Natural England Research Information Note RIN030

# Environmental impacts of land management

**The farming, forestry, and game industries have had a profound impact on the English landscape and its wildlife through history. This has been through modifying natural habitats and natural resources, investing in features such as hedgerows, water control structures and drainage, thereby affecting underlying natural processes, leading to landscapes and wildlife that favour species typically dependent on open habitats, early succession and regular disturbance.**

**Our rural landscapes are largely formed from land managed by farming, forestry and game management businesses in both the lowlands and uplands. All three industries depend on a healthy natural environment for their respective harvestable products. They also provide a home for biodiversity and a space for recreation and relaxation within a richly detailed landscape.**

## What was done

We looked at a number of management systems or activities prevalent in the farming, game, and forestry industries, and reviewed the published literature on their impacts on the natural environment - on biodiversity, natural resources such as water, soil and air, and the landscape. These management activities are presented in the context of pressures on and within the relevant industry so that the wider drivers behind them are recognised and better understood.

## Results and conclusions

Farmed and afforested land has a huge range of landscape and biodiversity. These, and the quality of soil, air and water are products of and intrinsic to the way these landscapes function. The farming, game and forestry industries all depend on these functions to provide a harvestable product such as food and timber. Accordingly, management sympathetic to these aspects is an essential part of our land use systems. The relevant industries must be environmentally sustainable over the long term, to ensure their own survival.

Historically, land management systems have modified the English landscape into what we value so highly today. Over time, the land management industries have responded to a range of pressures and imperatives – from the need for self-sufficiency in food through to the need for basic economic viability. Research has shown that these responses are linked to a range of consequences for the natural environment - such as loss of semi-natural habitats, a dramatic decline in some farmland birds, high pollution levels in our water, high levels of greenhouse gas emissions and homogenisation of distinctive landscapes.

### Arable farming

Almost half of the agricultural land in England is used for arable production. This type of farming has historically depended on cultivation, carried out on well drained soils. Crops are predominantly raised with the help of chemical sprays and fertilisers. Whilst there are ways of producing crops without recourse to some or all of these management tools, there is a cost in terms of level of production, or adequately proven alternatives: cultivations generally reduce soil organic matter, which

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has a negative effect on soil structure, and potentially growth enhancing microorganisms, as well as carbon emissions. Use of minimal or zero tillage systems over an extended period has not been fully researched in this country, but such a system could bring major benefits in all these areas.

**Livestock farming**

Low intensity livestock farming (such as in the uplands) can be a vital tool in terms of maintaining valuable habitats (which have evolved due to human activity), and indeed contributing to the maintenance of rural communities. In more intensive systems, more commonly found in the lowlands, more manipulative management is often undertaken, potentially resulting in loss of biodiversity, and problems with pollution from manures, slurries and their associated gasesThese by-products can also have a high value in maintaining or enhancing soil fertility, if applied at the right time and in the right place.

**Management of land for game production**

Some of the landscape heterogeneity in the lowlands and uplands is related to the maintenance of habitats suitable for game cover. In many instances, the objectives of conservation, and game management co-incide. The more detailed evidence currently available indicates that the specific management approaches adopted (e.g. with regard to burning and drainage) can be significant in terms of the outcomes for biodiversity and resource protection.

**Forestry and woodland**

Both planting and felling trees can create or destroy habitats, depending on what is being replaced, what the underlying soils are, and what the previous management regime was. Creation of woodland habitat is generally beneficial in terms of habitat creation and carbon sequestration. Replacing heathland habitat, or damaging peat soils by planting trees may be more harmful to biodiversity and natural resources than leaving an area as open habitat. Equally, where woodland habitats have traditionally been managed, cessation of felling could compromise flora and fauna that depend on the understorey.

**Withdrawal of management**

This is a comparatively unresearched topic in England. Fears are voiced that rural decline, changes to the economics of land management or changes in demand for certain products, could predispose some areas to the abandonment of traditional land or forestry management. In many instances, this could contribute to landscape and biodiversity gains. Habitats and landscapes in England are almost all man-made, and their continued existence is often dependent on continued sensitive management. Gains in one aspect may mean losses elsewhere.

## Natural England's viewpoint

A number of the management techniques, or systems can have a damaging or a beneficial effect on natural resources, depending on how, when or where they are practised. We aimed to identify the key issues and natural processes associated with these activities, without being prescriptive. This will allow land managers to make a more informed assessment of the environmental consequences of the management systems they operate.

Much of the current evidence is focused on damaging effects of management activities. This is largely a reflection of the research that has been carried out in the relevant areas. Land management that has been successfully integrated with natural processes and habitats has generally been less closely researched, and often tends to be specific to local conditions rather than more generally applicable.

The Environmental Impacts of Land Management report examines our understanding of how management practices affect the natural environment. It will provide robust information that can help policy makers, land managers and others in their work to address the complex and challenging task of developing environmentally sustainable land management practices. The results will also provide the basis for identifying where climate change will lead to significant changes in the impacts and the risks in future.

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## Further information

For the full details of the research covered by this information note see Natural England Research Report NERR030 - *Environmental impacts of land management*.

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