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Feeder Report 2021 - Extraction of non-living Resources

Introduction

1.1 This paper summarises extraction of non-living resources within the OSPAR Maritime Area and measures taken to manage the environmental impacts. It briefly notes key messages from the Quality Status Report (QSR) 2010 (/en/ospar-assessments/quality-status-reports/quality-status-report-2010/) and the Intermediate Assessment (IA) 2017, (/en/ospar-assessments/intermediate-assessment-2017/) and reports on progress since then.

(/en/ospar-assessments/quality-status-reports/qsr-2023/)

Distribution, intensity and trends

2.1 Current extraction of non-living resources in the OSPAR Maritime Area is dominated by sand and gravel. These deposits may be relict or fossil, formed when the sea level was lower than at present and parts of the modern sea bed were exposed, glaciated or crossed by major rivers; or formed under modern marine processes, such as sand banks in the southern North Sea (see e.g. Veligrakis et al, 2010; Bide et al, 2016). Sand and gravel are used as a source of aggregate or contract fill material for the construction industry, and as material for coastal works such as land reclamation, beach replenishment and coastal defence. The latter is particularly important in the Netherlands.

2.2 In the Netherlands, shells are extracted from the North Sea, Voordelta and Wadden Sea and used for purposes such as drainage systems, insulation and path surfacing. The amounts extracted are not allowed to exceed natural accretion (Noordzeeloket, 2020, Netherlands Ministries, 2015). Maerl was extracted in France but the International Council for the Exploration of the Sea (ICES) reports that this was banned in 2013 (ICES, 2018).

2.3 ICES reports that marine sediment extraction in the North Atlantic has increased substantially since the early 1970s from just a few hundred thousand m^3 per year to tens of millions of m^3 in recent years (ICES, 2019a). QSR 2010 reported that extraction of marine sand and gravel in the OSPAR Maritime Area had increased by around 30% in the previous decade; its associated background paper (OSPAR, 2009) showed an increase from 43 million m^3 in 1995 to 57 million m^3 in 2007, with a high point in that period of 63 million m^3 in 2005. The total area of extraction had been relatively stable as new areas had been offset by activity stopping elsewhere. The QSR anticipated that demand to supply construction projects and coastal protection schemes would continue to increase.

2.4 The following tables show extraction of sand, gravel, and other resources in the OSPAR area in 2018 and 2019 (data are for seabed areas within the OSPAR Maritime Area and are from ICES information (ICES, 2019a; ICES, 2020), which also gives more background to the figures; the tables also include some additional clarifications provided by OSPAR Contracting Parties).

⊞ Table 1: Extraction of aggregates and other non-living resources in the OSPAR region, 2018

⊞ Table 2: Extraction of aggregates and other non-living resources in the OSPAR region, 2019

2.5 The amounts extracted can vary substantially between years. In European Union (EU) and EFTA countries as a whole, a total of 3 billion tonnes of all terrestrial and marine aggregates was extracted in 2018, still lower than annual levels of over 3,6 billion tonnes between 2006 and 2008, before the 2008 financial downturn, despite an upward trend since 2013 (UEPG, 2020). For marine aggregates, which are less than 2% of total EU/EFTA aggregates production, volumes may be influenced by general demand, as well as country-specific factors. For example:

1. in the Netherlands, over 120 million m^3 of sand were extracted in each of 2009 and 2010 to supply major infrastructure, but below 16 million m^3 in 2016 (ICES, 2019a);
2. in France, annual amounts varied between 3,7 and 2,7 million m^3 from 2010 to 2019, with the lowest values in the middle of the decade (ICES, 2019a);
3. in the United Kingdom, marine aggregates meet around 20% of the sand and gravel demand for England and Wales. The tonnage extracted rose between 2010 and 2017 but was still below the levels from 1998 to 2008; trends varied considerably between regions (The Crown Estate 2018; 2019);
4. in Denmark, where legislative changes in 2010 and 2015 were introduced to the framework for extraction of offshore materials, extraction rose between 2010 and 2018 (Miljøstyrelsen, 2020).

2.6 The amounts of marine sediments (in million m^3) extracted in the ICES area (OSPAR and HELCOM) for the years from 2008 to 2019 are given below[1] (/en/ospar-assessments/quality-status-reports/qsr-2023/other-assessments/extraction-non-living-resources/#1).

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
64,013	174,333	161,597	103,993	94,253	80,237	92,450	71,448	51,250	56,698	72,253	61,462

2.7 ICES (2020) also reports the area licensed for extraction, although data are incomplete[2] (/en/ospar-assessments/quality-status-reports/qsr-2023/other-assessments/extraction-non-living-resources/#2) . Figures available (in km^2) are: Belgium 203, Denmark 617; France 193; Iceland 20; the Netherlands 548; United Kingdom 1079. The area actually used for extraction in the year, however, was smaller – ICES reports 59 km^2 in Belgium, 151 km^2 in France, 8 km^2 in Iceland, 95 km^2 in the Netherlands and 105 km^2 in the United Kingdom.

2.8 Maps of extraction sites and active extraction areas are also available from the EMODnet Human Activities Portal (EMODnet, 2020).

2.9 ICES also provides information on the intensity of the activity (dredging time per unit area of extraction – ICES use 50 x 50 m grid cells). The highest average time (25 minutes per cell) was in the United Kingdom, followed by Denmark, whereas the average time in the Netherlands (seven minutes) and Belgium (less than five minutes) was much lower. This reflects differences between the national activities in terms of:

1. national policy. For example, United Kingdom policy seeks to minimise the area dredged, to limit impacts on the environment and to reduce impacts on other marine users; areas are worked to economic exhaustion to allow recovery of previously worked areas. In the Netherlands, policy until 2004 was to extract not more than two metres below the sea bed, but since then extraction tends to be deeper - typically 6-8 metres below the sea bed, but extraction for Maasvlakte 2, a major expansion of facilities at the port of Rotterdam, was at a depth of 20 metres[3] (/en/ospar-assessments/quality-status-reports/qsr-2023/other-assessments/extraction-non-living-resources/#3) ;
2. geological resources – relict sand and gravel sources, as in the United Kingdom and Denmark are more spatially limited than more widely distributed sand resources, such as those in Belgian and Netherlands

waters;
3. dredging practices, for example where vessels modify the ratio of sand and gravel in accordance with the end-use of the product through on board screening.

2.10 The time intensity is not necessarily correlated with the impacts of extraction, which is influenced by indirect effects such as turbidity, sediment plumes and changes in current, as well as the factors affecting recovery, such as the nature of the local environment.

Economic status

3.1 The European Commission's Blue Economy report 2020 (European Commission, 2020) gives the following figures for the economic value of marine aggregates for the major producers in 2018 (including non-OSPAR regions):

Table 3: Economic statistics for aggregates production in OSPAR countries

Country	Persons employed (total)	Turnover(Million Euro)	Value added at factor cost (Million Euro)
Belgium	52	24,9	7,4
Denmark	84	34,5	12,3
Germany	301	57,8	22,0
France	123*	35,9	10,1
Netherlands	170	119,8	33,7

*France reports 655 direct jobs, http://sablesetgraviersenmer.fr/pages/les-donnees-cles.html (http://sablesetgraviersenmer.fr/pages/les-donnees-cles.html)

3.2 For the United Kingdom, a report for the UK Seabed User and Developer Group reported figures of c. 490 jobs, turnover of £266m and direct Gross Value Added of £13m (ABPMer and ICF, 2019)

3.3 The economic value of the infrastructure and construction activities supported by these extractions will be many times greater. For example, about 180 million m^3 of sand was used to support the first phase of Maasvlakte 2[4 (/en/ospar-assessments/quality-status-reports/qsr-2023/other-assessments/extraction-non-living-resources/#4)] . Nearly 1 million m^3 were used in the redevelopment of the Dover Western Docks (The Crown Estate, 2019). For construction more generally, marine aggregates provide around one third of the aggregates for London and the south-east of England[5 (/en/ospar-assessments/quality-status-reports/qsr-2023/other-assessments/extraction-non-living-resources/#5)].

Future trends

Sand and gravel

4.1 Future trends in the extraction of aggregates will be influenced by a variety of factors. These will include the rate of economic growth and its effect on construction demand; the availability of other sources of aggregates, including recycled material as well as land-based sources; available reserves of marine aggregates; and the need for coastal defence works, including in response to sea level rise driven by climate change.

4.2 Analysis from the European Aggregates Association has shown a broadly linear relationship between Gross Domestic Product per capita and aggregate production (UEPG, 2020). As of mid-2020, European countries were reporting different degrees of decline in aggregate production due to the impact of COVID-19 on the economy, with future trends dependent on the scale and timing of economic recovery.

4.3 The relationship between overall economic growth, construction growth and the use of marine aggregates is nevertheless not straightforward. For example, an analysis of future United Kingdom aggregates use from 2016 to 2030 explored scenarios affected by overall economic growth and demand; material intensity of construction; availability of recycled aggregates; use of crushed rock in aggregates; wharf and dredger capacity; ability to secure permissions for land-based sources; and availability of imports. Under those scenarios, the demand for marine sand and gravels from United Kingdom waters (12 million tonnes in 2015) ranged from as low as 9 million tonnes in 2030 to as much as 34 million tonnes. The scenarios were not predictions, and some assumptions may be more likely than others. The study did conclude that the contribution of land-won sand & gravel sources is likely to continue to decline in the United Kingdom, being replaced by a combination of marine sand & gravel and crushed rock substitution (Mineral Products Association, 2017).

4.4 Strategic analysis of sand and gravel reserves, and their future use, have been undertaken by several OSPAR countries. In the Netherlands, where sand extraction is considered an activity of national interest, sand is extracted for use in coastal reinforcement, to combat flood risks (e.g. beach nourishment) as well as occasional large-scale extraction for major projects and for use of marine sand on land for infrastructure and construction. The sea-level rise anticipated due to climate change will have consequences for the demand for replenishment sand and fill sand, and it is possible that the demand for sand for coastal maintenance could grow to up to 85 million m^3 per year (Noordzeeloket, 2020), although the most recent expectation is 10-37 million m^3 per year in the period after 2035, depending on a sea level rise of 2-8 mm per year[6] (/en/ospar-assessments/quality-status-reports/qsr-2023/other-assessments/extraction-non-living-resources/#6).

4.5 A sand extraction strategy has been prepared: the Netherlands is considered to have enough stocks in the designated sand extraction area for the 21st century, although the Netherlands North Sea Plan 2016-21 says that resources are under pressure in some specific areas. The zone between the continuous NAP -20m isobath and the 12-mile boundary is regarded as a reserve area for sand extraction (Noordzeeloket, 2020; Netherlands Ministries, 2015).

4.6 In France, studies were carried out by IFREMER on the scale of marine aggregate resources in the eastern English Channel and the Loire-Gironde (Ifremer, 2006) and in Brittany and Sud-Gascogne (Ifremer, 2012). The resources amounted to hundreds of billions of m^3 although the potential for extraction varied. It may be that in future years more use of marine aggregates will be needed for construction or coastal works (CGEDD/CGE, 2017).

4.7 In the United Kingdom, The Crown Estate reports that there are around 347 million tonnes of current permitted primary reserves which can be extracted for economic purposes, representing around 22 years of average annual offtake; substantial future reserves are present subject to future licensing (The Crown Estate, 2019; Bellamy & Russell, 2018).

4.8 In Denmark, the Geological Survey of Denmark and Greenland maps the seabed so as to identify sand and gravel which could be extracted, and maintains a national marine raw material database (further information in Ditlefsen et al, 2015; and GEUS, 2020).

4.9 The TILES project (Transnational and Integrated Long-term Marine Exploitation Strategies) has developed a knowledge base for Belgian waters and the southern Netherlands part of the North Sea. TILES concluded that the Belgian medium to coarse sands will be exhausted within 80-100 years, if extraction remains limited to the present-day concession zones, so that consideration of alternatives is required (Van Lancker et al, 2019).

4.10 Although uncertain, it is possible that extraction of sand and gravel may be developed in OSPAR countries other than the current producers. The Geological Survey of Norway has stated that in future there may be more exploitation of sand and gravel from the seabed of the fjords, along the coast or the continental shelf, but mapping of the resources, and evaluation of whether they can be exploited sustainability, is still needed (NGU, 2019). The Irish Sea IMAGIN project concluded that sustainable extraction of marine aggregates in Ireland and Wales was achievable in the short to medium term (Sutton et al, 2008), but as of 2018, ICES reports no extraction of marine aggregates by Ireland.

Other minerals, including deep sea mining

4.11 The EU's blue economy report 2020 described the role that marine minerals might play in the future supply of raw materials (European Commission, 2020). It listed five classes of mineral deposits associated with different water depths and geological conditions:

1. marine placers, typically found in shallow waters and including a variety of minerals;
2. phosphorites, forming at depths of 95-1950 metres, containing phosphate and with potential for critical rare earth elements;
3. seafloor massive sulphides, typically found from 400-3900 metres, containing copper, zinc, lead, silver and gold, as well as the potential for high-tech metals;
4. cobalt-rich ferromanganese crusts, forming from 800-7000 metres, containing manganese and with potential for other metals;
5. polymetallic nodules at depths of 4000-6000 metres, again containing manganese and other metals.

4.12 A map of resources in the OSPAR region, is shown below (source: OSPAR, 2021).

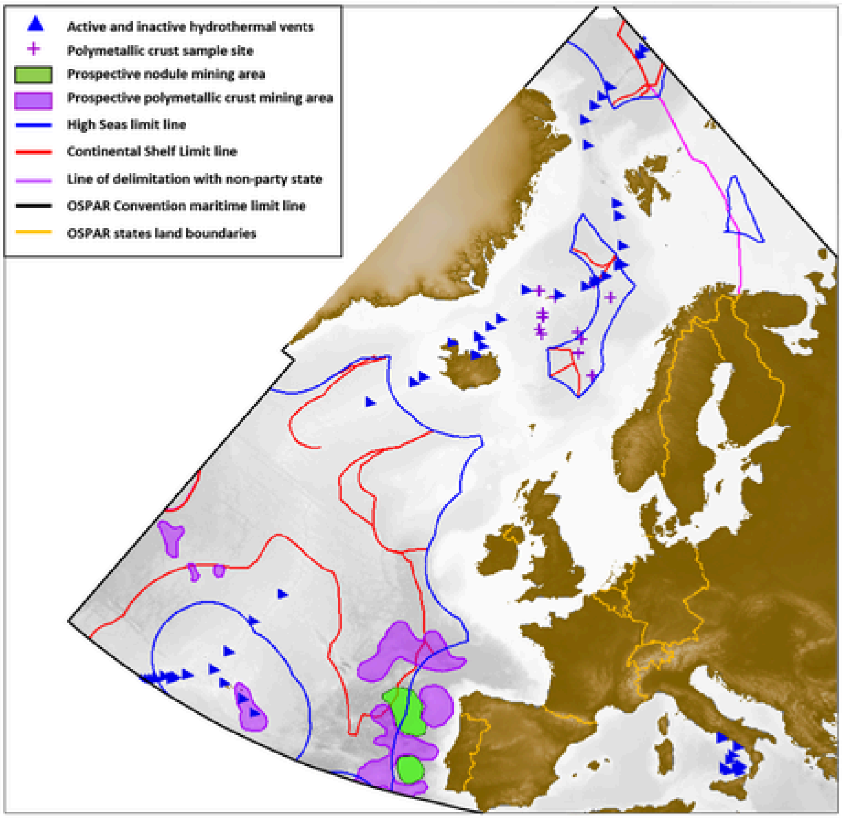

Figure 1: Compilation of confirmed and potential metallic deep sea mineral deposits within the OSPAR area (Compilation and layout: Norwegian Petroleum Directorate, Stavanger, Norway). Ocean areas are cut along the limits of the OSPAR Maritime Area (black lines). The limit of the High Seas (blue lines) is the boundary between the Area and the combined Exclusive Economic Zones (EEZs) of all coastal States within and adjacent to the OSPAR Maritime Area. The red lines indicate coastal States' outer limits of the continental shelf beyond 200 nautical miles as submitted to, or recommended by the Commission on the Limits of the Continental Shelf (CLCS). Data credits; bathymetric data are SRTM15_PLUS extracted from NOAA (Backdrop bathymetry: https://www.ncei.noaa.gov/archive/accession/0150537 [viewed 16/02/2021]); resource data and information are extracted from the Royal Society (Resource information: https://royalsociety.org/topics-policy/projects/future-ocean-resources/ [viewed 16/02/2021]) and the Norwegian Petroleum Directorate (Resource information: Norwegian Petroleum Directorate, Stavanger, Norway).

4.13 The European MINDeSEA project on seabed mineral deposits in European seas is characterising the occurrence of the minerals and their exploitation status (MINDeSEA, 2020). However, the Blue Economy report notes that further work would be needed to estimate reserves; as yet there are no commercial deep sea mining projects in the OSPAR area. There has also been work to characterise deposits in Norwegian waters (Miljødirektoratet, 2016). Under the current Subsea Minerals Act, the Norwegian Government last year initiated an opening process for offshore mineral activity, including an impact study[7] (/en/ospar-assessments/quality-status-reports/qsr-2023/other-assessments/extraction-non-living-resources/#7) 8 (/en/ospar-assessments/quality-status-reports/qsr-2023/other-assessments/extraction-non-living-resources/#8) 9 (/en/ospar-assessments/quality-status-reports/qsr-2023/other-assessments/extraction-non-living-resources/#9). A Government data acquisition program has been in place since 2018 (geological and geophysical data).

4.14 The Blue Economy report states that further research and knowledge on the deep sea environment and its resilience are required in order to move from exploration to exploitation. The EU is also supporting the International Seabed Authority's (ISA) development of a regional environmental management plan for areas beyond national jurisdiction in the North Atlantic, by funding a project on areas of particular environmental interest in the Atlantic (European Commission, 2020). ISA is continuing to develop the set of rules, regulations and procedures to regulate prospecting, exploration and exploitation of marine minerals in areas beyond national jurisdiction (ISA, 2020). ICES notes that there is still much uncertainty about the nature of extraction activities in the north-east Atlantic in terms of geography, water depth, potential pressures and sensitivity of habitats, although there will be parallels with experience from the management of sand and gravel extraction (ICES, 2019a). ICES also referred to exploration of ilmenite sands in Greenland for titanium recovery; further details, including on offshore resources, are outlined at Greenland Minerals Authority (2019).

4.15 A technical report for OSPAR has highlighted the increasing demand for resources such as copper, cobalt, nickel, lithium, silver, rare earth elements and critical metals, with a doubling of global demand anticipated by 2050-2060 (OSPAR, 2021). The transition to renewable energy, associated with increased energy storage requirements, is a key factor in driving up demand. Different types of resource require different mining techniques: for example, seafloor massive sulphide mining has a relatively small spatial footprint on the seabed (0,5-1,0 km^2 for the total life of a mining project, but involves a relatively deep extraction (up to 10 m depth). Mining of nodules and crusts has a much larger spatial footprint (typically 150-200 km^2 per year for nodules) while requiring much shallower excavation (10-30 cm).

Quality Status Report 2010 and Intermediate Assessment 2017

5.1 QSR 2010 and its associated background paper (OSPAR, 2009) highlighted increases since the mid-1990s in marine sand and gravel extraction, as well as the potential of deep sea mining. It highlighted the role of environmental impact assessments in avoiding damage to priority habitats, such as maerl beds or Sabellaria spinulosa reefs. It concluded that the use of ICES guidelines on managing extraction had been successful in some areas, such as the English Channel, but that variable quality of assessments made it hard to assess whether regulation had improved the protection of benthic ecosystems. It recommended that continued efforts would be needed to reduce negative impacts, including stringent implementation of ICES guidelines, harmonised reporting, and work to address gaps in knowledge of issues such as impacts on fish and small benthic fauna and long term recovery of the seabed.

Impacts and measures

6.1 Reports from ICES (Sutton & Boyd, 2009; ICES, 2016; ICES, 2019a) provide an overview of the impacts of sand and gravel extraction. Effects can include loss of the materials themselves, impacts on benthic fauna (few of which will survive the extraction process), sand coverage on seabeds in the vicinity, suspended matter in the water, and noise. The impacts can potentially be wide-ranging (see, for example, description in ICES (2019a) of turbidity effects modelled by environmental impact assessments for extraction of materials for the Maasvlakte 2 development). Changes in the topography (e.g. furrows) can remain for just a few months in highly mobile sand areas to several years or decades in areas of more stable sediments. Impacts will be influenced by factors such as the spatial extent, duration, frequency or intensity, as well as habitat type.

However, extraction can be managed in ways that minimise impacts and allow recovery of the benthic fauna within an acceptable period. Restoration of species diversity and biomass in gravel habitats can take ten years or more to complete, whereas in dynamic sandy habitats recovery is faster.

6.2 ICES has produced guidelines for the management of marine sediment extraction, which were adopted by OSPAR in its Agreement 2003-15 on sand and gravel extraction. The agreement also encouraged an ecosystem-based approach to management of human activities, general plans for extraction of sediments subject to strategic environmental assessment of those plans; and controls on the extraction of sediments from any ecologically-sensitive site. ICES (2016) reviewed the effects of aggregate extraction from 2005 to 2011. It concluded that the ICES guidelines are used in ICES countries through guidance or legislation, and that the guidelines remained fit for purpose.

6.3 The ICES Working Group on the Effects of Extraction of Marine Sediments on the Marine Ecosystem (WGEXT) has continued to consider the environmental effects of aggregate extraction. ICES (2019a) reviewed research on aggregates extraction in the context of the EU's Marine Strategy Framework Directive's objective of good environmental status. Conclusions included that:

1. extraction could potentially be a serious threat to biodiversity in gravelly areas either of small size or under-represented in the area. However, the ICES guidelines provide for the adoption of appropriate extraction site locations, preventing harm to habitats of prime importance;
2. extraction could potentially be a serious threat to fish species, for example through loss of spawning areas, but that the ICES guidelines also provide for adoption of appropriate extraction site locations, with the aim to prevent any harmful effect on habitats of prime importance;
3. extraction will affect sea bed integrity; extraction should preferably take place in naturally unstable bottoms (e.g. coarse sand dunes), where benthic communities are poor. However, that would not allow for gravel extraction. The ICES expert group considered that it should be accepted that some change will occur and that it would be inappropriate to expect no environmental change;
4. in general, the dimensions of dredged pits would have only limited influence on the macroscale current pattern;
5. while extraction generates noise, this is merely contributing to the general noise levels from shipping and introduces no negative impacts from the extraction itself;
6. mitigation could include measures such as seasonal closures for specific areas; rotation of dredging intensity to allow recolonization and recovery; and exploratory restoration techniques.

6.4 The ICES report also noted that the ICES guidelines will be updated in the next three years.

6.5 ICES has also considered aggregate extraction as part of work on the assessment and monitoring of human activities causing physical disturbance and loss to seabed habitats (ICES, 2019b; ICES, 2019c). Key messages included:

1. assessments of impacts should capture the physical and ecological recovery after cessation of the extraction. It should be noted that ecological recovery of biota can occur without a full physical recovery of the geomorphology of the seabed (ICES, 2019b);
2. it should not be overlooked that an activity may have a disproportionate effect on a specific biological habitat (ICES, 2019b).

6.6 ICES (2019a) also reviewed the place of aggregates extraction within development of methods for cumulative assessment of the impacts of human activities. It noted the complexities of issues such as assessment of trends over time and space, and whether habitat changes as a result of extraction can be considered positive in some circumstances (e.g. if fish populations with a high economic value are favoured). It recommended further work on how to incorporate issues such as the valuation of change over time, within overall work on cumulative assessment in the marine environment. However, it suggested that given current work on tools and methodologies to address the cumulative impacts of human activities, it was not relevant to develop a separate cumulative impacts tool focused on marine mineral extraction.

6.7 For deep sea mining, potential environmental impacts include loss of substrate; changes to seabed integrity; operational suspended sediment and chemical plumes; re-sedimentation from operational plume; discharge plume; increase in light; increase in noise levels and potential vibration; and release of sediment-bound or subsurface porewater toxic metals into the water column. Activities could also have impacts on other economic sectors, such as fisheries or the exploitation of biota for marine genetic resources.

Understanding of the extent and nature of impacts is uncertain. At present, it is difficult to be certain about the potential environmental impacts, given the rate of change in the technical approaches proposed, and the mitigation and restorative techniques still in development (OSPAR, 2021).

Conclusions

7.1 Key messages 10 (/en/ospar-assessments/quality-status-reports/qsr-2023/other-assessments/extraction-non-living-resources/#10)

1. ICES continues to advise that aggregate extraction is appropriately managed; however, OSPAR could consider encouraging ICES to engage with OSPAR in future assessments of impacts of aggregates extraction;
2. Future trends are uncertain and dependent on factors such as the scale of construction activity and availability of alternative materials. Climate change and sea level rise could increase the need for sand for coastal replenishment;
3. OSPAR may want to assure themselves that any major expansion of extraction volumes in specific regions, beyond historical levels, would not have a significantly more detrimental effect than current extraction;
4. Deep sea mining for resources such as key metals is likely to increase in coming decades, but understanding of the environmental impacts is as yet uncertain.

Distribution and intensity of activity

7.2 The majority of aggregates extraction is in OSPAR region 2, in particular in the southern North Sea and eastern English Channel near the coasts of the Netherlands, Denmark, Belgium, the United Kingdom and northern France. Some aggregates extraction also takes place in the French, Irish and United Kingdom areas of OSPAR region 3, and in the French, Spanish and Portuguese areas of OSPAR region 4, although in both regions the number of sites is much lower than in region 2. There are small areas of extraction in regions 1 (Iceland) and 5 (Azores). (Paragraphs 2.3 - 2.8)

7.3 Seafloor mineral resources, such as seafloor massive sulphides, cobalt-rich ferromanganese crusts and polymetallic nodules, which could be exploited by deep sea mining are spread across the OSPAR region, notably in region V. (Paragraph 4.12)

Trends

7.4 The total amount of aggregates extracted in the ICES area (including OSPAR and HELCOM) varies annually, but was lower in the second half of the 2010s. Use of large amounts of aggregates for major infrastructure in the Netherlands contributed to particularly high totals in 2009 and 2010. (Paragraph 2.6)

7.5 Future trends in aggregates extraction will depend on factors such as economic conditions, availability of land-based resources and recycled aggregates, and material intensity of construction. COVID-19 has depressed construction activity during the pandemic; its longer-term impact on construction activity and aggregates demand remains uncertain. Expansion of aggregates use may be required for coastal defence purposes due to sea level rise, notably in the Netherlands. (Paragraphs 4.1 - 4.9)

7.6 There is potential for development of sea bed mining in the OSPAR region in the coming decades, driven by the demand for key metals in applications such as renewable energy and energy storage. (Paragraphs 4.11 - 4.14)

Economic value

7.7 Figures from the European Commission and UK for the main aggregate producing countries in the OSPAR area show the sector supporting in the order of 1000+ jobs, with a GVA of c. €200m. Most of the employment and value is in OSPAR region 2. The value of construction projects incorporating marine aggregates is many times greater. (Paragraphs 3.1 - 3.3)

Pressures/impacts

7.8 The pressures of aggregates extraction include loss of the materials themselves, impacts on benthic fauna (few of which will survive the extraction process), sand coverage on seabeds in the vicinity, suspended matter in the water, and noise, potentially affecting MSFD descriptors 1, 3, 4, 6, 7, 8 and 11. (Paragraphs 6.1 - 6.3)

7.9 Potential impacts of deep sea mining include loss of substrate, changes to seabed integrity, the impacts of plumes, increases in light and noise levels, and release of toxic metals into the water column. (Paragraph 6.6)

Measures

7.10 Management of aggregates extraction is carried out in accordance with ICES (and OSPAR) guidelines, which ICES considers fit for purpose. However, the ICES guidelines are subject to a forthcoming review. (Paragraphs 6.2 – 6.3)
Development of mitigation or restorative techniques for deep sea mining is at an early stage, and there are substantial gaps in understanding. (Paragraph 6.6)

Summary table

7.11 (The assessment deals with volumes of sand/gravel extracted and does not cover deep sea mining.)

	OSPAR REGIONS[11] **(/en/ospar-assessments/quality-status-reports/qsr-2023/other-assessments/extraction-non-living-resources/#11)**				
	I	**II**	**III**	**IV**	**V**
Relative intensity[12] **(/en/ospar-assessments/quality-status-reports/qsr-2023/other-assessments/extraction-non-living-resources/#12)**	L	H	M	M	L
Trend since 2010	↔	↓	↔	↑	↔
Forecast trend to 2030	?	?	?	?	?

Footnotes

[1]Source: Ad Stolk (Ministry of Infrastructure and Water Management NL) – pers.comm. There may be a slight underestimate in some years as not all country data was made available.

[2]Figures include non-OSPAR regions

[3]Source: Ad Stolk (Ministry of Infrastructure and Water Management NL) pers.comm

[4]Source: Ad Stolk (NL) pers.comm

[5]Source: British Marine Aggregate Producers Association, pers.comm.

[6]Source: Ad Stolk (Ministry of Infrastructure and Water Management NL) – pers.comm

[7]Konsekvensutredningsprogram for mineralvirksomhet - regjeringen.no (http://regjeringen.no)

[8]Høring - forslag til konsekvensutredningsprogram for mineralvirksomhet på norsk kontinentalsokkel - regjeringen.no (http://regjeringen.no)

[9]The Shelf in 2020 - The Norwegian Petroleum Directorate (npd.no (http://npd.no))

[10]The views expressed on key messages are those of the assessor and do not necessarily represent the views of the OSPAR Commission

[11] For the delineation of OSPAR regions see https://www.ospar.org/convention/the-north-east-atlantic (https://www.ospar.org/convention/the-north-east-atlantic)

[12] Low, medium, high

References

⊞ Expand to view references

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