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INTRODUCTION

- 9.1 This Chapter considers the likely significant effects on relevant ecological receptors associated with the construction, operation and decommissioning of the proposed Clashindarroch II Wind Farm (the proposed development) study area. Ecological receptors relevant to this assessment include terrestrial and aquatic habitats, flora and fauna of conservation concern that have the potential to be affected by the proposed development. The assessment of potential effects on ornithological receptors is provided in Chapter 8: Ornithology.
- 9.2 The specific objectives of this Chapter are to:
- identify and describe the habitat types, flora and the presence of protected species across and immediately adjacent to the proposed development through both desk studies and surveys;
 - evaluate the sensitivity of each ecological receptor;
 - predict and assess potentially significant effects upon the ecological receptors;
 - define mitigation measures to avoid, reduce and offset adverse effects; and
 - assess the level of residual effects, i.e. effects that include mitigation measures.
- 9.3 A summary of the baseline information collated for the assessment of the proposed development is also provided in this Chapter, with further information included within a set of Technical Appendices set out as follows:
- Technical Appendix 9.1: Phase 1 Habitat and NVC Survey Results;
 - Technical Appendix 9.2: Protected Mammal Survey Results;
 - Technical Appendix 9.3: Bat Activity Survey Results;
 - Technical Appendix 9.4: Outline Species Protection Plans;
 - Technical Appendix 9.5: Outline Habitat Management Plan;
 - Technical Appendix 9.6: Outline Fisheries Management Plan; and
 - Confidential Annex: Sensitive Protected Species Records and Survey Results.
- 9.4 Baseline ecological surveys and the assessment of the proposed development were undertaken by MBEC ecological consultants between May 2015 and October 2019.
- 9.5 Some key aspects of the proposed development are summarised within this Chapter. All aspects of the proposed development, as described in Chapter 3: Description of the Development, form the basis of this assessment.

LEGISLATION, PLANNING POLICY AND GUIDANCE

Legislation

- 9.6 This assessment has been completed in compliance with the provisions of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017. Other key pieces of legislation,

conventions and directives that are of relevance to this assessment include:

- The Conservation (Natural Habitats, &c) Regulations 1994 (as amended in Scotland);
- Wildlife and Countryside Act 1981 (as amended in Scotland);
- Nature Conservation (Scotland) Act 2004 (as amended);
- The Wildlife and Natural Environment (WANE) (Scotland) Act 2011;
- Wild Mammals (Protection) Act 1996;
- The Convention for the Conservation of European Wildlife and Natural Habitat (The Bern Convention) 1979; and
- Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the 'Habitats Directive').

9.7 Table 9-1 provides a summary of the principal legal protection of the species (or taxonomic groups) which are the focus of this assessment. This is provided for general information purposes only, the original legislation should be referred to for definitive guidance (copies of the original, i.e. as enacted, and revised versions of all UK and Scottish Government legislation are available from The Stationery Office¹).

Table 9-1
Summary of Species Legal Protection Relevant to this Assessment

Species/Taxon	Key Legislation, Directives, Conventions	Summary of Relevant Protections
Badger	Bern Convention (Appendix 3) ⁱ Protection of Badgers Act (1992) ⁱⁱ	Badgers and their setts are fully protected.
Bats (all native species)	Habitats Regulations 1994, Schedule 2 (as amended) ⁱⁱⁱ EC Habitats Directive Annex IV ^{iv} Bern Convention (Appendices 2 & 3) ⁱ Convention on Migratory Species (Appendix 2 and EUROBATS) ^{iv}	All wild native bat species are European Protected Species (EPS). Bats and their roosts are fully protected.
Otter	Habitats Regulations 1994, Schedule 2 (as amended) ⁱⁱⁱ EC Habitats Directive Annex IV ^{iv} Bern Convention Appendix 2 ⁱ	Otter is an EPS. Otters and their breeding sites or resting places are fully protected.
Pine marten	Wildlife and Countryside Act 1981, as amended (Schedule 5) ^v Bern Convention (Appendix 3) ⁱ	Pine martens and any structure or place which they use for shelter or protection are legally protected.
Red squirrel	Wildlife and Countryside Act 1981, as amended (Schedule 5) ^v Bern Convention (Appendix 3) ⁱ	Red squirrels and any structure or place which they use for shelter or protection are legally protected.
Reptiles (common lizard, slow-worm and adder)	Wildlife and Countryside Act 1981, as amended (Schedule 5) ^v Bern Convention (Appendix 3) ⁱ	All native reptile species are protected from killing/injury.

¹ <http://www.tso.co.uk>, online copies of all UK and Scottish Government legislation are also available free from <http://www.legislation.gov.uk>.

Species/Taxon	Key Legislation, Directives, Conventions	Summary of Relevant Protections
Water vole	Wildlife and Countryside Act 1981, as amended (Schedule 5) ^v	Water vole is partially protected in Scotland. Their burrows are protected from damage, destruction, obstruction and disturbance when a water vole is occupying a burrow.
Wildcat	Habitats Regulations 1994, Schedule 2 (as amended) ⁱⁱⁱ EC Habitats Directive Annex IV ^{iv} Bern Convention (Appendix 2) ⁱ	Wildcat is an EPS. Wildcats and their breeding sites or resting places are fully protected.

- i. *The Convention on the Conservation of European Wildlife and Natural Habitats (the Bern Convention) was adopted in Bern, Switzerland in 1979.*
- ii. *The Protection of Badgers Act 1992 protects badgers from taking, injuring, killing, cruel treatment, selling, possessing, marking and having their setts interfered with, subject to exceptions.*
- iii. *The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended). Schedule 2 - European protected species (EPS) of animals. It is an offence to capture, injure, kill an EPS, harass or disturb an EPS while occupying a structure or place used for shelter or protection, disturb while it is rearing or otherwise caring for its young, obstruct access to a breeding site or resting place, or otherwise deny and EPS or group of EPS use of a breeding site or resting place.*
- iv. *Under Article 12 of Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the 'Habitats Directive') Member States must establish a system of strict protection for animal species listed in Annex IV.*
- v. *The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention or CMS) was adopted in Bonn, Germany in 1979. Agreement on the Conservation of Populations of European Bats (EUROBATS) as adopted at the Third Session of the Meeting of Parties, held in July 2000 in Bristol, UK.*
- vi. *The Wildlife & Countryside Act 1981 (as amended in Scotland). Specially protected bird species listed on Schedule 1, non-avian fauna on Schedules 5 and 6 and flora on Schedule 8.*

Summary of Relevant Planning Policy & Guidance

- 9.8 Scottish guidelines for development include the National Planning Framework (Ref. 9.1) and the Planning Advice Note 60 entitled 'Planning for Natural Heritage' (Ref. 9.2).
- 9.9 Scotland's third National Planning Framework provides a strategic level framework for the spatial development of Scotland as a whole whereas the Planning for Natural Heritage: Planning Advice Note 60 outlines development control processes and provides case studies for good management of the natural heritage, including vegetation restoration following development.

UK Biodiversity Action Plan

- 9.10 Relevant biodiversity policies were originally based on the UK Biodiversity Action Plan (UKBAP) (Ref. 9.3) which listed 65 Priority Habitats and 1150 Priority Species, and created action plans for these priority habitats and species. The UKBAP formally ended in 2010 and was replaced by the UK Post-2010 Biodiversity Framework published in 2012 (Ref. 9.4). The UK Post-2010 Biodiversity Framework sets out the priorities for UK-level work to support the Convention on Biological Diversity's (CBD's) Strategic Plan for Biodiversity 2011-2020 as well as its five strategic goals and 20 'Aichi Targets' agreed at the CBD meeting in Nagoya, Japan, in October 2010. In addition, it also considers the EU Biodiversity Strategy (EUBS) launched in May 2011 (Ref. 9.5).

2020 Challenge for Scotland's Biodiversity

- 9.11 The '2020 Challenge for Scotland's Biodiversity: A Strategy for the Conservation and Enhancement of Biodiversity in Scotland' launched in 2013 (Ref. 9.6) provides an overview of Scottish biodiversity

policies set within the UK framework. The 2020 Challenge publication is a supplement to the Scottish Biodiversity Strategy (SBS) published in 2004. Together, these form the complete SBS (Ref. 9.7).

- 9.12 The SBS outlines desirable outcomes for 2020 and lists the principles and approaches that should be undertaken to achieve these outcomes. The SBS emphasises the need to take account of how ecosystems work, particularly across landscapes. It states that both the broad and local scales need to be considered, that the capacity of ecosystems to respond to impacts is not infinite and that resilience is to be built into ecosystems using an adaptive, integrated approach at the scale of river catchments.
- 9.13 The UK BAP list of priority habitats and species remain integral to the SBS and the Scottish Biodiversity List (SBL).

The Scottish Biodiversity List

- 9.14 Since the original publication of the SBL (Ref. 9.8) in 2005, there are now four categories of habitats and species:
- conservation action needed - this includes habitats and species that have undergone a significant decline in Scotland and / or are rare or have a restricted distribution and are under threat (e.g. species protected Under the Wildlife and Countryside Act 1981, as amended);
 - avoid negative impacts - this includes habitats and species that are protected through international obligations (e.g. European protected species or habitats), those that are rare or have a restricted distribution and / or have undergone a significant decline in Scotland (e.g. species protected Under the Wildlife and Countryside Act);
 - watching brief only - this includes species on the UK BAP list but not considered to be at particular risk in Scotland as well as species with international obligations not identified in the other two categories for action (e.g. 'near threatened' category of the IUCN red-data criteria); and
 - communicating with the public - these are non-domestic species and habitats voted as being of importance to the Scottish public in 2005, and are designed to be used to inspire and engage the public on biodiversity conservation.
- 9.15 As a result, the habitats and species are listed on eight SBL schedules:
- Schedule 1 - on the UK BAP list;
 - Schedule 2 - are protected under an international obligation;
 - Schedule 3 - rare in the UK (less than sixteen 10km squares);
 - Schedule 4 - less than six Scottish 10km squares;
 - Schedule 5 - greater than 25% Scottish decline (over 25 years or other appropriate time period);
 - Schedule 6a - endemic to Scotland;
 - Schedule 6b - endemic subspecies/race (and must meet at least one other criterion); and
 - The Social Criteria List.

9.16 Table 9-2 provides a list of the national conservation policies relevant to the key protected species (or taxonomic group) considered in this assessment, along with a summary of the most recent assessments of species population trends.

Table 9-2
Summary of National Conservation Policy Status of Species Relevant to this Assessment

Species/Taxon	UK/Scottish Nature Conservation & Biodiversity Policy	UK / Scottish Trends
Badger	n/a	Not currently of conservation concern but they remain subject to human persecution and cruelty.
Bats (all native species)	UK BAP – Priority Species ⁱ Scottish Biodiversity List ⁱⁱ	Current UK assessment – ‘Favourable’ status (applies to all established species in Scotland with the exception of Nathusius’ pipistrelle the status of which is ‘Unknown’) ⁱⁱⁱ
Pine marten	UK BAP – Priority Species ⁱ Scottish Biodiversity List ⁱⁱ	Was once found throughout Britain, suffered dramatic declines during 19th Century. Since legal protection came into force in the 1980s, the population has made a significant recovery with an expansion south and eastwards from the core areas in the Northwest Highlands.
Red squirrel	UK BAP – Priority Species ⁱ Scottish Biodiversity List ⁱⁱ	IUCN Red List criteria ‘Near Threatened’, Scotland. Long-term decline in population size and range in the UK, strongholds are in highland and southern Scotland.
Reptiles	UK BAP – Priority Species ⁱ Scottish Biodiversity List ⁱⁱ	General long-term declines in all species present in Scotland.
Wildcat	UK BAP Priority Species ⁱ and the Scottish Biodiversity List ⁱⁱ .	IUCN Red List criteria ‘Critically Endangered’, Scotland. Species is extinct in England and Wales and vastly reduced distribution and population in Scotland from ‘historical’ levels (i.e. pre 20th Century). Recent assessments indicate that the population is at high risk of genetic extinction due to the effects of hybridisation with domestic / feral cats (IUCN 2019).
Water vole	UK BAP – Priority Species ⁱ	Very large declines in population size and range in the UK and Scotland in the 1980s and 1990s without recovery.

- i. *The UK List of Priority Species and Habitats was published in 2007 after adoption by the Governments of all four UK administrations as part of the UK contribution to the Convention on Biological Diversity (adopted at the Earth Summit in Rio de Janeiro, Brazil in June 1992). The ‘UK Post-2010 Biodiversity Framework’ succeeded the UK BAP in 2012 and set out the strategy for England, Wales, Scotland and Northern Ireland, and the UK as a whole, to meet internationally agreed biodiversity targets. However, the 2007 UK BAP priority species and habitats remain relevant as they still often form the basis for action in nature conservation / biodiversity policies.*
- ii. *The Scottish Biodiversity List is a list of flora, fauna and habitats considered by the Scottish Ministers to be of principal importance for biodiversity conservation. The publication of the Scottish Biodiversity List satisfies the requirements of Section 2(4) of The Nature Conservation (Scotland) Act 2004.*
- iii. *UK Conservation Status is derived from the 3rd UK Habitats Directive Report (JNCC 2013). This report considered the conservation status of all terrestrial and marine species listed under Annexes II, IV and V of the EC Habitats Directive present within the UK.*

- 9.17 This assessment also considers the potential implications of the proposed development on habitats of international, national or regional nature conservation/biodiversity value. For example, those listed in Annex I of Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora, including native woodland, blanket bog and dwarf shrub heath communities, bryophyte and sedge rich flushes, unimproved grasslands and calaminarian² grassland and heath communities. Also considered are other habitats of local importance highlighted for conservation action within the Local Biodiversity Action Plan.

Local Biodiversity Action Plan

- 9.18 Originally under the UK BAP, and now under the SBS, local authorities have a responsibility to produce their own list of priority habitats and species and associated actions for conservation. These are called Local Biodiversity Action Plans (LBAP). Aberdeenshire Council's Local Biodiversity Action Plan is incorporated into the North East Scotland BAP (2014-17) (Ref. 9.9). The LBAP outlines a vision for different habitats/landscape settings, incorporating a list of key species for each. Additionally, the Scottish Biodiversity List and the North East LBAP identify other locally important species that are considered to be rare or under threat at a local level. These species have also been taken into consideration, where relevant, in this assessment.

Aberdeenshire Local Development Plan

- 9.19 The Aberdeenshire Local Development Plan (LDP), adopted in April 2017 (Ref. 9.10), provides guidelines for development proposals in the Aberdeenshire Council area. The policies and Supplementary Guidance relating to the protection of the natural heritage and biodiversity which are potentially relevant to this assessment are listed below:
- Policy E1 Natural Heritage (nature conservation sites, protected species and wider biodiversity); and
 - Aberdeenshire Forestry and Woodland Strategy (April 2017).

Impact Assessment Guidance

- 9.20 The following guidance has been referred to and followed as appropriate for this ecological assessment:
- Chartered Institute of Ecology and Environmental Management (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland (Ref. 9.11).
 - Scottish Natural Heritage (SNH) (2018). Environmental Impact Assessment Handbook (Ref. 9.12).
 - Bats and Onshore Wind Turbines: survey, assessment and mitigation Version: January 2019 (Ref 9.13).
 - Scottish Renewables *et al*, Good Practice during Wind Farm Construction, 4th Edition (Ref. 9.14).

² A rare type of grassland vegetation that develop on soils that have a relatively high level of heavy metals (e.g. zinc, copper, lead, chromium). Typically, this community occurs on brownfield sites associated with past mining. However, natural examples can occur on in open vegetation on serpentine rock (as is found at Hill of Towanreef).

- SEPA (2017). Land Use Planning System SEPA Guidance Note 31 (LUPS - GN31) (Ref. 9.15).
- SNH (2016). Planning for development: What to consider and include in Habitat Management Plans. (Ref. 9.16).
- SNH (2018). General pre-application/scoping advice to developers of onshore wind farms (Ref. 9.17).
- Aberdeenshire Council (2005). Use of Wind Energy in Aberdeenshire Guidance for Assessing Wind Energy Developments (Ref. 9.18).

9.21 Additional reference material which is relevant to the assessment is referred to within the assessment text below as required.

SCOPE AND CONSULTATION

Consultation

- 9.22 Consultation with SNH was undertaken at various stages during the survey and assessment phases for the proposed wind farm. This included the required EIA Scoping process but also various meetings with SNH to discuss the approach to the EIA, including baseline survey methods and existing sources of data for the study area, to update on progress with surveys and wind farm design changes.
- 9.23 The potential for the proposals to affect wildcat and the approach to baseline survey and assessment for this species was also discussed in detail. SNH and Scottish Wildcat Action (SWA) were consulted in terms of requests for existing information on wildcat for the study area and in relation to the coordination of camera trap surveys. Camera trapping surveys were completed within the proposed development area during winter 2018-19 in co-ordination with similar wildcat monitoring undertaken by SWA in the wider Clashindarroch Forest. SWA and their partners provided data, from camera trapping and satellite tracking of individual wildcats, which has been invaluable in helping to characterise the current use of the proposed wind farm area by this species.
- 9.24 Further consultation with SNH and Forestry and Land Scotland (FLS) was undertaken during 2019 focusing on the assessment and mitigation of potential impacts on wildcat from the proposed wind farm, including potential long-term operational effects on habitat use. This consultation also included discussion of the appropriate approaches to minimise the risk of disturbance to wildcat and to their breeding sites or resting places during felling and construction works.
- 9.25 Following a wind farm re-design process, to allow for a taller model of proposed wind turbine, a second EIA scoping process was undertaken during 2018 (see below). Following this, further meetings were held during 2018 and 2019 with SNH and the Deveron, Bogie and Isla Rivers Charitable Trust to discuss the revised wind farm design and the proposed mitigation and monitoring measures.

Scoping

- 9.26 A scoping report, which included details of the proposed scope of, and methodological approach to, the assessment of effects on ecological receptors, was issued for consultation in March 2017. A formal Scoping Opinion was provided by the Scottish Ministers in July 2017. Following the wind farm re-design process an updated EIA scoping process was undertaken during 2018, under the

2017 EIA Regulations, with a new scoping report issued to consultees in October 2018. Responses to the scoping report were received from consultees in October and November 2018 and the formal response from Scottish Ministers in March 2019.

9.27 The full list of consultees along with a summary of the consultation responses received is provided in Chapter 6: Scoping and Consultation, and highlights the appropriate EIA Report Chapter which addresses each of the issues raised. The key issues regarding ecological receptors raised by the consultees and how they have been addressed in this assessment are provided in Table 9-3 below.

Table 9-3
Key Issues Raised During Scoping

Consultee	Summary of Key Issues Relevant to this Assessment	Where Addressed in Chapter
Aberdeenshire Council	<ul style="list-style-type: none"> • Potential impacts on Local Nature Conservation Sites (LNCSs) need to be addressed, in particular, the Craigs of Succoth, which is immediately adjacent to the proposed development Site. • The habitat management plan should include mitigation and habitat enhancement for wildcat, as well as identifying opportunities for the enhancement of biodiversity. • A forest design plan should be provided for areas of woodland clearance required for the scheme, particularly felling and restocking. 	<ul style="list-style-type: none"> • No direct effect is possible on any LNCS from the proposed development. • An outline HMP has been developed (see TA 9.5) • See TA 3.2.
Deveron District Salmon Fishery Board (DDSF) / Deveron, Bogie and Isla Rivers Charitable Trust	<ul style="list-style-type: none"> • A conditional objection was raised as the mitigation measures outlined in the document, for water quality and resident/migratory fish stocks and their habitats were not considered adequate. 	<ul style="list-style-type: none"> • An outline FMP has been developed in consultation with DBIRCT which sets out the proposed pre-construction, construction and post-construction fish and water quality monitoring (see TA 9.6).
Scottish Environmental Protection Agency (SEPA)	<ul style="list-style-type: none"> • Welcome the commitment to ensure that there is sufficient baseline data in place, including the recommended NVC survey buffer zones, to inform the assessment. • The Phase 1 and NVC surveys undertaken are the standard ones the range of surveys carried out is sufficient and appropriate subject to the above commitment. • There will be a need to assess whether the NVC community is a GWDTE. 	<ul style="list-style-type: none"> • Potential GWDTEs are shown on Figures 9.5a and b and are considered in this assessment and in Chapter 11: Hydrology

Consultee	Summary of Key Issues Relevant to this Assessment	Where Addressed in Chapter
Marine Scotland	<ul style="list-style-type: none"> • Site characterisation surveys of the Rivers Deveron and Bogie should be carried out within and downstream of the proposed development area, if desk study information is not up to date. This should include details of fish populations as well as water quality. • The EIA-R should include a Water Monitoring Plan, which includes monitoring plans for fish populations and water quality. • The potential impacts of felling, and the cumulative impacts on water quality and fish populations / passage within and downstream of the development area should be considered. • A restoration and decommissioning plan should be developed, which includes fisheries-related issues. • Site characterisation surveys should be carried out to determine fish diversity, water quality and macroinvertebrate composition. • Details of mitigation measures and monitoring programmes, to avoid and/or reduce potential impacts, should be provided in the ES. 	<ul style="list-style-type: none"> • Site characterisation surveys were carried out as part of the Clashindarroch wind farm post-construction monitoring and in agreement with DBIRCT these data are considered applicable to this assessment. • An outline FMP has been developed in consultation with DBIRCT which sets out the proposed pre-construction, construction and post-construction fish and water quality monitoring (see TA 9.6). • Potential impacts on fish populations from the proposed felling and construction works are considered in the construction effects assessment section of this Chapter. • Site restoration is set out within the draft CEMP document, see Appendix 3.1.
Scottish Natural Heritage (SNH)	<ul style="list-style-type: none"> • New bat survey guidance is due to be published and should be followed if published before the application is submitted (it will include transitional arrangements), in particular with reference to turbine lighting. • Welcomed the opportunity to discuss the approach to wildcat, mitigation and the Habitat Management Plan before the application is submitted. • Recommended that information from the operation of the existing Clashindarroch wind farm and its effect on wildcats is used to inform the EIA for this proposal. 	<ul style="list-style-type: none"> • The 2015 and 2016 bat activity surveys were completed before the current guidance was published (in January 2019). Further bat activity surveys have been completed during May to October 2019 and have been considered in the EIA (see TA 9.3) • There is no reference to wind turbine lighting within the 2019 bat survey guidance. A review of available literature, and guidance from other sources, has been completed to inform the assessment. • An outline HMP has been developed in consultation with SNH as is provided as TA 9.5. • All available information from the EIA, pre- and post-construction monitoring of Clashindarroch wind farm has been considered in the assessment.

Consultee	Summary of Key Issues Relevant to this Assessment	Where Addressed in Chapter
Scottish Badgers	<ul style="list-style-type: none"> Noted that there are sporadic live sightings recorded within the proposal Site. Recommended any badger surveys older than 3 months are renewed, owing to how quickly badgers can turn disused setts into ones in current use, or dig new setts. 	<ul style="list-style-type: none"> Badger surveys were completed during 2019 to ensure that there was a current and sufficient extent of survey data relevant to the proposed development and felling plans (as defined in August 2019). The results are summarised in this Chapter. Full details are included in a separate Confidential Annex to the EIA Report.

Effects Scoped Out

9.28 The designated sites nearest to the proposed development are Craigs of Succoth SSSI (Site of Special Scientific Interest) and Hill of Towanreef Special Area of Conservation (SAC) and SSSI, located 2.6km and 4.6km from the nearest proposed wind turbines respectively. None of the designated sites within 10km of the proposed development (i.e. including these sites and the River Spey SAC/SSSI) are hydrologically connected to the wind farm area and none are designated for mobile (non-avian) species, i.e. bats. As such, none of these sites are likely to be affected by the proposed development and the detailed consideration of the potential effects on any such designated site is therefore scoped out of this assessment.

9.29 Baseline surveys for the following species / taxonomic groups are not considered to be necessary to inform this impact assessment for the following reasons:

- Reptiles - current SNH guidance (Ref. 9.17) states that reptiles will not require surveys to inform the EIA as, with standard mitigation, they are unlikely to experience a significant environmental effect during construction/operation of onshore wind farms;
- Amphibians - surveys for great crested newt (*Triturus cristatus*) are not necessary as proposed development Site lies outside of the current known range of this species within Scotland. In addition, no potentially suitable breeding ponds were identified during the Phase 1 habitat survey in 2015. For other amphibian species, current SNH guidance is that surveys are not required to inform the EIA for onshore wind farms;
- Fish - annual electrofishing and fish habitat surveys have been carried out by the Deveron, Isla & Bogie Rivers Charitable Trust (the 'Trust') between 2011 and 2017 as part of the EIA process, pre-construction, construction and post-construction monitoring for the Clashindarroch Wind Farm. Due to the proximity of the proposed development to Clashindarroch Wind Farm all of the sub-catchments that could potentially be affected by the proposed development have been surveyed in detail by the Trust. It was confirmed at a meeting with the Trust in April 2019 that in view of the extensive existing fisheries dataset further baseline survey to inform the EIA process was not required; and
- Invertebrates - the findings of the desk study did not indicate that the proposed development area was likely to support any nationally rare invertebrates and/or priority species for conservation. Freshwater pearl mussel (*Margaritifera margaritifera*) populations, a critically endangered species which is legally protected, are not known to be present in any watercourses, within and downstream from the proposed development area, at potential

risk of impact from felling and construction works. Current SNH guidance states that invertebrates will not require surveys to inform the EIA as they are unlikely to experience a significant environmental effect during construction/operation of onshore wind farms.

Final Scope

9.30 Based on the results of the scoping process, other consultation, desk study and professional experience and judgement, this assessment therefore fully considers the potentially significant construction and operational effects of the proposed development on the following:

- areas of ancient woodland;
- habitats of conservation value such as those identified within the Local Biodiversity Action Plan and /or on Annex I of Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora, including native woodland, blanket bog and dwarf shrub heath communities, bryophyte and sedge rich flushes, unimproved grasslands and calaminarian grassland and heath communities;
- identification of habitats considered to be potential Groundwater Dependent Terrestrial Ecosystems (GWDTEs) as listed by SEPA (2017), as well as the risk of spread from any non-native invasive plant and animal species which may be present in the area;
- non-avian fauna ("protected species") subject to special legal protection, for example, through their inclusion on Schedule 5 of the Wildlife & Countryside Act 1981 (as amended), Schedule 2 of the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended), and the Badger Act 1992, specifically:
 - Badger (*Meles meles*);
 - Bats (all species);
 - Otter (*Lutra lutra*);
 - Pine marten (*Martes martes*);
 - Red squirrel (*Sciurus vulgaris*);
 - Water vole (*Arvicola amphibious*); and
 - Wildcat (*Felis sylvestris sylvestris*).
- salmonid fish species and associated freshwater ecology and habitats.

APPROACH AND METHODS

9.31 This section of the Chapter details the methods adopted to identify and characterise the sensitivity of the potential ecological receptors, from a combination of desk study and field survey. It also outlines the method followed in the assessment of potentially significant effects and the approach to the avoidance, reduction and offsetting of adverse effects on ecological receptors from the proposed development.

Information and Data Sources

9.32 For the purposes of the desk study process and for the various baseline surveys the following study areas have been defined:

- Wider Study Area – the proposed wind turbine area plus a 5km wide buffer (for statutory and non-statutory designated sites and requests for existing records to various data holders);
 - Core Study Area – the proposed wind turbine area and borrow pit locations plus a 500m wide buffer zone (within which the habitat and protected species surveys have been completed); and
 - Main access track – in addition to the core study area, various locations along the main access track have also been subject to targeted habitat and protected species surveys (e.g. at the proposed track improvement locations).
- 9.33 Details were obtained of all designated sites (local, regional, national and international) within the wider study area (i.e. 5km wide buffer around the wind turbine area).
- 9.34 As part of the initial desk study, relevant ecological data from published Environmental Statements (ES) from previous studies (for example, for the Clashindarroch Wind Farm) were also considered. Additionally, FLS were also consulted on any information they hold about protected and notable species and habitats within the wider study area including wildcat.
- 9.35 Details of international and national designated sites, such as SACs and SSSIs, were obtained through SNH’s Sitelink website (<http://www.gateway.snh.gov.uk/>) and associated GIS (Geographic Information System) data made publicly available by SNH.
- 9.36 The websites of Aberdeenshire Council (<http://www.aberdeenshire.gov.uk>) and SWT (<http://scottishwildlifetrust.org.uk>) were searched for details of any Wildlife Sites, Local Biodiversity Sites, LNRs, etc. within c. 5km of the Site boundary.
- 9.37 The SNH Ancient Woodland Inventory (Edition 3) was searched, using publicly available GIS data, to identify areas identified as ancient woodland, both semi-natural and those of plantation origin (areas that have been under continuous woodland cover since about 1750). Data from the Native Woodland Survey of Scotland, provided by the FCS (now Scottish Forestry), were also searched for any information relevant to the wider study area.
- 9.38 Following meetings with SNH in April 2016 a request was made for any detailed information on wildcat that SNH or SWA may hold for proposed development Site, which is located within the Strathbogie Wildcat Priority Area (WPA), particularly any information indicating the presence of any dens or other resting places within or near to the proposed development. SWA, in conjunction with WildCRU (Wildlife Conservation Research Unit of Oxford University Zoology Department), have generously provided available data from monitoring work in this area (including camera trapping, satellite tracking of cats with GPS collars and ad hoc observations between autumn 2013 and spring 2019).
- 9.39 In relation to fish populations, the Deveron, Isla & Bogie Charitable Rivers Trust (the ‘Trust’) have provided all of the electrofishing and fish habitat data relevant to this assessment from the extensive annual surveys they have completed for the Clashindarroch Wind Farm project between 2011 and 2017.
- 9.40 The following organisations were also contacted with requests for notable³ biological records for

³ 'Notable' in this context refers to species that have a conservation designation such as special legal protection status, or are listed in various international conventions, treaties or European directives. Additionally, those species which are considered rare or scarce (under national or international systems of categorising conservation status), that may be highlighted for conservation action in the UK Biodiversity Action Plan (BAP),

the proposed development area:

- North East Scotland Biological Records Centre (NESBReC);
- FCS (Now known as Forestry and Land Scotland);
- Scottish Badgers;
- Northeast Scotland Bat Group;
- North Aberdeenshire moth recorder;
- Butterfly Conservation (Aberdeenshire); and
- Botanical Society of Britain and Ireland (BSBI) Vice County Recorder.

9.41 NESBReC provides a comprehensive collation of biological datasets from individuals as well as various nature conservation organisations. It maintains quality assured records and acts as a hub for biological data exchange.

9.42 Any sensitive data (e.g. badger sett locations, wildcat related data) from the desk study or field surveys are included in a Confidential Annex to this Chapter which will be issued to SNH and the planning authority only and will not be made publicly available.

Field Survey

9.43 A range of ecological baseline surveys were undertaken by MBEC between May 2015 and October 2019. The surveys were initially for a larger wind turbine area than is currently proposed. The currently proposed wind turbines are located entirely within this larger area (see Figure 9.1). Further information on the evolution of the wind farm layout design is provided in Chapter 2: Site Description and Design Evolution. The proposed wind turbines, internal access tracks other infrastructure and borrow pits) and the relevant buffers zones are fully included within the current survey data. The survey areas are defined as follows:

- the Phase 1 habitat survey area included a 500m wide buffer around the Site boundary as it was defined in 2015. This fully encompasses the current wind turbine area. Further survey work was completed in summer 2019 to ensure that there was complete coverage of all elements of the proposed development and the necessary buffer zones;
- the NVC survey included a 250m wide buffer around the Site boundary, as it was defined in 2015 with additional survey completed in summer 2019 to ensure that there was complete coverage of all elements of the proposed development and the necessary buffer zones; and
- a suite of walkover protected species surveys were completed in 2015-16 within the Site boundary, as defined in 2015, with further surveys based on the evolving wind farm design, completed in 2017, 2018 and 2019.

9.44 The additional vegetation surveys in 2018 and 2029 were completed to ensure that NVC data was available to at least 250m from all wind turbines and all other relevant infrastructure.

9.45 Table 9-4 summarises the surveys which were undertaken between 2015 and 2019 and the methodologies used. All surveys were completed by suitably experienced ecologists following

the Northeast Scotland Local Biodiversity Action Plan (LBAP) or the Scottish Biodiversity List (SBL).

current best practice guidance on survey methods. Further details regarding survey methodologies are provided in relevant Technical Appendices to this Chapter (see Technical Appendices 9.1 - 9.6).

Table 9-4
Baseline Ecological Surveys Undertaken from 2015 to 2019

Survey Type	Date(s)	Methodology
Phase 1 habitats	Sep 2015	Survey based on standard JNCC methodology (Ref. 9.19). All habitats to within c. 500m of the proposed wind turbines (based on layout LCLON017, Pre-Scoping).
	Sep 2017	Survey of proposed borrow pits, temporary compounds, battery storage area, substation (including 250m wide buffer), all of which lay outside of the 2015 survey area.
	Aug 2019	Survey of proposed track improvements, all of which lay outside of the 2015 survey area.
National Vegetation Classification Surveys	Sep 2016	Survey based on standard methodology (Ref. 9.20). This survey covered the area within 500m of the provisional turbine layout under consideration at the time (i.e. Pre-Scoping).
	Sep 2017	Survey of proposed borrow pits, temporary compounds, battery storage area, substation (including 250m wide buffer), all of which lay outside of the 2015 survey area.
	Aug 2019	Survey of proposed track improvements, all of which lay outside of the 2016 survey area.
Bat Roost and Activity Surveys	Jun to Oct 2015, Apr to Aug 2016, May to Jul 2019	<p>2015-16 Surveys:</p> <ul style="list-style-type: none"> • an assessment of trees and structures for bat roost potential; • driven transect surveys on three dates each year; and • static automated recording using pairs of static detectors. Three survey periods of at least 5 nights in each year. <p>2019 Surveys: Additional bat activity monitoring commenced in May 2019 (methods following current guidance (Ref. 9.13)) in order to verify that the 2015-16 data remained accurate and ensure that the baseline data was relevant to the current proposed layout. Roost emergence surveys were completed during summer 2019 at a building within the core study area.</p>
Terrestrial Mammals (including badger, otter, pine marten, red squirrel, water vole and wildcat).	Sep 2015 Aug 2016 Sep-Oct 2017 Oct 2018 to Jul 2019	<p>Survey for badger, otter and water vole included all potentially suitable habitat within the survey area and took place in accordance with standard methodologies (Ref. 9.21, 9.22, 9.23).</p> <p>For pine marten, a general assessment of habitat quality was completed in accordance with Cresswell <i>et al.</i> (2012) (Ref. 9.24), along with a search for evidence of the presence of pine marten and potentially suitable den sites.</p> <p>For red squirrel signs of squirrel presence were searched for along walked transects. In addition, an assessment of habitat quality was made using Forestry Commission information and the classification used by Vattenfall (2009).</p> <p>For wildcat initial surveys completed in 2015 concentrated on identifying</p>

Survey Type	Date(s)	Methodology
		and assessing potentially suitable habitat and locating potentially suitable resting places (i.e. potential dens and other features that could be used by wildcat). In September 2016, further targeted surveys were carried out, based on information provided by SWA from GPS tracking studies. Further surveys, on all areas potentially affected by the emerging wind farm layout design and felling plans, were completed between Sep-Oct 2017 and Oct 2018 to Aug 2019, which also included baited camera trap monitoring and dusk surveys using thermal imaging equipment.
	Sep-Oct 2017 Aug 2019	Survey of proposed borrow pits, temporary compounds, battery storage area, substation and update survey of the proposed wind turbine area (including up to a 250m wide buffer). This survey was updated in August 2019 and also included the areas of proposed track improvements.

Assessment Methods

9.46 This assessment follows a standard, systematic approach to EIA which is informed by the best available scientific evidence and experienced professional judgement. Where there are uncertainties, reasonable worst-case assumptions are made to minimise the risk of effects being under-estimated. The assessment method follows guidance produced by SNH, SEPA and the Chartered Institute of Ecology and Environmental Management (CIEEM). Such as CIEEM's Guidelines for Ecological Impact Assessment in the UK (2018) and SNH's Environmental Impact Assessment Handbook (2018).

9.47 Ecological impact assessment is a process that can be summarised as a series of stages, as follows:

- identifying the ecological receptors that could be significantly affected by the proposals (effectively part of scoping);
- evaluating the 'importance' (i.e. importance for biodiversity/nature conservation at the relevant geographical scales, also referred to as receptor 'sensitivity') of the receptor informed by data from baseline surveys and other appropriate sources;
- identifying and systematically characterising impacts and their effects (wherever possible based on best available scientific evidence), noting any uncertainties and taking a precautionary approach as appropriate;
- incorporating measures to avoid and mitigate negative impacts and effects;
- assessing the significance of any residual effects after the proposed mitigation has been taken into account;
- identifying appropriate compensation measures to offset significant residual effects; and
- identifying opportunities for ecological enhancement.

9.48 In this Chapter, the terms 'impact' and 'effect' have the following meanings:

- Impacts - arise from the construction or operation/implementation of the proposals and result in a material change to a receptor; and
- Effects - are the consequences of the impact, which may be varied, for the ecological receptor under consideration.

Defining Receptor Sensitivity

- 9.49 The importance of each ecological receptor (also referred to as 'receptor sensitivity' in this assessment) can involve a wide range of factors (e.g. habitat naturalness, extent, quality, populations that are of conservation importance at various geographical scales, or at the edge of their natural range). In practice, conservation status and rarity are often the most important criteria to consider. Therefore, ecological receptor sensitivity is usually defined by rarity at different geographical scales (e.g. local, regional, national, international). This is also useful in placing the receptor in the context of nature conservation designations which tend to be selected and ranked according to the rarity of the qualifying species or habitats at different geographical scales, e.g. habitats or species that are rare at a global or European level are usually covered by European legislation and protected within designated sites such as SACs. Definitions of ecological receptor sensitivity are outlined in Table 9-5.
- 9.50 Where there is uncertainty about the accuracy of the available information used to inform judgements on receptor sensitivity a precautionary approach has been adopted to minimise the risk of under-valuing any receptor.

Table 9-5
Defining Ecological Receptor Sensitivity

Receptor Sensitivity	Definition
International	<p>Habitats or species that form part of the cited interest within an internationally protected site or candidate site (for example, Special Area of Conservation (SAC), Special Protection Area (SPA), or Ramsar site). This includes European protected habitats and species, and internationally important wetlands.</p> <p>A habitat or species which is either unique or sufficiently unusual (in terms of distribution and/or abundance) to be considered as being an area or population of the highest quality example in an international/national context that the site is likely to be designated as a SAC/SPA.</p>
National (i.e. at the Scottish or UK level)	<p>Habitats or species that form part of the cited interest within a nationally designated site (for example, a Site of Special Scientific Interest (SSSI) or a National Nature Reserve (NNR)).</p> <p>A habitat which is either unique or sufficiently unusual (in terms of distribution and/or abundance) to be considered as being one of the highest quality examples in a national context for which the site could potentially be designated as an SSSI. This includes Annex I habitats and UK BAP priority habitats.</p> <p>A population of a species which is either unique or sufficiently unusual (in terms of distribution and/or abundance) to be considered as being of nature conservation value at up to a country context. This includes European protected species, 'Nationally Scarce' species, and priority UK BAP species.</p>
Regional (i.e. Southern Scotland)	<p>Viable areas of internationally- or nationally-important habitats (i.e. Annex I habitats and priority UK BAP habitats) present in quality and extent at a regional (e.g. biogeoclimatic zone as partially defined by the SNH Natural Heritage Futures) level of importance.</p> <p>Sites supporting a regularly occurring, regionally significant number of internationally (or nationally) important species. This includes European protected species, 'Nationally Scarce' species and priority UK BAP species.</p>
Local (High)	<p>Sites that are a Local Nature Reserve or Wildlife Site.</p> <p>Sites containing viable area(s) of any priority UK BAP habitat or presence of species identified in</p>

Receptor Sensitivity	Definition
	<p>the UK BAP or Local BAP.</p> <p>Sites supporting viable breeding populations of species known to be Scottish Local Authority rarities and/or supplying critical elements of their habitat requirements.</p>
Local (Medium)	<p>Habitats which are not considered extensive and/or of good enough quality to qualify for non-statutory designation, but which provide locally important semi-natural habitats within an approximate radius of 15-20km from the Site.</p> <p>Populations of any species of conservation importance in the context of the local area within an approx. radius of 15-20km from the Site. However, any such population would not be of a significant number to deem it as being of 'regional' importance.</p>
Local (Low)	<p>Habitats which are not considered to qualify for non-statutory designation, but which provide locally-important semi-natural habitats in the context of the immediate surrounding area, such as species-rich hedgerows or small ponds.</p> <p>Populations of any species of conservation importance in the context of the immediate surrounding area.</p>
Negligible	<p>Commonplace habitat or species with little or no significance, the loss of which would not be seen as detrimental to the ecology of the area.</p>

Effect Characterisation

9.51 The overall character of an effect is a function of a wide range of variables acting on the receptor which include the following:

- Direction - whether the effect benefits (positive) or harms (negative) the receptor;
- Extent - the area affected or potentially affected by a particular impact (e.g. distance over which artificial lighting may affect bat behaviour);
- Magnitude - the amount of a habitat type or population affected (quantified, where possible, as the proportion of the receptor lost or affected);
- Complexity - relating to whether an effect is direct or indirect, proximal or distal, immediate or delayed;
- Reversibility - can the effect be reversed, within a reasonable timescale and with reasonable expectation of recovery, or is it permanent and irreversible;
- Frequency - is the effect acting constantly or intermittently (e.g. occasional noise disturbance in comparison to a longer-term change to the existing baseline levels of disturbance);
- Timing - is the effect occurring during a more or less sensitive period for the receptor (e.g. relative to the breeding season);
- Duration - the length of time that the effect is acting on the receptor, this may be longer than the associated impact is occurring for and may be short, medium, long-term or permanent (indicative periods for these categories are given in Table 9-6, in relation to faunal receptors duration may also be defined relative to the lifecycle of the species); and
- Confidence - certain/near certain (95% or greater chance of occurring), probably (50-95%), unlikely (5-49%) or extremely unlikely (<5%).

9.52 The overall effect level, considering all of the above factors, for each receptor is categorised for each phase of the proposed development (i.e. the construction phase, the operational phase and the decommissioning phase). To help illustrate this, summary descriptions of the various effect levels (primarily considering effect magnitude and duration) are provided in Table 9-6 below.

Table 9-6
Defining Effect Level

Effect Level	Description of the Resultant Effect on the Ecological Receptor
Total/Near-total	Would cause the loss of a major proportion or whole feature/population, or cause sufficient damage to a feature to immediately affect its viability.
High	Major effects on the feature/population, which would have a sufficient effect to alter the nature of the feature in the short-long term and affect its long-term viability. For example, more than 20% habitat loss or damage.
Medium	Effects that are detectable in short and long-term, but which should not alter the long-term viability of the feature/population. For example, between 10 - 20% habitat loss or damage.
Low	Minor effects, either of sufficiently small-scale or of short duration to cause no long-term harm to the feature/population. For example, less than 10% habitat loss or damage.
Negligible	Minimal change on a very small scale.
Duration definitions	Long-term (5 - 25 years or longer, and refers to operations). Short-term (<5 years, and refers to construction or decommissioning).

Effect Significance

9.53 Significance is a measure of the importance that should be given to an effect in relation to the consideration of appropriate mitigation and the overall environmental impact of the proposals and the planning process. Effects can be significant at a wide range of geographical scales (i.e. from the local level to effects that are of international importance for the receptor under consideration) but which result in important consequences for the functioning and/or conservation status of the receptor. In general terms, 'significance' is determined through the interaction between receptor sensitivity and the categorised effect level (i.e. taking into account effect extent, duration, reversibility, etc.).

9.54 Effect significance is reported in categories, from None to Major, through Negligible, Minor and Moderate. A matrix is provided as Table 9-7 to help illustrate how effect level and receptor sensitivity relate to judgements of effect significance. For the purposes of this assessment, effects are considered significant (i.e. 'significant' in terms of the relevant EIA Regulations and of key importance in terms of planning consent decision-making) if they are reported as Moderate or above.

9.55 Where significant adverse effects are predicted then mitigation measures are usually recommended, where feasible, in order to reduce effect severity. Mitigation measures are actions to prevent, reduce or ameliorate adverse effects on ecological receptors. This might include alternative construction methods, the timing of works and effective habitat restoration. In some cases, mitigation measures may also be specified where effects are not considered to be significant as part of a best practice approach to development. Following consideration of the proposed mitigation then the residual effect and significance is reported in the assessment.

- 9.56 In relation this proposal, appreciable reduction or avoidance in potential impacts has been achieved through the wind farm design process. However, as design changes are incorporated into the development at an early stage and are therefore not considered as mitigation measures in the context of the assessment of residual effects. How the development design considered ecological receptors in this process is provided in Chapter 2: Site Description and Design Evolution.
- 9.57 The process of determining the significance of an effect can be illustrated by a simple matrix which shows the interaction between receptor sensitivity and the magnitude of effect as illustrated in Table 9-7. In practice, the determination of significance involves the careful application of informed professional judgement and consideration of a range of parameters, as outlined above. If the likely effect is assessed as being moderate or above, the effect on the ecological receptor is judged to be 'significant'.

Table 9-7
Illustrative Matrix for Determining the Significance of Effect on Ecological Receptors

Receptor Sensitivity	Effect Level (significant effects in bold)				
	Total/Near-total	High	Medium	Low	Negligible
International	Major	Major	Major	Major - Moderate	Negligible
National	Major	Major	Major - Moderate	Moderate	
Regional	Major	Major - Moderate	Moderate	Moderate - Minor	
Local (High)	Major - Moderate	Moderate	Moderate - Minor	Minor	
Local (Medium)	Moderate	Moderate - Minor	Minor	Minor	
Local (Low)	Moderate - Minor	Minor	Minor	Minor	
Negligible	Negligible				

Mitigation & Residual Effects

- 9.58 Where potentially significant effects are predicted, mitigation measures have been recommended in order to reduce their severity. Mitigation measures are actions to prevent, reduce or compensate for any likely significant effect on ecological receptors. The impact assessment, therefore, considers the potential effects after mitigation measures have been outlined, in order to determine the significance of the residual effect.
- 9.59 The avoidance or reduction of impacts achieved through the wind farm design process is an important form of mitigation. These design changes are incorporated into the proposed development at an early stage and are therefore not considered as mitigation measures in the context of the assessment of residual effects. How the development design considered ecological receptors in this process is provided in Chapter 2: Site Description and Design Evolution.

Statement of Significance

- 9.60 At the end of the Chapter a statement of significance is provided. This is a summary of the complete assessment, taking into consideration any proposed mitigation measures, and reports the significance of the residual effects in compliance with the EIA Regulations (the residual assessment of the construction and operational effects are also summarised in Tables 9-14 and 9-15).

Cumulative Effects

- 9.61 The potential for cumulative impacts with other wind farm proposals has also been assessed where relevant. For (non-avian) ecological features cumulative impacts are only likely to be significant for other developments within the same hydrological catchment(s) or located within the regular range of more mobile species, e.g. bats. As such, the cumulative assessment has been restricted to other potential developments (including forest harvesting) within the same hydrological catchment, i.e. the catchment of the River Bogie. The assessment has included consideration of operational projects; projects under construction; consented projects which are not yet under construction; and projects for which planning applications have been submitted and for which ecological impact assessment information is available.

Assumptions, Limitations and Confidence

- 9.62 The baseline data collated to inform the assessment is considered to accurately represent the key habitats and species present and is sufficiently detailed and current to allow a realistic and reliable assessment of effects. Although it should be noted that there is the potential for the baseline situation to change with time, particularly in the context of the commercial conifer plantation where clear-felling inevitably results in rapid changes in habitat types and therefore suitability for certain protected species and their various habitat requirements (e.g. bats, pine marten and wildcat). Also, in the absence of evidence of the presence of a species (particularly rare and elusive species such as wildcat), it cannot be assumed, where suitable habitat is present, that the species is entirely absent or that the use of the area could not change in the future.
- 9.63 There is considered to be sufficient information available about the proposed development to base the assessment on, and where there is uncertainty realistic 'worst case' has been assumed, in order to avoid under-estimating the potential effects. The assessment of ecological impacts is subject to a number of generic limitations (i.e. limitations which apply to the ecological impact assessment process generally and are not specific to this assessment), which are highlighted and discussed in the relevant sub-sections of the assessment and Technical Appendices.
- 9.64 In relation to wildcat, as is the case for most terrestrial mammals (excluding bats), there is uncertainty around the potential long-term effects of wind farm development on the species. This is due to lack of published monitoring studies that have considered the issue in any detail. As a 'critically endangered' species in Scotland, a precautionary approach has been taken in both the assessment of effects and in determining the proposed suite of mitigation measures. The assessment has been informed by a review of available literature (e.g. relevant published wildcat research from Scotland and mainland Europe including monitoring studies associated with wind farms and other development projects such as roads) and all available wildcat data for the wider study area for the period winter 2013 to summer 2019.
- 9.65 There is the potential for sources of disturbance associated with the construction works for Clashindarroch wind farm to influence the use of the Site by some species (including wildcat).

However, Clashindarroch wind farm was largely operational during the 2015 to 2019 baseline survey period. Construction works were fully completed in spring 2015. Much of the targeted survey effort on wildcat was completed during autumn 2018 to summer 2019, more than three years after the wind farm became operational.

9.66 The following is a brief summary of limitations with respect to Site-specific constraints experienced during the baseline surveys:

- Access: areas of dense conifer plantation, windthrow and clearfell are problematic to survey on foot due to the ground conditions, density of the trees and risk to the surveyors from windthrow trees collapsing. Access to all of the survey area was therefore affected to some extent. However, all areas that could be safely accessed were surveyed, including clearfell where possible, and the perimeters of windthrow areas and dense stands of trees were surveyed from adjacent forest rides, tracks and accessible forest stands; and
- Disturbance: harvesting operations may have influenced the distribution of some protected species as a result of localised disturbance. Tree harvesting was being carried out in some parts of the survey area through the survey period. Disturbance from harvesting operations in the Oxter Burn area (north of proposed Turbine 8) and near Raven Hill (between proposed Turbines 3 and 13) may have affected use of these areas by some species, such as pine marten and wildcat, particularly during 2016 and 2018.

9.67 The density of trees within post-thicket conifer plantations also makes it difficult to locate red squirrel dreys and potential pine marten dens. It is possible that dreys and dens not situated close to rides, glades and forest edges were present and not recorded during the baseline surveys. For this reason, the assessment of the potential effects of felling and habitat loss on red squirrel and pine marten is informed by a systematic appraisal of forest habitat quality. The risk to red squirrel and pine marten (individuals and populations) from felling operations is one that FLS is experienced in managing and mitigating through their felling operations with Clashindarroch Forest and elsewhere on the Forest Estate. An approach to address the issue of the protection of red squirrel and pine marten during felling is outlined in the mitigation section of this Chapter and in Technical Appendix 9.4.

9.68 In relation to the bat detector surveys, it is also important to recognise the limitations of the data that these types of surveys provide. For example, automated bat detectors, in particular, do not provide information on the number of bats using a location. It is not possible to determine if a relatively large number of separate bat passes were made by the same individual circling the detector location or by a number of bats flying past. The data they generate gives an estimate of the level of activity only. Additionally, no bat activity monitoring at height was undertaken as part of the baseline surveys. The potential risk to bats flying within the height band that proposed wind turbine blades would be operating in has to be inferred from the collected ground-based data and reference to relevant information from published wind farm monitoring studies and other literature. Further discussion on the limitations of bat activity data is provided in Technical Appendix 9.3.

9.69 Due to the effects of hybridisation on the Scottish wildcat population, it is not possible to definitively determine the genetic status of individuals from images alone. DNA testing is required to confirm the extent to which an individual can be considered a hybrid. To address this issue a precautionary approach was taken in the assessment of wildcat pelage from the camera trap images. Also recognised in this assessment is the ongoing uncertainty about the genetic status of wildcats generally (i.e. whether there are any animals that could be considered 'true' wildcats

remaining). However for this study and assessment the data from all putative wildcats and known or suspected wildcat hybrids was treated as important and relevant in terms of informing judgements on the potential long-term use and importance of the area for the species during the 25-year life of the wind farm.

- 9.70 The relatively mild conditions during winter 2018-19 may have reduced the effectiveness of baited camera traps. This is due to wildcats potentially being less attracted to bait when there is good availability of live prey and thermoregulation energy demands are lower in comparison to cold winters. However, conversely, deep snow cover can also affect wildcat by hampering movement and prey capture.

BASELINE CONDITIONS

Study Area

- 9.71 The location of the proposed development is on the border of Moray and Aberdeenshire, approx. 6km south-west of the town of Huntly at an elevation of approximately 400m above sea level. The approximate centre of the proposed wind turbine area is at OS grid reference NJ 437 327. A map showing the location of the Site boundary, including the main access route from the public road and the various ecology survey areas are provided as Figures 9.1a-b. The wider study area for the identification of designated sites as potentially relevant receptors for this assessment is shown on Figure 9.2.
- 9.72 The Site of the proposed development is located within an extensive area of predominantly upland conifer plantation known as Clashindarroch Forest, managed by FLS. Clashindarroch Forest extends to 59km² in total and is dominated by non-native conifers such as Sitka spruce (*Picea sitchensis*), Norway spruce (*Picea abies*), hybrid larch (*Larix x eurolepis*), lodgepole pine (*Pinus contorta*) and Japanese larch (*L. kaempferi*) of various age classes and planted at typical commercial stocking densities.
- 9.73 The proposed development would be located in an area of commercial conifer plantation to the immediate north and east of the Clashindarroch Wind Farm (18 wind turbines, operating since early 2015) and would be located on ridges and spurs, encompassing an area (based on a line around the outermost proposed wind turbines) of approximately 546 hectares. Approximately 90% of the area is comprised of commercial non-native conifer plantation at various stages in the forestry rotation.
- 9.74 The proposed wind turbines are located towards the north-western edge of Clashindarroch Forest, at 350-400m above sea-level. To the west, at an elevation c. 500m, is the unplanted ridge of Grumack Hill which is comprised of open moorland habitats (i.e. dwarf-shrub heaths, and blanket bog vegetation). All of the proposed wind turbines are located in areas which are currently thicket or pole-stage conifer plantation, mostly comprised of Sitka spruce trees.
- 9.75 The forest is managed under commercial felling and re-stocking rotations. At the time of the surveys, during 2016-2019, a number of mature coupes were undergoing harvesting. However, within 500m of the wind turbines, the majority of the plantation is at high forest, pole or thicket stage. There are very limited areas of broadleaved plantation woodland composing less than 5% of the core study area. The Site is intersected by a number of minor watercourses with banksides vegetated with damp neutral grassland communities. There are some areas of moorland within the surrounding area (i.e. >500m from the proposed development) that have not been planted within conifers, the most significant of which is the dwarf shrub heath located at the western edge of

Clashindarroch Forest at Grumack Hill.

- 9.76 The proposed development Site is intersected by a number of minor watercourses with banksides vegetated with damp neutral grassland communities. There is some unplanted moorland within the survey area, the most significant of which is located at the western edge of the survey area, which includes the south-east slopes of Grumack Hill and the adjacent hill to the south-west.

Designated Sites

- 9.77 Sites designated for nature conservation, of importance at an international or national context, within 10km of the proposed development are shown in Figure 9.2. No such designated sites are located within the Site boundary. Brief details of sites within 10km, excluding sites designated solely for their ornithological interest (see Chapter 8: Ornithology) and sites designated solely for their geological interest (see Chapter 11: Hydrology, Hydrogeology and Geology), are provided in Table 9-8.

Table 9-8
Statutory Designated Sites within 10km

Site Name	Designation	Distance/Direction from Proposed Development	Reasons for Designation
Craigs of Succoth	SSSI	2.5km north of the nearest wind turbine. The Site application boundary is adjacent to this site, the main access track is c. 450m from the SSSI boundary at its closest point.	Calaminarian grassland and serpentine heath; and Subalpine flushes.
Hill of Towanreef	SAC / SSSI	4.2km south of the nearest wind turbine and 4.0km from the application boundary.	SAC - Alpine and subalpine heaths; blanket bog; dry heaths; grasslands on soils rich in heavy metals; juniper on heaths or calcareous grasslands; and marsh saxifrage (<i>Saxifraga hirculus</i>). SSSI - Calaminarian grassland and serpentine heath; marsh saxifrage; upland assemblage; and vascular plant assemblage.
Moss of Kirkhill	SSSI	9.3km east-south-east of the nearest wind turbine and 8.2km from the application boundary.	Basin fen.
River Spey	SAC / SSSI	9.4km west-north-west of the nearest wind turbine and 8.7km from the application boundary.	SAC and SSSI - Atlantic salmon (<i>Salmo salar</i>), Freshwater pearl mussel (<i>Margaritifera margaritifera</i>), otter, sea lamprey (<i>Petromyzon marinus</i>).

- 9.78 There are no local authority designated sites, such as Local Nature Reserves, Wildlife Sites or Local Biodiversity Sites (or similar), within or adjacent to the proposed development. The Clashindarroch Wind Farm ES (2009) refers to the 'Glenlivet, Glenfiddich and Cabrach Site of Interest for Natural Science', described as an extensive site that abuts the western boundary of the Clashindarroch Forest comprised of a complex mosaic of heather moorland and acid grassland. This site is within the Moray local authority area. There appears to be no information on the Moray Council website

about this designation and whether it is still recognised. However, no direct effects on the habitats within this area are possible from the proposed development.

- 9.79 Clashindarroch Forest is situated within the Strathbogie Wildcat Priority Area, which extends north of Huntly and eastwards over Gartly Moor (see Figure 9.2).
- 9.80 The Ancient Woodland Inventory (AWI) includes areas of current woodland that have evidence of continuous, or very close to continuous, tree cover from at least 1750 AD. There are a number of such woodlands in the wider area and one within the Site, as shown on Figure 9.2. The closest AWI site is unnamed, and it is identified as an ancient woodland of semi-natural origin. It occurs alongside the Dry Burn, c. 100m from the nearest proposed wind turbine. However, much of the AWI site appears to have been cleared of trees and there remains only a narrow strip of mature beech trees (*Fagus sylvatica*) along one bank of the watercourse.

Habitats

- 9.81 The following is a summary of key findings from the Phase 1 and NVC surveys completed. Further detail is provided in Technical Appendix 9.1. The mapped results of the Phase 1 habitat survey are shown on Figure 9.3 and the target notes are also provided in Technical Appendix 9.1. Table 9-9 provides details of Phase 1 habitat types recorded within 500m of the proposed wind turbines.
- 9.82 The Site is dominated by commercial conifer plantation, which comprises c. 90% of the area within 500m of the proposed wind turbines. In terms of broad age-class categories, this area is comprised of 6.1% clearfell / pre-thicket, 39.8% thicket, 12.4% pole-stage and 19.3% high forest (see Table 9-1.4 in Technical Appendix 9.1). This compares with figures for Clashindarroch Forest as a whole of 15.0% clearfell / pre-thicket, 26.3% thicket, 13.3% pole-stage and 18.3% high forest.
- 9.83 Within the area immediately around each of the proposed wind turbines (c. 100m), over 85% of the trees are Sitka spruce and over 95% of the combined area is currently categorised as thicket (63%), pole (10%) or high forest (24%).
- 9.84 The plantation is intersected by a number of minor watercourses which typically flow through corridors dominated by damp neutral grasslands. In a number of areas, these riparian zones have been planted with native broadleaf trees. In some of the higher-lying and open unplanted areas, where there is some accumulation of peat and the ground is less suitable for forestry, there are small areas of dry and wet heath, as well as an area of wet modified bog. These areas have been completely avoided in the proposed development layout. Generally, across all open areas of the Site, there is encroachment by self-seeded Sitka spruce.

Table 9-9
Extent of Phase 1 Habitats within 500m of the Wind Turbines

Phase 1 Code	Habitat Type	Area (ha)	% Cover
A122	Coniferous plantation woodland	429.10	80.32
A42	Recently felled coniferous woodland	34.86	6.52
A112	Broad-leaved plantation woodland	27.08	5.07
B21	Unimproved neutral grassland	16.53	3.09
A132	Mixed plantation woodland	11.48	2.15

Phase 1 Code	Habitat Type	Area (ha)	% Cover
E17	Wet modified bog	5.67	1.06
D5	Dry heath / acid grassland mosaic	3.91	0.73
D11	Acid dry dwarf shrub heath	2.00	0.37
D2	Wet dwarf shrub heath	1.51	0.28
A131	Mixed semi-natural woodland	1.16	0.22
B22	Semi-improved neutral grassland	0.72	0.13
C31	Tall ruderal	0.24	0.04
J36	Buildings	0.01	0.00
Total		534.26	100.00

9.85 Table 9-10 provides details of NVC communities and Phase 1 habitat types recorded within 250m of the proposed turbines (see also Figure 9.4). The survey area contains relatively small areas of the NVC community MG9 *Holcus lanatus* - *Deschampsia cespitosa* grassland, which has moderate potential to be groundwater dependent according to current SEPA guidance (SEPA 2017). No NVC communities considered to be highly groundwater-dependent were recorded near to the proposed permanent works. At the proposed temporary construction compound (close to the northern edge of Clashindarroch Forest and adjacent to the existing wind farm main access track) there was an area of M23a *Juncus acutiflorus*-*Galium palustre* rush-pasture, which is considered to be moderately groundwater-dependent in this context.

Table 9-10
Extent of NVC Communities and Phase 1 Habitats within 250m of the Wind Turbines

NVC Community / Habitat Type	Area (ha)	% Cover
Coniferous plantation woodland	219.74	85.06
Broad-leaved plantation woodland	10.16	3.93
Recently felled coniferous plantation	9.19	3.56
MG9 (<i>Holcus lanatus</i> - <i>Deschampsia cespitosa</i> grassland)	7.94	3.07
Track, bare ground	5.24	2.03
Mixed plantation woodland	3.34	1.29
H9 (<i>Calluna vulgaris</i> - <i>Deschampsia flexuosa</i> heath)	1.30	0.51
M19 (<i>Calluna vulgaris</i> - <i>Eriophorum vaginatum</i> blanket mire)	0.65	0.25
Other habitat	0.42	0.16
OV25 (<i>Urtica dioica</i> - <i>Cirsium arvense</i> community)	0.24	0.09
H12 / U2 (<i>Calluna vulgaris</i> - <i>Vaccinium myrtillus</i> heath / <i>Deschampsia flexuosa</i> grassland)	0.11	0.04
Total	258.34	100.00

- 9.86 The M19 *Calluna vulgaris* – *Eriophorum vaginatum* blanket mire relates to an area referred to on the OS map as ‘The Lumps’. This is a relatively small pocket of remnant bog vegetation located within the conifer plantation that has not been planted with trees.

Protected and Notable Species

Desk Study Information

- 9.87 The following is a summary of information from various desk studies to collate and review existing notable species records for the wider study area. Further details of the non-confidential findings of the desk study for protected and notable species is provided in Technical Appendix 9.2.
- 9.88 Protected species surveys completed for the Clashindarroch Wind Farm EIA recorded the presence of a number of protected species within the survey area, which overlaps with the survey area for the proposed development. Badger evidence was noted within the survey area and several setts were recorded (see Confidential Annex for further details). Pine marten were confirmed as being present within the study area for that assessment although no dens were found near to the proposed development. A potential otter holt and two lying-up areas were found, although no definitive evidence of the species was recorded. No definitive signs of wildcat were found and no potential den sites were recorded within the proposed development survey area. Red squirrel transects did not reveal any squirrel activity, two incidental sightings of red squirrel were made. No evidence of water vole was recorded.
- 9.89 The 2009 ES for Clashindarroch Wind Farm reported that there had been 11 wildcat sightings within the Clashindarroch Forest by FLS Staff between 1999 and 2003, with only one of these being within the Clashindarroch wind farm boundary, at Cloichedubh Hill.
- 9.90 In addition, the 2009 ES reported that the surrounding area is known to support adder, brown long-eared bat (*Plecotus auritus*), common pipistrelle bat (*Pipistrellus pipistrellus*), brown hare (*Lepus europaeus*), mountain hare (*Lepus timidus*), red deer (*Cervus elaphus*), roe deer (*Capreolus capreolus*) and wildcat. The desk study for this assessment did not reveal any records of bat roosts from within the wider study area (i.e. c. 5 km of the proposed wind turbine area)
- 9.91 The 2009 ES also reported records for the following plant species included on the Scottish Biodiversity List (Ref. 9.8: harebell (*Campanula rotundifolia*); juniper (*Juniperis communis*); and Scots pine (*Pinus sylvestris*), plus the fungi (*Cortinarius limonius*).
- 9.92 A survey for water vole was carried out in 2017. Water vole were found to be present both in the south-west of Clashindarroch Forest and at Coynachie in the north. DBIRCT monitor and remove American mink (*Neovison vison*), an invasive non-native predator of water vole, from the main watercourses in Clashindarroch Forest.
- 9.93 The proposed development is situated within the Strathbogie WPA, which extends north of Huntly and eastwards over Gartly Moor (see Figure 9.2), a total area of 37,460 ha (374.6 km²) of which 11,068 ha (110.7 km²) is considered to be high-quality wildcat habitat. Camera trapping surveys of the proposed WPA during autumn 2013 recorded four wildcats and three hybrids (Littlewood *et al.* 2014 (Ref. 9.25). Based on an analysis of the results of more recent winter camera trap surveys, during winter 2017-18, it has been estimated that Strathbogie WPA supports a minimum of 6 wildcats along with 22 un-neutered hybrids (Breitenmoser *et al.* 2019 (Ref. 9.26). The density of wildcats within the Strathbogie WPA has been estimated at 1.2 per 100km². This compares to

estimates for the other four WPAs of 0.7 (Morvern); 1.6 (Northern Strathspey); 4.9 (Strathpeffer); and 3.7 (Angus Glens).

- 9.94 Clashindarroch Forest has the potential to support up to 9 female wildcats, based on a potential average territory size of 6km². The size of male territories, indicated from satellite tracking of wild-living cats (that is, wildcats as well as hybrids) within the wider area in 2015, are generally much larger than this, estimated to be in the region of 19-27km². Although Clashindarroch Forest is not a large enough area on its own to support a viable wildcat population, in the context of the estimated remaining wildcat population in Scotland, and taking into consideration the current and potential future importance of this area for the species, this area is considered to be nationally important for the species.
- 9.95 SWA and WildCRU have provided data for the wider study area from camera trapping surveys and from several wildcats / wildcat hybrids that have been fitted with GPS collars between 2013 and 2018. This data is sensitive and has not been reproduced within the EIA Report. The key findings relevant to this assessment are discussed within the section summarising the baseline data for wildcat in this Chapter.

Field Surveys

- 9.96 The non-confidential results of the protected species baseline surveys are provided in Technical Appendix 9.2. The following is a summary of key findings for each relevant species.

Badger

- 9.97 One badger sett (outlier) was found within 250m of the proposed development (i.e. the wind turbine envelope) during surveys completed in 2018. Another inactive sett was found during the 2015 surveys and is located >500m from the proposed development. Badger are likely to be active in and around the general Site area, particularly in the more mature and open plantations and the farmland fringes of the Site, where suitable foraging habitat is present.
- 9.98 The full results of the findings from the badger surveys are provided in the Confidential Appendix to this Chapter.

Bat Species

- 9.99 The results of the bat roost assessment surveys are provided in Technical Appendix 9.2 and the bat activity surveys in Technical Appendix 9.4. The following text provides a summary of the key findings for the surveys completed between 2015 and 2019.
- 9.100 The majority of survey area is comprised of densely stocked conifer plantation which is generally of relatively low quality as bat foraging habitat. However, within the survey area there are better quality habitats associated with the plantation edges and riparian zones. Large areas of clear-fell and exposed moorland areas such as Cloichedubh Hill, which have some connectivity through rides and across the existing wind farm site to other areas of upland moorland, are considered to provide low-quality foraging habitat although such open areas can be used by bats on calm and warm nights.
- 9.101 The static automated bat detector surveys recorded at least four species of bat: common pipistrelle (56% of bat passes in 2015, 65% in 2016 and 59% in 2019); soprano pipistrelle (44% of bat passes in 2015, 35% in 2016 and 39% in 2019); and comparatively low levels of recorded activity by *Myotis*

bats (most likely Daubenton's but also possibly Natterer's bats, *M. daubentonii* or *M. nattereri*) and brown long-eared bat in all years. Levels of activity were generally much lower in open areas, e.g. clear-fell and pre-thicket areas and open moorland (i.e. areas most representative of proposed turbine locations), compared to locations near to watercourses and forest edges.

- 9.102 Typically, bat activity data is high variable (e.g. when comparing bat passes per night between nights and locations), ranging widely in response to a number of factors including: weather (particularly wind speed and air temperature); proximity to roost sites; proximity to water and edge habitat features; and time of year. This makes it difficult to compare data between sites and to quantify the risk to bats in wind farm EIA, although various recently published studies have helped considerably with such assessments (e.g. Lintott *et al.* 2016, Mathews *et al.* 2016, and Richardson *et al.* 2019). Table 9-11 provides a summary of the bat activity survey data in the form of nights of comparatively 'high', 'moderate' and 'low' levels of activity based on the output from the Mammal Society Ecobat website [www.ecobat.org.uk]. This online data processing tool allows the comparison of bat activity survey data with similar data collected from other surveys in the same region. This helps to provide some level of context for the results, i.e. whether activity levels are relatively high, moderate or low in comparison to the reference dataset.

Table 9-11

Summary of Ecobat Analysis for Bat Activity Data 2015, 2016 and 2019

(MYsp = Myotis species, PIPi = common pipistrelle, PIPY = soprano pipistrelle, PLAUR = brown long-eared bat)

Species/Genus	High Activity	Moderate/ High Activity	Moderate Activity	Low/ Moderate Activity	Low Activity
MYsp (nights)	0	1	1	16	61
MYsp (% total nights)	0.0	1.3	1.3	20.3	77.2
PIPI (nights)	72	93	121	98	141
PIPI (% total nights)	13.7	17.7	23.1	18.7	26.9
PIPY (nights)	40	65	59	67	129
PIPY (% total nights)	11.1	18.1	16.4	18.6	35.8
PLAUR (nights)	0	0	0	1	19
PLAUR (% total nights)	0.0	0.0	0.0	5.0	95.0

- 9.103 Locations where comparatively high levels of activity were recorded (i.e. >80% of comparison records) were frequently recorded (i.e. >10 nights in total) are highlighted on Figure 9.12 for 2015, Figure 9.13 for 2016 and Figure 9.14 for 2019 data. All of these locations are associated with forest edges and/or riparian zones.
- 9.104 For all species, most of the recorded nightly activity was classified as being at 'moderate' levels or below (i.e. 98.8% of Myotis activity, 68.7% of common pipistrelle activity, 70.8% of soprano pipistrelle activity and 100% of brown long-eared activity). Where high / moderate-high levels of activity were recorded these tended to be at locations associated with forest edges or near to watercourses. In 2019 there were 3 nights with high levels of activity by common pipistrelles recorded in 'open habitat' locations (i.e. not at forest edges), this represents 4.2% of all of the nights

of high activity during 2019. Both of these locations (G and I) were near to watercourses (see Figure 9.11).

- 9.105 Roosting opportunities across the survey area were generally lacking, due to the dominance of the densely planted Sitka spruce plantation (c. 90% of the survey area), which due to the age of the trees do not typically provide suitable features for roosting bats. Semi-mature common beech (*Fagus sylvatica*) trees within the western central section of the survey area, along the Dryburn and associated with the AWI site, that had been initially considered as having some roost potential were inspected in detail 2016 and again in 2019. No potential roost features were recorded. A line of mature sycamore (*Acer pseudoplatanus*) trees that had been recorded as offering some potential suitability for bat roosting in 2015 were not inspected in detail due to their location, being c. 1.25km from the nearest proposed wind turbine and well outside of the proposed felling area.
- 9.106 Four structures within the survey area appeared to provide features that could potentially support a bat roost: the derelict building Corrydown, which had multiple access points into the roof space and cavities via doorways, windows and areas of collapse; a concrete bridge beneath the track at the south-eastern end of the survey area, close to Wormy Hillock, which may have had suitable access points and was within an area of reasonable quality foraging habitat; and the ruins of two buildings at the southern end by Old Forest, which were reduced to standing walls that had a number of potential access points.
- 9.107 The bat roost surveys in 2017 and 2019 at the ruined cottage at Corrydown confirmed that the structure is used by small numbers of common pipistrelle (*Pipistrellus pipistrellus*) as a summer roost (<5 bats), and the surrounding forest edges and nearby riparian corridor are used as a foraging area. This is assumed to be a non-breeding summer roost, likely occupied by male bats.

Otter

- 9.108 A single otter resting place was found on the Ealaiche Burn during the 2015 surveys, this was located more than 500m from any part of the proposed wind farm infrastructure (see Figure 9.7). Other evidence of otter recorded included two spraints and an otter slide. With the exception of the locations of the proposed access track, upgrades at several existing watercourse crossings the majority of the habitats which would be directly affected by the construction of the proposed development are unsuitable for otter.

Pine Marten

- 9.109 Overall habitat quality was rated as 'moderate' for pine marten within the survey area. There were no confirmed pine marten dens recorded during the surveys, but a number of potentially suitable features were found (see Figure 9.9). There are a number of features within c. 200m of some of the proposed wind turbines (e.g. old log-stacks, holes under old tree stumps, exposed root plates, brank tangles in wind-throw areas). Such features are common throughout the survey area and the wider Clashindarroch Forest. No particularly suitable elevated features were found within the forest during the survey, suitable tree holes are generally absent from the conifer plantation due to the relatively young age of the trees. The derelict cottage at Corrydown has the potential to be used by this species and could be suitable for a breeding female. There was no evidence of the use of these features during the baseline surveys, but this could change with time.
- 9.110 There were several sightings of adult pine marten on tracks and numerous records of probable pine marten scats across the survey area, usually on the edge of forestry. During the winter 2018-19 baited camera trapping for wildcat, pine marten were recorded at most of the camera traps (32 of

the 39 locations), including all of the locations within the existing wind farm. The evidence indicates that the survey area as a whole supports a good density of pine marten.

Red Squirrel

- 9.111 The survey area contains habitats ranging in their suitability for red squirrel from optimal to habitat of little or no value (see Figure 9.8). The method of assessment of habitat quality for red squirrel is detailed in Technical Appendix 9.2. In summary, densely planted, even-aged and relatively young stands of Sitka spruce, typical of commercial conifer plantations, are considered to be sub-optimal habitat. Mature and thinned stands of larch, Scots pine and Norway spruce are considered to be particularly important for red squirrel within Clashindarroch Forest (FLS 2019⁴).
- 9.112 Of the 14 proposed wind turbine locations, 9 are located in habitats of 'Poor' habitat quality for red squirrel. Four are within 'Moderate' quality habitat and one is on the edge of 'Optimal' quality habitat. The evidence from the walkover surveys indicates that the habitat suitability assessment is fairly accurate in terms of where evidence of the presence of squirrels was recorded.
- 9.113 Within 500m of the proposed development, the main red squirrel evidence was found in the pole-stage plantation at Red Hill, close to proposed turbine 1 (see Figure 9.7), and in the mature plantation along Dry Burn, between proposed turbines 3 and 7.
- 9.114 Concentrations of red squirrel feeding remains were found during 2019 in the Corshalloch area, along the main access south of the proposed substation within pole-stage and high forest.
- 9.115 Other concentrations of red squirrel feeding remains were found within pole-stage and high forest further south along the main access, at The Grains, Craigend Hill (proposed borrow pit area), Killin Burn and Little Black Hill.
- 9.116 The camera traps recorded 29 visits by red squirrel in total, at five of the 39 camera locations. The cameras that recorded red squirrels were: camera 1, in high forest, south of the proposed borrow pit area between Craigend Hill and Killin Burn; cameras 2, 3 and 31, all east of Red Hill close to proposed turbine 1; and camera 14, close to proposed turbine 4, in an area of pole-stage plantation where evidence of red squirrel had not previously been recorded, but is classed as 'Moderate' habitat quality for the species.

Water Vole

- 9.117 No evidence of the presence of water vole was found during surveys carried out in 2015 and 2016. There is limited potentially suitable habitat for this species within the Site (e.g. wet grassland along the slower flowing sections of the Bogrotten Burn). Most of the habitats associated with the minor watercourses that could be affected by the proposed development were not considered to be particularly suitable for the species, lacking the preferred slow-flowing relatively deep water sections, suitable aquatic and riparian vegetation and soft banks for burrowing without dense tree cover.

⁴ Clashindarroch Land Management Plan (July 2019).

Wildcat

Summary of Camera Trapping Results (2018 - 2019)

- 9.118 A camera trap survey was completed by MBEC within the wind farm core study area from October 2018 to July 2019 (further detail is provided in Technical Appendix 9.2). It was agreed in advance with SWA that MBEC would avoid repeating camera trapping effort in the same locations that SWA planned to use in Clashindarroch 2018-19 and there would be an exchange of data as the season progressed. The results from the SWA 2018-19 survey have not been processed so are not available at the time of writing. The cameras deployed by MBEC were focused on potentially suitable locations for wildcat near to the proposed wind turbine positions rather than on main riparian corridors and forestry tracks.
- 9.119 A total of 33 wildlife camera traps (baited during the winter months) were set-up within the core study area following the same deployment protocol used by SWA/FLS (i.e. as advised by Dr R. Campbell, based on the method set out in Kilshaw *et al.* 2015). All of the camera traps were located near to features that may be used by wildcat (such as forest / grassland edges, rides, forest tracks and deer trails) as close as possible to the proposed wind turbine positions. Additionally, 6 camera traps were positioned within the existing Clashindarroch Wind Farm area (see Figure 9.10).
- 9.120 A combined total of 5,137 trap nights were completed in total across the 39 camera traps deployed from October 2018 to July 2019 (trap nights per camera averaged 131.7, ranging from 7 to 279). Further details on the deployment dates, trap nights for each of the locations and the species captured is provided in Appendix 9.2. No confirmed wildcat images were captured during this survey. Two previously trapped and neutered male hybrid wildcats (confirmed by Dr R. Campbell, SWA), possibly the same individual, were recorded at two locations in November and December 2018. One was within Clashindarroch Wind Farm (along the Craig Water, c. 250m from the nearest operational wind turbine) and other in the Corrydown area, within c. 150m of a proposed wind turbine.

Walkover Surveys and Dusk Transects

- 9.121 Walkover surveys to search for and record features potentially suitable for wildcat as dens or other resting places (e.g. brash piles, old log stacks, rock piles, windthrow areas) were completed in 2015, 2016 and 2019 (see Technical Appendix 9.2 for further details). No definitive evidence of use of any of these features by wildcat were recorded during these surveys. This was not unexpected due to the highly elusive nature of the species and its relative scarcity. A number of scats were recorded on forestry tracks that were potentially from wildcat. However, reliable identification of wildcat and fox scats is difficult without DNA analysis. No den sites were found but some of the areas did have features such as sections of windthrown trees, which provide dense cover which could be used by a wildcat to rest above ground. All areas of windthrow, brash and log piles, which may be potentially suitable for wildcat, were searched for and mapped within the survey area (see Figure 9.9).
- 9.122 Foraging habitat was largely restricted to the main riparian zones, where conifers had not been planted up the edge of the watercourses and there was neutral and marshy grassland communities present, as well as a few areas of recent clearfell.
- 9.123 From November 2018 and July 2019, a total of 9 x c. 2-hour dusk transects were also completed within the core study area (see Technical Appendix 9.2 for further details). The surveyors, aided with a thermal image camera, used suitable vantage points to watch over potential den / daytime resting places within the proposed wind farm area. Due to the type of technology that the cameras

use the quality of the images is not suitable for pelage scoring, therefore it is not possible to identify potential wildcats from hybrids or feral cats. No potential wildcats were seen within the survey area during this period. One large cat was observed well to the east of the core study area on one occasion.

Summary of Satellite Tracking Results

- 9.124 In addition to the 2015-18 camera trap results, SWA also provided data from a male hybrid wildcat that had been trapped and fitted with a GPS collar during winter 2013-14. This cat (SBO-CA) was successfully tracked for 98 days and ranged over an area estimated to be 27.4km² (Campbell 2015). Consistent with the camera trap studies, this cat when it entered the core study area appeared to prefer riparian zones (particularly forestry tracks along the Ealaiche Burn, Bogrotten Burn and the upper reaches of the Burn of Brockholes) but spent the majority of tracking period to the south and east of the wind farm. Appearing to favour clearfell areas or more open mature plantation, woodland edges, gorse scrub, fields (particularly field boundaries) adjacent to the forest edge or woodland patches (shelterbelts, copses) and appearing to favour dens sites near to farm buildings (94% of location fixes were in a farm yard and adjacent fields).
- 9.125 The SBO-CA data included some locations near to the proposed development where the cat had been stationary for extended periods, indicating the potential locations of resting places (e.g. dens or daytime lying-up areas). These locations were carefully searched for and checked by ecologists, with a wildcat survey license, during September 2016. No potentially suitable den sites were found but some of the locations did have areas of windthrow, which provide good cover and could be used by a wildcat for shelter from the weather or to rest during the day. Most of these locations are more than 500m from the nearest proposed wind turbine. One location is c. 250m from the nearest proposed wind turbine and c. 340m from the nearest existing wind turbine.
- 9.126 During the winter 2018-19 SWA, in partnership with WildCRU, attempted further live trapping of cats within Clashindarroch Forest. Three adult wildcats were successfully trapped and fitted with GPS collars, a female and two males. This was thought to be 3 of the 4 potential wildcats SWA were aware of as present in the southern Clashindarroch Forest at that time (Dr R. Campbell, pers. comm). The full results of this study have yet to be published but some of the raw data has been made available to MBEC by Dr Kerry Kilshaw (WildCRU). The initial results appear to be consistent with the previous GPS tracking data for the wider study area and the findings from the MBEC camera trap survey during the same period, indicating infrequent use of areas near to the proposed wind turbines, in comparison to the wider study area, and a preference for riparian corridors when present in the core study area. Similarly to SBO-CA, a high proportion (c. 85%) of location fixes, for all of the data combined, were outside of the forest (i.e. outside the Clashindarroch Forest boundary). One of the male wildcats visited the southern part of the core study area, apparently using forestry tracks along the Bogrotten Burn and Craig Water areas.
- 9.127 It is not possible to conclude that there are were no wildcats present within the wind farm study area during this period and which could have been active in the core study area. As stated above, there was at least one potential wildcat active in the area that was not trapped and fitted with a GPS collar. However, the general pattern of recorded wildcat ranging activity, location and habitat associations, was broadly consistent with previous GPS tracking studies and with the available camera trapping results.
- 9.128 The recorded activity by the female, available at that time, was all well outside the proposed development area. She was mostly active outside the forest or when within areas of Clashindarroch Forest generally closer to farmland around the fringes of the plantation to the south and east of the

proposed development, including areas of clearfell and re-stock plantation. It is not known at this time if this female was pregnant or raised any young during the period the GPS tracking data covers.

Conclusions

- 9.129 The proposed development core study area overlaps with the territories of several wildcats / wildcat hybrids, estimated at up to 5 individuals. The combined evidence from camera trapping and tracking of GPS collared wildcats indicates very infrequent use of the forest blocks where the wind turbines are to be located. The wind turbines are within thicket and pole conifer plantation, which provides poor foraging habitat for wildcat. Camera trapping across the core study area during 2018-19 failed to record any wildcats active near to the proposed wind turbine locations. The recorded activity has been focused on forestry tracks and rough grassland habitats adjacent to the main watercourses within the core study area, particularly near Corrydown and along the Bogrotten Burn.
- 9.130 Areas of windthrow, old brash piles and log stacks located in the less disturbed parts of the core study area may provide suitable resting places for wildcat. It is difficult to definitively confirm the absence of resting places due to a large number of potentially suitable features present (e.g. brash piles, old log stacks, windthrow) and because wildcats may avoid leaving clear signs of their presence. However, no confirmed or suspected wildcat dens have been found within the survey area to date.
- 9.131 Of the four wildcats / hybrids that GPS tracking data is available for (3 males and 1 female) the core study area does not appear to be located in well-used parts of their territories. Based on the available survey data, and what is generally understood about wildcat behaviour and habitat preferences, the habitats where the wind turbines are proposed are currently considered to be of relatively low quality, particularly in terms of prey availability, in comparison to areas located at lower elevations and closer to farmland fringing the southern and eastern edges of the forest⁵. It is also considered unlikely, based on the currently available data and the habitat assessments, that the wind farm area would currently provide sufficiently prey-rich habitat, combined with the range of suitable near-by undisturbed denning opportunities, required to support a breeding female.

Fish and Fish Habitats

- 9.132 The proposed development is located within sub-catchments of the Water of Bogie / River Bogie, which joins the River Deveron just to the north of Huntly.
- 9.133 Both River Deveron and River Bogie support prolific populations of migratory salmonid and provide popular recreational fisheries of importance both regionally and within the national context of Scotland. The fisheries are also visited by overseas anglers that provide contributions to the local tourist industry. The river systems are of statutory regulated fish conservation value as they support populations of Atlantic salmon and brook lamprey (*Lamptera planeri*).
- 9.134 The upper reaches of the River Deveron and Bogie catchments support populations of migratory salmonids Atlantic salmon and sea trout, (*S. trutta*) non-migratory trout, the brown trout, and diadromous species such as the European eel (*Anguilla anguilla*). There are also species that have no angling or commercial value but are of conservation interest, including brook lamprey, three-

⁵ In general, less elevated areas with a connected mosaic of habitats (mix of woodland and grassland), abundant prey (rabbits and rodents), shelter and dens have been identified as priorities for wildcat conservation (Silva *et al.* 2013, Kilshaw *et al.* 2016).

spined stickleback (*Gasterosteus aculeatus*) and non-native minnows (*Phoxinus phoxinus*).

- 9.135 Salmonid fish population and habitat quality surveys were completed by DBIRCT over 7 years, from 2011 to 2017, at 21 sampling sites as part of the monitoring programme for the construction of Clashindarroch wind farm. The survey methods followed best practice guidance published by the Scottish Fisheries Coordination Centre (2007). It was agreed during the EIA scoping process that this extensive dataset would be adequate to also act as the baseline for the assessment of the proposed development. A summary of the findings from the 2011 to 2017 surveys, which are relevant to the proposed development area, is provided in Technical Appendix 9.6.
- 9.136 The 2011-2017 surveys confirmed the presence of juvenile trout within all of the main watercourses draining the area that the proposed development would be located within. Densities of juvenile salmon were generally much lower and more variable than trout within the proposed development area, but all of the main watercourses also support populations of this species. There was no evidence of the presence of juvenile salmon at the sampling points closest to the proposed development Site. Habitat quality for spawning and juvenile salmonids is poor / absent at and above the existing and proposed watercourse crossing points for the wind farm access tracks.
- 9.137 DBIRCT concluded that there was no evidence from the data collected of any long-term adverse effect from the construction of Clashindarroch wind farm on the health of the salmonid fish populations within the catchments draining the area that the wind farm is located within.

Receptor Evaluation

- 9.138 The ecological receptors evaluated as having greater than negligible sensitivity and which are considered to have some potential to be adversely affected by the proposed development are given in Table 9-12. These have been evaluated following the methodology summarised in Table 9-5 and have been considered in the ecological impact assessment section.

Table 9-12
Summary of Ecological Receptor Sensitivity

Ecological Receptor	Evaluation	Study Area Receptor Sensitivity (see Table 9-5)
Watercourses and fish	Watercourses within the Site are tributaries of the Water of Bogie/River Bogie, and are known to support populations of Atlantic salmon and brown/sea trout. Atlantic salmon is listed on Annexes II and V of the Habitats Directive. There is very limited suitable habitat for migratory salmonids, which could be directly affected by the proposed development. There are headwaters of sub-catchments of important salmonid rivers located within the Site. The Bogie has no statutory designation (e.g. SAC or SSSI status), but is identified as a 'salmonid water'.	Regional
Marshy / neutral grassland communities	Some areas of marshy and neutral grassland have a relatively high floristic species-richness and provides a locally important semi-natural habitat within context of the Site. They are also considered to be moderately sensitive GWDTEs.	Local (Medium)

Ecological Receptor	Evaluation	Study Area Receptor Sensitivity (see Table 9-5)
Broad-leaved semi-natural woodland	Mature broadleaved woodland is rare within the wider study area and is of relatively greater importance due to the dominance of non-native commercial plantation. One strip of common beech trees along the Dry Burn is located within an AWI site.	Local (Medium)
Bats	<p>All of Britain's native bat species are listed on Annex IV of the EC Habitats Directive and are EPS, as such bats and their roosts are fully protected under the Habitats Regulations 1994 (as amended). All bat species recorded using the Site are also UK BAP priority species and listed on the Scottish Biodiversity List. The status of the regional populations of common and soprano pipistrelle are unknown but likely to be consistent with national trends (i.e. stable or increasing).</p> <p>Relatively low levels of bat activity recorded at the proposed wind turbine locations (or analogous habitat types post-felling), predominantly by common and soprano pipistrelle. Foraging habitat quality is relatively poor away from forest edges and riparian corridors. Roosting habitat quality is poor within the wind turbine locations. One non-breeding common pipistrelle roost site (used by <5 bats) is located c. 200m from the nearest proposed wind turbine.</p>	Local (High)
Badger	<p>Badgers and their setts are legally protected under the Protection of Badgers Act (1992). This is not currently a species of conservation concern in the region.</p> <p>Limited evidence of badger presence within the proposed wind turbine area. Habitat quality is generally sub-optimal in this area. There are no known setts at direct risk of damage from works within the proposed wind turbine area but disturbance from felling operations is possible.</p>	Local (Medium)
Otter	Otter is listed on Annexes II and IV of the EC Habitats Directive. Otter is an EPS and as such otters and their breeding site or resting places are fully protected under the Habitats Regulations 1994 (as amended). Otter is also a UK BAP priority species and on the LBAP. The status of the regional population is unknown, but otters are no longer of conservation concern, and in a Scottish, and are widespread having reoccupied most if not all catchments previously lost within its range. Otter appears to only be present periodically and in specific locations associated with a small number of the watercourses within the Site.	Local (High)

Ecological Receptor	Evaluation	Study Area Receptor Sensitivity (see Table 9-5)
Pine marten	<p>Pine martens and any structure or place which they use for shelter or protection (e.g. dens) are legally protected under the Wildlife & Countryside Act 1981 (as amended). Pine marten is a UK BAP Priority Species and is on the Scottish Biodiversity List. The current status of the regional population is unknown but based on national trends is likely to be stable or increasing.</p> <p>Evidence of the presence of pine marten is extensive across much of the proposed development area although habitat quality is variable. Based on mean territory sizes for lowland coniferous woodland habitats the core study area (i.e. 500m buffer around the proposed wind turbines) could support 3-4 pine martens but this is likely to be an overestimate given the extent of relatively poor quality habitat present. No confirmed dens have been recorded within 250m of the proposed development but there are abundant potentially suitable features and cover for pine marten within the core study area.</p>	Regional
Red squirrel	<p>Red squirrels and any structure or place which they use for shelter or protection (e.g. dreys) are legally protected under the Wildlife & Countryside Act 1981 (as amended). Red squirrel is a UK BAP Priority Species and is on the Scottish Biodiversity List. The current status of the regional population is unknown but likely to be stable. Red squirrels are present in most suitable woodland habitat throughout NE Scotland.</p> <p>Evidence of the presence of red squirrel is found across much of the proposed development area although habitat quality varies in relation to conifer plantation age class and species composition. A high proportion of the areas that require to be felled to accommodate the proposed development are currently of poor-moderate quality for red squirrel.</p>	Local (High)

Ecological Receptor	Evaluation	Study Area Receptor Sensitivity (see Table 9-5)
Wildcat	<p>Wildcat is on Annex IV of the Habitats Directive, which includes the list of species of community interest in need of strict protection. As an EPS, wildcats and their breeding sites or resting places are fully protected under the Habitats Regulations 1994 (as amended). Wildcat is a UK BAP Priority Species and is on the Scottish Biodiversity List. The Scottish population is considered to 'critically endangered' and at risk of genetic extinction due to the pervasive effects of hybridisation with domestic and feral cats. Due to their rarity (potential 200-400 remaining), large enough areas of suitable habitat supporting/or potentially supporting wildcats are potentially of national importance. The proposed development is located within a Wildcat Priority Area, which are the remaining known strongholds of the species in Scotland.</p> <p>The core study area has been estimated to overlap with the territories of up to 5 wildcats / wildcat hybrids (i.e. >1% of the potential national population). Habitat quality is variable within the core study area with much of the Sitka spruce dominated thicket and pole-stage plantation (which comprises over 90% of the area) providing limited foraging opportunities, although this habitat can provide good cover for wildcat, particularly areas of windthrow. Better quality foraging habitat is associated with the main riparian corridors. Areas of clearfell can support a relatively high density of small mammal prey, with brash piles and old undisturbed log-stacks offer denning opportunities.</p>	National

Future Baseline

9.139 Under a 'do nothing' scenario, the future baseline for the Site has been considered in the context of the FLS Forest Plan period (further detail is provided in Technical Appendix 3.2). Over the next Forest Plan period the Clashindarroch Forest would broadly be expected to exhibit:

- a potential marginal decrease in open ground as a result of the implementation of the new Landscape Management Plan (LMP) by c. 1.3% (21.7 to 20.4%);
- a small increase in the extent of the Sitka spruce component of the plantation of c. 3% (30.2 to 33.1%);
- mixed native broadleaved trees to increase in proportional cover by 3.6% (9.0 to 12.6%);
- continuation of existing commercial forestry operations and typical harvesting/replanting regimes;
- harvesting is planned to continue at an average rate of c. 288 ha per 5-year felling plan period, see Table 3.2.7 in Technical Annex 3.2 (this is c. 4.6% of the whole forest by area);
-
- during the fell plan period there will be an increasing extent of recently felled and pre-thicket plantation which is likely to increase habitat for small mammals, thereby improving prey availability for wildcat and other predators; and

- broadly similar distributions of existing broad habitat types and presence/density of pine marten, red squirrel populations to the current baseline subject to localised variation in response to harvesting operations, coupe restocking and tree growth over the next felling plan period.
- 9.140 Under the proposed LMP (Ref. 9.27) for Clashindarroch Forest, FLS would continue to work in partnership with SWA, contributing to the survey and monitoring of wildcats in Clashindarroch. This will include: working with WildCRU on GPS tagging and monitoring of wildcats (NB subject to funding availability); planning operations and activities to minimise disturbance to wildcats; creating and monitoring artificial dens; raising awareness of Scottish wildcats through joint-working, media and encouraging the reporting of sightings and providing staff/contractor wildcat awareness training; and
- 9.141 There is uncertainty about the long-term status of the wildcat population with the recent IUCN assessment indicating that the Scottish population is, or is close to being, 'functionally extinct'. Recent and continuing efforts to reduce the impact of hybridisation with feral and domestic cats within the Strathbogie WPA and, where possible, improve habitat quality for the species are likely to remain critical to the recovery of the species in the long-term, along with potential future efforts to reinforce the population through captive breeding programmes.

ASSESSMENT OF EFFECTS

The Proposed Development

- 9.142 The project involves the construction of up to 14 wind turbines and their associated access tracks (c. 11 km of new and some limited upgrading of existing forestry tracks) and other infrastructure, a permanent meteorological mast, establishment of temporary and permanent compounds and the extraction of stone from the extension to an existing borrow-pit within the site. The turbine blades are up to 70 m long and the turbine hub height would be up to 110 m above ground level. The pre-works felling, site clearance and construction works are anticipated to take 18 months in total.
- 9.143 The turbines are required to be lit with medium intensity (2000 candela) steady red aviation warning lights in accordance with Article 222 of the UK Air Navigation Order (ANO) 2016. A second light serving as an alternative should be provided in case of failure of the operating light. Additionally at least three (to provide 360 degree coverage) low-intensity (32 candela) lights should be fitted at an intermediate level of half the nacelle height.
- 9.144 Further detail on the wind farm design, construction plans and programme is provided in Chapter 3: Description of the Development.

Summary of Potential Effects

- 9.145 This section considers the potential for likely significant effects on habitats of nature conservation importance and non-avian protected species as a result of the proposed development. Potential impacts associated with construction, operation and decommissioning of a wind farm upon ecological receptors include habitat loss and fragmentation, habitat degradation, pollution (particularly freshwater habitats), and noise and light disturbance. Indirect effects that may also occur; for example, pollution of surface waters during earthworks, could adversely affect food resources for species dependent upon aquatic prey.
- 9.146 Whilst the operational phase of the proposed development may be associated with fewer adverse

impacts on ecological receptors there are specific potential effects that require consideration such as the risk to bats from the operating wind farm and potential disturbance and displacement of other protected species such as wildcat.

9.147 Potential adverse effects that might occur during the decommissioning phase are the same as those that might occur during the construction phase, but are usually smaller in potential magnitude.

9.148 The following is a list of potential adverse effects, from each phase of the proposed development, which are relevant to this Chapter and which have been considered in the assessment and in determining the proposed mitigation measures.

9.149 Tree felling/construction works could result in:

- the destruction of breeding sites/resting places;
- temporary disturbance (noise, olfactory, vibration, lighting, presence of people) to breeding sites/resting places, potentially resulting in breeding failure or reduced breeding success;
- pollution from earthworks, hydrocarbons and/or chemical spillages (including run-off during forestry activities should large areas of plantation be felled within a short space of time) into aquatic habitats affecting water quality, the aquatic ecosystem and fish species dependent upon the aquatic habitats;
- potential for increased risk of killing / injury from felling, machinery, vehicle collisions (e.g. wildcat, pine marten, badger, otter, red squirrel);
- displacement from foraging habitats and movement corridors; and
- the loss and fragmentation of habitats supporting faunal receptors, potentially also resulting in effects on habitat connectivity.

9.150 Potential effects arising from wind farm operation include:

- increased levels of human presence in the area as a source of long-term disturbance to faunal receptors resulting in displacement / changes to ranging behaviour, resulting in energetic costs and potential effects on survival and breeding productivity (e.g. wildcat, pine marten, badger);
- increased risk of mortality from vehicle collisions (e.g. wildcat, pine marten, badger, otter, red squirrel);
- bat collision/barotrauma from the operational wind turbines and the potential increased risk of collision/barotrauma from the presence of aircraft warning lighting on the wind turbine nacelles potentially affecting insect prey or bats directly;
- the presence of the wind turbines (e.g. visual, lighting, blade shadows and noise from their operation) could disturb faunal receptors (e.g. wildcat, pine marten) and influence their access and use of habitats / features within the area;
- noise from the wind turbines could directly interfere with predator avoidance, hunting and breeding behaviour (e.g. wildcat, pine marten, badger, otter, red squirrel);
- visual/noise disturbance from the operating wind turbines could also affect the use of movement corridors affecting connectivity between different parts of individual wildcat territories (e.g. summer vs winter ranging) or movement between territories (e.g. males moving between different breeding female territories); and

- the potential for pollution events either through standard maintenance activities or through leaks within the turbines.

9.151 Wind farm decommissioning works could result in:

- pollution from hydrocarbons and/or chemical spillages into aquatic habitats affecting water quality, the aquatic ecosystem and fish species dependent upon the aquatic habitats;
- the temporary disturbance to breeding sites / resting places, potentially resulting in breeding failure or reduced breeding success;
- increased risk of mortality from vehicle collisions (e.g. wildcat, pine marten, badger, otter, red squirrel); and
- displacement from foraging habitats and movement corridors.

9.152 There is also the potential for cumulative effects to arise from different aspects of the proposed development and in combination with other plans and projects (e.g. additive effects on the same catchment in relation to effects on fish populations).

9.153 The assessment of adverse effects upon each ecological receptor for each phase of the development is provided below.

Construction Effects

Tree Felling & Habitat Loss

9.154 Estimates of habitat loss that would occur during the construction of the proposed development are given in Table 9-13. The calculations are based on the infrastructure dimensions and construction methods detailed in Chapter 3: Description of the Development.

9.155 For these calculations, an additional 5m wide zone was added to the 'footprint' of the infrastructure to allow for loss and damage to habitats resulting from construction disturbance. Due to the absence of any terrestrial habitats that are particularly sensitive to changes in local hydrology as a result of excavation works (e.g. flushes and blanket bog), other than very small areas of marshy grassland, adjacent to the proposed works no additional zone to allow for potential drying of peat or gley soils has been allowed for in the habitat loss / change calculations.

Table 9-13
Estimates of Habitat Loss from the Construction of the Wind Farm

Phase 1 Habitat	Area (ha)	Percentage
Coniferous plantation woodland	24.82	85.28
Recently felled coniferous woodland	2.79	9.60
Mixed plantation woodland	0.45	1.53
Semi-improved neutral grassland	0.26	0.90
Improved grassland	0.19	0.66
Broad-leaved plantation woodland	0.19	0.64
Dry heath / acid grassland mosaic	0.18	0.61
Unimproved neutral grassland	0.16	0.55
Marsh / marshy grassland	0.06	0.22
Totals	29.11	100.00

- 9.156 Table 9-13 shows that the direct habitat loss to the development would be about 29 ha. Approximately 96% of this (c. 28 ha) would comprise coniferous plantation and recently felled plantation and only c. 3% would affect grassland and dwarf-shrub heath habitats. The grassland and heath vegetation, which could be affected, is primarily found along existing trackside verges. This means that the predicted losses are likely to be an over-estimate as they would only be affected where upgrades to the existing tracks are required.
- 9.157 The proposed tree felling for the wind farm is detailed in Technical Appendix 3.2. In summary, prior to construction works commencing, areas of existing conifer plantation would be felled or cleared (in the case of young trees with no merchantable timber) to accommodate the wind farm construction works. The 24.8 ha estimated loss of plantation forest given in Table 9-13 relates to the 'foot-print' of the development, i.e. areas that could not be replanted during the lifetime of the wind farm. An area of 88.5 ha (as stated in Technical Appendix 3.2., see Table 3.2.10) would be left unplanted, which includes the 24.8 ha area lost to the tracks, turbine bases and other hardstandings.
- 9.158 Additional felling would be required, for the operational phase of the wind farm, within coupes at risk of windthrow. In those locations, felling would extend to wind-firm edges. This total felling area is estimated to be c. 125 ha (see Technical Appendix 3.2, table 3.2.7), accounting for the pole-stage coupes that would reach harvesting age and be felled under the existing Forest Plan (i.e. coupes due to be felled prior to 2021, the assumed start of construction for the purposes of the assessment). As a result, the amount of harvesting would increase marginally during the 2017-2021 felling phase from 328.4 ha to 453.7 ha (i.e. from 5.23% to 7.2% of the Clashindarroch Forest) in comparison to what would occur under the existing (i.e. no wind farm) felling plan. Total harvesting would then be slightly reduced, by c. 44 ha, in comparison to the existing felling plan for the subsequent 5-year phases (i.e. from 2022 to 2041). There would also be a very small reduction in the area of long-term retention of 2.9 ha under the wind farm felling plan in comparison to the existing fell plan.

- 9.159 This proposed additional felling is not a permanent loss of forest cover as, following construction, trees would be replanted to within c. 80m of the wind turbine bases. Replanting would be carried out with the conifer species identified in the restocking plan (see Technical Appendix 3.2, Figure 3.2.7) at a minimum density of 2,500 trees per hectare. Restocking within the proposed broadleaf woodland areas would be at a planting density of 1,600 trees per hectare. All restocking would be carried out to current standard practice and in accordance with the guidelines contained in the UK Forestry Standard (2017).

Marshy Grassland

- 9.160 There would be minimal direct loss of marshy grassland (MG9 *Holcus lanatus* – *Deschampsia cespitosa* grassland), approximately 0.06 hectares (see Table 9-13), which equates to about 1% of the total extent of this vegetation community recorded within 250m of the proposed development. However, this habitat is present in the wider plantation forest, associated with wetter rides and riparian zones. In this wider context of contiguous habitats, the relative losses would be even smaller. This habitat includes some NVC communities that are considered to be moderately groundwater-dependent in this context. The loss of marshy grassland habitat as a result of the proposed development is considered to be a Negligible effect (i.e. **Not Significant**).

Other Terrestrial Habitats

- 9.161 Table 9-13 shows that other habitats lost due to construction of the proposed development (i.e. that could not be restored during the lifetime of the wind farm) would be associated primarily with conifer plantation. The direct losses as a result of construction would represent approximately 11% of the total conifer plantation present within 250m of the proposed wind farm. In the context of the wider Clashindarroch Forest this represents 0.4% of the forest as a whole.
- 9.162 Without further mitigation, taking into consideration the extent of similar habitat in the wider area and its relatively low inherent nature conservation/biodiversity importance, the effect of the loss of conifer plantation/recently felled plantation is considered to be no greater than a Low effect overall, resulting in a potential effect significance level of Minor (i.e. **Not Significant**).

Badger

- 9.163 The direct loss of grassland and woodland habitats as a result of the felling and construction of the proposed wind farm is considered to be negligible in terms of badger foraging resource. There would be no loss of any currently known setts as a result of the works. There is the potential for badgers to be disturbed and displaced from foraging habitats during the works, however, this is a different impact which is assessed separately.
- 9.164 Without considering further mitigation, the effect of the loss of badger habitat is Low overall resulting in a potential effect significance level of Minor (i.e. **Not Significant**).

Bats

- 9.165 Given the general absence of potentially suitable features for roosting bats in the vast majority of the conifer plantation, it is considered that there would be a negligible loss of bat roosting resource as a result of the proposed tree felling. The proposed felling would increase the extent of forest edge habitat and this is likely to be beneficial for foraging bats. Although this potential benefit needs to be considered carefully with respect to a potential increased risk of mortality if felling (including felling for the construction of new access tracks leading to wind turbines) 'encourages' bats towards

the wind turbine locations. This potential effect is considered in the assessment of operational phase impacts. The felling could result in some fragmentation of habitat for bats, however, this is not considered to be significant in the context of Clashindarroch Forest as a whole. Furthermore, taking into consideration the importance of riparian zones as foraging and habitats and commuting corridors for bats and that these areas would not be largely unaffected by the proposed felling.

- 9.166 Without further mitigation, the loss of bat roosting and foraging resources is considered to be an effect level of Low overall, resulting in a potential effect significance level of Minor for the relevant bat populations (i.e. **Not Significant**).

Otter

- 9.167 Without further mitigation, loss of habitat and/or connectivity would be very unlikely to cause a significant effect on otter because of the low levels of otter activity within the vicinity of the proposed development. Otter evidence is scant within the core study area and what has been recorded is closely associated with the main watercourses. Otter may move across and forage within wetland and bog habitats away from watercourses at certain times of the year (particularly during the spring); such habitats are largely absent from the proposed development area. There is some potential for localised habitat disturbance at the proposed watercourse crossing improvements. However, no appreciable loss of otter habitat is anticipated from the proposed development. Loss of habitats from the proposed development is therefore considered to be Negligible for the otter population (i.e. **Not Significant**).

Pine Marten

- 9.168 Without further mitigation, loss of habitat and/or habitat connectivity from the proposed felling would be very unlikely to cause a significant effect on the pine marten population within Clashindarroch Forest because of the relatively poor quality of the majority of this habitat for pine marten denning and foraging, and the availability of similar habitats within the area. The proposed felling is comparable in scale to normal harvesting operations that have occurred in the area over recent years. Despite this, based on the camera trapping results, pine marten are clearly still present across much of the survey area.
- 9.169 The felling is also unlikely to impact on a single territory and the absence of suitable natal den sites indicates that the felling would not impact on a breeding female. However, if this were to occur to an adult female there is the potential for the pine marten to be displaced and to suffer reduced breeding success, but the effect is unlikely to be permanent or significant in terms of the status of the local population.
- 9.170 The proposed felling could result in habitat fragmentation effects on pine marten. Females, in particular, are known to avoid open areas. The evidence from camera trapping surveys within the core study area during 2018-19 indicates that pine marten (possibly males, typically ranging over larger territories than females) are not discouraged from hunting well outside of forest cover.
- 9.171 In relation to resting places for pine marten (denning features and dense cover) there are a number of potentially suitable features within 200m of some of the proposed wind turbines (see Figure 9.7b and Technical Annex 9.2). This includes windthrow areas, old log-stacks and potentially suitable holes under old tree stumps. Such features are common throughout the survey area and the wider Clashindarroch Forest. The derelict cottage at Corrydown has the potential to be used by this species and could be suitable for a breeding female. There was no evidence of use of this site during the baseline surveys, but this could change with time. This issue is addressed through the proposed

pre-felling surveys (see the mitigation measures section below).

- 9.172 There is also the potential for felling to increase the availability of small mammal prey, particularly along the forest edge habitats that pine martens tend to exploit, which would be a beneficial effect.
- 9.173 The loss / change of forest habitat from the proposed development on the pine marten population present in Clashindarroch Forest is considered to be an effect level of Low overall, resulting in a potential effect significance level of Minor (i.e. **Not Significant**).

Red Squirrel

- 9.174 Without further mitigation, loss of habitat and/or habitat connectivity from the proposed felling would be very unlikely to cause a significant effect on the red squirrel population within Clashindarroch Forest because of the relatively small areas of habitat affected, their quality and availability in the wider area.
- 9.175 The proposed felling, at a local scale, is comparable in area to harvesting that has occurred in the area over recent years. In that regard, the felling is not markedly different from normal ongoing forest management.
- 9.176 The main area of proposed felling (c. 125 ha), which would be required under the scenario assumed in the Forestry Technical Appendix (3.2), is mostly rated as being of poor habitat quality for red squirrel (53.5%). Some areas of moderate quality (e.g. around turbine 1) would be felled. Moderate quality habitat for red squirrel is estimated at 32.8% of the felling area. Most of the other areas of moderate to high habitat quality are due to be felled under the existing Forest Plan (i.e. independently of the proposed wind farm development).
- 9.177 In this context, the loss and fragmentation of habitat resulting from the proposed development is considered to have an overall effect level of Low for the red squirrel population within Clashindarroch Forest, resulting in a potential effect significance level of Minor (i.e. **Not Significant**).

Wildcat

- 9.178 The direct loss of habitat (excluding features that provide potentially suitable resting places) as a result of the construction of the proposed development (i.e. the un-restorable areas associated with the tracks, turbine bases and permanent buildings/compounds, estimated at 29.1 ha) is considered to be Negligible (**Not Significant**) for the wildcat population within Clashindarroch Forest due to the relatively small area (relative to wildcat territory sizes), its apparent quality and the availability of other similar habitats in the surrounding area.
- 9.179 In relation to potentially suitable resting places for wildcat (denning features and dense cover) there are a number of features within 200m of some of the proposed wind turbines. This includes areas of windthrow, brash piles, old log-stacks and potentially suitable holes under old tree stumps. Such features are common throughout the survey area and the wider Clashindarroch Forest. There was no evidence of their use during the baseline surveys, but this could change with time. This issue is addressed through the proposed pre-felling surveys (see the mitigation measures section below). This effect is considered to be Negligible (**Not Significant**) for the wildcat population within Clashindarroch Forest.
- 9.180 Without further mitigation, loss of forest habitat and habitat connectivity from the wider proposed felling (c. 125 ha) would also be unlikely to cause a significant effect on the wildcat population

within Clashindarroch Forest. This is due to a combination of the relatively low quality of the habitats affected and the small area lost in comparison to the size of wildcat territories and the extent of similar habitat within the wider forest. The proposed felling, at a local scale, is comparable in area to harvesting that has occurred in the area over recent years and in the context of the wider forest is only marginally greater (c. 2% for the Phase 1 felling period) than the felling that would occur anyway without the wind farm. Existing areas of windthrow (an important habitat for wildcat generally) would generally be avoided by the proposed felling and, although the fell plan is designed to minimise the potential for this to occur, some degree new windthrow may be unavoidable. In terms of potentially suitable den features, there are a number of such features around the fringes of the proposed felling area that have been noted as having some potential to be used by wildcat as resting places. There was no evidence of their use during the baseline surveys, but this could change with time. This issue is addressed through the proposed pre-felling surveys (see the mitigation measures section below).

- 9.181 There is the potential for felling to increase the availability of small mammal prey for wildcat, particularly along edge habitats, which could improve foraging habitat quality in the area for this species.
- 9.182 Overall, the loss/change to forest habitats resulting from the proposed felling is considered to be a Negligible effect for wildcat and **Not Significant**.

Potential Freshwater Pollution / Aquatic Habitat Loss & Degradation

- 9.183 There are only two new proposed crossings of some minor watercourses within the Site and all infrastructure, with the exception of tracks, has been designed to be at least 50m from any surface waterbody. Consequently, direct loss of any aquatic or riparian habitats as a result of the construction of the proposed development has been minimised. There is the potential for some disturbance to aquatic habitats during the proposed upgrades of some of the existing culverts. However, this is expected to be minimal and would not result in the loss of any particularly sensitive habitat (e.g. spawning gravels for salmonids).
- 9.184 Surface run-off from construction areas and accidental chemical pollution (for example, from concrete, oils or fuels) can significantly adversely affect freshwater ecosystems. Such habitats can also be affected from the silt-laden run-off arising from earthworks (such as excavation of foundations, temporary storage of excavated spoil), dust from aggregate brought in to create access tracks and concrete for turbine foundations.
- 9.185 Clear-felling can also result in siltation and acidification effects from an increase in nitrogen mineralisation and nitrification which, in turn, can promote nitrate leaching and enhance acidity and aluminium solubility in waters draining some soils, particularly peaty soils. The effect usually lasts for two to five years after felling, depending upon the rate at which vegetation re-establishes (Forestry Commission 2011). Research shows that the effects of harvesting on surface water acidity are difficult to discern when 20% or less of a catchment is felled within any three-year period.
- 9.186 Without providing any further mitigation in addition to the mitigation embedded within the design of the proposed development, surface water pollution is assessed as a Medium level effect collectively on the watercourses/sub-catchments within and draining the Site. Taking into consideration the potential for effects to be spread downstream and into more sensitive sections of the various tributaries of the Rivers Bogie/Deveron, this could result in an effect level of Medium overall, resulting in a potential effect significance level of Moderate (i.e. **Significant**).

Salmonid Fish

- 9.187 Felling and construction works for the proposed development could potentially impact fish populations of two main river systems that border the site: the River Bogie to the east and the Deveron to the west. The Bogie supports healthy populations of Atlantic salmon, European eel and trout. Potential impacts of fish populations during construction could have a range of implications such as fish mortality, changes in invertebrate abundance, habitat damage, blocking of migration routes and avoidance behaviour resulting in unused habitat.
- 9.188 Any major freshwater pollution incidents arising from the proposed construction works, including silt and acidification arising from felling, have the potential to affect fish species of conservation concern supported by aquatic habitats downstream of the proposed development. Whilst there would be some spatial separation from the more sensitive lower-lying reaches, the steep topography of some of the locations where felling and earthworks would be undertaken means that rapid run-off could quickly affect these sensitive aquatic habitats.
- 9.189 Without further mitigation, over and above that embedded within the design of the proposed development, the potential effect level of freshwater pollution is assessed as Low for salmonid fish, resulting in a potential effect significance level of Moderate (i.e. **Significant**).
- 9.190 The potential for new or upgraded watercourse crossings to result in significant barriers to the free movement of migratory fish (including consideration of within-catchment movements by species such as brown trout), is considered to be negligible given the size of the watercourse channels affected and absence of suitable spawning habitat/juvenile fish habitat generally upstream of the proposed crossings. Without considering further mitigation, fish habitat loss due to fragmentation is assessed Negligible and **Not Significant**.

Otter (Food Resource)

- 9.191 Without further mitigation, taking into consideration the potential adverse effect of pollution during construction on otter prey species (fish and amphibian populations) and the evidence suggesting that the watercourses within the site are only infrequently used by otter, freshwater pollution effects are assessed on a precautionary basis as Low, resulting in a potential effect significance level of Minor (i.e. **Not Significant**).

Bats (Food Resource)

- 9.192 Without further mitigation, taking into consideration the potential adverse effect on prey species (aquatic invertebrates) of any watercourse pollution, any freshwater pollution is assessed as likely to have a no more than a Low effect on bats, resulting in a potential effect significance level of Minor (i.e. **Not Significant**).

Risk of Killing / Injury to Protected Mammal Species

Badger

- 9.193 The baseline surveys did not locate any badger setts at direct risk from the construction of the wind farm but there are setts present in the area which could be at risk. Badgers are also at risk from being killed or injured by moving vehicles. The risk of badger mortality during felling/construction is considered to be a Low effect overall, resulting in a potential effect significance level of Minor (**Not Significant**).

Bats

- 9.194 No bat tree roost has been identified within 250m of the proposed development and the plantation forestry provides few features that bats could use as roost sites. There is also a legal requirement to ensure that impacts on bats and their roost sites are avoided. The risk of bat mortality during felling/construction is considered to be Negligible, the effect is **Not Significant**.

Otter

- 9.195 There is a risk of killing or injury to otter from collisions with moving forestry and construction vehicles. No resting places are considered to be at risk from the works. Although it appears to be the case that otter are only infrequently present along the minor watercourses that drain the Site and generally unlikely to be encountered during works other than at the proposed watercourse crossings upgrades on the main access track. However, some risk from vehicle collision would be unavoidable. The risk of otter mortality during felling/construction is considered to be Low, the effect is Minor and **Not Significant**.

Pine Marten

- 9.196 No pine marten dens have been confirmed within the proposed felling and construction areas. However, there is the potential for suitable features to be present within dense thicket and pole plantation areas. Adult pine marten are highly mobile and can move away from sources of disturbance associated with felling or construction works, reducing the risk. There is a greater risk should a breeding female be present with young as the kits would be extremely vulnerable and may not be mobile enough to leave the den. The available evidence suggests that the potential for a natal den to be affected in this way by the proposed works is very low, but it cannot be completely discounted as a potential effect. There is also a legal requirement to ensure that impacts on this species and its resting places are avoided. Pine marten, particularly young animals, are also at risk of from vehicle collisions. The risk of pine marten mortality during felling/construction is considered to be a Low effect overall, resulting in a potential effect significance level of Minor (**Not Significant**).

Red Squirrel

- 9.197 Adult red squirrel are highly mobile and can move away from sources of disturbance associated with construction works, reducing the risk of direct mortality from the works. There is the potential for red squirrels to be present during the felling operations, including breeding females, and this increases the potential for squirrels to be killed as the young are less mobile and more likely to stay within the drey. There is also a legal requirement to ensure that impacts on this species and its resting places are avoided. Red squirrel are also at risk of from vehicle collisions. The risk of red squirrel mortality during felling/construction is considered to be Low, resulting in a potential effect significance level of Minor (i.e. **Not Significant**).

Wildcat

- 9.198 The felling and clearance of trees and the proposed development construction works have the potential to kill or injure wildcats. However, the risk of direct mortality to adult wildcats from such works is considered to be Low. They are likely to move away from the area as a result of disturbance from the approaching machinery. However, kittens are more likely to stay within their den, particularly within the first few months of life, and are therefore at much greater risk. Based on current evidence the potential for a breeding site to be located within the Site and at risk of such an impact is considered to be low. There is also a legal requirement to ensure that impacts on this

species and its resting places are avoided. There is also a risk of killing or injury to wildcats from collisions with moving forestry and construction vehicles. Road traffic deaths are one of the main sources of human-caused mortality for the species. The risk of wildcat mortality during felling/construction is considered to be a Low effect overall, due to the National importance of the wider study area for wildcat this results in a potential effect significance level of Moderate (i.e. **Significant**).

Noise, Light and other sources of Disturbance to Protected Mammal Species

Badger

- 9.199 The effects of short-term disturbance are unlikely to be significant to badger providing that breeding setts are unaffected. However, prolonged disturbance may displace these animals from important foraging habitats which may affect their body condition and breeding success. There is also a legal requirement to ensure that impacts on badger and their setts are avoided. However, some degree of disturbance would be unavoidable during the works.
- 9.200 Without considering further mitigation, and notwithstanding the legal protection afforded to badgers, the potential effects of disturbance from felling and construction activities has been assessed as Low overall, resulting in a potential effect significance level of Minor (i.e. **Not Significant**).

Bats

- 9.201 As no bat roost has been identified within c. 200m of the proposed development, construction activities are not predicted to result in any appreciable disturbance to roosting bats. However, unrestricted working hours and associated lighting could potentially affect commuting and/or foraging bats. There is also a legal requirement to ensure that impacts on bats and their roost sites are avoided.
- 9.202 Without considering further mitigation, and notwithstanding the legal protection afforded to bats and their roosts, effects from sources of disturbance from felling and construction activities has been assessed conservatively as a Low overall, resulting in a potential effect significance level of Minor (i.e. **Not Significant**).

Otter

- 9.203 Otters are highly mobile and can move away from the immediate vicinity of sources of disturbance associated with construction works. The effects of short-term disturbance are unlikely to be significant, providing that breeding sites or resting places are unaffected. Prolonged disturbance to otter habitat may displace animals from important foraging habitats which may affect body condition and breeding success.
- 9.204 The only confirmed resting site is almost 500m from the proposed development and is not considered likely to be suitable as a natal holt (i.e. breeding site). Additionally, there is a legal requirement to ensure that impacts on otter and their resting places are avoided. However, some degree of disturbance, should otter be present in the area, would be unavoidable during the works.
- 9.205 Without considering further mitigation, and notwithstanding the legal protection afforded to otters and their breeding sites or resting places, the effect of disturbance from felling and construction activities has been assessed as a Low overall, resulting in a potential effect significance level of

Minor (i.e. **Not Significant**).

Pine Marten

- 9.206 Pine marten are highly mobile and can move away from sources of disturbance associated with construction works. The effects of short-term disturbance are unlikely to be significant providing that important den sites (e.g. natal dens) are unaffected. Prolonged disturbance may displace these animals from important foraging habitats which may affect their body condition and breeding success. There is also a legal requirement to ensure that impacts on pine marten and its resting places are avoided. However, some degree of disturbance to pine marten would be unavoidable during the works.
- 9.207 Without considering further mitigation, and notwithstanding the legal protection afforded to pine marten and their dens and other places of shelter, the potential effects of disturbance from felling and construction activities has been assessed as Low overall, resulting in a potential effect significance level of Minor (i.e. **Not Significant**).

Red Squirrel

- 9.208 Red squirrel are highly mobile and can move away from sources of disturbance associated with construction works. The effects of short-term disturbance are unlikely to be significant providing that important sites such as breeding dreys are unaffected. Prolonged disturbance may displace red squirrels from important foraging habitats which may affect body condition and breeding success. There is also a legal requirement to ensure that impacts on red squirrels and their dreys are avoided. However, some degree of disturbance, should red squirrel be present in the area, would be unavoidable during the works.
- 9.209 Without considering further mitigation, and notwithstanding the legal protection afforded to red squirrel and their dreys, the potential effects from felling and construction-related disturbance are assessed as Low overall, resulting in a potential effect significance level of Minor (i.e. **Not Significant**).

Wildcat

- 9.210 Indirect temporary habitat loss (i.e. displacement from the area) or degradation (i.e. reduced access to a supporting habitat in their wider territory due to disturbance) could occur as a result of disturbance during the period of felling and wind farm construction (c. 18 months). Noise, lighting, vehicles and the presence of people could all affect wildcat and influence their use of the area. There is also the potential for more subtle effects, such as interference of olfactory cues. Wildcats, as solitary territorial hunters, using scent marking (scats, urine, tree scratching and cheek rubbing) to communicate with other wildcats. Although generally quiet, vocal communication is also important at times, for example with mate finding when female wildcats are in oestrus. Noise from felling and construction activities could therefore potentially interfere with breeding, if not directly affecting the home range of a breeding female.
- 9.211 In considering such potential effects it is also important to take account of the context of the felling and construction disturbance. It would occur within a working commercial forest, with significant areas at or reaching an age where harvesting and thinning operations are regularly being carried out. This is not an area where people and machinery are rarely present. There is evidence that wildcats in Scotland may tolerate some human disturbance through habituation (Ref. 9.28).

- 9.212 The potential importance of such impacts will also vary depending on a range of factors relating to habitat quality and use of the area by individual wildcats (e.g. temporary displacement of a male from low-quality habitat would be a lower effect on the individual and population in comparison to the same disturbance sources affecting a breeding female rearing her young). There is very little published data available that has attempted to quantify behavioural reactions of wildcats to such sources of disturbance. Studies that have considered the effects of roads and traffic on wildcat movements have indicated that use of a zone up to 200m from a road and up to 900m from settlements may be affected, although this is dependent on the type of adjacent habitat and the degree of cover (Ref. 9.29).
- 9.213 Consideration of the potential for long-term disturbance effects on wildcat during the operation of the wind farm is given in the operational assessment.
- 9.214 Without considering further mitigation, and notwithstanding the legal protection afforded to wildcat and their breeding sites or resting places, the potential effects of disturbance from felling and construction activities on the wildcat population is assessed as Low overall, due to the national importance of the wider study area for wildcat this is a potential effect significance level of Moderate (i.e. **Significant**).

Mitigation

Environmental Protection Measures during Felling & Construction

- 9.215 The environmental protection measures during construction and Site restoration works would be outlined in a Construction and Environmental Management Plan (CEMP). The outline content of the CEMP is provided in Technical Appendix 3.1. The CEMP would be prepared following the determination of the application and would include an outline of the proposed approach to construction methods and environmental protection during all aspects of construction works. The CEMP would be agreed in consultation with SEPA, SNH and Aberdeenshire Council.
- 9.216 The CEMP would include detailed Method Statements based on best practice for:
- pollution prevention measures, Site drainage, water monitoring and sensitive habitat protection (including buffers around GWDTes), as outlined in Technical Appendix 3.1; and
 - instructions on how to use and store excavated soils and translocated vegetation turfs for Site road verges and batters, wind turbine bases and crane pad batters; as well as restoration techniques and monitoring methods.
- 9.217 Damage to sensitive habitats would be reduced, as far as possible, prior to, during and following construction works. These would include measures outlined in the publication 'Good Practice during Windfarm Construction' by Scottish Renewables *et al.* (Ref. 9.14) and the latest edition of the Forestry & Water Guidelines (Ref. 9.30).
- 9.218 Tree felling operations would be undertaken with conventional harvesting and forwarding equipment with low ground pressure (flotation) tracks, as required, to minimise ground disturbance during the forestry operations. The phasing of clear-felling to reduce acidification risk to freshwater habitats from acidic episodes and associated aluminium solubility draining from peaty soils would be detailed within the Felling Plan. The proposed phases of felling are outlined in Technical Appendix 3.2.

- 9.219 Disturbance to soils and peat during the felling process would be further reduced by the use of brash mats for the harvesting and forwarding machinery to run on. As a result of their use, the brash mats would be compacted and would be left in situ to breakdown naturally as there would be a risk of causing further damage and risk of polluted run-off affecting nearby watercourses if the brash were removed or attempted to be removed.
- 9.220 Within the felling areas, tree stumps and root-plates would be left in situ, apart from where it is necessary for construction works (e.g. along the route of proposed access tracks, at proposed borrow pit sites, turbine bases and crane pads).
- 9.221 If consented the proposed development would appoint suitably experienced and qualified Ecological Clerk of Works (ECoW) for the duration of the pre-works, construction and Site restoration phases. The ECoW would oversee the implementation of ecological mitigation/ environmental protection measures during construction. The ECoW would be impartial and have the authority to stop works immediately should any environmental issues arise.
- 9.222 The appointment of the individual(s) covering the ECoW role would be agreed in advance in consultation with SNH. The ECoW would provide monthly reports on the progress of the works in relation to the implementation of the environmental protection measures (including measures under the outline SPP, see Technical Appendix 9.4) and a final report at the end of the construction and Site restoration works. Copies of the reports would be provided to SNH and SEPA.
- 9.223 The ECoW would be integral in the successful implementation of the CEMP and the Species Protection Plans (see 9.221).

Fish

- 9.224 An outline Fisheries Management Plan (FMP) has been agreed in consultation with fisheries biologists from the Deveron, Bogie and Isla Rivers Charitable Trust (see Appendix 9.6). The outline FMP would be developed in detail, in consultation with the Trust, well in advance of works (including felling) commencing on the Site. The FMP would set out in sufficient detail the proposed fish and water quality monitoring regime prior to, during and following construction. It would also set out the measures and procedures that would be followed to ensure the protection of fish and fish habitats during the works.
- 9.225 The detailed design of all new and up-graded culverts/watercourse crossings would be agreed in consultation with SEPA and the Deveron, Bogie and Isla Rivers Charitable Trust to ensure that any potential adverse effects on fish movement are minimised.

Species Protection Measures (excluding wildcat)

- 9.226 Species Protection Plans (SPPs, for each relevant species) would be developed by a suitably experienced ecologist, and agreed in consultation with SNH, in advance of works commencing on the Site. The SPPs would set out in sufficient detail the measures and procedures that would be followed to ensure the protection of sensitive species as well as legally protected species during construction. Outline SPPs have been included in Technical Appendix 9.4.
- 9.227 The SPPs would detail the pre-works survey methods for each species (i.e. badger, bats, otter, pine marten, red squirrel and wildcat). To ensure that the baseline information for all potentially-affected protected species is up-to-date, surveys would be undertaken not more than 8 months prior to the commencement of works (including felling). The pre-works surveys would be completed

in all areas of suitable habitat up to 250m around proposed turbine locations, felling areas, access tracks and other wind farm infrastructure.

- 9.228 The SPP would also detail the measures, as outlined below for each species, to ensure that the effects of felling/construction works are avoided, or minimised as far as is practically possible, and that the works proceed lawfully with respect to the legislation protecting the species.
- 9.229 Additionally, as part of standard FLS procedures in preparation for felling, there would be an assessment made of the current status of the populations of key species within the area (including red squirrel and pine marten) to inform the felling workplan process and ensure that appropriate mitigation measures for each species are put in place as required.

Badger

- 9.230 A pre-felling / construction survey would be completed not more than 8 months ahead of the proposed works to search for any badger setts near to any of the proposed felling or construction works. If works have to be undertaken within 50m of any sett a site-specific assessment report and protection plan would be produced by the ECoW. A licence for the works would be sought from SNH as required.
- 9.231 Additional best practice measures would be undertaken where construction occurs in areas that the ECoW believes badger could be present. These would include: no activity to be undertaken at night or dawn/dusk periods; no lighting affecting setts or well used badger paths; covering of all open excavations or providing suitable escape ramps for badgers (and other animals) to use.

Bats

- 9.232 No bat tree roosts have been identified within 200m of the proposed wind turbines although one ruined building near to the existing main access track and c. 200m from the location of Turbine 9 is known to support a small number of roosting common pipistrelle bats (see Figure 9.7). The potential for any roosts to be present in areas which could be directly affected by the proposed felling and construction works is considered to be low due to the general lack of trees with potentially suitable roost features. However, a pre-felling / construction survey would be completed not more than 8 months ahead of the proposed works to identify any potential bat roost near to any works. Where possible, works would be microsited to avoid any confirmed roost site. If works have to be undertaken within 50m of any roost a site-specific assessment report and protection plan would be produced by the ECoW. An EPS licence would be sought from SNH.

Otter

- 9.233 A pre-felling/construction survey would be undertaken for otter by a suitably experienced ecologist not more than 8 months before the start of construction. Otter breeding is largely non-seasonal, and a breeding holt may contain a nursing female with young at any time of the year. Depending on the circumstances, micrositing of the works would be considered in the first instance in order to avoid damage or disturbance to the site. Alternatively, construction activities would be halted, waiting until it was certain that the site was no longer in use. If avoidance was not possible an EPS licence would be sought from SNH and a specific assessment and mitigation plan would be developed. Protection zones for otter would be at least 200m for breeding sites (including suspected breeding sites during the period of monitoring to determine the status of the site). For sites where otters are not breeding, the exclusion zone will be 30m.

- 9.234 If construction were to be undertaken within 50m of any otter shelter and there was no likelihood of this being a breeding holt, and the shelter could not be avoided by a suitable buffer zone, a Site-specific assessment report and protection plan would be produced by the ECoW. An EPS licence would be sought from SNH.
- 9.235 Additional best practice measures would be undertaken where construction occurs in areas that the ECoW believes otter could be present. These would include: no activity to be undertaken at night or dawn/dusk periods; no lighting adjacent to watercourses; covering of all open excavations or providing suitable escape ramps in excavations for otters (and other animals) to use.

Pine Marten

- 9.236 A pre-works survey would be undertaken for pine marten by a suitably experienced ecologist not more than 8 months before the start of felling or construction. If active resting places are identified within 100-200m of a felling or construction area, micro-siting of the works would be considered, particularly if there was a possibility of a breeding site being affected. Alternatively, construction activities would be halted, waiting until it was certain that the site was no longer in use.
- 9.237 If construction were to be undertaken within 50m of any pine marten den and there was no likelihood of this being a breeding site, and the shelter could not be avoided by a suitable buffer zone, a Site-specific assessment report and protection plan would be produced by the ECoW. A licence would be sought from SNH.

Red Squirrel

- 9.238 A pre-works survey would be undertaken for red squirrel by a suitably experienced ecologist not more than 8 months before the start of felling or construction. If active dreys are identified within 100-200m of a construction area, micro-siting of the works would be considered, particularly if there was a possibility of a breeding drey. Alternatively, construction activities would be halted, waiting until it was certain that the site was no longer in use.
- 9.239 If construction were to be undertaken within 50m of a drey and there was no likelihood of this being a breeding site, and it could not be avoided by a suitable buffer zone, a Site-specific assessment report and protection plan would be produced by the ECoW. A licence would be sought from SNH.

Wildcat SPP

- 9.240 An outline SPP for wildcat has been developed in consultation with FLS, SNH and SWA (further detail is provided in Appendix 9.4), the following text summarises the proposed approach.

Pre-works Survey

- 9.241 A detailed survey method statement would be developed by a suitably experienced ecologist and this would be discussed and agreed with SNH in advance of any felling or construction works commencing for the proposed development. All methods would follow current best practice and surveys would be completed by suitably experienced ecologists with wildcat survey licences. Consideration would also be given to novel methods to improve survey effectiveness (e.g. use of specially trained and carefully controlled dogs to help locate breeding sites and resting places). The survey would be completed not more than 8 months preceding the commencement of felling/construction.

- 9.242 The initial survey and assessment would include a walkover to assess habitat quality, identify and describe potential breeding sites/resting places and search for any evidence of the presence of wildcat within at least 250m from the outer edge of the proposed works area. A larger zone of 500m would be surveyed around borrow pits where rock blasting is proposed. Areas of impenetrable thicket plantation that cannot be fully accessed would be surveyed as thoroughly as possible from the perimeter. A risk-based assessment would be made on the likelihood, based on the available evidence and quality of the habitats present, that the area could provide opportunities for wildcats to use as a resting place.
- 9.243 Should any evidence of wildcat be found and/or features that are suitable as resting places then this would trigger the need for more detailed surveys to be carried out. As wildcats tend not to leave obvious evidence of their presence a precautionary approach would be followed. It would be assumed that any suitable features are resting places until sufficient monitoring has been completed to make an informed judgement as to the status of the feature. What is considered sufficient monitoring to determine the status of any potential resting place would be set out within the survey method statement and agreed in advance with SNH.

Tree Felling / Site Clearance

- 9.244 All relevant personnel, prior to works starting within the felling area, would be fully briefed by the FLS ranger or Ecological Clerk of Works (ECoW) on the potential for wildcat to be present in the area, their status and legal protection, relevant details of the SPP and what actions they need to take should wildcats be encountered during their work.
- 9.245 Existing tree and scrub cover along all riparian zones within the proposed felling areas would be retained. This is to minimise potential habitat fragmentation effects on wildcat movement corridors through the wind farm area.
- 9.246 Where possible, tree felling and site clearance for the proposed development would be programmed outside of the main wildcat breeding season, which is March to August inclusive (i.e. includes the main gestation, birth and kitten-rearing period). By timing felling outside of this more sensitive period it will help to minimise potential disturbance effects from the construction of the proposed development on the wildcat population generally and would also avoid the risk of direct effects on any active breeding sites. This timing would also help to ensure that potential impacts on the majority of nesting birds are also minimised.
- 9.247 Where it is not possible to restrict felling outside of this period (e.g. due to an increased risk of other environmental impacts from concentrating felling into the remaining part of the year) then the appropriate approach would be followed, as detailed in the SPP. Irrespective of the time of year that it is carried out, felling can present a risk to wildcat dens and other resting places. Therefore, suitably detailed pre-works surveys would be undertaken and appropriate protection measures would be implemented, depending on the findings of those surveys, following the approach outlined in Appendix 9.4. This approach is based on the risk-matrix guidance developed by SWA (see Clashindarroch Draft LMP 2019^[1]), which builds on existing forestry guidance (FCS Guidance

^[1] Available from: [<https://forestryandland.gov.scot/images/corporate/design-plans/moray-aberdeenshire/clashindarroch-land-management-plan-draft.pdf>].

Note 35d: Forest operations and wildcats in Scotland^[2]).

- 9.248 Log stacks, brash piles and root plates would be removed from the felling areas (i.e. a minimum of 250m from the wind farm) during or immediately following felling. Logs, brash and root plates would be used to create wildcat den features, in suitable locations away from the proposed development (>500m), to be agreed with FLS in advance (see Appendix 9.5).

Risk of Killing / Injury to Wildcat (and other species)

- 9.249 The following measures would be implemented during felling/construction works to minimise the risk of killing or injuring wildcats during vehicle movements and felling/clearance works:
- felling/construction would be restricted to daylight hours only (avoiding dusk/dawn periods);
 - vehicle speed restrictions of <15 mph on site would be strictly imposed;
 - covering of all open excavations or providing suitable escape ramps; and
 - log stacks, brash piles and root plates would be removed from the felling areas (i.e. a minimum of 250m from the wind farm) during or immediately following felling.

General Disturbance during Works

- 9.250 Restricting felling to outside of the breeding season would reduce the potential impact on wildcat and would also avoid the risk of direct effects on any breeding sites. Where this is not possible, a risk-matrix approach would be followed (as set out in Appendix 9.4) to help ensure that the potential impact on wildcat from felling disturbance is minimised.
- 9.251 FLS have committed to balancing felling for the proposed development against harvesting planned for the same period elsewhere within Clashindarroch Forest. No other felling operations would occur elsewhere within the forest at the same time as felling within the wind farm area. This would help to avoid potential cumulative disturbance effects on the same individual wildcat territories.
- 9.252 Artificial lighting may be required during the works, such as vehicle and plant headlights and warning lights. Restricting works to daylight hours would help to minimise any potential impacts on wildcat from artificial lighting. Additionally, lighting at the construction compound and areas of works would be directional and light spill would be avoided to surrounding woodland.

Breeding Sires / Resting Places - Disturbance

- 9.253 No felling/construction works would be carried out within 250m of any potential wildcat resting place (i.e. including all features that could provide suitable enclosed denning or above-ground shelter) until sufficient monitoring has been carried out to determine that the site is not a resting place. What constitutes sufficient monitoring would be agreed in advance with SNH through consultation on the survey method statement.
- 9.254 If the monitoring evidence confirms, or indicates, that the feature is in use as a resting place then altering the felling/construction plan would be considered so that any impact on the site can be avoided. Where that is not possible, SNH would be consulted on the appropriate course of action,

^[2] Available from: <https://forestryandland.gov.scot/images/corporate/pdf/epswildcat.pdf>.

whether an EPS derogation licence could be granted and under what circumstances. If the evidence from monitoring is sufficiently convincing to conclude that the site is not used by a breeding female then, depending on the circumstances, if disturbance cannot be avoided, an EPS derogation licence would be sought. This would require an assessment of the potential impacts on the wildcat population and details of the proposed mitigation in the form of a site-specific protection plan.

- 9.255 If the resting place is confirmed or suspected to be used by a breeding female, then a protection zone would be established, at least 200m around the site, and no felling or other work would be carried out in that zone until SNH has been consulted on the monitoring evidence and the appropriate course of action. Due to the conservation status of the species, SNH have advised that they may not be in a position to permit the disturbance of a wildcat breeding site. This assessment would have to be made on a case-by-case basis. It is important to note that a proven wildcat resting place is legally protected whether it is in current use or not.

Breeding Sites / Resting Places - Destruction

- 9.256 If the felling/construction plans cannot be altered to avoid the destruction of a non-breeding resting place then SNH would be consulted on whether, under the specific circumstances, an EPS derogation licence could be granted. This would require an assessment of the impact on the wildcat population and details of the proposed mitigation in the form of a Site-specific protection plan. For example, mitigation could include the creation of at least three features suitable as wildcat resting places in suitable locations in the surrounding area (i.e. adjacent to suitable habitat, >500m from the wind farm).
- 9.257 For confirmed or suspected breeding sites the only course of action would be to establish a protection zone (at least 200m wide, surrounding the site). No felling or other work would be carried out until SNH has been consulted on the monitoring evidence and the potential options for mitigation. This assessment would have to be made on a case-by-case basis. As stated above in relation to disturbance, it may not be possible to obtain an EPS licence to allow the destruction of a wildcat breeding site, even if it is not in use at the time.

Watching Brief / Works Supervision

- 9.258 There would be a watching brief in place during the felling and construction operations to help ensure that the relevant SPP measures are correctly and consistently applied and also to react to any new evidence of wildcat that may be found during the works. This would be the responsibility of the appointed ECoW.

Residual Effects

- 9.259 The residual effects of the construction phase are summarised in Table 9-14. All effects are negative unless otherwise stated.

Table 9-14
Summary of Residual Effects for Habitats and Protected Species During the Construction Phase

Receptor	Effect without Mitigation (significant effects shown in bold)	Best Practice/Mitigation Measures	Overall Residual Effect/Level of Confidence
Watercourses	Moderate - Pollution (siltation, acidification, hydrocarbons)	<ul style="list-style-type: none"> Felling operations to follow best practice detailed in the Forest & Water Guidelines. Pollution prevention measures, including silt management and spillage procedures, as detailed in Technical Appendix 3.1. Effective construction drainage design and management. ECoW full-time supervision of the works. Monitoring of water quality during the works, rapid and effective reaction to exceedances. 	Minor (Not significant) Near-certain
Fish	Negligible - Habitat loss/fragmentation Moderate - Freshwater pollution (siltation, acidification, hydrocarbons)	<ul style="list-style-type: none"> See above re. protection of surface waters during the works. Best practice measures include following SEPA guidelines for working near watercourses, as well as ensuring that no more than 20% of the main catchments are felled within any three-year period, and include re-planting of riparian trees. Implementation of a Fisheries Management and Monitoring Plan. 	Overall Minor Near-certain
Marshy grassland (inc. associated GWDTEs)	Negligible - Habitat loss/degradation	<ul style="list-style-type: none"> Micrositing during detailed design to further avoid sensitive habitats. Avoid / minimise damage during felling process. To follow the best practice measures outlined within the CEMP. Soil/peat stored with the topsoil and subsoil are kept distinct and protected by turfs placed over them vegetation side up. 	Negligible Near-certain
Other terrestrial habitats	Minor - Habitat loss/degradation	<ul style="list-style-type: none"> Micrositing during detailed design to further avoid sensitive habitats. To follow the best practice measures outlined within the CEMP. Soil stored with the topsoil and subsoil are kept apart, and protected by turfs placed over them vegetation side up. 	Negligible Near-certain
Badger	Minor - Habitat loss for commuting and foraging Minor - Disturbance from noise and lighting	<ul style="list-style-type: none"> A pre-works badger survey to be undertaken. Appropriate mitigation to be implemented if setts could be affected. Vehicle speed restrictions of <15 mph on Site would be strictly imposed. No lighting near to setts or known paths. Providing escape ramps in deep excavations. Follow SPP protocol for protection of setts. 	Overall Negligible Near-certain
Bats	Minor - Habitat loss/fragmentation for commuting and foraging Negligible - Roosting habitat loss Minor - Killing/injury Minor - Freshwater pollution Moderate-minor -	<ul style="list-style-type: none"> A pre-works bat roost survey to be undertaken. Appropriate mitigation to be implemented if roosts are present and potentially affected. No lighting near to roosts or known commuting routes. Follow SPP protocol for protection of identified roosts. Pollution prevention measures as detailed above for watercourses. 	Overall Negligible Near-certain

Receptor	Effect without Mitigation (significant effects shown in bold)	Best Practice/Mitigation Measures	Overall Residual Effect/Level of Confidence
	Disturbance from noise and lighting		
Otter	Negligible - Habitat loss/fragmentation Minor - Freshwater pollution Minor - Killing/injury Minor - Disturbance from felling/construction activities	<ul style="list-style-type: none"> • Pollution prevention measures as detailed above for watercourses. • Pre-works surveys to provide an updated baseline and location of potential breeding sites or resting places. • Vehicle speed restrictions of <15 mph on Site would be strictly imposed. • Providing escape ramps in deep excavations. • Follow SPP protocol for protection of identified resting places. • Other protection measures to be incorporated into SPP as appropriate. 	Overall Negligible Near-certain
Pine marten	Minor - Habitat loss/fragmentation Minor - Killing/injury Minor - Disturbance from felling/construction activities	<ul style="list-style-type: none"> • Pre-works surveys to provide an updated baseline and location of potential / confirmed resting places. • Vehicle speed restrictions of <15 mph on Site would be strictly imposed. • Providing escape ramps in deep excavations. • Follow SPP protocol for protection of identified resting places. • Other protection measures to be incorporated into SPP as appropriate, where advised by the ECoW. 	Overall Minor Near-certain
Red squirrel	Minor - Habitat loss Minor - Killing/injury Minor (Not significant) – Disturbance from felling/construction activities	<ul style="list-style-type: none"> • Pre-works surveys to provide an updated baseline and location of potential / confirmed resting places. • Vehicle speed restrictions of <15 mph on Site would be strictly imposed. • Follow SPP protocol for protection of identified resting places. • Other protection measures to be incorporated into SPP as appropriate. 	Overall Minor Near-certain
Wildcat	Negligible - Habitat loss/fragmentation Moderate - Killing/injury Moderate - Disturbance from felling/construction activities	<ul style="list-style-type: none"> • Pre-works surveys to provide an updated baseline and location of potential / confirmed resting places. • Follow SPP protocol for protection of identified resting places. • Other protection measures to be incorporated into SPP include: <ul style="list-style-type: none"> • Following the wildcat risk-matrix approach, as outlined in the draft LMP and SPP, to help minimise disturbance to wildcat during felling operations. • Restricting felling works to outside the breeding season, where possible and appropriate, to reduce the potential disturbance effects on wildcat generally and avoid the risk of any direct effects on breeding sites. • Felling would be restricted to daylight hours only (avoiding dusk / dawn periods); • Managing felling operations across Clashindarroch Forest to balance wind farm and non-wind farm felling. • Providing escape ramps in deep excavations. 	Overall Negligible Probable

Receptor	Effect without Mitigation (significant effects shown in bold)	Best Practice/Mitigation Measures	Overall Residual Effect/Level of Confidence
		<ul style="list-style-type: none"> Vehicle speed restrictions of <15 mph on Site would be strictly imposed; and Log stacks, brash piles and root plates would be removed from the felling areas (i.e. minimum of 250m from the wind farm) during or immediately following felling. 	

Operational Effects

Potential Freshwater Pollution/Aquatic Habitat Degradation

- 9.260 There is the potential for run-off from an operational wind farm to include accidental chemical pollution (for example, oils or fuels) and for spills to occur directly into watercourses. However, the potential for such incidents would be expected to be much more limited in extent, duration and frequency in comparison to the construction phase.
- 9.261 As a result of clear-felling of conifer plantation, there may be some ongoing acidification of watercourses as a result of medium to long-term soil changes.

Watercourses

- 9.262 The risk of significant point-source pollution incidents and diffuse pollution during wind farm operation would be greatly reduced in comparison to the felling and construction phases. However, there is a potential risk associated with all vehicle and plant use (e.g. fuel, oil, hydraulic fluid spills) near to watercourses during day-to-day Site operations and during track repairs, drainage maintenance and larger works that may need to be carried out periodically such as turbine blade replacement. Without further mitigation, the effects of freshwater pollution during the operational phase is assessed as Medium on watercourses, resulting in a potential effect significance level of Moderate (i.e. **Significant**).

Fish

- 9.263 Without further mitigation, the effects of freshwater pollution incidents during the operational phase of the wind farm area are conservatively assessed as Medium, resulting in a potential effect significance level of Moderate (i.e. **Significant**).
- 9.264 Systematic annual monitoring of salmonid fish populations and water quality is proposed prior to, during and following the construction of the proposed development. This would be detailed within a Fisheries Management Plan (FMP), which would be developed and agreed in consultation with the relevant stakeholders, well in advance of the start of works. The scope and programme of the proposed monitoring are outlined in Table 9-16.

Otter

- 9.265 In comparison to the construction phase, the risk of pollution incidents is greatly reduced in scope and scale during the operational phase, therefore the risk to otter is inherently lower. Without mitigation, the potential effect of freshwater pollution during the operational phase is assessed as

Low for otter, resulting in a potential effect significance level of Minor (i.e. **Not Significant**).

Displacement/Disturbance to Protected Mammal Species

- 9.266 There are very few peer-reviewed papers or published wind farm monitoring studies that have considered the effects of operational wind farms on terrestrial mammals (excluding bats). A small number of studies have focused on a few species at individual wind farm sites and most have been completed over relatively short periods. It is therefore important to be cautious in extrapolating the results from these few site-specific studies to the circumstances of the proposed development. However, there are some general findings and principles that are likely to be relevant to this assessment.
- 9.267 It is important to acknowledge that the effects resulting from changes in habitats as a result of wind farm construction can be difficult to disentangle from the effect of the wind turbines (e.g. visual presence and noise) and human activities associated with wind farm construction, operation and servicing. In the context of wind farms located in forests the removal of the trees (whether this is 'key-hole' felling or clearance of the trees on a wider basis) will radically alter the habitat suitability for most species. This can have both positive and negative effects depending on the species considered.
- 9.268 In a literature review on the subject completed by Helldin *et al.* (Ref. 9.31) it was proposed that the adverse effects on large mammals (such as deer and carnivores) were mainly the result of the increase in human activity associated with construction works. When human presence decreased following the construction phase there would be a period of habituation to the wind farm and gradual return to vacated habitats. There is also no evidence in the literature to indicate that wind farms can act as an important barrier to the free movement of wide-ranging terrestrial mammals.
- 9.269 A study of an operational wind farm in southern Poland, over two winters, found that roe deer (*Capreolus capreolus*) and European hare (*Lepus europaeus*) avoided wind farm interiors and the wind turbines (i.e. macro and micro-avoidance). Foxes (*Vulpes vulpes*) showed a neutral response to the wind turbines (Łopucki *et al.*, Ref. 9.32). Significant, although temporary, avoidance of wind farms during construction has been reported for the Iberian wolf (case study reviewed in Helldin *et al.* (2017). Łopucki *et al.* (2017) speculated that large grazing mammals such as deer less frequently visited the wind farm, and areas close to wind turbines, due to both the physiological effects of excessive noise and their impaired ability to hear approaching predators.
- 9.270 There is little evidence in the literature to suggest that operating wind turbines directly affect small mammal populations (e.g. Ennen *et al.* (Ref. 9.33), Łopucki and Mróz (Ref. 9.34)). Therefore, the potential for effects on prey species availability for wildcat and pine marten is considered unlikely. Although, effects from habitat changes due to tree felling would occur and are potentially positive in terms of prey availability.
- 9.271 In conclusion, although published scientific studies on the effects of wind turbine noise and visual disturbance are lacking, this does not mean that there are no effects. A precautionary approach to impact assessment is therefore appropriate in the absence of better quality data being available. Consequently, it is appropriate that the potential effects from wind farm development on large mammals should be minimised as much as possible (e.g. timing works outside particularly sensitive periods and avoiding important habitats supporting the population) and mitigated (e.g. creating and enhancing habitats). This is particularly important in the case of wildcat whose populations are at such critically low levels. Further discussion of the potential operational effects of the proposed wind farm on wildcat is provided in the species-specific section below.

Badger

- 9.272 In comparison to the construction phase the risk of disturbance to badger would be greatly reduced during the operational phase. Without considering mitigation, long-term disturbance/displacement effects during the operation of the wind farm have been assessed Negligible for badger, which is **Not Significant**.

Bats

- 9.273 In comparison to the construction phase the risk of disturbance to bat roosts would be greatly reduced during the operational phase. Without considering mitigation, long-term disturbance/displacement effects during the operation of the wind farm have been assessed Negligible for bats, which is **Not Significant**.

Otter

- 9.274 In comparison to the construction phase the potential for disturbance to otter would greatly reduced during the operational phase. Current evidence suggests that otter are infrequently present within the Site. It is unlikely that the level of human activity during the wind farm operation would differ appreciably from existing baseline levels within Clashindarroch Forest. Without considering mitigation, disturbance/displacement effects from the operational wind farm has been assessed as having a Negligible effect on otter, which is **Not Significant**.

Pine Marten

- 9.275 In comparison to the felling and construction works the potential for disturbance to pine marten would be greatly reduced in during the operational phase. It is unlikely that the level of human activity during the wind farm operation would differ appreciably from existing baseline levels within Clashindarroch Forest. There is no evidence form the monitoring of the existing wind farm that this species has been displaced by the presence of the wind turbines and may have been attracted into the area of the existing wind farm due to increased prey availability. There is also no evidence from the literature (although monitoring and research of this issue are lacking) that this is species is likely to be sensitive to visual or noise effects from the operating wind turbines. Without considering further mitigation, long-term disturbance/displacement effects from the operational wind farm has been assessed as Low overall for the pine marten population within Clashindarroch Forest, resulting in a potential effect significance level of Minor (i.e. **Not Significant**).

Red Squirrel

- 9.276 In comparison to the felling works the potential for disturbance to red squirrel would greatly reduced during the operational phase of the development. There is also no evidence from the literature (although monitoring and research of this issue are lacking) that this is species is likely to be sensitive to visual or noise effects from the operating wind turbines. Without considering mitigation, long-term disturbance/displacement effects during the operational phase of the wind farm have been assessed as having a negligible effect on the red squirrel population within Clashindarroch Forest, which is **Not Significant**.

Wildcat

Operational Disturbance & Displacement

- 9.277 There does not appear to be any published research that has considered wind farm disturbance and displacement effects on wildcat in detail. However, this issue has received some attention in Germany, particularly in the central and southwestern parts of the country where wildcats are present in areas where wind farms have been constructed. Emerging evidence from pre- and post-construction monitoring indicates that wildcats do not necessarily avoid wind turbines after construction disturbance has ceased, although the results of longer-term monitoring are not yet available (Reichenbach *et al.* 2015 (Ref. 9.35), Trinzen 2017 (Ref. 9.36)). Given the limited information available on this issue, the known sensitivity of wildcat to human disturbance and the acute conservation status of the species in Scotland, it is considered reasonable to assume that wildcats are sensitive in the long-term to effects from operating wind turbines.
- 9.278 Evidence from monitoring with the core and wider study areas indicates the proposed development area is not likely to provide important supporting habitats for breeding female wildcats. It appears to be located within an area that is within or towards the margins of several male territories. This location, adjacent to the elevated western edge of Clashindarroch Forest, is also likely to reduce the risk of disruption to connectivity within and between wildcat territories and the wider WPA.
- 9.279 Activity by walkers (potentially accompanied by dogs) and cyclists using the new wind farm access tracks could increase human disturbance of the area during the operational phase of the wind farm. The extent to which this could result in a meaningful effect on wildcat is unclear. The use of areas by wildcat hunting and moving at night which are subject to relatively high levels of human/vehicle use during the day has been reported in studies from mainland Europe (e.g. Klar *et al.* 2009, Ref. 9.37). A study on the importance of camera trap location on wildcat detection rates in forests in central Germany found that the extent of traffic on forest roads does not affect wildcat capture success (Wening *et al.* 2019, Ref. 9.38). As stated previously, there is some evidence of displacement of wildcat from roads at a distance of 200m (Ref. 9.27). Applying a nominal 200m zone of potential displacement around the proposed wind turbines equates to a total area of c. 175 ha. This equates to c. 3.0% of Clashindarroch Forest, c. 0.5% of the WPA as a whole, and 1.6% of high-quality wildcat habitat within the WPA.
- 9.280 When assessing potential disturbance effects on wildcat from the increased presence of people and vehicles it is important to consider the context and existing sources of disturbance. The proposed wind farm is located within a working commercial conifer plantation where there is regular use of the tracks by forestry vehicles for tree harvesting and management activities. The Site is also open to the general public for use by walkers, horse riders and Nordic skiers in the winter. The forest has also been made available for car rallying competitions in the past. Wildcats are clearly using the core study area and the wider forest despite existing levels of human presence and potential sources of disturbance. It is perhaps relevant that most human/vehicle activity occurs during the daytime when wildcats are generally less active. It is proposed in the SPP that this issue is best addressed through operational monitoring. Action that could be taken to reduce such potential effects should they occur would be the encouragement of public access along routes that are less sensitive.
- 9.281 There would also be an increase in vehicle movements within the core study area, which presents a potential increased collision risk to wildcat. Measures are also proposed to help ensure that vehicle mortality risk is not increased from the existing baseline.

- 9.282 Taking into account available information, it is considered unlikely, given the size of the proposed development and quality of habitats in the core study area, that operational disturbance effects would be significant for any individual wildcat territory. However, there is clearly uncertainty around potential long-term effects. Sources of disturbance associated with the operation of the existing and proposed wind farms could act cumulatively and reach a threshold where wildcats are affected and potentially avoid the area. In making detours to avoid the wind turbine locations, this could result in increased energy expenditure, particularly if the whole area is avoided. This would result in reduced access to a much larger area of relatively undisturbed foraging habitat and shelter and could affect access to potential mates. Over time, this could adversely affect breeding productivity and survival rates, resulting in a significant effect on the local population. However, there is no evidence from the construction and operation of the existing Clashindarroch wind farm for any appreciable adverse effect on wildcat. Although it is recognised that information is limited in this regard. It appears likely, based on the available information from the EIA baseline surveys and desk study, that the Clashindarroch wind farm site was not used regularly by wildcat prior to construction (Vattenfall 2009, Ref. 9.39).
- 9.283 Although considered unlikely, there is also the theoretical potential for habitat displacement to alter a female wildcat's use of her territory. This could result in greater exposure to feral and domestic cats during oestrus, thereby increasing the rate of hybridisation.
- 9.284 This general issue of potential operational effects is considered to have a low risk of occurring, but because of the high sensitivity of the wildcat population the potential effects, should they occur, are significant. Therefore, this issue has been considered in detail in the assessment and in the proposed mitigation strategy for the operational wind farm.

Wind Turbine Movement, Noise and Lighting

- 9.285 As a species primarily active during crepuscular and nocturnal periods, the potential for wildcat to be affected by the visual presence of the turbines (e.g. blade movement, shadow flicker, aircraft warning lights) is considered to be low. Such effects would be limited to some extent by the screening provided by the retained and replanted trees adjacent to the wind turbines and in the wider forest. Also, given the tendency for wildcats to use riparian corridors in Clashindarroch Forest, this would also provide some topographic shielding from the wind turbines located on more elevated positions.
- 9.286 As well as the physical/visual presence of the wind turbines potentially influencing behaviour and habitat use, there is also the potential for wind turbine noise to disturb wildcats, interfere with hunting activity and potentially with mating behaviour. The potential effects are likely to vary depending on the character of the noise (frequency range, amplitude, duration, intermittency). Noise can mask or reduce the perception of important sounds in the animal's environment (e.g. affecting prey capture, predator avoidance, signalling to potential mates). It may also cause physiological stress reactions such as increased heart rate and respiration. This could, in turn, cause behavioural responses such as avoidance of the affected area (i.e. habitat displacement). Wildcats may also react to noise due to a general wariness of any novel or strange sounds in their environment. The potential importance of such effects on the wildcat population would also depend on the context (e.g. displacement of a female with young from a den site in comparison to a male displaced from a relatively small part of its outlying territory) and the degree to which wildcats may habituate to, or tolerate, the noise.
- 9.287 Based on the experience from wind farm projects in Europe, Germany in particular, there is some evidence that wind farm projects within habitats used by wildcat can avoid significant impacts on

the species. In relation to disturbance to wildcats during felling and construction works there are procedures and measures that can be implemented to effectively mitigate the risk of significant impacts occurring. However, it is also recognised that there is currently a lack of data on the potential long-term effects of wind farms on this species.

- 9.288 There is also some evidence from surveys completed in Clashindarroch Forest between 2015 and 2018 that wildcats are occasionally active near to the existing wind farm. For example, during camera trapping in autumn/winter 2018 a hybrid wildcat was recorded using a clear-fell area near to a watercourse and within c. 250m of the nearest wind turbine. A wildcat (potential hybrid) was also seen within c. 500m of the existing wind farm during spring 2015. During winter 2018-19 one of the wildcats fitted with a GPS collar by WildCRU was recorded within 30m of a wind turbine.
- 9.289 In comparison with other mammals, wildcats are known to have particularly sensitive hearing (Harris & Yalden 2008, Ref. 9.40). They are able to detect noises at relatively low sound pressure thresholds and across a broad range of frequencies (e.g. 48 Hz to 85 kHz, based on a study of domestic cats, Heffner & Heffner 1985 (Ref. 9.41). Their sensitivity to high frequency, low amplitude sounds is likely to be an adaptation to hunting small mammals. Most of the noise from wind turbines is produced when the blades pass through the air. Most of the sound energy is within a band of relatively low frequencies (e.g. between 500-1000 Hz). The amplitude of the sound varies as a result of a wide range of factors including: distance from the source; turbine size; wind speed; wind direction; humidity; temperature and attenuation by intervening topography and vegetation. This frequency range should not directly interfere with the higher frequencies that wildcats are likely to be focusing on during active hunting. Although, as discussed above, there is the potential for wildcats to avoid areas affected by wind turbine noise due to other reasons.
- 9.290 Two types of aircraft warning lighting are required to be fitted to the highest practical points on the wind turbines (i.e. on the nacelle). The turbines on the perimeter of the scheme are to be fitted with MOD accredited 25 candela, omni-directional, red or infrared lighting with an optimised flash pattern of 60 flashes per minute. All of the wind turbine nacelles would also be fitted with medium intensity (2000 candela) steady red aviation warning lights to comply with CAA requirements.
- 9.291 Under good light conditions, wildcat vision is understood to be dichromatic, responsive to green and blue light, and well-developed in comparison to domestic cats (Williams *et al.* 1993, Ref. 9.42). Wildcat vision is also highly responsive to movement even under low light conditions (Macdonald & Loveridge 2010, Ref. 9.43)). Artificial night lighting (i.e. illumination of roads and paths) has been identified as a potentially important impact on a wide range of nocturnal mammals (Beier 2006, Ref. 9.44). Wildcats, similarly to other wild felids, tend to actively avoid areas illuminated by artificial lighting. Whilst the potential effects of artificial night lighting is a general concern, in this case, the spectrum and luminosity of the proposed lighting, such as it would be visible at a localised ground level, is considered unlikely to have any appreciable effect on wildcat or any other non-flying mammals present in the core study area. Potential effects on bats are considered separately.

Conclusions

- 9.292 The potential long-term effects of wind farm development on wildcat populations, and the temporal and spatial scales over which these effects might operate are currently poorly understood. There is a lack of published studies and data relevant to this issue. However, based on the limited information available, primarily from wind farm development in Germany, there is some evidence to indicate that carefully located, designed and constructed wind farms can avoid significant effects on the species. However, taking a precautionary approach considering the

current conservation status of wildcat in Scotland, it has been assumed in the assessment that long-term effects are possible and appropriate mitigation is required to offset them.

- 9.293 Measures are proposed to reduce and offset the potential long-term effects on wildcat from the operation of the wind farm should planning consent be forthcoming. This includes measures to reduce the potential effects at source (i.e. the way in which the wind farm area is managed), to improve the quality of habitats away from the wind farm area and to support wildcat conservation efforts in the wider WPA.
- 9.294 Consideration has also been given in the assessment, and in the measures proposed to offset operational effects, to the potential long-term value of the proposed development study area for wildcat (i.e. the density of wildcats the area could potentially support should ongoing and future conservation measures within the wider WPA result in an increase in the wildcat population).
- 9.295 Without considering mitigation, and on a precautionary basis given the uncertainty about long-term effects and the critical status of the species, potential effects during the operational phase of the wind farm have been assessed as a Low effect overall, due to the importance of Clashindarroch Forest for the species at a national level, this is a potential effect significance level of Moderate (i.e. **Significant**).

Collision Risk and Barotrauma for Bats

- 9.296 Bat fatalities at wind farms have been attributed to both direct collision and barotrauma. Barotrauma involves tissue damage to air-containing structures in the body caused by rapid or excessive pressure change which occurs near to rotating turbine blades. Due to the long lifespan and slow reproductive rate of bats, a possible increase in mortality due to wind turbines has the potential to have a significant effect on local populations. Bat mortality from wind turbines has been reported from a large number of operating wind farms in Europe and North America with mortality rates varying considerably from site to site. An extensive study of operating wind farms in the UK found bat fatality rates similar to those reported for wind farms elsewhere in Europe, ranging from 0 to 5.25 bats per turbine per month (Mathews *et al.* 2016, Ref. 9.45).
- 9.297 Bat mortality at turbines does not appear to be the result of chance events, however, the key elements that result in some sites posing a relatively high risk to bats are still not fully understood. In a review of published studies of bat and wind farm interactions Arnett *et al.* (2016, Ref. 9.46) highlighted a number of factors are potentially important influences on the risk that individual wind farms present to bat populations:
- there is no clear evidence that specific turbines within a wind farm are more 'risky' for bats than others, therefore targeted mitigation at the individual turbine scale is unlikely to be effective, measures must be applied to the wind farm as a whole;
 - most bat fatalities, in temperate regions of North America and Europe, occur during late summer and early autumn;
 - bats may be attracted to wind turbines and/or their insect prey may be attracted resulting an increased risk to bats that would not be evident during pre-construction monitoring;
 - there is weak or contradictory evidence for the influence of topography or habitat type on bat mortality risk; and
 - most bats are killed on nights with relatively low wind speeds (e.g. <6 m/s) and relatively warm air temperature. This is likely related to an associated increase in aerial insect activity

at height.

- 9.298 Recent published studies and reviews of the issue of bat wind farm mortality (e.g. Arnett *et al.* 2016 (Ref. 9.46), Lintott *et al.* 2016 (Ref. 9.47), Mathews *et. al* 2016 (Ref. 9.45), Richardson *et al.* 2019 (Ref. 9.48)) have highlighted issues with the highly variable nature of pre-construction bat activity data, and the relatively infrequent occurrence of bat fatalities at most wind farms that have been monitored (and for which there is data available). At afforested sites the baseline survey data is also unlikely to be representative of bat activity once the trees have been felled and the wind farm is operational. In this case, the survey methods have been adapted to try to address this (see Technical Appendix 9.3), but it is not possible to entirely account for this effect. It is therefore important that the interpretation of pre-construction data and in the assessment of potential impacts there is recognition of the limitations of pre-construction monitoring studies and the uncertainties about the risk to bats from individual wind farm developments.
- 9.299 Bats species adapted to fly in open, less cluttered air-space (i.e. away from vegetation) are considered to be most vulnerable to wind turbine mortality. Common and soprano pipistrelle were both recorded during the 2015 and 2016 bat activity surveys. These species can exploit both open habitats and moderately cluttered environments, including woodland edges. Both species are considered to be at high risk from wind turbine mortality (SNH *et al.* 2019, Ref. 9.13) due to their behaviour and flight capabilities (i.e. being able to exploit open habitats and potentially hunting for insects within the height band that the wind turbines would be operating within).
- 9.300 During 2015, 2016 and 2019 surveys, there was comparatively low bat activity across open habitats within the Site in comparison to activity levels recorded along watercourses and forest edges. Habitat quality at the locations where the wind turbines were proposed to be sited (i.e. in thicket and pole-stage spruce plantation on relatively elevated ridges and spurs, away from riparian zones) was relatively poor in terms of foraging habitat suitability. Although it is recognised that there is the potential for bats to be active, particularly on warmer nights with low wind speeds, above the range of the ground-based bat detectors and potentially above canopy height. The plantation areas that would be affected by the proposed wind farm felling was considered to be of negligible value as a roosting resource as the relatively young, densely-planted conifers lacked suitable features that bats typically use as roost sites.
- 9.301 There was no evidence from the desk study of any known bat roosts within or near to the proposed wind farm Site. However, one ruined building within the study area, at Corrydown (see Figure 9.7b), was identified as having suitability as a roost site. Separate roost activity surveys (see Technical Appendix 9.2) confirmed it was used by a small number of common pipistrelles and is likely to be a non-breeding summer roost. Overall, habitat suitability for bats within the proposed / likely wind turbine locations was considered to be low. The study area as a whole was considered to be low-moderate in overall sensitivity for bats.
- 9.302 Siting turbines within woodland ('key-holing') may increase the risk to bats due to the creation of edge habitats near to the wind turbines and particularly for bats that fly above tree canopy height (Rodrigues *et al.* 2014, Ref. 9.49). There is also the potential for the clearance of trees for the construction new access tracks to create attractive fly-ways for bats, leading them towards wind turbine locations. There is some evidence that the size of the clearfell area can influence bat activity with greater levels of activity recorded in smaller felled stands compared to larger ones, although increases in activity may be in response to relatively short-term increases in prey availability following felling operations (Kirkpatrick *et al.* 2017, Ref. 9.50). The EUOBATS guidance (Rodrigues *et al.* 2014, Ref. 9.49) state that wind turbines should not be installed within 200m of woodland

due to the high risk of fatalities. Currently, UK guidance recommends a minimum separation of 50m from blade tips to the nearest woodland edge or linear feature that bats use (SNH *et al.* 2019, Ref. 9.13).

- 9.303 In this case, the wind farm tree felling has been designed to ensure that there is a minimum 50m wide buffer from blade tips to forest edge (this equates to a c. 80m radius zone around the proposed model of wind turbine). Tree felling, where it is needed, would also be to wind-firm edges (see Technical Appendix 3.2). Some of the forest coupes where wind turbines are proposed would be felled before construction, under the existing FLS Fell Plan (i.e. will be felled anyway, irrespective of the wind farm being constructed). This would result in the edges of retained standing trees generally being much further than 50m from the proposed wind turbines (see Figure 3.2.6 in Technical Appendix 3.2).
- 9.304 The proposed aircraft warning lighting has the potential to increase the risk to bats from the operating wind turbines by acting as an attraction to the bats or to their aerial insect prey. Some bat species are drawn to artificial light (e.g. mercury-vapour street lights in particular) but, unlike birds, the purpose of this behaviour is to increase foraging efficiency due to the high density of aerial insects that can gather around bright lights at night. There is no evidence that artificial lights disorientate bats to the same extent as can be the case for nocturnal migrant birds. Therefore, in relation to the proposed wind turbine lights, the primary potential concern for bats is for the lights to attract insects and thereby increase bat foraging activity and at the same time the risk of blade collision or barotrauma from the rotating blades.
- 9.305 From the few monitoring studies that have considered lighting as a factor in bat deaths at wind turbines, lighting of turbines does not appear to appreciably affect mortality risk (e.g. Bennett & Hale 2014 (Ref. 9.51)⁶). It has also been speculated that insects may be attracted to the heat produced by the turbine machinery within the nacelle rather than any lights. However, most of these studies are from North America where flashing red aviation warning lights have been deployed rather than solid burning red lights, as proposed in this case. Most aerial insects that are attracted by light directly (i.e. display phototaxis) are most responsive to lights that emit in ultraviolet A wavelengths (i.e. 400 - 320nm). This is why mercury vapour lights with a strong UV component are used to attract insects in light traps (i.e. for entomological surveys). Consequently, the attractiveness of the proposed red turbine lights (which would emit light at the opposite end of the visible spectrum) would be expected to be poor in comparison to UV lights or bright white lights.
- 9.306 There is no widely accepted guidance on the issue of turbine lighting and bats in the UK. On the basis of currently available information, which provides no evidence of an effect from lighting from the few studies that have been published to date, it is reasonable to conclude than the proposed aircraft warning lights should have no additional adverse impact in relation to bat mortality risk.
- 9.307 However, taking into consideration on-going research gaps and uncertainties about the long-term effects of onshore wind farms in the UK on bat populations, a precautionary approach to this assessment has been followed.
- 9.308 Without considering further mitigation or monitoring, the potential for collision risk/barotrauma of bats with turbine blades, in particular, common and soprano pipistrelle populations present within Clashindarroch Forest, has been assessed on a precautionary basis, as a Low effect, resulting in a

⁶ NB this study considered flashing red lights rather than red lights that are permanently on, as is proposed in this case, although the moving turbine blades may create the impression that the lights are flashing from some positions in front of the turning blades.

potential effect significance level of Minor (i.e. **Not Significant**).

Mitigation

General Best Practice Measures During the Operational Phase

- 9.309 During the operation of the wind farm, general maintenance would be required on the wind turbines and tracks. Access to areas requiring maintenance would be confined to areas previously used for construction activities with no new access tracks constructed. Method statements for all potential maintenance and emergency maintenance works would be developed in accordance with best practice for both terrestrial and freshwater habitats and therefore protected species.
- 9.310 Although significant impacts are not predicted, given the uncertainty about the potential risk to bats, particularly with the additional uncertainty that the proposed aircraft warning lighting creates, a bat activity monitoring programme is proposed. The details of the monitoring programme will be discussed and agreed with SNH prior to the wind farm becoming operational.

Wildcat Mitigation for the Operational Phase

- 9.311 The proposed HMP (see Appendix 9.5) is intended to offset the potential long-term effects of the operation of the wind farm on wildcat. The following measures are proposed to reduce, where possible, potential disturbance effects at the source.
- all Site operation and maintenance work would be restricted to daylight hours;
 - the <15 mph speed limit would also apply to all wind farm vehicles during the operational phase of the proposed development; and
 - pre-works surveys for wildcat would be completed in advance of any significant maintenance and repair work (e.g. replacement of turbine blades), which has the potential to disturb wildcat present in the surrounding area. The applicable measures set out for the construction phase would be followed.
- 9.312 The new access tracks (c. 11km in total) constructed for the wind farm could result in an increase in activity by people (e.g. dog walkers, horse riders, cyclists) within this part of Clashindarroch Forest. The potential for this to occur to the extent that it could result in a significant impact on wildcat is considered to be low. However, such activity, particularly affecting any wildcats using this part of the forest for shelter during the daytime, could potentially increase beyond a threshold that becomes significant. Evidence of this potential effect would be subject to monitoring during the operational phase of the wind farm.
- 9.313 If required to reduce an effect identified through monitoring, measures could be taken to encourage use of specific walking and cycling routes within the forest. The routes could be designed to avoid areas that wildcat are known to favour.

Outline HMP & Support for Wildcat Conservation

- 9.314 The following is a summary of the proposed HMP objectives and their purpose. The HMP proposals have been discussed in outline with SNH, SWA and FLS (further detail is provided in Technical Appendix 9.5). They would be developed into fully detailed prescriptions in a wildcat HMP prior to commencement of the proposed development:

- Wildcat Habitat Corridors: develop, in consultation with SWA, FLS and other relevant landowners, a detailed plan for the improvement of habitats for wildcat within corridors linking Clashindarroch Forest to large woodland areas at Gartley, Correen and Insch. This to include up to 50 ha of suitable native woodland/scrub planting which may be subdivided into smaller blocks of up to 1 ha, not more than 500m apart, and linking hedgerows - in order to improve habitat connectivity within and beyond the Strathbogie WPA;
- Riparian Zones: within the proposed development area: protection and enhancement of suitable cover and hunting habitat for wildcat along riparian zones within the wind farm study area - to mitigate potential effects from the operating farm, affecting wildcat use of, and movement through, the area;
- Artificial Dens: create at least 10 den sites (e.g. boulder piles, hay barns, brash and root plate piles), breeding females are thought to use a suite of dens in close proximity to each other, which they will regularly transfer their kittens between - in order to address the potential loss of similar suitable resting places as a result of felling, construction and the operational effects of the wind farm; and
- Windthrow: retaining or creating windthrow areas, cross-felling low value standing timber near to stand edges in suitable undisturbed locations >500m from the wind farm - in order to address the potential loss of similar habitat as a result of felling, construction and the operational effects of the wind farm.

9.315 SWA currently has a project officer for the Strathbogie WPA. The project officer carries out important work in the priority area including monitoring and camera trapping, managing volunteers, promoting wildcat conservation, and the Trap-Neuter-Vaccinate-Release (TNVR) programme. When SWA completes this phase of its work in 2020, there will no longer be a dedicated conservation officer for Strathbogie. SNH have advised that it is anticipated that there will be a single conservation officer to cover all the WPAs to continue some monitoring and work with volunteers.

9.316 Further discussion with SWA and SNH is proposed to determine the most effective way for the proposed development to support a full-time wildcat project officer (WPO) for at least 5-years should existing funding sources no longer be available at that time. The role of the WPO is anticipated to be broadly similar to the current role under SWA (i.e. including the continuation of wildcat monitoring within the WPA and the TNVR programme, see below) and would also include responsibility for overseeing the implementation of the proposed HMP. The management of the WPO position would be the responsibility of SWA or if this is not practical then alternative options would be considered and agreed with the relevant parties (e.g. the WPO post could be managed by FLS).

9.317 SWA has been managing the TNVR programme across the WPAs since 2016. As of summer 2018, over 200 cats have been treated through this programme. If this work were not to continue it is likely that the number of feral cats in the vicinity would grow, further increasing the impact of hybridisation on Scottish wildcat. There is the potential for the proposed development to fund the continuation of the TNVR programme should existing sources of funding no longer be available at that time.

Residual Effects

9.318 The residual effects of the operational phase are summarised in Table 9-15. All effects are negative unless otherwise stated.

Table 9-15
Summary of Residual Effects for Habitats and Protected Species During the Operational Phase

Receptor	Effect without Mitigation (significant effects shown in bold)	Best Practice/Mitigation Measures	Overall Residual Effect/Level of Confidence
Watercourses	Moderate - Pollution	<ul style="list-style-type: none"> • Good practice track drainage and water-crossing design. • Post-construction monitoring of water quality. • Confining maintenance vehicles to existing roads. • Spillage emergency procedures. 	Minor-negligible Near-certain
Fish	Moderate - Freshwater pollution	<ul style="list-style-type: none"> • Good practice track drainage and water-crossing design. • Post-construction fish population and water quality monitoring. 	Minor-negligible Near-certain
Badger	Negligible – Disturbance / displacement	<ul style="list-style-type: none"> • Maintain <15 mph speed limit on all access tracks. 	Negligible Probable
Bats	Negligible - Disturbance Minor - turbine collision risk/barotrauma	<ul style="list-style-type: none"> • Reduce the risk of bat mortality during the operational phase of the wind farm through a commitment to maintain forest edges at least 50m from the turbine blade tips. • A monitoring programme is proposed, should permanent aircraft warning lighting be required, to ensure that the risk to bats from the operational wind farm is properly quantified. 	Negligible - Disturbance Minor - turbine collision risk/barotrauma Probable
Otter	Minor - Freshwater pollution Negligible - Disturbance/ displacement	<ul style="list-style-type: none"> • Good practice track drainage and water-crossing design. • Maintain <15 mph speed limit on all access tracks. 	Negligible - Freshwater pollution Negligible - Disturbance Near-certain
Pine marten	Minor - Disturbance/ displacement	<ul style="list-style-type: none"> • Maintain <15 mph speed limit on all access tracks. 	Minor Probable
Red squirrel	Negligible - Disturbance/ displacement	<ul style="list-style-type: none"> • Maintain <15 mph speed limit on all access tracks. 	Negligible Near-certain
Wildcat	Moderate - potential disturbance/ displacement	<ul style="list-style-type: none"> • Wildcat habitat enhancement proposals set out within an outline HMP. Also, financial support for wildcat conservation measures within the wide Strathbogie WPA. These measures are proposed to offset the potential long-term effects of the proposed development on wildcat. • Maintain speed restrictions for all vehicles on Site. • Monitoring programme. 	Negligible-minor - potential disturbance / displacement Probable

Decommissioning Effects

- 9.319 Decommissioning would involve secondary earthworks with the removal of structures, such as turbine foundations. Such works would have the potential to create long-term adverse effects on habitats and habitats for protected species, additional to disturbance to protected species. Further, there would be potential for temporary effects from pollution, arising from hydrocarbons spillages from vehicles and machinery, which could be associated with resultant pollution of terrestrial and freshwater habitats.
- 9.320 The scale and nature of effects would be similar to those of the construction phase, with the type of access and working methods (such as for wind turbine and foundation removal) being critical to determining the level of effects.
- 9.321 It is therefore assumed that the general effects from decommissioning would be no greater than those during the construction phase.

General Best Practice Measures during the Decommissioning Phase

- 9.322 The potential effects on habitats and protected fauna from decommissioning of the proposed development is difficult to assess with certainty due to the potential for ecological baseline conditions to have changed over the estimated 25-30 year operational life of the proposed development. However, given the existing Site, it would be expected that the ecological constraints would be similar in 25-30 years. As such, the decommissioning mitigation would be similar to the construction mitigation.
- 9.323 Pre-works survey and the relevant SPP measures proposed for the construction phase would apply to the decommissioning works. However, these measures would be reviewed, in advance of the decommissioning, in order to take into account the results of monitoring during the operation of the wind farm, advances in scientific understanding of wildcat and current best practice to mitigate impacts on the species that would have emerged since the wind farm was constructed.

CUMULATIVE EFFECTS

- 9.324 Potential cumulative effects have been considered at the scale of the wider Clashindarroch Forest (with respect to protected species) and for the relevant catchments with respect to fish populations. The main potential sources of cumulative effect for this assessment relate to the existing wind farm and the tree harvesting, thinning and long-term management plans for the forest.
- 9.325 The potential for cumulative disturbance effects on protected species are considered to be only relevant in the case of relatively wide-ranging species such as bats, pine marten and wildcat. Such effects will be minimised by FLS managing and scheduling the timing of proposed felling across the forest area as a whole. Felling required for the wind farm would not be completed at the same time as other significant harvesting operations elsewhere within the forest. This would also help to ensure that potentially significant cumulative effects on fish populations from tree harvesting within the wider catchments of the Kirkney Water and the Lag Burn can be avoided.
- 9.326 In relation to the existing wind farm and the potential for significant cumulative effects on key protected species, as stated previously (see Assumptions, Limitations and Confidence), the baseline surveys for this assessment did not coincide with the construction phase for Clashindarroch wind

farm. The wind farm has been operational since winter 2014-15. There is some evidence in the literature (scientific and 'grey' literature) for the displacement of some terrestrial mammal species (excluding bats) during wind farm construction followed by an apparent period of habituation once the wind farm is operational. It is unknown the extent to which this scenario is applicable to wildcat and pine marten in this case, and what the potential duration of the habituation period could be. However, based on what limited information is available, there is no evidence indicating that the existing wind farm has resulted in significant displacement of these species. For example, during the 2018-19 camera trapping surveys pine marten were recorded at all of the camera traps located within the existing wind farm (see Technical Appendix 9.2). Also, a hybrid wildcat was recorded on one of the camera traps located within that area. This is despite the fact that most of the plantation trees had been cleared from the site prior to the Clashindarroch wind farm becoming operational, which removed almost all cover for pine marten and wildcat within c. 250m of the majority of the wind turbines.

- 9.327 Baseline surveys for the EIA of the existing Clashindarroch wind farm did not indicate regular use of the area by wildcat and the evidence available at that time from research on Scottish wildcat ecology and from local site knowledge (such as forest rangers) suggested that this was a reasonable conclusion. It is important to acknowledge that the surveys for the EIA of Clashindarroch wind farm were completed over 10 years ago. Information on wildcat presence and use of the forest has increased significantly since then, due to the work completed by SWA and others within the Strathbogie WPA. There are also differences in survey methods and survey effort in comparison to the baseline surveys undertaken for this assessment.
- 9.328 There is no evidence to indicate that the construction and operation of the existing wind farm has distorted the baseline data for this EIA, for example, by displacing key species from parts of the survey area near to the existing wind farm. It is possible, if wind farm displacement is occurring, that this could have caused in an increase in wildcat activity within the proposed development survey area. However, if assumptions about low levels of use prior to felling and construction of Clashindarroch wind farm are valid this would not be expected.
- 9.329 There is also the potential for cumulative effects on bat populations (i.e. mortality risk from both wind farm projects combined). However, this is not considered to be a significant concern for this assessment due to the inherently low risk to bats from the existing wind farm. It is located in an area that has been largely cleared of trees, leaving very few forest edges within the wind farm. Those edge habitats are also at the highest and most exposed parts of the Site, where conditions are least favourable for foraging bats.
- 9.330 It remains a possibility, and a reasonable assumption, that the clearance of dense conifer plantation for the existing wind farm has actually improved foraging habitat quality for both species and therefore levels of activity may have increased post-felling. However, following a precautionary approach to this assessment, due to the inherent limitations and uncertainties, it has been concluded that adverse cumulative effects, such as wind farm displacement, are possible.
- 9.331 In conclusion, there are clearly some uncertainties about the potential cumulative effects from wind farm development on terrestrial mammals (including, in particular, wildcat and pine marten). However, the available evidence, although limited and with some weaknesses, does not indicate that the existing Clashindarroch wind farm has had any appreciable adverse effect on these species. Therefore, significant cumulative effects are not anticipated, particularly when the proposed suite of mitigation measures to avoid, minimise and offset effects, are taken into consideration.

FURTHER SURVEY REQUIREMENTS AND MONITORING

- 9.332 Pre-works surveys for badger, bats, otter, red squirrel, pine marten and wildcat would be completed by suitably experienced ecologists (holding the relevant SNH survey licences) not more than 8 months in advance of works commencing (including tree felling). Following the surveys, specific additional mitigation may be necessary to ensure the works proceed lawfully with respect to the relevant legislation protecting these species.
- 9.333 Should permanent aircraft warning lighting be fitted to the wind turbines (i.e. if alternative technologies, that satisfy CAA and MoD requirements, are not acceptable or achievable) a bat activity monitoring programme would be implemented. The objective of the monitoring would be to determine the actual risk to bats from the operating wind farm. Should significant risk be identified, additional mitigation would be developed and implemented in consultation with SNH.
- 9.334 A wildcat monitoring programme would be implemented during the operational phase of the proposed development. A detailed monitoring plan would be developed in consultation with SNH, SWA and FLS (and any other interested parties) in advance of works commencing on the proposed development. The main objectives would be to determine the extent to which wildcat behaviour has been influenced by the presence of the wind farm, inform decisions on any changes to wind farm operational mitigation and to assess the development and effectiveness of the habitat enhancement measures proposed under the HMP. This is likely to include systematic camera trapping and could also include support for satellite tracking studies of wildcats to further improve knowledge of the use of Clashindarroch Forest by wildcat.
- 9.335 Under the proposed Fisheries Management Plan, pre-works electrofishing and fish habitat surveys would be completed for at least one year prior to works commencing (including tree felling). The proposed schedule of monitoring is outlined in Table 9-16 below and the proposed monitoring locations in Technical Appendix 9.6 (see also Figure 9.6.1). This outline of the approach to the pre-works, construction and post-construction monitoring of fish (and water quality generally) has been agreed in consultation with the River Deveron District Salmon Fisheries Board and Deveron, Isla and Bogie Rivers Charitable Trust.

Table 9-16
Proposed Schedule of Survey and Water Quality Monitoring

	No. Sampling Points (inc. control sites)	Frequency	Pre-construction (12 months minimum)	Felling / Construction Phase	Monitoring Years Post-construction			
					1	2	3	4
Water quality scheduled sampling	11 (inc. 2 control sites)	Monthly	✓	✓	✓*	✓*	✓*	✓*
Water quality monitoring (data loggers)	3	Continuous	✓	✓	✓*	✓*	✓*	✓*
Water quality monitoring (ECoW)	As required	As required		✓				
Water quality (operational phase)	As required	Quarterly			✓*	✓*	✓*	✓*
Electrofishing	11 (inc. 2 control sites)	Annual	✓	✓	✓*	✓*	✓*	✓*

	No. Sampling Points (inc. control sites)	Frequency	Pre-construction (12 months minimum)	Felling / Construction Phase	Monitoring Years Post-construction			
					1	2	3	4
Fish Habitat	11 (inc. 2 control sites)	Annual	✓	✓	✓*	✓*	✓*	✓*
Aquatic Macroinvertebrates	11 (inc. 2 control sites)	Annual	✓	✓	✓*	✓*	✓*	✓*

* The scope, duration and frequency of post-construction monitoring would be agreed in consultation with SEPA and the Deveron District Salmon Fishery Board

STATEMENT OF SIGNIFICANCE

- 9.336 The assessment of effects on key ecological receptors arising from the proposed development has identified the potential for unmitigated significant effects to occur from felling and construction activities. In particular, associated with the risk of pollution to watercourses with resulting effects on sensitive watercourses and fish populations downstream of the site. The unmitigated effects of disturbance associated with felling and construction of the wind farm could result in potentially significant effects on wildcat. The unmitigated effects of the operation of the wind farm could also result in potentially significant effects on watercourses, fish and wildcat.
- 9.337 The implementation of appropriate monitoring, Site environmental supervision and good practice methods to avoid, minimise and control aquatic pollution during felling and construction would minimise the risk of effects on fish populations and aquatic habitats. No significant residual effects are predicted on these receptors.
- 9.338 Pre-works surveys for the relevant protected species (i.e. badger, bats, otter, pine marten, red squirrel and wildcat) would be completed. The results would inform detailed species-specific protection plans that would be developed prior to works commencing (including tree felling). The protection plans would include appropriate best practice measures to ensure that the potential adverse effects on the species during felling and construction are avoided and that the works proceed lawfully with respect to the legislation protecting the species. It is vital that significant disturbance to wildcat, especially breeding females, is avoided during the works due to the 'critically endangered' status of the population in Scotland. Outline SPPs have been included in Technical Appendix 9.4 which set out the proposed approach.
- 9.339 A suitably experienced Ecological Clerk of Works would be appointed to supervise the implementation of, and adherence to, the agreed environmental protection measures for the duration of the pre-works, construction and Site restoration phases of the project. The ECoW would have authority to immediately halt any works that have the potential to affect protected species or that would contravene the ecological/environmental commitments.
- 9.340 The risk of bat mortality during the operational phase of the wind farm is likely to be low and has been reduced through the design of the wind farm, the felling plans and a commitment to maintaining forest edges at least 50m from the turbine blade tips. However, there is uncertainty around this potential effect due to the inherent limitations of pre-construction bat monitoring (i.e. the industry-wide issue of accurately characterising the risk to bat populations from wind farm development). This uncertainty is increased by the requirement to install aircraft warning lighting on some of the wind turbines. Such lighting has the potential to increase the risk of bat mortality

although this is again considered to be unlikely it cannot be completely ruled out. It is possible that alternative technologies would be put in place to avoid the need for visible or permanent aircraft warning lighting. However, should permanent aircraft warning lighting be required, a monitoring programme is proposed, to ensure that the risk to bats from the operational wind farm is fully understood.

- 9.341 An outline HMP has been developed, in consultation with SNH and FLS, which is principally intended to address the uncertain and potential long-term effects of the proposed wind farm on the wildcat population associated with Clashindarroch Forest (the implementation of the HMP would also have wider biodiversity benefits). The HMP proposals would be developed into fully detailed plans and prescriptions prior to commencement of the proposed development and as soon as possible following planning determination. The HMP includes measures to improve habitat connectivity for wildcat between Clashindarroch Forest and the large woodland blocks within the Strathbogie WPA. There are also measures proposed in the outline HMP to protect and enhance important wildcat habitats within Clashindarroch Forest to ensure that there is no loss of denning opportunities and so that potential habitat fragmentation effects are avoided or minimised. The Applicant is also committed to assisting wildcat conservation action within the WPA through the financial support of a Wildcat Project Officer and to assist ongoing efforts to address wildcat hybridisation through a TNVR (trapping, neutering, vaccinating and release) programme for feral cats.
- 9.342 The assessment of the proposed development has concluded, assuming that the proposed mitigation measures are implemented effectively, that all potentially significant adverse effects are avoidable for all sensitive ecological receptors. In relation to the HMP proposals, there is the potential to result in a net-positive contribution to local biodiversity and national nature conservation policy objectives in the long-term.

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