



# Land-use legacies of twentieth-century forestry in the UK: a perspective

Susanne Raum 

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## Abstract

**Context** Complex interactions between societies and their environment have shaped landscapes across Europe over centuries. Therefore, taking a historical perspective can be important when designing new forestry policy and management activities.

**Objectives** This perspective aims to improve our appreciation of how a better historical understanding of landscapes can increase our understanding of current conditions and inform current and future policy and practice. I provide a perspective on land-use legacies and forest change, with a particular emphasis on landscapes, and using the example of forestry in the United Kingdom.

**Methods** For this purpose, I undertook a comprehensive review of scholarly forestry literature and of relevant policy and legal documents in the UK, covering the last 100 years.

**Results** This brief review of the dynamics of forest landscapes in the UK over the last 100 years, shows that certain decisions, policies and management activities had major effects on the landscape, especially in terms of landscape patterns and species distribution, constraining it until today. Historic research investigated some of these legacies, leading to real change in policy and management, including a

Broadleaved Policy, an Ancient Woodland Inventory, habitat restoration, habitat network and rewilding schemes. Research on past experiences of Dutch Elm disease in the UK and of similar outbreaks in other countries have guided responses to today's tree pest/disease outbreaks and plant trade decisions.

**Conclusion** A better appreciation of past decisions and activities, especially in forestry, helps to anticipate landscape legacy effects and potential cross-scale interactions of new policies and practices. It may also help to better justify and negotiate new decisions and long-term planning among multiple actors.

**Keywords** Land-use legacy · Land-use policy · Environmental change · Policy · History · Historical ecology · Forest management · Great Britain

## Introduction

Complex interactions between societies and their environment have shaped landscapes across Europe over centuries. Landscapes can change due to changes in the social system and/or the natural system (Bičák et al. 2001), and these changes, in turn, have effects on both systems alike (Bürgi et al. 2015). Over the past two decades, an increasing number of scholars have come to recognise that historical understanding of our landscapes is important to inform current and future

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S. Raum (✉)  
Centre for Environmental Policy, Imperial College  
London, London SW7 1NE, UK  
e-mail: s.raum@imperial.ac.uk

policy and practice (e.g. Marcucci 2000; Tieskens et al. 2017). Past land-use decisions, policies and management activities continue to influence landscapes and ecosystems for decades or even centuries (Foster et al. 2003). So, do natural or direct human induced events, such as storms, droughts, fires and pest/disease introductions (Fischer 2018). The ability to discern the history of a landscape can much enhance the policymaking and planning process (Antrop 2005; Palang et al. 2011). Historical studies also help to increase our understanding of current environmental problems (Christensen 1989).

Although all types of landscapes can be viewed through the lens of social-natural systems, forest landscapes comprise a particularly intriguing type of such coevolving systems because of their spatial and temporal dynamics (Fischer 2018). Forest landscapes change as the result of complex social and ecological factors that interact across time and space (Fischer 2018). This may be a slow process punctuated by rapid and, at times, surprising shifts or threshold crossings (Liu et al. 2007). The planting of new forests or the clear-cutting of established ones are examples of more drastic or rapid changes, the conversion of single-aged, mono-culture forests to mixed age and species stands (or vice versa) may create a more subtle and slow change; both, however, may affect landscapes and ecosystems. This combination of linear and non-linear interactions between ecological and social components across time and space make forest landscapes a good example for highlighting the importance of taking a historical perspective when designing policy and management activities (Fischer 2018). Trees can live for hundreds, sometimes thousands of years and decisions made in the past can still be highly relevant decades or even hundreds of years' later (Fischer 2018). In many regions of the world, past forest management has left a lasting imprint on landscapes (Bürgi and Schuler 2003). History adds to our understanding of the present and helps to understand present and potential future characteristics of forests (Bürgi and Schuler 2003).

Studies that have taken a historical perspective on forests to gain a better understanding of the presence have looked at both ecological and social aspects. Early studies include work, for instance, on the historic changes in woodlands in eastern England (Peterken and Harding 1975), tree rings and climate (Fritts 1976), the fire history of Barron Township

Algonquin Park Ontario (Cwynar 1978), the age structure and disturbance history of a Southern Appalachian Virgin Forest (Lorimer 1980), and the historical factors affecting the number and distribution of vascular plant species in the woodlands of central Lincolnshire (Peterken and Game 1984). More recently, scholars looked at forest change in the Swiss lowlands (Bürgi 1999), the contributions of land-use history to carbon accumulation in US forests (Casperperson et al. 2000), the suppression of fire on carbon storage in Minnesota (Tilman et al. 2000), the long-term effects of land-use history on nitrogen cycling in northern hardwood forests (Goodale and Aber 2001) and the past management of Dutch elm disease in Great Britain (Hardwood et al. 2010). Scholars who looked at historic changes with a particular emphasis on forested landscapes include Rackham (1976) with his history of trees and woodland in the British landscape, Marcucci's (2000) landscape history of Long Pond, Pennsylvania, Hersperger and Bürgi (2010) who analysed how policies shaped landscapes in the Limmat Valley, Switzerland and Tieskens et al. (2017) who characterised cultural agricultural and forest landscapes in Europe.

This perspective aims to improve our appreciation of how a better historical understanding of our landscapes can increase our understanding of current conditions and inform current and future policy and practice. Drawing on scholarly and secondary literature, I provide a perspective on land-use legacies and forest change, with a particular emphasis on landscape. I define landscape as „an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors” (Council of Europe 2000). A landscape can refer to visual and ecological characteristics. Here, I focus on temperate forests, using the example of forests in the United Kingdom. As sets of coevolving social and natural systems, connected through time lags, cross-scale interactions and feedbacks, temperate forest landscapes serve as a particularly good example (Fischer 2018).

### **UK forests and forestry—a brief overview**

Over the centuries, the importance of forests and woodland to British society has changed significantly, impacting landscapes, ecosystems, forest cover, forest

policy and management. In post-glacial times, Britain was largely covered by forests of various kinds (Rackham 1986). The continuous expansion of human populations and their livestock since Neolithic times led to substantial forest decline (Rackham 1986; Aldhous 1997). Forest products were initially used primarily for fodder, fuel and ornamental purposes and, to a lesser extent, for wood and timber for local use (Rackham 2006). In the 16th century, wood fuel-using industries, such as ironworks and tanneries expanded rapidly, requiring increasing volumes of wood for charcoal production (Rackham 2006). Under Henry VIII's (1491–1547), deer parks became popular, encouraged by his passion for hunting (Rackham 2006). The late 17th century saw a significant rise in timber use for naval and commercial shipbuilding and coal mine pit-props (Rackham 2006). The 18th century saw a rising fashion in skilfully designed landscapes around country mansions which incorporated ancient trees and woods (Rackham 2004). In the 19th century, there was a growing need for oak wood for expanding railway lines. In the second half of the 19th century, estate woods became less important for the production of timber, due to falling timber prices, and were increasingly used for game sport purposes (Foot 2010).

Despite, at times, considerable timber shortages, past government action was only taken on an ad hoc basis in response to specific problems either concerning the provision of oak for naval purposes or the royal forests (Aldhous 1997). The general view was that tree planting was mainly the responsibility of private individuals, rather than that of the state (Robinson 1927; Holmes 1975). By the beginning of the 20th century, forest cover was down to an estimated 4.7% of land cover (Forestry Commission 2019). As a result of the timber crisis caused by World War I, forestry became a strategically important sector (Mather 1991). This was reflected in a shift towards state organisation and the establishment of the Forestry Commission in 1919 (for England, Scotland and Wales) (Raum and Potter 2015). The Forestry Commission continued to operate until the early 21st century in this setting, when, as part of the devolution of public administrative services, its functions in Wales were transferred to the Welsh Government and Natural Resources Wales in 2013 and in Scotland to Scottish Forestry and Forestry and Land Scotland in 2019 (Forestry Commission 2019). Today, the

Forestry Commission England and the newly devolved country equivalents, and Forest Service in Northern Ireland are responsible for setting forestry policy (Forestry Commission 2019).

These public organisations also own or manage 0.86 million hectares—27% of the total woodland area—ranging from 16% in England to 55% in Northern Ireland (Forestry Commission 2019). They also offer large areas of open access land for the public and manage many important wildlife sites, such as the New Forest in southern England and Glen Affric in the Scottish Highlands (Gambles 2019). The other forest owners consist of 43.6% private owners, 12% businesses, 3.6% charities and 4.9% local authorities and other public owners (Smith et al. 2001).<sup>1</sup> Today, the area of forest and woodland (hereafter used interchangeably) in the UK is estimated to be 3.19 million hectares. This represents 13% of the total land cover: 10% in England, 19% in Scotland, 15% in Wales and 8% in Northern Ireland (Forestry Commission 2019). Conifers account for around one half (51%) of the UK woodland area, although this proportion varies from around one quarter (26%) in England to around three quarters (74%) in Scotland (Forestry Commission 2019). Conifers are found mainly in the uplands, whereas broadleaved woods are mainly in the lowlands, although there they are supplemented with significant conifer plantations in some areas, especially on former heathland in South-West England and East Anglia (Bunce et al. 2014).

### Land-use and landscape change due to afforestation

By the early 20th century, ninety percent of the country's timber needs were met by imports—hardwoods came mainly from tropical countries and softwoods from the Baltic States, Russia and North America (Holmes 1975). The magnitude of this dependency on timber imports was only fully realised during World War I (Holmes 1975). During the war years of 1914 to 1918, Britain was mostly cut off from its overseas timber supplies and had to rely on its own forests for timber. Its dependency on foreign timber became a major national security issue (Griffith 1951).

<sup>1</sup> This is the last known date for this type of data.

In response to the timber crisis, a Forestry Subcommittee was set up in 1916 under the War Reconstruction Committee to look at the best ways of increasing timber supplies (Acland 1918). The Acland Committee, as it was known, concluded that a state organisation was the most effective way of co-ordinating extensive re-forestation so that future timber needs could be met by home grown timber (Acland 1918). The committee further suggested to increase forest cover from 1.2 million to 1.9 million hectares over an eighty-year period. Over the first ten years, 60,703 hectares were to be planted by the proposed new state organisation and 50,000 by private landowners with government assistance (Acland 1918).

At the time, 97% of the wooded land was privately owned with the remainder being royal forests, belonging to the crown estate (Forbes 1904; Holmes 1975); broadleaved trees dominated both private and royal forests (Coppock 1960). Forestry was mainly practised in the context of estates owned by the aristocracy or wealthy individuals (Forbes 1904; Holmes 1975). These estate woods were a mixture of arboriculture and landscape gardening; very few, however, were under management for timber production (Forbes 1904). Some forests were kept for the purpose of providing cover for game (deer, pheasants, partridge) for sporting reasons (Stewart 1985). In response to the Acland Committee's recommendation, the UK government embarked on an intensive afforestation programme beginning with the 1919 Forestry Act. The Act established the Forestry Commission as the new state-owned Forest Authority for Great Britain (Holmes 1975), i.e. England, Scotland and Wales. It was given wide powers to promote afforestation, the production and supply of timber and timber industries, to acquire and plant land, provide grants, undertake research and provide education (HMSO 1919). In Northern Ireland, forestry was placed under the responsibility of the then Ministry of Agriculture (Aldhous 1997).

During the 1920s and 30s, the newly formed Forestry Commission focused on acquiring and planting land. The bulk of this was poor-quality and therefore cheap agricultural land, including lowland heaths, and later upland heath- and moorland (Rackham 2006; Foot 2010). The afforestation led to the largest change in land use in Europe, involving a shift from agriculture to forestry, especially in the uplands

(Bunce et al. 2014). By 1939, the Commission had acquired 263,046 hectares of land of which it had planted 149,734 hectares in 230 new forests, dispersed throughout the country; it had become the largest landowner in Britain (Aldhous 1997). The Forestry Commission's landholdings then included many of the royal forests, hitherto part of the crown estate, and local council woods which had both been placed under the Commission's responsibility as part of the 1923 Forestry (Transfer and Woods) Act (HMSO 1923). Another 50,586 hectares were planted between 1919 and 1939 in private forests with the assistance of government grants (Aldhous 1997). Nonetheless, there was merely a small net change in the gross woodland area in the UK during this period (Aldhous 1997).

The royal forests were often established semi-natural broadleaved woodlands; some had existed for hundreds of years (Stewart 1985). At the time, established woods were closely linked to the rest of the landscape and semi-natural habitats comprised a high proportion of the landscape between the woods (Rackham 1986; Peterken 1996). Trees spread out into the surrounding countryside through hedges and areas of wood-pasture. Grassland and heath came into the woods along rides and glades or at the boundaries (Bunce et al. 2014). In contrast, the new forests were plantations, consisting of even-aged, non-native and fast-growing conifer species, planted in geometrical blocks on open ground (Coppock 1960). One of the first articles raising concern over the effects of afforestation on the British landscape was published in the journal 'Forestry' in 1927. In his article 'Aesthetic Consideration in British Forestry', W. Dallimore (1927, p. 53) criticised the "*fancy block after block of the same kind of tree... spaced with mathematical accuracy, and only relieved by other blocks of another kind of dismal uninteresting trees*". Whilst some landscapes were dominated by these new forests, in others' the blocks were more localised, altering cultural landscape patterns, vegetation cover and even drainage systems (Bunce et al. 2014). In the 1930s, first local contentions occurred in the Lake District, where the Forestry Commission proposed large scale afforestation in Eskdale and Dunnerdale (Symonds 1936).

World War II, caused another devastating loss of standing timber, the brunt of which was carried by the former royal forests and privately owned forests, as

most of the newly planted state owned conifer plantations were still too young to be of much use (Foot 2010). In Shabbington Woods in southern England, for instance, a remnant of the former royal forest of Bernwood, traditional broadleaved coppice-with-standards tree stands were clear-felled during the War and later replanted with mono-culture conifer or conifer-broadleaved mixtures in which the conifer was dominant (Kirby and Thomas 2017). The sudden visual effects of tree felling in many parts of the country were considerable (Foot 2010). In response to the renewed timber crisis, the Government enacted a series of Forestry Acts to aid restocking and/or restructuring of privately owned woodlands, to make state timber production more efficient and to halt further deforestation through the introduction of timber felling licences (HMSO 1943, 1944, 1945, 1947a, b, 1951). In line with the intensification of agriculture after the war, the focus in forestry shifted from afforestation to the intensification of timber production (Zuckerman 1957).

### Forest change due to intensification of timber production

The Forestry Act 1951 (HMSO 1951), especially, placed even more emphasis on timber production. In the years that followed, the Forestry Commission, due to pressure of the Treasury and a growing domestic wood processing industry, was forced to become more efficient and requested to supply large volumes of timber (Gambles 2019). The newly planted state-owned conifers formed the bulk of the timber required to feed the growing demand for pulp and board wood (Scot 1966). This rapidly growing demand, however, led to renewed concerns of timber shortages, resulting in new planting programmes on even greater scales (Scott 1966). Moreover, the Forestry Commission, helped by technological advances, rationalised and mechanised its operations and increasingly planted shorter rotation species, (Foot 2010). The net area of state forests increased between the mid-1940s and 1980, when it nearly doubled. The net area of privately-owned woodland increased substantially after 1956 (Aldhous 1997). The intensification of forestry, coupled with the increasing use of fertilisers, herbicides, pesticides, heavy machinery and the establishment of forest access roads, forests dwellings

and even villages in remote locations, resulted in considerable land manipulation and change (Mason 2007; Tsouvalis 2000).

The 1960s saw the beginning of large-scale afforestation by mainly private forest investment companies, especially in the Scottish uplands, stimulated by a favourable tax system (Tompkins 1989; Tsouvalis 2000). As a result, in some regions in the uplands, entire landscapes became dominated by coniferous plantations (Bunce et al. 2014). Apart from the visual impacts on the landscape, these plantations had major impacts on ecosystems, including changes in species distribution, run-off of water, drying out of soils, changes in water levels and the destruction of the original drainage patterns and small streams, including their flora and fauna (Bunce et al. 2014). The visual effects of afforestation and the increasingly harsh treatment of semi-natural ecosystems resulted in more wide-spread criticism of the Forestry Commission by a rapidly growing environmental and recreational lobby (Aldhous 1997; Foot 2010). The Forestry Commission responded, amongst other measures, by appointing the landscape consultant Sylvia Crowe in 1964 (Richards 2003; Foot 2010). Crowe introduced more aesthetic treatments of afforestation schemes, including contour planting and broadleaved trees in sensitive and edge locations (Crowe 1966; Crowe 1979). In the Kielder Forest District, an upland forested area in northern England, for instance, a new forest management plan was developed to move away from the early uniformity and to limit future wind damage caused by the clear felling and restocking of large areas of even-aged trees (Hibberd 1985).

The Countryside Act 1968 (HMSO 1968), a further product of these critiques and the lobbying for greater access to the countryside, strengthened this development (Foot 2010). The Act required public bodies “*to have regard to the desirability of conserving the natural beauty and amenity of the countryside*” (HMSO 1968). The Forestry Commission, especially, was required to “*provide or arrange for or assist in the provision of tourist, recreational or sporting facilities and any equipment, facilities or works ancillary thereto*” (HMSO 1968). In the following years, the Forestry Commission extended its recreational facilities in many of its forests; it had already opened some of its less productive forests in the 1930s (Nail 2010). Recreational innovations included new trails and hides for viewing wildlife and sculpture trails. Nature trails

became popular in the early 1960s through the development of county naturalists' trusts and the establishment of the Council for Nature, a national body which actively lobbied for better management of nature reserves (Matless et al. 2010). In Grizedale in the Lake District, the Forestry Commission established a Wildlife Centre in 1968 and opened a sculpture trail in 1977 (Steele 1972; Nevard and Penford 1978). However, the 1970s also saw the onset of Dutch elm disease, a serious fungal disease which spread across the country, killing more than 25 million English elm trees. Elms had dominated much of the British landscape until then (Gambles 2019).

### Land-use, landscape and forest change due to balancing of forestry objectives and land restoration

From the 1980s onwards, the sixty year-long emphasis on afforestation and timber production was replaced by a more formal widening of forestry objectives (Slee 2012). One of the milestones for this development was the Wildlife and Countryside Act 1981 which placed more focus onto the protection of wild plants, animal species and their habitats (HMSO 1981). In the same year, John Morton Boyd, the newly retired head of the Scottish Nature Conservancy Council, was appointed by the Forestry Commission to encourage more nature conservation on the Commission's estate (Foot 2010). In response to the loss of natural woodland, first highlighted in the publication 'Native Pinewoods of Scotland' (Steven and Carlisle 1959) and work by Oliver Rackham (1976) and George Peterken (1977, 1981), the Nature Conservancy Council also began to identify and compile a list of ancient woodlands—the Ancient Woodland Inventory—in 1981 (NCC 1984, Thomas et al. 1997). In 1985, the Wildlife and Countryside (Amendment) Act (HMSO 1985) placed even more emphasis on landscape amenity and conservation. It instructed the Forestry Commission to keep a 'reasonable balance' between, "(a) ... afforestation, ... the production and supply of timber, and (b) the conservation and enhancement of natural beauty and the conservation of flora, fauna ..." (HMSO 1985). In the same year, the Commission launched its 'Policy for Broadleaved Woodlands' (Forestry Commission 1985) with the intention to halt the further conversion of broadleaved woodlands to

conifer plantations (Mason 2007) to safeguard landscape amenity and biodiversity. In 1988, large scale upland conifer afforestation, by mainly private investors, came to a standstill, due to a change in tax rules (Lynch 1989; Tompkins 1989). Overall tree planting slowed considerably thereafter (Aldhous 1997); the rate of increase in conifer area slowed down, whereas broadleaved cover increased (Bunce et al. 2014).

The introduction of the idea of 'rewilding' (Foote 1990; Soule and Noss 1998) in the early 1990s, strengthened previous calls for more conservation, however, with a new emphasis on the restoration of manipulated/degraded landscapes and ecosystems (Bunce et al. 2014). Such restoration included, for example, the conversion of landscapes without tree cover, especially in the uplands, to a more natural state, involving trees and woods (Bunce et al. 2014). Similarly, proposals for the development of habitat networks were made (e.g. Adams et al. 1992; Moseley et al. 2005) aimed at offsetting some of the negative effects of the increased isolation of woods through the creation of semi-natural vegetation between woods (Hopkins and Kirby 2007). Habitat networks were seen as a basis for habitat restoration (Peterken 1996). Moreover, in response to the UK Biodiversity Action Plan, published in 1994, action plans were developed to aid the recovery of priority species and habitats (BAP 1994). The Scottish Forestry Strategy, for instance, encouraged the development of forest habitat networks through the restoration and improvement of existing woodland and the expansion of new woodland. Specific examples include the development of a native woodland habitat network in the Scottish Highlands (Moseley et al. 2005). In more recent years, a series of local-level projects, such as in Ennerdale in the Lake District England and in Carrifran in Dumfriesshire Scotland, have been set up to restore native forests and their natural processes to increase ecological resilience in the face of climate change (Bunce et al. 2014). 'Wild Ennerdale', a partnership project led by the principal landowners in the Ennerdale valley, is one of the largest initiatives in England; it allows ecosystems throughout the valley to evolve with little or no human interference (Bunce et al. 2014).

The first UK Forest Standard, published in 1998, supported ideas of landscape and ecosystem restoration, whilst also placing more explicit consideration on

balancing the social, environmental and economic aspects of forests; it set out the standards for the sustainable management of all forests and woodlands in the UK (Forestry Commission 1998). Since the 2000s, there have been increasing challenges due to a rise in tree pests and diseases and climate change (Gambles 2019). One of the most challenging pathogens, *Phytophthora ramorum*, first discovered in a garden centre in Sussex in 2002, has killed many trees, especially in the south-west of England (Gambles 2019). Research on the earlier Dutch Elm disease outbreak (e.g. Hardwood et al. 2010; Tomlinson and Potter 2010; Santini et al. 2013) has helped to shape policy and management for today's outbreaks, such as ash dieback. Climate change and evolving international trade are likely to further increase the risks posed by the introductions of new tree pests and diseases (Potter and Urquhart 2017). The first European Landscape Convention, introduced in the UK in 2007 aims at promoting the protection, management and planning of the landscapes (European Council 2000). However, due to Brexit, it still has to be seen whether the Convention will have much impact on the British landscape. There has also been another recent push towards tree planting in both rural and urban areas, due to the importance of trees in mitigating and adapting to climate change. The 2008 Climate Change Act (HMSO 2008), for instance, encourages afforestation as a cost-effective way to climate change mitigation. Similarly, the Renewable Heat Incentive (DECC 2011) is driving increased demand for home grown timber.

## Summary and conclusion

Forest landscapes change as a result of complex social and ecological factors that interact across time and space. It is increasingly recognised that a historical understanding of these factors enables decision-makers to make more informed decisions about future actions (Fischer 2018). This perspective on forest change and land-use legacies in the UK indicates that certain decisions, policies and management activities during the last 100 years, had major effects on the landscape. Table 1 synthesizes the major policy stepping stones, illustrating the historical shifts in forest policy or management practice and their landscape legacy effects that continue to influence

the structure of landscapes today. During the first half of the last century, there were major land-use and subsequent landscape changes, due to afforestation, especially through monoculture plantation forests. This was followed by landscape changes due to management activities and practices, such as emergency clear-cut felling of old forests during WWII and subsequent regular clear-cut harvesting of matured plantation forests. During the second half of the last century a more gradual change of existing forest stands took place, due to forest intensification and mechanisation, including the conversion of private mixed broadleaved to mono-culture conifer forests. However, towards the end of the last century, there was a major shift in favour of broadleaved trees, habitat and species restoration, and landscape amenity. In more recent years, there has been a renewed focus on afforestation, especially in the Midlands and the north of England, and on rewilding degraded landscapes. Many of these past decisions had lasting effects on the landscape, for instance, on landscape patterns and species distribution, constraining today's landscapes in terms of management and climate change.

Historic research by Steven and Carlisle (1959), Rackham (1976, 1986, 2004) and Peterken (1977, 1981, 1996), amongst others, investigated complex social and ecological factors, making major contributions to people's understanding which led to real change in policy and management. Their comprehensive work, for instance, informed the Forestry Commission's Broadleaved Policy, the Ancient Woodland Inventory, the development of policy and programmes for habitat restoration, the establishment of habitat networks, and rewilding schemes. The latter includes increasingly large-scale restructuring programmes, especially in upland areas. Moreover, research on past experiences of Dutch Elm disease in the UK (Hardwood et al. 2010; Tomlinson and Potter 2010) and of similar outbreaks in other countries (Santini et al. 2013) have guided responses to today's tree pest/disease outbreaks and plant trade decisions. Still, past choices, especially on tree species and species distribution, require major adjustments as equal aged monoculture conifer stands are still widespread and tend to be less resilient in the face of climate change (Jactel and Brockerhoff 2007).

A better appreciation of past choices and activities, especially in forestry, helps to anticipate landscape

**Table 1** Overview of major policy stepping stones and their landscape legacy effects

Legislation/policy	Change in approach and management	Landscape effects
Forestry Act 1919	Land conversion and afforestation in form of conifer plantations	Homogeneous monospecific stand structure
Forestry Act 1951	Intensification of timber production, conversion of broadleaved to conifers	Monospecific stand structure, loss of old growth forest
Wildlife & Countryside Act 1981/85	Focus on conservation and landscape, halting of afforestation in Scotland	Softened stand structure of plantations, protection of old growth forest
Broadleaved Policy 1985		
Biodiversity Action Plan 1994	Focus on landscape restoration and development of habitat networks	Softened and more natural landscape patterns
Climate Change Act 2008	Renewed focus on afforestation and tree planting	Varied multi-specific stand structure
Renewable Heat Incentive 2011		

legacy effects and potential cross-scale interactions of new policies and practices. A good understanding of the past can also help to justify and negotiate new decisions (Fischer 2018) and to foster broad-scale policy and management change (Antrop 2005; Maruccci 2000). This may include decision-making related to tree species choice, agroforestry schemes, wildlife management (e.g. deer and squirrels), the reintroduction of wildlife (e.g. beavers, wolfs or even bisons) or timber and plant trade decisions. Looking at history can help to anticipate changes and the longer-term effects of such choices. Anticipating how ecological processes that result from current forest management will interact across time and space may also help people make informed decisions at the finer management scales (Fischer 2018). In forestry, the outcomes of current policy and management actions may be evident for decades, if not centuries.

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