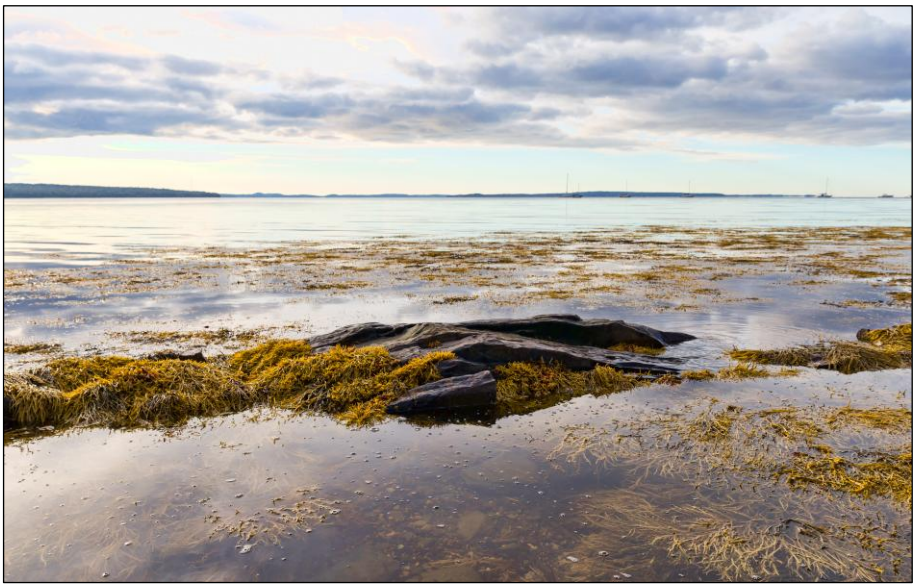
Maritime Usage Licence (MUL) Application: Sustainable hand-harvesting of *Ascophyllum nodosum* in Kenmare Bay

NATURA IMPACT STATEMENT



Version : 29th of July 2025

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SUMMARY

This Natura Impact Statement (NIS) has been prepared to inform the Appropriate Assessment of a proposal by BioAtlantis Ltd. to sustainably hand-harvest up to 1,826 wet tonnes of *Ascophyllum nodosum* annually within intertidal zones of Kenmare Bay, Co. Kerry. The harvesting will occur entirely within Kenmare River Special Area of Conservation (SAC, Site Code: 002158), a Natura 2000 site designated under the EU Habitats Directive. The NIS assesses the potential for the project to affect the integrity of this and other nearby European sites, having regard to their qualifying interests and conservation objectives, as required under Article 6(3) of the Directive.

Screening for Appropriate Assessment, completed prior to this NIS, concluded that significant effects on Kenmare River SAC could not be ruled out and that Appropriate Assessment was necessary. Several other nearby European sites were screened in on a precautionary basis due to proximity. This executive summary provides an overview of the assessment and conclusions contained in the full NIS document.

The legal protections for Natura 2000 sites are based on the possibility that a proposed project could have a significant effect on one of these sites, rather than requiring proof that such an effect will definitely occur. This precautionary approach means that if there is any doubt, the project must be assessed. A significant effect is any effect on species or habitats for which the site is designated, other than minor or trivial effects. Any plan or project that could affect a Natura 2000 site must be assessed to determine its potential impact. Importantly, mitigation measures designed to reduce or eliminate impacts cannot be taken into account at screening stage. This principle has been confirmed by several legal cases and underpins the approach taken in this Natura Impact Statement.

This NIS has been prepared in accordance with Irish and EU guidance documents, including the Department of the Environment, Heritage and Local Government's 2010 guidance for planning authorities and the Office of the Planning Regulator's 2021 Appropriate Assessment screening guidance. It also takes account of relevant European Commission guidance and applicable case law, including rulings of the Court of Justice of the European Union that require assessments to be based on the best available scientific evidence and to apply the precautionary principle where doubt exists.

Information for the NIS was compiled from a detailed review of datasets available from the National Parks and Wildlife Service (NPWS), the National Biodiversity Data Centre, the Environmental Protection Agency, and BioAtlantis Ltd. A series of desktop assessments and ecological walkovers were undertaken to inform the understanding of baseline ecological conditions. The assessment considered both the direct and indirect effects of the proposed activity, as well as in-combination effects with other existing or planned activities in the bay.

The proposal involves manual harvesting of *Ascophyllum nodosum*, a native intertidal brown seaweed, using traditional hand-cutting methods. The activity is confined to rocky mid-shore habitats within Kenmare River SAC. Harvesters will remove fronds using handheld tools, leaving the basal portions and holdfasts intact to allow for natural regeneration. The project will operate under a rotational harvesting system, with rest periods between harvest cycles to promote regrowth. All activity will be conducted on foot during low tide, with access by boat to more remote sites. The harvesting technique avoids mechanical equipment and is designed to minimise ecological disturbance.

Although *Ascophyllum nodosum* is not itself a listed species under the EU Habitats Directive, it forms a critical structural and functional element of Annex I habitats such as [1160] Large Shallow Inlets and Bays and [1170] Reefs. As such, its management has implications for the integrity of these designated

habitats. Kenmare River SAC is also designated for a range of other habitats and species, including [1220] Perennial Vegetation of Stony Banks, [1230] Vegetated Sea Cliffs, [1330 and 1410] Salt Meadows, [2120 and 2130] Coastal Dunes, [4030] Dry Heath, and protected species such as Otter (*Lutra lutra*) and Common Seal (*Phoca vitulina*).

The assessment identified that, without mitigation, the proposed activity could result in localised ecological effects within Kenmare River SAC. These include potential loss of seaweed biomass, disturbance to protected habitats, and displacement or disturbance of sensitive fauna such as seals or otters. There is also a limited potential for changes to sediment structure and for cumulative impacts when considered in combination with other pressures such as aquaculture and recreational activity.

While no harvesting is proposed within other nearby SACs, the proximity of sites such as Mucksna Wood SAC, Blackwater River (Kerry) SAC, Glanmore Bog SAC, Drongawn Lough SAC, and Old Domestic Building SAC necessitated precautionary consideration. Potential indirect risks such as biosecurity concerns and disturbance were considered in the context of the legal requirement to adopt a precautionary approach in all assessments under Article 6(3).

A comprehensive suite of mitigation measures has been developed and is set out in Section 6 of the NIS. These include strict adherence to minimum cutting heights, rotational harvesting and rest periods, exclusion of sensitive or recovering areas, and spatial limits on harvesting effort. Specific seasonal restrictions will apply to minimise disturbance during sensitive periods for marine mammals. In addition, a biosecurity protocol will be implemented to prevent the introduction or spread of invasive species. Harvesters will receive training and will operate under supervision to ensure full compliance with environmental conditions. The project will be subject to monitoring and reporting to confirm that the conservation objectives of the SAC are being met.

For the nearby sites screened in on a precautionary basis, the main mitigation consists of strict spatial avoidance and biosecurity protocols. These measures are considered effective and easily implementable and will ensure that the conservation status of these sites is not adversely affected.

Following a full and detailed assessment, it is concluded that the proposed sustainable hand-harvesting of *Ascophyllum nodosum* can proceed without adverse effects on the integrity of Kenmare River SAC or any other Natura 2000 site. This conclusion is based on the implementation of the mitigation measures described in the NIS, and on the use of a harvesting method that is demonstrably low-impact and ecologically compatible with the conservation objectives of the site.

The proposal complies with the requirements of Article 6(3) of the Habitats Directive and with national regulations. No significant adverse effects on European sites are anticipated once mitigation is in place.

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Date 29th of July 2025

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1. INTRODUCTION

The current document provides a Natura Impact Statement (NIS) to inform the Article 6 Appropriate Assessment of the proposed BioAtlantis sustainable hand harvesting of *Ascophyllum nodosum* project in Kenmare Bay. A Natura Impact Statement (NIS) is a scientific and legal document prepared to assess the potential impacts of a proposed plan or project on European sites (i.e. Special Areas of Conservation (SACs) and Special Protection Areas (SPAs)) designated under the EU Habitats Directive and Birds Directive.

The proposal involves the harvesting of up to 1,826 wet tonnes of *A. nodosum* per annum within Kenmare Bay. A description of the proposed project has been provided by BioAtlantis in the following reports:-

- BioAtlantis (2025a) License Application for sustainable hand-harvesting of *Ascophyllum nodosum* in Kenmare Bay. Proposal Document.
- BioAtlantis (2025b) Assessment of Impact of the Maritime Usage (AIMU) Report for the sustainable hand-harvesting of *Ascophyllum nodosum* in Kenmare Bay.

The location of the proposed hand-harvesting areas in Kenmare Bay are indicated in Figure 1. Full details are provided in BioAtlantis (2025a&b). These documents are attached to the current NIS in Appendix 1.

BioAtlantis Ltd. is a biotechnology company which provides solutions to problems caused by stresses in plants, animals and humans. The company works with several of the leading universities in Ireland and across the world, isolating key functional molecules from natural resources and validating their functionality and effectiveness for use in solving problems facing modern agriculture and healthcare. As part of continued expansion, the security of supply of raw material *A. nodosum* is imperative to future development.

Sustainability is the ability to conserve an ecological balance by avoiding the depletion of natural resources, i.e. the rate of harvest should not exceed the rate of regeneration. In essence, the term 'sustainability' indicates no adverse impact on the receiving environment.

The purpose of the NIS is to determine whether the plan or project, either alone or in combination with other plans or projects, is likely to have an effect on the integrity of a European site, having regard to its conservation objectives. It is required where a Screening for Appropriate Assessment determines that significant effects cannot be ruled out, and the proposal must therefore proceed to Stage 2 Appropriate Assessment. The NIS is submitted to the Competent Authority, which uses it to carry out the Appropriate Assessment required under Article 6(3) of the Habitats Directive.

Appropriate assessment comes from the Habitats Directive (92/43/EEC), which seeks to safeguard the long-term survival of Europe's most valuable and threatened species and habitats. Natura 2000 sites are those identified as sites of European Community importance designated under the Habitats Directive (1992) and EC Birds Directive (2009/147/EC). The Habitats Directive, in combination with the Birds Directive (2009), establishes a network of internationally important sites designated for their ecological status; identified as Special Areas of Conservation (hereafter referred to as SACs) designated under the Habitats Directive for the protection of flora, fauna and habitats and as Special Protection Areas (hereafter referred to as SPAs) designated under the Birds Directive to protect rare, vulnerable and migratory birds. These sites together form a Europe-wide 'Natura 2000' network of designated sites, referred to in this report as Natura 2000 sites.

A Screening for Appropriate Assessment report was prepared by Ecofact (2025a) for the proposed project. That screening concluded that the proposed activity is not directly connected with or necessary to the management of any Natura 2000 site. It was furthermore concluded that the project is *capable* of causing significant adverse effects on the Qualifying Interests of the Kenmare River SAC (002158). The proposed activity is located within this SAC, and mitigation will be required to protect its ecological features.

Five other Natura 2000 sites were also identified as requiring precautionary mitigation due to their proximity to the application area. These sites are Mucksna Wood SAC (001371), Blackwater River (Kerry) SAC (002173), Glanmore Bog SAC (001879), Drongawn Lough SAC (002187), and Old Domestic Building and Askive Wood SAC (002098).

The safeguards set out in Article 6(3) and (4) of the Habitats Directive are triggered not by certainty but by the possibility of significant effects, as per case 2013/802 JR Kelly -v- An Bord Pleanála. "*There is no need to establish such an effect; it is [ ] merely necessary to determine that there may be such an effect"* (C-258/11). Any project capable of having a significant effect on a Natura 2000 site must undergo an assessment of its implications on the Natura 2000 site network. A significant effect is any effect on the Qualifying Interests of a Natura 2000 site, excluding inconsequential effects. A precautionary approach is fundamental and, in cases of uncertainty, it must be assumed the effects could be significant. Mitigation – and even "standard practice" cannot be provided at the screening stage, as per case C-323/17 People Over Wind and Peter Sweetman v Coillte.

This NIS describes the proposed project, identifies the relevant European sites that may be affected, and assesses the potential impacts on their conservation objectives and site integrity. It also sets out the mitigation measures proposed to avoid or reduce any identified adverse effects. In doing so, the NIS provides the competent authority with the information necessary to determine whether the project can proceed without causing adverse effects on the integrity of any European site.

1.1 Legislative context

The current assessment takes account of Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora - '*The Habitats Directive'* which was transposed into Irish law by the '*European Community (Natural Habitats) Regulations 1997*' (S.I. No. 94/1997). The most recent transposition of this legislation in Ireland is the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011). The Birds Directive (2009/147/EC) which is now included in the former Regulations seeks to protect birds of special importance by the designation of Special Protection Areas (SPAs) whereas the Habitats Directive does the same for habitats and other species groups within Special Areas of Conservation (SACs), which are designated or proposed as candidate Special Areas of Conservation (cSACs). It is the responsibility of each member state to designate SPAs and SACs, both of which will form part of Natura 2000, a network of protected areas throughout the European Community. Article 6, paragraphs 3 and 4 of the EC 'Habitats' Directive (1992) state that:

6(3) 'Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.'

6(4) 'If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted. Where the site concerned hosts a priority natural habitat type and / or a priority species, the only considerations which may be raised are those relating to human health or public safety, to beneficial consequences of primary importance for the environment or, further to an opinion from the Commission, to other imperative reasons of overriding public interest.'

In addition, the European Court of Justice in Case C-127/02 (the "Waddenzee Ruling") has made a relevant ruling in relation to Appropriate Assessment and this is reflected in the current assessment:

'Any plan or project not directly connected with or necessary to the management of the site is to be subject to an appropriate assessment of its implications for the site in view of the site's conservation objectives if it cannot be excluded, on the basis of objective information, that it will have a significant effect on that site, either individually or in combination with other plans or projects" and that the plan or project may only be authorised "where no reasonable scientific doubt remains as to the absence of such effects.'

Kenmare River SAC is designated as an SAC under the European Union Habitats (Kenmare River Special Area of Conservation 002158) Regulations 2024 (S.I. S.I. No. 143 of 2024).

1.2 Activities Requiring Consent (ARCs)

Seaweed harvesting is a regulated activity under the Maritime Area Planning Acts 2021 and 2022. Schedule 7, Section 10, titled *"Maritime Usages which may be undertaken in the Maritime Area pursuant to Licence"*, explicitly includes: *"The harvesting, disturbance or removal of seaweed, whether growing or rooted on the seabed, or deposited in or washed up thereon by the action of any one or more of the following: (a) tides; (b) winds; (c) waves."*

The Maritime Area Regulatory Authority (MARA) is the designated State agency and Competent Authority responsible for licensing such activities. MARA's functions in relation to seaweed harvesting are defined within the legislative framework established by the Maritime Area Planning Acts (MARA, 2024; MARA, 2025).

Kenmare River SAC is designated as an SAC under the European Union Habitats (Kenmare River Special Area of Conservation 002158) Regulations 2024 (S.I. S.I. No. 143 of 2024). Under this legislation, a comprehensive list of Activities Requiring Consent (ARCs) from the Minister is provided in order to regulate operations that could potentially damage the qualifying interests of this SAC. These activities are restricted because of the site's designation under the EU Habitats Directive for a wide range of marine, coastal and terrestrial habitats and species. The consent requirement is intended to ensure that no potentially harmful activity occurs without prior assessment of its effects on the site's conservation objectives.

The list includes activities that may result in physical disturbance, habitat degradation, species loss, or other ecological impacts. These include reclamation and infilling; dredging or removal of sediment; cutting or uprooting of vegetation; construction works; modification of soil, watercourses, caves or coastlines; burning or reseeding of vegetation; application of fertilisers, lime or pesticides; and significant changes in land use, stocking densities or drainage. Also regulated are the introduction of

non-native species, water abstraction, felling or planting of trees, disposal of materials, commercial recreational development, and acoustic disturbance in the marine environment.

A number of marine-related activities are identified. These are recognised as potentially impactful on the highly sensitive and protected marine ecosystems of Kenmare River SAC.

Seaweed harvesting falls under ARC 05, which refers to "*cutting, uprooting or otherwise removing plants*". While the regulation explicitly states that consent is not required for the harvesting of cultivated crops, it does not exempt the harvesting of wild marine flora such as *Ascophyllum nodosum,* a key intertidal seaweed species occurring naturally within the SAC.

Seaweed is generally considered a plant for the purposes of this ARC. Harvesting cultivated seaweed is usually not subject to ARC 05, but harvesting wild seaweed does fall under ARC 05. The NPWS has indicated that hand harvesting of *Ascophyllum nodosum* at small scales may not require consent, but this is considered case by case. NPWS say the following "*ARCs are not prohibited activities but before being carried out, consent must be granted by the Minister for Housing, Local Government and Heritage ('the Minister') or by another relevant public authority to which the consent function for that activity falls. This prior consent requirement ensures that the Minister (or the relevant competent authority) carries out the necessary environmental assessment to determine if the activity can take place and if any conditions should be attached to any consent given*".

Because hand harvesting of *A. nodosum* involves the direct removal of native vegetation from its natural habitat within a designated conservation site, it constitutes a notifiable activity under ARC 05. It may also interact with ARC 36, which covers the harvesting of marine invertebrate species, depending on whether associated fauna are disturbed or collected incidentally during harvesting operations.

As such, any proposal for the commercial or large-scale harvesting of wild seaweed within the boundaries of Kenmare River SAC requires prior consent. This is to ensure that the activity is assessed for potential impacts on the conservation objectives of the site, particularly those related to intertidal habitats, reef systems, sediment communities, and associated qualifying species. The requirement for consent supports the broader objectives of the Habitats Directive by ensuring that the ecological integrity of Natura 2000 sites is not adversely affected by unregulated activities.

Seaweed harvesting is a regulated activity under the Maritime Area Planning Acts of 2021 and 2022. Section 10 of Schedule 7 "*Maritime Usages which may be undertaken in Maritime Area pursuant to Licence*" states: *"The harvesting, disturbance or removal of seaweed, whether growing or rooted on the seabed, or deposited in or washed up thereon by the action of any one or more than one of the following: (a) tides;(b) winds;(c) waves."* The Maritime Area Regulatory Authority (MARA), as Ireland's designated State agency and Competent Authority, is responsible for licensing seaweed harvesting. MARA's functions in this regard are defined within the framework of the Maritime Area Planning Acts (MARA, 2024; MARA, 2025).

2. METHODOLOGY

2.1 Guidance

The preparation of this NIS for Appropriate Assessment follows the guidance '*Appropriate Assessment Screening for Development Management'* produced by OPR (2021) and the '*Appropriate Assessment of Plans and Projects in Ireland. Guidance for Planning Authorities'* published by DoEHLG (2010).

This Natura Impact Statement was also prepared with regard to the following guidance:-

- European Commission, (2001). 'Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC.'
- European Commission, (2007). 'Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC: Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interests, compensatory measures, overall coherence and opinion of the Commission.'
- European Commission, (2018). 'Managing Natura 2000 Sites. The Provisions of Article 6 of the Habitats Directive 92/43/EEC.'

According to these guidelines, assessing the impacts of a project or plan on a Natura 2000 site is a four staged approach, as described below:

- ***Stage One: Screening / Test of Significance*** - The process which identifies the likely impacts upon a Natura 2000 site of a project or plan, either alone or in combination with other projects or plans, and considers whether these impacts are likely to be significant.
- ***Stage Two: Appropriate Assessment*** - The consideration of the impact of the project or plan on the integrity of the Natura 2000 site, either alone or in combination with other projects or plans, with respect to the site's structure and function and its conservation objectives. Additionally, where there are adverse impacts, an assessment of the potential mitigation of those impacts.
- ***Stage Three: Assessment of Alternative Solutions*** - The process which examines alternative ways of achieving the objectives of the project or plan that avoid adverse impacts on the integrity of the Natura 2000 site; and
- ***Stage Four: Assessment Where Adverse Impacts Remain*** - An assessment of compensatory measures where, in the light of an assessment of Imperative Reasons of Overriding Public Interest (IROPI), it is deemed that the project or plan should proceed.

The safeguards set out in Article 6(3) and (4) of the Habitats Directive are triggered not by certainty but by the *possibility* of significant effects. Thus, in line with the precautionary principle, it is unacceptable to fail to undertake an appropriate assessment on the basis that it is not certain that there are significant effects.

A Natura Impact Statement (NIS) considers whether the plan or project, alone or in combination with other projects or plans, will have adverse effects on the integrity of a Natura 2000 site, and includes any mitigation measures necessary to avoid, reduce or offset negative effects. The current report is set out in the format of a NIS and comprises a scientific examination of the plan / project and the relevant Natura 2000 sites; to identify and characterize any possible implications for the site in view of the site's conservation objectives, structure and function, taking account of in combination effects. The

requirements for Appropriate Assessment derive directly from Article 6(3) of the EU Habitats Directive (1992).

Direct and indirect impacts in isolation or in combination with other plans and projects on the identified Natura 2000 sites in view of the sites' conservation objectives have been examined. Case law of the European Court of Justice (ECJ) has established that Appropriate Assessment must be based on the best scientific knowledge in the field

The conservation objectives for Natura sites (SACs and SPAs) are determined under Article 4 of the Habitats Directive and are intended to ensure that the relevant qualifying interests i.e. Annex I habitats, Annex I bird species and Annex II species present within the designated sites are maintained in a favourable condition. The conservation objectives of the Natura 2000 sites, potentially affected by the proposal, are listed and potential impacts outlined with respect to the integrity of the Natura 2000 site. Mitigation measures have been proposed for the protection of the conservation interests and the avoidance of impacts to Natura 2000 Sites occurring within the study area.

2.2 Information sources

This Natura Impact Statement was informed by a desk study of the information provided by the client, along with a detailed review of the information on designated sites available on the website of the National Parks and Wildlife Service (NPWS).

A review of published literature was undertaken in order to collate data on the receiving environment, including species and habitats of conservation concern in the study area. A range of additional sources of information including scientific reports produced by, and information on the websites of the EPA, NPWS and other agencies were also reviewed. A full bibliography of information sources reviewed is given in the reference section. Information sources reviewed include:

- National Parks and Wildlife Service (NPWS) site synopses.
- NPWS Conservation Objectives and Natura 2000 Forms.
- Protected species data on NPWS/National Biodiversity Data Centre (NBDC) online databases.
- Environmental Sensitivity Mapping (ESM) Tool.
- Environmental Protection Agency (EPA) mapping tools (including AAGeoTool).
- Online aerial imagery (Bing, Google Satellite).
- BioAtlantis (2025a) BioAtlantis Proposal Document (Kenmare Bay), and its associated Appendices.
- BioAtlantis (2025b) Assessment of Impact of the Maritime Usage (AIMU) Report for the sustainable hand-harvesting of *Ascophyllum nodosum* in Kenmare Bay.

Mapping of the proposed development was carried out in QGIS, using aerial imagery of the site (Bing & Google) and with reference to the proposed development drawings.

A desktop study was undertaken to identify the extent and scope of the potentially affected designated Natura 2000 sites within the current study area. The desktop study identified the conservation interests of the designated sites with respect to the qualifying interests (species and habitats) relevant to the designated sites within the area.

General high level walkover surveys were undertaken to inform the NIS with regard to the qualifying interests and conservation features of the Natura 2000 sites within the study area of the proposed project. The findings of this broad-scale survey are included in the current assessment. The study area

was visited during January 2017, July 2017, and July 2024 and an overview assessment was carried out to establish the presence and sensitivity of Annex I habitats and suitable habitat availability for Annex II species, with regard to the Natura 2000 designations within the study area.

The BioAtlantis (2025a&b) project reports also detail the information gathering that was completed during the design of the project proposal. The BioAtlantis (2025a&b) project reports also detail the consultation that was completed during the design of the project proposal.

2.3 Statement of authority

The current report was prepared by [redacted] a senior ecologist with over 30 years professional experience. He is a graduate of the University of Wales, Cardiff where he was awarded an MSc degree in Applied Hydrobiology, and the National University of Ireland, Galway where he received a PhD degree in Zoology for research on the Shannon estuary.

He is a Fellow of the Society of Biology, a Chartered Environmentalist, a Chartered Biologist and a full member of the Chartered Institute of Ecology and Environmental Management. [redacted] is the Managing Director and Principal Ecologist of Ecofact and has prepared Natura Impact Statements and Environmental Impact Statements for numerous of major commercial and infrastructural developments affecting marine, estuarine and coastal habitats.

3 PROJECT DESCRIPTION

A description of the proposed hand harvesting has been provided by BioAtlantis in the following reports:-

- BioAtlantis (2025a) License Application for sustainable hand-harvesting of *Ascophyllum nodosum* in Kenmare Bay. Proposal Document, and its associated appendices.
- BioAtlantis (2025b) Assessment of Impact of the Maritime Usage (AIMU) Report for the sustainable hand-harvesting of *Ascophyllum nodosum* in Kenmare Bay.

These reports are attached to the current NIS document, and supported by relevant appendices provided in the application. The application involves the hand harvesting of up to 1,826 wet tonnes of *Ascophyllum nodosum* per annum in Kenmare River SAC, as shown in Figure 1.

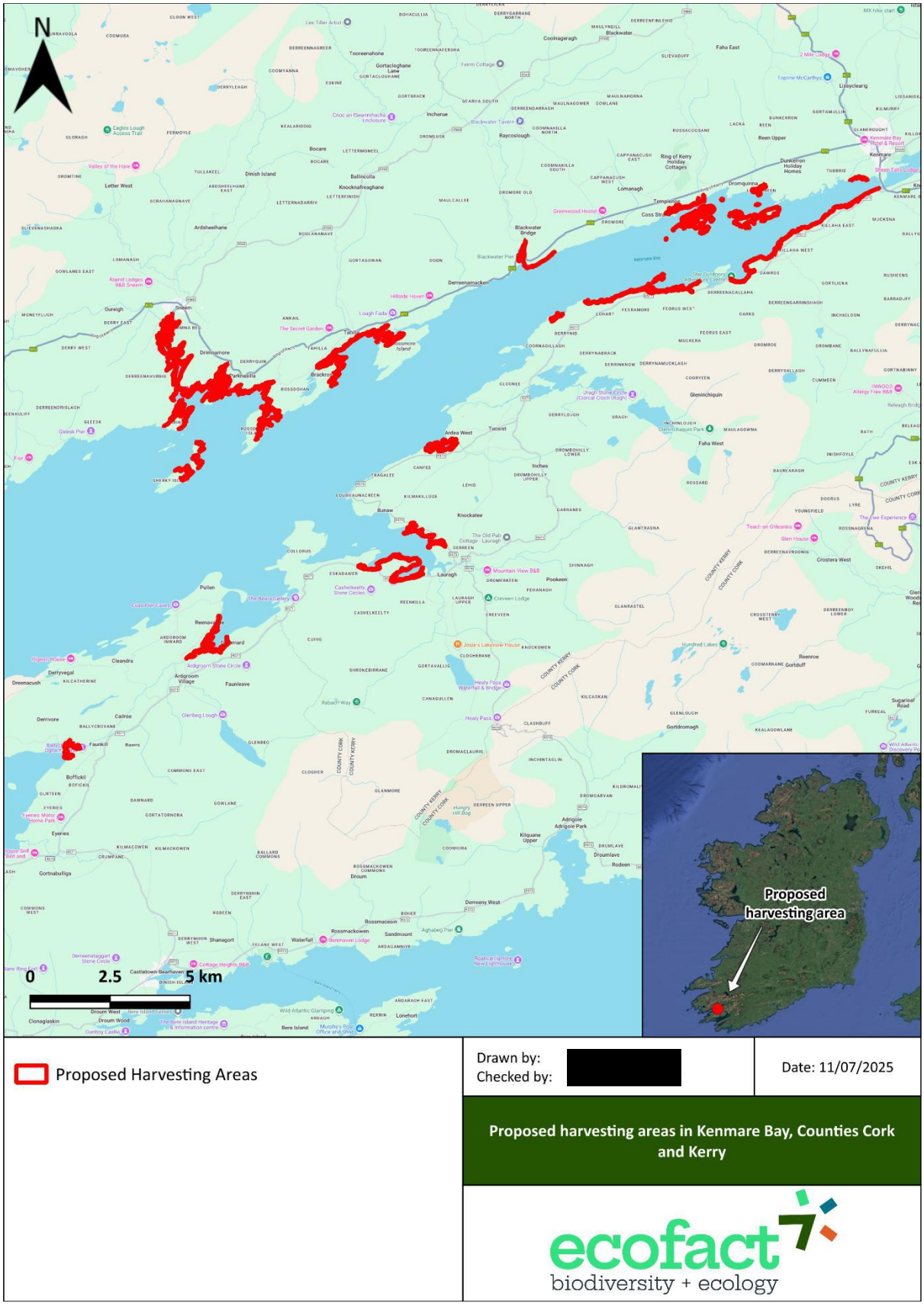

Figure 1 Location of the proposed sustainable hand-harvesting of Ascophyllum nodosum areas in Kenmare Bay.

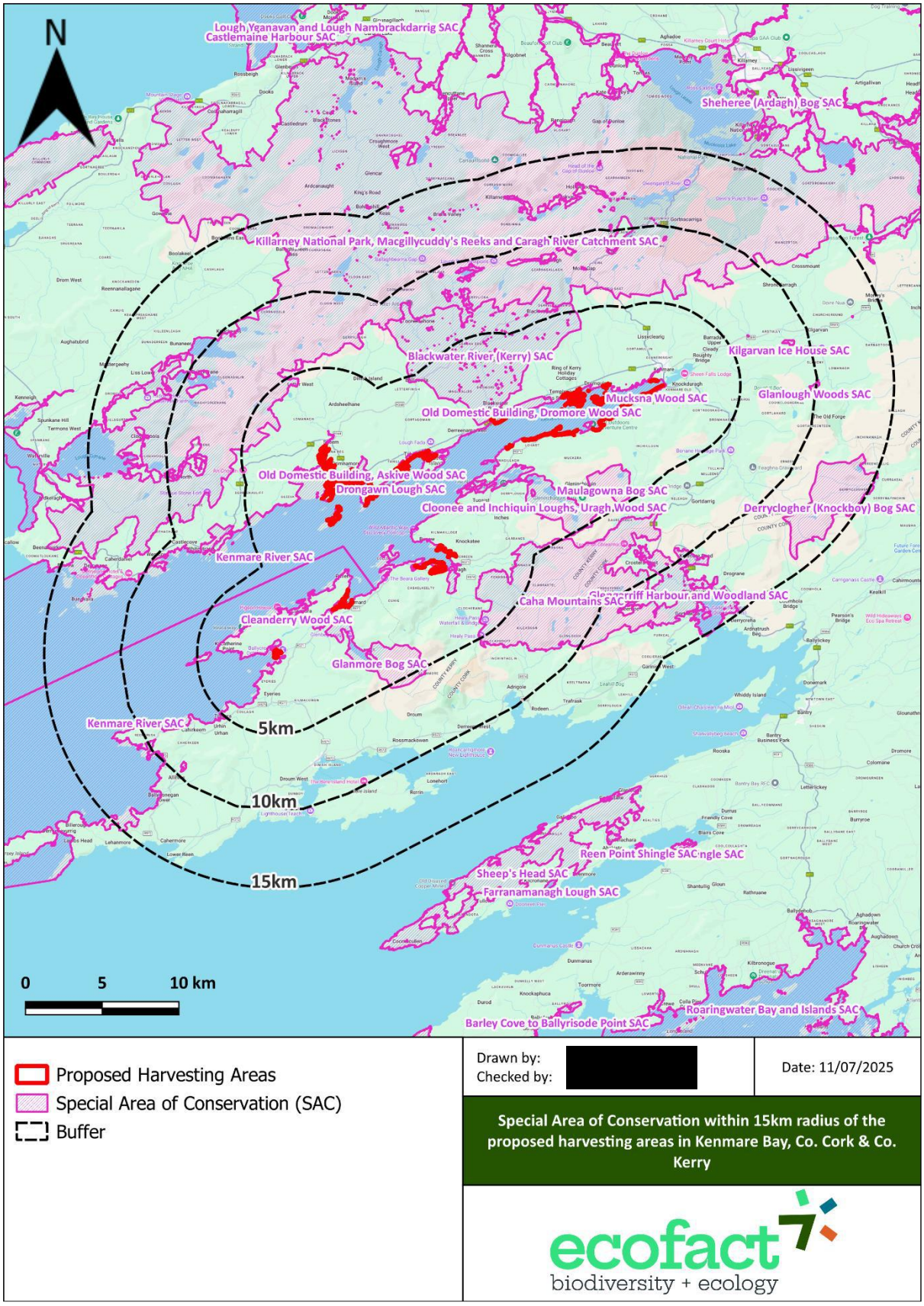

Figure 2 Location of the proposed sustainable hand-harvesting of *Ascophyllum nodosum* areas in Kenmare Bay in relation to Special Areas of Conservation (SACs).

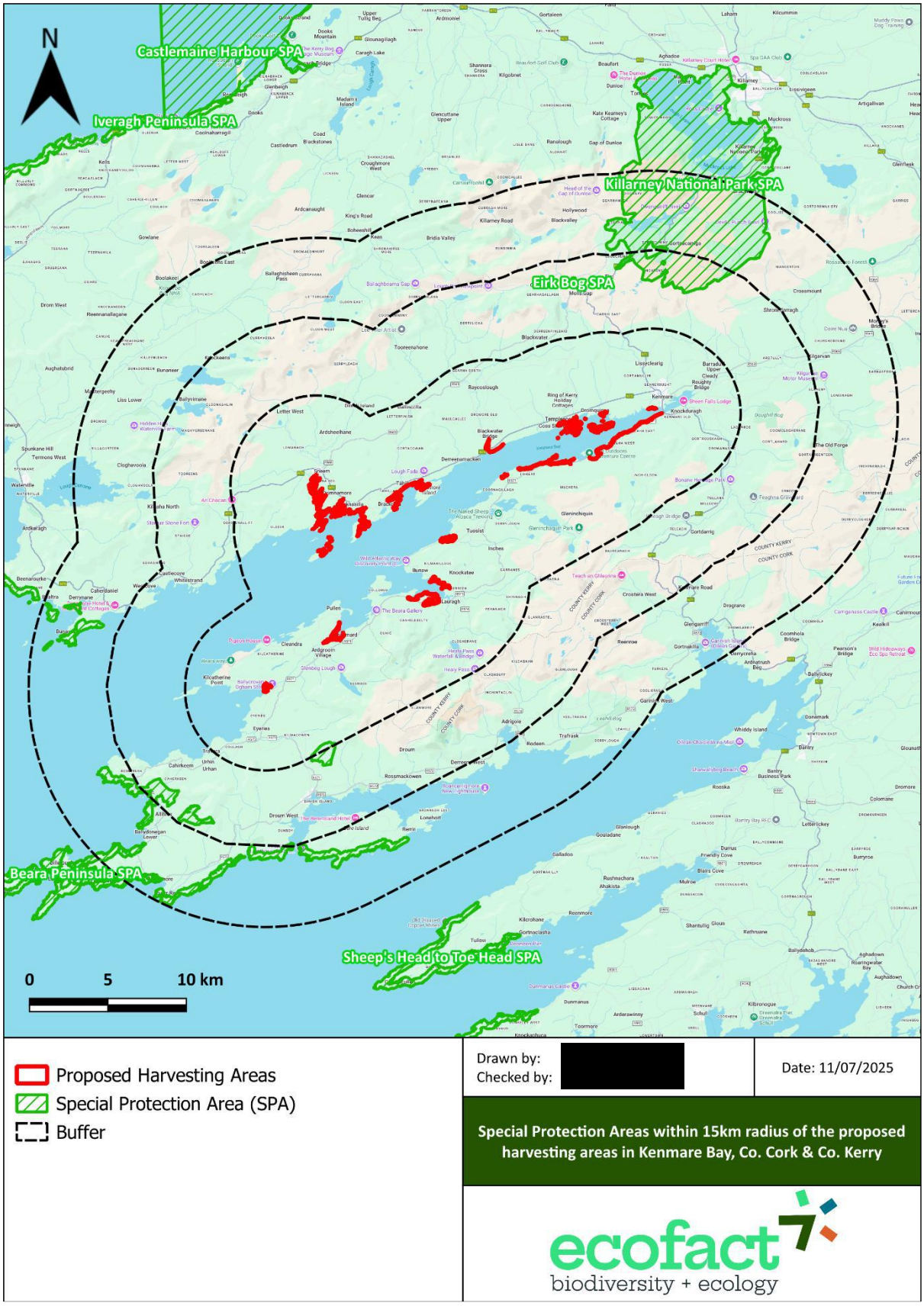

Figure 3 Location of the proposed sustainable hand-harvesting of *Ascophyllum nodosum* areas in Kenmare Bay in relation to Special Protection Areas (SPAs).

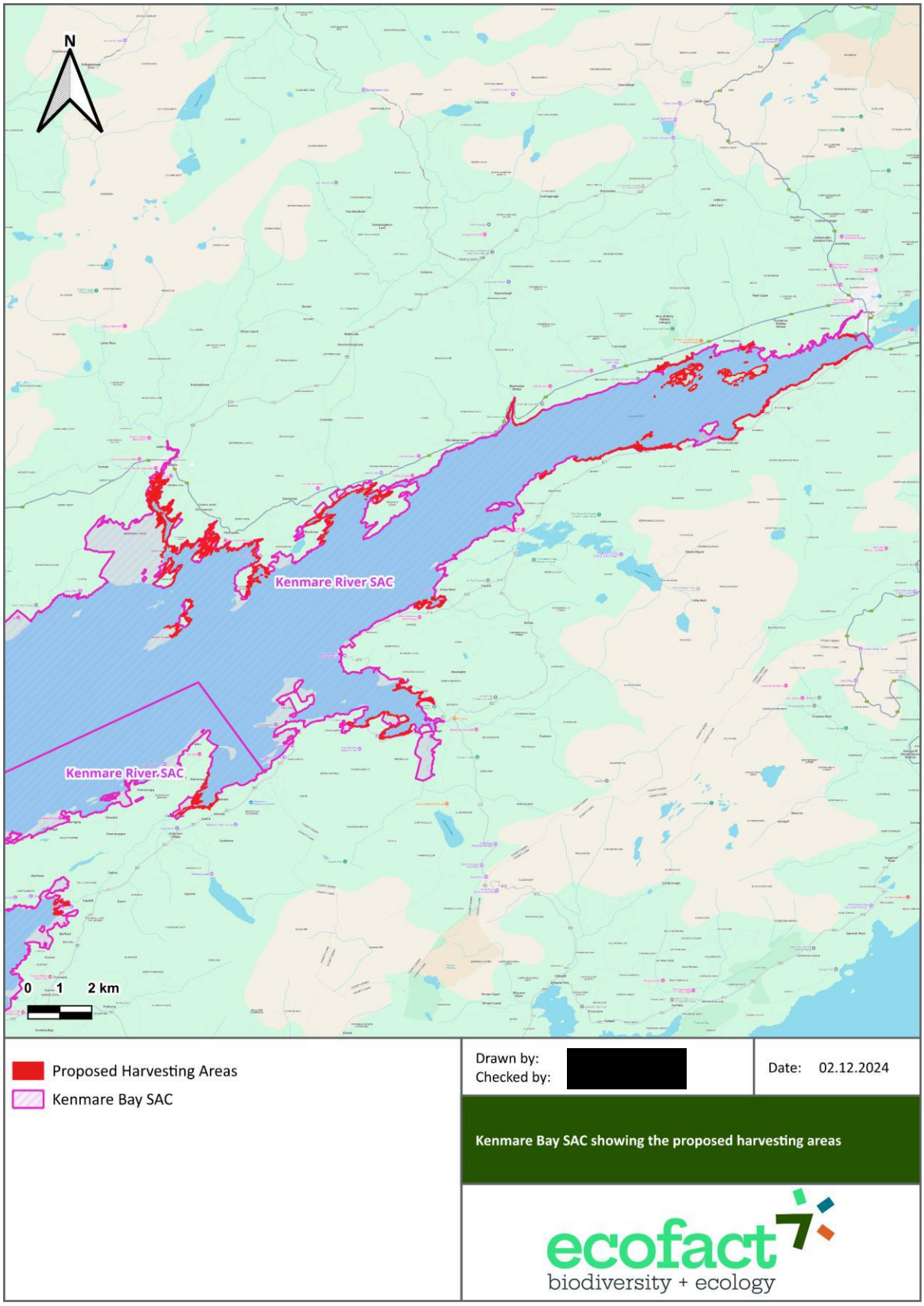

Figure 4 Location of the proposed harvesting areas in relation to the boundary of the Kenmare River SAC.

4. RECEIVING ENVIRONMENT

4.1 Introduction

4.1.1 Ascophyllum nodosum

Ascophyllum nodosum (Linnaeus) Le Jolis is a large brown macroalga belonging to the class Phaeophyceae, order Fucales, and family Fucaceae. The common name used for this species is Knotted Wrack. It is a perennial intertidal seaweed characterised by its olive-green to brown fronds, which are typically unbranched and possess air bladders (vesicles) arranged singly along the thallus. The presence of these vesicles gives the species its distinctive knotted appearance. The thalli can grow to over one metre in length and often form dense mono-specific stands. Reproductive receptacles appear seasonally, typically in spring, and contain conceptacles that produce gametes for sexual reproduction.

Ascophyllum nodosum is ecologically significant in intertidal ecosystems of temperate Atlantic shores. It typically occurs in the mid to upper intertidal zone of sheltered to moderately exposed rocky shores. The species forms dense belts along the coastline, often in association with other fucoid algae such as *Fucus vesiculosus*. It requires hard substrata for attachment, such as bedrock or stable boulders, and is intolerant of high wave exposure and unstable substrates such as mobile cobble or sand.

The species plays a critical role in coastal ecology. It provides structural habitat and shelter for a wide range of intertidal organisms, including certain species of epiphytic algae, invertebrates and vertebrates such as fish or juvenile fish. It supports high levels of biodiversity, stabilises the shoreline, and contributes to nutrient cycling through detrital export. *A. nodosum* is also a source of carbon in coastal food webs and forms an important component of wrack beds that support detritivore communities.

Ascophyllum nodosum is highly adapted to growing in sheltered environs with suitable substratum. Growth rates and biomass production vary with latitude, salinity, nutrient availability and exposure. Reproduction occurs through the production of gametes in receptacles that develop in spring. Fertilisation is external, and zygotes settle near parent thalli. The species shows limited dispersal capacity due to the heavy zygotes and requirement for suitable hard substrata. This life history trait contributes to its vulnerability to overharvesting or habitat disturbance. Vegetative reproduction is also key to maintaining *A. nodosum* populations, supporting shoot growth and biomass accumulation for years. Fronds can grow for years, while holdfasts may reproduce vegetatively for decades.

The natural distribution of *Ascophyllum nodosum* spans the North Atlantic, from the Arctic coasts of Norway and Russia, southward to Portugal, and across the Atlantic from Greenland and the Canadian Maritimes to the northeastern United States. In Ireland, the species is particularly widespread along western coasts, favouring sheltered bays, fjords and estuarine environments with stable rocky substrates.

In the Irish context, *Ascophyllum nodosum* is abundant and widespread, forming prominent intertidal zones in sheltered marine inlets and bays, particularly along western coasts of Galway, Mayo and Donegal,. Kenmare Bay (Kenmare River SAC) is a significant location in Ireland for this species, due to the combination of its extensive rocky shoreline, complex bathymetry, and relatively low wave energy environment. Within the SAC, *A. nodosum* forms well-developed intertidal belts, particularly in mid-shore zones of semi-exposed and sheltered reef systems, contributing to the structure and function of designated habitats.

Although *Ascophyllum nodosum* itself is not a species listed under the Annexes of the EU Habitats Directive, it is an integral structural and functional component of Annex I habitat [1160] Large Shallow Inlets and Bays and [1170] Reefs, both of which are Qualifying Interests for Kenmare River SAC. In these habitats, the presence of intertidal macroalgal assemblages, including fucoid algae such as *A. nodosum*, is a key ecological attribute. Their integrity is essential for the overall favourable conservation status of the habitat.

Harvesting of *Ascophyllum nodosum* using unsustainable methods can potentially have significant ecological effects by reducing biomass, altering community structure, and impairing habitat functions. For this reason, harvesting within a designated SAC such as Kenmare Bay is regulated under the European Union Habitats (Kenmare River Special Area of Conservation 002158) Regulations 2024, specifically under ARC 05 (cutting, uprooting or otherwise removing plants). As such, seaweed harvesting activities require Ministerial consent and must be subject to Appropriate Assessment where likely significant effects cannot be excluded. It is noted that seaweed harvesting is a regulated activity under the Maritime Area Planning Acts of 2021 and 2022. The Maritime Area Regulatory Authority (MARA), as Ireland's designated State agency and competent authority, is responsible for licensing seaweed harvesting. MARA's functions in this regard and the requirements of applicants are defined within the framework of the Maritime Area Planning Acts and in MARA's Technical and Process guidance Notes (MARA, 2024; MARA, 2025).

Sustainable methods of hand harvesting methods are generally considered less ecologically damaging than other methods. However, even these require scientific scrutiny and regulatory oversight within Natura 2000 sites to ensure that the conservation objectives for the relevant Qualifying Interests are not compromised.

Ascophyllum nodosum is a keystone intertidal species in Irish coastal ecosystems and plays a vital role in the structure and function of protected marine habitats. Its occurrence in Kenmare Bay contributes directly to the ecological character of the SAC. As a species dependent on stable, rocky intertidal environments, it is sensitive to physical disturbance and requires careful management, particularly in areas of conservation importance. The harvesting of this species, while potentially sustainable, must be subject to rigorous ecological and environmental review and Ministerial control within European sites to ensure that conservation objectives are upheld.

4.1.2 Hand harvesting of Ascophyllum nodosum

Hand harvesting of *Ascophyllum nodosum* is a traditional, low-impact method of collecting this intertidal brown seaweed, which is widely used in the agricultural and biotechnology sectors due to its valuable biochemical properties. In Ireland, harvesting typically occurs on sheltered, rocky shores where *A. nodosum* forms extensive mid-shore belts, particularly in bays and fjord-like inlets.

Harvesting is generally carried out on foot during low tide when the seaweed is fully exposed on the shoreline. Harvesters access suitable beds either directly from the shore or by using small boats to reach remote locations and island sites. Once on site, the seaweed is harvested using simple manual tools, most commonly sickles or curved knives, which allow the fronds to be cut cleanly. The harvested seaweed is gathered into bags or nets , and may be carried or floated to collection points, often using small boats. For more details, see the Code of Practice in Appendix 4 of the proposal document.

Rake methods of hand harvesting at high tide may be more suitable in areas with large, solid substrata, while hand harvesting at low tide may be preferable in regions with a heterogeneous mix of small rocks, pebbles, and friable materials. In Canada, where the hand-harvesting "rake" method is used, *A.*

nodosum biomass typically recovers within 2 to 5 years (Sharp and Tremblay, 1989, and references therein). Recovery has been observed as early as 3 years after 50% biomass removal (Sharp and Tremblay, 1989; Lauzon-Guay *et al*., 2021, and references therein). This rapid regrowth may result from stimulated shoot growth and branching in suppressed clumps (Ugarte *et al*., 2006). A study by Lauzon-Guay *et al*., 2023, shows that harvest of A. nodosum at sites with a 20 + year history of commercial harvesting in Canada, does not have long-term impact on the morphology of the algae or on the abundance of its main inhabitants. During the operational phase of the license, BioAtlantis will evaluate both hand-harvesting methods (hand harvesting at low-tide on the shore, and harvesting at high tide with the rake) to determine their applicability and suitability.

The key principle of sustainable hand harvesting is to remove only the upper portion of the frond while leaving the basal part of the plant, including the holdfast and lower stipe, intact. Typically, a minimum of 15 to 20 centimetres of the frond is left attached to the substrate. This allows the plant to regenerate and continue to perform its ecological role within the intertidal community. By avoiding removal of the entire thallus, the structural integrity of the seaweed bed is maintained and regrowth can occur over subsequent growing seasons.

Harvesting is often carried out according to a rotational or sectional system, where different areas of shoreline are harvested in different years. This rotation allows time for recovery in previously harvested zones, typically over a two- to four-year period, or potentially earlier, depending on local environmental conditions and growth rates. The harvested biomass is transported from the shoreline either fresh or partially dried, depending on the intended use. In some cases, the material is sun-dried at nearby facilities, while in others it is delivered directly to processing plants for the purposes of drying or for further extraction or refinement.

To minimise ecological disturbance, careful harvesting practices are employed. These include avoiding impacts on associated intertidal organisms such as mussels, barnacles, and other vertebrates and invertebrates, and reducing trampling impacts on adjacent sensitive habitats such as saltmarshes or eelgrass beds. Harvesting should also be timed to avoid sites of relevance during sensitive periods for wildlife, such Harbour seal *(Phoca vitulina)* moulting and breeding sites and bird breeding sites. Biosecurity protocols must be followed to prevent the accidental introduction or spread of invasive species and pathogens, particularly when equipment is moved between harvesting sites.

In designated European sites such as the Kenmare River SAC, hand harvesting of *Ascophyllum nodosum* is classified as an activity requiring Ministerial consent under Regulation ARC 05 of the European Union Habitats (Kenmare River Special Area of Conservation 002158) Regulations 2024. This is because it involves the removal of native plant material within a protected site. Although it is a low-impact activity when conducted properly, it must still be subject to Appropriate Assessment under Article 6(3) of the Habitats Directive. This ensures that the activity will not give rise to significant adverse effects on the conservation objectives of the site, particularly in relation to Qualifying Interests such as [1160] Large Shallow Inlets and Bays and [1170] Reefs, which depend on the continued presence and ecological function of intertidal fucoid assemblages including *A. nodosum*. It is noted that seaweed harvesting is a regulated activity under the Maritime Area Planning Acts of 2021 and 2022. The Maritime Area Regulatory Authority (MARA), as Ireland's designated State agency and competent authority, is responsible for licensing seaweed harvesting. MARA's functions in this regard are defined within the framework of the Maritime Area Planning Acts (MARA, 2024A; MARA, 2024B).

In conclusion, hand harvesting of *Ascophyllum nodosum* involves the selective removal of the upper fronds by manual cutting while ensuring that the plant's holdfast is left in place to allow for regrowth. When conducted in accordance with scientific guidance and regulatory oversight, this practice can be

compatible with the conservation of sensitive intertidal ecosystems. However, within designated Natura 2000 sites such as Kenmare Bay, it must be carefully planned and authorised to ensure the protection of the site's ecological integrity. The hand harvesting of *Ascophyllum nodosum* has been practiced for centuries in parts of Ireland, Scotland, and Atlantic Canada, and when carried out under regulated conditions, it is generally considered to be a sustainable method of seaweed utilisation. However, its sustainability depends on several key factors, including the intensity and frequency of harvesting, the harvesting technique used, the recovery rates of the resource, and the ecological sensitivity of the sites involved.

4.1.3 Evidence of Sustainability

In scientific and regulatory literature, hand harvesting is typically viewed as the least ecologically disruptive method of seaweed exploitation. Studies have indicated that if no more than 50% of the standing biomass is removed during a harvesting cycle, and if sufficient time is allowed for regrowth (typically two to five years), *A. nodosum* beds can recover their biomass and canopy cover. A study by Marine Institute (Kelly *et al*., 2001) also showed that sites in Ireland demonstrate almost complete recovery of *A. nodosum* 11- and 17-months post-hand harvesting, when fronds are cut at a sufficient distance height above the holdfast (approx. 20cm).

In relation to sustainable hand harvesting using the rake method, Ugarte *et al* (2006) stated that "*the casual observer of a recently harvested rockweed bed in southern New Brunswick cannot perceive any change in cover and biomass compared to undisturbed beds*". This paper also noted rapid recovery within a year after the harvest.

Nonetheless, localised impacts have been observed in some areas. Repeated or poorly managed harvesting can potentially lead to reduced canopy height, shifts in community composition, lower biodiversity among epifauna, and possible long-term changes to ecosystem structure. The cumulative effect of harvesting in areas already under pressure from other marine activities, such as aquaculture or water pollution, may increase the risk of negative impacts. For this reason, many ecologists and regulatory authorities advocate for site-specific assessments and ongoing monitoring to ensure ecological thresholds are not exceeded.

In Ireland, *Ascophyllum nodosum* is harvested extensively along the west and south-west coasts, with key harvesting areas including Galway, Mayo and Donegal. It is estimated that over 30,000 tonnes (wet weight) are collected annually, some of which is processed domestically for use in the manufacture of animal feed supplements, fertilisers, plant biostimulants, and in the extraction of seaweed-based bioactives. While a small portion of this biomass may be beach-cast or collected from previously storm-stranded material, the majority is actively harvested from intertidal beds, primarily by hand.

The practice remains economically important in rural coastal communities, supporting businesses and value-added industries.

In response to growing interest in commercial seaweed harvesting and concerns regarding ecological impact, the Department of Housing, Local Government and Heritage introduced more formalised regulatory controls, particularly within Natura 2000 sites such as Kenmare River SAC. Under the European Union Habitats Regulations, any hand harvesting within a designated SAC now requires Ministerial consent, and activities must be subject to Screening for Appropriate Assessment to determine whether they are likely to have a significant effect on the site's conservation objectives.

In conclusion, hand harvesting of *Ascophyllum nodosum* has the potential to be sustainable, and in many areas it has been practised responsibly for generations. However, the sustainability of the practice is highly dependent on local conditions, harvesting effort, and adherence to ecological safeguards. It is now subject to regulatory oversight in Ireland, particularly within protected areas, to ensure that it does not compromise the conservation objectives of designated habitats such as intertidal reefs and large shallow bays. Continued management of harvesting activities is essential to inform adaptive management and safeguard both the ecological and socio-economic values associated with this natural resource.

4.2 Kenmare River SAC (002158)

4.2.1 Natura 2000 Site description

Kenmare River SAC (Site Code: 002158), located in County Kerry, comprises a long, narrow, south-west facing bay formed within a drowned glacial valley. The site is designated as a Special Area of Conservation under the EU Habitats Directive for a wide range of Annex I habitats and Annex II species. The listed Qualifying Interests include Large Shallow Inlets and Bays, Reefs, Perennial Vegetation of Stony Banks, Vegetated Sea Cliffs, Atlantic Salt Meadows, Mediterranean Salt Meadows, Marram Dunes (White Dunes), Fixed Dunes (Grey Dunes), Dry Heath, Juniper Scrub, Calaminarian Grassland and Sea Caves.

The Annex II species for which the site is designated are Narrow-mouthed Whorl Snail (*Vertigo angustior*), Lesser Horseshoe Bat (*Rhinolophus hipposideros*), Otter (*Lutra lutra*), Common (Harbour) Seal (*Phoca vitulina*) and Harbour Porpoise (*Phocoena phocoena*). This wide range of marine, coastal and terrestrial features, many of which are considered rare or threatened at national or European level, makes Kenmare River SAC one of the most ecologically significant conservation sites in Ireland.

The SAC encompasses a rich and varied environment, with the bedrock primarily composed of Old Red Sandstone forming reefs that extend through the length of the bay. Exposure to oceanic conditions is greatest at the mouth of the bay and decreases inland, where numerous inlets and islands create highly sheltered conditions. These physical features contribute to a diversity of marine habitats and communities, including several that are considered unusual or rare in Irish waters.

The marine environment includes three Annex I habitats: large shallow inlets and bays, reefs and submerged sea caves. These support an exceptional array of marine species, including the only known Irish population of the Northern Sea-fan (*Swiftia pallida*) and the only area in Ireland where this species occurs alongside the Southern Sea-fan (*Eunicella verrucosa*). Sublittoral sediments range from coarse sands in exposed areas to muddy sands in sheltered inlets. These support fauna such as *Lutraria* species, the Norwegian Prawn (*Nephrops norvegicus*), the burrowing sea cucumber (*Neopentadactyla mixta*) and the rare burrowing anemone *Pachycerianthus multiplicatus*. The site is also home to communities of burrowing brittlestars, including *Ophiopsila annulosa* and *Amphiura securigera*. Maerl beds, composed of free-living calcareous red algae, occur in several of the sheltered bays.

Intertidal habitats include exposed sandy beaches with zoned faunal communities comprising sandhoppers, polychaetes, lugworms (*Arenicola marina*), razor shells (*Ensis arcuatus*) and burrowing sea urchins (*Echinocardium cordatum*). Sea caves found midway along the southern coastline are inhabited by sponges, ascidians and bryozoans. At the mouth of the bay, reef communities are particularly well developed and display strong ecological gradients associated with depth and wave exposure.

Vegetated coastal features are of high conservation value and are widely distributed throughout the SAC. The perennial vegetation of stony banks is well developed at Pallas Harbour and Rossdohan Island, with typical flora including Thrift (*Armeria maritima*), Common Scurvygrass (*Cochlearia officinalis*), Rock Samphire (*Crithmum maritimum*) and Sea Campion (*Silene vulgaris* subsp. *maritima*). The Derrynane Bay area supports an exceptional assemblage of habitats including dry heath, vegetated sea cliffs, fixed dunes and both Atlantic and Mediterranean salt meadows. Of particular significance is the presence of the Kerry Lily (*Simethis planifolia*), a Red Data Book species protected under the Flora (Protection) Order, 2015 and found only within the Kenmare River SAC. Other locally uncommon or protected plant species include Betony (*Stachys officinalis*), Chaffweed (*Anagallis minima*), Crowberry (*Empetrum nigrum*), Wild Madder (*Rubia peregrina*) and Roseroot (*Rhodiola rosea*).

Salt meadows are widely distributed throughout the SAC, extending from Derrynane to Kilmakilloge Harbour. Detailed surveys have recorded a range of forms, including fringe saltmarsh on peat and bay-type saltmarsh associated with sandy substrates. Flora recorded from these habitats includes Sea Rush (*Juncus maritimus*), Seamilkwort (*Glaux maritima*), Thrift, Sea Aster (*Aster tripolium*), Sea Plantain (*Plantago maritima*), Common Saltmarsh-grass (*Puccinellia maritima*) and various Atriplex species.

Heath and grassland habitats are also prominent across the SAC, particularly along coastal slopes. Dry heath is especially well represented and occurs in complex mosaics with wet heath, coastal grassland and rocky outcrops. Species such as Heather (*Calluna vulgaris*), Bell Heather (*Erica cinerea*), Western Gorse (*Ulex gallii*), Bilberry (*Vaccinium myrtillus*) and Purple Moor-grass (*Molinia caerulea*) are widespread. Burnet Rose (*Rosa pimpinellifolia*), Juniper (*Juniperus communis*) and several protected species including Kerry Lily and Betony occur within these areas. Juniper scrub is found near Cappul Bridge, Ardgroom and opposite Black Rock. Vegetated sea cliffs are scattered throughout the SAC and support a typical floristic assemblage including Thrift, Sea Campion, Rock Sea-spurrey (Spergularia rupicola), Rock Samphire and Sea Spleenwort (*Asplenium marinum*).

Calaminarian grassland occurs in association with former mine workings near Allihies and is notable for its specialised and rare bryophyte flora. Fixed dunes are largely confined to Derrynane and support a characteristic assemblage of grasses and herbs including Red Fescue, Bird's-foot Trefoil (*Lotus corniculatus*), Lady's Bedstraw (*Galium verum*), and several moss species such as *Homalothecium lutescens* and *Rhytidiadelphus squarrosus*. White dunes dominated by Marram (*Ammophila arenaria*) are also present and host additional species such as Sea Holly (*Eryngium maritimum*), Portland Spurge (*Euphorbia portlandica*) and Kidney Vetch (*Anthyllis vulneraria*).

The SAC supports significant populations of several Annex II species. The Common Seal (*Phoca vitulina)* is frequently observed, with a maximum count of 391 individuals recorded in the 2003 all-Ireland survey. The species is commonly seen around rocky islets and harbour areas throughout the SAC. Otters (*Lutra lutra*) are present throughout the site. Two internationally important Lesser Horseshoe Bat (*Rhinolophus hipposideros*) roosts occur within the SAC, including a souterrain near Dunkerron and a cottage near Killaha, with over 100 individuals recorded at each. The Narrow-mouthed Whorl Snail (*Vertigo angustior*) has been recorded in wet dune slacks at Derrynane, and the Natterjack Toad (*Epidalea calamita*), a protected Red Data Book species, has been re-established in the area following a successful reintroduction programme.

The site also supports breeding tern colonies, with over 95 pairs of Common and Arctic Tern recorded in 2008. Little Tern has bred at the site on occasion, and Sandwich Tern is known to nest sporadically on islands within the SAC, including Eyeries Island and Spanish Island.

Kenmare River SAC is subject to a range of environmental pressures. Aquaculture, fishing, water pollution, dumping of waste and recreational activities all pose potential threats to the ecological integrity of the site. Bait digging and housing developments may also lead to localised degradation. Seals and bats are vulnerable to disturbance, although some mitigation, such as conservation grazing at Derrynane, is already in place to support habitat condition and rare species.

In summary, Kenmare River SAC is of exceptional ecological value due to its wide range of marine and terrestrial habitats, high biodiversity, and the presence of species and habitats of national and European conservation concern. The designation reflects the importance of maintaining these habitats and species in favourable conservation status, supported by appropriate management and mitigation of human pressures.

4.2.2 Qualifying Interests (habitats)

4.2.2.1 Large shallow inlets and bays [1160]

The habitat Large shallow inlets and bays [1160] is a marine Annex I habitat listed under the EU Habitats Directive. It is defined as encompassing large, shallow coastal embayments that are partially enclosed by land and exhibit variable degrees of exposure to wave action. These systems are typically influenced by both marine and freshwater inputs and may include a mosaic of subtidal and intertidal habitats such as mudflats, sandflats, reefs, saltmarshes, seagrass beds, and kelp-dominated rocky substrates. They often support diverse biological communities and are particularly important for nursery and feeding grounds for many marine fish and invertebrate species, as well as for birds and marine mammals.

In an Irish context, this habitat is relatively widespread along the western seaboard and is considered of high conservation value due to its biodiversity and ecosystem productivity. According to national assessments, this habitat type is generally in unfavourable-inadequate status, largely due to pressures from aquaculture, water pollution, invasive species, and coastal developments.

Within the Kenmare River SAC (site code 002158), this habitat is a major qualifying interest and forms one of the primary ecological features of the site. The Kenmare River, a long and narrow drowned glacial valley, supports an extensive and diverse range of marine habitats representative of this Annex I type. It includes both exposed and highly sheltered areas, extensive intertidal zones, reefs, subtidal sediment beds, and a range of benthic communities. The complex topography, combined with the sheltered nature of much of the bay, supports a high degree of habitat heterogeneity and species richness. This includes communities of maerl, burrowing bivalves, sea cucumbers, brittlestars, and rare cnidarians such as *Swiftia pallida* and *Pachycerianthus multiplicatus*.

4.2.2.2 Reefs [1170]

The habitat Reefs [1170] is listed under Annex I of the EU Habitats Directive and includes both intertidal and subtidal rocky habitats that provide stable surfaces for the growth of attached marine organisms. These reefs may be composed of bedrock, boulders, or cobbles and are typically colonised by a wide range of algae and invertebrates. The habitat is ecologically significant due to its structural complexity, biodiversity, and role in supporting ecosystem functions such as primary production, shelter, and feeding grounds for many marine species.

Reefs may be classified as intertidal, exposed during low tide and often dominated by fucoid algae such as *Fucus vesiculosus* and *Ascophyllum nodosum*, or subtidal, remaining submerged and supporting

kelp forests, sponges, ascidians, coralline algae, and other sessile biota. These communities vary depending on exposure, depth, salinity, and substrate type.

In the Kenmare River SAC (Site Code: 002158), Reefs [1170] are among the primary qualifying interests and are particularly well developed. The SAC contains extensive and varied reef formations throughout the bay, shaped by the underlying Old Red Sandstone bedrock. These include both exposed infralittoral reef systems near the mouth of the bay and sheltered reef habitats within more enclosed inlets and channels. The site supports a high diversity of reef-associated species, including several rare and biogeographically important taxa such as the Northern Sea-fan (*Swiftia pallida*), the Southern Sea-fan (*Eunicella verrucosa*), and the burrowing anemone (*Pachycerianthus multiplicatus*). The presence of both shallow and deeper reef habitats with distinct biological communities highlights the conservation importance of this Annex I habitat within the SAC.

Reef habitats in Kenmare River SAC also include intertidal reef platforms where *Ascophyllum nodosum* forms dense mid-shore canopies. These algae provide important ecosystem services by stabilising substrates, moderating desiccation, and offering habitat and feeding grounds for certain invertebrate and vertebrate species.

4.2.2.3 Perennial vegetation of stony banks [1220]

The habitat Perennial vegetation of stony banks [1220] is an Annex I habitat type under the EU Habitats Directive. It refers to naturally occurring, stable accumulations of cobbles and stones found along the upper parts of coastal shorelines that are subject to wave action, but which support a specialised and permanent plant community. These habitats form part of the broader system of coastal shingle features and are typically located above the high tide mark, beyond the reach of regular tidal inundation.

The vegetation associated with this habitat is generally sparse but highly distinctive, comprising salt-tolerant and wind-resistant species that are adapted to poor nutrient availability, substrate mobility, and saline conditions. Characteristic species include Thrift (*Armeria maritima*), Common Scurvygrass (*Cochlearia officinalis*), Sea Campion (*Silene vulgaris* subsp. *maritima*), and Rock Samphire (*Crithmum maritimum*). These plant communities help stabilise the stony substrate and play a role in coastal defence by dissipating wave energy.

Within the Kenmare River SAC (Site Code: 002158), this habitat occurs in a limited number of locations, notably at Pallas Harbour and Rossdohan Island, where it is well developed and supports typical flora. Although relatively scarce in extent, the habitat is of conservation importance due to its sensitivity to physical disturbance and the specialised nature of its vegetation.

4.2.2.4 Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]

The habitat Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] is listed under Annex I of the EU Habitats Directive. It refers to naturally occurring cliff formations along coastlines where vegetation is able to persist despite exposure to wind, salt spray, and often steep or vertical rock faces. This habitat includes both soft and hard cliffs, and it supports specialised plant communities that are adapted to these extreme conditions, including many halophytic (salt-tolerant) and stress-tolerant species.

The vegetation typically associated with this habitat is species-poor but includes characteristic taxa such as Thrift (*Armeria maritima*), Sea Campion (*Silene vulgaris* subsp. *maritima*), Rock Samphire (*Crithmum maritimum*), Sea Spleenwort (*Asplenium marinum*), and Rock Sea-spurrey (Spergularia

rupicola). In some locations, this habitat also provides nesting opportunities for seabirds and roosting sites for bats, and it can be important for maintaining coastal biodiversity.

Within the Kenmare River SAC (Site Code: 002158), vegetated sea cliffs occur intermittently along the length of the coastline. The cliffs are often composed of Old Red Sandstone, and while many are relatively low in height, they are sufficiently exposed to support well-developed examples of the [1230] habitat. These cliffs typically support typical cliff-edge plant assemblages, and in some locations, their microhabitats contribute to the presence of rare or protected species. The cliffs may also be adjacent to other habitats of conservation interest, such as dry heath or juniper scrub, which together create ecologically diverse coastal mosaics.

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

This is an Annex I habitat under the EU Habitats Directive. It encompasses extensive areas of coastal grassland that are regularly inundated by saltwater, typically occurring on low-lying, sheltered shorelines such as estuaries, bays, and tidal flats. These salt meadows are formed on soft, silty or peaty substrates where the tidal influence creates a distinct zonation of plant communities that are adapted to frequent flooding, high salinity, and low oxygen soils.

The vegetation is typically dominated by salt-tolerant graminoids and halophytic forbs, with characteristic species including Sea Plantain (*Plantago maritima*), Sea Arrowgrass (*Triglochin maritima),* Sea Aster (*Aster tripolium*), Red Fescue (*Festuca rubra*), Sea Milkwort (*Glaux maritima*), Sea Purslane (*Atriplex* spp.), and Common Saltmarsh-grass (*Puccinellia maritima).* These communities often form a mosaic of grassy swards, low-growing succulents, and bare sediment patches. Salt meadows provide a valuable range of ecosystem services, including sediment stabilisation, nutrient cycling, and habitat provision for invertebrates and wading birds.

Within the Kenmare River SAC (Site Code: 002158), Atlantic salt meadows are well distributed in sheltered locations from Derrynane Bay to Kilmakilloge Harbour. Six discrete saltmarsh sites within the SAC have been surveyed in detail. Of these, five are described as fringe-type saltmarshes on peat, while the saltmarsh at Derrynane is of the bay type, occurring on muddy sand in association with a sand dune system. These habitats support a typical assemblage of saltmarsh species, including Sea Rush (*Juncus maritimus*), Thrift (*Armeria maritima*), Red Fescue, and Sea Aster. The variety of plant communities present reflects both the geomorphological complexity of the site and the relatively undisturbed nature of many of its coastal zones.

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

The habitat Mediterranean salt meadows (*Juncetalia maritimi*) [1410] is listed under Annex I of the EU Habitats Directive and represents a coastal saltmarsh community characterised by the dominance of Sea Rush (*Juncus maritimus*). Despite the name, it is not restricted to Mediterranean regions and occurs along the western coasts of Europe, including Ireland, where it develops in low-lying coastal areas that are subject to periodic tidal inundation but are generally less frequently flooded than Atlantic salt meadows.

This habitat forms in upper saltmarsh zones on peaty or mineral soils, often behind sand dunes or along sheltered estuarine margins. It typically supports a dense sward of Sea Rush mixed with a range of salt-tolerant grasses and forbs such as Red Fescue (*Festuca rubra*), Saltmarsh Rush (*Juncus gerardii*), Sea Milkwort (*Glaux maritima*), and Creeping Bent (*Agrostis stolonifera*). These communities are important for stabilising coastal sediments and provide breeding and foraging habitat for a variety of

invertebrates and wading birds. The transition zones between Mediterranean and Atlantic salt meadows also enhance overall ecological diversity in coastal areas.

Within the Kenmare River SAC (Site Code: 002158), Mediterranean salt meadows are found in association with other saltmarsh types, particularly in sheltered inlets and bays from Derrynane to Kilmakilloge Harbour. The Sea Rush-dominated communities are generally associated with upper saltmarsh zones and can occur in both fringe and bay-type marshes. At least six saltmarsh sites have been surveyed in detail within the SAC, and Sea Rush has been recorded at multiple locations, confirming the presence of this habitat type.

4.2.2.7 Shifting dunes along the shoreline with Ammophila arenaria (white dunes) [2120]

The habitat *Ammophila arenaria* (white dunes) [2120], commonly referred to as "white dunes", is a coastal habitat listed under Annex I of the EU Habitats Directive. It represents the early, mobile stages of sand dune development where vegetation begins to stabilise wind-blown sand, forming embryo or foredunes. The defining species is Marram Grass (*Ammophila arenaria*), which is highly tolerant of salt spray and capable of trapping and binding sand with its extensive root system. This pioneering vegetation helps initiate the dune formation process, thereby creating conditions for more stable and diverse dune habitats to develop inland.

White dunes typically occur along exposed sandy coastlines and are often found in association with other dune types such as grey dunes (fixed dunes) [2130] and wet dune slacks. The vegetation is usually species-poor due to the harsh, unstable conditions, but may include Sea Bindweed (*Calystegia soldanella*), Sand Sedge (*Carex arenaria*), Ribwort Plantain (*Plantago lanceolata*), Kidney Vetch (*Anthyllis vulneraria*), and Sea-holly (*Eryngium maritimum*). These communities are important for biodiversity, shoreline stabilisation, and protection against coastal erosion.

Within the Kenmare River SAC (Site Code: 002158), white dunes [2120] are found in the Derrynane Bay area on the south side of the Iveragh Peninsula. This system is relatively small in scale but contains a well-formed foredune dominated by Marram Grass, extending landward from a sandy beach. The white dune habitat here grades into fixed dune [2130] and saltmarsh [1330], forming an ecologically valuable coastal habitat complex. The vegetation includes not only Marram Grass but also several species typical of early dune succession and adapted to highly mobile, nutrient-poor sandy substrates.

4.2.2.8 Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]

The habitat Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] is an Annex I priority habitat under the EU Habitats Directive. Commonly referred to as grey dunes, this habitat represents a later and more stable stage of dune succession that develops inland from white dunes [2120]. Grey dunes are characterised by the presence of a semi-fixed to fully fixed dune system, where sand movement has significantly reduced due to stabilisation by a dense cover of herbaceous vegetation and mosses. Over time, organic matter accumulates in the soil, allowing for increased plant diversity and more complex ecological interactions.

Typical plant species found in grey dunes include Red Fescue (*Festuca rubra*), Lady's Bedstraw (*Galium verum*), Common Bird's-foot-trefoil (*Lotus corniculatus*), Smooth Meadow-grass (*Poa pratensis*), and Ribwort Plantain (*Plantago lanceolata*). In addition, mosses such as *Homalothecium lutescens, Rhytidiadelphus squarrosus,* and *Hypnum cupressiforme* are often abundant. These

vegetation communities support high biodiversity, including rare orchids, pollinators, and invertebrates. The habitat also plays an important role in coastal protection by stabilising sand and reducing erosion.

Within the Kenmare River SAC (Site Code: 002158), grey dunes [2130] are primarily located at Derrynane, on the southern side of the Iveragh Peninsula. The fixed dune system here forms part of a complex coastal habitat mosaic, occurring in association with white dunes [2120], salt meadows [1330 and 1410], dry heath [4030], and dune slacks. Although the area of fixed dunes is relatively limited in extent, it contains important plant species, including Betony (Stachys officinalis) and the protected Kerry Lily (*Simethis planifolia*), which is found almost exclusively in this region in Ireland. These species add to the ecological value and conservation interest of the site.

4.2.2.9 European dry heaths [4030]

The habitat European dry heaths [4030] is listed under Annex I of the EU Habitats Directive and represents a semi-natural vegetation type found on acidic, nutrient-poor soils. It is typically dominated by dwarf shrubs such as Heather (*Calluna vulgaris*), Bell Heather (*Erica cinerea*), and Western Gorse (*Ulex gallii*), often occurring in association with grasses, herbs, mosses and lichens. This habitat is widespread across upland and coastal regions in Europe and supports a high diversity of plant and invertebrate species. Dry heath also provides foraging and breeding habitat for birds and is an important cultural landscape maintained historically by grazing and low-intensity land use.

Within the Kenmare River SAC (Site Code: 002158), European dry heaths are a notable inland and coastal feature. They occur along extensive coastal strips, sometimes extending from sea level to higher elevations on rocky slopes. The dry heath habitat in this SAC is of particularly high ecological value, as it forms part of a wider habitat mosaic that includes wet heath, coastal grassland, exposed rock, and dune systems. In addition to the common dwarf shrub species, the site supports rarer flora such as Kerry Lily (*Simethis planifolia*) and Betony (*Stachys officinalis*), both of which are listed under the Flora (Protection) Order 2015 and are of significant conservation concern in Ireland. Other species recorded in this habitat within the SAC include Bilberry (*Vaccinium myrtillus*), Mat-grass (*Nardus stricta*), and Purple Moor-grass (*Molinia caerulea*), along with Bracken (Pteridium aquilinum) and Creeping Willow (*Salix repens*) in more variable locations.

4.2.2.10 *Juniperus communis* formations on heaths or calcareous grasslands [5130]

The habitat Juniperus communis formations on heaths or calcareous grasslands [5130] is listed under Annex I of the EU Habitats Directive and comprises semi-natural stands where Common Juniper (*Juniperus communis*) forms a significant component of the vegetation. These formations occur either on acidic heathlands or on calcareous grasslands, typically on well-drained, nutrient-poor soils. The habitat may include open or dense stands of juniper, often intermixed with species typical of dry heaths, calcareous grasslands, or rocky outcrops. It is valued for its biodiversity and structural diversity, providing important habitat for birds, invertebrates, bryophytes, and lichens.

In Ireland, this habitat is relatively rare and scattered, often occurring in isolated pockets in upland or coastal areas where land use has remained relatively undisturbed. It is considered of conservation concern due to habitat loss, overgrazing, and lack of regeneration.

Within the Kenmare River SAC (Site Code: 002158), *Juniperus communis* formations are present in at least three known locations. These are situated near Cappul Bridge, in the Ardgroom area, and at two stations opposite Black Rock, southeast of Cod's Head. In these areas, juniper scrub forms a component of a wider mosaic of heath, exposed rock, and dry grassland. The vegetation structure

varies from low, creeping forms to more upright bushes depending on site conditions and exposure. The habitat supports additional species typical of the surrounding dry heath and grassland environments, and its relative rarity enhances its conservation value within the SAC.

4.2.2.11 Calaminarian grasslands of the *Violetalia calaminariae* [6130]

The habitat Calaminarian grasslands of the *Violetalia calaminariae* [6130] is listed under Annex I of the EU Habitats Directive. It is a rare and specialised habitat type that develops on soils enriched with heavy metals, particularly lead, zinc, and copper, often in association with historical mining activity. The flora of this habitat is distinctive and includes metal-tolerant species that are adapted to the extreme edaphic (soil) conditions. These grasslands are typically species-poor but are notable for the presence of rare or endemic bryophytes, lichens, and vascular plants that can tolerate metal-rich soils.

In the Irish context, Calaminarian grasslands are exceptionally scarce and generally confined to locations with a legacy of metal mining, where spoil heaps or metalliferous soils remain exposed. The habitat is valued not only for its botanical interest but also for the insight it provides into ecological adaptation and soil-plant relationships in extreme environments.

Within the Kenmare River SAC (Site Code: 002158), Calaminarian grassland occurs in association with the historic copper mine workings at Allihies, located on the Beara Peninsula in the western part of the SAC. This habitat in the Allihies area is particularly significant for its rare bryophyte flora, which includes species that are almost entirely restricted to this habitat type in Ireland. The habitat's presence reflects the long industrial history of the region and adds a unique dimension to the SAC's terrestrial biodiversity.

4.2.2.12 Submerged or partially submerged sea caves [8330]

The habitat Submerged or partially submerged sea caves [8330] is listed under Annex I of the EU Habitats Directive. This habitat encompasses marine caves formed by erosion along rocky coastlines that are either entirely submerged or partially flooded by seawater. These caves are often found in cliffs or steep rocky shores and may vary in size from small crevices to large, complex systems. The ecological conditions within sea caves are highly specialised, including reduced light, limited water movement, and stable salinity, which allow the development of distinctive biological communities. Typical inhabitants include a range of encrusting sponges, bryozoans, ascidians (sea squirts), red algae, and crustaceans, many of which are adapted to the low-light and stable conditions.
In the Kenmare River SAC (Site Code: 002158), sea caves occur predominantly along the south-facing coast of the Iveragh Peninsula, particularly midway along the SAC's southern shoreline. These caves are formed in the coastal cliffs and are typically partially submerged, depending on the tidal regime. Surveys have recorded a diverse assemblage of marine invertebrates within these habitats, including encrusting sponges, ascidians, and bryozoans, all of which contribute to the conservation value of the site. The sea caves in Kenmare River SAC are considered to be in relatively good condition and represent a high-quality example of this habitat type in the south-west of Ireland.

4.2.3 Qualifying Interests (species)

4.2.3.1 *Vertigo angustior* (Narrow-mouthed Whorl Snail) [1014]

Narrow-mouthed Whorl Snail (*Vertigo angustior*) [1014], is a minute terrestrial snail of high conservation concern in Europe and is listed under Annex II of the EU Habitats Directive. It belongs to the family Vertiginidae and is characterised by a very small sinistral shell, typically measuring around 2 mm in length, with multiple fine whorls and distinct apertural dentition. The species is highly sensitive to

microhabitat conditions and depends on humid environments with a well-developed sward structure and a steady supply of moisture, often within dune slack systems or wet grasslands.

In the Kenmare River SAC, *Vertigo angustior* has been recorded in the fixed dune systems at Derrynane on the southern shores of the Iveragh Peninsula. These dune systems include a range of habitats such as white dunes, fixed grey dunes, and humid dune slacks. Within these mosaics, the snail inhabits damp depressions amongst the dunes where moisture is retained, often near the transition zones between dry dune grassland and wetter slack areas. The species' presence in Derrynane reflects both the high ecological value and structural diversity of the dune system in this part of the SAC.

4.2.3.2 *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303]

Lesser Horseshoe Bat (*Rhinolophus hipposideros*) [1303] is a bat species of significant conservation concern in Europe. It is listed under Annex II of the EU Habitats Directive, highlighting its importance in biodiversity conservation efforts. This species is characterized by its distinctive horseshoe-shaped noseleaf, which aids in echolocation, and its small size, with adults typically weighing between 5 to 9 grams and possessing a wingspan of approximately 192 to 254 mm. The Lesser Horseshoe Bat primarily inhabits western Ireland and southwestern Britain, with populations also present in parts of continental Europe and North Africa.

In Ireland, the Lesser Horseshoe Bat is predominantly found in the western counties, including Galway, Mayo, Clare, Limerick, Cork, and Kerry. The Kenmare River Special Area of Conservation (SAC) (Site Code: 002158) encompasses parts of Counties Cork and Kerry and is designated for the protection of this species among others . Within this SAC, the bat utilizes a variety of roosting sites, such as caves, souterrains, cellars, and old or derelict buildings, which provide the cool, stable temperatures and minimal disturbance required for hibernation and breeding. The species is known for its fidelity to roost sites, often returning to the same location annually. For foraging, the Lesser Horseshoe Bat relies on linear landscape features like treelines, stone walls, and hedgerows to navigate from roosts to feeding sites, typically within a few kilometres .

4.2.3.3 *Phocoena phocoena* (Harbour Porpoise) [1351]

Harbour Porpoise (Phocoena phocoena) [1351] is a small cetacean species prevalent in the cooler coastal waters of the Northern Hemisphere. Characterized by its robust body, dark grey dorsal colouring, and lighter underparts, the harbour porpoise typically measures between 1.4 to 1.9 meters in length. It is known for its shy and elusive nature, often surfacing briefly and making it less conspicuous than other cetaceans. This species primarily feeds on small schooling fish such as herring, sprat, and sand eels, and is usually found in shallow waters less than 200 meters deep.

Within the Kenmare River Special Area of Conservation (SAC) (Site Code: 002158), the harbour porpoise is listed as a qualifying interest species. The SAC encompasses a long, narrow bay situated in southwest Ireland, characterized by its glacially formed valley and diverse marine habitats, including reefs and large shallow inlets. While specific conservation objectives for the harbour porpoise in this SAC are not detailed, general conservation measures aim to maintain the favourable conservation condition of this species within the site.

4.2.3.4 *Phoca vitulina* (Harbour Seal) [1365]

Harbour Seal (*Phoca vitulina*) [1365] is a medium-sized pinniped widely distributed along the temperate and Arctic coastlines of the Northern Hemisphere. Adults typically measure between 1.4 to 1.9 meters

in length and weigh up to 168 kilograms. They exhibit a range of coat colours from brownish-black to tan or grey, often with distinctive spots. Harbour seals are known for their V-shaped nostrils and lack of external ear flaps, distinguishing them from other seal species. They are highly adaptable, occupying various coastal habitats including sandy beaches, rocky shores, estuaries, and intertidal zones. These seals are non-migratory, often remaining within a limited home range throughout the year. They haul out on land to rest, breed, and molt, showing strong site fidelity to these haul-out sites. Their diet primarily consists of fish, squid, and crustaceans, making them integral components of the marine ecosystem.

4.2.3.5 *Lutra lutra* (Otter) [1355]

Otter (*Lutra lutra*) [1355] is a semi-aquatic mammal belonging to the Mustelidae family. It is widely distributed across Europe, Asia, and parts of North Africa. The species is characterized by its streamlined body, dense waterproof fur, and webbed feet, adaptations that make it an adept swimmer. Primarily nocturnal, the Eurasian Otter feeds on a diet consisting mainly of fish, but it also consumes amphibians, crustaceans, and small mammals. Otters are territorial animals, with individuals maintaining and defending specific ranges along water bodies. They require clean, unpolluted water with abundant prey and suitable sites for resting and breeding, such as dense vegetation, holts (dens), or cavities in riverbanks.

In the Kenmare River Special Area of Conservation (SAC) (Site Code: 002158), Otter is listed as a qualifying interest species under the EU Habitats Directive. The SAC encompasses a diverse range of habitats, including marine and coastal environments, which provide essential resources for the otter's lifecycle. The conservation objectives for the otter within this SAC aim to restore its favourable conservation condition. Key targets include maintaining the distribution of otters across the site, ensuring no significant decline in the extent of terrestrial habitats used by otters, and preserving the quality of aquatic habitats to support their foraging needs. Monitoring data indicate that otters are present throughout the SAC, utilizing both freshwater and marine habitats for feeding and commuting. The presence of suitable resting and breeding sites along the shoreline and riparian zones is crucial for supporting the local otter population.

4.2 Other Natura 2000 sites

The Screening for Appropriate Assessment report prepared by Ecofact (2025a) also identified a number of other Natura 2000 sites for further consideration, on a precautionary basis, due to their proximity to the application area and the potential for indirect effects. The concerns relating to these sites included the potential for disturbance and the spread of non-native invasive species. It was concluded that mitigation measures to protect these sites should be included in the project's code of practice, in particular by avoiding these sites and implementing robust biosecurity protocols. These sites are as follows:-

- Mucksna Wood SAC (001371)
- Blackwater River (Kerry) SAC (002173)
- Glanmore Bog SAC (001879)
- Drongawn Lough SAC (002187)
- Old Domestic Building and Askive Wood SAC (002098).

Mitigation for these sites are provided in Section 6. It is considered important for the harvesters to be aware of the location of these sites and ensure that no activities take place with the boundaries of these sites. Also, biosecurity measures will be implemented to protect these sites. These sites will be identified

in the work plans, and adherence to the mitigation measures will be ensured as part of the Code of Practice. It is considered that the assessment of these sites is precautionary only and the mitigation and full protection of these sites will be easily delivered though the proposed project. The Qualifying Interests and sensitivity of these sites are listed in Table 1.

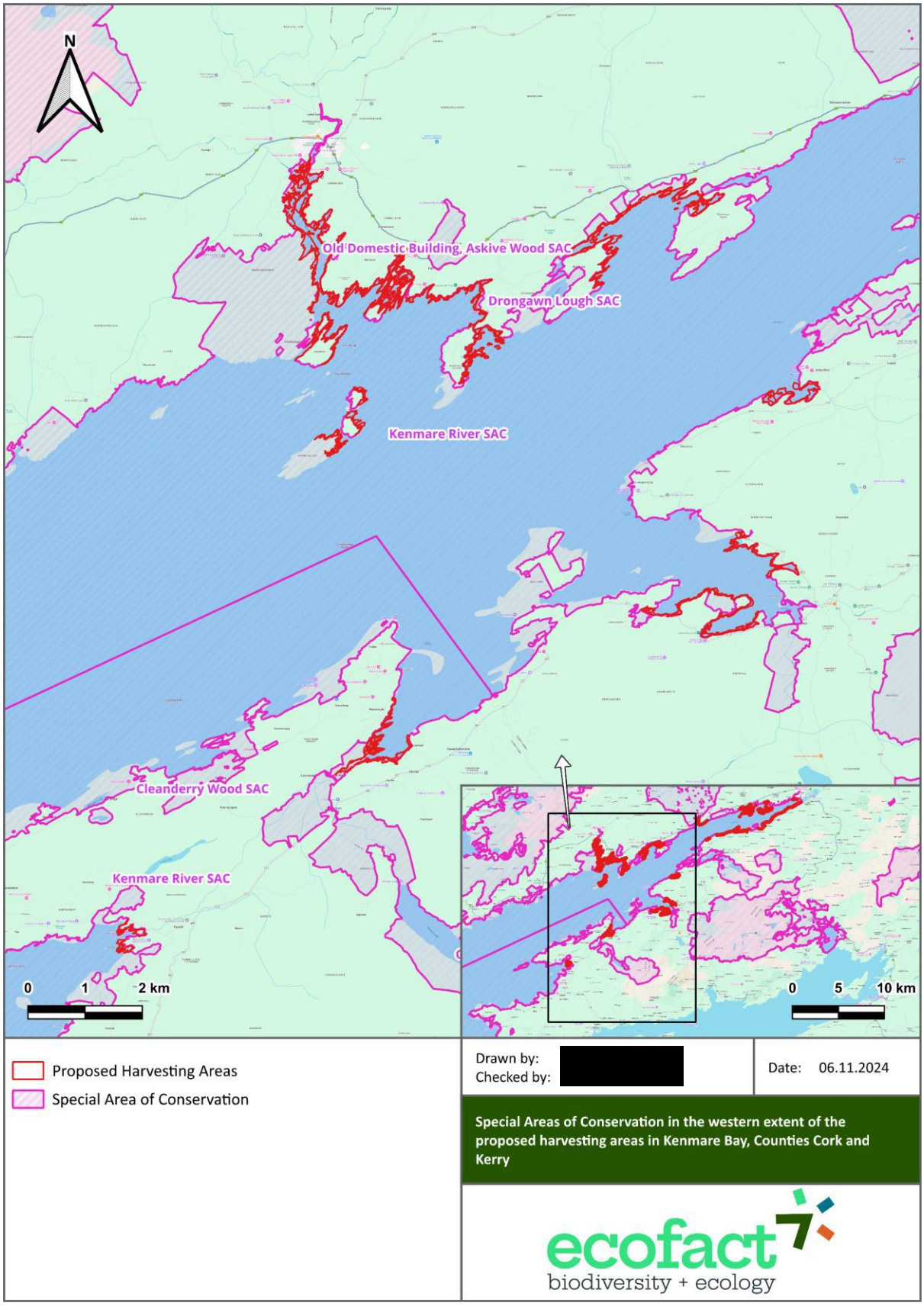

Figure 5 Location of the proposed harvesting areas in relation to SACs (Map 1).

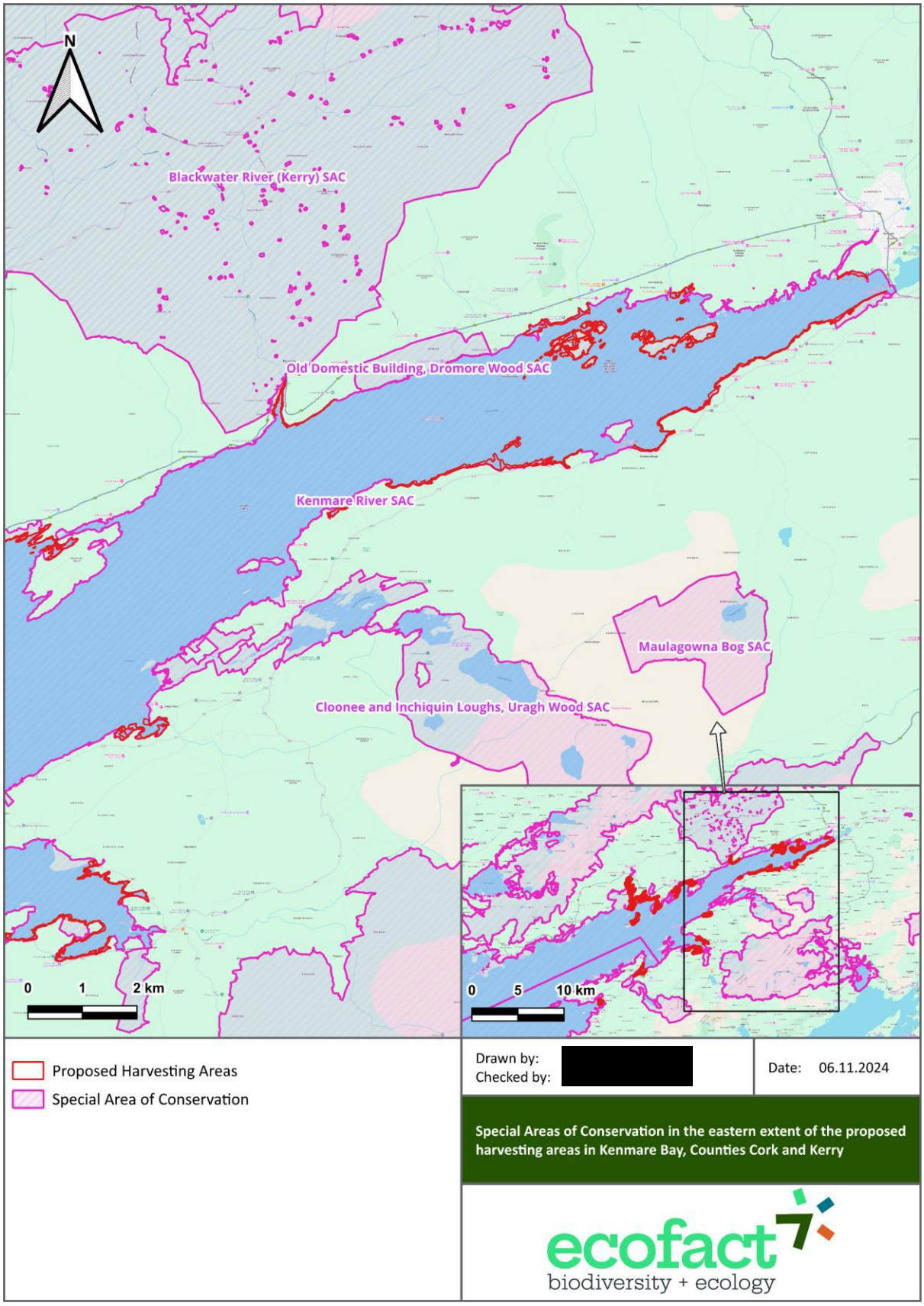

Figure 6 Location of the proposed harvesting areas in relation to SACs (Map 2).

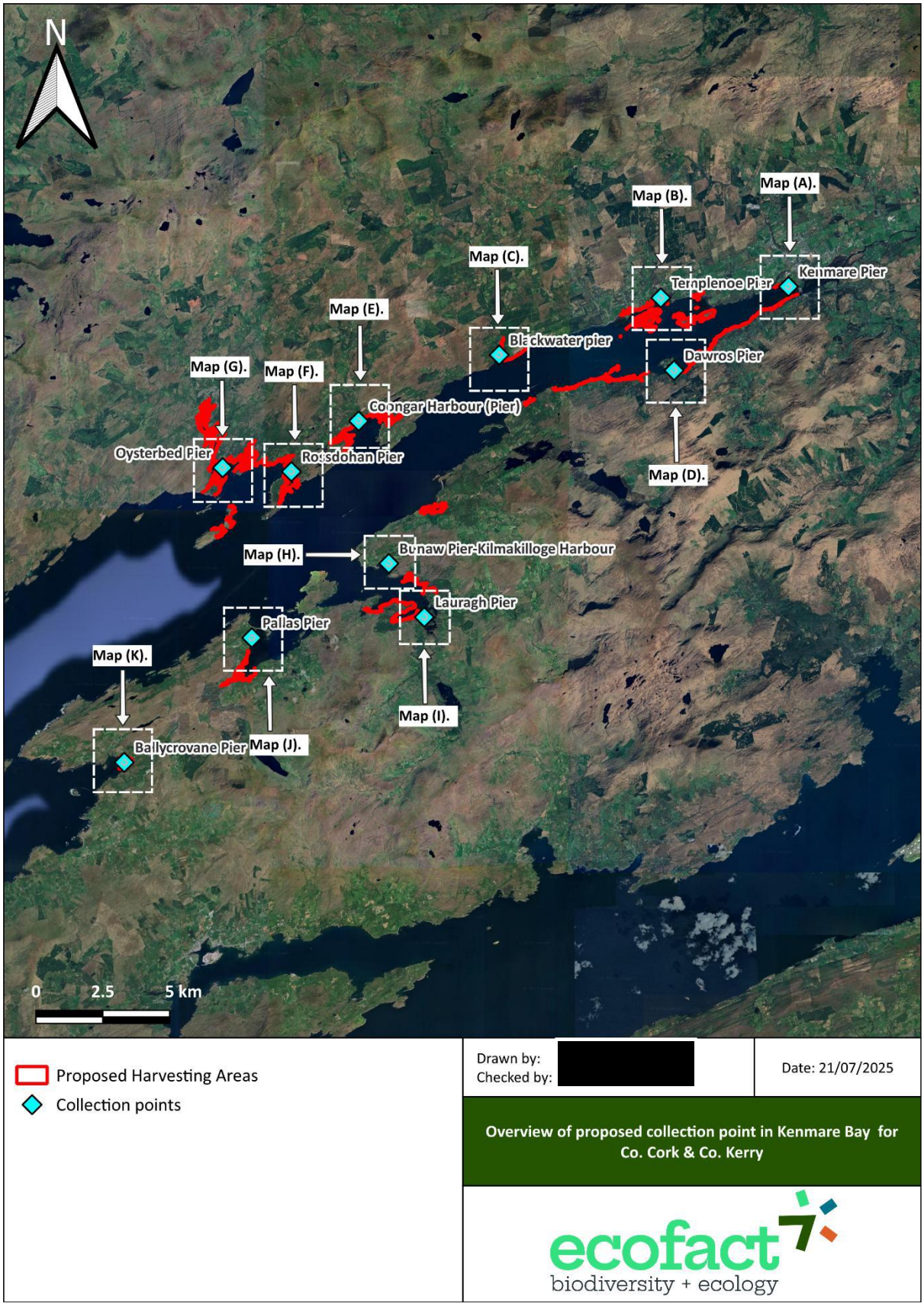

Figure 7 Overview map of the proposed collection points in Kenmare Bay. These are all existing piers.

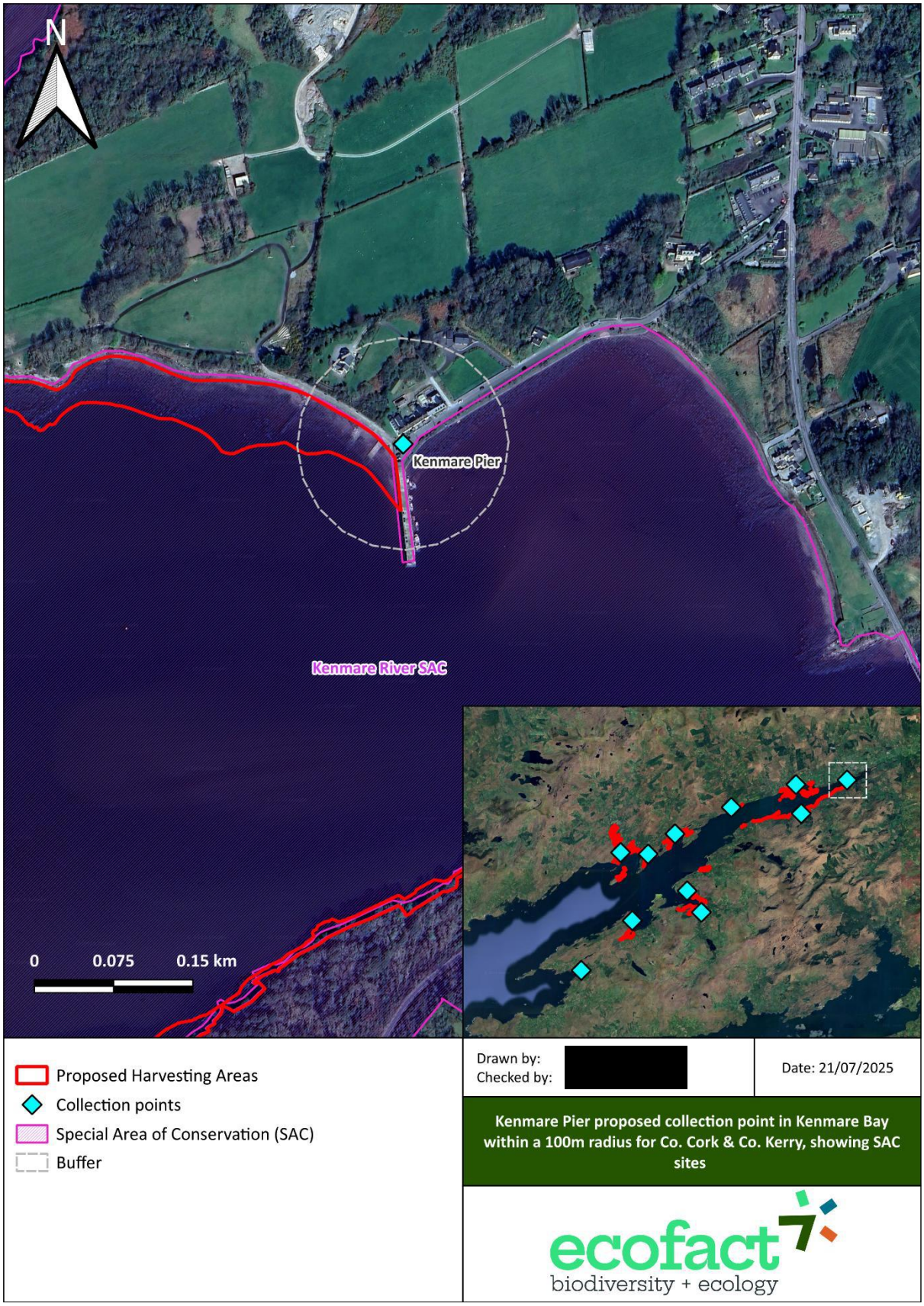

Figure 8 Map of the proposed collection points in Kenmare Bay (Kenmare Pier – Map A).

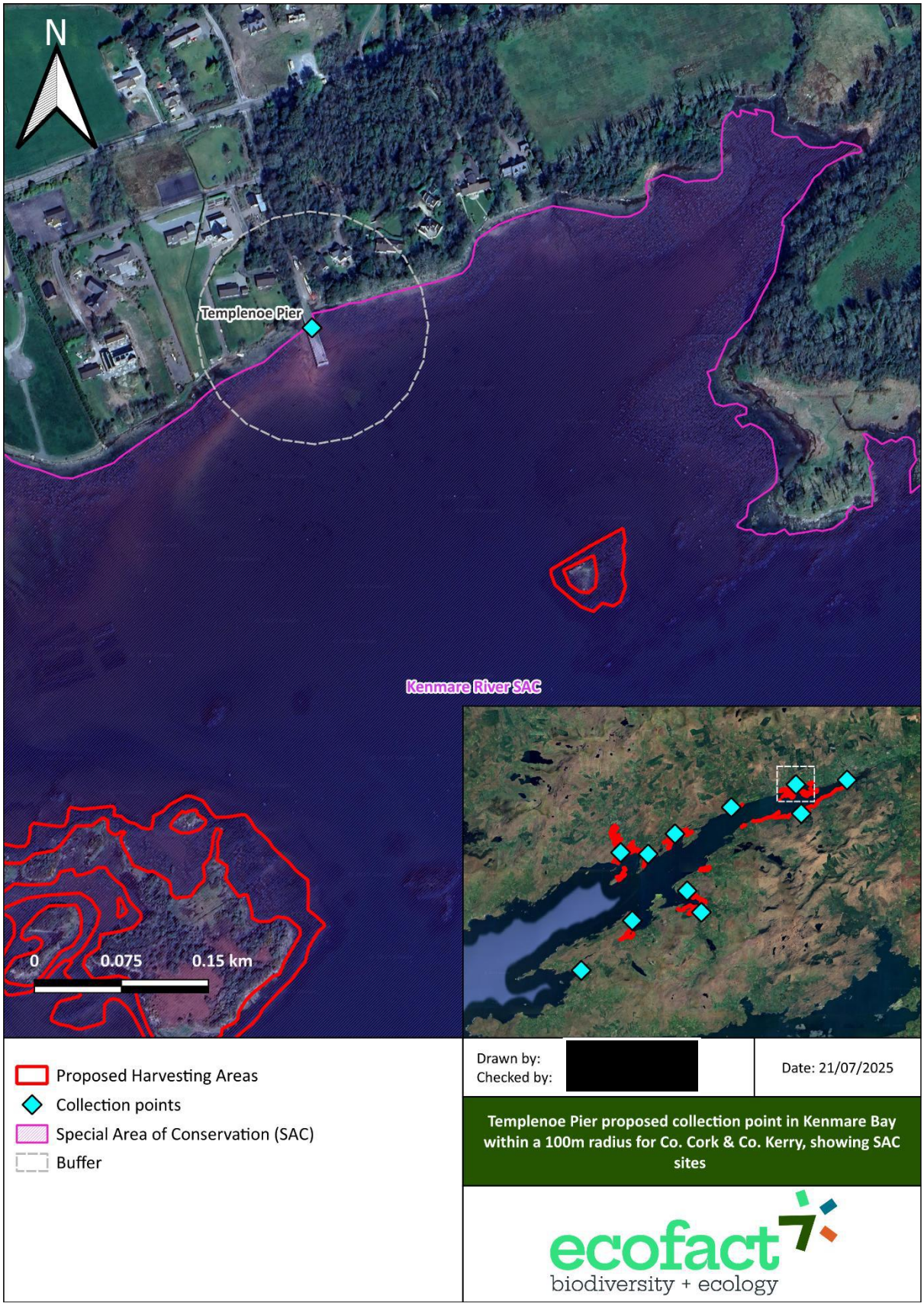

Figure 9 Map of the proposed collection points in Kenmare Bay (Templenoe Pier – Map B).

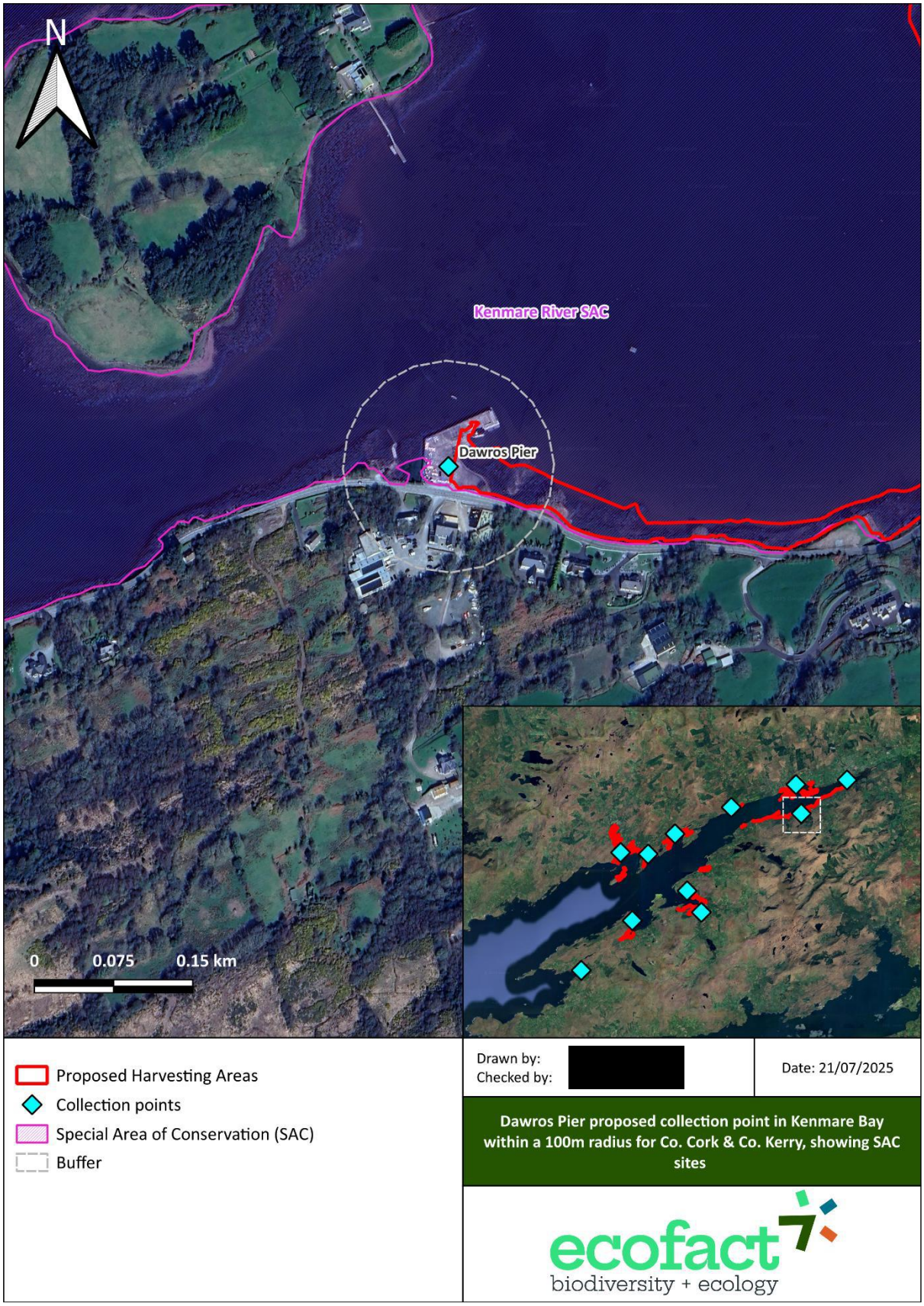

Figure 10 Map of the proposed collection points in Kenmare Bay (Dawros Pier – Map C).

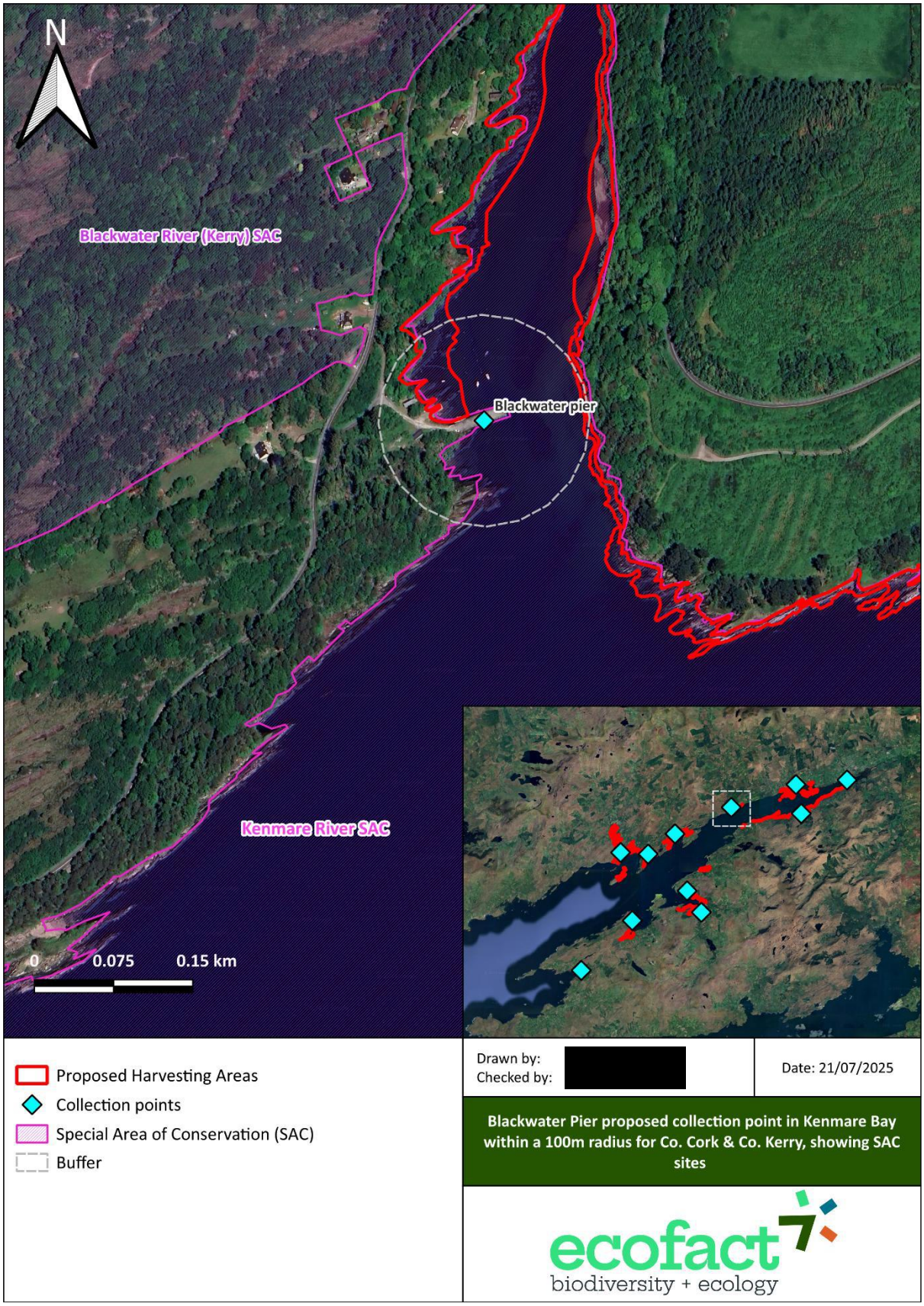

Figure 11 Map of the proposed collection points in Kenmare Bay (Blackwater Pier – Map D).

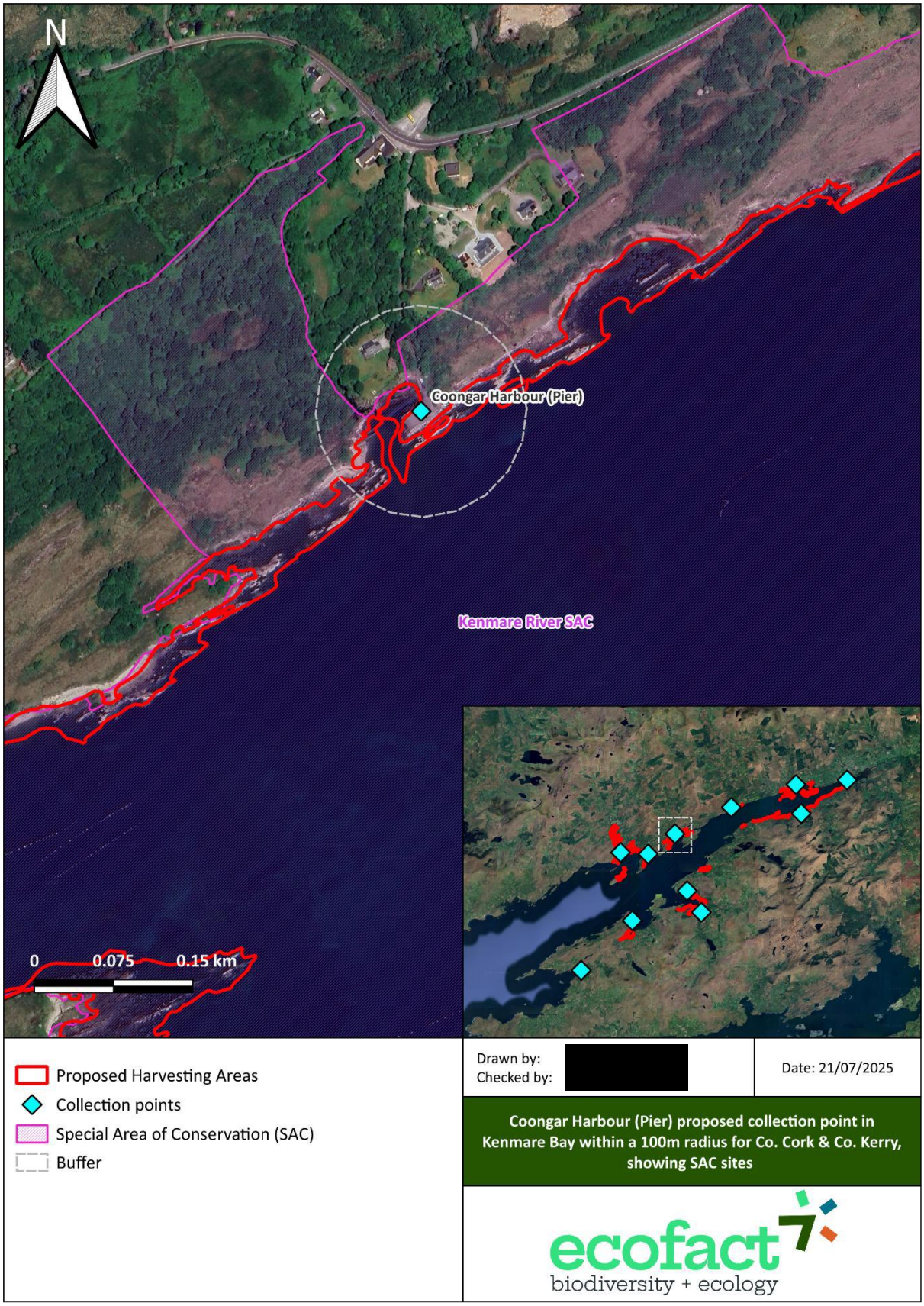

Figure 12 Map of the proposed collection points in Kenmare Bay (Coongar Harbour Pier – Map D).

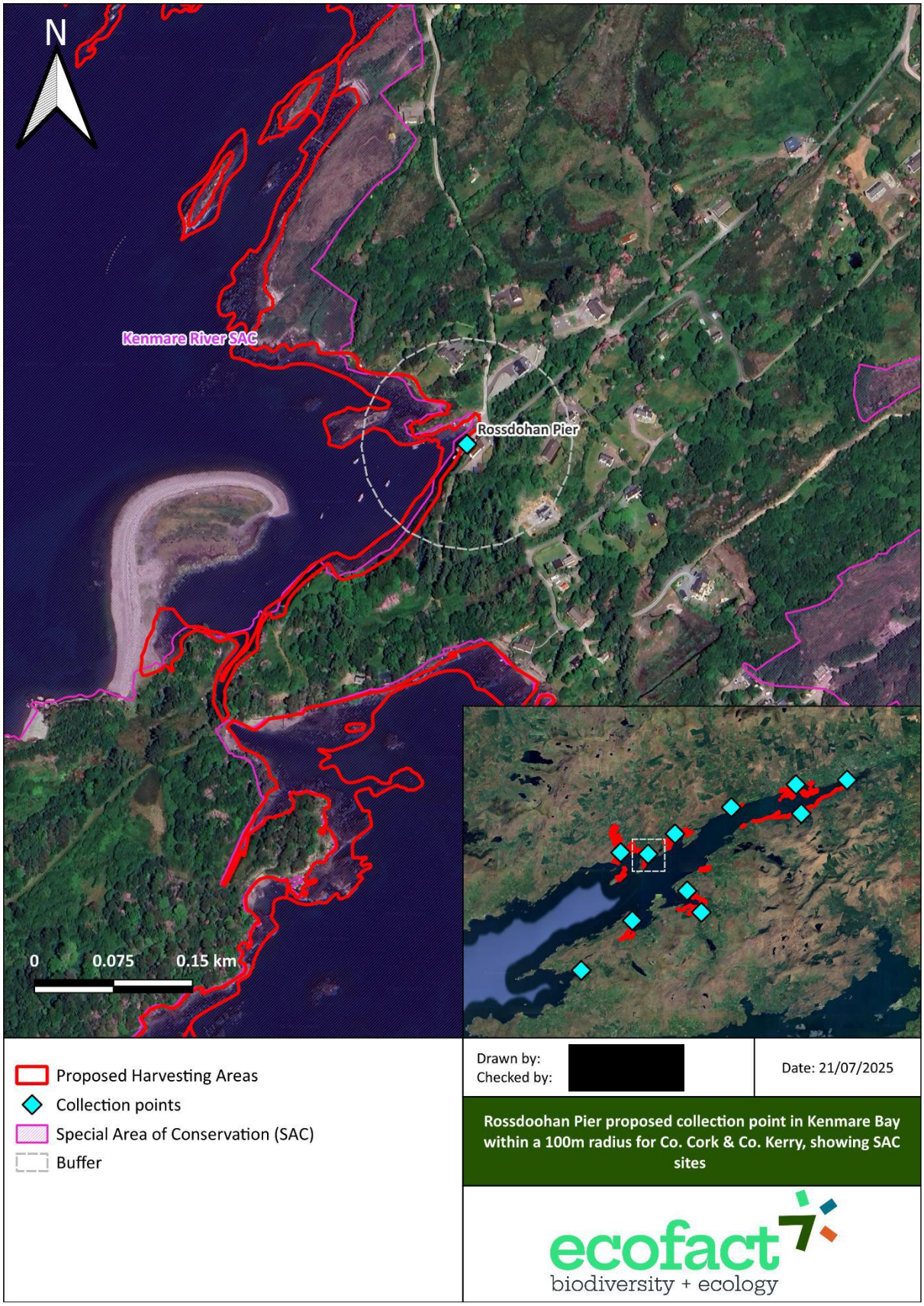

Figure 13 Map of the proposed collection points in Kenmare Bay (Rossdoohan Pier – Map E).

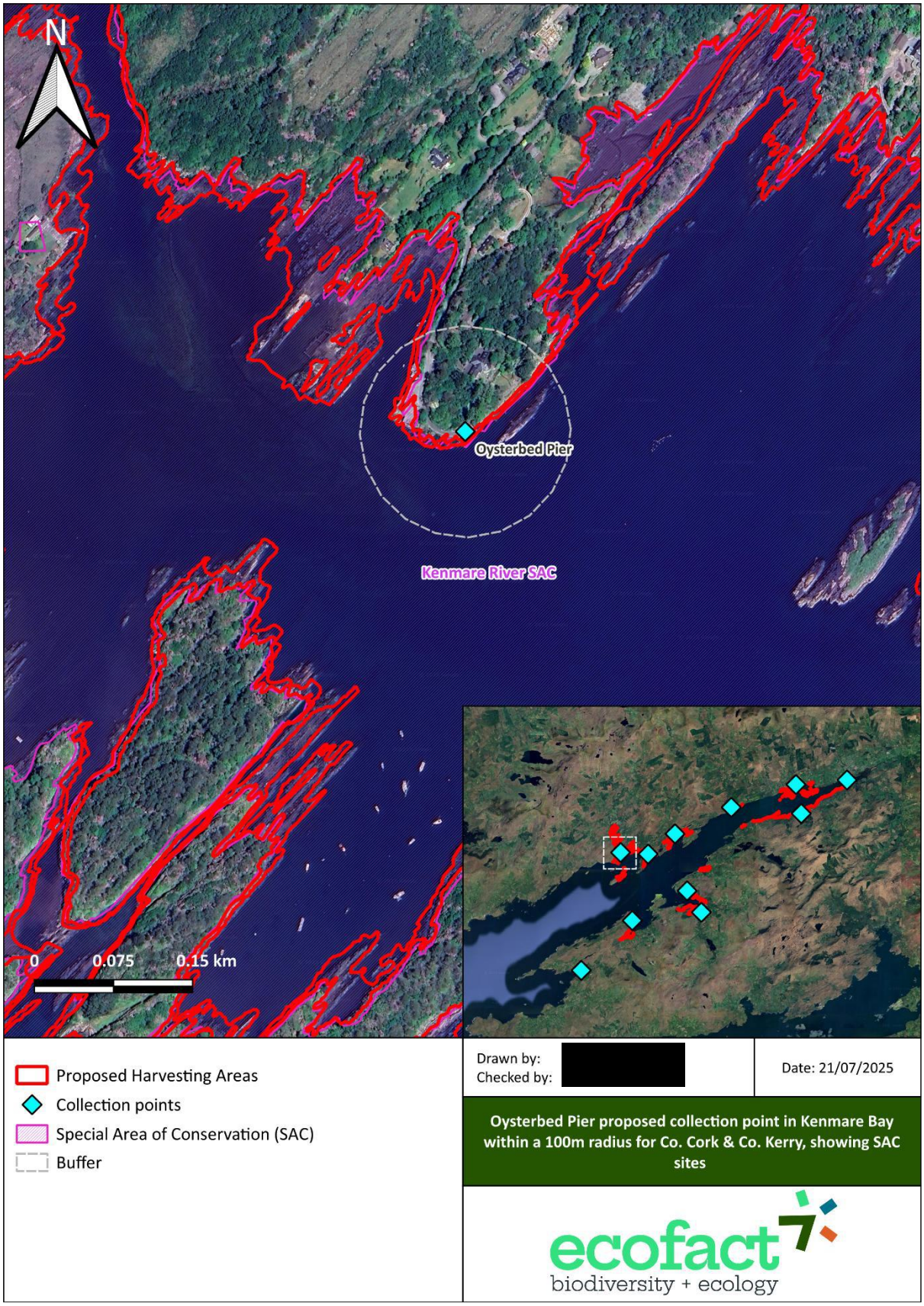

Figure 14 Map of the proposed collection points in Kenmare Bay (Oysterbed Pier – Map F).

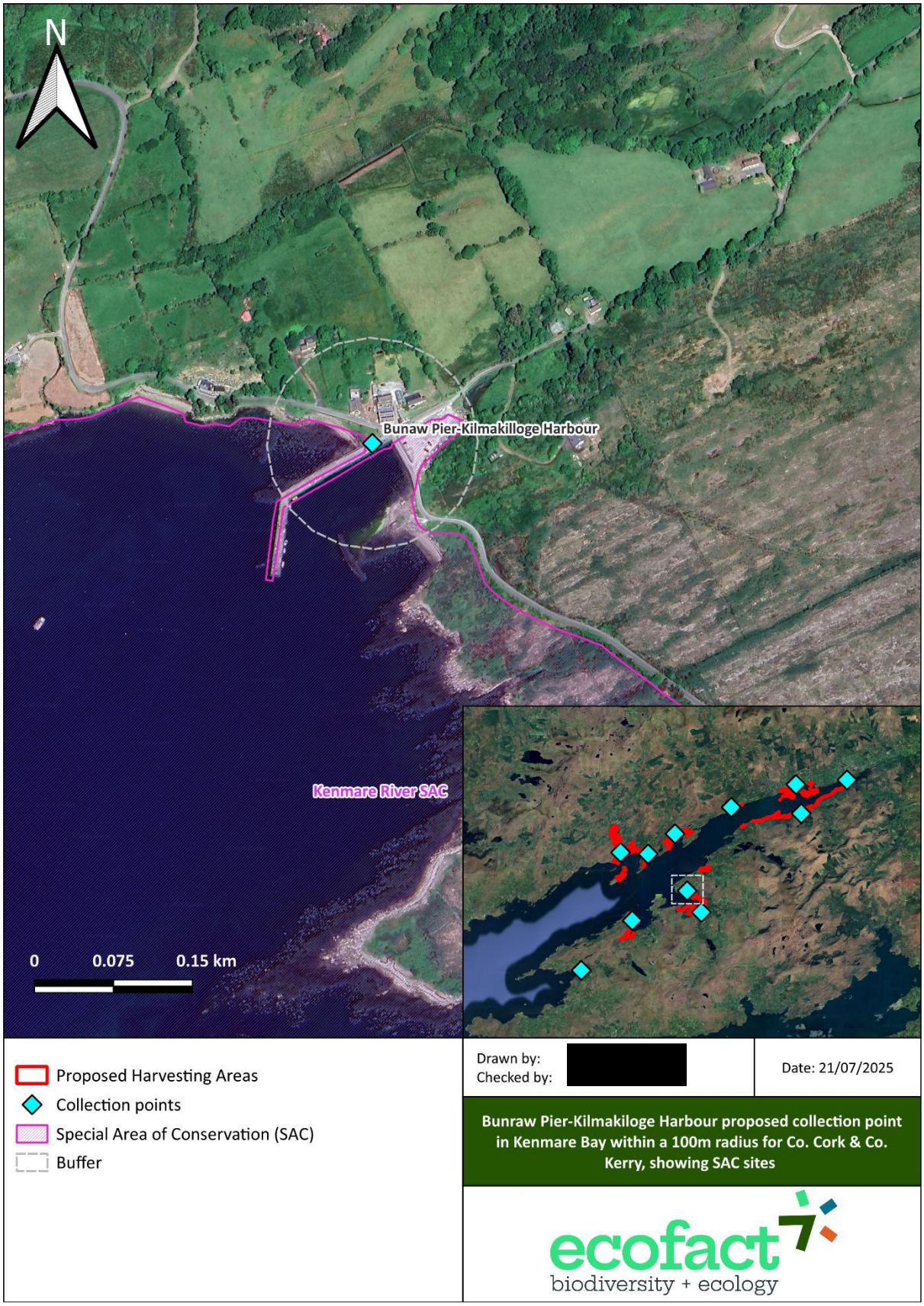

Figure 15 Map of the proposed collection points in Kenmare Bay (Bunaw Pier – Map G).

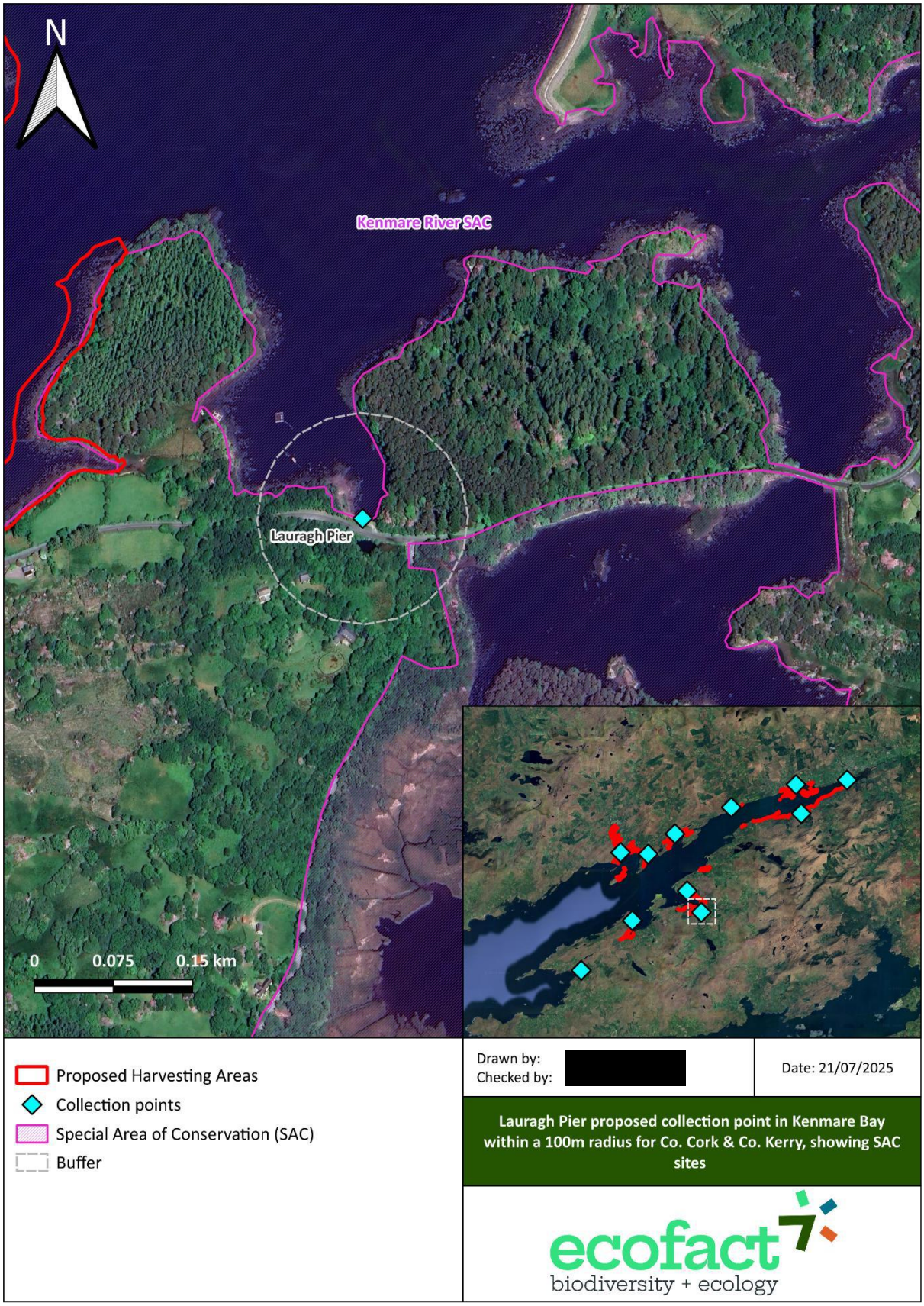

Figure 16 Map of the proposed collection points in Kenmare Bay (Lauragh Pier – Map H).

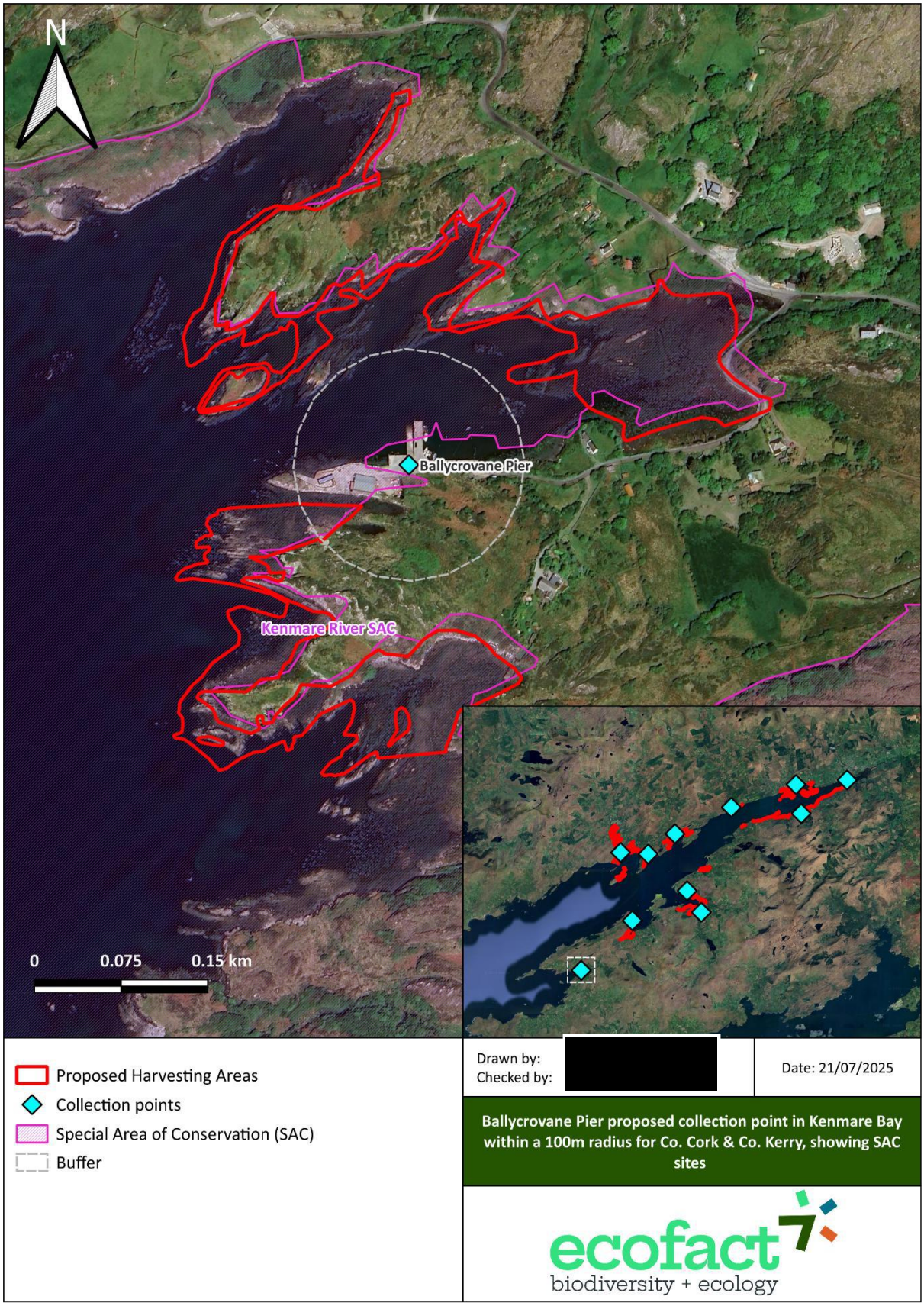

Figure 17 Map of the proposed collection points in Kenmare Bay (Ballycrovane Pier – Map I).

Figure 17 Map of the proposed collection points in Kenmare Bay (Pallas Pier – Map J).

Table 1 Designated Natura 2000 sites located within 500m of the proposed *A. nodosum* license area for BioAtlantis in south Co. Kerry and west Co. Cork. The qualifying interests and the potential for impacts affecting these individual features are identified. These sites were screened in for assessment by Ecofact (2025a).

Natura site	Qualifying Interests	Potential for impacts identified
Kenmare River SAC (002158)	Large Shallow Inlets and Bays [1160] Reefs [170] Perennial Vegetation of Stony Banks [1220] Vegetated Sea Cliffs [1230] Atlantic Salt Meadows [1330] Mediterranean Salt Meadows [1410] Marram Dunes (White Dunes) [2120] Fixed Dunes (Grey Dunes) [2130] Dry Heath [4030] Juniper Scrub [5130] Calaminarian Grassland [6130] Sea Caves [8330] Narrow-mouthed Whorl Snail (*Vertigo angustior*) [1014] Lesser Horseshoe Bat (*Rhinolophus hipposideros*) [1303] Otter (*Lutra lutra*) [1355] Common (Harbour) Seal (*Phoca vitulina*) [1365]	Activities are required within habitats that interact with the intertidal zone and within the bay itself; therefore pathways exist for impacts on Large Shallow Inlets and Bays and Reefs and potentially other qualifying interest. Otter and Common seal have been recorded from within the project area and SAC populations and are known to be mobile, therefore there is the potential for impacts to these species. Localised impacts to terrestrial / upper shore habitats of this designated site are also possible. These impacts could include biosecurity issues and precautionary mitigation will be required.
Mucksna Wood SAC (001371)	Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0]	This is a terrestrial habitat and is considered unlikely to be affected. However, because of the proximity of this site it is concluded that avoidance and biosecurity mitigation is required on a precautionary basis.
Blackwater River (Kerry) SAC (002173)	Oligotrophic Waters containing very few minerals [3110] Floating River Vegetation [3260] Wet Heath [4010] Species-rich *Nardus* Grassland [6230] Blanket Bogs (Active) [7130] Freshwater Pearl Mussel (*Margaritifera margaritifera*) [1029] Killarney Fern (*Trichomanes speciosum*) [1421]	This SAC is upstream from the proposed harvestable area. A bridge over the River Blackwater (N70 road) separates this SAC from the harvest areas and Kenmare River SAC. Potential impacts on Salmon or Otter would concern the Blackwater River (Kerry) SAC populations. Taking account of the location of this SAC and the character of these qualifying features there will probably be no interactions

Natura site	Qualifying Interests	Potential for impacts identified
		or pathways for impacts arising from the proposed activities which may affect the habitats and species for which this site is designated. However, because of the proximity of this site it is concluded that avoidance and biosecurity mitigation is required on a precautionary basis.
Glanmore Bog SAC (001879)	Oigotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Northern Atlantic wet heaths with *Erica tetralix* [4010] Species-rich Nardus grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) [6230] Blanket bogs (* if active bog) [7130] *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Vandenboschia speciosa* (Killarney Fern) [6985]	This SAC is designated for terrestrial habitats and is considered unlikely to be affected. However, because of the proximity of this site it is concluded that avoidance and biosecurity mitigation is required on a precautionary basis.
Drongawn Lough SAC (002187)	Coastal lagoons [1150]	There will be no harvesting in this area. However, because of the proximity of this site it is concluded that avoidance and biosecurity mitigation is required on a precautionary basis.
Old Domestic Building, Askive Wood SAC (002098)	*Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303]	There will be no harvesting in this area. However, because of the proximity of this site it is concluded that avoidance and biosecurity mitigation is required on a precautionary basis.
Old Domestic Building, Dromore Wood SAC (000353)	*Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303]	There will be no harvesting in this area. However, because of the proximity of this site it is concluded that avoidance and biosecurity mitigation is required on a precautionary basis.

5. POTENTIAL IMPACTS

5.1 Introduction

At the NIS stage, the potential ecological effects of a proposed project or plan must be assessed in detail, with particular reference to the integrity and conservation objectives of any Natura 2000 sites that may be affected. Where necessary, mitigation measures may be proposed to avoid or reduce likely significant effects. Importantly, the assessment must demonstrate, based on the best scientific evidence available, whether the project, alone or in combination with other plans or projects, would adversely affect the integrity of a European site.

The integrity of a Natura 2000 site is defined as "*the coherence of the site's ecological structure and function, across its whole area, or the habitats, complex of habitats and/or populations of species for which the site is or will be classified."* Therefore, a site's integrity is fundamentally linked to the structure and function of its Annex I habitats and Annex II species, which are referred to as the Qualifying Interests. The conservation status of these features forms the basis of the site's conservation objectives and must be maintained or restored.

This chapter sets out a structured assessment of the potential ecological impacts that could arise from the proposed activity. It identifies the main pressures and pathways through which the project could affect the site's habitats, species, and ecological processes. These impacts are assessed both individually and in the context of cumulative effects with other existing or proposed activities.

Although sustainable hand harvesting is generally regarded as a lower-impact activity compared to mechanical or industrial methods, a project of this scale within a designated European site requires careful scrutiny. Potential impacts may arise not only from the direct removal of biomass, but also from associated habitat modification, the disturbance of fauna, the alteration of coastal and sedimentary processes, and the potential for biosecurity risks such as the introduction of invasive species. It is also necessary to consider whether the activity could contribute to cumulative pressures in the bay.

The proposed project involves the hand harvesting of up to 1,826 wet tonnes of Ascophyllum nodosum within the Kenmare River SAC (Site Code: 002158). The ecological implications of this proposal are considered in detail in the sections that follow. Mitigation measures intended to avoid or reduce significant effects are presented in Section 6. Section 7 assesses the residual impacts (i.e. the likely effects following the implementation of mitigation) of the project in the context of the conservation objectives and Qualifying Interests of the Natura 2000 sites concerned.

5.2 Kenmare River SAC

Kenmare River SAC (Site Code: 002158) is the only designated Natura 2000 site in which seaweed harvesting activities are proposed.

This SAC is of high ecological value and is designated for a diverse range of Annex I habitats including Large Shallow Inlets and Bays [1160], Reefs [1170], Perennial Vegetation of Stony Banks [1220], Vegetated Sea Cliffs [1230], various dune systems [2120, 2130], heathland [4030], and priority habitats such as Mediterranean Salt Meadows [1410] and *Calaminarian* Grasslands [6130]. It also supports several Annex II species including the Otter (*Lutra lutra*) [1355], Common (Harbour) Seal (*Phoca vitulina*) [1365], Lesser Horseshoe Bat (*Rhinolophus hipposideros*) [1303], and the rare Narrow-mouthed Whorl Snail (*Vertigo angustior*) [1014].

The proposed harvesting will take place in intertidal areas and shallow subtidal zones within the bay, where pathways clearly exist for direct impacts to the qualifying marine habitats and species, particularly Large Shallow Inlets and Bays and Reefs. Mobile protected species such as Otter and Harbour Seal, both of which have been recorded within the project area, may also be affected through disturbance or changes to habitat or prey availability. In addition, there is potential for localised impacts to terrestrial or upper shore features of the SAC, particularly in relation to access routes or handling areas/pick-up points/collection points. Therefore, mitigation measures are required in this SAC to avoid adverse effects on site integrity. These measures are not precautionary in nature, but are necessary to ensure compliance with Article 6(3) of the Habitats Directive. The relevant mitigation is described in detail in Section 6 of this report.

5.2.1 Habitat Modification and Loss of Biomass

The physical removal of *Ascophyllum nodosum* biomass may have the potential to alter the structure and function of intertidal habitats, particularly within areas designated as Large Shallow Inlets and Bays [1160] or Reefs [1170]. Even with hand harvesting methods, large-scale biomass removal could lead to a temporary reduction in canopy cover, which could in turn reduce habitat complexity and shelter for certain species of vertebrates and invertebrates (e.g. juvenile fish and crustacean species), and other associated organisms. If not properly managed, over-harvesting could potentially lead to degradation of the intertidal zone and long-term changes in community composition.

5.2.2 Disturbance to Associated Fauna

The intertidal zone in which *A. nodosum* occurs supports a range of species that utilize the seaweed canopy for food, shelter, or breeding habitat. Harvesting activities may disturb resident fauna such as molluscs, crustaceans, polychaetes, and potentially certain small fish species. While direct mortality may be limited with careful harvesting, the displacement or exposure of these organisms to predation and desiccation can potentially have population-level consequences, particularly if recovery periods are insufficient.

5.2.3 Impacts on Annex I Habitat Types

The project area falls within habitat types [1160] Large Shallow Inlets and Bays and [1170] Reefs. These are sensitive to physical disturbance, and the removal of macroalgal communities is recognised as a pressure in the supporting documentation for Article 17 reporting. If the scale or intensity of harvesting exceeds the capacity of the habitat to recover within natural cycles, it may result in a decline in habitat quality or extent, contrary to the conservation objectives for the site.

5.2.4 Disturbance to Protected Species

Although the harvesting of *A. nodosum* is an intertidal activity, it may lead to indirect disturbance of Annex II species such as Common Seal (*Phoca vitulina*), which uses rocky islets and shores in the SAC for moulting, breeding and resting. Harvesting in proximity to haul-out sites at sensitive times could cause displacement or stress.

Otters may also be affected by increased human presence, particularly if there is human disturbance near holts or freshwater inflows. While Lesser Horseshoe Bats and other terrestrial features are unlikely to be directly affected, increased access to remote areas may bring incidental disturbance.

5.2.5 Biosecurity and Introduction of Invasive Species

Harvesting operations involve the movement of equipment and personnel between coastal sites. Without appropriate biosecurity measures, there is a risk of introducing or spreading non-native marine invasive species such as *Sargassum muticum*, *Undaria pinnatifida*, or marine pathogens. Terrestrial non-native invasive species could also be inadvertently introduced or dispersed. These could have significant long-term impacts on the ecological integrity of the SAC.

5.2.6 Changes in Sediment Stability and Coastal Processes

Dense beds of *Ascophyllum nodosum* help to stabilise the intertidal zone by binding substrate and potentially by influencing hydrodynamics. Widespread removal may potentially alter sediment dynamics, increasing erosion risk or sediment mobility in certain areas. This could have implications for adjacent habitats such as saltmarshes or mudflats, which are sensitive to changes in hydrodynamic conditions; however, the risk is considered low.

As the proposed activities require physical removal of *A. nodosum* material, there is the potential for indirect effects which could lead to increased scouring or erosion due to hydrodynamic forces associated with reduced *Ascophyllum* cover. In turn, this has potential to have impacts on settlement by animals within the biotope. This is most likely to occur due to inappropriate techniques being applied or extensive harvesting occurring, such as cutting close to the holdfast. Excessive removal of *A. nodosum* may therefore, have impacts at a local level along the intertidal zone.

The influence of *A. nodosum* on hydrodynamics beyond the intertidal zone is likely to be more limited. *A. nodosum* itself is extremely sensitive to changes in hydrodynamic forces, having adapted to growing in sheltered environs and with substantial difficulty in remaining attached to hard substrate in less sheltered waters, wave swept conditions, or in areas where hydrodynamics are intense. In the event of increased wave exposure, the rate of *A. nodosum* mortality is also likely to be increased, particularly as the *A. nodosum* fronds grow to levels large enough to exert greater pressure on the holdfast to separate from substrate. It is unlikely that severe reductions in *A. nodosum* cover would impact on hydrodynamics to levels that would affect habitats with mud and sand components or marine community types.

Excessive removal of *A. nodosum*, which is a significant primary producer in the SAC could lead to reductions in organic matter cycling and of deposition of dead seaweed on Annex I habitats. However, its impact on nutrient cycling rates is likely to be more limited given the low levels of nitrogen and exceptionally low levels of potassium and phosphorus present in this species.

5.2.7 Potential for Non-compliance with Conservation Objectives

Given the site's designation under the Habitats Directive, any plan or project must not result in adverse effects on site integrity. If the proposed annual removal of up to 1,826 wet tonnes is concentrated in sensitive or poorly recovering areas, or if mitigation and monitoring are inadequate, the activity could conflict with the site's stated conservation objectives.

5.2.8 Cumulative Effects with Other Pressures

Kenmare Bay supports various marine and coastal activities, including aquaculture, fishing, boating, and recreational use. In combination with these, large-scale seaweed harvesting may contribute to

cumulative pressures on intertidal and shallow subtidal systems. Nutrient loading, sedimentation, and disturbance regimes may interact with seaweed removal to reduce the resilience of the ecosystem.

5.3 Potential impacts on other Natura 2000 sites

5.3.1 Introduction

There will be no harvesting in these areas. However, because of the proximity of a number of other Natura 2000 sites it is concluded that avoidance and biosecurity mitigation is required on a precautionary basis.

Although the proposed sustainable hand harvesting of *Ascophyllum nodosum* is confined to the intertidal and shallow subtidal areas of the Kenmare River SAC, a number of other nearby Natura 2000 sites have been included in the screening process and assessed further within this NIS on a precautionary basis. While no harvesting or associated activity will occur within these sites, their proximity to the project area warrants consideration under Article 6(3) of the Habitats Directive.

The legal basis for this precautionary approach stems from the requirement that any plan or project likely to have a significant effect on a European site, either alone or in combination with other plans or projects, must be subject to Appropriate Assessment. The threshold for triggering an assessment is intentionally low. The precautionary principle, which underpins the Habitats Directive, requires that where there is scientific doubt regarding the absence of significant effects, further assessment must be undertaken to remove all reasonable doubt.

In the context of the sites ‘screened in’ on a precautionary basis, such as Mucksna Wood SAC, Blackwater River (Kerry) SAC, Glanmore Bog SAC, Drongawn Lough SAC, and the Old Domestic Building SACs, the potential for impacts is considered to be remote or negligible, particularly as no activity will occur within them and there are no clear impact pathways. However, to ensure that no indirect or cumulative effects arise (e.g. via the spread of invasive species or inadvertent disturbance), a conservative approach has been taken in line with legal and ecological best practice.

It is important to emphasise that the types of potential effects considered in relation to these nearby sites - primarily biosecurity risks and the need to avoid accidental disturbance - are readily avoided through the implementation of standard, well-established mitigation measures. These include cleaning protocols, movement restrictions, and general good practice measures for works near sensitive habitats. The adoption of these measures ensures that no significant effects will arise, and that the integrity of these European sites will be fully protected in accordance with the requirements of the Directive.

5.3.2 Mucksna Wood SAC

Mucksna Wood SAC (Site Code: 001371) is designated for its high-quality old sessile oak woodland habitat, classified under Annex I as Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0]. This is a terrestrial woodland habitat and is not expected to be directly affected by the proposed seaweed harvesting activities, which are marine in nature. However, due to the proximity of the SAC to the proposed harvesting areas, there remains a theoretical risk of indirect impacts, particularly in relation to biosecurity. As such, avoidance and biosecurity mitigation measures will be implemented on a precautionary basis to ensure that no adverse effects arise.

Blackwater River (Kerry) SAC (Site Code: 002173) is designated for a range of aquatic and terrestrial habitats and species, including oligotrophic waters [3110], floating river vegetation [3260], wet heaths [4010], species-rich grasslands [6230], active blanket bogs [7130], and two Annex II species: the Freshwater Pearl Mussel (*Margaritifera margaritifera*) [1029] and the Killarney Fern (*Trichomanes speciosum)* [1421]. Although this SAC lies upstream of the proposed harvesting area, it is separated from it by a bridge over the River Blackwater (N70 road). Direct impacts are not expected, particularly as no harvesting will occur within the SAC itself. Nevertheless, because of its proximity and the sensitivity of its features, particularly for species like Salmon and Otter that may range widely, avoidance and biosecurity mitigation are considered necessary on a precautionary basis.

5.3.3 Glanmore Bog SAC

Glanmore Bog SAC (Site Code: 001879) is designated for a suite of upland and wetland habitats including oligotrophic waters of sandy plains [3110], montane watercourses with aquatic vegetation [3260], wet heaths [4010], species-rich Nardus grasslands [6230], and active blanket bogs [7130]. It also supports two important species: Freshwater Pearl Mussel (*Margaritifera margaritifera*) [1029] and Killarney Fern (Vandenboschia speciosa) [6985]. These are predominantly terrestrial or freshwater features and lie outside the marine environment targeted for harvesting. No direct interactions are anticipated. However, given the site's proximity and the importance of its designated features, particularly in relation to biosecurity, precautionary avoidance and mitigation measures will be adopted.

5.3.4 Drongawn Lough SAC

Drongawn Lough SAC (Site Code: 002187) is designated for Coastal lagoons [1150], a priority habitat under the Habitats Directive. While the proposed seaweed harvesting will not take place within this area, its location nearby warrants precautionary measures. Due to the ecological sensitivity of lagoon habitats to nutrient input, disturbance, or hydrological changes, biosecurity and avoidance protocols will be followed to ensure that no indirect impacts occur.

5.3.5 Old Domestic Building, Askive Wood SAC

Old Domestic Building, Askive Wood SAC (Site Code: 002098) is designated for the conservation of the Lesser Horseshoe Bat (*Rhinolophus hipposideros*) [1303], a protected species under Annex II of the Habitats Directive. This site lies in proximity to, but outside, the harvesting areas, and no harvesting activity will take place within it. However, due to the mobility and roosting sensitivity of this bat species, especially with regard to disturbance or changes in prey availability linked to environmental changes, precautionary biosecurity and avoidance measures are considered necessary.

5.3.6 Old Domestic Building, Dromore Wood

Old Domestic Building, Dromore Wood SAC (Site Code: 000353) is also designated for the Lesser Horseshoe Bat (*Rhinolophus hipposideros*) [1303]. Although no harvesting is proposed within or immediately adjacent to the SAC, the proximity of the site means that indirect pathways for disturbance cannot be entirely ruled out. Accordingly, mitigation measures focused on avoidance and biosecurity will be implemented as a precautionary safeguard against any potential ecological effects.

6. MITIGATION

6.1 General Mitigation

In the context of the proposed hand harvesting operation for *Ascophyllum nodosum* within Kenmare River SAC, appropriate mitigation measures must be implemented to ensure that the activity does not adversely affect the integrity of the site or compromise its conservation objectives. These measures should address both direct and indirect impacts on the Annex I habitats and Annex II species for which the SAC is designated, and must reflect the precautionary principle outlined in Article 6(3) of the Habitats Directive.

The following are general mitigation measures that may be applied to such a project. These should be tailored to site-specific conditions and supported by ecological monitoring:

6.2.1 Harvesting Method and Intensity Control

Harvesting should be carried out manually using non-destructive tools such as sickles or knives. The holdfast and lower portion of the frond must be retained to ensure natural regrowth. The removal of entire plants must be strictly prohibited. Harvesting intensity should be limited so that no more than 50% of the standing biomass is removed from any given area during a single harvesting cycle.

6.2.2 Rotational Harvesting System

The project area should be divided into harvesting zones with a clearly defined rotation schedule. Zones should be allowed sufficient time for regeneration and canopy recovery between harvests, with rotational requirements assigned for harvest sites. The boundaries and timing of harvesting zones should be specified in the operational plan and agreed with the competent authority.

6.2.3 Seasonal Restrictions

To minimise disturbance to wildlife, particularly Common Seals and breeding birds, harvesting should be avoided at certain sites during sensitive periods or mitigation measures employed to prevent disturbance or impacts. In general, measures should be taken in relation to the Common Seal pupping and moulting seasons (May to September approx.), the bird breeding/nesting season (March to September approx.). Additional measures should be employed during other seasonal periods or sites identified through site-specific data, to prevent disturbance events or impacts.

6.2.4 Exclusion Zones and Avoidance of Disturbance

Harvesting should not occur within a buffer zone 100 metres of known Common Seal breeding and moulting haul-out sites during sensitive times. Important breeding sites for protected bird species should be avoided during sensitive times. Sensitive sites should be identified on maps and incorporated into the operational plan. Measures should be in place to ensure that disturbance of common seals, otters and birds is avoided, e.g. otter holts should not be interfered with, roosting birds should not be disturbed, etc.

6.2.5 Avoidance of Sensitive or Recovering Areas

Areas with slow regrowth or historical overharvesting should be identified and excluded from harvesting, until sufficient time has passed to allow for recovery. Site Inspections and robust management of harvest databases should inform this process, and the areas should be mapped or added to a database on an ongoing basis.

6.2.6 Access and Trampling Management

To reduce physical disturbance, harvesting activities must be limited to the intertidal zone where *A. nodosum* is present, and access routes used by harvesters must not traverse or involve trampling across sensitive coastal habitats (e.g. saltmarshes), or other sensitive habitats such as eelgrass beds. Harvesters should be informed of this requirement. Where appropriate, signage or local guidance may be used to direct access along durable surfaces.

6.2.7 Biosecurity Protocols

All nets/bags must be cleaned and/or disinfected before being used at the site to prevent the introduction or spread of non-native invasive species and marine pathogens. Steps to prevent introduction of invasive species and marine pathogens by boats must also be taken. A formal biosecurity protocol or Code of Practice should be prepared and followed by all personnel involved.

6.2.8 Training and Supervision

All harvesters should be trained where necessary in species identification, sustainable harvesting techniques, and the conservation sensitivities of the site. The project should be overseen by a suitably qualified scientist or seaweed resource manager to ensure compliance with the agreed mitigation measures.

6.2.9 Monitoring and Reporting

Ecological surveys must be completed at selected non-harvest areas and harvest areas, with regular monitoring to assess regrowth rates, impacts on associated fauna, and any evidence of habitat degradation. Monitoring should follow a scientifically robust protocol and results should be reported as required to the competent authority. An Adaptive Management approach should be applied where negative trends are identified.

6.2.10 Limitation on Scale and Duration

The total annual biomass removed must not exceed the permitted threshold (in this case, 1,826 wet tonnes) and should be geographically distributed across the harvest sites in the SAC to avoid concentrated pressure on particular zones. The duration of fallowing periods will be reviewed periodically based on emerging data and monitoring outcomes.

6.2.11 Preventing impacts on Annex I Habitat Types

The proposal includes the sustainable harvesting of *A. nodosum* by hand within Kenmare River SAC, which including the shoreline of the bay and the islands. Key measures of conservation status in SACs include area, range, structure and function and future Prospects. As hand harvesting of *A. nodosum*

does not give rise to permanent damage to the shore, it does not interact with the parameters of Area or Range. However, targeted removal of species has potential to result in alterations to Structure & Function.

In some national assessments under Article 17 reporting (e.g. Ireland), a working threshold of 25% habitat disturbance has been used as an indicator of potential unfavourable conservation status. However, this is not a formal EU-wide threshold and must be interpreted in the context of the specific habitat and pressures involved. EU Article 17 guidance does not set a fixed quantitative threshold for disturbance. Instead, Member States are encouraged to evaluate disturbance in context looking at habitat sensitivity, ecological function, recovery potential, and the nature of the impact. Any use of a specific threshold must be clearly justified based on habitat characteristics, scientific evidence, and national policy frameworks. NPWS guidance suggests that ongoing disturbance of any habitat community within a Natura 2000 site should not exceed approximately 15% of its area. This figure is a national precautionary benchmark - not an EU legal requirement - and triggers stronger review if reached. This is an arbitrary level and does not have a legal or ecological basis, and care must be taken when applying it.

To measure the potential impact on structure and function in Kenmare River SAC, the total area of habitat in the SAC of each marine community type and, the area affected by the proposed harvest activities/annum was calculated by BioAtlantis. Table 2 contains a list of each marine community type in the Kenmare River SAC and the area potentially affected by hand harvest activities. The original figures were given to two decimal places, which implies a level of precision that is not realistic for habitat mapping and management at this scale. Values were rounded to avoid overstatement of accuracy, aligns with typical standards used in ecological assessment, and ensures that the data are easier to interpret for decision-making and regulatory review.

Table 2 List of marine habitat types in Kenmare River SAC and the area potentially affected.

No.	Marine community types	Total Area (Ha)	Max Area Affected Annually (Ha)	Area of Large Shallow Inlets & Bays Affected (%)	Area of SAC Affected (%)
1	Zostera Community	145	0	0%	0%
2	Shingle	1.4	0	0%	0%
3	Maerl Dominated community	252	0	0%	0%
4	Laminaria-dominated community complex	3678	0	0%	0%
5	Intertidal reef community complex	680	28	4.05%	0.07%
6	Intertidal mobile sand community complex	64	0	0%	0%
7	Muddy fine sands dominated by polychaetes & *A. filiformis* community complex.	20932	3.6	0.017%	0.009%
8	Fine to medium sand with crustaceans & polychaetes community complex.	1995	0	0%	0%
9	Coarse sediment dominated by polychaetes community complex.	8334	0	0%	0%
10	*Pachycerianthus multiplicatus* community	6	0	0%	0%
11	Subtidal reef with echinoderms and faunal turf community complex	480	0	0%	0%

* *A. nodosum* cannot be harvested in *Laminaria*, Maerl, Zostera or other subtidal areas.

A national conservation assessment indicates that Large shallow inlets and bays [1160] in Ireland is classified as ‘unfavourable-bad’ (Scally *et al*., 2020). The 'area' conservation attribute is classified as ‘favourable’, while ‘structure & functions’ and ‘future prospects’ are considered as ‘unfavourable-bad’ and ‘unfavourable-inadequate’ respectively.

For Kenmare River SAC, Large shallow inlets and bays [1160] is categorized as 'favourable' in terms of Area, 'unfavourable-bad' for two attributes: 'future prospects' and 'overall site assessment' and 'unfavourable-inadequate' for 'structure & functions'.

The report by Scally *et al*., (2020) assessed the status of community distribution in Large shallow inlets and bays in Kenmare River SAC. This included an assessment of Sediment Marine Community Types as follows: (a) Intertidal mobile sand community complex, (b) Muddy fine sands dominated by polychaetes and *Amphiura filiformis* community complex, (c) Fine to medium sand with crustaceans and polychaetes community complex and (d) Coarse sediment dominated by polychaetes community complex. The study also included The following Reef Marine Community Types: (a) Intertidal reef community complex, (b) Laminaria-dominated community complex and (c) Subtidal reef with echinoderms and faunal turf community complex.

The main explanation for the failure of Large shallow inlets and bays [1160] to achieve Favourable conservation status is the significant change recorded in the Area and Structure & functions of keystone communities which are characterized by sensitive indicator species.

In Kenmare River SAC, minor increases in the habitat for the sensitive indicator species, *Pachycerianthus multiplicatus,* was recorded; however, these increases are considered to be the result of increased survey effort rather than an increase in species distribution. No significant increase in the extent of the area of other keystone species was recorded (Scally *et al*., 2020).

The conservation status of Reefs [1170] in Kenmare River SAC (where *A. nodosum* harvesting will primarily take place) has been assessed as 'favourable' in terms of area, structure & functions, future prospects and the overall site assessment. Reef Marine Community Types sampled within Kenmare River SAC which led to the 'favourable' status designation include: (i) Intertidal reef community complex (which includes *A. nodosum* habitat), (ii) Laminaria-dominated community complex and (iii) Subtidal reef with echinoderms and faunal turf community complex (Scally *et al*., 2020).

The conservation assessment undertaken for habitats (a) Reefs [1170] and (b) Submerged or partially submerged sea caves [8330] concludes that both habitats are 'favourable' in terms of area, structure & functions, future prospects and the overall site assessment. At a national level, the conservation status of Reef in Ireland has been assessed as 'Favourable' in terms of Area, Structure and function, future prospects. This includes both inshore and offshore reef areas (Scally *et al*., 2020).

The application appropriately addresses the conservation status of Annex I habitats within the Kenmare River SAC, including (where applicable to the SAC), Sandbanks slightly covered by seawater at all times [1110], Estuaries [1130], Mudflats and sandflats not covered by seawater at low tide [1140], Reefs [1170], Submerged or partially submerged sea caves [8330], and Large shallow inlets and bays [1160]. It incorporates mitigation measures where applicable, to prevent impacts on these habitats and to ensure their conservation status is maintained, as outlined in the Code of Practice.

Harvesting will not take place in areas categorized as unfavourable, unless mitigation measures are in place to ensure they are unaffected. Estuaries [1130] are considered as 'favourable' at national level in terms of area, and unfavourable in terms of structure and function, future prospects and overall; mitigation measures are in place to ensure that harvesting does not negatively impact on these areas. Mudflats and sandflats not covered by seawater at low tide [1140] are considered as being in Unfavourable-Inadequate condition on a national level; harvesting will not take place in this habitat and measures are in place to ensure mudflats and sandflats are unaffected when travelling to and from sites. While 'submerged or partially submerged sea caves' [8330] and 'Sandbanks which are slightly

covered by sea water all the time [1110]' are in favourable condition, harvesting will not take place in these areas.

In Kenmare River SAC, Large shallow inlets and bays [1160] is a broad category with 6 attributes encompassing 11 habitats/community types: (a) Zostera dominated communities, (b) Maërl dominated communities, (c) *Pachycerianthusn multiplicatus* community, (d) Intertidal mobile sand community complex; (e) Muddy fine sands dominated by polychaetes and *Amphiura filiformis* community complex; (f) Fine to medium sand with crustaceans and polychaetes community complex; (g) Coarse sediment dominated by polychaetes community complex; (h) Shingle; (i) Intertidal reef community complex; (j) Subtidal reef with echinoderms and faunal turf community complex; (k) *Laminaria*-dominated community complex. *A. nodosum* harvesting will not take place in areas where *Pachycerianthus multiplicatus* grows (depth range: 10 - 130 m). In addition, *A. nodosum* harvesting will not take place in soft substratum areas (intertidal and subtidal mud/sandy mud areas) and mitigation measures are in place to ensure they are unaffected during travel to and from harvesting sites. Further measures are in place in the Code of Practice to ensure that the above habitats/community types in Large shallow inlets and bays [1160] are unaffected by harvesting.

Reef represents a subcategory of Large shallow inlets and bays [1160] whilst also forming a stand-alone Annex 1 habitat category (Reef [1170]). According to Scally *et al*. (2020), Reef [1170] in Ireland and in Kenmare River SAC is categorized as being in a 'favourable conservation' condition. This includes intertidal and subtidal reef areas. *A. nodosum* harvesting will take place in intertidal reef areas, subject to close compliance with mitigation measures listed in the Code of Practice. This will ensure that Reef [1170] is maintained in favourable conservation condition in terms of area, structure and function and future prospects.

Harvesting activities are within the Annex I Habitat 'Large Shallow Inlets and Bays [1160]'. Harvesting will also take place within the 'Reefs [1170] habitat. These activities do not require the removal or disturbance to the sensitive littoral reef habitat or to Maerl or *Zostera* communities identified as important community biotopes within the Kenmare Rive SAC [1160] Annex I habitat type. The percentage of Intertidal reef community complex and Muddy fine sands dominated by polychaetes & *A. filiformis* community complex, which are Marine Community Types of the Annex I habitat, Large shallow Inlets and Bays [1160], that will be impacted each year is very low. The percentage area of intertidal Reef to be impacted each year is 4.05%, while the potential spatial overlap between harvest areas and Muddy fine sands dominated by polychaetes & *A. filiformis* community complex is also very low, at 0.017% per annum. Other reef and Annex I habitats will be unaffected as there is either no spatial overlap with such habitats or *A. nodosum* harvesting cannot occur in such areas due to their subtidal nature. The overall area of Large shallow inlets and bays [1160] in Kenmare River SAC is 39322.3 hectares (https://eunis.eea.europa.eu/sites/IE0002158). The percentage of Intertidal reef community complex to be impacted annually is 0.07% of this area, while the percentage of Muddy fine sands dominated by polychaetes & *A. filiformis* community complex potentially impacted annually is 0.009%. The spatial overlap with shingle habitat is 0%. The percentage of the total area of Large shallow Inlets and Bays [1160] to be utilized per annum during hand harvesting activities in the intertidal zone, is 0.079%.

The evidence from the literature suggests that the potential for effects to arise as a result of sustainable hand harvesting of *A. nodosum*, are limited. For example, Kelly *et al*., 2001, shows that *A. nodosum* regenerates 11 to 17 months post harvesting. Kelly *et al*., 2001, also demonstrates that there are no impacts of harvesting on overall biodiversity, mobile epifauna and fish 11 to 17 months post-harvesting.

A study by Lauzon-Guay et al., 2023, shows that harvest of *A. nodosum* (at sites with a 20 + year history of commercial harvesting) does not have long-term impact on the morphology of the algae or on the

abundance of its main inhabitants. Therefore, it is considered unlikely that sustainable hand harvesting of *Ascophyllum nodosum* would give rise to any further effects on Large Shallow Inlets and Bays [1160], Reefs [1170] or other habitats or community types in Kenmare River SAC. However, mitigation measures are in place to ensure that no further effects occur, particularly areas where harvesting will take place such as intertidal reef areas.

The proposed sustainable hand harvesting of *Ascophyllum nodosum* within the Kenmare River SAC has been evaluated in the context of the site's conservation objectives and the potential for adverse effects on the integrity of Annex I habitats, particularly Large Shallow Inlets and Bays [1160] and Reefs [1170].

The harvesting is confined to intertidal areas and avoids sensitive marine community types such as *Zostera* and *Maerl* beds, *Pachycerianthus multiplicatus* habitat, and soft sediment communities. Harvesting will take place only in areas with suitable substratum and depth and will follow a strict Code of Practice to ensure avoidance of sensitive features. These measures are designed to prevent deterioration of key habitat attributes, particularly those relating to structure and function.
Quantitative analysis demonstrates that the proportion of habitat affected annually is very low, with 0.079% of the total area of Large Shallow Inlets and Bays [1160] potentially subject to direct overlap. Within that, the affected area of intertidal reef is 0.07%, and for the Muddy Fine Sands community, it is 0.009%. These figures were rounded appropriately to reflect realistic mapping precision and to avoid the implication of undue accuracy.

While the conservation status of Large Shallow Inlets and Bays [1160] in Kenmare River SAC is currently unfavourable, with structure and function assessed as 'unfavourable-inadequate' or 'bad', the harvesting avoids the keystone and most vulnerable communities associated with that status. In contrast, Reefs [1170] are in favourable condition, both nationally and at site level, and harvesting is confined to robust intertidal reef areas, which are considered less sensitive to this type of activity when carried out under appropriate controls.

Available literature, including Kelly et al. (2001) and Lauzon-Guay et al. (2023), supports the view that hand harvesting of *A. nodosum* does not result in long-term impacts on algae morphology, faunal communities, or ecosystem function, provided it is done sustainably. These findings, while encouraging, have been applied cautiously and supported by site-specific mitigation and monitoring commitments.
It is acknowledged that arbitrary disturbance thresholds (such as 15% or 25%) are not formally recognised under EU guidance. The assessment has therefore adopted a context-specific approach, considering habitat sensitivity, recovery potential, and ecological function in line with the precautionary principle.

Based on the limited spatial overlap, the exclusion of sensitive communities, the application of strict mitigation, and supporting scientific evidence, it is considered that the proposed harvesting activity will not result in adverse effects on the integrity of Kenmare River SAC, either alone or in combination with other plans or projects.

6.2.12 Appropriate Assessment and Licensing

The project must be subject to Appropriate Assessment under Article 6(3) of the Habitats Directive. A Ministerial Consent under the European Union Habitats Regulations is required, and this consent should include enforceable conditions reflecting all agreed mitigation measures.

6.2 Project mitigation

The Code of Practice (29th of July, 2025) for the proposed hand harvesting of *Ascophyllum nodosum* in Kenmare River SAC sets out a comprehensive framework of operational measures intended to avoid or minimise ecological impacts. It directly addresses the likely effects identified in the Natura Impact Statement and aligns with the mitigation requirements of Article 6(3) of the EU Habitats Directive. A summary and evaluation of the Code's content is provided below.

6.2.1 BioAtlantis Code of Practice

The Code outlines a structured and precautionary approach to harvesting *Ascophyllum nodosum*, with a focus on protecting the ecological integrity of the Kenmare River SAC. Key features include:

- **Harvesting Technique:** Only manual harvesting is permitted using hand tools (e.g. knives or sickles). The fronds are to be cut a minimum of 8-12 inches (20-30cm) above the holdfast to allow for regrowth. Entire plants, including the holdfast, must not be removed.

- **Harvesting Intensity and Biomass Limit:** The annual wet biomass removal is capped at 1,826 tonnes. Harvesting must be distributed across designated sub-sites to avoid excessive pressure on any one area.

- **Rotation and Recovery:** A rotational harvesting regime is implemented to allow each site a rest period before being harvested again. This supports canopy regeneration and reduces the risk of long-term ecological degradation.

- **Exclusion Zones and Sensitive Areas:** Harvesting will not occur within 100 metres of known Common Seal breeding and moulting haul-out sites during sensitive times. Important breeding sites for protected bird species will be avoided during sensitive times. No activity is permitted in areas of saltmarsh, Zostera beds, or subtidal reef features. Measures are in place to prevent disturbance events when in the vicinity of estuarine areas, river mouths and other freshwater inputs.

- **Seasonal Restrictions:** Harvesting is not permitted at specific sensitive sites during key periods for wildlife, particularly between May to September to avoid disturbance to Common Seals during pupping and moulting, and to reduce potential interference with birds during the breeding/nesting season (March to September approx.).

- **Access and Disturbance Management:** Access routes used by harvesters must not traverse or involve trampling across sensitive inland and coastal habitats, and harvesters cannot enter into the following sensitive coastal zones and terrestrial habitat. Harvesters must avoid trampling of vegetation, especially in soft intertidal areas. Access to the shore by vehicles is also subject to these control measures in order to protect sensitive areas. Measures are also in place to ensure that disturbance of common seals, otters and birds is avoided, e.g. otter holts should not be interfered with, roosting birds should not be disturbed, etc.

- **Training and Supervision:** All harvesters must undergo environmental awareness training, where necessary, and comply with the operational controls. A Resource Manager is responsible for monitoring compliance and coordinating with statutory agencies.

- **Monitoring and Reporting:** A programme of ecological monitoring is to be implemented, including surveys of harvested areas to assess biomass recovery, canopy condition, and associated biota. All required data will be compiled and submitted, as necessary to the relevant competent authority. A Marine Ecologist will be directly employed or contracted for the purposes of measuring *A. nodosum* recovery and conducting ecological surveys.

- **Biosecurity:** To prevent the spread of invasive marine species or diseases, measures are in place to ensure that harvest activities to not act as a vector; for example, all bags/nets will be cleaned with appropriate cleaning agents or other suitable methods on delivery to production facilities and returned to harvesters in a clean condition. Movement between sub-sites is to be minimised and harvest locations will be recorded.

The Code of Practice successfully incorporates the main mitigation measures necessary to address the likely impacts identified for hand harvesting within a Natura 2000 site. Specifically:

- **Habitat Protection:** The frond cut height requirement and prohibition on holdfast removal directly reduce habitat degradation and ensure regrowth. The rotational system prevents repeated disturbance and allows sufficient recovery, thereby maintaining habitat structure and function.

- **Species Safeguards:** Seasonal restrictions and spatial buffers ensure that harvesting avoids peak periods of activity for protected species such as Common Seal, while measures are also in place to prevent disturbance to Common Seal, Otter and birds. These measures reduce the risk of behavioural disturbance and habitat exclusion.

- **Minimisation of Cumulative Effects:** By restricting access, controlling biomass removal, and implementing sufficient rest periods, the Code reduces cumulative pressure on intertidal ecosystems, particularly in areas also affected by aquaculture and recreation.

- **Ecological Monitoring:** The inclusion of baseline and ongoing monitoring allows for adaptive management and ensures that the activity remains within ecological thresholds. This is essential for compliance with Article 6(3) requirements.

- **Biosecurity Measures:** The cleaning/disinfection of nets/bags and restrictions on cross-site activity address the risk of introducing invasive species or pathogens, which could otherwise have long-lasting impacts on the SAC's integrity.

- **In combination and cumulative effects:** Measures are in place to prevent in combination or cumulative effects with other activities in Kenmare Bay, such as tourism, sport and recreation related activities, aquaculture, angling and fisheries activities, and other seaweed or seaweed harvesting-related activities.

- **Regulatory Compliance**: The project is structured around the requirement for Ministerial consent and is explicitly designed to support Screening for Appropriate Assessment and Natura Impact Statement processes under the EU Habitats Directive.

The Code of Practice provides a robust and well-structured approach to managing the ecological risks associated with the hand harvesting of *Ascophyllum nodosum* in Kenmare River SAC. It reflects best practice as outlined in national and international guidance, and it demonstrates that the proposed activity can be carried out in a manner consistent with the conservation objectives of the SAC. Provided

that all measures in the Code of Practice are fully implemented, the project is unlikely to result in adverse effects on the integrity of the designated site.

A summary of potential Impacts and mitigation for Kenmare River SAC habitats and species, is provided in Tables 3 and 4. Further mitigation measures to prevent impacts on Kenmare River SAC habitats and species are provided in the Code of Practice.

Table 3 Summary Table of Potential Impacts and Mitigation for Kenmare River SAC Habitats.

Qualifying Interest (Code)	Potential for Impact	Mitigation
Large shallow inlets and bays [1160]	Potentially affected by trampling, canopy removal, and disturbance to sediment and associated species within intertidal zones where *Ascophyllum nodosum* occurs. Could result in loss of habitat complexity, reduced biodiversity, and altered community structure.	Harvesting restricted to mapped intertidal zones; frond cut height maintained at 8-12 inches (20-30cm) above holdfast; rotational harvesting with recovery periods; pick up points are identified and agreed with management.
Reefs [1170]	May be impacted by physical disturbance from foot traffic and selective removal of seaweed cover. Reefs support diverse epifaunal communities that may be sensitive to changes in shading and shelter provided by seaweed.	Harvesting methods prohibit full plant removal; minimal use of tools; training on habitat recognition.
Perennial vegetation of stony banks [1220]	Risk of disturbance from harvesters accessing intertidal areas, potentially leading to erosion, trampling, or loss of specialist flora in stony substrate habitats.	Access routes used by harvesters must not traverse or involve trampling across stony bank areas; awareness training for harvesters.
Vegetated sea cliffs [1230]	Not directly affected by harvesting but at risk from incidental access during entry to shoreline or from repeated foot traffic near cliff bases.	Harvesters required to avoid sea cliffs; training to deter unnecessary approach.
Atlantic salt meadows [1330]	Could be affected by access and trampling leading to sward damage, soil compaction, and hydrological alteration. Sensitive to physical disturbance and nutrient input.	Prohibition of entry to saltmarshes; access routes used by harvesters must not traverse or involve trampling across saltmeadow areas.
Mediterranean salt meadows [1410]	Similar vulnerability to trampling and nutrient input; possible indirect impacts via sediment mobilisation and erosion in adjacent zones.	Avoidance of all saltmarsh areas; access routes used by harvesters must not traverse or involve trampling across saltmeadow areas.

Qualifying Interest (Code)	Potential for Impact	Mitigation
Ammophila arenaria (white dunes) [2120]	Highly sensitive to erosion and vegetation loss due to trampling. Not directly in harvesting zone but could be damaged by indirect access.	Harvesting exclusion from all dune systems; access routes used by harvesters must not traverse or involve trampling across dune systems.
Fixed coastal dunes with herbaceous vegetation [2130]	Sensitive to vegetation loss and substrate destabilisation. Low direct overlap but access risks exist.	Harvesting exclusion from all dune systems; access routes used by harvesters must not traverse or involve trampling across dune systems.
European dry heaths [4030]	Indirect risk through access routes or secondary trampling near coastal heathland. Habitat vulnerable to erosion and nutrient change.	Access routes used by harvesters must not traverse or involve trampling across heathland; no storage or equipment placement in heath areas.
Juniperus communis formations [5130]	Rare habitat with fragile shrubs susceptible to trampling. Could be impacted if crossed during access to shore.	Avoidance of all Juniper scrub zones; Access routes used by harvesters must not traverse or involve trampling across these areas; training on habitat identification.
Calaminarian grasslands [6130]	Not located near intertidal areas but highly sensitive to compaction or contamination. Presence near old mine sites could be impacted by misdirected access.	Mined landscapes avoided by harvesters when accessing the shore; exclusion of historical mining areas.
Submerged or partially submerged sea caves [8330]	Risk of disturbance from noise, light, or vibration near cave entrances, especially if used by sensitive fauna such as seals or bats.	No entry to cave areas; avoid activity in known locations of sea caves.

Table 4 Summary Table of Potential Impacts and Mitigation for Kenmare River SAC species.

Qualifying Interest (Code)	Potential Impact	Mitigation Summary (Code of Practice)
Vertigo angustior (Narrow-mouthed Whorl Snail) [1014]	Unlikely to be directly affected, as this species inhabits dune slacks and humid grasslands well above the intertidal zone targeted for harvesting. However, indirect trampling or encroachment could affect habitat structure if movement is not carefully managed near coastal dune systems.	The Code of Practice requires that harvesting activity remains strictly within predefined intertidal zones and excludes dune systems. Personnel are instructed to avoid vegetated upper shore and dune slack areas. Access routes used by harvesters must not traverse or involve trampling across dune systems, to avoid unnecessary disturbance of coastal habitats.
Rhinolophus hipposideros (Lesser Horseshoe Bat) [1303]	No significant direct impacts are anticipated due to the species' nocturnal behaviour and preference for roosting in terrestrial structures. However, accidental disturbance could occur if roosts are present in nearby buildings, caves or boathouses used as equipment storage or shelter.	Precautionary measures in the Code of Practice include training all harvesters to identify signs of bat roosts and to avoid entering buildings or structures without prior inspection. Staff and harvesters are instructed not to disturb any suspected roosting sites and to report any bat sightings to management.
Phocoena phocoena (Harbour Porpoise) [1351]	Hand-harvesting is a low-impact, non-motorised activity conducted in intertidal zones. Consequently, acoustic or spatial disturbance to Harbour Porpoise is highly unlikely, given their preference for deeper subtidal and pelagic zones.	The Code of Practice includes measures to prevent disturbance of marine mammals, and steps to record disturbance events. Harvesters will also be trained to identify presence of marine mammals such as Harbour Porpoise, as part of the general environmental awareness training.

Qualifying Interest (Code)	Potential Impact	Mitigation Summary (Code of Practice)
Lutra lutra (Otter) [1355]	There is some potential for localised disturbance to otters, particularly at shoreline commuting routes, resting sites and possible holts. Intertidal activity during foraging periods could interfere with natural behaviour if precautions are not observed.	The Code of Practice requires that harvesters do not interfere with otter holts and resting/couching sites. Harvesters are required to avoid shores at dusk or night, where possible. Site personnel receive species awareness briefings and follow low-noise, low-impact working practices.
Phoca vitulina (Harbour Seal) [1365]	Disturbance could occur if harvesting is conducted close to known seal haul-out sites, particularly during breeding and moulting seasons. Even low levels of human presence may cause stress or flushing behaviour.	The Code of Practice mandates that harvester boats must not enter within 100m of breeding and moulting sites during sensitive times. Field teams are trained in marine mammal disturbance protocols and will maintain visual observation to avoid unintentional disturbance.

7. RESIDUAL IMPACTS

7.1 Introduction

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. Favourable conservation status is defined for Annex I habitats and Annex II species in the Habitat Directive (1992):

- Article 1 (e)
  Conservation status of a natural habitat means the sum of the influences acting on a natural habitat and its typical species that may affect its long-term natural distribution, structure and functions as well as the long-term survival of its typical species within the territory referred to in Article 2.
  The conservative status of a natural habitat will be taken as 'favourable' when: its natural range and areas it covers within that range are stable or increasing, and the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future.

- Article 1 (i)
  Conservation status of a species means the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations within the territory referred to in Article 2.
  The conservation status will be taken as 'favourable' when: population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- the conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

The current assessment utilizes the site-specific conservation objectives and the national 'Status of EU Protected Habitats and Species in Ireland' Report (NPWS, 2019a; NPWS, 2019b; NPWS, 2019c).

The implementation of the provided mitigation measures is considered to be sufficient to minimise any risk of impacts to the Natura 2000 sites. There are no impacts arising from the proposed development which could affected the conservation status of the Annex I habitats or Annex II species listed as qualifying interests of the SACs or SPA.

The proposed development will comply with the required mitigation to ensure that there will be no residual impacts arising.

7.2 Kenmare River SAC

7.2.2 Qualifying Interests (habitats)

7.2.2.1 Large shallow inlets and bays [1160]

The potential impact on this habitat depends on the spatial and temporal extent of the activity and on the sensitivity of associated biological communities. *A. nodosum* is a key component of the intertidal rocky shore, often forming dense canopies in the mid to upper intertidal zone. These stands contribute to habitat structure, provide shelter for invertebrates, and support biodiversity.

If poorly managed, hand-harvesting could potentially reduce canopy cover and lead to localised disturbance of rocky shore ecosystems, particularly in areas where *A. nodosum* beds form part of the structural and functional matrix of the large shallow bay. Potential effects include increased desiccation stress on underlying biota, reduction in shelter or habitat for certain mobile invertebrate and vertebrate species (e.g. fish, juvenile fish), and short-term alterations to community composition. However, where harvesting is carried out under strict controls, with retention of holdfasts and partial canopy, and where adequate rotation and rest periods are enforced, the risk of significant, long term or lasting impact to the [1160] habitat is low.

In the case of the proposed project, the Code of Practice provides for rotational harvesting, biomass limits and exclusion of sensitive areas. These measures are consistent with maintaining the ecological integrity of the Large shallow inlets and bays habitat. Therefore, provided that these safeguards are fully implemented, and that harvesting does not occur in areas with fragile or rare benthic communities, it is unlikely that this Annex I habitat will be adversely affected. Nonetheless, continued management of activities is necessary to ensure sustainability and to detect any potential effects of harvesting that might arise over time, including potential cumulative or sub-lethal effects, where applicable,

7.2.2.2 Reefs [1170]

With regard to the potential impacts of the hand harvesting o*f Ascophyllum nodosum* on this habitat, the risk is generally confined to the intertidal reef zone. If harvesting is unregulated or excessive, it may lead to a temporary reduction in algal cover, disturbance to the understorey community, increased exposure of bare rock, and potential shifts in species composition. Such impacts could potentially degrade the ecological quality of reef features, especially where sensitive species are present or where the habitat could potentially overlap with other conservation features such as *Zostera* beds or saltmarsh margins.

However, under the proposed project, harvesting is strictly limited to hand methods, with a mandated minimum cut height above the holdfast, rotational harvesting, and exclusion zones around sensitive reef areas. No harvesting is proposed on subtidal reefs or in areas of high conservation sensitivity. These measures significantly reduce the potential for long-term or large-scale adverse effects.

Therefore, while Reefs [1170] in the Kenmare River SAC could be locally affected by *Ascophyllum nodosum* hand harvesting in intertidal areas, the risk of significant ecological degradation is low if the activity is conducted in strict accordance with the established Code of Practice and within the limits of Ministerial consent. Ongoing site-specific management will be essential to ensure the conservation status of the reef habitat is maintained

7.2.2.3 Perennial vegetation of stony banks [1220]

Direct impacts on this habitat from the proposed project are unlikely, provided that harvesting is restricted to intertidal rocky shores and does not involve any activity above the high tide mark where these vegetated stony banks are located. However, indirect impacts could arise if access routes to harvesting areas are poorly managed and traverse these sensitive habitats, leading to physical trampling, vegetation loss, or substrate disturbance.

The Code of Practice for the proposed harvesting activity in Kenmare River SAC includes measures to avoid such impacts, including the requirement that access routes used by harvesters must not traverse or involve trampling across stony bank areas, and awareness training for harvesters.

Perennial vegetation of stony banks [1220] is a restricted but significant habitat within Kenmare River SAC. Provided that harvesting activities are conducted within the intertidal zone and that harvesters do not access Perennial vegetation of stony banks areas, there should be no adverse effect on the conservation status of this habitat from the proposed hand-harvesting of *Ascophyllum nodosum.* Nonetheless, ongoing management of activities and adherence to best practice guidelines remain essential to safeguard against unintentional disturbance.

7.2.2.4 Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]

It is unlikely that this habitat would be directly affected, as vegetated sea cliffs occur above the high-water mark and are not part of the intertidal zone where harvesting will take place. However, indirect impacts could arise if harvesting personnel access intertidal sites by crossing cliff edges or cliff-top vegetation, especially in locations where informal paths or routes are used without appropriate management. This could lead to trampling, soil erosion, or vegetation damage on these fragile habitats.

The Code of Practice for the hand-harvesting activity includes measures to avoid such effects, including the exclusion of ecologically sensitive terrestrial habitats from harvesting operations, including vegetated sea cliffs.

Vegetated sea cliffs [1230] are a qualifying habitat within the Kenmare River SAC and are of significant conservation value due to their distinctive flora and role in supporting coastal ecological processes. While the proposed seaweed harvesting activity is not expected to affect this habitat directly, strict adherence to the Code of Practice to ensure that harvesters do not access vegetated sea cliffs, is essential to prevent indirect impacts and ensure the habitat's continued integrity.

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

Atlantic salt meadows are not directly targeted, as this activity is confined to the intertidal rocky shores where the seaweed is found. However, indirect impacts may occur if access routes to harvesting zones pass through or adjacent to saltmarsh areas, particularly in locations where soft sediment and vegetation are vulnerable to trampling, erosion, or compaction. Repeated foot traffic in such areas can degrade the structure and function of saltmarsh vegetation and result in loss of cover or soil destabilisation.

The Code of Practice for the project explicitly identifies sensitive habitats such as [1330] salt meadows as areas to be avoided, and requires that access routes used by harvesters must not traverse or involve trampling across saltmarsh areas, to prevent unintentional disturbance. Harvesting will not be permitted in areas where crossing saltmarsh is required, and biosecurity measures are also included to prevent the introduction of invasive species that could alter saltmarsh community dynamics.

In summary, Atlantic salt meadows [1330] are a widespread and ecologically important habitat within the Kenmare River SAC. While not directly affected by the hand harvesting of *Ascophyllum nodosum*, they are potentially vulnerable to indirect impacts from access and trampling. However, provided that the Code of Practice is rigorously implemented and that harvesters do not access saltmarsh areas, it is expected that the conservation status of this habitat can be safeguarded during the operation of the proposed harvesting project.

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

With respect to the proposed hand harvesting of *Ascophyllum nodosum*, direct impacts on Mediterranean salt meadows are not anticipated, as the target species is confined to the rocky intertidal zone, well below the elevation at which this saltmarsh type occurs. However, indirect impacts could arise if harvesting personnel use informal or unregulated access routes that traverse saltmarsh areas, particularly during wet conditions when the ground is more susceptible to trampling and compaction. Damage to Sea Rush swards can be slow to recover and may lead to fragmentation of the vegetation or encroachment by ruderal or invasive species.

The project's Code of Practice has recognised this risk and incorporates measures to avoid such impacts. It specifically identifies upper saltmarsh habitats, including those dominated by Sea Rush, as exclusion zones, requires that access routes used by harvesters must not traverse or involve trampling across saltmarsh areas and that such features be avoided. In addition, training and supervision are provided to harvesters to reinforce awareness of sensitive habitats and to ensure compliance with the environmental safeguards in place.

In conclusion, Mediterranean salt meadows [1410] are a well-represented and ecologically important habitat within the Kenmare River SAC, contributing to the diversity and structural complexity of coastal wetland systems. While the hand harvesting of *Ascophyllum nodosum* does not target this habitat, it is necessary that the Code of Practice is rigorously implemented and that harvesters do not access saltmarsh zones to prevent indirect disturbance. Provided the Code of Practice is fully implemented, significant effects on this habitat are unlikely.

7.2.2.7 Shifting dunes along the shoreline with Ammophila arenaria (white dunes) [2120]

This habitat is not directly targeted as the seaweed occurs exclusively on rocky intertidal shores, well below the elevation of dune systems. However, there is potential for indirect impacts if harvesters use dune systems for access to the shore, particularly in areas where formal paths are lacking or unmarked. Trampling of Marram Grass and associated dune vegetation can destabilise the foredune, leading to increased erosion, habitat degradation, and a loss of natural dune dynamics.

To address this risk, the project's Code of Practice includes clear provisions that harvesting operations must avoid crossing dune systems, and requires that access routes used by harvesters must not traverse or involve trampling across such areas. Awareness training for harvesters is also integral to the mitigation strategy to prevent disturbance to this sensitive habitat.

White dunes [2120] are a dynamic and ecologically significant habitat type within the Kenmare River SAC, particularly at Derrynane. While they are not directly affected by the harvesting of *Ascophyllum nodosum*, their vulnerability to trampling and erosion requires that strict access controls and environmental safeguards be maintained. With full implementation of the Code of Practice, adverse effects on this habitat are not anticipated.

7.2.2.8 Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]

Grey dunes are not a target habitat and do not contain intertidal rock suitable for seaweed collection. However, indirect impacts could arise if access routes to harvesting areas traverse dune systems. Trampling by harvesters could lead to vegetation damage, soil compaction, and destabilisation of the dune structure, all of which could compromise the habitat's conservation status. In particular, rare and protected plant species are susceptible to disturbance and loss through even low levels of physical impact.

The Code of Practice for the project addresses these risks through clear mitigation measures. It designates dune habitats, including fixed dunes, as exclusion areas, and stipulates that all access to the shoreline must avoid dune systems entirely, and that access routes used by harvesters must not traverse or involve trampling across these areas. Robust management of harvesting activities and environmental training for harvesters are in place to ensure these controls are respected, and that unintentional impacts are prevented.

Grey dunes [2130] represent a structurally and floristically rich habitat of high conservation value within the Kenmare River SAC. Although they are not directly affected by the hand-harvesting of *Ascophyllum nodosum*, their sensitivity to disturbance requires robust protection measures. Provided the Code of Practice is strictly implemented, significant impacts on this habitat are not expected.

7.2.2.9 European dry heaths [4030]

The hand-harvesting of *Ascophyllum nodosum* takes place in the intertidal zone of rocky shores, typically at a distance from the locations where European dry heath occurs. Consequently, direct impacts on this habitat are not expected. However, there is potential for indirect effects if access routes are poorly managed and if harvesting personnel were to cross heathland areas to reach coastal harvesting sites. Dry heath vegetation is particularly vulnerable to trampling, erosion, and disturbance, especially in steep or sloping areas where vegetation cover is thin or patchy. Such disturbance could lead to loss of cover, damage to rare plant populations, and increased risk of invasive species colonisation.

These concerns have been anticipated in the project's Code of Practice, which explicitly identifies dry heath and similar sensitive terrestrial habitats as exclusion zones, and requires that access routes used by harvesters must not traverse or involve trampling across these areas. Harvesting personnel are trained to recognise and avoid entering or damaging such habitats. Management of harvesting activities will ensure compliance with the Code of Practice and the prevention of any potential impacts.

In summary, European dry heaths [4030] are an important conservation feature within the Kenmare River SAC, with particularly high botanical value due to the presence of rare species and the integration of heathland with other coastal habitats. Although not directly targeted or adjacent to harvesting zones, the habitat could be vulnerable to unregulated access. With proper adherence to the Code of Practice and mitigation measures, the risk of impact from *Ascophyllum nodosum* hand-harvesting is considered low.

7.2.2.10 *Juniperus communis* formations on heaths or calcareous grasslands [5130]

The proposed activity is confined to the intertidal rocky shoreline, and does not directly overlap with areas supporting juniper scrub. However, as with other terrestrial habitats of conservation concern, there is potential for indirect impacts if access to the shore is not carefully managed. Trampling, even

from occasional foot traffic, could damage sensitive vegetation, compact soils, and disrupt natural regeneration processes of juniper, which already regenerates poorly under most Irish conditions.

To address this, the project's Code of Practice explicitly prohibits access through sensitive terrestrial habitats, including juniper scrub and adjacent heathland, and requires that access routes used by harvesters must not traverse or involve trampling across these areas. Awareness training is also integral to the mitigation strategy to ensure compliance.

In conclusion, the Juniperus communis formations on heaths or calcareous grasslands [5130] within Kenmare River SAC represent a rare and valuable habitat, occurring in discrete inland and coastal locations. While not directly impacted by the proposed *Ascophyllum nodosum* harvesting, its vulnerability to disturbance requires careful management. With full implementation of the proposed safeguards, significant adverse effects on this habitat are not expected.

7.2.2.11 Calaminarian grasslands of the *Violetalia calaminariae* [6130]

Calaminarian grasslands are not situated near the intertidal zones where harvesting will occur. As a result, direct impacts from harvesting are not anticipated. However, as with other inland terrestrial habitats, indirect effects could potentially occur if harvesters were to traverse through or near these sites when accessing the shoreline. This could lead to soil compaction, trampling of rare moss and lichen species, or inadvertent erosion of fragile substrates.

To address such concerns, the project's Code of Practice establishes strict access restrictions and clearly identifies sensitive terrestrial habitats, including Calaminarian grasslands, as exclusion zones, and requires that access routes used by harvesters must not traverse or involve trampling across these areas. Harvesters are trained to recognise such areas and to avoid contact with or proximity to inland conservation features. Effective implementation of the Code of Practice will ensure that these measures are effective.

Calaminarian grasslands of the *Violetalia calaminariae* [6130] are a rare and ecologically valuable habitat in the Kenmare River SAC, associated with historic mining activity and supporting highly specialised plant communities. Although these grasslands are not located near the intertidal zone, where seaweed harvesting will take place, their protection is ensured through the implementation of the Code of Practice and environmental training. Therefore, with adherence to the established Code of Practice, no significant effects on this habitat are expected from the proposed harvesting activity.

7.2.2.12 Submerged or partially submerged sea caves [8330]

Direct interaction with this habitat type is unlikely, as seaweed harvesting is concentrated on exposed and moderately sheltered intertidal rocky shores, where *A. nodosum* forms dense canopies. Sea caves, on the other hand, tend to occur at the base of steep coastal cliffs and are often inaccessible or unsafe for harvesting activity. Furthermore, the biological communities associated with sea caves do not include *Ascophyllum nodosum*, which otherwise requires sheltered environs.

Nonetheless, potential indirect effects cannot be entirely discounted. Disturbance from human activity in the vicinity of cave entrances, particularly during low tides, could theoretically affect the more sensitive cave-dwelling fauna. This risk is particularly relevant where caves are located near known access routes or where inexperienced harvesters might explore unfamiliar shoreline features.

These concerns are addressed in the project's Code of Practice, which requires that access routes used by harvesters must not traverse or involve trampling across cliffs and cave features. The

requirement to remain within mapped harvesting zones and avoid unnecessary coastal exploration reduces the likelihood of any disturbance to sea caves.

Submerged or partially submerged sea caves [8330] are a valuable and well-documented feature of the Kenmare River SAC. They support specialist marine communities and are geographically distinct from the intertidal *A. nodosum* beds targeted for hand-harvesting. While there is a low risk of indirect disturbance, the implementation of the Code of Practice ensures that this risk is minimised, and no significant impacts on this habitat are anticipated as a result of the proposed activity.

7.2.3 Qualifying Interests (species)

7.2.3.1 *Vertigo angustior* (Narrow-mouthed Whorl Snail) [1014]

There is no direct overlap between the primary zones of *Ascophyllum nodosum* hand-harvesting, which occurs in the intertidal marine environment, and the terrestrial habitats occupied by *Vertigo angustior*. However, there remains a potential for indirect impacts where access routes or foot traffic cross dune habitats to reach shoreline areas. If uncontrolled, such activity could cause trampling and compaction of sensitive vegetation, desiccation of dune slacks, and disturbance to the microhabitats that support the species.

The project's Code of Practice includes spatial controls and operational restrictions designed to avoid such impacts. Harvesting activities are to be confined to mapped intertidal zones and access routes used by harvesters must not traverse or involve trampling across terrestrial or dune habitats occupied by *Vertigo angustior*. These measures are supported by harvester training.

As a result, the risk of impact to Vertigo angustior is considered low, provided these procedures are adhered to. The presence of this Annex II species within the SAC reinforces the need for careful adherence to the Code of Practice, particularly in relation to site access and operational activity near designated terrestrial habitats.

7.2.3.2 *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303]

It is unlikely that the proposed activities would directly affect the Lesser Horseshoe Bat within the Kenmare River SAC. The proposed harvesting will occur in intertidal zones, whereas the bat's roosting and foraging habitats are terrestrial and typically located inland. However, there is a precautionary consideration that the species could roost in structures near the shoreline, such as boathouses or other outbuildings. Therefore, it is important for project personnel involved in the harvesting operations to be aware of the presence of this protected species in the area. Precautionary mitigation measures should include training for staff to recognize potential bat roosting sites and protocols to avoid disturbing these areas. By implementing such measures, the risk of inadvertently impacting the Lesser Horseshoe Bat can be effectively minimized, ensuring compliance with conservation objectives and the continued protection of this species within the SAC.

7.2.3.3 *Phocoena phocoena* (Harbour Porpoise) [1351]

The hand-harvesting of *Ascophyllum nodosum* (knotted wrack) within the Kenmare River SAC is conducted in intertidal zones, focusing on the sustainable collection of seaweed. Given that harbour porpoises predominantly inhabit deeper subtidal waters and are sensitive to underwater noise and disturbances, the low-impact nature of hand-harvesting activities, which do not involve mechanized equipment or significant noise generation, suggests a negligible risk of disturbance to this species.

Furthermore, the spatial separation between harvesting sites and typical harbour porpoise habitats within the SAC further reduces the likelihood of any adverse interactions.

Nonetheless, as a precautionary measure, it is essential that all personnel involved in the hand-harvesting operations are made aware of the presence of harbour porpoises within the SAC. Training should include information on the species' protected status, ecological significance, and the importance of minimizing disturbances. By promoting awareness and adherence to best practices, the integrity of the harbour porpoise population within the Kenmare River SAC can be effectively safeguarded.

7.2.3.4 *Phoca vitulina* (Harbour Seal) [1365]

The hand-harvesting of *Ascophyllum nodosum* (knotted wrack) within the Kenmare River SAC is conducted in intertidal zones, focusing on the sustainable collection of seaweed. Given that Harbour Seals utilize intertidal and nearshore areas for hauling out, there is potential for disturbance if harvesting activities occur near these sites. However, the harvesting practices are designed to minimize such impacts. Harvesters are trained to recognize and avoid seal haul-out sites, especially during sensitive periods such as breeding and molting seasons, and are also trained on measures required to prevent disturbance events. By adhering to these guidelines, the risk of disturbance to Harbour Seals is significantly reduced. Therefore, while there is a potential for interaction, the implementation of best practices ensures that the proposed activity does not adversely affect the Harbour Seal population within the Kenmare River SAC.

7.2.3.5 *Lutra lutra* (Otter) [1355]

Regarding the potential impact of hand-harvesting *Ascophyllum nodosum* (knotted wrack) within the Kenmare River SAC, it is unlikely that such activities would significantly affect the otter population. The harvesting is conducted in intertidal zones, focusing on the sustainable collection of seaweed, and does not involve significant disturbance or habitat alteration. However, to ensure the continued protection of otters, it is important that harvesting activities are managed to avoid disturbance to key otter habitats, particularly resting and breeding sites along the shoreline. Implementing best practice guidelines, such as preventing interactions with otter holts and minimizing noise and human disturbance can further mitigate any potential impacts. By adhering to these measures, the integrity of the otter population within the Kenmare River SAC can be effectively safeguarded.

7.3 Other Natura 2000 sites

It is considered important for the harvesters to be aware of the location of these sites and ensure that no activities take place with the boundaries of these sites. Also, biosecurity measures will be implemented to protect these sites. These sites will be identified in the work plans and adherence to the mitigation will be ensured through implementation of the Code of Practice. It is considered that the assessment of these sites is precautionary only and the mitigation and full protection of these sites will be easily delivered though the proposed project.

9. CONCLUSION STATEMENT

The provisions of Article 6 of the 'Habitats' Directive 92/43/EC (2000) defines 'integrity' as the: 'coherence of the site's ecological structure and function, across its whole area, or the habitats, complex of habitats and/or population of species for which the site is or will be classified'.

Mitigation measures proposed ensure that there are no residual impacts on the Kenmare River SAC or any other Natura 2000 sites. The potential impacts identified will be successfully avoided and/or reduced in scale following the implementation of the mitigation measures in this NIS.

Mitigation measures for hand harvesting of *Ascophyllum nodosum* within Kenmare River SAC will be managed based on a precautionary, ecologically informed approach. By regulating harvest intensity, avoiding sensitive areas, enforcing seasonal restrictions, and implementing robust biosecurity protocols and monitoring, the potential for adverse effects on the site's Qualifying Interests can be minimised. These measures will form part of an enforceable management framework to ensure long-term sustainability and compliance with the conservation objectives of the SAC.

It has therefore been concluded that following an examination, analysis and evaluation of the relevant information, including in particular the nature of the predicted impacts from the proposed activity, and with the implementation of the mitigation measures proposed, that the proposed works do not pose a risk adversely affecting the integrity of any Natura 2000 site, either alone or in-combination with other plans or projects.

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PLATES

Plate 1 Kenmare River SAC is designated for a variety of Annex I habitats and Annex II species.

Plate 2 Large shallow inlets and Bays are a qualifying interest of the Kenmare River SAC.

Plate 3 The shores of Kenmare Bay showing *Ascophyllum nodosum*.

Plate 4 Common (harbour) Seal *Phoca vitulina* at Kenmare Bay, a species designated within the Kenmare River SAC.

Plate 5 Common (harbour) Seal *Phoca vitulina* at Kenmare Bay, a species designated within the Kenmare River SAC.

Plate 6 *Ascophyllum nodosum* in Kenmare Bay.

Plate 7 *Ascophyllum nodosum* partly in water; showing single bladders which grow centrally in long fronds.

Plate 8 BioAtlantis will utilize sustainable hand harvesting techniques to ensure no excessive removal occurs; harvesters will cut >200mm above the holdfast.

Plate 9 Holdfast of *Ascophyllum nodosum*; showing multiple fronds growing from each holdfast.

APPENDIX 1 PROJECT PROPOSAL (BIOATLANTIS)

The following project proposal documents are provided separately:-

- BioAtlantis (2025a) License Application for sustainable hand-harvesting of *Ascophyllum nodosum* in Kenmare Bay. Proposal Document.
- BioAtlantis (2025b) Assessment of Impact of the Maritime Usage (AIMU) Report for the sustainable hand-harvesting of *Ascophyllum nodosum* in Kenmare Bay.