Natura Impact Report

County Galway Wind Energy Strategy

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Summary

In May 2011 Galway County Council published a draft Wind Energy Strategy (WES) for County Galway. The purpose of the WES is to provide strategic direction to encourage renewable energy and to guide the siting and design of wind energy developments in appropriate locations within the County. The WES designates strategic wind farm development areas in terms of their suitability for wind farm development based on strategic analysis in relation to wind resources, natural heritage designations, landscape sensitivity, infrastructure capacity, settlement growth and amenity considerations.

Due to the potential of the draft WES Plan to result in likely significant effects on Natura 2000 Sites a Habitats Directive Assessment (HDA) of the draft WES Plan was required under the Planning and Development Act, 2010 and the European Communities (Birds and Natural Habitats) Regulations, 2011.

A Stage 1 Screening Assessment of the draft WES was undertaken during February and March, 2011. This Screening Assessment identified the potential for the draft WES to have likely significant effects to a number of candidate Special Areas of Conservation (cSAC) and Special Protection Areas (SPAs) occurring within the sphere of influence of the draft WES Plan.

The nature of the likely significant effects to these cSACs and SPAs (i.e. Natura 2000 Sites) was assessed in more detail during a Stage 2 Appropriate Assessment of the draft WES Plan. The identification of potential impacts to Natura 2000 Sites was undertaken by examining how the draft WES could affect the conservation status of individual qualifying interests for which each Natura 2000 Site is designated. Once the potential impacts and the pathways leading to such impacts were understood mitigation measures were outlined to ensure that the implementation of the draft WES Plan would not result in adverse effects to these qualifying interests and the Natura 2000 Sites.

It was recognised during the HDA that details concerning future wind energy developments in areas zoned for wind energy development by the draft WES were unknown and as a result not well understood at the level of strategic land use planning involved in formulating the draft WES.

This uncertainty had implications for assessing in-combination effects with other plans and projects and also for making sure that the mitigation measures outlined in the HDA would ensure that likely significant effects were avoided. Therefore to avoid uncertainty with regard to the draft WES resulting in likely significant effects to Natura 2000 Sites a precautionary approach underpins the WES and the direction it affords to future wind energy developments. This approach is outlined in Objective WE11 of the WES which ensures that this Plan will not support any future wind energy developments that are likely to result in likely significant effects to Natura 2000 Sites.

Chronology and Iterations to the Natura Impact Report

The Natura Impact Report (NIR) of the WES has undergone a number of iterations and addendums as a result of changes made to the WES arising from:

- the findings of the SEA/HDA;
- submissions from statutory and non-statutory organisations and the public; and
- alterations posed by Galway County Council.

The NIR presented below is outlined in chronological order with the initial Sections outlining the assessment of the draft WES and the latter Sections detailing changes made to the draft WES and the resultant HDA recommendations for these changes.

Sections 1 – 4 of this NIR outline the results of the Stage 1 Screening and Stage 2 Appropriate Assessment of the draft WES.

Section 5 of this Natura Impact Report (NIR) details the changes to the draft WES and NIR which resulted from submissions during the public consultation period.

Section 6 provides a summary of the Manager's Report to the submissions made during the initial period of public consultation between May and June, 2011.

Section 7 details the proposed Material Alterations put forward by Galway County Council members that are of relevance to Natura 2000 Sites. This Section provides a brief summary of the implications of these Material Alterations to Natura 2000 Sites. The full assessments of these alterations are provided in Annex documents to this NIR.

The Material Alterations were put on public display during August and September, 2011. The submissions received during this period are outlined in a Managers Report of the Material Alterations to the WES. Section 7 summaries this Manager's Report and how the results of the HDA of the Material Alterations informed the recommendations outlined in the Manager's Report.

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1 Introduction

Minogue & Associates & Doherty Environmental have been appointed by Galway County Council to undertake a Habitats Directive Assessment of the Draft Galway Wind Energy Strategy (to be referred to as the Draft WES). This Habitats Directive Assessment (HDA) has been undertaken in conjunction with a Strategic Environmental Assessment (SEA) of the Draft Strategy and should be read in combination with the Draft WES and the Strategic Environmental Assessment of the Draft WES.

During the scoping stage of the SEA it was recognised that the Draft WES may have the potential to significantly impact upon Natura 2000 sites. The potential for likely significant effects to occur triggered the need for a HDA. The purpose of this process is to assess the impacts of the Draft WES, in combination with other relevant plans or projects, on the integrity of Natura 2000 sites.

1.1 County Galway Draft Wind Energy Strategy

The overall purpose of the Draft WES is to direct the development of wind energy generation in the County through a "planning-led" approach. Such an approach will provide clear guidance to both planners, prospective developers, the public and communities, service providers and other stakeholders that will streamline the planning process with respect to wind farm developments. A key aim of the Draft WES is to align County's wind generation policy to the existing wind energy resources by identifying strategic areas for wind energy development of local, county, regional and national importance. Through the identification of these strategic areas the Draft WES has sought to establish a platform that will facilitate achieving a target of 500MW of wind energy generation in the County by 2020.

The Draft WES has sought to strike a balance between achieving greater energy security, meeting national and international commitments for reducing greenhouse gases, promoting renewable energy and ensuring that environmental receptors are not adversely affected by the implementation of the Strategy. The Draft WES sets out its commitment to ensuring the protection of environmental receptors through its stated

aims of ensuring full compliance with the SEA Directive (2001/42/EC), the Habitats Directive (1992/43/EEC) and the relevant national legislation and guidelines that transpose and facilitate the implementation of these EU Directives.

Once finalised, it is the intention that this Draft Wind Energy Strategy will be adopted as a variation of the existing County Galway Development Plan 2009-2015.

1.2 Identification of Wind Energy Areas

The Draft WES adopted a hierarchical approach to the zoning of suitable areas for wind energy developments. This hierarchy i.e. Strategic Areas, Acceptable in Principle Areas etc. and the associated selection criteria are outlined in *Table 1.1* below.

Table 1-1: Criteria for Defining Areas for Wind Farm Development

Hierarchy	Strategic Level Criteria
Strategic Areas	Larger areas in optimal locations for wind farm development without significant environmental constraints, based on strategic level assessment: • Viable wind speeds (i.e. above 8m/s) • Proximity and access to grid (i.e. generally within 10km of transmission network and not isolated from grid by Natura 2000 sites) • Excludes all Natura 2000 sites (cSACs, SPAs) • Excludes all Ramsar sites (Inner Galway Bay, Lough Corrib, Coole Lough & Garryland Wood) • Excludes all Freshwater Pearl Mussel Sub-Catchments (Owenriff, Dawros) • Excludes all National Parks (Connemara NP) • Excludes all NHAs and pNHAs • Excludes all Nature Reserves (Coole-Garryland & Ballynastaig Wood NR, Clochar na gCon/Bealacooan Bog NR, Derrycrag Wood NR and Rosturra Wood NR, Leam West Bog NR, Pollnaknockaun Wood NR, Richmond Esker NR) • 1km from Galway City and Tuam Town and 500m from other settlements and residential properties receiving post • 200m from motorways/national roads and 100m from other physical linear features such as regional roads, rail lines and electricity lines • 100m from high tide mark for coastal areas and water's edge for lakes

	• 200m from architectural heritage features (ACAs & RPS) and generally 100m from archaeological heritage features (RMP) • Excludes Landscape Sensitivity Class 5 – Unique and Class 4 – Special • Excludes areas with high landscape sensitivity based on fieldwork assessment
Acceptable in Principle	Smaller areas in favourable locations for wind farm development without significant environmental constraints, based on strategic level assessment: • Viable wind speeds (i.e. above 8m/s) • Proximity and access to grid (i.e. generally within 10km of transmission network and not isolated from grid by Natura 2000 sites) • Excludes all cSACs, SPAs, NHAs and pNHAs, National Parks, Nature Reserves, Ramsar sites & Dawros Freshwater Pearl Mussel Sub-Catchment • 1km from Galway City and Tuam Town and 500m from other settlements and residential properties receiving post • 200m from motorways/national roads and 100m from other physical linear features such as regional roads, rail lines and electricity lines • 100m from high tide mark for coastal areas and water's edge for lakes • 200m from architectural heritage features (ACAs & RPS) and generally 100m from archaeological heritage features (RMP) Excludes Landscape Sensitivity Class 5 – Unique and Class 4 – Special
Areas Open for Consideration	Areas with some locations that may have potential for wind farm development due to viable wind speeds or clustering with Strategic Areas but with significant environmental constraints, based on strategic level assessment: • Variable wind speeds, but generally over 8m/s, apart from an area clustered with the Strategic Areas in the west • Proximity to the grid and densely populated areas varies throughout this area. • Excludes all SACs and SPAs, National Parks and Nature Reserves and avoids most NHAs. The NHAs included wholly or partly in this designation are listed in Section 5 – Development Management Guidelines. • Low to medium population density Excludes Landscape Sensitivity Class 5 – Unique and Class 4 – Special
Not Normally	Areas generally not suitable for wind farm development due to their

Permissible	overall sensitivity and constraints arising from landscape, ecological, recreational, settlement, infrastructural and/or cultural and built heritage resources, based on strategic level assessment: • Includes all Natura 2000 sites (cSACs and SPAs), Ramsar sites, National Parks and Nature Reserves • Includes most NHAs, apart from those listed in Section 5 – Development Management Guidelines • Includes all urban areas, towns, villages and small settlements • Large number of natural heritage designations, or important recreational / tourism area • Large number of protected structures and/or archaeological sites • Includes Landscape Sensitivity Class 5 – Unique and Class 4 – Special HDA and SEA recommended against these areas being included

Within the Draft WES the Strategic Areas and Areas Acceptable in Principle constitute the areas identified within the County as having the capacity to support the highest level of wind energy development in a sustainable manner. The Strategic Areas are of particular importance to the Draft WES as these sites represent areas that are of strategic importance for the regional and national development of wind energy. An indicative target of 250MW of wind energy generation within the lifetime of the Galway County Development Plan (GCDP) 2009 – 2015 has been assigned for Strategic Areas.

Areas zoned Acceptable in Principle are of regional and county wide importance for wind energy generation. Wind energy developments in these areas will be facilitated subject to detailed project level assessments. An indicative target of 100MW of wind energy generation within the lifetime of the GCDP 2009 – 2015 has been assigned for areas zoned Acceptable in Principle.

A third potential area for wind energy development has been zoned as Areas Open for Consideration. The Draft WES notes that these areas may have the suitable resources for wind energy development but significant constraints occurring in these areas may present obstacles to the sustainable development of commercial wind farms. Any wind farm developments proposed in this zoning will be assessed on a case by case basis.

An indicative target of 30MW of wind energy generation within the lifetime of the GCDP 2009 – 2015 has been assigned for Areas Open to Consideration.

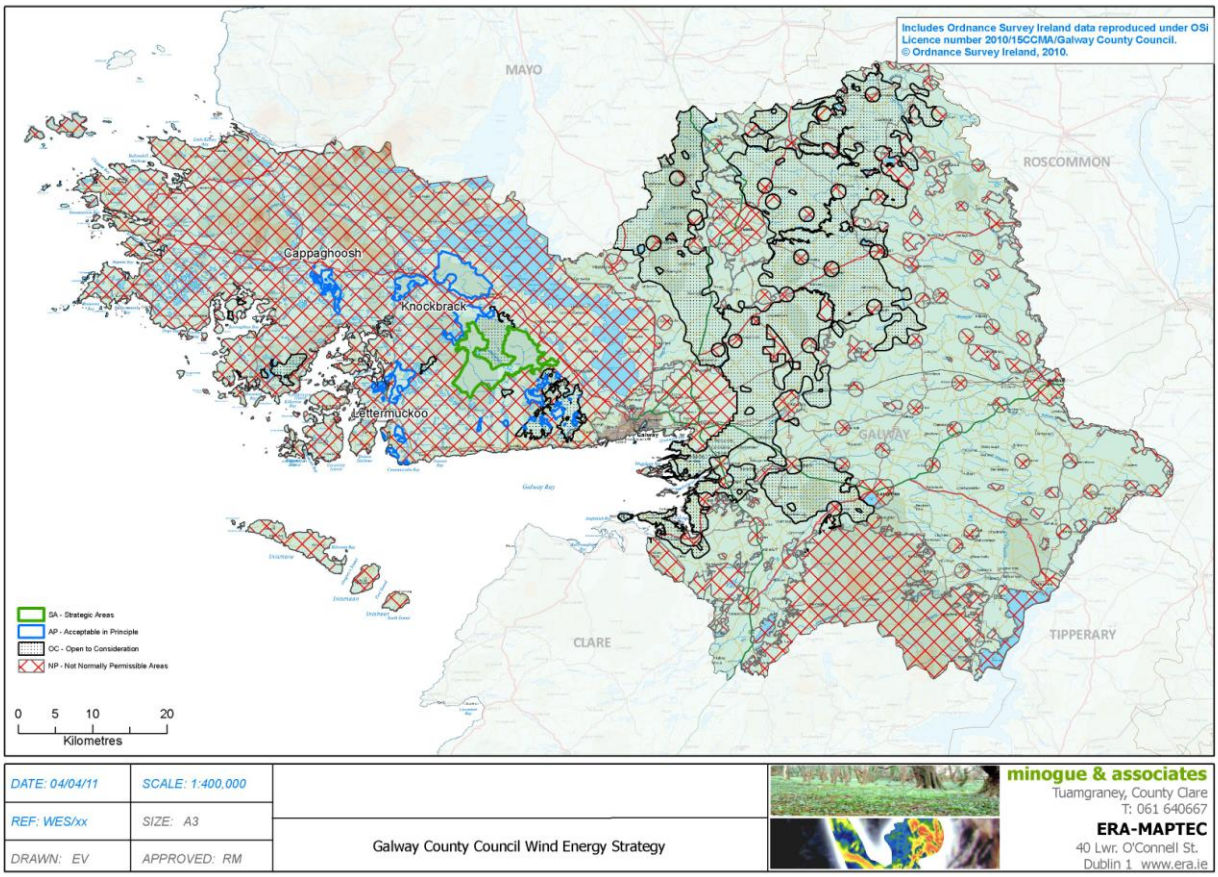
For the purposes of this HDA all areas ascribed indicative targets for wind energy generation under the Objectives of the Draft WES are considered to represent wind energy areas.

The Draft WES also seeks to identify areas within the County that are considered unsuitable for wind energy development. Therefore, a number of criteria were used to identify and map areas considered Not Normally Permissible for wind energy development. These areas are not considered suitable for development due to their overall sensitivity arising from landscape, ecological, recreational and/or cultural and built heritage resources.

A final category has been zoned within the County by the Draft WES. This zoning, entitled Low Wind Speed Areas is not the subject of specific policies or objectives that relate to the development of wind energy. No indicative targets for wind energy have been set for areas zoned as Low Wind Speed.

Figure 1.1 illustrates the location of each category area as defined by the Draft WES.

Figure 1-1 Draft Galway Wind Energy Strategy Map



1.3 Habitats Directive Assessment

The EU Birds and Habitat Directive oblige member states to establish a network of designated conservation areas known as the Natura 2000 (N2K) Network. The N2K network includes sites designated as Special Areas of Conservation (SACs), under the EU Habitats Directive and Special Protection Areas (SPAs) under the EU Birds Directive. Article 6 of the EU Habitats Directive imposes strict land-use control measures on SACs and SPAs, with Articles 6(3) and 6(4) establishing a prior authorisation process for any land-use plan or project likely to have a significant effect on an N2K site.

In the case of the draft County Galway WES, it is considered necessary to examine the potential for certain elements of the Draft WES to significantly affect the integrity and conservation status of N2K sites occurring within the Strategy's area of influence.

This examination will be arrived at by assessing the implications of the Draft WES on the "qualifying interests" (i.e. those Annex I habitats, Annex II species, and Annex I bird species and populations for which the site has been designated an SAC or SPA) that form the basis of N2K site designations.

The HDA is underpinned by the precautionary principle. Therefore, if the risk of adverse impacts to the conservation objectives of a N2K Site cannot be ruled out it is assumed that an adverse impact may exist. Where such uncertainties are identified during the assessment, measures will be proposed to avoid or mitigate the risk of adverse impacts occurring.

The Area of Influence of the draft WES includes all lands occurring within County Galway and also within a 15km buffer distance from Galway County boundary. This area of influence, which will be referred to throughout this report as the "Study Area", follows current guidance with respect to Habitats Directive Assessments of land use plans[1]

The approach for this Article 6 assessment broadly follows the guidelines outlined in the European Commission (2001) guidance document *Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological Guidance on the provisions of Article 6(3) and 6(4) of the EU Habitats Directive 92/43/EEC* (to be referred to throughout this report as the "EC guidance"). Other guidance referred to during this assessment include:

- *Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities*. Department of the Environment Heritage and Local Government (DEHLG) (2010).
- Managing Natura 2000 Sites – The provisions of Article 6 of the Habitats directive 92/43/EEC. European commission (2000). (To be referred to as MN 2000).

[1] See Scott-Wilson (2008) and DEHLG (2010).

- Guidance on Article 6(4) of the Habitats Directive 92/43/EEC – Clarification of the Concepts of: Alternative Solutions, Imperative reasons of Overriding Public Interest, Compensatory Measures, Overall coherence, Opinion of the Commission. European Commission (2007).
- Appropriate Assessment of Plans. Scott Wilson, Levett-Therivel sustainability Consultants, Treweek Environmental Consultants and Land Use Consultants (2006).
- Department of the Environment Heritage and Local Government (DEHGL) Circular letter SEA 1/08 & NPWS 1/08 dated 15 February, 2008.

The completion of an Article 6 Assessment may involve, if necessary, the completion of a number of assessment stages. These stages, as outlined in the above EC guidance and in more recent guidance published by the DOEHLG (2010), include:

- Stage 1 Screening for AA

  This stage defines the proposed project, establishes whether the proposed project is necessary for the conservation management of the Natura 2000 site and assesses the likelihood of the project having a significant effect, alone or in combination with other plans or projects, upon a Natura 2000 site.

- Stage 2 AA

  If a project is likely to have a significant effect, an Appropriate Assessment must be undertaken. In this stage the impact of the project to the Conservation Objectives of the N2K site is assessed and measures are proposed to avoid or reduce impacts so that they do not result in significant effects to the site. The outcome of this assessment will establish whether the project will have an adverse effect upon the integrity of the N2K site.

- Stage 3 Alternative Solutions

If it is concluded that, subsequent to the implementation of mitigation measures, a project has an adverse impact upon the integrity of a N2K site, it must be objectively concluded that no alternative solutions exist before the project can proceed to Stage 4.

- Stage 4 IROPI

  Where no alternative solutions exist and where adverse impacts remain but imperative reasons of overriding public interest (IROPI) exist for the implementation of a project, an assessment of compensatory measures that will effectively offset the damage to the N2K site will be necessary.

It is anticipated that an emphasis on Stage 1 and 2 of this process will, through a series of iterations, ensure that potential adverse effects are identified and eliminated through the inclusion of mitigation measures designed to avoid, reduce or abate potential impacts.

The remainder of this Natura Impact Report sets out the Methodology and Results of the Screening and the Appropriate Assessment (i.e. Stage 1 & 2 above.) of the Draft WES.

1.4 Consultation

Consultation regarding the potential risks posed by the draft WES to N2K sites was held with the National Parks and Wildlife Service (NPWS) who is the competent Authority for managing the conservation of habitats and species designated under the EU Habitats Directive. This Habitats Directive Assessment Report does not form the final step in the process. The consultation programme for the Draft WES will provide an opportunity for statutory bodies, stakeholders and the general public to comment on the findings of this report.

2 Stage 1 Screening

2.1 Introduction

The Draft Galway WES requires the identification of areas for future wind energy development. *Table 1.1* outlines the approach adopted during the zoning of areas for wind energy development. A key criterion underlining the identification of these areas was the probability of likely significant effects to Natura 2000 sites. In this context "likely" refers to the presence of doubt with regard to the absence of significant effects (ECJ case C-127/02) and "significant" means not trivial or inconsequential but an effect that has the potential to undermine the site's conservation objectives (English Nature, 1999; ECJ case C-127/02). In other words, any effect which would compromise the functioning and viability of a site, and interfere with achieving the conservation objectives of the site, would constitute a significant effect.

The nature of the likely interactions between the Draft WES and the integrity of N2K sites will depend upon the proximity of N2K sites to designated wind energy areas; the sensitivity of N2K sites' qualifying features to potential impacts associated with wind farm developments; the current conservation status of the site; and the likely changes that will result from the implementation of the Draft WES, in combination with other plans and projects.

A Screening Matrix is provided in Appendix 1 to this NIR. This matrix lists all N2K sites and associated qualifying interests identified as occurring within the study area. Information on current threats and sensitivities of qualifying interests and Screening conclusions for each N2K site is also provided in this Appendix.

2.2 Methodology

The EC guidance outlines the steps involved in undertaking a Screening Assessment which involves the following:

1. Describe the plan and determine whether it is necessary for the conservation management of N2K Sites;

2. Identify and describe the N2K Sites likely to be influenced by the plan;
3. Assessment of the likely effects of the plan and whether they are (alone or in combination with other plans or projects) likely to adversely affect any N2K Sites; and
4. Screening Conclusions.

2.3 Description of the Plan and Relationship with N2K Sites

Section 1.1 above provides a summary of the Draft WES and it is clear from this description that the Draft WES is not necessary to the management of any Natura 2000 site for nature conservation purposes. Therefore consideration was given to the Draft WES and whether it was likely to have a significant effect and if so what the implications would be to the Conservation Objectives for any Natura 2000 site.

2.4 Identification and Description of Natura 2000 Sites

In order to identify the Natura 2000 sites that could be significantly affected by the implementation of the Draft WES a list of all sites occurring within the study area has been compiled. A total number of 132 SACs and 29 SPAs were identified within the study area. These sites represent a diverse range of habitats ranging from lowland grassland to upland heath and blanket bog, while a number of sites occurring within the study area are also designated due to the presence of a particular Annex II species, such as the Lesser Horseshoe bats, salmon or freshwater pearl mussel.

Many of the SPA designations overlap with the SACs. These sites are of particular ecological interest and are of international importance for the species and populations of birds they support. *Figures 2.1 – 2.2* below show the location of N2K sites occurring within the study area.

2.4.1 Conservation Management Objectives for N2K Sites

At the time this assessment was undertaken, specific Conservation Management Plans were unavailable for all Natura 2000 sites, with the exception of the two SACs – Fin

Lough SAC and Lough Coy SAC. For sites lacking a published Plan, a list of generic conservation management objectives (CMOs) were generated in consultation with the NPWS. These are:

For SACs

- To maintain the Annex I habitats for which the SAC has been selected at favourable conservation status;
- To maintain the Annex II species for which the SAC has been selected at favourable conservation status;
- To maintain the extent, species richness and biodiversity of the entire site; and
- To establish effective liaison and co-operation with landowners, legal users and relevant authorities.

For SPAs

- To maintain the bird species of special conservation interest, for which the SPA has been designated, at favourable conservation status

Information regarding the main threats to SACs was sourced from Ireland's Article 17 Report to the European Commission "Status of EU Protected Habitats and Species in Ireland" (NPWS, 2008). However, this report assesses the conservation status and associated threats to Annex-listed habitats and species on a countrywide basis, and therefore, the status and threats to specific sites in the study area were not available at the time of writing. There is no similar information collated for SPAs.

Since the conservation management objectives for the N2K sites focus on maintaining the favourable conservation status of the qualifying interests of each site, the Screening process concentrated on assessing the potential implications of the Draft WES against the qualifying interests of each site.

Figure 2-1: SACs occurring within the Study Area

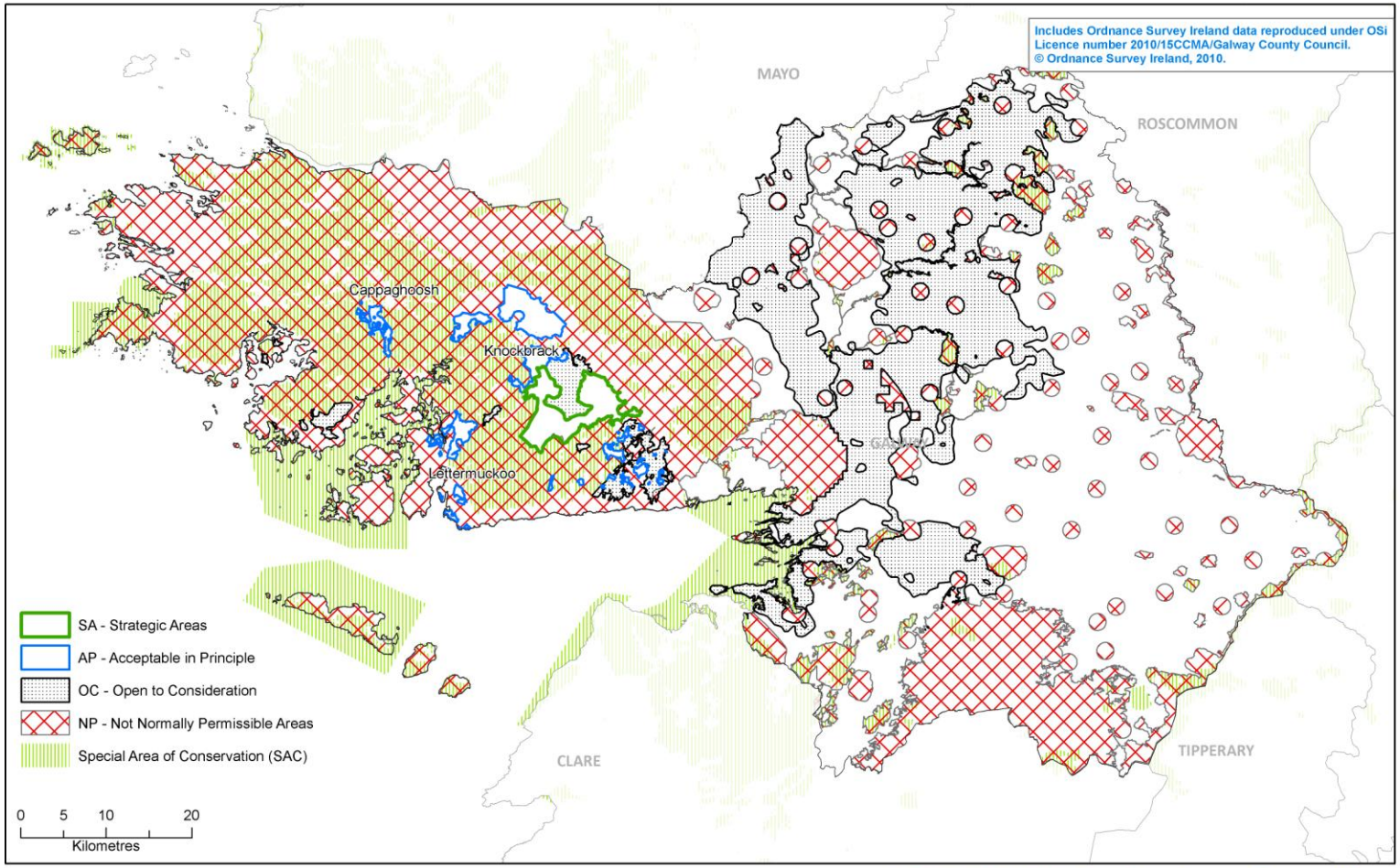
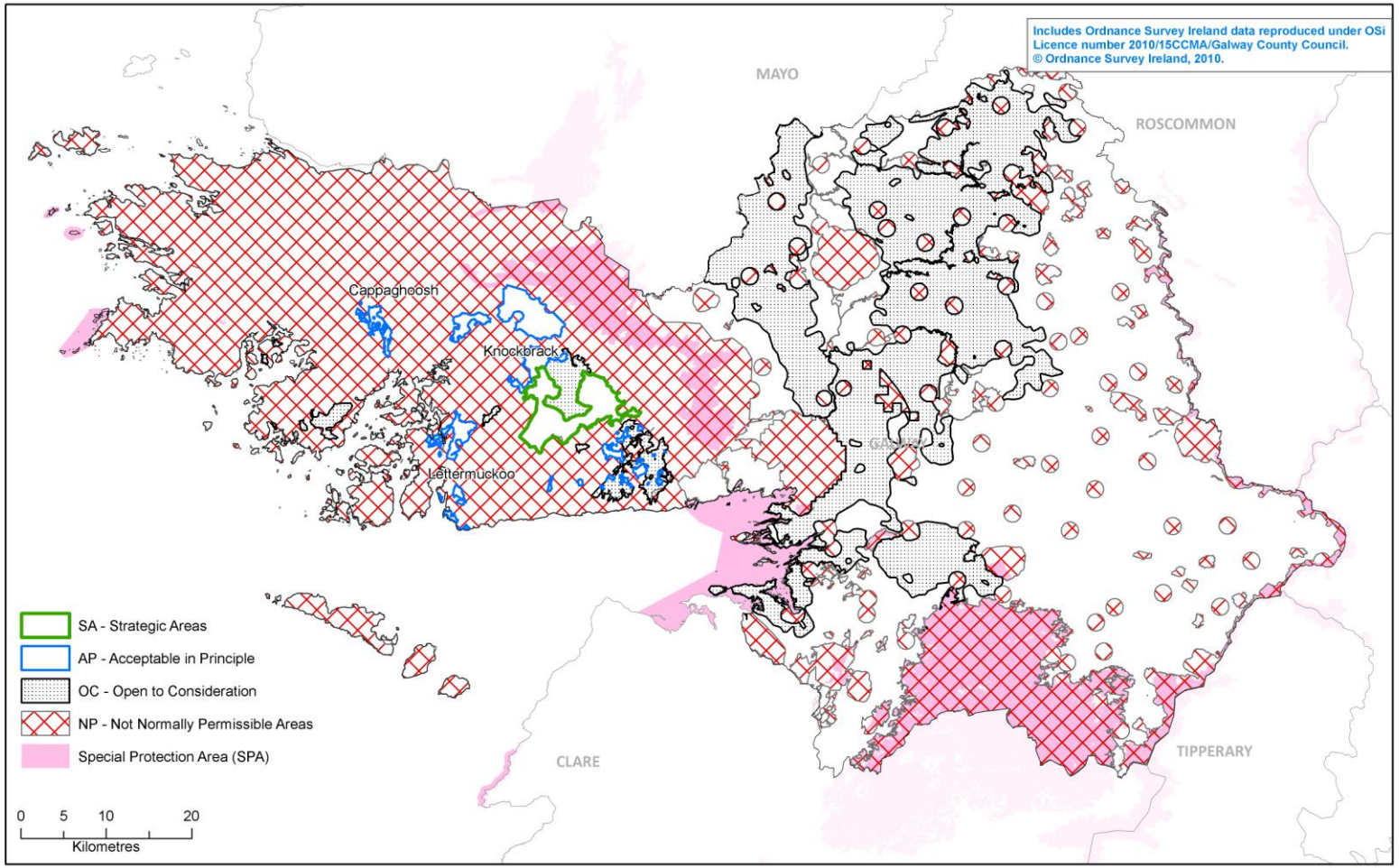


Figure 2-2: SPAs occurring within the Study Area



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REF: WES/xx	SIZE: A3	Galway County Council Wind Energy Strategy	ERA-MAPTEC 40 Lwr. O'Connell St. Dublin 1 www.era.ie
DRAWN: EV	APPROVED: RM		

2.5 Assessment of Likely Significant Effects

2.5.1 In-Combination Effects

A range of in-combination effects with other plans and projects could arise from the implementation of the Draft WES. Some of these plans include the following:

- Relevant objectives of EU Directives such as the Water Framework Directive, Nitrates Directive etc.
- National Development Plans and national level spatial development plans such as the NDP 2007 – 2013; National Spatial Strategy 2002 – 2020.
- Plans relevant at a regional level such as the Regional Planning Guidelines; the Western River Basin Management Plan and other County Development Plans, County Wind Energy Strategies and Renewable Energy Strategies.
- Plans relevant at a county and local context including the GCDP 2009 – 2015 and associated Local Area Plans and significant projects such as road projects, power-line projects and other wind energy projects.

However given the uncertainties that exist with regard to the scale and location of wind energy developments it is recognised that the identification of cumulative impacts is limited and that the assessment of in-combination effects will need to be undertaken in a more comprehensive manner at the project-level.

2.5.2 Likely Significant Effects of the Draft WES on N2K Sites

A variety of components are associated with the development of wind farms and any one of these components has the potential to significantly affect the qualifying features of N2K sites. Details of these components and the likely significant effects associated with them are outlined in *Table 2.3* below.

Table 2-3 Components of Wind Farm Developments having the Potential to cause Significant Effects to N2K Sites

Component	Details	Potential Impact
Construction Compound	A wind farm construction compound can vary in size from 50x50m to 100x100m. The compound generally consists of storage space, construction equipment and amenity area for construction staff. Construction compounds are generally temporary structures and habitats/vegetation is reinstated following development of the wind farm.	• Habitat loss and disturbance. • Alterations to local hydrology and effect on adjacent habitats.
Site Development	During site development large scale construction activity will be undertaken within the proposed development site.	• Long-term and short-term loss of habitat • Short-term displacement and avoidance of decommissioning areas and noise disturbance to wildlife. • Sediment pollution and associated hydrological impacts • Oil and chemical contamination
Site Access	Site access tracks are necessary to access the various turbine locations of a wind farm as well as the sub-station and control building. Access tracks are also	Potential impacts associated with access tracks include: • Habitat loss and disturbance. • Alterations to local hydrology and

	required during construction, turbine delivery and for ongoing operation and maintenance of the wind farm.	effect on adjacent habitats. • Sediment pollution during construction and associated hydrological impacts. • Peat slides resulting from poor construction management and a failure to identify areas susceptible to peat slide • The development of site access tracks can lead to increases in human activity which can affect the long-term integrity of habitats (Fagundez, 2008)
Cable Trenching	Cable trenches will typically follow the site access routes. These trenches are dug for the laying of electric cables linking the turbines to the site sub-station.	Cable trenches can act as drainage channels for surface water runoff or lead to the drainage of adjacent habitats. Where trenches are constructed on slopes the flow of water could lead to the erosion of soils which could enter water watercourses and increase the rate of suspended solids.
Borrow Pits	Where suitable construction material is located on site, borrow pits are installed to provide rock and aggregate for the construction of wind farms.	The excavation of borrow pits can result in: • Habitat loss and disturbance. • Alterations to local hydrology with subsequent impacts to adjacent habitats. • Sediment pollution during

		construction and associated hydrological impacts. • Peat slides resulting from poor construction management and a failure to identify areas susceptible to peat slide
Turbine Foundations including transformers and crane pads	Turbine foundations have to be founded on rockhead which requires the excavation of mineral soils and peat where present. Once excavation is complete the turbines are generally secured by piled or rock anchored platforms. With recent increases in the size of wind turbines the required area for both platforms and crane pads have increased and can reach up to 50x50m^2 per turbine, with varying depths depending on soil type and depth to bedrock. While reinstatement of vegetation post construction will reduce the area of hard-standing to that occupied by the turbine platform, the area of ground effected by base excavations and crane hard-	• Habitat loss and disturbance • Effect on the local water table • Effect on adjacent area and watercourses due to high concentrations of sediment discharge • Effect on reinstatement due to the quality of peat stripping and storage • Oil or chemical contamination • Peat slides resulting from poor construction management and a failure to identify areas susceptible to peat slide

[2] Dargie, T (2004). Windfarm impacts on blanket peat habitats in Scotland. In: F. Maxwell (ed.) *Renewable Energy: is it ecologically friendly? Proceedings of the 19th Conference of the Institute of Ecology and Environmental Management*, pp. 43-51. London 18 May 2004. IEEM, Winchester.

	standing can amount to considerable areas (e.g. the 21 turbine Causeymire Wind Farm in Scotland amounted to 3.9ha of base excavation and crane hardstanding (see Dargie, 2004). Where the site is located on wet bog or heath excavated areas may require pumping and the installation of settlement ponds.	
Grid Extensions and Connections	The majority of wind farm sites will require the extension of existing, or installation of new electricity power lines linking the Wind Farm to the National Grid. Connection lines can be installed over-head or underground.	The installation of underground lines can result in increased habitat loss while over-head lines can result in bird collisions and fatalities.
Sub-Station & Control Building	A sub-station is required to convert the electricity generated by wind turbines to transmission voltage suitable to connect into the National Grid system. The sub-station typically includes all necessary ancillary equipment such as control room, voltage and current transformers and circuit breakers for the control and protection of the sub-station. The substation would be surrounded by hard-standing for vehicle parking and equipment.	• Habitat loss and disturbance • Effects on local hydrology during construction

Forest Clearance	Many wind farms are developed within or adjacent to plantation forestry. From a review of the EISs associated with developed or proposed wind farms in Co. Clare the results showed that the majority of these wind farms are associated with plantation forestry. A requirement for forest clearance is typically associated with clearance for wind turbines, access tracks and substations. "Turbulence clearance" may also be necessary. The latter refers to wind turbulence generated by trees which can reduce wind speeds and have a negative effect on electricity generation.	• Increases in soil water content • Effects on water quality through increased erosion rates and sedimentation. • Leaching of nutrients, particularly, phosphorous and nitrogen, resulting from increases in soil water content (and associated reduction in evapotranspiration), felling waste, the removal of the tree layer and the establishment of anaerobic conditions as a consequence of the rise in the groundwater table (Ahtianinen & Huttunen, 1999). The clear-felling of forests and the resultant increases in nutrient mobilisation can be particularly pronounced in peatland habitats where the peat soils are naturally anaerobic.
Operating Wind Farms	Operating wind farms will involve rotating turbine blades and generally infrequent visits by maintenance personnel to and from wind farm sites.	• Operating turbines can result in habitat loss and displacement for bird species. • Moving turbine blades can result in fatalities to bird and bat species.
Decommissioning	Wind turbines have a typical life expectancy of 20 – 25 years. The current trend in the industry is to replace older wind energy projects by upgrading older	• Short-term displacement and avoidance of decommissioning areas and noise disturbance to wildlife.

	equipment with more efficient turbines. However if upgrading does not take place the wind farm will be decommissioned. The decommissioning of a wind farm will involve: • All turbines, including the blades, nacelles and towers will be disassembled, and transported off site. • All of the transformers will also be transported off-site for reuse or reclamation. • All underground infrastructure at shallow depths will be removed. • Areas where subsurface components are removed will be graded to match adjacent contours, stabilized with an appropriate seed mix, and allowed to re-vegetate naturally. • All road materials will be allowed to remain on-site.	

The potential effects listed in *Table 2.3* can be divided into direct and indirect impacts. Direct impacts are impacts which occur in the immediate vicinity of a development and are directly related to the development. Indirect impacts are impacts caused by the interaction of effects or off-site effects of a project.

As N2K sites are excluded from all wind energy areas (i.e. Strategic Areas, Areas Acceptable in Principle and Areas Open for Consideration) the potential for direct

impacts (as outlined in *Table 2.3*) to adversely affect N2K sites is avoided from the outset.

The potential for indirect impacts to have a likely significant effect on N2K sites will depend on whether there are linkages between impact sources and the sites. For the purposes of the screening process the linkages between impact sources and N2K sites will include:

- Physical proximity
- Hydrological linkages
- Mobile species linkages

(While aerial linkage can in theory link impact sources to receptor sites, impacts derived from aerial deposition and/or precipitation was not considered to be a significant pathway).

As the draft WES identifies Wind Energy Areas as areas where future wind energy development will take place, it follows that the source of potential impacts associated with wind farm developments will be restricted to these areas. As no N2K sites overlap with these areas zoned as Wind Energy Areas only indirect impacts are considered likely to affect the qualifying interests of the N2K sites.

2.5.3 Likely Changes to N2K Sites

Considering the potential impacts associated with the individual components of a wind farm development, the zonings of the WES will have the potential to result in a variety of effects outlined in *Table 2-4* below. The effects listed in this table reflect those used in the EC Guidance to describe any likely changes to an N2K site arising from the implementation of a plan or project. The potential impacts identified in *Table 2.3* above are grouped under the relevant effects in *Table 2.4.*

Table 2-4 Potential Effects to Natura 2000 sites associated with the implementation of the Draft WES

Potential Effect	Example of potential impacts
Physical loss	Habitat loss Habitat degradation
Physical damage	Habitat degradation Erosion Changes to slope profile Alterations to natural ecological processes Sedimentation/silting Deterioration of water quality Habitat fragmentation Severance/barrier effects Edge effects
Interference with key relationships that define the structure and function of the site.	Alterations of key hydrological processes through: Desiccation; Water level fluctuations; Alterations to flow regime (erosion/deposition). Changes in water quality arising from pollution events. Changes in tidal or marine processes. Soil degradation and pollution.
Disturbance to Key Species	Introduction of alien species. Disturbance and/or displacement of species resulting from noise, vibration, lighting and the

	presence of human activity.
Reduction in Species Density	Direct mortality during construction. Direct mortality during operation of turbines. Habitat displacement and loss of feeding/breeding habitat

To assess how the implementation of the Draft WES will potentially change N2K sites, the plan has been assessed in the context of the effects outlined in *Table 2.4*. *Tables 2.5* and *2.6* present a summary of this exercise. Those sites for which affects have been identified will be taken forward to Stage 2 Appropriate Assessment. Those N2K sites which are not likely to be affected by the implementation of the Draft WES will not require Stage 2 Appropriate Assessment and will be screened out at this stage of the assessment. N2K Sites Screened Out at this Stage (i.e. those that resulted in the answer "none" and/or "N/A" to the potential impacts listed in *Tables 2.5* and *2.6*) were eliminated due to: the location of these sites at remote distances from wind energy areas; the lack of hydrological links between them and wind energy areas; and the lack of Annex II mobile species listed as a qualifying interest (where N/A appears in the Tables it refers to the latter reason).

Table 2-5: Potential Changes to SACs arising from the Draft WES

SAC Site Name	Physical Loss	Physical Change	Interference with Key Relationships	Disturbance to Key Species	Reduction in Species Density
Ballyallia Lake	None	None	None	N/A	N/A
Ballycullinan Lake	None	None	None	N/A	N/A
Ballyogan Lough	None	None	None	N/A	N/A

Black Head-Poulsallagh Complex	None	None	None	None	None
Dromore Woods And Loughs	None	None	None	None	None
Moneen Mountain	None	None	None	None	None
Moyree River System	None	None	None	None	None
Inishmaan Island	None	None	None	N/A	N/A
Inishmore Island	None	None	None	None	None
River Shannon Callows	None	None	None	None	None
Coolcam Turlough	None	None	None	N/A	N/A
Barroughter Bog	None	None	None	N/A	N/A
Caherglassaun Turlough	None	None	None	None	None
Castletaylor Complex	Potential Impact	Potential Impact	Potential Impact	N/A	N/A
Cloonmoylan Bog	None	None	None	N/A	N/A
Coole-Garryland Complex	None	None	None	N/A	N/A
Croaghill Turlough	Potential Impact	Potential Impact	Potential Impact	N/A	N/A
Derrycrag Wood Nature Reserve	None	None	None	N/A	N/A
Galway Bay Complex	None	Potential Impact	Potential Impact	Potential Impact	Potential Impact

Inishbofin And Inishshark	None	None	None	None	None
Kilsallagh Bog	Potential Impact	Potential Impact	Potential Impact	N/A	N/A
Kiltartan Cave (Coole)	None	None	None	None	None
Levally Lough	Potential Impact	Potential Impact	Potential Impact	N/A	N/A
Lisnageeragh Bog And Ballinastack Turlough	Potential Impact	Potential Impact	Potential Impact	N/A	N/A
Lough Corrib	Potential Impact	Potential Impact	Potential Impact	Potential Impact	Potential Impact
Lough Cutra	None	None	None	None	None
Lough Lurgeen Bog/Glenamaddy Turlough	Potential Impact	Potential Impact	Potential Impact	N/A	N/A
Lough Rea	Potential Impact	Potential Impact	Potential Impact	N/A	N/A
Loughatorick South Bog	None	None	None	N/A	N/A
Loughatorick South Bog	None	None	None	N/A	N/A
Peterswell Turlough	None	None	None	N/A	N/A
Pollnaknockaun Wood Nature Reserve	None	None	None	N/A	N/A
Rahasane Turlough	Potential Impact	Potential Impact	Potential Impact	N/A	N/A

Rosroe Bog	Potential Impact	Potential Impact	Potential Impact	N/A	N/A
Shankill West Bog	Potential Impact	Potential Impact	Potential Impact	N/A	N/A
Tully Mountain	None	None	None	N/A	N/A
Lough Ree	None	None	None	None	None
Ardkill Turlough	None	None	None	N/A	N/A
Ballymaglancy Cave, Cong	None	None	None	N/A	N/A
Carrowkeel Turlough	None	None	None	N/A	N/A
Cloughmoyne	None	None	None	N/A	N/A
Clyard Kettle-Holes	None	None	None	N/A	N/A
Cross Lough (Killadoon)	None	None	None	N/A	N/A
Greaghans Turlough	None	None	None	N/A	N/A
Kilglassan/Caheravoostia Turlough Complex	None	None	None	N/A	N/A
Shrule Turlough	None	None	None	N/A	N/A
Skealoghan Turlough	None	None	None	N/A	N/A
All Saints Bog And Esker	None	None	None	N/A	N/A
Ferbane Bog	None	None	None	N/A	N/A
Fin Lough (Offaly)	None	None	None	None	None

Mongan Bog	None	None	None	N/A	N/A
Moyclare Bog	None	None	None	N/A	N/A
Ballinturly Turlough	None	None	None	N/A	N/A
Bellanagare Bog	None	None	None	N/A	N/A
Carrowbehy/Caher Bog	None	None	None	None	None
Cloonchambers Bog	None	None	None	N/A	N/A
Derrinea Bog	None	None	None	N/A	N/A
Lough Fingall Complex	None	Potential Impact	Potential Impact	Potential Impact	Potential Impact
Errit Lough	None	None	None	N/A	N/A
Lisduff Turlough	None	None	None	N/A	N/A
Lough Croan Turlough	None	None	None	N/A	N/A
Lough Funshinagh	None	None	None	N/A	N/A
Mullygollan Turlough	None	None	None	N/A	N/A
Ballyduff/Clonfinane Bog	None	None	None	N/A	N/A
Kilcarren-Firville Bog	None	None	None	N/A	N/A
Ridge Road, S.W. Of Rapemills	None	None	None	N/A	N/A
Ballyvaughan Turlough	None	None	None	N/A	N/A
Aughrusbeg Machair And Lake	None	None	None	N/A	N/A

Carrownagappul Bog	None	None	None	N/A	N/A
Cregduff Lough	None	None	None	None	None
Dog's Bay	None	None	None	N/A	N/A
Gortnandarragh Limestone Pavement	None	None	None	N/A	N/A
Inisheer Island	None	None	None	N/A	N/A
Kiltiernan Turlough	None	Potential Impact	Potential Impact	N/A	N/A
Omey Island Machair	None	None	None	None	None
Rusheenduff Lough	None	None	None	None	None
Ross Lake And Woods	Potential Impact	Potential Impact	Potential Impact	Potential Impact	Potential Impact
Rosturra Wood	None	None	None	N/A	N/A
Termon Lough	None	None	None	N/A	N/A
Lough Cahasy, Lough Baun And Roonah Lough	None	None	None	N/A	N/A
Mocorha Lough	None	None	None	N/A	N/A
Castlesampson Esker	None	None	None	N/A	N/A
Four Roads Turlough	None	None	None	N/A	N/A
Liskeenan Fen	None	None	None	N/A	N/A
Lough Carra/Mask	None	None	None	None	None

Complex					
Pilgrim'S Road Esker	None	None	None	N/A	N/A
Glendree Bog	None	None	None	N/A	N/A
Sonnagh Bog	None	None	None	N/A	N/A
East Burren Complex	None	None	None	N/A	N/A
Mweelrea/Sheeffry/Erriff Complex	None	None	None	None	None
Maumturk Mountains	Potential Impact	Potential Impact	Potential Impact	N/A	N/A
The Twelve Bens/Garraun Complex	None	None	None	None	None
Connemara Bog Complex	None	Potential Impact	Potential Impact	Potential Impact	Potential Impact
Slyne Head Peninsula	None	None	None	None	None
Corliskea/Trien/Cloonfelliv Bog	None	None	None	N/A	N/A
Kilkieran Bay And Islands	Potential Impact	Potential Impact	Potential Impact	Potential Impact	Potential Impact
Lough Coy	None	None	None	N/A	N/A
Barnahallia Lough	None	None	None	None	None
Lough Nageeron	None	None	None	None	None
Pollagoona Bog	None	None	None	N/A	N/A

Murvey Machair	None	None	None	None	None
Tully Lough	None	None	None	None	None
Newgrove House	N/A	N/A	N/A	None	None
Lower River Shannon	None	None	None	None	None
Gortacarnaun Wood	None	None	None	None	None
Drummin Wood	None	None	None	N/A	N/A
Glenloughaun Esker	None	None	None	N/A	N/A
Killeglan Grassland	None	None	None	N/A	N/A
Lough Derg, North-East Shore	None	None	None	N/A	N/A
Ardrahan Grassland	None	None	None	N/A	N/A
Old Farm Buildings, Ballymacrogan	None	None	None	None	None
Ballycullinan, Old Domestic Building	None	None	None	None	None
Toonagh Estate	None	None	None	None	None
Kingstown Bay	None	None	None	N/A	N/A
Carrowbaun, Newhall And Ballylee Turloughs	None	None	None	N/A	N/A
Cahermore Turlough	None	None	None	N/A	N/A
Ballinduff Turlough	None	None	None	N/A	N/A

Williamstown Turloughs	None	Potential Impact	Potential Impact	N/A	N/A
River Moy	None	None	None	N/A	N/A
Slieve Bernagh Bog	None	None	None	None	None
Old Domestic Buildings, Rylane	N/A	N/A	N/A	None	None
Cregg House Stables, Crusheen	None	None	None	None	None
Kildun Souterrain	None	None	None	None	None
Drumalough Bog	None	None	None	N/A	N/A
Ballynamona Bog And Corkip Lough	None	None	None	N/A	N/A
Camderry Bog	None	None	None	N/A	N/A
Curraghlehanagh Bog	None	None	None	N/A	N/A
Monivea Bog	None	Potential Impact	Potential Impact	N/A	N/A
Redwood Bog	None	None	None	N/A	N/A
Ardgraigue Bog	None	None	None	N/A	N/A

Table 2-6: Potential Changes to SPAs arising from the Draft WES

SPA Site Name	Physical Loss	Physical Change	Interference with Key Relationship	Disturbance to Key Species	Reduction in Species Density

			s		
Inner Galway Bay	None	Potential Impact	Potential Impact	Potential Impact	Potential Impact
Lough Corrib	None	Potential Impact	Potential Impact	Potential Impact	Potential Impact
Lough Cutra	None	None	None	None	None
Lough Derg (Shannon)	None	None	None	None	None
Lough Mask	None	None	None	None	None
High Island (Galway)	None	None	None	None	None
Lough Scannive	None	None	None	None	None
Rahasane Turlough	None	Potential Impact	Potential Impact	Potential Impact	Potential Impact
Middle Shannon Callows	None	None	None	None	None
River Suck Callows	None	None	None	None	None
Coole-Garryland	None	Potential Impact	Potential Impact	Potential Impact	Potential Impact
Slyne Head Islands	None	None	None	None	None
Lough Rea	None	Potential Impact	Potential Impact	Potential Impact	Potential Impact
Cregganna Marsh	None	Potential Impact	Potential Impact	Potential Impact	Potential Impact

Slieve Aughty Mountains	None	Potential Impact	Potential Impact	Potential Impact	Potential Impact
Cruagh Island	None	None	None	None	None
Cliffs of Moher	None	None	None	None	None
Ballyallia Lough	None	None	None	None	None
Lough Carra	None	None	None	None	None
Crosslough (Killadoon)	None	None	None	None	None
Mongan Bog	None	None	None	None	None
River Little Brosna Callows	None	None	None	None	None
Middle Shannon Callows	None	None	None	None	None
All Saints Bog	None	None	None	None	None
Dovegrove Callows	None	None	None	None	None
Lough Ree	None	None	None	None	None
Bellanagare Bog	None	None	None	None	None
Lough Croan Turlough	None	None	None	None	None
Four Roads Turlough	None	None	None	None	None

2.6 Summary of Screening Results

The likely significant effects that will arise from the adoption of the WES have been assessed in the context of a number of potential effects e.g. physical loss, physical

disturbance etc. that could affect the integrity of N2K sites. The results of this assessment are presented in *Tables 2.7 and 2.8*. These tables show that of the 132 SACs and 28 SPAs included in the Screening Assessment 20 SACs and 7 SPAs are at risk of experiencing likely significant effects as a result of the adoption of the WES. *Table 2.7* presents a summary list of these sites and the reasons why they are at risk of experiencing likely significant effects. These sites and their associated qualifying interests will be brought forward for Stage 2 Appropriate Assessment.

Table 2-7: N2K Sites Brought Forward for Stage 2 Appropriate Assessment

SAC	Reason for Inclusion
Castletaylor Complex	This SAC is designated for the occurrence of qualifying habitats dependent upon hydrological processes and sensitive to any disturbance to these processes. As this SAC is located within 500m of an Area Open for Consideration, wind energy development could pose a risk to hydrological processes for which qualifying habitats are dependent.
Croaghill Turlough	This SAC is designated for the occurrence of qualifying habitats dependent upon hydrological processes and is sensitive to any disturbance to these processes. As this SAC bounds an Area Open for Consideration, wind energy development could pose a risk to hydrological processes for which qualifying habitats are dependent.
Galway Bay	This SAC is designated for the occurrence of qualifying habitats dependent upon hydrological processes and is sensitive to any disturbance to these processes. As this SAC is located within 2.5km of an area zoned AIP and bounds an Area Open for Consideration, wind energy development could pose a risk to hydrological processes for which qualifying habitats are dependent.
Kilsallagh Bog	This SAC is designated for the occurrence of qualifying habitats

	dependent upon hydrological processes and is sensitive to any disturbance to these processes. As this SAC bounds an Area Open for Consideration, wind energy development could pose a risk to hydrological processes for which qualifying habitats are dependent.
Levally Lough	This SAC is designated for the occurrence of qualifying habitats dependent upon hydrological processes and is sensitive to any disturbance to these processes. As this SAC bounds an Area Open for Consideration, wind energy development could pose a risk to hydrological processes for which qualifying habitats are dependent.
Lisnageeragh Bog and Ballinastack Turlough	This SAC is designated for the occurrence of qualifying habitats dependent upon hydrological processes and is sensitive to any disturbance to these processes. As this SAC bounds an Area Open for Consideration, wind energy development could pose a risk to hydrological processes for which qualifying habitats are dependent.
Lough Corrrib	This SAC is designated for the occurrence of qualifying habitats and species that are dependent upon a number of key relationships such as hydrological processes and good ecological status in waterbodies and are sensitive to any perturbations to these relationships. As this SAC is located within 1km of a Strategic Area and bounds both areas zoned as AIP and Areas Open for Consideration, wind energy development could pose a risk to the key relationships that maintain the conservation status of qualifying habitats and species.
Lough Lurgeen Bog/Glenamaddy Turlough	This SAC is designated for the occurrence of qualifying habitats dependent upon hydrological processes and is sensitive to any disturbance to these processes. As this SAC bounds an Area Open for Consideration, wind energy development could pose a risk to hydrological processes for which qualifying habitats are dependent.

Lough Rea	This SAC is designated for the occurrence of a qualifying habitat that is dependent upon its relationship with hydrological processes and good ecological status in waterbodies and is sensitive to any disturbance to these relationships. As this SAC bounds an Area Open for Consideration, wind energy development could pose a risk to these relationships for which qualifying habitats are dependent.
Rahasane Turlough	This SAC is designated for the occurrence of qualifying habitats dependent upon hydrological processes and is sensitive to any disturbance to these processes. As this SAC bounds an Area Open for Consideration, wind energy development could pose a risk to hydrological processes for which qualifying habitats are dependent.
Rosroe Bog	This SAC is designated for the occurrence of qualifying habitats dependent upon hydrological processes and is sensitive to any disturbance to these processes. As this SAC bounds an Area Open for Consideration, wind energy development could pose a risk to hydrological processes for which qualifying habitats are dependent.
Shankill West Bog	This SAC is designated for the occurrence of qualifying habitats dependent upon hydrological processes and is sensitive to any disturbance to these processes. As this SAC bounds an Area Open for Consideration, wind energy development could pose a risk to hydrological processes for which qualifying habitats are dependent.
Lough Fingall Complex	This SAC is designated for the occurrence of qualifying habitats that are dependent upon a key relationship with hydrological processes and the maintenance of suitable breeding sites and habitat connectivity for qualifying species. As this SAC bounds an Area Open for Consideration, wind energy development could pose a risk to the key relationships for which qualifying habitats and species are dependent.

Kiltiernan Turlough	This SAC is designated for the occurrence of a qualifying habitat dependent upon hydrological processes and is sensitive to any disturbance to these processes. As this SAC is located within 500m of an Area Open for Consideration, wind energy development could pose a risk to hydrological processes for which qualifying habitats are dependent.
Ross Lake and Woods	This SAC is designated for the occurrence of qualifying habitats and species that are dependent upon key relationships with hydrological processes, the good ecological status of waterbodies and the maintenance of suitable breeding sites and habitat connectivity. As this SAC is located within 1km of a Strategic Area and 3km of areas zoned as AIP and Areas Open for Consideration wind energy development could pose a risk to the key relationships for which qualifying habitats and species are dependent.
Maumturk Mountains	This SAC is designated for the occurrence of qualifying habitats that are dependent upon a key relationship with hydrological processes and is sensitive to any perturbations to these processes. As this SAC is located within 500m of an area zoned AIP, wind energy development could pose a risk to the hydrological processes for which qualifying habitats are dependent.
Connemara Bog Complex	This SAC is designated for the occurrence of qualifying habitats and species that are dependent upon a number of key relationships such as hydrological processes and good ecological status in waterbodies and are sensitive to any perturbations to these relationships. As this SAC bounds a Strategic Area, areas zoned as AIPs and Areas Open for Consideration, wind energy development could pose a risk to the key relationships that maintain the conservation status of qualifying habitats and species.

Williamstown Turlough	This SAC is designated for the occurrence of a qualifying habitat dependent upon hydrological processes and is sensitive to any disturbance to these processes. As this SAC bounds an Area Open for Consideration, wind energy development could pose a risk to hydrological processes for which qualifying habitats are dependent.
Monivea Bog	This SAC is designated for the occurrence of a qualifying habitat dependent upon hydrological processes and is sensitive to any disturbance to these processes. As this SAC bounds an Area Open for Consideration, wind energy development could pose a risk to hydrological processes for which qualifying habitats are dependent.
Kilkieran Bay and Islands	This SAC is designated for the occurrence of qualifying habitats dependent upon hydrological processes and is sensitive to any disturbance to these processes. As this SAC is located within 2.5km of an area zoned AIP and bounds an Area Open for Consideration, wind energy development could pose a risk to hydrological processes for which qualifying habitats are dependent.
SPA	
Inner Galway Bay	This SPA is located within 5km of an area zoned AIP and is bounded by an Area Open for Consideration. Wind energy developments in these areas located within close proximity to qualifying bird species could pose a risk to the conservation status of these species by virtue of the potential effects identified in Table 2.6.
Lough Corrib	This SPA is located within 5km of a Strategic Area and Area Open for Consideration and 500m of an area zoned as AIP. Wind energy developments in these areas located within close proximity to qualifying bird species could pose a risk to the conservation status

	of these species by virtue of the potential effects identified in Table 2.6.
Rahasane Turlough	This SPA is bounded by an Area Open for Consideration and 500m of an areas zoned as AIP. Wind energy developments in this area located within close proximity to qualifying bird species could pose a risk to the conservation status of these species by virtue of the potential effects identified in Table 2.6.
Coole-Garryland	This SPA is located within 5km of an Area Open for Consideration. Wind energy developments in this area located within close proximity to qualifying bird species could pose a risk to the conservation status of these species by virtue of the potential effects identified in Table 2.6.
Lough Rea	This SPA is located within 5km of an Area Open for Consideration. Wind energy developments in this area located within close proximity to qualifying bird species could pose a risk to the conservation status of these species by virtue of the potential effects identified in Table 2.6.
Cregganna Marsh	This SPA is located within 5km of an Area Open for Consideration. Wind energy developments in this area located within close proximity to qualifying bird species could pose a risk to the conservation status of these species by virtue of the potential effects identified in Table 2.6.
Slieve Aughty Mountains	This SPA is located within 5km of an Area Open for Consideration. Wind energy developments in this area located within close proximity to qualifying bird species could pose a risk to the conservation status of these species by virtue of the potential effects identified in Table 2.6.

3 Stage 2: Appropriate Assessment

Twenty SACs and seven SPAs have been brought forward for Stage 2 Appropriate Assessment. Of these N2K sites, fourteen SACs and four SPAs have been brought forward due to the potential effects associated with wind energy development in Areas Open for Consideration. The Draft WES outlines a target of 30MW of wind energy within the entire area designated as Areas Open for Consideration. In light of the large area of land zoned as Areas Open for Consideration, this target can be achieved with the installation of a very low number and density of wind turbines (15 2MW turbines will achieve this target). Considering such a low number and density of turbines over such a relatively large area, it is likely that of each of the N2K sites brought forward, due to its proximity to this zoning, to be affected will be reduced to the extent that LSEs will be avoided at most of these sites. However, a very precautionary approach with regard to N2K sites in close proximity to Areas Open for Consideration has been adopted because the specific siting of turbines within this zoning is not defined by the Draft WES. Therefore all N2K sites bounded by, or occurring in close proximity to, wind energy areas are examined as part of this Stage 2 Appropriate Assessment.

3.1 Description of N2K Sites Brought forward for Stage 2

3.1.1 SACs

Turloughs and mires represent the principal Annex 1 qualifying habitats for which SACs brought forward to Stage 2 have been designated. Of the twenty SACs, eighteen are designated for the occurrence of turloughs and/or mire and heath habitats. Of these sites, ten contain turloughs as qualifying interests while five are designated solely for the occurrence of turloughs. Thirteen sites are designated for the occurrence of mire and heath habitats while four are designated solely for the occurrence of mire habitats. The following Annex 1 Habitats are included under the heading of “mire and heath habitats”:

Mires -

- Active raised bog

- Degrade raised bog
- Blanket bog (* if active)
- Depression on peat substrates of the Rhynchosporion
- Transition mires and quaking bogs
- Molinia meadows on calcareous, peaty or clay/silt laden soils
- Bog woodland
- Northern Atlantic wet heath

Heaths -

- European dry heaths
- Molinia meadows on calcareous, peaty or clay/silt laden soils
- Alpine and boreal heaths
- Juniperus communis formations on heaths or calcareous grassland

One site, Lough Rea SAC, is designated solely for an Annex 1 listed waterbody (i.e. oligotrophic waters with Chara spp.), while freshwater-dependent habitats are included amongst the qualifying interests for seven SACs. *Table 3.1* provides details of the qualifying interests for each of the twenty SACs brought forward to Stage 2.

Besides turloughs and mire habitats fifteen other Annex 1 habitats are listed as qualifying habitats for the twenty SACs brought forward. These qualifying habitats have been divided into three broad categories as follow:

1. Freshwater-dependent Habitats:
    - Watercourses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
    - Natural dystrophic lakes and ponds
    - Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.

- Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
- Petrifying springs with tufa formation (Cratoneurion)
- Alkaline fens
- Calcareous fens with Cladium mariscus and species of the Caricion davallianae*

2. Coastal and Marine Habitats
    - Coastal lagoons
    - Mudflats and sandflats not covered by seawater at low tide
    - Large shallow inlets and bays
    - Salicornia and other annuals colonising mud and sand
    - Mediterranean salt meadows (*Juncetalia maritimi*)
    - Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
    - Reefs
3. Terrestrial Habitats not dependent on freshwater
    - Limestone pavements
    - Semi-natural dry grassland and scrub facies on calcareous substrates (Festuco-Brometalia)
    - Old sessile oak woods with Ilex and Blechnum in the British Isles
    - Siliceous rocky slopes with chasmophytic vegetation
    - Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*)

None of the twenty SACs are designated exclusively for the occurrence of Annex II species, however *Table 3.1* lists the SACs that are designated for supporting qualifying Annex II species.

Table 3-1: SACs and Qualifying Interests

SAC	Site Code	Turloughs	Mire & Heath Habitats	Freshwater Habitats	Coastal & Marine Habitats	Other Terrestrial Habitats	Qualifying Species
Casteletaylor Complex	242	✓	✓			✓	
Croaghill Turlough	255	✓					
Galway Bay	268	✓	✓	✓	✓	✓	Grey seal Otter
Kilsallagh Bog	285		✓				
Levally Lough	295	✓					
Lisnageeragh Bog	296	✓	✓				
Lough Corrib	297		✓	✓		✓	Atlantic Salmon Brook Lamprey Lesser Horseshoe Bat Otter White-clawed Crayfish Freshwater Pearl Mussel Slender Naiad Varnished

							Hook-moss
Lough Lurgeen	301	✓	✓				
Lough Rea	304			✓			
Rahasane Turlough	322	✓					
Rosroe Bog	324		✓				
Shankill West Bog	326		✓				
Lough Fingall Complex	606	✓	✓	✓		✓	Lesser Horseshoe Bat
Kiltiernan Turlough	1285	✓					
Ross Lake and Woods	1312		✓	✓			Lesser Horseshoe Bat Otter
Maumturk Mountains	2008		✓	✓		✓	
Connemara Bog Complex	2034		✓	✓		✓	Atlantic Salmon Otter Marsh Fritillary Slender Naiad
Kilkieran Bay and Islands	2111				✓	✓	Otter

							Grey seal Slender Naiad
Williamstown Turlough	2296	✓					
Monivea Bog	2352		✓				

3.1.2 SPAs

Of the seven SPAs brought forward six are designated for supporting migratory and/or wetland bird species. The Sliabh Aughty Mountains SPA, designated for the occurrence of hen harriers and merlin, is the only SPA not designated for migratory or wetland species.

3.2 Assessment of Impacts

As the potential impact of the WES depends on whether the qualifying interests, for which N2K sites have been designated, are adversely affected the remainder of this Stage 2 Assessment focuses on impacts to these qualifying interests.

This assessment examines the potential effects to habitats and species separately. As no N2K sites are located within wind energy areas, no direct impacts associated with physical loss of Annex 1 habitats or supporting habitats of Annex listed species (including birds) will occur within the N2K site boundaries. Thus the assessment of potential affects focuses on examining the potential for indirect impacts or impacts outwith N2K sites to affect the conservation status of qualifying interests. As many of the impacts associated with the potential effects arising from the Draft WES will be similar for a range of qualifying habitats, the assessment of impacts examines these effects with reference to the broad categories of qualifying habitats as outlined in *Section 3.1.1* above. Where impacts that are specific to an individual qualifying habitat are identified these will also be outlined under the relevant habitat category.

With regard to species, the assessment of impacts has been undertaken examining whether or not indirect effects will have the potential to result in fragmentation of a species range, or perturbations to key habitats and/or reduction in densities of qualifying species.

Where adverse affects are identified mitigation measures have been proposed to eliminate the impact or reduce it to a level that will not result in likely significant effects.. The mitigation of likely significant effects is in line with the EC guidance by following a mitigation hierarchy that begins with avoidance.

Where project-level developments and associated activities in wind energy areas presents a risk of likely significant effects to qualifying habitats or species a flexible approach will be adopted by the WES. A detailed investigation of the risks (i.e. project-level Appropriate Assessment) and identification of mitigation measures to avoid likely significant effects will be undertaken at the project level for proposed developments in such areas. Where the risk of likely significant effects still exists following detailed appropriate assessment and mitigation at the project level, the WES will not support the development of such projects.

This flexible and precautionary approach will ensure that the implementation of the WES will not result in risks to qualifying habitats/species or the integrity of N2K sites.

In addition to this precautionary approach that prioritises avoidance of likely significant effects, generic mitigation measures have been outlined to further ensure that project level developments and associated activities are underpinned from the outset by an approach that aims to avoid significant effects to Natura 2000 Sites.

3.2.1 Assessment of Impacts to Qualifying Habitats

3.2.1.1 Turloughs

(i) Draft WES & Turloughs

Turloughs are a designated qualifying interest of ten SACs as outlined in *Table 3.1*. With the exception of Castletaylor Complex SAC all Stage 2 SACs containing turloughs

are bounded by Areas Open for Consideration. The Castletaylor Complex is located within 500m of an Area Open for Consideration. Furthermore the Galway Bay Complex is located within 2.5km of an area zoned as Acceptable in Principle.

(ii) Conservation Objectives for Turloughs

The conservation objective for turloughs under the Habitats Directive is to achieve and maintain these habitats at favourable conservation status.

The Water Framework Directive (WFD) and relevant national legislation oblige EU member states to achieve at least good ecological status in all waters by 2015. As turloughs are defined as a topographic depression in karst which is intermittently inundated on an annual basis, mainly from groundwater, and which has a substrate and/or ecological communities characteristic of wetlands it is a waterbody that comes under the remit of the WFD. One of the core environmental objectives of the WFD is to ensure that all protected areas achieve compliance with relevant standards and objectives by 2015. As such the WFD obliges member states to achieve and maintain favourable conservation status for turloughs.

(iii) Current Status of Turloughs within the Study Area

No specific assessment of the conservation status of turloughs occurring in the relevant SACs listed in Table 3.1 has been published to date. However an assessment of the conservation status of turloughs has been undertaken on a national basis under Article 17 of the Habitats Directive.

The hydrology of a turlough is considered to be the principal process that influencing turlough ecology and over 30% of turloughs in Ireland have been damaged by drainage. Currently the range and area of this habitat are considered to be favourable but the specific structure and functions are unfavourable and the overall conservation assessment for this habitat is unfavourable.

(iv) Current threats to Turloughs

The main pressures and threats to turloughs, as identified in the Article 17 assessment report, include drainage, overgrazing, eutrophication and peat cutting, marl extraction and quarrying.

(v) Potential Impacts to Turloughs arising from the Adoption of the Draft WES

The development of wind farms adjacent to turloughs will have the potential to alter groundwater drainage patterns through inappropriate turbine excavations.

Developments in areas adjacent to turloughs will have the potential to contaminate groundwaters associated with turlough habitats through the accidental release of pollutants such as hydrocarbons and cement from construction areas. In addition, during the construction phase activities, areas being excavated or disturbed for the installation of turbines and associated infrastructure will have the potential to result in increases sedimentation within groundwaters feeding turloughs. The influx of contaminants and the deposition of sediments on turlough substrates will have the potential to affect wetland flora and fauna assemblages associated with turlough habitats.

(vi) Mitigation Measures

Given the level of uncertainty associated with the location of future wind energy developments in wind energy areas all proposals should be assessed for their likely significant effects to N2K sites and where necessary a habitats directive assessment should be completed in line with relevant guidelines.

Wind energy developments will not occur immediately adjacent to SACs designated for the occurrence of turloughs. A suitable buffer distance will be installed between turloughs and boundaries of proposed wind energy developments. These suitable buffer distances will be agreed with the NPWS during the design of project-level windfarm developments. Detailed hydrology and hydro-geological assessments of the effects of excavations associated with turbine installations will be undertaken as part of the project-level assessment. Burrow pits will not be permitted in areas that will have the potential to adversely impact on hydrology of turloughs.

(vii) Can Likely Significant Effects be Avoided?

Likely significant effects to Turloughs can be avoided provided that:

- suitable buffer areas are established between turloughs and associated surface/ground waters and proposed wind energy developments; and
- the measures outlined above to avoid hydrological/hydrogeological impacts are implemented during wind energy developments;

3.2.1.2 Mire Habitats

(i) Draft WES & Mire Habitats

Mire habitats are designated qualifying interest for thirteen of the SACs brought forward to Stage 2. These habitats are dominated by raised bog to the east of the study area and blanket bog habitat to the west. Other Annex 1 habitats which occur as complex mosaics with raised bogs and blanket bogs include depressions of the Rhynchosporion and transitional mires and quaking bogs. A small example of bog woodland is associated with the Lough Corrib SAC. The types of substrates associated with molinia meadows depends on the location of the relevant SACs with those occurring to the west generally being associated with peaty substrates while those associated with SACs located in the east of the study area being associated with calcareous substrates. Wet heath habitats are generally associated with mountainous areas and are qualifying habitats for the Maumturks Mountains SAC and Connemara Bog Complex. Wet heath is listed as a mire habitat rather than heath habitat due to its floristic affinities with mire vegetation (Elkington *et al.* 2001). European dry heaths occur within the Connemara SAC and are generally restricted to areas of shallower peat on freer draining slopes.

With the exception of the Maumturk Mountains SAC, all Stage 2 SACs containing mire habitats are located next to Areas Open for Consideration. In addition to this, Lough Corrib SAC is bounded by an area zoned as Acceptable in Principle and is located 1km from a Strategy Area, while Connemara Bog Complex is bounded by all three wind energy areas (i.e. Strategic Area, Acceptable in Principle and Area Open for

Consideration). As for the Maumturk Mountains SAC, this is located within 500m of an area zoned as Acceptable in Principle.

(ii) Conservation Objectives for Mire Habitats

The conservation objective for mire and heath habitats under the Habitats Directive is to achieve and maintain these habitats at favourable conservation status.

(iii) Current Status of Mire Habitats within the Study Area

No specific assessment of the conservation status of mire and heath habitats occurring in the relevant SACs listed in *Table 3.1* has been published to date. However an assessment of the conservation status of these habitats has been undertaken on a national basis under Article 17 of the Habitats Directive. *Table 3.2* outlines the results of this assessment with respect to each of the mire and heath habitats occurring as qualifying interests for Stage 2 SACs.

Table 3-2: Conservation Status of Mire and Heath Habitats

Annex 1 Habitat Type	Range	Area	Specific Structure and Function	Future Prospects	Overall Conservation Status
Active raised bog	Bad	Bad	Bad	Bad	Bad
Degrade raised bog	Favourable	Favourable	Inadequate	Inadequate	Inadequate
Blanket bog	Favourable	Bad	Unfavourable Inadequate	Bad	Bad
Depression of the Rhynchosporion	Favourable	Favourable	Favourable	Favourable	Favourable
Transition mires and quaking bogs	Favourable	Favourable	Unfavourable Bad	Unfavourable Bad	Unfavourable Bad
Molinia meadows	Favourable	Bad	Bad	Bad	Bad

Bog woodland	Favourable	Inadequate	Inadequate	Inadequate	Inadequate
Northern Atlantic wet heath	Favourable	Unknown	Unfavourable Bad	Unfavourable Bad	Unfavourable Bad
European dry heaths	Favourable	Favourable	Inadequate	Inadequate	Inadequate
Alpine and boreal heaths	Favourable	Unfavourable Inadequate	Unfavourable Inadequate	Unfavourable Inadequate	Unfavourable Inadequate
Juniperus communis formations	Favourable	Unfavourable Inadequate	Unfavourable Inadequate	Unfavourable Inadequate	Unfavourable Inadequate

(iv) Current threats to Mire Habitats

The main pressures and threats to mire and heath habitats, as identified in the Article 17 Conservation Status Assessment report, include deterioration of hydrological conditions, drainage, forestry, overgrazing, peat cutting and agricultural reclamation and intensification.

(v) Potential Impacts to Mire Habitats arising from the Adoption of the Draft WES

The excavation of soils and subsoils for the turbine base will have the potential to alter the hydrology of sensitive mire habitats (i.e. raised and blanket bog, depressions of the Rhynchosporion, transitional and quaking bog, wet heaths) adjacent to such activities by reducing the water levels associated with these mire habitats. The extent of such drainage effects are dependent on the hydraulic conductivity of the surrounding mire habitat and could range from a relatively discrete area of 2m up to 50m from the excavation area (Nayak, 2008). The draw-down of water from surrounding peatlands can also lead to a destabilisation and desiccation of the surrounding peatland. A de-stabilisation of peatland will increase the risk of peat slippage which can occur on gentle as well as steep slopes. The vast majority of past peat failures in Ireland have

occurred on slopes between 4° and 8° (Boylan *et al.* 2008). A peat slip event will have the potential to cause wide-ranging and significant effects on mire habitats, water quality, and aquatic fauna downstream of the slip location.

The release of highly alkaline cement-based products associated with turbine bases and access tracks could have the potential to adversely affect the ecology of mire habitats. Mire habitats are oligotrophic and are dependent on hydrochemistry and biogeochemistry of low pH values (generally less than pH 4.5). Inputs of highly alkaline water derived from cement-product runoff will have the potential to damage Sphagnum and later the vegetation composition of mire habitats (Bridgham *et al*, 1996).

Furthermore where highly alkaline material is used for turbine bases and access tracks, percolating waters can form alkaline leachate derived from this material. The percolation of such leachate into the native substrate adjacent to these areas can alter the hydrochemistry of sub-soil waters by elevating pH levels. Changes to the pH of waters associated with mire habitats will have the potential to result in changes to the vegetation composition of this habitat and ultimately depletion in typically peat forming species.

The movements of vehicles and machinery through proposed wind farm sites on peatlands during the construction stage will have the potential to result in the compaction of upper peat surfaces which can lead to the destruction of areas of regenerating peat surfaces in blanket bog habitats

(vi) Mitigation Measures

Given the level of uncertainty associated with the location of future wind energy developments in wind energy areas all proposals should be assessed of their likely significant effects to N2K sites and where necessary a Habitats Directive Assessment should be completed in line with relevant guidelines.

A minimum buffer zone of 50m should be implemented between wind energy areas and the boundaries of SACs designated for the occurrence of mire and heath habitats.

Areas of deep and active peat associated with mire habitats should be avoided by the design of appropriate wind farm layouts. Detailed peat slip risk assessments should be carried out for all proposed wind energy developments in areas where peat substrates occur.

Construction machinery should be restricted to site roads and designated access routes to the turbine areas. Machinery should not be allowed to access, park or travel over areas outside development construction zones.

Peat excavated during construction activity should not be stored (temporarily or otherwise) on areas of adjacent mire habitats or near flushes, drains or watercourses. Temporary storage of spoil material excavated during the construction phase of proposed wind energy developments should be stored at suitable locations away from surface watercourses. All spoil material excavated during the construction phase should be reinstated following the completion of the construction phase of a proposed development.

No carbonate-rich material should be used for the construction of access tracks or turbine foundations in mire habitats. Wherever possible, aggregates of similar chemistry as site bedrock should be used for road construction and turbine foundations.

Where wind farm developments are undertaken in area of modified or degraded peatland habitat, where appropriate and in agreement with the NPWS, a peatland conservation and management plan should be implemented as part of the proposed development. This conservation and management plan will be developed in line with the IPCC Peatlands 2020 Conservation Plan.

- A minimum buffer area of 50m is established between wind energy developments and qualifying mire and heath habitats.
- Deep and active peat bog habitats are avoided during wind energy design layouts;
- Suitable materials are used during the construction of wind energy projects; and

- The sensitive hydrology of mire habitats in particular and heaths occurring in Natura 2000 Sites adjacent to any proposed wind energy project is maintained.

3.2.1.3 Water-dependent Habitats

(i) Draft WES & Freshwater-dependent Habitats

Water-dependent habitats are designated qualifying interest for seven of the SACs brought forward to Stage 2. These habitats are dominated by open waterbodies such as oligotrophic lakes and watercourses, with fens also occurring. With the exception of Ross Lake and Woods and Maumturk Mountains SACs, all Stage 2 SACs containing water-dependent habitats are located next to Area Open for Consideration. In addition to this, Lough Corrib SAC is bounded by an area zoned as Acceptable in Principle and is located 1km from a Strategic Area, while Connemara Bog Complex is bounded by all three wind energy areas (i.e. Strategic Area, Acceptable in Principle and Area Open for Consideration). As for the Ross Lake and Woods and Maumturk Mountains SACs, these are located within 3km and 500m respectively of areas zoned as Acceptable in Principle. In addition to this, Ross Lake and Woods is also located within 1km of a Strategic Area.

(ii) Conservation Objectives for Freshwater-dependent Habitats

The conservation objective for water-dependent habitats under the Habitats Directive is to achieve and maintain these habitats at favourable conservation status. Other objectives for ensuring the favourable conservation status of waterbodies (such as oligotrophic lakes, dystrophic lakes and watercourses) have also been set out by relevant legislation transposing the Water Framework Directive. The Water Framework Directive obliges EU member states to achieve at least good ecological status in all waters by 2015. One of the core environmental objectives of the directive is to ensure that all protected areas achieve compliance with relevant standards and objectives by 2015. Consequently, the conservation objectives for these habitats under the Habitats

Directive also form part of the WFD's River Basin Management Plan's programme of measures which must be achieved by 2015.

(iii) Current Status of Freshwater-dependent Habitats

No specific assessment of the conservation status of water-dependent habitats occurring in the relevant SACs listed in *Table 3.1* has been published to date. However an assessment of the conservation status of these habitats has been undertaken on a national basis under Article 17 of the Habitats Directive. *Table 3.2* outlines the results of this assessment with respect to each of the mire and heath habitats occurring as qualifying interests for Stage 2 SACs.

Table 3-3: Conservation Status of Water-dependent Habitats

Annex 1 Habitat Type	Range	Area	Specific Structure and Function	Future Prospects	Overall Conservation Status
Watercourse of plain to montane levels	Favourable	Favourable	Unfavourable Bad	Unfavourable Bad	Unfavourable Bad
Natural dystrophic lakes and ponds	Favourable	Unknown	Unfavourable Bad	Unfavourable Bad	Unfavourable Bad
Hard oligo-mesotrophic waters with Chara spp.	Favourable	Favourable	Unfavourable Bad	Unfavourable Bad	Unfavourable Bad
Oligotrophic waters containing very few minerals	Favourable	Favourable	Unfavourable Bad	Unfavourable Bad	Unfavourable Bad
Petrifying springs	Favourable	Favourable	Unfavourable Bad	Unfavourable Bad	Unfavourable Bad

Alkaline fens	Favourable	Favourable	Unfavourable Bad	Unfavourable Bad	Unfavourable Bad
Calcareous fens with Cladium mariscus	Favourable	Favourable	Unfavourable Bad	Unfavourable Bad	Unfavourable Bad

(iv) Current threats to Freshwater-dependent Habitats

The main pressures and threats to the water-dependent habitats, as identified in the Article 17 assessment report include drainage, forestry, overgrazing, peat cutting and agricultural reclamation and intensification.

(v) Potential Impacts to Freshwater-dependent Habitats arising from the Adoption of the Draft WES

Due to the proximity of wind energy areas to the SAC's that include water-dependent habitats as qualifying interests, wind energy developments will have the potential to adversely affect these habitats through indirect impacts associated with a deterioration in water quality. These impacts could arise as a result of:

- Increases in sediment loading to watercourses and subsequent movement of sediment throughout the catchment and settlement onto river beds resulting in alterations to aquatic habitats.
- Changes in watercourse nutrient status. With regard to wind energy developments this impact is most likely to occur where developments require the clear-felling of plantation forestry adjacent to, or within the catchment of qualifying waterbody habitats.
- Pollution events associated with the migration of toxic substances associated with the construction phase of wind energy developments to watercourses.

(vi) Mitigation Measures

Given the level of uncertainty associated with the location of future wind energy developments in wind energy areas all proposals should be assessed of their likely significant effects to N2K sites and where necessary a project-level Habitats Directive Assessment should be completed in line with relevant guidelines.

Any wind energy proposal hydrologically link to water-dependent qualifying interest of N2K sites should be accompanied by a detailed Surface Water Management Plan (SWMP). The objective of the SWMP will be to prevent pollution to waterbodies and water-dependent habitats such as fens.

Wind energy development layouts should avoid areas of deep peat and active bog. Slopes in excess of 15° will be avoided. The implementation of these measures will reduce the risk of peat slippage and the mass movement of sediment to watercourses.

Construction areas will be minimised to reduce the area of exposed ground occurring during the construction phase.

Buffer zones of a minimum of 50m from higher-order streams and 150m from lower-order watercourses should be adhered to during the design of windfarm development layouts. Buffer zones should be maintained in all instances except where watercourse crossings are required along proposed access track routes.

No construction activities should be undertaken at watercourse crossing in wet weather conditions.

All watercourse crossings should use clear span, bottomless, arch or oversize culverts.

Forest clear-felling for wind energy developments in areas hydrologically linked to water-dependent qualifying habitats should follow the guidance of the Forest Service and the NPWS.

Disturbance to natural drainage features should be avoided during the construction phase of a wind energy development.

Uncontaminated surface runoff should be diverted away from construction areas through the installation of interceptor drains up-gradient of construction areas.

Suitable prevention measures should be put in place at all times to prevent the release of sediment to drainage waters associated with construction areas and migration to adjacent watercourses. Drainage waters originating in construction areas should be collected in a closed system and treated prior to controlled, diffuse release. Drainage waters from construction areas should be managed through a series of treatment stages that may include swales, check dams and detention ponds along with other pollution control measures such as silt fences and silt mats.

Swales should be used to hold water temporarily and to encourage infiltration/discharge into the ground locally to where the rainfall hits the ground. It is noted that low infiltration rates are associated with peat soils and blanket bog, which dominates the land cover within much of the study area.

Check dams should be placed along swales to settle out silts and reduce flow velocities along with subsequent erosion potential.

Detention ponds will attenuate and treat runoff and should be required for all the turbine locations. These should have permanent open water to minimise the risk of sediment washout. Detention pond side slopes should be constructed at shallow grades such as 1 in 3 side slope. Site drains should not discharge directly into watercourses.

Runoff from excavations should not be pumped directly into watercourses. Where dewatering of excavations is required, water should be pumped to the head of a treatment train in order to receive full treatment prior to re-entry to the natural drainage system.

Dust suppression should be undertaken around construction areas during periods of dry weather. Only clean, settled water should be used for dust suppression.

(vii) Can Likely Significant Effects be Avoided?

Likely significant effects to Water-Dependent habitats can be avoided provided that detailed SWMP's are established for all wind energy projects proposed in areas that present a risk to water-dependent qualifying habitats of N2K Sites. The SWMP's will

include as a minimum the mitigation measures outlined above. The ability of the SWMP to avoid impacts to such qualifying habitats at the project level will form part of the project level Habitats Directive Assessment. Therefore the adequacy of project designed SWMPs to prevent likely significant effects to water dependent habitats will also be assessed prior such developments taking place. No planning approval will be granted to proposed wind energy developments in the event that the project-level HDA cannot rule out the likelihood of significant effects to such habitats occurring.

3.2.1.4 Coastal & Marine Habitats

(i) Draft WES & Coastal & Marine Habitats

Coastal habitats are associated with three SACs – Galway Bay SAC, Connemara Bog Complex SAC and Kilkieran Bay and Islands SAC – brought forward to Stage 2. Galway Bay and Kilkieran Bay and Islands support a range of coastal qualifying habitats. These include coastal lagoons, mudflats, large shallow bays and saltmarshes. In contrast Connemara Bog Complex contains one coastal qualifying habitat, coastal lagoons.

(ii) Conservation Objectives for Coastal & Marine Habitats

The conservation objective for coastal habitats under the Habitats Directive is to achieve and maintain these habitats at favourable conservation status. Other objectives for ensuring the favourable conservation status of coastal habitats have also been set out by relevant legislation transposing the WFD. Consequently the conservation objectives for these habitats under the Habitats Directive also form part of the WFD's River Basin Management Plans programme of measures which must be achieved by 2015.

(iii) Current Status of Coastal & Marine Habitats within the Study Area

With the exception of saltmarsh habitats (Including Atlantic & Mediterranean Saltmarsh and Salicornia flats) no recent and specific assessment of the conservation status of coastal habitats occurring in the relevant SACs listed in *Table 3.1* has been published to date. However an assessment of the conservation status of these habitats has been

undertaken on a national basis under Article 17 of the Habitats Directive. *Table 3.4* outlines the results of this assessment with respect to each of the coastal habitats occurring as qualifying interests for Stage 2 SACs.

Table 3-4: Conservation Status of Water-dependent Habitats

Annex 1 Habitat Type	Range	Area	Specific Structure and Function	Future Prospects	Overall Conservation Status
Coastal Lagoon	Favourable	Unfavourable Inadequate	Unfavourable Bad	Unfavourable Inadequate	Unfavourable Bad
Mudflats and sandflats	Favourable	Favourable	Favourable	Unfavourable Inadequate	Unfavourable Inadequate
Large shallow inlets and bays	Favourable	Favourable	Unknown	Unfavourable Inadequate	Unfavourable Inadequate
Salicornia and other annuals colonizing mud and sand	Favourable	Favourable	Unfavourable Bad	Unfavourable Bad	Unfavourable Bad
Mediterranean salt meadows	Favourable	Favourable	Unfavourable Inadequate	Unfavourable Inadequate	Unfavourable Inadequate
Atlantic salt meadows	Favourable	Unfavourable Inadequate	Unfavourable Inadequate	Unfavourable Inadequate	Unfavourable Inadequate
Reefs	Favourable	Unknown	Unfavourable Inadequate	Unfavourable Inadequate	Unfavourable Inadequate

Detailed assessments of the conservation status of saltmarsh habitats were undertaken during the Saltmarsh Monitoring Programme 2007-2008 (see McCorry & Ryle, 2009 –

Vol. 1 and Vol.3). This Monitoring Programme included site specific saltmarsh surveys and assessments throughout Ireland. The monitoring programme identified eight saltmarsh sites occurring within the Galway Bay SAC and six occurring within the Kilkieran Bay and Islands SAC.

The Galway Bay SAC saltmarshes were dominated by Atlantic Saltmarsh habitats and six of the eight sites included within the SAC were considered to be of unfavourable and Inadequate/Bad conservation status. The two sites (Roscam West & South and Seaweed Point) of favourable conservation status are limited in extent at approximately 3ha in size.

(iv) Current threats to Coastal & Marine Habitats

The main pressures and threats to the coastal habitats, as identified in the Article 17 assessment report, include reclamation, invasion by Spartina swards and over-grazing.

The detailed assessment of saltmarsh sites occurring within the Galway Bay and Kilkieran Bay and Islands SAC identified overgrazing and poaching by cattle and sheep as the main impacts to these habitats. Other common impacts identified during the Monitoring Programme included the infilling of saltmarsh habitat, the development of seawalls which affected the accretion of saltmarsh habitats and disturbance caused by vehicle rutting along saltmarsh tracks.

(v) Potential Impacts to Coastal & Marine Habitats arising from the Adoption of the Draft WES

As outlined above in the assessment of impacts to water-dependent habitats, the construction of wind farms will have the potential to result in increases in sedimentation in watercourses. Increases in sediment transport has the potential to have specific impacts on the mudflat habitats occurring downstream of wind farm developments. Elevated sediment loading arising from watercourses may adversely impact upon key components of this habitat. The deposition of elevated sediment levels on mudflats is known to damage feeding structures (Shin *et al.,* 2002); can smother sediment surfaces, turning underlying sediments anaerobic and suffocating

bivalves (Thrush *et al.,* 2003); and can result in changes to the population dynamics of key species such as bivalves (Norkko *et al.* 2006).

As mentioned in Section 3.2.1.3 the clear-felling of forestry for wind energy developments can result in the mobilisation of nutrient, resulting in a significant increase in the nutrient status of watercourses downstream. While any clear-felling of forestry for wind energy developments will occur at remote distances from coastal habitats, the potential exists, albeit tenuous, for high nutrient waters derived from clear-felling to affect coastal habitats.

The deposition of high nutrient levels from upstream sources to estuaries and mudflat habitats can lead to the excessive growth of alga causing algal mats to dominate surface muds. High nutrient levels in estuarine habitats such as mudflats and estuaries will lead to greater productivity and an increased food resource for bird species. While eutrophic conditions in such habitats are not necessarily considered to be a negative impact for bird species, the development of algal mats result in impacts to the infauna communities of this habitat. Also some research has shown that an initial increase in wader populations as a result of high productivity and the growth of extensive algal mats is followed by a shift in distribution to areas less affected by algal mats (Raffelli, 1999). Algal mats have also been observed to smother the germination and growth of pioneer saltmarsh species such as *Salicornia* species (Boorman, 2003) Thus there remains the potential for increased inputs of nutrients to adversely affect the habitats and distribution of birds associated with mudflat habitats of the Galway Bay and Kiltiernan Bay and Islands SACs.

The inputs of pollutants to estuarine habitats such as mudflats and lagoons can lead to deleterious effects to these habitats. Mudflats are particularly sensitive to pollutants due to the presence of fine grained and cohesive sediments that readily adsorb pollutants onto particles (Boyes & Allen, 2007). Elevated levels of pollutants in mudflat habitats can lead to significant impacts to biota at various trophic levels within the food web supported by the habitat. This includes wading birds which can be negatively impacted by the biomagnifications of pollutants in such mudflat habitats.

(vi) Mitigation Measures

Adherence to the mitigation measures outlined for water-dependent qualifying habitats will ensure that adverse impacts to coastal habitats avoided.

(vii) Can Likely Significant Effects to be Avoided?

As likely significant effects to coastal habitats will arise upstream within terrestrial habitats the avoidance of such impacts is dependent upon avoiding impacts to terrestrial freshwater habitats. As outlined in Section 3.2.1.3 (vii) such affects can be avoided provided that adequate SWMPs are implemented prior to the development of wind energy developments. Furthermore, the WES requirement for project level HDAs to demonstrate that SWMPs and associated mitigation measures adequately protect water-dependent qualifying interests provides additional safeguards against the type of impacts outlined above from occurring.

3.2.1.5 Other Terrestrial Habitats

(i) Draft WES & Other Terrestrial Habitats

Four other Annex 1 qualifying habitats occur within the SACs brought forward to Stage 2. Limestone pavements are qualifying interests of Castletaylor Complex, Lough Corrib and Lough Fingall Complex.

Semi-natural dry grasslands form part of the Castletaylor Complex, Galway Bay, Lough Fingall Complex, and Lough Corrib SAC. Connemara Bog Complex and Lough Corrib are designated for the occurrence of old sessile oak woodlands while the Maumturk Mountains are designated for supporting siliceous rocky slopes.

(ii) Conservation Objectives for Other Terrestrial Habitats

The conservation objective for the other terrestrial habitats as outlined above under the Habitats Directive is to achieve and maintain these habitats at favourable conservation status.

(iii) Current Status of Other Terrestrial Habitats within the Study Area

No specific assessment of the conservation status of the other terrestrial habitats occurring in the relevant SACs listed in *Table 3.1* has been published to date. However an assessment of the conservation status of these habitats has been undertaken on a national basis under Article 17 of the Habitats Directive. *Table 3.5* outlines the results of this assessment with respect to each of the mire and heath habitats occurring as qualifying interests for Stage 2 SACs.

Table 3-5: Conservation Status of Water-dependent Habitats

Annex 1 Habitat Type	Range	Area	Specific Structure and Function	Future Prospects	Overall Conservation Status
Limestone Pavement	Favourable	Unfavourable Inadequate	Unfavourable Inadequate	Unfavourable Inadequate	Unfavourable Inadequate
Semi-natural grasslands	Favourable	Bad	Bad	Bad	Bad
Lowland hay meadows	Bad	Bad	Bad	Bad	Bad
Old sessile oak woodlands	Favourable	Bad	Bad	Bad	Bad
Siliceous rocky slopes with chasmophytic vegetation	Favourable	Unfavourable Inadequate	Unfavourable Inadequate	Unfavourable Inadequate	Unfavourable Inadequate

(iv) Current threats to Other Terrestrial Habitats

The main pressures and threats to these habitats, as identified in the Article 17 assessment report, include inadequate grazing, scrub and invasive species encroachment and inadequate use by humans.

(v) Potential Impacts to Other Terrestrial Habitats arising from the Adoption of the Draft WES

These habitats are not dependent on hydrological processes and are more robust than the habitats previously identified in the above *Sections*, particularly with relation to indirect impacts. These habitats are not likely to experience such effects as habitat fragmentation or degradation, or interference with key relationships such as soil degradation and pollution.

(vi) Mitigation Measures

Adherence to the mitigation measures outlined in other sections of this NIR will ensure that likely significant effects to these habitats are avoided by the implementation of the Draft WES.

(vii) Can Likely Significant Effects to be Avoided?

As these habitats are not sensitive to indirect impacts the likelihood for significant effects to occur in limited. The implementation of the mitigation measures outlined throughout this NIR will provide sufficient safeguards for these habitats from any potential impacts associated with wind energy developments.

3.2.2 Assessment of Impacts to Qualifying Species

3.2.2.1 Mammals

(i) Draft WES & Mammals

The mammal species associated with the SACs brought forward to Stage 2 include otters, lesser horseshoe bats and grey seals. Otters are associated with Galway Bay Complex, Ross Lake and Woods, Lough Corrib, Kilkieran Bay and Islands and Connemara Bog Complex. Lesser-horseshoe bats are associated with Lough Corrib, Lough Fingall Complex and Ross Lakes and Woods while grey seals are associated with Galway Bay Complex and Kilkieran Bay and Islands.

With the exception of Ross Lake and Woods, all of the above SACs are bounded by Areas Open for Consideration. Connemara Bog Complex is bounded by all three wind energy areas while Ross Lake and Woods and Lough Corrib are located within 1km of a Strategic Area.

(ii) Conservation Objectives for Mammals

The conservation objective for all three mammal species is to achieve favourable conservation status for these species. Favourable conservation status of these species can be described as being achieved when the population data on the species concerned indicate that it is maintaining itself, and the natural range of the species is neither being reduced or likely to be reduced for the foreseeable future, and there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

(iii) Current Status of Mammals within the Study Area

Otters are likely to be widespread throughout the study area and occur along most suitable watercourses. While at a national level the population of otters is considered to be inadequate, the range and availability of habitat for this species is favourable. However, even though the future prospect for otters within Ireland is favourable the overall conservation assessment of this species is considered to be inadequate.

The 2006 distribution map (NPWS, 2007(a)) of Lesser horseshoes bats noted high density clusters of roost site towards the south of the study area, south of Kilcolgan and particularly to the north of Gort. Another area of particular high density occurs in the region of Clonbur and Cong between Lough Corrib and Lough Cong. Other areas supporting lesser horseshoe bats include lands adjacent to the western shore of Lough Corrib and north of Tuam. The overall national conservation status of this species is considered to be favourable.

The grey seal is restricted to the coastal and marine waters of the study area. The overall conservation status of this species is considered to be favourable.

(iv) Current threats to Mammals

Current threats to otters are related to threats to waterbodies. These threats are outlined above under *Section 3.2.1.3* examining effects to water-dependent habitats.

The threats to lesser horseshoe bats are associated with the alteration of foraging and commuting habitats through the abandonment of pastoral systems and the removal of hedges and scrub habitat. This species is associated with cave systems, particularly during the hibernation season and disturbances to these bats in roosting caves systems can threaten individual bats. Vandalism of roosting habitats has also been identified as a potential impact to this species.

Excessive disturbance to grey seals at key breeding sites and haul-out sites are example of threats to this species. Other negative impacts identified include occasional illegal culling, mortality as a result of by-catch and competition with humans for prey resources

(v) Potential Impacts to Mammals arising from the Adoption of the Draft WES

The potential impacts to otters arising from the adoption of the Draft WES relate to impacts associated with water-dependent habitats as outlined in the relevant section above.

Potential impacts to lesser horseshoe bats relate to the inadequate siting of turbines in close proximity to bat habitat features and the removal of bat foraging and commuting habitat as a result of wind farm layouts. Wind farm developments associated with the Draft WES are unlikely to have a significant impact upon designated roosting sites due to the zoning of N2K sites as Not Normally Permissible for wind energy developments.

Potential impacts to bats arising from the inadequate siting of wind turbines could result in bat fatalities. Research in Europe, Australia and North America has shown that the operation of wind turbines can resulted in bat fatalities. The research suggests that peak casualties occur during migration (Kunz *et al.* 2007; Rodrigues *et al.,* 2008) and within extensive forested areas (Brinkmann & Schauer-Weisshahn, 2006). Fatalities at wind farm sites can result from collision with the turbine and turbine blades and barotrauma i.e. damage to lungs caused by rapid or excessive pressure changes in

the vortices of moving turbine blades. Baerwald *et al.* (2008) suggested that barotrauma maybe the over-riding cause of bat mortality at wind farm sites.

Further studies in the US have concluded that bats are attracted to wind turbines and show a tendency towards investigating moving blades. Such behaviour has resulted in direct collision and bats being caught in the vortices of moving blades (Horn *et al.* 2008). While the reason for this behaviour is unknown, it has been suggested that bats may view wind turbines as tree roosts. It has also been hypothesised that ultrasonic sound created by the wind turbine may attract bat species (although there is yet no evidence to support this hypothesis (see Szewczak & Arnett, 2006: Horn *et al.,* 2008).

While specific studies relating to the impact and risks of wind turbines to lesser horseshoe bats have not been undertaken, guidance on these risks have been provided by Natural England's Technical Information Notes TIN 051: Bats and onshore wind turbines (Mitchell-Jones & Carlin, 2009). The Natural England guidelines outline the collision risks and population threats that wind farm developments pose to different species of bats. Lesser horseshoe bats have been classified by the above guidance document as a species at low risk of turbine collision. This categorisation is based on the habitat associations and flight behaviour of lesser horseshoes i.e. these bats show strong associations with habitat features and commute/forage along hedgerows and woodland habitats (Betts, 2006). This guidance also classifies lesser horseshoe bats as being at low risk of population threat from wind turbines.

The potential impacts to grey seals arising from the adoption of the Draft WES relate to impacts associated with coastal habitats as outlined in the *Section 3.2.1.4* above.

(vi) Mitigation Measures

With regard to otters and grey seals adherence to the mitigation measures outlined under the *Sections* dealing with water-dependent habitats and coastal habitats will ensure that significant effect to these qualifying species are avoided following the implementation of the Draft WES.

In order to mitigate potential impacts to lesser horseshoe bat arising from wind energy developments in areas zoned by the Draft WES for development the following measures should be adhered to:

Any proposed wind energy development occurring in wind energy areas located within close proximity to the Stage 2 SACs containing lesser horseshoe bats as qualifying interests should be assessed for likely significant effects to these species and where necessary a Habitats Directive Assessment should be completed in line with relevant guidelines.

The Natural England Interim guidance on bats and wind farm development should be adhered to and a minimum buffer zone of 50m from the nearest point of the rotor swept area of a turbine and bat habitat features should be maintained. It is noted that draft guidelines for bats and wind farm developments have been launched by Bat Conservation Ireland which suggest that a 200m separation distance should be maintained unless the results of detailed field surveys indicate that this distance can be reduced. This separation distance is in line with Eurobats mitigation. Once finalised, should these guidelines become the standard guidelines in Ireland for implementing mitigation measures for bats at wind farm developments, than the particulars of this guidance document should be adopted.

The removal of lesser horseshoe commuting and foraging habitat should be avoided during the construction and operation phase of wind energy developments. Where the removal of commuting or foraging habitat cannot be avoided alternative habitat should be established prior to such habitat removal.

Note that the above measures outlined for Lesser horseshoe bats should apply for all bat species.

(vii) Can Likely Significant Effects be Avoided

Likely significant effects to mammal species can be avoided provided that the above mitigation measures and the range of mitigation measures pertaining to otters and seals are implemented during project- level wind energy developments.

3.2.2.2 Draft WES & Freshwater Pearl Mussels

(i) Draft WES & Freshwater Pearl Mussels

The freshwater pearl mussel is a designated qualifying interest of two SACs, Lough Corrib SAC and Twelve Bens/Garraun Complex SAC. With regard to the Lough Corrib SAC the freshwater pearl mussel is associated with the Owenriff River Catchment while the mussel population occurring within the Twelve Bens/Garraun Complex SAC is associated with the Dawros River Catchment. Both catchments are listed in the First Schedule of the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations, 2009 and sub-basin management plan have been prepared for both catchments.

With regard to the potential affects to these catchments upon implementation of the Draft Strategy it is unlikely that the Dawros Catchment will be adversely impacted by elements associated with the Draft WES due to the location of this catchment within a Not Normally Permissible Area and the remote distance of this catchment from the nearest Wind Energy Area. For these reasons the Twelve Bens/Garraun Complex SAC was Screened Out during Stage 1 of this NIR.

However as noted in the Stage 1 Screening Assessment the implementation of the Draft WES will have the potential to adversely affect the conservation status of the Lough Corrib SAC in general and the populations of Freshwater Pearl Mussel occurring within the Owenriff Catchment in particular.

(ii) Conservation Objectives for Freshwater Pearl Mussels

The conservation objectives for freshwater pearl mussels designated as qualifying interests for the SACs is to achieve favourable conservation status for this species. Favourable conservation status of a species can be described as being achieved when "the population data on the species concerned indicate that it is maintaining itself, and the natural range of the species is neither being reduced or likely to be reduced for the foreseeable future, and there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis".

Other objectives for ensuring the favourable conservation status of pearl mussels is achieved have also been set out in statutory legislation by the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations, 2009 and also by the Water Framework Directive. The Freshwater Pearl Mussel Regulations, 2009 requires Sub-basin Management Plans to be established in order to reduce pollution/pressure and ensure that each designated pearl mussel catchment meets the standards set out in the third and fourth schedule of the regulations.

The Water Framework Directive and relevant national legislation oblige EU member states to achieve at least good ecological status in all waters by 2015. One of the core environmental objectives of the directive is to ensure that all protected areas achieve compliance with relevant standards and objectives by 2015. Consequently the environmental objectives of sub-basin management plans and the conservation objectives of pearl mussel populations listed as qualifying interests for SACs also form part of the WFD's river basin programme of measures which must be achieved by 2015.

(iii) Current Status of Freshwater Pearl Mussels within the Study Area

The Owenriff Sub-basin Management Plan notes that the status of the existing pearl mussel populations in the Owenriff catchment is in decline with the population dominated by an older age profile and reduced distribution throughout the catchment. Surveys carried out in 1996 (Moorkens, 1996) established that the population was actively breeding, distinguishing it as one of the few remaining breeding populations in the EU and the world. While pearl mussels were noted as being abundant during this survey, an extensive algal bloom and pearl mussel kill occurred in 2004. Surveys carried out in 2004 confirmed the presence of a population in excess of two million in the Owenriff River. However yearly monitoring undertaken between 2004 and 2009 has noted a trend characterised by a shift towards larger size classes and an older age profile. Currently the known distribution and abundance of the Owenriff Catchment population is as follows:

- Frequent to common and occasional along stretches of the main Owenriff River channel between Agrafford and Lough Ateeann.
- Occasional between Lough Ateeann and Oughterard
- Frequent to occasional downstream of the waterfall in the Owenriff River in the townland of Canrawer
- Abundant downstream of Canrawer East and along the stretch of the Owenriff River flowing through Oughterard
- Occasional immediately upstream of Lough Corrib along the Owenriff River; and
- Frequent along the Derrygauna River, at and upstream of the confluence of the Srutlaunboy River; and
- Sparse adjacent to Lough Agrafford, along the Glengawbeg River and along the main channel of the Owenriff River immediately downstream of Lough Agrafford.

(iv) Current threats to Freshwater Pearl Mussels

The Owenriff Sub-basin Management Plan outlines a number of key pressures that are responsible for the unfavourable conservation status of the Owenriff pearl mussel population and continue to threaten the future viability of this population. These pressures include:

- Diffuse inputs of nutrients;
- Diffuse inputs of silt;
- Current riparian zone land use and management;
- Field drainage; and
- Outfalls including culvert outfalls, storm drains and industrial discharges

Catchment Walkover Risk Assessments, undertaken as part of the Sub-basin Management Plan noted that, of the above pressures the most commonly noted pressure exerting a high risk within the catchment was current riparian zone land use management and diffuse nutrient inputs.

The reasons for high risks associated with riparian zones along the catchment are principally associated with urbanisation of riverbanks leading to the removal of natural buffers which reduces the capacity of the riparian zone to reduce pressures from urban areas.

Housing was noted as the most common source of diffuse nutrient inputs but high risks associated with forestry, among other sources, was recorded at one site during the walkover assessments. However on a catchment level the threat from forestry is considered to be significant.

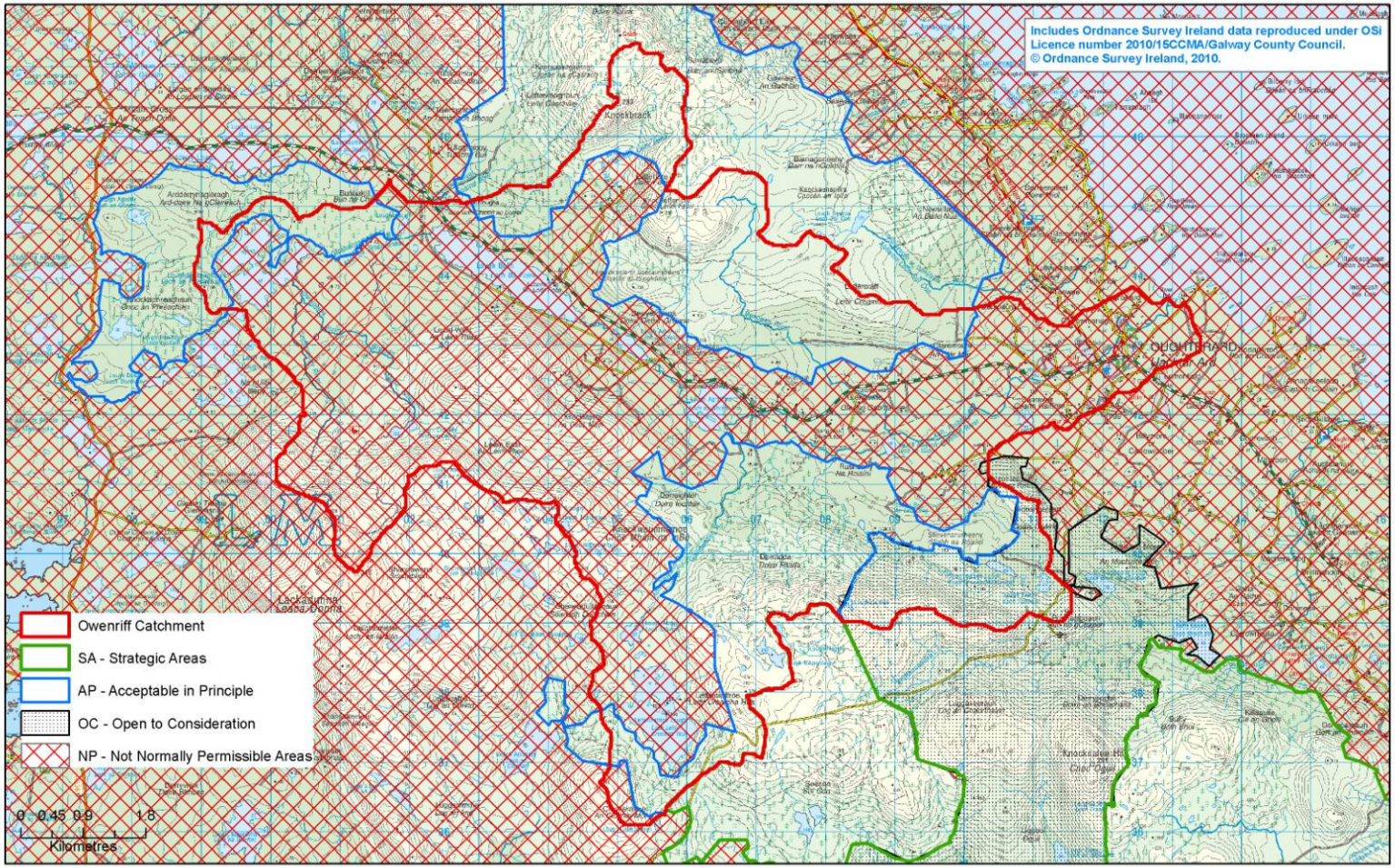
Of the total catchment area approximately 16.8% is currently afforested. Significantly, with respect to the Draft WES the majority of the forestry that occurs within the Owenriff Catchment coincides with areas zoned as Acceptable in Principle (AIP). (Note Figure 3.1 shows the AIP areas referred to in this *Section)*. The main areas of forestry with the catchment are located:

- to the southwest and north of Loughaphreaghaun. These areas form part of the Knockaphreagaun Acceptable in Principle (AIP) area; and
- in the townland of Derradda and Lettercraffroe both of which form part of the Derradda AIP; and
- north of Lough Bofin in areas that form part of the Knockbrack AIP.

The main pressures associated with forestry within the catchment include:

- nutrient enrichment from ground and aerial fertilisation;
- nutrient enrichment from post-felling brash decay;
- sediment loss associated with harvesting;

Figure 3-1: Owenriff Catchment and associated Wind Energy Zoning



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- potential impacts relating to increases in dissolved organic carbon (DOC) in pearl mussel watercourses; and
- the application of pesticides at afforestation and replanting stages.

Furthermore, as up to 50% of the forestry occurring in these areas was planted prior to the establishment of Forestry Service guidance documents and codes of practice, large stands of this forestry are directly connected to natural watercourses and lakes with no buffering being provided in many instances. The occurrence of forestry in such situation will exacerbate the above pressures and limit the scope for remedial action.

Peat exploitation is carried out throughout the catchment and has been identified within the vicinity of pearl mussel populations, such as adjacent to the populations occurring around Lough Agrafford. Exposed areas of peat in these areas can lead to increases in surface runoff and base flow and result in large quantities of silt being discharged to receiving waters. The area of peat cutting noted in the Sub-basin Management Plan adjacent to Lough Agrafford is of particular relevance to the draft WES as this area coincides with the Derradda AIP.

(v) Potential Impacts to Freshwater Pearl Mussels arising from the Adoption of the Draft WES

The main channel of the Owenriff River is bounded to the north by the Knockbrack AIP and to the south by the Derrada AIP while the Knockaphreaghaun AIP occurs along the western limits of the catchment. Watercourses which feed the main Owenriff River channel flow through all three AIPs. The Bunowen River and Glengawbeg River which flow through Knockbrack and Derradda AIP respectively are major tributaries of the Owenriff River. While no known pearl mussel population is associated with the Bunowen River, a sparse population occurs along the Glengawbeg River, immediately upstream of Lough Agrafford.

Knockaphreghaun AIP occurs to the southwest and northeast of Loughaphreaghaun within the western limits of the Owenriff Catchment. The widespread presence of older

pearl mussels was recorded along the Derrygauna River immediately upstream of Loughaphreagaun during surveys carried out in 2008.

Due to the proximity of these AIPs to watercourses associated with this catchment and the over-riding peat nature of the soil substrates in these AIPs, wind energy developments in these locations will have the potential to adversely affect the water quality of adjacent streams, rivers and lakes.

Adverse affects on the water quality of this catchment could arise as a result of:

- Increases in sediment loading to watercourses during the construction phase of wind energy developments and subsequent movement of sediment throughout the catchment and settlement onto river beds resulting in the clogging of clean gravel and pebble beds.
- Changes in watercourse nutrient status. With regard to wind energy developments, this impact is most likely to occur where developments require the clear-felling of adjacent stands of plantation forestry.
- Pollution events associated with the migration of toxic substances associated with the construction phase of wind energy development to watercourses.

Increases in Sediment Loading

The land-cover of the AIPs is dominated by Atlantic and Mountain blanket bog whose peat depths are likely to range from 0.5m to >3m in depth. Areas of blanket bog with peat depths occurring within this range are highly sensitive to disturbance. The excavation of turbine bases and installation of access tracks, electric cabling and drainage ditches can lead to the draw-down of water from peatlands leading to the disturbance and de-stabilisation of surrounding peat. Disturbed peatland is more susceptible to decomposition and erosion, which can lead to significant increases in the sediment load of surface runoff. Runoff from eroded peatlands containing high quantities of sediment will eventually increase the sediment loading of receiving watercourses with potential adverse consequences for pearl mussels. Increased peat decomposition may also have the potential to increase the rate of dissolved organic

carbon (DOC) loss to watercourses. Increases in DOC will promote primary productivity and can lead to a decrease in oxygen levels and an increase in detritus depositing on river beds.

A de-stabilisation of peatland will increase the risk of peat slippage which can occur on gentle as well as steep slopes. The vast majority of past peat failures in Ireland occurred on slopes between 4° and 8° (Boylan *et al.* 2008). A peat slip event will have the potential to cause wide-ranging and significant effects on water quality, freshwater pearl mussels and aquatic fauna downstream of the slip location.

The clear-felling of forestry for wind energy development may also exacerbate pressures associated with sediment loss during harvesting operations, while, as noted above, activity during the construction phase of developments may contribute to further sediment loss.

Watercourse crossings and the installation of culverts will have the potential to result in sediment mobilisation and increased loading downstream of proposed development sites.

Physical siltation of pearl mussel watercourses resulting from increased sediment inputs from wind farm construction areas can continue to cause very serious effects on a long term basis. Ingestion of silt by adult mussels can lead to rapid mortality, while the prolonged clamming-up of pearl mussels in response to siltation can result in death from oxygen starvation. Other life-cycle stages are also negatively affected by siltation. The silting of gravel beds decreases the oxygen supply to juvenile habitats which prevents recruitment of the next generation. The deposition of sediment on gravelly river beds can also promote macrophyte growth, which will lead to negative feed-backs as established macrophytes trap suspended solids, further increasing sediment levels and exacerbating impacts on juvenile habitats.

Changes in Nutrient Status

With regard to wind energy developments, changes in the nutrient status of watercourses are most likely to occur where developments require the clear-felling of

plantation forestry which may occur within close proximity to turbine locations. Where wind turbines are situated in plantation forestry, forestry clearance for wind turbines and associated infrastructure as well as turbulence clearance around wind turbine locations will be required. The extent of turbulence clearance largely depends on the advice provided by turbine manufacturers. The clearance of forestry for wind energy development will have the potential to contribute to existing forestry pressures on the catchment resulting from nutrient enrichment from brash decay.

The link between coniferous clear-felling and changes in nutrient status of nearby watercourses is well documented (Hornbeck *et al.,* 1987; Neal *et al.*, 1992; Rosen *et al.* 1996; Ahtianinen & Huttunen, 1999). The nutrient increases associated with clear-felling can have a prolonged effect lasting up to four years in some studies. A recent EPA study noted significant and prolonged increases of phosphorous in watercourses downstream of forestry clear-felling on peat soils in Mayo (Rodgers *et al.* 2008). This study also noted significant increases in suspended solids downstream of clear-felling operations.

Low levels of ortho-phosphate are essential for maintaining suitable conditions for pearl mussels. Any increases in this nutrient can change macrophyte assemblages and increase productivity which will in turn lead to a reduction in oxygen levels, changes in channel characteristics and an increase in siltation.

Pollution Events

Pearl mussels are considered to be among the most sensitive organisms to water pollution and inputs of contaminating substances such as hydrocarbons and cement-based products associated with the construction phase of wind energy development will have the potential to adversely affect the conservation status of pearl mussels.

Clear-felling associated with wind energy development will also have the potential to indirectly affect water quality within the catchment as a result of replacement planting. The Forest Service Felling Policy for Wind Farms requires the planting of replacement forestry that matches the extent of forestry removed for wind energy developments plus an additional 10% to offset the increases in soil carbon emissions during

afforestation. In addition to the above, the Policy also states that, where turbulence felling is necessary, short-rotation forestry (SRF) will be made a condition of the felling license. The planting of replacement forestry and the associated application of insecticides and herbicides during the replanting phase will have the potential to result in elevated concentrations of pollutants associated with these pesticides in watercourses.

(vi) Mitigation Measures

Siltation and nutrient loss from potential wind energy developments in AIP areas pose a significant risk to the pearl mussel population of the Owenriff Catchment. Therefore, without the removal of risk to pearl mussel populations wind energy developments will not be permitted in AIP areas occurring within the Owenriff Catchment.

In order to offset this risk and the likelihood of significant effects occurring as a result of the adoption of the draft WES the following mitigation measures are outlined below. It is noted that the measures outlined below will not necessarily reflect the entirety of measures required to offset risks to pearl mussel during the development of wind energy projects. However these measures along with the policies and objectives of the draft WES not to support wind energy projects that will have the potential to result in likely significant effects will ensure that the adoption of the WES will not represent a risk to this species.

The mitigation measures outlined here should be used as the minimum standard measures required to offset the risk of likely significant effects to pearl mussels.

Site Drainage and Control of Surface Runoff

Any wind energy proposal occurring within the Owenriff Catchment will be accompanied by a detailed Surface Water Management Plan (SWMP). The objective of the SWMP will be to prevent pollution to watercourses and adverse impacts to pearl mussels (as well as other Annex and non-Annex listed aquatic fauna). The SWMP will provide sufficient detail to ensure that all activities that could potentially lead to negative impacts on water quality are identified.

The SWMP will be based upon a detailed understanding of the hydrology, hydrogeology and geology within and surrounding proposed wind energy development sites. The production of SWMPs will be carried out by experience hydrologists and hydrogeologists.

Peat depth surveys and peat stability assessments will be required for the design of all SWMP for wind energy developments within the Owenriff Catchment. Peat depth surveys will be undertaken by experience geotechnical professionals. The information to be contained within the SWMP and other relevant mitigation measures for proposed wind energy developments in AIPs occurring within Owenriff Catchment are outlined below.

Any wind energy proposal hydrologically link to water-dependent qualifying interest of N2K sites should be accompanied by a detailed Surface Water Management PIan (SWMP). The objective of the SWMP will be to prevent pollution to waterbodies and water-dependent habitats such as fens.

Forest clear-felling for wind energy developments in areas hydrologically linked to water-dependent qualifying habitats should follow the guidance of the Forest Service and the NPWS.

Disturbance to natural drainage features should be avoided during the construction phase of a wind energy development.

Uncontaminated surface runoff should be diverted away from construction areas through the installation of interceptor drains up-gradient of construction areas.

Suitable prevention measures should be put in place at all times to prevent the release of sediment to drainage waters associated with construction areas and migration to adjacent watercourses. Drainage waters originating in construction areas should be collected in a closed system and treated prior to controlled, diffuse release. Drainage waters from construction areas should be managed through a series of treatment stages that may include swales, check dams and detention ponds along with other pollution control measures such as silt fences and silt mats.

Swales should be used to hold water temporarily and to encourage infiltration/discharge into the ground locally to where the rainfall hits the ground. It is noted that low infiltration rates are associated with peat soils and blanket bog, which dominates the land cover within much of the study area.

Check dams should be placed along swales to settle out silts and reduce flow velocities along with subsequent erosion potential.

Detention ponds will attenuate and treat runoff and should be required for all the turbine locations. These should have permanent open water to minimise the risk of sediment washout. Detention pond side slopes should be constructed at shallow grades such as 1 in 3 side slope. Site drains should not discharge directly into watercourses.

Runoff from excavations should not be pumped directly into watercourses. Where dewatering of excavations is required, water should be pumped to the head of a treatment train in order to receive full treatment prior to re-entry to the natural drainage system.

Dust suppression should be undertaken around construction areas during periods of dry weather. Only clean, settled water should be used for dust suppression.

Development Layouts and Buffer Zones

Wind energy development layouts will avoid areas of deep peat and active blanket bog. Slopes in excess of 15° will be avoided.

Construction areas will be minimised to reduce the area of exposed ground occurring during the construction phase.

Buffer zones of a minimum of 50m from higher-order streams and 150m from lower-order watercourses should be implemented. Buffer zones will be maintained in all instances except where watercourse crossings are required along proposed access track routes.

No construction activities will be undertaken at watercourse crossing in wet weather conditions.

All watercourse crossings will use clear span, bottomless, arch or oversize culverts.

Forest Clear-felling

Forest clear-felling for wind energy developments in the Owenriff catchment will follow the guidance of the Forest Service, NPWS and all relevant provisions for clear-felling outlined in the forthcoming final version of the Owenriff Sub-basin Management Plan.

The Coillte Forest Management Plan for Derradda has not identified felling methods, areas and volumes at this location as an agreed procedure has not yet been established due to potential risks to pearl mussel populations. No clear-felling will be undertaken for wind energy developments prior to the establishment of an agreed felling procedure within the Owenriff Catchment. Subsequent to the establishment of procedures all clear-felling and replanting for wind energy developments will adhere to these procedures.

Where forestry clear-felling is proposed the list of national measures relating to forestry which aim to address pressures impacting on pearl mussels will be followed. These measures are reproduced from Table 6.2 of the Owenriff Sub-basin Management Plan in Appendix 1 of this document. Specific measures will be adopted to prevent the leaching of soils, phosphorous and other nutrients which can lead to the enrichment of surface watercourses where clear-felling activities are undertaken.

Construction Materials

Construction materials that resemble the geochemistry of local bedrock will be used in preference of high-carbonate materials such as cement-based products which will be avoided where possible. The avoidance of high-carbonate materials will ensure that changes to the predominantly acidic surface and soil water conditions with the Owenriff Catchment are avoided.

Ready-mixed concrete should be used during the construction phase of wind energy developments.

Responsibilities of Contractors and Sub-contractors

All site personnel will be made aware of their environmental responsibilities through the production of a Method Statement outlining Environmental Requirements for Contractors and Sub-contractors. The Method Statement will include environmental emergency response procedures to deal with spillages should they occur.

Oils, Fuels and Site Vehicle

Oils and fuels will be stored in designated bunded areas greater than 20m from any surface watercourse.

Storage tanks will be tested to a recognised standard with a secondary containment system to provide at least 110% of the maximum tank capacity.

Designated refuelling points for site-vehicles will be established 50m from any surface watercourse. Drip trays will be used at refuelling points.

Site vehicles and delivery vehicles will not be washed down on site.

Regular inspection of vehicles, tanks and bunds will be undertaken.

Documented emergency procedures to deal with any accidental slippages will be established.

Oil spill protection measures will be provided adjacent to surface watercourses.

Relevant Guidance

- Good Practice Guidance notes proposed by the UK Environment Agency/Scottish Environmental Protection Agency/Northern Ireland Environment Agency will be implemented. The relevant Guidance Notes to be adhered to will include:
    - PPG1: General Guide to the Prevention of Pollution
    - PPG5: Works and Maintenance In, Near or Liable to Affect Watercourses
    - PPG10: Working at Construction and Demolition Sites
    - PPG21: Pollution Incident Response Planning

The construction phase and associated drainage will also have regard to the Scottish Natural Heritage guidance Good Practice during Windfarm Construction (2010).

(vii) Can Likely Significant Effects be Avoided

Likely significant effects to pearl mussels as a result of the adoption of the draft WES can be avoided provided the precautionary approach of the WES and the mitigation measures outlined above are implemented in full. The implementation of the WES's precautionary approach will ensure that, where project-level developments cannot avoid risks to pearl mussels in AIP's occurring within the Owenriff catchment, such projects will not be supported by the WES and planning permission will not be granted.

3.2.2.3 Fish & White-clawed Crayfish

(i) Draft WES & Fish & White-clawed Crayfish

Fish, which include Atlantic salmon, sea lamprey and brook lamprey, and crayfish, are qualifying features of Lough Corrib SAC while Atlantic salmon is a qualifying interest ofthe Connemara Bog Complex SAC.

The Lough Corrib SAC is bounded by areas zoned as Acceptable in Principle and Areas Open for Consideration and are located 1km from a Strategic Area. The Connemara Bog Complex is bounded by all three wind energy areas.

(ii) Conservation Objectives for Fish & White-clawed Crayfish

The conservation objective for fish and crayfish is to achieve favourable conservation status for these species. Favourable conservation status of these species can be described as being achieved when "the population data on the species concerned indicate that it is maintaining itself, and the natural range of the species is neither being reduced or likely to be reduced for the foreseeable future, and there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis".

(iii) Current Status of Fish & White-clawed Crayfish within the Study Area

The range of Atlantic salmon is favourable on a national level but the populations are considered to be bad, while both the habitat for the species and its future prospects as inadequate. The overall conservation assessment for Atlantic salmon is considered to be bad.

O'Connor (2007) noted that juvenile lampreys have a patchy distribution within the Corrib catchment, while the NPWS 2007 Conservation Status Assessment report for this species suggested this species has a widespread distribution where suitable habitat prevails. The overall conservation status of brook lamprey is considered to be favourable while the overall conservation status of sea lamprey is considered to be unfavourable.

The range, population, habitat and future prospects for crayfish are considered to be inadequate and the overall conservation status of crayfish is considered to also be inadequate.

(iv) Current threats to Fish & White-clawed Crayfish

A range of current pressures and threats have the potential to affect the future conservation status of Atlantic salmon. These include barriers to upstream migration, deterioration in water quality as a result of a range of activities and processes, genetic pollution and inadequate drainage and maintenance of watercourses.

While water quality and eutrophication are not considered to be highly significant in impacting on lamprey status, pollution from contaminating substances has been shown to have a significant mortality effect on lampreys. Obstacles to passage along watercourses and river drainage and maintenance are noted as a significant pressure and threat to this species.

Reynolds (2007) outlined the main threats to white-clawed crayfish as loss of water and habitat quality and impacts from angling and other leisure activities as well as introductions of non-native species to watercourses. The last threat represents the most serious threat to the conservation status of this species. The introduction of non-native crayfish species baring crayfish plague to watercourses in the UK and Europe has resulted in significant declines of white-clawed crayfish stocks. While Ireland is now the only European country without non-native crayfish species the release of such species to freshwater watercourses will have the potential to have rapid and widespread effects on the white-clawed crayfish populations

(v) Potential Impacts to Fish & White-clawed Crayfish arising from the Adoption of the Draft WES

The potential impacts to fish and white-clawed crayfish as a result of the implementation of the Draft WES largely reflect those outlined in the *Sections* that examined the potential impacts to water-dependent habitats and freshwater pearl mussels.

(vi) Mitigation Measures

Adherence to the mitigation measures outlined under the *Sections* dealing with water-dependent habitats and freshwater pearl mussels will ensure that significant effect to these qualifying species are avoided following the implementation of the Draft WES.

(vii) Can Likely Significant Effects be Avoided

Likely significant effects to the White Clawed Crayfish can be avoided provided the range of mitigation measures outlined in this NIR are implemented along with the precautionary approach of the WES to wind energy developments that have potential to cause such effects to qualifying interests of Natura 2000 Sites.

3.2.2.4 Marsh Fritillary

(i) Draft WES & Marsh Fritillary

The Connemara Bog Complex is the only SAC brought forward to Stage 2 assessment that contains the marsh fritillary butterfly as a qualifying interest.

(ii) Conservation Objectives for Marsh Fritillary

The conservation objective for marsh fritillary is to achieve favourable conservation status for this species. Favourable conservation status of this species can be described as being achieved when "the population data on the species concerned indicate that it is maintaining itself, and the natural range of the species is neither being reduced or likely to be reduced for the foreseeable future, and there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis".

(iii) Current Status of Marsh Fritillary within the Study Area

While in general the distribution of marsh fritillary is in decline (Fox et al. 2006; Bulman & Bourn, 2006) recent increases in survey effort have revealed the presence of previously unknown colonies in Ireland. The known range of marsh fritillary in 2009 (noted from Butterfly Ireland website) occurs towards the east of the study area, east of Athenry and between Loughrea to the south and Glenamaddy to the north and also north of Galway City and north of Spiddle. The latter population is associated with the Connemara Bog Complex SAC. The distribution of marsh fritillary in the study area broadly follows that noted by Fox *et al* in the State of Butterflies in Britain and Ireland (2006).

The 2007 Article 17 Conservation Status Assessment Report for marsh fritillary noted that, while the national range of the species was favourable the populations, habitats and future prospects for this butterfly was inadequate. An overall conservation assessment deemed the species status to be inadequate.

(iv) Current threats to Marsh Fritillary

Changes in habitat availability as a result of agriculture, foresty and development are generally cited as reason for the decline in marsh fritillary (Bulman, 2001; Warren 1994). The abandonment of pastoral systems along with the development of roads and motorways were noted as the main threats and pressure to this butterfly in the 2007 Article 17 Conservation Assessment.

(v) Potential Impacts to Marsh Fritillary arising from the Adoption of the Draft WES

Habitats dominated with purple moor-grass (*Molinia caerulea*) and interspersed with devil's-bit scabious (*Succisa pratensis)* are known to be particularly important for the marsh fritillary with one previously published study (Fowles & Smith, 2006) suggesting that the butterfly can only exist at sites with high Molinia cover and widespread dispersal of Succisa throughout. As sub-populations of marsh fritillary use sites intermittently they may be present at a suitable habitat site one year and not the next. For this reason it is important to conserve suitable habitat with frequently to

abundantly occurring Succisa (Fowles, 2005). With regard to the Draft WES this is of particular note in areas of suitable habitat as described above that occur in wind energy areas adjacent to the Connemara SAC. The loss of suitable habitat for marsh fritillary in these areas adjacent to the Connemara SAC could have the potential to impact upon the SAC populations through a decrease in the range of suitable habitat occurring in the wider landscape.

(vi) Mitigation Measures

Habitat surveys associated with project-level wind energy developments should establish the occurrence or otherwise of devil's-bit scabious meadows within proposed development sites. Should such meadows occur within proposed development sites, areas of high density devil's-bit scabious, where possible, should be avoided by the footprint of the development through the appropriate design of wind farm layouts. Where such layouts cannot avoid areas of high density devil-bit scabious meadows, consultation should be undertaken with the NPWS to establish an appropriate design and mitigation measures at the project design stage.

Furthermore in such circumstances project-level Habitats Directive Assessments should be undertaken.

(vii) Can Likely Significant Effects be Avoided

Likely significant effects to Marsh Fritillary can be avoided provided the range of mitigation measures outlined in this NIR are implemented along with the precautionary approach of the WES to wind energy developments that have potential to cause such effects to qualifying interests of Natura 2000 Sites.

3.2.2.5 Slender Naiad

(i) Draft WES & Slender Naiad

Lough Corrib and Connemara Bog Complex are the only SAC brought forward to Stage 2 assessment that contains slender naiad as a qualifying interest.

(ii) Conservation Objectives for Slender Naiad

The conservation objective for slender naiad is to achieve favourable conservation status for this species. Favourable conservation status of this species can be described as being achieved when "the population data on the species concerned indicate that it is maintaining itself, and the natural range of the species is neither being reduced or likely to be reduced for the foreseeable future, and there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis".

(iii) Current Status of Slender Naiad within the Study Area

The Slender Naiad is a rare water plant whose distribution in Europe is supported mainly in areas of Ireland and Scotland. This plant is widespread in North America. In Ireland populations of this plant have been recorded at 49 locations restricted to the western seaboard counties, with Connemara a stronghold for the species with 25 of the 49 populations recorded in this region (NPWS, 2007). The 2007 Article 17 Conservation Status Assessment for Slender Naiad noted that, while the range and future prospects for this species was favourable, the current populations and habitat was unfavourable. The Conservation Assessment concluded that overall conservation status for this species was unfavourable.

(iv) Current threats to Slender Naiad

The principal threat to the Slender Naiad, as noted in the Article 17 Conservation Status Assessment backing document (NPWS, 2007) is deterioration in water quality as a result of eutrophication or acidification.

(v) Potential Impacts to Slender Naiad arising from the Adoption of the Draft WES

The nearest known population of the Slender Naiad to a wind energy areas occurs in Lough Creibhinne, which is located within the vicinity of areas zoned Acceptable In Principle by the Draft WES. Any impacts to water quality as described in relevant *Sections* above will have the potential to adversely impact upon this species.

(vi) Mitigation Measures

Adherence to the mitigation measures outlined under the *Sections* dealing with water-dependent habitats will ensure that significant effect to this qualifying species are avoided following the implementation of the Draft WES.

(vii) Can Likely Significant Effects be Avoided

Likely significant effects to the Slender Naiad can be avoided provided the range of mitigation measures outlined in this NIR are implemented along with the precautionary approach of the WES to wind energy developments that have potential to cause such effects to qualifying interests of Natura 2000 Sites.

3.2.2.6 Varnished Hook Moss

(i) Draft WES & Varnished Hook Moss

Lough Corrib is the only SAC brought forward to Stage 2 assessment that contains varnished hook moss (*Drepanocladus vernicosus* or *Hamatocaulis vernicosus*) as a qualifying interest.

(ii) Conservation Objectives for Varnished Hook Moss

The conservation objective for varnished hook moss is to achieve favourable conservation status for this species. Favourable conservation status of this species can be described as being achieved when "the population data on the species concerned indicate that it is maintaining itself, and the natural range of the species is neither being reduced or likely to be reduced for the foreseeable future, and there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis".

(iii) Current Status of Varnished Hook Moss within the Study Area

The Varnished Hook Moss is also commonly referred to as slender green-feather moss or shining sickle moss. Two cryptic species of *Hamatocaulis vernicosus* occur, with one species widespread throughout Europe and the second occurring only south of the boreal zone in Europe (*Hedenas & Eldenas,* 2007). It is a characteristic moss of mire habitats where mineral rich waters that are not strongly calcareous occur. In occurs in

association with the commonly occurring *Calliergonella cuspidata.* The current core range of this species in Ireland is in the uplands of Galway and Mayo with outlier populations occurring in Donegal, Waterford and Westmeath. In these areas it is associated with bog habitats although it is also known to occur in fens and petrifying tufa springs. A "strong population" of this species dominant over several tens of square metres was recorded to the north west of Gortachalla Lough within Lough Corrib SAC in 2004 (NPWS Article 17 Conservation Status Assessment for *Hamatocaulis vernicosus*). The range of this species is considered to be favourable in Ireland.

(iv) Current threats to Varnished Hook Moss

Current threats to this species are related to pollution from eutrophication and inadequate land use practices. Drainage of wetland mire habitats for agriculture or forestry is the principal land use practice threatening this species. Inappropriate grazing regimes resulting in changes to vegetation structure, poaching of land and eutrophication also threaten this species.

(v) Potential Impacts to Varnished Hook Moss arising from the Adoption of the Draft WES

As outlined above in the assessment of impacts to mire habitats, the construction of wind farms will have the potential to result in disturbances to mire hydrology through inadequate drainage and drying-out of peatland habitats and the changes to the chemistry of peatland waters. These changes will have the potential to degrade habitat suitable for supporting populations of *H. vernicosus.*

(vi) Mitigation Measures

Adherence to the mitigation measures outlined under the *Sections* dealing with mire habitats will ensure that significant effect to this qualifying species are avoided following the implementation of the Draft WES.

(vii) Can Likely Significant Effects be Avoided

Likely significant effects to the White Clawed Crayfish can be avoided provided the range of mitigation measures outlined in this NIR are implemented along with the

precautionary approach of the WES to wind energy developments that have potential to cause such effects to qualifying interests of Natura 2000 Sites.

3.2.2.7 Birds

(i) Draft WES & Birds

Seven SPAs have been brought forward to Stage 2 Appropriate Assessment. Of the seven SPAs all, with the exception of the Slieve Aughty Mountains are designated for the occurrence of migrating and/or waterbirds. *Table 3.5* details each of the SPAs and associated qualifying features that are included in the Stage 2 assessment.

All SPAs are bounded by Areas Open for Consideration while Lough Corrib SPA is located within 500m of an area zoned as Acceptable in Principle and less than 5km from a Strategic Area. Inner Galway Bay SPA is also located within 3km of an area zoned as Acceptable in Principle.

Table 3-6: SPAs and Qualifying Interests brought forward to Stage 2 Appropriate Assessment

SPAs	Site Code	Qualifying Interests
Inner Galway Bay	4031	Black-throated Diver; Great Northern Diver; Cormorant; Grey Heron; Light-bellied Brent Goose; Red-breasted Merganser; Ringed Plover; Bar-tailed Godwit; Turnstone; Sandwich Tern; Common Tern. Additional SCI: Shelduck; Wigeon; Teal; Shoveler; Golden Plover; Lapwing; Dunlin; Curlew; Redshank; Black-headed Gull; Common Gull; and Wetlands & Waterbirds
Lough Corrib	4042	Lough Corrib is of international importance for wintering Pochard. It is one of the top five sites in the country for wintering waterfowl and also qualifies for international importance because it regularly supports well in excess of 20,000 waterfowl. It is the most important site in the country for Pochard, Tufted Duck and Coot,

		supporting 21%, 46% and 13% of the respective national totals. It also has nationally important populations of wintering Mute Swan, Gadwall, Shoveler, Golden Plover and Lapwing. The lake is a traditional site for Greenland White-fronted Goose. Relatively small numbers of Whooper Swan occur, along with Wigeon, Teal, Mallard, Goldeneye, Curlew and Cormorant.
Rahasane Turlough	4089	Rahasane Turlough SPA is of high ornithological importance and supports seven species of national importance. The Wigeon and Golden Plover populations are of particular note as they each represent approximately 4% of the national totals of these species. The occurrence of Greenland White-fronted Goose, Whooper Swan and Golden Plover is of importance as these species are listed on Annex I of the E.U. Birds Directive.
Coole-Garryland	4107	Whooper Swan Additional SCI: Wetland & Waterbirds
Lough Rea	4134	Lough Rea is important for birds and holds internationally important numbers of Shoveler and nationally important numbers of Tufted Duck and Coot.
Cregganna Marsh	4142	Greenland White-fronted Goose Additional SCI: Wetland & Waterbirds
Slieve Aughty Mountains	4168	Hen Harrier & Merlin

(ii) Conservation Objectives for Birds

The conservation objective for birds is to achieve favourable conservation status for these species. Favourable conservation status of these species can be described as being achieved when "the population data on the species concerned indicate that it is maintaining itself, and the natural range of the species is neither being reduced or

likely to be reduced for the foreseeable future, and there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis".

(iii) Current Status of Birds within the Study Area

Recent surveys have recorded declines in diving ducks and coot numbers at Lough Corrib (Boland *et al.* 2008) and declines in several wader species at Inner Galway Bay, especially ringed plover, golden plover, lapwing and dunlin (Boland *et al.* 2009).

Increases in bird assemblages at Rahasane Turlough were noted during the 2007 and 2008 IWeBS monitoring season, while nationally important populations of shoveler and coot were recorded at Lough Rea over the 2008 IWeBS survey season.

Cregganna marsh, is a freshwater marsh with lowland wet grassland and limestone pavement also occurring and it supports nationally important flocks of Greenland white-fronted geese.

The Slieve Aughty Mountains is a national stronghold for breeding hen harriers with a high number of breeding pairs occurring throughout this SPA.

In order to identify further the types of species occurring within wind energy areas (WEAs) zoned in the draft WES a review of recent Environmental Impact Statements for wind farm developments proposed in County Galway was undertaken. The results of this review are present in *Table 3.3* below. The information outlined in this table is taken from the results of bird surveys undertaken for each of the proposed developments listed.

Table 3-3: Bird Species occurring in areas zoned as WEAs as identified during EIA fieldwork for proposed wind farm developments

Planning Application Details and Relationship with WEAs.	Specific Birds Surveyed during EIA field studies	Results	Other Relevant Information

Shannagurraun & Truskaunnagappul PA No. 10/1225 This site is located north of Spiddle in an area zoned Acceptable in Principle (AIP)	Red Grouse	2 pairs	Flushed in blanket and cutover bog
	Merlin	None recorded	Signs of a plucking post 2.3km from the proposed site.
	Waders	16 Golden Plover. Other waders included teal, snipe, common sandpiper, mallard and common gull. Meadow pipit and skylark were the most commonly occurring species.	Kestrel recorded
Lettermuckoo, Muckanaghkillew & Derrynea PA No. 10/1326 Located in Lettermuckoo AIP	Greenland White-fronted Goose (Connemara bog flock)	Flocks recorded to the east of this Site and the east of Lettermuckoo AIP. Recorded on the eastern bank of Glenicmurrin Lough. Flightlines recorded and presumed to occur east of this location. Largest flock size was 27 in 2009/2010.	
	Waders/ Waterbirds	Cormorant, little grebe, mute swan, greylag goose, redshank, common sandpiper, whimbrel, mallard, wigeon, teal, snipe, golden plover, great black-backed gull, were all recorded. Flocks of golden plover flew over the proposed site on 2 separate occasions. Mute swans noted in the area during EIA field surveys. Mute swans were also noted	

		during Draft WES field surveys.	
	Merlin	2 active breeding sites for merlin recorded. 1 female recorded flying low over ground. 2 female merlins recorded flying along the eastern shore of Glenicmurrin Lough.	
	Red Grouse	None recorded	
Leitir Gungaid & Doire Chrith Na Forbacha PA No. 10/1214 North of Forbacha, located in an AIP	Red Grouse	2 pairs and 1 individual were recorded.	
	Merlin	None recorded	
	Waders/Waterbirds	Cormorant, mute swan, mallard, teal, snipe, golden plover. Flocks of wintering golden plover were noted during surveys. No breeding golden plover were recorded.	
	Whooper Swan	None recorded.	
	Other species	A range of passerines were recorded with skylarks and meadow pipits occurring in greatest numbers.	
Lettercraffroe PP No. 10/1454 Adjacent to Strategic Area	Whooper Swan	Small flocks of Whooper swan were observed during winter surveys. A pair observed flying low in a southwesterly direction towards Lettercraffroe Lough during the breeding season.	
	Sparrowhawk	Sighted along a fire break	

	Red grouse	A pair was recorded on wet heath.	
	Golden plover	A flock of up to 160 birds were recorded during winter surveys. Were heard but not seen during EIA breeding bird surveys.	
	Merlin	Recorded on two occasions during EIA field surveys.	
	Waders/waterbirds	Common sandpiper, little crebe, cormorant, mallard, snipe, teal, moorhen were all recorded during winter bird surveys	
	Other birds	A range of passerines and crow species were recorded with and adjacent to the proposed development area.	
Finnaun PP No. 10/303 In Strategic Area	Golden Plover	6 were recorded during winter surveys. 2 pairs were recorded breeding in this area.	Flightlines were generally in a north-easterly direction.
	Whooper Swans and	Recorded around larger loughs surrounding the proposed site. No flightlines for these species passed through the site.	Maximum number recorded during any survey was 9. This species was consistently recorded between Nov. and Dec. 08 and again during Dec., Feb – Apr. 09 in the vicinity of the proposed site.

	Greenland White-fronted geese	Recorded around larger loughs surrounding the proposed site. No flightlines for these species passed through the site.	Maximum flock size was 56. This species was consistently recorded between October and April 08 in the vicinity of the proposed site.
	Other Wader/Waterbirds	Golden plover, common sandpiper, woodcock, mallard, cormorant, teal, and snipe	Low densities of waders were recorded during EIA field surveys.
	Red Grouse	5 - 10 pairs were recorded during EIA field surveys.	
	Hen harrier	At least 2 were recorded.	Hen harriers were recorded foraging over open ground in and adjacent to the proposed site. They were not recorded breeding during surveys.
	Peregrine falcon	Seen frequently during the winter surveys.	
	Merlin	Recorded only once.	Was hunting outside the proposed site
	Other raptors	Kestrels and sparrowhawk were recorded.	Kestrel was recorded breeding within the proposed site.

	Other birds	A range of other passerines and crow species were recorded during EIA surveys.	

(iv) Current threats to Birds

While no specific Article 17 report has been published for SPAs and their qualifying interests the threats to these bird species include loss of habitat and/or habitat fragmentation and changes and/or disturbance to the hydrology of wetland habitats that support bird assemblages.

(v) Potential Impacts to Birds arising from the Adoption of the Draft WES

Potential impacts to bird species could result from a range of impacts occurring outwith SPA designations. These impacts include:

Physical damage to bird species

All bird species are at some risk of colliding with wind turbines during the operational phase of the Draft WES. Collision can result in the direct mortality or lethal injury of birds and can result not only from collisions with wind turbine blades but also with other structures associated within wind turbines such as towers, nacelles etc. Collision risk can be influenced by topography and weather, particularly during periods of poor visibility i.e. fog. Other factors influencing collision risk include species-specific flight behaviour and morphology (de Lucas *et al,* 2008). The majority of studies assessing collision caused by wind farms have recorded relatively low levels of mortality. However this may be a reflection of the fact that many wind farms are located away from large concentrations of birds. Another factor which may have influenced the low mortality rates of previous studies is the fact that mortality rates are based only on found corpses. This may lead to an under-recording of mortality if scavenging rates of corpses is high in the vicinity of wind farms. In general it is considered that collision rates and associated impacts are likely to be low provided wind farm are sited in

areas that do not support rare and relatively long-lived species with low reproductive rates.

The studies of collision risks to waterbirds that have been undertaken to date have focused on assessing the response of sea birds, particularly eiders (*Somateria mollissima*) to wind farms. Numerous studies have shown a high rate of avoidance of wind farms by eiders (Tulp *et al.*, 1999, Kahlert, 2000, Desholm & Kahlert, 2005, Larssen & Guillemette, 2007, Masden 2009). This high rate of avoidance reduces the overall susceptibility to mortality from wind farms. Other studies noted similarities in flight behaviour between eiders and dabbling ducks such as wigeon (Kahlert, 2000) and that these similarities led to similar avoidance rates at wind farms. Petersson (2005) also reported high avoidance rates of wind turbines for waterfowl (which included dabbling ducks) while other studies recorded wildfowl taking avoidance action between 100 and 3000m from off-shore turbines. The results of Petersson's study also indicated no increased collision risk to nocturnal migrant wildfowl.

The risk of hen harrier collision with wind turbines is considered to be lower than that for most other raptors. It is considered that this lower susceptibility to collision is due to the low flight altitude of hen harriers, the higher rotor swept area of modern turbines and the high avoidance rate[3] (99% avoidance has been suggested) of wind turbines (Madders & Whitfield, 2006b). Studies have also shown that the risk of collision to hen harriers and raptors in general does not increase with increased (harrier/raptor) abundance (Madders & Whitfield, 2006b, de Lucas *et al,* 2008). A number of studies have concluded that the collision impacts are not likely to be biologically significant because the numbers of birds involved are likely to be minimal. However it is noted that cumulative mortality from multiple wind farms may contribute to population declines in susceptible species (Langston & Pullen, 2003). While the hen harrier or merlin are not considered to be a species of high susceptibility (see Desholm, 2009) it is accepted that, even when collision rates per turbine are

[3] Note that "avoidance" here refers to the avoidance of a wind turbine when on a collision path, rather than avoidance of areas associated with a wind farm, which is considered to constitute "displacement".

considered low (as in the case of the hen harrier), collision mortality may be high where high bird and wind farm densities overlap (Langston & Pullen, 2003, Drewitt & Langston, 2006).

Reduction in Habitat Extent

A number of studies have reported a varying degree of displacement effect to waterbirds. Meeks *et al* (1993) showed no decline in ducks surrounding a wind farm in Scotland inferring that no displacement took place. However the disturbance to waterbirds differs between species. Some studies have shown that disturbance of resting and foraging waders occurred up to 800m from wind turbines (Clausager & Nohr, 1995). Two studies (Winkelman, 1989 & 1992) found little or no displacement effects on wintering coot and breeding black-tailed godwit respectively. However, a further study of the displacement of breeding waterbirds in Germany found that black-tailed godwits were disturbed within 200m of turbine locations (Ketzenberg *et al.* 2002). Similar results for the effects of displacement of wintering-ducks in Belgium were reported by Everaert (2004). This study recorded avoidance distances of 100 – 300m from wind turbines for a range of wintering duck species. After undertaking a systematic review of the impacts of wind farms on birds Stewart *et al* (2007) concluded that there is clear evidence of declines in abundance of wildfowl and waders in the vicinity of wind farms. Reductions in activity of a range of bird species was also noted by Pearce-Higgins *et al.* (2009), who noted reduced flight activity for waders such as golden plover and snipe as well as passerines such as meadow pipit.

Another form of displacement associated with wind farms is their potential to act as barriers to movement. Avoidance of wind farms can lead to displacement and increased flight times when the wind farms act as a barrier to movement (Masden *et al.* 2009). The effects of such barriers will generally be more pronounced when wind farms are located along flight paths between roosting/nesting areas and foraging sites.

(vi) Mitigation Measures

Given the level of uncertainty associated with bird movements, feeding sites and roosting site within the study area, detailed studies of these factors should be

undertaken for all proposed wind energy developments following the adoption of the Draft WES. All proposed wind energy developments should undergo a Habitats Directive Assessment to identify likely significant effects to bird species.

Adherence to mitigations measures outlined above for other qualifying interests will also ensure that impacts to bird species are avoided following the development of the Draft WES.

Furthermore pre and post construction monitoring of wild birds should be undertaken at wind farm developments. The post-construction monitoring schedule will be agreed in consultation with GCC and the NPWS prior to grant of planning permission.

(vii) Can Likely Significant Effects be Avoided

Likely significant effects to qualifying bird and populations of birds can be avoided provided the range of mitigation measures outlined in this NIR are implemented along with the precautionary approach of the WES to wind energy developments that have potential to cause such effects to qualifying interests of Natura 2000 Sites.

3.2.3 General Mitigation Measures

The following general mitigation measures should be applied where relevant in respect of wind farm development arising from the adoption of the WES:

- undertake and submit a monitoring report at appropriate intervals in the construction and operation phases to monitor mitigation measures and environmental impacts particularly in terms of soils, water quality and biodiversity. The monitoring report will be undertaken by an appropriately qualified professional and terms of monitoring will be agreed in advance with GCC, Inland Fisheries and NPWS; and
- where deemed necessary inform GCC in advance of key construction activities in sensitive areas and facilitate the monitoring by GCC of construction activities to ensure mitigation measures are being implemented adequately.

This mitigation measures will have particular relevance to sensitive areas such as areas zoned Acceptable in Principle and Strategy Areas located in the vicinity of the Owenriff Catchment which supports populations of freshwater pearl mussels among other species.

3.3 Mitigation Measures with Regard to the Policies and Objectives of the Draft WES

The Draft WES states that one of the aims of the Strategy is to ensure the production of wind energy is consistent with and takes account of nature conservation and environmental legislation and targets, including the conservation and protection of the designated and proposed Natura 2000 sites and Natural Heritage Areas in and adjacent to the County. An additional aim stating that the Strategy will ensure full compliance with the requirements of the *EU Habitats Directive (92/43/EEC)*, in particular the need for Appropriate Assessment, in line with the *Natural Habitats Regulations (SI No. 94 of 1997), Appropriate Assessment Guidelines 2009* (DoEHLG, 2009) and the *Planning and Development Act 2000-2010* is also outlined within the Draft WES.

While no specific policy outlines the commitent of the Draft WES to ensuring that Article 6 (3) and (4) of the Habitats Directive is fully implemented, Objective WE11 states

"Having regard to the provisions of the Habitats Directive (92/43/EEC), where a proposed development will give rise to significant adverse direct, indirect or secondary impacts on Natura 2000 sites, (either individually or in combination with other plans or projects), permission will only be granted where there is no alternative solution and where there are imperative reasons of overriding public interest in favour of granting permission, including those of a social or economic nature."

It is noted that in the case of priority habitats imperative reasons of overriding public interest cannot include those of a social or economic nature with only issues of human health or public safety, beneficial consequences of primary importance for the

environment or further to an opinion from the Commission being allowed to form part of the consideration.

With regard to the Draft WES and the SACs assessed under Stage 2 Appropriate Assessment this point is of significance as most of these SACs support priority listed habitats which include turloughs, active raised bog, active blanket bog and limestone pavement habitats. A priority habitat type is one which is in danger of disappearance and for whose conservation EU Member states have a special responsibility by reason of the proportion of the habitat's natural range that falls within the European Community.

In light of these points it is suggested that Objective WE 11 be changed to the following wording:

"Having regard to the provisions of the Habitats Directive (92/43/EEC) ensure that:

- All activites derived from the adoption of the Wind Energy Strategy that may give rise to significant adverse direct, indirect or secondary impacts on the qualifying interests and conservation objectives of Natura 2000 Sites, (either individually or in combination with other plans or projects), will be subject to Habitats Directive Article 6 Assessments; and
- Permission will only be granted where project-level Article 6 Assessments conclude that no likely significant effects will to occur."

4 NIR Conclusion of Draft WES

This NIR has reviewed the impacts arising from the Draft WES and found following a Stage 1 Screening Assessment that, without the implementation of mitigation measures, significant effects were likely to impact upon the integrity of N2K sites. It was noted at the Screening Stage that due to the precautionary approach adopted by the Draft WES from the outset the likelihood of direct impacts affecting N2K Sites was avoided. As such, a Stage 2 Assessment outlined the qualifying interests that were likely to be affected by indirect impacts, without mitigation measures. In order to address these

potential impacts, and ensure that the Draft WES will have no adverse effects on the integrity of N2K Sites mitigation measures were identified to address these risks.

Furthermore an overarching objective for the Draft WES has been suggested that will ensure that no activities arising from the adoption of the Draft WES, which will result in adverse effects to N2K Sites, will be permitted.

On the basis of this suggested Objective and the mitigation measures outlined in *Section 3* of this NIS it is considered possible for the Draft WES to be implemented without it resulting in adverse effects on the integrity of N2K Sites.

Furthermore, each wind energy project in areas zoned for wind energy development will be required to undergo a project-level Habitats Directive Article 6 Assessment wherever the possibility of a likely significant effect on a N2K Site cannot be excluded. This is of fundamental importance for the adoption of the Draft WES because the details of how the Draft WES will drive wind energy development (i.e. the precise location, form and design of all projects which may be proposed) are not known at this stage. However this Plan-level NIR provides direction for future projects and associated Environmental and/or Habitats Directive Assessments by identifying measures that should be required at the project stage to avoid effects on the conservation status of qualifying interests and the integrity of N2K Sites. It is recognised that not all measures identified in this NIR will have to be applied in all proposed projects, but only where the project requires such measures to ensure that there is no adverse effect on the conservation status of qualifying interests and the integrity of N2K Sites.

Following on from this it is noted that developments within some areas zoned for wind energy development are likely to pose a greater risk of impact on N2K Sites and specific qualifying interests than others and are likely to present more challenges and require more mitigation than other locations in order to ensure no adverse effects on the integrity of N2K Sites.

In summary and in light of the:

- original approach of the Draft WES and the zoning of all N2K sites as Not Normally Permissible,
- over-arching Objective WE-11;
- requirement to undertake project-level HDA wherever the possibility of likely significant effects cannot be excluded; and
- plan-level mitigation measures outlined in this NIR, the SEA of the Draft WES and the Draft WES mitigation measures,

it is considered that the adoption of the Draft Wind Energy Strategy, including its policies, objectives and mitigation measures, will not adversely affect the integrity of Natura 2000 Sites, either individually or in combination with other plans or projects.

Notwithstanding this consideration it is noted that the forthcoming consultation period of the Draft WES will have the potential to influence the Wind Energy Strategy through the consideration of comments submitted on the details of the Draft WES and the findings of the SEA and the HDA. Any changes to the details of the Draft WES as a result of comments submitted during the consultation period will be assessed as part of an updated HDA and SEA. Comments submitted in respect of the HDA will also be considered and where appropriate changes will be made to the detail of the HDA. A record of any changes to the HDA made in light of comments submitted during the consultation period will also form part of the updated HDA.

5 Submission on the WES and NIR

The Draft WES, SEA and NIR were put on public display from the 9th May 2011 to the 7th June, 2011. During this timeframe submissions on the Draft WES and associated assessment reports were invited from the public, statutory and non-statutory agencies and other interested entities.

Following this public display period submissions were made to Galway County Council on the policies and objectives of the WES and also on the measures outlined in the

SEA and NIR to ensure that significant environmental impacts and likely significant effects to Natura 2000 Sites were avoided on implementation of the WES.

All submissions directly relating to the measures outlined in the NIR were considered and a response was made to each submission. The full details of the responses to submissions are provided as Annex 1 to this NIR. Where appropriate changes were made to the contents of the NIR of the Draft WES. These changes were made to further strengthen the measures that would ensure likely significant effects are avoided upon adoption of the WES.

Following the consideration of the submissions these changes were outlined in an addendum report to the NIR. This Addendum Report is provided in full as Annex 2 of this NIR. *Subsection 5.1* outlines the changes to the NIR of the Draft WES arising from the consideration of submissions during the May-June public display timeframe..

5.1 Changes to the NIR Following Consideration of Submissions

Where new text is proposed to *Sections 1 to 4* inclusive of the NIR, this is presented in blue, bold font. Where text is proposed for omission, the relevant wording is struck through in the text. Finally, where commitments are made to provide additional text, for example baseline information, this is presented in black, italic font.

It is noted that changes are not made to the original NIR; this Addendum forms part of the documentation of the ongoing Strategic Environmental Assessment and plan-making process. It supplements and should be read in conjunction with the original NIR which includes information on an assessment of the potential for the Draft WES to result in likely significant effects to the integrity and conservation status of Natura 2000 Sites.

The findings of this Addendum will be used to update the NIR on adoption of the Draft WES. The updated NIR will be amended to take account of the Elected Members' decisions with regard to the Manager's Recommendations and will be made available to the public alongside the County Galway Wind Energy Strategy as adopted.

Table 5-1: Changes to Section 1 to 4 of the NIR following Consideration of Submissions

Changes in NIR	Submission From and Reference in Managers Report	WES Reference
Section 3.2.1 & 3.2.2 *An additional subsection, number subsection VII will be inserted for each qualifying habitat or group of qualifying habitats assessed in Section 3.2.1 and each qualifying species, or group of qualifying species assessed in Section 3.2.2.* *This additional subsection will provide a targeted conclusion based on the prior assessment, outlining whether or not the adoption of the Draft WES will result in likely significant effect to the particular qualifying habitat/group of habitats and qualifying species/ group of species.*	Related to the response to DAU, Item 6.	n/a
Section 3.2.2.2 *This Section will be expanded to provide further information which will contextualise the potential impacts to the Owenriff catchment and Freshwater Pearl Mussels as a result of zoning areas within*	Related to the response to DAU, Item 6.	n/a

this catchment as AIP		
Section 3.2.2.3 *This section will be expanded to provide further information, as part of the baseline characterisation for qualifying fish species in Section 3.2.2.3, on relevant catchments associated with Natura 2000 Sites brought forward to Stage 2 Appropriate Assessment.* *Data to be sourced from www.wfdfish.ie* *The relationship between the Owenbolishka River, Natura 2000 Sites and Wind Energy Areas will be examined and where there is an overlap in these areas this will be described as part of the baseline description in Section 3.2.2.3.* *Additional baseline information will also be included on fish populations within relevant catchments.* *The Owenbolishka River will be highlighted as fish stocks have to be restored in this catchment.*	Inland Fisheries Items 1, 3,4,6 Item 5	n/a
Section 3.4 *An additional Section 3.4 Habitats Directive Assessment Monitoring Programme will outline a monitoring programme to review the adopted WES*	Clare County Council Item 2	Section 5.2.3 *as new Point - "Point H" -* of WES

during the lifetime of the Strategy.		
Section 3.2.1.2; Subsection VI; Following Paragraph 5: No carbonate-rich material should be used for the construction of access tracks or turbine foundations in mire habitats. Wherever possible, aggregates of similar chemistry as site bedrock should be used for road construction and turbine foundations. **Where wind farm developments are undertaken in area of modified or degraded peatland habitat, where appropriate and in agreement with the NPWS, a peatland conservation and management plan should be implemented as part of the proposed development. This conservation and management plan will be developed in line with the IPCC Peatlands 2020 Conservation Plan.**	Western Regional Planning Authority Item 4	Section 5.2.3 of WES
Section 3.2.1.2; Subsection V; Paragraph 1 The draw-down of water from surrounding peatlands can also lead to a destabilisation **and desiccation** of the surrounding peatland.	An Taisce Item 4	n/a
Section 3.2.2.1; Subsection VI; Following Paragraph 5: The removal of lesser horseshoe commuting and foraging habitat should be avoided during the	An Taisce Item 7	Section 5.2.3 of WES

construction and operation phase of wind energy developments. Where the removal of commuting or foraging habitat cannot be avoided alternative habitat should be established prior to such habitat removal. Note that the above measures outlined for Lesser horseshoe bats should apply for all bat species.		
Section 3.2.2.2; Subsection VI; Paragraph Site Drainage and Control of Surface Runoff; Paragraph 2: The SWMP will be based upon a detailed understanding of the hydrology, hydrogeology and geology within and surrounding proposed wind energy development sites. The production of SWMPs will be carried out by experience hydrologists and hydrogeologists.	Western Regional Planning Authority	Section 5.2.3 of WES
Section 3.2.2.2; Subsection VI; Paragraph Site Drainage and Control of Surface Runoff; Paragraph 3: Peat depth surveys and peat stability assessments will be required for the design of all SWMP for wind energy developments within the Owenriff Catchment. Peat depth surveys will be undertaken by experience geotechnical professionals. The information to be contained within the SWMP and		Section 5.2.3 of WES

other relevant mitigation measures for proposed wind energy developments in AIPs occurring within Owenriff Catchment are outlined below.		
Section 3.2.2.2; Subsection VI; Paragraph Forest Clear Felling: Where forestry clear-felling is proposed the list of national measures relating to forestry which aim to address pressures impacting on pearl mussels will be followed. These measures are reproduced from Table 6.2 of the Owenriff Sub-basin Management Plan in Appendix 1 of this document. **Specific measures will be adopted to prevent the leaching of soils, phosphorous and other nutrient enrichment of surface watercourses where clear-felling activities are undertaken.**	Western Regional Planning Authority Item 10 An Taisce Item 9	Section 5.2.5 of WES
Section 3.2.2.7; Subsection VI; Following Paragraph 2: Adherence to mitigations measures outlined above for other qualifying interests will also ensure that impacts to bird species are avoided following the development of the Draft WES.	An Taisce Item 6	Section 5.2.3 of WES

Furthermore pre and post construction monitoring of wild birds should be undertaken at wind farm developments. The post-construction monitoring schedule will be agreed in consultation with GCC and the NPWS prior to grant of planning permission.		
Section 3.3 "Having regard to the provisions of the Habitats Directive (92/43/EEC) ensure that: • All activites derived from the adoption of the Wind Energy Strategy that may give rise to significant adverse direct, indirect or secondary impacts on the qualifying interests and conservation objectives of Natura 2000 Sites, (either individually or in combination with other plans or projects), will be subject to Habitats Directive Article 6 Assessments; and • Permission will only be granted where project-level Article 6 Assessments conclude that no likely significant effects ~~are likely to~~ will occur."	An Taisce Item 3	Section 3.3 of WES

Other Issues Identified Following Submissions to the Draft WES:

Galway County Council received notice on 21st June 2011 that the Minister for Arts, Heritage and the Gaeltacht proposes to designate the Connemara Bog Complex as a SPA. This proposed SPA (pSPA) is comprised of 3 separate areas in southern and western Connemara.

A review of the documentation provided by the DoAHG in relation to GCC's GIS, shows that the areas designated as part of the Connemara pSPA all occur within the Connemara Bog Complex cSAC designation. This being the case, the pSPA area is currently designated as Not Normally Permissible under the draft WES. The assessment of potential impacts to this pSPA follows that outlined in Section 3.2.2.7 of this NIR. The mitigation measures outlined in this Section to avoid impacts to bird species arising from the adoption of the WES will also apply to this pSPA designation. Likely significant effects to this pSPA will be avoided provided these mitigation measures and the precautionary approach of the WES to wind energy developments that have potential to cause such effects to qualifying bird interests of this pSPA are implemented.

6 Manager's Report

The Manager's Report lists the persons or bodies that made submissions during the public consultation period, summarises the issues raised by the Minister, the Western Regional Authority and other persons or bodies in the submissions and sets out the response of the Manager to the issues raised.

This Manager's Report, in conjunction with the draft WES, SEA and HDA reports, was considered by the elected members before they decided to adopt the WES (with or without modifications) or to reject the WES, in accordance with the provisions of the Planning and Development Act and Regulations and the principles of proper planning and sustainable development. The Manager's Report and supporting environmental assessments were considered by the Elected Members during a Council meeting of July, 2011.

7 Material Alterations to the Draft WES

During the Council Meeting of July 2011 the Council members agreed on a number of material amendments to the Draft WES. The following Material Alterations (and their associated number as reflected in the Addendum Report to the NIR) were those which were considered to have the potential to interact with or affect Natura 2000 Sites:

5. Amend the designation on the areas of land on the attached map[4] from "Acceptable in Principle" to "Not Normally Permissible".
6. Amend the designation on the lands which were the subject of Submission No. 18 from "Not Normally Permissible" to "Open for Consideration".
7. Amend the designation on the lands which were the subject of Submission No. 17 from "Not Normally Permissible" to "Open for Consideration".
8. Amend the designation on the lands which were the subject of Submission No. 8 from "Not Normally Permissible" to "Open for Consideration".

Figure 7.1 shows the broad location of these proposed Material Alteration zonings in the context of County Galway.

An assessment of these amendments and their implications for Natura 2000 Sites was undertaken. The HDA of the amendments was outlined as Addendum 2 to the NIR of the Draft WES. A summary of this Addendum is provided below while the full text of the Addendum 2 Report is provided in Annex 2 of this NIR.

The material amendments agreed to by the Galway County Council during the July Council Meeting proposed zoning amendments to the WES which had the potential to interact with Natura 2000 Sites. These zoning amendments included a change of zoning from Acceptable in Principle to Not Normally Permissible and three zoning changes from Not Normally Permissible to Open for Consideration.

[4] Note that detailed maps showing the location of proposed Material Alteration zoning locations in relation to Natura 2000 Sites are produced in Annex 2 of this NIR – NIR Addendum No. 2 – Material Alterations to the draft WES. Figure 7.1 below shows the location of these areas in relation to County Galway

Figure 7.1 below shows in pink border the proposed material amendments with respect to the wind energy zonings.

As outlined in Addendum 2 to the NIR it was concluded that Material Amendment No. 5 proposing a change from an area originally zoned Acceptable in Principle to Not Normally Permissible will not result in likely significant effects to Natura 2000 Sites. The HDA assessment of the material amendments also found that Material Amendment No. 6 & 7 which proposed changing two areas originally zoned Not Normally Permissible to Open for Consideration, would not result in likely significant effects to Natura 2000 Sites provided the measures outlined in NIR of the Draft WES and relevant policies and objectives of the WES are implemented.

However the HDA of Material Amendment No. 8 relating to the zoning change from Not Normally Permissible to Open for Consideration concluded that the potential for likely significant effects to occur in this area as a result of these amendments could not be ruled out. The reasons for the uncertainty with regard to the likelihood of significant effects occurring relates to the fact that this amendment proposed to designate a wind energy area within existing Natura 2000 Site boundaries. As the proposed amendment area overlap with existing Natura 2000 Sites the potential for direct impacts, such as habitat loss of Annex 1 habitats, could not be ruled out. Furthermore it is noted that there is limited scope to mitigate direct impacts such as habitat loss of Annex 1 Habitats so that likely significant effects are avoided. In light of these points the HDA of Material Alteration No. 8 recommended that this Material Alteration should not form part of the final WES to be adopted by Galway County Council.

The Material Alterations to the draft WES together with addendum reports on the SEA and HDA were put on public display for the period 12th August 2011 to 9th September 2011. A total of 21 submissions were received.

A Manager's Report on submissions received on the proposed Material Alterations to the draft WES was prepared by Galway County in September, 2011. Following the recommendations of the HDA of the Material Alterations the Manager's Report

recommended that Material Alteration No. 8 to zone an area Open for Consideration within the Sliabh Aughty Mountains should be removed and reverted to a zoning of Not Normally Permissible.

The WES and associated SEA Environmental Report and Natura Impact Report were finalised in September, 2011. The final wind energy zonings associated with the WES are presented in Figure 7.2 below.

Figure 7-1: Material Alterations to the Draft WES proposing zoning changes to Wind Energy Areas

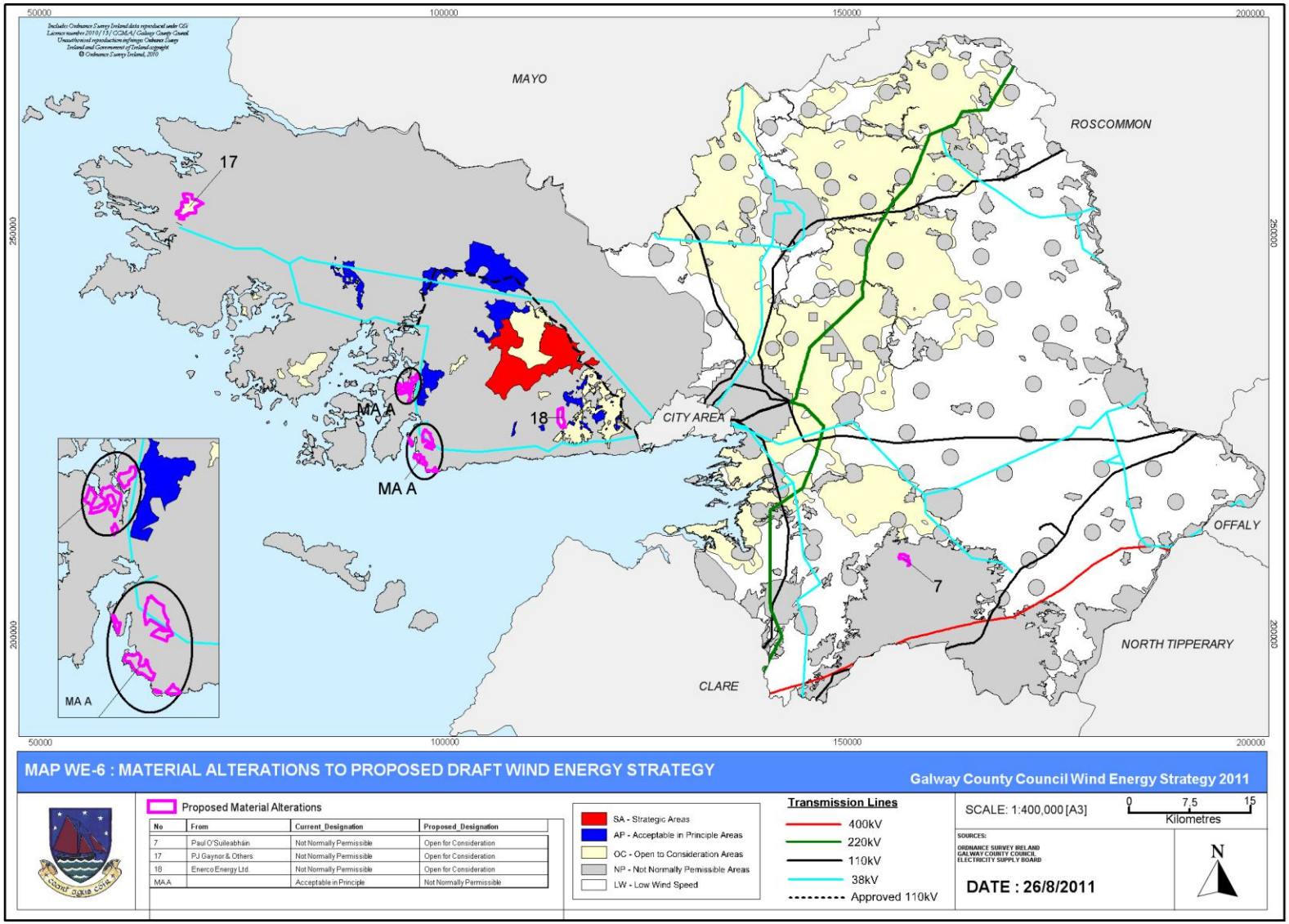
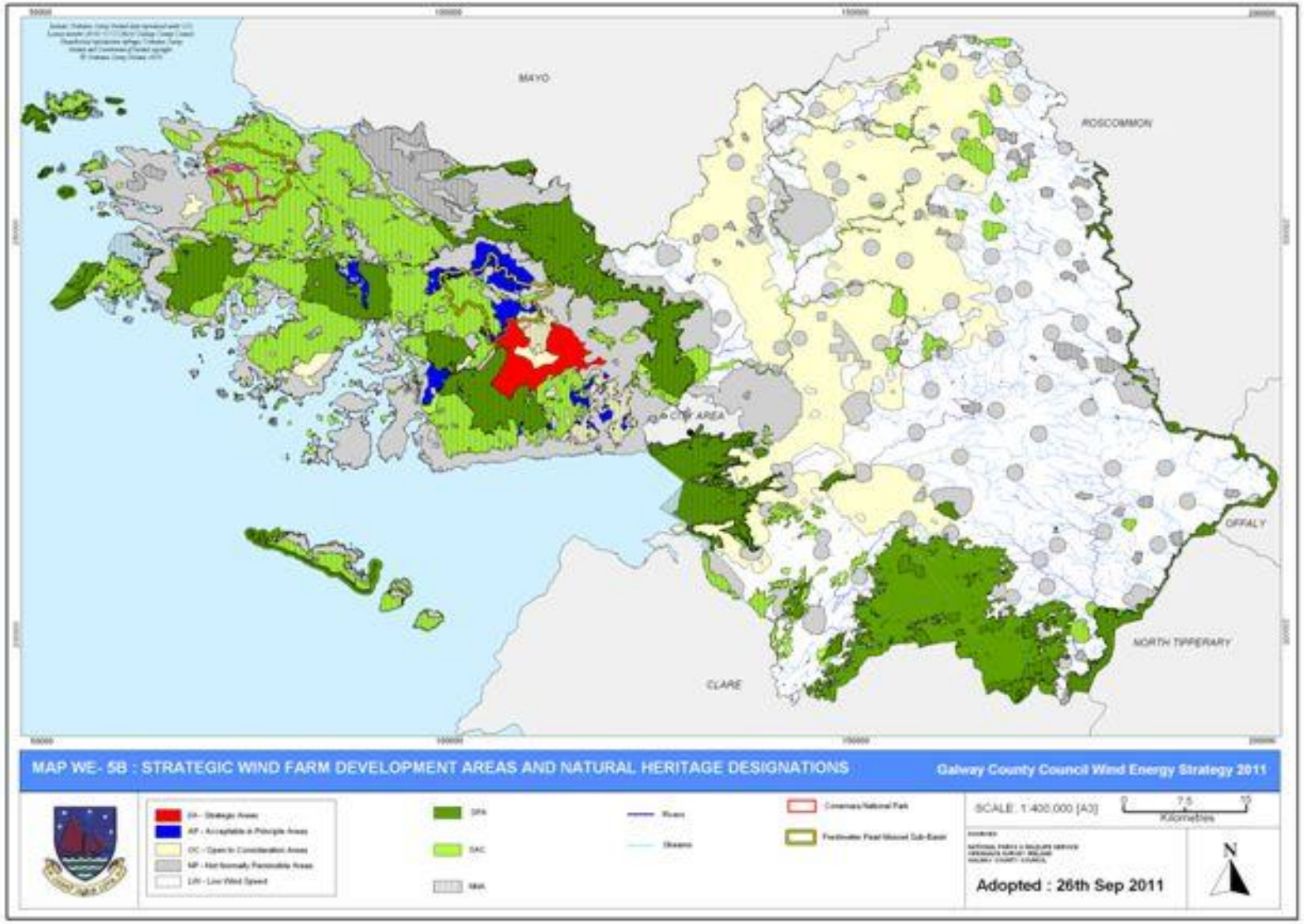


Figure 7-2: Final Wind Energy Zonings in relations to Natura 2000 Sites



8 NIR Conclusion of Final WES

The conclusions of the NIR for the draft WES outlined in Section 4 of this NIR are equally relevant to the Final WES. The HDA assessment of proposed Material Alterations to the draft WES ensured that no accepted changes to the draft WES will result in likely significant effect to Natura 2000 Sites.

Proposed Material Alterations that were considered to have the potential to result in likely significant effects, even after the implementation of the precautionary policies and objectives of the WES and mitigation measures outlined in this NIR, were not accepted as part of the Final WES.

The WES has from the outset through the drafting and consultation and amendment stages aimed to avoid significant impacts to Natura 2000 Sites by zoning all of them as Not Normally Permissible. In addition to this, Objectives WE-11 of the WES will ensure that no future wind energy developments that pose a risk that cannot be avoided to Natura 2000 Sites will be supported by the WES. The requirement for project level HDA wherever the possibility of such a risk of impacts exist will also ensure that all proposed developments are assessed for likely significant effects to Natura 2000 Site. Finally the mitigation and monitoring measures outlined in the NIR and SEA and adopted by the final WES, along with the above precautionary approach, establishes a robust plan-led approach to future wind energy developments that will ensure adverse impacts to Natura 2000 Sites are avoided.

References

Ahtianinen, M & Huttunen, P (1999). *Long term effects of forest management on water quality and loading in brooks.* Boreal Environmental Research: Vol 4, pp101 – 114.

Baerwald, E.F., D'Amours, G.H., Klug, B.J. & Barclay, R.M.R. (2008). *Barotrauma is a significant cause of bat fatalities at wind turbines*. Current Biology. **18**(6): 695 – 696.

Betts, S. (2006). Are British bats at risk from wind farms? *British Wildlife* **17**: 339-345.

Boyes, S. & Allen, J.H. (2007). Topographic monitoring of a middle estuary mudflat, Humber estuary, UK – Anthropogenic impacts and natural variation. Marine Pollution Bulletin. Vol. 55 pp. 543 – 554.

Boylan, N., Jennings P. & Long M. (2008). Peat slope failure in Ireland. Quaterly Journal of Engineering Geology and Hydrogeology. Vol: 41: pp.93 – 108.

Bridgham, S.D., Pastor, J., Janssens, J.A., Chapin, C. And Malterer, T.J. (1996). Multiple limiting gradients in peatlands: a call for a new paradigm. Wetlands. Vol: 16(1): pp.45 – 65.

Brinkmann, R. & Bontadina, F. (2006). Survey of possible operational impacts on bats by wind facilities in Southern Germany.

Bulman, C.R. (2001) Conservation biology of the marsh fritillary butterfly Euphydryas aurinia. PhD thesis, University of Leeds.

Bulman, C. R. & Bourn, N. (2006) Conserving the Marsh Fritillary at a landscape-scale: sharing best practice - Summary of the workshop held on 4-5 October 2006, Holsworthy, Devon. Butterfly Conservation, Wareham.

Clausager, I. & Nøhr, H. (1995): *Vindmøllers indvirkning på fugle. Status over viden og perspektiver.* - Faglig rapport fra DMU, nr. 147, 51 pp.

Dargie, T. (2004) *Windfarm impacts on blanket peat habitats in Scotland*. In: F.

In: F. Maxwell (ed.) Renewable energy – is it ecologically friendly? Proceedings of the 19th Conference of the Institute of Ecology and Environmental Management, pp. 43-51. London 18 May 2004. IEEM, Winchester.

de Lucas, M., Janss, G.F.E., Whitfield D. P. & Ferrer, M. (2008). Collision fatality of raptors in wind farms does not depend on raptor abundance. Journal of Applied Ecology. Vol. 45: pp. 4695 – 1703.

Department of the Environment Heritage and Local Government (DEHGL) (2008) Circular letter SEA 1/08 & NPWS 1/08.

Desholm, M. and Kahlert, J. (2005). *Avian collision risk at an offshore wind farm.* Biology Letters. Pub. Online.

Desholm, M. (2009). Avian sensitivity to mortality: Prioritising migratory bird species for assessment at proposed wind farms. Journal of Environmental Management. Vol. 90 pp. 2672-2679

Drewitt, A.L. & Langston, R.H.W. (2008). Collision Effects of Wind-power Generators and Other Obstacles on Birds. Annals of the New York Academy of Sciences. Vol. 1134: pp. 233-266.

Elkington, T., Dayton, N., Jackson, D.L. & Strachan, I. M. (2001). National Vegetation Classification: Field Guide to Mires and Heath. Joint Nature Conservation Committee.

English Nature (1999). Habitats *regulations guidance note no. 3 (HRGN No. 3).* Determination of Likely Significant Effect under the Conservation (Natural Habitats &c) Regulations 1994.

European Communities (2000). *Managing Natura 2000 sites. The provisions of Article 6 of the Habitats Directive 92/43/EEC*. Luxembourg.

European Communities (2002). Assessment of plans and projects significantly affecting Natura 2000 sites. Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC. Luxembourg.

European Commission (2007). Guidance on Article 6(4) of the Habitats Directive 92/43/EEC – Clarification of the Concepts of: Alternative Solutions, Imperative reasons of Overriding Public Interest, Compensatory Measures, Overall coherence, Opinion of the Commission.

Everaert, J. (2004). Wind turbines and birds in Flanders. Preliminary study results and recommendations. Natuur Oriolus 69. Vol 4: pp. 145 – 155.

Forestry Commission (Scotland), (2002).Guidance Note 21. Wind Farm Policies and Proposals Impacting on Forests and Woods.

Fowles, A. P. (2005) Habitat Quality Mapping for Marsh Fritillary Populations, Staff Science report No. 05/5/1.

Fowles, A.P. & Smith, R.G. (2006) Mapping the habitat quality of patch networks for the marsh fritillary *Euphydryas aurinia* (Rottemburg, 1775) (Lepidoptera: Nymphalidae) in Wales. *Journal of Insect Conservation*, **10**, 161-177.

Fox, R., J. Asher, T. Brereton, D. Roy, and Warren, M. (2006). The state of butterflies in Britain and Ireland. Butterfly Conservation and the Centre for Ecology and Hydrology: Newbury, Berkshire, UK.

Horn J.W., Arnett E.B., Kunz T.H. (2008). *Behavioural responses of bats to operating wind turbines.* Journal of Wildlife Management. **72**(1): 123 – 132.

Hornbeck, J.W., Martin, C.W., Pierce, R.S., Bormann, F.H., Likens, G.E. & Eaton, J.S. (1987). The Northern hardwood forest ecosystems: ten years of recovery from clearcutting. NE-RP-596. Broomall, PA: US Department of Agriculture, forest Service, Northeastern Forest Experiment Station.

Kahlert, J., Desholm, M., Clausager, I. & Petersen, I.K. (2000). *Rodsand offshore wind farm EIA technical background report.* DMU report to SEAS

Ketzenberg, C., Exo, K.-M., Reichenbach, M., & Castor, M. (2002) Einfluss von Windkraftanlagen auf brütende Wiesenvögel. *Natur und Landschaft* 77: 144-153.

Kunz, T. H. e*t al.* (2007). *Ecological impacts of wind energy development on bats: questions, research needs and hypothesis*. Frontiers in Ecology and the Environment. **5**(6): 315 - 324.

Langston, R.H.W. & Pullan, J.D. (2003). Windfarms and birds: an analysis of the effects of windfarms on birds, and guidance on environmental assessment criteria and site selection issues. Report by Birdlife International on behalf of the Bern Convention. RSPB, Sandy

Larsen, J.K. and Guillemette, M. (2007). *Effects of wind turbines on flight behaviour of wintering common eiders: implications for habitat use and collision risk.* Journal of Applied Ecology. Vol 44: pp. 516 - 522.

Madders M. & Whitfield D.P. 2006. Upland raptors and the assessment of wind farm impacts. Ibis 148 (Suppl. 1), 43-56.

Masden, E. A., Haydon, D. T., Fox, A. D., Furness, R. W., Bullman, R., and Desholm, M. 2009. *Barriers to movement: impacts of wind farms on migrating birds.* ICES Journal of Marine Science, 66: 746-753.

McCorry, M. & Ryle, T. (2009). Saltmarsh Monitoring Programme 2007 - 2008: Volume 1 Final Report. NPWS. http://www.npws.ie/search/Publications.jsp

McCorry, M. & Ryle, T. (2009). Saltmarsh Monitoring Programme 2007 - 2008: Volume 3 Final Report. NPWS. http://www.npws.ie/search/Publications.jsp

Meek, E.R., Ribbands, J.B., Christer, W.G., Davy, P.R. and Higginson, I. (1993). *The effects of aero-generators on moorland bird populations in the Orkney Islands, Scotland.* Bird Study. Vol. 40: pp. 140 - 143.

National Parks and Wildlife Service (2008). The Status of EU Protected Habitats and Species in Ireland.

Natural England, (2009). Technical Information Note 051 (TIN 051) Bats and Onshore wind turbines - Interim Guidance.

Nayak, D.R., Miller, D., Nolan, A., Smith, P. & Smith, J. (2008). Calculating carbon savings from wind farms on Scottish peat lands - A new approach. Science Policy and Co-operativeordination Division, Scottish Government.

Neal, C., Reynolds, B., Smith, C.J., Hill, S., Neal, M., Conway, T., Ryland, G.P., Jeffrey, H.A., Robson, A.J. & Fisher, T. (1992). The impact of conifer harvesting on stream water pH, alkalinity and aluminium concentrations for the British uplands: an example for an acidic and acid sensitive catchment in mid-Wales. Science of the Total Environment. Vol. 126: pp. 75 - 87.

Norkko, J., Hewitt, J.E. & Thrush, S.F. (2006). Effects of increased sedimentation on the physiology of two estuarine soft-sediment bivalves, *Austrovenus stutchburyi* and *Paphies australis.* Journal of Experimental Marine Biology and Ecology. Vol 333(1): pp. 12 - 26.

O'Connor, W. (2007). A baseline survey of juvenile lamprey populations in the Corrib and Suir catchments. Irish Wildlife Manual No 26. National Parks and Wildlife Service, Dept. of Environment, Heritage and local Government, Dublin Ireland.

Pearce-Higgins, J.W., Stephen, L., Langston, R.H.W., Bainbridge, I.P. & Bullman, R. (2009). The distribution of breeding birds around upland wind farms. Journal of Applied Ecology. Vol. 46(6): pp. 1323 - 1331.

Petersson, J. (2005). *The impact of offshore wind farms on bird life in southern Kalmar Sound, Sweden*. Swedish Energy Agency.

Raffaelli, D. (1999). Nutrient enrichment and trophic organization in an estuarine food web. Acta Oecologica. Vol 20(4).

Reynolds, J. (2007). Conservation Assessment of the White-clawed Crayfish *Austropotamobius pallipes* (Lereboullet, 1858) in Ireland. Report to NPWS.

Rodgers, M., Xiao, L., Muller, M., O'Connor, M., de Eyto, E., Poole, R., Robinson, M. & Healy, M. (2008). Quantification of Erosion and Phosphorus release from a peat soil forest catchment. Strive Report for the EPA and COFORD by NUI Galway.

Rodrigues L., Bach L., Dubourg-Savage M.-J., Goodwin J. & Harbusch C. (2008). Guidelines for consideration of bats in wind farm projects. EUROBATS Publication Series No. 3 (English version). UNEP/EUROBATS Secretariat, Bonn, Germany, 51 pp.

Rosen, K., Aronson, J.A. & Eriksson, H.M. (1996). Effects of clear-cutting on stream water quality in forest catchments in central Sweden. Forest ecology and Management. Vol. 83: pp. 237 - 244.

Scott Wilson, Levett-Therivel Sustainability Consultants, Treweek Environmental Consultants & Land Use Consultants (2006). *Appropriate Assessment of Plans*.

Stewart, G.B., Pullin, A.S., and Coles, C.F. (2007). *Poor evidence-base for assessment of windfarm impacts on birds.* Environmental Conservation. Vol. 34: pp. 1 - 11.
Tulp, I., Schekkerman, H., Larsen, J.K., van der Winden, J., van de Haterd, R.J.W., van Horssen, P., Dirksen, S. & Spaans, A.L. (1999) *Nocturnal flight activity of sea ducks near the wind farm Tunø Knob in the Kattegat*. IBN-DLO Report No. 99.30. www.alterra.nl

Thrush, S.F., Hewitt, J. E. Cummings, V. J. Ellis, J. I., Hatton, C., Lohrer A. and Norkko, A. (2004). Muddy Waters: Elevating Sediment Input to Coastal and Estuarine Habitats. Frontiers in Ecology and the Environment Vol. 2(6) pp. 299 - 306.

Tulp, I., Schekkerman, H., Larsen, J.K., van der Winden, J., van de Haterd, R.J.W., van Horssen, P., Dirksen, S. & Spaans, A.L. (1999) *Nocturnal flight activity of sea ducks near the wind farm Tunø Knob in the Kattegat*. IBN-DLO Report No. 99.30. www.alterra.nl

Warren, M.S. (1994). The UK status and suspected metapopulation structure of a

threatened European butterfly, the Marsh Fritillary, *Eurodryas aurinia.* Biological Conservation **67**: 239-249.

Winkelman, J.E. (1989) *[Birds and the wind park near Urk: collision victims and disturbance of ducks, geese, and swans].* RIN Rep. 89/15. Rijksinstituut voor Natuurbeheer, Arnhem, The Netherlands. Dutch, English summary. www.alterra.nl

Winkelman, J.E. (1992d) [*The impact of the Sep wind park near Oosterbierum (Fr.), The Netherlands, on birds, 4: disturbance]*. RIN Rep. 92/5. DLO-Instituut voor Bos- en Natuuronderzoek, Arnhem, The Netherlands. 106pp plus Appendices. [Dutch, English summary.] www.alterra.nl

Annex 1

Responses to Submissions Received

Table A1-1: Reponses to Submissions Received May - June, 2011

No.	Name/Position/Section	Organisation/Address	Key Issues Raised Environmental	SEA	HDA
25.	Marian O'Driscoll, Planning System and Spatial Policy	Department of Environment, Community and Local Government, Custom House, Dublin 1	The submission from the Department of Environment, Community and Local Government (DoAHG) commends Galway County Council on preparing a detailed and informative wind energy strategy that clearly sets out the challenges facing County Galway in balancing compliance with the renewable energy targets set by the Government and at the same time complying with legal obligations in relation to the EU Habitats Directive. The submission raises 2 key issues in relation to the WES: **1.** Flexibility Provision should be made for flexibility in WES to inform development management process in order to facilitate on site relocation of turbines within reasonable parameters when construction commences, as recommended under the Wind Energy Guidelines.	1. Its proposed that WES will provide for some flexibility in response to this issue although relocation beyond 20 m will require planning. As this is a County Level Strategy, site specific considerations will be assessed under normal planning applications, and environmental considerations. The SEA has informed the selection of appropriate wind energy areas (please see Chapter 2 of the SEA ER) and the inclusion of mitigation and buffers within the SEA ER (Chapter Eight) and WES will help to protect environmental resources whilst facilitating this alteration. 2.WES proposes to increase this to 25	1. These comments are noted and mitigation measures in the NIR are considered sufficient. 2. These comments are noted and mitigation measures in the NIR are considered sufficient.

			2. Commissioning and Decommissioning Retention permission for developments requiring EIA has been excluded under the Planning and Development Act 2010 and Section 5.3.2 (b) of the WES dealing with commissioning and decommissioning, which refers in the final paragraph to extending the life of wind farms through retention permission, should be amended accordingly. It is important to ensure that the period of 20 years set out in this section for decommissioning is closely examined to ensure that it remains appropriate and relevant and will not cause unnecessary problems for wind energy developments in the future.	years. This is considered acceptable from the SEA perspective.	

9.	Jim McGovern, Director	West Regional Authority, 1st Floor, Woodquay Court, Woodquay, Galway	WES and aims consistent with RPGs Criteria of Section 5.5. of the RPGs be included in WES re infrastructural corridors Minor amendments proposed including: 1. S3.3 Wind Energy Objectives – Objective WE9 2. S5.1.4 Note re 'notifiable actions' and activities in certain NHAs including Connemara Bog Complex, Oughterard District Bog and Moycullen Bogs NHA. 3.. S5.2.2. Cross referencing of Environmental Management Plans to environmental monitoring (5.2.4) or 5.2.13 Monitoring Eg: annual monitoring would be important in certain sites 4. S5.2.3 Freshwater Pearl Mussels – add sentence to 3rd paragraph 'Surface Water Management Plans and peat depth surveys be carried out by experienced ecologists and hydrological experts 5. S5.2.3 Natura 2000 sites d) Peat, Mire and Heath habitats. A	These recommendations are noted and all will be included in the SEA Chapter Eight Mitigation Measures	These recommendations are noted. 1. See SEA Response 2. See SEA Response 3. See SEA Response 4. Freshwater Pearl Mussels. The following sentences have been inserted into Paragraph (IV) of Section 3.2.2.2 The production of SWMPs will be carried out by experience hydrologists and hydrogeologists. Peat depth surveys will be undertaken by experience geotechnical professionals. 5. Paragraph (IV) of Section 3.2.1.2 of the NIR has been updated to include the following measures: *Where wind farm developments are undertaken in area of modified or degraded peatland habitat, where appropriate and in agreement with the NPWS, a peatland conservation and management plan should be*

			requirement for a long term peatland conservation and management plan be included in this section as found in section 5.2.6 Soils and Geology. Such a plan should be developed in consultation with the NPWS and including considerations of biodiversity, drainage, degradation and refer to IPCC Peatlands 2020 Conservation Plan. Ref could be included in Section 5.2.4a (habitats restoration) 6. S5.2.3 Natura 2000 sites – replace *burrow with borrow pits* 7. S5.2.3 Natura 2000 sites Buffer Areas .addition to text 'Where development is proposed close to ……if a HDA is required; *noting that the individual project may impact on a Natura 2000 site or it may impact on a Natura 2000 site in combination with other plans or projects (as identified in section 5.2.12 'Cumulative Impacts of Wind Farms'* 8. Section 5.2.4 Biodiversity reference to biodiversity protected under Irish legislation including 1999 Flora Protection Order, Wildlife Acts 1976-2000 etc. 9. S 5.2.4 Invasive Species include		*implemented as part of the proposed development. This conservation and management plan will be developed in line with the IPCC Peatlands 2020 Conservation Plan.* 6. See SEA Response 7. See SEA Response 8. See SEA Response 9. See SEA Response 10. See SEA Response 11. See SEA Response 12. See SEA Response 13. See SEA Response

			reference to Gunnera tinctoria/manicata Giant Rhubarb; also consider making reference to EC (Birds and Natural Habitats Regulations 2010 which lists restricted non-native species. 10. S5.25 Drainage. Reference Shellfish Waters Pollution Reduction Programmes after point 5. most relevant shellfish areas are Kilkieran, outer Galway bay indreabhan, Clarinbridge/Kinvara Aughinsh and Ballyvaughan /Poulnaclough Bay. 11. Include reference to leaching of soils in Point 7: The *leaching of soils* and the potential release of phosphorous *and other nutrients* during clearfelling and.. 12. Replace Regional fisheries staff to Inland Fisheries Ireland regional staff 13. S 5.2.10 Air and Climate provide footnote to define forestry technique of 'keyholing'		

	Prescribed Bodies				
1.	Ita Daly, Inspector, Process Industries Unit	Health and Safety Authority, 3rd Floor, 1A South Mall, Cork	1. An indication of planning policy in relation to major accident hazard sites notified under the regulations, which reflects the intentions of Article 12 of Directive 2003/105/EC. 2. The consultation distances supplied by the HSA to GCC in relation to such sites. These distances to be indicated on the various maps included in the plan, as well as any more specific distances and advice supplied by the HSA. 3. A on the siting of new major hazard establishments, taking account of Article 12 and the published policy of the HSA in relation to new developments, including developments in the vicinity of such establishments. 4. Mention of the following notified site: Tynagh Energy Limited, Derryfrench, Tynagh, Loughrea, Co. Galway. .	All Points are noted and accepted. Section 4.9 of the SEA ER will be amended to highlight that Tynagh Energy is a Seveso site under the Seveso II Directive	All points are noted and will be highlighted within the SEA ER.
2.	Michael McCormack, Policy Advisor (Planning)	National Roads Authority, St. Martin's House, Waterloo Road,	1. The submission recommends that developments subject to the strategy should not be sited so as to:	All points are noted This can be referenced in the SEA under the transport mitigation measures	All points are noted and will be referenced in Chapter Eight of the SEA ER.

		Dublin 4	• Compromise future national road schemes or network improvements such as junction enhancements, widening, etc. • Interfere with the provision of any safety requirements or measures. • Cause a safety hazard for traffic on the national road network. 2. The submission notes that, while the NRA has no specific standards adopted relating to the siting of turbines or other wind energy apparatus, the Council may find the Highways Agency *Spatial Planning Advice Note: SP 12/09 Planning Applications for Wind Turbines sited near to Trunk Roads* a useful reference document. . Provides Reference of Highways Agency Spatial Planning Advice Note SP 12/09	in Chapter Eight.	
4.	Yvonne Nolan, Development Applications	Department of Arts, Heritage and the Gaeltacht,	1. Page 37 of WES Draft Report should be changed in the 'Project-level Implications' column.	1. Noted and accepted, this will also be included in the SEA ER Chapter Eight	1. Please see SEA response. 2. Please see SEA response

	Unit	Newtown Road, Wexford	2. The variation is not likely to have significant negative impact on archaeological heritage. 3. The WES will not in itself have a significant effect on the architectural heritage of the County. Impacts, if any, are likely to occur when specific development proposals are put forward and can be addressed at that future time. 4. The WES will not in itself have a significant effect on the architectural heritage of the County and any impacts should be either benign or positive. 5. WES should refer to Natura Impact Statement (NIS) not a Natura Impact Report (NIR) for certain developments. 6.. Owenriff River Catchment and	2. Noted and accepted 3. Noted and accepted 4. Noted and accepted 5. Please see HDA response . 6. Owenriff River Catchment It should be noted that the majority of the Owenriff River Freshwater Pearl Mussel sub-basin is included in the Not Normally Permissible category in the Draft WES, including all of the areas within the Lough Corrib cSAC as well as other areas outside the SAC also included in the Not Normally Permissible category due to proximity to settlements/houses. These areas therefore have a higher level of protection than the Open to Consideration designation recommended in the submission from the DoAHG. The remaining areas designated as Acceptable in Principle within the sub-basin were initially designated as Strategic Areas at the pre-draft stage	3. Please see SEA response 4. Please see SEA response 5. The WES will refer to Habitats Directive Assessments of Land Use Plans as Natura Impact Reports and Habitats Directive Assessments of Projects as Natura Impact Statements. This follows the nomenclature outlined in the Planning and Development Act, 2010. The WES will be updated to ensure that this nomenclature is followed. 6. The WES is a strategic level land use plan that contains some level of uncertainty with regard to risks presented by indirect impacts to natural heritage and the Freshwater Pearl Mussels. While the NIR has identified a range of issues and potential indirect impacts associated with the implementation of the WES, many of these can only be assessed fully once specific details of projects/proposals resulting from the WES are developed.

			Freshwater Pearl Mussel.	due to the suitable wind speeds, proximity to the electricity grid, absence of significant environmental constraints such as Natura 2000 and NHA sites and suitable distance from residential properties, settlements and built heritage. These areas were re-designated as Acceptable in Principle in the Draft WES in recognition of the sensitivities associated with the Freshwater Pearl Mussel and in accordance with the assessment contained in the HDA Natura Impact Report. In addition a significant number of mitigation measures have been developed to address potential effects and monitoring of impacts are provided for as part of the SEA process and stated in Chapter 9 of the SEA ER.	However, in order to off-set the risk associated with this uncertainty a precautionary approach has been adopted with regard to project-level wind energy development in general and the development of wind farms in the AIP area associated with the Freshwater Pearl Mussel in particular. In light of this precautionary approach and the range of mitigation measures proposed the assessment of impacts to the Freshwater Pearl Mussel and other qualifying interests poses the question "Following the adoption of the WES can likely significant effects that may arise at the project-level be avoided at this lower tier of planning decision making". Adherence to: • The WES Objective WE11 which ensures that any project that will result in likely significant effects to the qualifying freshwater pearl mussel will not be support by the WES;

					• The Programme of Measures outlined in the Owenriff Sub-basin Management Plans. • Forest felling procedures in this catchment, once established between relevant stakeholders. Forest clear-felling undertaken to facilitate wind farm developments will be carried out with adherence to the Owenriff Sub-basin Management Plans. Forest clearance in the Owenriff Catchment will not proceed until an agreed felling procedure is established. • Good planning practice and implementation of the general mitigation measures outlined in the NIR, which include the establishment of adequate buffer zones between watercourses in the catchment area and proposed wind farm developments. Will ensure that likely significant effects associated with the designation of an AIP in this area will be avoided

					through the avoidance of such effects at the project level planning decision stage. An additional subsection will be inserted for each qualifying habitat, group of habitats and qualifying species, group of species which will function as a concluding subsection of the relevant qualifying interest or group of qualifying interests. This concluding subsection will provide a response to the following question "Following the adoption of the WES can likely significant effects that may arise at the project-level be avoided at this lower tier of planning decision making". As noted above for freshwater pearl mussels the concluding response to this Subsection will set out why the adoption of the Draft WES will not result in likely significant effects to qualifying interests. Furthermore, additional text will be inserted into the assessment of impacts to freshwater pearl mussels so that the issues arising from the Draft WES AIP designation in this

					area are further contextualized.
12.	Carmel Conaty, Co-ordination Unit	Department of Communications, Energy and Natural Resources, Elm House, Cavan	The submission from the Department of Communications, Energy and Natural Resources states that they have no comments to make at this time and that this is without prejudice to any comments/observations Inland Fisheries Ireland may have in this regard.	Noted	Noted
23.	Charles Stanley-Smith, Chair	An Taisce, The Tailor's Hall, Black Lane, Dublin 8	Buffer Areas – Section 5.1.3, Table WE11 (page 36) and Section 5.2.3 (d) (page 46) and (g) (page 48) Sites of ecological significance such as Natura 2000, NHA, proposed NHA and Ramsar sites should be offered protection of a minimum buffer, which may need to be increased depending on the sensitivity of the site and the specifics of the project. In addition, propose that paragraph in Section 5.2.3 (d) should be amended as follows: • A minimum buffer zone of 50m should be implemented between wind energy areas and the boundaries of SACs, NHAs and proposed NHAs designated for the	1. Buffer zones are identified in the WES and SEA and HDA. It is considered that a minimum buffer is not appropriate as buffer distances will dependant on the site and habitats present. Therefore it is recommended that appropriate buffer zones be developed in consultation with GCC in the first instance and the Inland Fisheries and NPWS (as appropriate). This will be clarified in Section Eight Mitigation Measures	1. As outlined in the SEA response, the need for buffer zones is highlighted in the WES, SEA ER and NIR. A flexible approach has been taken to the distances associated with buffer zones as these distances will be dependent on the habitat and species at risk and the characteristics of the location where development and associated activities are to take place. Therefore it is recommended that the distance of buffer zones be outlined and implemented during the project-level assessment. The buffer distances outlined at this stage should ensure that potential

			occurrence of mire, heath and peat habitats. 2. Natural Heritage Areas Disagree with inclusion of 3 NHAs in Open to Consideration area (Connemara Bogs, Oughterard District and Moycullen NHAs) and these NHAs should be included in the Not Normally Permissible area instead. 3. Objective WE4 – Not Normally Permissible Areas (NP) Objective WE4 should be amended as	2. These have been excluded from Strategic and AIP zoning and it is considered that applications would be made on a case by case basis and subject to normal planning considerations including detailed peat and ecological assessment. Please note that the RPGs for the West provide clear direction as to the exclusion of Natura 2000 sites for wind energy strategies but do not include the NHAs within this; in addition the Wind Energy Guidelines provide for wind energy development in NHAs depending on the habitats and subject to normal planning and environmental considerations. 3. Please note that reference is already made to HDA and EIA within this objective. In addition Objective WE11 (below) is a specific policy regarding Habitats Assessment. This objective was amended and strengthened through the SEA and HDA process and is due to further strengthened as shown in the HDA column. The changed wording is as follows: *"Having regard to the provisions of the Habitat Directive, (92/43/EEC), ensure*	risks to Natura 2000 Sites are avoided. 2. See SEA response 3. See SEA Response. Also note that the wording of WE11 has been amended to further strengthen this policy. The changed wording is as follows: *"Having regard to the provisions of the Habitat Directive, (92/43/EEC), ensure that:……* • *.Permission will only be granted where project*

			follows: *These areas are not considered suitable for wind farm development due to their overall sensitivity and constraints arising from landscape, ecological, recreational, settlement, infrastructural and/or cultural and built heritage resources. The HDA and SEA process in particular helped to inform the identification of these areas. Future wind farm developments will accordingly be discouraged in these areas, unless project level HDA and EIA can demonstrate to the satisfaction of the planning authority that environmental and other impacts can be successfully avoided, minimised and/or mitigated.* The HDA must demonstrate beyond reasonable scientific doubt that there will be no significant effects on the designated site. 4. Table WE12 – Peat, Ground Conditions and Landslide Susceptibility. Peat, Ground Conditions and Landslide Susceptibility section in Table WE12 should also include the effects of increased erosion of peat	*that:……* • *Permission will only be granted where project level Article 6 Assessments conclude that no likely signficant effects will occur* 4. The SEA will highlight potential peat erosion and drying out of peat areas. As potential impacts associated with construction activities in Chapter 7 of the SEA ER. However this may not be directly due to wind farm construction activities and may arise from previous landuse activities such as drainage, access roads etc. In addition, a series of mitigation measures are developed in the SEA and fully adopted into the WES to address good practice and management of soils and peats. These are found in Chapter Eight of the SEA ER. 5. Noted and accepted this will be included in Chapter Eight of the SEA ER	*level Article 6 Assessments conclude that no likely signficant effects will occur* 4. The effects of erosion and desiccation of peat are outlined in Sub-section V Section 3.2.1.2 of the NIR. The word "desiccation" has been inserted into the first paragraph of this sub-section to highlight the potential impacts associated with this process. Mitigation measure to avoid this process affecting peat qualifying habitats within Natura 2000 Sites are outlined in Sub-section VI of Section 3.2.1.2 of the NIR. These measures are also reflected in the SEA ER.

			due to wind farm infrastructure drying peat out in areas, in addition to the impacts of construction works. 5. Environmental Impact Statement Where the WES refers to the preparation and implementation of an Environmental Management Plan, a Surface Water Management Plan and the Inspection and Maintenance Plan, it should be stated that such plans must be drawn up and included within the EIS when the application is submitted. 6. Section 5.2.3 Natura 2000 Sites and Qualifying Habitats and	6. Noted and accepted, this will be included in Chapter Eight of the SEA ER 7. Noted and accepted, this will be included in Chapter Eight of the SEA ER 8. It is considered that slope analysis and landslide susceptibility risk assessment is better addressed by	5. See SEA response 6. Noted and accepted, the following text has been included in Subsection VI of Section 3.2.2.7 of the NIR: *"Furthermore pre and post construction monitoring of wild birds should be undertaken at wind farm developments. The post-construction monitoring schedule will be agreed in consultation with GCC and the NPWS prior to grant of planning permission."* Note that the above text does not specify the timing of the monitoring schedule. It is considered that this will be set out during detailed project-level pre-planning scoping and assessments. The monitoring schedule will be agreed with GCC and the NPWS. 7. Noted. Reference is made to this submission in the NIR through the addition of the following text to Subsection VI

			Species – (a) Wild Birds This section should clarify that yearly monitoring of wild birds should be carried out prior and post construction of the wind farm. Pre and post data collection is essential in order to make an accurate comparison of the baseline data and therefore assess the impacts of the wind farms on wild birds. This paragraph should also clarify that yearly monitoring should be carried out until the end of the wind farm's operational life span. 7. Section 5.2.3 Natura 2000 Sites and Qualifying Habitats and Species – (b) Lesser Horseshoe Bats This section should not just refer to the Lesser Horseshoe Bat but to all bat species within Ireland.	suitably qualified professionals at site level. Slope issues including potential landslide risks will be highlighted in Table WE12 of the WES and also highlighted in Chapters Seven of the SEA ER. Mechanical peat extraction was not noted to any significant extent during fieldwork for the SEA and HDA. In addition, there may be other reasons for forestry failure. Again as this is a county level strategy, this level of detail and assessment is better and more appropriately addressed at site/project level.	of Section 3.2.2.1: *"Note that the above measures outlined for Lesser horseshoe bats should apply for all bat species."* 8. See SEA Response

			8. Section 5.2.3 Natura 2000 Sites and Qualifying Habitats and Species – (c) Freshwater Pearl Mussels Refer to following paragraph in this section: • *Wind energy development layouts will avoid areas of deep peat and active blanket bog. Slopes in excess of 15° will be avoided.* Refer to a report commissioned by Natural England Investigating the Impacts of Wind Farm Development on Peatlands in England: Project Report and Guidance published in 2010, which describes how "peat slides tend to occur in shallow peat (up to 2m) on steeper slopes (5-15°). In contrast, bog bursts tend to occur on deeper peat (greater than 1.5m depth) and on shallower slopes (2-10°). Submit that angle of slope to be avoided should be significantly decreased. In addition, areas that have been cut with sausage machines or have seen coniferous plantations fail are not suitable for wind	9. Accepted, will be combined with 'other nutrients' as per Western RPG note, this will be amended into Chapter Eight of the SEA ER 10. Noted but WES and SEA cannot anticipate content of future policy paper and GCC will respond as necessary following publication of same. 11. This electricity consumption data was best on most recent data available and is intended to provide a ball park figure. Recalculating this data is not considered appropriate for the WES or SEA at this juncture.	9. Noted. Under the Paragraph Heading Forest Clear-felling in Subsection VI of Section 3.2.2.2 of the NIR the following text has been added to address this submission: *Specific measures will be adopted to prevent the leaching of soils, phosphorous and other nutrient enrichment of surface watercourses where clear-felling activities are undertaken.* 10. See SEA Response

			farm development and the statement should include: Wind energy development layouts will avoid areas of deep peat and active blanket bog. In addition, to areas where there has been mechanical peat extraction and areas where plantations have failed. 9. Section 5.2.5 Drainage, Water Quality and Fisheries Propose that the paragraph should be amended as follows: • *The potential for release of phosphorus during clearfelling and impacts on water quality should be carefully assessed and appropriate* measures taken to prevent any phosphorous enrichment of the local watercourse. b. Policy and Strategy 10. New Energy White Paper A new energy White Paper is being drawn up and will be published in early 2012 and the WES should be as flexible as possible in order to be able to embrace any changes to national	12. Noted, however it is considered that existing and future wind energy developments will reduce CO_2 emissions. 13. Noted, however the content of the CC Bill is not known at this point in time. 14. This is noted; however Counties Mayo and Clare have also identified areas as strategic for wind energy development so this provides for some consistency with these three local authorities who share good wind resources. The SEAI renewable energy template is noted but is unlikely to be ready within the timeframe of this WES. This is noted; however the current applications to GCC concern wind energy and hence this strategy is focusing on wind energy only. Other renewable energy strategies will be considered in light of available resources	11. See SEA Response 12. See SEA Response 13. See SEA Response 14. See SEA Response

			policy in the new White Paper 11. Electricity Consumption Projections Final electricity consumption in Ireland has been rounded down from previous projections made pre-2010 and the 2020 figures change as a result of this. Some of the figures in the WES need to be revised accordingly, which will have a knock on impact on other figures in the strategy. 12. Reduction of CO_2 The WES aim to reduce CO_2 emissions from energy production is unclear as there are only 2 thermal plants in Galway, these will not shut down and the same level of CO_2 emissions will remain whether wind is brought online or not. 13. Climate Change Bill The Programme for Government includes the publication of the Climate Change Bill and it is recommended that this be referred to before the WES is finalised.	15. Such corridors are recognised as important in the WES, however GCC is not in a position to identify such corridors as this is more appropriately addressed through Grid 25. 16. Whilst the strategy aims to flexible the Wind Energy Guidelines and RPGs remain statutory documents that the WES and SEA must have regard for. Should the new national energy policy recommend significant changes these will be facilitated through the review of the WES as appropriate. 17. Additional clarification will be provided on terms and definitions and also decommissioning times are proposed for extension to 25 years. This is considered appropriate for the SEA perspective.	15. See SEA Response 16. See SEA Response 17. See SEA Response

			14. Strategic Wind Farm Areas The draft WES has 4 wind farm areas, compared to 3 in the Wind Farm Guidelines and 2-4 in other nearby Local Authorities, which can create confusions for wind farm developers. The SEAI is also developing a template for renewable energy strategies and WES should be future proofed against this. Strategy should also address other renewable energy generation, particularly given other renewable energy sources in County, such as biomass and blue energy (i.e. ocean energy and other hydro), and opportunity to build a comprehensive strategy for the County. 15. Electricity Infrastructure Corridors Electricity infrastructure is important and other official corridors should be included, including a more robust statement of intent, to avoid future delays especially to provide for connection to blue energy.	18. These alternatives were considered as part of the SEA process and are expanded and assessed more fully in Chapter Six of the SEA ER. 19. Noted, community impact assessment is provided for in the WES and this is considered appropriate. 20. Noted, however the Peatlands Council has recently been established to address turbary and the implementation of the WES will not affect turbary rights.	18. See SEA Response 19. See SEA Response 20. See SEA Response

			16. Flexibility The Wind Energy Development Guidelines are outdated and will be reformed in line with new national energy policy. The Western Regional Planning Guidelines will also be somewhat outdated and the strategy should therefore maintain some level of flexibility. 17. Turbine Sizes and Decommissioning New turbine heights and energy outputs are being developed that are larger than previous/current technologies and this must be considered at decommissioning stages of some existing wind farms and provision should be made for this. A general statement on lack of prescription leaves communities, developers, statutory bodies confused. It is also necessary for investors/investors to provide certainty and reduce risks. Various options are available to developers upon decommissioning and this is not adequately provided for in the WES. Should review what		

			has happened in other EU states and apply to WES. Recommend that annual monitoring mentioned under Section 5.3.2 (b) be a more definitive requirement to ensure that developers follow conditions of planning and provide a library of research for Galway and other projects. 18. Galway Energy Strategy Amalgamation of Options 3, 4 and 7 in WES should be undertaken as Galway Energy Agency to provide a holistic approach. 19. Public Consultation Management Plan Recommend that Galway County Council insist on a public consultation management plan be included at pre-planning consultation phase. Monaghan County Council have a model of public consultation that would provide a good starting point. d. Conclusion 20. Turbary Request consultation on the issue of		

			turbary and wind farms in County Galway before the final strategy is published.		
26.	Brian McCarthy, Senior Executive Planner, Planning, land Use and Transportation	Clare County Council, Ennis, Co. Clare	1. Transboundary issues should be highlighted and also linked to the 3 points below. 2. The HDA mitigation measures could be linked to the SEA mitigation measures and vice versa. 3. A HDA monitoring progamme should be proposed. 4. Link the flood risk mitigation and monitoring to the HDA and SEA.	1. See responses to Points 2 – 4 below. 2-4: Noted and Accepted, a new table linking all SEA, HDA and Flood Risk measures will be developed. This will build upon the current table in Chapter Ten of the SEA ER.	1. See responses below. 2 & 4. Noted. See SEA Response 3. A Section outlining a HDA Monitoring Programme will be included within the NIR
27.	Greg Forde, Acting Director	Inland Fisheries Ireland, Western River Basin District – Galway, Teach Breac, Earl's Island, Galway	1. Impacts on Fishery Resource The main impacts on the fishery resource relate to the potential for a) mobilisation of soils and peat particulates and b) impairment of the visual amenity of angling waters with consequential effects on the marketability of a fishery. 2. Fish and Pearl Mussels There is probably an over emphasis on the pearl mussel to the detriment	1. Noted, potential impacts on the fishery resource will be expanded upon in Chapter Four of the SEA ER and highlighted within the WES as appropriate. 2. Noted and accepted , this will be amended in the SEA ER Chapters Four and Eight	1a. The effects of soil and peat mobilization are outlined in the NIR. 1b. See SEA Response 2. The mitigation measures outlined in the NIR for Freshwater Pearl Mussels also apply to Qualifying Fish

			of fish and this is unfortunate as fish populations tend to be more closely associated with potential wind farm sites taking into account the pressure, pathway, receptor model that is central to the Water Framework Directive. 3. Water Framework Directive and Water Bodies There is a need to contextualise the strategy in a catchment/WFD water body context. From a fisheries perspective, the data emerging from the studies being undertaken in the context of the Water Framework Directive is relevant. 4. Salmonid Fisheries From a fisheries perspective, the objective should be to ensure that the zones designated as Strategic or Acceptable in Principle do not significantly overlap or impact on nationally important salmonid rivers. Submission mentions Owengowla, Cashla and Ballinahinch catchments as particularly noteworthy. The relevant GIS layers of the wind energy zones should be included in the strategy and overlaid with the key	3. Noted and further information on the relevant catchments will be provided for in the SEA. 1. Noted and GIS data will be requested from Inland Fisheries and wind energy designations upon adoption will be forwarded to Inland Fisheries Ireland. Highly scenic areas at landscape character area level including classifications 5 (unique) and 4 (special) are excluded from Strategic and Acceptable in Principle Designations.	Species. Adherence to these measures with respect to avoiding impacts to these fish species is specified in Subsection VI of Section 3.2.2.3 of the NIR. 3. Noted. Further information on relevant catchments associated with Natura 2000 Sites brought forward to Stage 2 Appropriate Assessment will be noted in the NIR as part of the baseline characterisation for qualifying fish species in Section 3.2.2.3. 4. Noted. GIS data will be overlain on Wind Energy Area zonings. Where there is an overlap between noteworthy catchments that feed Natura 2000 Sites and Wind Energy Area these will be highlighted in the NIR.

			fisheries catchments. There is a case for restricting wind turbines in highly scenic zones adjacent to important angling lakes. 5. Owenbolishka River Owenbolishka River is a river where fish stocks will need to be restored and the challenge will be to do this while simultaneously facilitating the wind farm sector. 6. Water and Fish Information There is an extensive body of information available for rivers, lakes and transitional waters within the WRBD region in which status is assigned by reference to fish populations and this should be integrated into the strategy document. There is also information available from fish counters on the more important salmonid rivers, e.g. Ballinahinch, Cashla, Owenglin, Dawros and Kilcolgan. 7. Catchment Management Initiatives Where wind farms are established within a Catchment, they should be encouraged to become active stakeholders in co-operating with	5. Noted and accepted. This will be highlighted in the SEA ER chapter 4 and will be an additional mitigation measure to require consultation with Inland Fisheries for developments within this area. 6. Accepted and this information will be included in the SEA ER Chapter 4 and integrated into the WES as appropriate. 7. Noted and accepted. This can be provided for as an additional mitigation measure in Chapter Eight of the SEA ER	5. The relationship between the Owenbolishka River, Natura 2000 Sites and Wind Energy Areas will be examined and where there is an overlap in these areas this will be noted in line with Point 4 above. 6. Accepted. This information will be included in the NIR where relevant. 7. Noted. This can be specified

			catchment management initiatives.		as an additional mitigation measures in the NIR
3.	Peter Keaveney, Director	Galway Energy Agency Ltd., City Hall, College Road, Galway	1. Wind Energy Categories 2. Existing Sites and consider existing industrial sites as 'strategic' Existing wind farms should be 'strategic' and areas surrounding same should be 'open for consideration' 3. Wind Energy Designations Strategic and Acceptable in Principle very small, recommend to reconsider	1. Greater clarity and explanation of terms in relation to categories will be provided for in the WES, this will be reflected in the SEA ER as necessary. 2.Objective WES Small Scale and Micro Generation specifically addresses wind energy development for autoproducers which could apply on a case by case basis to certain existing industrial sites subject normal planning procedures. See below for proposed amendment that is considered acceptable from the SEA perspective *Small-Scale and Micro Generation Wind Energy Projects* *Facilitate, where appropriate, small scale wind energy development projects by autoproducers, in urban areas,* industrial estates *and* business parks, or *for small community-based proposals to help meet the immediate needs of the development being provided and/or to reduce their reliance on fossil fuels, and subject to the following criteria being met* Regarding Existing Wind Farms, this point is noted but some existing wind farms are located within recently designated Natura 2000 sites and must be addressed within the Habitats	1. See SEA Response 2. See SEA Response 3. See SEA Response 4. See SEA Response 5. See SEA Response

			4. Grid Connection and 5. Decommissioning	Directive Assessment procedure. Whilst existing wind farms are operating within Natura 2000 sites in a small number of areas, cumulative impacts on the conservation objectives may arise as a result of designating surrounding areas as 'open for consideration'. 3. The WES methodology has been informed by the SEA and HDA process and functions as a strategic policy document to guide wind energy development whilst maintaining adequate protection of environmental resources. In light of the methodology used this is considered robust and appropriate for the lifetime of the strategy and in line with SEA requirements. 4. Planning permission allows for ten years to facilitate grid connection. 5. Decommissioning timeframe is proposed to increase from 20 to 25 years. This is acceptable from the SEA perspective.	
5.	Catriona Diviney, Chief Operating Officer	Irish Wind Energy Association, Sycamore House, Millenium Park, Osberstown, Naas, Co. Kildare	1. Wind Speeds Wind speeds of 8m/s may be overly restrictive	Noted and recognised in WES 1. This is noted and this approach has been followed for 'strategic' and	See SEA Response 1. See SEA Response

				‘acceptable in principle’ areas in particular.	
			2. Designated Sites Wind energy on designated sites such be on a case by case basis rather than full exemption	1..Noted, but this has been considered sufficient for the timeframe of the WES.	
				2.. The Habitats Directive Assessment process has informed the development of the WES and has not recommended Natura 2000 sites for inclusion. In many cases in County Galway such sites are important for blanket bog habitats and hence may support areas of deep peat.	2.. The designation of Natura 2000 Sites as Not Normally Permissible does not preclude wind farm developments from these designated conservation sites where it has been shown through detailed project level Environmental and Habitats Directive Assessments that such developments will not result in likely significant effects to Natura 2000 Sites in particular and natural heritage in general.
			3. Potential energy Output and Targets Recommends increasing Strategic and AIP zonings as current land allocated is too little to achieve target for 2020.	3.. Noted. However, the SEA and HDA process have informed the WES development and zoning and is considered the most appropriate allocation within current timeframes and environmental considerations.	3. See SEA Response
6.	Séan O’Foighil	Fuinneamh Gaoithe Teo, An Cnoc, Indreabhan, Co. na Gaillimhe	1. Project Size It is presumed that the new strategy puts an emphasis on projects that are over 5MW but it is not clear that this is the case. A distinction should be made between big projects and small projects and propose that projects over 10MW are subject to wind farm areas in WES and on wind map and that any project less than 10MW	1. The suggested upper limit of 10MW for small projects is a significant power output and is twice the threshold over which an EIA is mandatory. Objective WE8 provides for the facilitation of small-scale and micro wind energy projects and this objective would provide broad support for small scale projects, although additional clarity could be provided in the objective in relation to industrial and similar sites.	1. See SEA Response

			would not be prohibited in any part of the County independent of the wind map as long as it is not contravening normal planning rules. 2. Existing Projects Propose that projects that are long established would be given recognition in strategy. Get permission to increase the farm by less than 10MW if they have permission to connect to the new power.	This will be provided and is considered appropriate from the SEA perspective. 2. Long established wind energy projects can be considered for repowering and any proposed increase in energy output subject to normal planning considerations at development management level. In cases where the project will not be materially different to that already permitted, it may be not be necessary to obtain planning permission. The proposed 10MW consideration is a significant power output and exceeds the threshold for EIA and any such proposals would need to be considered accordingly. Therefore amending this would not be in compliance with the EIA directive and not appropriate from the SEA perspective.	2. See SEA Response
7.	Paul O'Suileabháin, Banisteoir Ginearalta	CDS Teo., Corr na Mona, Co. na Gaillimhe	Summary Submission refers to the existing estate in Corr na Mona that provides employment for over 100 people and states intention to install wind turbines on or close to the estate to serve the site and local community and to compete with other companies that have started generating	The existing estate at Corr na Mona is located in an area designated as Not Normally Permissible for wind farms. This area is designated on the basis of the strategic spatial analysis and key issues in the area include existing settlements, designated sites and high landscape sensitivity. It is accordingly not appropriate or consistent with the project methodology to designate the	See SEA Response

			electricity. Request that the estate and the land 2km around it be recognised as a Strategic Area to serve the requirements of estate and local community	area as a Strategic Area. Nor is it considered appropriate from the SEA perspective. Objective WE8 provides for the facilitation of small-scale and micro wind energy projects and this objective would provide broad support for small scale projects, although additional clarity could be provided in the objective in relation to industrial and similar sites to support the development of small scale wind energy projects, subject to project level assessment. Suggested amendments to this policy is shown in Response to Submission No.3 above.	
8.	Frank O'Domhnaill	Corr Na Gaoithe Teo, Corr Na Mona, Co. na Gaillimhe	Request that a site in northern most reaches of Slieve Aughties in east of County be included as a Strategic Area as all of East Galway is excluded from favoured status and this designation is required for a wind farm project on site to be successful with An Bord Pleanala. Site is adjacent to existing Sonnagh Old wind farm, has significant wind resource, existing local infrastructure and project is of an appropriate scale and with careful design can be successfully accommodated. Project has a Gate 3 Grid Offer from ESB Networks which will allow project to	The site forms part of the Slieve Aughty Mountains SPA, which has been designated under the EU Birds Directive. In accordance with the project methodology, the assessment undertaken as part of the Habitats Directive Assessment and the provisions of the Regional Planning Guidelines for the West Region 2010-2022, all Natura 2000 sites have been designated as Not Normally Permissible. It is accordingly not appropriate or consistent to designate the area as a Strategic Area. Whilst wind farm developments are	See SEA Response

			connect to the grid. The only projects with grid offer in Gate 3 in east of County are at Sonnagh Old.	generally discouraged in Not Normally Permissible areas, Objective WE4 of the WES does provide the option to consider wind farm developments at development management stage where *project level HDA and EIA can demonstrate to the satisfaction of the planning authority that environmental and other impacts can be successfully avoided, minimised and/or mitigated*.	
10.	Peter Walsh	Lir Environmental Research Ltd., Letterfrack, Co. Galway	1. That community wind projects will be up to 5MW. 2. Projects under 5MW will not be restricted by the County Development Plan, Strategic Area for wind. 3. A community project must offer 40% or greater to a multiple of local people. 4. That the County Council will continue to support the idea of community wind.	With regard to Points 1 – 4 the WES supports the development of community wind projects and benefits from wind energy development, in particular under Policy WE5 and Objective WE8. It is not considered appropriate to set a power output limit or delivery percentage for community wind projects given the various forms such projects may take and the need to provide sufficient flexibility to consider and assess different proposals at project level. Projects will accordingly be assessed in accordance with Objective WE8 on a case by case basis and based on their merits, subject to a detailed assessment and having regard to the principles contained in the WES and the need to balance the provision of community wind energy with the protection of the environment, landscape and amenity.	1. See SEA Response 2. See SEA Response 3. See SEA Response 4. See SEA Response

11.	John O'Sullivan	E3 Energy Solutions	Key points 1. Enabling Infrastructure – needs more focus on WES 2. Key Targets – conservative 3. Strategic Areas coverage –too small coverage 4. Community projects – should be afforded greater flexibility.	1. The WES supports the provision and extension of the necessary infrastructure to support wind energy development, most notably under Policy WE6 and Objective WE9. In addition, the Galway County Development Plan 2009-2015 provides policies and objectives in Section 7.6 supporting the development of electricity infrastructure. This is considered appropriate at strategic level for the purposes of the WES and SEA. 2. Targets The 500MW target in the WES exceeds the combined total of existing, permitted and Gate 3 allocations for wind energy in the County. The SEA has informed the WES development and these targets are considered appropriate for the designated areas. 3. Strategic Wind Farm Areas The areas designated as Strategic and Acceptable in Principle has been based on a robust methodology that seeks to remove significant potential environmental, landscape and amenity constraints for wind energy development from the most suitable areas and to provide a high level of clarity and certainty to wind energy developers, local communities, service providers and	1. See SEA Response 2. See SEA Response 3. See SEA Response

				other stakeholders. This methodology is based on a range of national and EU legislation, policy, guidance and best practice. The SEA and HDA informed the WES development and additional methodology is provided for in Chapter Two of the SEA ER. 4. The WES supports the development of community wind projects and benefits from wind energy development, in particular under Policy WE5 and Objective WE8. It is not considered appropriate to set a power output limit for community wind projects given the various forms such projects may take and the need to provide sufficient flexibility to consider and assess different proposals at project level. Projects will accordingly be assessed in accordance with Objective WE8 on a case by case basis and based on their merits, subject to a detailed assessment and having regard to the principles contained in the WES and the need to balance the provision of community wind energy with the protection of the environment, landscape and amenity.	4. See SEA Response
13.	Sophie Preteseille, Geologist,	Geological Survey of Ireland, Beggars Bush, Haddington	1. Draft Wind Energy Strategy At development level, please ensure	1. Noted and accepted. Chapter Eight of the SEA ER will be amended to	1. See SEA Response

	Heritage and Planning Programme	Road, Dublin 4	to consult with GSI in relation to landslide records (as indicated in Section 5.2.6.), but also for geological heritage sites and other possible relevant comments on "surface water and groundwater" and "soils and geology" parts of EIS accompanying planning application for developments above 5 turbines (or below if requested by Galway County Council). 2. SEA Environmental Report and Non-Technical Summary Since the Environmental Report is satisfactory in relation to the environmental baseline, likely significant effects and mitigation measures for the "water resources" and "soils and geology" parts of the report, GSI has no further comments to add except on geological heritage. The Map 4.13 features quarries and "geological pNHAs". A list of geological heritage sites compiled by GSI was provided to Era-Maptec in April 2011. The list comprises geological heritage sites for Co. Galway, some recommended for NHA, others recommended for County Geological Sites (CGS) designation. A more accurate caption	reference this. 2. Accepted and following will be inserted to Chapter 8 of the SEA ER. Consultation should be undertaken with any relevant statutory bodies and other agencies as part of the preparation of an EIS or other environmental reports. This will include consultation with the GSI in relation to landslide risk, geological heritage sites and other relevant issues in the EIS. Title of Map 4.13 will be amended accordingly.	2. See SEA Response

			would read as "Figure 4.13: Quarries and Geological Heritage Sites", since no geological heritage sites have been designated by NPWS yet, nor benefit of CGS status under the current development		
14.	Nicola Stronach	Fermoyle Lodge, Costello, Co. Galway	1. Need for extensive public consultation. 2. Removal of Glenicmurran/Lettermuckoo Area out of WES	1. GCC has undertaken public consultation for the draft WES. This has included public notices published in local newspapers, displayed on the GCC website and sent to local radio station, making copies of the draft WES and associated documents available in the County Buildings, Area Offices and Branch Libraries, a briefing on the draft WES during the public display period, invitations for the public to make written submissions on the draft WES and consideration of the issues raised in these submissions in the Manager's Report and by the Elected Members prior to any decision being taken in relation to the WES. This complies with the statutory requirements set out under the Planning and Development Act 2000 (as amended) 2. The draft WES proposes a number of Acceptable in Principle areas, including one in Lettermuckoo townland, although there is no Acceptable in Principle area in the Glenicmurran townland. This identification of the various Acceptable in Principle areas are based on the methodology and	1. See SEA Response 2. See SEA Response

				criteria set out under Section 2 and Table WE9 of the draft WES and in Chapter Two of the SEA ER. The Acceptable in Principle area excludes designated natural heritage sites, areas with high landscape sensitivity and a number of other criteria listed in Table WE9. This is considered appropriate at a strategic level. In addition, wind energy proposals at a project level will be subject to the guidance in the WES at project level, including the need for detailed assessment in relation to landscape and other impacts to address the guidance in the WES, national policy and other guidelines. This will ensure that any issues in relation to local level impacts can be assessed and addressed at project stage. This is considered acceptable from the SEA perspective.	
15.	Coillte	c/o McCarthy Keville O'Sullivan Ltd., Planning & Environmental Consultants, Block 1, GFSC Moneenageisha Road, Galway	1. Wind Energy Designations NHAs should be included in areas designated Strategic, Acceptable in Principle and Open to Consideration in the final WES as, subject to detailed assessment, this would help to ensure the County meets its wind energy targets to 2020 and beyond and would make a significant contribution to reaching national renewable energy obligations. Clear	1.The Western Region RPGs exclude Natura 2000 sites from wind energy strategies and this must be adhered to under the Planning and Development Act 2010. The SEA and HDA informed the WES developed and is considered the most appropriate and robust approach to wind energy strategy development within the County.	1. See SEA Response

			policy provisions should be included in final WES to facilitate consideration of wind energy developments in designated Natura 2000 areas in terms of individual merit, including where a net environmental or ecological gain is demonstrated or other satisfactory compensatory measures are agreed. Planning Authority should exercise flexibility and discretion when considering wind energy proposals that may be adjacent to areas classified as Strategic or Acceptable ion Principle for wind farm development. 2. Targets The 500MW target for the County up to 2020 is too conservative and should be increased having regard to the extensive wind resource in the County and the important role Galway could fulfill in meeting EU and National renewable energy targets. 3. Capacity of Wind Energy Designations Draft WES only designates 2% of County area as Strategic Areas or Acceptable in Principle areas for wind farm development and this is regarded as unduly restrictive and	2. The SEA and HDA informed the WES developed and is considered the most appropriate and robust approach to wind energy strategy development within the County	2. See SEA Response

			additional areas should be identified in the final strategy. Much of Acceptable in Principle area may also not be available for wind energy development due to Freshwater Pearl Mussel Catchment. . 4. Grid Connection Infrastructure. Whilst grid connection is a key consideration for wind energy development, particularly in terms of financial viability, areas should not be ruled out for wind energy development merely as a result of any current deficiency in grid accessibility and this should be regarded as a determining factor. Whilst Policy WE6 and Objective WE9 prioritise improvements in the transmission network, WES should go further to consider broad infrastructure corridors and potential opportunities to improve grid infrastructure and facilitate new connections. The strategy should show possible/preferred utility corridors to provide guidance. 5. Landscape Sensitivity Draft WES designates landscape sensitivity class 4 and 5 as Not Normally Permissible while under the Landscape Character Assessment	3. The WES is a county level strategic document that will be subject to review as part of the CDP review and subject to SEA Monitoring. Should environmental impacts arise (including Targets AQ1 and AQ2) the WES may be reviewed and updated. 4. The importance of grid connection infrastructure is acknowledged however this is more appropriately supported by implementation of Grid 25 by Eirgrid.	3. See SEA Response 4. See SEA Response

			2002 landscape sensitivity class 5 was a No Go Area whilst class 4 was considered as part of Areas for Consideration. The proposed changes in the draft WES are considered unreasonable will further restrict the ability to meet the WES targets and class 4 should at least be included in Open to Consideration, with planning applications subject to EIA and site specific assessment at planning application stage.	5. .The draft WES designates landscape sensitivity Class 4 and 5 as Not Normally Permissible for wind farm developments due to the high landscape importance of these areas and their high visual and landscape sensitivity to wind farm development. It should also be noted that large parts of the Class 4 areas are also subject to additional environmental sensitivities in the form of NHAs or Natura 2000 sites. In many cases there are therefore multiple criteria that have led to the designation of these areas as Not Normally Permissible. The WES also provides flexibility at project-level under Objective WE4, which provides the option to consider	5. See SEA Response

				wind farm projects in the Not Normally Permissible areas where project level HDA and EIA can demonstrate to the satisfaction of the planning authority that environmental and other impacts can be successfully avoided, minimised and/or mitigated. In addition, the WES provides flexibility for considering small scale wind energy projects under Objective WE8 in appropriate locations throughout the County, subject to the guidance in the WES and detailed assessment. The landscape classifications used in the SEA and WES are derived from the 2002 landscape character assessment of the County and it is important to stress that the advice contained in the SEA and WES is based on the LCA boundaries and not at smaller site level assessments. This can be stated in Chapter Eight of the SEA ER	
			6. Classification of Wind Farm/Turbine Types Section 1.4 of draft WES classifies wind farm developments on basis of size and concern that many wind farms would be classified as Very Large – more than 25 turbines, which could generate negative public perceptions and size and scale should be determined on a case-by-case basis having regard to the characteristics of an area and potential for landscape impacts, as recommended in the	6.Classification of Wind Farm/Turbine Types Section 1.4 of the WES includes definitions of turbine sizes and wind farm sizes. In addition, Section 3.4 of the WES includes guidance in relation to statutory thresholds for wind energy developments. The WES Appendix also includes a definition of Autoproducers.	

			Wind Energy Guidelines 2006. References to height classifications in draft WES are outdated and heights are increasing, so this should be omitted or qualified further. A more flexible approach that places more emphasis on siting and design would be more effective, avoid confusion and unnecessary public concern.	The definitions provided for wind farm sizes and heights are necessary to provide some measure of the magnitude of different scales of wind farm development. The draft WES acknowledges that the scale of development is currently increasing and that a flexible approach is necessary and this is considered appropriate for the purposes of the strategy and for providing a degree of clarity and a common set of reference points for assessing planning applications. Nonetheless, it is considered that for the sake of greater clarity, the definitions provided for different categories of wind turbine sizes and wind energy development sizes be clearly stated in Section 1.4 and that greater clarity be provided as to which aspects of the WES guidance apply to which category of wind turbine or wind energy development. This will be reflected in the SEA ER.	6. See SEA Response
16.	Seosamh & Máire Ó Giobúin	Camus, Casla, Co. na Gaillimhe	Submission recommends following: 1. Local Impacts GCC should consult with the local people. The WES has major implications for the parish of Rosmuc including the Camus community	1. GCC has undertaken public consultation for the draft WES. This has included public notices published in local newspapers, displayed on the GCC website and sent to local radio station, making copies of the draft WES and associated documents available in	1. See SEA Response 2. See SEA Response 3. See SEA Response

			where there are large areas of the parish designated as suitable for wind farm developments in areas such as Lettermuckoo, areas around Gleannicmuirinn, Cappaghoosh and Knocbrack. The Acceptable in Principle areas are to produce 100MW, compared to 240MW for the Strategic Areas, and this output is too high for these areas. Here are the main tourist roads through the area and the wind farms will be visible from these roads. These are the areas where we have relied upon in the development of tourism products, walking routes, fishing, outdoor pursuits and cultural tourism as well as being our own leisure amenities. 2. Public Consultation The date for submissions is deferred to end of summer, September, to allow communities to be knowledgeable of the wind energy strategy and to discuss this, given complex nature of strategy, time taken to prepare it and need for public to have a reasonable time to comment on it. 3 Acceptable in Principle and	the County Buildings, Area Offices and Branch Libraries, a briefing on the draft WES during the public display period, invitations for the public to make written submissions on the draft WES and consideration of the issues raised in these submissions in the Manager's Report and by the Elected Members prior to any decision being taken in relation to the WES. This complies with the statutory requirements set out under the Planning and Development Act 2000 (as amended Landscape capacity was based on LCA of County Galway which identified this area thus; please note this advice is at larger landscape scale rather than site specific. Please also note Failte Irelands Research and Wind Farms and Tourists which finds most tourists do not object to wind farms . 2.Consultation is required for a minimum period of weeks under the Planning and Development Act, additional opportunities for consultation are facilitated for new planning applications. It is noted that there is a range of complex and technical issues relating to wind energy and the environment and the SEA Non Technical Summary aims to provide	4. See SEA Response

			Strategic Areas GCC should consult with individuals and community groups living in the Acceptable in Principle areas or areas affected by the Acceptable in Principle areas. 4. Strategic Areas Applications for planning permission on the Acceptable in Principle areas should not be considered until wind farm developments in the Strategic Areas have been implemented.	information in a more accessible manner. 3. Please see previous point. 4. There is limited opportunity to prioritize this at strategic level. However, the SEA ER scrutinizes these designations in particular as they are likely to see the greatest development interest over the lifetime of the strategy.	
17.	PJ Gaynor & Others	c/o McCarthy, Keville & O'Sullivan, Planning & Environmental Consultants, Block 1 GFSC Moneenageisha Road, Galway	1. Wind Energy Designations. Exclusion of landscape sensitivity class 4 and all/most NHAs/pNHAs is overly constrictive. Severe restrictions in land zoned as strategic/acceptable in principle 2. Targets and Deliverability 3. Grid Connection Infrastructure 4. Site specific issues	1..Landscape advice is broad and is based on Landscape Character Areas not site specific assessments. Section 8.3 Landscape will highlight this point. Regarding the restriction in land zoned as strategic/acceptable in principle the SEA and HDA process have informed the methodology and is considered the most appropriate and robust means to identify areas for wind energy in the existing regulatory framework 2. Targets are considered achievable within the lifetime of the WES 3. The proposal of broad infrastructure	1. See SEA Response 2. See SEA Response 3. See SEA Response 4. See SEA Response 5. See SEA Response

				corridors is not considered appropriate for GCC and regard must be had to Eirgrid Grid 25 and accompanying draft SEA and HDA of same. West Regional Authority recommends inclusion of criteria from West RPGs 2010 -2020 for infrastructural corridors and these will be included in the WES. 4. Noted.	
18.	Enerco Energy Limited	c/o McCarthy, Keville & O'Sullivan, Planning & Environmental Consultants, Block 1 GFSC Moneenageisha Road, Galway	1. Wind Energy Designations 2. Targets and Deliverability 3. Grid Connection Infrastructure 4. Site Specific Issues	These points are noted and considered. However the main advantage of the WES approach, informed by the SEA and HDA is to ensure compliance with relevant land use and environmental legislations, whilst developing in an objective manner the most appropriate areas for wind energy development. Nonetheless, the WES does allow for some flexibility and this area has been subject to site level EIA and HDA. Should these be robust and of sufficient quality and assessment to determine the proper and sustainable development of the wind farm whilst complying with all relevant environmental legislation, this application should be considered on its own merits and in line with proper environmental management and planning.	See SEA Response

19.	Údarás na Gaeltachta	c/o McCarthy, Keville & O'Sullivan, Planning & Environmental Consultants, Block 1 GFSC Moneenageisha Road, Galway	1. Wind Energy Designations The blanket designation of Natura 2000 as Not Normally Permissible areas is not considered appropriate, particularly in case of County Galway as this severely restricts delivery of wind energy development where wind resource is best. Clear policy provisions should be included in final WES to facilitate consideration of wind energy developments in designated Natura 2000 areas in terms of individual merit, including where a net environmental or ecological gain is demonstrated or other satisfactory compensatory measures are agreed. 2. Targets and Deliverability 3. Grid Connection Infrastructure 4. Site Specific Issues 5. Galway Gaeltacht and Irish Language	1. Noted but the HDA and SEA process cannot determine at strategic level that a different zoning would not result in adverse impacts on the conservation objectives of these sites. In addition, the West RPGs advise the exclusion of such sites from wind energy designations and GCC must adhere to this guidance. 2. The targets for the individual wind farm areas is considerably less that the estimated potential of each of these areas (240MW target in Strategic Areas where potential is 600MW, 100MW in Acceptable in Principle areas where potential is 520MW and 45MW in Open to Consideration areas where potential is 480MW) These targets are	1. The zoning of Wind Energy Areas according to the specified hierarchy outlined in the WES has been based on strategic analysis in relation to wind resources, natural heritage designations, landscape sensitivity, infrastructure capacity, settlement growth and amenity considerations. It is acknowledged that the designation of Natura 2000 Sites does not preclude the development of wind farms within these designated conservation areas. This is made clear in the recent document EU Guidance on Wind Energy Development in Accordance with the EU Nature Legislation (2010). However, based on the strategic analysis outlined above Natura 2000 Sites represent significant constraints at the broad strategic level of the WES and it cannot be ruled out that the designation of wind energy area in Natura 2000 Sites will not result in direct impacts that will represent a risk of likely significant effects. Therefore

				considered achievable for the lifetime of the WES.3. Noted but infrastructure is more properly addressed through Grid 25. Eirgrid has recently published the draft SEA ER and HDA for Grid 25 so this will be referenced and considered in the SEA in Chapters Three and Seven and HDA 4. Objective WES Small Scale and Micro Generation specifically addresses wind energy development for autoproducers which could apply on a case by case basis to certain existing industrial sites subject normal planning procedures. See below for proposed amendment that is considered acceptable from the SEA perspective 5. Noted and could be supported through Objective WES Small Scale and Micro Generation if appropriate 6. Noted.	the zoning of Natura 2000 Sites as Not Normally Permissible ensured from the outset that the risk of likely significant effects associated with direct impacts are avoided. Furthermore, the WES has been guided by the Western Regional Planning Guidelines and in particular Objective IO54 of these guidelines. This Objective states that Natura 2000 sites should be placed in the Not Normally Permissible category when developing county-wide Wind Energy Strategies. Notwithstanding this objective and the strategic analysis of the WES, it is noted in Objective IO54 of the Regional Planning Guidelines and also in the WES that the zoning of areas Not Normally Permissible does not preclude wind farm developments where it has been shown through detailed project level Environmental and Habitats Directive Assessments (where necessary) that such developments will not result in adverse impacts to Natura 2000 Sites in particular and natural heritage in general.

					With regard to the AIP adjacent to the Owenriff catchment, it is considered that this AIP will be able to accommodate wind energy development without resulting in likely significant effects to Freshwater pearl mussels. The extent of development will be based on the availability of suitable sites within the AIP for development that will not result in LSEs to mussels. The strategic nature of the WES and this AIP zoning does not facilitate at this stage an approximation of the area of land likely to be available/suitable for wind energy within this AIP. However, it is noted that the Draft WES has zoned approximately 7,000 ha of land as AIP and that a target of 100MW wind energy will be generated from these AIPs. Assuming that the majority of wind energy within this area will be generated using 2MW wind turbines, this equates to an approximate area of 140ha per wind turbine in AIPs. While these calculations are approximations, they serve to

					highlight the extent of the land zoned as AIP in comparison the actual footprint of land required for the installation of approximately 50 wind turbines (i.e. 50 2Mw wind turbines will achieve a target of 100Mw). 2. See SEA Response 3. See SEA Response 4. See SEA Response 5. See SEA Response 6. See SEA Response
20.	Eamon O Domhnaill	AEOLAS Development Consultants, An Bóthar Buí, An Cheathrú Rua, Co. Galway	1. Strategic Areas and Natural Heritage Designations Current Draft WES is too restrictive and will hamper the potential development for wind energy in the County because the area of the County considered as 'Strategic' is very small. In addition to the areas that have been designated as 'Strategic', consider that the following areas contain locations that are suitable for wind energy development and should therefore be designated as 'Strategic': • Parts of South Connemara • Large parts of East Galway including the Slieve Aughty	1.Noted but the Western Region RPG advice on exclusion of Natura 2000 sites for wind energy strategy and the SEA would not be in compliance with this policy if it ignored it. The point regarding Natural Heritage Designations is noted however many of the Natura 2000 sites are designated for blanket bog habitat and these sites often contain areas of deep peat and complex hydrology that may be impacted adversely upon by construction activities. Moreover, in relation to the Sliabh Aughties SPA the HDA cannot say that cumulative impacts would not arise on the conservation objectives of	1 . As per the SEA Response and also the response to Submission No. 19 above. With regard to Natural Heritage Designations the monitoring report publication of Madden and Porter are noted. Whilst the risk of hen harrier (which is the principal qualifying interest of the Sliabh Aughty SPA) collision with wind turbines is considered to be lower than that for most other raptors, it is noted that even when collision rates per turbine are considered low (as in the case of the hen

			Mountains • Existing Wind Farms Parts of South Connemara were designated as 'Strategic' in the previous Wind Strategy and seem to have been omitted on this occasion due in part to Natural Heritage Designations and proximity of rural settlements. The east of the county seems to have been omitted primarily due to the proximity of rural and urban settlements as well as low wind speeds. The Slieve Aughty Mountains seem to have been omitted due to Natural Heritage Designations. This reasoning should be reviewed. EU guidance on wind energy development and Natura 2000 sites indicates that Habitats Directive does not, *a priori*, exclude wind farm developments in or adjacent to Natura 2000 sites but that these need to be judged on a case by case basis. Natura 2000 designation alone should not therefore be a reason for excluding areas for designation as strategic areas. Indeed, in the case of the Slieve Aughty Mountains SPA, there is no evidence that the existing wind farms have had any significant impact on Hen Harriers (Madden &	that particular site. In addition, the County Clare WES also excluded the Sliabh Aughties based on the HDA so this is a consistent approach. 2. This is acknowledged and included in the designations Low Wind Speeds in the WES. 3. Again the methodology used to designate aims to provide an objective and robust approach to wind energy designation and a presumption for all existing wind farms and their surrounds to be strategic is not in keeping with this methodology and approach.	harrier), collision mortality may be high where high bird and wind farm densities overlap. This is of particular relevance to the potential collision impacts that may arise should the WES encourage wind farm development in the Sliabh Aughty SPA. Furthermore, while the Madders and Porter monitoring results of the Derrybrien wind farm did not record displacement impacts associated with wind turbines, other studies from Northern Ireland and Scotland suggest that hen harrier nesting attempts may be displaced within 200 – 300m of wind turbines. Should such a risk of displacement occur, the proliferation of wind farms within the Sliabh Aughty SPA will have the potential to significantly affect the conservation status of this species within the SPA. It is for this reason (i.e. the risks associated with the cumulative impacts of wind farms), in addition to the reasons outlined in the responses to Submission 19, Point No. 1 that the Slieve Aughty SPA has been zoned Not Normally Permissible

			Porter 2007). 2. Low Wind Speeds Turbines with 100m hub heights were erected and commissioned on low lying flat peatlands near the Lisheen Mine in Co. Tipperary in 2010. This confirms that inland sites, with low lying, flat landscapes can have an adequate wind resource. Flat, low lying areas in the east of Co. Galway would have adequate wind speeds with the use of taller hub heights. According to the Wind Energy Development Guidelines (2006) tall turbines are aesthetically the most appropriate in such landscapes: *Low lying, flat landscapes are most suitable for large wind turbines in excess of 100m hub heights.* 3. Existing Wind Farms Existing wind farms already have critical infrastructure in place, including access roads, on-site roads, hardstands, turbine foundations, grid control buildings and compounds, and grid connections to the national grid. The re-powering or extension of existing wind farms provides the most economical means for		2. See SEA response 3. See SEA response

			increasing the County's renewable electricity generation capacity and with the least environmental impact. Existing wind farms and their surrounds should therefore be designated as Strategic Areas.		
21.	Gaoi an Iarthar Teo.	c/o McCarthy, Keville & O'Sullivan, Planning & Environmental Consultants, Block 1 GFSC Moneenageisha Road, Galway	1. Wind Energy Designations Draft WES only designates 2% of County area as Strategic Areas or Acceptable in Principle areas for wind farm development and this is regarded as unduly restrictive and additional areas should be identified in the final strategy. 2. Targets and Deliverability The currently proposed wind energy target is too conservative as wind is likely to be primary source of renewable energy in Ireland, Galway has excellent wind resources that other Counties do not have and need to take a longer term view of wind energy development given Government's commitment to sector. 3. Grid Connection Infrastructure	1.The Western Region RPGs exclude Natura 2000 sites from wind energy strategies and this must be adhered to under the Planning and Development Act 2010. The SEA and HDA informed the WES developed and is considered the most appropriate and robust approach to wind energy strategy development within the County. 2. The SEA and HDA informed the WES developed and is considered the most appropriate and robust approach to wind energy strategy development within the County. 3.Noted, however this is not considerable feasible within the timeframe of the WES and Eirgrid 25.	1. With regard to Natura 2000 Sites see response to Submission No. 19, Point No. 1 2. See SEA response 3. See SEA response

			Whilst grid connection is a key consideration for wind energy development, particularly in terms of financial viability, areas should not be ruled out for wind energy development merely as a result of any current deficiency in grid accessibility and this should be regarded as a determining factor. 4. Site Specific Issues Submissions refers to subject lands at Lettermuckoo that received a grant of planning permission for a development consisting of 27 turbines generating 81MW of electricity. The application was accompanied by an EIA demonstrating that the site could accommodate the development without giving rise to significant environmental effects. The subject lands at Lettermuckoo are designated as Acceptable in Principle in draft WES. WES also states that this character area is highly sensitive to large/very large wind farm proposals (defined as 11 or more turbines) and moderately to highly sensitive to medium wind farms (6-10 turbines). Draft WES's	4. Acknowledged and noted. Please note that landscape advice is based on broad Landscape Character Areas defined in the 2002 LCA of the County and offers advice rather than prescription in relation to site specific. The wording can be expanded upon in the SEA (Chapter Seven and Eight) to make this clearer In addition, the WES and SEA do allow for assessment on case by case basis and it is important to restate that both the WES and SEA are county level strategic documents that aim to direct wind energy to the most appropriate levels based on the SEA and HDA processes. Should the EIA and HDA undertaken on this site be of appropriate quality and assessment this development should be considered by the Board on its own merits. Wind energy developers should also consider the landscape capacity guidance contained in Section 4 and Table WE10 of the WES. This guidance is intended as broad advice based on landscape character areas and will need to be balanced against site-specific assessments of the landscape capacity	4. See SEA response

			conservative target of 100MW from Acceptable in Principle areas would be substantially delivered from this single site. There is a serious issue in Strategy's assessment of landscape capacity as WES considers that the Landscape Character Area within which it is located is considered to have a capacity to accommodate small to medium scale wind farms (5-10 turbines). There is a danger that specified number of turbines will be taken as prescriptive and used against proposals in a way that Strategy may not have intended. Also consider that there will be any landscape benefit from limiting turbines in this area as extent of visibility will not be significantly different.	at project level. .	
22.	Brendan Mulligan	Engineers Ireland West Region	1. Wind Farm Areas, Natural Heritage Designations and Biodiversity Concerned that the outcome of the methodology applied has been a very conservative draft strategy with only 1% of County designated as Strategic Areas and a further 1% designated as Acceptable in Principle Areas, particularly given the world class	. 1. The SEA and HDA informed the	1. See response to Submission 19, Point No. 1.

			wind resources in the County and the national renewable energy targets. The fact that 115 MW of wind energy developments have already been permitted in areas that are now designated in the draft strategy as Not Normally Permissible Areas is proof of how conservative the draft strategy is. The exclusion of all cSACs, SPAs, NHAs and pNHAs from potential "Strategic Areas" and "Acceptable in Principle Areas" is too conservative. Developments within Natura 2000 sites are not banned by EU legislation. Proposed developments within Natura 2000 sites must be subject to rigorous assessment in accordance with the EU Habitats and Birds Directives. In October 2010 the EU produced guidance on wind energy developments in Natura 2000 sites. The proposed effective banning of wind energy developments in Natura 2000 sites by the draft strategy renders these guidelines pointless. 2. Wind Energy Targets The target of achieving 500 MW from wind energy developments in the County by 2020, while significant	WES developed and is considered the most appropriate and robust approach to wind energy strategy development within the County. With regard to natural heritage designations the Western Region RPGs exclude Natura 2000 sites from wind energy strategies and this must be adhered to under the Planning and Development Act 2010. The SEA and HDA informed the WES developed and is considered the most appropriate and robust approach to wind energy strategy development within the County 2. Noted, however the methodology used has estimated this target as viable within the lifetime of the strategy and within current planning and environmental legislations.	2. See SEA response

			in terms of County Galway's own energy needs, is modest in comparison to the estimated 6,000MW of installed capacity required to achieve Ireland's target of 40% of electricity from renewable resources by 2020. It is by no means certain that this target can be achieved as developments will be subject to "detailed environmental and visual assessment 3. Access to the Transmission Network The new 110kV Screebe line will facilitate the connection of some of the proposed wind farm developments but using access to this line as a criterion in determining the designations of "Strategic Areas" and "Acceptable in Principle Areas" is too restrictive. There is also a need for infrastructure improvements, greater certainty regarding where wind energy will be developed so that infrastructure improvements can be planned under EirGrid's Grid 25 Strategy and a regional approach to	3. . 3. This is recognized as a constraint and whilst GCC can be supportive of these upgrades the planning and implementation of same lies with Eirgird 4.Noted and please see below for proposed amendment: *Small-Scale and Micro Generation Wind Energy Projects*	4. See SEA response 5. See SEA response

			the develop of renewable energy. 4. Wind Energy Auto-Production Note the provision in Objective WE8 for autoproducers but are of the opinion that it is too restrictive. Submit that appropriate scale wind energy development projects by autoproducers should be facilitated on existing and new industrial estates, commercial and business parks in the County, where appropriate.	*Facilitate, where appropriate, small scale wind energy development projects by autoproducers, in urban areas,* industrial estates *and* business parks, or *for small community-based proposals to help meet the immediate needs of the development being provided and/or to reduce their reliance on fossil fuels, and subject to the following criteria being met* .	
24.	Gael Gibson, Principal Planner, Programme Management Office, Grid Development & Commercial	EirGrid, The Oval, 160 Shelbourne Road, Ballsbridge, Dublin 4	Baseline information provided on current and planned transmission infrastructure and Gate 3 connections. Small amendments proposed including section 1.2.3 , 1.2.4, and 2.2.3 of the WES	These changes mainly concern the baseline information provided in the WES and these will be amended and included in the SEA as appropriate. In addition the Draft SEA and HDA of Grid 25 is now available and reference will be made to this in Chapter Three of the SEA ER, and where relevant Chapters Four, Seven and Eight.	

Annex 2

Addendum No. 2 to NIR

HDA of proposed Material Alterations to the Draft WES

Draft County Galway Wind Energy Strategy

Second Addendum Report for the Habitats Directive Assessment Natura Impact Report (HDA NIR)

Introduction

This report presents the updates to the Natura Impact Report which have arisen from the meeting of Galway County Council on 21st July and alterations proposed by elected members on the draft Wind Energy Strategy (WES). The following amendments, not in accordance with the Manager's Report and Recommendations of 30th June 2011, were made by the elected members to the proposed WES at the Galway County Council meeting held on 21st July 2011.

The aim of this Addendum Report is to assess the potential for Likely Significant Effects to Natura 2000 to occur as a result of the proposed amendments by the elected members and to identify if additional mitigation measures will be required. This report should be read in conjunction with the Managers Report and Strategic Environmental Assessment Environmental Report on the proposed material amendments.

Material Alterations

The headings in the remainder of this report review to the amendments proposed by the elected members. Where new text has been proposed for the draft WES, this is presented in red text. The environmental implications of this amendment is then assessed, this is shown in blue font.

1. **Section 4.2 Strategic Guidance on Landscape Capacity for Wind Energy Developments**

Insert after first paragraph: This guidance is intended as broad advice on landscape character areas and will need to be balanced against site-specific assessments of the landscape capacity at project level.

The aim of the landscape guidance contained in the draft WES is to provide strategic level advice and therefore the site specific landscape impacts are more appropriately addressed at project level. This amendment is assessed as a neutral to positive impact in relation to landscape and therefore no mitigation measures are suggested for this amendment. This amendment does not involve any land use or physical activities that have the potential to affect qualifying habitats or species of Natura 2000 sites. As such this amendment will not result in likely significant effects to Natura 2000 Sites,

2. **Section 5.1.5 Community Involvement and Benefit**

All wind farm developments shall require a Community Impact Statement (CIS) in identifying the potential impact of the proposed development on the local community and proposals to address any impacts identified. The CIS will also include details of all measures taken to consult with the local community and any benefits that may arise or be provided for the local community as a result of the proposed development.

The purpose of this section is to promote adequate consultation with local communities in relation to wind energy developments. The current and proposed text will enhance consultation procedures with local communities in relation to wind energy developments and is identified as providing a positive impact on human health and population within the Strategic Environmental Assessment process which has been undertaken in parallel to the Habitats Directive Assessment. This amendment does not involve any land use or physical activities that have the potential to affect qualifying habitats or species of Natura 2000 sites. As such this amendment will not result in likely significant effects to Natura 2000 Sites,

3. **Include the following additional wording in WE4 after the final paragraph**

The approach taken to the compilation of the Wind Energy Strategy is based on a consistent and robust methodology which was not varied to take account of individual planning permissions which have been fully assessed under HDA. However, where any project has been granted planning permission following HDA

assessment which shows that the project complies with the Habitats Directive and the Birds Directive, it is considered that this project is consistent with and in full compliance with this Wind Energy Strategy".

While this amendment will not, of itself, result in likely significant effects to Natura 2000 Sites it is noted that the Wind Energy Strategy aims to provide strategic direction to encourage renewable energy and to guide the siting and design of wind energy developments in appropriate locations within the County. The WES has been guided by a set of criteria outlined in Chapter 2 of the WES. Individual project level planning applications do not form part of this criteria and the wording of this proposed amendment is already outlined in the following wording of Objective WE4:

……unless project level HDA and EIA can demonstrate that environmental and other impacts can be successfully avoided, minimised and/or mitigated.

And the following wording of Objective WE11, second bullet point (as Amended in the First Addendum to the NIR):

Permission will only be granted where project level Article 6 Assessments conclude that no likely significant effects will occur.

Where project level habitats directive assessments result in a "finding of no significant effects" the EU Habitats Directive and associated national legislation transposing this Directive into Irish Law will not represent a fetter to wind energy proposals. This general principal is acknowledged in the original wording of Objective WE4 and the wording of Objective WE11. The proposed amendment does not undermine or conflict with the original wording of Objective WE4 but serves to narrow the focus of the original wording of this Objective by referring only to Habitat Directive Assessments (see SEA Environmental Report).

While this proposed amendment will not result in likely significant effects to Natura 2000 site the SEA assessment of this proposed amendment is noted.

4. **Include the following additional wording in WE2 after the final paragraph**

"The approach taken to the compilation of the Wind Energy Strategy is based on a consistent and robust methodology which was not varied to take account of individual planning permissions which have been fully assessed under HDA. However, any project which was subject to a planning application which has been granted permission following assessment of all factors including landscape capacity, it is considered that this project is consistent with and in full compliance with this Wind Energy Strategy".

While this amendment will not, of itself, result in likely significant effects to Natura 2000 Sites it is noted that the Wind Energy Strategy aims to provide strategic direction to encourage renewable energy and to guide the siting and design of wind energy developments in appropriate locations within the County. The WES has been guided by a set of criteria outlined in Chapter 2 of the WES. Individual project level planning applications do not form part of this criteria and the wording of this proposed amendment is already outlined in the following wording of Objective WE4:

……unless project level HDA and EIA can demonstrate that environmental and other impacts can be successfully avoided, minimised and/or mitigated.

And the following wording of Objective WE11, second bullet point (as Amended in the First Addendum to the NIR):

Permission will only be granted where project level Article 6 Assessments conclude that no likely significant effects will occur.

5. **Amend the designation on the areas of land on the attached map from "Acceptable in Principle" to "Not Normally Permissible".**

The NIR of the original WES found that no likely significant affects to Natura 2000 sites would result from the implementation of the draft WES provided all mitigatory and precautionary measures are adhered to. As the WES does not set targets for the development of wind energy in areas designated Not Normally Permissible the

amendment of a wind energy designation from Acceptable in Principle to Not Normally Permissible will not result in likely significant effects to Natura 2000 sites in the vicinity of the area where this amendment applies.

However, the amendment of an area Acceptable in Principle (AIP) to Not Normally Permissible reduces the overall "landholding" designated as AIP and as such concentrates the development targets associated with AIPs into a smaller "landholding". The reduction in the overall AIP designation as a result of this amendment will constitute 171.1ha or 2.4% of the overall AIP designation. With this reduction in place 6,823ha will remain designated as AIP and this land area will be required to meet a target of 100MW by 2020. Considering the extent of the remaining landholding designated as AIP and provided all mitigatory and precautionary measures are adhered to it is considered that sufficient flexibility in terms of wind farm infrastructure siting and layout design will remain to ensure that 100MW can be installed without adverse impacts to Natura 2000 Sites occurring.

AS outlined in the SEA ER to this amendment it is noted that this change in designation does dilute the WES methodology but has been proposed in response to concerns raised by the local community.

6. **Amend the designation on the lands which were the subject of Submission No.18 from "Not Normally Permissible" to "Open for Consideration".**

This amendment changes the designation of an area of land amounting to 124.8ha from Normally Permissible to Open for Consideration.

This amendment area is enclosed by the Connemara Bog Complex (Site Code: 002034) SAC which forms the boundary to the amendment area. An existing farm access track links the amendment area to the local road network to the south of this area.

The Connemara Bog Complex SAC is the only site that is linked to the amendment area via impact pathways.

An assessment of potential impact pathways linking this area to the qualifying interest of this SAC is outlined in Table 6.1 below.

Table 6-1: Assessment of likely significant affects to the Connemara Bog Complex SAC as a result of the amendments in designation with respect to Submission 18

Qualifying Interest	Sensitivity of Qualifying Interest	Impact Pathway	Potential for Likely Significant Effects	Comment and Conclusion
Blanket bog	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	Hydrological linkages occur between this amendment area and this qualifying interest. A review of aerial photography suggests that the amendment area itself is characterised by modified and disturbed blanket bog with the presence of lateral peat bank cuttings shown on the photography. However, the photography suggests that intact and (likely) active blanket bog occurs adjacent to the amendment area, particularly to the east of this area. Deep excavations associated with	Yes, in the absence of appropriate mitigation these indirect impacts will have the potential to result in likely significant effects to this qualifying interest.	The NIR of the draft WES prescribed a range of mitigation measures to ensure that the likely significant effects associated with the designation of wind energy areas adjacent to/in the vicinity of blanket bogs will avoid indirect impact to this qualifying habitat. These measures will apply for this amendment designation. Provided the mitigation

		turbine foundations in particular and other wind farm infrastructure will have the potential to result in indirect impacts to this qualifying interest.		measures outlined in the NIR of the draft WES with respect to blanket bogs are implemented and the precautionary measures of the WES and draft NIR are adhered to, particularly Objectives WE 4 and WE11, the designation of the amendment area as Open for Consideration will not result in likely significant effects to this qualifying interest.
Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia	Surface and groundwater dependant. Highly sensitive to hydrological changes.	The only lake linked to the amendment area via a (hydrological) impact pathway is the lower Boliska Lough which is feed by the	Yes. Adverse impacts to the Scruffaunnambrack River will have the potential to lead to likely significant effects to the	The NIR of the draft WES prescribed a range of mitigation measures to ensure that the likely significant effects

uniflorae)	Highly sensitive to pollution	Scruffaunnambrack River. While this river does not occur within the boundary of the amendment area it is likely to receive surface water draining from this area. The Lower Boliska Lough is likely to be representative of an oligotrophic water that may support the vegetation community associated with this Annex 1 habitat. Adverse impacts to the water quality of the Scruffaunnambrack River will have the potential to result in likely significant effects to the lower section of Lough Boliska.	lower Boliska Lough.	associated with the designation of wind energy areas adjacent to/in the vicinity of watercourse will avoid indirect impact to the water quality of these rivers/streams. These measures will apply for this amendment designation. Provided the mitigation measures outlined in the NIR of the draft WES with respect to water quality are implemented and the precautionary measures of the WES and draft NIR are adhered to, particularly

				Objectives WE 4 and WE11, the designation of the amendment area as Open for Consideration will not result in likely significant effects to this qualifying interest.
Natural dystrophic lakes and ponds	Surface and groundwater dependant. Highly sensitive to hydrological changes. Highly sensitive to pollution	No natural dystrophic lakes and ponds are linked to the amendment area via impact pathways.	The designation of the amendment area as Open for Consideration will not result in likely significant effects to this qualifying habitat.	
Water courses of plain to montane levels with the Ranunculion	Surface and groundwater dependent. Highly sensitive to	The Scruffaunnambrack and the Knock River are likely to support examples of this Annex 1 habitat. Surface	The decrease in water quality of the Scruffaunnambrack and Knock Rivers derived	See comment for the qualifying habitat "Oligotrophic waters" above.

fluitantis and Callitricho-Batrachion vegetation	hydrological changes. Highly sensitive to pollution.	waters from the amendment area drain to these rivers. The migration of contaminants and silts from the amendment area along surface water pathways will have the potential to adversely affect the water quality of the above rivers.	from polluting surface waters from the amendment area will have the potential to result in likely significant effects to this Qualifying habitat.	
Northern Atlantic wet heaths with Erica tetralix	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	This habitat is likely to occur along with blanket bog as part of a mosaic of habitats adjacent to the amendment area. The potential impacts to this habitat will reflect those outlined for blanket bogs above.	There will be a potential for likely significant effects to occur. See assessment for "Blanket Bog" above.	See comment for the qualifying habitat "Blanket Bog" above.
European dry heaths	Surface and groundwater dependent. Highly sensitive to	This habitat is likely to occur along with wet heath and blanket bog as part of a mosaic of habitats adjacent to	There will be a potential for likely significant effects to occur. See assessment for "Blanket	See comment for the qualifying habitat "Blanket Bog" above.

	hydrological changes. Inappropriate management	the amendment area. The potential impacts to this habitat reflect those outlined from blanket bogs and wet heath.	Bog" above.	
Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	Surface and groundwater dependent. Moderately sensitive to hydrological change. Changes in management. Changes in nutrient status	This habitat is likely to occur along with heath and blanket bog habitats as part of a mosaic of habitats adjacent to the amendment area. The potential impacts to this habitat reflect those outlined from blanket bogs and heath habitats.	There will be a potential for likely significant effects to occur. See assessment for "Blanket Bog" above.	See comment for the qualifying habitat "Blanket Bog" above.
Old sessile oak woods with Ilex and Blechnum in British Isles	Changes in management. Changes in nutrient or base status. Introduction of alien	No old sessile oak woods are linked to the amendment area via impact pathways.	The designation of the amendment area as Open for Consideration will not result in likely significant effects to this	N/A

	species.		qualifying habitat.	
Alkaline fens	Groundwater dependant. Highly sensitive to hydrological changes. Changes in nutrient or base status	This habitat may occur along with heath and blanket bog habitats as part of a mosaic of habitats adjacent to the amendment area. The potential impacts to this habitat reflect those outlined from blanket bogs and heath habitats.	There will be a potential for likely significant effects to occur. See assessment for "Blanket Bog" above.	See comment for the qualifying habitat "Blanket Bog" above.
Coastal lagoons	Surface, ground and marine water dependent. Highly sensitive to hydrological changes. Highly sensitive to pollution. Changes in salinity and tidal regime	No coastal lagoons are linked to the amendment area via impact pathways.	The designation of the amendment area as Open for Consideration will not result in likely significant effects to this qualifying habitat.	N/A

Transition mires and quaking bogs	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	This habitat may occur along with heath and blanket bog habitats as part of a mosaic of habitats adjacent to the amendment area. The potential impacts to this habitat reflect those outlined from blanket bogs and heath habitats.	There will be a potential for likely significant effects to occur. See assessment for "Blanket Bog" above.	See comment for the qualifying habitat "Blanket Bog" above.
Depressions on peat substrates of the Rhynchosporion	Surface and groundwater dependent. Low sensitivity to hydrological changes. Erosion, land-use changes	This habitat is likely to occur along with heath and blanket bog habitats as part of a mosaic of habitats adjacent to the amendment area. The potential impacts to this habitat reflect those outlined from blanket bogs and heath habitats.	There will be a potential for likely significant effects to occur. See assessment for "Blanket Bog" above.	
Reefs	Sensitive to disturbance and	No reefs are linked to the amendment area via impact	The designation of the amendment area as	N/A

	pollution.	pathways	Open for Consideration will not result in likely significant effects to this qualifying habitat.	
Salmo salar	Surface water dependent Highly sensitive to hydrological change	No standing water in the form of ponds or lakes occur within the amendment area. However, upper tributaries of the Knock River and the Scuffaunnambrack River occur to the east and west (respectively) of the amendment area. Surface water draining from the amendment area drain to these watercourses. The Scuffaunnambrack River drains into the lower Boliska Lough which is known to support trout and occasional salmon. Knock Lough and River are	The decrease in water quality of the Scruffaunnambrack and Knock Rivers derived from polluting surface waters from the amendment area will have the potential to result in likely significant effects to this Qualifying specie.	See the comment for qualifying habitat "Oligotrophic Waters" above.

		known to contain occasional salmon while the water quality of Knock River is classed as Good Status by the Galway Coast Water Management Unit.		
Lutra lutra	Surface and marine water dependent. Moderately sensitive to hydrological change. Sensitivity to pollution	Otters are likely to be associated with the Scruffaunnambrack and Knock Rivers.	The decrease in water quality of the Scruffaunnambrack and Knock Rivers derived from polluting surface waters from the amendment area will have the potential to result in likely significant effects to this Qualifying specie.	See the comment for qualifying habitat "Oligotrophic Waters" above.
Euphydryas aurinia	Changes in management. Habitats are sensitive to hydrological changes.	The marsh fritillary is a mobile species that establishes meta-populations at different sites over time. Should populations	The loss of suitable Succisa pratensis breeding habitat within the amendment area	The NIR of the draft WES prescribed a range of mitigation measures to ensure that the likely

	Changes in nutrient base status.	associated with the SAC breed within the amendment area, the loss of suitable breeding habitat within this area will have the potential to adversely affect the conservation status of the populations associated with the Connemara SAC.	(should it occur) will have the potential to result is likely significant effects to this Qualifying specie.	significant effects associated with the designation of wind energy areas adjacent to/in the vicinity of SACs designated for the occurrence of marsh fritillary will be avoided. These measures will apply for this amendment designation. Provided the mitigation measures outlined in the NIR of the draft WES with respect to marsh fritillary are implemented and the precautionary measures of the WES and draft NIR are adhered to, particularly

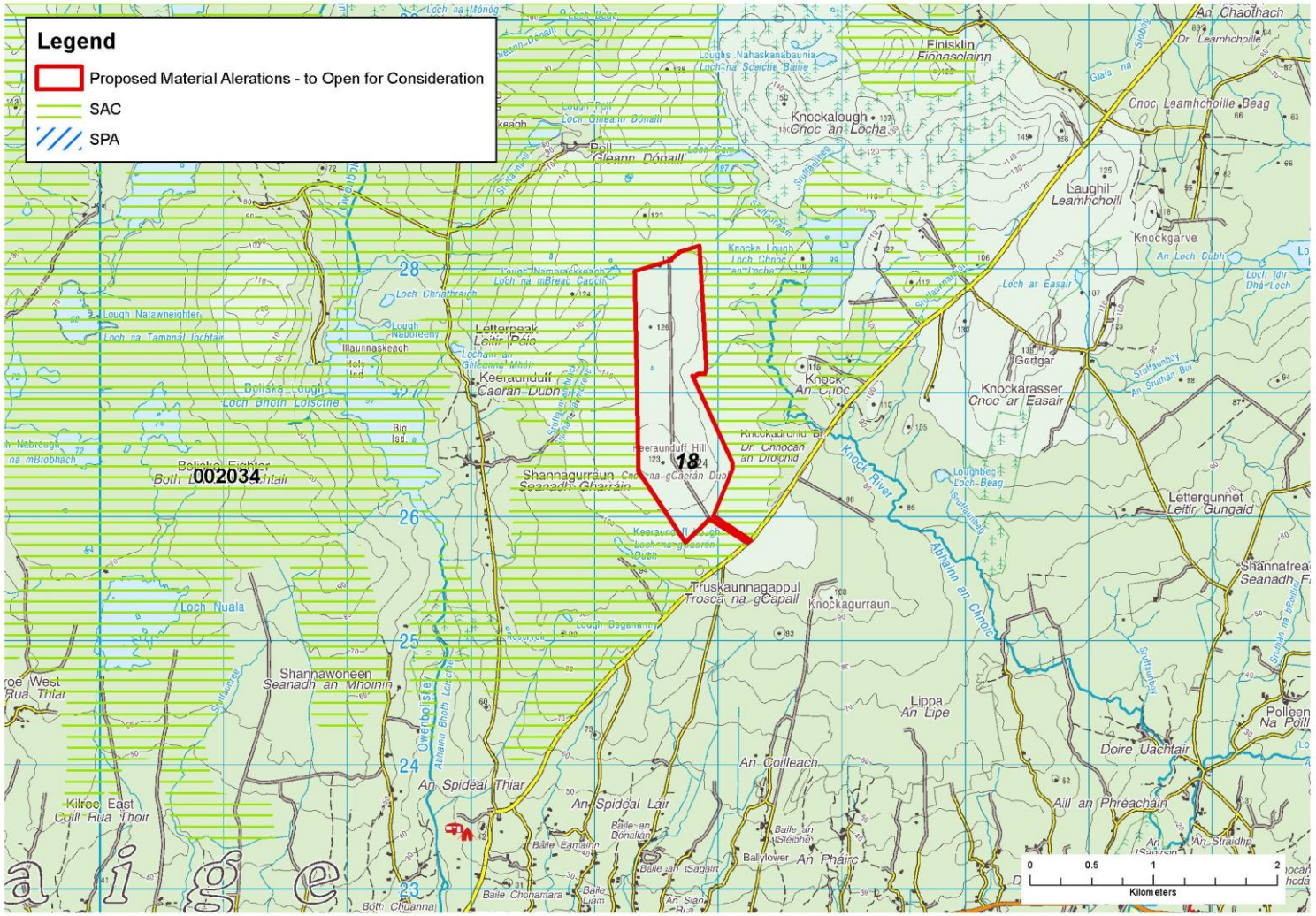
				Objectives WE 4 and WE11, the designation of the amendment area as Open for Consideration will not result in likely significant effects to this qualifying interest.
Najas flexilis	Highly sensitive to hydrological changes. Highly sensitive to pollution.	Slender Naiad is likely to be associated with Lough Boliska which is linked to the amendment area via the Scruffaunnambrack River.	The decrease in water quality of the Scruffaunnambrack Rivers derived from polluting surface waters from the amendment area will have the potential adversely affect the status of Lough Boliska and any populations of Slender Naiad (should they occur) supported by this lake. Such adverse	See comment for the qualifying habitat "Oligotrophic Waters" above.

			impacts will have the potential to result in likely significant effects to this Qualifying specie.	

Provided the mitigation measures and the precautionary measures outlined in the NIR of the draft WES are implemented and adhered to, the amendment of this area from Not Normally Permissible to Open for Consideration is not likely to result in likely significant effects to N2K sites.

Furthermore, as outlined in Objective WE 4 and WE11, any proposed wind energy project in this amendment area will be required to undergo project-level HDA. Planning permission will only be given to projects that result in a finding of no significant effects to N2K following the completion of project level HDA.

Amendment Area relating to Submission No. 18 and relationship with Connemara SAC



7. **Amend the designation on the lands which were the subject of Submission No 17 from "Not Normally Permissible" to "Open for Consideration".**

This amendment changes the designation of an area of land amounting to 438.8ha from Normally Permissible to Open for Consideration.

The N2K sites occurring in the vicinity of this area of land are outlined in the Table below.

Table 7-0-2: SAC Sites occurring within the vicinity of the amendment area

N2K Site Name	Distance from Amendment Area
Twelve Bens and Garraun Complex SAC	771m
Connemara Bog SAC	2079m
Slyne Head SAC	4902m

The Twelve Bens/Garraun Complex SAC is the closest N2K site to this area of land, located at 771m to the east of the amendment area and is the only N2K site that is linked to the amendment area via impact pathways.

An assessment of potential impact pathways linking this area to the qualifying interest of this SAC is outlined in Table 7.2 below.

Figure 7.1: Amendment Area relating to Submission No17 and relationship with Twelve Bens SAC

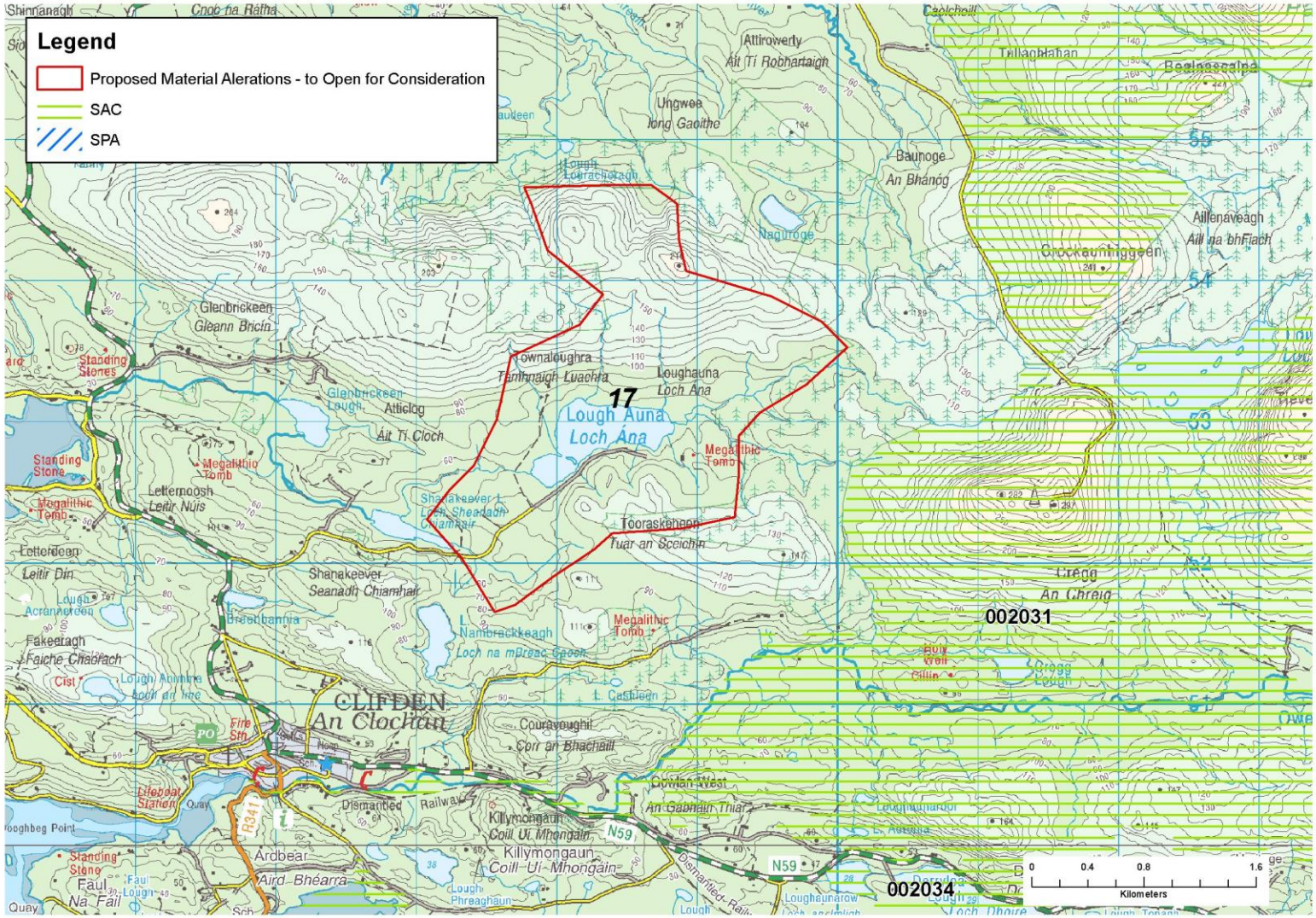


Table 7-2: Assessment of likely significant affects to the Twelve Bens Garraun Complex SAC as a result of the amendments in designation with respect to Submission 17

Qualifying Interest	Sensitivity of Qualifying Interest	Impact Pathway	Potential for Likely Significant Effects	Comment and Conclusion
Blanket bog	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	Hydrological linkages occur between this amendment area and this qualifying interest. However this qualifying interest occurs upstream of the proposed amendment area and therefore is not at risk from activities that would be associated with any potential wind energy development in the amendment area	No	
Siliceous rocky slopes with chasmophytic vegetation	Erosion, overgrazing and recreation.	No impact pathways link this qualifying interest to the amendment area.	No activities that would be associated with any potential wind energy development in the amendment area will present a risk of likely	

			significant effects to this qualifying interest.	
Alpine and Boreal heaths	Changes in management. Changes in nutrient or base status. Moderately sensitive to hydrological change	Hydrological linkages occur between the amendment area and this qualifying interest. However this qualifying interest occurs upstream of the proposed amendment area and therefore is not at risk from activities that would be associated with any potential wind energy development in the amendment area.	No	
Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	Surface and groundwater dependant. Highly sensitive to hydrological changes. Highly sensitive to pollution	Hydrological linkages occur between the amendment area and this qualifying interest. However this qualifying interest occurs upstream of the proposed amendment area and therefore is not at risk from activities that would be	No	

		associated with any potential wind energy development in the amendment area.		
Old sessile oak woods with Ilex and Blechnum in British Isles	Changes in management. Changes in nutrient or base status. Introduction of alien species.	No impact pathways link this qualifying interest to the amendment area.	No activities that would be associated with any potential wind energy development in the amendment area will present a risk of likely significant effects to this qualifying interest.	
Depressions on peat substrates of the Rhynchosporion	Surface and groundwater dependent. Low sensitivity to hydrological changes. Erosion, land-use changes	Hydrological linkages occur between the amendment area and this qualifying interest. However this qualifying interest occurs upstream of the proposed amendment area and therefore is not at risk from activities that would be associated with any potential wind energy development in	No	

		the amendment area.		
Salmo salar	Surface water dependent Highly sensitive to hydrological change	Hydrological linkages occur between the amendment area and this qualifying interest. Two upland watercourses flow from the Sac to Lough Auna which is located within the amendment area.	While the upland streams are not likely to represent the principal salmonid watercourses in the SAC the development of wind energy infrastructure in this amendment area will have the potential to adversely affect water quality within the surrounding area. A decrease in water downstream of the SAC and the upper sections of the two watercourses which occur within the SAC will have the potential to adversely affect salmon occurring within these	The NIR of the Draft WES undertook a Stage 2 Assessment of potential impacts to salmon as a result of wind energy developments adjacent to or within the catchment of SACs designations that include salmon as a Qualifying Interest. A number of mitigation measures have been prescribed to ensure that the likely significant effects as a result of wind energy designations associated

			watercourses.	with the WES are avoided. These measures will apply for this amendment designation. Provided the mitigation measures outlined in the NIR of the draft WES with respect to salmon and water quality are implemented and the precautionary measures of the WES and draft NIR are adhered to the designation of the amendment area as Open for Consideration will not result in likely significant effects to this qualifying interest.

Lutra lutra	Surface and marine water dependent. Moderately sensitive to hydrological change. Sensitivity to pollution	See the assessment for Salmon above.	See the assessment for Salmon above.	See the assessment for Salmon above.
Margaritifera margaritifera (Incorporates the Dawros Margaritifera catchment Sub-Basin Plan)	Surface water dependent. Highly sensitive to hydrological change Very highly sensitive to pollution	The Dawros River Catchment is the principal watercourse which supports freshwater pearl mussel within this SAC. The amendment area is not hydrologically linked to this catchment area. No records of this qualifying interest are associated with Lough Auna and the catchment surrounding the amendment area. However the assessment for	As no freshwater pearl mussel are associated with the catchment in which the amendment area occurs, the designation of the amendment area will not result in significant likely effects to the known distribution of this species. However, the assessment for salmon applies to this qualifying species, particularly so as the life cycle of this	See the assessment for Salmon above. All measures outlined in the NIR of the draft WES with regard to freshwater pearl mussels and water quality should apply to this amendment area.

		salmon above also applies to this qualifying interest.	pearl mussel is reliant on healthy stocks of salmon and good water quality.	
Najas flexilis	Highly sensitive to hydrological changes. Highly sensitive to pollution.	Hydrological linkages occur between the amendment area and this qualifying interest. However this qualifying interest occurs upstream of the proposed amendment area and therefore is not at risk from activities that would be associated with any potential wind energy development in the amendment area.	No	

Provided the mitigation measures and the precautionary measures outlined in the NIR of the draft WES are implemented and adhered to the amendment of this area from Not Normally Permissible to Open for Consideration is not likely to result in likely significant effects to N2k sites.

Furthermore, as outlined in Objective WE 4 and WE11, any proposed wind energy project in this amendment area will be required to undergo project-level HDA. Planning permission will only be given to projects that result in a finding of no significant effects to N2K following the completion of project level HDA.

8. **Amend the designation on the land which were the subject of Submission No.8 (marked as No.7 on map) from "Not Normally Permissible" to Open for Consideration".**

This amendment changes the designation of an area of land amounting 79.2ha from not Normally Permissible to Open for Consideration. This area of land is entirely situated within the Slieve Aughty SPA and partially situated within the Old Sonnagh Bog SAC. Figure 8.1 below shows the relationship between this amendment area and the above N2K sites.

The Slieve Aughty SPA is designated for supporting internationally important breeding populations of Hen Harrier and Merlin.

The Old Sonnagh Bog SAC is designated for supporting the Annex 1 listed habitat: Blanket Bog. The NPWS site synopsis for this SAC refers to the blanket bog occurring here as being "*a good example of intact, lightly grazed upland blanket bog"*. Intact, or active, blanket bog is listed as a priority habitat under Annex 1 of the EU Habitats Directive.

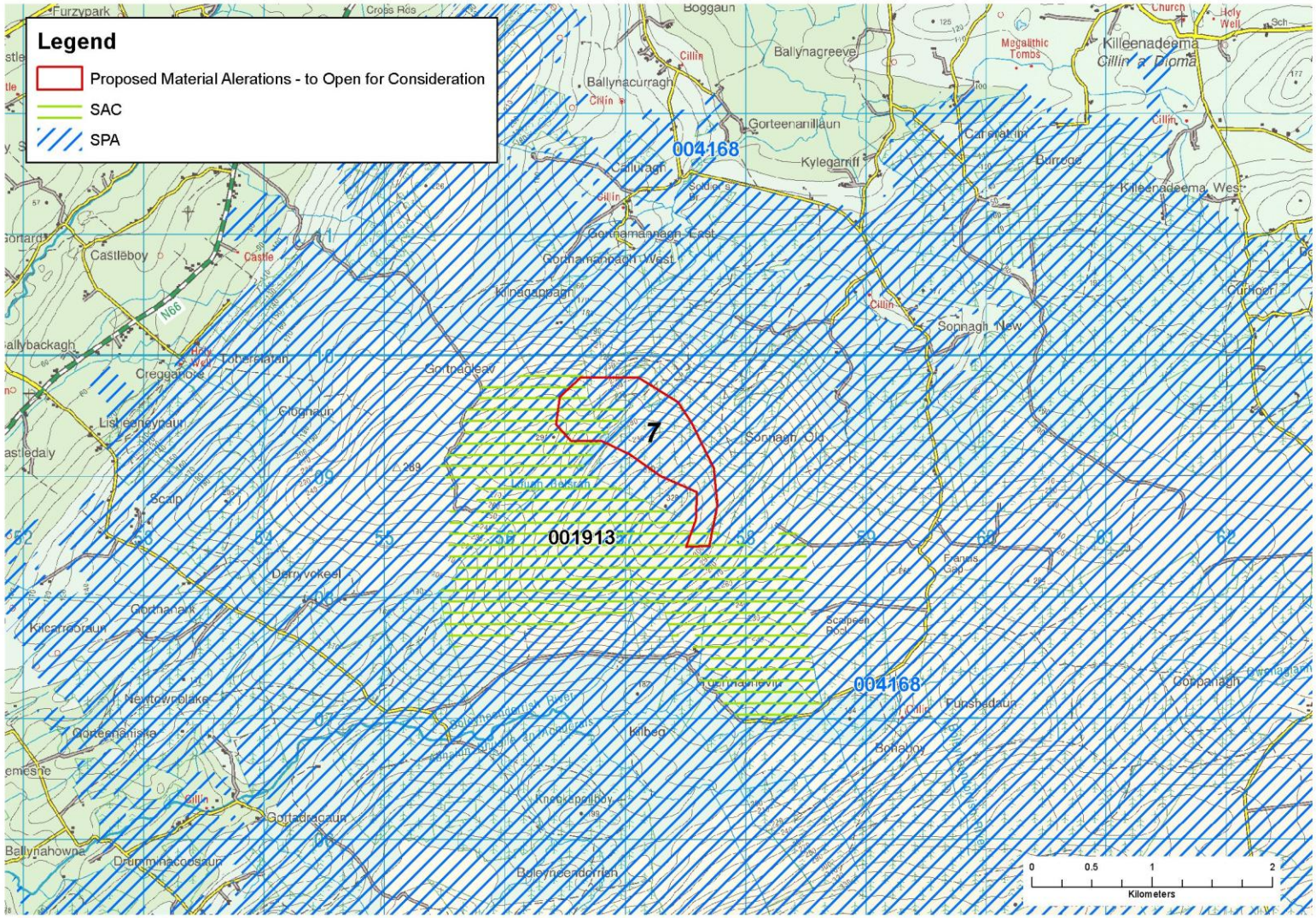
The designation of this area as Open for Consideration will have the potential to lead to direct impacts to the Slieve Aughty SPA and Old Sonnagh Bog SAC. Direct impacts, such as a loss of Annex 1 blanket bog habitat or breeding/foraging habitat for

Hen Harriers and Merlin, as a result of land-take associated with wind farm developments will have the potential to result in likely significant effects to these sites. Where direct habitat loss of such habitats occur mitigation measures are unlikely to avoid likely significant effects and compensation measures will be required. Therefore the implementation of mitigation measures outlined in the NIR of the draft WES or additional mitigation measures will not remove the potential risk for likely significant effects to occur within these Natura 2000 sites as a result of this amendment

Furthermore, the designation of lands occurring within Natura 2000 sites which have the potential to result in direct habitat loss of Annex 1 habitat and Annex 1 bird species habitat is not consistent with the methodology of the WES and is not consistent with the Western Regional Planning Guidelines 2010 - 2022.

It is recommended that this area remain designated as Not Normally Permissible and should individual wind energy projects be proposed in this area of land that they be subject EIA and HAD and that Objective WE4 and WE11 apply.

Amendment area relating to Submission No. 7 and the relationship of this area with N2K sites



N2K Site	Site Code	Distance from Wind Energy Area Zoning	Qualifying Interests	Current threats to Qualifying Interests	Sensitivity of Qualifying Interests	Is the Implementation of the Plan Likely to Result in Potential Impacts to the Qualifying Interest of the Site
SACs						
GALWAY SACs						
Inishmaan Island	**212**	14km from AIP	Limestone pavements*	Quarrying, reclamation for agriculture and reduced farming activity which has facilitated the spread of scrub over some areas. Intensive agriculture and domestic/municipal waste sources in the vicinity of pavement may also threaten groundwater.	Physical removal. Scrub encroachment	No. This site is located at a remote distance from the nearest WEA and no impact pathways linking the WES area to this site have been identified. Therefore it is considered unlikely that this qualifying feature will be adversely impacted by the implementation of the Draft WES
			Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)	Abandonment of traditional agricultural practices and reclamation.	Changes in management. Changes in nutrient or base status. Moderately sensitive to hydrological change	

European dry heaths	Afforestation, over-burning, over-grazing, under-grazing and bracken invasion.	Moderately sensitive to hydrological change. Changes in management. Changes in nutrient status
Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)	Agricultural intensification; drainage; abandonment of pastoral systems and the associated encroachment of rank vegetation and scrub.	Surface and groundwater dependent. Moderately sensitive to hydrological change. Changes in management. Changes in nutrient status
Machairs (* in Ireland);	Agricultural activity; fertilisation; ovegrazing and undergrazing; recreational activity; waste disposal; invasion by a species.	Changes in management. Changes in nutrient status.

Perennial vegetation of stony banks'	Disruption of the sediment supply, owing to the interruption of the coastal processes, caused by developments such as car parks and coastal defence structures including rock armour and sea walls. The removal of gravel .	Marine water dependent. Low sensitivity to hydrological changes. Coastal development, trampling from recreational activity and gravel removal.
Reefs	Professional fishing; taking for fauna; taking for flora; water pollution; climate change; and change in species composition.	Sensitive to disturbance and pollution.
Vegetated sea cliffs of the Atlantic and Baltic coasts	Erosion; grazing; recreational pressures; development of golf courses and housing; dumping; cutting of peat; coastal protection works; climate change	Coastal development. Erosion, over-grazing and recreation

			Embryonic shifting dunes;	Natural erosion processes exacerbated by recreation and sand extraction. Coastal protection interfering with natural processes	Overgrazing, and erosion. Changes in management.	
			Shifting dunes along the shoreline with Ammophila arenaria (white dunes)	Removal of beach material and interference with the supply of sand; construction of coastal defences; sand compaction caused by vehicles and trampling.	Overgrazing, and erosion. Changes in management.	
Inishmore Island	**213**	9.5km from AIP	Limestone pavements*	Quarrying, reclamation for agriculture and reduced farming activity which has facilitated the spread of scrub over some areas. Intensive agriculture and domestic/municipal waste sources in the vicinity of pavement may also threaten groundwater.	Physical removal. Scrub encroachment	No. This site is located at a remote distance from the nearest WEA and no impact pathways linking the WES area to this site have been identified. Therefore it is considered unlikely that this qualifying feature will be adversely impacted by the implementation of the Draft WES

European dry heaths	Afforestation, over-burning, over-grazing, under-grazing and bracken invasion.	Moderately sensitive to hydrological change. Changes in management. Changes in nutrient status
Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)	The main threats to this habitat include the abandonment of traditional agricultural practices and reclamation.	Changes in management. Changes in nutrient or base status. Moderately sensitive to hydrological change
Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)	Agricultural intensification; drainage; abandonment of pastoral systems and the associated encroachment of rank vegetation and scrub.	Surface and groundwater dependent. Moderately sensitive to hydrological change. Changes in management. Changes in nutrient status

Fixed coastal dunes with herbaceous vegetation (grey dunes)	Recreation; overgrazing and undergrazing: non-native plant species, particularly sea buckthorn (Hippophae rhamnoides),	Overgrazing, and erosion. Changes in management.
Embryonic shifting dunes	Natural erosion processes exacerbated by recreation and sand extraction. Coastal protection interfering with natural processes	Overgrazing, and erosion. Changes in management.
Shifting dunes along the shoreline with Ammophila arenaria (white dunes)	Removal of beach material and interference with the supply of sand; construction of coastal defences; sand compaction caused by vehicles and trampling.	Overgrazing, and erosion. Changes in management.

Dunes with Salix repens ssp.argentea (Salix arenariae)	Agricultural improvement; overgrazing and undergrazing; forestry; recreational activity	Overgrazing, and erosion. Changes in management.
Humid dune slacks	Agricultural improvement; overgrazing and undergrazing; forestry; recreational activity	Overgrazing, and erosion. Changes in management. Sensitive to hydrological change.
Machairs (* in Ireland)	Agricultural activity; fertilisation; ovegrazing and undergrazing; recreational activity; waste disposal; invasion by a species.	Changes in management. Changes in nutrient status.

Perennial vegetation of stony banks	Disruption of the sediment supply, owing to the interruption of the coastal processes, caused by developments such as car parks and coastal defence structures including rock armour and sea walls. The removal of gravel .	Marine water dependent. Low sensitivity to hydrological changes. Coastal development, trampling from recreational activity and gravel removal.
Reefs	Professional fishing; taking for fauna; taking for flora; water pollution; climate change; and change in species composition.	Sensitive to disturbance and pollution.
Vegetated sea cliffs of the Atlantic and Baltic coasts	Erosion; grazing; recreational pressures; development of golf courses and housing; dumping; cutting of peat; coastal protection works; climate change	Coastal development. Erosion, over-grazing and recreation

			Alpine and Boreal heaths	Abandonment; overgrazing; burning; outdoor recreation; quarries; communication networks; and wind farm developments.	Changes in management. Changes in nutrient or base status. Moderately sensitive to hydrological change	
			Submerged or partly submerged sea caves	Water pollution	Pollution	
			Coastal lagoons	Drainage for agricultural and safety reasons; natural siltation; Water pollution in the form of excessive nutrient enrichment	Surface, ground and marine water dependent. Highly sensitive to hydrological changes. Highly sensitive to pollution. Changes in salinity and tidal regime	
			Vertigo angustior	Loss of riverside and canal-side habitat; exploitation of esker sites and drainage of wetlands, and sheep grazing and over-exploitation of dune sites.	Groundwater dependent. Highly sensitive to hydrological changes	

River Shannon Callows	**216**	Over 20km from WEA	Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)	Agricultural intensification; drainage; abandonment of pastoral systems and the associated encroachment of rank vegetation and scrub.	Surface and groundwater dependent. Moderately sensitive to hydrological change. Changes in management. Changes in nutrient status	No. This site is located at a remote distance from the nearest WEA. Therefore it is considered unlikely that this qualifying feature will be adversely impacted by the implementation of the Draft WES
			Molinia meadows on calcareous, peaty or clay-silt-laden soils (Molinion caerulecae)	Agricultural intensification; drainage; abandonment of pastoral systems	Surface and groundwater dependent. Moderately sensitive to hydrological change. Changes in management. Changes in nutrient status	
			Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)*	Inappropriate grazing levels; invasive species; and clearance for agriculture or felling for timber.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Changes in management.	

Limestone pavements*	Quarrying, reclamation for agriculture and reduced farming activity which has facilitated the spread of scrub over some areas. Intensive agriculture and domestic/municipal waste sources in the vicinity of pavement may also threaten groundwater.	Physical removal. Scrub encroachment

			Lutra lutra	Decrease in water quality: Use of pesticides; fertilization; vegetation removal; professional fishing (including lobster pots and fyke nets); hunting; poisoning; sand and gravel extraction; mechanical removal of peat; urbanised areas; human habitation; continuous urbanization; drainage; management of aquatic and bank vegetation for drainage purposes; ; and canalization or modifying structures of inland water course.	Surface and marine water dependent. Moderately sensitive to hydrological change. Sensitivty to pollution	

Coolcam Turlough	**218**	Over 20km from WEA	Turloughs*	Nutrient enrichment and inappropriate grazing; drainage, peat cutting; marl extraction and quarrying.	Surface and Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site.
Barroughter Bog	**231**	19.5km from AOC	Active Raised Bog*	Deterioration of the hydrological conditions caused by peat cutting, drainage, forestry and burning.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site.
			Degraded raised bogs still capable of natural regeneration	Changes in agricultural practices; afforestation and general forest management; burning; peat extraction,;drainage; and the introduction of invasive species.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	

			Depressions on peat substrates of the Rhynchosporion	Drainage; burning; peat extraction; overgrazing; afforestation; erosion; and climate change.	Surface and groundwater dependent. Low sensitivity to hydrological changes. Erosion, land-use changes	
Caherglassaun Turlough	**238**	1.5km from AOC	Turloughs*	Nutrient enrichment and inappropriate grazing; drainage, peat cutting; marl extraction and quarrying.	Surface and Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	
			Rhinolophus hipposideros	Loss of suitable summer and winter roosting sites; loss of commuting routes linking roosts to foraging sites, and loss of suitable foraging sites.	Disturbance. Changes in Management.	
Castletaylor Complex	**242**	135m from AOC	Turloughs*	Nutrient enrichment and inappropriate grazing; drainage, peat cutting; marl extraction and quarrying.	Surface and Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	Yes. Should wind-farm developments occur in WEAs 135m from this N2K site and turlough habitats in particular the potential for significant effects to this qualifying interests and the N2K site exists.

Limestone pavements*	Quarrying, reclamation for agriculture and reduced farming activity which has facilitated the spread of scrub over some areas. Intensive agriculture and domestic/municipal waste sources in the vicinity of pavement may also threaten groundwater.	Physical removal. Scrub encroachment
Semi-natural dry grasslands and scrub facies on calcareous substrates (Festuco-Brometalia) (*important orchid sites)	The main threats to this habitat include the abandonment of traditional agricultural practices and reclamation.	Changes in management. Changes in nutrient or base status. Moderately sensitive to hydrological change
Alpine and boreal heaths	Abandonment; overgrazing; burning; outdoor recreation; quarries; communication networks; and wind farm developments.	Changes in management. Changes in nutrient or base status. Moderately sensitive to hydrological change

			Juniperus communis formations on heaths or calcareous grassland	Overgrazing; fire; agricultural expansion; invasion by alien species particularly Rhododenron ponticum; and poor regeneration.	Onset of inundation or waterlogging Inappropriate management	
Cloonmoylan Bog	**248**	19.5km from AOC	Active Raised Bog*	Deterioration of the hydrological conditions caused by peat cutting, drainage, forestry and burning.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site.
			Degraded raised bogs still capable of natural regeneration	Changes in agricultural practices; afforestation and general forest management; burning; peat extraction,;drainage; and the introduction of invasive species.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	

			Depressions on peat substrates of the Rhynchosporion	Drainage; burning; peat extraction; overgrazing; afforestation; erosion; and climate change.	Surface and groundwater dependent. Low sensitivity to hydrological changes. Erosion, land-use changes	
			Bog woodland*	Drainage, peat cutting, burning and development;	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	
Coole-Garryland Complex	**252**	3.5km from AOC	Turloughs*	Nutrient enrichment and inappropriate grazing; drainage, peat cutting; marl extraction and quarrying.	Surface and Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	No. This site is located at a distance of approximately 6km from the nearest WEA and no impact pathways linking the WES area to this site have been identified. Therefore it is considered unlikely that the qualifying habitats or species of

Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation.	Nutrient enrichment; overgrazing; affforestation and general forest management; introduction of invasive species; and increased pressures from human activities.	Surface and groundwater dependant. Highly sensitive to hydrological changes. Highly sensitive to pollution.
Rivers with muddy banks with Chenopodion rubri p.p and Bidention p.p. vegetation	Changes in flooding regimes; grazing, fertilisation, peat extraction, pollution, general forestry management and invazive species.	This habitat is dependent on surface-water flooding and high nutrient status. It is highly sensitive to hydrological change and changes in nutrient status.
Juniperus communis formations on heaths or calcareous grassland	Overgrazing; fire; agricultural expansion; invasion by alien species particularly Rhododenron ponticum; and poor regeneration.	Onset of inundation or waterlogging Inappropriate management

this site will be adversely impacted by the implementation of the Draft WES.

Semi-natural dry grasslands and scrub facies on calcareous substrates (Festuco-Brometalia) (*important orchid sites)	The main threats to this habitat include the abandonment of traditional agricultural practices and reclamation.	Changes in management. Changes in nutrient or base status. Moderately sensitive to hydrological change
Old sessile oak woods with Ilex and Blechnum in the British Isles	The introduction of alien species; sub-optimal grazing patterns; general forestry management; increases in urbanisation and human habitation adjacent to oak woodlands; and the construction of communication networks through the woodland.	Changes in management. Changes in nutrient or base status. Introduction of alien species.

			Limestone pavements*	Quarrying, reclamation for agriculture and reduced farming activity which has facilitated the spread of scrub over some areas. Intensive agriculture and domestic/municipal waste sources in the vicinity of pavement may also threaten groundwater.	Physical removal. Scrub encroachment	
Croaghill Turlough	**255**	Adjacent to AOC	Turloughs*	Nutrient enrichment and inappropriate grazing; drainage, peat cutting; marl extraction and quarrying.	Surface and Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	Yes. Should wind-farm developments occur in WEAs adjacent to this qualifying habitat the potential for significant effects to this qualifying interests and N2K site exists.

Derrycrag Wood Nature Reserve	**261**	18km from AOC	Old sessile oak woods with Ilex and Blechnum in the British Isles	The introduction of alien species; sub-optimal grazing patterns; general forestry management; increases in urbanisation and human habitation adjacent to oak woodlands; and the construction of communication networks through the woodland.	Changes in management. Changes in nutrient or base status. Introduction of alien species.	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site.
Galway Bay Complex	**268**	Adjacent to AOC; 2.5km from AIP ; 10.5km from SA	Coastal Lagoons*	Drainage for agricultural and safety reasons; natural siltation; Water pollution in the form of excessive nutrient enrichment	Surface, ground and marine water dependent. Highly sensitive to hydrological changes. Highly sensitive to pollution. Changes in salinity and tidal regime	Yes. Should wind-farm developments occur in WEAs adjacent to these qualifying habitats and population od qualifying species, the potential for significant effects to these qualifying interests exists.

Mudflats and sandflats not covered by seawater at low tide	Aquaculture, fishing, bait digging, removal of fauna, reclamation of land, coastal protection works and invasive species, particularly cord-grass; hard coastal defence structures; sea-level rise.	Surface and marine water dependent. Moderately sensitive to hydrological change. Moderate sensitivty to pollution. Changes to salinity and tidal regime. Coastal development
Large shallow inlets and bays	Aquaculture, fishing, dumping of wastes and water pollution.	Surface and marine water dependent. low sensitivity to hydrological changes. Aquaculture, fishing and pollution.
Salicornia and other annuals colonizing mud and sand	Invasive Species; erosion and accretion	Marine water dependent. Medium sensitivity to hydrological change. Changes in salinity and tidal regime. Infilling, reclamation, invasive species

Mediterranean salt meadows (Juncetalia maritimi	Over-grazing by cattle or sheep; infilling and reclamation.	Marine and groundwater dependent. Medium sensitivity to hydrological change. Changes in salinity and tidal regime. Coastal development and reclamation.
Alkaline Fens	Peat mining activities, land drainage; infilling; fertiliser pollution and eutrophication	Groundwater dependant. Highly sensitive to hydrological changes. Changes in nutrient or base status
Calcareous fens with Cladium mariscus and species of the Caricion davallianae*	Peat or turf cutting, arterial drainage, local drainage and agricultural reclamation, infilling of sites with building waste, dumping of household refuse, afforestation, water pollution and urban expansion.	Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.

Turloughs*	Nutrient enrichment and inappropriate grazing; drainage, peat cutting; marl extraction and quarrying.	Surface and Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.
Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (*important orchid sites)	The main threats to this habitat include the abandonment of traditional agricultural practices and reclamation.	Changes in management. Changes in nutrient or base status. Moderately sensitive to hydrological change
Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Overgrazing; erosion; invasive species, particularly common cordgrass (Spartina anglica); infilling and reclamation.	Marine and groundwater dependent. Medium sensitivity to hydrological change. maritimae) Changes in salinity and tidal regime. Overgrazing, erosion and accretion

Phoca vitulina	Continued by-catch in fishing gear; occasional illegal culling; competition for prey resources with fisheries and disturbance at key breeding and moulting haul-out sites.	Marine water dependent. Sensitive to changes in food supply.

			Lutra lutra	Decrease in water quality: Use of pesticides; fertilization; vegetation removal; professional fishing (including lobster pots and fyke nets); hunting; poisoning; sand and gravel extraction; mechanical removal of peat; urbanised areas; human habitation; continuous urbanization; drainage; management of aquatic and bank vegetation for drainage purposes; ; and canalization or modifying structures of inland water course.	Surface and marine water dependent. Moderately sensitive to hydrological change. Sensitivty to pollution	

Inishbofin And Inishshark	**278**	Over 20km from WEA	Coastal lagoons	Drainage for agricultural and safety reasons; natural siltation; Water pollution in the form of excessive nutrient enrichment	Surface, ground and marine water dependent. Highly sensitive to hydrological changes. Highly sensitive to pollution. Changes in salinity and tidal regime	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site.
			Northern Atlantic wet heaths with Erica tetralix	Reclamation, afforestation and burning; overstocking; invasion by non-heath species; exposure of peat to severe erosion.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	
			European dry heaths	Afforestation, over-burning, over-grazing, under-grazing and bracken invasion.	Moderately sensitive to hydrological change. Changes in management. Changes in nutrient status	
			Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	Nutrient enrichment; afforestation; waste water; invasive alien species; sport and leisure activities.	Surface and groundwater dependant. Highly sensitive to hydrological changes. Highly sensitive to pollution	

			Halichoerus grypus	Continued by-catch in fishing gear; occasional illegal culling; competition for prey resources with fisheries and disturbance at key breeding and moulting haul-out sites.	Marine water dependent. Sensitive to changes in food supply.	
Kilsallagh Bog	**285**	Adjacent to AOC	Depressions on peat substrates of the Rhynchosporion	Drainage; burning; peat extraction; overgrazing; afforestation; erosion; and climate change.	Surface and groundwater dependent. Low sensitivity to hydrological changes. Erosion, land-use changes	Yes. Should wind-farm developments occur in WEAs adjacent to this qualifying habitat the potential for significant effects to this qualifying interests and N2K site exists.
Kiltartan Cave (Coole)	**286**	6km from AOC	Caves not open to the public	Human habitation adjacent to the cave system; disposal of household waste; road development; speleology (which leads to the disturbance of bats); vandalism; and inundation.	Human disturbance. Pollution	No. This site is located at a distance of approximately 6km from the nearest WEA and no impact pathways linking the WES area to this site have been identified. Therefore it is considered unlikely that the qualifying habitats or species of this site will be adversely impacted by the implementation of the Draft

			Rhinolophus hipposideros	Loss of suitable summer and winter roosting sites; loss of commuting routes linking roosts to foraging sites, and loss of suitable foraging sites.	Disturbance. Changes in Management.	implementation of the Draft WES.
Levally Lough	**295**	Adjacent to AOC	Turloughs*	Nutrient enrichment and inappropriate grazing; drainage, peat cutting; marl extraction and quarrying.	Surface and Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	Yes. Should wind-farm developments occur in WEAs adjacent to this qualifying habitat the potential for significant effects to this qualifying interests and N2K site exists.
Lisnageeragh Bog And Ballinastack Turlough	**296**	Adjacent to AOC	Turloughs*	Nutrient enrichment and inappropriate grazing; drainage, peat cutting; marl extraction and quarrying.	Surface and Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	Yes. Should wind-farm developments occur in WEAs adjacent to these qualifying habitats or populations of qualifying species the potential for significant effects to these qualifying interests exists.
			Active Raised Bog*	Deterioration of the hydrological conditions caused by peat cutting, drainage, forestry and burning.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	

			Degraded raised bogs still capable of natural regeneration	Changes in agricultural practices; afforestation and general forest management; burning; peat extraction,;drainage; and the introduction of invasive species.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	
			Depressions on peat substrates of the Rhynchosporion	Drainage; burning; peat extraction; overgrazing; afforestation; erosion; and climate change.	Surface and groundwater dependent. Low sensitivity to hydrological changes. Erosion, land-use changes	
Lough Corrib	**297**	Adjacent to AIP andAOC ; 870m from SA	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	Nutrient enrichment arising from intensification of agriculture and urban developments.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Highly sensitive to pollution	Yes. Should wind-farm developments occur in WEAs adjacent to these qualifying habitats or populations of qualifying species the potential for significant effects to these qualifying interests exists.
			Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	Nutrient enrichment; afforestation; waste water; invasive alien species; sport and leisure activities.	Surface and groundwater dependant. Highly sensitive to hydrological changes. Highly sensitive to pollution	

Active Raised Bog*	Deterioration of the hydrological conditions caused by peat cutting, drainage, forestry and burning.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management
Old sessile oak woods with Ilex and Blechnum in British Isles	The introduction of alien species; sub-optimal grazing patterns; general forestry management; increases in urbanisation and human habitation adjacent to oak woodlands; and the construction of communication networks through the woodland.	Changes in management. Changes in nutrient or base status. Introduction of alien species.
Molinia meadows on calcareous, peaty or clavey-silt-laden soils (Molinion caeruleae)	Agricultural intensification; drainage; abandonment of pastoral systems	Surface and groundwater dependent. Moderately sensitive to hydrological change. Changes in management. Changes in nutrient status

Alkaline fens	Peat mining activities, land drainage; infilling; fertiliser pollution and eutrophication	Groundwater dependant. Highly sensitive to hydrological changes. Changes in nutrient or base status
Calcareous fens with Cladium mariscus and species of the Caricion davallianae*	Peat or turf cutting, arterial drainage, local drainage and agricultural reclamation, infilling of sites with building waste, dumping of household refuse, afforestation, water pollution and urban expansion.	Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.
Limestone pavements*	Quarrying, reclamation for agriculture and reduced farming activity which has facilitated the spread of scrub over some areas. Intensive agriculture and domestic/municipal waste sources in the vicinity of pavement may also threaten groundwater.	Physical removal. Scrub encroachment

Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)	The main threats to this habitat include the abandonment of traditional agricultural practices and reclamation.	Changes in management. Changes in nutrient or base status. Moderately sensitive to hydrological change
Bog woodland*	Drainage, peat cutting, burning and development;	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management
Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	Eutrophication; overgrazing, excessive fertilisation; afforestation; and the introduction of invasive alien species.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Highly sensitive to pollution.
Petrifying springs with tufa formation (Cratoneurion)	Peat or turf cutting; arterial drainage; local drainage; water abstraction and agricultural reclamation.	Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.

Degraded raised bogs still capable of natural regeneration	Changes in agricultural practices; afforestation and general forest management; burning; peat extraction,;drainage; and the introduction of invasive species.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management
Depressions on peat substrates of the Rhynchosporion	Drainage; burning; peat extraction; overgrazing; afforestation; erosion; and climate change.	Surface and groundwater dependent. Low sensitivity to hydrological changes. Erosion, land-use changes
Petromyzon marinus	Obstructions to movement; gross pollution; and specific pollutants.	Surface water dependent Highly sensitive to hydrological change

Salmo salar	Numerous threats impact upon this specis. Some of these include: cultivation, pesticides; fertilization; pollution; water pollution; biocenotic evolution; accumulation of organic material; eutrophication; over-fishing; forest-related pressures; parasites.	Surface water dependent Highly sensitive to hydrological change
Lampetra planeri	Channel maintenance, barriers, passage obstruction, gross pollution and specific pollutants.	Surface water dependent Highly sensitive to hydrological change
Rhinolophus hipposideros	Loss of suitable summer and winter roosting sites; loss of commuting routes linking roosts to foraging sites, and loss of suitable foraging sites.	Disturbance. Changes in Management.

Lutra lutra	Decrease in water quality: Use of pesticides; fertilization; vegetation removal; professional fishing (including lobster pots and fyke nets); hunting; poisoning; sand and gravel extraction; mechanical removal of peat; urbanised areas; human habitation; continuous urbanization; drainage; management of aquatic and bank vegetation for drainage purposes; ; and canalization or modifying structures of inland water course.	Surface and marine water dependent. Moderately sensitive to hydrological change. Sensitivty to pollution

			Austropotamobius pallipes	Introduction of diseases transmitted by introduced American crayfish.	Surface water dependent Highly sensitive to hydrological change Very highly sensitive to pollution	
			Margaritifera margaritifera (Incorporates the Owenriff Margaritifera catchment Sub-Basin Plan)	Poor substrate quality due to increased growth of algal and macrophyte vegetation as a result of severe nutrient enrichment, as well as physical siltation.	Surface water dependent Highly sensitive to hydrological change Very highly sensitive to pollution	
			Najas flexilis	Fertilization; disposal of household waste; water pollution; eutrophication; and invasion by alien species.	Highly sensitive to hydrological changes. Highly sensitive to pollution.	
			Drepanocladus vernicosus	Fertilization; abandonment of pastoral systems; undergrazing; afforestation; water pollution; and drainage.	Highly sensitive to hydrological changes. Highly sensitive to pollution.	

Lough Cutra	**299**	9km from AOC	Rhinolophus hipposideros	Loss of suitable summer and winter roosting sites; loss of commuting routes linking roosts to foraging sites, and loss of suitable foraging sites.	Disturbance. Changes in Management.	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site.
Lough Lurgeen Bog/Glenamaddy Turlough	**301**	Adjacent to AOC	Active Raised Bog*	Deterioration of the hydrological conditions caused by peat cutting, drainage, forestry and burning.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	Yes. Should wind-farm developments occur in WEAs adjacent to these qualifying habitats or populations of qualifying species the potential for significant effects to thesequalifying interests exists.
			Turloughs*	Nutrient enrichment and inappropriate grazing; drainage, peat cutting; marl extraction and quarrying.	Surface and Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	

			Degraded raised bogs still capable of natural regeneration	Changes in agricultural practices; afforestation and general forest management; burning; peat extraction,;drainage; and the introduction of invasive species.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	
			Depressions on peat substrates of the Rhynchosporion	Drainage; burning; peat extraction; overgrazing; afforestation; erosion; and climate change.	Surface and groundwater dependent. Low sensitivity to hydrological changes. Erosion, land-use changes	
Lough Rea	**304**	Adjacent to AOC	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	Nutrient enrichment arising from intensification of agriculture and urban developments.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Highly sensitive to pollution	Yes. Should wind-farm developments occur in WEAs adjacent to these qualifying habitats or populations of qualifying species the potential for significant effects to thesequalifying interests exists.

Loughatorick South Bog	**308**	19.5km from AOC	Active Blanket Bog*	Land reclamation, peat extraction; afforestation; erosion and landslides triggered by human activity; drainage; burning and infrastructural development.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site
Peterswell Turlough	**318**	1.3km from AOC	Turloughs*	Nutrient enrichment and inappropriate grazing; drainage, peat cutting; marl extraction and quarrying.	Surface and Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	No. This site is located at a distance of approximately 1.3km from the nearest WEA and no impact pathways linking the WES area to this site have been identified. Therefore it is considered unlikely that the qualifying habitats or species of this site will be adversely impacted by the implementation of the Draft WES

Pollnaknockaun Wood Nature Reserve	**319**	16.7km from AOC	Old sessile oak woods with Ilex and Blechnum in the British Isles	The introduction of alien species; sub-optimal grazing patterns; general forestry management; increases in urbanisation and human habitation adjacent to oak woodlands; and the construction of communication networks through the woodland.	Changes in management. Changes in nutrient or base status. Introduction of alien species.	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats or species associated with this N2K site
Rahasane Turlough	**322**	Adjacent to AOC	Turloughs*	Nutrient enrichment and inappropriate grazing; drainage, peat cutting; marl extraction and quarrying.	Surface and Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	Yes. Should wind-farm developments occur in WEAs adjacent to these qualifying habitats or populations of qualifying species the potential for significant effects to thesequalifying interests exists.

Rosroe Bog	**324**	10.3km from AIP	Blanket bog (*active only)	Land reclamation, peat extraction; afforestation; erosion and landslides triggered by human activity; drainage; burning and infrastructural development.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats or species associated with this N2K site
			Depressions on peat substrates of the Rhynchosporion	Drainage; burning; peat extraction; overgrazing; afforestation; erosion; and climate change.	Surface and groundwater dependent. Low sensitivity to hydrological changes. Erosion, land-use changes	
Shankill West Bog	**326**	Adjacent to AOC	Active Raised Bog*	Deterioration of the hydrological conditions caused by peat cutting, drainage, forestry and burning.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	Yes. Should wind-farm developments occur in WEAs adjacent to these qualifying habitats or populations of qualifying species the potential for significant effects to thesequalifying interests exists.

			Degraded raised bogs still capable of natural regeneration	Changes in agricultural practices; afforestation and general forest management; burning; peat extraction,;drainage; and the introduction of invasive species.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	
			Depressions on peat substrates of the Rhynchosporion	Drainage; burning; peat extraction; overgrazing; afforestation; erosion; and climate change.	Surface and groundwater dependent. Low sensitivity to hydrological changes. Erosion, land-use changes	
Slyne Head Islands	**328**	17.5km from AOC	Reefs	Professional fishing; taking for fauna; taking for flora; water pollution; climate change; and change in species composition.	Sensitive to disturbance and pollution.	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats or species

			Halichoerus grypus	Continued by-catch in fishing gear; occasional illegal culling; competition for prey resources with fisheries and disturbance at key breeding and moulting haul-out sites.	Marine water dependent. Sensitive to changes in food supply.	associated with this N2K site
Tully Mountain	**330**	19.5km from AOC	European dry heaths	Afforestation, over-burning, over-grazing, under-grazing and bracken invasion.	Moderately sensitive to hydrological change. Changes in management. Changes in nutrient status	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats or species associated with this N2K site
			Alpine and Boreal heaths	Abandonment; overgrazing; burning; outdoor recreation; quarries; communication networks; and wind farm developments.	Changes in management. Changes in nutrient or base status. Moderately sensitive to hydrological change	
			Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	Nutrient enrichment; afforestation; waste water; invasive alien species; sport and leisure activities.	Surface and groundwater dependant. Highly sensitive to hydrological changes. Highly sensitive to pollution	

			Blanket bog (*active only)	Land reclamation, peat extraction; afforestation; erosion and landslides triggered by human activity; drainage; burning and infrastructural development.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	
Ballymaglancy Cave, Cong	**474**	8.3km from AIP ; 13.4km from AOC ; 15.8km from SA	Caves not open to the public	Human habitation adjacent to the cave system; disposal of household waste; road development; speleology (which leads to the disturbance of bats); vandalism; and inundation.	Human disturbance. Pollution	No. This site is located at a distance of approximately 8km from the nearest WEA and no impact pathways linking the WES area to this site have been identified. Therefore it is considered unlikely that the qualifying habitats or species of this site will be adversely impacted by the implementation of the Draft WES
Lough Fingall Complex	**606**	Adjacent to AOC	Turloughs*	Nutrient enrichment and inappropriate grazing; drainage, peat cutting; marl extraction and quarrying.	Surface and Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	Yes. Should wind-farm developments occur in WEAs adjacent to these qualifying habitats or populations of qualifying species the potential for significant effects to thesequalifying interests exists.

Limestone pavements*	Quarrying, reclamation for agriculture and reduced farming activity which has facilitated the spread of scrub over some areas. Intensive agriculture and domestic/municipal waste sources in the vicinity of pavement may also threaten groundwater.	Physical removal. Scrub encroachment
Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)	The main threats to this habitat include the abandonment of traditional agricultural practices and reclamation.	Changes in management. Changes in nutrient or base status. Moderately sensitive to hydrological change
Alpine and Boreal heaths	Abandonment; overgrazing; burning; outdoor recreation; quarries; communication networks; and wind farm developments.	Changes in management. Changes in nutrient or base status. Moderately sensitive to hydrological change

			Juniperus communis formations on heaths or calcareous grasslands	Overgrazing; fire; agricultural expansion; invasion by alien species particularly Rhododenron ponticum; and poor regeneration.	Onset of inundation or waterlogging Inappropriate management	
			Calcareous fens with Cladium mariscus and species of the Caricion davallianae*	Peat or turf cutting, arterial drainage, local drainage and agricultural reclamation, infilling of sites with building waste, dumping of household refuse, afforestation, water pollution and urban expansion.	Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	
			Rhinolophus hipposideros	Loss of suitable summer and winter roosting sites; loss of commuting routes linking roosts to foraging sites, and loss of suitable foraging sites.	Disturbance. Changes in Management.	

Aughrusbeg Machair And Lake	**1228**	Over 20km from WEA	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	Nutrient enrichment; afforestation; waste water; invasive alien species; sport and leisure activities.	Surface and groundwater dependant. Highly sensitive to hydrological changes. Highly sensitive to pollution	No. This site is located at a distance of approximately 2.8km from the nearest WEA and no impact pathways linking the WES area to this site have been identified. Therefore it is considered unlikely that the qualifying habitats or species of this site will be adversely impacted by the implementation of the Draft WES
			Northern Atlantic wet heaths with Erica tetralix	Reclamation, afforestation and burning; overstocking; invasion by non-heath species; exposure of peat to severe erosion.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	
Carrownagappul Bog	**1242**	2.2km from AOC	Active raised bog*	Deterioration of the hydrological conditions caused by peat cutting, drainage, forestry and burning.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	No. This site is located at a distance of approximately 2.8km from the nearest WEA and no impact pathways linking the WES area to this site have been identified. Therefore it is considered unlikely that the qualifying habitats or species of

			Degraded raised bogs still capable of natural regeneration	Changes in agricultural practices; afforestation and general forest management; burning; peat extraction,;drainage; and the introduction of invasive species.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	qualifying habitats or species of this site will be adversely impacted by the implementation of the Draft WES
			Depressions on peat substrates of the Rhynchosporion	Drainage; burning; peat extraction; overgrazing; afforestation; erosion; and climate change.	Surface and groundwater dependent. Low sensitivity to hydrological changes. Erosion, land-use changes	
Cregduff Lough	**1251**	2.8km from Aoc ; 15km from AIP	Transition mires and quaking bogs	Drainage, infilling, reclamation and pollution.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	No. This site is located at a distance of approximately 2.8km from the nearest WEA and no impact pathways linking the WES area to this site have been identified. Therefore it is considered unlikely that the qualifying habitats or species of this site will be adversely impacted by the implementation of the Draft WES
			Najas flexilis	Fertilization; disposal of household waste; water pollution; eutrophication; and invasion by alien species.	Highly sensitive to hydrological changes. Highly sensitive to pollution.	

Dog'S Bay	**1257**	4.5km from AOC ; 16.8km from AIP	Annual vegetation of drift lines	Grazing; sand and gravel extraction; recreational activities; coastal protection works	Overgrazing and erosion. Changes in management.	No. This site is located at a distance of approximately 4.5km from the nearest WEA and no impact pathways linking the WES area to this site have been identified. Therefore it is considered unlikely that the qualifying habitats or species of this site will be adversely impacted by the implementation of the Draft WES
			Embryonic shifting dunes	Natural erosion processes exacerbated by recreation and sand extraction. Coastal protection interfering with natural processes	Overgrazing, and erosion. Changes in management.	
			Fixed coastal dunes with herbaceous vegetation (grey dunes)	Recreation; overgrazing and undergrazing: non-native plant species, particularly sea buckthorn (Hippophae rhamnoides).	Overgrazing, and erosion. Changes in management.	
			European dry heaths	Afforestation, over-burning, over-grazing, under-grazing and bracken invasion.	Moderately sensitive to hydrological change. Changes in management. Changes in nutrient status	

			Shifting dunes along the shoreline with Ammophila arenaria (white dunes)	Removal of beach material and interference with the supply of sand; construction of coastal defences; sand compaction caused by vehicles and trampling.	Overgrazing, and erosion. Changes in management.	
Gortnandarragh Limestone Pavement	**1271**	3km from SA ; 4.2km from AOC ; 17km from AIP	Limestone pavements*	Quarrying, reclamation for agriculture and reduced farming activity which has facilitated the spread of scrub over some areas. Intensive agriculture and domestic/municipal waste sources in the vicinity of pavement may also threaten groundwater.	Physical removal. Scrub encroachment	No. This qualifying habitat is robust in terms of its sensitivity to indirect impacts, and as any wind farm developments occurring in nearby AOCs will be buffered from this N2K site by at least 3km it is unlikely that this habitat will experience significant adverse effects.

Inisheer Island	**1275**	17km from AIP	Limestone pavements*	Quarrying, reclamation for agriculture and reduced farming activity which has facilitated the spread of scrub over some areas. Intensive agriculture and domestic/municipal waste sources in the vicinity of pavement may also threaten groundwater.	Physical removal. Scrub encroachment	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats or species associated with this N2K site
			Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)	The main threats to this habitat include the abandonment of traditional agricultural practices and reclamation.	Changes in management. Changes in nutrient or base status. Moderately sensitive to hydrological change	
			European dry heaths	Afforestation, over-burning, over-grazing, under-grazing and bracken invasion.	Moderately sensitive to hydrological change. Changes in management. Changes in nutrient status	

			Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)	Agricultural intensification; drainage; abandonment of pastoral systems and the associated encroachment of rank vegetation and scrub.	Surface and groundwater dependent. Moderately sensitive to hydrological change. Changes in management. Changes in nutrient status	
			Reefs	Professional fishing; taking for fauna; taking for flora; water pollution; climate change; and change in species composition.	Sensitive to disturbance and pollution.	
			Coastal lagoons	Drainage for agricultural and safety reasons; natural siltation; Water pollution in the form of excessive nutrient enrichment	Surface, ground and marine water dependent. Highly sensitive to hydrological changes. Highly sensitive to pollution. Changes in salinity and tidal regime	
Kiltiernan Turlough	**1285**	350m from AOC	Turloughs*	Nutrient enrichment and inappropriate grazing; drainage, peat cutting; marl extraction and quarrying.	Surface and Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	Yes. Should wind-farm developments occur in WEAs immediately adjacent to this habitat the potential for significant effects to impact this habitat exist.

Omey Island Machair	**1309**	Over 20km from WEA	Machairs (* in Ireland)	Agricultural activity; fertilisation; ovegrazing and undergrazing; recreational activity; waste disposal; invasion by a species.	Changes in management. Changes in nutrient status.	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats or species associated with this N2K site
			Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	Nutrient enrichment arising from intensification of agriculture and urban developments.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Highly sensitive to pollution	
			Petalophyllum ralfsii	Agricultural improvement and fertilisation; overgrazing; changes in agricultural practices i.e. land abandonment & undergrazing; drainage; erosion and drying out.	Changes in management. Changes in nutrient or base status. Sensitive to hydrological change	

Rusheenduff Lough	**1311**	Over 20km from WEA	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	Nutrient enrichment; afforestation; waste water; invasive alien species; sport and leisure activities.	Surface and groundwater dependant. Highly sensitive to hydrological changes. Highly sensitive to pollution	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats or species associated with this N2K site
			Najas flexilis	Fertilization; disposal of household waste; water pollution; eutrophication; and invasion by alien species.	Highly sensitive to hydrological changes. Highly sensitive to pollution.	
Ross Lake And Woods	**1312**	800m from SA; 2.8km from AIP; 2.5km from AOC	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	Nutrient enrichment arising from intensification of agriculture and urban developments.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Highly sensitive to pollution	Yes. Should wind-farm developments occur in WEAs 800m or more upstream of a number of these qualifying habitats or populations of qualifying species the potential for significant effects to thesequalifying interests exists.
			Alkaline fens	Peat mining activities, land drainage; infilling; fertiliser pollution and eutrophication	Groundwater dependant. Highly sensitive to hydrological changes. Changes in nutrient or base status	

Molinia meadows on calcareous, peaty or clavey-silt-laden soils (Molinion caeruleae)	Agricultural intensification; drainage; abandonment of pastoral systems	Surface and groundwater dependent. Moderately sensitive to hydrological change. Changes in management. Changes in nutrient status
Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	Inappropriate grazing levels; invasive species; and clearance for agriculture or felling for timber.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Changes in management.
Rhinolophus hipposideros	Loss of suitable summer and winter roosting sites; loss of commuting routes linking roosts to foraging sites, and loss of suitable foraging sites.	Disturbance. Changes in Management.

			Lutra lutra	Decrease in water quality: Use of pesticides; fertilization; vegetation removal; professional fishing (including lobster pots and fyke nets); hunting; poisoning; sand and gravel extraction; mechanical removal of peat; urbanised areas; human habitation; continuous urbanization; drainage; management of aquatic and bank vegetation for drainage purposes; ; and canalization or modifying structures of inland water course.	Surface and marine water dependent. Moderately sensitive to hydrological change. Sensitivty to pollution	

Rosturra Wood	**1313**	19km from AOC	Old sessile oak woods with Ilex and Blechnum in British Isles	The introduction of alien species; sub-optimal grazing patterns; general forestry management; increases in urbanisation and human habitation adjacent to oak woodlands; and the construction of communication networks through the woodland.	Changes in management. Changes in nutrient or base status. Introduction of alien species.	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site
Termon Lough	**1321**	9km from AOC	Turloughs*	Nutrient enrichment and inappropriate grazing; drainage, peat cutting; marl extraction and quarrying.	Surface and Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	No. This site is located at a distance of approximately 9km from the nearest WEA and no impact pathways linking the WES area to this site have been identified. Therefore it is considered unlikely that the qualifying habitats or species of this site will be adversely impacted by the implementation of the Draft WES

Lough Carra/Mask Complex	**1774**	8.4km from AIP; 14.4km from AOC; 16.7km from SA	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	Nutrient enrichment arising from intensification of agriculture and urban developments.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Highly sensitive to pollution	No. This site is located at a distance of approximately 8.4km from the nearest WEA and no impact pathways linking the WES area to this site have been identified. Therefore it is considered unlikely that the qualifying habitats or species of this site will be adversely impacted by the implementation of the Draft WES
			Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	Nutrient enrichment; afforestation; waste water; invasive alien species; sport and leisure activities.	Surface and groundwater dependant. Highly sensitive to hydrological changes. Highly sensitive to pollution	

Limestone pavements*	Quarrying, reclamation for agriculture and reduced farming activity which has facilitated the spread of scrub over some areas. Intensive agriculture and domestic/municipal waste sources in the vicinity of pavement may also threaten groundwater.	Physical removal. Scrub encroachment
European dry heaths	Afforestation, over-burning, over-grazing, under-grazing and bracken invasion.	Moderately sensitive to hydrological change. Changes in management. Changes in nutrient status
Calcareous fens with Cladium mariscus and species of the Caricion davallianae*	Peat or turf cutting, arterial drainage, local drainage and agricultural reclamation, infilling of sites with building waste, dumping of household refuse, afforestation, water pollution and urban expansion.	Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.

Alkaline fens	Peat mining activities, land drainage; infilling; fertiliser pollution and eutrophication	Groundwater dependant. Highly sensitive to hydrological changes. Changes in nutrient or base status
Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	Inappropriate grazing levels; invasive species; and clearance for agriculture or felling for timber.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Changes in management.
Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)	The main threats to this habitat include the abandonment of traditional agricultural practices and reclamation.	Changes in management. Changes in nutrient or base status. Moderately sensitive to hydrological change
Rhinolophus hipposideros	Loss of suitable summer and winter roosting sites; loss of commuting routes linking roosts to foraging sites, and loss of suitable foraging sites.	Disturbance. Changes in Management.

Lutra lutra	Decrease in water quality: Use of pesticides; fertilization; vegetation removal; professional fishing (including lobster pots and fyke nets); hunting; poisoning; sand and gravel extraction; mechanical removal of peat; urbanised areas; human habitation; continuous urbanization; drainage; management of aquatic and bank vegetation for drainage purposes; ; and canalization or modifying structures of inland water course.	Surface and marine water dependent. Moderately sensitive to hydrological change. Sensitivty to pollution

			Drepanocladus vernicosus	Fertilization; abandonment of pastoral systems; undergrazing; afforestation; water pollution; and drainage.	Highly sensitive to hydrological changes. Highly sensitive to pollution.	
Sonnagh Bog	**1913**	1.6km from AOC	Blanket bog (*active only)	Land reclamation, peat extraction; afforestation; erosion and landslides triggered by human activity; drainage; burning and infrastructural development.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	No. This site is located at a distance of approximately 1.6km from the nearest WEA and no impact pathways linking the WES area to this site have been identified. Therefore it is considered unlikely that the qualifying habitats or species of this site will be adversely impacted by the implementation of the Draft WES
East Burren Complex	**1926**	15.8km from AIP	Turloughs*	Nutrient enrichment and inappropriate grazing; drainage, peat cutting; marl extraction and quarrying.	Surface and Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats

Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	Eutrophication; overgrazing, excessive fertilisation; afforestation; and the introduction of invasive alien species.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Highly sensitive to pollution.
Alpine and Boreal heaths	Abandonment; overgrazing; burning; outdoor recreation; quarries; communication networks; and wind farm developments.	Changes in management. Changes in nutrient or base status. Moderately sensitive to hydrological change
Juniperus communis formations on heaths or calcareous grasslands	Overgrazing; fire; agricultural expansion; invasion by alien species particularly Rhododenron ponticum; and poor regeneration.	Onset of inundation or waterlogging Inappropriate management

of qualifying habitats associated with this N2K site

Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)	The main threats to this habitat include the abandonment of traditional agricultural practices and reclamation.	Changes in management. Changes in nutrient or base status. Moderately sensitive to hydrological change
Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)	Agricultural intensification; drainage; abandonment of pastoral systems and the associated encroachment of rank vegetation and scrub.	Surface and groundwater dependent. Moderately sensitive to hydrological change. Changes in management. Changes in nutrient status
Calcareous fens with Cladium mariscus and species of the Caricion davallianae*	Peat or turf cutting, arterial drainage, local drainage and agricultural reclamation, infilling of sites with building waste, dumping of household refuse, afforestation, water pollution and urban expansion.	Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.

Petrifying springs with tufa formation (Cratoneurion)	Peat or turf cutting; arterial drainage; local drainage; water abstraction and agricultural reclamation.	Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.
Alkaline fens	Peat mining activities, land drainage; infilling; fertiliser pollution and eutrophication	Groundwater dependant. Highly sensitive to hydrological changes. Changes in nutrient or base status
Limestone pavements*	Quarrying, reclamation for agriculture and reduced farming activity which has facilitated the spread of scrub over some areas. Intensive agriculture and domestic/municipal waste sources in the vicinity of pavement may also threaten groundwater.	Physical removal. Scrub encroachment

			Caves not open to the public	Human habitation adjacent to the cave system; disposal of household waste; road development; speleology (which leads to the disturbance of bats); vandalism; and inundation.	Human disturbance. Pollution	
			Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	Inappropriate grazing levels; invasive species; and clearance for agriculture or felling for timber.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Changes in management.	
Maumturk Mountains	**2008**	220m from AIP; 8.3km from AOC; 10.6km from SA	Alpine and Boreal heaths	Abandonment; overgrazing; burning; outdoor recreation; quarries; communication networks; and wind farm developments.	Changes in management. Changes in nutrient or base status. Moderately sensitive to hydrological change	Yes. Should wind-farm developments occur in WEAs 500m or more upstream of a number of these qualifying habitat the potential for significant effects to these habitat exists.
			Siliceous rocky slopes with chasmophytic vegetation	Overgrazing; extractive industries; recreational activities and improved access	Erosion, ovegrazing and recreation.	

			Blanket bog (*active only)	Land reclamation, peat extraction; afforestation; erosion and landslides triggered by human activity; drainage; burning and infrastructural development.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	
			Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	Nutrient enrichment; afforestation; waste water; invasive alien species; sport and leisure activities.	Surface and groundwater dependant. Highly sensitive to hydrological changes. Highly sensitive to pollution	
			Northern Atlantic wet heaths with Erica tetralix	Reclamation, afforestation and burning; overstocking; invasion by non-heath species; exposure of peat to severe erosion.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	
			Depressions on peat substrates of the Rhynchosporion	Drainage; burning; peat extraction; overgrazing; afforestation; erosion; and climate change.	Surface and groundwater dependent. Low sensitivity to hydrological changes. Erosion, land-use changes	

The Twelve Bens/Garraun Complex	**2031**	2.9km from AIP; 5.5km from AOC	Blanket bog (*active only)	Land reclamation, peat extraction; afforestation; erosion and landslides triggered by human activity; drainage; burning and infrastructural development.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	No. This site is located at a distance of approximately 2.9km from the nearest WEA and no impact pathways linking the WES area to this site have been identified. Therefore it is considered unlikely that the qualifying habitats or species of this site will be adversely impacted by the implementation of the Draft WES
			Siliceous rocky slopes with chasmophytic vegetation	Overgrazing; extractive industries; recreational activities and improved access	Erosion, ovegrazing and recreation.	
			Alpine and Boreal heaths	Abandonment; overgrazing; burning; outdoor recreation; quarries; communication networks; and wind farm developments.	Changes in management. Changes in nutrient or base status. Moderately sensitive to hydrological change	
			Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	Nutrient enrichment; afforestation; waste water; invasive alien species; sport and leisure activities.	Surface and groundwater dependant. Highly sensitive to hydrological changes. Highly sensitive to pollution	

Old sessile oak woods with Ilex and Blechnum in British Isles	The introduction of alien species; sub-optimal grazing patterns; general forestry management; increases in urbanisation and human habitation adjacent to oak woodlands; and the construction of communication networks through the woodland.	Changes in management. Changes in nutrient or base status. Introduction of alien species.
Depressions on peat substrates of the Rhynchosporion	Drainage; burning; peat extraction; overgrazing; afforestation; erosion; and climate change.	Surface and groundwater dependent. Low sensitivity to hydrological changes. Erosion, land-use changes

Salmo salar	Numerous threats impact upon this specis. Some of these include: cultivation, pesticides; fertilization; pollution; water pollution; biocenotic evolution; accumulation of organic material; eutrophication; over-fishing; forest-related pressures; parasites.	Surface water dependent Highly sensitive to hydrological change

Lutra lutra	Decrease in water quality: Use of pesticides; fertilization; vegetation removal; professional fishing (including lobster pots and fyke nets); hunting; poisoning; sand and gravel extraction; mechanical removal of peat; urbanised areas; human habitation; continuous urbanization; drainage; management of aquatic and bank vegetation for drainage purposes; ; and canalization or modifying structures of inland water course.	Surface and marine water dependent. Moderately sensitive to hydrological change. Sensitivty to pollution

			Margaritifera margaritifera (Incorporates the Dawros Margaritifera catchment Sub-Basin Plan)	Poor substrate quality due to increased growth of algal and macrophyte vegetation as a result of severe nutrient enrichment, as well as physical siltation.	Surface water dependent Highly sensitive to hydrological change Very highly sensitive to pollution	
			Najas flexilis	Fertilization; disposal of household waste; water pollution; eutrophication; and invasion by alien species.	Highly sensitive to hydrological changes. Highly sensitive to pollution.	
Connemara Bog Complex	**2034**	Adjacent to Sa; AIP; and AOC	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	Nutrient enrichment; afforestation; waste water; invasive alien species; sport and leisure activities.	Surface and groundwater dependant. Highly sensitive to hydrological changes. Highly sensitive to pollution	Yes. Should wind-farm developments occur in WEAs immediately adjacent to qualifying habitats or populations of qualifying species the potential for significant effects to this N2K site exists.
			Natural dystrophic lakes and ponds	Peat cutting, overgrazing and afforestation of peatland habitats.	Surface and groundwater dependant. Highly sensitive to hydrological changes. Highly sensitive to pollution	

Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	Eutrophication; overgrazing, excessive fertilisation; afforestation; and the introduction of invasive alien species.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Highly sensitive to pollution.
Northern Atlantic wet heaths with Erica tetralix	Reclamation, afforestation and burning; overstocking; invasion by non-heath species; exposure of peat to severe erosion.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management
European dry heaths	Afforestation, over-burning, over-grazing, under-grazing and bracken invasion.	Moderately sensitive to hydrological change. Changes in management. Changes in nutrient status
Molinia meadows on calcareous, peaty or clavey-silt-laden soils (Molinion caeruleae)	Agricultural intensification; drainage; abandonment of pastoral systems	Surface and groundwater dependent. Moderately sensitive to hydrological change. Changes in management. Changes in nutrient status

Blanket bog (*active only)	Land reclamation, peat extraction; afforestation; erosion and landslides triggered by human activity; drainage; burning and infrastructural development.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management
Old sessile oak woods with Ilex and Blechnum in British Isles	The introduction of alien species; sub-optimal grazing patterns; general forestry management; increases in urbanisation and human habitation adjacent to oak woodlands; and the construction of communication networks through the woodland.	Changes in management. Changes in nutrient or base status. Introduction of alien species.
Alkaline fens	Peat mining activities, land drainage; infilling; fertiliser pollution and eutrophication	Groundwater dependant. Highly sensitive to hydrological changes. Changes in nutrient or base status

Coastal lagoons	Drainage for agricultural and safety reasons; natural siltation; Water pollution in the form of excessive nutrient enrichment	Surface, ground and marine water dependent. Highly sensitive to hydrological changes. Highly sensitive to pollution. Changes in salinity and tidal regime
Transition mires and quaking bogs	Drainage, infilling, reclamation and pollution.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management
Depressions on peat substrates of the Rhynchosporion	Drainage; burning; peat extraction; overgrazing; afforestation; erosion; and climate change.	Surface and groundwater dependent. Low sensitivity to hydrological changes. Erosion, land-use changes
Reefs	Professional fishing; taking for fauna; taking for flora; water pollution; climate change; and change in species composition.	Sensitive to disturbance and pollution.

Salmo salar	Numerous threats impact upon this specis. Some of these include: cultivation, pesticides; fertilization; pollution; water pollution; biocenotic evolution; accumulation of organic material; eutrophication; over-fishing; forest-related pressures; parasites.	Surface water dependent Highly sensitive to hydrological change

Lutra lutra	Decrease in water quality: Use of pesticides; fertilization; vegetation removal; professional fishing (including lobster pots and fyke nets); hunting; poisoning; sand and gravel extraction; mechanical removal of peat; urbanised areas; human habitation; continuous urbanization; drainage; management of aquatic and bank vegetation for drainage purposes; ; and canalization or modifying structures of inland water course.	Surface and marine water dependent. Moderately sensitive to hydrological change. Sensitivty to pollution

			Euphydryas aurinia	Abandonment of traditional pastoral systems; infrastructure developments and increased urbanisation	Changes in management. Habitats are sensitive to hydrological changes. Changes in nutrient base status.	
			Najas flexilis	Fertilization; disposal of household waste; water pollution; eutrophication; and invasion by alien species.	Highly sensitive to hydrological changes. Highly sensitive to pollution.	
Slyne Head Peninsula	**2074**	12km from AOC	Coastal lagoons	Drainage for agricultural and safety reasons; natural siltation; Water pollution in the form of excessive nutrient enrichment	Surface, ground and marine water dependent. Highly sensitive to hydrological changes. Highly sensitive to pollution. Changes in salinity and tidal regime	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats or speciesassociated with this N2K site
			Annual vegetation of drift lines	Grazing; sand and gravel extraction; recreational activities; coastal protection works	Overgrazing and erosion. Changes in management.	

Perennial vegetation of stony banks	Disruption of the sediment supply, owing to the interruption of the coastal processes, caused by developments such as car parks and coastal defence structures including rock armour and sea walls. The removal of gravel .	Marine water dependent. Low sensitivity to hydrological changes. Coastal development, trampling from recreational activity and gravel removal.
Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Overgrazing; erosion; invasive species, particularly common cordgrass (Spartina anglica); infilling and reclamation.	Marine and groundwater dependent. Medium sensitivity to hydrological change. maritimae) Changes in salinity and tidal regime. Overgrazing, erosion and accretion

Mediterranean salt meadows (Juncetalia maritimi)	Over-grazing by cattle or sheep; infilling and reclamation.	Marine and groundwater dependent. Medium sensitivity to hydrological change. Changes in salinity and tidal regime. Coastal development and reclamation.
Embryonic shifting dunes	Natural erosion processes exacerbated by recreation and sand extraction. Coastal protection interfering with natural processes	Overgrazing, and erosion. Changes in management.
Shifting dunes along the shoreline with Ammophila arenaria (white dunes)	Removal of beach material and interference with the supply of sand; construction of coastal defences; sand compaction caused by vehicles and trampling.	Overgrazing, and erosion. Changes in management.

Machairs (* in Ireland)	Agricultural activity; fertilisation; ovegrazing and undergrazing; recreational activity; waste disposal; invasion by a species.	Changes in management. Changes in nutrient status.
Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	Nutrient enrichment; afforestation; waste water; invasive alien species; sport and leisure activities.	Surface and groundwater dependant. Highly sensitive to hydrological changes. Highly sensitive to pollution
Juniperus communis formations on heaths or calcareous grasslands	Overgrazing; fire; agricultural expansion; invasion by alien species particularly Rhododenron ponticum; and poor regeneration.	Onset of inundation or waterlogging Inappropriate management
Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)	The main threats to this habitat include the abandonment of traditional agricultural practices and reclamation.	Changes in management. Changes in nutrient or base status. Moderately sensitive to hydrological change

Large shallow inlets and bays	Aquaculture, fishing, dumping of wastes and water pollution.	Surface and marine water dependent. low sensitivity to hydrological changes. Aquaculture, fishing and pollution.
Reefs	Professional fishing; taking for fauna; taking for flora; water pollution; climate change; and change in species composition.	Sensitive to disturbance and pollution.
Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	Nutrient enrichment arising from intensification of agriculture and urban developments.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Highly sensitive to pollution
European dry heaths	Afforestation, over-burning, over-grazing, under-grazing and bracken invasion.	Moderately sensitive to hydrological change. Changes in management. Changes in nutrient status

Molinia meadows on calcareous, peaty or clavey-silt-laden soils (Molinion caeruleae)	Agricultural intensification; drainage; abandonment of pastoral systems	Surface and groundwater dependent. Moderately sensitive to hydrological change. Changes in management. Changes in nutrient status
Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)	Agricultural intensification; drainage; abandonment of pastoral systems and the associated encroachment of rank vegetation and scrub.	Surface and groundwater dependent. Moderately sensitive to hydrological change. Changes in management. Changes in nutrient status
Alkaline fens	Peat mining activities, land drainage; infilling; fertiliser pollution and eutrophication	Groundwater dependant. Highly sensitive to hydrological changes. Changes in nutrient or base status

			Petalophyllum ralfsii	Agricultural improvement and fertilisation; overgrazing; changes in agricultural practices i.e. land abandonment & undergrazing; drainage; erosion and drying out.	Changes in management. Changes in nutrient or base status. Sensitive to hydrological change	
			Najas flexilis	Fertilization; disposal of household waste; water pollution; eutrophication; and invasion by alien species.	Highly sensitive to hydrological changes. Highly sensitive to pollution.	
Corliskea/Trien/Cloonfelliv Bog	**2110**	1.7km from AOC	Active raised bog*	Deterioration of the hydrological conditions caused by peat cutting, drainage, forestry and burning.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats

			Degraded raised bogs still capable of natural regeneration	Changes in agricultural practices; afforestation and general forest management; burning; peat extraction,;drainage; and the introduction of invasive species.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	of qualifying habitats associated with this N2K site
			Depressions on peat substrates of the Rhynchosporion	Drainage; burning; peat extraction; overgrazing; afforestation; erosion; and climate change.	Surface and groundwater dependent. Low sensitivity to hydrological changes. Erosion, land-use changes	
Kilkieran Bay And Islands	**2111**	66m from AOC; 8.4km from SA	Mudflats and sandflats not covered by seawater at low tide	Aquaculture, fishing, bait digging, removal of fauna, reclamation of land, coastal protection works and invasive species, particularly cord-grass; hard coastal defence structures; sea-level rise.	Surface and marine water dependent. Moderately sensitive to hydrological change. Moderate sensitivty to pollution. Changes to salinity and tidal regime. Coastal development	

Coastal lagoons*	Drainage for agricultural and safety reasons; natural siltation; Water pollution in the form of excessive nutrient enrichment	Surface, ground and marine water dependent. Highly sensitive to hydrological changes. Highly sensitive to pollution. Changes in salinity and tidal regime	
Large shallow inlets and bays	Aquaculture, fishing, dumping of wastes and water pollution.	Surface and marine water dependent. low sensitivity to hydrological changes. Aquaculture, fishing and pollution.	
Reefs	Professional fishing; taking for fauna; taking for flora; water pollution; climate change; and change in species composition.	Sensitive to disturbance and pollution.	

Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Overgrazing; erosion; invasive species, particularly common cordgrass (Spartina anglica); infilling and reclamation.	Marine and groundwater dependent. Medium sensitivity to hydrological change. maritimae) Changes in salinity and tidal regime. Overgrazing, erosion and accretion	
Mediterranean salt meadows (Juncetalia maritimi)	Over-grazing by cattle or sheep; infilling and reclamation.	Marine and groundwater dependent. Medium sensitivity to hydrological change. Changes in salinity and tidal regime. Coastal development and reclamation.	
Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)	Agricultural intensification; drainage; abandonment of pastoral systems and the associated encroachment of rank vegetation and scrub.	Surface and groundwater dependent. Moderately sensitive to hydrological change. Changes in management. Changes in nutrient status	

Machairs (* in Ireland)	Agricultural activity; fertilisation; ovegrazing and undergrazing; recreational activity; waste disposal; invasion by a species.	Changes in management. Changes in nutrient status.	
Lutra lutra	Decrease in water quality: Use of pesticides; fertilization; vegetation removal; professional fishing (including lobster pots and fyke nets); hunting; poisoning; sand and gravel extraction; mechanical removal of peat; urbanised areas; human habitation; continuous urbanization; drainage; management of aquatic and bank vegetation for drainage purposes; ; and canalization or modifying structures of inland water course.	Surface and marine water dependent. Moderately sensitive to hydrological change. Sensitivty to pollution	

			Phoca vitulina	Continued by-catch in fishing gear; occasional illegal culling; competition for prey resources with fisheries and disturbance at key breeding and moulting haul-out sites.	Marine water dependent. Sensitive to changes in food supply.	
			Najas flexilis	Fertilization; disposal of household waste; water pollution; eutrophication; and invasion by alien species.	Highly sensitive to hydrological changes. Highly sensitive to pollution.	
Lough Coy	**2117**	3.5km from AOC	Turloughs*	Nutrient enrichment and inappropriate grazing; drainage, peat cutting; marl extraction and quarrying.	Surface and Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	No. This site is located at a distance of approximately 3.5km from the nearest WEA and no impact pathways linking the WES area to this site have been identified. Therefore it is considered unlikely that the qualifying habitats or species of this site will be adversely impacted by the implementation of the Draft WES

Barnahallia Lough	**2118**	Over 20km from WEA	Blanket bog (*active only)	Land reclamation, peat extraction; afforestation; erosion and landslides triggered by human activity; drainage; burning and infrastructural development.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site
			Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	Nutrient enrichment; afforestation; waste water; invasive alien species; sport and leisure activities.	Surface and groundwater dependant. Highly sensitive to hydrological changes. Highly sensitive to pollution	
			Najas flexilis	Fertilization; disposal of household waste; water pollution; eutrophication; and invasion by alien species.	Highly sensitive to hydrological changes. Highly sensitive to pollution.	
Lough Nageeron	**2119**	1.1km from AOC; 16.5km from AIP	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	Nutrient enrichment; afforestation; waste water; invasive alien species; sport and leisure activities.	Surface and groundwater dependant. Highly sensitive to hydrological changes. Highly sensitive to pollution	No. This site is located at a distance of approximately 1.1km from the nearest WEA and no impact pathways linking the WES area to this site have been identified. Therefore it is considered unlikely that the qualifying habitats or species of

			Najas flexilis	Fertilization; disposal of household waste; water pollution; eutrophication; and invasion by alien species.	Highly sensitive to hydrological changes. Highly sensitive to pollution.	this site will be adversely impacted by the implementation of the Draft WES
Murvey Machair	**2129**	7.8km from AOC; 19.8km from AIP	Machairs (* in Ireland)	Agricultural activity; fertilisation; ovegrazing and undergrazing; recreational activity; waste disposal; invasion by a species.	Changes in management. Changes in nutrient status.	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site
			Petalophyllum ralfsii	Agricultural improvement and fertilisation; overgrazing; changes in agricultural practices i.e. land abandonment & undergrazing; drainage; erosion and drying out.	Changes in management. Changes in nutrient or base status. Sensitive to hydrological change	

Tully Lough	**2130**	Over 20km from WEA	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	Nutrient enrichment; afforestation; waste water; invasive alien species; sport and leisure activities.	Surface and groundwater dependant. Highly sensitive to hydrological changes. Highly sensitive to pollution	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site
			Najas flexilis	Fertilization; disposal of household waste; water pollution; eutrophication; and invasion by alien species.	Highly sensitive to hydrological changes. Highly sensitive to pollution.	

Gortacarnaun Wood	**2180**	10.3km from AOC	Old sessile oak woods with Ilex and Blechnum in British Isles	The introduction of alien species; sub-optimal grazing patterns; general forestry management; increases in urbanisation and human habitation adjacent to oak woodlands; and the construction of communication networks through the woodland.	Changes in management. Changes in nutrient or base status. Introduction of alien species.	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site
Drummin Wood	**2181**	8.4km from AOC	Old sessile oak woods with Ilex and Blechnum in British Isles	The introduction of alien species; sub-optimal grazing patterns; general forestry management; increases in urbanisation and human habitation adjacent to oak woodlands; and the construction of communication networks through the woodland.	Changes in management. Changes in nutrient or base status. Introduction of alien species.	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site

Glenloughaun Esker	**2213**	17.5km from AOC	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)	The main threats to this habitat include the abandonment of traditional agricultural practices and reclamation.	Changes in management. Changes in nutrient or base status. Moderately sensitive to hydrological change	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site
Lough Derg, North-East Shore	**2241**	Over 20km from WEA	Taxus baccata woods of the British Isles	Invasive aliens species.	Restricted distribution and limited suitable habitat Inappropriate management Invasion by aliens	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site
			Juniperus communis formations on heaths or calcareous grasslands	Overgrazing; fire; agricultural expansion; invasion by alien species particularly Rhododenron ponticum; and poor regeneration.	Onset of inundation or waterlogging Inappropriate management	

Alkaline fens	Peat mining activities, land drainage; infilling; fertiliser pollution and eutrophication	Groundwater dependant. Highly sensitive to hydrological changes. Changes in nutrient or base status
Calcareous fens with Cladium mariscus and species of the Caricion davallianae*	Peat or turf cutting, arterial drainage, local drainage and agricultural reclamation, infilling of sites with building waste, dumping of household refuse, afforestation, water pollution and urban expansion.	Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.
Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	Inappropriate grazing levels; invasive species; and clearance for agriculture or felling for timber.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Changes in management.

			Limestone pavements*	Quarrying, reclamation for agriculture and reduced farming activity which has facilitated the spread of scrub over some areas. Intensive agriculture and domestic/municipal waste sources in the vicinity of pavement may also threaten groundwater.	Physical removal. Scrub encroachment	
Ardrahan Grassland	**2246**	1.2km from AOC	Alpine and Boreal heaths	Abandonment; overgrazing; burning; outdoor recreation; quarries; communication networks; and wind farm developments.	Changes in management. Changes in nutrient or base status. Moderately sensitive to hydrological change	No. This site is located at a distance of approximately 1.2km from the nearest WEA and no impact pathways linking the WES area to this site have been identified. Therefore it is considered unlikely that this qualifying feature will be

			Limestone pavements*	Quarrying, reclamation for agriculture and reduced farming activity which has facilitated the spread of scrub over some areas. Intensive agriculture and domestic/municipal waste sources in the vicinity of pavement may also threaten groundwater.	Physical removal. Scrub encroachment	adversely impacted by the implementation of the Draft WES
			Juniperus communis formations on heaths or calcareous grasslands	Overgrazing; fire; agricultural expansion; invasion by alien species particularly Rhododenron ponticum; and poor regeneration.	Onset of inundation or waterlogging Inappropriate management	

Kingstown Bay	**2265**	19.2km from AOC	Large shallow inlets and bays	Aquaculture, fishing, dumping of wastes and water pollution.	Surface and marine water dependent. low sensitivity to hydrological changes. Aquaculture, fishing and pollution.	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site
Carrowbaun, Newhall And Ballylee Turloughs	**2293**	4.3km from AOC	Turloughs*	Nutrient enrichment and inappropriate grazing; drainage, peat cutting; marl extraction and quarrying.	Surface and Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	No. This site is located at a distance of approximately 1.4km from the nearest WEA and no impact pathways linking the WES area to this site have been identified. Therefore it is considered unlikely that this qualifying feature will be adversely impacted by the implementation of the Draft WES

Cahermore Turlough	**2294**	1.4km from AOC	Turloughs*	Nutrient enrichment and inappropriate grazing; drainage, peat cutting; marl extraction and quarrying.	Surface and Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	No. This site is located at a distance of approximately 1.4km from the nearest WEA and no impact pathways linking the WES area to this site have been identified. Therefore it is considered unlikely that this qualifying feature will be adversely impacted by the implementation of the Draft WES
Ballinduff Turlough	**2295**	5.6km from AOC	Turloughs*	Nutrient enrichment and inappropriate grazing; drainage, peat cutting; marl extraction and quarrying.	Surface and Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	No. This site is located at a distance of approximately 5.6km from the nearest WEA and no impact pathways linking the WES area to this site have been identified. Therefore it is considered unlikely that this qualifying feature will be adversely impacted by the implementation of the Draft WES

Williamstown Turloughs	**2296**	Adjacent to AOC	Turloughs*	Nutrient enrichment and inappropriate grazing; drainage, peat cutting; marl extraction and quarrying.	Surface and Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	Yes. Should wind-farm developments occur in WEAs immediately adjacent to this habitat the potential for significant effects to impact this habitat exist.
Cregg House Stables, Crusheen	**2317**	15.1km from AOC	Rhinolophus hipposideros	Loss of suitable summer and winter roosting sites; loss of commuting routes linking roosts to foraging sites, and loss of suitable foraging sites.	Disturbance. Changes in Management.	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying species associated with this N2K site
Camderry Bog	**2347**	2.4km from AOC	Active raised bog*	Deterioration of the hydrological conditions caused by peat cutting, drainage, forestry and burning.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	No. This site is located at a distance of approximately 1.1km from the nearest WEA and no impact pathways linking the WES area to this site have been identified. Therefore it is considered unlikely that this qualifying feature will be

			Degraded raised bogs still capable of natural regeneration	Changes in agricultural practices; afforestation and general forest management; burning; peat extraction,;drainage; and the introduction of invasive species.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	qualifying feature will be adversely impacted by the implementation of the Draft WES
			Depressions on peat substrates of the Rhynchosporion	Drainage; burning; peat extraction; overgrazing; afforestation; erosion; and climate change.	Surface and groundwater dependent. Low sensitivity to hydrological changes. Erosion, land-use changes	
Curraghlehanagh Bog	**2350**	1.1km from AOC	Active raised bog*	Deterioration of the hydrological conditions caused by peat cutting, drainage, forestry and burning.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	No. This site is located at a distance of approximately 1.1km from the nearest WEA and no impact pathways linking the WES area to this site have been identified. Therefore it is considered unlikely that this qualifying feature will be

			Degraded raised bogs still capable of natural regeneration	Changes in agricultural practices; afforestation and general forest management; burning; peat extraction,;drainage; and the introduction of invasive species.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	qualifying feature will be adversely impacted by the implementation of the Draft WES
			Depressions on peat substrates of the Rhynchosporion	Drainage; burning; peat extraction; overgrazing; afforestation; erosion; and climate change.	Surface and groundwater dependent. Low sensitivity to hydrological changes. Erosion, land-use changes	
Monivea Bog	**2352**	Adjacent to AOC	Degraded raised bogs still capable of natural regeneration	Changes in agricultural practices; afforestation and general forest management; burning; peat extraction,;drainage; and the introduction of invasive species.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	Yes. Should wind-farm developments occur in WEAs immediately adjacent to this habitat the potential for significant effects to impact this habitat exist.

			Active raised bog*	Deterioration of the hydrological conditions caused by peat cutting, drainage, forestry and burning.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	Yes. Should wind-farm developments occur in WEAs immediately adjacent to this habitat the potential for significant effects to impact this habitat exist.
			Depressions on peat substrates of the Rhynchosporion	Drainage; burning; peat extraction; overgrazing; afforestation; erosion; and climate change.	Surface and groundwater dependent. Low sensitivity to hydrological changes. Erosion, land-use changes	Yes. Should wind-farm developments occur in WEAs immediately adjacent to this habitat the potential for significant effects to impact this habitat exist.
Ardgraigue Bog	**2356**	Over 20km from WEA	Active raised bog*	Deterioration of the hydrological conditions caused by peat cutting, drainage, forestry and burning.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site

			Degraded raised bogs still capable of natural regeneration	Changes in agricultural practices; afforestation and general forest management; burning; peat extraction,;drainage; and the introduction of invasive species.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	
			Depressions on peat substrates of the Rhynchosporion	Drainage; burning; peat extraction; overgrazing; afforestation; erosion; and climate change.	Surface and groundwater dependent. Low sensitivity to hydrological changes. Erosion, land-use changes	
Clare SACs						
Ballyallia Lake	14	Over 20km from WEA	Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation.	Nutrient enrichment; overgrazing; affforestation and general forest management; introduction of invasive species; and increased pressures from human activities.	Surface and groundwater dependant. Highly sensitive to hydrological changes. Highly sensitive to pollution.	No. This site is located at a remote distance from and not hydrologically linked to the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site

Ballycullinan Lake	16	18.9km from WEA	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)*	Inappropriate grazing levels; invasive species; and clearance for agriculture or felling for timber.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Changes in management.	No. This site is located at a remote distance from and not hydrologically linked to the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site
Ballyogan Lough	19	13.5km from WEA	Calcareous fens with Cladium mariscus and species of the Caricion davallianae*	Peat or turf cutting, arterial drainage, local drainage and agricultural reclamation, infilling of sites with building waste, dumping of household refuse, afforestation, water pollution and urban expansion.	Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	No. This site is located at a remote distance from and not hydrologically linked to the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats ssociated with this N2K site

Black Head-Poulsallagh Complex	20	7.3km from AOC; 12.2km from AIP; 18km from SA	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	Eutrophication; overgrazing, excessive fertilisation; afforestation; and the introduction of invasive alien species.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Highly sensitive to pollution.	No. This site is located at a remote distance from and not hydrologically linked to the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats or species associated with this N2K site
			Alpine and Boreal heaths	Abandonment; overgrazing; burning; outdoor recreation; quarries; communication networks; and wind farm developments.	Changes in management. Changes in nutrient or base status. Moderately sensitive to hydrological change	
			Juniperus communis formations on heaths or calcareous grasslands	Overgrazing; fire; agricultural expansion; invasion by alien species particularly Rhododenron ponticum; and poor regeneration.	Onset of inundation or waterlogging Inappropriate management	

Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)	The main threats to this habitat include the abandonment of traditional agricultural practices and reclamation.	Changes in management. Changes in nutrient or base status. Moderately sensitive to hydrological change
Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)	Agricultural intensification; drainage; abandonment of pastoral systems and the associated encroachment of rank vegetation and scrub.	Surface and groundwater dependent. Moderately sensitive to hydrological change. Changes in management. Changes in nutrient status
Petrifying springs with tufa formation (Cratoneurion)*	Peat or turf cutting; arterial drainage; local drainage; water abstraction and agricultural reclamation.	Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.

Limestone pavements*	Quarrying, reclamation for agriculture and reduced farming activity which has facilitated the spread of scrub over some areas. Intensive agriculture and domestic/municipal waste sources in the vicinity of pavement may also threaten groundwater.	Physical removal. Scrub encroachment
Reefs	Professional fishing; taking for fauna; taking for flora; water pollution; climate change; and change in species composition.	Sensitive to disturbance and pollution.
Submerged or partly submerged sea caves	Water pollution	Pollution

			Perennial vegetation of stony banks	Disruption of the sediment supply, owing to the interruption of the coastal processes, caused by developments such as car parks and coastal defence structures including rock armour and sea walls. The removal of gravel .	Marine water dependent. Low sensitivity to hydrological changes. Coastal development, trampling from recreational activity and gravel removal.	
			Petalwort	Agricultural improvement and fertilisation; overgrazing; changes in agricultural practices i.e. land abandonment & undergrazing; drainage; erosion and drying out.	Changes in management. Changes in nutrient or base status. Sensitive to hydrological change	

Dromore Woods And Loughs	32	15.6km from AOC	Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation.	Nutrient enrichment; overgrazing; affforestation and general forest management; introduction of invasive species; and increased pressures from human activities.	Surface and groundwater dependant. Highly sensitive to hydrological changes. Highly sensitive to pollution.	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats or species associated with this N2K site
			Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	The spread of invasive species; arterial drainage and agricultural improvement at the river edge.	Highly sensitive to hydrological changes. Highly sensitive to pollution. Changes in nutrient or base status	
			Limestone pavements*	Quarrying, reclamation for agriculture and reduced farming activity which has facilitated the spread of scrub over some areas. Intensive agriculture and domestic/municipal waste sources in the vicinity of pavement may also threaten groundwater.	Physical removal. Scrub encroachment	

Rhinolophus hipposideros	Loss of suitable summer and winter roosting sites; loss of commuting routes linking roosts to foraging sites, and loss of suitable foraging sites.	Disturbance. Changes in Management.

			Lutra lutra	Decrease in water quality: Use of pesticides; fertilization; vegetation removal; professional fishing (including lobster pots and fyke nets); hunting; poisoning; sand and gravel extraction; mechanical removal of peat; urbanised areas; human habitation; continuous urbanization; drainage; management of aquatic and bank vegetation for drainage purposes; ; and canalization or modifying structures of inland water course.	Surface and marine water dependent. Moderately sensitive to hydrological change. Sensitivty to pollution	

Moneen Mountain	54	2.9km from AOC; 15.8km from AIP	Limestone pavements*	Quarrying, reclamation for agriculture and reduced farming activity which has facilitated the spread of scrub over some areas. Intensive agriculture and domestic/municipal waste sources in the vicinity of pavement may also threaten groundwater.	Physical removal. Scrub encroachment	No. This site is located at at an elevated "upstream" distance of approximately 3km from the nearest WEA and no impact pathways linking the WES area to this site have been identified. Therefore it is considered unlikely that this qualifying feature will be adversely impacted by the implementation of the Draft WES
			Petrifying springs with tufa formation (Cratoneurion)*	Peat or turf cutting; arterial drainage; local drainage; water abstraction and agricultural reclamation.	Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	
			Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)	The main threats to this habitat include the abandonment of traditional agricultural practices and reclamation.	Changes in management. Changes in nutrient or base status. Moderately sensitive to hydrological change	

Calaminarian grasslands of the Violetalia calaminariae	Succession over time and reclamation by levelling and tidying of mine spoil using topsoil.	Surface and groundwater dependent. Moderately sensitive to hydrological change. Changes in management. Changes in nutrient status
Alpine and Boreal heaths	Abandonment; overgrazing; burning; outdoor recreation; quarries; communication networks; and wind farm developments.	Changes in management. Changes in nutrient or base status. Moderately sensitive to hydrological change
Juniperus communis formations on heaths or calcareous grasslands	Overgrazing; fire; agricultural expansion; invasion by alien species particularly Rhododenron ponticum; and poor regeneration.	Onset of inundation or waterlogging Inappropriate management
Turloughs*	Nutrient enrichment and inappropriate grazing; drainage, peat cutting; marl extraction and quarrying.	Surface and Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.

			Rhinolophus hipposideros	Loss of suitable summer and winter roosting sites; loss of commuting routes linking roosts to foraging sites, and loss of suitable foraging sites.	Disturbance. Changes in Management.	
			Euphydryas aurinia	Abandonment of traditional pastoral systems; infrastructure developments and increased urbanisation	Changes in management. Habitats are sensitive to hydrological changes. Changes in nutrient base status.	
Moyree River System	57	14km from AOC	Limestone pavements*	Quarrying, reclamation for agriculture and reduced farming activity which has facilitated the spread of scrub over some areas. Intensive agriculture and domestic/municipal waste sources in the vicinity of pavement may also threaten groundwater.	Physical removal. Scrub encroachment	No. This site is located at a remote distance from the nearest WEA and no impact pathways linking the WES area to this site have been identified. Therefore it is considered unlikely that this qualifying feature will be adversely impacted by the implementation of the Draft WES

Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation.	Nutrient enrichment; overgrazing; affforestation and general forest management; introduction of invasive species; and increased pressures from human activities.	Surface and groundwater dependant. Highly sensitive to hydrological changes. Highly sensitive to pollution.	No. This site is located at a remote distance from the nearest WEA and no impact pathways linking the WES area to this site have been identified. Therefore it is considered unlikely that this qualifying feature will be adversely impacted by the implementation of the Draft WES
Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	The spread of invasive species; arterial drainage and agricultural improvement at the river edge.	Highly sensitive to hydrological changes. Highly sensitive to pollution. Changes in nutrient or base status	No. This site is located at a remote distance from the nearest WEA and no impact pathways linking the WES area to this site have been identified. Therefore it is considered unlikely that this qualifying feature will be adversely impacted by the implementation of the Draft WES

Rhinolophus hipposideros	Loss of suitable summer and winter roosting sites; loss of commuting routes linking roosts to foraging sites, and loss of suitable foraging sites.	Disturbance. Changes in Management.	No. This site is located at a remote distance from the nearest WEA and no impact pathways linking the WES area to this site have been identified. Therefore it is considered unlikely that this qualifying feature will be adversely impacted by the implementation of the Draft WES

			Lutra lutra	Decrease in water quality: Use of pesticides; fertilization; vegetation removal; professional fishing (including lobster pots and fyke nets); hunting; poisoning; sand and gravel extraction; mechanical removal of peat; urbanised areas; human habitation; continuous urbanization; drainage; management of aquatic and bank vegetation for drainage purposes; ; and canalization or modifying structures of inland water course.	Surface and marine water dependent. Moderately sensitive to hydrological change. Sensitivty to pollution	No. This site is located at a remote distance from the nearest WEA and no impact pathways linking the WES area to this site have been identified. Therefore it is considered unlikely that this qualifying feature will be adversely impacted by the implementation of the Draft WES

Loughatorick South Bog	308	19.5km from AOC	Active Blanket Bog*	Land reclamation, peat extraction; afforestation; erosion and landslides triggered by human activity; drainage; burning and infrastructural development.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	No. This site is located at a remote distance from the nearest WEA and no impact pathways linking the WES area to this site have been identified. Therefore it is considered unlikely that this qualifying feature will be adversely impacted by the implementation of the Draft WES
Ballyvaughan Turlough	996	7.5km from AOC; 17.6km from AIP	Turloughs*	Nutrient enrichment and inappropriate grazing; drainage, peat cutting; marl extraction and quarrying.	Surface and Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	No. This site is located at a remote distance from the nearest WEA and no impact pathways linking the WES area to this site have been identified. Therefore it is considered unlikely that this qualifying feature will be adversely impacted by the implementation of the Draft WES

Termon Lough	1321	8.9km from AOC	Turloughs*	Nutrient enrichment and inappropriate grazing; drainage, peat cutting; marl extraction and quarrying.	Surface and Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	No. This site is located at a remote distance from the nearest WEA and no impact pathways linking the WES area to this site have been identified. Therefore it is considered unlikely that this qualifying feature will be adversely impacted by the implementation of the Draft WES
Glendree Bog	1912	18.9km from AOC	Active Blanket Bog*	Land reclamation, peat extraction; afforestation; erosion and landslides triggered by human activity; drainage; burning and infrastructural development.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	No. This site is located at a remote distance from the nearest WEA and no impact pathways linking the WES area to this site have been identified. Therefore it is considered unlikely that this qualifying feature will be adversely impacted by the implementation of the Draft WES

Pollagoona Bog	2126	16.2km from AOC	Active Blanket Bog*	Land reclamation, peat extraction; afforestation; erosion and landslides triggered by human activity; drainage; burning and infrastructural development.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	No. This site is located at a remote distance from the nearest WEA and no impact pathways linking the WES area to this site have been identified. Therefore it is considered unlikely that this qualifying feature will be adversely impacted by the implementation of the Draft WES
Newgrove House	2157	Over 20km from WEA	Rhinolophus hipposideros	Loss of suitable summer and winter roosting sites; loss of commuting routes linking roosts to foraging sites, and loss of suitable foraging sites.	Disturbance. Changes in Management.	No. This site is located at a remote distance from the nearest WEA and no impact pathways linking the WES area to this site have been identified. Therefore it is considered unlikely that this qualifying feature will be adversely impacted by the implementation of the Draft WES

Lower River Shannon	2165	Over 20km from WEA	Estuaries	Aquaculture; fishing; coastal development and water pollution.	Surface and marine water dependent. Moderately sensitive to hydrological change. Moderate sensitivty to pollution. Changes to salinity and tidal regime. Coastal development	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats or species associated with this N2K site.
			Mudflats and sandflats not covered by seawater at low tide	Aquaculture, fishing, bait digging, removal of fauna, reclamation of land, coastal protection works and invasive species, particularly cord-grass; hard coastal defence structures; sea-level rise.	Surface and marine water dependent. Moderately sensitive to hydrological change. Moderate sensitivty to pollution. Changes to salinity and tidal regime. Coastal development	

Coastal Lagoons*	Drainage for agricultural and safety reasons; natural siltation; Water pollution in the form of excessive nutrient enrichment	Surface, ground and marine water dependent. Highly sensitive to hydrological changes. Highly sensitive to pollution. Changes in salinity and tidal regime
Vegetated sea cliffs of the Atlantic and Baltic coasts	Erosion; grazing; recreational pressures; development of golf courses and housing; dumping; cutting of peat; coastal protection works; climate change	Coastal development. Erosion, over-grazing and recreation

Salicornia and other annuals colonizing mud and sand	Invasive Species; erosion and accretion	Marine water dependent. Medium sensitivity to hydrological change. Changes in salinity and tidal regime. Infilling, reclamation, invasive species
Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Overgrazing; erosion; invasive species, particularly common cordgrass (Spartina anglica); infilling and reclamation.	Marine and groundwater dependent. Medium sensitivity to hydrological change. maritimae) Changes in salinity and tidal regime. Overgrazing, erosion and accretion

Mediterranean salt meadows (Juncetalia maritimi)	Over-grazing by cattle or sheep; infilling and reclamation.	Marine and groundwater dependent. Medium sensitivity to hydrological change. Changes in salinity and tidal regime. Coastal development and reclamation.
Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	Eutrophication; overgrazing, excessive fertilisation; afforestation; and the introduction of invasive alien species.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Highly sensitive to pollution.

Sandbanks which are slightly covered by sea water all the time	Aggregate extraction, coal extraction and wind farm development	Marine water dependent. Medium sensitivity to hydrological change. Changes in salinity and tidal regime. Infilling, reclamation, invasive species
Large shallow inlets and bays	Aquaculture, fishing, dumping of wastes and water pollution.	Surface and marine water dependent. low sensitivity to hydrological changes. Aquaculture, fishing and pollution.
Reefs	Professional fishing; taking for fauna; taking for flora; water pollution; climate change; and change in species composition.	Sensitive to disturbance and pollution.

Perennial vegetation of stony banks	Disruption of the sediment supply, owing to the interruption of the coastal processes, caused by developments such as car parks and coastal defence structures including rock armour and sea walls. The removal of gravel .	Marine water dependent. Low sensitivity to hydrological changes. Coastal development, trampling from recreational activity and gravel removal.
Spartina swards (Spartinion maritimae)	As Spartina is considered to be an invasive alien species in Ireland, it is assessed in a different way to other habitats. Increases in the area and extent of this habitat are considered to be unfavourable and future expansion is considered likely.	Marine water dependent. Medium sensitivity to hydrological change. Considered an invasive species in Ireland.

Molinia meadows on calcareous, peaty or clay-silt-laden soils (Molinion caerulecae)	Agricultural intensification; drainage; abandonment of pastoral systems	Surface and groundwater dependent. Moderately sensitive to hydrological change. Changes in management. Changes in nutrient status
Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)*	Inappropriate grazing levels; invasive species; and clearance for agriculture or felling for timber.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Changes in management.
Lampetra fluviatilis	Channel maintenance, barriers, passage obstruction, gross pollution and specific pollutants.	Surface water dependent Highly sensitive to hydrological change
Lampetra planeri	Channel maintenance, barriers, passage obstruction, gross pollution and specific pollutants.	Surface water dependent Highly sensitive to hydrological change

Petromyzon marinus	Obstructions to movement; gross pollution; and specific pollutants.	Surface water dependent Highly sensitive to hydrological change
Atlantic Salmon	Numerous threats impact upon this specis. Some of these include: cultivation, pesticides; fertilization; pollution; water pollution; biocenotic evolution; accumulation of organic material; eutrophication; over-fishing; forest-related pressures; parasites.	Surface water dependent Highly sensitive to hydrological change
Bottle-nosed Dolphin	By-catch in fishing gear; pollution of the marine environment and habitat degradation and increased disturbance from dolphin watching boat trips.	Surface water dependent Highly sensitive to hydrological change

Margaritifera margaritifera	Poor substrate quality due to increased growth of algal and macrophyte vegetation as a result of severe nutrient enrichment, as well as physical siltation.	Surface water dependent Highly sensitive to hydrological change Very highly sensitive to pollution

			Lutra lutra	Decrease in water quality: Use of pesticides; fertilization; vegetation removal; professional fishing (including lobster pots and fyke nets); hunting; poisoning; sand and gravel extraction; mechanical removal of peat; urbanised areas; human habitation; continuous urbanization; drainage; management of aquatic and bank vegetation for drainage purposes; ; and canalization or modifying structures of inland water course.	Surface and marine water dependent. Moderately sensitive to hydrological change. Sensitivty to pollution	

Old Farm Buildings, Ballymacrogan	2245	18.9km from AOC	Rhinolophus hipposideros	Loss of suitable summer and winter roosting sites; loss of commuting routes linking roosts to foraging sites, and loss of suitable foraging sites.	Disturbance. Changes in Management.	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying species associated with this N2K site.
Ballycullinan, Old Domestic Building	2246	20km from AOC	Rhinolophus hipposideros	Loss of suitable summer and winter roosting sites; loss of commuting routes linking roosts to foraging sites, and loss of suitable foraging sites.	Disturbance. Changes in Management.	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying species associated with this N2K site.

Toonagh Estate	2247	Over 20km from WEA	Rhinolophus hipposideros	Loss of suitable summer and winter roosting sites; loss of commuting routes linking roosts to foraging sites, and loss of suitable foraging sites.	Disturbance. Changes in Management.	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying species associated with this N2K site.
Slieve Bernagh	2312	Over 20km from WEA	Blanket bog (* active only)	Land reclamation, peat extraction; afforestation; erosion and landslides triggered by human activity; drainage; burning and infrastructural development.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site.
			Northern Atlantic wet heath with Erica tetralix	Reclamation, afforestation and burning; overstocking; invasion by non-heath species; exposure of peat to severe erosion.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	

			European dry heath	Afforestation, over-burning, over-grazing, under-grazing and bracken invasion.	Moderately sensitive to hydrological change. Changes in management. Changes in nutrient status	
Old Domestic Buildings, Rylane	2314	Over 20km from WEA	Rhinolophus hipposideros	Loss of suitable summer and winter roosting sites; loss of commuting routes linking roosts to foraging sites, and loss of suitable foraging sites.	Disturbance. Changes in Management.	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying species associated with this N2K site.
Mayo SAC						

Ardkill Turlough	461	4.4km from AOC	Turloughs*	Nutrient enrichment and inappropriate grazing; drainage, peat cutting; marl extraction and quarrying.	Surface and Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	No. This site is located at approximately 4.4km upstream from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site.
Carrowkeel Turlough	475	5.4km from AOC	Turloughs*	Nutrient enrichment and inappropriate grazing; drainage, peat cutting; marl extraction and quarrying.	Surface and Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	No. This site is located at approximately 4.4km upstream from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site.

Cloughmoyne	479	3.3km from AOC; 11.5km from AIP; 12.7km from SA	Limestone pavements*	Quarrying, reclamation for agriculture and reduced farming activity which has facilitated the spread of scrub over some areas. Intensive agriculture and domestic/municipal waste sources in the vicinity of pavement may also threaten groundwater.	Physical removal. Scrub encroachment	No. This site is located at approximately 3.3km upstream from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site.
Clyard Kettle-Holes	480	7.5km from AOC; 16.6km from AIP	Calcareous fens with Cladium mariscus and species of the Caricion davallianae*	Peat or turf cutting, arterial drainage, local drainage and agricultural reclamation, infilling of sites with building waste, dumping of household refuse, afforestation, water pollution and urban expansion.	Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	No. This site is located at approximately 7.5km upstream from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site.

			Turloughs*	Nutrient enrichment and inappropriate grazing; drainage, peat cutting; marl extraction and quarrying.	Surface and Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	
Cross Lough (Killadoon)	484	Over 20km from WEA	Perennial vegetation of stony banks	Disruption of the sediment supply, owing to the interruption of the coastal processes, caused by developments such as car parks and coastal defence structures including rock armour and sea walls. The removal of gravel .	Marine water dependent. Low sensitivity to hydrological changes. Coastal development, trampling from recreational activity and gravel removal.	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats or species associated with this N2K site.
			Coastal lagoons	Drainage for agricultural and safety reasons; natural siltation; Water pollution in the form of excessive nutrient enrichment	Surface, ground and marine water dependent. Highly sensitive to hydrological changes. Highly sensitive to pollution. Changes in salinity and tidal regime	

			Machairs (* in Ireland)	Agricultural activity; fertilisation; overgrazing and undergrazing; recreational activity; waste disposal; invasion by a species.	Changes in management. Changes in nutrient status.	
			Molinia meadows on calcareous, peaty or clavey-silt-laden soils (Molinion caeruleae)	Agricultural intensification; drainage; abandonment of pastoral systems	Surface and groundwater dependent. Moderately sensitive to hydrological change. Changes in management. Changes in nutrient status	
Greaghans Turlough	503	3.4km from AOC	Turloughs*	Nutrient enrichment and inappropriate grazing; drainage, peat cutting; marl extraction and quarrying.	Surface and Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	No. This site is located at approximately 3.4km upstream from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site.

Kilglassan/Caheravoostia Turlough Complex	504	4.4km from AOC	Turloughs*	Nutrient enrichment and inappropriate grazing; drainage, peat cutting; marl extraction and quarrying.	Surface and Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	No. This site is located at approximately 4.4km upstream from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site.
Shrule Turlough	525	700m from AOC; 16.7km from AIP; 18.2km from SA	Turloughs*	Nutrient enrichment and inappropriate grazing; drainage, peat cutting; marl extraction and quarrying.	Surface and Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	No. While this site is located at close proximity to an AOC i.e. 700m it is located upstream from the nearest AOC and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site.

Skealoghan Turlough	541	6.7km from AOC	Turloughs*	Nutrient enrichment and inappropriate grazing; drainage, peat cutting; marl extraction and quarrying.	Surface and Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	No. This site is located at approximately 6.7km upstream from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site.
Lough Cahasy, Lough Baun And Roonah Lough	1529	Over 20km from WEA	Coastal lagoons	Drainage for agricultural and safety reasons; natural siltation; Water pollution in the form of excessive nutrient enrichment	Surface, ground and marine water dependent. Highly sensitive to hydrological changes. Highly sensitive to pollution. Changes in salinity and tidal regime	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats or species associated with this N2K site

			Shifting dunes along the shoreline with Ammophila arenaria (white dunes)	Removal of beach material and interference with the supply of sand; construction of coastal defences; sand compaction caused by vehicles and trampling.	Overgrazing, and erosion. Changes in management.	
			Perennial vegetation of stony banks	Disruption of the sediment supply, owing to the interruption of the coastal processes, caused by developments such as car parks and coastal defence structures including rock armour and sea walls. The removal of gravel .	Marine water dependent. Low sensitivity to hydrological changes. Coastal development, trampling from recreational activity and gravel removal.	

Mocorha Lough	1536	4.9km from AOC; 15.7km from AIP; 18km from SA	Calcareous fens with Cladium mariscus and species of the Caricion davallianae*	Peat or turf cutting, arterial drainage, local drainage and agricultural reclamation, infilling of sites with building waste, dumping of household refuse, afforestation, water pollution and urban expansion.	Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	No. This site is located at approximately 4.9km upstream from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site.
Mweelrea/Sheeffry/Erriff Complex	1932	16km from AIP	Coastal lagoons	Drainage for agricultural and safety reasons; natural siltation; Water pollution in the form of excessive nutrient enrichment	Surface, ground and marine water dependent. Highly sensitive to hydrological changes. Highly sensitive to pollution. Changes in salinity and tidal regime	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats or species associated with this N2K site
			Annual vegetation of drift lines	Grazing; sand and gravel extraction; recreational activities; coastal protection works	Overgrazing and erosion. Changes in management.	

Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Overgrazing; erosion; invasive species, particularly common cordgrass (Spartina anglica); infilling and reclamation.	Marine and groundwater dependent. Medium sensitivity to hydrological change. maritimae) Changes in salinity and tidal regime. Overgrazing, erosion and accretion
Embryonic shifting dunes	Natural erosion processes exacerbated by recreation and sand extraction. Coastal protection interfering with natural processes	Overgrazing, and erosion. Changes in management.
Shifting dunes along the shoreline with Ammophila arenaria (white dunes)	Removal of beach material and interference with the supply of sand; construction of coastal defences; sand compaction caused by vehicles and trampling.	Overgrazing, and erosion. Changes in management.

Atlantic decalcified fixed dunes (Calluno-Ulicetea)	Removal of beach material and interference with the supply of sand; construction of coastal defences; sand compaction caused by vehicles and trampling.	Overgrazing, and erosion. Changes in management.
Dunes with Salix repens ssp.argentea (Salix arenariae)	Agricultural improvement; overgrazing and undergrazing; forestry; recreational activity	Overgrazing, and erosion. Changes in management.
Machairs (* in Ireland)	Agricultural activity; fertilisation; ovegrazing and undergrazing; recreational activity; waste disposal; invasion by a species.	Changes in management. Changes in nutrient status.
Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	Nutrient enrichment; afforestation; waste water; invasive alien species; sport and leisure activities.	Surface and groundwater dependant. Highly sensitive to hydrological changes. Highly sensitive to pollution

Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea	Pollution,; agricultural activities; peat extraction; and forestry	Surface and groundwater dependent. Highly sensitive to hydrological changes. Highly sensitive to pollution.
Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	Eutrophication; overgrazing, excessive fertilisation; afforestation; and the introduction of invasive alien species.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Highly sensitive to pollution.
Northern Atlantic wet heaths with Erica tetralix	Reclamation, afforestation and burning; overstocking; invasion by non-heath species; exposure of peat to severe erosion.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management

European dry heaths	Afforestation, over-burning, over-grazing, under-grazing and bracken invasion.	Moderately sensitive to hydrological change. Changes in management. Changes in nutrient status
Alpine and Boreal heaths	Abandonment; overgrazing; burning; outdoor recreation; quarries; communication networks; and wind farm developments.	Changes in management. Changes in nutrient or base status. Moderately sensitive to hydrological change
Juniperus communis formations on heaths or calcareous grasslands	Overgrazing; fire; agricultural expansion; invasion by alien species particularly Rhododenron ponticum; and poor regeneration.	Onset of inundation or waterlogging Inappropriate management

Blanket bog (*active only)	Land reclamation, peat extraction; afforestation; erosion and landslides triggered by human activity; drainage; burning and infrastructural development.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management
Transition mires and quaking bogs	Drainage, infilling, reclamation and pollution.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management
Alkaline fens	Peat mining activities, land drainage; infilling; fertiliser pollution and eutrophication	Groundwater dependant. Highly sensitive to hydrological changes. Changes in nutrient or base status
Petrifying springs with tufa formation (Cratoneurion)	Peat or turf cutting; arterial drainage; local drainage; water abstraction and agricultural reclamation.	Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.

Siliceous rocky slopes with chasmophytic vegetation	Overgrazing; extractive industries; recreational activities and improved access	Erosion, ovegrazing and recreation.
Calcareous rocky slopes with chasmophytic vegetation	Overgrazing; extractive industries; recreational activities and improved access	Erosion, ovegrazing and recreation.
Mediterranean salt meadows (Juncetalia maritimi)	Over-grazing by cattle or sheep; infilling and reclamation.	Marine and groundwater dependent. Medium sensitivity to hydrological change. Changes in salinity and tidal regime. Coastal development and reclamation.
Natural dystrophic lakes and ponds	Peat cutting, overgrazing and afforestation of peatland habitats.	Surface and groundwater dependant. Highly sensitive to hydrological changes. Highly sensitive to pollution
Depressions on peat substrates of the Rhynchosporion	Drainage; burning; peat extraction; overgrazing; afforestation; erosion; and climate change.	Surface and groundwater dependent. Low sensitivity to hydrological changes. Erosion, land-use changes

Salmo salar	Numerous threats impact upon this specis. Some of these include: cultivation, pesticides; fertilization; pollution; water pollution; biocenotic evolution; accumulation of organic material; eutrophication; over-fishing; forest-related pressures; parasites.	Surface water dependent Highly sensitive to hydrological change

Lutra lutra	Decrease in water quality: Use of pesticides; fertilization; vegetation removal; professional fishing (including lobster pots and fyke nets); hunting; poisoning; sand and gravel extraction; mechanical removal of peat; urbanised areas; human habitation; continuous urbanization; drainage; management of aquatic and bank vegetation for drainage purposes; ; and canalization or modifying structures of inland water course.	Surface and marine water dependent. Moderately sensitive to hydrological change. Sensitivty to pollution

Margaritifera margaritifera	Poor substrate quality due to increased growth of algal and macrophyte vegetation as a result of severe nutrient enrichment, as well as physical siltation.	Surface water dependent Highly sensitive to hydrological change Very highly sensitive to pollution
Vertigo geyeri	Loss of riverside and canal-side habitat; exploitation of esker sites and drainage of wetlands, and sheep grazing and over-exploitation of dune sites.	Groundwater dependent. Highly sensitive to hydrological changes
Vertigo angustior	Loss of riverside and canal-side habitat; exploitation of esker sites and drainage of wetlands, and sheep grazing and over-exploitation of dune sites.	Groundwater dependent. Highly sensitive to hydrological changes
Petalophyllum ralfsii	Agricultural improvement and fertilisation; overgrazing; changes in agricultural practices i.e. land abandonment & undergrazing; drainage; erosion and drying out.	Changes in management. Changes in nutrient or base status. Sensitive to hydrological change

			Najas flexilis	Fertilization; disposal of household waste; water pollution; eutrophication; and invasion by alien species.	Highly sensitive to hydrological changes. Highly sensitive to pollution.	
River Moy	2298	12.2km from AOC	Active raised bog*	Deterioration of the hydrological conditions caused by peat cutting, drainage, forestry and burning.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats or species associated with this N2K site
			Degraded raised bogs still capable of natural regeneration	Changes in agricultural practices; afforestation and general forest management; burning; peat extraction,;drainage; and the introduction of invasive species.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	

Depressions on peat substrates of the Rhynchosporion	Drainage; burning; peat extraction; overgrazing; afforestation; erosion; and climate change.	Surface and groundwater dependent. Low sensitivity to hydrological changes. Erosion, land-use changes
Old sessile oak woods with Ilex and Blechnum in British Isles	The introduction of alien species; sub-optimal grazing patterns; general forestry management; increases in urbanisation and human habitation adjacent to oak woodlands; and the construction of communication networks through the woodland.	Changes in management. Changes in nutrient or base status. Introduction of alien species.
Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	Inappropriate grazing levels; invasive species; and clearance for agriculture or felling for timber.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Changes in management.

Salmo salar	Numerous threats impact upon this specis. Some of these include: cultivation, pesticides; fertilization; pollution; water pollution; biocenotic evolution; accumulation of organic material; eutrophication; over-fishing; forest-related pressures; parasites.	Surface water dependent Highly sensitive to hydrological change
Petromyzon marinus	Obstructions to movement; gross pollution; and specific pollutants.	Surface water dependent Highly sensitive to hydrological change
Lampetra planeri	Channel maintenance, barriers, passage obstruction, gross pollution and specific pollutants.	Surface water dependent Highly sensitive to hydrological change

			Lutra lutra	Decrease in water quality: Use of pesticides; fertilization; vegetation removal; professional fishing (including lobster pots and fyke nets); hunting; poisoning; sand and gravel extraction; mechanical removal of peat; urbanised areas; human habitation; continuous urbanization; drainage; management of aquatic and bank vegetation for drainage purposes; ; and canalization or modifying structures of inland water course.	Surface and marine water dependent. Moderately sensitive to hydrological change. Sensitivty to pollution	
			Austropotamobius pallipes	Introduction of diseases transmitted by introduced American crayfish.	Surface water dependent Highly sensitive to hydrological change Very highly sensitive to pollution	

Kildun Souterrain	2320	10.2km from AOC; 14km from AIP; 18.5km from SA	Rhinolophus hipposideros	Loss of suitable summer and winter roosting sites; loss of commuting routes linking roosts to foraging sites, and loss of suitable foraging sites.	Disturbance. Changes in Management.	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying species associated with this N2K site
Roscommon SAC						

Lough Ree	440	Over 20m from WEA	Lutra lutra	Decrease in water quality: Use of pesticides; fertilization; vegetation removal; professional fishing (including lobster pots and fyke nets); hunting; poisoning; sand and gravel extraction; mechanical removal of peat; urbanised areas; human habitation; continuous urbanization; drainage; management of aquatic and bank vegetation for drainage purposes; ; and canalization or modifying structures of inland water course.	Surface and marine water dependent. Moderately sensitive to hydrological change. Sensitivty to pollution	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats or species associated with this N2K site
			Natural euthrophic lakes with Magnopotamion or Hydrocharition-type vegetation			

Alkaline fens	Peat mining activities, land drainage; infilling; fertiliser pollution and eutrophication	Groundwater dependant. Highly sensitive to hydrological changes. Changes in nutrient or base status
Old sessile oak woods with Ilex and Blechnum in British Isles	The introduction of alien species; sub-optimal grazing patterns; general forestry management; increases in urbanisation and human habitation adjacent to oak woodlands; and the construction of communication networks through the woodland.	Changes in management. Changes in nutrient or base status. Introduction of alien species.
Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites).	The main threats to this habitat include the abandonment of traditional agricultural practices and reclamation.	Changes in management. Changes in nutrient or base status. Moderately sensitive to hydrological change

			Bog woodland*	Drainage, peat cutting, burning and development;	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	
			Limestone pavements*	Quarrying, reclamation for agriculture and reduced farming activity which has facilitated the spread of scrub over some areas. Intensive agriculture and domestic/municipal waste sources in the vicinity of pavement may also threaten groundwater.	Physical removal. Scrub encroachment	
			Degraded raised bogs still capable of natural regeneration	Changes in agricultural practices; afforestation and general forest management; burning; peat extraction,;drainage; and the introduction of invasive species.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	

Ballinturly Turlough	588	13.3km from AOC	Turloughs*	Nutrient enrichment and inappropriate grazing; drainage, peat cutting; marl extraction and quarrying.	Surface and Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site
Bellanagare Bog	592	12.5km from AOC	Active raised bog*	Deterioration of the hydrological conditions caused by peat cutting, drainage, forestry and burning.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site

			Degraded raised bogs still capable of natural regeneration	Changes in agricultural practices; afforestation and general forest management; burning; peat extraction,;drainage; and the introduction of invasive species.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	
			Depressions on peat substrates of the Rhynchosporion	Drainage; burning; peat extraction; overgrazing; afforestation; erosion; and climate change.	Surface and groundwater dependent. Low sensitivity to hydrological changes. Erosion, land-use changes	
Carrowbehy/Caher Bog	597	8.5km from AOC	Euphydryas aurinia	Abandonment of traditional pastoral systems; infrastructure developments and increased urbanisation	Changes in management. Habitats are sensitive to hydrological changes. Changes in nutrient base status.	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats or species associated with this N2K site

			Degraded raised bogs still capable of natural regeneration	Changes in agricultural practices; afforestation and general forest management; burning; peat extraction,;drainage; and the introduction of invasive species.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	
			Active raised bog*	Deterioration of the hydrological conditions caused by peat cutting, drainage, forestry and burning.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	
			Depressions on peat substrates of the Rhynchosporion	Drainage; burning; peat extraction; overgrazing; afforestation; erosion; and climate change.	Surface and groundwater dependent. Low sensitivity to hydrological changes. Erosion, land-use changes	

Cloonchambers Bog	600	5.2km from AOC	Degraded raised bogs still capable of natural regeneration	Changes in agricultural practices; afforestation and general forest management; burning; peat extraction,;drainage; and the introduction of invasive species.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats or species associated with this N2K site
			Active raised bog*	Deterioration of the hydrological conditions caused by peat cutting, drainage, forestry and burning.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	
			Depressions on peat substrates of the Rhynchosporion	Drainage; burning; peat extraction; overgrazing; afforestation; erosion; and climate change.	Surface and groundwater dependent. Low sensitivity to hydrological changes. Erosion, land-use changes	

Derrinea Bog	604	15.3km from AOC	Degraded raised bogs still capable of natural regeneration	Changes in agricultural practices; afforestation and general forest management; burning; peat extraction,;drainage; and the introduction of invasive species.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats or species associated with this N2K site
			Active raised bog*	Deterioration of the hydrological conditions caused by peat cutting, drainage, forestry and burning.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	
			Depressions on peat substrates of the Rhynchosporion	Drainage; burning; peat extraction; overgrazing; afforestation; erosion; and climate change.	Surface and groundwater dependent. Low sensitivity to hydrological changes. Erosion, land-use changes	

Errit Lough	607	12.2km from AOC	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	Nutrient enrichment arising from intensification of agriculture and urban developments.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Highly sensitive to pollution	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site
Lisduff Turlough	609	15.9km from AOC	Turloughs*	Nutrient enrichment and inappropriate grazing; drainage, peat cutting; marl extraction and quarrying.	Surface and Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site

Lough Croan Turlough	610	Over 20m from WEA	Turloughs*	Nutrient enrichment and inappropriate grazing; drainage, peat cutting; marl extraction and quarrying.	Surface and Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site
Lough Funshinagh	611	Over 20m from WEA	Turloughs*	Nutrient enrichment and inappropriate grazing; drainage, peat cutting; marl extraction and quarrying.	Surface and Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site

Mullygollan Turlough	612	13.5km from AOC	Turloughs*	Nutrient enrichment and inappropriate grazing; drainage, peat cutting; marl extraction and quarrying.	Surface and Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site
Castlesampson Esker	1625	Over 20m from WEA	Turloughs*	Nutrient enrichment and inappropriate grazing; drainage, peat cutting; marl extraction and quarrying.	Surface and Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site

Four Roads Turlough	1637	17.3km from AOC	Turloughs*	Nutrient enrichment and inappropriate grazing; drainage, peat cutting; marl extraction and quarrying.	Surface and Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site
Killeglan Grassland	2214	17.3km from AOC	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)	The main threats to this habitat include the abandonment of traditional agricultural practices and reclamation.	Changes in management. Changes in nutrient or base status. Moderately sensitive to hydrological change	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site

Drumalough Bog	2338	7.9km from AOC	Active raised bog*	Deterioration of the hydrological conditions caused by peat cutting, drainage, forestry and burning.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site
			Degraded raised bogs still capable of natural regeneration	Changes in agricultural practices; afforestation and general forest management; burning; peat extraction,;drainage; and the introduction of invasive species.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	
			Depressions on peat substrates of the Rhynchosporion	Drainage; burning; peat extraction; overgrazing; afforestation; erosion; and climate change.	Surface and groundwater dependent. Low sensitivity to hydrological changes. Erosion, land-use changes	

Ballynamona Bog And Corkip Lough	2339	Over 20m from WEA	Active raised bog*	Deterioration of the hydrological conditions caused by peat cutting, drainage, forestry and burning.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site
			Degraded raised bogs still capable of natural regeneration	Changes in agricultural practices; afforestation and general forest management; burning; peat extraction,;drainage; and the introduction of invasive species.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	
			Depressions on peat substrates of the Rhynchosporion	Drainage; burning; peat extraction; overgrazing; afforestation; erosion; and climate change.	Surface and groundwater dependent. Low sensitivity to hydrological changes. Erosion, land-use changes	

			Turloughs*	Nutrient enrichment and inappropriate grazing; drainage, peat cutting; marl extraction and quarrying.	Surface and Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	
Offaly SAC						
All Saints Bog And Esker	566	Over 20km from WEA	Bog woodland*	Drainage, peat cutting, burning and development;	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site
			Active raised bog*	Deterioration of the hydrological conditions caused by peat cutting, drainage, forestry and burning.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	

			Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)	The main threats to this habitat include the abandonment of traditional agricultural practices and reclamation.	Changes in management. Changes in nutrient or base status. Moderately sensitive to hydrological change	
			Degraded raised bogs still capable of natural regeneration	Changes in agricultural practices; afforestation and general forest management; burning; peat extraction,;drainage; and the introduction of invasive species.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	
			Depressions on peat substrates of the Rhynchosporion	Drainage; burning; peat extraction; overgrazing; afforestation; erosion; and climate change.	Surface and groundwater dependent. Low sensitivity to hydrological changes. Erosion, land-use changes	

Ferbane Bog	575	Over 20km from WEA	Active raised bog*	Deterioration of the hydrological conditions caused by peat cutting, drainage, forestry and burning.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site
			Degraded raised bogs still capable of natural regeneration	Changes in agricultural practices; afforestation and general forest management; burning; peat extraction,;drainage; and the introduction of invasive species.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	
			Depressions on peat substrates of the Rhynchosporion	Drainage; burning; peat extraction; overgrazing; afforestation; erosion; and climate change.	Surface and groundwater dependent. Low sensitivity to hydrological changes. Erosion, land-use changes	
Fin Lough (Offaly)	576	Over 20km from WEA	Vertigo geyeri	Loss of riverside and canal-side habitat; exploitation of esker sites and drainage of wetlands, and sheep grazing and over-exploitation of dune sites.	Groundwater dependent. Highly sensitive to hydrological changes	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats

			Alkaline fens	Peat mining activities, land drainage; infilling; fertiliser pollution and eutrophication	Groundwater dependant. Highly sensitive to hydrological changes. Changes in nutrient or base status	associated with this N2K site
			Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	Nutrient enrichment arising from intensification of agriculture and urban developments.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Highly sensitive to pollution	
			Degraded raised bogs still capable of natural regeneration	Changes in agricultural practices; afforestation and general forest management; burning; peat extraction,;drainage; and the introduction of invasive species.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	
Mongan Bog	580	Over 20km from WEA	Active raised bog*	Deterioration of the hydrological conditions caused by peat cutting, drainage, forestry and burning.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site

			Degraded raised bogs still capable of natural regeneration	Changes in agricultural practices; afforestation and general forest management; burning; peat extraction,;drainage; and the introduction of invasive species.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	
			Depressions on peat substrates of the Rhynchosporion	Drainage; burning; peat extraction; overgrazing; afforestation; erosion; and climate change.	Surface and groundwater dependent. Low sensitivity to hydrological changes. Erosion, land-use changes	
Moyclare Bog	581	Over 20km from WEA	Depressions on peat substrates of the Rhynchosporion	Drainage; burning; peat extraction; overgrazing; afforestation; erosion; and climate change.	Surface and groundwater dependent. Low sensitivity to hydrological changes. Erosion, land-use changes	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site

Ridge Road, Sw Of Rapemills	919	Over 20km from WEA	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)	The main threats to this habitat include the abandonment of traditional agricultural practices and reclamation.	Changes in management. Changes in nutrient or base status. Moderately sensitive to hydrological change	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site
Pilgrim'S Road Esker	1776	Over 20km from WEA	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)	The main threats to this habitat include the abandonment of traditional agricultural practices and reclamation.	Changes in management. Changes in nutrient or base status. Moderately sensitive to hydrological change	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site
Tipperary SACs						

Ballyduff/Clonfinane Bog	641	Over 20km from WEA	Bog woodland*	Drainage, peat cutting, burning and development;	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site
			Active raised bog*	Deterioration of the hydrological conditions caused by peat cutting, drainage, forestry and burning.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	
			Degraded raised bogs still capable of natural regeneration	Changes in agricultural practices; afforestation and general forest management; burning; peat extraction,;drainage; and the introduction of invasive species.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	
			Depressions on peat substrates of the Rhynchosporion	Drainage; burning; peat extraction; overgrazing; afforestation; erosion; and climate change.	Surface and groundwater dependent. Low sensitivity to hydrological changes. Erosion, land-use changes	

Kilcarren-Firville Bog	647	Over 20km from WEA	Active raised bog*	Deterioration of the hydrological conditions caused by peat cutting, drainage, forestry and burning.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site
			Degraded raised bogs still capable of natural regeneration	Changes in agricultural practices; afforestation and general forest management; burning; peat extraction,;drainage; and the introduction of invasive species.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	
			Depressions on peat substrates of the Rhynchosporion	Drainage; burning; peat extraction; overgrazing; afforestation; erosion; and climate change.	Surface and groundwater dependent. Low sensitivity to hydrological changes. Erosion, land-use changes	

Liskeenan Fen	1683	Over 20km from WEA	Calcareous fens with Cladium mariscus and species of the Caricion davallianae*	Peat or turf cutting, arterial drainage, local drainage and agricultural reclamation, infilling of sites with building waste, dumping of household refuse, afforestation, water pollution and urban expansion.	Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site
Redwood Bog	2353	Over 20km from WEA	Active raised bog*	Deterioration of the hydrological conditions caused by peat cutting, drainage, forestry and burning.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	No. This site is located at a remote distance from the nearest WEA and it is unlikely that potential indirect impacts associated with wind farm developments will adversely affect the conservation status of qualifying habitats associated with this N2K site
			Degraded raised bogs still capable of natural regeneration	Changes in agricultural practices; afforestation and general forest management; burning; peat extraction,;drainage; and the introduction of invasive species.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management	

			Depressions on peat substrates of the Rhynchosporion	Drainage; burning; peat extraction; overgrazing; afforestation; erosion; and climate change.	Surface and groundwater dependent. Low sensitivity to hydrological changes. Erosion, land-use changes	
SPAs						
Galway SPAs						
Inner Galway Bay	4031		Gavia immer [wintering]	While no information in the form of an Article 17 Conservation Status Report exists for waterbirds or their respecitive SPAs a number of pressures have been identified by Crowe *et al* (2008). These pressures include: the modification of wetland sites, particularly for industry or housing and increased levels of disturbance, alrgely related to recreational activity. Eutrophication at a number of wetland sites as a result of nutrient inputs from a range of	Highly sensitive to hydrological changes and loss of wetland habitat. Sensitive to disturbance.	Yes. Should wind-farm developments occur in WEAs adjacent this N2K site the potential for significant effects to this qualifying interests and the N2K site exists.
			Phalacrocorax carbo [breeding]			
			Phalacrocorax carbo [wintering]			
			Ardea cinerea [wintering]			
			Branta bernicla hrota [wintering]			
			Tadorna tadorna [wintering]			
			Anas penelope [wintering]			
			Anas crecca [wintering]			
			Anas clypeata [wintering]			
			Mergus serrator [wintering]			

			Charadrius hiaticula [wintering]	polluting activities were also identified as a potential pressure. However this latter pressure is now being alleviated through stricter control of activities associated with water discharge/runoff etc. Climate change was also noted as a significant factor underlying changes in trends of wintering waterbirds in Ireland.		
			Pluvialis apricaria [wintering]			
			Vanellus vanellus [wintering]			
			Calidris alpina [wintering]			
			Limosa lapponica [wintering]			
			Numenius arquata [wintering]			

Lough Corrib	4042		This SPA is currently under review and as such no information regarding the bird species listed as Special Conservation Interests for this site was available at the time of writing.			Yes. Should wind-farm developments occur in WEAs adjacent this N2K site the potential for significant effects to this qualifying interests and the N2K site exists.
Lough Cutra	4056		Phalacrocorax carbo [breeding]	Populations of cormorants are considered to be expanding	Highly sensitive to hydrological changes and loss of wetland habitat. Sensitive to disturbance.	No. As this site is located at a remote distance from the nearest WEA it is considered unlikely that this qualifying feature will be adversely impacted by the implementation of the Draft WES

Lough Derg (Shannon)	4058		This SPA is currently under review and as such no information regarding the bird species listed as Special Conservation Interests for this site was available at the time of writing.			
Lough Mask	4062		Aythya fuligula [wintering] Larus ridibundus [breeding] Larus canus [breeding] Larus fuscus [breeding] Sterna hirundo [breeding] Anser albifrons flavirostris [wintering]	See Inner Galway Bay SPA for information regarding wintering bird species listed as Special Conservation Interests for this Site	Highly sensitive to hydrological changes and loss of wetland habitat. Sensitive to disturbance.	No. As this site is located at a remote distance from the nearest WEA it is considered unlikely that this qualifying feature will be adversely impacted by the implementation of the Draft WES

High Island (Galway)	4067		This SPA is currently under review and as such no information regarding the bird species listed as Special Conservation Interests for this site was available at the time of writing.			
Lough Scannive	4088		This SPA is currently under review and as such no information regarding the bird species listed as Special Conservation Interests for this site was available at the time of writing.			
Rahasane Turlough	4089		Cygnus cygnus [wintering] Anas penelope [wintering] Pluvialis apricaria [wintering]	See Inner Galway Bay SPA for information regarding wintering bird species listed as Special Conservation Interests for this Site	Highly sensitive to hydrological changes and loss of wetland habitat. Sensitive to disturbance.	Yes. Should wind-farm developments occur in WEAs adjacent this N2K site the potential for significant effects to this qualifying interests and the N2K site exists.

			Limosa limosa [wintering]			
			Anser albifrons flavirostris [wintering]			
Middle Shannon Callows	4096		Cygnus cygnus [wintering]	See Inner Galway Bay SPA for information regarding wintering bird species listed as Special Conservation Interests for this Site	Highly sensitive to hydrological changes and loss of wetland habitat. Sensitive to disturbance.	No. As this site is located at a remote distance from the nearest WEA it is considered unlikely that this qualifying feature will be adversely impacted by the implementation of the Draft WES
			Anas penelope [wintering]			
			Crex crex [breeding]			
			Pluvialis apricaria [wintering]			
			Vanellus vanellus [wintering]			
			Limosa limosa [wintering]			
			Larus ridibundus [wintering]			
River Suck Callows	4097		Cygnus cygnus [wintering]	See Inner Galway Bay SPA for information regarding wintering bird species listed as Special Conservation Interests for this Site	Highly sensitive to hydrological changes and loss of wetland habitat. Sensitive to disturbance.	No. As this site is located at a remote distance from the nearest WEA it is considered unlikely that this qualifying feature will be adversely impacted by the implementation of the Draft WES
			Anas penelope [wintering]			
			Pluvialis apricaria [wintering]			
			Vanellus vanellus [wintering]			
			Anser albifrons flavirostris [wintering]			

Coole-Garryland	4107		Cygnus cygnus [wintering]	See Inner Galway Bay SPA for information regarding wintering bird species listed as Special Conservation Interests for this Site	Highly sensitive to hydrological changes and loss of wetland habitat. Sensitive to disturbance.	Yes. Should wind-farm developments occur in WEAs adjacent this N2K site the potential for significant effects to this qualifying interests and the N2K site exists.
Slyne Head Islands	4123		This SPA is currently under review and as such no information regarding the bird species listed as Special Conservation Interests for this site was available at the time of writing.			
Lough Rea	4134		Anas clypeata [wintering] Fulica atra [wintering]	See Inner Galway Bay SPA for information regarding wintering bird species listed as Special Conservation Interests for this Site	Highly sensitive to hydrological changes and loss of wetland habitat. Sensitive to disturbance.	Yes. Should wind-farm developments occur in WEAs adjacent this N2K site the potential for significant effects to this qualifying interests and the N2K site exists.

Cregganna Marsh	4142		Anser albifrons flavirostris [wintering]	See Inner Galway Bay SPA for information regarding wintering bird species listed as Special Conservation Interests for this Site	Highly sensitive to hydrological changes and loss of wetland habitat. Sensitive to disturbance.	Yes. Should wind-farm developments occur in WEAs adjacent this N2K site the potential for significant effects to this qualifying interests and the N2K site exists.
Slieve Aughty Mountains	4168		Circus cyaneus [breeding] Falco columbarius [breeding]	Hen harrier is listed as a priority bird species by Birdwatch Ireland and RSPB.	Sensitive to disturbance.	Yes. Should wind-farm developments occur in WEAs adjacent this N2K site the potential for significant effects to this qualifying interests and the N2K site exists.
Cruagh Island	4170		Puffinus puffinus [breeding] Branta leucopsis [wintering]	See Inner Galway Bay SPA for information regarding wintering bird species listed as Special Conservation Interests for this Site	Highly sensitive to hydrological changes and loss of wetland habitat. Sensitive to disturbance.	Yes. Should wind-farm developments occur in WEAs adjacent this N2K site the potential for significant effects to this qualifying interests and the N2K site exists.
Clare SPAs						
Cliffs of Moher	4005		Fulmarus glacialis [breeding] Rissa tridactyla [breeding] Uria aalge [breeding] Alca torda [breeding] Fratercula arctica [breeding]	No specific information on the conservation status of breeding waterbirds sourced at the time of writing.	Highly sensitive to hydrological changes and loss of wetland habitat. Sensitive to disturbance.	No. As this site is located at a remote distance from the nearest WEA it is considered unlikely that this qualifying feature will be adversely impacted by the implementation of the Draft WES

			Pyrrhocorax pyrrhocorax [breeding]			
Ballyallia Lough	4041		Anas penelope [wintering]	See Inner Galway Bay SPA for information regarding wintering bird species listed as Special Conservation Interests for this Site	Highly sensitive to hydrological changes and loss of wetland habitat. Sensitive to disturbance.	No. As this site is located at a remote distance from the nearest WEA it is considered unlikely that this qualifying feature will be adversely impacted by the implementation of the Draft WES
			Anas strepera [wintering]			
			Anas crecca [wintering]			
			Anas platyrhynchos [wintering]			
			Anas clypeata [wintering]			
			Fulica atra [wintering]			
			Limosa limosa [wintering]			
Mayo SPAs						

Lough Carra	4051		Larus canus [breeding]	No specific information on the conservation status of breeding waterbirds sourced at the time of writing.	Highly sensitive to hydrological changes and loss of wetland habitat. Sensitive to disturbance.	No. As this site is located at a remote distance from the nearest WEA it is considered unlikely that this qualifying feature will be adversely impacted by the implementation of the Draft WES
Cross Lough (Killadoon)	4212		Sterna sandvicensis [breeding]	This is an amber listed species by Birdwatch Ireland due to its localised population in Ireland.	Highly sensitive to hydrological changes and loss of wetland habitat. Sensitive to disturbance.	No. As this site is located at a remote distance from the nearest WEA it is considered unlikely that this qualifying feature will be adversely impacted by the implementation of the Draft WES
Roscommon SPAs						

Lough Ree	4064		This SPA is currently under review and as such no information regarding the bird species listed as Special Conservation Interests for this site was available at the time of writing.			No. As this site is located at a remote distance from the nearest WEA it is considered unlikely that this qualifying feature will be adversely impacted by the implementation of the Draft WES
Bellanagare Bog	4105		This SPA is currently under review and as such no information regarding the bird species listed as Special Conservation Interests for this site was available at the time of writing.			No. As this site is located at a remote distance from the nearest WEA it is considered unlikely that this qualifying feature will be adversely impacted by the implementation of the Draft WES
Lough Croan Turlough	4139		Anas clypeata [wintering] Pluvialis apricaria [wintering]	See Inner Galway Bay SPA for information regarding wintering bird species listed as Special Conservation Interests for	Highly sensitive to hydrological changes and loss of wetland habitat. Sensitive to disturbance.	No. As this site is located at a remote distance from the nearest WEA it is considered unlikely that this qualifying feature will be adversely

			Anser albifrons flavirostris [wintering]	this Site		impacted by the implementation of the Draft WES
Four Roads Turlough	4140		Pluvialis apricaria [wintering] Anser albifrons flavirostris [wintering]	See Inner Galway Bay SPA for information regarding wintering bird species listed as Special Conservation Interests for this Site	Highly sensitive to hydrological changes and loss of wetland habitat. Sensitive to disturbance.	No. As this site is located at a remote distance from the nearest WEA it is considered unlikely that this qualifying feature will be adversely impacted by the
Offaly SPAs						
Mongan Bog	4017		This SPA is currently under review and as such no information regarding the bird species listed as Special Conservation Interests for this site was available at the time of writing.			No. As this site is located at a remote distance from the nearest WEA it is considered unlikely that this qualifying feature will be adversely impacted by the implementation of the Draft WES
River Little Brosna Callows	4086		Cygnus cygnus [wintering] Anas penelope [wintering] Anas crecca [wintering] Anas acuta [wintering]	See Inner Galway Bay SPA for information regarding wintering bird species listed as Special Conservation Interests for this Site	Highly sensitive to hydrological changes and loss of wetland habitat. Sensitive to disturbance.	No. As this site is located at a remote distance from the nearest WEA it is considered unlikely that this qualifying feature will be adversely impacted by the implementation of the Draft WES

			Anas clypeata [wintering]			
			Pluvialis apricaria [wintering]			
			Vanellus vanellus [wintering]			
			Limosa limosa [wintering]			
			Larus ridibundus [wintering]			
			Anser albifrons flavirostris [wintering]			
Middle Shannon Callows	4096		Cygnus cygnus [wintering]	See Inner Galway Bay SPA for information regarding wintering bird species listed as Special Conservation Interests for this Site	Highly sensitive to hydrological changes and loss of wetland habitat. Sensitive to disturbance.	No. As this site is located at a remote distance from the nearest WEA it is considered unlikely that this qualifying feature will be adversely impacted by the implementation of the Draft WES
			Anas penelope [wintering]			
			Crex crex [breeding]			
			Pluvialis apricaria [wintering]			
			Vanellus vanellus [wintering]			
			Limosa limosa [wintering]			
			Larus ridibundus [wintering]			

All Saints Bog	4103		This SPA is currently under review and as such no information regarding the bird species listed as Special Conservation Interests for this site was available at the time of writing.			No. As this site is located at a remote distance from the nearest WEA it is considered unlikely that this qualifying feature will be adversely impacted by the implementation of the Draft WES
Dovegrove Callows	4137		Anser albifrons flavirostris [wintering]	See Inner Galway Bay SPA for information regarding wintering bird species listed as Special Conservation Interests for this Site	Highly sensitive to hydrological changes and loss of wetland habitat. Sensitive to disturbance.	No. As this site is located at a remote distance from the nearest WEA it is considered unlikely that this qualifying feature will be adversely impacted by the implementation of the Draft WES