



Cumbernauld Forest Wood

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



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Background

Forests are an important part of Scotland's natural heritage and can provide a number of benefits to people, such as natural flood management, recreation and timber. The type of benefits a forest delivers depends on the way it is managed and used. In addition, different people will perceive benefits differently and have different preferences. To understand how these things are interconnected, the James Hutton Institute is conducting a research project looking at forests in different parts of Scotland. One of our study areas are the woodlands near the new town of Cumbernauld, in North Lanarkshire, Central Scotland. Here in this report we specifically look at Forest Wood, a woodland of approximately 90 ha at the southern edge of Cumbernauld and managed by Scottish Wildlife Trust (hereafter the Trust). Within this study area, we looked at another woodland, the Cumbernauld Glen, also managed by the Trust. This is dealt with in a separate report. The other study areas are located in the Cairngorms and Argyll (Glen Creran).

To measure the perceived benefits from different management interventions and explore the differences in people's preferences, we chose a methodology which we call here *scenarios*

workshops. This entails developing illustrative future management scenarios which form the basis of discussions about the management and use of the woodland. For Forest Wood, researchers at the James Hutton Institute developed, with input from Duncan Clark (Cumbernauld Reserve Manager) and Ian MacKenzie (Living Landscape Manager) from the Trust, six scenarios as written narratives. These built on documents such as management plans and surveys (Appendix 1). The six narratives were supplemented by 3D visualisations at key viewpoints in the woodland. One of the scenarios was based on the past (*The Early 1990s*), one on *The Present* (2019) and the other four were future scenarios set in the year 2031. The four hypothetical future scenarios were based on i) the current management plan (which we termed *Blaeberry Woods*), ii) a strong emphasis on biodiversity and conservation (*Pine Martens & Red Squirrels*), iii) a focus on community engagement (*The Outdoor Classroom*), and iv) a final scenario (*Walking the Dog*), based around a scenario where budgets are very low and only management interventions required to fulfil minimum statutory requirement are carried out.

The Local Expert Panel Methodology

A local expert panel was assembled for a one-day facilitated workshop in June 2019. The panel comprised five local experts from different backgrounds, professions and perspectives, though all but one could be said in one way or another to come from an environmental background. The remaining panel member represented more of a local community perspective. In addition, one representative from the Trust was present to help answer specific questions about the area. The local panel members were sent the six narratives a week before the workshop. Following an information session and explanation of methodology, participants were asked to individually score (from 1-10) how well they thought each scenario performed against 11 ecosystem service (benefit) indicators (see Appendix 2 for full description of the indicators). Participants were also asked to indicate how confident (low, medium, high) they felt about their scores.

Following the scoring exercise, the scores were displayed visually around the room for all the six scenarios, across the 11 indicators. Each expert's scores were represented using a different coloured dot. A facilitated discussion followed, to explore patterns, differences and similarities in the scores for different scenarios across indicators and individuals. For example, did any scenarios score particularly well across all indicators? How did scores for any particular

indicator (i.e. mental restoration) vary depending on scenario? And what were the reasons behind any differences between individual scores?

Following the first deliberation session, participants were given an opportunity to revise their individual scores if they wished. Panel members were then asked to choose their favourite scenario, explaining why they made this choice, and what improvements or changes they would make to it.

Results from the scoring exercise

Table 1 below illustrates the median values of the six scenarios across the eleven indicators. While these values are based on a very small number of participants and therefore need to be interpreted with caution, some overall response patterns can be highlighted. Two of the scenarios, 'Blaeberry Woods' and 'Pine Martens & Squirrels', have relatively high medians across all indicators, while three, 'Early 1990s', 'Present' and 'Outdoor Classroom', show greater variation across the indicators, and one, 'Walking the Dog', shows relatively consistently low medians for all indicators. However, within each of the scenarios and indicators there was variation amongst the participants as shown in the box plots in Figure 1. The horizontal line in each box indicates the median or middle value, while the size of box indicates the variation in how the panellists scored a particular indicator for a particular scenario.

Table 1: Median values of the scenarios across the 11 indicators (where 1 is low and 10 is high). See Appendix 2 for the full description of each indicator.

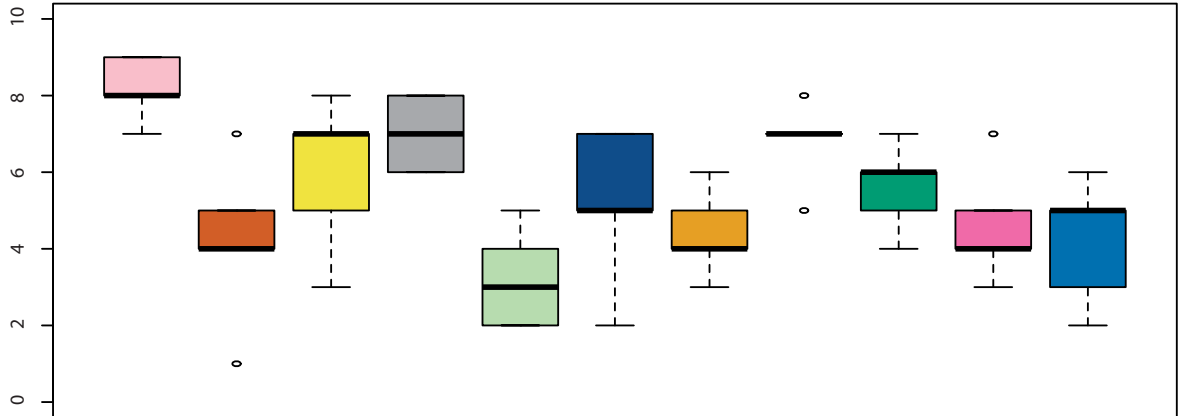
	Early 1990s	Present	Blaeberry Woods	Pine Martens & Squirrels	Outdoor Classroom	Walking the dog
Employment	8	5	8	7	8	2
Target Species A	4	7	8	8	6	3
Target Species B	7	6	7	8	6	2
Timber extraction	7	5	5	7	7	5
Carbon	3	7	8	8	6	3
Restoration	5	7	7	7	6	2
Spirituality	4	6	7	7	4	2
Learning	7	7	9	6	8	2
Landscape quality	6	7	8	8	5	4
Place attachment	4	6	7	7	8	3
Natural flood management	5	6	7	7	5	4
Median of medians	5	6	7	7	6	3

Figure 1: A summary of the scores as box-plots for the six scenarios across the 11 indicators. 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 long 'whiskers' emerging for the boxes represent the maximum and minimum scores.

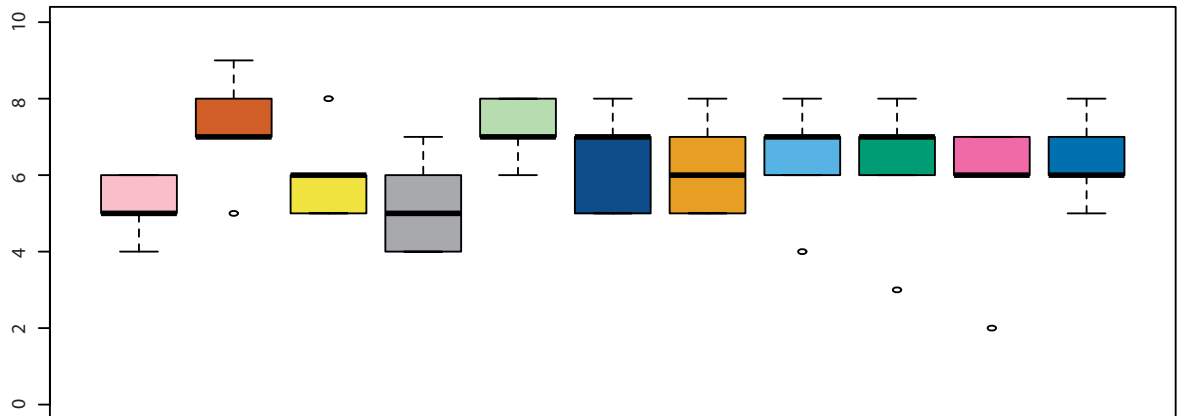
Legend

- | | | |
|--------------------------------|-----------------------------------|---|
| Employment and Income | Target Species A – Spring Flowers | Target Species B – brambles, bracken and rhododendron |
| Timber Extraction | Carbon Stored | Mental Restoration |
| Learning, Knowledge and Skills | Landscape Quality and Character | Place Attachment |
| | | Spirituality |
| | | Natural Flood Management |

The Early 1990s



The Present 2019



Blaeberry Woods

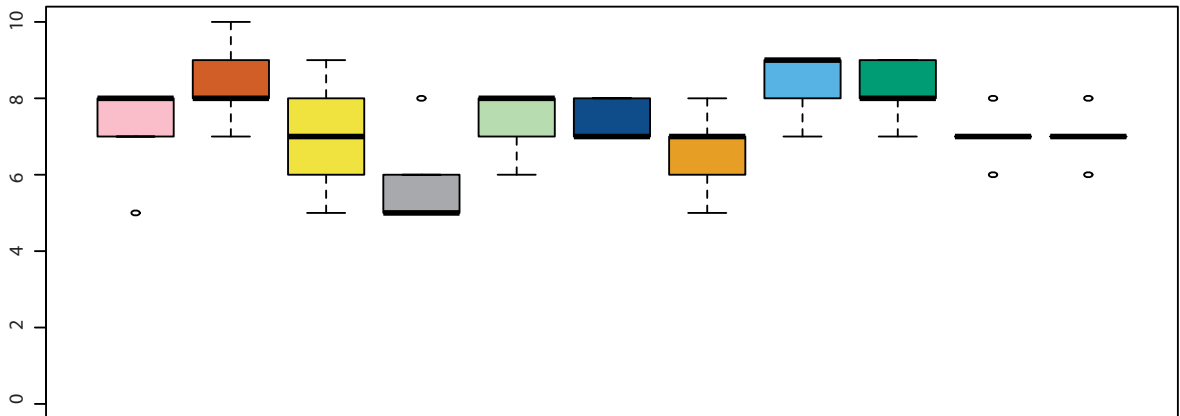
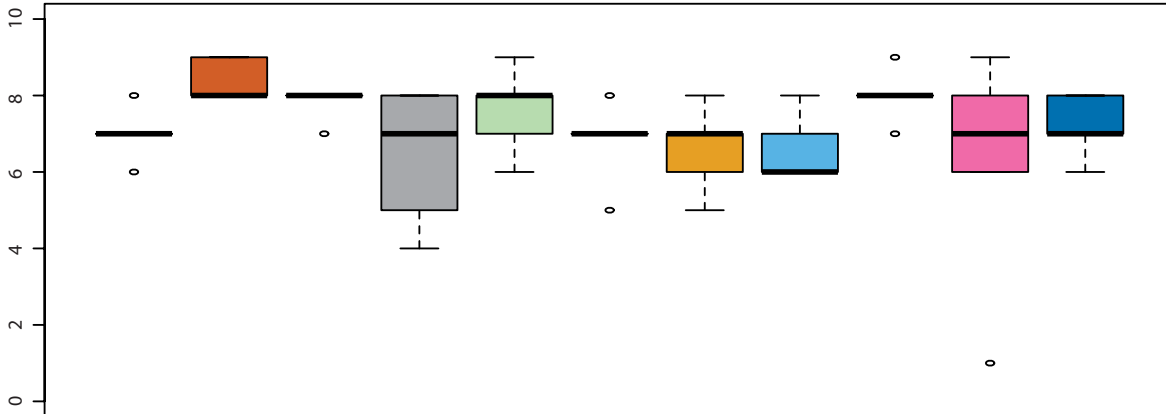


Figure 1. Continued.

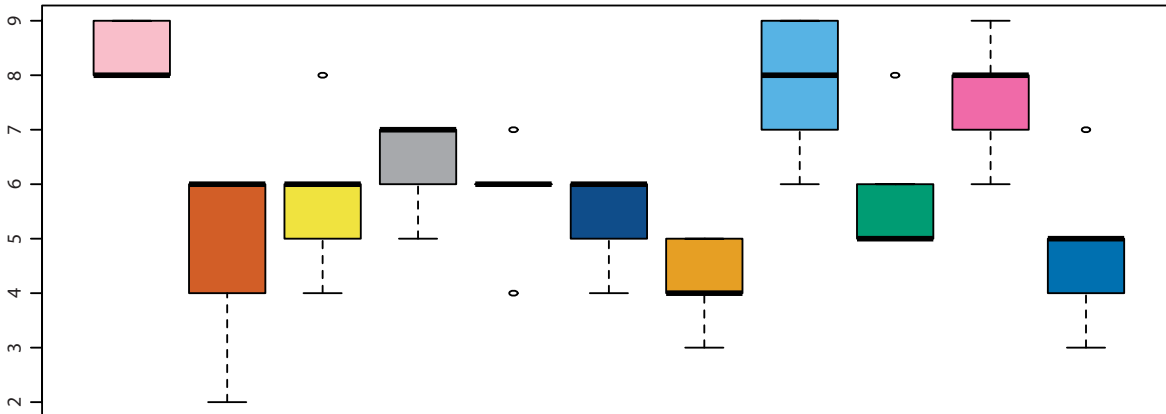
Legend

- Employment and Income
- Target Species A – Spring Flowers
- Target Species B – brambles, bracken and rhododendron
- Timber Extraction
- Carbon Stored
- Mental Restoration
- Spirituality
- Learning, Knowledge and Skills
- Landscape Quality and Character
- Place Attachment
- Natural Flood Management

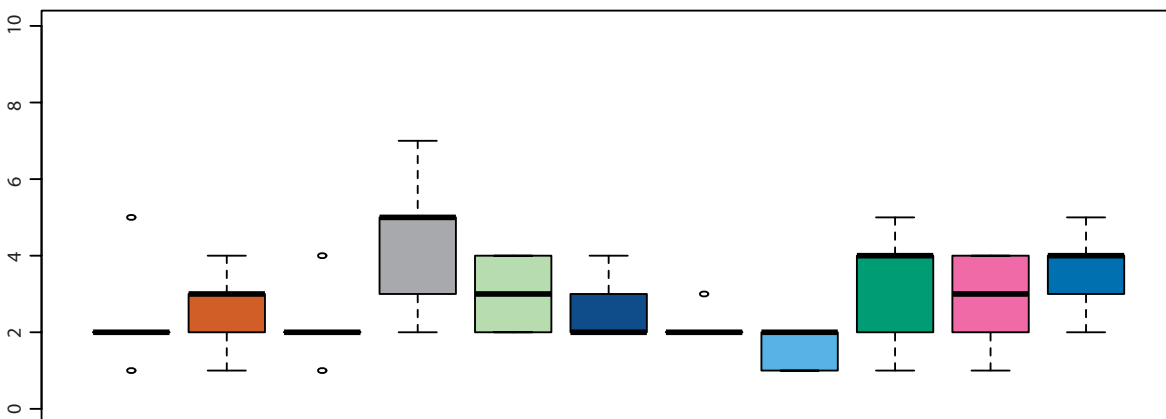
Pine Martens and Squirrels



Outdoor Classroom



Walking the Dog



After the participants had individually scored all the scenarios for all the indicators, they were given some time to look at everybody else's scores. Parts of the discussion which followed focused on differences and similarities in scoring across the participants. For some indicators such as employment and natural flood management, everybody's scores for a given scenario clustered around similar values, while for most indicators there was comparatively more variation not just in the median for different scenarios, but also in the spread of individual scores (as indicated by the different sizes of boxes and extremes for the same indicator in different scenarios in figure 1). While it is tempting to interpret this variability in responses as an indicator of uncertainty, the discussion showed that this cannot automatically be assumed to be the case. For example, during the discussion the participants expressed that they felt they did not have enough knowledge and information in order to score natural flood management with high confidence. Contrary to what might be expected this led them to score natural flood management relatively similarly to each other across the scenarios as most had opted for a 'middle of the road' score in the face of uncertainty.

Another indicator which the panellists felt was difficult to assess was carbon sequestration. Again, this was in part due to lack of knowledge and information as well as to additional uncertainties linked to which time frame was employed in the evaluation and how different management options were implemented. For example, using extracted timber for building purposes compared to using wood chips for fuel was seen to result in a different carbon balance under the same scenario as illustrated in the following quote.

But also a mature conifer plantation is not sequestering as much carbon as a brand new planted plantation because of the growth curves of the trees and species dependence. It was a really interesting one, I could have spent ages trying to work out where to put my dot on that one. I think I put on a couple of them where are you taking the timber and what's the timber destined for because if its...if that timber...I mean Sitka spruce grown in this country it's going to be low density, low grade timber, it's not going to go into construction. So it's probably going to go into wood pulp or it's probably going to go into chipping and chips means that it burns immediately, which means it goes straight back into the atmosphere.

In some cases variation amongst participants with regard to how they had scored a particular indicator for a particular scenario was linked

to differences in perspectives and to the more subjective nature of indicators such as spirituality and place attachment. With regard to spirituality, for example, panellists discussed that some people can find spiritual experiences in group-based settings or activities (e.g. church services) while others require solitude for these kinds of experiences. Another example included that for some spiritual experiences may be connected with being surrounded by big, tall trees, while for others it may be connected to the openness and light of a forest clearing.

I kind of thought well everyone is going to have masses of really different perceptions on that. What I think is a beautiful landscape is not going to be what a gardener thinks is a beautiful landscape and probably spirituality, what I find spiritual in a woodland [...] might not be what someone else thinks... I might find a forest clearing, the sun coming through spiritual. Someone else might find standing amid tall trees to be really spiritual.

While acknowledging the subjective nature of these experiences the panellists had mainly followed their own preferences in their evaluation of the scenarios when it came to indicators such as spirituality. The tendency amongst the panellists was to score scenarios which involved higher visitor numbers (e.g., 'Outdoor Classroom') lower in terms of spirituality compared to scenarios such as which involved lower visitor numbers and where the emphasis was on nature conservation ('Blaeberry Woods' and 'Pine Martens & Red Squirrels').

Similarly, place attachment was seen to depend a lot on whose perspective was taken into account. From a local perspective, place attachment was linked to sense of ownership and to activities happening in an area. For example, 'The Outdoor Classroom' scored high in place attachment from a local perspective as this scenario included many activities for local people as well as a newly constructed learning centre which could promote people's pride in the area and hence their place attachment. In contrast, the 'Pine Martens & Red Squirrels' scored low in place attachment from a local perspective as the focus was on management practices that improved the area from an ecological point of view while there was little focus on involving local community. From the point of view of conservationists, however, the situation was reversed as their sense of attachment was linked to ecological status and sense of wilderness.

It's almost saying this is not a used place. This is only for us professionals to come in and you're losing that community attachment. But...that's why I kind of put [two scores] because [it's] great for the professionals,

the learning bit but [...] where are your local schools and all this? Where are your primary schools? They're getting nothing out of it.

Some panellists felt that some indicators were intrinsically linked to each other and had therefore scored different indicators similarly for particular scenarios. From this perspective, management interventions that promoted one indicator would also promote the other. An example of such a link was between mental restoration and spirituality where qualities in a woodland that would enhance mental restoration were also seen to enhance spirituality.

Key discussion points from group deliberation

Trade-offs and conflicts

One of the issues which came up during the discussion related to potential conflicts and compatibility between different uses and interests. In relation to conservation interests and local uses, the panel members thought that there were often very different priorities and preferences between local people and conservationists; most local people would prefer more intensive management for a tidy and more 'park-like' look, which was at odds with some current conservation practices such as leaving deadwood in the forest.

We regularly get that from the public, the same with wildflower meadows: 'Go and cut that grass. Why are you letting that grass grow?' It's just like, well, from our point of view that grass is a fantastic wildlife resource but obviously either we're not explaining that properly to the public or the public just don't care, or some sectors of the public don't care.

Some panel members suggested that differences such as these could partly be resolved by explaining better the reasons behind particular conservation practices to local residents and involving local residents in monitoring activities.

Another way of resolving or avoiding conflicts which the panellists discussed was to use a zoning approach, where some areas are managed primarily for local use while others are managed more for conservation, though this option is dependent on having large enough areas to encompass different zones.

One of the things we try and do in [another place], it's a zoned approach, a spatially zoned approach so some areas are more for the communities and for I guess a sense of place attachment or...whereas others are zoned for quieter enjoyment of the countryside and are essentially for nature, for wildlife....

In response to this suggestion, the representative of the Trust explained that this is

already done to some degree, between different woodlands rather than within the same woodland, but without employing the terminology of zoning. Hence, Forest Wood is currently managed mainly with a view to wildlife conservation rather than to increase the local use and accessibility of the area. In contrast, other woodland areas in Cumbernauld are managed more with a view to recreational use and accessibility. Panellists discussed that within a woodland the design of the path network could be used to try to direct people away from some areas and towards others as most visitors would stick to existing paths.

Another potential area of conflicting interests or trade-offs was related to the transition of existing plantation woodland areas to more native broadleaf woodland, which was part of several of the scenarios. While this was presented as a gradual process in most of the scenarios, one panel member suggested that an alternative would be to clear-fell areas of plantation wood and replant the clear-felled areas with native broadleaf trees. The advantages would be that it would enable a quicker transition to native woodland as well as potentially providing an additional source of revenue for the management of the area through the sale of timber.

[Clear felling] would have achieved the aims of...much more native broadleaf cover quickly. It would have given some income from the timber extraction and sale but it's a more aggressive way of managing the woods [...]

Disadvantages would include the more drastic impact clear-felling would have on the landscape and the need to subsequently fence off felled areas to protect replanted areas from deer browsing. Realising the economic gains from clear-felling would also depend on the availability of suitable access routes into the area.

Two of the scenarios, 'Blaeberry Woods' & 'Pine Martens & Red Squirrels', introduced dog walking permits and here the panel members discussed what effect this would have on local people's use as well as on their perception of the site. However, this would depend on whether permits were only for professional dog walkers or all dog walkers, and how they were implemented and monitored. Generally, there was a perception that introducing permits was problematic from the point of view of outdoor access rights as well as local residents' attachment to the site.

You kind of lose that connection a wee bit with your natural space because well if I need to pay to take my dog out for a walk? Do you know [this] is not exactly the most affluent area in Cumbernauld. Why should they have to pay to take their dog out for a walk?

At the same time, though, some of the panellists felt that from a wildlife protection point of view there could be benefits to access restrictions, but that they would be difficult to enforce in practice.

Perceptions of safety in woodlands

Another part of the discussion focused on issues of safety which is a key concern from a local perspective. Many local residents are hesitant to use existing green spaces such as Forest Wood because they are seen as unsafe and there are problems with anti-social behaviour such as fly-tipping and vandalism.

The main accessible route is through Forest Road or through an underpass. Now I challenge anyone in this room to say that they've walked under an underpass at night-time and felt 100% comfortable do you know? [...] the passes are well maintained, yeah but the underpass I guarantee you could take graffiti off and the next day it's going to have graffiti on it. You can replace the light the next day the light is going to be smashed. It's not a safe way to get into it do you know? So it's like how can you feel attached to a place...when I get there yea it's great. But how the bugger do I get there?

In general, management was seen as key in green spaces close to urban areas to provide a sense of safety and avoid deterioration due to vandalism and fly tipping. In one of the scenarios, 'The Outdoor Classroom', improving the situation in this regard had been a key feature and included for example installing lighting along the main paths to provide an increased sense of safety. Some panel members thought that accessibility and safety could be improved through less intrusive measures such as keeping entrance areas clear and providing signage at entrances without this having to detract from the natural feel of the woodland itself in the way that they thought artificial lighting would do. Also, they thought that there was a self-reinforcing aspect to people's use, with higher visitor numbers generally making other people feel safer and therefore more likely to use an area.

People feel more safe if they think they're going to see somebody else on the path that's maybe a bit like them. Similar age or whatever, other people like yourself makes people feel at home and it can be welcoming if the entrance is clear. It doesn't have to be lit, maybe a signpost, or interpretation board but if it feels and it's managed maybe without having litter bins frequently and if its open so you can see that somebody's not going to jump out from the path and grab your leg...

The panel members also discussed that there were different perceptions and interests even

among local people. For example, young people having parties in the woods is often seen as antisocial and problematic behaviour by older residents due to noise and littering, and this can create conflicts between older and younger generations. However, as some of the panel members pointed out, parties do not necessarily have to cause problems and can create feelings of place attachment amongst younger people. However, only the problematic cases are visible and noticed because of noise and litter left behind, while 'well behaved' parties go undetected. This can create a skewed impression of what kinds of uses are problematic and conflating one set of behaviours, such as partying, with another, such as littering.

[The] point about the parties is interesting because we see the negative impact of those parties, you go to your site and you see where that party has been. Do you know how many parties there have been where they've not left their rubbish you know? Like I'm sure we've all been camping in the woods and had a few beers or something, no one would know I was there. So like...there's...that's my observation just from being in Cumbernauld and you know where there's been a party and people have left their rubbish. But you don't know where there's been a party and people have taken it away.

Preferences for future management

Though there had been clear differences in the mean scores of different scenarios, with 'Blaeberry Woods' and 'Pine Martens & Red Squirrels' performing the best, none of the presented scenarios was regarded as ideal by the panel members. Instead, their preferences for future management combined elements from different scenarios reflecting the preceding discussion. The combinations mainly aimed at achieving a better balance between conservation-focused management interventions and community engagement.

There's a really...there are some really good and really...maybe not negative but some not so good [things] from each of them. Like that one good kids education in the restoration of peatland but there's a lot of litter in that one so you're only educating the kids, the primary school kids, the primary kids aren't out you know, it's the teenagers that are out dropping the trash. So its like all age ranges. As much as I put really really low scores for the 'Pine Marten and Red Squirrels'...but you've got that expertise on the ground but you know if the expertise on the ground using the Stirling Uni guys is citizen science why not involve

the community into the citizen science? Do you know and have the Stirling Uni guys for example, as team leaders, something along those lines?

Thus, the community-focused 'Outdoor Classroom' scenario was improved by adding in more conservation elements, while the conservation focused 'Pine Marten & Red Squirrel' scenario was improved by adding in more elements focusing on involving the community more. In addition, some of the panel members had come up with novel suggestions such as creating a community firewood scheme as a way to create local engagement and income. General shortcomings were seen to consist of a lack of clear management objectives for some aspects.

Although 'The Present' had received mid-range scores in the scoring exercise, none of the participants had used the present-day scenario as the basis for their preferred scenario. The panellists discussed that this could be due to the present being mostly disregarded and taken for granted, and that the focus of the whole exercise on change maybe automatically directed their attention towards those scenarios that explicitly represented a change from current conditions.

General feedback

The workshop ended with a more general discussion of the workshop itself as well as some of the topics touched on during the course of the day. One such topic was the trade-off or conflict between conservation interests and local preferences and people engagement. Despite the options for resolving this through approaches such as zoning, the panellists still saw this as a key issue which is both important and difficult to tackle. The panel members came mostly from a conservation background and felt that this was reflected in the relatively high median scores for the scenarios which put more emphasis on conservation ('Blaeberry Woods' and 'Pine Martens & Red Squirrels'). At the same time, however, they felt that in terms of actual policy and management, emphasis had moved from conservation towards public engagement and access. While they acknowledged that both were important and that there needed to be a balance between the two, they also felt that maybe the balance had tipped too far towards public engagement and managing woodlands and other natural areas for the benefit of humans at the expense of managing these areas for biodiversity and their intrinsic value.



In relation to the process of scoring scenarios, the panel members discussed whether it made sense to score the past and the present or whether it would have been better to have more time to focus on only the four future scenarios. While some felt that first scoring the past had helped them to set a kind of baseline to which the present and future could then be compared, others felt that this did not make up for the reduced amount of time available to look at each scenario.

In addition, panel members also discussed the last scenario ('Walking the Dog') which represented a situation of limited resources, which meant that only minimum management operations were carried out. Some panel members felt that this was a very realistic scenario and that it was worthwhile to look at what the impacts of such a situation would be. Others, however, felt that this scenario was qualitatively different from the other scenarios which represented active choices in relation to different management objectives. One suggestion was to instead present a non-interference or minimum management scenario as an active choice rather than as something imposed by circumstances, in order to reduce the negative bias they felt had been inherent in this scenario.

Next steps

Over the next year we plan to conduct a further two local expert panel workshops in the remaining study area (in the vicinity of the Cairngorms National Park). After that, our plan is to conduct a cross-site analysis of the data to gain an overview about how different types of management interventions impact woodland goods, services and benefits from a range of perspectives.

Cumbernauld Forest Wood

Site description

Forest Wood is situated on the south eastern edge of Cumbernauld, about 1 km from the town centre and bordering Palacerigg County Park. It forms a transition zone between urban and rural land use. The 90 ha site consists of a core area of old plantation forest dating back to the 19th century dominated by oak, beech and birch underplanted with conifer in the 1960s. Around 30 ha of the site are recorded on the Ancient Woodland Inventory as 'long established woodland of plantation origin' which means that woodland has been present here since the 1800s. The remaining forest areas were planted in the 1960s and 70s on the open farmland of Mid Forest Farm as part of the new town's urban design by the Cumbernauld Development Corporation (CDC) and consist of plantations of larch, Sitka spruce, Scots pine, lodgepole pine and western hemlock. In addition, the reserve also contains grassland areas and part of Fannyside Muir a 150 ha area containing one of the best examples of blanket bog in North Lanarkshire. Because of the peaty soils, the area is vulnerable to burning, and in the last decades, numerous fires have left their mark. A network of broad paths runs through the area and connects it with the town. Information boards provide images and texts about species found in the area.

It is believed that historically, the area around Forest Wood was part of the old lowland Forest of Caledon, as tree stumps preserved in the peat suggest. Signs of rigg and furrow cultivation below mature beech trees in the central area of the reserve indicate that at some point, centuries ago, the land was also used for agriculture.

The Early 1990s

Forest Wood is a mixed amenity woodland, which comprises predominately non-native (Sitka spruce, larch, lodgepole pine) conifers and a mixture of native (birch, oak, ash) and non-native broadleaves (beech, sycamore), with remnants of long established plantation woodland with oak. The site also includes heathland peat bog, which was drained to support the ongoing commercial peat extraction and afforestation with productive conifers (lodgepole pine). A number of fire ponds provide a valuable wildlife resource for amphibians (including palmate newt) and dragonflies (six species, including black darter and common hawkler dragonfly).

The area is also home to deer, badgers, foxes, grey squirrels, rabbits, hares and bats. In addition, rare birds such as black grouse, green woodpecker and long-eared owl have been recorded as well.

Until recently, a forestry Youth Trainee Scheme existed for Cumbernauld, and there were overall about 25 forestry workers employed, with the management of Forest Wood as part of their remit. Works undertaken by the forestry department included thinning and draining plantations, removing diseased trees and patrolling for fire as well as staffing fire observation posts at critical times. Thinnings from new conifer plantations were taken to the saw mill at Orchardton farm (the main forest depot).

The woodlands are mostly used by the local residents for quiet recreation, walking and cycling. A network of about 3 km links up with Palacerigg County Park. The local residents from Abronhill appreciate the landscape scenery (which dominates the southern skyline of Cumbernauld) provided by the variable and diverse woodlands, and open heathland. Fire raising is a particular problem on the dry heathland, and some of the burnt areas are naturally re-colonised by birch and willow. Currently there are no regular litter picking activities; litter is removed only when specific dumping is reported.



The Present (2019)

In 1995 Forest Wood was gifted to the Scottish Wildlife Trust (SWT). This led to a change in management objectives, favouring the restoration and expansion of native woodland. Since then, the Trust has been successful in securing funds to deliver various access upgrade projects and has completed the first phase of their long term forestry plan. Around 70% of the reserve is woodland; however, overall, the area has quite an open feel to it. Whilst still mostly dominated by conifers, selective felling and thinning has opened up the dense woodland to light, allowing for some natural regeneration of native (oak, birch) and non-native broadleaves (beech). A number of ash copses have been infected by ash die back and have had to be removed. The large scale restoration project at Fannyside Muir in 2014 has dramatically changed the landscape of the area adjacent to Forest Wood (the reserve falls into a small corner of the Muir). The removal of 25 hectares of conifers and scrub on Fannyside Muir (including in Forest Wood) has given the area a more open feel and ditch-blocking and the creation of further pools has rewetted parts of the muir, allowing the slow regeneration of a

peat-forming bog. Individual dead trees are left standing in places to create habitat for species dependent on dead or dying wood. Some of these trees have died of natural causes while some are non-natives (beech) which have deliberately had their crowns removed to prevent them from reproducing and to reduce the proportion of non-native trees. In a few places, dead trees have been converted into sculptures. Over 126 species of flowering plants and 67 species of breeding birds have been recorded on the Forest Wood reserve. Mammals such as roe deer, badger, red fox, stoat, weasel, bats and even pine marten are all known to frequent the woods.

Forest Wood is popular with walkers, dog walkers, commercial dog walkers, mountain bikers and horse-riders, who come for the wide open spaces and views. A number of well-maintained core paths link the residential areas of Abronhill (via underpasses) and Glenhead Farm to Palacerigg Country Park, through Forest Wood. There is no formal car park so people park on the roadside on Fannyside Road. The woodland is affected by fly-tipping (near Fannyside Road) and other anti-social behaviour such as motor biking and lighting fires. A Reserves Manager employed by SWT oversees the management of Forest Wood (and the other three SWT reserves in Cumbernauld). Cumbernauld Living Landscape project has provided the main mechanism to engage with neighbouring land owners and the local community. This programme includes volunteer and training opportunities and workshops to increase residents' awareness of the reserve and actions to improve green spaces. It also includes the creation of artworks in a collaboration between artists and local groups on the theme of why residents value their green areas, which are exhibited in the town's shopping centres.

The following four scenarios describe what Forest Wood might look like in the future (2031), if different hypothetical management approaches are followed:



Blaeberry Woods (2031)

A large part of the woodland on the site has been selectively thinned and restructured to remove non-native conifers, and the proportion of broadleaf trees is now around 50%. A patchwork of habitats from open grassland, heathland and restored mire (lowland raised bog) surrounds the diverse woodlands. All of the encroaching conifers have been removed from the regenerating muir bog/heathland. Things are thus

moving towards the long-term goal of 80% native trees in the wooded areas.

The greater openness of the woodlands has allowed the spread of Blaeberry and other native ground flora, attracting more butterflies and insects. Monitoring has shown an increase in badgers and pine martens.

Collaboration with developers and North Lanarkshire Council has allowed the integrated expansion of the core path network, reduced the threat from non-native species and enabled a holistic and common ground approach to countryside interpretation. Visitors to the reserves have an enhanced understanding of land ownership and awareness of native species.

The woodlands and heaths are very popular with the local residents who use it for dog walking (subject to permits), walking, mountain biking and jogging. The new residential area is surrounded by a 15 m buffer zone between the woodland and the houses. Green network corridors within the estate lead residents to key reserve gateway entrances, which are flagged with ever-changing interpretation boards (highlighting key things to look and listen for and do each month). Since the new residential development was completed, visitor numbers have substantially grown. In addition, collaboration with Palacerigg Country Park have led to signed walking routes and guided tours through the two areas. Littering, garden escapees and dog fouling have increased. Fire raising, despite an increase in dry periods in spring, has reduced following a concerted joint education programme with the local fire service. Fly-tipping has decreased, possibly due to increased presence of people and viewpoints around the reserve. Funding for the Natural Connections work has gone up and down over the years, but a team still exists, and as part of their community outreach work they regularly organise events with the local primary school such as litter picks, wildlife cam watches, large heath butterfly surveys and winter monitoring of Taiga bean geese. The Abronhill Primary school recently won the annual Cumbernauld Nature Quiz.



Pine Martens & Squirrels (2031)

Extensive thinning, felling, restructuring and augmentation of the woodland compartments has led to opening up of woodland areas. Over time, it is hoped that this will lead to a number of distinctive woodland types including alder, mixed oak-birch with bilberry, mixed broadleaved with bluebells. A number of the conifer plantations to the south of the reserve have been felled, and muir restoration (ditch blocking) has been initiated with Buglife Scotland as the main partner.

This has added another 10 hectares of restored peatland to the 150 ha already under restoration on neighbouring Fannyside Muir. Annual habitat and species monitoring in the woodlands and restored peatland is conducted by biology and ecology students from Stirling University, using a mix of citizen science and internet-based crowd classification of remotely generated material (e.g., from drones and camera traps) and traditional monitoring and management techniques. The diversification of woodland types, and expansion of the habitat mosaics of grassland, heathland and muir has resulted in an upward trend in invertebrate numbers such as dragonflies, large heath butterflies and damselflies. There was also a recent sighting of a goshawk, and kestrels hunt in the open parts of the reserve. The pine marten has reduced grey squirrel numbers and enabled the return of the red squirrel to Forest Wood. Collaboration and funding with a range of utility providers has enabled 60% of the wayleaves to be managed for wildflowers as pollinator corridors.

The woodlands and heaths are popular with the local residents who use it for walking, cycling and equestrian users. Dog walking is now regulated using permits, and while there are still some dog walkers using the area, this has substantially reduced their number. Apart from the core paths, the pathway network has been reduced and information signs are kept to a bare minimum (e.g. 'ground nesting birds', 'keep dog on a lead'). Since the new residential development was completed in 2025, fly-tipping, fire-raising, littering and dog fouling had temporarily increased. This is now being kept in check with regular clear-ups and using drones and ground staff (rangers) to reduce undesirable behaviour. Most residents are unaware of the reserve's designed eco-transition zone (40m buffer) surrounding the new residential area as it appears to seamlessly blend into the woodland edge. The buffer strip is regularly monitored for garden escapees and remedial action is instigated. 'Green fingers' of mixed vegetation (rowan, hawthorn and other small trees and bushes that attract a variety of birds and insects) are reaching into the new housing area and help to improve connectivity. Occasionally recurring outbreaks of invasive exotics (for example, Japanese knotweed) are controlled by eco-friendly herbicides.

However, the numbers of complaints to the SWT office have increased, especially with regards to permits for dog walkers and public safety. There have also been a number of complaints regarding other interventions that are met with a lack of public understanding, pine marten preying on pets e.g. rabbits and small cats.



The Outdoor Classroom

Forest Wood is a mixed old plantation woodland dominated by oak, beech and birch which has been underplanted by conifer, and areas of younger plantation of larch, Sitka spruce, Scots pine, lodgepole pine and western hemlock. The previous long-term goal of 80% native trees has been abandoned as priorities have changed, and especially as non-native (disease resistant/ climate change adaptable species) deciduous trees are now well-accepted. There has been a focus on opening up the woodlands, ensuring greater visibility and open sight lines, installing targeted lighting, recycling bins, sign posting and interpretation boards. 'Green fingers' of fruit and ornamental trees and bushes are reaching into the new housing area, and a 20 m buffer zone (on the land of the community growth area) between the reserve and the new development has succeeded in keeping complaints about the negative effects of mature trees on private properties to a minimum. While pine marten numbers have gone down, populations of some insects have increased.

The new Environment Centre and social rental apartments built on SWT land are powered by the 'solar meadow', solar panels and ground source heat pumps, which are installed on a wildflower meadow. The centre was developed in partnership with a private-sector children's nursery following Scottish Government nursery care reform in 2018, through an investment from Tesla style 'power bank' home storage sub-station in 2021. The Environment Centre and reserve is a thriving hub of activity and SWT now employs ten full-time staff and eight fully paid apprentices. Nursery, primary and secondary school children are benefiting from the outdoor classroom facilities and hands-on experience with nature. Older children as well as interested citizen scientists also take part in eco-projects such as monitoring taiga bean geese, butterflies and dragon/damselflies, as well as sustainable energy workshops and bushcraft training. Local residents' awareness and membership of SWT has increased. However, some local residents have been unhappy about the new buildings, increased activity and solar installations at the site, feeling that some of the naturalness of the reserve has been lost.

The woodlands and heaths are very popular with the local residents who use it for dog walking, walking, mountain biking and jogging. Additional lighting at entrances to the wood have been added due to concerns for safety by residents. A novel trim trail has been installed that interacts with 'fitbit' devices and improves the effectiveness of green prescribing. Electric wheelchairs suitable

for rough terrain are available to loan for free, improving the accessibility to the site. Additional parking spaces have been created, and new paths have been designed such that they attract visitors away from previous 'desire lines' that crossed sensitive habitats. Unfortunately, noise levels (teenage parties!) have increased, but fire raising and litter/fly tipping have been decreased because of higher community presence in the reserve, degradable packaging and value of raw materials e.g. payments for recycling. The liaison officer spends a substantial amount of their time on awareness raising and mediating between competing user groups, whose interests are not necessarily always fully compatible.



Walking the Dog

The 90 ha site is a mixed old plantation woodland dominated by oak, beech and birch which has been under planted by conifer, and areas of younger plantation of larch, sitka spruce, scots pine, lodgepole pine and western hemlock. In the last years, woodland management has been limited to removing storm damaged trees and monitoring for exotic invasives and emergence and re-occurrence of tree diseases and pests (especially *Phytophthora* spp., greater spruce beetle, ash dieback). Due to the unfavourable general public funding situation and the increasingly milder climate *Phytophthora* has spread further across the UK, so all larch had to be removed. The effects of climate change on the mature trees in the rest of the reserve are as yet unclear. The muir adjacent to the woodland is visibly being encroached with Sitka spruce and birch saplings as there have been no funds to continue earlier peatbog restoration efforts. Likewise, due to limited funds, plans to reduce the amount of non-native trees through selective felling and replacement with native trees has been put on a halt. Obligatory surveys (for the compulsory felling orders) for bats, pine marten and badger setts suggest populations of these mammals are stable but no information is available on the status of flowering plants or birds.

The footfall in Forest Wood has increased significantly due the new residential development. Local residents use it mostly for dog walking, mountain biking and jogging, sticking mainly to the core paths, as many of the smaller paths are now overgrown with nettles and shrubs. Some of the path surfaces are falling into disrepair and this has made access more difficult for older and disabled users. Complaints about safety issues have increased from local residents. Unfortunately, fly-tipping, littering, fire raising



and dog fouling have also increased substantially. These signs of misuse, along with the lack of visible signs of management and care has contributed to some local residents, especially women and children, feeling that Forest Wood is not a safe place to visit. In addition, during the hot summer of 2028, a substantial part of the heathland caught fire (due to a camp fire that got out of hand), and 3 hectares of native woodland was lost. There is only a narrow buffer strip between the reserve and the new development, and observations suggest that garden escapees from dumped garden waste are spreading into the reserve. In addition, some of the more mature trees on the reserve boundary are seen negatively by some of the owners of adjacent homes due to shading and fears of storm damage and either had to be felled by SWT or have been damaged by construction activities and died off.

Public engagement activities ceased years ago due to a lack of funding, and SWT is now in negotiations to close Cumbernauld's reserves to the public from Monday to Friday and charge entrance fees for weekend visitors. The part-time Manager patrols the site aided by drone technology.

Appendix Two - Ecosystem service indicators:

Potential 'benefits' from Cumbernauld Forest Wood.

These indicators are common across the different research sites in this study. As such, some of the indicators (e.g. timber extraction; natural flood management) might be more applicable to the other woodland contexts than Cumbernauld Forest Wood.

	Indicator	Explanation
1	<p>Employment and Income</p> <p>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?</p>	<p>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.</p>
2	<p>Target species – spring flowers</p> <p>Overall, how well do you think the scenario encourages woodland spring flowers (bluebell, wood anemone, violets etc.)?</p>	<p>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.</p>
3	<p>Target species – brambles, bracken and rhododendron</p> <p>Overall, how well do you think the scenario suppresses species such as bramble, bracken and rhododendron?</p>	<p>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.</p>
4	<p>Timber Extraction</p> <p>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?</p>	<p>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.</p>
5	<p>Carbon stored</p> <p>Overall, how do you think each scenario will affect the amount of carbon stored at the site?</p>	<p>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.</p>
6	<p>Mental restoration</p> <p>Overall, to what extent does each scenario promote people's feelings of being relaxed and restored?</p>	<p>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.</p>

Indicator		Explanation
7	<p>Spirituality</p> <p>Overall, how well do you think each scenario delivers on opportunities for spiritual experiences?</p>	<p>This indicator refers to how each scenario fosters a sense of encountering something sacred or bigger than oneself, and promotes a sense of wonder.</p>
8	<p>Learning, Knowledge and Skills</p> <p>Overall, how well do you think each scenario delivers on opportunities for training, education and learning?</p>	<p>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.</p>
9	<p>Landscape quality and character</p> <p>Overall, how well do you think the scenario delivers on perceived landscape quality and character?</p>	<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	<p>Place Attachment</p> <p>Overall, how well do you think each scenario supports local people/visitors in forming and/or maintaining a strong attachment to this place?</p>	<p>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'.</p>
11	<p>Natural Flood Management</p> <p>Overall, how well do you think each scenario provides protection from flooding, e.g. through natural flood management?</p>	<p>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.</p>



Acknowledgements

We would like to thank the local panellists for their time and expertise, and to Ian MacKenzie, Duncan Clark and Tracy Lambert from Scottish Wildlife Trust for their support and access to site data. The research for this project is funded by the Strategic Research Programme of the Scottish Government under the theme Natural Assets.

For further information about the project or copies of reports from other case-study areas please contact: antonia.eastwood@hutton.ac.uk

Suggested citation

Byg, A., Lorenzo-Arribas, A., Eastwood, A., Herrett, S., Juarez Bourke, A., Donaldson-Selby, G. and Fischer, A. (2019) Cumbernauld Forest Wood: Exploring the perceived impacts of different management interventions on woodland benefits. Workshop Report. The James Hutton Institute, UK.