



Land Use Policy

journal homepage: www.elsevier.com/locate/landusepol



Forestry paradigms and policy change: The evolution of forestry policy in Britain in relation to the ecosystem approach



Susanne Raum*, Clive Potter

Centre for Environmental Policy, Faculty of Natural Sciences, Imperial College London, South Kensington Campus, London SW7 1NA, United Kingdom

ARTICLE INFO

Article history:

Received 10 November 2014

Received in revised form 10 August 2015

Accepted 13 August 2015

Keywords:

Forest policy

Forest management

Sustainable forest management

Ecosystem approach

Ecosystem services

Politics

Paradigms

ABSTRACT

Forestry policy and practice in Britain has been subject to a series of paradigm changes since the establishment of the Forestry Commission in 1919. Drawing on a documentary analysis of legislation, published policy statements, commentaries and scholarly critiques, this paper argues that British forestry policy has undergone three significant paradigm shifts since it was first mooted in the late 19th century. With origins in a largely ad hoc and laissez-faire attitude towards forest expansion and management which dominated up to World War I, a productivist stance based on intensive mono-culture plantations in order to reduce import dependence then held sway until the early 1970s. This has since been overlain with ideas about multi-functionality and sustainability that continue to be important today. The new ecosystem approach (and its specific emphasis on the provision of ecosystem services) can arguably be viewed as an emerging new forestry paradigm era in which ideas of resilience and sustainability are to the fore. It is suggested in conclusion that while the policy and practice of forestry in Britain continues to mirror broader shifts in environmental governance within the country, these in turn are increasingly influenced by international debates and obligations.

© 2015 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

1. Introduction

The balance between the commercial importance and societal contribution of forestry and woodland in Britain has changed significantly since the setting up of the Forestry Commission and the advent of a recognisably government-led policy for forestry in 1919. Prior to this forestry was already becoming a strategically important sector. This was reflected in the shift towards state organisation that was enshrined in the 1919 Forestry Act and a long series of reassessments and changes of emphasis which followed. The literature offers various analyses of these developments (e.g., Mather, 1991; Tsouvalis, 2000; Mason, 2007) but few have examined the drivers behind these ebbs and flows. Many changes can be traced to key ideas and frameworks which shaped debate and justified the adoption of new policy paradigms but which also required the broader socio-economic context to be favourable in order to be adopted. Moreover, while forestry policy in Britain has been strongly influenced by national concerns and domestic circumstances, for instance the more or less complete eradication of native forest and severe war-time timber shortages (Mather, 1991),

formal international policy influences have become increasingly important in recent years. Indeed, in common with most of the western world, forestry policy and management is now shaped by a series of world views and international obligations which influence beliefs and impact on practice.

A useful way to conceptualise the role of arguments and ideas in shaping and reshaping an important public policy domain such as forestry is that of a policy paradigm. A paradigm can be defined as “a dominant belief structure that organises the way people perceive and interpret the functioning of the world around them” (Milbrath, 1984; p. 7). At any point, new circumstances may challenge the belief and value structure of the dominant paradigm (Brown and Harris, 2000), and cause a shift in focus. Such paradigm shifts can be seen as a “profound change in thoughts, perceptions and values that form a particular vision of reality” (Capra, 1982; p. 30). Some commentators have argued that the process of paradigmatic change is characterised by a revolutionary departure from established procedures (e.g., Kuhn, 1962; Hall, 1993). Others, in particular social scientists, prefer to characterise the process as evolutionary in nature (Skogstad and Schmidt, 2011). Previous studies of paradigm evolution and change suggest that while some threshold events can be identified which lead to the replacement of one paradigm by another, more often there is an accumulation of ideas and rationales over time, leading to backward referencing, reassessment

* Corresponding author.

E-mail addresses: s.raum@imperial.ac.uk (S. Raum), c.potter@imperial.ac.uk (C. Potter).

and rebranding. Policy analysts have had a particular interest in the role of arguments and ideas in framing policy choices and justifying changes in policy direction (e.g., Hall, 1993; Coleman et al., 1996; Skogstad, 2011). Peter Hall (1993), in his classic study of British macro-economic policy in the 1970s and 1980s, explored the idea of policy paradigms, pointing to periods of continuity in public policy, punctuated by occasional paradigm shifts when existing ideas and standards were questioned, bringing about shifts in policy direction. A policy paradigm can be defined as “a powerful cognitive-normative concept that permits the analysis of distinctly different, sometimes incommensurable ways of conceptualising the issues, problems, interests, goals, and remedies involved in policymaking” (Carson et al., 2009; p. 7).

Hall (1993) groups shifts in policy into first, second and third order changes, “according to the magnitude of the changes involved” (p. 287) which will be used as the basic framework for this analysis. He sees first and second order change as “normal policymaking”, i.e., “a process that adjusts policy without challenging the overall terms of a given policy paradigm” (p. 79). By contrast, third order policy changes are “likely to reflect a very different process, marked by the radical changes in the overarching terms of policy discourse” (p. 279). This he characterises as a ‘paradigm shift’. First order changes are likely to display the features of routinized decision making, such as the adjustment of fiscal and monetary instrument settings (Hall, 1993). Second order policy changes move one step further, and may include new policy instruments, however without changing the overall policy goals (Hall, 1993). By contrast, third order changes are likely to display a radical change of the hierarchy of goals, of policy settings, and the set of instruments employed to guide such policy, including the introduction and/or elimination of regulatory instruments. According to Hall, these radical shifts usually go together with a more substantial change in the analysis on which previous policy was based. Coleman et al. (1996) adapts many of these ideas to present an analysis of agricultural policy paradigm change in Australia, Canada and the United States. Drawing on the conceptual tools of policy feedbacks and networks, their work suggests that change is a negotiated process between various group representatives and state actors, resulting in a “more managed series of policy changes that culminate in a paradigm shift” (p. 273). In recent years, scholarly attention has increasingly been given to the implications for domestic policy development of various transnational influences (Skogstad, 2011; Carson et al., 2009), including the role of formal international organisations, global networks of various state and private actors, and civil advocacy groups in paving the way for paradigmatic policy change (Skogstad, 2011).

Those scholars who have explored the historical development of forestry policy in any detail (e.g., Mather, 1991; Richards, 2003; Nail, 2010) typically trace observable shifts in forest cover and management over time, but only indirectly distinguish between the scientific, social and policy dimensions of such shifts of emphasis. In her study of Britain’s state forests, for instance, Judith Tsouvalis (2000) investigated the relationships between world views and the woodland management practices in Britain that come to be associated with them, particularly focusing on the Forestry Commission and its overlapping spheres of influence. Other authors have focussed on forest (resource) management paradigms (e.g., Brown and Harris, 2000; Kline et al., 2013) or forest cover change in the context of the overall land use pattern, frequently termed a forest transition (e.g., Mather, 1991; Barbier et al., 2010). Our review of the literature suggests that there have been no academic studies focusing specifically on forest policy paradigms in Britain or elsewhere, though Kline et al. (2013) briefly summarise historical forest management paradigms in the United States and relate these to economic approaches. These authors divide the 20th century into three distinct national forest management phases, each of which, they argue, “can be traced to specific socioeconomic forces and laws

enacted by the US Government” (Kline et al., 2013; p. 141). Other authors’ (e.g., Behan, 1990; Kennedy and Quigley, 1998; Brown and Harris, 2000) have looked at various aspects of forest resource management paradigm shifts in the 1980s and 90s, again in the United States. Alexander Mather (1990), in his seminal work on ‘Global Forest Resources’ analysed change in forest use and cover in the context of overall land use change. He suggests a three stage transition from ‘pre-industrial’ to ‘industrial’, and, more recently, ‘post-industrial’ forestry practices. In the following year, Mather (1991) proposed “a broad temporal sequence of these three stages” for European forests during the twentieth century, using distinct milestones to mark the transitions (p. 245). In this same article, Mather also reviews trends in British forestry policy against the background of the more general shift from industrial to post-industrial forests (Mather, 1991).

Despite a wide application of the core concept, applying a paradigm framework to explain specific periods of policy stability and change is not a straightforward task. Paradigm shifts are often hard to identify at a specific point in time. They often constitute “a phase in a broader process of change”, entailing alterations in institutional arrangements, the redefinition of policy problems and the reordering of guiding principles (Carson et al., 2009; p. 377). This process frequently takes place over extended periods and accumulates through a long series of organisational and regulatory changes (Carson et al., 2009). Moreover, most commentators acknowledge “the existence of competing paradigms in any given context” (Surel, 2000; p.502). A dominant paradigm, if there is one, is thus not necessarily exclusive, adding to the overall complexity of (public policy) paradigm research. Furthermore, in a transnational context, the ‘diffusion’ of a new (policy) paradigm entails frequently complex and, at times, inconsistent mechanisms of adaptation (Surel, 2000). This, Surel (2000) argues, depends on the one hand on the nature and extent of the previous paradigm, and on the other, on “the institutional configurations specific to each country which act as filters to the dominant paradigm” (p. 42). Transnational norms are therefore likely to be ‘localised’ and introduced in parts, rather than adopted in their entirety (Acharya, 2004; Skogstad and Schmidt, 2011). An ‘operative’ policy paradigm on the national level, may thus not necessarily be the same as the conceptual framework that has originally guided it (Carson et al., 2009).

Given these analytical challenges, the overall aim of this paper is to review and analyse recent trends in British forestry policy in terms of paradigm change through a primarily top-down analysis, complementing Tsouvalis’s more bottom-up approach. Drawing on a comprehensive review of the published literature, particular emphasis will be placed on how wider more formal international and European policy-making processes are coming to exert growing influence on national forestry policy and operations. In this article, Hall’s policy paradigm framework will be applied to British forestry, using Mather’s forestry transition categories as a starting point. We go on to develop a more refined differentiation of Mather’s post-industrialist period. This will be done primarily through a review and analysis of key legislative and other policy measures and forestry policy statements. Although the relevant events can be described here only in brief terms, we identify key policy milestones which mark the most important transitions.

2. Methods and approach

There are various methods available to investigate, analyse and diagnose paradigm shifts of the sort discussed above. In this paper, a qualitative, interpretative and iterative approach has been applied, based on textual methods, mainly documentary review and analysis. Relevant public documents were reviewed, in particular international, European and UK forestry policy documents,

guidelines, acts, and statistical data. We have aimed to capture the most salient international, European and UK national forestry related legislation applicable to Britain, fitting this within the overall analytical framework of paradigms. Moreover, national forestry related policy documents, standards, instruments, and governmental reports, have been looked at for the purpose of this analysis. This has been supplemented by peer reviewed literature and, due to a lack of comprehensive journal papers on British forestry policy, some secondary material, mainly in form of books, to help fill gaps. Documentary review and analysis has been further used to help identify various indicators that might signal or be taken as proof of major policy change. The findings of the review were broadly assessed against Hall's policy paradigm framework presented in the introduction. Drawing on Hall's third order policy changes, forestry policy in Britain was examined for evidence of paradigm shifts in terms of the reordering of goal hierarchies, the establishment of new policy settings and the adoption of new types of policy instruments (Hall, 1993). In this paper, the emphasis has been on identifying such milestones primarily through legislation, and then by other instruments, tools and key policy statements. Various indicators have been identified to mark major policy transitions.

3. Results and discussion

3.1. Mono-functional forestry (industrial forestry): 1919–(1967)

The emergence of what Tsouvalis (2000) calls 'scientific forestry' centred on the creation of plantation forests designed to supply high volumes of commercial timber dates from the period immediately after the First World War. Prior to this, in 1905, an audit of the total woodland area in Great Britain had shown a decline to about five per cent of the country's total land surface (Acland, 1918). These pre-plantation woodland areas were primarily privately owned estates, with some belonging to the Crown. With timber prices falling in the second half of the 19th century, many estate woods had become less important for the production of timber and instead became coverts for game (deer, pheasants, partridges) (Foot, 2010). Many also remained important for landscape reasons (Foot, 2010). World War I had severed most of Britain's overseas timber supplies and the country had to rely on its own woodlands for timber. As a result, forest cover had fallen sharply and Britain's dependence on foreign timber provisions became an issue of national security (Acland, 1918). In response to the timber crisis, a Forestry Subcommittee, known as the Acland Committee, was set up in 1916 under the War Reconstruction Committee, to look at the best ways of increasing timber supplies. It recommended a state organisation as being the most effective way of co-ordinating re-forestation to meet future timber needs (Forestry Commission, 2012). Consequently, the Forestry Act 1919 established the Forestry Commission with a remit to "promote afforestation and the production and supply of timber" (HMSO, 1919). Although paradigm shifts are often difficult to locate precisely, it can be argued that the establishment of the first Forestry Act in 1919 launched a decisive industrialisation of forestry in Britain, resulting in a major shift towards plantation forestry under state management. The plan was to increase forest cover from three million acres to four and three quarter million acres over an eighty year period (HMSO, 1943), promoting reduced dependence on foreign timber supplies for up to three years, specifically during times of war (Acland, 1918). The Forestry Commission (FC), a semi-autonomous government agency set up under the Forestry Act 1919, was given powers to allocate grants and loans, give advice and assist in the establishment of woodland industries (HMSO, 1919). 'Planting Grants' were introduced in 1919, followed by 'Ground Preparation and Scrub Clearance Grants' in 1922 (Forestry Commission, 2006).

The Act can be seen as a third order policy change in Hall's terms. It constituted a radical shift in the hierarchy of goals and subsequent policy settings, including the introduction of new instruments and tools such as grants and loans. Moreover, these policy changes were accompanied by a substantial change in the underlying assumptions on which previous policy was based and a reshaping of the policy discourse around forestry. Up to World War I, forestry in Britain was mainly seen as the business of private individuals rather than the State (Aldhous, 1997). However, "the imperative demands for timber" during the War "forced the State to intervene" (Robinson, 1927; p. 1). Forestry became framed and justified as a national security issue and therefore a public policy priority. The Acland Report (Acland, 1918) in particular, argued that Britain "cannot run the risk of future wars without safeguarding its supplies of timber" (p. 4). The Act established the FC with a specific remit of producing and supplying timber, thereby discarding the previous un-coordinated, laissez faire approach to forestry (Aldhous, 1997). In 1923, the Forestry (Transfer of Woods) Act 1923 (HMSO, 1923) placed Royal Forests, hitherto part of the Crown Estate, fully under the responsibility of the FC, thereby considerably enlarging the public forest estate and consolidating state forestry (Nail, 2010). The Commission's set up was influenced by the established concept of state forestry in continental Europe and colonial India (Oosthoek, 2003). Over the following fifty years or so, the governments' main emphasis remained, initially on afforestation and, following the devastating loss of timber during World War II, on the establishment and maintenance of adequate reserves of trees, emphasised in the Forestry Acts 1951 (HMSO, 1951) and 1967 (HMSO, 1967). Informal continental and empire forestry and foresters would continue to influence forest management practices through research, training and conferences until the 1950s (Oosthoek, 2003).

In the 1920s, forestry had become the subject of an international debate, with the first World Forestry Congress in Rome in 1926 discussing the economics of forestry for the first time (Nail, 2010). The themes of these early discourses were in line with prevailing trends in western forestry: they were highly technical and focused primarily on the preservation of a timber resource and establishing the conditions for a sustained yield of timber production (Nail, 2010). In Britain, these trends continued and even intensified during the following decades. Nevertheless, in response to the growing interest in the countryside and outdoor recreation in the early 1930s, the FC began to open up some of its less productive forests to the public, giving birth to Forest National Parks in 1949 (Nail, 2010). In the same year, the Government had passed the National Parks and Access to the Countryside Act (HMSO, 1949a) to preserve and enhance natural beauty and provide recreational opportunities for the public in newly designated National Park areas. The Act also established the Nature Conservancy (later Nature Conservancy Council) which was empowered to further establish and maintain National Nature Reserves and Areas of Outstanding National Beauty (HMSO, 1949b), many of which contained woodlands. It would take several more decades, however, before recreation and conservation became part of the official mission of the FC (Mather, 1991).

In 1943, the FC reacted to another national timber crisis caused by the devastating loss of standing timber encountered during World War II, publishing its Post-war Forest Policy (HMSO, 1943). It was supplemented by a report on Private Woodlands (HMSO, 1944) in the following year. By this point, an outcry from private land owners about the irretrievable loss of assets they had encountered during war-time, convinced policy-makers of the need to foster a stable forestry policy and finance (Robertson, 1944). In response, the Government enacted a series of Forestry Acts: the Forestry Act 1945 (HMSO, 1945) which reconstituted the FC to bring it under closer ministerial control; and the Forestry Act 1947 (HMSO, 1947a) which addressed the need to aid restocking of privately owned

woodlands, by enabling the FC to operate a new grant scheme, the ‘Dedicated Woodland Scheme’. Moreover, to halt further deforestation, licences for timber felling were introduced through the Town and Country Planning Act 1947 (HMSO, 1947b). The Forestry Act 1951 put even more emphasis on timber production, including that from privately owned forests, and requested the FC to “promote the establishment and maintenance of adequate reserves of growing trees” (HMSO, 1951). It was supplemented by a new ‘Small Woods Grant Scheme’ in 1951 and the ‘Approved Woodland Grant Scheme’ in 1952 (Forestry Commission, 2006). These acts obliged the FC to intensify afforestation (Nail, 2010), and gave more attention to the rehabilitation of private woodlands. Consequently, in many privately owned forests, namely estates, timber production became the primary objective, but other management goals, in particular game and landscape aesthetics remained pertinent (Watkins, 1990). As Oliver Rackham (2006) notes, that up to World War II the FC had seldom been interested or involved in the management of private woodlands, having primarily focused on acquiring and preparing land for new woodland plantations. However, after 1945, the Commission started to either purchase hitherto privately owned woodlands on 999-year leases or subsidise private land owners to afforest their woods through the above new grant schemes (Rackham, 2006). Many of these woods were ancient semi-natural broadleaved woodlands, and of great ecological merit (Lowe et al., 1986) which were increasingly converted into plain conifer plantations (Tsouvalis, 2000).

During the challenging post-war years, food self-sufficiency and rural development had become key concerns (Foot, 2010). Consequently, one of the first major policy reviews, conducted by the Committee on Natural Resources, looked into the scope for “increasing production from agriculture as well as from forestry”, whilst at the same time reducing population decline in rural areas (Zuckerman, 1957, p. 58). The report focussed particularly on the economic and social benefits of integrating forestry with agriculture on marginal land, mainly in the Scottish Highlands and Central Wales (Zuckerman, 1957). Interestingly, in its conclusion the report called the strategic role of afforestation into question (Price, 1997), instead recommending that more attention be given to the social, and particularly the economic, aspects of forestry (Zuckerman, 1957). Consequently, the Government’s main emphasis continued to remain on timber production for the following years. The Forestry Act 1967 (HMSO, 1967) which consolidated the Forestry Acts 1919 to 1963, reiterated the importance of afforestation, timber production, and maintaining reserves of trees, albeit increasingly justified by import savings and a potential future worldwide timber shortage (Mather, 1991). Mather (1991) termed this period ‘the industrial forest phase’. However, here, in line with other, more recent commentators (e.g., EEA, 2010) it has been phrased ‘mono-functional forestry’. Interestingly, the paradigm shift that this represents appears to have taken place over a relatively short period, with a clearly identifiable starting point dating from the influential Zuckermann report. The mono-functional forestry paradigm continued more or less exclusively until the 1970s, when, in response to changing circumstances and increasing public and international pressure, a broader public goods justification for state intervention began to be established. On the international level, perceptions of forestry were undergoing more rapid change. The 5th World Forestry Congress in Seattle in 1960, for example, made ‘Multiple Use of Forests and Associated Lands’ its main theme, and defined ‘multiple use’ as forest management that “will yield a high level of production in five major uses—wood, water, forage, recreation and wildlife” (FAO, 1960). In the same year, the US firmly established the concept of a more balanced forest management approach through the Multiple Use Sustained Yield Act 1960 (Foot, 2010).

3.2. Multi-functional forestry: 1968/1985 – (1992)

In the following period, influences on forestry and policy-making processes became more complex, with domestic impulses increasingly being superseded by international processes and obligations. Perhaps partly because of these more complex dual processes the transition point for the shift from mono-functional forestry to multi-functional forestry is more difficult to define. Whereas the marking point in 1919 was very clear, this time a process of reassessment and adjustment took longer, with threshold events being harder to define. If milestones are seen as points “in a broader process of change”, entailing the redefinition of policy problems and the reordering of guiding principles, gradually cumulating in organisational and regulatory change (Carson et al., 2009; p.377), however, then there were various moments during the 1960s when an appreciation of landscape amenity and the recreational benefits of the countryside appeared to come into greater prominence (Foot, 2010). One starting point was the decision by various non-governmental organisations to lobby for greater public access to the countryside generally and woodlands and forests in particular (Foot, 2010). The Countryside Act 1968 was one such important marker, requiring local authorities and other bodies for the first time to have regard “for the conservation and enhancement of natural beauty and for the benefit of those resorting to the countryside” (HMSO, 1968). The FC was specifically 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). This new statutory duty marked one of the entry points for a new debate about what state owned forests were for and who they should be benefiting.

In response to the Countryside Act and the increasing strength of the environment movement, the FC put more emphasis on catering for amenity purposes and the provision of recreational facilities, but these objectives continued to remain secondary to timber production (NAO, 1986). Following the formerly mentioned rejection of the strategic defence justification for British forestry (Zuckerman, 1957), later policy reviews revolved around the question of whether the overall contribution made by forestry to society merits its share both of public investment and land resources (Holmes, 1975). In 1972 (HM Treasury, 1972), the Treasury reviewed, for the first time, the costs and benefits of British forestry, with particular attention been given to the non-commercial benefits of forests. The study concluded that even though afforestation failed to produce the 10% return expected from public sector investment, forestry would be economically viable when recreation and amenity benefits were factored in (Holmes, 1975); it estimated the recreational value of the then forest estate at some £1.5 million (in 1968) and expected this to increase by up to 10% annually (HM Treasury, 1972). The outcome of the 1972 Treasury review is frequently seen as having brought about another shift towards the widening of forestry objectives (Nail, 2010). The economics of forestry now became the subject of a heated debate (e.g., Grove, 1983). Moreover, particularly, in the 1970s and 80s, the Forestry Commission became increasingly criticised by a rapidly growing environmental and recreational lobby, including the Forestry Action Group (1971), the Ramblers Association (1971), the British Association of Nature Conservationists (Grove, 1983), the Royal Society of the Protection of Birds (RSPB, 1985), and the Government’s own Nature Conservancy Council (NCC, 1986). The unsympathetic afforestation of the Scottish Highlands and the destruction of ancient woodland in the English lowlands had become areas of particular concern (Tsouvalis, 2000). Our review suggests that up to the late 1970’s forestry policy processes were gradually being opened up to wider debates about public goods and non-market benefits. Controversial afforestation schemes merely raised the temperature of an already simmering debate.

In addition, policy impulses from European and wider international sources began to hold sway. As a result of Britain's entry into the European Union in 1973, and the growing influence of international treaty organisations such as the United Nations (UN), decisions regarding the British countryside, including her forests, were now being influenced by European Community and international legal obligations. For example, the UN Convention on the Conservation of European Wildlife and Natural Habitat (UN, 1979) (or Bern Convention) which put more pressure on habitat and wildlife protection, began to impact on British policy. The Convention aimed at ensuring the conservation and protection of wild plants and animal species and their natural habitats, and was transposed into British law through the EU Birds Directive (EU, 1979) and the Wildlife and Countryside Act 1981/1985 (HMSO, 1981). In particular from the 1980s onwards, domestic influences increasingly became superseded by more formal international processes and obligations, arguably bringing about a more substantial policy change. The 1985 Wildlife and Countryside (Amendment) Act (HMSO, 1985) which specifically addressed forestry, not only formally added new objectives, but also instructed the FC to keep a 'reasonable balance' between, "(a) the development of afforestation, the management of forests and the production and supply of timber, and (b) the conservation and enhancement of natural beauty and the conservation of flora, fauna and geological or physiographic features of special interest" (HMSO, 1985). The act was supported by other measures such as grants and a new forestry policy to help widen forestry objectives. Only then policy shifts were accompanied by a substantial change in the underlying assumptions on which previous policy was based. At the time, an intense national debate was taking place around the issue of forestry. The FC had been strongly criticised and lobbied to give more regard for conservation and amenity needs. The 1985 Act formally incorporated the multi-functional concept into British forestry and can therefore be seen as another key milestone in the establishment of the multi-purpose forestry paradigm in Britain. It once again broadened forestry policy, this time fulfilling Hall's third order policy change criteria. Mather (1991) positioned the beginning of, what he termed 'post-industrial forestry' in Britain to the 1980s.

In response to the above legislative influences, better scientific understanding and public concern about the loss of ancient woodlands, first highlighted in the publication 'Native Pinewoods of Scotland' (Steven and Carlisle, 1959), the Nature Conservancy Council under George Peterken began to identify and compile a list of ancient woodlands, the 'Ancient Woodland Inventory' in 1981 (Thomas, 1997). The FC responded by publishing its 'Policy for Broadleaved Woodlands' (Forestry Commission, 1985), a ground-breaking document which aimed to halt further conversion of broadleaved woodlands to conifer plantations (Mason, 2007) in order to safeguard biodiversity, amenity and landscape values. This was followed, in the same year, by the launch of a new 'Broadleaved Woodland Grant Scheme' (Forestry Commission, 2006). In 1988, forestry was finally taken out of the scope of income tax, after much lobbying, in particular by the RSPB in connection with private afforestation in the Flow Country (Tsouvalis, 2000). These tax incentives had existed relatively unchanged since the Finance Act 1909 (Lynch, 1989), a more detailed elaboration of which can be found in Thomas Lynch's (1989) book 'Taxation of Woodlands'. Interestingly, around the same time, the FC had achieved its 1943 target of 5 million acres of forest cover (Mather, 1991); forest cover had more than doubled by the early 1990s to approximately 10% (HMSO, 1994). In response to changing fiscal policy, and in support of its new Broadleaved Policy, the FC introduced another new 'Woodland Grant Scheme (MkI)' and a 'Farm Woodland Scheme' in 1988, followed by the 'Woodland Grant Scheme (MkII)' in 1992 (Forestry Commission, 2006). Whereas the 'Forestry Grant Scheme' which operated from 1981 to 1988 still "required that timber pro-

duction be the primary objective", the new grant schemes reflected broader aims and included providing for landscape, wildlife, and recreational needs (Reid, 1997; p. 26). Moreover, the 1989 EEC Council Regulation (EEC, 1989) on the development of woodlands in rural areas, laid down provisions for the generation of employment, the development of tourism and recreation, and for soil and water conservation measures through forestry programmes. It was supplemented by the 'Farm Woodland Premium Scheme' in 1992 (Forestry Commission, 2006). By then, plantation forest expansion had slowed considerably and the focus had shifted towards multiple forestry objectives. Nevertheless, the introduction of the 'balancing duty' through the 1985 Countryside (Amendment) Act, in particular the interpretation of what constitutes a 'reasonable balance', created a considerable challenge (Foot, 2010).

3.3. Sustainable forest management: 1992–(2006)

From the early 1990s onwards, international and European policy-making influences intensified further. In particular, the 1992 United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro, which mainstreamed the concept of sustainable development, led to a number of ground breaking international agreements. Forestry policy was at the forefront of these. Several of these agreements, including the UN Convention on Biological Diversity, the UN Convention on Climate Change, and the UN Forest Principles, acknowledged the significance of forests for society. The Convention on Biological Diversity (CBD) provides a more general framework and holistic approach for the conservation and sustainable use of biological diversity in all types of ecosystems (SCBD, 1992). This was taken up by the 1992 EU Habitats Directive, which obliges all member states to make "a contribution to the general objective of sustainable development" and to "promote the maintenance of biodiversity, taking account of economic, social, cultural and regional requirements" (European Commission, 1992). Specifically related to forests, the UN Forest Principles, a 'non-legally binding authoritative statement of principles for a global consensus on the management, conservation and sustainable development of all types of forests' (UNCED, 1992), introduced the concept of 'Sustainable Forest Management' (SFM). It "defined a new paradigm for forest management", through a set of 15 principles to support the management, conservation and sustainable development of forests and their multiple uses and functions (UNEP, 2003, p.34). The document stated that "forest resources and forest lands should be sustainably managed to meet the social, economic, ecological, cultural and spiritual needs of present and future generations" (UNCED, 1992). These principles, however, are not legally binding.

Since then the international forestry community has made considerable progress in developing and co-ordinating international forestry policy, particularly in defining principles and criteria for sustainable forest management. At EU level, the Ministerial Conference on the Protection of Forests in Europe (MCPFE), took forward these ideas and principles and developed guidelines for the sustainable management of European Forests (MCPFE, 1993). However, as mentioned before, there is a general difficulty in introducing and transplanting internationally conceived concepts into national contexts. In particular, translating broad international commitments, such as sustainable development, or here sustainable forest management "into specific policies which do actually make a difference to what is going on in practice" can be difficult (Reid, 1997 p.28). National policy-makers tend to articulate and re-interpret international ideas in ways which resonate with the public in their own country (Skogstad and Schmidt, 2011). Transnational norms are thus likely to become 'localised' and adopted in parts, with each country or even locality interpreting them in a different way (Acharya, 2004; Skogstad and Schmidt, 2011). The added difficulty for European countries is that global norms and obligations are not

necessarily directly transposed from UN level to national country level, but instead undergo further, often complex negotiations and re-interpretations on the European level, adding yet another layer of interpretation. As has been indicated in this brief summary, the relationships between transnational and national policy paradigms are complex (Skogstad, 2011); it is thus beyond the remit of this paper to examine these in greater detail.

Following the UN Rio Conference and the onus it placed on national policymakers to respond with details on how they intended to craft and rebalance policy priorities, the UK government began to develop its own interpretation of 'Sustainable Forest Management'. Despite official endorsement of the SFM approach in various policy documents and measures during the 1990s (e.g., 'Sustainable Forestry: The UK Programme (1994) and the 'UK Forestry Standard' (1998)), it is hard to find any clear legislative milestone which marked the adoption of sustainable forestry as a new paradigm of practice in Britain. One explanation is a general trend in governance at this time away from legislation towards voluntary and market approaches, including guidance, education, and voluntary certification. In anticipation of the 1992 UN Earth Summit (UNCED) in Rio, the FC had already included the importance of the "sustainable management of its existing woods and forests" into its 1991 'Forestry Policy for Great Britain' (Forestry Commission, 1991). The policy was supplemented by the 1991 'Woodland Grant Scheme MkII' which included grants for wider management objectives and a new 'Community Woodland' supplement grant in 1992 (Forestry Commission, 2006), reflecting the increasing importance given to wider social aspects of forestry. In order to fulfil its Rio commitments more fully, the FC once again reshaped its 1991 Forestry Policy and produced 'Sustainable Forestry: The UK Programme' (Forestry Commission, 1994) in 1994. Moreover, in 1998 the FC published the 'UK Forestry Standard: The Government's Approach to Sustainable Forestry' (Forestry Commission, 1998) to outline best forestry practice. This was supported by a number of instruments, including new Woodland Grant Schemes in the various newly devolved regions, (England 2005, Wales 2006, Scotland 2007), a series of specific Guidelines (1998, 2004, 2011), a Certification Scheme (1999) and Indicators for Sustainable Forestry (2002), none of which are legally binding. Only tree felling regulations, first introduced in the Town and Country Planning Act 1947 (HMSO, 1947b), provide a legal foundation to underpin the practice of sustainable timber yield management. Nevertheless, taking into account the strong emphasis that has been given to the concept of SFM in Britain, displayed both in rhetoric but also in various policy statements and other non-legal measures, the concept is here recognised as a full forestry paradigm.

It was at this point that the by now many and various forestry concepts in circulation become conflated and even confused in professional as well as policy circles. Mather (2001) for example observes, that in the 1990s "in practice, sustainable forestry and multi-purpose or multi-functional forestry became almost synonymous" (p.256). In later years, the two concepts tended to be used in parallel by both forestry practitioners and policy-makers (Cubbage et al., 2007; Slee, 2012). Surel (2000) offers a theoretical explanation for this, suggesting that the adoption of a new norm may not necessarily substitute the old policy framework, particularly during the early phase of its adoption, but rather manifests itself through associations, retranslations and new hierarchical rankings of existing elements (Surel, 2000). A new approach does not 'destroy' an existing (dominant) paradigm; rather it becomes the new reference point towards which these older frames must adapt (Surel, 2000). Moreover, many researchers acknowledge the existence of different or even 'competing' paradigms at any one time. A dominant paradigm, if there is one, is thus not necessarily exclusive, adding to the overall complexity (Surel, 2000). Here, the idea of multi-purpose forestry continues to be used throughout the following

years until today. This being said, and despite a lack of formal legal underpinning, SFM has become an enduring term of reference for British forestry, acting as a source of ideas about long term forest planning and providing the policy justification for further shifts in funding and research.

3.4. Recent shifts in forestry: 2007–present

Indeed, the recent history of British forestry policy and the scientific and policy discourses surrounding it is largely one of further refinement and extension to this core idea. One of the most important of these is the so-called Ecosystem Approach, an idea with roots in the UN Convention on Biological Diversity of 1995, where it was adopted as a 'primary framework for action' (SCBD, 1995). The idea has subsequently been refined into a set of twelve ecosystem approach principles, supplemented by 5 points of operational guidance in which it defined the approach as "a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way" (SCBD, 2000). These were formally adopted by the Convention in 2000 under which all signatory states are legally required to adopt and develop the CBD's Ecosystem Approach and its principles (DEFRA, 2007b). Similar to the sustainable development concept which led to the sustainable forestry paradigm, the ecosystem approach has been disseminated through international networks and knowledge exchange. However, as mentioned before, in a transnational context the 'diffusion' of a new policy framework entails frequently complex and at times inconsistent mechanisms of adaptation. This depends on the nature and extent of the previous paradigm(s), and on "the institutional configurations specific to each country" (Surel, 2000; p. 508). The new framework was translated into British law through the 2000 Countryside Rights of Way Act in the context of biodiversity. The Act imposed an obligation on all governmental departments in the "carrying out of its functions to have regard to the purpose of conserving biological diversity in accordance with the Convention on Biological Diversity" (HMSO, 2000). The 2006 Natural Environment and Rural Communities Act (HMSO, 2006) extended this obligation to all public bodies, including the FC. It should be noted, though that today the FC owns approximately 35% of the woodland area in Britain (Forestry Commission, 2013), with most woodland being in private hands.

In response to the latest international obligations, Defra published an Ecosystem Approach Action Plan (DEFRA, 2007b), accompanied by an Ecosystems Valuation Guide (DEFRA, 2007a) with the aim to bring about a "decisive shift towards an ecosystems approach" in policy-making and delivery (DEFRA, 2007b, p. 3). The action plan states that "in order to further embed an ecosystems approach", the FC, Natural England and the Environment Agency "will need to ensure that its principles are clearly reflected in their corporate plans, strategies and delivery plans and that the approach is then effectively operationalised at all levels within their organisations" (DEFRA, 2007b, p. 15). Drawing on the UN led global Millennium Ecosystem Assessment (MEA, 2005), the Government began its own country-wide ecosystem assessment in 2009 to assist the development of "an evidence base" needed for the implementation of "the ecosystem approach in the UK" (Forestry Commission, 2011, p. 9). The final UK National Ecosystem Assessment (UK NEA, 2011) report published in 2011, included a chapter on woodlands (Quine et al., 2011), and attempted to value several ecosystem services (timber and fuel production, deer stalking/venison, and carbon sequestration) in a separate valuation exercise (Valatin and Starling, 2010). Since the publication of Defra's action plan and valuation guidelines in 2007, and the UK NEA in 2011, the new approach is gradually being embraced in Britain. The operationalization of the ecosystem approach, however, is still at an early stage of development. Its implementation is troubled by a general confusion around what

Table 1
Summary of the dominant forestry policy paradigms in Britain.

Forestry style	Context	Perception of forests	Use/objectives	Characteristics/management
Monofunctional Forestry 1919–(1968) ^a	World War I + II → creation of timber reserve	<ul style="list-style-type: none"> Forests considered as units of primary production – tree factories 	<ul style="list-style-type: none"> Timber (Employment + rural development) 	<ul style="list-style-type: none"> Intensive forestry Heavy machinery Large-scale felling Even-aged monoculture Non-native species
Multifunctional Forestry 1968 – (1992) ^a	<ul style="list-style-type: none"> ↑ In scientific understanding ↑ In recreation ↑ In environmental movement 	<ul style="list-style-type: none"> Forests considered to have multiple productive + social functions The latter being secondary to the former 	<ul style="list-style-type: none"> Timber Recreation Landscape amenity Wildlife conservation (Employment) (Rural development) 	<ul style="list-style-type: none"> Production as main financial source Trade-offs to fulfil several functions
Sustainable Forestry 1992 – (2006) ^a	<ul style="list-style-type: none"> ↑ Environmental crisis ↑ In international policy-making 	<ul style="list-style-type: none"> Forests expected to fulfil social, economic + environmental needs Of present and future generations 	<ul style="list-style-type: none"> Economic Environmental Social Heritage for the future 	<ul style="list-style-type: none"> Certification Indicators Long-term pursuit Felled trees need to be replanted Ecological, societal + economic aspects
Ecosystem Approach 2006 –	<ul style="list-style-type: none"> ↑ Complexity ↑ Interconnectivity ↑ Number of stakeholders 	<ul style="list-style-type: none"> Forests considered as ecological systems Which provide multiple services for the well-being of society 	<ul style="list-style-type: none"> Provisioning services Regulating services Cultural services Supporting services 	<ul style="list-style-type: none"> Holistic forestry Importance given to ecological + societal implications of management Native species Mixed age + species

Source: adapted from Schuetz (1990) and EEA (2010).

^a These forestry approaches are all overlapping and aspects of each one of them are still continuing to this date.

exactly constitutes an ecosystem approach. Multiple meanings have been attached to the term, however, they typically do not fully reflect the ethos of the ecosystem approach as defined by the CBD; the main focus currently is on ‘understanding and valuing ecosystem services’ (Waylen et al., 2014).

Nevertheless, a number of forestry workshops and conferences have been convened in recent years, to explore how best to apply ecosystem thinking to forestry policy and practice, including one in October 2012 which examined how the concept could be integrated into forest management regimes (Mason and Mencuccini, 2014). The FC made a first formal reference towards the CBD’s ecosystem approach in a published policy document in its revised 2011 UK Forestry Standard (Forestry Commission, 2011). This includes a reduced list of forest ecosystem services, based on the Millennium Ecosystem Assessment classification. However, the implementation of the ecosystem approach in British forestry to date has not been supported by any further forestry specific policy measures, instruments and tools. Neither has it led to a new forestry policy specifically geared towards the ecosystem approach, nor led to new legislation. The two previous forestry paradigms – multi-purpose and sustainable forestry are arguably so deeply entrenched in British forestry policy and practice as to leave little room for another paradigmatic innovation. Indeed, forestry practitioners have raised concerns that the ecosystem approach may challenge the evolved compromise between multiple forestry benefits and objectives which has been reached under sustainable forestry. In particular, the current overemphasis on valuation and monetary incentivisation of ecosystem services may favour those benefits which are easy to value, with the potential danger that forestry might return to the pursuit of single purposes (e.g., carbon sequestration) (Quine et al., 2013). Nonetheless, and despite a lack of a new forestry policy specifically around the approach and any

specific formal legal underpinning, the emergence of the ecosystem approach, including its most recent emphasis on ecosystem services can arguably be viewed as the beginnings of another developing forestry paradigm. A summary of the main approaches to forestry in Britain, their principle time of occurrence, the evolution of scientific thinking, changing sociological, political and economic circumstances and its implications on forest management is shown in Table 1 below.

4. Conclusions

The narrative outlined above has identified a succession of forestry realignments and shifts, many of them enabling policy reforms which in turn have produced changes to forest cover, ownership, governance and management. In retrospect, this sequence of events can be understood as a series of forestry policy paradigm shifts. By disaggregating the process of policy changes into distinct phases, it can be argued that British forestry had undergone three distinct policy paradigm changes during the last hundred years. Even though it has been difficult to fully capture paradigm shifts, and old and new paradigms tend to overlap, it has been possible through this analysis to highlight certain indicators, milestones and threshold events. In this paper, the emphasis has been on identifying milestones through legislation, supported by other instruments and tools, and key policy statements. It has been suggested here that British forestry evolved from a largely ad hoc and laissez faire approach until up to World War I, through a period of intensive state-run mono-culture plantation forestry, followed by multi-functional and then sustainable forestry. The emergence of the ecosystem approach can arguably be viewed as an emerging fourth forestry paradigm. Nevertheless, it should be noted that during each stage in the story, elements of previous paradigms

continued, with new approaches often being overlaid on to, rather than fully superseding, previous models. Drawing on Hall's (1993) paradigm framework, only the first two of the above distinct policy eras could be clearly identified. However, whilst the first paradigm shift had a clear legal transition point in time, at around 1919 and began the industrialisation of forestry in Britain, the transition to the multi-purpose forestry paradigm was a longer process with several threshold events. Interestingly, although sustainable forestry can arguably be seen as a distinct paradigm era, and its beginning could be clearly placed around 1992, no clear legal transition points could be identified. Moreover, it has been suggested here that forestry policy paradigms in Britain continue to change in ways that mirror a changing social paradigm within the country; however it is increasingly dominated by international processes and commitments.

Acknowledgements

The research on which this article is based was jointly funded by the UK Research Councils NERC and ESRC. The authors would like to thank Anthony Lavers and an anonymous reviewer for their valuable comments on earlier versions of this article.

References

- Acharya, A., 2004. *How ideas spread: whose norms matter? Norm localization and institutional change in Asian regionalism*. *Int. Organ.* 58.
- ACLAND 1918. Final Report of the Forestry Sub-Committee of the Reconstruction Committee. Cd 8881. London.
- Aldhous, J.R., 1997. *British forestry: years of achievement*. *Forestry* 70, 283, 70, 291.
- Barbier, E.B., Burgess, J.C., Grainger, A., 2010. *The forest transition: Towards a more comprehensive theoretical framework*. *Land Use Policy* 27, 98–107.
- Behan, R.W., 1990. *Multiresource forest management: a paradigmatic challenge to professional forestry*. *J. For.* 88, 12–18.
- Brown, G., Harris, C.C., 2000. *The US forest service: wither the new resource management paradigm?* *J. Environ. Manage.* 58, 1–19.
- Capra, F., 1982. *The Turning Point: Science, Society and the Rising Culture*. Simon and Schuster, New York.
- Carson, M., Burns, T.R., Calvo, D. (Eds.), 2009. *Peter Lang, Frankfurt am Main*.
- Coleman, W.D., Skogstad, G.D., Atkinson, M.M., 1996. *Paradigm shifts and policy networks: cumulative change in agriculture*. *J. Public Policy* 16, 273–301.
- Cubbage, F., Harou, P., Sills, E., 2007. *Policy instruments to enhance multi-functional forest management*. *For. Policy Econ.* 9, 833–851.
- DEFRA 2007. *An introductory guide to valuing ecosystem services* London: Department for Environment, Food and Rural Affairs.
- DEFRA 2007. *Securing a Healthy Natural Environment: An Action Plan for Embedding an Ecosystems Approach*. London: Department for Environment, Food and Rural Affairs.
- EEA 2010. *10 Messages for 2010 Forest ecosystems*. Luxembourg: Office for Official Publications of the European Union.
- EEC 1989. *Council Regulation (EEC) No 1610/89 Laying down provisions for implementing Regulation No 4256/88 as regards the scheme to develop optimally utilized woodlands in rural areas in the Community*.
- EU 1979. *EU COUNCIL DIRECTIVE on the conservation of wild birds (79/409/EEC)*.
- European Commission 1992. *Directive on the Conservation of Natural Habitats and Wild Fauna and Flora: The Habitats Directive*. Council Directive 92/43/EEC. (21/5/1992). Brussels.
- FAO 1960. *Fifth world forestry congress*. Unasylva, 14.
- Foot, D., 2010. *Woods & People. Putting Forests on the Map*. The History Press, Stroud.
- Forestry Action Group 1971. *The Case against Coniferous Afforestation*. Darowen, Powys.
- Forestry Commission 1985. *The Policy for Broadleaved Woodland*. Edinburgh: Forestry Commission.
- Forestry Commission 1991. *Forestry Policy for Great Britain*. Edinburgh: Forestry Commission.
- Forestry Commission 1994. *Sustainable Forestry: The UK Programme* Edinburgh: Forestry Commission.
- Forestry Commission 1998. *The UK Forestry Standard. The Government's Approach to Sustainable Forestry*. Edinburgh: Forestry Commission.
- Forestry Commission. 2006. *History of Forestry Commission Grant Schemes* [Online]. Available: [http://www.forestry.gov.uk/pdf/HistoryFCGrantSchemes.pdf/\\$FILE/HistoryFCGrantSchemes.pdf](http://www.forestry.gov.uk/pdf/HistoryFCGrantSchemes.pdf/$FILE/HistoryFCGrantSchemes.pdf) (accessed 10.07.14.).
- Forestry Commission 2011. *The UK Forestry Standard*. Edinburgh, Forestry Commission.
- Forestry Commission. 2012. *History of the Forestry Commission* [Online]. Available: <http://www.forestry.gov.uk/forestry/CMON-4UUM6R/> (accessed 28.06.12.).
- Forestry Commission 2013. *National Statistics on Woodland Area*. NEWS RELEASE. No 15,968. In: UNIT, E.A. S. (ed.). Farnham: Forestry Commission.
- Grove, R., 1983. *The Future for Forestry*. Cambridge.
- Hall, P.A., 1993. *Policy paradigms, social learning, and the state: the case of economic policymaking in Britain*. *Comp. Politics* 25, 275–296.
- HM Treasury 1972. *Forestry in Great Britain: an Interdepartmental Cost/Benefit Study* London: Her Majesty's Stationery Office.
- HMSO 1919. *Forestry Act 1919*. London: Her Majesty's Stationery Office.
- HMSO 1923. *The Forestry (Transfer of Woods) Act 1923*. London: Her Majesty's Stationery Office.
- HMSO 1943. *Post-war Forest Policy of Great Britain*. Cmd 6447. London: Her Majesty's Stationery Office.
- HMSO 1944. *Post-war forest policy. Private Woodlands*. Cmd 6500. London: Her Majesty's Stationery Office.
- HMSO 1945. *The Forestry Act 1945*. London: Her Majesty's Stationery Office.
- HMSO 1947. *The Forestry Act 1947*. London: Her Majesty's Stationery Office.
- HMSO 1947. *The Town and Country Planning Act 1947*. London: Her Majesty's Stationery Office.
- HMSO 1949. *National Parks Access to the Countryside Act 1949*. London: Her Majesty's Stationery Office.
- HMSO 1949. *National Parks and Access to the Countryside Act 1949*. London: Her Majesty's Stationery Office.
- HMSO 1951. *The Forestry Act 1951*. London: Her Majesty's Stationery Office.
- HMSO 1967. *The Forestry Act 1967*. London: Her Majesty's Stationery Office.
- HMSO 1968. *Countryside Act 1968*. London: Her Majesty's Stationery Office.
- HMSO 1981. *Wildlife and Countryside Act 1981*. London: Her Majesty's Stationery Office.
- HMSO 1985. *Wildlife and Countryside (Amendment) Act 1985*. London: Her Majesty's Stationery Office.
- HMSO 1994. *Sustainable Forestry. The UK Programme*. London: Her Majesty's Stationery Office.
- HMSO 2000. *Countryside Rights of Way Act 2000*. London: Her Majesty's Stationery Office.
- HMSO 2006. *The Natural Environment and Rural Communities Act 2006*. London: Her Majesty's Stationery Office.
- Holmes, G.D., 1975. *History of forestry and forest management*. *Philos. Trans R. Soc. London B Biol. Sci.* 271, 69–80.
- Kennedy, J.J., Quigley, T.M., 1998. *Evolution of USDA forest service organizational culture and adaptation issues in embracing an ecosystem management paradigm*. *Landscape Urban Plan.* 40, 113–122.
- Kline, J.D., Mazzotta, M., Spies, T.A., Harmon, M.E., 2013. *Applying the ecosystem services concept to public land management*. *Agric. Res. Econ. Rev.* 42, 139–158.
- Kuhn, T.S., 1962. *The Structure of Scientific Revolutions*. Chicago, University of Chicago Press.
- Lowe, P., Cox, G., Macewen, M., O'riordan, T., Winter, M., 1986. *Countryside Conflicts: The Politics of Farming, Forestry and Conservation*. Gower Publishing, Aldershot.
- Lynch, T.D., 1989. *The Taxation of Woodlands in the United Kingdom*. W. Green & Son, Edinburgh.
- Mason, B., Mencuccini, M., 2014. *Managing forests for ecosystem services—can spruce forests show the way?* *Forestry* 87, 189–191.
- Mason, W.L., 2007. *Changes in the management of British forests between 1945 and 2000 and possible future trends*. *Ibis* 149, 41–52.
- Mather, A.S., 1990. *Global Forest Resources*. London, Belhaven.
- Mather, A.S., 1991. *Pressures on British forest policy: prologue to the post-industrial forest?* *Area* 23, 245–253.
- Mather, A.S., 2001. *Forests of consumption: postproductivism, postmaterialism, and the postindustrial forest*. *Environ. Plan. C Gov. Policy* 19, 249–268.
- MCPFE 1993. *Resolution H1 General Guidelines for the Sustainable Management of Forests in Europe*. Helsinki: Ministerial Conference on the Protection of Forests in Europe.
- MEA, 2005. *Millennium Ecosystem Assessment. Ecosystems and Human Well-Being. Synthesis*. Island Press, Washington D.C.
- Milbrath, L.W., 1984. *Environmentalists: Vanguard for a New Society*. State University of New York Press, Albany.
- Nail, S., 2010. *Forest Policies and Social Change in England*. Springer, Dordrecht; London.
- NAO 1986. *Review of Forestry Commission Objectives and Achievements* London: Her Majesty's Stationery Office.
- NCC 1986. *Nature Conservation and Afforestation in Britain*. Peterborough: Nature Conservancy Council.
- Oosthoek, J., 2003. *The colonial origins of scientific forestry in Britain*. International Conference on the Forest and Environmental History of the British Empire and Commonwealth. Centre for World Environmental History, University of Sussex.
- Price, C., 1997. *Twenty-five years of forestry cost-benefit analysis in Britain*. *Forestry* 70, 173–189.
- Quine, C., Cahalan, C., Hester, A., Humphrey, J., Kirby, K.J., Moffat, A. & Valatin, G. 2011. *Chapter 8: Woodlands*. UK National Ecosystem Assessment. Cambridge: UNEP-WCMC.
- Quine, C.P., Bailey, S.A., Watts, K., 2013. *PRACTITIONER'S PERSPECTIVE: Sustainable forest management in a time of ecosystem services frameworks: common ground and consequences*. *J. Appl. Ecol.* 50, 863–867.
- Rackham, O., 2006. *Woodlands*. London, Collins.
- Ramblers' Association 1971. *Forestry: Time to Rethink*. London.

- Reid, C., 1997. [The changing pattern of environmental regulation: British forestry and the environmental agenda](#). *J. Environ. Law* 9, 23–42.
- Richards, E.G., 2003. [British Forestry in the 20th century. Policy and Achievements](#). Brill, Leiden–Boston.
- Robertson, W.A. 1944. [Post-War Forestry. A Report on Forest Policy prepared by the Royal Scottish Forestry Society and the Royal England Forestry Society](#). Edinburgh/London.
- Robinson, R.L., 1927. [British forestry](#). *Forestry* 1, 1–5.
- RSPB 1985. [Forestry in the Flow Country: The Threat to Birds](#). Sandy: The Royal Society of the Protection of Birds.
- SCBD 1992. [UN Convention on Biological Diversity](#). Montreal: Secretariat of the Convention on Biological Diversity.
- SCBD 1995. [COP 2 Decision II/8: Preliminary consideration of components of biological diversity particularly under threat and action which could be taken under the convention](#). Montreal: Secretariat of the Convention on Biological Diversity.
- SCBD 2000. [SBSTTA 5 Recommendation V/10. Ecosystem approach: further conceptual elaboration](#). Montreal: Secretariat of the Convention on Biological Diversity.
- Schuetz, J.P. 1990. [Sylviculture 1. Principes d'éducation des forets](#). Zurich: Section Forestière, École Polytechnique Fédérale, Zurich.
- Skogstad, G. (Ed.), 2011. [University of Toronto Press, Toronto](#).
- Skogstad, G., Schmidt, V., 2011. [Introduction](#). In: Skogstad, G. (Ed.), [Policy Paradigms, Transnationalism, and Domestic Politics](#). University of Toronto Press, Toronto.
- Slee, B., 2012. [Present opportunities for sustainable and multifunctional forest management for the development of rural areas](#). *J. For. Mt. Environ.* 67, 147–160.
- Steven, H.M., Carlisle, A., 1959. [The Native Pinewoods of Scotland](#). Oliver and Boyd, Edinburgh.
- Surel, Y., 2000. [The role of cognitive and normative frames in policy-making](#). *J. Eur. Public Policy* 7, 495–512.
- Thomas, R.C., 1997. [The Conservation of a fragmented ecosystem within a cultural landscape—the case of ancient woodland in England](#). *Biol. Conserv.* 82, 243–252.
- Tsouvalis, J., 2000. [Critical Geography of Britain's State Forests](#). Oxford University Press, Oxford.
- UK NEA. 2011. [The UK National Ecosystem Assessment: Technical Report](#). Cambridge: UNEP-WCMC.
- UN 1979. [The Convention on the Conservation of European Wildlife and Natural Habitat \(Bern Convention\)](#). Geneva: United Nations.
- UNCED 1992. [Non-legally binding authoritative statement of principles for a global consensus on the management, conservation and sustainable development of all types of forests](#). Rio de Janeiro: United Nations.
- UNEP 2003. [Ecosystem Approach: Further Elaboration, Guidelines for Implementation and Relationship with Sustainable Forest Management](#). Montreal: UNEP/CBD.
- Valatin, G. & Starling, J. 2010. [Valuation of ecosystem services provided by UK woodlands](#). UK NEA Economic Analysis Report.
- Watkins, C., 1990. [Woodland Management and Conservation](#). David and Charles, Newton Abbot.
- Waylen, K.A., Hastings, E.J., Banks, E.A., Holstead, K.L., Irvine, R.J., Blackstock, K.L., 2014. [The need to disentangle key concepts from ecosystem-approach jargon](#). *Conserv. Biol.* 28, 1215–1224.
- Zuckerman, S. 1957. [Forestry, Agriculture and Marginal Land](#). A Report by the Natural Resources Committee. London: Her Majesty's Stationery Office.