Does the conservation status of a Caledonian forest also indicate cultural ecosystem value?

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Abstract   The Black Wood of Rannoch is one of the largest remnants of ancient, semi-natural Caledonian pine forest in Scotland. It is culturally important as a location for aesthetic and spiritual experience, artistic inspiration, (bio)cultural heritage and a sense of identity and belonging by local communities and urban visitors. Despite this, the values that inform its management are almost exclusively those associated with biodiversity conservation. This focus has proved very effective in protecting the forest from destructive economic interests. However, it could have two negative effects. Firstly, it could continue to downplay the significance given to the full range of cultural benefits, and constrain their recognition and expression to those that are realised by a policy of conservation. Secondly, it could be used as a 'precautionary principle' to justify exclusion of visitors. This paper reports on a series of workshops, discussions, events and residencies, led by two environmental artists, to prompt a debate that rethinks existing narratives of the value and management of the Black Wood and the Caledonian forest more broadly. We analyse the range of cultural ecosystem services associated with the forest, and discuss how these might be realised through six alternative management scenarios. In conclusion we suggest that the new concept of biocultural diversity offers a unifying principle with which to guide a new vision of social and ecological restoration.

1. Introduction

At around 1000 hectares in size, the Black Wood of Rannoch in Highland Perthshire is one of the largest remnants of the ancient Caledonian pine forests that once extended across much of Scotland after the last glaciation. Designated as both a Site of Special Scientific Interest (SSSI) and a Special Area of Conservation (SAC), it is of undoubtedly high biodiversity value and a focus for ecological restoration of a network of native pinewood habitat across the region (FCS, 2009). While typically referred to as pine forests, and primarily comprising Scots pine (*Pinus sylvestris*), the Caledonian forests are diverse ecosystems also containing birch (*Betula* spp.), rowan (*Sorbus aucuparia*) and juniper (*Juniperus communis*) and provide habitats for iconic and threatened wildlife such as capercaillie (*Tetrao urogallus*), Scottish wildcat (*Felis silvestris silvestris*) and pine marten (*Martes martes*).

Although less frequently acknowledged, the Caledonian forests are also culturally important: as a tangible embodiment of (bio)cultural heritage, as a location and inspiration for aesthetic and spiritual experiences and artistic expression, and as places which members of local rural communities and urban-based visitors identify with and feel a sense of attachment and belonging. In 2014, following a public vote, the Scots pine was declared the national tree of Scotland by the Scottish Government. Despite this, the social and cultural relationship to the Caledonian pinewood ecosystem is limited. For example, it is neither an image nor a concept that has much traction in archives and museums or parks and botanic gardens in the cities of Scotland.

In the Black Wood, the values and benefits that have the most influence on decision-making about how the site is managed are those associated with biodiversity. This focus has been extremely effective in protecting the forest from destructive economic interests over the last 40 years. But it also shapes and constrains the ways in which its cultural benefits are understood, discussed, and realised. It is argued that the protectionist policy in the Black Wood, which allows the forest to 'follow nature's way', is also the best way to maintain its cultural value. In this view, referring to the question in the title, the high conservation status of a forest like the Black Wood is also an indicator that the forest has high cultural value.

Is it that simple? What does cultural value actually mean? Is the only important cultural benefit of the Caledonian pinewoods the aesthetic experience of being in close contact with nature? Who knows about this opportunity and has access to it? What about the fact that the Black Wood is anything but an untouched wilderness – the product of interaction with humans within a historical context of conflict and change over several centuries? What about the diverse meanings and associations of members of local communities who visit or work in the forest? How important are representations of the forest in art, literature, advertising, media, museums and botanic gardens? How might the notion of biocultural diversity help our understanding?

Such questions formed the basis of a year-long creative enquiry into the ecological and cultural values associated with the Black Wood between July 2013 and July 2014. The project involved a series of residencies, workshops and discussions led by environmental artists, Tim Collins and Reiko Goto, in collaboration with David Edwards, a social scientist from Forest Research (the research agency of the Forestry Commission) and a diverse range of other partners, including Forestry Commission Scotland (FCS), who own and manage the Black Wood, the Landscape Research Group, the Perth and Kinross Countryside Trust (a local NGO concerned with access and planning), local artists and residents in Kinloch Rannoch, and academics from the arts and humanities. Over time, the effort would focus upon the development of a 'Future Forest' workshop held over two days in Kinloch Rannoch in November 2013. The event created a space for participants to reflect on their own experiences of the forest and imagine alternative futures that protect its ecological value, while exploring a more robust cultural relationship.

The next three sections focus on three types of cultural value or benefit that were identified during the project as being realised to different degrees through engagement with the Black Wood: 'aesthetic/spiritual', '(bio)cultural heritage', and 'community-held' values.[1] The discussion explores how these categories relate to recent literature on cultural ecosystem services (Church et al., 2014), how they might be delivered through different future management scenarios, and how a process of realising the cultural benefits of Caledonian forests might be facilitated both locally and nationally. The conclusions return to the question in the title, and consider how the notion of biocultural diversity might contribute to the debate. Our account raises as many questions as it answers, but we feel this is appropriate during this early stage in what we hope will become a national-level conversation about the ecological and cultural value of the Caledonian forests of Scotland.

2.   Engaging with the Black Wood (and with the people who care about it)

2.1   Aesthetic and spiritual experience

Anyone who has ever stepped into one of the ancient pinewoods of Scotland will understand their allure: they are, quite simply, magical landscapes, resonating with almost primal echoes. But the pinewoods are also landscapes of contradiction – for alongside this aura of apparent resilience is a tender fragility. To journey through the woods is to immerse yourself in this blurring of time and meaning. Their stillness is inspirational: the outside world just falls away and you are left alone, awed – and humbled – by their enduring magnificence (Vanessa Collingridge, in Bain, 2013).

This emotive account of the experience of visiting a Caledonian forest, taken from the foreword to a recently-published book, sits easily within the wider public imagination of places like the Black Wood: we like to think this is what it is like to visit an ancient pine forest, even if we might never do

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[1] Church et al. (2014: 24-5) define cultural values as "the collective norms and expectations that influence how ecosystems accrue meaning and significance for people", and cultural benefits as 'the dimensions of human well-being that can be associated with and that derive from… interactions between people and the natural environment." (cf. Kenter et al., 2014).

so. How accessible is an experience of this kind to members of the public? Is this description really valid? How many people have had the opportunity to find out for themselves?

The Black Wood borders the southern shore of Loch Rannoch (see Figure 1). Whether one arrives by train, car, foot or bicycle, visitors can struggle to find their way into the forest. There is one sign, easily missed as it is set back and parallel to the Loch road. Another can be found half a mile down a dirt road. To get into the forest one follows any one of four trails that move in a southerly direction. Moving gently uphill, the forest is alternately open and closed with a mix of birch and pine, and some rowan, across a range of age classes from saplings to mature trees. The most memorable trees are the huge 200-300 year old pines with sprawling limbs, colloquially known as 'granny pines'. One is immediately struck by the relationship of the forest to its curious topography – a mix of small glacial moraine deposits or hillocks with a seemingly endless repetition of smaller hummocks of thick blaeberry, cowberry, bracken and heather, formed over large rocks and tree stumps, creating an unusual 'lumpy' forest floor that adds texture to the rolling mound-and-hollow topography. But it is the granny pines that capture one's attention: they are far from the traditional foresters' ideal of a tall straight trunk. Why are they here and why so many of them?

[Insert Figure 1 (map of the Black Wood) around here]

Moving through the forest along the western-most trails the casual walker will notice changes to the underlying moraine topography, with alternating wetter and drier areas. Walking south, the forest opens up to reveal a bog clearly visible through the trees. Those who explore that area will discover the remnants of an old homestead site on higher, drier ground. Moving further east along the trail, the observer will realize that the ground vegetation changes, with wetland grasses replacing the robust blaeberry and cowberry understory in reaction to the increasingly wet ground underfoot. Further along the (raised and dry) trail, there are two spots where small open streams are first heard, then seen. These wet/dry transitions do two things. They provide a gradation of microhabitats that support a range of species. But they also provide an aesthetic complexity, which rewards the eye and ear, the nose and the kinesthetic (bodily) senses of those that walk attentively through this amazing forest.

At the centre of the forest, an area known locally as the 'potato patch' is often attributed to war-related food production in the first part of the twentieth century, but historical maps reveal that it was actually cleared by 1906, apparently for some other purpose. The potato patch is notable today for its broad even-aged stand of pines that reads like a plantation, straight and tall with little understory diversity. It provides an aesthetic counterpoint to the rest of the forest.

What we are trying to establish here is that the Black Wood is a powerful aesthetic presence. We argue that it 'returns ones gaze': it is woodland of sufficient complexity that it can't be seen in a day, and indeed evolves in one's eye and mind as it is visited over seasons and years. People look at forests in different ways: the appreciation of botany and birds or insects and fungi is just one framework for looking carefully, and considering the life of a place. One argument worth considering is that, what science tells us through data and detail needs to be complemented through aesthetic attention. In the layers of organisms, divergent reproduction cycles and ever-changing seasonal conditions lies a complex aesthetic experience that repays attention over time.

It may be tempting to go further and suggest that the dominance of a scientific discourse of conservation has blinded us to the appreciation of cultural value, by objectifying nature, and de-sensitising us from a holistic aesthetic engagement. But this is evidently not the case – at least not in such a simplistic way. Those responsible for the Black Wood were among the most passionate advocates of the aesthetic and spiritual values associated with the experience of visiting the wood. They saw their role as (at times, misunderstood) guardians of the natural features that give the wood these values. Local managers indicated that they personally valued the wood as much (if not more) for its cultural importance as its environmental importance. This appreciation was brought home to us clearly by the FCS manager who accompanied us during one of the first walk-and-talk visits. He spoke of the granny pines as "the fantastic matriarchs of the forest, something to respect, to be treated

honourably", and the need to find the Black Wood "emotionally, intellectually and spiritually", "to make room for imagination", "to come feel the forest" and see the trees "as things of great beauty" (Collins et al., in press). Perhaps the answer to the question posed in the title is 'yes' – high biodiversity value means high cultural value. Perhaps the forest need only be managed for biodiversity, because in doing so its cultural value is realised and protected by default. Importantly, the cultural value referred to here is a kind of aesthetic experience that is compatible with, and realised through, the current policy of biodiversity conservation. Is something lost as a result of recognising only this particular kind of experience?

2.2 Understanding (bio)cultural heritage

With access to the Forestry Commission Library and key staff members, the authors began to think in terms of the three-hundred year life cycle of a Scots pine tree and its changing relationship to the use of the land. Over three centuries the forest would have been picked through consistently. But what was it that kept the forest structure sufficiently open, especially during the eighteenth century, to produce the 'granny' form, rather than a tightly-spaced forest where trees must grow straight and tall to reach the light? In a specific response to this question, Peterken and Stace (1986) conducted a resurvey of historic experimental plots, and identified a generation of trees dating from 1780-1835 with a predominantly straight form characteristic of close-grown trees. This however was preceded by an older generation dating from 1650-1700, which appears to have originated in an open condition, and would have allowed trees with the characteristic low branching to develop. The effect would have been accentuated by subsequent selective felling of any well-formed old generation trees (Peterken and Stace, 1986: 29).

The eighteenth century would have been a difficult time to live in the Rannoch Valley, which was seen as a local stronghold of support for the Jacobite risings against the ruling government. Estate land was forfeited to the crown repeatedly and a barracks was built in the valley to suppress resistance by force. Factors brought in to manage the forfeited estate were particularly worried about keeping tenants' goats out of the Black Wood. Tenant livestock would not be excluded from the forest by fencing until the later part of that century (Lindsay, 1974: 291-94). Speaking of Caledonian forests in general, the historian Christopher Smout (2000: 51) described their use by tenants for shelter and feed for goats, cattle, sheep and horses. The combination of grazing pressure and wood extraction would have a particular impact on regeneration and growth in the Black Wood, shaping both biodiversity and the form and perception of the forest overstory, its understory and its related ground flora.

Partly as a means to repress Jacobitism, the Highland Clearances across northern Scotland resulted in forced evictions of Gaelic-speaking tenant farming communities in the Rannoch area. By the middle of the nineteenth century the clearances were just about complete. With vast herds of sheep replacing people, the forest was again struggling to regenerate itself. Steven and Carlisle (1959: 140) tell us that at the end of the nineteenth century another fence was erected to create a deer forest for the hunting estate. Young trees that might have had a chance with free range sheep would have no chance with an enclosed population of red deer! In the twentieth century the fences were down again, deer were free to roam, but there were more sheep on the land than any time in the past. Thus generation after generation of creatures would have eaten most of the young trees. Cattle, goats, sheep and deer would have changed the shape of saplings and older trees as well. In addition, there is evidence that capercaillie (*Tetrao urogallus*) and black grouse (*Tetrao tetrix*) can damage leading shoots, while strong winds, wet snow and ice storms will also have caused branch loss and catastrophic failure over the years.

These are the conditions that shaped a semi-open canopy where the few trees that could get away were able to grow into the light both horizontally as well as vertically. Through the years, the straight trees would have been targeted for timber harvesting. Overall, the historical narrative can be seen as a fluctuation between periods of exploitation and protection, as outlined in Box 1. It is interesting to think that the aesthetic form, considered to be so attractive in the Black Wood today, actually embodies, among other factors, the contested land use history of this region of Scotland. And yet, its representation is typically underpinned by assumptions of untouched 'wilderness' which shape our

aesthetic experience and the meanings and associations we attribute to the forest. Does it matter that so few people are able (or encouraged) to interpret the physical form of places like the Black Wood in terms of their conflicted social and political history?

[Insert Box 1 around here]

In addition to the tangible biocultural heritage embodied in the forest structure and granny pines, there are several unscheduled ancient monuments in the Black Wood that are little understood or appreciated. Within the local Perth Museum and Art Gallery there is an understanding of the scientific import of the site amongst the curators but a paucity of records in their entomology or botany collection. The Jacobite history of conflict in Rannoch, coupled with the histories of the clearances and the practical management of the forest and landscape, would have constrained 'cultural interests' at the time that these collections were being developed. That said there are important archival records of the Black Wood, which document the repeated forfeiture of the owners of the Black Wood, the Robertsons of Struan (Millar, 1909).[2] There are histories of the brutal clearances and various Gaelic language translations of both histories and tales of the region found in the Inverness Gaelic Society archives as well as in the Scottish Studies Library at the University of Edinburgh.

Together, these resources and artefacts remind us of the largely lost intangible cultural heritage associated with the Black Wood – the traditional forest and pastoral management practices that were historically embedded in the local society and economy, and the knowledge and world views associated with them. Once the Black Wood was part of an organic cultural landscape, but now it is relict. The Gaelic place names throughout the landscape, translated as part of this project, hint at the heritage lost in particular during the Highland Clearances (see Figure 1; Collins et al., in press; Murray, 2014). Does it matter that so little attention is given to these features, and to their significance in understanding the current forest form and its changing place in the local culture and economy?

As the southern-most large Caledonian pine forest, the Black Wood survived in modern times (where others did not) partly due to isolation and restricted access. There is one road in and out of Rannoch. It was spared from harvesting during World War I, although there was a significant harvest in the final years of the World War II. The Forestry Commission acquired the forest in 1947, with Lord Robinson, the FC Chairman, visiting the wood in that year and declaring that "this piece of old Caledonian Pine Forest should, if possible, be preserved." (Peterken and Backmeroff, 1988: 21). However, the actuality did not meet the ideal. Between 1947 and 1975 the Forestry Commission felled about 500 cubic metres (from 5000 trees) to promote regeneration and clear up dead, dying and windblown trees. During the 1960s they planted exotic conifers on wetter sites unsuitable for local varieties of Scots pine (FCS, 2009: 6).

By 1973, the Forestry Commission Conservator Gunnar Godwin was newly in charge of the Black Wood and with an awareness of this history and what he saw as potential threats from within his own organisation he began working closely with the Nature Conservancy Council to establish an agreement for the long-term management and conservation of the Black Wood in 1975. This was followed by a series of conservation-based remedial actions in the 1980s. The current management plan identifies long-term plans to extend the Black Wood significantly further, establishing a stronger functional link to neighbouring forests (FCS, 2009: 6). The Black Wood restoration is a success story that needs to be carefully described and widely communicated. It is through interventions like these over the last 50 years that has resulted in the good condition of the Black Wood as we find it today. Recently, in recognition of Gunnar Godwin's achievements, a plaque was erected in the forest at the base of an old pine tree (see Figure 2). Does it matter that so few people are aware of the historical tensions between conservation and production, and the precarious existence of the Black Wood at specific moments in its twentieth century history?

[Insert Figure 2 (photo of Godwin's Tree) around here]

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[2] See: http://archive.org/stream/selectionofscott00millrich/selectionofscott00millrich_djvu.txt

These historical narratives are currently not how the Black Wood is portrayed in visitor interpretation and other representations, which tend to focus on biodiversity and naturalness. Yet, the long history of human intervention in the Black Wood is a far cry from an idealized notion of wilderness that lies behind public perceptions of Caledonian forest and underpins aesthetic appreciation. The granny pines have undoubtedly been shaped by human intervention, and if future management continues along a 'do nothing' route then they could eventually die out leaving them absent from the forest landscape. With such a limited biocultural record of the Caledonian forest in botanic gardens and museums, and without publications, memories, songs and stories, the Caledonian forest as a contemporary, living memory will also disappear. Debates within environmental aesthetics explore how aesthetic appreciation is shaped by knowledge and experience of a place (Eaton, 2004). If it is not a wilderness, but a cultural landscape, shaped by humans over centuries, then how might this change the aesthetic and spiritual experience of visiting the forest? Perhaps, for some, the experience is enhanced by the idea that nature is regaining control over a forest with a history of human exploitation (Kirchhoff and Vicenzotti, 2014).

2.3   Listening to community-held values

In the Black Wood, FCS management practices meet the standards of the Land Reform (Scotland) Act of 2003, in that there are no fences or gates impeding movement. The current Black Wood Management Plan limits changes and 'formal recreational development' within the forest (FCS, 2009: 10 & 15). The plan affirms guided tours on request, a threshold reserve sign and interpretation of timber harvest canals from the 1800s. As understood through dialogue with FCS and SNH, there would be little encouragement of or invitation to access; there would be no maps, or interpretative publications that might make way-finding easier, even where there were 'adopted core paths' or 'asserted rights of way' that were established over centuries during the transhumance. There would be no changes to public awareness that might increase public use of the Black Wood. One was left with the impression that the official invitation into the Black Wood, as it exists today, only addresses a limited group of utilitarian forest interests.

The restrictions on awareness and access are attributed to the status of the site as a Special Area of Conservation regulated by SNH. The authors were told that any proposed changes that might affect the public awareness of the Black Wood or increase the number of people accessing it would need to provide scientific evidence that no possible harm would come to that sensitive ecosystem. The claim was that there are peripheral restoration areas that are more amenable than the 'jewel-like' core areas. Yet, the ecological importance of the Black Wood might be comparable to ancient pinewood sites at Glen Tanar and Glen Affric further north where responsible public access is outlined in management plans and fully supported. The culture of scientific conservation strategically embraced by Gunnar Godwin to protect the Black Wood from economic interests had over time (and without malice or intent) allowed the discourse and practice of conservation science to exclude nearly all other social and cultural interests.

Working closely with partners, the authors sought to establish an artistic and cultural discourse that might complement the dominant ethos. A first attempt at holding a collective 'walk and talk' in the Black Wood, with people invited to represent a range of interests, revealed overt tensions, but also a sense of unacknowledged common ground. Plans for the 'Future Forest' workshop evolved from this initial encounter. Thirty participants attended the two-day workshop, which was held in November 2013 along with a public discussion and visits to the forest. Invited participants included arts practitioners, humanities scholars, foresters and ecologists, government agency and NGO representatives, and local residents. The goal was to use the Black Wood as a setting to examine the ideas, knowledge, values and experiences that enable and constrain public access to, and awareness of, forests with significant ecological and cultural import.

The workshop presentations began with local stakeholder perspectives, then ecological perspectives, a broad set of cultural perspectives, and followed by intensive 'Future Forest' break-out groups. The participants were introduced to a range of ideas, opinions and proposals. Break-out groups were asked

to proceed from initial scoping of what mattered to them about the Black Wood, through more detailed consideration of problems and opportunities, and visions of the future forest that could be shared by most participants. Each group was given maps of the management zones in the forest and surrounding catchment, and a mapped overview of current strategic management objectives. These helped participants locate aesthetic and cultural interest and access opportunities within the forest. The event was recorded by video, and conversations were later transcribed and analysed as part of a residency at Forest Research.

The most important outcome from the workshop was that a constructive dialogue had now begun between diverse interests. There was agreement on a number of precepts. In particular, nothing should be done to change the generative capacity and biodiversity, structure and character of the Black Wood. Overall, the workshop and related events uncovered community-held values and perspectives that saw the Black Wood as a place of (bio)cultural importance, and a desire to realise these values through closer engagement with the forest, and with those who protect and manage it. A number of tangible proposals emerged.

Deep mapping
One practical outcome could be a multi-layered, bio-cultural map, compiled with the aid of GPS receivers, and linked to a series of texts and images that celebrates the Black Wood. Workshops and events in the forest would explore what is known, what is suspected, what is invisible to the untrained eye and what isn't known but should be. Local residents would be asked to work with forest memories, material artifacts in the forest, history embedded in the trees and the Gaelic/English description of a place with few names. Specific individuals with long familial relationship to the region would be targeted.

Forest planning
The outcomes of the deep mapping approach would be made more tractable if linked to practical planning with FCS and other agencies to establish productive working agreements regarding awareness, access and branding. It would involve a carefully organized programme of discussion with key points to be agreed and rigorously debated with various speakers brought in to provide critical and independent insight. While a lot of common ground was revealed at the workshop, nothing was agreed on paper. Importantly the planning process would need to be inclusive, for example by finding ways to engage with those who don't find workshops an easy forum to express their views.

Forest Way initiative
There was a proposal to link specific areas, forests and communities through a landscape trail defined by arts, culture and Gaelic themes. Such a Forest Way initiative could take into account the life and poetry of Duncan Ban MacIntyre (1724-1812) who was born at neighbouring Loch Tulla and is best known for his poem 'In praise of Beinn Dorain'. The project would require strong community support across the potentially linked villages coupled with a depth of expertise from Scotland's academic and professional communities.

Arts, humanities and ecology residencies
There was the idea that the Black Wood would benefit from an arts, humanities and ecology residency programme, which would create an expanding archive as a means of recovering and archiving historic knowledge and developing new aspects of an integrated forest culture. It could help establish new social and cultural relationships to the Black Wood, and develop the ecological evidence base required to allow forest managers move beyond the 'precautionary principle' while ensuring the Black Wood continues to be recognised and celebrated for its ecological value.

To conclude, many locals (and visitors from urban centres) benefit from a sense of identity with, attachment to, and ownership of the Black Wood, and when the project began some residents saw its protectionist policy as a barrier towards fully realising these benefits. Despite understandable anxieties within FCS and Scottish Natural Heritage (SNH), it turned out that nobody involved wanted any harm to come to the wood, or substantially increase visit numbers, or introduce intrusive signage or trails.

The ideas of local residents were largely compatible with a successful policy of biodiversity conservation.

3. Analysis and discussion

To recap, we have argued that the values and benefits that justify decisions about the Black Wood are almost exclusively those associated with biodiversity conservation and ecological restoration. Over the last 40 years, this focus has proved very effective in the face of destructive economic interests. However, it could have at least two negative effects. Firstly, it could continue to downplay the significance given to the full range of cultural values and benefits, and constrain their recognition and expression to those that are realised by a policy of conservation, i.e. a science-informed (cognitive) aesthetic experience limited to a few knowledgeable individuals. This 'cultural problem' is not restricted to those who make the decisions; it is reflected across society as a whole, which over centuries has gradually lost its former cultural and historical connections with the rural environment. Professionals from the arts and humanities also struggle with these questions, as was evident during the Future Forest workshop.

Secondly, it could be used as a 'precautionary principle' to justify exclusion of visitors ostensibly to protect the ecological integrity of the forest. As argued above, the risk that additional visitors, if properly managed, would pose to biodiversity value is unclear (see Marzano and Dandy, 2012). Is there any reason why levels of public access can't be similar to other comparable pine forests with relatively high visit levels? Exclusion of visitors might also be seen incidentally by decision-makers as a means to protect the 'wilderness' experience of the few people who already know and value the forest. *But surely, to some extent, cultural value (unlike biodiversity value) is proportional to the number of people who are made aware of it, and can access it, appreciate it and respect it?* An attitude towards the Black Wood as a potential cultural resource for the nation might take a more proactive approach to access, interpretation and engagement, while still successfully maintaining its protectionist functions (the legitimacy of which in fact no one involved in the project has questioned).

If the management of Caledonian pine forests, and protection of the Black Wood, were explicitly seen to be justifiable through a more equal balance of both biodiversity and cultural benefits, then it would no longer be appropriate for objectives to be defined primarily by a narrow group of expert interests. Indeed Mason et al. acknowledge that: "Native pinewoods are an emblem of the natural and cultural heritage of Scotland" and that "discussions about their management have tended to take place within a relatively narrow community of landowners, foresters and conservationists" (Mason et al., 2004, p. 215). To appreciate the full range of cultural values and benefits, and to incorporate them into decision-making, a debate is needed that goes beyond those currently involved. This project has prompted such a debate in relation to the Black Wood.

What might be the outcome of this debate into the future, both locally and nationally? Firstly it could explore further the multiple meanings of 'cultural value' and create a shared language for discussing it. Secondly it could explore potential future scenarios and their impacts on different types of value. Thirdly, as well as allowing us to recognise existing ecological and cultural value, it could help create new values and meanings through an iterative and inclusive process. These points are outlined in turn below.

3.1   What do we mean by 'cultural value'?
Current debates around the cultural value of the environment are typically framed in terms of cultural ecosystem services (CES) (Millennium Ecosystem Assessment, 2005). Church et al. (2014) provide some of the clearest thinking on how to define and assess these services in ways that support land management and policy-making. They understand CES as: "the environmental spaces within which people interact with the natural environment and the cultural practices that define these interactions and spaces". Taken together, these environmental spaces and practices "shape and reflect a wider set of cultural (collective or shared) values about ecosystems". In turn, "values, spaces and practices

interact in complex and non-linear ways to give rise to a range of cultural benefits to human well-being". Furthermore, this interaction leads to the production of 'cultural goods', such as "organised opportunities for recreation and tourism, food and drink of local provenance, local festivals etc" (Church et al., 2014: 8 & 106). To this list, we would add tangible cultural artefacts and representations (of the Black Wood) in galleries, archives, museums, literature and the media etc. Although not explicitly stated by Church et al. we would suggest that both the production of such cultural goods, and use of the goods themselves, would also lead to cultural benefits.

Building on Chan et al. (2011) they propose three kinds of cultural benefits:
- Identities – e.g. belonging, sense of place, rootedness, spirituality.
- Experiences – e.g. tranquillity, inspiration, escape, discovery.
- Capabilities – e.g. knowledge, health, dexterity, judgement.

With respect to 'identities', Church et al. highlight the "cultural meanings [associated with ecosystems] through which people understand themselves and their relationship to the world around them". An example is the idea of belonging: "ecosystems play a role in the process of place identification through which ideas of affiliation and attachment develop" (Church et al., 2014: 31). Regarding 'experiences', Church et al. mean "benefits that are produced, mentally or physically, through immediate contact with ecosystems", for example feelings of calm or aesthetic pleasure. Importantly, they extend their definition of direct experience to include "dis-embodied and distant" forms of contact "such as the benefits associated with consuming nature through a television programme" (Church et al., 2014: 31). To this, we would add experience of cultural artefacts in museums, galleries, etc, and other 'cultural goods' located outside the forest. Finally, regarding 'capabilities', Church et al. highlight "the role ecological phenomena play in shaping individual and social capabilities to understand and to take action", e.g. through acquisition of knowledge (e.g. making sense of biodiversity), skills, wisdom, judgement and insight, and acquiring employment (Church et al., 2014: 32). In addition, we would interpret 'social capabilities' to include the sense of trust and cohesion within a community, and the capacity to act together to realise a common goal, which can develop when given opportunities to engage actively in the local environment and in the decisions that affect it.

The previous section explored three broad categories of cultural benefits that emerged from discussions during the project: aesthetic/spiritual, cultural heritage, and communally-held. Broadly speaking, these can be mapped onto the categories identified by Church et al. One caveat is that we would list 'spirituality' under 'experiences' rather than 'identities'. With this revision, 'experiences' maps onto our category of 'aesthetic/spiritual' and 'identities' maps onto 'communally-held'. 'Capabilities' maps onto '(bio)cultural heritage', but only in its intangible manifestations as the knowledge, skills and practices associated with traditional forest management, which are now largely lost or dissociated from a meaningful relationship with the contemporary cultural landscape. These capabilities are what UNESCO refers to as intangible cultural heritage (ICH). Meanwhile, the main contemporary expression of 'capabilities' relating to the Black Wood is evident in the discourses, practices and products of professional ecologists and foresters, and (to a lesser extent) artists, humanities scholars and professionals in the cultural sector.

The typology and conceptual framework of Church et al. provides a nuanced language to support decisions about how to realise cultural benefits. Thus, opportunities exist in the Black Wood to realise 'experiences' and 'identities', but arguably they are restricted to a relatively narrow range of people. Perhaps the most notable improvement could be made by creating further opportunities for 'capabilities'. Thus, from an ecological perspective, there might be greater involvement of volunteers and community representatives in contemporary conservation and restoration practice, helping to develop skills and create jobs in the local community, or in some locations a revival of traditional forms of woodland management and associated skills could be encouraged. From a cultural perspective, capabilities could also be enhanced through active engagement with representatives from the arts and humanities, locally and nationally, to encourage production and use of 'cultural goods' associated with the Black Wood.

There is of course overlap between the categories, and, as Church et al. point out, one benefit can be understood differently through the lens of others. Inviting people to gain direct aesthetic 'experience' of the forest might motivate them to develop 'capabilities', i.e. skills and knowledge of the forest, which in turn might help strengthen 'identities' with the forest and its communities of interest. Ironically perhaps, this could also generate wider support for biodiversity conservation. A project seeking to realise the full range of biocultural values and benefits might try to build synergies of this kind.

3.2   What might be done instead?
In principle, how might the Black Wood and other Caledonian forests be managed differently in ways that enhance cultural benefits while still meeting conservation objectives? Firstly, there are options that would not make direct changes to the physical structure of the forest (although there could be unintended impacts of an increase in visit numbers), e.g. improvements to public access, interpretation and representations of the forest through education, the media and the arts. Secondly, there are interventions that would seek to change the biophysical structure of the forest. Regarding the latter point, Mason et al. suggest that: "Managers need to understand more about the spiritual values the forests provide and how these may be affected by management" (Mason et al. 2004: 215). They call for better understanding, but the implication is that such understandings could inform changes to silvicultural practice to enhance 'spiritual values'.

Bringing 'interpretive' and bio-physical interventions together into different combinations, a number of potential future scenarios for management of areas of Caledonian forest over the next 50 years can be outlined. A brainstorming exercise by the authors came up with six options:

1. **Untouched wilderness** – often talked about amongst conservationists, it implies a management style where utility is bracketed and nature takes its own path. Human access is discouraged. Within the discourse of re-wilding it suggests robust natural expansion once human interest is retracted followed by a reintroduction of large mammals.
2. **Sacred and/or cultural ecology** – a reconsideration of landscape, forest and its experience within specific Celtic traditions, spirituality, song and literary frameworks: an interpretative approach that is of the forest, but without material impact in the forest (cf. Maddrell, 2014).
3. **Native forest conservation** – preservation of the core and ecological restoration area to an expanding Black Wood perimeter (i.e. the approach closest to current practice). Following Peterken and Stace (1986) the forest evolves with no active attempt to maintain the current form of the granny pines, which could eventually be lost from the landscape as a result.
4. **Social and ecological restoration** – an approach to native forest conservation which actively encourages interaction with relevant communities of place and interest in mutually beneficial ways, by engendering the formation of capabilities, identities and experiences, which in turn generate further support for biodiversity conservation.
5. **Revived cultural landscape** – introduction of historic forms of management to revive a relict 'organically-evolved' cultural landscape (as defined by UNESCO, 2008: 96), possibly based on transhumance and/or silvi-pastoralism, creating living forms that reflect processes and periods in social and environmental history.
6. **Community forest economy** – local community management and/or ownership for diverse social and economic objectives, including income generation from local visitor spending, timber production (only where appropriate), and grants to deliver public goods (e.g. education), in ways that find a balance with the objective of protecting the ecological integrity of the forest.

The scenarios have been listed in order of increasing levels of intervention. It is worth highlighting that there is no option that resembles a 'theme park', or involves intrusive interpretation or recreational infrastructure, since this was not seen by any participant as a desirable outcome. Also of note, loss of the current form of the granny pines is a possibility under all of these scenarios, not just under Scenario 3, which is probably closest to current practice. Rather than preserving their current form, the

alternative scenarios might seek to produce a 'culturally meaningful' aesthetic form that also meets ecological (and in some cases economic) needs.

The future scenarios outlined above impact differently on the three main types of cultural benefit adapted from Church et al. (2014) as well as on the biodiversity benefits of a Caledonian forest. Using the authors' judgement based on experiences with the forest and the local community, an indicative assessment was made as a means to illustrate possible levels of benefits provided by each option and the factors that influence them (see Table 1). Scores on a scale from 1-5 (1 = low; 5 = high) were assigned to each scenario to indicate the approximate level of cultural benefit that would be realised by any one person (e.g. a visitor to the forest) for each of the three categories from Church et al. (columns 'd', 'e' and 'f'). These scores were then averaged to derive an overall score for cultural benefit per person ('g'), which was then weighted by a score for the number of people (or 'beneficiaries') who would have access to these benefits ('c') to derive a score for total cultural benefit for each scenario ('h'). A separate estimate was made of the total biodiversity benefit judged to be delivered by each scenario ('i'). As a final step, a score for the total benefit of each scenario ('k') was derived by averaging the scores for biodiversity benefit and total cultural benefit ('i' and 'j').

[Insert Table 1 around here]

Table 1 suggests that if we are trying to provide a wide range of cultural benefits, for a wide range of people, then Scenarios 4 and 6 would score higher than Scenario 3 (which most closely resembles 'business as usual'). Broadening the analysis to include biodiversity value, arguably a high biodiversity score would be given to Scenarios 1 and 4, suggesting that, overall, Scenario 4 could offer the greatest aggregated public benefit. These estimates are only indicative, and depend upon several assumptions: in particular the high biodiversity score given to Scenario 4 assumes there would be a synergistic ('win-win') relationship between community engagement and support for biodiversity conservation.

3.3   The way forward: an 'authentic' process

Table 1 is intended to offer an impressionistic analysis, and not everyone would agree with the scores that we have assigned. Also we have not considered the costs of each option: community engagement can be very time-consuming for everyone concerned, and cannot always be sustained. However, we suggest it would be neither necessary nor appropriate to seek an accurate, definitive, quantitative (or monetized) cost benefit analysis of these options. As it stands, Table 1 already makes the point that new scenarios might deliver greater public benefits compared to current practice. It could be useful to conduct a similar exercise with representatives of different stakeholder groups helping to develop storylines, and select, assess, and weight indicators, and aggregate them to derive an overall value for each scenario. But arguably its main contribution would be as a heuristic device to facilitate social learning and deliberations around planning rather than as a means to derive hard evidence for the best option to be selected for implementation.

We make this argument for two reasons. Firstly, using such an exercise, it is difficult to define, let alone quantify and aggregate, the cultural benefits of forests without important dimensions of value being lost or distorted (e.g. Chan et al., 2011). Secondly, scenario analyses that follow the technical-rational logic in Table 1 struggle to take account of the fact that values and benefits are not necessarily fixed and given, but are also created, in ways that are hard to predict, through the iterative process of participatory assessment, planning and implementation. In short, the process leads to changes in thinking and behaviour (Nutley et al. 2007: 11 & 38). It is through this process that the synergistic relationship between community engagement and support for biodiversity conservation in Scenario 4 would be realised.

While the authors were reflecting on the scenarios outlined in Table 1, Tim Collins prompted a debate on social media by posing the question: "What would an authentic cultural ecology look like?" One answer to this question is: "One that resulted from an authentic process". In other words, the journey is as important as the destination: the answer is not to pick an idealised option off the shelf and try to

implement it in a top-down fashion. The role of scenarios would be to offer loosely-held visions of the future that: a) inspire and guide an inclusive, iterative process of deliberation, decision-making and action, b) combine aspects of ecological and cultural value, which are currently considered separately, c) are unique to the Black Wood and the wider cultural landscape in which it is located, and d) may challenge established discourse and its effects on management decisions in positive ways. This 'authentic' process might continue in the Black Wood through the deep mapping idea and other proposals identified in the Future Forest workshop.

4. Conclusion: towards biocultural diversity?

Returning to the question in the title, in the Black Wood the answer is arguably 'yes' – high conservation status indicates high cultural ecosystem value. But only up to a point, because managing for biodiversity conservation alone evidently shapes and constrains the realisation of a wider range of cultural values and benefits. We conclude that the way forward is to start a debate which leads to greater realisation of the diversity of cultural benefits associated with the Caledonian forest (where 'realisation' is defined as the simultaneous recognition of existing values and benefits and creation of new ones). How does this goal relate to the notion of biocultural diversity now enshrined in the 2014 Florence Declaration on the Links between Biological and Cultural Diversity (UNESCO, 2014)? According to the Declaration, the European landscape is predominantly a biocultural multifunctional landscape. It goes on to state that: "The involvement of local communities, and recognition of and respect for their cultural heritage, traditional knowledge, innovations and practices can assist in more effective management and governance of multifunctional biocultural landscapes, and contribute to their resilience and adaptability". While the emphasis here is on organic landscapes with unbroken traditions, knowledge, skills and practices (i.e. ICH), this statement reflects our own argument about the overall benefits of 'social and ecological restoration' (Scenario 4) whereby local community engagement is synergistic with realisation of both cultural value and biodiversity value. It might be worth noting that the interests arguing for conservation, aesthetic value, and public access, have shared historic origins in the Romantic movement, and at times have been close allies in their opposition to economic exploitation (Smout, 2000). New integrated concepts such as biocultural diversity (but also 'living heritage', 'socio-ecological systems', 'cultural ecology' etc) could help reunite these disparate interests and invite us to think imaginatively of future visions of the Caledonian pine forests of Scotland that might transcend the artificial categories of ecology and society.

Acknowledgements

References

Bain, C. (2013). *The Ancient Pinewoods of Scotland: A Traveller's Guide*. Sandstone Press: Ross-Shire, Scotland.
Chan, K.M.A., Goldstein, J., Satterfield, T. et al. (2011). Cultural services and non-use values. In: Kareiva, P., Ricketts, T.H. et al. (eds). *Natural Capital: Theory and Practice of Mapping Ecosystem Services*. University Press, Oxford, 206–228.

Church, A., Fish, R., Haines-Young, R., Mourato, S., Tratalos, J., Stapleton, L., Willis, C., Coates, P., Gibbons, S., Leyshon, C., Potschin, M., Ravenscroft, N., and Sanchis-Guarner, R., Winter, M., and Kenter, J. (2014). *UK National Ecosystem Assessment Follow-on. Work Package Report 5: Cultural Ecosystem Services and Indicators*. UNEP-WCMC: Cambridge, UK.

Collins, T., Goto, R. and Edwards, D. (in press). Future Forest: The Black Wood, Rannoch, Scotland. Landscape Research Group and Forest Research, UK.

Eaton, M.M. (2004). Fact and Fiction in the Aesthetic Appreciation of Nature. Chapter 9 in: Carlson, A. and Berleant, A. (eds). *The Aesthetics of Natural Environments*. Broadview Press.

FCS (2009). *Black Wood of Rannoch Management Plan, 2009-2019.* Tay Forest District, Forestry Commission Scotland: Dunkeld, Scotland.

Kenter, J.O., Reed, M.S., Everard, M., Irvine, K.N., O'Brien, E., Molloy, C., Bryce, R., Brady, E., Christie, M., Church, A., Collins, T., Cooper, N., Davies, A., Edwards, D., Evely, A., Fazey, I., Goto, R., Hockley, N., Jobstvogt, N., Orchard-Webb, J., Ravenscroft, N., Ryan, M., and Watson, V. (2014). *Shared, Plural and Cultural Values: A Handbook for Decision-Makers*. UK National Ecosystem Assessment Follow-on phase. UNEP-WCMC: Cambridge, UK.

Kirchhoff, T. and Vicenzotti, V. (2014). A Historical and Systematic Survey of European Perceptions of Wilderness. *Environmental Values*, 23: 443-464.

Lindsay, J. M. (1974). *The Use of Woodland in Argyllshire and Perthshire between 1650 and 1850.* Unpublished PhD Thesis, University of Edinburgh (2 volumes).

Maddrell, A. (2015). Contextualising Sacred Sites, Pathways and Shared Heritage: Local History, Ecumenism and National Identity In: Maddrell, A., della Dora, V. and Walton, H. (eds). *Christian Pilgrimage, Landscape and Heritage*. Routledge.

Marzano, M. and Dandy, N. (2012). Recreation use of forests and disturbance of wildlife: a literature review. *Forestry Commission Research Report*, Forestry Commission: Edinburgh UK.

Mason, W.L., Hampson, A. and Edwards, C. (2004). *Managing the Pinewoods of Scotland*. Forestry Commission Scotland: Edinburgh, Scotland.

Millennium Ecosystem Assessment (2005). *Current State and Trends Assessment*. Island Press, Washington D.C.

Murray, J. (2014). *Reading the Gaelic Landscape: Leughadh Aghaidh na Tire*. Whittles Publishing: Cunbeath, Caithness, Scotland.

Nutley, S.M., Walter, I. and Davies, H.T.O. (2007). *Using Evidence: How Research can Inform Public Services*. The Policy Press: Bristol, UK.

Peterken, G.F. and Backmeroff, C. (1988). *Long-Term Monitoring in Unmanaged Woodland Nature Reserves*. Peterborough: Nature Conservancy Council.

Peterken, G.F. and Stace, H. (1986). Stand Development in the Black Wood of Rannoch. *Scottish Forestry*, 41(1).

Smout, T.C. (2000). *Nature Contested: Environmental History in Scotland and Northern England since 1600.* Edinburgh University Press: Edinburgh, Scotland.

Steven, H.M. and Carlisle, A. (1959). *The Native Pinewoods of Scotland*. Oliver and Boyd Ltd: Edinburgh, Scotland.

UNESCO (2008). *Operational Guidelines for the Implementation of the World Heritage Convention.* UNESCO, World Heritage Centre.

UNESCO (2014). *Florence Declaration on the Links between Biological and Cultural Diversity. Florence (Italy) 11 April 2014*. UNESCO/CBD.

Box 1. The Black Wood of Rannoch – history shapes the forest form

1439: Rannoch estate given to the Robertsons of Struan for apprehending the murderers of King James 1st.

1689-1745: Estate is forfeited in 1689, 1715, and again in 1745. Heavy exploitation of 960 trees per year.

1745: The forest was much feared by local people as a haunt for 'broken men', outlaws from the failed Jacobite rebellion. A garrison was established and Jacobite homes were burned.

1750: The forest was judged to be in bad shape. Yet forfeited estates initiate felling at 1200 trees/year.

1757: Sawmill burnt down by an evicted tenant. New sawmill built 1758.

1781: The forest is completely enclosed to protect it from domestic animals.

1784: The estate is returned to the Robertsons (until 1857).

Late C18: Swine put in forest to break up soil for regeneration.

1803-15: Napoleonic Wars and significant felling occurs. Canals dug to float timber to market.

Early C19: Opened again to farm stock; sheep farming in full swing.

Mid C19: Highland clearances. Radical increases of the number of sheep. Human population of Rannoch is less than half the original number.

1895: Enclosed as a deer forest. Roads constructed along canals.

1889-94: 1000 trees felled for West Highland Railway.

1918: Opened for general grazing.

1939-45: 8,000 trees cut for the 2nd World War effort.

1947: Protected again from deer.

1957-67: 5,000 trees cut by Forestry Commission.

1974: Fully protected as Forest Nature Reserve, later becoming an SSSI.

Table 1: Indicative assessment of possible impacts of six management scenarios on the cultural and biodiversity benefits of a Caledonian forest (1=low, 5=high)

Scenario description			Cultural benefits per beneficiary (Scale 1-5)				Total benefits (Scale 1-5)		
a	b	c	d	e	f	g	h	i	j
Scenario name	Level of intervention	Number of beneficiaries (Scale 1-5)	Identities	Experiences	Capabilities	Average cultural benefit*	Total cultural benefit**	Total biodiversity benefit	Total benefit*
1. Untouched wilderness	None	1	1	5	1	2.3	1.5	5	3.3
2. Sacred & cultural Ecology	Insignificant	3	4	5	3	4.0	3.5	3	3.2
3. Native forest conservation	Significant but minimal	2	3	4	2	3.0	2.5	4	3.2
4. Social & ecological restoration	Significant	5	5	4	5	4.7	4.8	5	4.9
5. Revived (bio)cultural landscape	Substantial	2	4	3	4	3.7	2.7	3	2.9
6. Community forest economy	Substantial	5	5	3	5	4.3	4.6	2	3.3

*The score for average cultural benefit (column 'g') is the arithmetic mean of the scores in columns 'd', 'e' and 'f'. Similarly the score for total benefit (column 'j') is the arithmetic mean of the scores for total cultural benefit (column 'h') and total biodiversity benefit (column 'i'). Therefore, in both cases, we have applied an equal weighting to the different types of benefit that are being aggregated.

**The score for total cultural benefit (column 'h') is the geometric mean of the average cultural benefit per beneficiary (column 'g') and the number of beneficiaries (column 'c'). It is derived by multiplying 'g' by 'c', giving a score on a scale from 1-25, which is then converted to a score on a scale from 1-5 by calculating the square root. Thus: $h = \sqrt{(c \times g)}$.
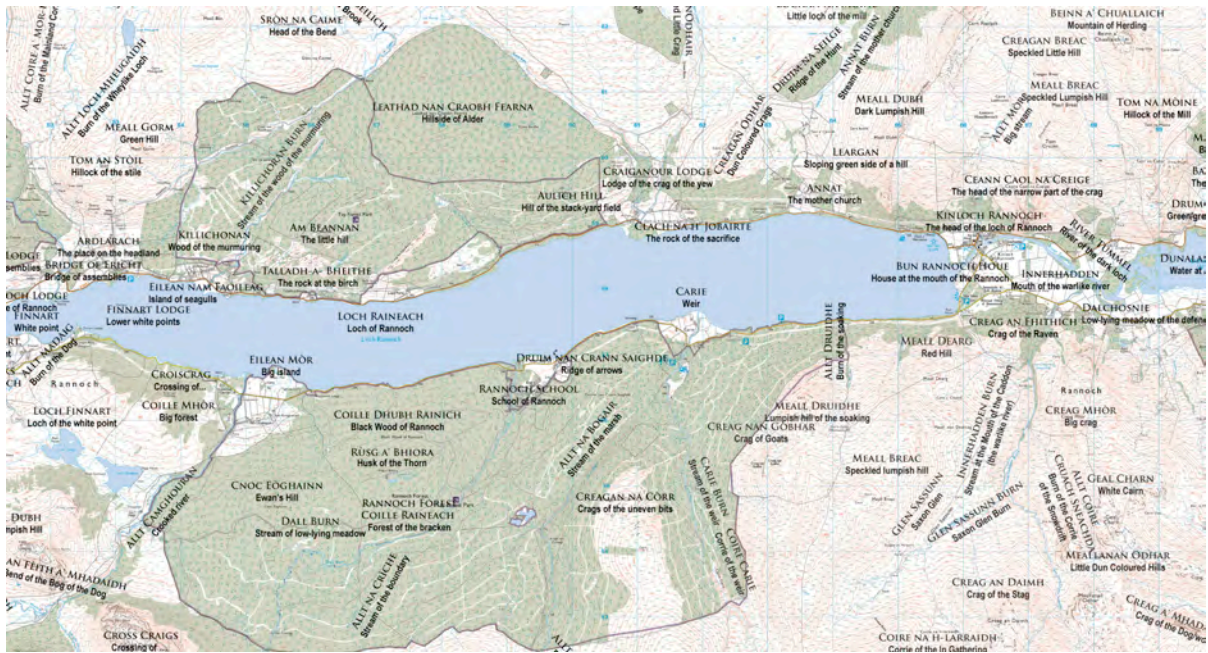
Figure 1. Initial mapping of translated Gaelic place names in Rannoch, showing the Black Wood to the south of the loch (© Ordnance Survey License number 100021242. Translation by Beathag Mhoireasdan, Collins & Goto Studio, 2014).

Figure 2. 'Gunnar's Tree' in the Black Wood of Rannoch, with community members, November 2013 (© Collins & Goto Studio, 2013).