RISK ASSESSMENT FOR ANNEX IV SPECIES

Extensive Aquaculture

in

Dundalk Bay SAC and Dundalk Bay SPA,

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Introduction

This Annex IV Risk Assessment has been prepared by the Marine Institute to comply with the provisions of Article 12 and 13 of Council Directive 92/43/EC in relation to the protection afforded to Annex IV species from disturbance or harm. Specifically, this Risk Assessment appraises the existing and proposed aquaculture activities in Dundalk Bay SAC and Dundalk Bay SPA.

Legislative Context

The Habitats Directive has identified a number of animal and plant species across Europe, which are rare or are threatened with extinction and which need special measures to be taken to ensure their long-term survival. Under Article 12 and 13 of the Habitats Directive, Member States must establish systems of strict protection for animal and plant species which are listed on Annex IV of the Habitats Directive. Article 12 and 13 of the Habitats Directive are transposed into Irish law by Regulations 51 and 52 of the European Communities (Birds and Natural Habitats) Regulations 2011, as amended[1].

The aim of the strict protection measures (set out in Article 12 (for animals) and 13 (for plants) of the Directive) is that the species in question will reach and remain at favourable conservation status. This means that the population dynamics of the species concerned can maintain itself on a long-term basis as a viable component of its natural habitats. It also means that the natural range of the species is neither being reduced, nor is likely to be reduced for the foreseeable future, and that there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Annex IV species are afforded strict protection throughout their range, both inside and outside of designated protected areas. This protection is afforded to these species at all stages of their life cycle and wherever they occur. This protection includes from deliberate disturbance of these species, particularly during periods of breeding, rearing, hibernation and migration. It is an offence to deliberately capture or kill, keep, transport or sell, injure or disturb a specimen in the wild, or damage or destroy a breeding site or resting place of an Annex IV animal species. For plants it is an offence to deliberately pick, collect, cut, uproot or destroy any specimen of these species in the wild, or keep, transport, or sell any specimen of these species taken in the wild.

S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011 (inc. Amendment SI 293 of 2021[2])
Protection of fauna referred to in the First Schedule **51.** (1) The Minister shall take the requisite measures to establish a system of strict protection for the fauna consisting of the species referred to in Part 1 of the First Schedule. (2) Notwithstanding any consent, statutory or otherwise, given to a person by a public authority or held by a person, except in accordance with a licence granted by the Minister under Regulation 54 or 54A, a person who in respect of the species referred to in Part 1 of the First Schedule— a) deliberately captures or kills any specimen of these species in the wild,

[1] European Communities (Birds and Natural Habitats) Regulations 2011 to 2021 - Unofficial Consolidation (Updated to 28 July 2022)

[2] https://www.irishstatutebook.ie/eli/2021/si/293/made/en/print?q=293

b) deliberately disturbs these species particularly during the period of breeding, rearing, hibernation and migration,
c) deliberately takes or destroys eggs of those species from the wild,
d) damages or destroys a breeding site or resting place of such an animal, or
e) keeps, transports, sells, exchanges, offers for sale or offers for exchange any specimen of these species taken in the wild, other than those taken legally as referred to in Article 12(2) of the Habitats Directive,

shall be guilty of an offence.

(3) The prohibitions referred to in paragraph (2) shall apply to all stages of life of the biological cycle of fauna to which this Regulation applies.

(4) The Minister shall establish a system to monitor the incidental capture and killing of fauna consisting of the animal species referred to in Part 1 of the First Schedule and, having regard to the information gathered, he or she shall conduct further research or take such conservation measures as required to ensure that incidental capture and killing does not have a significant negative impact on the species concerned.

Protection of flora referred to in the First Schedule

52.

(1) The Minister shall take the requisite measures to establish a system of strict protection for the flora consisting of the plant species referred to in Part 1 of the First Schedule.

(2) Notwithstanding any consent, statutory or otherwise, given to a person by a public authority or held by a person, except in accordance with a licence granted by the Minister under Regulation 54 or 54A, a person who in respect of the plant species referred to in Part 1 of the First Schedule—

a) deliberately picks, collects, cuts, uproots or destroys any specimen of these species in the wild, or
b) keeps, transports, sells, exchanges, offers for sale or offers for exchange any specimen of these species taken in the wild, other than those taken legally as referred to in Article 13(1)(b) of the Habitats Directive

shall be guilty of an offence.

(3) The prohibitions referred to in paragraph (2) shall apply to all stages of the biological cycle of the flora to which this Regulation applies.

The list of Annex IV species which occur in Ireland and its waters[3] is set out in Table 1.

Table 1 Annex IV species which occur in Ireland (NPWS).

Animals	Plants
All bat species	Killarney Fern
Otter	Slender Naiad
Natterjack Toad	Marsh Saxifrage
Kerry Slug	
Dolphins, Whales and Porpoises	
Marine Turtles	

As an Annex IV species may be found throughout the country, the protection of these species is not restricted in geographical terms and is not necessarily associated with areas subject to specific designations. Any works or projects must ensure compliance with the requirements of the Regulations, which means avoiding impacts to Annex IV species. To do this a project must determine the probability of the protected species being present in the area affected by the works, using existing

[3] https://www.npws.ie/legislation

information, and applying the precautionary principle. If it is highly unlikely that an Annex IV species could be present or affected by the works, then the works will be compliant with Regulations 51 and 52[4].

If information shows that the Annex IV species is present, or may be present, then an investigation to establish presence is required. The Precautionary Principle must be applied in relation to this matter at this stage. If the investigation finds the species to not be present, then the project may proceed. If an Annex IV species is found to be present, or there is a breeding or resting place to which the animals are likely to return, then the likely impacts of the project needs to be examined to see if those impacts can be avoided through the design of the works[5].

Outline of the Proposed Aquaculture Activities

Currently within Dundalk Bay there are no sites licenced for extensive aquaculture production. The MI has been requested to assess 6 new applications for extensive aquaculture activities within or near the Dundalk Bay SAC and Dundalk Bay SPA (Figure 1a). Two of these, are for suspended rope mussel culture in subtidal waters and the remaining 4 applications are for the culture of the Pacific oyster (*Magallana gigas)* intertidally (Figure 1 (b)).

Table 1 Application sites currently in progress within Dundalk Bay.

Site No.	Status	Species	Total Area* (ha)	Access Indicated
T01-097A	Application	Pacific oyster	1.9	Yes
T01-122A	Application	Pacific oyster	13.1	Yes
T01-099A	Application	Pacific oyster	25.71	Yes
T01-123A	Application	Pacific oyster	14.46	Yes
T01-1001	Application	Blue mussel	72.03	Yes
T01-1002	Application	Blue mussel	72.05	Yes

Intertidal Oyster Culture

Pacific oyster (*Magallana gigas*) cultivation comprises oysters in bags placed on a variety of trestle designs. The standard trestle most commonly used, holds 6 bags and is L 3m x W 1m, H 0.4 – 1.2m. A variety of mesh bags and or hanging baskets can be used. The configuration is dependent on the hydrological characteristics of a site. The goal is to maximise growth rate, quality (i.e. meat yield, shell shape) and reduce handling on the shore. Plastic (HDPE) mesh bags are typically attached with rubber

[4] Guidance on the Strict Protection of Certain Animal and Plant Species under the Habitats Directive in Ireland. 2021. National Parks and Wildlife Service Guidance Series 1. DHLGH Link

[5] Guidance on the Strict Protection of Certain Animal and Plant Species under the Habitats Directive in Ireland. 2021. National Parks and Wildlife Service Guidance Series 1. DHLGH Link

straps and hooks. Over 2-3 years as the oysters grow, they are graded and bags of larger mesh sizes i.e. 6mm, 9mm, and 14mm, are used.

Intertidal oyster applications will require Aids to Navigation (AtoNs), i.e. marker poles at each of the four corners of the sites. Each marker poles comprises of a concrete filled tractor or truck tyre base measuring 1100mm diameter X 400mm depth with a 1500mm length outer pole cemented in centre. This pole measures 1100mm exposed at top and has diameter 76mm. A 6 metre inner pipe extends out from this centre outer pipe which has a 2metre yellow outer sleeve and St. Andrews Cross attached at the top. A concrete base of a tyre with cement, is partially buried in intertidal seabed substrate.

Suspended Mussel Culture

There are two locations proposed for suspended longline mussel farming in Dundalk Bay, namely Site T01-1001 and T01-1002. Each site is 72 hectares. It is proposed that the sites would be accessed using a boat from Greenore in Carlingford Lough.

The culture method involves placing settlement media (such as rope, strap, mesh) in the water column, known as a 'dropper' on which natural juvenile mussels settle. Depending on a number of seasonal and local factors this takes place in April, May or June. The naturally collected mussel seed is then on-grown for typically 18-24 months before being harvested as per market requirements and in line with shellfish and water quality parameters. As these mussels grow the stock may be relocated to other culture areas (within Ireland or beyond), or remain *in-situ*. Some farms grade the mussels during the 18-24 months, using the "New Zealand" continuous rope system, whereby the mussels are re-packed at a specific density using bio-degradable cotton mesh around the rope, the mesh rots away after the mussels have re-attached using their byssal threads. All of the longlines in use are double head rope longlines, constructed from polypropylene mostly of 110 m in length, with typically 30 x 210-250 L floatation units (generally grey in colour) and anchored at each end with 2.5 tonne concrete weights. In general, the long-line density is no greater than 3 lines per hectare.

The suspended mussel aquaculture sites proposed navigation plan is a marking scheme with a placement of 4 x yellow NAV02 buoys at each corner of each site. Each buoy has an inbuilt St. Andrews Cross and radar reflector. A flashing yellow light will be added to top flange of buoy. It is proposed that all lights will be synchronised.

These buoys will be moored onto the seabed using 1.5 tonne mooring block measuring (1.1m x 1.1m x 0.55m) + 5 metre mooring chain (32mm), shackles + Rope – Dyneema 22mm. Sub-tidal buoys will be used mid-line to assist keep rope and chain off seabed. Length of Dyneema rope will depend on each location using 2:1 ratio for this proposed tighter mooring system.

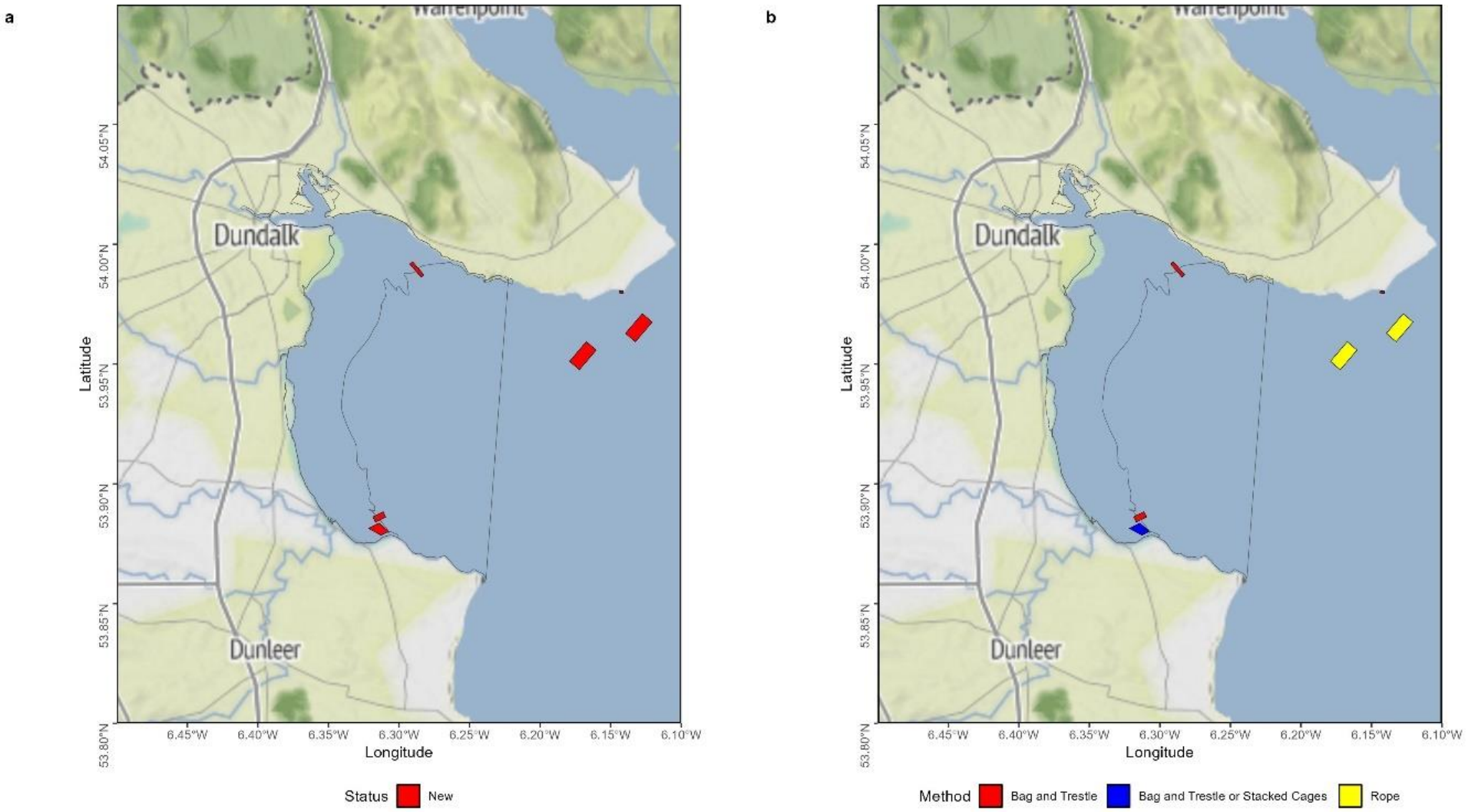

Figure 1 a) Proposed extensive aquaculture sites in Dundalk Bay; b) Primary culture type at each licenced site in Dundalk Bay. The grey outlines indicate the boundary of the SAC and SPA.

Relevant Annex IV Species

The Habitats Directive has identified a number of plant and animal species across Europe, which are rare or are threatened with extinction and which need special measures to be taken to ensure their long-term survival. All species listed under Annex IV with the potential to be impacted by the proposed site investigation works should be included, even if they have been separately assessed in the AA process.

Of the animal and plant species on Annex IV known to occur in Ireland, the following species were identified as relevant to the proposed development:

Cetaceans

Below is the list of Cetaceans that have been sighted, in some way, within the vicinity of Dundalk Bay (data from the National Biodiversity Data Centre Ireland)[6].

- Bowhead whale (*Balaena mysticetus*)
- Bottlenosed Dolphin (*Tursiops truncatus*)
- Common Dolphin (*Delphinus delphis*)
- Harbour Porpoise (*Phocoena phocoena*)
- Humpback whale (*Megaptera novaeangliae*)
- Minke whale (*Balaenoptera acutorostrata*)

Given the potential for overlap between the proposed activities and these species they will be considered in more detail in this risk assessment.

Otter

Ireland remains a European stronghold for the otter and the species is widespread here in our rivers and streams and along our coastline and lakeshores. Otter has two basic habitat requirements: adequate prey; and safe refuges where they can rest and breed. Otter maintain territories along river banks, lake shores and coasts. Coastal territories require a freshwater source for the otter to wash, so will always include a stream or spring. In productive areas, such as coastlines, territories are in the range of 5-6 km. On the coast, Otter forage within 80-100m of the coastline, typically in depth of <3m, but up to 10-12m. For foraging they prefer shallow, rocky environments with seaweed cover. Otter maintain numerous resting places, known as couches (above-ground, hidden in foliage) and holts (underground, among roots, rocks, or tunnels) within its territory. They breed all year, nesting in a well-hidden natal holt.

There are otter reports within Dundalk Bay[7], so are considered in more detail in this risk assessment.

All bat species

Dundalk Bay SAC and SPA is a marine site at a distance from bat habitats. The aquaculture activities do not impact on trees, hedges, buildings, bridges, caves, so bats are not likely to be present or affected by the proposed activities. While bats are susceptible to changes in lighting, the intertidal

[6] National Biodiversity Data Centre Link
[7] National Biodiversity Data Centre Link

AtoNs are not lit while the suspended culture sites will have lit AtoNs. The lighting proposed for the special marks will be yellow, in the range of 565 to 590 nanometers (nm). Bats are considered tolerant of this higher wavelength. As bats are not likely to be present directly over the site, the lack of spatial overlap or likely interactions between the Annex IV species and the aquaculture activities means there is no significant risk to the number of individuals to breed successfully, nor to the survival of the population, and the species natural range is secure and will not be reduced. **Therefore, bats are not carried forward for a risk assessment.**

Natterjack Toad

The natural ranges for the Natterjack Toad are freshwater and terrestrial. Populations are restricted to sites in County Kerry. Natterjacks are nocturnal and during the day they hide under logs and stones. Over winter, natterjacks hibernate in burrows that they dig themselves in sandy soils, or in piles of rocks or dry-stone walls. The toad breeds in shallow ponds and forages in the areas around those ponds at these locations. These extensive aquaculture sites are not a suitable habitat for Natterjack toads. There is not likely any overlap between these marine sites and this species, so there is no risk to the number of individuals to breed successfully, nor to the survival of the population, and the species natural range is secure and will not be reduced. **Therefore, Natterjack Toads are not carried forward for a risk assessment.**

The Kerry Slug

The Kerry Slug are terrestrial and nocturnal (generally), with their natural ranges restricted to sites in County Kerry and west Cork (and more recently found in Galway, Limerick and Tipperary). Its habitats are woodland, and lichen covered rock outcrops and boulders. These aquaculture sites are not a suitable habitat for the Kerry slug. There is not likely any overlap between this marine site and this species, so there is no risk to the number of individuals to breed successfully, nor to the survival of the population, and the species natural range is secure and will not be reduced. **Therefore, the Kerry Slug are not carried forward for a risk assessment.**

Plants

The natural ranges for the Annex IV plants species (Killarney Fern, Slender Naiad, and Marsh Saxifrage) are terrestrial and they are highly unlikely to be impacted by these aquaculture activities, so there is no risk to these Annex IV species. **Therefore, the Killarney Fern, Slender Naiad and Marsh Saxifrage are not carried forward for a risk assessment.**

Marine Turtles

Various turtle species are occasional visitors to Irish waters however none have been recorded in the vicinity of Dundalk Bay (Biodiversity Data Centre). Considering the rarity in Irish waters of these widely roaming marine species, the design of the infrastructure with weighted lines and moorings and the predominately shallow subtidal and intertidal nature of the proposed activities it is not likely that there will be any significant interactions with these Annex IV species, and there is no risk to the number of individuals to breed successfully, nor to the survival of the population, and the species natural range is secure and will not be reduced. **Therefore, marine turtles are not carried forward for a risk assessment.**

Conclusion

The relevant Annex IV species which are likely to be present in the area or potentially affected by these projects, and are considered for further investigation, are:

- Cetaceans
- Otter

Risk Assessment

Cetaceans

The National Biodiversity Data Centre, Ireland data indicates that there are 2 delphinidae species (Bottle-nosed Dolphin (*Tursiops truncatus*) and Common Dolphin (*Delphinus delphis*)), 3 baleen whale species (Humpback Whale (*Megaptera movaeangliae*); Minke Whale (*Balaenoptera acutorostrata*); Bowhead Whale (*Balaena mysticetus*) and one porpoise species Harbour Porpoise (*Phocoena phocoena*) which could potentially utilise waters in the vicinity of Dundalk Bay.

There is only a single sighting of both the Bowhead Whale and Humpback Whale near Dundalk Bay. The Irish Sea is not a key part of the range of these species and can therefore be ruled out of further risk.

The remaining species, Bottlenose Dolphin, Harbour Porpoise Common Dolphin and Minke Whale are all regularly recorded in The Irish Sea and may utilise waters close to the proposed and existing activities in Dundalk Bay. The main impacts associated with the proposed projects on dolphins, whales and porpoises are related to:

- **Noise disturbance** - Noise associated with aquaculture vessels is considered low and ambient. The increase in vessel activities associated with the proposed activities will be local and are unlikely to add significantly to the ambient noise level from existing activities. **There is therefore unlikely to be any significant effects on cetaceans in the area.**
- **Collisions or entanglement** - the small number of vessels that will be required for the proposed activities will not significantly increase vessel traffic in the area. These vessels will be travelling at slow speeds, in a predefined trajectory, allowing for animals to avoid vessels. There is very low risk of an interaction with vessels or suspended mussel equipment used.
  Humpback whale may be at increased risk of entanglement in finfish aquaculture gear (between containment net and predator net)[8] and there is a lack of evidence of humpback whale becoming entangled in other shellfish aquaculture structures. Minke are the most abundant baleen whale in Irish waters. Minke whale have been recorded as capable of detecting and reacting to ropes simulating single buoy lines in the water column, having a higher detection where ropes were white or black[9]. There is greater potential for interaction within the proposed suspended culture aquaculture sites and activities. This interaction is likely if they forage inshore, close to the structures. Given the relatively small footprint of the suspended aquaculture locations the

[8] Storlund RL, Cottrell PE, Cottrell B, Roth M, Lehnhart T, Snyman H, Trites AW, Raverty SA. Aquaculture related humpback whale entanglements in coastal waters of British Columbia from 2008-2021. PLoS One. 2024 Mar 20;19(3):e0297768. doi: 10.1371/journal.pone.0297768. PMID: 38507405; PMCID: PMC10954164

[9] Kot, B. W., Sears, R., Anis, A., Nowacek, D. P., Gedamke, J., & Marshall, C. D. (2012). Behavioral responses of minke whales (Balaenoptera acutorostrata) to experimental fishing gear in a coastal environment. Journal of Experimental Marine Biology and Ecology, 413 13-20.

likelihood of interactions is very small. In addition, the locations of the structures are close to shore, and as such, they do not present a significant barrier to movement of this species in the area. If aquaculture lines are appropriately tensioned, the risk of entanglement is likely to be low[10]. Furthermore, the structures are such that echo-locating species (porpoise and dolphin) can easily detect and avoid, if necessary, the structures/sites and therefore, avoid any risk of collision or entanglement[11,12,13].

Finally, research has demonstrated that dolphin may be attracted to structures similar to those used in suspended culture operations[14], presumably on the basis that they act as fish attraction devices[15] and therefore, likely act as a food aggregation area for dolphin.

In addition, it is noted that there are no significant energy sources (e.g., light from AtoNs, noise etc.) likely to result from activities at the sites that pose a risk. **Given these observations it is concluded there are no likely significant effects posed by the suspended aquaculture operations on bottlenose dolphin, harbour porpoise and other cetaceans species.**

- **In relation to intertidal culture -** Given the sheltered and shallow locations for the inter-tidal activities, it is not optimal habitat for cetaceans in general. **There will be no interaction with intertidal structures therefore risk of collision or entanglement can be ruled out.**
- **Obstruction and displacement** – the potential for the infrastructure to cause obstruction to cetaceans is considered low. These mobile species can avoid and go around any obstructions without any significant disturbance. The size of the proposed and existing activities is relatively limited and not significant when considered against the overall area available to these species there will be no loss of habitat to these wide-ranging species. **Therefore, risk of obstruction and displacement can be ruled out.**

The potential for impact from the listed hazards is generally unlikely or of low intensity. While there may be isolated sightings in the vicinity, the lack of spatial overlap or likely interactions between the Annex IV species and the aquaculture activities means there is no significant risk to the number of individuals to breed successfully, nor to the survival of the population, and the species natural range is secure and will not be reduced by the existing and proposed shellfish aquaculture operations.

Otter

Otter are reported within the area of the SAC, therefore suitable habitat must exist within the Dundalk Bay SAC. Otter are an opportunist hunter, mainly eating fish, but also eats frogs, small birds, eggs,

[10] Clement, D. (2013) Effects on Marine Mammals. Chapter 4 *in:* Ministry for Primary Industries. Literature review of ecological effects of aquaculture. Report prepared by Cawthron Institute, Nelson, New Zealand. http://www.fish.govt.nz/en-nz/Commercial/Aquaculture

[11] Watson-Capps JJ, Mann J (2005) The effects of aquaculture on bottlenose dolphin (Tursiops sp.) ranging in Shark Bay, Western Australia. Biological Conservation 124: 519–526.

[12] Heinrich, S. (2006) Ecology of Chilean dolphins and Peale's dolphins at Isla Chiloe, southern Chile (PhD dissertation). University of St Andrews, 239 p

[13] Ribeiro S, Viddi FA, Cordeiro JL, Freitas TRO (2007) Fine-scale habitat selection of Chilean dolphins (Cephalorhynchus eutropia): interactions with aquaculture activities in southern Chiloe Island, Chile. Journal of the Marine Biological Association of the United Kingdom 87: 119–128

[14] Díaz López, B. & Methion, S. (2017) The impact of shellfish farming on common bottlenose dolphins' use of habitat. Marine Biology 164: 83. doi:10.1007/s00227-017-3125-x

[15] Callier M, Byron C, Bengtson D, Cranford P, Cross S, Focken U, Jansen H, Kamermans P, Kiessling A, Landry T., O'Beirn F., Petersson E., Rheault, RB., Strand, O., Sundell, K., Svasand, T., Wikfors, GH., McKindsey, CW. (2017) Attraction and repulsion of mobile wild organisms to finfish and shellfish aquaculture: a review. Rev Aquac 0:1–26

mussels, crabs and other invertebrates. The preferred foraging habitat is intertidal rocky environments with seaweed cover. The main habitats utilised by the proposed and existing aquaculture licences are intertidal and subtidal mud and sand flats with good flat hard ground. There will therefore be very little overlap in the preferred habitat of Otter and the proposed or existing habitat.

The main pressures associated with the proposed projects on otter are related to:

- **Obstruction (intertidal)-** The structures (trestles and AtoNs) and activities associated with this form of oyster culture structures are positioned on, and rising to approximately 1m above, the intertidal seabed. They are oriented in rows with gaps between structures, thus allowing free movement through and within the sites. The structures are placed on the lower shore, in the intertidal area, which is covered by water for most of the tide. The structures allow for sufficient space and will not interfere with the natural behaviour of otter.
- **Entanglement** - Shellfish production activities are highly unlikely to pose any risk to otter populations through entrapment or direct physical injury. Otter can move freely among submerged trestles as well as droppers or ropes used for suspended mussel culture. The structures do not present a barrier to movement.
- **Displacement -** While the general habitat in the area is likely to support otters, the intertidal areas of extensive aquaculture are not considered ideal foraging areas for otter, which prefer shallow, rocky environments with seaweed cover for foraging. The extensive aquaculture, being in the intertidal area, and the access routes, being in well-travelled routes, are highly unlikely to interfere with the couches and holts within its territory, nor to disturb the breeding locations.
- **Disturbance** – Vessels being used during harvesting and site access as well as tractor activity on the shore will have a disturbing effect from both visual and noise disturbance on resting or foraging otter. The proposed operations are generally carried out in daylight hours. The interaction with the otter will be minimal, given that otter foraging is primarily crepuscular. Therefore, the level of disturbance is likely to be low, localised, occasional and will be dictated by tidal state in daylight hours. There is no lighting on intertidal AtoNs and suspended culture the lighting is likely visible to otter along the shore, given the lanterns can emit light visible up to 3+nm. Lights will be stationary and will flash in a predictable synchronized pattern of one flash every five seconds. Otters are a riverine and coastal species which are primarily crepuscular, foraging mainly at twilight, although coastal foraging during the day has also been noted[16]. Within Ireland, light pollution is not thought to be a major pressure for the otter population particularly in comparison to other threats such as habitat destruction and pollution[17]. Evidence from dated literature on satellite tagged Otters in the UK indicate that lights such as car headlights and from local housing had no effects on Otter behaviour[18.] Lighting, as a result of aquaculture activities in Dundalk Bay, is unlikely to directly affect any population

[16] Carss (1995) Foraging behaviour and feeding ecology of the otter *Lutra lutra:* A selective review
[17] **NPWS (2009)** Threat Response Plan: Otter (2009-2011). National Parks & Wildlife Service, Department of the Environment, Heritage & Local Government, Dublin.
[18] Jefferies (1985) The effects of angling interests on otters, with particular reference to disturbance. Angling and wildlife in freshwaters. Institute of terrestrial ecology.

characteristics for Otter. **Likely significant effects of extensive aquaculture activities (including vessels and light disturbance) on Otter can therefore be ruled out.**

- **Prey competition** - The nature of this extensive aquaculture means it is not likely to have a negative effect on the number or availability of prey for otter.

The potential for impact from the listed hazards are generally highly unlikely or of low intensity. The lack of significant spatial overlap or likely interactions between the Annex IV species and the aquaculture activities means there is no significant risk to the number of individuals to breed successfully, nor to the survival of the population, and the species natural range is secure and will not be reduced.

Mitigation Measures

On the basis that the sites are operated in a manner expected and that any debris or loose material is removed in a timely manner, then otter and cetaceans are highly unlikely to interact with these extensive aquaculture farms in a manner to result in harm. Based on the information above, no mitigation measures for encounters are considered necessary for these projects.

Conclusions

Following a risk assessment of the proposed extensive aquaculture licence applications in Dundalk Bay the activities pose no risk to the number of individuals to breed successfully, nor to the survival of the population, and the species natural range is secure and will not be reduced, for the Annex IV species which occur in Ireland and its waters.