

# Assessing the impact of deer on woodlands: a new method

Helen Armstrong & Kate Holl *explain the need for a standard approach when assessing deer impacts and introduce the Herbivore Impact Assessment method.*

**D**eer are currently having a widespread, and damaging, impact on Scotland's woodlands. The results of the recent native woodland survey of Scotland [1] showed that in 33 per cent of our native woodland by area, there is no tree regeneration at all while in another 54 per cent, only one or two of the less palatable tree or shrub species are regenerating. Additionally, around 12.5 per cent of our ancient semi-natural woodland, which cannot be replaced, has disappeared in the last 40 years. All of this is due largely to the impact of large herbivores, particularly deer. Also due largely to deer, most of our native woodlands are species-poor in terms of trees, shrubs and field layer plants and are almost completely lacking climbing and trailing plant species [2]. Additionally, many woodland plants are unable to flower and set seed and are limited to vegetative reproduction

due to the high levels of herbivory. As well as affecting the genetic diversity of the plants themselves, the lack of flowering and seeding deprives many insects, birds and mammals of a food source, leading to a reduction in overall woodland biodiversity.

## A standard approach

We have become so used to seeing woodlands that are grazed to the bone that many people think that woodlands 'should' have no understorey and no young trees or shrubs. Sometimes we see seedlings 'hiding' beneath the ground layer vegetation and we feel re-assured that the next generation is on its way. But a closer inspection will often reveal that these 'seedlings' have been browsed back to the height of the surrounding vegetation year on year. At other sites there are simply no seedlings or young trees present, so we conclude that the woodland canopy is not letting enough light through to the woodland floor or that there are no viable seeds, and we

wrongly assume that deer impacts are not that great. In fact, if you look closely at the shoots that are trying to emerge from the base or trunks of the adult trees, often you will see that they are all bitten back to nothing and that the lower branches of the adult trees have been pruned back to deer height. At yet other sites, we see young trees above the height of the ground vegetation and we conclude that all is well. However, a closer look reveals that only one or two species are 'getting away' and the more palatable tree and shrub species are not present, or are being too heavily browsed to 'escape'. The more palatable shrubs and climbers like honeysuckle, raspberry, bramble and ivy are all bitten back wherever they are within reach of deer mouths.

Even within deer fences, it can sometimes appear that regeneration is prolific and there is an abundant ground layer. Closer inspection of browsing on seedlings and saplings may, however, reveal that deer have

Above: Oak wood with no understorey due to high long-term deer impacts. Photo: Kate Holl.





Above, from top: Woodland with low long-term deer impacts showing complex structure. Heavily browsed birch basal shoots. Opposite page from top: Heavily browsed oak sapling. Unbrowsed hazel basal shoots. Photos: Kate Hollis and Helen Armstrong and Richard Thompson.

found their way into the enclosure and that, after a period during which young trees have ‘got away’, deer pressure has subsequently increased and the young trees are all heavily browsed.

These examples illustrate the importance of looking carefully at a number of indicators before coming to a conclusion about the level of deer impact. By doing so, it is possible to see not only the impact that deer are having currently but also what browsing pressure has been like in the past. Since different people look at different things and do not always look carefully enough at the right indicators, they can come up with quite different assessments of the impact of deer on the same wood. There is, therefore, a need for a standard approach that ensures that everyone is looking at a wood in the same way when assessing deer impacts.

**The Herbivore Impact Assessment method**

Ten years ago, with support from Scottish Natural Heritage and Forestry Commission Scotland, we and several colleagues (notably Richard Thompson and Bob Black) began the development of a simple, observational method of assessing the impact of deer, and other large herbivores, on woodlands. The aim was to produce a tool that anyone

could easily learn to use. We wanted a method that did not involve detailed measurements but, instead, asked the user to look carefully at all the relevant indicators of impact. Ten years on, we think we have a tried and tested method that fulfils our aims.

The method involves stopping at ten ‘typical’ locations within the woodland. At each location the structure of the woodland is first assessed as one of ten types (see Table 1). This provides information about historic grazing impacts on the woodland.

The level of current impact on the woodland is then assessed using seven indicators:

- On older trees
  - Browsing on shoots sprouting from the base of the trunk
  - Browsing on shoots sprouting from the sides of the trunk and from the lower edges of the canopy
  - Bark stripping and stem breakage
- On seedlings and saplings
  - Browsing rates
- On ground layer vegetation
  - Grazing on preferentially grazed plants
  - Grazing on ground vegetation
  - Ground disturbance

Woodland Structure Class	Suggested grazing impacts
1. Open ground, simple ground vegetation (no young trees or shrubs present)	May be open because of high herbivore impacts, because seed trees are absent or because the ground is very wet, very poor or rocky.
2. Open ground, complex ground vegetation (some young trees and palatable shrubs present)	A period of low impacts within the last decade.
3. Dense regeneration on previously open ground	Recent herbivore impacts low or absent.
4. Young, dense woodland in the stem exclusion, thicket or early maturity stage	Recent or historic impacts low or absent.
5. Mature woodland with understorey regeneration	A period of low impacts within the last decade.
6. Mature woodland, no understorey regeneration	Historically moderate to heavy herbivore impacts.
7. Post-mature woodland, dead canopy trees, complex understorey	A period of low impacts within the last decade.
8. Post-mature woodland, dead canopy trees, simple understorey	Heavy current or recent herbivore impacts and a decline in woodland cover.
9. Open canopy, open-grown trees, complex understorey	A period of low impacts within the last decade.
10. Open canopy, open-grown trees, simple understorey	An ongoing heavy impact and the potential for long-term woodland decline.

Table 1: Woodland structure types and potential past grazing impacts

Detailed guidance is provided on how to visually allocate the level of impact on each indicator present to one of five categories from 'none' to 'very high'. The absence of an indicator can usually have several possible causes, apart from herbivore pressure, so no inferences are made from such an absence. If an indicator is not present it is therefore recorded as 'not applicable'. Similarly, indicators of the presence, or density, of herbivores such as dung, tracks or fur caught on brambles, are not necessarily related to the level of impact so are not used. They can, however, be recorded for interest and as evidence of the presence of different herbivore species. The results for the ten locations can be compared, either for each indicator separately, or using a summary result for each location derived from all indicators. Mapping the results helps to highlight any spatial patterns. An overall result for the whole woodland can be derived by summarizing the results for all indicators and all locations.

To assess the cumulative impact of large herbivores on the previous season's growth the method is carried out, ideally, at the end of winter or in early spring, before significant new growth has occurred (usually March or April depending on location). If monitoring at this time of year is not possible, it can be done later but care is needed to ensure that only the impact on the previous season's growth is recorded. To assess the impact over summer only, monitoring can be carried out at the end of the growing season, focusing on the current year's growth and impacts. Assessing the woodland at both times of the year will help, for example, to separate the impact of summer-only grazing by domestic stock from the impact of deer over winter. Since the method needs just one visit to assess the cumulative impact over the whole year, or over the summer, and does not require detailed measurements or complicated data analysis, it is ideal for use by busy woodland managers. We believe it is an extremely useful tool that will assist them in getting to grips with the real impact of deer on their woodland. Details of the method, together with recording



forms and guidance, can be found on the Forestry Commission Scotland website as part of the Woodland Grazing Toolbox [3].

### Not all grazing is bad

A complete lack of grazing can, in some cases, particularly on more productive sites, lead to a loss of biodiversity as ranker plant species crowd out less competitive ones. Very light grazing, especially by cattle, which are less selective feeders than deer or sheep, can produce a woodland where some regeneration of the complete suite of tree and shrub species is taking place but where the ground layer is relatively short and a wide range of plant species can survive and reproduce. Getting the grazing pressure right is not easy, however, and some trial and error will usually be needed.

The Woodland Grazing Toolbox was developed to provide guidance on setting appropriate initial grazing regimes. Where lichens and lower plants are a key feature of a woodland, it may be important to keep the ground vegetation, and tree regeneration, suppressed although this is likely to reduce the diversity of other woodland species. As the mature trees age, some tree regeneration will be necessary to ensure continuity of habitat for lichens and bryophytes.

Whatever the objectives for a woodland, regular use of the

Herbivore Impact Assessment method is an easy and quick way to track changes in the impact of deer and domestic stock. Management can be adjusted, as necessary, in response to the results. Above all, we hope that the method will enable woodland managers, whether private, public or NGO, to easily and accurately assess the impact of deer on their woodland and that the results will then help to inform decisions about deer management needs.

### References

1. Patterson, G. et al. (2014) Scotland's native woodlands. Results from the native woodland survey of Scotland. Forestry Commission Scotland, Edinburgh. <http://scotland.forestry.gov.uk/supporting/strategy-policy-guidance/native-woodland-survey-of-scotland-nwss/national-nwss-report>
2. Holl, Kate & Armstrong, Helen (2014). Deer and livestock impacts on native woodlands in Scotland revisited. *Scottish Forestry*, 68(2), 32-36. <http://tinyurl.com/okcdt87>
3. Woodland Grazing Toolbox and Herbivore Impact Assessment Method <http://scotland.forestry.gov.uk/woodland-grazing-toolbox>

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