



Habitat Science

Woodland Management

Woodlands: General

- Trees dominant
- 12% land coverage
- Individual canopies overlap
- Light critical – variety of plants species
- Decaying material
- Plantation
- Dominant tree species & spacing



Canopy



- Vary in density and structure
- Restriction to understorey
- Mature beech vs ash
- Woodlands – spacing the result of competition
- Plantation – proximity planting

Woodlands: Bark



- 80 species moss – oak woodlands
- 324 species of lichen
- 300+ km⁻² New Forest
- Microhabitats for invertebrates
- Filamentous algae

Woodlands: Soils

- Good cover – variety of unseen fauna
- Recycling – mycorrhizal
- 1700+ invertebrates in rotting wood habitats.
- Fungal hyphae



Types of woodland: Coniferous

- Predominantly conifers
- Typically evergreen
- Seed producing - inside cones



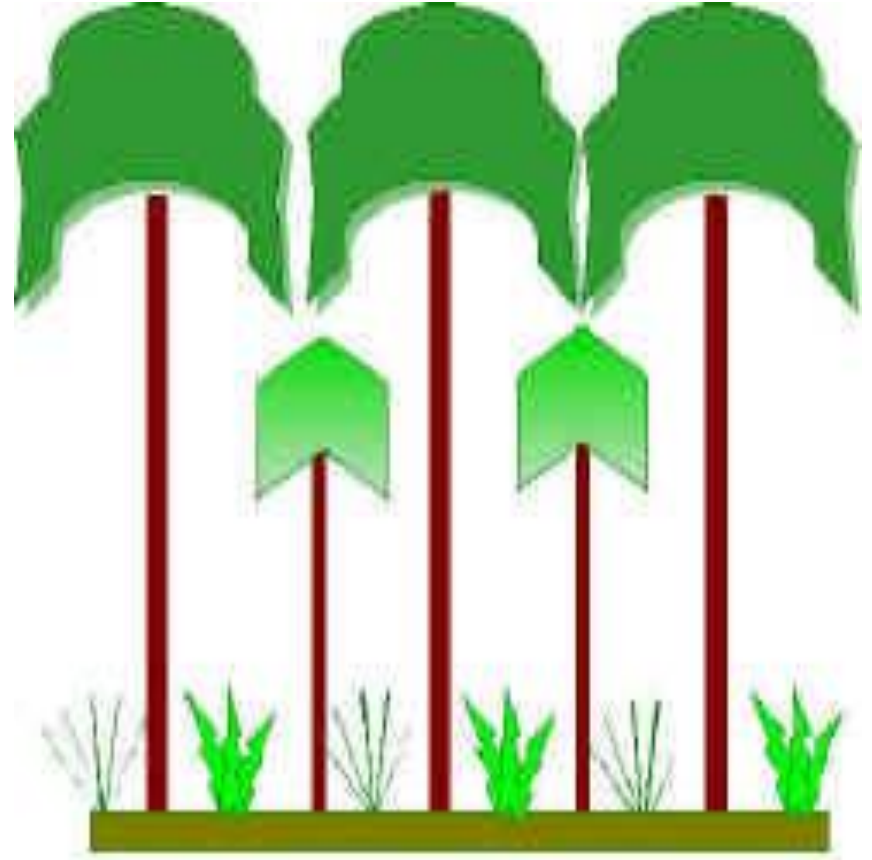
Broadleaf



- Variety
- Leaf shape – broad and flat
- Deciduous
- Holly
- Seeds – acorns and berries
- Climatic variability

Woodland structure (Anon, 2008)

- Variation in vertical structure
- Canopy - understorey – field layer – ground layer
- Blurred distinction
- Epiphytes



Woodland Structure

- **Understorey**: young trees of dominant variety, shrubs. Sprawling sideways growth; invasive non-natives
- **Field layer**: ferns, grasses, sedges
- **Ground layer**: mosses, ivy, lichens, fungi
- Vertical structure – influence where fauna found



Seasonal variation to structure

- Broadleaf – high light availability in dormancy
- Warmer autumn and spring periods – energy essential for flowering and seed production
- Conifer plantations – limited variation in understorey



Broadleaf vs coniferous understorey



- Bluebells and wood anemone
- Layers alter according to season
- Conifer – purpose planted
- Thinning – leads to better development

Sessile

Oak Woodland

- Two native species: **Sessile oak** *Quercus petraea* and **Pedunculate oak** *Quercus robur*
- Sessile – shallow, acid soils
- Pedunculate – heavy clays of ‘lowland’ Britain
- Often mixed woods - rarely single stands
- Diverse – 400+ invertebrates
- Ancient trees – 300+ lichens



Pedunculate

Beech wood

- Tall crowns and few lower branches
- Autumnal interest
- Dense shade – limited structure
- Saprophytic species – Birds-nest orchids
Neottia nidus-avis
- Beech leaves – slow to rot



Beech Woodland

- Not impoverished
- Not restricted by soil type – limestone soils
- 100+ species of invertebrates
- 200+ lichens
- Porcelain fungus
- Beech nuts – mast
- Grey squirrel



Ash Woodland

- Limestone areas
- Finely divided, compound leaves
- Loosely branched
- Varied understorey
- Less favoured by invertebrates (40 species)
- Rich in lichens (255)
- Climax species



Birch woodland



- Silver *Betula pendula* and Downy *Betula pubescens*
- Pioneering species
- Not long-lived
- Require high light levels
- Hardy
- Diverse – 300+ insects and mites
- Fly agaric *Amanita muscaria*

Alder/Willow Carr

- Wet or waterlogged soils
- Naturally part of succession from hydrosere
- Willows can support 450+ invertebrates
- Sedges; rushes
- Land drainage - BAPs



Coniferous Woodland

- Scots Pine *Pinus sylvestris*, Juniper *Juniperus Cupressaceae*, and Yew *Taxus baccata*
- Most planted as plantation – introduced species
- Forestry – economic yield 6 x that of broadleaf
- Softwood – pine furniture to paper



Douglas Fir *Pseudotsuga menziesii*



- Non-native
- Imported to improve yields
- Land too poor for agriculture
- Sitka spruce *Picea sitchensis*
- Conservation concerns – wide rides; streams and gullies cleared

Larch Woodland *Larix decidua*

- Deciduous
- Spreading, loose growth
- Light penetration
- Varied flora and fauna unlike most other conifer plantations



Woodland Threats

- Legal Loopholes – 85% Ancient woodland has no legal protection
- Land management – agricultural practices, fragmentation & overgrazing
- Climate change – increased temperature, changes to precipitation & storms
- Diseases – fungal, viral & bacterial

Bacterial and Viral Infections

- Lack of light, water, CO₂ and nutrients can lead to reduced growth – stress
- Stressed trees more vulnerable to disease
- Oak decline – complex – bacteria, insect infestation & weathering

Acute – mature trees. Bacterial agents - symptoms such as stem bleeding

- Pedunculate & Sessile affected

Chronic – more prolonged (yrs)

- Early signs - foliage deterioration, twig death, sparse foliage over crown
- Typically Pedunculate



Brown and White Rot

- Brown rot – attacks cellulose
- Leaves a brittle, cracked brick effect – timber value lost
- White rot attacks all the wood – spongy mass
- Often only discovered when fruiting parts are visible
- Honey fungus
- Not all fungus problematic!



Notifiable Diseases

1. Sudden Oak Death -

Phytophthora ramorum

- Native oaks not as susceptible as American oaks
- Rhododendron – host
- Since 2009 – Japanese Larch



2. Red Band Needle Blight -

Dothistroma septosporum

- Corsican Pine & Lodgepole Pine
- Defoliates – climatic change – wet, warm spring & summers



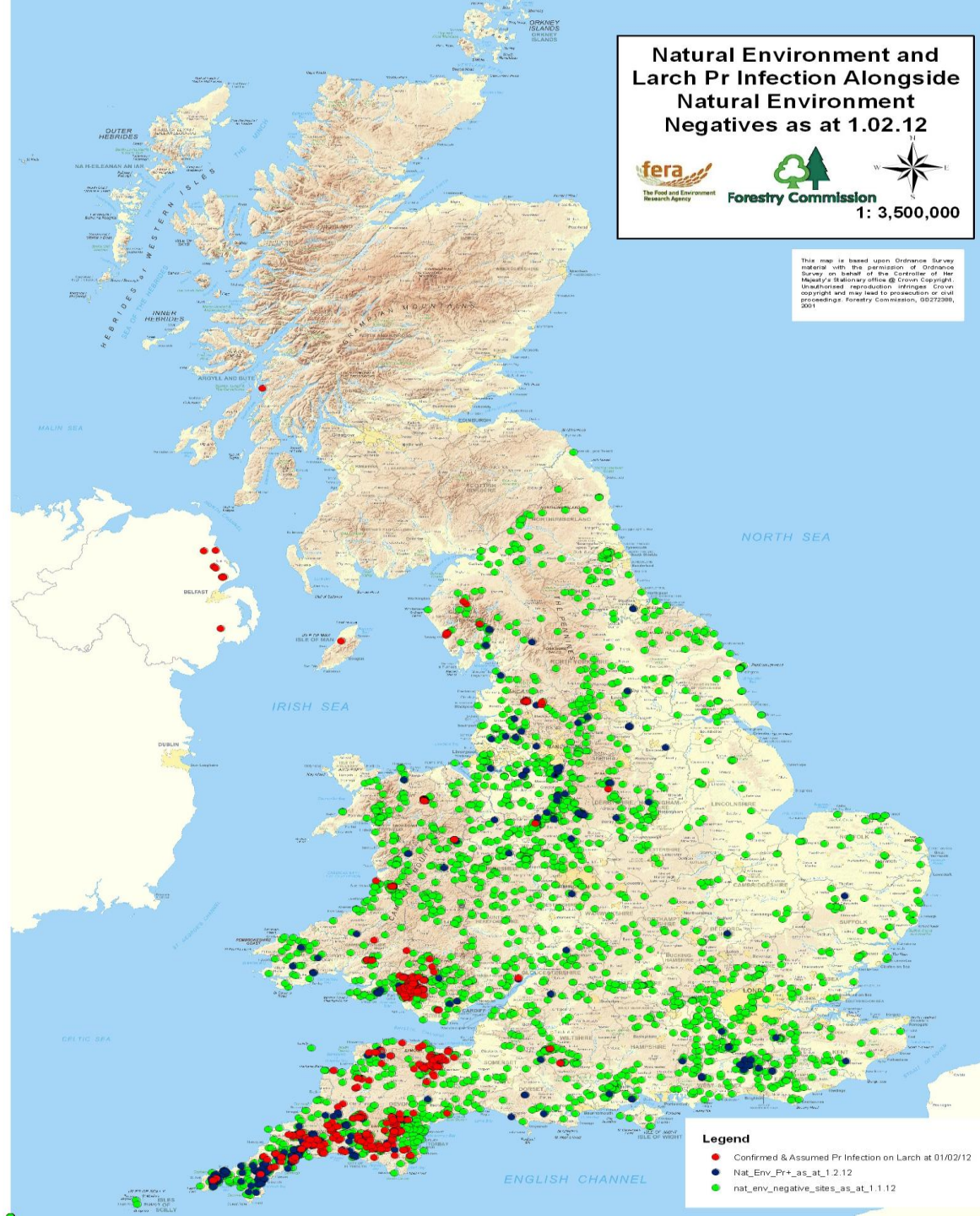
Natural Environment and Larch Pr Infection Alongside Natural Environment Negatives as at 1.02.12



Forestry Commission

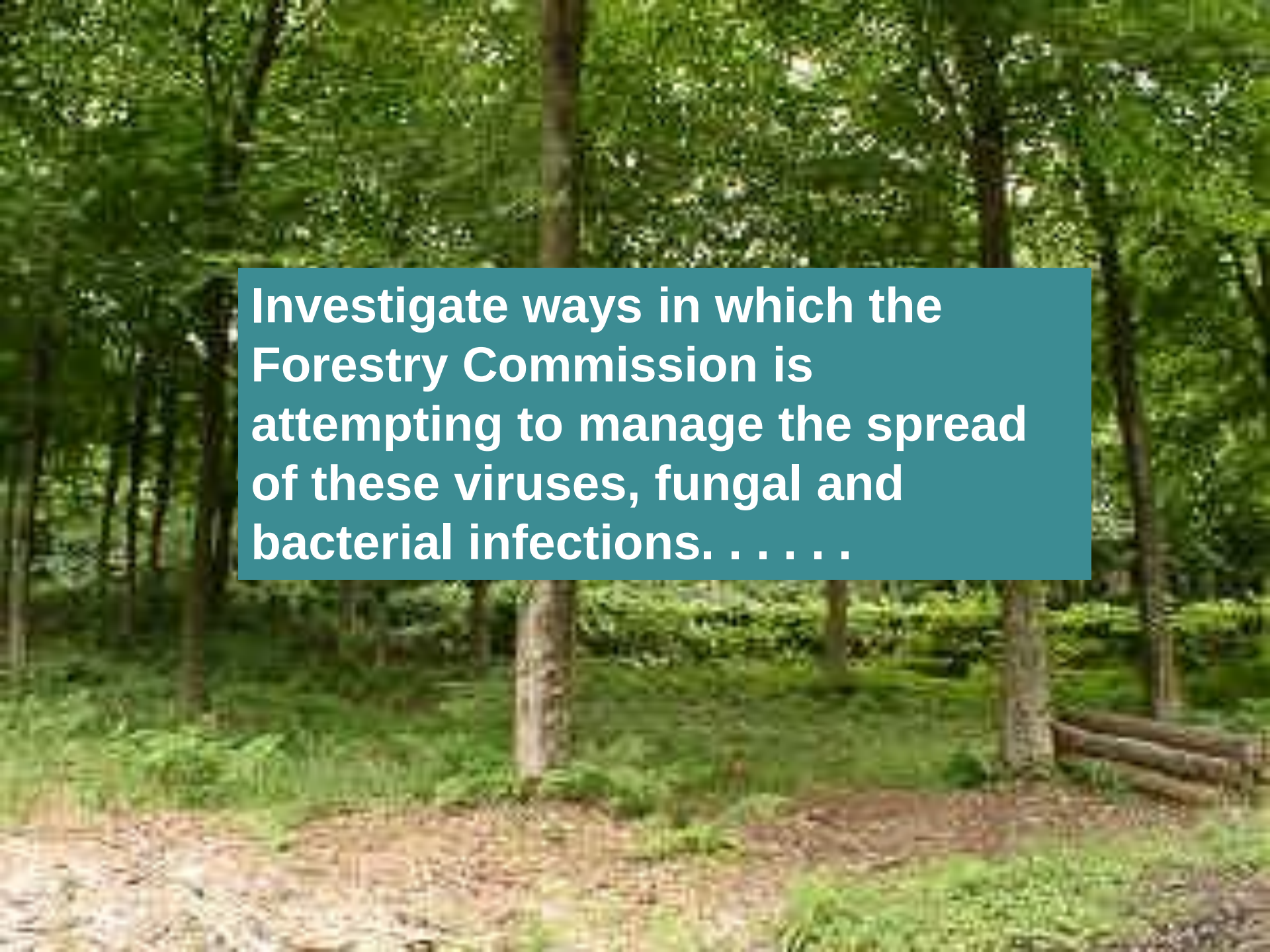
1: 3,500,000

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Legend

- Confirmed & Assumed Pr Infection on Larch on 01/02/12
- Nat_Env_Pr+_as_at_1.2.12
- nat_env_negative_sites_as_at_1.1.12

A photograph of a forest with many green trees and a dirt path. A teal rectangular box is overlaid on the left side of the image, containing white text.

**Investigate ways in which the
Forestry Commission is
attempting to manage the spread
of these viruses, fungal and
bacterial infections.**

Ancient Woodland



- Land which has been continuously wooded since AD1600 (England & Wales) or AD1750 (Scotland)
- Not necessarily the same tree cover
- Diverse
- Rare species
- Historical and archaeological significance
- Less than 20% of UK wooded area
- 20 ha in area

Ancient Woodland Indicator Species

- Historical maps & estate records
- Banks, ditches, topographical features
- Flora rather than fauna – vascular plants (AWVP)
- Where no air pollution – hundreds of lichens
- Caution – geographical variation; not always representative



Indicator species - characteristics

- Largely absent outside the wood
- Capable of growing in shade – adaptability
- Slow colonisers
- Reliable regional indicators



Woodland Management

- Faced with a piece of woodland, should it be managed or left to nature?
- Management :
 - Timber
 - Games species
 - Wildlife conservation
 - Recreational opportunities



Woodland Management: To manage or not to manage?

- Economic – timber:
 - Removal competing species
 - Controlling pests/disease/predators
 - Ensuring adequate nutrition
- Wildlife conservation:
 - Grazing sheep, pigs, cattle
- Cessation management – dark dense woods; reduced diversity
- Woodland structural diversity



Management for specifics

- Species-specific management often benefits others
- Simultaneous management – commercial products, conservation and recreation
- Conflicting needs



Planting

- Natural regeneration
 - succession
- Before planting – audit area
- Ecological vandalism
- Ecological complexity
- Provision tracks and rides
- Trees species to suit aim and objectives



Planting



- Broadleaf trees – slow growing but uses such as furniture
- Long-term investment
- Conservation value also
- Planting species suited to area reduces level of intervention and management needed
- Native before non-native species

Planting

- Spacing is species and purpose – dependent
- Timber production – plant close together
- Conservation – plant further apart
- Exposure and size of sapling
- Dormancy



Types of transplants

- Seedling :
 - Smallest.
 - Not previously moved from seedbed
- Transplants – transferred from seedling bed to secondary bed and grown on. '1+1'
- Undercutting – mechanically slicing through root. 1U1
- Whip – largest. 120-210cm
- Protection – guards, fencing, stakes



Coppicing

- Cutting down of trees and allowing stumps to regenerate
- Then harvesting re-growth
- Oak, hazel, lime, ash
- Re-growth can be rapid



Coppicing



- Cut stump – stool
- Shoots harvested on rotation
- New shoots tender – grazed by herbivores
- Products – ships planking, half-timbered Tudor houses, furniture sheep hurdles, baskets and fencing

Pollarding



- Where grazing is prevalent, trees would be cut 2-5m above ground level
- Common in wood pasture
- Boundary markers
- Structural diversity
- Reduction active coppicing – decline British butterflies
- Hazel coppice - dormice

Coppicing

- Labour intensive – expensive
- Wood products – relatively low market value
- Loss of traditional skills
- Less than 3% woodlands coppiced – sweet chestnut and hazel
- Old days – biodiversity a side-effect of coppicing



Wood products and crafts

- Firewood
- Wood chip – by-product from sawmills:
 - Power stations
 - Paper industry
 - Flavour home-brewed beer
 - Mulch
 - Shock absorber for children's playgrounds
 - Herbal medicines – quinine, witch hazel, cinnamon



Woodland edges

- Transition zones
- Often higher biodiversity value – mingling of two habitat types
- Abrupt edges
- Woodland – scrub – open areas



Rotting wood

- Pursuit of tidiness when managing habitats
- Estimated 20% loss of fauna
- Standing wood – insects, fungi, bats & woodpeckers



Scrub management

- Path maintenance
- Promote diversity of plants
- Not in pursuit of tidiness
- Brambles and scrub:
 - Food source
 - Shelter
 - Breeding sites



Summary

- Most woodlands benefit from management
- Habitat altering
- Flexibility in management approach
- Financial and resource constraints
- Piecemeal changes



Student Research

- What is the current status of both managed and natural woodland in Wales?
- What current management techniques are employed in UK woodlands?



- Pictures from Offwell Woodland and Wildlife Trust (2004); Garate, 2010 and Jenkins, 2010/11

