Christmas Cranberries on Sliabh Beagh

CANN delivers through Covid

It is 2020 and the world is spinning on a very different course to how it was a year ago. People around the world have had to adapt to unthinkable new ways of living and working. We are very proud of the way the CANN team has powered through these changes, delivering some fantastic results despite Covid and sometimes even because of it, e.g. our carbon footprint is smaller while our ability to offer training and attend conferences remotely has increased our impact.

Covid has also made people examine their motivations and perhaps move towards more sustainable choices and the awareness of our climate crisis has grown. But the danger is that climate, ecological and social issues (like Covid 19), are seen as separate and not enough attention is paid to the role of healthy ecosystems for all three of these areas Peatlands strongly connect all three and are core to human civilisation, as they are on the edge between land and water and are sometimes seen as the divide between life and the afterlife. However, until recently, these wetlands were widely considered good-for-nothing wastelands. So globally, many peatlands were drained, excavated, mined and burned. Today, around 15% of peatlands are severely degraded. But with all this 'climate talk', there seems to be a new wave of appreciation towards the world's bogs and fens and their role in storing carbon. However, there is more to peatlands than just climate. In their natural state, they also provide many other ecological and social services: flood prevention, biodiversity habitat, water filtration and purification. We are proud that the CANN project is able to focus on all these aspects of wetland management with a truly holistic eye which will be reflected in the pages of this newsletter.

COLLABORATIVE ACTION for the NATURA NETWORK

CANN

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Reaching a Carbon Balance

One of the most significant and public pieces of work carried out by CANN partners, Ulster Wildlife, has been the erosion gully and peat hagg restoration of degraded blanket bog on Cuilcagh Mountain. This project was even featured on BBC News. To do this work we needed to use helicopters to bring in heavy materials like the Coir Rolls and fencing to temporarily exclude stock. The Coir Rolls are used to block the gullies, slowing the flow of water and preventing the precious peat from washing away.

The carbon benefits of protecting and restoring active blanket peat are well known but using such carbon-intensive transport as a helicopter and even shipping material like coir may lead some people to ask if this tips the carbon balance. So, before we started work, we decided to do some research to make sure we were making the right choices.

Helicopter depositing a cargo of Coir

Coir fibre is the outer husk of the coconut and is a by-product of the coconut industry, not a purpose-harvested product. Coir rolls are placed across the bare peat of eroding gullies to intercept the erosive flowing water that is washing peat off the mountain. The coir traps the peat sediment but allows water to seep through slowly enough to rewet the area, creating the conditions needed to allow natural bog plant and particularly peat-forming species like sphagnum mosses to re-establish. Coir has a high lignin content, meaning it takes 5-10 years to rot away, allowing enough time for the plants to root and start protecting the underlying peat.

These are some of the reasons why coir rolls were recommended as part of the hydrological analysis from our consultants, RPS Ireland. The use of coir rolls has been standard practice for peatland restoration in Scotland, England and Northern Ireland for more than ten years.

However, we are always looking to improve on the standard practice, to push the science of peatland restoration forward and to this end, we have already gained permission from our funders and the relevant government departments to trial a light-weight, novel sediment trap technique. It is hoped that solutions like these could potentially replace coir rolls in the future and reduce the associated carbon costs of international shipping and helicopter transport. We have used sheep's wool and peat itself on other areas on Cuilcagh and are monitoring these results. We are also exploring other potential alternatives through the CANN project, such as locally sourced heather bales and wool, to examine their effectiveness and feasibility for this type of restoration.

When we trial alternatives, however, we must bear in mind that Cuilcagh is an

internationally important, protected site and there needs to be a balance between trying these novel techniques (holding a possibility of failure) and the immediate need for effective and fast gully blocking using established techniques to halt the destruction of this amazing place. We must take care when using local materials such as heather bales that our removal does not damage one area to restore another nor does it introduce pests such as the heather beetle into the SAC. We also need to look at the longevity of the materials, for example, the idea of using locally grown straw was abandoned as it simply does not last long enough to act as an effective sediment trap.

Our biggest carbon conundrum was the use of the highly fuel and carbon-intensive helicopter. But the alternative of carrying the materials to do the same job, either using machinery or human power, would cause significant damage to the habitats through repeated tracking over very long distances. Using the helicopter means we can reach the remote areas of the site without causing any damage to the important habitat in the process.

At our 2019 CANN conference, we learned that the Moors for the Future Partnership in the UK regularly use helicopters to transport materials for their peatland restoration projects, including coir rolls. Their carbon audits indicate that the restoration outcomes of their work outweigh the carbon emissions by a huge amount. Their study showed that one year following re-vegetation, the magnitude of the avoided loss of carbon from areas of bare peat will be 37 times that of the GHG emissions produced through undertaking the work, including use of helicopters. This is also before factoring in all the associated (non-carbon linked) benefits of gully restoration on improved downstream water quality and biodiversity that the re-vegetation delivers.

Ulster Wildlife has secured funding to do a carbon audit of their operations and will be including an audit of this gully restoration project on Cuilcagh. We hope and expect that similar results to the Moors for the Future audit will demonstrate the effectiveness of our valuable work on Cuilcagh.

Coir rolls bundled for tranport

Harriers in the hills and hollow places

During 2020 significant efforts were made to collect field data despite Covid 19 restrictions that called a halt to spring surveys from late March to late May. However, we put in place stringent risk assessment and mitigation and all landowners' permissions were revisited to ensure we could access the sites safely and to make up for lost time. The monitoring team of Golden Eagle Trust staff and volunteers worked all hours to complete surveys wherever possible. Hen Harrier were recorded breeding and/or wintering within and around several of the lowland CANN sites.

Hen Harrier in Flight

During winter and into early spring, the area around Moneygal Bog hosted hen harriers roosting in the bog, in scrub and *juncus* dominated pasture areas. A small number of foraging flights were recorded on the site during the summer as birds nesting across the border in Donegal quartered the wetland looking for the small mammals and passerines that make up much of their diet. Sadly, the Donegal pair did not fledge any young.

Late winter surveys at Garry Bog identified over wintering hen harriers in rushy areas around the site where they like to roost. However, there were no breeding birds and the nearest known pair were in the Antrim Hill SPA and the 20km is perhaps too long a flight for summer foraging. Peatlands Park painted a similar picture with neither wintering nor breeding harriers present, but there are some nice developing reedbed systems that could be highly beneficial for winter roosting hen harriers in the future. Hen harriers, along with an occasional marsh harrier, are known to frequent winter roost sites near Peatlands Park around Lough Neagh.

Food passing—part of the mating skydance

It is felt that Cranny Bog is probably too small with restricted habitats to provide space and food for breeding or foraging, and the surrounding houses and more intensively managed farm land may dissuade winter roosting birds although these birds are known to occur in the wider area. Tully Bog is also probably too small, and the birds were not recorded here either in 2020, although they are known in the wider area.

Fairywater Bog complex has many neighbouring winter roost sites for Hen Harriers, some of which were occupied during the winter season with the bog providing winter refugia, although high numbers of foxes may have reduced optimal roosting sites by predation. Sadly, no breeding or foraging birds were recorded in 2020. A similar tale is told at Ballynahone and Curran Bogs, although there are known breeding sites less than 10km away around the Glenshane Pass, the improved farmland between the uplands and the bogs perhaps acts as a habitat barrier for movements of the species.

The rate of nest failure around Sliabh Beagh SPAs during 2020 was higher than expected for these Special Protection Areas (SPAs) but some notable disturbances with off-road motorbikes, unleashed dogs and heavy machinery activity across a range of locations which

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may have caused displacement or disturbance of some pairs of harriers. In our upland sites there was however some success, although on smaller scale than the record-breaking season in 2019. This year 3-4 pairs of Hen Harriers bred, fledging 7 young and wintering on the lower slopes and valleys around Cuilcagh and 7-10 pairs across Sliabh Beagh SPAs (north and south) only fledged a disappointing five young in total. All the Cuilcagh breeding pairs were recorded nesting outside the Special Area of Conservation (SAC) and were found in second rotation non-native conifer plantation, but once fledged the birds far preferred the open moorland to hunt and overwintered within the designated sites.

Fledgling Hen Harrier filmed at the nest under licence

A living legacy for the land

Open moorland on Sliabh Beagh

During spring, a large area of the cross border Sliabh Beagh uplands was gifted to An Taisce – The National Trust for Ireland, by the Rossmoor estate and Lord “Paddy” Rossmoor. For generations, this land has been managed for hunting and wildlife by the Rossmoor’s. In a far-sighted and extremely generous gesture, Paddy Rossmoor gifted this land to An Taisce. As an environmental and heritage charity An Taisce is well-positioned to safeguard this land for future generations and continue the Rosmoor’s legacy.

The unique habitats on Sliabh Beagh are an asset to the people of Ireland. Sliabh Beagh is part of Natura 2000, the largest coordinated network of protected land in the world. As the third-largest blanket bog in Northern Ireland this area stores vast amounts of carbon. An Taisce is an organization that is keenly aware of the importance of keeping this carbon locked up in the ground.

Some of Ireland’s highest quality rivers are found on the slopes of Sliabh Beagh. Just twenty pristine rivers are left in Ireland and 10% of them are on Sliabh Beagh. A significant proportion of North County Monaghan’s population gets its drinking water from a source on An Taisce’s land. Maintaining a healthy bog is a priority for keeping this water source in top condition.

An Taisce is keen to foster sensitive, non-car-based ecotourism on the site to allow people to experience the Irish uplands in a low impact manner. The charity has a deep understanding of Ireland’s upland habitats and the steps required to manage them. One example is the grazing of traditional Dexter cattle which started in the spring (see last newsletter for details of this project). As this project, and our partnership with An Taisce develops we will let you know.

An Taisce’s Ian Lumley with Sliabh Beagh farmers

Optimism for rare waders across borders

Over the past four years the bird monitoring teams from the Golden Eagle Trust (GET) and Argyll and the Isles Coast and Countryside Trust (ACT) have been studying important wading bird populations across CANN's upland and lowland moorland and bog sites.

These baseline surveys will help us monitor the effectiveness of our conservation actions like the restoration of natural water levels, leading to re-wetted habitats with wader-friendly pool-systems across the sites.

One of the most endangered breeding species we work with is the golden plover, protected at the highest level in the EU. Winter on Cuilcagh, Slieve Beagh and Fairywater is marked by large flocks, the speckled gold of their feathers catching the light. In summer they develop a black chest and head and their piercing, shrill call echoes across the mountains and bog.

The golden plover needs short vegetation swards for breeding and will abandon a site if it is over-grazed or too rushy. The species requires pools or water features nearby to support the invertebrates that make up its diet. The management and restoration of bogland by restoring the water balance is vital to provide food during the drier summer months.

Pool systems on blanket bog

During 2019 and 2020 breeding golden plover were recorded on Cuilcagh Mountain, a fabulous habitat that straddles the Irish Border. In 2019, three or four territories were identified and despite Covid restrictions, 2020 saw two or three pairs in Northern Ireland and two in Ireland

The restoration and continued management of the CANN project sites is key to improving the fortunes of these important species. The project shows early indications of the capacity of waders to rebound, when conditions are right. Several pairs of curlews were recorded around the other cross-border site, at Sliabh Beagh Mountain. Five to seven curlew pairs nested across the mountain in Monaghan and Tyrone and Fermanagh during 2020. Curlew were also seen near Moneygal Bog and the Fairywater Bog complex. Following restoration works, which are continuing apace, there is hope that we may soon see the return of this species to some of the lowland raised bogs.

Although breeding snipe are rare on lowland raised bogs, during winter when water levels are high, snipe numbers were healthy. These sites have a good capacity with 200 wintering at one site and 97 at a second. Raising and maintaining high water levels over-summer, will optimise potential breeding conditions. Snipe were also recorded at relatively low densities, on both the upland sites at Cuilcagh and Sliabh Beagh and good management will encourage the return of this enigmatic wader with its distinctive "chipping" and "drumming" breeding displays during the spring and summer.

On Islay, surveys in 2020 revealed seven different species of waders across the island with the best site at Coille, which supports four wader species in the prime pool habitat surrounded by rich farmland. There were indications of Snipe breeding at Eilean na Muice Duibhe. But sadly, despite the pool system, no other species were recorded there. Redshank and lapwing with young were spotted at Claddach as well as passing curlew, thought to be breeding nearby. This small coastal site is a mixture of crofting fields and bog, providing an ideal combination of pools and more productive land for these species of waders to feed. Another coastal site supported a pair of breeding dunlin amongst other waders, adding to the pair found at Coille. This is only the second year of

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Golden Plover in winter plumage

surveys on Islay and with subsequent surveys we hope to obtain a better picture of the range of birds these sites support. A range of factors, particularly disturbance and sub-optimal habitat conditions, have contributed to some of the ongoing declines, loss, and absence of several wader species. But the presence of these species recorded within the CANN project sites and the novel information being collected, from extensive field surveys, is helping to build a picture of how and where restoration works can take place. This data should help improve the populations of rare and declining wading bird species, across both the uplands and lowlands within Ireland, Northern Ireland, and Scotland

Lakes may carry key to their own demise

Marl Lakes, like the Magheraveeley-Kilroosky lake cluster, are renowned for their water clarity and the rare stoneworts on the lake beds. These special features depend on the lakes' naturally low levels of nutrients such as phosphorus (P). As a fertiliser Phosphorus support the growth of floating microalgae and low levels meant clear water. But now the water clarity is less and the stonewort have mostly disappeared because P concentrations in the Magheraveely marl lakes are sometimes four times those of a few decades ago. So where does the phosphorus for these now very frequent, algal blooms come from?

In the summer, the water in the lakes becomes thermally stratified. This means that colder water sinks to the bottom with warmer water floating on top. This means there are now two water bodies within the one lake with circulations that operate independently with little intermixing. Unfortunately the cool bottom layers are effectively cut off from the fresh air, while dead plankton falling from the upper layers decomposes using up the oxygen in the water. The low oxygen triggers a large amount of phosphorus to be released from the sediment. Then, when the thermal stratification breaks down as the lake cools in autumn and the entire lake water body mixes again the phosphorus from the bottom waters can fertilise the next sequence of algal blooms in the upper layers.

CANN partner, Ulster University, investigated this process to try to unlock solutions. At Horseshoe Lake, they simulated summer conditions at the bottom of the lake in very large test tubes. Six pairs of sediment cores were collected, half were treated to remove oxygen (as happens in the cold dark depths) and half were bubbled with air to act as a control. The phosphorus levels were analysed over 30 days and by extrapolating out to lake scale, they were able to see that already after three weeks of low oxygen levels the lake sediment would release enough phosphorus to push the lake from the desired high status with good water clarity to its current status of only moderate environmental condition. This means that even if the water quality of springs, streams and rivers feeding the lakes vastly improved to minimise new phosphorus imports, the lake sediments would still release sufficient excess nutrients to maintain the current level of decline from within the lake.

Now that UU understands the lakes' problems, they can start to work on solutions and commencing in January they will test to see if they can help the lake by adding more calcite, to keep the phosphorus locked in the sediment, even when the oxygen in the water is low.

First Aid for Bogs

The Sliabh Beagh uplands span the border of counties Monaghan, Fermanagh and Tyrone and, nestling in a spot known as the Three Counties Hollow, where these counties meet, some groundbreaking conservation work has been taking place.

Here, a large area of the blanket bog was drained and readied for planting forestry. But for some reason, pine seedlings never made it into the ground and after Sliabh Beagh was designated as an ASSI and SAC, planting was forever out of the question and we were left with close to 120 hectares of drained blanket bog that had the potential for re-wetting.

Luckily the owners, the Northern Ireland Forestry Service, were happy when the CANN project approached them with a plan to rehabilitate this area of drained bog to return it to a healthy functioning blanket bog.

When a bog is drained its lifeblood seeps away. It can no longer hold water and begins to release CO_2 back into the atmosphere instead of capturing it as a healthy bog does. Rain moves off the bog quickly, making rivers flood faster and the biodiversity that depends on a healthy wet bog can no longer flourish. This bog needed some urgent first aid.

During November and December 2020 CANN project contractors set about helping to rehabilitate the bog. The peat dams they installed into the drains act in a similar way to a doctor placing a stitch in a wound, they allow the bog to heal and the drain to close up. This healing process can take many years but is an investment well worth the wait.

The expert father-and-son drain doctors, Matthew and Kevin Farrell carried out the highly specialized task of constructing the dams. They used specially converted diggers with plastic tracks to reduce damage to the bog surface. To place a peat dam, a key must be cut either side of the drain. Peat from a donor site or borrow pit is then compacted across this key, forming a dam. Plant material or scraw is then taken from the borrow pit and placed on top of the new dam to hold it together like a giant band-aid.

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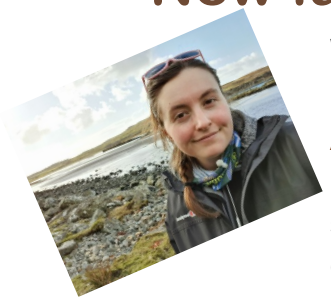
These specialist contractors placed over 1200 peat dams into the drains. Work started in very heavy rain and the benefits were immediately visible as the water level rose right to the surface of the bog, where it belongs, within hours.

Where the drains are deep or where large drains converge at the bottom of a slope, sandwich dams were used. These are marine plywood, held in place with stakes and peat backed up either side topped off with scraw from a nearby donor location.

Convalescent care will be needed for this bog in the form of a careful Conservation Action Plan but the patient is definitely on the road to recovery.

Waste not, want not… how does Ulster Wildlife make valuable charcoal from useless scrub?

New faces at CANN



We welcome three new faces to the CANN partners

Angharad Ward started for ACT (on the CANN project in September, she lives on Islay where she first came for residential volunteering during university and has been in love with the place ever since! Angharad's background is ecology and conservation, primarily in peatland and upland habitats with an interest in ornithology and lepidopterology. She will be helping to deliver the CANN project on Islay, aiding Deb Baker in organising and overseeing conservation works, providing technical advice, writing Conservation Action Plans, and liaising with key stakeholders and project partners.

Maria Snell is our new co-ordinator at AFBI and will lead on our mapping and monitoring work package, she is an ecologist working within the Agri-Environment Branch. Maria's research interests include ecosystem response to changes in climate, biogeochemical cycling and ecological assessment, and include ecological management and conservation.

Finally, we welcome **Paul Sherlock** to the team in Monaghan. Paul will be working as a Conservation Assistant where his role involves helping to coordinate and oversee the work of the CANN project in the Sliabh Beagh area. Paul says he is excited to join the CANN team. He lives close by the Sliabh Beagh area and has a keen interest in improving and enhancing his home place.

Project Partners

Lead Partner: Newry, Mourne and Down District Council (NMDDC).

- Agri-Food and Biosciences Institute (AFBI);
- Argyll and the Isles Coast and Countryside Trust (ACT);
- Armagh City, Banbridge and Craigavon Borough Council (ABCBC);
- East Border Region (EBR);
- Golden Eagle Trust (GET);
- Institute of Technology Sligo (ITS);
- Monaghan County Council (MCC);
- Scottish Natural Heritage (SNH);
- Ulster University (UU);
- Ulster Wildlife (UW).

The CANN project partnership also works very closely with National Parks and Wildlife Service (NPWS) in Ireland and the Northern Ireland Environment Agency (NIEA).

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