European Community Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC)

Fourth Report by the United Kingdom under Article 17

on the implementation of the Directive
from January 2013 to December 2018

Supporting documentation for the
conservation status assessment for the species:

S1377 - Maerl (*Phymatolithon calcareum*)

SCOTLAND

IMPORTANT NOTE - PLEASE READ

- The information in this document is a country-level contribution to the UK Report on the conservation status of this species, submitted to the European Commission as part of the 2019 UK Reporting under Article 17 of the EU Habitats Directive.
- The 2019 Article 17 UK Approach document provides details on how this supporting information was used to produce the UK Report.
- The UK Report on the conservation status of this species is provided in a separate document.
- The reporting fields and options used are aligned to those set out in the European Commission guidance.
- Explanatory notes (where provided) by the country are included at the end. These provide an audit trail of relevant supporting information.
- Some of the reporting fields have been left blank because either: (i) there was insufficient information to complete the field; (ii) completion of the field was not obligatory; (iii) the field was not relevant to this species (section 12 Natura 2000 coverage for Annex II species) and/or (iv) the field was only relevant at UK-level (sections 9 Future prospects and 10 Conclusions).
- For technical reasons, the country-level future trends for Range, Population and Habitat for the species are only available in a separate spreadsheet that contains all the country-level supporting information.
- The country-level reporting information for all habitats and species is also available in spreadsheet format.

Visit the JNCC website, https://jncc.gov.uk/article17, for further information on UK Article 17 reporting.

Report on the main results of the surveillance under Article 11 for Annex II, IV and V species (Annex B)

NATIONAL LEVEL

1. General information

1.1 Member State	**UK (Scotland information only)**
1.2 Species code	**1377**
1.3 Species scientific name	**Phymatolithon calcareum**
1.4 Alternative species scientific name	
1.5 Common name (in national language)	Maerl

2. Maps

2.1 Sensitive species	No
2.2 Year or period	
2.3 Distribution map	Yes
2.4 Distribution map Method used	
2.5 Additional maps	No

3. Information related to Annex V Species (Art. 14)

3.1 Is the species taken in the wild/exploited?	No	
3.2 Which of the measures in Art. 14 have been taken?	a) regulations regarding access to property	No
	b) temporary or local prohibition of the taking of specimens in the wild and exploitation	No
	c) regulation of the periods and/or methods of taking specimens	No
	d) application of hunting and fishing rules which take account of the conservation of such populations	No
	e) establishment of a system of licences for taking specimens or of quotas	No
	f) regulation of the purchase, sale, offering for sale, keeping for sale or transport for sale of specimens	No
	g) breeding in captivity of animal species as well as artificial propagation of plant species	No
	h) other measures	No

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3.3 Hunting bag or quantity taken in the wild for Mammals and Acipenseridae (Fish)

a) Unit

b) Statistics/ quantity taken	Provide statistics/quantity per hunting season or per year (where season is not used) over the reporting period					
	Season/ year 1	Season/ year 2	Season/ year 3	Season/ year 4	Season/ year 5	Season/ year 6
Min. (raw, ie. not rounded)						
Max. (raw, ie. not rounded)						
Unknown	No	No	No	No	No	No

3.4. Hunting bag or quantity taken in the wild Method used

3.5. Additional information

BIOGEOGRAPHICAL LEVEL

4. Biogeographical and marine regions

4.1 Biogeographical or marine region where the species occurs

Marine Atlantic (MATL)

4.2 Sources of information

Barbera, C., Mallol, S., Verges, A., Cabanellas-Reboredo, M., Diaz, D., & Goni, R. (2017). Maerl beds inside and outside a 25-year-old no-take area. Marine Ecology Progress Series, 572, 77-90.
Hall-Spencer, J. M., & Moore, P. G. (2000). Scallop dredging has profound, long-term impacts on maerl habitats. ICES Journal of marine science, 57(5), 1407-1415.
Hernandez-Kantun, J.J., Hall-Spencer, J.M., Grall, J., Adey, W., Rindi, F., Maggs, C.A., Barbara, I. and Pena, V. (2017) North Atlantic Rhodolith Beds. In Rhodolith/Maerl Beds: A Global Perspective, pp. 265-279. Springer, Cham.
Martin, S., & Hall-Spencer, J. M. (2017). Effects of ocean warming and acidification on rhodolith/maerl beds. In Rhodolith/Maerl Beds: A Global Perspective (pp. 55-85). Springer, Cham.
Melbourne, L. A., Hernandez-Kantun, J. J., Russell, S., & Brodie, J. (2017). There is more to maerl than meets the eye: DNA barcoding reveals a new species in Britain, Lithothamnion erinaceum sp. nov.(Hapalidiales, Rhodophyta). European Journal of Phycology, 52(2), 166-178.
Wilson, S., Blake, C., Berges, J. A., & Maggs, C. A. (2004). Environmental tolerances of free-living coralline algae (maerl): implications for European marine conservation. Biological Conservation, 120(2), 279-289.
Marine Scotland Consultation Webpage for Priority Marine Feature Consultation https://consult.gov.scot/marine-scotland/priority-marine-features

5. Range

5.1 Surface area (km²)

14000

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5.2 Short-term trend Period		
5.3 Short-term trend Direction	Stable (0)	
5.4 Short-term trend Magnitude	a) Minimum	b) Maximum
5.5 Short-term trend Method used		
5.6 Long-term trend Period		
5.7 Long-term trend Direction		
5.8 Long-term trend Magnitude	a) Minimum	b) Maximum
5.9 Long-term trend Method used		
5.10 Favourable reference range	a) Area (km²) b) Operator c) Unknown d) Method	
5.11 Change and reason for change in surface area of range	Improved knowledge/more accurate data Use of different method The change is mainly due to:	Improved knowledge/more accurate data
5.12 Additional information		

6. Population

6.1 Year or period	2013-2017	
6.2 Population size (in reporting unit)	a) Unit b) Minimum c) Maximum d) Best single value	number of map 1x1 km grid cells (grids1x1) 476 476 476
6.3 Type of estimate	Best estimate	
6.4 Additional population size (using population unit other than reporting unit)	a) Unit b) Minimum c) Maximum d) Best single value	
6.5 Type of estimate		
6.6 Population size Method used	Based mainly on extrapolation from a limited amount of data	
6.7 Short-term trend Period	2013-2018	
6.8 Short-term trend Direction	Uncertain (u)	
6.9 Short-term trend Magnitude	a) Minimum b) Maximum c) Confidence interval	
6.10 Short-term trend Method used	Based mainly on expert opinion with very limited data	
6.11 Long-term trend Period		
6.12 Long-term trend Direction		

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6.13 Long-term trend Magnitude	a) Minimum b) Maximum c) Confidence interval
6.14 Long-term trend Method used	
6.15 Favourable reference population (using the unit in 6.2 or 6.4)	a) Population size b) Operator c) Unknown d) Method
6.16 Change and reason for change in population size	Improved knowledge/more accurate data The change is mainly due to: Improved knowledge/more accurate data
6.17 Additional information	

7. Habitat for the species

7.1 Sufficiency of area and quality of occupied habitat	a) Are area and quality of occupied habitat sufficient (to maintain the species at FCS)?	No
	b) Is there a sufficiently large area of occupied AND unoccupied habitat of suitable quality (to maintain the species at FCS)?	Yes
7.2 Sufficiency of area and quality of occupied habitat Method used	Based mainly on expert opinion with very limited data	
7.3 Short-term trend Period	2007-2018	
7.4 Short-term trend Direction	Decreasing (-)	
7.5 Short-term trend Method used	Based mainly on expert opinion with very limited data	
7.6 Long-term trend Period		
7.7 Long-term trend Direction		
7.8 Long-term trend Method used		
7.9 Additional information		

8. Main pressures and threats

8.1 Characterisation of pressures/threats

Pressure	Ranking
Shipping lanes, ferry lanes and anchorage infrastructure (e.g. canalisation, dredging) (E03)	M
Marine fish and shellfish harvesting (professional, recreational) causing reduction of species/prey populations and disturbance of species (G01)	H
Marine fish and shellfish harvesting (professional, recreational) activities causing physical loss and disturbance of seafloor habitats (G03)	H
Marine aquaculture generating marine pollution (G16)	M

Other invasive alien species (other then species of Union concern) (I02)	M

Threat	Ranking
Marine fish and shellfish harvesting (professional, recreational) causing reduction of species/prey populations and disturbance of species (G01)	M
Marine fish and shellfish harvesting (professional, recreational) activities causing physical loss and disturbance of seafloor habitats (G03)	M
Marine plant harvesting (G04)	M
Marine aquaculture generating marine pollution (G16)	M
Other invasive alien species (other then species of Union concern) (I02)	M
Temperature changes (e.g. rise of temperature & extremes) due to climate change (N01)	H
Change of habitat location, size, and / or quality due to climate change (N05)	H

8.2 Sources of information

8.3 Additional information

9. Conservation measures

9.1 Status of measures	a) Are measures needed?	Yes
	b) Indicate the status of measures	Measures identified and taken
9.2 Main purpose of the measures taken		Maintain the current range, population and/or habitat for the species
9.3 Location of the measures taken		Both inside and outside Natura 2000
9.4 Response to the measures		Long-term results (after 2030)

9.5 List of main conservation measures

Management of professional/commercial fishing (including shellfish and seaweed harvesting) (CG01)
Reduce/eliminate marine pollution from marine aquaculture (CG08)
Reduce impact of transport operation and infrastructure (CE01)
Manage changes in hydrological and coastal systems and regimes for construction and development (CF10)
Other measures to reduce impacts from marine aquaculture infrastructures and operation (CG09)
Adopt climate change mitigation measures (CN01)
Management of hunting, recreational fishing and recreational or commercial harvesting or collection of plants (CG02)

9.6 Additional information

10. Future prospects

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10.1 Future prospects of parameters	a) Range b) Population c) Habitat of the species
10.2 Additional information	

11. Conclusions

11.1. Range	
11.2. Population	
11.3. Habitat for the species	
11.4. Future prospects	
11.5 Overall assessment of Conservation Status	
11.6 Overall trend in Conservation Status	
11.7 Change and reasons for change in conservation status and conservation status trend	a) Overall assessment of conservation status No change The change is mainly due to: b) Overall trend in conservation status No change The change is mainly due to:
11.8 Additional information	

12. Natura 2000 (pSCIs, SCIs and SACs) coverage for Annex II species

12.1 Population size inside the pSCIs, SCIs and SACs network (on the biogeographical/marine level including all sites where the species is present)	a) Unit b) Minimum c) Maximum d) Best single value
12.2 Type of estimate	
12.3 Population size inside the network Method used	
12.4 Short-term trend of population size within the network Direction	
12.5 Short-term trend of population size within the network Method used	
12.6 Additional information	

13. Complementary information

13.1 Justification of % thresholds for trends	

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13.2 Trans-boundary assessment

13.3 Other relevant Information

Distribution Map

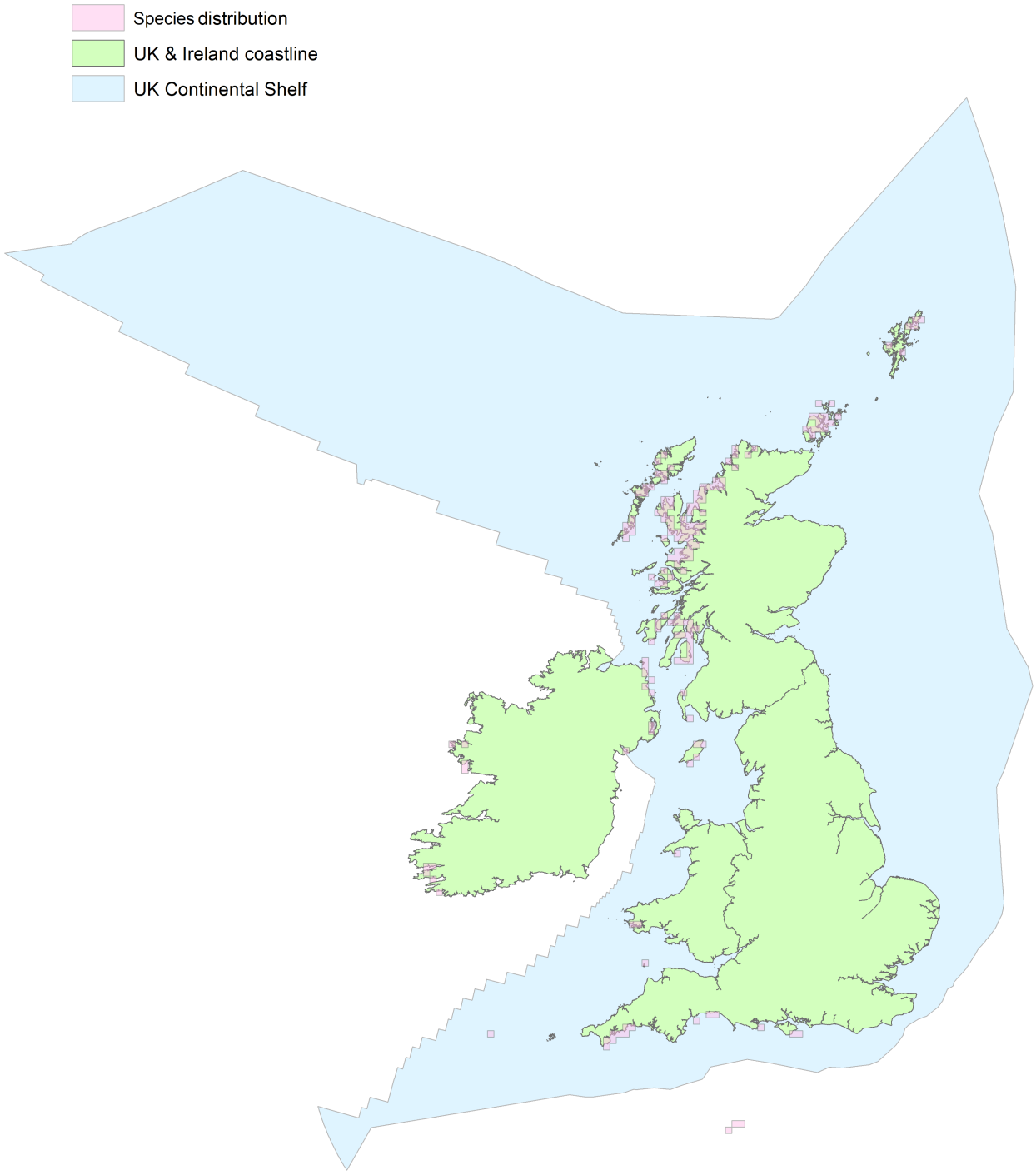

Figure 1: UK distribution map for S1377 - Maerl (*Phymatolithon calcareum*).

The 10km grid square distribution map is based on available species records within the current reporting period. For further details see the 2019 Article 17 UK Approach document.

Range Map

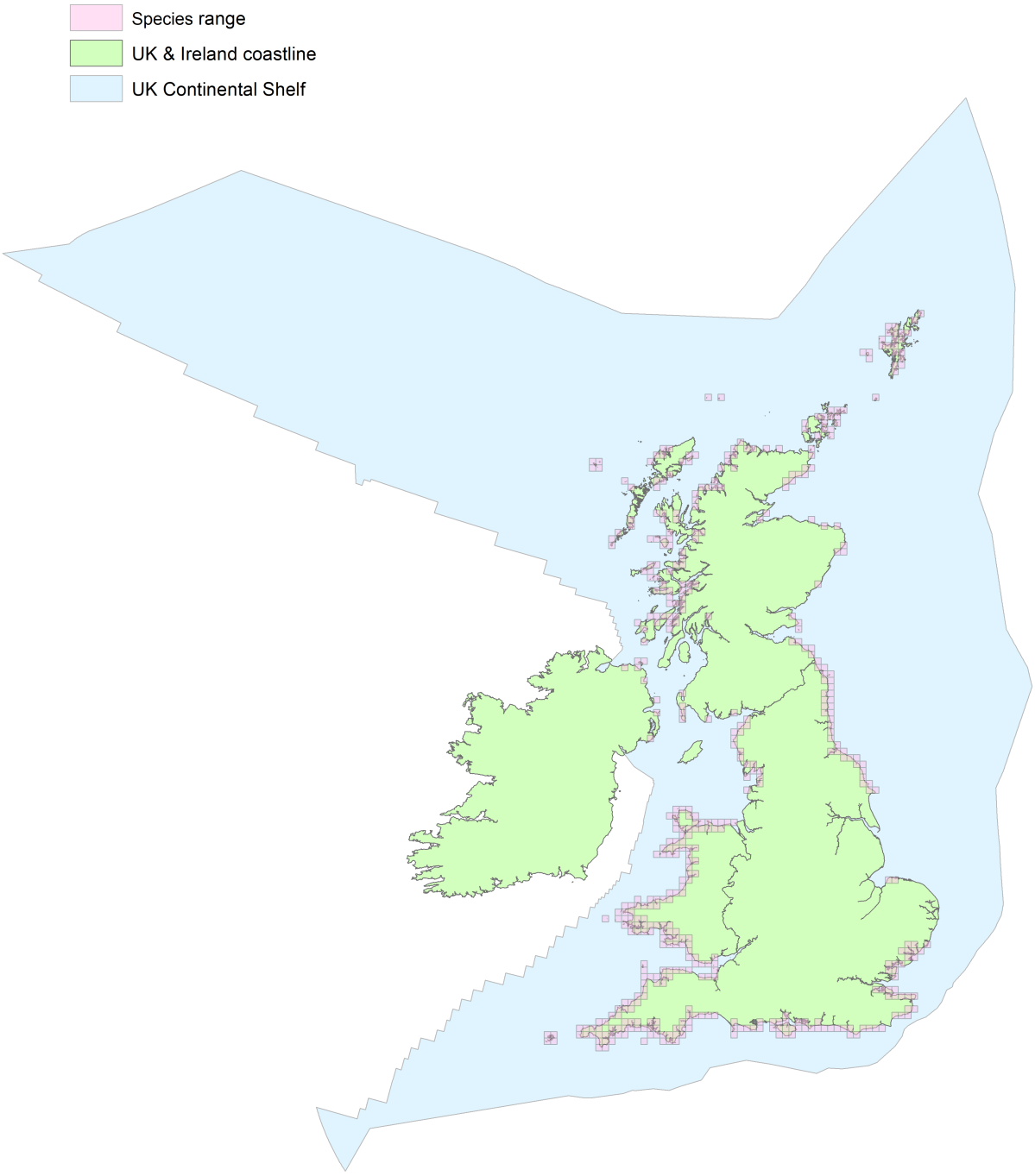

Figure 2: UK range map for S1377 - Maerl (*Phymatolithon calcareum*).

It is recognised that it is extremely difficult to distinguish maerl species without genetic testing and previous identification of UK maerl species in surveys may not be reliable. Therefore, all records of maerl species in UK waters were used to create the distribution map and range map. The number of 10x10km grid squares containing maerl records were used to calculate the range.

Explanatory Notes

Species name: Phymatolithon calcareum (1377) Region code: MATL

Field label	Note
5.11 Change and reason for change in surface area of range	The range of this species has increased since the value reported in 2013 for Scotland. However, this due to increased knowledge/information about the distribution of the habitat in Scottish waters, through additional survey work particularly in relation to the designation of new Nature Conservation MPAs in Scottish waters. Additionally the value in 2013 was specifically for P. calcareum. However, it is recognised that there are many difficulties in distinguishing maerl species and genetic testing is the only confident way to do this. Rherefore all records of maerl species in Scottish waters have been included in the 2019 reporting. It is likely that the proportion of P.calcareum is somewhere in the region of 80% of the records but this is a judgement only.
6.2 Population size	Note that reporting on this species is largely covered by reports on the habitat maerl beds rather than the species Phymatolithon calcareum. This is important due to the difficulties distinguishing this species from other maerl species in the field. Therefore this population estimate uses records of maerl in Scotland. However it is likely that most records in Scotland will be Phymatolithon calcareum. Maerl beds are a subfeature of the Annex I habitat Subtidal Sandbanks as well as a Priority Marine Feature, therefore survey and monitoring work often focuses on this feature (e.g. the Sound of Barra BACI surveys). There are two PMFs relevant for this species - Maerl beds and Maerl or Coarse shell gravel with burrowing sea cucumbers. The area provided here is based on the presence of maerl in a 1x1km grid, therefore this is likely to be an overestimate of the maerl resource as this includes records of small pieces of maerl as well as maerl beds.
6.16 Change and reason for change in population size	The population size of this species has increased since the value reported in 2013 for Scotland. However, this due to increased knowledge/information about the distribution of the habitat in Scottish waters, through additional survey work particularly in relation to the designation of new Nature Conservation MPAs in Scottish waters. Additionally the value in 2013 was specifically for P. calcareum. However, it is recognised that there are many difficulties in distinguishing maerl species and therefore all records of maerl species in Scottish waters have been included in the 2019 reporting.
7.1 Sufficiency of area and quality of occupied habitat	The habitat of maerl has been taken to be maerl beds/maerl gravel because this provides an indication that maerl is able to exist in the locality. The area/quality of occupied habitat is not believed to be sufficient because we know of declines/loss in maerl beds in several localities that have come to light in recent years, e.g. declines in South Arran and Wester Ross MPAs, loss of maerl bed in Upper Loch Fyne and Loch Goil MPA that was associated with the flameshell bed (Moore, 2014).
7.4 Short term trend; Direction	The short term trend direction of the habitat of maerl has been noted as decreasing because of the declines outlined above and because we know there have been activities including mobile bottom towed fishing gear interacting with maerl and its habitat over the past 6 year period, which has caused degradation of the habitat in some locations (see 7.1, Moore, 2014)

9.6 Additional information	For SACs licensable activities e.g. aquaculture, renewable developments, oil and gas exploration and development, coastal developments, activitie associated with shipping/vessels e.g. dredging, anchorage, moorings military activities are subject to Habitiats Regulations Appraisal in Scotland which considers whether a particular plan or project (activities) will cause a likely significant effect on the habitat and result in an adverse effect on site integrity. If the tests of the HRA are not met then the development normally will not be allowed to continue unless suitable mitigation can be undertaken. For Nature Conservation MPAs a Section 83 assessment is undertaken of the licensable activities, which requires the public authority to assess whether there is a significant risk of the activity hindering the achievement of the conservation objectives of the Nature Conservation MPA. Conservation measures are in place for the following SACs and MPAs: Loch Sween, Wyre and Rousay Sounds, Fetlar to Haroldswick, Wester Ross, Loch Carron and South Arran MPAs, Luce Bay and Sands SAC, Loch Laxford SAC, and Sanday SAC. Sheltand Shellfish Management Organisation closed areas also provide protection for maerl beds inside and outside MPAs and SACs (see https://www.ssmo.co.uk/maps). Outside of MPAs impacts are considered on Priority Marine Features (PMFs) (https://www.snh.scot/professional-advice/safeguarding-protected-areas-and-species/priority-marine-features-scotlands-seas) , of which maerl beds and Maerl or coarse shell gravel with burrowing sea cucumbers are relevant for this species). Policy GEN 9 Natural Heritage in Scotland's National Marine Plan (Marine Scotland 2015) requires that development and use of the marine environment must not result in a significant impact on the national status of PMFs, including these habitats. Regional Marine Management Plans for some regions (Shetland, Clyde) have been developed which seek to identify the location of sensitive PMFs and propose regional marine management policies to limit impacts of activities on these features and site development in more appropriate places. Conservation measures which will start to operate during the next reporting period: Further fisheries management measures for sites with maerl beds present will be consulted on in 2018 with an aim to implement these in 2019. These are: Loch nam Madadh SAC, Sound of Arisaig SAC, Sound of Barra SAC, Fetlar to Haroldswick MPA. Currently underway (as of July 2018) is a consultation lead by Marine Scotland to consider where there is a need to consider additional management for bottom contacting mobile fishing gears to ensure there is no significant impact on the national status of the most sensitive habitat PMFs within the 6 nautical mile (NM) limit. This specifically deals with the location of these sensitive habitats outside of Marine Protected Areas including SACs. See https://consult.gov.scot/marine-scotland/priority-marine-features/ Regional Marine Management Plans will continue to be developed for other regions with Orkney and the Outer Hebrides being proposed for during the next reporting period.

10.1 Future prospects of parameters	Maerl beds are a subfeature of the Annex I habitat Subtidal Sandbanks and therefore this maerl species is offered protected via some SACs, Nature Conservation MPAs and also through being a PMF. There are two PMFs relevant for this species - Maerl beds and Maerl or Coarse shell gravel with burrowing sea cucumbers. These features are protected in some Nature Conservation MPAs including Wester Ross, Wyre and Rousay, and South Arran MPAs but also outside the MPA network in Scotland under the National Marine Plan General Policy 9. We believe that the range of this species should remain stable in the future over the next 12 year period based on the monitoring data within sites and the conservation measures that are currently in place or planned, both within MPAs and outside of protected areas. Additionally the main climate change pressure which could affect this feature, ocean acidification, is likely to take longer than 12 years before we see an effect on range. We propose that trend for population and structure and function is stable due to the pmanagement measures now in place and that are proposed again both inside and outside protected areas. There may be a slight positive increase in population/structure and function because of the management but due to the slow growth of this species it is hard to determine. However, it should be recognised that there are uncertainties in the the assessment because the new management measures are being targeted on the basis of the existing evidence-base only and it is unclear whether there may be future iterations needed similar to the current PMF review process. It is also clear from recent work (e.g. in Loch Carron on flameshell beds) that human activities will continue to modify examples of our most sensitive PMFs in areas where no survey records currently exist. Therefore there maybe records of maerl that we are currently unaware of that are being impacted by human activities.