



Fish Monitoring Programme

Clachaig Glen Wind Farm

PREPARED FOR
RWE Renewables UK Onshore
Wind Limited

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ACRONYMS AND ABBREVIATIONS

Acronym	Description
DSFB	District Salmon Fishery Board
ECoW	Ecological Clerk of Works
ECU	Energy Consents Unit
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
ERM	Environmental Resources Management
FHS	Fish Habitat Survey
FMP	Fish Monitoring Programme
km	Kilometres
m	Metres
SEPA	Scottish Environment Protection Agency
SFCC	Scottish Fisheries Coordination Centre

1. INTRODUCTION

Environmental Resources Management Ltd (ERM) has been commissioned by RWE Renewables UK Onshore Wind Limited (RWE) to prepare a Fish Monitoring Programme (FMP) to discharge a pre-commencement planning condition for Clachaig Glen Wind Farm ('the Development').

The Development is located on land approximately 20 kilometres (km) north of Campbeltown on the western coast of the Kintyre Peninsula, Argyll and Bute. The Development is a 12-turbine wind farm, which comprises seven turbines with a blade tip height of up to 185 metres (m) and five turbines with a blade tip height of up to 200 m, a battery energy storage facility and associated infrastructure.

1.1 PLANNING CONDITION

Scottish Ministers granted Section 36 consent, as well as deemed planning permission for the Development subject to conditions, which are outlined in full within the Section 36 consent (ECU reference no: ECU00002103; Argyll & Bute Council reference no: 22/00613/S36).

This document has been produced to discharge Condition 34 of the Development's Section 36 consent:

"Condition 34: Fish Monitoring Programme

- (1) No later than 18 months prior to the commencement of development a Fish Monitoring Programme (FMP) shall be submitted to the Planning Authority for their written approval in consultation with Marine Scotland Science and the Galloway Fisheries Trust.*
- (2) The FMP shall consist of fully quantitative electrofishing baseline fish surveys, in late summer/autumn at sites which could potentially be impacted by the development or its construction and at control sites:*
 - (a) One year prior to commencement of development;*
 - (b) At least annually, during construction; and,*
 - (c) for at least one-year post-construction, the length of post-construction monitoring being dependent on monitoring results during the construction phase.*
- (3) The sites to be surveyed should include but not be limited to existing crossing points and those to be constructed or upgraded.*
- (4) The FMP shall provide for the submission of the results of the surveys to the Planning Authority and Marine Directorate and the Argyll District Salmon Fishery Board within three months of each survey having taken place.*
- (5) All survey/monitoring work must be undertaken using Scottish Fisheries Coordination Centre standards and in accordance with the approved programme and implemented in full.*
- (6) The FMP shall detail the proposed mitigation where it is found that the construction has adversely impacted on fish populations and timelines for undertaking such mitigation, as necessary.*

(7) Any updates or amendments made to the FMP by the Company must be submitted, in writing, by the Company to the Planning Authority for its written approval.

(8) The FMP approved under part (1) or any updates or amendments to that document approved under part (7) shall be implemented during the period of its operation."

The aim of this FMP is to detail the information requested regarding Condition 34 taking cognisance of the fisheries information detailed within Environmental Impact Assessment Report (EIAR) Volume 2: Chapter 9: Ecology and EIAR Volume 3: Technical Appendix 3: Fish and Freshwater Pearl Mussel Report.

2. METHODOLOGY

2.1 FISH FAUNA MONITORING

As per Chapter 9: Ecology, fish surveys were conducted in 2015, to support the 2016 Environmental Impact Assessment (EIA). The fish surveys found brown trout (*Salmo trutta*) at most sampling sites on the Clachaig Water and Achadh a'Choirce. The development could lead to direct and indirect impact upon fish species, consequently fish fauna monitoring will be undertaken during construction and operation.

Baseline (pre-construction) surveys will be conducted to identify the presence, distribution and population estimates for salmonid species within watercourses that are being crossed by the Development. This data, and subsequent monitoring data will enable the detection of potential impacts on fish fauna that could arise during and after the construction of the Development (i.e., from nutrient enrichment, spillages, increased acidity, siltation, etc.). Two survey methods will be employed as part of the fish fauna monitoring: fish habitat survey (FHS), and quantitative electrofishing surveys.

2.1.1 FISH HABITAT SURVEY

The objectives of the FHS will be to:

- Assess the distribution and extent of fish habitats at proposed crossing point locations;
- Advise on micro-siting as required to minimise the risk to fish populations; and,
- Identify and confirm locations of electrofishing monitoring points including control sites.

Fish habitat surveys will be completed by way of a walkover FHS upon all watercourses in which crossing points are located. Locations for FHS are detailed on Figure 1, Appendix A. Fish habitat surveys will be completed in accordance with Scottish Fisheries Coordination Centre (SFCC) habitat protocols¹. The type of channel identified in each survey will be recorded, along with the suitability of habitat for different life-stages of salmonid fish: spawning, fry, parr and adults (after Henry and Cragg-Hine²). The location, quantity and quality of key habitat features associated with salmonid fish will also be assessed. Significant features such as fish spawning sites, deeper pools and potential obstacles to fish passage will be recorded separately.

¹ Scottish Fisheries Coordination Centre (2007). *Electrofishing survey training course manual*. MSS. Pitlochry, pp 1 – 64.

² Hendry, K & Cragg-Hine, D. (1997). *Restoration of Riverine Salmon Habitats*. Fisheries Technical Manual 4, Environment Agency, Bristol.

2.1.2 QUANTITATIVE ELECTROFISHING SURVEY

Electrofishing will be conducted by suitably qualified and experienced personnel in accordance with SFCC standards¹. Electrofishing will cover all accessible in-stream habitat types available for salmonid use and will be fully quantitative.

To obtain information on salmonid populations, each monitoring location of approximately 100 m² will be marked out using stop nets at both ends of each monitoring location. Monitoring locations will then be electrofished up to four times in a consecutive manner to allow a depletion estimate of the density of each age class of each species to be made. On completion of each sub-sample, a calculation of a minimum fish density for each habitat type surveyed will be undertaken.

Fish will be caught in hand-held dip nets. Caught fish will be placed in holding containers of clean water, where they will be held until ready for processing. Fish will be anaesthetised for processing. Processing will involve identifying caught individuals to species level and measuring fork length.

Non-salmonid species that are present and caught will also be recorded and measured. However, their population density may not be accurately assessed using the electrofishing method, as this has been designed specifically for surveying salmon and trout populations.

A general description of fish habitat (e.g., substrate type, water depth, flow rate, in-stream cover) will be recorded during each surveying event.

2.1.2.1 AGE CLASS

The electrofishing survey will concentrate on assessing the status of salmonid species, namely brown trout as this is the species recorded during the initial surveys in 2015. Age determination can be made by assessing the length of fish present. However, with older fish it can be more difficult to clarify age classes. In these cases, a small number of scale samples will be taken from fish, in addition to length assessments, to verify the ages of fish whose age cannot be determined with certainty from length alone.

2.1.2.2 ANALYSIS

Densities of fish will be calculated separately for fry (young of the year) and parr for salmonids. Estimates of minimum population densities will be calculated by dividing up the number of fish caught by the area of habitat surveyed. All fish densities will be expressed as fish per 100 square metres of wetted stream area (fish / 100 m²).

Classification will be conducted as per SFCC data collection protocols¹. The classifications are based on large datasets held by SFCC. The quintile ranges of salmon and trout densities will allow for comparison of fishery performance against regional and national reference points. The classification system is based on semi-quantitative fishing (i.e., density based on number of fish captured during a single electric fishing run through an undisturbed site). Different classifications are provided for streams of various widths.

Fish densities at each monitoring location will be determined from the baseline pre-construction dataset and used to make comparisons with densities recorded during construction and post-construction monitoring, to characterise any changes in water quality associated with the Development.

2.1.3 MONITORING LOCATIONS

FHS will be undertaken ahead of the baseline (pre-construction) electrofishing surveys at new crossing points and any which are being upgraded (FHS survey locations are shown in Figure 1). The FHS will identify which of the crossing point locations will be subject to electrofishing as part of the monitoring programme, dependent on the suitability of habitat for fish in these locations. The final list of monitoring locations will be shared with the Planning Authority following the conclusion of the pre-construction (baseline) surveys in the form of an updated FMP.

2.1.4 MONITORING FREQUENCY

2.1.4.1 ESTABLISHING THE MONITORING BASELINE

Baseline quantitative fish fauna surveys will be conducted as follows within one year prior to construction:

- Fish Habitat Surveys in Summer 2025; and
- Quantitative electrofishing surveys on monitoring points selected following fish habitat surveys, conducted between July and September 2025, in accordance with the methodology described in Section 2.1.2.

2.1.4.2 MONITORING DURING CONSTRUCTION

Monitoring surveys at each location, to be defined following the collection of the baseline (pre-construction) data, will be conducted annually throughout the construction phase. This will comprise quantitative electrofishing surveys undertaken between July and September inclusive; and in accordance with Section 2.1.2.

2.1.4.3 MONITORING AFTER CONSTRUCTION

Monitoring surveys at each location, to be defined following the collection of the baseline (pre-construction) data, will be conducted for one year following construction, as per Millidine *et al.* (2015)³. This will comprise electrofishing surveys undertaken between July and September inclusive; and in accordance with the methodology described in 2.1.2.

3. MITIGATION

3.1 FISH FAUNA EMERGENCY ACTION PLAN

Any observation of a visual deterioration in water quality, fish in distress, or floating or other dead fish will constitute a trigger for urgent investigation.

If a construction-related event is identified the construction activities will cease until the problem is identified and isolated, and the Ecological Clerk of Works (ECow) will be contacted for advice. Method Statements and emergency plans (including remediation) will be provided by RWE and included in the Construction Environmental Management Plan (CEMP), (e.g., placement of additional silt traps, check dams, diversion of runoff, etc.).

³ Millidine, K.J., Malcom, I.A., McCartney, A., Laughton, R., Gibbins, C.N., and Fryer, R.J. *The influence of wind farm development on the hydrochemistry and ecology of an upland stream*. Environmental Monitoring and Assessment 2015 Aug; 187(8): 518.

SEPA will also be contacted so that they may alert other water users of the event, where required, and ensure that any proposed remediation is appropriate.

Provision for additional monitoring surveys will be implemented as necessary to monitor the recovery after such an event. The aim of remedial actions will be to restore baseline conditions as soon as possible.

4. REPORTING

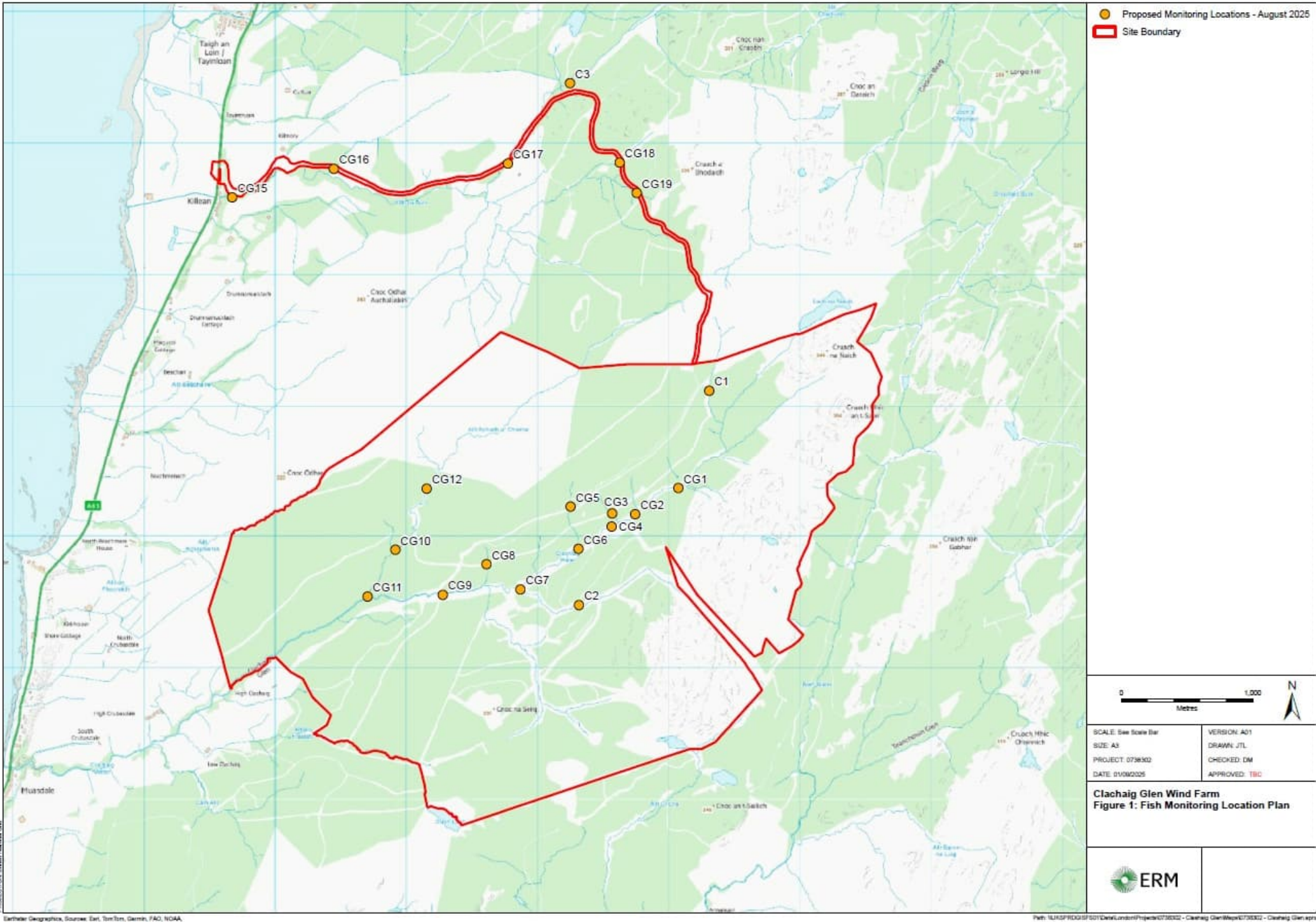
4.1 FISH MONITORING REPORT

The following reports will be produced:

- A baseline fish survey report. This will detail the results of the baseline (pre-construction) fish habitat surveys and electrofishing surveys. The report will be submitted to the Planning Authority, Marine Directorate and Argyll DSFB within three months of each survey having taken place;
- An annual report during construction will be prepared and submitted to the Planning Authority, Marine Directorate and Argyll DSFB within three months of each survey having taken place. The report will detail the results of the surveys. Results will be compared to previous baselines to identify variations in fish populations; and,
- A post-construction fish survey report. This will detail the post-construction electrofishing surveys. This will be submitted to the Planning Authority, Marine Directorate and Argyll DSFB within three months of the survey having taken place. The report will detail the results of the surveys. Results will be compared to previous baselines to identify variations in fish populations.

APPENDIX A FIGURES

FIGURE 1 FISH MONITORING LOCATION PLAN





ERM HAS OVER 140 OFFICES ACROSS THE FOLLOWING
COUNTRIES AND TERRITORIES WORLDWIDE

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Colombia	Portugal
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Germany	South Africa
Hong Kong	South Korea
India	Spain
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