

**Ecology report: mammal survey and
ecological assessment for a proposed
upgrade of the Shannon Erne Blueway,
Co. Cavan**

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DOCUMENT CONTROL SHEET

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1 Introduction

Waterways Ireland (WI) is proposing to upgrade the Shannon Erne Waterway from Lock 1 to Aghalane to Blueway standards (multi-recreational use path). In addition, WI are partnering with Cavan County Council to investigate a connecting trail from Aghalane to Belturbet, where the route follows the existing road network and an existing agricultural access laneway.

To ensure the proposed project is developed in the most sensitive and sustainable manner possible WI have commissioned the following works:

1. A mammal survey of the entire route.
2. A detailed ecological assessment of potential habitat sensitivities between Aghalane and Belturbet.

2 Methods

2.1 Study area

The study area comprised a linear survey area covering approximately 5 km. The survey followed the proposed route of the Shannon Erne Blueway from Lock 1 to Aghalane, and then a proposed trail route following the existing road network and agricultural access laneway from Aghalane to Belturbet.

2.2 Desktop survey and consultation

A detailed desktop survey was carried out to gather available information on the study area. This included data sources such as National Parks and Wildlife Service (NPWS) site information, and the National Biodiversity Data Centre (NBDC) species database maps.biodiversityireland.ie was reviewed for species records within the same 2 km squares as the survey area. In addition, relevant ecological reports prepared for WI were reviewed and an internet search was undertaken.

Data collection focused, but was not confined to, habitats listed within Annex I and flora and fauna listed on Annex II and IV of the EU Habitats Directive. Flora and fauna listed under the Wildlife Acts 1976-2012. Flora listed on the Flora (Protection) Order, 2015 (S.I. 356/2015). Invasive species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011 (S.I. 477/2011). Bird species listed on Annex I of the Birds Directive and Birds of Conservation Concern in Ireland (BoCCI; Colhoun *et al.*, 2013).

2.3 Field survey

A field survey was undertaken on 13th November 2018 to gather up-to-date ecological data on the study area to augment data collected as part of the desktop study. The following activities were undertaken as part of this field survey:

- **Bats:** As the survey was conducted in November, when bat activity is reduced, the bat element focused on recording trees and structures within the study area that are potential bat roosts (PBRs).
- **Mammals (excluding bats):** Mammal activity within the study area was assessed, including a detailed assessment of otter and badger activity and potential foraging routes/holts/setts. The location of otter spraints (droppings), slides, potential holts, badger setts, *etc.* were recorded using a hand-held GPS with representative photographs taken. The optimal time for carrying out badger and otter surveys are winter/spring when vegetation cover is at its lowest.
- **Plants and habitats:** All habitats within the section of the survey area along the proposed trail route from Aghalane to Belturbet were classified as per Fossitt (2000) Guidelines (Level III), with habitats that conformed to Annex I of the Habitats Directive, in particular, highlighted.

Mapping data were recorded in the field and digitised on return to the office using ArcGIS based on ITM projection. Mapping followed the best practice guidance by Smith *et al.* (2011) and the minimum mapping area for habitats was set at 100 m² and the minimum length for a linear feature was set at 20 m, unless a feature or habitat was considered to be of particular note, such as an old building that could be a PBR.

2.4 GIS

Digital habitat maps were prepared based on the information collected in the course of the field survey. Habitats were mapped in ITM using ArcGIS following the Fossitt (2000) classification. Locations of notable species, including records of mammal species, are illustrated on the mapping. Also particularly ecological sensitive areas, such as Annex I habitats or important resources for pollinators, are also illustrated on the mapping.

3 Results

3.1 Desk study

The survey area is not within any sites designated by National Parks and Wildlife Service as being of conservation interest; the closest designated sites are Lough Oughter and Associated Loughs SAC (000007), which is adjacent to the southern end of the trail in Belturbet, and Lough Oughter SPA (004049), which is approximately 4 km to the south of the survey area. Of the three Qualifying Interests for the nearby Lough Oughter and Associated Loughs SAC, otter (*Lutra lutra*) (**Table 1**) is the only one located within the survey area and the data collected on this species during the current study is discussed below.

Table 1 lists the nine native mammal species that have been recorded within the survey area or within the same 2 km squares (H31J, H31N, and H31P) as the survey area. Two of the mammal species listed in **Table 1**, otter and Leisler's bat, are listed as Near Threatened by Marnell *et al.* (2009).

Table 1: Desk study records for native mammal species previously recorded within the same 2 km squares (NBDC, 2018) as the survey area.

Common name	Scientific name	Year of last record	Status of this species in Ireland (Marnell <i>et al.</i> , 2009)
Leisler's bat	<i>Nyctalus leisler</i>	2006	Near threatened
Common pipistrelle	<i>Pipistrellus pipistrellus</i>	2006	Least concern
Daubenton's bat	<i>Myotis daubentonii</i>	2011	Least concern
Otter	<i>Lutra lutra</i>	2001	Near Threatened
Badger	<i>Meles meles</i>	2017	Least concern
Irish hare	<i>Lepus timidus</i> ssp. <i>hibernicus</i>	1997	Least concern
Irish stoat	<i>Mustela ermine</i> ssp. <i>hibernica</i>	2001	Least concern
Pine marten	<i>Martes martes</i>	2015	Least concern
Fox	<i>Vulpes vulpes</i>	2017	Least concern

Table 2 lists the 17 bird species that have been recorded within the survey area or within the same 2 km squares (H31J, H31N, and H31P) as the survey area.

Seven of these birds are Green-listed species (Colhoun and Cummins, 2013) and not considered threatened. Six species are Amber-listed by Colhoun and Cummins (2013) and are of medium conservation concern. Three of the birds species listed in **Table 2**, the Common Goldeneye, Common Pochard, and Tufted Duck, are Red-listed and are bird species of high conservation concern.

Table 2: Desk study records for bird species recorded within the same 2 km squares (NBDC, 2018) as the survey area.

Common name	Scientific name	Year of last record	Status of the species in Ireland (Colhoun and Cummins, 2013)
Blackcap	<i>Sylvia atricapilla</i>	2011	Least concern
Canada Goose	<i>Branta canadensis</i>	2001	Considered an invasive species
Common Buzzard	<i>Buteo buteo</i>	2011	Least concern
Common Coot	<i>Fulica atra</i>	2001	Medium concern
Common Goldeneye	<i>Bucephala clangula</i>	2001	High conservation concern
Common Moorhen	<i>Gallinula chloropus</i>	2001	Least concern
Common Pochard	<i>Aythya ferina</i>	2001	High conservation concern
Common Snipe	<i>Gallinago gallinago</i>	2001	Medium concern
Common Whitethroat	<i>Sylvia communis</i>	2011	Least concern
Great Cormorant	<i>Phalacrocorax carbo</i>	2001	Medium concern
Great Crested Grebe	<i>Podiceps cristatus</i>	2001	Medium concern
Grey Heron	<i>Ardea cinerea</i>	2001	Least concern
Little Grebe	<i>Tachybaptus ruficollis</i>	2001	Medium concern
Mallard	<i>Anas platyrhynchos</i>	2001	Least concern
Mute Swan	<i>Cygnus olor</i>	2001	Medium concern
Tufted Duck	<i>Aythya fuligula</i>	2001	High conservation concern
Water Rail	<i>Rallus aquaticus</i>	2001	Least concern

There are no records of notable plant species listed by NBDC (2018) that are within the same 2 km squares as the survey area. Two non-native invasive mammal species listed on the Third Schedule of S.I. 477/2011, have been recorded within the same 2 km squares (H31J, H31N, and H31P) as the survey area (**Table 3**).

Table 3: Desk study records for non-native invasive species which are listed on the Third Schedule of S.I. 477/2011 recorded within the same 2 km squares (NBDC, 2018) as the survey area.

Common name	Scientific name	Date of last record
Grey squirrel	<i>Sciurus carolinensis</i>	2001
American mink	<i>Mustela vison</i>	2001

3.2 Field survey results

3.2.1 Habitat survey

Below are the results of the habitat survey, along with the ecological assessment of the habitats recorded as guided by NRA (2009). A total of 16 habitat types covering 4.83 ha and 9.14 km were identified within the survey area and these are presented on the habitat map in Appendix 1. The

surveyed area was the footprint of the proposed trail from Aghalane Bridge to Belturbet and was generally confined to roads and tracks and adjacent linear habitats such as hedgerows. The survey also included some more extensive areas of land owned by WI and Cavan County Council in the north of the site near Aghalane Bridge. All habitats are mapped according to *The Irish Heritage Council Habitat Classification Scheme* (Fossitt, 2000). The habitats are described below and listed in decreasing order of area, or length for the linear habitats. As the survey area was dominated by linear habitats these are listed first. Photographs of habitats are presented in Appendix 2.

BL3 - Buildings and artificial surfaces: This is the most abundant habitat recorded within the survey area covering 1.54 ha. The majority of this habitat is paved road; although in places the paved road is less than 4 m wide and could have been mapped as a polyline large areas are greater than 4 m wide and for simplicity all areas were mapped as polygons, but there were also two abandoned buildings. This habitat is of no importance for wildlife unless some of the deserted buildings are found to contain bat roosts, currently both abandoned buildings are classified as moderate-high PBRs.

GS2 - Dry meadows and grassy verges: This is the most common linear habitat recorded, covering 3.94 km, it also covers an area of 0.46 ha within the survey area. Common grass species within this habitat include Cock's-foot (*Dactylis glomerata*), and False Oat-grass (*Arrhenatherum elatius*). Broadleaf herb species recorded within this habitat were Dandelions (*Taraxacum* agg.), Bush Vetch (*Vicia sepium*), Red Clover (*Trifolium pratense*), Meadowsweet (*Filipendula ulmaria*), Common Nettle (*Urtica dioica*), and Ribwort Plantain (*Plantago lanceolata*). This habitat is deemed to be of *Low Local Importance*, but it does represent small areas of semi-natural habitat that are of some local importance for wildlife.

WL1 - Hedgerows: This is the second most common linear habitat, covering 3.62 km of the survey area. Hedgerows are lower than treelines, mainly less than 5 m high. Common tree species within this habitat are Ash (*Fraxinus excelsior*), Hawthorn (*Crataegus monogyna*), Hazel (*Corylus avellana*), and Blackthorn (*Prunus spinosa*). Holly (*Ilex aquifolium*) and Goat Willow (*Salix caprea*) were less common tree species noted within the hedgerows. Common fern species are Hart's-tongue (*Phyllitis scolopendrium*) and Male-fern (*Dryopteris filix-mas*). Many of the common grasses and broadleaf herbs associated with grassy verges (GS2 listed above) were also associated with the hedgerows. Additional species that are more common within the WL1 habitat included Ivy (*Hedera helix*), Great Horsetail (*Equisetum telmateia*), and Cleavers (*Galium aparine*). Semi-natural hedgerows are deemed to be of *High Local Importance* as they provide cover and foraging opportunities for bird and mammal species and nesting sites for some bird species. Hedgerows also serve the function of maintaining habitat links between areas of semi-natural habitat within the locality.

As one of the aims of the current study was to undertake an ecological assessment of potential habitat sensitivities WL1 was only used to classify semi-natural hedgerows, to distinguish this ecologically sensitive habitat from hedgerows that are predominantly made up of non-native species. The most common non-native hedgerow species within the survey area were Wilson's Honeysuckle (*Lonicera nitida*), Wild Privet (*Ligustrum vulgare*), and Snowberry (*Symphoricarpos albus*).

FW4 - Drainage ditches: This linear habitat includes 0.88 km of wet channels that are artificial in origin. The drainage ditches recorded within the site survey area are usually found beneath hedgerows, but also occur underneath a treeline. There are dry ditches recorded within the survey area, but as they did not appear to support wetland vegetation they are not included within this habitat category. Generally, common plant species that are tolerant of waterlogged conditions, such as Creeping Buttercup (*Ranunculus repens*) and Great Horsetail were found in the wet ditches, two plants that were only recorded within wet ditches were Floating Sweet-grass (*Glyceria fluitans*) and Brooklime (*Veronica beccabunga*). The drainage ditches serve the function of maintaining habitat links and they are deemed to be of *Low Local Importance*.

ED2 – Spoil and bare ground: This linear habitat covered 0.29 km and was made up of an unconsolidated farm track. This habitat is of no importance for wildlife.

WL2 - Treelines: Only three treelines were mapped within the survey area covering 0.26 km. The two treelines mapped in the north of the site are made up of mature White Salix (*Salix alba*) with eight of these trees ranked as moderate-high or high level PBRs. The one treeline in the south of the site had tall emergent Hawthorn trees but a very similar flora to the hedgerows (WL1 listed above). The treelines within the survey area are deemed to be of *High Local Importance*.

BL2 – Earth banks: Although there is only 53 m of earth banks within the survey area, they are also an occasional component of the hedgerows that were surveyed. Although many of the plant species associated with the bank are also recorded within the hedgerows (WL1 listed above) two characteristic species of the banks are Primrose (*Primula vulgaris*) and the moss species (*Rhytidiadelphus triquetrus*). The earth banks that are not associated with hedgerows are of *Low local Importance*.

FW1 – Eroding/upland rivers: A short, 44 m section, of stream was recorded flowing through the riparian woodland into the Rag River. The stream serves the function of maintaining links between aquatic habitats and it is deemed to be of *Low Local Importance*.

BL1 – Stone walls and other stonework: A 28 m section of old stone wall was recorded in the south of the site. The old stone wall would be expected to provide shelter to fauna including small mammals and is ranked as *Low Local Importance*.

GS4 - Wet grassland: This is the second most abundant habitat in terms of total area, covering 1.44 ha or 30% of the survey area. This habitat is common in the north of the site near Aghalane Bridge, often found in a mosaic with other drier grassland habitats. Common species within this habitat include broadleaf herbs such as Creeping Buttercup, Meadowsweet (*Filipendula ulmaria*), Silverweed (*Potentilla anserina*), and Common Nettle, the grasses Yorkshire Fog (*Holcus lanatus*) and Creeping Bent (*Agrostis stolonifera*), Brown sedge (*Carex disticha*) and Hard Rush (*Juncus inflexus*). Along the Woodford River, some areas of wet grassland are dominated by Reed Canary-grass (*Phalaris arundinacea*) and Willowherb species (*Epilobium* spp.). Using the ecological rating system this habitat is deemed to be of *Low Local Importance*.

GS1 – Dry calcareous and neutral grassland: The habitat covered 0.53 ha of the survey area, including a short 22 m linear section of grassland habitat. GS1 was only recorded within the northern section of the site and is most common in the drier areas of a large field where it is found in a mosaic with areas of wet grassland. The sward height was short at the time of the field survey, as the habitat is preferentially grazed by the two horses within the field. Common grass species within the habitat include Crested Dog's-tail (*Cynosurus cristatus*), Smooth Meadow-grass (*Poa pratensis*), and Perennial Rye-grass (*Lolium perenne*). Common broadleaf herbs are Meadow buttercup (*Ranunculus acris*), Daisy (*Bellis perennis*), White Clover (*Trifolium repens*), and Common Mouse-ear (*Cerastium fontanum*). Using the ecological rating system this habitat is deemed to be of *Low Local Importance*.

WN5 – Riparian woodland: This is the third most abundant habitat in terms of total area, covering 0.53 ha. This habitat is found in two riverine locations and consists of small areas of woodland dominated by willow species, including Grey Willow (*Salix cinerea*) and the two and non-native species White Willow and Osier (*Salix viminalis*). The broadleaf herbs Creeping Buttercup and Common Nettle are frequent components of the field layer. Using the ecological rating system this habitat is deemed to be of *Low Local Importance*.

WD1 – (Mixed) broadleaved woodland: This habitat was recorded growing on the steep N3 embankment and covered an area of less than 0.1 ha. The woodland is a mixed stand of semi-mature native species such as Birch (*Betula* spp.) and non-native species such as Beech (*Fagus sylvatica*). This habitat is assessed to be of *Low Local Importance*.

WS1 - Scrub: Less than 0.1 ha of scrub habitat was mapped, but small areas of Bramble (*Rubus fruticosus* agg.) scrub that were below the minimum mapping area were also occasional within the survey area. This habitat is deemed to be of *Low Local Importance*.

WN2 – Oak-ash-hazel woodland: Less than 0.1 ha of this woodland type was recorded in a thin section of woodland that has developed from an abandoned track and the adjacent treelines. The tree species within the woodland include Hawthorn, Hazel and Spindle (*Euonymus europaeus*) and the grass species False Brome (*Brachypodium sylvaticum*), Primrose, and Male-fern are common components of the field layer. This habitat is ranked as *High Local Importance* as evidence was found showing that badgers, a species protected under the Wildlife Acts 1976 to 2012, regularly utilised the habitat.

FS1 – Reed and large sedge swamps: Adjacent to the Woodford River, there is a very small area, less than 0.1 ha, of Bulrush (*Typha latifolia*) dominated swamp. This habitat is deemed to be of *Low Local Importance*.

Table 4 lists each of the 16 habitats recorded in the survey area with the NRA rating assigned to each of them.

Table 4: NRA ratings assigned to the 16 habitats recorded in the Belturbet survey area. Habitat categories are according to Fossitt (2000). Habitats are listed according to ecological importance NRA (2009).

Habitat category	NRA rating
WL1 – Hedgerows	High Local Importance
WL2 – Treelines	High Local Importance
WN2 – Oak-ash-hazel woodland	High Local Importance
BL1 – Stone walls and other stonework	Low Local Importance
BL2 – Earth banks	Low Local Importance
FS1 – Reed and large sedge swamps	Low Local Importance
FW1 - Stream	Low Local Importance
FW4 – Drainage ditches	Low Local Importance
GS1 –Cry calcareous and neutral grassland	Low Local Importance
GS2 – Dry meadows and grassy verges	Low Local Importance
GS4 – Wet grassland	Low Local Importance
WD1 – (Mixed) broadleaved woodland	Low Local Importance
WN5 – Riparian woodland	Low Local Importance
WS1 – Scrub	Low Local Importance
BL3 – Buildings and artificial surfaces	No Importance
ED2 – Bare ground	No Importance

3.2.2 Bat roost survey results

Large mature trees, particularly White Willow, some with splits and holes, were recorded as PBRs of moderate-high or high value. The full list of trees are shown below in Table 5. The majority of the PBR trees are located along the southern bank of the Woodford River. There are also two abandoned

buildings and an old farm building within the survey area that are potential bat roosts of moderate-high or high value and these are listed at the end of **Table 5**.

Table 5: The location of potential bat roosts within the survey area. Easting and Northings are presented in ITM.

Type	PBR rating	Notes	Location	Easting	Northing
<i>Salix alba</i>	Moderate to high	Line of 3 trees	Between Aghalane Bridge and Lock 1	633916.9	819358.4
<i>Salix alba</i>	High	Tree with snapped trunk	Between Aghalane Bridge and Lock 1	633933.9	819354.4
<i>Salix alba</i>	High	Tree with heavy ivy and snapped branches	Between Aghalane Bridge and Lock 1	634024.9	819355.4
<i>Salix alba</i>	High	Line of 3 trees	Between Aghalane Bridge and Lock 1	633934.9	819333.4
<i>Salix alba</i>	Moderate to high	105 m line of trees	Between Aghalane Bridge and Lock 1	633862.9	819385.4
<i>Salix alba</i>	Moderate to high	75 m line of trees	Between Aghalane Bridge and Lock 1	633752.9	819449.4
<i>Salix alba</i>	Moderate to high	Line of 5 trees	Between Aghalane Bridge and Lock 1	633536.0	819498.3
<i>Salix alba</i>	Moderate	Line of 3 trees	Between Aghalane Bridge and Lock 1	633462.0	819492.3
<i>Salix alba</i>	High	Single tree	Between Aghalane Bridge and Lock 1	633153.1	819621.3
<i>Fraxinus excelsior</i>	High	Tree with heavy ivy	Between Aghalane Bridge and Lock 1	633118.1	819643.3
<i>Quercus sp.</i>	High	Tree with heavy ivy	Between Aghalane Bridge and Lock 1	633106.1	819650.3
<i>Salix alba</i>	High	Tree with holes	Between Aghalane Bridge and Lock 1	632952.1	819786.3
<i>Salix alba</i> & <i>Fraxinus excelsior</i>	High	100 m line of trees	Between Aghalane Bridge and Lock 1	632919.1	819789.3
<i>Salix alba</i>	High	Single tree	Between Aghalane Bridge and Lock 1	632802.2	819783.3
<i>Salix alba</i>	High	Single tree	Between Aghalane Bridge and Lock 1	632774.2	819778.3
<i>Quercus sp.</i>	High	Single tree	Between Aghalane Bridge and Lock 1	632353.2	819947.3
<i>Quercus sp.</i>	High	Single tree with split limbs and holes	Between Aghalane Bridge and Lock 1	632167.3	820138.2
<i>Quercus sp.</i>	High	Single tree	Between Aghalane Bridge and Lock 1	632153.3	820151.2
<i>Quercus sp.</i>	High	Tree with heavy ivy	Between Aghalane Bridge and Lock 1	632140.3	820165.2
<i>Fraxinus excelsior</i>	High	Tree with holes	Between Aghalane Bridge and Lock 1	632068.3	820200.2
<i>Salix alba</i>	Moderate to high	Single tree	South bank of Rag River	634660.0	818430.0
<i>Quercus robur</i>	Moderate to high	Tree with heavy ivy and broken limbs	Between Rag River and Belturbet	634891.0	818026.4
Built structure	Moderate to high	Abandoned house	Between Rag River and Belturbet	634094.6	819373.5
Built structure	Moderate to high	Abandoned house	Between Rag River and Belturbet	634615.1	818606.0
Built structure	High	Old farm building	Between Rag River and Belturbet	635053.4	817758.1

3.2.3 Mammal survey (other than bats) results

A badger trail and latrine (Plate 5 Appendix 2) were located within an area of WN2 woodland on the northern bank of the Rag River (location shown on Appendix 1). There is a known sett (NBDC, 2018) within approximately 200 m of where the badger latrine was found.

A badger latrine was also located near Lock 1, on the southern bank of the Woodford River in scrub to the west of the existing path. A temporary badger shelter (Plate 6 Appendix 2) was also located nearby in a culvert running under the towpath.

During the survey, a fox was observed in the vicinity of the WD1 woodland strip next to the N3 and foxes and other mammals may utilise this area for cover before crossing safely under the N3.

Although there is evidence from 2001 for otter activity on the northern banks of the Woodford River, within the vicinity of Aghalane Bridge (NBDC, 2018), no field evidence for the species was located during the current field survey.

Additional evidence of mammal activity are summarised in **Table 6**.

Table 6: The location of field signs for mammals within the survey area. Easting and Northings are presented in ITM.

Species	Notes	Location	Easting	Northing
Badger	Latrine	Near Lock 1	631498.4	820230.2
Badger	Bedding at mouth of culvert	Near Lock 1	631497.4	820225.2
Badger	Feeding signs	Near Lock 1	631390.5	820172.2
Badger	Mammal trail	North bank of Rag River	634651.6	818448.3
Badger	Latrine	North bank of Rag River	634644.6	818448.0
Fox	Fox flushed from bramble scrub	Near Aghalane Bridge	633935.9	819274.4
Fallow deer	Deer tracks abundant	Mixed woodland south of Woodford River near Lock 1	631358.8	820155.5
Unknown	Scat (rose hips)	Between Aghalane Bridge and Lock 1	633821.9	819416.4
Unknown	Scat	Between Aghalane Bridge and Lock 1	633717.0	819462.4
Unknown	Scat	Between Aghalane Bridge and Lock 1	633584.0	819498.3
Unknown	Scat (rose hips)	Between Aghalane Bridge and Lock 1	633570.0	819499.3
Unknown	Scat	Between Aghalane Bridge and Lock 1	633489.0	819497.3
Unknown	Scat on path (rose hips)	Between Aghalane Bridge and Lock 1	633122.1	819634.3
Unknown	Mammal trail	Between Rag River and Belturbet	634635.1	818416.8
Unknown	Mammal trail	Between Rag River and Belturbet	635395.9	817474.0

3.2.4 Non-native invasive species

Although desk study results exist for two non-native invasive mammal species listed on the Third Schedule of S.I 477/2011 within the same 2 km squares as the survey area (see **Table 3**), no non-native invasive species listed on the Third Schedule were recorded during the current survey. However, just outside the survey area a large stand of Japanese Knotweed (*Fallopia japonica*) was recorded on the northern bank of the Woodford River to the west of Aghalane Bridge.

3.2.5 Survey limitations

The habitat survey was carried out in November, outside the optimum habitat surveying period (April - September); however, this survey focused on common habitats and was undertaken by an experienced botanist and therefore the limitations were minor.

4 Discussions, recommendations and mitigation

4.1 Designated sites

The proposed trail between Lock 1 and Belturbet is not within an area designated by National Parks and Wildlife Service as being of conservation interest. Although there are records for otter activity from 2001 on the northern side of the Woodford River (**Table 1**) there is no evidence for this species or any of the other Qualifying Interests listed for Lough Oughter and Associated Loughs SAC (000007) within the survey area.

4.2 Habitats

Fourteen of the habitats listed in **Table 4** are considered to be of some ecological importance; three are considered to be of *High Local Importance* and 11 are considered to be of *Low Local Importance*. The proposed development of the trail from Lock 1 to Belturbet could result in habitat losses and recommendations are presented to mitigate these potential impacts for the three *High Local Importance* habitats. Habitats with lower ecological importance have not been considered further.

The proposed development could result in some habitat loss or degradation for the three *High Local Importance* habitats, Oak-ash-hazel woodland (Fossitt habitat WN2), treelines (Fossitt habitat WL2), and hedgerows (Fossitt habitat WL1). The recommendations for all three habitats are provided together as many are similar.

The Oak-ash-hazel woodland, treelines, and hedgerows shown on the habitat map (Appendix 1) are important locally as habitat corridors connecting wildlife populations, they also support native semi-mature to mature trees some of which have been classified as important PBRs (**Table 5**). All three habitats are also important as wildlife refuges, providing opportunities for shelter, foraging and commuting to fauna, including badgers, bats and birds.

The following recommendations should be adhered to in order to reduce the impact of any habitat loss:

- Where possible Oak-ash-hazel woodland, treelines and hedgerows within the proposed development site should be maintained.
- For all the hedgerows and treelines, it is recommended to retain their associated ditches and banks and at least a 1 m wide area of semi-natural habitat, to fulfil the structural condition criterion of a natural buffer listed by Foulkes *et al.* (2013).
- Semi-mature or mature trees should not be removed, particularly those identified as PBRs.
- Where retention is not possible, mitigation by provision of the same type of habitat will be required and any new tree planting should utilise native tree species of local provenance.
- Any tree felling and/or the clearance of associated scrub habitats should take place either after the 31st of August or before 1st of March. The Wildlife Acts 1976 to 2012 state that wild birds and their nests and eggs are protected and as the nesting period for many bird species is taken to be from the 1st of March to the 31st of August it is best practice to undertake tree felling and scrub clearance outside these dates.

4.3 Bats

Three bat species, Daubenton's bat, Common pipistrelle and Leisler's bat, have been recorded foraging and commuting within the survey area (**Table 1**). All bat species in Ireland are protected under the Wildlife Acts 1976 to 2012 and the EU Habitats Directive (92/43/EEC), where they are listed as Annex IV species (i.e. species in need of strict protection). The Lesser horseshoe bat is additionally listed in Annex II.

The degree of impact on local bat populations from the proposed trail development depends particularly on the potential impact on hedgerows, treelines and the PBRs listed in **Table 5**. If all PBRs and areas of hedgerow and treelines are retained the potential impact will be low. However, the degree of loss of trees, hedgerows and treelines will increase the impact on local bat populations.

The following measure is recommended to ensure that the site continues to provide a habitat for bats:

- Retain as many of the PBRs, hedgerows and treelines as possible.

Pre-construction of the trail

- When tree felling is unavoidable, ensure felling is undertaken in spring or autumn months on mild days when the temperature is greater than 10°C, as bats are generally inactive below this temperature.
- Large mature trees, if felled, should be gradually dismantled by tree surgeons prior to felling, and left on the ground for 24 hours.
- Any trees covered with heavy ivy which require felling should be left to lie for 24 hours after cutting to allow any bats beneath the cover to escape.

After construction of the trail

- If any lighting is required for the development, it should be of a wildlife-friendly type that is directional and shines towards the ground with minimal spillage onto adjoining habitats.

4.4 Mammals (other than bats)

The proposed development could affect mammals, such as hedgehogs, badgers and foxes if it reduces shelter, foraging, and commuting opportunities. Badgers have been confirmed at two locations within the survey area and fox in one area. Otter and hedgehogs were not confirmed to be using the survey area, but both species could be expected to utilise the area as there are areas of suitable habitat.

The following legislation protects badgers and their places of shelter:

- Badgers and their setts are protected under the provisions of the Wildlife Acts 1976 to 2012. It is an offence to intentionally kill or injure a protected species or to wilfully interfere with or destroy the breeding site or resting place of a protected wild animal.

Recommendations are provided below with respect to the protection of all mammals (other than bats):

Pre-construction of the trail

- A pre-construction mammal survey should be carried out no more than 10-12 months prior to construction to identify if there have been any changes in the site's use by mammals, in particular badger, in the intervening period (NRA, Undated). This would ensure that there would be sufficient time to comply with all licensing requirements and that the necessary actions are undertaken, if required, to protect badger populations prior to the commencement of construction (NRA, Undated). The survey should be supplemented by a further inspection of the proposed development site immediately prior to any site clearance to establish no badger setts have established in the intervening period (NRA, Undated).
- Mammal crossing points should be considered during the design phase of the trail for three key areas where mammal activity was recorded. These three areas (shown on the habitat map Appendix 1) are, near Lock 1 to accommodate badgers, under the N3 to accommodate the safe passage of all mammals, and on the north bank of the Rag River to allow badgers to continue to utilise their trail through the area.

During construction

- All works should consider animal welfare and aim to reduce any stress an animal may suffer as a result of the proposed development.
- Any excavations that need to be left overnight should be covered or fitted with mammal ramps to ensure that any animals that enter can safely escape.
- Excavations should be backfilled as soon as possible to minimise the potential for animals to become trapped.
- All open pipeline entrances more than one section long should be capped at the end of each working day to prevent mammals becoming trapped.

4.5 Other considerations

The proposed trail between Lock 1 and Belturbet could also impact birds within the area, as it could reduce shelter, foraging and commuting opportunities. No bird nests were identified during the survey, but the proposed development site has many features, such as the treelines, hedgerows and scrub which are highly suitable for nesting birds. Many habitats within the survey area are also highly suitable for foraging birds.

As stated in Section 4.2, the Wildlife Acts 1976 to 2012 protects wild birds, their nests and eggs. As the nesting period for many bird species is taken to be from the 1st of March to the 31st of August it is best practice to undertake tree felling and scrub clearance outside these dates. Recommendations are provided below with respect to the protection of birds and their nests and compensatory measures for the loss of nesting and foraging opportunities on the site:

Pre-construction

- To ensure compliance with the Wildlife Acts 1976 to 2012 any vegetation clearance (including tree removal, hedgerow removal and scrub clearance) should be undertaken outside the nesting bird season which is weather dependent, but taken to be from the 1st of March to the 31st of August.
- Any vegetation or trees that are to be removed or disturbed during the nesting season should be checked by an experienced ecologist for nesting birds immediately prior to works commencing. If birds are found to be nesting, any works which may affect them would have to be delayed until the young have fledged and the nest has been abandoned naturally.

After construction

- The loss of nesting opportunities for birds in the form of treelines, hedgerows and scrub should be compensated for.
- As stated in Section 4.2 where treeline or hedgerow retention is not possible mitigation by provision of the same type of boundary should be undertaken and new tree planting will aim to utilise native tree species of local provenance.

4.6 Non-native invasive species

No non-native invasive species listed on the Third Schedule S.I. 477/2011 were recorded within the survey area. However, just outside the survey area a large stand of Japanese Knotweed (*Fallopia japonica*) was recorded on the northern bank of the Woodford River to the west of Aghalane Bridge. A management plan should be implemented for the control and eradication of this species.

5 Reference list

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Appendix 1 – Habitat Map

Habitat maps one to 18 show the Fossitt habitats recorded within the footprint of the proposed trail route from Aghalane Bridge to Belturbet. Map one is at the northern end of the route at Aghalane Bridge and each subsequent map moves south with the final map in Belturbet. The habitat maps also include notes on the location of mammals, including badgers, and potential bat roosts.