Developing results-based approaches to supporting the management of common grazings– final report, part 2: annexes

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European Forum on
Nature Conservation
and Pastoralism

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Figure 1. Eroding peat on Beinn Mholach in north central Lewis. (Richard Webb, Creative Commons Licence)

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Annex 1 – scorecards and guidance

General scorecard, guidance and species ID card

A.1 What is the number of positive indicators in the field? Circle all positive indicators present from List A.

PI no.	Low: up to 5	Low: 6-10	Medium: 11-15	High: 16-20	Very high: >20
Score	*0*	*5*	*10*	*15*	*20*

List A - positive indicators

1	Birds-foot-trefoils (Common & Greater) & Kidney Vetch	**23**	Milkworts
2	Black bog-rush	**24**	Mints - all species
3	Blaeberry	**25**	Mountain everlasting
4	Bog Pimpernel	**26**	Orchids - all species
5	Bushy lichens	**27**	Ox-eye Daisy (not common daisy)
6	Common mouse-ear	**28**	Pale butterwort
7	Cowslip & Primrose	**29**	Ragged Robin
8	Crowberry	**30**	Ribwort plantain
9	Devil's bit scabious	**31**	Rushes, Woodrushes, Spike Rushes, **not** soft/cong. rush
10	Eyebrights - all species	**32**	Sedges - all species except star sedge
11	Harebell	**33**	Selfheal and Bugle
12	Juniper	**34**	Small umbels - Pignut, Yarrow, Sneezewort or Wild Carrot
13	Knapweed	**35**	Sorrel - Common & Sheep
14	Lady's bedstraw	**36**	St John's Worts (not Tutsan)
15	Lady's Mantle	**37**	Tormentil
16	Lady's Smock - also known as Cuckooflower	**38**	Vetches/vetchlings - Meadow, Bitter, Tufted etc.
17	Large Umbels - Angelica, Valerian & Common Hogweed	**39**	Violets - all species
18	Lesser spearwort	**40**	White-flowered bedstraws (heath, marsh)
19	Louseworts - Common & Marsh	**41**	Wild Thyme
20	Marsh Cinquefoil or Marsh Marigold	**42**	Yellow Composites which are not dandelion
21	Marsh Pennywort	**43**	Yellow-rattle - also known as Hay Rattle
22	Meadowsweet		

A2. Frequency of positive species and structure of vegetation

		Structure of the vegetation				
	This column first (Answer each question in turn from the top) All questions apply to the main body of the assessments area (i.e. Away from running water, rock outcrops and tracks) ↓	**Then this row →**	Uniformly short vegetation with many signs of **very heavy grazing** throughout.	Vegetation mostly a **mixture of tall and short**, judged at a scale appropriate to the species present; dead litter from previous years is insignificant/ minimal.	Vegetation is characteristic of being for **hay/silage or deferred grazing**, i.e. Relatively uniform and dead litter from previous years insignificant/ minimal	Dead litter is common, vegetation generally rank, assessment area may have signs of recent grazing, but clearly **undergrazed**
Frequency of positive indicator species from List A	1 or more species from A.1 **present**?	If no →	-10	0	0	-10
	If yes, 5 or more species from List A **present**?	If no →	0	5	5	0
	If yes 5 or more species from list A **common**?	If no →	5	30	30	5
	If yes 1-5 species from List A **abundant**?	If no →	10	50	50	10
	If yes >5 species from List A are **abundant**?	If no →	10	60	60	20
		If yes →	15	80	80	35

A.3 Native woodland and scrub in the mosaic.
If the score for A.2 is within the green rows, go to A.4. Otherwise:

What is the combined canopy cover of native woodland and scrub as a % of the assessment area (do not include bog myrtle or any negative species listed below)?

	Negligible: >1%	Low: 1-5%	Medium: 6-14%	High: 15-20%
Score	*0*	*5*	*10*	*15*

If it is present, is the woodland and scrub cover sustainable?

Any regeneration present is below 15 cm tall, clear browse line	Limited number of young trees/bushes and unbrowsed saplings	Good spatial distribution of trees/bushes of all ages - equivalent to at least 10% of the wooded area is regenerating
-5	*5*	*15*

A.4 What is the combined cover of the following potentially-dominating species: bracken, soft rush, brambles, tufted hair-grass, European Gorse?
(Do not count sparse bracken nor any areas of any of the species showing signs of mechanical control in the year of survey)

	High: >50%	Med-high: 21-50%	Med-low: 11-20%	Low: 6-10%	Negligible: <5%
Score	*-40*	*-25*	*-15*	*-10*	*0*

B. Indicators of damage

B1. Is rhododendron present?

Yes	No
-50	*0*

B.2 What is the combined cover of the following negative indicators: other exotic species, docks, cotoneaster Crocosmia, nettles, spear or creeping thistles, ragwort, self-seeded non-native conifers?

	High: Is it common over 10% or 5 ha (whichever largest)	Medium: Is it Common over 5-9% or 0.5 to 2 ha (whichever largest)	Low: Is it common over more than up to 4% or 0.5 ha (whichever largest)	Absent or negligible: Less than 1% or 0.5 ha (whichever is the smallest)
Score	*-40*	*-25*	*-15*	*0*

B.3 What is the impact of artificial drainage on the habitats?

	High: Drains are delivering sediment to the natural watercourse and having clear impact on the habitats	Medium-high: Drains either significant in terms of sediment or impact on surrouding habitats	Medium-Low: Drains present but have limited or highly localised impact on habitats	Absent or negligible: Drains absent or having negligible impacts on habitats
Score	*-50*	*-30*	*-5*	*0*

B.4 What is the scale and impact of supplementary feeding?

	High: Some feed sites are impacting >0.5 ha each and/or are impacting directly on watercourses in terms of poaching or disturbed vegetation	Medium-high: No feed sites are impacting directly on watercourses but some sites impacting >0.5 ha in terms of poaching or disturbed vegetation	Medium-Low: No feed site impacting >0.5 ha in terms of either poaching or disturbed vegetation	Absent or negligible: Minimal or no damage from feed sites
Score	*-80*	*-30*	*-5*	*0*

B.5 What is the scale and impact of any other damaging activities in terms of their impact on soil or water?

	High: Either soil or water being severely affected in terms of either seriousness or scale	Medium-high: Either soil or water being affected in a limited way	Medium-Low: Occasional and localised impacts	Absent or negligible impact
Score	*-80*	*-30*	*-5*	*0*

RESULTS-BASED GUIDANCE OUTER HEBRIDES

General card

It is recommended that these guidelines are read fully prior to carrying out scoring

Aim of the scorecard

To promote the positive management of general habitat in the Outer Hebrides. General habitat is defined as habitat which is **not** blanket bog, machair or wader grazed grassland.

Objectives:

- To maintain or improve the condition of general habitat
- To support crofters and common grazing committees in the management of general habitat, rewarding good condition and encourage improvement in that condition
- Conservation priority species such as oceanic liverworts, fresh water pearl mussel and golden eagle are supported
- To provide other associated ecosystem benefits such as water flow management, wider biodiversity and pollination

Outcomes:

- Increased awareness of positive habitat condition of general habitat
- The habitat is better managed and the condition of degraded habitat is improved
- Crofters and common grazings can use their own skills to manage the general habitat appropriate to their common grazing

What is general habitat?

General habitat is a catch all term used for habitat in the Outer Hebrides which is not blanket bog, machair or wader grazed grassland, and is likely to be the most commonly encountered type of habitat. General habitat can include a number of different habitat types, or a mosaic of different habitat types, but will typically be dominated by a mix of dwarf shrubs and grasses. General habitat can extend from sea level to over 600m elevation, and can be found on gentle to steep slopes, as well as on crags and ledges. It is mostly unwooded but can have scattered native trees and shrubs which grow in sheltered areas and glens.

The habitat types included in the general habitat vary depending on environmental conditions including soil type, drainage, vegetation and oceanic influence. Soil type can range from mineral soil to shallow peaty soil. It does not include deep peat >50cm or soil made up of wind-blown shell-sand. Drainage can range from free-draining to damp and waterlogged.
While vegetation will mainly be dominated by dwarf shrubs and grasses it can include the following habitat types:

- Dry heath – free-draining mineral soil dominated by bell and ling heather, blaeberry, grasses, and flowering plants such as tormentil and heath bedstraw (Fig 1).

Fig 1: Dry heath dominated by heather species

- Wet heath – shallow peat soil (which does not dry out in summer) and is dominated by cross-leaved heath, deer-grass and purple moor-grass with mosses, bog asphodel, orchids and bushy lichens (Fig 2).

Fig 2: Wet heath dominated by cross-leaved heath, deergrass and purple moor-grass

- Coastal heath – typically found on the Atlantic coast and on the tops of cliffs where strong winds and sea spray keep the vegetation short. Vegetation includes typical heath species such ling and tormentil but species which are tolerant of exposure to salt such as sea plantain and spring squill can also be found (Fig 3).

Fig 3: Coastal heath with short vegetation.

- Montane heath – typically found above 700m but can be found as low as 300m in the Outer Hebrides because of the strong influence of climate. Montane heath is typically short and can have wind-clipped vegetation which grows close to the ground. Carpets of the grey-green woolly hair-moss (*Racomitrium lanuginosum*) are common in montane heath in the Outer Hebrides (Fig 4)

Fig 4: Woolly hair-moss commonly forms carpets in montane heath (Creative Commons licence ©Martin Godfrey).

- Liverwort-rich heath – this is a globally scarce type of damp heath which is largely restricted to cool oceanic climates. It is typically found on steep, shaded areas like rocky north-facing outcrops or on the sides of ravines (Fig 5). It can occur at sea level but is more commonly encountered in hillier areas between 300-600m elevation. Some of the rarest liverworts are found in small sites in North and West Harris such as Carrington's featherwort (*Plagiochila carringtonii*) and cloud earwort (*Scapania nimbosa).*

Fig 5: Purple spoonwort – a oceanic liverwort found in steep and shaded heath habitat, and also occasionally in blanket bog

- Acid grassland – grass dominated vegetation on acidic soils. Acid grassland occurs most extensively in the grazed uplands and extends to over 600m elevation. Vegetation is typically short with a mix of different grasses and flowering plants such as tormentil and heath bedstraw (Fig 6).

Fig 6: Acid grassland with stands of wiry matgrass (Nardus stricta)

- Inundation grassland – this type of grassland is found at the coast and is frequently inundated with sea spray. Vegetation height can be variable.

General habitat is valuable to a vast range of species including many priority species such as skylark, twite, merlin, short-eared owl, hen harrier, golden eagle and white-tailed eagle.

Scorecard outcomes

The habitat outcomes for the general scorecard are as follows:

- To maintain or improve biodiversity
- To maintain or increase cover of positive indicators
- To remove invasive non-native plant species
- To minimise the occurrence of negative indicator species
- To promote all four growth stages of ericoid shrubs i.e. heathers where they are present
- To minimise areas of bare soil
- To identify and better manage areas of damage

When to use the scorecard

This scorecard is for use on habitats which are dominated by dwarf shrubs and grasses where none of the following habitats cover a significant area: blanket bog, machair or wader grazed grassland.

Time of year

The assessment can be carried out from April to October but ideally should be carried out between May and September. Most of the positive indicators will be in flower during these months making them easier to identify. Species ID sheets are provided to aid in identification.

How to use the scorecard

The purpose of the scorecard is to evaluate the overall condition of the general habitat. The general scorecard covers a broad range of habitat types and the scorecard is designed to encompass this variation whilst still providing the necessary flexibility to allow for crofters to select the most appropriate management for their common grazing.

Step 1: Preparatory work – remote sensing imagery

It is beneficial to have previous knowledge of the site in order to identify areas to target for assessment, as it is likely most common grazings are made up of more than one type of habitat e.g. a mix of general and blanket bog. Aerial photography can be a useful tool in visualising the extent of the habitat and can help with planning which areas within the common grazing to survey.

Step 2: Preparatory work – planning the survey

It is recommended that a map is prepared prior to going on site which allows the extent of the habitat to be outlined and a pre-planned survey route marked on. The survey route should take the form of a structured walk in the shape of a "w". This helps to prevent the surveyor from inadvertently following tracks and paths and cover a greater extent of the habitat and therefore a more accurate measure of habitat quality.

Along the length of the "w" a number of points should be marked on at regular intervals (Fig 7). These points are where the surveyor will stop when carrying out the assessment. Monitoring stops should be representative of the variation in condition across the area so if they are marked on prior to going on site this should prevent surveyors inadvertently being drawn to more diverse or less damaged areas. It is recommended that a minimum of 10 stops are made per assessment with the number of stops increasing in line (between 10-20) with the area of habitat present.

When marking on the monitoring stops it is recommended that a grid reference (to at least 8 figures) is noted so that these points can be located when out on site. GPS use is encouraged and can greatly assist with the assessment. Most mobile phones are equipped with GPS and/or a mapping app which would be suitable for use in the assessment.

Fig 7: Example of a structured walk. The "w" is outlined in red with monitoring stops (circles) at regular intervals. The extent of habitat is outlined in black.

Step 3: Arriving on site

When arriving on site it is important to check that the map corresponds with what you see on the ground as some satellite photographs can be several years old. It is important to note that once the structured walk and monitoring stops have been finalised, this same route will be walked in future years in order to assess the change in habitat condition and any increase in score. Therefore this information **must** be securely stored for future use.

Step 4: Carrying out the assessment

The time taken to carry out the structured walk will vary with the size of the assessment area and the total number of monitoring stops. The type of walking terrain should also be considered as rougher terrain takes longer to walk.

At each monitoring stop two tasks should be carried out:

- Examine the vegetation in a rough 1x1m² area in order to look more closely at the vegetation and identify positive indicators, late-flowering positive indicators, and negative indicators. A table has been provided with the list of positive indicators so that they can be ticked off at each monitoring spot in order to make recording them easier.
- Stand in the same spot and turning 360º look at the habitat features to be assessed within a 30m radius. This allows the surveyor to look at the quality of habitat at a more landscape-scale. Here the surveyor is trying to assess condition as an **overall** score of all monitoring

stops, not just one particular stop, and scoring the habitat at the end of the assessment. When a particular score is consistently high in one area and low in another, consider again whether it might be appropriate to split the parcel for scoring.

Step 5: Calculating your score
Once the assessment has been carried out count up the points in each section to give a score out of 100.

Working through the scorecard

Section A: Ecological quality
Points available: 100

A.1 What is the number of positive indicators in the field? Circle all positive indicators present from List A.
There are 43 positive indicator species in List A which cover the range of species found within wet heath, dry heath, coastal and montane heath, as well as acid grassland, inundation grassland and species-rich grassland which is not machair. The positive indicators, all of which are easily identifiable, reward areas with a high diversity of flowering plants, shrubs, lichens and some sedges and rushes. Many of these species are important for a wide range of pollinating insects and other invertebrates, which in turn support numerous other species. Species ID cards are provided to help with identification.

A.2 Frequency of positive species and structure of vegetation
This question assesses grazing levels, species diversity and vegetation structure by showing the correlation between species diversity and vegetation structure (Fig 8). The scores are presented as a matrix, which increase with both species diversity and quality of vegetation structure. Questions in the frequency of positive indicators column should be addressed first and worked through systematically. Once the appropriate frequency has been selected, read through the structure of vegetation categories to finally decide the overall score for the question.

General habitat dominated by heather species (e.g. ling, cross-leaved heath and bell heather) will be one of the most frequently encountered types of general habitat in the Outer Hebrides. Heather species can be useful indicators of the condition of habitat, particularly when assessing vegetation structure. When in good condition, the heather species found in general habitat should show a high degree of variation in vegetation structure, usually with lots of plants growing together forming a bushy carpet. This mix of short and tall vegetation provides valuable feeding habitat for some bird species, whereas taller stands of heather are favoured by species such as hen harrier and merlin for nesting habitat. If the heathers are uniformly short in height, this tends to indicate past damage such as burning or overgrazing. In contrast, if the heathers are uniformly tall, this can indicate a lack of grazing and poor variation in vegetation structure.

In addition to this, all four stages of heather growth should be evident; this is a clear sign of good condition. The four stages are:

1. Pioneer stage – from seedling to young plant; flowers after the first year
2. Building stage – well established plant with bushy growth; very few plants growing underneath the canopy of heather
3. Mature stage – growth is less vigorous with gaps opening up in the heather canopy
4. Degenerate stage – more gaps opening up in the heather canopy; some dead branches evident

It is important to note that exposure to wind and elevation can significantly alter vegetation structure, with heather species in exposed areas growing close to the ground and in the direction of the prevailing wind. In these conditions, shorter or more uniform vegetation structure is natural and some plants might actually be over 20 years old but not very tall. Older heather plants can be identified by their thicker, woody stems.

If the score is within the green rows go to A.4. If the score is not within the green rows go to A.3.

Fig 8: Differences in vegetation structure: heavily grazed habitat (right of the fence) with recovering habitat (left of the fence)

A.3 Native woodland and scrub in the mosaic

This question applies to low scoring parcels with a lower frequency of positive indicator species in the first three rows of the matrix. The aim is to reward the common grazing for scattered native scrub or woodland that would be more typically found in relatively species poor areas of general habitat. For example, dry heath can be in good condition but have a limited number of positive indicators which may result in a low score within the A.2 matrix. By applying these "top up" points, a fairer score will be achieved.

A.4 What is the combined cover of the following potentially-dominating species: bracken, soft rush, brambles, tufted hair-grass, European Gorse? (Do not count sparse bracken nor any areas of any of the species showing signs of mechanical control in the year of survey)

The above species can be beneficial for biodiversity on a common grazing providing they are not allowed to become dominant. Some species such as soft rush can quickly colonise areas of damp ground that has been disturbed, whereas bramble can become established when grazing levels are too low. These species can become difficult to control if they are allowed to spread and not managed appropriately. Scoring is designed to incentivize prompt management of these species.

Section B: Indicators of damage

Points available: 0

B.1 Is rhododendron present?

A high quality habitat should not contain any invasive non-native species. Non-natives can be extremely detrimental to habitat quality and rhododendron is particularly problematic to control if allowed to become established. Scoring here is designed to encourage monitoring and control of rhododendron in order to prevent it becoming established in the first place. It is essential that if any non-native species are identified, even if not on the structured walk route, they are dealt with in a prompt and appropriate manor to prevent them becoming an issue in the future.

B.2 What is the combined cover of the following negative indicators: other exotic species, docks, cotoneaster, Crocosmia, nettles, spear or creeping thistles, ragwort, self-seeded non-native conifers?

Some native species can alert us to threats to the condition of general habitat, particularly when they are common. The various individual 'negative indicator' species each indicate a slightly different potential threat. For example, species such as thistle can indicate disturbance and enrichment, whereas ragwort can indicate heavy grazing. Other invasive non-natives such as garden escapees like Crocosmia are included in this category (Fig 9). While they are not as damaging as rhododendron, they can spread quickly if not managed. Negative indicators can be difficult to control once they become established therefore regular monitoring and removal is recommended.

Fig 9: Crocosmia growing along a peat road.

B.3 What is the impact of artificial drainage on the habitats?

The wetness of soil can vary considerably between the different habitat types covered by general habitat. For example, wet heath has wet ground conditions and tends to be wet all year round, whereas dry heath is well-drained. Artificial drainage can therefore negatively impact on wet heath and other damp heaths but have little impact on dry heath. When assessing the impact of artificial drainage the scale of the impact should be considered i.e. is the vegetation adjacent to the drain different from the surrounding vegetation? This should give some indication as to whether or not the drain is negatively impacting on the habitat. The other factor to consider is whether the artificial drain is causing erosion and delivering sediment into the watercourse.

B.4 What is the scale and impact of supplementary feeding?

The impact of supplementary feeding can be assessed by considering the level of poaching and disturbance to vegetation, and whether it directly impacts on watercourses. If the ground is heavily poached around a watercourse this can result in soil erosion and sediment being released into the water. This can potentially led to a decrease in water quality and can be difficult to manage if the area of damage is allowed to increase. Damage can be minimised by regularly moving feeding sites, and ensuring feeding sites are not located near to watercourses (Fig 10).

Fig 10: Hay feeders with medium-low impact; some bare ground and disturbance of vegetation evident but limited to less than 0.5ha.

B.5 What is the scale and impact of any other damaging activities in terms of their impact on soil or water?

Other damaging activities can include: burning (Fig 11), dumping, pollution, inappropriate herbicide use, and ATV damage. Dumping from fly-tipping can be discouraged through signage, gates and restricted access, as can anti-social use of ATV's. Scoring is related to the scale of impact.

Fig 11: Burning removes the vegetation layer which leaves soil vulnerable to erosion from weather and trampling, and can take many years for the habitat to recover

LIST A: Positive indicators

(1) Bird's foot trefoil and kidney vetch

(2) Black bog-rush

(3) Blaeberry

(4) Bog pimpernel

(5) Bushy lichens

(6) Common mouse-ear

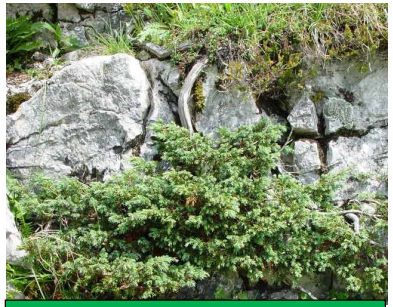
(7) Cowslip and primrose

(8) Crowberry

(9) Devil's bit scabious

(10) Eyebrights

(11) Harebell



(12) Juniper

(13) Knapweed

(14) Lady's bedstraw

(15) Lady's mantle

(16) Lady's smock

(17) Large umbellifers

(18) Lesser spearwort

(19) Lousewort – marsh/common

(20) Marsh cinquefoil and marsh marigold

(21) Marsh pennywort

(22) Meadowsweet

(23) Milkworts

(24) Mints – all species

(25) Mountain everlasting

(26) Orchids

(27) Ox-eye daisy

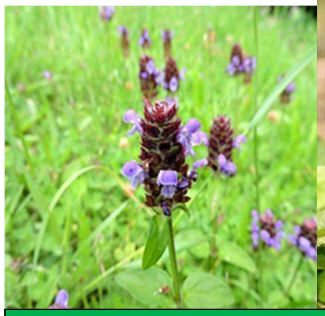
(28) Pale butterwort

(29) Ragged robin

(30) Ribwort plantain

(31) Rush – all except soft/conglomerate

(32) Sedges – all except star sedge



(33) Selfheal and bugle

(34) Small umbellifers

(35) Sorrels

(36) St John's worts – not tutsan

(37) Tormentil

(38) Vetches/vetchlings – all species

(39) Violets – all species

(40) White-flowered bedstraws

(41) Wild thyme

(42) Yellow composites – not dandelion

(43) Yellow rattle

Bog scorecard, guidance notes and ID sheet

Common Grazing name:
Common Grazing ID:

Surveyor:
Survey date:

Total score: /100

Section A: Species diversity Score /50

A.1 How many positive indicators are present? (please circle all positive indicators recorded below)

Number of species: Low: 0 (0-2) Medium: 5 (3-4) High: 10 (5-6) Very high: 20 (7+)

Positive indicators: (look at all 3 vegetation layers)

Moss layer:	*Dwarf shrub layer:*	*Sedge/herb layer:*
1. Mound-forming sphagnums	5. Cross-leaved heath	7. Black bog-rush
2. Blanket-forming sphagnums	6. Ling heather	8. Common cotton-grass
3. Bog pool sphagnums		9. Deergrass
4. Non-crustose lichens		10. Hare's tail cotton-grass
		11. White beak-sedge

Negative indicators:

European gorse
Tufted hair-grass
Heath or Soft rush
Nettle

A.2 What is the combined cover of *Sphagnum mosses* away from ditches*?* (positive indicators listed above)

Cover: Low: 0 (0-10%) Med-low: 10 (11-20%) Medium: 15 (21-30%) High: 20 (31-40%) Very high: 30 (>40%)

A.3 Presence of non-native species:

Present: -30 Absent: 0

A.4 What is the combined cover of all negative indicators?

Cover: High: -20 (>25%:) Medium: -10 (11-25%) Med-low: -5 (1-10%) Low: 0 (<1%)

B. Vegetation structure Score /10

B.1 How is vegetation structure impacted by grazing?

Overgrazed	Moderate-high	Moderate-low	Good	Undergrazed
Uniformly short herb and dwarf shrub vegetation. Many other signs of excessive stock pressure e.g. hoof prints, dung and paths and of enrichment.	Uniformly short herb and dwarf shrub vegetation. Only localised other signs of excessive stock pressure e.g. hoof prints, dung, paths and of enrichment.	Herb and dwarf shrub vegetation a mix of tall and short over most of the site. Few signs of excessive stock pressure e.g. hoof prints, dung and paths and of enrichment	Herb and dwarf shrub vegetation a mix of tall and short over most of the site. No signs of excessive stock pressure e.g. hoof prints, dung and paths and of enrichment.	Herb and dwarf shrub vegetation uniformly tall; litter may be common in certain vegetation types; few or no signs of grazing
Score -25	Score -5	Score 0	Score 10	-5

C. Integrity of bog function Score /40

C.1 To what extent has modification impacted on bog hydrology?

Damaged/drained bog	Modified bog with significantly altered hydrology	Modified bog with slightly altered hydrology	Near natural bog with slightly altered hydrology	Near natural bog with intact hydrology
Free flowing drains/gullies allow rapid water flow away from most of the bog area causing significant impact on surrounding bog vegetation. Areas of flat bare peat with standing water or cracked surface may be present.	Evidence of rapid water flow from site at multiple locations e.g. extensive peat banks with seepage or drainage channels without vegetation to slow water flow. Areas of flat bare peat with standing water or cracked surface may be present.	Localised evidence of rapid water flow from site e.g. roadside ditch. Bog surface intact across over most of the site. Water flow in ditches/ gullies slowed by the presence of vegetation but movement of water still evident. Seepage evident on peat banks but cut banks are not numerous.	Negligible evidence of rapid water flow from site. Bog surface largely intact. If drains or channels present the flow of water is slowed by dense vegetation. If old peat banks are present they are localised and largely revegetated.	Minimal evidence of rapid water flow from the site. Intact bog surface with negligible evidence of past drainage or disturbance.
Score -30	Score -15	Score 0	Score 10	Score 20

C.2 What is the height of the water table for most of the year?

Very poor	Poor	Moderate	Good	Excellent
Little evidence of high water table apart from small localised wet areas.	The ground is noticeably dry across multiple damaged locations. The water table is not high throughout or low for some of the year.	The water table is high in places although some areas of dry ground where surface is damaged.	High water table mostly throughout although some small localised drier areas.	High water table with ground obviously wet throughout.
Score -20	Score -10	Score 0	Score 10	Score 20

D. Threats to site Score /0

D.1 Select from the table below the most serious category of damage, considering the indicators of damage which occur.

High	Medium	Low	Negligible
Areas of bare and eroding soil (>5%) e.g. large peat hagg/gully systems OR Peat cut by machine OR Significant damage caused by vehicle tracks with multiple areas of bare soil from rutting and/or extensive damage to moss layer (>2%)	Small areas of bare and eroding soil evident (1-5%) across the assessment area OR Small peat hagg/gully system starting to form OR Active peat banks with steep bare peat "cliffs" with vegetation layer not replaced OR Small areas of damage to soil and/or moss layer from vehicle tracks (1-2%)	Bare soil evident along more frequently used routes but (<1%) but no peat hagg/gully system present OR Few areas of bare soil although some old peat bank 'cliffs' evident. OR Vehicle tracks causing limited erosion and/or damage to moss layer (<1%).	Little or no bare soil across the entire assessment area. Some bare patches at 'pinch' points (e.g. gateways) is acceptable providing there are no signs of erosion. AND Vehicle tracks are restricted to established tracks only.
Score -50	Score -30	Score -10	Score 0

D.2 Is there evidence of damage to vegetation, soil or water from other activities? (if yes, list them all below)
Examples can include: burning, dumping, pollution to soil/water, inappropriate herbicide use, litter, etc

Cover: High: >10% -50 Med: 1-10% -20 Low: <1% -10 Absent: 0

RESULTS-BASED GUIDANCE OUTER HEBRIDES

European Forum

BLANKET BOG

It is recommended that these guidelines are read fully prior to carrying out scoring

Aim of the scorecard
To promote the positive management of blanket bog in the Outer Hebrides.

Objectives:

- To improve the condition of blanket bog habitat
- To minimise peat erosion and oxidation and where possible to increase carbon sequestration
- To support or enhance the provision of other associated ecosystem services, including high quality water, water flow regulation, and wider biodiversity
- To support crofters and common grazings committees in the management of blanket bog, rewarding good blanket bog condition and encouraging improvement in that condition

Outcomes:

- Increased awareness of positive habitat condition of blanket bog
- Blanket bog is better managed and the condition of degraded blanket bog is improved
- Crofters and common grazings can use their own skills to manage blanket bog appropriate to their common grazing
- Well managed blanket supports conservation priority species such as dunlin, red-throated and black throated divers, and raptors and pollinating insects e.g. large heath butterfly

What is blanket bog?
Blanket bog is a type of wetland characterised its ability to accumulate and store dead organic matter in the form of peat. Blanket bog favours very wet ground conditions and can typically be found on flat or gently undulating ground which allows peat to accumulate to considerable depth >50cm. The accumulation of peat is a slow process (millimetres per year) and is mainly made up of sphagnum mosses and other plant species such as cotton-grass.

Blanket bog is one of the dominant habitats found in moorland in the Outer Hebrides. All bog habitats are of conservation importance and are UK BAP Priority Habitats and Annex 1 habitats under the EU Habitats Directive. Blanket bog is a globally rare habitat and many sites within the Outer Hebrides receive national (e.g. Special Area for Conservation) and international designations (e.g. RAMSAR wetland of international importance). The largest area of blanket bog is found on

Lewis, the Lewis Peatlands, and is the second largest area of blanket bog in Europe. The Uists also have vast areas of blanket bog, particularly Mointeach Scadabhaigh SAC, in North Uist.

Bogs deliver a multitude of public goods such as drinking water, water flow regulation, and are widely recognized for their crucial role in mitigating climate change via carbon sequestration. They are also important for biodiversity, having many bog-specialist species and provide habitat for rare populations of breeding birds such as waders and raptors. Migratory and over-wintering bird species also rely on blanket bog.

Scorecard outcomes:
To be healthy, blanket bog must first and foremost be wet all year round. Blanket bog in good condition should have a high water table and have an open vegetation structure (Fig 1). Vegetation cover needs to be continuous to prevent the peat layer from drying out or erosion. The landscape of a blanket bog is typically undulating with small raised mossy mounds, the classic blanket bog "hummock-and-hollow" feature. Sphagnum mosses thrive in this wet and acidic environment, forming carpets, mounds and being found in bog pools. Blanket bog is a highly sensitive habitat which has taken thousands of years to form and slow to respond to changes in management.

The habitat outcomes for blanket bog scorecard are as follows:

- To maintain or improve blanket bog biodiversity
- To increase the cover of peat-forming sphagnum mosses
- To remove invasive non-native plant species
- To minimise the occurrence of negative indicator species
- To maintain an open vegetation structure
- To prevent damage to the sphagnum moss layer and other vegetation by considering stocking densities and time of year of grazing
- To improve and maintain the "wetness" of bog habitat
- To minimise areas of pare peat and prevent further peat loss
- To identify and better manage areas of damage

It should be noted that muirburn or burning of any kind is highly damaging to blanket bog and is **not** permitted by the Muirburn Code and is a breach of cross-compliance rules for agricultural payments.

When to use the scorecard
This scorecard is for use on blanket bog. Blanket bog is classed as habitat with deep peat soil (typically >50cm) dominated by sphagnum mosses and cotton-grasses. Blanket bog is usually found on flat or gently undulating ground and tends to be obviously wet and squelchy underfoot. Where ground becomes rocky, steepens or the soil becomes thin this is likely to be a different type of habitat from blanket bog.

Blanket bog in poor condition may no longer be dominated by its characteristic sphagnum mosses and cotton-grasses. In some instances it may have species more typical of heath, particularly if it has been drained as drier ground conditions are less favourable to sphagnum mosses. However, if there is clear evidence of deep peat soil indicated by the presence of peat banks or peat haggs then the

blanket bog scorecard should still be used (Fig 2). However, if the habitat is heavily degraded and most of the peat layer has been removed it is worth seeking specialist advice before proceeding with the assessment.

Fig. 1: Blanket bog is characteristically flat and open

Fig. 2: Degraded blanket bog with evidence of deep peat

Time of year

It is possible to assess the quality of blanket bog all year round. However, for ease of identification of the indicator species it is recommended that assessments are carried out between May and September. Species ID sheets are provided to aid in identification.

How to use the scorecard

Step 1: Preparatory work, remote sensing imagery

It is beneficial to have previous knowledge of the site in order to identify areas to target for assessment as it is unlikely that a common grazing is made up entirely of blanket bog. Aerial photography can be a useful tool in visualising the extent of the habitat and can help with planning which areas within the common grazing to survey. Scale may be an issue for very large common grazings and subdividing the area into smaller units may help.

Step 2: Preparatory work, planning the survey

It is recommended that a map is prepared prior to going on site which allows the extent of the habitat to be outlined and a pre-planned survey route marked on. The survey route should take the form of a structured walk in the shape of a "w". This helps to prevent the surveyor from inadvertently following tracks and paths and cover a greater extent of the habitat and therefore a more accurate measure of habitat quality.

Along the length of the "w" a number of points should be marked on at regular intervals. These points are where the surveyor will stop when carrying out the assessment. Monitoring stops should be representative of the variation in condition across the area so if they are marked on prior to going on site this should prevent surveyors inadvertently being drawn to more diverse or less damaged areas. It is recommended that a minimum of 10 stops are made per assessment with the number of stops increasing in line (between 10-20) with the area of habitat present.

When marking on the monitoring stops it is recommended that a grid reference (to at least 8 figures) is noted so that these points can be located when out on site. GPS can also be used, for example, using an app on your mobile phone.

Step 3: Arriving on site

When arriving on site it is important to check that the map corresponds with what you see on the ground as some satellite photographs can be several years old.

Step 4: Carrying out the assessment

The time taken to carry out the structured walk will vary with the size of the assessment area and the total number of monitoring stops. The type of walking terrain should also be considered as rougher terrain takes longer to walk.

At each monitoring stop two tasks should be carried out:

1. Examine the vegetation in a rough 1x1m² area in order to look more closely at the vegetation and identify positive indicators, sphagnum cover, and negative indicators. No more than ten minutes should be necessary to carry this out at each stop.
2. Stand in the same spot and turning 360º look at the habitat features to be assessed within a 30m radius. This allows the surveyor to look at the quality of habitat at a more landscape-scale. Here the surveyor is trying to assess condition as an **overall** score of all monitoring stops, not just one particular stop, and scoring the habitat at the end of the assessment. When a particular score is consistently high in one area and low in another, consider again whether it might be appropriate to split the parcel for scoring.

Step 5: Calculating your score

Once the assessment has been carried out count up the points in each section to give a score out of 100. This value should then be divided by ten to give the overall habitat assessment score on a scale of one to ten.

Working through the scorecard

Section A: Species diversity

Points available: 50

A.1 How many positive indicators are present?

The positive indicators selected should all be found in good quality blanket bog. Indicators such as sphagnum and cottongrasses are good indicators of wet ground conditions. Others such as bushy lichens and heathers are useful indictors of grazing pressure and trampling.

A positive indicator should be frequently encountered during the survey i.e. occur in more than one stop to be considered present within the assessment area. All three vegetation layers should be examined; dwarf shrub, sedge/herb and moss layer. It may be necessary to part vegetation to see the ground cover of mosses and seedlings underneath (Fig 3).

Fig. 3: Examining all three vegetation layers

Possible ways to improve positive indicator cover:

1. Block drains to increase wetness of site
2. Low stocking density (LSU 0.02/ha)
3. No winter grazing
4. ATV use kept to roads and tracks
5. No burning

A.2 What is the combined cover of Sphagnum mosses away from ditches?

Sphagnum mosses are a key positive indicator for blanket bog and are essential in retaining moisture and the formation of peat. They are an excellent indicator of the health of a blanket bog as they are highly sensitive to drying out and damage from activities such as trampling and ATV use. A healthy bog can have many different species of sphagnum moss but they can be tricky to identify. They can be found in small pools and can also form small raised mounds or dense carpets. Other mosses can be present such as branched mosses but these tend to indicate drier ground conditions. Sphagnum have dense “flower heads” at the end of the stem and can range in colour from green, red, ochre and brown (Fig 4).

While the majority of sphagnum species are positive, some species are more tolerant of disturbance and water movement so sphagnum in ditches and in free-flowing drains should not be included when calculating cover even when the sphagnum fills up the whole drain.

Fig. 4: Sphagnum mosses

Possible ways to improve sphagnum cover:

6. Block drains to increase wetness of site
7. Low stocking density (LSU 0.02/ha)
8. No winter grazing
9. ATV use kept to roads and tracks
10. No burning

A.3 Presence of invasive non-native species:

A high quality habitat should not contain any non-native species. Non-natives can be extremely detrimental to habitat quality and some species e.g. rhododendron are difficult and costly to control once they become established (Fig 5). Scoring here is designed to encourage monitoring and control of such species to prevent them becoming established in the first place. Capital payments can be applied for to assist with control of invasive non-natives.

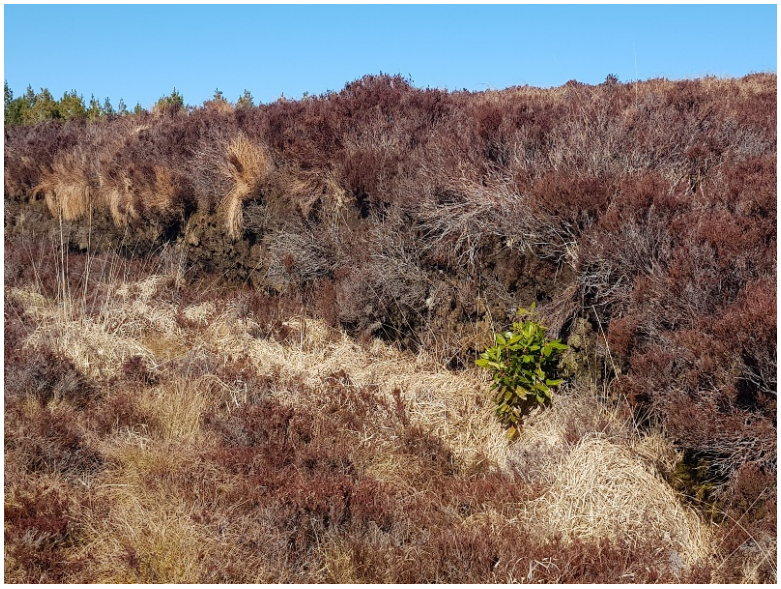


Fig. 5: Rhododendron plant growing in old peat banks.

A.4 What is the combined cover of all negative indicators?

Some native species can alert us to threats to the condition of the bog, particularly when they are common (see A.3). The various individual 'negative indicator' species each indicate a slightly different potential threat. For example, soft rush can indicate ground disturbance whereas thistle point to nutrient enrichment. This question has a maximum score of zero to incentivise prompt management and prevent the negative indicators from spreading.

Section B. Vegetation structure

Points available: 10

B.1 *How is vegetation structure impacted by grazing?*

Good quality blanket bog habitat has an open vegetation structure with minimal build up of dead leaf litter. An open structure means that no single dwarf shrub or sedge/herb should dominate and the positive indicators are scattered throughout. This open structure provides habitat for numerous protected bird species such as golden plover and greenshank, providing nesting and foraging habitat, as well as pollinators. A combination of light grazing and wet ground conditions should maintain the ideal open vegetation structure of blanket bog with minimal dead plant litter build up.

Grazing pressure can be assessed by looking for browsing damage to stems and vegetation, and signs of ground disturbance. Other obvious signs include hoof prints and dung. If plants normally considered unpalatable, such as cross-leaved heath, are browsed, this is an indication of high grazing pressure. Guidance from NS recommends 0.02 LU/ha/year – this includes all grazing species i.e. deer and livestock.

Timing of grazing is of critical importance as the peat surface is more easily damaged in the wetter winter months when vegetation is not growing. Heather species do not tend to be preferentially grazed if livestock levels are kept low, however, it can be susceptible to longer term damage if grazed over the winter.

1. Low stocking density (0.02 LU/ha)
2. No winter grazing
3. No supplementary feeding near stands of heather

Section C. Integrity of bog function

Points available: 40

C.1 To what extent has modification impacted on bog hydrology?

Hydrology is one of the most vital aspects of blanket bog health; ground conditions must be wet, preferably waterlogged, all year. Though peat bogs are wet, water tends to move through and over them rather slowly – the slower, the better. Hydrology can be altered by a number of factors: artificial drains, beat banks, peat haggs or anything which modifies or removes the vegetation layer from the bog surface. These activities can result in the removal of water from the bog. This can then have a cascade of negative effects leading to the peat layer drying out and becoming vulnerable to erosion. Dry peat is water-repellent, making the problem even worse. This prevents the bog from functioning naturally and can limit its ability to lock away carbon.

The impact of drainage is not always obvious from ground conditions and drainage ditches can alter the hydrology of the bog beyond their immediate area, usually resulting in an alteration of vegetation. A single drainage ditch within the assessment area should have a reasonably localised impact to approximately 20m from the drain. Multiple drains can impact severely on hydrology. The effect of drains can be mitigated by the degree of vegetation within the drain i.e. a drainage channel with no vegetation can result in a greater negative impact compared to a channel where the flow rate of water is slowed by the presence of vegetation (Fig 6). The vegetation also helps reduce the erosion of peat within the drainage channel. Erosion features such as haggs can act in the same way as artificial drains.

Peat banks, providing they are not extensive across the assessment area tend to have a localised impact. This is dependent, however, on the peat being cut by sustainably by hand and the vegetation layer being replaced after cutting. Revegetated peat banks are less impactful than bare peat banks (Fig 7).

Fig. 6: Drainage channel with severe impact on hydrology (left). Drainage channel with reduced impact on hydrology (right).

Fig. 7: The bog surface altered by revegetated peat banks.

C.2 What is the height of the water table for most of the year?

A high water table is an excellent indicator of blanket bog health. Ground conditions should ideally be waterlogged and the ground obviously wet with shallow pools of standing water. Restoring the height of the water table is one of the most beneficial ways to improve blanket bog quality. Possible ways to improve bog hydrology and increase the height of the water table:

1. Ensure continuous cover of vegetation i.e. no bare peat
2. Block drains to increase wetness of site
3. If roadside drains are necessary efforts should be made to reduce the negative impacts of water loss e.g. vegetated drains will have slower water flow
4. Peat cut by hand; turves retained and replaced
5. Peat cliffs/haggs landscaped and re-vegetated

Section D. Threats to site

Points available: 0

D.1 Select from the table below the most serious category of damage, considering the indicators of damage which occur.

Bare soil can result from a number of factors, e.g. overgrazing and peat cutting and can severely impact on blanket bog quality. Once the protective layer of vegetation has been removed the peat layer is incredibly vulnerable to drying out and erosion by wind or water. These areas of bare ground have an increased risk to further damage from activities such as trampling and vehicle use; minimising the area of bare peat is therefore a management priority (Fig 8 – 11).

Examples of damage:

Fig. 8: Extensive bare peat surface with hagging.

Fig. 9: Peat cut by machine with below ground damage

Fig. 10: Large peat hagg.

Fig. 11: Damage by vehicle tracks

Possible ways to minimise damage to bog:

1. Block drains to increase wetness of site
2. Low stocking density (0.02 LSU/ha)
3. No winter grazing
4. Ensure/re-establish continuous cover of vegetation i.e. no bare peat
5. Peat cut by hand; turves retained and replaced
6. Peat cliffs/haggs landscaped and re-vegetated
7. ATV use kept to roads and tracks
8. Keep supplementary feeding away from damaged areas
9. Consider fencing off severely damaged areas

D.2 Is there evidence of damage to vegetation, soil or water from other activities? (if yes, list them all below)

Examples can include: burning, dumping, pollution to soil/water, inappropriate herbicide use, litter, etc.

POSITIVE INDICATORS

Moss layer:

1. Mound-forming sphagnums

2. Carpet-forming sphagnums

3. Bog pool sphagnums

4. Non-crustose (bushy) lichens

Shrub layer:

5. Cross-leaved heath

6. Ling heather

Sedge/herb layer:

7. Black bog rush

8. Common cottongrass

9. Deergrass

10. Hare's tail cottongrass

11. White beak-sedge

NEGATIVE INDICATORS

European gorse

Tufted hair-grass

Heath rush/Soft rush

Nettle

Machair scorecard, guidance notes and ID card

Common Grazing name: Surveyor: Total score: /100
Common Grazing ID: Survey date:

Please read the guidance note *How to use the Machair Scorecard* prior to assessment.

Section A: Ecological integrity Score /100

A.1 How many positive indicators are present?

Low: 0-12 (15) Med-low: 13-17 (30) Med: 18-23 (40) High: 24-29 (45) Very high: 30+ (50)

A.2 What is the combined cover of the positive indicators throughout? (refer to Table 1)

Cover: Low: <20% (5) Med-low: 21-40% (10) Med: 41-60% (15) High: 61-80% (20) Very high: >80% (30)

A.3 Are late-flowering species (devil's bit scabious*, harebell*, knapweed*, red clover*, yarrow*, yellow composites*) present with flowerheads?

Absent or recorded at only one stop: (0) Present at a several stops: (10) Present at numerous stops: (15) Present at more than half of stops: (20)

A.4 What is the combined cover of the following potentially dominating species in the assessment area: common daisy, meadowsweet, ragwort, creeping or spear thistle, white clover, Yorkshire fog?

High	Medium	Low	Negligible
Abundant throughout the assessment area (31-50%).	Occur in multiple larger patches or found frequently throughout the assessment area (16-30%).	Occur in multiple smaller patches or found in small numbers throughout the whole assessment area (6-15%).	Occur in small localised patches at most (<5%).
Score -15	Score -10	Score -5	Score 0

A.5 Are invasive non-native species present (e.g. Crocosmia, Japanese rose, etc.)?

Present (-30) Absent (0)

A.6 What is the combined cover of negative indicators in the assessment area (Table 2)?

High	Medium	Low	Negligible
>10% of assessment area with negative indicators.	Negative indicators with combined cover of 1-10% across the assessment area.	Less than 1% or 0.1ha (whichever is smallest) of assessment area affected by negative indicators.	Negative indicators are negligible across the assessment area.
Score -30	Score --20	Score -10	Score 0

B. Habitat structure Score /0

B.1 Does *summer* grazing negatively impact on the following sand dune species: marram, lyme-grass or couch grass?

Heavily grazed	Moderately grazed	Lightly grazed	Not present
Flowering suppressed; poaching to dune system in multiple locations.	Some plants in flower; limited damage to dune system from poaching.	Plants mostly in flower; little evidence of damage from poaching.	Dune system not present.
Score -20	Score -5	Score 0	Score 0

B.2 What is the quality of vegetation structure?

Very poor	Poor	Moderate	Good
Vegetation is overgrazed (<5cm) and uniformly short throughout. Flowering plants suppressed. *or* Vegetation is rank throughout with negligible signs of grazing.	Vegetation is heavily grazed in multiple areas with large areas of uniformly short (<5cm) vegetation but some stands of taller umbellifers or tussocky vegetation present occassionally. Flowering plants supressed in places but not throughout.	Vegetation height varied throughout with localised areas of uniformly short vegetation (<5cm). Taller umbellifers or tussocky vegetation frequent. Flowering plants occurring across at least half of the assessment area.	Vegetation height varied throughout with negligible areas of uniformly short vegetation. Stands of tussocky species or umbellifers common. Flowering plants common to abundant throughout.
Score -30	Score -15	Score -5	Score 0

C. Threats to site Score /0

C.1 What is the extent of damage to soil caused by livestock across the assessment area?

High	Medium	Low	Negligible
Extensive damage from heavy poaching/trampling clearly causing erosion with multiple large areas (>100m²) of bare soil; new tracks may be forming.	Bare soil at multiple locations or one single large area (≤100m²) e.g. around a ring feeder but damage not extensive; new tracks may be forming.	Some small localised areas of bare soil at pinch points e.g. around gates across; no evidence of new tracks forming.	Some hoof prints, dung and tracks evident but limited bare soil; no new tracks forming.
Score -40	Score -20	Score -10	Score 0

C.2 Is there evidence of damage to vegetation, soil or water from other activities? (if yes, list them all below)
Examples can include: drainage, vehicle tracks, human trampling, sand extraction, dumping, pollution to soil/water, inappropriate herbicide use, litter, etc.

Severe impact: -50 Moderate impact: -30 Local impact only: -10 Negligible: 0

RESULTS-BASED GUIDANCE OUTER HEBRIDES

MACHAIR

It is recommended that these guidelines are read fully prior to carrying out scoring

Aim of the scorecard
To promote the positive management of machair habitat in the Outer Hebrides.

Objectives:

- To maintain or improve the species-richness of machair habitat
- To support crofters and common grazing committees in the management of machair habitat, rewarding good machair condition and encouraging improvement in that condition
- Locally rare plant species are preserved e.g. slender naiad, northern gentian
- Conservation priority species such as breeding waders, corncrake and pollinating insects e.g. great yellow bumblebee, northern Colletes mining bee are supported
- To provide other associated ecosystem benefits such as coastal defence, flood prevention, wider biodiversity and pollination

Outcomes:

- Increased awareness of positive condition of machair
- Machair is better managed and the condition of degraded machair is improved
- Crofters and common grazings can use their own skills to manage machair habitat appropriate to their common grazing

What is machair?
Machair is an internationally rare habitat restricted to coasts on the north and west of Scotland and the west coast of Ireland. Some of the largest areas of machair habitat are to be found in the Outer Hebrides, much of it designated a Special Area of Conservation or a Special Protection Area. While the term machair usually refers to the low-lying fertile grassland formed through the accumulation of windblown shell-sand, it is actually part of a wider coastal system. The machair system extends from the shore, spanning the sand dunes and machair plain which then transitions to saline lagoons and saltmarsh, or to fen, heath and bog as you move inland. This mosaic of habitats supports an exceptional number of species, and machair grassland has some of the highest botanical species-richness of any grassland (Figure 1).

Machair requires specific environmental conditions such as strong winds (to blow particles of sand inland forming sand dunes and the machair plain) and a cool oceanic climate. Machair has been managed by people for thousands of years through traditional practices such as extensive grazing

and cultivation, which is widely accepted to be beneficial for maintaining high species diversity. Traditional management includes cattle grazing, seaweed spreading and rotational cropping with crops such as small oat, rye or bere, with fallow years between crops. These fallow years allow many 'arable weeds' to flourish, which increases biodiversity and supports a number of other species.

Fig. 1: Machair grassland with high species-richness, Huisnis.

Machair in the Outer Hebrides has a mix of cultivated and uncultivated machair; some islands such as North Uist have a strong tradition of machair cropping, whereas this practice is less widespread on Barra, Lewis and Harris.

Scorecard outcomes

The habitat outcomes for the machair scorecards are as follows:

- To maintain or improve the diversity of flowering plants and other machair plant species
- To maintain or increase the cover of flowering plants and other machair plant species
- To maintain or improve the seed bank in soil by allowing flowering plants and other machair species to set seed, even late-flowering species
- To remove invasive non-native plant species
- To minimise the occurrence of negative indicator species
- To maintain an open sward with a high degree of structural variation in order to provide optimum habitat for species such as waders, corncrake, twite and great yellow bumblebee
- To minimise disturbance to nesting birds during the breeding season
- To provide nectar sources for pollinating insects
- To minimise soil erosion
- To improve and maintain wet features such as flushes and machair lochans
- To identify and better manage areas of damage

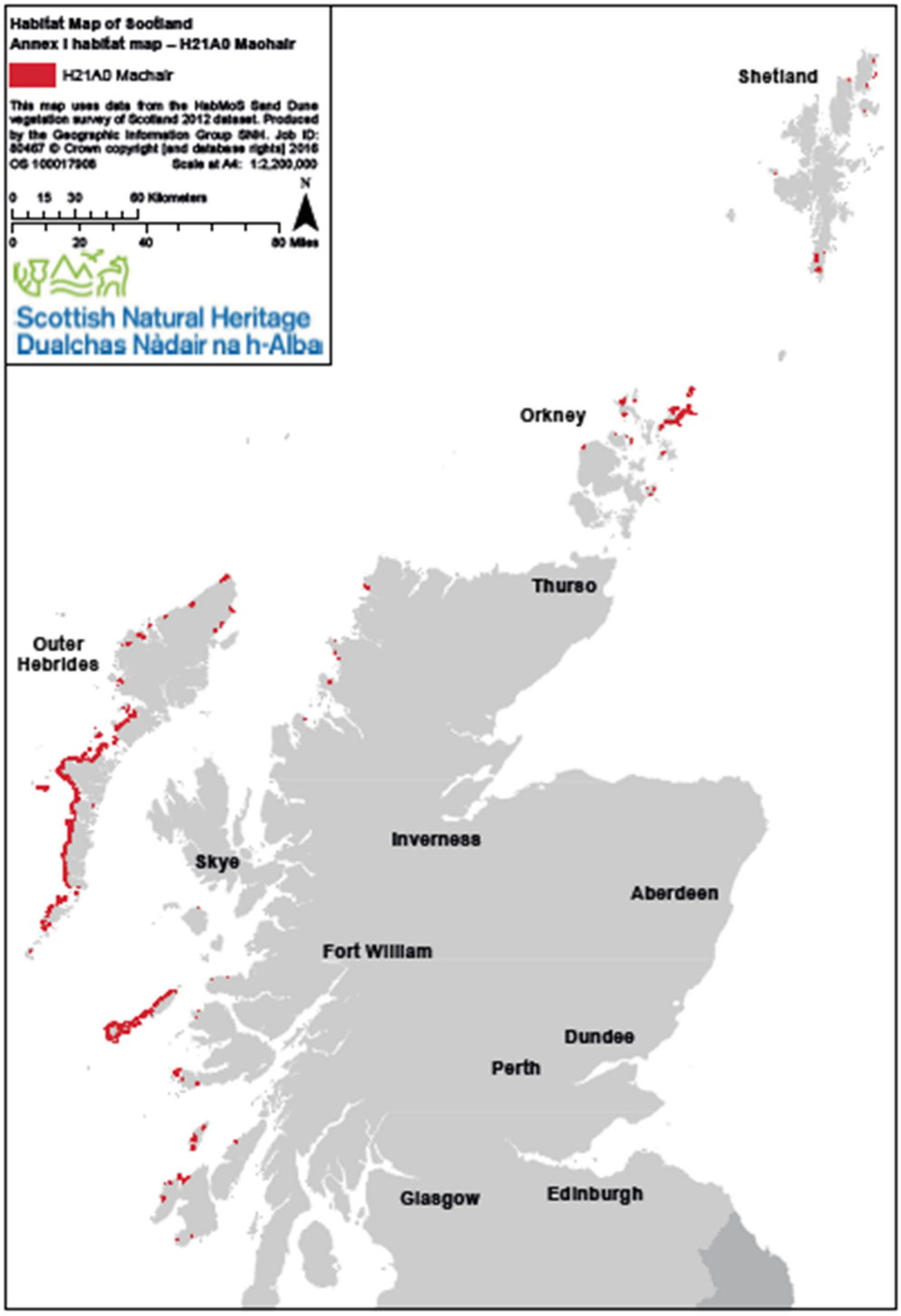


Fig. 10 Extent of machair in Scotland

When to use the scorecard

This scorecard is for use on machair habitat including the sand dune system, machair plain and other associated habitats such as the margins of machair lochans.

NB The scorecard is for use on the uncropped areas of common grazing. Rotational cropping of machair is recognised as a valuable form of traditional management and widely encouraged but for the purposes of agricultural payments is treated as part of the croft inbye.

Time of year

Scoring should be carried out between the 15th July and 31st August. This is the time of year machair should be in optimum condition and many of the positive indicators will be in flower making them easier to identify. Species ID sheets are provided to aid in identification.

How to use the scorecard

Step 1: Preparatory work – remote sensing imagery

It is recommended that the Habitat Map of Scotland (HabMoS) is used to identify the extent of the machair habitat and whether the habitat is indeed classed as machair[1] (Figure).

Scale may be an issue for very large common grazings and subdividing the area into smaller units may help by using features like fences or roads to delineate the boundaries.

Step 2: Preparatory work – planning the survey

It is recommended that a map is prepared prior to going on site which allows the extent of the habitat to be outlined and a pre-planned survey route marked on. The survey route should take the form of a structured walk in the shape of a "w". This helps to prevent the surveyor from inadvertently following tracks and paths and cover a greater extent of the habitat and therefore a more accurate measure of habitat quality.

Along the length of the "w" a number of points should be marked on at regular intervals (Fig 2). These points are where the surveyor will stop when carrying out the assessment. Monitoring stops should be representative of the variation in condition across the area so if they are marked on prior to going on site this should prevent surveyors inadvertently being drawn to more diverse or less damaged areas. It is recommended that a minimum of 10 stops are made per assessment with the number of stops increasing in line (between 10-20) with the area of habitat present.

When marking on the monitoring stops it is recommended that a grid reference (to at least 8 figures) is noted so that these points can be located when out on site. GPS use is encouraged and can greatly assist with the assessment. Most mobile phones are equipped with GPS and/or a mapping app which would be suitable for use in the assessment.

Step 3: Arriving on site

When arriving on site it is important to check that the map corresponds with what you see on the ground as some satellite photographs can be several years old. It is important to note that once the structured walk and monitoring stops have been finalised, this same route will be walked in future years in order to assess the change in habitat condition and any increase in score. Therefore this information **must** be securely stored for future use.

[1] The Habitat Map of Scotland can be found here: https://map.environment.gov.scot/sewebmap/?layers=HabVegSurvey1&extent=-298028,475191,719972,1268192.

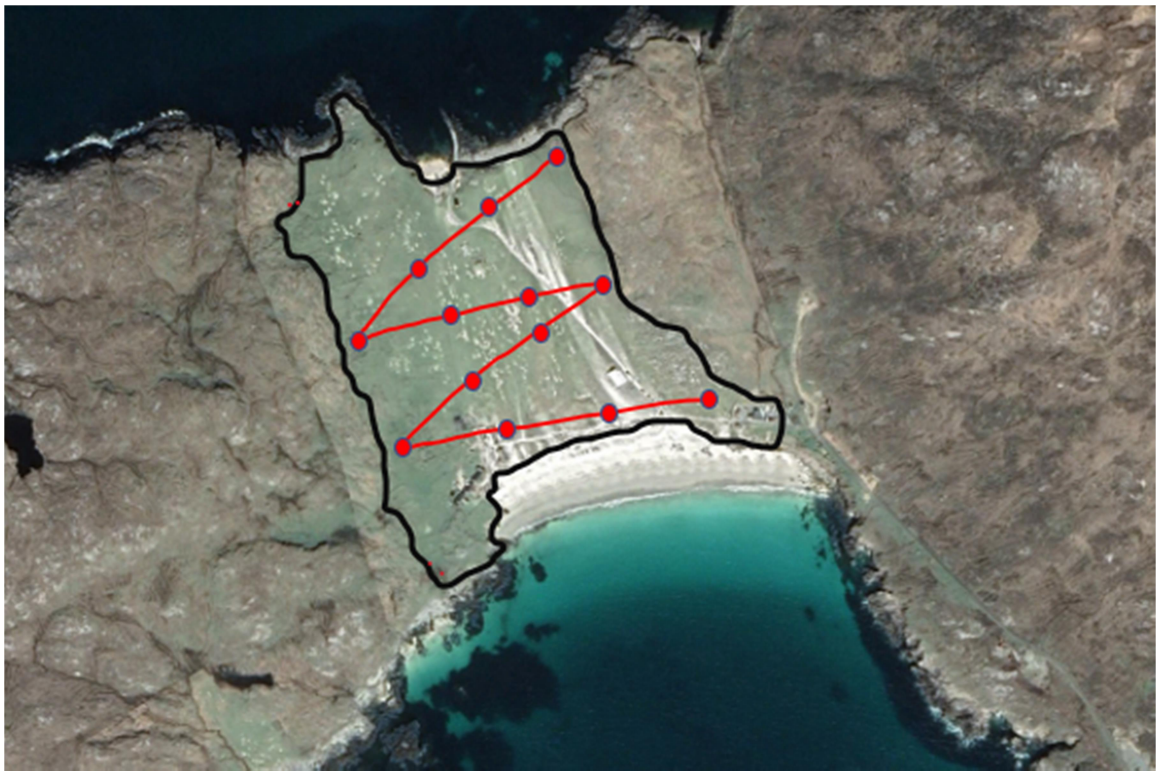


Fig. 2: Example of a structured walk. The "w" is outlined in red with monitoring stops (circles) at regular intervals. The extent of machair habitat is outlined in black.

Step 4: Carrying out the assessment

The time taken to carry out the structured walk will vary with the size of the assessment area and the total number of monitoring stops. The type of walking terrain should also be considered as rougher terrain takes longer to walk.

At each monitoring stop two tasks should be carried out:

1. Examine the vegetation in a rough 1x1m² area in order to look more closely at the vegetation and identify positive indicators, late-flowering positive indicators, and negative indicators. A table has been provided with the list of positive indicators so that they can be ticked off at each monitoring spot in order to make recording them easier.
2. Stand in the same spot and turning 360º look at the habitat features to be assessed within a 30m radius. This allows the surveyor to look at the quality of habitat at a more landscape-scale. Here the surveyor is trying to assess condition as an **overall** score of all monitoring stops, not just one particular stop, and scoring the habitat at the end of the assessment. When a particular score is consistently high in one area and low in another, consider again whether it might be appropriate to split the parcel for scoring.

Step 5: Calculating your score

Once the assessment has been carried out count up the points in each section to give a score out of 100. This value should then be divided by ten to give the overall habitat assessment score on a scale of one to ten.

Working through the scorecard

Section A: Ecological integrity
Points available: 100

A.1 How many positive indicators are present?
The machair system can support a high level of floristic diversity and is an important habitat for a vast range of species including rare insects and birds. The machair flowers are dependent on pollination by invertebrates and machair in good condition requires a healthy invertebrate population. Species will naturally flower at different time of the year but the majority of flowering occurs between July and August.

The positive indicators selected are common machair species and should be readily found across the site. The list of positive indicators can be found in Table 1 of the scorecard and has accompanying photographs for identification in the Machair Species ID Card. When carrying out the assessment use Table 1 to tick off all species recorded at each monitoring stop, counting up all the positive indicators found at the end of the assessment and select either the Low, Med-Low, Medium, High or Very high category. Different species thrive in different parts of the machair system depending on soil stability, soil pH, and wetness and some species may appear as clusters rather than being spread evenly throughout the common grazing (Fig 3). Good quality habitat is indicated if a high number of positive indicators are present.

Depending on vegetation height it may be necessary to part vegetation to see smaller species at ground level.

Possible ways to improve number of positive indicators:

1. Seasonal grazing i.e. allow plants to flower and set seed
2. Grazing by sheep and/or cattle
3. Reduce stocking density during the summer months
4. Limit use of herbicides and other biocidal agents

A.2 What is the combined cover of the positive indicators throughout? (refer to Table 1)
Machair in good condition should have a high combined cover of positive indicators across the entire assessment area. While some areas of bare soil are part of the natural system, e.g. dune blowout, this should only comprise a small area of the total common grazing (this is covered in C.1). Having recorded positive indicators in A.1 this should assist with estimating combined cover (Fig 4).

Possible ways to improve positive indicator cover:

1. Seasonal grazing i.e. allow plants to flower and set seed
2. Grazing by sheep and/or cattle
3. Reduce stocking density during the summer months
4. Limit use of herbicides and other biocidal agents

Fig. 3: Distinct clusters of different positive indicators: sea thrift (pink flowers) and bird's foot trefoil (yellow flowers)

Fig. 4: Examples of combined cover of positive indicators: medium cover (left) and very high (right)

A.3 Are late-flowering species (devil's bit scabious, harebell*, knapweed*, red clover*, yarrow*, yellow composites*) present with flowerheads?*

The condition of machair can be improved by having reduced stocking density in summer, or a summer grazing break. This allows more species to set seed and ensures there is a good stock of seeds in the soil for the next year. A reduced stocking density/summer grazing break can also benefit ground nesting birds as the risk of trampling and disturbance is minimised.

The species listed above flower later in the season, usually from August to as late as the end of September. These species are also important nectar sources for numerous pollinators.

A.4 What is the combined cover of the following potentially dominating species in the assessment area: common daisy, meadowsweet, ragwort, creeping or spear thistle, white clover, Yorkshire fog?

The above species can be beneficial for biodiversity on a common grazing providing they are not allowed to become dominant. Some species such as nettle or thistle can indicate enrichment,

whereas ragwort can be an indicator of overgrazing in summer (Fig 5). These species can also become difficult to control if they are allowed to spread and are not managed appropriately.

Fig. 5: Potentially dominating cover of common ragwort.

A.5 Are invasive non-native species present (e.g. crocosmia, Japanese rose, etc)?

A high quality habitat should not contain any invasive non-native species. Non-natives can be extremely detrimental to habitat quality and some species e.g. rhododendron are difficult and costly to control once they become established. Scoring here is designed to encourage monitoring and control of such species to prevent them becoming established in the first place. It is essential that if any non-native species are identified, even if not on the structured walk route, they are dealt with in a prompt and appropriate manor to prevent them becoming an issue in the future. Capital payments may be available to assist with the control of invasive non-natives. Herbicides should only be used for invasive non-native species after seeking specialist advice.

A.6 What is the combined cover of negative indicators in the assessment area (Table 2)?

Some native species can alert us to threats to the condition of the machair, particularly when they are common. The various individual 'negative indicator' species each indicate a slightly different potential threat. For example, species such as dandelion and perennial ryegrass tend to be present because of enrichment. This question has a maximum score of zero to incentivise prompt management and prevent the negative indicators from spreading. Negative indicators can be difficult to control once they become established therefore regular monitoring and removal is recommended.

B. Habitat structure

Points available: 0

B.1 Does summer grazing negatively impact on the following sand dune species: marram, lyme-grass or couch grass?

Marram, lyme-grass and sand couch are grasses which grow readily on sand dunes and are responsible for stabilizing loose sand. These species are essential in the formation of sand dunes which can play a vital role in coastal defence. Machair grassland typically forms behind sand dunes. If these grasses are heavily grazed in summer it can limit the plant's ability to spread by means of underground creeping shoots, therefore impacting the stability of existing sand dunes and their formation (Fig 6). This can in turn lead to the machair grassland being more vulnerable to erosion. Not all common grazings will have a dune system, most likely because it has been lost historically; there is no negative score if it is absent.

Possible ways to improve condition of sand dune species (marram, lyme grass and sea couch grass):

1. Reduce stocking density during the summer months
2. Have a summer grazing break
3. Fence off badly damaged areas

Fig. 6: A dune system with marram in good condition (left) and fencing clearly showing the impact of grazing (right)

B.2 What is the quality of vegetation structure?

The height and vegetation structure of machair will vary significantly throughout the year. However, during the months of July to August machair should be in the best condition. Good quality machair will have an open sward with a high degree of variation in vegetation structure arising from the many different species of flowering plant (Fig 7). This provides valuable habitat for a wide range of species and should include areas of short vegetation (<10cm in height), areas of taller vegetation (>20cm) and/or a sward with a mix of heights throughout. Vegetation height does **not** include the flowering heads of plants i.e. refers to the height of the leaves. Areas of short vegetation provide good foraging for some wading bird species and areas of taller vegetation can provide nest sites and cover. Possible ways to improve vegetation structure:

1. Seasonal grazing i.e. allow plants to flower and set seed/summer grazing break
2. Grazing by both sheep and cattle

3. Reduced stocking density during April and May where nesting birds are present to protect against disturbance and trampling of nests
4. Encroaching scrub/rank vegetation cut back and removed

C. Threats to site
Points available: 0

C.1 What is the extent of damage to soil caused by livestock across the assessment area?
While some areas of bare soil are part of the natural system this should only comprise a small area of the total common grazing (<5%). Areas of bare soil can provide nest sites for rare pollinating insects such as the northern Colletes mining bee. Some species such as ragwort can spread more easily in areas with disturbed ground (Fig 8). Bare areas arising from storm damage will not be negatively scored providing grazing on the dune system or other human activities have not been contributing factors. Areas of fallow on cropped machair should not be counted under this question.
Possible ways to prevent bare soil and erosion:

1. Seasonal grazing
2. Regularly move feeders to minimise damage to the machair surface
3. Keep supplementary feeding away from damaged areas
4. Consider fencing off severely damaged areas

Fig. 7: Examples of vegetation structure: poor quality (left) and good quality (right)

C.2 Is there evidence of damage to vegetation, soil or water from other activities? (if yes, list them all below)
Other damaging activities can include sand extraction (Fig 9), dumping, pollution, inappropriate herbicide use, and ATV damage. Dumping from fly-tipping can be discouraged through signage, gates and restricted access, as can anti-social use of ATV's.

Fig. 8: Ragwort growing readily in areas of bare ground.

Possible ways to reduce damaging activities:

1. Control rabbit populations
2. Access routes for people and ATVs kept to established roads and tracks
3. Public access routes signposted

Fig. 9: Sand extraction can be damaging and lead to further erosion.

Table 1: Positive indicators

Monitoring stops

	Flowering plants	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	Bird's foot trefoil *(Lotus corniculatus*)																				
2	Bogbean *(Menyanthes trifoliata*)																				
3	Bog pimpernel (*Anagallis tenella*)																				
4	Buttercups (*Ranunculus* spp)																				
5	Common restharrow (*Ononis repens*)																				
6	Common stork's bill (*Erodium cicutarium*)																				
7	Cuckoo flower (*Cardamine pratensis*)																				
8	Eyebrights (*Euphrasia* spp.)																				
9	Fairy flax (*Linum catharticum*)																				
10	Harebell (*Campanula rotundifolia*)*																				
11	Kidney vetch (*Anthyllis vulneraria*)																				
12	Knapweed (*Centaurea nigra*)*																				
13	Knotted Pearlwort (*Sagina nodosa*)																				
14	Ladies bedstraw (*Galium verum*)																				
15	Lesser celandine (*Ranunculus ficaria*)																				
16	Lesser meadow-rue (*Thalictrum minus*)																				
17	Lesser spearwort (*Ranunculus flammula*)																				
18	Marsh bedstraw (*Galium palustre*)																				
19	Marsh cinquefoil (*Potentilla palustris*)																				
20	Marsh marigold (*Caltha palustris*)																				
21	Marsh pennywort (*Hydrocotyle vulgaris*)																				
22	Marsh willowherb (*Epilobium palustre*)																				
23	Milkworts (e.g. *Polygala serpyllifolia)*																				
24	Orchids																				
25	Oxeye daisy *(Leucanthemum vulgare*)																				
26	Plantains (Buck's-horn, *Plantago coronopus;* Sea, *P. maritima*)																				
27	Primrose (*Primula vulgaris*)																				
28	Ragged robin (*Lychnis flos-cuculi*)																				
29	Red clover (*Trifolium pratense*)*																				
30	Rock samphire (*Crithmum maritimum*)																				
31	Sandwort (*Honckenya peploides*)																				

32	Scabious, Devil's bit *(Succisa pratensis)**																				
33	Scurvygrass (*Cochlearia officinalis* subsp *scotica*)																				
34	Sea campion (*Silene uniflora*)																				
35	Sea mayweed (*Tripleurospermum maritimum*)																				
36	Sea milkwort (*Glaux maritima*)																				
37	Sea rocket (*Cakile maritima*)																				
38	Sea thrift (*Armeria maritima*)																				
39	Selfheal (*Prunella vulgaris*)																				
40	Silverweed (*Potentilla anserina*)																				
41	Stonecrops (*Sedum anglicum, S. acre*)																				
42	Thyme (*Thymus polytrichus*)																				
43	Umbellifers (Angelica, *Heracleum sphondylium, Daucus carota*)																				
44	Vetches (e.g *Vicia cracca*)																				
45	Violets (e.g. *Viola canina, V. riviniana*)																				
46	Water mint (*Mentha aquatica*)																				
47	Water speedwells (*Veronica anagallis-aquatica, V. catenata*)																				
48	Yarrow (*Achillea millefolium*)*																				
49	Yellow composites, not dandelion (e.g Hawkweeds, hawkbits and cat's ear)*																				
50	Yellow flag (*Iris pseudacorus*)																				
51	Yellow rattle (*Rhincanthus minor*)																				
	Grasses, sedges and rushes																				
52	Common reed (*Phragmites australis*)																				
53	Common spike rush (*Eleocharis palustris*)																				
54	Lyme grass (*Leymus arenarius*)																				
55	Marram (*Ammophila arenaria*)																				
56	Sand couch (*Elytrigia juncea*)																				
57	Sedges (*Carex* spp.)																				

	Dwarf shrubs																				
58	Bell heather (*Erica cinerea*)																				
59	Blaeberry (*Vaccinium myrtillus*)																				
60	Creeping willow (*Salix repens*)																				
61	Cross-leaved heath (*Erica tetralix*)																				
62	Crowberry (*Emptrum nigrum*)																				
63	Heather, Ling (*Calluna vulgaris*)																				

*species in blue favour damp/wet ground

Table 2: Negative indicators

1	Bracken (*Pteridium aquilinum)*
2	Common dandelion *(Taraxacum officinale)*
3	Dock, broad-leaved (*Rumex obtusifolius)*
4	Dock, curly (*Rumex crispus)*
5	Perennial ryegrass (*Lolium perenne)*
6	Pineapple weed *(Matricaria discoidea)*
7	*Rubus* species

TABLE 1: POSITIVE INDICATORS

White flowers:


(2) Bogbean


(8) Eyebrights


(9) Fairy flax


(13) Knotted pearlwort


(18) Marsh bedstraw


(22) Marsh willowherb


(24) Orchid


(25) Oxeye daisy


(31) Sandwort


(33) Scurvygrass


(34) Sea campion


(35) Sea mayweed


(37) Sea rocket


(43) Umbellifers e.g. wild carrot


(48) Yarrow

Yellow flowers:

(1) Bird's foot trefoil

(4) Buttercups

(11) Kidney vetch

(14) Ladies bedstraw

(15) Lesser celandine

(16) Lesser meadow-rue

(17) Lesser spearwort

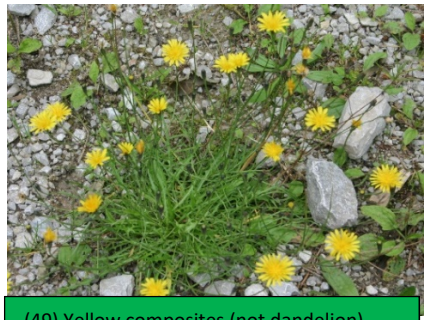
(20) Marsh marigold

(27) Primrose

(30) Rock samphire

(40) Silverweed

(41) Stonecrop, biting



(49) Yellow composites (not dandelion)

(50) Yellow flag

(51) Yellow rattle

Pink/purple flowers:


(3) Bog pimpernel


(5) Common restharrow


(6) Common stork's bill


(7) Cuckooflower


(10) Harebell


(12) Knapweed


(19) Marsh cinquefoil


(21) Marsh pennywort


(23) Milkworts


(24 Orchid e.g. northern marsh, heath spotted

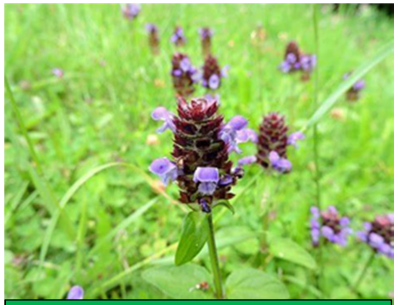

(28) Ragged robin


(29) Red clover


(32) Scabious, Devil's bit


(36) Sea milkwort


(38) Sea thrift


(39) Selfheal


(41) Stonecrop, English


(42) Thyme


(44) Vetches


(45) Violets


(46) Water mint


(47) Water speedwells

Green flowers:


(24) Orchids e.g. frog, twayblade


(26) Plantains e.g. sea plantain

Grasses, rushes, sedges:


(52) Common reed


(53) Common spike rush

(54) Lyme grass

(55) Marram

(56) Sand couch

(57) Sedges e.g Carex

Dwarf shrubs:

(58) Bell heather

(59) Blaeberry

(60) Creeping willow

(61) Cross-leaved heath

(62) Crowberry

(63) Heather, ling

POTENTIALLY DOMINATING SPECIES:


Common daisy


Meadowsweet


Ragwort


Thistle, creeping


Thistle, spear


White clover


Yorkshire fog

TABLE 2: NEGATIVE INDICATORS

Bracken

Common dandelion

Dock, broad-leaved

Dock, curly

Perennial ryegrass

Pineapple weed

Rubus species

Wader scorecard, guidance notes and ID card

Common Grazing name: Surveyor: Total score: /80
Common Grazing ID: Survey date:

Please read the guidance notes on the *Wader Grazed Grassland Scorecard* prior to assessment.

Section A: Quality of habitat Score /40

A.1 What is the height of vegetation* during the breeding season (April-June)? *not including any vegetation cut within the previous year

Poor	Moderate	Good	Excellent
Vegetation across the assessment area is uniformly one height e.g. all tall (>20cm) or all short (<5cm).	Vegetation across the assessment area is mostly tall (>20cm) or mostly short (<5cm) with some localised areas with intermediate heights.	Vegetation across the assessment area has distinct areas with different heights i.e. a mix of tall vegetation (>20cm), short vegetation (<5cm) and intermediate heights.	Vegetation across the assessment area is a mosaic of varying heights throughout. Some localised areas of bare ground or tall vegetation present.
Score 0	Score 5	Score 10	Score 20

A.2 What is the combined cover of dense cover of soft/conglomerate rush?

Cover: High: >50% -40 Medium: 21-40% -15 Med-low: 10-20% -5 Low: <10% 0

A.3 What is the combined cover of sparse rush cover?

Cover: High: >70%: -10 Low : <70% 0

A.4. At how many monitoring stops are positive indicators recorded (List A)?

Absent or recorded at only one stop: 0 Present at a several stops: 10 Present at numerous stops: 15 Present at more than half of stops: 20

List A: Positive indicators

1. Bogbean	6. Marsh pennywort
2. Cuckooflower	7. Marsh willowherb
3. Devil's bit scabious	8. Ragged robin
4. Lesser spearwort	9.Ribwort plantain
5. Marsh cinquefoil	10. Sedges – all species

A.5 Are invasive non-native species present (e.g. rhododendron, giant rhubarb, Japanese rose)?

Present: -30 Absent: 0

Section B. Ground conditions and artificial drainage Score /40

B.1 What is the height of the water table during the breeding season (April-June)?

Low	Moderate	Good	Excellent
Water table is low and ground conditions are dry	Water table is high in some small localised areas	Water table is high across distinct larger areas	Water table is high across most of the assessment area
Score -20	Score 0	Score 10	Score 20

B.2 Are shallow open pools or scrapes >20m² present during the breeding season (April-June)?

Absent: 0 Present but < 20m²: 5 Present and ≥20m²: 20

B.3 What is the condition of artificial drainage?

Very poor	Poor	Sub-optimal	Good
Drains have none of the following features: 1. shallow sides 2. vegetated channel 3. adjacent open wetland vegetation	Drains have only one of the following features: 1. shallow sides 2. vegetated channel 3. adjacent open wetland vegetation	Drains have at least 2 of the following features: 1. shallow sides 2. vegetated channel 3. adjacent open wetland vegetation	No drains present OR Drains have all 3 following features: 1.shallow sides 2. vegetated channel 3. adjacent open wetland vegetation.
Score -20	Score -10	Score -5	Score 0

B.4 What is the extent of bare ground caused by livestock during the breeding season (April-June)?

High	Medium	Limited
Multiple areas of bare soil caused by poaching e.g. along tracks and around hay rings (combined area >0.1ha).	Hoofprints and piles of dung present but areas of bare soil caused by animals are isolated and not excessive (no areas larger than 0.1ha).	Hoofprints and piles of dung present but little of no areas of bare soil. Some bare patches at 'pinch' points along regularly used routes (e.g. gateways).
Score -30	Score -10	Score 0

C. Threats to site Score /0

C.1 Is the assessment area impacted by scrub encroachment or rank vegetation (e.g. European gorse, bracken, bramble, creeping thistle, etc)?

Large or widely scattered areas of scrub and/or rank vegetation: -30

Localised small areas of scrub and/or rank vegetation: -15

No scrub and/or rank vegetation: 0

C.2 Is there evidence of damage to vegetation, soil or water from other activities? (if yes, list them all below)
Examples can include: vehicle tracks, dumping, pollution to soil/water, inappropriate herbicide use, litter, etc

Severe impact: -50 Moderate impact: -30 Localised impact: -10 Negligible impact: 0

RESULTS-BASED GUIDANCE
OUTER HEBRIDES

European Forum

WADER GRAZED GRASSLAND

It is recommended that these guidelines are read fully prior to carrying out scoring

Aim of the scorecard
To promote positive management practices on grassland habitat which supports wading bird species such as lapwing, redshank, curlew, snipe or oystercatcher.

Objectives:

- To increase habitat quality for the benefit of wading bird species
- To provide other associated ecosystem benefits such as water regulation, as well as supporting biodiversity and pollination
- To provide clear habitat targets which are linked to positive management of wader grazed grassland
- To support crofters and common grazings in the assessment and management of wader grazed grassland

Outcomes:

- The quality of nesting areas for wading bird species is improved during the breeding season
- The quality of foraging areas for adults and chicks is improved during the breeding season e.g. soft ground and open areas of shallow water
- The risk of disturbance and trampling of the nest by livestock is minimised during the breeding season
- The risk of predation to adults and chicks is minimised by removing predator habitat e.g. scrub or dense stands of tall vegetation

What is wader grazed grassland?
Wader grazed grassland is a type of semi-improved grassland associated with township parks which provides wading bird species with good quality breeding habitat. This agricultural improvement tends reflect past rather than current management. The grassland tends to be on acid to neutral soil, on damp to boggy ground, and has a relatively low diversity of plant species.

Waders select nesting habitat based on the following characteristics (Fig 1):

- Slope – the area must be flat or gently undulating to provide the adults with good visibility for detecting predators.
- Openness – the area must be open and not overlooked by trees, shrubs or hedges.

- Vegetation height – vegetation height should be a mix of short and tall vegetation to provide cover and feeding areas.
- Dampness – damp soil, shallow drains and standing water provide good quality feeding areas for adults and chicks.
- Size – the area should be larger than one hectare.

Scorecard outcomes

The habitat outcomes for the wader grazed grassland scorecard are as follows:

- To manage vegetation structure to maintain an open sward
- To manage vegetation structure to provide optimal vegetation heights
- To manage rush cover
- To remove invasive non-native plant species
- To maximise foraging habitat by maintaining wet ground conditions and shallow pools and/or wader scrapes during the breeding season
- To provide suitable cover and site conditions for adults and chicks
- To minimise disturbance from livestock during the breeding season
- To manage predator habitat such as scrub and rank vegetation

Fig 1: Good quality wader grazed grassland on flat, open ground with wet areas and varied vegetation heights.

What type of habitat can the scorecard be used on?

This scorecard is designed for use on semi-improved grasslands which are typically associated with township parks or have been in previous AECS for wader grazed grassland. The habitat must meet all the slope, size and openness criteria outlined in the *What is wader grazed grassland?* section. This card is **not** appropriate for use on species-rich grassland habitat.

Time of year

The assessment should be carried out between 15th March and June 30th, i.e. during the wader breeding season. This provides a more accurate assessment of habitat quality and should ensure a

meaningful score. It also helps with the identification of indicator species, as most plants are easier to identify when in flower.

How to use the scorecard

The purpose of the scorecard is to evaluate the overall suitability of the habitat for wading bird species looking at both nesting habitat and foraging habitat. Habitat requirements vary depending on the species and the scorecard is designed to encompass these requirements whilst still providing the necessary flexibility to allow for crofters to select the most appropriate management for their common grazing.

Step 1: Preparatory work – remote sensing imagery

It is beneficial to have previous knowledge of the site in order to identify areas to target for assessment as it is likely that the semi-improved grassland found in township parks covers only a small proportion of the overall common grazing. Aerial photography can be a useful tool in visualising the extent of the habitat and can help with planning which areas within the common grazing to survey.

Step 2: Preparatory work: planning the survey

It is recommended that a map is prepared prior to going on site which allows the extent of the habitat to be outlined and a pre-planned survey route marked on. The survey route should take the form of a structured walk in the shape of a "w". This helps to prevent the surveyor from inadvertently following tracks and paths and cover a greater extent of the habitat and therefore a more accurate measure of habitat quality.

Along the length of the "w" a number of points should be marked on at regular intervals (Fig 2). These points are where the surveyor will stop when carrying out the assessment. Monitoring stops should be representative of the variation in condition across the area so if they are marked on prior to going on site this should prevent surveyors inadvertently being drawn to more diverse or less damaged areas. It is recommended that a minimum of 10 stops are made per assessment with the number of stops increasing in line (between 10-20) with the area of habitat present.

When marking on the monitoring stops it is recommended that a grid reference (to at least 8 figures) is noted so that these points can be located when out on site. GPS use is encouraged and can greatly assist with the assessment. Most mobile phones are equipped with GPS and/or a mapping app which would be suitable for use in the assessment.

Step 3: Arriving on site

When arriving on site it is important to check that the map corresponds with what you see on the ground as some satellite photographs can be several years old. It is important to note that once the structured walk and monitoring stops have been finalised, this same route will be walked in future years in order to assess the change in habitat condition and any increase in score. Therefore this information **must** be securely stored for future use.

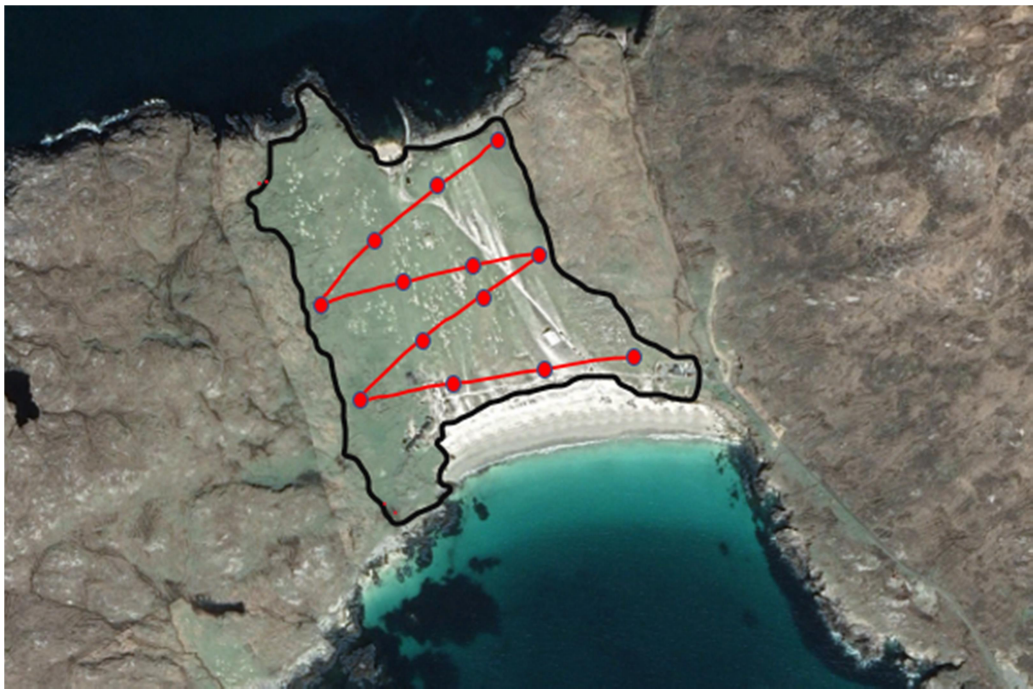


Fig 2: Example of a structured walk. The "w" is outlined in red with monitoring stops (circles) at regular intervals. The extent of habitat is outlined in black.

Step 4: Carrying out the assessment

The time taken to carry out the structured walk will vary with the size of the assessment area and the total number of monitoring stops. The type of walking terrain should also be considered as rougher terrain takes longer to walk.

At each monitoring stop two tasks should be carried out:

- Examine the vegetation in a rough 1x1m² area in order to look more closely at the vegetation and identify positive indicators, late-flowering positive indicators, and negative indicators. A table has been provided with the list of positive indicators so that they can be ticked off at each monitoring spot in order to make recording them easier.
- Stand in the same spot and, turning through 360º, look at the habitat features to be assessed within a 30m radius. This allows the surveyor to look at the quality of habitat at a more landscape-scale. Here the surveyor is trying to assess condition as an **overall** score of all monitoring stops, not just one particular stop, and scoring the habitat at the end of the assessment. When a particular score is consistently high in one area and low in another, consider again whether it might be appropriate to split the parcel for scoring.

Step 5: Calculating your score

Once the assessment has been carried out count up the points in each section to give a score out of 80. The wader grazed grassland card is the only scorecard which does not have an overall score of 100 in order for it to fit in with the payment structure.

Working through the scorecard

Section A: Quality of habitat
Points available: 40

A.1 What is the height of vegetation during the breeding season (April-June)? *not including any vegetation cut within the previous year*
Different species of wader show a strong preference for specific heights of vegetation for nest site selection. For example, lapwing prefer areas of short vegetation ideally <5cm tall whereas species such as curlew and snipe prefer longer vegetation along wetland margins. Ideal wader habitat is made up of a mosaic of vegetation heights which in theory will provide the greatest number of nesting opportunities to different wader species (Fig 3).

A.2 What is the combined cover of dense cover of soft/conglomerate rush?
Soft and conglomerate rush are a type of tall vegetation which grows in damp to wet soil which is ideal for waders. However, they are fast-growing and can become very dense, coming to dominate an area if they are not controlled. While some waders favour longer vegetation for nesting, they avoid very dense vegetation because it is difficult to move through and may harbour predators. Some stands of dense rush are acceptable.

Fig 3: Vegetation height: a mosaic of different heights (left) and mostly tall vegetation (right).

A.3 What is the combined cover of sparse rush cover?
Areas with an existing high cover of sparse rush will be more likely to end up with dense cover if not managed appropriately. Ideally, areas with a high cover of sparse rush should be monitored and managed appropriately in order to prevent them becoming an issue in the future (Fig 4).

Fig 4: Dense cover of soft/conglomerate rush (left) and sparse rush cover (right).

A.4. At how many monitoring stops are positive indicators recorded (List A)?

All the positive indicator species in List A are species which thrive in damp to wet ground conditions and are good indicators of the feeding habitat preferred by waders. They are also straightforward to identify with the aid of the Species ID card.

List A: Postive indicators	
1. Bogbean	6. Marsh pennywort
2. Cuckooflower	7. Marsh willowherb
3. Devil's bit scabious	8. Ragged robin
4. Lesser spearwort	9.Ribwort plantain
5. Marsh cinquefoil	10. Sedges – all species

A.5 Are invasive non-native species present (e.g. rhododendron, giant rhubarb, Japanese rose)?

A high quality habitat should not contain any non-native species. Non-natives can be extremely detrimental to habitat quality and some species e.g. rhododendron are difficult and costly to control once they become established. Scoring here is designed to encourage monitoring and control of such species to prevent them becoming established in the first place. Capital payments can be applied for to assist with the control of invasive non-natives.

Section B. Ground conditions and artificial drainage

Points available: 40

B.1 What is the height of the water table during the breeding season (April-June)?

A high water table and wet ground conditions provide ideal feeding habitat for adult waders and their chicks. Damp to wet ground is softer and easier for waders to probe for invertebrate prey with their beaks. Scoring is designed to reward all wet ground conditions with a clear incentive to increase the height of the water table across the whole area.

B.2 Are shallow open pools or scrapes >20m² present during the breeding season (April-June)?

Wader scrapes are shallow depressions in the ground which can be created using machinery and provide valuable feeding areas for waders. As a results-based indicator, wader scrapes are quick to

create and are a straightforward way to increase the overall score. Studies have shown that scrapes larger than 20m² offer greater benefits for waders.

B.3 What is the condition of artificial drainage?

Drains can be valuable for waders if they are shallow-sided, vegetated in the main channel and have adjacent wetland vegetation. These conditions provide valuable feeding areas particularly for chicks because they provide good access and cover. Chicks, because of their small size, require shallow-sided drains to be able to climb in and out of.

B.4 What is the extent of bare ground caused by livestock during the breeding season (April-June)?

This question is to promote a reduced stocking density during the wader breeding season in order to minimise disturbance and trampling of nesting birds. Some hoof prints and dung are beneficial because this provides feeding opportunities for waders because dung attracts their invertebrate prey (Fig 5).

C. Threats to site

Points available: 0

C.1 Is the assessment area impacted by scrub encroachment or rank vegetation (e.g. European gorse, bracken, bramble, creeping thistle, etc.)?

Waders prefer open areas with little tree cover or scrub in order to reduce the predation risk to chicks. Waders tend to avoid areas with scrub and rank vegetation because it provides good cover for predators. If encroachment and rank vegetation is not managed it may lead to a decline in the number of waders in that area.

Fig 5: Grazing by cattle at a reduced stocking density is beneficial during the wader breeding season.

C.2 Is there evidence of damage to vegetation, soil or water from other activities? (if yes, list them all below) Examples can include: vehicle tracks, dumping, pollution to soil/water, inappropriate herbicide use, litter, etc.

This is a general catch-all question designed to highlight other activities we would wish to discourage such as damage by vehicle tracks, dumping, etc. Scoring is negative and increases with the severity and area of damage.

(1) Bogbean

(2) Cuckooflower

(3) Scabious, Devil's bit

(4) Lesser spearwort

(5) Marsh cinquefoil

(6) Marsh pennywort

(7) Marsh willowherb

(8) Ragged robin

(9) Ribwort plantain

(10) Sedges – all species

Annex 2 – payment calculation data

Region 2 inbye cattle

Assumptions			
0.5 LU/ha minimum activity for maintaining 100% semi-natural inbye (score 10)			
Assume LFASS cat B, v fragile, >50% cattle			
For SSBSS, assume island rates			
Data sources			
SAC Farm Management Handbook			
QMS Cattle and Sheep Enterprise Costings			
SUCKLER COW (from FMH DATA - croft outwintered)			
			per ha
Gross margin per cow less SSBSS before family labour	-31.20		-15.60
SSBSS	148.20		74.10
BPS R2	43.13		43.13
LFASS	28.57		28.57
Total gross margin before family labour			130.20
Amount of family labour per cow (QMS)	17.92		8.96
Cost @ £15	269		134.38
Gross margin incl. family labour			-4.18
QMS fixed costs	423.86		211.93
Estimated fixed costs	423.86		211.93
Estimated net margin before family labour			-81.73
Est net margin with family labour			-216.11

Degression considerations			
What does keeping just one cow entail?			
0.5 hrs per day? Per yr:	182.5		91.25
Cost @ £15	2737.50		1368.75
Gross margin incl. family labour			-1238.55
Net margin incl. family labour			-1450.48

Region 2 inbye sheep

Assumptions			
0.5 LU/ha minimum activity for maintaining 100% semi-natural inbye (score 10)			
LFASS B very fragile, no cattle rates			
Data sources			
SAC Farm Management Handbook			
QMS Cattle and Sheep Enterprise Costings			
CROFT SHEEP (from FMH DATA - 120% lambing)			
			per ha
Gross margin per 10 sheep before family labour and LFASS	81.00		27.00
LFASS			9.50
BPS R2			44.80
Gross margin incl. LFASS per 10 sheep before family labour			81.30
Amount of family labour per 10 sheep (hrs)	13		4.43
Cost @ £15	200		66.50
Gross margin per 10 sheep incl. family labour			14.80
QMS fixed costs	437.60		145.87
Estimated fixed costs	437.60		145.87
Net margin per 10 sheep before family labour			-64.57
Net margin per 10 sheep incl. family labour			-131.07

Degression considerations			
What does keeping just 10 sheep entail?			
Based on Iain Murdo Macmillan pers. comm., adjusted for lower intensity (less feeding)			
Hours for 10 sheep flock	135		45.00
Cost @ £15	2025.00		675.00
Gross margin incl. family labour			-593.70
Net margin incl. family labour			-739.57

Region 2 rough grazings cattle

Assumptions			
0.05 LU/ha minimum activity for maintaining 100% semi-natural inbye (score 10)			
Assume LFASS B, very fragile area and >50% cattle			
For SSBSS, assume island rates			
Data sources			
SAC Farm Management Handbook			
QMS Cattle and Sheep Enterprise Costings			
SUCKLER COW (from FMH DATA - croft outwintered)			
			per ha
Gross margin per cow less SSBSS before family labour	-11.00		-0.55
SSBSS	148.20		7.41
BPS R2			44.80
LFASS			5.28
Total GM			56.94
Amount of family labour per cow (QMS)	18		0.90
Cost @ £15	269.00		13.44
Gross margin incl. family labour			43.50
QMS fixed costs	423.86		
Estimated fixed costs	423.86		21.19
Estimated net margin before family labour			35.74
Est net margin incl. family labour			22.30

Degression considerations			
What does keeping just one cow entail?			
0.5 hrs per day? Per yr.:	182.5		9.13
Cost @ £15	2737.50		136.88
Gross margin incl. family labour			-79.94
Net margin incl. family labour			-101.13

Region 2 rough grazings sheep

Assumptions			
0.05 LU/ha minimum activity for maintaining 100% semi-natural hill (score 10)			
Assume LFASS B rate on very fragile, no cattle			
Data sources			
SAC Farm Management Handbook			
QMS Cattle and Sheep Enterprise Costings			
CROFT SHEEP (from FMH DATA - 80% lambing)			
			per ha
Gross margin per 10 sheep before family labour and LFASS	3.00		0.10
LFASS (reduced proportionally below 0.09)			5.28
BPS R2			44.80
Gross margin incl. LFASS per 10 sheep before family labour			50.18
Amount of family labour per 10 sheep (hrs)	12.50		0.42
Family labour cost (from QMS)	187.50		6.25
Gross margin per 10 sheep incl family labour			43.93
QMS fixed costs	333.10		11.10
Estimated fixed costs	333.10		11.10
Net margin per 10 sheep before family labour			39.07
Net margin per 10 sheep incl. family labour			32.82

Degression			
What does keeping just 10 sheep entail?			
Based on Iain Murdo Macmillan pers. comm. adjusted for hill			
Hours for 10 sheep flock	114		3.80
Cost @ £15	1710.00		57.00
Gross margin incl. family labour			-6.82
Net margin incl. family labour			-17.93