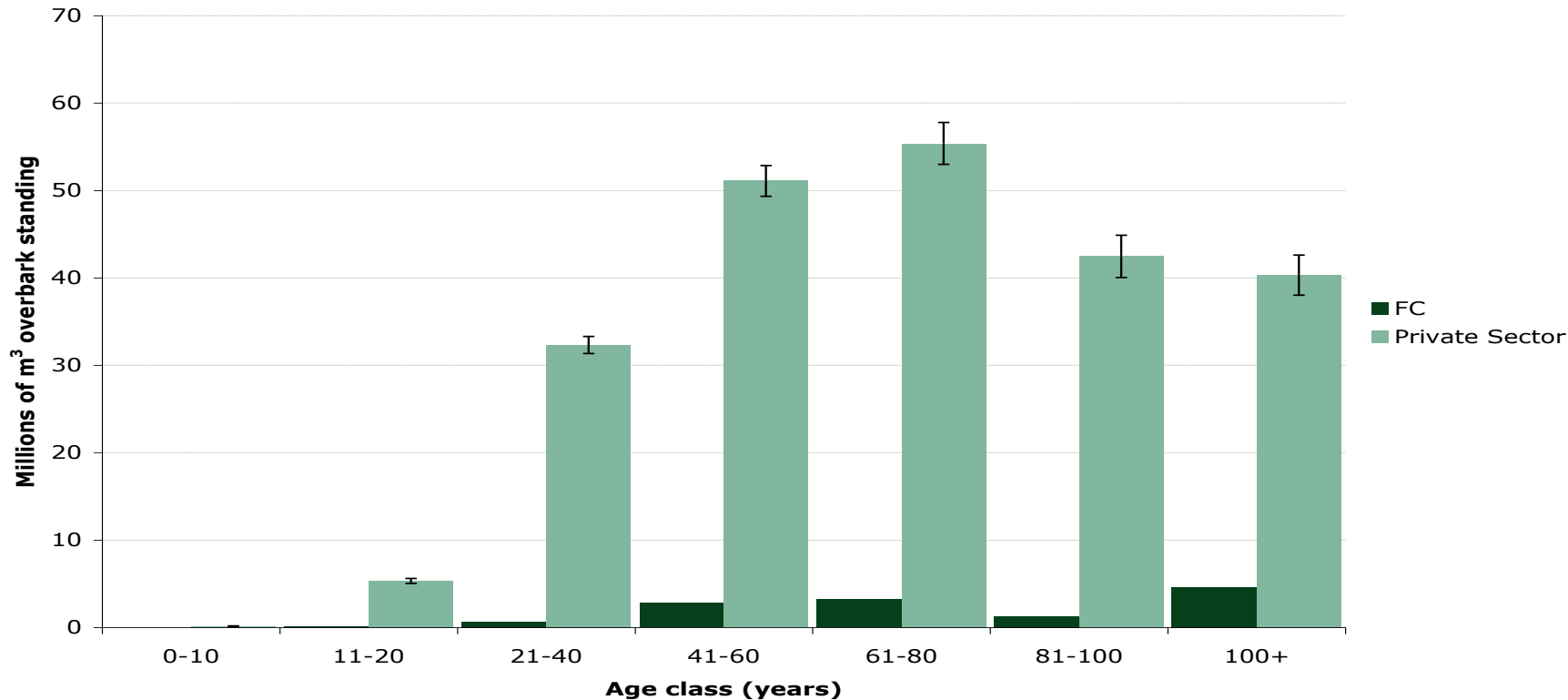


GB Landuse	Current % landuse share 2015	% Share by 2045		
		Share under 6,000 ha	Share under 10,000 ha	Share under 15,000 ha
Rural & open	78.5	77.7	77.2	76.6
Urban	8.2	8.2	8.2	8.2
Woodland	13.3	14.1	14.6	15.3

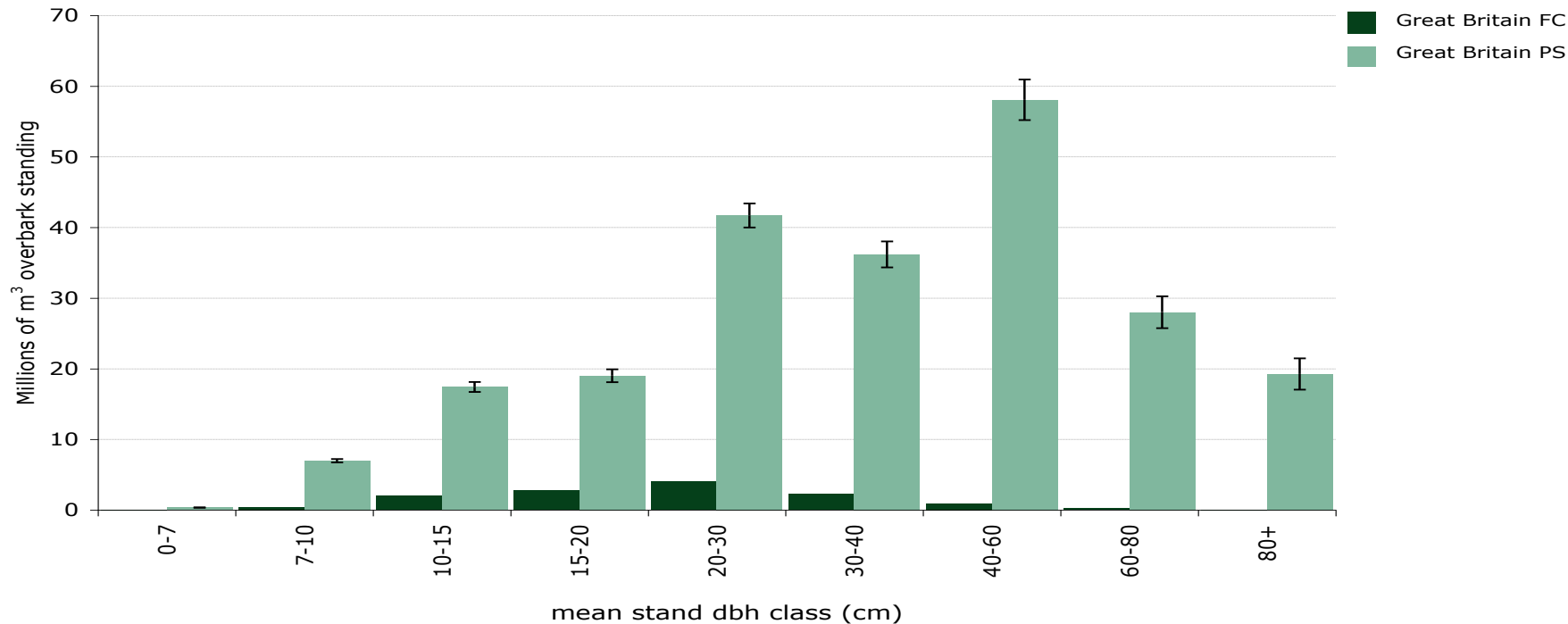
Broadleaved species distributions in stocked area

Principal species	FC	Private sector	Total area (000 ha)	
	area (000 ha)	area (000 ha)		SE%
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

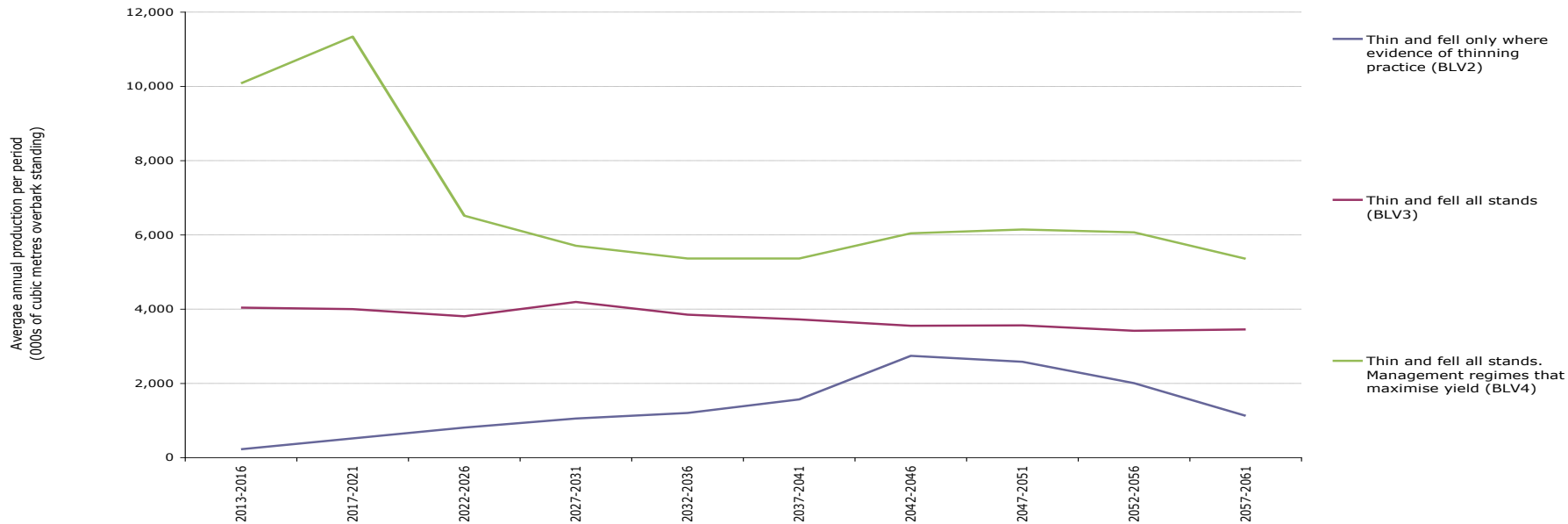
Standing Volume by Age Class



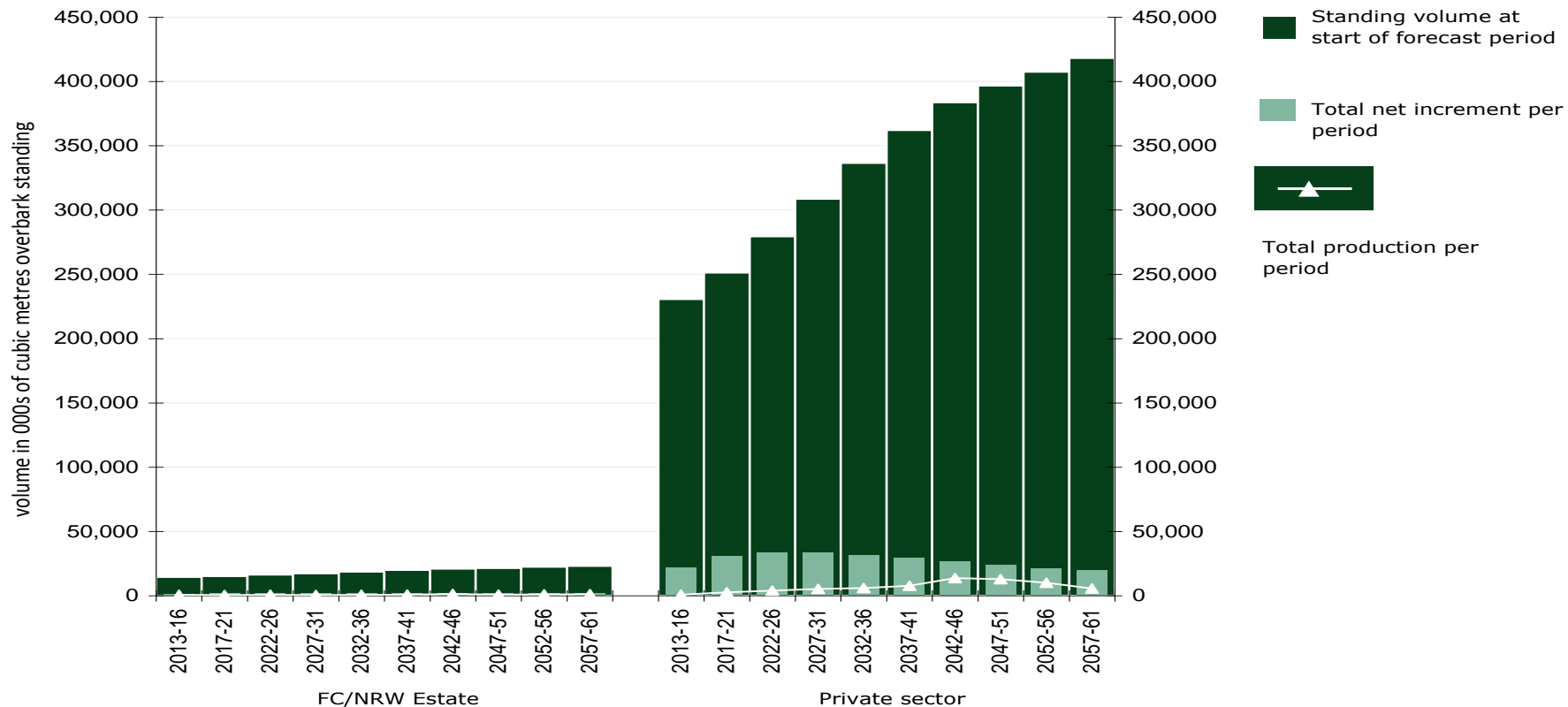
Bld. Standing Volume by Size



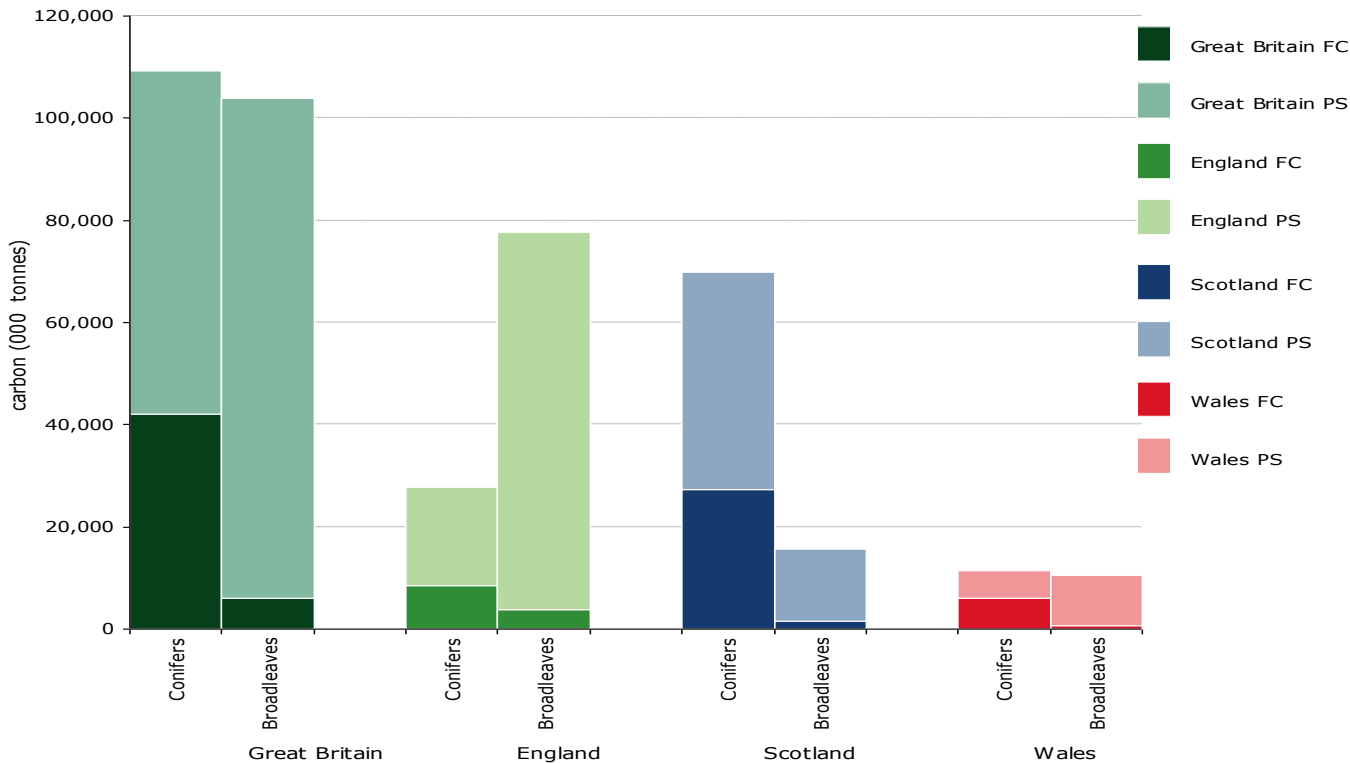
The impact of different harvesting scenarios upon 50-year timber potential for the Private sector (GB).



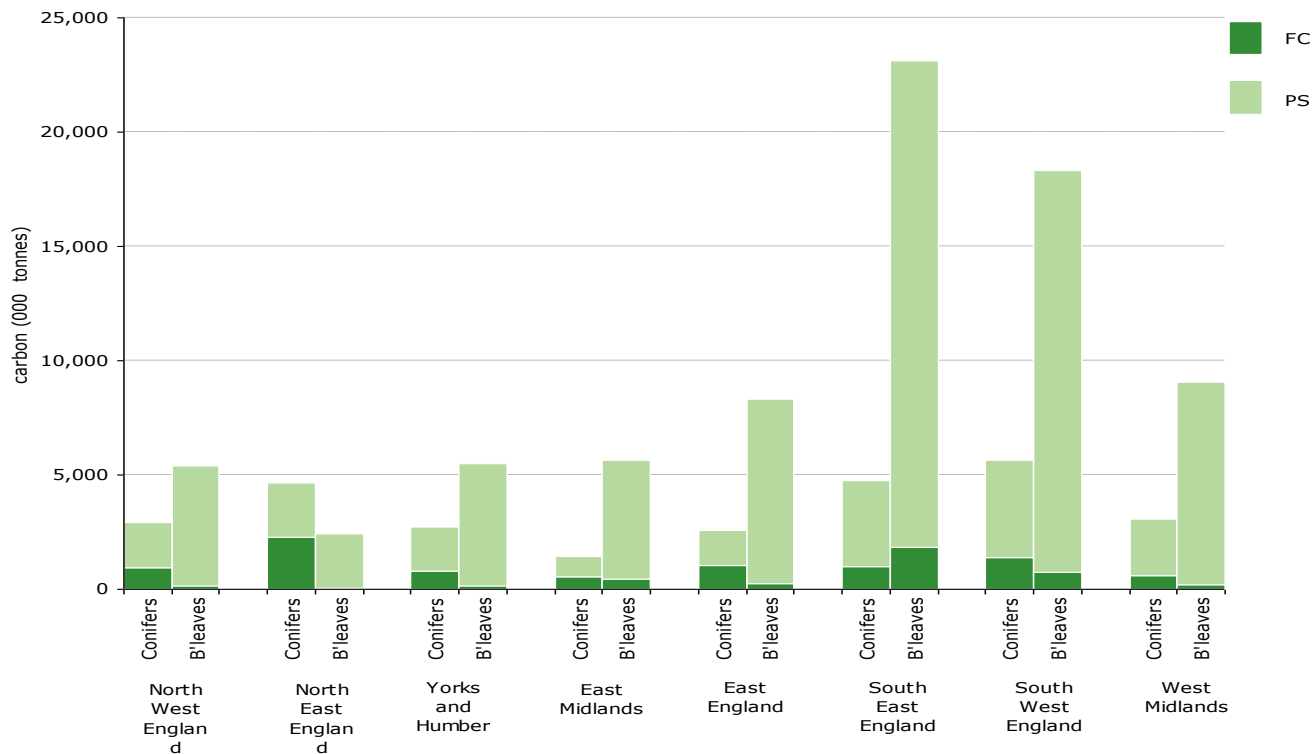
50-year summary of broadleaf standing volume, increment and production for GB (FC/NRW and PS)



Total carbon stocks (000 tonnes) in living trees in woodlands in Great Britain at 31 March 2011



Total carbon stocks (000 tonnes) in living trees in woodlands in England at 31 March 2011



- 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?

- 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

The UK Timber Resource and Future Supply Chain

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