Appeal Ref No. AP 10/2019

Aquaculture Licences Appeals Board

Technical Advisor's Report

Description: Assessment of the appeal against the Minister's decision to refuse an aquaculture and foreshore licence for the intertidal cultivation of Pacific Oysters using trestles and bags at Bunaclugga Bay (Lower Shannon Estuary), Co, Kerry

Licence Application

Department Ref No: T6/386

Applicant: Mr. Pat Moran
The Mount, Cheekpoint, Co. Waterford

Minister's Decision: Refusal

Appeal

Type of Appeal: To appeal the ministerial decision to refuse to grant an Aquaculture and Foreshore licence for the cultivation of Pacific Oysters using bags and trestles on the site reference T6/386

Appellant(s): Mr. Pat Moran

Observers: N/A

Technical Advisor: EcoÉireann Ecological Consultants

Date of site Inspection: Site visit completed by Ecologist Eoin Cussen on the 21st May 2020

Document Control

Version	Date	Changes	Confidentiality	Prep	Rev	Auth
V1	22/06/2020	Draft to client	Confidential	EC/TW	JH	MM
V2	01/09/2020	Final To Client	Confidential	EC		

Contents

1.0 General Matters / Appeal Details

1.1. Appeal Details & Observer Comments / Submissions

Date Appeal Received: 7th November 2019
Location of Site Appealed: Bunaclugga Bay (Lower Shannon Estuary), Co. Kerry

1.2. Name of Appellant (s):

Mr. Pat Moran, The Mount, Cheekpoint, Co. Waterford

1.3. Name of Observer (s)

N/A

1.4. Grounds for Appeal

Substantive Issues

1. *SPA Appropriate Assessment* The appellant is highly critical of the Appropriate Assessment (AA) of Aquaculture Activities in the River Shannon & Fergus Estuaries SPA report. The appellant believes that the approach used to break up the site into smaller areas was inappropriate, not a scientific approach and was used to magnify the size of aquaculture in comparison to the overall site.

2. *Data Quality & Quantity* The appellant believes the data used for the assessment is outdated and of questionable quality, for a number of reasons; lack of bird counts, lack of bird counters, the qualifications of the counters (volunteers), objective of the counters, narrow focus of the counts (many areas not looked at), and the number of recent hours spent ground-truthing. Based on inadequate bird data the AA determined that 99% of all Ringed Plover *Charadrius hiaticula* occur in the Lower Shannon Estuary and of that c.55% are located within the Bunaclugga/ Ballylongford area.

3. *Site Suitability* The appellant has stated that the site is located within the Ballylongford Designated Shellfish Waters. The site is located in an area where previous licensed sites were located, and these sites have not been reapplied for.

4. *Methodology & Materials* The appellant states that Triploid seed will only be used and that these will come from a hatchery, reducing the likelihood of introduction/ expansion of invasive non-native species. The appellant states that he will not be moving stock or seed from his currently operating sites in Waterford to Kerry, given the high mortality rates in Waterford, but will be using the Bunaclugga site as a reserve which could supply his sites in Waterford in times of high mortality.

5. *Business Continuity* The appellant states that this site application is not to expand his business but to ensure viability through high mortality events, which occurred in Waterford estuary in 2019 where 60-70% of his oyster stock was wiped out.

Non-Substantive Issues

1. *Lack of Balance & Fairness* The appellant believes that the Department's Appropriate Assessment Conclusion Statement lacks balance and fairness in its conclusions on his application. The appellant quotes 2 sections of the Department's AA Conclusion Statement as his evidence of this. These quotes being "Intertidal oyster trestle culture is considered non-disturbing to the feature mudflats and sandflats not covered by seawater at low tide" and "the development of intertidal/ aquaculture sites in the Ballylongford/ Bunaclugga area may cause moderate displacement to the Ringed Plover this area holds a relatively high proportion of the total SPA Ringed Plover population, however the birds may be widely spread across the full extent of the intertidal habitat within the area".

2. *Improper Approach* The appellant believes the use of data, within the AA, from the 2011 Trestle study was inappropriate, as this study had a very narrow focus and followed a vague statistical approach. The appellant believes that this study should not be applied to different geographic area under differing conditions (time of year, hydrographic, benthic, Physical environment, different interactions with different wildlife profiles in differing locations).

3. *Selective information* The appellant has taken selective quotes from the NPWS SPA Conservation Objectives Supporting Document (NPWS, 2012b) species notes relating to Ringed Plover and the constraints of the survey programme and argues that the use of this material as a baseline dataset for Appropriate Assessment is inappropriate and an incredibly weak starting position.

4. *Foraging Density* The appellant states that the calculated foraging density within the conservation objectives supporting document was 0.02 ha^{-1} Ringed Plover across the subsites where it was recorded, furthermore, that based on this figure his site would potentially impact on 0.2204 of a Ringed Plover.

5. *Benefits of Oyster Cultivation* The appellant states that the aside from the non-native negative, there are numerous positives from the cultivation of oysters including; nitrogen and phosphorus removal, increased biodiversity associated with the structures and carbon sequestration.

6. *Personal Opinion* The appellant states that he would never appeal the Ministerial Decision if he thought that there would be any serious negative impact either on its own or in combination with other sites, upon Ringed Plover or any other species.

1.5. Minister's Submission

Section 44 of the Fisheries (Amendment) Act 1997 states that:

"The Minister and each other party except the Appellant may make submissions or observations in writing to the Board in relation to the appeal within a period of one month beginning on the day on which a copy of the notice of appeal is sent to that party by the Board and any submissions or observations received by the Board after the expiration of that period shall not be considered by it."

The Minister responded to the application for the aquaculture and foreshore licence as below as described in the DAFM website https://www.agriculture.gov.ie/media/migration/seafood/aquacultureforeshoremanagement/aquaculturelicensing/aquaculturelicencedecisions/kerry/152-/155T06386ADeterminationofAquaculture111019.pdf [Accessed on 30/04/2020]

The following are the reasons and considerations for the Minister's determination to refuse the licences sought:

- This site shall not be permitted as the risk of disturbance to the integrity of the SAC and SPA cannot be discounted given the conclusions and recommendations of the Appropriate Assessment process.

- The precautionary principle must be evoked in relation to the licensing of certain areas in the Shannon Estuary given that the exact nature and level of existing and proposed activities within the Oyster Fishery Order areas is unknown and subject to change.

- The proposed aquaculture activity at this site is not consistent with the Conservation Objectives for the SPA and could potentially disturb protected shorebird species in the area. A moderate risk of disturbance arises, particularly on the Ringed Plover, if licensing were permitted at this proposed site.

- Taking account of the issues raised during the public and statutory consultation phase – which are listed below I n Section 6.1, Table 7.

1.6. Applicant Response

The Applicant may submit a response to appeal submissions under the provision set out in Section 44(2) of the Fisheries Amendment Act 1997 which states:

"The Minister and each other party except the Appellant may make submissions or observations in writing to the Board in relation to the appeal within a period of one month beginning on the day on which a copy of the notice of appeal is sent to that party by the Board and any submissions or observations received by the Board after the expiration of that period shall not be considered by it."

The Applicant made a submission as the appellant. The appellants response dated 7th November 2019, is addressed within this report.

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2.0 Consideration of Non-Substantive Issues

1. *Lack of Balance & Fairness* The appellant believes that the Department's Appropriate Assessment Conclusion Statement lacks balance and fairness in its conclusions on his application. The appellant quotes 2 sections of the Department's AA Conclusion Statement as his evidence of this. These quotes being
    - "Intertidal oyster trestle culture is considered non-disturbing to the feature mudflats and sandflats not covered by seawater at low tide" and,
    - "the development of intertidal/ aquaculture sites in the Ballylongford/ Bunclugga area may cause moderate displacement to the Ringed Plover this area holds a relatively high proportion of the total SPA Ringed Plover population, however the birds may be widely spread across the full extent of the intertidal habitat within the area".

The Departments AA Conclusion Statement is an amalgamation of conclusions from two Appropriate Assessments, one for the Lower River Shannon SAC which is designated for the protection of habitats and non-avian species and the other for the River Shannon and Fergus Estuaries SPA which is designated for the protection of avian species. The 2 quotes outlined above are conclusions from those 2 separate Appropriate Assessments, the first stating that the protected habitats within the SAC will not be disturbed by intertidal oyster culture and the second stating that there is potential for displacement of Ringed Plover a feature of Special Conservation Interest (SCI) of the SPA. Therefore there is no lack of balance or fairness.

2. *Improper Approach* The appellant believes the use of data in the AA from the 2011 Trestle study was inappropriate, as this study had a very narrow focus and followed a vague statistical approach. The appellant believes that this study should not be applied to different geographic areas under differing conditions (time of year, hydrographic, benthic, physical environment, different interactions with different wildlife profiles in differing locations).

It is acknowledged that no two areas will be exactly the same and thus differences will occur whether it be through hydrodynamic, benthic, sedimentary or wildlife profiles. However, the AA used a number of published trestle studies focused on the interactions of the same waterbird species (where these differed this was stated and the data was not used within the AA for comparison) with oyster trestles within intertidal habitat in an Irish setting and these studies compared interactions at a number of different bays across Ireland, including Poulnasherry Bay which is located in the same SPA on the opposite side of the Shannon Estuary. It can therefore be assumed that the differences between waterbird interactions with oyster trestles on intertidal flats between sites in Ireland will be minimal.

3. *Selective information* The appellant has taken selective quotes from the NPWS SPA Conservation Objectives Supporting Document (NPWS, 2012b) species notes relating to Ringed Plover and the constraints of the survey programme and argues that the use of this

material as a baseline dataset for Appropriate Assessment is inappropriate and an incredibly weak starting position.

The quotes extracted from within the SPA conservation objectives supporting document were highly selective and the appellant chose to ignore a number of points made within the same paragraph which could be used in argument against the granting of this license. However, it is agreed and has been stated within the Appropriate Assessment that the baseline dataset to which the AA was based on was outdated data and contained years with incomplete datasets, which is why the authors were selective in the datasets which they used.

Based on the lack of up to date data, the Precautionary Principle must be invoked until such a time that adequate data exists which can prove that this site would have no detrimental effect on the SCIs of the SPA.

4. *Foraging Density* The appellant states that the calculated foraging density within the conservation objectives supporting document was 0.02 ha^{-1} Ringed Plover across the subsites where it was recorded, furthermore, that based on this figure his site would potentially impact on 0.2204 of a Ringed Plover.

The initial figure ($0.02ha^{-1}$) referred to the whole SPA site average, therefore including areas where no Ringed Plover were recorded (only recorded in 19 of the 66 subsites) and so this lowered the overall average figure for the site. Bunaclugga/ Ballylongford Bay was ranked as the 4^{th} most important subsite for intertidal foraging Ringed Plover, within the River Shannon & Fergus Estuaries SPA. The peak intertidal foraging density within the SPA was 1.2 Ringed Plover ha-1 recorded for 0H517 (Querrin).

5. *Benefits of Oyster Cultivation* The appellant states that the aside from the non-native negative, there are numerous positives from the cultivation of oysters including; nitrogen and phosphorus removal, increased biodiversity associated with the structures and carbon sequestration.

Oyster Aquaculture is based on an entirely sustainable resource i.e. plankton production. Oyster shell growth has been shown to sequester carbon from the oceans. However, at unsustainable levels, large expanses of filter feeders can pose a negative impact on the plankton levels within a bay or harbour, in not only removing too much plankton from the water (thereby outcompeting other species naturally found) but also in terms of biodeposition. It has been shown that oyster cultivation can have negative impacts on waterbird species, through displacement and/ or disturbance, these effects must be considered as the site is located within a designated area for waterbirds.

6. *Personal Opinion* The appellant states that he would never appeal the Ministerial Decision if he thought that there would be any serious negative impact either on its own or in combination with other sites, upon Ringed Plover or any other species.

This is the personal opinion of the appellant and not fact, backed up by published literature. There is no evidence that the implementation of this site will have no effect on Ringed Plover and there is some published evidence to the contrary.

3.0 Oral Hearing Assessment

In line with Section 49 of the Fisheries Amendment Act 1997 an Oral Hearing may be conducted by the ALAB regarding the licence appeals.

At this time an Oral Hearing has not been called nor requested by the appellant or the applicant.

It is considered, by the advisor, that an Oral Hearing is not required for this application where there is no conflicting technical information on relevant and significant aspects of the appeal.

4.0 Minister's File

Details of the file received by ALAB from the Minster requested under Section 43 are listed here in chronological order. Copies of;

- Application form and site map and layout
- Submissions from Statutory and Technical consultations
- Notification of Minister's decision to the applicant
- Location map of the surrounding area including
    - Sites under application
    - Sites lapsed
    - Licensed sites
    - Sites currently under appeal
- Appropriate Assessment reports for aquaculture in the Lower River Shannon SAC and the River Shannon and Fergus Estuaries SPA.

5.0 Context of the Area

5.1. Physical Descriptions

5.1.1. Site Location

The River Shannon is the largest river system in Ireland, with a total length of 386km, and area of approximately 1500km^2 including the tributary estuaries of the rivers Fergus, Deel, and Maigue. It is located on the west coast of Ireland with the main estuary forming the border between Counties Kerry and Clare, and Limerick and Clare.

The appealed aquaculture site (T6/386A) is located within the lower Shannon Estuary at Bunaclugga Bay, north of the village of Astee, Co. Kerry, north-west of the town of Ballylongford, Co. Kerry and south-west of the town of Kilrush, Co. Clare. The town of Ballybunnion is the largest nearby settlement, located 13.5km south-west of the site.

5.1.2. Physical Characteristics and Freshwater Influence

The Shannon and Fergus Estuaries form the largest estuarine complex in Ireland. They form a unit stretching from the upper tidal limits of the Shannon and Fergus Rivers to the mouth of the Shannon Estuary (considered to be a line across the narrow strait between Kilcredaun Point and Kilconly Point). Within this main unit there are several tributaries with their own 'sub-estuaries' e.g. the Deel River, Mulkear River, and Maigue River. To the west of Foynes, a number of small estuaries form indentations in the predominantly hard coastline, namely Poulnasherry Bay, Ballylongford Bay, Clonderalaw Bay and the Feale or Cashen River estuary.

5.1.3. Meteorological Conditions

The River Shannon Estuary is located on the West Coast of Ireland. The Gulf Stream North Atlantic current flows past the west coastline resulting in generally mild temperatures, while it is mountainous nature, geographical location and the prevailing south westerly winds results in one of the highest rainfall rates in the country. The monthly rainfall average recorded by Met Éireann at the Valentia Observatory off the western coast of the Iveragh Peninsula was 140mm for the last ten years (2009-2019). The lowest average rainfall was 54.4mm and the highest 285mm.

5.1.4. Local Populations

The largest nearby population lies in Kilrush town, Co. Clare (2719) with an annual growth of 0.18% (2011 to 2016). Within County Kerry, south of the Shannon Estuary, Ballybunnion town (1413) comprises the larger regional population with an annual growth rate of +0.85% (2011 to 2016). Ballylongford (391) is a smaller town in the local area, which has a declining population of -1.32% (2011 to 2016) http://census.cso.ie/p2map11/ [accessed on 14/05/2020]).

Figure 1 Bunaclugga Bay in relation to the surrounding landscape

5.2. Resource Users

5.2.1. Aquaculture Activity

Bord Iascaigh Mhara, BIM, (Irish Sea Fisheries Board) was set up over 65 years ago to promote, develop and support the Irish seafood sector by providing technical expertise, business support, funding, training, and promoting responsible environmental practice. BIM have developed a Special Unified Marking Scheme, SUMS, for Bunaclugga/ Ballylongford Bay in conjunction with the Co-Ordinated Local Aquaculture Management System, CLAMS, and the local aquaculture license holders.

Aquaculture within the Lower River Shannon is confined to the production of shellfish (oysters and mussels). The main aquaculture activity is oyster culture, which involves the culture of both the native, *Ostrea edulis,* and Pacific oyster, *Crassostrea gigas*, on trestles in intertidal areas and subtidally on the seabed. Mussel *Mytilus edulis* culture includes subtidal suspended (longlines), intertidal/ subtidal Bouchet poles and bottom culture. The production of scallops *Pecten maximus* is also licensed; however this species is currently not being produced (MI, 2019a).

Within the Lower River Shannon are 3 Oyster Fishery Order, OFO, Areas (T08/004A, T08/004B & T08/008) which are under the remit of the Department of Communications, Climate Action and Environment. Two of these OFOs are the largest licensed aquaculture sites in Europe T08/004A (3515ha) and T08/004B (4548ha), with a large portion of the Lower River Shannon encompassed within the license bounds. The remaining OFO, T08/008, is situated at the entrance to the Inner Poulnasherry Bay and is much smaller than the other two OFOs at 40ha, approximately 25% of this area is currently in use for trestle and bag cultivation (MI, 2019a).

There are five locations currently in operation for oyster culture within the SAC, located in Rinneville, Carrigaholt, Ballylongford, Askeaton/Foynes, Poulnasherry Bays. Oyster culture, intertidally using trestles and bags, is the main production method occurring in Bunaclugga Bay, with a large site of licensed bottom culture mussel located adjacent in Ballylongford Bay.

The aquaculture sites within the River Shannon and River Fergus Estuaries SPA can be divided into three distinct clusters: Poulnasherry Bay, Ballylongford/ Bunaclugga Bays and Aughinish/ Foynes. Each of these clusters occurs in discrete areas of intertidal habitat separated from each other and other similar areas by open water and/or long sections of shoreline with negligible amounts of intertidal habitat (Atkins, 2019).

All aquaculture sites within the Lower River Shannon are located in the lower part of the Shannon Estuary downstream of the Fergus Estuary:- 52 sites (200 ha) of intertidal oyster cultivation, three sites (97 ha) of bottom oyster cultivation, two sites (130 ha) of bouchet pole mussel cultivation, three sites (313 ha) of bottom mussel cultivation and two sites (29 ha) of mussel longline cultivation (Atkins, 2019).

5.2.2. **Angling Activity**

The Shannon Estuary and the coasts of Co. Kerry and Co. Clare attracts notable numbers of domestic and European anglers, generating significant revenue for the local economy. The region's scenic and rugged coastline offers exceptional shore angling, with 40 shore angling marks located throughout the estuary. Charter fishing boats operate out of Kilrush, Killbaha and Carrigaholt and have excellent inshore fishing in the Shannon Estuary.

Shore angling occurs on the east and west side of Carrig Island, where Angling Marks are located, as well as on Littor Strand, to the west of Bunaclugga Bay. Angling in this region produces bull huss, dogfish, flounder, tope and the occasional dab (https://fishinginireland.info/sea/shannon/shannonests/ [accessed on 15/05/2020].

The River Shannon has a large hydroelectric facility upstream of Limerick City which limits the upstream movement of migratory fish, including Atlantic Salmon and Sea Lamprey. Salmon stocks within the River Shannon above the impoundment of the dam have been assessed as being below their Conservation Limit and so a harvest ban on wild salmon is in place in the Upper River Shannon. The Lower River Shannon is open for catch & release salmon fishing only (Gargan et al., 2020).

5.2.3. **Tourism**

The Midwest region (Counties Clare, Limerick and North County Tipperary) was the third most popular tourist and holiday destination outside of Dublin in 2017 (Fáilte Ireland, 2018a). Approximately 10% (1.4 million) of the total overseas tourists visiting Ireland travelled to the Midwest region in 2017 (with over half of this number visiting County Clare) with approximately 1,500,000 tourists (overseas) travelling to the area in 2018, while c. 11% (1.1 million) of domestic tourists travelled to the area in 2018 (Fáilte Ireland, 2019).

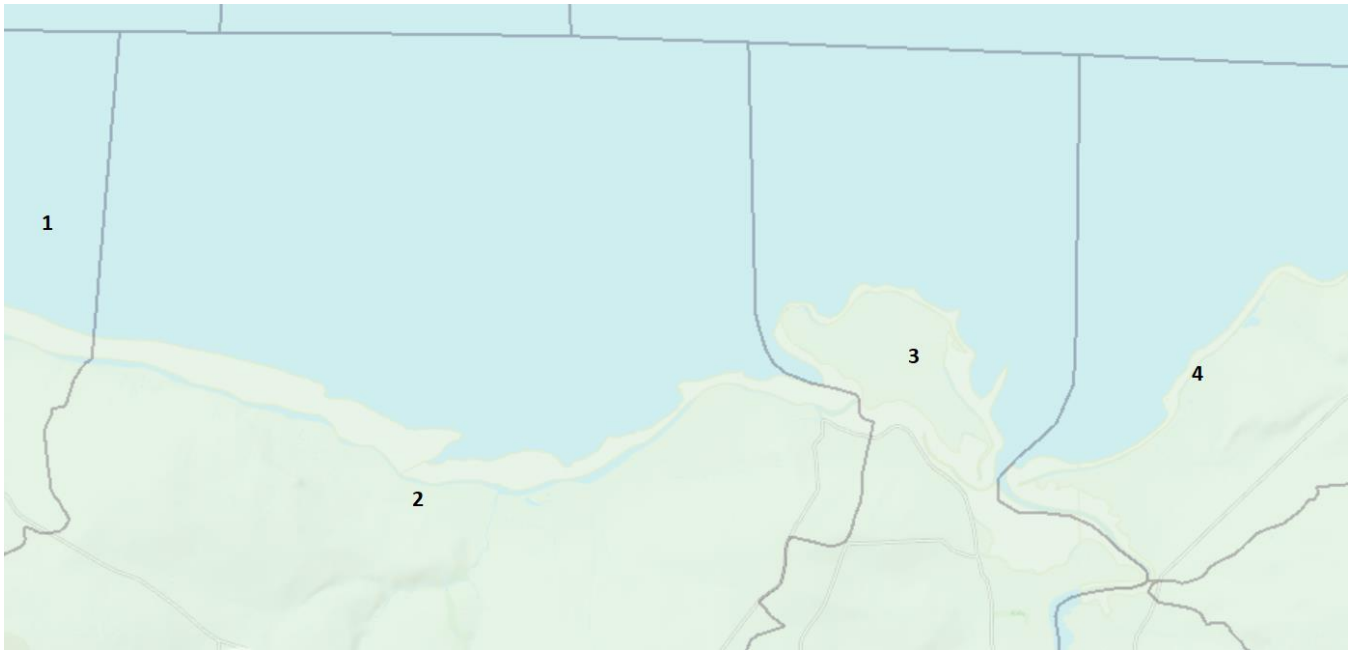
The south west region (Cork/Kerry) was the most popular tourist and holiday destination outside of Dublin in 2017 (Fáilte Ireland, 2018a). Approximately 19% of the total tourists visiting Ireland (from overseas and domestic) travelled to the south west region with approximately 2,241,000 tourists (domestic and overseas) travelling to Kerry in 2017 (Fáilte Ireland, 2018b).

Kerry as a county is dependent on tourism as an economic stream for the region. With blue flag beaches including Ballybunnion (north & south beaches), National Parks (Killarney) and mountain ranges providing scenic destinations for domestic and overseas visitors (Kerry County Council, 2018). The Wild Atlantic Way route travels along the Kerry coastline.

5.2.4. Agricultural Activity

Around Bunaclugga/ Ballylongford Bay there are 4 electoral regions which hold agricultural data (CSO - http://census.cso.ie/agrimap/ [Accessed 12/05/20]). The number of farms in each region are based on latest data (2010):

1. Beal (western boundary) – 30
2. Astee (centre west) – 64
3. Carrig (centre east) – 27
4. Tarbert (eastern boundary) – 33



In total, in 2010 there were 154 farms around the Bay. These farms make up approximately 1.8% of total farms in County Kerry.

Total grazing numbers for the area around Bunaclugga/ Ballylongford Bay based on 2010 figures are outlined in Table 1, below (http://census.cso.ie/agrimap [Accessed 12/05/20]).

Table 1 Grazing Figures per Electoral Area (2010)

Reference	Area	Total Farmed Area (ha)	Pasture (ha)	Total Cattle (head)	Total Horses (Head)
1	Beal	846	477	1478	24
2	Astee	2205	1204	4058	70
3	Carrig	1081	465	2204	5
4	Tarbert	1293	776	2646	15

5.2.5. **Inshore Fishing Activity**

The principal commercial fishing activity in the Shannon Estuary concerns shellfish cultivation, though some limited potting and seasonal trawling also occurs. Charter fishing boats operate from Carrigaholt, Kilrush and Kilbaha (CCC,2017a).

5.2.6. **Users of the Water Body & Surrounding Area**

The Shannon Estuary is multi-functional, as the waters and adjoining lands support a range of functions, uses, communities, activities, and environmental resources/assets, among the most notable functions are (SIFP, 2013):

- Shipping/Port functions
- Marine related Industry/Industry
- Fishing/Aquaculture
- Marine Tourism, Leisure and Recreation
- Energy generation
- Fuel Storage
- Aviation
- Heritage and Landscape
- Valuable Habitats and Species

The Shannon Estuary has a long-established history of facilitating major industries, including Shannon Foynes Port at Foynes, and Limerick Docks. The Port has grown to become Irelands second largest port operation, handling the largest vessels entering Irish waters, up to 200,000dwt. Shannon International Airport, ESB Moneypoint, Tarbert Power Station, NORA Fuel Storage, Aughinish Alumina have also grown and become major industrial and employment hubs within the Estuary (SIFP, 2013).

The Estuary has become a major contributor to the energy supply market. ESB Moneypoint has been generating electricity for around 25 years, and with a capacity of 915 MW it is capable of meeting approximately 25% of Irelands demand for electricity. Along with Tarbert Power Station, it has created a strategic energy hub within the Shannon Estuary, facilitating the growth of strategic grid infrastructure and other synergistic industries such as renewable energy and combined heat and power (SIFP, 2013).

There has been an increase in human activities on the land and sea, utilising the Estuary resources, and harnessing its potential, not just shipping and fishing, but the emergence of marine renewable energy opportunities, maritime tourism and recreation/cruise ships (SIFP, 2013).

A passenger ferry runs between Tarbert Co. Kerry across the estuary to Killimer Co. Clare, to the east of Bunaclugga Bay. Bunaclugga Bay was historically used for aquaculture by the local fishing co-op which have since been bought out (as per comms on site visit).

During the site visit subsistence periwinkle *Littorina littorea* harvesting was being carried out in the rocky intertidal foreshore area of Bunaclugga Bay.

5.3. Environmental Data

5.3.1. Water Quality

Water Framework Directive (WFD) Status

Water quality in Bunaclugga Bay is monitored as part of the WFD Monitoring Programme. The latest round of monitoring results (2013-2018) indicate that Bunaclugga Bay (Lower Shannon Estuary, site code IE_SH_060_0300 & Mouth of the Shannon, site code IE_SH_060_0000) demonstrates Good Ecological status for Transitional and Coastal Water Quality Status (EPA, 2019).

Bathing Water

Bathing water quality is not monitored within Bunaclugga Bay. The nearest site which is monitored for bathing water is the Cappagh Pier, Kilrush (IESHBWC_060_0000_0100), located 7km north-east of Bunaclugga Bay on the opposite side of the estuary, which for the 2019 period was recorded as being of Excellent Water Quality. Further sites monitored for Bathing Water Quality are located at Carrigaholt (IESHBWC060_0000_050) which is recorded as New (Classification Not Possible) for the 2019 period, and at Ballybunnion North & South (IESHBWC060_0000_0200 & IESHBWC060_0000_0300, respectively) which have been recorded as Good & Excellent Water Quality respectively. (https://gis.epa.ie/EPAMaps/ [accessed on 4/05/2020]).

Transitional and Coastal Waters

Transitional water is the term used to describe estuaries and lagoons. In Ireland, transitional and coastal waters cover an area of over 14,000 km2 (transitional 844 km2; coastal 13,325 km2) and represent a wide variety of types such as lagoons, estuaries, large coastal bays, and exposed coastal stretches. The ecological status of these waters has been assessed using data from 2013 to 2018, as many of the biological assessments are undertaken over a six-year period. The saline waters of Ireland are comprised of 304 water bodies (110 coastal and 194 transitional) and approximately 40% of these are monitored in the national Water Framework Directive monitoring programme.

Of the monitored transitional water bodies 30 (38%) are in high or good ecological status and 49 (62%) are in moderate or worse ecological status. Six of these water bodies are in bad ecological status (the worst status class) and 14 are in poor ecological status which include the Shannon Airport Lagoon and the Upper Shannon Estuary. Just over two-fifths (42%) of the surface area of transitional waters is in high or good status.

5.4. Statutory Status

The River Shannon and River Fergus Estuary is designated as a Special Protection Area (SPA) and a Special Area of Conservation (SAC) under Article 4 of the EU Habitats Directive (Figures 5 and 6). Bunaclugga/ Ballylongford Bay is also statutorily designated under the EU Shellfish Waters Directive as a Shellfish Designated Area.

5.4.1. **Shellfish Designated Waters**

Following the European Council Directive 79/923/EEC on the quality required of shellfish waters and the numerous subsequent amendments to this directive, a codified version was produced - Directive 2006/113/EC on the quality required of shellfish waters. This directive sets out physical, chemical, and microbiological parameters and regulations for the designation and sampling of Shellfish Designated Waters to protect or improve these waters in order to support shellfish (bi-valve and gastropod molluscs) life and growth. The directive also provides for the establishment of pollution reduction programmes for designated waters and thus, contribute to the high quality of shellfish products directly edible by man.

Within the Lower River Shannon there are four areas designated under the EU Shellfish Waters Directive and comprise a total area of 21.2km2 (NPWS, 2012). These include the Ballylongford Shellfish Area (8.6km2), Poulnasherry Shellfish Area (7.1km2), Rinevella Shellfish Area (0.6km2) and the Carrigaholt Shellfish Area (4.9km2). The West Shannon Ballylongford Shellfish Area extends from Knockfinglas Point, around Carrig Island and encompasses a section of Bunaclugga Bay, Co. Kerry. The Poulnasherry Shellfish Area extends from Querin Point to Baunahard Point, comprising the entirety of Poulnasherry Bay, Co. Clare. The Carrigaholt Shellfish Area incorporates the entire Carrigaholt Bay, while the Rinevella Shellfish Area incorporates the entire Rinevella Bay.

Figure 2 Shannon Estuary Shellfish Designated Waters and Licensed Aquaculture Sites

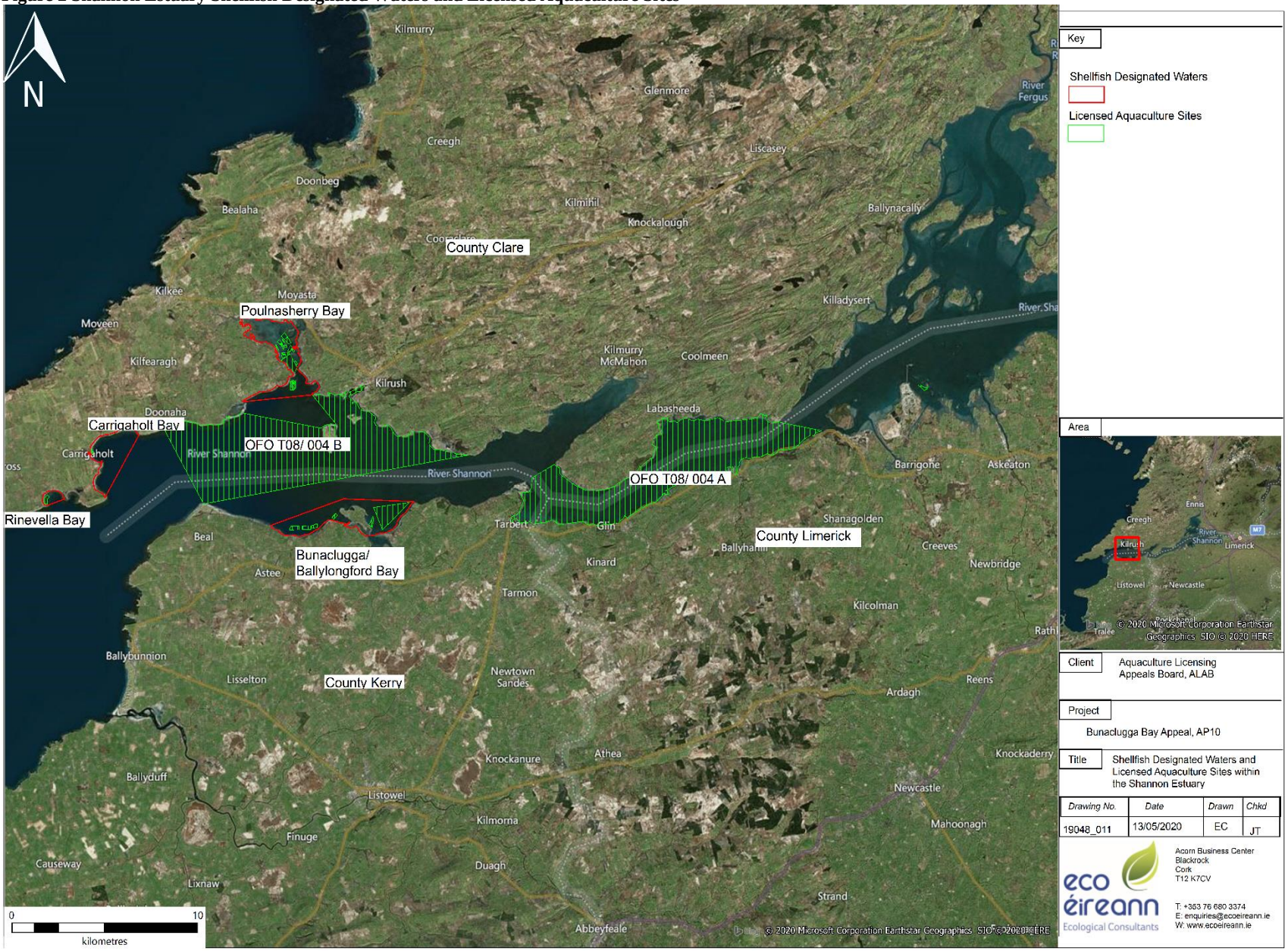


Figure 3 Ballylongford Bay Shellfish Designated Waters

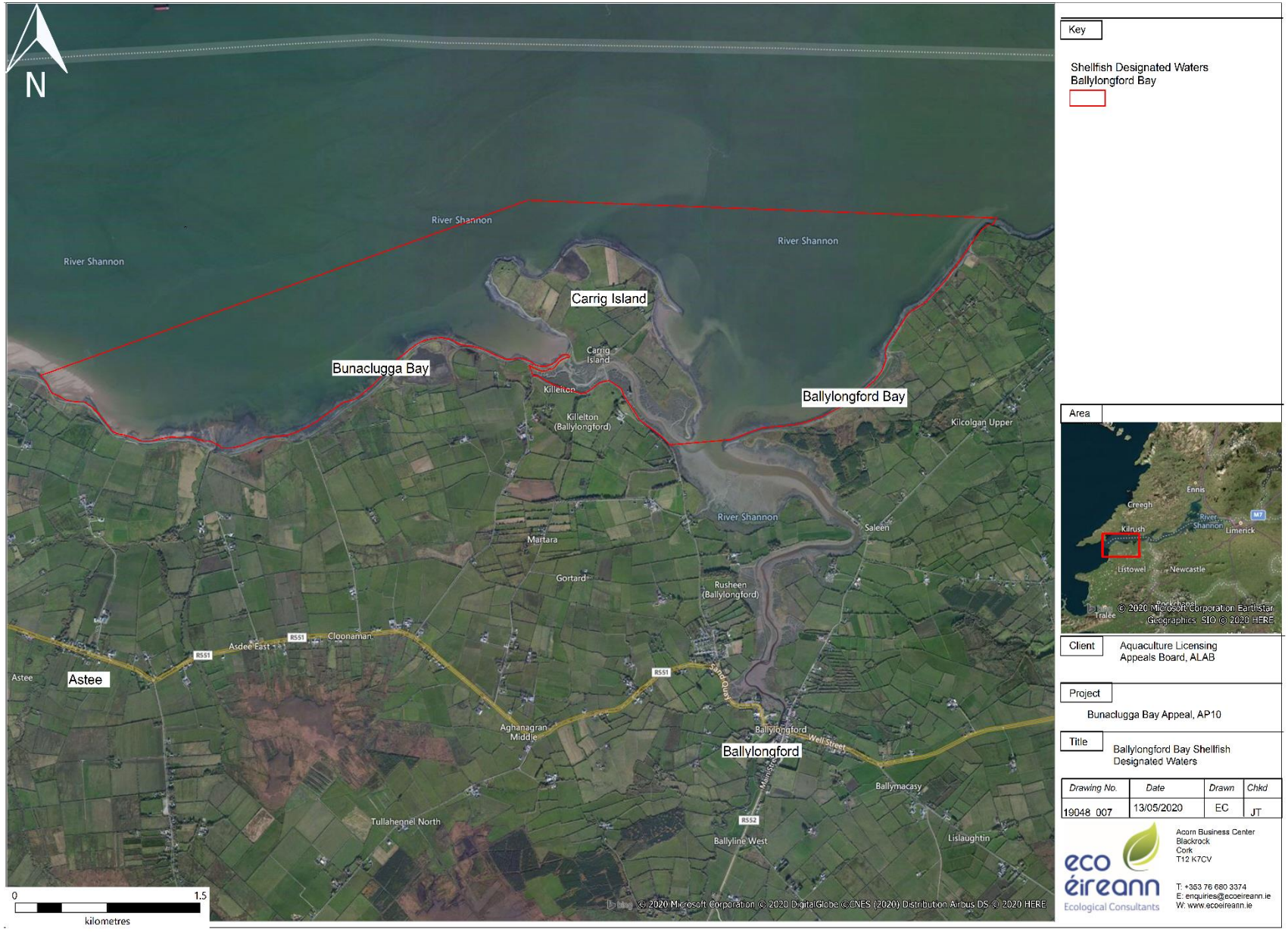
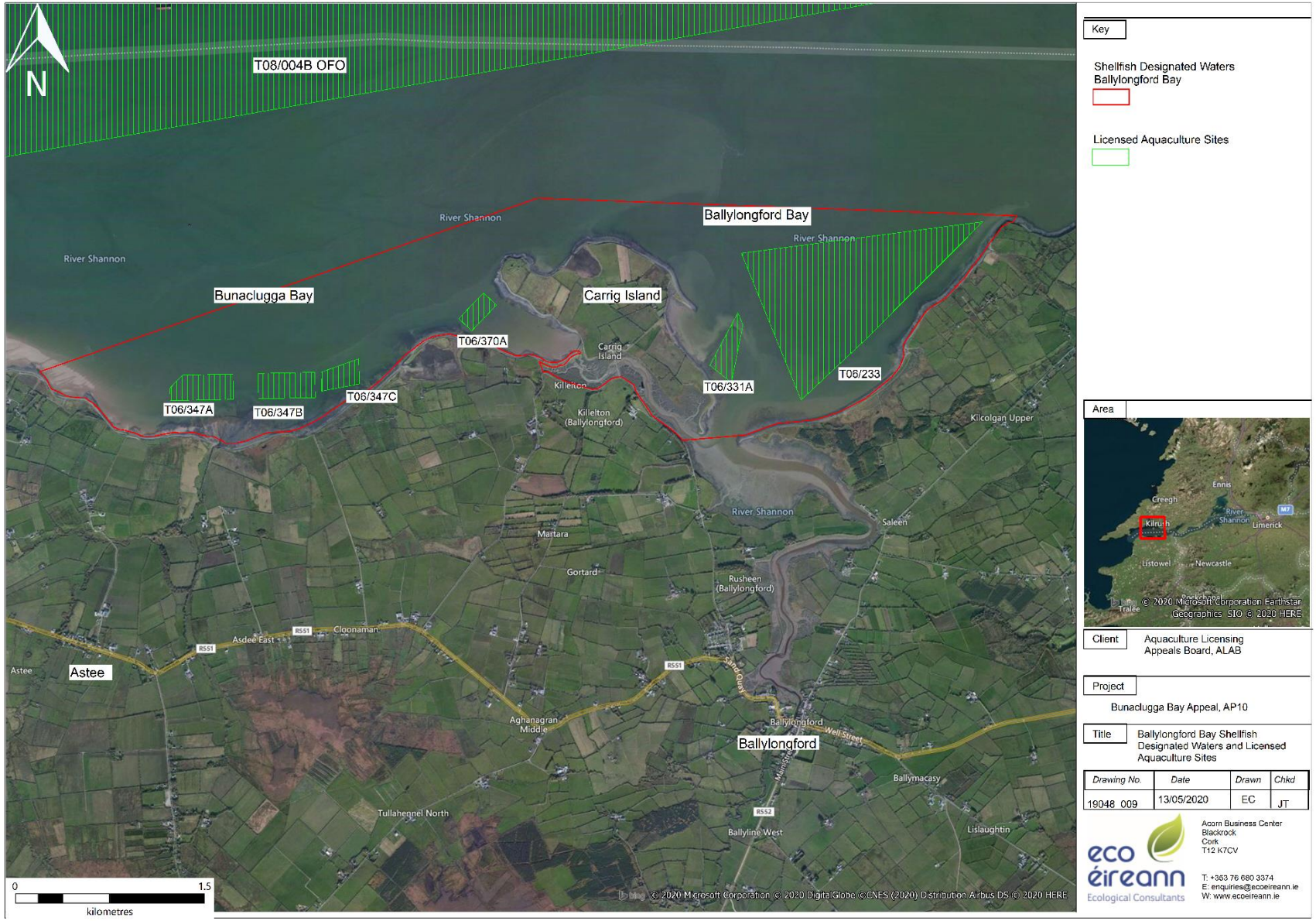


Figure 4 Ballylongford Bay Shellfish Designated Waters & Licensed Aquaculture Sites



5.4.2. **Nature Conservation Designations**

The River Shannon and River Fergus Estuary is designated as a Special Protection Area and a Special Area of Conservation under Article 4 of the EU Habitats Directive (Figures 5 and 6).

The protected habitats and species focused on in this report are those listed as qualifying interests and Special Conservation Interests (SCIs) of the River Shannon and River Fergus Estuary SPA (Table 2) and SAC (Table 3), which will be impacted by aquaculture activities including; mudflats and sandflats not covered by seawater at low tide (1140), large shallow inlets and bays (1160) and reefs (1170), as well as number bird species (Species listed below in Section 5.5).

River Shannon and River Fergus Estuaries SPA (Site Code: 004077)
The site designated as the River Shannon and River Fergus Estuaries SPA comprises the entire estuarine habitat from Limerick City westwards as far as Doonaha in Co. Clare and Dooneen Point in Co. Kerry. The River Shannon and River Fergus estuaries form the largest estuarine complex in Ireland. It is surrounded by the largest port and some of the most extensive areas of industrial development in the west of Ireland (NPWS,2015).

The Shannon Estuary is subject to permanent marine inundation with a tidal flow in a generally west to east aligned main channel. The estuary is macrotidal, having the largest tidal range (5.44 m at Limerick Docks) on the Irish coast. Water depths vary from c.37m at the estuary mouth to less than 5m near Limerick City (NPWS,2015).

In addition to the Shannon and Fergus, the site has numerous sub-estuaries including Ballylongford Creek (Ballylongford Bay), the Glencorbly river at Glin, the White river at Loghill, Robertstown River and Poulweala creek at Foynes and Aughinish, the River Deel at Courtbrown Point and the Maigue at Rinekirk Point. Both the Fergus and inner Shannon estuaries feature vast expanses of intertidal mudflats.

The inner site (Limerick City to the Fergus estuary) has the greatest proportion of intertidal habitat. The proportion of subtidal habitat within the site increases westwards towards the mouth. West of the Fergus Estuary, the northern shoreline of the site becomes rocky with the exception of Clonderlaw Bay and Poulnasherry Bay. The southern shoreline is lined mostly by mudflats and sandflats punctuated by estuaries of the many rivers and creeks entering the site. In the western section of the site, Bunaclugga Bay has both sandy and muddy sediments and boasts a vegetated shingle spit, a rare habitat in Co. Kerry (Moore & Wilson, 2006).

The River Shannon and River Fergus Estuaries SPA is designated for the presence of 21 waterbird species of Special Conservation Interest, SCI, listed in Table 2, below. It is also of special conservation interest for hosting an assemblage of over 20,000 wintering waterbirds. The site is the most important coastal wetland site in the country and regularly supports in excess of 50,000 wintering waterfowl (57,133 - five year mean for the period 1995/96 to 1999/2000) (NPWS, 2015).

The site holds internationally important populations of four species: Light-bellied Brent Goose (494), Dunlin (15,131), Black-tailed Godwit (2,035) and Redshank (2,645) (figures are five year mean peak

counts for the period 1995/96 to 1999/2000). In addition, there are 17 species that have wintering populations of national importance. The site also supports a nationally important breeding population of Cormorant (93 pairs in 2010). Of particular note is that three species which occur regularly are listed on Annex I of the E.U. Birds Directive. These species are: Whooper Swan, Golden Plover, and Bar-tailed Godwit (see Table 2, below) (NPWS, 2015).

The Conservation Objectives for the non-breeding SCIs of the River Shannon & River Fergus Estuaries SPA are focused on the

- Population Trend, which must be stable or increasing, and on the
- Distribution, of which there should be no significant decrease in the range, timing, or intensity of use of areas by the bird species.

Additional Conservation Objectives exist for Cormorant as they are designated for both breeding and wintering populations, these include:

- Breeding population abundance, which should have no significant decline
- Productivity rate, which should have no significant decline
- Distribution of breeding colonies, which should have no significant decline
- Prey biomass available, which should have no significant decline, and
- Barriers to connectivity, of which there should be no significant increase.

The wetland habitats contained within the River Shannon and River Fergus Estuaries SPA are identified to be of conservation importance for non-breeding (wintering) migratory waterbirds. Therefore, the wetland habitats are considered to be an additional Special Conservation Interest.

Table 2 Waterbird Special Conservation Interest (SCI) Species listed in the River Shannon & River Fergus Estuaries SPA

Common Name	Latin Name	Annex I Species	BoCCI[a]	Baseline Population[b]	Population Status at Baseline
Whooper Swan	Cygnus cygnus	X	A	118	All-Ireland Importance
Light-bellied Brent Goose	*Branta bernicla hrota*		A	494	International Importance
Shelduck	*Tadorna tadorna*		A	1,025	All-Ireland Importance
Wigeon	*Anas penelope*		A	3,761	All-Ireland Importance
Teal	*Anas crecca*		A	2,260	All-Ireland Importance
Pintail	*Anas acuta*		R	62	All-Ireland Importance
Shoveler	*Anas clypeata*		R	107	All-Ireland Importance
Scaup	*Aythya marila*		A	102	All-Ireland Importance
Cormorant	*Phalacrocorax carbo*		A	245	All-Ireland Importance
Ringed Plover	*Charadrius hiaticula*		A	223	All-Ireland Importance
Golden Plover	*Pluvialis apricaria*	X	A	5,664	All-Ireland Importance
Grey Plover	*Pluvialis squatarola*		A	558	All-Ireland Importance
Lapwing	*Vanellus vanellus*		R	15,126	All-Ireland Importance
Knot	*Calidris canutus*		R	2,015	All-Ireland Importance
Dunlin	*Calidris alpina*		A	15,131	International Importance
Black-tailed Godwit	*Limosa limosa*		A	2,035	International Importance
Bar-tailed Godwit	*Limosa lapponica*	X	A	460	All-Ireland Importance
Curlew	*Numenius arquata*		R	2,396	All-Ireland Importance
Greenshank	*Tringa nebularia*		A	61	All-Ireland Importance
Redshank	Tringa totanus		R	2,645	International Importance
Black-headed Gull	*Larus ridibundus*		R	2,681	All-Ireland Importance

[a]BoCCI – Listed on Birds of Conservation Concern in Ireland (Colhoun & Cummins, 2013) A=Amber, R=Red
[b]baseline Population – Five year peak mean for the period 1995/96 – 1999/00

The overarching Conservation Objective for the River Shannon and River Fergus Estuaries Special Protection Area is to ensure that waterbird populations and their wetland habitats are maintained at, or restored to, favourable conservation condition. This includes, as an integral part, the need to avoid deterioration of habitats and significant disturbance; thereby ensuring the persistence of site integrity.

The site should contribute to the maintenance and improvement where necessary, of the overall favourable status of the national resource of waterbird species, and the continuation of their long-term survival across their natural range.

Conservation Objectives for the River Shannon and River Fergus Estuaries SPA, based on the principles of favourable conservation status, are described below:

Objective 1: *To maintain the favourable conservation condition of the non-breeding waterbird Special Conservation Interest species listed above, for the River Shannon and River Fergus Estuaries SPA.*

Objective 2: *To maintain the favourable conservation condition of the wetland habitat at the River Shannon and River Fergus Estuaries SPA as a resource for the regularly occurring migratory waterbirds that utilize it.*

Objective 1 - Attributes and Targets:

- To be favourable, the long-term **population trend** for each waterbird SCI species should be stable or increasing. Waterbird populations are deemed to be unfavourable when they have declined by 25% or more, as assessed by the most recent population trend analysis.
- To be favourable, there should be no significant decrease in the range, timing, or intensity of use of areas by the SCI waterbird species, other than that arising from natural patterns of variation.

Factors that may affect the achievement of Objective 1 include:

- Habitat modification: Activities that modify discreet regions or the overall habitats available within the SPA in terms of their use by SCI species (e.g. as a feeding/wintering resource) could result in the displacement of these species from areas within the SPA and/or reduction in overall numbers.
- Disturbance: Anthropogenic disturbance that occurs in or near the site and is either singular or cumulative in nature could result in the displacement of one or more of the listed waterbird species from areas within the SPA, and a reduction in their numbers.
- Ex-situ Factors: use of habitats situated within the immediate hinterland areas of the SPA by SCI waterbird species, or in areas ecologically connected to it. Reliance on these outlying habitats will vary between species and site. Notable habitat changes or increased levels of disturbance within these outlying areas may result in the displacement of one or more of the SCI waterbird species from areas within the SPA, and/or a reduction in their numbers.

Objective 2 - Attributes and Targets:

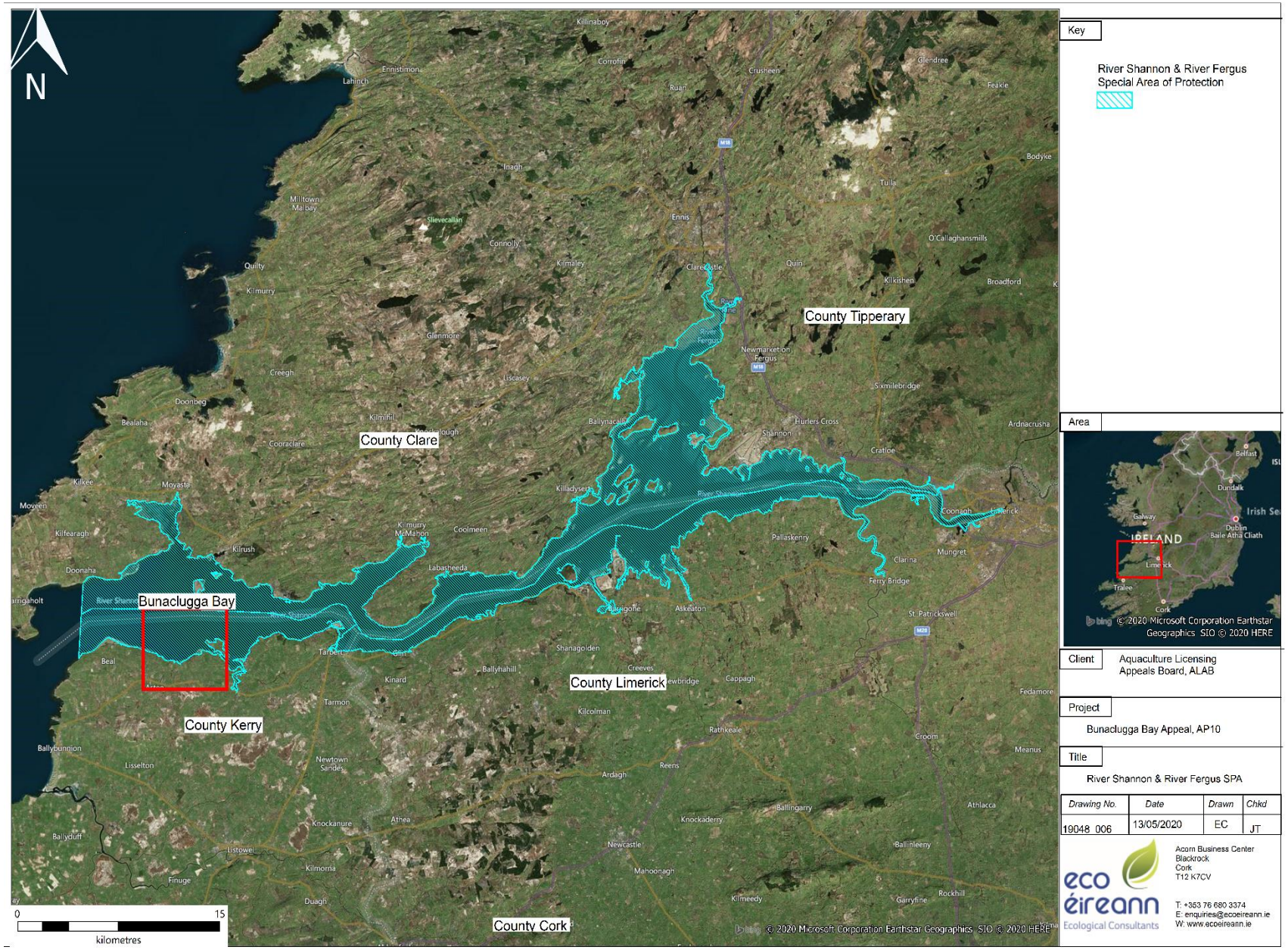
- To be favourable the permanent **area** occupied by the wetland habitat should be stable and not significantly less than the area of **32,261 ha** (other than that occurring from natural patterns of variation).

Conservation condition is assigned using the following criteria:

- Favourable population – population is stable or increasing
- Intermediate (Unfavourable) – Population decline in the range 1 – 24.9%
- Unfavourable population – populations that have declined between 25 – 49.9%
- Highly Unfavourable population – populations have declined > 50% from the baseline reference value.

The NPWS SPA Conservation Objectives Supporting Document (NPWS, 2012c) reports only a single waterbird species is considered as being of Favourable Conservation Condition, the Whooper Swan, which had an overall increase in its population status assessment for the site. One species, the Wigeon, is considered to be in Highly Unfavourable Conservation Condition due to the decline in numbers. While the rest of the SCIs, due to the variation in count coverages over time and the limitations of aerial surveying, the conservation condition is Undetermined (NPWS, 2012c).

Figure 5 River Shannon & River Fergus Estuaries SPA Showing the Bunaclugga Bay Area



Lower River Shannon SAC (Site Code: 002165)

This very large site stretches along the Shannon valley from Killaloe in Co. Clare to Loop Head/ Kerry Head, a distance of some 120km. The site thus encompasses the Shannon, Feale, Mulkear and Fergus estuaries, the freshwater lower reaches of the River Shannon (between Killaloe and Limerick), the freshwater stretches of much of the Feale and Mulkear catchments and the marine area between Loop Head and Kerry Head. Rivers within the sub-catchment of the Feale include the Galey, Smearlagh, Oolagh, Allaughaun, Owveg, Clydagh, Caher, Breanagh and Glenacarney. Rivers within the sub-catchment of the Mulkear include the Killeenagarriff, Annagh, Newport, the Dead River, the Bilboa, Glashacloonaraveela, Gortnageragh and Cahernahallia (NPWS, 2013).

The Lower River Shannon is designated as a Special Area of Conservation (SAC) under the Habitats Directive. The marine area is designated for the Annex I habitats Sandbanks which are slightly covered by sea water all the time (1110), Estuaries (1130), Mudflats and sandflats not covered by seawater at low tide (1140), Coastal lagoons (1150), Large shallow inlets and bays (1160) and Reefs (1170). The bay supports a variety of sub-tidal and intertidal sedimentary and reef habitats. The area is also designated for marine mammals (bottlenose dolphin, otter), freshwater fish (Sea, Brook, and River lampreys), the freshwater mussel and the Atlantic salmon (only in freshwater) (Atkins, 2019). A full list of Conservation Interest features is available in Table 3, below.

Table 3 Qualifying Interests for the Lower River Shannon SAC

Qualifying Interests	Designation Code
Freshwater Pearl Mussel *Margaritifera margaritifera* (Only in Freshwater)	1029
Sea Lamprey *Petromyzon marinus*	1095
Brook Lamprey *Lampetra planeri*	1096
River lamprey *Lampetra fluviatilis*	1099
Atlantic Salmon *Salmo salar* (Only in Freshwater)	1106
Sandbanks which are slightly covered by seawater all the time	1110
Estuaries	1130
Mudflats and sandflats not covered by seawater at low tide	1140
*Coastal Lagoons	1150
Large shallow inlets and bays	1160
Reefs	1170
Perennial vegetation of stony banks	1220
Vegetated sea cliffs of the Atlantic and Baltic coasts	1230
Salicornia and other annuals colonising mud and sand	1310
Atlantic salt meadows (*Glauco-puccinellietalia maritimae)*	1330
Bottlenose Dolphin *Tursiops truncates*	1349
Otter *Lutra lutra*	1355
Mediterranean salt meadows (*Juncetalia maritimi)*	1410
Watercourses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho- Batrachion* vegetation	3260
Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae)*	6410
*Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-padion, Alnion incanae, Salicion albae)*	91E0

*Indicates a Priority Habitat

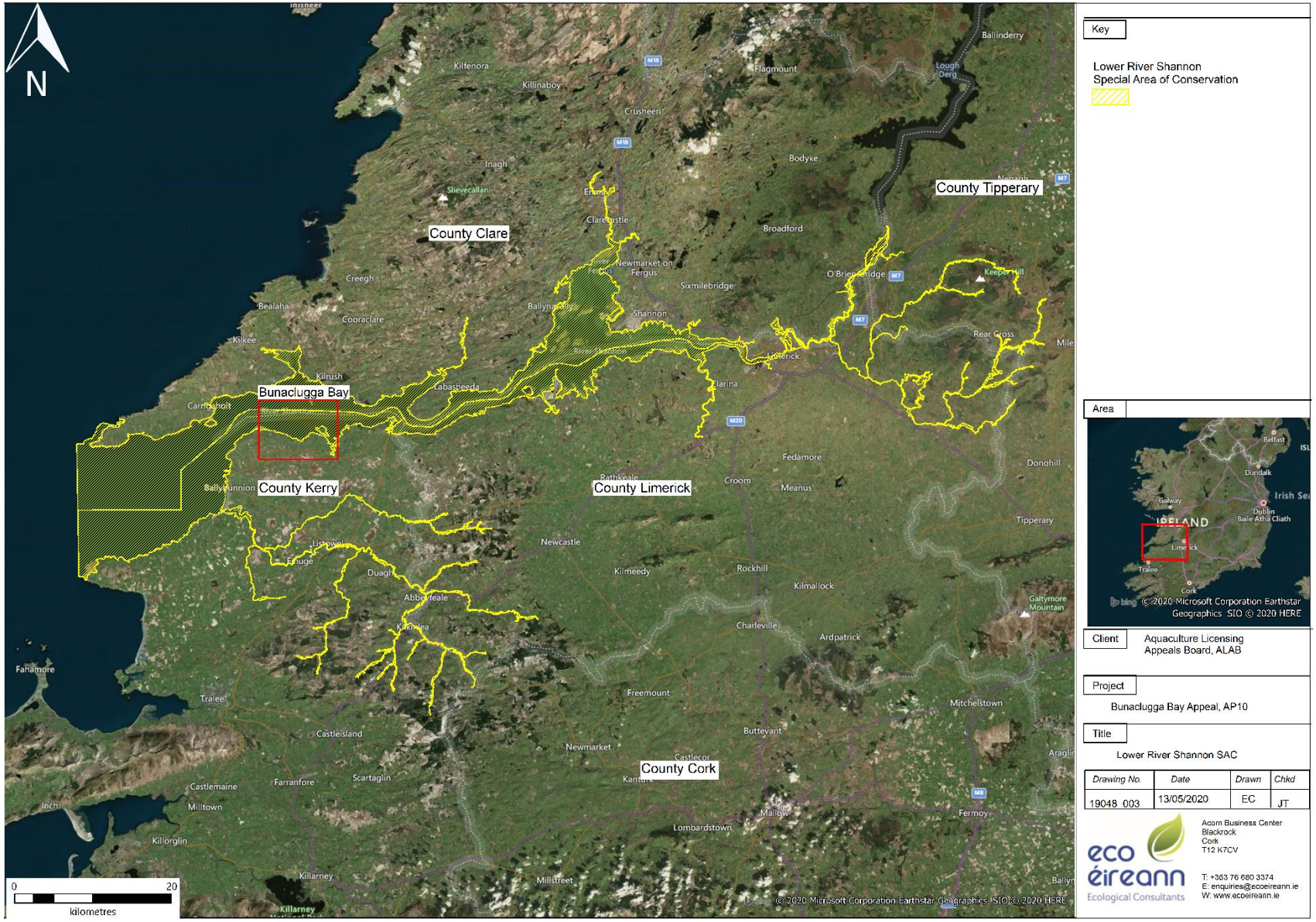
Conservation Objectives for these habitats and species relate to the requirement to maintain habitat distribution, structure and function, as defined by characterizing (dominant) species in these habitats (NPWS, 2012a). For designated species the objective is to maintain various attributes of the populations including population size, cohort structure and the distribution of the species in the SAC.

NPWS (2012a) reports the objectives and targets of each conservation objective within the Lower River Shannon SAC as follows:

1. To restore the favourable conservation condition of Sea Lamprey *Petromyzon marinus* (1095)
2. To maintain the favourable conservation condition of River Lamprey *Lampetra fluviatilis* (1099)
3. To restore the favourable conservation condition of Atlantic Salmon *Salmo salar* (only in fresh water) (1106)
4. To maintain the favourable conservation condition of Sandbanks which are slightly covered by sea water all the time (1110)
5. To maintain the favourable conservation condition of Estuaries (1130)
6. To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide (1140)
7. To restore the favourable conservation condition of Coastal lagoons (1150)
8. To maintain the favourable conservation condition of Large shallow inlets and bays (1160)
9. To maintain the favourable conservation condition of Reefs (1170)
10. To maintain the favourable conservation condition of Salicornia and other annuals colonizing mud and sand (1310)
11. To maintain the favourable conservation condition of Bottlenose Dolphin (1349)
12. To restore the favourable conservation condition of Otter (1355)
13. To restore the favourable conservation condition of Mediterranean salt meadows (*Juncetalia maritimi)* (1410)
14. To maintain the favourable conservation condition of Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation (3260)
15. To maintain the favourable conservation condition of Molinia meadows on calcareous, peaty or clayey-silt laden soils (*Molinion caeruleae*) (6140)
16. To restore the favourable conservation condition of Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) (91E0)

The conservation objectives above are defined further alongside key attributes and targets within the Conservation Objectives Series (NPWS, 2012a).

Figure 6 Lower River Shannon SAC Showing the Bunaclugga Bay Area



5.5. Protected Species

There are a range of protected species recorded in the 10km square (Q94) within which Bunaclugga Bay is located, based on records from the National Biodiversity Data Centre (https://maps.biodiversityireland.ie/Map [accessed on 04/05/2020]), in the last ten years. These include cetaceans, numerous bird records, otter, seals and a number of terrestrial based organisms, which would not be affected by the aquaculture development.

A number of these species have been protected under the EU Habitats and Birds Directives, as transposed into Irish law under the European Communities (Birds and Natural Habitats Regulations 2011) (S.I. No. 477 of 2011), as Species of Conservation Interest (SPA designated species) and Qualifying Features (SAC designated species), including numerous bird species, bottlenose dolphins, otter, salmon, lamprey, and the freshwater pearl mussel.

5.5.1. Cetaceans

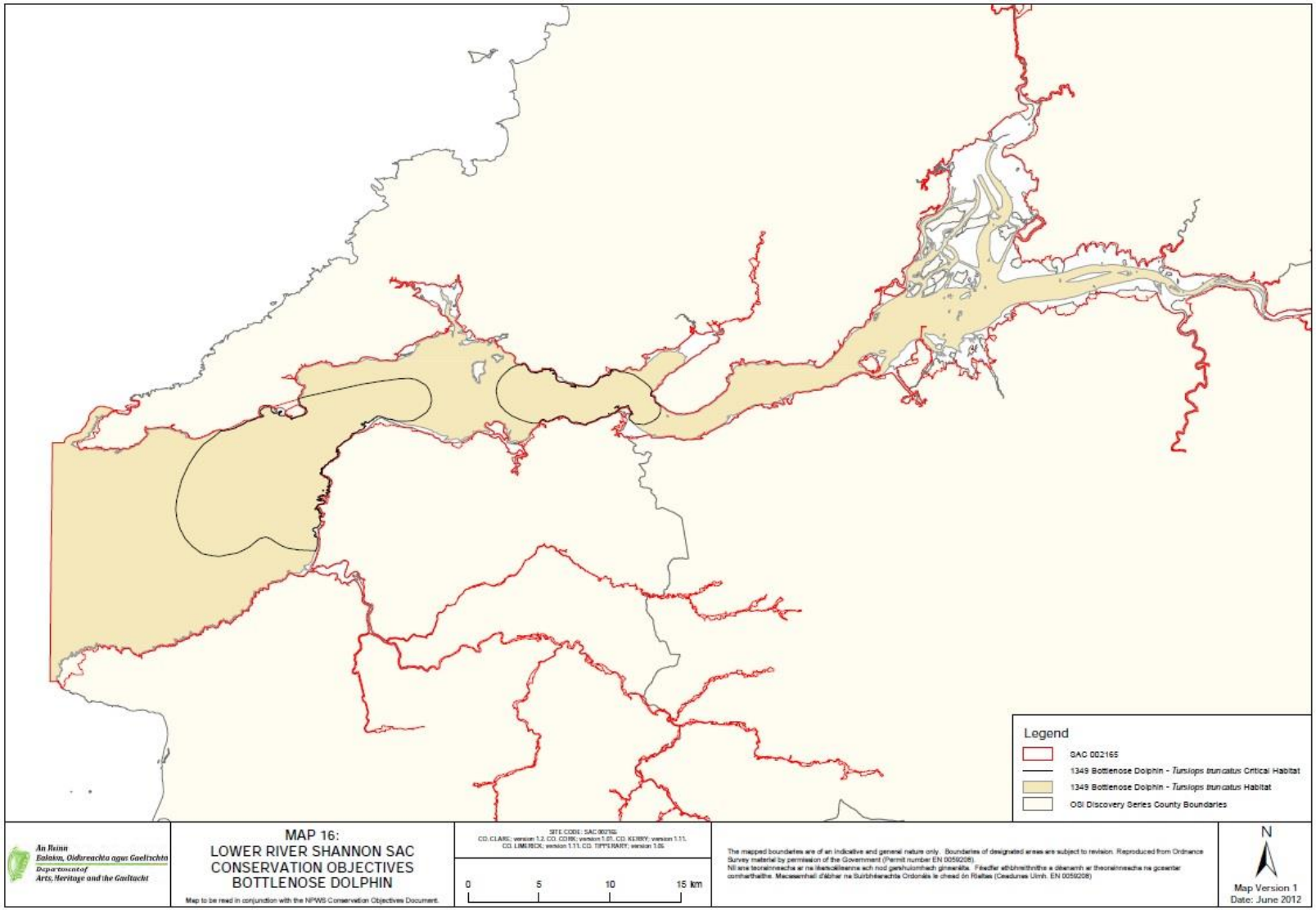
The size, community structure, distribution, and habitat use of bottlenose dolphin inhabiting the Lower River Shannon SAC are quite well understood. The population is described as resident within the site with dolphin groups present in the estuary throughout the year. The Lower River Shannon SAC is one of only two SACs in Ireland designated for the presence of bottlenose dolphin. A recent study (Rogan, et al., 2018) estimated the total numbers of dolphins using the Lower River Shannon SAC as 139 individuals, which indicated, in line with previous estimates calculated since 1997, a stable population size.

Within the Lower River Shannon SAC, two core locations have been identified within which the majority of the dolphin records occur. These 'Critical Areas' represent high value habitats used preferentially by the species within its overall range at the site and they broadly coincide with areas of steep benthic slope, greater depth and stronger currents (NPWS, 2012).

Due to the lack of survey effort, both spatially and temporally, in the upstream area of the LRS SAC it should be noted that all suitable aquatic habitat is considered relevant to the species' range and ecological requirements within the site and therefore of potential use by bottle-nosed dolphins (NPWS, 2012).

A search of the sightings database from the Irish Whale and Dolphin Group (IWDG - http://www.iwdg.ie [accessed on 04/05/2020]) from the last 10 years indicate there have been no cetacean sightings within Poulnasherry Bay. There have been numerous records of bottlenose dolphin within the Lower River Shannon Estuary, 4 recordings of common dolphin *Delphinus delphis*, 3 recordings of the common porpoise *Phocoena phocoena*, 2 records of the striped dolphin *Stenella coeruloealba* and 1 record of a long-finned pilot whale *Globecephala melas*.

Figure 7 Lower River Shannon SAC Potential & Critical Dolphin Habitat



5.5.2. **Birds**

The River Shannon and River Fergus Estuaries SPA is designated for the presence of 21 waterbird species of Special Conservation Interest. Regularly occurring non-SCI species which have been recorded within the River Shannon SPA are listed in Table 4, below. SCI Waterbird Baseline Population data is presented in Table 2, above, with the species' ecological characteristics, requirements and specialities listed in Table 6 below.

Table 4 Regularly Occurring Non-SCI Species which occur at the River Shannon SPA (NPWS, 2012c)

Common Name	Latin Name	Recent Peak Numbers (2005/06 – 2009/10)
Mute Swan	*Cygnus olor*	135 (i)
Greylag Goose	*Anser anser*	140
Mallard	*Anas platyrhynchos*	289
Pochard	*Aythya farina*	37
Tufted Duck	*Aythya fuligula*	93
Goldeneye	*Bucephala clangula*	17
Red-breasted Merganser	*Mergus serrator*	7
Great Northern Diver	***Gavia immer***	8
Little Grebe	*Tachybaptus ruficollis*	7
Great Crested Grebe	*Podiceps cristatus*	31
Little Egret	***Egretta garzetta***	29
Grey heron	*Ardea cinereal*	23
Moorhen	*Gallinula chloropus*	33
Coot	*Fulica atra*	51
Oystercatcher	*Haematopus ostralegus*	81
Snipe	*Gallinago gallinago*	115
Turnstone	*Arenaria interpres*	57
Common Gull	*Larus canus*	83
Lesser Black-backed Gull	*Larus fuscus*	16
Herring Gull	*Larus argentatus*	8
Great Black-backed Gull	*Larus marinus*	8

Species in **Bold** are Annex I species.

Given a number of issues, including the achievement of co-ordinated ground-based counts across the River Shannon and Fergus Estuaries SPA being impracticable, partly because on the unfeasibly large number of counters that would be required, and also due to limitations on time, accessibility and visibility, the estimation of accurate waterbird population trends for this site is difficult (NPWS, 2012c).

There was better ground coverage during the earlier years of I-WeBS (baseline years 1995/96 – 1999/00) while in more recent years the counts have focused more on smaller sections with a recommended focus on the key areas within the site (NPWS, 2012c).

The site is covered once or twice per season by aerial census. This enables complete coverage of the entire site. However, the quality of the counts undertaken during aerial census is limited by many factors, especially at this site which supports large numbers (tens of thousands) of birds of many species. These limitations are summarised below (NPWS, 2012c):

1. Aerial census only allows a limited timeframe and the counts provided of large flocks are estimates.

2. It is often difficult to discern/identify birds that remain on the ground and are not flushed by the aircraft.
3. Species occurring in low densities (such as Pintail, Teal, Grey Plover) are overlooked. Aerial counts are more suitable for dispersed and distinguishable species such as Lapwing, Golden Plover and Shelduck whereas small, scarce or skulking species are likely underestimated (e.g. Dunlin, Turnstone, Redshank, Greenshank) (Crowe, 2005) and are better covered by ground observations.

Given the differences in count coverage over time described above, the estimation of accurate waterbird population trends for this site is difficult. With the exception of 2004/05, ground-based coverage since 2001/02 has been considerably lower when compared to the baseline period. This factor limits the accuracy of the population trends (NPWS, 2012c).

Lewis et al. (2016) prepared a review and assessment of waterbird data for the River Shannon SPA, commissioned by the SIFP Environmental Sub Group, based on I-WeBS data and data from the NPWS Waterbird Survey Programme, which revealed that subsite count cover during I-WeBS has dropped considerably since 2010/11 largely due to a lack of count volunteers. Given this limitation the review concluded that site totals generated using I-WeBS data largely underestimate the actual number of waterbirds using the Shannon and Fergus site complex.

However, where adequate data existed, it was possible to examine trends at a smaller (subsite scale) scale and subsite trends are likely to be more accurate because they are based on the same count areas and calculated using data from years with the best count coverage. It was noted that the I-WeBS subsite for Bunaclugga Bay (OK406, Dooneen Point (Beale) – Bunaclugga Bay) is an equivalent area to the NPWS Waterbird Survey subsites for Beale strand and Bunaclugga Bay (OK507 & OK508, respectively). While the I-WeBS subsite (OK494) and the NPWS Waterbird Survey subsite (OK509) for Ballylongford Bay directly corresponds to each other.

I-WeBS subsite OK406 has been counted in 7 seasons by I-WeBS with a maximum of 2 counts per season; count coverage spanning the seasons 1999/00 to 2007/08. No recent I-WeBS count data is available for this subsite, however, OK508 (Bunaclugga Bay) received full coverage during the NPWS Waterbird Survey Programme (Lewis et al., 2016). Subsite 0K494 (Ballylongford Bay) has been counted in eight seasons during I-WeBS with a maximum of two counts per season; count coverage spanning the seasons 1998/99 to 2007/08. No recent data is available for this subsite (Lewis *et al.,* 2016).

During the NPWS Waterbird Survey Programme, 0K508 (Bunaclugga Bay) recorded 30 species overall, with 18-22 species present during low tide surveys and 11 species recorded during the high tide survey. The subsite was ranked as the third most species-rich out of the total 66 subsites within the River Shannon & Fergus Estuaries SPA. Subsite OK509 (Ballylongford Bay) was the most species rich subsite during the survey programme with the highest average species diversity out of the total 66 subsites counted. (Lewis *et al*., 2016).

During the roost survey, 0K508 (Bunaclugga Bay) held a total of eight roosting flocks comprising 13 species overall. Most flocks were recorded roosting intertidally or supratidally, while three subtidal

roosting flocks were recorded (Black-headed Gull, Light-bellied Brent Goose, and Wigeon). 0K508 was of significance for Ringed Plover, which occurred in peak numbers during all four low tide surveys, the high tide survey, and the roost survey. The peak count (19) for Red-throated Diver, an Annex I species, was close to the all-Ireland threshold (Lewis *et al*., 2016).

Lewis *et al.* (2016) concluded that despite low coverage of the Bunaclugga and Ballylongford bays during I-WeBS, that these count areas are extremely important to waterbirds.

The Department of Agriculture Food and the Marine have determined within their Natura Impact Conclusion Statement that the waterbird populations of Bunaclugga/ Ballylongford Bay will be monitored using I-WeBS. Lewis *et al.* (2016) concluded that the River Shannon & Fergus Estuaries SPA has not received thorough coverage during I-WeBS surveys and so it is unlikely to provide adequate count cover of the SPA now or in the near-future, simply due to the limited availability of experienced surveyors, which are essential due to the sites large size and difficulties in access to certain areas. Furthermore, without waterbird census data, as well as information on distribution and behaviour, conclusions made during ecological impact assessments currently, and in the near future, are likely to lack the required confidence.

Table 5 Summary of Recorded Waterbird Species and Numbers Within the Ballylongford/ Bunaclugga Bay Area

Species	I-WeBS		NPWS WSP
	Subsite OK406 Dooreen Pt. (Beal) – Bunaclugga Bay* 34 species	**Subsite OK494 Ballylongford Bay* 37 species**	**Subsites OK508 & OK509 Bunaclugga & Ballylongford Bay** 41 species**
Whooper Swan		**8**	**21**
Light-bellied Brent Goose	**268**	**25**	**35**
Shelduck	**4**	**86**	**36**
Wigeon	**72**	**578**	**468**
Teal	**39**	**692 (n)**	**49**
Pintail		**4**	**3**
Shoveler		**16**	**2**
Scaup		**54**	
Cormorant	**16**	**7**	**30**
Ringed Plover	**46**	**36**	**111 (n)**
Golden Plover	**630**	**3400 (n)**	**1188**
Grey Plover	**16**	**58 (n)**	**12**
Lapwing	**890**	**2700 (n)**	**1176 (n)**
Knot	**760 (n)**	**450 (n)**	**19**
Dunlin	**830 (n)**	**3200 (n)**	**1365 (n)**
Black-tailed Godwit			**87**
Bar-tailed Godwit	**180**	**40**	**54**
Curlew	**326**	**572 (n)**	**339**
Greenshank	**5**	**11**	**46 (n)**
Redshank	**24**	**175**	**192**
Black-headed Gull	**40**	**620**	**276**
Common Gull	180	226	216
Little Egret	3	11	20
Great Black-backed Gull	8	3	312

Species	I-WeBS		NPWS WSP
	Subsite OK406 Dooreen Pt. (Beal) – Bunaclugga Bay* 34 species	**Subsite OK494 Ballylongford Bay* 37 species**	**Subsites OK508 & OK509 Bunaclugga & Ballylongford Bay** 41 species**
Great Crested Grebe	3	19	26
Glaucous Gull	1		
Grey Heron	4	5	20
Lesser Black-backed Gull	32	12	16
Herring Gull	5		850
Iceland Gull	1		
Mallard	44	186	87
Mute Swan	5	9	1
Great Northern Diver	7	2	16
Oystercatcher	80	51	104
Red-throated Diver	3		19
Snipe	8	111	30
Sanderling	51		58
Turnstone	28	25	42
Whimbrel	29		
Black-necked Grebe	1		
Kingfisher		1	
Little Grebe		10	4
Moorhen		3	3
Red-breasted Merganser		5	
Spotted Redshank			1
Gadwall			1
Ruff			1
Water Rail			2

*SCI species in **Bold***

**Peak numbers recorded during any one I-WeBS count*

***Peak numbers recorded during any one count*

n – Denotes numbers of National Importance

Table 6 - Ecological Characteristics, Requirements & Specialities of Special Conservation Interest Waterbird Selection Species (NPWS, 2012c)

Waterbirds of Special Conservation Interest	Winter Distribution[A]	Trophic Guild[B]	Food/ Prey Requirements[C]	Principle supporting habitat within site[D]	Ability to utilise other/ alternative habitats (in & around the site)[E]	Site Fidelity[F]
Whooper Swan *Cygnus olor*	Widespread	1, 7	Wide	Lagoon and associated habitats, intertidal mudflats and shallow subtidal	2	Moderate/ High
Light-bellied Brent Goose *Branta bernicla hrota*	Highly restricted	1, 5, 7	Highly specialised	Intertidal mud and sand flats	2	High
Shelduck *Tadorna tadorna*	Localised	1, 5	Wide	intertidal mudflats and shallow subtidal	3	High
Wigeon *Anas penelope*	Widespread	1, 5	Narrower	Intertidal mud and sand flats and sheltered and shallow subtidal	2	Weak
Teal *Anas crecca*	Widespread	1	Wide	Sheltered and shallow Subtidal over sand and mud flats	1	Moderate
Pintail *Anas acuta*	Localised	1	Wide	Intertidal mud and sand flats and sheltered and shallow subtidal	2	Weak
Shoveler *Anas clypeata*	Intermediate	1	Wide	Lagoon, brackish and freshwater lakes plus intertidal mud and sand flats	3	Moderate
Scaup *Aythya marila*	Highly Restricted	2	Wide	Subtidal	1	Unknown
Cormorant *Phalacrocorax carbo*	Widespread	3	Highly specialized	Sheltered and shallow subtidal over sand and mud flats	1	Moderate
Ringed Plover *Charadrius hiaticula*	Localised	4	Wide	Intertidal mud and sand flats	3	High
Golden Plover *Pluvialis apricaria*	Intermediate	4	Wide	Intertidal mud and sand flats	2	Moderate
Grey plover *Pluvialis squatarola*	Localised	4	Wide	Intertidal mud and sand flats	3	high
Lapwing *Vanellus vanellus*	Widespread	4	Wide	Intertidal mud and sand flats	2	Moderate
Knot *Calidris canutus*	Localised	4	Narrower	Intertidal mud and sand flats	3	Moderate
Dunlin *Calidris alpina*	Intermediate	4	Wide	Intertidal mud and sand flats	3	High
Black-tailed Godwit *Limosa limosa*	Localised	4	Wide	Intertidal mud and sand flats	2	High
Bar-tailed Godwit	Localized	4	Wide	Intertidal mud and sand flats	2	Moderate

Limosa lapponica						
Curlew *Numenius arquata*	Widespread	4	Wide	Intertidal mud and sand flats	2	High
Greenshank *Tringa nebularia*	Intermediate	6	Wide	Intertidal mud and sand flats	3	High
Redshank *Tringa totanus*	Intermediate	4	Wide	Intertidal mud and sand flats	2	High
Black-headed Gull *Larus ridibundus*	N/C	1, 2, 4, 6, 7	Wide	Intertidal flats & sheltered and shallow subtidal	2	Moderate

[A] Winter distribution: Very widespread (>300 sites); Widespread (200 – 300 sites); Intermediate (100 – 200 sites); Localised (50-100 sites); Highly restricted (<50 sites) (based on Crowe (2005).

[B] Waterbird foraging guilds. 1 = Surface swimmer, 2 = water column diver (shallow), 3 = water column diver (deeper), 4/5 = intertidal walker (out of water), 6 = intertidal walker (in water), 7 = terrestrial walker. Further details are given within Appendix 5.

[C] Food/prey requirements - species with a wide prey/food range; species with a narrower prey range (e.g. species that forage upon a few species/taxa only), and species with highly specialised foraging requirements (e.g. piscivores).

[D] Principal supporting habitat present within the SPA. Note that this is the main habitat used when foraging with the exception of Whooper Swan that utilise wetland habitats for roosting and forage within terrestrial grasslands outside of the SPA.

[E] Ability to utilise alternative habitats refers to the species ability to utilise other habitats adjacent to the site. 1 = wide-ranging species with requirement to utilise the site as and when required; 2 = reliant on site but highly likely to utilise alternative habitats at certain times (e.g. high tide); 3 = considered totally reliant on wetland habitats due to unsuitable surrounding habitats and/or species limited habitat requirements.

[F] Site fidelity on non-breeding grounds: Unknown; Weak; Moderate; or High (based on published information)

5.5.3. **Otter**

The Otter *Lutra lutra* is protected under the Irish Wildlife Acts (1976 and 2000) and is also listed in Annexes II and IV of the Habitats Directive. It is listed as one of the qualifying features of interest in the Lower River Shannon SAC. Records from the National Biodiversity Data Centre indicate that the last record of otter within the 10km grid square (Q95) encompassing Poulnasherry Bay dates from May 2017.

Otter have been screened out of the Appropriate Assessment process due to the lack of potential overlap and interaction with aquaculture activities, it has been concluded that aquaculture activities (including Oyster Fishery Order areas) do not pose a threat to the conservation status of this species within the LRS SAC (MI, 2018).

5.5.4. **Salmon Lamprey, and the Freshwater Pearl Mussel**

The Atlantic Salmon *Salmo salar*, Sea Lamprey *Petromyzon marinus*, River Lamprey *Lampetra fluviatilis* and Brook Lamprey *Lampetra planeri* and the Freshwater Pearl Mussel *Margaritifera margaritifera*, are protected as qualifying features within the Lower River Shannon SAC, only within the freshwater reaches of the river system, therefore the aquaculture activities are considered non-disturbing to these species due to the lack of spatial overlap and interaction with aquaculture activities located within the estuarine stretch of the SAC system (MI, 2019).

5.6. Statutory Plans

There are no specific statutory development plans for Ballylongford/ Bunaclugga Bay, Co. Kerry. Aquaculture is, however, considered under the Kerry County Development Plan and the Strategic Integrated Framework Plan for the River Shannon Estuary.

5.6.1. **Kerry County Development Plan**

Kerry County Development Plan 2015- 2021 was adopted by the Elected Members of Kerry County Council on 16th February 2015 and is effective since 16th March 2015. Chapter 8 (Natural Resources) of the plan indicates the importance of aquaculture to the economy of the county and the importance of safeguarding the natural environment which supports the aquaculture economy.

The overall objectives of the plan with regards to aquaculture in Kerry are:

"Support and promote the sustainable development of the aquaculture sector in order to maximise its contribution to employment and growth in coastal communities and the economic wellbeing of the County, while ensuring environmental protection through the implementation of the objectives and Development Management, Guidelines and Standards of this Plan."

"Support the protection of water quality, key habitat and other natural resource requirements necessary to safeguard coastal, estuarine and freshwater fisheries."

"Have regard to the advice of the relevant statutory bodies, as appropriate and recommendations of the Environmental Section of Kerry County Council in assessing the environmental impacts of developments."

"Support the sustainable development of marine aquaculture and fishing industries and its diversification at appropriate locations having regard to the requirements of the EU Water Framework Directive, the relevant River Basin Management Plans, the Habitats Directive, the integrity of the Natura 2000 network and visual amenity."

Full objectives in relation to all Natural Resources - Fisheries are outlined in Section 8.4 of Chapter 8 (Kerry County Council, 2015).

The plan identifies the importance of creating a balance of sustaining businesses from natural resources and protecting the environment which provides a resource for these business throughout the county.

The CDP also refers to the importance of integrating the actions of the National Biodiversity Action plan in to planning application.

"Ensure compliance with the provisions of Actions for Biodiversity 2011-2016 – Ireland's National Biodiversity Plan and any subsequent document adopted during the lifetime of this Plan."

5.6.2. Strategic Integrated Framework Plan for the River Shannon Estuary

A Strategic Integrated Framework Plan (SIFP) was commissioned in 2011 by Clare County Council, Kerry County Council, Limerick City and County Councils, Shannon Development and Shannon Foynes Port Company. The plan is overseen by a multi-agency Steering Group comprising of the aforementioned parties plus other key stakeholders. The plan identifies Strategic Development Locations for Marine Related Industry and Areas of Opportunity for aquaculture and renewable energy generation, within the River Shannon Estuary.

The aim of the Strategic Integrated Framework Plan (SIFP) is to identify the nature and location of future development, economic growth and employment that can be sustainably accommodated within the Shannon Estuary whilst ensuring that the conservation status of the Natura 2000 and other environmentally sensitive sites would not be reduced as a result of the short-term or long-term impact of such developments.

A number of the general policies within the plan have potential for impacts on waterbird SCIs of the River Shannon and River Fergus Estuaries SPA. These include policies supporting the growth of shipping movements (SPN 1.1), promoting the development of marina facilities (MTL 1.6), encouraging the expansion of marine based recreational activities (MTL 1.7), encouraging the development of sustainable commercial fishing and aquaculture activities (CPA 1.2), and supporting the provision of appropriate infrastructure for fishing and aquaculture activities (CPA 1.4).

The plan includes the identification of nine strategic development locations for marine-related industry, four areas of opportunity for tidal energy development and eight areas of opportunity for aquaculture. The areas of opportunity for tidal energy development largely occur in subtidal habitat in the outer part of the estuary. However, the Tarbert Bay area of opportunity includes most of the intertidal habitat within Tarbert bay. The areas of opportunity for aquaculture largely reflect the current distribution of

the aquaculture sites within the Lower River Shannon. However, the area of opportunity at Clonderlaw Bay would represent an additional area of aquaculture development and could potentially affect a large area of intertidal habitat.

The plan also includes specific policies to ensure compliance with the Habitats Directive and other environmental legislation, and a Habitats Directive Assessment and a Strategic Environmental Assessment (RPS Group, 2013a, b) of the plan have been carried out. Because of the strategic nature of the plan, many of the potential impacts will need to be assessed by project-specific assessments.

5.6.3. National Biodiversity Action Plan

The National Biodiversity Action Plan (NBAP) 2017-2021 refers to aquaculture specifically in terms of engaging the sector to promote the benefits of conservation and sustainable use of biodiversity for the benefit of their businesses. There is a target within (Target 7) which states by 2020 areas under agriculture, aquaculture and forestry are managed sustainably ensuring conservation of biodiversity.

County Kerry has not produced a County specific Biodiversity Action Plan.

5.7. Man-made heritage

Bunaclugga/ Ballylongford bay exists within an area of extensive man-made heritage and high archaeological potential including terrestrial, foreshore and subtidal cultural heritage, with a number of recorded monuments within the immediate area including on nearby Carrig Island which has a number of recorded monuments; 3x Fulacht Fias (KE002-007, 005 & 006), Ancient Saints Road/ Trackway (KE002-010), Battery (KE002-004), Ringfort (KE002-009) and a series of enclosures, earthworks, field systems, a holy well, Church and ecclesiastical enclosure concentrated in the centre of Carrig Island.

The Department of Culture, Heritage and the Gaeltacht recommended that an Underwater Archaeological Impact Assessment (UAIA) be carried out. This UAIA was subsequently completed by Mizen Archaeology (Mizen Archaeology, 2019). Nothing of archaeological significance was recorded within the access route and site boundary of T06/386 during the visual and metal detection survey.

The UAIA report concluded that likely direct impact of the development on known archaeological sites is classified as null, the likely direct impact of the development on potential unknown archaeological sites is classified as imperceptible. No further archaeological mitigation measures are required for T06/386 (Mizen Archaeology, 2019)

6.0 Section 61 Assessment

6.1. Site Suitability

Bunaclugga Bay forms part of the wider Shannon Estuary which is designated as the River Shannon & River Fergus Estuaries SPA (Site Code: 004077) and the Lower River Shannon SAC (Site Code:002165). Bunaclugga Bay is also designated within the West Shannon Ballylongford Bay Shellfish Designated Area, which encompasses the entirety of Bunaclugga and Ballylongford Bays.

Bunaclugga Bay is an area of existing aquaculture (intertidal oyster trestle cultivation only) which can be seen as part of the intertidal habitats. The trestles are visible at low tide and from elevated positions only, and the population density in the area is low, thereby not considered to impact negatively on the aesthetic quality of the bay.

The proposed aquaculture site, T06/386 (11.02ha) is located on intertidal sandflats on the western edge of Bunaclugga Bay. The area is designated as both an SAC (the Lower River Shannon SAC) and SPA (the River Shannon & Fergus Estuaries SPA).

The Appropriate Assessment of aquaculture activities within the Shannon Estuary found that intertidal aquaculture in this area of the estuary will not have a negative impact on the protected habitats or species of the SAC, so long as fish health and invasive non-native species guidelines, regulations and license conditions were followed. However, the AA found that there was potential for this proposed site to cause displacement impacts on Ringed Plover, an SCI of the SPA.

A number of observations and comments were raised during the Statutory and Technical Consultations, while a single submission was received during the Public Consultation. These submissions and comments are listed in Table 7, below.

Table 7 Technical and Statutory Consultation Observations and Comments

Technical Consultation	
Authority	**Comments/ Observations**
Marine Engineering Division, MED	No objection to the licensing of this site. The application represents a new aquaculture site within an area of existing and historic aquaculture. The MED indicate the site is suitable for the proposed aquaculture They state the application is for 4.9ha but with the coordinates provided within the application form the size of the site is 11.02ha. The Med that the site is obscured from views from the R551 regional road and not visible from the Wild Atlantic Way
Marine Survey Office, MSO	The MSO have no objection to the application from a navigational viewpoint and have provided details of navigational markings to be placed at the site should it be licensed. The two offshore corners of the site are required to be marked with a yellow special mark with topmark; the topmark to be visible at all stages of tide at a height of two metres above the water.
Sea Fisheries Protection Authority, SFPA	The SFPA state that the application site will have no negative impact on local sea fishing operations

Statutory Consultation	
Authority	**Comments/ Observations**
Marine Institute, MI	The MI state that the site is located within Shellfish Designated Waters, which currently have a 'B' Classification. They recommend the applicant is requested for details on steps that would be taken to ensure that the risk of the introduction of any invasive non-native species into the site with seed stock or structures is minimised. The MI recommend that full account should be taken of the conclusions and recommendations of the Appropriate Assessment process and mitigation measures set out in the Departments Natura Conclusion Statement. The MI highlight the concerns raised of the likely impacts of existing and proposed aquaculture activities on the distribution of Ringed Plover in the Bunaclugga/ Ballylongford Area. They state the Appealed site T06/386 directly overlaps with the habitat type considered of importance for Ringed Plover (dry intertidal sandy shore habitat) and therefore the risk based on the location and preferred community type cannot be discounted.
Commissioners of Irish Lights, CIl	No objection to the application, they request that all structures are clearly marked as required by regulations.
Bord Iascaigh Mhara, BIM	Have no objection and are satisfied the application does not conflict with any other aquaculture or inshore fisheries interests in the area.
Inland Fisheries Ireland, IFI	Have no objection to the proposed application, however, they have proposed a number of licensing conditions should the site be licensed.
Shannon Foynes Port Company	The Harbour Master is satisfied that this application does not impact on commercial shipping activities.
Department of Culture Heritage and the Gaeltacht, DCHG	The DCHG observed that in-combination effects of the aquaculture activities within the Oyster Fishery Order areas for designated habitats and the potential for interactions with the bottlenose dolphin. Concerns were raised regarding the potential effectiveness of the Adaptive Management Plan to be implemented based on the results of the targeted monitoring programme of shorebirds in the Poulnasherry/Kilrush area and on the lack of data surrounding the exact nature and level of current and proposed activities within the Oyster Fishery Order areas.
MI comments on the DCHG observations	The MI's AA report on aquaculture activities within the Lower River Shannon SAC acknowledges the unknown nature and extent of the activities within the OFOs. To this end, a precautionary approach was employed such that any aquaculture activities likely to result in disturbance were considered in-combination with those as likely to occur in the OFOs. On this basis the MI advised caution be applied when considering if certain proposed aquaculture activities including sites T06/386 were to be licensed. The MI Clarified that there is potential for the development of intertidal aquaculture sites in the Bunaclugga/ Ballylongford area to cause moderate displacement to the Ringed Plover. They state that the site directly overlaps with habitat which is considered important to the Ringed Plover (dry intertidal sandy shore habitat) and therefore the risk of disturbance to this species on the basis of location (and preferred community type) cannot be discounted. Ongoing bird monitoring review of I-WeBS data will determine if consideration can be given to future licensing within this area.
Department of Housing, Planning and Local	No comments were received

Government, DHPLG	
An Taisce	Raised several objections regarding the risks of displacement to a number of bird species and to the bottlenose dolphin. 1. Bird Displacement An Taisce note that within the Natura Conclusion Statement it is stated that the AA conclusions are "Highly Precautionary" and state that the findings of the AA must be assessed in light of the Precautionary approach and not given less weight because of it. An Taisce noted that within the AA Conclusion Statement the majority of intertidal culture within the Bunaclugga AQUA is too occur low in the intertidal area, thereby implying it will have less of an impact. However, within the SPA AA it is outlined that the true distribution of intertidal habitat in this area is unknown and it is not possible to quantify the actual impact in terms of the percentage of available habitat that will be impacted under various tidal conditions. Licence renewals in this area have been proposed on these grounds with monitoring of Ringed Plover numbers through I-WeBs. However, in Section 2 of the SPA AA the limited use of I-WeBs data is outlined as sufficient coverage is not always possible to achieve within the I-WeBs scheme. An Taisce believe this will not be an adequate method to survey for potential displacement effects. An Taisce are of the belief that the proposed (currently running) over-wintering monitoring regime within Poulnasherry is a post consent condition. They state that leaving the assessment of the impacts of licensed aquaculture, and the creation of a management plan, to be addressed through the implementation of a post consent condition is impermissible and could not be considered 'point of detail' conditions provided for under S.34(5) of the Planning and Development Act 2000 (as Amended). An Taisce believe that it is essential to categorically predict the impact to waterbird species in order to fully determine the impacts of the proposed aquaculture activities prior to consent. An Taisce highlight the possibility of disturbance of hightide roosts in the Bunaclugga area due to increase vessel activity, which the SPA AA determined could not be excluded due to a lack of information about the usage of hightide roosts in this area. They suggest that licensing the proposed aquaculture projects would be in contravention of Article 6(3) of the habitats Directive. They state that further information should be sought on roosting behaviour prior to licensing. An Taisce also highlight the possibility of disturbance to Scaup in Poulnasherry Bay, in regards to potential significant impacts to the availability of suitable foraging habitat which cannot be excluded due to the lack of knowledge about the effects of oyster trestles on Scaup foraging behaviour. 2. Marine Mammals An Taisce submit that further information should be gathered on the potential impact that the presence of subtidal mussel fixed structures associated with the suspended subtidal culture of shellfish operations will have on the core areas identified for the Bottlenose dolphin within the LRS SAC and the potential impact of dredging activities in subtidal areas, which may alter the benthic habitats inducing cascade effects on higher trophic levels, they note the licensing authority must be certain, beyond reasonable doubt that no adverse effects will occur. Thus, if adequate mitigation measures cannot be furnished An Taisce hold the opinion that the licensing body should consider refusal of subtidal mussel culture aquaculture where it overlaps with critical habitat.

	3. Fishery Order Areas An Taisce raised concerns in relation to cumulative impact of certain aquaculture activities outwith and within the Fishery Order areas and stated that further clarification regarding the extent of current and planned aquaculture activities within these areas should be sought prior to licensing. 4. Water Quality Concerns were raised in relation to the potential impact of aquaculture on water quality in the Shannon Estuary, considering the cumulative impacts of other aquaculture projects, Fishery Order areas and with point source outfalls from wastewater discharges.
MI response to An Taisce	1. Bird Displacement The output of the AA for the SPA indicated that there is, in a number of areas within the SPA, a risk of significant disturbance to a number of bird species as a consequence of a combination of pressures including, among others, aquaculture (licensed, applications) and green algal accumulations (eutrophication) in intertidal areas. In Poulnasherry Bay, it was advised that (re)licencing of existing aquaculture activities proceed and be subject to ongoing monitoring of bird use in the bay. The monitoring would consider bird use at the site and in light of existing aquaculture activities in-combination with, among others, the pressure caused by the presence of large accumulations of green algae in the inner-Bay. The output of monitoring will present a summary of site-use by the shorebird species while also providing a commentary on the likely interactions with aquaculture activities and other pressures specifically, as it relates to species distribution within the survey area. The outputs and conclusions of monitoring efforts will provide the basis for any subsequent management actions. 2. Marine Mammals It is not clear if bottom dredging will result in damage to dolphin habitat. Due to the unknow nature of activities and their extent within the OFOs meant that full occupancy of the sites and disturbance to this habitat type was assumed. In the MI assessment the activities that may act in-combination with other disturbing activities were identified. The Mi quote a recent study on interactions between dolphin and floating structures used in the culture of shellfish (rafts), to conclude that shellfish farms appeared to have a positive effect on dolphin occurrence. 3. Fishery Orders The AA report for aquaculture activities in the LRS SAC, prepared by the MI, acknowledged the unknown nature and extent of the activities within the Fishery Order Areas. To this end, a precautionary approach was employed such that any aquaculture activities likely to result in disturbance on the seafloor was considered in-combination with those as likely to occur in the OFOs. 4. Water Quality The MI note that An Taisce have used outdated literature as it relates to the interaction of intertidal shellfish culture with sedimentary habitats. They identify more recent publications which support their conclusions with regards to shellfish aquaculture and environmental interactions. The MI note the quote taken from the EPA State of the Environment Report specifically relates to finfish culture and has little or no bearing on shellfish aquaculture which is not a fed aquaculture practice.
Irish Water	No comments were received
Kerry County Council	No comments were received
Fáilte Ireland	No comments were received

Public Consultation	
Submission	**Comments**
Ballylongford Enterprise Association	The Ballylongford Enterprise Association expressed some concerns over the proposed aquaculture site will pose a negative impact on future commercial shipping in the area. They stated that the site is close to potential development sites highlighted within the SIFP at Tarbert-Ballylongford Land Bank, which is zoned for marine-related industry, compatible or complimentary industries and enterprises which require deep water access. It was noted by the Department that the Harbour Master of the Shannon Foynes Port Company, the MSO and CIL have all already indicated there are no navigational concerns in respect of the proposed site and that it should be possible for aquaculture to co-exist with the proposed developments at the Land Bank.

Figure 8 Licensed and Appealed Aquaculture Sites in Bunaclugga Bay

6.2. Other Uses

The Shannon Estuary is a significant deep-water port with associated marine activity including commercial, fishing and marine leisure activity throughout the Estuary. Shore angling occurs on the east and west side of Carrig Island, where Angling Marks are located, as well as on Littor Strand, to the west of Bunaclugga Bay.

This application will have no detrimental effect on the other users of Bunaclugga Bay or the Shannon Estuary, where it is located within an intertidal area away from shore angling marks, commercial activity and in an area of low population density, therefore not impacting on the aesthetics of the area.

6.3. Statutory Status

There are no specific statutory or development plans for Bunaclugga Bay. Aquaculture is, however, considered under the Kerry County Development Plan (KCC, 2015) and the Strategic Integrated Framework Plan for the Shannon Estuary (SIFP, 2013).

Within both Plans it states that a balance must be achieved for the Shannon Estuary, by facilitating and maximising its potential for various forms of development while managing the estuarine and natural environment in full compliance with all relevant EU Directives.

Bunaclugga Bay has been highlighted with the SIFP as an Aquaculture Area of Opportunity (Area of Opportunity N - Carrig Island) which have been highlighted within the SIFP to support and promote where sustainable, the development of aquaculture activities within the Shannon Estuary.

An Appropriate Assessment has been carried out in terms of the impacts of aquaculture on both the River Shannon & Fergus Estuaries SPA (Atkins, 2019) and the Lower River Shannon SAC (MI, 2019).

Lower River Shannon SAC Appropriate Assessment

The Appropriate Assessment screening resulted in a number of the Lower River Shannon SAC qualifying features being excluded from further consideration due to the fact that there was no spatial overlap of the aquaculture activities expected to occur.

Table 8 Qualifying Features of the Lower River Shannon SAC Excluded from Further Assessment in the Appropriate Assessment Process

Qualifying Feature	Designation Code
Freshwater Pearl Mussel *Margaritifera margaritifera* (Only in Freshwater)	1029
Sea Lamprey *Petromyzon marinus*	1095
Brook Lamprey *Lampetra planeri*	1096
River Lamprey *Lampetra fluviatilis*	1099
Salmon *Salmo salar* (Only in Freshwater)	1106
Sandbanks which are slightly covered by seawater all the time	1110
Coastal Lagoons	1150
Perennial vegetation of stony banks	1220
Vegetated sea cliffs of the Atlantic and Baltic coasts	1230
Salicornia and other annuals colonising mud and sand	1310
Atlantic slat meadows	1330
Mediterranean salt meadows	1410
Watercourses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation	3260
Molinia meadows on calcareous, peaty and clayey-silt-laden soils	6410
Alluvial forests with Alnus glutinosa and Fraxinus excelsior	91E0

Table 9 Qualifying Features brought forward for Full Appropriate Assessment

Qualifying Feature	Designation Code
Estuaries	1130
Mudflats and sandflats not covered by seawater at low tide	1140
Large shallow inlets and bays	1160
Reefs	1170
Bottlenose Dolphin *Tursiops truncates*	1349
Otter *Lutra lutra*	1355

The Appropriate Assessment came to 6 main conclusions in regards these qualifying features.

Table 10 Lower River Shannon SAC Appropriate Assessment Conclusions

Conclusion 1	With one exception (Marine Community type – Anemone-dominated subtidal reef community (28.4%) which is above the 15% coverage threshold within the qualifying feature Large Shallow inlets and bays), **intertidal oyster trestle culture activities**, do not pose a risk of significant disturbance to the qualifying (Habitat) features of the Lower River Shannon SAC.
Conclusion 2	Given the long residence time in the Shannon Estuary and the fact that recruitment of the non-native Pacific Oyster is ongoing, **the risk posed by the culture of diploid Pacific Oyster cannot be discounted**. This risk is further exacerbated by the culture of these oysters unrestricted on the seabed. It is recommended that all oyster culture be carried out using triploid oysters and that subtidal culture of Pacific Oysters unrestricted on the seabed be reviewed in light of these findings.
Conclusion 3	It is recommended that acceptable sources of seed (in terms of alien species assessment) are identified for all shellfish culture operations. **The movement of stock in and out of the Lower**

	River Shannon SAC should adhere to relevant fish health legislation and follow best practice guidelines.
Conclusion 4	It is recommended that there **be strict adherence to the access routes identified** and that **density of culture structures within the sites be maintained at current levels.**
Conclusion 5	The current and proposed levels of aquaculture activities individually and in-combination with activities in the Fishery Order Areas are considered non-disturbing to Otter conservation features.
Conclusion 6	The current and proposed subtidal and bottom culture aquaculture activities are not considered disturbing to the Bottlenose Dolphin conservation features.

It should be noted that during the Appropriate Assessment the activities which are known to occur within the Oyster Fishery Order Areas (i.e. bottom culture of oysters and mussels) are deemed disturbing to a number of marine community types. The information available regarding the extent of usage and type of culture occurring within the Fishery Order Areas is sparse. Therefore, within the Appropriate Assessment the maximum area the Fishery Orders cover was used to calculate spatial extent, however it is possible that these areas are not fully utilised by the operators (MI, 2019).

River Shannon And River Fergus Estuaries SPA Appropriate Assessment

Aquaculture activities within the River Shannon and Fergus Estuaries SPA are concentrated into three main areas: Poulnasherry Bay and surrounding area, Ballylongford/ Bunaclugga Bay, and the Aughinish area. Each of these clusters occurs in discrete areas of intertidal habitat separated from each other, and from other similar areas, by open water and/ or long sections of shoreline with negligible amounts of intertidal habitat. For each of these areas, the AA used the distribution of intertidal habitat and the boundaries of waterbird count subsites to define *Aquaculture Areas* or AQUAS: the *Ballylongford/ Bunclugga AQUA,* the *Poulnasherry/ Kilrush AQUA* and the *Aughinish/ Foynes AQUA* (Atkins, 2019).

A number of licensed aquaculture sites are located outwith of the SPA designation but within the Lower River Shannon, therefore, due to the proximity of these sites to the River Shannon SPA these sites were included within the assessment. These sites are clustered within Carrigaholt Bay and the adjacent Rinevella Bay and are collectively referred to as the *Carrigaholt AQUA.*

The AA focused on Attribute 2 (Distribution) of the Conservation Objectives of waterbird SCIs, as impacts on Attribute 1 (Population Trends) are only likely to occur if there are high levels of displacement impacts.

SCIs for three adjacent SPAs, Ballyallia Lough SPA (Site Code: 004041) and Kerry Head SPA (Site Code: 004189) & Loop Head SPA (Site Code: 004119) have been screened in for assessment as the interchange between the SCI populations of these SPAs and the River Shannon SPA is unknown and considered possible. These SCI species were;

- Fulmar *Fulmarus glacialis* SCI of the Kerry Head SPA
- Kittiwake *Rissa tridactyla* and Guillemot *Uria aalge* SCIs of the Loop Head SPA
- Wigeon, Teal, Mallard, Shoveler and Black-tailed Godwit SCIs of the Ballyallia Lough SPA

The Appropriate Assessment of aquaculture activities within the River Shannon and Fergus Estuaries SPA assessed the potential impacts under three broad categories; ecosystem effects, habitat impacts and disturbance impacts.

Ecosystem Effects

These are potential impacts which are not spatially restricted to the areas in the vicinity of the aquaculture sites but could affect the whole ecosystem, such as reduced recruitment of benthic communities (due to direct consumption of eggs and larvae by the cultured bivalves and/ or through indirect food web effects (over consumption of available organic matter, outcompeting native species) (Atkins, 2019).

The detailed analysis required to assess these effects robustly was outside the scope of the AA, however, due to the scale of aquaculture activities carried out throughout the Lower River Shannon relative to the size of the overall River Shannon SPA indicated that ecosystem effects from these activities was unlikely to be an issue at the SPA scale (Atkins, 2019).

Habitat and Disturbance Impacts

Potential negative impacts to SCI species were identified where the activities may cause negative impacts to prey resources and/or cause disturbance impacts, where there is evidence of a negative response to the activity by the species from previous detailed studies (including the results of a trestle study in Poulnasherry Bay (Gittings & O'Donoghue, 2012& 2016)) and/or where a negative response is considered possible by analogy to activities that have similar types of impacts on habitat structure and/or by analogy to ecologically similar species (Atkins, 2019).

The extensive AA assessed the potential magnitude of any potential impacts from an aquaculture activity on an SCI species by analysing the spatial overlap between the distribution of the species and the spatial extent of the activity. This represents the maximum potential displacement if the species has a negative response to aquaculture activity (Atkins, 2019)

The potential displacement impacts were assessed qualitatively rather than quantitatively due to the lack of robust data needed to support such an analysis. This was due to poor quality marine community type habitat mapping data, the limited data available on waterbird distribution within the River Shannon SPA, and the lack of detailed site visits. Potential displacement impacts were assessed separately in each AQUA.

The AA assessed the potential impacts of oyster trestle cultivation on birds using the intertidal habitats, which are summarized in Table 11, below.

Table 11 Potential Impacts of Intertidal Oyster Trestle Culture on Birds Using the Intertidal Habitats (Atkins, 2019)

Potential Impact	Reasoning
Habitat Structure	Oyster trestle cultivation causes a significant alteration to the structure of the intertidal habitat through the placement of physical structures (oyster trestles) on the intertidal habitat. This alteration may alter the suitability of the habitat for waterbirds by interfering with sightlines and/or creating barriers to movement.
Food Resources (Benthic Fauna)	Oyster trestle cultivation may cause impacts to benthic invertebrates potentially affecting food resources for waterbird species. Variable effects of intertidal oyster cultivation on the benthic fauna have been reported, with studies in England, France and New Zealand showing intertidal oyster cultivation caused increased biodeposition, lower sediment redox potential and reduced diversity and abundance of the benthic fauna. However, studies in Ireland and Canada found few changes in the benthic fauna, due to high currents preventing accumulation of biodeposits. In a recent study commissioned by the Marine Institute, Ford *et al.* (2015) looked at benthic invertebrates along access tracks, under trestles, and in close controls at four sites along the west and south coasts of Ireland. the research indicated that oyster trestle cultivation in typical Irish sites is unlikely to have had major impacts on food resources for waterbirds that feed on benthic fauna.
Disturbance	Oyster trestle cultivation requires intensive husbandry activity and this may cause impacts to waterbirds using intertidal and/or shallow subtidal habitats through disturbance. Disturbance will not affect high tide roosts, or waterbirds that mainly, or only, use trestle areas when they are covered at high tide (such as Cormorant and Scaup), because no husbandry activity takes place during the high tide period.
Waterbird Responses	Trestle studies (Gittings and O'Donoghue, 2012 & 2016) have been carried out to categorise the nature of the association between oyster trestles and bird distribution patterns. Variable responses were recorded by the SCI species (shown in Table 6.3e below), with a number of species not being classified due to a lack of sufficient numbers recorded including; Shelduck, Teal, Pintail, Shoveler, Golden Plover, Lapwing, Black-tailed Godwit and Greenshank. This reflects that fact that these species tend to occur on muddier sediments, unlike the sandier sediments typically used for intertidal oyster cultivation. However, for Shelduck, Lapwing, Black-tailed Godwit and Greenshank, the trestle study found some weak evidence of negative (Shelduck, Lapwing and Black-tailed Godwit), or positive (Greenshank) association with trestles. Evidence of a negative association with trestles from other work exists for Golden Plover (Gittings and O'Donoghue, 2015). No evidence about the nature of the response of Teal, Mallard, Pintail and Shoveler to trestles exists, therefore a precautionary approach was assumed (i.e. precautionary classification of a negative response).

In-combination impacts – Boat Access	Boat access to/from aquaculture sites, and/or husbandry activity in moderately deep, or deep subtidal habitat could potentially cause disturbance impacts to waterbirds roosting in intertidal and shoreline habitats at high tide. Waterbirds using these types of roosts are typically more sensitive to disturbance than waterbirds roosting in subtidal habitat because the availability of suitable habitat in each roost site is usually tightly constrained. This means that if the birds are disturbed they will often flush and abandon the roost site completely, while birds roosting in subtidal habitat can usually move short distances to a safe distance away from the disturbance source. The potential disturbance impacts of boats travelling to/from aquaculture sites are likely to be very minor, as there are only likely to be two movements (at most) per tidal cycle and birds on adjacent intertidal and shallow subtidal habitat can move a short distance away if disturbed and then return when the boat has passed.
In-combination impacts – Fishery Order Areas	There are three areas within the River Shannon and River Fergus Estuaries SPA covered by Fishery Orders. Fishery Order T8/004A is located in the middle section of the Lower Shannon waterbody and occupies a total area of 3,515 ha. Most of the area covered by this order comprises subtidal habitat with generally narrow hard substrate intertidal zones along both shores with a few small bays containing areas of soft sediment intertidal habitat. Currently one producer is working this Fishery Order. Around 34 ha are being utilised for the relaying of seed and half-grown oysters, which are then harvested once they reach commercial size. Fishery Order T8/004B is located in the outer section of the Lower Shannon waterbody and occupies a total area of 4,548 ha. Most of the area covered by this order comprises subtidal habitat with only very narrow mainly hard substrate intertidal zones along the northern shoreline and around Scattery and Inishbig Islands. This Fishery Order does not include any intertidal habitat along the southern shoreline. One producer has leased the entire area and plans to use different methods of oyster cultivation in various places depending on the suitability of the areas for the cultivation methods. Fishery Order T8/004A only includes one significant area of intertidal habitat (Tarbert Bay), but the current activities within this Fishery Order area do not affect intertidal habitat. Fishery Order T8/004B does not include any significant areas of intertidal habitat. Therefore, the current and planned activities for Fishery Orders T8/004A and T8/004B in combination with development of the aquaculture sites covered by the AA are not likely to cause significant cumulative impacts to waterbirds using intertidal habitat. Fishery Order T8/008 is located in the lower section of the inner part of Poulnasherry Bay and occupies a total area of 40 ha. The area covered by this

	Fishery Order is mainly occupied by soft sediment intertidal habitat, around 28 ha, with a permanent tidal channel running through the middle of the area.
In-combination impacts – Other Activities	Beach recreation, bait digging or hand collection of shellfish, Shooting (Wildfowling), fishery activities, water-based recreational activities and commercial port activities were assessed in-combination with aquaculture activities. The main concentration of recreational activity in the intertidal is likely to be in the beach recreation areas at Beale Strand and Cappa Beach, the sandy areas likely to be favoured for recreational activities at Beale Strand appear to hold relatively few waterbirds. Shellfish gathering and bait digging will also involve activity in the intertidal zone. However, the levels of these activities appear to be low and they are unlikely to cause significant disturbance impacts. Wildfowling causes direct mortality of quarry species, as well as wider disturbance impacts, non-quarry species may also be affected by disturbance impacts. It was not possible to assess the potential cumulative impacts of wildfowling in-combination with aquaculture activity due to the lack of detailed information on the distribution and intensity of wildfowling activity within the SPA. Boat activity will generally not affect waterbirds in intertidal and shallow subtidal habitat. However, some types of recreational watersports activities can occur in very shallow waters and have been observed to cause disturbance to waterbirds. However, given the nature and distribution of the main intertidal areas within the River Shannon and River Fergus Estuaries SPA it seems unlikely that such activities would overlap with significant numbers of waterbirds. Boat traffic to/from quays and marinas may also cause disturbance to waterbirds roosting in shoreline areas or islands at high tide. The locations of the marinas and yacht clubs at Foynes, Kilrush and Limerick City indicate that boat traffic to/from these facilities is unlikely to pass close to sensitive roost sites. However, any additional vessel traffic associated with aquaculture activity from quays in Ballylongford Creek and the River Deel could have significant cumulative impacts on high tide roosts in-combination with the existing vessel traffic generated by aquaculture activity.
In-combination impacts – SIFP for the Shannon Estuary	There is potential for further significant cumulative impacts on a number of SCI species (Light-bellied Brent Goose, Shelduck, Wigeon, Teal, Pintail, Shoveler, Golden Plover, Grey Plover, Lapwing, Ringed Plover, Curlew, Black-tailed Godwit, Bar-tailed Godwit, Knot and Dunlin) from the development of the area of opportunity for tidal energy in Tarbert Bay, and/or development of the area of opportunity for aquaculture in Clonderlaw Bay.

Bunaclugga Bay Assessment

The Bunaclugga Area assessed (Bunaclugga AQUA) included the NPWS Waterbird Survey Programme, WSP, subsites OK507 (Littor Strand), OK508 (Bunaclugga Bay) & OK509 (Ballylongford Bay) (Figure 9, below). The eastern subsite, OK509 contains the estuary of Ballylongford Creek which hosts extensive beds of *Spartina***.** The shoreline of OK507 & OK508, has only a narrow shingle shore, with mainly open intertidal sandflats but with some mixed sediment and rocky shores on the eastern part of OK508. The NPWS Marine Communities types mapping has classified the littoral sediment in OK507 & OK508 as the *Intertidal sand with Scolelepis squamata and Pontocrates spp. Community* which corresponds to dry, sandy shore type substrate (Atkins, 2019).

The Ballylongford/ Bunaclugga area is particularly important for Light-bellied Brent Goose and Ringed Plover, and also holds significant numbers of several other species. The occurrence and distribution of waterbirds in the Ballylongford/ Bunaclugga area during the NPWS Waterbird Survey Programme (WSP) 2010/2011 are shown in Table 12, below. The WSP flock maps from the low tide counts show that the mapped flock positions were concentrated in the south-western section of 0K507, the eastern section of 0K508 and the inner parts of 0K509.

Table 12 Occurrence and Distribution of Waterbirds in Intertidal Habitats in the Ballylongford/ Bunaclugga AQUA during the 2010/2011 NPWS WSP Counts (Atkins, 2019)

Species	Mean % of		Mean Count NPWS WSP		
	SPA	LS Zone	OK507	OK508	OK509
Light-bellied Brent Goose	49%	49%	37	7	7
Shelduck	2%	4%	0	0	12
Wigeon	14%	25%	0	87	95
Teal	3%	4%	0	3	67
Mallard	6%	10%	1	3	25
Golden Plover	12%	37%	33	0	226
Grey Plover	5%	9%	1	1	4
Lapwing	7%	19%	59	2	237
Ringed Plover	39%	40%	6	35	15
Curlew	8%	11%	22	70	47
Black-tailed Godwit	0%	9%	0	10	2
Bar-tailed Godwit	10%	14%	11	11	5
Knot	1%	5%	1	1	3
Dunlin	4%	26%	1	51	397
Black-headed Gull	9%	24%	68	77	80

This table shows: (1) the mean of each low tide count in the intertidal and subtidal zones across all the subsites in the Ballylongford/Bunaclugga AQUA as percentages of the total count across the whole SPA, and across the Lower Shannon zone, respectively; and (2) the mean low tide count in each of the Ballylongford/Bunaclugga AQUA subsites.

The assessment of potential impacts in the Bunaclugga area is complicated by the fact that part of the area occupied by the aquaculture sites are below the mapped extent of intertidal habitat. Therefore, simple quantification of the area of intertidal habitat affected, based on the mapped extent of intertidal habitat, would have underestimated the actual impact. As the true distribution of intertidal habitat in this area is unknown, it is not possible to quantify the actual impact in terms of the percentage of the

available habitat that will be affected under various tidal conditions. However, it does appear that most of the intertidal habitat affected will only be exposed on spring low tides. (Atkins, 2019).

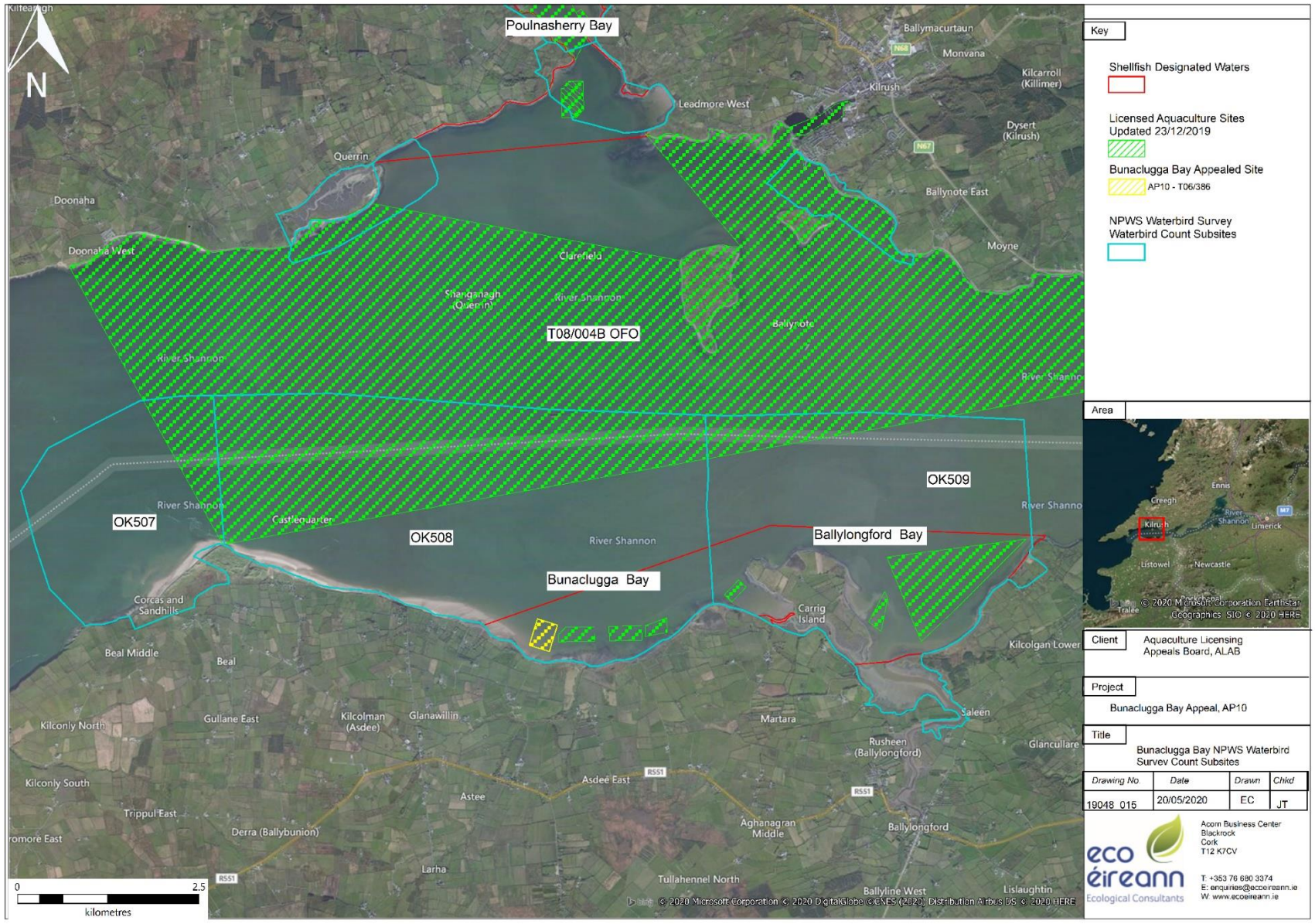
The intertidal habitat to the west of Carrig Island can be divided into two distinct zones: a muddy sand zone with mixed sediment/rocky substrate along the upper shore extending from Carrig Island to around site T06/386A and a dry sand zone extending west from this point. The flock mapping data indicates that most of the waterbird records from subsite 0K508 were concentrated into eastern section of the subsite, indicating that they were associated with the muddy sand zone (Atkins, 2019).

The licensed and proposed aquaculture sites occupy approximately 50% of the shoreline length in the muddy sand zone. Therefore, on spring low tides there is potential for high levels of displacement of species associated with intertidal sediment from this subsite. However, Ringed Plover, the species for which the Ballylongford/Bunaclugga AQUA is most important for, is more likely to use the full extent of intertidal habitat in this subsite, as it is often associated with dry sand shore habitat (Atkins, 2019).

The Ballylongford/ Bunaclugga area appears to hold a relatively high proportion of the total SPA Ringed Plover population so the potential displacement impact to this species could be significant, as this species appears to be completely excluded from oyster trestles. The potential impact is assessed as moderate as the birds may be widely spread across the full extent of intertidal habitat within this area (Atkins, 2019).

The WSP high tide roost survey identified a number of small roost sites (each holding 1-50 birds) in the outer part of Ballylongford Creek and along the south-eastern shoreline of Ballylongford Bay. These sites could potentially be affected by disturbance from boat activity associated with travel to/from sites T06/233, T06/394A and T06/394B, and/or husbandry activity in site T06/233. The proposed site T06/386 was not one of the sites identified and is located on the western edge of Bunaclugga Bay, in intertidal habitat, approximately 4.4km from the outer part of Ballylongford Creek, with proposed land access at low tide.

Figure 9 Location of Appealed Site in Reference to the NPWS WSP Count Subsites



6.4. Economic Effects

Tourism and natural resources are key areas of employment in the region (Kerry County Council, 2015). The aquaculture industry provides a substantial element of the overall economy of the region, in addition to providing employment in areas where seed for the sites is typically sought. Should the site be approved it may provide local employment from the operation of the business in addition to availing of support from local industries therefore providing for the local and regional economy.

The site applicant, and appellant in this case, Mr. Pat Moran has existing licensed sites within Waterford estuary and is based at Cheekpoint in Co. Waterford. The distance between this site and the appellants base of operations is large (c. 210km) and it is unclear whether members of the local community will be hired for the proposed site or whether existing employees will commute to carry out site operations.

It is the considered opinion of the advisor that the operation of this new site could provide a positive effect to the local and regional economy.

6.5. Ecological Effects

6.5.1. Particle Suspension / Benthic Communities

Oysters are suspension feeders which means that biodeposition can occur on the seabed beneath the bags and trestles where faeces and pseudofaeces accumulate. This biodeposition can affect the natural local sediment movement and also the natural infaunal community.

Where some enrichment (from biodeposition) in the water can be beneficial, over enrichment can be detrimental and can lead to a change in the natural biogeochemistry reducing natural/ native species richness and at times anoxic conditions can occur proving fatal to local organisms.

Oysters can have a “plastic response” to increased sedimentation level, increasing their filtration rate which in turn can increase the amount of biodeposition. The rate of biodeposition in an area is dependent on the density of animals in addition to the hydrology of the site.

Based on the information gathered to inform this report and the fact that the Shannon Estuary is known to have the largest tidal range in Ireland, it can be assumed that the build-up of faeces and pseudofaeces from the development of these sites will be localised to the area under the trestles and not have a detrimental impact on the surrounding benthic habitats or water quality within the Bay.

6.5.2. Shading

Oysters, as filter feeders, can alter the zooplankton and phytoplankton abundance and communities in the water column and therefore the overall productivity of a site. It may decrease the turbidity of the water, increasing light penetration through the water column. This increase in light penetration may be beneficial to some species such as eel grass (Zostera spp.). Conversely, the trestles and bags may cause shading to the seabed, decreasing the light penetration, thereby negatively impacting the growth of vegetation such as eel grass.

It is the considered opinion of the advisor that given the new application site is proposed to be situated in an area of intertidal sandflats with no vegetative communities within, therefore, it can be assumed that shading caused by the trestles and bags, at this site will not pose a significant impact on the benthic communities beneath.

6.5.3. Non-native Species

The movement of oysters in and out of the water can encourage the transport of non-native and / or invasive species either though the introduction via seed and / or from boats moving between sites. *C. gigas* has been known to have become naturalised in some sites in Ireland, including the Shannon Estuary.

The movement of stock in and out of the River Shannon Estuary should adhere to relevant fish health legislation and follow best practice guidelines (e.g. https://invasivespeciesireland.com/biosecurity/aquaculture/).

The use of triploid oysters (sterile) can reduce the potential of the Pacific oyster expanding further within the Lower Shannon Estuary.

6.6. General Environmental Effects

It is considered that the proposed application will not have significant environmental effects within the bay and in the wider Lower River Shannon Estuary other than those highlighted in Section 6.3 & 6.5. There are no predicted impacts from pollution sources or changes to hydrological functioning of the site as a whole (including freshwater influences).

6.7. Effect on man-made heritage

There is no predicted impact on man-made heritage sites located around Bunaclugga/ Ballylongford Bay, as was concluded within the UAIA conducted by Mizen Archaeology (2019).

6.8. Section 61 Assessment Conclusions

Site Suitability

The site under appeal is **considered suitable** for the intended purpose for the following reasons;

1. The sites are located on firm substrate within an existing area of aquaculture and within the West Shannon Ballylongford/ Bunaclugga Bay Shellfish Designated Waters, which currently have a 'B' Classification meaning the oysters produced are not suitable for direct human consumption and must be purified first.
2. The intertidal culture of Pacific oysters using trestles and bags is considered non-disturbing to the benthic community type upon which the sites are proposed to be located.
3. A Special Unified Marking Scheme is in place, providing safe navigation for the Bay.

The sites under appeal are **considered unsuitable** for the intended purpose for the following reasons;

1. The AA of aquaculture activities within the SPA concluded there was Moderate potential for the development of these sites to cause significant displacement impacts to an SCI species, Ringed Plover.
2. The situation of the application site on the preferred habitat of this SCI species (dry Intertidal sandy shore) and location within an area considered to be of very high importance for Ringed Plover (Ballylongford/ Bunaclugga Bay) together with the lack of continuous up to date monitoring at the site indicates that there is potential for significant displacement effects if this license was to be approved

Other Uses

The proposed development should have **no impact** on the possible other uses or users of the area for the following reasons;

1. Shore angling marks in the area are located away from the proposed site to the east and west
2. The site will have no impact on other fisheries or aquaculture operations
3. The site is situated in an area of low population density and is located away from the major tourism hotspots of the Wild Atlantic Way and Ballybunnion
4. The site is unlikely to impact on recreational activity due to its location on the intertidal foreshore, away from areas used by local walkers.

Statutory Status

The proposed development may have a **significant adverse impact** on the statutory status of the area for the following reason:

1. The proposed development has the potential to cause significant displacement impacts on the SCI species Ringed Plover, therefore potentially impacting on the Conservation Objectives of the River Shannon & Fergus Estuaries SPA

Economic effects

There is a **significant positive effect** on the economy of the area for the following reasons:

1. Through local employment over the operation of the site
2. Through expansion of a local business providing employment and generating revenue for the local economy
3. Utilising the goods and services of the local area trades to service the operation and maintain the site

Ecological Effects

There is a **potential significant adverse effect on avifauna (Birds)** of the area as a result of the proposed operation for the following reasons;

- The Appropriate Assessment of aquaculture activities within the River Shannon & Fergus Estuaries SPA highlighted that the proposed developments have the potential to cause significant displacement impacts on the SCI species

The proposed development is considered to pose a **non-significant effect on the habitats** of the site, including those which are designated as Features of Conservation Interest for the SAC in which the proposed site is located for the following reason;

1. Intertidal oyster trestle culture activities do not pose a risk of significant disturbance to the qualifying (Habitat) features of the Lower River Shannon SAC.
2. The build-up of faeces and pseudofaeces is considered unlikely due to the rate of tidal exchange within the Bay.
3. Habitat Community types sensitive to shading such as Zostera beds are not reported from within the proposed area or Bunaclugga Bay

The proposed development is considered to pose a **significant effect on the habitats** of the site, including those which are designated as Features of Conservation Interest for the SAC in which the proposed site is located for the following reason;

1. The movement of oysters in and out of the water can encourage the transport of non-native and / or invasive species either though the introduction via seed and / or from boats/ equipment moving between areas. The movement of stock in and out of the River Shannon Estuary should adhere to relevant fish health legislation and follow best practice guidelines
2. Pacific oysters have been known to become naturalised in some sites in Ireland, including the Shannon Estuary. The use of triploid ysters and the cessation of uncontained bottom culture of Pacific oysters can reduce this risk significantly.

General Environmental Effects

The proposed development is considered **not to pose a significant effect** on the general environment of the site for the following reasons;

1. Pollution of the site is not predicted from the processing of the new site
2. No hydrological effects are predicted from the processing of the new site

Man-made Heritage

There will be **no effect on the man-made heritage** of value in the area as a result of the proposed operation for the following reasons;

- The Underwater Archaeological Impact Assessment concluded that the proposed site would have no likely impacts on the known heritage.

6.9. Confirmation re Section 50 Notices

There are no pertinent matters which arise in the Section 61 assessment which the Board ought to take into account which have not been raised in the appeal documents and it is not necessary to give notice in writing to any parties in accordance with section 50 (2) of the 1997 Act.

7.0 Screening for Environmental Impact Assessment.

Aquaculture is listed as an Annex II Project under the EU EIA Directive 85/337/EEC, however, where this form of aquaculture depends on natural processes for production and supply of feed (i.e. extensive) an EIA Screening process is deemed not required (Ireland as a Member State Guidance). Therefore, it is the conclusion of the advisor that an EIA Screening (formally EIS) is not required in this instance.

The Minister for Agriculture, Food and the Marine has not produced a EIA report or screening report for aquaculture activities within the Lower River Shannon SAC or the River Shannon & Fergus Estuaries SPA, in accordance with the requirement of Regulation 5(2) of the Aquaculture (License Application) Regulations, 1998, although, the Minister has produced an Appropriate Assessment Conclusion Statement for aquaculture activities within the Lower River Shannon SAC and the River Shannon and Fergus Estuaries SPA.

8.0 Screening for Appropriate Assessment.

Appropriate Assessments have been carried out with respect to the potential impacts of aquaculture activities on the Conservation Objectives of the River Shannon & Fergus Estuaries SPA (Atkins, 2019) and the Lower River Shannon SAC (MI, 2019). These are considered to provide significant data required to assess the significance of an impact posed by aquaculture sites on the Conservation Objectives of the SPA and SAC.

Site Referenced T06/386 (Proposed Site Application) lies within Bunaclugga Bay within the Lower River Shannon SAC and River Shannon & Fergus Estuaries SPA. It is considered, from best available data, that there is potential for the establishment of new sites in this area to have a significant impact on the conservation objectives of the SPA in terms of SCI (waterbird) displacement and disturbance, specifically on Ringed Plover. These assessments applied the precautionary principle in relation to the Bunaclugga/ Ballylongford AQUA, due to the lack of up to date data and the historical relevance (Baseline I-WeBs data and NPWS WSP) of this site for the SCI species Ringed Plover. The Department of Agriculture, Food and the Marine determined that future licensing decisions will be informed by the ongoing monitoring of I-WeBS data for the Bay.

9.0 Technical Advisor's Evaluation of the Substantive Issues in Respect of Appeal and Submissions/Observations Received

With respect to the substantive issues raised by the appellant the below comments reflect the considered opinion of the advisor based on best available information;

Issue	Appellant Comments	Advisor Comments
SPA Appropriate Assessment	The appellant is highly critical of the Appropriate Assessment of Aquaculture Activities in the River Shannon & Fergus Estuaries SPA report. The appellant believes that the approach used to break up the site into smaller areas was inappropriate, not a scientific approach and was used to magnify the size of aquaculture in comparison to the overall site.	The Appropriate Assessment did break down the River Shannon & Fergus Estuaries into discreet areas for a number of reasons. This approach was justified by the sheer size of the SPA site and the viability of certain habitats for waterbird species. The approach was not used to magnify the size of aquaculture in comparison to the overall SPA site. Throughout the AA constant reference is given to the fact that the areas looked at form a small part of the overall SPA site and conclusions were derived based on this.
Data Quality and Quantity	The appellant believes the data used for the assessment is outdated and of questionable quality, for a number of reasons; Lack of bird counts, lack of bird counters, the qualifications of the counters (volunteers), objective of the counters, narrow focus of the counts (many areas not looked at), and the number of recent hours spent ground-truthing. Based on inadequate bird data the AA determined that 99% of all Ringed Plover occur in the Lower Shannon Estuary (Table 5.3 of AA report) and of that 55% are located within the Bunaclugga/ Ballylongford area.	It is the considered opinion of the Technical Advisor that the appellant is correct in that the existing data on waterbird distribution is outdated. However the most recent dataset was not produced through I-WeBS and so was not conducted by volunteers of questionable qualifications; the NPWS Waterbird Survey Programme was planned, organized and conducted by professionals, and achieved full coverage of the Bunaclugga/ Ballylongford area. This figure refers to the overall SPA survey counts, meaning 99% of the Ringed Plover observations reported in the 2010/2011 NPWS WSP surveys were made in the Lower Shannon area of the SPA, whilst 1% were reported in the Fergus Estuary area of the SPA. Of the 99% figure, 55% of the observations were made in the Bunaclugga/ Ballylongford NPWS WSP Subsites in 2010/2011, to which the AA refers to cumulatively as the Ballylongford/ Bunaclugga AQUA. This equates to 54.45% of all Ringed Plover recorded within the River Shannon & Fergus Estuaries SPA, during these surveys.

Site Suitability	The appellant has stated that the site is located within the Ballylongford Designated Shellfish Waters. The site is located in an area where previous licensed sites were located and these sites have not been reapplied for.	It is the considered opinion of the Technical Advisor that the area of the site is suitable for aquaculture. The area was previously in use for aquaculture by the local fishing co-op, which has since been bought out by the adjacent sites (T06/347A, B & C) license holder. The sites the appellant is referring to have not been in operation for a number of years.
Methodology & Materials	The appellant states that Triploid seed will only be used and that these will come from a hatchery, reducing the likelihood of introduction/ expansion of invasive non-native species. The appellant states that he will not be moving stock or seed from his currently operating sites in Waterford to Kerry, given the high mortality rates in Waterford, but will be using the Bunaclugga site as a reserve which could supply his sites in Waterford in times of high mortality.	It is the considered opinion of the advisor that these points raised by the appellant are dealt with within the licencing conditions of each specific licence, and are fully regulated by the Department and the Marine Institute. The movement of stock in and out of the licenced areas must be approved by the Department s per Regulations.
Business Continuity	The appellant states that this site application is not to expand his business but to ensure viability through oyster mortality events, which occurred in Waterford estuary in 2019 where 60-70% of his stock was wiped out.	It is the considered opinion of the advisor that this site could be used to ensure continuity of the appellants business in times of mortality events at their main site. However, it cannot be shown without scientific doubt that this site will not impact on the conservation objectives of the River Shannon & Fergus Estuaries SPA, in terms of displacement to Ringed Plover an SCI for the site.

10.0 Recommendation of Technical Advisor with Reasons and Considerations.

It is the considered opinion of the advisor that the license be refused on the grounds that:

- There is insufficient data to show that this appealed site would not have a detrimental effect on the distribution of Ringed Plover within Bunaclugga Bay and the wider River Shannon & Fergus Estuaries SPA. Bunaclugga Bay has been shown to be extremely important for this species in the context of the overall SPA, with 54.45% of all Ringed Plover, within the SPA, recorded in this subsite during the 2010/2011 NPWS WSP surveys.

The Technical Advisor, based on the above information, recommends the Board apply the precautionary principle and agree with the Ministers decision to refuse the application. A licence should only be granted where It can be shown with no scientific doubt that proposed development will have no negative impact on the conservation objectives of the protected areas.

11.0 Draft Determination Refusal /or Grant

It is recommended to uphold the Ministers decision to refuse the application based on details outlined in Section 10.

Technical Advisor: Eoin Cussen, Ecologist, EcoÉireann

Date: 10th June 2020

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Appendix A: Site Photographs

View across Bunaclugga Bay towards the proposed site, facing west

View of the proposed site area from the eastern edge, facing north

View of the proposed site area, facing north west

View of Bunaclugga Bay from the eastern edge of the proposed site, facing east

View of the proposed site from the foreshore, facing north east

View of the proposed site from the foreshore, facing north

View of the eastern edge of the proposed site and Bunaclugga Bay, facing north east

View of the centre of the proposed site, facing north east

View of the centre of the proposed site, facing east

View of the centre of the proposed site, facing the shore (south)

View of the typical benthic habitat within the site, intertidal sandflat