

Glenvernoch Wind Farm

Environmental Impact Assessment Report Volume I Chapter 9: Ecology

October 2024

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9 ECOLOGY

Non-Technical Summary

9.1 A suite of ecology surveys have been undertaken, during baseline studies for the proposed wind farm development, including habitats, protected species and freshwater. The results of the baseline surveys were used to inform the turbine and associated wind farm infrastructure design and also form the basis of the detailed assessment.

9.2 Table 9.1 lists the detailed ecological studies undertaken for the development.

Table 9.1: Ecological surveys undertaken at Glenvernoch Wind Farm.

Survey	Survey Dates
Extended Phase 1 Habitat Survey	September 2023
National Vegetation Classification (NVC) Survey	September 2023
Bat Surveys	May-October 2023
Protected Mammal Surveys	June-September 2023
Great Crested Newt: Habitat Suitability Survey	June-July 2023
Fisheries Assessment Survey	August-September 2024

9.3 There are no statutory or non-statutory nature conservation areas, designated for non-avian ecological features within the proposed wind farm site. However, three statutory sites designated for their ecological value lie within 2km of the boundary of the wider Glenvernoch Site: River Bladnoch Special Area of Conservation (SAC), Galloway Oakwoods SAC and Wood of Cree Site of Special Scientific Interest (SSSI). The Wood of Cree SSSI is contiguous with a section of the Galloway Oakwoods SAC. It is concluded that the proposed wind farm will have no detrimental impacts on the designated features of these SACs or SSSI.

9.4 Overall, the effects of the proposed development on non-avian ecology features of local or higher value, or which are legally protected, are not significant in terms of the EIA definition.

9.5 In addition, mitigation (by following Best Practice) is also identified which would ensure that the wind farm could be constructed and operated without breach of laws protecting flora and fauna.

9.6 As a result, the Proposed Development would not significantly impact on the ecological habitats identified on and around the Proposed Development site in terms of the EIA Regulations.

Introduction

- 9.7 This chapter of the EIA describes and evaluates the ecological interest of the Site and the adjacent area (core study area). Potential impacts on the ecological receptors are discussed and, where required, mitigation is suggested. This chapter should be read with Chapter 8: Ornithology of this EIA, which evaluates the effects on avian fauna within the Site and surrounding area.
- 9.8 This chapter provides a summary of various ecological consultations, desktop studies, surveys and assessments undertaken at the proposed Glenvernoch Wind Farm during the period of June to September 2023.
- 9.9 Further details of all the surveys undertaken to date is provided within the following Technical Appendices:
- Technical Appendix 9.1: Ecology Survey Report 2023;
 - Technical Appendix 9.2: Bat Survey Report 2023; and
 - Technical Appendix 9.3: Watercourse Crossing Assessment - Fisheries 2024, OS Ecology.
- 9.10 Technical Appendix 9.1 includes details of the location of species subject to persecution and therefore should only be made available to NatureScot. Technical Appendix 9.1 should not be placed in the public domain.

Scope of Assessment

Core Study Area

- 9.11 The ecological core study area is defined as the proposed wind farm site, the wider Glenvernoch Site and a buffer zone around the wider Glenvernoch Site. Any buffer zones, if required, were determined by the subject (habitat or protected species) being studied and current best-practice guidelines.

Survey Areas

- 9.12 All ecological surveys surveyed the wider Glenvernoch Site as these surveys were started prior to the layout of the proposed wind farm being finalised. However, the data presented within this Chapter is discussed with regard to two different areas: the wider Glenvernoch Site and the reduced Glenvernoch Wind Farm. The boundaries of both these sites/areas are detailed in Technical Appendix 9.1.

Policy, Legislation and Guidance

Policy

- 9.13 Planning policies relevant to this assessment are summarised in Chapter 5: Planning & Policy Context and are set out in detail in the Planning Statement accompanying this application.

Relevant Legislation

- 9.14 Table 9.2 below provides an overview of the key legislation related to protected species in Scotland and the implications of this protection.

Table 9.2: Protected species legislation potentially relating to the Glenvernoch Site.

Species	Key Legal Protection
Bats (all species)	Bats are classified as European protected species and are awarded full protection under the Conservation (Natural Habitats, &c.) Regulations 1994 and Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2007. The above legislation makes it an offence to: • Deliberately or recklessly capture, injure, take or kill a bat; • Deliberately or recklessly harass a bat; • Intentionally or recklessly disturb a bat in its place of rest (roost), or which is used for protection or rearing young; • Deliberately or recklessly damage, destroy or obstruct access to any resting place or breeding area used by bats; • Deliberately or recklessly disturb a bat in any way which is likely to significantly affect the local populations of the species, either through affecting their distribution or abundance, or affect any individuals ability to survive, reproduce or rear young; and • Possess or advertise/sell/exchange a bat (dead or alive) or any part of a bat. In Scotland, licences are issued by SNH for any actions that may compromise the protection of a European protected species, including bats, under the Habitats Regulations 1994 (as amended). This includes all developments, regardless of whether or not they require planning permission. Bats are also protected by the Wild Mammals (Protection) Act 1996, The Nature Conservation (Scotland) Act 2004 and the Wildlife and Natural Environment (Scotland) Act 2011.
Great Crested Newt	Great Crested Newts are protected under European and Scottish law, having the same level of protection as bats (see above). Licenses are issued by SNH for any actions that may compromise the protection of this species, under the Habitat Regulations 1994 (as amended). This includes all developments, regardless of whether or not they require planning permission. The species is also protected under The Nature Conservation (Scotland) Act 2004 and Natural Environment (Scotland) Act 2011 and is listed on the UK Biodiversity Framework.
Otter	Otter are protected under European and Scottish law and receive the same level of protection as bats (see above). The species is

Species	Key Legal Protection
	listed under Annex II and IV of the Habitats Directive, which is implemented through the Conservation (Natural Habitats, &c.) Regulations 1994 and the Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2007. Otter are also protected under the Wild Mammals (Protection) Act 1996 and are listed as a priority species in Appendix II of the Bern Convention. The species is also protected under The Nature Conservation (Scotland) Act 2004 and Natural Environment (Scotland) Act 2011 and is listed on the UK Biodiversity Framework.
Water Vole	Water Voles receive partial protection under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended in Scotland). This makes it an offence to: • Damage, destroy or obstruct access to any place used by water vole for shelter or protection; or • Disturb water vole while they occupy such places of shelter. The species is also protected under the Wild Mammals (Protection) Act 1996, The Nature Conservation (Scotland) Act 2004 and Natural Environment (Scotland) Act 2011, and is listed on the UK Biodiversity Framework.
Pine Marten	Pine Marten is listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended in Scotland). It is an offence to intentionally or recklessly: • Kill, injure or take a wild Pine Marten; • Damage, destroy or obstruct access to any structure or place which a Pine Marten uses for shelter or protection (a nest or den); • Disturb a Pine Marten whilst it is within a nest or den; and • Possess or control, sell, offer for sale or possess or transport for the purpose of sale any live or dead wild Pine Marten, or any derivative of a Pine Marten. The species is also protected under the Wild Mammals (Protection) Act 1996, The Nature Conservation (Scotland) Act 2004 and Natural Environment (Scotland) Act 2011, and is listed on the UK Biodiversity Framework.

Biodiversity Policy Guidance

- 9.15 The UK Post-2010 Biodiversity Framework has been devised to fulfil the UK Government's role in conserving biodiversity as set out in the Strategic Plan for Biodiversity 2011-2020 and the implementation of the Convention of Biological Diversity in the UK. The UK Biodiversity Framework focuses '*on managing the environment as a whole*' with Scotland, England, Northern Ireland and Wales working as one.
- 9.16 The work carried out under the former UK Biodiversity Action Plan (UK BAP) is focused within the UK Post-2010 Biodiversity Framework. As the UK Post-2010 Biodiversity Framework does not contain lists of species and habitats of priority conservation importance, the former BAP lists are still widely used and referred to when identifying ecological features of key importance. The UK Biodiversity Framework does not provide statutory legal protection, although many of the species and habitats listed under the former BAP are protected under the legislation outlined in Table 8.1.

- 9.17 The Scottish Biodiversity List is a list of animals, plants and habitats that Scottish Ministers consider to be of principal importance for biodiversity conservation in Scotland. The purpose of the list is to enable public bodies to carry out their biodiversity duty by identifying species which are of the highest priority for biodiversity and conservation in Scotland.

Methodology

Consultation

- 9.18 Ecological consultation data was requested from the South West Scotland Environmental Information Centre (SWSEIC) in order to obtain further information regarding the presence and distribution of key species within the Proposed Wind Farm Site and surrounding area.

Desk Study

- 9.19 A desk-top search/assessment was also carried out using the following resources:
- The Government's Multi-Agency Geographic Information for the Countryside;
 - The relevant Ordnance Survey maps; and
 - Google Earth Pro.

Field Surveys

- 9.20 A summary of the ecological surveys undertaken between June and September 2023, is detailed in Table 9.3 below.
- 9.21 Summaries of survey methodologies used are briefly described below. However, please refer to Technical Appendix 9.1, Technical Appendix 9.2 and Technical Appendix 9.3 for full details of survey methodologies.

Table 9.3: Ecological surveys undertaken at Glenvernoch, June-September 2023.

Survey	Survey Dates	Surveyors
Habitats: Phase 1	September 2023	Sterna Ecology
Habitats: NVC	September 2023	Sterna Ecology
Bats: Ground-level Static Surveys – Spring	May 2023	Cairn Ecology
Bats: Ground-level Static Surveys – Summer	July 2023	Cairn Ecology
Bats: Ground-level Static Surveys – Autumn	October 2023	Cairn Ecology
Great Crested Newt: Habitat Suitability Survey	June-July 2023	Sterna Ecology
Badger Survey	June-July 2023	Sterna Ecology
Otter Survey	June-July 2023	Sterna Ecology
Water Vole Survey	June-July 2023	Sterna Ecology

Survey	Survey Dates	Surveyors
Red Squirrel: Spring surveys	June 2023	Sterna Ecology
Red Squirrel: Autumn Surveys	September 2023	Sterna Ecology
Pine Marten: Spring surveys	June 2023	Sterna Ecology
Pine Marten: Autumn Surveys	September 2023	Sterna Ecology
Fisheries Assessment	August-September 2024	OS Ecology

Phase 1 Habitat Survey

- 9.22 A Phase 1 Habitat Survey of the wider Glenvernoch Site was undertaken in September 2023. The Phase 1 survey was completed following the methodology detailed in *The Handbook for Phase 1 Survey* (JNCC 2010). This allows habitats and boundary features to be mapped by a trained surveyor following a standardised system that can be easily interpreted.

NVC Survey

- 9.23 A National Vegetation Classification (NVC) Survey of the proposed Glenvernoch Wind Farm, plus an infrastructure buffer, was undertaken in September 2023. The survey was carried out in accordance with standard NVC survey methodology (Rodwell 1991 *et seq*; Rodwell 2006) on potential Ground Water Dependent Terrestrial Ecosystems (GWDTEs) and habitats of potential nature conservation significance.

Bat Surveys

Ground-level Static Surveys

- 9.24 Activity surveys, comprising of the deployment of static recorders were completed during the main bat activity season (May to October 2023) covering the three key activity periods: spring migration, maternity and autumn dispersal. The surveys were designed using an indicative turbine layout, prior to infrastructure plans being finalised.
- 9.25 To comply with current guidance (NatureScot 2021), static detectors were deployed for a minimum of ten nights in spring, summer and autumn. Static detectors should be placed at all potential turbine locations, with one detector for each of the first ten turbine locations and a further detector for every three additional turbines (NatureScot 2021). Eleven static detectors were therefore deployed at Glenvernoch, proportional to the proposed number of turbines (13).
- 9.26 Full details of the bat surveys can be found in Technical Appendix 9.2.

Great Crested Newt Habitat Suitability Index Surveys

- 9.27 An assessment of the suitability of the habitats within the Site and surrounding area for Great Crested Newts was undertaken in June and July 2023. As a part of this assessment, a Habitat Suitability Index (HSI) of all ponds within the wider Glenvernoch Site, following the methodology published by Oldham *et al.* (2000), was undertaken, in order to help determine the likely suitability of these waterbodies for Great Crested Newts. No access

was available to any ponds outside the wider Glenvernoch Site boundary, and within 250m of the Site.

- 9.28 Areas of standing water (bog pools and swamp) are also present within the wider Glenvernoch Site. However, these lie within areas of fen and mire habitat and their resultant high acidity levels are considered to provide largely unsuitable conditions for breeding Great Crested Newts.
- 9.29 The HSI evaluates the pond against key criteria, such as pond location, size, macrophyte cover, the presence of fish and wildfowl and water quality, in order to obtain an index value of between 0 and 1. Ponds with a value of 0 are considered highly unsuitable for Great Crested Newt, while those with a score of 1 are considered to be ideal for the species.
- 9.30 Full details of the Great Crested Newt surveys can be found in Technical Appendix 9.1.

Badger Surveys

- 9.31 Badger surveys were undertaken of the wider Glenvernoch Site in June and July 2023. Badger surveys were carried out with reference to Harris *et al.* (1989) with the site surveyed for Badger field signs, such as setts, prints, snuffle holes, dung pits and hair. Any setts recorded were classified according to the published criteria.
- 9.32 Full details of the Badger surveys can be found in Technical Appendix 9.1.

Otter & Water Vole Surveys

- 9.33 Otter and Water Vole surveys were undertaken of the wider Glenvernoch Site in June and July 2023. Both banks of all the watercourses within the Site were surveyed, where safe access was possible, with checks primarily made from the bankside due to the depth of water along some of the watercourses. The banks of two small lochs just south-west of the boundary of the wider Glenvernoch Site (Loch Quie and Loch Swad) were also surveyed, as were a number of small pools/ponds along the Boughty Burn. Otter field signs searched for included spraint, paths/slides, footprints, couches/lying-up sites and holts. Checks were primarily made for Water Vole latrines, as well as feeding stations, lawns, prints, burrows and tunnels/runways.
- 9.34 Otter surveys were undertaken with reference to Chanin (2003) and Water Vole surveys with reference to Strachan *et al.* (2011). Full details of the Otter and Water Vole surveys can be found in Technical Appendix 9.1.

Red Squirrel Surveys

- 9.35 Visual transect surveys were undertaken of the wider Glenvernoch Site in June 2023 and September 2023, based on Gurnell *et al.* (2009). The surveys involved walking along a number of predetermined survey transects, through woodland where possible or alongside it if not, whilst recording all squirrels, and field signs observed. During the visual surveys, feeding signs were also searched for and recorded. Surveys began as soon after sunrise as possible, this being the time when squirrels are most active. Five minute stops were

undertaken at 100m intervals along the transect routes. All squirrels identified were recorded along with the time and place they were seen.

- 9.36 The visual transect surveys were augmented by the use of remote digital 'camera traps'. Two of these 'camera traps' were rotated around woodland areas of the wider Glenvernoch Site, and adjacent areas, to provide as wide coverage of the site as possible, continuously during the months of June-September 2023.
- 9.37 Full details of the Red Squirrel surveys can be found in Technical Appendix 9.1.

Pine Marten Surveys

- 9.38 Visual transect surveys, for Pine Martens, were undertaken of the wider Glenvernoch Site in June 2023 and September 2023, using survey techniques detailed in Cresswell *et al.* (2012). The surveys involved walking along a number of predetermined survey transects, through woodland where possible or alongside it if not, recording all field signs encountered, such as Pine Marten footprints and droppings (scats) observed. Where suspected scats were found, the area was searched for any signs of tracks or dens.
- 9.39 The visual transect surveys were augmented by the use of remote digital 'camera traps' at baited feeding sites. Two of these 'camera traps' were rotated around the wider Glenvernoch Site, to provide as wide coverage of the site as possible, continuously during the months of June-September 2023.
- 9.40 Full details of the Pine Marten surveys can be found in Technical Appendix 9.1.

Fisheries Assessment

- 9.41 The wider Glenvernoch Site was subject to a walk over, in August and September 2024, during which the watercourses were assessed based on their habitats. In addition, a drone was used in order to assess up and downstream habitats from each watercourse reviewing features which may prevent migration.
- 9.42 Full details of the Fisheries surveys can be found in Technical Appendix 9.3.

Impact Assessment Methodology

- 9.43 In order to determine the value of the habitats and species found through the ecological surveys detailed above, and the impacts of the proposed wind farm, the baseline and survey results were assessed against the criteria developed by the Chartered Institute of Ecology and Environmental Management (CIEEM 2019).
- 9.44 The method used in this assessment involved four key stages:
- Baseline studies;
 - Identification of Valued Ecological Receptors;
 - Identification and characterisation of potential impacts; and
 - Assessment of impact significance.

Baseline Studies

- 9.45 Baseline information about ecological features, including international and national site designations, species populations, species assemblages and habitats, was primarily obtained from field surveys, but was also supported by desktop studies, consultation and existing ecological data relevant to the wind farm site.

Identification of Valued Ecological Receptors

- 9.46 From amongst the species populations or species assemblages present within the zone of influence, of the proposed wind farm, Valued Ecological Receptors (VERs) are identified. VERs are typically species of conservation that could be significantly affected by the proposed wind farm.
- 9.47 The value of populations of species, species assemblages and habitats is evaluated with reference to:
- Their importance in terms of 'biodiversity conservation' value (which relates to the need to conserve representative areas of different habitats and the genetic diversity of species populations);
 - Any social benefits that species and habitats deliver (e.g. relating to enjoyment of flora and fauna by the public); and
 - Any economic benefits that they provide.
- 9.48 For the purposes of this assessment, sites, species populations, species assemblages and habitats have been valued using the following scale:
- International;
 - National;
 - Regional/County;
 - Local; and
 - Low.
- 9.49 These criteria are detailed in Table 9.4 below.

Table 9.4: Criteria for determining the nature conservation value of specific features.

Value of Feature	Key Examples
International	An internationally designated site or candidate site (SAC, cSAC, pSAC, Biogenetic Reserve) or an area which meets the designation criteria for such sites. Internationally significant and viable areas of a habitat type listed in Annex 1 of the Habitats Directive, or smaller areas of such habitat, which are essential to maintain the viability of a larger whole. Any regularly occurring, globally threatened species. A regularly occurring population of an internationally important species, which is threatened or rare in the UK, of uncertain conservation status. A regularly occurring, nationally significant population/number of any internationally important species.

Value of Feature	Key Examples
National	A nationally designated site (e.g. SSSI, NNR) or a discrete area which meets the published selection criteria for national designation (e.g. SSSI selection guidelines) irrespective of whether or not it has yet been notified. A viable area of a UK BAP priority habitat, or smaller areas of such habitat which are essential to maintain the viability of a larger whole. A regularly occurring significant number/population of a nationally important species e.g. listed on the Wildlife and Countryside Act 1981 (as amended). A regularly occurring population of a nationally important species that is threatened or rare in the county or region. A feature identified as being of critical importance in the UK BAP.
Regional/County	Viable areas of key habitat identified in the Regional or County BAP or smaller areas of such a habitat, which are essential to maintain the viability of the larger whole. Regional/county significant and viable areas of key habitat identified as being of regional value by statutory bodies. A regularly occurring significant population/number of any important species important at a regional/county level. Any regularly occurring, locally significant population of a species which is listed in a Regional/County RDB or BAP on account of its regional rarity or localisation. Sites of conservation importance that exceed the district selection criteria but that fall short of SSSI selection guidelines.
District	Areas of habitat identified in a District/City/Borough BAP or in the relevant Natural Area profile. Sites that the designating authority has determined meet the published ecological selection criteria for designation, including Local Nature Reserves selected on District/City/Borough ecological criteria. Sites/features that are scarce within the District/City/Borough or which appreciably enrich the District/City/Borough habitat resource. A diverse and/or ecologically valuable hedgerow network. A population of a species that is listed in a District/City/Borough BAP because of its rarity in the locality or in the relevant Natural Area profile because of its regional rarity or localisation. A regularly occurring, locally significant number of a District/City/Borough important species during key phases of its life cycle.
Local	Areas identified in a Local BAP or the relevant natural area profile. Sites/features which are scarce in the locality or which are considered to appreciably enrich the habitat resource within the local context, e.g. species-rich hedgerows. Local Nature Reserves selected on Neighbourhood/Local ecological criteria. Significant numbers/population of a locally important species <u>e.g.</u> one which is listed on the Local BAP. Any species, populations or habitats of local importance.
Low	Habitats of moderate to low diversity which support a range of locally and nationally common species, the loss of which can be easily mitigated.

Sensitivity of Receptors

- 9.50 The impacts of the Proposed Development upon any species or feature are described within this Chapter. The sensitivity of any species or feature to the Proposed Development must also be considered when determining the significance of any impact upon a particular species or habitat. This is based on the conservation value or importance of that species or habitat, as outlined in Table 9.5 below:

Table 9.5: Criteria for assessing the sensitivity of species, habitats and sites.

Sensitivity of Feature	Assessment Criteria
Very High	A species, population or habitat which is/are a designated feature of a SAC or SSSI.
High	Sites, habitats or species of at least national importance, as identified through field survey, desk survey or consultation or features are likely to be significantly affected by the Development.
Moderate	Sites, habitats or species of at least county importance, as identified through field survey, desk survey or consultation or features, although potentially affected, which would not suffer significant effects as a result of the Development.
Low	Sites, habitats or species of local or neighbourhood importance, as identified through field survey, desk survey or consultation or features which would not be significantly affected by the Development.

Impact Magnitude

- 9.51 The magnitude of each potential impact was determined using Table 9.6. The impact magnitude was also assessed based on whether the impact will be positive or negative and direct or indirect.

Table 9.6: Criteria for magnitude of impacts.

Magnitude of Impact	Assessment Criteria
Very Major	The proposed development will have effects which would result in a change in the integrity of a SAC or SSSI.
Major	The proposed development would have effects which would result in a change in the integrity of a site, or a change in the ability of a species to retain its current population levels (at a regional or higher level).
Intermediate	The proposed development would have effects which would alter key attributes of a site but which would not result in a change to a site's evaluation, or would result in changes in the distribution of a species but not affect its population status at a regional level.
Minor	The proposed development would have effects which would neither alter key attributes of a site nor change its evaluation, or would affect the distribution or status of a species at a local level.
Neutral/Negligible	No impact or the proposed development will have very minor effects which would neither alter key attributes of a development site nor change its evaluation, or will affect the distribution or status of a species at a local level.

Significance of Effect

- 9.52 The magnitude of impacts was compared against the value and sensitivity of particular features in order to determine the significance of effects the proposed windfarm is likely to have upon such features. It should be noted that such effects may be negative or positive. The matrix below (Table 9.7) was used to determine the significance of effects upon sites and species. Cells highlighted in light grey are classified as a significant effect for the purposes of this EIA.

Table 9.7: Matrix for assessing significance of effects.

Sensitivity of Feature	Magnitude of Impact				
	Very Major	Major	Intermediate	Minor	Neutral/ Negligible
Very High	Very Major	Major	Moderate/ Major	Minor	Negligible
High	Major	Major	Moderate/ Major	Minor	Negligible
Moderate	Major	Moderate/ Major	Moderate/ Minor	Minor	Negligible
Low	Moderate/ Major	Moderate/ Minor	Minor	Minor/ Negligible	Negligible

- 9.53 The impacts that will have a Very Major, Major or Moderate/Major negative effect upon a feature are considered to be significant, and measures will be put in place to mitigate or compensate for these effects where appropriate.
- 9.54 Effects that were assessed to be Minor/Negligible were subject to professional judgement as to whether the effect was indeed Minor or Negligible. In such cases, mitigation or compensation was included for effects where appropriate to help ensure that there is no net loss in biodiversity as a result of the proposed windfarm.
- 9.55 The duration and reversibility of effects was also considered as a part of the assessment. The definitions used to describe the duration of the effects are explained in Table 9.8. The duration of effects is extremely variable and is dependent upon an individual or species tolerance towards an effect.

Table 9.8: Definitions of the duration of effects.

Effect Magnitude	Assessment Criteria
Permanent	Effects that have the potential to continue over 15 years are considered as permanent. This typically includes habitat loss such as tree felling.
Temporary	Long term: 10 to 15 years. Medium term: 5 to 10 years. Short term: 0 to 5 years.

Reversibility

- 9.56 A temporary impact is one that means recovery is possible. A permanent impact is one that means recovery is unlikely to occur within a reasonable timescale.

Cumulative Effects

- 9.57 All operational and consented wind farm developments, plus those currently in planning, within 10 km of the Proposed Development were considered when assessing cumulative effects of the windfarm on ecology. Environmental Statements (ESs) and Environmental Impact Assessment Reports (EIARs) were used to gain ecological data from these wind farm projects. Data was not always available for operational windfarms and therefore the cumulative assessment has been made using the data available at the time of writing this ecology chapter (July 2024). No cut-off date was used for the ecological data that was included within the cumulative assessment.

Baseline Conditions

Designations

- 9.58 The Site does not lie within any sites or areas designated or recognised for their international or national ecological value.
- 9.59 Three statutory sites designated for their ecological value lie within 2km of the boundary of the wider Glenvernoch Site: River Bladnoch Special Area of Conservation (SAC), Galloway Oakwoods SAC and Wood of Cree Site of Special Scientific Interest (SSSI). The Wood of Cree SSSI is contiguous with a section of the Galloway Oakwoods SAC.

Table 9.9: Statutory Designations within 2km of Glenvernoch.

Statutory Site	Reasons for Designation	Distance from Glenvernoch
River Bladnoch SAC	River Bladnoch is designated a SAC for the population of Atlantic Salmon, an Annex II species, that uses the river as a spring-run.	710m west of Glenvernoch
Galloway Oakwoods SAC	The Galloway Oakwoods are designated as a SAC for the Annex I old Sessile Oak woods habitat that they support. The individual sites are small and dispersed, but are regionally important due to the highly fragmented nature of remnant semi-natural woodland in south-west Scotland.	270m south-east of Glenvernoch
Wood of Cree SSSI	This SSSI supports important upland oak woodlands. The site is the largest and most important example of ancient coppice woodland in the area. Historical records for the wood stretch back to the 13 th Century.	270m south-east of Glenvernoch

Consultation

South West Scotland Environmental Information Centre

- 9.60 The South West Scotland Environmental Information Centre (SWSEIC) was able to supply details of one amphibian, one reptile and eight terrestrial mammal species that have been recorded within 2km of the wider Glenvernoch Site between 1960 and 2020. These species were:
- Smooth Newt;
 - Slow-worm; and
 - Red Squirrel, Otter, Hedgehog, Brown Hare, Natterer's Bat, Lesser Noctule, Common Pipistrelle and Soprano Pipistrelle.
- 9.61 Full details of these records are included in Technical Appendix 9.1 and Technical Appendix 9.2.

Field Surveys

- 9.62 Those species/habitats of Regional/County conservation importance and above, and therefore considered as Valued Ecological Receptors (VERs), recorded during the field surveys are summarised within this section. Further details of the results or the ecological surveys can be found within Technical Appendix 9.1, Technical Appendix 9.2 and Technical Appendix 9.3.
- 9.63 A total of four VERs were identified within the core study area during the ecological surveys, and thus taken forward for further assessment. These VERs are:
- Habitats;
 - Bats;
 - Reptiles; and
 - Fisheries.
- 9.64 No Pine Martens, or Pine Marten field-signs, have been recorded from within the wider Glenvernoch Site during the 2023 ecology surveys, or incidentally during the 2021-2023 ornithology surveys.
- 9.65 No Badgers, or Badger field-signs, have been recorded from within the wider Glenvernoch Site during the 2023 ecology surveys, or incidentally during the 2021-2023 ornithology surveys.
- 9.66 No Otters, or Otter field-signs, have been recorded from within the wider Glenvernoch Site during the 2023 ecology surveys, or incidentally during the 2021-2023 ornithology surveys.
- 9.67 No Water Voles, or Water Vole field-signs, have been recorded from within the wider Glenvernoch Site during the 2023 ecology surveys, or incidentally during the 2021-2023 ornithology surveys.

- 9.68 The Great Crested Newt Habitat Suitability Index, undertaken of all waterbodies within the wider Glenvernoch Site, concluded that these waterbodies were of low value for Great Crested Newt.

Habitats

- 9.69 The wider Glenvernoch Site is dominated by a complex mosaic of acidic grassland, blanket bog, mire and rush pasture habitats, all on a substrate of varying peat depths.
- 9.70 Potential Groundwater Dependant Terrestrial Ecosystems (GWDTEs) occur throughout the Site, with these either having a moderate groundwater dependence, such as the widespread M25 NVC community, or a higher dependency on groundwater such as the more restricted NVC communities M6. Some GWDTEs are typically restricted to linear features flowing down hillsides, and along the sides of ditches and burns (such as NVC community M6. Groundwater dependence is assessed in Table 9.10, which also assesses the site's habitats with respect to the Scottish Biodiversity List.

Table 9.10: Potential Groundwater Dependency of Communities and UK BAP Status.

NVC Community	Potential Groundwater Dependence (SEPA 2017)	Annex 1 Habitats Scottish Biodiversity List (SBL)
M6 <i>Carex echinata</i> – <i>Sphagnum fallax</i> mire	High	Not Annex 1. SBL: Upland flushes, fens & swamps.
M17: <i>Trichophorum cespitosum</i> – <i>Eriophorum vaginatum</i> blanket mire, <i>Cladonia</i> sub-community M17b	Not dependent	Annex 1: Blanket bog. SBL: Blanket bog.
M19: <i>Calluna vulgaris</i> – <i>Eriophorum vaginatum</i> blanket mire	Not dependent	Annex 1: Blanket bog. SBL: Blanket bog.
M23 <i>Juncus effusus/acutiflorus</i> – <i>Galium palustre</i> rush pasture	High	Not Annex 1. SBL: Purple moor grass and rush pasture.
M25 <i>Molinia caerulea</i> – <i>Potentilla erecta</i> mire	Moderate	Annex 1: Blanket bog. SBL: Purple moor grass and rush pasture.
M6/M23 mosaic: <i>Carex echinata</i> – <i>Sphagnum fallax/denticulatum</i> mire / <i>Juncus effusus/acutiflorus</i> – <i>Galium palustre</i> rush-pasture mosaic	High	Not listed on Annex 1 or SBL.
MG5: <i>Cynosurus cristatus</i> – <i>Centaurea nigra</i> grassland.	Not dependent	Not listed on Annex 1 or SBL.
MG9 <i>Holcus lanatus</i> - <i>Deschampsia cespitosa</i> grassland	Moderate	Not listed on Annex 1 or SBL.

NVC Community	Potential Groundwater Dependence (SEPA 2017)	Annex 1 Habitats Scottish Biodiversity List (SBL)
MG10 <i>Holcus lanatus</i> – <i>Juncus effusus</i> rush pasture	Moderate	Not Annex 1. SBL: Purple moor grass and rush pasture.
U4 <i>Festuca ovina</i> - <i>Agrostis capillaris</i> - <i>Galium saxatile</i> grassland	Not dependent	Not listed on Annex 1 or SBL.
U20 <i>Pteridium aquilinum</i> – <i>Galium saxatile</i> community	Not dependent	Not listed on Annex 1 or SBL.
W11/W17 mosaic: <i>Quercus petraea</i> – <i>Betula pubescens</i> – <i>Oxalis acetosella</i> woodland / <i>Quercus petraea</i> – <i>Betula pubescens</i> – <i>Dicranum majus</i> woodland mosaic.	Not dependent	Annex 1: Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> SBL: Upland birch woods.

- 9.71 Communities listed as having high groundwater dependence are potentially sensitive to development, notably through direct land take as well as through disruption in water flows. As a result, where possible they should be avoided together with appropriate buffers, or suitable mitigation should be implemented.
- 9.72 SEPA recommends buffers of 100m from roads, tracks and trenches and 250m from borrow pits and turbine foundations. In some cases it may be possible to reduce this buffer, based on topography and hydrological flows. For example, M6 mire can occur where groundwater is not involved and only surface flow is present. Communities listed as having moderate groundwater dependence may also be sensitive to development, though, as with the example above, these communities are not always dependent on ground water flow, especially in areas of high rain fall, where surface water flow may be the driver instead.
- 9.73 In general all of the NVC communities recorded are considered to be common and widespread within the region. None of the habitats were recorded as being of high conservation concern, though Annex 1 Habitats do occur that are generally included on Annex 1 due to their occurrence on peat substrates.

Bats

Activity Surveys

- 9.74 During the spring deployment of the ground-level static bat detectors, bats were recorded at nine of the eleven locations. During the summer deployment bats were detected at all of the eleven locations, and during the autumn deployment at seven of the locations.
- 9.75 During the spring, summer and autumn deployments calls characteristic of eight species of bats were recorded. These species were:
- Common Pipistrelle;
 - Soprano Pipistrelle;
 - Brown Long-eared Bat;

- Daubenton's Bat;
- Natterer's Bat;
- Whiskered Bat;
- Leisler's Bat; and
- Noctule Bat.

9.76 The site level risk is determined by project size and habitat risk. The proposed development consists of 13 turbines and therefore falls in the category of a 'medium' sized project (NatureScot 2021). The Site has low potential for bats, with no potential roost features being located within the site and open exposed surrounding habitat. The site has therefore been categorised as low risk in accordance with the best practice guidelines (NatureScot 2021). Using the matrix from the best practice guidelines, the medium project size combined with the low-risk habitat results in an overall Site risk level of Low.

Reptiles

9.77 The presence of a very small population of Common Lizard within the wider Glenvernoch Site was confirmed, as incidental records, during both the 2023 Ecology Surveys and the 2021-2023 Ornithology Surveys.

9.78 The wider Glenvernoch Site is considered to be of Low value for Reptiles.

Fisheries Assessment

9.79 Habitats on site are considered to be of generally low to moderate value to local fish populations, with some of the larger watercourses providing potential habitats for salmonid and other fish species. However, there are also a number of smaller burns likely to provide only limited opportunities.

9.80 There are five watercourses, linked to crossing points within the wider Glenvernoch Site, that have the potential to support salmonids. These watercourses could support breeding habitat for resident and migratory fish in small numbers based on the habitats present and connectivity. They are not considered to provide habitats which are considered important in anything more than a local context, based on the extent of habitat within these areas and upstream, and with large numbers of similar, and larger watercourses present within the catchment, and the wider district, that are likely to be more important to the sustenance of the populations.

9.81 Other fish species present are likely to be limited to small numbers of Three-spined Stickleback, Stone Loach, Bullhead and Minnow.

Modifying Influences

9.82 The populations of VERs recorded during the survey period, to date, are likely to follow the national, regional and county population trends.

Information Gaps

- 9.83 It is considered that the ecological baseline surveys, consultation and desktop studies provide the full suite of data required. There are considered to be no significant ecological information gaps.

Design Evolution

- 9.84 Valued Ecological Receptors have been considered throughout the wind farm design process. In particular, the layout of the wind farm infrastructure was designed to avoid National Vegetation Communities (NVC) that occur on deep peat and habitats indicative of Groundwater Dependant Terrestrial Ecosystems (GWDTEs). For instance Turbine T5 was moved further north to avoid construction on an area of M17 *Trichophorum cespitosum* – *Eriophorum vaginatum* blanket mire (*Cladonia* sub-community M17b), a GWDTE on deep peat.

Assessment of Effects

International and National Designated Sites

- 9.85 None of the designated sites, in the area surrounding the Proposed Development, have been brought forward for further assessment. This is primarily due to the distances involved, but also general lack of hydrological connections and therefore mechanism for effects to occur.

Species of Conservation Importance

- 9.86 The effects of the Proposed Development on habitats/species of Regional/County conservation importance and above, and therefore considered as VERs, are summarised within this section.
- 9.87 A summary of effects, without mitigation measures, is provided in the table at the end of this section (Table 9.13).

Construction Phase

- 9.88 This section summarises the significance of potential effects on VERs during the construction phase of the development.

Disturbance and Displacement

Habitats

- 9.89 Construction of the tracks, crane pads, turbine foundations, and construction compound within the footprint of the actual wind farm, would see the loss of several small areas of seven NVC habitats: M6 *Carex echinata* – *Sphagnum fallax* mire, M17 *Trichophorum cespitosum* – *Eriophorum vaginatum* blanket mire, *Cladonia* sub-community M17b, M19 *Calluna vulgaris* – *Eriophorum vaginatum* blanket mire, M23 *Juncus effusus/acutiflorus* – *Galium saxatile* rush pasture, M25 *Molinia caerulea* – *Potentilla erecta* mire, MG10 *Holcus*

lanatus – *Juncus effusus* rush pasture and U20 *Pteridium aquilinum* – *Galium saxatile* community. One of these habitats (U20) is of low value. Of the other six habitats, three (M17, M19 and M23) are listed as both Annex 1 Habitats and as Habitats of Principal Importance on the Scottish Biodiversity List. The remaining three habitats (M6, M23 and MG10) are just listed as Habitats of Principal Importance on the Scottish Biodiversity List.

- 9.90 Although construction of the wind farm will see the permanent loss of some habitats both on Annex 1 and the Scottish Biodiversity List, as the areas that will be lost to the construction are very small, then the loss of such habitats is considered to be an **intermediate impact**. This **intermediate impact**, on an ecological feature of **moderate sensitivity**, would result in a **moderate/minor effect**, which is **not significant**.

Ground Water Dependent Terrestrial Ecosystems

- 9.91 Construction of the tracks, crane pads, turbine foundations and construction compound, within the footprint of the actual wind farm, would see the loss of several small areas of four groundwater dependent NVC habitats: M6 *Carex echinata* – *Sphagnum fallax* mire, M23 *Juncus effusus/acutiflorus* – *Galium saxatile* rush pasture, M25 *Molinia caerulea* – *Potentilla erecta* mire and MG10 *Holcus lanatus* – *Juncus effusus* rush pasture. Two of these habitats have high groundwater dependence, whilst two have moderate groundwater dependency. However, as the areas that will be lost to the construction are very small, then the loss of such habitats is considered to be an **intermediate impact**. This **intermediate impact**, on an ecological feature of **moderate sensitivity**, would result in a **moderate/minor effect**, which is **not significant**.

Bats

- 9.92 No structures or trees were identified within the wider Glenvernoch Site that were considered to have between a moderate and high potential for supporting roosting bats. None of the coniferous plantations (primarily Sitka Spruce), just outside the wider Glenvernoch Site, were considered to be suitable for roosting bats, due to their age structure.
- 9.93 The construction period would result in the loss and disturbance of habitats of low value for foraging bats. The limited value of such habitats to foraging bats, and the presence of areas of similar to higher quality habitat in the surrounding area, limits the scale of impact such works would have upon the local bat population. Disturbance and displacement of foraging bats, during the construction period, a VER of **high** sensitivity, would be **minor**, resulting in a **minor effect** which is **not significant**.

Reptiles

- 9.94 A small population of Common Lizard have been confirmed as being present within the wider Glenvernoch Site, and it is also considered, given the habitats present, that a small population of Adder may also be present within the wider Site.
- 9.95 The construction of the turbines and associated infrastructure would result in the direct loss of some small areas of potentially suitable habitat, for both Common Lizard and Adder, during construction. However, this loss of habitat is considered to be of low significance when compared with the availability of similar habitats within the wider area. Destruction

of this habitat, through construction works, would have a **negligible** impact on reptiles, a receptor of **moderate** sensitivity, resulting in a **negligible**, and thus **not significant**, effect.

Fisheries

- 9.96 Habitats on site are considered to be of generally low to moderate value to local fish populations, with some of the larger watercourses providing potential habitats for salmonid and other fish species.
- 9.97 The construction of the turbines and associated infrastructure, particularly new watercourse crossing points, could result in the following impacts:
- Severance of watercourses for both migratory and resident fish species, moving into and out of breeding and foraging areas;
 - Harm to fish during works; and
 - Pollution to downstream habitats as a result of the works, including increased siltation of habitats.
- 9.98 However, all works on site will strictly adhere to a Construction Environmental Management Plan (CEMP) in order to minimise the risk of causing harm or damage to fisheries and their environment. It is therefore considered that the impacts on fisheries, through construction works, would have a **minor** impact on fisheries, a receptor of **moderate** sensitivity, resulting in a **minor**, and thus **not significant**, effect.

Operational Phase

Disturbance and Displacement

- 9.99 This section summarises and evaluates the significance of the potential effects on species (without mitigation measures) during the 40-year operational period of the Proposed Development. Both displacement and collision effects on VERs are considered within this section.
- 9.100 The main causes of displacement to non-avian fauna during the operational period of a wind farm are visual and noise disturbance from turbines. Increased presence of people within the Site undertaking maintenance of the Proposed Development also has the potential to cause disturbance to fauna.
- 9.101 Levels of human activity on the operational wind farm site are likely to be comparable to the existing situation, with the Site currently being operated as low intensive grazing land. There are currently no inhabited dwellings within the wider Glenvernoch Site boundary and the Site is moorland with access being difficult. Therefore current levels of background human activity within the Site are likely to be **negligible**. Predicted human presence within the Site, during the operational period, is likely to be similar, with the wind farm being operated remotely and maintenance visits being infrequent. Human activity, during the operational phase, would therefore result in a negligible impact on VERs of **high-low sensitivity**, all resulting in **negligible** effects, which are **not significant**.

Habitats

- 9.102 All the loss of NVC habitats would occur during the construction phase of the Proposed Development. There are thus predicted to be no additional anticipated effects on NVC habitats during the operational phase of the wind farm. It is therefore predicted that there would be **no significant** effects on NVC habitats as a result of the operation of the wind farm.

Groundwater Dependent Terrestrial Ecosystems

- 9.103 All the loss of ground water dependent NVC habitats would occur during the construction phase of the Proposed Development. There are thus predicted to be no additional anticipated effects on GWDTEs during the operational phase of the wind farm. It is therefore predicted that there would be **no significant** effects on GWDTEs as a result of the operation of the wind farm.

Bats

- 9.104 Bats may be affected by operational wind turbines in three main ways: disturbance of adjacent areas, risk of collision and barotrauma. Low levels of activity by a small range of species have been recorded across the Site.
- 9.105 NatureScot (2021) provides information regarding the likely risk to individual bat species, and populations, from wind turbine strike. Bats of the genus *Nyctalus*, which are considered to be at high risk from collision with wind turbines, at a population level, were identified within the survey area.
- 9.106 The majority of habitats within the wider Glenvernoch Site, primarily open moorland, offer limited foraging potential for bats. The Site is therefore considered to have low potential for foraging and commuting bats with roosting opportunities appearing to be non-existent.
- 9.107 Based on the above, the initial site risk assessment score for the Site is considered to be low.
- 9.108 Table 9.11 below provides an assessment of the potential risk to each bat species based on their comparative activity levels and the Potential Vulnerability of Scottish Bat Populations.

Table 9.11: Assessment of the potential risk to each bat species.

Species	Species Assessment	Potential Vulnerability	Potential Risk	Comments
<i>Pipistrellus</i> (including Soprano & Common Pipistrelles)	Moderate/High	Medium	Medium	Although the activity levels for these species are higher, it should be noted that the population vulnerability is medium
<i>Nyctalus</i> (including Leisler's & Noctule Bats)	Low/Moderate	High	Low	These species are within their known ranges. With the lack of evidence of a roost of high conservation value, the overall potential risk to these

				species is deemed to be medium.
Myotis (including Daubenton's & Natterer's Bats)	Low/Moderate	Low	Low	Given the low/moderate activity levels for these species and collision risk.

- 9.109 A minimum stand-off distance of 50m between the turbine blade tips and the top of any features/areas that could be used by foraging or commuting bats would be established, in order to minimise the risk of bats being harmed or disturbed, in line with current best-practice guidelines (NatureScot 2021). This would include those plantation edges which come close to some of the turbine locations in the southern half of the Site. As this distance is likely to be exceeded at the Site, the risk of bats being affected by disturbance of adjacent areas is considered to be low. The operation of the turbines would therefore have an impact of (at worst) **minor** magnitude upon the local bat population (a VER that is of **high** sensitivity), resulting in a **minor** impact, which is **not significant**.

Reptiles

- 9.110 Human activity associated with wind farm maintenance, inclusive of vehicle movements, would be limited to the permanent infrastructure areas, such as the tracks and turbine bases. It is therefore predicted that there would be no significant effects on the local Reptile populations as a result of the operation of the Proposed Development.

Fisheries

- 9.111 The operational activity of the wind farm, inclusive of vehicle movements, will be limited to the permanent infrastructure areas, such as tracks and turbine bases. It is therefore predicted that there would be no additional significant effects on fisheries, beyond those at the construction phase, as a result of the operation of the Proposed Development.

Decommissioning Phase

- 9.112 It is extremely difficult to evaluate the potential effects decommissioning could have on important habitats and non-avian fauna populations after the lifespan of the wind farm. In addition, it is possible that after 40 years habitats and species communities may have altered significantly.
- 9.113 In the absence of mitigation the effects of decommissioning are likely to be similar to those of the construction phase, with these potential effects likely to be temporary. Ecology surveys would be required prior to decommissioning works commencing to identify protected species within the planned work areas. These would be carried out to best practice methodology, guidance and legislation at that time.

Micro-siting

- 9.114 There would be no change in the ecological assessment if the turbines, or other site infrastructure such as crane pads or access tracks, are micro-sited to a maximum distance of 100 m in any direction from the proposed locations.

Cumulative Effects

- 9.115 Wind developments within 10 km of the proposed Glenvernoch Wind Farm, which have the potential to add cumulative impact are shown in Table 9.12. In order to undertake the cumulative assessment each wind farm EIAR was searched for and in its absence the Non-technical Summary (NTS) was used to gain ecological impacts from developments which are currently in planning, consented or operational. However, for some of the wind farms both the EIAR and NTS were not available in the public domain.

Table 9.12: Wind Farm Developments/Applications within 10km of Glenvernoch Wind Farm which have the Potential to add Cumulative Effects.

Wind Farm	Size	Status	Rational
Blair Hill	15 turbines	Pre-planning	Within 5km of Glenvernoch: no EIAR or NTS available yet.

- 9.116 No potentially significant effects are predicted in relation to ecological receptors as a result of the combination of effects from the Proposed Development in conjunction with other consented and proposed developments within 10km of the Site.

Summary of Effects

- 9.117 The effects of the Proposed Development on VERs, without mitigation, are shown in Table 9.13 below. The significance of impact on any of the ecological receptors is, at most, **moderate/minor adverse**.

Table 9.13: Assessment of the effects of the Proposed Development prior to mitigation.

Receptor & Summary of Predicted Effect	Sensitivity of Feature	Magnitude of Impact	Duration of Pre-mitigation Effect	Significance of Effect
Construction Phase				
Habitats: loss of NVC habitats – wind farm	Moderate	Intermediate	Permanent	Moderate/minor
GWDTEs: loss of GWD habitats – wind farm	Moderate	Intermediate	Permanent	Moderate/minor
Bats: disturbance of building roosts	High	Negligible	Short-term	Negligible
Bats: disturbance & loss of tree roosts	High	Negligible	Short-term	Negligible
Bats: disturbance & loss of foraging habitats	High	Minor	Short-term to Permanent	Minor
Reptiles: loss & disturbance of habitats	Moderate	Negligible	Short-term to Permanent	Negligible
Fisheries: direct harm of individuals	Moderate	Minor	Permanent	Minor
Fisheries: pollution to downstream habitats,	Moderate	Minor	Permanent	Minor

Receptor & Summary of Predicted Effect	Sensitivity of Feature	Magnitude of Impact	Duration of Pre-mitigation Effect	Significance of Effect
including increased siltation				
Operational Phase				
Habitats: disturbance of NVC habitats	Moderate	No effect	Permanent	No effect
GWDTEs: disturbance of GWD habitats	Moderate	No effect	Permanent	No effect
Bats: disturbance of building roosts	High	Negligible	Permanent	Negligible
Bats: disturbance of tree roosts	High	Negligible	Permanent	Negligible
Bats: disturbance of foraging habitats	High	Minor	Permanent	Minor
Bats: collision with wind turbines	High	Minor	Permanent	Minor
Reptiles: disturbance	Moderate	Negligible	Permanent	Negligible
Fisheries: disturbance	Moderate	Negligible	Permanent	Negligible
Decommissioning Phase				
Habitats: loss of NVC habitats – wind farm	Moderate	Intermediate	Permanent	Moderate/minor
GWDTEs: loss of GWD habitats – wind farm	Moderate	Intermediate	Permanent	Moderate/minor
Bats: disturbance of building roosts	High	Negligible	Short-term	Negligible
Bats: disturbance & loss of tree roosts	High	Negligible	Short-term	Negligible
Bats: disturbance of foraging habitats	High	Minor	Short-term to Permanent	Minor
Reptiles: disturbance of habitats	Moderate	Negligible	Short-term	Negligible
Fisheries: direct harm of individuals	Moderate	Minor	Permanent	Minor
Fisheries: pollution to downstream habitats, including increased siltation	Moderate	Minor	Permanent	Minor

Mitigation

- 9.118 As no potentially significant effects have been predicted it is not considered necessary to include any mitigation measures.
- 9.119 However, Energiekontor is committed to maintaining and improving the ecological value of the Site and surrounding area and thus the following ornithological mitigation would therefore be implemented as part of the Proposed Development.

Protected Species

- 9.120 In order to minimise the risk of protected species being adversely affected, from the implementation of the proposals, the following mitigation measures will be implemented during the construction period of the development:
- 9.121 As all wild birds, their nests and eggs are protected by law under Part 1 of the Wildlife and Countryside Act 1981 (as amended), then no vegetation clearance works, soil stripping works, fence construction or off-track vehicle movements would be undertaken during the bird breeding season (March to August inclusive), unless a checking survey by a suitably qualified ornithologist has shown active nests to be absent immediately prior to the start of works;
- 9.122 Construction works will not be undertaken at night, to minimise the risk of disturbing nocturnal species such as bats;
- 9.123 No high-powered lighting will be installed either during the construction or operational phases of the development;
- 9.124 Any trenches or pits created will be covered overnight, or one side of these features will lie at a 45° angle to allow any animals which may fall in safe access out. Such features will be checked prior to the recommencement of works on site each morning, to ensure protected and notable species are not adversely affected by the proposals;
- 9.125 No fires will be lit as part of the proposals;
- 9.126 Any chemicals required will be locked away in appropriately secure containers when not in use.

Bats

- 9.127 To minimise the identified potential negative effects to bat populations, from the proposed wind farm, a number of best practice mitigation measures will be adhered to, during both the construction and operation of the wind farm. These have included/will include:
- The adjustment of turbine locations to avoid key habitat features – already undertaken;
 - Habitat Management;
 - Monitoring; and
 - Where appropriate, feathering of turbine blades.

Turbine Locations

- 9.128 Current guidelines (NatureScot 2021) recommend that wind turbine blade tips should be more than 50m away from features likely to be used by foraging and commuting bats, such as trees, watercourses and waterbodies. During the design of the turbine and infrastructure layout for Glenvernoch, suitable buffer distances were included to maintain separation of turbines and bat habitat.
- 9.129 These buffer distances were estimated using the following formula:

$$b = \sqrt{(50 + bl)^2 - (hh - fh)^2}$$

9.130 Where: bl = blade length; hh = hub height; and fh = feature height (all in metres).

Habitat Management

9.131 To maintain a low collision risk, the Habitat Management Plan for the Site will maintain the habitats within 50m of the turbine blade swept radius in a state which offers poor foraging for bats. As the habitat on, or adjacent to, the Site changes, the habitat management methods will be reviewed to ensure that habitats within a 50m buffer of all turbine blade swept radius are unsuitable for use by bat species.

Monitoring

9.132 To assess and revise the success of the above mitigation on Site, monitoring of turbine locations for bat corpses caused through collision with, or barotrauma from, turbines, will be completed through the first two years of the operational phase of the development. In the unlikely event that bat mortality is recorded at turbine locations, management activities will be introduced to further reduce the interaction between bats and turbines at the Site. Such management could include an increase in the buffer distance between the turbines and woodland edges, or other features.

Feathering

9.133 Current guidance states that there is evidence that bat casualties at wind farms are reduced by pitching the blades out of the wind ('feathering') to reduce rotation speeds below 2rpm while idling, and in some cases increasing the cut-in speed during high-risk periods (for instance warm evenings in summer with low wind speeds). It has been found that the reduction in speed resulting from feathering, compared with normal idling, may reduce bat fatality rates by up to 50%. As this option does not result in any loss of output, it will be undertaken at Glenvernoch wherever it is practically possible (NatureScot 2021).

Fisheries

9.134 The following Fisheries Mitigation Strategy will be followed during the construction and operation of the Glenvernoch Wind Farm:

- Where possible the crossing points will be located in areas of lower value for fisheries such as existing crossing points, areas where livestock cross the watercourse or other modified features, to minimise impacts – already undertaken;
- The diameters of any culverts or pipes used should be as large as feasible in order to maintain flow and depth of water as much as possible, and to allow light into the channel. Where possible bridging rather than culverting should be used;
- Culverts should be over deepened into the channel to ensure that flow persists at depth through the channel and to allow natural substrate to be deposited within the channel over time; and

- All works on site should take place to a Construction Environmental Management Plan (CEMP) in order to minimise the risk of causing harm or damage to fisheries and their environment.

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