

Update to the Phase 1 Habitat and NVC report for Beaw Field Wind Farm



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Summary

Peel Energy commissioned Alba Ecology to undertake a walkover survey at Beaw Field to update the Phase 1 Habitat and National Vegetation Classification (NVC) survey for the consented Beaw Field Wind Farm.

The habitats and communities within the Beaw Field Wind Farm Application Boundary have previously been surveyed on a number of occasions, including in 2012, 2015 and again in 2020. These surveys are reported in Appendix 11.2 Phase 1 Habitat Survey, National Vegetation Classification (NVC) Survey and Groundwater Dependant Terrestrial Ecosystem (GWDTE) Report for Beaw Field Wind Farm (2016) and in Beaw Field Wind Farm Habitat Management Plan (HMP) (2020).

The area within the Application Boundary, including 14 of the proposed turbine locations, were walked in May 2022. The habitats and communities were considered against the maps and descriptions from previous surveys (2012, 2015 and 2020) as well as the standard Phase 1 Habitat and NVC descriptions.

Overall, the area within the Application Boundary was characterised by highly eroded and degraded wet and dry modified bog, with small areas represented by blanket bog which was in a less modified state than the modified bog but still impacted through grazing pressure. The banks of the watercourse were characterised by acid grassland. There were areas of dry dwarf shrub heath on shallow soils, usually with rocks showing through. There were also areas of peat cuttings characterised by exposed peat and soils, with colonisation of mainly acid grassland species.

There was no fundamental change in the habitats and communities present in 2022 compared to those reported in the Beaw Field ES (2016) and in the condition of the peatland as reported in the Beaw Field HMP (2020). Therefore, there were no substantial changes identified in the baseline habitats that would mean that the assessment of potential impacts on habitat within the original ES was no longer valid.

Introduction

Peel Energy commissioned Alba Ecology to undertake a walkover survey at Beaw Field to update the Phase 1 Habitat and National Vegetation Classification (NVC) survey for the consented Beaw Field Wind Farm. Peel Energy is seeking a Section 36C life extension to the project and following discussions with NatureScot, an updated survey of habitats was requested.

The consented wind farm is focussed in the southeast of Yell and comprises of 17 turbines (Figure 1).

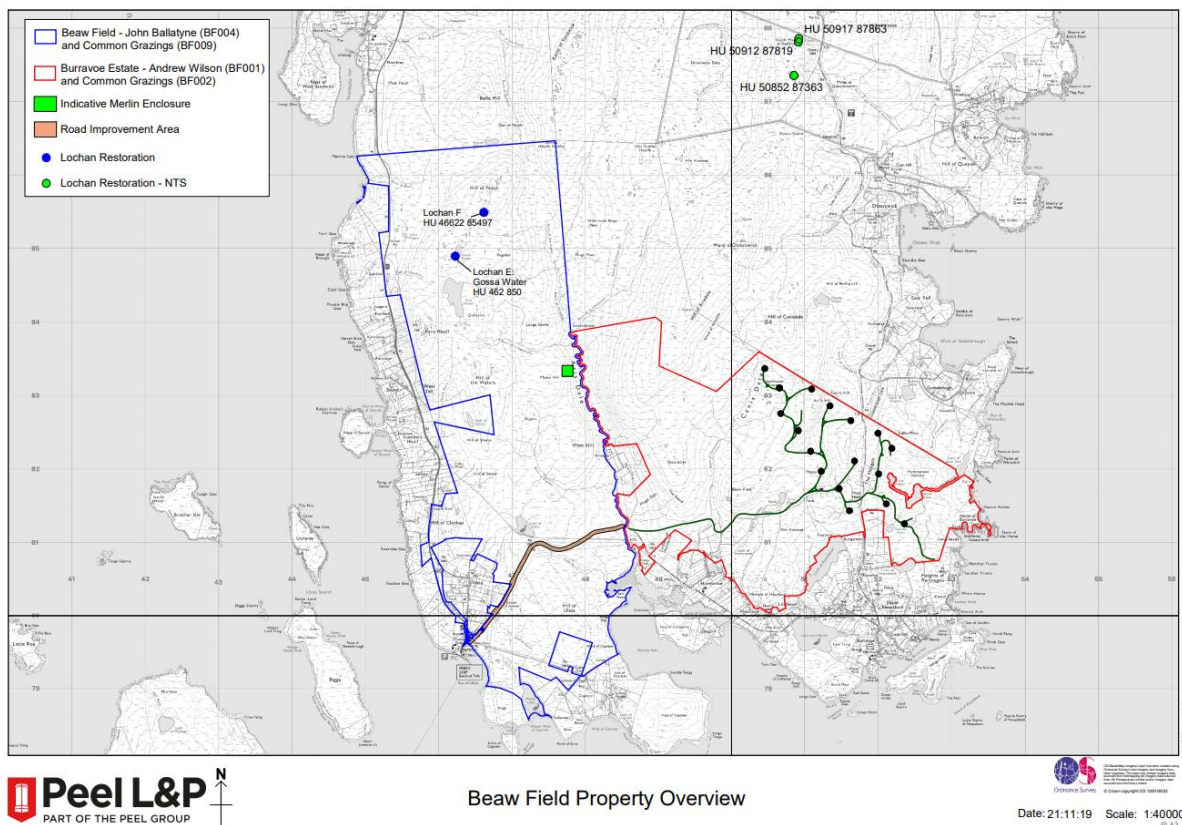


Figure 1: The consented Beaw Field Wind Farm layout.

Background

The habitats and communities within the Beaw Field Wind Farm Application Boundary (hereafter referred to as 'Application Boundary') have previously been surveyed on a number of occasions including in 2012, 2015 and again in 2020 and are reported in Appendix 11.2 Phase 1 Habitat Survey, NVC Survey and Groundwater Dependant Terrestrial Ecosystem (GWDTE) Report for Beaw Field Wind Farm (Massey and Shields, 2016) and in Beaw Field Wind Farm Habitat Management Plan (HMP) (Massey and Cosgrove, 2020).

The habitats and plant communities within the Application Boundary were originally reported in Appendix 11.2 of the ES. Field survey work was undertaken in May 2012 with additional areas surveyed in September 2015. Field work on both these occasions included an extended

Phase 1 Habitat survey, a NVC survey and an assessment of wetland habitats. Habitats and community types were described and mapped, a species list was compiled, and target notes were made. From this, groundwater dependent terrestrial ecosystems (GWDTEs) were assessed and were reported on.

The Application Boundary was described as *“dry modified blanket bog (39%) with large areas of wet modified bog (25%) and some unmodified blanket bog (8%). There were smaller areas of unimproved acid grassland (7%), dry dwarf shrub heath (4%) and improved grassland (2%) There were many mosaics of habitat types”* (Massey and Shields, 2016).

The Phase 1 Habitat map from Appendix 11.2 of the ES is reproduced in Figure 2.

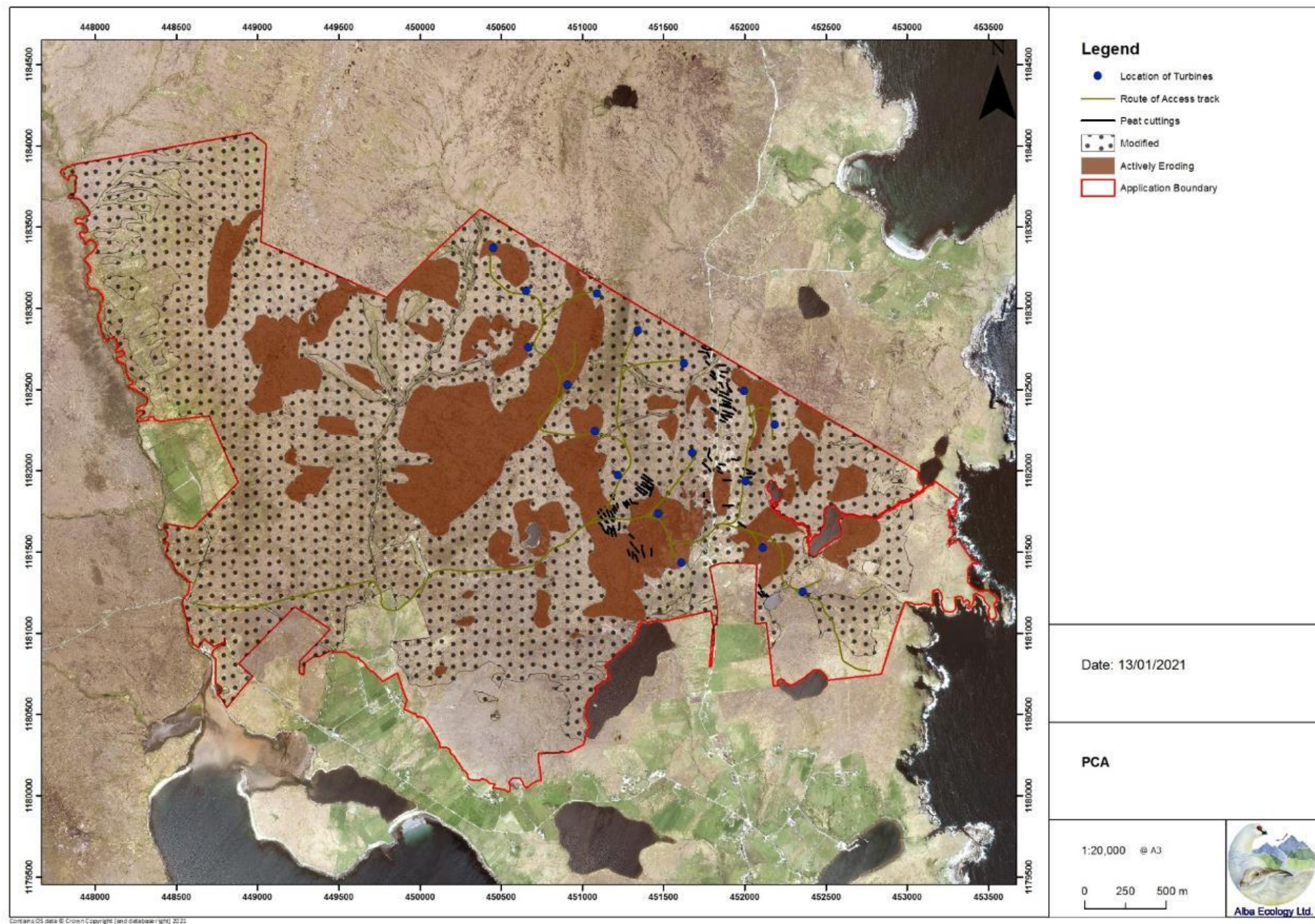
On a site visit in July 2020 the condition of the peatland habitat was mapped as part of a Peatland Condition Assessment (PCA) survey, with reference to aerial imagery, OS mapping and the Phase 1 Habitat and NVC survey data provided in the ES. This was completed to provide additional information for peatland habitat restoration as part of the Beaw Field Habitat Management Plan (HMP). The PCA bases 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). It involved walking much of the area within the Application Boundary and considered the original habitat data.

The peatland habitat within the Application Boundary was described as *“All of the peatland was classified as Modified, largely through grazing pressure, with some peat cutting. The vegetation was often dry, heather and lichen dominated, with few remaining bog-mosses. Whilst bare peat patches and grazing impacts were common and widespread, the degree of modification varied and it is recognised that some areas were less Modified than others (e.g. the ‘unmodified blanket bog’ in the Phase 1 Habitat surveys). Very large areas were both Drained by numerous erosion gullies and were considered Actively Eroding”* (Massey and Cosgrove, 2020)

The PCA map from the July 2020 survey is reproduced in Figure 3.



Figure 3: The PCA Map Reproduced from the Beaw Field HMP (2020)



Study Area

The Application Boundary is centred at the Burn of Hamnavoe at OS grid references HU 504 820, in the south of Yell. The Study Area for the update to the Phase 1 Habitat survey and NVC survey was the whole of the Application Boundary as shown in Figures 1, 2 and 3.

The Study Area was dominated by three ridges, the largest of which was the Hill of Arisdale at 210m above sea level. There were two valleys, Canis Dale and Aris Dale, which included the main streams running through them (Burn of Hamnavoe and Burn of Sundrabister respectively). There were several lochs and lochans in the south and east of the Study Area, the largest being Loch of Kettlester.

Aims and objectives

The objectives for this survey and report are:

- Walkover the Study Area to assess if there have been substantial changes in the habitats and plants communities as described and mapped in previous reports (i.e. Appendix 11.2 of the ES and the Beaw Field HMP).

Methods

The habitat and vegetation surveys were conducted by highly experienced habitats surveyor Dr Kate Massey (MCIEEM) of Alba Ecology Ltd in May 2022. Dr Kate Massey led all the previously habitat surveys in relation to the consent Beaw Field Wind Farm and so knows the site, the habitats and the communities very well.

The surveys were conducted using 1:50,000 Ordnance Survey maps and recent aerial photographs from Google Earth along with the Phase 1 Habitat and NVC data produced for the Beaw Field ES. The surveys were conducted at a scale of 1:7,500 using a combination of these data overlaid on the aerial imagery.

The Study Area was walked and considered the Phase 1 Habitat and NVC communities present compared to those mapped in the previous surveys. The walkover survey including consideration of representative samples of habitat across the whole Application Boundary and included visiting consented turbine locations.

Phase 1 Habitat Survey

Phase 1 Habitat surveys are a standard national classification scheme of broad habitat types and are based on plant species presence and some abiotic indicators such as apparent peat depth. The vegetation was described and mapped following the methods described in the Joint Nature Conservation Committee (JNCC) Handbook for Phase 1 Habitat surveys ([JNCC, 2010](#)) in 2012 and 2015.

This walkover survey considers the habitats within the Study Area in their current state, alongside the Phase 1 Habitat descriptions and the descriptions in the original Phase 1 Habitat survey (ES Appendix 11.2) and noted any changes or variation.

National Vegetation Classification (NVC) Survey

The NVC is a detailed survey of plant communities using plant species presence and abundance. The vegetation was classified and mapped following the methods described in the JNCC National Vegetation Classification User's Handbook ([JNCC, 2006](#)) in 2012 and 2015. Reference was made to NVC field guides (e.g. Hall et al., 2004; Elkington et al., 2001; Cooper, 1997) the published NVC communities and the floristic tables (e.g. Rodwell, 1991a; Rodwell, 1991b; Rodwell, 1992; Averis et al., 2004).

This walkover survey considers the vegetation communities within the Study Area in their current state, alongside the standard NVC community descriptions and the descriptions in the original NVC survey (ES Appendix 11.2) and noted any changes or variation.

Peatland Condition Assessment (PCA)

The PCA is a standardised, if basic, method for assessing the condition of peatland habitats. The PCA bases 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 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. Modified¹ – bare peat is in small patches, fires may be recent, grazing impacts are evident, bog-mosses are absent or rare, 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.

Target notes were across the site to describe the habitat, note and changes or variation or to comment on similarities.

Limitations

While every effort was made to provide a full update on the habitats and communities of the Study Area, it is unlikely that one additional survey can achieve full characterisation due to temporal variations (e.g. between seasons). Limitations include:

- Maps are only indicative of the boundaries as there was often no clear boundary between vegetation types, there being instead a gradual change.

¹ Note that the definition of the term 'Modified' in the PCA differs to that in the Phase 1 Habitat surveys. Resulting in the 'unmodified' blanket bog in Phase 1 terminology being categorised as 'Modified' in the PCA. This is a recognised difference in the survey terminology.

- Some Phase 1 habitats and NVC communities are made up of a similar assemblage of species, and there can be transitional stages between two community types.
- The fit of NVC communities to the published communities is often imperfect and the closest approximation of the communities are described. Surveying in Scotland has the added limitation that many of the NVC community descriptions were derived in England and so the published descriptions may not match well with those found for example in Shetland.
- Phase 1 habitat surveys and NVC surveys are not floristic surveys and not intended to create full species inventories or count all individuals of any plant species but to map and describe the communities. Species were recorded when they were encountered, but it is likely that additional species, not listed, are present within the Study Areas, particularly as species presence and visibility varies throughout the growing season.
- Plant species occurrence and visibility change both temporally and spatially. This is particularly true for colonising and invasive species. The data provided by habitat surveys is a snapshot in time (May 2022 for this survey) and cannot account for changes that occur outwith this time period. Non-native invasive species can be prolific colonisers. For example, Japanese knotweed (*Fallopia japonica*) spreads from rhizomes, rhizome fragments, as well as stem and crown fragments. Spread is usually a result of human intervention, such as spreading fragments in tyre treads (Fennell *et al.*, 2018). Additionally, at different times of year (e.g. winter) or life-stage (e.g. early colonisation) the identification of non-native invasive species can be challenging. Therefore, although non-native invasive species were considered during field surveys and field surveys were conducted at a suitable time of year, it is possible for non-native invasive species to be present within the Study Areas.
- Whilst the Application Boundary was walked not every polygon was been visited. This survey considered a representative sample of locations across the Application Boundary including consented turbine locations.

The limitations were minimised by conducting the field survey within a suitable survey period (May 2022) by a highly experienced habitat surveyor who has worked on numerous occasions within the Study Area (e.g. 2012, 2015 and 2020) and more widely across Shetland and Scotland and knows the habitats and communities extremely well.

It is important to note that measuring peat depth was outside the scope of these surveys. Apparent peat depth as discussed in this report is estimated based on visual vegetation assessments, through estimating peat depth from available features such as hags, and ditches.

Nomenclature

Common names only are given in this report. Nomenclature follows Streeter and co-workers (2016) for higher plant species, and Atherton *et al.*, (2010) for bryophyte species. Plant groups

comprising many micro-species (such as dandelions) are treated as aggregates. These micro-species are not important for e.g. defining NVC communities.

Results

The Study Area, including 14 of the proposed turbine locations, were walked in May 2022. The habitats and communities were considered against the maps and descriptions from previous surveys from 2012, 2015 and 2020 as well as the standard Phase 1 Habitat and NVC descriptions.

Overall, the Application Boundary was characterised by highly eroded and degraded wet modified bog and dry modified bog, with small areas represented by blanket bog which was in a less modified state but still impacted through grazing pressure. The banks of the watercourse were characterised by acid grassland. There were areas of dry dwarf shrub heath on shallow soils, usually with rocks showing through. There were also areas of peat cuttings characterised by exposed peat and soils, with colonisation of mainly acid grassland species.


The peatland habitat was considered to be modified, largely through current and historic grazing pressure, and was clearly actively eroding across a wide area.




There was considered to be no fundamental change in the habitats and communities present in 2022 compared to those reported in the Beaw Field ES (2016) and in the condition of the peatland as reported in the Beaw Field HMP.




Target notes are presented in Table 1 with their locations shown in Figure 4.




The Phase 1 Habitat and NVC maps as presented in the original ES are considered fundamentally unchanged. Although some small changes/differences were noted, these were small, resulting in no fundamental change.




The habitat and community descriptions as reported in Technical Appendix 11.2 of the Beaw Field ES were considered to still be appropriate and they have not been repeated here for brevity. No new habitat or community types were recorded.





TG	Grid ref	Note	Photo
1	HU 50077 81638	Large area of bare peat and M3, as mapped, although there is U5 acid grassland also forming across parts of this area which may have colonised since the original surveys.	




TG	Grid ref	Note	Photo
2	HU 50172 81698	Dry modified bog as mapped. Highly hagged and eroded. Small pools were occasionally in base of hags. Bare peat evident. Little to no bog-moss present.	
3	HU 50332 81655	View of lochan, with bare peat and highly modified bog around it. Highly damaged and actively eroding. Bare peat extensive. Mapping is consistent with the view.	
4	HU 50632 81917	M19. The area was blanket bog as mapped. The vegetation was made up of heather, cross leaved heath, hare's-tail cottongrass with red bog-moss. There was woolly fringe moss forming occasional hummocks, and there were lichens. The M19 (as mapped) appeared to be derived from M17 and was in a wet basin. It was modified in terms of a PCA (as mapped).	




TG	Grid ref	Note	Photo
5	HU 50680 81898	Wet modified bog as mapped. There were many hummocks of woolly fringe moss with heather and lichens. There were damper areas at the base of hags sometimes with feather bog-moss. There was substantial evidence of sheep presence.	
6	HU 50723 81904	Highly eroded wet modified bog as mapped (actively eroding).	
7	HU 51126 82053	Occasional M2 pools at base of hags in the wet modified bog. These were species poor with generally only feathery bog-moss present.	




TG	Grid ref	Note	Photo
8	HU 51235 82011	View looking east showing a vast area of modified and damaged bog with exposed actively eroding peat (as mapped).	
9	HU 51239 81960	Near T11. Dry modified bog as mapped. The dry modified bog tended to be more intact (i.e. less exposed peat and erosion features). There tended to be a high proportion of glittering wood-moss. There was also an abundance of graminoids including hare's-tail cottongrass and common cottongrass.	
10	HU 51262 82127	View, showing the wet modified bog patches within the more intact M19 and dry modified bog as mapped. There were clear lines of streamside vegetation which were also mapped.	




TG	Grid ref	Note	Photo
11	HU 51057 82153	There was U6 vegetation at the top of the stream within an erosion gully. Heath rush was dominant. Mosses were present under the tight swirls of heath rush, they were mostly pleurocarps but there was some flat-topped bog-moss. This was not mapped, but was very thin (ca. 3m wide) and clearly met with the mapped U6 further down slope. This community type could have extended up the gully since the original survey.	
12	HU 51022 82267	Large area of wet modified bog (as mapped) near T8.	
13	HU 51061 82470	A small patch of U6 as mapped. There were patches of common haircap and flat-topped bog-moss amongst the dominant heath rush. This was a patch within a large area of dry modified bog, which was dry heath vegetation on deep peat as described in the ES.	





TG	Grid ref	Note	Photo
14	HU 50884 82540	Near T6. Wet modified bog as mapped. There were large erosion gullies over 1m deep. Woolly fringe moss, heather and occasional patches of red bog-moss.	
15	HU 51071 82782	In this area of dry modified bog and M3 (as mapped), these communities were clearly present but there was also some U6 colonisation on mineral soils and bare peat. Heather was also occasional. The U6 may have colonised this area since the original survey work.	
16	HU 51084 83086	Near T3. Wet modified bog as mapped. There were many erosion gullies and much bare exposed peat. There was one small (4m x 4m) pool in the vicinity with just feathery bog-moss within it.	 




TG	Grid ref	Note	Photo
17	HU 50819 83133	In the centre of the valley there was a thin line of blanket bog (M19) with some water seepage lines in it made up of M3 and M29 with bulbous rush and bog pondweed. This area was not mapped separately in the original survey but was included within a wider area of modified bog (as mapped). It was perhaps 70m x 200m in size.	
18	HU 50635 83090	Near T2. Dry modified bog (as mapped). There were many small and large erosion features.	
19	HU 50647 82937	There was a wet basin at this location with M18 blanket bog and M29 mire vegetation (not separately mapped in original survey). It was clearly modified to some extent as there were four sheep on it at time of survey and there were many hoof prints and patches of dung evident. There were many lines of water with bog-mosses common (including cow horn, flat-topped and papillose) with heather, common cottongrass, hare's-tail cottongrass and deergrass. It was included as part of a wider area of wet modified bog in the original survey.	



TG	Grid ref	Note	Photo
20	HU 50436 83208	There were some small patches of U6 grassland which were un-mapped in the original survey. They were ca. 20m x 70m in a wider area of dry modified bog.	
21	HU 50442 83373	Near T1. Eroded wet modified bog as mapped. Large erosion features 1m to 1.5m deep. Woolly fringe moss dominated with mix a of heather, hare's-tail cottongrass and common cottongrass. There was very little bog-moss present.	
22	HU 50266 83092	The habitat beside the watercourse had more U5 and MG10 present than was shown in the original mapping. It had been mapped as U6. The matrix for this watercourse habitat is now U6:U5: MG10 at a ratio of 50:30:20.	


TG	Grid ref	Note	Photo
23	HU 50042 83043	U6 as mapped, although not quite so extensive as was mapped previously.	
24	HU 49717 82893	MG10 as mapped. Although there was more U6 further uphill, above this point. MG10 dominated by soft rush with glittering wood-moss, common sorrel with Yorkshire fog.	
25	HU 49507 82786	Large area of dry modified bog (as mapped). Glittering wood-moss was abundant with heather, hare's-tail cottongrass, crowberry and common cottongrass. Generally intact with fewer hags than the wet modified bog. Looks like dry heath but is on deep peat. Little or no bog-moss present.	


TG	Grid ref	Note	Photo
26	HU 49515 82779	View across Beaw Field Hill. It was a hillside of modified and degraded bog as mapped.	
27	HU 49363 82688	MG10 and U6 as mapped.	
28	HU 49280 82786	Small patch of M19 as mapped. Heather, hare's-tail cottongrass and red bog-moss.	

TG	Grid ref	Note	Photo
29	HU 49214 82813	A lost lochan. This may have had water in it in previous surveys.	
30	HU 49213 82804	The water from the lochan above had been lost from the lochan at this point, where there was a peat pipe exposed.	 
31	HU 49166 82795	M2a as mapped, although this may be a bit smaller (possibly due to drainage from the erosion features).	


TG	Grid ref	Note	Photo
32	HU 49122 82725	Area of wet modified bog as mapped. This area would clearly have held lochans and pools with a water table much higher than is currently present. These pools and lochans have been lost (perhaps decades ago) due to erosion.	
33	HU 48866 82760	Dry modified bog as mapped.	
34	HU 48882 83105	M19 as mapped. Occasional pool present. Bog was squishy underfoot due to bog-moss layer which included papillose bog-moss. Likely derived from M17 or M18 blanket bog, but now the best fit is M19, as mapped.	

TG	Grid ref	Note	Photo
35	HU 48900 83310	Area has degraded from the mapped M19:M3 to wet modified bog (with M3 and bare peat). There were large areas of bare peat, potential some recent or more extended than when it was previously mapped as the exposed peat was very dark with little colonisation. There was very little bog-moss in the surrounding vegetation which best fit the wet modified bog category.	
36	HU 48954 83472	This area was more akin to wet modified bog now compared to the mapped M19:M3 from the previous surveys. Blocks of peat and vegetation had broken and eroded into the gullies.	
37	HU 48943 83497	Wet modified bog as mapped with bare peat surfaces. It was highly degraded and eroded with bare peat surfaces up to 5m in height.	(camera worked only sporadically from this point onwards).
38	HU 48785 83644	Large area of dry modified bog as mapped. Graminoid and glittering wood-moss were highly abundant with lichens also present. Essentially dry heath vegetation but the frequent erosion features demonstrated it was over deep peat.	
39	HU 48555 83341	View of Arisdale with acid grassland going into dry modified bog, as mapped.	
40	HU 49016 82584	Highly eroded wet modified bog as mapped.	

TG	Grid ref	Note	Photo
41	HU 49575 82443	Wet modified bog and erosion features, next to dry modified bog as mapped. Hillside opposite (Beaw Field) clearly a mix of wet and dry modified bog as mapped.	
42	HU 49870 82432	Confluence of tributaries. Some M2 present as mapped and some pools with flat-topped bog-moss, but also U6 and areas of bulbous rush and deergrass and a variety of sedges present. There were small pools and sluggish waterways of M29 with bog pondweed.	
43	HU 50007 82223	Vast area of highly eroded wet modified bog as mapped. Large and small erosion features present with exposed bare peat and hummocks of woolly fringe moss. Hoof prints and sheep were evident across the area.	
44	HU 49463 81975	Dry modified bog as mapped.	

TG	Grid ref	Note	Photo
45	HU 49709 81770	Watercourse with habitats largely of U6 as mapped, but with some U5 and MG10 also present (as previously noted in TG22).	
46	HU 51807 80905	Sheep grazed MG7a improved grassland as mapped.	
47	HU 51848 82608	There was U6:M3 mapped here. It is generally as mapped although there is more heather than would be expected from these communities, with some M15 forming over the exposed peat cutting areas.	
48	HU 51767 82621	U6 as mapped.	
49	HU 51615 82651	Near T7. Mapped as M19 but becoming wet modified bog. Hummocks of woolly fringe moss were common with small erosion features common. There was more red bog-moss than was often seen in other areas of wet modified bog. There were no pools present and was quite dry underfoot. There was not a full carpet of bog-moss by any means. Lichens and woolly fringe moss were highly abundant. This area was either mapped very cautiously previously, as blanket bog rather than wet modified bog, or there has been deterioration in condition since the original mapping.	
50	HU 51341 82861	View on to T5 which was clearly wet modified bog as mapped.	

TG	Grid ref	Note	Photo
51	HU 51876 82553	Mat grass forming an open U5 with the U6 in this area (mapped as M3/U6).	
52	HU 51990 82483	Near T9. M19 as mapped. There was more bog-moss than the wet modified bog but there were elements of wet modified bog, such as woolly fringe moss hummocks. May have been mapped cautiously or it may have deteriorated since the original surveys. There were some wet areas and generally better condition than the wet modified bog, which is mapped beside it.	
53	HU 52199 82219	Near T12. M19 as mapped, better condition than surrounding wet modified bog, but clearly modified through sheep grazing. Bog-mosses were frequent to abundant.	
54	HU 52248 82238	M18 as mapped. Bog pools common ca. 15% of area. M2 and M3. There was papillose, red and flat-topped bog-moss all present and abundant. There was wet modified bog all around this area (as mapped).	
55	HU 52474 82167	Line of U5 went into M19 and dry modified bog either side, as mapped.	
56	HU 52509 82071	View of very large area of wet modified bog as mapped.	
57	HU 52248 81851	Area as mapped although small (GIS) mapping error around edge of lochan which showed more water than was actually present.	

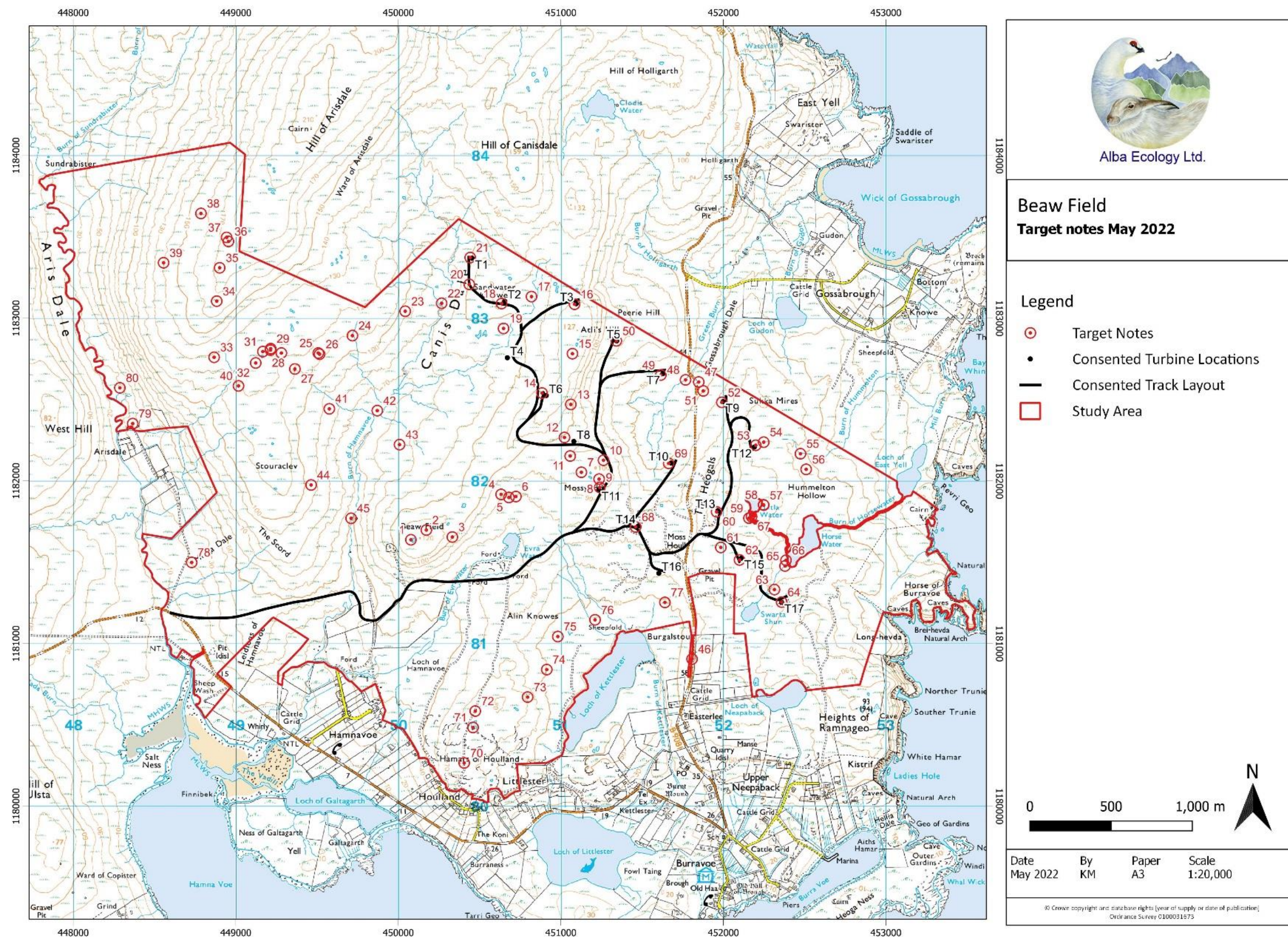
TG	Grid ref	Note	Photo
58	HU 52247 81853	Open water lochan as mapped.	
59	HU 52157 81771	Sluggish waterway with bog pondweed, cow horn bog-moss and bulbous rush at the end of the lochan. M29. Very small area (<20 x 20m) that was not mapped in the original survey.	
60	HU 51958 81810	Near T13. This area was mapped as M3/U6 previously but there was more U5 acid grassland than U6 acid grassland in May 2022. Mat grass, common cottongrass and creeping bent were all common, although there were dense patches of heath rush also present. All of this area was peat cutting with the peat cut down to mineral soil in places. Creeping bent formed mats over once bare peat.	
61	HU 51984 81591	Large areas of bare peat in this wet modified bog (as mapped) ca. 15m wide.	
62	HU 52099 81514	Near T15. Highly modified and degraded bog as mapped. Perhaps at a transition between wet and dry modified bog.	
63	HU 52314 81332	This area, mapped as U6, was more U5 in May 2022, although there were commonly still patches of dense heath rush. Mat grass was commonly abundant, with fork-mosses, red bog-moss,	

TG	Grid ref	Note	Photo
		glittering wood-moss and common cottongrass.	
64	HU 52358 81255	Near T17. H10a as mapped. Shallow soils. Rocks showing through. Heather with heath rush and occasional deergrass. Woolly fringe moss frequent.	
65	HU 52379 81477	Bare ground and M29 as mapped.	
66	HU 52385 81512	M6 as mapped. It was open with flat-topped bog-moss and sedges and other graminoids growing through it.	
67	HU 52173 81780	Little Water lochan as mapped.	
68	HU 51460 81717	Near T14. Bare peat and bare ground as mapped. Vast area of bare peat with patches of mineral soil. Some U6 and U5 colonizing in places.	
69	HU 51663 82108	Near T10. M19 as mapped, but it was modified (in terms of the PCA, and as mapped) and degraded. It was graminoid rich with some patches of red bog-moss.	
70	HU 50405 80266	Woolly fringe moss dominated heath H14 as mapped.	
71	HU 50459 80484	U6 with H14 and M15 beside it as mapped, although U6 was closer to U5 in many places.	
72	HU 50473 80585	M29 as mapped, although there were no M1 pools. Possible that these had dried.	
73	HU 50795 80671	H10b dry heath as mapped.	
74	HU 50913 80840	This area was mapped as M19, but it is now best described as wet modified bog.	

TG	Grid ref	Note	Photo
75	HU 50981 81043	This area was mapped as M3/M6. It would now be best described as a combination of M2, M3 and M6.	
76	HU 51210 81146	Large area wet modified bog as mapped.	
77	HU 51640 81253	U6 as mapped, though occasional wet areas of M6.	
78	HU 48728 81499	Large area of dry modified bog with occasional patches of wet modified bog as mapped.	
79	HU 48365 82352	U6 as mapped, but now patches of M15 wet heath in some areas.	
80	HU 48286 82572	Dry modified bog as mapped with acid grassland and U5 to U6 up the slopes (mapped as U6). U6 along stream, as mapped.	

Table 1: Target Notes from a walkover survey of the Study Area in May 2022.

Figure 3: Target Note Locations



Discussion

There was no fundamental change in the habitats and communities present in 2022 compared to those reported in the original surveys and presented in the Beaw Field ES and HMP.

Some small differences in the habitats and communities were noted. For example, some areas appeared to be more eroded than were reported in the original survey with erosion blocks fallen and a deterioration of the vegetation (e.g. TG35, TG36, TG49 and TG74). These areas were previously described as M19 blanket bog but were now considered to be better described as wet modified bog. This may show a deterioration of the habitat since the original surveys.

Another noted change in community type was seen in some locations where a form of acid grassland dominated by mat grass was more prevalent than the previously reported acid grassland dominated by heath rush (U6) (e.g. TG51, TG60, TG63 and TG71). This may demonstrate a form of succession between the grassland types over the intervening decade. However, both NVC communities are forms of acid grassland.

One of the watercourse habitats was considered to be better described now as U6:U5:MG10 at a ratio of 50:30:20 compared to the previous survey which described it as U6. This could show real change or may be differences due to inherent variation in habitat surveys.

There were three small patches within the wider blanket bog/modified bog habitat that were picked out as different NVC communities in 2022 but were not mapped in the previous surveys. These areas were M19 at TG17, some M18 at TG19 and some U6 at TG20. These were very small in the context of the Study Area and broadly formed part of the overall bog or mire complex as previously mapped.

Variation in habitat mapping between different surveyors, and between the same surveyor at different times, is a well-known and accepted limitation to the process of mapping habitats and there are several potential explanations to account for the small differences recorded in 2022 compared to the previous surveys.

Firstly, there could be a small degree of real habitat and community change over the past ca. 10 years. For example, the transition/succession between U5 and U6 grassland is well understood (e.g. Rodwell, 1992) and some additional erosion and deterioration in the condition of blanket bog in the intervening ca. 10 years is considered inevitable given the condition of the site and the continued presence of sheep.

A well-recognised and inherent limitation of all habitat survey work, including the standard Phase 1 Habitat and NVC surveys used within the Study Area is that different surveyors often interpret and map the vegetation communities differently (e.g. Hearn *et al.* 2011) and this would likely also be the case for the same surveyor mapping at two different times, especially 10 years apart.

Hearn and co-workers (2011) demonstrated that when seven experienced NVC surveyors surveyed the same study area within a five-week period, the average proportion of the area that had the same NVC community for each pair-wise comparison of the maps produced by the seven surveyors was 34%. The level of agreement ranged from 5 to 70%. This clearly

demonstrates that the mapping of NVC communities (which are themselves human constructs) has known inherent variation.

The composition of habitats varies in both space and time. Temporal variations, within a season occur because some species are only visible earlier or later in the summer seasons. Variation between seasons can also be high with abiotic and biotic factors affecting which species are present at whatever densities. These within and between season variations can impact upon the assessment of a habitat/community and could account for some of the difference between years.

Many habitats and communities grade into one another gradually over several metres. Habitats therefore do not conform to the prescribed communities with hard, 'clear' edges, so professional judgments are made of the 'best fit' to a community and where lines of demarcation are drawn between communities, especially within transitions. This is a well-known and recognised source of variation between surveyors: no two surveyors are likely to map the exact same habitat edge where habitats grade into each other and so even the same surveyor, when looking at the same habitats 10 years apart would not necessarily place the line the same location.

The habitats and communities at Beaw Field were described and mapped accurately by Alba Ecology following standard methods and guidance in 2012 and 2015 with further work carried out in 2020. The field survey work carried out in 2022 confirms that there have been no fundamental changes in the habitats and communities as described in the Beaw field ES. Therefore, there were no substantial changes identified in the baseline habitats that would mean that the assessment of potential impacts on habitat within the original ES was no longer valid.

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