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Water Framework Directive Assessment - Ballyness Bay Oyster and Clam Aquaculture Sites

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Contents

1. Introduction	1
1.1. Background.....	1
1.2. Legislative Context.....	1
1.3. Water Framework Directive Assessment	2
2. Project Overview.....	3
2.1. Licence description.....	3
2.2. Site Context	5
2.3. Cultivation Methods	6
2.3.1. Oyster Cultivation.....	6
2.3.2. Intertidal Clam Cultivation	6
2.3.3. Spatial footprint of proposed aquaculture sites in context of Ballyness Bay.	7
2.1. Access Routes	8
3. Water body Screening.....	9
3.1. Introduction.....	9
3.2. Zone of Influence.....	9
4. Waterbody Overview	11
4.1. WFD Classification System.....	11
4.2. Ballyness Bay WFD Status.....	11
4.3. Northwestern Atlantic Seaboard Status.....	12
4.4. Identification of Protected Areas	13
5. No Deterioration Assessment	14

5.1.	Introduction.....	14
5.2.	Physicochemical elements.....	14
5.3.	Hydromorphological Elements	14
5.4.	Biological Elements.....	15
5.5.	Chemical Status	16
5.6.	Conclusion of No Deterioration Assessment.....	17
6.	Achievement of Good Status	17
7.	Conclusion.....	18
8.	Statement of Authority	18
9.	References	20

List of Figures

Figure 2-1: Spatial footprint of Proposed Aquaculture Sites within Ballyness Bay.	8
Figure 3-1: Location of WFD coastal and transitional water bodies in the vicinity of the proposed aquaculture sites.....	10

List of Tables

Table 2.1: List of appealed aquaculture sites granted by the minister for Agriculture, Food and the Marine included in this WFD assessment.	4
Table 2.2: Estimated annual production tonnages provided by the applicant for the proposed aquaculture sites in Ballyness Bay.	5
Table 2.3: Spatial footprint of the proposed aquaculture sites in Ballyness Bay.	7
Table 4.1: Status of relevant waterbodies as reported under the WFD.	12
Table 5.1 Assessment of interaction with WFD objectives.	16

1. Introduction

1.1. Background

AQUAFACT, a member of the APEM Group, have been commissioned to prepare a Water Framework Directive (WFD) assessment in relation to the proposed aquaculture licences at Ballyness Bay, Co. Donegal (**Table 2.1**).

This WFD Assessment identifies relevant WFD surface water bodies located in the proximity of the proposed Project and undertakes an assessment of the potential for the proposed Project to impact on the main objectives of the WFD.

1.2. Legislative Context

The EU Water Framework Directive (Directive 2000/60/EC) establishes a framework for the protection of inland surface waters, transitional waters, coastal waters, and groundwater. It aims to prevent and reduce pollution, promote sustainable water use, protect and improve the aquatic environment and mitigate the effects of floods and droughts.

In Ireland, the WFD is transposed by the following national regulations:

- European Communities (Water Policy) Regulations (2003 and 2014) and;
- European Union Environmental Objectives (Surface Waters) Regulations (2009, 2012, 2015 and 2019)

Under the WFD, a water body is the basic management unit used to assess if the environmental objectives for that water body have been met.

The key environmental objectives of the WFD are set out in Article 4 of the Directive. It requires member states to use their River Basin Management Plans (RBMPs) and Programme of Measures (PoMs) to protect and, where necessary, restore water bodies in order to reach good status, and to prevent deterioration. Good status means both good chemical and good ecological status. RBMPs are key tools for implementing the WFD and are drawn up every six-years following extensive public consultation.

The Irish River Basin District (RBD) covers an area of 70,273 km², with 46 catchment management units consisting of 583 sub-catchments and 4,829 water bodies (DHLGH, 2018).

In Ireland, the Department of Housing, Local Government and Heritage leads the development and implementation of Ireland's river basin management plans. To date, there have been two full cycles of river basin management planning in Ireland: the first cycle covered the period 2010-2015 and the second cycle the period 2018-2021. Ireland's third cycle RBMP will cover the period 2022- 2027.

Under the requirements of the WFD, member states and competent authorities within those member states must ensure that the requirements of Article 4 are met. Specifically, the relevant competent authorities of a member state must consider whether proposals for new schemes/development have the potential to:

1. Cause a deterioration of a water body from its current status or potential, and or,
2. Jeopardise attainment of good status or potential where not already achieved.

As a result, new schemes and developments that have the potential to impact on current or predicted WFD water status are required to assess their compliance against the WFD objectives of the potentially affected water bodies.

1.3. Water Framework Directive Assessment

To allow the relevant competent authority to determine if a proposed project is likely to prevent the objectives of the Directive being met, the applicant should undertake a Water Framework Directive Assessment.

The assessment should provide sufficient information to allow the competent authority to determine the following:

1. What water bodies should be considered in the assessment;
2. Will the proposed development result in deterioration of water status of a water body or water bodies considered in the assessment;
3. Will the proposed development jeopardise the achievement of good water status of a water body or water bodies considered in the assessment;
4. Is the proposed development compatible with the WFD Programme of Measures.

2. Project Overview

2.1. Licence description

There are currently 10 applications for aquaculture granted by the Minister for Agriculture, Food and the Marine that are being appealed which are covered under this assessment. Seven licence granted sites are being appealed for Pacific oyster (*Magallana gigas* formerly *Crassostrea gigas*) production using the bag and trestle method only, with an additional 2 applications to culture oysters (on bags and trestles) in addition to clams under netting on the seabed in the intertidal zone. There is a single application to culture clams (only). This assessment focuses on the sites specified in **Table 2.1**. There were two operators in the 1990's that held licences for oyster farming, but these operations are now ceased and these licences are no longer valid.

The aquaculture licences were originally granted, or granted with variation, by the Minister for Agriculture, Food and the Marine. These decisions were subsequently appealed to the Aquaculture Licences Appeals Board (ALAB), which confirmed the Minister's decisions. Following judicial review, the ALAB determinations were quashed and remitted to ALAB for reconsideration. The appeals are currently at Stage 3: Information Gathering.

Information provided by the applicants indicates that, following the original grant of the licences, three adjacent sites on the western side of the bay became briefly operational prior to the quashing of the licences. These sites were subsequently restored to their previous condition and all aquaculture structures were removed. No aquaculture activity is currently taking place. The operations that took place are further described below.

In August 2024, metal trestles were installed at sites T12-407B and T12-515A for oyster culture and at site T12-441A, metal trestles and wooden frames were installed for oyster and clam aquaculture, respectively. In September 2024, seed was placed on site. The access route used for equipment transport and routine operations followed routes as permitted under the granted licences (*i.e.*, including partial access over Annex I habitat mudflats and sandflats not covered by seawater at low tide [1140] and did not involve access over any dune habitat). In March 2025, it was anticipated that the granted licences may be subject to quashing and all oyster and clam seed was removed during March and April 2025. All movements of stock were undertaken in accordance with the Fish Health Unit of the Marine Institute. Following confirmation that the licences had been quashed, all trestles,

wooden frames, and pole markers were removed from the shore. The sites were restored to their original condition, which represents their current state.

The proposed aquaculture is extensive in nature, limited spatially to licensed intertidal areas, and does not involve external feed inputs. Estimated annual production tonnages have been provided by the applicant for each site and represent best estimates of anticipated annual production rather than fixed licensed capacities. These may differ from original licence application figures due to changes in licensed area and subsequent operational downsizing. Overall, the intensity of production is low and constrained by natural environmental conditions and carrying capacity (see **Table 2.1**, **Table 2.2** and **Figure 2-1**).

Table 2.1: List of appealed aquaculture sites granted by the minister for Agriculture, Food and the Marine included in this WFD assessment.

Site Ref.	Cultivation licence	Applicant	Ministers Decision
T12/407B	Cultivation of Pacific Oysters (<i>Crassostrea gigas</i>) using bags and trestles on the inter-tidal foreshore on site ref T12/407B in Ballyness Bay, Co. Donegal.	Joseph Coll	Grant
T12/409A	Cultivation of clams (<i>Ruditapes philippinarum</i>) on wooden trays under mesh on the inter-tidal/sub-tidal foreshore on site ref T12/409A in Ballyness Bay, Co. Donegal.	Edward & Paul O'Brien	Grant with variation
T12/409B (1&2)	Cultivation of Pacific Oysters (<i>Crassostrea gigas</i>) using bags and trestles and cultivation of clams (<i>Ruditapes philippinarum</i>) on wooden trays under mesh on the inter-tidal/sub-tidal foreshore on site ref T12/409B in Ballyness Bay, Co. Donegal.	Edward & Paul O'Brien	Grant with variation
T12/441A	Cultivation of Pacific Oysters (<i>Crassostrea gigas</i>) using bags and trestles and cultivation of clams (<i>Ruditapes philippinarum</i>) on wooden trays under mesh on the foreshore on site ref T12/441A in Ballyness Bay, Co. Donegal.	Anthony McCafferty	Grant
T12/441B	Cultivation of Pacific Oysters (<i>Crassostrea gigas</i>) using bags and trestles on the foreshore on site ref T12/441B in Ballyness Bay, Co. Donegal.	Anthony McCafferty	Grant
T12/441C	Cultivation of Pacific Oysters (<i>Crassostrea gigas</i>) using bags and trestles on the foreshore on site ref T12/441C in Ballyness Bay, Co. Donegal.	Anthony McCafferty	Grant
T12/500A	Cultivation of Pacific Oysters (<i>Crassostrea gigas</i>) using bags and trestles on the inter-tidal foreshore on site ref T12/500A in Ballyness Bay, Co. Donegal.	Joseph Coll	Grant
T12/502A	Cultivation of Pacific Oysters (<i>Crassostrea gigas</i>) using bags and trestles on the inter-tidal foreshore on site ref T12/502A in Ballyness Bay, Co. Donegal.	Joseph Coll	Grant

Site Ref.	Cultivation licence	Applicant	Ministers Decision
T12/515A	Cultivation of Pacific Oysters (<i>Crassostrea gigas</i>) using bags and trestles on the inter-tidal foreshore on site ref T12/515A in Ballyness Bay, Co. Donegal.	Joseph Coll	Grant
T12/516A	Cultivation of Pacific Oysters (<i>Crassostrea gigas</i>) using bags and trestles on the inter-tidal foreshore on site ref T12/516A in Ballyness Bay, Co. Donegal.	Joseph Coll	Grant

Estimated annual production tonnages were provided by the applicant for each individual site. These figures represent best estimates of annual production and may differ from figures contained in earlier licence documentation due to changes in licensed area and subsequent operational downsizing (**Table 2.2**). The total estimated annual production across all sites is approximately 63 tonnes, reflecting the small-scale, extensive nature of the proposed Project relative to the size of the receiving waterbody.

Table 2.2: Estimated annual production tonnages provided by the applicant for the proposed aquaculture sites in Ballyness Bay.

Site Ref.	Applicant	Activity/ Species	Estimated annual production (tonnes)
T12/407B	Joseph Coll	Oysters	3
T12/409A	Edward & Paul O'Brien	Clams	10
T12/409B (1&2)	Edward & Paul O'Brien	Clams (3 t) + Oysters (15 t)	18 (combined)
T12/441A	Anthony McCafferty	Clam seed (<1 t) + Oysters (3 t)	~4*
T12/441B	Anthony McCafferty	Oysters	4
T12/441C	Anthony McCafferty	Oysters	4
T12/500A	Joseph Coll	Oysters	5
T12/502A	Joseph Coll	Oysters	12
T12/515A	Joseph Coll	Oysters	2
T12/516A	Joseph Coll	Oysters	1

*Tonnage figures are applicant-provided best estimates of annual production per site and are used as an indication of the likely scale and intensity of the proposed activity. These figures do not represent maximum licences production and may differ from original licence documentation due to changes in licences area and operational scaling. For T12/441A, total production is approximate due to the inclusion of a small-scale clam seed nursery (<1 tonne).

2.2. Site Context

Ballyness Bay is a large, shallow estuarine system in north-west Donegal near Gortahork and Falcarragh. The bay contains extensive sandflats exposed at low tide and is sheltered by the Dooey Peninsula, which leaves only a narrow opening to the sea. The proposed aquaculture sites lie within the Ballyness Bay SAC, and the bay lies approximately 0.8 km from the Falcarragh to Meenlaragh SPA (refer to the accompanying Natura Impact Statement (NIS) for further detail).

2.3. Cultivation Methods

2.3.1. Oyster Cultivation

All applicants will use bag and trestle as the method of cultivation and all have identified that they will grow triploid seed in the bay which will be sourced from one of the following:

1. Grain Ocean
2. Satmar
3. Guernsey Hatchery and
4. France Nissan

Oyster trestles vary in height however, typically they do not exceed 0.5 m height and their height above the sediment is often less as they sink into the sediment. The trestles are usually arranged in single or paired rows with a separation of around 4 m between rows and with wider (10-20 m) access lanes. Where the trestles occur on open sandflats the rows are usually orientated more or less perpendicularly to the tideline.

Oyster spat is supplied by hatcheries and is placed in mesh bags. Generally, only a proportion of the trestles hold oyster bags at any one time. The bags are placed on top of the trestles, where they are on-grown until they are ready for harvesting. The function of the trestles is to keep the animals off the seabed, preventing grit getting inside the oysters, providing increased water flow and allowing suitable shell growth. The mesh bags facilitate stock handling and prevent predation.

Oyster husbandry activities mainly take place during spring at low tides. Workers usually access the trestles by driving tractors across the beach and will often drive through shallow water on the receding tide to make the most use of the time available. Husbandry activities involve turning the mesh bags every spring tide to rid the bags of any settled silt, stop the growth of oyster shell into the mesh and destroy fouling organisms (Gittings & O'Donoghue, 2012).

2.3.2. Intertidal Clam Cultivation

It is proposed to culture the Manila Clam (*Ruditapes philippinarum*) on-bottom at three sites in intertidal areas. The seed is usually obtained in April, during spring season. The seed is likely to be sourced from hatcheries in France or Lissadell hatchery Co. Sligo, at size 8 mm – 12 mm and grown in trays and bags for one year after which time they are sown on intertidal ground under mesh. The netting is buried in the ground down around 10 cm and is kept in place with rope that is stapled around the edges with steel hooks. The netting is usually changed once in the cycle when the mesh size is also

increased. They reach harvestable market size around 3 years. Harvesting is carried out by tractors with modified dredges (to which sieves are attached). They are sold onto the local and regional retail marketplace, as well as to retail in France.

2.3.3. Spatial footprint of proposed aquaculture sites in context of Ballyness Bay.

The combined area occupied by all proposed aquaculture plots amounts to 14.69 ha representing a small proportion of the overall waterbody area within Ballyness Bay (594.96 ha) (**Figure 2-1**). In total, the aquaculture footprint equates to approximately 2.47% of the measured bay area (**Table 2.3**).

The proposed aquaculture footprint therefore represents a relatively small proportion of the available habitat within Ballyness Bay. As illustrated in **Figure 2-1**, the sites are spatially dispersed across the bay and do not form a continuous area of development.

The scale of activity is inherently limited by the licensed area, the extensive low-intensity nature of the proposed cultivation methods, and the estimated annual production levels provided by the applicant. Shellfish aquaculture is extractive and does not require external feed inputs, with production constrained by natural environmental conditions and carrying capacity. The total estimated annual production across all sites is approximately 63 tonnes per annum. As such, the intensity of production is low relative to other forms of aquaculture and is not expected to exert significant pressure on the receiving environment.

Given the limited spatial extent and dispersed nature of the sites, any associated environmental interactions are expected to be localised and of low magnitude.

Table 2.3: Spatial footprint of the proposed aquaculture sites in Ballyness Bay.

Parameter	Value
Total Aquaculture Footprint	14.69 Ha
Ballyness Bay Waterbody area	594.96 Ha
Aquaculture footprint as % of waterbody	2.47%

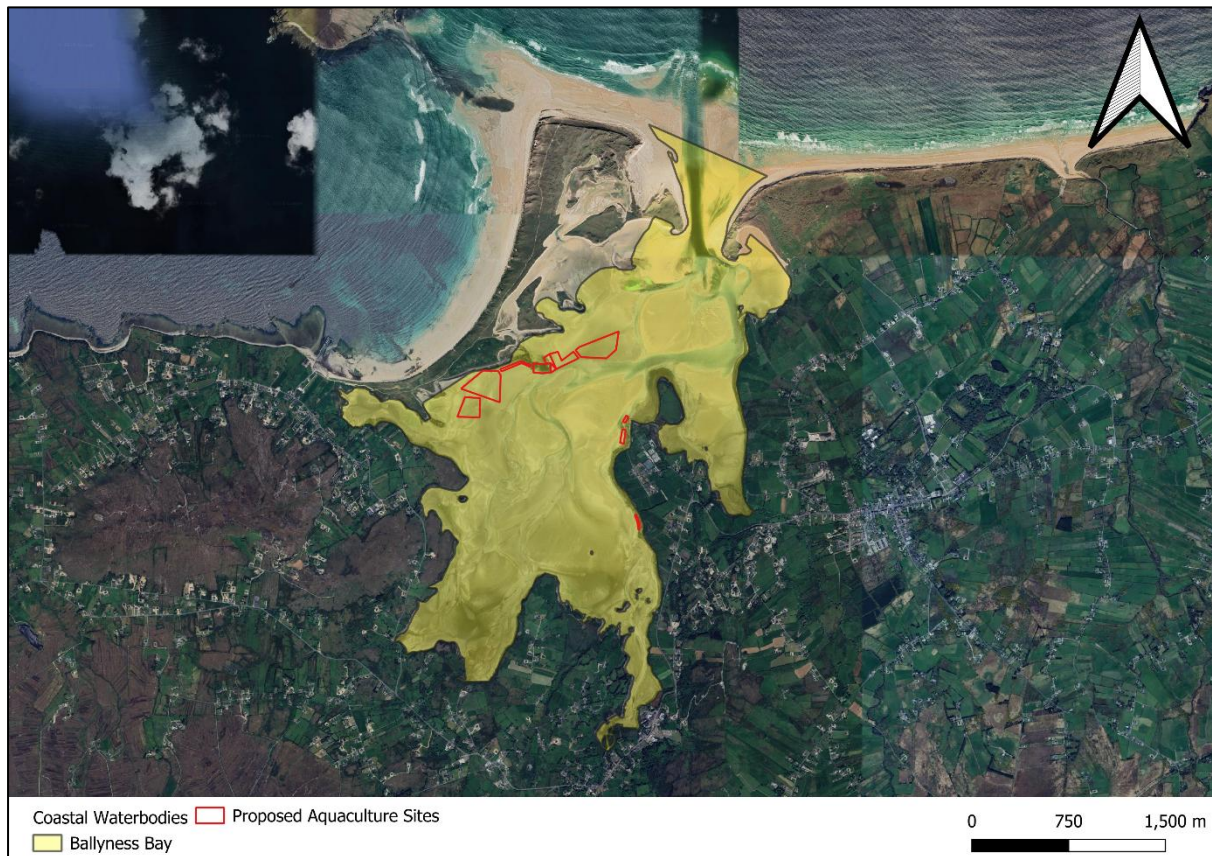


Figure 2-1: Spatial footprint of Proposed Aquaculture Sites within Ballyness Bay.

2.1. Access Routes

There are a number of access routes for the operators in the area to the applied licensed sites. Tractors and trailers are used by all applicants. One access route is proposed from Ballyness Pier to the east (via tractor and boat). For sites in the centre of the bay, access will be from a public road near Ranaghmore Island. The initially suggested access route for sites on the western side of the bay was from Magheraroarty Pier along an established sand track that runs through the QI Fixed coastal dunes with herbaceous vegetation (grey dunes) (2130), with a number of points of access to the intertidal sites. Calculation of area of the access routes in the SAC is linear length (in metres) by a putative route width of 10 m, which is considered a sufficiently precautionary estimate, gives a total spatial overlap of 6.81 ha. An access route, suggested by the Department of Agriculture, Food and the Marine (DAFM), is proposed with access from the south of the bay to avoid the areas covered by the QI Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]. The route proposed by DAFM is the route presented in this application. This route represents an addition of approximately 1 km of access track (or 0.85 ha) on the QI 1140 (Mudflats and sandflats not covered by seawater at low tide) and on the

community type Mobile Sand Community Complex. This represents total aquaculture access related coverage of 0.81% of the QI 1140 and 0.74% of the Mobile Sand Community Complex.

For the purposes of this WFD Assessment, access is assumed to be via the forementioned routes using tractors and trailers. Any interaction with intertidal sediments is expected to be temporary and localised in nature.

3. Water body Screening

3.1. Introduction

The first step in a WFD assessment is to determine which WFD identified water bodies should be included in the assessment. The source-pathway-receptor method will be used, where the source of potential pollution is the proposed Project; the pathway is the route by which pollution arising from the proposed Project may enter the environment and the receptor is defined as any WFD water body which may be impacted by this pollution. Given the nature and location of the site, the pathway to be considered in this case is the hydrological connectivity pathway between the proposed Project and any connected WFD surface water body and/or groundwater body. Hydrological connectivity not only considers the movement of water but also the movement of organisms, energy and matter through a catchment.

3.2. Zone of Influence

Management under the WFD is organised by River Basin Districts, with objectives and measures set out in Ireland's River Basin Management Plans (RBMPs). The principles underpinning the Directive are wide-ranging. Waters are to be managed according to natural hydrological boundaries, namely river basin districts, rather than administrative or political borders. Water bodies status is assessed using biological, physico-chemical, and hydromorphological quality elements. Ecological status reflects biological communities such as fish, benthic invertebrates, and aquatic plants, along with hydromorphological conditions and physico-chemical parameters. Chemical status is assessed by reference to pollutants, priority substances, and compliance with Environmental Quality Standards.

The proposed shellfish licence area is located within the Ballyness Bay coastal waterbody (IE_NW_170_0000), which is therefore considered the primary receptor (**Figure 3-1**)

Given the low-intensity and spatially limited nature of the proposed shellfish aquaculture activities, the modest estimated annual production levels, and the absence of a direct hydrological pathway to inland freshwater bodies, no inland waterbodies are considered to fall within the Zone of Influence.

The adjacent Northwestern Atlantic Seaboard coastal waterbody (IE_NW_100_0000) is also considered on a precautionary basis.

Examination of the EPA's Catchments.ie website indicates that the sub-catchments of most relevance to this WFD assessment include Tullaghobegly, Owenawillin, Glenna and An Cheathru Cheanainn sub catchments.

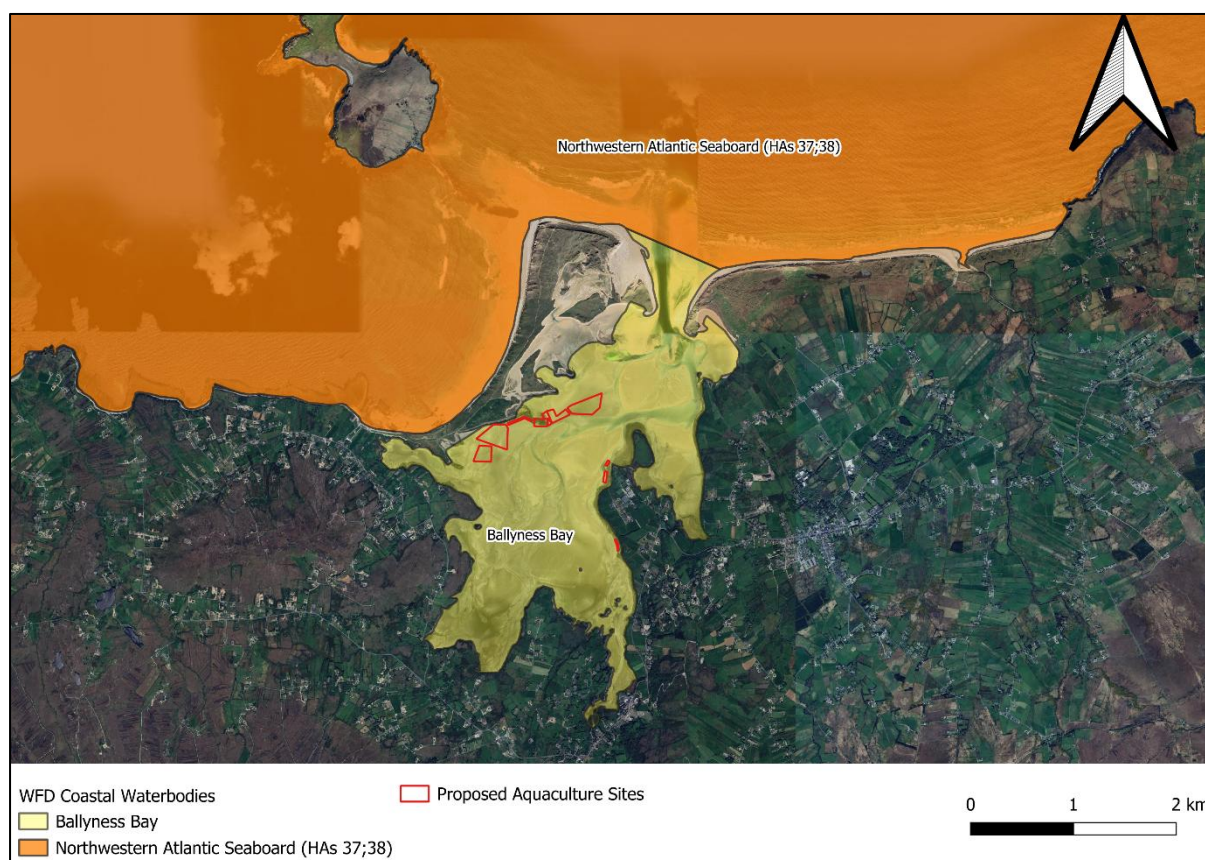


Figure 3-1: Location of WFD coastal and transitional water bodies in the vicinity of the proposed aquaculture sites.

4. Waterbody Overview

4.1. WFD Classification System

The status of water bodies under the WFD is determined based on ecological and chemical status.

Ecological status is assessed using:

- Biological quality elements (*e.g.*, phytoplankton, benthic invertebrates, fish)
- Physico- chemical conditions (*e.g.*, nutrients, oxygen, transparency)
- Hydro morphological conditions (*e.g.*, tidal regime and morphology)

Chemical status is determined through compliance with environmental quality standards for priority substances. The overall classification of a water body follows the “one out, all out” principle whereby the lowest scoring element determines the overall status.

4.2. Ballyness Bay WFD Status

Ballyness Bay (IE_NW_170_0000) is a coastal waterbody located within the Gweebarra - Sheephaven catchment, which encompasses the river systems draining to Gweebarra River, Sheephaven Bay and the coastline between Rossan Point and Fanad Head, Co. Donegal, covering a total area of approximately 1,450 km².

The catchment is comprised of nine sub-catchments containing 88 river waterbodies, 83 lake waterbodies, ten transitional waterbodies, 14 coastal waterbodies and five groundwater bodies. Falcarragh is the largest urban centre in the catchment.

For the most recent WFD assessment cycle (2016-2021) the waterbody was assigned High ecological status using the EPA grouping assessment method. This EPA grouping assessment method assigns status to unmonitored water bodies by grouping them with similar monitored water bodies (based on physical characteristics and pressures) and applying the monitored status to the wider group, supported by statistical analysis and expert judgement (EPA, 2022).

Across previous monitoring cycles the waterbody has consistently achieved High ecological status and is currently classified as Not at Risk under the national WFD risk screening process. The bay is not transboundary, and is not designated as a High-Status Objective, Heavily Modified, or Artificial Waterbody.

4.3. Northwestern Atlantic Seaboard Status

The Northwestern Atlantic Seaboard (HAS 37; 38) (IE_NW_100_0000) is a coastal waterbody located offshore of Ballyness Bay.

For the most recent WFD monitoring cycle the waterbody achieved High ecological status and Good chemical status with high confidence.

The waterbody is classified as Not at Risk in terms of achieving its environmental objectives. The WFD status classifications for all identified waterbodies are provided in **Table 4.1**.

Table 4.1: Status of relevant waterbodies as reported under the WFD.

Status	Assessment Cycle	Assessment Technique	Status Confidence	Value
Ballyness Bay (IE_NW_170_0000)				
Ecological Status or Potential	2019 - 2024	Grouping	-	High
Ecological Status or Potential	2016- 2021	Grouping	Medium confidence	High
Ecological Status or Potential	2010- 2015	Grouping	Low confidence	High
Northwestern Atlantic Seaboard (Has 37;38) (IE_NW_100_0000)				
Ecological Status or potential	2019- 2024	Monitoring	High confidence	High
Ecological status or potential	2016- 2021	Monitoring	High confidence	High
Chemical Surface Water Status	2016- 2021	-	-	Good
Ecological status or potential	2013- 2018	Monitoring	High confidence	High
Chemical surface water status	2013-2018	-	-	Good
Ecological Status or Potential	2010 - 2015	Monitoring	Unknown	High
Chemical surface water status	2010-2015	-	-	Good
Ecological status or potential	2010 - 2012	Monitoring	Unknown	Good
Ecological Status or Potential	2007- 2009	Monitoring	Unknown	High

4.4. Identification of Protected Areas

Under the Water Framework Directive, Member States are required to establish a Register of Protected Areas. These include areas requiring special protection under EU legislation where the maintenance or improvement of water status is an important factor in their protection.

The proposed aquaculture sites are located within Ballyness Bay SAC, which is designated under the Habitats Directive for several coastal habitats including:

- Mudflats and sandflats not covered by seawater at low tide (1140)
- Fixed coastal dunes with herbaceous vegetation (2130)

In addition, Falcarragh to Meenlaragh SPA is located approximately 0.8 km from Ballyness Bay and supports important populations of wintering waterbirds associated with intertidal habitats. These European sites are considered separately within the Appropriate Assessment process. However, they are identified here as protected areas where the maintenance of water quality is relevant to the conservation of qualifying interests.

Magheraroarty Bathing Water (IENWBWC100_0000_0300) is located to the northwest of Ballyness Bay at Magheraroarty Beach, approximately 0.8 km from the proposed aquaculture licence area. The bathing water is designated under the Bathing Water Directive (2006/7/EC) and is included within the Register of Protected Areas under the Water Framework Directive. According to EPA monitoring data, Magheraroarty Bathing Water achieved an "Excellent" classification in 2024.

Although connectivity between the proposed aquaculture sites and Magheraroarty Bathing Water cannot be entirely excluded, bathing water quality is classified on the basis of the microbiological parameters *E. coli* and intestinal enterococci. The proposed shellfish aquaculture activity is a low-input form of extensive aquaculture and does not involve sewage, wastewater, feed inputs or routine medicine use. Localised biodeposition beneath culture structures is benthic in nature and does not constitute a source of the microbiological contaminants relevant to bathing water classification. The proposed Project will therefore not result in deterioration of bathing water quality or affect compliance with the objectives of the Bathing Water Directive.

No designated Shellfish Waters have been identified within the vicinity of the proposed Project.

5. No Deterioration Assessment

5.1. Introduction

The WFD requires that developments must not cause deterioration in the ecological or chemical status of water bodies. This section therefore assesses the potential for the proposed aquaculture activity to affect:

- Physico- chemical elements
- Hydromorphological elements
- Biological elements
- Chemical status

5.2. Physicochemical elements

Shellfish aquaculture using the bag and trestle method does not require feed inputs or chemical treatments (FAO, 2009). Potential interactions with physico-chemical conditions are therefore limited to minor temporary increases in suspended sediment associated with vehicle access across intertidal sandflats and localised biodeposition beneath culture structures. Estimated annual production across all sites is approximately 63 tonnes, reflecting the extensive, low-intensity nature of the proposed activity. No nutrient enrichment or organic loading to the water column is expected at a scale relevant to WFD classification.

These disturbances are short-term and spatially limited relative to the size of Ballyness Bay and are not expected to influence water quality at the scale of the waterbody.

5.3. Hydromorphological Elements

With the aquaculture footprint occupying approximately 2.47% of the measured bay area, and total estimated annual production across all sites of approximately 63 tonnes, the Project represents a small, spatially constrained and low-intensity use of the waterbody. In this context and given that structures are low profile and access-related sediment disturbance is temporary and localised, the proposal is not expected to alter the tidal regime, current patterns, or sediment transport at waterbody scale. Consequently, no hydromorphological status change is anticipated for the Ballyness Bay waterbody.

5.4. Biological Elements

Ballyness Bay is currently classified by the EPA as Not at Risk, and the adjacent Northwestern Atlantic Seaboard coastal waterbody is also identified as Not at Risk. The Ballyness Bay coastal waterbody has consistently achieved High ecological status, while the Northwestern Atlantic Seaboard has also achieved High ecological status in recent WFD cycles. This provides important context that the receiving environment is currently of high quality at waterbody scale.

The proposed activities are small-scale, do not involve the input of feed, are limited to a dispersed aquaculture footprint occupying a small proportion of Ballyness Bay, and have an estimated total annual production of approximately 63 tonnes. Potential biological interactions are therefore limited to localised sediment disturbance during access, husbandry, seeding and harvesting, together with localised biodeposition beneath cultivation structures. Evidence from oyster aquaculture studies indicates that, in adequately flushed systems with relatively low stocking density and small farm footprints, effects on water quality are minor relative to natural background variability and are unlikely to negatively affect local water quality. Turner *et al.* (2019) found that differences in water quality variables inside and outside oyster farm footprints were much smaller than seasonal and site-level variation and concluded that low-density oyster farms in adequately flushed areas are unlikely to negatively impact local water quality.

Oysters are filter-feeding organisms and can influence ecosystem functioning through removal of suspended particles from the water column and stimulation of nitrogen cycling (Newell, 2004; Kellogg *et al.*, 2014). Oyster suspension feeding, associated biodeposition and microbial activity can enhance nitrification-denitrification processes and support nitrogen removal from coastal systems.

For Manila clams, the principal interaction with the substrate is through shallow burrowing and bioturbation. Studies on *R. philippinarum* show that clam activity can increase sediment-water exchange, promote vertical sediment mixing and influence nutrient cycling within surface sediments. Hou *et al.* (2023) found positive relationships between Manila clam biomass, sediment water content and macrobenthic diversity metrics in bottom-sowing culture areas, indicating that clam presence did not correspond to a disturbed macrobenthic state in that study system. Manila clam bioturbation has also been shown experimentally to affect sediment erodibility, particularly at lower current velocities; however, this represents a physical, local-scale sediment process rather than evidence of deterioration in biological quality at waterbody scale.

In the context of Ballyness Bay, any suspended sediment generated during clam seeding or harvesting would be expected to be temporary and spatially restricted to the immediate working area. Given that Ballyness Bay is a coastal, rather than transitional, waterbody and exchanges with the Northwestern Atlantic Seaboard waterbody offshore, localised sediment plumes would be expected to dissipate rapidly under normal tidal conditions. That conclusion is supported by the small footprint of the activity, the exposed coastal setting, and evidence that effects of low-density shellfish culture are strongly moderated by flushing and background variability (Turner *et al.*, 2019).

Overall, the proposed aquaculture activity is not of a scale or intensity likely to influence phytoplankton, benthic invertebrates, fish or other biological quality elements at the scale relevant to WFD classification, particularly given the limited footprint, modest estimated annual production, and well-flushed coastal setting. Any effects would be temporary, localised and reversible, and no deterioration in biological quality elements at waterbody scale is anticipated.

5.5. Chemical Status

The proposed aquaculture activity does not involve the use of priority substances or hazardous chemicals. Fuel associated with tractor operation represents the only potential source of chemical contamination; however, the risk of pollution is low and controlled through licence conditions and good practice measures. The proposed Project is therefore not expected to affect chemical status.

Table 5.1 Assessment of interaction with WFD objectives

WFD Quality Element / Objective	Potential Interaction	Assessment Outcome
Ecological Status (biological elements: benthic invertebrates, fish, phytoplankton)	Shellfish cultivation may result in localised biodeposition (faeces and pseudofaeces) beneath culture structures. Shellfish are filter feeders and may locally reduce phytoplankton concentrations within the immediate vicinity of the culture area.	Effects are localised and typical of shellfish culture systems, with deposition confined to areas directly beneath or adjacent to culture structures. Given the limited footprint and modest estimated annual production (~63 t per annum), no change to ecological status classification is anticipated.
Chemical Status (priority substances under EQSD)	Shellfish aquaculture does not involve feed inputs, chemical treatments or routine use of veterinary medicines.	No deterioration in chemical status expected.
Hydromorphology (tidal regime, morphology, sediment dynamics)	Installation of trestles and associated culture structures introduces small-scale physical infrastructure within the intertidal or shallow subtidal environment.	No alteration beyond natural variability

Supporting Physico- chemical Conditions (nutrients, dissolved oxygen, salinity)	Shellfish cultivation does not introduce nutrients to the water column as no feed is used. Localised biodeposition may occur beneath culture structures.	No alteration beyond natural variability
Achievement of Future Status Objectives	Shellfish aquaculture represents a low-intensity activity with limited environmental footprint.	No constraints on future improvements

5.6. Conclusion of No Deterioration Assessment

Based on the assessment above, the proposed aquaculture activity will not cause deterioration in the ecological or chemical status of Ballyness Bay or any connected waterbody. Ballyness Bay has consistently achieved High ecological status across monitoring cycles, indicating that existing pressures within the waterbody have not resulted in deterioration of status. In the context of the limited aquaculture footprint, the estimated annual production of approximately 63 tonnes across all sites, and the extensive non-fed nature of the proposed activity, no deterioration in any WFD quality element is anticipated.

6. Achievement of Good Status

The WFD requires that developments must not prevent the achievement of good ecological status in water bodies that have not yet achieved this objective. Ballyness Bay currently holds High ecological status and is classified as Not at Risk in terms of achieving its environmental objectives. The proposed aquaculture Project is small in scale, with an estimated total annual production of approximately 63 tonnes, and does not involve nutrient inputs, chemical discharges or hydromorphological alterations. Any environmental effects are expected to be minor, temporary and spatially limited.

The proposed Project is therefore fully compatible with the achievement and maintenance of WFD objectives.

7. Conclusion

This WFD assessment has considered the potential interaction between the proposed aquaculture licence applications at Ballyness Bay, Co. Donegal and the environmental objectives of the Water Framework Directive.

The primary receptor is the Ballyness Bay coastal waterbody (IE_NW_170_0000), with the Northwestern Atlantic Seaboard (IE_NW_100_0000) considered on a precautionary basis. The most recent WFD assessment identified Ballyness Bay as being of High ecological status and Not at Risk of status deterioration.

The proposed Project comprises low-intensity shellfish cultivation using oyster bags and trestles and, where relevant, clam culture methods. This form of aquaculture does not require feed inputs or routine chemical treatment and therefore gives rise to limited pressures on the receiving environment. Estimated annual production across all sites is approximately 63 tonnes, and the total aquaculture footprint occupies approximately 14.69 ha, representing 2.47% of the Ballyness Bay waterbody. Potential interactions are limited to temporary and localised sediment disturbance associated with access and operations, together with localised biodeposition beneath cultivation structures.

Accordingly, the proposed Project complies with the requirements of Article 4 of the Water Framework Directive and will not result in deterioration of status nor prevent the achievement of Good status in any relevant waterbody.

8. Statement of Authority

This report was authored by Neve McCann.

Neve is a Senior Marine Consultant with AQUAFACT (APEM Group), specialising in Appropriate Assessment (AA), Natura Impact Statements (NIS), and Environmental Impact Assessment Reports (EIAR). She has extensive experience delivering environmental assessments for infrastructure, renewable energy, and marine projects, with a strong focus on regulatory compliance under the Habitats Directive, Water Framework Directive (WFD), and Marine Strategy Framework Directive (MSFD). She has led and contributed to complex multidisciplinary assessments, supporting projects from screening through to detailed impact assessment and mitigation design.

She is technically skilled in data management and spatial analysis, proficient in ArcGIS, R Studio, and SQL, with experience in MSFD Descriptor assessments, ICES data calls, and contributions to MSFD Article 8 reporting. Neve has actively participated in ICES Working Groups and European marine forums, supporting collaborative research and policy development. Her fieldwork experience includes protected species surveys, benthic sampling, freshwater assessments, and sea-going surveys such as Irish Groundfish and Nephrops UWTV. Neve also holds JNCC Marine Mammal Observer certification and has completed specialist training in stock assessment and project management for wildlife conservation.

This report was reviewed by Aidan Long.

Aidan is a Principal Marine Consultant at AQUAFACT with 9 years of demonstrable experience spanning industry, government and academia with a PhD in marine ecology. Aidan will oversee the preparation of the MUL application form and associated attachments including compliance statements for relevant Irish, EU and international legislation (*e.g.* NMPF, WFD and MSFD). He has expertise in environmental project management, marine ecology, marine legislation, Marine Usage Licences, Dumping at Sea permits, technical writing, monitoring programme design and statistical analysis. He has profitably managed large multidisciplinary environmental projects for high-profile industry clients across Ireland, Australia and Brazil in sectors such as fisheries, aquaculture, offshore renewables, ports, wastewater and mining. He has authored over 40 major technical reports as an environmental consultant/government scientist and has led the authorship of multiple papers in international science journals. He regularly presents research at international conferences and engage regularly with clients, stakeholders, and in business development.

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