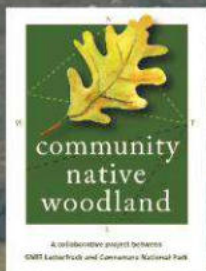


Community Native Woodland



Ecology report 2025



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Foreword

The ecological survey of the Community Native Woodland (CNW), Connemara campus, ATU and this report detailing the findings and recommendations have been undertaken as part of the Power to Change project. Power to Change is a partnership between Atlantic Technological University and the Sligo Public Participation Network. The project aims to build capacity within community groups to take positive actions to address the challenges of Climate Change. It consists of three strands:

1. Community Group Mentoring
2. Climate Education Clubs
3. Living and Learning Native Woodland

▼ Figure 1

Planting the first saplings at the Community Native Woodland in 2013

A selection of videos about the CNW are available to view on the Sligo PPN website [here](#).



A core focus of Power to Change is learning by sharing knowledge and experiences within our communities and our education settings to support local communities to become agents of positive change.

The CNW Ecology Report is intended to act as a dissemination instrument for others wishing to learn about woodland establishment and its potential. It also provides content to celebrate the value of our woodlands which is a key element of the Living and Learning Woodland Initiative.

▼ Figure 2

Power to Change Workshop at the Hardwood Processing Centre, ATU Connemara



Executive summary

The Community Native Woodland (CNW) was established in 2013 through a collaborative initiative led by the Letterfrack campus of Galway-Mayo Institute of Technology (now ATU Connemara), in partnership with Connemara National Park, Connemara West, and local community groups. Supported by the “One Million Trees in One Day” initiative and a Department of Agriculture Native Woodland grant, the project aimed to create a living learning environment for students and staff, while enhancing local biodiversity.

Located within Connemara National Park and covering 1.83 hectares across three plots, the woodland was designed with ecological sensitivity, incorporating native tree species suited to the site's peaty soils. The CNW serves as a model for integrating education, conservation, and community engagement in a protected landscape.

▼ Figure 3

Official opening of the Community Native Woodland (L-R) Sean Garey, Dermot O'Donovan, Duncan Stewart, and Janet O'Toole



Biodiversity

The CNW supports a developing mosaic of habitats that contribute to local biodiversity within Connemara National Park. Planted primarily with alder, alongside oak, holly, and other native species, the woodland is classified as an “Immature Woodland”. Its structure is still evolving, with a dominant canopy and limited understorey, but it already provides valuable ecological functions.

A 2023 ecological survey carried out by Dr. Dolores Byrne recorded a variety of flora and fauna. The ground flora is dominated by grassland species, with patches of sedges, rushes, and herbaceous plants that support pollinators such as small white butterflies, white-tailed bumblebees, and hoverflies. These species rely on nectar-rich plants and undisturbed ground for overwintering. Decomposer and predatory invertebrates, including woodlice, ants, and ground beetles were also observed, indicating healthy soil processes.

Bird species such as robin, blue tit, chaffinch, and coal tit were noted using the woodland for feeding and refuge. While nesting opportunities are currently limited due to the immaturity of the trees, this is expected to improve as the woodland matures. No mammals were directly observed during the survey, though the area may be used by foxes and small mammals. Red deer, known to impact young woodlands, are managed through deer-proof fencing installed by Connemara National Park.

Although the National Biodiversity Data Centre (NBDC) held no species records for the specific 1km grid square encompassing most of the woodland, adjacent areas contain over 500 records, suggesting a rich surrounding biodiversity that may interact with the woodland ecosystem over time.

▼ Figure 4
Common Footman moth caterpillar (Eilema lurideola)



Value to community

The CNW provides a range of ecosystem services that benefit both the environment and the local community. Using the Millennium Ecosystem Assessment (MEA) framework, these services can be grouped into provisioning, regulating, supporting, and cultural categories.

While the woodland's provisioning services are modest — offering limited timber for educational use and minimal food resources — it plays a more meaningful role in regulating services. These include carbon sequestration, air and water quality improvement, and soil health enhancement. Although small in scale, the woodland contributes to climate regulation and erosion control, particularly through its integration with the broader landscape of Connemara National Park.

As a developing habitat, CNW supports biodiversity by offering refuge and foraging grounds for pollinators, birds, and invertebrates. It also contributes to nutrient cycling through organic matter decomposition. Culturally, the woodland holds growing value as a site for environmental education and research, particularly for ATU students. While not currently a recreational destination, its potential as a community and educational resource is expected to expand over time, deepening its cultural and social significance.

▼ Figure 5
Alder sapling (Alnus glutinosa)



Value as a learning resource

The CNW serves as a dynamic educational and research resource, particularly for students and staff of ATU Connemara. Designed as a living laboratory, it supports hands-on learning in ecology, forestry, and environmental science. The woodland's development and ongoing monitoring offer valuable opportunities for field-based education, biodiversity assessment, and climate-related research.

Looking ahead, the CNW also holds potential for enhancing ecological connectivity within Connemara National Park. Currently isolated within extensive peatland, the woodland does not yet form habitat linkages with other wooded areas or hedgerows. A proposed long-term goal is to establish connections with the wooded corridor along the Owengarve River, which would significantly enhance its ecological function and educational value. Any such expansion would require careful planning in line with the conservation objectives of this Natura 2000 site.

▼ Figure 6

Tree planting with ATU students, 2025



Section 1

Origins of the woodland plantation

The establishment of the CNW was coordinated by the Letterfrack campus of Galway-Mayo Institute of Technology (now ATU Connemara) in 2013 in collaboration with Connemara National Park (CNP), Connemara West campus and local community groups. The woodland development was supported by the 'One Million Trees in One Day' initiative and a Department of Agriculture Native Woodland grant. The woodland concept emerged as an objective from the ATU Connemara Green Campus Committee to provide a learning environment for students and staff of the ATU Connemara campus, where timber is used as a raw material in programme delivery.

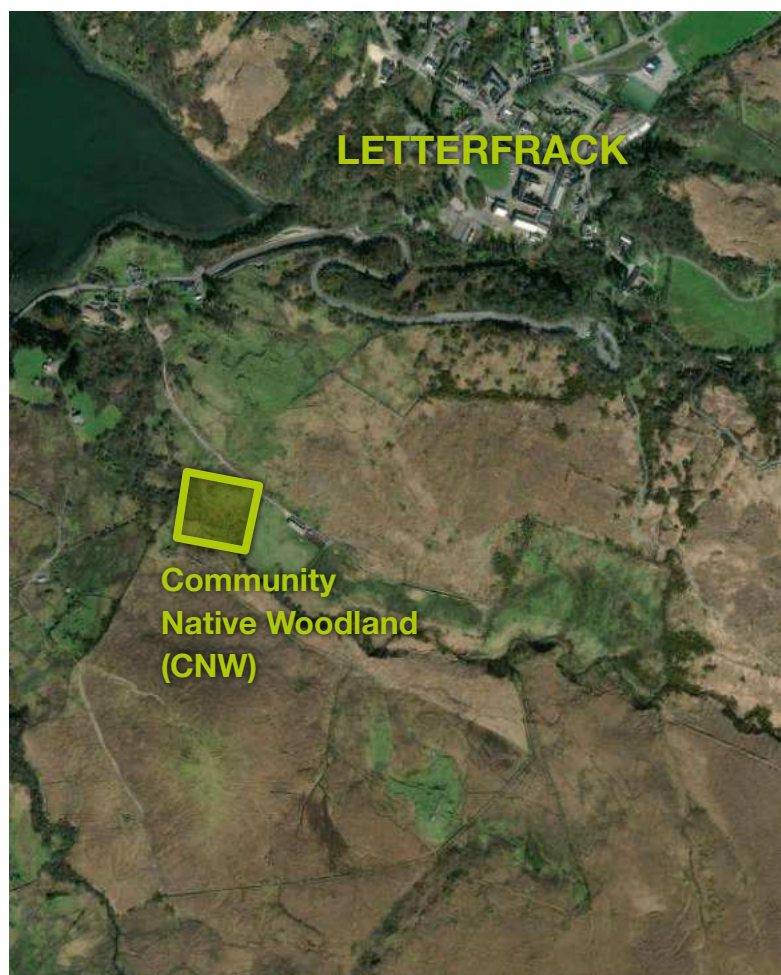
The woodland is located within Connemara National Park (NP) and a planting plan comprises 1.83 ha over three plots (Appendix 1)

Plot 1 (1.33 ha) is planted with alder (*Alnus glutinosa* – 0.87ha) in addition to smaller areas of whitethorn (*Crataegus monogyna*), gorse (*Ulex europaeus*), holly (*Ilex aquifolium*).

Plot 2 (0.44 ha) is comprised of whitethorn, holly, crab apple (*Malus sylvestris*), pedunculate oak (*Quercus robur*) and wild cherry (*Prunus avium*), with occasional Scots pine (*Pinus sylvestris*).

Plot 3 (0.6ha) is predominantly open space for biodiversity.

Each year, the committee organises a community-led tree planting day at the site. It is anticipated that the recommendations within this report will help to inform the committee on future actions. In establishing the woodland, the Green Campus Committee has also sought to diversify habitats for biodiversity gain within Connemara NP and to contribute to carbon sequestration.



▲ Figure 7
Location of the Community Native Woodland (CNW) planting in Connemara National Park, Co. Galway. This map is for illustrative purposes only and not held conclusive as to the boundaries or their extent

Soils within the National Park are classified as peaty ([Teagasc](#)), underlain by metamorphic rocks. The soil under the woodland appears to be a shallow mineral soil over peat, which would have constrained the types of trees suitable for planting.

The Owengarve River is located approximately 100 m to the south of the woodland. It rises in the peatlands of Connemara NP and travels in a slightly meandering east-west direction for 3.6 km before it enters the Atlantic Ocean at Ballynakill Bay, near the village of Letterfrack. It is an order 3, upland eroding river for much of its length.

The woodland is within The Twelve Bens/Garraun Complex Special Area of Conservation (SAC), [European site code 002031](#). This SAC was designated for a number of conservation objectives, including the protection of blanket bog habitat, species such as salmon (*Salmo salar*), freshwater pearl mussel (*Margaritifera margaritifera*) and otter (*Lutra lutra*). The immature woodland of CNW is not a conservation objective of the designation, nor is it directly supporting the protected species.

▼ Figure 8

View towards Ballynakill Bay from Diamond Hill





▲ Figure 9
Map showing Connemara National Park Boundary and the CNW. This map is for illustrative purposes only and not held conclusive as to the boundaries or their extent

Within [Connemara NP](#), which extends to over 2000 ha, the dominant habitats are blanket bog and heathland. Connemara is largely devoid of woodland cover and woodland constitutes a very minor habitat within the park boundaries. In addition to the CNW woodland, Connemara NP has planted 0.81 ha of native deciduous trees in 2020, called the 'Newfound Woodland' as part mitigation for loss of woodland along the N59 road. This woodland is fenced to prevent access by domestic and wild grazers. In future, the NP authority aims to create a greater expanse of woodland in the park, which will add to the diversity of habitats present.

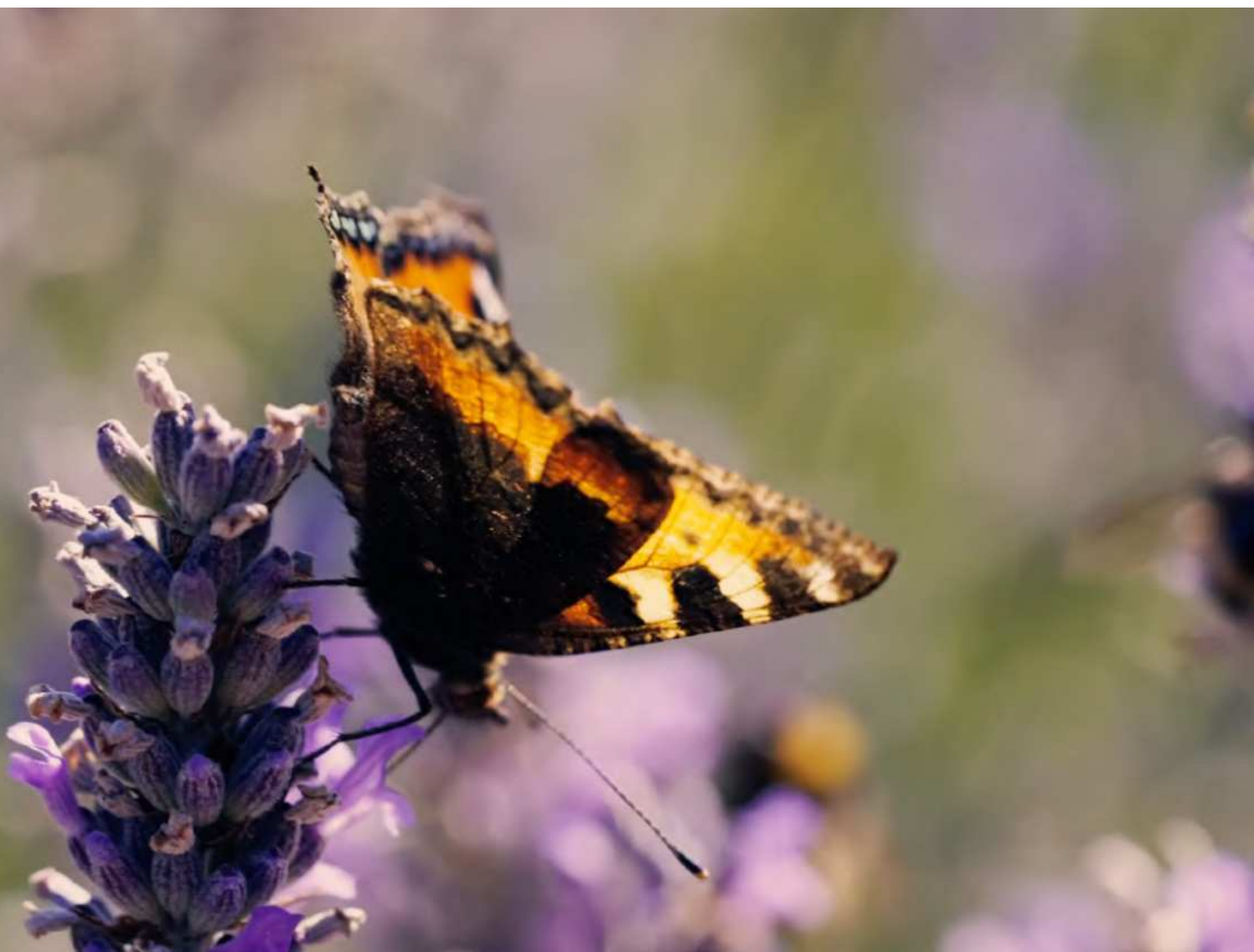
Section 2

Ecological survey methods

▼ Figure 10

*A small tortoiseshell (Aglais urticae)
butterfly*

The woodland survey was undertaken by Dr. Dolores Byrne, ATU lecturer and member of the Agroecology and Rural Development (ARD) research group, in June 2023. The woodland habitat and adjoining habitats were classified to level 3 of the Fossitt (2000) Irish habitat classification system. Species using the woodland and its margins on the day of survey were identified to species level. This is the equivalent of a Phase 1 survey, where the main habitats and species present are identified, along with potential importance for rare or protected species. This level of survey is sufficient to act as a baseline inventory for the ecological status of the CNW, and to provide some recommendations to further enhance the biodiversity and ecosystem service potential of the woodland.



Additionally, a search of the [National Biodiversity Data Centre \(NBDC\)](#) records was undertaken to ascertain if there are existing species records for the 1km grid square where it is located. Records in the NBDC are submitted by the public or from specialist surveys. Reference was also made to [EPA Maps](#), which is a repository of information related to water features, their quality and protection, specifically for the Owengarve River, which runs along the south of the woodland.

There are an increasing number of toolkits to measure carbon sequestration potential of farmland and other habitats. For this survey, the carbon sequestration potential of the woodland (alder) was preliminarily explored using the [Teagasc Carbon Forest Tool](#).

▼ Figure 11

A Eurasian Otter (Lutra lutra) in the Owengarve River



Section 3

Woodland habitat and species present

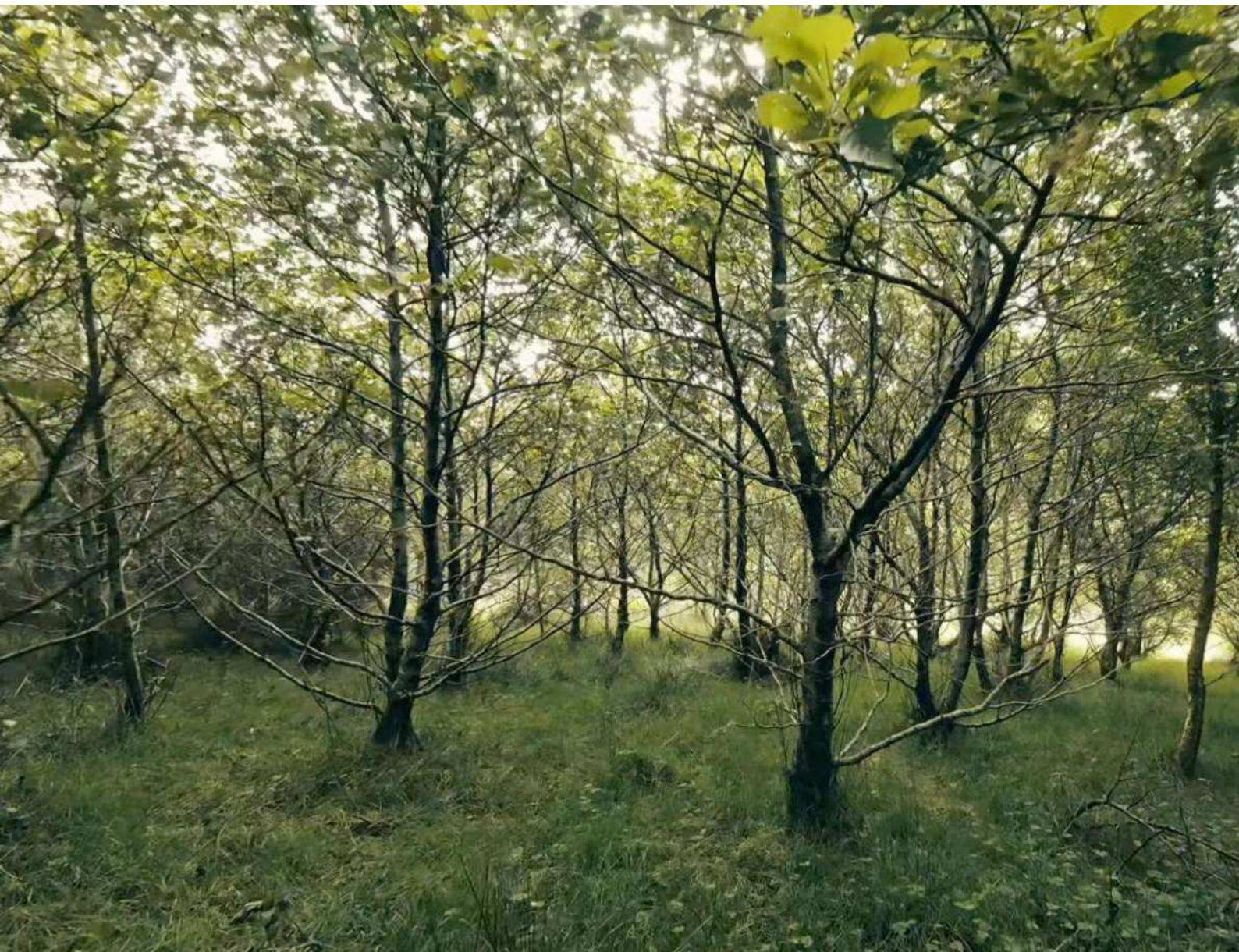
▼ Figure 12

Under the canopy of the CNW

3.1 Habitat classification

Under the Irish habitat classification system ([Fossitt, 2000](#)) this woodland is classified as 'Immature Woodland' (Fossitt code WS2). This type of woodland habitat type signifies groupings of trees which are generally less than 5m in height.

As the trees continue to mature, the woodland will progress to broadleaved woodland (Fossitt code WD1). Woodland is the final successional phase for most Irish habitats, and left undisturbed, natural woodland processes of organic matter accumulation and recycling, shading, windthrow and regeneration will proceed.



3.2 Vegetation and habitat connectivity

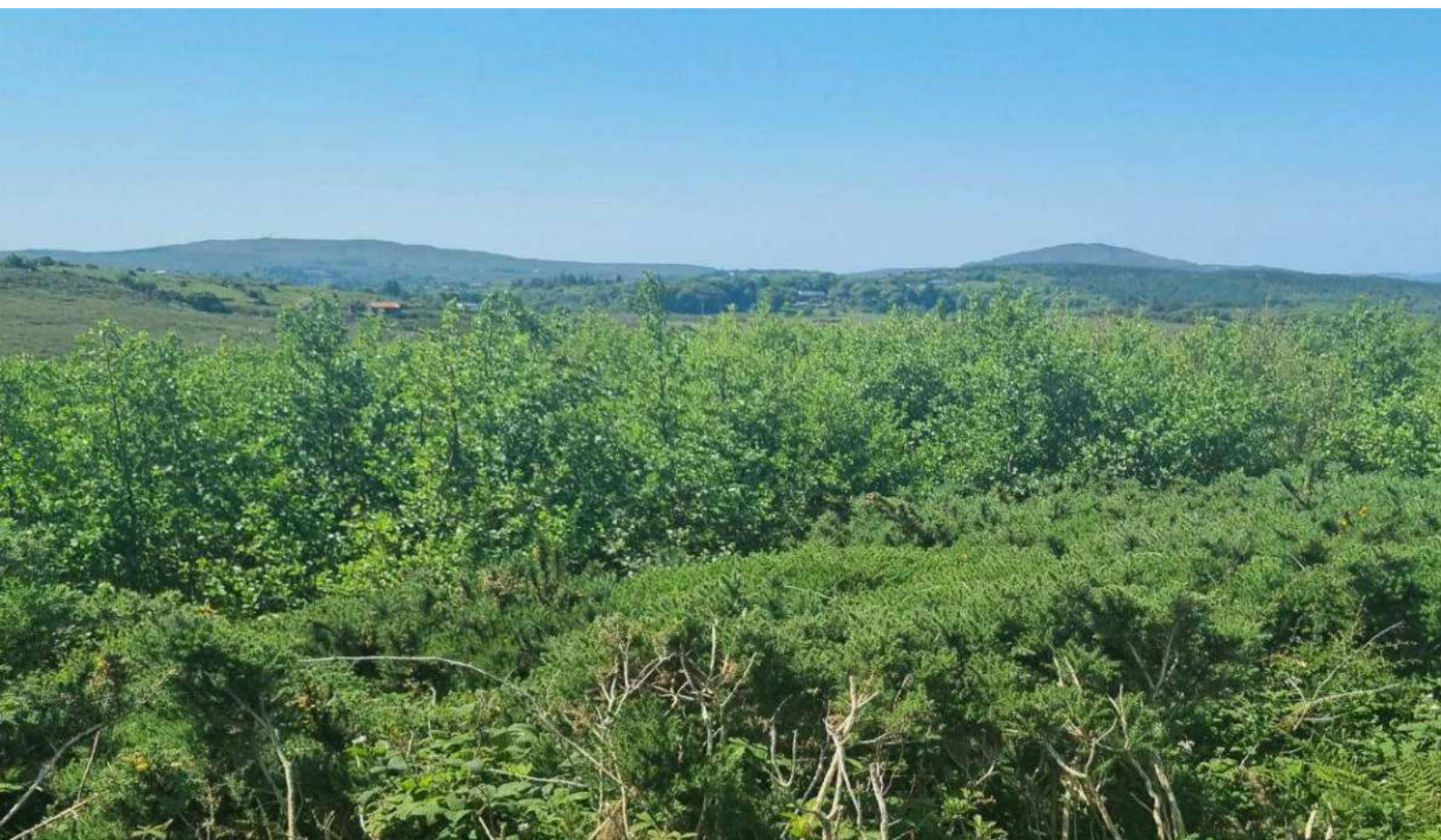
Alder is the dominant tree species planted, and it forms the main woodland canopy (Figure 13). The trees are approximately 4-6m tall, and relatively uniform in spacing, reflecting their planted origin. Immature planted oak saplings are present along the eastern woodland margins. The trees are immature and therefore have no ivy cover or substantial crack, crevices and snags, which are features of more mature trees, and of importance for birds and bats. Alder was a very suitable choice for the peaty soil, which would have been naturally low in nutrients, as its roots have symbiotic relationships with nitrogen-fixing bacteria. In low nutrient soils, such as peaty soils, this symbiotic relationship can assist the alder trees in establishing and thriving where other plants might not survive as readily.

On the north-eastern margins, small pedunculate oak trees are growing but they appear to be slightly stunted at present.

As it is an immature woodland, it lacks an understorey shrub layer, which may develop over time. The understorey is an important part of woodland structure, adding complexity to the microhabitats present for wildlife, particularly invertebrates and birds, in addition to interception of rainfall and nutrient cycling.

▼ *Figure 13*

Immature alder trees dominate the CNW (background) with gorse scrub and brambles to the foreground along the northern woodland boundary





▲ Figure 14

Ground cover under the main woodland canopy. Good levels of light are penetrating through at present (8 years after planting), but levels will diminish as the woodland matures meaning only shade tolerant ground flora will be capable of growing

The ground flora of the woodland (Figure 14) is dominated by grassland species, primarily grasses such as Yorkshire fog (*Holcus lanatus*), crested dog's-tail (*Cynosurus cristatus*), cock's-foot (*Dactylis glomerata*), bent-grasses (*Agrostis* spp.) and sedges (*Carex* spp). Common herbaceous species associated with grassland such as creeping buttercup (*Ranunculus repens*), meadow buttercup (*Ranunculus acris*) and white clover (*Trifolium repens*). Small areas of soft-rush (*Juncus effusus*) were noted, indicating damp ground conditions. Other species such as pignut (*Conopodium majus*), cat's-ear (*Hypochaeris radicata*), ragged robin (*Lychnis flos-cuculi*), tormentil (*Potentilla erecta*), greater bird's-foot trefoil (*Lotus pedunculatus*) and field wood-rush (*Luzula campestris*) indicate that the wet grassland on which the woodland was planted was relatively species diverse. The grassland did not show signs of management under the immature woodland canopy.

Bracken (*Pteridium aquilinum*) is present along the margins of the woodland, with larger cover around the new planted trees of the immediately adjacent Newfound Woodland, planted by Connemara NP.

The margins of the woodland offer contrasting types of vegetation and structures (Figures 15, 16 & 18). The western boundary has an abrupt edge from the woodland to the adjacent grassland, which is bounded by a low, dry-stone wall. Along the northern boundary, the woodland grades from alder into lower gorse (*Ulex europaeus*) scrub, grassland with occasional patches of bramble (*Rubus fruticosus* agg.) to deer-proof post and wire fencing. Some gorse had been cleared along the fence line to facilitate its installation. The other boundaries also have some scrub edges leading from the woodland.

▼ Figure 15 Northern woodland boundary with occasional small gorse, grassland margin and deer fencing



▼ *Figure 16 Boundary along the western margin with abrupt edge between the woodland and grassland, leading to a stone wall*

There is limited connectivity between the woodland and the Owengarve River, which is lined by trees and scrub, and forms the other primary wooded habitat in the environs. The Owengarve River forms part of the Traheen_010 waterbody, part of the Dawros SC 010 sub-catchment, which is rated 'at risk' of not achieving 'Good Ecological Status' under the Water Framework Directive. Whilst the overall status of the river is 'good', the presence of the European protected freshwater pearl mussel in the Dawros River raises the targeted objective to 'High' status, as pristine water quality is required for the survival of this mussel.



3.3 Invertebrates

On the day of the survey, numerous small white butterflies (*Pieris rapae*) were noted feeding on the herbaceous plants in the grassland margins along the woodland. White-tailed bumblebee (*Bombus lucorum*) and hoverflies (*Helophilus spp.*) were also in abundance. These pollinators rely on floral nectar resources for foraging and on leaf litter and uncut areas for hibernation and refuge over winter. At the ground level, typical decomposer taxonomic groups such as woodlice (sub-order *Oniscidea*), ants (sub-order *Hymenoptera*) as well as predatory ground beetles (*Pterostichus spp.*) were noted. The adjacent heathland, blanket peat and acidic/wet grassland habitats will be reservoirs for other invertebrates which may use the woodland occasionally.

3.4 Birds

Bird species noted included robin (*Erithacus rubecula*), blue tit (*Cyanistes caeruleus*), chaffinch (*Fringilla coelebs*) and Coal tit (*Periparus ater*). These common species will make use of the woodland for refuge, perching, feeding, in addition to also using the adjacent habitats. At present, there are limited nesting opportunities in the woodland due to the absence of larger branches, snags and holes.

▼ Figure 17 Juvenile birdlife within the CNW



3.5 Mammals

No evidence of mammals was noted on the day of survey within the woodland. It may be used occasionally by small mammals such as fox (*Vulpes vulpes*). Red Deer (*Cervus elaphus*) are present in the area and can be problematic to the establishment of planted woodland. Connemara NP has installed deer proof fencing along the perimeters of the woodland to deter deer from browsing on the trees.

3.6 National Biodiversity Data Centre records

The NBDC held no records for 1km grid square L7056, where the majority of the woodland is situated. Over 500 records (see Appendix 2) were available for 1km grid square L7057, however, this contains only a small proportion of the woodland and most of species recorded will be based in or using habitats surrounding the woodland.

▼ *Figure 18 Boundary between the CNW woodland and adjacent grassland. Edges such as these can be valuable for wildlife but could grade more gradually between the two habitats*



3.7 Establishing the ecological importance of habitats/species

The importance of an ecological feature should be considered within a defined geographical context. The [CIEEM Environmental Impact Assessment](#) guidance provides the following frame of reference (Table 1) which was used to assess the ecological value of the woodland:

▼ Table 1 Assessing the ecological importance of habitats and species

Level of importance	Description
International and European	Ramsar, Natura 2000 designation (SAC, SPA). Annex I (IV and V) species or Annex II habitat listed on the Habitats Directive. Annex I bird species listed on the Birds Directive. Red Data List species and habitats.
National	National Heritage Area, National Park. Species which is protected under the Wildlife Acts (and Amendments) 1976. Species or habitat listed on the National Biodiversity Action Plan. Nationally rare or scarce species. Birds of Conservation Concern. Red Data List species and habitats.
Regional	Habitat or species which may be considered regionally characteristic, important or rare. Ancient woodland.
Metropolitan, County, vice-county or other local authority-wide area	Species or habitat which could be of importance within a county, e.g. listed on the Sligo Biodiversity Action Plan
River Basin District	Habitat or species which is important within a river basin district or catchment.
Local	Site that has features which may be of local interest, e.g. watercourse or area of species-rich grassland which is not of Annex quality.

Based on the definitions above, the woodland is considered to be of local ecological interest. It should also be noted that Ireland has a very low cover (2% approximately) of native woodland ([Perrin, 2008](#)) and any deciduous woodland planting is valuable.

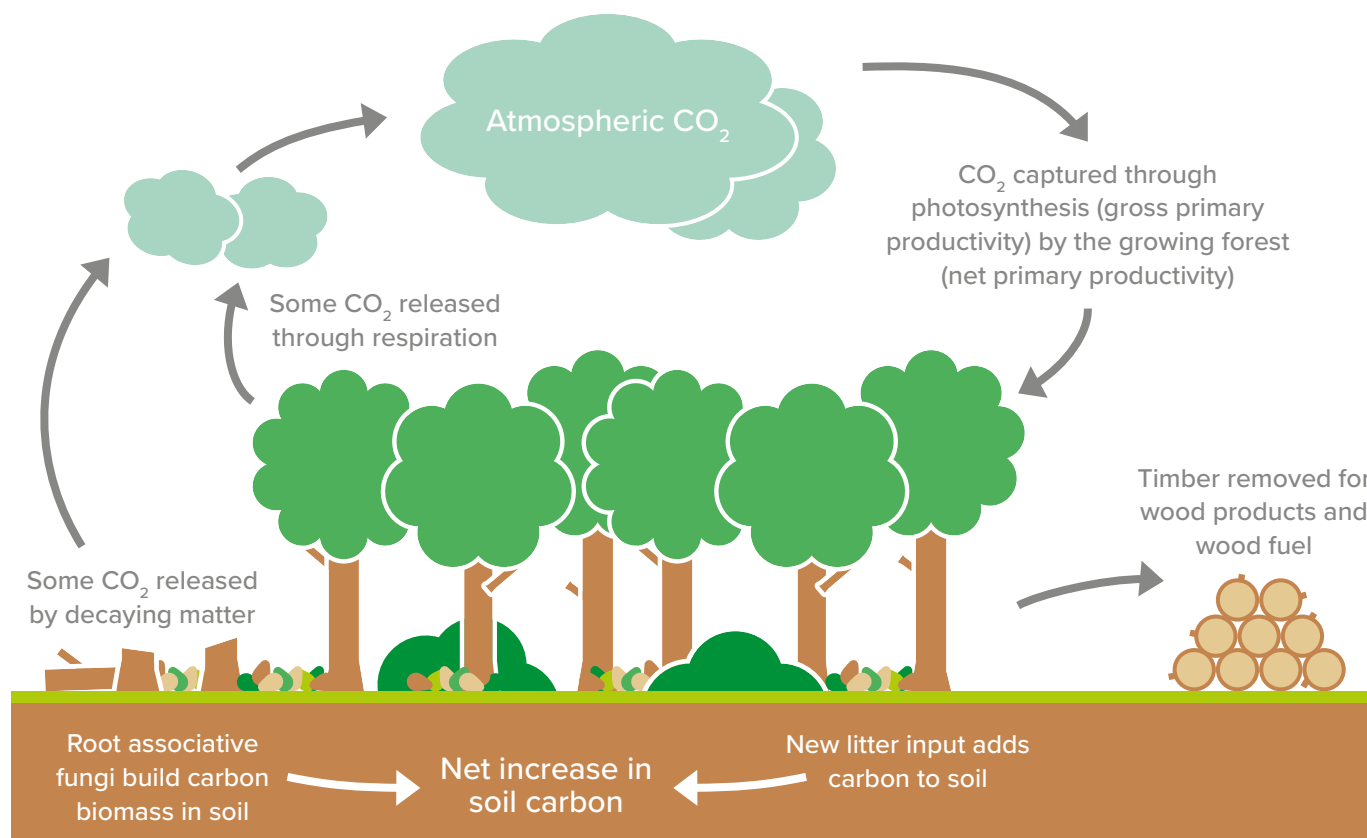
Section 4 Carbon capture and sequestration

Whilst there has been considerable scientific, public and increasingly, financial, interest in estimating the carbon capture and sequestration potential of habitats, it is still a difficult task to calculate with accuracy.

Carbon capture refers to the uptake of carbon by either biological or geological processes. Sequestration means the amount of carbon which is stored – in this case within the trees and the woodland, as it grows and matures, i.e. the sequestration rate will change as the woodland changes (see Figure 19 for a summary of these processes).

An excellent report by [Anderson \(2021\)](#) summarises the knowledge base of carbon capture and sequestration by different habitats. The challenges with fully understanding woodland carbon storage is evident in the report. However, it also indicates that soils which are richer in organic matter are 2-3 times richer in carbon than other soils. The CNW will be building stores of carbon under the canopy as it progresses into mature woodland and could be a good addition to carbon sequestration efforts in Connemara NP. The report also notes that it can take woodlands 10-30 years to be net contributors to carbon sequestration.

▼ Figure 19 Carbon sequestration processes summary



The summary of the Teagasc Forest Carbon Tool estimate is shown in Figure 20. This estimates that on peaty soils, a fast-growing broadleaved tree such as alder can sequester 0.49 t/CO₂/ha/yr. It is very important to emphasise that this is a best guess estimate by the tool based on the input parameters of 'fast growing broadleaf, yield class 6 and peaty soils'. The true rate of carbon sequestration will depend on a myriad of different parameters, such as growing climate, disturbances, and tree age. Additionally, the estimate does not take into account the full-scale carbon capture, sequestration and release which is part of a functioning ecosystem, which can change this figure substantially. As carbon sequestration tools become more sophisticated, the extent of carbon stored in the woodland can be re-estimated with greater accuracy.

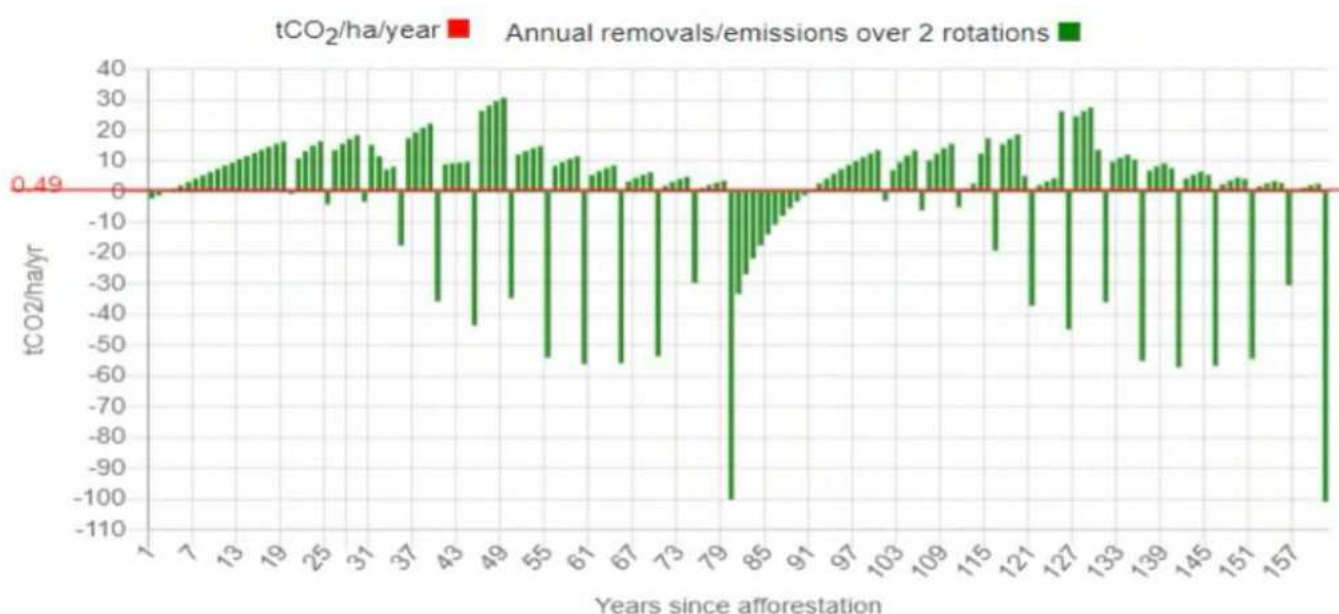
▼ Figure 20 Summary output of the Teagasc Forest Carbon Tool for 'fast growing broadleaves – sycamore, alder, birch' on peaty soil and yield class 6

Mean annual/cumulative CO₂ removals

Forest site sequestration	-1.07
Harvested wood products	1.24
Energy substitution	0.32
Mean sequestration rate (tCO₂/ha/year)	0.49
CAP (tCO₂/ha)	232.14

While the table presents average carbon sequestration, this graph shows how the rate of sequestration varies over the forest cycle/timeline.

Annual removals/emissions over 2 rotations



Section 5

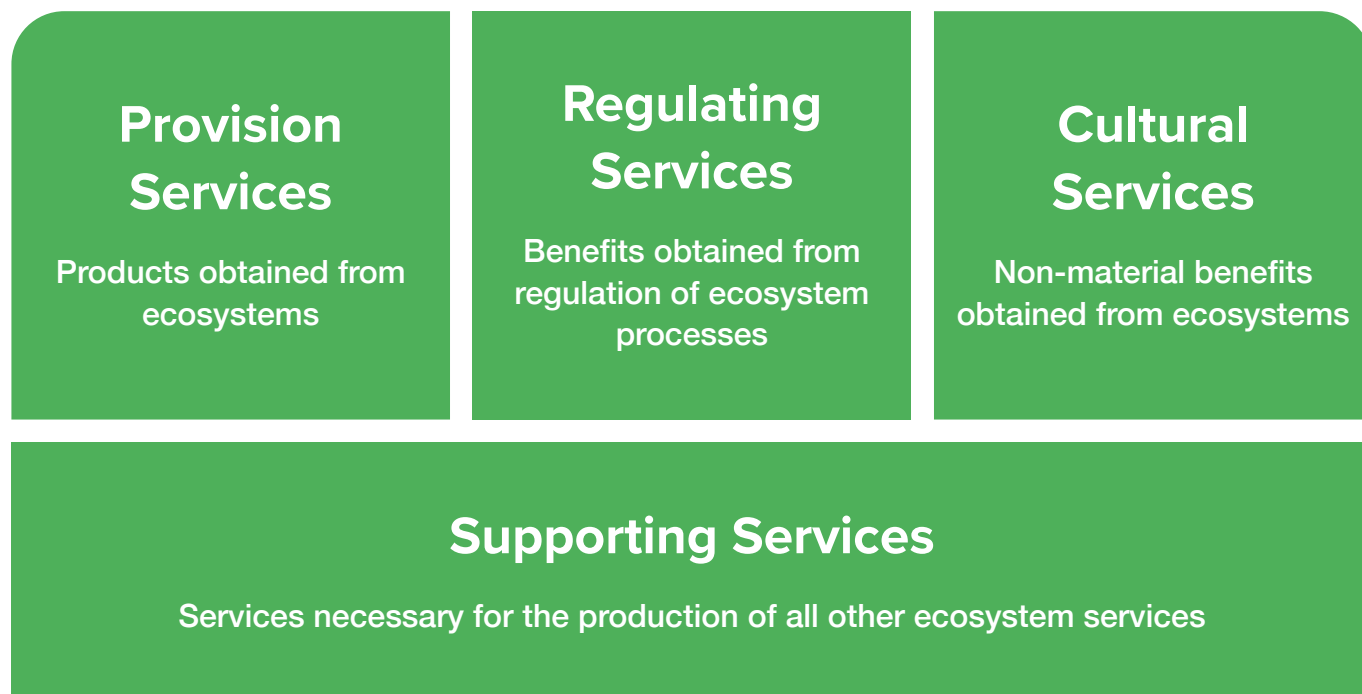
Ecosystem service value

Woodlands provide a wide range of ecosystem services that are essential for both the environment and human well-being. These services contribute to the ecological balance, climate regulation, and the quality of life for people in various ways.

The [Millennium Ecosystem Assessment \(MEA\)](#) set out to categorise the different types of services provided by ecosystems to humanity. Essentially, we think of these services as being provided for free by ecosystems, e.g. drinking water and clean air. One of the focuses of the MEA's initial categorisation work was to develop a standardised typology of services which could then be used in a multitude of ways to assist in the valuing and restoration of ecosystems.

▼ *Figure 21 The four ecosystem service categories identified by the Millennium Ecosystem Assessment (MEA 2006)*

The MEA identified four main ecosystem service categories – provisioning, supporting, regulating and cultural (Figure 21).



▼ Table 2 Summary of the main ecosystem services provided by woodlands, with specific reference to the CNW

Taking these categories, we can identify the following main ecosystem services which may be provided by the CNW woodland (Table 2).

Description	Ecosystem service status of the CNW
Provisioning	
Timber Woodlands are an economically important source of timber, a valuable raw material.	Moderate: The CNW could produce small quantities of timber for educational uses.
Food Woodlands can also provide non-timber forest products (e.g., mushrooms, berries). Some woodlands can be used as part of pastoral agriculture and management of stock, contributing the provision of food.	Low: The CNW currently provides very limited non-timber products and is not used as part of a pastoral system.
Regulating	
Carbon Sequestration Trees and plants in woodlands absorb carbon dioxide (CO₂) from the atmosphere during photosynthesis and store it as biomass. This helps mitigate climate change by reducing the concentration of greenhouse gases in the atmosphere.	Low/moderate: This small woodland is sequestering carbon, but the final net balance will depend on management and end uses of the timber products.
Air and Water Quality Woodlands play a crucial role in improving air quality by filtering pollutants and releasing oxygen. They also help maintain water quality by reducing soil erosion, filtering pollutants from runoff, and regulating water flow in catchments.	Low/moderate: The woodland will infiltrate rainfall and have small positive impacts on erosion control which contribute to air and water quality.

Description

Ecosystem service status of the CNW

Climate Regulation

Woodlands contribute to local and regional climate regulation by influencing temperature and humidity.

Low/moderate: The woodland planting does assist with climate regulation, and benefits from wider optimal management of the Connemara NP peatlands.

Flood Regulation

Trees and vegetation in woodlands help regulate water flow and reduce the risk of flooding by absorbing and storing excess rainfall, reducing surface runoff, and stabilising riverbanks.

Low: The woodland is not in a high risk area for flooding and therefore offers limited flood regulation services.

Soil health

Woodlands improve soil fertility and structure by adding organic matter, enhancing nutrient cycling, and preventing soil erosion.

Low/moderate: The woodland replaced species-rich grassland, both of which have good potential to support soil health if optimally managed.

Biodiversity

Woodlands are important habitats for a diverse range of plant and animal species. They provide nesting sites, food sources, and shelter for various wildlife, contributing to biodiversity conservation. Woodlands can also act as wildlife corridors.

Low/moderate: The general absence of woodland in the surrounding area makes this woodland a localised biodiversity hotspot. As the woodland matures, the biodiversity value will enhance.

Supporting

Nutrient cycling

Woodlands are valuable places for the storing and cycling of nutrients.

Low/moderate: The woodland will be locally valuable for retaining and recycling nutrients, produced mainly by leaf fall and organic matter decomposition.

Description

Ecosystem service status of the CNW

Cultural

Educational and research opportunities

Woodlands can serve as living laboratories for ecological research and environmental education.

Moderate: The woodland offers educational opportunities to ATU students and visitors to the woodland.

Recreation

Woodlands can provide recreational activities that support tourism and local economies. Recreational opportunities include activities such as hiking, camping, bird-watching, and photography.

Low: The woodland is not currently along a publicly accessible recreational trail within Connemara NP.

Cultural and spiritual value

Woodlands often hold cultural and spiritual significance, being places of cultural heritage and traditional practices (e.g. coppicing).

Low/moderate: The woodland has local cultural value related to its origins and potential use as a teaching and outreach tool, which will expand over time and as interaction builds with the woodland.

More details on ecosystem services can be found at the [Common International Classification of Ecosystem Services \(CICES\)](#). This standardised classification system can be used to identify specific ecosystem services the woodland is providing and could form part of future student monitoring and interaction with the woodland.

Section 6

Woodlands and the Sustainable Development Goals

The Sustainable Development Goals (**SDGs**) are 17 goals with 169 targets, which were identified by the United Nations to improve the lives and future prospects of humanity. Each nation is tasked with working towards achievement of the goals and targets, and report regularly on the progress to the United Nations. Even a small woodland planting such as the CNW can contribute to Ireland's progress towards the SDGs, and also to assist in raising awareness of the existence of the goals to the ATU staff and students, and visitors to the woodland.

▼ Table 3 Summary of the interaction between the Sustainable Development Goals and the CNW



SDG 15 Life on Land

Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

The CNW is a sustainable habitat use which is contributing to maintenance of biodiversity and ecosystem processes on land.



SDG 13 Climate Action

Take urgent action to combat climate change and its impacts.

The CNW is contributing to carbon sequestration and very localised regulation of rainfall and climatic extremes.

Table continues onto the following page

3 GOOD HEALTH AND WELL-BEING



SDG 3 Good Health and Well-Being

Ensure healthy lives and promote well-being for all at all ages.

The CNW was created by community co-operation and promotes opportunities for learning, and reflection on sustainable use of provisioning ecosystems.

6 CLEAN WATER AND SANITATION



SDG 6 Clean Water and Sanitation

Ensure availability and sustainable management of water and sanitation for all.

The CNW will have a small contribution to the maintenance of good water quality in the nearby Owengarve River.

4 QUALITY EDUCATION



SDG4 Quality Education

Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

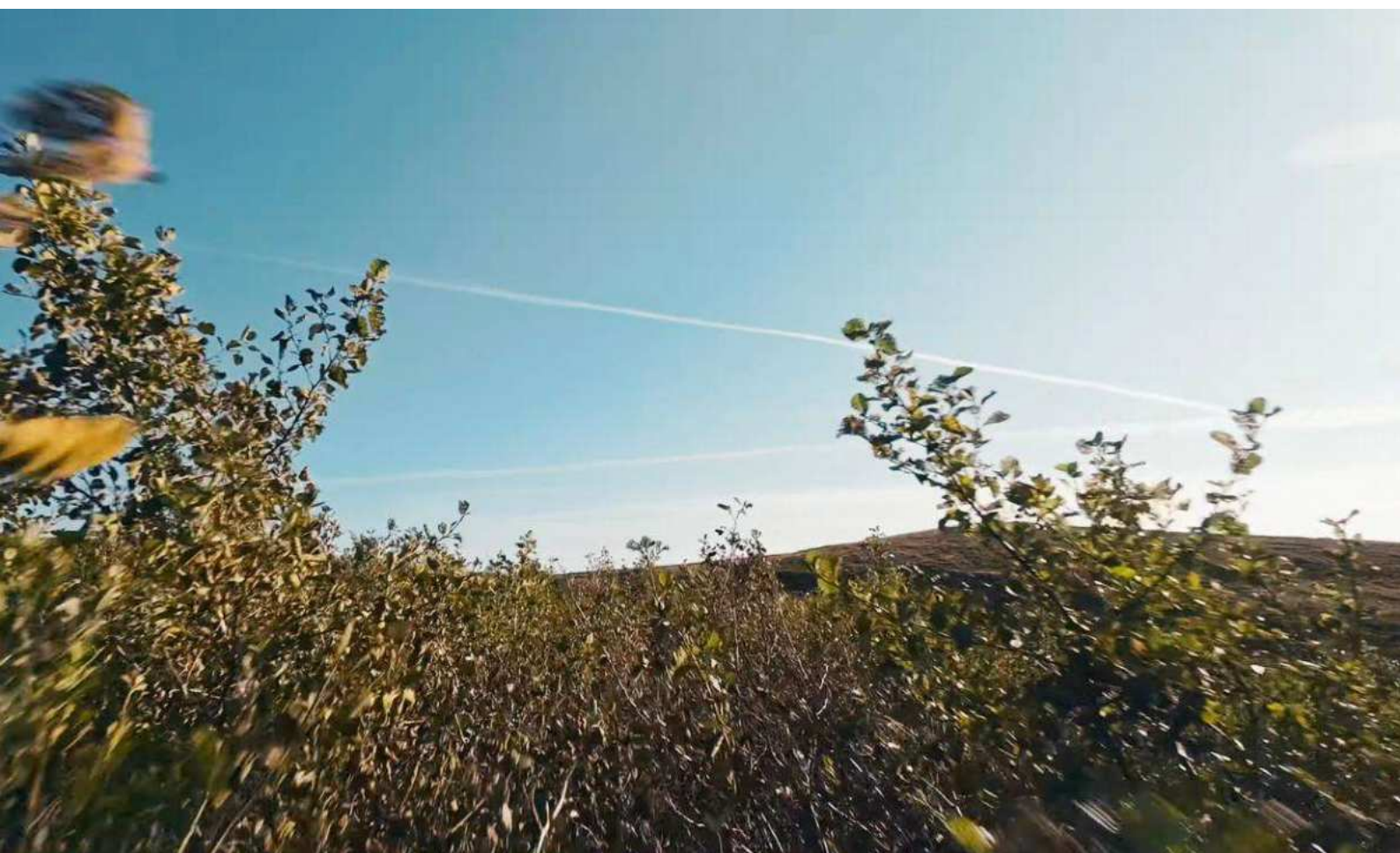
The CNW contributes specifically to Target 4.7 ensuring that all learners acquire the knowledge and skills needed to promote sustainable development.

Section 7 Potential ecological conservation enhance- ment oppor- tunities

Generally, limited interventions are optimal for planted woodland habitats once they have become established. The species in the woodland will be continuously adapting to the changing light, temperature and organic matter build up as the woodland matures. These processes will progress naturally, as woodland is the climax (end) vegetation over much of Ireland, where habitat management, e.g. grazing, mowing etc, cease.

Nonetheless, a small number of actions could be taken which will enhance the woodland value for flora and fauna, as well as for educational purposes. It is vitally important that all actions are discussed in advance with the Connemara NP authorities, as some may be 'Actions Requiring Consent' due to the Natura 2000 designation.

▼ *Figure 22 View above the alder canopy*



7.1 Thin/coppice woodland

Current situation: The CNW is densely planted, but as the trees are young, light can still penetrate to the ground level, allowing herbaceous plants to grow.

As the alder trees mature, this light will be diminished and will reduce ground flora diversity. This will facilitate the development of woodland ground flora, as shade tolerant species will thrive. Woodlands, however, are not always places of complete shade at the lower levels. Pockets or flecks of light are important, particularly for herbaceous ground flora which grows most rapidly in springtime, when light in deciduous woodlands is at its optimum. As the main stand is even aged, management options should consider how to create a mosaic of light distribution to the ground levels.

Recommendation: Thinning of trees will likely occur over the earlier stages of the woodland growth to facilitate enhanced growth of remaining trees. Thinning could be used to open up small glades within the woodland which will provide open areas for plant growth and warmth patches to attract insects, particularly flying insects.

To encourage structural diversity in the woodland, parts could be coppiced in rotation. Alder responds well to coppicing, forming straight, slender stems which are useful for a range of timber-based products. Coppicing is a traditional woodland

management tool and its implementation in the woodland could be used as a demonstration event. Alder trees are typically coppiced during the dormant season, which is usually in late winter or early spring before new growth begins. This minimises stress on the tree and encourages vigorous regrowth. Alder can be coppiced on a 5-10 year basis – in this woodland a longer rotation would be suitable. Some trees could be left uncoppiced to become standards (taller trees with wider girth). More information on coppicing is available at Hedgerows Ireland.

The Acres West Connacht team (www.acreswestconnacht.ie) is based in Belmullet, Co. Mayo and liaise with farmers throughout the area to maintain and enhance farmland habitats through an agri-environment scheme. Coppicing demonstrations would be of interest to farmers in the locality as under the Acres scheme, they have options to plant woodland as a scheme measure. Farmers can also avail of the Native Woodland Scheme premia for afforestation using native species. A specialised training day on coppicing would benefit local knowledge and outcomes for biodiversity and woodland/hedgerow management.

7.2 Extend native species planting during thinning of Plot 1

Current situation: The main section (plot 1) of the CNW is dominated by alder, with occasional oak and birch seedlings along the woodland margin. Small proportions of other tree species are present, but they do not currently substantially contribute to the canopy cover. The canopy height is almost uniform, which will limit the potential biodiversity opportunities as the woodland matures.

Recommendation: As thinning of the alder in Plot 1 occurs, there is an opportunity to plant other native species within the main woodland section, as well as creating small treeless glades (see 7.1 above). This would increase the potential value of the woodland as it would be mixed-aged and different tree species will attract different wildlife. Native trees already planted would be suitable.

7.3 Increase habitat for fauna through retention of fallen wood

Current status: Small twigs and leaf litter were noted on the floor of the woodland. Over time, as the woodland matures, larger branches will fall onto the woodland floor. If possible, these branches should be left in situ, as they provide opportunities for decomposers (fungi, bacteria, wood dwelling insects such as bark beetles) to colonise the area. This will increase the microhabitat types present in the woodland.

Recommendation: Retain fallen dead wood within the woodland. These can be stacked at points within the woodland if health and safety concerns mean they cannot be left scattered where they fall.

▼ *Figure 23 A marble gall on an oak tree from the marble gall wasp (Andricus kollari)*



7.4 Increase habitat for birds through installing nest boxes

Current status: The immature trees have limited potential to host nesting birds.

Recommendation: Students in ATU Connemara, with the support and engagement of the local community, could make nest boxes and install them in the CNW. It is imperative that the nest boxes are cleaned out at the end of each breeding season - this halts the spread of diseases between birds. Further information is available from: <https://birdwatchireland.ie/app/uploads/2019/09/Nestboxes-factsheet.pdf>

If safe to do so, and in line with GDPR considerations, a bird box camera could be installed in active nest boxes and the streaming could be available to students in ATU Connemara and beyond. This would bring additional 'connectivity' of the woodland with the campus staff and students.

▼ *Figure 24 Students preparing to install nest boxes in the CNW*



7.5 Manage edge habitats

Current status: At present there is a somewhat abrupt edge between the woodland and the surrounding edge habitat along the western boundary. A more graduated edge would be a useful transition for wildlife using the woodland area. Elsewhere the gradation from woodland to scrub to grassland should be retained.

Recommendation: Retain the gorse along the northern woodland boundary. If it becomes too mature and ‘leggy’, it could be cut at the base and the brash stored beside the woodland to decompose and provide a wildlife refuge.

Grassland species respond to management. Having longer (closer to the woodland) and shorter areas of grassland attracts a range of insects. Consideration could be given to using a traditional scythe as part of the grassland management – and providing demonstrations of its use. Maintenance of species diverse grassland at the woodland margins would assist in providing foraging resources for pollinators and could be tied into ATU Connemara’s contribution to the [All Ireland Pollinator Plan](#).

▼ *Figure 25 Grassland at the south of the woodland. This grassland would benefit from occasionally mowing or grazing to maintain species diversity*



7.6 Monitor extent of bracken

Current status: During the survey, patches of bracken (*Pteridium aquilinum*) were noted in the vicinity of the woodland. It is also present in adjacent heathland/grassland habitats within Connemara NP. In small patches, this native species can provide shelter and habitat for invertebrates and small mammals. However, it can spread rapidly and become problematic, reducing biodiversity.

Recommendation: Monitor the extent of bracken around and within the woodland. It can be cut back occasionally to help restrict its growth. Cutting can be undertaken with a mower, strimmer, or other method. Controlling bracken will also facilitate the establishment of immature saplings in the adjacent Newfound Woodland, planted by Connemara NP. A useful summary of bracken management practicalities can be found at the [Barn Owl Trust](#). When considering management, personnel resources will need to be taken into account –

methods such as bashing or bruising the bracken rhizome are effective in terms of control, and reduce impacts on underling vegetation, but require more time than cutting.

Bracken has been linked with carcinogenic effects (see Rasmussen et al, 2015 for a review). A risk assessment should be carried out before any management of bracken is implemented. Minimising ingestion of bracken spores should also be taken into account when undertaking any educational visits to the woodland. The UK H&S Executive (cited in [Natural England Bracken Management and Control](#) leaflet) recommends that a suitable face mask should be worn while cutting or working in spore-producing bracken (i.e. during late July, August and September).

▼ *Figure 26 Bracken at the edges of the woodland planting - young planting is part of the Newfound woodland planting by Connemara NP*

Rasmussen, L.H., Donnelly, E., Strobel, B.W., Holm, P.E. and Bruun Hansen, H.C. (2015) Land management of bracken needs to account for bracken carcinogens – A case study from Britain, *Journal of Environmental Management*, Volume 151, Pages 258-266, ISSN 0301-4797, <https://doi.org/10.1016/j.jenvman.2014.12.052>



7.7 Continued ecological monitoring

Current status: This survey is the first targeted ecological survey of the CNW and forms the baseline for ongoing ecological surveys and monitoring.

Recommendation: Periodic ecological monitoring of the woodland would add to the knowledge base of the woodland. It could encompass taxonomic groups such as moths, ground beetles and pollinators – but note that these would require specialist ecologists and small pieces of equipment to run.

Tying ecological surveys into events such as Bioblitz's (regional or national) and Heritage Week can bring about added benefit and interest. Given the distance of the woodland from the main road and lack of car parking, managed access to the woodland for these monitoring and recording events is recommended.

Where students and staff visit the woodland and note the presence of a species, it would be ideal to record that sighting onto the NBDC website (or via their app) as there are currently no records for the 1km grid in which the majority of the woodland is located.

A future project could be the deployment of continuous monitoring sensors in the woodland to measure a suite of parameters, e.g. temperature and relative humidity (inside and outside of woodland). Sensors can either be purchased, e.g. from [NHBS](#) or developed in collaboration with engineering students for example. Building this information will expand student understanding of the role of woodlands in regulating local environment climate (regulating ecosystem service) as well as providing timber (provisioning ecosystem service).

▼ Figure 27 ATU students and staff visiting the CNW



7.8 Carbon sequestration monitoring

Current status: The carbon sequestration value of the woodland has been very generally established on a per hectare scale using the Teagasc carbon calculator.

▼ *Table 4 Links to carbon calculators which include woodland habitats*

Recommendation: The woodland could have a specific carbon inventory carried out at regular intervals during its lifetime. To undertake such an inventory requires specific information – this is different for each calculator. Possible carbon inventory calculators are shown in Table 4 below:

Carbon Calculator	Weblink	Comments
Ireland's Tree Volume and Carbon Calculator	https://tserver.ifer.cz/TreeModel/	Developed for Ireland. Requires specific information for trees – height, diameter at breast height etc which can be used to calculate carbon storage (sequestration) for a stand
UK Woodland Carbon Code	https://www.woodlandcarboncode.org.uk/view-the-code	Developed for planting in the UK (generally applicable to Ireland), where owners may wish to sell carbon credits, this has both small (<5ha) and large woodland carbon calculation sheets. It can also address net carbon storage – if details of the original planting site are available
Natural Resources Wales Carbon calculator	https://cdn.naturalresources.wales/687190/eng-worksheet-carbon-storage-calculator.pdf	Simplified carbon calculator which can be used as an educational resource to show how carbon storage is calculated

The values will change as the trees grow and mature, therefore the calculations should be undertaken on a regular basis (every 5 years approximately until the woodland matures).

[Note: There are many online carbon footprint calculators which attempt to estimate the total amount of greenhouse gases (including carbon dioxide and methane) that are generated by actions – e.g. personal or by a business. These can be used to estimate carbon offset. These tools are not suitable for estimating carbon sequestration].

7.9 The woodland as an educational resource

Current status: One of the main aims of the woodland is to be an educational resource for staff and students of ATU and other interested parties.

Recommendations: The sections above include actions which can be part of educational resources built around the woodland and its management including:

- Coppicing and possibly scything as a demonstration activity
- Assisting in measurements required for carbon sequestration calculations
- Ecological surveys and recording of flora and fauna (records to the National Biodiversity Data Centre)

▼ *Figure 28 Students receiving instruction at the CNW planting day*



Beyond the activities already recommended, the woodland already supports a wide range of educational initiatives:

Field-based modules and workshops: The CNW hosts workshops on woodland ecology, habitat restoration, and environmental monitoring. It also offers an opportunity to discuss and consider the development and role of woodlands and forestry in Ireland. These are integrated into existing ATU courses and could be offered as standalone workshops for external groups.

Citizen science and community

engagement: The woodland provides an accessible site for citizen science projects, such as pollinator counts, bird surveys, and phenology tracking. These activities can foster public engagement with biodiversity and climate action.

Integration with digital tools: Students can use GIS mapping, drone imagery, and data loggers to monitor woodland development, soil health, and microclimate changes. This supports training in modern ecological survey techniques and data analysis.

Interpretive materials and guided learning:

The existing tree trail booklet at the Connemara National Park Visitor Centre can be expanded into a broader educational toolkit, including QR-coded signage, interactive maps, and seasonal guides to flora and fauna. These resources can support self-guided learning and enhance visitor understanding of native woodland ecosystems.

Research opportunities: The CNW offers a controlled environment for undergraduate and postgraduate research projects, including studies on woodland succession, carbon sequestration, species interactions, and the impact of deer exclusion.

7.10 Enhanced connectivity

Current status: The final recommendation is a 'blue skies' option. At present, the woodland is isolated within extensive peatland habitats. It does not form effective habitat connections with other woodland or even hedgerows, which can provide some of the same ecosystem services. Whilst the value of the woodland for biodiversity can be enhanced with the implementation of the recommendations above, the primary way to provide ecological enhancement is to plan greater woodland/scrub connectivity. The National Park authorities have indicated they wish to consider further native woodland planting within the park boundaries.

Recommendation: Consult with the Connemara National Park authorities on the potential to form linkages between the woodland and the wooded corridor along the Owengarve River. Ideally the linkage would be trees/scrub to increase the connectivity of the two habitats. However, the conservation objectives of the park and practical conservations will need to be addressed before any connectivity work is planned or undertaken – in accordance with rules and regulations applicable to a Natura 2000 site.

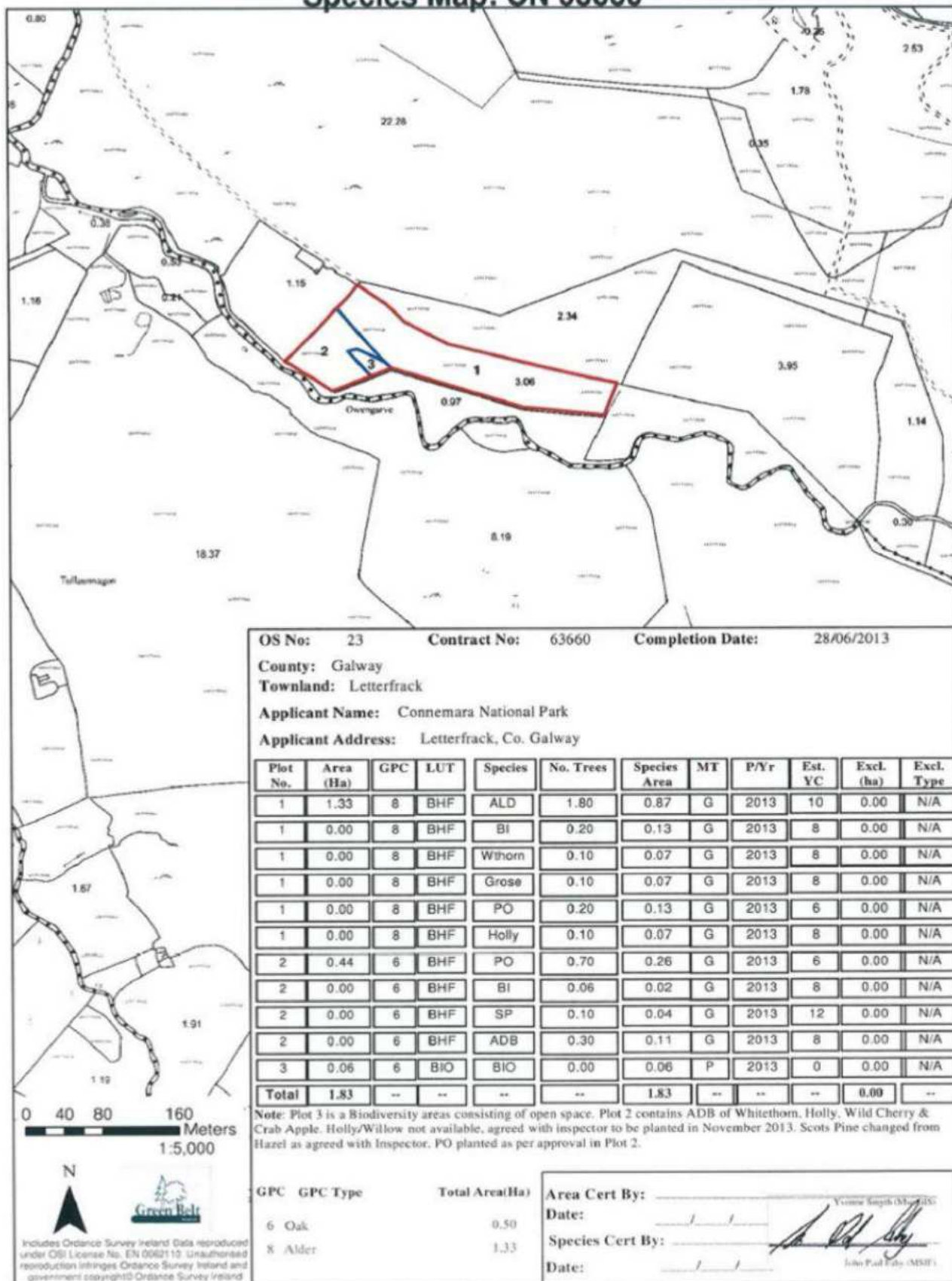
▼ *Figure 29 Aerial photograph of the Owengarve River*



Section 8 Appendix 1

Planting plan for the CNW plot

Species Map: CN 63660



Section 9 Appendix 2

National Biodiversity Data Centre information – 1km grid square L7057





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