

Mapping wildness in Scotland's Countryside: a beginner's guide

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The 2007 Perception Survey of Scottish residents carried out by Market Research Partners on behalf of Scottish Natural Heritage reported that of the 1300 residents polled, 91% agreed that wild land was an important aspect of Scotland's countryside and needed to be protected. This is a remarkable figure and one that serves to underline the significance of wild land as an essential part of Scotland's unique and varied landscape, but in order to protect wild land we first need to know what it is and where it is. It also, to some degree, points towards the understanding among the Scottish public that wild land is a thing of value and one that is under threat from development (including renewable energy), climate change and habitat loss. It is therefore important that we are able to effectively map it and use the results to inform management, planning and policy development.

Defining wild land

Several definitions of wild land exist within the Scottish context. The National Planning Policy Guidelines on Natural Heritage define 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.*" (NPPG14, 1998). The 2002 SNH policy document *Wildness in Scotland's Countryside* refers to those 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*" (SNH, 2002), while the National Trust for Scotland refer to wild land as "*relatively remote and inaccessible, not noticeably affected by contemporary human activity, and offers high-quality opportunities to escape from the pressures of everyday living and find physical and spiritual refreshment... The primary purpose will be to identify, protect and enhance the 'core wild land' areas of Scotland*" (NTS, 2002). Whatever the formal definition of wild land, those of us with any knowledge or experience of the Scottish landscape will no doubt appreciate the many aspects of its wild character be that a sense of remoteness, of space or of naturalness or scenic grandeur. We might also have some personal knowledge or intrinsic feeling of where wild land exists, but this is not always easy to express on a map. For example, we might describe the Cairngorm Plateau or Rannoch Moor as wild, and be able to describe the qualities that make it feel wild, but where does that wildness begin and end? When we leave the paved road and start walking? When we've walked for an hour, or two, or even three? Or is it when we can no longer see the road or any other obvious forms of human influence on the land? Being able to answer these kinds of questions and map wild land in a rigorous, robust and defensible manner is critical to the further development of wild land policy in Scotland and its ultimate protection as a landscape character of great value to Scotland.

Mapping wildness

The above definitions of wild land from SNH and NTS provide some basis for mapping the geography of wild land in Scotland. From these definitions (if we accept them), we can see that wildness and wild land is something that is defined by lack of human habitation and influence, remoteness and inaccessibility, size, ruggedness, challenge and opportunity for physical recreation. Some, if not all, of these characteristics of wildness can be mapped, maybe not directly, but using proxy indicators that express the spatial pattern of a small number of key attributes of wildness. SNH in their 2002 policy document on wild land identify four basic attributes of wildness. These are:

- The perceived naturalness of the land cover
- The absence of modern human artefacts in the landscape
- The rugged and otherwise challenging nature of the terrain
- The remoteness from mechanised forms of access

SNH go on to list a series of physical attributes based on this list that could be used to identify the pattern and distribution of wild land across Scotland. These are summarised in the Table 1 below.

Table 1. Physical attributes in the identification of wild land (After SNH, 2002)

<i>Attributes</i>	<i>Main Criteria</i>
Perceived naturalness	Functioning natural habitats Unmodified catchment systems
Lack of constructions or other artefacts	No recent buildings/works Little impact from large structures outside area
Little evidence of contemporary land uses	Little indication of historic settlement Only extensive grazing and field sports
Rugged or otherwise challenging terrain	Striking topographic features and difficult terrain Natural settings for recreation providing hard physical exercise and challenge
Remoteness and inaccessibility	Distance from settlement and communications Limited access either by scale of area and/or lack of easy access
Extent of area	Area sufficient to engender feeling of remoteness and solitude

A number of wild land mapping projects have been carried out in Scotland by the Wildland Research Institute (WRI) at the University of Leeds in collaboration with SNH, the Loch Lomond and the Trossachs National Park Authority, and the Cairngorm National Park Authority. Further work has been carried out at a national and international scale for the John Muir Trust, for the European

Environment Agency and the US Forest Service/Death Valley National Park. However, the basic approach behind wild land mapping remains the same, namely that attribute maps are created that best describe the four main attributes of wildness which are then combined by simple map overlay to create an overall index of wildness. This index is based on a sliding scale or continuum that describes the degree of human modification of the landscape through contemporary land use, visible constructions and access roads, together with the physical nature of the terrain itself (topography, climate and vegetation) which determines how easy or difficult it is to cross. This index assumes that if for a particular location all four wildness attributes have a high value (i.e. using the attributes from Table 1 above, it has functioning natural habitats that exhibit little evidence of contemporary land use, there are no visible buildings/works from either within or outside the area, the terrain is difficult and challenging, and it is a long way from settlement and communication routes and so of limited access) then it can be described as wild. If one or more of the four attributes are in some way compromised, then the area might slip down the scale away from “wild” and towards “not wild”. If all four of the attributes are modified or compromised to a high degree, for example through intensive farming, urbanisation, transport infrastructure, energy developments, etc., then an area would be described as not wild. This concept is known as the wildness continuum or environmental modification spectrum, and is shown graphically in Figure 1.

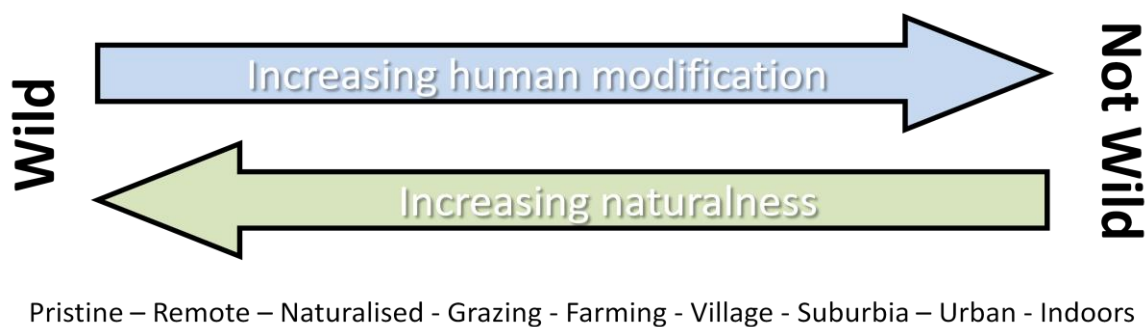


Figure 1. The wildness continuum

While the creation of the four attribute maps is quite a complex and involved process requiring a good deal of local knowledge, data and expertise, the maps themselves are relatively simple and intuitive. These are described simply below and each map shown for the Loch Lomond and the Trossachs National Park. A common sliding colour scale from brown (showing low wildness values) to green (showing high wildness values) is used for all maps. Readers who are interested to know more about exactly how each map was created, the datasets used and the assumptions and caveats made in their construction are referred to the full report and technical annexes.

Perceived naturalness of land cover

How natural the vegetation patterns are gives us an indication of how natural or unmodified the underlying ecosystem is. This map essentially illustrates how natural the vegetation and land use looks to the casual observer as they walk through the landscape. This is based on a variety of land cover datasets derived from satellite imagery, aerial photographs and map databases tallied in such a way as to give an overall figure of the naturalness of the land cover within the immediate vicinity of the observer. What it does not do is attempt to measure the impact of large areas of modified land use such as plantation forestry and urban areas if these are a long way from the area in question as this is taken into account in the next attribute. The map of perceived naturalness of land cover is shown for the LLTNP in Figure 2.

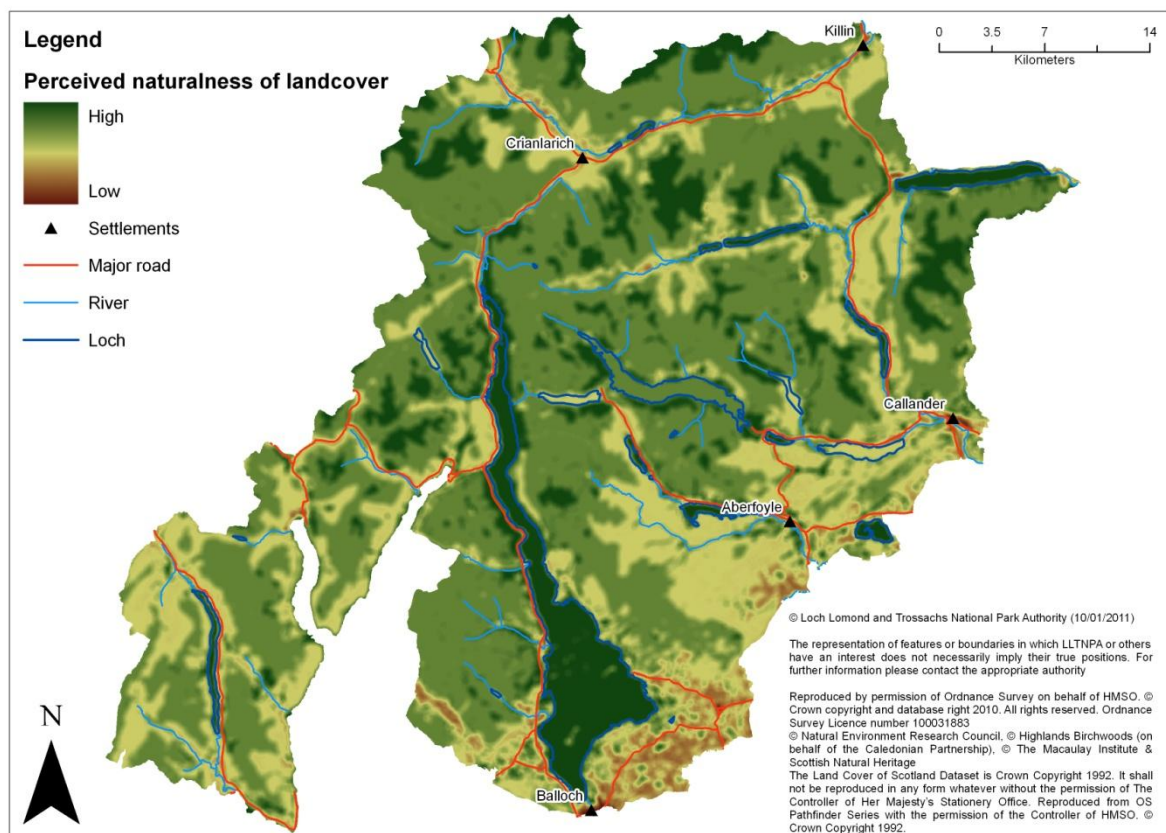


Figure 2. Perceived naturalness of land cover in the LLTNP

Absence of modern human artefacts

The absence of modern human artefacts such as plantation forestry, buildings, roads and other constructions in the landscape can be used to supplement the map of perceived naturalness of land cover in describing how modified or altered the landscape feels. This requires some very computationally intensive calculations to work out from where across a landscape it is possible to see any human artefacts, how many can be seen and just how big they appear. The map shown in Figure 3 shows the number and relative influence (size) of all significant human features or artefacts in the LLTNP landscape. The list of features includes plantation forest, roads, railways and hill tracks, pylons, buildings and other constructions (including dams and draw down lines on reservoirs). Wind turbines and wind farms up to 30km outside the park are included in this calculation. The maximum visible distance (assuming good weather) for other features is assumed to be 15km.

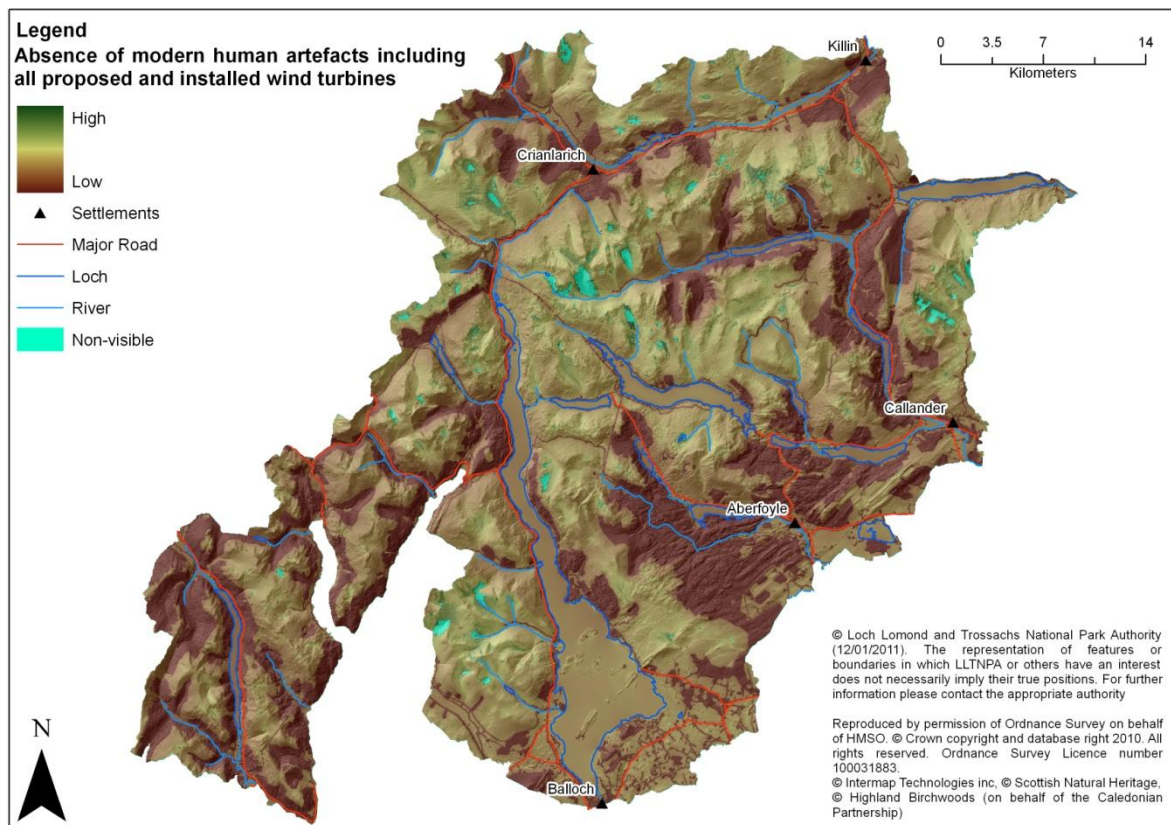


Figure 3. Absence of modern human artefacts in the LLTNP

Rugged or physically challenging nature of the terrain

The physical nature of the landscape, its topography, climate and vegetation, all affect how difficult it is to cross it on foot and thus affect how rugged and challenging a landscape feels. The effect of terrain, vegetation and conditions underfoot on remoteness and accessibility are considered in the next and final attribute, but here terrain and climatic effects are used to describe ruggedness and the challenge involved in wild landscapes. The map shown in Figure 4 is based on how rough the landscape is and how the challenging nature of the terrain is affected by climatic factors. To do this we combine data on how variable the terrain is with an altitude factor based on the assumption that the higher you climb, the more likely you are to encounter inclement and extreme weather conditions such as precipitation, poor visibility from hill fog, high winds, cold, snow and ice, etc.

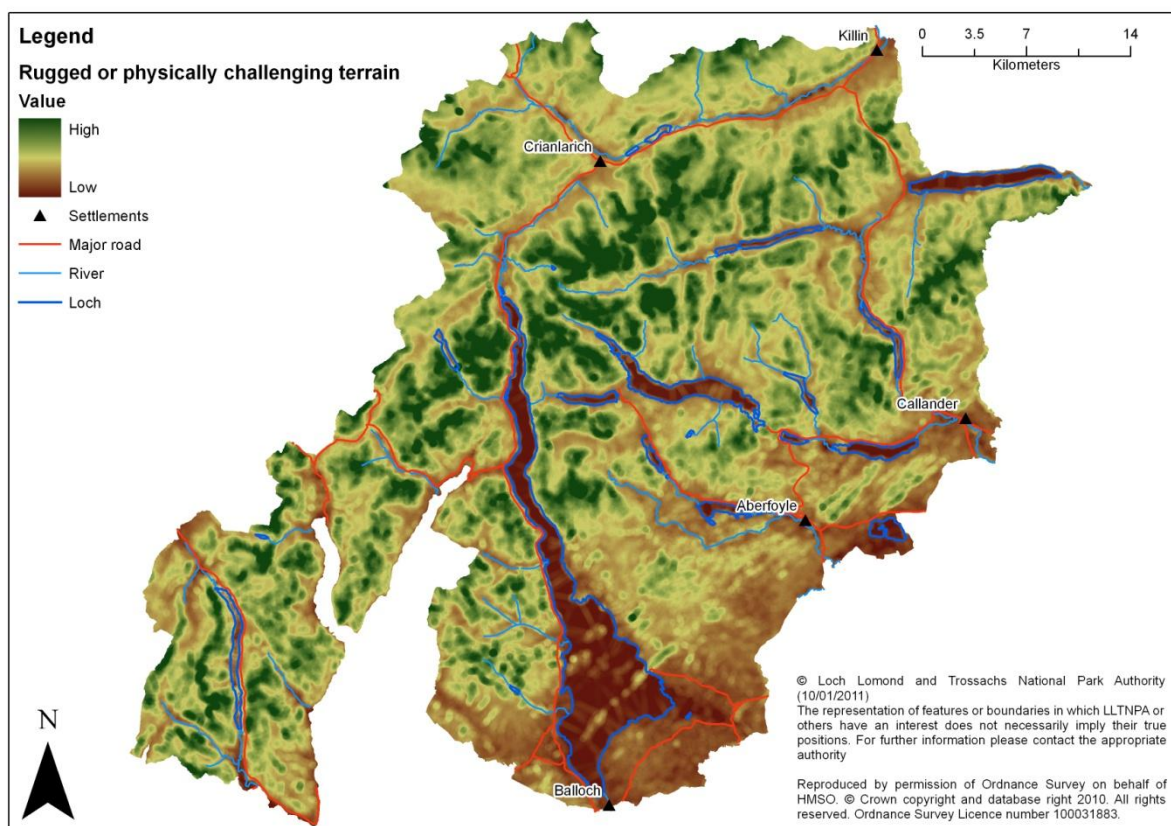


Figure 4. Rugged or physically challenging nature of the terrain

Remoteness from mechanised access

The final attribute concerns how long it takes to walk into a wild landscape after leaving the road or other point of mechanised access. The work carried out in the LLTNP not only includes road access, but also rail, ferries and boat access since the park contains several large bodies of water and coastal areas where boat use is common. In calculating these access times the model used takes walking speeds into account (and the equivalent speeds using watercraft where appropriate) together with controlling factors such as steepness of the terrain, conditions underfoot (e.g. dense vegetation and boggy areas) and the presence of any barrier features such as large rivers, lochs and very steep ground/cliffs. The map shown in Figure 5 essentially shows “The Long Walk In” based on the time taken to walk from the nearest point of mechanised access.

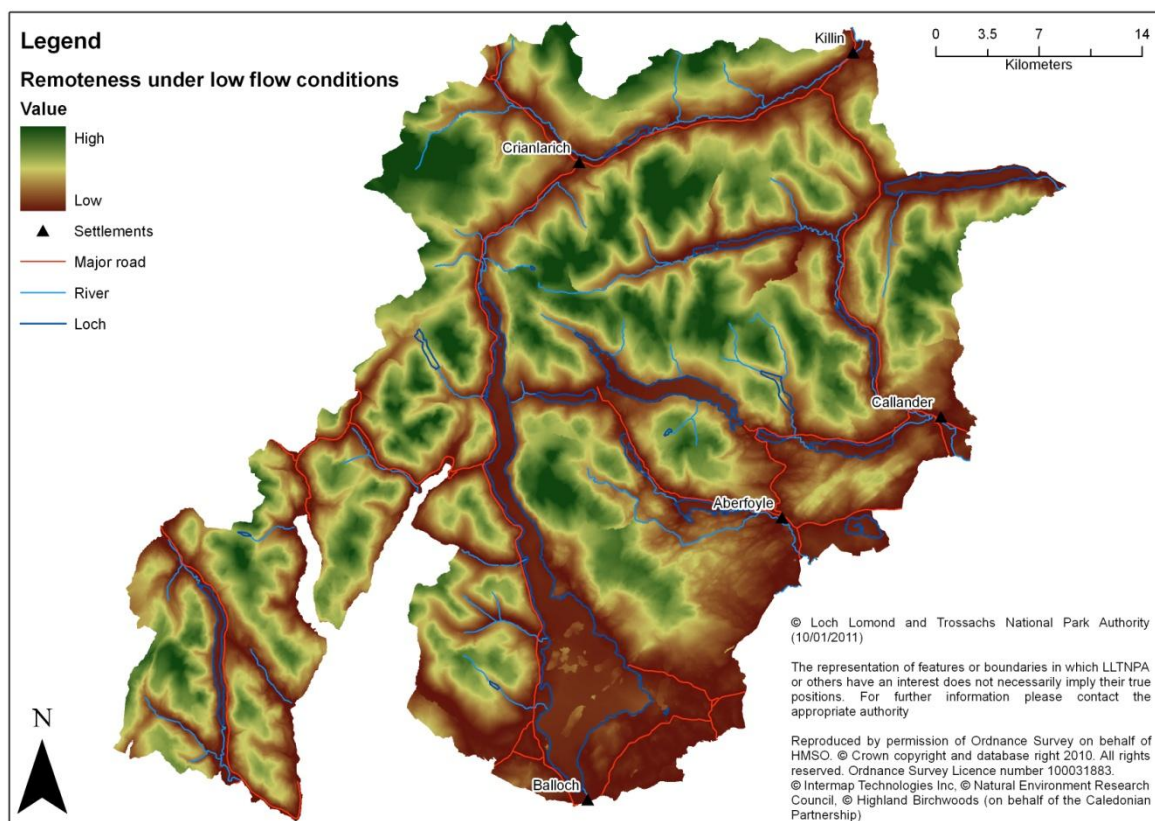


Figure 5. Remoteness in the LLTNP

Creating a wildness map

Once all four attributes have been created it is possible to combine these by simple addition to create an overall wildness map. This is shown in Figure 6 for the LLTNP. This assumes that all four attribute maps that go together to make up the overall wildness map are of equal importance.

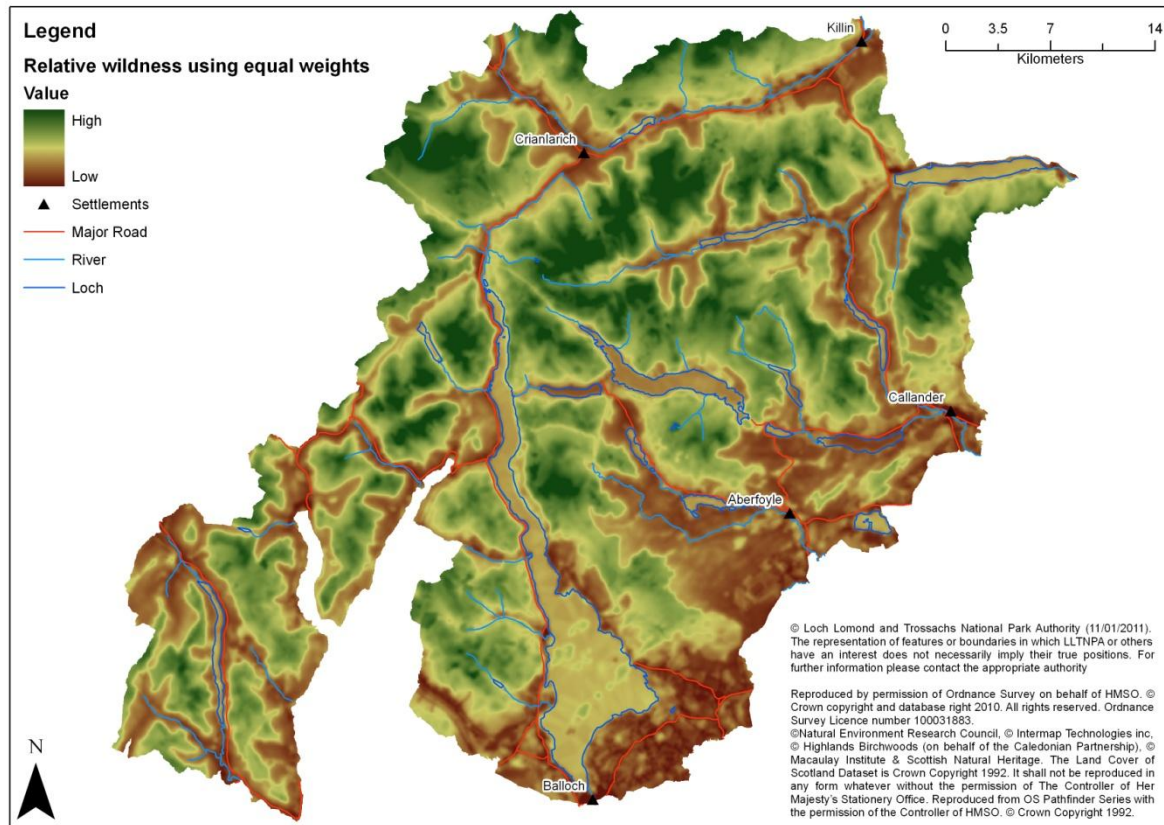


Figure 6. Wildness in the LLTNP based on equal weights

While this is a reasonable starting point from which to base management and planning decisions in regard to wildness within the park, it may be that future perception surveys within the park might inform the park authority of different views of wildness held by different stakeholder groups. An example of a possible different wildness map for the park is shown in Figure 7. This is based on priorities (weights) for the four attributes of wildness derived from the 2007 perception survey of Scottish residents. Here perceived naturalness is weighted at 48% (and as such accounts for nearly half of the pattern seen in Figure 7), absence of human artefacts at 32%, remoteness at 16% and ruggedness at only 4%. This clearly creates a different picture of wildness than the equally weighted version shown in Figure 6. While this might seem like a disadvantage, having multiple maps of wildness can actually better inform management and planning for different stakeholder groups or different purposes such as management of development (e.g. the Cononish gold mine and renewable energy proposals), access management, re-wilding and habitat restoration, and so on.

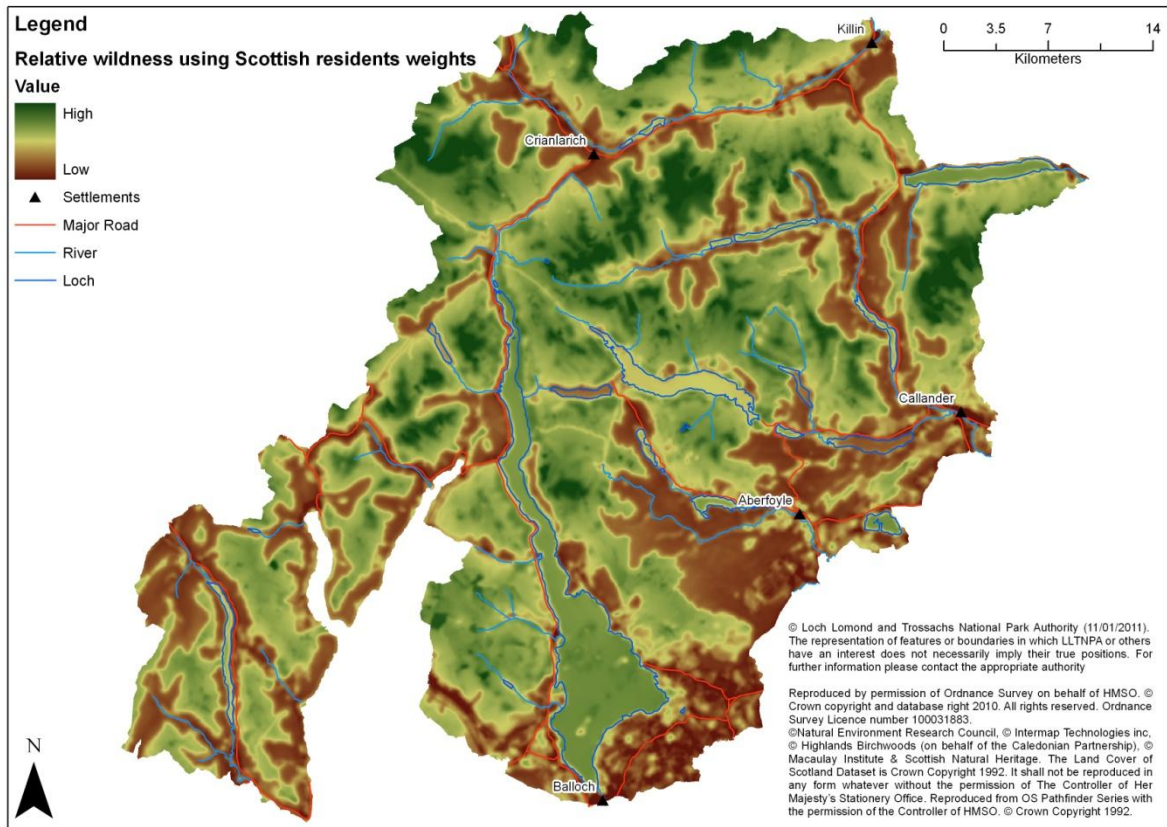


Figure 7. Wildness in the LLTNP based on Scottish residents' weights

Application of wild land maps

Once a wildness map has been created for the park it can be used to derive wild land zones for the park and for comparison with other parks or the national picture. Work by McMorran et al., (2006) for SNH identifies a typology of wild land that is applicable to the Scottish countryside. Figure 8 shows how a version of this typology has been simplified and applied to the maps created for the LLNP. This uses statistical methods to split the park into 3 zones: the wild land core, the wild land buffer and the wild land periphery. Again, such maps will be valuable in informing management and planning decisions and can be a useful communication tool for describing different wild land management zones to stakeholders and the public.

Having a robust and defensible wild land map and set of associated wild land zones is a useful tool in helping make comparisons against other parks and designated areas, as well as confirming the position of the park in the national context. Similar wildness mapping work to that described here has been carried out for the Cairngorms National Park as well as for Scotland as a whole. Figure 9 shows wildness mapped for the CNP using the same methods and data as applied here for the LLTNP. Figure 10 shows the resulting wild land zones for the CNP. These can be compared with Figures 6 and 8 for the LLTNP, respectively. National mapping work is currently ongoing with SNH and should be completed by mid-2011.

For further details on the LLTNP wildness mapping work please see the main project report and technical annex.

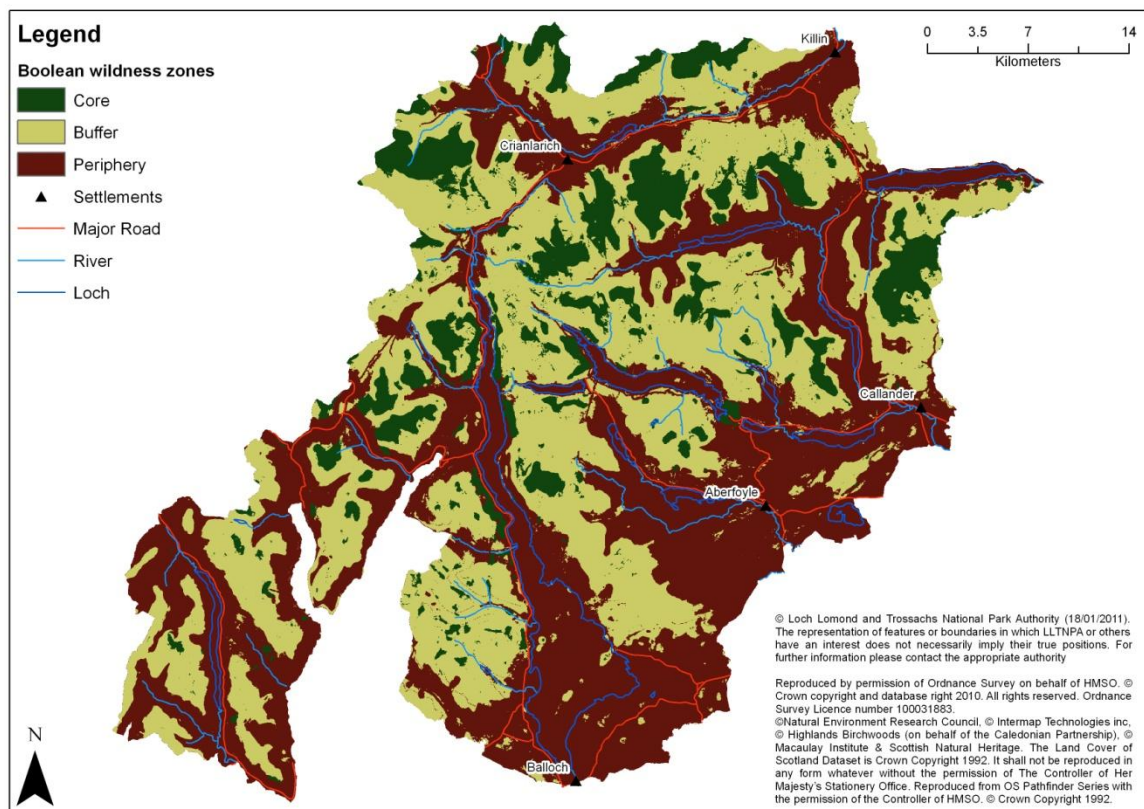


Figure 8. Wild land zones in the LLTNP

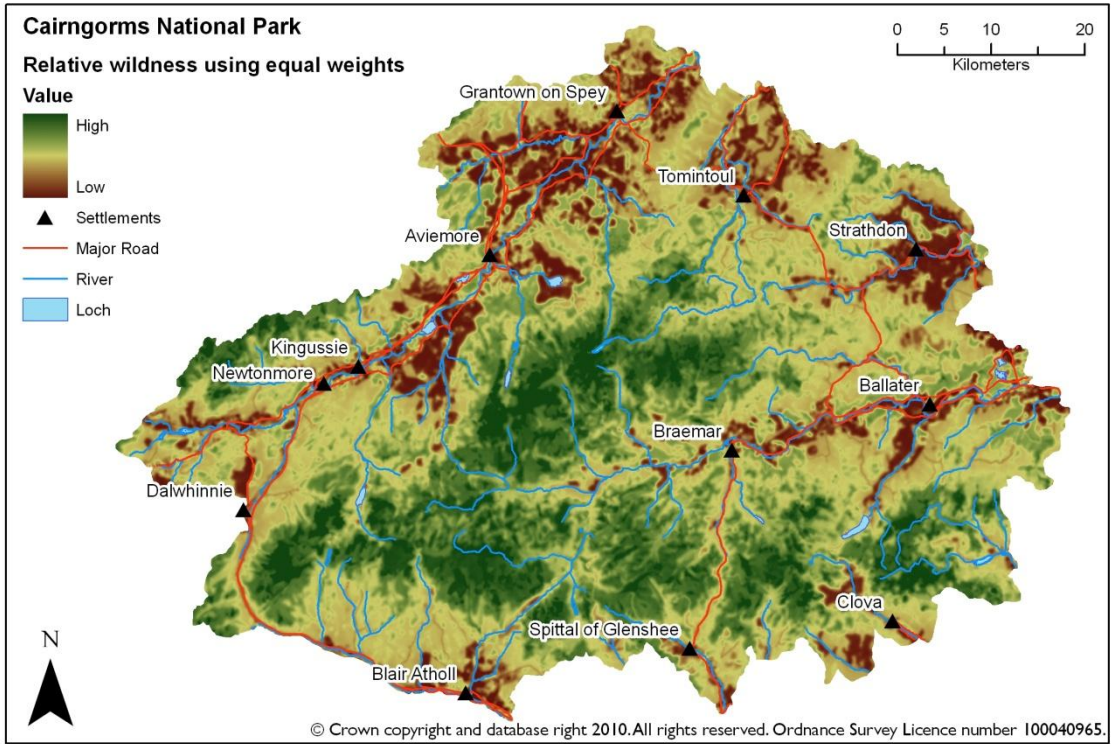


Figure 9. Wildness in the CNP based on equal weights

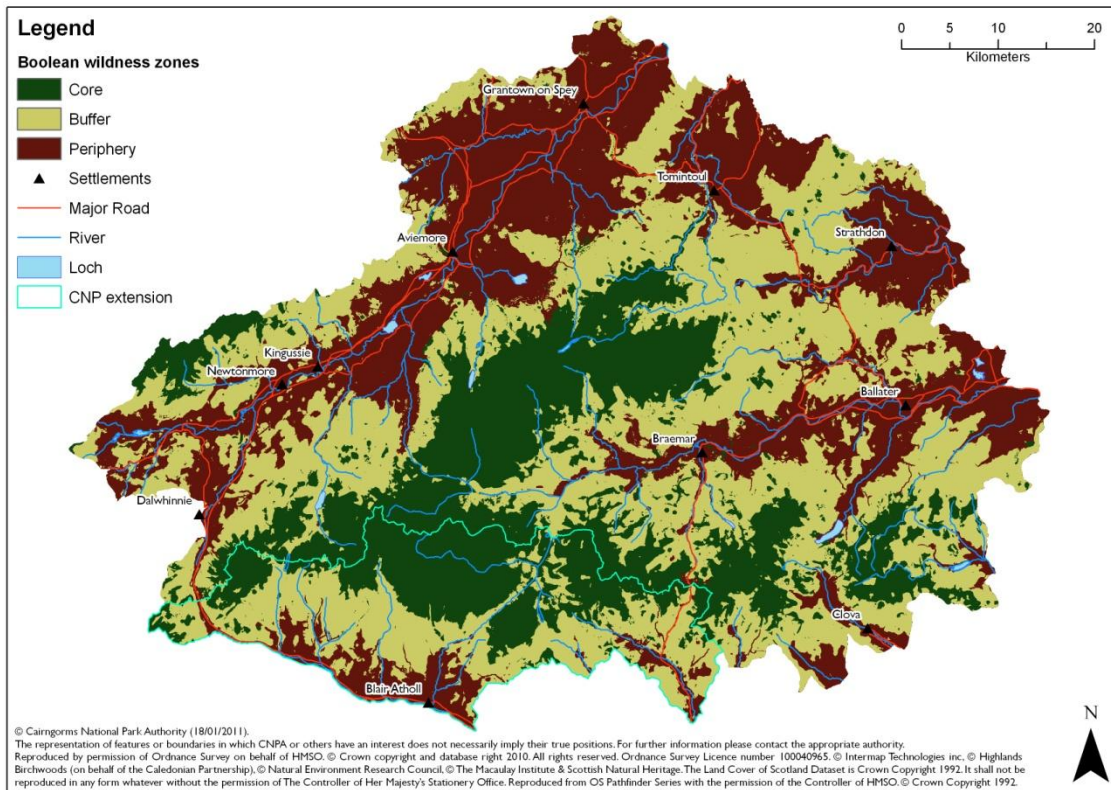


Figure 10. Wild land zones in the CNP