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Pinewood Enhancement for Biodiversity

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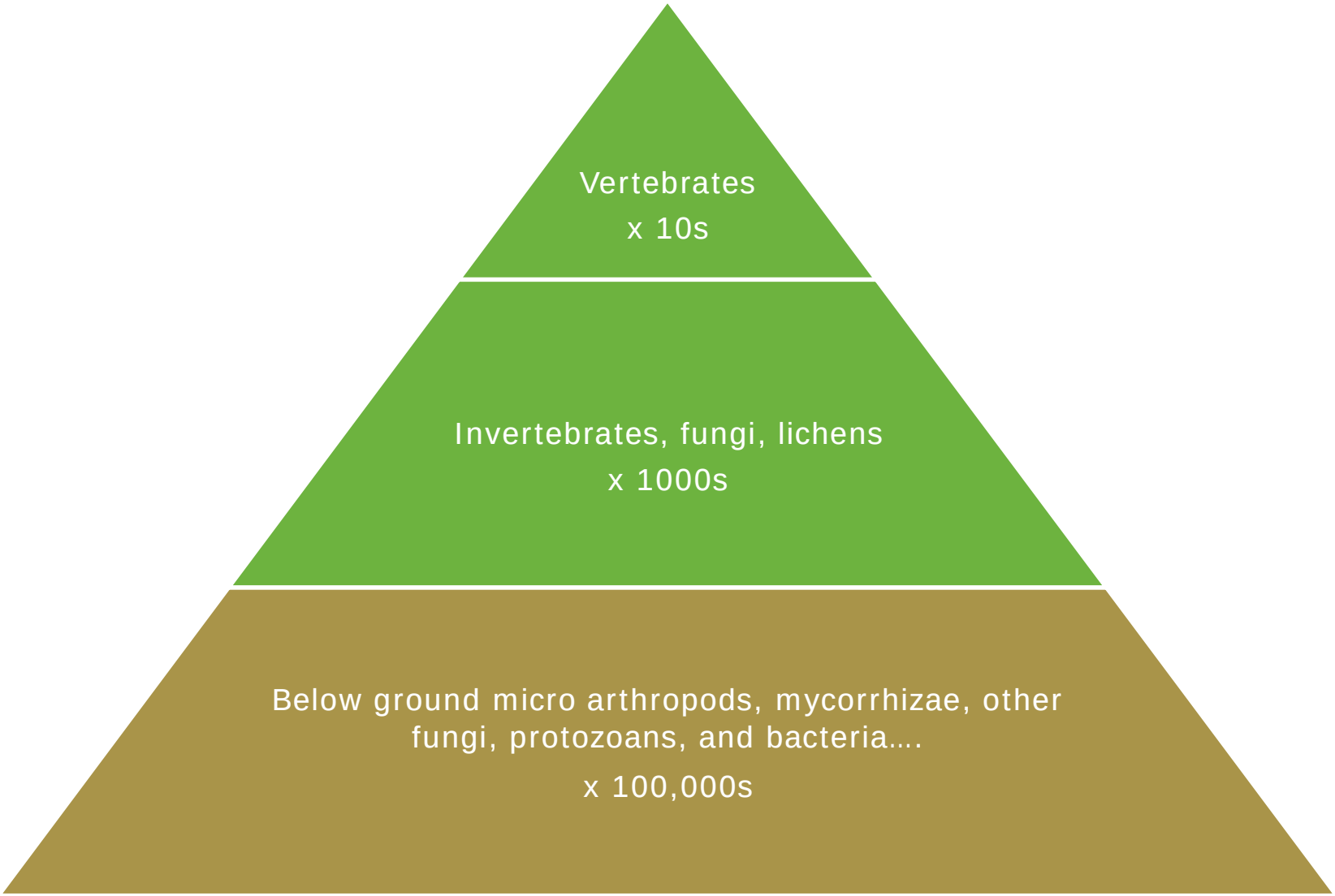
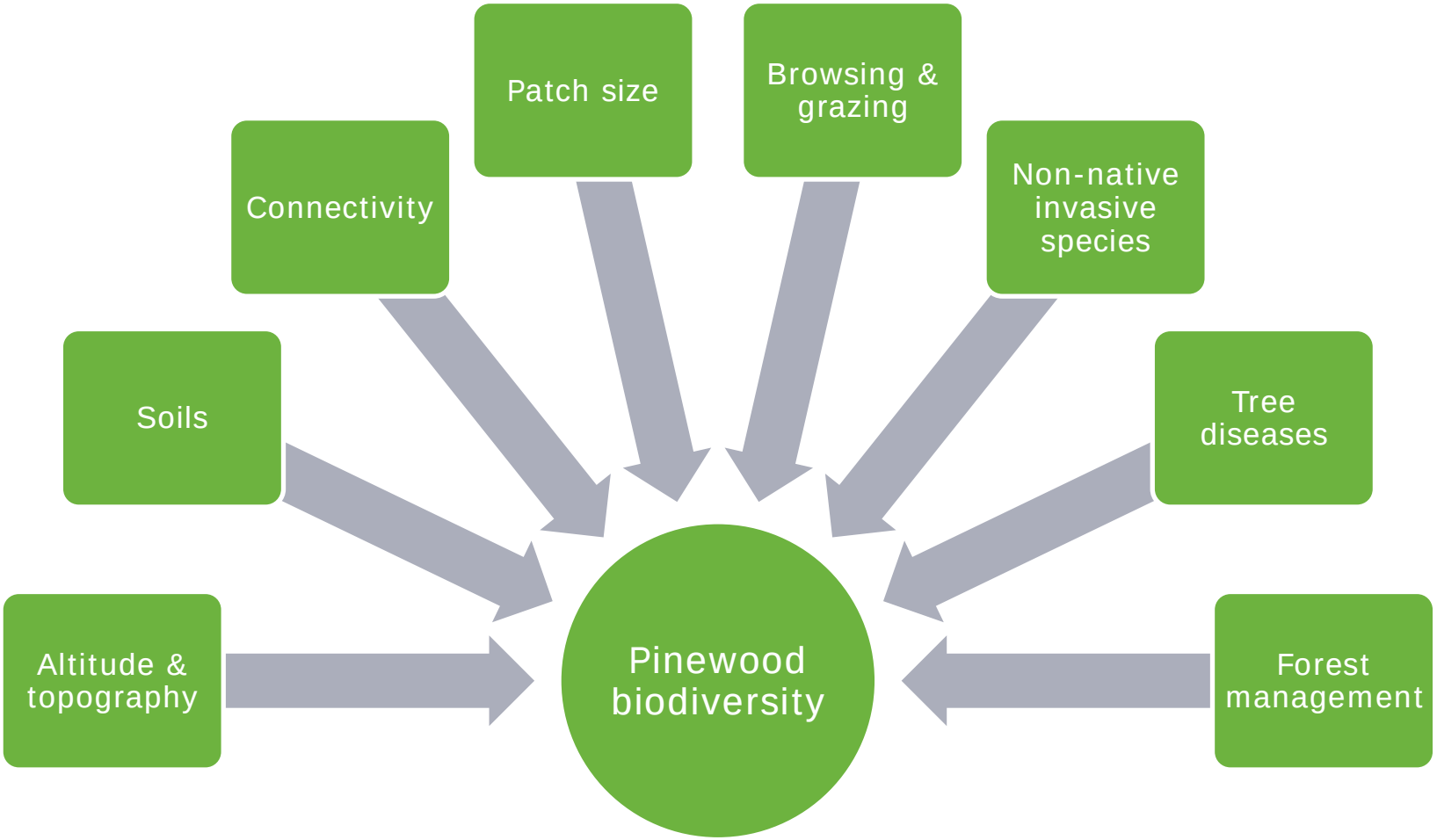
Cairngorms Forests – Where next?
28th June 2016

Biodiversity in pinewoods



Norwegian forest soil had over 4000 independent genomes of bacteria per gram of soil (Torsvik et al. 1990).

What influences biodiversity in pinewoods?



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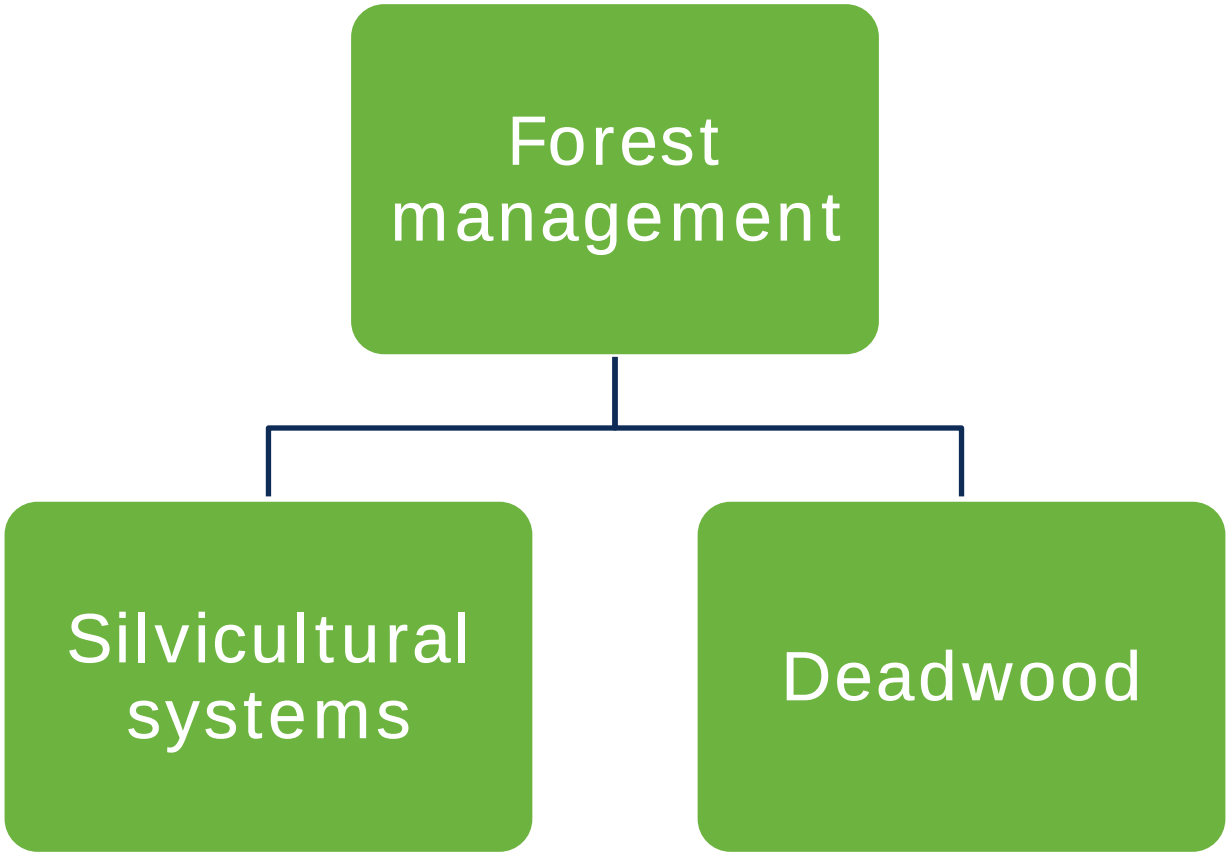

Forest management
Silvicultural systems
Deadwood

- Study comparing breeding bird assemblages in CCF and CFR
- Descending order of species richness:

CCF with shrub understorey

CCF without shrub understorey

Young pre-thicket CFR

Mature CFR

Calladine et al. 2015. Comparison of breeding bird assemblages in conifer plantations managed by CCF and clear felling. Forest Ecology & Management , 344, 20-29.

Main findings:

- CCF plantations support enhanced community of birds relative to CFR
- ‘Mature forest species’ only found/more abundant in CCF (e.g. wood warbler, redstart)
- But some species prefer young stages of CFR (e.g. willow warbler, dunnock, lesser redpoll)
- Same pattern for other taxa in other studies
- Employing a range of silvicultural systems will enhance pinewoods for biodiversity

Rotation length and biodiversity

Figure 1 Number of studies from the literature with significant results indicating an increase, decrease or neutral response to stand age by taxonomic group/biodiversity indicator.

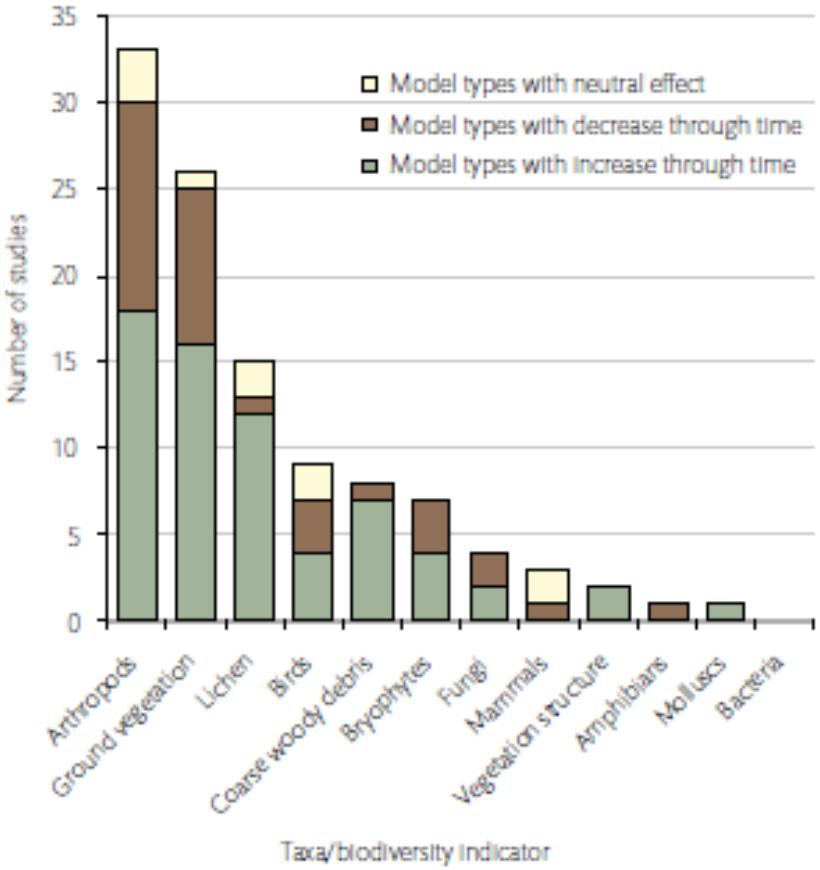
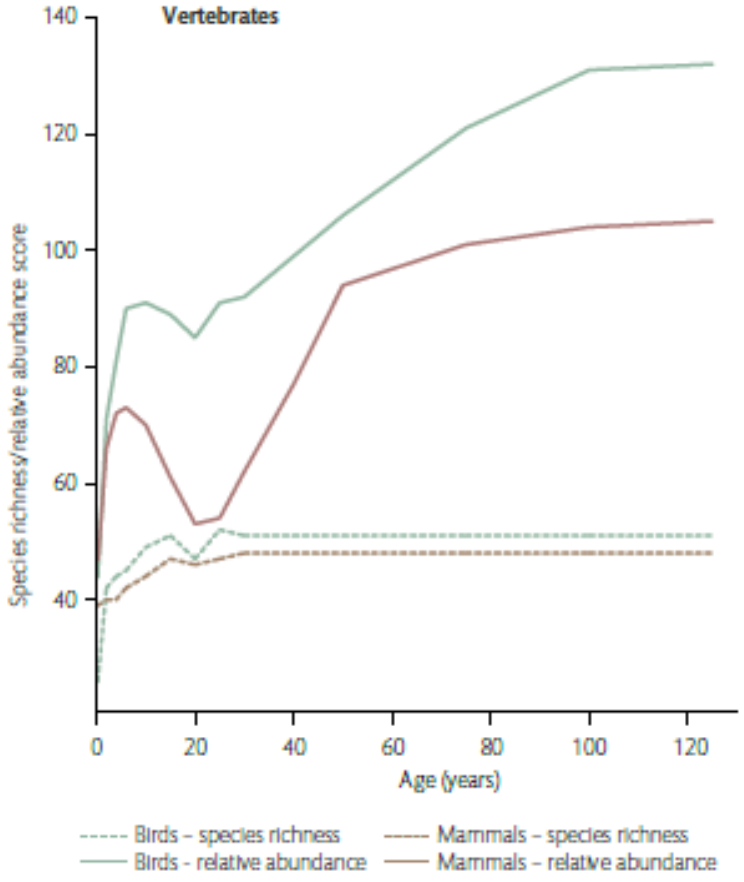


Figure 2 Relationship between vertebrate species richness and relative abundance and stand age in British forests.



Pinewood enhancement for biodiversity:

- Employ a range of silvicultural systems
- Increase rotation length in some stands
- Increase tree species diversity
  - Broadleaves – birch, rowan, aspen, juniper
  - More non-native conifers?

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Silvicultural systems and biodiversity

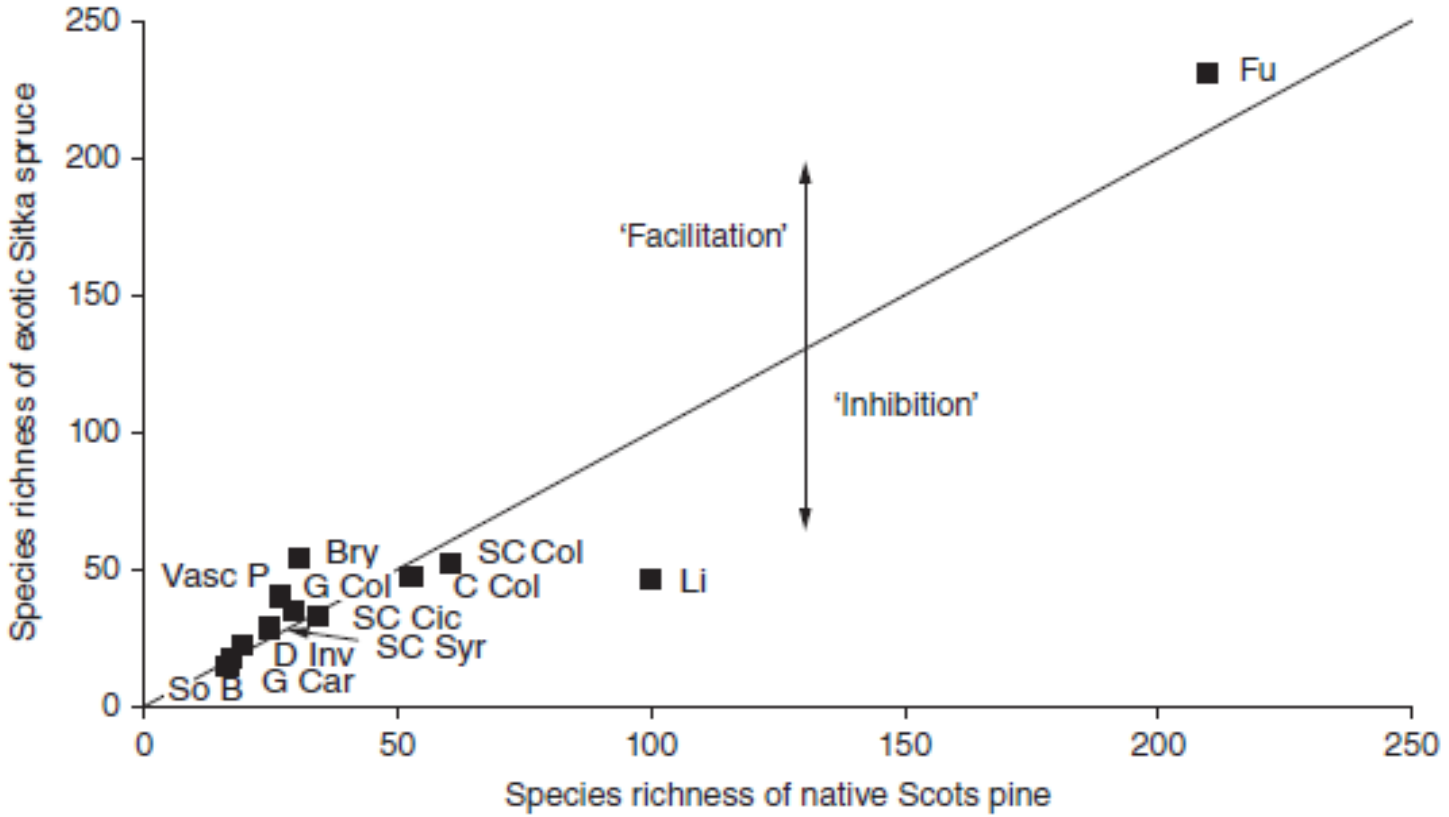
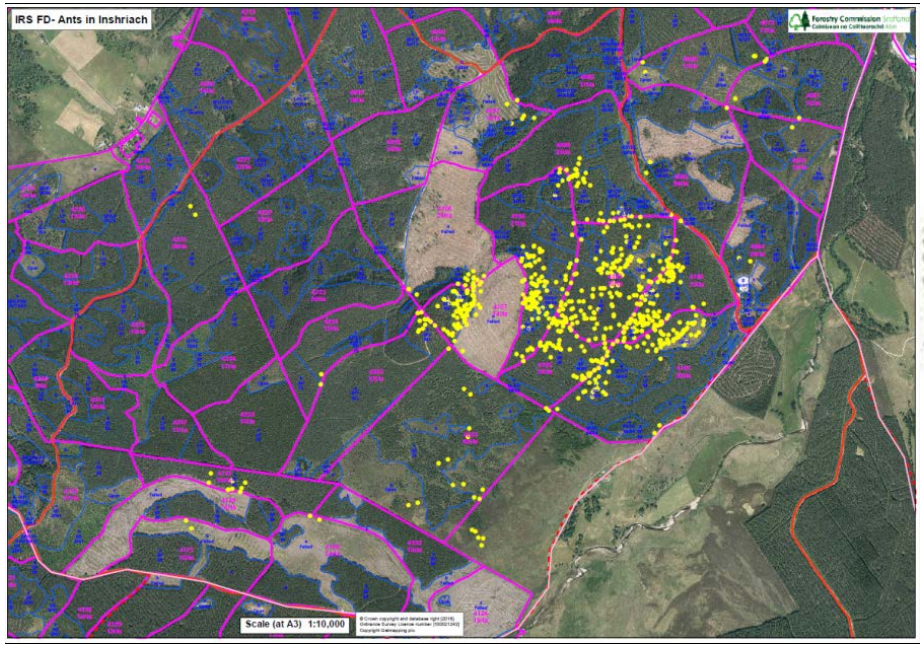
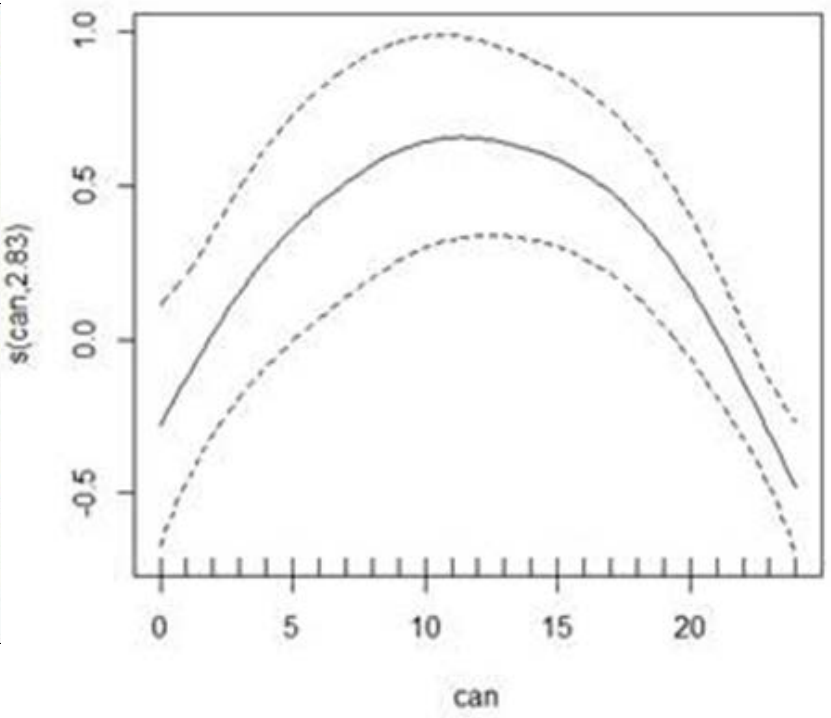


Fig. 15.2. The broad equivalency of species richness by group in exotic Sitka spruce (*Picea sitchensis*) and native Scots pine (*Pinus sylvestris*) from the British Biodiversity Assessment Programme. (From Quine and Humphrey (2010) reproduced under RightsLink licence 3438230916023.) Key: Bry, bryophytes; C Col, canopy coleopteran; D Inv, dead wood invertebrates; Fu, fungi; G Car, ground Carabidae; G Col, ground Coleoptera (excluding Carabidae); Li, lichens; SC Cic, sub-canopy Cicadamorpha; SC Col, sub-canopy coleopteran; SC Syr, sub-canopy Syrphidae; So B, songbirds; Vasc P, vascular plants.

Quine, C.P. and Humphrey, J.W. (2010) Plantations of exotic tree species in Britain: irrelevant for biodiversity or novel habitat? Biodiversity Conservation 19, 1503–1512.

We find that plantation forests provide a suitable surrogate habitat primarily for generalist species, as well as providing habitat for certain species of conservation concern.





Irwin et al. 2016. The role of planted forests in the provision of habitat: an Irish perspective. Biodiversity and Conservation, 1-22, in press.

We find that plantation forests provide a suitable surrogate habitat primarily for generalist species, as well as providing habitat for certain species of conservation concern. ***However, we find that plantation forests provide poor habitat for native forest specialists.***

Irwin et al. 2016. The role of planted forests in the provision of habitat: an Irish perspective. Biodiversity and Conservation, 1-22, in press.

Hunter identified 44 species of beetle as being restricted to pine in Scotland. 38 can be classified as saproxylic:

- 25 are associated with the subcortical layer
- 6 with bracket fungi
- 4 with decaying heartwood
- 3 with roots and stumps

Hunter, F.A. 1977. Ecology of pinewood beetles. Native pinewoods of Scotland,42-55. Cambridge: Institute of Terrestrial Ecology.

Deadwood management principles:

- Retain and create as much deadwood as possible on a **continuing** basis.
- Retain and create as many deadwood microhabitats as possible.
- Favour native tree species when creating and retaining deadwood.
- Favour the retention and creation of **large-diameter** (>20cm) deadwood.
- Retain and create high stumps and snags within woodland and permanent open areas (but not on clear fells that will be restocked).
- Design the distribution of deadwood to maximise connectivity.

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- Use a variety of silvicultural systems
- Increase rotation length in some stands
- Increase tree species diversity
- Standard Scots pine management suits many species
- Increase the amount and diversity of deadwood for specialists
- **Need more pinewoods – even if they are plantations**

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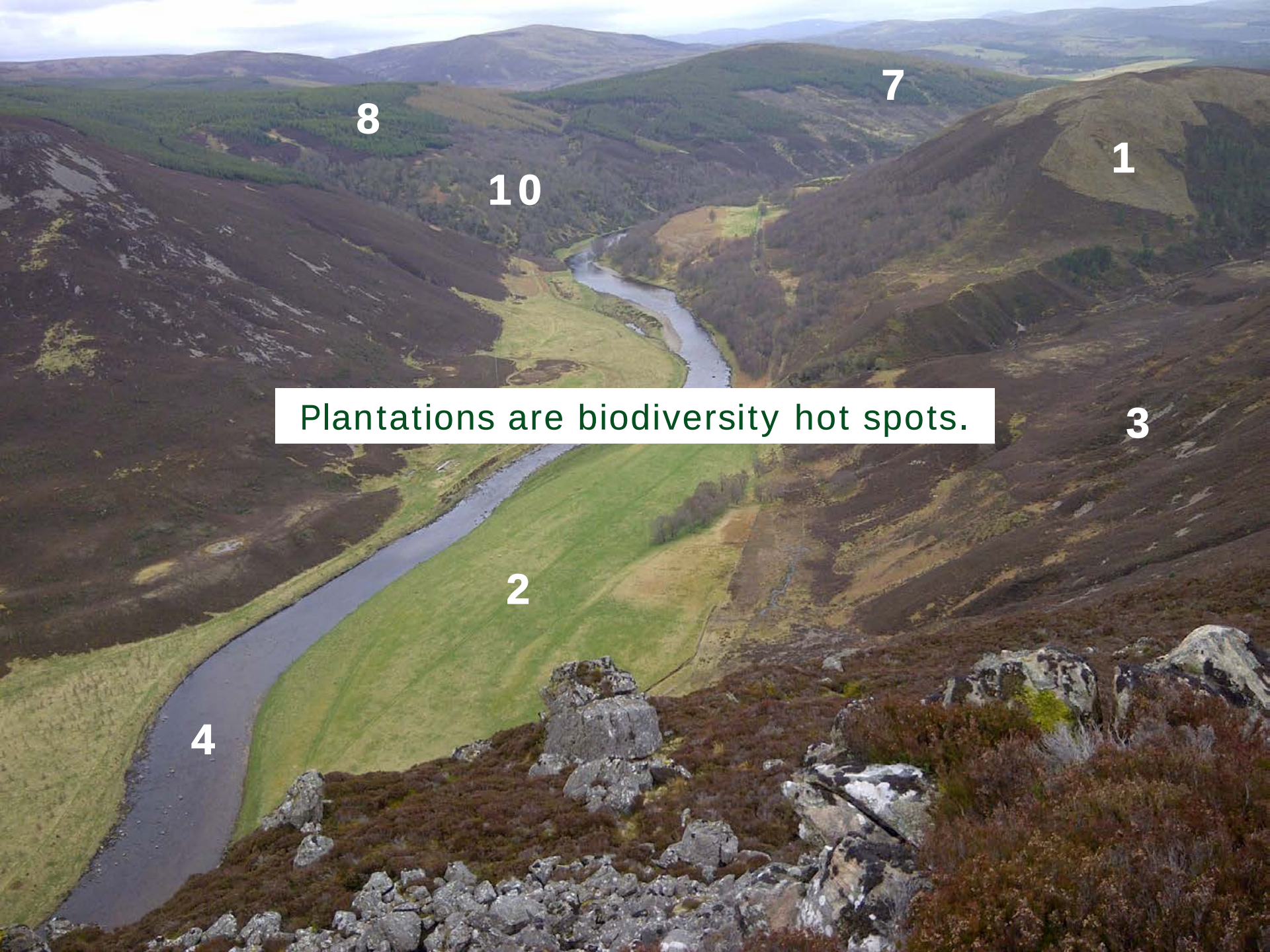
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Plantations are biodiversity hot spots.
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