

# **Appendix P1: Background to the WSWG Proposal 2022**

"Did you know the woods are for sale?"
"Which woods?"
"Those woods!"
"What???"

That was the moment in late June 2018 which started the WSWG journey, in which we are hopefully coming to the final stages of the beginning! It is the next bit we are really excited about.

West Stormont Woodland Group (WSWG) was established in July 2018 as a response to the opportunity offered by Forestry and Land Scotland (formerly the Forestry Commission Scotland) to make available two woodlands about six miles north of Perth within the Strathtay ward available for potential community ownership via its Community Asset Transfer Scheme (CATS). This scheme falls within Scottish Government obligations contained within the Community Empowerment (Scotland) Act 2015 Part 5, that has introduced the right for community organisations and groups to request ownership, lease or use of public sector assets through acquiring them at a discount upon market values on the basis of investing in community benefits.

A group of interested local residents produced a Scoping Paper for acquiring Taymount Wood and Five Mile Wood as community-owned assets. This formed the basis of an Expression of Interest signed by 184 local people which was submitted to and officially registered by Forestry and Land Scotland (FLS) in July 2018. Once this process had commenced, FLS were able to enter into a formal agreement with WSWG in providing a preferential structured timetable to proceed through the process of submitting proposals for a woodland Community Asset Transfer.

The Steering Group then established WSWG as a constituted community association which, through meaningful engagement and involvement of the local community, would take the lead in developing proposals for how the woods would be managed, the range of benefits they would bring to the local community and the community needs they would serve through being in community ownership.

With funding support in 2019 from the Scottish Land Fund (SLF) Stage 1 Development Funding and Perth and Kinross Council's (PKC) Community Investment Fund, one of the first tasks of WSWG was to embark upon gaining knowledge and expertise and mapping out the preparation of a feasibility study designed to explore what potential could exist for the community to manage the woodlands in an environmentally friendly way and provide a broad range of benefits to local people.

The first question to answer was "Who will these woods belong to?". Sitting a mile apart, the woods are immediately encircled by Kinclaven to the east, Stanley to the south, Bankfoot to the west and Murthly to the north. Would that suitably define the boundary we were required to put on paper? From the signatories to the Expression of Interest, it was already clear that an outer circle of nearby settlements felt directly connected to the woods and to the prospect

of community ownership: Luncarty, Redgorton, Pitcairngreen, Logiealmond, Dunkeld and Birnam, Caputh and Spittalfield to name a few.

Through the local West Stormont Historical Society, we learnt that West Stormont was the name used in medieval times to cover the parishes of Auchtergaven, Kinclaven, Logiealmond, Moneydie, Redgorton (Stanley) and the Murthly portion of Little Dunkeld. Being such a close match, this helped determine our boundary and explains why West Stormont has been chosen as the most suitably inclusive title for the many communities connected to Taymount and Five Mile Woods today.

WSWG embarked on a programme of community outreach and engagement, spreading the word and growing support for the project throughout the WSWG area and beyond. From the outset, WSWG networked widely with community organisations including the various community councils, Stanley Development Trust, Spittalfield and District Active Recreation Hub, Bankfoot Gala, Murthly Gala and more. We also liaised with relevant departments in PKC, including Community Education, the Health and Social Care Partnership and the Strathtay Action Partnership, through which WSWG is now cited as a working partner in the Strathtay Local Action Plan. In September 2018, Stanley Community Council requested a WSWG update at its monthly meetings, which instigated the "Community Monthly Update" which has been published widely in email and poster form since then, including routine display on homemade noticeboards at the four main entrances to the woods. A membership scheme was set up which at December 2022 has 351 Members within the WSWG area and 154 Associates from further afield. Around 100 children were added through family sign-up cards pre covid, but are under 16's are not eligible for the on-line joining process which has operated since then. In future, WSWG will develop membership arrangements which will be able to include children. Additional Supporters (individuals and organisations) bring our contacts list to nearly 700.

Our events programme started with guided walks in 2018, and in 2019, with funding from the PKC Community Investment Fund, we hosted a programme of events for all ages and abilities entitled "Feeling Good in the Woods" which attracted more than twice the overall target numbers of people joining in. This is when we also first engaged with the seven primary schools in the WSWG area for the "Woodland in a Backpack" sessions delivered by the amazing Biscuit of Wee Adventures. These events were complemented with pop-up stalls at Active Kids, The Picnic on the Pitch at Spittalfield Primary School and Aviva HQ, amongst other venues. WSWG also met with many if not quite all neighbouring landowners and householders to seek their early views on the prospect of community ownership of the woods. In addition, WSWG conducted gateway surveys to help understand who and how many people used the woods, in what ways, what they like about the woods and how they travelled there. Whilst our inperson community engagement was obviously impacted by the covid pandemic, we maintained communications with everyone throughout and devised covid-compliant ways in which people could connect with the woods as lockdown regulations eased. Usage of both woods increased significantly during the pandemic, we would estimate by a factor of perhaps 3 or 4, with greater use still maintained as we get back to more normal ways of living.

Once plans were well advanced, we conducted a community consultation on a Draft Proposal in February and March 2021 through an on-line survey because of covid restrictions. Having used those results and the vast number of comments provided to inform changes and adding financial, governance and operational plans to produce this revised Proposal, WSWG is ready for the concluding stages of the CATS process.

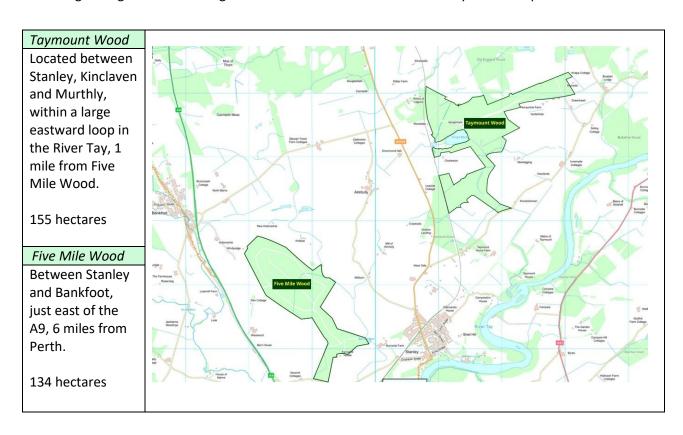
Nearing as we are to our goal of submitting the WSWG CATS Application to FLS in November 2022, our final task is to secure clear support from the local community, all ages and demographics, members and non-members alike, for both the principle of community ownership and the final Proposal itself which the CATS process requires. We therefore hope our local community likes our plans and ethos for being the best stewards of Taymount Wood and Five Mile Wood we can possibly be.

In this respect WSWG is holding "Community Consultation 2" from 17 to 31 October 2022 that seeks to demonstrate the level of local support which exists for the WSWG Project Proposal. The outcome of this community consultation will form a key foundation in supporting our case to Forestry and Land Scotland.

The timeline for achieving the woodland transfer goal of WSWG is dependent on a number of factors. We anticipate the evaluation process commencing at the CATS Panel in early 2023 and with the final decision being made by FLS within the following six months. We will also have to raise the funds to purchase Taymount and Five Mile Woods, which had a market valuation of £2.4 million in 2020/21 on which we would hope to secure a discount of perhaps some 5-20% in recognition of the delivery of community benefit through the WSWG Project. The purchase price is a large sum of money, but not an unattainable one and one which with support from the right donors will ensure Taymount and Five Mile Woods are retained in perpetuity by the community and not be sold off as private or commercial forest woodlands bringing little benefit to the community. Whilst we have begun the process of fundraising through a nominal figure prospectively attainable from the Scottish Land Fund and a further application to the Investing in Communities Fund Round 2 for a substantial funding package towards operations in Years 1 and 2, we will address the total fundraising process once we have established clearly stated community support for the Proposal we intend to submit.

# 2. Taymount and Five Mile Woods - "One Wood with a Gap in the Middle"

Taymount Wood and Five Mile Wood lie within a definable ecological unit in lowland Perthshire between the A9 and a large loop in the River Tay. Taymount Wood lies immediately east of the main Perth to Inverness railway line and is associated with a fairly well-wooded landscape in the northern part of the area, all of which bar Taymount and Five Mile Wood are in private ownership. Five Mile Wood to the south-west of Taymount Wood is an isolated woodland in an intensively managed, very open, arable landscape. The two woods being a mile apart in this long and still ecologically declining landscape highlights both the need and wonderful opportunity we have to protect the habitats and species which still cling on in the woods and to enable the woods to naturalise further, but also the urgent need for ecological regeneration through habitat enhancement and connectivity at landscape scale.



The same connectivity principle applies to the need for improved public access in the area. The woods should be more accessible from all surrounding settlements by active travel and public transport as well as by car. WSWG

therefore wishes to help improve the access network within and between the two woods and links with those beyond, such as Kinclaven Bluebell Woods.



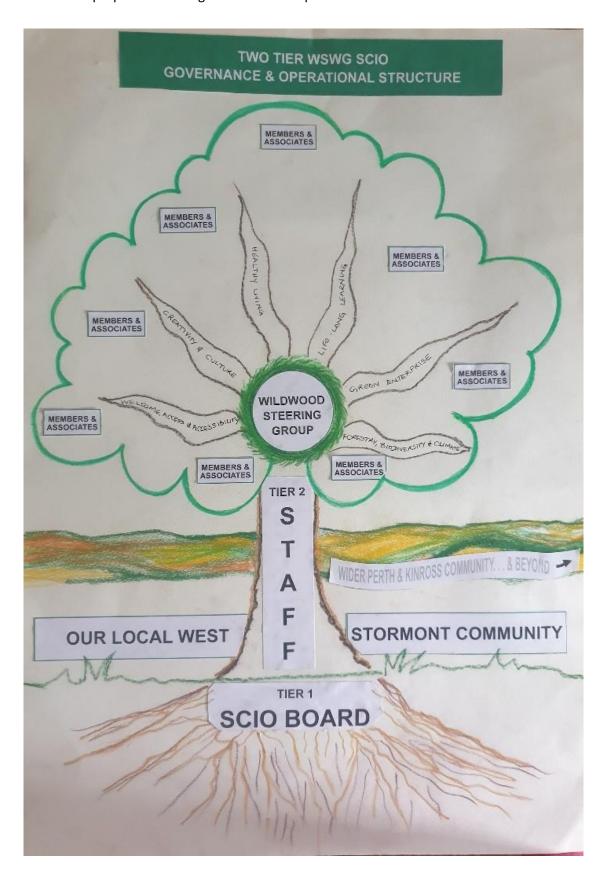
# 3. A Community Owned Woodland

In seeking to bring Taymount and Five Mile Woods into community ownership, both hold their unique and individual characteristics relating to their history and management in more recent decades by Forestry Commission Scotland. Both woods have significant histories, having been forest plantations in one form or another for centuries in the hands of estate owners before they were acquired by Forestry Commission Scotland. However, in terms of community ownership and future development, the woods will be maintained in Trust by charity ownership for the benefit of the community.

On 5 April 2022, WSWG was registered as a Scottish Charitable Incorporated Organisation (SCIO) which will be responsible for holding the woodlands in perpetuity as a legacy benefit for the community. It held its first General Meeting (GM) on 20 June 2022 at the Tayside Hotel in Stanley, at which the Interim Board was replaced by an elected Board of Trustees.

WSWG has chosen to become a "2- tier SCIO", which means that its members are encouraged to participate in the running of the organisation and its activities. WSWG has put considerable thought into the kind of structure which would support diverse and meaningful involvement of members in a staffed organisation. The two key components

being proposed are the Wildwood Steering Group and "Window on the Woods" themed Community Working Groups. Read more on proposed WSWG governance and operations in Sections 1.2 and 1.3 of the WSWG Proposal.



All members of the "old WSWG" will be invited to transfer their membership to the WSWG SCIO, either as Members (those who live within the WSWG area) or Associates (those who live elsewhere). Members will have voting rights whilst Associates will not. However, community ownership and project activities are for the whole community, whether signed up as members or not. Membership of WSWG is free.

# 4. Sharing Our Vision

### **WSWG** acting on Climate and Biodiversity

Through community consultation on the Draft WSWG Proposal in February/March 2021, 95% of respondents agreed or strongly agreed that the woods should be managed for biodiversity and climate. Starting from day one of our community ownership in this alarm-call United Nations Decade on Ecological Restoration, WSWG will therefore look after these woods with action for climate and biodiversity at the heart of its purpose and practice through regenerative management.

Society needs timber for a multitude of uses, but it will not be WSWG's main purpose. We have a whole timber industry with its massive forests and state of the art sawmills, ports and other industry infrastructure to do that. In a sustainable future, we need community woodlands to fulfil a different role for people and planet. Community owned woods are absolutely vital to community benefit and ecological and climate action, but not by trying to compete or keep up with conventional timber production without the economies of scale available to large, commercial forestry concerns. The mission of community-owned woodland is to invent a new space for itself, innovative, versatile, nimble on its feet, niche, special, different, reviving the network of small local sawmills able to address their smaller scale and more diverse needs specifically.

Thanks to community ownership, we will have access to many other sources of income and funding than would be available to a commercial timber extraction business owner, which is the most likely alternative type of owner to WSWG for Taymount and Five Mile Woods. We have the potential therefore to diversify our income streams rather than focus on timber extraction as our main source of money, particularly when that would impede or compromise our other objectives. These include a suite of options under what can be termed "Living Forest" income streams, which with people worldwide working hard to make it happen, are expected to become, much wider and mainstream in future. WSWG will always have our trees to fall back on for conventional timber income if necessary.

By stepping away from limiting the lifespan of the majority of trees in the woodlands to their MMAI (a forestry term representing maximum annual growth), typically around 50 years of age (still very young for a tree), we can help nature massively from day one by leaving as many trees of different species as possible to grow old, becoming more valuable to the ecosystem every year they remain standing, living or dying, and storing carbon longer term. It is often said when contemplating the natural life-time of an oak tree that it grows for 200 years, thrives alive for 200 years more and takes 200 years to die. Each of these phases is vital and increasingly important to the overall ecological value of a woodland. Some oaks grow much older than that if allowed to.

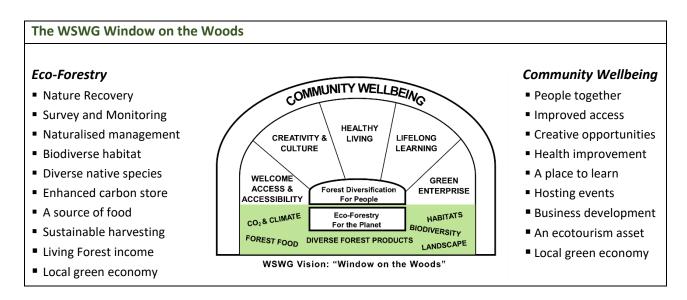
WSWG can, and still will, sell timber but we will first make sure that the woodland soils and ecosystem, which have been starved of natural cycles and diversity for perhaps a century or more, are allowed to regenerate and restore themselves, locking up the levels of carbon they can under a natural system which would never be achieved under extractive 50-year cycles for timber production, whether sustainably managed or otherwise. Removal of felled trees from the forest represents enormous removal of nutrients from the site.

Clear-felling will be limited to small areas required for new community facilities or designated for early replanting as native broadleaf woodland. WSWG's Eco-Forestry plans will seek firstly to promote proforestry (allowing trees to reach their natural maturity) and deadwood (standing or fallen, of which WSWG understands some European countries advocate 30% of the overall forest biomass), followed by use of selectively felled timber on-site for construction needs, habitat, educational, craft and other community benefit. Having satisfied those needs first, timber felled in line with WSWG nature restoration policy can be sold off site for cash.

By putting nature recovery foremost, WSWG can punch above its weight for people and planet by protecting Taymount and Five Mile Woods from reverting to business-as-usual commercial plantations. By focusing even more on rapid naturalisation of the woods, we can use the journey started through a low impact silvicultural system (LISS) 20 years ago by Forestry and Land Scotland to let the woods develop more naturally as a springboard for our best and earliest local action for the climate and ecological crises we are in.

You could say WSWG's Motto for Climate and Biodiversity is "Give to Nature First - Keep It in The Ground".

On the matter of positive action for climate and biodiversity, this ethos will not be restricted to management of the trees and habitats, it will extend to all WSWG activities and operations relating to community benefit and green enterprise activity as well. In an economic system which too often rewards choices which are detrimental to people and planet, this requires courage and determination, often involving practices which are not the cheapest or evidently most cost effective. In transition to a safer and more just economic framework for humanity, there is unlikely to be gain without pain. However, when you begin to realise that the gain from routinely making good choices for people and planet outweighs any pain, the step change is underway for you. When you view higher costs as greater investment in the right things, being part of the progressive shift to a sustainable future quickly reveals itself as a win-win situation all round.



The mission of West Stormont Woodlands Group is: "To provide Taymount Wood and Five Mile Wood with a long-term sustainable future as a community resource & a vital part of nurturing our local environment".

## WSWG's 25 Year Goal:

"To achieve significant progress towards a thriving community living in a sustainable, healthy and enjoyable landscape in eastern Strathtay centred on the two rapidly naturalising Taymount Wood and Five Mile Wood. Substantially enhanced landscape-scale ecology, improved and integrated access provision and a boosted local green economy."

WSWG's mission for Taymount and Five Mile Woods in community ownership is encompassed within a detailed, costed 10-year Community Benefit Plan with outline Community Enterprise projections to 25 years and a costed 25-year Woodland Management Plan for each wood. This seeks to achieve marked progress towards ensuring that our community attains a sustainable, healthy and enjoyable landscape in Strathtay that can gain benefits from the naturalising of Taymount Wood and Five Mile Wood, where improved access provision and a positive focus on maintaining a green local economy can be delivered.

WSWG seeks to reflect its aspirations in terms of sharing a commitment towards achieving Sustainable Development Goals and the associated Scottish Government National Outcomes framework covering a range of indicators related to investing in communities, improving health and wellbeing, equality and promoting environmental sustainability.

#### Sources of Inspirations for WSWG's Mission and Ethos

With the climate and biodiversity emergencies now hard upon us, not only do we need major transition to a sustainable future, but we need it to happen much faster than normal rates of change in society usually occur. That is behind WSWG's mission for Nature Recovery at the heart of the Woodland Management Plans for Taymount and Five Mile Woods from day 1. We are also conscious of the current and potential role the woods can make in a more connected landscape-scale approach to ecological regeneration. WSWG has found many sources of inspiration, local, regional and global in origin, which have helped it build and stand by its ethos and mission.

### Key amongst these are:

- ➤ UN Decade on Ecosystem Restoration 2020-2030
- > The Good Ancestor Project thinking about the impact our actions have on future generations
- > Wellbeing Economy Alliance putting people and planet first so profit does not cost the earth
- Doughnut Economics 7 Ways to Think Like a 21<sup>st</sup> Century Economist
- Nature Recovery Networks reversing the fragmentation and deterioration of habitats our actions have wrought on the natural world
- > Three Horizons Approach to Planning Change International Futures Forum modelling for change
- > The Scottish Rewilding Alliance
- Perthshire Nature Connections Partnership
- Perth Most Sustainable Small City in Europe

#### **Consulting with our community**

Consulting with our local community in West Stormont is an exceptionally important component in preparing our proposals for asset transfer submission where we need to incorporate the views of local people, to show that there is clear local support and wide enthusiasm for the project. This was already evidenced by the wide-ranging input from local people to the Steering Group, logo creation, website, posters, brainstorm sessions and other "Imaginarium" activities, access audits, and volunteering at events. With plans for both woods well advanced, we were able to go out to community consultation with a Draft Proposal in February/March 2021. Whilst we had not at that stage completed project costings, the feedback was enormously reassuring. Here is a flavour of the outcome of Community Consultation 1.

- © 367 Surveys were completed representing 769 adults and 131 children
- © More than half of respondents were not members and 100 new members joined WSWG
- © 92% of respondents agreed or strongly agreed with WSWG's Eco-Forestry proposals for the woods
- © 95% agreed or strongly agreed that the woods should be managed for climate and biodiversity
- © 95% agree or strongly agree with WSWG's proposals for Welcome, Access and Accessibility in the woods
- © Overwhelming support for working with local businesses and creating jobs and community enterprise.
- Bothy and Hutting in Taymount Wood were more popular than Wigwams in Five Mile Wood.
- © Only 0.83% of respondents disagreed or strongly disagreed with WSWG's Vision for the woods.

Consultation 1 on the Draft Proposal in February and March 2021 provided a valuable opportunity for the then WSWG Steering Group to share our vision and the results and the vast number of comments back from our community enabled us to incorporate many suggestions, ideas and other aspects of the feedback into this revised and final Proposal.

In particular, we took into account a clear wish not to over-develop the wider woodlands, the wish for improved car parking at both woods and the relatively limited support for hutting and wigwam accommodation as income generating enterprises in Taymount and Five Mile Woods respectively. As a result, we have redirected development ideas towards the main entrance areas at each wood and a new range of income generating enterprises to support the project going forward once in community hands which in themselves will deliver community benefit through the provision of community facilities and services for woodland users and others.

In line with the WSWG goal of creating distinctive and complementary woodland character, we are proposing a Flagship Project for each wood: The Taymount Hub in Taymount Wood which will be the main base for the WSWG Project offering community facilities, community enterprises and staff accommodation; and the "Woodland Observatory Project" in Five Mile Wood where the focus will be on education and active recreation. And of course, supporting the recovery of the forests as living ecosystems will be the underpinning policy in WSWG's Woodland Management Plans.

These intentions for Community Benefit and Nature Recovery are detailed in the revised WSWG Proposal 2022 *Going Forward* along with information on WSWG Governance and Operations and Summary Financial Data for the project which were then the subject of the on-line "Community Consultation 2" from 17-31 October 2022. The purpose of Consultation 2 was not so much to influence the content but to indicate the level of support in the local community for the revised WSWG Proposal going forward as part of the CATS Application in late 2022.

Everyone in our community was encouraged to participate in the survey, members and non-members alike. Look out for member notification by email, posts on Facebook, posters on noticeboards, a notice in the local press, a flyer through the door of all homes in Strathtay ward and please share with family, friends and neighbours to encourage as big a local response rate as we can muster. Thank you.

The key results from Consultation 2 are summarised below, showing overwhelming support for the Proposal from those who took part.

## **Consultation 2**

- © 173 responses representing 376 adults and children
  - 71.3% of responses from the WSWG area; 28.7% from outwith the WSWG area
  - 52.3% of responses from members, 47.7% from non-members
- © Support for different elements of the WSWG Proposal average score out of 5:

-	Year-Round Activities Programmes	4.6
-	Access Improvements	4.6
-	Taymount Wood Hub (Flagship Project TW) and Community Enterprises	4.3
-	Woodland Observatory Project (Flagship Project FMW)	4.5
-	Woodland Management Plans	4.7
-	Governance	4.5
-	Operations	4.3
-	Funding	4.2
-	Overall support	4.6

The full financial data behind the summary data in the WSWG Proposal was too unwieldy to form part of Consultation 2 but is presented in the WSWG Business Plan accompanying the WSWG Proposal as part of the CATS Application to demonstrate the long-term viability of what we are proposing. The Business Plan also includes an indication of Social Return on Investment (SROI) as a means of conveying the value of community benefits obtained from the WSWG Project which are not conveyed in standard financial accounting.



# **Appendix P2: Imagine Looking Back**

Imagine looking back after twenty or so years of fantastic progress through community ownership of Taymount and Five Mile Woods. Woodland management focussed on nature recovery and climate action have led to mixed broadleaf and conifer woodlands teeming in wildlife, enriching the habitat, doubling the species populations, bringing in new flora and fauna into the site, redressing some of the decades of ecological decline suffered in our area as across the whole world since Rachel Carson's Silent Spring warned us of the risks in 1962. A well cared for path network with conveniently positioned seats and picnic benches, enabling everyone to enjoy the different parts of the wood, on foot, wheels or hooves. Forest food is abundant in all seasons for us to pick for ourselves or enjoy in the Taymount Hub café. Apples, berries, nuts, roots, shoots and leaves, washed down with delicious and refreshing Living Forest Birchwater. Our community and diverse forest enterprises have thrived, meaning we have relied less and less on felling timber for income. Our Camp 53 café, shop, exhibition space and meeting room have created a thriving hub of activity and green enterprise, creating local jobs, supporting other local businesses, benefiting everyone in the community and attracting people from miles around. Our forest school areas and Loggers' Shieling have been a huge hit with local schools and a range of activity groups and clubs for regular outdoor activities for all ages.

Year-Round Activities programmes have helped us to enjoy the woods for different purposes – fun, health and wellbeing, arts, crafts and cultural activities, learning, tending the Food Forest, building paths, habitat features or forest buildings. Just coming to chill, enjoying time with the trees, birdsong and breeze. Our MiDAS community transport initiative has worked wonders in helping so many more people get to events in the woods. Even people who are unable to come out to the woods have enjoyed the virtual woodland experiences we have shared with them on-line.

WSWG has inspired, encouraged and worked closely with neighbouring landowners meaning new paths have provided links between woods and settlements throughout the area, and wider environmental action has enriched the habitat networks at landscape scale. Our area is recovering amazingly well after years of decline. And we are all feeling so much better for it, local residents and landowners alike. We know so many more people and so much more about our local environment. We have taken action for People and Planet. Our springs are not silent.

Imagine looking back and finding it didn't happen.

With your help, we're not going to let that happen.



# **Botanical Survey**

of Stormont Woods,

Perthshire,

For

**West Stormont Woodland Group** 

September 2021

## **Adrian R Davis**

NAIAD Environmental Consultancy 4 Murthly Terrace Birnam Dunkeld Perthshire PH8 0BG

Tel 01350 727201

#### 1 INTRODUCTION

#### Terms of reference.

1.1 Naiad was asked to provide a botanical and vegetation survey for Stormont Woods consisting of Five Mile Wood and Taymount Wood for the West Stormont Woodland Group WSWG in May 2021. The vegetation survey followed standard methodologies for Phase I Habitat Survey with associated target notes. This survey considers current nature conservation and ecological information regarding the study area with a habitat description of the main habitats.

#### Site location

- 1.2 The study areas are shown in Figure 1 and 2. The Five Mile Wood is located at national grid reference NO 09027 33683 (approximate centre of site), approximately 5 miles north of Perth, Perthshire and includes access tracks and forestry plantations with some open moorland. The Taymount Woods are located at national grid reference NO 11702 36083 (approximate centre of site), some 7 miles north of Perth, Perthshire and includes access tracks and forestry plantations with some heathland bordering Kings Myre, a large eutrophic loch on the western edge.
- 1.3 This report describes the main habitats and areas of interest with the main forest types and species associated with the forest and its associated phase 1 habitats. It should be noted that this is a predominantly coniferous forest and has been planted mainly as a commercial forest.

#### 2.0 BACKGROUND INFORMATION

- 2.1 Information was gathered on the ecology of the area and included:
  - liaison with the WSWG and Forestry Land Scotland FLS on habitats and species in the area.
  - liaison and information from other landowners and farmers.

## General habitat and landscape

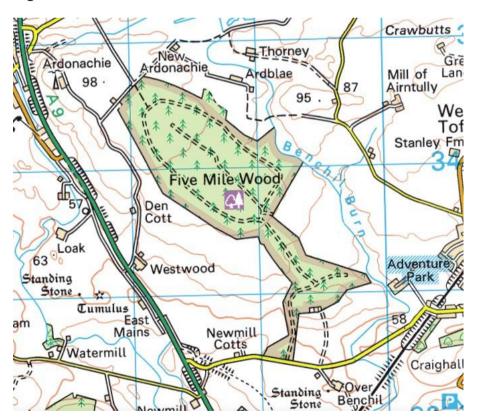
- 2.2 The main features of the landscape are plantation forest at different ages of development.
- 2.3 Five Mile wood is an extensive area of conifer plantation with some large clearfell areas and open moorland on the higher ground to the north of the site, which rises to approximately 100m. There are also some small more natural native plantations consisting of oak and birch with wet margins including alder and willow near the southern entrance to the site. The gently undulating ground with open moorlands are generally very acidic with deep peat having formed over much of the land with some previously forested areas on deep peat. Many parts of the more open unplanted areas are now being encroached by scrub and young trees. There are many conifer trees including predominantly Sitka and Norway spruce with some Scots pine in places. The character of this forested landscape extending into farmland beyond with few habitations and people, gives the area a remote feel.

2.4 Taymount Woods are covered in mixed age stands of trees, mainly conifers including Sitka and Norway spruce, larch and scots pine. A few clearfell areas exist on open heathland and deeper peat to the north and east of the site. The gently undulating ground was very acidic with potentially deep peat having formed over some of the land. The character of this forested landscape extending into farmland beyond with few habitations and people, gives the area a remote feel. There are scattered broadleaved trees on this site but rarely do they form extensive natural woodland stands.

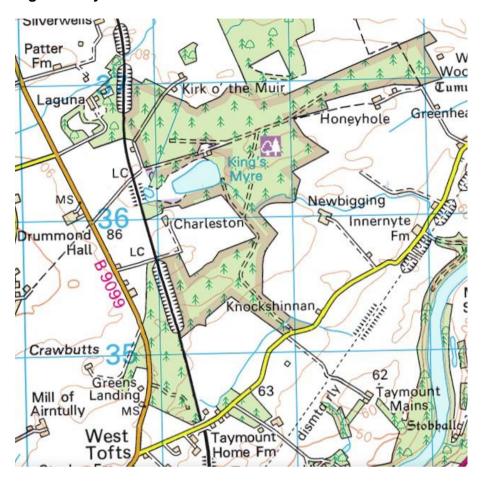
### Land management

2.5 The sites are managed and owned currently by FLS for a variety of objectives, the main activities include forestry and recreation with peripheral areas including arable on the borders with some fishing on the lochs. The higher plateau area consist of some dry heath, wet heath and blanket bogs with a little modification (old drains) in the past but these are not really noticeable on the ground now. Deer grazing is probably the key factor in the growth of trees and other vegetation in the forest environment.

**Figure 1 Five Mile Wood** 



**Figure 2 Taymount Wood** 



#### 3 Methods

3.1 The methods for Phase I Habitat Survey include a walkover recording the main habitats and species. Phase I¹ is a quick method for assessment of the main habitats on site but is quite generic and can miss important habitats and species so they are normally recorded in target notes. Given these sites are forests of plantation origin, many habitats here will fit semi-natural vegetation descriptions. Therefore the forest design plans and maps shown in Figures 3 and 4 will give a better impression of the current planted forest layout and species composition in each compartment. This system is a representation of the main vegetation communities on a site. A note of the potential National Vegetation Classification NVC communities is also recorded in Table 1.

## 4 Major habitats

4.1 The main habitats within the two forests are coniferous plantations, mixed plantations of conifers and broadleaved trees and broadleaved plantations. There are pockets of semi-natural vegetation which include scattered scrub, marshy grasslands and open heathland. Generally these fit into the broad categories below. Additional habitats have developed in the clearfell, open and areas which were not previously planted including trackside vegetation and open wetlands and ponds. Table 1 gives the best description of all these habitats with specific descriptions within target notes

-

<sup>&</sup>lt;sup>1</sup> JNCC (2003). *Handbook for Phase 1 habitat survey*. Joint Nature Conservation Committee, Peterborough.

throughout the site. It should be noted that some areas were inaccessible due to dense scrub and gorse.

Figure 3 Five Mile Wood forest plan

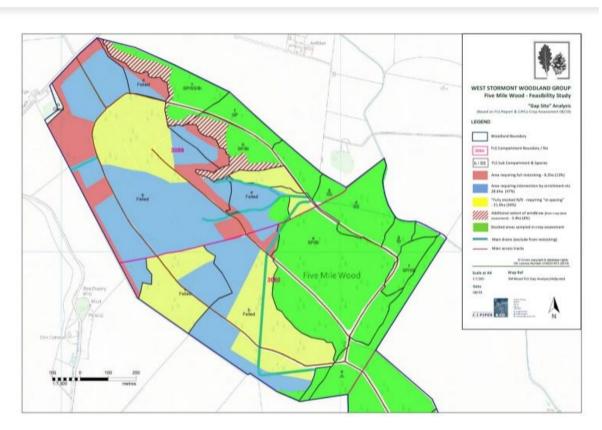
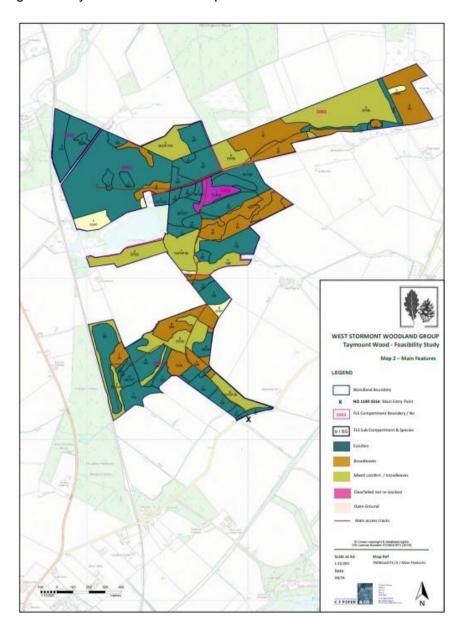


Figure 4 Taymount Wood forest plan



Key to Species

SS Sitka spruce

**NS Norway Spruce** 

SP Scots pine

Lx Larch or hybrid larch

DF Douglas Fir

MB Mixed broadleaves

Bi Birch

SOK Sessile Oak

## 5 Woodland Ecology, Management and Future Considerations

#### Five Mile wood

5.1 Five Mile Wood has a considerable area of felled forest which was on deep peat. The peat is irrevocably damaged due to previous drainage and forest operations which have completely changed the hydrological status of the site. The blue areas in Figure 3 show the extent of this felled forest and adjacent windblow areas. Many of these areas would have been on deep peat and this carbon source is now recognised as being of significant value to biodiversity and to carbon capture. The northern areas of blue have considerable heathland value, a habitat not common in lowland situations but this too will regenerate with trees over time although deer numbers will affect the speed at which this occurs. Some lowland heath may be appropriate here and of value to wildlife. Natural succession is taking place and over a very long time period, (over 30-50 years) some of these peaty plantations will ultimately become wet woodland again although the amount of non-native species dominates, mainly sitka spruce here apart from birch and willow. It will take years for the hydrology and therefore peat to re-establish on this site without significant interventions and peatland restoration. Birch and willow woodlands have biodiversity value but many of these habitats are still forming over previously felled and wet areas and on shallow peat and clay.

#### **Taymount Wood**

Taymount wood has a considerable area of mature forest and a more mixed assemblage of habitats as it appears to be on slightly drier soils with less deep peat than Five Mile wood but there are still previous deep peat areas. The peat is irrevocably damaged due to previous drainage and forest operations which have completely changed the hydrological status of the site. The forestry plantations have also dried out the former peatlands. The lower part of the site supports some more interesting mixed broadleaf plantations and more natural stands of woodland occur in isolated locations such as the SOK sessile oak plantation compartment in lower Taymount wood. The diversity of this forest and woodland area is more accessible and a little drier on less deep peat as a whole. It is therefore more favourable to manage.

## **Future Management**

- 5.3 Management options for the existing forest are dependent upon the prime objectives of future landowners. Commercial forestry has dictated the previous 30+ years on these sites and has changed the ground status irrevocably. It will be very difficult, time consuming and costly to re-instate natural forest, peatlands or some other habitats to these areas without major interventions such as harvesting machines and access through better road infrastructure as the sites are so wet in places, especially Five Mile Wood. Open areas with heathland and some wetland areas with marshy grasslands may be more easily maintained.
- 5.4 Harvesting non-native species will also be difficult without large forestry machinery. Local interventions will only have a limited effect without major machinery and actions such as drain blocking etc. There are grants available to restore former forestry plantations on deep peat but the longer a site is left and the condition of the peat deteriorates, the less likely peat restoration will be successful. In my view Five Mile wood has little value in restoring peatlands except in very small pockets where the ground water is still very close to the surface and where drainage is less affected by clearfell or extraction of timber. Wetland creation may be the other option as there

are some very wet hollows and depressions which could be enhanced with active interventions and wetland creations options.

## **Management Options**

## 5.5 Land management could therefore look at:

- Produce a Management plans for the site with targeted aims and objectives agreed by all parties for all compartments.
- Undertaking further surveys on the soils and hydorology of the site to better understand the options for the management plan.
- Improving access and ecological units within the woodland with environmental education.
- Encouraging the balance of native species plantations e.g. oak, alder, willow and cherry planting over commercial trees sitka and Norway spruce in the future.
- Encouraging regeneration of native species and remove extensive sitka and other invasive non-native species.
- Encouraging management, and cropping (coppicing) for local crafts and products of native species such as willow, hazel and ash. This may also be appropriate for sycamore.
- Removal of commercial forestry in appropriate areas where the best opportunities for biodiversity and native species occur.
- Enhance other non-woodland habitats around existing grasslands, wetlands and heathlands. Grazing animals could be introduced to encourage this and to prevent scrub or woodland regeneration. However fencing may be required.
- It may be worth maintaining some areas of commercial forest especially larch, Norway spruce and scots pine where other species such as red squirrels are frequent so as to maintain and encourage these populations.
- Tree planting of native species to include a wide range of suitable local trees and shrubs including sessile oak, wytch elm, bird cherry, alder, willows and aspen with hawthorn, hazel, blackthorn and juniper.

Table 1 Key vegetation descriptions

Table Vegetation communities in the forests							
Phase 1 habitat	Potential NVC community	Habitats and Water Framework Directive (Ground Water Dependent Terrestrial Ecosystems GWDTE)	Description				
A1.1.1 Semi-natural Native woodland	W7 Alnus glutinosa- Fraxinus excelsior- Lysimachia nemorum	Annex 1 habitat GWDTE	Alder Alnus glutinosa is scattered over mainly wet gleys with almost permanently damp soils. The underlying vegetation is generally rich.				
A1.2.2 Coniferous plantation	None		Coniferous plantations consisting mainly of sitka <i>Picea sitchenisis</i> , Norway spruce <i>P. abies, Scots pine Pinus sylvestris and occasional Douglas fir</i>				

			Pseudotsuga menziesii.
A1.3.2 Mixed plantation	None		Coniferous plantations consisting mainly of sitka Picea sitchenisis, Norway spruce P. abies, Scots pine Pinus sylvestris with mixed broadleaved trees including sessile oak Quercus petraea, beech Fagus sylvatica, Birch Betula spp and alder Alnus glutinosa.
A1.1.2 Broadleaved plantation	None		Mixed broadleaved trees including sessile oak <i>Quercus petraea</i> , beech <i>Fagus sylvatica</i> , <i>Birch Betula spp</i> and alder <i>Alnus glutinosa</i> . Some may be naturally seeded in such as <i>ash Fraxinus excelsior</i> and cherry <i>Prunus spp</i> .
A 2.1.1. Scattered scrub			Frequent and abundant broom Cytisus scoparius and gorse Ulex europeaus along access tracks with some base rich grassland. Some eyebright Euphrasia officinalis, oxe eye daisy Leucanthemum vulgare, fairy flax Linum catharticum, yellow rattle Rhinanthus minor, fescues Festuca ovina, F rubra, bent grass Agrostis capillaris, StJohns worts Hypericum elodes, Hieracium pilosella, cats ear Hypochaeris radicata.
B5 Marshy grassland	M23 Juncus effuses/acutiflorus- Galium palustre rush- pasture	Potential GWDTE	Rcuh dominated Juncus acutiflorus M23a and or Juncus effusus dominated marshy grassland with occasional patchy sedge rich areas grading to other flushes and mires.
C Tall Herb and Fen	U20 Pteridium aquilinum-Galium saxatile		Bracken <i>Pteridium aquilinum</i> is present in some areas on mainly grassy areas.
D1 Dry heath (basic)	H12 Calluna vulgaris- Vaccinium myrtillus heath	Annex 1 habitat	H12 Extensive dry heath on open moorland on higher ground.
D2 Wet heath	M15 Scirpus cespitosum-Erica tetralix wet heath.	Annex 1 habitat GWDTE	Small patches of wet heaths with a variety of associate species including Trichophorum/Molinia/Erica tetralix dominated mire on peat in a variety of situations. Purple moor grass Molinia caerulea is less tussocky and sometimes prominent in this grassy sward with ling Calluna vulgaris frequent and occasional patches of rushes Juncus spp. Mainly associated with hilly tops

			and shallow peat with grassland and heath.
E1.6.1 Former blanket bog	M17 Scirpus cespitosum-Erioporum vaginatum blanket mire	Annex 1 habitat GWDTE	Former M17 active blanket bog with common cotton grass <i>Eriophorum vaginatum</i> varied <i>Sphagnum</i> cover including deer grass <i>Trichophorum germanicum</i> with cross leaved heath <i>Erica tetralix</i> and Molinia caerulea on previously deep peat. This is now intensively modified and damaged due to forestry drains and furrows when it was planted. However very small patches of this habitat exist as remnants.
E2.1 Acid flush (or B5 Marshy grassland in limited circumstances)		Annex 1 habitat GWDTE	This community is frequently dominated by sedges and rush <i>Juncus acutiflorus</i> dominated marshy grassland with patchy sedge-rich flushes and bog mosses in a mire system often with M23 (see below).

Appendix 1 Five Mile Wood Target Notes

Task: B	otanical surv	ey target		Site: Five Mile Woods
Target Note Numbe r	Survey Date	Grid Referen ce ND	Habitat	Details
1	03/07/2021	NO 09224 32515	Semi-natural broadleaved woodland	A compartment with semi-natural broadleaved woodland with silver birch Betula pendula and rowan Sorbus aucuparia occasional Sycamore Acer pseudoplatanus and several older oaks Quercus petraea, with a little spruce Picea sitchensis. There is some good regeneration here, with birch, sycamore and scrub. There is areas of tufted hair grass Deschampsoa cespitosa, broad buckler fern Dryopteris dilatata, and bramble Rubus fruticosus agg with wetter patches including Angelica sylvestris. There is some willow scrub Salix spp in the ditch.
2	03/07/2021	09244 32718	Coniferous plantation	Mixed pinewood of scots pine Pinus sylvestris, with some oak, birch and sycamore. A varied field layer includes hawthorn Crataegus monogyna, hazel Corylus avellana, sycamore and beech Fagus sylvatica. areas of regenerating rowan, broom Cytisus scoparius, yew Taxus baccata, with scots pine, beech and gorse Ulex europeaus on the track edges.
3	03/07/2021	09204 32892	Birch regeneration in felled woodland	Pinewood with broadleaves planted throughout includes oak, some beech and a grassy heath as understorey with Fescues Festuca, Yorkshire fog Holcus lanatus, bilberry Vaccinium myrtillus, and grassy banks.
4	03/07/2021	09267 32962	Mixed plantation	Mixed pinewood of scots pine <i>Pinus</i> sylvestris, with some oak, birch and sycamore. A varied shrub layer includes hawthorn <i>Crataegus monogyna</i> , hazel <i>Corylus avellana</i> , sycamore and beech <i>Fagus sylvatica</i> . areas of regenerating rowan, broom <i>Cytisus scoparius</i> .

5	03/07/2021	09623 33010	Wet ditches	Scots pinewood with downy birch Betula pubescens regeneration on wetter ground. Old drainage lines with peaty ground but quite grassy with tufted hair grass and yorkshire fog among the bilberry heath.
6	03/07/2021	09308 33212	Broadleaved plantation young.	Main track - willow Salix spp regeneration with some scots pine, spruce, downy birch and young beech with spruce trees.
7	03/07/2021	09132 33591	Coniferous plantation	Open commercial forest dominated by scots pine, with young dense areas of larch <i>Larix</i> spp, pine and spruce with shrubs frequent gorse, holly <i>Ilex aquifolium</i> , willow <i>Salix</i> spp and a damp field layer with tufted hair grass and yorkshire fog some rushes.
8	03/07/2021	09232 33838	Mixed plantation	Mixed pinewood 30-40years old of scots pine <i>Pinus sylvestris</i> , with some oak, birch and sycamore. Quite open forest in areas with a sparse bilberry and wavy hair grass field layer. Occasional bluebells <i>Hyacinthoides non-scripta</i> and wood sorrel <i>Oxalis acetosella</i> .
9	03/07/2021	09231 34047	Semi-natural broadleaved woodland	Wet birchwood downy birch with many young trees and ferns common broad buckler fern <i>Dryopteris dilatata</i> with tufted hair grass and a grassy heath ground layer. Several seedlings include holly <i>Ilex aquifolium</i> , sessile oak <i>Quercus petraea</i> , rowan <i>Sorbus aucuparia</i> , and willows including <i>Salix cinerea</i> and <i>S. aurita</i> . Herbs include heath bedstraw <i>Galium saxatile</i> , dog violet <i>Viola riviniana</i> , wood sorrel <i>Oxalis acetosella</i> , yorkshire fog, fox glove <i>Digitalis europea</i> , and tormentil <i>Potentilla erecta</i> .
10	03/07/2021	8870 34197	Felled plantation	Clearfell area with extensive brash and regeneration of spruce, gorse and willows.
11	03/07/2021	08276 34559	Heathland	Open heath and grassland mosaic including ling Calluna vulgaris, tufted hair grass and Festuca/Agrostis grassland with eared willow Salix aurita frequent

<b>12</b> 03/07/2021 09074 33415	Open forest dominated by scots pine, with young areas of birch and beech (young), spruce with rowan with heathland and tufted hair grass.
----------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------

# Appendix 2 Taymount Woods Target Notes

	Task: Botanical survey target notes			Site: Taymount Woods
Target Note Number	Survey Date	Grid Refer ence ND	Habitat	Details
1	03/07/2 021	NO 01186 33527	Track	Trackside edge along ditch with willow scrub Salix spp., dominant. Grades into open area to east with downy birch Betula pubescens, Cytisus scoparius, elder Sambucus nigra, and a dry understorey with grasses and ferns frequent. Grasses include yorkshire fog Holcus lanatus, wavy hair grass Deschampsia flexuosa, tufted hair grass Deschampsia cespitosa, common bent Agrostis capillaris, and a ground layer with wetter patches, old ditches including soft rush Juncus effusus, marsh willowherb Epilobium palustre, creeping buttercup Ranuculus repens, ragged robin Lychnis flos-cuculi, lady's smock Cardamine pratensis and angelica Angelica sylvestris and marsh thistle Cirsium palustris. Slightly drier areas with common mouse ear chickweed Cerastium fontanum, nettle Urtica dioca, bird's foot trefoil Lotus corniculatuds, greater bird's foot trefoil Lotus uliginosus, ground ivy Glechoma hederacea, black knapweed Centaurea nigra, common dock Rumex obtusifolius, hogweed Heracleum sphondylium and white clover Trifolium repens.
2	03/07/2 021	NO 01177 33538	Birch plantation	Downy birch plantation with many young trees (c. 15 years old) and a fern dominated understorey. Broad buckler fern <i>Dryopteris dilatata</i> , male fern <i>Dryopetris felix-mas</i> , lady fern <i>Athyrium felix-femina</i> , some polypody <i>Polypodium vulgare</i> , and a grassy heath ground layer. Several seedlings include holly llex aquifolium, sessile oak <i>Quercus petraea</i> , rowan <i>Sorbus aucuparia</i> , and willows including <i>Salix cinerea</i> and <i>S. aurita</i> . Herbs include heath bedstraw <i>Gaium saxatile</i> , dog violet <i>Viola riviniana</i> , wood sorrel <i>Oxalis acetosella</i> , yorkshire fog, fox glove <i>Digitalis europea</i> , and tormentil <i>Potentilla erecta</i> .

3	03/07/2	NO 01170 3 33602	Birch reneration in felled woodland	Downy birch regeneration over a clearfell area with many young trees (c. 3-5 years old) and a rushy dominated understorey among the mounds. A grassy wet heath and marshy grassland ground layer with numerous seedlings including birch, rowan Sorbus aucuparia, and willows including common sallow, and eared willow. Herbs include heath bedstraw, ling Calluna vulgarus, cross leaved heath Erica tetralix, bell heather Erica cinerea, bilberry Vaccinium myrtillus, rushes Juncus spp, and bog mosses especially in ditches and wet hollows. Wet ditches consist of star sedge Carex echinata, lesser spearwort Ranunculus flammula, yellow sedge Carex viridula, water forget me knot Myosotis scorpioides, occasional bulrush Typha latifolia and floating sweet grass Glyceria fluitans with pond weeds Potamageton natans in open water.
4	03/07/2 021	NO 01176 33654	Birch regenerati on	Birch regeneration area in recently felled area. Abundant birch and willow scrub with spruce trees and rushy dominated habitats. Rushes Juncus spp, and bog mosses especially in ditches and wet hollows. Wet ditches also support some star sedge Carex echinata, lesser spearwort Ranunculus flammula, yellow sedge Carex viridula.
5	03/07/2 021	NO 01173 33659	Wet ditches	Wet ditches with rushes Juncus spp, and bog mosses lesser spearwort Ranunculus flammula, yellow sedge Carex viridula, water forget me knot Myosotis scorpioides, and floating sweet grass Glyceria fluitans with pond weeds Potamageton natans in open water.
6	03/07/2 021	NO 01123 5 33529 0	Birch plantation young.	Downy birch regeneration adjacent to track and plantation forest with sitka. Some clearfell area with seeding young trees (c. 2-5 years old) and a rushy dominated understorey. A grassy wet heath and marshy grassland ground layer with numerous seedlings including birch, rowan Sorbus aucuparia, and willows including common sallow Salix caprea, and eared willow Salix aurita. Herbs include heath bedstraw, ling Calluna vulgarus, cross leaved heath Erica tetralix, bell heather Erica cinerea, bilberry Vaccinium myrtillus, rushes Juncus spp, and bog mosses especially in ditches and wet hollows.

7	03/07/2 021	NO 01168 33667	Trackside	Frequent and abundant broom <i>Cytisus scoparius</i> and gorse <i>Ulex europeaus</i> along access tracks with some base richness. Some eyebright <i>Euphrasia officinalis</i> , oxe eye daisy <i>Leucanthemum vulgare</i> , fairy flax <i>Linum catharticum</i> , yellow rattle <i>Rhinanthus minor</i> , fescues <i>Festuca ovina</i> , <i>F rubra</i> , bent grass <i>Agrostis capillaris</i> , <i>Hypericum elodes</i> , <i>Hieracium pilosella</i> , cats ear <i>Hypochaeris radicata</i> .
8	03/07/2 021	NO 01147 33629	Loch and Burnside	Burn running out of loch into the forest includes mature birch etula spp, scots pine Pinus sylvestris and beech Fagus sylvatica. Dense shrubs include hawthorn Crataegus monogyna, eared willow Salix aurita, roses Rosa spp, and Ribes spp. Some very small swamp includes canary grass Phalaris arundinacea, meadowsweet Filipendula ulmaria and marsh willowherb Epilobium spp, rushes Juncus spp and spike rushes Eleocharis spp.





# **Hedgehog Recovery Plan and Statement of Support**

The HogWatch Scotland project has been running since 2019, funded by the British Hedgehog Preservation Society and aims to survey and protect hedgehogs across Scotland. There are concerning population declines across the UK. Between 2000-14 hedgehog populations declined by over half in our countryside and nearly a third in cities and suburbs. There are around 310,000 hedgehogs left in Scotland and around 1.5 million across England, Scotland and Wales collectively. Although population estimates can be challenging throughout the 1960's there were over 30 million hedgehogs across Britain. Further information in The State of Britain's Hedgehogs 2018.

Our proposal until 2023 is to work more with communities on a landscape scale to develop more connected landscape and implement conservation changes to enhance habitat for hedgehogs. We therefore fully support the actions of the West Stormont Woodland Group to restructure and renaturalise the conifer dominant woodlands. We also support West Stormont Connect, the landscape scale vision implemented through projects such as Ridge to River and Biodiversity Villages.

There are three main habitat requirements to consider when managing green space for hedgehogs:

# ► A range of nesting opportunities

The most sturdy nests rely on <u>medium-sized deciduous leaves</u> and a structure to hold the leaves in place. Bramble patches, log piles and open compost heaps are common locations for breeding nests and hibernacula.

#### **Actions:**

- Alongside natural regeneration, the most beneficial species (medium-sized deciduous) would be oak, sycamore, fruit trees, beech. Birch leaves are not the hibernation leaf of choice due to their small size. A focus on bringing the stands of diversification species for restocking and enrichment such as oak, hazel, rowan, birch, holly, hawthorn and gean into good health and providing nesting opportunity in this area.
- Identifying opportunity for scrub, bramble, shrubs and dead hedging which are important nesting and foraging sites.
- Keeping fallen leaves on the ground or in accessible leaf stores is especially useful for breeding and winter nest building. Either keeping leaf litter in situ or collecting into piles near tree lines, copses or hedgerows.
- Bramble and scrub cover provide protection from predators. Establish and maintain bramble cover year-round this will keep lower daytime temperature during hibernation and reduce arousal from the hibernation period.
- Badgers are the main natural predator of hedgehogs and also compete for similar prey. It's
  thought that the two species can coexist as they have for thousands of years, so long as
  there's enough feeding and nesting habitat for them both.

• Whilst not advised as a replacement for natural habitat, purpose-built hedgehog houses throughout sheltered areas of woodland can provide additional protection from predators.

# High quality feeding areas

Hedgehogs are omnivores, but the bulk of their diet consists of macro-invertebrates such as beetles, worms, slugs, earwigs, caterpillars and millipedes.

#### **Actions:**

- Deadwood management in woodlands. Creating smaller piles of decaying wood and leaf litter and allowing larger fallen pieces of deadwood to integrate with the landscape providing essential habitat for beetle species, earthworms and a variety of other invertebrates. 40% of woodland wildlife depends on deadwood at some life stage.
- Pesticide and herbicide use: TCV support West Stormont Woodland Group aspirations to be
  pesticide free. Herbicides can directly reduce earthworm density and reduce the varied
  ground cover needed for foraging. Slug pellets are potentially lethal if directly ingested and
  also reduce important prey sources. Avoid chemicals where possible and use organic
  alternatives where necessary. Wool pellets, nematode treatments, salt, seaweed, broken
  egg -shells or coffee grounds are popular alternatives for slug control. WSWG lay out that
  they will not be using any biocides in the management of the land.

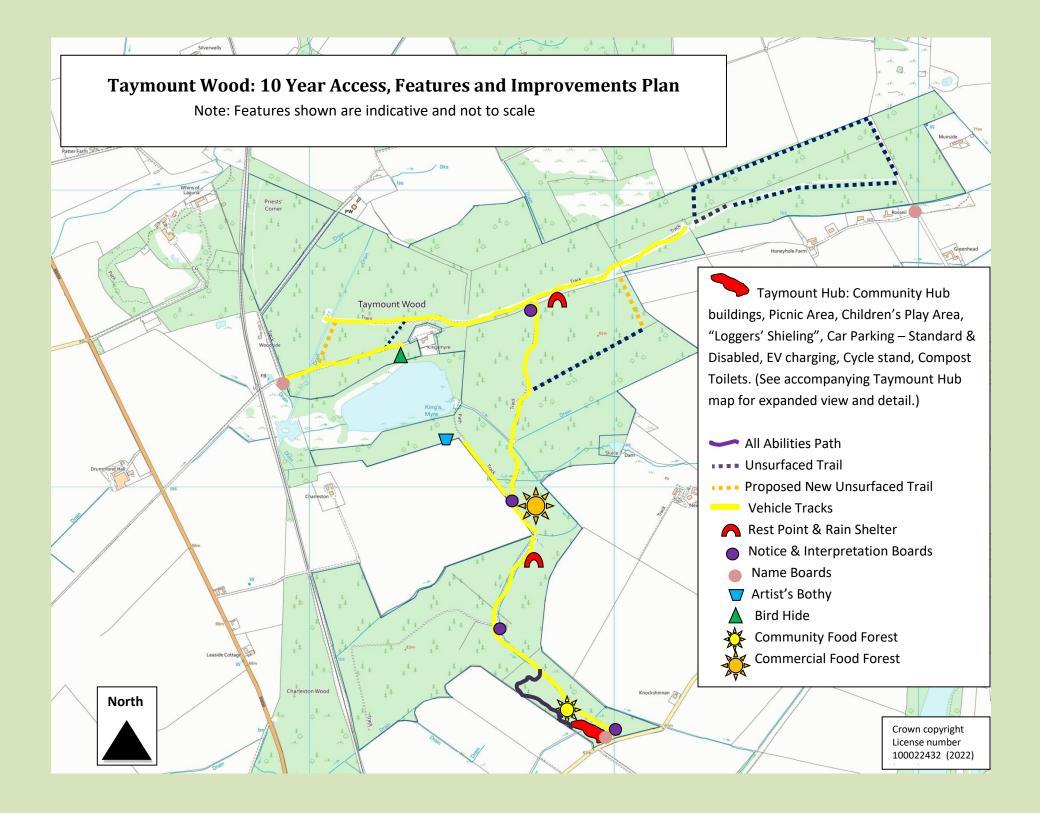
# Ensuring varied habitats are well-connected

Hedgehogs are highly active and range widely. They need to be able to move freely through a well-connected range of habitats to find food, mates and areas to nest. Radio-tracking studies show that hedgehogs can travel around 2km in a night in urban areas, and up to 3km a night in rural landscapes, though distances differ between the sexes. A viable population of urban hedgehogs is thought to need **around 0.9km²** of well-connected habitat.

#### **Actions:**

- In surrounding housing, fields and land ensure boundaries are permeable to hedgehogs.
  Hedging or hedgehog-sized holes in fencing or walls helps to create Hedgehog Highways.
  Ground-level boundary holes should measure 13x13cm and should link as many
  neighbouring pieces of land as possible through inhabited areas, forming a connected
  section between the woodlands.
- Edge habitat is especially important as hedgehogs often navigate landscapes by following
  linear features. New boundary planting along edges of the woodland with a native hedgerow
  mix (species including: blackthorn, hawthorn, goat willow, dog rose etc...) or to connect any
  gaps in existing hedgerow is recommended. This could also be enhanced with hedgehogfriendly hedgerow corridors within the woodland to connect various areas.
- Increase density per hectare, the width, height and length of hedgerows. Ideally hedge bases should be more than 2m wide, with dense vegetation and no gaps

For more information see here - <a href="https://www.hedgehogstreet.org/wp-content/uploads/2018/05/Farmers-leaflet.pdf">https://www.hedgehogstreet.org/wp-content/uploads/2018/05/Farmers-leaflet.pdf</a>



# Five Mile Wood: 10 Year Access, Features and Improvements Plan

Note: Features shown are indicative and not to scale

