

# REPORT

## **Millport Coastal Flood Protection Scheme: Environmental Statement**

### Chapter 9 Fish and Shellfish Resource

Client: North Ayrshire Council

Reference: PB4749-RHD-ZZ-XX-RP-Z-0009

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## Acronyms

Acronym	Acronym description
CIA	Cumulative Impact Assessment
EIA	Environmental Impact Assessment
ES	Environmental Statement

## Glossary

### Glossary Term

### Glossary Text

#### **Environmental Impact Assessment (EIA)**

A statutory process by which certain planned projects must be assessed before a formal decision to proceed can be made. It involves the collection and consideration of environmental information, which fulfils the assessment requirements of the EIA Directive and EIA Regulations, including the publication of an Environmental Statement.

#### **Environmental Statement (ES)**

A document reporting the findings of the EIA and produced in accordance with the EIA Directive as transposed into UK law by the EIA Regulations.

#### **Millport Coastal Flood Protection Scheme**

The scheme consists of offshore rock armour structures which will be built in the vicinity of the rock islets within Millport Bay. Onshore works will include flood walls, improvement works to existing coast protection structures, and works to raise the level of existing grass areas. Works on the foreshore include shore-connected rock armour breakwaters and rock armour revetments.

## 9 Fish and Shellfish Resource

### 9.1 Introduction

1. This chapter of the Environmental Statement (ES) considers the potential impacts of the proposed Millport Coastal Flood Protection Scheme (the proposed scheme) on Fish and Shellfish Resource.
2. This chapter provides a summary description of key aspects relating to existing fish and shellfish resource followed by consideration of the effects upon the baseline conditions resulting from the construction, operation and decommissioning of the Proposed Scheme. The potential effects on fish and shellfish resource are assessed conservatively using realistic worst-case scenarios for the proposed scheme.
3. All figures referred to in this chapter are provided in Volume II of this ES.
4. The assessment of potential effects has been made with specific reference to Scotland's National Planning Framework and Planning Policy. These are discussed further in **Chapter 2 Policy and Legislation** and outlined below in Section 9.2. These are the principal decision-making documents for flood protection schemes.
5. This chapter has been prepared by Royal HaskoningDHV in accordance with the relevant legislation and policies, adhering to the methodology for Environmental Impact Assessment (EIA) and Cumulative Impact Assessment (CIA) as discussed in Section 9.4
6. Due to the close association between fish and shellfish resource and other marine receptors, this chapter should be read in conjunction with **Chapter 6 Marine Geology, Oceanography and Physical Processes, Chapter 7 Marine Water and Sediment Quality, Chapter 8 Benthic Ecology and Chapter 12 Commercial Fisheries.**

### 9.2 Policy, Legislation and Guidance

7. There are a number of pieces of legislation applicable to fish and shellfish resource. The following key pieces of International and UK legislation which are relevant to this chapter. Further details are provided in **Chapter 2 Policy and Legislation** on the following legislation.

#### 9.2.1 Legislation

8. For fish and shellfish ecology the relevant legislation is as follows:
9. International:
  - Habitats Directive Council (Directive 92/43/EEC) and other associated habitat regulations;
  - Birds Directive (Directive 2009/147/EC);
  - Ramsar Convention of Wetlands of International Importance;
  - Water Framework Directive (WFD) (EU Directive 2000/60/EC);
  - Marine Strategy Framework Directive (MSFD); and
  - The Convention for the Protection of the Marine Environment of the North-East Atlantic (the OSPAR Convention 1992).

## 10. National:

- Wildlife and Countryside Act 1981 (as amended) (includes amendments made via the Wildlife and Natural Environment (Scotland) Act 2011);
- Marine and Coastal Access Act 2009;
- Nature Conservation (Scotland) Act 2004;
- Conservation (Natural Habitats, &c.) Regulations 1994 (as amended);
- Marine (Scotland) Act 2010; and
- Water Environment and Water Services (Scotland) Act 2003.

**9.2.1.1 Planning Policy**

## 11. For fish and shellfish resource the following planning policies are relevant:

National Planning Framework

12. Scotland's third National Planning Framework (NPF) (Scottish Government, 2014a) includes the following ambitions relevant to the marine environment at Millport, and these have been considered when undertaking the EIA for the proposed scheme:
13. *Para 4.10 The 2020 Challenge for Scotland's Biodiversity aims to promote and enhance Scotland's nature, and to better connect people with the natural world. Maintaining our natural capacity to provide services makes economic sense – to help achieve this, biodiversity in Scotland needs to be viewed at a landscape scale; and*
14. *The coast and islands will capitalise on their world-class environment.*
15. *Para 4.29 The environment of our coastal areas, on land and at sea, is an outstanding, internationally important resource. These natural assets support quality of life and underpin important economic sectors like tourism, outdoor recreation and food and drink.*
16. *Para 4.30 The marine environment, and its natural resources, are central to this. National and Regional Marine Plans will provide policies to achieve sustainable development, protection and, where appropriate, enhancement of the marine area. Onshore, land management practices, including crofting in the north and west and on the islands, help to sustain unique cultural and natural environments.*
17. *Para 4.31 As climate change impacts on Scotland's coastline, there will be a need to address the long-term resilience of some island and coastal communities.*

Natural Environment White Paper 2011

18. The paper was the first White Paper produced by the government in 20 years. The paper contains plans to reconnect nature, connect people and nature for better quality of life and capture and improve the value of nature.

A Green Future: Our 25 Year Plan to Improve the Environment 2018

19. The plan sets out 10 goals and a range of high-level policies aimed at helping "the natural world regain and retain good health". The key policies within the plan relevant for this chapter are:
- Embedding an 'environmental net gain' principle for development, including housing and infrastructure;
  - Focusing on woodland to maximise its many benefits; and
  - Protecting and recovering nature (including improving biosecurity to protect and conserve nature).

#### Scottish Planning Policy

20. Scotland's Planning Policy (SPP) (Scottish Government, 2014b) contains the following Policy Principles with regards to Valuing the Natural Environment and these have been taken into consideration when undertaking the EIA for the proposed scheme:
21. *The planning system should:*
- *Facilitate positive change while maintaining and enhancing distinctive landscape character;*
  - *Conserve and enhance protected sites and species, taking account of the need to maintain healthy ecosystems and work with the natural processes which provide important services to communities;*
  - *Promote protection and improvement of the water environment, including rivers, lochs, estuaries, wetlands, coastal waters and groundwater, in a sustainable and co-ordinated way;*
  - *Seek benefits for biodiversity from new development where possible, including the restoration of degraded habitats and the avoidance of further fragmentation or isolation of habitats; and*
  - *Support opportunities for enjoying and learning about the natural environment.*
  - *The planning system should support an integrated approach to coastal planning to ensure that development plans and regional marine plans are complementary.*

#### Planning Advice Notes (PANS)

22. *Planning Advice Note (PAN) 1/2013: Environmental Impact Assessment* explains the role of individual planning authorities and that of the Consultation Bodies in EIA, as well as providing guidance on the ways in which EIA can be integrated into the overall development management process.
23. *PAN 60: Planning for Natural Heritage* provides advice on how development and the planning system can contribute to the conservation, enhancement, enjoyment and understanding of Scotland's natural environment and encourages developers and planning authorities to be positive and creative in addressing natural heritage issues. It complements the National Planning Policy Guideline on Natural Heritage (NPPG 14), with examples of good planning practice in relation to natural heritage drawn from across Scotland highlighted in a number of case studies.

#### National Planning Policy Guidelines (NPPG)

24. *National Planning Policy Guideline (NPPG) 14: Natural Heritage* gives guidance on how the Government's policies for the conservation and enhancement of Scotland's natural heritage should be reflected in land use planning. In this context, Scotland's natural heritage includes its plants and animals, its landforms and geology, and its natural beauty and amenity. Natural heritage embraces the combination and interrelationship of landform, habitat, wildlife and landscape and their capacity to provide enjoyment and inspiration. It therefore encompasses both physical attributes and aesthetic values and, given the long interaction between human communities and the land in Scotland, has important cultural and economic dimensions.

#### Scotland's National Marine Plan: A Single Framework for Managing Our Seas

25. This Plan was published in 2015 and provides a comprehensive overarching framework for all marine activity in our waters. It enables sustainable development and use of our marine area in a way which will protect and enhance the marine environment whilst promoting both existing and emerging industries.

#### Clyde Regional Marine Plan

26. A pre-consultation on the draft Clyde Regional Marine Plan took place between 18th March and 27th May 2019. The first version of the SPP for the Clyde Regional Marine Plan was given Ministerial

approval in December 2017. This version has since been updated to reflect changes in the pre-consultation draft phase. The most recent version was given Ministerial Approval in December 2018.

27. The Plan will create a framework for integrated, sustainable and co-ordinated planning and management of the Clyde Marine Region's environmental, economic and community resource.

#### Ayrshire Shoreline Management Plan

28. The Ayrshire Shoreline Management Plan (SMP) has been completed by North Ayrshire and South Ayrshire Councils. It was adopted by both councils in September 2018. The SMP is a large-scale assessment of the risks associated with coastal tides. It will help to inform the future management of these risks to land and people by delivering an action plan and includes the island of Great Cumbrae.

#### Local Development Plans

29. The proposed scheme falls within the North Ayrshire Council local authority boundaries.
30. The latest Local Development Plan for North Ayrshire Council was adopted in November 2019. The new local plan, is considered below.
31. The new LDP covers a 10 year period, up to 2025. It is replaced every 5 years. Millport Conservation Area Regeneration Scheme (CARS) and Flood Defence Scheme is listed as a strategic project for North Ayrshire within the North Ayrshire Local Development Plan: Action and delivery Programme – March 2018 – this document acts as the implementation mechanism for the plan.
32. For the purpose of the Local Plan, Millport and the footprint of the proposed scheme is categorised to be within 'Developed Coast'.

#### Ayrshire Joint Structure Plan

33. The Ayrshire Joint Structure Plan 'Growing A Sustainable Ayrshire' (North Ayrshire Council, East Ayrshire Council and South Ayrshire Council, 2007) establishes a framework that brings together the aspirations of communities with those of business and industry, and the area's many supporting agencies and organisations, to provide a strategic land use context to the year 2025.
34. **Error! Reference source not found.** ~~Table 9-1~~ provides details of the local planning policy documents and the relevant policies in respect fish and shellfish resource. These policy document have been considered when undertaking the EIA for the Proposed Scheme.

Table 9-1 Relevant local planning policies

Document	Policy / Guidance	Policy / Guidance purpose	ES Reference
North Ayrshire Local Development Plan (2019)	Policy 9: Preserving and Enhancing our Conservation Areas	Development within or adjacent to a Conservation Area, that preserves or enhances its character and appearance, and is consistent with any relevant Conservation Area Appraisal or Management Plan, will be supported providing it can be demonstrated that it retains appropriate scale, proportion, siting, massing, design, and use of materials whilst not	Consideration of nature conservation designations, habitats and species is provided in Section 9.6.

Document	Policy / Guidance	Policy / Guidance purpose	ES Reference
		inhibiting high quality innovative design.	
North Ayrshire Local Development Plan (2019)	Policy 16: Protection of our Designated Sites	We will support development which would not have an unacceptable adverse effect on our valuable natural environment	Consideration of nature conservation designations, habitats and species is provided in Section 9.6.
North Ayrshire Local Development Plan (2019)	Policy 22: Water Environment Quality	We will support development that helps achieve the objectives of the Water Framework Directive and the River Basin Management Plan for Scotland. Generally, development which would lead to the deterioration of the water environment will be resisted unless it would deliver significant social, environmental or economic benefits. Development will be required to ensure no unacceptable adverse impact on the water environment	Consideration of nature conservation designations, habitats and species is provided in Section 9.6.

### 9.2.2 Best Practice and Guidance

35. The EIA has been based upon the following guidance and standards:

- Chartered Institute of Ecology and Environmental Management (CIEEM) (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine;
- CIEEM Guidelines for Ecological Report Writing (2nd Edition, December 2017).
- A Handbook on Environmental Impact Assessment (SNH, 2002);
- British Standard 42020:2013 –Biodiversity. Code of Practice for planning and development (British Standard, 2013);
- CIRIA Guidance note C692 Environmental Good Practice on Site Guide (3rd edition) (CIRIA, 2010);
- Joint Nature Conservation Committee Marine Monitoring Handbook (2001);
- Planning Advice Note 1/2013: Environmental Impact Assessment (Scottish Government, 2013);
- Scottish Biodiversity List (Biodiversity Scotland, undated);
- National Planning Policy Guidance (NPPG) 14 Natural Heritage (Scottish Government, 1999);
- Planning Advice Note (PAN) 60 (Planning for Natural Heritage) (Scottish Government, 2008).
- Scottish Natural Heritage website: guidance on protected species (<http://www.snh.gov.uk/protecting-scotlands-nature/protected-species/protected-species-az/>) (SNH, 2016a); and
- GB Non-native Species Secretariat (2015) Species Information.

### 9.3 Consultation

36. To inform the ES, North Ayrshire Council has undertaken a thorough pre-application consultation process, which has included the following key stages:

- Scoping Report submitted to Marine Scotland and North Ayrshire Council (Royal HaskoningDHV 2017); and

- Scoping Opinion received from Marine Scotland and North Ayrshire Council (2017).
  - Interim EIA submitted to Marine Scotland and North Ayrshire Council (Royal HaskoningDHV, 2018)
  - Comments received on the interim EIA from Marine Scotland and North Ayrshire Council (2018)
37. Full details of the proposed scheme consultation process to date is presented within **Chapter 3 EIA Methodology and Consultation**.
38. A summary of the consultation carried out at key stages throughout the proposed scheme, of particular relevance to fish and shellfish resource, is presented in Table 9-2.

Table 9-2 Consultation responses

Consultee	Date/ Document	Comment	Response / Where addressed in the ES
SEPA	Scoping Response	Assessment of possible impacts of fish and shellfish at the ICES rectangle scale could be refined given the likelihood of more local information from UMBS Millport e.g. Kames Bay used as a nursery for plaice	Consultation with Millport Field Centre (formerly University Marine Biological Station Millport) was undertaken in order to obtain fish and shellfish resource data. The data received has been incorporated into the baseline (Section 9.5).

## 9.4 Methodology

39. This section describes the methodology used to obtain baseline data and characterise the fish and shellfish resource of the area. The primary study area (the fish and shellfish Study Area) is Millport Bay, located between Millburn Street (west) (NS 15820 54609) and Kames Bay (east) (NS17233 54949), and is approximately 1.55 km<sup>2</sup>. Baseline data was collected through a desk based study obtaining pre-existing data on Millport and the wider Firth of Clyde. No site specific surveys were conducted.

### 9.4.1 Baseline Data Collection

40. Information on the fish and shellfish resources within the study area were collected from a wide range of sources. The characterisation of the existing environment has been carried out through a desk based literature review of the existing information and through consultation with a number of organisations, including:
- West Coast Regional Inshore Fisheries
  - Marine Scotland
  - Millport Field Centre
  - Ayr Fishery Office
  - Clyde Fisherman Association
41. The following existing survey data were also used for the baseline:

- The International Council for the Exploration of the Sea (ICES) landings data
- Long term scientific survey on Firth of Clyde demersal fish community (Health and Spiers, 2011)
- UK Spawning and Nursery Grounds (Ellis et al., 2010)
- Ayr Fishing Association 2017 Landings data

## 9.5 Existing Environment

42. The sections below describe some of the key habitats and existing baseline environment for fish and shellfish resource within the study area. Fish and shellfish species expected to be present within Millport Bay and Kames Bay will likely mirror those species found in the Firth of Clyde and that utilise the habitats present in the study area including Nephrops, Scallops, cod, whiting, sprat and dab. There is potential for juvenile fish to utilise the area however it is thought the habitat would not be suitable for spawning ground. Additionally, it is not expected that migratory fish would enter Millport Bay as part of their migratory route past Great Cumbrae.

### 9.5.1 Wider Region – Firth of Clyde

43. Millport Bay is within the Firth of Clyde, a semi-enclosed basin receiving both freshwater and marine inputs. A long term scientific trawl survey of the demersal fish community in the Clyde was conducted from 1927 to 2009 (Health and Speirs, 2011). All species recorded during the survey are presented in Table 9-3. Common species recorded during the survey include hake *Merluccius merluccius*, long rough dab *Hippoglossoides platessoides*, cod *Gadus morhua*, whiting *Merlangius merlangus*. Pelagic species such as herring *Clupea harengus* and sprat *Sprattus sprattus* and invertebrate species such as Norway lobster *Nephrops norvegicus* were also recorded during the survey. Although it is recognised that data collection from this study ended 10 years ago it is a very useful data set for informing the existing environment of the region.

Table 9-3 Species list for the Clyde (from Heath and Speirs, 2011)

Species	Common name	Type	% of years when species found
<i>Merluccius merluccius</i>	Hake	Demersal	100
<i>Hippoglossoides platessoides</i>	Long Rough Dab	Demersal	100
<i>Gadus morhua</i>	Cod	Demersal	97.8
<i>Merlangius merlangus</i>	Whiting	Demersal	97.8
<i>Limanda limanda</i>	Common Dab	Demersal	93.5
<i>Eutrigla gurnardus</i>	Grey Gurnard	Demersal	93.5
<i>Trisopterus esmarki</i>	Norway Pout	Demersal	93.5
<i>Trisopterus minutus</i>	Poor Cod	Demersal	93.5
<i>Pleuronectes platessa</i>	Plaice	Demersal	87
<i>Clupea harengus</i>	Herring	Pelagic	87
<i>Sprattus sprattus</i>	Sprat	Pelagic	84.8
<i>Nephrops norvegicus</i>	Norway lobster	Invertebrate	84.8
Gobiidei	Gobies (unidentified)	Demersal	82.6
<i>Argentina sphyraena</i>	Lesser argentine	Demersal	82.6
<i>Callionymus lyra</i>	Dragonet	Demersal	76.1
<i>Melanogrammus aeglefinus</i>	Haddock	Demersal	76.1
<i>Glyptocephalus cynoglossus</i>	Witch demersal	Demersal	76.1
<i>Lumpenus lampretaeformis</i>	Snake blenny	Demersal	71.7
<i>Rhinonemus cimbrius</i>	Four-bearded rockling	Demersal	67.4
<i>Scylliorhinus canicula</i>	Lesser spotted dogfish	Demersal	65.2
<i>Pollachius virens</i>	Saithe	Demersal	58.7
<i>Microstomus kitt</i>	Lemon sole	Demersal	56.5
<i>Scomber scombrus</i>	Mackerel	Pelagic	50
<i>Callionymus maculatus</i>	Spotted dragonet	Demersal	47.8
<i>Platichthys esus</i>	Flounder	Demersal	41.3

Species	Common name	Type	% of years when species found
<i>Lophius piscatorius</i>	Anglerfish	Demersal	39.1
<i>Squalus acanthias</i>	Spurdog	Demersal	39.1
<i>Cepola rubescens</i>	Red band-fish	Demersal	34.8
<i>Trachurus trachurus Pelagic</i>	Horse mackerel (scad)	Pelagic	32.6
<i>Loligo forbesii</i>	Long finned squid	Invertebrate	32.6
<i>Alloteuthis subulata</i>	Alloteuthis	Invertebrate	28.3
<i>Zeus faber</i>	John dory	Demersal	28.3
<i>Conger conger</i>	Conger eel	Demersal	26.1
<i>Leucoraja naevus</i>	Cuckoo ray	Demersal	21.7
<i>Cyclopterus lumpus</i>	Lumpsucker	Demersal	21.7
<i>Raja montagui</i>	Spotted ray	Demersal	17.4
<i>Raja clavata</i>	Thornback ray	Demersal	17.4
<i>Micromesistius poutassou</i>	Blue whiting	Demersal	13
<i>Pollachius pollachius Lythe</i>	Pollack demersal	Demersal	10.9
<i>Gaidropsarus vulgaris</i>	Three-bearded rockling	Demersal	10.9
<i>Argentina silus</i>	Greater argentine	Demersal	8.7
<i>Lepidorhombus whiffiagonis</i>	Megrim demersal	Demersal	8.7
<i>Ciliata mustela</i>	Five-bearded rockling	Demersal	6.5
<i>Galeorhinus galeus</i>	Tope demersal	Demersal	6.5
<i>Trigla lucerna</i>	Tub gurnard	Demersal	6.5
<i>Psetta maxima</i>	Turbot	Demersal	6.5
<i>Galeus melastomus</i>	Black mouthed dogfish	Demersal	4.3
<i>Scophthalmus rhombus</i>	Brill	Demersal	4.3
<i>Agonus cataphractus</i>	Hooknose	Demersal	4.3
<i>Ommastrephidae</i>	Short finned squid	Invertebrate	4.3
<i>Dipturus batis</i>	Common skate	Demersal	4.3
<i>Buglossidium luteum emersal</i>	Solenette	Demersal	4.3
<i>Gadiculus argenteus thori</i>	Silvery pout	Demersal	4.3
<i>Ammodytidae</i>	Sandeels (unidentified)	Pelagic	4.3
<i>Engraulis encrasicolus</i>	Anchovy	Pelagic	2.2
<i>Trisopterus luscus</i>	Bib	Demersal	2.2
<i>Raja brachyura</i>	Blonde ray	Demersal	2.2
<i>Myoxocephalus Scorpius</i>	Bull rout	Demersal	2.2
<i>Cottus gobio</i>	Bullhead	Demersal	2.2
<i>Arnoglossus imperialis</i>	Imperial scaldfish	Demersal	2.2
<i>Triglops murrayi</i>	Moustache sculpin	Demersal	2.2
<i>Scyliorhinus stellaris</i>	Nurse hound	Demersal	2.2
<i>Echiodon drummondi</i>	Pearfish	Demersal	2.2
<i>Trigla lyra Demersal</i>	Piper gurnard	Demersal	2.2
<i>Chelidonichthys cuculus</i>	Red gurnard	Demersal	2.2
<i>Trigloporus lastoviza</i>	Streaked gurnard	Demersal	2.2
<i>Taurulus bubalis</i>	Sea scorpion	Demersal	2.2
<i>Microchirus variegatus</i>	Thickback sole	Demersal	2.2
<i>Alosa fallax</i>	Twaite shad	Demersal	2.2
<i>Sepiolidae</i>	Bobtail squids (unidentified)	Invertebrate	<2

## 9.5.2 Study Area Millport Bay

### Habitats/sediments

44. Millport Bay and Kames Bay to the east are sheltered bays due to the presence of the large rock outcrops (the Eileans, the Leug and the Spoig). The outcrops shelter the bay against waves from the south enabling deposition of sand in their lee along the Newton Bay shoreline. Habitats present within the sheltered bay range from mobile infralittoral sediment close to shore to circalittoral muds in deeper water. The rocky reefs surrounding the bay are dominated by kelp forest in the shallow subtidal and are frequently silted or inundated by sediment in deeper water. The rocky habitats appear to be heavily grazed by the extensive cover of crustose coralline algae and non-calcaerous crustose red

algae on the rock. The shallow sediment-rock interface is sometimes populated by foliose algae (Royal HaskoningDHV, 2018a)

45. Mixed substrata habitats are common in Kames Bay and may well be rich in species in the summer months but in January many epibiota species are absent. More information on key benthic habitats and species are described in **Chapter 8 Benthic Ecology**.

### Species

46. In order to identify which species may be present within the study area a number of data sources have been interrogated as detailed above in Section 9.4.1.
47. Millport Bay and in particular Kames Bay, a small south facing bay at the head of Millport Bay have been subject to a number of ecological surveys by the Millport Field Studies Council (MFSC). Consultation with MFSC confirmed that a wide range of fish species can be found in Millport Bay and Kames Bay. Kames Bay is a shallow sandy environment is used during the summer months for juvenile feeding grounds for flatfish, dogfish, different wrasse species, the common intertidal gobies and blennies, butterfish, scorpion fish and numerous other intertidal species common to the West coast of Scotland (*Pers. comms* Millport Field Studies Council, 2018). This description is anecdotal with no empirical data available.
48. Landings data are a useful indication of what species may be within the study area, although it is recognised that landings data are biased towards commercial species. In the Clyde, fishing occurs throughout the area and the main landing ports are Campbeltown, Tarbert, Ayr and Troon and some smaller fishing ports, Greenock, Largs and Rothesay. The Clyde had once been a productive fishery for demersal, pelagic and shellfish but is now primarily a shellfish fishery. This is evident from the ICES data provided by Marine Scotland.
49. The coast around Millport lies within the ICES rectangle<sup>1</sup> 40E5. All species of which more than one tonne was landed from this rectangle between 2014 and 2018 are shown in Table 9-4 and displayed in Plate 9-1. As can be seen in by the ICES data, the landings are dominated by shellfish, with the large majority of landings for Nephrops, with scallops, queen scallops and whelks also present in large numbers.

Table 9-4 ICES rectangle 40E5 landings by weight

Species	Landings Weight (tonnes) by year				
	2014	2015	2016	2017	2018
Crabs (C.P.Mixed Sexes)	0	0	0	9	11
Crabs - Velvet (Swiming)	1	1	2	2	1
Lobsters	1	0	0	2	2
Nephrops (Norway lobster)	900	807	929	657	594
Queen scallops	40	0	0	0	0
Razor clam	4	2	7	62	159
Scallops	44	9	4	7	3

<sup>1</sup> The International Council for the Exploration of the Sea (ICES) has developed a grid system derived from degrees latitude and longitude that divides the seas into rectangles.

Species	Landings Weight (tonnes) by year				
	2014	2015	2016	2017	2018
Whelks	6	5	12	100	6

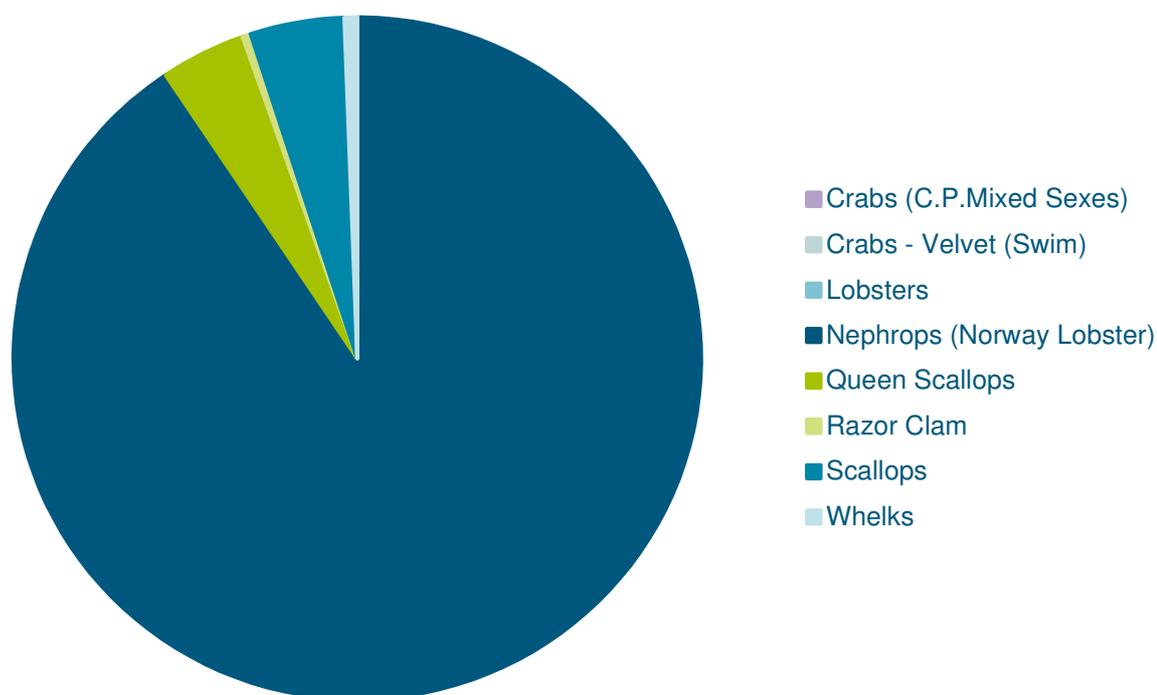


Plate 9-1 Shellfish catch composition from ICES rectangle 40E5 2014-2018 (Source: UK Sea Fisheries Statistics 2018)

50. The principle fishery in the Clyde is Nephrops followed by great scallops *Pecten maximus* and the related but smaller queen scallop *Chlamys opercularis* (McIntyre et al., 2012). For demersal species, Clyde Sea area are a mixed fishery with cod, haddock and whiting the predominant roundfish caught in this mixed fishery with highest catches in the winter, although there can also be important by-catches of other species such as hake and saithe (WGNSDS, 2008<sup>2</sup>).
51. Data are not available specifically for fish caught in Millport, fish caught in Millport Bay are likely to land at Largs (Ayr fishing Association, pers. comms 2018). Data from landings at Largs and Greenock Creek in the Ayr District for 2017 are provided in Table 9-5 below. Nephrops are landed almost entirely live whole using bottom trawl and twin trawls, with only a small proportion fished by Nephrops creels. The shellfish category is whelks caught by whelk pots. Landings from Largs and Greenock Creek indicate that similar to the whole of the Clyde Nephrops and shellfish dominate the landings.

Table 9-5 Landings data from Largs and Greenock Creek 2017 (Ayr Fishing Association)

Species type	Weight as landed (tonnes)
Demersal	0.00
Nephrops	22.58
Pelagic	0.00
Shellfish	87.90

<sup>2</sup> ICES Working Group for the Assessment of Northern Shelf Demersal Stocks (WGNSDS) met in 2008

52. Although data on fish species present within Millport Bay in isolation is not available, species likely to be present can be inferred using data on fish species presented above from the wider coastal area and on the habitats present within the study area available from the benthic survey of Millport Bay (Royal HaskoningDHV, 2018a).
53. Nephrops distribution is limited to areas of sublittoral soft sediment, such as mud, sandy mud and muddy sand. Within some Scottish sea Lochs and in the Clyde Nephrops have been found in shallower waters (<20m) (Sabatini and Hill, 2008; McIntyre *et al.*, 2012). Within Kames Bay and inshore of the islands depths are generally less than 5m whereas further offshore the depth deepens rapidly to greater than 30m. Additionally, the habitats present are a mixture of soft sediment and rocky habitats (Royal HaskoningDHV, 2018a). Therefore, it is expected that nephrops would not be present in the shallower water and within Kames bay but may be present in the deeper offshore water in the study area. Nephrops burrows were recorded during the benthic survey at deeper locations where soft sediment was present, suggesting Nephrops are present in the study area (Royal HaskoningDHV, 2018a).
54. Other shellfish that are likely to be present in the study area include queen scallop which are found between tidemarks to 100m on sand or gravel (Carter, 2008), and great scallop found in sand or sandy gravel (Marshall and Wilson, 2008). Great scallops are found at depths greater than 10m so may not be present further inshore in Kames Bay.
55. There is a classified shellfish harvesting area at Fairlie, located approximately 2.5km east of Millport Bay, which hosts a class B Pacific oyster *Magallana gigas* fishery. There are no classified shellfish harvesting areas within Millport Bay, and bivalve molluscs are not targeted within the Bay.
56. Fish that have the potential to be present in Kames Bay and the wider study area include but are not limited to the following species: cod which can found in shallow coastal areas (Heard, 2004); Dab which are found in sandy areas from the shore down to 150m but are most common between 20-40m (Ruiz, 2008); Whiting, found in mud, gravel, sand and rock habitats at depths between 30-100m (Barnes, 2008a); and sprat, which are usually found in inshore waters sometimes entering into estuaries (Barnes, 2008b).

### Spawning and nursery habitat

57. The Clyde (including the footprint of the proposed scheme) is identified as high intensity nurseery grounds for cod, hake, ling mackerel, herring and spurdog (Ellis *et al.*, 2010) as shown in Figures 9-1 to 9-5 in Volume II of the ES.
58. The Clyde fishery depends to a large extent on young fish. Although there is no conclusive evidence that the Clyde populations are self-contained, all the major species are known to spawn within or close to the area they occur. Additionally, tagging experiments have shown that there is not much mixing between Clyde fish and those from surrounding areas (McIntyre *et al.*, 2012).
59. Cod in the west of Scotland have shown a high degree of fidelity to their spawning grounds with recent studies estimating that between 67-97% of inshore cod remains within 100 km of their spawning ground (Wright *et al.*, 2006). Information specific to hake in the Clyde is limited but discarding rates of juvenile hake is substantial in the area (Stratoudakis *et al.*, 2001).
60. Data on spawning and nursery grounds specifically within Millport Bay and Kames Bay is not available. Anecdotal evidence from MFSC suggests Kames Bay is used during the summer months

for juvenile feeding grounds for flatfish, dogfish, different wrasse species, the common intertidal gobies and blennies, butterflyfish, scorpion fish and numerous other intertidal species common to the West coast of Scotland (*Pers. comms* Millport Field Studies Council, 2018). However, due to the shallow depth of water (Marine Space et al., 2013) and mobile sediment veneer at Millport Bay, the footprint of the proposed scheme is an unlikely location for fish spawning to successfully occur.

#### **Migratory fish and species of conservation importance**

61. Endrick Water SAC is located upstream, over 10km away from of the propped scheme, and is designated for Atlantic salmon *Salmo salar*, brook lamprey *Lampetra planeri* and river lamprey *Lampetra fluviatilis*. The population of brook lamprey are non migratory. River lamprey and Atlantic salmon may to pass close to the study area as they navigate past Great Cumbrae on their migration route out of the Clyde, however the fish are considered unlikely to enter Millport Bay on their normal migratory route.

### **9.5.3 Anticipated Trends in Baseline Conditions**

62. It is important to recognise that the baseline physical environment is not static, but instead will exhibit considerable variability due to cycles or trends of natural change. These can include (for example) the short-term effects of storms and surges, the well-observed patterns in the movement of tides during spring and neap cycles and the longer-term effects of sea-level rise associated with global climate change.
63. The baseline data from ICES described above used an aggregation of fisheries statistics data over (at least) a five-year period and, while there are fluctuations over this period, landings from within ICES 40E5 have remained substantial and the key targeted species have not changed. Therefore, it is not expected anthropogenic pressure from commercial fishing is going to change in the short-term to mid-term therefore there are not anticipated to be any significant changes in the baseline for fish and shellfish resource in Millport Bay.

## **9.6 Impact Assessment**

### **9.6.1 Overview of Potential Impacts**

64. The Scoping Report and interim EIA undertaken for the Proposed Scheme was used to identify potential impacts in relation to fish and shellfish resource. The Scoping Report and interim EIA submitted in support of the Proposed Scheme determined there would be no significant impacts in relation to fish and shellfish resources, and therefore all impacts were scoped out of the EIA process for fish and shellfish resource. (Royal HaskoningDHV, 2016).
65. Consultation on the Scoping Report and Interim EIA resulted in the following consultation advice from SEPA in relation to fish and shellfish ecology:
66. 'Assessment of possible impacts of fish and shellfish at the ICES rectangle scale could be refined given the likelihood of more local information from UMBS Millport e.g. Kames Bay used as a nursery for plaice'
67. Based on the consultation advice, consultation with Millport Field Centre (formerly University Marine Biological Station Millport (UMBS Millport)) was undertaken. Following the receipt of further information from Millport Field Centre and the most up to date ICES data, the baseline for fish and shellfish resources has been updated (Section 9.5).

68. The updates to the baseline reinforce the current understanding of the fish and shellfish resource within the study area, namely species expected to be present within Millport Bay and Kames Bay will likely mirror those species found in the Firth of Clyde, and while there is potential for juvenile fish to utilise the area it is thought the habitat would not be suitable for spawning ground. Additionally it is not expected that migratory fish would enter Millport Bay as part of their migratory route past Great Cumbrae.
69. Based on the baseline for fish and shellfish resource the impact assessment presented in the Scoping Report and Interim EIA has not changed, meaning **no significant impacts are expected to fish and shellfish resource due to the Proposed Scheme**. As no change has occurred since the scoping phase of the EIA the impacts have remained scoped out of the EIA. A summary of potential impacts that were considered in the Scoping Report and Interim EIA are provided below in Table 9-6.

Table 9-6 Potential impacts for fish and shellfish scoped out of the EIA

Potential Impact	Comment
Construction	
Noise and vibration disturbance	Noise and vibration may be generated from a number of sources including, vessels activity, dredging and rock dumping. The noise generated will be short term temporary and limited to the vicinity of the works An increasingly significant body of work has been carried out into the study of the effects of underwater noise upon sensitive fish species (Popper & Hastings 2009; Nedwell, et.al., 2008; Parvin et. al., 2006; Nedwell, et al., 2003). Such studies have suggested that spawning activity, by hearing specialist species such as herring, may be disrupted (and eggs damaged) through the noise and vibration effects associated with the construction activities such as pile driving. Hearing specialists (Nedwell et. al., 2004) that may be present in the area include herring, which are known to be sensitive to noise disturbance however the shallow water depth and mobile sediments make it unlikely for herring to be spawning within the footprint of the proposed scheme (MarineSpace Ltd <i>et al.</i> , 2013). Therefore no significant impacts to fish and shellfish resources are expected.
Reduction in water quality (suspended sediment, release of contaminated sediment, spills/leakage of fuel from construction vessels)	Chapter 9 assessed changes in suspended sediment concentrations as negligible. Therefore no significant impacts to fish and shellfish resources are expected.  Accidental contaminant release, such as fuel, from vessels associated with the construction, maintenance and decommissioning will be managed through compliance with relevance guidance and through a Marine Pollution Contingency Plan (Section 9.6.2.1). Therefore, no significant impacts to fish and shellfish resource are expected.
Impacts to populations from designated sites	Migratory fish on route to Endrick Water SAC are unlikely to divert and enter Millport Bay when passing Great Cumbrae and are therefore not expected to come into contact with the effects of the proposed scheme. Therefore, no significant impacts to fish and shellfish resource are expected.
Operation	
Habitat Loss	The physical presence of the breakwater represents a permanent loss of habitat within the footprint of the harbour breakwater. The footprint of the works is very small in comparison the habitat area any loss of habitat is considered to be negligible. The benthic footprint of the proposed scheme is mobile in character and shallow in depth, and as such is not considered to be suitable as spawning habitat. Available data does

Potential Impact	Comment
	not validate that the habitat is used for spawning. Therefore no significant impacts to fish and shellfish resources are expected.
Reductions in water quality due to reduced tidal flushing	Chapter 9: Marine Geology Oceanography and Physical Processes determined that changes to the wave regime, tidal current and sediment transport patterns would be negligible, meaning reductions in water quality due to reduced tidal flushing is not expected. Therefore no significant impacts to fish and shellfish resources are expected.
Changes in habitat due to changes in hydrodynamic and sediment transport processes	Chapter 9: Marine Geology Oceanography and Physical Processes determined that changes to the wave regime, tidal current and sediment transport patterns would be negligible and not significant. Therefore no significant impacts to fish and shellfish resources are expected.
Increase in fish and shellfish abundance	The breakwaters are likely to be colonised by marine organisms, providing shelter and supporting additional food resource. However, the new breakwater is small in comparison to available habitat within Millport Bay. Therefore, no significant impacts to fish and shellfish resources are expected.

### 9.6.2 Embedded Mitigation

70. Embedding mitigation into the proposed scheme design is a type of primary mitigation and is an inherent aspect of the EIA process. A full account of embedded mitigation measures is contained in **Chapter 5 Project Description**. Embedded mitigation through best practice and policy of relevance to fish and shellfish resource are described in Table 9-7.

Table 9-7 Embedded mitigation through Best Practice and Policy

Parameter	Mitigation measures through Best Practice and Policy
Pollution prevention	Guidance for Pollution Prevention GPP 5: Works and maintenance in or near water (Netregs, undated)
Pollution prevention	GPP 22 Dealing with spills (Netregs, undated)
Pollution prevention	The following Pollution Prevention Guidance (PPG) or updated equivalent (Netregs, undated): PPG 6: Working at construction and demolition sites; PPG 1 Understanding your environmental responsibilities – good environmental practices; PPG 14: Marinas and crafts.
Construction good practice	CIRIA Coastal and marine environmental site guide (2 <sup>nd</sup> edition)
Construction good practice	CIRIA Guidance note C692 Environmental Good Practice on Site Guide (3rd Edition).
Pollution prevention	SEPA Pollution Prevention Guidelines.

71. As part of this best practice, several mitigation measures will be implemented as part of the project embedded mitigation to manage and minimise the risk of a pollution event occurring during construction activities, set out below.

### Marine Pollution Contingency Plan and Vessel Management Plan

72. Development of a Marine Pollution Contingency Plan and Vessel Management Plan, which would include the following measures:
- Notice to Mariners to be issued to reduce collision risks;
  - Vessels associated with all Project operations will comply with IMO/MCA codes for prevention of oil pollution and any vessels over 400 GT will have on board SOPEPs;
  - Vessels associated with all Project operations will carry on-board oil and chemical spill mop up kits; and
  - Where possible, vessels will avoid working in poor weather conditions.
  - Safe-working practices, including the correct use of navigational aids and lights by construction vessels and barges; and,

### Ecological Action Plan

73. Development of an Ecological Action Plan (EAP) to ensure correct procedures are adhered to in order to minimise pollution incidents
74. All mitigation measures proposed in relation to the impacts identified for each receptor below will be incorporated and detailed in an overarching EAP. Where mitigation or management plans are mentioned in the mitigation sections below, these will be incorporated into the EAP also.
75. The EAP will form part of the Environmental Management Plan (EMP) and will cover the ecological requirements of the pre-, during and post-construction stages of the Proposed Scheme. The EAP will be a live document and will be updated throughout each of these phases. The EAP will take into account any planning obligations and conditions attached to the Proposed Scheme should consent be granted. The EAP will be submitted to and agreed with the North Ayrshire Council, SNH and other stakeholders, where appropriate, based upon the final design of the Proposed Scheme. The EAP will include the principal requirements of mitigation, including:
- Pre-construction ecological surveys;
  - Habitats or species directly affected by the Proposed Scheme;
  - Method statements (where necessary);
  - Tool box talks;
  - Licensing requirements (where necessary);
  - Habitat re-instatement plan (if applicable);
  - Overall strategy for delivery of the mitigation proposed in this EclA; including
  - Programme for delivery of mitigation; and
  - Responsibilities attributed to the relevant parties to deliver the plan.
76. An Ecological Clerk of Works (ECoW) will audit the implementation of the EAP. This would be a desk-based and site-based role. It should be noted that the mitigation measures presented below are based on the individual receptor, therefore in some cases there may be a conflict between the requirements of one receptor over another (or indeed with other priorities, e.g. tourism and recreation). The ECoW will have suitable expertise to develop and find pragmatic solutions to any potential conflicts in consultation with the relevant consultees.

## 9.7 References

Barnes, M.K.S. (2008a). *Merlangius merlangus* Whiting. In Tyler-Walters H. and Hiscock K. (eds) Marine Life Information Network: Biology and Sensitivity Key Information Reviews, [on-line]. Plymouth: Marine Biological Association of the United Kingdom. [cited 19-04-2018]. Available from: <https://www.marlin.ac.uk/species/detail/96>

Barnes, M.K.S. (2008b). *Sprattus sprattus* Sprat. In Tyler-Walters H. and Hiscock K. (eds) Marine Life Information Network: Biology and Sensitivity Key Information Reviews, [on-line]. Plymouth: Marine Biological Association of the United Kingdom. [cited 19-04-2018]. Available from: <https://www.marlin.ac.uk/species/detail/82>

Carter, M.C. (2008). *Aequipecten opercularis* Queen scallop. In Tyler-Walters H. and Hiscock K. (eds) Marine Life Information Network: Biology and Sensitivity Key Information Reviews, [on-line]. Plymouth: Marine Biological Association of the United Kingdom. [cited 19-04-2018]. Available from: <https://www.marlin.ac.uk/species/detail/1997>

Ellis et al., (2010) Spawning and nursery grounds of selected fish species in UK waters.

Heard, J.R. (2004). *Gadus morhua* Atlantic cod. In Tyler-Walters H. and Hiscock K. (eds) Marine Life Information Network: Biology and Sensitivity Key Information Reviews, [on-line]. Plymouth: Marine Biological Association of the United Kingdom. [cited 19-04-2018]. Available from: <https://www.marlin.ac.uk/species/detail/2095>

Heath, M.R. and D.C. Speirs (2011). Changes in species diversity and size composition in the Firth of Clyde demersal fish community (1927-2009). *Proceedings of the Royal Society, B*, doi, 10.1098/rspb.2011.1015.

MarineSpace Ltd, ABPmer Ltd, ERM Ltd, Fugro EMU Ltd and Marine Ecological Surveys Ltd (2013) Environmental Effect Pathways between Marine Aggregate Application Areas and Atlantic Herring Potential Spawning Habitat: Regional Cumulative Impact Assessments. Version 1.0.

Marshall, C.E. & Wilson, E. (2008). *Pecten maximus* Great scallop. In Tyler-Walters H. and Hiscock K. (eds) Marine Life Information Network: Biology and Sensitivity Key Information Reviews, [on-line]. Plymouth: Marine Biological Association of the United Kingdom. [cited 19-04-2018]. Available from: <https://www.marlin.ac.uk/species/detail/1398>

McIntyre, F., Fernandes, P.G and W. R. Turrell (2012) Clyde Ecosystem Review. Scottish Marine and Freshwater Science Report Volume 3 Number 3.

Nedwell, R., & Brooker, A., (2008). Measurement and assessment of background underwater noise and its comparison with noise from pin pile drilling operations during installation of the SeaGen tidal turbine device, Strangford Lough. Subacoustech Report No. 724R0120 to COWRIE Ltd. ISBN: 978-0-9557501-9-9. Available at: [http://www.offshorewindfarms.co.uk/Assets/Final%20report\\_26%2001%2009.pdf](http://www.offshorewindfarms.co.uk/Assets/Final%20report_26%2001%2009.pdf)

Parvin, S., Nedwell, J., & Workman, R. (2006) Underwater noise impact modelling in support of the London Array, Greater Gabbard and Thanet Offshore Wind Farms. Subacoustech report No. 710R0517

Popper, A., & Hastings, M. (2009). The effects of anthropogenic sources of sound on fishes. *Journal of Fish Biology* 75, 455–489

Royal HaskoningDHV (2018a) Millport Benthic Surveys Technical Note

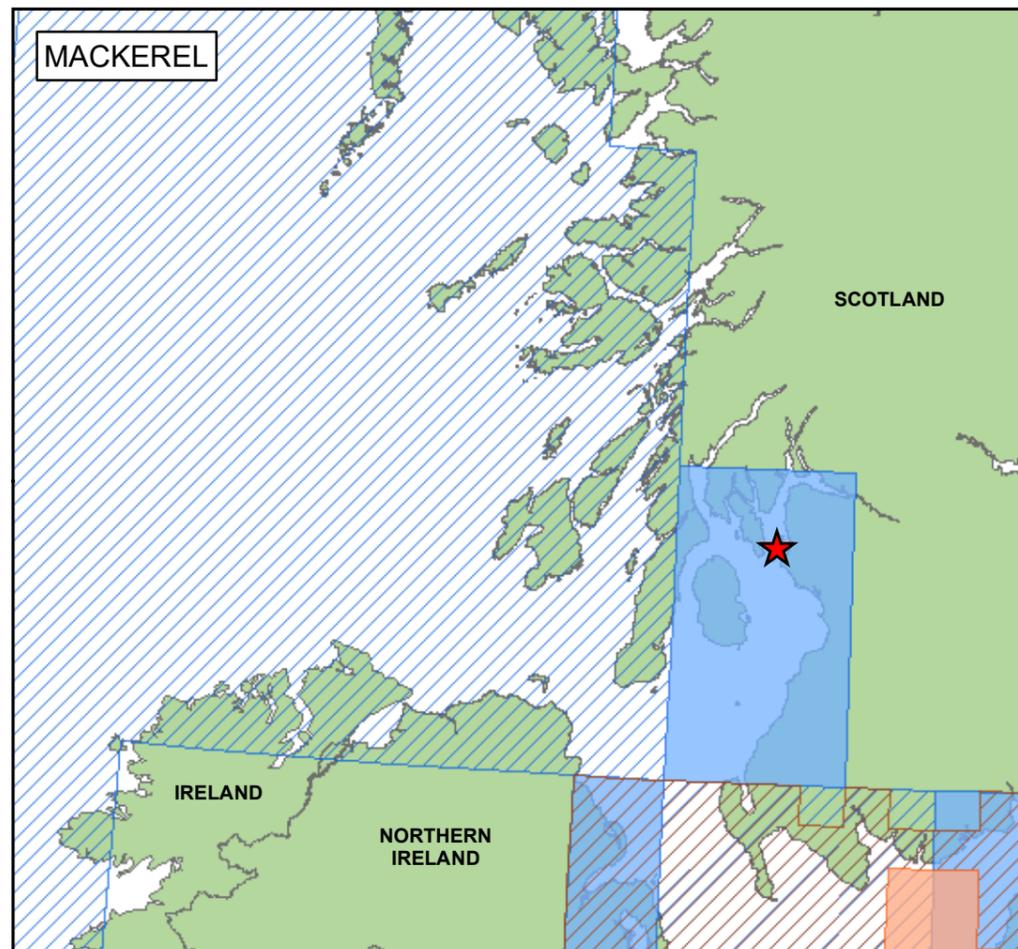
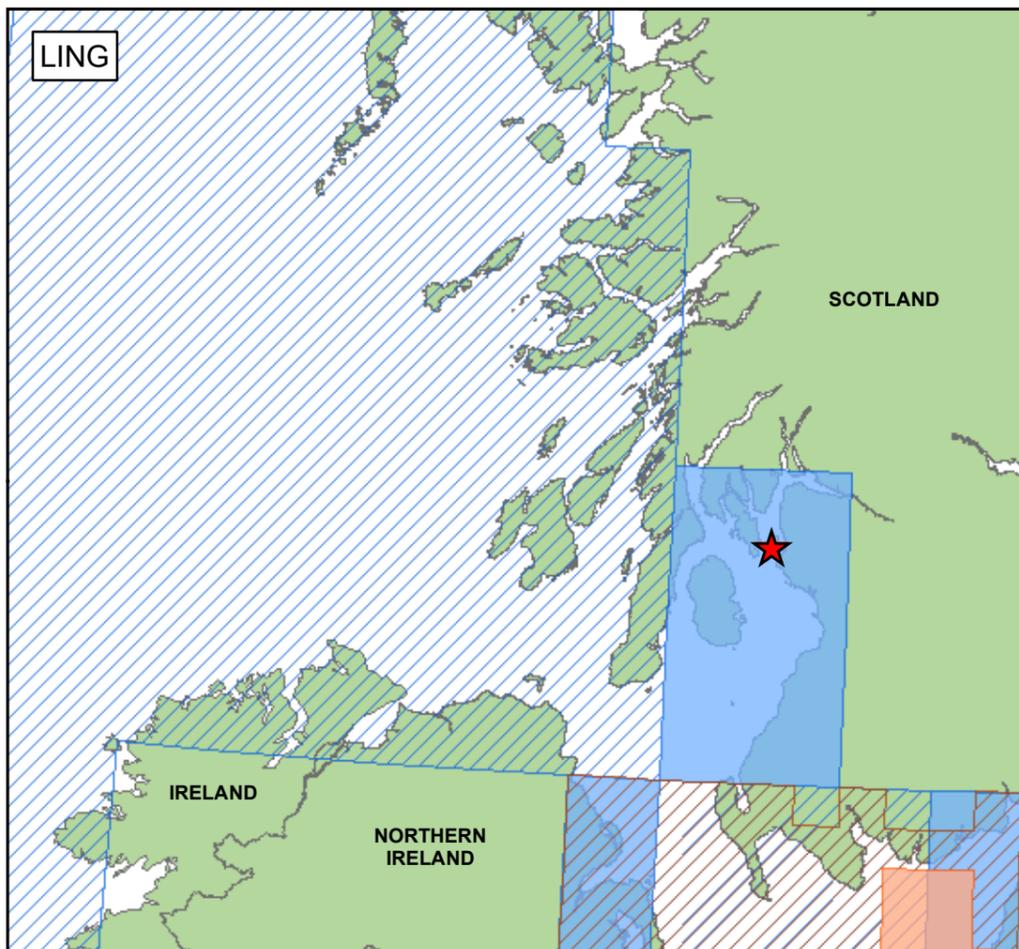
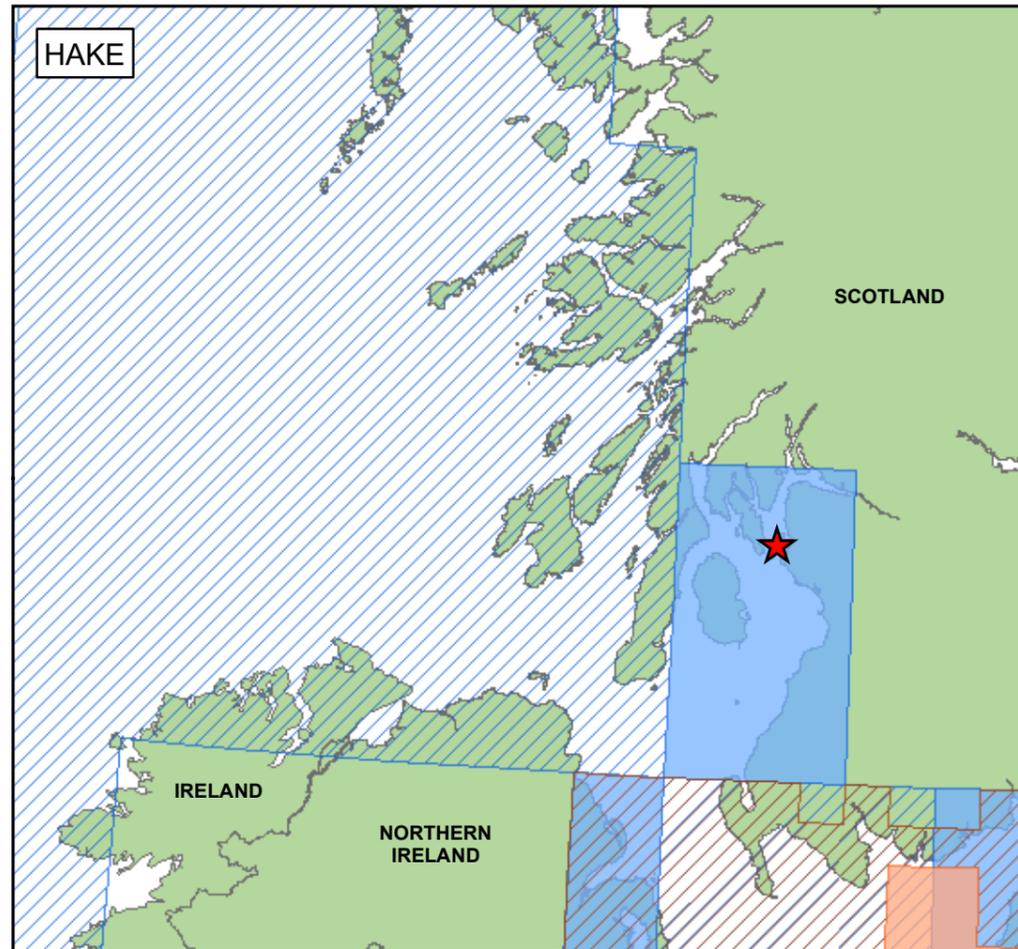
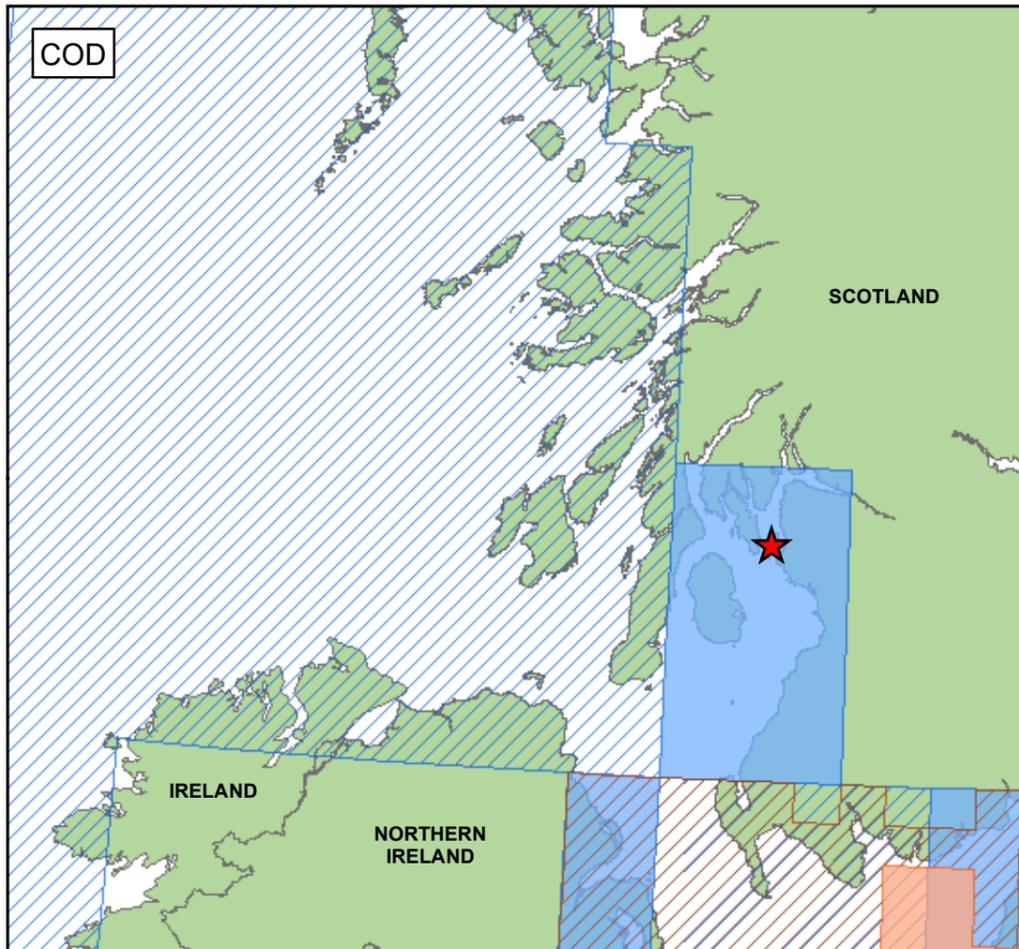
Royal HaskoningDHV (2018b) Millport Coastal Processes Assessment

Ruiz, A. (2008). *Limanda limanda* Dab. In Tyler-Walters H. and Hiscock K. (eds) Marine Life Information Network: Biology and Sensitivity Key Information Reviews, [on-line]. Plymouth: Marine Biological Association of the United Kingdom. [cited 19-04-2018]. Available from: <https://www.marlin.ac.uk/species/detail/2174>

Sabatini, M. & Hill, J.M. (2008). *Nephrops norvegicus* Norway lobster. In Tyler-Walters H. and Hiscock K. (eds) Marine Life Information Network: Biology and Sensitivity Key Information Reviews, [on-line]. Plymouth: Marine Biological Association of the United Kingdom. [cited 19-04-2018]. Available from: <https://www.marlin.ac.uk/species/detail/1672>

Stratoudakis, Y., R. J. Fryer, et al. (2001). Fish bycatch and discarding in Nephrops trawlers in the Firth of Clyde (west of Scotland). *Aquatic Living Resources*, 14(5), 283-291.

Wright, P. J., E. Galley, et al. (2006). Fidelity of adult cod to spawning grounds in Scottish waters. *Fisheries Research*, 77(2), 148-158.



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★ Site Location

**Spawning Grounds**

- High Intensity (Ellis et al. 2010)
- Low Intensity (Ellis et al. 2010)

**Nursery Habitat**

- High Intensity (Ellis et al. 2010)
- Low Intensity (Ellis et al. 2010)

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**Fish Spawning Grounds and Nursery Habitat**

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★ Site Location

**Spawning Grounds**

- High Intensity (Ellis et al. 2010)
- Low Intensity (Ellis et al. 2010)

**Nursery Habitat**

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- Low Intensity (Ellis et al. 2010)

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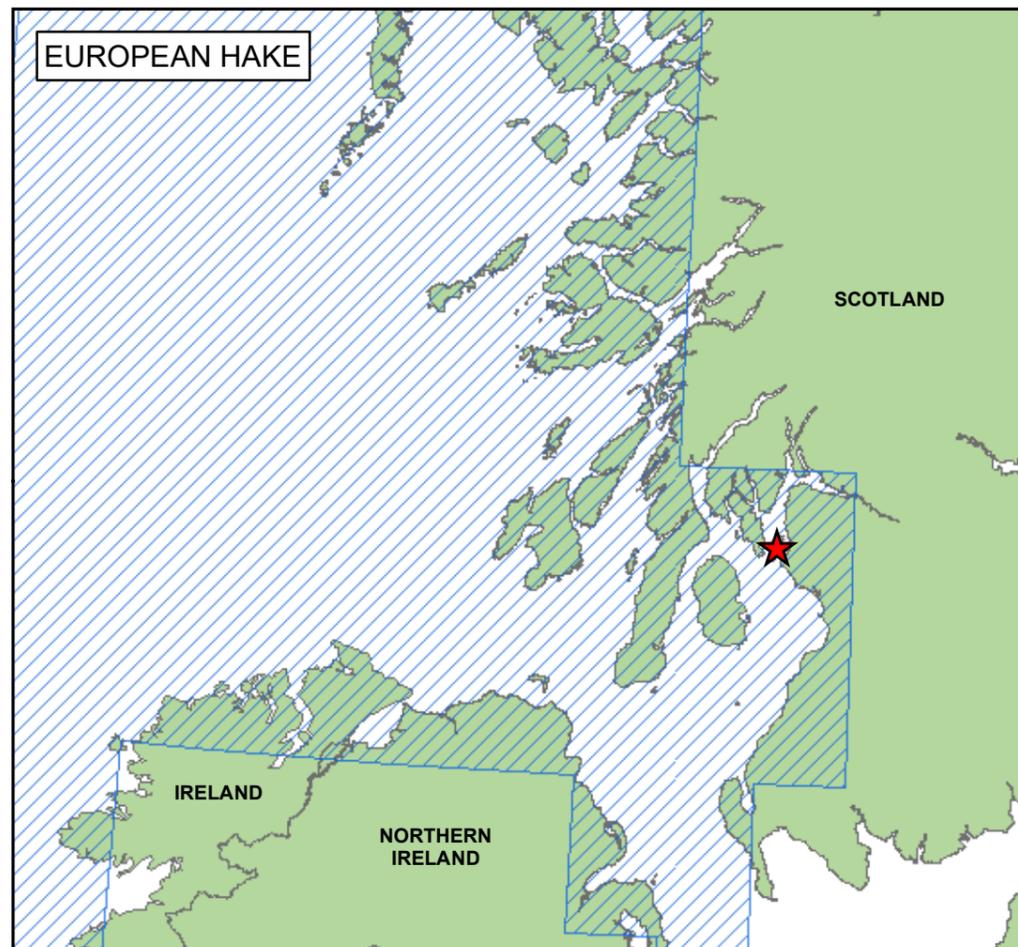
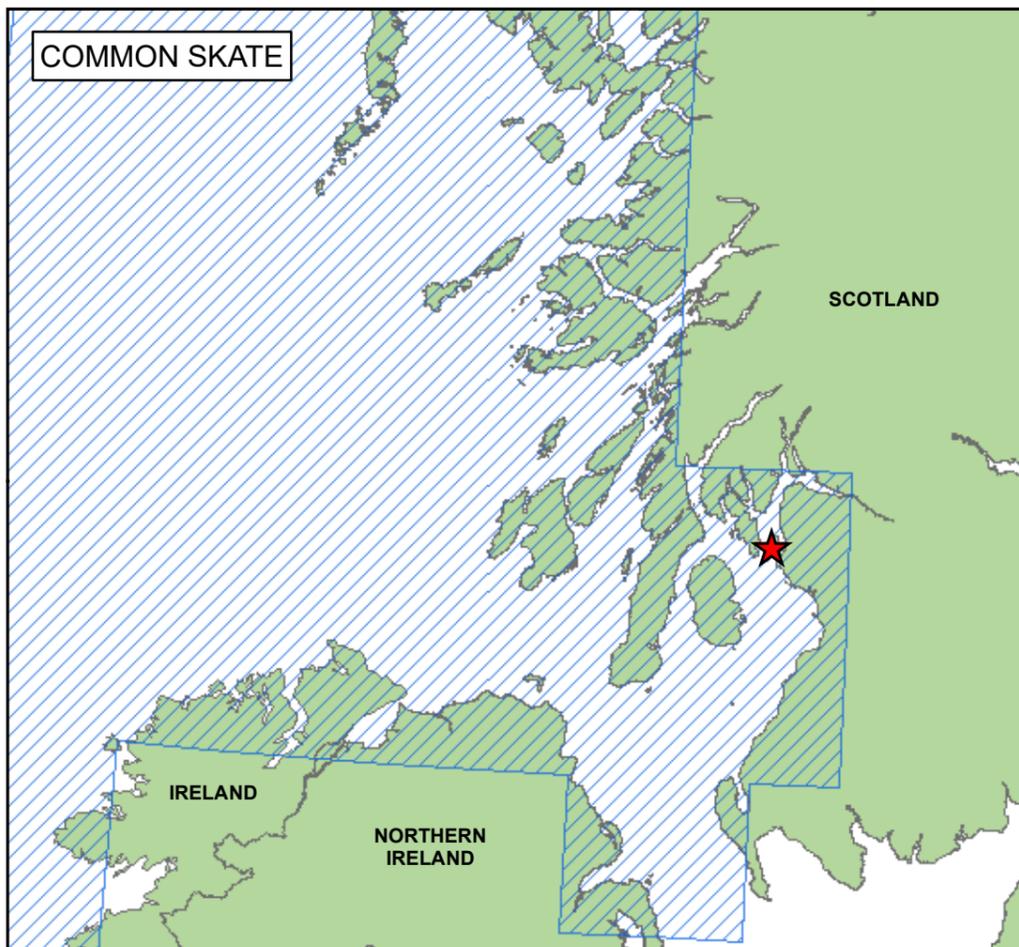
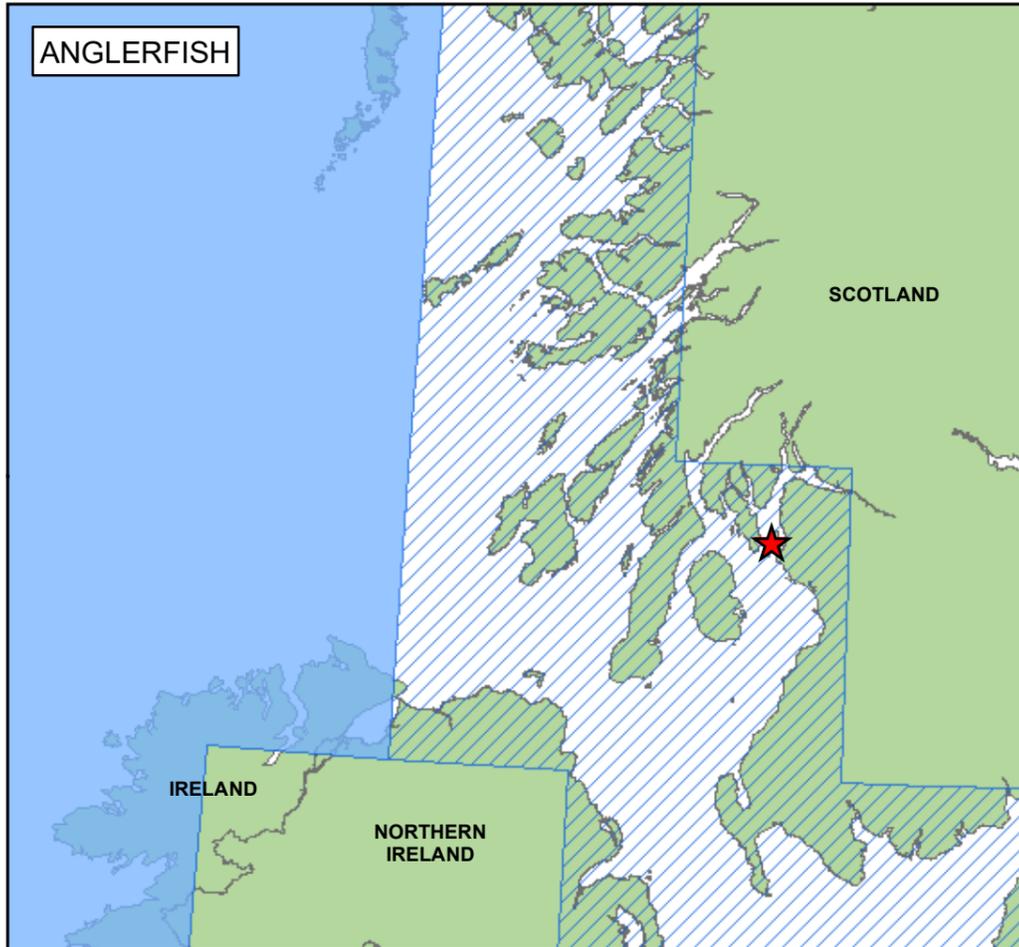
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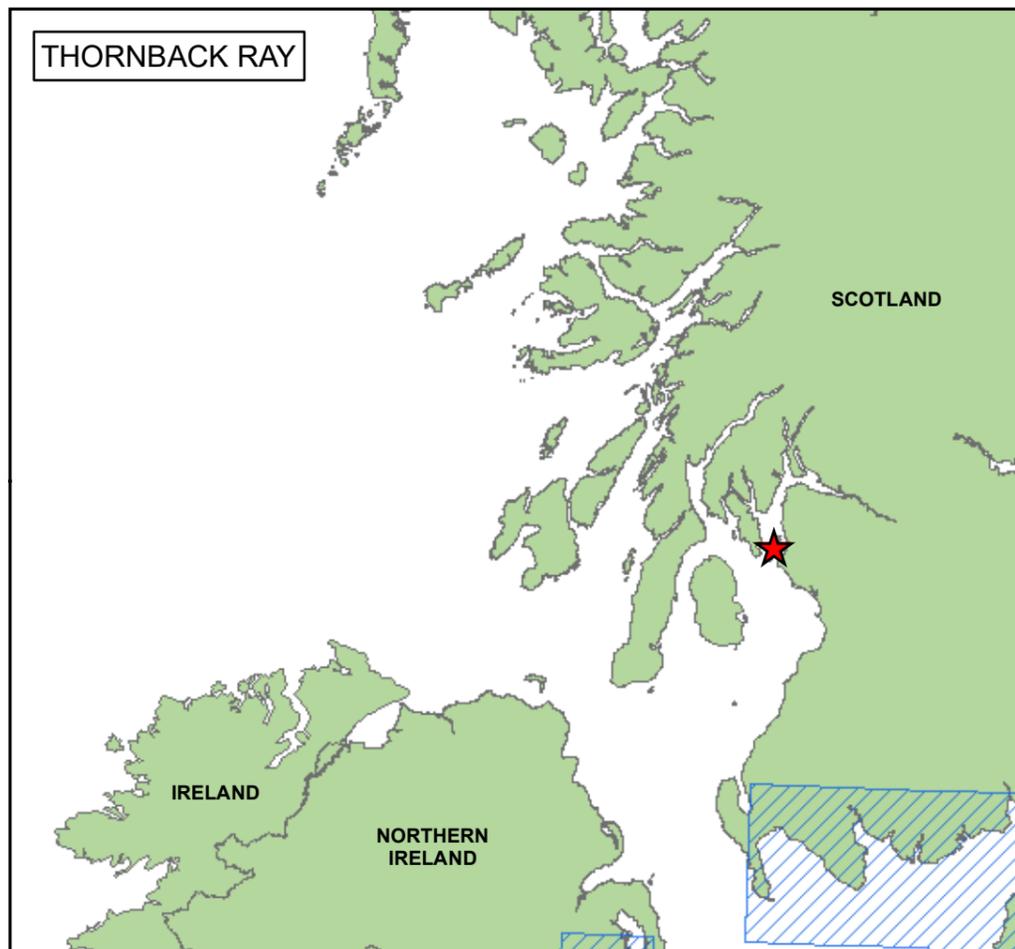
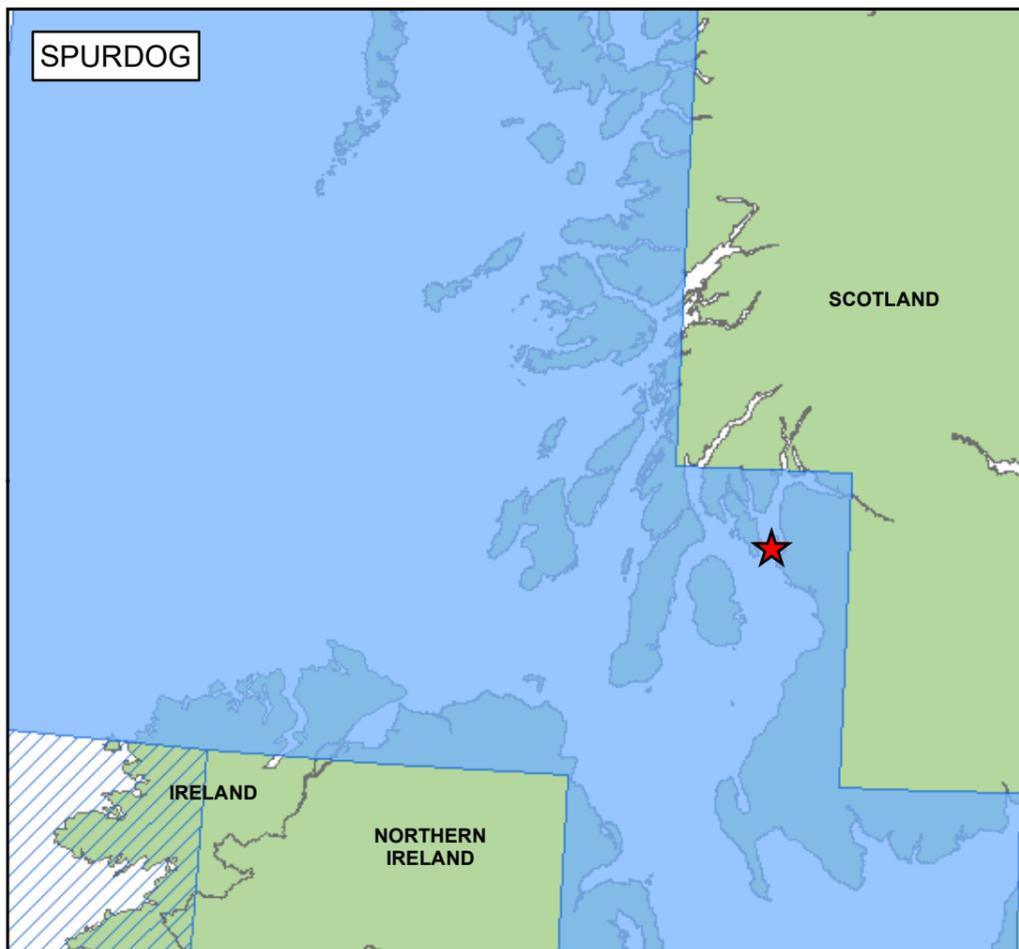
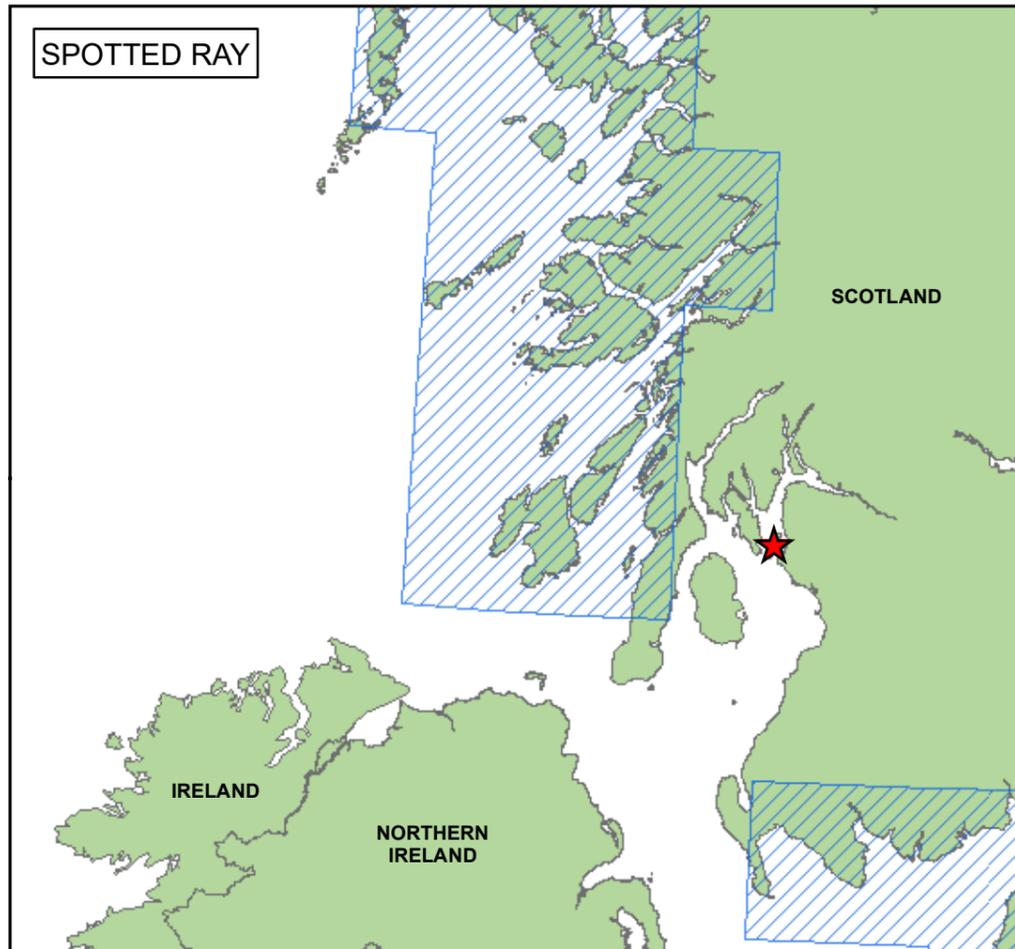
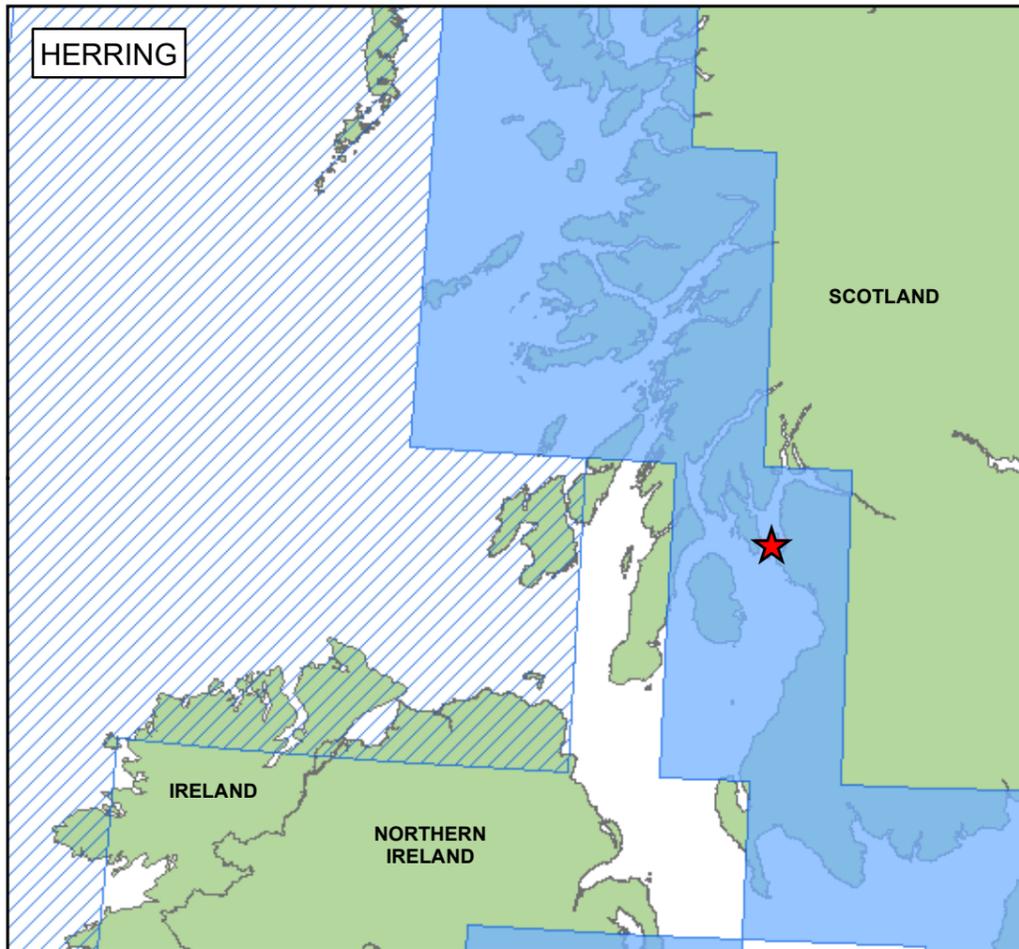
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**Legend**

★ Site Location

**Nursery Habitat**

- High Intensity (Ellis et al. 2010)
- Low Intensity (Ellis et al. 2010)

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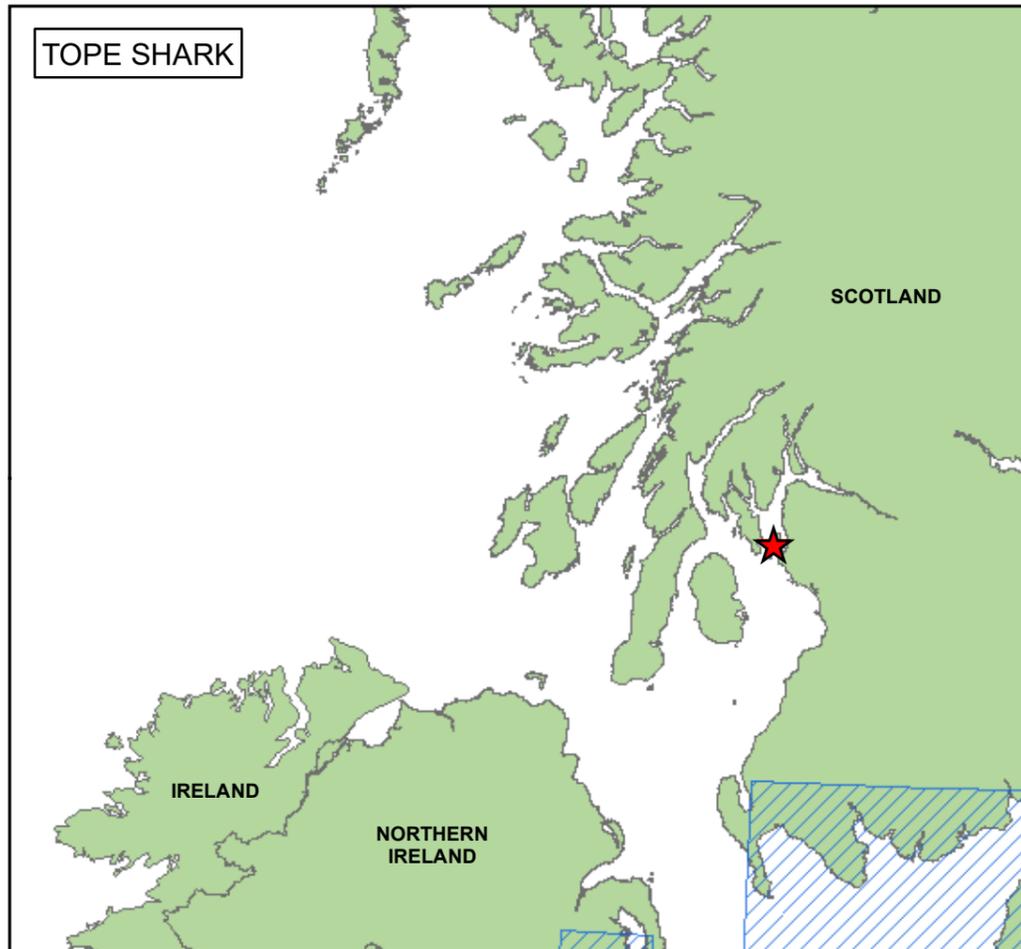
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★ Site Location

**Nursery Habitat**

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