Woodlands and Carbon in the Lake District National Park

Presentation by Sandy Greig

27 September 2012

SANDWOOD ENTERPRISE

Outline

- Woodland resource in the LDNP
- Carbon storage in LDNP woodlands
- Carbon sequestration in LDNP woodlands
- Carbon Gains – wood products and substitution
- Woodland creation and carbon
- So what: the wider context

Woodland Resource in the LDNP

- Woodlands – NIWT 1999 – 28,412 hectares

- 40% conifer
- 42% broadleaf
- 8% mixed
- 0.3% coppice
- 2.3% felled/windblow
- 7.6% open space

- 33% managed by FE

Carbon Storage in LDNP High Forest

Conifers: 5.2 million tonnes of CO_2
(410 tonnes per hectare)

Broadleaves: 7.4 million tonnes of CO_2
(569 tonnes per hectare)

Total: 12.6 million tonnes of CO_2

Chart 1: Carbon stored in tree biomass shown by species group

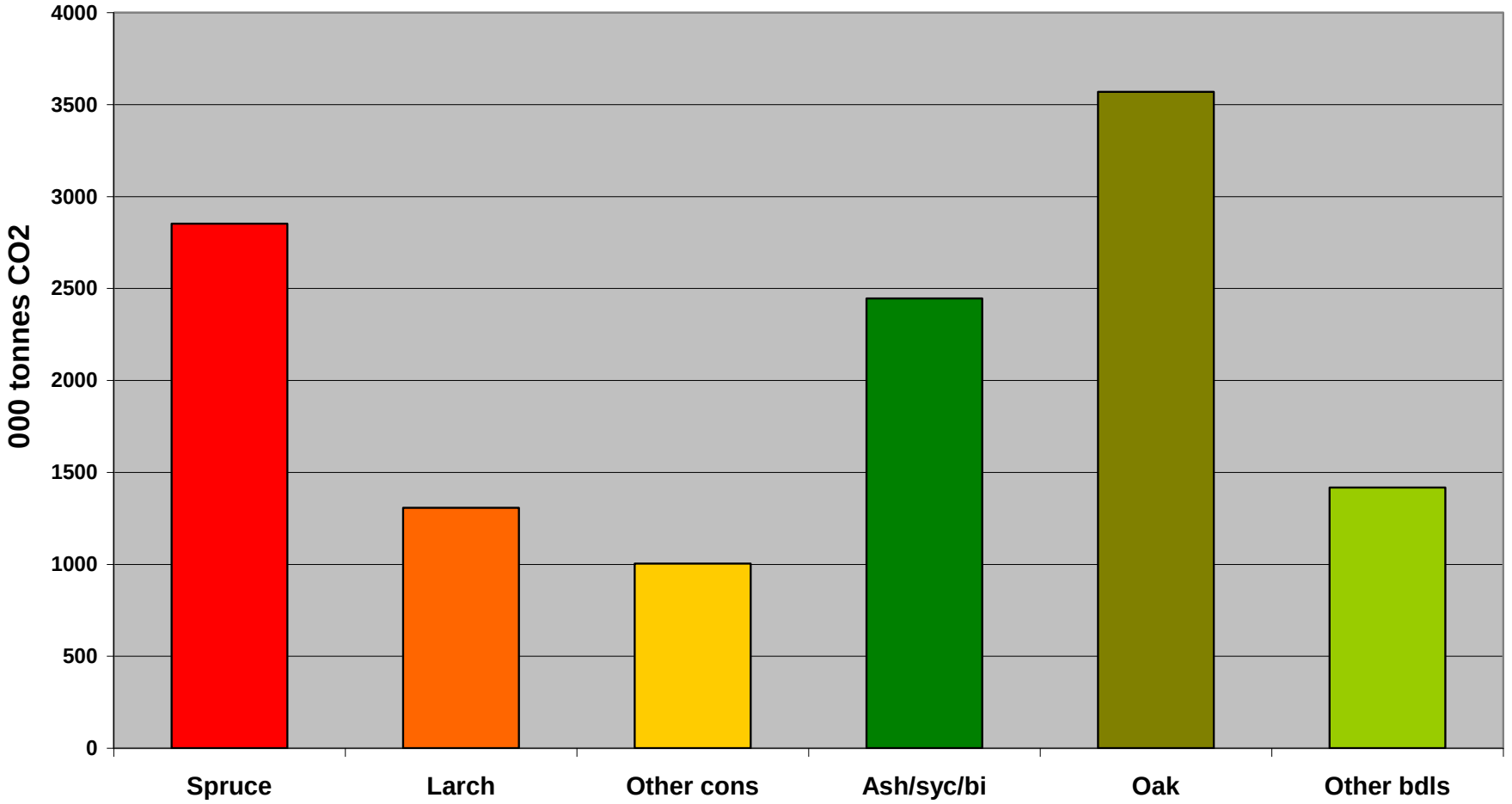
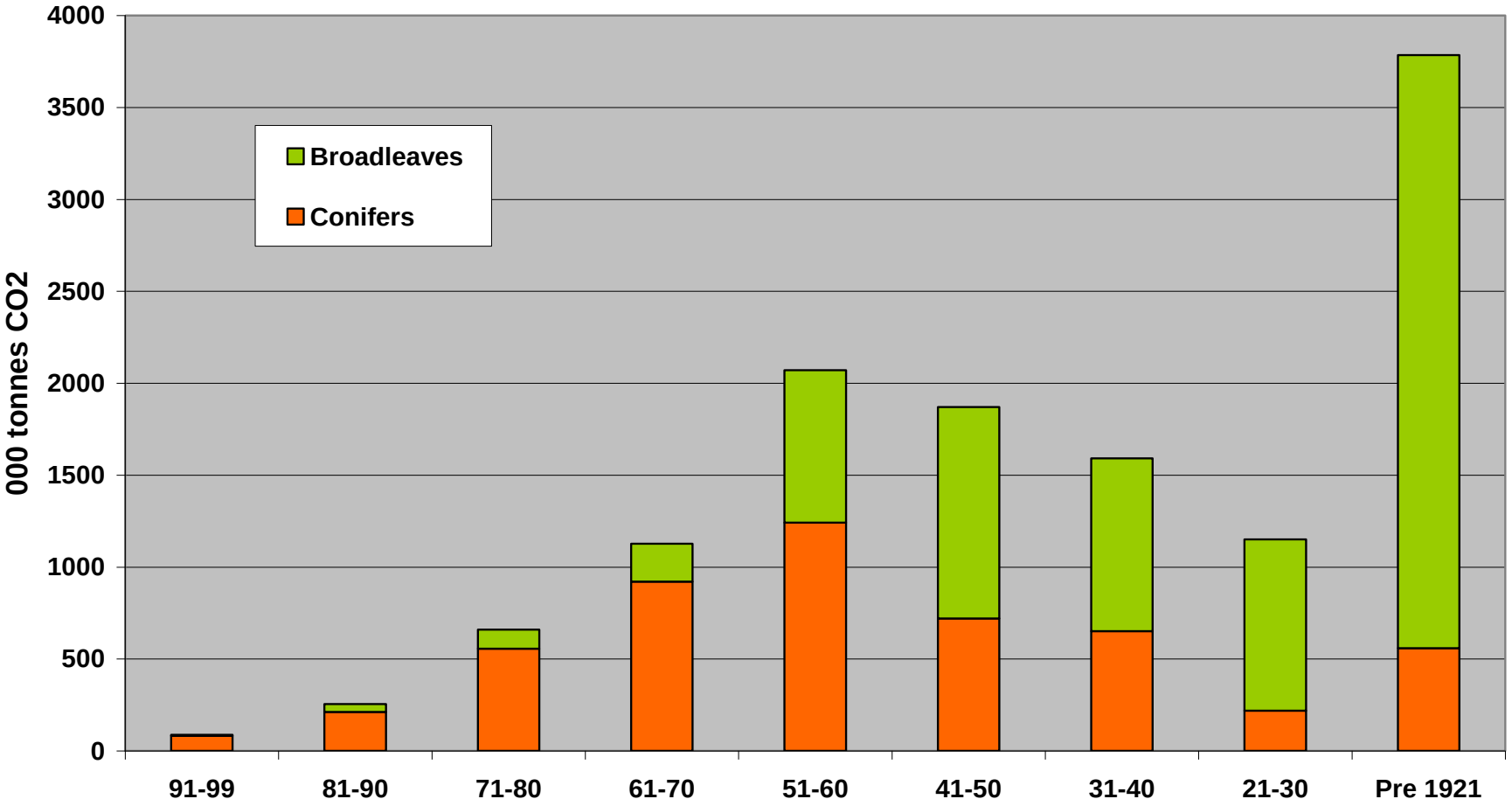


Chart 2: Carbon stored in tree biomass shown by planting year class



Carbon Sequestration in LDNP High Forest

Conifers: 103,740 tonnes CO_2 per annum
(8.2 tonnes/ha/annum)

Broadleaves: 55,860 tonnes CO_2 per annum
(4.3 tonnes/ha/annum)

Total: 159,600 tonnes CO_2 per annum

Net Carbon Sequestration in LDNP Woodlands

- Conifers: 46,480 tonnes CO_2 per annum
  (3.7 tonnes CO_2/ha/annum)

- Broadleaves: 51,020 tonnes CO_2 per annum
  (3.9 tonnes CO_2/ha/annum)

Total: 97,500 tonnes CO_2 per annum

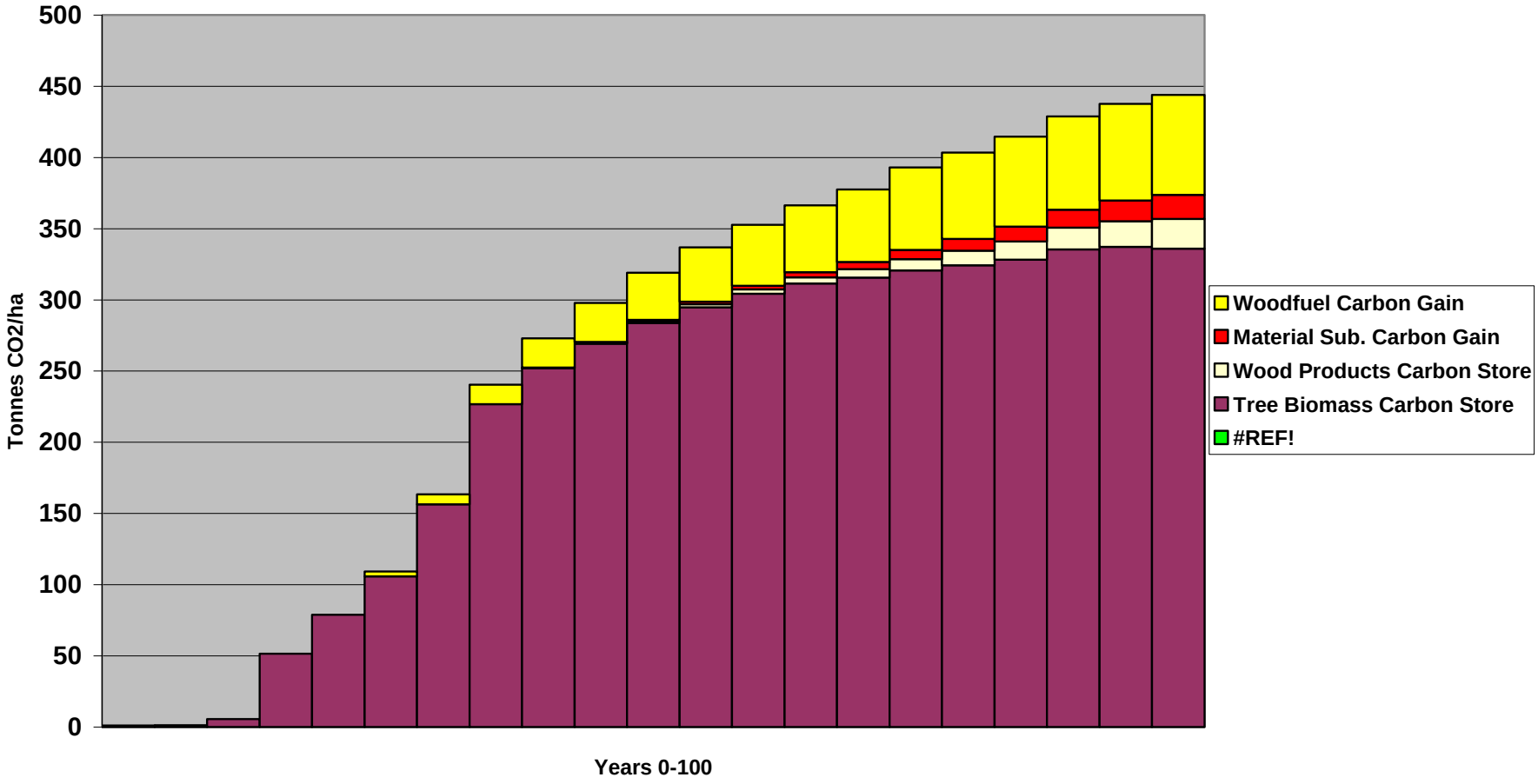
Carbon Stores, Emissions and Gains

- Carbon Stores:
  1. Above ground biomass
  2. Below ground biomass
  3. Wood products
  4. Change in soil carbon store
- Carbon Emissions
  1. Forest management and harvesting
  2. Timber transport
  3. Product manufacture
- Carbon Gains/Losses
  1. Direct substitution – woodfuel
  2. Material substitution
  3. Net carbon balance from land use change

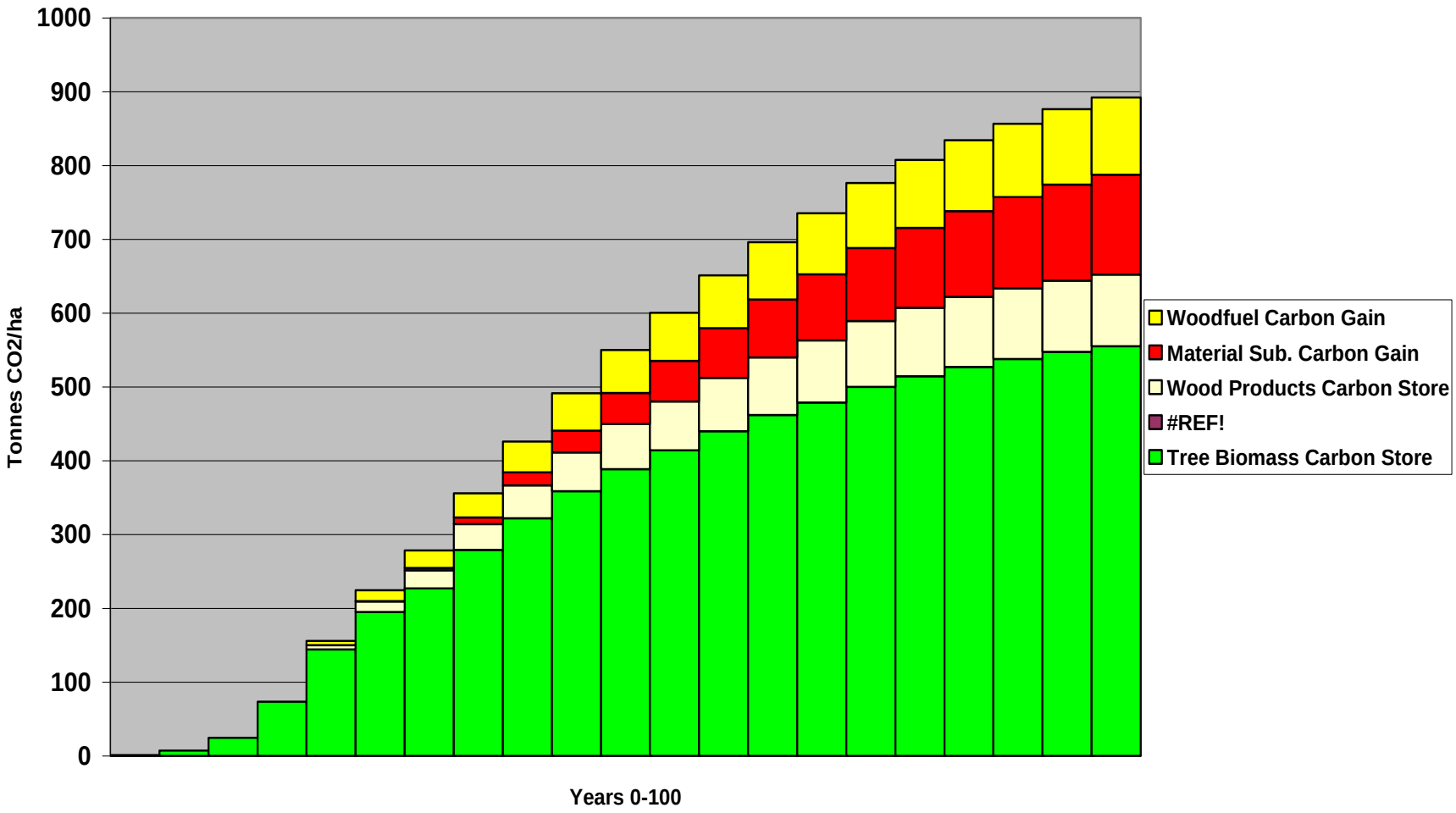
Summary Carbon Account for LDNP woodlands

Item	Conifers (tCO2)	Broadleaves (tCO2)	Total (tCO2)
Annual sequestration in tree biomass	103,460	56,140	159,600
Removed in harvesting	57,260	4,840	62,100
Net annual sequestration	46,200	51,300	97,500
Added to wood product C store	34,190	1,400	35,590
Material substitution C gain	20,900	600	21,500
Woodfuel C gain	9,350	2,210	11,560
Operational emissions	1,360	50	1,410
Total net C gain	109,280	55,460	164,740
Net C gain per ha	8.7	4.2	6.4

Carbon Chart for LDNP Native Woodland Model: 100 Years



Carbon Chart for LDNP Conifer Model: 100 Years



So What?

- Lake District currently responsible for GHG emissions of 2.3 million tonnes CO2 per annum
- Target to reduce this by 1% (i.e. 23,000 tonnes) per annum
- A 1% improvement in the carbon performance of existing LDNP woodlands would contribute 7% towards the target
- A mixed woodland planting programme of 350 hectares per annum would contribute 10% towards the target