

Rehabilitation Works at Monasterevin Bridge, Co. Kildare

Biodiversity Assessment



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1. INTRODUCTION

Kildare County Council are proposing to carry out rehabilitation works on a road bridge in the town of Monasterevin in County Kildare. The bridge is on the R445 road which crosses the main channel of the River Barrow at the south west side of the town. Figure 1 shows the location of the site of the proposed development in Monasterevin, Co. Kildare. Ecofact were commissioned to survey the study area in order to evaluate the biodiversity receptors present at the site and outline the findings in a report. As the bridge is within the River Barrow and River Nore SAC, a standalone Natura Impact Statement has also been completed for the proposed bridge works, assessing the potential impacts of the proposed works on the River Barrow and River Nore SAC (Ecofact, 2020).

The current report assesses the potential impacts of the proposed development on terrestrial and aquatic flora and fauna (ecology). The aim of the study is to identify features of ecological interest within the proposed development study area that may present constraints to development or where special mitigation is necessary. An evaluation is made of the scientific or conservation value of the sites identified and the potential for adverse impacts affecting designated sites following the implementation of appropriate mitigation at design stage.

This assessment has been prepared with regard to the EPA (2017) '*Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR)*', the European Commission (2017b) '*Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report*'. The CIEEM (2016) '*Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, and Coastal*', and the National Roads Authority (2009) '*Guidelines for Assessment of Ecological Impacts of National Road Schemes*'.



Figure 1 Location of Monasterevin Bridge, Monasterevin, Co. Kildare.



2. METHODOLOGY

2.1 Desktop Review

A desktop review was carried out to identify features of ecological importance within the study area of the proposed bridge works. The desktop review was carried out to collate data on the receiving environment; a range of additional sources of information including scientific reports produced by, and information on the websites of the EPA, NPWS and the IFI were also reviewed. The ecological assessment included designated and sensitive areas in the vicinity of the study area, to enable sufficient assessment to identify and quantify any significant impacts on the habitats, flora and fauna likely to arise from the proposed development.

Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Proposed Natural Heritage Areas (pNHAs) in the vicinity of the proposed development were identified. This information was collated by accessing the NPWS website.

The online database hosted by the Irish National Biodiversity Data Centre (NBDC) (www.biodiversityireland.ie) was also utilized to assess the importance of the study area for mammals and bats. Other sources accessed to gather information on bats in the study area included The Bat Conservation Trust's report '*Distribution Atlas of Bats in Britain and Ireland 1980-1999*' (Richardson, 2000). The '*Irish Red Data Book 2: Vertebrates - Threatened Mammals, Birds, Amphibians and Fish in Ireland*' (Whilde 1993) and the updated '*Irish Red List No. 3: Terrestrial Mammals*' (Marnell *et al.* 2009) were also reviewed.

2.2 Field Survey

Monasterevin Bridge was visited on the 13th to 14th September 2019 to conduct field surveys. These surveys included habitat surveys, mammal survey (including bats), aquatic ecology surveys and bird surveys.

The habitats present on the site were identified following '*A Guide to Habitats in Ireland*' by J.A. Fossitt (2000) and with regard to '*Best Practise Guidance for Habitat Surveying and Mapping*' (Smith *et al.*, 2011).

General protected species surveys were also undertaken to identify any species of ecological importance within the study area. The bridge was surveyed for the presence of otters or other mammals from 100m upstream of the bridge to 100m downstream of the bridge (with other general checks up to 200m). Any evidence of mammal usage was recorded. The bridge was checked for any evidence of bat usage such as droppings, staining or smearing. Any birds or evidence of birds nesting were recorded. Dip net (kick) sampling surveys were undertaken to assess the presence or absence of small fish and lampreys. Habitat in the area was assessed for the potential to have reptile, amphibian or protected terrestrial invertebrate habitat. The flora and fauna at the site were identified and evaluated for ecological importance.

2.2.1 Bat surveys

A formal bat survey was undertaken. Monasterevin Bridge was visited on the 13th September 2019 for an initial daytime bridge assessment where potential crevices were inspected for bats following methodology outlined in '*Bat Mitigation Guidelines for Ireland*' by Kelleher & Marnell (2006), and also following Billington and Norman (1997). Crevices were examined using endoscopes, aided with a step



ladder. All spaces within reach that could potentially allow bats access to the crevices in the bridge were visually examined for bats, signs of bats, or evidence of bat activity, using a torch and borescope where necessary. Cracks, crevices etc. were investigated for ingress / egress points and evidence of bat habitation, such as smearing lines, droppings and staining. Not all crevices could be reached, and these were visually assessed for signs of bats using close-focusing binoculars. Most the higher crevices were damp and are clearly receiving drainage from the road. This renders them generally unsuitable for bat occupation.

An emergence survey was also completed on the evening of the 13th September 2019. This survey extended from one hour before dusk to 1.5 hours after and was completed by two ecologists. Surveyors used visual observations and bat detectors (Bat Box Duets and/or Echo Meter Touch 2 Pro) to assess if bats emerged from the bridge.

2.3 Consultation

The following statutory bodies provided information via publically available sources for this report:

- National Parks and Wildlife Service (NPWS);
- Inland Fisheries Ireland (IFI);
- Environmental Protection Agency (EPA);
- National Biodiversity Data Centre online database

2.4 Evaluation

The evaluation of impact significance is a combined function of the value of the affected feature (its ecological importance), the type of impact, and the magnitude of the impact. It is therefore necessary to identify the value of ecological features within the study area in order to evaluate the significance and magnitude of possible impacts. Ecological features are assessed on a scale ranging from international-national-county-local. The local scale is approximately equivalent to one 10 km square but can be operationally defined to reflect the character of the area of interest. This scheme is taken from NRA (2009) and is given in Appendix 1.

3. CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

Monasterevin Bridge is a five-arch bridge along which the main road (R445) in Monasterevin in County Kildare crosses over the main channel of the River Barrow. The limestone square cut, masonry arch structure is supported by two Masonry abutments and four Masonry piers. The proposed project relates to remediation works of the bridge. The proposed works are outlined in the method statements prepared by O'Connor, Sutton, Cronin Multidisciplinary Consulting Engineers (OCSC, 2019 and 2020). The work that is required involves both in-stream and out-of-stream works on the walls of the structure itself, as well as on the embankments and the surface of the bridge. As stated in the remediation methodology, "*The proposed repair works consists of repointing of the parapets, relaying of the bridge surface, reconstruction of the riverbed under some of the arches, removal of vegetation from embankments and the inclusion of underpinning repairs to the upstream cutwaters of the R445 bridge*" (OCSC, 2020). All works will be complete between July 1st and September 30th 2020.

The road surface on the bridge is currently uneven due to past patch repairs; the proposed works involves planning and resurfacing the road on the bridge, not including the footpaths which are currently in good condition.



De-vegetation and cut-back of overgrowth is required for the upstream and downstream embankments, including the removal of a tree on the upstream east embankment.

Much of the walls of the structure require raking and re-pointing of the joints this includes walls of the parapets (approximately 60%), both upstream and downstream and both river and roadside. It also includes the abutments (approximately 30/40%) and the spandrel walls. Vegetation growth on the structures surfaces and in the joints must also be removed before raking and repointing. Removal and reinstatement of the capping on the parapet walls, both upstream and downstream, will be required in some sections, in order to remove vegetation growing underneath the capping. According to the methodology the masonry surfaces that are undergoing repairs will be cleaned with a high pressure jet to remove dirt, surface deposits and surface vegetation from the structure. Raking may involve the use of plugging chisel and hammer or brushing with a stiff wire brush while keeping surrounding masonry suitably damp and ensuring that there is no weeping flow / pooled water. It is also stated in the methodology that no lime mortar re-pointing will be carried out if temperatures are expected to fall below 5°C within 1 week of this being undertaken. Re-pointing and vegetation removal will be carried out in sections, coinciding with the timing of the underpinning works on each pier to avail of the existing protection measures.

In-stream, the river bed erosion will be addressed by removing debris and re-grading the river bed, under Arch 1 and under Arch 4. Evident scouring on several of downstream piers resulted in the inclusion of scour protection measures in the proposed works. Some piers also require reconstruction or additional repairs as well as the joint raking and re-pointing, including Pier 2 and Pier 3 which are settling away from the bridge, new concrete skirts and masonry cutwater repairs are required. Dry works areas for the works under the bridge will be created with sheet piling. There will be one dry works area in place at any given time, i.e. one pier will be worked on at a time. On completion of one section all debris / material will be removed from the area, any river bed disturbance will be reinstated and the sheet piling will be removed to allow the flow in the channel to return to normal before the next dry works area for the next pier will be prepared. Grouting will be required for some of these in-stream works and silt curtains will be installed to prevent accidental grout entering the water. Some material for the masonry cutwaters and concrete skirt works will be removed and disposed of off-site while some will be stored and used in the reconstruction. Steel dowel bars and sheets are to be drilled through the existing piers. Cast-in-situ concrete will be required for the new concrete skirt.

Reconstruction of an outfall pipe on the east downstream bank which has collapsed will be carried out. The wall at the outfall of a culvert has also collapsed and requires reconstruction on the upstream side. The proposal involves constructing a 15 m section of rock armour along the downstream east bank to address scouring at this area. To install the rock armour a dryworks area is to be created using sand bags. Geotextile (terram), granular backfill and stone will be used to form the armour with a toe trench at the base and a plateau at the top, both of 0.9m wide.

Holes in the bridge decks of all five arches are to be assessed with drainage sections to confirm if they are used in conjunction with the drainage system for the road surface. The holes will be filled if it is confirmed that they are not used in conjunction with the road drainage system (OCSC, 2019).

Access to the riverbed for in-stream works will be from the downstream west embankment.



4. RECEIVING ENVIRONMENT

4.1 General desk study

According to the Monasterevin Local Area Plan (2016 - 2022); "*substantial areas of high biodiversity value and habitat connectivity are found in Monasterevin. Habitat and landscape features have an important role to play as ecological corridors as they allow for the movement of species, and help to sustain the habitats, ecological processes and functions necessary to enhance and maintain biodiversity.*" The protection of these important habitat and landscape features of the town were emphasised in the plan and it was noted that development of the town would involve particular attention to the preservation and management of green infrastructure and a requirement for appropriate ecological assessment for all projects was also emphasised. In 2018, the Tidy Towns Adjudication Report for Monasterevin a score of 72% was awarded for the 'nature and biodiversity' category.

The River Barrow, which is part of the River Barrow and River Nore SAC, flows through the town on the West outskirts. The River Barrow rises on the northern slopes of the Slieve Bloom Mountains and flows north and then east past Mountmellick and Portarlinton to Monasterevin. At Monasterevin it turns south and flows through Athy, Carlow, and Leighlinbridge, past Bagenalstown, Goresbridge, Borris, and Graiguenamanagh, before reaching the tide at Saint Mullin's.

Monasterevin Bridge is located on the 5th order River Barrow (EPA Segment Code: 14_10474) in the town of Monasterevin in County Kildare where the R445 road crosses the main channel of the Barrow. The bridge is located just upstream of the confluence of the 2nd order Passlands watercourse (EPA Segment Code: 14_1410) with the River Barrow. The EPA monitor biological water quality in this stretch of the River Barrow with a station located on the next bridge upstream (Station Code S14BO11000). This site was rated as being Q3-4 (Moderate) in 2017. This site is located 1km upstream of the subject bridge site. The Monasterevin Wastewater Treatment Plant is located on the right bank of the river downstream of Monasterevin Bridge. A NIS for this plant was prepared in 2011 (Ecofact, 2011) and it was concluded that "*the ongoing operation of the WwTP is therefore evaluated as affecting the integrity of the cSAC downstream*".

The EPA's most recent assessment of the River Barrow overall is as follows: "*The Barrow was sampled across 2017 and 2018 due to the outbreak of crayfish plague. Of the 12 stations sampled along the Barrow in 2017, stations 0200, 0780, 1300, 1500, 2900 were in Good ecological condition, while the two uppermost stations maintained High ecological quality (0050 & 0100). A decline to unsatisfactory Moderate quality occurred at Station 1000 (Pass Bridge) and the lowermost station at Graiguenamanagh (3500). In 2018, station 0300 (Twomile Br) improved to High ecological quality, while station 1900 (Tankardstown Br) declined to unsatisfactory Poor quality. The latter site had an overabundance of Potamopyrgus snails and too much instream algae. Station 0700 (Kilnahown Br) retained Good ecological quality and stations 0500, 2200, 2455, 2600 and 2680 all remained at unsatisfactory Moderate ecological quality*".



4.2 Designated Areas

4.2.1 Natura 2000 Sites

Monasterevin Bridge is located within the River Barrow and River Nore SAC. The River Barrow and River Nore SAC (site code 002162) is selected for alluvial wet woodlands and petrifying springs, priority habitats on Annex I of the E.U. Habitats Directive, 1992. The site is also selected as a SAC for old oak woodlands, floating river vegetation, estuary, tidal mudflats, *Salicornia* mudflats, Atlantic salt meadows, Mediterranean salt meadows, dry heath and eutrophic tall herbs, all habitats listed on Annex I of the E.U. Habitats Directive. As well as habitats, the SAC has been selected due to the presence of invertebrate, fish and mammal species which are listed under Annex II of the EU Habitats Directive, including freshwater pearl mussel (*Margaritifera margaritifera* and its hardwater form *M. durrovensis*), freshwater crayfish (*Austropotamobius pallipes*), Atlantic salmon (*Salmo salar*), twaite shad (*Alosa fallax fallax*), the three Irish Lamprey species - sea (*Petromyzon marinus*), brook (*Lampetra planeri*) and river (*Lampetra fluviatilis*), the Desmoulin's whorl snail *Vertigo moulinsiana* and Eurasian otter (*Lutra lutra*).

The qualifying interests of this site with regard to their presence within the study area and their conservation status are discussed in detail in the NIS report for the site (Ecofact, 2020).

4.2.2 Natural Heritage Areas

The only Natural Heritage Area (NHA) in the same 10 km national grid square (N61) as Monasterevin Bridge is the Grand Canal NHA. According to an ecological survey of the Grand Canal, the section of the Barrow Line with the highest diversity was along the stretch that passes Monasterevin.

The canal intersects the Barrow upstream of the site and then runs adjacent to the Barrow channel until it comes into contact with it again in Athy, nearly 20 km downstream of Monasterevin.

4.2.3 Other

There are no SPAs or other designated areas in the surrounding environment that could be impacted by the proposed project. Moore Abbey Woods is currently not a designated site however it has been noted as an important area for nature conservation. This woodland is just over 1 km to the South East of Monasterevin Bridge. The significance of the site for nature and biodiversity was acknowledged in the Tidy Towns Adjudication Report for the town in 2018. It was advised that the town seeks SPA or NHA status for this woodland due to its influence on nature conservation in Monasterevin.

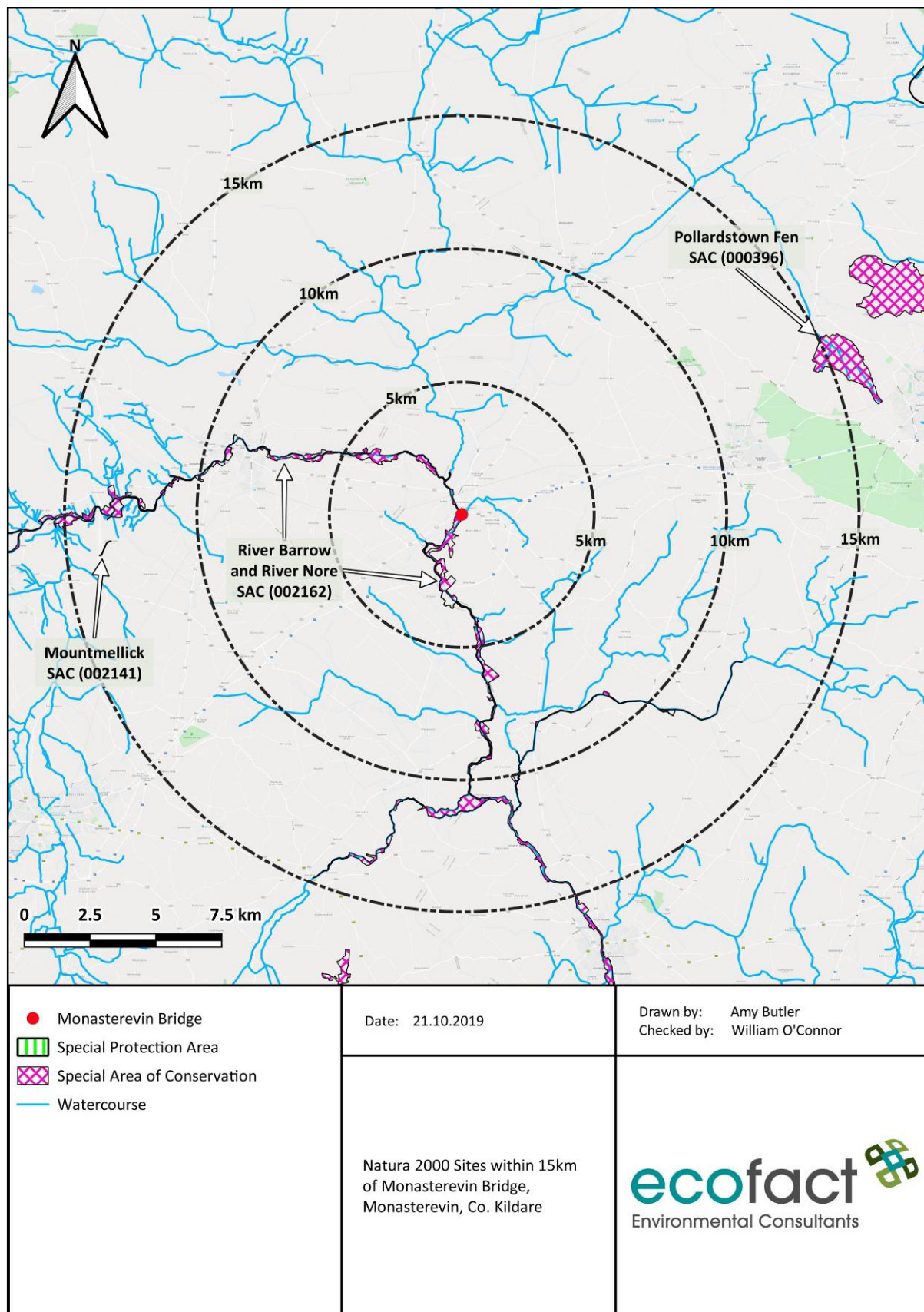


Figure 2 Natura 2000 Sites within 15km of Monasterevin Bridge, Monasterevin, Co. Kildare.

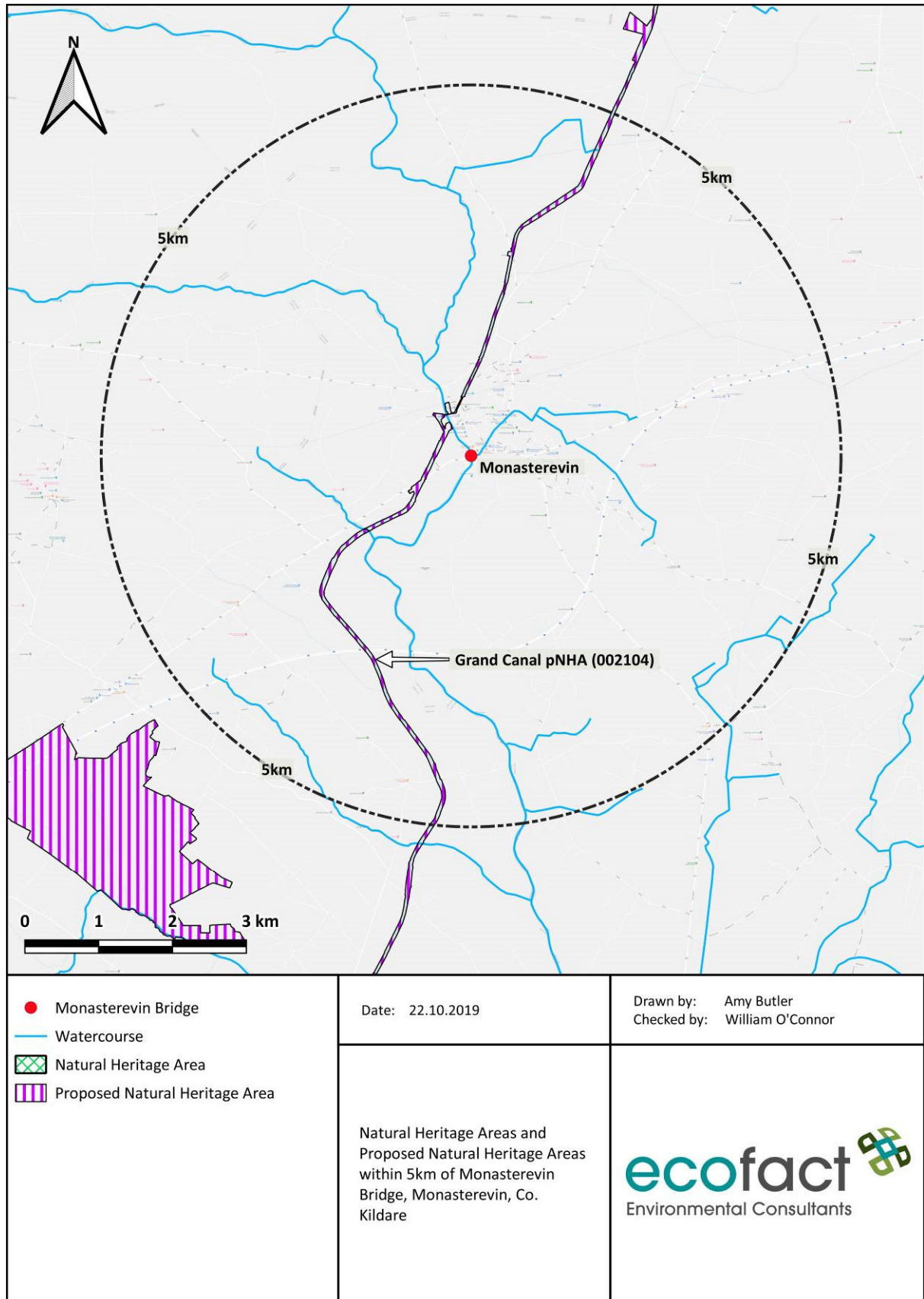


Figure 3 Natural Heritage Areas and Proposed Natural Heritage Areas within 5km of Monasterevin Bridge, Monasterevin, Co. Kildare.



4.3 Habitats and Flora

Monasterevin Town lies to the East of the River Barrow and the proposed bridge works site. Immediately upstream of the Monasterevin Bridge there is an apartment block on the left bank (the East side of the river). There are buildings for approximately 120 m as far as the Monasterevin Fire Station on the left side of the river. Continuing upstream along the left bank from this point the area between the Main Street of Monasterevin and the River widens to a vegetated buffer zone of approximately 50 m consisting of trees and gardens.

On the left bank immediately downstream of the site there is a section of mature trees for approximately 100 m on the left bank. A small road then runs alongside the river into the Moore Abbey Estate buildings with a few trees scattered along the bank between the river and the road. This estate on the left bank then opens into a large area of agricultural land stretching from the river to Moore Abbey Wood for a stretch of more than 500 m before the bank becomes occupied by woodland again.

The right bank upstream of the bridge predominantly consists of wet grassland and trees, which separate the River Barrow from the Grand Canal. Downstream of the bridge the riparian area along the right bank is dominated by trees and woodland for nearly 1 km, before it moves into a large agricultural area.

According to an ecological survey of the Grand Canal, the Barrow Line supports 155 species of vegetation, and the stretch of the line which passes Monasterevin was found to support the greatest diversity. In the same survey of the Grand Canal in 1991, there was an area of calcareous ground identified to the South West of the town of Monasterevin. This calcareous mound was reported as being of significance in terms of biodiversity as it "*supports a very high diversity of species, many of which do not occur elsewhere along the Barrow Line*" (Dromey *et al.* 1991).

4.3.1 Habitats affected

The following habitats have been identified to occur in the vicinity of the subject bridge site. The most important habitat is Depositing Lowland River (FW2) which is the River Barrow channel and is designated within the SAC.

Table 1 Habitats in the vicinity of Monasterevin Bridge and their evaluation.

Habitat Name	Code	Evaluation
Depositing Lowland River (FW2)	FW2	International Importance
Amenity Grassland (Improved)	GA2	Local Importance
Dry Meadows and Grassy verges	GS2	Local Importance
Mixed Broadleaved Woodland	WD1	Local Importance, Higher value
Treelines	WL1	Local Importance
Ornamental/non-native Shrub	WS3	Local Importance
Buildings and Artificial Surfaces	BL3	Local Importance
Earthbanks	BL2	Local Importance



4.3.2 Non-native invasive species

There was a section of Japanese knotweed *Reynoutria japonica* recorded at the site during the survey. The invasive plant was found growing just upstream of Monasterevin Bridge on the left bank.

4.4 Fauna

4.4.1 Non-volant mammals

Badgers *Meles meles*, Otters *Lutra*, Red Squirrels *Sciurus vulgaris*, Hedgehogs *Erinaceus europaeus* and Pygmy Shrews *Sorex minutus* are protected species which have been recorded in the same 10 km grid square (N61) as Monasterevin Bridge is located; as recorded in the National Biodiversity online database (Appendix 1). There were no otter holts or badger setts recorded at the site. The only evidence of non-volant mammals at the site during the assessment was a Mink scat which was found on the right bank of the river. There are no Otter holts or Otter features within 100m+ of Monasterevin Bridge.

4.4.2 Bats

The National Biodiversity Data Centre (NBDC) maps landscape suitability for bats based on Lundy *et al.* (2011). The maps are a visualisation of the results of the analyses based on a 'habitat suitability' index. The index ranges from 0 to 100, with 0 being least favourable and 100 most favourable for bats. Table 2 below gives the suitability of the study area for the bat species found in Ireland (based on NBDC) along with their Irish Red List Status (from Marnell *et al.*, 2009). The overall assessment of bat habitats for the current study area is given as 31.78.

Table 2 Bat Habitat Suitability Assessment – Monasterevin.

Common name	Scientific name	Suitability index	Irish red list status
All bats	-	31.78	
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>	41	Least Concern
Brown long-eared bat	<i>Plecotus auritus</i>	42	Least Concern
Common pipistrelle	<i>Pipistrellus pipistrellus</i>	47	Least Concern
Lesser horseshoe bat	<i>Rhinolophus hipposideros</i>	0	Least Concern
Leisler's bat	<i>Nyctalus leisleri</i>	44	Near Threatened
Whiskered bat	<i>Myotis mystacinus</i>	34	Least Concern
Daubenton's bat	<i>Myotis daubentonii</i>	34	Least Concern
Nathusius's pipistrelle	<i>Pipistrellus nathusii</i>	4	Least Concern
Natterer's bat	<i>Myotis nattererii</i>	40	Least Concern

Monasterevin has been acknowledged in the past for its bat population. Bat boxes in the area were noted in the Tidy Towns Adjudication Report (2018) as having contributed positively to the biodiversity in the town. A Bat Walk was organised in the town during Biodiversity Week in 2017, run by Bat Conservation Ireland and, Vincent Wildlife Trust and Irish Wildlife Trust <https://greennews.ie/nine-places-see-bats-biodiversity-week-2017/>. Developmental projects in the town have incorporated benefits to the bat population. For example; the renovation of the 200-year-old Ballykelly Mill saved an important bat roosting site from dereliction and the inevitable loss of the roost habitat. This project also incorporated the addition and improvement of bat landscape/habitat around the roost with native hedgerows development and impact mitigation measures for the construction.

<https://www.kildarenow.com/news/home/471477/council-gives-green-light-for-multi-million-euro-distillery-and-visitor-centre-near-monasterevin.html>



No evidence of bat usage in any of the crevices was recorded during an extensive search using endoscopes on the 13th September 2019. Bats were not found to be present in any of the gaps and crevices in the bridge during the site inspection. The crevices in the bridge walls and piers showed no evidence of bat use; there was no staining or droppings around any potential entrance points and there were undisturbed cobwebs around the gaps and openings. Most of the crevices were either damp, had cobwebs/debris present or were accessible by predators (e.g. rats). However a very small number of individual bat droppings were recorded on flat surfaces underneath the bridge. These were thought to have originated from bats passing upstream and downstream. However, it is possible that some of the higher crevices are used.

A bat emergence survey was completed on the 13th September 2019. This survey was completed by two ecologists located on both sides of the bridge for the duration of the survey (30 minutes before dusk to 1.5 hours after dusk). Three bat species were recorded during the survey; Soprano Pipistrelle, Common Pipistrelle and Daubenton's bat. The activity levels were considered low-moderate and bats were feeding along the river and passing upstream and downstream of the bridge. Pipistrelles (both species) were also recorded feeding around the trees downstream of the bridge. It is possible that some of the bats came from the bridge – but no definite observation of this was made. Any crevice in a bridge could potentially be used by bats – especially individual bats – and bats can use crevices as both day and night roosts. It is clear that Monasterevin Bridge is not a significant bat roost. However, the bridge does have potential for bats. The overall evaluation of Monasterevin Bridge for bats using the Billington and Norman (1997) methodology is 'Crevices possibly used by bats (Grade 1)'. A bat derogation licence and mitigation for bats will be required to work on this bridge – mainly as a precaution.

4.4.3 Birds

According to an 'assessment of the distribution and abundance of Kingfisher *Alcedo atthis* and other riparian birds of six SAC river systems in Ireland' (Cummins *et al.*, 2010), including the River Barrow and River Nore SAC, commissioned by NPWS; There were several kingfisher sightings on the Barrow just downstream of Monasterevin. In the section immediately downstream of the town, there are heavily forested areas along the river. In this area there were several sightings and also possible Kingfisher nests recorded. This area was identified as 'Probable' King fisher habitat. Further downstream of this, as far as Dunrally Bridge, was considered 'Possible' Kingfisher habitat with several sightings of the species recorded. The assessment also noted that the bird showed preference for higher, vertical banks which was a likely reason that the numbers of individuals recorded in the sightings was fewer in the Barrow compared to the Nore where there were more suitable riverbanks in most of surveyed sections.

There were no sightings of Kingfisher during the current survey. There is no potential nesting habitat for this species in the stretch of river immediately upstream and downstream of Monasterevin bridge (to 100m+).

No bird nests were found at Monasterevein Bridge during the current survey.

4.4.4 Aquatic Ecology

Inland Fisheries Ireland (IFI) carried out an electrofishing survey of the entire River Barrow Catchment as part of the National Research Survey Programme in 2015, including 35 sites on the main river channel and canal cuts and 118 sites across 21 sub-catchments. The IFI survey identified a trend across the Barrow sub-catchments whereby the sub-catchments of the upper area of the Barrow



Catchment tended to be assigned a fish status of moderate or less compared to better status in the downstream sub-catchments. The likely cause of the poorer fish stocks is mainly due to poor water quality, poor habitat, barriers impeding migratory fish passage and competition with invasive Dace. In the entire survey of the catchment there were only 5 sites of the 153, that were assessed, i.e. 3% of the survey sites, that had a High fish stock status. More than 50% of the survey sites across the entire Barrow Catchment were recorded as having Moderate or lower fish status. The recurring problems in the Barrow Catchment relating to water quality in the past were also noted in this assessment (Delanty *et al.*, 2017).

In 2015 IFI carried out a catchment wide survey of the River Barrow. Overall non-native Dace were the most common species recorded. Of the sites they surveyed, three sites along the main channel were located very near site 33 in Monasterevin. Pike were very common in this area relative to other places in the main river channel, but general abundance was low. Dace and roach were also common. No brown trout fry were present but brown trout 1+ were present in small numbers (Delanty *et al.*, 2015).

IFI also completed a catchment-wide juvenile lampreys survey of the River Barrow catchment in 2005 (King 2006). The majority of the sites (n=18) surveyed along the main channel yielded negative results, with juvenile lamprey only captured at four locations – two upstream of Monasterevin and two between Monasterevin and Carlow. No juvenile lampreys were recorded at Monasterevin. At those sites where ammocoetes were found, density values were low. Only *Lampetra* spp. Lampreys were recorded. No Sea Lamprey ammocoetes were captured in any of the main channel sites examined. At the time of the survey the site was dominated by coarse fish such as Roach, Dace and Gudgeon. Some Perch and Pike were also recorded and small numbers of Brown Trout.

Only juvenile cyprinids were seen / recorded during the current survey (Minnows and Dace). There is potential for the presence of small numbers of brook lamprey and juvenile salmon at the site. However, habitats are suboptimal. Salmon could potentially use the faster glide habitat downstream of the bridge. However, there is no spawning habitat for salmon or lampreys in the immediate vicinity of Monasterevin bridge.

Ecofact undertook an electrical fishing survey of the main channel of the River Barrow at Monasterevin on behalf of Board na Mona in September 2018 (Ecofact 2019). The site was located upstream of Monasterevin bridge. During this electro-fishing survey, a total of eight fish species recorded. Very low densities of *Lampetra* spp. were recorded, and White-clawed crayfish were also present during the September 2018 survey. However, crayfish have now been lost from this stretch of river due to crayfish plague. Dace were the most numerous species recorded - and Roach and Minnow were recorded in fair numbers. Gudgeon were recorded as present. Also recorded at this site were Perch and Pike in scarce/few numbers. The fisheries status was rated as "Moderate". Ecofact (2019) also assessed chemical water quality at this site in September 2019. Chemical water quality was recorded as "Moderate".

A general kick sampling survey was undertaken during the current survey. Macroinvertebrate family diversity at the was 9. There was one group A species recorded at this site – *Epemera danica*. Group B was represented by damselfly nymphs. There were 6 group C species recorded here. *Gammarus duebeni* were dominant and green chironomids were numerous at this site. Simuliidae larvae and *Baetis rhodani* were present in small numbers. The caseless caddis flies *Hydropsyche siltalai* and *Rhyacophila dorsalis* were present in scarce/few numbers. The group D Isopod *Asellus aquaticus* was present in scarce/few numbers. The group E Bloodworm *Chironomus* sp. was numerous at this site. This site was rated Q3-4. There is an EPA monitoring station (Station code: 14B011000) located 1km



upstream of Monasterevin Bridge. This site was rated Q3-4 in 2017 equivalent to WFD "Moderate Status".

4.4.5 Reptiles and Amphibians

The common frog *Rana temporaria*, smooth newt *Lissotriton vulgaris* and common lizard *Zootoca vivipara* are protected species that have been recorded in the N61 10 km grid square. Frogs and newts tend to use shallow and stagnant water with plentiful algae, usually in ponds and ditches. Although there may be some potential habitat at the edges of the river among the rushes and the algal blooms, in general the species would not use a 5th order channelised river such as the Barrow. The site is not suitable Lizard habitat, which would be mostly bogs and grassland. No reptiles or amphibians were recorded during the September 2019 survey and there is no habitat for these species present – although frogs could possibly occur as in any river, but they would never breed here.

4.4.6 Terrestrial Macroinvertebrate

Several protected invertebrates, including bees, mayfly, butterflies and snails have been recorded in the 10 km grid square that the bridge is located in (N61) (Appendix 1). Potential habitat for invertebrates is present at the site but no invertebrates were recorded at the site during the assessment.



5. POTENTIAL IMPACTS

5.1 Designated Sites

5.1.1 Natura 2000

The River Barrow and River Nore SAC will be affected by the proposed works since the site is within the SAC. These potential impacts have been addressed in the accompanying Natura Impact Statement.

5.1.2 Nationally Important Sites

The Grand Canal NHA is the nearest hydrologically connected NHA but is unlikely to be impacted by the project. The intersection of the Barrow and the canal is at Athy.

5.2 Habitats and Flora

The main impacts on habitats and flora from the proposed project would be in the immediate vicinity of the bridge. Included in the proposed rehabilitation works is the removal of vegetation overgrowth on the bridge structure and within the walls and joints of the structure. The works also involve de-vegetation of embankments and removal of trees at the site, in order to create an access point to the bridge and to carry out the proposed rehabilitation works.

There is potential for the spread of the invasive Japanese knotweed also if the necessary biosecurity measures are not taken.

5.3 Fauna

5.3.1 Non-volant mammals

There is no evidence of mammal use or presence on the banks of the river at the proposed site. There are no Otter holts or other proposed non-volant mammal dwellings present.

Although no Otter holts were found in the vicinity of the proposed works area, it is likely that the species uses the river at the site for foraging and commuting. Direct disturbance impacts during the rehabilitation works at the bridge have the potential to affect the species when active at the site. Works at the arches could affect Otters moving upstream and downstream through the bridge, particularly if multiple arches were worked on and closed at the same time. An increase in suspended solids and accidental spillages of oil / fuel from machinery and / or spillages of concrete / cement, if required, could impact on water quality in the River Barrow. Indirect water quality impacts could potentially affect fish populations which are a food source for the Otter. Therefore, mitigation measures are required to protect water quality and avoid disturbance impacts to this species.

5.3.2 Bats

The proposed project has the potential to adversely affect bats by disturbing a possible bat commuting route during the construction phase. However, these impacts will be short term impacts. The repairing of the bridge and filling of gaps and crevices could potentially impact on bats. There is no evidence that Monasterevin Bridge is used as a bat roost. However, crevices with potential for bats are present and a derogation licence and mitigation for bats will be required.



5.3.3 Birds

Some disturbance impacts during the construction period may impact on birds in the site vicinity. There is no evidence that birds nested in the bridge in 2019. There are no Kingfisher nest sites within 100m+ of the bridge.

5.3.4 Aquatic Ecology

The main issue in relation to the proposed works is the potential adverse impact the construction will have on water quality which can impact significantly on aquatic species. An increase in suspended solids and accidental spillages of oil / fuel from machinery and / or spillages of concrete / cement, if required, could impact significantly on water quality in the River Barrow and therefore on the aquatic ecology at the site as well as downstream.

5.3.5 Reptiles and Amphibians

The proposed works are not affecting important reptile and/or amphibian habitat.

5.3.6 Terrestrial Macroinvertebrates

Altering the riparian area to prepare the site works areas and the access route to the river and bridge, possibly including de-vegetation and excavation will impact to the invertebrates in the area. However, no notable or protected species are present.



6. MITIGATION MEASURES

The main mitigation measure is that a site ecologist will be appointed to monitor the works and compliance with the mitigation provided below and outlined in the site method statement. The method statement provides the details of how each step of the works adheres to the mitigation measures (timing of works, limiting access outside of the proposed works area, biosecurity protocols and water quality protection measures) including the processes, how the areas will be accessed, and equipment will be managed and treated etc.. The methodology will be confirmed with the site ecologist for each step of the works to ensure the relevant precautions are taken. The best practice methods have due regard to the relevant sections of the following guidelines:

- IFI, (2010) '*Biosecurity Protocol for Field Survey Work*'
- IFI, (2016) '*Guidelines of protection of Fisheries during construction works in and adjacent to waters*'
- NRA, (2010) '*The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads*'
- NRA, (2008) '*Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes*'
- CIRIA, (2002) '*Control of Water Pollution from Construction Sites - Guide to Good Practise (SP156)*'
- CIRIA (2001) '*Control of Water Pollution from Construction sites- Guidance for Consultants and Contractors (C532)*'
- CIRIA (2006) '*Control of Water Pollution from Linear Construction Projects -Technical Guidance (C649)*'
- CIRIA (2006) '*Control of Water Pollution from Linear Construction Projects- Site Guide (C649)*'
- CIRIA (2005) '*Environmental Good Practice – Site Guide (C650)*'

Full details of the work programme broken down to each step should also be prepared. It will also be important to have emergency measures planned and drawn up to show how the site can be demobilised in the event of a flood.

6.1 Designated Areas

Water pollution mitigation measures must be put in place to protect both the River Barrow and River Nore SAC. Details of the mitigation for the specific conservation interests of the SAC are provided in the NIS.

6.2 Habitats and Flora

Where possible trees should not be removed – any areas cleared will need to be replanted after works on the bridge are complete. There will be a single access route used to access the river bed for the proposed works. This will help to limit the area and riparian habitat disturbed by the activities.

Biosecurity measures to manage the Japanese knotweed must be taken. The small section of Japanese Knotweed that has been identified at the site will be carefully eradicated prior to the commencement of works. This will prevent the further spread of this invasive plant in the area, and to stop it spreading elsewhere. Common control options for Japanese knotweed include; herbicide



treatment screening/sifting, rhizome fragmentation and cultivation, burial on site, root barrier membrane, removal to landfill and biological control.

6.3 Fauna

6.3.1 *Non-volant mammals*

The time frame of the proposed works should be specified for each arch and included in the site-specific method statement. Regular daylight working hours will be kept for the duration of the project to prevent disturbance of nocturnal mammal activity; in particular, otter foraging.

6.3.2 *Bats*

Access to the potential bat flight route under the bridge will not be blocked during the night to prevent adverse impacts on bat commuting and foraging. In order to carry out the proposed works on the bridge a bat derogation license is required.

It is also important to survey the bridge for bats just prior to the commencement of works. This inspection will be carried out by a qualified ecologist that will check any cracks and crevices for roosting bat. Bat use can change with season and from year to year so it is necessary to ensure that no bats are roosting in the bridge.

6.3.3 *Birds*

Vegetation removal will not take place during the nesting and breeding season (March – August). In accordance with section 40 of the Wildlife Act 1976, as amended by Section 46 of the Wildlife (Amendment) Act 2000; the cutting, grubbing, burning or destruction by other means of vegetation growing on uncultivated land or in hedges or ditches is restricted during the nesting and breeding season for birds and wildlife.

6.3.4 *Aquatic Ecology*

Strict mitigation measures, as similarly detailed in the NIS report, must be in place and adhered to in order to protect the water quality and thus the aquatic ecology in the River Barrow.

The proposed works will be carried out between July and September as stated in the current method statement. The exact schedule of each stage of works should be specified and included in the detailed method statement prior to commencement. The works will therefore be undertaken before the salmonid close season which begins at the end of September. There is no close season for coarse fish in Ireland but it is recommended to avoid the typical coarse fish spawning period and adhere to the UK coarse fish close season avoiding works at this time (15th March – 15th June). Lamprey spawning season (May – early July) will also be avoided. Works will have to be completed before the end of September.

There will be a bunded storage area in the site compound for any oils or fuels that may be required for minor machinery used during the proposed works to ensure no spillages occur. Any oiling or refuelling of machinery that may be required will be undertaken away from the River Barrow. Machinery will be checked for leaks prior to its use on site and prior to working in-stream. The site compound will have security to deter vandalism, theft and unauthorised access. The site compound will be located at least 10 m back from the river as stated in the current method statement.



The potential for disturbance of bank side soils, debris from the bridge repair works and surface-water run-off will be mitigated for with the placement of sandbags and silt fences within the works areas. Any sandbags used on the site must be clean and be covered in the site biosecurity plan. The sandbags will only be sourced from a quarry that has a biosecurity certificate. The current method statement notes that a disinfection / cleaning station will be set up next to the site compound and at least 10 m back from the river. All equipment will be sterilised with an approved biocide / cleaning agent at this designated area.

Prior to any in-stream works occurring, the site ecologist will agree a 5-day weather window of low flow conditions with the contractor to minimise the risk of works in the river during a flood event. Silt fences will be placed on the outside of the dry works area first, with sandbags placed inside to ensure no impacts regarding suspended solids arise. The type of sandbags used and how the sandbags will be placed will be specified and included in the method statement as agreed with the site ecologist. The site ecologist will mark out the location of the sandbags and silt curtains to be deployed around the works area within the dewatered section of the river during in-stream works. The methods used for dewatering behind sand bagged works areas will also have to be specified. The site ecologist will over-see the set-up of dry works areas. Any lamprey and fish species potentially caught behind the dammed area will be translocated upstream by the ecologist who will have obtained a section 14 license for this activity.

The works area will also be fenced to avoid trampling or disturbance by personnel outside of the works area or by public access to the site. Again, sandbags used for the dewatering of the works areas will be sourced from a pit or quarry with a biosecurity plan to ensure no sand bags have the potential to be vectors for the spread of non-native invasive species, such as Crayfish plague. There should be an Emergency Contingency Plan for the removal of sand bags during a flood event, detailing how long the removal of sand bags will take, how it will be done, and what measures will be taken if there is a flood event on a weekend when there are no workers on site. This plan will be prepared in advance of approval for the works and in advance of works commencing.

No concrete / cement mixing will be carried out at the river bank area; mixing within the mixing area in the site compound will be controlled by the contractor, with all wash water, tool washings and any waste / grey water stored securely on site; no waste will be stored on site; if concrete / cement is required as part of the works, it will be carried out behind the silt fencing and sandbags, in the dry works area. Waste management will be carried appropriately by the contractor in accordance with the site-specific method statement, whereby it will be kept to a minimum and handled, stored and disposed of correctly. The waste includes soil and vegetation removed for the works. Specific storage areas for concrete / cement and grout are also required for the works.

If there is a requirement for pumping out water from the dammed works area silt bags will be installed at the end of the pumping pipes to filter water to be pumped from the dammed section of the river. These silt bags will be specified by the contractor to adequately cope with the volume of water and will be maintained so it is operating effectively with suspended solids loadings at the end of pipe at less than 10mg/l. Any dewatering, passing through a silt bag would be similar in nature to flood water in the area. The pump to be used will need to be specified and included in the method statement as well as what water levels the work will be done under.

On-site monitoring will be undertaken by the site ecologist on a daily basis for the duration of the works to include visual observations of suspended solids or colouring upstream and downstream of the works. If elevated levels of suspended solids are observed, all works at the site must stop and the



source of the elevation identified, methodologies reviewed, and works can only recommence when a solution has been agreed with the site ecologist and the contractor. The silt curtains and sandbags on the site will be inspected daily by the site ecologist and will be repaired and maintained by the contractor as requested.

The site ecologist will monitor water ingress and the cleanliness of the works area within the dewatered area. Although works will be undertaken during low water levels, in the unlikely event that a significant ingress of water occurs, all works within the dewatered area will stop. If required, the concrete / cement works will not be undertaken if there is a flow of water into the dewatered section, taking account of the dewatering volume to be passed through the silt bags at the end of the pumping pipes.

In the event of a flood / emergency situation the Contractor will be required to implement the Emergency Contingency Plan. The method statement should note that the weather is to be checked ahead daily; however it is recommended that the site ecologist will agree a 5-day weather window for the works, as the Barrow is a spate river flood events can happen in a short period of time. The site compound must also be secured with regard to surface water run-off in the event of a significant rainfall event. The containment of the site utilising silt fences will be overseen by the site ecologist in such cases.



7. RESIDUAL IMPACTS

7.1 Designated Areas

No residual impacts.

7.2 Habitats and Flora

Riparian habitat will recover over time and there will be no long term significant negative effect.

7.3 Fauna

7.3.1 Non-volant mammals

There will be no residual impacts as there are no dwellings being interfered with. There will only be temporary disturbance impacts.

7.3.2 Bats

There will be no significant residual impacts on bats.

7.3.3 Birds

In the long term the project will not affect the downstream bird habitats as the works do not involve alterations to the downstream river or its banks and habitats. If water quality protection measures are adhered to during the project there should be no residual impacts on water quality which could affect the fish and thus, the food source of the Kingfisher.

7.3.4 Aquatic Ecology

No residual impacts on aquatic ecology are anticipated if the outlined mitigation is followed.



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PLATES



Plate 1 Monasterevin bridge viewed from downstream.



Plate 2 River Barrow downstream of Monasterevin bridge.



Plate 3 River Barrow looking upstream from Monasterevin bridge.



Plate 4 Dredging works at Monasterevin in the 1930s. This is the stretch of river immediately upstream of the subject bridge (Source: Irish Waterways History).

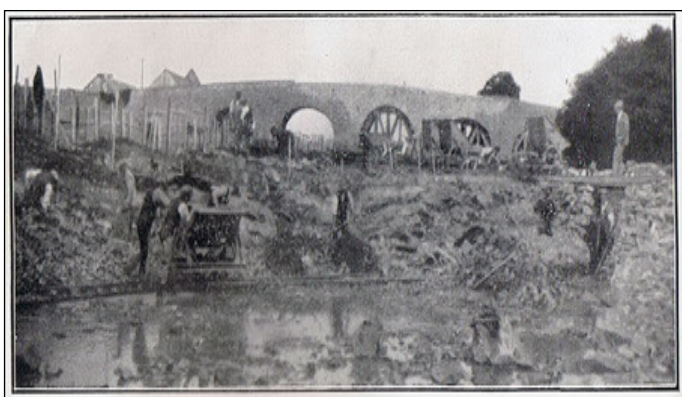


Plate 5 Dredging works at Monasterevin in the 1930s. This entire stretch of river was dredged and channelised and the effects of this scheme are still apparent today (Source: Irish Waterways History).



Plate 6 Dredging works at Monasterevin in the 1930s. The dredging works were undertaken using drag lines and the river was also diverted and dried out during the works. This scheme permanently altered the physical character the river (Source: Irish Waterways History).

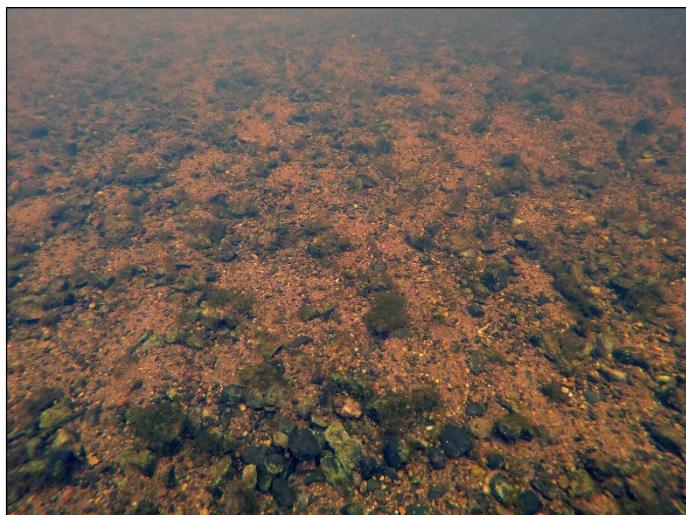


Plate 7 Example of substrate at bridge site – dominated by sand with cobbles. This is not a salmonid or lamprey spawning area and is also a sub-optimal habitat for juvenile lampreys.

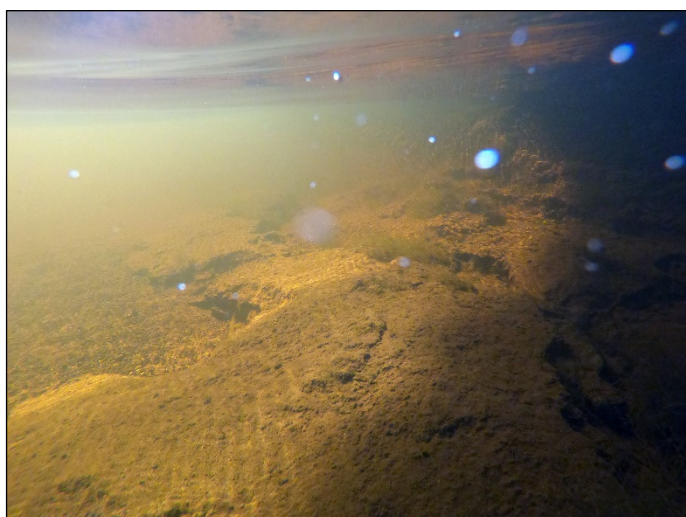


Plate 8 Example of substrate at bridge site – heavy siltation. No juvenile lampreys were present here (sampled by kick sampling) but low densities of juvenile lampreys are likely to be present.

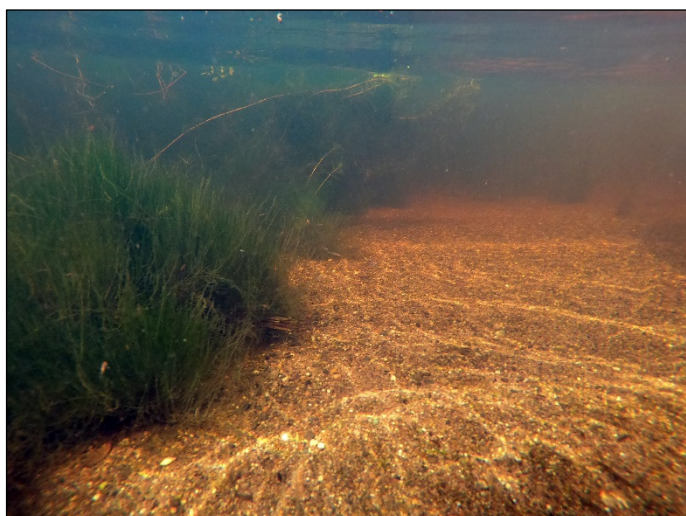


Plate 9 Example of substrate at bridge site – sand dominating. This is sub-optimal juvenile lamprey habitat.



Plate 10 Upstream face of Monasterevin Bridge showing large cracks and spaces in the stonework. Bridge is in obvious need of rehabilitation.



Plate 11 Evidence of previous maintenance works and filling of crevices at Monasterevin Bridge. This has reduced the potential for bats. The crevices present are in the shearwaters and generally low and large; such crevices are also potentially accessible by rats so bats less likely to use them.



Plate 12 Left arch also showing previous filling / repointing. Only crevices at the top of the bridge are wet and seem to be receiving road runoff – making them unsuitable for use by bats.



Plate 13 Large gaps present between stonework – but no evidence of bat usage was found.



Plate 14 Large gaps present between stonework – evidence of old bird nests but these crevices are potentially accessible by rats and this will deter use by bats and birds.



Plate 15 Other large gaps/crevices has extensive webs and debris present – no evidence of usage. All of these crevices were surveyed effectively.



Plate 16 Another large gap/crevice with extensive webs and debris present – no evidence of usage.



Plate 17 Discharge entering the River Barrow at the left bank beside the bridge.



Plate 18 Sewage Fungus apparent in the river downstream of the discharge (previous plate) and under the bridge.



Plate 19 Eutrophication and siltation in the river upstream of Monasterevin Bridge.



Plate 20 Silt plumes visible in the river at the site.



Plate 21 Japanese knotweed *Fallopia japonica* upstream of the site on the left bank.



APPENDIX 1 CRITERIA USED TO EVALUATE HABITATS AND IMPACTS

Table A4.1 Criteria used to determine the value of ecological resources (taken from NRA, 2009).

Criteria	
International Importance	<p>'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation. Proposed Special Protection Area (pSPA). Site that fulfils the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended). Features essential to maintaining the coherence of the Natura 2000 Network Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive. Resident or regularly occurring populations (assessed to be important at the national level) of the following:</p> <ul style="list-style-type: none"> • Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or • Species of animal and plants listed in Annex II and/or IV of the Habitats Directive. • Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971). • World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972). • Biosphere Reserve (UNESCO Man & The Biosphere Programme) • Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979). • Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979). • Biogenetic Reserve under the Council of Europe. • European Diploma Site under the Council of Europe. • Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).
National Importance	<p>Site designated or proposed as a Natural Heritage Area (NHA). Statutory Nature Reserve. Refuge for Fauna and Flora protected under the Wildlife Acts. National Park. Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park. Resident or regularly occurring populations (assessed to be important at the national level) of the following:</p> <ul style="list-style-type: none"> • Species protected under the Wildlife Acts; and/or • Species listed on the relevant Red Data list. • Site containing 'viable areas' of the habitat types listed in Annex I of the Habitats Directive.
County Importance	<p>Area of Special Amenity. Area subject to a Tree Preservation Order. Area of High Amenity, or equivalent, designated under the County Development Plan. Resident or regularly occurring populations (assessed to be important at the County level) of the following:</p> <ul style="list-style-type: none"> • Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; • Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; • Species protected under the Wildlife Acts; and/or • Species listed on the relevant Red Data list. <p>Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance. County important populations of species; or viable areas of semi-natural habitats; or natural heritage features identified in the National or Local BAP; if this has been prepared. Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county. Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.</p>



Criteria	
Local Importance (higher value)	<p>Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared; Resident or regularly occurring populations (assessed to be important at the Local level) of the following:</p> <ul style="list-style-type: none"> • Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; • Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; • Species protected under the Wildlife Acts; and/or • Species listed on the relevant Red Data list. <p>Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality;</p> <ul style="list-style-type: none"> • Sites or features containing common or lower value habitats, including naturalised species that are essential in maintaining links and ecological corridors between features of higher ecological value.
Local Importance	<p>Sites containing small areas of semi-natural habitat that are of some local importance for wildlife;</p> <p>Sites or features containing non-native species that are of some importance in maintaining habitat links.</p>

Table A.2 Criteria for assessing impact magnitude (NRA, 2009).

Impact magnitude	Definition
No change:	No discernible change in the ecology of the affected feature.
Imperceptible Impact:	An impact capable of measurement but without noticeable consequences.
Slight Impact:	An impact which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate Impact:	An impact that alters the character of the environment that is consistent with existing and emerging trends.
Significant Impact:	An impact which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Profound Impact:	An impact which obliterates sensitive characteristics.



APPENDIX 2 NBDC BIODIVERSITY RECORDS

Protected and Threatened Species (Grid Square: N61)

Group	Species	Scientific name	Designation
Amphibian	Common Frog	<i>Rana temporaria</i>	Protected Species: EU Habitats Directive Protected Species: EU Habitats Directive >> Annex V Protected Species: Wildlife Acts
Amphibian	Smooth Newt	<i>Lissotriton vulgaris</i>	Protected Species: Wildlife Acts
Bird	Barn Owl	<i>Tyto alba</i>	Protected Species: Wildlife Acts Threatened Species: Birds of Conservation Concern Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Bird	Barn Swallow	<i>Hirundo rustica</i>	Protected Species: Wildlife Acts Threatened Species: Birds of Conservation Concern Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Bird	Black-headed Gull	<i>Larus ridibundus</i>	Protected Species: Wildlife Acts Threatened Species: Birds of Conservation Concern Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Bird	Common Grasshopper Warbler	<i>Locustella naevia</i>	Protected Species: Wildlife Acts Threatened Species: Birds of Conservation Concern Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Bird	Common Kingfisher	<i>Alcedo atthis</i>	Protected Species: Wildlife Acts Threatened Species: Birds of Conservation Concern Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Bird	Common Linnet	<i>Carduelis cannabina</i>	Protected Species: Wildlife Acts Protected Species: EU Birds Directive Protected Species: EU Birds Directive >> Annex I Bird Species Threatened Species: Birds of Conservation Concern Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Bird	Common Pheasant	<i>Phasianus colchicus</i>	Protected Species: Wildlife Acts Protected Species: EU Birds Directive Protected Species: EU Birds Directive >> Annex II, Section I Bird Species Protected Species: EU Birds Directive >> Annex III, Section I Bird Species
Bird	Common Snipe	<i>Gallinago gallinago</i>	Protected Species: Wildlife Acts Protected Species: EU Birds Directive Protected Species: EU Birds Directive >> Annex II, Section I Bird Species Protected Species: EU Birds Directive >> Annex III, Section III Bird Species Threatened Species: Birds of Conservation Concern Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List



Group	Species	Scientific name	Designation
Bird	Common Starling	<i>Sturnus vulgaris</i>	Protected Species: Wildlife Acts Threatened Species: Birds of Conservation Concern Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Bird	Common Swift	<i>Apus apus</i>	Protected Species: Wildlife Acts Threatened Species: Birds of Conservation Concern Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Bird	Common Wood Pigeon	<i>Columba palambus</i>	Protected Species: Wildlife Acts Protected Species: EU Birds Directive Protected Species: EU Birds Directive >> Annex II, Section I Bird Species Protected Species: EU Birds Directive >> Annex III, Section I Bird Species
Bird	Corn Bunting	<i>Emberiza calandra</i>	Protected Species: Wildlife Acts
Bird	Corn Cuckoo	<i>Crex crex</i>	Protected Species: Wildlife Acts Protected Species: EU Birds Directive Protected Species: EU Birds Directive >> Annex I Bird Species Threatened Species: Birds of Conservation Concern Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Bird	Dunlin	<i>Calidris alpina</i>	Protected Species: Wildlife Acts Protected Species: EU Birds Directive Protected Species: EU Birds Directive >> Annex II, Section I Bird Species Protected Species: EU Birds Directive >> Annex III, Section II Bird Species Threatened Species: Birds of Conservation Concern Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Bird	Eurasian Curlew	<i>Numenius arquata</i>	Protected Species: Wildlife Acts Protected Species: EU Birds Directive Protected Species: EU Birds Directive >> Annex II, Section II Bird Species Threatened Species: Birds of Conservation Concern Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Bird	Eurasian Teal	<i>Anas crecca</i>	Protected Species: Wildlife Acts Protected Species: EU Birds Directive Protected Species: EU Birds Directive >> Annex II, Section I Bird Species Protected Species: EU Birds Directive >> Annex III, Section III Bird Species Threatened Species: Birds of Conservation Concern Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Bird	Eurasian Woodcock	<i>Scolopax rusticola</i>	Protected Species: Wildlife Acts Protected Species: EU Birds Directive Protected Species: EU Birds Directive >> Annex II, Section I Bird Species Protected Species: EU Birds Directive >> Annex III, Section III Bird Species Threatened Species: Birds of



Group	Species	Scientific name	Designation
			Conservation Concern Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Bird	European Golden Plover	<i>Pluvialis apricaria</i>	Protected Species: Wildlife Acts Protected Species: EU Birds Directive Protected Species: EU Birds Directive >> Annex I Bird Species Protected Species: EU Birds Directive >> Annex II, Section II Bird Species Protected Species: EU Birds Directive >> Annex III, Section III Bird Species Threatened Species: Birds of Conservation Concern Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Bird	Great Cormorant	<i>Phalacrocorax carbo</i>	Protected Species: Wildlife Acts Threatened Species: Birds of Conservation Concern Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Bird	Hen Harrier	<i>Circus cyaneus</i>	Protected Species: Wildlife Acts Protected Species: EU Birds Directive Protected Species: EU Birds Directive >> Annex I Bird Species Threatened Species: Birds of Conservation Concern Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Bird	Herring Gull	<i>Larus argentatus</i>	Protected Species: Wildlife Acts Threatened Species: Birds of Conservation Concern Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Bird	House Martin	<i>Delichon urbicum</i>	Protected Species: Wildlife Acts Threatened Species: Birds of Conservation Concern Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Bird	House Sparrow	<i>Passer domesticus</i>	Protected Species: Wildlife Acts Threatened Species: Birds of Conservation Concern Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Bird	Lesser Black-backed Gull	<i>Larus fuscus</i>	Protected Species: Wildlife Acts Threatened Species: Birds of Conservation Concern Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Bird	Little Grebe	<i>Tachybaptus ruficollis</i>	Protected Species: Wildlife Acts Threatened Species: Birds of Conservation Concern Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Bird	Mallard	<i>Anas platyrhynchos</i>	Protected Species: Wildlife Acts Protected Species: EU Birds Directive Protected Species: EU Birds Directive >> Annex II, Section I Bird Species Protected Species: EU Birds Directive >>



Group	Species	Scientific name	Designation
Bird	Merlin	<i>Falco columbarius</i>	Annex III, Section I Bird Species Protected Species: Wildlife Acts Protected Species: EU Birds Directive Protected Species: EU Birds Directive >> Annex I Bird Species Threatened Species: Birds of Conservation Concern Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Bird	Mew Gull	<i>Larus canus</i>	Protected Species: Wildlife Acts Threatened Species: Birds of Conservation Concern Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Bird	Mute Swan	<i>Cygnus olor</i>	Protected Species: Wildlife Acts Threatened Species: Birds of Conservation Concern Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Bird	Northern Lapwing	<i>Vanellus vanellus</i>	Protected Species: Wildlife Acts Protected Species: EU Birds Directive Protected Species: EU Birds Directive >> Annex II, Section II Bird Species Threatened Species: Birds of Conservation Concern Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Bird	Rock Pigeon	<i>Columba livia</i>	Protected Species: Wildlife Acts Protected Species: EU Birds Directive Protected Species: EU Birds Directive >> Annex II, Section I Bird Species
Bird	Sand Martin	<i>Riparia riparia</i>	Protected Species: Wildlife Acts Threatened Species: Birds of Conservation Concern Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Bird	Sky Lark	<i>Alauda arvensis</i>	Protected Species: Wildlife Acts Threatened Species: Birds of Conservation Concern Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Bird	Spotted Flycatcher	<i>Muscicapa striata</i>	Protected Species: Wildlife Acts Threatened Species: Birds of Conservation Concern Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Bird	Stock Pigeon	<i>Columba oenas</i>	Protected Species: Wildlife Acts Threatened Species: Birds of Conservation Concern Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Bird	Whinchat	<i>Saxicola rubetra</i>	Protected Species: Wildlife Acts Threatened Species: Birds of Conservation Concern Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List



Group	Species	Scientific name	Designation
Bird	Whooper Swan	<i>Cygnus cygnus</i>	Protected Species: Wildlife Acts Protected Species: EU Birds Directive Protected Species: EU Birds Directive >> Annex I Bird Species Threatened Species: Birds of Conservation Concern Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Bird	Yellowhammer	<i>Emberiza citrinella</i>	Protected Species: Wildlife Acts Threatened Species: Birds of Conservation Concern Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Crustacean	Freshwater White-clawed Crayfish	<i>Austropotambius pallipes</i>	Protected Species: EU Habitats Directive Protected Species: EU Habitats Directive >> Annex II Protected Species: EU Habitats Directive >> Annex V Protected Species: Wildlife Acts
Insect - Butterfly	Marsh Fritillary	<i>Euphydryas aurinia</i>	Protected Species: EU Habitats Directive Protected Species: EU Habitats Directive >> Annex II Threatened Species: Vulnerable
Insect - Butterfly	Small Heath	<i>Coenonympha pamphilus</i>	Threatened Species: Near threatened
Insect - Butterfly	Wall	<i>Lasiommata megera</i>	Threatened Species: Endangered
Insect Hymenopteran -		<i>Andrena (Melandrena) nigroaenea</i>	Threatened Species: Vulnerable
Insect Hymenopteran -	Gooden's Nomad Bee	<i>Nomada goodeniana</i>	Threatened Species: Endangered
Insect Hymenopteran -		<i>Halictus (Seladonia) tumulorum</i>	Threatened Species: Near threatened
Insect Hymenopteran -	Large Red Tailed Bumble Bee	<i>Bombus (Melanobombus) lapidarius</i>	Threatened Species: Near threatened
Insect – Mayfly (Ephemeroptera)		<i>Procladius bifidum</i>	Threatened Species: Vulnerable
Mollusc	Blind Snail	<i>Cecilioides (Cecilioides) acicula</i>	Threatened Species: Vulnerable
Mollusc	Common Whorl Snail	<i>Vertigo (Vertigo) pygmaea</i>	Threatened Species: Near threatened
Mollusc		<i>Vertigo (Vertigo) moulinsiana</i>	Protected Species: EU Habitats Directive Protected Species: EU Habitats Directive >> Annex II Protected Species: Wildlife Acts Threatened Species: Endangered
Mollusc	Desmoulin's Whorl Snail	<i>Radix auricularia</i>	Threatened Species: Vulnerable
Mollusc	Ear Pond Snail	<i>Leiostryla (Leiostryla) anglica</i>	Threatened Species: Vulnerable
Mollusc	English Chrysalis Snail	<i>Deroceras (Deroceras) agreste</i>	Threatened Species: Data deficient
Mollusc	Globular Pea Mussel	<i>Pisidium hibernicum</i>	Threatened Species: Near threatened
Mollusc	Glutinous Snail	<i>Myxas glutinosa</i>	Threatened Species: Endangered
Mollusc	Heath Snail	<i>Helicella itala</i>	Threatened Species: Vulnerable
Mollusc	Lake Orb Mussel	<i>Musculium lacustre</i>	Threatened Species: Vulnerable
Mollusc	Marsh Whorl Snail	<i>Vertigo (Vertigo) antivertigo</i>	Threatened Species: Vulnerable
Mollusc	Moss Bladder Snail	<i>Aplexa hypnorum</i>	Threatened Species: Vulnerable
Mollusc	Moss Chrysalis Snail	<i>Pupilla (Pupilla) muscorum</i>	Threatened Species: Endangered



Group	Species	Scientific name	Designation
Mollusc	Smooth Grass Snail	<i>Vallonia pulchella</i>	Threatened Species: Vulnerable
Mollusc	Swan Mussel	<i>Anodonta (Anodonta) cygnea</i>	Threatened Species: Vulnerable
Mollusc	Tree Snail	<i>Balea (Balea) perversa</i>	Threatened Species: Vulnerable
Moss	Blunt-fruited Pottia	<i>Tortula modica</i>	Threatened Species: Vulnerable
Moss	Large White-moss	<i>Leucobryum glaucum</i>	Protected Species: EU Habitats Directive Protected Species: EU Habitats Directive >> Annex IV
Moss	Sausage Beard-moss	<i>Didymodon tomaculosus</i>	Threatened Species: Vulnerable
Reptile	Common Lizard	<i>Zootoca vivipara</i>	Protected Species: Wildlife Acts
Terrestrial Mammal	Brown Long-eared Bat	<i>Plecotus auritus</i>	Protected Species: EU Habitats Directive Protected Species: EU Habitats Directive >> Annex IV Protected Species: Wildlife Acts
Terrestrial Mammal	Daubenton's Bat	<i>Myotis daubentonii</i>	Protected Species: EU Habitats Directive Protected Species: EU Habitats Directive >> Annex IV Protected Species: Wildlife Acts
Terrestrial Mammal	Eurasian Badger	<i>Meles meles</i>	Protected Species: Wildlife Acts
Terrestrial Mammal	Eurasian Pygmy Shrew	<i>Sorex minutus</i>	Protected Species: Wildlife Acts
Terrestrial Mammal	Eurasian Red Squirrel	<i>Sciurus vulgaris</i>	Protected Species: Wildlife Acts
Terrestrial Mammal	European Otter	<i>Lutra lutra</i>	Protected Species: EU Habitats Directive Protected Species: EU Habitats Directive >> Annex II Protected Species: EU Habitats Directive >> Annex IV Protected Species: Wildlife Acts
Terrestrial Mammal	Lesser Noctule	<i>Nyctalus leisleri</i>	Protected Species: EU Habitats Directive Protected Species: EU Habitats Directive >> Annex IV Protected Species: Wildlife Acts
Terrestrial Mammal	Natterer's Bat	<i>Myotis nattereri</i>	Protected Species: EU Habitats Directive Protected Species: EU Habitats Directive >> Annex IV Protected Species: Wildlife Acts
Terrestrial Mammal	Pine Marten	<i>Martes martes</i>	Protected Species: EU Habitats Directive Protected Species: EU Habitats Directive >> Annex V Protected Species: Wildlife Acts
Terrestrial Mammal	Pipistrelle	<i>Pipistrellus pipistrellus sensu lato</i>	Protected Species: EU Habitats Directive Protected Species: EU Habitats Directive >> Annex IV Protected Species: Wildlife Acts
Terrestrial Mammal	Soprano Pipistrelle	<i>Pipistrellus pygmaeus</i>	Protected Species: EU Habitats Directive Protected Species: EU Habitats Directive >> Annex IV Protected Species: Wildlife Acts
Terrestrial Mammal	West European Hedgehog	<i>Erinaceus europaeus</i>	Protected Species: Wildlife Acts