Beinn Ghlas Outline Biodiversity Enhancement and Habitat Management Plan Walkover Survey Report - November 2023

Dr Kate Massey, MCIEEM and Dr Peter Cosgrove, FCIEEM

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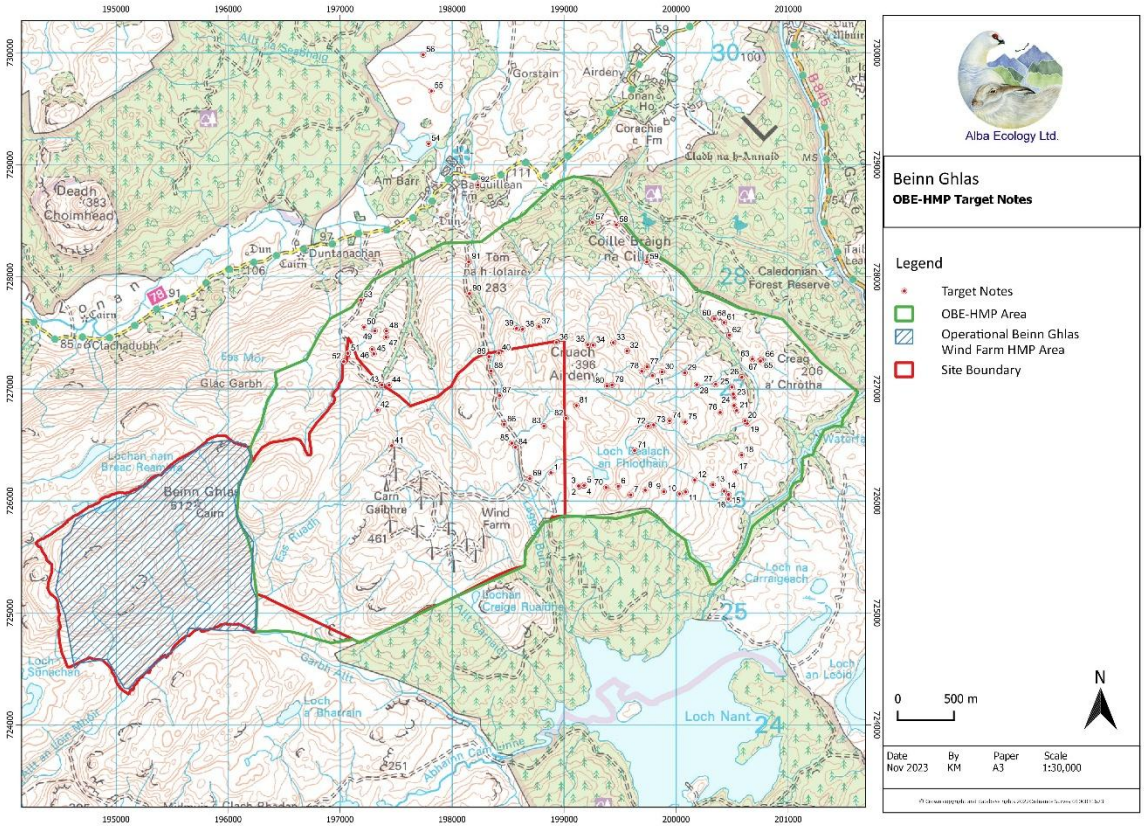
Registered Office: Coilintra House, High Street, Grantown on Spey, Moray PH26 3EN Tel: 01479 870238,
enquires@albaecology.co.uk

Introduction

The wider OBE-HMP Area and parts of the Application Boundary were walked in November 2023 to assess for potential biodiversity enhancement and peatland restoration opportunities. The main area that was walked was between the Application Boundary (red line in Figure 1) and the OBE-HMP boundary line (green line in Figure 1).

Opportunities for biodiversity enhancement and peatland restoration were searched for. Target notes were made, and illustrative photographs taken (Figure 1, Appendix 1: Target Notes).

Figure 1: OBE-HMP Area



Peatland Condition Assessment (PCA)

Active peatland restoration includes drainage ditch blocking and restoration of erosion features through actions such as hagg reprofiling. Peatland restoration opportunities in the form of drainage ditches or erosion features were searched for in November 2023. When peatland restoration opportunities were noted, these features were mapped and a Peatland Condition Assessment was undertaken (PCA) for the surrounding habitat. The habitat was broadly considered in regard to Phase 1 Habitats and National Vegetation Classification (NVC) communities (although a full survey was not undertaken). Any Near-Natural blanket bog encountered was also recorded for reference.

Consideration of the condition of the peatland habitat was based on the Peatland Action Guidance for PCA (Peatland Action, 2016).

PCA assesses the condition of blanket bog on indicators such as bog-moss cover, extent of bare peat and evidence of grazing and burning (Peatland Action, 2016). The PCA recognises four broad categories of peatland condition:

1. Near-Natural - peat forming bog-mosses dominant, with no recent fires, little or no grazing pressure and little or no bare peat, heather is not dominant.
2. Modified – Bare peat is in small patches, fires may be recent, grazing impacts are evident, bog-mosses are absent or rate, extensive cover of heather or purple moor-grass.
3. Drained – within 30m either side of an artificial drain or a revegetated hagg or gully system.
4. Actively Eroding – actively eroding hagg/gully system, extensive continuous bare peat surfaces.

At least one category from the PCA was assigned to each mapped peatland area. The category names are capitalised within the text. Drainage ditches were noted in the field, and the extent of them, and the surrounding bog were mapped as a desk-based exercise using aerial imagery (Google Satellite and Bing Aerial).

The mapped area of each type of peatland, from the walkover conducted in 2023 is shown in Table 1 and Figure 2.

Peatland Condition	**Area (ha)**
Actively Eroding	0.3
Modified (and Drained)	19.9
Near-Natural	0.8
Total	*21.0*

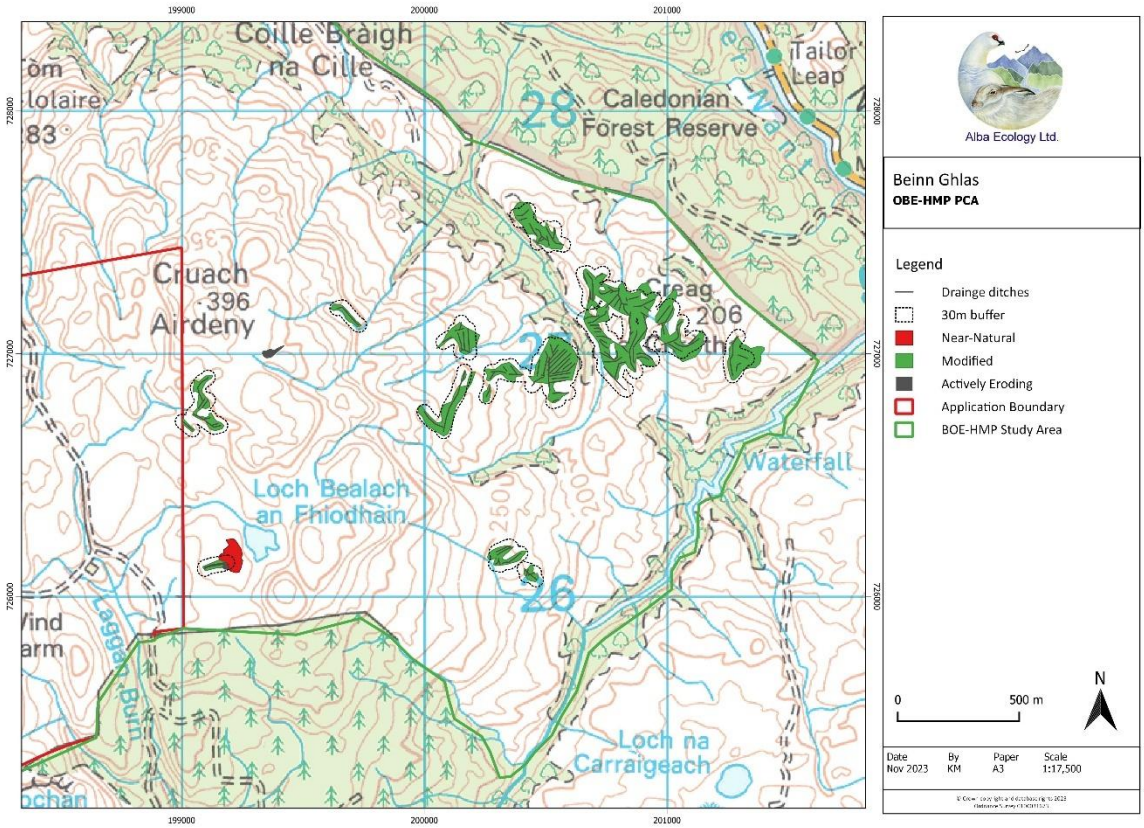
Table 1: The total area each PCA found in the wider OBE-HMP Area.

These metrics are in addition to the areas of peatland mapped and reported in TA 6.3 Beinn Ghlas Wind Farm PCA survey report. Note that by no means were all of the blanket bog, wet modified bog or other habitats mapped in the wider OBE-HMP Study Area, only where peatland restoration opportunities were identified or where there was Near-Natural blanket bog. The areas not mapped in Figure 2 are either not bog, or bog habitat without clear restoration opportunities (e.g. no clear drain lines, or erosion features).

A total of 7,221m of drainage ditches were mapped in the wider OBE-HMP Study Area in November 2023 (e.g. Target Note 13 and 44). A 30m buffer was placed around the drains, resulting in the majority of the mapped blanket bog being considered to be in a Modified and Drained condition (Figure 2). These Modified and Drained bog habitats, were in some areas, degraded to purple moor-grass dominated stands (NVC community M25a over deep peat), whereas other areas there was a generally species poor blanket bog vegetation characterised by heather, cottongrasses and some bog-mosses (NVC community M17). The vast majority of drains were well vegetated, often lined with rushes.

There was a very small amount of Actively Eroding blanket bog, with erosion features c. 50-100m long and c. 1m deep (e.g. Target Note 79 and 80).

Figure 2: Drainage Ditches and PCA mapped in the wider OBE-HMP Study Area in November 2023



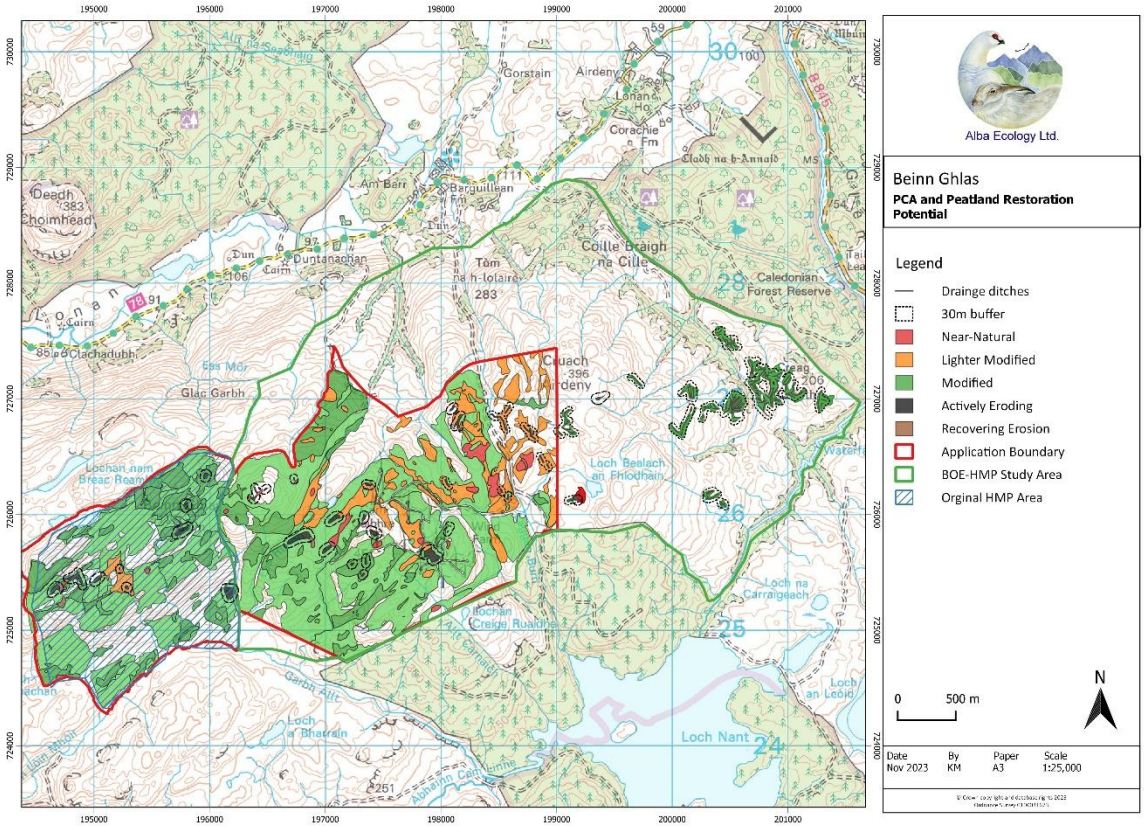
Potential for Peatland Restoration

Active peatland restoration potential was identified through mapping of drainage ditches and areas with erosion features which had the potential for peatland restoration.

There was a total of c. 720m of drainage ditches identified as part of the Beinn Ghlas PCA survey report. An additional c. 7,220m were identified in the November 2023 giving a total of 7,940m of drainage ditches with the potential for peatland restoration in the whole of the OBE-HMP Study Area (including the Application Boundary). Using a 30m buffer, a total of c. 43ha of surrounding habitat (including a mixture of blanket bog and wet heath) could potentially be rewetted as a consequence of drainage ditch blocking (Figure 3).

There was a total of 6.2ha of Actively Eroding blanket bog identified as part of the Beinn Ghlas PCA survey report. An additional 0.3ha were identified in November 2023 giving a total area of actively eroding blanket bog of 6.5ha that is suitable for peatland restoration in the whole of the OBE-HMP Study Area (including the Application Boundary) (Figure 3). Placing a 30m buffer around this area results in an additional c. 24.2 ha of surrounding habitat that could potentially be re-wetted as a consequence of restoring the Actively Eroding blanket bog.

Figure 3: PCA and 30m Buffer around Drainage Ditches and Actively Eroding Blanket bog in the OBE-HMP Study Area



Suitable Peatland Restoration Techniques

Drainage ditch blocking: Drainage ditches can be blocked and reprofiled with the aim of restoring the natural water table, reducing erosion and allowing revegetation. Blocking can be achieved through the use of e.g. plastic dams or e.g. wave damming and reprofiling.

Plastic dams or wave dams should be created every c. 5m along drainage ditches. Wave dams differ from traditional peat or plastic dams in how they are made. The excavator straddles the drain facing up-slope (a larger machine may be better). Dams are made by drawing in a full bucket of peat from the base of the drain and supplementing this with at least 1/2 bucket of vegetated peat 'pinched' from either side of the drain and compressing this to form a long, wide dam built up to a height of approx. 0.5m to allow for any subsidence.

The drainage ditches should be reprofiled so that at the end they should resemble a vegetated, shallow dip. This process, employed in between wave dams, is used to reduce the size and visibility of the drain void in order that drain blocking with new plants will occur more quickly thus potentially speeding up re-wetting. It involves the machine 'toothing' the drain side walls and gently displacing peat in an expanding and shallowing pattern, with distance from the edge, so that once complete the drain void appears to more or less disappear. The ditch should be worked from the highest point and then downslope.

Wave dams may be suitable in some instances, but where the drains are already well vegetated the use of e.g. plastic dams may be more suitable.

The ditch blocking is likely to benefit species such as lapwing, snipe, woodcock, mallard and teal. Woodcock is a red-listed bird species that has a preference of (often wet) native woodland habitats. We could directly help the fortunes of this priority species by: (i) wetting up wooded habitats through ditch blocking, (ii) expanding woodland cover, especially riparian cover through our nature network plans, and (iii) agreeing not to shoot woodcock (they are currently a legal quarry species). Incidentally, an increased lapwing, snipe, woodcock, mallard and teal population could form part of increased prey base for breeding golden eagles.

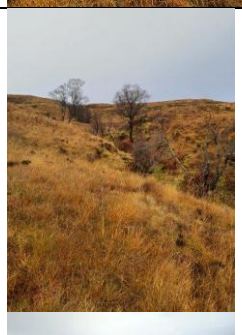
Reprofiling: The edges of cuttings and erosion features can be reprofiled. Reprofiling is a mechanism for lowering the gradient of the erosion feature or cut face and covering the bare peat of the hagg or cut face with vegetation, stretched from nearby existing vegetation (i.e. using the vegetation on adjacent bog at the top of the hagg/cutting and stretching this over the hagg/cutting face).

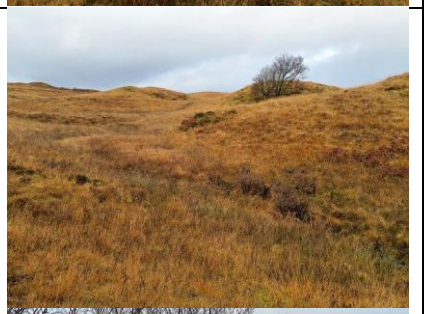
These peatland restoration techniques will deliver a series of ecological benefits to the HMP area. They will allow the wetting-up of the bog surface allow a more natural surface pattern and hydrology to develop. In turn, this will benefit the species that rely on wet bog vegetation such as craneflies and other insects, which further benefit associated bird species. This hydrologically linked wet bog will likely deliver additional carbon sequestration as the bog-mosses and bog vegetation form peat over a wider area, locking carbon into the peatland habitat over time.

Appendix 1: Target Notes

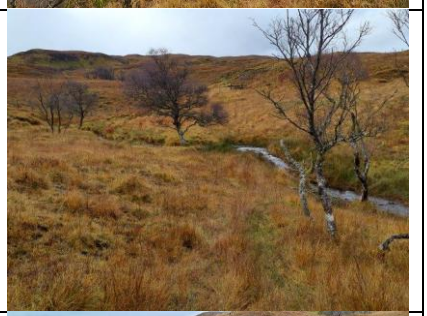
No.	Grid ref	Note	Illustrative photo
1	NM 98882 26251	Riparian planting suitable along this watercourse. There were occasional eared willow present, which demonstrates suitability.	
2	NM 99133 26130	Two historic drainage ditches filled with water, but likely taking some water from the surrounding blanket bog that was in a Near-Natural condition. The two historic drainage ditches could have several dams placed along them to block/reduce flows.	
3	NM 99130 26133	Another historic drainage ditch which could be dammed to reduce drainage from the surrounding blanket bog. Second photo shows drainage route downslope.	 
4	NM 99177 26135	High-quality Near-Natural blanket bog in overall area, but there were also some small (<0.5m) erosion features. These could be removed though cross-tracking.	

5	NM 99178 26138	A clear linear feature which may have been an old peat cutting. It is connected to the drains further downslope. Dams could be used here to prevent drainage from the surrounding bog habitat.	 
6	NM 99483 26130	Spring head with M10 flush. Likely to be a highly GWDTE.	
7	NM 99595 26053	Could have native woodland planting/natural regeneration in these acid grassland and dry heath hill slopes.	
8	NM 99724 26095	Hill slopes with bracken could be planted with native tree species or natural regeneration could be encouraged through reduced grazing. Sheep were seen grazing on the acid grassland.	
9	NM 99889 26082	Riparian planting of shrubs such as eared willow would be possible along unmarked burns where shallow soils allow. Native tree planting/regeneration would be suitable on hills behind.	

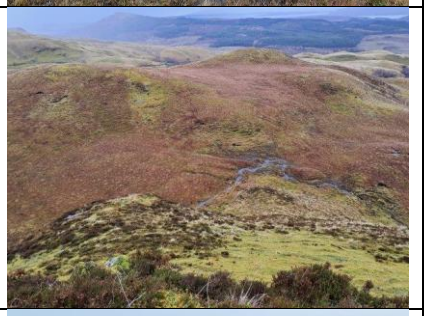
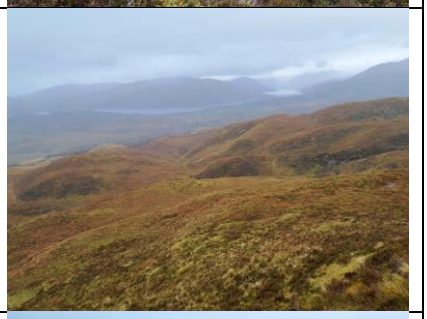
10	NM 00030 26063	Large area on the lower slopes of wet heath (M15b) and purple moor-grass dominated marshy grassland. These slopes would be suitable for native tree planting.	
11	NM 00084 26080	Several regenerating Sitka spruce noted in the wet heath. They were between c. 0.5m and 1.5m in height. These non-native trees should be removed.	
12	NM 00166 26186	Burn highly suitable for riparian planting. Already some old birch present in some areas. The sparse birch could be reinforced and gaps between the birch filled. The photos show the upstream then downstream view with largely M15b wet heath or M25a marshy grassland.	 
13	NM 00327 26145	Drainage ditch was c. 0.5m wide, 0.7m deep. In small section of blanket bog. Could be blocked.	
14	NM 00428 26087	Two small drains, c. 0.5m wide and 0.5m deep. Could be blocked.	

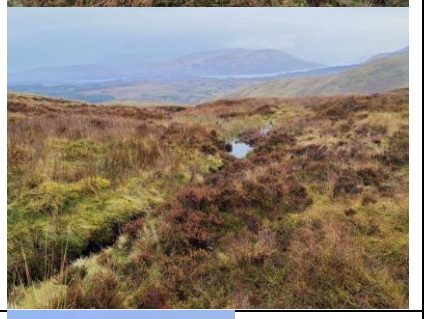
15	NM 00468 26056	View across to opposite hillslope, shows W11 birch woodland, which, in the absence of grazing could be more widely present in the east of the OHMP Study Area.	
16	NM 00468 26017	View of riparian birch woodland that could be reinforced by infilling gaps and widened, where appropriate, and lengthen up the watercourse.	 
17	NM 00531 26258	Watercourse suitable for riparian planting. Birch and willow scrub present in patches. This could be reinforced with careful planting with suitable, locally sourced trees and scrub species.	 
18	NM 00585 26409	Patches of bracken around the trees on slopes. Formed as network with woodland and acid grassland.	

19	NM 00634 26690	Recommend reinforcing the native riparian woodland with birch, willow, aspen and alder. Fill gaps and widen.	
20	NM 00614 26716	Hill slopes with patches of bracken and acid grassland could be planted with native trees or be allowed to naturally regenerate to woodland through grazing management/fencing.	
21	NM 00540 26806	Old drainage ditch. Well vegetated with rushes. Likely to have limited drainage influence on surrounding modified bog.	
22	NM 00517 26851	Fast flowing watercourse from drained area above. It was c. 0.5m wide, 0.5m deep. Riparian woodland could be reinforced along here.	 
23	NM 00517 26922	Old drainage ditches, well vegetated with rushes, relatively firm ground. Could block with plastic dams or similar, to ensure existing drainage is impeded, potentially rewetting a sizeable area.	

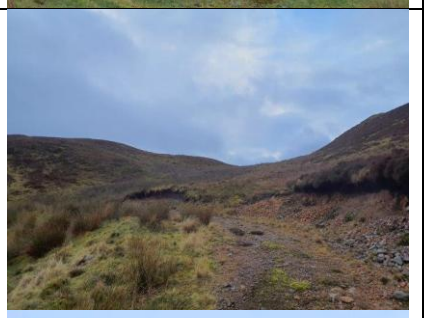
24	NM 00510 26953	Several historic drainage ditches in this area. The drains have rushes within them, and water was flowing in some of them. Dams could be placed within the ditches at regular intervals to slow/reduce flow.	
25	NM 00498 27016	View of drained purple moor-grass dominated (M25a) wet modified bog.	 
26	NM 00586 27103	Native oak and birch woodland (W11) on steep inaccessible slopes.	
27	NM 00353 27041	Recommend widening and reinforcing riparian woodland.	
28	NM 00184 27037	Drainage ditch c. 0.5m 1m wide. Deep in places with clearly flowing surface water. This could be blocked with e.g. plastic dams.	

29	NM 00076 27143	Some aspen present within this riparian woodland remnant. Reinforce.	
30	NM 99874 27151	Hill slope suitable for native woodland planting/allowing natural regeneration of woodland.	
31	NM 99789 27118	Reinforce woodland riparian. Holly present with the birch at this location.	
32	NM 99561 27339	Hillslopes of largely wet heath (M15b), marshy grassland (M25a-b), acid grassland (U4 or U5). There were pockets of isolated bog habitat in topographical basins. The bog was generally either purple moor-grass dominated M25a on deep peat (wet modified bog) or poor M17 in a Modified (and Drained) condition. Sheep were commonly seen in the area.	
33	NM 99439 27412	Watercourse could be planted with native, locally sourced birch and willow.	
34	NM 99259 27390	Riparian woodland planting suitable. Birch was seen downstream. Avoid planting on areas with deep peat.	

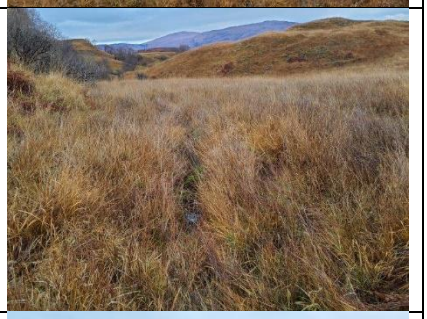
35	NM 99210 27395	Large M10 GWDTE. Triangle 10m c. 10m long on each side.	
36	NM 98931 27414	View of natural watercourse features including the head of the unnamed watercourse. There were no clear drains in the surrounding blanket bog (M17).	
37	NM 98774 27555	Viewpoint. Whilst some bog habitat was present there were no meaningful restoration opportunities in this area.	
38	NM 98629 27531	Acid grassland dominated beyond the fence-line.	
39	NM 98575 27539	View of existing riparian woodland which could be expanded. The grassy slopes could also be planted with native tree species or encouraged to naturally regenerate if grazing pressure was reduced.	
40	NM 98417 27320	Recommend reinforcing the existing riparian woodland habitat along this watercourse.	

41	NM 97461 26492	Riparian planting potential along this watercourse.	
42	NM 97333 26810	Potential for riparian planting. Upstream then downstream photos. Occasional riparian birch were noted downstream.	 
43	NM 97372 27035	Reinforce riparian woodland. Scattered birch was limited to inaccessible locations, suggesting grazing pressure inhibiting recovery in open and accessible areas.	
44	NM 97438 27033	Fast flowing, functional drainage ditch, c. 0.3m wide and 0.5m deep. Vegetation was largely sharp flowered rush and soft rush dominated rush pasture (MG10). Not blanket bog habitat.	
45	NM 97301 27312	Series of drainage ditches in rush pasture (MG10). Soft rush and sharp flowered rush with occasional tufted hair grass. Ditches were c.0.5m wide. Soil was apparently <1m deep. Habitat was not blanket bog.	

46	NM 97286 27352	View of drained MG10 area.	
47	NM 97410 27461	Series of drainage ditches in rush pasture (MG10), not bog habitat. Drained for sheep grazing.	
48	NM 97414 27517	Soils apparently less than 1m deep. Sharp flowered rush dominated.	
49	NM 97310 27518	Infill gaps in riparian woodland through planting of native tree and shrub species.	 
50	NM 97213 27551	Small disconnected, rush pasture (MG10) with some M25a marshy grassland. Drains not obvious at ground level, although can see water flow pathways from aerial imagery.	

51	NM 97069 27318	View of rush pasture and watercourse suitable for riparian planting.	
52	NM 97033 27243	Rush pasture considered unsuitable for peatland restoration. Watercourse would be suitable for riparian planting.	 
53	NM 97185 27792	Rush pasture unsuitable for peatland restoration.	
54	NM 97790 29188	Peatland habitat, M15b over deep peat – wet modified bog. Drainage ditches apparent and lined with rushes. Suitable for peatland restoration.	
55	NM 97815 29659	Blanket bog habitat, set within hills of acid grassland and bracken. There were occasional birch present.	

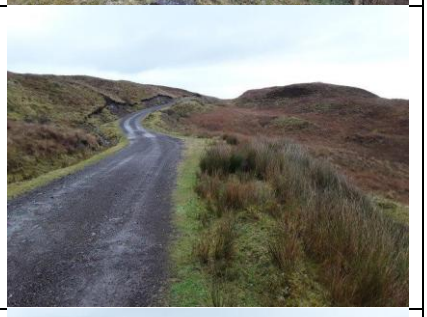
56	NM 97742 29983	Some peatland restoration potential between acid grassland hillocks.	
57	NM 99254 28486	High quality remnant oak woodland. Patches of bracken form part of the mosaic with open grassland. Likely to be good habitat for Lepidoptera.	
58	NM 99465 28464	Open woodland and scrub with grassland on to upland moor is ideal black grouse habitat. Unmarked deer fence through the middle of it – fence should be marked to reduce preventable black grouse mortality via fence strikes . Can see birch regen coming through beyond deer fence indicating high grazing pressure on one side of it.	 
59	NM 99738 28133	Open woodland and grassland. The grassland is likely suitable for Lepidoptera.	
60	NM 00337 27627	High quality birch and oak woodland, with patches of bracken and grassland as part of the structure of the woodland.	

61	NM 00428 27592	Historic drainage ditch, c. 1.5m wide, 0.4m deep, generally well vegetated. Suitable for blocking by e.g. plastic dam.	
62	NM 00476 27479	M17 blanket bog with signs of modification including fresh signs of grazing and bare patches. Historic drainage ditches well vegetated but could have plastic dams to reduce under surface drainage.	
63	NM 00681 27266	Historic drainage ditch. In M15b/M25a wet modified bog (over deep peat), with purple moor-grass and bog myrtle. Sharp flowered rush was noted in some places but did not dominate.	
64	NM 00744 27248	Wet modified bog (M15b/M25a) in a Modified and Drained condition.	
65	NM 00757 27261	Drainage ditch, marked with rushes. It was well vegetated, but some ongoing drainage is likely to be adversely affecting surrounding habitat.	
66	NM 00770 27261	Another example of a historic drainage ditch.	

67	NM 00752 27248	Historic drainage ditch. Generally well vegetated but could hear under surface water movement so clearly some drainage and drying out of surrounding habitat occurring.	
68	NM 00341 27626	Quiet area with open mature W11 oak and birch woodland. Potential source for local provenance seed.	
69	NM 98694 26199	Riparian planting could target here from forest block passed the control building along access track.	
70	NM 99375 26119	Small loch. Potentially suitable for a diver raft?	
71	NM 99629 26450	Potential for native tree planting on slope above deep peat. Bog pool present within high quality blanket bog.	
72	NM 99752 26666	Previous planning i.e. T3 link up with existing remnant riparian birch.	

73	NM 99799 26678	Only short gap to link up with existing and extensive native riparian woodland. Planting would take place on shallow soils so avoiding deep peat.	
74	NM 99941 26715	Planting may not be necessary in some areas. Potential to fence cliff and remnant trees and allow natural regeneration to take place.	
75	NM 00080 26704	Large, long and deep drainage ditch. Needs blocked in multiple places. Ditch was c. 1.5m deep. The top was covered by vegetation but deep and free flowing (water could be heard flowing).	
76	NM 00393 26789	Looking on to area of vegetated drains.	
77	NM 99741 27197	Woodcock flushed. Making woodland wetter and extending trees likely to benefit this declining, red-listed species.	
78	NM 99693 27157	Free flowing ditch, draining peaty hollow.	

79	NM 99428 27035	Eroded peat suitable for restoration. C. 100m long erosion feature, c. 1m deep.	
80	NM 99383 27026	Same erosion feature as above, c. 1.2m deep.	
81	NM 99110 26851	Drainage ditches in bog. Suitable for restoration.	
82	NM 99017 26736	Old ditch. Vegetated over.	
83	NM 98820 26668	Ditches draining bog into burn. Highly suitable for blocking and restoration. (already noted in original PCA).	 

84	NM 98566 26478	Fenced riparian woodland fragment along access track side demonstrating suitable growing conditions in the absence of grazing pressure. As previously noted, where it is fenced there was a high proportion of heather and willow scrub inside.	 
85	NM 98533 26515	Area for woodland planting on right side of access track looking north in photo.	
86	NM 98465 26683	Track side broadleaved planting recommended here to connect between catchments.	 
87	NM 98423 26940	Open burnside habitat suitable for riparian tree planting. Note in far left of the photo first broadleaved trees coming through from north.	

88	NM 98348 27160	Woodland remnants on cliff by watershed.	
89	NM 98329 27287	Extensive existing broadleaved riparian woodland heading north from this location. Appears continuous from here northward.	
90	NM 98155 27850	Very good mixed mature broadleaved trees in valley bottom. Riparian corridor already very strong here and illustrative of what is potentially possible.	
91	NM 98149 28134	Broadleaved trees have broken out from riparian corridor onto open hillside here.	
92	NM 98230 28821	Lowest part of access track, by site entrance, with mature broadleaves including oak (W11).