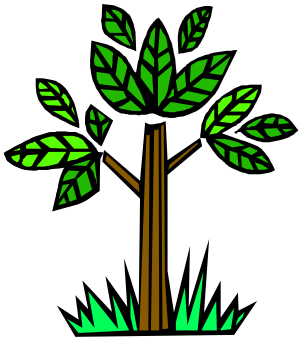
Peatlands Park

Case study

By Peter Bradley 11d



1.0 Introduction

PEATLANDS PARK …Description

Peatlands Park covers an area of over 250 hectares, half of which is designated as a National Nature Reserve in order to protect the flora and fauna. Access to these areas is restricted to the path systems only. The Verner family acquired the Park in the late seventeenth century to become part of the Churchill Estate.
For most of the time the land was relatively unused except for hunting, shooting and turf cutting. The Verners were responsible for most of the plantings of pine and rhododendron that are so prominent in the park. The park is an ideal place for quiet recreation. The narrow gauge railway, associated with the original turbary operation has been reconstructed and is open to the public.

1.1 Peat, Bog Habitat

1.11 Definition of Peat

Peat is a soil that is made up of the partially decomposed remains of dead plants, which have accumulated on top of each other in waterlogged places for thousands of years. Areas where peat accumulates are called peat lands or bog lands. Peat is brownish-black in colour and in its natural state is composed of approx. 90% water and 10% solid material. It consists of Sphagnum moss along with the roots, leaves, flowers and seeds of heathers, grasses and sedges. Occasionally the trunks and roots of trees such as Scots pine, oak, birch and yew are also present in the peat.

1.12 Peat: Fen & Bogs

There are two major peat land types found in Ireland; fens and bogs. The similarities and differences between these two types are summarised in the five points below.

· Fens are alkaline with a pH of 7 to 8. Bogs are acid with a pH of 3.2 to 4.2.
· Fens and bogs are waterlogged habitats.
· Fens are minerotrophic, which means that their water supply is from the mineral-rich ground water. Bogs are ombrotrophic, which means that their water supply is from the mineral-poor rainwater.
· Fen peat has a relatively high ash content, approximately 10% or more. Bog peat has a low ash content, circa 3% or more.
· The average peat depth in a fen is 2m. Peat depth in a bog varies from 2 to 12m.

1.13 Other types - Raised and Blanket Bogs

Bogs can be further divided into two different types; raised bogs and blanket bogs. Note that depending on the altitude, scientists can distinguish between Atlantic blanket bog (below 200m) and mountain blanket bog (above 200m).

Raised bogs occur in the midlands of Ireland and in the Bann River Valley where rainfall is between 800 and 900mm per year. Blanket bogs are found along the west coast of Ireland and in mountainous areas around the country where rainfall is 1,200mm per year or more.

1.2 Origin of Bogs

Peat lands are composed of deep layers of waterlogged peat and a surface layer of living vegetation. Peat consists of the dead remains of plants (and to a lesser extent of animals) that have accumulated over thousands of years. Peat accumulates in areas where the rate of plant production exceeds the rate of plant decomposition. Complete plant decomposition is prevented in areas where water logging occurs. In Ireland, high rainfall and low temperatures result in low evaporation which means that waterlogged soils are a common feature, for example in shallow basins. These waterlogged soils are anaerobic (poor in oxygen) and oxygen being essential for the growth of the soil micro-organisms (bacteria and fungi) that bring about the complete breakdown of plant material. As a result of the poor microbial activity dead plants accumulate in waterlogged areas as peat.

Another factor, which contributes to the accumulation of peat by preventing the growth of soil microorganisms, is the acidity of the ground water. In bogs, plants known as bog mosses, of the Sphagnum species, produce the acid nature of the ground water. These plants absorb the cations (positive ions) in rainwater (for example calcium and magnesium) and release hydrogen ions into the water. The more acidic the soil water, the less suitable it becomes for microorganisms to grow and the slower the decomposition of the plant remains.

1.21 Fen and Raised Bogs

Raised bog formation started at the end of the last glaciations - some 10,000 years ago - when the glaciers had retreated northward. At this time shallow lakes left behind by the melting ice covered much of central Ireland. Lakes also formed where glacial ridges, such as eskers, impeded free drainage and trapped the water.

At the base of these shallow lakes there were deposits of lake marl overlying clay and glacial drift. These lakes were fed by mineral-rich groundwater and spring and supported floating plant communities, which sometimes produced a thin peat layer just above the lake marl. Tall reed and sedge beds dominated the lake edges. As these plants died, their remains fell into the water and were only partly decomposed. They collected as peat on the lakebed. With time this process formed a thick layer of reed peat that rose towards the water surface. As the peat surface approached the upper water level, sedges invaded, and their remains added to the accumulating fen peat.

In time the fen peat layer in these shallow lakes became so thick (up to 2m) that the roots of plants growing on the surface were no longer in contact with the calcium-rich groundwater. When this happened the only source of minerals for the plants came from rainwater, a very poor source of the essential minerals needed for plant growth. As a result plants invaded that were able to grow in the mineral-poor habitats on the surface of the peat land. The best indicator of the changing conditions was the invasion of the bog moss or Sphagnum. This moss became common in such transitional fen/bog habitats, and made the ground even more acid, by its ion exchange activity. This intermediate stage between fen and bog can be seen today at Scragh Bog, County West Meath, where a mixture of lime-loving fen plants and acid Sphagnum cushions grow together. Plants typical of raised bogs, such as Heathers, Sundews and Deer Sedge invade the tops of the Sphagnum hummocks, completing the invasion of bog species.

The Bog Moss is important as it acts like a sponge or candle wick, drawing up water and keeping the surface of the bog wet and waterlogged, in all but the driest periods. So, even though the bog continued to grow upwards, away from the water table, the Bog Moss ensured that the water table rose in tandem with the rising peat level.
During the long history of bog growth, there have been occasional changes in the overall climate in Ireland. About 4,500 years ago the annual rainfall decreased. This caused bog surfaces to dry, and allows the invasion and establishment of a Pine woodland on the surface of the bog. This woodland persisted for some 500 years, until the climate changed again and became wetter. Rapid bog growth recommenced as the surface became waterlogged, and the trees died. Tree stumps and whole tree trunks were buried and preserved in the rapidly accumulating Sphagnum peat. The layers of fen and Sphagnum peat and the buried Pine stumps are often seen exposed by turf cutters at the margins of raised bogs.

1.22 Blanket Bogs

Blanket bog formation in the mountains and west of Ireland also started at the end of the last glaciations, 10,000 years ago. Initially peat formation was confined to shallow lakes and wet hollows and an infilling sequence from open water to fen and acid peat are recorded in these areas. Later, acid peat spread out to form a blanket covering huge areas. While some spread may have taken place as early as 7,000 years ago, many areas were not engulfed until 4,000 years ago when the climate became wetter. Heavy rainfall caused minerals such as iron to be washed out or leached from the surface layers of the soil. These were deposited lower down where they formed an impermeable layer known as an iron pan. Water cannot move down through such a layer and the soil surface became waterlogged as a result. Under these conditions the accumulation and spread of peat was made possible.
Today in the west of Ireland the blanket bog rests directly on the stumps of Pine trees what were once part of extensive woodlands in the area and also covers large areas of farmland that were cultivated by Neolithic (Stone Age) farmers. At the Céide Fields in North Mayo an extensive system of walls and fields has been unearthed dating to the Stone Age period of 5,000 years ago.

1.3 Bog Structure

Walking on a bog involves walking on a soft living carpet, which floats on a material, which is nearly all water. In fact bogs have less solids in them than milk. By weight, a raised bog may be up to 98% water and only 2% solid peat. Blanket bogs are rather more solid, with up to 85% water. This great volume of water is held within the dead Sphagnum fragments. This ability to retain water is one of the properties which makes Sphagnum peat such a prized horticultural material.
A bog consists of two layers: the upper, very thin layer, known as the acrotelm, is only some 30cm deep, and consists of upright stems of the Sphagnum mosses, largely still alive and colourful with their red, yellows and ochre. Water can move rapidly through this layer.
Below this is a very much thicker bulk of peat, known as the catotelm, where individual plant stems have collapsed under the weight of mosses above them to produce an amorphous, chocolate-coloured mass of Sphagnum fragments. Water movement through this amorphous peat is very slow indeed- typically less than a

meter a day. This is where most of the rainwater is stored. From here the water slowly seeps down through the bog over several weeks or even months.
The catotelm resembles the lower layers of a tropical rainforest, or the abyssal depths of the oceans, environments that enjoy constant, unvarying conditions because they are protected from the turbulent environment above by a relatively thin canopy or surface layer.
Under normal circumstances, the water table within the bog never drops down into the catotelm. Even drainage merely empties the acrotelm of its water more quickly. Generally the water table is very stable, remaining within a few centimetres of the bog's surface about 95% of the time.
Because the surface of a bog typically consists of low hummocks and ridges, scattered hollows or pools, this stable water table produces intense competition for living space between species. And so, several zones of characteristic vegetation have evolved each depending on their proximity to the water table.
In increasingly wet climates, bogs have adapted interesting surface patterns of pools to hold the surplus water, which cannot seep away before the next rainstorm. The pools are formed in the peat and do not go down to the underlying soil. They are unique to bogs and totally devoid of fish. However they are home to a wide variety of insects.

1.4 Bogs - fauna and flora

1.41 Bog Vegetation

Bog vegetation consists of a more or less continuous cover of Sphagnum moss or bog moss; and a somewhat stunted vegetation of flowering plants, heathers, sedges and grasses that grow through it. Sphagnum moss plants grow upwards from the tips. As the lower parts of the moss are continuously shaded they die and become peat. These combined factors mean that the bog surface grows upwards to become raised above the surrounding landscape. Wherever Sphagnum cover is well developed, active peat formation is taking place and the bog is growing usually at a rate of 1mm per year. Sphagnum mosses form the major component of peat. Vascular plants are less common in the peat and more localised.
Typically bog land vegetation where Sphagnum mosses are actively growing develops a system of hummocks and hollows with flat areas or lawns in between. The average difference in elevation between hummock and hollow is about 30cm, but in some bogs the tallest hummock may reach 70-80cm above the mean level of the bog surface and the hollows may attain a depth of 100cm or even lower, below it. The deeper hollows lie below the water table and appear as distinct water-filled pools. Areas where the bog surface is flat and lack such micro-relief are called lawns.

1.42 Life on the Bog lands

In the remarkable environment of the bogs, everything is waterlogged and floating on an immensely deep soup of peat. Yet there is often relatively little open water at the bog surface and nutrient levels are barely above that of distilled water. It is not surprising that bogs host some remarkable species.

Perhaps the most spectacular and best-known adaptation to life on the bogs is the carnivorous plant. Several species have developed the ability to trap and eat animals as a means of supplementing their meagre diet. The animals are very small and almost exclusively insects, although the sundews are able to trap the bigger dragonflies, which have wingspans as wide as a human hand.
The sweet scented bog myrtle, typical of western bog lands, forms a partnership with hydrogen fixing bacteria in its roots to obtain extra nitrogen, while the common bog cotton uses a `snorkel technique', relying on large air-filled cells in its root bases to survive in the oxygen poor environment beneath the living carpet of Sphagnum. A family of tiny brilliantly coloured `jewel' beetles use these air spaces as living quarters.
Another important group of species on the bog are the lichens - a group of plants formed by the symbiosis of a fungus and alga. These plants often have a grey appearance with some species having more colourful reproductive tips.
Another insect eating plant is the Pitcher, this putrid smelling plant attracts many insects manly the blue bottle, to its long slimy tube. When the insects go down the tube they get stuck in the water at the bottom and on the slimy walls, the plant eventually digests them.

Contrary to popular belief, bog lands are not dreary places: a close examination reveals a wealth of colour and mixtures of distinctive scents. The Sphagnum bog mosses themselves have a vivid colour, some are deep wine-red, others are brilliant orange, gingery brown, while yet others have bright greens mixed with delicate salmon-pinks. They combine to form a scene as intricate and colourful as a dirty carpet. Dotted through this soft carpet you can find the greens and pinks of heaths and heathers, bright splashes of yellow and orange from the bog asphodel, fuchsia-pinks and ruby-reds of cranberry flowers and berries, and the delicate white and pink frothy flowers of the bog bean (bog-bean used to be used as a herbal remedy for blood related skin disorders).
As the summer draws to a close, the bog lands stand out most distinctively from the rest of the landscape. The leaves of both the common bog cotton and, in particular, the deer grass turns the sward to a colourful brown, which seems to glow in the low winter light. These russet patches, swathes, or even entire landscapes, are sure indicators of bog land.

1.43 It's not all Plants...

Bog lands are home to only a few species of animal, yet they can boast the largest animal in Ireland today - the red deer. Red deer in areas where they are protected can be found wallowing in peat baths to rid themselves of flies and parasites. Otters and badgers occasionally venture out into the bogs in search of the eggs and chicks of ground nesting birds.
The great diving beetle, which grows to about 3 inches, patrols the water and provides food for birds.

The dragon flies are another interesting insect from the bog land, the females lay their eggs on the water surface, and upon hatching they live for 3 years before shedding there skin and becoming adults. There are two types of dragonfly in the bog, one is the Damselfly and the other one is the regular Dragonfly, they can be told apart from their ability to fold their wings. (The Damselfly can and the Dragonfly cannot).

Another flying insect found in the bog is the Emperor moth; it is easily distinguished by its extravagant patterns on its wings, which are used to scare away predators. Not many people know this but there is only one type of frog in Northern Ireland, but it fools us by continuously changes its skin colour thus giving us the impression that there are many different species. The Newt is another bog creature that has the ability to change its skin colour.

1.5 Irish Bogs .. Pagan Cultures & Modern Science

1.51 The Bogey-Man

The Bogey Man, or more correctly the Bog-man, is proclaimed as a ghost or gould used to scare children (and adults), is based in fact. The ancient priests of Ireland would sacrifice a man to the gods, by garrot and/or by a blow to the head, the body was then placed in the bog. The low rate of decay in the anaerobic environment preserves the body-"Mummy-like"- When these corpses are uncovered as for example 10 years ago in central Ireland and also in Yorkshire, even their clothes and stomach contents were preserved. The bog-men were men of stature as was reflected in their clothes, ornaments and neatly cut beards and hair. It was socially acceptable to be a sacrifice to be a bogeyman.

1.52 Bog Science

Scientists from many disciplines recognise the importance of bogs. Criminologists, archaeologists and biologists value the peat archives in the living bogs as essential to research: and naturalists cherish the living carpet that covers the peat. Bogs help to maintain reliable supplies of clean water to rivers, although in a recent article in the times there are fears that increased precipitation (due to the postulated "global warning) may actually release acid water into our fresh water supplies and therefore destroy the existing flora and fauna – fish etc. In Europe they also have a cultural importance as some of the last true wilderness areas and are enjoyed by plenty of nature loving people.

A Living Archive Bog contains an unparallel record of our past. A rich source of information lies preserved in bogs. Much of this is organic and has a capacity to expand our understanding of people, culture, economy and climate far back into prehistory. Pollen, plants, evidence for the use of wood and woodland management, boats, weapons, lines of communication and indications of human impact on surrounding landscape and ecology all contribute to modern knowledge in ways which are seldom approached on dry land. Peat bogs have produced some of the most spectacular finds of Irish archaeology, including as mentioned above the remarkably well-preserved bodies of some of our ancestors. Carbon Store Peat is rich in fossil carbon, removed from the atmosphere by plants and accumulated over thousands of years. Drainage and destruction of raised bogs results in the rapid loss of the stored carbon in the form of greenhouse gases (carbon dioxide and methane), as the peat decomposes, however the increase in carbon in the atmosphere is absorbed into existing plants (terrestial and aquatic) resulting in vigorous growth {This can be seen, particularly this year, even in the average garden… thick bushy growth and an abundance of fruit}.

Ancient Habitat Bogs are among some of the oldest Irish habitats; with some of the earliest examples dating back more than 10,000 years. Many rare and protected species of plant and animal are also found on bogs. The Greenland White-fronted Goose relies on wet bogs with pools for feeding and roosting. The invertebrates found on bogs contain many rare species. The bog moss Sphagnum Imbricatum is entirely restricted to bogs and is the principal peat forming species in oceanic peat land types. These are becoming increasingly rare as more sites are brought into development. Bog plants were and are traditionally used in folk medicine, brewing and for food. Today new uses are emerging for bog plants such as bio filters, septic tanks etc.

The most common use of bogs, particularly the blanket bogs of the west of Ireland, have been to provide year round grazing for cattle and sheep. This activity is only sustainable if stocking densities are kept to very low levels. Most fens have been reclaimed for agricultural use due to their fertile soil. International.

This scientific resource re-enforces our national and international obligation to conserve examples as part of the natural heritage of Ireland and in the wider context of Europe. Ireland's blanket bogs are particularly important in a world context. Blanket bog habitats cover 10 million hectares of the earth's surface. Ireland possesses 8% of the world's blanket bog and is the most important country in Europe for this type of habitat. Scotland is the second most important country, with 5% of the total area of the world's blanket bog resources. The disappearance of the Irish bogs would have serious international consequences; various plant and animal species the last western European refuge would be destroyed. Several species of birds would lose important wintering grounds. A type of landscape which once was characteristic for large parts of Western Europe, and which is unique for its spaciousness and quiet, and its cultural heritage would be annihilated.

The education potential of peat lands is only just being realised. An ecosystem which has so far been studied incompletely only, and which has been providing important ecological insights into hydrology, carbon fixation and environmental change would be lost for further research.

Further information on Irish Peat Conservation can be obtained from the "Irish Peat-Land Conservation Council", a registered charity.

2.0 Case Study On Peatlands Park

2.1 Hypothesis

My hypothesis concerns the growth of vegetation in bog lands, more specifically between the cutover and uncut bogs. The cutover bog is one, which has had its layer of vegetation burnt and its top layer of peat extracted and left to re-grow. The uncut bog is a natural bog, which has had no human interventions.

I hypothesise that the cutover bog will have some of the same vegetation as the uncut bog but in a smaller abundance.

The conditions of the cutover bog are different from the uncut and therefore some new opportunist plants, which are more adapted to growth in these dryer conditions, will be found. The lack of Sphagnum moss on the cutover bog will mean that the pH of the soil will be much higher than that of an uncut bog. I further predict that the moisture content In the cutover bog will be much lower because its top layer of peat

and vegetation has been extracted, which means that the bog has lost is natural sponginess decreasing the amount of water it is able to hold. The way the cutover bog is exposed to the sunlight would lead me to believe that its average temperature will be higher than the uncut (in saying so the day to day temperatures may vary).

2.2 Methodology

2.21 Uncut Bog

Mullenakill is an area of uncut bog within Peatlands Park. The survival of even this small-uncut fragment of raised bog is virtually unique in Co Armagh and thus it has been designated as a national nature reserve. A national nature reserve is an area of unique importance for its flora, fauna or features of geological or other special interest, which is managed for conservation and to provide special opportunities for study or research. Bogs are very susceptible to trampling damage so it would be unwise to allow large numbers of students to undertake sampling all over the bog. The large numbers of groups must therefore do the random sampling undertaken at Mullenakill from the specially constructed boardwalk- while this limits the study to a small area it is the only way the area can be utilised without causing significant damage to the nature reserve.

2.22 Cutover Bog

Due to the massive amount of time and resources required it is seldom possible to examine every inch of a field to determine the species and distribution of plants present. We can however select parts of the field to be examined very carefully, this allows us to make sufficiently accurate statements about the whole field and requires only a minimum amount of time.

2.23 Acquisition Of Data

There are two possible ways to measure plant species and their relative abundance, both included a quadrate.

The first method of sampling was systematic, this comprises of a line transect consisting of a tape or string laid along the field of study. Every five meters or so a quadrate is put down along side the transect line. The type of plant and abundance in each quadrate is reported.

-This technique provides valuable information concerning the change in abundance of each type of plant along the field of study.

-Measures of environmental differences at each quadrate position can be measured for example – light intensity at ground level, soil moisture, soil temperature and organic content. Soil pH. can also be determined.

-The change in the abundance of the various plants along the transect can be related to changes in environmental factors.

The second method of sampling, and the technique which we used, was random sampling. This is when a quadrate is dropped at random parts of the field of study. The type of plants and their abundance in each quadrate is measured and recorded. There are three different ways to quantify the measures, (1) Percentage of

cover (2) Density (3) Frequency. The average abundance per quadrate is calculated and from this and an estimate of the total abundance of each plant in the field of study can be calculated.

2.3 Presentation of Results

To record our results we will use a table like this:

	(%) Of Ground Covered by the Quadrate						
Plant							**Average(%)**
	1	**2**	**3**	**4**	**5**	**6**	

List of Tools;

- Quadrate
- Soil Auger
- Temperature Probe
- Notepad

To make our results more reliable we have pooled other group's results.

2.31 Cutover Bog

	(%) Of Ground Covered by the Quadrate						
Plant							**Average(%)**
	1	**2**	**3**	**4**	**5**	**6**	
Heather	53	32	38	25	45	59	42.0
Multi-headed Bog cotton	1.5	2	0.3	0.7	0.6	0.4	0.9
Bog moss	10	6.8	13	9	9	5	8.8
Lichen				9	10	20	6.5
Pine						8	1.3
pH	5.5	5.3	5.7	5	6	5.5	5.5
Temp (C)	12.1	11.8	11.9	12.1	12.1	12.2	12.0
Moisture (%)	75	70	73	76	71	75	73.3

Pooled results; Cutover Bog

Plant	(%) Of Ground Covered by the Quadrate						Average(%)
	1	2	3	4	5	6	
Heather	52	30	38	26	45	59	41.7
Multi-headed bog cotton	1	0.5	1	2	0.02	0.1	0.8
Bog moss	15	6	5	4	15	3	8.0
Lichen				9	15	16	6.7
Pine						12	2.0
pH	6.1	5.8	5.5	5	5.6	5	5.5
Temp (C)	11	12.1	11.8	12.6	12.2	12.4	12.0
Moisture (%)	76	78	80	79	76	75	77.3

(See graph)

Discussion;
As you can see from the graph and the table there are large amounts of heather and very little amounts of any other plant. This would lead me to believe that heather would be more suited to life in these wet and exposed conditions as it is a strong, small ground hugging plant with secure roots. There are very few other plants because the conditions are harsh and therefore poor for growth. As you can see the amount of Lichen and Pine are really small, this is simply because the lichens are so small and they need the sun to survive, however larger plants such as heather would block out the sun. Pine is a tree and does not grow in the same abundance as heather because it takes longer to grow and mature. The pH of the soil is slightly acidic because the bog moss releases Hydrogen ions into the soil. The temperature of the soil is directly related to the amount of exposure to the sun and we will see uniform day-to-day temperature variations over all the sites. The moisture content would also be due to the amount of rainfall, no surface water channels were evident. When you remove most of the bog life, plant interception decreases and the amount of water directly reaching the surface increases.

2.32 Uncut Bog

Plant	(%) Of Ground Covered by the Quadrate						Average(%)
	1	2	3	4	5	6	
Heather	22	18	26	15	29	22	22.0
Single headed bog cotton	54	50	38	39	49	44	45.7
Bog moss	8	5	11	7	9	8	8.0
Bog Mertal	4	3	5	2	6	4	4.0
Cranberry			3	6	0	3	2.0
Rhododendron				7	10	4	3.5
pH	5	6	4	5.7	6.3	5.1	5.4
Temp (C)	11.7	12.4	11.8	11.5	11.8	11.9	11.9
Moisture(%)	94	95	93	98	90	92	93.7

Pooled Results; Uncut Bog

Plant	(%) Of Ground Covered by the Quadrate						Average(%)
	1	2	3	4	5	6	
Heather	19	17	20	17	18	22	18.8
Single headed bog cotton	49	45	41	39	40	47	43.5
Bog moss	6	6	10	5	10	10	7.8
Bog Mertal	7	8	3	8	9	8	7.2
Cranberry			4	9	2	9	6.0
Rhododendron				7	10	4	7.0
pH	6	5	5	6	7	4	5.5
Temp (C)	11.2	12.8	11.2	11.5	12.7	12.1	11.9
Moisture(%)	91	97	95	95	90	98	94.3

(See graph)

Discussion;
As you can see from the graph and table there are some of the same plants but in different abundance, as the conditions are different. There are also some different plants in the uncut bog like the Rhododendron and the Cranberry. These plant may have in the cutover bog but in a much lesser abundance. There is much less heather and much more single headed bog cotton in the uncut bog, these are natural bog plants in their natural habitat. Bog moss and Mertal are around the same quantities as in the cutover bog. The PH. of the uncut bog seems to be around the same as the cutover bog because the amount of the bog moss is similar, which means the dispersion of hydrogen ions would be around the same. The moisture content is higher in the natural bog and is essential for the cycle of life for many bog creatures, which uses the water for breeding and living in.

2.33 Comparison of Cutover & Uncut Bogs

When we compare the two graphs you can plainly see, as I stated in my hypothesis, that the uncut bog will have more natural bog plants and in a greater abundance. In the cutover bog there are also some new plants that have taken the opportunity to grown. The amount of heather is greater in the cutover bog than in the uncut bog because heather is a tough plant and is more suited to the exposed conditions of the cutover. The Rhododendron plant is of particular interest, as you can see this plant grows profusely and becomes a real nuisance, even when it is cut down. If a small amount of the plant is left behind the Rhododendron will re-grow. This plant is usually found on the uncut bog.

2.4 Techniques of Sampling

To check the moisture content and the pH. of a soil sample first we had to cut two or three samples from each bog and preserve them in a plastic bag. To obtain moisture content we weighed and recorded the samples. Then we put the sample in an oven and let all the water evaporate away. Once the water had evaporated we then weighed the residue and took this value away from the first measure.
To get a pH reading we just put a pH-measuring tool into the sample and recorded the measurement.

2.41 Results

. **Cutover Bog Day-1 (Sample taken on the first day)**

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Total Organic Mass (g)	125.8	122.6	128	129.6	123.5	120.8
Mass Of Evaporation (g)	65.53	65.98	62.4	61.9	66.8	65.9
Organic-Mass (sample) (g)	60.23	60.78	63.8	62.59	67.34	61.56
Final Mass (g)	14.84	14.08	13.12	16.78	18.7	15.6
Water Lost (ml)	45.39	48.7	44.67	49.1	42.78	45.89
Moisture (%)	75	78.9	77	76.3	72.1	70
PH.	5.5	5	5.32	6	5.78	5.24

Uncut Bog Day-1 (Sample taken on the first day)

Total Organic Mass	210.8	212.6	218	219.6	213.5	210.8
Mass Of Evaporation	75.54	75.98	71.67	71.9	76.8	75.9
Organic-Mass (sample)	135.3	130.8	138.8	132.6	137.3	121.6
Final Mass	7.92	10.08	13.12	6.78	8.7	15.6
Water Lost	127.3	128.7	134.7	129.1	122.8	115.9
Moisture	94	88.9	97	96.3	92.1	90
PH.	5	6	5.32	6	5.78	5.24

3.0 Conclusion

Do my results agree with my hypothesis? To a certain extent yes they do. I have found that the two bogs have some of the same plants living in them but in different abundance this is due to the different biotic and abiotic conditions.
I was correct in saying that new conditions would lead to new opportunist plants growing such as the pine and the lichen. However I was wrong in thinking that the pH. of the two bogs would be different. My theory that more sphagnum moss would mean higher acidity was correct; the amount of sphagnum moss in each bog was the same therefore making their acidity approximately the same. The temperatures where indeed related to the amount of sunshine and how exposed they were to the sun. This was similar for moisture content and it was also related to how exposed the bog was to the rain. However the amount of plants on the top layer of the peat would mean more interception (plants catching the rain water before it hits the ground) and less water reaching the ground to be absorbed, this would be particularly effective in the uncut bog, which has plenty of vegetation. The natural sponginess of the bog also affects the moisture content, the more peat the more water it can absorb, but seeing as the cutover bog has had its top layer of peat extracted it loses this portion of its natural sponginess. This can be seen in the table where there is less water in the cutover bog sample than in the uncut bog sample.

Appendix:

1-Evaluation:

There were perhaps some things, which could have been done differently to give us more accurate and more reliable results. Firstly when we were on the uncut bog we were somewhat limited to the areas that could be measured from the board walk (the sections we restricted to). When we had laid the quadrate down it was difficult to get an accurate reading of the percentage cover as the ground was not level and the squares in the quadrate where never completely filled with the plant.

2-Safety:

All in all there was no real need for any specific safety rules but there were the usual common sense ones, just in-case.

- always listen to the teacher (however wrong they may be).
- never push or shove on the board walk.
- take care with the equipment you are given.
- take good notes and listen well.
- always do what you are told.

3-Sources:

- www.peatlandsparknorthernireland.com
- Encarta 2000
- Sunday Times

4-Graphs: