

Dark Mile Caledonian pinewood plan



1.0 Location:

(See Location map)

The Dark Mile Caledonian pinewood area lies within Loch Arkaig Forest close to Clunes hamlet, 8.5km north west of Spean Bridge in Lochaber. It is centred at grid ref: NN 1811 8922.

2.0 Background:

Caledonian pinewoods are areas where remnants of the ancient native Scots pine forests still survive in Highland Scotland. It was once a vast forest which stretched across the Scottish Highlands. It has been depleted over millennia due to climate change, clearance for farming, fuel, construction and plantation forestry.

The Dark Mile Caledonian pinewood is one of 22 separate pinewoods on Scotland's national forests. All of the pinewoods within Forestry and Land Scotland (FLS), ownership were assessed in 2021 by James Rainey from "Trees for Life" as part of the Caledonian Pinewoods Recovery project. The purpose of this project is to further our understanding of Caledonian pinewoods, improve relationships between stakeholders and to promote active site management. The assessment considered four characteristics of health and resilience:

- Diversity " the capacity of a Caledonian Pinewood to support the full richness and abundance of wildlife associated with the habitat type".
- Continuity "the ability of the Caledonian Pinewood to perpetuate its diversity into the future"
- Mobility " the ability of the Caledonian Pinewood to regenerate out with its current boundary where soil and climatic conditions are suitable".
- Connectivity " the size and configuration of Caledonian Pinewood and associated habitats in a landscape".

The Dark Mile Caledonian pinewood is small, however, it lies within a larger area which contains distinct pinewood remnants, some of which are SSSI designations. There is pinewood restoration at a landscape scale in the Arkaig catchment being carried out by some of our neighbours, thus adding resilience to the restoration efforts at the Dark Mile. FLS also manage Glengarry Forest to the north where there is up to 1,000ha of pinewood restoration next to Loch Garry in the years ahead.

The Dark Mile remnant is pivotal in linking the pinewood habitats of Glen Loy and Arkaig with those of Glengarry via the native woodland creation areas along upper Cia-Aig and Fhudair Lochan which connect to the Ladaidh system. The Clunes & Loch Arkaig Land Management Plan (LMP) aims to further strengthen this ecological connectivity through PAWS restoration and new native woodland creation. This should help to create conditions whereby the pinewoods can adapt to changes in climate by being able to move naturally to ideal locations. See the attached

Context map. The pinewoods of the west Highlands are often dominated by native broadleaf species with Scots pine as a component.

The Caledonian pinewood inventory defines areas which meet the appropriate criteria for density, population size and ecology. They contain three distinct zones (see Appendix I Caledonian pinewood inventory and the Caledonian Pinewood Zones map):

- Caledonian Pinewood (core pinewood zones) a concentration of Scots pine remnants.
- Regeneration zones normally within a 100m buffer of the core areas.
- Buffer zones normally up to 500m around the regeneration zones.

2.1 Core pinewood zones

2.1.1 Core Pinewood 1

(See core pinewood zones map)

Grid Ref	Area (ha)	Terrain	Current state	Threats	Comments
NN 1772 8892	(ha) 1.29	Highly visible from the south east side of Loch Arkaig. Steep with a south east aspect. Slope averages 75% (37°).	Robust group of granny pines. Regenerating pines and other native species and associated woodland flora.	INNS: Rhododendron Gaultheria NNR: Mature trees & regeneration. Species include: Sitka spruce, Western hemlock, Beech, Larch.	Boundary of core area and the FLS sub- cpt details need to be reviewed.
				Deer.	



2.1.2 Core Pinewood 2

Grid Ref	Area	Terrain	Current state	Threats	Comments
	(ha)				
NN 1791 8890	0.35	Steep with a south	Scots pine &	Non-native	Boundary of
		east aspect.	spruce with	regeneration	core area and
		Slope averages 88%	pine, birch	& INNS. Deer	the FLS sub-
		(41°).	and oak	impacting	cpt details
			regeneration	native	need to be
				regeneration.	reviewed.



2.1.3 Core Pinewood 3

Grid Ref	Area	Terrain	Current state	Threats	Comments
	(ha)				
NN	0.15	Podzolic heathery	Very small	INNS:	Boundary of
		hillock. Strong	core area.	Rhododendron	core area and
		slope with a north	Regenerating	Gaultheria &	the FLS sub-
		westerly aspect.	native	buddleia	cpt details
		Slope averages	broadleaf		need to be
		30% (16°).	species with	NNR:	reviewed.
			associated	Adjacent	
			ground flora.	maturing SS	
				trees &	
				regeneration.	
				Deer.	



2.1.4 Core Pinewood 4

Grid Ref	Area (ha)	Terrain	Current state	Threats	Comments
NN 1807 8920	0.32	Podzolic heathery hillock. Extreme slope with a north westerly aspect. Slope averages 50% (27°).	Young pines and native broadleaf species regenerating on NE facing slope and associated ground flora	INNS: Rhododendron Gaultheria & buddleia NNR: Adjacent maturing SS trees & regeneration. Deer	Boundary of core area and the FLS sub- cpt details need to be reviewed.



2.1.5 Core Pinewood 5

Grid Ref	Area	Terrain	Current state	Threats	Comments
	(ha)				
NN 1828 8923	0.74	Outcroppy.	Group of	INNS:	Boundary of
		Extreme slope	mature pines	Rhododendron	core area and
		averages 57% (30°).	with some	Gaultheria &	the FLS sub-
		Heathery and	mature sitka	buddleia	cpt details
		podzolic hillock.	spruce.		need to be
				NNR:	reviewed.
				Mature SS	
				trees &	
				regeneration.	
				Deer	



2.1.6 Core Pinewood 6

Grid Ref	Area	Terrain	Current state	Threats	Comments
	(ha)				
NN 1843 8928	1.34	Very outcroppy	Dominated	INNS:	Boundary of
		with a south south	by Norway	Rhododendron	core area and
		westerly aspect.	spruce. Sitka	Gaultheria &	the FLS sub-
		Steep slope	spruce also	buddleia	cpt details
		averages 70% (35°).	noted. Some		need to be
			pines seen in	NNR:	reviewed.
			central and	Mature SS	
			upper	trees &	Retain the
			sections of	regeneration	Norway
			the outcrop	within and	spruce
				adjacent to	element for
				the core area.	the next ten
					years as it
				Deer	supports
					suitable
					conditions
					for
					bryophytes.



2.1.7 Core Pinewood 7

Grid Ref	Area	Terrain	Current state	Threats	Comments
	(ha)				
NN 1885 8928	0.9	Very steep and	Mature and	INNS:	Boundary of
		outcroppy with	regenerating	Rhododendron	core area and
		southerly and	pines and	Gaultheria &	the FLS sub-
		south easterly	native	buddleia	cpt details
		aspects. Slopes are	birchwood		need to be
		averaging 116%	species with	NNR:	reviewed.
		(49°). Heathery	regenerating	Mature SS	
		podzolic soils.	willow, larch	trees &	
			and sitka	regeneration	
			spruce	within and	
				adjacent to	
				the core area.	
				Deer	



2.1.8 Core Pinewood 8

Grid Ref	Area	Terrain	Current state	Threats	Comments
	(ha)				
NN 1878 8918	0.2	Extreme slope and	Some scots	INNS:	Boundary of
		outcroppy with a.	pine and	Rhododendron	core area and
		The slope averages	native	Gaultheria.	the FLS sub-
		56% (29°).	broadleaf		cpt details
		Heathery podzolic	species with	NNR:	need to be
		soils. south easterly	a scattering	Mature SS	reviewed.
		aspect	of sitka	trees &	
			spruce	regeneration	
				within the	
				core area.	
				Deer	



2.1.9 Core Pinewood 9

Grid Ref	Area	Terrain	Current state	Threats	Comments
	(ha)				
NN 1870 8910	0.42	Very steep slope	Scots pine	INNS:	Boundary of
		and outcroppy with	and native	Rhododendron	core area and
		a south westerly	broadleaf	Gaultheria.	the FLS sub-
		aspect. The slope	species (oak,		cpt details
		averages 138%	elm, rowan,	NNR:	need to be
		(54°). Heathery	hazel, holly	Mature SS	reviewed.
		podzolic soils.	hawthorn &	trees &	
			ash), juniper	regeneration	
			with sitka	within and	
			spruce and	adjacent to	
			larch.	the core area.	
				Deer	



2.2 Pinewood regeneration zone

(See Regeneration zone map)

Area	Grid Ref	Current land use	Threat to pinewood restoration
1	NN 1763 8889	Allt Cia-Aig ASNW	Non-native trees, NNR & rhododendron
2	NN 1784 8916	P'2017 NMB	NNR & rhododendron
3	NN 1801 8934	SP 'P'1935	Infrastructure development, NNR & INNS
4	NN 1814 8933	Felled 2020 - bare	NNR & buddleia, rhododendron. Non-native trees left along edge of area too small for mechanised harvesting now becoming quite big.
5	NN 1819 8961	SP P'1936	NNR & INNS
6	NN 1827 8939& NN 1885 8939	Upland heathland habitat	NNR & rhododendron
7	NN 1854 8936	Felled 2012 – establishing SS	NNR & rhododendron
8	NN 1861 8927 & NN 1876 8936	SS P'1935	Major source of non-native seeding. NNR & rhododendron
9	NN 1902 8936	SP P'1934 inside upcoming harvesting coupe	No threat. Retain as much of this crop as possible.
10	NN 1865 8915	Felled 2012. Establishing as NMB.	NNR - beech & rhododendron. Lack of native regeneration on upper section around NN 1873 8926.
11	NN 1868 8901	Oak P'1850, NMB P'1996 & OG	NNR & rhododendron
12	NN 1843 8915	NMB P'1996, Oak P'1850 & OG	NNR & rhododendron.
13	NN 1843 8909	SS/DF P'1996 & OG	Future non-native seeding threat. INNS.
14	NN 1832 8909	SS P'1998.	Future non-native seeding threat. INNS.
15	NN 1803 8926 & NN 1812 8903	SS & NS P'1998 Area is larger than indicated.	Impending non-native seeding threat, rhododendron, buddleia & gaultheria.

Area	Grid Ref	Current land use	Threat to pinewood restoration
16	NN 1793 8903	SP & Birch	NNR & rhododendron. Mature non-native
		P'1850, P'1995 &	conifer & Beech trees.
		OG	
17	NN 1794 8880	NS P'1935. Area is	NNR & rhododendron.
		larger than	
		indicated.	
18	NN 1802 8918	SP & Birch & OG	NNR & rhododendron.
		(mostly in core	
		area)	
19	NN 1778 8917	Hydro water	NNR & rhododendron.
		pipeline wayleave	
		with pumphouse	
		at NN 1759 8898.	

3.0 Caledonian Pinewood Recovery (CPR) project findings summary

3.1 Diversity and Continuity

The impact on diversity and continuity of the Dark Mile pinewood assuming status quo management:

"over the next 100 – 200 years the Dark Mile Pinewoods would, in terms of diversity and continuity, and general characteristics, will have lost many of its native tree species and have been overtaken by non-native tree species.

Management action to improve diversity and continuity:

"creating conditions where native trees, ground vegetation and undergrowth can regenerate freely and removing non-native species."

3.2 Connectivity and Mobility

The impact on connectivity and mobility of the Dark Mile pinewood assuming status quo management:

"In the long term, with respect to connectivity and mobility, the Dark Mile pinewoods will be restricted in their ability to withstand threats such as climate change and fragmentation."

Management action to improve connectivity and mobility:

"Creating new pinewood in some adjacent areas to allow the Dark Mile to connect with other area of pinewood in the landscape.



3.3 General Management Actions

Helpful	General Management	Positive Result	Specific Action
Change	Suggestion		
Enhance	Reduce the impact of	Allow young native trees, particularly	Intervene to enable minor species to thrive through
diversity	deer.	sensitive ones, to establish and grow to	selective respacing to create suitable conditions for
		maturity.	Scots pine, oak, aspen, hazel, rowan, ash, wych elm and
	Remove non-native	Allow ground vegetation species, in	juniper.
	regeneration.	particular palatable ones, to flourish.	
		Enhance resilience to fire, climate change	
	Remove INNS (invasive	and disease.	
Enhance	non-native species)	Allow young native trees to establish and	Manage minor/diverse species to flourish. Manage deer
continuity	such as rhododendron,	grow to maturity.	to sustainable levels.
	buddleia and	Protect existing mature and old native	Halo thin around old and veteran trees to protect
	gaultheria.	trees.	crowns and associated ecosystem.
Enhance		Scots pine and native broadleaf trees are	Establish new native woodland on the bare ancient
mobility		able to regenerate outside the woodland	woodland inventory area in north Caig to link the CPI
		boundary in the upper part of the site,	area with the ASNW and young native woodlands of
		countering the effects of fragmentation	Clunes and Glengarry Forests to the north. This will
		and enhancing resilience to climate	eventually link with the Ladaidh section of the Glengarry
		change.	pinewoods.

Helpful	General Management	Positive Result	Specific Action
Change	Suggestion		
Enhance		Connectivity within the Dark Mile is	Remove the mature Sitka from the core pinewood areas.
connectivity		enhanced, protecting diversity and	
		enhancing resilience.	
	Restore surrounding	Scots pine and native broadleaf trees are	Continue with the PAWS restoration, control INNS &
	PAWS sites to native	able to regenerate in the wider landscape.	retain the SP components throughout the LMP.
	woodland.	Connectivity is enhanced with other CPI	Opportunity to work together with the Woodland Trust,
	Remove rhododendron	sites and native pinewoods, protecting	Arkaig Community Forest and Achnacarry Estate for
	from Ancient	diversity and enhancing resilience.	landscape scale pinewood restoration and native
	Woodland between		woodland creation in the Arkaig catchment. Common
	Dark Mile and Glen		goals regarding deer, INNS and non-native management.
	Mallie.		
Reduce risk	Develop a fire plan for	Reduce fire risk to health and resilience.	Remove BBQ plates from picnic tables. Erect "no
of fire	the Dark Mile		campfire" signs at all car parks, forest entrances and the
			Trailblazer site.
Reduce risk	Develop a plant health	Reduce disease risk to health and	Remove the Lodgepole and Corsican pine components
of disease	plan for the Dark Mile	resilience.	from the LMP area to remove the biggest threat from
			Dothistroma.
			Manage Ash to minimise danger to infrastructure, but
			maximise retention to save Chalara resistant trees and
			protected lichens and other species.
Monitoring %	Promoto inspections	Timely interventions to maximise	Prach/prupo inspection racks through establishing crops
management	and interventions	acological outcome and minimize cost	and carry out selective respecting adjacent to the racks
Indiagement			and carry out selective respacing adjacent to the facks.



4.0 Management Objectives

5.0 Programme of Work 5.1 Core pinewood zone

(See Core Pinewood zones map)

Pinewood Core area	Remove mature SS	Halo thin AW remnants	Remove NNR	Remove INNS
1	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes
4	No	No	Yes	Yes
5	Yes	Yes	Yes	Yes
6	Retain NS in this plan for bryophyte habitat.	Yes	Yes	Yes
7	Yes	Yes	Yes	Yes
8	Yes	No	Yes	Yes
9	Yes	Yes	Yes	Yes

5.2 Pinewood regeneration zone

(See Regeneration zone map)

Area	Fell	Remove NNR	Remove INNS	Supplementary plant	Inspection racks
1	Non-native trees. Retain specimen trees.	Yes	Yes	N/A	N/A
2	N/A	Yes	Yes	Yes	N/A

Area	Fell	Remove	Remove	Supplementary	Inspection
		NNR	INNS	plant	racks
2	No	Voc	Voc	No	No
5		res	res	NO	NO
4	Non-native trees	Yes	Yes	Yes, in places	N/A
5	No	Yes	Yes	N/A	No
6	Trees over 10cm dbh	Yes	Yes	N/A	N/A
7	Trees over 10cm dbh	Yes	Yes	Yes	No
8	Fell all non-native trees. May	Yes	Yes	No	N/A
	require sectional felling & ring				
	barking too.				
9	Retain as much SP as possible	Yes	Yes	N/A	No
	within harvesting coupe.				
10	Non-native trees over 10cm	Yes	Yes	Yes	Yes
	dbh				
11	1 Non-native trees over 10cm		Yes	No	No
	dbh				
12	Non-native trees over 10cm	Yes	Yes	No	No
	dbh				
13	Programme Phase 3 to	Yes	Yes	N/A	Yes?
	minimise seeding threat. This				
	area extends farther north				
	than the sub-cpt suggests.				
	Halo thin around Aw				
14	Programme Phase 2 to	Voc	Voc	N/A	Vac2
14	programme pridse 3 to	res	res	N/A	resr
	area is much smaller the sub-				
	cnts suggest.				
15	Fell all non-native in Phase 1.	Yes	Yes	No	N/A
	The area is larger than			-	,
	indicated on map.				
16	Non-native trees over 10cm	Yes	Yes	No	Yes
	dbh. Core areas 1 and 2 are				
	larger than indicated on map.				
17	Non-native trees except NS.	Yes	Yes	No	No
	Halo thin around AW				
	remnants. The NS area is				
	larger than indicated on map				

Fell	Remove NNR	Remove INNS	Supplementary plant	Inspection racks
Non-native trees over 10cm	Yes	Yes	No	No
dbh				
N/A	Yes	Yes	No	N/A
	Fell Non-native trees over 10cm dbh N/A	FellRemove NNRNon-native trees over 10cm dbhYesN/AYes	FellRemove NNRRemove INNSNon-native trees over 10cm dbhYesYesN/AYesYes	FellRemove NNRRemove INNSSupplementary plantNon-native trees over 10cm dbhYesYesNoN/AYesYesNo

Appendix 1 Caledonian Pinewood Inventory

Definition obtained from: Caledonian Pinewood Inventory (spatialdata.gov.scot)

Caledonian Pinewood Inventory

Description:

Scots pine (Pinus sylvestris L.) has the largest natural distribution of any conifer in the world, ranging from northern Norway to Spain, and from Scotland across Europe and Asia to Siberia and north-east China. It can grow on a range of soil types, surviving where the rainfall is as low as 200mm, and/or where the temperature drops to -64 degrees C.

In Scotland, pines were an important component of post-glacial natural forests (the so-called Wood of Caledon) which covered an estimated 70% of the country. They were largely confined to the poorest soils, often occurring in association with birch, but they also grew in mixture with other species in natural transitions to oak, ash and elm dominated woodland on the better soils, and to willows and alder on wet areas. Over many centuries vast areas of these ancient forests were cleared, and pinewood regeneration was prevented, either by allowing the land to be grazed or by replanting it with other tree species, usually of non-native origin. Other adverse effects were the browsing of deer and 'muirburning' to improve the grazing or the age structure of heather on adjacent grouse moors.

Pinewoods vary enormously in size, structure and natural species diversity. In Deeside, Strathspey and the Beauly catchment the pine-dominated woodlands are relatively extensive, but in Glen Falloch and Glen Loyne there are only a few old trees scattered over a large area. Other pinewoods occur on steep cliff faces, or in gorge woodlands, such as at Glen Avon, Allt Chaorunn and Attadale, where there may be several age classes present. The wet western pinewoods are more fragmented and isolated than most, and are generally regarded as being in the poorest condition, occasionally merging with oak, alder and other woodland types, indicating that there is scope for re-creating large new mixed native forests in those areas.

There are also biochemical differences between pinewoods; these are indicative of genetic variation. Of the seven Regions of biochemical similarity identified, the North West Biochemical Region, near Kinlochewe, is the most distinct, exhibiting considerable differences between individual pinewoods. It is known from the analysis of pollen records taken from peat bogs that pine has been present in North West Scotland for at least 8500 years, but when combined with the genetic information one may begin to speculate that the pines we see now are the direct descendants of trees which survived the last ice age either in Ireland, or possibly on areas of the continental shelf exposed by the lowered sea levels at that time.

The pinewoods of the South West Biochemical Region, around Fort William, are another distinct group. They show less variation between the fragments, although it is believed that they had a similar history to those in the North West Biochemical Region. The biochemical characteristics of the other pinewoods in Scotland are not so dissimilar, and these pinewoods seem to have more in common with Central Europe pinewoods.

In 1959 Steven and Carlisle published their book 'The Native Pinewoods of Scotland', in which they listed and described most of what they regarded as surviving (ex-Caledonian Forest) pinewoods. This stimulated an interest in pinewood conservation, and in due course the introduction of a number of incentives to support pinewood management and expansion. More recently the native pinewoods of Scotland have been listed as an endangered habitat in the EC

Habitats Directive. They are also the subject of a costed Habitat Action Plan (prepared under the UK Biodiversity Plan) which gives quantitative targets for the protection, restoration and expansion of the pinewoods by both natural regeneration and replanting. These targets are based on an earlier version of this Inventory.

To prepare the Caledonian Pinewood Inventory, the current extent of the native pinewoods named by Steven and Carlisle, have been investigated. Some of the pinewood fragments which they thought were too small to form discreet pinewood habitats, have also been considered. The total pinewood area now included in the Inventory is nearly 18000 hectares, and comprises 84 separate pinewoods of various sizes. In all cases the balance of probability suggests that they are genuinely native, that is, descended from one generation to another by natural seeding.

In addition, each pinewood has:

• a minimum density of 4 pine trees per hectare, excluding trees less than 2 metres in height, or at least 50 pine trees per hectare where sites have been extensively underplanted but are deemed capable of restoration to a more natural state;

• a minimum of 30 individual trees, unless the wood has historical, aesthetic or biological significance;

• vegetation which is characteristic of native pinewood, although possibly of a depleted diversity;

• a semi-natural soil profile, but accepting also sites with superficial cultivation such as shallow ploughing or scarification with some widely spaced drains.

Inventory Rules:

PINEWOOD FRAGMENT

Recorded separately if more than 1.5km from another fragment.

REGENERATION ZONE

Standard 100m but more if conditions indicate spread is likely to be greater (e.g. Glen Tanar). Where regeneration is likely to be less, such as a fragment of pine in an oakwood, then a smaller regeneration zone may be indicated (e.g. Loch Maree Islands). Area does not normally include open water unless the whole of the open water is within the pinewood and regeneration zone.

BUFFER ZONE

Standard 500m beyond regeneration zone but can be extended further:- 500m beyond watershed or 700m above sea level (e.g. Gleann Fuar) link fragments together (e.g. Barisdale)

Buffer zones will not include extensive areas of open water (e.g. South Loch Arkaig) unless the whole of the open water is within the buffer zone. Where the buffer zone includes some ground on the other shore of a loch then the water will be part of the buffer zone (e.g. Loch Hourn).

PLANTED AREAS

If of correct local origin then accept as pinewood if less than a third of total area of pinewood. The planted areas would be hatched on the maps and recorded as part of the regeneration zone not as part of the pinewood. Planted areas of correct origin, which are alongside pinewood, can have the regeneration zone round them (e.g. Doire Darach). Where a planted area has just been planted or is to be planted and is more than a third of the area of the pinewood, then it may be considered as part of the buffer zone and the buffer zone may be extended to 500m beyond the planted area (e.g. Breda).

Planted areas of local origin which are more than 500m from the pinewood will be ignored.

ATTRIBUTES

=========
FEATCODE: Feature Code
FEATDESC: Feature Description
PINEID: Pinewood ID
PINENAME: Pinewood Name
NGR: National Grid Reference
COREAREA: Area of the core woodland (Ha)
REGENAREA: Area of the regeneration zone (Ha)
BUFFERAREA: Area of the buffer zone (Ha)
TOTALAREA: Total area (Ha)
BIOCHEM: Biochemical region



Location Map:



Context Map



Dark Mile Caledonian pinewood zones map



Coilltearachd agus Fearann Alba



Dark Mile Regeneration zone map

Forestry and

Coilltearachd agus Fearann Alba

