Draft Appropriate Assessment Report of a draft Fishery Natura Plan for Seed Mussel (2023-2027) in the Irish Sea

Marine Institute

Rinville

Oranmore, Co. Galway

July 2023

Table of contents

1. Preface

This draft appropriate assessment report follows from a screening report for the Fishery Natura Plan for seed mussels in the Irish Sea (2023-2027). The screening report highlighted the possibility of significant effects of mussel fishing on common scoter within and in waters surrounding Dundalk Bay Special Protection Area (SPA) and The Raven SPA. Potential effects were also identified on sandbanks, which are slightly covered in water all of the time, within Blackwater SAC and Long Bank SAC and disturbance effects on Harbour and Grey Seals within Lambay Island Special Area of Conservation (SAC) and Harbour porpoise within and outside Rockabill to Dalkey SAC. Following direction from the Department of Agriculture, Food and the Marine (DAFM) this draft appropriate assessment report assesses the interactions of the proposed Fishery Natura Plan for seed mussel (2023-2027) with those Qualifying Interests (QIs) outlined above and identifies mitigation measures where these are deemed to be necessary.

2. Executive Summary

This draft appropriate assessment report assesses the likelihood of significant effects of a proposed Fishery Natura Plan (FNP) for seed mussel (2023-2027) on those qualifying interests (habitats and species) in Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) in the Irish Sea which could not be discounted during the screening process. Following further analysis where the possibility of significant effects cannot be discounted mitigation measures are proposed.

With respect to SACs the scope of the appropriate assessment includes sandbanks which are slightly covered by water all of the time within Blackwater Bank and Long Bank SACs, grey and harbour seals within and in the vicinity of Lambay Island SAC and harbour porpoise within and in waters surrounding Rockabill to Dalkey SAC. Regarding SPAs, common scoter within and outside Dundalk Bay and The Raven SPA are assessed in relation to prey removal pressure. All QIs within The Raven, Dalkey Islands, Howth Head Coast, Irelands Eye, Lambay Island, Skerries Islands and Wicklow Head are considered with respect to disturbance pressure from the presence of fishing vessels. Finally, potential in combination effects of removal of prey for common scoter by seed mussel fishing and the razor clam fishing and the future in combination disturbance effects of fisheries and offshore renewable energy (ORE) have been considered. The geographic scope of the assessment extends from Carnsore Point in the south to Carlingford Lough in the north and includes all waters in between and out to the 12nm limit. Mussel seed beds may be found in relatively small areas at the edge of sand banks and on coarse current swept sediments and rocky habitat both inter-tidally and sub-tidally in this area. Their extent and distribution may change annually depending on larval supply, substrate availability and post settlement survival.

The assessment of the proposed seed mussel fishery, as described in the Fishery Natura Plan (FNP) 2023-2027, finds that the majority of fishing activity by this fleet, since 1970, has occurred outside of SACs and SPAs. This is also highly likely to be case in the period 2023-2027.

In the case of Blackwater Bank and Long Bank the fishery has not occurred and is highly unlikely to occur in protected sand bank habitat although it occurs within the borders of the sites. In any case the characterizing species of the protected habitat within the site are not sensitive to physical disturbance pressure that seed mussel dredging would cause. The possibility of significant effects of the fishery on these sites can be discounted.

In the case of SPAs the seed mussel fishery will not have any significant effect on designated bird species in the Irish Sea with the exception of the effects of prey removal on common scoter. Common scoter is a species of conservation interest in Dundalk Bay SPA and Raven SPA and it feeds on bivalve molluscs including mussels. Recent surveys indicate that common scoter utilise waters within Dundalk Bay SPA and east and south of the Bay and also occur in the Raven SPA and in waters surrounding this site. Both sites and surrounding waters have suitable foraging conditions and habitat for common scoter. Although there is no historic fishing for mussel in the Dundalk Bay SPA the FNP allows for it. It is recommended that fishing in this area is prohibited unless a new FNP is developed which outlines the detail of any proposed fishery. There is extensive historic fishing within and surrounding The Raven SPA in areas of suitable foraging habitat for common scoter and removal of mussel from this area could deplete the overwintering prey requirements for this species. Therefore, the assessment recommends that appropriate mitigation in the form of a spatial closure, to all mobile fishing gears that come in contact with the seabed, is implemented in an area identified north of the Raven SPA. A number of mitigation options in this respect were considered and are outlined in section 8.

Significant in combination effects with the razor clam fishery cannot be discounted. Surveys for seed mussel should be undertaken in the Raven SPA including in areas where the razor clam fishery operates to further inform possible in combination effects.

3. Introduction

This document is a draft appropriate assessment of a Fisheries Natura Plan (FNP) for seed mussel in relation to Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) in the Irish Sea and the species and habitats (Qualifying interests; QIs) within those sites for which specific conservation objectives have been identified by the conservation authority (National Parks and Wildlife Service; NPWS). The fishery natura plan was drafted by the Bottom Grown Mussel Consultative Forum (BGMCF) and submitted for consideration to DAFM in May 2023. A screening assessment of the plan was completed in June 2023. The relevant QIs which could not be screened in the screening assessment are as follows; Sandbanks slightly covered with water all the time within Blackwater Bank and Long Bank SAC; harbour and grey seal inside and outside Lambay Island SAC, harbour porpoise within and outside Rockabill to Dalkey SAC, common scoter inside and outside Dundalk Bay and The Raven SPA with respect to prey removal pressure and all QI species within The Raven, Dalkey Islands, Howth Head Coast, Irelands Eye, Lambay Island, Skerries Islands and Wicklow Head with respect to disturbance pressure. In combination pressures which could not be screened out include the potential effects of prey removal by the seed mussel fishery and indirectly by the razor clam fleet and the future disturbance effect from offshore renewable energy (ORE) (Figure 1, Table 1, 2).

The screening assessment describes in further detail the FNP, the current and past status of the seed mussel fishery, other fisheries as well as the distribution of other marine industry sectors in the area. It also contains details on diet and foraging distances for bird species in the Irish Sea. This information has informed the current appropriate assessment.

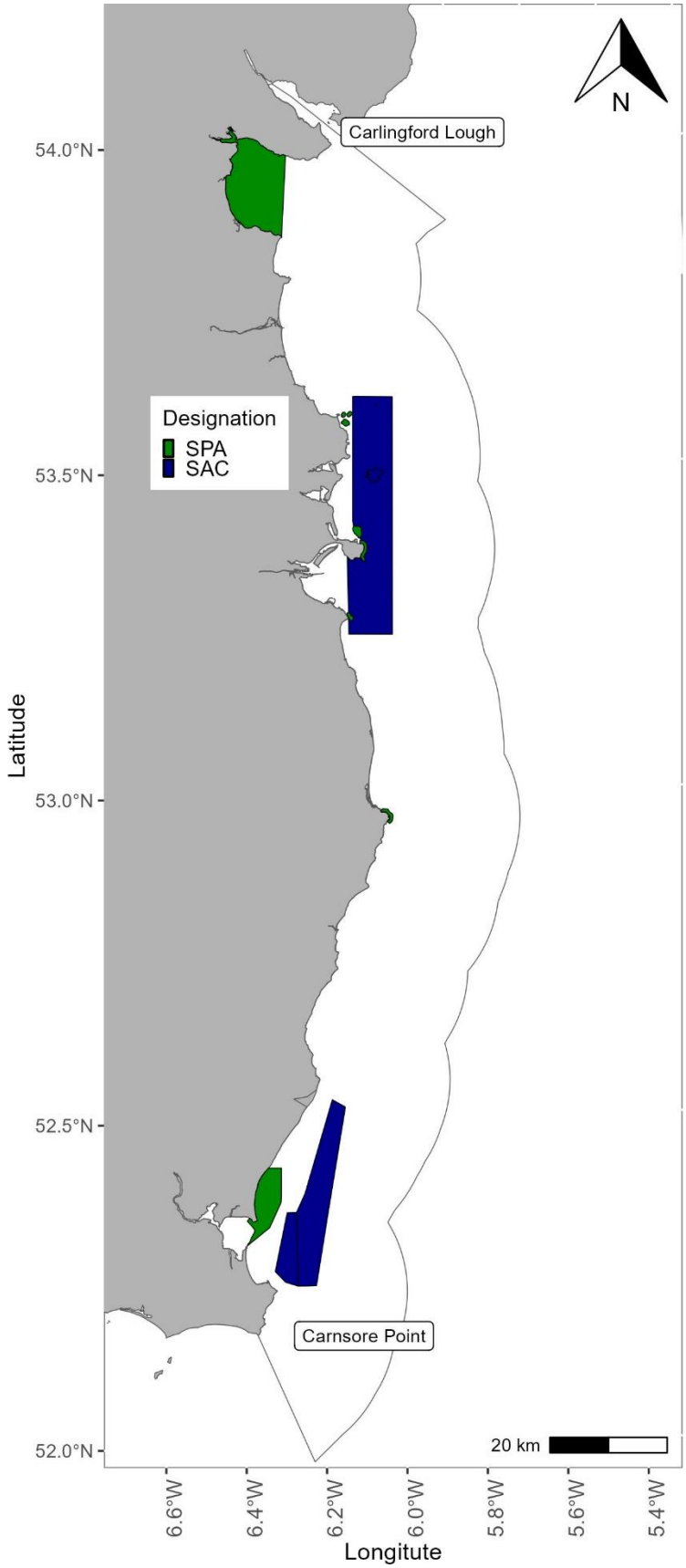

Figure 1. SACs and SPAs for which an appropriate assessment is undertaken in this report

Table 1 List of QIs and habitat features in the Irish Sea SACs to be assessed and the pressures exerted by the seed mussel fishery on those QIs or features.

Site no.	Name	Qualifying interests	Features	Pressure from seed mussel fishery	Potential incombination effects
2161	Long Bank	1110 Sandbanks which are slightly covered by sea water all the time	Sand with Nephtys cirrosa and Bathyporeia elegans community complex	Surface disturbance and abrasion	NA
2953	Blackwater Bank	1110 Sandbanks which are slightly covered by sea water all the time	Sand with Nephtys cirrosa and Bathyporeia elegans community complex	Surface disturbance and abrasion	NA
2953	Blackwater Bank	1110 Sandbanks which are slightly covered by sea water all the time	Cobble with Epifaunal community	Surface disturbance and abrasion	NA
3000	Rockabill to Dalkey	1351 Harbour porpoise *Phocoena phocoena*		Disturbance	ORE
0204	Lambay Island	1364 Grey Seal *Halichoerus grypus* 1364 Harbour Seal *Phoca vitulina*		Disturbance	ORE

Table 2 Pressures exerted by the seed mussel fishery per SCI and SPA which were taken forward for appropriate assessment.

Site no.	Name	Qualifying interests	Pressure from seed mussel fishery	Potential in combination effects
4019	The Raven	Red-throated Diver (*Gavia stellata*) [A001]	Disturbance	ORE
4019	The Raven	Cormorant (*Phalacrocorax carbo*) [A017]	Disturbance	ORE
4019	The Raven	Common Scoter (*Melanitta nigra*) [A065]	Prey removal, disturbance	Razor clam fishing, ORE
4026	Dundalk Bay	Common Scoter (*Melanitta nigra*) [A065]	Prey removal, disturbance	Razor clam fishing, ORE
4113	Howth Head Coast	Kittiwake (*Rissa tridactyla*) [A188]	Disturbance	ORE
4117	Irelands Eye	Cormorant (*Phalacrocorax carbo*) [A017]	Disturbance	ORE
4117	Irelands Eye	Herring Gull (*Larus argentatus*) [A184]	Disturbance	ORE
4117	Irelands Eye	Kittiwake (*Rissa tridactyla*) [A188]	Disturbance	ORE
4117	Irelands Eye	Guillemot (*Uria aalge*) [A199]	Disturbance	ORE
4117	Irelands Eye	Razorbill (*Alca torda*) [A200]	Disturbance	ORE
4122	Skerries Islands	Cormorant (*Phalacrocorax carbo*) [A017]	Disturbance	ORE
4122	Skerries Islands	Shag (*Phalacrocorax aristotelis*) [A018]	Disturbance	ORE
4122	Skerries Islands	Herring Gull (*Larus argentatus*) [A184]	Disturbance	ORE
4127	Wicklow Head	Fulmar (*Fulmarus glacialis*) [A009]	Disturbance	ORE
4127	Wicklow Head	Kittiwake (*Rissa tridactyla*) [A188]	Disturbance	ORE
4127	Wicklow Head	Guillemot (*Uria aalge*) [A199]	Disturbance	ORE
4127	Wicklow Head	Razorbill (*Alca torda*) [A200]	Disturbance	ORE
4172	Dalkey Island	Roseate Tern (*Sterna dougallii*) [A192]	Disturbance	ORE
4172	Dalkey Island	Common Tern (*Sterna hirundo*) [A193]	Disturbance	ORE
4172	Dalkey Island	Arctic Tern (*Sterna paradisaea*) [A194]	Disturbance	ORE

4 Natura Impact Statement

The proposed fishery for seed mussel could have the following ecological effects on marine habitats and species that are qualifying interests in SACs and SPAs in the Irish Sea and for which specific conservation objectives have been identified by NPWS.

- The seed mussel fishery, by using bottom dredges to fish for mussels, will cause physical abrasion to the sea bed.
- Mussel dredges do not penetrate the sediment so no shallow or deep disturbance of the sediment will occur. The disturbance is primarily at the surface.
- Seed mussel, which is a food source for a number of fish species, scavenging and predatory invertebrates and diving birds such as common scoter, will be removed.
- Non-target organisms, living in seed mussel beds, may be captured by the fishing gear. These include whelk, crab, starfish and flat fish.
- Vessels may cause disturbance to flocks of resting or foraging seabirds or cause disturbance to marine mammals.
- Seabird or mammal by-catch is highly unlikely.
- In summary, the main pressures likely to be exerted on the QIs are: abrasion (benthic habitats), competition for resources (birds), by-catch (benthic epifauna) and disturbance (birds, mammals).
- In addition to mussel dredging razor clam fishing occurs in close proximity to seed mussel fishing and may remove seed mussel as bycatch. This effect could work in combination with the seed mussel fishery to exacerbate prey removal for bivalve feeding birds and disturbance from fishing vessels.
- Other sectors present in the area include, shipping and aquaculture. In addition, offshore renewable energy is predicted to expand in the region throughout the course of the FNP (2023-2027). The main pressure exerted on QIs which could act in combination with the seed mussel fishery is disturbance on all bird QIs which could lead to exclusion from fishing grounds and increased energy expenditure due to continued flushing from an area.

5 Appropriate Assessment Methodology

5.1 Determining significance

- The significance of effects is determined in relation to the Conservation Objectives (COs) and targets for constituent habitats and species and guidance on these objectives and targets published by NPWS.
- A framework which accounts for the sensitivity of habitats and species to pressures from the fishery and with reference to the COs is used to assess risks and is summarised for habitats and species in sections 5.1.1 and 5.1.2 below. The framework is described in the following link:

  http://www.fishingnet.ie/sea-fisheriesinnaturaareas/proceduresandmethodology/

5.1.1 Habitats

- Habitats that are key contributors to biodiversity and which are sensitive to disturbance should be afforded a high degree of protection i.e. thresholds for impact on these habitats is low and any significant anthropogenic disturbance should be avoided.
- Significant disturbance of habitats is interpreted in this assessment as indicated in Figure 2. For broad sedimentary communities, significance of impact is determined in relation to spatial overlap, disturbance and the persistence of disturbance as follows:

  1. **Disturbance:** The degree to which the activity will disturb the QI (i.e. change the characterising species), as listed in the conservation objective guidance. The likelihood of change depends on the sensitivity of the characterising species to the fishery activities. Sensitivity results from a combination of resistance and resilience (recoverability) from the effects of the activity.
  2. **Persistence:** The persistence of the disturbance in relation to the sensitivity of the habitat. If the activities are persistent (high frequency, high intensity) and the receiving habitat has a low resistance to the activity (i.e. the characterising species of the habitats are impacted) and low resilience relative to the frequency of the activity then such habitats are said to be persistently disturbed.
  3. **Spatial Overlap**: The area of habitats or proportion of populations disturbed. In the case of habitats disturbance of less than 15% of the habitat area is deemed to be insignificant.

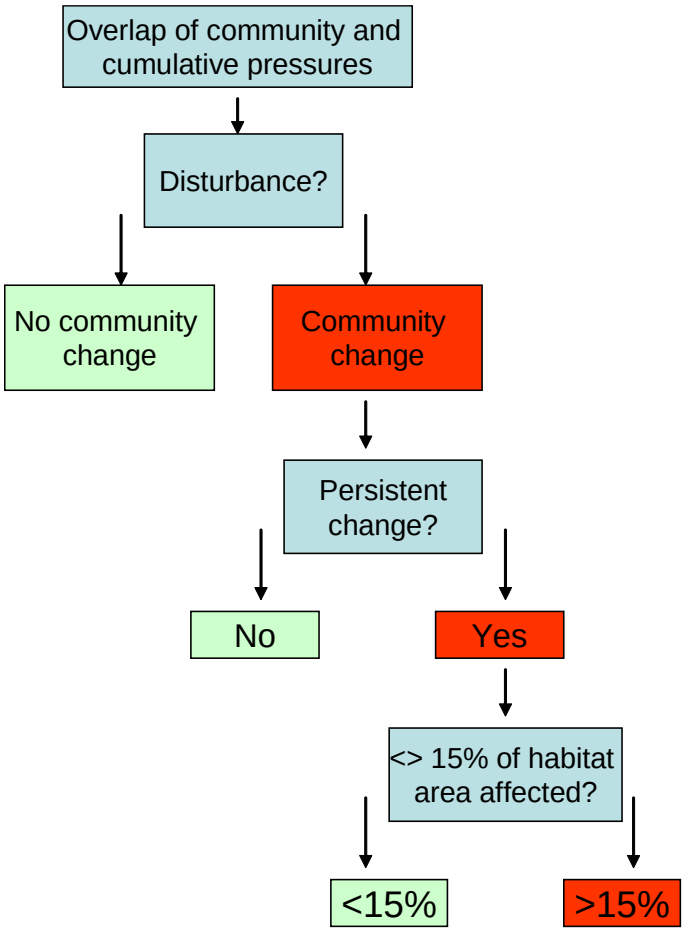

Figure 2. Determination of significant effects on benthic community distribution, structure and function (following NPWS 2011b).

5.1.2 Species

- In relation to designated species the sensitivity of the species and its populations to anthropogenic induced pressures at the site are taken into account in relation to the conservation objectives on a case by case basis.
- Consequence criteria for species includes information on population dynamics whether the population remains viable, the natural range of the species and how the fishery might impact it and where impacted if the habitat remains sufficiently large to maintain the population in the long term.
- In the case of species any population level effect is deemed to be significant.

6. Appropriate Assessment

6.1 Pressures of seed mussel fishery on qualifying interests within SACs

- Dredging for seed mussel causes physical abrasive pressure at the surface of the seabed. Sub-surface abrasion may occur to a limited degree but the mussel dredge is not toothed and is not designed to disturb sub-surface sediment. The target seed mussel bed forms a 'mat' over the sea bed which the dredge attempts to remove.
- Dredging may cause some changes in sediment composition by suspending sediment particles and causing downstream flow of fine material resulting in increased coarseness at the site of dredging.
- Dredging removes the mussel bed and exposes the underlying sediment.

6.2 Site by site assessment for habitat QI's and associated features

The full list of QI's and SACs included in this appropriate assessment is in Table 1.

6.2.1 Blackwater Bank (2953)

QI 1110 Sandbanks covered by seawater all the time

- Features of the Blackwater sand bank, identified in the COs, include clean sands which occur in shallow water on the open coast. The habitat is exposed to frequent natural disturbance from storms and wave exposure, typically lacks a significant seaweed component and is characterised by robust fauna, particularly amphipods (*Bathyporeia)* and polychaetes (*Nephtys cirrosa)* (habitat equivalent to EUNIS level 5.23). An area of cobble with serpulid polychaetes occurs on the south east corner of the site.
- The evidence base for assessment of impacts of seed mussel dredging on this habitat is described, with associated references, in ABPmer (2013) and summarised below.
- Species associated with sand sediments are predominantly infaunal and hence have some protection against surface disturbance. Macrobenthic communities from high-energy environments (characterised by clean sediments) tend to be less affected by fishing as they are subject to natural sediment disturbance. Nevertheless, in a moderately disturbed environment, fishing impacts on benthic community structure are distinguishable from those resulting from natural variation.

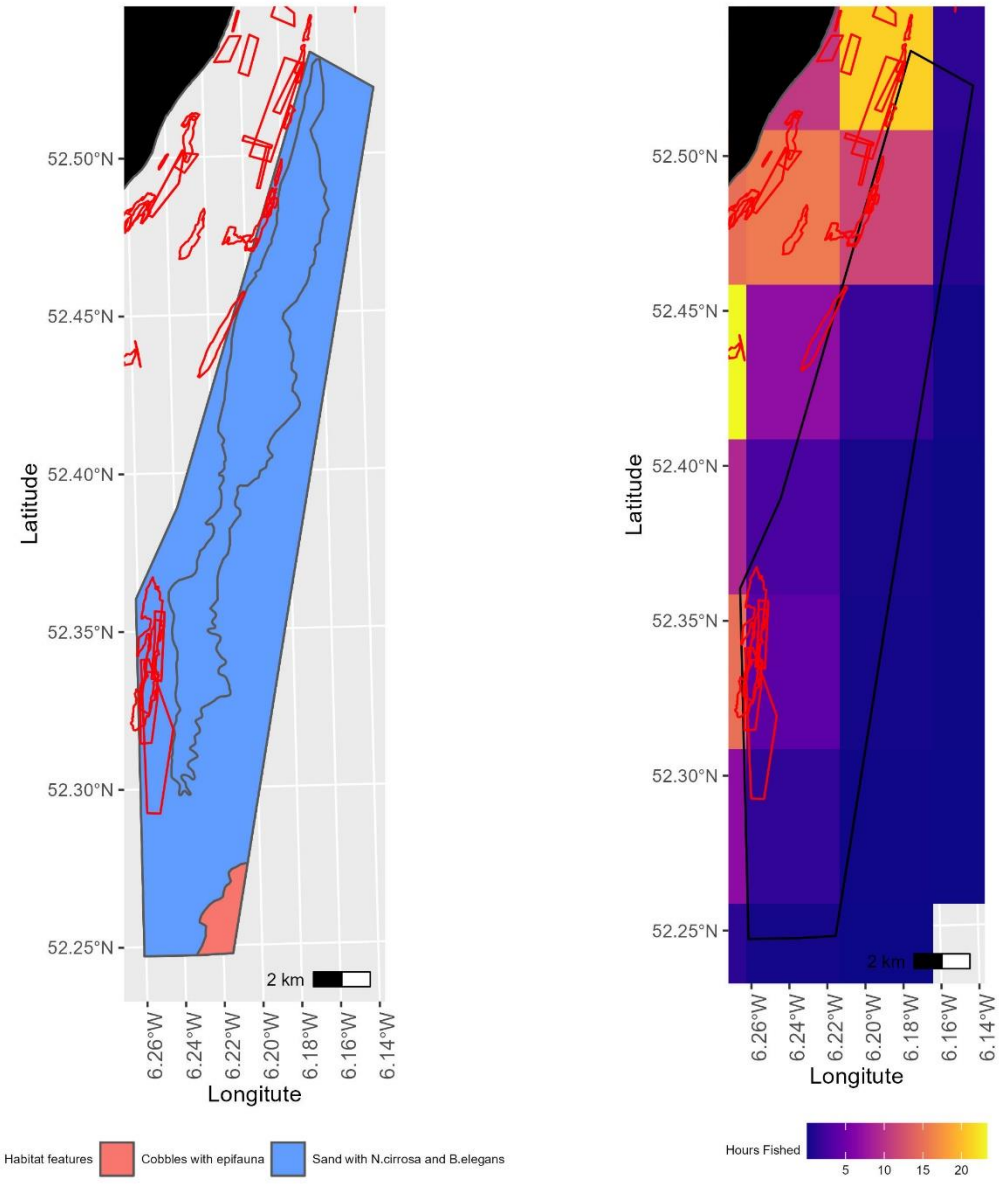

Figure 3 Blackwater Bank SAC habitat features (left) and VMS activity by seed mussel vessels between 2018-2021 (right). Historic seed mussel beds surveyed by BIM are included in red. The VMS presented here is an overestimate of the spatial footprint of the fishery due to the coarse resolution of the VMS data.

Sand with *Nephhtys cirrosa* and *Bathyporeia elegans* community complex

- The percentage spatial overlap of the proposed seed mussel fishery and this community has, historically, been 14%. This percentage is estimated from the overlap of the BIM surveys showing the spatial extent of seed mussel beds and the marine benthic community extents described in NPWS spatial data. Historic seed mussel beds are regularly present on the eastern and north eastern edges of the SAC (Figure 3). Review of the sensitivity of *N. cirrosa* and *B. elegans* to surface disturbance indicates they are not sensitive to this

pressure. *B. elegans* has low to medium sensitivity to increased sediment coarseness and *N. cirrosa* has low sensitivity to increased coarseness (ABPmer 2013).

- **A significant effect of the seed mussel fishery on the *Nephthys* and *Bathyporei*a community in the Blackwater Bank SAC can be discounted as the characterizing species are not sensitive to surface disturbance pressure.**

Cobble with Epifaunal community

- **The seed mussel fishery does not overlap with this community as it is unsuitable for dredging therefore the fishery will not have significant effects on this community.**

6.2.2 Long Bank (2161)

QI 1110 Sandbanks covered by seawater all the time

- Features of the Long Bank sand bank in the south Irish Sea include clean sands which occur in shallow water on the open coast similar to that described above for the Blackwater Bank.

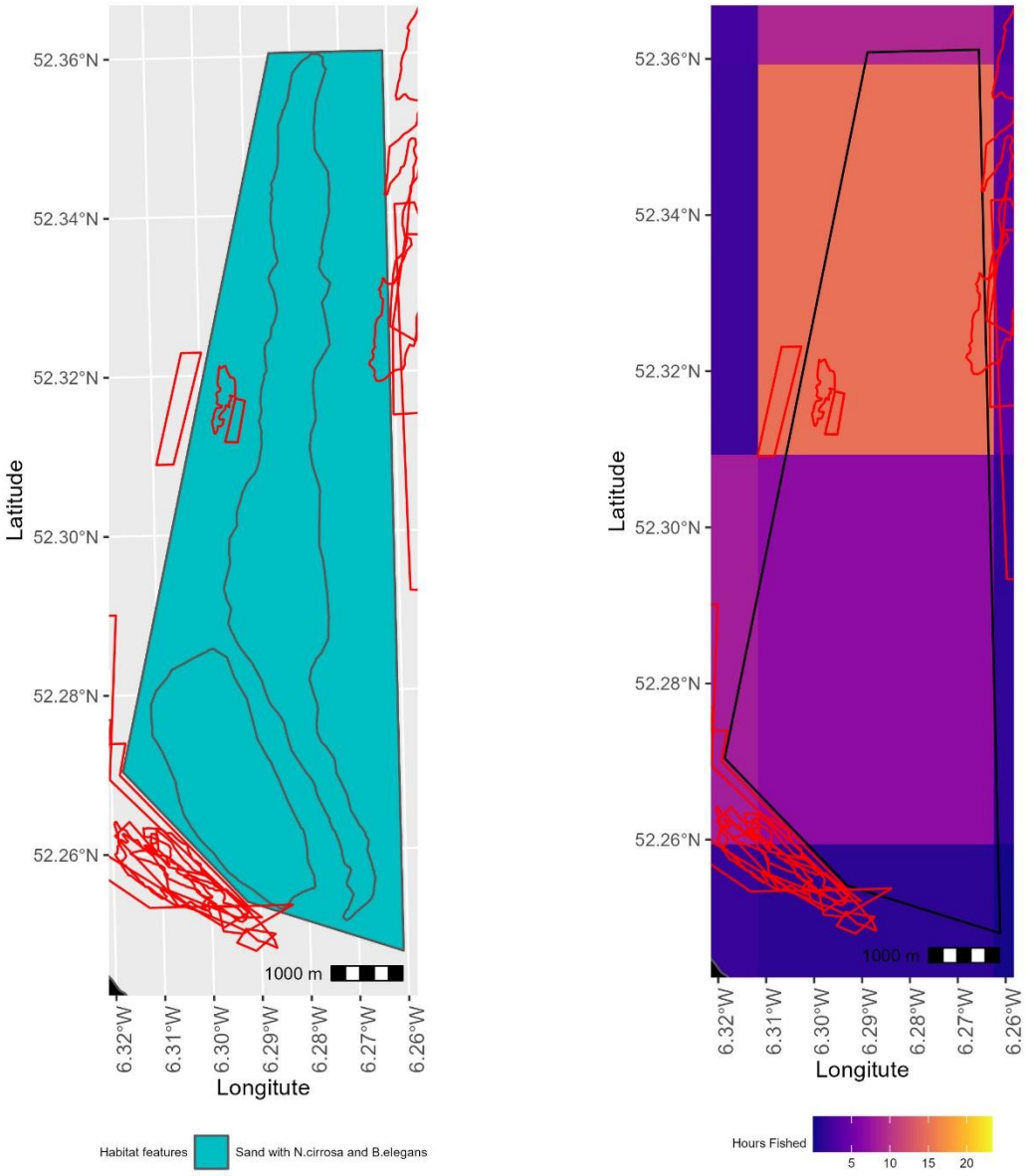

Figure 4 Long Bank SAC habitat features (left) and combined VMS hours fished between 2018 and 2021 (right). Historic seed mussel beds surveyed by BIM are included in red. The VMS presented here is an overestimate of the spatial footprint of the fishery due to the coarse resolution of the VMS system.

Sand with *Nephhtys cirrosa* and *Bathyporeia elegans* community complex

- Although the proposed fishery occurs within the SAC it has no spatial overlap with the sandbank habitat. The BIM survey polygons show concentrations of survey effort on either

side of the sand bank, reflecting presumably the pattern of seed mussel settlement (Figure 4).

- Review of the sensitivity of *N. cirrosa* and *B. elegans* to surface disturbance indicates they are not sensitive to this pressure. *B. elegans* has low to medium sensitivity to increased sediment coarseness and *N. cirrosa* has low sensitivity to increased coarseness.
- **A significant effect of the fishery on the *Nephthys* and *Bathyporeia* community in the Long Bank SAC can be discounted as characterizing species of the sand bank and surrounding habitats are not sensitive to surface disturbance. In addition, there is minimal spatial overlap between the sandbank and the fishery.**

6.3 Appropriate assessment for SAC Annex 2 species

Following from the description of the seed mussel fishery in the Fishery Natura Plan and in the screening assessment it is clear that fishing for mussels will be limited to areas east of Wexford and north to but excluding Wicklow Head SAC. No activity is envisaged north of Wicklow given the current preclusions in Fishery Natura Declarations (FND) 3/2018 and 2/2019 and given the recent history of distribution of fishing for mussels in the Irish Sea.

In situ effects of fishing for mussels on harbour porpoise (at Rockabill to Dalkey SAC), grey seal and harbour seal (at Lambay Island SAC) can, therefore, be discounted.

Harbour porpoise, grey seal and to a lesser extent harbour seal occur in open water in the south Irish Sea (Berrow *et al*. 2011)

Possible ex situ effects on harbour porpoise and seal are by-catch and disturbance.

- There is no risk of by-catch of porpoise or seals in seed mussel dredges. Dredges have a mouth area of approximately 2-4m in length and less than 1m high and these species are not likely to interact with this gear. Grey seal interact with bottom trawls and set nets to depredate fish but dredges do not catch fish. Harbour seals do not generally attend at fishing vessels.
- The fishery is restricted to 70 days per year and occurs in very limited areas of the south Irish Sea relative to the area of habitat available for seal and harbour porpoise. There are no seal haul out sites in proximity to the main fishing areas. There is no evidence of significant concentrations of harbour porpoise in shallow water of the south Irish Sea in proximity to the mussel fishery (Berrow *et al*. 2011, Rogan et al. 2018).
- **The possibility of the seed mussel fishery causing significant impacts to harbour porpoise, grey seal and harbour seal can be discounted.**

6.4 Appropriate assessment for Special Conservation Interests (SCIs) in SPAs

- Pressures and SCIs (bird species) that could not be screened out are in Table 2. Pressures include prey removal and disturbance. Potential effects of prey removal are limited to common scoter.
- Seed mussel fishing activity that occurs outside of SPAs may also affect birds that utilize or are designated in other SACs or SPAs or utilize habitats outside of these sites (ex situ effects). Both in situ and ex situ effects are therefore considered.

6.4.1 Appropriate assessment of competition for food resource (prey removal); Common Scoter

- Aerial seabird surveys carried out between 2014 and 2020 show that common scoter are distributed within and in proximity to Dundalk Bay SPA and the Raven SPA during winter months.
- Common scoter are the only species which feeds on mussels and other bivalves and which are present in the north and south Irish Sea where they are a listed species in the Dundalk SPA and Raven SPA but occur more broadly in the western Irish Sea particularly in waters south of Dundalk Bay towards Skerries (Figure 5).
- Optimal foraging conditions and suitable foraging habitat for common scoter are shallow waters (ideally less than 20m but with scope to dive to 30m) with a low water column current speed (Breen *et al*. 2022) of less than 0.6 m/s (Kaiser *et al*. 2006).
- The waters within and surrounding The Raven SPA (Figure 6) have a depth suitable for common scoter foraging and also water column current speeds of less than 0.6 m/s for greater than 50% of the time. The sightings of scoter from aerial surveys show they are present within The Raven SPA and surrounding areas.
- Seed mussel beds and fishing have historically been present in and especially to the north of the Raven SPA where foraging conditions are highly suitable.
- Mussel makes up a large portion (60%) of the common scoter diet (Durinck et al. 1993) e.g. common scoter in the North Sea are ‘mussel specialists’.
- **The possibility of effects of removal of mussel from waters surrounding the Raven SPA on common scoter cannot be discounted and any future fishing within and surrounding the Raven SPA should be managed to avoid significant effects on this species. Mitigation options are outlined in Section 8.**
- **Given the high abundance of Common Scoter in shallow waters of the north west Irish Sea from Dundalk Bay SPA south to Skerries fishing for mussels in sub-tidal waters of this area should be prohibited until a new FNP is developed and assessed and which shows how the potential effects of common scoter could be mitigated. Although there is no history of significant fishing for mussels in the area the current FNP allows for it.**

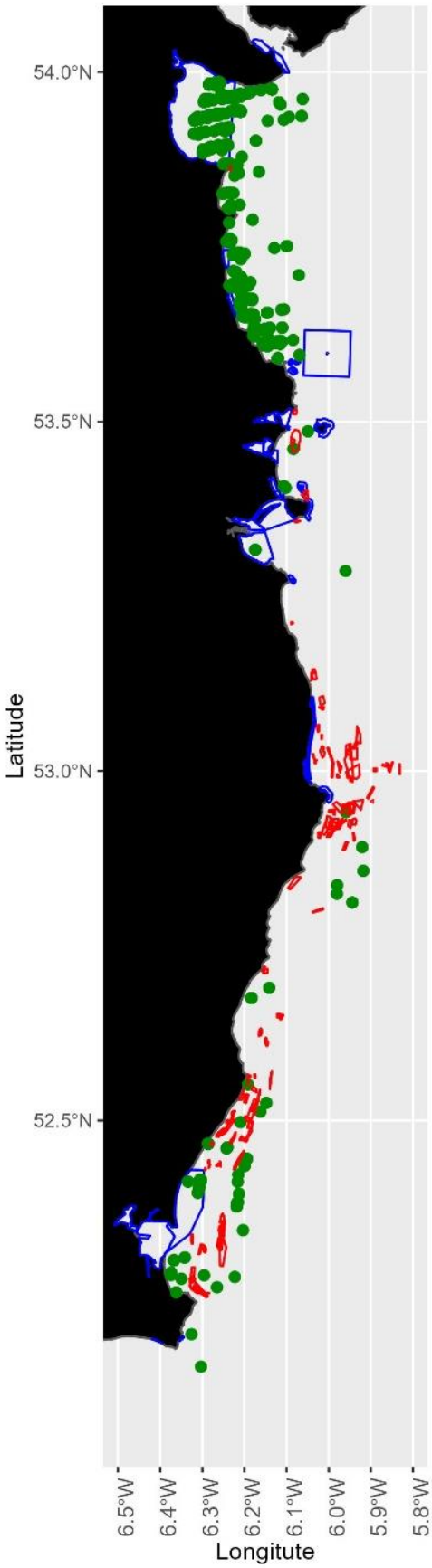

Figure 5 Location of sightings of Common Scoter (green dots) from MI aerial surveys (Mar&Dec 2014, Dec 2018, Jan-Mar 2019 and Nov 2020) in relation to SPAs (blue) and historic BIM seed mussel surveys (red).

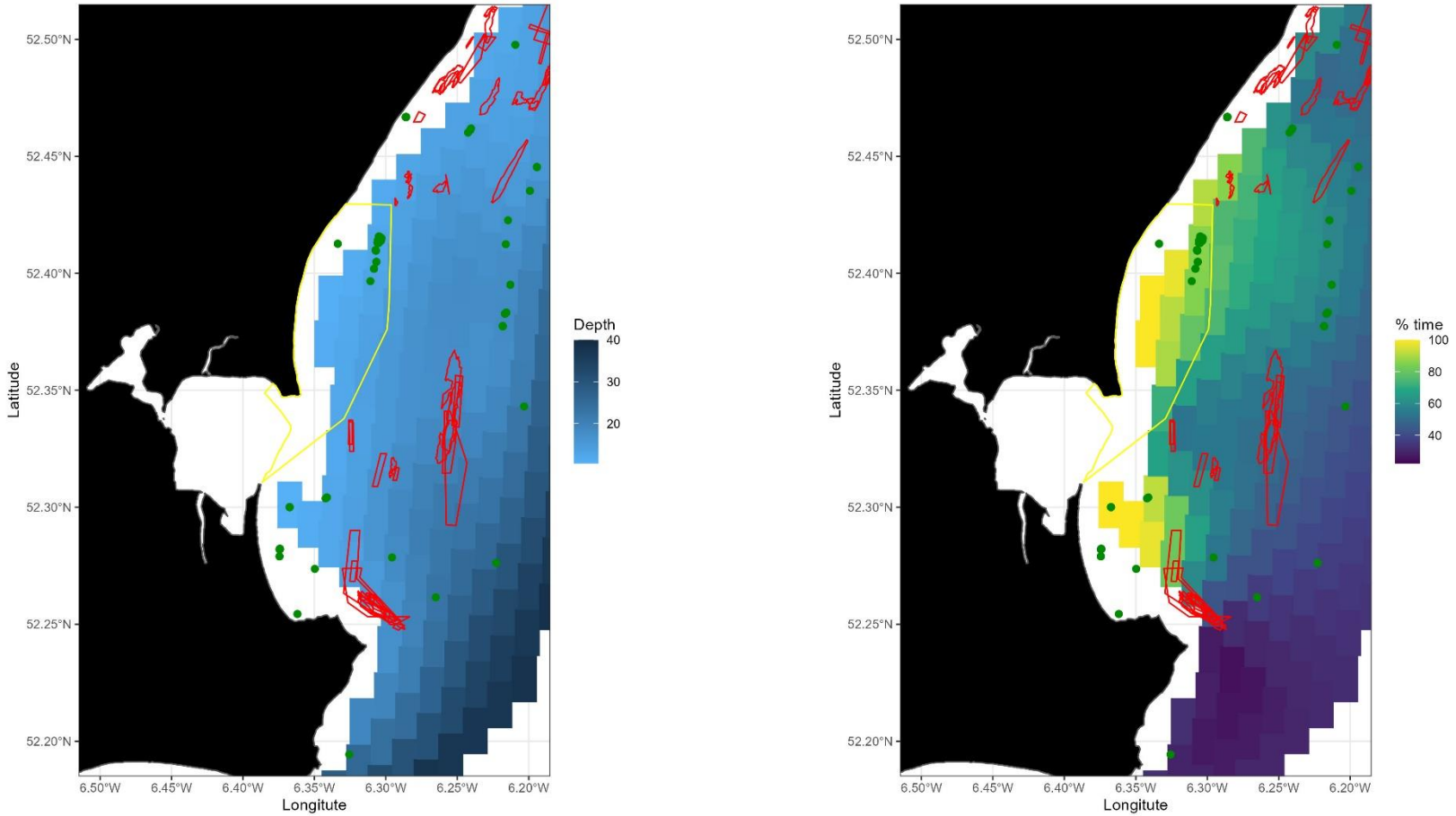

Figure 6 Depth (left) and percentage of time area has a surface current speed less than 0.6 m/s (right) within and around the boundary of The Raven SPA (yellow outline). Green dots represent common scoter sightings during MI aerial surveys and red polygons represent historic BIM seed mussel surveyed sites.

6.4.2 Appropriate assessment for disturbance effects

- The dredging of seed mussel and disturbance associated with this activity may reduce the quality of habitat and its suitability for birds leading to changes in the distribution, abundance and conservation status.
- Initial assessment is based on those species which forage inshore versus offshore. Species which are likely to prefer inshore coastal waters are not likely to be disturbed by the offshore dredging. Those species are: great crested grebe, red-breasted merganser and goldeneye.
- Of the offshore foraging species auks and common scoter have high disturbance responses to vessel activity. All gulls species and fulmar have low disturbance responses (Fliessbach et al. 2019).
- However, since the activity of the seed mussel vessels are limited both temporally and spatially significant disturbance leading to displacement from preferred habitat is unlikely. The mussel fishery occurs in autumn while common scoter overwinter in the western Irish Sea so temporal overlap between the fishery and overwintering populations is likely to be low.
- **Significant effects of disturbance from the seed mussel fishery on SCI species can be discounted.**

7 In combination effects

In combination effects of removal of prey for common scoter by the seed mussel fishery and the razor clam fishery in the south Irish Sea were retained for appropriate assessment. Possible disturbance effects of future ORE development in combination with fisheries were also retained for appropriate assessment.

7.1 Razor clam fishing

- Dredging for razor clams in the south Irish Sea is external to the Blackwater Bank SAC and Long Bank SACs. Therefore, there are no in combination effects with the seed mussel fishery in these sites.
- Dredging for razor clams occurs in The Raven SPA and Dundalk Bay SPA. Breen *et al.* (2022) found no evidence of prey competition between the razor clam fishery and common scoter in the north Irish Sea as the deep burrowing bivalves targeted by the razor clam fishery are not available prey species for common scoter. The absence of effects of the razor clam fishery assumed, therefore, that the common scoter in the north Irish Sea preyed on surficial bivalves which were not significantly affected by razor clam fishing. There are no extensive regularly occurring sub-tidal mussel beds in the Dundalk Bay SPA although mussel beds do occur in lower intertidal habitats at Duneany point on the south east shore of the Bay. In the Raven SPA and surrounding waters razor clam and seed mussel fisheries are both present. Although the razor clam fishery does not target mussels fishing for razor clams in areas where mussel occur would remove or significantly affect the mussel beds. The same applies to other bottom towed fishing gears such as trawls. Significant in combination effects of the razor fishery and mussel fishery to reduce mussel availability to scoter, cannot be discounted.
- **Mitigation options for in-combination effects of mussel and razor clam fishing are outlined in Section 8.**

7.2 Offshore Renewable Energy Developments (ORE)

- The data available on the eventual distribution of ORE within the Irish Sea is still not final. Polygons for proposed windfarm areas, cables and foreshore licenses are large and not representative of the actual eventual distribution of ORE.

- The likelihood of significant disturbance effects of ORE construction and operations on seabirds in the Irish Sea has not been assessed.
- The appropriate assessment (Section 5.4.2) concluded that as the number of vessels and fishing days in the seed mussel fishery was low the likelihood of significant disturbance effects could be discounted.
- **As significant effects of disturbance from the seed mussel fishery are discounted, significant in combination effects with the ORE can also be discounted.**

8 Mitigation

8.1 Introduction

Section 6.4.1 and section 7.1 outlined the reasons behind the need for mitigation in areas of suitable foraging habitat for common scoter. The main reason is to retain the availability of mussel as a prey resource for common scoter which would otherwise be removed by the seed mussel fishery and indirectly by the razor clam fishery which would reduce habitat quality and potentially lead to displacement of common scoter with significant population level effects.

There are two main options for mitigation in the present context; either catch/effort restrictions or spatial restrictions. Effort or catch restrictions are operationally a less suitable mitigation in the present case. Suitable foraging habitat for common scoter is restricted to <20m depth and where currents are <0.6m/s so effective catch or effort mitigation would need to occur within that area. Fishing in this area would potentially remove or significantly deplete seed mussel beds even with effort or catch limits within the area and would require in any case very high resolution real time spatial monitoring of fishing activity against detailed information on mussel distribution and biomass to ensure effective mitigation. Therefore, spatial mitigation or closure of a given area, within which there is no fishing, is more appropriate to ensure that adequate prey remains in suitable locations to support the overwintering population of common scoter in the south Irish Sea.

Previous assessment (2018; FishingNET - Irish Sea - including Mussel Seed Fishery) of the seed mussel fishery natura plan 2018-2022 already made recommendations to further understand the potential interactions of bivalve fisheries and common scoter in the south Irish Sea. These were

- that additional information on the distribution of common scoter should be collected.
- the fishing for mussel seed in the Raven SPA and Dundalk Bay SPA should be reviewed in light of new information on common scoter distribution
- in combination effects of bivalve fisheries in the south Irish Sea on common scoter should be further investigated

The current assessment provides further analysis and recommendations for mitigation based on new data that has been obtained since the 2018 assessment.

8.2 Methods

Developing options for spatial mitigation involved the followed steps:

1. Data on suitable foraging habitat i.e. depth of less that 20m and the percentage of time that average current speed was less than 0.6 m/s in depths of less than 20m were mapped (Figure 6). Both variables were scored or indexed between 0 and 5 with higher values representing increasingly suitable physical foraging habitat for common scoter (Table 3). Current speed was taken from MI modelled data.
2. A physical habitat suitability index was then generated by multiplying the indices (Table 3; Figure 7). This provided index values of 0-25 representing increasingly suitable physical foraging habitat for common scoter.
3. Optimum foraging conditions within physical foraging habitat, defined on the basis of depth and current, will occur when suitable bivalve prey resources are available within the physically suitable habitat. The presence of mussel beds in this physically suitable habitat potentially provides optimum foraging conditions. Although common scoter also feed on other bivalves many deep burrowing bivalves are unavailable as prey to scoter. Some bivalves occur in surficial sediments and are likely to be available to scoter. Mussel, as they occur on the seafloor, are likely to provide optimal foraging conditions within suitable physical foraging habitat and reduce the energetic demands of foraging compared to foraging on infaunal bivalves for instance. As referenced above mussel can make up a large portion (60%) of the common scoter diet to the extent that they can become 'mussel specialists'(Durinck et al. 1993).
4. Three polygons were created which enclosed different areas of physically suitable habitat and which also contained mussel beds (as shown from BIM surveys). The cut off index values used to define these different levels of physically suitable habitat, in areas with seed mussel, were greater than 0, greater than 5 and greater than 12 (Table 3). These areas were called 'all suitable', 'very suitable' and 'most suitable' habitat respectively (Figure 8).
5. In order to estimate the minimum level of mitigation by which significant effects of mussel removal by the fishery, on common scoter, could be discounted the seasonal foraging requirements of common scoter were estimated.

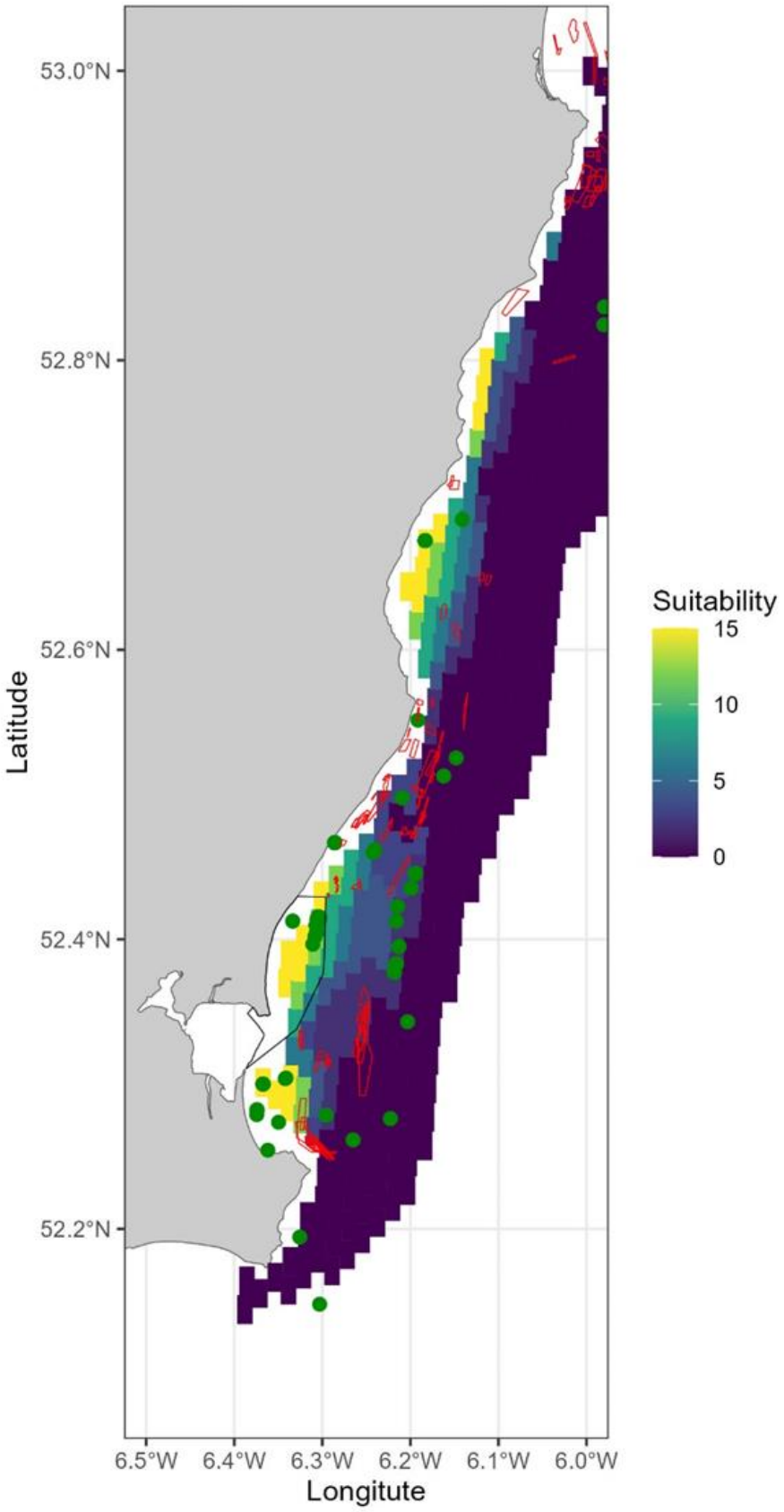

Figure 7 Foraging habitat suitability index for common scoter in the south Irish Sea. The Raven SPA is outlined Red polygons are BIM seed mussel surveys. Green dots are common scoter sightings from aerial surveys.

Table 3 Depth, current speed and final habitat suitability index scores. Blue= not suitable. All cells greater than 0 = all suitable (yellow, orange and green) all cells >5 = very suitable (yellow and orange) all cells > 12 = most suitable (yellow).

		% time current speed is <0.6m/s					
		90-100	80-90	70-80	60-70	50-60	<50
Depth range (m)	Score	5	4	3	2	1	0
0-5	5	25	20	15	10	5	0
5-10	4	20	16	12	8	4	0
10-15	3	15	12	9	6	3	0
15-20	2	10	8	6	4	2	0
>20	0	0	0	0	0	0	0

8.3 Mitigation options

Individual common scoter consumes approximately 690g live weight of bivalves per day (Kaiser *et al*. 2002). This is an approximate number which does not account for the energetics required to search for prey which will vary by bird, season, habitat suitability and prey density among other factors however, it is considered a useful baseline in the absence of a more sophisticated energetics model.

Aerial surveys conducted by the Marine Institute over a number of years provide estimates of population abundance of common scoter in the region from Rosslare north to the Wicklow coast to be approximately 5000 individual birds (MI internal report). Common scoter are present in the south Irish Sea mainly from the beginning of December to the end of February or 90 days in total. The total potential consumption of bivalves during these months by common scoter is therefore 310.5 tonnes. To successfully forage and consume this biomass significantly higher biomass of mussel would need to be available as energetically it would not be possible to forage for a depleting resource as the foraging season progressed. As a precaution, therefore, any mitigation should ensure that multiples of this biomass is retained for common scoter consumption.

Three potential levels of mitigation (spatial closure) in relation to common scoter foraging requirements were explored (Figure 8). These enclose all suitable, very suitable and most suitable physical habitat, as defined above, and represent increasingly less restrictive fishing options by homing in on most suitable physical habitat in which there is also sufficient mussel biomass for overwintering common scoter and which could, therefore, be regarded as

optimum foraging areas both physically and biologically. The biomass of mussel, from BIM surveys within each of the mitigation areas was estimated based, pro-rata, on the proportion of the survey area that was within each of the mitigation areas. This analysis showed that the 'all suitable' option had seed mussel present in all three years. The 'all suitable' and 'very suitable' options were very similar in 2021 and 2022. The 'most suitable' option significantly exceeded the seed mussel 310.5 tonnes foraging requirement in both 2021 and 2022 (Table 4). BIM survey data suggest that mussel settlement in this area is reasonably persistent over time.

Although there is suitable physical foraging habitat within the Raven SPA and common scoter area a qualifying interest in the site there is, as yet, no evidence from BIM surveys that there are any seed mussel beds in the site. Most of these mussel beds are to the north of the site in suitable physical habitat for common scoter or to the east of the site where the physical habitat is less suitable for common scoter. This assessment, therefore, has prioritized mitigations for common scoter to suitable physical and biological foraging habitat to the north of the Raven SPA.

As the mitigation level enclosing what is defined here as physically the most suitable foraging habitat (right hand panel in Figure 8) is also generally likely to contain sufficient mussel biomass to support overwintering common scoter this level of mitigation is likely to be sufficient to avoid potentially significant effects of the fishery on common scoter. This mitigation is likely to be sufficient if mussels are persistently present within the proposed closed area. If that is not the case the closed area may need to be reviewed periodically based on mussel survey data.

Table 4 Annual analysis of the overlap of proposed closed areas and biomass of seed mussel for three closure options.

Scenario	Index value	Year	BIM seed mussel survey area within closure (km2)	Portion of BIM seed mussel survey overlap with closure	Mussel biomass within closure
All Suitable Habitat	0-25	2020	0.42	0.38	3588
All Suitable Habitat	0-25	2021	0.7	0.33	3270
All Suitable Habitat	0-25	2022	0.76	0.2	1671
Very Suitable Habitat	5-15	2020	0	0	0
Very Suitable Habitat	5-15	2021	0.62	0.29	3270
Very Suitable Habitat	5-15	2022	0.76	0.2	1671

Most Suitable Habitat	15-25	2020	0	0	0
Most Suitable Habitat	15-25	2021	0.46	0.22	3117
Most Suitable Habitat	15-25	2022	0.65	0.18	1441

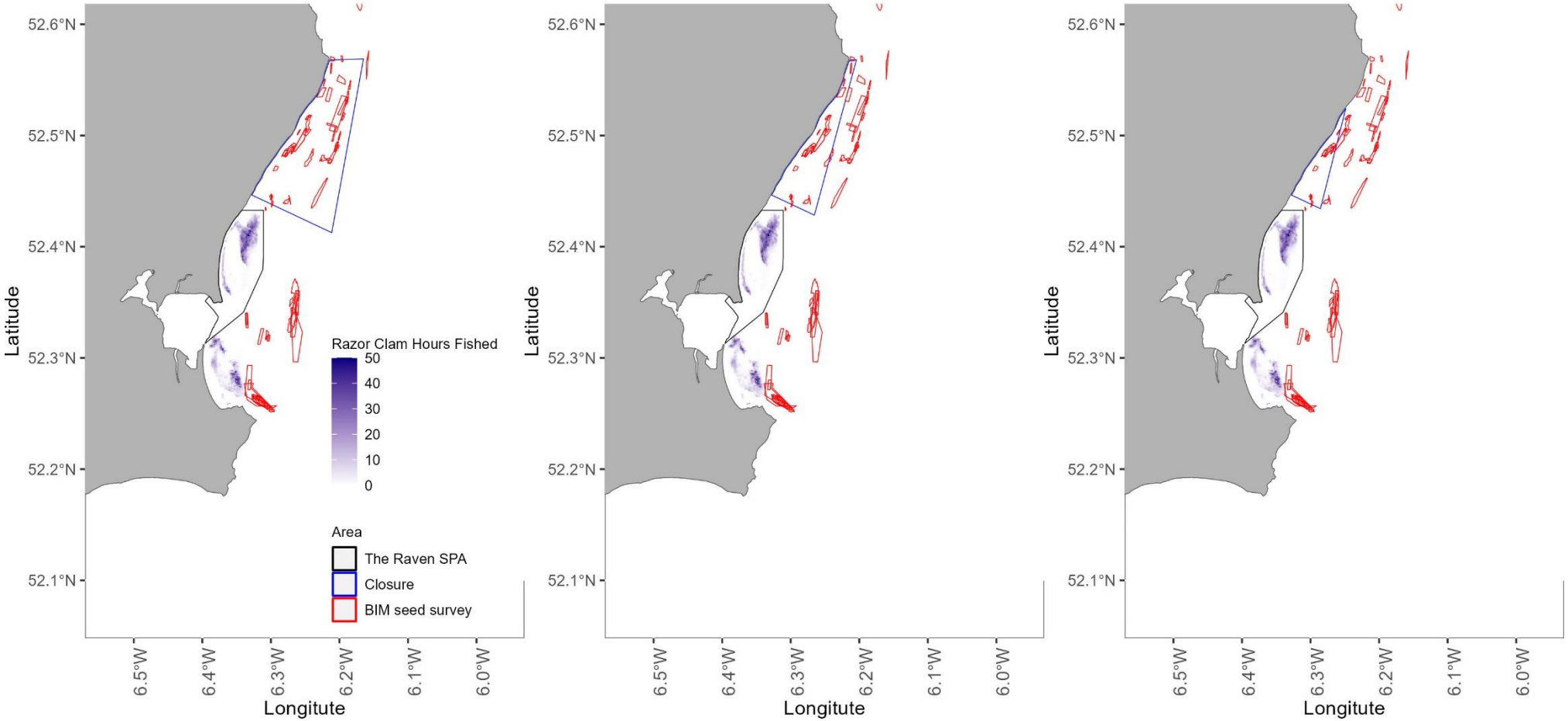

Figure 8 The three suggested mitigation options based on habitat suitability, presence of seed mussel beds and the feeding requirements of common scoter. Left all suitable option, middle, very suitable option and right the most suitable option.

9 Conclusion Statement and Recommendations

9.1 SAC qualifying interests

- The proposed seed mussel fishery, as described in the FNP for 2023-2027, may occur, as it has done in the past, in many different locations in the Irish Sea. Seed beds are usually associated with coarse, current swept, substrates in the south Irish Sea. When present, the beds are small and discrete in extent and distribution.
- Given the seed mussel survey data (1970-2022) and fisheries VMS data (2018-2021) the likelihood is that the majority of seed beds and seed mussel fisheries will occur in the south Irish Sea south of Dublin and outside of SACs. The exceptions are Blackwater Bank and Long Bank SACs where seed beds regularly occur.
- In the case of Blackwater Bank SAC and Long Bank SAC, although the seed beds and fisheries occur within the SAC boundaries, they do not occur on the designated habitat (Sandbank) or in the benthic community of the sandbank (*Nephthys, Bathyporeia*). The fishery occurs in deeper water on the sides of the banks. The benthic community of the sandbank is, in any case, not sensitive to physical disturbance pressures which could be caused by mussel dredging. Mussel dredging in these SACs poses no risk to the QIs in the sites.
- There is no anticipated disturbance from the seed mussel fishery on either Grey or Harbor Seals or Harbour Porpoise.
- **Recommendations:**
    - **The existing restrictions on mussel fishing in a number of SACs in the Irish Sea exclude the possibility of effects of fishing on these sites. These restrictions should remain in place.**

9.2 SPA qualifying interests.

- Common scoter survey data indicates that these birds are present in suitable foraging habitat in The Raven SPA and Dundalk Bay SPA and in waters surrounding these sites. In particular, high numbers of common scoter occur south of Dundalk Bay SPA in shallow waters south to Skerries. Significant effects of removal of seed mussel on common scoter in any of these areas cannot be discounted.
- There is low risk of by-catch of birds within the seed mussel fishery. Significant effects can be discounted.

- Disturbance may particularly affect common scoter. However due to the limited spatial and temporal distribution of fishing population level effects on common scoter can be discounted.
- In combination effects of fishing for razor clams and mussels in the same areas, such as in the Raven SPA and surrounding waters, cannot be discounted.
- **Recommendations:**
    - **Closure of an area of highly suitable habitat for common scoter north of the Raven SPA to all towed bottom fishing gears and within which there is also generally sufficient mussel biomass is recommended in order to protect prey resources for overwintering common scoter.**
    - **Closure of larger areas that encompass more of this habitat are also described. Given current information, these larger closures are likely to be unnecessary to protect the overwintering population of common scoter.**
    - **The proposed mitigation is likely to be sufficient if there is persistent presence of mussel beds in the proposed closed area. If that is not the case the closed areas may need to reviewed periodically based on mussel survey data.**
    - **Suitable common scoter sub-tidal foraging habitat occurs in and surrounding Dundalk SPA and particularly south of Dundalk Bay. Fishing for seed mussel generally does not occur in Dundalk Bay SPA or in waters south of this. However, as the fishery natura plan does not explicitly exclude the possible development of a mussel fishery in this area and because there is a risk of significant effects on foraging habitat for common scoter any fishing for seed mussel in Dundalk Bay SPA or in waters south to Skerries seed mussel fishing should be prohibited in this area until a new FNP is proposed and assessed. There is insufficient information in the current FNP to conduct an assessment for this area.**

9.3 In combination effects

- Razor clam fishing has the potential to remove seed mussel from the seabed including in the Raven SPA. The possibility of in-combination effects of fishing for razor clam and mussel, therefore, cannot be discounted.
- We can discount significant effects working in combination with ORE.
- **Recommendations:**

- **The razor clam fleet currently fish within the boundary of The Raven SPA. There is no evidence that seed mussel occurs within The Raven SPA. However, this area should be surveyed for seed mussel annually to assess the possible impact of the razor clam fishing fleet on common scoter. If seed mussel regularly occurs within the Raven SPA the area of mitigation proposed in this assessment should be reviewed.**
- **When sufficient data becomes available on ORE distribution, activity and the effects of disturbance from ORE on seabirds, in combination effects with all fishing practices should be reconsidered.**

10 References

Berrow, S., O'Brien, J , Ryan, C., McKeogh, E and O'Connor, I (2011). Inshore boat-based surveys for cetaceans: Irish Sea. Report to the National Parks and Wildlife Service. Irish Whale and Dolphin Group. pp.24.

ABPmer (2013) Sublittoral Fine Sand Community Complex. A report to the Marine Institute.28pp

Breen P, Clarke S, Tully O (2022) Modelling essential habitat for common scoter (Melanitta nigra) in a disturbed environment. Estuarine, Coastal and Shelf Science 276:108007.

Cramp S, Simmons KEL (2004) BWPi: birds of the western palearctic interactive (DVD-ROM). BirdGuides Ltd, Sheffield.

Durinck J, Christensen KD, Skov H, Danielsen F (1993) Diet of the common scoter Melanitta nigra and velvet scoter Melanitta fusca wintering in the North Sea. Ornis Fennica 70:215–218.

Fliessbach KL, Borkenhagen K, Guse N, Markones N, Schwemmer P, Garthe S (2019) A ship traffic disturbance vulnerability index for Northwest European seabirds as a tool for marine spatial planning. Frontiers in Marine Science 6:192.

Kaiser M.J (2002) Predicting the displacement of common scoter Melanitta nigra from benthic feeing areas due to offshore windfarms. Cowrie - Ben - 03 - 2002.

Kaiser MJ, Galanidi M, Showler DA, Elliott AJ, Caldow RWG, Rees EIS, Stillman RA, Sutherland WJ (2006) Distribution and behaviour of Common Scoter Melanitta nigra relative to prey resources and environmental parameters. Ibis 148:110–128.

Rogan, E., Breen, P., Mackey, M., Cañadas, A., Scheidat, M., Geelhoed, S. & Jessopp, M. (2018). Aerial surveys of cetaceans and seabirds in Irish waters: Occurrence, distribution and abundance in 2015-2017. Department of Communications, Climate Action & Environment and National Parks and Wildlife Service (NPWS), Department of Culture, Heritage and the Gaeltacht, Dublin, Ireland. 297pp

SNH (2011) Habitats Regulations Assessment of the Draft Plan for Offshore Wind Energy in Scottish Territorial Waters: Appropriate Assessment Information Review.