6.1 Rationale

The table in section 6.2 is an analysis of the key features identified during scoping and drafting of the LMP brief set in the context of the objectives selected from national and regional strategies. The key features informing proposals can be viewed spatially on **Maps 2a Water** and **2b Access, Environment & Heritage**. The table identifies the most significant opportunities and challenges that are likely to be encountered during the implementation of the plan and proposes design solutions that form a broad spatial framework for the forest that in turn will guide design detail.

Loch Ailsh & Benmore Forest's western coupes viewed from helicopter to the south. [Photo: A. Baranska]

Restocking species are proposed on the best information available at this time. However species will be matched to site following site visits and detailed soil survey in each compartment, as land form is revealed beyond clearfell. Any deviation from the proposals in this plan will be notified to SF in compliance with the agreed tolerance table requirements.

FLS North Region believe this to be best silvicultural practice in the circumstances: reliant on critical analysis by foresters at the most opportune time to implement the best practical and sustainable forest and open ground habitats. Improved site-to-species selection will maintain productivity in future productive forest rotations as well as help identify the most suitable areas for prioritising open habitat restoration. The planning system adopted by North Region to ensure that the most appropriate tree species are selected for planting is as follows:

Coupe planning visit takes place when felling has reached 75% of area - to identify any felling boundary issues and discuss landform, local climatic conditions and soils - to determine appropriate species for the next rotation. This meeting is attended by staff from Planning & Environment, Operational Delivery and Stewardship teams and is called the '75% visit'. Outcomes are recorded in the coupe work plan.

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Three years prior to restocking the Programme Manager chairs a site objectives meeting with the Planning Manager, Planning Forester, Environment Manager and FM Forester and uses the work plan to create appropriate planting stock orders for the coupe. This order is entered into the Business Plan by the FM Forester.

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Once restocking has taken place, the Operations Forester passes the coupe restock details to the GIS Technician who updates the Sub Compartment Database. The GIS Technician then informs the Planning Forester of completion.

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The Planning Forester then undertakes a site visit to confirm that the restock operation complies with the Land Management Plan objectives and design and completes the Monitoring Record and Change Log (if required).

6.2 Analysis and Concept Table

Analysis and concepts can also be viewed spatially in **Map 3**.

Plan Objective	Opportunities	Challenges	Concept Development
Peatland Restoration			
• Identify afforested deep peat sites with greatest conservation potential. • Secure their long term viability by woodland removal, drain & furrow blocking. • Create protective native woodland buffer (e.g. riparian woodland) between open peatland and productive woodland.	• Increase the effectiveness of the NFE to capture and store carbon by increasing area of functioning mires. • Improve local hydrology and water quality and aquatic conditions in designated watercourses by reinstating mires with natural hydrological conditions.	• Heavily modified mires will require intensive and expensive treatments to restore them to fully functioning condition; • Risk of short term hydrological and water quality impacts during the restoration phase; • Perception that softwood productive areas will be lost.	• *Yield Class tables and soils analysis used to confirm initial field observation(s) that demonstrate clearly where mire restoration will be appropriate.* • *Replacement of conifer forest with native woodland and restored mires has little impact on forest productivity given the very low volumes of timber recovered from these sites whilst better management of second rotation timber crops on correct soils will help maintain productivity in the long term.*
Riparian Woodland & Water Quality			
• Establish riparian woodland along major watercourses and native woodland at forest block boundaries where it is likely to secure environmental benefit and/or improve the overall forest management. • Establish riparian woodland along River Oykel and its tributaries - increased rainfall interception, percolation and transpiration helping reduce and/or smooth groundwater run-off.	• Enhancing the ecological condition of all watercourses will benefit the globally important designated rivers and species. • Increasing area of native riparian woodlands will increase area of long term retentions - contributing to increased age structure diversity into the future.	• The establishment of broadleaf woodland in the face of herbivore grazing pressure may be problematic. • Areas of peatland in close proximity to watercourses will limit plant-able area. • Visual impacts of 'ribbon' planting may look unnatural in some landscapes and from some vantage points.	• *FLS Wildlife Ranger teams will maintain culling to limit the expansion of deer numbers and participate in local Deer Management Group in liaison with neighbours.* • *Peat depth surveys have revealed areas where new riparian woodland will be inappropriate and the advice of FLS Landscape Architect has been adopted – both measures have informed the design of new and restock riparian woodland.* • *Some limited areas of deep peat in complexes with mineral soils may be planted where this will not impede the function of neighbouring intact mires.*
• Protect the integrity of all watercourses during management operations and into long term by applying measures outlined in UKFS *Forest and Water* guidance and FLS Freshwater pearl mussel management guidelines.	• Removing riparian conifers and then slowing run-off by restoring a riparian woodland/open space mosaic – implemented through low impact ground preparation techniques.	• Coniferous plantation silviculture is one factor that can contribute to increased phosphorous levels and siltation, supplementing the effects of natural processes.	• *Follow best practice: adopt riparian woodland buffer zone widths of 30m from each bank (on average) for OS 1:25k mapped watercourses and avoid unnecessary fertiliser applications.* • *Promote silvicultural nurse mixtures.*

	• Adopt current silvicultural best practice using nursing mixtures where possible to reduce reliance on fertilisers and ensure fertiliser applications where necessary follows best practice. • Avoid new, intensive drainage regimes on organic soils. • Opportunity to significantly enhance riparian habitat to benefit salmon and trout populations.	• Inappropriate cultivation of organic soils could cause deterioration in hydrology leading to oxidation of peat and consequent carbon and methane release.	• *Plant riparian native woodland where natural regeneration is unlikely and dedicate this as 'minimal intervention' once established at sufficient scale and species composition.* • *Restore peatland habitat on sites where such restoration is likely to be successful, will ensure positive carbon balance and will benefit the hydrology of the area.*
• Continue developing catchment-scale habitat management and monitoring to benefit species and positively influence hydrology, in close consultation with partners such as Forest Research, Kyle of Sutherland Fisheries Trust and SEPA. • To support local the economy by protecting and improving water quality, in order to maintain a healthy salmon population within the River Oykel catchment.	• There is an opportunity through communication and working with partners to significantly improve/protect the resilience of the Oykel catchment by participating in catchment scale restoration that crosses ownership boundaries, delivering maximum public benefit regardless of land ownership. • Both short term monitoring and longer term research studies on this internationally renowned fishery and globally important conservation site will allow the correct management decisions to be made in the future.	• Lack of formalised multi-ownership group of stakeholders may mean communication is not regular or effective at achieving best management for the catchment. • Monitoring is both costly and labour intensive. and constraints on budgets may threaten this valuable activity.	• *Partnership working to achieve this objective is vital. FES have nominated a lead forester to manage water issues and will continue open dialogue and partnership working with all neighbours and stakeholders.* • *Forest Research and North Region are currently assessing monitoring priorities but the importance of this catchment from economic and ecological perspectives will mean that monitoring will be prioritised here.* • *North Region will continue to look at external funding opportunities with neighbours and partners to maintain and hopefully increase habitat restoration delivery.*
Deer Management			
• Work with Scotland's environmental and rural land agencies and neighbours to develop a sustainable, landscape-scale approach to deer management. • Promote the National Forest Estate as an exemplar of best practice.	• Landscape-scale management of herbivore grazing will allow protection and enhancement of valuable habitats. • Working together with stakeholders will realise higher public benefit from ecosystem services.	• Potential for different approaches to deer management may mean that delivering all stakeholders objectives may be problematic. • Challenges in establishing large scale native woodland without the option of internal fencing of individual coupes.	• *FLS Wildlife Ranger teams will maintain culling to limit the expansion of deer numbers and participate in local Deer Management Group in liaison with neighbours.* • *External fences will be maintained/upgraded to assist in reducing grazing pressure.*

Native Woodland including Natural Reserves			
• Continue to monitor all ancient woodland and semi-natural woodland areas. • Where appropriate restore or enhance productive woodland comprising largely of native trees.	• Improve the integrity of valuable native woodlands within LMP area. • Contribute to targets for creating areas of Natural Reserve native woodland.	• Reduction in gross area of productive conifer. • Establishing new broadleaf woodland in the face of herbivore grazing pressure may be problematic.	• *FLS Wildlife Ranger teams will maintain culling to limit the expansion of deer numbers and participate in local Deer Management Group in liaison with neighbours.* • *Expanding and enhancing the Glen Einig Core Forest Reserve will protect a nationally important conservation site.* • *Establishment of large areas of native woodland will enhance the areas 'wild land' character, wider landscape integrity and benefit biodiversity.*
Landscape Character & Visual Impact			
• Implement LMP felling and restocking proposals designed in liaison with the FCS landscape architect and in sympathy with the principles of surrounding 'Wild Land' areas, the NW Highland Geopark and the Geological Conservation Review Sites. • Create wind-firm coupes using riparian woodland, changes in landform, forest roads and areas of open ground as boundaries; allowing for development of wind resistant edge trees and improving crop resilience.	• Through well designed coupe shapes and use of a greater diversity of species, the landscape impact of the forest could be significantly improved. • The increased areas of native and riparian woodlands and open habitat will lead to a more organic transition from neighbouring land use to high forest.	• Deer pressure may limit the successful establishment of native and riparian woodland (more palatable species). • Extent of windblow and forest health issues may mean felling coupe shapes are re-designed to recover deteriorating timber rather than improve landscape in this rotation – i.e. coupe scale may be necessarily larger than would otherwise be desirable. • Crops on very sensitive soils may be left after harvesting if operations become uneconomic, resulting in unsightly blocks.	• *Effective deer control, by a variety of techniques, will be adopted to allow the establishment of sensitive species and native/riparian woodlands beyond browsing height and will then be reviewed at the end of the plan period.* • *A pragmatic approach to determine felling coupe shapes will be taken if windblow or disease dictates early felling and this would be managed using agreed tolerances.* • *Accurate stratification of crops before marketing will allow harvesting to achieve full clearance of sites.*
Resilient & Productive Forestry			
• Remove wind damaged and/or diseased crops, prioritising highly used tourist routes and areas of ecological importance.	• The opportunity to increase timber quality – with particular emphasis on conifers on more productive sites can increase productivity and income.	• Extensive areas of windblown and/or DNB-affected crops with quickly deteriorating timber. • Stability of crops that miss their thinning windows could be compromised and the marginal economics	• *Prioritise higher value windblown coupes while deciding on the timing of felling around diseased coupes.* • *Ensure thinning interventions are undertaken on time and that best silvicultural practice is a high business plan priority.*

• Create a felling plan that will allow for timely removal of diseased trees to maximise recovery of any marketable timber.	• Where current non-native species are compromising biodiversity aims (e.g. PAWS), remove the crops as early as possible.	of thinning could mean that budget constraints affect programmes. • Recovering all fibre from restock sites may present difficulties with follow-on ground preparation work.	• *Continue to work with timber processors to maximise recovery of fibre on all sites (in particular to clear mire restoration sites) and ensure subsequent restock operations do not damage more mobile soils.*
• Use best practice in silviculture to identify productive soils and suitable species and manage these areas accordingly, thinning where climate and soils allow.	• Identification of soils capable of supporting productive crops will allow improved silviculture in the next rotation. • Stratification of sites based on growing potential will allow biomass crops to be targeted to more marginal sites and higher silvicultural inputs to be concentrated on areas of higher potential.	• The less fertile organic soils and the exposed nature of some parts of West Sutherland LMP area will limit the choice of suitable species for the establishment of productive woodland.	• *Use site soil and climate conditions at coupe level to indicate future management prescription and species at a scale which is silviculturally appropriate.* • *Use the Ecological Site Classification Support System to assist in correct species choice/management prescriptions.* • *Continue to introduce site improving species such as birch as an element of productive conifer sites.*
• Diversify the age structure and species composition of our forests making use of silvicultural mixtures and disease resistant species to increase resilience to pathogens and climate change.	• The successful establishment of current restock sites will allow continued improvement of age structure diversity. • The development of native and riparian woodland on appropriate sites will add to age class diversity.	• The restructuring programme is a long term objective so successful alteration in overall forest age structure will inevitably take in excess of 50 to 100 years. • The windblow suffered in recent years has compromised the forest structure for the current rotation.	• *Accept the need to fell some areas prematurely in order to establish a more practical felling sequence (against prevailing wind) and more wind firm coupes in next rotation.* • *Use watercourses, roads, existing and designed open ground as natural coupe boundaries, allowing for development of wind resistant edge trees and as a consequence more resilient coupes.* • *Extend the rotation of coupes where climate and soils allow, increasing age class structure, while improving timber quality.* • *Ensure areas of natural reserve are correctly identified and retained to increase age diversity.*
Public Access/Recreation & Socio-economic Benefit			
• Maintain levels of public access to the forests within the LMP area by providing alternative access routes during forest operations and ensuring forest entrances are SOAC compliant.	• Opportunity for formal and low key recreational access. Good infrastructure and facilities for tourists and local users.	• Funding and resources are an inevitable constraint on further development of facilities. Lack of longer trails and marketing budget may therefore ultimately constrain user numbers.	• *Build on established links with local providers to encourage use of the sites.* • *Continue to improve existing facilities as resources allow.*

	• Improve visual diversity and landscape quality along new trails with an international profile. • Opportunity to enhance the landscape around existing RoW and Core Path network. • Opportunity to create a wider access network with minimal investment using existing forest roads.	• Forest operations can create conflict with other forest users particularly where sites are closed for Health and Safety reasons. • Many access points – formal and informal – exist across this extensive LMP area and some may not be fit for purpose. • Antisocial behaviour – motorbike use, litter, dog disturbance and unauthorised trail building could compromise conservation objectives and disturb other forest users.	• *Continue to improve path corridors by appropriate 'visitor zoning' operations and coupe restructuring.* • *Work with the Highland Council Access Officer, Police Scotland, Community Councils and local residents/landowners to explore potential access linkage, limit anti-social use and encourage access by all.*
Community & wider Socio-Economic Benefit			
• Contact local Community Councils and local interest groups within the LMP area in order to develop management approaches that reflect their aspirations and secure benefits for local residents and other potential forest users.	• The identification of stakeholders and partners with which to work can improve the management of this sensitive catchment and perhaps maximise the benefits of tourism for the community.	• Lack of engagement may see opportunities missed.	• *Consult with all Community Councils, known stakeholder groups and also publicly through web and local papers to make sure that the opportunity to contribute to the plan and ongoing management is widely known.*
• Continue to support the development of local timber and wood fuel businesses • Seek out new outlets for small roundwood to help reduce timber miles.	• Use existing customers to provide timber to local markets to improve utilisation and reduce 'timber miles'.	• Lack of demand for low value timber may influence markets. • Technically challenging harvesting sites may limit number of customers interested in the LMP area.	• *Continue to draw on the experience of local, regional and national staff experienced in niche marketing to maximise the value of produce available.*
• Continue to make the land within the National Forest Estate available to windfarm and hydro scheme development and work with developers to deliver projects of maximal environmental and economic benefit.	• Increased income and working to help Scottish Government achieve a sustainable green economy. • Locally generated power can benefit communities by creating funding opportunities.	• Inappropriate siting of renewables projects can have dramatically negative effects on landscape quality – an important feature of the LMP area and wider countryside. • Inappropriate hydro schemes can have a detrimental effect on migratory fish and dependent species.	• *There are no current plans for renewable energy developments in this area.* • *Any future developments would require full planning process to be applied.*