BLANKET BOG

3A

(top)signs of low impact: presence of flowering bog cotton and (below) signs of high impact: bare soil with deer hoof prints

Aim

The aim of this guide is to describe the Best Practice Habitat Impact Assessment method for blanket bog. The BPG HIA guides, Principles* and Principles in Practice** are essential pre-reading.

Habitat description

Blanket bogs usually have a 'skin' of bog mosses (*Sphagnum*), cotton grasses (*Eriophorum angustifolium* and *Eriophorum vaginatum*) and dwarf-shrubs over a layer of peat more than 50cm deep. The surface can have hummocks, ridges, moss lawns, wet hollows and pools. Blanket bogs can be sensitive to impacts at low herbivore densities and are considered more fragile than either grassland or dwarf-shrub heaths. Over time, deer impacts may dramatically reduce, or even eliminate, *Sphagnum* cover.

Key indicators

Deer impact on blanket bog mainly by trampling and browsing[1]. **Trampling**, by extending already exposed areas of peat or breaking through the vegetative skin, may lead to loss of *Sphagnum* and cause newly exposed areas. Areas of bare peat may increase with time and it can erode away. Deer trampling is assessed by recording a combination of the presence of bare peat with deer hoof prints visible, and signs of damaged *Sphagnum* (hoof prints or pulled/crushed moss). Impact on *Sphagnum* is one of the most important indicators of intensity of herbivore impact. The cover of *Sphagnum* is a good indicator of the health of the bog but does not always indicate the current deer impact on blanket bog as cover can be affected by several current and historical factors.

Browsing is measured by looking at the percentage of heather 'long shoots' browsed. This indicates the 'off-take' from the heather. If heather is not present, blaeberry can be used instead. If neither is present, cross-leaved heath can be used – this species is unpalatable, and any browsing on it usually indicates a high impact.[2]

Fieldwork

Principles and Planning

For information on the number and location of plots as well as what time of year to assess, follow the detailed guidance in BPG Principles* and BPG Principles in Practice**.

Bog moss
(Spagnum) forms large cushions or clumps. Colours vary with species

Bog myrtle
(Myrica gale) Shrub, 1-2m, aromatic leaves

Ling heather
(Calluna vulgaris) evergreen, leaves 3 sided, 1-2mm

Blaeberry
(Vaccinium myrtillus) Woody shrub, up to 30cm, leaves 1-3cm

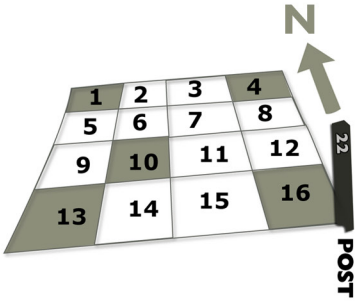
Cross-leaved heath
(Erica tetralix) woody shrub, 20-50 cm tall, leaves in whorls of four

Common cotton-grass
(Eriophorum angustifolium) Scattered stems, up to 60cm tall, leaves 2-6mm wide, several flower-heads

Hare's tail cotton-grass
(Eriophorum vaginatum) Tussock-forming, up to 50cm tall, leaves 1mm wide, single flower-head

Purple moor-grass
(Molinia caerulea) Tufts 20-45 cm tall, leaves 3-10mm wide

Deer grass
(Trichophorum spp) 10-25 cm tall, tussocks or unbranched stems



Setting up the plot

3 On the first visit, if the GPS point falls into the wrong habitat type or an untypical area (e.g. ATV route or feeding site), relocate it to the nearest patch of the correct habitat within 50m, and record the new location using GPS. Mark the plot with a post or tag. This should be small enough to minimise attention by deer; hammered below vegetation height, or located at a fixed distance (e.g. 10m) from the plot.

When establishing plots:

- Be aware of ground nesting birds. Avoid placing plots where birds are showing alarm behaviour. Avoid any disturbance of ground nesting birds during wet or windy conditions.
- Minimise trampling. Try not to add to the impact!

3 Use lightweight material (e.g. proprietary quadrats or rope and tent pegs) to mark a 2m x 2m plot which is subdivided into sixteen 0.5m x 0.5m quadrats. The right-hand edge of plot should be orientated due North (or the bearing recorded).

What to measure in the field

3 Once the plot is established, use the BPG recording sheet / electronic workbook for blanket bog*** to record the indicators set out in the table below.

What?	How to record
Height of Dwarf-shrubs (Note that Bog myrtle is not a dwarf-shrub)	*In Quadrat 1, take 5 measurements of dwarf-shrub height above the ground by running your hand down a ruler placed in the centre and in each quarter of the quadrat to the first 'hit' on a dwarf-shrub. Record the average of your 5 measurements.* *If there are only a few shoots (say, up to 10) in your quadrat, you can measure them all and take an average.* *Repeat for quadrats 4, 10, 13 and 16*
Browsing of heather shoots (If ling heather absent, use blaeberry. If neither present, use the next indicator)	*In Quadrat 1, estimate the proportion of last year's long shoots which have been browsed. Closely examine 5 "handfuls" of shoots (circles of approximately 5cm diameter), estimating the percentage of shoots browsed in each, and taking the average.* *Record as:* *• L - less than 33% of long shoots in the sample browsed;* *• M - 33 – 66% long shoots browsed;* *• H - more than 66% long shoots browsed.* *Repeat for quadrats 4, 10, 13 and 16.*
Browsing on cross-leaved heath (ONLY if heather and blaeberry absent.)	*• In the absence of heather or blaeberry, record if any browsing of cross-leaved heath occurs in the plot.* *If cross-leaved heath is not browsed, or not present, leave blank.*
Presence of bare peat	*For all quadrats, record if bare peat is present.*
Deer prints in bare peat	*For all quadrats with bare peat, record if hoof prints are evident on bare peat.*
Presence of Sphagnum	*For all quadrats, record if Sphagnum is present. Take care to look underneath other vegetation because often Sphagnum forms a layer beneath other species*
Trampling damage to Sphagnum	*For all quadrats with Sphagnum, record if there are hoof prints in Sphagnum or it has been disrupted or pulled up.*

Additional information to record

3 Record and note any of the factors in the table below that apply.

What?	Why?	How to record
Other herbivores	*Deer, sheep, goats, cattle, hares and grouse graze and trample in different ways. It is important to know which herbivores are present*	*Record signs (sightings, dung, hoof prints, hair, wool, etc.) record in the Additional Information boxes.*
Burning	*Burning can affect blanket bog. It may affect how herbivores use the area, or directly affect the habitat*	*Record evidence of old or recent burning in the Additional Information boxes or Other Comments box.*
Other information	*Additional information may help in interpretation. e.g. higher impacts may be seen if a plot is next to a feeding site, or a well used deer track*	*Use the Other Comments box to highlight information to help interpret results and inform future management*
Take at least two digital photos of the plot from fixed points.	*Photographs provide a useful way to visually monitor changes to the habitat over time, and assist in plot relocation for future assessments. A good photographic record can also help to confirm the results of the survey*	*Photos should be taken with the quadrat frame in place. Use laminated numbers to identify the plot in the photographs. Take one photo taken from south of the plot and include the whole plot. A second photo should show the plot in wider context, for example with an identifiable landmark. If possible, take the second photo from a standard position (10m south of the plot) but use other landmarks, if better, noting direction. Where no obvious landmark take further photos, North, East and West in addition, Record the photo numbers.*

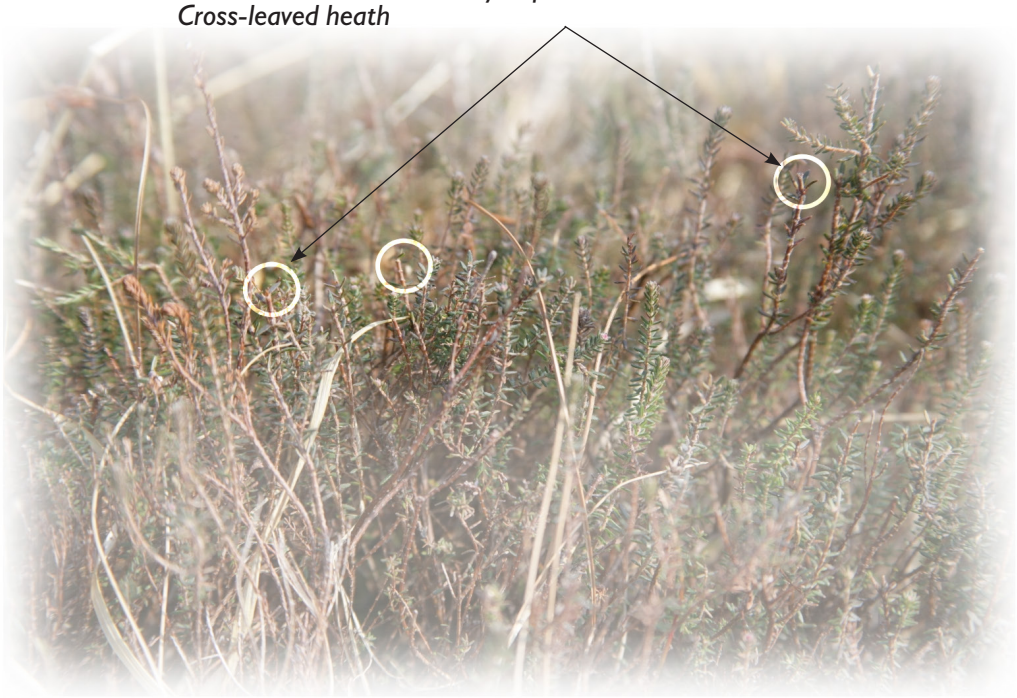
Data analysis

Summarise and analyse the data collected, following the detailed guidance in BPG: Analysis Blanket Bog and associated workbook ±.

Understanding Impacts; Interpreting results and management actions

Interpret results and consider possible management actions following the detailed guidance in BPG: Interpretation and Management Actions ±±.

Browsing of unpalatable species such as cross-leaved heath indicates heavy impact. Cross-leaved heath



**BPG Habitat Impact Assessment: Principles*
***BPG Habitat Impact Assessment: Principles in Practice*
**** BPG Habitat Impact Assessment: Data recording sheet (Blanket Bog)*
± BPG Habitat Impact Assessment: Analysis (Blanket Bog).
±± BPG Habitat Impact Assessment: Interpretation and management

[1] Guide to Upland Habitats, Surveying Land Management Impacts. Angus Macdonald, Penny Stevens, Helen Armstrong, Philip Immirzi and P Reynolds. Volumes 1 & 2 https://www.nature.scot/guide-upland-habitats-surveying-land-management-impacts-volumes-1-and-2
2Heather damage: a guide to types of damage and their causes. 2nd ed. A MacDonald http://jncc.defra.gov.uk/page-2636