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MAR LODGE ESTATE FOREST PLAN

2012-2032



Mar Lodge Estate Forest Plan

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A: Introduction

A:1 Background

Mar Lodge Estate lies at the heart of the Cairngorms National Park and contains some of the most remote and scenic wild land in Scotland. Covering 29,380ha, the estate was acquired by the National Trust for Scotland in 1995. A full description of the estate, the vision for the estate and its management objectives is described in detail in the “Mar Lodge Management Plan 2011-2016”. This document, the Mar Lodge Estate Forest Plan, forms a subsidiary plan sitting within the context of the full estate plan. The purpose of this plan is to describe the future long term vision for the woodlands across Mar Lodge Estate and to detail a 20 year work plan which will aim to put in place the building blocks necessary for attaining the 500 year vision. The plan will recognise the need for sustainable management of the woodland resource and detail the role woodland across the estate has to play in a social, environmental and economic context.

A:2 Landscape

Mar Lodge Estate is a spectacular landscape with significant wild land, cultural and natural heritage character. Within its boundaries are fine examples of classic features of a highland landscape: remnants of the Caledonian pinewood, heather moorland, clear fast flowing streams, juniper scrub and a large part of the Cairngorm plateau. These features stand alongside the remains of settlements, agricultural land, shielings and numerous other archaeological sites, which hint at the historic occupation and land-use of the estate. The “quality” of the landscape within Mar Lodge Estate has been recognised by its inclusion within both the Deeside and Lochnagar and the Cairngorm Mountain National Scenic Areas along with the whole estate being an integral part of the Cairngorms National Park (CNP).

A:3 Nature Conservation

The estate supports a vast diversity of habitats, plant and animal species, many of which are rarities in a UK or European context. This nature conservation interest has led to over 80% of the estate being designated as a Site of Special Scientific Interest (SSSI), Special Area of Conservation (SAC) and Special Protection Area (SPA) (Mar Lodge Management Plan 2011-2016). Over a fifth of the site lies within the Cairngorms National Nature Reserve (NNR), and two high level lochs are designated as wetlands of international importance under the Ramsar Convention.

A:4 Cultural Heritage

Mar Lodge Estate has a wealth of nationally significant post-medieval settlement evidence. Farmsteads, townships, agricultural lands and associated shielings are to be found along the river terraces of the Quoich, Lui, and Dee and their upper tributaries, and along the Geldie, Bynack, Connie and Cristie Mor burn-sides (based on survey work by the Royal Commission on the Ancient and Historical Monuments of Scotland (RCAHMS) 1993). Around 260 hectares are designated as Scheduled Ancient Monuments (SAMs). There are also numerous individual sites of pre-Improvement date, bearing witness to land-use over a number of centuries and which are to be found up to the 600m contour. Around the high mountain rim, there are the scattered remains of at least six military aircraft that crashed into this side of the Cairngorm massif during the 2nd World

War. All are regarded as falling under the Protection of Military Remains Act (1986). By way of contrast, around the Chest of Dee and in Upper Glen Geldie evidence has been found of Mesolithic settlements dating to 8,500–5,500 years ago (Clarke 2007). Lithics found further up the Dee date to a subsequent period of land-use, in the later Neolithic/early Bronze Age period around 2,000BC. These are extremely rare discoveries for an inland, upland landscape, which may well be replicated along other river terraces of the upper Dee and its tributaries.

In addition, the built environment of Mar Lodge Estate has at its core a number of designated Listed Buildings associated with its use as a sporting estate. These are surrounded by a currently unmapped designed landscape that stretches from the Linn of Dee to Allanaquoich on the north side of the Dee, as well as along an indeterminate length of the opposite side of the river. Certain detached later-19th century buildings have designed plantings around them, with small groups of trees or larger 'plantations' of aesthetic and intrinsic value.

A:5 Recreation

The Mar Lodge woodlands are an important recreational asset for the Estate, local area and the Cairngorms National Park. The scenic beauty and historic connection of the pinewoods, set in a dramatic landscape is renowned, and offers both physical and spiritual refreshment. Remnant Caledonian Pinewood is considered one of the least altered by man's influence. It has a special place in the minds of many, with strong romantic links to Scotland's past.

["To stand in them is to feel the past"....(Steven and Carlisle, 1957)]

A number of tracks and paths run through the woodlands, offering easy access to visitors. From a total of around 80,000 'visits' per annum, most visitors will spend some time within or walking through the woods. For the naturalist, native Caledonian woodland contains special plants such as twinflower; birds such as Scottish crossbill and capercaillie and animals such as red squirrel. On the edge of the forests can be seen red deer, black grouse, and birds of prey including the iconic golden eagle.

Some deerstalking will take place on the edge of the woodlands, and in the longer term, stalking or culling within the trees could become more commonplace as the forest expands.

Wild camping within the woods presents challenges from the removal of deadwood and risk of unplanned fire from campfires, these issues currently managed through interpretation and visitor liaison by the Ranger Service.

Salmon fishing, offered by the Estate, takes place along stretches of the Dee. On areas upstream of Linn of Dee, some planning will be required to accommodate salmon beats and future riparian plantings.

A:6 Climate

The climate in the eastern Cairngorms is "subarctic oceanic" but less "oceanic" than the west coast of Scotland. There is a large difference between summer and winter with respect to day length and insolation received, which is important for the growing season. Temperature drops quickly with

altitude resulting in a rapid decline in the length of the growing season with altitude. Precipitation varies from 2250mm/yr on the Cairngorm summits to 900mm/yr in the Dee valley (Gimingham 2002) with the average annual fall for Braemar 913mm between 1971 and 2000 (<http://en.wikipedia.org/wiki/Braemar>). June is usually the driest month in the eastern Cairngorms. The average temperature in Braemar between 1971 and 2000 was 6.3° degrees Celsius with the lowest average mean temperature being recorded in January (mean daily max. 4.1° min -1.8°) and the highest in July (max 18.1° min 8.7°) (<http://en.wikipedia.org/wiki/Braemar>). The Cairngorms are the snowiest part of Britain and the annual average number of days on low ground with snow lie is 60days/yr and up to 200days/yr on the mountain tops. Days of snow lie have however declined in recent years. The prevailing winds in the Cairngorms are from the south-west and it is not uncommon to experience gales at high altitudes (Gimingham 2002).

Climate change is now a recognised phenomenon but the effects of this are hard to predict due to uncertainty in modelling. NTS is aware of the potential effects of climate change and will strive to manage a woodland that is rich, healthy and diverse and hence hopefully robust to climate change effects.

A:7 Estate Management

The management of Mar Lodge Estate is guided by a set of management principles agreed with the Easter Charitable Trust and also the terms and conditions set out in the Management Agreement (1995) between NTS and Scottish Natural Heritage (SNH) (Mar Lodge Management Plan 2011-2016). The three main objectives are to conserve the internationally important natural and cultural heritage, to maintain Mar Lodge as a Highland sporting estate and to ensure appropriate public access. NTS aims to demonstrate that Highland sporting objectives and conservation objectives need not be mutually exclusive but can be managed hand in hand with both objectives being successfully achieved.

The approach to deer management is critical for NTS to be able to achieve both its sporting and conservation objectives, particularly with respect to woodland regeneration. To this end, the estate has been split into two management zones – the regeneration zone and the moorland zone (Mar Lodge Management Plan for full description, Mar Lodge Section 7 Agreement 2010 & Figure 1). The regeneration zone includes all the pinewood areas (Glens Derry, Luibeg, Lui and Quoich). In this area NTS is striving to achieve natural regeneration and recovery of the pinewood (Mar Lodge Management Plan objective 1, SAC objectives see Appendix 1) through reducing deer numbers and hence alleviating grazing pressure (Mar Lodge Management Plan, Mar Lodge management principle (iii)). At present, after several years of experimentation, this involves reducing the deer population to as low a point as possible. However, once extensive regeneration has established it is hoped in future years that the deer presence within the regeneration zone can be increased. The moorland zone covers the south and western part of the estate and in this zone deer are managed to provide a sporting resource from which NTS can continue sport stalking activities and to maintain the moorland habitats in favourable condition. The Trust aims to maintain a red deer population (approx 1650 red deer) from which it can shoot 80 to 100 stags with guests per annum.

Figure 1.



A:8 NTS wide policies

In addition to the site specific Mar Lodge Management Principles, the estate must also be managed within the context of a number of overarching NTS wide policies. Some of these have particular relevance to the Whole Estate Forest Plan and the likely management it will entail – Wild Land Policy (2002), Conservation Principles (2003), Access and Enjoyment Principles (2005), Deer Management Policy (2003), Landscape Policy (2005) and Environmental Policy (2004).

A:9 Mar Lodge Independent Review

Over the last few years there has been growing criticism of the management of Mar Lodge Estate, particularly from neighbouring sporting landowners, the sporting community and the local community. This has focussed particularly on the reduction in deer numbers and the perceived implications of this on the neighbours and communities interests. In response to this criticism, in spring 2012 the chairman of NTS commissioned a panel to conduct an independent evidence-based review of woodland, moorland and deer management at Mar Lodge Estate, having regard to the National Trust for Scotland's overall objectives for the Estate, and specifically, fencing policy, deer culling, the regeneration of the forest and maintaining a sporting estate. The review panel produced their report with eight management recommendations in November 2011 (Mar Lodge Independent

Review Panel Report 2011). This report has specific implications for the Whole Estate Forest Plan in relation to fencing, ground disturbance and planting of trees. Prior to the review the Trust had a presumption against fencing and reservations about planting and ground disturbance due to the management principles but also the impact of these practices on wild land quality, landscape, cultural heritage, woodland grouse and access (Mar Lodge Management Plan 2011-2016), NTS policy documents). However, the review panel made specific recommendations about fencing, planting and ground disturbance and this has resulted in a decision to go ahead with these practices in certain circumstances. While this may have implications for wild land quality, access, cultural heritage and landscape it should reap longer term benefits for the woodland structure and function both within Mar Lodge Estate and between Mar Lodge and neighbouring estates.

A:10 History of the Mar Lodge woodlands

The history of the Caledonian pine woodland of Mar Lodge Estate has been the subject of considerable study (Paterson, 2010). Palaeo-environmental work indicates that around Geldie Lodge and White Bridge the native pine initially (before c7550calBP) formed part of an open diverse woodland but that it had disappeared by c2800–1900calBP. Even at Doire Bhraghad, where Scots pine became established by c9100calBP and formed a closed woodland by c8600calBP, there was gradual decline from c4000calBP onwards until Calluna became the dominant species here too. Early fluctuations in the canopy in Glen Geldie may relate to Mesolithic activity, and there is the possibility of cereal cultivation c4000BP. Elsewhere there is evidence for low intensity grazing. However, in all instances evidence to date suggests the fragmentation and loss of pine woodland has been largely due to climatic change toward wetter conditions in prehistoric times. The pine stumps in the lower levels of the peat will therefore be of prehistoric date.

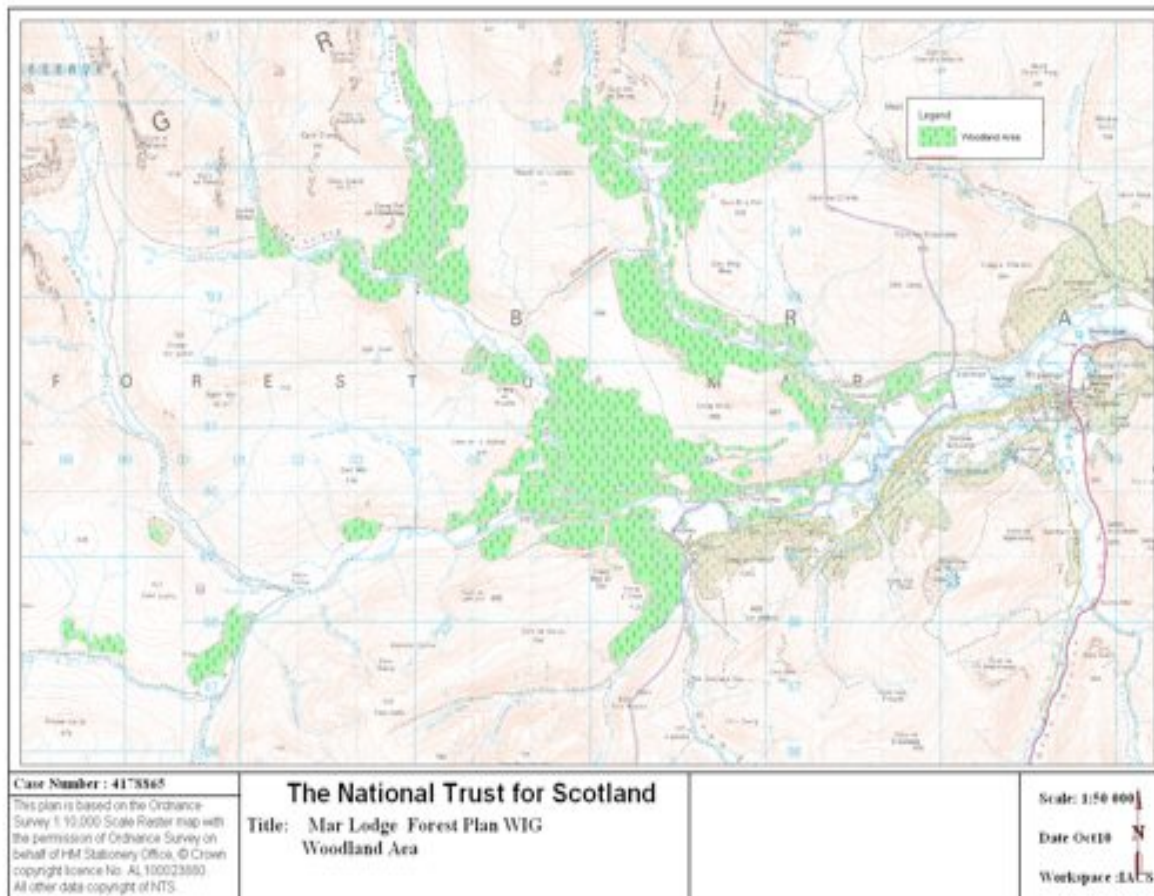
The prehistoric extent of the Scots pine woodland cover was never re-established. Throughout the 1st and 2nd millennia AD it seems that pine woodland only existed east of a N–S line through Dalvorar, and did not extend north of Creag Bheag across the higher ground between the Quoich and the Lui. There were attempts to control the removal of the remaining woods throughout the medieval period, when the larger Mar Estate was a hunting 'forest', but even then the density of cover is not clear – the use of the word 'forest' in this context does not mean 'vast areas of trees'. Estate papers indicate that since at least the 16th century there has been a history of commercial exploitation of timber, with various cycles of felling and at least partial re-stocking with Scots pine (Jamieson 1998).

The overall result has nevertheless been the further contraction of the Scots pine cover since it was recorded in 1703, when a map of the 'Forest of Mar' was produced. A large area has been lost from the upper reaches of the east side of the Derry and various patches elsewhere. However, a reduction in woodland cover would have suited 19th-century estate management, as commercial interest in the property increasingly concentrated on its use as a sporting estate. The resulting increase in deer numbers would have soon put an end to the possibility of natural woodland regeneration, for which there is no evidence beyond the 1830s (Urquhart *et al* 2001). Since then, instead of natural regeneration, in places conifer plantations have been grown to provide deer shelter, designed landscape woodlands have been created, and latterly new native pinewood schemes have been developed.

A:11 Current woodland component

The woodland within Mar Lodge Estate is dominated by Scots pine but also includes areas of Birch, Larch and Norway Spruce. Other species such as Alder, Aspen, Rowan, Willow and Juniper are in scattered and dispersed patches.

Figure 2.



The woodland currently supported across the estate can be broadly categorized into types -

1. Semi-natural woodland - predominantly Scots pine dominated remnant Caledonian pinewood but also some areas of upland birchwood. This woodland occurs primarily in the regeneration zone although some small pockets of broadleaved trees occur in the moorland zone on crags and along riversides. The remnant Caledonian pinewood (Steven & Carlisle 1959) at Mar Lodge currently extends to 840 ha. It is a scattering of “granny pines” (190 years and older) with little evidence of regeneration. Many of the trees show signs of senescence and there is an urgent need to initiate regeneration if the future of the woodland is to be secured. The Caledonian pinewood is a designated feature of the SAC and

there is a legal requirement to bring it into favourable condition. Until recently it has been classed as in “unfavourable condition – favourable management “ but in light of recent progress with deer management and regeneration this has been upgraded to “unfavourable but recovering condition”. There are two main stands of birch woodland (mixed with pine) in mid-Glen Quoich and Mar Forest, otherwise broadleaved woodland is mainly scattered along the riparian corridors and on exposed and inaccessible crags.

2. Plantations - a variety of plantation origin woodland occurs across the estate within both the regeneration and moorland zones. This falls into three general categories: 1. 1960's and 70's plantations, 2. Late 1980's and early 90's new native woodland schemes and 3. small enclosures established by the Nature Conservancy Council. The total area of the 1960 and 70's plantations is 683 ha. A number of these early plantations contained both non-native species (lodgepole pine, sitka spruce and larch) and/or Scots pine of non-local origin however since 1995 management has focused on their potential to be “naturalised”. This has led to extensive remedial work, much of this grant aided, including fence removal, removal of non-native species (except European larch), thinning and restructuring. All Scots pine has been left irrespective of the origin and regeneration seeded from plantations is starting to occur. Generally the plantations in the regeneration zone have had more of this type of work carried out than those in the moorland zone.

In the late 1980 and early 90's a number of new native woodland schemes totalling 85.6ha were established containing Scots pine and a variety of hardwoods. These were and still are fenced to exclude deer and were established initially with no ground preparation or fertiliser. Between 1956 and 1990 the Nature Conservancy Council established thirteen enclosures (deer fenced) totalling 101 ha within Glen Derry and Luibeg. Some of these were planted and others left for natural regeneration. The purpose of these enclosures was two-fold. Firstly to establish a future seed source in the glens where the mature pines were already infrequent and being lost and secondly to experiment with the effect of ground preparation and fertilisation on the success and speed of establishment (Ross 2000).

3. Designed landscape woodland - since the later-18th century, plantings have taken place to enhance the setting of the principal seat of residence of Mar Lodge, features of natural wonder and, subsequently, the detached shooting lodges. Within this Forest Plan, the latter are classed as 'designed plantings' while the former is characterised as a 'designed landscape'. Policy plantings were laid out around Mar Lodge itself and larger area-plantations were established between the Linn of Dee and the Linn of Quoich, forming a designed landscape that also extended south of the river. At Derry Lodge there is a sequence of tree-planting that has yet to be deciphered, but it is described herein as 'designed planting'. Small stands of trees were established at the outlying shooting lodges, such as Bynack. The main species planted were Scots pine, European larch and Norway spruce, but a wider range of species was grown in the policies of Mar Lodge, very much in keeping with the plant collecting practice of the later-18th and 19th centuries. Much of the original planting was clear felled during the 2nd World War and over the last 20 years or so there has been small scale re-stocking in an attempt to maintain the character of the 19th-century landscaping. The extent of this woodland is now approx 207 ha.

A:11 Whole Forest Plan conception, vision and objectives

This forest plan was developed upon the recognition that NTS had no overall strategic plan for all the woodlands at Mar Lodge Estate and that the recovery of the Caledonian pinewood was progressing very slowly. To date the woodland habitats across the estate have not been considered together as a whole nor has the potential value of the woodland habitat for biodiversity, deer management, landscape and commercial value been considered collectively. In order for NTS to develop a forest plan it has been necessary to agree a long-term vision for the future of the woodlands. This has been completed for the semi-natural and plantation woodland on the estate but this has not yet been possible for the designed landscape woodland as there is still thinking and work to be done in this area (see objective below).

The 500 year vision for the semi-natural and plantation woodland on Mar Lodge Estate is:

“To have established a self-sustaining intimate mix of structurally and compositionally diverse woodland and non-woodland habitats extending from the valley floor to the natural altitudinal limit for tree growth; that are ecologically and culturally appropriate for the site and climatic conditions, that increase connectivity between habitats (particularly the remnant pine areas) across the landscape and within the site through the development and expansion of woodland networks, that respect and where possible enhance conservation of the estate’s cultural heritage assets and that provide a range of ecological and social services without the need for intensive management. ”

Within the scope of this vision and with reference to obligations from designations as well as with reference to previous reports and plans the NTS have identified a number of detailed objectives for the Mar Lodge Estate Forest Plan:

Semi-natural woodland:

1. Achieve “favourable condition” status of the Caledonian pinewood within the next 20 years through meeting the conservation objectives for the SAC.
2. In the next 20 years, establish regeneration in areas where mature trees, particularly outliers, are being lost and where further fragmentation is likely in the next few years.
3. Create suitable conditions through control of browsers and field layer management to allow ongoing regeneration and henceforth woodland expansion.
4. Improve the potential connectivity of woodland within the estate and with neighbouring estates through the establishment of seed source planting and riparian woodland as well as contributing to the Cairngorms National Park Forest Network Plan and the Upper Dee Riparian Project.
5. As soon as possible, undertake Archaeological work to establish a methodology for identifying areas of prehistoric significance in areas along the glens where ground disturbance is planned for seed source and riparian woodland plantings. This work will

lead to the production of new constraint maps detailing the rare prehistoric remains in the glens. These maps are key to the works associated with the other objectives.

Plantations:

1. Manage the plantations through thinning, deadwood creation and restructuring to improve their contribution to the woodland habitat, biodiversity and landscape value and to conserve the cultural heritage resource.
2. Manage the plantations where relevant to facilitate deer management and to provide winter shelter for deer.
3. Exploit the plantation resource for its economic value and as a fuel source for renewable power generation where this does not compromise the first two objectives.

Designed landscape:

1. Develop a Designed Landscape Plan which details a vision for the designed landscape woodland and actions for achieving this vision.

A:13 Whole Forest Plan development

This document is the culmination of work between NTS staff and a number of external partners (SNH & FCS) and advisors. NTS commissioned two contractors to provide specialist advice on the future management of the semi-natural woodlands and plantations and the riparian woodland habitat. Subject to a brief written by NTS, Colin Edwards (formerly Forest Research) produced a “Regeneration Management Plan for Mar Lodge Estate woodlands” document which builds and modifies his earlier work “Developing a Regeneration Management Plan for Mar Lodge Estate native woodlands: 2010-2030”. This forms the primary reference document for this whole forest plan and 20 year work plan for the semi-natural woodland and plantations (Appendix 1 & 2). Similarly, in response to an NTS brief a second advisor, Carol Robertson (Scottish Native Woods) produced a document “Mar Lodge Estate Forest Plan, Riparian Woodland” (Appendix 3). This supplemented her work on parts of Mar Lodge reported in the “Upper Dee Riparian Woodland”, (a discussion paper for the Cairngorm National Park Authority). Again these are important reference documents for this plan in that they outline the opportunities for riparian woodland creation across the estate and suggestions for the 20 year work plan for riparian woodlands.

For use in delivering this plan the NTS’s Landscape Architect advisor, Alison Grant, produced a document “Mar Lodge Landscape and Visual Assessment” (Appendix 7). This document includes an analysis of the landscape character of Mar Lodge, considers the relevance of the Cairngorm National Park Landscape Character Assessment and then produces visual opportunities and constraints in map form. While some work has been done to identify the designed plantings and landscape on Mar Lodge Estate we are not yet in as clear a position to prepare a plan for their future as we are with the other types of woodland. It is therefore proposed that a plan and work schedule for this aspect

of the woodlands should be developed and in place by year 5. It is expected that this, too, will be developed by staff, advisers and, if necessary, a contractor.

A:14 Preparatory work

The delivery of some of the work which is outlined in this forest plan has potential implications for natural and cultural heritage interests, wild land, landscape and access. This particularly applies to the work which is more interventionist and involves disrupting the field layer and disturbing the ground. As a general principle before any of the larger scale ground disturbance work and planting schemes are undertaken an Environmental Impact Assessment and a landscape assessment will be carried out. The locations of many of the features of natural (rare plant sites, raptor breeding sites) and cultural heritage interest (upstanding archaeological remains) are known. Hence it has been possible to incorporate these into the forest plan through a “constraints” mapping process outlined below.

In order for Colin Edwards and Carol Robertson to produce meaningful work plans to show where activities like planting and scarification could take place it was necessary to identify the areas where such activities would not be acceptable, hence a “constraints” map (Figure 2). A “constraint” was considered a condition or situation that would prevent access to a location within the Estate or where disturbance of the soil, vegetation layer or intrusion of seedling regeneration was considered undesirable (see Appendix 1). The following constraints were considered: designed landscape, upstanding archaeological sites and sensitivity, nature conservation interests, raptor breeding areas and machine access. A detailed explanation of these constraints is given in “Regeneration Management Plan for Mar Lodge Estate Woodlands” (Appendix 1). Further refinement of this layer will be possible if additional features are located.

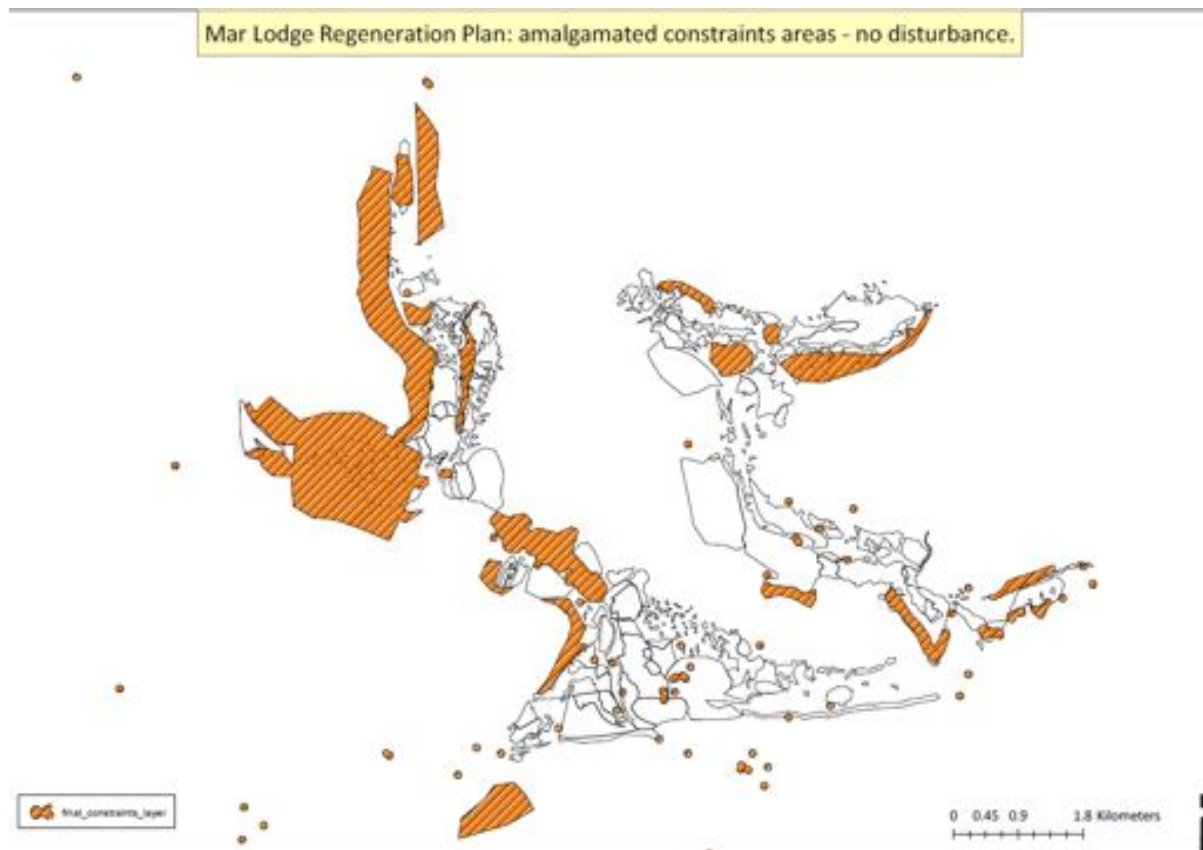


Fig 2 Constraints layer as produced by C. Edwards 2011

It is unlikely that any extensive areas of natural heritage interest are missing from the constraints layer but it is possible that very small features of interest may have been overlooked as a result of the larger scale of the mapping. It is also probable that some areas of cultural heritage interest will have been missed as Neolithic and Mesolithic archaeological evidence is found below ground. As this has yet to be investigated and mapped it could not be part of our constraint mapping.

In view of the above, in addition to the “constraints” map further procedures will be followed to ensure there are no detrimental impacts of the forest plan work to natural or cultural heritage interests. A site survey will be carried out for all potential work areas. This will involve the areas being walked over by both natural and cultural heritage specialists prior to producing detailed site operational maps. The bird breeding season will be avoided for all ground disturbance work.

Mesolithic and Neolithic evidence is most likely to occur along the river and burn sides where riparian planting is proposed. It is intended that a staged 5-year programme of assessment and action, in partnership with certain university departments, will be undertaken so that constraints maps can be regularly produced during the period to ensure the conservation of this highly unusual resource, while enabling planting in appropriate locations. Planting in this zone will therefore be dependent on taking forward the proposed archaeological assessment work, reviewing the results and producing constraints maps over the next 5 years.

B: Regeneration Zone

B:1 Description

The regeneration zone is the area of the estate which supports the majority of the estates woodland and hence has the greatest potential for woodland regeneration and expansion. It includes the remnant Caledonian pinewood (Steven & Carlisle 1959), semi-natural birch woodland, most of the new native pinewood schemes and a number of the 1970's plantations. It is in this zone where NTS are focussed on achieving the semi-natural woodland objectives 1-3 of this plan which involve the restoration and expansion of the native Caledonian Pinewood. Semi-natural woodland objectives 4 and 5 and objectives 1-3 for the plantations will also be addressed in part in this zone as well as in the moorland zone (see later).

At the present time semi-natural woodland is to be found between 300 and 550m though some individual trees can be found at over 600m with a suggested nominal tree line of 650m (Appendix 1). Montane scrub (juniper, willows, dwarf birch etc.) does occur above this height but is not a specific priority at the outset of this 20 year plan. The potential extent of the montane scrub community is becoming increasingly apparent as the effects of the reduced grazing pressure, particularly in recent years, are being recognised. The development of montane scrub will be monitored in 5 years time and an assessment will be made as to whether any intervention to boost this community is required within the remainder of this plan. Should intervention be deemed necessary at this time, potential areas of the regeneration zone that are suitable for expanding or establishing tree-line montane scrub woodland can be derived from woodland suitability maps produced by Colin Edwards (Appendix 2 & see below).

The geology is fairly complex as the regeneration zone is located across the boundary between the main granite mass of the Cairngorms and other underlying strata such as gneisses and other rocks of the Central Highland Granulites or Moine series. This means the west side of Glen Derry is granite while most of the east is of Moine origin with Calcareous outcrops. Moine gneiss underlies most of Glen Quoich. The soils originate from glacial drift of varying texture and all contain a high proportion of quartzose material. The freely draining areas with coarse texture soils have the best-stocked pinewood while the more open stocked areas are probably the result of impeded drainage (Steven & Carlisle 1959).

The regeneration zone supports a diverse mosaic of NVC habitats (Rodwell 1991) but particular habitats types dominate. Dry heath, Blanket bog, Pine and birch woodland and wet heath NVC communities are prevalent across most of the lower altitude areas of the zone with montane heaths and grasslands at higher altitudes. NVC data was used by Colin Edwards (Appendix 2) to generate spatial suitability maps for woodland habitats across the regeneration zone (See Fig. 3). These maps illustrate the potential woodland habitats that could grow in the regeneration zone based on an analysis of soil moisture and soil nutrient regimes and subject to further modification by climate. Current wooded areas were not included in the analysis but assumed to be suitable. Over the majority of the lower elevations in Mar Lodge, NVC W18 (*Pinus sylvestris* - *Hylocomium splendens*) is the principle woodland habitat. This has been divided into three categories based on its current

suitability for woodland establishment (Appendix 2) and these have formed the basis for the prioritisation of work within this plan.

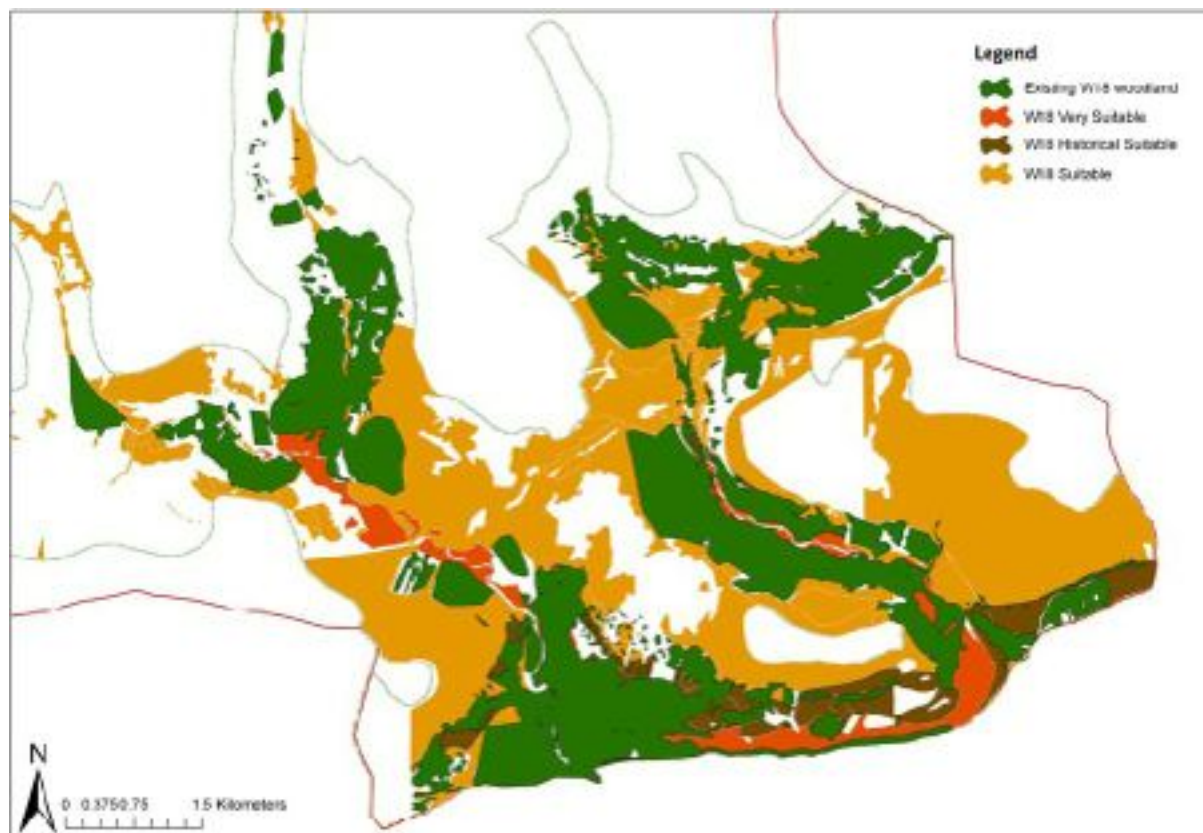


Fig 3. Suitability map for expansion of NVC W18 woodland (C. Edwards 2009 (Appendix 2))

B:2 Nature Conservation

The mainstay of the regeneration zone is covered by a number of national and international designations (Mar Lodge Management Plan 2011-2016). These include SPA, SAC, SSSI, NSA, NNR, GCR, Ramsar Sites and National Park. The notified features of these designations can be individual species, habitats or geological formations and any expansion of the pinewood may have possible implications for the features (Appendix 4). Appendix 8 lists all the notified features and details what the likely impacts of the work programme outlined in this plan will have on these features. The priority habitat most likely to be affected by woodland expansion is dry heath, as it occupies the sites most suitable for pine regeneration. While all such potential conflicts will have to be considered, in this particular case there is an agreement between Scottish Government and SNH that the expansion of the pinewood would have priority over dry/wet heath within the Cairngorms National Park. Another feature which requires specific consideration is golden eagles, as the Cairngorm Massif SPA is designated primarily for their conservation. Prior to any work within this plan commencing, an evaluation of the impact of the planned woodland expansion on golden eagle foraging habitat will be undertaken in agreement with SNH. In most cases areas of conflict between notified features of the designations and planned work for woodland expansion has been avoided

through the process of constructing the constraints map (see earlier). However any further conflicts will be identified on the ground prior to any works beginning.

B:3 Cultural Heritage

The regeneration zone has a large number of archaeological sites, many of which are designated in groups as Scheduled Ancient Monuments. The latter are subject to a Management Agreement with Historic Scotland (2011-2015). There are many other recorded historic features of significance, as well as the possibility of evidence for inland, upland prehistoric settlement (Mar Lodge Management Plan 2011-2016). The majority of the immediately obvious sites in this zone are pre-Improvement townships with their associated agricultural and sheiling grounds; they provide an immediate and significant window on medieval and post-medieval ways of life.

All of the located sites are to be excluded from all impacts associated with interventions that will enable natural regeneration and planting, both across the wider landscape and in riparian parts of this zone. The application of a buffer zone around these sites will ensure that neither vehicular access, planting, nor fencing will impinge upon these areas. Nevertheless, some consideration will need to be given to ensuring that specific pathways between townships and their shieling grounds are maintained as open routes.

In time, ongoing regeneration and woodland expansion will pose management challenges, affecting both the historic sites themselves and their settings. In addition, while some archaeological sites (particularly those on the river flats) were once very obvious features in the landscape, the reduction in grazing pressure and consequent vegetation growth has seen them become far less visible. Some sites are already at risk from vegetation encroachment and, without management, this will only get worse. So, while the use of buffer zones is a very blunt and appropriate tool for the present, it is recognised that as our knowledge grows the management of archaeological sites will have to be refined and modified to ensure the removal of young saplings as appropriate. Consideration will also need to be given to implementing a grazing regime as a tool for maintenance of sites.

It is also accepted that a gap in archaeological knowledge is presented by the plantations, in that they were not surveyed by the RCAHMS due to their dense nature. Walk over surveys prior to any work within them will be commissioned, to identify and record sites and ensure their conservation and appropriate management. At the other end of the spectrum, the furthest extent of the regeneration zone extends into the high glens which are gradually 'receiving' eroding pieces from various 2nd World War aircraft that crashed into the Cairngorms over 60 years ago. An assessment of the distribution of these items and a proposal for their long-term 'management' are required.

There is one designed planting in the zone – that surrounding Derry Lodge – which will be reviewed to ensure appropriate management and succession. Part of the elongated designed landscape associated with Mar Lodge also falls within this zone, at the Lower Quoich around Queen Victoria's Picnic Lodge at the Punch Bowl. Both of these buildings are Listed. At present our knowledge of the form that the designed landscape took is not sufficient to adequately support a plan for its maintenance. Hence this will be addressed as part of the work to be undertaken under the Designed Landscapes section.

B:4 Semi-Natural Woodland

The two reports produced by Colin Edwards (Appendices 1 & 2) along with the stand structure survey (Appendix 5) emphasised three issues with the semi-natural woodland habitat, 1: the loss and non replacement of old growth pinewood, 2: the lack of connectivity of the pinewood stands and 3: the need to ensure ongoing low level pine regeneration recruitment. Addressing these three issues is the focus of this plan for the regeneration zone. In 20 years it is only possible to start to address these issues but it is important that this is undertaken.

- 1- *the loss and non-replacement of old growth pinewood* - It is accepted that due to the length of heather, depth of the moss/litter layer and lack of exposed mineral soil, regeneration is not going to proceed fast enough to realise the long term woodland vision without some sort of intervention. In this context, intervention is the removal of the vegetation layer and disturbance of the soil to create a better seed bed. Both of these actions can be achieved either mechanically or through burning. It is anticipated that the soil disturbance methods that will be implemented are different types of scarification. These are detailed in a scarification matrix produced by Colin Edwards (Pages 12-13 Appendix 1). However, the suitability of burning as a tool primarily to remove the vegetation layer but also to create a better seed bed will be explored during the first few years. The NTS Moorland Management Guidelines will be referred to for guidance on the use and prevention of fire in moorland habitats.

“Priority areas” were identified by Colin Edwards and these are sections of existing woodland identified in the Stand Structure survey as Degraded old growth/Non wooded habitat/Scattered trees. These are where the trees and general woodland habitat is in the latter stages of degradation and decline, where tree mortality appears to be occurring but where new regeneration is absent. These represent the areas most urgently in need of intervention to ensure there is no habitat loss. “Priority areas” were modified to take account of the potential seed dispersal ability of Scots pine trees and clipped to remove any areas that overlapped with the constraints layer. The remaining areas after these modifications indicate the areas that would benefit from disturbance to encourage regeneration recruitment and these were termed the “allowed disturbance” layer (see Fig. 4 page 9 Appendix 1). All work circles for the next 20 years occur within these “allowed disturbance” areas. It is envisaged that intervention work would be staggered over areas and over time with the aim of introducing a varied age structure to the resulting regeneration. To this end 3 work circles have been established where work over the next 20 years will be focussed (Figure. 4). These work circles will be tackled in succession. It is also understood that this work will be dictated in any year by the predicted pine seed fall and hence plans need to be flexible. The pine seed fall will be predicted by counting female flowers and immature conelets at 24 and 12 months respectively, in advance of a potential seed year. Some areas of “allowed disturbance” were excluded as working circles from the next 20 years work plan as they overlapped with a constraint which was machine accessibility to the area. Although not identified as working circles, NTS may consider carrying out work in these areas by hand, depending on resource availability.

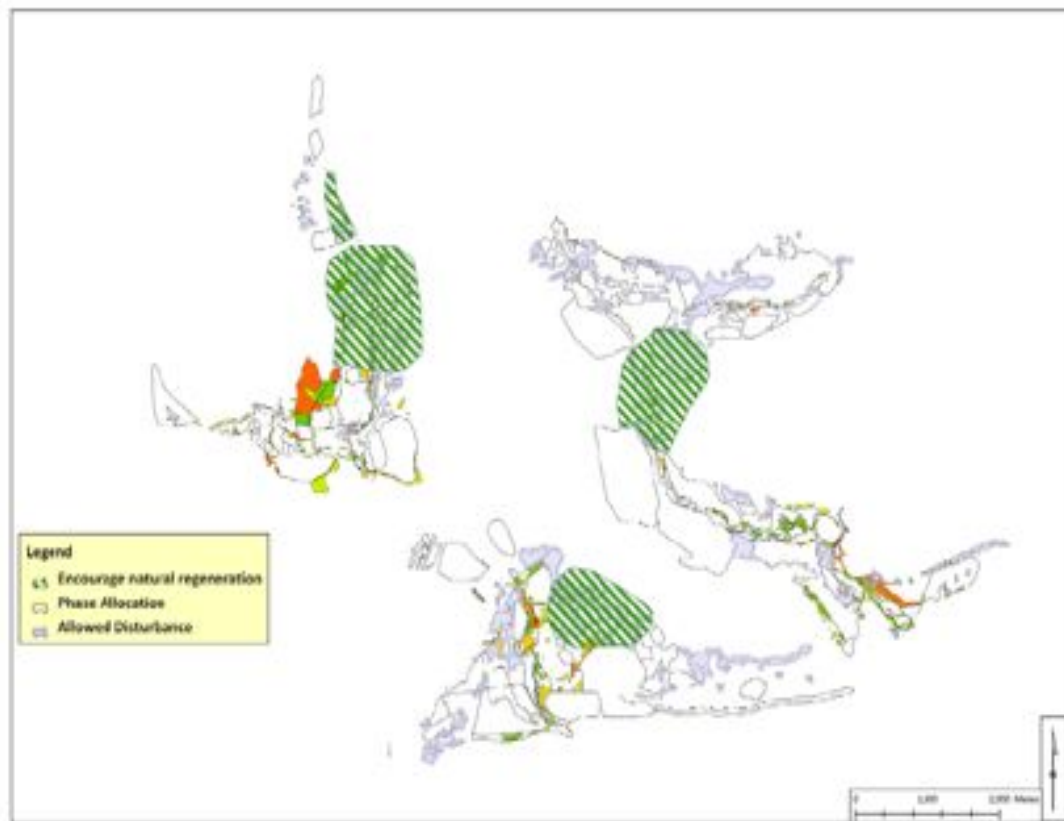


Fig. 4 Location of work circles and proximity to existing natural regeneration from C Edwards 2012 (Appendix 1).

It is accepted within NTS that there may be the need for some intensive ground disturbance to encourage regeneration despite possible impacts on wild land, landscape and access. The level of intervention applied will be that suited to the topography, vegetation and soil and adequate to produce the desired results. Intervention will be carried out sensitively with consideration given to the landscape, cultural heritage and wild land impacts in the location, distribution and size of disturbed areas. While the work circles for disturbance have been selected for their suitability at a macro-scale, there is the possibility that small patches exist within the work circles of habitat unsuitable for disturbance such as mire, areas of deep peat etc. A walkover survey of all areas to be disturbed will be conducted prior to any work being carried out. During the first 5 year period of this plan NTS will experiment with different types of scarification in different areas in an attempt to identify preferred methods of disturbance that produce results yet minimise impacts on other criteria that NTS deem important. This method(s) of intervention will be used in the autumns prior to expected good seed years over the remaining periods of the plan. Work will be carried out in autumn as the seed bed created will remain un-vegetated and hence receptive until seed fall the next spring and also this avoids sensitive times of the year for breeding birds. Target densities and species values will need to be identified prior to intervention work being carried out. This will allow an assessment of whether the intervention has been successful and whether or not it should be repeated or the type and level of intervention manipulated.

Once seedlings are established in disturbed areas, it is important that this new regeneration is protected. While the present “zero tolerance” policy for deer and the presence of two barrier fences are seen as the main factors to protect regeneration, there are other potential problems like hares and sporadic deer incursions that may be a threat in certain areas. New patches of regeneration will be watched for browsing and experimentation with possible solutions like bud caps and focussed stalker effort, will be undertaken as and when the opportunity arises.

- 2- *the lack of connectivity of the pinewood stands*- BEETLE analysis (Section 5 Appendix 1) has highlighted the need for seed source planting to improve future connectivity of woodland areas both within the estate and with neighbouring estates. Initially an ambitious programme of work was proposed to tackle the seed source planting. However after consideration, this plan will focus on two work circles in Glen Lui initially (Figure. 5). Depending on the success of these work circles and the lessons learnt then some capacity for tackling the other work circles will be allowed for in the later phases of the plan. Best practice would dictate these planting sites are established with ground preparation and fertiliser and are protected by fencing. Doing this may not be compatible with the NTS’s other objectives, so again a certain amount of experimentation will be involved in the initial period to ascertain the best method(s) to achieve our goals while not overly compromising other objectives.
- 3- *the need to ensure ongoing low level regeneration recruitment throughout the woodland* - regeneration recruitment has been ongoing throughout the regeneration zone in recent years and it is hoped that this will continue albeit that it is at a low level in many areas. Long-term protection of this regeneration is critical if the long term vision and “favourable condition” of the woodland is to be achieved. This protection will be achieved as described above (see section 1), through the continuation of the “zero tolerance” policy for deer and presence of two barrier fences.

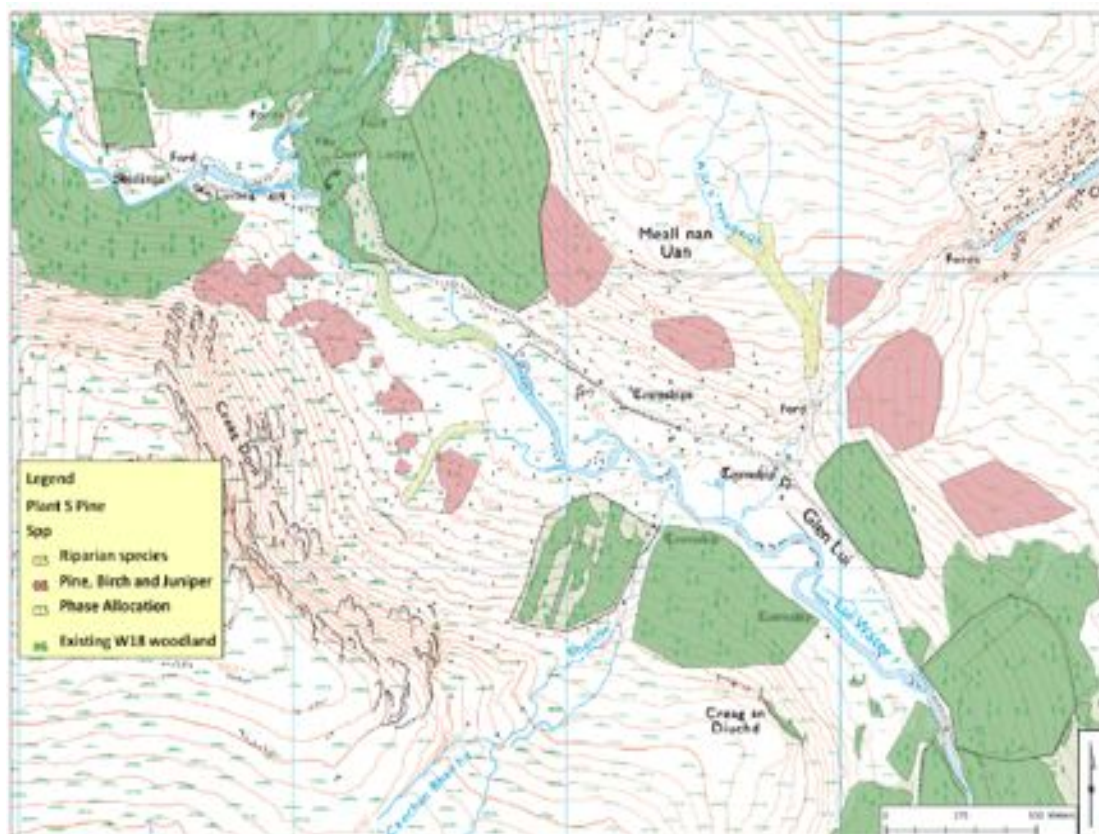


Fig. 5. More detailed view of proposed planting areas in Glen Lui from C Edwards 2012 (Appendix 1).

The work circles for intervention include an element of riparian woodland. Carol Robertson focussed specifically on riparian woodland in her work (Appendix 3) and a number of the areas she suggested for riparian woodland creation within the regeneration zone are included in the work plan of this document.

Riparian areas supporting existing remnants of woodland have been identified and it has been suggested where these remnants could be supplemented through enrichment planting. NTS would prefer to achieve this riparian woodland creation without fencing as many of these areas are further out into the estate in more remote locations of high landscape and wild land quality. However, NTS will utilise the opportunity offered by existing fenced enclosures on the estate and broadleaved species will be planted into these to provide a future seed source in the glens. With the low deer presence within the regeneration zone it is also felt that establishing trees without fencing may be possible and definitely worth trying. Various establishment strategies have been proposed and these will be trialled in the absence of fencing and in areas of low deer use. These include mob planting, use of brash mats, mixing palatable and unpalatable species and exploiting potential nurse species. A period of experimentation with these establishment strategies was initially planned to take place and will still occur during the initial 5 year period of the plan, informed by an integrated natural/cultural heritage approach to on-site assessment work. However, as a result of the Independent Review Report the start of these trials has been brought forward and some small scale experiments have been established in May 2012. This

period of experimentation will determine whether riparian woodland can be established in the regeneration zone through planting without the use of fencing. Target survival rates and levels of browsing damage will need to be identified prior to the trials being carried out such that an assessment can be made as to whether the establishment strategy can be deemed as successful or whether another method of establishment needs to be considered. It is recognised that the riparian woodland and seed source planting elements of this plan are potentially highly archaeologically sensitive. The importance of establishing some form of predictive analysis for prehistoric settlement along the river courses is key to fulfilling the work programme part of the plan. It is accepted that this cannot be achieved immediately and will require additional resources to enable delivery.

B:5 Plantations

The plantations within the regeneration zone were established for a variety of reasons. Since 1995, NTS has recognised their potential value for biodiversity, shelter for deer and economically. However, in 1995 NTS was also aware of their detrimental impact on wild land, landscape, archaeological sites, the setting of historic sites, and birds through fence strikes. To that end the 1960's & 70's plantations have been managed by the NTS in a programme of "naturalisation" works to remove unwanted non-natives, remove redundant fences, re-shape edges and re-structure the stand by variable thinning. More recent work includes deadwood creation by ring barking. NTS would still like to remove wood from the plantations, where this is viable economically, particularly because the use of wood as a biomass fuel is currently being explored. In the pinewood context, the plantations, with 40-50 year old trees, are now seen as a potential addition to the stand structure of the woodland to compensate for the lack of a suitable natural alternative.

Over the next 20 years, NTS will manage the plantations within the regeneration zone primarily to improve their contribution to the woodland habitat, biodiversity and landscape value and to conserve the cultural heritage resource. The plantations will also be managed, if required, to facilitate deer management and to realise their economic value. With respect to the improving the woodland habitat and biodiversity value, Colin Edward's (Section 6 Appendix 1) has recommended using patch felling, crown thinning and non thinning within the plantations to produce a more heterogeneous stand structure which would mimic better a natural situation. For those areas where extraction is not an option, some thinning will be carried out through ring barking rather than felling. This will add structural diversity in the long term to the plantation and also create standing dead wood, an important habitat for conservation. Thinning through ring-barking will probably have to be done more slowly over a longer period of time. This work should enhance the plantation habitats for many species including some of conservation priority. The creation of clearings and thinning will allow greater light penetration into the plantations allowing a ground flora which is currently not present to develop. These plant species along with the invertebrate community they support may provide food for species such as black grouse. If shade is reduced and sunny glades created then colonisation by wood ant species is possible. Ring barking to create deadwood will in the longer term provide deadwood of all types

which is a key habitat for a number of deadwood invertebrates along with fungi, lichens and bryophytes.

Through consultation with the Head stalker some management will be carried out in selected plantations to facilitate deer control and deer extraction. Work will be carried out in the plantations on a cyclical basis and it is envisaged that all plantations will have had some work completed within the first five years of the plan

Based on Colin's recommendations a thinning programme for the plantations was developed and submitted as the Long Term Forest Plan (LTFP) (Appendix 6).

To date non-native tree species have been removed from plantations in the regeneration zone with the exception of European larch. A decision was made to leave this species primarily due to its value as a food resource for a number of pinewood species (black grouse, crossbill and red squirrel). Larch is also growing in some inaccessible areas where it is impractical to remove it. For the lifetime of this plan larch will slowly be reduced within the plantations through the ongoing phased thinning works that will be carried out. Its value to a number of species is still recognised and hence there is no desire to remove larch completely within a short time scale.

While considerable "naturalisation" works have been conducted in the last 15 years in the plantations, from a landscape perspective some of them are still in need of further work. The removal of non natives species in the plantations has resulted in one poorly shaped block in a prominent position in the Lui. The "naturalisation" of the other plantation's edges has not yet been bold enough to make them either relate to land form or look semi natural. While it is the NTS's intention to continue with the "naturalisation" of these plantations edges it is felt that the emphasis of how this will be achieved should change to reflect our woodland expansion aims. The reshaping process will now focus on encouraging regeneration to achieve the desired shapes rather than purely on tree removal.

It is recognised that a gap in archaeological knowledge is presented by the plantations, in that they were not surveyed by the RCAHMS due to their dense nature. Archaeological surveys prior to any work will therefore be carried out, to identify and record sites and ensure their conservation and management within the modified plantations.

Some of the younger plantations and those set up as enclosure experiments remain fenced but NTS intend to remove most of these in the early periods of the plan. Many of the fences have reached the end of their useful life and replacement is not necessary with the current level of grazing.

B:6 Fencing

To date there has been a "general presumption" against the use of fencing outlined in the Mar Lodge Management Principles (Mar Lodge Management Plan 2011-2016). However, the Mar Lodge Independent Review Report (2011) made specific recommendations about the use of fences and their value in resolving conflict situations and allowing successful integration of objectives. To this end a 4.5km barrier fence will be erected in 2012 at the Linn of Dee. This fence will be part off-set electric and part full height deer fence. Its primary purpose is to protect

the estates sporting resource of red deer stags which tend to winter in the woodland in the regeneration zone. However, the fence will also reduce the risk of browsing to the natural regeneration in and around the Linn of Dee and Glen Lui areas.

There are a number of fenced enclosures within the regeneration zone (Glen Lui, Derry and Luibeg). Many of the fences are at the end of their life and redundant as the trees within the enclosures are beyond the risk of browsing. Furthermore, the browsing pressure is so low that the fences are no longer required. Over 2012-2013 many of these fences will be removed, including the top fence of the large Creag Bhalg enclosure behind Mar Lodge.

B:7 Work Plan for Regeneration Zone

General information working circles

Three regeneration working circles have been identified for the pinewood regeneration and expansion work and they are a central focus for planning, ground disturbance and browse protection for at least a 10 year period. The three circles are Glen Lui, Glen Quoich and Glen Derry (Fig. 4.) and these will be worked in this sequence over the 20 year plan.

The following schedule will be applied to each working circle:

Year 1 - detailed site planning, walking areas to identify site constraints, access points for machines, historic features, important habitats or soil types to avoid disturbing new constraints not previously identified and most suitable disturbance types for the vegetation type/soil present.

Years 2 - 6 - actual site working, site disturbance timed to avoid nesting periods and take advantage of good seed years. If there has been no or little regeneration recruitment response to the management interventions in years 2-4 then repeat disturbance can be undertaken in years 5 & 6.

Years 7 - 10 - period of intense protection and monitoring to ensure regeneration is established to above 2m height.

Lessons will be learned during the planning and intervention work of first working circle. Knowledge gained from this will then be applied to the next two working circles.

The timescales are more fluid for the riparian woodland creation and woodland creation aimed at increasing connectivity. This is due to the more experimental initial stages of the work and the time required for the assessment of the extent of prehistoric settlement evidence, as well as uncertainty over the time required obtain trees of a local provenance suitable for planting out.

However, for any large scale planting which occurs the first year will be spent undertaking the relevant assessments and surveys and pre-planning.

Table 1. Regeneration zone workplan.

Year	1-5	6-10	11-15	16-20
Pinewood regeneration & expansion	Survey and plan Lui work circle. Includes identifying target seedling densities.	Survey and plan Quoich work circle. Includes identifying target seedling densities.	Survey and plan Derry work circle. Includes identifying target seedling densities.	Survey and plan Lui work circle.
	Phase work in areas identified for intervention within working circle in Lui.	Phase work in identified areas in Quoich	Phase work in identified areas in Derry.	Phase work in identified areas in Lui
	Trial different scarification methods and trial archaeological prospection in these cleared areas	Protect and monitor Lui areas. Reapply disturbance if required	Protect and monitor Lui and Quoich areas (reapply disturbance is required)	Protect and monitor Derry (reapply disturbance if required) and Quoich areas
	Trial protection methods e.g. bud caps on establishing regeneration.			
Increase connectivity	Source local provenance broadleaves and Scots Pine		Consider embarking on second planting scheme	
	Establish planting, ground preparation and protection methods in Glen Lui.	Review success (if unfenced) based on targets and consider other options if targets not met.		

Riparian Woodland	Establish target survival rates and browsing levels.	Planting and beating up as planting material allows.	Planting and beating up as planting material allows	
	Protect and Monitor planting	Protect and Monitor planting	Protect and Monitor planting	Protect and Monitor planting
	Source local provenance broadleaves.			
	Trial non fencing methods in areas suggested in riparian report.	Review years 1-5 success and apply to a second group of areas suggested in riparian report if there has been success measured against set targets.	Identify third group of areas and apply.	Identify fourth group of areas and apply.
Cultural heritage	Establish target survival rates and browsing levels.	If establishment unsuccessful then consider other options.	Review years 1-10 success.	
	Survey and assess prehistoric settlement evidence, resulting in agreed constraint maps.			
	Trail archaeological prospection in intervention areas of Lui working circle.	Archaeological prospection in intervention areas of Quoich working circle.	Archaeological prospection in intervention areas of Derry working circle.	

	Research historic routes from townships to shielings across the zone to ensure appropriate future management	Research aircraft wreckage distribution and develop management regime		
	Monitor historic areas and pull young saplings as necessary	Monitor historic areas and pull young saplings as necessary	Monitor historic areas and pull young saplings as necessary	Monitor historic areas and pull young saplings as necessary
	Assess need for grazing regime for cultural heritage areas in Glen Lui	Assess need for grazing regime for cultural heritage areas in Glens Lui and Quoich	Assess need for grazing regime for cultural heritage areas in Glens Derry, Quoich and Lui	Assess need for grazing regime for cultural heritage areas in Glens Derry, Quoich and Lui
	Produce plan for Derry Lodge designed plantings and begin implementation.	Continue to implement any actions from Derry Plan		
Designed Plantings and Landscape				
Plantations	Strategic planning of thinning and landscape design work,			
	Phased thinning and landscape design work including archaeological survey work.	Phased thinning and landscape design work including archaeological survey work.	Phased thinning and landscape design work including archaeological survey work.	Phased thinning and landscape design work including archaeological survey work.

Montane Scrub	Monitor development	Conduct assessment and plan any intervention if required	Monitor development or continue intervention	Monitor development
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C: Moorland Zone

C:1 Description

This zone comprises the remainder of the estate out-with the regeneration zone. It includes the head waters of the River Dee and most of the land up to the source of the many tributaries running into the river Dee. The zone can be subdivided into a large block to the west, managed in recent times for grouse and deer. There is almost no woodland in this area, with the exception of the odd plantation designed as deer shelter and remnant pockets of broadleaved woodland in gullies and on inaccessible crags. Moorland habitats dominate the zone. In sharp contrast the eastern part of the zone contains the Mar Lodge designed landscape, a number of plantations and areas of farmland on the Dee valley floor.

The northern part of the moorland zone forms part of the main granite mass of the Cairngorms. Moving south away from the high tops the geology changes and becomes more varied. Just north of the river Dee and in the western area of the moorland zone the underlying strata is moinian rocks, mainly psammite. In the Dalvorar area of the moorland zone the underlying geology is a mixture of quartzites and schists (Gimingham 2002).

Like the regeneration zone the soils are varied but generally poor. The zone is dominated by wet heath and blanket bog NVC communities at lower altitudes. Dry heath and grassland areas do occur but these are less widespread. At higher elevations dry heath, montane heath and montane grassland communities NVC communities are present.

Some areas of the moorland zone have the potential to support trees although there little in the way of existing woodland to provide a seed source, hence trees would have to be planted. This zone is currently managed to support a deer population that provides a sporting resource and maintains the moorland habitats in favourable condition. The density of deer throughout most of the zone is too high to allow trees to establish without the use of fencing. At present increasing the tree cover is not seen as a priority with the exception of creating areas of riparian woodland.

C:2 Nature Conservation.

The moorland zone is covered in part by a number of nature conservation designations. The designated areas form parts of the same SPA's, SAC's, SSSI's and NSA's which cover the regeneration zone and the designated areas are generally overlapping (Mar Lodge Management Plan 2011-2016). A smaller proportion of the moorland zone is covered by designations compared to the regeneration zone with the exception of the Cairngorms Massif golden eagle SPA which almost covers the zone in its entirety.

The western part of the moorland zone is dominated by moorland habitats including dry heath, wind-clipped heath, wet heath, blanket bog and grassland. As mentioned above this area is

predominantly un-wooded but there are a few small and isolated patches of woodland present. The presence of pine roots in the peat in many areas is of prehistoric date.

There is potential to create riparian woodland throughout this zone. This would have benefits for a number of riparian species but also act as a wildlife corridor linking up woodland on Mar Lodge Estate with woodland on other neighbouring estates. As most of the ground is undesignated there are not the same issues as in the regeneration zone concerning loss of one priority habitat over gain in another. There may be some loss of moorland habitats through the riparian woodland creation but it is accepted that the benefits of the woodland habitats would outweigh the moorland loss.

C:3 Cultural Heritage

As with the regeneration zone, the moorland zone was surveyed by RCAHMS, resulting in the identification of numerous historic pre-Improvement township and shieling sites, as well as other structures, including those associated with late-18th/19th century shepherding (Mar Lodge Management Plan 2011-2016). Three groups of sites are designated as SAMs and there are numerous other sites beyond their boundaries. The same buffer zones will therefore be applied here as are applied in the regeneration zone, with the same proviso that their management may need to be modified as knowledge increases.

More recently, the discovery of worked flint and quartz in three areas of the upper Dee and its tributaries has highlighted the significance of this zone: these apparently remote, high glens were clearly in use semi-permanently over 6,000 years ago. This is a very rare discovery for an inland, upland area; it is of national significance. An assessment of the extent of this resource and the identification of actual or potential prehistoric sites are key to progressing riparian woodland creation in this zone.

There are two lodges in the moorland zone, one of which, Bynack Lodge, has some remnant trees planted around the time of its construction. It is intended that a decision regarding whether or not to succession plant at this site will be taken before 2013. Consideration will also be given to planting stands of trees at Geldie Lodge, Ruigh nan Clach and Dalvorar.

The designed landscape is considered as a separate section later in this plan.

C:4 Semi-Natural Woodland

The semi-natural woodland in this zone is confined to new native woodland (NNW) plantations and broadleaved remnants to be found in gullies, on islands and steep river banks. The NNW plantations will be managed to maintain their diversity until their fences are no longer viable. At this point a decision will be made as to whether deer can be given access. The growth of the trees and their corresponding height and girth at this time will be key to this decision.

There is currently a project called the Upper Dee Riparian Project (UDRP) established by the Dee District Fisheries Board and the National Park. The aim of this project is to establish riparian

woodland in the upper Dee catchment with a long-term goal of linking up catchments through a riparian woodland corridor. Prior to conducting the advisory work for NTS, Carol Robertson was involved in surveying riparian areas within Mar Lodge for the UDRP. In both her reports for UDRP and for NTS, she has identified areas of remnant riparian woodland that would be suitable for enrichment planting. NTS will work with the Dee District Fisheries Board (DDFB) and CNP to create some areas of riparian woodland within the zone as potential seed sources for future expansion. Consideration will be given to Carol's suggested areas as well as proposals directly from the DDFB/CNP. Constraints associated with designated and other cultural heritage sites, deer management and movements will be addressed. While having all these factors to consider makes the process time-consuming, initial discussions suggest that suitable sites will be found where these factors can all be satisfied.

It is likely that some of this work will involve riparian woodland creation along the Geldie burn with a long-term view to a woodland link with Glen Feshie. As deer densities here are too high to attempt planting without fencing this work will follow a more traditional route of planting and fencing. Subsequent to the Independent Review Report this approach using planting and fencing is now considered acceptable. However, due consideration will be given to impacts on access, wild land, cultural heritage, landscape and deer movements and hence fence lines and fence types will be carefully considered. A landscape assessment will be commissioned.

There are some areas of the moorland zone where deer usage may allow woodland establishment without fencing. These areas have been identified in Carol Robertson's plan. NTS intend to trial riparian planting without fencing in these areas over the first five years of the work plan, using the planting strategies outlined in the regeneration zone-semi-natural woodland section (see above).

C:5 Plantations

The primary objective for the plantations in the moorland zone is to provide deer shelter. However, they will also be managed where possible to improve their contribution to the woodland habitat and biodiversity value, conserve the cultural heritage resource and realise their economic value (Section 6 Appendix 1). Plantations will be primarily managed through a process of patch felling, crown thinning and non-thinning. The moorland zone plantations are the only source of winter shelter for deer and therefore will be managed in consultation with the Head stalker to maintain their value to deer in winter. Thinning plans for these plantations will have this requirement as a priority and strive to improve the quality of the woodland habitat for deer. A few of the plantations still contain non-native tree species (Norway Spruce, Lodgepole Pine & Larch). These will slowly be removed from the plantations in preference to Scots pine during any thinning phases where this will not impact on the quality of the habitat for deer shelter. As for B5 the plantations are a gap in our archaeological knowledge and therefore walk over surveys will be carried out prior to any works.

C:6 Designed landscape plantations

Many of the plantations within the eastern block of the moorland zone fall into the designed landscape, specifically those plantations around the Linn of Dee, within the immediate vicinity of Mar Lodge and further east. Many of these plantations have been historically planned, ensuring that they stand out from the rest of the landscape by the planting of “exotic “ species, even if exotic here means Norway Spruce and Larch. A Designed Landscape Plan is required before a plan for these plantations can be developed.

Table 2. Work Plan for Moorland Zone

Year	1-5	6-10	11-15	16-20
Riparian Woodland	Discuss riparian proposals from Dee Fisheries Board and finalise for Life funding bid or SRDP route			
	Depending on funding success of the UDRP potential establish planting enclosures up the Geldie burn	If required complete UDRP exclosure establishment up Geldie burn		
	Trial non fencing methods in areas where the grazing pressure might be lower e.g. Area 1 in Carol's report, gorges and steep burn sides. Set targets for survival rates, browsing levels.	Review years 1-5 success and apply to a second area suggested in riparian report if successful when measured against targets. If not successful need to consider other options.	Identify third group of areas and apply.	Identify fourth group of areas and apply.
Cultural heritage	Survey and assess prehistoric settlement evidence, resulting in agreed constraints maps.	Research aircraft wreckage distribution and develop management regime		
	Research historic routes from townships to shielings across the zone to ensure appropriate long-term management			

Designed Plantings and Landscape	Monitor historic sites in riparian and plantation areas and develop management regime if necessary.	Monitor and manage historic sites as necessary	Monitor and manage historic sites as necessary	Monitor and manage historic sites as necessary
	Agree designed plantings management approach for Bynack and Geldie Lodges and Ruigh nan Clach and Dalvorar, and action.	Take forward designed plantings work	Take forward designed plantings work	Take forward designed plantings work
	Produce Designed Landscape Plan (dependent on HofG&DL) – see following section			
Plantations	Planning of thinning and landscape design work.			
	Phased thinning and landscape design work.	Phased thinning and landscape design work.	Phased thinning and landscape design work.	Phased thinning and landscape design work

D: Designed Elements at Mar Lodge Estate

D:1 Description

As previously noted, there are two main elements that form the designed part of Mar Lodge Estate: the plantings around the various shooting lodges, some of which have survived, while others have disappeared or may never have existed; and the designed landscape that focuses on Mar Lodge itself, stretching from Linn of Dee to Allanaquoich, as well as along parts of the opposite side of the Dee.

Historical information is available that relates to these later-18th or 19th century designed elements, but it needs to be drawn together to ensure that well-founded decisions are taken regarding the conservation management of these areas.

D:2 Small designed elements

A few Larch survive at Bynack Lodge, a small remnant of the larger stand of trees that clearly enhanced the setting of the lodge in the mid-late 19th century. A number of deciduous trees are recorded by the Ordnance Survey at Dalvorar in the 1860s which are no longer extant, while other stands may have been planted at Geldie Lodge and Ruigh nan Clach, although this has still to be verified. These trees would have provided a visual focus and sense of homecoming within these vast open straths of the eastern Cairngorms. Aesthetically they would have been significant features of the landscape, and consideration has therefore been given to their long-term management within this Forest Plan.

It is proposed that further Larch should be planted at Bynack to provide a succession in the immediate vicinity of the extant stand and the associated lodge. Desk-based and on-site research will be undertaken in the short-term to inform a broader decision as to whether small stands of trees should be planted at Dalvorar, and possibly Geldie Lodge and Ruigh nan Clach, to provide an appropriately-scaled visual reminder, as survives at Bynack Lodge.

D:3 Derry Lodge

Derry Lodge is enclosed on all sides by a Scots pine plantation that was clearly originally established before 1860. The trees provide a visual focus for the lodge as well as shelter around it. But the bounding form of the planting appears to have been somewhat lost in the ensuing years. A fully integrated plan for the longer term management of Derry Lodge and its wooded setting will be developed in accordance with the Estate Management Plan, incorporating potential future uses of the building; historical perspective; wild land significance; access & recreation; and any other relevant issues.

D:4 The designed landscape associated with Old Mar Lodge and its successors

A broad-brush overview of the planted and built elements in the landscape from Linn of Dee, to Mar Lodge, the Punch Bowl and Allanaquoich, has been completed, providing an indication of the possible extent of the designed landscape associated with old and new Mar Lodge and Corriemulzie. Some of the plantations within the eastern block of the moorland zone fall into this designed landscape. Some of which have been historically planned, ensuring that they stand out from the rest of the landscape by the use of species exotic here like Norway spruce and

Larch. Consideration needs to be given to the replacement strategy for these older trees as highlighted in the Landscape and Visual Analysis (Appendix 7). However, the details of the designs and plantings along the slopes of the Dee, in the immediate policies and wider settings, have yet to be researched and fully understood. A Designed Landscape Plan is to be developed to enable appropriate management of the woodlands in this part of the estate, a process to be led by the Head of Gardens and Designed Landscapes, supported by other specialist staff and advisers.

Table 3. Work Plan for Designed Elements at Mar Lodge Estate

Year	1-5	6-10	11-15	16-20
Designed plantings	<p>As noted in Table 1: Produce plan for Derry Lodge designed plantings and begin implementation</p> <p>As noted in Table 2: Agree designed plantings management approach for Bynack Lodge and consider plantings at Geldie Lodge, Ruigh nan Clach and Dalvorar, and action</p>	Take forward designed plantings work	Take forward designed plantings work	Take forward designed plantings work
Designed Landscape	<p>Year 1 Using various sources as well as site work, define boundaries of designed landscape from Linn of Dee to Allanaquoich.</p> <p>Year 1-3 Prepare Designed Landscape Plan, led by/under the guidance of Head of Gardens & Designed Landscapes</p> <p>Year 3-5 Initiate agreed actions</p>	Continue implementation of Designed Landscape Plan	Continue implementation of Designed Landscape Plan	Continue implementation of Designed Landscape Plan

E: General

E:1 Working practices

NTS is a conservation organisation with multiple objectives for Mar Lodge Estate and is guided by a set of management principles and NTS policies. These influence the type of activities and working practices that NTS is willing to undertake across the estate. There is recognition that some methods of work, while having benefit to one interest could compromise another in either the short or long term. The Trust's principles of work at Mar Lodge aspire to achieve holistic integrated conservation management by adopting working practices that sustain a balance without detriment to the values for which the estate was acquired.

After due consideration the following table lays out the NTS's position on the working methods it intends to employ to achieve the work outlined in this document.

Table 4. Working practices

Activity	Regeneration Zone	Moorland Zone	Designed Landscape
Deer Management	Continue to apply the “zero tolerance” approach in the regeneration zone. Focussed control to protect newly regenerated and planted areas. Discuss designing plantation work to facilitate deer management.	Maintain deer population around 1650.	Individual protection the most likely method employed
Archaeological sites and areas - before interventions	Assessments of un-surveyed areas in this zone will be completed before any direct work is undertaken.	Assessments of un-surveyed areas in this zone will be completed before any direct work is undertaken.	Historical and archaeological sites will be managed appropriately.

Intervention - removal of vegetation layer	Archaeological area constraints will be applied before any planting, including riparian.	Archaeological area constraints will be applied before any planting, particularly riparian.	
	Reviews of work plans and progress with other specialists at Mar Lodge will ensure efficient delivery.	Reviews of work plans and progress with other specialists at Mar Lodge will ensure efficient delivery.	
	Methods will be trialed. Preference for cutting and either removing or leaving material on site.	Not applicable	Not applicable
	Burning methods to be trialed. There will be archaeological, landscape and nature conservation reviews after these trials and before scarification or planting, to enable amendment as necessary.		
Intervention - Scarification	Experiment with various techniques to ensure least intrusive but still effective method used for each site conditions.	Not applicable	Not applicable
Planting (includes riparian planting)	Planting undertaken when need for potential seed source for future identified. Native origin seed source if possible or local provenance.	Native origin seed source if possible or local provenance.	Planting of “Exotics” and native trees with individual protection, as detailed in the Designed Landscape Plan.

Ground preparation	Experimentation for riparian planting following archaeological assessment and development of constraints maps. With mob planting, brash mats and protection from less palatable species. Small exclosures of “deer will not jump in” size.	Riparian planting as for regen zone but larger fenced enclosures likely in the Geldie burn as part of UDRP, following archaeological assessment and development of constraints maps.	
	Some ground preparation essential and depending on site conditions this will range from spade/ mattock screefing to spot cultivator. Mounding or ploughing not permitted.	As per Regen zone Mounding or ploughing not permitted.	All hand tool operation
	Fertiliser application required. Examine mycorrhizal inoculation of trees prior to planting	Fertiliser application required.	Not applicable
	Fencing of planting (including riparian) sites may be necessary in some situations. Off-set fencing would be the method of choice. Natural, cultural heritage and landscape issues will be taken into account before	Fencing required for enclosures up the Geldie burn (UDRP). Fence types will be explored but full deer fencing likely. New barrier fence at Linn of Dee as per IRP report. Fencing of experimental riparian planting seen as last resort but may be necessary	Stock and deer as required.

Fence removal	fencing lines are established.	if unable to succeed without fencing.	
		Cultural heritage and landscape issues will be taken into account before fencing lines are established.	
	Desire to reduce deer fencing over time. Older plantation fences will be removed.	Completed on all suitable plantations. Remainder to be removed when trees no longer vulnerable.	Not likely in period of plan
Thinning	Plantations to undergo restructuring with aim to make them more heterogeneous. This will be done by a mix of patch felling and crown thinning and non-thinning. Incorporating ring barking as an option when extraction not required. Edges of plantations to be adjusted by variable thinning where landscape design suggests this. Use of produce for biomass and other commercial purposes when this is practical.	As for regen zone	Dictated by needs of landscape design.
Archaeological site management	Regeneration across site zones and along routes between townships and shielings will be monitored on an annual basis and all trees will be pulled while still young to ensure feathered effects	Regular removal of regeneration as per Regen zone Review any indication of need for grazing in specific areas and action if necessary. Identification and management of aircraft	Monitoring to be undertaken

	rather than specific line boundaries	wreckage will be developed
	Desire to introduce grazing to these areas to be reviewed and actioned.	Monitoring to be undertaken
	Identification and management of aircraft wreckage will be developed	
	Monitoring to be undertaken	

E:2 Seed sources for planting

Trees planted within the scope of the Forest plan on Mar Lodge Estate will all be of a local seed provenance. The regions of provenance and native seed zones map produced by the Forestry Commission will be adhered to for broadleaved planting and similarly the Indigenous Scots Pine Seed zones for Scots pine planting. Collecting pine seed from the Mar Lodge trees and growing this on for planting back out was initially considered. However this idea was not pursued for a number of reasons: 1. there has been considerable historic planting across Mar Lodge Estate which has resulted in some of the existing native pinewood. The genetic origin of some of this planting we know is not from Mar Lodge, although local to Deeside but the origin of some of the planting is unknown, 2. the labour, time and financial costs of collecting seed and growing trees on are high, 3. genetic variability within the pinewood may be a positive thing in relation to adaptation to climate change and pathogens and 4. sourcing seed from Mar Lodge does not reduce the risk of introducing pathogens (particularly *Dothostroma*) unless a nursery was established on-site.

E:3 Risks

The two main risks to the woodland asset at Mar Lodge are fire and pathogens. There is a recognition that the fuel load, particularly within the regeneration zone has increased in recent years as a result of reduced grazing pressure. The main risks of wild fire on the estate come from campers and muirburn. While a ground fire could have benefits for natural regeneration it could also have catastrophic effects should the fire become a crown fire. A fire plan is to be produced for the estate as a standalone document and this is being considered a priority. The estate maintains high levels of vigilance and patrolling at times of high fire risk and fire fighting equipment is held primed and on site during warm weather periods.

The estate is aware of the risks to the woodland asset from pathogens and in particular Red band needle blight (*Dothostroma*). *Dothostroma* does have devastating effects on some species of pine and does infect Scots pine. However, the potential impact of this fungi on native pinewoods is as yet unknown. With the absence on a clear national policy regarding *Dothostroma* at present, NTS will refer to and follow current Forestry Commission guidelines. Staff on-site will be trained in recognising the symptoms of *Dothostroma* and be vigilant in looking out for it, as early detection is likely to be key in minimising its impacts. The estate will strive to maintain some species diversity within the woodlands on the estate and may choose not to plant Scots pine for the foreseeable future or exercise extreme care in the selection of any planting stock. Remaining lodgepole pine in the plantations will also be removed as this is particularly susceptible to *Dothostroma*.

E:4 Monitoring

A monitoring programme will be put in place to monitor the success of the intervention work in seedling establishment and survival. This will involve plot-based sampling to record seedling species density, seedling height and level of browsing damage. Monitoring will also be established to record the success of the riparian planting trials and the seed source planting in Glen Lui if this goes ahead un-fenced. Target density and species values will need to be identified prior to monitoring so that the results can be compared with an expected outcome and if necessary management input can be changed to meet the desired targets.

As noted above, monitoring of the cultural heritage will be regularly undertaken to ensure that the sites and their settings remain visible and well-managed. Small saplings may have to be

pulled from sites (presumably these could be re-planted elsewhere) and consideration may have to be given to temporary grazing across certain areas. Time and resources will be required for these actions.

F: Work timeline and Costings

Separate table for internal use.

G: List of Figure, Tables, References & Appendices

G:1 Figures

- Figure. 1. Map showing the regeneration and moorland zones
- Figure. 2. Mar Lodge Regeneration Plan: amalgamated constraints areas - no disturbance
- Figure. 3. Suitability map for expansion of NVC W18 from C. Edwards 2009
- Figure 4. Location of work circles and proximity to existing natural regeneration from C. Edwards 2012
- Figure. 5. Detailed view of planting areas in Glen Lui.

G:2 Tables

- Table. 1. Work plan for the regeneration zone
- Table. 2. Work plan for the moorland zone
- Table. 3. Work plan for the designed landscape
- Table . 4. Working practices.

G:3 Appendices

- Appendix 1. Regeneration Management Plan for Mar Lodge Estate woodlands. Jan 2012. C. Edwards.
- Appendix 2. Developing a Regeneration Management Plan for Mar Lodge Estate native woodlands: 2010-2030. Dec 2009. C. Edwards.
- Appendix 3. Mar Lodge Estate Braemar, Forest Plan, Riparian Woodland. Oct 2011. C. Robertson.
- Appendix 4. Designations Table.
- Appendix 5. Monitoring in the native pinewoods at Mar Lodge; baseline Stand Structure Survey. 2010. C. Edwards & O. Davies.
- Appendix 6. Long term forest plan - Mar Lodge 2012.
- Appendix 7 Mar Lodge Landscape and Visual Assessment. 2012. A Grant
- Appendix 8 Impact on features table.

G:4 References

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