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# Ballykett Windfarm

Freshwater Pearl Mussel Stage 1 Surveys

P00013688

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**Project Director:** Michael Dobson  
**Project Manager:** Gráinne Keogh  
**Project Authors:** Gráinne Keogh

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APEM Ltd  
NSC-Campus  
Mahon  
Cork  
T12 XY2N  
Tel: 021 2339580  
Registered in Ireland No. 493496

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## 1. Introduction

### 1.1. Background

APEM Ireland was commissioned by Greensource to conduct Stage 1 Freshwater Pearl Mussel (FPM) surveys at the site of river crossing points on the proposed turbine delivery route at Ballykett, Co. Clare. This document provides summary of the methods used and results obtained.

### 1.2. Site Description

The proposed crossing points ("the Site") are located at Ballykett, Co. Clare at approximately Irish Transverse Mercator (ITM) 505161 659761 and 506874 659796.

### 1.3. Purpose of this Report

The purpose of this report is to describe the results of a series of Stage 1 FPM surveys conducted at the location of and downstream of river crossing points on the turbine delivery route.

### 1.4. Aquatic Ecology Survey Site Selection

Survey locations were chosen based on our understanding of the proposed turbine delivery route.

### 1.5. Evidence of Technical Competence and Experience

Summaries of the qualifications and experience of the personnel involved in the work, and their role in delivering it, are outlined below. Gráinne Keogh and Amy Adwan carried out the field survey. This report was prepared by Gráinne Keogh and technically reviewed by Michael Dobson.

**Gráinne Keogh** is a Senior Ecologist at APEM. Gráinne holds a BSc(Hons) in Ecology and Environmental Biology and an MSc in Marine Biology. Gráinne has carried out field and lab work across marine, terrestrial, and freshwater environments; these include habitat surveys and mapping, species identification, freshwater pearl mussel surveys, electrofishing surveys and chemical and biological water quality analysis including SSRS and Q-value assessments. She has previously worked on the Climate Change Mitigation Research Project in Inland Fisheries Ireland and she has also spent time at sea on research vessels conducting fisheries surveys with the Marine Institute. Grainne also has a robust understanding of the impact assessment processes, and Irish and EU wildlife legislation and has written a number of Appropriate Assessments, Natura Impact Statements and Ecological Impact Assessments.

**Amy Adwan** is a Senior Terrestrial Ecologist with APEM with 7 years' experience in the ecological sector in Ireland. Amy is a qualified ecologist experienced in a wide range of ecological survey techniques and methodology including bats, mammals, freshwater and habitats. Amy has worked on various projects relating to bats including extensive survey work, mitigation plans including the design of bat houses, derogation licences as well as Ecological Clerk of Works and compliance reporting. Amy holds a licence to disturb bats for survey work, a bat handling licence and a photography licence covering all species of bat in Ireland. Amy has also extensive experience in surveying mammal species for a wide range of developments, including road schemes, wind farms and housing projects.

**Dr Michael Dobson FLS MCIEEM** is a freshwater biologist with over 35 years' experience. He spent 20 years as a research scientist, specialising in ecology and management of rivers and freshwater wetlands throughout Europe and East Africa, along with developing biotic indices for river quality assessment in Central America. He was Director of the Freshwater Biological Association for six years

before joining APEM in 2013, working initially in the limnology and water quality team before setting up its dedicated invasive species team in 2019 and moving to APEM Ireland in 2022. Mike has written many peer-reviewed papers in ecology and biogeography, along with two undergraduate textbooks for Oxford University Press (both in their second editions) and seven identification guides to freshwater invertebrates of Britain and Ireland. He has extensive experience of survey design, data analysis and reporting, including publication and verbal reporting for non-technical audiences. He has written and reviewed Habitats Directive assessments in both Ireland and the UK.

## 2. Freshwater Pearl Mussel Survey

### 2.1. Methods

#### 2.1.1. Stage 1 Survey

The Doonbeg River and its tributaries lie within an FPM sensitive area. The survey work was carried out under licence (No. C214/2023) granted by NPWS for qualified ecologists to survey the FPM in the specified locations. The proposed turbine delivery route crosses the Tullagower River and Brisla East Stream which are part of the Doonbeg catchment.

Three 300 m river sections (sites 1-3) and three 50-150 m spot check areas (sites 4-6), were selected on the Tullagower and Brisla East for proposed FPM Stage 1 surveys, where the works are due to take place and downstream of the works. Proposed survey sections and areas surveyed can be seen in Figure 1.

Surveys took place following the standard methodology used by the NPWS (National Parks and Wildlife Service, 2004) on 09 and 10 October 2023. Weather conditions during the surveys were clear (c. 15% cloud cover), sunny, 20°C with a light air<sup>1</sup>.

At each station, accessible sections of the proposed 300 m section of riverbed were systematically searched for living mussels or mussel shells, where suitable habitat was available, giving particular attention to the immediate vicinity of suitable habitat (suitable habitat is described in detail in Appendix A) and a detailed recording Stage 1 data survey form was completed, including information on mussel numbers (including absence of mussels), describing the habitat in detail, and including any relevant observations on the state of the watercourse.

Survey covered approximately 40 m at site 1, 118 m at site 2 and 130 m at site 3. Survey was not possible at sites 4, 5 and 6.

Surveys were carried out using bathyscope techniques. Surveys were conducted by one surveyor and a bankside manager.

### 2.2. Results

#### 2.2.1. Stage 1 Survey

There were access issues limiting the survey coverage relative to that planned (Figure 1), but the habitat in many cases was unsuitable for pearl mussel. The species avoids silt- or clay-dominated beds and is unlikely to be present where there is extensive overhanging vegetation and aggregations of organic matter. It is sensitive to fine sediments and will not be present where there has been recent channel straightening or clearance. Runoff via land drains will also make the habitat unsuitable. All of these features were extensive in the areas surveyed.

No live mussels were encountered and there was no evidence recorded of mussels (e.g. empty shells) during stage 1 surveys.

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<sup>1</sup> <https://www.met.ie/forecasts/marine-inland-lakes/beaufort-scale>

Site 1 was largely an overgrown channel which had signs of previous modification throughout. High banks and field drains were present throughout this stretch along with overhanging brambles and vegetation (Plate 1, Plate 3). This area was well shaded but the substrate, where accessible, was not suitable FPM substrate with up to 50% of the substrate being clay in areas, immediately downstream of the existing road crossing had the most suitable substrate with 35% of the substrate being cobble. The surveyed stretch (ca. 40 m) had an average depth of ca. 8 cm, mainly comprised of run habitat and had an average width of ca. 1m. Upstream of the road crossing area was entirely inaccessible due to vegetation cover.

Site 2 was a channel between 1-2 m width with an average depth of ca. 70 cm where surveyed (ca. 118 m) (Plate 4). Signs of previous channel modification were present throughout with high steep banks and field drains present. There was a high amount of instream vegetation narrowing the surveyable area within the channel, this instream vegetation includes *Nasturtium officinale*, *Callitriche stagnalis*, *Sparganium sp.*, and *Lolium sp* (Plate 5). The substrate in this area was mainly soft and comprised of silt and clay, no cobble or boulder substrate was present in this stretch. This stretch was mainly comprised of glide habitat. At the upstream end of the stretch the channel was >1 m depth and very soft, this was unsuitable to survey and the river bed could not be seen even with the use of a torch.

Site 3 spanned across the Tullagower River and Brisla East Stream. The Tullagower River downstream of the confluence the channel was up to 2 m wide with an average depth of 30 cm (Plate 6). It was largely overgrown with brambles and ferns, conifers from the bordering forestry and inaccessible in many areas due to this vegetation. Again, there was evidence of previous channel modification and field drains at this site. The substrate consisted of up to 50% cobble, instream vegetation consisting of *Lolium sp* and *Stachys palustris* was also present in the section surveyed upstream of the confluence on the Tullagower River (Plate 7). Survey was conducted on ca. 130 m of the Tullagower River at this site. Survey was not possible on the Brisla East Stream, it was heavily vegetated instream and bankside (Plate 8). Upstream of the road crossing on this stream was heavily overgrown with brambles and inaccessible. Japanese knotweed (*Fallopia japonica*) was also noted upstream of the road crossing at this Site.

Site 4 was located within an area of cutover bog. There was no water body present at this location, and thus no FPM surveys were conducted at this location (Plate 9). Bog drains, field drains and forestry drains are present in the surrounding areas (Plate 10).

Site 5 and 6 were accessed from the banks (Plate 11, Plate 12). No FPM surveys were conducted due to channel access at these sites. The channel here was narrow and shallow with high overgrown banks making it unsuitable to survey. At the confluence the Tullagower River is representative of a field drain and was stagnant with instream vegetation. The confluence was also viewed from the right hand bank of the Doonbeg river at site A. The main Doonbeg channel at this location was ca. 8 m wide and comprised mainly of glide habitat (Plate 13). The substrate and depth of the river at this location were not clear from the bank however there were willows in stream which often provide suitable cover for FPM.

As there was a significant difference in the flow within the Tullagower River between sites 1-3 and sites 4-6, further sites were visited for investigation of the river system. At site B there is an unmapped forestry drain which is flowing from site B east towards site C (Plate 14). The majority of the flow from the Tullagower River sites upstream of here is flowing east here rather than along the mapped channel. Similarly, the Tullagower River directly north of site B is flowing towards the confluence at site B and east towards site C (Plate 15). This channel still exists at site C and is flowing north east towards site D (Plate 16, Plate 17). The confluence of the drain running from site D with the unnamed



river on which site E was not located but it is suspected this drain runs to this unnamed river (Plate 18).

### 2.3. Conclusions

Where the channels were suitable for FPM survey none were found. A survey of this type, based on a single site visit, always has the risk of missing presence of the species elsewhere in the area to be affected. However the complete absence of records paired with, for the most part, unsuitable habitat suggests a genuine absence of FPM at the locations surveyed.

Notwithstanding the probable absence of FPM in the tributaries, the Doonbeg River lies within an FPM sensitive area which means that consideration of this species is required, particularly with respect to mitigation during and following construction. There are previous records of FPM in the Doonbeg River, both upstream and downstream of its confluence with the Tullagower River. Therefore, although no FPM were recorded at the surveyed sites it is important to consider their presence in the wider Doonbeg system, particularly downstream of the confluence, when carrying out any works surrounding the watercourses.

Incidental sightings of third schedule invasives species were noted at the Site. The European Communities (Birds & Natural Habitats) Regulations 2011 – 2023 restrict the importation, distribution, sale or release of approximately 70 species of plants and animals considered to be the most harmful Invasive Alien Species. Japanese knotweed and Himalayan balsam are two of the plant species listed in Part 1 of the Third Schedule of the 2011 - 2023 regulations. Japanese knotweed is also listed as a vector material in Part 3 of the Third Schedule. It is an offence to plant, disperse, allow or cause to disperse, spread or otherwise cause to grow in any place any plant included in the Third Schedule. It is an offence under the Wildlife Acts 1976 – 2022 to plant or otherwise cause to grow in a wild state in any place in the State any species of (exotic) flora, or the flowers, roots, seeds or spores of (exotic) flora. Therefore care must be taken and appropriate mitigation must be put in place not to further disperse these species at Ballykett.

### References

Gittings, T., O'Keefe, D., Gallagher, F., Finn, J. and O'Mahony, T., (1998). Longitudinal variation in abundance of a freshwater pearl mussel *Margaritifera margaritifera* population in relation to riverine habitats. *Biology and Environment: Proceedings of the Royal Irish Academy* 98B (3), 171 – 178.

Hastie, L. C., Boon, P. J. and Young, M. R. (2000). Physical microhabitat requirements of freshwater pearl mussels, *Margaritifera margaritifera* (L.). *Hydrobiologia* 429, 59 – 71

National Parks and Wildlife Service (NPWS; 2004). *Margaritifera margaritifera. Stage 1 and Stage 2 survey guidelines*. Irish Wildlife Manuals, No. 12. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

Plates

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**Plate 1 Site 1 surveyed section taken in stream**



**Plate 2 Site 1 overgrown section inaccessible, downstream of road crossing**



**Plate 3 Site 1 inaccessible section, upstream of road crossing**



**Plate 4 Site 2 surveyed channel with instream vegetation visible**





**Plate 5 instream vegetation Site 2**



**Plate 6 Site 3, surveyed channel downstream of confluence**



**Plate 7 Site 3, surveyed section Tullagower river upstream of confluence**



**Plate 8 Site 3, Brisla East Stream, inaccessible upstream of confluence**





**Plate 9 Site 4, no river present**



**Plate 10 Site 4, nearby large bog drain**



**Plate 11 Site 5, overgrown channel inaccessible for survey**



**Plate 12 Site 6, overgrown channel, inaccessible for survey**





**Plate 13 Main Doonbeg River downstream of confluence from right hand bank at Site A.**



**Plate 14 Channel continuing east at Site B**



**Plate 15 Mapped Tullagower channel running south towards unmapped forestry channel at Site B**



**Plate 16 Drain channel flowing east at Site C**



**Plate 17 Digger seen alongside drain running east at Site D**



**Plate 18 Channel seen at Site E flowing towards Doonbeg channel**



## Figures

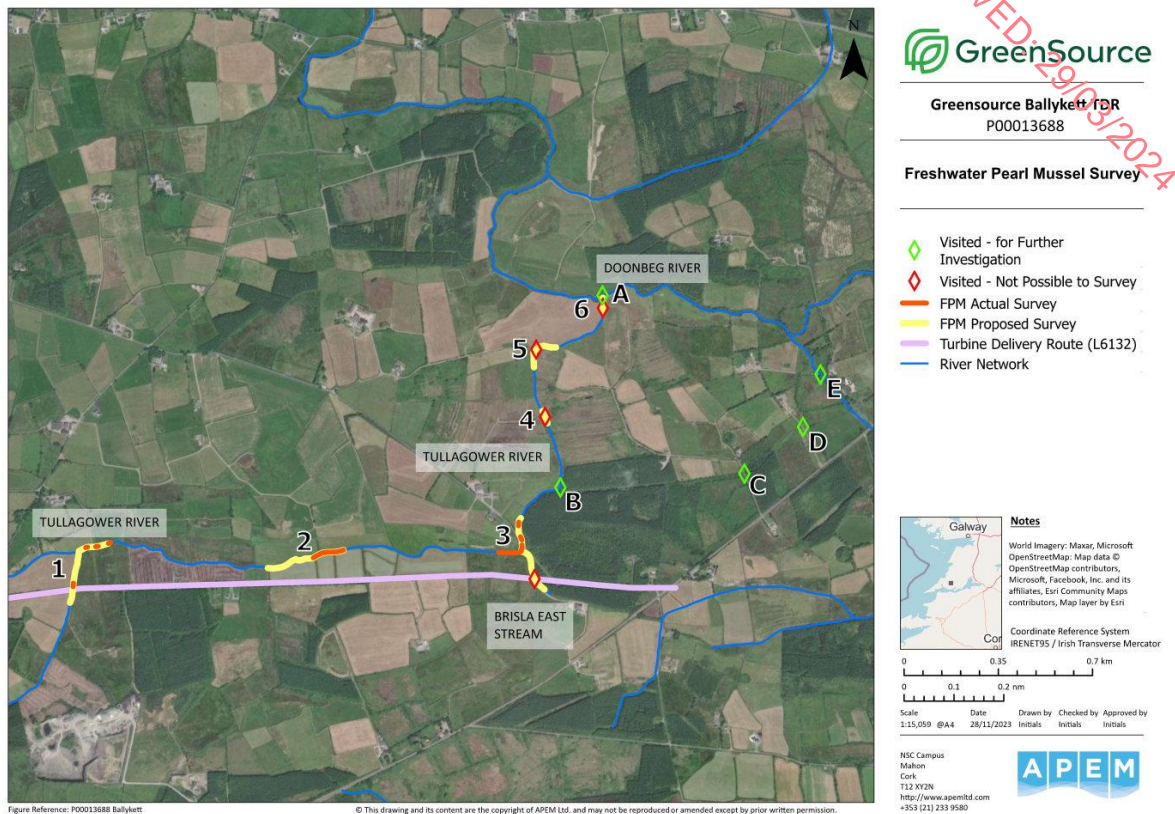


Figure 1: Stage 1 surveys, proposed and actual locations.

## Appendix A: Descriptions of suitable freshwater pearl mussel habitats

Freshwater Pearl Mussel (*Margaritifera margaritifera*) require clean, fast-flowing water, optimum water depths of 0.3–0.4 m, optimum current velocities of 0.25–0.75 ms<sup>-1</sup> with boulder-stabilised refugia, and which contain enough sand for burrowing. Adults can tolerate silty or muddy conditions for unknown lengths of time, but juveniles are never found in this type of habitat. Boulders are important as they usually prevent significant bed scour during major floods (Hastie *et al.* 2000, Gittings *et al.* 1998). Most suitable areas to search during stage 1 survey is in the immediate vicinity of boulders and under overhanging trees in suitable marginal areas, channel shading is extremely important.