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May 18th 2021

Irish Wildlife Trust submission to the Climate Action Plan

To Whom it May Concern,

The Irish Wildlife Trust (IWT) is a national, charitable, membership-based organisation which was established in 1979. Our goal is to raise awareness of our natural heritage and its benefits to people. We would like to make a submission as part of the public consultation on the Climate Action Plan.

Background

Ireland (and indeed the world in general) is in the midst of a two-pronged ecological emergency comprising an extinction crisis and a climate crisis. This was formally recognised by the Dáil in May of 2019. While the climate crisis is at least acknowledged in the public sphere, the extinction crisis is less well known.

Nevertheless, biodiversity is vanishing from across our land and sea at an unprecedented rate. Evidence for this can be found in a series of 'red list' reports from the National Parks and Wildlife Service (NPWS) which have found that across all groups of species analysed an average of one third of our native plants and animals are threatened with extinction or 'near threatened'. A number of species are either already extinct or their disappearance is imminent, such as the curlew, the angel shark and the freshwater pearl mussel.

The extinction crisis represents a haemorrhaging of our nation's heritage as well as undermining some of our most important industrial sectors, most notably fishing, agriculture, tourism and forestry.

Of particular relevance to this submission is the fact that action to protect biodiversity is nearly always beneficial from a climate perspective – either as part of climate sequestration measures, mitigation/adaptation against current/future pressures (e.g. extreme weather) and building resilience into the future. The reverse is not the case – i.e. climate action is not always beneficial from a biodiversity perspective. It is essential therefore that climate and biodiversity are not seen as separate challenges, or where addressing one is more important than addressing the other. They must be seen as different perspectives of the same challenge. Indeed, keeping the global increase in temperature to within 1.5 degrees of pre-industrial levels is not possible without some

means of removing carbon from the atmosphere. While some pin their hopes on unproven technology, we believe that restoring nature is by far the cheapest, easiest, quickest and most reliable way of achieving our goals.

It is important to note that nature-based solutions (NbS) are not a substitute for reductions in greenhouse gas emissions from the burning of fossil fuels. Nor is nature an offset for an unsustainable economic model, rather, it is a fundamental part of a new model where we see ourselves as an intrinsic part of nature, and where there is recognition of nature's right to exist and to flourish.

Nature-based Solutions (NbS)

The science on NbS is developing rapidly and we do not intend to provide a comprehensive overview here. An excellent portal is provided by the University of Oxford, UK at this link https://www.naturebasedsolutionsinitiative.org/

Figure 1 – c. University of Oxford

For the purposes of this submission, we provide views on the climate interconnectedness of issues which are most of relevance in Ireland: oceans, peatlands, agricultural land and forests.

Oceans

Although greenhouse gas emissions from land use, land use change and forestry (LULUCF) are accounted for in Ireland's reporting to the UN's Framework Convention on Climate Change, there is no accounting for emissions from the ocean (or indeed the ocean's role in regulating climate). These emissions may be substantial, if hidden behind the enormous absorption of CO2 from the atmosphere to the ocean, something which is leading to acidification of sea water.

Healthy ecosystems are more resilient when faced with stressors such as rising temperatures, increased storm surges or reduced oxygen[1]. Ireland's marine environment is currently in a degraded state compared to historical conditions, which means it is also less resilient and future climate scenarios may spell the end for certain species. Allowing habitats and species to recover so that they may withstand the combined effects of rising temperatures, reduced oxygen and ocean acidification is crucial.

Besides rebuilding marine habitats and species for their own sakes, marine ecosystems also offer many services to humankind. In the context of climate change, it is important to note that marine sediments are important carbon stores. Crucially, some marine ecosystems can store carbon up to millennial time scales, while the carbon stored by terrestrial systems is usually only sequestered up to decades[2].

Important species for climate mitigation and adaptation:

Oysters: The native oyster *Ostrea edulis* can form dense beds, or reefs, on seabed sediments. They are ecosystem engineers, because dense aggregations of oysters transform species-poor sedimentary environments into three-dimensional habitats which many other species find shelter in. This three-dimensionality also means that oysters can reduce storm surge and thereby protect the coast from erosion. Many other inshore species also provide shoreline protection and should be prioritised for protection and/or restoration for climate adaptation and biodiversity protection. Examples are kelp forests, mussel beds, sponge and coral reefs, and saltmarsh. The best way to restore these ecosystems is by restricting bottom trawling and dredging, improving water quality and allowing our bays and estuaries to rewild, however direct restoration of bivalve reefs (oysters and mussels) is also needed. Some recent studies have also shown that restoration of one habitat facilitates restoration of another. For example, by introducing oysters or mussels to an area, the subsequent improved water quality and shelter allows seagrass to return to nearby sediments while reduced wave action reduces erosion on saltmarsh, thereby allowing it to expand (see https://www.youtube.com/watch?v=ApfY0dWTL6E) .

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[1] Jennifer K. O'Leary, Fiorenza Micheli, Laura Airoldi, Charles Boch, Giulio De Leo, Robin Elahi, Francesco Ferretti, Nicholas A. J. Graham, Steven Y. Litvin, Natalie H. Low, Sarah Lummis, Kerry J. Nickols, Joanne Wong, The Resilience of Marine Ecosystems to Climatic Disturbances, BioScience, Volume 67, Issue 3, March 2017, Pages 208–220, https://doi.org/10.1093/biosci/biw161

[2] Röhr, M. E., Holmer, M., Baum, J. K., Björk,M., Boyer, K., Chin, D., et al. (2018). Blue carbon storage capacity of temperate eelgrass (Zostera marina) meadows. Global Biogeochemical Cycles,32, 1457–1475. https://doi.org/10.1029/2018GB005941

Similarly, shading provided by kelp forest canopy makes settlement of oysters easier, because algae are unable to grow under on the dark seafloor, reducing space competition with oysters[3].

Eelgrass: Although seagrasses account for less than 0.2% of the world's oceans, they sequester approximately 10% of the organic carbon buried in ocean sediment annually (27.4Tg of carbon per year)[4]. Although there are large regional variations, studies have shown that one square meter of *Zostera marina* (one of the Irish resident eelgrass species) can sequester up to 39 g of organic carbon per year which is subsequently stored in the seabed sediment.[5] In the Eastern Atlantic region, one hectare of *Z. marina* (along with the top 100 cm of sediment) was projected to contain approximately 55 tonnes of carbon[6]. There are 26 km^2 of mapped seagrass meadows around the coast of Ireland, which therefore store around 144,000 tonnes of organic carbon, which is around 500,000 tonnes CO_2 equivalent[7]. There are several unmapped seagrass meadows around the Irish coast, so the actual extent is likely to be higher. There is also a need for Irish studies to measure actual amount of carbon stored in Irish seagrass meadows to get more accurate data relevant to Ireland.

Protecting the remaining seagrass beds should be the top priority from a carbon, biodiversity and fisheries point of view. In the UK, seagrass has declined by over 90%, but projects such as Project Seagrass are already underway with the aim to restore large areas of seagrass. In Ireland, there can be no such efforts until the pressures causing seagrass decline have been identified and dealt with.

Ocean sediments: Much of the seafloor in the Irish marine territory consists of sandy or muddy sediment. According to a recent study, surface sediments of the UK Exclusive Economic Zone (EEZ) were found to contain around 530 Mt of organic carbon and 2,500 Mt of inorganic carbon[8]. Interestingly, fjords were found to hold the most amount of organic carbon within their sediment – around 1.84–2.03 kg per m^2.

There are three fjords in the Republic of Ireland, namely Lough Swilly, Killary Harbour and Carlingford Lough. Carlingford Lough was part of the UK study and it is estimated to hold 2,185 ± 292 tonnes Organic Carbon (OC) per km^2 – significantly higher than other inshore sediments (total OC stored in Carlingford Lough is 1.6 Mt). The study authors conclude that well-defined OC accumulation hotspots (e.g. fjords, estuaries and coastal muds) should be managed and protected from disturbance.

Unfortunately, Killary Harbour is not a protected area despite being home to a *Serpula vermicularis* reef (a highly fragile reef-forming worm). Other inshore areas are also not afforded proper protections despite a protected area status. In Ireland,

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[3] Shelamoff, V., Layton, C., Tatsumi, M., Cameron, M. J., Wright, J. T., & Johnson, C. R. (2019). Ecosystem engineering by a canopy-forming kelp facilitates the recruitment of native oysters. Restoration Ecology, 27(6), 1442–1451. https://doi.org/10.1111/rec.13019

[4] Fourqurean JW, Duarte CM, Kennedy H, Marbà N, Holmer M, Mateo MA, et al. Seagrass ecosystems as a globally significant carbon stock. Nat Geosci. 2012; 5:505±509.

[5] Postlethwaite VR, McGowan AE, Kohfeld KE, Robinson CLK, Pellatt MG (2018) Low blue carbon storage in eelgrass (Zostera marina) meadows on the Pacific Coast of Canada. PLoS ONE 13(6): e0198348. https://doi.org/10.1371/journal.pone.0198348

[6] Röhr, M. E., Holmer, M., Baum, J. K., Björk,M., Boyer, K., Chin, D., et al. (2018).Blue carbon storage capacity of temperate eelgrass (Zostera marina) meadows. Global Biogeochemical Cycles,32, 1457–1475. https://doi.org/10.1029/2018GB005941

[7] Seagrass extent calculated from National Parks and Wildlife Service Article 17 report spatial data from 2019

[8] Smeaton C, Hunt CA, Turrell WR and Austin WEN (2021) Marine Sedimentary Carbon Stocks of the United Kingdom's Exclusive Economic Zone. Front. Earth Sci. 9:593324. doi: 10.3389/feart.2021.593324

bottom trawling and dredging is only banned in 3 of our 90 Special Areas of Conservation with marine components (Hook Head and Saltee Islands SACs, Lough Hyne SAC).

While the devastating effects of bottom contact gear on seabed biodiversity have been known for some time, recent research has found that bottom trawling emits as much carbon as the entire aviation industry by churning up seabed sediments that would otherwise lie undisturbed for millennia[9].

Fish and other sea life

According to one study in 2020 industrial fishing has resulted in a massive extraction of 'blue carbon' by removing organisms from the ocean. The study suggests that historical catches and fuel consumption have resulted in a minimum of 0.73 billion metric tons of CO2 (GtCO2) being released to the atmosphere since 1950[10]. Half of the fisheries examined were found to be unprofitable and the study concluded that "limiting blue carbon extraction by fisheries, particularly on unprofitable areas, would reduce CO2 emissions by burning less fuel and reactivating a natural carbon pump through the rebuilding of fish stocks and the increase of carcasses deadfall."

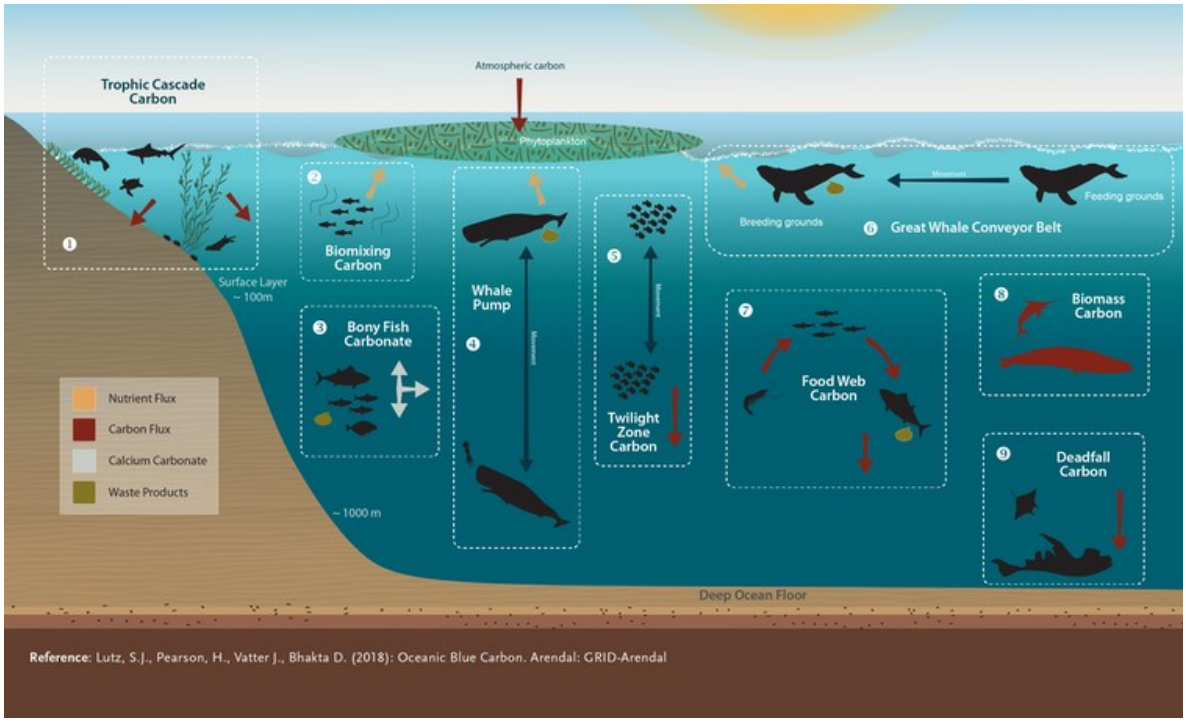

Figure 2 – Ways in which marine life activate the carbon cycle

[9] Sala, E., Mayorga, J., Bradley, D. et al. Protecting the global ocean for biodiversity, food and climate. Nature 592, 397–402 (2021). https://doi.org/10.1038/s41586-021-03371-z

[10] Mariani et al. Let more big fish sink: Fisheries prevent blue carbon sequestration—half in unprofitable areas. Science Advances 28 Oct 2020: Vol. 6, no. 44, eabb4848 DOI: 10.1126/sciadv.abb4848

A 2010 study found that humans had reduced the abundance of large vertebrates in the ocean. It found that rebuilding whale populations to historic levels would store 8.7×10^6 tons Carbon, "equivalent to 110,000 hectares of forest or an area the size of the Rocky Mountain National Park"[11]. Whales and other marine organisms do not just store carbon, they are essential links in biogeochemical cycles, transferring nutrients from the seafloor to the surface when feeding and excreting, and back to the seafloor when they die and sink.

Solutions
Marine Protected Areas (MPAs) are the best tool we have to protect and restore ocean ecosystems. Our current network of MPAs is not achieving its objectives due to the absence of conservation measures. It is vital that the future MPA network incorporates sedimentary organic carbon in their formal designation status where management can be tailored to maximise carbon storage in sediments. This requires the MPAs to be highly protected areas where all mobile bottom gear is banned to protect seabed habitats and carbon stores, and where all industrial pelagic gears are banned to protect fish populations.

Right now, Ireland lacks the legislation to designate offshore MPAs for habitats that are not listed in the Habitats Directive (e.g. carbon rich shelf sediments). New MPA legislation needs to be prioritised so that these areas can be protected as soon as possible to avoid further degradation.

Ending overfishing in EU waters, including ending the discarding of non-target species, was to have ended by 2020. This has not happened. The mounting evidence on the importance of protecting the ocean as a form of climate action surely just adds to the urgency of this task.

Peatlands

A recent publication by the Environmental Protection Agency (EPA) highlighted how 16.1% of Ireland's terrestrial surface area is characterised by wetlands, including peatlands[12]. 300,000 hectares are used for extensive grazing by cattle and sheep, something the report states has "important consequences" for greenhouse gas emissions.

Commercial forestry plantations have also been situated on peatlands, and while the extent of new planting on peatland is much reduced, it appears that new forestry licences are still being granted on peat soils[13]. The EPA estimates that 500,000 hectares of peatland are being exploited for fuel.

In addition, applications for new wind energy installations on peatlands continued into 2021. Some of these have had disastrous consequences, most notably at Meenbeg in Co. Donegal, where construction of wind turbine infrastructure is implicated in a bogslide that not only caused irreparable damage to the blanket bog but also harmed

[11] Pershing et al.. The Impact of Whaling on the Ocean Carbon Cycle: Why Bigger Was Better. 2010. PLOS ONE https://doi.org/10.1371/journal.pone.0012444
[12] Haughet E. 2021. Climate Change and Land Use in Ireland. Environmental Protection Agency.
[13] https://twitter.com/SaveLeitrim/status/1374648766142242823?s=20

aquatic life in downstream water courses. It is evidence that government policy on renewable energy is not aligned with other environmental goals, in this case protection of peatlands.

All of Ireland's peatland habitats are assessed as 'unfavourable' by the National Parks and Wildlife Service as part of their reporting to the European Commission under Article 17 of the Habitats Directive. Indeed, turf-cutting on Special Areas of Conservation (SAC) and where raised bog is a qualifying interest, is on-going, despite being banned in 2011[14].

Meanwhile the 'enhanced rehabilitation' of Bord na Móna peatlands has shown its worth in locking away carbon and restoring biodiversity. In April 2021 it was reported that a pair of Common Crane was nesting on a rehabilitated bog. If they are successful, they will be the first to rear young in 300 years.

Solutions

Peatland restoration must become a central plank of the government's Climate Action Plan. The Peatlands Strategy, which was never fully implemented, must be reviewed in light of the climate and biodiversity emergency. There must be an end to turf-extraction in SACs where peatlands are a qualifying interest and management measures implemented as a matter of urgency. The Wildlife Bill, currently before the Dáil, and which proposes removing Natural Heritage Area protections to allow further turf-cutting must not be passed.

An important piece of research from Spain showed that grazing animals on blanket bogs resulted in rates of erosion similar to areas of bare peat in the UK (up to 35mm per year)[15]. While some grazing by livestock in certain peat habitats may be compatible with conservation and climate goals (e.g. cattle at very low densities on heath habitat), agricultural grazing of peatland is largely unsustainable. The emissions of greenhouse gases from fires on peatlands is not calculated but is surely substantial. Nor are the emissions from 'unmanaged' peatlands and as a result, the enormous loss of carbon and biodiversity, as well as pollution to air and water courses, from livestock grazing is not quantified.

There is an urgent need for peatland restoration on a landscape scale. This must include rewilding of legacy conifer plantations. There should also be a blanket prohibition on burning vegetation on peat soil. There should be no grazing of blanket bog.

Trees on peat?

It is frequently not possible to say with certainty whether a particular patch of peatland is suitable for trees. A variety of native trees grow well on peat and the climax vegetation of many upland areas in Ireland is 'montane birch forest'[16]. Blanket bog is typically not suitable for trees however open canopy Pine *Pinus sylvestris* can and does grow on blanket bog in Scotland and Scandinavia.

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[14] https://iwt.ie/press-release-unlawful-turf-cutting/

[15] Chico et al. Application of terrestrial laser scanning to quantify surface changes in restored and degraded blanket bogs. Mires and Peat. Volume 24 (2019) Article 14

[16] Crosss J. Biology and Environment: Proceedings of the Royal Irish Academy , AUGUST 2006, Vol. 106B, No. 2 (AUGUST 2006), pp. 65-116

The priority from a management perspective should be to restore the peatland hydrology while allowing trees to naturally regenerate. In other words, let the trees decide if and where they should grow. Only in exceptional circumstances (e.g. where no seed source is available) should trees be planted on peat.

Forests

With the lowest forested area among the larger European countries, Ireland has an enormous potential to restore tree cover across a variety of landscapes. The loss of native woodland (less than 1% of land area?) and the degradation of remaining areas of native woodland, including those within SACs, is a national tragedy.

From a carbon point of view, a recent study by Natural England found that "new native woodlands can sequester carbon at a higher rate than other semi-natural habitats, with the right combination of soil type and tree species. The sequestration rates fall with time but are typically higher than other habitats, even after 100 years or more without management. […] Over much of England, native tree species can sequester carbon at rates comparable to, or in some cases higher than, non-native conifer plantations and support higher biodiversity"[17].

Existing areas of native woodland must be identified, mapped and surveyed. Management measures for these woodlands must be prioritised while natural regeneration should be the preferred option to expand and ultimately join up these fragments.

Woodland establishment along river corridors can provide multiple benefits for water quality, biodiversity and climate mitigation. In particular, the role of woodlands in reducing flood and drought peaks is underappreciated in Ireland. However, ecological restoration must also include undoing decades of hard engineering works to rivers and their flood plains.

Restoring entire river systems and 'slowing the flow' is proven to provide significant flood mitigation[18]. The Arterial Drainage Act must be reformed to remove the requirement to continuously 'maintain' 11,500km of river channel while removing barriers to fish migration will increase ecological coherence and restore natural processes.

Farmland

Agricultural soils are significant stores of carbon however the EPA has identified these as net carbon emitters. There is sadly a serious deficit in our knowledge of

[17] R Gregg, J. L. Elias, I Alonso, I.E. Crosher and P Muto and M.D. Morecroft (2021) Carbon storage and sequestration by habitat: a review of the evidence (second edition) Natural England Research Report NERR094. Natural England, York.

[18] https://www.gov.uk/flood-and-coastal-erosion-risk-management-research-reports/working-with-natural-processes-to-reduce-flood-risk

farmland soil in Ireland, particularly in relation to the biological health of soil. Recent years have seen a resurgence in interest in soil health and its ability to sequester and store carbon. The planting of trees alongside grazing animals, referred to in modern policy circles as 'agro-forestry', has arguably been a long-standing feature of Irish farming, where hedgerows were established as stock-proof barriers as well as providing forage for animals and fuel and food for people. Hedgerows are also stores of carbon in much the same way as native woodlands but a series of surveys carried out by local authorities has indicated they are in bad condition. There is no national survey of hedgerows although it is widely believed that traditional management practices are increasingly rare. A paucity of data therefore is a significant hinderance to accounting for the potential of Irish farmland on mineral soil to remove and store carbon from the atmosphere.

The UK has targeted an increase in length of hedgerow in meeting its climate 'net zero' target. However, this approach is fraught with difficulty. Hedgerow management is widely variable while new hedgerow is not comparable from a biodiversity perspective to better management/restoration of existing hedgerow. Length-based targets can therefore be misleading.

The Drawdown Project has attempted to quantify the benefits of regenerative farming for climate but has warned that this cannot be a substitute for reducing direct emissions, e.g. from enteric methane. Regenerative agriculture has great potential for water, biodiversity and farmers, but can be an unreliable approach to greenhouse gas reduction[19]. Regenerative agriculture implicitly includes elimination of artificial inputs such as artificial nitrogen, synthetic fertilisers and imported feedstuffs. These reductions can make a positive, and quantifiable, contribution to climate goals.

Conclusion

A recurring theme in the debate on climate and the environment is policy coherence. Many government policies, e.g. on growth in the agricultural sector, are at odds with environmental goals. Policies which favour biodiversity and carbon sequestration, e.g. the Native Woodland Scheme, are undermined by eligibility requirements under the single farm payment which promote the removal of native woodland, particularly scrub. Public money is spent on peatland restoration while peatlands are still being lost from illegal turf-cutting in SACs. Across the board there has been a reluctance to implement binding environmental targets which would bring ancillary climate benefits, e.g. ending overfishing or managing conservation sites in the Natura 2000 network. Nature can play an outsized role in addressing the climate crisis but resolving these policy contradictions is a priority if the potential is to be realised.

[19] Farming our way out of the Climate Crisis. 2020. www.drawdown.org