

Woodland Ecological Condition report

A NEW DATASET FROM NATIONAL FOREST INVENTORY

Summary

This new dataset provides a baseline for measuring woodland ecological condition. It is potentially transformative in driving good woodland management, by measuring woodland against a gold standard of high-quality ancient woodland.

The report demonstrates that across the UK, native woodlands are falling short due to lack of management. Non-native forests fare slightly better, but there is plenty of room for improvement in woodlands of all kinds.

It is important to understand the limitations of the data when interpreting it. It is possible that some improvements could be made in future reports using this new data to drive further improvements in woodland management.

What is the Woodland Ecological Condition report?

This report (WEC) is a major piece of work by Forest Research's National Forest Inventory (NFI) in collaboration with Natural England, SNH and NRW, providing data on the ecological quality of UK woodlands.

As well as providing a snapshot of our woodlands now, the report provides a baseline for future surveys which will show trends and facilitate assessment of the success of policies to improve habitat quality.

The WEC report is available [here on the Forest Research website](#).

Methodology

The survey sampled all types of woodland across the UK between 2010 and 2015, measuring over 15,000 one-hectare squares, 610,000 trees and 24,000 transects.

It measured 15 indicators of ecological health, as follows:

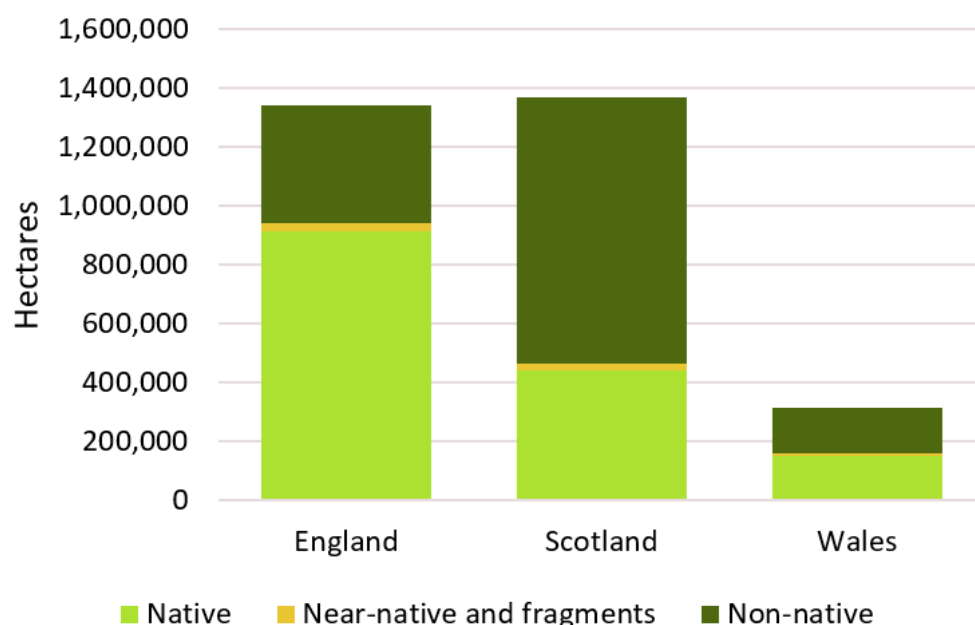
- 1. Ground flora:** Vegetation at ground, field and shrub layer is measured quantitatively, and qualitatively related to the National Vegetation Classification categories.
- 2. Tree pests and diseases:** level of tree mortality, crown dieback, and signs of disease.
- 3. Invasive species:** presence of a list of 10 non-native invasive plants.
- 4. Herbivores/ grazing pressure:** visible damage by browsing or bark-stripping.
- 5. Regeneration at component group level:** a baseline measure which will demonstrate regeneration over time.

6. **Number of native tree and/or shrub species:** diversity of native species within a 1ha square.
7. **Deadwood volume:** cubic metres standing and fallen deadwood per hectare excluding stumps: 80m³+, 20-80 m³, -20m³.
8. **Vertical structure:** are there 1, 2-3, or 4+ different heights of trees within a stand.
9. **Veteran trees:** number of veteran trees per 20 hectares (40+, 1-40, -1).
10. **Age distribution of tree species:** presence of three age groups <20, 21-150, and >150 years.
11. **Nativeness of occupancy:** proportion of the woodland occupied by native species.
12. **Proportion of open space:** amount of open space appropriate to each woodland, and quality of open space habitat.
13. **Proportion of woodland/ favourable habitat:** amount of land in a 100km² circle which is semi-natural as opposed to intensively cultivated or urban.
14. **Size of woodland parcel:** bigger is better. The threshold for 'favourable' is 20ha.
15. **Regeneration at population level:** level of regeneration across the woodland.

Results

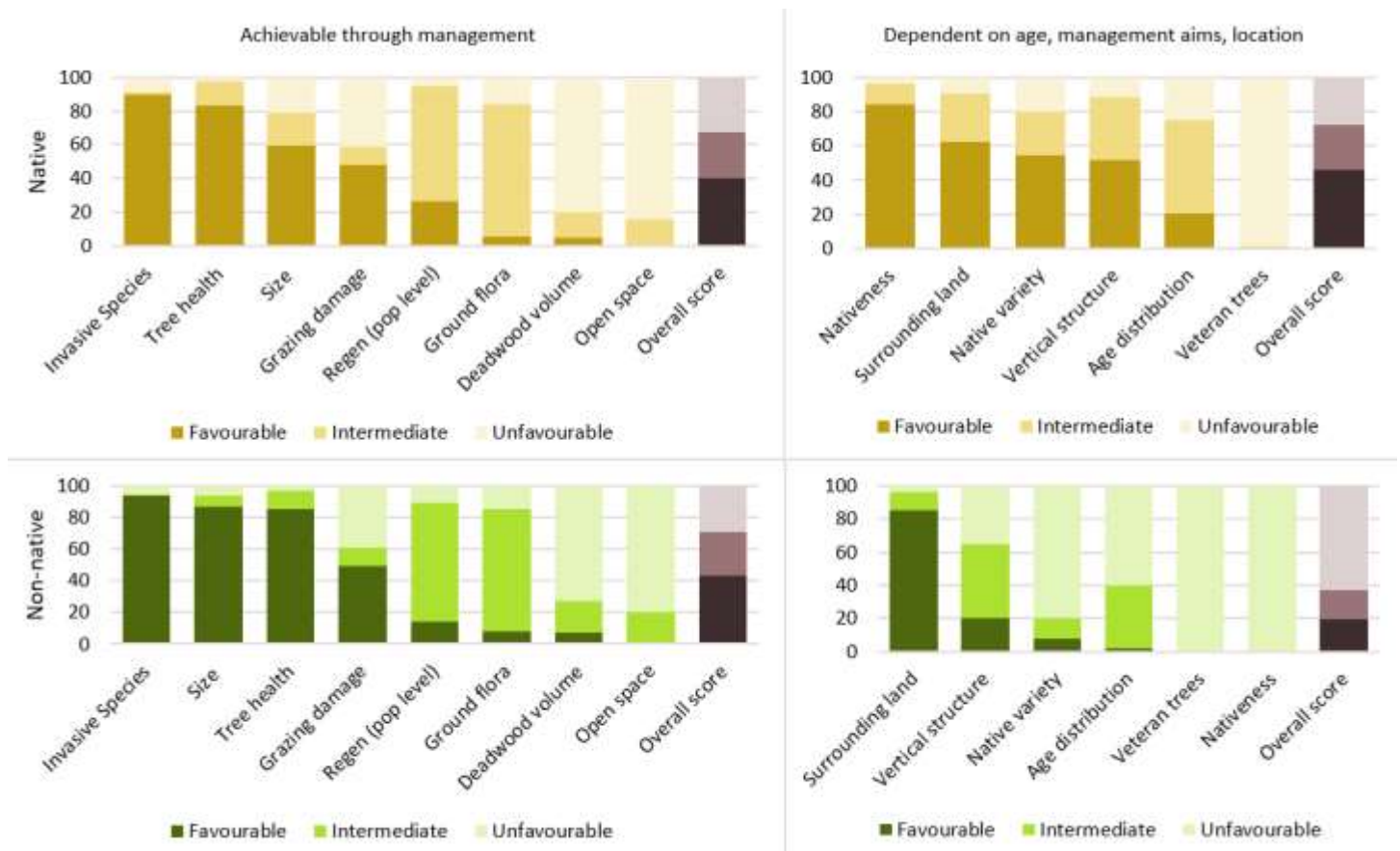
Data is provided for:

- Favourable, intermediate and unfavourable for each of the 15 indicators.
- GB, England, Scotland and Wales, as well as regional data within England and Scotland.
- Native, near-native and fragments, and non-native.¹ Note these categories are significantly different to the 'conifer' and 'broadleaf' used in Forestry Statistics, especially in Scotland:



¹ Native = 50%+ native tree species. 'Near-native and fragments' = 40-49% native, or native but under 0.1ha. Non-native = -40% native.

The results provide numerous opportunities to explore and interrogate the data. An interesting example of this is to divide the indicators into those which are achievable through forest management, and those which are out of the forester’s control:²



Non-native woodlands in the UK show higher levels of tree health, are better protected from invasive species and grazing, form larger woodland units, have more ground flora and higher volumes of deadwood, and better balance of woodland to open space.

Some measurements will only be improved with time (veteran trees and age distribution indicators cannot be ‘favourable’ in forests planted in the past century), or by policy in other sectors (forestry cannot influence surrounding land). However, there is clearly plenty of room for improvement in management of woodlands of all types.

The next WEC report for 2015-2020 will demonstrate policy success (or failure) of the past 5 years.

² The very small ‘near-native’ category has been omitted; as has the ‘regeneration at component group level’ indicator.

What are the limitations of the WEC report?

While the WEC report provides a snapshot of woodland environmental condition, it is important to understand the limitations of its results.

Dealing with new woodland creation

The data is sliced by nativeness and location, but it has been noted that several indicators are also dependent on the age of the woodland.

Around 50,000ha new woodland is likely to be created 2016-2020, and the UK Government has set ambitious targets of 30,000 hectares a year (150,000 in the NFI reporting period). These new woodlands will inevitably score badly on many areas (veteran trees, age distribution, deadwood, ground flora, vertical structure) for several decades. However, data on these new woodlands will be extremely valuable for assessing how well new woodlands are designed and managed.

It will be vital, therefore, that future WEC reports present data sampled from new woodland separately from the existing dataset, otherwise gains delivered through good management and woodlands maturing will be suppressed by the low scores of newly created woodland.

It would be extremely useful to present existing data by age of woodland: for example in existence before 1900, planted 1900-1999, and planted after 2000. This would allow policymakers to distinguish low scores due to poor management from those which are a consequence of the young age of much UK woodland.

Direct measures of biodiversity

The only two direct measures of biodiversity in the WEC report are variety of native trees. Other measures are structural 'surrogate' measures known to contribute to the forest's ecological condition.

An obvious omission of direct data is the Woodland Bird Count data provided by BTO and published annually in Forestry Statistics. While not collected directly by NFI, it would be extremely valuable to work with BTO to map this data against the various forest types, and incorporate the woodland bird index into this and future editions of WEC.

In future, similar species-based indicators, such as lepidoptera or priority species, could also be used, drawing on the growing National Biodiversity Network dataset.

Limitations of existing indicators

Nativeness of occupancy

It seems curious to have an indicator which is the same as one of the categories. However, it does allow measurement of whether non-native trees are invading native woodlands – or the extent to which native species are found in non-native woods.

Variety of native species

Although a mainly non-native conifer forest may include a diverse native element designed for ecological benefit, for example extending existing native woodland or creating riparian corridors, this is not reflected in the current published results. So any native trees reported in the 'non-native'

category here are inside the non-native forest itself. If a sample square lands on the native element of a forestry scheme, it is categorised as native woodland. This explains a large part of the ‘new’ native woodland measured in Scotland, as the considerable amount of native woodland created through restructuring conifer plantations has not previously been measured.

The published results therefore do not measure ‘forestry schemes and conservation woodland’ but specifically non-native and native tree cover. It would be possible for NFI to produce reports for other criteria if these can be clearly defined: for example forests owned by Confor members, or forests with a management plan.

Deadwood

The definition of deadwood, which excludes stumps, is derived from the UK Forestry Standard. However, the purpose of the deadwood measure in UKFS is to direct management activity, and repurposing it to compare woodlands creates a bias in the data. Most non-native forests contain significant quantities of deadwood in stumps due to thinning and harvesting: a study in Ennerdale found that conifer plantations contained 5-12m³ deadwood in stumps, compared with 0.2-3m³ in ancient and native woodland.³ This suggests that including stumps would push significant proportions of the non-native woodland into higher categories.

Vertical structure

Vertical structure is measured within a stand, but there is no measure of the varied vertical structure across a forest characteristic of much clearfell rotational forestry in the UK. A focus only on diverse stand structure therefore provides no measure of the dynamic, edge-rich matrix habitat created by the restructuring of even-aged forests into coupes, a shift which has occurred in much non-native forestry in past decades.

Conclusion

The Woodland Environmental Condition report will be of interest to anyone concerned with forest management and policy at national and local level. It provides far richer data than has previously been available and will develop in interest as future reports create trends against a bar for success which is set rightly high.

However, it is important for anyone using the WEC report to understand the limitations of the data, and where comparisons are and are not valid.

It will be important for the NFI team to consider how they treat new woodland creation in future reports. While it is undesirable to change methodology once a baseline established, it seems that the measures for deadwood and possibly vertical structure could usefully be revised. There is also potential to include more direct biodiversity indicators through collaboration with conservation organisations.

³ Jenny Woodman, [Comparison of dead wood composition and forest regeneration in broadleaf and coniferous stands – Wild Ennerdale, Cumbria, UK](#). MSc dissertation, Newcastle University, 2013 p.27.