



Practice Guide

Conserving and managing trees and woodlands in Scotland's designed landscapes



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Peter McGowan
with Christopher Dingwall

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Introduction

Purpose and coverage of this Practice Guide

Designed landscapes and their woodlands, parkland and trees make a major contribution to the scenery of many parts of Scotland. This guidance has been prepared to assist owners and managers in caring for all the tree components in the fine heritage of designed landscapes throughout Scotland. The guidance sets out to:

- aid understanding of what comprises an historic designed landscape
- outline the components of designed landscapes, in particular their tree features, their design principles and common management issues
- help plan a restoration, replanting or management project
- assist owners in deciding what actions may be necessary when seeking funding for conservation management
- provide background information and links to further sources of information.

What is a designed landscape?

Designed landscape is a term describing the ornamental grounds of country houses and institutions, public parks and similar sites. This includes gardens and *policies* i.e. 'the enclosed, planted and partly embellished park or demesne land lying around a country house' – what in England would be termed the *park*. The following definition of designed landscapes is used here:

Grounds deliberately enclosed and laid out for aesthetic effect by any combination of landforming, building, water management and planting, and incorporating the natural landscape, for pleasure, agriculture and forestry purposes.

Designed landscapes in the 21st century

Most designed landscapes in the form they exist today are the product of the 19th century and earlier periods. The problems adapting to the huge economic and social changes of the 20th century – reduced estate incomes, loss of manpower, costs of maintenance and development pressures – affect all properties to a greater or lesser degree. Most sites have been through processes of change periodically. Further adaptation and change, including new uses and development, may have to be part of the future of many sites. This can be possible without detriment if done in a sensitive and planned way, based on a full understanding of the values of the place. An aim of this guidance is to assist in achieving this type of change.

Figure 1 Dawyck, Scottish Borders.



Legislation, policies and guidelines

Legislation, planning policies and planning guidance

In contrast with most other facets of Scotland's natural and cultural heritage, the listing and protection of designed landscapes and their trees and woodlands through legislation and Scotland's town and country planning system is a comparatively recent development.

Trees and woodland

Town and Country Planning Act 1947 gives powers to local authorities to designate Tree Preservation Orders to protect individual trees and small areas of woodland, usually in urban and suburban areas, where these are considered to have high amenity value. Similar protection is afforded to trees in Conservation Areas through the *Planning (Listed Buildings and Conservation Areas)(Scotland) Act 1997*, though its effect, too, is largely confined to urban areas. Outwith urban areas the principal control over the management of woodland is through the issuing of a Felling Licences, first introduced under the *Forestry Act 1967*, which requires the landowner to consult with the Forestry Commission Scotland on proposals to fell existing woodland, although there are significant exemptions for trees in private gardens, orchards and churchyards.

Many local authorities employ officers who are able to offer advice on matters to do with trees and woodland. These officers are backed up in many areas by voluntary tree wardens, who operate under the aegis of the Tree Council.

Scheduled monuments and Listed buildings

Archaeological or architectural features within a park or designed landscape may be either scheduled (as monuments of national importance) or listed. Although the aforementioned Planning Act 1997 does not give explicit recognition of gardens and designed landscapes it includes provisions that are intended to protect the setting of listed buildings. Government policy and guidance on this subject is also stated in *Scottish Planning Policy 23: Planning and the Historic Environment*. At the time of writing Historic Scotland is in the process of developing a new advice note under the headline *Managing Change in the Historic Environment: Setting*.



Figure 2

The Antonine Wall ditch in Callendar Park, Falkirk. Scheduled ancient monument and World Heritage Site.

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Inventory of gardens and designed landscapes

The *Inventory of Gardens and Designed Landscapes in Scotland* was originally published in 1987, covering 282 sites, with additional sites being added from 2001 onwards following regional resurveys. The last published list (2007) included 386 sites. In 2008 a comprehensive area-based Inventory resurvey programme was begun, designed to provide a more up-to-date resource. This project entails a full revision of all existing Inventory sites, the selection of new candidates and the identification and removal of sites which no longer meet the criteria for inclusion.

Although Inventory status is not a statutory designation (and therefore different from the scheduling of monuments and listing of buildings) it has been a material consideration in the Scottish planning system since 1992. The terms of the *Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2008*, (formerly the *General Development Procedure Order*) require local authorities to consult Historic Scotland on development proposals affecting Inventory sites. It should be noted that Historic Scotland's locus is restricted to development which requires planning permission. They do not have a formal role in the day-to-day management or maintenance of Inventory sites.

The *Inventory of Gardens and Designed Landscapes in Scotland* with a description and evaluation of each site is available on Historic Scotland's website (www.historic-scotland.gov.uk/heritage/gardens).

In addition, the Historic Land-use Assessment on the HLAmap website of the Royal Commission on the Ancient and Historical Monuments of Scotland shows the location of the core area of many designed landscapes (hla.rcahms.gov.uk).



Figure 3

Inventory designed landscape.
Monteviot, Scottish Borders.

Non-Inventory gardens and designed landscapes and planning policies

Scottish Ministers encourage local authorities to formulate policies for the identification and management of non-Inventory sites which nevertheless make a positive contribution to the local or regional historic environment.

It is for local authorities to identify such sites and develop policies within development plans for their protection and future management. Local authorities are encouraged to formulate policies for both Inventory and non-Inventory sites. All local authority development plans now contain policies in respect of *Inventory* sites, but only a few currently cover non-Inventory sites. Some local authorities have undertaken systematic surveys of non-Inventory sites with a view to including them under planning policies.

Figure 4 Non-Inventory designed landscape. Cawder, East Dumbartonshire.



Ancient woodland

Designed landscapes may include land designated as a Site of Special Scientific Interest, or even as a National Nature Reserve, but many more include areas identified by Scottish Natural Heritage (SNH) as Ancient Woodland, or long-established semi-natural or plantation woodland. Designated areas are included in the Ancient Woodland Inventory maintained by SNH and are defined on maps on the Forestry Commission's GLADE Land Information Search website. Woodland operations within designated sites are generally made the subject of management agreements between the agency and the landowner, where grant aid is involved. The overall objectives of SNH in respect of trees and woodland are set out in its policy statement *Natural Heritage Futures, Forests and Woodlands* (2002) (www.snh.org.uk).

Felling licences

Permission from the Forestry Commission Scotland is normally needed to fell growing trees. Forestry Commission Scotland give this with a felling licence or with approval under a Dedication Scheme. In certain circumstances you may also need special permission from another organisation for any proposed felling.

Everyone involved in the felling of trees, whether doing the work or by engaging others, e.g. the owner, agent, timber merchant or contractor, must ensure that a felling licence or approval under a Dedication Scheme has been issued before any felling is carried out or that one of the exemptions apply. They must also ensure that the work is carried out in accordance with the terms of a Forestry Commission permission. If there is no licence or other valid permission, or if the wrong trees are felled, anyone involved can be prosecuted. Any felling carried out without either a licence or other permission is an offence, unless it is covered by an exemption. In any calendar quarter, you may fell up to 5 m³ on your property without a licence as long as no more than 2 m³ are sold.

Certain types of felling do not need permission. Forestry Commission publication *Tree Felling, getting permission* (www.forestry.gov.uk/publications) explains the requirements and exceptions further. The Forestry Act 1967, as amended, and related regulations give the exceptions in full.

British Standards

When carrying out work to trees the following British Standards should be adhered to:

BS 3998:2100 Recommendations for Tree Work

BS 5837:2005 Trees in Relation to Construction

Scotland Rural Development Programme and Single Farm Payment

These rural and agricultural support schemes have conditions that may affect historic landscapes and are considered under Funding in the Appendices.

Figure 5 A range of historic sites from the Roman period onwards and several designed landscapes in the Tweed valley below the Eildon Hills. Scott's View, Bemersyde, Scottish Borders.



UK Forestry Standard and Guidelines

In achieving sustainable forest management (SFM), the conservation of heritage features and achievement of landscape quality are promoted in the *UK Forestry Standard* (1998). Their respective SFM requirements are for:

- important heritage features are protected.
- due account is taken of cultural, historic or designed landscapes.
- landscape quality is enhanced.

The Forestry Commission *Forestry Practice Advice Note 3 – Woodlands in Designed Landscapes* (1995, out of print) provided basic information for woodland managers on the history, identification, value and care of the tree and woodland components of a designed landscape. The present guidance replaces that earlier national guidance with particular reference to Scotland and relates it to current grant and other funding opportunities.

A suite of design guidelines – *Forest Landscape Design*, *Lowland Landscape Design* and *Community Woodland Design* – all contain advice on the principles and processes of designing and managing

forests and woodlands in the UK landscape. Much of this advice is relevant to the restoration, rejuvenation and sustainable management of designed landscapes.

Both the *UK Forestry Standard* (UKFS) and associated suite of Guidelines are to be superseded by new publications available late 2011. Besides the new UKFS, of relevance to this guidance are the new *Forests and the Landscape Guidelines* and *Forests and the Historic Environment Guidelines*.

Figure 6 An outstanding non-Inventory site with many typical features. Stobs Castle, Scottish Borders.



The Scottish Forestry Strategy

The Scottish Forestry Strategy (2006) acknowledges the contribution made by trees and woodland to landscape character and quality, placing a high priority on increasing structural and species diversity, and on the provision of well designed and well managed woods. Recognition is afforded to designed landscapes that contain non-native trees and shrubs. The strategy encourages the sympathetic management of trees and woodlands in sites listed in the *Inventory*, as well as valued individual ancient and heritage trees.

Scotland's Woodlands and the Historic Environment

The Forestry Commission Scotland policy statement *Scotland's Woodlands and the Historic Environment* (2008) was developed for all those with an interest in Scotland's trees, woodlands and forests and brings together *Scottish Historic Environment Policy* (SHEP; Historic Scotland, 2009) and the *Scottish Forestry Strategy* to:

- Communicate the forestry sector's shared understanding of how forests and woodlands contribute towards Scotland's historic environment.
- Promote the appreciation of the history of Scotland's forests and woodlands, and their contribution towards our cultural heritage.
- Confirm how the forestry sector will endeavour to deliver the required outcomes of Scottish Ministers' strategic policies for the historic environment.
- Outline what practical measures the forestry sector can take to ensure that all our activities enhance the stewardship of the historic environment.

The Forestry Commission Scotland Policy Statement can be found at:
www.forestry.gov.uk/histenvpolicy

Trees and woodlands in designed landscapes

Components of designed landscapes

Designed landscapes were laid out over ground with natural landform, watercourses and vegetation, sometimes already improved for agricultural use. The natural landscape usually still plays a major role in the design together with the following man-made features – both constructed and planted.

- **Buildings** – mansion house, stables, estate cottages and lodges – are essential components, together with garden buildings – follies and eye-catchers, dovecots, ice-houses and walled gardens with glasshouses, conservatories and bothies.
- **Enclosures** – hahas, terrace walls and balustrades, estate fences, field boundaries, estate walls.
- **Landform** – terrace banks, ground-moulding, causeways, rockwork.
- **Circulation** – drives, estate roads, rides, walks, footpaths, steps and bridges.
- **Water features** – may be adapted natural watercourses – rills, cascades, glens – or formal elements fed by them – canals, lakes, artificial rivers, ponds, pools, fountains.
- **Views and visual structure** – while these components are not physical they are as much part of the design as the other features and include vistas (narrow axial views), broader views and panoramas, and the contained and linked spaces formed by planting and walls. External views, whether expansive or directed at specific features, are often also important.
- **Planted features** – parkland with clumps, groups and individual trees, avenues; boundary tree belts, shelter belts, roadside and boundary trees and hedges; shrubberies, ornamental woodland, and arboretums; policy woodland, forestry plantations and areas of semi-natural woodland; kitchen gardens and other gardens in all their variety.

Each of these component groups needs regular management, maintenance and repair for their survival, and may entail substantial investment to restore neglected features. Each is a specialist area that may require professional inputs and skilled craftsmen. While recognising all the components that comprise a designed landscape, this guidance deals in detail only with the planted components and the visual structure that they create.

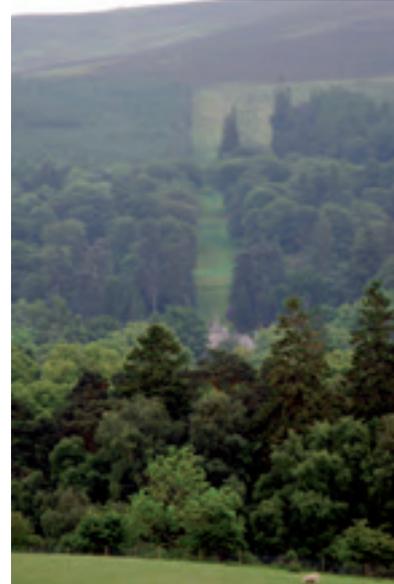
Figure 7 The mansion house, focus of the landscape, Dumfries House.



Figure 8 Ornamental canal, Newliston.



Figure 9 Axial ride, Dawyck.



How can designed landscapes be identified?

In many parts of Scotland, from around our towns and cities to more remote areas, designed landscapes account for much of the land we view as countryside. Many people do not recognise that these particularly fine areas of landscape have been deliberately designed because they have become an essential part of the landscapes we travel through and enjoy. From the roadside, estate walls, boundary tree belts and formal gateways and lodges are indicators. Planting features will include avenues of mature trees, parkland grazing with large trees and tree clumps, and a variety of woodland types. Near the main house may be terraced gardens, shrubberies, wild gardens and collections of fine trees. Within the site will also be found a walled or kitchen garden, stables block, estate cottages, dovecot, ice-house and, possibly, ornamental buildings and follies. In the outer parts of the site pasture and arable farmland and large-scale commercial forestry plantations may play a part.

The forms that designed landscapes take can be identified on maps and on the ground, although their variability and degree of design can sometimes make this difficult. Also, the designed landscapes may display features from different design periods which can make understanding the chronological development of the landscape a challenge.

Values and uses of designed landscapes

Perhaps the main value of designed landscape and the tree components in terms of their everyday impact on our lives is their contribution to Scottish scenery whether in the vicinity of towns or rural areas of the Lowlands, Highlands and islands. The landscapes we see as we travel through landscapes, either on a daily basis or as an occasional visitor, often depend for their quality to a large degree on the deliberate planting of trees over many centuries and at different scales by estate owners. But this important part of our heritage and has many values including:

- **Artistic value** for their design that combines natural landscape and man-made built and planted features
- **Historical value** on account of family history, role in national or local history, association with famous people including designers and plant collectors
- **Horticultural value** due to excellence of garden or plant collections, or arboricultural value for its variety of trees

- **Architectural value** as the setting for listed buildings and works by renowned architects
- **Scenic value** for contribution to the local landscape, either individually or in a group or sequence
- **Nature conservation value** on account of the habitats and diversity of species of native flora and fauna
- **Archaeological value** for physical remains from any period including evidence of gardens from earlier periods
- **Recreational value** for public and/or private use and for many activities
- **Educational value** whether through interpretation or more formal types of teaching and field study at primary, secondary and tertiary level, covering any of the above topics
- **Climatic value** – trees and forests contribute towards mitigation and adaptation of climate change in many different ways.

In terms of use, all sites have a combination of pleasure and productive land-uses, including:

- Recreational uses both by owners, paying or free access by visitors or by the local community
- Agriculture and forestry
- Sporting use (game birds, deer stalking, fishing)
- Direct and indirect contribution to local tourism.

Figure 10 Hillside parkland with high aesthetic and scenic value. Leny House, Callander, Stirlingshire.



Landscape design styles and historic periods

This section gives a summary of the styles of designed landscape and their historic development. A site may show one particular design period or style clearly, often because substantial re-design has taken place at one time and survived, in which case much of the tree planting may be of a fairly uniform age. Alternatively, the surviving landscape may be a series of layers, representing additions and changes through successive periods, where trees might be of a wide age range.

Natural and semi-natural woodland

Scattered remnants of Scotland's native woodland are to be found within many designed landscapes throughout Scotland. In the more cultivated parts of the Lowlands, woodland of this sort generally occurs in inaccessible locations such as cliffs, gorges and steep sided dens, where

it cannot easily be exploited for its timber or reached by grazing animals. In many designed landscapes, however, the native woodland has generally become depleted through past exploitation, has been invaded by self-seeded non-native species trees such as sycamore, or has been deliberately interplanted with ornamental species to add visual interest or timber value. Within the Highlands remnants of native woodland tend to survive only on the steepest slopes, in the remotest glens, or on islands in lochs, where they have escaped the combined pressures of burning and grazing. Even here there may be evidence of past exploitation, sometimes by extracting timber by floating on lochs and rivers. Some native woodland has also survived in the form of wood pasture, where a balance is maintained between grazing and natural regeneration, creating a patchwork of woodland and open grassland. Such landscapes are often rich in biodiversity. Although wood pasture derived from natural woodland is different in character from parkland deliberately planted with clumps and individual trees, both can make an important contribution to landscape character.

Early forest management

The systematic management and exploitation of Scotland's forests began in medieval times. With the gradual expansion of agriculture, it became necessary to impose some controls over forest clearance and grazing. These controls were mostly exercised directly by the Crown or through grants of land to religious houses and feudal barons, with penalties to be imposed on those who disobeyed the law. Some religious orders, notably the Cistercians, are known to have employed foresters to manage their woods, while favoured barons were able to enjoy special rights and privileges over the land and forest which was placed under their jurisdiction.

While some woods and forests were managed and exploited for their timber, others were protected and maintained as hunting reserves. In the Lowlands and more settled parts of the country this often involved the creation of wooded parks, usually bounded by fences and ditches, some of which are depicted on early maps of Scotland such as those of Timothy Pont and Johan Blaeu. Traces of these medieval hunting reserves still survive in some places as earthworks, often found in close proximity to royal palaces and high status houses of the medieval period. Their former existence may also be revealed by place-names which include words such as 'forest', 'park', 'hart' and 'hind'. Though primarily intended for the raising of deer, these parks sometimes included other features such as fishponds and rabbit warrens or 'cunninggars.'

Figure 11

Stirling Castle and Kings Park from Timothy Pont map c.1595.



Figure 12

The castle and new park of Cumbernauld from Johan Blaeu map, 1654.



Geometrical planting

A fondness for order and proportion in the landscape, as in the architecture to which it was often related, was evident in the plantations surrounding Scottish houses from an early date. Scotland's earliest gardening book *The Scots Gard'ner* by John Reid, first published in 1683, encouraged landowners to "... make all the buildings and plantings lie so about the house as that the house may be the centre ... whatever you have on the one hand, make as much, and of the same form and in the same place, on the other." Although the natural topography often made it difficult to achieve absolute symmetry, many landscapes of the late 17th century and early 18th century exhibited this sort of regularity, frequently centred on an axial line running through the house, with a cross-axis set at right angles to it. Where the surrounding plantations formed part of the pleasure grounds, they were frequently cut through with intersecting walks and rides, or with narrow vistas radiating from a single point. Until the mid 18th century formal plantations of this sort were generally referred to as *wildernesses*.

Figure 13

Plan from *The Scots Gard'ner* by John Reid, 1683.

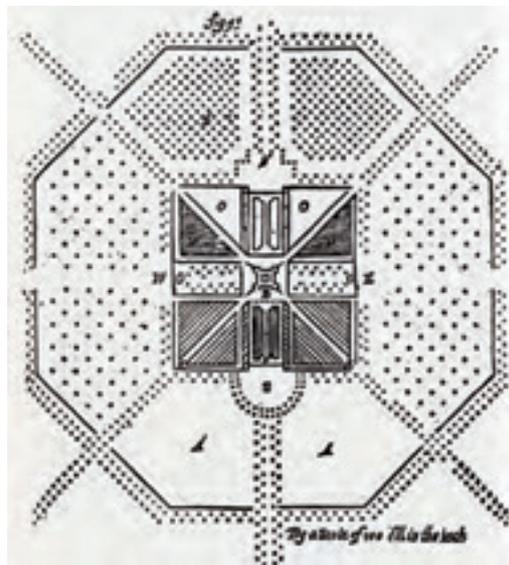


Figure 14

Typical plan c.1700.

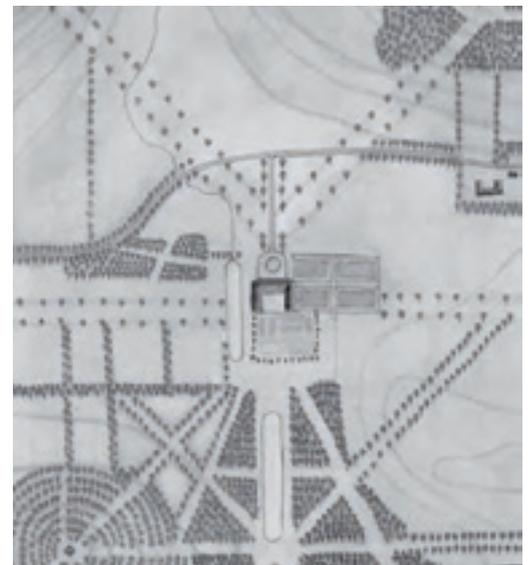


Figure 15 Vista in Wilderness. Newliston, City of Edinburgh.



The avenues and vistas that were a feature of these landscapes served in some cases as the main approach to the house, or in other cases as edges to frame views to and from the house. They were normally in the form of rows of regularly spaced standard trees, or narrow parallel belts of planting. Where they stretched out into the surrounding landscape they could be seen as symbolic of a landowner's power and influence over his surroundings – as John Reid observed “... *being like the sun sending forth his beams*”. One characteristic of many of these landscapes was the alignment of the main axis on a distant feature such as a castle or prominent hill-top. Where a plantation was cut into a star shape or *rond-point*, each of the radiating vistas might be aligned on a different landscape feature. Early tourists such as Daniel Defoe c.1710 and John Macky c.1723 described many such landscapes in their journals.

The formality of the policies surrounding the mansion house was frequently extended into the surrounding landscape in the form of rectangular enclosures or *parks*, bounded by hedges or walls, along which standard trees were planted at regular intervals. In more exposed situations these lines of trees could be thickened into narrow tree-belts, to serve as wind-breaks. Although changing fashion in the late-18th century saw many of these geometrical landscapes altered, with ancient avenues uprooted or left to decline, there was a revival of interest in formality in Victorian and Edwardian times, resulting in the renewal of old avenues or the planting of new ones, sometimes with exotic conifers such as giant sequoia or monkey puzzle.

Naturalistic or parkland landscapes

The aim of creating an idealised classical landscape, influenced by the paintings of the Claude Lorrain and Salvator Rosa and the sights of the grand tour, brought about a change in fashion in landscape improvement in the mid-18th century. The new style reflected a growing appreciation of the natural character of a site. Added to these considerations was the cost of maintaining *wilderness* plantations, where the formal walks and rides required frequent pruning and mowing. The new style, which came to be known as the ‘English’ landscape garden or natural style, paid more attention to natural topography and sought to exploit the scenic opportunities which it offered. Although the style is closely associated with three English landscape designers – William Kent, Lancelot *Capability* Brown and Humphry Repton – they did not practise north of the Border (apart for one site in Fife by Repton), so its application in Scotland is attributable to others.

Figure 16

Parkland planting. Blair Adam, Kinross.



Figure 17

Parkland planting styles by William Gilpin.



In place of the formal avenues and regular plantations of earlier times there developed new *parkland* landscapes bounded by plantations with sinuous edges, embracing broad areas of grassland, ornamented with irregular clumps, groups or scattered individual trees. Often the natural topography helped to determine the pattern of planting – in the words of one contemporary writer “*I just plant what winna pleugh, and nature does the rest.*” Sweeping drives allowed much greater variety in forming the approaches to a house, adding interest by exploiting the favourite 18th century device of concealment and surprise. Carefully placed trees and plantations served to frame distant views, and in others to hide public roads, service drives and unsightly features from view.

From the mid-18th century many parkland landscapes were planted with individual parkland trees and clumps, carefully chosen for their form and visual interest. Whether observed from a fixed point such as a house, or seen from the windows of a moving carriage, the pattern of planting was designed to add variety and depth to the fore ground and middle ground of views. Parkland was almost invariably maintained as permanent pasture or hay-meadow, with grazing animals adding to its pastoral character. In many landscapes the sunken fence or *ha-ha* was introduced, to maintain open views while keeping stock out of the areas closest to the house. In such landscapes farm buildings and stable blocks might be positioned at some distance from the house, either hidden or with features to serve as eye-catchers. On more distant hilltops, other eye-catchers in the form of artificial ruins, obelisks or monuments would be placed. Walled kitchen gardens were generally at some distance from the house, sheltered by tree planting which could be underplanted with shade-bearing herbaceous plants such as bluebells and daffodils, or with ornamental shrubs such as rhododendrons and azaleas, to create attractive woodland walks. Elsewhere, especially where landscapes were being managed for their sporting value, underwood was planted with particular shrub species to provide cover for game birds.

Figure 18

Typical plan c.1800.



Figure 19

Parkland, Balloch castle, Loch Lomond.



Picturesque and sublime landscapes

The wilder aspects of nature, shunned by earlier generations, began to attract attention from the mid-18th century onwards. As one contemporary writer was moved to comment in verse in the 1720s “*Still other harsh and frightful objects be / Which not a little grace a country seat / If only brought within the bounds of sight.*” Many Scottish landowners began to seek out wild glens in the vicinity of their houses, and to incorporate them into their designs by with new paths, drives,

Figure 20

Typical plan c.1890.



Figure 21

Picturesque view at Barskimming.



bridges and planting. These led visitors to viewpoints overlooking dramatic landscape features such as cliffs, crags and waterfalls. While many such landscapes were already partially wooded by nature, others benefited from new planting put in to add visual interest, or to frame views. Such scenes, eagerly sought out by tourists from the mid 18th century onwards, remain popular with visitors to Scotland two and a half centuries on.

As in tamer landscapes, the device of concealment and surprise was frequently employed to add to the drama, with paths leading through woodland to viewpoints offering carefully contrived glimpses or views, often described as *picturesque* or *sublime*. Although picturesque and sublime landscapes were to be found in the Lowlands, mostly centred on river gorges and waterfalls, it was amongst the hills and mountains that some of the most dramatic scenes of nature were to be found. The purpose of these landscapes was to thrill the observer without putting them in danger and were carefully laid out and planted to maximise their effect.



Figure 22

Sublime landscape at Falls of Bruar.

Exotic trees, arboretums and American gardens

With the exploration of the world leading to a rapid expansion in the range of trees available to planters from late 18th century, new and exciting opportunities were opened up to planters, gaining momentum through the 19th century. Exotic conifers, in particular, attracted the attention of foresters and landowners, whether for their potential as timber trees, or for their beauty and rarity. Their varied forms and evergreen foliage were able to provide winter colour in wooded landscapes. Landowners and nurserymen, who were prominent amongst the membership of organisations such as the Oregon Botanical Association, sought to outdo each other in the creation of experimental plantations and arboreta, designed to show off these new introductions to best effect. Referred to initially as *American gardens*, these exotic tree collections soon became an established feature of many Scottish estates.



Figure 23

Exotic tree groups, Balloch castle, Loch Lomond.

Those tree species which were found to be tolerant of the exposed conditions and poor soils of the Highlands and on the West Coast allowed landowners to expand their landscape improvement through extensive hill planting, entailing the forestation of landscapes long stripped of their natural woodland cover. Sitka spruce and lodgepole pine soon established themselves as the most favoured species for such hill planting, alongside earlier but less hardy introductions such as Norwegian spruce and larch, and the native Scots pine. After Britain's lack of a timber reserve was highlighted in the First World War, government in the 20th century invested heavily in new planting of these fast growing trees through the establishment of the Forestry Commission, offering generous grants to landowners. As a result, many estate policy woodlands which had been felled during the two wars were replanted with commercial conifers. Some such plantings have been criticised for their establishment without due regard for other interests and sensitivities, including an adverse effect on landscape character.

Today, most of Scotland's tallest trees are exotic conifers, located within designed landscapes where they have been allowed to grow to maturity. Consequently, it is often possible to identify such landscapes with the help of these signature trees. Exotic broadleaved trees, too, have found a place in these woodlands, though these are less prominent in the landscape because of their resemblance to native species. While recent years have seen a marked trend, encouraged by altered government grants, towards the replanting of woodlands with native species, exotic trees deliberately planted in prominent positions continue to add variety, provide autumn colour and make landmarks, among other effects, in designed landscapes.

Designed agricultural landscapes

While not part of the policies surrounding country houses, planting in the surrounding countryside often shows clear evidence of deliberate design. From monastic times onwards tree-planting has always been seen as an important part of agricultural improvement, whether for amenity or for shelter. This is most often seen in roadside and field boundary planting, with trees spaced at regular intervals along field dykes and hedgerows, especially along the approach and boundary roads to a house or estate. In some areas, the hedgerows themselves become a characteristic feature of the rural landscape. Though essentially practical in their purpose, windbreaks, too, are often planted with visual amenity in mind. In some instances, where there is no big house to act as a focus, the pattern of fields and plantations can be seen as a designed landscape in its own right.



Figure 24

Designed agricultural landscape.

Given that the structure of much of Scotland's agricultural landscape was established in the late-18th and 19th centuries, many of the trees which were so carefully chosen and planted by our forebears are now mature or over-mature. With the enlargement of fields and the mechanisation of agriculture, field boundary and parkland trees have come to be regarded by some landowners as an inconvenience, leading to their loss or deliberate removal, with a consequent impact on landscape character.

Regional variations

There is considerable regional variation in the styles and types of designed landscapes found around Scotland. Distinctive types include West coast wild and rhododendron gardens, often with tree collections; Highland hunting lodges; northern isles designed landscapes with few trees and grass terraces; coastal and lochside landscapes generally.

Under SNH's Natural Heritage Zones (NHZ) Programme in 1999 the regional characteristics in respect of designed landscapes of each of the twenty-one NHZs was assessed in terms of:

- Abundance and distribution
- Characteristics of sites in zone
- Overall status within national resource
- Sites of special significance
- Pressures and threats
- Objectives and funding

Conservation documents, surveys and management plans

Conservation Management Plans

All major decisions in the management of designed landscape, including dealing with many of the issues in the following sections, should be made in the context of a Conservation Management Plan. Such plans have the advantage of dealing with all the factors relevant to managing a landscape in a comprehensive way to reach balanced policies and courses of action. A Conservation Management Plan is often required by funding bodies and may itself be grant aided. One may be required also by a planning authority where new development or large-scale change is proposed in a designed landscape recognised in its planning policies.

A Conservation Management Plan is a document produced by an experienced professional or site manager that:

- gives a detailed understanding of the site and its features through research, consultations and surveys
- provides a statement of cultural significance of the whole site and its major components
- assesses the threats to its heritage and other management issues
- sets out conservation policies as the basis for future management, conservation works and new developments or changes
- lays down management policies and proposals.

The detailed understanding will involve historical research and site surveys in sufficient detail to produce an informed statement of significance and develop detailed policies and proposals, and deal with the mitigation of the effects of any development that may be proposed.

Historical research may involve study of primary sources (unpublished documents such as estate archives and manuscript maps and plans) and secondary sources (published books, maps etc.). Repositories for these include local libraries, estate offices, council and university archives, and national repositories such as the National Archives of Scotland, General Register Office for Scotland (these two soon to be merged), Royal Commission on the Ancient and Historical Monuments of Scotland and the National Library of Scotland, all in Edinburgh, or the British Library in London. Increasingly all kinds of documents are available online at the websites of these and many other organisations.

Historic maps and plans, and records of existing land classifications and designations are usually the most useful starting point in gathering information about a site. A short guide to research sources, maps and websites in site assessment is given as an Appendix in Section 15.

A sample brief for a Designed Landscape Conservation Management Plan can be found at: www.hlf.org.uk/howtoapply

Balancing priorities

The value of the Conservation Management Plan process is that by rating the significance of the different aspects of the landscape, priorities can be established and balance achieved between different objectives, for example between:

- conserving the surviving trees of the historic landscape
- restoring the planted and built features of the designed landscape
- preserving visual amenity and the scenic value of the site
- ensuring the viability of agriculture and forestry

- conserving habitats and encouraging species diversity
- providing for the requirements for field sports and private uses
- providing public access and visitor attractions
- achieving the best use of available resources.

Tree and woodland surveys

A comprehensive record of the existing resource is a valuable tool for understanding in detail the characteristics and management requirements of the individual trees and tree groupings of a site. Trees may require surveying either as individuals – as in the case of parkland, small groups, avenue, specimen and veteran trees – or as areas, in the case of clumps, belts, woods and more extensive plantations. Trees in some situations are likely to require tree work to maintain their health and vigour and for public safety, or to require replacement with young trees. Surveys for the basis for organising tree work, both initially and periodically thereafter, and for monitoring the tree stock in the longer term.

Tree surveys should generally be undertaken to BS 5837 : 2005, but may be tailored to the requirements of a particular site and the special needs of the project. Tree surveys should be undertaken by a qualified and experienced arboriculturalist, preferably an Arboricultural Association registered Tree Consultant (www.trees.org.uk), or a member of the Royal Scottish Forestry Society (www.rsfs.org) or Royal Institute of Chartered Foresters (www.charteredforesters.org).

Forest Plans

A Forest Plan aims to deliver long-term environmental benefits through sustainable forest management and consists of a strategic plan describing the major forest operations over a 20 year period. A Forest Plan may be a stand-alone document for a designed landscape, or incorporated in a Conservation Management Plan.

Forestry Commission Scotland can provide support to help prepare a Forest Plan, through the Woodland Improvement Grant (WIG) for long-term forest planning. An approved Forest Plan will give a 10 year approval for felling, thinning and the means of accessing grants for restructuring felling and regeneration. It will also provide access to other grant support through Rural Development Contracts – Rural Priorities (see Sources of Funding).

Information on Woodland Improvement Grants including long-term forest planning can be found at: www.forestry.gov.uk/glsotland

The format of the Forest Plan has been designed for use in any woodland. The Plan will not necessarily need to be complex but the detail included in the Plan should be in line with the scale, complexity and sensitivity of the woodland. Forestry Commission Scotland have prepared a number of Forest Plan examples to give an indication of what is expected in a range of different situations. These are available from www.forestry.gov.uk/wighelp as follows:

- Large Upland Mixed Conifer Forest
- Small Community Woodland
- Native Woodland

Planning a restoration or restocking project

Planning a planting project will require an experienced land manager or professional advisor such as a forester or landscape architect. The size and types of trees, ground preparation, planting technique and protection will vary depending on site characteristics, including soil type and microclimate. The information included in the following sections gives outline guidance only.

Guidance section

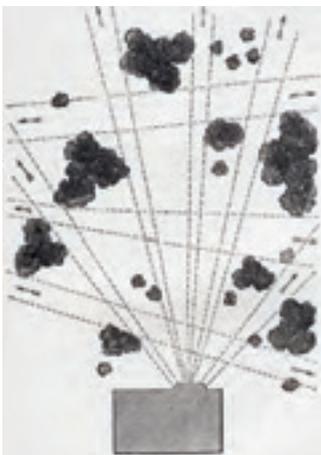
This section provides the main body of the guidance and considers the different tree features of designed landscapes, specific management issues relating to them that have been identified and more general management issues that commonly occur.

Conservation and management of trees in designed landscapes

Parkland trees – individual trees, groups, roundels and clumps

Figure 25

Planning of parkland planting, William Kemp (circa 1890).



Grazed parkland is perhaps the most common design feature derived from the English landscape garden tradition, seen in confined to extensive areas in practically all designed landscapes. Tree components in parkland can include individual or standard trees, small groups, roundels, clumps and small irregularly-shaped plantations. These tree features are often arranged to create a sense of depth in the principal views from house and drives, by their overlapping forms to disguise boundaries, to channel views, and to create a character of open woodland that can be visually similar to wood pasture. Often parkland planting appears quite random and unrefined, while still creating a distinct character, and in other places can be subtly planned to create particular visual effects.

If no detailed estate surveys are available and it is considered both desirable and appropriate to recreate the original layout, the best basis for restoring the pattern of planting is the 1:2500 1st edition Ordnance Survey, generally surveyed in the period 1850–1870, which is available for much of Scotland (available from the National Library of Scotland Map Library). Ideally the original tree species should be used and it is essential to protect against livestock, horses, deer and rabbits. Most of the features would have been protected when first planted by a fence or by hedge planted on a mound, evidence for which can often be seen.

- **Parkland tree species in Scotland** – commonly beech, lime, oak and sycamore; frequently ash, horse chestnut, sweet chestnut; occasional use of conifers including cedars, larch, Scots pine, Wellingtonia and others.
- **Restocking parkland trees** – 2.75–3.00 m high standard trees or lighter / heavier for individual parkland trees and small groups or roundels – staked and tied for the first year or two, with rabbit protection and stock-proof guards or fences. Larger clumps may be more suited to planting with forestry transplants, with tree-shelters or rabbit and stock fences.

Figure 26

Scots pine and Wellingtonia as parkland trees.



Figure 27

Parkland trees restocked by Borders Forest Trust.



- **Nurse trees** – faster growing species were often planted with the trees that were intended as mature trees in groups, clumps and roundels, as well as in belts and small woods. Typically Scots pine or larch would be planted with, for example, beech or oak, to provide shelter, with the intention that they would be removed after they had served their purpose. Frequently nurse trees can be seen remaining in the mature tree features. Use of nurse trees in restocking these features is an option.

Figure 28

Parkland in traditional pasture use, with declining trees.



Figure 29

Reduced tree group endangered by close ploughing.



Parkland cultivation and use

Often areas that were originally parkland grazing with permanent pasture and individual trees and tree groups are now managed more intensively, with regularly resown grass pasture or arable crops involving frequent use of heavy agricultural machinery, pesticides and fertilizers. Issues here include:

- cultivation (especially ploughing) close to trees, damaging roots and altering soil levels leading to tree deaths
- soil compaction from agricultural machinery
- fertilizer regimes affect the natural balance of tree nutrients and their uptake, which can affect the mycorrhizal fungal associations and make them more vulnerable to pathogens
- increased stock numbers with 'poaching' of the ground causing compaction and waterlogging from animals' feet and excessive dunging that can damage tree roots
- gradual reduction of the number of trees in groups due to lack of boundary protection, leading to eventual loss of the whole feature.

When trees were originally established under less intensive agricultural practices it would have been intended that parkland pasture would be grazed by cattle, sheep or deer. Most trees and tree groups would have had protective fences, hedges or hedges banks around them in their early years. In many cases this protection has been lost or broken down, leading to animals using the trees for shelter or cultivation closer to or over tree roots.

Estates commonly hold events in parkland and woodland areas, including cross-country riding, motor shows and music festivals, that can all have potential impacts on the trees in terms of compaction and direct physical damage, that can be exacerbated in wet weather. An impact assessment during the planning for events needs to be undertaken to identify potential problems and necessary mitigation measures put in place.

Parkland – loss to woodland

Parkland and other fields within designed landscapes typically have irregular boundaries with adjoining woodland, or the boundary is disguised from the main viewpoints by the placing of tree groups. The temptation for managers is to simplify boundaries into straight fence lines and to plant up awkward corners leading to a loss of essential character and visual diversity. In some cases whole areas of less productive parkland grazing located away from the main house have been targeted for planting. Parkland has been lost in this way through the 20th century and is currently under pressure due to the promotion of native woodland creation under SRDP.

Confusion can be caused by land in designed landscapes being often shown as 'Potential core woodland' in GLADE, the Forestry Commission's Land Information Search tool (www.forestry.gov.uk/lis). Owners are encouraged to undertake more detailed assessment of site values and design before committing to woodland planting in parkland areas.

Figure 30

Planting parkland to simplify boundaries resulting in loss of character.

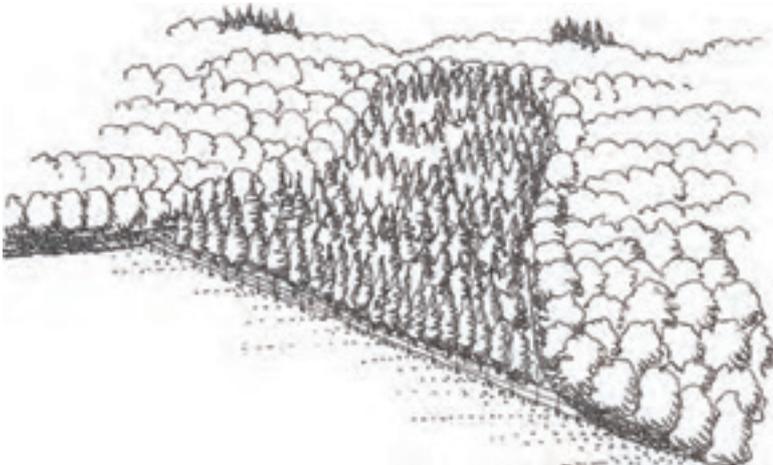


Figure 31

Conifers infill in policy woodland.



Parkland that is important to the design and character of a landscape and should be identified in a Conservation Management Plan. New planting should be limited to areas where effects on the integrity of the design are of low consequence and where it can make a positive contribution to other values such as biodiversity.

Wood pasture

Ancient wood pastures are areas of grazed pasture, heath or open hill with a scattering of open-grown veteran trees. Once a common feature of the Scottish landscape, they provided shelter, pasture and fodder for livestock, as well as wood products for local people. Some trees may have been pollarded (cut back to a high stump out of reach of grazing animals), regenerating with multiple stems to provide poles, or browse for livestock in harsh times. The grazing prevented competition by younger trees, allowing some individual trees to survive to a great age.

In many places the wood pasture structure has been erased by modern land-uses, but sites remain where the combination of old trees and pasture gives us a glimpse of an earlier managed landscape and the culture and traditions that created it. The trees themselves are inspiring; some are many centuries old and may have a lineage on that site stretching back to prehistory.

Figure 32

Oaks in wood pasture.



Courtesy of The Woodland Trust.

Figure 33

Veteran and younger oaks in wood pasture, Dalkeith, Midlothian.



Courtesy of The Woodland Trust.

As well as being historic landscapes of cultural importance, ancient wood pastures now provide a precious habitat for some rare and specialised wildlife that depend on the old trees. Conserving these species requires protection of the habitat by managing the grazing and ensuring there will be a continuing supply of old trees into the future.

Wood Pasture and Parkland is a priority habitat of the UK Biodiversity Action Plan with targets for its conservation, restoration and expansion. Previously listed as Lowland Wood Pasture and Parkland the scope of the plan was extended in 2008 to include upland sites.

Grant funding is available through the Scotland Rural Development Programme to support the management of ancient wood pastures.

Forestry Commission Scotland *Guidance on management of ancient wood pasture* (www.forestry.gov.uk/publications) provides an introduction to the restoration and management of ancient wood pasture and includes references and online links to a wide range of other relevant publications on the subject by SNH, English Nature, The Woodland Trust and others.

Picturesque glens

The fashion for picturesque or sublime landscapes that developed from the natural style of landscape gardening took form in Scotland in the improvement of natural glens where they occurred on estates. Many designed landscapes have a picturesque steep-sided glen located in the outer part of the landscape beyond the parkland and policy woods. The glen will have been improved by paths, bridges over the rushing burn or river, viewpoints of waterfalls, follies such as a hermitage, and planting of woodland and feature trees. Sometimes these glens are quite separate from the main policies, e.g. Falls of Bruar (Blair Castle) and Falls of Acharn (Taymouth) and vary greatly in scale depending on the natural assets of the site – from the magnificent Falls of Clyde (part of adjoining Bonnington and Corehouse estates) to unnamed glens of smaller estates. Woodland planting in these landscapes is, by default, of native species, although conifer nurse species were often used and newly introduced exotics added either as specimens or for larger shelter plantations. Subtle clumps of trees perched on gorge edges are often seen, several oaks planted together to create a multi-stemmed effect or twinned with Scots pine, for all appearances a natural occurrence.

Picturesque glens require particularly sensitive management to conserve their special qualities and are easily damaged by intrusive actions so are best tackled by a Conservation Management Plan.

Figure 34 Bonnington Linn, Falls of Clyde, Lanarkshire.



Almost inevitably natural heritage values are prominent and may need to be given precedence over design issues if the site has protected status such as a Site of Special Scientific Interest.

Avenues

Avenues of lime, beech, sycamore or oak may survive from the formal landscapes of 17th and 18th century or may be of later origin (using newly introduced conifers in some cases) either accompanying principal drives or forming main vistas. Avenues may be single or double rows, or even narrow belts. The difficulty is how to restock the avenue while retaining the valuable original, usually veteran, trees – whether to thin the old trees and interplant in the row, to replace with a parallel row – or, as a last resort, to fell wholesale and plant a complete new avenue. The solution will vary depending of the characteristics of the each avenue, the original spacing of the trees, the trees surviving in the rows and their vigour, their value as veteran trees, the width between rows and the adjoining space available. Here, as elsewhere when dealing with veteran trees, the emphasis should be on conserving the old trees wherever possible and for as long as possible.

Revitalising trees by hard pruning is a management option in some cases, e.g. lime avenues of a certain age and condition, although this approach needs to be based on good arboricultural advice.

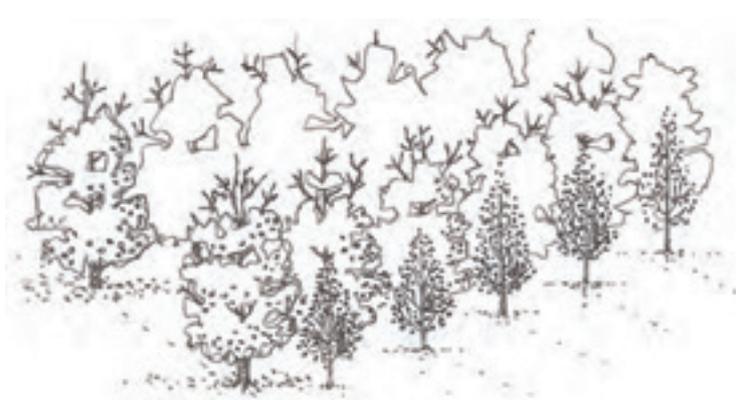
Figure 35

Avenue restocking by interplanting.



Figure 36

Avenue replanting by parallel interplanting.



- **Avenues tree species in Scotland** – commonly beech, lime, oak and sycamore; sometimes ash, elm and sweet chestnut; occasional use of Douglas fir, Scots pine and Wellingtonia.
- **Restocking avenue trees** – 2.75–3.00 m high standard trees or lighter/heavier – staked and tied for the first year or two, with rabbit protection and stock-proof guards or fences.



Figure 37

Avenue replanting.

Overgrown hedges

Overgrown hedges are a frequent sight in designed landscapes both where the site has suffered long-term neglect and where hedges have been unmanaged at a critical period in their growth. Most commonly beech hedges where the individual plants have grown into mature trees are seen, sometime to impressive effect. There is no easy answer to the correct procedure and much will depend on the size to which the trees have grown, whether to accept the trees as a feature of historic interest or to cut them back and regrow the hedge.



Figure 38

Overgrown beech hedge and avenue trees.

Boundary belts and strips

Tree belts of mixed broadleaves, often with some Scots pine or larch, are the traditional form of enclosure for estate boundaries and parks within the designed landscape. Often the presence of pine and larch is the result of use as a nurse crop that has not been removed during management when the primary tree species have become established. Belts may be geometric

and of regular width or of more naturalistic shapes related to the landform. Frequently belts and other policy woods were felled in the WW2 period and often have since been left to regenerate naturally with no regular management. The most common problem is gaps or sections planted with commercial conifer species, particularly Sitka spruce, in the 1960s and 1970s, reducing the character of the belts and the spaces they form. Felling these areas and restocking with broadleaves, plus Scots pine where appropriate, is the preferred solution.

- **Boundary belts tree species in Scotland** – typically ash, beech, lime, oak, sycamore, Scots pine, larch.
- **Restocking boundary belts** – forestry transplants 45–60 cm high – with tree-shelters or rabbit and stock fences.

Figure 39

Broadleaved boundary and internal tree belts.



Figure 40

Neglected tree belt.



Roadside trees and hedges

Hedges planted with distinctive species or simple quickthorn hedges are a feature of estate landscapes in many parts of Scotland, for example, beech hedges with sides shaped to a batter are characteristic of some areas of the Borders, in most cases planted by the local estate, sometimes with mature trees in the adjoining verge. Where trees occur in the hedgeline itself, it is usually set back from the road edge. Roadside trees are sometimes seen as a hazard, although few accidents

Figure 41

Estate planting of roadside trees.



Figure 42

Ageing, potentially dangerous roadside trees.



occur and timeous replacement with young trees can avoid the problem. Hedges generally survive remarkably well, although often gaps need to be replanted, but depend on continued regular maintenance. Over Scotland, the roadside tree stock is generally aged or over-mature and requires a programme of replacement planting to preserve the local character of these roads. Although primarily concerned here with planted features, conservation of estate walls, march dykes and field boundary dykes should also be part of the programme of landscape conservation.

- **Field roadsides tree species in Scotland** – typically ash, beech, oak, sycamore.
- **Restocking roadside trees** – 2.75–3.00 m high standard trees or lighter/heavier – staked and tied for the first year or two, with rabbit protection and stock-proof guards.

Field boundary trees

In some parts of the Scotland, field boundary trees and hedges are an essential part of the outer agricultural areas of estate landscapes. As with roadside trees, they are invariably ageing and gradually disappearing. Again, replacement planting is needed to perpetuate the character of these areas.

- **Field boundary tree species in Scotland** – ash, beech, oak, sycamore.
- **Restocking boundaries trees** – 2.75–3.00 m high standard trees or lighter/heavier – staked and tied for the first year or two, with rabbit protection and stock-proof guards.

Figure 43 Tall conifers pinpoint a small designed landscape in its wider setting.



Ornamental planting and collections

Close to the main house and principal approaches use of exotic broadleaves and conifers with flowering and evergreen shrubs is the norm. Such planting forms both the setting for the building and routes and provides visual delight and natural beauty. Often tall specimen conifers in these areas pinpoint the core of the landscape when seen over the tree-tops from a distance. At their most ambitious such tree planting is organised into arboretums or pinetums that have scientific as well as ornamental value.

Many sites have arboretums and pinetums that can be very valuable as arboricultural and scientific resources. At present there is no national inventory of such places or systematic cataloguing of the species and provenance of the trees grown there.

Figure 44

Field boundary trees.



Figure 45

Ornamental and exotic trees in garden area.



Trees from lost features

The progressive development of many designed landscapes through successive stylistic periods results in old trees surviving from one period to the next in a different setting. Most commonly trees from the avenues, allées and planted vistas in the formal layouts of the 17th and earlier 18th centuries survive as isolated trees or intermittent rows among the naturalistically scattered parkland trees of the late 18th and 19th centuries. The effect can be seen clearly on many 19th century Ordnance Survey maps at 6" or 25" scale, where broken rows of trees can still be discerned among otherwise irregular planting. In many cases these rows can still be seen today, although the tree numbers may be reduced.

The value of conserving trees from lost features is self-evident, being a living record of the development of the landscape, as well as having all the other values of veteran trees (see below). Whether the lost feature should be perpetuated by replacement planting is a more difficult question. Such an issue can only be explored and resolved if considered with all the other factors in a Conservation Management Plan.

Individual notable trees

Sites sometime possess individual trees that are notable on account of the size, age, species or their history. Examples include the Capon Tree (near Jedburgh, Scottish Borders), the Dunkeld larch (Perthshire) and the Camperdown elm (Dundee). Such trees will be of special public interest and may be visitor attractions in their own right. Local authorities or voluntary group sometime

Figure 46

Capon Tree, near Jedburgh, Scottish Borders.



Figure 47

Champion variegated sycamore.



publish lists of such trees in their areas and many occur within designed landscapes. *Heritage Trees of Scotland* by Rodger, Stokes & Ogilvie (The Tree Council, 2003) is a good national guide.

Inevitably the preservation and care of such trees is a issue for management. Actions may include fencing to protect the tree and for public safety from dangerous limbs, tree work such as propping and bracing, interpretation, and replacement planting in order to have a young tree in its place when it eventually fails and to preserve the genetic stock of the tree.

Veteran and ancient trees

Veteran or ancient trees have immense historical, aesthetic and biodiversity values within designed landscapes, particularly in parkland but potentially in any tree component of a site. Mature and ageing trees bring problems of safety and appearance, as well as the issue of planting replacements. Where old trees are near drives, footpaths or other public areas, owners have a responsibility to keep them in a safe condition. Elsewhere there are strong aesthetic and nature conservation reasons to retain old and ancient (over 200 years) trees, particularly where they have no timber value.

Long-established woodland, parkland or wood pasture may also include areas of remnant coppice woodland or individual ancient coppiced trees. These have the additional interest of evidence of former management systems and again the priority should be their conservation.

Natural England handbook *Veteran Trees: A Guide to Good Management* (naturalengland.etraderstores.com/NaturalEnglandShop) is a comprehensive guide to the subject. Other useful sources include:

- Ancient Tree Forum, *Ancient Trees guide series* (frontpage.woodland-trust.org.uk/ancient-tree-forum)
- Forestry Commission, *Estimating the Age of Large and Veteran Trees in Britain* (www.forestry.gov.uk/publications)



Figure 48

Veteran Cadzow oaks, Hamilton High Parks, Lanarkshire.

Orchards

Many designed landscapes have small orchards, often associated with the walled garden – either within or immediately outside its walls – and including wall-trained fruit trees. The benefits of orchards can be many, including preservation of old fruit varieties, growing locally grown and sustainably produced fruit, encouraging healthy eating and others. The conservation and cultivation of orchards should be encouraged wherever possible.

There is growing interest in orchards with a number of local initiatives. *Scottish Orchards* is a new organisation for anyone interested in promoting and developing orchards in Scotland.

Use of walled gardens

Very few walled gardens survive in traditional use as productive kitchen gardens for vegetables, fruit and flowers. Their excellent growing conditions resulting from their design and build-up of fertile soil suggests a preference for horticultural uses rather than uses such as single or multiple house plots. Successful examples exist around Scotland of:

- continued use as flower and produce garden on a reduced scale
- hotel vegetable and ornamental garden
- retail plant nursery or garden centre
- market gardening / organic vegetable growing
- communal allotments
- commercial tree nursery



Figure 49

Walled garden retained in traditional use by a hotel.

Woodland management and silvicultural systems

Policy woodlands and plantation edges

Policies are the ornamental grounds of a large country house – what in England is called the park. Policy woodlands are any woods within this area, although more typically the term excludes the most ornamental features such as woodland gardens, arboretums and such like. The size and type of woods in a designed landscape will grade from smaller belts and clumps near the centre to extensive forestry plantations on the outer hill land, with the primary function grading from ornamental or amenity to commercial forestry. Policy woodlands typically should have some of both functions and will have had good timber trees removed for sale periodically. Many woods today suffer from a prevalence of introduced conifers and require restructuring to mixed broadleaves, plus Scots pine and/or larch where appropriate.

The design of policy woodlands depends on the style of the landscape and may be geometric blocks or organically-shaped areas. Various degrees of irregularity relate to the character of individual designs. Often the complexity of a layout and its woodland edges has been lost in the desire to save on the cost of boundary dykes and fences, or to infill parts or entire grazed parks. The reinstatement of woodland boundaries and the reforming of original spaces is an essential item in restoring a designed landscape.

Figure 50

Long-established policy woodlands.



Figure 51

Conifers dominating an estate entrance in the place of avenue trees, mixed tree belts or parkland planting.



- **Policy woodland and boundary belts tree species in Scotland** – typically ash, beech, lime, oak, sycamore, Scots pine, larch.
- **Restocking policy woodlands** – forestry transplants 45–60cm high – with tree-shelters or rabbit, deer and stock fences.

Silvicultural systems

Among typical management issues faced in policy woodlands are:

- older woods that may have been neglected and developed a uniformity of structure with little natural regeneration
- woods felled during WWII or at some time since and not replanted, dominated by dense natural regeneration of sycamore and ash, and with a uniformity of age
- older woods where gaps have been planted up with conifers as a short term measure
- small woods and belts in visually prominent positions that have been replaced wholesale with conifers to the detriment of the landscape.



Figure 52

Tree features replanted with conifers.

All these situations require the woodland cover to be modified to achieve better tree species and age diversity over time in line with current management objectives. The general movement away from clear-felling with replanting and towards continuous cover silvicultural systems in forest and woodland management is particularly appropriate for the woods of designed landscapes where pleasure use and visual amenity are major considerations. It is also the type of system that has been used historically.

Management systems with a lower impact than clear-felling are also likely to prove an effective way to increase the resilience of forests with respect to climate change. In semi-natural woodland, lower impact systems are recommended in accordance with the relevant Forest Practice Guide.

A silvicultural system is the process of tending, harvesting and regenerating a forest or woodland. Systems adopted for woodland management should be driven by management objectives defined in terms of the broader objectives for the management of the whole designed landscape. Ideally this will be set out in a Conservation Management Plan. Typical objectives for policy woodlands will include:

- general visual amenity
- preserving the function in the landscape design
- enhancing nature conservation values
- recreational uses
- provision for sporting use and game cover
- growing timber of commercial value

There are many different types of silvicultural systems and a broad classification can be made based on the pattern of regeneration and how the tree canopy is reduced or removed. Generally woods or forests managed using clear felling and shelterwood systems tend to be even-aged (only possess one or two canopy strata) and those managed using selection systems are uneven-aged (have three or more canopy strata).

Silvicultural systems will be determined most by the characteristics of the woodland at the start of the management programme in terms of species composition, age classes, density and distribution of species and classes, their general condition and the soil, the micro-climate and associated fungi, flora and fauna.

Under continuous cover systems applied to policy woodlands, the variables to be considered will be:

- **Method of thinning or felling** – trees to be removed e.g. weakest, most mature, best timber, undesirable species; pattern of removal e.g. individuals, groups, small coupes.
- **Re-stocking method and woodland type** – natural regeneration; planting semi-natural woodland species; planting based on historic composition; planting for other objectives including commercial timber species.
- **Details of planting method** – cultivation/ground preparation, drainage, plant size, notch planting, method of protection against rabbit, deer etc.

As a guideline, in semi-natural woodland, limit felling to 10% of the area in any 5-year period, unless there are overriding biodiversity or social advantages to felling a greater percentage area.

Principles of the continuous cover approach

- **Adapt the wood to the site** – Continuous cover forestry (CCF) seeks to work with the site and to respect ecological processes and inherent variation rather than impose artificial uniformity. In practice, this leads to a presumption towards the use of natural regeneration and the development of mixed species and mixed-age stands.
- **Adopt a holistic approach to forest management** – CCF regards the whole woodland ecosystem as the 'production capital'. This includes the soil, the forest micro-climate, associated fungi, flora and fauna, as well as the trees themselves. Management for timber production is directed towards the creation, maintenance and enhancement of a functioning ecosystem rather than the periodic creation and removal of individual crops of trees.

- **Maintain forest conditions without clearfelling** – CCF regards the maintenance of forest conditions as an essential tool in achieving its aims. The use of the overstorey to influence the amount of light reaching the forest floor, to limit ground vegetation, trigger regeneration, and then control its development is crucial. If clear felling takes place, forest conditions are lost, the benefits of shelter reduced and regeneration becomes more difficult.
- **The growing stock** – Under CCF management, stand improvement is concentrated on the development of preferred individuals rather than the creation of a block of stems with uniform spacing and average stem characteristics. A characteristic of permanently-irregular stands is that yield control is based on measurements of stem-diameter and increment rather than age and area.

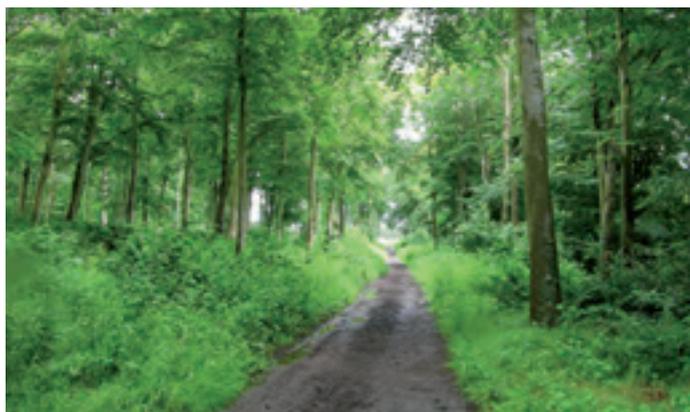


Figure 53

Estate broadleaved woodland managed for hardwood.

Felling and restocking larger woods

Many 20th century woodlands were planted or felled and re-planted over a short time with little diversity. Other older woods may have been neglected and developed a uniformity of structure. At felling and restocking, opportunities are presented to restructure age classes to develop forest diversity. In even aged woodlands, this may involve advancing felling in some areas and delaying felling and restocking in others. Following restructuring, further age-class diversity can be introduced in subsequent rotations. The design of future felling coupes can also be addressed at restocking by developing a long-term forest structure with future felling coupes defined by open ground, watercourses and semi-natural habitats General guidelines include:

- In forests where there is little age-class diversity, retain stands adjoining felled areas until the restocking of the first coupe has reached an average height of 2 m: for planning purposes this is likely to be between 5–15 years depending on establishment success and growth rates.
- Develop a long-term forest structure by making use of permanent features such as watercourses and open space; in upland forests identify future felling boundaries and manage crop edges to increase stability.
- Identify sites for long-term forest cover and thin them early.

Commercial conifers and forestry plantations

Plantations of commercial conifers have been part of the Scottish landscape for centuries, with Scots pine, European silver fir, Norway spruce and European larch in use during the 18th century and with a greatly expanded choice of species from North America added in the 19th century. At different scales, conifers have both ornamental and commercial roles in designed landscapes. However, on many estates such plantings have become the dominant woodland type, replacing broadleaved woodland to the detriment of visual and ecological diversity.

During the latter part of the 20th century the strategic timber resource imperative that drove many commercial conifer plantings was gradually supplanted by the appreciation that all woodlands had the potential to provide multiple benefits. More recent policies and associated grant programmes have encouraged a wide range of woodland types, promoting native broadleaves and amenity planting related to public access in many situations. Over time, this should promote further change and the restoration of previous woodland features

Ornamental planting close to the main house often features large north American and other conifers – cedars, Douglas fir, grand fir, noble fir, monkey puzzle, yew, western hemlock, Wellingtonia – while forestry on the outer hill land may be almost exclusively coniferous. There are locations in designed landscapes for these planting types but their siting requires careful planning, preferably within the context of a Conservation Management Plan.

Forestry planting on the wider scale is covered by the Forestry Commission's suite of guidelines, with the principles and process of restructuring conifer plantations described in the Forestry Commission Practice Guide *Forest design planning: a guide to good practice* (1998) (www.forestry.gov.uk/publications).

Figure 54 Extensive afforestation in Tweed valley enclosing designed landscapes.



Figure 55 Woodland replanting ignoring original pattern of clumps and boundaries.



General management issues

Clearance to restore views, spaces and routes

Once the historic layout and the design of a site are understood and before any new or replacement planting is undertaken, a first step may be to clear vegetation that is in the wrong place. It may be possible to significantly improve and restore the landscape by removal of undergrowth and natural regeneration to re-open intended views or vistas, clear overgrown spaces and make lost paths and drives accessible again. Depending on how altered or overgrown the landscape has become, it may be possible by clearance of later additions and undergrowth to recreate lost spaces and reform field boundary lines.

Figure 56

Abandoned drive.



Figure 57

Overgrown lime avenue.

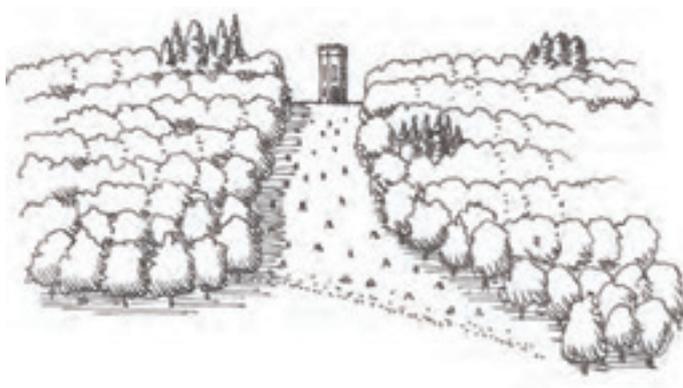


Figure 58

Reopening a view to an eye-catcher.

Removal of vegetation should be carefully considered and be a balanced decision based on a full appreciation of its current value (landscape, cultural heritage and biodiversity), preferably determined through a Conservation Management Plan. Also, if the vegetation in question constitutes woodland or forest then the manager should be aware of the Scottish Government Policy on Control of Woodland Removal (www.forestry.gov.uk/publications).

Selection of species

The starting point for all planting in designed landscapes is the historic precedent – in most cases owners and managers in the 17th to 19th centuries had greater empathy with their land and knowledge of planting than we have now and their original choices are the best to follow and, in some situations, should be followed for historical accuracy. Although trees native to the region are preferable in many situations, long-established policy planting may have a greater range of British, European and even north American species. Typical species for different features are given elsewhere in this section.

The effects of climate change and the management objectives of the project, including aims for biodiversity, will also need to be considered in selecting species for planting.

Wych elm is omitted from the lists given above due to Dutch elm disease. Precise species of birch, oak, lime etc will vary depending on the site characteristics. Cultivars may be appropriate in some situations. Where the aim is to create semi-natural woodland habitats, local strains may be sourced.

Planting for biodiversity

The values of designed landscapes include nature conservation and contribution to biodiversity. While the focus of this guidance is on design and conservation of the man-made or planted features of the historic environment, any opportunity to enhance biodiversity of the landscape by adding beneficial species or otherwise enriching habitats should be taken when planting.

Many areas of designed landscapes – parkland, wood pasture, woods, tree belts, artificial water bodies, natural burns and rivers – may be significant habitats as well as important visual and amenity features in the design layout. Even more formal features such as avenues, walled gardens, woodland gardens and arboretums may have developed significant nature conservation interest through long-establishment or neglect and invasion of more natural species. Both in dealing with past neglect and in new or replacement planting opportunities occur to optimise biodiversity, for example by modifying tree species in shelterbelts to include the most beneficial native species.

Figure 59

Minimum protection of individual parkland or avenue trees.



More general information can be found on Scottish Natural Heritage's website at: www.snh.gov.uk/about-scotlands-nature

Of particular interest may be Habitat Action Plans for habitats associated with designed landscapes e.g. Wood-Pasture and Parkland, included in the UK Habitat Action Plan (www.ukbap.org.uk).

Protection of planting

Protection of young trees from grazing stock, deer, hares and rabbits can be a major cost of a planting project but is essential for successful establishment.

Permanent protection from stock is necessary for trees adjoining or within grazing land. Field boundaries and fences around clumps and roundels need to be kept secure and appropriate and durable forms of barrier maintained around the trunks of parkland trees.

- **Protection of parkland and avenue trees** – robust timber tree guards to keep stem and branches out of the reach of stock and deer, and withstanding brushing by cattle, also provided with rabbit protection (wire mesh or spiral guard etc). After establishment, steel

tree guards are a good solution providing they are adjusted or upgraded as the girth of tree trunks increase.

- **Protection of roundels and clumps** – rabbit- and stock-proof fence (in grazed parkland) as Forestry Commission *Technical Guide, Forest Fencing*.
- **Protection of woods and belts** – deer-, livestock- and rabbit-proof fencing as Forestry Commission *Technical Guide, Forest Fencing*.



Figure 60

Protection of individual trees needs to be robust to protect against cattle, horses and deer.

Maintenance of planting

Many planting and restocking schemes fail due to lack of after care. Maintenance is limited to a few seasonal or annual operations and is not onerous but needs to be allowed for in annual budgets and planned into contracts or work schedules. Operations will depend on the features of the planting scheme and will include:

- weed control to reduce competition – vital in the early years of establishment
- adjustment of tree ties; checking rabbit protection; removal of stakes; removal of tree shelters
- beating up or replacement of dead plants
- brashing and thinning to final spacing
- control of litter
- maintenance of tree protection

There is a need to facilitate safe access over fences to planting areas for maintenance by means of gates or stiles.



Figure 61

Tree protection needs to be maintained.

Fences and signs

Although this guidance is concerned primarily with planting in designed landscapes, fencing and signage can have a significant impact on landscape quality. Use of urban fence types that are out of character and a proliferation of signs can be problematic, particularly where sites are in divided ownership, with several uses, and there is no coordinated management.

Traditional iron estate railings are preferable where a stock-proof fence is needed along drives, although their expense means that timber rail or agricultural fences may be a necessary alternative. Similar fences should be used in other parts of the landscape. Where present, drystone walls and hawthorn, beech or mixed-species hedges should be maintained wherever possible.



Figure 62

Traditional iron estate fencing survives in some places, but is difficult to repair and expensive to replace.

Forest managers have traditionally used fences as one option to protect young trees from damage by herbivorous wild animals such as deer and rabbits.

However, it is an expensive control measure, particularly in remote areas or where access is difficult. It can also be contentious, drawing opposition from groups such as environmental organisations, ramblers, hill walkers and local communities.

It is therefore vital that the appropriate type of fence is designed, located and erected to high specifications, and then maintained properly to ensure that it fulfils its role cost-effectively and with minimal environmental and landscape impact until it has finished its job and can be removed.

The Forestry Commission therefore published a revised guide in 2006 that updates its previous advice on forest fencing. It takes into account recent developments such as new fencing materials on the market, temporary and electric fencing, marking fences to reduce deaths of woodland birds from collisions, and the use of machinery

Technical Guide: Forest Fencing (www.forestry.gov.uk/publications), was written by Roger Trout of Forest Research, and Harry Pepper, and replaces Forestry Commission Bulletin 102: Forest Fencing, first published in 1992.

It recommends best-practice principles for managers as a guide to planning, assessment and mitigation of adverse factors, and choosing the fence design appropriate for the target species. It also indicates the key practical steps in construction. It helps in identifying the normal specifications of components required to accommodate typical situations and when taking account of special local circumstances.

When considering deer fencing, reference should be made to the joint agency statement on deer fencing, available on the SNH website at: www.snh.gov.uk

Signage should also be well considered. All signs will be intrusive to a degree in a rural landscape and so their use should be minimised. Materials and graphic design should be chosen to balance the need to be visible and deliver a message with the requirement that signs fit into their setting. It is preferable to use a single style of sign if several are required.

Statutory nature conservation designations in designed landscapes

A designed landscape that has been neglected can have developed nature conservation values that, in terms of its significance rating, may outweigh its value as a designed landscape, for example, a woodland may have been designated a Site of Special Scientific Interest (SSSI) on account of its woodland flora or deadwood invertebrates giving it statutory protection and value at a national level compared to the non-statutory and possible lower ranking as a designed landscape. Other SSSIs may have been designated as a result of long use as woodland, parkland or wood pasture. More commonly, woodlands in designed landscape are designated as *Ancient woodland* or *Long-established woodlands of plantation origin* and included in SNH's Ancient Woodland Inventory. In a few instances National Nature Reserves overlap the boundaries of designed landscapes. In addition, protected species of birds, other animals and plants occurring within designed landscapes. It is an offence for people to kill or capture birds and other animals, or to uproot plants. The law also prohibits the disturbance of some wild creatures, and their nests or resting places, and the picking of any part of some plants.

All SSSIs have management guidance produced by SNH to assist owners and a list of management operations for the site that require consent. Where a SSSI occurs in a designed landscape and restoration or replanting is proposed, careful consideration of management actions and detailed discussions with the SNH's local office will be necessary in order to avoid potentially damaging impacts on the natural heritage interest of the site. Written consent for agreed management operations must be achieved.

The statutory protection for special sites and protected species means that by law it is necessary for the nature conservation interests to take precedence over other designed landscape values or issues such as aesthetics, use of exotic species etc. However, it is to be hoped that a balanced approach can be achieved by cooperative working in which aims for both the natural and cultural heritage can be achieved.

Figure 63 Policy woodland and SSSI, Clyde valley.



Fragmentation of sites

Country estates are often sold as a number of lots and result in divided ownership and a lack of coordinated management and maintenance. In some cases the main house retains only a small part of the gardens or the house has been lost due to fire so the landscape has no focus. In many instances new houses have been built in parts of the grounds or other new uses like golf added to the landscape. Often in these situations, more common close to urban areas, no-one has overall responsibility for management and features such as tree belts, hedges and drives that cross ownership boundaries have no clear owner and become neglected or subject to different treatments.

There can be significant communal and public benefit in conserving such fragmented sites through coordinated management, that may include public uses such as community woodland, that is best achieved through a Conservation Management Plan. A new management organisation or Trust may be appropriate in some cases and involvement of owners and other stakeholders will be essential.

Access and interpretation

Many designed landscapes are outstanding resources for public access in scenic situations and public areas can often be managed alongside privately used parts of the estate. Their great range of cultural and natural interests means that waymarked walks and interpretation can add greatly to people's enjoyment of the place.

Access rights

The Land Reform (Scotland) Act 2003 (www.snh.gov.uk/land-and-sea) established statutory rights of responsible access to land and inland water for:

- outdoor recreation
- crossing land
- some educational and commercial purposes.

These are known as Scottish access rights.

The Scottish Outdoor Access Code gives detailed guidance on the responsibilities of those exercising access rights and of those managing land and water. The Act sets out where and when access rights apply and how land should be managed with regard to access. The Code defines how access rights should be exercised. The three principles for responsible access apply to both the public and land managers:

- **Respect the interests of other people:** be considerate, respect privacy and livelihoods, and the needs of those enjoying the outdoors.
- **Care for the environment:** Look after the places you visit and enjoy. Care for wildlife and historic sites.
- **Take responsibility for your own actions:** The outdoors cannot be made risk-free for people exercising access rights; land managers should act with care for people's safety.

Full details of Scottish access rights can be found on the Scottish Outdoor Access Code website at: www.outdooraccess-scotland.com



Figure 64

Dean Castle Country Park, Kilmarnock – several estate landscapes are now country parks with good public access.

Planning for access and interpretation

Planning for public access and provision of information on the heritage of a site are often prerequisites to grant aid for restoration and restocking sites. Good sources of guidance are available for both of these subject areas from the SNH website, and it is essential that these issues are considered at the earliest stage of a project.

The most appropriate media for interpretation will vary with each site. It is usually preferable to avoid panels on site, due to their limitations in terms of intrusion, durability and vulnerability to abuse, in preference to leaflets, for example.

The history of an estate and its designed landscape is a theme of great interest to many visitors, although surveys show that it is seldom interpreted.

Invasive species, pests and diseases

Invasive species

A number of non-native shrub and herbaceous plant species were once used extensively in estate planting for shelter, game cover or ornament and have proven highly invasive, vigorously spreading to exclude more desirable native species. *Rhododendron ponticum* is the most widespread invasive species, often responsible for overgrowing paths and other features, and was planted as game cover or as the rootstock for species rhododendron that have since reverted. *Rhododendron ponticum* and hybrids is one of six species of flora and fauna included in the Scottish Natural Heritage (SNH) Species Action Framework (January, 2007) that sets out a framework for the management of species in Scotland and lists species for which clear, targeted action over the next five years could make the most difference to biodiversity. Less widespread but locally creating severe problems are snowberry (*Symphoricarpos rivularis*) and salmonberry (*Rubus spectabilis*).

Among herbaceous plants three large perennials stand out. All are garden escapees originally planted for their ornamental effect.

- **Japanese knotweed** (*Fallopia japonica*, syn. *Polygonum cuspidatum*) – listed on Schedule 9 of the Wildlife and Countryside Act 1981, which makes it an offence to plant or cause this plant to grow in the wild. It is not an offence if it is growing in your garden or on your land and there is no specific duty either to notify anyone of its presence or to control it. Japanese knotweed is able to regenerate from very small pieces of plant and its rhizome

system can be up to 3 m deep, making it extremely difficult to eradicate once established. It causes ecological problems as a result of out-competing native plants. It can also be commercially damaging because of the cost of eradication and its ability to damage structures and road surfaces.

- **Giant hogweed** (*Heracleum mantegazzianum*) – can often be found on waste ground and riverbanks. It grows up to 5 m tall and each flower head produces thousands of seeds that are readily dispersed by wind and water. If sap from the plant gets on to the skin and is then exposed to sunlight, it can blister and cause severe skin irritation.
- **Himalayan balsam** (*Impatiens glandulifera*) – an attractive garden escapee that can be often found along riverbanks. It can outgrow native flora, creating an ecologically-harmful monoculture in which native species are unable to thrive. It is able to project its seed over a radius of up to 4 m and so spreads readily.

Figure 65

Rhododendron ponticum enclosing drive, Scottish Borders.

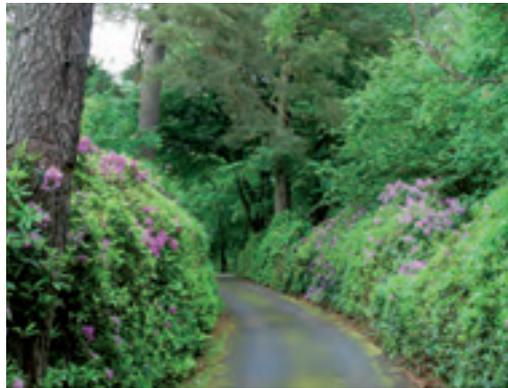


Figure 66

Salmonberry, Rousay.



Figure 67

Japanese knotweed.



Figure 68

Giant hogweed.



For other non-native invasive species in Scotland visit: www.scotland.gov.uk

The Scottish Government along with Defra and the Welsh Assembly Government launched the *Invasive Non-native Species Framework Strategy* (secure.fera.defra.gov.uk) for Great Britain on 28 May 2008. Its overarching aim is to minimise the risk posed and reduce the negative impacts caused by invasive non-native species in Great Britain. It is intended to provide a strategic framework within which the actions of government departments, their related bodies and key stakeholders can be better coordinated.

Pest and diseases

Pest and diseases affecting trees and shrubs can have a major affect on our landscapes, none more so than the devastating effect of Dutch Elm Disease on elms across Britain during the early to mid-1970s, which continues to be active in Scotland. More recently *Phytophthora*, a fungus-like pathogen known in a number of forms, is causing extensive damage and mortality to trees and shrubs in parts of the United Kingdom including designed landscapes such as Brodick, Balloch Castle and Ross Priory, affecting rhododendrons, beech, yew, larch and other plants.

With a recent increase in findings of new pest and diseases it is clear that Britain's trees are under unprecedented threat. Science indicates that climate change will create the conditions for even more pest activity.



Figure 69

Ground sterilisation to combat phytophthora, Loch Lomondside.

These heightened threats require us to take a more strategic approach to forest and tree health and the Forestry Commission has recently formed a Biosecurity Programme Board with members drawn from a number of organisations with environmental interests in the private and voluntary sectors together with experts from the Commission and its Forest Research branch.

The top threats already present in Britain are:

- **Acute oak decline** – a disease affecting oak trees in parts of Britain, in which bacteria, including one species previously unknown to science, are believed to be involved.
- **Bleeding canker of horse chestnut** (*Pseudomonas syringae* pathovar *aesculi*) – a bacterium that causes death to horse chestnut trees. Up to half of Britain's horse chestnut trees have symptoms.
- **Great spruce bark beetle** (*Dendroctonus micans*) – is present throughout much of the Eurasian region, practically everywhere that spruce trees grow.
- **Horse chestnut leaf miner** (*Cameraria ohridella*) – first found in London 2002. Its range has expanded over the years to many locations in southern England and parts of Wales.
- **Oak pinhole borer** (*Platypus cylindrus*) – used to be rare in Britain, but populations grew in the south and southeast of England as a result of the 1987 gales, when it took advantage of the sudden glut of suitable breeding material.
- **Oak processionary moth** (*Thaumetopoea processionea*) – defoliates oak trees and can cause them to die. Trees are weakened and become prone to attack by other pests.
- ***Phytophthora kernoviae*** – has so far only been found in Britain, and only in a very few trees. It can damage a number of tree species, including beech and English oak.

- *Phytophthora ramorum* – a fungus-like organism which attacks a range of trees and shrubs. Japanese larch has recently been found to be a host.
- **Pine tree lappet moth** (*Dendrolimus pini*) – has been captured in pine forests in Inverness-shire. A serious defoliator of pine and other conifer species in its native range in northern and eastern Europe and Russia.
- **Red band needle blight** – caused by the fungus *Dothistroma septosporum*, can cause mortality and loss of timber yield in pine trees. Main host is Corsican pine.

Plant health inspections of trees and woodland by Forestry Commission plant health inspectors play an important role in efforts to manage outbreaks of pests and diseases. The Commission's Guidance for Plant Health Inspectors (www.forestry.gov.uk/planthealth) can help you understand what to expect if an inspector needs to visit your property.

For more information about *Phytophthora kernoviae* and *Phytophthora ramorum* in Scotland visit: www.forestry.gov.uk/phytophthora

Climate change and effects on woods and trees

Perhaps the greatest issue affecting the tree components of designed landscapes in the long-term is climate change. Climate change is now one of the greatest global challenges and research is underway to establish the likely impacts on all aspects of the environment. There are many uncertainties in the extent and range of climate change, and its likely impact on trees, ecosystems, native species and management operations. A key basis for risk planning and management is diversification; from broadening the choice of genetic material, mixing tree species in stands, to varying management systems and the timing of operations.

In this rapidly developing field of knowledge it is difficult to give precise advice on how to adapt a planting project to restore the tree components of a designed landscape so that it is more resilient to climate change. But there are emerging recommendations from research by the Forestry Commission Scotland and Scottish Natural Heritage, and it will be necessary to keep in touch with developments through dedicated areas of their websites.

Forestry Commission and climate change

The Forestry Commission's programme of climate change research on trees, woodlands and forests is wide-ranging, covering important aspects of climate change impacts, adaptation and mitigation. The research aims to inform both policy and forest management practice. It also supports biosecurity policy, and relates strongly to the ecosystem services approach to evaluating the goods and services that trees and woodlands provide to society. The Forestry Commission spends around a quarter of its research budget with Forest Research on climate change and related programmes.

Forestry Commission policy

Forestry Commission policy on climate change stems from the UK Government's response to the Kyoto Protocol with the publication of the strategic document on climate change: *Climate Change – the UK programme* published in November 2000.

The Scottish Forestry Strategy identifies climate change as the number one theme cross-cutting all other aspects of forestry. The strategy calls for a robust adaptation policy to prepare the industry to adjust and maintain or improve sustainable forest management.

Within the continuously developing and expanding knowledge of climate change and its effects and based on the current known trends, Forestry Commission Scotland predicts the following effects on tree growth and cultivation and makes the recommendations that follow.

Key findings:

- The expected warmer climate will improve tree growth nationally, but particularly in southern and eastern Scotland. Productivity will increase generally, and this could be by 2 to 4 cubic metres per hectare per year (m³/ha/yr) for conifers on sites where water and nutrients are not limiting.
- The climate of southern and eastern Scotland will be more favourable for growing high-quality broadleaved trees on suitable deep, fertile soils.
- Droughty soils in eastern Scotland will become unfavourable for Sitka spruce and other drought-sensitive species.
- Changes in the seasonal distribution of rainfall will cause more frequent summer drought and more frequent winter flooding.
- Changes in the frequency of extreme winds will cause more wind damage. However wind scenarios have a high uncertainty attached.
- Pest and disease ecology will change with the climate; for example, more frequent green-spruce aphid attacks may reduce growth in eastern and southern Scotland.
- Scotland's aspiration to expand woodland from 17% to 25% by 2050 provides an opportunity to target reforestation within habitat networks. This will reduce woodland fragmentation and thereby help improve the resilience of woodland ecosystems to climate change.

Emerging recommendations

- Low-impact silvicultural systems (LISS) and the use of mixtures could provide the basis for adaptation strategies.
- Where other management regimes are used, a wider range of species and a broader range of genetic material within a species will increase stand resilience in a changing climate.
- Acceptance of natural colonisation of woodlands of non-native tree species may be a valid adaptation strategy, but this must be reviewed where conservation is a major objective.
- Forest nurseries in eastern Scotland will have to adapt to the drier summers (for example by using more irrigation) and to wetter winters (for example by avoiding soil damage).
- Contingency plans need to provide an adequate response to increasing risks of catastrophic wind damage, fire, and pest or disease outbreaks.
- The upper wind exposure limit, defined in terms of the detailed aspect method of scoring, for productive conifer plantations may need to be reduced.

Selected Forestry Commission and SNH reports and publications giving further information on climate change issues include:

- Impacts of climate change on forests in Scotland - final report, Duncan Ray with Dave Wainhouse, Joan Webber and Barry Gardiner; January 2008.
- The evidence supporting the use of Continuous Cover Forestry in adapting Scotland's forests to the risks of climate change, Victoria Stokes and Gary Kerr, October 2009.
- Climate change and the future for broadleaved tree species in Britain, M. Broadmeadow, D. Ray and C. Samuel; *Forestry* 78:145-167.
- Climate Change and British Woodland, M. Broadmeadow and D. Ray; Forestry Commission Information Note 69.
- SNH's Climate Change Action Plan (July 2009) sets out in some detail the actions it intends to take over the current five year period.
- Effects on nature and landscapes are set out in terms of species, habitats and geology, soils and landscapes in a dedicated area of SNH's website.

Box 1 General sketch showing selected issues.



- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Park trees and groups in need of restocking 2. Parkland trees from early avenue 3. Veteran trees, biodiversity value 4. Standing and fallen deadwood, biodiversity value 5. Drive-side tree groups positioned for views to house 6. Ha-ha separating lawn from grazed park 7. Iron estate fencing around park 8. Former woodland garden | <ol style="list-style-type: none"> 9. Unmanaged woodland garden area with natural regeneration, balancing management objectives in future management 10. Woodland management in relation to watercourses 11. Unmanaged policy woodland 12. Estate planted roadside trees, potentially dangerous and requiring replacement 13. Roadside trees from former avenue 14. Hedges requiring regular maintenance and gapping up |
|---|---|



- 15. Rhododendron invasion
- 16. Inappropriately located conifer infill
- 17. Abandoned walled garden, new use required
- 18. Old trees from lost early avenue
- 19. Ornamental tree groups including north American conifers
- 20. Parkland managed as improved pasture with damage trees and declining tree groups
- 21. Restocking of main avenue; retained element from 18th century layout
- 22. Formal gardens
- 23. Simplification of park boundaries by infill tree planting
- 24. Outer park planted with trees
- 25. Commercial forestry on outer hillsides
- 26. Picturesque glen with wild character and man-made features
- 27. Former wood pasture with veteran trees

Appendices

Research sources, maps and websites in site assessment

There can be problems in deciding the extent of designed landscapes where there is a gradual transition from parkland and policy woodland into the surrounding agricultural or forestry landscape. In assessing the extent of these landscapes from map evidence, one is looking for signature features such as field shape, gate-lodges, avenues, walled gardens etc. Confusion may be caused by landscapes that have been combined, subdivided, or diminished in size. For example, should the boundary mark the present extent, or the maximum area historically, of the designed landscape, even where part of it may have become degraded or built over?

Historic Scotland, Inventory of Gardens and Designed Landscapes in Scotland

The maps in the original published volumes defined key landscape elements such as parkland, drives, walled gardens etc, and included 'land historically influenced by the designed landscape' within a dotted line, and the maps included in the supplementary volumes for Lothian, Fife and Highlands & Islands, defined additional elements such as 'principal views or vistas' and 'essential setting.' On the maps with the online version of the *Inventory* (www.historic-scotland.gov.uk/index/gardens) only the site boundaries are marked and there is no internal detail included. In some instances the 'land historically influenced by the designed landscape' has been omitted from the online site maps, leading to uncertainty about the true extent of the designed landscape. Historic Scotland are currently carrying out a systematic resurvey of the Inventory which will address these concerns.

RCAHMS, Pastmap

This online map, which allows zooming, panning and downloading of images, defines the extent of *Inventory* landscapes clearly with yellow shading. No internal detail is included. Boundaries are not shown for non-*Inventory* sites. Designed landscape elements of non-*Inventory* sites – gate-lodges, walled gardens, stable blocks, view-houses etc – may be identified by using the colour coded buttons for scheduled monuments, listed buildings, items on county sites and monuments records etc, this is point-based information, and does not help in assessing the extent of designed landscapes.

Historic Land-use Assessment (RCAHMS)

The Historic Land-use Assessment (HLA) is a joint project between Historic Scotland and RCAHMS. It is an online GIS-based map – available at HLAmap (hla.rcahms.gov.uk) – that depicts the historic origin of land-use patterns, describing them by period, form and function. Its purpose is to enhance our knowledge and understanding of the historic dimension of the landscape and to inform management decisions relating to it. It highlights relict archaeological landscapes and helps identify areas where further survey could usefully be targeted.

The HLA will be useful in forest planning and design; in considering the historic elements within most Forestry Commission Scotland grants and licensing activities; and in considering historic landscape character for Local Authority Woodland and Forestry Strategies.

HLA is compiled at a scale of 1:25 000 (enabling a comprehensive broad overview). The smallest area that it is therefore practical to map is 1 ha (1000 m²). The assessment is based on the analysis of key data sources, such as early maps, the National Monuments Record of Scotland, aerial photography and archaeological survey results. It identifies individual **historic land-use** types,

grouped together under thematic headings (categories) and assigned a likely chronological period. These historic land-use types survive within current land-use patterns and contain information in regard to landscape character and development. It also depicts **relict land-use**; archaeological landscape features that survive but have fallen out of use.

The Historic Land-use Assessment uses evidence of the historic environment derived from a variety of sources to produce three distinct but complementary categories of information:

- **Category** is designed to aid the user by sorting the individual land-use types into fourteen national land-use categories for ease of reference. Land-use categories include forestry, agriculture, urban, transport and mineral extraction
- **Period** is designed to aid the user by indicating likely chronological period of any given feature and is indicated by century (and medieval / prehistoric etc).
- **Type** is extensive with over 50 land-uses, from medieval fields through to cemeteries, charcoal platforms, fortifications and relict golf courses. Each type is characterised by its period of origin, alongside its form and function.

HLA data is currently available for around 73% of the country.

Forestry Commission Scotland *Historic Land-Use Assessment User Guide* is available at: www.forestry.gov.uk/histenvpolicy

National Library of Scotland, County Maps

Although coverage of the country is both patchy and uneven, depending on the date of the survey, the scale of the map, and the level of detail included by the individual surveyor, pre-Ordnance Survey maps (i.e. pre-1850) can be valuable in assessing the extent of designed landscapes. On maps drawn at a larger scale, it may be possible to distinguish parkland and policies with the help of shading and/or conventional symbols used, though these are not standardised between maps. Almost all the County Maps are available online at the National Library of Scotland's website (maps.nls.uk/counties), which allows panning, zooming and downloading of the map images.

National Library of Scotland, Ordnance Survey Maps

Ordnance Survey maps at a range of scales were produced from c.1850 onwards – the most useful scales for assessing individual designed landscapes being 1:10 560 (6 inches to the mile) and 1:2 500 (25 inches to the mile). The identification of designed landscapes on the OS 1st edition 1:10 560 sheets is assisted in many cases by the parkland within the policies being distinguished by a grey stipple. It may also be possible to distinguish between policy planting and more commercial planting from the species mix, evident from conventional symbols for broadleaves and conifers. The 6 inch OS sheets also include details of gate-lodges, footpaths, view houses etc, which can be useful in defining landscape boundaries and extent.

Where they exist, covering most lowland and settled areas, the 1:2 500 (25 inch) sheets, are easier to read and interpret, but do not contain much more detail.

Both the 1 inch OS c.1900 and 1 inch OS *Popular Edition* c.1925–30, though drawn at too small a scale to show internal detail, use grey stipple to distinguish parkland and are useful for giving an impression of the distribution and extent of designed landscapes in an area. All of these scales and dates of Ordnance Survey maps are available from the Map Library online, with the ability to pan, zoom and download images (maps.nls.uk/series). In some instances the character and

composition of named woods is described in the *OS Object Name Books*, microfilm copies of which are available from RCAHMS.

Forestry Commission, GLADE Land Information Search

Although it is not the purpose of this website to show the extent of designed landscapes, the 'Ancient Woodland' overlay which can be generated by clicking on the relevant box will often be found to coincide closely with the extent of long-established policy woodland within designed landscapes. The GLADE site (www.forestry.gov.uk/lis) is also an excellent source for related mapping of land classifications and designations, and for all forestry grants that are already in place.

Historic Environment Information and Advice for Forest and Woodland Managers in Scotland

An essential guide to the resources available to forest and woodland managers relating to the historic environment of Scotland. It has been designed as a routemap to the most pertinent available information and advice. Available as a free download from the Forestry Commission Scotland website at: www.forestry.gov.uk/histenvpolicy

Aerial Photographs

Although there are several websites giving access to detailed aerial photographic images, such as *Google Maps* and *Bing Map*, coverage of the country is very uneven, and the quality and scale of the images is very variable and not dated. Aerial photographs can be useful for corroborative purposes, but are less valuable on their own.

RCAHMS hold the national collection of aerial photography with periodic coverage of many sites from post-WW2 onwards, enabling assessment of change over the last 50–60 years with much detail legible, particularly when viewed stereoscopically. Aerial photographs also record Scheduled Ancient Monuments and other sites of archaeological interest, often under different weather conditions to reveal otherwise hidden information. RCAHMS aerial photography is not currently available online.

Sources of funding

Scotland Rural Development Programme (SRDP)

The SRDP brings together a wide range of formerly separate support schemes including those covering the farming, forestry and primary processing sectors, rural enterprise and business development, diversification and rural tourism. It includes measures to support and encourage rural communities and delivers the LEADER initiative for local innovation in rural areas. Within SRDP the most applicable grant mechanisms for design landscapes are:

- **Rural Priorities** – this is a competitive grant scheme delivered jointly by Scottish Government Rural Payments Inspections Directorate, Scottish Natural Heritage and Forestry Commission Scotland through area offices.

Contracts are awarded for the proposals which are best able to deliver the agreed Regional priorities. The most relevant priorities to designed landscapes are 'Landscape Priorities' and 'Built & Cultural Heritage' Priorities.

- **Challenge Funds** – consists of Woodlands In and Around Towns (WIAT) and Forest for People (F4P) and are administered by Forestry Commission Scotland. The WIAT fund is the most relevant fund to support designed landscapes. The WIAT scheme aims to improve the quality of life in towns and cities and focuses on woods within 1km of settlements with a population of over 2000 people. The core objectives are:
 - Bringing neglected woodland into management
 - Creating new woodlands
 - Supporting people to use and enjoy their local woods

An Action Plan has been developed to support delivery from 2011–2014 (www.forestry.gov.uk/wiat).

Figure 70

Many designed landscapes adjoin town centres. Dalkeith, Midlothian.



Figure 71

Woods, tree belts and water bodies from estate designed landscapes often survive as valuable resources within the built-up area of towns.



- **LEADER** – Links Between Activities Developing the Rural Economy – LEADER is a bottom-up method of delivering support for rural development through implementing local development strategies. Support, awarded by Local Action Groups (LAGs), is aimed at local projects with a wide community benefit that show an element of originality or experimentation where possible, and complement other activities within the local development strategy.

The aim of LEADER is to increase the capacity of local rural community and business networks to build knowledge and skills, and encourage innovation and co-operation in order to tackle local development objectives. LEADER accounts for 6% of the total Scottish Rural Development Programme SRDP allocation.

For application forms, guidance and advice contact your Local Action Group.

Full details about Scotland’s Rural Development Programme can be found at the Scottish Government’s SRDP website.

Central Scotland Green Network (CSGN)

The Scottish Government's second National Planning Framework (NPF2) designates the Central Scotland Green Network (CSGN) as one of only 14 National Developments. The CSGN is intended to deliver *"a step change in environmental quality, woodland cover and recreational opportunities"*, to make Central Scotland *"a more attractive place to live and do business, help to absorb CO₂, enhance biodiversity, and promote healthier, more active lifestyles"*.

Forestry Commission Scotland, in its capacity as joint lead partner for the CSGN, invites applications to a new fund, to support the development of early CSGN delivery projects.

For information covering the scope of the funding, eligibility criteria, and the application process, visit the CSGN website (www.centralscotlandgreennetwork.org).

Heritage Lottery Fund

The Heritage Lottery Fund uses money from the National Lottery to give grants for a wide range of projects involving the local, regional and national heritage of the United Kingdom. HLF's award programmes (details of how to apply can be found at www.hlf.org.uk/howtoapply) that can be relevant to designed landscapes projects include:

- **Heritage Grants** (grants above £50,000): This is the main programme for grants over £50,000 for all kinds of heritage that relate to the national, regional and local heritage of the UK. It is open to all not-for-profit organisations.
- **Your Heritage** (£3000 to £50,000): This is the general small grants programme for all types of heritage projects. It is a flexible programme particularly designed for voluntary and community groups and first-time applicants.
- **Parks for People** (£250,000 to £5million): Parks for People is for whole park projects that support the regeneration of existing designed urban or rural green spaces, the main purpose of which is for informal recreation and enjoyment.
- **Landscape Partnerships** (£250,000 to £2million): This programme supports schemes that are led by partnerships of local, regional and national interests, which aim to conserve areas of distinctive landscape character throughout the UK.
- **Skills for the future** (£100,000 to £1million): Skills for the Future funded projects which provide paid training placements to meet a skills gap in the heritage sector, and fully support trainees to learn practical skills.

Historic Scotland

Historic Scotland's grants are directed primarily at listed buildings, scheduled ancient monuments and other archaeological sites, and conservation areas. Grants can be a source of funding for work to these structures or areas that are in or part of a designed landscape.

Historic Scotland can award Landscape Management Plan Grants for the preparation of landscape management plans for sites included in the Inventory of Gardens and Designed Landscapes in Scotland.

Applications are considered throughout the year on Historic Scotland's Landscape Management Plan application form (www.historic-scotland.gov.uk/heritage/grants). Grants can be awarded at rates of up to 50% of the cost of preparing a plan prepared by a consultant who has an established record of work to historic gardens and designed landscapes.

For further details visit the Historic Scotland Landscape Management Plan Grants webpage at:
www.historic-scotland.gov.uk/heritage/grants

Organisations for further information and advice

- **Forestry Commission** – www.forestry.gov.uk
Grants and licences; forestry initiatives; extensive technical advice on all aspects of tree cultivation, woodlands and forestry; land information search.
- **Ancient Tree Forum** – frontpage.woodland-trust.org.uk/ancient-tree-forum
- **Central Scotland Forest Trust** – www.csft.org.uk
- **Central Scotland Green Network** – www.centralscotlandgreennetwork.org
- **Edinburgh and the Lothians Forest Habitat Network partnership** – www.elfhnp.org.uk
- **Garden History Society in Scotland** – www.gardenhistorysociety.org
Independent source of information and advice.
- **Glasgow Clyde Valley Green Network Partnership** – www.gcvgreennetwork.gov.uk
- **Greenspace Scotland** – www.greenspacescotland.org.uk
- **Historic Scotland** – www.historic-scotland.gov.uk
Inventory of Gardens and Designed Landscape in Scotland; landscape management plan grants; listed buildings.
- **The Landscape Institute** – www.landscapeinstitute.org
Appointing a Landscape Architect, list of practices.
- **National Library of Scotland, Map Library** – maps.nls.uk
- **The National Trust for Scotland** – www.nts.org.uk
- **Royal Commission on the Ancient and Historical Monuments of Scotland** – www.rcahms.gov.uk
- **Royal Scottish Forestry Society** – www.rsfs.org
Journal, events and research related to trees, woods and forestry in Scotland.
- **Scottish Government Rural Payments and Inspections Directorate** – www.scotland.gov.uk/topics/farmingrural/srdp
Scotland Rural Development Programme (SRDP).
- **Scottish Natural Heritage** – www.snh.org.uk
Statutory protection of sites and species; Outdoor Access Code; country parks; grants and licences; interpretation; access design guidance; signs guidance.
- **The Woodland Trust** – www.woodsforpeople.info
Woods for people.

General reading

Many specialist publications are listed under different topics in other parts of the preceding Guidance. The following is a short bibliography of general reading on the subject, both published books and online resources.

- BELL, S. (1998). *Forest design planning: a guide to good practice*. Forestry Commission Practice Guide. Forestry Commission, Edinburgh. (www.forestry.gov.uk/publications)
- FORESTRY COMMISSION SCOTLAND (2008). *Scotland's Woodlands and the Historic Environment*. Forestry Commission Scotland, Edinburgh. (www.forestry.gov.uk/publications)
- LAND USE CONSULTANTS (2008). *An Inventory of Gardens and Designed Landscapes in Scotland*. Vols. 1–5 (1987), later supplements and online *Inventory* (www.historic-scotland.gov.uk/heritage/gardens).
- REID, J. (1988). *The Scots Gard'ner, 1683*. Reprinted by Mainstream Publishing Company, Edinburgh. Introduction by Annette Hope.

- SCOTTISH NATURAL HERITAGE (1997). *Designed Landscapes in Scotland: notes on their planting and management*. SNH Review No. 82. Scottish Natural Heritage, Inverness.
- TAIT, A.A. (1980). *The Landscape Garden in Scotland 1735–1835*. Edinburgh University Press, Edinburgh.
- WATKINS and WRIGHT (2007). *The Management & Maintenance of Historic Parks, Garden & Landscapes*. English Heritage Handbook. English Heritage, London.

Relevant legislation and publications

- A Preliminary and Interim List of Parks and Gardens of Outstanding Historic Interest, ICOMOS-UK 1979*
- An Inventory of Gardens and Designed Landscapes in Scotland 1987*
- An Inventory of Gardens and Designed Landscapes in Scotland, List of Sites 2007*
- Ancient Woodland Inventory, Scottish Natural Heritage*
- European Landscape Convention 2000*
- Forestry Act 1967*
- Natural Heritage Futures, Forests and Woodlands 2002*
- Planning (Listed Buildings and Conservation Areas)(Scotland) Act 1997*
- Rural Development Contracts, Land Managers Options 2008*
- Scotland Rural Development Programme 2007–2013*
- Scottish Historic Environment Policy 2009*
- Scottish Planning Policy 2010*
- The Scottish Forestry Strategy 2006*
- The Tree Council's Tree Warden Scheme, Tree Warden Handbook*
- Town and Country Planning Act 1947*
- Town and Country Planning (General Development Procedure)(Scotland) Order 1992*

Glossary and acronyms

- Historic Environment Information and Advice for Forest and Woodland Managers in Scotland*
www.forestry.gov.uk/histenvpolicy List of acronyms.
- SYMES, M. (2006). *A Glossary of Garden History*. Shire Garden History series, 3rd revised edition.
 The most useful published Glossary.
- Gardensit.com – www.gardensit.com/garden_glossary – Online glossary of garden terms.

The Scottish Historic Environment Policy (July 2009) describes gardens and designed landscapes as, 'Gardens and designed landscapes can be defined as grounds that are consciously laid out for artistic effect. They are often the setting of important buildings and, in addition to parkland, woodland, water and formal garden elements, can often have significant archaeological and scientific interest.'

Since Medieval times, designed landscapes have evolved and at times changed dramatically in style and character. Throughout all periods and recognised styles however, trees have been an essential feature. In the 20th century social and economic changes proved challenging times for land management, with a combination of estate fragmentation, decline and changed land-use policies, specifically regarding new objectives for forest expansion and management. Now designed landscapes are appreciated for their contribution to local landscape character and the distinctiveness of many of Scotland's landscapes.

Today the challenge is to protect, restore and rejuvenate the remaining legacy, whilst ensuring arboricultural and silvicultural practices can deal with the changes anticipated from climate change. This guidance is an essential contributor in helping ensure designed landscapes can meet those challenges.



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