

## ANNEX 1 – SNH Core Areas of Wild Land 2013 Map Response Form

### John Muir Trust response

#### Q.1. What is your view on the Core Areas of Wild Land 2013 map?

1. Wild land is one of Scotland's most important assets, with spectacular scenery and abundant wildlife, its conservation is necessary to support a wide range of public benefits and Government policy objectives. These include protection of biodiversity, supporting sustainable rural economic development, combatting and mitigating climate change. It provides us with natural resources such as clean air, water and food and contributes to Scotland's identity and public image. The John Muir Trust (JMT) is a UK conservation charity dedicated to protecting and enhancing wild land and we campaign for the protection of our wildest land. Core wild land areas are disappearing rapidly – as a proxy figure, see SNH's Natural Heritage Indicator, N3, for 2012 which details the increased visual impact of built development within Scotland. So it is vital that there is a high level of protection from industrialisation for Scotland's remaining core wild land areas.
2. JMT strongly supports the principle of Scottish Natural Heritage (SNH)'s map of Core Areas of Wild Land (CAWL), as issued for consultation. The map is required for two key purposes. Without a map of this resource it is very difficult to have accurate knowledge of whether the resource is diminishing and at what rate. The map provides an audit and documentation of the current nationally-important wild land resource in Scotland and is of immense value in that respect. The Trust therefore welcomes and strongly supports the principle of the SNH map of Core Areas of Wild Land and the methods used to derive it.
3. The second key reason for the map is that it provides a strategic planning policy tool which gives robust guidance as to where wild land is to be found. The explicit link made by the Scottish Government between the CAWL map and the National Planning Framework 3 and the Scottish Planning Policy brings much needed clarity and is required for protection of the wild land resource in considering planning decisions. The Trust considers that the map will provide a very good basis for local authorities, Scottish Government and others to improve protection for Scotland's wild land.
4. From the Trust's expertise, we consider that the methodology used by SNH is robust in its general approach. Advances in technology have allowed very significant progress in mapping, since the production in 2002 of its 'Wildness in Scotland's Countryside' policy statement and the associated map of Search Areas of Wild Land. The research techniques used are similar to the work carried out for JMT in its earlier mapping exercise (2010), although SNH's mapping is considerably more refined as it uses a much more detailed level of information with much smaller "cells" used. We welcome the methodological development by SNH and the consultation that led up to it, using techniques which have been used by others, e.g. for European mapping. Wild land mapping has some parallels to the original work on our National Parks and it is not a radical concept but Scotland should be proud of leading on its implementation in public policy.
5. For technical analysis of the methodology, please consider the attached Report (Appendix 1) from Leeds Wildland Research institute as part of our response.
6. With regard to the specific approach taken in paragraph 4.4 of the consultation background paper 'Extent of wild land areas and inclusion of lower wildness scores', we believe that this is a balanced and pragmatic approach to defining and protecting wild

land.

7. We value the map as a resource and a strategic policy instrument and recognise the value of 4.6 'Field testing to ground truth the work'. Wild land is a holistic concept of what can be seen and felt across large stretches of wildness. The Trust endorses SNH's definition in paragraph 2.2 which makes the important point that wild land is not empty of human activities and the importance of recognising that Scotland's wild land is distinct from ideas of "wilderness".
8. It is essential, however, that the recognition of the strategic nature of the map, given in paragraph 4.6, is not allowed to become a mechanism to allow challenge to be made of every area of contention. It is not possible to eat away bit by bit from the edges of wild land core areas and not have an impact on the whole – the national wild land resource. This should be borne in mind when too much detail obscures rather than clarifies the main issues.

**Q.2. Do you have specific comments on any of the areas of wild land identified?**

9. There will always be some discussion over where the boundaries of an area, defined as wild land, will be. This is no different from when the National Parks were designated or National Scenic Areas. In the end, this is a matter for decision-makers, using advice based on research-led judgement. However, it should not be forgotten that Scotland's wild land has been recognised as a national asset, in national planning policy, and so a national overview of the areas which require strong protection is appropriate.
10. We would expect that the map is likely to be revisited in future years as the availability of data and mapping tools develops further. However, there is an urgent need for a finalised map to be available as soon as possible. Otherwise, we will be "fiddling whilst Rome burns" – watching wild land disappear while we discuss whether the CAWL map is absolutely perfect. It would be illogical to accept that CAWLs should be inter-actively redrawn because consents have been given to developments around the edge of a CAWL while the mapping is going through the consultation process. This logic would dictate that the CAWL map would need to be redone on a continuous basis, with the core areas reducing all the time, because several more developments have been built in wild land areas while consultation has been ongoing. The logical endpoint of such an approach could lead to there being little wild land left.
11. Policy-makers need to recognise that all of the areas of wild land identified in the CAWL at consultation need to be protected as a principle. Indeed, it is very important to remember that both the National Parks and the National Scenic Areas were only intended to be representative of the best landscapes Scotland has – they do not encompass all of them. So these, currently unprotected core areas of wild land, should be recognised as a resource of national, not regional importance.

**Q.3. Are there any other issues regarding the Core Areas of Wild Land 2013 map, or its preparation, that you would like to raise?**

12. The Trust does not agree with the approach taken as given in the document 'SNH's Mapping of Scotland's Wildness and Wild Land : Non Technical Description of the Methodology (October 2013) page 5 & 6 point 32 (a).

“ *In identifying a boundary judgement has also been applied to take account of some of the limitations with the methodology, in particular:*

*a)excluding from the areas of wild land, consented wind farms and large hydro schemes not considered in the analysis (only built and mapped features were captured by the Phase I analysis);”*

13. We believe that where consent for large developments of any kind has been approved in the ‘core areas for wild land’ as defined by the map, but the development is not constructed, that the CAWL should not take this consent into account. Specifically, the areas should not be redrawn and reduced to take that into account, in the CAWL map which will be released in 2014. The map is, first and foremost, a map of the current wild land resource and should not anticipate and guess at loss of areas in drawing the boundaries. On this specific approach, it is clear that a development might have consent but never be built – possibly due to the costs of the project e.g. costs of transmission; changes in subsidy regime.
14. It cannot possibly be correct to map one of the wildest areas in Scotland as if it is not wild because it is *anticipated* that that area will be significantly impacted. This would then allow another intrusive development to come forward and be consented, because the area is not mapped as wild land/no longer regarded as wild land, but the first development may never be built. In other words, the first development has acted as a stalking horse, whether intentionally or not. The Trust would note that our understanding, from earlier consultation, was that consented areas would not be excluded from wild land mapping, if they currently fulfilled the criteria.
15. We believe that the map identifies the main key natural heritage assets as categorised by paragraphs 2.1 and 2.2. However we are of the view that coastal, island and peatland wild land areas have not been given sufficient prominence and protection as they are not necessarily covered by the definition given in 3.4 iii ‘Landform which is rugged or otherwise physically challenging’ when interpreted in a traditional manner.
16. Examples of where this approach does not seem correct or logical are
  - a) flat peatland may be very challenging to cross.
  - b) A relatively small island has a remoteness intrinsic to its nature but it is unlikely to fulfil the condition in the methodology for the minimum size of area.
  - c) The interaction of land and sea at coastlands provides some of our wildest experiences.
17. The Trust would ask that consideration be given to these points but recognises that this may be for a future review.
18. **The Trust would highlight that the 2012 Public Perceptions of Wildness Survey was conducted by SNH, in conjunction with the National Parks, was specifically undertaken as part of the consultation on the wild land mapping to find out public views about wildness and include that in the consideration of final mapping.** This detailed survey gives a resounding mandate for taking action to improve protection for Scotland’s wild land. The overwhelming majority of respondents felt wild land was important, under threat and needed increased planning policy protection.



## **Technical Report**

for the John Muir Trust

**Author:** Dr Steve Carver

**Date:** 22<sup>nd</sup> November 2013

**Client:** The John Muir Trust

### **Appendix 1**

**to John Muir Trust's response**

**to SNH Consultation on Core Areas of Wild Land 2013 Map**

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# **1 Introduction**

## **1.1 Scope**

This technical report has been commissioned by The John Muir Trust (JMT) in support of their submission to Scottish Natural Heritage (SNH) in response to the consultation on Core Areas of Wild Land (CAWL) 2013 map. The document lays out the technical and conceptual origins of the SNH mapping of wildness in Scotland before analysing the key issues regarding the mapping of wild land leading up to the publication of the CAWL and making a number of recommendations as to how to take the work forward.

## **1.2 Experience**

Dr Carver is the Director of the Wildland Research Institute (WRI) based at the University of Leeds and has 30 years of experience in Geographical Information Systems (GIS) and over 15 years of experience of research into applying GIS to mapping wild land with an emphasis on Scotland, the UK and Europe. He has published widely on the topic and is the author of several key academic papers and technical reports on wild land in Scotland. He has followed the SNH wildness mapping process very closely and provided technical advice at several key stages of this work. He has provided key evidence on wild land and wild land mapping for the EU, EEA, the Scottish Government, SNH and JMT as well as for several planning inquiries where development proposals have potentially impacted on wild land. These include the Allt Duine, Sallachy and Glenmorie wind farm proposals and the Cononish gold mine. He has also worked extensively with the US Forest Service and US National Park Service informing their decision making processes regarding wilderness and landscape character.

## 2 SNH approach and methodology

### 2.1 Origins and background

The current SNH wildness mapping process has its origins in NPPG14 (1998)<sup>1</sup> which included an early reference to wild land as “Uninhabited and often relatively inaccessible countryside where the influence of human activity on the character and quality of the environment has been minimal.” This was followed up in 2002 by the SNH policy statement on *Wildness in Scotland’s Countryside*<sup>2</sup> which both recognised the value of wild land as “parts of Scotland where the wild character of the landscape, its related recreational value and potential for nature are such that these areas should be safeguarded against inappropriate development or land-use change” (p15). The SNH policy statement goes on to recognise four essential attributes of wildness specific to Scotland which include:

- perceived naturalness of land cover;
- absence of modern human artefacts;
- rugged and challenging nature of the terrain; and
- remoteness from mechanised access.

These also encapsulate the qualities of scenic grandeur and size/scale of area. While the 2002 policy statement provides some indicative maps of remoteness from public and private roads it does not provide any definitive maps. Instead SNH provide a map showing Search Areas for Wild Land (SAWL) that is intended as guidance to local authorities in developing their own regional level maps and analyses to inform the planning process. There is no national designation of wild land, rather wild land is a concept that is to be recognised and applied in considering planning applications likely to affect the special wild character of the landscape in these areas. It is worth noting that the SAWL map was never intended to be used as a tool for making decisions about where and where not to locate large-scale developments such as wind farms, but it appears to have been used as a guide and has often be quoted in environmental assessments and planning proposals. It was, in retrospect, a mistake to digitise the SAWL map provided in Annex 1 of the 2002 policy statement and make it available for public use as a GIS format dataset. The SAWL map was drawn using the personal knowledge of the policy statement’s authors and while being a reasonable approximation of the core wild land areas (i.e. we intrinsically know where these areas are) it is neither robust nor repeatable having being drawn essentially “by hand”. The SAWL map should therefore be replaced by the CAWL map as soon as possible.

Developments in Europe have paralleled those in Scotland over the last five years and serve to support the work carried out by SNH. In February 2009 the European Parliament passed a resolution on Wilderness in Europe with a majority of 538 for versus only 19 against<sup>3</sup>. The Scottish Government subsequently commissioned a report on *A review of the status and conservation of wild land in Europe* which was published in 2010<sup>4</sup> and this has since informed EU-level work through the development of the *Guidelines on Wilderness in Natura 2000: Management of terrestrial wilderness and wild areas within the Natura 2000*

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<sup>1</sup> Executive, S. (1999). National Planning Policy Guideline (NPPG) 14.

<sup>2</sup> *Wildness in Scotland’s Countryside: A Policy Statement*. Scottish Natural Heritage, 2002.

<sup>3</sup> European Parliament (2009) Wilderness in Europe. Resolution A6-0478/2008 / P6-TA-PROV(2009)0034, 3 Feb 2009.

<sup>4</sup> Fisher, M., Carver, S. Kun, Z., McMorran, R., Arrell, K. and Mitchell, G. (2010). Review of Status and Conservation of Wild Land in Europe. Project commissioned by the Scottish Government.

*Network* (2013)<sup>5</sup> and on-going work on the development of a European Wilderness Register. The Guidelines document provides a definition of European wilderness that states “A wilderness is an area governed by natural processes. It is composed of native habitats and species, and large enough for the effective ecological functioning of natural processes. It is unmodified or only slightly modified and without intrusive or extractive human activity, settlements, infrastructure or visual disturbance” (p.10). While this definition might not fit wild land in Scotland, the Wilderness Register draft report recognises that areas not meeting the strict definition of wilderness but retaining significant wild characteristics may be locally or nationally important. These are defined as areas with “a high level of predominance of natural processes and natural habitat. They tend to be individually smaller and more fragmented than wilderness areas, although they often cover extensive tracts. The condition of their natural habitat, processes and relevant species is however often partially or substantially modified by human activities such as livestock herding, fishing, forestry, sport activities or general imprint of human artefacts.” This matches the concept of wild land in Scotland very well.

## 2.2 Ethos and purpose

While SNH recognise the qualitative and subjective nature of wildness, they also recognise the paramount importance of clarity of definition and the ability to reliably and robustly map the qualities of wildness and core wild land areas in a repeatable and defensible fashion<sup>6</sup>. The Phase I mapping of wildness and the Phase II and III identification of core areas form an integrated programme intended to identify both the spatial variation in the qualities of wildness across the whole of Scotland and inform the identification and mapping of selected core areas. While the Phase I map can inform strategic thinking about wild land at a national level by showing the overall pattern of wildness as a continuum from least wild to most wild, it can also inform local decisions about planning and development. In order to expedite the decision-making process it is necessary to make difficult decisions regarding the fuzzy nature of wildness and draw a line on the map showing the boundary of the core wild land areas. The Phase II and III mapping is intended to meet this need for a map showing CAWL. It is these boundaries and their definition that are currently out for consultation.

## 2.3 Methodology

The methodological approach taken by SNH in the Phase I mapping is based largely on the local level mapping work carried out by the WRi and colleagues for the two Scottish national parks: the Cairngorm National Park (initially in 2008 and again in 2011 to take into account the southern extension to the park boundary) and the Loch Lomond and The Trossachs National Park (2011)<sup>7</sup>. This has been scaled up and generalised to make it applicable to a national level mapping programme. The Phase II and III work is based around a method of SNH’s own design but draws on publications by WRi and common practice in GIS mapping

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<sup>5</sup> European Union (2013) Guidelines on Wilderness in Natura 2000: Management of terrestrial wilderness and wild areas within the Natura 2000 network.

<http://ec.europa.eu/environment/nature/natura2000/wilderness/pdf/WildernessGuidelines.pdf>

<sup>6</sup> SNH Core Areas of Wild Land 2013 Map Consultation Paper, section 3.3.

<http://www.snh.gov.uk/docs/A1104206.pdf>

<sup>7</sup> Carver, S, Comber, L, Fritz, S, McMorran, R, Taylor, S and Washtell, J. Wildness study in the Cairngorms National Park, 2008.

of this kind<sup>89</sup>. The following sections identify key issues in the process of mapping wildness and wild land in Scotland, but it is worth noting that the SNH wildness mapping in Phase I and identification of CAWL in Phase II and III represents the most detailed, sophisticated and rigorous mapping of wild land in any country anywhere in the world to date.

The full methodology employed by SNH in developing their Phase I mapping and Phase II and III CAWL maps is fully described in SNH documents which provide both technical and non-technical detail. The approach taken can be summarised as follows:

**Phase I:** equal weighted summation of normalised attribute maps describing the four attributes of wildness as established in the 2002 policy statement to create a wildness continuum showing the spatial variation in wildness from least to most wild.

**Phase II:** partitioning of the Phase I wildness map into eight wildness classes based on the Jenks Natural Breaks Optimisation method followed by comparison with the 2002 SAWL and identification of contiguous areas of classes 7 & 8 (high wildness) of 1000ha or more and 500ha or more south of the Highland Boundary Fault and consideration of classes 5 & 6 where these abut the above areas.

**Phase III:** consolidation of Phase II areas using informed judgement as regards changes since the Phase I mapping, isolated detractors, small inclusions of class 4 areas and inclusion of inland water (sea lochs) followed by drawing of simplified logical boundaries based on recognisable features on the ground such as rivers, lochs, ridgelines, etc.

The work on mapping wildness in the national parks carried out in 2008 and 2011 was in both cases accompanied by a perception survey aimed at elucidating public opinion on the value, understanding and character of wild land in Scotland. The first survey in 2007<sup>10</sup> questioned 1300 Scottish residents and established that by far the greater majority thought wild land important (91% of Scottish residents and 96% of national park residents) of which a significant number thought wild land very important (70% of Scottish residents and 82% of national park residents) while the second survey in 2011-12 was used to identify patterns in people's opinions about the relative importance of key attributes of wildness<sup>11</sup>.

## 2.4 Current state of play

The CAWL are currently "out to consultation" until 20<sup>th</sup> December 2013.

## 3 Key issues

### 3.1 Scale

Scale is a fundamental concept in all geographical studies. The window of observation and the "lens" through which one views the landscape very much determines the detail that we see. Wildness (and wilderness quality) have been modelled and mapped at a whole range of spatial scales from the global to the local. Global scale mapping such as the *Human*

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<sup>8</sup> Comber, A., Carver, S., Fritz, S., McMorran, R., Washtell, J. and Fisher, P. (2009) Evaluating alternative mappings of wildness using fuzzy MCE and Dempster-Shafer in support of decision making. *Computers, Environment and Urban Systems*. 34 (2), 142-152.

<sup>9</sup> Carver, S.J., Comber, A., McMorran, R. & Nutter, S. (2012) A GIS model for mapping spatial patterns and distribution of wild land in Scotland, *Landscape and Urban Planning*, 104(3-4), 395-409.

<sup>10</sup> Market Research Partners, Edinburgh (2007) Public perceptions of wild places and landscapes in Scotland. Commissioned report No.291 (ROAME No. F06NC03)

<sup>11</sup> [http://www.lochlomond-](http://www.lochlomond-trossachs.org/images/stories/Looking%20After/PDF/publication%20pdfs/Wildness_survey_report.pdf)

[trossachs.org/images/stories/Looking%20After/PDF/publication%20pdfs/Wildness\\_survey\\_report.pdf](http://www.lochlomond-trossachs.org/images/stories/Looking%20After/PDF/publication%20pdfs/Wildness_survey_report.pdf)



*Footprint* and *Last of the Wild* maps are drawn using global scale datasets to show the broad major patterns in human impact and the world's remaining wilderness areas<sup>12</sup>. These show up in areas such as Antarctica, Greenland, Siberia, Alaska, the Sahara and Gobi deserts, the Amazon rainforest, etc. but cannot distinguish national level patterns very well nor identify areas of local importance. For example, Scotland doesn't even show up on the *Last of the Wild* mapping yet we know that Scotland's wild land is a priceless national asset. Regional scale mapping such as those developed for Europe and North America can show more detail but still rely on relatively broad scale coordinated datasets to show overall patterns and distributions of wildness. The recent maps developed to support the EU Wilderness Register show up the principal core areas in Scotland relatively well (despite Scotland not being able to return any wilderness areas to the Register) but these lack definition in terms of their boundaries and characteristics.

The scale of mapping covered in the SNH Phase I, II and III maps represents the optimum scale for national level mapping wherein detailed nationally available data can be used in a coordinated fashion using models that are customised and attuned to best suit the national patterns and our understanding of wild land. This is ideal for strategic planning at a national level such as is required in defining the CAWL maps and evaluation of national designations. Local scale studies such as those developed for the two Scottish national parks are more appropriate for these smaller areas where detailed models and data can be further customised to better distinguish the detail required for local strategic planning and decision making. This scale is better suited to making decisions as regards location and permissions for new developments, opportunity mapping, planning policy and restoration projects.

Decisions concerning the scale of core wild land areas have had to be made by SNH in the Phase II and III CAWL mapping when looking at the obvious differences between the Highlands and Lowlands of Scotland. It is obvious looking at the Phase I map that the bulk of the wild land resource is located in the Highlands while the Lowlands are relatively under-represented. Considering the concept of relativity that scale and different windows of observation engender, it is important to ensure a representative spread of core wild land areas between both Highlands and Lowlands in a similar fashion to concerted efforts by the Federal agencies to make sure eastern areas of the USA were better represented in the US National Wilderness Preservation System. SNH therefore make the decision to reduce the size threshold for core areas south of the Highland Boundary Fault from 1000ha to 500ha thus ensuring at least some core areas remain within easy reach of the main conurbations of the Central Belt. This is a logical choice based on the key geographical division represented by the Highland Boundary Fault though the size thresholds are arbitrarily decided on.

### 3.2 Resolution

Resolution is very much related to scale. The more local the scale, the higher the resolution one can view the landscape, based on both availability of more detailed (higher resolution) datasets and available computer resources. The global and regional studies described above have used 1km resolution data whereas the local mapping for the national parks has used 20m resolution datasets. The mapping work carried out by SNH at a national level has used data resolutions of 25m, 50m and 100m to ensure the highest quality results are available at the national scale while ensuring the analysis is practical on the basis of required computational overheads. While the methodology applied in developing the Phase I mapping is based around the local scale mapping developed for the two

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<sup>12</sup> Sanderson E. W., M. Jaiteh, M. A. Levy, K. H. Redford, A. V. Wannebo, and G. Woolmer. (2002) The human footprint and the last of the wild. *Bioscience*. 52(10), 891-904.

national parks some generalisation has been required due to data availability and computational overheads. For example, while the visibility analyses for the two national parks were run at 20m resolution using the NextMap DSM data, this level of analysis would prove too unwieldy at the national scale where runtimes would have proved too long for practical analyses. As a result decisions were taken by SNH to run the visibility analyses at 50m resolution with a 15km search radius and 100m for wind turbines where a wider search radius of 30km was deemed necessary to reliably represent their impact on the wider landscape.

### **3.3 Attributes and mapping criteria**

The SNH Phase I mapping is based around the four attributes of wildness identified in their 2002 policy statement. These and their implications for the CAWL map are discussed below:

#### **3.3.1 Perceived naturalness of land cover**

This attribute deals with how natural the land cover feels to the individual. It is based on a reclassification of the 25m resolution CEH Land Cover Map 2007 into “naturalness” classes and combination of these within a 250m radius zone around the observer. This takes into account the total effect of all land cover within the immediate area around the observer. It is not a measure of the ecological naturalness rather it is a measure of how natural it looks and feels to the casual observer. For example, montane vegetation is deemed wilder than grazing land which is wilder than arable land which is wilder than built up areas. Some uncertainty is acknowledged by SNH in distinguishing the level of management within land cover classes. For example, heather moor can be natural when unmanaged and only semi-natural when managed for grouse shooting by muirburn. Similarly, the LCM2007 data does not distinguish between natural and artificially impounded water with its associated draw-down line and infrastructure. However, these are justifiable generalisations for a national level mapping exercise and can be better and more confidently distinguished by local level mapping as demonstrated in the mapping work carried out for the two national parks where land cover data can be supplemented by more detailed dataset and “ground truthing” by local experts.

#### **3.3.2 Absence of modern human artefacts**

This attribute deals with how the landscape visible from any one point is impacted by the visibility of obvious modern human artefacts such as linear features (roads, tracks and railways), buildings, structures (dams, power lines, masts, etc.) and wind turbines. The relative impact of all such human artefacts is calculated based on the proportion of the 360° landscape view around any point over a landscape defined using a 50m resolution terrain model, that is occupied or taken up by these artefacts as opposed to background land cover. This therefore takes both the vertical area (i.e. height) of artefacts visible and the distance from the observer and is calculated using custom software. A maximum search radius of 15km is used for all human features except for wind turbines where a radius of 30km is used. This increased search radius is based on the fact that these very large installations stand out against the surrounding land cover and also move thus making them more visible over longer distances. Both search radii are based on results from research carried out by Bishop et al. (2002)<sup>13</sup>. This methodology only differs from that carried out for the two national parks in that plantation forest is not considered at the national level, however these are considered in the deliberations about areas included through the Phase III mapping and are included in the mapping of perceived naturalness. Another query raised in the consultation process has been the decision to base the

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<sup>13</sup> Bishop, I. (2002) Determination of thresholds of visual impact: the case of wind turbines. Environment and Planning B. 29(5) 7070-718

visibility of wind farms only on installed turbines and not to also include consented turbines. This is justified on the basis that the Phase I map is intended to represent a snapshot of wildness across Scotland at the time of mapping such that this can be used as a baseline against which further encroachments on wildness and CAWL can be judged in the future. Since the consented turbines had not yet been built at the time of mapping (and many still remain unbuilt and could in fact fail to be built as economic circumstances change) the decision was taken not to include consented turbines in the Phase I mapping process. Consented turbines which are ultimately built will have their visual influence and impact on CAWL calculated in the repeat mapping in the future.

### **3.3.3 Rugged and challenging nature of the terrain**

This attribute deals with how rugged the landscape looks (and by association, how challenging it is to cross). This is modelled directly from the terrain data using standard deviation of total curvature. If the terrain is rugged and complex the standard deviation will be high, if the terrain is smooth and less complex, it will be lower. The measure basically captures the rate of change of altitude in both plan and profile. This works very well at capturing the ruggedness of the landscape in mountainous areas but presents certain difficulties with the concept of “challenging” where flat (and therefore not rugged) but boggy/waterlogged terrain (and therefore challenging) is concerned. This is an area of uncertainty that has been voiced in respondents concerns. However, the effects of relatively low lying, flat and boggy ground such as found in the Flow Country, Claish Moss and Rannoch Moor are relatively localised and largely accounted for in the calculation of the remoteness from mechanised access layer.

### **3.3.4 Remoteness from mechanised access**

This attribute deals with how remote the landscape is based on how long it takes to walk from the nearest point of mechanised access, usually a public road. The model uses a GIS implementation of the well-known Naismith’s Rule<sup>14</sup> to calculate walking times based on horizontal distance, vertical rates of ascent and descent, the effects of ground cover on walking speeds (e.g. boggy ground and dense forest/shrub have a marked effect in slowing walking speeds), and the influence of barrier features (e.g. lochs, rivers, cliffs, etc.) in impeding progress. It does not take into account the popularity of walking routes and destinations such as mountain summits (e.g. Munros) as these are temporal aspects that change from day to day and so cannot be reliably modelled. Rather the remoteness attribute looks at the effect of inaccessibility and the commitment required on the part of the individual to travel by foot into core wild land areas as an indication of overall remoteness in and across the landscape. Some concern has been voiced here over the ability of the model as applied to represent the remoteness of islands where there is no public road/ferry access. While some of these may be relatively accessible (and therefore not remote) to anyone with a suitable boat, they are considered to be in the remotest class in the SNH Phase I mapping which focuses on remoteness from public roads when travelling on foot. Again, this is a sensible generalisation when looking to map wildness and CAWL at the national scale. Local models such as those developed for the Loch Lomond and The Trossachs National Park where travel by boat on inland and sea lochs is a possibility having taken the use of water craft into account, while remoteness of coasts, inland marine areas and islands has been accurately modelled by WRi for the JMT in Lewis/Harris, the Shetlands and the Skye/Knoydart areas.

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<sup>14</sup> Naismith, W. W. (1892) Scottish Mountaineering Club Journal. II: 136.

### 3.4 Transparency

Some concerns have been expressed as to the transparency of the Phase I, II and III mapping process. SNH provide two documents on their web pages; a technical document and a non-technical summary<sup>15</sup>. These give both the precise details of how the maps were created and a broad, plain-English explanation of the principles used for non-GIS experts. The non-technical summary necessarily simplifies the complexities of the modelling process and in doing so misses out some technical details. It is recognised that modelling wildness is a non-trivial task and while the basic models involved in Phase I, II and III mapping are simple enough in principle, their implementation necessarily requires a series of complicated steps to combine a variety of data streams and spatial models, perhaps giving rise to some appearance of non-transparency in the overall mapping process to non-GIS experts.

### 3.5 Robustness and repeatability

It is essential that the mapping process undertaken in Phase I, II and III are both robust and repeatable. The results of the Phase I mapping and the Phase II and III identification of core wild land areas represent a tremendous effort and great deal of work on the part of SNH and are, as stated in section 2.3, the most detailed, rigorous and sophisticated mapping of wildness at a national level anywhere in the world to date. It should therefore be considered as robust as practically possible for a country of this size. The aim of the mapping process is to define the pattern and distribution of wildness at a national scale and identify CAWL for a specific point in time (i.e. 2013) in the assumption that the mapping work will be repeated in the future as attributes of wildness change through both development and restoration. It is anticipated that subsequent repeat mapping campaigns (say on a five or ten year cycle) can show up losses and gains to the CAWL and so better inform national strategic thinking on wild land and the threats it faces from development as well as local planning policies and decision-making.

### 3.6 Qualitative vs quantitative definitions

It is recognised at various levels and at various stages in SNH thinking that wildness and wild land are essentially a qualitative concept that will inevitably vary from person to person and between stakeholder groups and organisations. This may be used as an argument to say that it is pointless to map it since the concept is too vague to be reliably quantified. The alternative and stronger argument is that wildness and wild land in Scotland's countryside is too valuable a resource not to at least attempt to quantify it and therefore be able to map it sufficient detail and rigor such that it can best be delimited and protected. There are many difficulties associated with mapping wildness and wild land as is amply demonstrated by the work SNH has done and the amount of interest and comment generated; both supportive and critical. What is true, and a fact that we cannot deny, is that if left unmapped and unprotected, Scotland's wild land resource will be at great risk of steady erosion from numerous developments, not least of which are those from the renewable energy sector, but also from estate management (e.g. proliferation of hill tracks), mineral exploitation (e.g. mining, quarrying, etc.), communications (e.g. cell masts) and urbanisation<sup>16</sup>. It is clear from the two perception studies that the majority of Scottish residents believe wild land is a value asset and ought to be protected. This lends the weight of "being in the national interest" to the SNH mapping work. There has been some discussion as to whether the boundaries presented in the Phase III CAWL maps

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<sup>15</sup> SNH's Mapping of Scotland's Wildness and Wild Land: Non-technical Description of the Methodology (October 2013) <http://www.snh.gov.uk/docs/A1104165.pdf>

<sup>16</sup> Carver, S. and Wrightham, M. (2003). Assessment of historic trends in the extent of wild land in Scotland: a pilot study. Scottish Natural Heritage Commissioned Report No. 012 (ROAME No. FO2NC11A).

should be regarded as discrete or fuzzy (i.e. vague). Certainly the concept of wildness is fuzzy and it is difficult to see how the transition from non-wild to core wild land areas can ever be mapped with 100% certainty, but for planning and decision making purposes a discrete and definitive line on the map is required. This is not without precedent in Scotland or abroad. In Scotland, national parks and other protected areas with which certain planning and development restrictions are linked, are defined sharp boundaries on definitive maps in planning offices. In the USA, designated wilderness areas are similarly defined (for example in Death Valley National Park, legally designated wilderness begins 500 feet from the road)<sup>17</sup>. Protection of wildness and core wild land areas in Scotland needs, despite the uncertainties associated with mapping a vague and fuzzy concept, a definitive line on the map.

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<sup>17</sup> Carver, S., Tricker, J., & Landres, P. (2013). Keeping it wild: Mapping wilderness character in the United States. *Journal of Environmental Management*, 131, 239-255.

## 4 Recommendations

It is strongly recommended that we accept the SNH Phase I, II and III mapping work and the CAWL map that arises therefrom. The reasons for this recommendation are given in detail in the sections above, but are summarised below:

- Wild land is a highly valued and distinctive aspect of Scotland's culture and countryside that is sensitive to development. The majority of Scotland's population thinks wild land is important and requires protection.
- Informed decisions about protection depend heavily on high quality mapping. The SAWL provided in Annex I of the 2002 SNH policy statement on wild land was only ever intended as a preliminary search map for areas of wild land and should never have been released for use in digital form.
- The SNH Phase I, II and III mapping of wildness and wild land in Scotland represents to most detailed and rigorous national mapping exercise of its kind in the world to date. Scotland may therefore be seen as a world leader in this field and therefore the work of SNH should be given the fullest support possible.
- The approach for the Phase I mapping is based on proven and accepted methods developed for the Cairngorm National Park and the Loch Lomond and The Trossachs National Park, but has been generalised to facilitate scaling up to map the whole of Scotland. This generalisation is wholly warranted and driven by scale, data availability and computational considerations.
- The four attributes of wildness have been mapped using the most up-to-date datasets and spatial models. SNH acknowledge that there are some uncertainties within these that are generated from data limitations and generalisations, but these are accounted for either within other attributes or within the Phase II and III mapping.
- The Phase II mapping represents a logical, robust and repeatable approach to identifying the core wild land areas from the Phase I continuum map based on wildness and size with a sensible approach to recognising the differences in core areas in both the Highlands and the Lowlands across the Highland Boundary Fault.
- Phase III introduces human input from landscape experts scrutinizing the Phase I and II mapping to make decisions about the final boundaries presented in the CAWL maps. This is necessary to produce sensible boundaries based on local geographical knowledge and features recognisable on the ground as well as performing a final check for features and anomalous geographies not picked up in the more automated Phase I and II mapping.
- The SAWL should be withdrawn and replaced by the 2013 CAWL map as the basis for informing current and future decisions regarding wild land, its wider protection and proposals impacting upon it.

### ***Respondent Information Form***

Please complete the two forms below and return with your consultation response. Your contact details are held solely for the purpose of the consultation.

<b>Name or Organisation</b>	John Muir Trust
<b>Title</b>	Ms
<b>Forename</b>	Helen
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### ***Release of information contained in consultation responses***

SNH will normally publish all consultation responses we receive, although personal data or other sensitive information will be redacted.

I am responding as an individual. <b>No</b>	I am responding on behalf of a group or organisation. <b>Yes</b>
Do you agree to your name being made available when we publish your consultation response? <b>No</b>	The name of your organisation will be published along with your consultation response.