

Toghers were used as military bottlenecks by the native Irish against invading English armies in later centuries, particularly when they provided the only means of access to a settlement, castle or monastery. Trenches were dug across toghers or the toghers were broken up altogether as a method of stalling the enemy. i.e. it took Lord Mountjoy two years to cross the midland bogs into Ulster in pursuit of Hugh O'Neill after the battle of Kinsale in 1601 because he did not know the togher routes.





## **7 BOGS IN IRISH ECONOMY**

### **PAST:**

The bogs were the last wilderness to take shape in the Irish landscape in the wake of the Ice Age. During the first millennia little could be done to reclaim these barren wet deserts and replace them with fields as had been done with most of the forest wilderness in other parts of the world. This relationship between humans and bogs in Ireland changed for two reasons:

1. The increasing scarcity of wood as a domestic fuel.
2. An increasing population.

Turf was found not to be an inferior fuel. It burnt low and evenly and there was little chance of burning splinters setting fire to the house, as with wood.

The old Irish law text, "The Seanchas Mór" dates from the 7th & 8th centuries. It refers to "the ditch of a turf cutting" as among the seven ditches which are exempt from liability in the case of accidental drowning.

Beneath the hill of Goig Castleconnell, Co. Limerick a togher was found in the 19th century and beside this, under at least 20 spit of turf, there were ancient bog holes and the remains of wooden sleáns. In the Annals of Standish O'Grady there is a reference to a 7th century King of Connaught being killed at the hands of a party of turf cutters. "And this their design they verily executed with the turf spades that were in their hands". From these references it is clear that turf was an important resource in Gaelic Ireland.

In the 12th Century the bog and its traditions were adopted by the Anglo-Normans. The right of its Norman Lord to demand a certain number of days' work on the bog each year from his tenants can be found in medieval documents i.e. The Red book of Ormond "they also say it was customary for each tenant to give five days to his Lord drawing turf and so on".

In medieval times turf was burnt in monastery, manor and tenant cottage alike. People became more familiar with the edges of bogs where they could drain them easily. But they hadn't the technology to drain the bog interior.

By the 18th century and 19th century and until after W.W. II, when turf was the only fuel people had, 5 million tons of turf were cut each year. At this rate of consumption, it was thought there was enough turf in Irish bogs to last 700 years. The production of hand cut turf peaked at over 6 million tons in 1926.

During the 18th & 19th centuries there was no alternative fuel as all the forests were in the hands of the landlords who used it for hunting or felled it to build the ships of the British Empire.

During the 18th & 19th centuries the growing Irish cities and towns turned to the bogs for fuel. This market was facilitated by the construction of the Grand Canal and Royal Canal through the Bog of Allen. In the early 19th century 30,000 tons of turf were being shipped to Dublin by canal from the Bog of Allen each year.

In the 18th & 19th centuries large amounts of turf were cut in Connemara and transported by Galway hookers to the Aran Islands and the Burren in Clare where there was no turf. The trade continued until after W.W. II. The annual "cruinniú na mbád" festival in Kinvara each year commemorates this chapter in Irish history. In the 19th century turf was a vital and strategic resource. During the Land League disturbances people took care to pay their turbary (turf cutting) dues even though they withheld their rent. This was because people depended so much on it.

During W.W. II British & Polish coal supplies to Ireland were cut off. The bogs were called on to replace the 2 million tons of imported coal – the entire fuel needs of the country. The Cork T.D., Hugo Flynn was appointed "Turf Controller" by the Government. He empowered the County Councils to take over and work the bogs. As a result of his efforts, the country was self sufficient in fuel needs during the war. This affinity with the bogs gave the Irish people a great sense of unity and pride in themselves. They recognised that the bog was a means of self-sufficiency and something that could bring the nation into the modern age.

The traditional tool used for cutting turf is the sleán. It's pronunciation and its design varies from one part of the country to another. The sleán has to be as light as possible due to the heavy weight of the sod it lifts. It is usually made from a light wood like elm or larch. The freshly cut turf is spread on the ground where the wind reduces its moisture content by 25% - 30%.

The turf cish is a basket with four light wooden handles used to carry the semi dry sods away from the turf bank to another area of the bog for further drying. The bog barrow can be used for the same purpose. It too is made from a light wood.

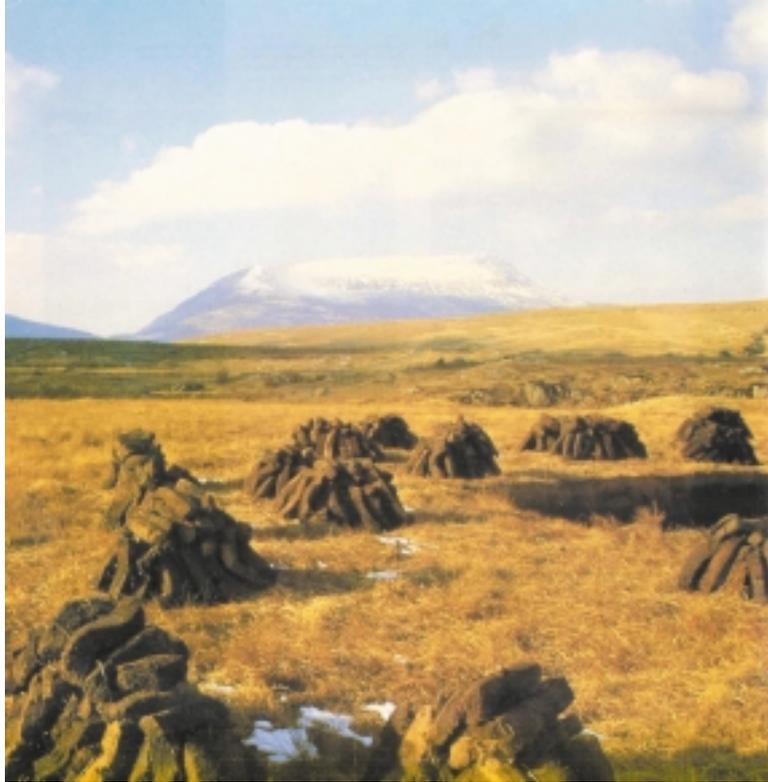


The turf is then footed. This entails placing 5 – 6 sods on their ends with a few on top to form a stack. After 5 – 6 weeks the footings are built into clamps. Clamps are larger versions of footings.

The clamps are taken home from the bog by donkey and cart. Sometimes, creels are used. Creels are baskets suspended on either side of the donkey. The donkey with creels often travels more easily on the bog surface.

Once home, the turf is either stored for winter in a shed or built into a rick. A rick is specially designed so that rain water runs off its surface sods, while those inside the rick remain perfectly dry.

The traditional skills associated with "saving the turf" are diminishing as machinery is being increasingly used. So is the language associated with saving the turf by hand.





## THE MODERN ERA:

Up until the mid 20th century, Ireland lacked industrial development. One reason for this was that we had no native source of energy.

During W.W. II, the Irish discovered that the bogs could sustain the fuel needs of the whole country.

This led the Government into considering commercial exploitation of the bogs using modern technology developed to harvest the bogs in Russia and Germany.

Bord Na Móna was set up in 1946 to revolutionise the cutting of the bogs. Up until then, the use of hand tools meant that large-scale cutting was impossible so the bogs were basically intact until this time.

Irish engineers went to Germany & Russia to learn their technology. German & Russian engineers came here to teach Bórd Na Móna the technology.

This assault on the bogs was directed mainly towards the raised bogs of the Midlands which are deep and flat and easy to work on with machinery. The blanket bogs of the west coast presented difficulties, as they are shallow and hilly, meaning that machines operated with great difficulty. The mechanical cutting of the bog consists of 4 stages:

### **1. Preparation:**

- A. A **ditcher** is used to cut channels into the bog surface. Since the bog is 95% water it cannot be worked on until the bulk of the water is drained off. The ditcher has wide tracks, which distributes its weight over a large area so it will not sink. After cutting the channels, it takes 5 – 7 years for the bog surface to dry sufficiently to bring other machines on to it.
- B. **Graders** are brought in to level the surface of the bog. These are like bulldozers.
- C. **Light railway** tracks are laid down as a means of transporting the turf when it is cut.

### **2. Harvesting:**

Most turf is harvested as milled peat.

- A. A miller scrapes off approximately 2 cm of turf and shreds it.
- B. While it dries for a few days, it is turned several times by a harrow to speed up the drying process.
- C. A **ridger** arranges it into ridges for easy collection by train. It is then collected by the bog trains. The tracks are light and can easily be moved when cutting moves to another section of the bog. The trains transport it to power stations or briquette factories.
- D. A small proportion is cut into sods by a machine called a bagger. It is dried in the sun for approximately 6 weeks and sold as a domestic fuel.

### 3. Marketing:

\*50% of the turf is sold as domestic fuel.

- Most of this is in the form of briquettes, which are made by compressing the milled peat into a solid block. The briquette factories are at Littleton, Derrinlough & Croghan. These are sold countrywide.
- A smaller proportion is sold as sod peat in areas close to the bogs.

\*40% is sold to the E.S.B. to make Electricity in its power stations at Shannonbridge, Lanesboro and Edenderry. This accounts for 18% of the total energy needs in Ireland.

\*10% is sold as Mosspeat (soil conditioner); Biocycle units and fire packs etc. This 10% is the soft sphagnum moss from the surface, which is removed by the grader before the milling begins.

The use of technology has undoubtedly speeded up the loss of a natural resource with its unique ecosystem. Only 4% of our original bogs now remain intact as a result of 60 years cutting by Bord Na Móna and private cutting.

But it must be remembered that this was 60 years of prosperity for the Irish Midlands. The last half of the 20th Century was a time of massive emigration from Ireland. Bord na Móna employs over 20,000 people in the Midlands. This number was higher in the past. Each employee was part of a family which could stay and grow up in its own locality. Each employee spent money in local shops, cinemas, restaurants etc. so the multiplier effect spread throughout the whole community in small Midland towns i.e. Ferbane and Allenwood. The people of these towns developed a culture around the Bord Na Móna factory. Bord Na Móna built some of the towns i.e. Coill Dubh. So rather than moaning about the damage done, a balance needs to be kept between the damage done and the livelihoods provided.



## FUTURE

"Where would the world be once bereft  
Of wet and of wildness? Let them be left  
O Let them be left, wildness and wet  
Long live the weeds and the wilderness yet"

*G. M. Hopkins.*

The global extent of conservation-worthy raised bogs is only 46,522 ha, and 51% of this resource occurs in Ireland – an area of 23,527 ha. A few decades from now most raised bogs will be exhausted of their peat reserves unless we now choose otherwise. In time the burning of peat may be little more than a ritual, like the May bush outside the door celebrating the fertility of the first fields.

We may see sectional interests seeking to acquire land badly needed for agriculture or forestry.

The need for a government body with representatives from many interest groups will be vital. Bord Na Móna had pledged that "every acre of Bord Na Móna cutaway bog land will be utilised in the national interest." It may not be so easy to decide what the national interest is. And there is a real danger of accepting short-sighted answers. Part of this shortsightedness is the assumption that wild landscape is less productive than such options as coniferous forest. 100,000ha of cutaway is now available for reclamation. Its development will be one of the great reclamation schemes of Europe – as big as the Zuider Zee project in the Netherlands.

The critical factor in determining the future of cutaway is the depth of peat remaining when the bog has been worked out.

To reclaim it for agriculture is very difficult and expensive as soil nutrients (nitrogen, potassium, phosphorous and calcium) are lacking. It was assumed in the early years that Coillte (the state forestry board) would plant conifers on whatever cutaway bog was made available to them. However, in terms of output and employment this has been a less attractive option than agriculture. Part of the problem was that native broad leaved species were not considered.

The most interesting option for the future is to allow cutaway bog to colonise naturally and develop a new mosaic of natural ecosystems which are adapted to the changed conditions. Some parts of this mosaic could be used for amenity and recreation. The hollows between the moraines and drumlins will flood naturally, or could be flooded artificially, giving back to the landscape something of the atmosphere it had when the Mesolithic people hunted, gathered and fished here 8,500 years ago. Over 10,000 ha of Bord Na Móna bogs in the Shannon catchment, when flooded, could add to the area of semi-natural wetland in the Shannon basin. This would add to the water storage capacity of the flood plain, which would alleviate winter flooding on farmland.

New forests of native broad leaved trees displaced by the growth of bog 9,000 years ago can again become dominant.

Crops which are at home on peat like cranberry and blueberry are compatible with other uses such as wildlife conservation and recreation. Dr. Bellamy argues for the cultivation of reeds and willows for use in furniture and basket making etc. Another possibility is the cultivation of sphagnum (for packaging, medical dressings, insulation etc.)

Other concepts include the development of constructed wetlands, which exploit the filtering and purifying capacities of aquatic ecosystems in the treatment of such waste products as town sewage, while developing naturally diverse habitats.

### **CONSERVATION?**

A century ago the bogs covered 17% of Ireland. It now covers 4%. They were regarded as a wet desert, a tragic waste of land. In time this desert began to be viewed as the country's most valuable natural resource whose commercial exploitation has contributed to Ireland's economy.

For centuries the bogs played a crucial role in the economy of the farm. The turf harvest was more than a laborious task to lay up supplies of fuel for the winter. The days on the bog were hard work but they were enjoyed because there was knowledge that there was something more here, a knowledge that winter was gone. Part of the unique atmosphere was a sensuous awareness of summer, the fruitfulness of the harvest and underlying this, the excitement of contact with the natural world. Here nature was sensed more richly than anywhere else and even if not articulated, time spent on the bog was much more than an economic exercise. It was an aesthetic experience, a cultural ritual which added richness to the fabric of life.

The remaining Irish bogs must be preserved as the last wild places. They must be preserved because of their natural diversity, because of the record they contain of how the landscape has changed in the millenia since the Ice Age and as living museums and libraries of our own human past. Deep in the peat, steadily accumulating over the centuries since people first settled in Ireland and for millenia before, there is an incomparable archive of information about how the landscape has changed and about how successive communities played a role in directing that evolution since the Ice Age.

During the second half of the 20th Century the war between conservation and development was waged while the largest of the Raised Bogs (Bog of Allen) disappeared. We are now coming to the end of that chapter, much wiser than at the start.

What both sides forgot was to consult the people who live beside and make their living from the bogs. The conservationists and the developers were "outsiders". This rekindled the suspicion, so long prevalent in rural Ireland, that heritage is for the elite with nothing better to do than study flowers & ruins. This suspicion seriously damages the growth of awareness that the heritage of the bogs is the heritage of all, primarily the heritage of those who live and work on the bogs.

We are now at the point where the debate is not between two opposite sides but one, which takes place in the heart and mind of the bog community.

Why should we bother to conserve bogs at all? Who are we conserving them for?

1. The Irish bog plants and animals are genetically different from those elsewhere, subtly adapted after thousands of years to Irish conditions. They are a significant part of the genetic pool of Europe as a whole. The bogs therefore belong to the whole community of Europeans.
2. The Irish bogs are hydrogeologically important. They store water in flood times. They produce water in dry times. We don't know how their removal would affect Ireland's hydrology (water cycles).
3. They constitute a continuing record of climate change.
4. They are the main reserve of ecological diversity in the Irish landscape.
5. They are important carbon sinks.
6. They are rich in archaeological heritage.
7. At the most basic level they are part of ourselves. In a very true sense, when we remove the bogs we are selling our birthright for urgent economic reasons just as our Celtic ancestors sold their birthright of the ancient forests.

80% - 90% of Ireland's blanket and raised bog has been destroyed already. In a European context, the value placed on these ecosystems can be gauged by the fact that the Dutch Government has purchased Scragh Bog to preserve its environmental heritage for Europeans. In contrast, an E.U. directive to conserve the remaining Irish bogs has been ignored by Irish authorities. Only 10% of the bogs earmarked for conservation have been acquired by the state. The remaining intact bogs are small and scattered. They await future generations of Irish and visitors to Ireland to enjoy. They hold the future for the communities who live around them, economically and culturally. Therefore it falls to local communities to take ownership of their own landscape.

The bogs are a response to topography, changing climate and human activities. The first people arrived here before the bog and lived alongside it as it grew and changed. Humans had as much to do with the growth of bogs in the first place as in its retreat now.

But the cutting of the bogs has brought a new wilderness into being – the cutaway with all its variety, which can often be richer than the bog it replaces. Old cutaways (turbaries) are the most important areas of peatland regeneration. They comprise a complex mosaic of habitats. These new fens are a floristic paradise, their splendour reflected in the variety of their orchids and insects. Their range of aquatic life is great. Vast expanses of birchwood intersperse with the fens. The natural regeneration in such a short time span is amazing.

In Ireland we are close to the maximum mean annual temperature at which bogs can form (11°C). Warmer climate changes in the past slowed or even killed bog growth for periods of time. It is impossible to predict how future climate change will affect our bogs. It is all the more important that we should not therefore confine our conservation to the isolated intact wet bogs but that we should conserve the regenerated cutaway bog also. The cutaway has the potential to become the new Midlands wilderness. Places like Lough Boora and Turraun illustrate the rich diversity of bog regeneration where in the drier cutaway, fens and birch have become established but in the wetter bog holes and drains, sphagnum has begun to regenerate. The regenerated bogs will not be the same as the old bogs but they will be living, ecologically viable and rich, growing alongside the ancient mature bogs which may be struggling against a climate change to which the new bogs have adapted.



## 8 THE PERFECT HOLIDAY FOR THE BOTANIST AND ZOOLOGIST.

### UNIQUE FLORA

Plants get all the nutrients they need from the atmosphere (carbon, hydrogen and oxygen) and from soil (nitrogen, potassium, phosphorous and calcium). These nutrients are recycled when the plant dies and is available for use by other living plants.

Therefore bogs are extremely difficult places for plants. The nutrients they need from soil are deep beneath the peat out of their reach. The peaty soil is waterlogged and devoid of oxygen, which is why undecayed plants accumulate in the first place – fungi and bacteria responsible for decay of plant matter need oxygen.

The surface of an undisturbed bog is made up of an almost unbroken carpet of liverworts and mosses, mostly sphagnum, all of which are specially adapted to cope with the harsh conditions of nutrient "rationing". Each has its own strategy for coping with the problem and this is one reason why natural history of bogs is so interesting.

Bogs are the richest areas of natural vegetation in Ireland. The plants are all competing for the same limited pool of resources but like the shops in a town, all seeking to extract money from the customers pockets, they go about it in different ways. So, although there is an element of competition, there is little direct conflict. Four strategies are used by bog plants to solve the problem of the nutrient budget.

1. Enlist the help of fungi to gain nutrients.
2. Collaborate with nitrogen-fixing bacteria.
3. Use the nutrient reserves in the bodies of bogland insects.
4. Make use of what little nutrients the rain brings in.

**1. Help from fungi:** Plant-Fungi associations are called "mycorrhizae". Mycorrhizal associations are particularly important to bog plants. The fungi help the plant to obtain essential nutrients, especially phosphorous. In return, the plant gives the fungi a share in the carbohydrate it produces. Orchids have a special mycorrhizal association. Bog orchids are involved with their fungal partners from an early age. Their tiny seeds carry no food reserves for germination. They depend on the fungus to foster them through germination, seeding and sometimes their entire life.



Other bog plants which rely on mycorrhizal include bog asphodel and crowberry as well as willows and birches, deergrass and purple moorgrass.

**2. Help from nitrogen-fixing bacteria:** Among living organisms, the only creatures which can fix atmospheric nitrogen are certain groups of bacteria, those which possess the critical nitrogenous enzyme. These bacteria dwell in special nodules in the roots of their host plant. Fixing nitrogen is a very costly process in energy terms and this energy is provided by the host plant in the form of carbohydrate. In return the plant is supplied with organic nitrogen. The best-known nitrogen-fixing bacteria are the rhizobium species, which live in the root nodules of the furze and bog myrtle. Bog myrtle is a deciduous bush with a fragrant scent produced by glistening golden-bead glands, which cover the leaves. Much of the nitrogen present in the leaves during the growing season is salvaged before the leaves are shed in autumn and stored over winter in the rhizomes.



**3. Using the nutrients from the bodies of bog insects.**

**(a) Sundews:** The leaves of sundews are covered with tentacles, around 200 per leaf. These tentacles secrete a very thick glue which glistens like dew in the sun and turns the leaf into an efficient fly trap. The insects are attracted not just by the colour and glistening appearance of the leaves but also the scent. When an insect alights on the leaf, the tentacles closest bend towards the centre, gradually followed by those further away. Entrapment by the tentacles is assisted by the folding movement of the leaf blade itself. The smaller creatures may be killed in as little as 1 hour because the sticky secretion blocks their tracheae. The tentacle glands also secrete a range of enzymes that dissolve all but the skeleton of the victim. The process of digestion usually takes several hours depending on how much protein the digestive enzymes have to break down. When the job is done, the leaves open out again and the secretion slows down so that the leaves can dry out. This means that the skeleton can be blown away by the wind before the leaf starts to secrete its deceptive dew again.



**(b) Butterworts:** The strategy of the butterwort is akin to the old-fashioned fly trap technique. Butterworts are fibrous rooted perennials. They have rosettes of yellowish-green leaves, which are curled up at the edges and give off a faint fungus-like scent. The leaves are covered with tiny stalked glands which secrete a glue so sticky that it can be drawn out into threads nearly  $\frac{1}{2}$  metre long. These glands give the leaves a greasy sheen. The digestive fluid is produced by different unstalked glands. These are sunk in shallow pits in the surface. Between the two kinds, there are 25,000 glands to the sq. centimetre. Only the margins of the leaves move, curling slowly over small insects and other creatures trapped near the edge. Prey which is trapped near the centre is digested there. The incurved edges help prevent trapped prey from being washed off the edge by rain or wind. It eventually falls into the centre to be digested.



(c) **Bladderworts:** These are perennials, though they have no roots. The plant consists of branching hair-like leaves on which the tiny bladders are produced. The bladders are the most fascinating part of the plant. They are among the most intricate structures found anywhere in the plant kingdom. They are a translucent green colour with walls only two cells thick. Each bladder has an opening, which is normally closed off by a transparent one-way flap (valve). This is flanked by two antennae, each bearing several bristles. The bristles are arranged in a cone-like fashion and serve to direct small animals foraging in the vicinity towards the entrance to the bladder. The valve is very transparent and flexible. It can only open inwards. The surface of the valve and the bladder is abundantly lined with glands, which produce mucilage and sugar, which attract the prey. The prey consists of small insect larvae, fresh water worms and other minute creatures. When the creature touches the bristles on the outside of the valve it opens and the walls of the bladder are triggered so as to distend by as much as 80% of its volume, sucking water into the bladder along with the prey which triggered the response. This all happens in 10 thousandths of a second. Once inside, there is no way out. The creature inside eventually runs out of oxygen and is digested by enzymes and acids secreted by the four-armed glands. These glands pump water out of the bladder and absorb the products of decomposition after decay. The two-armed glands keep prisoners away from the entrance where they might disturb the trap's delicate balance. The trap is ready for action again \_ hour – 2 hours after it has been sprung.



**4. Making use of what little nutrients the rain brings in:** Sphagnum moss is the main component of the upper layers of a raised bog. As the bog surface is above the level of the groundwater, the stem of the sphagnum acts like a wick drawing up water with it. The stems and leaves of the moss contain large dead cells, which have pores in their outer walls to hold water. Sphagnum moss can absorb 20 times its own weight in water, which it stores in these dead cells.

Sphagnum moss is very well adapted to the nutrient-poor conditions on the bog surface. The main water supply is rain, which is slightly acidic (PH 5-6) and low in nutrients. Special compounds in the sphagnum cell walls exchange the few nutrients in the rain water for hydrogen ions by a complex ion-exchange mechanism. The hydrogen ions are released into the bog water and increase its acidity to Ph 3 or 4. The soil microorganisms that break down plant material cannot survive in these acid conditions. Thus the dead plants accumulate as an increasingly thick layer of peat.



### **UNIQUE FAUNA**

The bog is an austere world and only those plants and animals which can meet the terms it lays down can live there. The most demanding of these restrictions are the high acidity and low nutrient status of the peat and fluctuations in weather conditions – at one time dry and warm, at other times wet and cold. Since green plants are at the base of the food chains which mesh together to spin the web of life, only animals which can feed on bog plants and the carnivores which in turn feed on these herbivores can find a place for themselves on the bog. These true bog specialists have learned to cope with the harsh physical and biochemical demands imposed by the bog environment.

**The Irish Hare:** The only mammal which truly belongs to the bog is the Irish hare. For the hare, the bog is not just another habitat. It is the perfect habitat.

The diet of the hare consists of heather, cotton grass and other bog plants. It makes its nest or "form" in a sheltered place among the heather. The hare will only leave the bog when it is very wet in winter and if it is running short of food. The most characteristic density is one hare per Km<sup>2</sup> of bog.



**The skylark:** The bird which is most at home on the bog is the skylark. The skylark loves open treeless country. It is found in all bogs but in the most extensive and wildest bogs of the West, it may sometimes be the only bird in residence. The singing of the skylark fills the bog in spring and summer, especially after rain, and it is the most immediately noticeable of all bog sounds. The lark always greets the sunrise. It rises off its nest and hovers in the sky and sings for approximately one hour. When it drops back down, it never lands near its nest. It lands approximately 100 yards from its nest and crouches down while running back to its nest. It repeats this ritual several times each day. It is the most protective bird of its nest and its young. Its song is the most beautiful of all songbirds. Skylarks are seldom seen on the bog over winter. They form migratory flocks in autumn and wander further afield, returning to the bog to establish breeding territories in spring.

**The Snipe and Curlew:** The snipe and curlew are common species in bogs, although the snipe more especially favours the marshy rush-infested grassland which surrounds many bogs where it feeds on worms and other invertebrates it extracts from the wet soil with its long beak. During the breeding season between March and July the bleating or drumming of the snipe – the strange un-bird-sound it makes with its wings as it dives or swoops through the air over the bog, is unforgettable. In winter it is one of the few birds, which can be found even on the most open, inhospitable bogs. The snipe gives its name to a sudden fast diversionary movement. This sudden turn of the snipe is a defensive strategy in the open bogland where it has little cover to hide it from predators.

Grassy and rushy oases in bogs are the principal nesting areas of the curlew. Curlews move to the river estuaries with their new families later in the summer and spend the winter feeding there. In hard and frosty winters they sometimes return to their summer haunts in the bogs. The cry of the curlew is associated with the arrival of rain.



### **The Red Grouse:-**

The red grouse is the only bird which is found only on peatland. It was once the most characteristic bird of Irish bogs. Before Irish Independence the vast areas of bog controlled by the landlord estates were managed for red grouse hunting through controlled and regular burning of heather. The adults feed almost entirely on the young shoots, flowers and fruits of heather, although the chicks supplement this diet with large quantities of insect food. Grouse populations declined after 1918. A research programme carried out in 1966 found that the decline in heather burning accounted for the decline in red grouse.



### **The Greenland white-fronted goose:**

Special winter visitors to Irish bogs include the Greenland white-fronted goose. A generation or two ago, when the large bogs were still intact, the white-fronted goose made much greater use of them for feeding and roosting. It was known as the bog goose, an apt name in view of its adaptation for probing in the soft peat for underground storage organs of plants such as common cottongrass, white beak-sedge and arrowgrass. With the reduction in the large wet bog areas favoured in the past, the goose has come to rely more extensively on the river callows, (flood plains) but its numbers don't appear to have suffered in consequence. The goose breeds on the treeless tundra and open marches of Greenland, migrating south to Ireland for the winter.



**The Dragonfly:** Dragonflies are the most magnificent and fascinating of all the creatures of the bogland. There are two groups of dragonflies. One comprises beautifully slender insects whose flight resembles butterflies and which rest with their two pairs of similar wings folded above their backs. These are the damselflies. The other group, the anisoptera, includes the stouter and more powerful looking fast-flying insects, much taken to hovering – and when they come to rest they do so with their wings outstretched. These larger dragonflies have two pairs of dissimilar wings. No other group of bog insects surpasses them for grace and beauty and the large size of many allows the beauty of their structure to be appreciated. Adult dragonflies are aerial predators but they spend their nymphal lives in the water. They are the most ferocious carnivores of the bog pools. They owe their ferocity to the extraordinary structure of their feeding apparatus, which is called the mask. The mask is kept folded back under the head when not in use, but is shot forward quickly to grasp passing prey.

On the bog, when the weather is right, as many as 6 or 7 different species of these magnificent creatures can be seen at the same time in the same place.

One of the first things to strike you in a face-to-face encounter with a dragonfly is its enormous eyes, which seem to take up the whole head. Each eye is made up of as many as 10,000 individual lenses, each of which responds separately to light or shade. It can spot its prey from a distance of 20 meters.

Damselfly nymphs are slender insects, and are very easy to recognize because of three prominent gills at the end of their tails. They crawl about slowly on plants, waiting for prey to come within reach of their ferocious jaws, which are shot out to impale the unfortunate victim. The anisopterous nymphs on the other hand are usually bottom dwellers, and their dull colouring makes them almost invisible against the mud or sediment. They are much stouter and lack the prominent protruding gills of damselflies.

Dragonflies are great fliers. Their wings move independently. They can hover and dart back and forth and make 90° turns.

Dragonfly legs are spiky and hold on to slippery surfaces while it grips its food. Its body is flexible to help it maintain balance.

Adult dragonflies have only a brief month of life. They spend 1-2 years as nymphs. When the nymph is ready to enter adult life it crawls up along a plant until it is outside the water. Here it rests and then the skin on the thorax splits down the middle and the adult hauls itself out of its obsolete wet suit. It takes 1-2 hours for the body to develop its full glorious gloss. It then takes to the air for its final month of life.





## POLLARDSTOWN FEN

Pollardstown Fen is situated on the northern the end of Curragh, approximately three kilometres west north west of Newbridge, of Co. Kildare. The area of the fen is 220 hectares, 60% of which is state owned. This fen is unique in Ireland, as it is the only remaining intact post-glacial fen of its type in the country. This means Pollardstown Fen has an enticing deep historical background with an uninterrupted pollen record and a prehistoric burial ground at the edge of the fen on the esker ridge.

The drastic effects of turf cutting domestically and mechanically can also be seen in this beautifully scenic fen. At one time, the fen was almost three times its present size.

Pollardstown Fen contains a wide diversity of habitats because of the large variety of soil types present throughout the fen and its surrounding areas. These include reed and saw sedge swamps and damp grassland.

As you look out over the picturesque lake, the scene is alive and buzzing with nature with rare fauna hiding in the colourful array of flora, which thrive in this naturalistic area. Birds such as the mute swan, teal, coot, water rail and little grebe inhabit the lake. Migrants such as the pintail, mallard, widgeon, shoveler, gadwall and the tufted duck arrive during the winter months. The common birds of Irish boglands are also seen in Pollardstown fen such as the snipe and the distinctive call of the skylark breaks the silence of the peaceful bogland plains.

The more unusual visitors and inhabitants include reed buntings, sedge warbler and the savi's warbler who is a very rare visitor to Ireland. The rare cetti's warbler, reed warbler and marsh harrier, which is extremely threatened in Kildare have been recorded in Pollardstown Fen. Mammals living on the fen include otters, hares and pygmy shrews, which are becoming rare in Europe. A colourful variety of invertebrates can be seen fluttering on the fen. An outstanding 150 species of butterfly and moth and some other rare invertebrates have been recorded on the fen. Species such as the vibrant orange tip, the green veined white, tortoise shell, speckled wood and common blue. The most common butterflies on this fen include the fox moth; the cinnabar and six-spot bunted moths. The very rare and unusual invertebrates found on Pollardstown Fen include the rare caddis fly (*Liptocenus tineiformis*) and rare semi-aquatic snail (*vertigo geyeri*). The animal species on the fen which are protected by E.U. law are the marsh fritillary butterfly, brook lamprey and otter.

There are numerous varieties and species of flora growing in the fen. Many of these are very rare due to the hydrology of the fen. Each area has several different species of vegetation. For example, the lake and old drainage ditches consists of aquatic plants like water mint, and water horsetail. The fen is also important for the rare and threatened plants it contains; the fly orchid, pugsley's marsh orchid, fen bedstraw, slender sedge, blunt flowered rush and a rare arctic-alpine moss.

The dominant plant on the fen is saw sedge (*caladium mariscum*), a plant which grows to 1.5m tall. Pollardstown is the largest stand of saw sedge in Western Europe. The most unusual plant combinations are found around the seepage zones of the fen. Many rare orchids of bright and beautiful colours can be seen flowering in full bloom amongst the vegetation throughout the summer. Such species include the lesser butterfly orchid, fragrant orchid, twayblade and the distinctive spotted orchids and the unusual and very rare Fly orchid. The insect eating plants on the fen such as the common butterwort and western bladderwort can be found in the lake and ditches along with the round leaved sundew. Several plants found in Pollardstown Fen such as sphagnum moss indicate that parts of the fen are acidic in nature, which is unusual because fens are alkaline. This is an indication that the fen will transform into its next state, a bog, with the formation of acidic peat. The office of Public Works manages Pollardstown Fen. There is an information board and bird hide present on one area of the fen. This historic unique natural and untouched feature is waiting to be discovered by tourists and in our opinion would make a wonderful attraction for tourists of every kind, age and nationality.

This fen failed to transform to bogland as other fens did because of the constant inflow of calcium-rich groundwater from the Curragh aquifer. The water enters the fen via 40 landsprings and some seepage zones also. The water table is always at or near the surface of the fen. Water flows out from the fen naturally but the pattern of outflow has been altered over the years. This is now the main water supply for the Grand Canal.

## SCRAGH BOG

Scragh Bog is situated 10 kilometres north-west of Mullingar. This 16ha site is one of Ireland's premier nature reserves. Many of the rare species, which are present in Scragh Bog today, were common in the Irish Midlands during the time period immediately after the end of the Ice Age from 10,000 to 7,000 years ago. With the development of raised bogs, these species, which thrived in fen-like conditions, were displaced and became extinct in most of the areas where they were once in abundance. Therefore Scragh Bog is seen as an extremely rare, unique and precious site because of the number of relic species, which have survived there.

But why did they survive here?

Like most other bogs, it was discovered that the basin did contain a lake at one stage. But in contrast to the normal stages of a reedswamp, fen, and finally a raised bog, this sequence of stages did not occur in the formation of Scragh Bog. It wasn't until the early Christian period (200AD) that a scraw began to form on the lake surface. Therefore Scragh Bog is technically not a bog but in strict scientific sense, should be classed as fen. Because of the unusual state of this bog, the flora and fauna which inhabited the lakes in the early fen stage thousands of years ago can live in Scragh Bog as it is at this stage at present.

The bog is highly rated as a site of International scientific importance. The name "Scragh Bog" comes from the Irish "sraith" meaning scraw or mat and "bog" meaning soft. This captures an essential feature of the site with its quaking scraw surface.

It is mainly for its rare flora that this bog is justly famous. The most important plant species in Scragh Bog is most definitely the wintergreen (*Pyrola rotundifolia*). This plant with fresh evergreen leaves flowers in mid summer. Its dainty white flower adds a spot of colour to the base of the willow and Birch trees where it blooms most frequently.

The most important group of plants is the sedges of Scragh Bog. Several species, which are extremely rare throughout our country, are thriving in abundance at Scragh Bog. The most common in this bog is the slender sedge (*Carex lasiocarpa*). This plant has an unusual appearance with its height and its array of fine leaves. Another distinctive feature of this sedge is the short hairs on the fruit (utricles). An even rarer species, which displaces the widespread slender sedge in a thin strip around the margin of the bog, is the fibrous tussock sedge. And finally, the mud sedge. This graceful form holds its position among the frequent sphagnum moss, which covers the central area of the bog. The mud sedge provides a focal point amongst the sphagnum moss with its distinct but unusual features.

It consists of a rare blue-green coloured leaf and pendant female spike. In the southeastern half of the bog the rare, soft and endangered slender cotton grass can be found. This species is actually protected under the wildlife act 1976 because of its rarity in Europe in general. The exquisite orchids flower and bloom in summer providing a rich splash of light water colours in this uniquely picturesque bogland scene. Such orchids include the marsh spotted orchid with its abundance of

bright white flowers, which have a gentle and delicate appearance. The rare narrow-leaved marsh orchid, which is another species among the rarest and endangered flora that inhabit this bogland.

In our opinion, this beautifully scenic bog would be an excellent attraction for tourists. We have discovered the enchanting flora and fauna of this bog. During our research and it offer tourists with a wonderful opportunity to experience the magic of our boglands.

We owe the conservation of Scragh Bog to the people of the Netherlands who bought it in honour of the Dutch bogs, which have all been cut away and are now just a memory.