



Clunes and the Tom an Eireannaich woodland

**Exploring the impacts of different management
interventions on woodland benefits**



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This is the sixth in a short series of reports written by researchers at the James Hutton Institute investigating people's perceptions of management interventions on different woodlands around Scotland.

Background

Forests and woodlands are an essential part of Scotland's natural heritage. Woodlands provide a range of benefits: they are home to various flora and fauna, store water and carbon, and provide a space for recreation and relaxation. The way a forest or woodland is managed and used affects the benefits of a forest. A forest that is managed for timber production, for example, might have direct benefits such as timber and creating employment opportunities, and might additionally be used as a place of recreation and for mental restoration, as well as preventing water run-off and providing natural flood management. People will have different understandings about the range of benefits a woodland can offer, and some people might prefer one type of benefit over another. To understand how these factors are interconnected, researchers from The James Hutton Institute are researching woodlands in different parts of Scotland: in the Central Belt (North Lanarkshire), on the west coast (Argyll), and in the Highlands.

Clunes and the Tom an Eireannaich woodland

This report presents the results of a research workshop that was undertaken in relation to the Tom an Eirannaich woodland near the community of Clunes. A second workshop report is available that discusses the nearby Loch Arkaig Pine Forest.

The Tom an Eireannaich woodland is approximately 15km NE of Fort William near the community of Clunes on the southwestern shore of Loch Lochy, in the Loch Lochy and Loch Oich Special Landscape Area. Tom an Eireannaich makes up roughly 60% of the 6ha site and consists of ancient, mixed broad-leaved woodland containing patches of upland oakwood, upland birchwood, and wet woodland, each with a diverse association of ground flora, although bracken and rhododendron are present as well. The woodland is considered a small but valuable example of Scotland's ancient Atlantic rainforest with high conservation value, and the mild, wet

climate provides ideal conditions for lichens, mosses, liverworts, and ferns. As well as the loch, the woodland is bounded by plantations to the north and the Allt Bhan to the south.

Consulting local experts

To explore different perspectives about woodland management and the impacts of management interventions on the perceived benefits from forests, we adopted a research methodology called *scenario workshops*. This entails describing a range of management scenarios for the woodland, which form the basis of in-depth discussions with a small group of people with local knowledge and expertise about the woodland.

Scenario development

Researchers at The James Hutton Institute developed narratives depicting six management approaches for discussion (appendix 1), building on documents such as management plans, site surveys and future climate predictions. The narratives were developed with input from staff at the Woodland Trust and Arkaig Community Forest. One of the scenarios was based on the past management style **The Past 1980s/1990s**, one on the site's current management plan **The Present 2021**, and then four hypothetical future scenarios set in 2035. These focus on possible management interventions and practices on the site: i) **Restoration and Revival** which is based on the continued implementation of the current management plan for the site; ii) **A Diverse Hotspot** with a strong emphasis on biodiversity and conservation; iii) **People's Forest**, giving prominence to community engagement activities; and iv) **Natural Growth** a scenario based on reduced budgets and resources, whereby only minimal management interventions necessary to fulfil statutory requirements are undertaken.

Local expert panel methodology

Seven participants attended a workshop in August 2021. Attendees included people



with different backgrounds, professions, and perspectives, all with knowledge and interest in the woodland at Clunes. Participants included environmentally engaged stakeholders such as forestry experts, volunteer ranger, a local minister and local business owner.

Due to the Covid-19 pandemic, the workshops were hosted online using an interactive whiteboard and videoconference. Participants received a workshop pack a week before the workshops, which contained the six scenarios and scoring worksheets. Participants were asked to individually score how well they thought each scenario performed against eleven different woodland benefits (ecosystem service indicators), using a 10-point 'Likert' scale where 1 is low, and 10 is high. The full description of the eleven indicators is listed in appendix 2.

The scores given by participants in relation to each indicator were displayed visually on the

virtual whiteboard for each of the scenarios. These scores formed the basis of facilitated discussions to explore patterns and differences across the scenarios and identify the reasons behind participants' choices. Following these discussions, participants were able to revise any individual scores. Finally, the participants were invited to identify their preferred future management scenario and what an ideal future management approach would look like, explaining the rationale for their choice.

We analysed the scores given for each of the woodland benefits across the scenarios. We also analysed the comments made by participants about their decisions to gather additional insight about perspectives of management interventions and their impact on the benefits of the woodland. These findings are discussed in the next section.

Workshops were hosted on an interactive online platform to facilitate and encourage participation



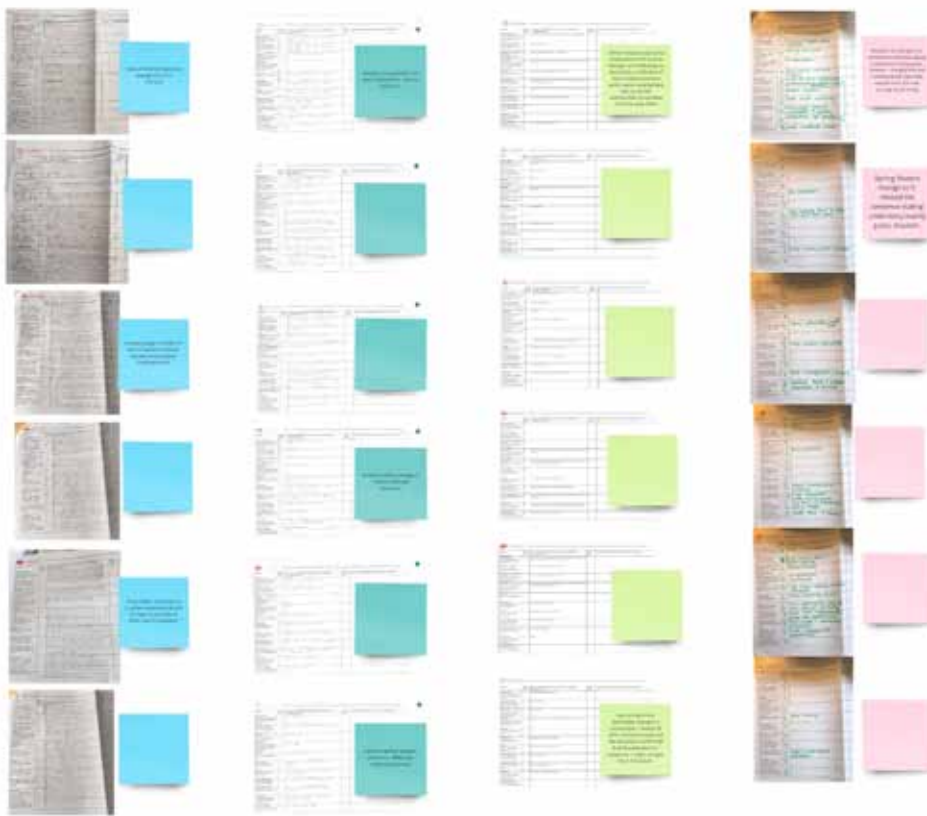
Ecosystem benefits across the scenarios: results from the scoring exercise

The median values for each of the eleven ecosystem service indicators assessed for each scenario are illustrated in table 1. The median score is the most informative measure of central tendency when results can have skewed or

outlying results as it prevents outliers from dominating the results. By reviewing the median scores across the eleven indicators and six scenarios, several key points stand out.

Table 1: Median scores given to each indicator for each scenario (1 is low; 10 is high). The 'median of medians' indicates the preferred scenario overall based on participant scores. See Appendix 2 for a full description of the ecosystem service indicators.

	The Past	The Present	Restoration & Revival	A Diverse Hotspot	People's Forest	Natural Growth
Employment & Income	5.0	4.0	5.0	7.0	9.0	2.0
Target species - spring flowers	3.0	5.0	5.0	8.0	8.0	3.0
Target species - brambles, bracken and rhododendron	3.0	4.5	6.0	8.5	8.0	2.0
Timber	2.0	4.5	4.0	2.5	4.0	1.5
Carbon sequestration	4.5	5.0	5.0	7.0	6.0	4.0
Mental restoration	5.5	6.0	6.0	7.5	8.0	3.0
Spirituality	3.5	5.0	5.5	6.0	6.5	1.5
Knowledge, education, skills & training	3.0	5.5	6.5	6.5	10.0	2.5
Landscape quality & character	6.0	6.0	7.0	8.0	7.5	3.5
Place attachment	5.5	7.0	7.5	7.0	9.0	2.5
Natural flood management	5.0	5.0	6.0	8.0	6.0	5.0
Median of Medians	4.5	5.0	6.0	7.0	8.0	2.5



- The scenario **Natural Growth** received the lowest scores, with all median scores for any indicator below 5. This scenario involved limited management interventions. Participants noted that they felt this scenario missed opportunities and lacked the investments required. Furthermore, they noted that it would be less appealing to residents and creates *"a depressing site"* The median score for 'Learning, Knowledge and Skills' within the **People's Forest** was ten. Participants noted that this scenario provided far-reaching and engaging learning opportunities, with one noting that this is the *"best scenario for opportunities to engage and educate"*.
- Similarly, **People's Forest** scored a median of 9 out of 10 for 'Place Attachment'. One participant credited their high score, saying that by having more people involved in the woodlands it would increase 'Place Attachment' through positive experiences and that both residents and visitors would have a *"better understanding of place and pride in the place"*
- Participants responded positively with the treatment of 'Target Species B – Brambles, Bracken and Rhododendron' within the **Diverse Hotspot**, seeing it score a median of 8.5. One participant reflected that this scenario's approach to bracken was a *"radical action [and] a major improvement."*
- Across all scenarios, the indicator 'Timber Extraction' gained relatively low scores, with the median ranging from 1.5 to 4.5. Reviewing

the rationale that participants provided, one stated that the *"site [is] too small for much timber extraction."*

- 'Landscape Quality and Character' gained high scores across all scenarios, apart from **Natural Growth**. One participant attributed their low scores to the fact that it was *"reduced compared to other scenarios- reduced understorey, walls of rhododendron [and] damaged trees."* In contrast, when considering 'Landscape Quality and Character' within the **Diverse Hotspot**, a participant noted: *"This will be aesthetically pleasing to avid naturalists and visitors alike."*
- The **People's Forest** and **Diverse Hotspot** received high scores overall, with a median of 8 and 7, respectfully. The scenarios scored well for every indicator except for 'Timber Extraction'.

Figure 1 (page 10) summarises the scores as boxplots for each of the indicators. The boxplots enable us to see the variation between participants' responses in more detail and help identify commonality, agreement, and disagreement areas. The boxplots display that within the scenario **Restoration and Revival**, the indicator 'Carbon Stored' has a strong consensus between participants, with 75% of participants scoring it from 5 to 6. This shows high agreement by most participants agrees on the score for this indicator. Other tangible indicators, such as Target Species B (Brambles, Bracken and Rhododendron), also receive close consensus in their scores.

- 'Employment and Income' tended to receive a degree of disagreement with a considerable range in the scores. This is particularly evident in the scenario **The Past**, with outlying scores ranging from 1 to 8, showing that participants have mixed interpretations of how well this scenario addresses income and employment. Reviewing the data in more depth discloses that participants disagree for the first scenarios, namely: **The Past**, **The Present**, **Restoration and Revival** and **Diverse Hotspot**. However, they reach an agreement that the **People's Forest** is good for income and employment and that **Natural Growth** performs poorly for this indicator. Further analysis of the discussion and rationale for Employment and Income is discussed on (page 7)
- A second example of an indicator that received a range of results is 'Spirituality'. The boxplots display a large variety of results for this indicator across all the scenarios, again showing that participants disagree on how the various interventions benefit the 'Spirituality' of the woodlands. This lack of agreement is due to the indicator forming two cluster groups in the data, with two participants consistently scoring 0-1 while concomitantly three participants score at the high end of the spectrum. This indicator prompted an in-depth discussion which is the focus of the next section.

Key discussion points from group deliberation

Spirituality, accessibility, and the role of personal meaning

The potential spiritual benefits of the Clunes woodlands were a key point of discussion during the panel workshop, possibly due to the differences in participant scoring. This exposed the integral role that personal values, preferences and perspectives play with regards to 'Spirituality'. This indicator gained a range of high and low scores as participants attached different personal meanings to it. One participant stated:

"Is it going to be such a struggle to get here I'm not going to be able to think feel anything or experience anything?"

"I will probably overall have scored quite highly because it's an indicator that is obviously important to me, both from a work point of view and a personal point of view so I think that's quite clear, I think I'm on a higher number than others on that one generally".

In contrast, a second participant replied:

"As a committed and confirmed atheist, it was kind of a fairly meaningless thing... for me. I had no way I thought of thinking how I would value these things. It would be a bit like if one of the indicators was how good would this be as habitat for unicorns?"

These comments initiated a dialogue about what 'Spirituality' meant to individual participants within the context of the Clunes woodlands. Participants agreed that there is a strong connection between the three indicators 'Spirituality', 'Mental Restoration', and 'Place Attachment'. Together, they felt the distinction between the three indicators was challenging to discern:

"It was difficult to distinguish, and I was confusing mental restoration and sense of place with spirituality. But what I would say is in terms of spirituality, which I think is a really important aspect of spending time outside, whether you're an atheist, a Christian or whatever your spiritual system... but it's the sense of awe, it's the sense of something that's so much greater than ourselves".

The 'sense of awe' concept for 'Spirituality' resonated with other participants, many of whom agreed that this contributed to their perception of 'Spirituality'. However, one participant commented that a 'sense of awe' can be experienced in the most unexpected places. They used the example of an ancient old oak tree, the Skippinish oak, right in the middle of a Sitka spruce plantation to illustrate their point. Considering the numeric scores provided by the participants, it is important to note that while participants range in their agreement towards 'Spirituality', they tended to agree on the Woodlands ability for 'Mental Restoration' and 'Place Attachment'. This is important as the discussion disclosed that participants feel these three indicators are closely linked, and the difference between them is challenging to differentiate. The boxplots (Page 10) illustrate this finding, where the scores for 'Spirituality' range vastly, while 'Place Attachment' and 'Mental Restoration' show close agreement between participants' scores. This highlights the importance of language and phrasing in consultations as certain words may carry positive or negative connotations, which could skew results.

The participants moved to debate the factors that impact the woodland's spiritual quality. This identified the critical role that accessibility plays for them. Access was discussed both as physical ability to reach and navigate the woodlands and as emotionally wanting to access the woodlands. Participants recognised that the quality of the footpaths would impact their ability to get to and around Clunes. They felt that this was significant within the scenarios with regards to the wildness of the landscape, as if paths are overgrown by bracken, it limits the users' capacity to use and navigate the space:

"You're not going to get any spiritual sense from a place you can't get to...can I get here, is it going to be such a struggle to get here I'm not going to be able to think anything or feel anything or experience anything."

Further concerns were expressed that the cleanliness of the woodlands would impact wanting to use it with a participant reflecting:

"...Issues around litter and human waste and things like that and you just think oh, there's really just pretty visual and other sensory experiences that would not allow you to go there."

These feelings were reiterated by other participants, who agreed that there is a clear connection between 'Spirituality' and accessibility, which is impacted by both physical and emotional attributes. As such, ensuring that woodlands are kept clear from waste and rubbish and that the paths are well maintained should increase the accessibility of the woodlands, which they believe positively impacts the feeling of 'Spirituality' for users.

Public engagement and 'Place Attachment'

Following the discussion on the 'Spirituality' indicator, participants turned their attention to 'Place Attachment'. Participants in this workshop felt that spending time in the woodlands increases the feeling of attachment to it. This highlighted the temporal nature of 'Place Attachment', with participants agreeing that being engaged in and spending time at the woodlands increases their feeling of place attachment. One member emphasised this point:

"I'm not really looking at place attachment in terms of people who pass through a place once, but if you work on a place, if you're involved in a group that's making a difference and changing it, if you're going to be there on a repeat basis, those are the things that build up place attachment"

Other participants resonated with this point, confirming that they believe visitors and locals



will have a different experience and attachment to the Clunes woodlands. They spoke of the visitors who pass by compared to those who experience the woodlands every day:

"...different development or different scenarios might have different impacts on place attachment for locals and visitors, and I don't mean the person who just comes once in their life, but the tourist who comes back every year or whatever, may have a different set of impressions of a place than someone who lives right next to it and sees it every day and whether or not it's part of their life"

The discussion highlights that people need to feel engaged and have a purpose for spending time there to create a greater sense of 'Place Attachment'. Being actively involved and seeing your engagement make a difference in the woodlands builds up the users' attachment over time. While living nearby and being local is an important aspect of place attachment, participants still felt that those who engage positively through volunteering or work on a repeat basis would form a strong feeling of attachment to the landscape. As such, participants felt public engagement, employment, and volunteering play a valuable role in giving people a sense of connection to the woodlands whether they are directly local or not.

Beneficiaries and societal impact of rural employment

Participants turned their attention to the societal impact of rural employment, discussing the broad indicator 'Employment and Income'. This included whether both direct and indirect income and employment should be included. Participants considered these factors within **The Past** scenario. **The Past** gained dispersed scores for this indicator. One participant who scored this scenario high in terms of employment and income commented that this was because:

"Although there wasn't much employment linked directly with this site, there were a lot of forestry employees living in the houses at

“It just seemed that it was on a trajectory to create more jobs and had a lot of possibility and I felt to maximise opportunities for people within the area”.

Clunes who were even living in tied houses and so on and then they were using that bit of land to keep chickens and all that sort of thing, so I suppose I was thinking of it more as indirect employment if you like.”

A second participant concurred that they felt the quantity of forestry employment in the 80s and 90s was high compared to the other scenarios. However, this was balanced with the belief that the past employment was not diverse, thus that this is not necessarily a model to follow. Nevertheless, for the sheer quantity of employment, they provided a high score. This trade-off between quality and quantity of rural employment is significant when considering future management interventions.

The scenario **People's Forest** performed highest overall for 'Employment and Income'. One participant stated they felt:

“It just seemed that it was on a trajectory to create more jobs and had a lot of possibility and I felt to maximise opportunities for people within the area”.

A second participant agreed with this feeling, confirming that the **People's Forest** created the greatest diversity of potential 'Employment and Income' within a community from the site and seemed to do that *“in a way that was relatively in tune with the environment, with the local aspiration and so on.”*

Looking beyond the individual scenarios, the discussion considered broader forest management and how community woodlands have *“the potential to generate opportunities for people to stay in an area, maybe generate affordable social housing, maybe get people more interested in forestry”*. Participants saw this as a positive aspect of rural employment, showing that the various methods of forestry management have a substantial impact on the 'Employment and Income' of the community surrounding the Clunes woodlands. Furthermore, the discussion exposed the wider societal aspects such as housing and rural migration patterns impacted by forestry management decisions. Fundamentally, the participants felt that increasing employment would benefit the area as it is likely to attract people to stay, increase economic activity, and benefit the quality of the forests through woodland

management by forestry staff.

Woodland size, scale and the surrounding landscape

Due to Tom an Eireannaich being a relatively small woodland, size and scale emerged as important factors throughout the discussion. This was particularly evident regarding flooding, connectivity, and the wildlife it hosts. The discussion around 'Natural Flood Management' considered the size of the site and how it relates to the broader landscape. Participants agreed that due to its size, it is hard to see that this site would impact the 'Natural Flood Management' or to change the nature of that site. This was demonstrated by a participant stating:

“it's such a tiny size, it's right next to the loch and the stream that drains into the loch anyway. It's very difficult to see that it has any significant impact at all on flood management, and actually none of the scenarios fundamentally change the nature of the woodland on the site.”

A second participant agreed:

“it didn't seem to me that any of the scenarios made a really significant impact to flooding ... here it didn't seem to be one that actually there was much change and I think if you started scoring one as ten and one as two, when actually you're exaggerating the value of this indicator for the site.”

Their contribution led to a discussion regarding the wildlife found on the site, with participants agreeing that the activities of the wildlife in the Clunes woodlands are unlikely to be influenced dramatically by different management interventions due to its scale:

“that's probably not purely down to the activity on this tiny little bit of woodland, it's a broader thing... if there are beavers in the area they're not going to be purely in this tiny little bit of woodland, it's going to be a catchment-wide population.”

The prompted discussion regarding whether the size of the woodland impacts its **connectivity** to the wider landscape. Here, participants reflected that they do not believe there is a connection issue; rather, they feel there needs to be recognition that the Clunes woodland is not an isolated space.

“isn't have this tiny little fragment of woodland, which is what it is, as being great beaver and otter habitat if the rest of the surrounding thousands of hectares isn't. Cos those species just need more space than is possibly going to be available for them on that site”

Between various points in the discussion, participants noted the importance of focusing

efforts at the appropriate scale and the value of not considering or treating the Clunes woodlands in isolation. They felt it is important to distinguish the elements of the woodlands that can be managed and accept that there are aspects of the woodlands, such as otter and beaver habitats, that will likely occur regardless of the interventions utilised in this small area of woodland.

Preferences for future management and managing trade-offs

During the discussion, participants were encouraged to create their preferred scenario by adding or removing factors of the existing scenarios. Here, participants considered the trade-offs and synergies between the scenarios to conclude with what they felt were the ideal management interventions. Participants located their 'preferred scenario' on the virtual whiteboard next to, or between, the scenarios that they felt strongest aligned to. This exercise resulted in all the participants clustering their comments around the **People's Forest** and **Diverse Hotspot**. This result aligned with the numerical scores shown in Table 1.

The Past and **Natural Growth** both scored poorly, illustrated in Table 1. Participants were dismissive of these scenarios, with one joking: "Does anyone ever vote for the past?". The conversation led to interrogating the remaining scenarios that the participants felt had merit. All participants sought a balance of the elements of the **People's Forest** and the **Diverse Hotspot** with one expressing: "It's the crux of a lot of what we do professionally on this call is those trade-offs between more biodiversity and more opportunities for rural employment and jobs... I think it would be amazing if we could find a middle ground there where biodiversity was winning as was rural employment."

The importance of rural employment as championed by the **People's Forest** was restated by other participants who agreed that the **People's Forest** "delivers the best on the most important outcomes (jobs, education) for the community". Employment was thus confirmed as a significant element of creating a preferred management scenario, with many participants seeking a people-centred forest.

A further element that many participants drew out from the **People's Forest** is that it engages a wide spectrum of the community. This did not only apply to the direct local community, but the wider community that regularly use the woodlands. However, participants' views differed regarding the level of people engagement and which groups of people should be the focus

of engagement activities. One participant expressed the trade-off between quality (**Diverse Hotspot**) versus quantity (**People's Forest**), by using a spiritual analogy and posing the question of which would be more beneficial to society; a beautiful ornate church that accommodates twenty people or a large modern cathedral which accommodates three hundred people.

Some participants felt that being very visitor focused would result in less wildlife and more disturbance, while others felt the animals would learn to take ownership over the forest areas that people do not visit.

"They just get to learn whether they need to be bothered with people or not and people aren't bothering them and dogs are on leads or whatever then you'd be surprised how confiding and friendly a great deal of species can be."

Looking to the benefits of the **Diverse Hotspot**, one participant noted that a further strength of this scenario is that it aims to acquire some of the wider catchment area and create a nursery. The benefits surrounding the nursery were valued, with one commenting that that it: "Not only provide[s] jobs but also benefits the wider biodiversity. The nursery will have significant benefit in other water catchments and increase carbon sequestering of a wider area"

An additional positive aspect of the **Diverse Hotspot** was that it aimed to create a community garden that would expand to include bees and honey. Participants felt this was a constructive element that they would like to retain when considering their preferred scenario.

Participants generally concurred that reaching a balance between a -centred forest whilst still fostering a diverse woodland would be the ideal future scenario for the Clunes woodland. Challenges and potential trade-offs in how this may come to fruition were noted, particularly regarding the size of the woodland and potential wildlife disturbance. The discussion with local experts demonstrated that for a healthy and prosperous future at Clunes, the management vision must actively engage with the forest, its plant, and wildlife while concomitantly considering the interests and needs of the local community.

"I think it would be amazing if we could find a middle ground there where biodiversity was winning as was rural employment."

Figure 1: Boxplots summarising the scores for each ecosystem benefit across the six scenarios. The horizontal line in the middle of each box is the median, or middle, score. The top line of the box represents the 75th percentile (upper quartile) and the bottom line the 25th percentile (lower quartile). The lines emerging from the boxes represent the maximum and minimum scores given by participants. Points outside the lines are 'outliers' – scores that are numerically distant from the rest of the data. See Appendix 2 for a full description of the indicators.

Legend

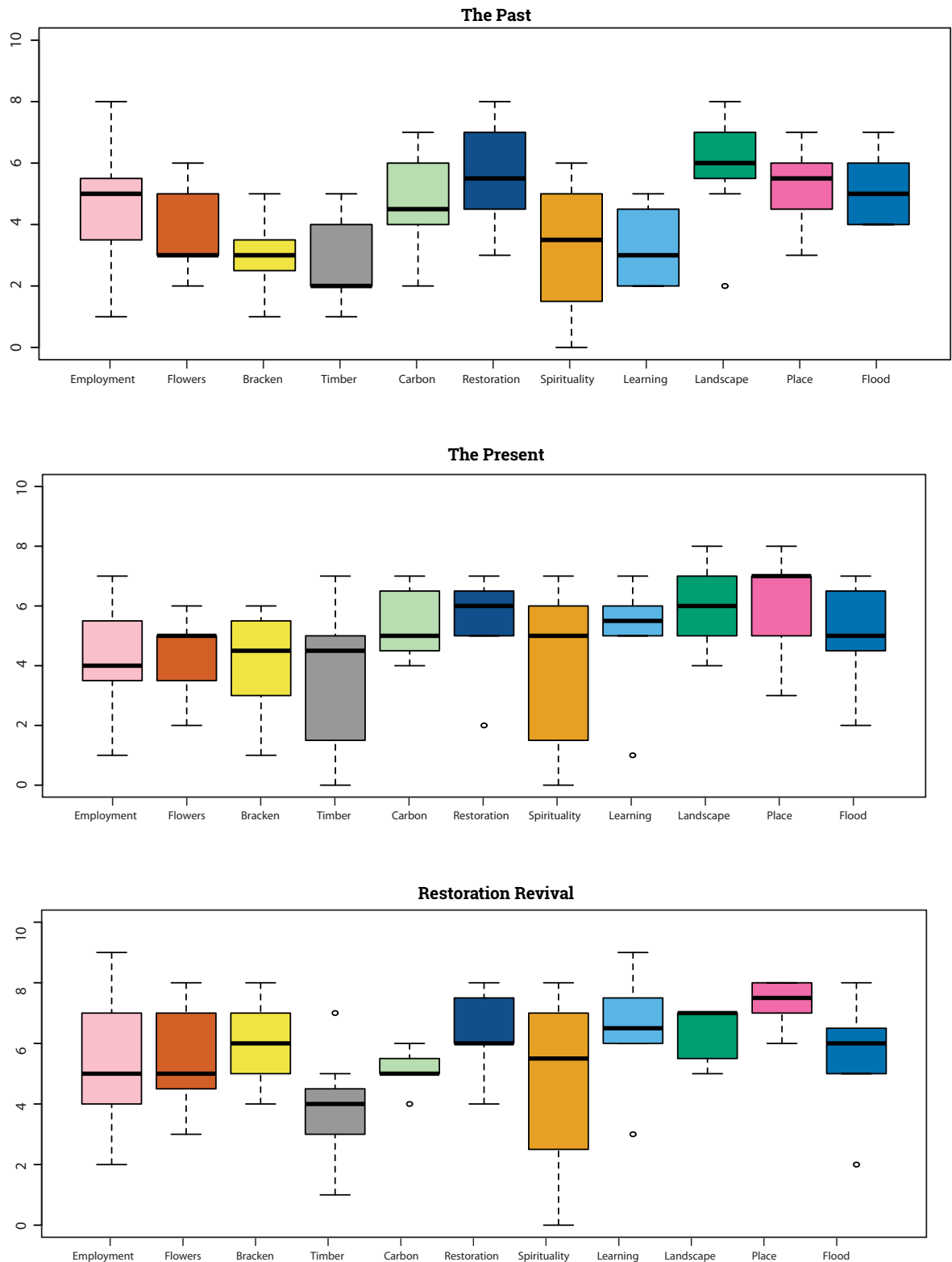
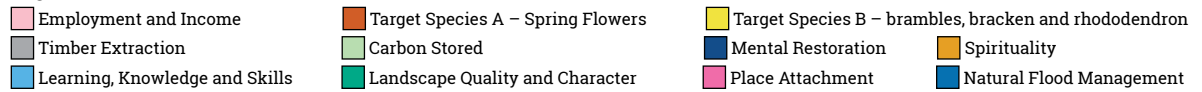
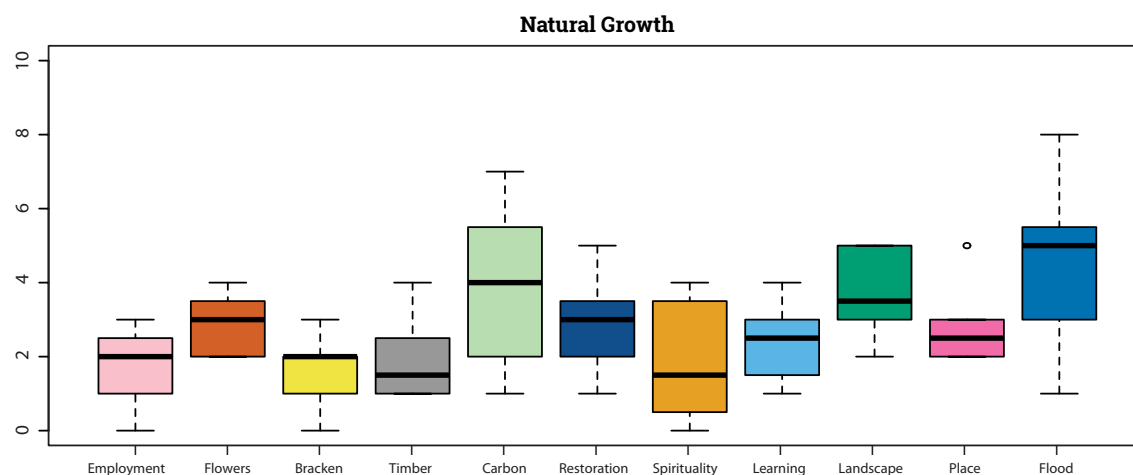
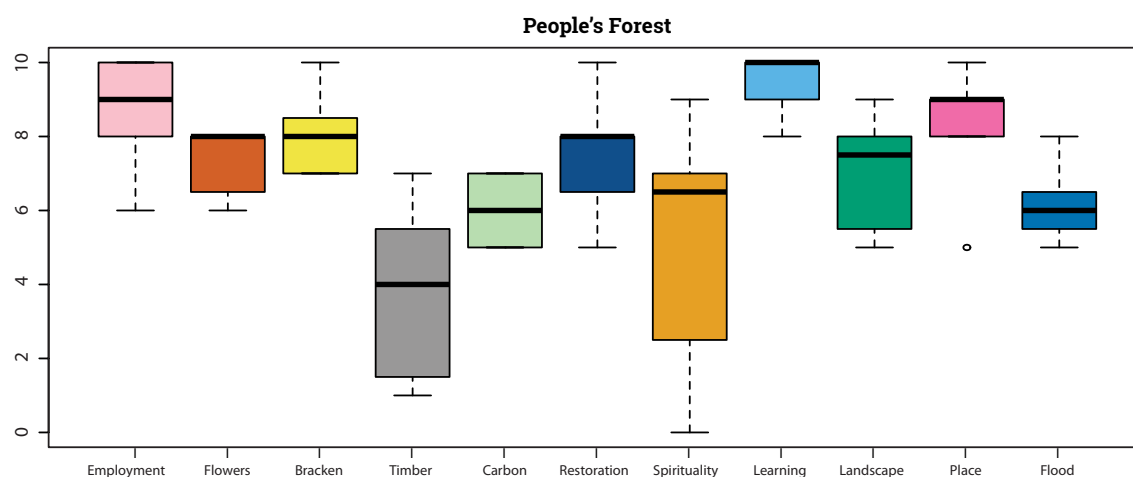
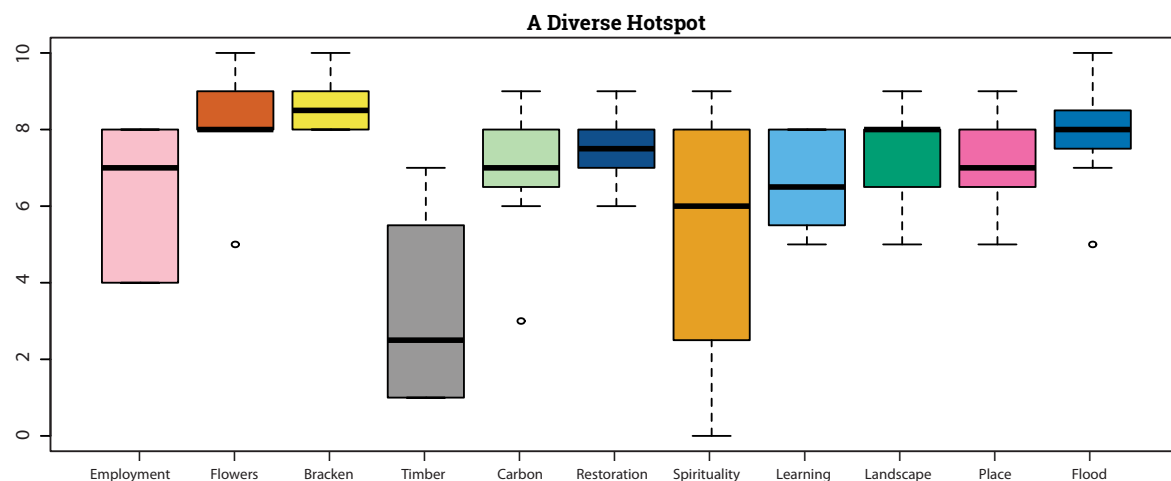
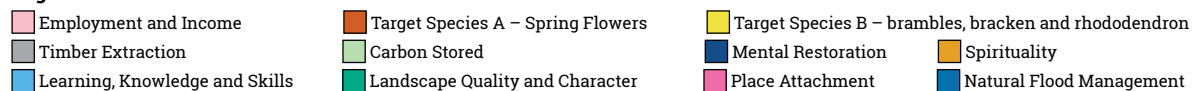
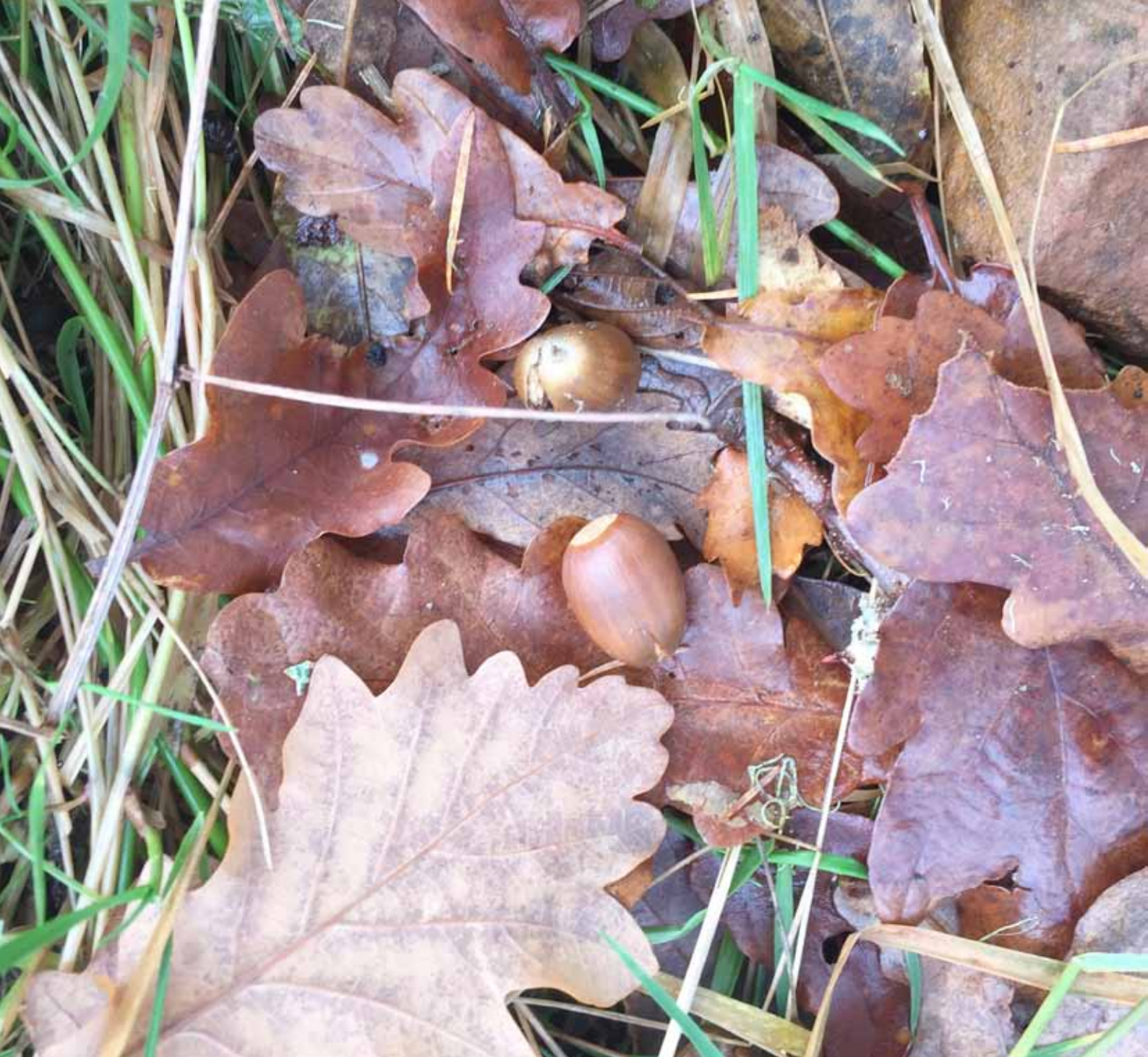


Figure 1. Continued.

Legend





Next steps

We have now concluded six local expert panel workshops across Scotland. We will now conduct a cross-site analysis of the data to gain an in-depth overview of how different management interventions impact woodland goods, services, and benefits from a range contexts and perspectives.

The full list of workshops (and workshop reports) is
Glen Creran Woods, Argyll
Glasdrum National Nature Reserve, Argyll
Forest Wood, Cumbernauld
Cumbernauld Glen, Cumbernauld
Loch Arkaig Pine Forest

Tom an Eireannaich oakwood and Clunes

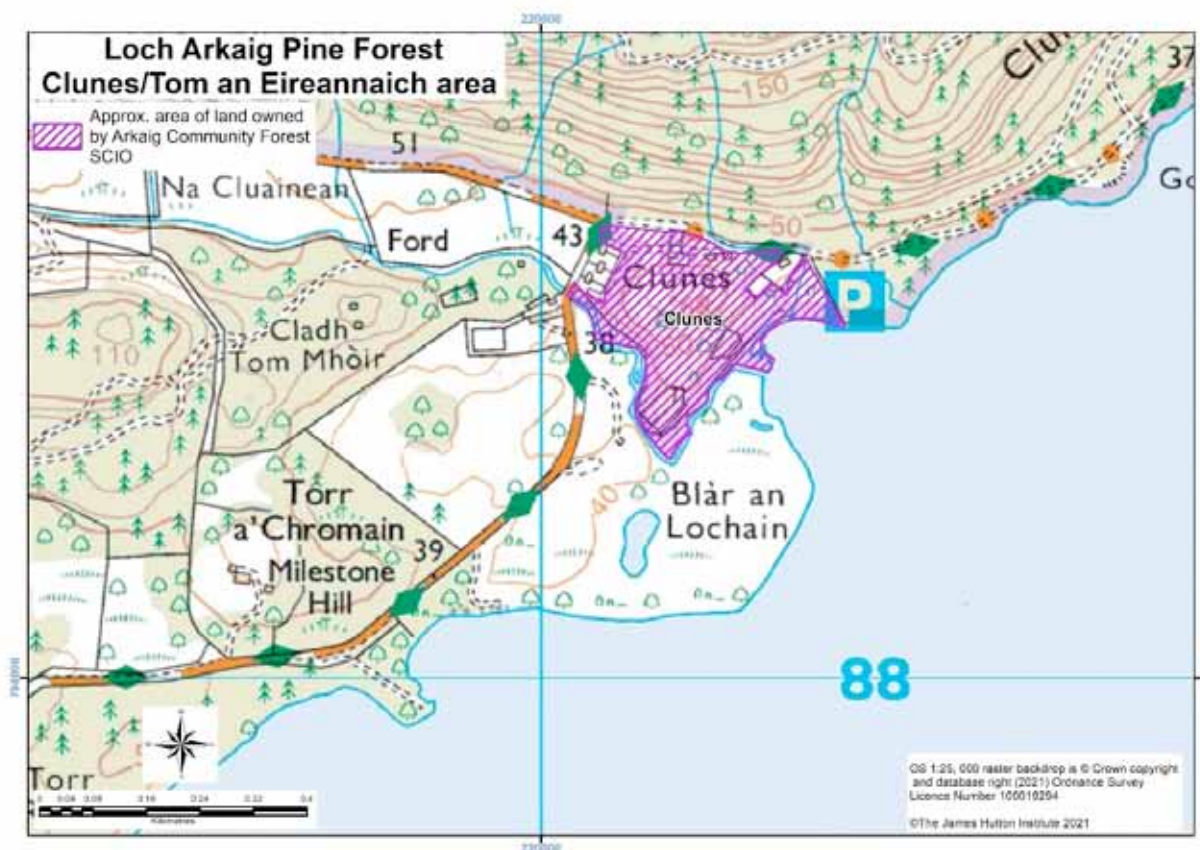
Site description

Clunes and the Tom an Eireannaich woodland are roughly 15km NE of Fort William on the southwestern shore of Loch Lochy, in the Loch Lochy and Loch Oich Special Landscape Area. Tom an Eireannaich makes up roughly 60% of the 6ha site and consists of ancient, mixed broad-leaved woodland containing patches of upland oakwood, upland birchwood, and wet woodland each with a diverse association of groundflora, although bracken and rhododendron are present as well. The woodland is considered a small but valuable example of Scotland's ancient Atlantic rainforest with high conservation value, and the mild, wet climate provides ideal conditions for lichens, mosses, liverworts, and ferns. As well as the loch, the woodland is bounded by plantation to the north and the Allt Bhan to the south.

The Clunes Forest School buildings were originally used as workshop space by the Forestry Commission from the 1970s-2000s. They consist of a basic workshop and another building which was upgraded in 2003 as a general-purpose office, classroom, and meeting space. These small buildings are located next to the oakwood on the forest road which extends along Loch Lochy, and which also forms part of the popular Great Glen Way and cycle path.

The area also supports a small tree nursery, community garden and orchard used by the local community, and an area of willow planted to provide material for craft activities with schools and visitors, as well as a small playing field and shinty pitch. Following three years of feasibility work and negotiations, both the buildings and the woodland were acquired in 2021 by Arkaig Community Forest (ACF) from Scottish Ministers (managed by Forestry and Land Scotland) under the Community Asset Transfer Scheme.

The area around Clunes has been home to settlements as far back as the 12th Century. It has links with the Jacobite Rebellion of the mid-18th century, and the significant settlement of Gaelic-speaking highlanders was forcefully evicted in 1802 during the Clearances. The woodland is part of the larger Clunes forest block which was acquired by the Forestry Commission from Locheil Estate, along with five other forest blocks in the Arkaig watershed in the post-war period, when development of a homegrown timber supply was a high priority. The Tom an Eireannaich woodland was spared from the large-scale planting of non-native conifers, perhaps due to its amenity value to the hunting lodge at Clunes.





The Past (1980s/1990s)

Loch Arkaig Pine Forest (Glenmallie, and the Gusach further west along the southern loch shore) is owned by the Forestry Commission and managed primarily for timber. Both forest blocks contain compartments of Sitka spruce, Lodgepole pine (which constitutes a significant proportion of the Gusach), and larch that were planted in the 1960s and 1970s, and trees on the better ground are maturing well following active management and thinning in the 1980s. Both Glenmallie and the Gusach are surrounded by fencing to prevent deer from entering and browsing younger trees, and any deer found within the plantation areas are controlled.

As well as large areas of commercial plantation on ancient woodland sites (PAWS) there are remnant stands of semi-natural Scots pine, upland birch, and oak. These semi-natural elements led to the forest being included in the 1994 Caledonian Pinewood Inventory as one of only 83 such remnant sites in Scotland and they contain important bryophytes such as ostrich plume moss and tree lungwort. Restoration work in 1997 has focussed on felling non-native trees to waste in areas with mature Scots pine and other valuable semi-natural features. Subsequent fencing and deer control have resulted in plenty of birch saplings and some Scots pine regeneration in these areas, diversifying the forest structure. Elsewhere in the woodland, the compartments of commercial non-native trees (e.g., Sitka spruce, Lodgepole pine) have been left to mature and are being harvested on a planned rotation. These stands have tended to prevent a diverse understory from developing due to shading and needle litter.

The forestry activity in the wider area supports a small community, most of whom

live locally at the Clunes Forestry Commission houses, and staff are based out of the workshop and office there.

Glenmallie doesn't receive many visitors, and the remote location of the Gusach means that there are no expectations of public access. The small number of visitors use the small car park at the Chia-Aig falls just east of Loch Arkaig and walk across the White Bridge to the southern shore, and sometimes on to the bothy at Invermallie. Few continue onwards to the Gusach because of the difficult ground, and this forest tends only to be accessed for management purposes.



The Present (2021)

Following a period of community usage of the Clunes forestry buildings and workshop, now known as Clunes Forest School, the Tom an Eireannaich oakwood and two small buildings were purchased by Arkaig Community Forest SCIO (ACF) from Scottish Ministers (through Forest and Land Scotland (FLS)) in mid-2021. ACF is a small, volunteer-led charity with a strong local membership. The Woodland Trust, a partner with ACF in the nearby Glenmallie and Gusach forest blocks just a short distance from Clunes, rents space in the forest school buildings to use as an office and meeting space.

The oakwood has not changed much in the past decades, with mature oak and birch and associated lichens, mosses, and liverworts. The understory is mainly grass and bracken, with sporadic Rhododendron visible up the hill. The popular walking and cycling route, the Great Glen Way, forms the north and west boundary

for the woodland and attracts a lot of visitors, leading them from Fort William to Inverness. The flat area adjacent to the oakwood and Clunes buildings are a popular camping and overnight location for hikers of the Great Glen Way. A small number of pop-up events have been organised to engage other community members and visitors. Information boards located next to the forest school provide information about the woodland habitats, as well as cultural history from nearby, such as stories about the Jacobite Uprising (1745-1746), and how the area was used in the filming of the 1995 film, Rob Roy.

While most residents are retired, one or two locals are self-employed in the forestry sector and others are either employed by the nearby Achnacarry estate or make the 25-minute commute to Fort William (or at least they did before Covid). The Locheilnet Community Broadband service has relatively recently been installed which means that residents are better able to work from home. The forest school buildings are also connected to that network.

Whilst keeping individual allotments is now limited, work has recently restarted to create a community garden for residents. In addition to a small number of fruit trees, a small patch of willow trees planted about 15 years ago have been restored and re-coppiced, with willow being shared with local craftspeople. Occasional activity days have been organised jointly by ACF and The Woodland Trust, where volunteers help maintain fencing and clear bracken. Acorns are collected in late autumn, with an aim of growing seedlings for future restocking of the sites both here and at Loch Arkaig Pine Forest. With limited international travel as a result of the Covid-19 pandemic, there has been an increase in both wild camping and camper vans recently. No public facilities are currently available to support visitors, and while most people respect the area, there have been issues with litter and

disturbance. Given experiences elsewhere, there may be both public health and fire-related risks if this situation is not addressed.

The following four scenarios describe what Clunes Forest School & Tom an Eireannaich woodland might look like in the future (2035), under different hypothetical management approaches:



Restoration and Revival

Future scenario 1 (2035)

Since the acquisition of the woodland and Clunes Forest School in 2021, annual work parties of local volunteers have maintained the main species composition of oak and birch and have improved and maintained the footpaths and fences. While some silviculture work has taken place, predominantly to provide firewood for local households and to cut away hazardous broken branches, trees in the woodland itself are not actively managed, and a few non-native Sitka spruce, larch, and beech trees remain. Ash dieback caused a problem in the 2020s, but the affected trees have all been removed. The woodland floor continues to host blaberries and tree seedlings, and bracken cover overall has been substantially reduced due to continual cutting back by community members. That said, managing bracken is an ongoing challenge and there are ongoing concerns about it as tick habitat, and the associated risks of Lyme's disease.

The Great Glen Way has seen year on year rise in walkers and cyclists (both electric and pedal) with the increase in domestic holidays. Camper vans are also increasingly common, and this has meant that more people are gathering in and around the woodlands. A single public compost toilet and drinking water supply has been installed to mitigate the impact of those

camping, and the community has also installed a solar-powered charging station for bikes and phones. In the height of the summer these basic facilities are heavily used. The community has continued to host occasional events & pop-ups, which create a consistent source of income, which is then reinvested into educational activities for students from across Lochaber. Plans for a small visitor centre are underway, although funding is hard to find. A small stream of additional income has been created from two artists who use the forest school buildings on the weekends, taking inspiration from the local area for their work.

The investment in the community gardens from the 2020s is really paying off: with a lot of hard work, community members have a small and successful plot which brings in vegetables, herbs, and some fruits each year, and the bracken is kept at bay. Excellent internet access now means that most people can work from home as required, and even school students now only attend school two days a week, with additional lessons being delivered online. This has led to greater demand for rural housing, and there is pressure to build new houses in the area to which there is a mixed response from existing residents.

A Diverse Hotspot

Future scenario 2 (2035)

Following a lot of work in the 2020s, ACF decided to concentrate on developing the oakwood as a biodiversity hotspot, with effort focused on removing non-native plants and potentially invasive species such as rhododendron and azaleas. The woodland is now free of these plants thanks to an all-out effort by ACF in the 2020s, which has exposed ground for oak, birch, and native understory including wildflowers to re-establish over time. Regular monitoring of deer numbers found an increase in both roe and red in the area, and targeted culls began in 2025. This, along with repairs to nearby deer fences (which was part-funded by ACF) has contributed to young trees establishing under reduced browsing pressure. Older oak and birch are left standing as valuable invertebrate and bird habitat, with pine marten sign regularly spotted. Otters are regularly seen at the waters' edge and leave signs up the burn, and beavers have recently established in the area. Lichens, bryophytes, dragonflies, and butterflies are all thriving – indeed an endemic species of damselfly is increasing in number.

ACF has also committed to supporting other native woodland restoration projects across

Lochaber through the careful gathering of seeds and growing of seedlings from the Clunes site each year which provides a small source of income from the Woodland Trust and other woodland charities. Low intensity livestock grazing has been re-introduced in the small grassland areas, and efforts have been made to restore hay-meadows in the open areas, both for feed and increased biodiversity.

ACF was successful in securing funding to purchase the neighbouring section of woodland from Forestry and Land Scotland, meaning that the local water source from the sub-catchment is now under ACF ownership and management. Drains have been blocked and woody dams put in place to hold water and sediment on the hillside to reduce erosion and protect water supplies (the beavers' activities are helping with this).

The small community garden has developed well & provides a nice space for engagement, as well as some supplies for the local community. The blossoms of the small fruit orchard are welcome sight in the spring, providing the backdrop to the annual "Arkaig Biodiversity Celebration" hosted by the community for conservation groups from across Scotland. This event involves citizen science projects which engage families and students and provide data for larger studies relating to national biodiversity monitoring. The car park is still under FLS operation and the road has been improved. The local landscape and biodiversity is not widely advertised, but nevertheless attracts some tourists, and FLS ranger services work with the community to engage and manage visitors, helping them to appreciate its value.

People's Forest

Future scenario 3 (2035)

There has been a steady increase in interest in the community woodland, and members of ACF regularly organise walks and host visitors from around Scotland to share experiences, skills, and knowledge of managing a community woodland. The forest now has a small network of paths that also connect with the wider area, and with the bracken cleared there are fewer ticks meaning visitors can better appreciate the area. The old oak and birch trees continue to provide a green canopy, and some natural regeneration means that the forest has a healthy mixed age structure and a diverse understory with some woodrush and wood anemones, and a camera trap regularly films the local pine marten. Given its location overlooking Loch Lochy, the area has become a popular spot with visitors.

The forest school buildings that the community purchased in 2020 have now been replaced with a new forest information centre as a result of a successful fundraising project in the 2020s and the generous contribution of materials and resources by local architects and tradespeople. The centre is proving popular with the local community and provides a valuable resource for school and university groups from across Scotland.

The new building is frequently used by the community for meetings and events and has proven a popular 'stop' on the Great Glen Way, providing a small interactive exhibition with information about the woodlands and the wider area, and a small café and shop supporting a small number of seasonal jobs and direct income for the ACF group to support its work. The community has responded to increased visitor numbers by providing basic facilities for campers (clean water, compost toilets, a solar-charged recharging centre). Connections have been made with the Clan Cameron museum, with a joint ticketing scheme that means that many visitors to the area enjoy both the Clunes Forest Centre and the Clan Cameron museum. The Clunes Forest Centre is also heavily used by local schools, and the local authority has worked with ACF to develop a part-time role for a teacher during the school year to run classes about biodiversity, local history, and crafts. Most schools around Lochaber enjoy using the new facility on a regular basis. ACF now also employs a seasonal forest ranger to support additional forest management tasks, and activities for visitors in the summer months.

The small play area created near the forest school buildings has been updated and remains an important community resource. The willow plot in the community garden now provides a small but consistent source of income as well, with regular coppicing providing materials that are sold further afield and are available to for local crafts.

management has meant that any oak and other broadleaf saplings that do sprout are browsed back, and unable to replace the aging trees.

Following the purchase of the pre-existing Clunes Forest School buildings several years ago, a new community building was planned to complement these. However, despite the efforts of a group of dedicated volunteers, funds could not be raised. Meanwhile a separate decision was made to remove the older buildings due to health and safety concerns, leaving the local population without a hub for social activities.

Small storage buildings have been sourced from a commercial supplier, but these are not suitable for hosting community, school, or other groups. While this has been a disappointment to the community, residents continue to operate one or two 'pop-up' events in the summer, on days such as the Great Glen Gander (a popular fundraising event with hundreds of participants), with student volunteers providing information and craft activities.

The Great Glen Way has continued to grow in popularity which has meant a lot of challenges with litter and antisocial behaviour. The cleared ground where the old buildings once were provides an ideal flat spot for wild camping and camper vans, and with less community activity, means that the surrounding land is prone to littering and the emptying of chemical toilet waste. Nearby woodland trees are frequently damaged by campers attempting to source firewood.

Changes in working practices after the Covid pandemic of 2020-2022 mean that working from home is now an established practice, but a broader culture of longer working hours means that it is harder to find volunteers to help with community events. Pressures on public finances after the Covid pandemic also means that there is less funding available to employ seasonal rangers to help guide and manage visitors.



Natural Growth

Future scenario 4 (2035)

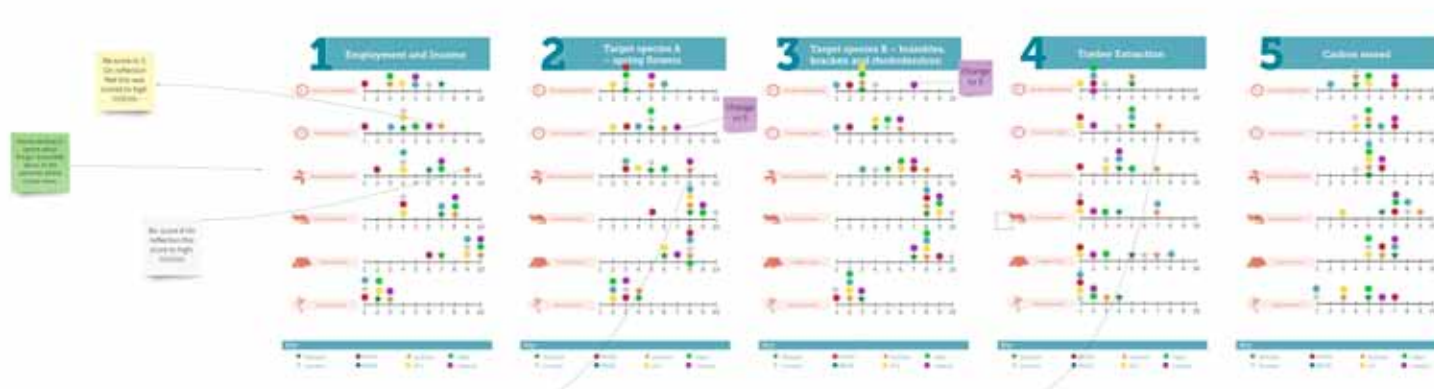
The mature oak and birch continue to provide a good habitat for red squirrels, mosses and bryophytes, and ash dieback has opened some glades, creating a small habitat for butterflies such as the chequered skipper, which are now occasionally seen in the area. These areas are at risk from the continuing spread of bracken and Rhododendron, which also restrict other understory vegetation such as wood anemone and blueberry. The lack of investment in deer

Appendix Two - Ecosystem service indicators:

Potential benefits from Clunes Woodland.

These indicators are common across the different research sites in this study. Some of the indicators might be more applicable to other woodland contexts than Clunes Woodland.

	Indicator	Explanation
1	Employment and Income Overall, how well do you think each scenario delivers with regards to employment, i.e. the number of jobs directly or indirectly linked to the site?	Consider for each scenario the impact on employment for the area. Think about the impact each scenario has on the diversity of jobs available in the local area and whether these are likely to be unskilled, skilled or professional jobs.
2	Target species – spring flowers Overall, how well do you think the scenario encourages woodland spring flowers (bluebell, wood anemone, violets etc.)?	Consider for each scenario to what extent the various management interventions lead to more open, woodlands, with moderate levels of disturbance and species rich ground flora.
3	Target species – brambles, bracken and rhododendron Overall, how well do you think the scenario suppresses species such as bramble, bracken and rhododendron?	For this indicator we are interested in the impact of the scenario on species that are considered 'bad for biodiversity' as they potentially exclude others, leading to reduced species diversity. In this case, a high score indicates that these species would be kept at bay in a given scenario.
4	Timber Extraction Overall, how do you think each scenario will affect the actual extraction of different types of wood materials (i.e. construction timber, wood fuel, wood for pulp, craft woods) from the site?	This indicator refers to wood/timber materials for different uses that are extracted from the site under the different scenarios. Please consider in your answers both the availability of such materials and the extent to which it is actually taken off site.
5	Carbon stored Overall, how do you think each scenario will affect the amount of carbon stored at the site?	Please consider in your answer that all of the components of the site potentially contribute to carbon uptake and storage, e.g. trees, understory shrubs and grasses, mosses, but also the carbon in the soil itself.
6	Mental restoration Overall, to what extent does each scenario promote people's feelings of being relaxed and restored?	This indicator relates to subjective experiences that contribute to mental wellbeing. In your answer please consider how each scenario would affect users' feelings of calmness and tranquillity, stress relief and escape from daily hassles/problems, and feeling refreshed and re-energised. This includes local residents, visitors and any other people using the site.



	Indicator	Explanation
7	Spirituality Overall, how well do you think each scenario delivers on opportunities for spiritual experiences?	This indicator refers to how each scenario fosters a sense of encountering something sacred or bigger than oneself, and promotes a sense of wonder.
8	Learning, Knowledge and Skills Overall, how well do you think each scenario delivers on opportunities for training, education and learning?	Please consider the full range of potential knowledge, skills and training opportunities and all age groups – from traditional land management skills to handicrafts, to research and monitoring, to outdoor education and mountaineering skills.
9	Landscape quality and character Overall, how well do you think the scenario delivers on perceived landscape quality and character?	<p>To which extent do you think people will appreciate the landscape, in terms of its visual aesthetics as well as its other features and its overall character?</p> <p>Consider how the different elements and features (natural and human made) make up the landscape in the scenario.</p>
10	Place Attachment Overall, how well do you think each scenario supports local people/visitors in forming and/or maintaining a strong attachment to this place?	How might each scenario affect people's emotional connection to the site? Please consider how the changes described in the scenario would affect the emotional significance of the place for individuals, as well as extent to which users would experience feelings of belonging and being 'at home'.
11	Natural Flood Management Overall, how well do you think each scenario provides protection from flooding, e.g. through natural flood management?	Do any scenarios increase or decrease the risk of flooding either in the upper or lower catchment? Consider how the vegetation and soil structure in each scenario may affect the volume and speed of surface water run off or soil permeability.





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