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## Scottish Natural Heritage: A Consultation on the draft Carbon and Peatland Map

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**Date of submission:** 13 March 2015

### Introduction

Carbon rich soils and peatland areas have been recognised as key to climate change mitigation for their roles as soil carbon stores and for their active sequestration potential. This information is of interest to a range of users but access to a fit-for-purpose map and data has been limited historically.

Scottish Natural Heritage (SNH) has prepared a consolidated spatial dataset of '*Carbon rich soil, deep Peat and priority Peatland habitats*' in Scotland derived from existing soil and vegetation data.

The 'Carbon and Peatland' map 2014 has updated earlier work undertaken by SNH for the identification of natural heritage features of national importance<sup>(1)</sup> and released as spatial data in the Scotland's soils website<sup>(2)</sup>. The intention behind developing and publishing this map is to give greater understanding, to a wide range of audiences, as to where Scotland's peatlands occur<sup>(3)</sup>.

The soil and vegetation data underpinning the new map are available under licence granted by Scottish Ministers for non-commercial use. The new dataset is combined (at 1:250,000 scale and 1:25,000 scale) with habitat information derived from the Land Cover of Scotland 1988 (LCS88) survey.

It is envisaged that the new maps and data may be used to:

- provide greater appreciation and transparency around where Scotland's peatland occur
- support strategies and projects related to the management and restoration of Scotland's peatland habitats
- support the implementation of the forthcoming Scotland's National Peatland Plan
- assist in identifying peat and other carbon rich soils for development plans
- facilitate mapping of wind farm spatial frameworks in line with the new Scottish Planning Policy (SPP) (2014)

- support the siting of proposals that could impact on the soil resource and design of mitigation to avoid or reduce such impacts

The maps can also be used to assist development management decisions, although a more detailed site survey will usually be needed to inform the siting, design, construction, aftercare and restoration stages of a development.

To ensure the robustness of the approach and integrity of advice provided, we need the help and support of all those with an interest in using these data. This consultation invites comments on the '*carbon rich soil, deep peat and priority peatland habitats*' map and whether it effectively identifies these key natural heritage assets.

Please use the form below to give us your views. Responses to specific questions are particularly welcome, but any comments you may have in relation to the future management of our peatland will be much appreciated and taken into account in developing the National Peatland Plan.

- (1) Soils of National Conservation Importance in Scotland updated 29/11/2013 - <http://www.snh.gov.uk/docs/A465864.pdf>
- (2) Scotland's soil website – soil carbon map <http://www.soils-scotland.gov.uk/data/soil-carbon>
- (3) Scotland's peatland - SNH CR No 701 [http://www.snh.org.uk/pdfs/publications/commissioned\\_reports/701.pdf](http://www.snh.org.uk/pdfs/publications/commissioned_reports/701.pdf)

**Comments are invited on the methodology for mapping carbon rich soil, deep peat and priority peatland habitats described in part 1 of the consultation document.**

**Question 1: Do you think SNH's approach to mapping carbon rich soil, deep peat and priority peatlands is appropriate and scientifically robust?**

**Response:**

The Institute believes that SNH has used the best available data (but see below) to produce this map and is pleased to see these datasets used in this way. There is no real alternative to the combination of soil data that has been used and LCS88, although now approaching 30 years old, has much more detail than LCM2007. The interpretation of mosaic categories, extensive over much of upland Scotland, allows subtle differences in the carbon-richness of the soils to be disaggregated. The Institute is of the view that mosaics are more representative of upland Scotland than are the single feature categories of LCM2007.

However, the methodology is exactly the same thing as used in the WISE tool produced by the James Hutton Institute with funding primarily from CxC. The probability maps in WISE are very much driven by the LCS88 overlay onto the 1:250,000 and 1:25,000 soil maps. We advise more caution in the interpretation of the overlapping categories that resulted from the map overlays than appears in this consultation.

There are uncertainties in the underlying data which will manifest themselves when they are overlaid. Even the Class 1 polygons in their mapping structure will have serious uncertainties both in

the land cover and the soil mapping. This is then magnified down the ranked order of their Classes. For example, the blanket bog vegetation LCS88 category has an up to 40% misclassification error with moorland habitat (see LCS88 documentation). In addition, the 1:250,000 soils maps have their own errors in that peat was often not mapped as individual polygons of known location, but rather as a component of the soil complexes occurring in a given polygon.

The Class 1 groups are most probably satisfactory at regional level, but it will almost certainly not be accurate at local (1 km) scale. This has been tested by Institute staff in the Forsinard area, and neither the LCS88 nor the 1:250,000 soils maps were accurate enough to really represent the small-scale variations in peat depth and vegetation structure. Classes 2 and 3 are unlikely to hold up on-site examination, due to aforementioned LCS misclassification 'errors' and the lack of spatially-explicit certainty in the soils data.

We do not wish for these reservations to over-ride the fact that the procedure and output presented here are very useful as strategic planning tools but any interpretation of the maps must take into account the uncertainties associated with the data. We still maintain that the best available data have been used but maps that represent natural or semi-natural phenomena such as soils and vegetation will always have uncertainties associated with merging boundaries and overlapping definitions of classes.

**Question 2: Are there any issues related to the methodology for creating the map, or other issues related to the rationale for creating a 'Carbon and Peatland' map (2014) that you would like to raise?**

**Response:**

Consultation document

Table 5 is the key step in the creation of the Carbon and Peatland Classes; any change to the allocation to a particular class within this matrix will clearly affect the mapped output. It is stated in Paragraph 2.11 that 'The approach gave more weight to the unequivocal presence of peat (carbon category (6 and 5) than to the mapped vegetation data'. It might be argued that the weighting should be to the much more detailed land cover data (10 fold scale difference).

Referring to Table 3, if 'The approach gave more weight to the unequivocal presence of peat (carbon category (6 and 5) than to the mapped vegetation data', then should soil carbon category 2 'Area dominated by mineral soils, but may include some limited area of peat soils' not be all Class 3 or 4? The method appears to have used peatland habitat type (from LCS 88) to over-ride the soil category. Similarly with soil carbon categories 3 and 4; the vegetation would appear to have been given more weight. Paragraphs 2.11 and 2.12 appear to contradict each other a little.

In Table 3 it is conceivable (but unlikely) that combinations D-0 and C2-0 could be Class 1.

At Paragraph 1.8 carbon-rich soils and deep peat are defined. We suggest that 'deep' is removed as 50 cm is the threshold for peat. Soils with less than 50 cm are referred to variously as organo-

mineral or peaty soils. It would be more straightforward to exclude peat from the category of 'carbon-rich soils and use the 50 cm threshold to separate the two categories.

Carbon rich soils are referred to in Paragraph 1.8, are not referred to in Table 1 but appear again in Table 4. We believe this may confuse the non-specialist.

There is a degree of 'fuzziness' between a number of the categories in Tables 1 and 2 which perhaps needs a sentence of explanation.

Figure 1 Had been produced using a combination of 1:250,000 and 1:25,000 scale data?

Table 4 Could be argued that this category should be further up the scale? It has high soil carbon stocks and potential for restoration to peatland. Class 4 has low carbon soils and no peatland habitat.

Tables 4 and 5 could be combined.

Supporting information document:

Figure 1 Could it be argued that Category 2 is more carbon rich than Category 3 as it has peat as a component? We suggest probably not on balance so we accept this ranking.

Category 5 Mention should be made of peaty soil in SMU\_SUBDOMINANT.

Paragraph 2.7 Does this paragraph not contradict the figure? The different categories are well defined in Figure 1 but the text below appears to cast doubt on it.

Figure 2 At the box 'Is peat soil also present?' there should be a prompt to distinguish whether the peat soil is dominant or subsidiary, and to allow allocation into Category 4 or 5? We cannot see a reason why there cannot be a Category 4

Tables 2 and 4: Some of the types C1 do not have peatland vegetation e.g. the primary 5:secondary 6 and primary 5: secondary 8 combinations. Should they not be type B (which is currently absent from Table 4?).

Table 3 Can 'all other occurrences' be explained more fully?

Figure 3 is very difficult to read.

Some of the vegetation combinations (Table 4) might be better described as Heathland dominated e.g. vegetation combinations 4:4, 4:6, 6:4 and 6:6.

Where 9 is the dominant vegetation, there should be more differentiation in that column; 9:3 is different from 9:6 for example.

Some of Category 10 with scattered trees will have non-native tree regeneration on it. Can this be accounted for? Is it important?

Some of Category 10 is eroded peat, therefore degraded? Should eroded peat be distinct from non-eroded peat? If the map is not concerned with peat quality, probably not, but if it is, it should be separated.

Table 5 In the combinations of 3D, 4D and 5D, the vegetation has taken precedence over soil. This would appear to be counter to paragraph 2.11 but in line with paragraph 2.12.

Figure 5. The colours get confused when used with the base map, but the base map detail does make locating oneself so much easier.

### **Comments are invited on advice for using and interpretation of CPP map**

**Question 3: Do you agree that classes 1 & 2 of the ‘Carbon and Peatland’ map (2014) shown in Table 4 should be used as the basis for mapping ‘carbon rich soil, deep peat and priority peatland habitats’ as set out in Table 1 of SPP (Spatial Frameworks)?**

**Response:**

As a general principle yes, but please be aware of our words of caution under Q1. The map can be used at a broad strategic level and the principles for classification can be used independent of scale on the ground.

### **Other comment on definitions**

**Question 4: Do you have any other comments relating to the location and definitions of carbon rich soil, deep peat and priority peatland habitats?**

**Response:**

Any issues have already been covered in the Questions above.

### **Any other Comments**

**Response:**

No response provided