



Date: 14th February 2022

**Subject: Appeal FAC 838/2020 in relation to Afforestation License GY27-
FL0050**

Dear

I refer to the appeal to the Forestry Appeals Committee (FAC) in relation to the above Licence issued by the Minister for Agriculture, Food and the Marine. The FAC established in accordance with Section 14A (1) of the Agriculture Appeals Act, 2001 has now completed an examination of the facts and evidence provided by all parties to the appeal.

Background

Licence GY27-FL0050 is for the clearfelling and restocking of a site area of 19.93ha at Illion East, Co. Galway and was approved by the Department of Agriculture, Food and the Marine (DAFM) on 20 October 2020.

Hearing

An Oral Hearing of appeal FAC 838/2020 of which all parties were notified, was held by a division of the FAC on 17 and 18 November 2021.

In attendance

FAC Members: Mr. Des Johnson (Chairperson), Mr. Seamus Neely, Mr. John Evans and Mr. Donal Maguire

Secretary to the FAC:

Ms. Ruth Kinehan
Mr. Michael Ryan

Ornithologist: Dr. Alan Fielding



DAFM: Mr. Kevin Collins, Mr. Anthony Dunbar and Ms. Eilish Kehoe

Applicant 1:

Introduction

The Forestry Appeals Committee (FAC) considered all of the documentation on the file, including application details, processing of the application by the DAFM, the written grounds of appeal, submissions made at the Oral Hearing and all submissions/observations, and the consultant ornithologist's report, before deciding, on the 07th February 2022, to affirm the decision to grant the licence (GY27-FL0050).

Proposal and site description

The proposal is for the clearfelling and restocking of a site area of 19.93ha at Illion East, Co. Galway. The existing stock is Lodgepole pine (19.03ha planted in 1977) MLA (0.13ha) and Sitka spruce (0.77ha planted in 1989). Proposed restocking is with Lodgepole pine (18.93ha) and Open space of 1ha is to be provided. No fertilisers or herbicides are proposed. Soils are stated to be predominantly blanket peat and the slope is gentle. The existing habitat is 99% conifer plantation and 1% wet heath. There is stated to be downstream hydrological connection to Maumturk Mountains SAC (360m), Connemara Bog Complex SAC (1700m), Connemara Bog Complex SPA (1700m), and Twelve Bens/Garraun Complex SAC (7930m).

The site is located north of the N59, approximately 7km NNW of Maam Cross and approximately 6km ENE of Recess. It forms part of a larger existing conifer forestry block of varying age. There are small open areas within this forestry block. The site adjoins a public road to the NE. The Maumturk Mountains SAC is adjacent to the east, separated from the project lands by the public road. There is an Order 2 stream flowing from east to south west through the site, and a small, unconnected lake approximately 300-400m to the south west. The wider landscape is characterised by open heathland interspersed with lakes and streams, and blocks of conifer forestry. Settlement is very sparse and dispersed.

Referrals

DAFM referred the application to the County Council and Inland Fisheries Ireland (IFI). No responses are recorded.



DAFM processing of the application

The applicants submitted a Natura Impact Statement (NIS), dated 24.09.2020. The NIS addresses proposed clearfelling operations using a timber harvesting machine, and timber extraction using a forwarder machine. Both are described as low ground pressure machines. Brash mats are proposed. Reforestation would include windrowing prior to replanting to provide a clear site. Replanting is to be entirely manual. Insecticide would be applied manually, if necessary. Environmental setbacks are to be provided. Natura 2000 sites within a 15km radius are considered, with the following four sites screened in for Stage 2 Appropriate Assessment - Connemara Bog Complex SAC (1931m separation), Maumturk Mountains SAC (145m separation), Connemara Bog Complex SPA (1931m separation), and Twelve Bens/Garraun Complex SAC (7930m separation). Appropriate Assessment is carried out, with qualifying interests/special conservation interests (QIs/SCIs) and conservation objectives (COs) listed, and assessment made of the potential for adverse effects arising on the qualifying interests from the proposed development. Mitigation measures are recommended in respect of each of the screened in Natura 2000 sites (in order) as follows:

1. No mitigation required. Merlin – the separation distance is 1.9km, so there is no potential for adverse effects
2. Mitigations recommended for Salmon, Slender Naiad, Oligotrophic waters, North Atlantic Wet Heath, Blanket Bogs, Depressions on peat substrates
3. Mitigations recommended for Salmon, Otter, Slender Naiad, Oligotrophic waters, Oligotrophic to mesotrophic standing waters, Water Courses of plain to montane levels
4. Mitigations measures for Salmon, Otter, Slender Naiad, Oligotrophic waters, Oligotrophic to mesotrophic standing waters.

Mitigations are set out under the headings of exclusion zones for machinery, silt and sediment control, extraction and removal of timber, brash management, temporary water crossings, reforestation operations, chemical use, and monitoring and contingency planning. In-combination projects are considered - harvesting (3) (56.37ha), and forest roads (2) (1320.3m). The NIS notes that the proposed development overlaps with the Sub-Basin Owentooey_010, and that the overlapping area is 0.346ha. The water quality status for the waterbody is 'Good', and the impact on the waterbody is considered to be negligible.

The DAFM carried out Appropriate Assessment screening (AAS), dated 29.09.2020 (postdates the submission of the NIS). This screened out the following sites from Stage 2 assessment - Lough Corrib SAC, Lough Corrib SPA, Kilkieran Bay and Islands, Lough Carra/Mask Complex SAC, Lough Mask SPA, Rosroe Bog SAC, and Mweelrea/Sheeffry/Erriff Complex SAC. The AAS concluded that four Natura 2000



sites should be subject to Stage 2 assessment - Maumturk Mountains SAC, Connemara Bog Complex SAC, Connemara Bog Complex SPA, and the Twelve Bens/Garraun Complex SAC. (These are the same 4 sites for which Stage 2 assessment was carried out in the NIS submitted).

The DAFM prepared an Appropriate Assessment Determination (AAD), dated 01.10.2020. The AAD confirmed the conclusions of the AAS regarding sites screened out for Stage 2 assessment, and reasons are given. The AAD also confirmed the four sites screened in for Stage 2 assessment as Maumturk Mountains SAC, Connemara Bog Complex SAC, Connemara Bog Complex SPA, and the Twelve Bens/Garraun Complex SAC. The reason for screening in the 3 SACs is the possible effect due to direct hydrological connectivity and, in respect of the SPA the reason is the proximity of potential habitat for species listed as SCIs in the Natura 2000 site. The AAD evaluated the NIS submitted and concluded that it contained information sufficient to derive appropriate conditions for a determination. The AAD considered other projects focussed on the general vicinity of the project lands in the River Sub-basin Owentooey_010, Recess_010. Non forestry projects included agricultural developments and dwellings, and two felling projects are considered. It is noted that the River Sub-Basins have approximately 5% and 15% forest cover respectively. The AAD concludes that, based on best scientific knowledge in the field, the proposed development individually, or in combination with other plans and projects, will not adversely affect the integrity of any of the listed European sites, having regard to their conservation objectives, provided specified mitigations are implemented relating to Merlin, site preparation, protection of blanket bogs, protection of adjoining/downstream aquatic based species and habitat, the Otter, and adherence to specified guidance and the Forest Standards manual. The basis for the AAD is stated as follows: *this 19.93ha blanket peat site, lies on a moderate slope adjacent to conifers to the west and peatland east of the project. Conditions have been set out considering the peaty nature of the soil along with aquatic measures to protect the SAC features hydrologically linked. Broadleaf planting has been specified on the open east borders of the site to provide structural diversity supporting prey species of the SPA feature and sufficient ecotone to the adjacent peatland. Aquatic buffer zone planting has also been set out in the extended aquatic setback. With all of the above measures set out, no impacts to the qualifying interest features is concluded.* The overall conclusion reached is that there is no scientific doubt remaining as to the absence of any adverse effect on the integrity of any European site.

Licence

The licence was issued on 20.10.2020, and is exercisable until 31.12.2020. The licence is subject to standard conditions plus the mitigations as per the AAD.

Grounds of appeal and Statement of Facts



There is a single appeal against the decision to grant the licence. The grounds of appeal (in summary) are as follows:

1. The appellant had limited access to the application documents contrary to requirements of the EIA Directive and the Aarhus Convention. The decision does not meet with the standards and requirements for public participation as is legally required.
2. The appellant was unable to make a precise and targeted submission identifying any defects in the application procedure. In the absence of relevant information, the appellant contends that the proposed development is likely to impact on foraging, roosting or nesting of protected species in an SPA site.
3. It is not clear if the original application was ever subject to a proper or adequate EIA or AA, or if the cumulative impacts and effects of this crop was ever properly assessed. Arguably, there are implications for remedial assessment and remediation of the site. If deforestation is proposed, further screening for EIA may arise. Regardless, the initial afforestation is being materially altered due to felling and, as such, the proposed development falls within the EIA Directive.
4. The Forestry (Miscellaneous Provisions) Act 2020 does not adequately or correctly transpose the EIA Directive, either for screening or conduct of EIA by the FAC.
5. Thinning and felling have the potential to remove Merlin nests and nesting habitats. Merlin are vulnerable to disturbance from forestry operations, which requires mitigation. Reference is made to Lusby et al 2015. Felling must be carried out outside the nesting season, and loss of nesting habitat must be considered through Appropriate Assessment. The loss of roosting habitat may also be material.
6. The decision should have been considered in the context of Articles 4, 5 and 9 of the Birds Directive, Articles 12-16 of the Habitats Directive, Article 4 of the Water Framework Directive, and climate impacts.
7. The licence should be refused in order to prevent adverse impacts on the integrity of the SPA, or the risk of adverse impacts. The population of Hen Harrier needs to be considered, and reference is made to the 2015 National Survey of Breeding Hen Harriers in Ireland. There is a risk of an adverse effect on the integrity of the SPA resulting from loss of foraging area/loss of roosting area/loss of nesting area (as appropriate) in particular.

The DAFM responded to the written grounds as follows (in summary):



1. It is open to any person to make a submission during the public consultation process, after which they receive a copy of the decision and, if requested, a copy of the file. The appellant was free to make such a submission at the time.
2. The administration of the appeals system, including fees, is a matter for the FAC. The FAC carries out its functions in an independent and impartial manner in respect of the appeal process, as required by Irish law.
3. Operational activities of thinning or clearfelling and replanting an already established forestry area are not categorised under Annex II of the EIA Directive. There is no change of use or extension of an earlier authorisation for the project within the meaning of the EIA Directive, as future felling and replanting would have been envisioned and accounted for at the time of the forest's establishment as one of the main cyclical management options going forward.
4. The potential of the project to result in displacement of breeding Merlin was identified on a Precautionary basis. Heathlands are vital hunting habitats for Merlin. Merlin now predominantly nest in trees with a strong preference for conifer plantations. Breeding success is positively related to the proportion of suitable foraging habitat. Mitigation was required in the form of licence conditions to avoid impact.
5. An in-combination report, including both forestry and non-forestry projects in the vicinity of the project area was considered. The proposed development, when considered with other plans and projects, will not give rise to any adverse effect on the integrity of any European site.
6. Appropriate Assessment screening was carried out based on European sites within a 15km radius of the project area, and sites beyond that and hydrologically connected. Specific mitigation measures set out in the Appropriate Assessment Determination (AAD) ensure that the proposed development will not result in any adverse effect on any European site. The conditions of the licence are consistent with best forest practice, national forest policy, and protection of the environment.
7. In respect of the Water framework Directive (WFD), the DAFM applies a wide range of checks and balances in its evaluation. The licence is conditional on adherence to the Interim Standards for Felling and Reforestation (DAFM 2019).

Note: As the written grounds of appeal and the DAFM Statement of Facts relate to multiple cases, some of the grounds and responses relating to Hen Harrier and Merlin relate to some appeals but not others. In this case, the Merlin is a special conservation interest of the Connemara Bog Complex SPA. Hen Harrier is a special conservation interest of Lough Corrib SPA at a separation distance of approximately 9km.

Correspondence subsequent to submission of appeal



On receipt of the appeal, the FAC provided the appellant with copies of all information that had been provided to it by the DAFM in accordance with section 7(2) of the Forestry Appeals Committee Regulations of 2020 (SI 418/ 2020). Subsequently, the appellant submitted an expansion of the grounds raised in its original appeal, as provided for under section 14(b)(6) of the Act. In the particular circumstances of this appeal, the FAC decided to accept and consider this further submission, which is an expansion of the original appeal, and the DAFM response to it.

This expansion submission is (in summary) as follows:

1. The FAC procedure is unlawful and invalid. The application is determined by the Minister but the FAC is made up of Members of the Minister's staff who are answerable to the Minister. There is a lack of independence and objectivity. The criteria for the Minister granting a licence is not adequately set out in legislation. The public consultation process is inadequate.
2. The FAC is an administrative decision maker. The FAC has not complied with appropriate notification and participatory obligations. It falls on the FAC to conduct Appropriate Assessment, and has obligations under Article 4 of the Water Framework Directive, to ensure the adequacy of compliance with the strict protection of Annex IVa species, and the adequacy of screening determinations in respect of EIA and/or AA. As a public authority, the FAC must disapply provisions of national law that would be in breach of EU law.
3. Reference is made to Ms Justice Finlay Geoghegan in *Kelly v ABP* in respect of the nature and standard required for Appropriate Assessment. The FAC is obliged to carry out an AA. An AA cannot have lacunae or gaps, and must include an examination, analysis, evaluation, findings, conclusions and a final determination. There cannot be any scientific doubt. The material before the FAC does not provide a basis on which it can safely determine that there will be no adverse impacts on the integrity of the Natura 2000 sites.
4. In respect of the protection of water quality, there is an over-reliance on Standard Best Management Practices. Forestry impacts on 16% of Ireland's waterbodies with the most common problems relating to the release of sediment and nutrients, and impacts from acidification. Forestry may also give rise to changes in stream flow regimes caused by associated land drainage. Procedures outlined in the Standards for Felling and Reforestation (DAFM, 2019) are not sufficient to fully protect water bodies. Buffer widths of 10-25m may not be capable of removing all nutrients from run-off. In high storm events the retention time may be too short for uptake of soluble phosphorus by vegetation. The risk of run-off is being underestimated as peat catchments are susceptible to high rates of run-off. It is not possible to reach conclusions beyond reasonable doubt.



5. No Harvest Plans or maps were provided and these are required to be submitted at the same time as the Licence application. Specifics of the site have not been provided. Exclusion zones are not identified and it is not clear where silt traps would be located. The waterbody is not identified. No indication is given regarding the use of chemicals. Post consent conditions are not permissible and cannot be considered as a point of detail.
6. The NIS refers to some Freshwater Pearl Mussel concerns. No specific mitigation is apparent in the conditions of the licence. A fluctuating water table can impact on this species and standard water protection measures as mitigation may not be sufficient. This is not referred to in the NIS or AAD.
7. Cumulative assessment for aquatic impact is inadequate. The run-off risk can vary from site to site. The EPA recently produced Pollution Impact Potential maps which indicate areas of high risk of phosphorus and nitrogen run-off, and these should be referred to in any assessment. The correct legal test has not been applied to the assessment of cumulative impact. The cumulative impact assessment for this site is incomplete.
8. There is a dearth of information regarding reforestation. There is no detail regarding any requirement for further drains or drain clearing activity that may be needed.
9. There is inadequate consideration of the potential impact on Annex IVa species. Article 12-16 of the Habitats Directive provide for the strict protection of Annex IVa species whether or not they are listed as qualifying interests in Natura 2000 sites e.g., Otters. Otter territories can stretch from 10-15km. Female otters can range up to 1km away from a river to establish a natal holt, and they can breed at any time of the year.

On receipt, the above submission was circulated to all other parties to the appeal, Inland Fisheries Ireland (IFI) and Galway County Council. No response was received from IFI or the Local Authority. The DAFM made observations which are summarised as follows:

1. The DAFM has developed a new Forest License Viewer (FLV) giving the public access to documentation regarding forest licence applications. The FLV displays sites for afforestation, felling and road applications from 1st January 2018. Relevant documents for applications received after 11th January 2021 are also available. All relevant documentation on which the DAFM has based its decision are available to the public. All information is available free of charge.
2. The DAFM's AA procedures are set out in a November 2019 Guidance Note (reference provided). The processes are underpinned by a team of qualified



foresters who undertake AA screening, and ecologists who are responsible for either reviewing the NIS (where submitted) or compiling an AA Report, and completing an AA Determination. It is important that the DAFM AA decision-making has a strong scientific basis.

3. DAFM's policies, standards and requirements are applied to all harvesting and reforestation applications. This includes observing exclusion zones along aquatic zones, installation of appropriate crossing points etc. The AA process is not focussed primarily on felling. Reforestation is referenced throughout the NIS and the AAD.
4. The Hen Harrier Threat Response Plan is currently in draft format. Until it is agreed and completed, DAFM will continue to apply the approach agreed with the NPWS and set out in Appendix 21 of the Forest Standards Manual.
5. A Harvest Plan is not a legal requirement, but applicants are encouraged to include one with an application. The DAFM may request a Harvest Plan by way of further information for social and environmental reasons.
6. There was sufficient information for the DAFM to screen out certain European sites. For sites screened in for Appropriate Assessment, a detailed NIS is submitted. The NIS provides greater detail around felling and replanting operations. The information in the application and the NIS was sufficient for the DAFM to complete the AAD, and this concluded that there was no possibility for an adverse effect on the integrity of any European site and to make a decision to issue the licence.

Oral Hearing

The FAC convened a limited agenda Oral Hearing in Portlaoise on 17th and 18th November 2021 relating to 13 appeal cases, including GY27-FL0050. Representatives from DAFM, (applicants) and applicants' representatives in respect of 3 other cases under appeal, and (appellant) attended and participated. Referral bodies (County Council, Inland Fisheries Ireland (IFI)), were notified but did not attend. The National Parks and Wildlife Service (NPWS) was notified but did not attend. The Oral Hearing had a limited, specified agenda relating to the protection of the Hen Harrier and the Merlin. The FAC engaged a consultant ornithologist to advise it, and he attended and participated at the Oral Hearing, and subsequently submitted a report containing advice sought in accordance with a brief provided by the FAC. Copies of Oral Hearing notifications, introduction and agenda, the consultant's brief and report, and submissions made by the parties at the Oral Hearing are contained on file.

Assessment of grounds of appeal - ornithological

In addressing the grounds of appeal, the FAC firstly considered the ground of appeal contending that the proposed development has the potential to remove Merlin nests and nesting habitats, and that Merlin are vulnerable to disturbance from forestry



operations which require mitigation. The FAC noted that, at the Oral Hearing, [redacted] for the appellant addressed the issue of 'favourable conservation status' (FCS). He referred to Article 1 of the Habitats Directive and noted that EC Guidance stated that principles underpinning FCS are equally applicable in relation to the objectives of the Birds Directive. He submitted that conservation status is favourable when population dynamics data indicate that a species is maintaining itself on a long-term basis as a viable component of its natural habitats, and the natural range is neither being reduced nor is likely to be reduced for the foreseeable future. He further submitted that a species must be able to maintain itself without human intervention. He referred to Favourable Reference Values (viability) and noted that no FRVs exist for Hen Harrier or Merlin in Ireland. Merlin is a challenging species to monitor due to low population density, widespread distribution in remote upland areas, and discrete breeding behaviour. He submitted that there is no robust estimate of population size and trends available, and that Merlin is an Amber-listed Bird of Conservation Concern in Ireland. [redacted] stated that there may be an estimated 200-400 breeding pairs in Ireland, and 27-41 breeding pairs in the SPAs. He submitted that the natural range, true population, habitat availability and quality are unknown. Scientific evidence for mitigating main forestry related impacts is inadequate, and the overall conservation status of the Merlin is unknown, and that clearfelling is the main known impact in Ireland. [redacted] submitted that Merlin predominantly select mature trees for nesting, and that nest selection is influenced by the presence of open suitable habitat in proximity. He also stated that Merlin use or avoidance of forestry for foraging is not known. He submitted that no on-site ecological assessment is undertaken of the adjacent habitat, and it is left open to foresters or contractors as to whether the 100m buffer applies. He stated that the main mitigation does not consider the impact of restocking in respect of the conservation interests of the SPAs. [redacted] stated that scientific doubt cannot be excluded if the mitigation has no scientific basis, and that there must be consideration given to the cumulative impacts of licenced activities.

The FAC noted that a specific condition of the licence is as follows:

No felling or other forestry operations associated with the licence shall take place for the period 1st March to 31st August inclusive, within 100m of the forest edge, where such forest edge is immediately adjacent to moors, heathland, peat bogs or natural grassland, or within 100m of a clearing in sections of the forest of larger than 1ha. Such operations can progress towards the exclusion zone, but can only enter it during the period 1st September to 29th February, inclusive.

Reason: *In the interest of protecting the special conservation interest of the Connemara Bog Complex SPA, as per the Appropriate assessment Determination for GY27-FL0050.*

The FAC engaged Dr Alan Fielding, consultant ornithologist, to provide opinion in respect of conditions attached to the appealed licences as to their adequacy to avoid impact on Merlin and Hen Harriers in terms of habitat loss, damage to nest sites, or



direct mortality, to such an extent as would be likely to prevent the achievement of favourable conservation status of these species. The consultant was also asked if there is any scientific basis for the temporal and spatial parameters attached to the conditions, and is there any known scientific basis for varying these parameters? Dr Fielding attended and participated at the Oral Hearing held on 17th and 18th November and had access to the full file.

Dr Fielding's report, dated 02 December 2021, addresses the ornithological issues raised by the appellant in both the written grounds of appeal and submissions made at the Oral Hearing. It also references and considers relevant studies carried out in Ireland and the UK before reaching the opinion that the felling and replanting conditions, as currently specified, are unlikely to have negative effects on the current conservation status of Merlin in the SPAs. Felling licence conditions relating to Merlin, restrict forestry operations between 1st March to 31st August. The Fielding report refers to the assumed Merlin breeding season in the United Kingdom (Table 2), but states that there are few other sources of detailed information. Based on the information referenced, the report concludes that restricting forestry operations between 1st March to 31st August appears to be robust, and no amendment is suggested. In terms of the required buffer of 100m, the Fielding report concludes that there is little empirical supporting evidence for changing this distance.

The proposed project lands do not lie within a SPA, but are separated by approximately 2200m from the Connemara Bog Complex SPA, for which the Merlin is listed as a special conservation interest. The SPA lies to the south and the intervening lands are occupied by existing forestry, open heath and a public road. The wider landscape is characterised by scattered blocks of mature forestry surrounded by open heathlands drained by rivers and streams, and lakes of varying sizes. Settlement in the area is sparse and dispersed. The Maumturk Mountains are also shown on the EPA public website as a proposed Natural Heritage Area (NHA). While traditionally Merlin generally nest on the ground, amongst heather in hilly moorlands, there is evidence that, in recent years, they have been nesting in trees at the edge or within forest plantations (Irish Birds, David Cabot, 2021). There is no information before the FAC to indicate that there are any Merlin nests in the forestry the subject of this appeal, or that the proposed development would have an adverse impact on foraging territory for the Merlin. Having regard to the conclusions of the Fielding report, the nature and scale of the proposal, the separation of the project lands from the Connemara Bog Complex SPA (separation distance approximately 2200m) and to the existing intervening land uses, the FAC concludes that there is no convincing evidence that the proposed development would have an adverse impact on Merlin, listed as a qualifying interest for the Connemara Bog Complex SPA, or the Merlin species in general. Furthermore, the FAC concludes that there is no convincing case for extending the 100m buffer distance in respect of Merlin.



The FAC noted that the Hen Harrier is a qualifying interest of Lough Corrib SPA. This Natura 2000 site is at a separation distance of approximately 9km from the project lands. There are lakes, heathland, agricultural lands and public roads intervening. There is no evidence before the FAC to indicate the presence of Hen Harriers on the project lands or the use of lands in the wider area for foraging by the species. Having regard to the information before it, including the separation distance to Lough Corrib SPA and intervening lands uses, the FAC concluded that the proposed development would not give rise to any significant adverse impacts on the conservation status of the Hen Harrier in the Lough Corrib SPA, or on the species in general.

Assessment of grounds of appeal - administrative

The appellant contends that they had limited access to the application documents contrary to requirements of the EIA Directive and the Aarhus Convention, and that the decision does not meet with the standards and requirements for public participation as is legally required. They further submit that they were unable to make a precise and targeted submission identifying any defects in the application procedure, and that, in the absence of relevant information, they conclude that the proposed development is likely to impact on foraging, roosting or nesting of protected species in an SPA site, and other environmental effects. The DAFM reject this contention, stating that the right to participate was available at the application stage and that the appellant did not avail of that right. The FAC notes that the appellant lodged written grounds of appeal, which were subsequently expanded upon in a further submission, and also attended and participated fully in the Oral Hearing. Based on the information before it, the FAC concludes that the DAFM decision was made in line with fair procedures, and that the appellant has availed of their right to participate in the appeal process.

The appellant contends variously that the procedures of the FAC are unlawful and invalid for reasons of public participation and public access to the environment. The appellant did not make a submission to the DAFM as part of the licensing process. The FAC note that, having submitted their grounds of appeal, the appellant was provided with the material provided to the FAC by the DAFM which informed the granting of the licence, and that this material in turn informed the appellants expansion of their grounds of appeal. For these reasons and the reasons outlined in the previous paragraph the FAC does not consider that the appellant was disadvantaged or had inadequate access to information required for the submission of an appeal.

The appellant contends that the composition of the FAC renders the procedures of the FAC unlawful on the basis that the FAC is made up of members of the Minister's staff who are answerable to the Minister. The FAC concludes that there is no basis for this contention. The FAC is independent and impartial in the performance of its functions, as required by legislation.

The appellant submits that the FAC is an Administrative Decision Maker; and has not complied with appropriate notification and participatory obligations as required by the



Aarhus Convention; and that it falls to the FAC to conduct inter alia matters such as Appropriate Assessment under article 6(3) of the Habitats Directive and Article 4 of the Water Framework Directive and other obligations arising from EU law. The FAC's consideration of this appeal is in accordance with the provisions of the Forestry (Miscellaneous Provisions) Act, 2020, and the FAC's determination of this appeal is made in accordance with Section 14B(13) of the Act.

Assessment of grounds of appeal – other

The FAC considered the appellant's contention that the proposed development should have been addressed in the context of the EIA Directive. The EU Directive sets out, in Annex I a list of projects for which EIA is mandatory. Annex II contains a list of projects for which member states must determine, through thresholds or on a case-case-basis (or both), whether or not EIA is required. Neither afforestation nor deforestation (nor clear-felling) are referred to in Annex I. Annex II contains a class of project specified as "initial afforestation and deforestation for the purpose of conversion to another type of land use". (Class 1(d) of Annex II). The Irish regulations, in relation to forestry licence applications, require compliance with the EIA process for applications relating to afforestation involving an area of more than 50ha, the construction of a forest road of a length greater than 2000 metres and any afforestation or forest road below the specified parameters where the Minister considers such development would be likely to have significant effects on the environment. The FAC concludes that the felling and subsequent replanting, as part of a commercial forestry operation, with no change in land use, does not fall within the classes referred to in the Directive, and similarly is not covered in the transposing regulations. Furthermore, the proposed development does not include any works which, by themselves, would fall within a class covered by the Directive or the transposing regulations. The appellant argues that, if deforestation is proposed, screening for EIA may arise. The FAC considers that there is no basis for this contention as the licence issued is for felling and reforestation and does not consent to any change of land use. In considering Class 13(a) of Annex II of the Directive, the FAC found no convincing reason to conclude that the proposed clearfelling and reforestation of the project lands planted predominantly in 1977 (with 0.77ha planted in 1989) would constitute "any change or extension of a project listed in Annex I, or this Annex, already authorised, executed or in the process of being executed, which may have significant adverse effects on the environment", as there would be no change or extension to the existing commercial forestry project which may have significant effects on the environment. As such, the FAC concluded that there is no breach of any of the provisions of the EIA Directive.

The appellant contends that there is insufficient detail in relation to the reforestation aspects of the project. The appellant submits that these issues arise by reason of there being no Harvest plans or maps at the same time as the felling licence application. In considering these grounds of appeal, the FAC has regard to the response submission from DAFM to the appellant's expanded grounds. This submits that a Harvest Plan is



not a legal requirement although it is encouraged, and that the Department may request the submission of a Harvest Plan from the applicant if deemed necessary. The FAC noted that details of reforestation are included in the NIS submitted as well as the AAD, together to frequent references to reforestation in the Standards for Felling and Reforestation. Furthermore, the FAC noted that conditions attached to the licence are reflective of information contained in the NIS and AAD. The carrying out of any licensed development must comply with the conditions attached to the licence. On this issue, the FAC finds no reason to conclude that there was any significant or serious error made in the making of the decision to grant the licence.

The appellant contends that, in respect of the protection of water quality, there is an over-reliance on Standard Best Management Practices. Referring to forestry impacts, the appellant states that these impacts affect 16% of Ireland's waterbodies with the most common problems relating to the release of sediment and nutrients, and impacts from acidification. Forestry may also give rise to changes in stream flow regimes caused by associated land drainage. It is contended that procedures outlined in the Standards for Felling and Reforestation (DAFM, 2019) are not sufficient to fully protect water bodies. The FAC noted that the site falls within two river sub-basins – Owentooey_010 and the Recess_010, with 0.346ha of the site within the Owentooey_010 and the remainder and majority of the site within the Recess_010. The water quality status for the Owentooey_010 is 'Good', and the water quality status for the Recess_010 is 'Poor'. The FAC noted that the most significant pressure on the Recess_010 is stated to be agriculture. The FAC considered the terms of the licence issued and noted that there are 16 separate conditions relating to the protection of water quality addressing a range of issues including mounding, collector drains, water setbacks, planting of broadleaves in aquatic buffer zones, identification of water hotspots and requirement for exclusion zones, provision and maintenance of sediment trapping measures, treatment of historic mound drains, and requirement for operational measures during felling and replanting. Having regard to the nature and scale of the development, and to the terms of the licence issued, the FAC concludes that the licensed development is not likely to have an adverse impact on water quality, and finds no reason to conclude that there was any significant or serious error made in the making of the decision to grant the licence in respect of this issue.

The appellant contends that the NIS submitted refers to some Freshwater Pearl Mussel concerns, and that mitigation measures contained as conditions of the licence may not be sufficient. The FAC noted that the Freshwater Pearl Mussel is listed as a QI/SCI for the Twelve Bens/Garraun Complex SAC, which is approximately 9600m downstream of the project lands. It is not a qualifying interest of any other downstream Natura 2000 site within a 15km radius of the project lands. The FAC noted that the hydrological separation distance between the project lands and the SAC is approximately 9600m, that the location of the Freshwater Pearl Mussel population is in the north-west of the SAC and that there is no hydrological link between the project lands and the Freshwater Pearl Mussel population. The FAC further noted that the



licence contains 14 conditions relating to the protection of adjoining/downstream aquatic-based species and habitats during harvesting and restocking. Based on the information before it, the FAC finds no reason to conclude that the licensed development would have any adverse impact on Freshwater Pearl Mussel populations or that any significant or serious error was made in the making of the decision to grant the licence in this respect.

Habitats Directive provisions

The FAC considered the procedures undertaken by the DAFM in respect of the provisions of the Habitats Directive. The DAFM carried out screening of Natura 2000 sites within a 15km radius to determine if Stage 2 assessment is required. The screening conclusion screens out 6 Natura 2000 sites for Stage 2 assessment and screens in the following 4 sites – Maumturk Mountains SAC, Connemara Bog Complex SPA, Connemara Bog Complex SAC, and Twelve Bens/Garraun Complex SAC. The DAFM screening was undertaken after the submission of a NIS by the applicants, and the conclusions of the screening assessment concur with screening undertaken in the NIS. The DAFM prepared an AAD and this confirmed the screening assessment conclusions, and evaluated the NIS submitted, which contained a Stage 2 Appropriate Assessment of the 4 Natura 2000 sites identified, before concluding that it contained sufficient information to derive appropriate conditions for a determination. The mitigations recommended in the AAD were attached as conditions of the licence issued. The FAC noted that the in-combination projects were considered; non-forestry projects were agricultural developments and dwellings, and forestry related projects were two felling projects. The FAC noted that the project lands form part of a larger block of conifer planting at Illion East, including areas of new planting adjacent to the north-west and south-east. There are existing forestry tracks through the larger plantation. The FAC noted that there are several streams flowing through the larger block of forestry and these, together with the Order 2 stream on the project lands, flow into Illion Lough and then westwards through a series of further loughs. These streams rise in the Maumturk Mountains and, for the most part appear to flow through mature conifer forestry before reaching Illion Lough. The larger forestry block is bounded to the east and the west by the Maumturk Mountains SAC. Based on the information before it, and having regard to the characteristics of the surrounding area, the FAC finds no reason to conclude that the licensed development alone, or in-combination with other plans or projects would give rise to adverse impacts on the QIs/SCIs of any Natura 2000 site.

The appellant submits that there was inadequate consideration of the impact of the licenced operations on species listed under Annex IVa of the Habitats Directive, which provides for strict protection of those species under Articles 12-16. Specifically, it is submitted that consideration of such species is confined to their being qualifying interests for Natura 2000 sites, and that the protections required under the Directive extend beyond such circumstances, and cites the Otter as an example. The FAC notes



that the appellant has not provided any convincing evidence of Annex IVs species on the project lands or demonstrated how such species would be likely to be adversely impacted by the proposed development. There is no documentary evidence before the FAC to indicate that the Otter is present on or near the site. The Otter is a qualifying interest of the Connemara Bog Complex SAC and the Twelve Bens/Garraun Complex SAC, and reference to the publicly available EPA website indicates that these European sites are approximately 2800m and 9500m (respectively) downstream of the project lands. The FAC noted that recommended mitigations in respect of the Otter are included as conditions dd) and ee) of the licence. Based on the evidence before it, the FAC finds no reason to conclude that there was any significant or serious error made in the making of the decision to grant the licence in respect of inadequate consideration of protection for Annex IVa species.

Conclusion

Having considered all of the information before it, the FAC found no reason to conclude that there was any significant or serious error made in the making of the decision to grant the licence in respect of GY27-FL0050, or that the decision was made contrary to fair procedures. In deciding to affirm the decision to grant the licence, the FAC considered that the licensed development would be consistent with National policy and Good Forestry Practice.

Yours sincerely

Des Johnson on behalf of the Forestry Appeals Committee



Brief for Consultant Ornithologist

Introduction:

The Forestry Appeals Committee (FAC) are currently considering 3rd party appeals against the decision of the Minister for Agriculture, Food and the Marine to grant licences for the carrying out of forestry operations at various locations throughout the country. There are thirteen licences concerned and all of these were granted with conditions attached.

Specifically, the subject appeals are against the decision of the Minister to grant a licence for forestry operations, which include felling, restocking and afforestation, on sites which are in or adjacent to European sites for which the Hen Harrier and/or the Merlin are qualifying interests.

The FAC will convene Oral Hearings on these cases in Portlaoise on Wednesday 17th and Thursday 18th November 2021. The Committee hearing the cases will consist of the Chairperson and three Deputy Chairpersons. In addition, the Committee will be assisted by a Consultant Ornithologist, who will hear the submissions made and participate in the proceedings at the discretion of the Chairperson. The agenda for the Oral Hearings will be limited to hearing submissions (and discussion at the discretion of the Chairperson) in respect of the conditions relating to the protection of the Hen Harrier and/or Merlin.

In advance of the Oral Hearing, the FAC will provide to the Consultant Ornithologist a synopsis of each of the cases to be heard.

Advice sought:

The advice sought from the Consultant Ornithologist relates to specific conditions attached to each of the appealed licences, specifically relating to the protection of the Hen Harrier and/or Merlin. Samples of the conditions concerned are attached below.

Based on the information before the FAC in relation to each appeal (including information submitted at the Oral Hearings), and having regard to the location of the sites concerned and the extent of existing forestry operations in the vicinity of each of the sites, the FAC is seeking expert opinion, including specifically on the following matters:

1. Are the specific conditions attached to each of the licences (including those relating to reforestation) adequate to avoid impact on the Hen Harrier in terms of habitat loss, damage to nest sites or direct mortality, to such an extent as would be likely to prevent the achievement of favourable conservation status of that species? If the conditions are not considered adequate, then how should they be amended to achieve their purpose?
2. Are the specific conditions attached to each of the licences (including those relating to reforestation) adequate to avoid impact on the Merlin in terms of habitat loss, damage to nest sites or direct mortality, to such an extent as would be likely to prevent the achievement of favourable conservation



status of that species. If the conditions are not considered adequate, then how should they be amended to achieve their purpose?

3. Specifically, is there any scientific basis for the temporal and spatial parameters attached to these conditions, and is there any known scientific basis for varying these parameters?

Following the Oral Hearing, the Consultant Ornithologist will submit a written report to the Chairperson containing the advice sought. The report should be submitted as soon as possible, but within the period of 3 weeks following the closing of the Oral Hearing.

Sample Conditions

h) No Felling or other forestry operations associated with this licence shall take place during the period 1st March to 31st August inclusive, within 100 metres of the forest edge, where such forest edge is immediately adjacent to moors, heathland, peat bogs or natural grassland; or within 100 metres of a clearing in the forest of larger than one hectare. Such operations can commence in sections of the project area furthest away from the 100 metre exclusion zone. Such operations can progress towards this exclusion zone but can only enter it during the period 1st September to 29th February inclusive.

Reason: In the interest of protecting the Special Conservation Interest of the Slieve Aughty Mountains SPA as per the Appropriate Assessment determination for GY10-FL0140.

j) The site of this project lies wholly within a Green Area in relating to Hen Harrier, the Special Conservation Interest of the SPA. Therefore, potential disturbance operations associated with this project (see below) can take place during the Hen Harrier breeding season (1st April to 15th August, inclusive). However, if the Department of Agriculture, Food & the Marine (DAFM) is notified by the National Parks & Wildlife Service of a new Hen Harrier nesting site, and if the site of the project lies within or partially within 1.2 km of this location, the DAFM will inform the Applicant of this situation and will amend the terms of the licence, with immediate effect, to exclude potential disturbance operations from taking place during the Hen Harrier breeding season (1st April to 15th August, inclusive). (A potential disturbance operation is a forestry operation associated with a licenced project, which has the potential, through excessive noise, vibration, mechanical movement, artificial lights, etc. to disturb the breeding activity of Hen Harriers. Potential disturbance operations include: timber felling (thinning, clearfell); timber extraction to roadside; timber loading at roadside; aerial fertilisation; mechanical cultivation for both afforestation and reforestation; forest road construction (and associated developments); the driving of fencing posts; and any other operation(s) the Forest Service may deem as potentially creating disturbance.)



Reason: In the interest of protecting the Special Conservation Interest of the Slieve Aughty Mountains SPA as per the Appropriate Assessment determination for GY10-FL0140.
Forestry Appeals Committee
15.10.2021.

Ornithological Opinion on conditions attached to appealed felling licences, specifically relating to the protection of the Hen Harrier and/or Merlin

Report to the Forestry Appeals Committee

Dr Alan Fielding BSc (Hons), MSc, PhD, FHEA, FLS

2nd December 2021

Background and Requests

The FAC sought my opinion on the following three matters:

1. Are the specific conditions attached to each of the licences (including those relating to reforestation) adequate to avoid impact on the Hen Harrier in terms of habitat loss, damage to nest sites or direct mortality, to such an extent as would be likely to prevent the achievement of favourable conservation status of that species? If the conditions are not considered adequate, then how should they be amended to achieve their purpose?
2. Are the specific conditions attached to each of the licences (including those relating to reforestation) adequate to avoid impact on the Merlin in terms of habitat loss, damage to nest sites or direct mortality, to such an extent as would be likely to prevent the achievement of favourable conservation status of that species. If the conditions are not considered adequate, then how should they be amended to achieve their purpose?
3. Specifically, is there any scientific basis for the temporal and spatial parameters attached to these conditions, and is there any known scientific basis for varying these parameters?

My comments should be interpreted as applying specifically to the appeals considered in the meeting on the 17th and 18th November 2021 dealing with case reference numbers: GY10-FL0141, TFL 00426019, TFL 00225618, LS06-FL0053, LS06-FL0054, GY21-FL0039, GY21-FL0038, CK01-FL0063, GY10-FL0140, LK01-FL0207, GY27-FL0050, GY22-FL0008, TFL 00150218.

I recognise that my conclusions may have more general application outside of the above cases. My conclusions were derived whilst paying due regard to the precautionary principle.

Sample Hen Harrier Condition (Green Area)

The site of this project lies wholly within a Green Area in relating to Hen Harrier, the Special Conservation Interest of the SPA. Therefore, potential disturbance operations associated with this project (see below) can take place during the Hen Harrier breeding season (1st April to 15th August, inclusive).

Sample Hen Harrier Condition (Red Area)

The site of this project overlaps with a High Likelihood of Nesting Area relating to Hen Harrier, the Special Conservation Interest of the SPA. Therefore, no potential disturbance operation(s) associated with this project shall take place during the Hen Harrier breeding season (1st April to 15th August, inclusive). To do so will lead to the immediate cancellation of this licence and may represent an offence under the Birds & Habitats Regulations (2011) (S.I.477 / 2011). (A potential disturbance operation is a forestry operation associated with a licensed project, which has the potential, through excessive noise, vibration, mechanical movement, artificial lights, etc. to disturb the breeding activity of Hen Harriers. Potential disturbance operations include: timber felling (thinning, clearfell); timber extraction to roadside; timber loading at roadside; aerial fertilisation; mechanical cultivation for both afforestation and reforestation; forest road construction (and associated developments); the driving of fencing posts; and any other operation(s) the Forest Service may deem as potentially creating disturbance).

Hen Harrier Condition Observations

Assuming there are no restrictions relating to merlin or other qualifying species.

- a. No operations are allowed anywhere within the site during the breeding season if the site is within 1.2 km of a known hen harrier nest site. This condition is effectively a temporal constraint as the restriction, once applied, has no other spatial exemption. **Therefore, the first issue for my opinion relates to the start and end dates of the hen harrier breeding season.**
- b. If the site is not within 1.2 km of a known hen harrier nest site there are no restrictions unless a new hen harrier breeding site is identified before felling begins. If a new site is found condition applies. **Therefore, the second issue for my opinion relates to the adequacy of the High Likelihood of Nesting Areas.**

Sample Merlin Condition

No Felling or other forestry operations associated with this licence shall take place during the period 1st March to 31st August inclusive, within 100 metres of the forest edge, where such forest edge is immediately adjacent to moors, heathland, peat bogs or natural grassland; or within 100 metres of a clearing in the forest of larger than one hectare. Such operations can commence in sections of the project area furthest away from the 100 metre exclusion zone. Such operations can progress towards this exclusion zone but can only enter it during the period 1st September to 29th February inclusive.

Merlin Condition Observations

Assuming there are no restrictions relating to hen harrier or other qualifying species.

- a. There is a spatial constraint, a 100 m exclusion buffer during the breeding season. This exclusion buffer only applies if the felling is adjacent to open areas. Felling and other operations are allowed outside of this buffer at all times. **Therefore, the first issue for my opinion relates to adequacy of a 100 m buffer.**
- b. If the felling is adjacent to open areas, no operations are allowed within 100 m of the forest edge during the breeding season. **Therefore, the second issue for my opinion relates to the start and end dates of the merlin breeding season.**

Conclusions

The evidence that I used to arrive at my responses is detailed in the report.

FAC Question	My response
<p>1. Are the specific conditions attached to each of the licences (including those relating to reforestation) adequate to avoid impact on the Hen Harrier in terms of habitat loss, damage to nest sites or direct mortality, to such an extent as would be likely to prevent the achievement of favourable conservation status of that species? If the conditions are not considered adequate, then how should they be amended to achieve their purpose?</p>	<p>Using the best scientific information available to me, and my interpretations of such information, I am content that the felling and replanting conditions, amended as suggested in my response to question 3, will not have a negative effect on the current conservation status of hen harriers in the SPAs.</p>
<p>2. Are the specific conditions attached to each of the licences (including those relating to reforestation) adequate to avoid impact on the Merlin in terms of habitat loss, damage to nest sites or direct mortality, to such an extent as would be likely to prevent the achievement of favourable conservation status of that species. If the conditions are not considered adequate, then how should they be amended to achieve their purpose?</p>	<p>Using the best scientific information available to me, and my interpretations of such information, I am content that the felling and replanting conditions, as currently specified, will not have negative effects on the current conservation status of merlins in the SPAs.</p>
<p>3. Specifically, is there any scientific basis for the temporal and spatial parameters attached to these conditions, and is there any known scientific basis for varying these parameters?</p>	<p>Yes, there is scientific basis for the temporal and spatial parameters attached to the conditions. But, to remove an element of potential disturbance, I suggest that the temporal restriction for hen harriers is extended to begin on March 1st.</p>

Report Structure

My report focuses on six factors that are either directly, or peripherally relevant, to the appealed felling conditions. The first four factors are directly relevant to the appeals considered in the meeting on the 17th and 18th November 2021 dealing with reference numbers: GY10-FL0141; TFL 00426019; TFL 00225618; LS06-FL0053; LS06-FL0054; GY21-FL0039; GY21-FL0038; CK01-FL0063; GY10-FL0140; LK01-FL0207; GY27-FL0050; GY22-FL0008 and TFL 00150218.

The remaining two factors are less directly relevant to the above appeals but provide additional context for my conclusions with respect to the first four factors. It is important to recognise, at the start, that the ecologies of these species, particularly the hen harrier, are complex and often poorly understood so my conclusions reflect my interpretation and weighting of the evidence and published studies.

1. Timing of operations
2. Distance restrictions
3. Green and Red hen harrier areas
4. Re-afforestation
5. Hen harriers and forests
6. Favourable Conservation Status.

1. Timing of Operations

The licence conditions for both species include restrictions covering the breeding seasons. What is the evidence that these periods are adequate and appropriate?

1.1 Hen harrier

If there is historic evidence of adjacent (see Section 3) hen harrier breeding attempts the felling licence conditions prohibit forestry operations between 1st April to 15th August, inclusive.

Table 1 is a summary of the assumed hen harrier breeding season in the United Kingdom (Hardey *et al.*, 2013), as applicable to hen harrier surveys.

Table 1. Summary of hen harrier breeding season in the UK (Hardey *et al.*, 2013).

Breeding activity (No. of days)	Range	Peak Period
Site occupation & display	Late February to late May	Early April to early May
Nest building	April to late May	-
Egg laying (5-12 days)	Mid April to late June	Late April to mid May
Incubation (29-31 days)	Mid April to late July	Late April to mid June
Hatching	Mid May to late July	Late May to mid June
Young in nest (28-39 days)	Mid May to late August	Late May to mid July
Fledging	Mid June to late August	Late June to mid July
Juvenile dispersal	August to September	-

O'Donoghue (2010) presented data on breeding dates for 86 clutches in Ireland. The median laying date was the 5th May with an earliest date of 16th April (Kerry, 2008) and a latest of 10th June (Slieve Aughties, 2008). Fledging occurred from as early as the week of 18th – 24th June, to as late as the week of 6th – 12th August, and peaked during the week of 9th – 15th July. Fledged young remained within 1 km of the nest until 26th August.

The felling licence conditions between 1st April to 15th August fit with the peak period of nest activity but operations in March have the potential to prevent hen harriers from selecting nest sites that could be close to the proposed forest operations. Starting felling operations prior to April 1st could lead to a relatively small change in a nest location but it also has the potential to displace the birds over much greater distances, potentially to a new location outside of the SPA.

Tree planting in Scottish SPAs is rare but I found one recent example (Cambusmore¹) with conditions imposed by SNH (now NatureScot). *"All operations will take place outwith the hen harrier breeding season (March to mid-August inclusive) or within this period only if preoperational hen harrier surveys have been done and concluded there was no breeding"*.

In verbal evidence at the hearing Coillte stated that if NPWS gets information before April 1st about a new nest location, not in an existing red zone, forestry activities will be stopped. There are two points of note about this statement. First, it wasn't clear if this action was codified in the relevant directives. Second, and of more relevance to this section, it is only possible to give notice of a new nest if it was discovered last year or was a new nest in the current year. If it is considered that a new

¹ I need to declare an interest in that I provided some advice and analyses following the death of Paul Haworth who had been providing advice on this scheme.

breeding location can be located before April 1st then clearly the April 1st start date is too late in the breeding season.

The current hen harrier breeding season restriction of April 1st to mid August may not take account of potential disturbance early in the hen harrier breeding season. It is suggested that the current restriction of operations period should be extended from March 1st to August 15th.

1.2 Merlin

The felling licence conditions prohibit forestry operations between 1st March to 31st August inclusive. Table 2 is a summary of the assumed merlin breeding season in the United Kingdom (Hardey *et al.*, 2013). There are few other sources of detailed information and more general descriptions are similar to those in Table 2. Fernández-Bellon *et al.* (2011) studied the diet of the merlin in Ireland during the breeding season using monthly surveys between April and July. Rebecca *et al.* (1992) surveyed for signs of occupation or nesting between March and May in NE Scotland. Finally, Heavisides (1987) noted that British merlin were generally found on their breeding sites from March (initial site occupation) until August.

Table 2. Summary of merlin breeding season in the UK (Hardey *et al.*, 2013).

Breeding Activity	Peak Period	Range
Site occupation		Late February to late April
Courtship display		Late March to late April
Egg laying	Early May to mid-May	Late April to early June
Incubation	Early May to mid-June	Late April to early July
Hatching	Early June to mid-June	Late May to early July
Young in nest	Early June to mid-July	Late May to early August
Fledging		Late June to early August
Juvenile dispersal		Early July to early September

The merlin felling licence conditions, restricting forestry operations between 1st March to 31st August, appear to be robust and no amendment is suggested.

2. Distance Restrictions

Distance restrictions during felling operations are in place to reduce disturbance and apply during the breeding season (Section 1). The most comprehensive review of disturbance distances is that of Ruddock and Whitfield (2007). The Ruddock and Whitfield (2007) review was based on literature reviews and conversations with experts, both national and international. The relevant values for hen harrier and merlin, from Ruddock and Whitfield (2007), are summarised in Table 3. The information, on which these summary statistics are based, is then summarised.

Table 3. An extract from Table 1 in Ruddock and Whitfield 2007. "Summary descriptive statistics on disturbance distances (m) from the expert opinion survey, split according to results on incubating birds and chick-rearing birds. Median values (n opinions in parentheses) and "80 %" range values (the range in opinion values after the lower 10% and upper 10% of opinions had been excluded) are shown for AD (= 'alert distance' or 'static' disturbance distance), and FID = ('flight initiation distance' or 'active' disturbance distance)."

	'ALERT DISTANCE'				'FLIGHT INITIATION DISTANCE'			
	INCUBATION		CHICK REARING		INCUBATION		CHICK REARING	
	Median	80%	Median	80%	Median	80%	Median	80%
Hen harrier	310 (24)	<10-750	225 (23)	10-750	30 (27)	<10-500	225 (29)	<10-750
Merlin	225 (22)	<10-500	400 (19)	10-500	30 (30)	<10-300	225 (28)	10-500

2.1 Hen harrier

The following is a summary from Ruddock and Whitfield's (2007) report.

- During wind farm construction, displacement has been suggested to potentially occur up to 500 m around construction sites with some disruption up to 1 km, depending on line of visibility.
- Expert opinion survey's produced a range of values and suggested a maximum buffer of 500 - 750 m.
- The active disturbance distance during the incubation stage was very low, which reflects the tendency for incubating females to flush at close range and reactions at larger distances may be more dependent on the presence of the male.
- Incubating birds may remain on the nest until the last minute even with the mate defending. Remaining on the nest until close range, nevertheless, does not mean that the disturbance source has not been detected.
- Signs of active disturbance were evident at much greater distances during chick-rearing than during incubation (median: 225 m and 30 m respectively).
- Although the expert survey range is compatible with the estimated disturbance displacement suggested during wind farm construction, it is much higher than that seen during wind farm operation (but operating turbines with infrequent maintenance visits is not directly comparable to a single approaching pedestrian or intense activity around construction sites).
- The larger distances of up to 1000 m may indicate acute sensitivity of some pairs as does the opinion of a small minority of survey respondents.

Other observations not in Ruddock and Whitfield (2007).

Caravaggi *et al* (2019) describe the surveying methods used in the Hen Harrier Project (<http://www.henharrierproject.ie/>) “Where sites were occupied, vantage points **were a minimum of 500 m from nests sites** (my emphasis). *Vantage points were identified a-priori based on habitat suitability, topographical constraints and the potential for observers to cause disturbance to breeding birds.*” I presume that they considered 500 m to be a safe distance that would not cause disturbance. Hardey *et al.*, (2013) , in their guide for raptor surveys in Scotland state that disturbance is minimised if nesting areas are viewed from distances of 500 - 700 m and that special care should be taken to minimise disturbance to hen harriers while they are laying, as nests containing one or two eggs may be deserted.

Tree planting in Scottish SPAs is rare but one recent example (Cambusmore) has conditions imposed by SNH. “All operations will take place outwith the hen harrier breeding season (March to mid-August inclusive) or within this period only if preoperational hen harrier surveys have been done and concluded there was no breeding. **No operations associated with this consent will occur within 750m of an active nest.** In addition prior to winter operations surveys will be undertaken for roosting hen harriers and any roost identified will be buffered as per best practice.” The buffering relates to protecting roost sites from any planting rather than disturbance.

The Scottish Forestry Commission (now Forest, Lands and Estates) defined the nesting season as April to August during which time the safe working distances were 500 – 1,000 m. There is an additional comment about the need to avoid winter roosts which is missing from the felling conditions under consideration here. Hardey *et al.*, (2013) also make a comment about winter roosts. Although most roosts seem to be in lowland marshes or mosses, some females will roost individually on old nests in breeding areas between August and October or February to April.

The felling licence distance constraint for hen harriers is implicit in the definition of red areas (Section 3). Historic nest sites are buffered to 1,200 m. Therefore the maximum distance from a nest to the edge of a planned forestry operation, before the licence condition became applicable, would be 600 m. Six hundred meters is within the normal range of suggested safe working distances and there is no need to change this. This conclusion is based on the assumption that the definition of red areas is robust (Section 3).

2.2 Merlin

Lusby *et al* (2015) stated that “Merlin do not use young forests (<10 years) for nesting. Forests from 11 years to those older than 50 years were used for nesting, with most pairs nesting in forests between 31 and 40 years, which is within the age range for felling or thinning operations in commercial forests. This, coupled with the fact that Merlin naturally occurs at low population densities, highlights the importance of ensuring that forest management operations do not negatively impact their breeding performance.”

The survey techniques advice for surveying merlin in Scotland (Hardey *et al.*, 2013) states that “Care should be taken during visits in late March and April to avoid disturbance of merlins at occupied nesting ranges, as this may cause the birds to move. To minimise the risk of disturbance it is recommended that nesting areas are viewed from distances of 300–500 m”.

The following is a summary from Ruddock and Whitfield’s (2007) report.

- Little has been published on the effects of human disturbance on merlin.
- In pairs routinely exposed to predictable disturbance, tolerance and habituation is likely because urban nesting is recorded regularly in the US & Canada and reproductive output has been recorded as higher than rural populations.
- Flushing distances of wintering birds ranged from 17 – 180 m for pedestrian disturbance and from 44 – 85 m in response to vehicles.
- > 90% of birds flushed to pedestrians whilst only 38% flushed to vehicles.
- Tree nesting birds are likely to detect disturbance at greater distances than ground nesting pairs. Despite this, tree-nesting birds may respond at shorter distances as some studies have shown birds at a higher elevation appear to have a shorter response threshold.
- Merlin are particularly prone to desertion just prior to egg laying and the risk declines thereafter, although individuals were occasionally found breeding at a different site if disturbance occurred prior to or at the laying of the first egg.
- US forestry guidelines maintain a minimum 91 m no-cut buffer around known merlin nest sites when they are discovered. However, tree-nesting merlin use the old abandoned nests of other species which will have limited survivorship particularly if large merlin broods are reared, so that individual nests are unlikely to be used for more than a few seasons.
- A preliminary 200 – 400 m protective buffer around nest sites for forestry workers was proposed in the UK in 1997 with no apparent empirical support.
- Expert survey revealed a very wide range of opinions on the typical distance at which nesting merlin may be disturbed by an approaching human.
- Static disturbance during incubation ranged from <10 m to 300 – 500 m. This wide range may represent differences in experiences with ground- and tree-nesting birds.
- Empirical records of disturbance distances were few in the literature and confined to observations of non-breeding birds which flushed at up to 125 m distance from an approaching human.

The 100 m threshold for merlin appears appropriate, particularly given the practical difficulties with its implementation with respect to forest operations. Changing the distance has little empirical supporting evidence and any increase would be unlikely to introduce any material changes to forestry operations.

3. Green and Red Hen Harrier Areas

Red and green areas are designed to identify areas likely to be used for nesting. They are defined in Appendix 21 of the Department of Agriculture, Food and the Marine's Forestry Standards Manual (2015).

"Red areas are 1.2 km radius areas centred on known Hen Harrier nesting areas. The 1.2 km radius is based on half the maximum separation distance of annual nest locations within territories observed in the Slieve Aughty Mountains within the 2005-2010 period, plus an additional 500 metre buffer. Depending on the location of their centre point, Red Areas may encapsulate land outside the boundary of the SPA. The remainder of the SPA is referred to as 'Green Areas'. New Red Areas may be generated from time-to-time, as new Hen Harrier nesting sites are identified, either individually or as a result of a regional or national survey."

It is known that hen harriers can breed in close proximity to each other (e.g. Watson, 1977; Balfour & Cadbury, 1975; Simmons, 2000 and O'Donoghue, 2010) and often they have overlapping foraging ranges (e.g. Arroyo *et al.*, 2008). This close proximity can result in the formation of loose 'colonies'. Caravaggi *et al* (2019b) found that the 2010 hen harrier territories were located at least 141 m from the nearest territory in 2015 but with a mean separation of 3.8 km. Irwin *et al* (2012) suggest, using evidence from a *pers. comm.*, that pairs were capable of moving several kilometres between and even within seasons.

Given the loose colonial nature of many hen harrier nesting attempts, combined with a tendency to nest in the same general areas between years but not the same exact location, my assumption was that this would result in overlapping buffers rather than isolated 1.2 km circular buffers. This was confirmed in a verbal response by DAFM. Consequently, it seems reasonable to assume that likely nesting locations are included within the red zones (High Likelihood Nesting Area).

The main concern therefore relates to the historic nature of the data used to create the red zones, it will always be at least one year earlier. DAFM confirmed, verbally, that there is a rapid updating process when new nest sites are located.

How likely is it that a new nest site will be outside of a current red zone? A circle with a radius of 1.2 km has an area of $\sim 4.5 \text{ km}^2$ so the area occupied by a series of overlapping buffers will be quite large. It would be interesting to know how red zones have changed over the period they have been operational. Have they increased in area, moved or shrunk?

It was suggested that hen harriers in Ireland may have much larger foraging areas than other populations. Caravaggi *et al.*, 2019b comment that *"Poor foraging opportunities in the surrounding landscape may be placing a larger provisioning burden on both parents who consequently must travel greater distances to find food"*. This assumption is based on a single satellite tracked flight and Irwin *et al* (2012) suggested that these were *"larger than usual as the 2010 and 2011 breeding seasons both followed unusually severe winters during which many of the resident upland passerines, an important prey item, was high"*. Other comments about the same tracked birds is also relevant *"..... the three birds showed preferences for second rotation pre-thicket forest, particularly those between 3 and 9 years of age, and for grasslands managed at low intensity"*. (See Section 4).

Breeding dispersal appears to be generally small and this is consistent across studies. In Wales, Whitfield and Fielding (2009) recorded a median breeding dispersal distance of 0.7 km. In Scotland, they usually nest in the same area in successive years, with the median distance moved between

sites from year to year being 0.71 km (Etheridge *et al.*, 1997). Picozzi (1984) found that, in Orkney, known females which had nested one year did so the next year within an average of 1.03 km (n = 163) of the previous year's nest. Etheridge *et al.* (1997) also found a small, but non-significant, difference in distance moved in successive years between successful female breeders (0.63 km) and unsuccessful females (0.81 km). **Breeding dispersal distances on this magnitude, if applied, in Ireland support the 1.2 km radius used for the Red zones particularly given the year on year accumulation of nest sites within a Red zone.**

Given that SPA populations of hen harriers are not large, new nest locations outside of the Red zones are unlikely and, in order to invoke a licence condition, it would have to be within 600 m of the proposed felling. While not impossible, this seems an unlikely scenario. **Therefore, the use of hen harrier red zones is suitably robust.**

4. Re-forestation

Re-forestation does not produce an identical tree cover to that felled because of new open areas and water course set-back distances. One consequence is that potentially new and important foraging strips may be created, particularly around water courses. If the water course runs through the felled block a new open strip up to 40 m wide could be created, which would have the potential to provide habitat supporting hen harrier and merlin prey. Based on considerable evidence from the Isle of Mull (Paul Haworth, *pers comm*) such open spaces can be well used by foraging hen harriers. Indeed, the 2015 national survey (Ruddock *et al.*, 2016) recognised the potential for such habitat use by adding 'Linear features' as a new foraging habitat category (drainage channels, hedgerows, forest rides and open habitat corridors containing power-lines).

Mull has very few merlin so there is no direct evidence that they would benefit in the same way. However, it is difficult to imagine a scenario in which there would be a negative impact from the re-forestation. A shortage of crow nests in remaining mature trees seems unlikely.

The largest concern about re-forestation, excluding the continuing loss of previously open habitat, appears to relate to effects of second rotation pre-thicket forest on hen harrier productivity and survival. The evidence is inconclusive with respect to it having a positive or negative impact.

It has been argued that the creation of significant areas of second rotation pre-thicket forest can become an ecological trap for hen harriers as they apparently suffer poor reproductive success despite a marked selection for this habitat. It has also been suggested that their breeding success can decrease noticeably when the percentage of second rotation pre-thicket forest in the surrounding landscape is greater than 10% (Wilson *et al.*, 2009). It is, therefore, worth examining this suggestion in detail, beginning with the observation that the negative relationship between second rotation pre-thicket forests and hen harrier breeding success appears to be significant only in the Slieve Aughty Mountains.

Irwin *et al* (2020) suggest that, in a forested landscape with a well-balanced age structure, approximately 25% of the forest will be in pre-thicket stage at any one time. This means that as long as there is less than 40% for total forest cover in the landscape the percentage of pre-thicket forest should not be >10%. Therefore, problems, if they are real, should not become apparent until >40% of the landscape is forested.

Irwin *et al* (2012) investigated the ecology of the hen harrier in Ireland between 2000 and 2005. As in other studies the main nesting habitats were pre-thicket stage forests, particularly second rotation plantations. They found no evidence that the area of post-closure plantations impacted negatively on hen harrier nest distribution but there was a positive association between changes in numbers of nests between 2000 and 2005 and changes in the area of pre-thicket second rotation plantations suggesting that the overall effect of plantation forests on breeding hen harriers in Ireland was positive. The same study used satellite tracking data from three breeding adults, tracked for four days, in the Ballyhouras. One surprising result was the maximum distances from the nest: a female was 7.5 km and a male was 11.4 km. However, it is possible that these are larger than usual as the 2010 and 2011 breeding seasons both followed unusually severe winters during which many mortality in the resident upland passerines, an important prey item, was high. Both forest and non-forest habitats were used in proportion to their availability but the three birds showed preferences for second rotation pre-thicket forest, particularly those between 3 and 9 years of age, and for grasslands managed at low intensity. It is difficult to understand why foraging hen harriers would preferentially forage in second rotation pre-thicket forest unless prey was more available (note that prey abundance and availability or not the same although there should be some linkage).

Given that much has been made of the 11km foraging distance it is worth noting that Irwin *et al* (2012) found that over 50% of all GPS records, consistent with hunting behaviour, were <2 km from the nest. Indeed, the concentration of hunting behaviour was more than 10 times higher within 1 km of the nest than it was between 2 - 5 km.

The effect of second rotation pre-thicket forest on hen harriers in Ireland is far from certain and it cannot be assumed to have a negative impact on hen harrier productivity. Wilson *et al* (2012) is a detailed analysis of productivity and habitat and it is worth including some quotes from this work. *"...the lower breeding success experienced by Hen Harriers breeding in landscapes with high levels of second-rotation pre-thicket described here are counter-intuitive – one might expect that Hen Harriers breeding in such landscapes would be more successful than in other habitats. It should be emphasized that these relationships were not consistent across all study areas and that, over the whole dataset, the model including both second rotation pre-thicket and study area explained just 9% more variation than the model with study area alone. **Moreover, we cannot be certain that these relationships were causal, but even if they were, it is likely that second-rotation forests are often valuable for Hen Harriers in Ireland, enabling them to breed in areas where they would otherwise be scarcer or absent"**. [my emphasis].*

In a later study, pre-thicket forests were not observed to have an effect on breeding success (Caravaggi *et al.*, 2019b) and SPAs were observed to have a moderate positive effect on breeding success. However, they considered that the success of SPAs in facilitating breeding success may be skewed by increased success in locations where heather and moorland nesting and foraging habitats were of higher quality.

The evidence for a definitive and causal relationship between the extent of second rotation pre-thicket forest and reduced hen harrier breeding success is weak and generally any interpretations of a mechanism involve many plausible assumptions, typically about increased nest predation [Section 5.2].

5. Hen Harriers and Forests

5.1 Habitat choice

Habitat is the aggregation of physical and biotic factors which make up the sort of place an organism lives. The quality of these factors, especially resource availability and predator exposure, affect an animal's survival and reproductive success. Selection should favour an active choice of areas that enhance reproductive success and survival. In hen harriers, reproductive success has been the focus of many studies, but the habitat factors that correlate with success are difficult to pinpoint. Breeding site choice is the most obvious candidate that can be specifically linked to offspring production and this has been the subject of a number of studies including many in Ireland.

Nesting habitat choices are more adaptable than was previously thought, especially with respect to woodland; this has been noted in Ireland, France and the west of Scotland. Availability of extensive areas of open habitat had always been thought of as vital for successful breeding and hunting by hen harriers; a particular problem when large areas of potential habitat are replaced with conifer plantations. It is important to note that forests planted as an agricultural resource differ greatly from natural woodlands, largely as a consequence of the limited age structure and an even high density of trees. After planting the pre-thicket areas can be attractive to hen harriers but become unsuitable after approximately 12 years.

Although large tracts of continuous forest are unsuitable for hen harriers, patchy woodland with relatively clear areas within hunting distance is not. New afforestation usually creates opportunities for hen harriers with the potential to create local high densities of breeding pairs. At its simplest, establishment of woodland initially provides tall vegetation for nest concealment. Additionally these areas are largely free from the risk of trampling by large herbivores. Finally, burning of adjacent land tends to be restricted allowing taller vegetation to develop around the new planting and reduced grazing can increase preferred prey both within and adjacent to woodland areas. However, as the planted open areas close up there will be an inevitable decline in the local population unless new areas are planted. Blake (1976) considered that new forest plantations were one of the main reasons for the re-colonisation of mainland Scotland by hen harriers. Studies in Ireland indicate that more nests are found in pre-thicket second rotation plantations than in any other habitat, even though that habitat represented < 5% of the study areas (Wilson *et al.*, 2009). This is good, if circumstantial, evidence that active choice for young or low level plantations was taking place.

It is important to place some of the major hen harrier studies, particularly in the UK, into a historical context with respect to large scale changes in forest planting. There were two peaks of planting; the first (1970s) was a combination of Forestry Commission and private schemes. The second, (late 1980s) coincided with the wing tagging study (1990-1995) reported by Etheridge and Summers (2006). Inevitably much of this young plantation habitat was lost as trees matured and, as in Ireland's SPAs, the young forest resource will never be the same again unless new open spaces are planted. Given the plantation ages, the forest estate across much of Scotland and the Irish SPAs is now in a phase of comprehensive restructuring which may involve changes to the trees planted, their density and the configuration of open space. Re-afforestation is not the same as afforestation and it has the potential to create more hen harrier habitat which may give rise to additional nesting opportunities. The progressive implementation of re-afforestation best practice could create more open areas, more broadleaf species and conifer-free riparian zones which have the capacity to

provide an enhanced prey base and nesting opportunities for harriers that could experience less disturbance.

There is some evidence that hen harriers can adapt to new habitats. For example, although approximately 15% of one of France's most important hen harrier populations nest in natural or semi-natural habitats (young plantations, fallow land and marshes) the majority nest in wheat or barley fields (Millon *et al.*, 2002). This preference for crops over natural habitats seems to be relatively recent and applies equally to Montagu's Harriers. There is little evidence of a similar movement in the UK or Ireland, although a relatively recent record of a successful nest in southern England hints that it is possible in the future.

Irish national surveys have demonstrated the importance of forests to a large segment of the breeding hen harrier population (Barton *et al.*, 2006, Ruddock *et al.*, 2012, 2105, Wilson *et al.*, 2009). Ruddock *et al.* (2016) reported that pre-thicket new and second rotation forestry made up 61.5% of all known nesting habitats in 2005 and 64.7% in 1998-2000. Petty and Anderson (1986) recognised the importance of landscape configuration if hen harriers were to breed in restocked conifer forest "*Access to suitable large areas of open ground could be critical for Hen Harriers, and this is seldom available in restocked forest, except at higher elevations where some adjacent moorland may remain unplanted*". Since it is known that hen harriers have nested in forest rides in closed canopy woodland in Argyll (Redpath *et al.*, 1998) suitable forest restructuring may increase such opportunities.

Significantly, habitat configuration appears to become more important as the total amount of open habitat is reduced (Flather and Bevers, 2002). It is, therefore, unsurprising that in much of Ireland, restocked or partially failed forest is used more than elsewhere. A recent analysis of landscape characteristics in Ireland, in relation to hen harrier breeding success, indicated that, at local scales, total forest cover and percentage cover of closed-canopy forest was associated with reductions in hen harrier productivity (Wilson *et al.*, 2012). In some local areas high cover of second rotation pre-thicket reduced nest success and fledged brood size. Therefore, although hen harriers are choosing second rotation pre-thicket as a nesting habitat in much of Ireland, it may be a sub-optimal choice related to the landscape surrounding re-stocked forests. Re-stocked forest appears to be used less in Scotland because sufficient habitat remains outwith the forests, particularly as sheep grazing continues to decline and hen harrier populations in some non-forested regions are small because of other constraints such as persecution.

5.2 Predation on Hen Harriers

One of the main negative impacts of nesting in forests is ***an assumed*** increase in nest predation because of the extra cover provided to the predators (e.g. Avery and Leslie, 1990). Despite this, Etheridge *et al.* (1997) found that, for hen harriers, there were fewer losses due to predation close to forests than to nests in unmanaged moorland.

Eggs and young chicks are particularly vulnerable to predation when parents are absent, which is more likely when prey is in short supply or adults have been disturbed. Like most other places where hen harriers are studied, **data on the abundance and activity of upland predators in Ireland are scarce** and assessments of the level of impact are largely based on assumptions with a list of potential predators that includes foxes, pine marten, American mink, stoat, raven and hooded crow.

Hen harriers are very variable in their nest defence, showing both individual variability and temporal changes. It is assumed that nest defence has an important role in deterring ground predators, (Simmons *et al.*, 1986) though there are few direct examples. Unfortunately many examples of ground predators such as the red fox *Vulpes vulpes* and hooded crow, *Corvus corone cornix*, are anecdotal and quantitative information on population effects is scant.

O'Donoghue (2010) attributed 55% of all nest failures in south and west Ireland in 2007 and 2008 to predation events but it is unclear what a 'natural' predation failure rate should be. Is 55% high, normal or low compared to a theoretical population in an environment not altered by humans? Predation is part of the natural process of hen harrier population regulation. It becomes a problem only when anthropogenic activities lead to much more predation than would be expected in a natural landscape, leading to reduced survival or, more likely, reduced productivity. Conversely, anthropogenic activities can reduce natural levels of predation, for example, when ground and avian predators are controlled. However, it is clear from the current and recent hen harrier distribution in the United Kingdom that the comprehensive control of ground predators on grouse moors does not result in healthy hen harrier populations. When studies have been undertaken (e.g. Amar and Redpath, 2002 and Baines and Richardson, 2013) the conclusions are not robust enough to identify consistent and significant impacts on the conservation status of the hen harrier.

Adults, rather than young in the nest, are probably at greatest risk when there are large apex predators such as golden and white-tailed eagle. The white-tailed eagle may become an important predator of hen harriers as the Irish population increases. For example, Sansom *et al* (2016), in a review of the future for Scotland's white-tailed eagles noted that "*It would be interesting to study how the expanding population of white-tailed eagles affect other raptor species of conservation concern. In particular, the hen harrier (Circus cyaneus) breeds in high densities on some Scottish islands and it is possible that increased abundance of white-tailed eagles might have negative impact on hen harriers on these islands. In an international perspective, it is very rare that the geographical breeding range of hen harriers and white-tailed eagles overlap...*". Ireland, like the Scottish Western Isles will be another example where the geographical breeding range of hen harriers and white-tailed eagles overlap.

6. Favourable Conservation Status (FCS)

There are generic FCS rules for Ireland's hen harriers and merlins in NPWS SPA documents. The absence of specific targets is regrettable but it is possible to infer if actions are likely to be positive, neutral or negative with respect to FCS.

The favourable conservation status of a species is achieved when:

1. population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
2. the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
3. there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Assessing the conservation status of a species inevitably involves comparing the current situation against targets such as a target population size which is a product of density and habitat extent. But, how large should target populations be? This is not a simple question to answer since it involves making value judgements about the relative merits of different species, habitats and time scales. This was expressed quite trenchantly by Monbiot (2013) as *"... A tendency I've noticed among some groups is to try to make all their target species common, even if they were naturally rare. Perhaps some species ought to be rare. Those which lived in open habitats – which would have been small and occasional before people started cutting and burning the forests – are likely to have been rarest of all."* In the case of an open ground predator, such as the hen harrier, this means that judgements have to be made about the desired extent and quality of open ground, both of which are influenced by factors other than their conservation status. If density is held constant but the extent or quality of habitat decreases so will the hen harrier population size.

In addition, a judgement is needed on the desired density of breeding attempts. In the case of hen harrier density there is additional complexity arising from its apparent loose coloniality which means that it cannot be assumed that breeding attempts are spaced evenly across suitable breeding habitat or are constant year on year.

Habitat constraints reduce the extent and quality of nesting and foraging habitat. Additionally, there may be landscape level effects that alter the spatial relationship between nesting and foraging habitat, for example by retaining good nesting habitat but reducing the extent and quality of foraging habitat close to nest sites and *vice versa*. The principal constraints on habitat are those which alter vegetation height and structure. Changes to the height and structure of vegetation can have direct and indirect effects on nesting habitat and on prey distribution, abundance and availability. Processes which may alter the extent and quality of habitat include grazing (and burning); forestry operations, weather and wind farm construction.

There is little information on merlins in Ireland so the majority of the subsequent text relates to hen harriers.

6.1 Dispersion and Site Fidelity

Dispersal and site fidelity are related to both the species range and its population dynamics. There are two categories of dispersal: dispersive and philopatric. Differences between them have important consequences for understanding hen harrier population biology.

Dispersive dispersal implies extensive natal (from the nest) and breeding dispersal. In this mode young birds do not come back to breed in their natal site and breeding birds do not return to the same site next year. This is important in the context of understanding the ecology of hen harriers in Ireland's SPA.

The alternative philopatric dispersal type has three modes:

- marked breeding site fidelity of adults, particularly males;
- faithfulness to the site and sub-group of adults within a colony (particularly males) with marked inter-colony movements of young birds particularly females or
- marked philopatry by adults and young males (return to breed close to where they fledged) but with some natal dispersal between sites by young females.

Categorisation of hen harrier dispersal is significant for understanding and modelling local and national hen harrier populations and understanding if the species has a FCS. New *et al.* (2011), describing their population model of a Scottish hen harrier population, stated "We do not account for fecundity as it does not affect harrier density in an area. This results from high rates of juvenile dispersal, with almost no natal site fidelity. However, after dispersal, harriers are site faithful". This assumption means that the fate of a population would be dependent entirely on recruitment which will not, apparently, contain a significant proportion of local birds. In the context of Ireland's SPAs this could mean that the number of hen harriers pairs is dependent on what is happening outside of SPAs. This assumption appears to rest on ringing and wing tagging studies in Scotland that may have been confounded by the state of the forest estate at the times of the study.

The New *et al.* (2011) population model attempted to explain changes in the number of breeding females in the Scottish Langholm population and this population was also modelled by Baines and Richardson (2013) but they had different assumptions and arrived at a completely different explanation. The New *et al.* (2011) model was based on two important dispersal assumptions that are relevant to understanding the conservation of hen harriers in Ireland's SPAs.

1. Little natal site fidelity implies that **immigration, rather than productivity, determines the population growth rate**. They estimated that an increase of 100 Meadow Pipits per km² would raise recruitment, i.e. immigration, by 9% whilst the same vole increase would raise recruitment by 14%.
2. The **probability of settlement was related to the abundance of prey**. Predictions from their model were a good approximation to reality, which was a large increase between 1995 and 1997 followed by two years of decline.

Implications from the New *et al.* (2011) model are that quite large increases in the number of breeding attempts could occur in a particularly good prey year but this might be followed by a slow decline if there was no further recruitment but pairs remained faithful to their breeding sites. This type of dynamics has been observed in some of the Scottish SPA populations.

It is clear from population models that, as productivity increases adult survivorship becomes relatively less important but always remains the most important factor. Adult survivorship is influenced by a range of factors including predation, weather and prey availability.

The overall conclusion from this type of analysis is that accurate and robust estimates of annual survival rates must take account of both mortality and dispersal. It is very difficult to fully understand the dynamics of any hen harrier populations in the absence of this information. This

creates a problem for understanding how Ireland's SPA populations should be managed. For example, the New *et al.* (2011) and Baines and Richardson (2013) models make similar predictions for the same population despite making very different assumptions about population dynamics. Both cannot be correct. Nonetheless, their similar predictions reinforce the importance of robust knowledge about hen harrier dispersal and philopatry if appropriate management techniques and threat reductions are to be developed. **In the context of Ireland's SPAs it is essential to understand the balance between natal philopatry and immigration.**

Whitfield and Fielding (2008, 2009), in their study of the Welsh population, had a median natal dispersal distance of recovered hen harriers of 18.4 km (females) and 12.1 km (males). In Scotland, the median natal dispersal distance in female hen harriers was 10 km and 51 km for birds hatched on moorland and conifer forest respectively (Etheridge *et al.*, 1997). Whitfield and Fielding (2009) concluded that the Welsh population probably has low linkage with other breeding areas in the British Isles and that, at least currently and for females, is more-or-less 'closed'. It is reasonable to assume a similar logic applies in Ireland (including Northern Ireland).

Breeding dispersal appears to be generally small and this is consistent across studies. In Wales, Whitfield and Fielding (2009) recorded a median breeding dispersal distance of 0.7 km. In Scotland, they usually nest in the same area in successive years, with the median distance moved between sites from year to year being 0.71 km (Etheridge *et al.*, 1997). Picozzi (1984) found that, in Orkney, known females which had nested one year did so the next year within an average of 1.03 km of the previous year's nest and that female harriers that moved into a new territory moved further following breeding failure than after successful breeding. Etheridge *et al.* (1997) also found a small, but non-significant, difference in distance moved in successive years between successful female breeders (0.63 km) and unsuccessful females (0.81 km). **Breeding dispersal distances on this magnitude, if applied, in Ireland support the 1.2 km radius used for the red zones particularly given their five year roll over.**

6.2 Population trends

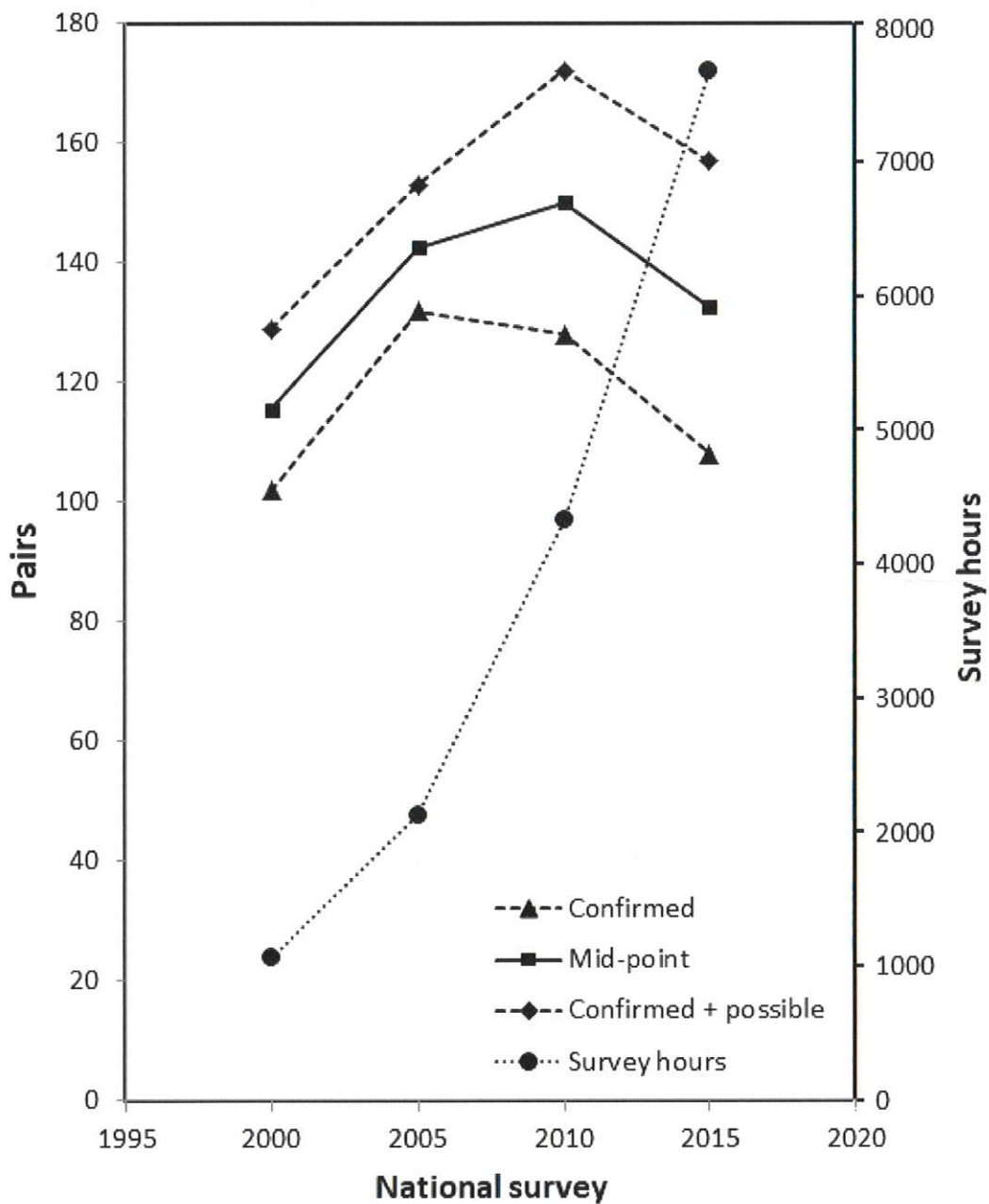
Figure 3 in Ruddock *et al.* (2016) appears to show a dramatic decline in hen harriers in the 2015 national hen harrier survey despite vastly increased survey effort. However, the axes and fitted curves are potentially misleading, at least without a detailed consideration of the data. Fig.1 is redrawn from Figure 3 in Ruddock *et al.* (2016) but with both axes starting at 0. Note that the survey hours in 1998-2000 survey are a hindcast and should be treated with considerable caution. The mid-point is halfway between the number of proven breeding pairs and the number of proven breeding pairs plus the number of proven plus probable breeding pairs. The interval between these two is the number of probable breeding pairs (this number includes pairs where the presence of a pair was not established with strong evidence). The use of the mid-point is an understandable but rather arbitrary value.

Fitting a linear trend to the number of proven pairs suggests no significant change, whilst the linear trends for the number of confirmed and possible pairs or the mid-point, are both significantly positive despite the 2015 decline.

The increase in survey effort is a problem for any interpretation of population trends but, in general, it should be interpreted that precision increases as the survey effort increases. While that might give weight to the suggestion of a decline, the increasing uncertainty or error associated with earlier

surveys means that the number of pairs should be considered to be increasingly imprecise in the earlier surveys. However, if it is assumed that confirmed pairs were correctly identified the uncertainty must rest in unrecorded and possible pairs. It is noticeable that increased survey effort is associated with an increase in the number of possible pairs which creates a wider gap between the number of confirmed pairs and the number of confirmed plus possible pairs. Therefore, despite the increased survey effort, the consequence is an increased uncertainty about the value of the mid-point. So, although increasing survey effort might be expected to increase precision it appears to have decreased it, at least for the mid-point metric is to be one of the most often cited trend measures.

Figure 1. Trends in hen harrier pairs across four national surveys (redrawn from Figure 3 in Ruddock et al (2016)).



Ruddock *et al* (2016) attempted to deal with the uncertainty created by changes in survey effort by restricting comparisons to only the 10 km squares surveyed in all four national surveys. “*Within these 78 squares in 1998 – 2000, there were 110 – 155 pairs which declined in 2005 to 110 – 127 pairs (-18.1%) with a small increase recorded in 2010 to 100 – 132 pairs (+3.9%) and finally a decline in 2015 to 78 – 103 pairs (-21.9%). Overall from 1998 – 2000 there has been a decrease by approximately one third (-33.5%) in these squares which have received coverage across all surveys.*” Note that the percentage declines refer to confirmed + possible pairs and not confirmed pairs. If confirmed pairs is used the small increase in 2010 is actually a -14.8% decline. It is reasonable to conclude that the number of pairs has declined in those 78 squares

However, a decline in those 78 squares masks complex changes, including increases and losses, across surveys and regions (Table 13 in Ruddock *et al* (2016)) which suggests some mobility in the breeding Irish hen harrier population, particularly given the spatial and temporal dynamic nature of first and second rotation pre-thicket woodland.

The Hen Harrier Project (<http://www.henharrierproject.ie/resources.html#>) reported that, in 2021, there were 62 confirmed breeding pairs and seven possible breeding pairs of Hen Harriers within the SPA network (a population range of 62 - 69 territorial pairs). **This is similar to the total numbers of territorial pairs recorded within the SPAs since their annual monitoring began in 2017 (58 - 70 pairs); 2018 (53 - 68 pairs); 2019 (56 - 63 pairs); and, 2020 (58 - 62 pairs). It is possible that previous population fluctuations in the SPA populations have stabilised.**

Caravaggi *et al* (2019a) have considered how multiple factors need to be considered when attempting to understand the Irish hen harrier population. They suggest that the narrow focus of previous research means that there is little information about the broader range of anthropogenic pressures that might impact breeding their foraging and breeding habitat.

Pressures on Ireland’s hen harrier, and by extension the merlin, are not homogenous in severity or extent. The three most probable candidates for causing reduced productivity in Ireland are, in no particular order, insufficient available prey, poor breeding season weather and nest predation. It is unlikely that these three constraints are independent or constant across the hen harrier's range, as illustrated by the considerable year on year variability in productivity recorded by the Hen Harrier Project. For example, as a direct consequence of wet and cold weather, poor breeding season weather may lead to reduced prey populations and poor nest survival. Poor weather can reduce foraging time and increase the risk of nest failure and while reduced prey may be associated with an increased risk of nest predation as other prey become scarce and parents forage for longer.

Caravaggi *et al* (2019b) showed that breeding success was negatively influenced by rainfall early in the breeding season and impending climatic instability could create greater year on year variation. Caravaggi *et al* (2019b) thought that chicks were most vulnerable to changes in minimum temperature, possibly exacerbated by rainfall, during the early stages of the breeding season.

In summary, attempting to understand the Irish hen harrier population in terms of only the extent and location of first and second rotation pre-thicket forestry in SPAs will never be successful.

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