

Introduction and History

The Brechtia Forest Garden is a collection that includes 88 of the 190 forest tree species found growing in the British Isles. Established by local foresters in the late 1950s and early 1960s the original objective appears to have been the establishment of a collection of species from which measurements and observations could be made on the suitability for British forest use. Although data from the 1970's is sparse, an invaluable list of seed origins and planting treatments has survived. Records of the establishment progress also survive from 1965, 66, 83.

Future

The value of the plots in the Forest Garden is above all as a living demonstration of a wide range of tree species grown under forest conditions. The main aim is to retain each plot until biological rotation and collect such data as is thought useful to foresters in the future. A subsidiary objective is to create a varied age class structure by replacing the felled plots whilst also maintaining the plots in a condition that enhances their value to foresters and other interested bodies. In an era when there is an increasing interest in the wider values of trees and forestry combined with potential climate changes, the significance of the Forest Garden should not be underestimated.

Topic		FOREST GARDENS MANAGEMENT PLAN, LLANYMDYFRI FD.			
Environment	Sub Topic	Description	Management implications	Proposals	Monitoring
	Soil	There are four soil types present in the Gardens' - 1. Deep acid brown soils of pH in the range 4.5 to 5.0 overlying well broken shales. 2. Shallow acid brown soils of pH in the range 4.5 to 5.0 overlying well broken shales. 3. Gleyed or partially gleyed soils derived from glacial till on the more gentle slopes. 4. Surface water gleys close to the Afon Gorlech.	Range of soil types should enable suitable sites to be found for a range of species in future trials. Soils not a limiting factor for most species.		
	Climate	Mean annual rainfall of 1,700mm and accumulated day degrees (>5 8degC) of 1,375-1,650. The plots lie within the 'warm-moist' climatic zone defined by the Ecological Site Classification ² . There are however 'frost hollows' on part of the site.	Choice of species should reflect current but also projected future climate.	To work with FC Research and other interested parties in the choice of species for trials.	
	Hydrological Features	Few on site except the river Afon Gorlech at the base of the site.	Serves as a limit to plot expansion to the North East.		
	Geology	The site lies on glaciated Silurian rocks.			
Silvicultural Aspects	Site preparation and planting	Most sites will have substantial brush post harvesting. Gley and peaty gley sites may have microsite drainage problems. Some whole tree harvesting will leave less residues over some sites. Whole tree harvesting will be the preferred harvesting method.	On most sites cultivation will be required to provide weed free plantable positions and clear brush. Drainage from designed dollop or formal drainage systems may be required on some sites. Chipping of residues may be appropriate where denitrification is not a problem.	Any future clearing to be followed by site clearance suitable for the establishment of research plots, likely to be more intensive than large scale operations.	
	Natural regeneration	Large amounts of natural regeneration are limited to spruce, Western hemlock, lodgepole pine and to Stranvaesa, with smaller amounts of reggen present from abies sp. Species or provenance change is prevented by the use of natural regeneration.	Successful restocking will not rely on natural regeneration on these sites. Where species change is desired then action will need to be taken to limit natural regeneration. Natural regeneration present may affect the establishment and growth of the desired species. Natural regeneration within some plots where continuous cover using the species of interest may be acceptable, but might also produce plots with unacceptably high stocking density. This to be managed on a plot by plot basis.	Where natural re-generation will affect the preferred species it will be controlled by suitable means. Stranvaesa, lodgepole pine and western hemlock will all be removed.	
	Deer Protection	Deer may be present in low numbers in some areas, damage in the Forest Gardens is not evident at present.	Deer numbers do not require control at present.	Reaction dependent on survey results and any future occurrence of damage.	Annual deer surveys

	Protection from other mammals	Small mammals cause significant but localised damage. Grey squirrels are a localised source of damage to conifers but a wide scale damaging agent in BL trees esp. Sycamore and Beech. Sheep and livestock trespass can occur.	Small scale damage is inevitable but survey and prompt action can stop large scale damage from occurring. Neighbour relations need to be good to obtain co-operation in removing stock. Should large scale damage occur the value of long term trials could be compromised. The scale and complexity of the larger forest area mean that good design and silviculture may be more effective than control in limiting damage levels.	Refer to the District Wildlife Strategy. New plots established with broadleaves will employ tree shelters for maximum survival rates.	Refer to the District Wildlife Strategy
	Use of pesticides and herbicides	Chemicals are used to produce cost effective solutions to weed and pest control problems	Usage has to be controlled and justified and other solutions found to enable a long term reduction in chemical usage	Refer to the District Chemical Strategy. Only non-residual chemicals will be used to avoid long term effects on plot establishment	Refer to the District Chemical Strategy
	Use of fertilisers	Tree nutrition in the plots is good with few areas showing evidence of deficiency.	Fertilisation will not be required except in very limited and specific circumstances. Investigation of poor nutrition signs or poor growth with the FRA will be a necessary first step. Foliage analysis and soil/vegetation analysis will also be valuable techniques to discover the cause of problems.	Fertiliser will not be used as a matter of course in order to exarmin growth in 'typical' forest conditions. Use of fertiliser will only be considered after discussion with Forest Research.	Site visits and survey
	Harvesting	Modern harvesting systems rely exclusively on mechanised extraction, felling and delimbing. Generally the use of manual systems has been reduced markedly for health and safety and economic reasons. The use of horse extraction systems is rare and expensive. Site damage from inappropriate systems or poor operational procedures can be high with soil compaction and erosion as the most visible results.	High quality Site planning and assessment and the use of modern, well maintained machinery and trained operators are critical in achieving a good result. Site plans should indicate sensitive areas and any treatment of site features	Rigorous site planning and knowledge will be applied via the coupe management form (CMF). All sites will be covered by a CMF for clearfall. Full consultation with interested parties will take place in advance of work commencing. Well trained and managed operators will be used with evidence of H&S compliance, certification, insurance and a good track record. Opportunities should be used to encourage the use of purpose designed equipment for small scale harvesting situations. Consideration will be given to horse logging and whole tree harvesting.	CMF Site diaries contract files

	Thinning	<p>WHC is 3 or below . The area is capable of producing high quality, large diameter trees. Thinning has been patchy in the past due to changing research capabilities.</p>	<p>Opportunity for thinning is very high across the area. Plots which have been under thinned in the past will need a careful return to a thinning regime.</p>	<p>Rigorous site planning and knowledge will be applied via the coupe management form (CMF). All sites will be covered by a CMF for clearfall. Full consultation with interested parties will take place in advance of work commencing. Well trained and managed operators will be used with evidence of H&S compliance, certification, insurance and a good track record. Opportunities should be used to encourage the use of purpose designed equipment for small scale harvesting situations. Consideration will be given to horse logging and whole tree harvesting. Thinning will be the preferred management tool for density management, clearfelling reserved for plot clearance prior to restocking.</p>	Site visits and survey
	Age Class Structure	<p>Planting was initially concentrated in the late 1950's and early 60's has resulted in a poor age class structure. The structure has been widened slightly by seven plots established in 1985, 88, 86 and 2004, 5, 6.</p>	<p>The long term vision for the Forest Gardens is to ensure a range of alternative species are trialed to assist in decision making when seeking to increase the diversity of UK forests. Existing and proposed species for the Forest Gardens will be evaluated according to their ability to improve the social, environmental and economic aspects of the UK forest. Preference will be given to those species for which there is little information under UK conditions.</p>	<p>To replace plots only as existing plots fail or are deemed no longer to be of value.</p>	Site visits and survey
	Endemic Windthrow	<p>Small scale endemic windblow often concentrated on poorly drained areas or thinning gaps is a continuous problem and can be precipitated by adjacent felling</p>	<p>Small scale windblow affects the progress of plots and has implications for the success of plans in restructuring and retaining diversity. The presence of small areas of poor drainage within felled coupes will increase future risk of windthrow</p>	<p>Small scale windblow of individual trees will be cleared when other work is in progress. Larger blow areas will be cleared where it is economic or for research purposes. The presence of all nearby windfirm boundaries should be sought to reduce the scale of any changes to plot size and shape. Future plot establishment will avoid wet flushes and the exposed upper margin of the area.</p>	Site visits and survey

	Catastrophic windblow	Catastrophic windblow has occurred in Brechtia in 1976 and in 1980 which has resulted in windblow of large areas (500-Ha), often concentrated in areas of old crops often despite low WHC falling.	Little can be done to avoid the occurrence of catastrophic blow. Good thinning practise with regard to thinning ages use of graded edges and control of method may allow some crops to avoid major damage.	The use of good thinning practise (dependent on research and measurement requirements) and retention of the protective LP and JL upper margin.	Site visits and survey
	Deadwood	Standing or lying deadwood is a valuable habitat for mammal, bird, reptile and lower animals as well as many fungi and frequently plants.	The amounts of deadwood within the plots in both productive and adjacent lodgepole pine areas is ample.	Some revenue could be generated by the removal of some of the felled timber whilst still providing ample dead wood in line with the Dead Wood Strategy.	coupe plans site diaries LBHAP assessments
International significance		Picks are of considerable interest to foresters from all temperate Western European countries.	The advice and assistance of the appropriate bodies will be sought to enable the FD to avoid damage and to enhance the nature and value of these sites	Use with relevant bodies	
National Significance		Identified as of considerable national/cultural importance by Forest Research.	Need to include the management of these sites within the FDP process and nearby coupe plans with advice from interested parties where necessary.	FDP review	
Local Significance Strawfield davidiana (Penticks?)		Strawfield davidiana is present at many locations within the Upper Corfeish Valley. Through a colourful flowering shrub species with little or no conservation or other benefit. In moderate to high light situations from thinning or clearfall it will establish itself as dense stands.	This weed species will increasingly make the establishment of clearfall and ATC areas difficult and expensive. It could be a major problem in conservation and broadleaf areas where it precludes the development of ground flora and shrub vegetation.	Strawfield will be killed wherever possible in conjunction with other operations. Opportunities should be sought in surveys of any type to flag its presence and trigger action to eliminate its presence. This process should also include the wider area surrounding the Forest Garden. A control programme to be drawn up for WSO to be implemented by 2008.	Coupe surveys FVMA surveys conservation checks and surveys LBHAP surveys and assessments
Consultation and Stakeholder involvement		Consultation on current and future management, including monitoring, undertaken with organisations and individuals with relevant skills and expertise.	Given the national and possible international significance of the trial plots, consultation on management plans will be essential.	The FD will consult with organisations and individuals with relevant skills and expertise. Creating a medium to long term partnership with interested partners may well help to secure the long term future of the Forest Gardens.	

References
1. Corcoran, S. (1988) Brechtia Forest Garden Description and Five year Work Programme.
2. Pyatt, D. G. (1985) An Ecological Site Classification for Forestry in Great Britain. FC Research Information Note 260