

# IRELAND'S WOODLAND HERITAGE

A GUIDE TO IRELAND'S NATIVE WOODLANDS



*An Roinn  
Ealaíon, Oidhreacht agus Gaeltachta*  
*Department of  
Arts, Heritage and the Gaeltacht*

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Cover image: Oceanic oak woodland showing trees and branches covered in epiphytes. Furbo, Connemara, Co. Galway.



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I walked among the seven woods of Coole:  
Shan-walla, where a willow-bordered pond  
Gathers the wild duck from the winter dawn;  
Shady Kyle-dortha; sunnier Kyle-na-no,  
Where many hundred squirrels are as happy  
As though they had been hidden by green boughs  
Where old age cannot find them; Pairc-na-lee,  
Where hazel and ash and privet blind the paths...

Extract from *The Shadowy Waters* by W.B. Yeats.



## INTRODUCTION

Woodlands and forests are places of great beauty and mystery. They are three dimensional at the human level: we can walk into a wood and be dwarfed by the trees in a way that is not possible in, for example, grasslands or bogs. They are places of fairytales and folklore, romance and poetry. Even within small woodlands it is possible to feel isolated as the trees reduce the view and cut off outside sights and sounds. Indeed, it is much easier to get lost in a relatively small wood than on a mountain! The trees themselves form the woodland habitat and at the same time provide habitats for other plants and animals which live in and on the trees. Even though Ireland is the least wooded country in Europe (apart from Iceland), forests and woodlands, especially our native woodlands, contain a great variety of plant and animal life or 'biodiversity' and are a very valuable part of our natural heritage.



Bluebell dominated wood, Charleville, Co. Offaly



Oak tree with epiphytes



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## WHAT ARE NATIVE WOODLANDS?

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Native woodlands are stands of trees formed primarily of native tree and shrub species, i.e. species that made their way to Ireland by natural processes over thousands of years following the last Ice Age. Most of our native woodlands consist of oak, ash, alder, birch and hazel with a variety of other species also present. A list of native tree and shrub species can be found in Appendix I. It will be noticed that most of the species are broadleaved, deciduous trees (i.e. they lose their leaves

in the autumn). The main exceptions are holly, which is evergreen, and yew, which is both evergreen and coniferous, i.e. it has narrow, needle-like leaves rather than broad leaves. It will also be noticed that species such as beech and sycamore do not occur in this list for, although widespread and common in Ireland, they are not native but were brought here several hundred years ago and have now integrated fully into the Irish landscape. They have considerable value for wildlife, but in the



Mixed oak and Scots pine wood. Vale of Clara Nature Reserve, Co. Wicklow

context of true native woodlands, they can have negative impacts on woodland vegetation and structure. Scots pine is, however, included on the list of native trees. This beautiful coniferous tree was once widespread throughout the country but is believed to have become extinct over 1,000 years ago. It has been widely planted over the last few centuries and in suitable locations regenerates naturally. It is now common in some woods, especially on poor soils.

Scrub is the term applied to low woodlands, usually less than 5 m in height. Typically, it consists of hazel, hawthorn,

willow or blackthorn. The term has rather a negative connotation but in fact scrub may be very valuable for bird and insect life and is often a precursor to much taller woodland.

Our native woodlands – as distinct from native trees - vary in terms of their age and their origins. It is probable that very few woodlands are more than 300-400 years old, although some may occur on land which has probably been continuously wooded for thousands of years, eg those in the Killarney National Park. Such woods are known as ancient woodlands. Research shows that many of our native woodlands

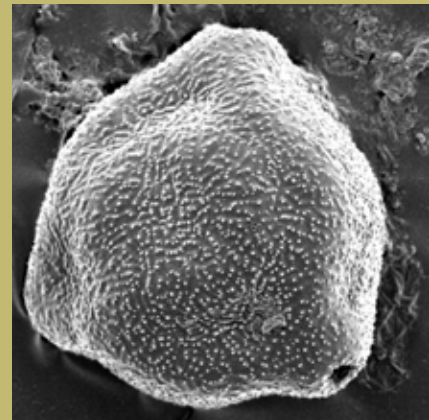
originated within the past 200 years or so and many were planted. Some are very young, for example the birch woodlands that have grown up naturally in the past few decades on abandoned cutaway bog in the Midlands, or the scrub woodland that is spreading over abandoned farmland. Ancient woodlands may contain rare species which do not occur in younger woods. Interestingly, few woods contain very old trees as they are usually felled before they reach a great age. Most trees are less than 200 years old, although there are some woods with trees over 400 years old, eg Charleville Estate, Co. Offaly.



Toothwort – a parasitic plant possibly an indicator of ancient woodland

## THE RISE AND FALL OF IRISH WOODLANDS

Pollen grains preserved in peat provide us with a picture of the history of Irish vegetation since the last Ice Age. From this we know that Ireland was dominated for several thousand years by tundra-like vegetation, such as is now found in the Arctic. Then, about 10,000 years ago the climate warmed up and woodland quickly invaded the land. First came juniper scrub, followed by mixed birch, Scots pine and hazel woodland. About 8,000 years ago mixed elm and oak forests with yew and ash developed, leaving Scots pine mainly on drier soils. After another thousand years the



P. Coxon

8,000 year old hazel pollen - greatly magnified





Low-growing hazel woodland in the Burren

climate became wetter and alder increased in abundance while Scots pine declined. Elm declined dramatically about 5,900 years ago, possibly as a result of disease or human activity. However, humans first began to have a major impact on the forests during the Neolithic period, about 5,500 years ago, and from the Bronze Age (about 4,500 years ago) onwards the history of native Irish woodlands is one of progressive decline as land was cleared for agriculture, especially for grazing. By Medieval times, very little woodland remained. During the 18th and 19th centuries a number of programmes of planting began. This had little overall impact on the area of woodland but saw the widespread introduction of non-native species, such as beech, sycamore, Norway spruce and larch. By the beginning of the 20th century, only about 1% of the country was covered in woodland and the State began a re-forestation programme that continues today.

The aims of the State's forestry programme were primarily to establish a forest resource that would supply Ireland's timber needs and, latterly, to develop a viable national timber industry. Because the native tree resource was so depleted, the decision was made to focus on the use of coniferous tree species (mostly from North America) to establish these new forests. While these species are fast-growing in Irish conditions and provide attractive financial returns to forest growers, they have a very different ecology to our native trees and shrubs and the forest habitats they provide differ greatly from our native woodlands. The most extensive conifer plantations are located on formerly open land, especially on hills and peatlands, but sometimes they were planted into native woodlands, or on the sites of former native woodlands. Today, the total national area of forest has increased to about 10 % of the land surface, less than one-fifth of which consists of native woodland.

With the loss of the native woodland went numerous plants and animals. Scots pine probably became extinct as a native species over a thousand years ago, although some plants associated with pine forests are still found here. Some species, especially those which have limited ability to disperse, may still be declining, eg. narrow-leaved helleborine. Not only did we lose plants and animals but we also lost the traditions and woodmanship associated with woodland management, eg. coppicing, charcoal making. These traditional management practices, which still exist in other countries, have had a major influence on the character of some of our native woodlands.



## WHERE DO OUR NATIVE WOODLANDS OCCUR? SOME FACTS AND FIGURES

Native woodlands are one of our rarest habitats. The most up to date figures indicate that there are about 85,000 ha of native woodland with, in addition, a considerable area of mixed native and non-native woodland. This is only about 1.25% of the land area of the country. Native woodlands occur throughout the country, although they are highly fragmented and mostly cover small areas. Of 1,320 sites recently surveyed, 50% were less than 6ha in area. Very few woodlands are larger than 100ha.

There is a concentration of native woodlands in upland areas, probably because the soils are poor and of low agricultural value, although they are widely scattered across the country. There is a concentration in the mountain valleys of Wicklow, Waterford, Kerry and west Cork and on the rocky terrain of parts of Donegal. The shallow limestone soils of

parts of Clare and Galway are covered in extensive areas of hazel scrub woodland that is expanding as agricultural practices change and in recent years birch woodland has spread onto cutaway bogs in the midlands.

The least wooded counties are Carlow, Louth and Dublin while the blanket bogs of north-west Mayo and Connemara are also largely devoid of native woodlands. In the fertile parts of the country, native woodland is typically confined to agriculturally less attractive areas, such as esker ridges, or to former demesnes where they were often planted for shelter, game cover or for landscaping the surrounds of the 'big house'. Characteristically, many of these demesne woodlands contain exotic species, such as beech or sycamore, or remnants of former conifer plantations, eg larch, Scots pine or Norway spruce.



West Cork landscape

Very few woodlands are larger than 100ha.



Paudie O'Leary

## WOODLANDS IN THE LANDSCAPE

Woodlands often form prominent landscape features by virtue of their texture and character. In the lowlands even small areas, interlinked with hedgerows, can give the impression of a well-wooded landscape which belies the scarcity of native woodland. Large areas of birch woodland occur on cutaway bogs in the midlands and, in places, the formerly open, bog-dominated landscape is becoming wooded and enclosed. About half of all native woodlands occur in valleys or on hillsides and are therefore easily viewed from surrounding higher land. Lakeside woodlands are also common and here and there woodland occurs in the alluvial plains of our lowland rivers, although most of these areas have been cleared of trees for agriculture.



Alluvial woodland, Co. Wicklow

**Biodiversity** is the name given to the variety of living organisms. It includes a) the diversity of species b) the genetic diversity or variation within the species and c) the ecosystems in which the species occur

An **ecosystem** is a group of interdependent organisms (plants, animals, fungi, bacteria, etc.) together with the environment that they inhabit and depend upon.

## WHAT IS IT LIKE TO LIVE IN A WOOD? THE WOODLAND HABITAT:

The plants and animals that live in a woodland are influenced by the woodland habitat and the nature of the woodland habitat is in turn determined by a number of physical factors, such as the soil and climate. The trees themselves, of course, create their own environment.

Perhaps the most important influence is the soil. Differences in fertility, acidity, the amount of moisture, whether it is well-drained or waterlogged, the amount of organic matter, i.e. whether it is derived from mineral matter or peat (partially decomposed vegetable matter), all determine what species of trees and other plants can grow there. Variations of soil type within a wood can often be detected by changes in the vegetation. For example, an area of poorly drained soil occurring



Bird cherry



Dandelion



Irish spurge

within an area of dry soil is often marked by the presence of moisture-loving plants, such as alder, willows and meadowsweet. Variations in climate also influence the vegetation. Although climatic differences in Ireland are less pronounced than in some other countries, it is nonetheless possible to see distinct variations in the woodland flora in different parts of the country. Mosses, liverworts, lichens and epiphytes\*, for example, are particularly luxuriant in wetter areas, i.e. in the west and in the uplands. There are also some species which are confined to the warmer southwest, e.g. Irish spurge, while others are more common further north, e.g. bird cherry.

Trees themselves are large enough to create their own environment. We seek out trees for shelter from sun, wind and heat. Put thousands of trees together to produce a wood and they have a major impact on their surroundings. Within a wood it is cooler, darker, moister, more sheltered and the climate is more equable than outside. Organisms such as many mosses, liverworts, ferns and lichens will thrive in such situations while they would die or struggle to survive in the open.

Plants living within a wood are presented with numerous challenges, chief of which is the amount of light they receive. In an open situation the amount of light is at a maximum

\*An epiphyte is a plant which grows on another plant which acts purely as a support. They are not parasitic.

in mid-summer and at a minimum in mid-winter. Within a deciduous wood, however, the maximum amount of light occurs in late spring before the trees are in full leaf. Many flowering plants have adapted their life cycle to this pattern. Bluebell, celandine and anemone are examples of so-called vernal plants which store food in underground bulbs or rhizomes (a thickened underground stem), enabling them to make a quick spurt of growth early in spring. Once they have flowered the leaves die down quickly and by mid-summer they have all but disappeared. Other plants remain in a vegetative state under heavy shade, only coming into bloom when a tree falls, dies or is cut down. Under evergreen trees such as yew or holly, the amount of light is much less than under deciduous trees and most species of flowering plant cannot survive, although there may be plenty of ferns and mosses.

A woodland is seldom an unbroken sea of trees. Gaps occur naturally, formed by fallen or dying trees, alongside rivers and streams or around small lakes, or as a result of human activity, e.g. felling, creation of tracks. These open areas are very important in creating diversity within the wood and they provide habitat for certain plants and animals which require these more open conditions to flower, feed or breed.



Violet and celandine



Ash trees



Strawberry tree



Shattered oak stump

## DEATH AND DECAY: THE IMPORTANCE OF DEAD WOOD

Dead wood is a vitally important part of a woodland ecosystem, providing food and habitat for hundreds of organisms. Dead wood comes in a variety of forms, eg. standing dead trees, fallen dead stems and branches, and occurs in a variety of locations, eg. warm, dry and sunny or cool, shaded and moist, each providing habitat for different organisms. Many organisms that live in dead wood are very small and may be invisible to the naked eye, for example bacteria and fungi, but they are a key component of the ecology of the woodland, playing a valuable part in the re-cycling of nutrients within the woodland ecosystem. Standing dead trees provide important habitat for animal life, especially invertebrates (eg. insects, spiders), birds and bats. Dead stems and branches lying on the woodland floor provide habitat that is more sheltered, shaded and moister, and these conditions are ideal for a range of mosses, liverworts, ferns, fungi and different groups of animals. As dead wood decays, the nutrients released are gradually returned

to the soil. The rotting wood may also become a substrate for flowering plants and a nursery for tree seedlings.

In general, Ireland's native woodlands lack large diameter dead and decaying timber because it tends to be removed for fire wood or to 'tidy up' the woods. This means that many of the associated species are also missing or occur only very locally. One way of bringing a rapid improvement to the biodiversity of our native woodlands is to make a concerted effort to leave dead wood where it is.

Large, old trees, often referred to as "Veteran" trees, are also important. They often have dead branches which may remain on the tree for decades before falling off. Because many invertebrates need both living and dead wood for the different stages of their life cycle, this is the very best form of dead wood habitat. Veteran or senescent trees are rare in Ireland's woodlands and should always be protected and retained.



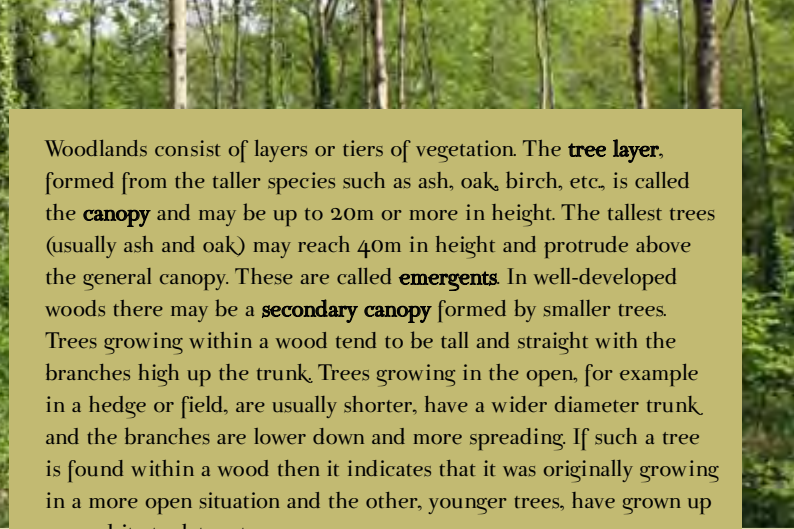
Standing dead tree



Bonnet mushroom (*Mycena metata*).

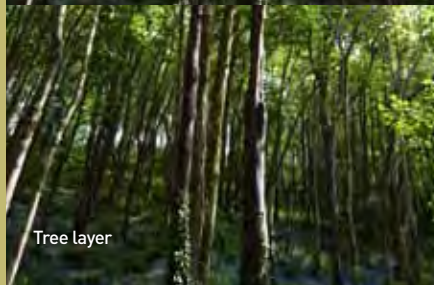


Shrub and tree layers



Woodlands consist of layers or tiers of vegetation. The **tree layer**, formed from the taller species such as ash, oak, birch, etc. is called the **canopy** and may be up to 20m or more in height. The tallest trees (usually ash and oak) may reach 40m in height and protrude above the general canopy. These are called **emergents**. In well-developed woods there may be a **secondary canopy** formed by smaller trees. Trees growing within a wood tend to be tall and straight with the branches high up the trunk. Trees growing in the open, for example in a hedge or field, are usually shorter, have a wider diameter trunk and the branches are lower down and more spreading. If such a tree is found within a wood then it indicates that it was originally growing in a more open situation and the other, younger trees, have grown up around it at a later stage.

## HOW WOODLANDS ARE CONSTRUCTED:



Tree layer

The **shrub layer** or **understorey** is formed by shrubs or small trees, such as hazel, holly or hawthorn, or young trees of the canopy species. It forms a layer about 3m to 10m in height. In some woods, mainly on acidic soils, there may be a **dwarf shrub** layer of low-growing woody species, such as bilberry or ling heather, which can reach up to 1m or more in height.





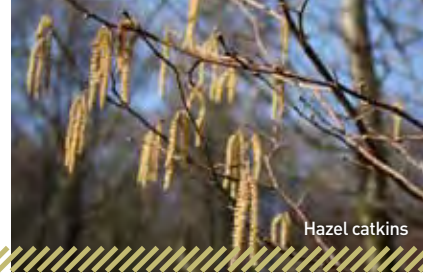
Spreading oak that once grew in the open

## THE STRUCTURE OF WOODLANDS.



Herb and moss layers

The **field** or **herbaceous (herb)** layer consists mostly of non-woody plants such as grasses, sedges, herbs and ferns, although it also includes low-growing woody plants such as bramble, ivy and honeysuckle. In addition, it includes tree seedlings, some of which will eventually form part of the shrub layer and ultimately the canopy. Growing on the ground, on rocks and fallen branches we find the **moss** or **ground layer**, which consists of mosses, liverworts (collectively known as **bryophytes**) and sometimes very small ferns and lichens. These diminutive plants may also grow as **epiphytes** on the trunk, branches and twigs of trees. In suitable situations they can form dense mats which provide a rooting medium for ferns and even herbs or trees to become established. Connecting all these layers together are the **climbers**, principally ivy and honeysuckle, which are rooted in the herb layer but can climb up into the canopy.



Hazel catkins

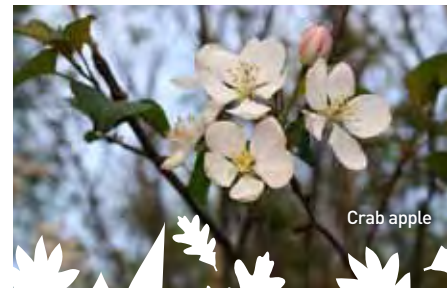
## PLANTS OF OUR NATIVE WOODLANDS

There may be hundreds of plant species occurring within a typical native Irish woodland. Excluding microscopic organisms, the greatest biodiversity of plants within Irish woodlands is often found among the mosses and liverworts. In contrast, there are relatively few tree species, although they are the most prominent element. Long-established woodlands contain significantly more species than woodlands which have developed recently and these woodlands may also harbour some of our rarer species, such as toothwort or narrow-leaved helleborine.

Compared with Britain and the nearby continent, Ireland has a much poorer flora of higher plants and this is true also for woodlands. Certain trees, such as beech, lime and field maple, as well as numerous herbs, e.g. lily-of-the-valley, are not native to Ireland. On the other hand, Ireland is particularly well endowed with moisture-loving and/or frost-sensitive plants, e.g. Irish spurge, strawberry tree, hay-scented buckler-fern, filmy ferns, bryophytes.

### TREES AND SHRUBS

Irish woodlands are typically dominated by ash, oak, birch, hazel and, on wetter soils, alder. There are two species of oak in Ireland, pedunculate oak and sessile oak, as well as the hybrid between these two species. Sometimes they grow together, but pedunculate oak is more common on fertile and/or wet soils than sessile oak, which is commoner on poorer and well-drained upland soils. There are also two species of birch – downy birch and silver birch – the former being by far the most common species. Of the smaller tree species, hazel (often considered a shrub because it is multi-stemmed), holly, rowan and grey willow are most abundant. Scattered through these species are small numbers of less common trees, such as aspen, cherry, crab apple, elm, hawthorn, spindle, whitebeam and yew. The low-growing guelder rose and blackthorn may also occur. Willows may be abundant on wet soils and yew may be locally dominant on limestone outcrops. Oak is often thought of as the commonest native species, but in fact ash is more common and widespread. Hawthorn is the most frequently occurring of all tree species, although it may not be very abundant.



Crab apple



Wood speedwell (left) and bugle.

## DWARF SHRUBS

These are woody plants which do not grow more than about 1.5m tall. The two commonest species are bilberry and ling heather, both of which are most abundant in oak or birch forests on poor soils. Bilberry may form a continuous and dominant layer in some woods.



Bilberry

## HERBS

There is a great variety of plants in the herb layer. Some of the commonest species are bramble, honeysuckle, herb-Robert, wood-avens, meadowsweet and violet. In some places one species may dominate. For example, under sessile oak, on poor soils woodrush may form dense carpets, while bramble or bluebell may dominate under ash and ivy under yew. In general, there are more herbs on fertile soil than on poor soils. These include many familiar and colourful plants, such as the early flowering wood anemone, bluebell, celandine, primrose and species of violet. Later flowering plants include enchanter's nightshade, meadowsweet, various grasses and sedges.

**Bluebells** are a quintessential element of many of our native woodlands. Bluebell woods are spectacular – both to see and smell - and are one of the wonders of our natural heritage. While the bluebell is common in Ireland, it occurs elsewhere only in Britain and parts of Belgium, France and Spain. The Spanish bluebell and the hybrid with our native species are coarser and less heavily scented. They are often planted in gardens and can be invasive.



Bluebell



Ivy



Honeysuckle



Scaly male-fern



Hay-scented buckler-fern

## CLIMBERS

There are only two native true climbers in Ireland: ivy, which clings on to trees and other supports by means of small roots; and honeysuckle, which twines around supports. Some species of wild rose and bramble also have the ability to reach considerable heights, being held in place by means of backward pointing thorns, but they are not true climbers. Wild clematis is an introduced climber which can be vigorous and invasive.

Ivy is an abundant and ecologically valuable evergreen plant. Typically, it creeps along the ground and, under dense shade, may dominate the herb layer. When it finds a tree it begins to climb and then produces non-clinging, flowering branches with leaves of a different shape. In autumn it produces clusters of yellow-green flowers which provide an important supply of nectar for insects when most other plants have finished flowering. The black berries ripen in spring and again are an important food source. The dense cover also provides shelter for roosting and nesting birds as well as insects. Ivy is not parasitic, and uses the trees merely as support. However, very heavy growths in

the canopy make trees more susceptible to being blown down in winter storms. Further, by smothering the tree trunks, ivy prevents the growth of epiphytic lichens, mosses and liverworts on the bark. The practice of cutting the stems of ivy is in general not considered desirable from a wildlife point of view but may be necessary to protect or encourage epiphytes and occasionally for safety reasons

## FERNS

Ferns are a characteristic feature of our woodlands. They may be abundant, and sometimes even visually dominant. Some of the most common species are broad buckler-fern, scaly male-fern, shield-fern, hart's-tongue and lady-fern. Bracken may form dense stands, especially in clearings. Of particular interest is the hay-scented buckler-fern which is relatively common in western Ireland and Britain, but is rare outside these islands. Common polypody is frequent as an epiphyte, as are the tiny filmy ferns, which are abundant in some of our western oak woods.





*Conocephalum conicum* – a thalloid liverwort



Scarlet elf-cup (*Sarcoscypha coccinea*)

## MOSES AND LIVERWORTS

Mosses and liverworts are small plants which grow on the soil, on rock outcrops and fallen timber or as epiphytes on tree trunks, branches and twigs. They are hard to identify without a microscope and specialist knowledge, but there is a great variety. Some woods contain more species of these diminutive plants than flowering plants. Ireland has one of the richest moss and liverwort floras in Europe, with 51% of European liverworts occurring here.

## FUNGI AND LICHENS

Native woodlands are home to a large number of species of fungi. This group of organisms is largely hidden from view, only becoming apparent when they produce their fruiting bodies – such as the familiar mushrooms or toadstools. They occur in enormous quantities growing through the soil or on dead wood or fallen leaves that they help to decompose. In the process they return nutrients to the soil to be taken up again by the trees and other plants. Some species, called **mycorrhiza**, live in association with the roots of plants and are essential for the healthy growth of many species of trees. Others are parasitic and may lead to the death of, or at least cause severe damage to, trees and other plants.



Honey fungus (*Armillaria ostoyae*)

Lichens are curious organisms consisting of a fungus that grows together with an alga. They form crust-like, branching (foliose) or fleshy (thalloid) growths on tree trunks and branches as well as on rocks and sometimes the soil. Many lichens require humid conditions and many are very sensitive to air pollution. They are particularly abundant in woodlands in the west of the country.



Lichens: *Evernia prunastri* and *Hypogymnia physoides*




Tree moss (*Climacium dendroides*)




## ANIMALS OF OUR NATIVE WOODLANDS

### INVERTEBRATES

The hum of insects and the occasional glimpse of butterflies on a warm summer's day are evocative of woodlands but these may be the only conscious contact we have with the vast numbers of invertebrates (animals without backbones) dwelling in a wood. Although often the least visible of the woodland fauna, it is the invertebrates which are the most diverse, abundant and ubiquitous forms of animal life. They include herbivores, such as the caterpillars of butterflies and moths which eat leaves and other living plant material; sap suckers, such as aphids; carnivores, such

A large butterfly with vibrant orange wings and dark brown spots and markings, resting on a green leaf.

Silver-washed Fritillary

A small butterfly with pale blue wings and dark spots, resting on a green leaf.

Holly Blue butterfly

as spiders, ladybirds and other beetles; detritivores, such as woodlice, snails and worms, which live off dead material; nectar-feeding insects such as hoverflies and bees, and omnivores, such as ants.

Invertebrates are to be found everywhere within a woodland, although they tend to be most obvious in open woodland, in gaps and along edges where they can take advantage of the often limited amounts of sunshine. They occur in the canopy, where they feed on the leaves; in micro-habitats such as convolutions of bark of trees and shrubs; on the herbs; in the mosses and liverworts, both on the ground and on the epiphytes; feeding on lichens and fungi; in live and dead wood; in pools and wet hollows on the ground or in trees; and last but by no means least, in the leaf litter and soil, where huge numbers of snails, slugs, woodlice, millipedes, springtails, worms and many microscopic species, help to break down dead material and recycle nutrients.

The number of known insects in Ireland is 11,422 of which a large number are dependent on deciduous woodland. Oak, willow and birch are particularly important sources of food and hawthorn and blackthorn are also very valuable. Many invertebrates occupy very specific micro-habitats and are therefore very sensitive to change. A clearing or even the removal of a dead tree can present an insurmountable obstacle to a small organism and consequently some species have become very rare and vulnerable.



## ANIMALS OF OUR NATIVE WOODLANDS

### BIRDS

Birds are an important element of our woodlands although they may be heard rather than seen. Many of our birds are generalists which have adapted to a relatively unforested landscape. However, about 28 % of our bird species may be considered as woodland species in the broadest sense. For casual visitors walking through a wood the most commonly observed (or heard) species are the chaffinch, blackbird, robin, various tits (especially the great, blue and coal), wren, wood pigeon and goldcrest. In the summer, migrant species, such as blackcaps and chiffchaff are commonly heard. The treecreeper is specifically adapted to life in trees and may be seen running mouse-like up tree trunks poking its bill into crevices in the bark to extract insects. The jay is also very much associated with woods, playing an important role in dispersing acorns, as do wood pigeons and rooks.

Treecreeper





Alyn Walsh

Chiffchaff



Mike Brown

Chaffinch



Dick Coombes

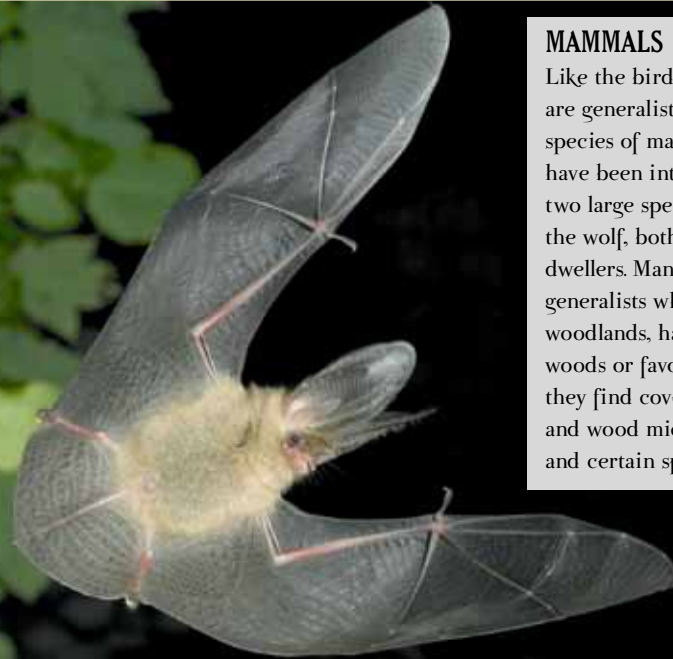
Great spotted woodpecker

Many of these species feed on the abundance of invertebrates found within the wood, often out of sight high in the canopy. A few, however, spend a lot of time on the ground. Blackbirds, for example, frequently scratch around in the leaf litter and are often responsible for the unnerving feeling that there is 'something' hiding in the bushes! The elusive woodcock is a ground-dwelling bird which may arrive in large numbers from the continent in winter, although it also breeds here. If disturbed it will shoot up from the ground almost under your feet and fly away in a zig-zag manner between the trees.

Two species of particular interest, as they have only recently arrived in (or returned to) Ireland, are the buzzard and the great spotted woodpecker. Over the last 10 to 15 years the buzzard has become increasingly common, having spread south from Northern Ireland. Although not exclusively a woodland species it frequently nests in tall trees in woodlands. The arrival of the great spotted woodpecker in some of our oakwoods in the east of the country is of particular significance. There are no historical records of this bird in Ireland, despite it being common in Britain, although Bronze Age bones have been found in County Clare. It is exclusively adapted to life in trees and plays an important role in creating new habitats within woodlands by making holes in dead and moribund trees. These can be used by other birds or mammals, especially bats, and it will be interesting to see what impact its arrival has on our woodlands.



## ANIMALS OF OUR NATIVE WOODLANDS



### MAMMALS

Like the birds, many of our mammals are generalists. Ireland has relatively few species of mammal and of these several have been introduced, while we have lost two large species – the wild boar and the wolf, both of which were woodland dwellers. Many terrestrial species are generalists which, while living happily in woodlands, have adapted to life outside woods or favour woodland edges where they find cover, e.g. fox, hedgehog, deer and wood mice. Red squirrel, pine marten and certain species of bat are perhaps the



Mike Brown



Mike Brown



Mike Brown

most closely dependent on woodland but stoats, which are competent climbers, are also common inhabitants of woodlands, especially if they are open. All species of deer (except possibly red deer) are introduced. If their numbers become too large they can do a lot of damage within a wood, eating the herb layer, preventing regeneration of trees and shrubs and sometimes stripping the bark off mature trees. The introduced grey squirrel also damages trees and is a threat to the native red squirrel.

Ireland has 9 species of bat and while they may occur in a variety of habitats many are characteristically species of deciduous woodland, roosting or nesting in holes or under loose bark. They also like to hunt along woodland edges or over open woodland. Riparian woodlands are particularly important as they provide foraging for our rarest bats: whiskered, natterers and lesser horseshoe. Riparian woodlands are also important for otters.

Mention should be made here of domestic livestock. It is traditional in many parts of the country to use woodlands for grazing cattle and sheep and sometimes ponies and goats (now usually feral). They play an important role in the ecology of the wood; if the grazing pressure is low then they help to diversify the structure and encourage biodiversity, but if the grazing pressure is too high then they can prevent regeneration, damage the ground flora and lead to the dominance of grasses.



## VARIATIONS IN WOODLANDS: WOODLAND TYPES



In his poem 'The Shadowy Waters' Yeats, referring to Coole Park, County Galway, wrote: 'Where hazel and ash and privet blind the paths'. Here he correctly referred to the woodland type, dominated by ash and hazel (privet is probably introduced), which grows there and which is probably the most widespread woodland type in the country on well-drained calcareous (lime-rich) soils.

Native Irish woodlands can be classified into 4 major types. For simplicity, each type is called after the most frequently occurring tree and herb:

- **Oak – woodrush woodlands**
- **Ash – ivy woodlands**
- **Alder – meadow-sweet woodlands**
- **Birch – purple moor-grass woodlands**

In addition there are 2 very distinctive minor types, willow woods and yew woods. Each type reflects major differences in the soil, principally the acidity, whether it is peaty or mineral, and the soil moisture. Management, e.g. grazing or former timber harvesting, can also have a major influence on the woodland, particularly in determining the herb layer. The different types are summarised opposite.

### Relationships between soil and woodland types

Major woodland type	Soil acidity	Soil type	Soil moisture
Oak-woodrush	Very acidic	Mineral	Well-drained
Ash-ivy	Mildly acidic	Mineral	Well-drained to moist
Alder-meadowsweet	Mildly acidic	Mineral or peat	Wet, some-times waterlogged
Birch moor-grass	Very to mildly acidic	Peat or mineral	Wet or Well-drained
<b>Minor woodland types</b>			
Yew	Basic	Limestone rock outcrops	Well-drained
Willow	Mildly acidic	Peat and mineral	Wet, sometimes waterlogged

These types are further subdivided into at least 20 sub-types, each again reflecting variations in habitat conditions. When visiting a particular wood it must be remembered that these distinctions are artificial and in practice many woodlands may be intermediate or contain several different sub-types. Descriptions of the major woodland groups are given on the following pages.



Foxglove



Hard fern



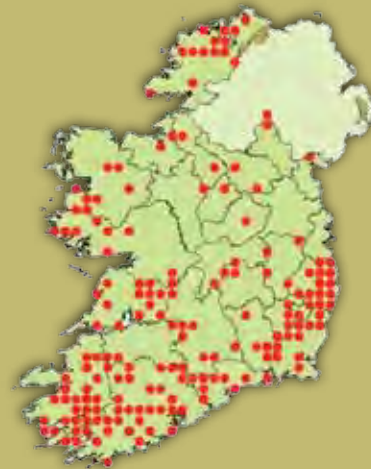
Woodrush

## OAK-WOODRUSH WOODLANDS

These woodlands occur principally in upland areas on relatively poor, well-drained, acidic soils. Sessile oak is the main tree in these woods often with birch and rowan. The shrub layer consists mostly of holly. A dwarf shrub layer of bilberry is often present and sometimes forms a dense layer. The herb layer is usually rather poor. Woodrush may be common forming thick carpets through which other plants have difficulty in growing. Other species include honeysuckle, wood sorrel and a variety of ferns, mainly hard fern, bracken and broad buckler-ferns. Where the soil is slightly more fertile, for example at the base of slopes or alongside streams, ash and hazel may occur. Here there is also a much richer herb layer including bluebell, violet, herb-Robert and enchanter's nightshade.

In very humid areas, such as in sheltered valleys and in particular in the western half of the country, there may be a luxuriant growth of ferns, including filmy

ferns, mosses, liverworts and lichens. They are often abundant as epiphytes. These woods are often referred to as 'oceanic oak woodlands'. The abundance of evergreen plants and mosses gives the woodlands a semi-evergreen appearance. The introduced beech sometimes occurs in these woodlands but the commonest and most unwelcome non-native species is rhododendron.





Hazel



Wild garlic



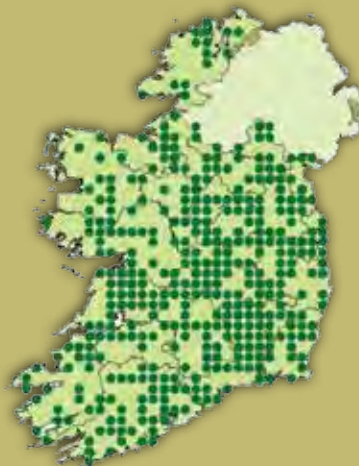
Primrose

## ASH-IVY WOODLANDS

Woodlands dominated by ash and hazel are the commonest type in Ireland on relatively dry and fertile lowland soils. They are generally much richer in flowering plants than oak woods and often have a colourful spring flora with plants such as bluebell, anemone, primrose, violets and lesser celandine. Ash is the dominant tree but pedunculate oak is often also present. Birch and rowan as well as the introduced beech and sycamore also occur. Hazel forms the shrub layer, with small amounts of hawthorn, holly, spindle and blackthorn and locally the introduced cherry laurel. The herb layer also includes bramble, honeysuckle, ivy, wood avens, wood speedwell, strawberry, false brome, lords and ladies, wood sanicle, enchanter's nightshade and numerous ferns. Mosses and liverworts are generally less abundant and varied than in oak woodlands.

These woodlands show a lot of variation. On less fertile soils and under deep shade, eg. under holly, there may be far fewer species with ivy dominating on the

woodland floor. In contrast, on shallow soils, the woodlands may be very rich in species, including some of our less common shrubs and trees, e.g. whitebeam, yew, buckthorn. On limestone pavement, where the soil is very shallow, the woods are often dominated by hazel with only occasional ash trees emerging above this layer and a very well developed moss layer.



Bluebell and celandine under pedunculate oak and ash



Alder woodland with yellow flags (David Holyoak)

## ALDER-MEADOWSWEET WOODLANDS

Alder-meadowsweet woods are widely distributed across the country in wet situations, for example on lakeshores and beside rivers where they are periodically flooded, in waterlogged hollows and on heavy, poorly drained soils on both mineral and peat soils. They are varied and often species-rich, typically consisting of a mixture of alder with various amounts of ash, grey willow and occasionally birch and pedunculate oak,

Hawthorn, hazel and guelder rose may occur in the shrub layer. Alder casts a relatively light shade and this allows the development of a tall and lush herb layer. Typical species include angelica, meadowsweet, remote sedge, creeping buttercup, wood avens, purple loosestrife, marsh-bedstraw, water mint, yellow flag and reed canary-grass as well as the ubiquitous ivy, bramble and honeysuckle.



Yellow flag



Guelder rose



Alder



These woodlands occur principally on peat, mostly on cut-away bogs in the midlands, but also on mineral soil in association with oak woods. Birch is one of the first trees to colonise abandoned land and many of these woodlands are relatively recent. Consequently, they tend to have fewer species than other woodlands. Typically, birch is the dominant tree, sometimes with Scots pine and occasionally ash and oak. Grey willow and occasionally holly form the thin shrub layer. The herb layer

is poor in species, with bramble, bracken, honeysuckle, ivy and purple moor-grass being most common. Some birch woodlands contain species commonly found in oak or ash woods, indicating that they are early stages in succession to these woodland types. Of particular interest are birch woodlands on raised bogs underlain by dense carpets of Sphagnum moss and a thin covering of moor-grass, ferns and ling heather. These represent the very rare 'bog woodland'.



Sphagnum moss

## BIRCH-PURPLE MOOR-GRASS WOODLANDS



Birch woodland with bracken and bramble [BEC Consultants]



Marsh marigold

A very distinctive type of woodland occurs on nutrient-rich alluvium along the banks of slow-flowing rivers, such as the Shannon and Suir. It is dominated by several species of willow. This includes the native grey willow but the most prominent species are white willow, crack willow and common osier. These willows are probably not native but

were introduced many centuries ago, principally for basket making. They contain a very distinctive flora of tall herbs, such as nettle, reed canary-grass, water dropwort, hedge bindweed and angelica. The trees tend to fall over once they reach a certain size forming a dense tangle of branches which makes it very difficult to walk through.

## WILLOW WOODLANDS



Yew woodland is a distinctive and very rare woodland type confined to limestone outcrops in the southwest of the country. Typically, species found in ash woods occur but because of the very dense shade cast by the evergreen yew the shrub

and herb layers are very poorly developed. Ivy is the commonest species with small amounts of false brome, carnation sedge and honeysuckle. In contrast, however, the moss layer is often luxuriant, although dominated by only one or two species.



Common tamarisk moss  
(*Thuidium tamariscinum*)

## YEW WOODLANDS



Yew wood at Garryland, Co. Galway



Yew fruits



## HOW WOODLANDS CHANGE OVER TIME



Relative to human lifespan, many tree species are long lived. There are oaks in Charleville, Co. Offaly, thought to be 450 years old - they would have been saplings shortly after Elizabeth 1st became Queen of England - and they could probably survive as long again, albeit in a moribund condition. Today, these oak trees are surrounded by tall oak and ash but as saplings their environment was probably quite different. Were they a small group on their own in a gap in the canopy or were they part of a larger wood and are the only trees to have survived?

It may appear that once a woodland reaches a certain degree of maturity that it changes little over time. However, there are constant processes at work causing change. Trees die or are blown over opening up gaps. Sometimes this is a gradual process but every so often a major event, such as a storm, may fell swathes of trees. There is a rapid response to such changes. The herb layer develops quickly, taking advantage of the light. Very small trees, which may have been growing slowly for decades, put on a spurt of growth and within 10 years or so, the gap is filled with young trees and the undergrowth dies back. If we could hover above a woodland in a time-machine to observe the changes over a few centuries we would see gaps opening and closing and possibly waves of different tree species moving across the woodland, e.g. ash replacing oak or vice versa.

On a larger scale, the size of a wood may remain more or less unchanged for decades or even centuries. Some woods may lose area through conversion to agricultural land or development of houses while others may expand if agricultural land is abandoned. The past history of native Irish woodlands has been one of successive decline but in recent decades this has been reversed, partly through increased planting but also through natural expansion as a result of land abandonment and cessation of peat cutting.



## NEW TREES FOR OLD: REGENERATION

Most of our native trees and shrubs regenerate sexually, i.e. by means of seeds which are borne in fruits. The fruits may be very small, such as birch and willow, or large, such as acorns of the oak. The majority are dispersed by wind or birds and they are adapted according to the manner in which they are dispersed. Birch and ash fruits, for example, have 'wings' which enable them to be dispersed by the wind, in some cases for considerable distances. Trees which use birds as dispersal agents produce brightly-coloured berries, e.g. holly, yew and rowan. Acorns and hazel nuts are carried by large birds, especially rooks and jays, and possibly also by mice, squirrels and pine martens. Generally these large seeds are dispersed over much shorter distances.

Seeds may be produced in huge numbers, but the majority will never produce a mature tree. The seed may be eaten before it has a chance to germinate; if it does germinate the seedling may be eaten or die from disease and if it grows into a sapling it may be shaded out by older trees. Most of our native species do not regenerate

readily under shade – their seeds need to land in open ground if they are to grow and thrive. In this way trees colonise clearings or natural gaps and expand into new places.

Some species, such as aspen and cherry, regenerate vegetatively or asexually, i.e. without seed, by means of underground shoots or suckers. As a result, a small group of trees develops, all of which are genetically identical. Willows have the ability to grow from natural 'cuttings', i.e. twigs or branches which break off the tree and subsequently root. This is a particular advantage for trees growing alongside rivers, as broken branches can be carried downstream to establish new trees. Occasionally, natural layering occurs, where a branch still attached to a tree will root if it is pinned down to the ground, for example, by a fallen bough; this is particularly common with yew and holly. These vegetative means of propagation are less common than regeneration by seed, but they do enable trees to survive if sexual reproduction fails.





Rhododendron

## THREATS TO OUR NATIVE WOODLANDS



### ALIEN INVADERS

One of the most serious threats to our native woodlands arises from the invasion by non-native plants. Some of these plants may be beautiful or useful and they may appear to add interest and variety to our woodlands but in fact they can do a lot of damage. The commonest invasive non-native trees are beech and sycamore, which were often planted for timber. Old trees may actually be valuable for wildlife but where they regenerate abundantly they shade out native species and are then considered undesirable. During the last century many native woodlands were underplanted with conifers, especially spruce and pine. As these grew they gradually shaded out the native species. Fortunately, remnants of the original flora often persisted and today some of these areas are being restored by removing the conifers.

Rhododendron and cherry laurel are particularly damaging invasive shrubs. Where they are well developed they can form impenetrable thickets which shade out native species, prevent native trees from regenerating and destroy animal habitats. Snowberry and red-osier dogwood, the latter especially along rivers, are also a problem and locally wild clematis can be invasive. Herbaceous species, eg. giant hogweed that grows alongside rivers and streams, can also be very damaging.



Red deer

Eddie Dunne



Tree regeneration within a fenced area

## GRAZING ANIMALS

Grazing animals are a natural part of a woodland ecosystem. Large herbivores, such as red deer, would have grazed and browsed our woods in the past and their activities would have created clearings and gaps and disturbed the soil. This can be beneficial because it prevents any one species dominating the herb layer, encourages a variety of plants and aids the regeneration of trees. However, there is a fine balance between a healthy level of grazing and too much grazing. Today, some of our woodlands are over-grazed, with the result that the herb layer is almost absent and plants cannot flower and set seed, while tree seedlings and saplings are destroyed. In the long-term, this could lead to the loss of the wood as the older trees die off and there are no younger trees surviving to replace them. While deer are a major – and increasing – cause of overgrazing, sheep and cattle can also cause damage.

Fences can be used to keep animals out but they are not a long term solution as they have to be well maintained. Further, if there is too little grazing the woodlands can become overgrown with, for example, dense thickets of bramble. In such situations there is a loss of biodiversity because other species cannot compete against the more vigorous plants. A happy medium is required: the best solution is a regime of light grazing, sufficient to encourage diversity of species but not so heavy that trees cannot regenerate.

## CLEARANCE

Woodland clearance leads to the loss of the woodland. This is particularly serious for long-established or ancient woodlands which contain the greatest amount of biodiversity. Once such a wood has been cleared and the tree roots removed it cannot be recreated because it takes centuries for newly planted trees to mature and for the associated flora and fauna to return – if ever.

## OTHER THREATS

More subtle impacts on our native woods arise from indirect activities. For example, air pollution can damage delicate lichens, while fertiliser drift from adjacent farm land can alter the woodland flora. Drainage damages alluvial and other wetland woods by altering flooding regimes.

Finally, dumping of domestic and agricultural rubbish is unfortunately common in our native woodlands, and this detracts from their natural beauty.



Rubbish washed in by floods



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## MANAGEMENT OF NATIVE WOODLANDS

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Since man first arrived in Ireland all our woodlands have been influenced to some extent by human activity. In the past, woodlands were considered a valuable resource, not only for timber but also for other uses, e.g. as a source of food or grazing for domesticated animals. As a result, they were often carefully protected and managed and a variety of different management practices developed. These were often beneficial to wildlife, creating habitats for a wealth of plants and animals. Over the last century, however, as the emphasis shifted towards the growing of coniferous plantations, many of these practices have been abandoned and the woodlands left to develop naturally. Paradoxically, this change has not always been beneficial for biodiversity or the woodland ecosystems.

In the past, woodlands were often managed for specific products. Some were coppiced to produce a constant supply of small timber for charcoal production or bark for the tanning industry. In some woods, selected trees were left to grow to maturity and a wood of ‘coppice with standards’ developed, i.e. widely spaced large trees with an undergrowth (or underwood) of coppiced trees. The large trees were used for construction purposes, e.g. for buildings or ships. This process also led to the selection of the most valuable species: oak was particularly useful and valuable. Measures were often taken to protect young trees from grazing animals, e.g. the creation of ditches and banks or fences, which are often still visible. Charcoal hearths and saw pits are common in many woods, although not

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### COPPICING

Coppicing is a practice based on the ability of most of our native trees to produce new shoots from the stump or roots following felling. These new shoots can be cut again, whereupon more new shoots will be produced. The cut stump, referred to as a stool, can survive almost indefinitely, gradually expanding outwards. Coppicing is a form of traditional woodland management which was practiced for millennia,

but largely died out in the early part of last century. Trees were coppiced on a regular or irregular cycle, usually of around 20 years. In some cases the trees were cut at about 2 metres above the ground to prevent grazing animals eating the new shoots. This is known as pollarding. Evidence of former coppicing and pollarding, such as multi-stemmed trees or old stools, may be found in many woods.





Coppiced woodland. St. John's Wood, Co. Roscommon

Keith Alexander

always easily recognised. Other woods were used for grazing and, over time, were converted into open grassland with scattered large trees or 'wood pasture'.

While the landowners were felling they were also planting introduced species, such as Norway spruce, larch, Scots pine and beech, were often planted among native species or in new woodlands and mature specimens of these species are often present in woodlands today. Shrubs, such as rhododendron, snowberry and cherry laurel, were also introduced for game cover or to beautify the woods.

Today, relatively few of our native woodlands are managed for timber. Some are managed specifically for biodiversity (i.e. within nature reserves or national parks) but many are effectively abandoned, apart from the occasional removal (sometimes theft!) of trees. These woods often consist of even-aged trees of the same size and are uniform, overgrown and deeply shaded. While this suits some species, eg. certain lichens, other species need the light and warmth of a more open canopy and gaps. Moreover, as many of the trees are of poor quality, the landowner may consider the woodland a waste of space and is therefore more likely to fell it or convert it to agricultural or development land.



Newly planted native woodland



Coppice stool

# AN OVERLOOKED RESOURCE? USES OF NATIVE WOODLANDS



Properly managed and using an integrated and planned approach, native woodland can be a valuable asset, producing an income from timber, providing habitat for wildlife and benefitting the environment in general. Their economic value is often overlooked, perhaps because it is not always easy to quantify.

With the present overwhelming importance of plastics, metals and concrete in everyday life it is very easy to forget how important our native woodlands were in the past. Until

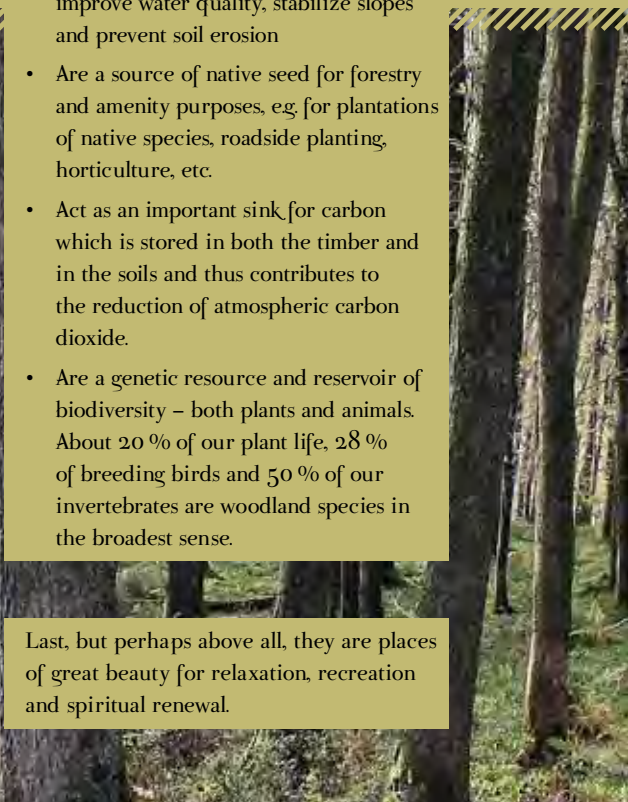
relatively recently timber was widely used for almost every aspect of daily life: housing, furniture, domestic utensils, agricultural implements and in particular firewood. Each timber type had specific uses, eg oak for construction, ash for tool handles, hurleys, etc. Native woodlands also had an industrial value as they were a source of charcoal for smelting metals and of bark for use in the tanning industry. Indeed, the very survival of some woodlands is due to their former economic value. Today, our native woodlands are not used to any

significant extent for these purposes, except perhaps for the growing of hurley ash and, increasingly, fire wood. However, in a world where the importance of sustainability is increasingly recognised, timber produced from native woodlands could form an important part of our economy.

It is important also to look at less tangible benefits and values of native woodlands. Besides timber they

- Provide important environmental 'services', eg they regulate the flow of water in our rivers, reduce flooding, improve water quality, stabilize slopes and prevent soil erosion
- Are a source of native seed for forestry and amenity purposes, eg for plantations of native species, roadside planting, horticulture, etc.
- Act as an important sink for carbon which is stored in both the timber and in the soils and thus contributes to the reduction of atmospheric carbon dioxide.
- Are a genetic resource and reservoir of biodiversity – both plants and animals. About 20 % of our plant life, 28 % of breeding birds and 50 % of our invertebrates are woodland species in the broadest sense.

Last, but perhaps above all, they are places of great beauty for relaxation, recreation and spiritual renewal.



## INTERNATIONAL SIGNIFICANCE OF NATIVE IRISH WOODLANDS

At an international level, our woodlands are part of the temperate deciduous broadleaf forests that stretch from the Atlantic to the Ural Mountains in Russia. Many of our woodlands are rare and distinctive at a European level, thanks to our moist, mild climate and the particular group of species occurring in Ireland. In fact some may be of global significance as they are restricted to Ireland or Britain and some nearby parts of the continent. These include: the fern-, moss- and lichen-rich oak woods, often referred to as 'oceanic oak woodlands', which are largely confined to western Ireland and Britain; ash woods, largely restricted to Ireland and Britain; hazel woods, mostly confined to western Ireland and western Scotland; yew woods and, finally, bog (birch) woods occurring on raised bogs. This makes it all the more critical that we conserve and manage them correctly.



A variety of herbs growing in a hazel wood in the Burren



## CONSERVATION

The importance of our native woodlands has been recognised by the establishment of 29 nature reserves covering c4,500 ha. In addition, there are several important woodlands within the National Parks, foremost of which are the Killarney woods covering a total area of c1,200 ha – see Appendix 4. The Killarney woods have the greatest extent and greatest diversity of all our native woodlands, including oak woods, ash woods, a variety of alder and willow woods, the most extensive alluvial woodlands in the country and a large yew woodland.

The significance of some of our woodlands is recognised by the European Union. Under the EU Habitats Directive c9,500 ha of native woodland have been designated as Special Areas of Conservation (SACs) or Natura 2000 sites. These include oak woodlands, alluvial woodlands (a variety of different woodland types subject to flooding or which grow around springs or seepage areas), yew woods and bog woods. In addition, there are areas of woodlands and scrub on limestone pavement which are also designated as Natura 2000 sites. In the future, additional areas, particularly ash woodlands, will be protected as

Natural Heritage Areas under the national Wildlife Act.

Currently, the area of native woodland in the country is small and fragmented and many woods are in poor condition. Under the EU Habitats Directive, Ireland is obliged to improve the quality of Natura 2000 sites, reduce fragmentation and expand the area. To this end woodlands must be managed correctly. First and foremost, invasive plants, such as rhododendron and laurel, must be removed. This is physically demanding and expensive work but, if properly done, as for example, in Glengarriff Wood Nature Reserve, Co. Cork, and Killarney National Park, can be very effective and rewarding in opening up areas previously choked with these shrubs. Control of grazing animals is also required where overgrazing is a problem. This is particularly necessary following the removal of invasive plants, otherwise the native vegetation will not be able to re-establish itself. Other action which may be necessary includes removal of non-native conifers, amalgamation of existing stands of native woodland by planting native species, opening gaps and ride-lines and, in places, re-introducing coppicing.

The image is a full-page photograph of a lush, green forest. In the foreground, there is a dirt path that winds through tall grasses and various green plants. The middle ground is filled with a dense canopy of trees, with sunlight filtering through the leaves, creating dappled light on the ground. In the background, more trees are visible, and a hint of a blue sky can be seen through the branches. The overall scene is vibrant and natural.

## NATIVE WOODLANDS IN THE FUTURE

There is general recognition that we need to expand the area of forest in the country and this has been government policy for many years. Native woodlands will form part of these new forests. Some will be plantations of native tree species planted for timber production. Others will be planted to improve the environment, especially along rivers and streams and in flood plains. At the same time, native woodland is expanding naturally, both on former agricultural land, especially in the uplands, and on abandoned cutaway bog. All this is good news for native woodlands and for the plants and animals which live in them and their future looks brighter now than it has done for many decades.

## APPENDIX I: NATIVE IRISH TREES AND SHRUBS

Common Name	Latin Name	Irish Name
Alder	<i>Alnus glutinosa</i>	Fearnóg
Alder buckthorn	<i>Frangula alnus</i>	Draighean fearna
Ash	<i>Fraxinus excelsior</i>	Fuinneóg
Aspen	<i>Populus tremula</i>	Crann Creathach
Birch - Silver	<i>Betula pendula</i>	Beith gheal
Birch - Downy	<i>Betula pubescens</i>	Beith chlúmhach
Black poplar	<i>Populus nigra</i>	Poibleog dhubh
Blackthorn	<i>Prunus spinosa</i>	Draighean
Buckthorn	<i>Rhamnus catharticus</i>	Paide bréan
Cherry - Bird	<i>Prunus padus</i>	Donnroisc
Cherry - Wild	<i>Prunus avium</i>	Crann sílín
Crab apple	<i>Malus sylvestris</i>	Mubhall fhiadhain
Elder	<i>Sambucus nigra</i>	Trom
Elm	<i>Ulmus glabra</i>	Leamhán
Guelder rose	<i>Viburnum opulus</i>	Caor chon
Hawthorn	<i>Crataegus monogyna</i>	Sceach geal
Hazel	<i>Corylus avellana</i>	Coll
Holly	<i>Ilex aquifolium</i>	Cuilleann
Juniper	<i>Juniperus communis</i>	lúr craige
Oak - Hybrid	<i>Quercus x rosacea</i>	Dair
Oak - Pedunculate	<i>Quercus robur</i>	Dair ghallda
Oak - Sessile	<i>Quercus petraea</i>	Dair ghaelach
Rowan	<i>Sorbus aucuparia</i>	Caorthann
Scots pine	<i>Pinus sylvestris</i>	Guis
Spindle	<i>Euonymus europaeus</i>	Feoras
Strawberry tree	<i>Arbutus unedo</i>	Caithne
Whitebeam	<i>Sorbus aria</i>	Fionncholl
Whitebeam - English	<i>Sorbus anglica</i>	Fionncholl gallda
Whitebeam - Irish	<i>Sorbus hibernica</i>	Fionncholl gaelach
Whitebeam - rock	<i>Sorbus rupicola</i>	Fionncholl creige
Willow - Bay	<i>Salix pentandra</i>	Saileach labhrais
Willow - Eared	<i>Salix aurita</i>	Crann sníofa
Willow - Goat	<i>Salix caprea</i>	Sailchearnach
Willow - Grey	<i>Salix cinerea</i>	Saileach liath
Willow - purple*	<i>Salix purpurea</i>	Saileach chorcra
Yew	<i>Taxus baccata</i>	lúr

## APPENDIX 2: LIST OF PLANT SPECIES MENTIONED IN THE TEXT

Common name	Latin name
Angelica	<i>Angelica sylvestris</i>
Beech	<i>Fagus sylvatica</i>
Bilberry	<i>Vaccinium myrtillus</i>
Bluebell	<i>Hyacinthoides non-scripta</i>
Bluebell - Spanish	<i>Hyacinthoides hispanica</i>
Bracken	<i>Pteridium aquilinum</i>
Bramble	<i>Rubus fruticosus</i>
Broad buckler-fern	<i>Dryopteris dilatata</i>
Celandine	<i>Ranunculus ficaria</i>
Cherry Laurel	<i>Prunus laurocerasus</i>
Common osier	<i>Salix viminalis</i>
Common polypody	<i>Polypodium vulgare</i>
Creeping buttercup	<i>Ranunculus repens</i>
Dandelion	<i>Taraxacum officinale</i>
Dog's mercury	<i>Mercurialis perennis</i>
Enchanter's nightshade	<i>Circaea lutetiana</i>
False brome	<i>Brachypodium sylvaticum</i>
Field maple	<i>Acer campestre</i>
Filmy fern	<i>Hymenophyllum species</i>
Foxglove	<i>Digitalis purpurea</i>
Giant hogweed	<i>Heracleum mantegazzianum</i>
Hard fern	<i>Blechnum spicant</i>
Hart's-tongue fern	<i>Phyllitis scolopendrium</i>
Hay-scented buckler-fern	<i>Dryopteris aemula</i>
Hedge Bindweed	<i>Calystegia sepium</i>
Herb-Robert	<i>Geranium robertianum</i>
Honeysuckle	<i>Lonicera periclymenum</i>
Horsetail - Great	<i>Equisetum telmateia</i>
Irish spurge	<i>Euphorbia hyberna</i>
Ivy	<i>Hedera helix</i>
Lady-fern	<i>Athyrium filix-femina</i>
Larch	<i>Larix species</i>
Lily-of-the-valley	<i>Convallaria majalis</i>
Lime	<i>Tilia species</i>
Ling heather	<i>Calluna vulgaris</i>
Lords and ladies	<i>Arum maculatum</i>

Common name	Latin name
Marsh-bedstraw	<i>Galium palustre</i>
Marsh marigold	<i>Caltha palustris</i>
Meadowsweet	<i>Filipendula ulmaria</i>
Narrow-leaved helleborine	<i>Cephalanthera longifolia</i>
Nettle	<i>Urtica dioica</i>
Norway spruce	<i>Picea abies</i>
Primrose	<i>Primula vulgaris</i>
Purple loosestrife	<i>Lythrum salicaria</i>
Purple moor-grass	<i>Molinia caerulea</i>
Red-osier dogwood	<i>Cornus sericea</i>
Reed canary-grass	<i>Phalaris arundinacea</i>
Rhododendron	<i>Rhododendron ponticum</i>
Scaly male-fern	<i>Dryopteris affinis</i>
Sedge - remote	<i>Carex remota</i>
Sedge - carnation	<i>Carex panicea</i>
Shield-fern	<i>Polystichum setiferum</i>
Snowberry	<i>Symphoricarpos albus</i>
Strawberry	<i>Fragaria vesca</i>
Sycamore	<i>Acer pseudoplatanus</i>
Toothwort	<i>Lathraea squamaria</i>
Violet	<i>Viola species</i>
Water dropwort	<i>Oenanthe crocata</i>
Water mint	<i>Mentha aquatica</i>
Wild clematis	<i>Clematis vitalba</i>
Wild garlic	<i>Allium ursinum</i>
Wild rose	<i>Rosa species</i>
Willow - Crack	<i>Salix fragilis</i>
Willow - White	<i>Salix alba</i>
Wood Anemone	<i>Anemone nemorosa</i>
Wood avens	<i>Geum urbanum</i>
Woodrush	<i>Luzula sylvatica</i>
Wood sanicle	<i>Sanicula europaea</i>
Wood sorrel	<i>Oxalis acetosella</i>
Wood speedwell	<i>Veronica montana</i>
Yellow flag	<i>Iris pseudacorus</i>

## APPENDIX 3: LIST OF ANIMAL SPECIES MENTIONED IN THE TEXT

Common Name	Latin Name	Irish Name
<b>Invertebrates</b>		
Holly blue butterfly	<i>Celastrina argiolus</i>	
Kerry Slug	<i>Geomalacus maculosus</i>	
Merveille du Jour moth	<i>Dichonia aprilina</i>	
Puss Moth	<i>Cerura vinula</i>	
<b>Birds</b>		
Blackbird	<i>Turdus merula</i>	Lon dubh
Blackcap	<i>Sylvia atricapilla</i>	Caipín dubh
Buzzard	<i>Buteo buteo</i>	Clamhán
Chaffinch	<i>Fringilla coelebs</i>	Rí rua
Chiffchaff	<i>Phylloscopus collybita</i>	Tiuf-teaf
Great spotted woodpecker	<i>Dendrocopos major</i>	Mórchnagaire breac
Goldcrest	<i>Regulus regulus</i>	Cíorbhuí
Jay	<i>Garrulus glandarius</i>	Scréachóg
Robin	<i>Erithacus rubecula</i>	Spideog
Rook	<i>Corvus frugilegus</i>	Rúcach
Tit - blue	<i>Parus caeruleus</i>	Meantán gorm
Tit - coal	<i>Parus ater</i>	Meantán dubh
Tit - great	<i>Parus major</i>	Meantán mor
Treecreeper	<i>Certhia familiaris</i>	Snag
Woodcock	<i>Scolopax rusticola</i>	Creabhar
Wood pigeon	<i>Columba palumbus</i>	Colm coille
Wren	<i>Troglodytes troglodytes</i>	Dreoilín
<b>Mammals</b>		
Badger	<i>Meles meles</i>	Broc
Bat - brown long-eared	<i>Plecotus auritus</i>	Ialtóg fhad-chluasach
Fox	<i>Vulpes vulpes</i>	Madra rua
Hedgehog	<i>Erinaceus europaeus</i>	Grainneóg
Pine marten	<i>Martes martes</i>	Cat crainn
Red deer	<i>Cervus elephus</i>	Fia rua
Stoat	<i>Mustela erminea</i>	Easóg
Squirrel - Grey	<i>Sciurus carolinensis</i>	Iora glas
Squirrel - Red	<i>Sciurus vulgaris</i>	Iora rua
Wild boar	<i>Sus scrofa</i>	Torc fáin
Wolf	<i>Canis lupus</i>	Mac tíre
Woodmouse	<i>Apodemus sylvaticus</i>	Luch fhéir

## APPENDIX 4

### PRINCIPAL NATIVE WOODLANDS IN NATIONAL PARKS AND NATURE RESERVES.

Restoration management has been undertaken in many of these woodlands over recent decades. The principal action has been the removal of conifers, rhododendron and laurel and control of grazing. There has also been some planting of native trees.

### NATIONAL PARKS

1. **Killarney.** County Kerry. c.1,200 ha. The most extensive areas of native woodland in Ireland occur in the Killarney Valley. They include sessile oak, ash, alder, birch and yew woods. They are noted for the luxuriance of the mosses, liverworts and lichens and the presence of species which occur much further south, eg. strawberry tree.
2. **Glenveagh.** County Donegal. c.60 ha. A mixture of sessile oak and birch woodland with patches of hazel scrub in valleys.
3. **Burren.** County Clare. Patches of species-rich hazel scrub and hazel-ash woodland occur on limestone pavement. Old hazel woodland with interesting epiphytes is also present.
4. **Wicklow Mountains.** Old oak woodland occurs on the flanks of the valley at Glendalough. Extensive areas of conifer plantations in the same area are being converted to oak-Scots pine-birch woodland.



## NATURE RESERVES

### County Clare

**Cahermurphy.** R567945\* 12 ha. A small oak woodland with a diversity of habitats, including a small stream. The flora is rich and varied.

**Dromore.** R357877. 330 ha. 10 km north of Ennis. Species-rich ash and hazel woodland on deeper soils, hazel scrub on shallow soils and patches of limestone pavement. Small areas of willow and alder woodland occur around lake shores.

### County Cork

**Glengarriff Wood.** V916569. 300 ha. A large oak woodland similar to those in the Killarney National Park. It has a very rich flora, including many bryophytes and lichens typical of the mild and moist climate.

**Knockomagh Wood.** W091289. 12.5 ha. A mixture of sessile oak and beech overlooking Lough Hyne Nature Reserve.

**The Gearagh.** (Owned by ESB). W299696. An extensive alluvial woodland on the River Lee, consisting of a network of channels and small islands covered in pedunculate oak and ash. The site is dangerous and difficult to access.

### County Donegal

**Ballyarr Wood.** C185202. 30 ha. 11 km north of Letterkenny. An old oak wood with patches of ash, alder and birch woodland and a rich flora.

**Derkmore Wood.** G812990. 7 ha. An isolated wood north-east of Glenties. It consists of oak, birch and hazel scrub with a well-developed bryophyte and lichen flora.

**Duntally Wood.** C067310. 15 ha. Just south of Creeslough this wood lies in a deep valley. Much of the area is covered in species-rich ash and hazel woodland with alder woodland on poorly drained soils in the valley bottom.

**Rathmullan Wood.** C279271. 33 ha. This wood lies on the western shores of Lough Swilly. It consists mostly of oak woodland with patches of wet alder woodland and beech.

### County Galway

**Coole-Garryland.** M424038. 363 ha, and **Ballynastaig Wood.** M421054. 10 ha. 5 km northwest of Gort. Extensive woodlands partly on limestone pavement and incorporating a complex of turloughs and lakes. The area is very diverse and rich and includes ash woodland, alder-hawthorn woodland around the turloughs, yew woodland and a variety of rare species.

**Derryclare.** L832496. 10 ha. Situated on the northwest shore of Derryclare Lough. An excellent example of sessile oak woodland with a rich bryophyte and lichen flora. Small areas of birch and willow woodland also occur.

**Richmond Esker.** M590540. 16 ha. 4 km northwest of Moylough. Ash woodland on an esker ridge with a typical flora. The area is a restored conifer plantation.

**Rosturra Wood.** M759009. 17 ha. **Derrycrag Wood.** R742991. 110 ha. **Pollnacknockaun Wood.** M739015. 39 ha. These 3 woodlands occur just outside Woodford. Formerly a mosaic of introduced conifers and oak they are being converted to a mixture of sessile oak, Scots pine and birch. There are small areas of alder wood and several uncommon plant species.

### County Kerry

**Uragh Wood.** V836627. 87 ha. c.14 km southwest of Kenmare. A large wood on a steep, rocky hillside above Lough Inchiquin. It consists of a mixture of oak and birch and is rich in bryophyte and lichens.

### County Kilkenny

**Ballykeeffe.** S407515. 57 ha. 12 km southwest of Kilkenny situated on a prominent limestone hill. A young ash woodland with pedunculate oak and abundant bramble and bluebells.

**Kyledohir.** S371425. 61 ha. 5 km southwest of Callan. Mixed, young oak - ash - elm woodland on a low-lying site with moisture-loving species.

**Garryricken.** S400385. 28 ha. 6 km southwest of Callan. This reserve consists of a mixture of ash, oak and birch woodland on a variety of soil types.

**Fiddown Island.** S463205. 21 ha. 7 km east of Carrick-on-Suir. An alluvial woodland dominated by tree willows formerly used for basket making. The vegetation is characterised by tall herbs, sedges and grasses.

\*The location is given by the 6 figure grid reference. The area given is that of the Nature Reserve; the woodland may be smaller.

**County Laois**

**Grantstown Wood and Lough.** S336801. 49 ha, and **Coolacurragh Wood.** 8 ha. S 332793. 8 km west of Durrrow. These reserves are examples of wet woodland on base-rich soils. They are dominated by alder, ash and birch with hawthorn in the shrub layer. The herb layer is dominated by bramble, nettle and meadowsweet. Grantstown Lough is a classic example of a lake which has gradually infilled through fen to alder carr.

**Timahoe Esker.** S539915. 13 ha. 1 km northeast of Timahoe. Ash woodland with pedunculate oak and grey willow, hawthorn and hazel. The herb layer includes bluebell, bugle and shield fern.

**County Mayo**

**Oldhead Wood.** L830825. 27 ha. 3 km northeast of Louisburg. A sessile oak woodland on a prominent hill. It contains a diverse flora and is rich in epiphytic mosses and lichens and clearly shows the effects of exposure.

**County Wicklow**

**Deputy's Pass.** T235905. 47 ha. 2 km southwest of Glenealy. A typical sessile oak wood with woodrush and bilberry. Part of the site is dominated by birch and ash woodland occurs near the small stream.

**Glen of the Downs.** O260112. 59 ha. 9 km south of Bray. Sessile oak woodland in a spectacular valley. The woodland, which was formerly coppiced, is mostly poor in species but shows marked contrast between the drier western-facing slope and the moister eastern-facing slope. There is a band of ash woodland in the valley bottom.

**Knocksink Wood.** O212184. 52 ha. Just north of Enniskerry. Situated in the Glencullen River valley this woodland is a mixture of sessile oak and ash woodland, rich in species. Seepage areas and springs on the valley sides are characterised by alder and great horsetail.

**Vale of Clara.** T183915. 220 ha. A very extensive woodland in the valley of the Avonmore River between Rathdrum and Laragh. It consists of a mixture of old sessile oak woodland, mixed oak and Scots pine and young birch woodland which has developed following removal of conifers. Woodrush, bilberry and bluebell are common. Like many oak woods in Wicklow, this site was formerly coppiced.

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