# <u>Appropriate Assessment Conclusion Statement by the Licensing Authority for aquaculture activities</u> <u>in the Lower River Shannon SAC (Site Code: 002165) and River Shannon</u> <u>and Fergus Estuaries SPA (Site Code: 004077) (Natura 2000 sites) – July 2019</u>

This Conclusion Statement outlines how it is proposed to manage and license aquaculture activities in the above Special Area of Conservation (SAC) and Special Protection Area (SPA) in compliance with the EU Habitats and Birds Directives. Aquaculture projects in these Natura 2000 sites will, if approved, be licensed in accordance with the standard terms and conditions as set out in the aquaculture licence templates. These are available for inspection on the Department's website at:-

https://www.agriculture.gov.ie/seafood/aquacultureforeshoremanagement/aquaculturelicensing/aquacultureandf oreshorelicencetemplates/. Furthermore, any proposed licences may incorporate specific conditions to accommodate Natura 2000 requirements, as appropriate, in accordance with the principles set out in this document.

The Appropriate Assessment reports for aquaculture in the SAC and SPA have been prepared by the Marine Institute in relation to marine habitats and Atkins Ecology/Marine Institute in relation to bird species, on behalf of the Department of Agriculture, Food and the Marine (available on the Department's website). The Article 6(3) Appropriate Assessment considered the potential ecological impacts of aquaculture activities on Natura 2000 features in both the SAC and the SPA. The information upon which the Appropriate Assessment is based is the definitive list of applications for aquaculture available at the time of assessment. This information was provided by the Department of Agriculture, Food and the Marine.

# Aquaculture activity in the SAC and SPA

Aquaculture activity in the SAC and SPA relates to the production of shellfish (oysters and mussels). The main aquaculture activity involves the cultivation of Pacific oysters (*Crassostrea gigas*) on trestles in intertidal areas. The mussel culture includes subtidal suspended (longlines) and bottom culture.

The majority of the sites are contained in inner Poulnasherry Bay where aquaculture activity has been carried out for many years. There are aquaculture applications in outer Poulnasherry Bay and there are existing and proposed aquaculture activities in the Carrigaholt, Rinevella, Ballylongford/Bunaclugga and Aughinish/Foynes areas of the Shannon Estuary.

In addition, there are three areas within the Shannon Estuary covered by Fishery Orders. Whilst these Orders do not come under the remit of the Department of Agriculture, Food and Marine, they are included as part of the in-combination assessment.

# The Lower River Shannon SAC

The Lower River Shannon SAC is a very large site (120km) which stretches along the Shannon valley from Limerick City in the upper reaches out to the mouth of the Shannon, covering an area between Loop Head (Co. Clare) in the north and Kerry Head (Co. Kerry) in the south. The mouth of the estuary is over 15 km wide, narrowing to just over 3 km between Kilcredaun and Kilconly Headlands. 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.

# **Qualifying Interests**

The Lower River Shannon SAC is designated for the marine Annex I qualifying interests of 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 Annex I habitats 1130 and 1160 are large physiographic features that may wholly or partly incorporate other Annex I habitats including Reefs, Sandbanks and Mudflats and Sandflats within their areas. A number of coastal habitats can also be found in the SAC, including Mediterranean salt meadows (*Juncetalia maritime*, 1410), Perennial vegetation of stony banks (1220), Vegetated sea cliffs of the Atlantic and Baltic coasts (1230), Salicornia and other annuals colonizing mud and sand (1310), Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*, 1330), Water courses of plain to montane levels with the *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).

The area is also designated for a number of Annex II species including the Common Bottlenose Dolphin (*Tursiops truncatus*, 1349), the Otter (*Lutra lutra*, 1355), Freshwater Pearl Mussel (*Margaritifera margaritifera*, 1029), Sea Lamprey (*Petromyzon marinus*, 1095), Brook Lamprey (*Lampetra planeri*, 1096), River Lamprey (*Lampetra fluviatilis*, 1099) and the Atlantic Salmon (*Salmo salar*, 1106) only in fresh water).

An initial screening exercise resulted in a number of habitat features and species being excluded from further consideration by virtue of the fact that no spatial overlap of the culture activities was expected to occur. Within the Lower River Shannon SAC, the qualifying habitats/species considered subject to potential disturbance and carried further in the Appropriate Assessment were:-

- 1130 Estuaries;
- 1140 Mudflats and sandflats not covered by sea water all the time;
- 1160 Large shallow inlets and bays;
- 1170 Reefs;
- 1349 Bottlenose Dolphin (Tursiops truncates);
- 1355 Otter (Lutra lutra).

Once spatial overlap was identified, subsequent disturbance and the persistence of disturbance were considered. Effects were deemed to be significant when, cumulatively, the risk posed by those aquaculture activities (i.e. bottom mussel, suspended mussel and bottom oyster culture) in-combination with other activities considered disturbing, that would likely lead to long term change (persistent disturbance) in broad habitat features (or constituent communities). The threshold for such a level of disturbance is 15% of any habitat or community type. Intertidal oyster trestle culture is considered non-disturbing to the majority of the habitat features.

The Fishery Orders overlap four habitat features (1130, 1140, 1160 and 1170) and two additional community types (Faunal turf-dominated subtidal reef community and *Laminaria*-dominated community complex) found within the qualifying interests of the SAC. On the basis of the activities i.e. primarily bottom oyster culture at the larger Fishery Order sites (T08/004A and T08/004B) there is potential habitat disturbance due to the culture of a high density of single species and the physical disturbance associated with harvesting. A single Fishery Order site (T08/008) near Poulnasherry is used for the intertidal culture of oysters and is considered non-disturbing to habitat features.

The long residence time in the Lower River Shannon SAC increases the likelihood of successful recruitment of alien species (*Crassostrea gigas*) and further impacts are likely, due to the uncontained placement of this species on the seafloor.

# **Conservation Objectives for the Lower River Shannon SAC**

The Conservation Objectives for the qualifying interests in the Lower River Shannon SAC were identified in NPWS (2012a). The natural condition of the designated features should be preserved with respect to their area, distribution, extent and community distribution. Habitat availability should be maintained for designated species and human disturbance should not adversely affect such species.

# Screening of adjacent SACs for ex-situ effects

In addition to the Lower River Shannon SAC, there are a number of other Natura 2000 sites proximate to the proposed activities. A screening was carried out on the likely interaction with aquaculture activities based primarily upon the likelihood of spatial overlap. As it was deemed that there are no *ex-situ* effects and no effects on features in adjacent Natura 2000 sites, all qualifying features were screened out.

# Assessment of the effects of aquaculture activity on the Conservation Objectives for Habitat features in the Lower River Shannon SAC

#### Estuaries (1130):

#### Habitat Area

It is considered unlikely that the proposed aquaculture activities will reduce the overall extent of permanent habitat within the feature, Estuaries. The habitat area is likely to remain stable.

#### **Community Distribution**

Aquaculture activities overlap the following Estuaries (1130) marine community types - Intertidal sand to mixed sediment with polychaetes, molluscs and crustaceans community complex, Subtidal sand to mixed sediment with *Nucula nucleus* community complex, Subtidal sand to mixed sediment with *Nephtys* spp. community complex and Fucoid-dominated intertidal reef community complex. The combined aquaculture activities overlap with 1.34% of the habitat feature, Estuaries.

Fishery Orders overlap 17.11% of the feature, Estuaries. However, this assumes 100% occupancy of the Fishery Order areas by fisheries activity. The in-combination effects of Fishery Order activities and likely disturbing aquaculture activities (i.e. bottom mussel, suspended mussel and bottom oyster culture) are significant for the feature, Estuaries as well as four community types. Intertidal oyster trestle culture is considered non-disturbing to the feature, Estuaries.

#### <u>Mudflats and sandflats not covered by seawater at low tide (1140):</u> Habitat Area

# It is considered unlikely that the proposed aquaculture activities will reduce the overall extent of permanent habitat within the feature, Mudflats and sandflats not covered by seawater at low tide. The habitat area is likely to remain stable.

#### **Community Distribution**

This attribute considered interactions of aquaculture operations with two community types - Intertidal sand with *Scolelepis squamata* and *Pontocrates* spp. community and Intertidal sand to mixed sediment with polychaetes, molluscs and crustaceans community complex. The combined aquaculture activities overlap with 1.33% of the habitat feature, Mudflats and sandflats not covered by seawater at low tide (1140).

Fishery Orders overlap 2.27% of the feature, Mudflats and Sandflats not covered by seawater at low tide. However, this assumes 100% occupancy of the Fishery Order areas by fisheries activity. Significant incombination effects of Fishery Order activities and likely disturbing aquaculture activities (i.e. bottom mussel, suspended mussel and bottom oyster culture) are not considered likely. Intertidal oyster trestle culture is considered non-disturbing to the feature, Mudflats and sandflats not covered by seawater at low tide.

# Large Shallow Inlets and Bays (1160)

# Habitat Area

It is considered unlikely that the proposed aquaculture activities will reduce the overall extent of permanent habitat within the feature, Large Shallow Inlets and Bays. The habitat area is likely to remain stable.

# **Community Distribution**

The combined aquaculture activities overlap with 0.79% of the habitat feature, Large Shallow Inlets and Bays (1160).

This attribute considered interactions between aquaculture activities and the following community types -Intertidal sand with *Scolelepis squamata* and *Pontocrates* spp. Community, Intertidal sand to mixed sediment with polychaetes, molluscs and crustaceans community complex, Subtidal sand to mixed sediment with *Nephtys* spp. community complex, Fucoid-dominated intertidal reef community complex, Mixed subtidal reef community complex and Anemone-dominated subtidal Reef community. Specifically, one aquaculture activity (bottom oyster culture) overlaps with 28.4% of Anemone-dominated subtidal Reef community within the qualifying feature, Large Shallow Inlets and Bays, which is considered disturbing.

Fishery Orders overlap 10.8% of the feature, Large Shallow Inlets and Bays. However, this assumes 100% occupancy of the Fishery Order areas by fisheries activity. The in-combination effects of Fishery Order activities and likely disturbing aquaculture activities (i.e. bottom mussel, suspended mussel and bottom oyster culture) are significant for four community types within the feature, Large Shallow Inlets and Bays. Intertidal oyster trestle culture is considered non-disturbing to the feature, Large Shallow Inlets and Bays.

# **Reefs (1170)**

# Habitat area

The habitat area of Reef is unlikely to be changed as a consequence of aquaculture activities and is considered stable.

# **Community Distribution**

The identified community types - Fucoid-dominated intertidal reef community complex and Anemonedominated subtidal reef community will be exposed to differing ranges of pressure from aquaculture activities. This was considered during the assessment process and may result in more chronic and long-term changes in community composition. The combined aquaculture activities overlap with 0.09% of the habitat feature, Reefs.

Fishery Orders overlap 9.44% of the feature, Reefs. However, this assumes 100% occupancy of the Fishery Order areas by fisheries activity. The in-combination effects of Fishery Order activities and likely disturbing aquaculture activities (i.e. bottom mussel, suspended mussel, bottom oyster and intertidal oyster culture) are significant for two community types within the feature, Reefs.

# Bottlenose dolphin (Tursiops truncatus)

The following aquaculture production activities within the SAC spatially overlap with dolphin critical habitat area:-

# Suspended Intertidal Oyster Culture

Given the intertidal location of the structures and activities associated with this form of oyster culture, it is unlikely that marine mammals will have any negative interaction with this culture method. Ancillary activities at sites, i.e. site services and human, boat and vehicular traffic may increase the risk of minor disturbance to marine mammals. However, these impacts can be discounted as interactions are likely to be short term, temporary and localised.

# Subtidal Bottom Shellfish (Mussel, Oyster) Culture

Given that this culture type does not entail any structures, it would not act as a barrier to movement of the dolphin throughout its habitat range, including the critical habitat area. However, biological effects of such aquaculture may alter the natural condition of the critical habitat. The schedule of operations may also cause disturbance, however, this is likely to be limited to seasonal activities i.e. seeding, grading and harvesting, which should not coincide with the more sensitive periods for marine mammals. These impacts can, therefore, be discounted.

#### Suspended Subtidal Mussel Culture

Given the presence of subtidal fixed structures associated with the suspended subtidal culture of shellfish operations i.e. longlines, there is a possibility that their presence may act as a barrier restricting the range and movement of the dolphin within the critical habitat area. Ancillary activities at sites, i.e. site services and human and boat traffic, may increase the risk of disturbance to marine mammals. However, the dolphin has the ability to avoid structures and they may act as fish aggregation devices which may benefit this marine mammal. Recent studies have shown increased bottlenose dolphin occurrence near mussel farm locations and in waters close to aquaculture zones. Given the low level of overlap (0.26%) and limited levels of this activity in the SAC, allied with the potential benefits of the structures, impacts from suspended subtidal mussel culture can be discounted.

#### **Fishery Order Areas**

Given that Fishery Orders overlap at an almost significant level (14.23%) with the critical habitat area of the dolphin, and that the exact nature and level of activities proposed and ongoing are unknown, there is potential for interactions to occur. The biological effects of oyster dredging may alter the natural condition of the critical habitat. The operations at Fishery Order sites i.e. seeding, grading and harvesting may also cause disturbance. However, this assumes 100% occupancy of the Fishery Order areas by fisheries activity.

#### Otter (Lutra lutra)

The following aquaculture production activities within the SAC spatially overlap with otter critical habitat area:-

#### Suspended Intertidal Oyster Culture

Given the intertidal location of the structures and activities associated with this form of oyster culture, it is unlikely that the marine mammals will have any negative interaction with this culture method. Therefore, impacts can be discounted.

#### Suspended Subtidal Mussel Culture

The otter will likely forage in and around mussel lines. The lines are typically large in diameter and the risk of entanglement is minimal. Given that otter foraging is primarily crepuscular, interactions with mussel culture operators are likely to be minimal. It is unlikely that mussel culture poses a risk to otter populations within the SAC, impacts can therefore be discounted.

#### Subtidal Shellfish (Mussels, Oyster) Culture

Given that this culture type does not entail any structures and all operations are likely to be carried out in daylight hours, while otter foraging is primarily crepuscular, the interaction between the otter and aquaculture operations is likely to be minimal. It is unlikely that these culture types pose a risk to otter populations in the SAC and impacts can be discounted.

# **Fishery Order Areas:**

Given that all operations are likely to be carried out in daylight hours, and that otter foraging is primarily crepuscular, the interaction with culture operations is likely to be minimal. Structures may be used within these areas but it is unlikely they would pose a risk to otter populations within the SAC. Therefore, impacts can be discounted.

#### **River Shannon and Fergus Estuaries SPA**

The Appropriate Assessment considered the potential impacts of aquaculture activity on the Special Conservation Interests (SCIs) of the River Shannon and Fergus Estuaries Special Protection Area (SPA) and on the SCIs of other SPAs where these SCIs may have connectivity with the Shannon Estuary.

All the sites within the River Shannon and Fergus Estuaries SPA are located in the lower part of the Shannon Estuary downstream of the Fergus Estuary. There are also a number of existing and proposed aquaculture sites located outside the River Shannon and Fergus Estuaries SPA in Carrigaholt and Rinevella Bays.

#### **Qualifying Features**

The SCIs of the River Shannon and Fergus Estuaries SPA covered by the Appropriate Assessment are: Whooper Swan, Light-bellied Brent Goose, Shelduck, Wigeon, Teal, Pintail, Shoveler, Scaup, Cormorant, Golden Plover, Grey Plover, Lapwing, Ringed Plover, Curlew, Black-tailed Godwit, Bar-tailed Godwit, Knot, Dunlin, Greenshank, Redshank and Black-headed Gull.

The SCIs of other SPAs covered by the assessment are: the Fulmar SCI of the Kerry Head SPA, the Kittiwake and Guillemot SCIs of the Loop Head SPA, and the Wigeon, Teal, Mallard, Shoveler and Black-tailed Godwit SCIs of the Ballyallia Lough SPA.

# Core Conservation Objective for the River Shannon and Fergus Estuaries SPA

The core Conservation Objective is to maintain the favourable conservation condition of the SCI species in the SPA.

# Findings of the Appropriate Assessment in relation to Bird Species

# Stand alone effects:

#### Intertidal habitat

At the SPA and Lower Shannon scales, there is potential for substantial displacement to the Grey Plover and Bar-tailed Godwit in the Aughinish/Foynes area and also for the Grey Plover in the Poulnasherry/Kilrush area. Some moderate displacement of the Ringed Plover is predicted in the Ballylongford/Bunaclugga area.

The potential for intertidal oyster cultivation in the Poulnasherry/Kilrush aquaculture area to cause significant impacts to the availability of suitable foraging habitat for Scaup cannot be excluded due to a lack of knowledge about the effects of oyster trestles on Scaup foraging behaviour.

Intertidal aquaculture is unlikely to significantly affect the daytime habitat use by the River Shannon and Fergus Estuaries SPA Whooper Swan population, but due to a lack of information, possible impacts on nocturnal roost sites used by the Whooper Swan cannot be discounted.

Vessel activity associated with the development of sites in the Ballylongford/Bunaclugga area may cause significant disturbance impacts to important high tide roost sites for the SCI species covered by the Appropriate

Assessment. This possibility cannot be excluded due to a lack of information about the usage of high tide roost sites in these areas.

# Subtidal habitat

There are four aquaculture sites that occupy predominantly subtidal or only subtidal habitat within the River Shannon and River Fergus Estuaries SPA. Although there is no information available on the location of nocturnal roost sites used by the River Shannon and River Fergus Estuaries SPA Whooper Swan population, any such roost sites in subtidal habitat are likely to be located in sheltered waters. Therefore, the mussel longline sites (T06/394A and T06/394B) in the Ballylongford/Bunaclugga aquaculture area and the bottom mussel site in the Aughinish/Foynes area (T07/014A) are unlikely to provide suitable roost sites. However, the bottom mussel site in the Ballylongford/Bunaclugga aquaculture area (T06/233) could potentially provide suitable roosting habitat.

# In-combination effects:

# **Fishery Orders**

Fishery Order T08/008 is located within Poulnasherry Bay and includes approximately 28 hectares of intertidal habitat. Full utilisation of the Fishery Order, combined with full development of the aquaculture sites, would significantly increase the percentage occupancy of intertidal habitat by oyster trestle cultivation in Poulnasherry Bay. Therefore, the cumulative effects of oyster trestle cultivation in Fishery Order T08/008 in combination with oyster trestle cultivation in existing and proposed aquaculture sites in Poulnasherry Bay could potentially cause substantial impacts to the Grey Plover and impact negatively on other species.

Oyster trestle cultivation in Poulnasherry Bay may also cause a reduction in the availability of foraging habitat for Scaup. The recorded distribution of Scaup in the Waterbird Survey Programme counts was in the outer part of the bay (subsite 0H520), outside the area occupied by Fishery Order T08/008. However, from general knowledge of Scaup habitat usage and distribution patterns, it seems likely that they would, at times, come into the lower part of the inner bay. Therefore, there is potential for the cumulative effects of oyster trestle cultivation in Fishery Order T08/008 in combination with oyster trestle cultivation in existing and proposed aquaculture sites in Poulnasherry Bay to cause increased impacts to Scaup.

Vessel activity associated with subtidal aquaculture activity in Fishery Orders T08/004A and T08/004B could cause disturbance to various waterbird species. However, the likelihood of disturbance is considered small, given there is a single operator likely operating a single vessel.

#### Other activities:

The main concentration of activity in the intertidal zone is likely to be in the beach recreation areas at Beale Strand and Cappa Beach. While this will presumably mainly occur during summer, it may overlap with the build-up of significant numbers of some of the SCI species in late summer/early autumn. 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. The quarry species include Wigeon, Teal, Mallard, Pintail, Shoveler, Scaup and Golden Plover. However, it is not possible to assess the potential cumulative impacts of wildfowling in-combination with aquaculture activities in the River Shannon and Fergus Estuaries SPA 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 watersport activities can occur in very shallow waters and have been observed to cause disturbance to waterbirds. Given the nature and distribution of the main intertidal areas within the River Shannon and Fergus Estuaries SPA, it seems unlikely that such activities would overlap with significant numbers of waterbirds.

Boat traffic to and 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 and from these facilities are unlikely to pass close to sensitive roost sites.

Given the size of the River Shannon and Fergus Estuaries SPA, and the fact that any impacts to waterbird populations from upgrades in wastewater treatment are likely to be localised to the immediate vicinity of the existing outfall locations, it is unlikely that such upgrades would have measurable impacts to populations at the SPA scale. Therefore, it is not necessary to consider potential in-combination effects of such upgrades with the aquaculture activities covered in the Appropriate Assessment.

# Assessment of impacts on core SPA Conservation Objective

The possibility of intertidal or subtidal aquaculture development affecting nocturnal roost sites used by the Whooper Swan cannot be discounted as there is no information available on the location of these roost sites.

There is a high potential for significant displacement impacts to the Grey Plover and Bar-tailed Godwit in the Aughinish/Foynes area, to the Grey Plover in the Poulnasherry/Kilrush area and moderate displacement impacts to the Ringed Plover in the Ballylongford/Bunaclugga area arising from intertidal aquaculture.

The potential for intertidal oyster cultivation in the Poulnasherry/Kilrush aquaculture area to cause significant impacts to the availability of suitable foraging habitat for Scaup cannot be excluded due to the lack of knowledge about the effects of oyster trestles on Scaup foraging behaviour.

The potential for cumulative impacts from the development of aquaculture sites in combination with oyster trestle cultivation in Fishery Order T08/008 and/or bottom oyster cultivation in Fishery Orders T08/004A and T08/004B also warrants consideration.

There is potential for further significant cumulative impacts on some bird species from the development of aquaculture sites in combination with oyster trestle cultivation in Fishery Order T08/008, 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.

Significant displacement impacts to Shelduck, Wigeon, Teal, Pintail, Shoveler, Golden Plover, Lapwing, Curlew, Black-tailed Godwit, Knot and Dunlin are considered to be unlikely.

None of the aquaculture activities covered by the Appropriate Assessment are likely to cause significant impacts to the availability of suitable foraging habitat for Cormorant, or to cause significant disturbance impacts to Cormorant.

The potential impact of intertidal aquaculture on the Black-headed Gull cannot be assessed at this stage, due to a lack of data on Black-headed Gull distribution within the River Shannon and Fergus Estuaries SPA at the time of its likely peak usage of the area. Therefore, the likelihood of any negative impact occurring on the Black-headed Gull is uncertain.

None of the aquaculture activities covered by the Appropriate Assessment are likely to cause significant impacts to the availability of suitable subtidal foraging habitat for the Black-headed Gull, or to cause significant disturbance impacts to the Black-headed Gull roosting in subtidal habitat.

# Findings and Recommendations of the Article 6(3) Appropriate Assessment of Lower River Shannon SAC (Site Code: 002165) and River Shannon and Fergus Estuaries SPA (Site Code: 004077)

- Intertidal oyster trestle culture activities do not pose a risk of significant disturbance to the qualifying interests (Habitats) of the Lower River Shannon SAC with one exception (Marine Community type Anemone-dominated subtidal Reef community (28.4%) which is above the threshold (15%) within the qualifying feature, Large Shallow Inlet and Bays.
- Aquaculture activities (bottom mussel, suspended mussel and bottom oyster culture) in-combination with Fishery Order areas may pose a significant risk of disturbance to a number of qualifying interests in the SAC.
- The risk posed by the culture of diploid Pacific oyster (*Crassostrea gigas*) cannot be discounted given the long residence time in the Lower River Shannon SAC and considering the recruitment of the non-native oyster, *Crassostrea gigas*, is ongoing. This risk is further exacerbated by the culture of these oysters on the seabed. It is recommended that all oyster culture be carried out using triploid oysters and that the subtidal culture of *Crassostrea gigas* uncontained on the seafloor be reviewed in light of the findings.
- Mussel seed stock input into existing licensed mussel areas is collected locally at present. If seed is sourced outside of this area in the future, the risk posed by this activity, through the introduction of invasive non-native species, cannot be discounted. 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 (e.g. <u>http://invasivespeciesireland.com/cops/aquaculture/</u>).
- It is recommended that there be strict adherence to the access routes identified in order to minimise habitat disturbance.
- The current and proposed levels of aquaculture activities individually and in-combination with activities in Fishery Order areas are considered non-disturbing to otter conservation features.
- The current and proposed levels of subtidal suspended and bottom culture are unlikely to cause disturbance to the bottlenose dolphin conservation features. The bottlenose dolphin is unlikely to have any negative interaction with intertidal oyster culture.
- There is a risk of significant disturbance to a number of bird species as a consequence of a combination of pressures including, among others, aquaculture (existing and proposed) and green algal accumulations (eutrophication) in intertidal areas.
- There is potential for the development of intertidal aquaculture sites in the Poulnasherry/Kilrush area to cause substantial displacement to the Grey Plover, as this species is a visual feeder and may also avoid areas of heavy algal growth.

- The existing and proposed intertidal aquaculture sites in the Carrigaholt and Rinevella areas are outside the River Shannon and Fergus Estuaries SPA and significant utilisation of these areas by the SCI species is unlikely to occur.
- 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 intertidal habitat within the area.
- There is potential for development of intertidal aquaculture sites in the Aughinish/Foynes area to cause substantial displacement impacts to the Grey Plover and Bar-tailed Godwit.
- There is potential for further significant cumulative impacts on some of the bird species from the development of aquaculture sites in combination with oyster trestle cultivation in the Fishery Order T08/008, which covers part of Poulnasherry Bay.
- The possibility of significant disturbance impacts to high tide roosts used by 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 vessel activity associated with the development of sites in the Ballylongford/Bunaclugga and Aughinish/Foynes areas cannot be discounted due to a lack of information about the usage of high tide roost sites in these areas. The potential for cumulative impacts from this vessel activity in combination with other vessel activity in these areas also warrants further consideration.
- The possibility of intertidal or subtidal aquaculture developments affecting nocturnal roost sites used by the Whooper Swan cannot be discounted as there is no information available on the location of these roost sites.

# Summary of Management Actions and Mitigation Measures that are being implemented as a consequence of the Findings in the Appropriate Assessment Process and following Observations received during the Statutory and Public Consultation Process

Taking account of the recommendations of the Appropriate Assessment process, as well as additional technical/scientific observations, the following measures are being taken in relation to the proposed licensing of aquaculture in these Natura 2000 sites:-

- On the basis of the Appropriate Assessment findings, it is not proposed to license bottom oyster culture sites (due to the long residence time in the Lower River Shannon SAC increasing the likelihood of successful recruitment of the non-native oyster, *Crassostrea gigas*).
- The findings of the Appropriate Assessment process indicate that certain aquaculture activities (i.e. bottom mussel, suspended mussel and bottom oyster culture) in-combination with Fishery Order areas may pose a significant risk of disturbance to a number of qualifying interests in the SAC. It should be noted, however, that this assumes 100% occupancy of the Fishery Order areas by fisheries activity. As it is not proposed to license bottom oyster culture activities, further information on the specific levels of site use within Fishery Order areas would help to clarify the likely impact of some aquaculture activities, i.e. bottom culture of mussels and suspended intensive culture of mussels on these qualifying interests.

- There is potential for development of intertidal aquaculture sites in the Poulnasherry/Kilrush and Aughinish/Foynes areas to cause substantial displacement impacts to the Grey Plover, however, it should be noted that the Appropriate Assessment conclusions in this regard are highly precautionary.
- In the Poulnasherry/Kilrush area, a winter low tide count survey for shorebirds (including Scaup) was initiated in 2018 to consider bird use in the area in light of existing aquaculture activity as well as assessing the in-combination effects with green algae cover on the shore. It is anticipated that this monitoring will establish a summary of site use by the shorebird species while also providing observations on the likely interactions with aquaculture activities and other pressures specifically relating to the species distribution within the survey area. An Adaptive Management Plan will be applied based on the results of this targeted monitoring programme of shorebirds. In the event of increased or significant levels of displacement of shorebirds being observed, specific management actions (with a view to reducing disturbance effects) will be implemented (these will be operationalised by way of licence conditions).
- The use of all existing and proposed intertidal aquaculture sites in the Ballylongford/Bunaclugga area may cause moderate displacement to the Ringed Plover. On this basis, it is proposed to license existing aquaculture in the area and monitor the Ringed Plover numbers (through IWebs) to assess their long-term site use. Where licensing for intertidal oyster culture occurs in Ballylongford Bay, conditions will apply in relation to access and interactions with night roosts of some bird species. The subtidal bottom culture of mussels may be licensed in Ballylongford Bay with certain conditions relating to the extent and timing of activities. Given that existing aquaculture is confined to the eastern portion of the bird count survey area near Bunaclugga Bay, these sites should not adversely impact on bird distribution. The licensing of proposed aquaculture in this area may not occur on the basis that a moderate risk of disturbance (particularly on Ringed Plover) is anticipated if all activities are licensed. Ongoing bird monitoring (through IWeBS) for this area will determine if consideration can be given to any future licence applications.
- Full occupation of the aquaculture sites is predicted to have significant, or near significant, displacement impacts on the Grey Plover and the Bar-tailed Godwit in the Aughinish/Foynes area. On the basis of the Appropriate Assessment findings, it is proposed not to license site T07/012A for the cultivation of mussels using bouchot poles. There are no clear mitigation measures available to prevent the risk of disturbance to these shorebirds from the proposed activity at this site.
- The possibility of significant disturbance impacts to high tide roosts used by the SCI species covered by the Appropriate Assessment from vessel activity associated with the development of sites T06/233, T06/394A, T06/394B, T07/007, T07/012A and T07/014A cannot be discounted due to a lack of information about the usage of high tide roost sites in these areas. It is however, unlikely, given the small number of proposed operators for these areas that the levels of vessel activities are such that will result in significant disturbance to roosting SCI species. Travel to intertidal sites will occur outside of the period of high water and the subtidal sites will have limited access for maintenance and harvesting. Furthermore, the large bottom mussel site (T06/233) will be accessed from outside of the Shannon Estuary (Dingle Bay) and not Salleen Pier (from where the greatest disturbance might occur).
- The possibility of intertidal or subtidal aquaculture development affecting nocturnal roost sites used by the Whooper Swan cannot be discounted. Any night time activity occurring in site T06/233 could reduce the potential suitability of this site as a Whooper Swan nocturnal roost site. In the event of licensing aquaculture in this area, licence conditions will specify that no night time aquaculture activity be carried out.

- The combined activities are unlikely to cause disturbance to the bottlenose dolphin on the basis of the shallow and predominantly intertidal nature of the activities.
- All aquaculture licences are subject to standard licence conditions, which cover, among other things, any further actions that may be required in the event of deterioration in the conservation status of species/habitats/birds at site level that is directly attributable to shellfish culture operations.
- Licence conditions requiring strict adherence to the identified access routes over intertidal habitat in order to minimise habitat disturbance will apply.
- Licence conditions requiring that the Source of Seed must be approved by the Department of Agriculture, Food and the Marine will apply.
- Licence conditions requiring that Triploid Oysters be used for oyster culture to be carried out in the Lower River Shannon SAC and River Shannon and Fergus Estuaries SPA will apply.
- Licence conditions requiring full implementation of the measures set out in the draft Marine Aquaculture Code of Practice prepared by Invasive Species Ireland. Licensees will be required to prepare Contingency Plans for the approval of the Department of Agriculture, Food and the Marine which should identify, inter alia, methods for the removal from the environment of any non-target species introduced as a result of aquaculture operations.
- The use of updated and enhanced Aquaculture and Foreshore Licences containing terms and conditions which reflect the environmental protection required under EU and National law.

# Conclusion

The Licensing Authority is satisfied that, given the conclusions and recommendations of the Appropriate Assessment process, the implementation of the above measures will mitigate certain pressures on Natura 2000 features.

From a Natura 2000 perspective, consideration can be given to licensing existing intertidal oyster trestle culture along with limited proposed intertidal oyster activity and subject to other licensing criteria and considerations. Other aquaculture activities (i.e. bottom mussel, suspended mussel and bottom oyster culture) in-combination with Fishery Order areas may pose a significant risk of disturbance to a number of qualifying interests in the Lower River Shannon SAC. Although this assumes 100% occupancy of the three Fishery Order areas in the Shannon Estuary, the precautionary principle applies and the proposed licensing of bottom mussel and suspended mussel culture is dependent on further information on the specific levels of site use. It is not proposed to license bottom oyster culture sites due to the long residence time in the SAC increasing the likelihood of successful recruitment of the non-native oyster, *Crassostrea gigas*. The licensing of mussel cultivation using bouchot poles is also not being considered as the risk of disturbance to shorebirds from this activity cannot be discounted.

It is acknowledged that existing intertidal oyster trestle culture and limited proposed intertidal oyster activities may be licensed in the Poulnasherry/Kilrush area subject to the ongoing monitoring of bird use in the bay and other licensing criteria and considerations. The outputs and conclusions of monitoring efforts will provide the basis for any subsequent management actions and will inform continued/proposed licensing in this area.

Existing and proposed intertidal aquaculture sites in the Carrigaholt and Rinevella areas, which are outside the River Shannon and Fergus Estuaries SPA, may be licensed subject to other licensing criteria and considerations.

A moderate risk of disturbance arises, particularly on the Ringed Plover, if all existing and proposed aquaculture were to be licensed in the Ballylongford/Bunaclugga area. Consideration can be given to licensing existing aquaculture in this area subject to other licensing criteria and considerations. The Ringed Plover numbers will be monitored through IWebs to assess their long-term site usage. Ongoing bird monitoring will determine if consideration can be given to any future licence applications.

In the Aughinish/Foynes area, existing intertidal oyster culture may be licensed. The proposed aquaculture activities in this area should be considered in conjunction with the potential significant disturbance to birds and the cumulative impacts to seabed habitats.

Accordingly, the Licensing Authority concludes that the licensing of certain aquaculture activities in the Shannon Estuary, along with specific management actions and mitigation measures, is not likely to have a significant effect on the integrity of the Lower River Shannon SAC and the River Shannon and Fergus Estuaries SPA. However, certain proposed aquaculture activities cannot be authorised as the risk of disturbance to the integrity of the relevant Natura 2000 sites from these activities cannot be discounted given the conclusions and recommendations of the Appropriate Assessment process.

July 2019