Notes:

1. Extract from Ordnance Survey 5,000 scale mapping - sheet numbers 3880, 3881, 3937, 3938 and 6" Raster Mapping - sheet numbers LS010, LS011, OY040

Legend:

- Landowner Boundary (c.32.1 Hectares)
  Third party landowner's land interest
- Planning Application Area (c.12.2 Hectares)
- Applicants Land Interest Area (c.12.4 Hectares)
  under lease agreement from landowner
- Proposed S&G Extraction Area (c.8 Hectares)
- Special Protection Area (SPA)
  Slieve Bloom SPA
- Distance Off-Sets from Planning Application Boundary
  250m, 750m and 1km
- 500m Distance Off-Sets from Planning Application Boundary used for dust impact screening assessment
- R2 — Residential Property Locations
  Residences numbered within 1km of Application Boundary
- D3 — Baseline Dust Monitoring Locations
  D1 - D4

RECEIVED: 19/09/2024

Rev	Amendments	Date	By	Chk	Auth

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Breedon Ireland

Project
Sand and Gravel Pit Development at Mounthall, Camross, Co. Laois

Figure Title
Baseline Dust Monitoring Locations (and Receptors within 1km)

Scale		SLR Project No.
1:2,500	@ A3	00584.065036

Designed	Drawn	Checked	Authorised
SMcD	SMcD	LH	LH
Date	Date	Date	Date
01/24	01/24	09/24	09/24

Figure Number **Figure 8-1** Rev. **0**

Scale 1:2,500

Appendices

Appendix 8-A: Dust Risk Screening Assessment Methodology

Appendix 8-A:

Dust Risk Screening Assessment Methodology

The methodology applied in the assessment is a semi-quantitative risk assessment methodology, in which the probability of an impact occurring and the magnitude of the impact, if it were to occur, are considered. This methodology is the Tier 2 assessment of the dust assessment methodology. If identified dust sensitive receptors are not screened out within Tier 1, this approach provides a mechanism for identifying the areas where mitigation measures are required, and for identifying mitigation measures appropriate to the risk presented by the development, (i.e., the assessment does not take account of proposed mitigation being put in place).

The magnitude of the potential risk at each receptor is classified depending on the frequency of exposure and the distance from the site to the receptor. Frequency of exposure is represented by the percentage of moderate to high winds (over 3 m/s) from the direction of the site.

The screening assessment tool assesses the significance of the distance from site and the frequency of exposure of each receptor by assigning a ranked number. Receptors with a higher potential for dust impacts would therefore result in a higher value whilst receptors with lower potential would expect to carry a lower value. The value corresponding to an evaluation of risk is a product of the significance of the distance and frequency of exposure, each is assigned a value representing its significance. The multiplication of the two values assigned gives a total, which is then corresponded to a qualitative term of risk magnitude.

A.1.1 Frequency of Exposure Criterion

The potential for any site to emit dust is greatly influenced by weather. Increased wind speed increases the potential for the generation of airborne dust due to the suspension and entrainment of particles in airflow. A worst-case situation would be strong, warm, drying winds which increase the rate at which dust is lifted from an untreated surface and emitted into the air. Wind can also have the effect of spreading dust over a large area. Conversely, rainfall decreases dust emissions, due to both surface wetting and increasing the rate at which airborne dust is removed from air. An article on dust generation from quarry/pit operations[17] suggests that rainfall of greater than 0.2 mm per day is considered sufficient to effectively suppress windblown dust emissions.

The frequency of exposure to dust emissions represents the percentage of time that wind speeds capable of carrying airborne dust (greater than 3 m/s) are blowing from the site to the direction of the receptor. Frequencies are calculated based on meteorological data. For screening assessment wind speeds greater than 2 m/s were considered as this is how data on percentage occurrence of wind frequency and wind speed is calculated and presented by Met Eireann. For this reason, the assessment is conservative.

For the screening assessment, a value of 1 mm would be used for the criteria to classify days as ‘dry’ or ‘wet’; five times the recommended value, using annual average rainfall data. The average number of days when rainfall exceeds 1 mm would be provided for each month and calculated over the year to provide an average.

The resulting frequency of moderate to high wind speeds with the potential of carrying airborne dust towards receptors would then be classified into the criteria in Table 8 A-1 with the respective rank value assigned.

[17] Leeds University. Good Quarry. http://www.goodquarry.com/article.aspx?id=55&navid=2

Table 8 A-1 Frequency of Exposure – Risk Classification

Risk Category	Criteria
1	Frequency of winds (>2 m/s) from the direction of the dust source on dry days are less than 3%
2	The frequency of winds (>2 m/s) from the direction of the dust source on dry days are between 3% and 6%
3	The frequency of winds (>2 m/s) from the direction of the dust source on dry days are between 6% and 9%
4	The frequency of winds (>2 m/s) from the direction of the dust source on dry days are between 9% and 12%
5	The frequency of winds (>2 m/s) from the direction of the dust source on dry days are between 12% and 15%
6	The frequency of winds (>2 m/s) from the direction of the dust source on dry days are greater than 15%

A.1.2 Distance to Source Criterion

In assessing dust impacts, the distance from the source to the sensitive location is crucial, as airborne, and deposited dust tend to settle out close to the emission source. Smaller dust particles remain airborne for longer, dispersing widely and depositing more slowly over a wider area.

Guidance indicates that larger dust particles (greater than 30 µm) will largely deposit within 100 m of sources. Smaller particles (less than 10 µm) are only deposited slowly. Concentrations decrease rapidly on moving away from the source, due to dispersion and dilution.

To allow for this effect of distance, buffer zones are often defined by mineral planning authorities around potentially dusty activities to ensure that sufficient protection is provided. They have not been established in any rigorous scientific way, but usually range from 50 m to 200 m. The 1995 UK DoE Guidance on dust from surface mineral working's, however, recommends a stand-off distance of 100-200 m from significant dust sources (excluding short-term sources), although it is recognised that these distances can be reduced if effective mitigation measures are identified and implemented. In terms of identifying sensitive locations therefore, and to represent an extreme worst-case scenario, consideration only needs to be given to sensitive receptors within 500 m of the site boundary. Receptors at a distance greater than 500 m have therefore been screened out in Tier 1 of the assessment.

The criteria for classifying the distance from receptor to source and thus assigning a rank value has therefore been based on the various references to dust behaviour described above. The rank classifications are presented below in Table 8 A-2. A risk category is maintained for receptors more than 500 m for circumstances where although a receptor is beyond 500 m from the dust source, its sensitivity for example is sufficient for it to be taken onto a Tier 2 assessment.

Table 8 A-2 Distance to Source – Risk Classification

Risk Category	Criteria
1	Receptor is more than 500 m from the dust source
2	Receptor is between 400 m and 500 m from the dust source
3	Receptor is between 300 m and 400 m from the dust source
4	Receptor is between 200 m and 300 m from the dust source
5	Receptor is between 100 m and 200 m from the dust source
8	Receptor is less than 100 m from the dust source

A.1.3 Sensitivity of Receptors

Sensitive locations are those where the public may be exposed to dust from the site. Locations with a high sensitivity to dust include hospitals and clinics, hi-tech industries, painting and furnishing and food processing. Locations classed as being moderately sensitive include schools, residential areas, and food retailers. Table 8 A-3 below[18] shows examples of dust sensitive facilities.

Table 8 A-3 Examples of Dust Sensitive Facilities

High sensitivity	Medium sensitivity	Low sensitivity
Hospitals and clinics	Schools and residential areas	Farms
Retirement homes	Food retailers	Light and heavy industry
Hi-tech industries	Greenhouses and nurseries	Outdoor storage
Painting and furnishing	Horticultural land	
Food processing	Offices	

A.1.4 Evaluation of Risk

Once a rank value has been assigned to the frequency of exposure and distance to source, an overall risk can be evaluated by combining the two risk categories, along with consideration of the sensitivity of the receptor. For low sensitivity receptors the risk of dust impact is considered to be significantly lower than for medium and high sensitive receptors. Therefore, a factor of 0.5 would be applied to the final risk evaluation ranking.

For each receptor, the relative magnitude of risk is given by identifying which of the score categories in Table 8 A-4 it falls into. This final evaluation represents the risk of dust impacts prior to control and mitigation measures being employed on site.

Table 8 A-4 Risk Evaluation Ranking (Without Mitigation)

Magnitude of Risk	Score
Insignificant	7 or less
Acceptable	8 to 14
Slight Adverse	15 to 24
Moderate Adverse	25 or more

[18] **Ireland M. (1992)** "Dust: Does the EPA go far enough?", Quarry Management, pp23-24.

EIAR Extract

Chapter 10 Noise

CONTENTS

TABLES

FIGURES

Introduction

Background

10.1 This Chapter of the Environmental Impact Assessment Report (EIAR), prepared by SLR Consulting Ireland, addresses the potential noise and vibration effects of the proposed development at Mounthall & Cummer townlands, Camross, County Laois.

10.2 The proposed development being applied for under this current planning application is shown on EIAR **Figures 2-2** to **2-7** and will consist of:

- Continued use and extension to existing permitted sand and gravel pit registered under Section 261 of the Planning & Development Act 2000, as amended (site ref. QY05/10) within an overall application area of c. 12.2 hectares;
- Extraction of sand and gravel (dry working) over an area of c. 8 hectares with processing and washing of material on site (closed loop water recycling system with associated silt storage lagoons 1,952.25m^2), and all ancillary works and structures;
- Site facilities consisting of mobile processing plant, portacabin site office (6.25m²), portacabin welfare facility (18.9m²), serviced portaloo toilet, bunded fuel storage and refuelling pad with hydrocarbon interceptor, weighbridge, wheelwash, water supply borehole, perimeter berms, vegetation planting and fencing;
- Access to the site will be via the existing sand & gravel pit entrance;
- Restoration of the site to agricultural lands; and
- The proposed extraction operational period is for 10 years plus 1 year to complete restoration (total duration sought 11 years).

10.3 It is anticipated that the construction works required to facilitate the operational phase of the development would be completed over a 6-month period. The construction stage works will comprise the following:

- Installation of site facilities consisting of mobile aggregate processing plant, weighbridge office, welfare facility including canteen and cloakroom, serviced portaloo toilet, refuelling pad with hydrocarbon interceptor, weighbridge, wheelwash and water supply borehole.
- Construction of silt storage lagoons associated with the washing plant closed loop water recycling system.
- Construction of perimeter screening berms using soils stripped from the Phase 1 extraction area. The screening berms will be c. 2 m in height and will be located along the northern boundary of Phase 3 adjacent to residence R1, and along the eastern boundary of Phase 2 adjacent to residences R2/R3.
- Provision of acoustic fencing adjacent to residences R1 to the north and R2/R3 to the east.
- Vegetation planting with native species will be carried out around the periphery of the application area.
- Re-routing of the 5 no. electricity poles located within the proposed extension extraction area to traverse the periphery of the site.

10.4 The operational phase will see sand and gravel extraction carried out within an overall extraction area of c. 8 hectares, over a 10-year period at an average rate of 80,000 tonnes per annum.

10.5 It is proposed to completed extraction in 3 phases. Extraction will be commenced initially in the southeast of the site (Phase 1) to permit construction of acoustic fencing, screening berms and vegetation.

10.6 Perimeter screening berms along the northern and eastern boundaries of the extension extraction area will be constructed using the stripped topsoil and overburden soils from Phase 1 in the vicinity of residences R1 and R2/R3. Acoustic fencing structure will be constructed in two locations, each c.150 m in length along the application boundary with residences R1 to the north and R3 to the east.

Methodology

10.7 The following sections of this EIAR Chapter describe the potential noise impacts associated with the proposed development. The following issues are addressed separately:

- regulatory control framework for noise and vibration;
- methodology used to assess potential impacts from activities at properties (dwellings and farms) and sensitive ecological receptors;
- baseline conditions pertaining to existing background and ambient noise levels around the project site;
- noise impact evaluation criteria;
- prediction of the noise levels and identification of potential impacts;
- assessment of severity of impacts, with reference to the evaluation criteria;
- description of mitigation measures that will be incorporated into the design and operation of the scheme to eliminate or minimise the potential for noise impact, and
- a summary of any residual impacts.

10.8 To assist the understanding of acoustic terminology and the relative change in noise, a glossary of terms and phrases, which specifically relate to this Chapter of the EIAR, is provided in **Appendix 10-A**.

Consultations / Consultees

10.9 A formal pre-planning consultation meeting was held online between officials of Laois County Council, SLR and the Applicant on the 1st May 2024.

10.10 A pre-planning consultation document was issued to 13 no. statutory consultees which included the EPA, An Taisce, the HSE and the Heritage Council. The full list of statutory consultees and summaries of their responses is provided in **Chapter 1**, sections 1.33 to 1.40 and **Table 1-1**.

10.11 Feedback of most relevance and considered in the assessment of noise and vibration was received from the Health Service Executive (HSE) Environmental Health Department who made the following comments in their consultation response:

"The potential impacts for noise and vibration from the proposed development on all noise sensitive locations must be clearly identified in the EIAR. The EIAR must also consider the appropriateness and effectiveness of all proposed mitigation measures to minimise noise and vibration. A baseline noise monitoring survey should be undertaken to establish the

existing background noise levels. Noise from any existing industry/quarries or any potential sources in the area should not be included as part of the background levels.

In addition, an assessment of the predicted noise impacts during the construction phase and the operational phase of the proposed Quarry development must be undertaken which details the change in the noise environment resulting from the proposed development.

Details of the location and frequency of noise monitoring for the proposed development should be included in the EIAR to be submitted as part of the Planning Application."

10.12 Details of the assessment, the range of mitigation measures to be implemented at the site and, the schedule of future monitoring are provided later in the chapter.

10.13 In addition, consultation has been undertaken directly with EIA specialist contributors such as ecology in the preparation of the noise assessment.

10.14 Following this, and a review of published development plans and site surveys, it was considered that there was no requirement for any further formal external consultations to be carried out in respect of noise & vibration for the purposes of this assessment. There was however significant consultation with other specialist contributors to this EIA Report.

Contributors / Author(s)

10.15 The noise impact assessment presented in this Chapter was prepared by SLR Consulting Ireland. The lead consultant for the study was Ronan Murphy MIOA BSc Environmental Management, Diploma Acoustics and Noise Control. Ronan is Principal Acoustic Consultant with 18 years of experience.

Sources of Information

10.16 The prevailing noise levels at noise sensitive locations in the vicinity of the site and haulage routes was determined through onsite measurements. Empirical source data for expected activities during the construction and operational phases was then used to calculate potential noise impacts arising at the same noise sensitive locations.

Limitations / Difficulties Encountered

10.17 This assessment is compiled based on published guidance documents, and site-specific field surveys. No difficulties were encountered in compiling the required information.

Potential Impacts of the Proposed Development

Study Area

10.18 The application site is located within the townlands of Mounthall and Cummer, Camross, County Laois. The application site and the overall site are located within a rural agricultural landscape.

10.19 There are isolated private residential properties and agriculture farms located throughout the surrounding rural landscape, predominantly along the local road network.

10.20 Two local roads bound the application site at its southern and eastern boundaries. Access to the existing permitted pit is from local tertiary road L10317 located at the eastern site boundary. The preferred haul route for vehicles will be via local primary road L10317 to the L1031 located to the south and from there to the R440 regional road and national network beyond.

Nearest Noise Sensitive Receptors

10.21 Noise sensitive locations are defined in the Environmental protection Agency *Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities* (NG4, 2016) as:

"Any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or other area of high amenity which for its proper enjoyment requires the absence of noise at nuisance levels".

10.22 The closest receptors have been identified and assessed based on their distance to key working areas proposed as part of the application. The relevant receptors within a 500m radius are presented in **Table 10-1** below.

Table 10-1 Sensitive Receptors located within 500 m of redline boundary

Receptor	Receptor	Construction			Operational			
		Site preparation (all areas), storage lagoons[1]	Foundation (all work), including fuel pad	Weighbridge, wheelwash and welfare/office units	General Extraction P1	General Extraction P2	General Extraction P3	Aggregate Processing
R1	Residential	25	55	55	145	105	40	145
R2	Residential/Comm.	85	450	450	330	95	305	355
R3	Residential	85	465	465	310	100	300	340
R4	Residential	260	605	605	505	270	480	545
R5	Residential	235	650	655	245	305	415	365
R6	Residential/Comm.	245	605	610	250	425	435	360
R7	Residential	300	730	730	310	400	500	440
R8	Residential/Comm.	385	795	795	390	525	605	525
R9	Residential	475	860	860	480	640	685	605
R10	Residential	345	410	450	455	560	400	455
R11	Residential	275	360	360	545	430	445	545
R12	Residential/Comm.	305	395	395	545	395	440	550
R13	Residential	350	500	500	585	380	490	600
R14	Residential	395	605	605	655	430	570	675
R15	Residential	305	705	705	590	370	580	640

[1] Distances are to the site boundary (red line application boundary) with the exception of R2, R3 and R4 where distances are to the closest area of works (i.e. screening berm construction) as no operational works to be carried out between screening berm and eastern site boundary

Receptor	Receptor	Construction			Operational			
		Site preparation (all areas), storage lagoons[1]	Foundation (all work), including fuel pad	Weighbridge, wheelwash and welfare/office units	General Extraction P1	General Extraction P2	General Extraction P3	Aggregate Processing
R16	Residential	330	725	725	640	395	605	670
R17	Residential	350	735	735	645	420	625	690
R18	Residential	400	770	770	695	460	665	735
R19	Residential	415	790	790	725	480	685	755
R20	Residential	450	820	820	750	515	720	790

10.23 It is important to note that noise sensitive receptor R1 is the landowner's residence. In order to reflect potentially reduced sensitivity of the residents to noise generated from the site, it is reasonable to adopt some leniency in impact ratings and thresholds. This approach is reflected in environmental noise guidance documents including ETSU-R-97. The proposed thresholds for this location have been discussed further in Sections 10.82 and 10.87.

10.24 Additional consideration has been given to the proximity of potentially noise sensitive ecological receptors in the vicinity of the site.

10.25 There are three designated sites within a 2 km radius of the application site at Mounthall. These sites are identified in **Table 10-2** below.

Table 10-2 Ecological Receptors within 2 km of site

Natura 2000 Site	Site Code	Approximate distance to site (m)
Slieve Bloom Mountains SPA	004160	On site boundary
Slieve Bloom Mountains SAC & pNHA	000412	1,800 m

10.26 It is understood that the SPA and SAC provide potential nesting and foraging sites for Hen Harriers particularly within areas of heathland. Two representative areas of heath habitat have been included in the assessment. SPA(1) is located c. 250m SW of the application area adjacent to residence receptor (R6) and is included as the closest area of heath habitat but is unlikely to be used by Hen Harrier for breeding purposes as noted in Section 4 of the Natura Impact Statement (NIS). SPA(2) is located c. 1800m W of the site in an upland area and more likely to be used by Hen Harrier for breeding purposes.

Potential Noise Impacts from the Proposed Development

10.27 The proposed development will include a number of activities and processes that have the potential to generate noise impacts, these include:

- Additional vehicular movement on the surrounding road network, both initially during the construction stage and longer term due to the export of material from the site;
- The proposals include the construction of new site infrastructure. Ground clearance and excavation with heavy machinery as well as general construction work during this period will have the potential to give rise to noise impacts offsite;
- Once operational, the extraction process will require use of heavy machinery for removal and handling of material, a number of plant items including processing plant will also have the potential to generate noise impacts.

10.28 In addition to ongoing material extraction and processing, the proposed development will also include the restoration of the site to agricultural land as well as the formation of boundary treatment.

10.29 The proposed hours for operations (extraction, processing and haulage) at the site will be 07.00 hours to 18.00 hours Monday to Friday inclusive and 07.00 hours to 14.00 hours on Saturdays. No operations will be carried out on Sundays or Public Holidays[2]. The nature of mechanical plant onsite is such that no plant or process will be run outside of normal operational hours, and as such there is no risk of noise impacts arising during the evening or night period.

[2] DoEHLG 2004 Quarry & Ancillary Activities Guidelines for Planning Authorities – Section 4.7 (b)

Potential Vibration Impacts from the Proposed Development

10.30 The nature of onsite operations (i.e. no blasting, piling or drilling) and the distance to the nearest noise sensitive locations is such that the risk of vibration impacts occurring during either the construction or operational phases is negligible and has therefore not been assessed further as part of this assessment.

10.31 It has been found that ground vibration produced by road traffic are unlikely to cause perceptible structural vibration in properties located near to well-maintained and smooth road surfaces (TII, 2004). Considering the low traffic speeds and good state of repair of the L10317, potential vibration impacts from road traffic are deemed to be negligible and have not been assessed further as part of this assessment.

Interaction with Other Impacts

10.32 The potential impact of noise generated by the proposed development on sensitive receptors including residents and sensitive ecological receptors has been assessed in this Chapter of the EIAR. The impact of the proposed development activity on these receptors is further considered in Chapter 4 'Population and Human Health' and Chapter 5 'Biodiversity'.

Planning and Development Framework

10.33 The following sections outline the overarching planning policy and legislation relevant to noise management in the extractive industry at the proposed site.

National Planning Framework – Project Ireland 2040

10.34 The National Planning Framework (NPF) 2040[3] (published in February 2018) is a national planning framework for Ireland. The framework provides the policies for all regional and local plans. In the framework, the extractive industries are recognised as important for the supply of aggregates and construction materials to a variety of sectors.

10.35 National Planning Framework Objective 65 addresses noise related impact of development and identifies a requirement for Planning Authorities to:

10.36 *"Promote the pro-active management of noise where it is likely to have significant adverse impacts on health and quality of life and support the aims of the Environmental Noise Regulations through national planning guidance and Noise Action Plans."*

10.37 There are no specific policies in relation to noise emissions in NPF for mineral extraction or production of construction aggregates and materials. The stated general development objective is to facilitate the development while at the same time protect the environment.

Local Planning Policy – Laois County Development Plan 2021-2027

10.38 The current Laois County Development Plan details policies and objectives which provide for the planning and future sustainable development of the County between 2021 and 2027.

10.39 The development outlines the following Noise Pollution Policy Objectives.

ES 43 *Require an assessment of impact of the developments on noise levels, having regard to the provisions of the Environmental Protection Agency (EPA) Acts 1992 and 2003 and the EPA Noise Regulations 1994 when assessing planning applications.*

[3] Draft First Revision to the National Planning Framework (issued July 2024)

ES 44 *Support the implementation of the Noise Directive 2002/49/EC and associated Environmental Noise Regulations 2006.*

ES 45 *Ensure that relevant planning applications comply with the provisions of any Noise Action Plan or noise maps relating to the area.*

ES 46 *Restrict development proposals causing noise pollution in excess of best practice standards.*

ES 47 *Regulate and control activities likely to give rise to excessive noise, other than those activities which are regulated by the EPA.*

ES 48 *Ensure new development does not cause an unacceptable increase in noise levels affecting noise sensitive properties. Proposals for new development with the potential to create excessive noise will be required to submit a construction and/or operation management plan to control such emissions.*

ES 49 *Require activities likely to give rise to excessive noise to install noise mitigation measures and monitors. The provision of a noise audit may be required where appropriate.*

10.40 In line with policy objective ES 43 regarding the assessment of new development, reference should be made to the relevant provisions of the Environmental Protection Agency (EPA) Acts 1992 and 2003 and the EPA Noise Regulations 1994.

10.41 Section 106 and 107 of the Environmental Protection Agency Act 2003, outline powers in respect of the Agency and Local Authority to stipulate noise limits and controls on licenced activities.

10.42 Section 108 (i) of the EPA Act provide a definition of what constitutes a nuisance noise. This is defined as:

Where any noise which is so loud, so continuous, so repeated, of such duration or pitch or occurring at such times as to give reasonable cause for annoyance to a person in any premises in the neighbourhood or to a person lawfully using any public place, a local authority, the Agency or any such person may complain to the District Court and the Court may order the person or body making, causing or responsible for the noise to take the measures necessary to reduce the noise to a specified level or to take specified measures for the prevention or limitation of the noise and the person or body concerned shall comply with such order.

10.43 The Act does not outline specific noise thresholds or limits, however. For activities not required to obtain a licence from the Agency it is necessary to make reference to appropriate best practice guidance and standards to determine appropriate criteria to ensure that the requirements of Section 108 Part i. The guidance and standards relevant to the proposed development have been discussed in the following sections.

Guidance Documents and Assessment Criteria

Noise arising during the construction stage

10.44 There is no published statutory Irish guidance relating to the maximum permissible noise level that may be generated during the construction phase of a project. British Standard BS 5228-1:2009+A1:2014 *Code of Practice for Noise and Vibration Control on Construction and Open Sites - Noise* is typically adopted by local authorities for the control of construction noise impacts.

10.45 One of the approaches for deriving appropriate construction noise limits is for the designation of a noise sensitive receptor into a specific category (A, B or C) based on existing ambient noise levels in the absence of construction noise. This then sets a threshold noise value that, if exceeded at this location, indicates a significant noise impact is associated with the construction activities.

10.46 BS 5228-1:2009+A1:2014 sets out guidance on permissible noise levels relative to the existing noise environment. **Table 10-3** sets out the values which, when exceeded, signify a significant effect at the facades of residential receptors.

Table 10-3 Applicable Construction Noise Thresholds (BS5228-1:2014+A1:2019)

Assessment Category and Threshold Value Period	Threshold Values, $L_{Aeq,T}$ dB		
	Category A Note A	Category B Note B	Category C Note C
Night (23:00 to 07:00 hrs)	45	50	55
Evenings and Weekends Note D	55	60	65
Daytime (07:00 – 19:00 hrs) and Saturdays (07:00 – 13:00 hrs)	65	70	75

Note A	Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values
Note B	Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as Category A values
Note C	Category C: Threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values
Note D	Periods defined as 19:00 to 23:00 hrs weekdays, 13:00 to 23:00 hrs Saturdays and 07:00 to 23:00 hrs Sundays.

10.47 Clarification on the construction stage noise thresholds applicable in this instance has been provided in Sections 10.81, 10.86 and 10.87.

Noise arising from onsite operations

10.48 The EPA (2006) publication Environmental Management Guidelines for Environmental Management in the Extractive Industry (Non-Scheduled Minerals) (EMG-EMEI)[4] recommends the following in respect of noise:

- *In relation to quarry developments and ancillary activities, it is recommended that noise from the activities on site shall not exceed the following noise ELVs at the nearest noise-sensitive receptor:*
  - *Daytime: 08:00–20:00 h L_{Aeq} (1h) = 55 dBA*
  - *Night-time: 20:00–08:00 h L_{Aeq} (1h) = 45 dBA*
- *Note: 95% of all noise levels shall comply with the specified limit value(s). No noise level shall exceed the limit value by more than 2 dBA.)*

10.49 It is noted that the EU Noise Directive (2002/49/EC) as well as more recent noise guidance issued by the Agency (*Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities* (NG4, 2016)) provide updated definitions

[4] https://www.epa.ie/pubs/advice/general/EPA_management_extractive_industry.pdf

of day and night periods. Current best practice introduces an additional evening period and considers day and night periods as follows:

- Daytime (0700 to 1900 hrs);
- Evening (1900 to 2300 hrs); and
- Night (2300 to 0700 hrs).

10.50 The DoEHLG (2004) Guidelines for Planning Authorities (*Quarries and Ancillary Activities: Guidelines for Planning Authorities*[5]) recommends similar limit values.

10.51 The EMEI guidelines also provide some guidance in respect of low background noise levels, tonal noise and environmental mitigation works:

- Where existing background noise levels are very low, lower noise ELVs may be appropriate;
- Audible tones or impulsive noise should be avoided at night;
- It is also appropriate to permit higher noise ELVs for short-term temporary activities such as construction of screening bunds, etc., where these activities will result in a considerable environmental benefit.

10.52 In relation to short-term temporary activities such as construction of screening bunds, due to the reduced duration of these works and the direct and potentially long-term benefits arising, it would be deemed appropriate that noise from these works should be limited to the values derived from the ABC Method of BS 5228-1:2009+A:2014 *Noise and Vibration Control on Construction and Open Sites - Noise* as described in Section 10.45 – 10.46.

10.53 Additional guidance such as the World Health Organisation (WHO) *Environmental Noise Guidelines for the European Region* (2018) provides guidance on protecting human health from exposure to environmental noise. The guidance does not provide any interim targets for noise exposure.

10.54 Clarification on the operational stage noise thresholds applicable in this instance has been provided in Sections 10.86 and 10.87.

Guidance on Effects of Industrial Noise on Wildlife

10.55 The primary species of concern in respect of the adjacent protected areas is the Hen Harrier, which relies on the heath habitat for nesting and forage opportunities.

10.56 Currently, there are no statutory or guideline thresholds for noise exposure for potentially noise sensitive ecological receptors at either habitat or species-specific level.

10.57 Empirical research completed to date indicates that disturbance to avians is wholly linked to discrete (or impulsive) noise events but that the magnitude, frequency, predictability, spatial distribution and duration of disturbance varies considerably depending on a range of factors including species susceptibility to disturbance, the degree of previous exposure IECS 2009 report (Cutts et al., 2009) and the characteristics of the noise itself.

10.58 The links between visual and audible stimuli were also noted to be key components of disturbance in a number of studies (Smit and Visser, 1993 and Brown, 1990), in that many species required sight of the source of noise to be disturbed.

[5] https://www.epa.ie/pubs/advice/general/EPA_management_extractive_industry.pdf

10.59 Two of the studies set out potential impact classification rating based on disturbance observations recorded for that particular habitat, species and noise generating operation. The rating suggested that maximum noise levels arising from irregular noise events (i.e. those with discrete or impulsive qualities) may give rise to moderate impacts between 50 and 70 dB, with low to moderate impacts occurring for regular or consistent noise of similar levels. The acoustic parameter is understood to correspond to an $L_{Amax(F)}$.

10.60 Another issue noted amongst studies is that deriving ratings to describe avian disturbance is complicated by the fact avian hearing sensitivities range significantly between species. The use of standard acoustic weightings used for assessment of human receptors (A or C weighting) would also not reflect the sensitivity of the receptor species.

10.61 In respect of the proposed development and the adjacent and nearby SPA, pNHA and SAC. Whilst empirical data suggests that noise with discrete or impulsive qualities measured at levels of between 50 and 70 dB $L_{Amax(F)}$ may indicate potential moderate impacts, the use of this metric to gauge potential disturbance from sources or species not observed during any of the particular studies introduces a significant degree of uncertainty.

10.62 An additional qualitative review should also be conducted to consider:

- To what degree does the character of additional noise from the development vary from that already present in the vicinity of possible nesting or foraging habitats;
- Whether the working area would have a line of sight to nesting or foraging habitats that would support empirical studies that disturbance is more likely to occur; and
- What area of the habitat is impacted by noise from the development, is there sufficient alternative nesting and foraging habitat to minimise the potential impact of any potential disturbance.

Noise arising from vehicular traffic on public roads

10.63 There are no specific guidelines of limits relating to traffic related sources along the local or surrounding roads. In this instance, in order to assess the potential noise impact from any changes in road traffic, **Table 10-4** offers guidance as to the likely impact associated with a particular change in traffic noise level (Highways Agency Design Manual for Roads and Bridges HA 213/08).

Table 10-4 Likely Impacts Associated with Change in Traffic Noise Level (DMRB, 2011)

Change in Sound Level	Magnitude of Impact
0	No Change
0.1 – 0.9	Negligible
1.0 – 2.9	Minor
3.0 – 4.9	Moderate
> 5	Major

Quantifying significance of noise impacts

10.64 The *Guidelines for Noise Impact Assessment* produced by the Institute of Environmental Management and Assessment (IEMA) are generally recognised as established good practice standards for scope, content, and methodology of noise impact assessment.

10.65 These guidelines address the key principles of noise impact assessment and are applicable to all development proposals where noise effects are likely to occur. These

guidelines state that for any assessment, the noise level threshold and significance should be determined by the assessor, based upon the specific evidence and likely subjective response to noise. An example impact scale offered by the IEMA guidelines is shown in Table 10-5.

Table 10-5 Example Impact Scale from the Change in Sound Levels (IEMA)

Long-Term Impact Classification	Short-Term Impact Classification	Sound Level Change dB L_{pAeqT} (+ive or -ive) T = either 16hr day or 8hr night
Negligible	Negligible	≥ 0 dB and < 1 dB
	Minor	≥ 1 dB and < 3 dB
Minor	Moderate	≥ 3.0 dB and < 5 dB
Moderate	Major	≥ 5.0 dB and < 10 dB
Major		≥ 10.0

10.66 The criteria above reflect the key benchmarks that relate to human perception of sound. A change of 3 dB is generally considered to be the smallest change in environmental noise that is perceptible to the human ear under most normal conditions. A 10 dB change in noise represents a doubling or halving of the noise level. The difference between the minimum perceptible change and the doubling or halving of the noise level is split to provide greater definition to the assessment of changes in noise level.

10.67 To determine the overall noise impact, the magnitude and sensitivity Noise Effects Descriptors are presented in **Table 10-6**.

Table 10-6 Example of Relative Change Impact Rating (HS2 EIAR from IEMA)

Noise Effect Levels	Description
Very Substantial	Greater than 10 dB L_{Aeq} change in sound level perceived at a highly sensitive noise receptor
Substantial	Greater than 5 dB L_{Aeq} change in sound level at a noise-sensitive receptor, or a 5 to 9.9 dB L_{Aeq} change in sound level at a highly sensitive noise receptor
Moderate	A 3 to 4.9 dB L_{Aeq} change in a sound level at a sensitive or highly sensitive noise receptor, or a greater than 5 dB L_{Aeq} change in sound level at a receptor of some sensitivity
Slight	A 3 to 4.9 dB L_{Aeq} change in a sound level at a receptor of some sensitivity
None / Not Significant	Less than 2.9 dB L_{Aeq} change in sound level and/or all receptors of negligible sensitivity to noise or marginal to the zone of the influence of the proposed development

10.68 As recognised in the IEMA guidance, there are however many factors which affect people's perception and their responses to noise. Guidance on assessment of the magnitude of noise impact and the significance of the effects are presented in **Table 10-7**.

Table 10-7 Relationship between Noise Impact, Effect and Significance (IEMA)

Magnitude (Nature of Impact)	Description of Effect (On a Specific Sensitive Receptor)		Significance
Substantial	Beneficial	Receptor Perception = Marked Change Causes a material change in behaviour and/ or attitude, e.g., individuals begin to engage in activities previously avoided due to preceding environmental noise conditions. Quality of life enhanced due to change in character of the area.	More Likely to be Significant (Greater justification needed- based on impact magnitude and receptor sensitivities- to justify a non-significant effect) ↕ (Greater justification needed- based on impact magnitude and receptor sensitivities- to justify a significant effect) Less Likely to be Significant
Moderate		Receptor Perception = Noticeable Improvement Improved noise climate resulting in small change in behaviour and/or attitude, e.g., turning down volume of television; speaking more quietly; opening windows. Affects the character of the area such that there is a perceived change in the quality of life.	
Slight		Receptor Perception = Just Noticeable Improvement Noise impact can be heard but does not result in any change in behaviour or attitude. Can slightly affect character of the area but not such that there is a perceived change in quality of life.	
Negligible	N/A = no discernible effect on receptor		Not Significant
Slight	Adverse	Receptor perception = non-intrusive Noise impact can be heard, but does not cause change in behaviour or attitude, e.g., turning up volume of television, speaking more loudly; closing windows. Can slightly affect the character of the area but not such that there is a perceived change in the quality of life.	Less Likely to be Significant Greater justification needed- based on impact magnitude and receptor sensitivities- to justify a significant effect) ↕ Greater justification needed- based on impact magnitude and receptor sensitivities- to justify a non-significant effect) More Likely to be Significant
Moderate		Receptor Perception = Intrusive Noise impact can be heard and causes small changes in behaviour and/or attitude, e.g., turning up volume of television; speaking more loudly; closing windows. Potential for non-waking sleep disturbance. Affects the character of area such that there is a perceived change in the quality of life.	
Substantial		Receptor perception = Disruptive Causes material change in behaviour and /or attitude, e.g., avoiding certain activities during periods of intrusion. Potential for sleep disturbance resulting in getting to sleep, premature awakening, and difficulty in getting back to sleep. Quality of life diminished due to change in character of area.	
Severe		Receptor Perception = Physically Harmful Significant Changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or psychological effects, e.g., regular sleep	Significant

Magnitude (Nature of Impact)	Description of Effect (On a Specific Sensitive Receptor)		Significance
		deprivation / awakening; loss of appetite, significant, medically definable harm, e.g., auditory and non-auditory.	

Receiving Environment

Survey Methodology

10.69 An environmental noise survey was completed to establish the prevailing noise levels in the vicinity of the nearest noise sensitive receptors to the site and associated haul routes.

10.70 The survey was conducted by SLR Consulting Personnel in accordance with the procedures outlined in ISO 1996-2:2017 *Acoustics — Description, measurement and assessment of environmental noise - Determination of sound pressure levels*.

10.71 The noise monitoring locations selected for the purposes of the baseline noise survey are shown in **Figure 10-1** and comprise the following:

- **N1** located at the site entrance on the eastern boundary, representative of prevailing noise levels for residential properties located on the L10317 local road;
- **N2** located on the eastern boundary of the site, representative of prevailing noise levels at the rear of residential properties located at the junction of the L10317/L1031;
- **N3** located east of the site adjacent the L1031; and,
- **N4** located west of the site adjacent the L1031.

10.72 All measurements were completed using a Class 1 Sound Level Meter (Larson Davis 831 SLM). The sound level meter was calibrated before and after the survey. The calibration deviation was determined to fall within the acceptable range based on the meter specification (+/- 0.8 dB in this instance). The sound level meter was calibrated to traceable standard by a UKAS (United Kingdom Accreditation Service) accredited laboratory within 12 months preceding the measurement.

10.73 Measurements were completed at the four measurement positions between the hours of 11:58 and 16:30 hrs on Tuesday, 9th January 2024, noise levels were measured for a period of 1 hour at each of the monitoring positions.

10.74 In addition to subjective observations on key sources contributing to the prevailing noise climate, the following noise level indices were recorded:

- $L_{Aeq,T}$ - The A-weighted equivalent continuous noise level over the measurement period, and effectively represents an “average” value.
- $L_{Amax(F),T}$ - The maximum RMS A-weighted sound pressure level occurring within a specified time period. Measured using the “Fast” time weighting.
- $L_{Amin(F),T}$ - The minimum RMS A-weighted sound pressure level occurring within a specified time period. Measured using the “Fast” time weighting.
- $L_{A90,T}$ - The A-weighted noise level exceeded for 90% of the measurement period. This parameter is often used to describe the background noise.

- $L_{A10,T}$ - The A-weighted noise level exceeded for 10% of the measurement period. This parameter is often used to describe intermittent noise sources such as road traffic.

10.75 The weather conditions were generally conducive to environmental noise surveys with light to gentle northerly breeze (<4 m/s) present. External ambient air temperature of ~ 4°C was observed although a temperature inversion was not deemed to be present based on subjective observations of contributory noise sources.

10.76 All measurements were completed under free-field conditions (i.e., at least 3.5 m from the nearest vertical reflecting surface, with the microphone approximately 1.5 m above ground level).

10.77 All noise levels are recorded in 'A-weighted' decibels, dB(A). A-weighting is the process by which noise levels are corrected to account for the non-linear frequency response of the human ear. All noise levels are quoted in dB(A) relative to a sound pressure of 20 Pa.

Survey Results

10.78 Noise monitoring results for the baseline survey on are provided in Table 10-8.

Table 10-8 Summary of Measured Noise Levels, Free Field dB

Location	Time	Sound Pressure Levels (dB $2x10^{-5}$ Pa)				
		$L_{Aeq,1hr}$	$L_{Amax(F),1hr}$	$L_{Amin(F),1hr}$	$L_{A10,1hr}$	$L_{A90,1hr}$
N1	10:49-11:04	44	75	33	43	37
N2	12:36-12:51	49	79	27	43	31
N3	14:39-14:54	58	84	31	55	37
N4	16:36-16:51	58	86	24	49	29

10.79 The following observations are made in respect of the baseline noise monitoring undertaken around the application site:

- Measured noise levels at monitoring point **N1** were influenced by road traffic from the L1031 to the south and very limited traffic on the L10317;
- Measured noise levels at monitoring point **N2** were influenced by road traffic from the L1031 to the south and very limited traffic on the L10317, noise from the adjacent farm yard was audible intermittently;
- Measured noise levels at monitoring point **N3** were influenced by road traffic from the L1031. A tractor was operating in the adjacent farm yard for a period; and
- Measured noise levels at monitoring point **N4** were influenced by road traffic from the L1031, a tractor was operating in the farmyard to the north for a limited period.

Clarification of Assessment Criteria

Construction Stage Noise Limits

10.80 The hours of construction for the proposed development will be limited to the daytime period, Monday to Friday from 07:00 to 18:00 hrs, and on Saturdays from 07:00 to 14:00 hrs.

10.81 The applicable construction noise limits based on the prevailing noise climate have been summarised in **Table 10-9**.

Table 10-9 Proposed Construction Noise Limits

Monitoring Location	Baseline Noise Level ($L_{Aeq,1hr}$ dB), rounded to nearest 5 dB	BS5228-1:2014+A1:2019 ABC Method Category	Applicable Noise Threshold ($L_{Aeq,12hr}$)
N1	45	A	65
N2	50	A	65
N3	60	A	65
N4	60	A	65

10.82 Based on the reduced sensitivity of receptor R1[6], it is deemed appropriate that a 5 dB relaxation on the ABC Method thresholds be applied. A threshold of 70 dB $L_{Aeq,12hr}$ will therefore apply at receptor R1.

Operational Stage Noise Limits

10.83 The hours of operation for the proposed development will be limited to the daytime period, Monday to Friday from 07:00 to 18:00 hrs, and on Saturdays from 07:00 to 14:00 hrs.

10.84 Noise levels measured during the baseline noise survey do not indicate what would constitute an area of low background noise levels in accordance with best practice.

10.85 As such, in order to avoid adverse impacts, site specific operational noise, as measured at the nearest noise sensitive receptor, shall be limited to 55 dB $L_{Aeq,1hour}$ during the daytime period of 0700 to 1800 hrs.

10.86 It must be noted that for operational stage works involving the construction boundary screens, or other similar environmental measures, it would be appropriate that noise from these activities be limited to 65 dB $L_{Aeq,T}$ as measured at the nearest noise sensitive locations.

10.87 Based on the reduced sensitivity of receptor R1, it is deemed appropriate that a 5 dB relaxation on the standard EPA limits would be appropriate. A threshold of 60 dB $L_{Aeq,1hr}$ will therefore apply at receptor R1.

10.88 In line with the recommendations set out in the EPA *Environmental Management Guidelines for Environmental Management in the Extractive Industry (Non-Scheduled Minerals)*, tonal or impulsive noise shall not be present at the nearest noise sensitive location outside of the permitted daytime hours.

10.89 Tonal noise shall be assessed in accordance with procedures outlined in ISO 1996-2:2017 *Acoustics - Description, measurement and assessment of environmental noise Part 2: Determination of sound pressure levels*.

Assessment of Likely Significant Effects

Do-nothing Scenario

10.90 At present, the prevailing noise climate is influenced predominantly by intermittent road traffic along the local roads and agricultural activity on the adjacent landholdings.

[6] Landowner residence

10.91 Over time, changes in the prevailing noise levels would be impacted by variations in road traffic volumes as well as changes in the land use of the adjacent sites. Whilst it is expected that road traffic volumes would gradually increase, it would be difficult to assume whether the adjacent landholdings would remain in dairy and beef farming activities. Overall, it would be expected that prevailing noise levels would remain generally similar in the medium term.

Potential Impacts during the Construction Stage

10.92 A limited period of construction is expected to facilitate site infrastructure, key works shall include construction and installation of:

- Mobile aggregate processing plant, portacabin site office, portacabin welfare facility, serviced portaloo toilet, refuelling pad with hydrocarbon interceptor, weighbridge, wheelwash and water supply borehole;
- Silt storage lagoons;
- Construction of perimeter screening; and
- Fencing and acoustic fencing to perimeter of site.

10.93 A range of construction plant items will be required to facilitate the construction of the new site infrastructure, these shall include:

- 30 tonne excavator with digging bucket and breaker;
- Dumper truck for removal of topsoil;
- Loader for backfilling aggregate;
- Hand tools (angle grinder, nail gun, circular saw) for construction and installation of formwork and cutting rebar for foundation and ramps;
- Concrete truck for installation of subbase;
- Petrol poker for settling concrete in formwork;
- Telehandler for movement of materials; and,
- Mobile crane for lifting and installation of weighbridge and platform;

10.94 Construction noise calculations have been conducted generally in accordance with British Standard BS5228-1:2009+A1:2014.

10.95 As the construction programme would be subject to tender process, a construction programme including specific plant items is not available at this stage and predictions of construction related noise cannot be completed without introducing a degree of uncertainty.

10.96 The proposed construction works would be completed in a number of phases; however, it is expected that the works would be completed consecutively with no period of overlap due to the likelihood of the same machinery being required for each phase of work.

10.97 It is possible to reduce this uncertainty somewhat by presenting assessing a worst-case noise levels using empirical source data set out in guidance set out in BS5228-1:2009+A1:2014.

10.98 **Table 10-10** outlines source data based on the list of plant items listed above.

Table 10-10 Source Data for Construction Stage Assessment

Phase	Source	BS5528 Ref	Noise Level at 10 m (dB $L_{Aeq,1hr}$)	Qty	20LogN Corr.	Activity as % of 12 hr	Corr. to $L_{Aeq,12hr}$	Activity $L_{Aeq,12hr}$	Phase Total $L_{Aeq,12hr}$
Site preparation (all areas), storage lagoons	Ground excavation/earthworks, Tracked excavator (170 kW/30 t)	C.2.16	75	1	-	50	-3	72	85
	Distribution of material, Articulated dump truck (tipping fill) (187 kW/23 t)	C.2.32	74	1	-	50	-3	71	
	Earthworks, Articulated dump truck ж (194 kW/25 t)	C.5.16	81	1	-	50	-3	78	
	Transport of material, Articulated dump truck ж (239 kW/23 t)	C.10.19	87	1	-	50	-3	84	
Foundation (all work), including fuel pad	Ground excavation/earthworks, Tracked excavator (170 kW/30 t)	C.2.16	75	1	-	67	-2	73	83
	Transport of material, Wheeled loader ж (184 kW/23 t)	C.10.17	84	1	-	50	-3	81	
	Pumping concrete, Concrete mixer truck	C.4.27	79	1	-	67	-2	77	
	Concreting other, Poker vibrator (2.2 kW)	C.4.34	69	1	-	67	-2	67	
	Miscellaneous, Hand Tools	Other	59	1	-	67	-2	57	
Weighbridge, wheelwash and welfare/office units	Distribution of material, Telescopic handler (60 kW/10 t)	C.2.35	71	1	-	50	-3	68	79
	Craneage for piling (lifting piles, casings, etc), Wheeled mobile crane (/70 t)	C.3.30	70	1	-	50	-3	67	
	Lorry movements on access road, Lorry ж (350 kW/36 t)	C.11.5	80	1	-	67	-2	78	
	Miscellaneous, Hand Tools	Other	59	1	-	50	-3	56	

10.99 The proposed earth screening berms and acoustic fencing will offer further screening potential depending on location of the works area. For the operational phase a screening correction of -15 dB has been applied to the nearest properties to the proposed acoustic screen (R1 to R4 and R11 to R14). Elsewhere, the topography of the extraction areas is such that a screening factor of approximately - 7 dB is deemed appropriate for receptors elsewhere.

10.100 A correction of +3 dB has been applied to all predicted values to determine reflections from the façade. No correction has been applied to receptor positions in the SPA.

10.101 All sources have been modelled at a height of 2 metres above ground.

10.102 Propagation assumes 80% soft ground cover for all receptors with the exception of R1 to R3 reduced distance requires hard ground correction as per BS5228-1.

10.103 The predicted noise levels for each of the nearest NSR during the construction phase has been summarised in **Table 10-11**.

Table 10-11 Predicted Construction Stage Noise Levels

Receptor Reference	Screening Correction (dB)	Threshold Applicable (dB $L_{Aeq,12hr}$)	Predicted Construction Noise Level (dB $L_{Aeq,12hr}$)		
			Site preparation (all areas), storage lagoons	Foundation (all work), including fuel pad	Weighbridge, wheelwash & welfare/office units
R1	-15	70	65	56	52
R2	-15	65	55	38	34
R3	-15	65	55	38	34
R4	-15	65	45	35	31
R5	-7	65	54	43	39
R6	-7	65	53	43	39
R7	-7	65	52	42	38
R8	-7	65	50	41	37
R9	-7	65	48	40	36
R10	-7	65	51	47	42
R11	-15	65	45	40	36
R12	-15	65	44	39	35
R13	-15	65	42	37	33
R14	-15	65	41	35	31
R15	-7	65	52	42	38
R16	-7	65	51	42	38
R17	-7	65	50	42	38
R18	-7	65	49	41	37
R19	-7	65	49	41	37
R20	-7	65	48	41	37

Receptor Reference	Screening Correction (dB)	Threshold Applicable (dB $L_{Aeq,12hr}$)	Predicted Construction Noise Level (dB $L_{Aeq,12hr}$)		
			Site preparation (all areas), storage lagoons	Foundation (all work), including fuel pad	Weighbridge, wheelwash & welfare/office units
SPA(1) Heath @ 250m	-7	NA	53	41	37
SPA(2) Heath @ 1,800m	-7	NA	36	31	27

10.104 The predicted construction noise levels as presented in **Table 10-11** demonstrate that construction noise levels will fall below the adopted threshold of 65 dB $L_{Aeq,12hr}$ at the nearest noise sensitive locations.

10.105 Notwithstanding the findings of the construction phase noise impact assessment, best practice construction noise and vibration management practice should be adhered to and implemented as a matter of course. Further information on these practices has been outlined in Section 10.147.

10.106 The predicted construction noise levels at the SPA(1) are expected to fall in the region of 37 to 50 dB $L_{Aeq,1hr}$ for the nearest area of heath and 27 to 33 dB $L_{Aeq,1hr}$ in the upper areas of the mountain at SPA(2). It must be noted that noise levels predicted in accordance with BS5528-1 calculation methods introduce some uncertainty at distances greater than 300 metres due to impact of meteorological conditions on attenuation.

10.107 In the context of the disturbance impact rating described in Section 10.57, the predicted values are also presented in terms of the $L_{Aeq,T}$ rather than $L_{Amax(F)}$ parameter more representative of discrete or impulsive noise events. It would be expected that $L_{Amax(F)}$ levels could be of the order of 15 to 20 dB higher than the equivalent $L_{Aeq,T}$ values due to the intermittent nature of some of the sources. The resultant calculated max values in the vicinity of the SPA areas would be of the order of 52 to 70 dB $L_{Amax(F)}$ for the nearest area of the heath habitat, SPA(1) or 42 to 53 dB $L_{Amax(F)}$ for the nearest optimal heath nesting and foraging habitat, SPA(2).

10.108 While the predicted levels in the nearest area of heath are above the impact rating referenced in Section 10.57, it is important to note that:

- The nearest area of heath habitat, SPA(1) is located immediately adjacent an active farm (R6), and noise with discrete or impulsive characteristics from typical farming activities would already form part of the prevailing noise climate, the additional noise from the proposed development would not constitute a significant variance from what is already present; and
- Neither of these heath areas reviewed would have a clear line of sight to the plant and machinery so the visual stimuli required to induce disturbance would largely be absent.

Potential Impacts during the Operational Stage

10.109 During the operational phase, extraction and processing of sand and gravel will be completed over a 10 year with an average of 80,000 tonnes of material exported per year.

10.110 The primary noise generating processes and mechanical plant items expected to be operational during this period include:

- 23 tonne Loading shovel;

- 40 tonne excavator;
- 40 tonne rigid dump trucks (Scania R500 XF or similar);
- Mobile aggregate screens, 2 total; and
- An aggregate washing plant.

10.111 The nature of operational stage activities is such that processes, plant and machinery is largely similar to that arising during the construction stage. As such noise calculations have been conducted generally in accordance with British Standard BS5228-1:2009+A1:2014.

10.112 **Table 10-12** outlines source data based on the list of plant items listed in 10.110.

Table 10-12 Source Data for Operation Stage Assessment

Phase	Source	BS5528 Ref	Noise Level at 10 m (dB $L_{Aeq,1hr}$)	Qty	20LogN Corr.	Activity as % of 1 hr	Corr. to $L_{Aeq,1hr}$	Activity $L_{Aeq,1hr}$	Phase Total $L_{Aeq,1hr}$
General Extraction (all phases)	Ground excavation/earthworks, Tracked excavator (226 kW/40 t)	C.2.14	79	1	0	50	-3	76	82
	Transport of material, Wheeled loader (184 kW/23 t)	C.10.17	84	1	0	50	-3	81	
Aggregate Processing	General wheeled loader operations, Loading gravel to lorry (193 kW/23 t)	C.10.10	85	1	0	33	-5	80	86
	Semi-mobile screen/stockpiler, Screen stockpiler (51 kW/17 t)	C.10.15	81	2	6	33	-5	82	
	HGV movements on access road	C.11.4-20	82	1	0	33	-5	77	
	Washing Plant, Screen stockpiler (56 kW/15 t)	C.10.14	81	1	0	33	-5	76	

10.113 The proposed earth screening berms and acoustic fencing will offer further screening potential depending on location of the works area. For the operational phase a screening correction of - 5 dB has been applied to the nearest properties to the proposed acoustic screen (R1 to R4). Elsewhere, the topography of the extraction areas is such that a screening factor of approximately -7 dB is deemed appropriate for receptors elsewhere.

10.114 A correction of + 3 dB has been applied to all predicted values to determine reflections from the façade. No correction has been applied to receptor positions in the SPA.

10.115 All sources have been modelled at a height of 2 metres above ground.

10.116 Propagation assumes 80% soft ground cover for all receptors with the exception of R1 to R3 where hard ground has been assumed due to the short distance.

10.117 The predicted noise levels for each of the nearest NSR during the operational phase has been summarised in **Table 10-13**.

Table 10-13 Predicted Operational Stage Noise Levels

Receptor Reference	Screening Correction (dB)	Threshold Applicable (dB $L_{Aeq,1hr}$)	Predicted Operational Noise Level (dB $L_{Aeq,1hr}$)		
			General Extraction Phase 1 with Aggregate Processing Occurring	General Extraction Phase 2 with Aggregate Processing Occurring	General Extraction Phase 3 with Aggregate Processing Occurring
R1	-15	60	52	55	61
R2	-15	55	45	54	47
R3	-15	55	45	53	47
R4	-15	55	41	45	42
R5	-7	55	53	54	53
R6	-7	55	53	53	52
R7	-7	55	52	52	51
R8	-7	55	50	50	49
R9	-7	55	48	49	48
R10	-7	55	50	50	52
R11	-15	55	40	43	43
R12	-15	55	40	43	43
R13	-15	55	40	43	42
R14	-15	55	39	42	41
R15	-7	55	47	51	49
R16	-7	55	47	50	48
R17	-7	55	47	50	48
R18	-7	55	46	49	48
R19	-7	55	46	49	47

Receptor Reference	Screening Correction (dB)	Threshold Applicable (dB $L_{Aeq,1hr}$)	Predicted Operational Noise Level (dB $L_{Aeq,1hr}$)		
			General Extraction Phase 1 with Aggregate Processing Occurring	General Extraction Phase 2 with Aggregate Processing Occurring	General Extraction Phase 3 with Aggregate Processing Occurring
R20	-7	55	46	49	47
SPA(1) Heath @ 250 metres	-7	NA	51	50	50
SPA(2) Heath @ 1,800 metres	-7	NA	35	36	36

10.118 It can be seen from the results presented in **Table 10-13** that the noise levels generated during the operational phase will fall below the adopted threshold of 55 dB $L_{Aeq,1hr}$ at all locations with the exception of R1 where the predicted levels for Phase 3 extraction with the aggregate plant operating will be expected to fall in the region of 61 dB $L_{Aeq,1hr}$ which represents a 1 dB increase above the adopted relaxed criteria of 60 dB $L_{Aeq,1hr}$. A 1 dB variation in noise levels would typically be regarded as imperceptible for the majority of the population.

10.119 The predicted construction noise levels at the SPA are expected to fall in the region of 50 to 51 dB $L_{Aeq,1hr}$ for the nearest area of heath, SPA(1) and 35 to 36 dB $L_{Aeq,1hr}$ in the upper areas of the mountain, SPA(2). It must be noted that noise levels predicted in accordance with BS5528-1 calculation methods introduce some uncertainty at distances greater than 300 metres due to impact of meteorological conditions on attenuation.

10.120 In the context of the disturbance impact rating described in Section 10.57, the predicted values are also presented in terms of the $L_{Aeq,T}$ rather than $L_{Amax(F)}$ parameter more representative of discrete or impulsive noise events. It would be expected that $L_{Amax(F)}$ levels could be of the order of 15 to 20 dB higher than the equivalent $L_{Aeq,T}$ values due to the intermittent nature of some of the sources. The resultant calculated max values in the vicinity of the SPA areas would be of the order of 65 to 71 dB $L_{Amax(F)}$ for the nearest area of the SPA with heath habitat, SPA(1) or 50 to 56 dB $L_{Amax(F)}$ for the nearest optimal heath nesting and foraging habitat, SPA(2).

10.121 While the predicted levels in the nearest area of heath are above the impact rating referenced in Section 10.57, it is important to note that:

- The nearest area of heath habitat, SPA(1) is located immediately adjacent an active farm (R6), and noise with discrete or impulsive characteristics from typical farming activities would already form part of the prevailing noise climate, the additional noise from the proposed development would not constitute a significant variance from what is already present; and
- Neither of these heath areas reviewed would have a clear line of sight to the plant and machinery so the visual stimuli required to induce disturbance would largely be absent.

Additional Traffic on Public Roads

10.122 In addition to site-based construction and operational noise, there is potential for noise impacts to arise due to additional traffic on the local road network.

10.123 As described previously, access to the site for all traffic will be via L10317 tertiary local road, the haul route for extracted materials will be via the L1031, with 100% of heavy goods movements to and from the site traveling east on the L1031 towards the R440 regional road.

10.124 The potential impact of additional road traffic noise from the site can be considered by reviewing the contribution of scheme traffic to the existing traffic volumes on the local road network.

10.125 Typically, an increase of 25% in road traffic volumes would be required to give rise to a 1 dB increase in road traffic noise levels. For reference, increases in noise levels of the order of 1 to 2 dB are typically imperceptible under normal conditions.

10.126 The estimated annual average daily traffic (AADT) data values for the L1031 and L10317 with and without the development in place have been presented in **Table 10-14**.

Table 10-14 Additional Development Road Traffic on Local Road Network

Road	Year	Do Minimum (without S&G Pit)			Do Something (with S&G Pit)			Relative Increase	
		AADT	HGVs	HGVs%	AADT	HGVs	HGVs%	AADTs	HGVs
L1031 (E)	2025	358	31	9%	390	55	14%	9%	77%
	2030	383	35	9%	415	59	14%	8%	69%
	2040	404	40	10%	436	64	15%	8%	60%
L1031 (W)	2025	335	25	7%	339	25	7%	1%	0%
	2030	359	28	8%	362	28	8%	1%	0%
	2040	378	32	8%	381	32	8%	1%	0%
L10317	2025	50	10	20%	86	34	40%	72%	240%
	2030	53	11	21%	89	35	39%	68%	218%
	2040	57	12	21%	93	36	39%	63%	200%

10.127 The projected traffic volumes for the L1031 indicate that HGV volumes will increase by approximately 60% to 77% for eastbound traffic. In the context of the overall traffic volumes, variation in Annual Average Daily Traffic Volumes will be closer to 8 or 9%. The resultant increase in overall road traffic noise levels would be expected to be less than 1 dB at all receptors adjacent the road.

10.128 In respect of additional road traffic noise on the L10317, the traffic predictions suggest that relative increase in road traffic will be high for both HGV specific and overall annual daily traffic volumes. Due to the existing low road traffic volumes on this road and the proximity of receptors to the road, it is more appropriate to consider an estimate of the potential noise generated during peak hours.

10.129 The noise level associated with a discrete noise event, such as a passing vehicle movement, may be expressed in terms of its Sound Exposure Level (L_{AX}). The Sound Exposure Level can be used to calculate the contribution of a series of events to the overall noise level in a given period based on the following formula:

$$L_{Aeq,T} = L_{AX} + 10log10(N) - 10log10(T) + 20log10(r_1/r_2)\ dB$$

where

$L_{Aeq,T}$	is the equivalent continuous sound level over the time period T (in seconds);
L_{AX}	is the "A-weighted" Sound Exposure Level of the event considered (dB);
N	is the number of events over the course of time period T;
r_1	is the distance at which the L_{AX} value has been measured; and,
r_2	is the distance to the assessment location.

10.130 Typical Sound Exposure Level values for heavy goods vehicle (HGV) travelling at low speeds (i.e. 15 to 45 kmph) would be of the order of 82 dB L_{AX} at 5 metres from the vehicle. For light vehicles travelling at similar speeds, the value would be of the order 67 dB L_{AX} at 5 metres from the vehicle. These figures are based on a series of controlled measurements completed on vehicles in good repair travelling on a well surfaced tarmac road.

10.131 It is understood that peak hourly movements for the development would be approximately 4 no. heavy goods vehicles. It is expected that staff and other LGV movement would occur earlier and later than the expected peak for HGV for the site. During other periods, up to 2 no. HGV movements would be expected per hour.

10.132 Based on the proximity of the nearest noise sensitive locations to the L10317 (R2 at 4 metres and R3 at 8 metres from the road), the predicted road traffic noise level arising from peak hour HGV would be of the order of 48 to 54 dB $L_{Aeq,1hr}$ at noise sensitive receptors R2 and R3. This would reduce to approximately 45 to 51 dB $L_{Aeq,1hr}$ during other periods where only two hourly movements occur.

10.133 Based on the prevailing noise levels at these locations (49 dB $L_{Aeq,1hr}$ as measured at N2), the potential cumulative noise level from peak hourly HGV site vehicle movements would result in an overall cumulative noise level of 55 and 52 dB $L_{Aeq,1hr}$ at R2 and R3 respectively. During other periods, the cumulative noise level would reduce to 53 and 51 dB $L_{Aeq,1hr}$ at R2 and R3 respectively.

10.134 In terms of potential impact, making reference to the impact assessment rating presented in **Table 10-5**, peak hourly HGV movements at receptors R2 and R3 would be considered as minor to moderate in the long term. During non-peak hours, the long-term impact would be considered as negligible to minor.

10.135 Additional mitigation measures will be required to reduce potential impact of noise on these receptors, suitable mitigation measures have been outlined in Section 10.159 to 10.161.

Cumulative Impacts

10.136 In essence, cumulative impacts are those which result from incremental changes caused by other past, present, or reasonably foreseeable actions together with those generated by the proposed development. Therefore, the potential impacts of the proposed development cannot be considered in isolation but must be considered in addition to impacts already arising from existing or planned development.

10.137 A planning search undertaken to determine if there were any other planned developments in the vicinity of the application site did not identify any other potentially significant source of noise or ground-borne vibration, either approved or planned within 2 km of the application site. As a result, no potential for significant cumulative impacts has been identified. The cumulative impact of the proposed development on local noise and vibration levels is therefore assessed as insignificant.

10.138 To identify the potential impact of ongoing, continuous site activities, the predicted specific noise levels have been logarithmically added to existing ambient noise levels. The cumulative levels have been compared to the existing ambient noise levels at each of the

noise sensitive locations for each time-period. The cumulative assessment is presented in **Table 10-15**.

Table 10-15 Cumulative Operational Noise Levels

Receptor	Proxy Baseline Survey Location	Sound Pressure Level ($L_{Aeq,T}$ dB RE 2 x 10^{-5} Pa)			Difference	IEMA Long Term Impact Rating
		Existing Noise Levels	Maximum Operational Noise Level	Cumulative		
R1	N1	44	61	61	+ 17	Major
R2	N2	49	54	55	+ 6	Moderate
R3	N2	49	53	55	+ 6	Moderate
R4	N2	49	45	51	+ 2	Negligible
R5	N2	49	54	55	+ 6	Moderate
R6	N2	49	53	54	+ 5	Moderate
R7	N2	49	52	54	+ 5	Moderate
R8	N4	58	50	59	+ 1	Negligible
R9	N4	58	49	58	-	Negligible
R10	N1	44	52	52	+ 8	Moderate
R11	N1	44	43	47	+ 3	Minor
R12	N1	44	43	47	+ 3	Minor
R13	N1	44	43	47	+ 3	Minor
R14	N1	44	42	46	+ 2	Negligible
R15	N3	58	51	59	+ 1	Negligible
R16	N3	58	50	59	+ 1	Negligible
R17	N3	58	50	59	+ 1	Negligible
R18	N3	58	49	59	+ 1	Negligible
R19	N3	58	49	58	-	Negligible
R20	N3	58	49	58	-	Negligible

10.139 With reference to the Guidelines for Noise Impact Assessment published by the Institute of Environmental Management and Assessment (IEMA) and based on the prevailing noise levels measured during the baseline noise survey, the potential worst case cumulative medium-term noise impact from the proposed development would be considered as negligible to minor for the majority of receptors located in close proximity to the site.

10.140 It is noted that potentially major impacts would arise at receptor R1 during the latter stages of the extraction period. This would be expected to arise due to Phase 3 extraction works only. During Phase 1 and 2 extraction periods, the relative change in noise levels would give rise to slight to moderate impacts during worst case periods.

10.141 In a limited number of instances, the relative change in noise levels under worst case operational conditions suggests that moderate medium-term impacts may arise at receptors R2, R3, R5, R6, R7 and R10.

10.142 It is important to note that the predicted values represent worst case operational noise levels. In addition, the predicted operational noise levels at all locations fall below the adopted EPA Guideline Values at all locations. For the majority of the operational period, the predicted noise levels and resultant relative increase in noise levels is expected to be lower than that presented in **Table 10-15**.

Mitigation

10.143 Where necessary, the three established strategies for impact mitigation are avoidance, reduction, and remedy. Where it is not possible or practical to mitigate all impacts, then the residual impacts must be clearly described in accordance with the system for impact description set out in the EPA Guidelines. The adoption of Best Practicable Means is generally considered to be the most effective means of controlling noise emissions.

Acoustic Screening at Boundary

10.144 Screening berms will be constructed on the boundary of the site at specific locations using soils stripped from the Phase 1 extraction area. The screening berms will be c. 2 m in height and will be located along the northern boundary of Phase 3 adjacent to residence R1, and along the eastern boundary of Phase 2 adjacent to residences R2/R3.

10.145 In addition to the screening berms, proprietary fencing adjacent to residences R1 to the north and R2/R3 to the east will be installed.

10.146 Screening berms and acoustic barriers comprise a key mitigation measure for both the construction and operational phases of the development. The berms and barriers will be inspected on a regular basis and maintained as necessary.

Construction Phase

10.147 The impact assessment has indicated that worst case construction noise levels will fall within the adopted criterion.

10.148 Notwithstanding, it will be a requirement for the operator to employ and implement best practice construction noise and vibration management techniques throughout the construction phase in order to further reduce the noise and vibration impact to nearby noise sensitive receptors.

Construction Noise and Vibration Management Plan

10.149 Prior to commencement of works, the applicant and their appointed contractor will compile and submit to Laois County Council a suitable Construction Noise and Vibration Management Plan (NVMP). The plan shall:

- Outline management processes and mitigation measures to be utilised to remove or reduce significant noise impacts from the construction works;
- Define noise and vibration monitoring and reporting;
- Include method statements for each phase of the works including associated specific measures to minimise noise and vibration in so far as is reasonably practicable for the specific works covered by each plan and a detailed appraisal of the resultant construction noise and vibration generated.

10.150 The contractor will provide proactive community relations and will notify the public and vibration sensitive premises before the commencement of any works forecast to generate appreciable levels of noise or vibration, explaining the nature and duration of the works.

10.151 The contractor will distribute information circulars informing people of the progress of works and any likely periods of significant noise and vibration.

10.152 BS5228-1:2014+A1:2019 *Code of practice for noise and vibration control on construction and open sites – Noise* and BS5228-2:2014+A1:2019 *Code of practice for noise and vibration control on construction and open sites – Vibration* is the best practice standard for management of noise and vibration on construction sites.

10.153 The standards include guidance on several aspects of construction site mitigation measures, including, but not limited to:

- Selection of quiet and or low vibration emitting plant;
- Control of noise sources;
- Screening;
- Hours of work;
- Liaison with the public; and
- Monitoring.

Operational Phase

Mechanical Plant

10.154 All plant items will be properly and regularly maintained and operated according to the manufacturers' recommendations, in such a manner as to avoid causing excessive noise.

10.155 All plant will be fitted with effective exhaust silencers which are maintained in good working order to meet manufacturers' noise rating levels. Any defective silencers will be replaced immediately.

Vehicle Movement within Site Boundary

10.156 Access / internal haul roads will be kept clean and maintained in a good state of repair, i.e., any potholes are filled, and large bumps removed, to avoid unwanted rattle and "body-slap" from heavy goods vehicles.

10.157 Vehicles waiting within the site will be prohibited from leaving their engines running and there will be no unnecessary revving of engines.

10.158 Care will be taken when unloading vehicles to reduce or minimise potential noise disturbance to residents.

Vehicle Movements on Public Roads

10.159 Trucks owned and operated by the applicant will be required to adhere to a 30 kmph speed limit on the L10317 to ensure road traffic noise impacts on the nearest receptors R2 and R3 are minimised.

10.160 All trucks owned and operated by the applicant will be kept and maintained in good working order.

10.161 Any deliveries to the site will be programmed to arrive during daytime hours only.

Monitoring

10.162 It will be necessary that the operator complete an annual compliance noise survey to establish operational noise emissions from the site.

10.163 The survey shall be completed by a Competent Person in accordance with the EPA *Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities* (NG4).

10.164 The survey shall be completed using a Class 1 Sound Level meter.

Residual Impact Assessment

10.165 During the construction stage, under a worst-case scenario for noise generation, there is potential for moderate to significant temporary negative impacts.

10.166 The adoption and implementation of best practice Construction Noise Management practices should ensure residual impacts are minimised to the extent that construction noise should give rise to slight negative temporary impacts for the most part and moderate brief impacts on limited occasions.

10.167 During the operational phase, onsite activity arising from general extraction and aggregate processing has the potential to give rise to slight to moderate medium term noise impacts. For receptor R1 (landowner residence), it is possible that major short-term impacts could occur towards the latter end of the extraction period.

10.168 The adoption and implementation of operational phase mitigation measures is expected to ensure that noise impacts are limited to slight medium-term for the most part and moderate temporary towards the latter end of the extraction period.

Figures

Figure 10-1 Noise Monitoring Locations & Receptors

Notes:

1. Extract from Ordnance Survey 5,000 scale mapping - sheet numbers 3880, 3881, 3937, 3938 and 6" Raster Mapping - sheet numbers LS010, LS011, OY040

Legend:

- Landowner Boundary (c.32.1 Hectares)
  Third party landowner's land interest
- Planning Application Area (c.12.2 Hectares)
- Applicants Land Interest Area (c.12.4 Hectares)
  under lease agreement from landowner
- Proposed S&G Extraction Area (c.8 Hectares)
- Special Protection Area (SPA)
  Slieve Bloom SPA
- Distance Off-Sets from Planning Application Boundary
  250m, 500m, 750m and 1km
- R2 — Residential Property Locations
  Residences numbered within 1km of Application Boundary
- N3 — Baseline NOISE Monitoring Locations
  N1 - N4

RECEIVED: 19/09/2024

SPA(2) Heath @ 1,800m west of site

SPA(1) Heath @ 250m

Office/ Weighbridge/ Fuel Storage

PHASE 1

PHASE 2

PHASE 3

Processing Area

L10317 Local Road

L1031 Local Road

1000m

750m

500m

250m

0 50 100 150 200 250m

Scale 1:2,500

Rev	Amendments	Date	By	Chk	Auth

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Client
Breedon Ireland

Project
Sand and Gravel Pit Development at Mounthall, Camross, Co. Laois

Figure Title
Baseline Noise Monitoring Locations (and Receptors within 1km)

Scale		SLR Project No.
1:2,500	@ A3	00584.065036

Designed	Drawn	Checked	Authorised
SMcD	SMcD	RM	RM
Date	Date	Date	Date
01/24	01/24	09/24	09/24

Figure Number **Figure 10-1** Rev. **R1**

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Appendices

Appendix 10-A Glossary of Terms

Glossary of Terminology

To assist the understanding of acoustic terminology and the relative change in noise, the following background information is provided.

The human ear can detect a very wide range of pressure fluctuations, which are perceived as sound. To express these fluctuations in a manageable way, a logarithmic scale called the decibel, or dB scale, is used. The decibel scale typically ranges from 0dB (the threshold of hearing) to over 120 dB. An indication of the range of sound levels commonly found in the environment is given in the following table.

Table 10 A-1 Noise Levels Commonly Found in the Environment

Sound Level	Location
0 dBA	Threshold of hearing
20 to 30 dBA	Quiet bedroom at night
30 to 40 dBA	Living room during the day
40 to 50 dBA	Typical office
50 to 60 dBA	Inside a car
60 to 70 dBA	Typical high street
70 to 90 dBA	Inside factory
100 to 110 dBA	Burglar alarm at one metre away
110 to 130 dBA	Jet aircraft on take off
140 dBA	Threshold of Pain

Acoustic Terminology

Ambient Sound	Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far. Comprises of the residual sound and the specific sound when present.
Background Sound	The level of sound measured in the absence of extraneous noise sources.
dB (decibel)	The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure ($2x10^{-5}$ Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e., 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
Fast Time Weighted	The speed at which the instrument responds to changes in amplitude of the measured signal. The response time of a fats time-weighted instrument is 0.125 seconds.
Free-Field Level	The sound pressure level measured away from any reflective surfaces.
L_{Aeq}	is defined as the notional steady sound level which, over a stated period, would contain the same amount of acoustical energy as the A-weighted fluctuating sound measured over that period.
L_{10} & L_{90}	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence, L_{10} is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L_{90} is the 'average minimum level' and is often used to describe the background noise. It is common practice to use the L_{10} index to describe traffic noise.
L_{Amax} is the maximum	A-weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
Reference Time Interval (T)	Specified interval over which the specific sound level is determined.
Residual Sound	Ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound.
Residual Sound Level	(Lr = $L_{Aeq,T}$) Equivalent continuous A-weighted sound pressure level of the residual sound at the assessment location over a given time interval, T.
Sound Pressure	The difference between the pressure caused by a sound wave and the ambient pressure of the medium the sound wave is passing through. Measured in Pascals.
Sound Pressure Level (Lp)	The logarithm of the ratio of a given sound pressure (p) to the reference sound pressure (p0). The reference value for sound pressure is 20 μPa. Defined as:

$$L_p = 20log\left(\frac{p}{p_0}\right)$$

Appendix C Natura 2000 Sites Further Information

Breedon Materials Ltd. (trading as Breedon Ireland)

SLR Project No.: 501.00584.065036

10 September 2024

C.1 Slieve Bloom Mountains SPA (004160)

C.1.1 Brief Description

The Slieve Bloom Mountains SPA is situated on the border between Counties Offaly and Laois, and runs along a north-east/south-west aligned ridge for approximately 25 km.

Much of the site is over 200m in altitude, rising to a maximum height of 527m at Arderin.

The mountains are of Old Red Sandstone, flanked by Silurian rocks. Several important rivers rise within the site, including the Barrow, Delour and Silver.

The mountains have a near continuous ridge of mountain blanket bog, with wet and dry heaths also well represented.

The SPA is of ornithological importance because it provides excellent nesting and foraging habitat for breeding Hen Harrier and is one of the top sites in the country for the species.

The presence of three species, Hen Harrier, Merlin and Peregrine, which are listed on Annex I of the E.U. Birds Directive is of note.

The SPA is a Ramsar Convention site and a Biogenetic Reserve. Part of the Slieve Bloom Mountains SPA is a Statutory Nature Reserve.

C.1.2 Qualifying Interest

Hen harrier comprises the single SCI species for the Slieve Bloom Mountains SPA.

Hen Harrier *Circus cyaneus* [A082]

Population and Distribution

Based on the findings of *The 2022 national survey of breeding hen harrier in Ireland* (Ruddock et al., 2024), the national population of hen harriers in Ireland is estimated to be 100 pairs (Ruddock et al., 2024). Six SPAs across Ireland held 41% of the national population of hen harrier. **Table 9** details the hen harrier population between 2005 and 2022 in these SPAs.

Nationally, the breeding population of hen harrier declined by 33% in total or maximum numbers between 2015 and 2022. The trend of decline is accelerating, with a decline of 8.4% recorded between 2010 and 2015. The maximum population recorded in 2022 is lower than previous national surveys and considered at its lowest point of the past 25 years.

The hen harrier population have declined in five of six SPAs since 2005, with the Slieve Bloom Mountains SPA being the only SPA to have maintained a broadly stable population since 2005. The Slieve Bloom Mountains held a total of three successful nest sites and fledged a total of six chicks in 2022. The hen harrier population is estimated to be 10-11 pairs (Ruddock et al., 2024).

The Slieve Bloom Mountains SPA has generally maintained a stable or slightly increased population since the first national surveys (1998/00, 2005) (8-11 pairs). It peaked during the 2015 national survey (12-13 pairs) but has by 2022, apparently declined to around 2010 levels (8-9 pairs). Annual monitoring for the SPA (HHP, 2021) recorded a peak in 2017 (10-14 pairs; HHP, 2018) and the population declined thereafter to around 10-11 territorial pairs annually, between 2018 and 2021.

Threats to Hen Harrier

All of the Slieve Bloom breeding pairs were located within heather habitats and none in afforested habitats, with surveyors reporting that the adjacent coniferous forest plantations are a source of potential predation risk. Other threats to the species in the Slieve Bloom Mountains SPA included encroachment of self-seeded conifers within the heather habitat, the threat of

cutting, flailing management or heather burning, and recreational activities including walkers. Surveyors at this site also noted that a lack of spatial or temporal planning of disturbing activities, particularly forest management, recreation and recreational events are causing disturbance and displacement to hen harriers.

Conservation Objectives

The conservation objectives[16] for Slieve Bloom Mountains SPA are to restore the favourable conservation conditions of hen harrier in Slieve Bloom Mountains SPA by:

- Maintaining numbers at or above 5-10 breeding pairs;
- Maintain at least 1.0 – 1.4 fledged young per confirmed pair;
- Maintain at least 82-98% spatial utilisation of the SPA by breeding pairs;
- Maintain the extent and quality of bog and associated habitats to support the targets relating to population size, productivity rate and spatial utilisation;
- Maintain the extent and quality of low intensively managed grasslands and associated habitats to support the targets relating to population size, productivity rate and spatial utilisation;
- Maintain the extent and quality of hedgerows to support the targets relating to population size, productivity rate and spatial utilisation;
- Achieve an even and consistent distribution of age-classes across the forest estate; and
- Disturbance occurs at levels that does not significantly impact upon breeding hen harrier.

Table 9: Numbers of confirmed and possible hen harrier territories within the boundaries of each of the six breeding hen harrier SPAs (extracted from Ruddock et al., 2024).

SPA	2000	2005	2010	2015	2022	Change (2005 – 2022)	Change (2010 – 2022)	Change (2015 – 2022)	Change % (2005 – 2022)
Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle (4161)	41	40–45	18-29	23-28	21	-24	-8	-7	-53%
Mullaghanish to Musheramore Mountains (4162)	3	5	2-3	1	1	-4	-2	0	-80%
Slievefelim to Silvermines Mountains (4165)	8	4–5	6-7	4-10	3-4	-1	-3	-6	-20%
Slieve Bloom Mountains (4160)	11	5–8	9	12-13	8-9	1	0	-4	12%

[16] Found here: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004160.pdf

SPA	2000	2005	2010	2015	2022	Change (2005 – 2022)	Change (2010 – 2022)	Change (2015 – 2022)	Change % (2005 – 2022)
Slieve Aughty Mountains (4168)	21	24–27	15-23	8-14	3-5	-22	-18	-9	-67%
Slieve Beagh (4167)	3	4	5-6	3	2-3	-1	-3	0	-25%
Total	71-87	82-94	55-77	50-69	38-43	-51	-34	-26	-54%

C.2 River Barrow and River Nore SAC (002162)

C.2.1 Brief Description

This SAC consists of the freshwater stretches of the Barrow and Nore River catchments as far upstream as the Slieve Bloom Mountains, and it also includes the tidal elements and estuary as far downstream as Creadun Head in Waterford.

The SAC passes through eight counties – Offaly, Kildare, Laois, Carlow, Kilkenny, Tipperary, Wexford and Waterford. Major towns along the edge of the site include Mountmellick, Portarlington, Monasterevin, Stradbally, Athy, Carlow, Leighlinbridge, Graiguenamanagh, New Ross, Inistioge, Thomastown, Callan, Bennettsbridge, Kilkenny and Durrow.

The larger of the many tributaries include the Lerr, Fushoge, Mountain, Aughavaud, Owenass, Boherbaun and Stradbally Rivers of the Barrow, and the Delour, Dinin, Erkina, Owveg, Munster, Arrigle and King's Rivers on the Nore.

Overall, the SAC is of considerable conservation significance for the occurrence of good examples of habitats and of populations of plant and animal species that are listed on Annexes I and II of the E.U. Habitats Directive. Furthermore, it is of high conservation value for the populations of bird species that use it.

The occurrence of several Red Data Book plant species including three rare plants in the salt meadows and the population of the hard water form of the freshwater pearl mussel, which is limited to a 10 km stretch of the Nore, add further interest to this site

C.2.2 Qualifying Interest

There are several QI for the River Barrow and River Nore SAC including several species and habitats. This section details each of the QI that have been scoped into this Stage Two assessment below.

Estuaries [1130]

Characteristic species

Estuaries are coastal inlets where there is a significant freshwater influence. The high water points of estuaries are often formed from boulders/shingle and frequently by man-made margins in urban areas. The intertidal flanks can be composed of deposited material such as sand and mud/silt. The estuarine bed is often eroded to coarse material or bedrock. In faster flowing estuaries from shorter rivers little alluvium may aggregate, whereas in sites at the terminus of larger river basins a significant fringing mudflat or sandflat may accumulate. Finer sediments are often mobilised and removed in estuaries inundated with large swell driven waves. The degree of tidal range can effect mobilisation of finer fractions but may act to reduce downstream current velocities which cause the deposition of coarser material and may result in the formation of a delta.

The composition of estuarine communities depend on the environmental conditions and sediment makeup with the most frequent Mud to Fine Sand community characterised by crustaceans (*Corophium volutator, Crangon crangon*) and bristle worms (*Eteone longa, Hediste diversicolor, Pygospio elegans, Scoloplos armiger, Spio martinensis, Tubificoides benedii* and *Tubificoides pseudogaster*); and the Fine Sand to Sand community characterised by molluscs (e.g. *Angulus tenuis*) and worms (*Nephtys cirrosa, Scolelepis squamata, Scoloplos armiger* and *Spio martinensis*, *Tubificoides benedii*, and *Tubificoides pseudogaster*). The remaining communities included Muddy Sands/Sandy Muds, subtidal faunal turf, intertidal fucoid and subtidal Laminaria reef, and mixed sediment.

Extent and Distribution

Estuaries are distributed on the coastal areas of Ireland. Specifically, where rivers meet the coastal waters. **Appendix D** shows the full extent of this habitat within Ireland.

Threats

The main threat to this habitat is through marine pollution generated from residential, recreational, agricultural, or marine aquaculture activities, and the spread of invasive non-native species (NPWS, 2019b)

Conservation Objectives

To maintain the favourable conservation condition of Estuaries in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

- The permanent habitat area is stable or increasing, subject to natural processes.
- The following sediment communities should be maintained in a natural condition: muddy estuarine community complex; sand to muddy fine sand community complex; fine sand with *Fabulina fabula* community; and
- Maintain the natural extent of the *Sabellaria alveolata* reef, subject to natural process.

Mudflats and sandflats not covered by seawater at low tide [1140]

Characteristic species

Mudflats and sandflats not covered by seawater at low tide are comprised of the intertidal section of the coastline where sands and muds dominate.

The only vascular plant associated with this habitat is *Zostera noltei* and this species is found within a number of SACs (but not the River Barrow and River Nore SAC).

Extent and Distribution

Mudflats and sandflats are distributed along many of the coastal areas of Ireland. **Appendix D** shows the full extent of this habitat within Ireland.

Threats

The main threat to this habitat is through marine pollution generated from residential, recreational, agricultural, or marine aquaculture activities.

Conservation Objectives

To maintain the favourable conservation condition of the Mudflats and sandflats not covered by seawater at low tide in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

- The permanent habitat area is stable or increasing, subject to natural processes; and
- The following sediment communities should be maintained in a natural condition: muddy estuarine community complex; sand to muddy fine sand community complex.

Reefs [1170]

Characteristic species

Reefs are widespread marine features with immobile hard substrate for colonisation by epifauna.

Species can include *Dercitus bucklandi*, *Stelletta grubii*, *Parerythropodium coralloides*, *Esperiopsis fucorum*, *Haliclona simulans*, *Myxilla incrustans*, *Polymastia mamillaris*, *Raspailia* sp., *Suberites* sp., *Plakortis simplex*,*Tricheurypon viride*, *Ascidiella aspersa*, *Ascidia mentula*, *Ciona intestinalis*, *Corella parallelogramma* , *Dendrodoa grossularia*, *Phakellia vermiculata* *Axinella damicornis*, *Neocrania anomala*, *Aldisa zetlandica*, and *Paracentrotus lividus*.

Extent and Distribution

Reefs are present around the full extent of Ireland. The full extent of this habitat is shown in **Appendix D**.

Threats

The main threat to this habitat includes the following:

- Marine fishing causing a reduction and disturbance of species; and
- Harvesting of shellfish and marine fishing causing physical loss and disturbance of seafloor habitat.

Conservation Objectives

No conservation objectives are set out for this habitat. However, the Mudflats and sandflats not covered by seawater at low tide [1140] refers to a conservation objective target relating to reefs:

- Maintain the natural extent of the *Sabellaria alveolata* reef, subject to natural process.

Salicornia and other annuals colonising mud and sand [1310]

Characteristic species

Salicornia and other annuals colonising mud and sand is a pioneer saltmarsh community that may occur on muddy sediment seaward of established saltmarsh, or form patches within other saltmarsh communities where the elevation is suitable and there is regular tidal inundation.

The Interpretation Manual of EU Habitats (European Commission, 2013) defines habitat 1310 as annuals belonging mainly to the genus Salicornia that colonise periodically inundated muds and sands of marine or interior salt marshes and belong to the phytosociological classes *Thero-Salicornietea*, *Frankenietea pulverulentae* and *Saginetea maritimae*. Only vegetation from the first and third class is known in Ireland.

Extent and Distribution

Salicornia and other annuals colonising mud and sand are distributed in select coastal areas of Ireland, with an even distribution in all coastal areas of the country. **Appendix D** shows the full extent of this habitat within Ireland.

Threats

The main threats to this habitat include the following:

- Other alien species; and
- Intensive grazing or overgrazing by livestock.

Conservation Objectives

To maintain the favourable conservation condition of Salicornia and other annuals colonizing mud and sand in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

- Area stable or increasing, subject to natural processes, including erosion and succession. For the one sub-site mapped: Ringville - 0.03ha;
- No decline in habitat distribution, subject to natural processes;
- Maintain or where necessary restore natural circulation of sediments and organic matter, without any physical obstructions;
- Maintain natural tidal regime;
- Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession;
- Maintain range of saltmarsh habitat zonations including transitional zones, subject to natural processes including erosion and succession;
- Maintain structural variation within sward;
- Maintain more than 90% of area outside creeks vegetated;
- Maintain range of sub- communities with typical species listed in Saltmarsh Monitoring Project (McCorry & Ryle, 2009); and
- No significant expansion of Spartina. No new sites for this species and an annual spread of less than 1% where it is already known to occur.

Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]

Characteristic species

Atlantic salt meadows generally occupy the widest part of the saltmarsh gradient. They also contain a distinctive topography with an intricate network of creeks and salt pans occurring on the medium to large-sized saltmarshes.

Atlantic salt meadows contain several distinctive zones that are related to elevation and submergence frequency. The lowest part along the tidal zone is generally dominated by common saltmarsh-grass *Puccinellia maritima* with species like glassworts *Salicornia* spp., annual seablite *Suaeda maritima* and lax-flowered sea-lavender *Limonium humil* also important. The invasive common cordgrass Spartina anglica can be locally abundant in this habitat. The mid-marsh zones are generally characterised by thrift *Armeria maritima* and/or sea plantain *Plantago maritima*. This zone is generally transitional to an upper marsh herbaceous community with red fescue *Festuca rubra*, saltmarsh rush *Juncus gerardii* and creeping bent *Agrostis stolonifera*. This habitat is also important for other wildlife including wintering waders and wildfowl.

Extent and Distribution

Atlantic salt meadows are distributed around most of the coastline of Ireland. **Appendix D** shows the full extent of this habitat within Ireland.

Threats

Threats to this habitat include the following:

- Intensive grazing and overgrazing by livestock (and other agricultural activities);
- Sports, tourism and leisure activities;
- Modification of hydrological flow or physical alteration of water bodies from agriculture;

- Modifications of coastline, estuary, and coastal conditions for development, use, and protection (i.e., flood defence); and
- Other alien species.

Conservation Objectives

To restore the favourable conservation condition of Atlantic salt meadows in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

- Area stable or increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: Dunbrody Abbey - 1.25ha, Killowen - 2.59ha, Rochestown - 17.50ha, Ringville - 6.70ha;
- No decline in habitat distribution, subject to natural processes.
- Maintain/restore natural circulation of sediments and organic matter, without any physical obstructions;
- Maintain natural tidal regime;
- Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession;
- Maintain range of saltmarsh habitat zonations including transitional zones, subject to natural processes including erosion and succession;
- Maintain structural variation within sward;
- Maintain more than 90% of area outside creeks vegetated;
- Maintain range of sub-communities with typical species listed in Saltmarsh Monitoring Project (McCorry & Ryle, 2009); and
- No significant expansion of Spartina. No new sites for this species and an annual spread of less than 1% where it is already known to occur.

Mediterranean salt meadows (*Juncetalia maritimi*) [1410]

Characteristic species

Mediterranean salt meadows occupy the upper zone of saltmarshes and usually occur adjacent to the boundary with terrestrial habitats.

The habitat is distinguished from Atlantic salt meadows by the presence of rushes such as sea rush *Juncus maritimus* and/or sharp rush *Juncus acutus*, along with a range of species typically found in Atlantic salt meadows, including sea aster *Aster tripolium*, sea purslane *Atriplex portulacoides*, sea-milkwort *Glaux maritima*, saltmarsh rush *Juncus gerardii*, parsley water-dropwort *Oenanthe lachenalii*, sea plantain *Plantago maritima* and common saltmarsh grass *Puccinellia maritima*.

Extent and Distribution

This habitat is widespread on the Irish coastline; however, they are not as extensive as Atlantic salt meadows (1330). **Appendix D** shows the full extent of this habitat within Ireland.

Threats

Threats to this habitat include the following:

- Intensive grazing of overgrazing by livestock;
- Modifications of hydrological flow or physical alterations of water bodies for agriculture;
- Other agricultural activities; and

- Extensive grazing or undergrazing by livestock.

Conservation Objectives

1.1 To restore the favourable conservation condition of Mediterranean salt meadows in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

Habitat area stable or increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: Dunbrody Abbey - 0.08ha, Rochestown - 0.04ha, Ringville - 6.70ha;

- No decline in habitat distribution, subject to natural processes;
- Maintain or where necessary restore natural circulation of sediments and organic matter, without any physical obstructions;
- Maintain natural tidal regime;
- Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession;
- Maintain range of saltmarsh habitat zonations including transitional zones, subject to natural processes including erosion and succession.
- Maintain structural variation within sward;
- Maintain more than 90% of area outside creeks vegetated;
- Maintain range of sub-communities with typical species listed in Saltmarsh Monitoring Project (McCorry & Ryle, 2009); and
- No significant expansion of Spartina. No new sites for this species and an annual spread of less than 1% where it is already known to occur.

Water courses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation [3260]

Characteristic species

This annexed habitat has a broad definition, covering from upland, flashy, oligotrophic, bryophyte- and algal-dominated rivers, to tidal reaches dominated by higher plants. In Ireland, the highest riverine conservation interest is associated with lowland depositing and tidal rivers and unmodified, fast-flowing, low-nutrient rivers

A number of rare submerged and marginal species are found in the former including opposite-leaved pondweed *Groenlandia densa*, starworts (e.g. *Callitriche truncata*), triangular club-rush *Schoenoplectus triqueter*, needle spike rush *Eleocharis acicularis* and mud-dwelling mosses (e.g. *Ephemerum* spp.). The low-nutrient, high-velocity river types are associated with high bryophyte diversity, cascades, riffles and riparian woodland. Important communities also occur in groundwater-fed, base-rich oligotrophic rivers.

Extent and Distribution

This habitat is distributed all across Ireland. **Appendix D** shows the full extent of this habitat within Ireland.

Threats

The main problems for river habitats in Ireland are damage through hydrological and morphological change, eutrophication and other water pollution. Specifically:

- Agricultural activities generating diffuse pollution to surface or ground waters;

- Agricultural activities generating point source pollution to surface or ground waters
- Modification of hydrological flow;
- Physical alteration of water bodies;
- Discharge of urban wastewater (excluding storm overflows and/or urban run-offs) generating pollution to surface or ground water;
- Forestry activities generating pollution to surface or ground waters;
- Pollution to surface or ground water due to urban runoffs;
- Peat extraction;
- Plants, contaminated or abandoned industrial sites generating pollution to surface or ground water; and
- Abstraction from groundwater, surface water or mixed water.

Conservation Objectives

To maintain the favourable conservation condition of Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

- No decline in habitat distribution, subject to natural processes;
- Habitat area stable or increasing, subject to natural processes;
- Maintain appropriate hydrological regimes;
- The groundwater flow to the habitat should be permanent and sufficient to maintain tufa formation;
- The substratum should be dominated by large particles and free from fine sediments;
- Water chemistry: the groundwater and surface water should have sufficient concentrations of minerals to allow deposition and persistence of tufa deposits;
- Water quality (suspended sediments): the concentration of suspended solids in the water column should be sufficiently low to prevent excessive deposition of fine sediments;
- Water quality (nutrients): The concentration of nutrients in the water column should be sufficiently low to prevent changes in species composition or habitat condition;
- Vegetation composition: typical species of the relevant habitat sub-type should be present and in good condition; and
- The area of active floodplain at and upstream of the habitat should be maintained.

European dry heaths [4030]

Characteristic species

Dry heath comprises vegetation dominated by ericaceous dwarf shrubs and usually occurs on well-drained, nutrient-poor and acidic mineral soils or shallow peats (typically < 50 cm deep) on sloping ground. *Calluna vulgaris* is usually the main species but *Erica cinerea*, *Ulex gallii* and *Vaccinium myrtillus* may also be important components. Dry heaths occur from sea level up to around 400 m, where they start to merge into 4060 Alpine and Boreal heaths.

Extent and Distribution

This habitat is widely distributed across Ireland, although absence is notable to the north-east of the country as well as some smaller areas centrally, south-east and to the south. **Appendix D** shows the full extent of this habitat within Ireland.

Threats

The main threats to this habitat include the following:

- Intensive grazing or overgrazing by livestock;
- Burning for agriculture;
- Conversion to forest from other land uses, or afforestation;
- Wind, wave and tidal power, including infrastructure;
- Temperature changes due to climate change, for example; and
- Droughts and decreases in precipitation due to climate change.

Conservation Objectives

To maintain the favourable conservation condition of European dry heaths in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

- No decline in habitat distribution from current habitat distribution, subject to natural processes;
- Habitat area stable or increasing, subject to natural processes. Habitat area is not known but estimated as less than 400ha of the area of the SAC, occurring in dispersed locations;
- No significant change in soil nutrient status, subject to natural processes. No increase or decrease in area of natural rock outcrop;
- Cover of characteristic sub-shrub indicator species at least 25%: gorse *Ulex europaeus* and where rocky outcrops occur bilberry *Vaccinium myrtillus* and woodrush *Luzula sylvatica*. Some rock outcrops support English stonecrop *Sedum anglicum*, sheep's bit *Jasione montana* and wild madder *Rubia peregrina* as well as important moss and lichen assemblages;
- Cover of senescent gorse less than 50%;
- Long shoots of bilberry with signs of browsing collectively less than 33%;
- Cover of scattered native trees and shrub less than 20%;
- Number of positive indicator species at least 2 e.g. gorse and associated dry heath/ acid grassland flora;
- Cover of positive indicator species at least 60%. This should include plant species characterisitic of dry heath in this SAC including gorse, bilberry and associated acid grassland flora;
- Number of bryophyte or non-crustose lichen species present at least 2;
- Cover of bracken less than 10%;
- Cover of agricultural weed species (negative indicator species) less than 1%;
- Cover of non-native species less than 1%;
- No decline in distribution or population sizes of rare, threatened or scarce species, including Greater Broomrape *Orobanche rapum-genistae* and the legally protected clustered clover *Trifolium glomeratum*;

- Cover of disturbed bare ground less than 10% (but if peat soil less than 5%); and
- No signs of burning within sensitive areas.

Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430]

Characteristic species

Three distinct communities can be considered for the habitat 6430 "Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels" in Ireland:

> i) In the lowlands, the 6430 habitat occurs as a community of watercourses, particularly unmanaged edges of slow-moving rivers and the margins of lakes. Nutrient levels may be naturally high. The community is dominated by tall hydrophilous herbs, for example *Angelica sylvestris*, *Filipendula ulmaria*, *Iris pseudacorus*, *Lysimachia vulgaris*, *Lythrum salicaria* and *Valeriana officinalis*. Horsetails such as *Equisetum fluviatile* and *Equisetum palustre* are a common feature, but monospecific stands of horsetails should not be included.
>
> ii) In the uplands, the 6430 habitat occurs as a community of ungrazed or lightly grazed cliff ledges. These occur on calcareous cliffs and on wet siliceous cliffs where there is some base enrichment from the water. Individual patches of the community are typically small (<1m across). Floristically, there may be some overlap with communities of habitats 8210 and 8220, but in this community hydrophilous herbs are characteristic rather than ferns. Such species include Alchemilla spp., Angelica sylvestris, *Crepis paludosa*, *Filipendula ulmaria*, *Geum rivale* and *Thalictrum minus*. *Luzula sylvatica* may be present but ledges strongly dominated by this species are not included.

Extent and Distribution

This habitat is not well distributed across the country. Rather its distribution is limited to two large areas running from north to south within the centre and eastern areas of Ireland, as well as smaller isolated areas to the west, south, and south-west. are distributed. **Appendix D** shows the full extent of this habitat within Ireland.

Threats

The main threats to this habitat include the following:

- Intensive grazing or overgrazing by livestock;
- Drainage for use as agricultural land;
- Invasive alien species of Union concern; and
- Other invasive alien species.

Conservation Objectives

To maintain the favourable conservation condition of Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

- No decline in habitat distribution, subject to natural processes;
- Habitat area stable or increasing, subject to natural processes;
- Maintain appropriate hydrological regimes;
- 30-70% of sward is between 40 and 150cm in height;
- Broadleaf herb component of vegetation between 40 and 90%;

- At least 5 positive indicator species present; and
- Negative indicator species, particularly non-native invasive species, absent or under control- NB Indian balsam *Impatiens glandulifera*, monkeyflower *Mimulus guttatus*, Japanese knotweed *Fallopia japonica* and giant hogweed *Heracleum mantegazzianum*.

Petrifying springs with tufa formation (Cratoneurion) [7220]

Characteristic species

Petrifying springs are lime-rich water sources which deposit tufa (or travertine). The emerging spring water is rich in carbon dioxide and dissolved calcium carbonate. On contact with the atmosphere, carbon dioxide is outgassed and calcium carbonate is deposited as tufa. The resulting ecological conditions, with high pH and constant inundation by water and deposition of precipitated calcium carbonate, constitute a challenging environment for plants and animals to colonise, and the communities associated with petrifying springs are therefore highly specialised.

Ecologically significant species of petrifying springs which serve as positive indicators of habitat status consist largely of mosses and liverworts, with a smaller number of vascular plants. The mosses *Palustriella commutata*, *Palustriella falcata*, *Philonotis calcarea*, *Eucladium verticillatum*, *Didymodon tophaceus, Campylium stellatum*, *Scorpidium cossonii, Scorpidium scorpioides, Bryum pseudotriquetrum and Fissidens adianthoides* are highly characteristic, positive indicators, along with the liverworts *Pellia endiviifolia, Aneura pinguis* and *Jungermannia atrovirens*. Forbs which serve as positive indicators are *Pinguicula vulgaris*, *Parnassia palustris* and *Anagallis tenella*, and, especially in woodland springs, *Chrysosplenium oppositifolium* and *Crepis paludosa*. The graminoids *Festuca rubra*, *Carex lepidocarpa*, *Carex panicea* and *Eriophorum latifolium* are positive indicators, as are the pteridophytes *Equisetum telmateia*, *Equisetum variegatum* and *Selaginella selaginoides*. Stoneworts, especially *Chara vulgaris*, may also be present and serve as positive indicators.

Extent and Distribution

This habitat is distributed mostly to the north, north-east, and north-west of Ireland and is mostly absent in the south and central areas of Co. Laois, other than for relatively small and isolated areas. **Appendix D** shows the full extent of this habitat within Ireland.

Threats

The main threats to this habitat include the following:

- Abandonment of grassland management (e.g. cessation of grazing of mowing);
- Extensive grazing or undergrazing by livestock;
- Roads, paths, railroads and related infrastructure (e.g. bridges, viaducts, tunnels);
- Sports, tourism and leisure activities;
- Other human intrusions and disturbance not mentioned above;
- Mixed source pollution to surface and ground waters (limnic and terrestrial);
- Drainage; and
- Natural succession resulting in species composition change (other than by direct changes of agricultural or forestry practices).

Conservation Objectives

To maintain the favourable conservation condition of Petrifying springs with tufa formation (Cratoneurion) in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

- Habitat area stable or increasing, subject to natural processes;
- No decline in habitat distribution;
- Maintain appropriate hydrological regimes;
- Maintain oligotrophic and calcareous conditions; and
- Maintain typical species.

Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0]

Characteristic species

Old sessile oak woods is defined in the interpretation manual of EU habitats as “acidophilous *Quercus petraea* woods, with low, low-branched, trees, with many ferns, mosses, lichens and evergreen bushes.” Three indicative species are listed: *Quercus petraea*, *Ilex aquifolium* and *Blechnum* ssp.

Extent and Distribution

The distribution of this habitat is mostly to the south and southern-central areas of the country, extending along the coastal areas to the west and east. It is largely absent from the many northern areas. **Appendix D** shows the full extent of this habitat within Ireland.

Threats

The main threats to this habitat include the following:

- Other invasive alien species (other than species of Union concern);
- Intensive grazing or overgrazing by livestock;
- Problematic native species;
- Clear-cutting, removal of all trees; and
- Extreme weather events (e.g., storms/cyclone).

Conservation Objectives

To restore the favourable conservation condition of Old oak woodland with Ilex and Blechnum in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

- Habitat area stable or increasing, subject to natural processes, at least 85.08ha for sub-sites surveyed;
- No decline in habitat distribution;
- Woodland area stable of increasing. Where topographically possible, "large" woods at least 25ha in size and “small” woods at least 3ha in size;
- Woodland structure remains a diverse structure with a relatively closed canopy containing mature trees; subcanopy layer with semi-mature trees and shrubs; and well-developed herb layer;
- Maintain diversity and extent of the woodland community types;
- Woodland structure comprises seedlings, saplings and pole age-classes occur in adequate proportions to ensure survival of woodland canopy;

- At least 30m³/ha of fallen timber greater than 10cm diameter; 30 snags/ha; both categories should include stems greater than 40cm diameter;
- No decline in veteran trees present;
- No decline in indicators of local distinctiveness;
- No decline in native tree cover. Remains no less than 95%;
- A variety of typical native species present, depending on woodland type, including oak *Quercus petraea* and birch *Betula pubescens*; and
- Negative indicator species, particularly non-native invasive species, absent or under control.

Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) [91E0]

Characteristic species

A number of variants of this habitat exist, of which riparian forests *of Fraxinus excelsior* and *Alnus glutinosa* (*Alno-Padion*) of temperate and boreal Europe lowland and hill watercourses are the most common type found in Ireland.

Extent and Distribution

The range of this habitat covers most of Ireland with only a few areas mainly to the west not included. However, it's distribution is much more limited so smaller and sometimes isolated areas throughout the country, with most being to the south-east. **Appendix D** shows the full extent of this habitat within Ireland.

Threats

The main threats to this habitat include the following:

- Other invasive alien species (other than species of Union concern);
- Problematic native species;
- Clear-cutting, removal of all trees; and
- Plant and animal diseases, pathogens and pests.

Conservation Objectives

To restore the favourable conservation condition of Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

- Habitat area stable or increasing, subject to natural processes, at least 181.54ha for sites surveyed;
- No decline in habitat distribution;
- Woodland area stable or increasing. Where topographically possible, "large" woods at least 25 ha in size and "small" woods at least 3 ha in size;
- Diverse structure with a relatively closed canopy containing mature trees; subcanopy layer with semi-mature trees and shrubs; and well-developed herb layer;
- Maintain diversity and extent of community types;
- Woodland structure: Seedlings, saplings and pole age-classes occur in adequate proportions to ensure survival of woodland canopy;

- Appropriate hydrological regime necessary for maintenance of alluvial vegetation;
- At least 30m³/ha of fallen timber greater than 10cm diameter; 30 snags/ha; both categories should include stems greater than 40cm diameter (greater than 20cm diameter in the case of alder);
- No decline in veteran trees;
- No decline in indicators of local distinctiveness;
- No decline in native tree covers not less than 95%;
- A variety of typical native species present, depending on woodland type, including ash alder, willows (*Salix* spp.) and locally, oak; and
- Negative indicator species, particularly non-native invasive species, absent or under control.

***Vertigo moulinsiana* (Desmoulin's Whorl Snail) [1016]**

Population and Distribution

The population of Desmoulin's whorl snail is considered to be largely in decline, with only five sites considered in favourable status between 2013-2018 compared to 14 between 2007-2012 (Long & Brophy, 2019).

This species is limited mostly to the central parts of Ireland and is largely absent from much of Co. Laois. The full extent of this species is provided in **Appendix D**.

Threats

The main threats to this species include the following:

- Natural succession resulting in species composition change (other than by direct changes of agricultural or forestry practices);
- Abiotic natural processes (e.g. erosion, silting up, drying out, submersion, salinization);
- Abandonment of management/use of other agricultural and agroforestry systems (all except grassland); and
- Extensive grazing or undergrazing by livestock.

Conservation Objectives

To maintain the favourable conservation condition of Desmoulin's whorl snail in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

- No decline in the two known sites: Borris Bridge, Co. Carlow S711503; Boston Bridge, Kilnaseer S338774, Co. Laois.
- At least 5 adult snails in at least 50% of samples.
- Adult snails present in at least 60% of samples per site.
- Minimum 1 ha of suitable habitat per site.
- 90% of samples in habitat classes I and II as defined in Moorkens & Killeen (2011).
- 90% of samples in moisture class 3-4 as defined in Moorkens & Killeen (2011).

Margaritifera margaritifera (Freshwater Pearl Mussel) [1029]

Population and Distribution

NPWS (2019b) estimates that the national population of freshwater pearly mussel is between 7,394,834 – 9,607,907, with its distribution limited to select freshwater sites located in the

north, west, south, and south-east of Ireland. It is largely absent in the central areas and north of the country. **Appendix D** details the full extent of this species.

Threats

The main threats to this species include the following:

- Drainage for use as agricultural land;
- Modification of hydrological conditions, or physical alteration of water bodies and drainage for forestry (including dams);
- Other modification of hydrological conditions for residential or recreational development;
- Agricultural activities generating diffuse pollution to surface or ground waters;
- Forestry activities generating pollution to surface or ground waters;
- Discharge of urban wastewater (excluding storm overflows and/or urban run-offs) generating pollution to surface or ground water;
- Peat extraction;
- Modification of flooding regimes, flood protection for residential or recreational development;
- Hydropower (dams, weirs, run-off-the-river), including infrastructure; and
- Abstraction of ground and surface waters (including marine) for public water supply and recreational use.

Conservation Objectives

The status of the freshwater pearl mussel as a qualifying Annex II species for the River Barrow and River Nore SAC is currently under review. The outcome of this review will determine whether a site-specific conservation objective is set for this species. Please note that the Nore freshwater pearl mussel remains a qualifying species for this SAC. This document contains a conservation objective for the latter species.

It is anticipated that the conservation objectives would be similar to those laid out for the Nore freshwater pearl mussel, which are detailed **below**.

Nore Freshwater Pearl Mussel *Margaritifera durrovensis* [1990]

Population and Distribution

Margaritifera durrovensis is a freshwater pearl mussel (subspecies of *Margaritifera margaritifera*) that occurs only in the River Nore in Ireland. considered critically endangered. It has been assessed as unfavourable-bad both in the reporting period of 2001-2006 and 2007-2012 for all four parameters (EEA, 2012).

Threats

Threats to this species include hydrological changes, nutrient pollution and sediment pollution. It is anticipated that this species/subspecies faces similar threats to that of the freshwater pearly mussel, specifically:

- Drainage for use as agricultural land;
- Modification of hydrological conditions, or physical alteration of water bodies and drainage for forestry (including dams);
- Other modification of hydrological conditions for residential or recreational development;

- Agricultural activities generating diffuse pollution to surface or ground waters;
- Forestry activities generating pollution to surface or ground waters;
- Discharge of urban wastewater (excluding storm overflows and/or urban run-offs) generating pollution to surface or ground water;
- Peat extraction;
- Modification of flooding regimes, flood protection for residential or recreational development;
- Hydropower (dams, weirs, run-off-the-river), including infrastructure; and
- Abstraction of ground and surface waters (including marine) for public water supply and recreational use.

Conservation Objectives

To restore the favourable conservation condition of the Nore freshwater pearl mussel in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

- Maintain the distribution at 15.5 km;
- Restore population size to 5,000 adult mussels;
- Population structure: restore to at least 20% of population no more than 65mm in length; and at least 5% of population no more than 30mm in length;
- Adult mortality: no more than 5% decline from previous number of live adults counted; dead shells less than 1% of the adult population and scattered in distribution;
- Restore suitable habitat in length of river corresponding to distribution target (15.5km) and any additional stretches necessary for salmonid spawning;
- Water quality: restore water quality-macroinvertebrates: EQR greater than 0.90; phytobenthos: EQR greater than 0.93;
- Restore substratum quality-filamentous algae: absent or trace (<5%); acrophytes: absent or trace (<5%);
- Restore substratum quality-stable cobble and gravel substrate with very little fine material; no artificially elevated levels of fine sediment;
- Restore to no more than 20% decline from water column to 5cm depth in substrate;
- Restore appropriate hydrological regimes; and
- Maintain sufficient juvenile salmonids to host glochidial larvae.

***Austropotamobius pallipes* (White-clawed Crayfish) [1092]**

Population and Distribution

White-clawed Crayfish populations appear to be in decline in at least some SACs. In particular, there appear to have been losses from Lough Corrib SAC, the River Barrow and River Nore SAC and the River Moy SAC (Grimmell et al., 2021).

Crayfish surveys detected crayfish mostly within the upper reaches of the River Barrow (north of Carlow) in 2017, with southern areas showing a reduced population due to an outbreak of Crayfish Plague in the lower reaches of the River Barrow (south of Carlow) in 2017. As such, only a small number of surveys were carried out in this section of the SAC (Grimmell et al., 2021).

White-clawed crayfish are distributed throughout all central areas of Ireland, within freshwater habitats. They are absent from all coastal areas. **Appendix D** shows the full extent of this species.

Threats

The main threats to this species include the following:

- Plant and animal diseases, pathogens and pests;
- Invasive alien species, primarily signal crayfish *Pacifastacus leniusculus*causing the spread of crayfish plague.

Conservation Objectives

To maintain the favourable conservation condition of White-clawed crayfish in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

- No reduction in the baseline distribution;
- Juveniles and/or females with at eggs in at least 50% of positive samples;
- No alien crayfish species;
- No instances of disease;
- At least Q3-4 in water quality at all sites; and
- No decline in heterogeneity or habitat quality.

***Petromyzon marinus* (Sea Lamprey) [1095]**

Population and Distribution

According to a report by King (2006) detailing lamprey surveys for the River Barrow SAC, sea lamprey juveniles were recorded at four stations in four separate tributary channels. However, in all cases, numbers were very low. The full population is unknown. However, the population trend is considered stable (NPWS, 2019b).

The distribution of sea lamprey is limited to isolated to river habitats to the north-west, east, south-east and centrally. **Appendix D** shows the full extent of this species.

Threats

The main threats to this species include:

- Hydropower (dams, weirs, run-off-the-river), including infrastructure;
- Increases or changes in precipitation due to climate change;
- Application of natural fertilisers on agricultural land;
- Application of synthetic (mineral) fertilisers on agricultural land;
- Drainage for use as agricultural land;
- Marine fish and shellfish harvesting (professional, recreational) causing reduction of species/prey populations;
- Temperature changes (e.g. rise of temperature & extremes) due to climate change; and
- Droughts and decreases in precipitation due to climate change.

Conservation Objectives

To restore the favourable conservation condition of Sea lamprey in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

- Distribution: greater than 75% of main stem length of rivers accessible from estuary;
- Population: at least three age/size groups present;
- Juvenile density at least 1/m^2;
- No decline in extent and distribution of spawning beds; and
- Availability of juvenile habitat: more than 50% of sample sites positive.

***Lampetra planeri* (Brook Lamprey) [1096]**

Population and Distribution

Surveys conducted by King (2006) found that the River Barrow system was carried high densities of brook and river lamprey. Brook lampreys are well distributed across Ireland and are only really absent from coastal areas. **Appendix D** shows the full extent of this species.

Threats

1.2 The main threats to this species include the following:

- Application of natural fertilisers on agricultural land;
- Application of synthetic (mineral) fertilisers on agricultural land;
- Drainage for use as agricultural land;
- Clear-cutting, removal of all trees;
- Hydropower (dams, weirs, run-off-the-river), including infrastructure;
- Pollution to surface or ground water due to urban runoffs;
- Discharge of urban waste water (excluding storm overflows and/or urban run-offs) generating pollution to surface or groundwater;
- Temperature changes (e.g. rise of temperature & extremes) due to climate change; and
- Droughts and decreases in precipitation due to climate change.

Conservation Objectives

To restore the favourable conservation condition of Brook lamprey in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

- Distribution: access to all watercourses down to first order streams;
- Populations structure of juveniles: at least three age/size groups of brook/river lamprey present;
- Juvenile density: mean catchment juvenile density of brook/river lamprey at least 2/m^2;
- No decline in extent and distribution of spawning beds; and
- Availability of juvenile habitat: more than 50% of sample sites positive.

***Lampetra fluviatilis* (River Lamprey) [1099]**

Population and Distribution

Surveys conducted by King (2006) found that the River Barrow system was carried high densities of brook and river lamprey.

The distribution of river lamprey is much reduced compared to brook lamprey, with only small areas to the west, east and north-east. **Appendix D** shows the full extent of this species in Ireland.

Threats

The main threats to this species includes the following:

- Hydropower (dams, weirs, run-off-the-river), including infrastructure;
- Increases or changes in precipitation due to climate change;
- Application of natural fertilisers on agricultural land (M) A20 Application of synthetic (mineral) fertilisers on agricultural land;
- Drainage for use as agricultural land;
- Shipping lanes, ferry lanes and anchorage infrastructure (e.g. canalisation, dredging); and
- Temperature changes (e.g. rise of temperature & extremes) due to climate change.

Conservation Objectives

To restore the favourable conservation condition of River lamprey in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

- Distribution and extent: greater than 75% of main stem and major tributaries down to second order accessible from estuary;
- Population structure of juveniles: At least three age/size groups of river/brook lamprey;
- Juvenile density: mean catchment juvenile density of brook/river lamprey at least 2/m^2;
- No decline in extent and distribution of spawning beds; and
- Availability of juvenile habitat: more than 50% of sample sites positive.

***Alosa fallax fallax* (Twaite Shad) [1103]**

Population and Distribution

The River Barrow and River Nore SAC is one of only a handful of spawning grounds in the country for Twaite Shad.

Within the River Barrow and River Nore this species was dispersed throughout the estuary. However, capture numbers were consistently low during surveys, with a total count of 113 (Ryan et al., 2020). The population is considered stable.

This species has a limited distribution in Ireland and is only present in the south-east of the country, other than a very small and isolated population to the north-east. **Appendix D** provides the full extent of this species in Ireland.

Threats

The main threats to this species include the following:

- Application of natural fertilisers on agricultural land;
- Application of synthetic (mineral) fertilisers on agricultural land;
- Hydropower (dams, weirs, run-off-the-river), including infrastructure;
- Shipping lanes, ferry lanes and anchorage infrastructure (e.g. canalisation, dredging);
- Marine fish and shellfish harvesting (professional, recreational) causing reduction of species/prey populations;

- Freshwater fish and shellfish harvesting (recreational);
- Bycatch and incidental killing (due to fishing and hunting activities);
- Other invasive alien species (other than species of Union concern);
- Temperature changes (e.g. rise of temperature & extremes) due to climate change; and
- Increases or changes in precipitation due to climate change.

Conservation Objectives

To restore the favourable conservation condition of Twaite shad in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

- Distribution: greater than 75% of main stem length of rivers accessible from estuary;
- Population structure: more than one age class present;
- No decline in extent and distribution of spawning habitats;
- Water quality levels: no lower than 5mg/l; and
- Spawning habitat: maintain stable gravel substrate with very little fine material, free from filamentous algal (macroalgae) growth and macrophyte (rooted higher plants) growth.

***Salmo salar* (Salmon) [1106]**

Population and Distribution

The population for Atlantic salmon is estimated to be 202,428 nationally and has a stable population trend (NPWS, 2019b). IFI's (2022) *Wild salmon and sea trout statistics report* recorded 669 salmon in the River Nore and 154 salmon in the River Barrow in 2022.

The distribution of salmon is limited to river habitats and they are well distributed throughout Ireland, with only a large area in the centre of the country where they are absent. **Appendix D** shows the full extent of this species in Ireland.

Threats

Threats to this species includes the following:

- Agricultural activities generating diffuse pollution to surface or ground waters;
- Other impacts from marine aquaculture, including infrastructure;
- Physical alteration of water bodies;
- Temperature changes (e.g. rise of temperature & extremes) due to climate change;
- Agricultural activities generating point source pollution to surface or ground waters;
- Forestry activities generating pollution to surface or ground waters;
- Discharge of urban waste water (excluding storm overflows and/or urban run-offs) generating pollution to surface or ground water;
- Modification of flooding regimes, flood protection for residential or recreational development;
- Illegal harvesting, collecting and taking; and
- Other invasive species (other than species of Union concern).

Conservation Objectives

To restore the favourable conservation condition of Salmon in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

- Distribution: 100% of river channels down to second order accessible from estuary;
- Adult spawning fish: conservation limit for each system consistently exceeded;
- Fry abundance: maintain or exceed 0+ fry mean catchment-wide abundance threshold value. Currently set at 17 salmon fry/5 min sampling;
- No significant decline in out-migrating smolt abundance;
- No decline in the number and distribution of spawning redds due to anthropogenic causes; and
- Water quality: at least Q4 at all sites sampled by EPA.

***Lutra lutra* (Otter) [1355]**

Population and Distribution

The population of otters in Ireland is estimated to be between 7,218 – 10,186 breeding females, with the long-term trend being assessed as stable (NPWS, 2019b).

Threats

The threats to otter according to Reid et al., (2013) include the following:

- Habitat destruction and degradation;
- Water pollution; and
- Accidental death and/or persecution.

Conservation Objectives

To restore the favourable conservation condition of Otter in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

- No significant decline in distribution;
- No significant decline in terrestrial habitat. Area mapped and calculated as122.8ha above high-water mark (HWM); 1136.0ha along river banks / around ponds;
- No significant decline in the area of marine habitat. Area mapped and calculated as 857.7ha;
- No significant decline in the extent of freshwater (river) habitat. Length mapped and calculated as 616.6km;
- No significant decline in the extent of freshwater (lake) habitat. Area mapped and calculated as 2.6ha.
- No significant decline in couching sites and holts; and
- No significant decline in fish biomass available.

***Trichomanes speciosum* (Killarney Fern) [1421]**

Population and Distribution

There are 86 known populations of Killarney fern occupying an area of 239m^2 (Ní Dhúill et al., 2022). Many of these are in favourable condition, with only three populations being assessed as unfavourable, two of which were recorded as locally extinct (Ní Dhúill et al., 2022)

The distribution of this species is believed to be confined to a limited area of Europe, including Ireland, Britain, Western France, Spain and Italy (Ní Dhúill et al., 2022). In Ireland it is limited

to small, isolated areas across the country, with the greatest range being in the south-west. **0** shows the full extent of this species in Ireland.

Threats

The threats to this species as detailed by Ní Dhúill et al. (2022) include the following:

- The loss of plants through land clearance for developments;
- Removal of plants for collections/samples;
- Indirectly by alteration of habitat conditions leading to an alteration in relative humidity and desiccation of plants, for example:
    - Removal of woodland;
    - Alteration of watercourses
- Encroachment of other species such as bramble or alien species;
- Grazing;
- Use of biocides and other chemicals;
- Illegal dumping;
- Outdoor sports and other recreational pressures;
- Fire;
- Disease (e.g., grey fungal attack); and
- Flooding.

Conservation Objectives

To maintain the favourable conservation condition of Killarney Fern in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

- No decline in distribution. Three locations known, with three colonies of gametophyte and one sporophyte colony;
- Population size: maintain at least three colonies of gametophyte, and at least one sporophyte colony of over 35 fronds;
- Population structure: at least one of the locations to have a population structure comprising sporophyte, unfurling fronds, 'juvenile' sporophyte and gametophyte generations;
- Habitat extent: no loss of suitable habitat, such as shaded rock crevices, caves or gullies in or near to, known colonies. No loss of woodland canopy at or near to known locations;
- Maintain hydrological conditions at the locations so that all colonies are in dripping or damp seeping habitats, and water is visible at all locations;
- No increase in humidity. Presence of desiccated sporophyte fronds or gametophyte mats indicates conditions are unsuitable;
- No changes in shading due to anthropogenic impacts; and
- Invasive species are absent or under control.

C.3 River Nore SPA (004160)

C.3.1 Brief Description

The River Nore SPA is a long, linear site that includes the following river sections: the River Nore from the bridge at Townparks, (north-west of Borris in Ossory) to Coolnabuck (approximately 3 km south of Inistioge) in Co. Kilkenny; the Delour River from its junction with the River Nore to Derrynaseera bridge (west of Castletown) in Co. Laois; the Erkina River from its junction with the River Nore at Durrow Mills to Boston Bridge in Co. Laois; a 1.5 km stretch of the River Goul upstream of its junction with the Erkina River; the Kings River from its junction with the River Nore to a bridge at Mill Island, Co. Kilkenny. The river includes the river channel and marginal vegetation.

The River Nore SPA is of high ornithological importance as it supports a nationally important population of Kingfisher, a species that is listed on Annex I of the E.U. Birds Directive.Qualifying Interest

Kingfisher *Alcedo atthis* [A229]

Population and Distribution

Ireland supports a population of 368 – 1031 pairs of kingfishers (NPWS, 2012). A survey in 2010 (Cummins et al., 2010) recorded 22 pairs of Kingfisher (based on 16 probable and 6 possible territories) within the River Nore SPA. The trend of this species population shows a decrease of 45 since the 1991-2010 period. Records obtained from BirdWatch Ireland (1981/92 – 1983/84) show that kingfishers are distributed across the country, with records for this species existing throughout Ireland. However, most records are congregated around the east, south-east and south of Ireland.

Threats

According to Cummins et al. (2010), threats to this species include:

- Grazing from cattle, sheep, horses and goats;
- Sand and gravel quarries;
- Recreation walking and cycling on river tracks;
- Roads, car parks, and other built structures;
- Industrial and commercial areas;
- Nautical sports;
- Pollution due to forestry, agricultural, household, or sewage;
- Water deviation;
- Modifying structures of inland courses;
- Water abstractions from surface waters;
- Management of bank vegetation for drainage;
- Dykes and other flooding defense;
- Reduction or loss of specific habitat features;
- Erosion reducing potential breeding sites; and
- Siltation modifying the bank profile.

Table 10 details the pressures and threats that the River Nore (including the SPA) specifically experienced, according to Cummins et al. (2010). This concludes that most of the primary threats to kingfisher on the River Nore is due to grazing pressure, roads, bridges and other built structures, recreational pressure due to paths and cyclins, and bank management to manage drainage. Sand and gravel extraction and water extraction do not currently pose major threats to kingfishers on the River Nore.

Table 10: Pressures and threats identified. For each characteristic, the percentages of sections reported in the River Nore. Extracted from p. 13 of Cummins et al. (2010).

Threat / pressure	Percentage of section reported for the River Nore (%)
Grazing	72.2
Sand and gravel quarries	0.3
Paths, tracks, cycling tracks	38.7
Roads / motorways	46.4
Car parks and parking areas	18.5
Bridge / viaduct	28.1
Industrial and commercial areas	12.6
Nautical sports	8.9
Human trampling/overuse	14.6
Large scale water deviation	2.6
Modifying structures of inland water courses	8.9
Water abstractions from surface water	-
Aquatic bank management of vegetation for drainage	34.4
Dykes and other flooding defence	3.3
Reduction of specific habitat features	7.0
Erosion	18.5
Silting-up	2.6

Conservation Objectives

The conservation objectives for kingfisher are to maintain the Favourable conservation condition of Kingfisher in River Nore SPA, which is defined by the following list of attributes and targets:

- No significant decline in the long-term kingfisher;
- Sufficient productivity to maintain the population trend as stable or increasing;
- No significant loss of distribution in the long-term, other than that occurring due to natural patterns of variation;
- Sufficient area of high-quality nesting habitat to support the population target;
- Sufficient number of locations, area of suitable forage habitat and available forage biomass to support the population target;

- Maintain good water quality through both biotic (i.e. Q-value) and abiotic indices (i.e., reflect overall good-high quality status);
- No increase in barriers to connectivity; and
- Ensure that disturbance levels do not significantly impact upon breeding kingfisher.

There are no specific conservation objectives (COs) set for the Species of Conservation Interest (SCIs) of this SPA, but as for other similar SPAs which do have specific COs there is usually a link between habitat loss and disturbance (e.g. noise) impacts on populations of birds.

Appendix D Species/Habitats Distribution

Breedon Materials Ltd. (trading as Breedon Ireland)

SLR Project No.: 501.00584.065036

10 September 2024

Appendix D Species/Habitats Distribution

Breedon Materials Ltd.

SLR Project No.: 501.00584.065036

31 July 2024

KILLARNEY FERN *(Trichomanes speciosum)*

ANNEX: II, IV

Emer Ní Dhúill

Killarney fern *(Trichomanes speciosum)* is a type of filmy fern. These ferns have characteristically thin, membranous, translucent fronds which are prone to desiccation. The species has the two-stage life cycle typical of ferns, the first (gametophyte) stage comprising a filamentous structure, the second (sporophyte) being the more familiar fern frond. Both stages may live independently of one another.

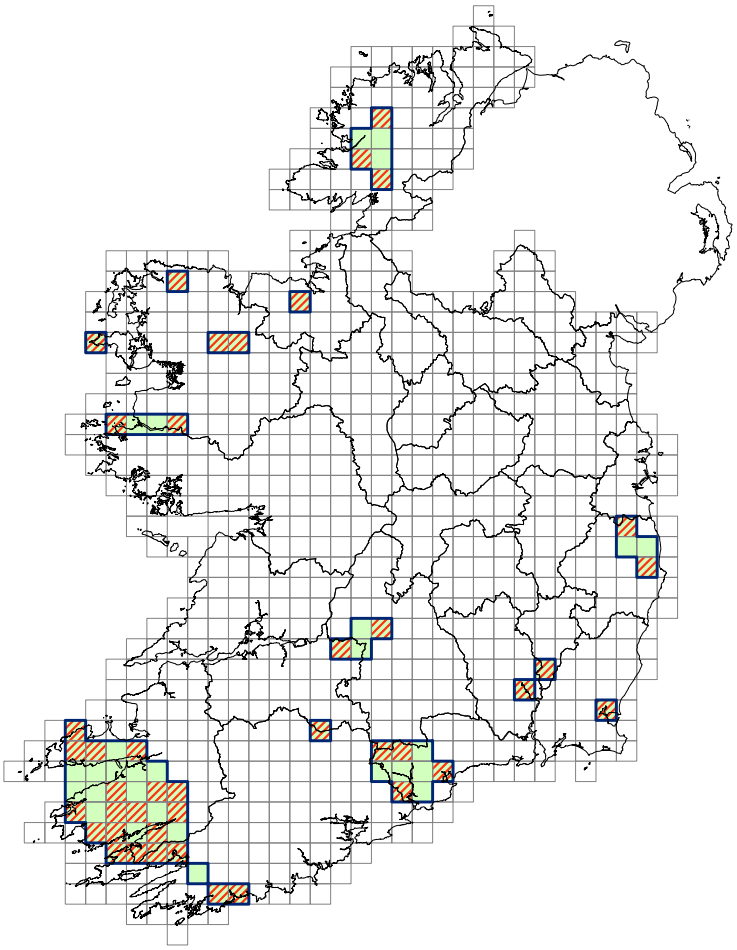
It grows in deeply shaded, humid situations such as dripping caves, crevices and overhangs on cliffs and rocky slopes, in stream gullies, by waterfalls and in woodlands, and occasionally occurs under fallen trees and on the floor of damp woodlands. It is found in areas underlain by acidic rocks such as quartzite, slates and sandstones and has an altitudinal range in Ireland of 50-380m above sea level; many of its sites have a predominantly north- or north-east-facing aspect.

Most sites are located in the south-west, in counties Cork, Kerry, Limerick, Tipperary and Waterford. However, counties Carlow, Donegal, Galway, Kilkenny, Mayo, Sligo, Wexford and Wicklow also hold populations.

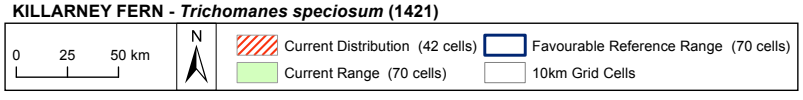
The current known Irish population comprises 177 discrete colonies within 64 populations, of which 25 have both sporophyte and gametophyte colonies, 18 have sporophytes only and 21 have gametophytes only. A colony is defined as a discrete, i.e. unconnected, "patch" or "plant". Knowledge of the species in Ireland has improved considerably since the last assessment and seven new populations have been discovered (comprising two sporophyte, one mixed and four gametophyte populations).

Killarney fern is potentially threatened by a variety of activities and impacts, either directly by loss of habitat, deliberate collection, encroachment of invasive or vigorous species, or indirectly by water pollution, removal of woodland or alteration of watercourses.

However there is no evidence of significant impact from pressures, and the Overall Status is assessed as Favourable.



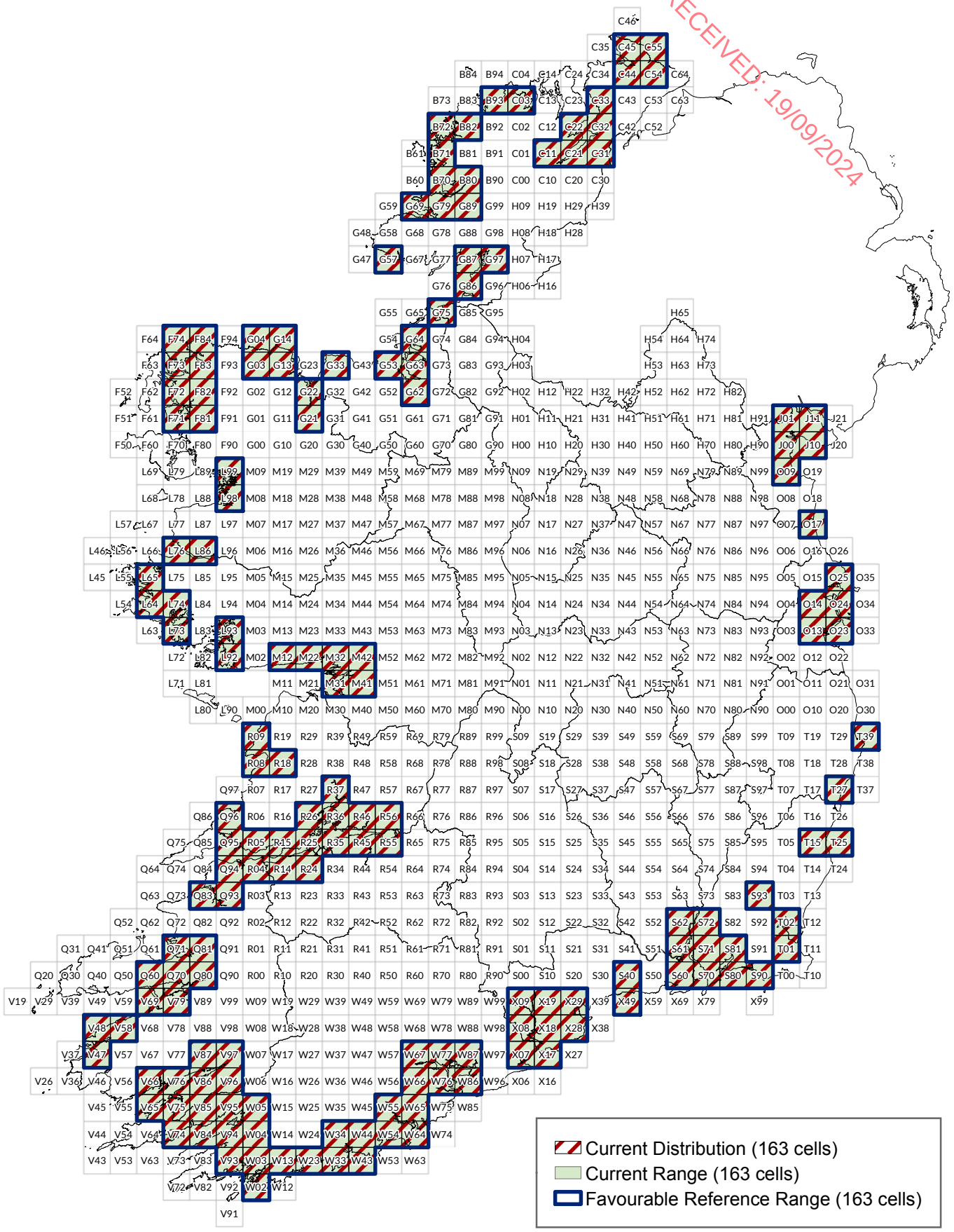
KILLARNEY FERN - *Trichomanes speciosum* (1421)



ASSESSMENT SUMMARY:

CONCLUSION	2007	2013
Range	Favourable	Favourable
Population	Favourable	Favourable
Habitat for the species	Favourable	Favourable
Future Prospects	Favourable	Favourable
Overall Status	Favourable	Favourable
Reason for change	No change	

Estuaries (1130)
Article 17 (2013 - 2018) Assessment



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Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
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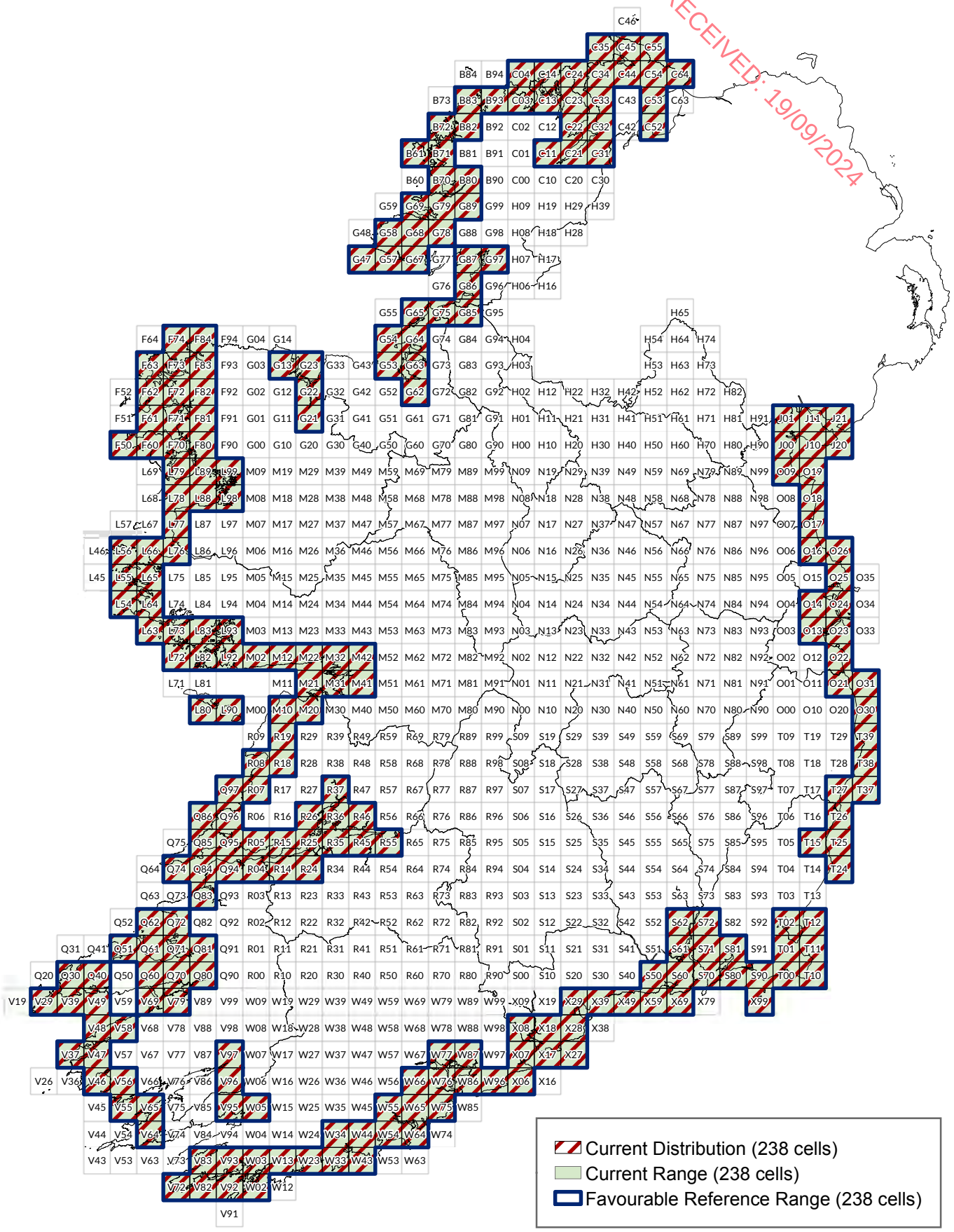
Scale - Scála
0 12.5 25 50 km

N

Ma arscáil V 2.0
Dáta June 2019

Tidal mudflats (1140)
Article 17 (2013 - 2018) Assessment



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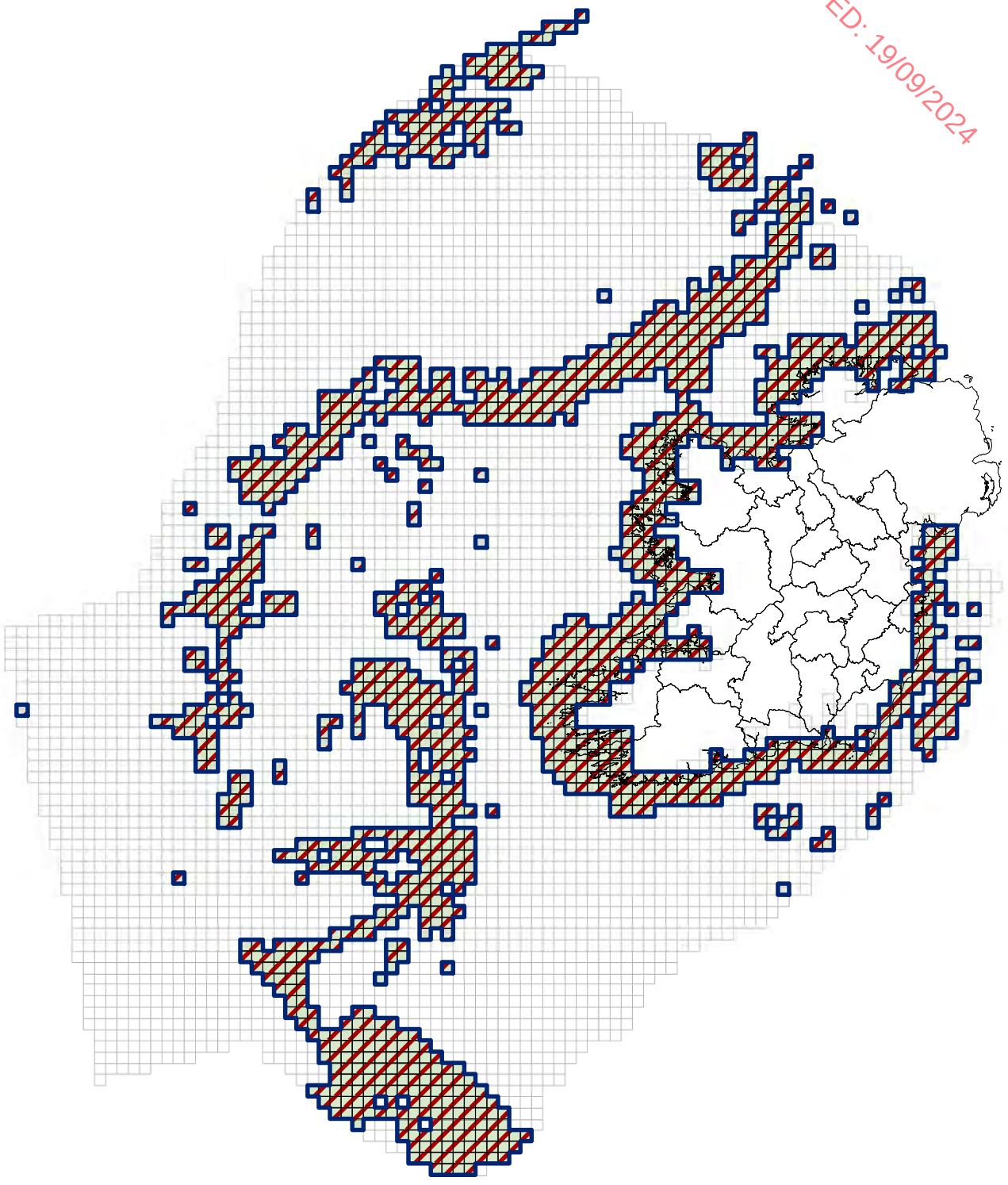
Scale - Scála
0 12.5 25 50 km

N

Ma arscáil V 2.0
Dáta June 2019

Reefs (1170)
Article 17 (2013 - 2018) Assessment



Current Distribution (1,439 cells)
Current Range (1,439 cells)
Favourable Reference Range (1,439 cells)

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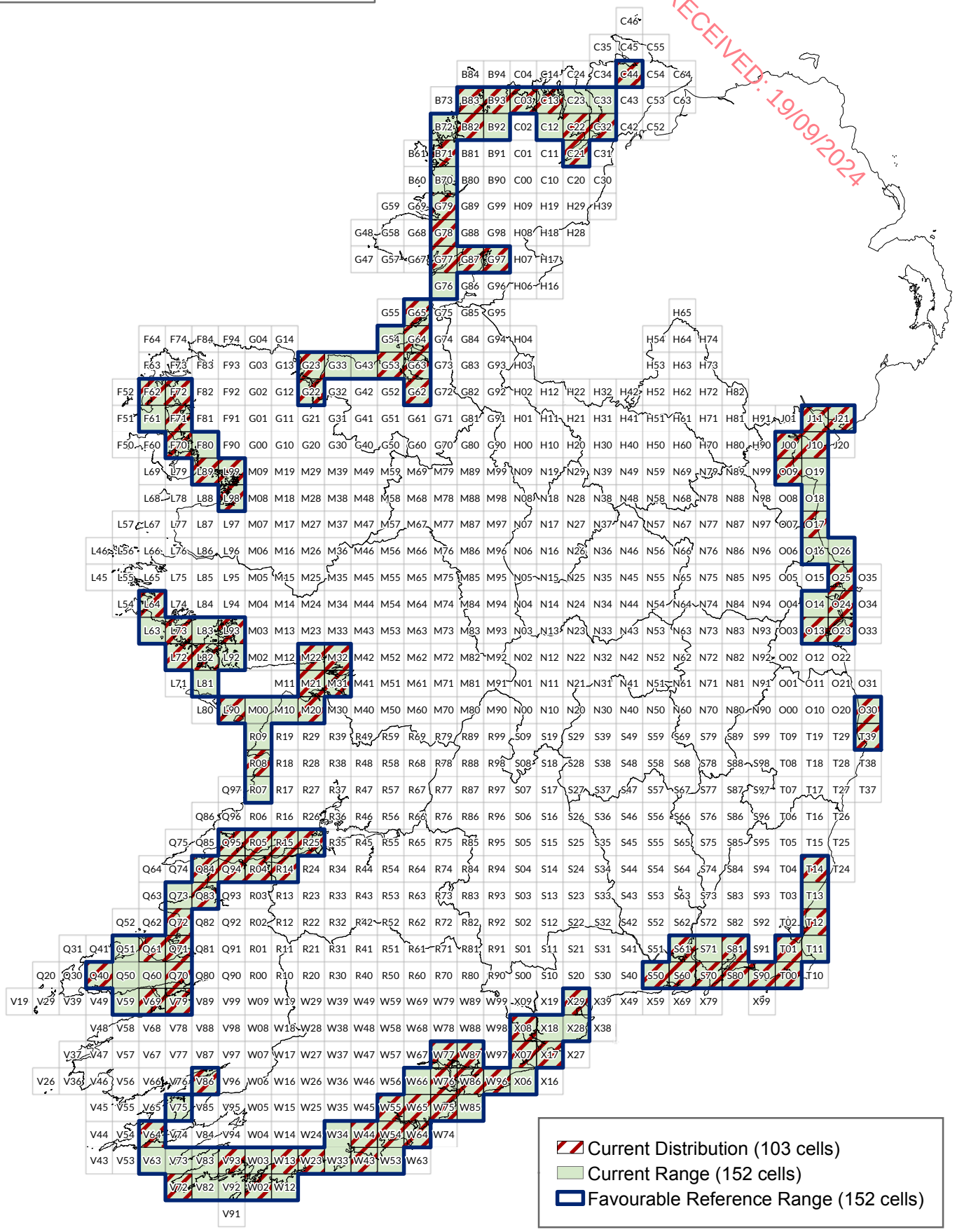
Scale - Scála
0 25 50 100 km

N

Ma arscáil
V 2.0
Dáta
June 2019

Salicornia and other annuals colonizing mud and sand (1310) Article 17 (2013 - 2018) Assessment



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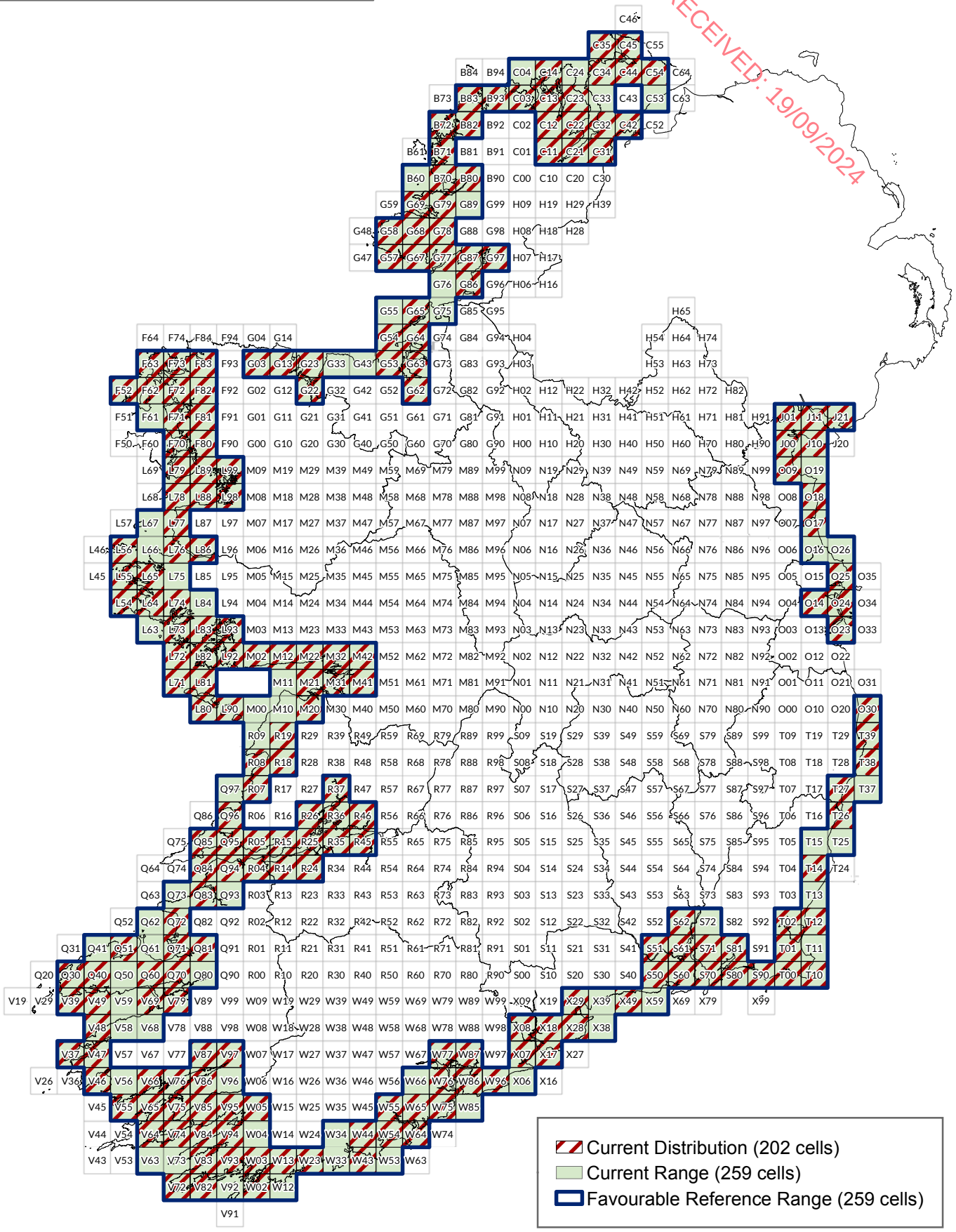
Scale - Scála
0 12.5 25 50 km

N

Ma arscáil V 2.0
Dáta June 2019

Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) Article 17 (2013 - 2018) Assessment



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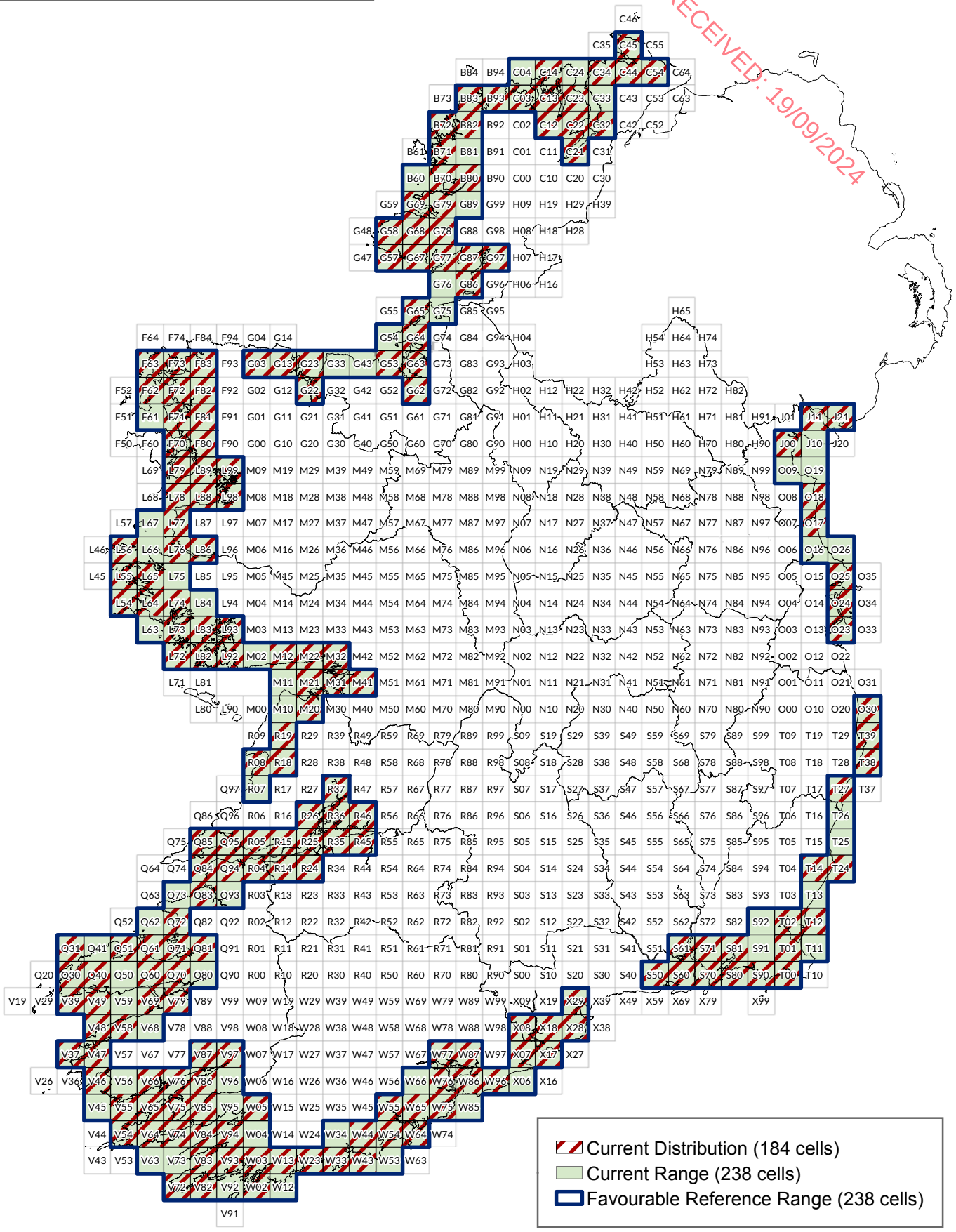
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 12.5 25 50 km

N

Ma arscáil V 2.0
Dáta June 2019

Mediterranean salt meadows (*Juncetalia maritimi*) (1410) Article 17 (2013 - 2018) Assessment



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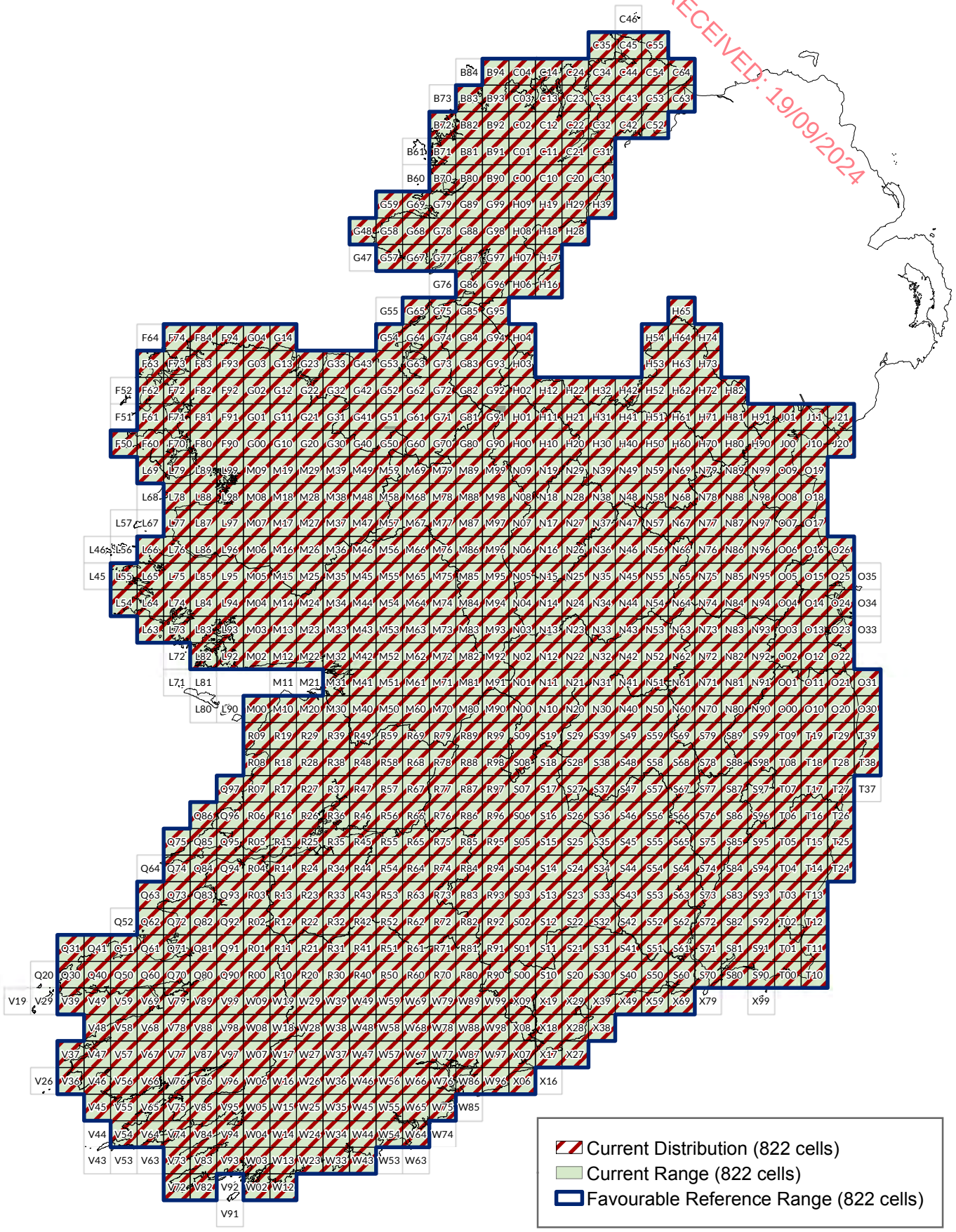
Scale - Scála
0 12.5 25 50 km

N

Ma arscáil V 2.0
Dáta June 2019

Floating River Vegetation (3260)
Article 17 (2013 - 2018) Assessment



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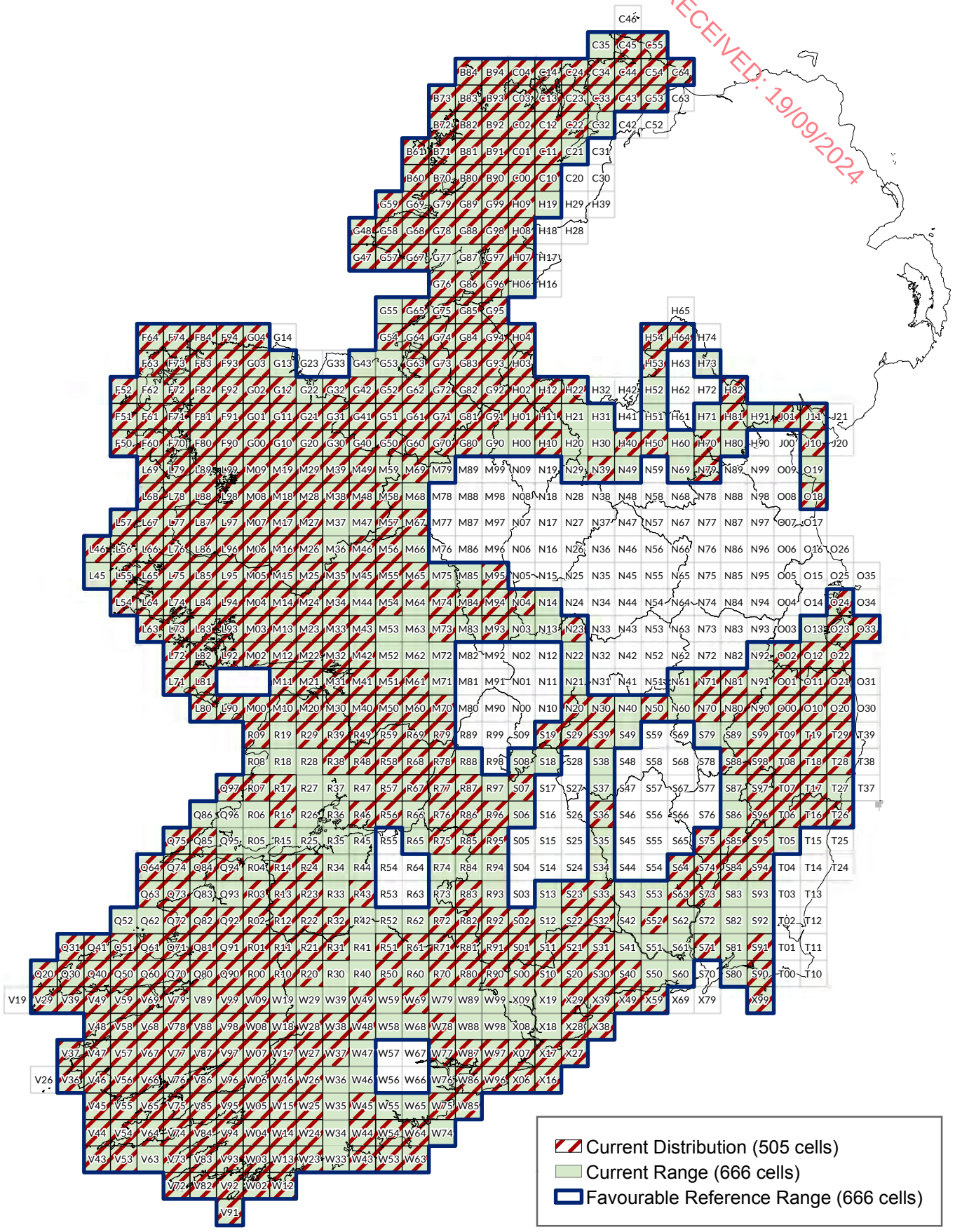
Ma arscáil V 2.0
Dáta June 2019

Dry heaths (4030)
Article 17 (2013 - 2018) Assessment



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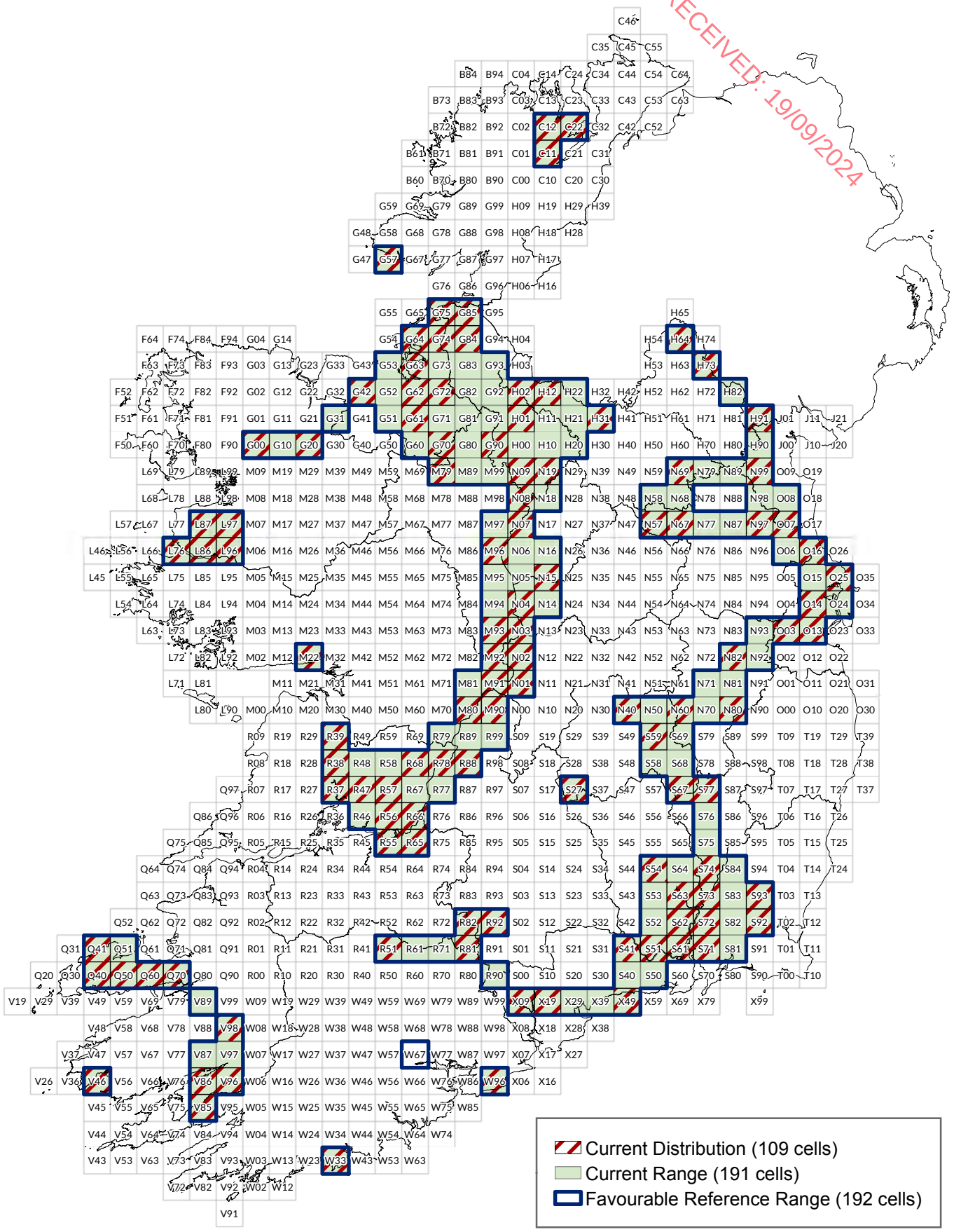
Ma arscáil V 2.0
Dáta June 2019

Hydrophilous tall herb (6430)
Article 17 (2013 - 2018) Assessment



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0 12.5 25 50 km

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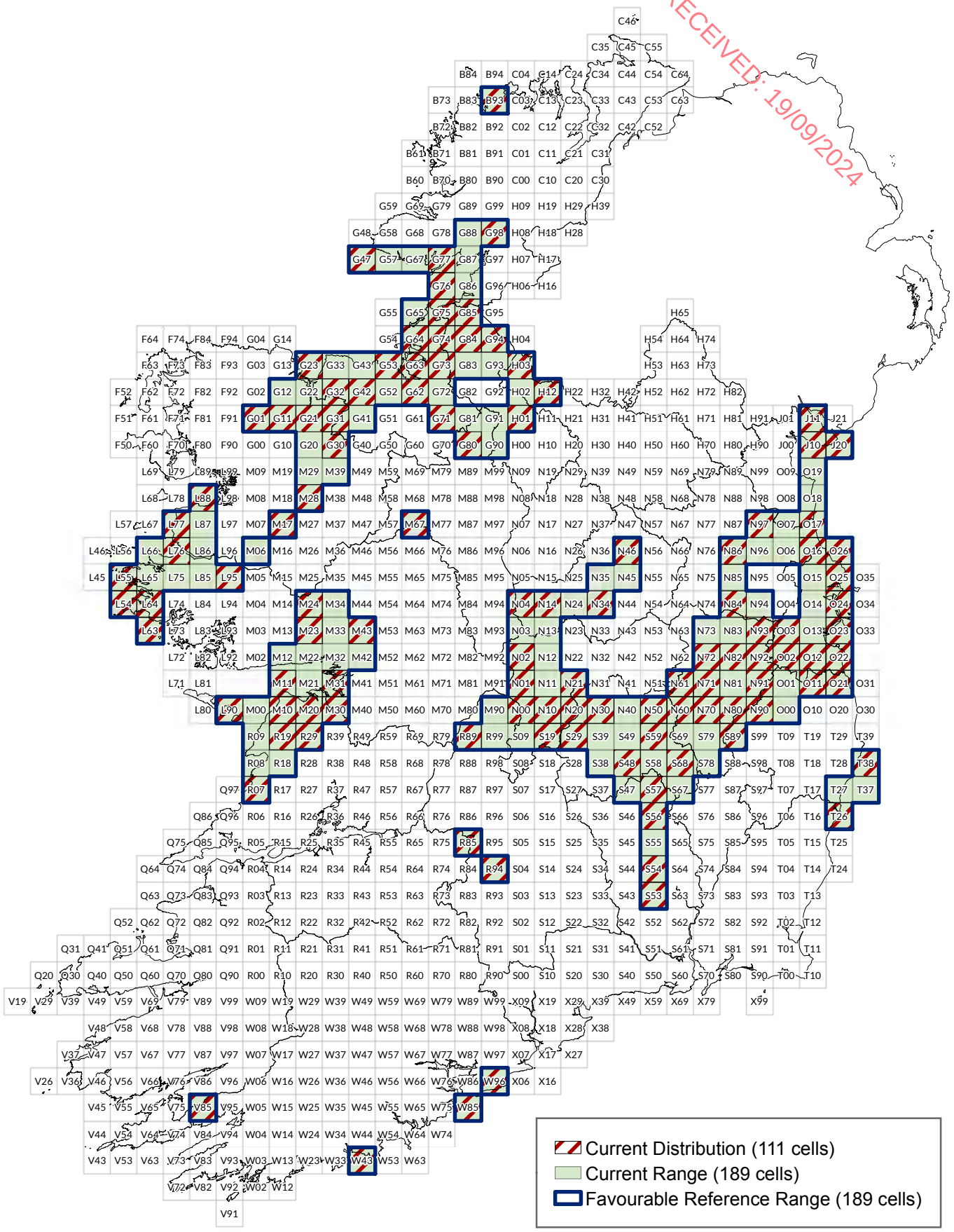
Mapa arscáil V 2.0
Dáta June 2019

Petrifying springs* (7220)
Article 17 (2013 - 2018) Assessment



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Scale - Scála
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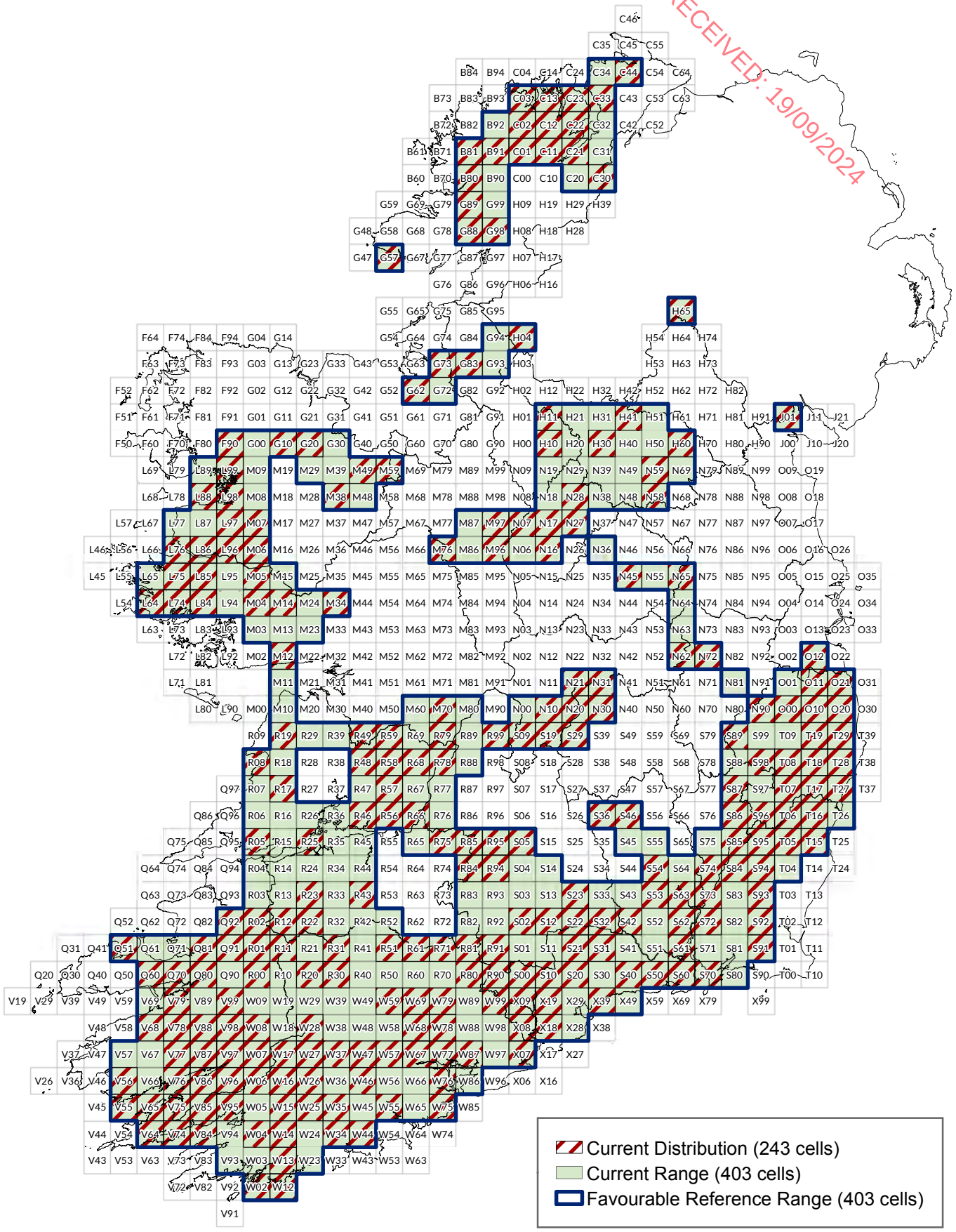
Ma arscáil V 2.0
Dáta June 2019

Old oak woodlands (91A0)
Article 17 (2013 - 2018) Assessment



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Scale - Scála
0 12.5 25 50 km

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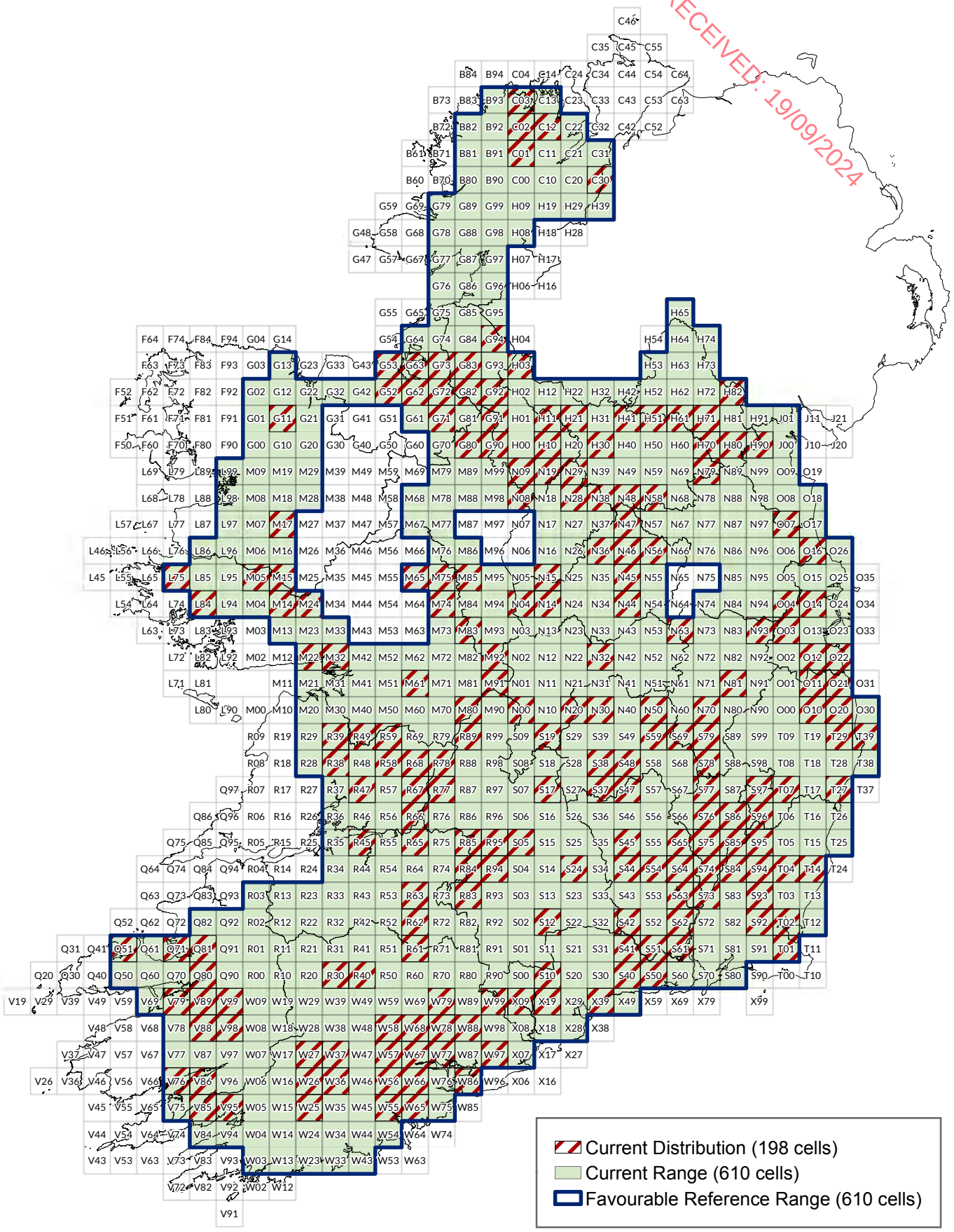
Ma arscáil
V 2.0
Dáta
June 2019

Residual alluvial forests* (91E0)
Article 17 (2013 - 2018) Assessment



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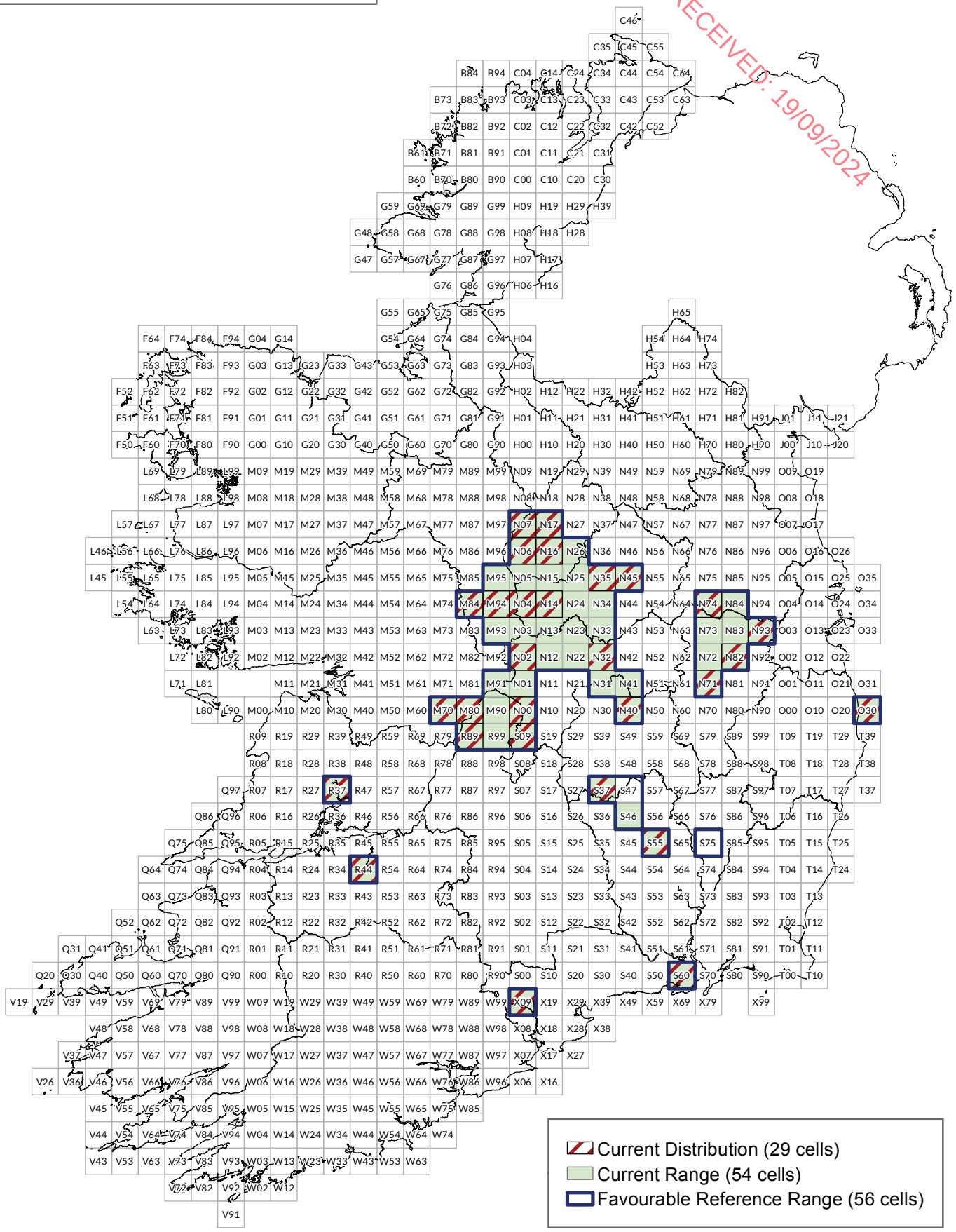
Ma arscáil V 2.0
Dáta June 2019

Desmoulin's whorl snail
Vertigo moulinsiana (1016)
Article 17 (2013 - 2018) Assessment



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Scale - Scála
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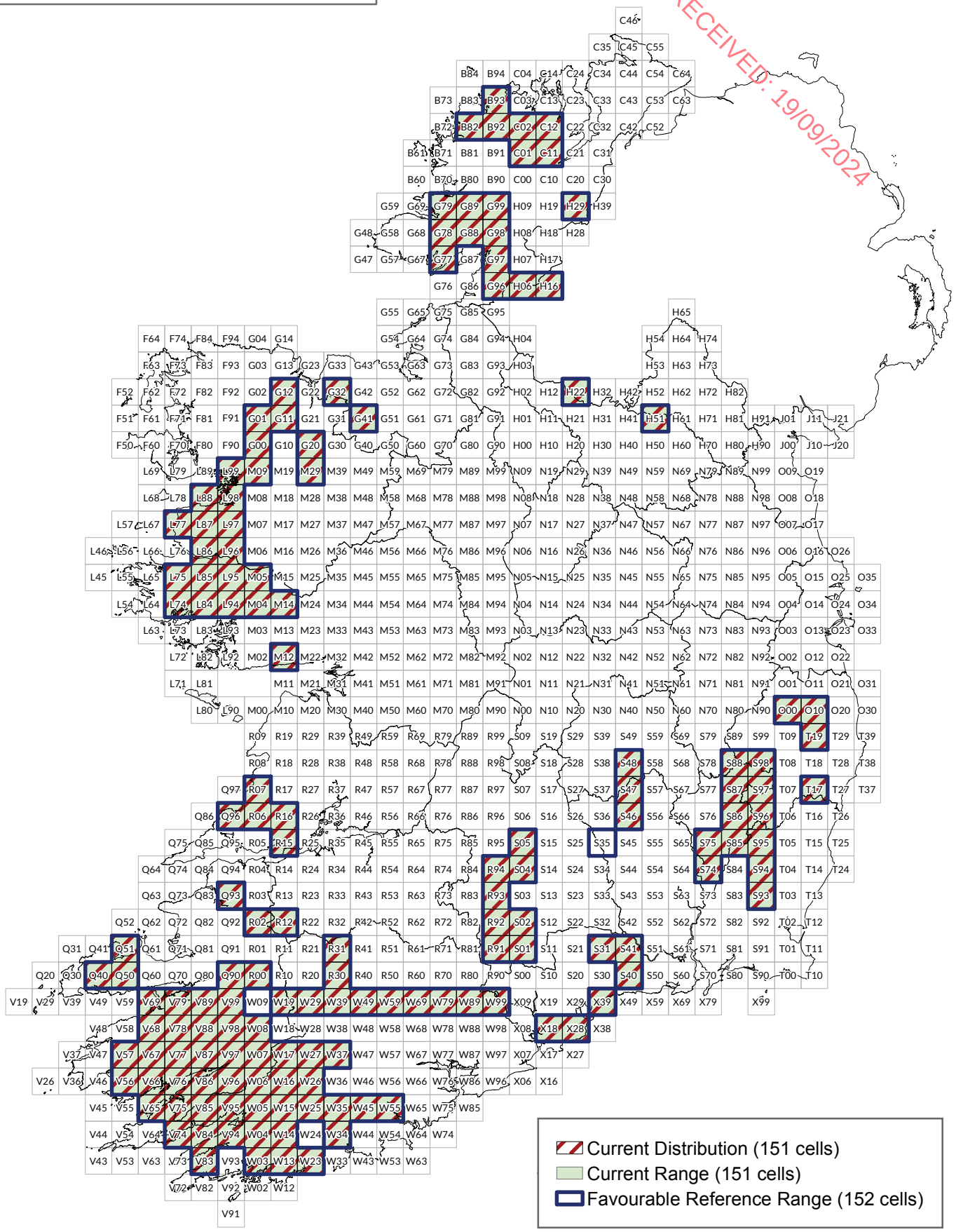
N

Map - rscáil V 2.0
Date áta June 2019

Freshwater Pearl Mussel
Margaritifera margaritifera (1029)
Article 17 (2013 - 2018) Assessment



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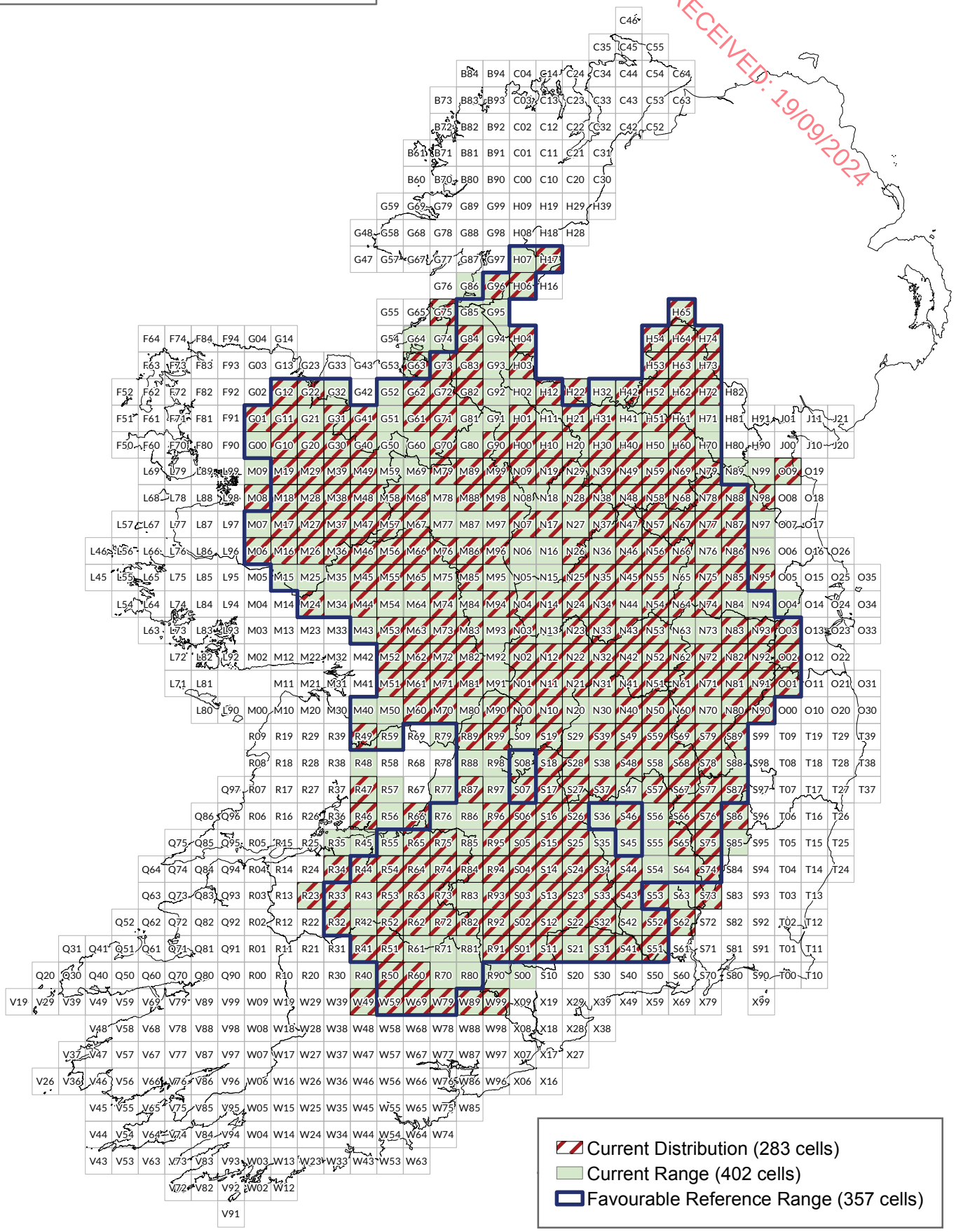
Map - rscáil V 2.0
Date áta June 2019

White -clawed Crayfish
Austropotamobius pallipes (1092)
Article 17 (2013 - 2018) Assessment



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0 12.5 25 50 km

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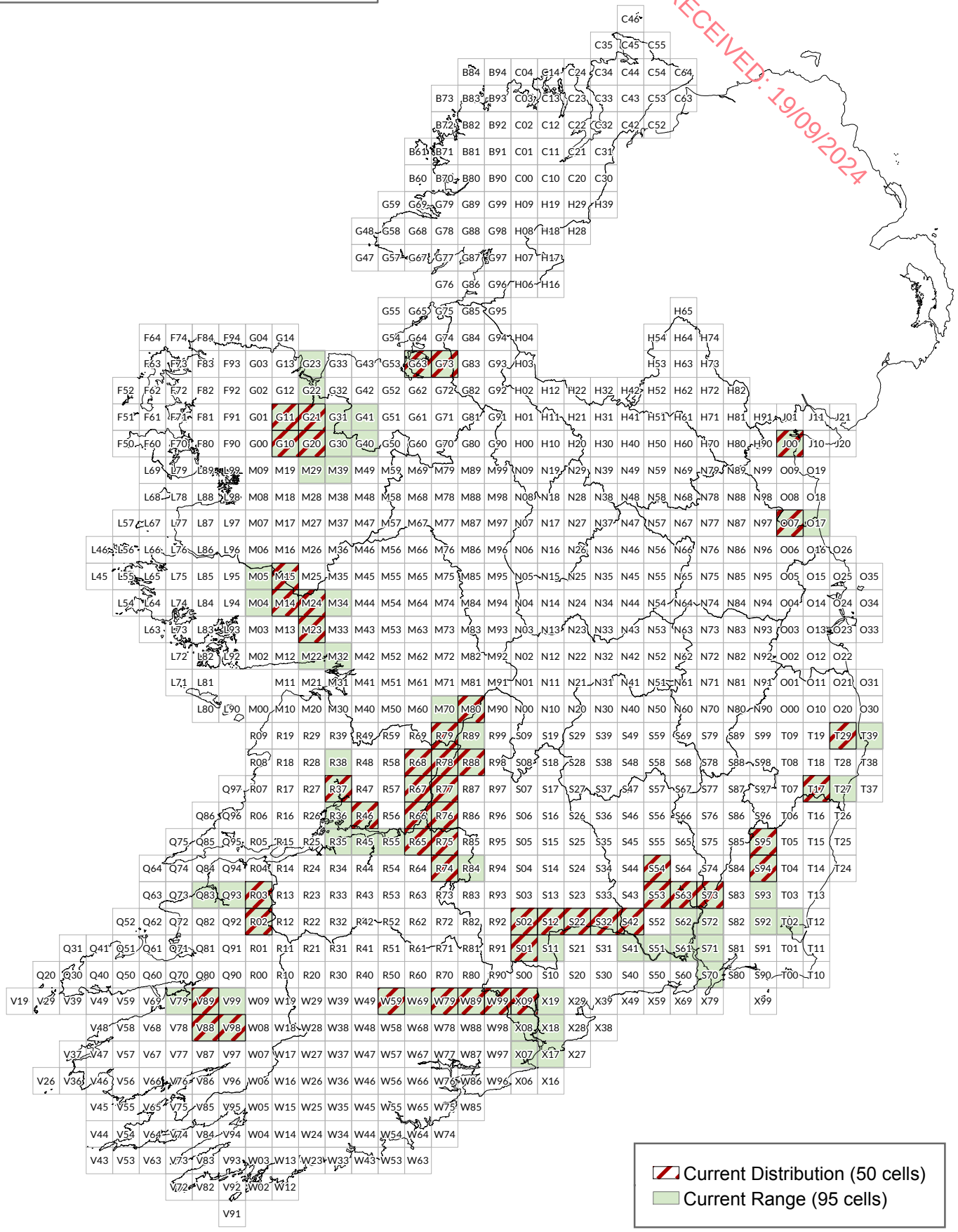
Map - rscáil V 2.0
Date áta June 2019

Sea lamprey
Petromyzon marinus (1095)
Article 17 (2013 - 2018) Assessment



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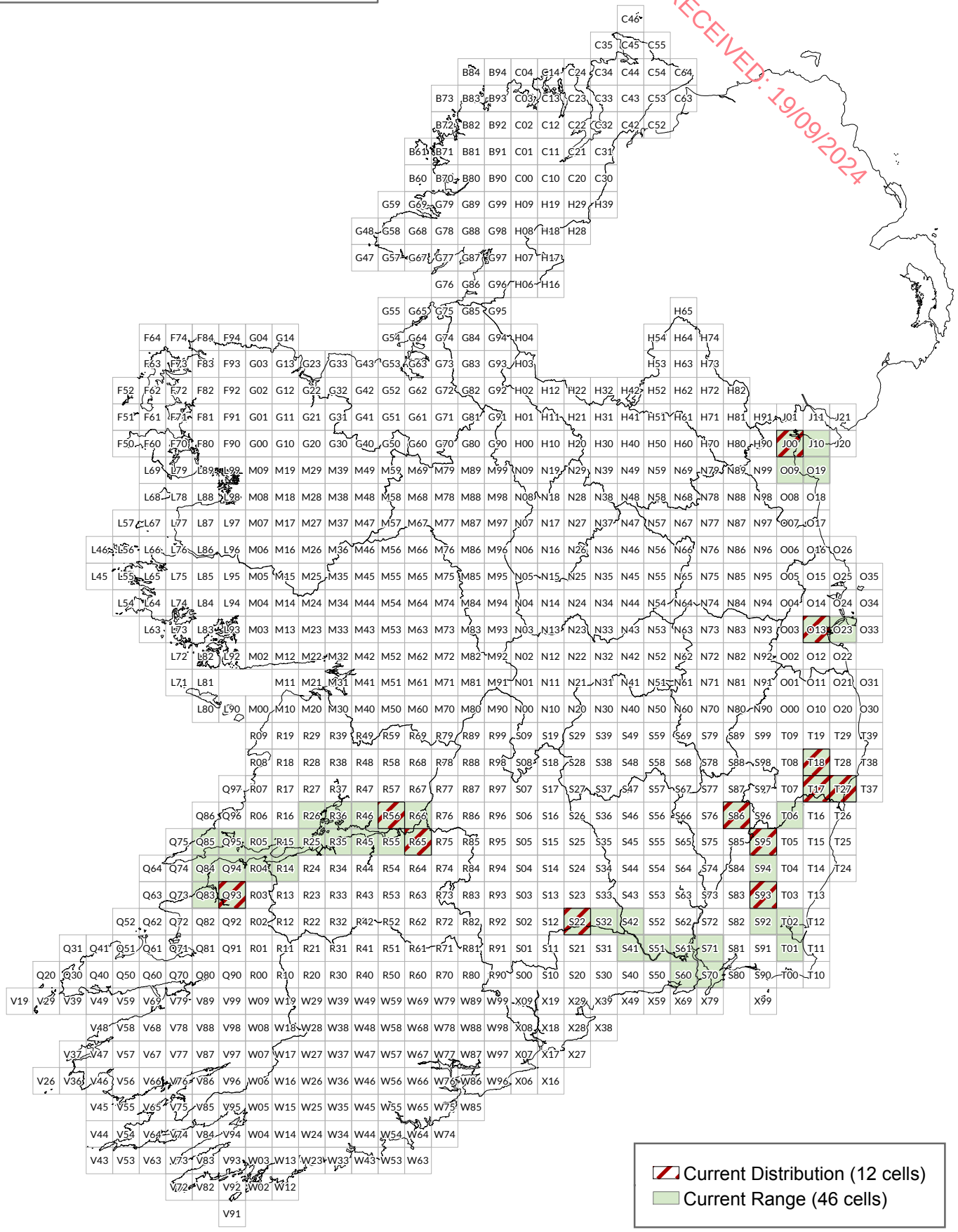
Map arscáil V 2.0
Dat Dát June 2019

River lamprey
Lampetra fluviatilis (1099)
Article 17 (2013 - 2018) Assessment



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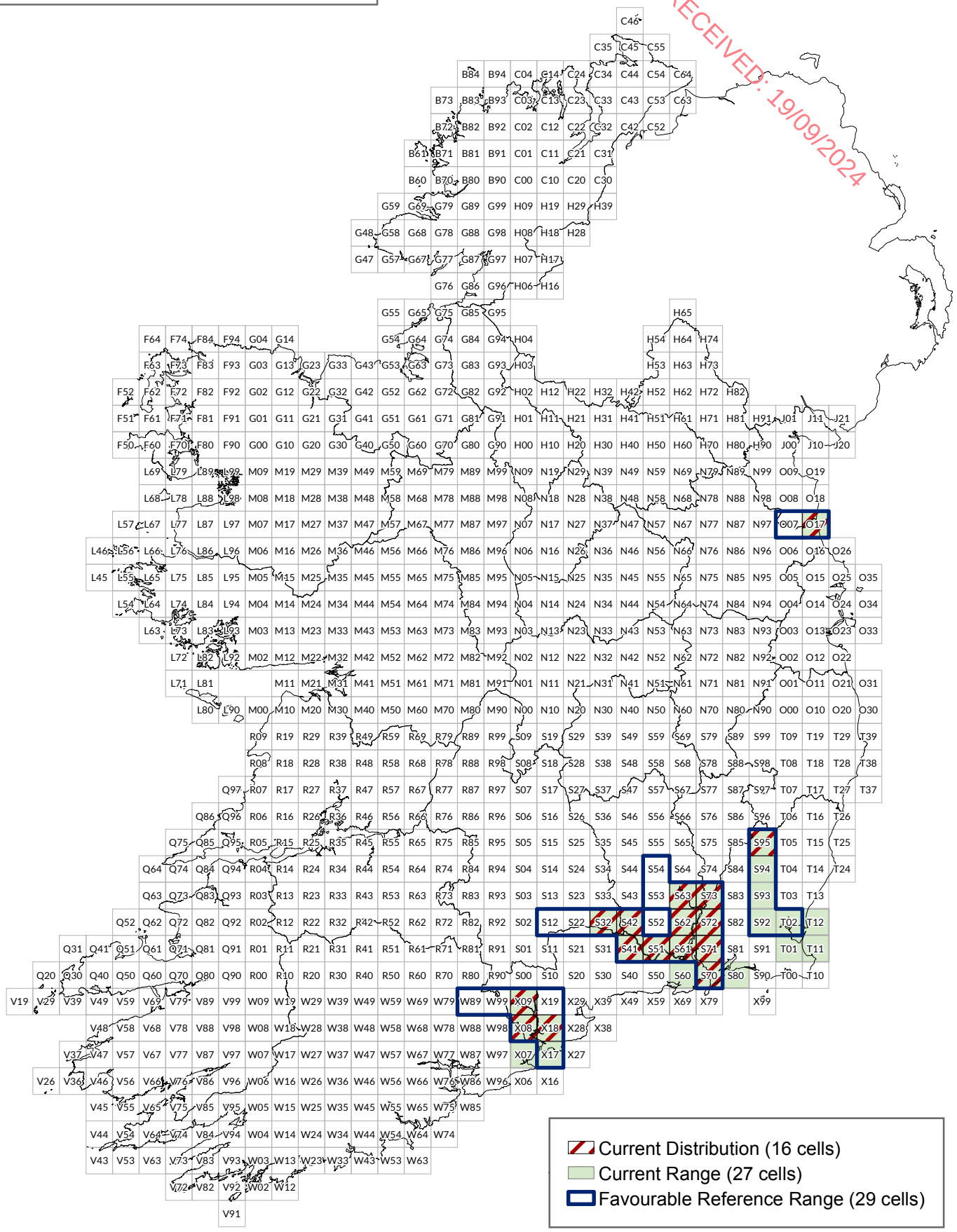
Scale - Scála
0 12.5 25 50 km

N

Map arscáil V 2.0
Dat Dát June 2019

Twaite shad
Alosa fallax (1103)
Article 17 (2013 - 2018) Assessment



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0 12.5 25 50 km

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Map arscáil V 2.0
Dat Dát June 2019