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SCICOM Steering Group on Human Interactions on Ecosystems

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First Interim Report of the Working Group on the Effects of Extraction of Marine Sediments on the Marine Ecosystem (WGEXT)

2–5 June 2014

Reykjavik, Iceland

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CIEM Conseil International pour l'Exploration de la Mer

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Executive summary

The Working Group on the effects of extraction of marine sediments on the marine ecosystem (WGEXT) met in Reykjavik, 2–5 June 2014. Thirteen participants from eight ICES member countries attended the meeting.

The objective of WGEXT is to provide a summary of data on marine sediment extraction (ToR A1), marine resource and habitat mapping, changes to the legal regime, and research projects relevant to the assessment of environmental effects (ToR A2). The data on marine sediment extraction will be reported on a yearly basis for OSPAR in an Interim Report. The other items will be addressed in the Final Report of the new ICES 3-year reporting period. In addition, WGEXT previously defined nine other ToRs which the group believe are important issues to be addressed.

Data reports were reviewed from sixteen (of 20) member countries. Although four member countries did not provide reports, the available data is thought to provide a representative assessment of the overall total of material extracted from the member states. Contact was made with a new representative from Denmark, Laura Addington, and WGEXT look forward to her contributing by correspondence at the next meeting.

Work has been ongoing on eight of the ToRs (B – J). During 2013, questionnaires were sent to member countries for five of the ToRs (B, E, G, H and J), with responses received from several member states. Efforts will continue during 2014 to get responses from the remaining ICES countries. A template for a WGEXT database was proposed during the meeting and proposals for ongoing work during 2014 were agreed.

ICES WGEXT agreed to meet again in Ostend, Belgium in April 2015 as guests of the Institute for Agricultural and Fisheries Research.

1 Opening of the meeting

The Working Group on the Effects of Extraction of Marine Sediments on the Marine Ecosystem (WGEXT) was welcomed to Iceland by the Director of the National Energy Authority; Gudni A. Johannesson and the Director of the Marine Research Institute; Johann Sigurjonsson, as well as WGEXT member Bryndis Robertsdottir who had organised the meeting in Reykjavik. Both directors welcomed the group and provided introductions to their institutes and the work they undertake. The chair of WGEXT, Ad Stolk, thanked the Marine Research Institute for hosting the meeting and all countries for providing national reports. The meeting included a tour of the Marine Research Institute by Konrad Thorisson and a fieldtrip to the Björgun dredging company and the Thingvellir National Park.

Rebecca Walker continued as the rapporteur of the group and the chair thanked all WGEXT members who had data and information for inclusion in the annual report in advance of the meeting. The chair welcomed Tammy Stamford (UK) to the group, who will take over as rapporteur in future years.

Marcel Rozemeijer (The Netherlands); Rui Quartau (Portugal); Laure Simplet (France); Jean-Paul Delpech (France); Keith Cooper (UK) and Mark Russell (UK) all sent their apologies for being unable to attend.

2 Adoption of the agenda

The 2014 annual meeting marks the first year of the three year ICES reporting period. It was again raised by WGEXT that the new format for ICES reporting raises the question concerning the validity of producing a Cooperative Research Report every five years given the new requirement for a Final Report every three years. WGEXT suggests that the Final Report can act as a Cooperative Research Report, rather than duplicating work within the three year ToR reporting period. Moreover the Final Report is given direction if it also acts as the CRR.

The agenda was duly adopted by WGEXT members, together with the addition of presentations from Belgium, Iceland, France, Finland and The Netherlands.

3 Terms of Reference

The Terms of Reference for WGEXT 2013 to 2016 (agreed within the SICOM Steering Group on Human Interactions on Ecosystems Resolutions (SSGHIE 2013)) are:

a) 1. **Review data on marine extraction activities including tonnages, spatial areas and the collection of geospatial data on extraction locations in the form of shape files for OSPAR**.

To be produced every year (interim and final reports) and sent to OSPAR.

2. **Review of development in marine resource mapping, legal regime and policy, environmental impact assessment, research and monitoring and the use of ICES Guidelines on marine aggregate extraction**.

To be produced for the final year three report (2016).

b) **Create an ICES aggregate database (linked to the ICES Data Center) comprising all aggregate related data, including scientific research and EIA licensing and monitoring data.** *Overall lead from WGEXT: Johan Nyberg*

This ToR is a large undertaking, therefore will take over three years to construct. In the first instance, WGEXT wish to create a database which allows users to contact relevant organisations in each country and see what data are available (rather than access the data themselves through the database). WGEXT will contact other WGs to look at how they have constructed/formatted their databases:

1. Year 1 (2013/2014) – creation of a template with data required from each country. *Lead from WGEXT: Johan Nyberg, Ingemar Cato, Marcel Rozemeijer and Henry Bokuniewicz.*
2. Year 1 (2013/2014) – Check with ICES options for WGEXT database linked to ICES database *Lead from WGEXT: Johan Nyberg*
3. Year 1 (2013/2014) – Create an inventory of other WG contacted with regards databases of relevance to WGEXT to allow possible links to be created within the WGEXT database. *Lead from WGEXT: Marcel Rozemeijer*
4. Year 2 (2014/2015) – template to be finalised and populated for each country and sent for approval to ICES. *Lead from WGEXT: All members, coordinated by Johan Nyberg*

c) **Incorporate the MSFD into WGEXT**. *Overall lead from WGEXT: Ad Stolk*

1. Years 2 and 3 (2014–2016) - Bringing forward the interpretation of GES descriptors 1, 4, 6, 7 and 11 of WGEXT to the EU *Lead from WGEXT: Ad Stolk*
2. Years 2 and 3 (2014–2016) - Collate the implications of GES descriptors 1, 4, 6, 7 and 11 for marine sediment extraction. *Lead from WGEXT: Ad Stolk (with all members to provide country view)*
3. Year 3 (2015/2016) - Review the 2003 ICES guidelines on Marine Aggregate Extraction, specifically in relation to the GES descriptors of the MSFD in light of discussions concerning 1 and 2 above. *Lead from WGEXT: Ad Stolk*

d) **Ensure outputs of the WGEXT are accessible by publishing as a group and creating a webpage on the ICES website**. *Overall lead from WGEXT: Rui Quartau*

1. Years 2 and 3 (2014–2016) Publish outputs from ToR 6a concerning intensity *Lead from WGEXT: Annelies de Backer and Keith Cooper*
2. Years 1 to 3 (2013–2016) Investigate other outputs to publish. *Lead from WGEXT: Rui Quartau and Michel Deprez*
3. Year 1 (2013/2014) Populate webpage on the ICES website. *Lead from WGEXT: Ad Stolk*

4. Year 3 (2015/16) Develop a proposal and organise a theme session at 2016 ICES Annual Science Conference. *Lead from WGEXT: Ad Stolk and Rebecca Walker (plus other members to present)*

e) **Discuss the mitigation that takes place across ICES countries and where lessons can be learnt or recommendations taken forward (years 2 and 3, 2014–2016).** *Overall lead from WGEXT: Rebecca Walker*

f) **Study the implications of the growing interest in deep sea mining for the WGEXT (legislation/environmental/geological).** *Overall lead from WGEXT: Bryndis Robertsdottir*

1. Years 1 and 2 (2013–2015) Produce summary paper concerning deep sea mining (What is being mined, where this is occurring, techniques being developed etc). *Lead from WGEXT: Bryndis Robertsdottir, Jan van Dalfsen and Rui Quartau*

g) **Promote harmonisation, where possible, of data across ICES countries**. *Overall lead from WGEXT: Jyrki Hamalainen*

Will involve ICES Data Centre where possible.

1. Year 2 (2014/2015) – Define the interpretation of intensity across ICES countries. *Lead from WGEXT: Annelies de Backer, Keith Cooper and Sander de Jong*
2. Years 1–3 (2013–2016) – Define where else data can be harmonised with regards to aggregate extraction *Lead from WGEXT: Jyrki Hamalainen*

h) **Identify the way archaeological, cultural and geomorphological values are taken into account**. *Overall lead from WGEXT: Michel Desprez*

1. Year 3 (2015/2016) All countries to provide details of how cultural values are taken into account. *Lead from WGEXT: Michel Desprez*

i) **Cumulative assessment guidance and framework for assessment should be developed. It is acknowledged that this work may be being developed within another ICES or OSPAR WG and steps should be taken to investigate and align guidance as appropriate**. *Overall lead from WGEXT: Jan van Dalfsen*

1. Years 1 and 2 (2013 – 2015) WGEXT to collate and review outputs from other WGs for relevance to WGEXT. *Lead from WGEXT: Jan van Dalfsen*

j) **Identify threshold conditions and associated reasoning for EIAs in different countries, discuss whether similar thresholds could apply in other countries (Year 3)**. *Overall lead from WGEXT: Henry Bokuniewicz*

4 Term of Reference (A1): Review annual data on marine extraction activities including tonnages, spatial areas and the collection of geospatial data on extraction locations in the form of shape files

ICES WGEXT have again attempted to provide information for all ICES countries on the annual amounts of sand and gravel extracted but have still found difficulty in obtaining information from countries not regularly represented in person at ICES WGEXT meetings. WGEXT members again attempted to contact those countries who were unable to submit data for inclusion in the annual report.

Available information is included in Table 4.1 below.

Table 4.1. Summary Table of National Aggregate Extraction Activities in 2013.

Country	A) Construction/ industrial aggregates (m^3)	B) Beach replenishment (m^3)	C) Construction fill/ land reclamation (m^3)	D) Non-aggregate (m^3)	E) Total Extracted (m3)	F) Aggregate exported (m^3)	New Maps/Data [illegible]	New legislation	New Policy	EIA initiated	EIA ongoing	EIA finished	EIA published
Belgium (OSPAR)	2,060,620	1,929,013	0	0	3,959,633	532,000	Yes[1]	No	No	No	No	No	No
Canada	N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d
Denmark[2, 9] (HELCOM)	1,800,000	100,000	1,100,000	N/d	3,000,000	142,000	N/d	N/d	N/d	N/d	N/d	N/d	N/d
Denmark[2, 9] (OSPAR)	1,200,000	3,500,000	3,000,000		7,700,000		N/d	N/d	N/d	N/d	N/d	N/d	N/d
Estonia (HELCOM)	0	0	0	0	0	0	N/d	N/d	N/d	N/d	N/d	N/d	N/d
Finland (HELCOM)	0	0	0	0	0	0	Yes	No	No	No	No	No	No
France [3] (OSPAR)	12,234,000	N/d	N/d	278,500	12,512,500	0	Yes	No	No	No	Yes	No	No
France (Med)	0	N/d	N/d	0	N/d	0	No	No	No	No	Yes	No	No
Germany (HELCOM)	57,404	176,621	0	0	234,025	N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d
Germany (OSPAR)	56364	816016	0	0	872,222	N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d
Greenland and Faroes (OSPAR)	N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d
Iceland (OSPAR)	N/d	0	182,115	ca 70,100	ca 252,215	N/d	Yes	No	No	No	No	No	No
Ireland (OSPAR)	0	0	0	0	0	0	N/d	N/d	N/d	N/d	N/d	N/d	N/d

Latvia (HELCOM)	N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d
Lithuania (HELCOM)	N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d
Netherlands [4] (OSPAR)	12,961,753	12,500,000	1,958,610	169,042	23,167,720[8]	2,510,000[5]	No[1]	No	No	Yes	No	No	Yes
Norway (OSPAR)	N/d	N/d	N/d	A few thousand	A few thousand	N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d
Poland (HELCOM)	507 237[10]	N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d
Portugal (OSPAR)	168,709	0	0	0	168,709	0	No	No	No	No	No	No	No
Spain (OSPAR)	0	0	0	0	0	0	No	Yes	No	No	No	Yes	Yes
Spain (Med)	0	0	0	0	0	0	No	Yes	No	Yes	Yes	Yes	Yes
Sweden (OSPAR)	0	0	0	0	0	0	No	No	No	Yes	Yes	No	No
Sweden (HELCOM)	0	0	0	0	0	0	No	No	No	Yes	Yes	No	No
United Kingdom (OSPAR)[6]	14,718,632	1,261,548	0	0	16,025,702	4,089,687	Yes	No	No	Yes	Yes	Yes	Yes
United States	827,692	9,912,829	0	2,448,830	13,189,351[7]	0	No	No	No	No	Yes	Yes	No

Table Definitions

A. Construction/industrial aggregates - marine sand and/or gravel used as a raw material for the construction industry for building purposes, primarily for use in the manufacture of concrete but also for more general construction products.

B. Beach replenishment/coastal protection – marine sand and/or gravel used to support large-scale soft engineering projects to prevent coastal erosion and to protect coastal communities and infrastructure.

C. Construction fill/land reclamation – marine sediment used to support large scale civil engineering projects, where large volumes of bulk material are required to fill void spaces prior to construction commencing or to create new land surfaces.

D. Non-aggregates – comprising rock, shell or maerl.

E. Total Extracted – total marine sediment extracted by Member Countries

F. Aggregates Exported - the proportion of the total extracted which has been exported i.e. landed outside of the country where it was extracted.

[1]Data continually updated and new maps available on demand from database

[2]The OSPAR area and the HELCOM area are overlapping in Denmark. The Kattegat area from Skagen to north of Fyn-Sjælland is included in both Conventions. Therefore the figures from the two Convention-areas cannot be added.

[3] Data relates to licensed amount rather than amount extracted, no extraction for construction and non aggregate in the Mediterranean, no information is available for extraction quantities for other sectors in the Mediterranean although sand extraction for beach replenishment is likely to have occurred.

[4] Total shell extraction including Western Scheldt and Wadden Sea

[5] Quantity estimated based on feedback from licence holders

[6] Conversion from reported tonnes to M^3 achieved using density / specific gravity conversion factor of 1.66

[7] Figures reported for USA pertain to north eastern Seaboard only

[8] Total sand-extraction figures exclude 169,042 m^3 of shells as non-aggregate material

[9] The amounts of extraction in Denmark are comparable with 2012, however it has not been possible to provide exact figures this year. Therefore the reported figures are the same as 2012. The exact figure will be reported in the year two interim report in 2015.

[10] Conversion factor for Poland, due to the deposits extracted, is 1T = 1.75m³

Iceland: The total volume for A and C is 182,15 m³, estimated 15% in A and 85% in C. New data are available for the physical properties of marine aggregates from the Kollafjördur extraction area.

WGEXT will again circulate a copy of the WGEXT 2014 interim report to contact points provided by OSPAR in order that the accuracy of the information presented can be assured.

N.B. The data for total extraction in the USA for 2012 (reported in the Annual Report 2013) has been corrected to 9 736 170 m³.

Similar to previous years, Table 4.2 provides information on countries with data adjustments or those who have never provided information to WGEXT.

Table 4.2. Specific matters highlighted in response to OSPAR request for ICES WGEXT to supply national data.

OSPAR COUNTRIES FOR WHICH DATA HAS NEVER BEEN RECEIVED (As of 2013)
GREENLAND AND FAROES (DENMARK) – Data for Denmark is reported separately
DATA ADJUSTMENTS FOR SPECIFIC COUNTRIES NECESSARY TO DISTINGUISH DATA FOR THE OSPAR REGION
SPAIN – Atlantic coast activities only (note separation of Mediterranean data)
FRANCE - Atlantic and Channel coast activities only (note separation of Mediterranean data)
GERMANY – North Sea activities only (exclude Baltic)
SWEDEN - Delineate activities in the Baltic area (Kattegat) which fall within the boundaries of the OSPAR 1992 DENMARK - As for Sweden

Table 4.3 summarises information on spatial extent of extraction activities, where available, for ICES WGEXT member countries. Although the data are incomplete at this time, it is important to note that the areas in which extraction occurred were much smaller than the areas licensed and the actual spatial footprint should be used to assess impacts.

Table 4.3. Licensed area and actual areas over which extraction occurs.

	Licensed Area Km²							Area in which extraction activities occur Km²						
Country	2006	2007/08	2009	2010	2011	2012	2013	2006	2007/08	2009	2010	2011	2012	2013
Belgium	273	273	273	273	319	319	319	N/d	N/d	N/d	N/d	105.7	106.2	113.7
Denmark	N/d	429	430	789	650	700	N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d
Finland	N/d	N/d	N/d	N/d	N/d	N/d	8	N/d	N/d	N/d	N/d	N/d	N/d	0
France[1]	73.08[2]	72.97/74.97[2]	74.87[2]	67.87[2]	67.87[2]	135.34[2]	168.539[2]	N/d	N/d	N/d	N/d	N/d	N/d	N/d
Iceland	N/d	N/d	20,55	20,50	20,57	20,57	20,55	N/d	N/d	N/d	N/d	N/d	N/d	N/d
Netherlands [5]	453	456/585	564	490	456	439	462	47[3]	38[3]/ 35.3[3]	86[3]	86[3]	71[3]	64	86[3]
Sweden	0	0	0	0	9.70	0	0	0	0	0	0	9.70	0	0
UK	576[7]	556/570[7]	536[7]	552[7]	567[7]	391[7]	739[7]	141[4]	135/138	124	105	114	97	332

Table Notes

[1] Most of French dredging vessels are fitted with EMS but the information is not treated to make area in which extraction activity occur available.

[2] Includes 58.46 km² sand and gravel extraction area and 14.62 km² non aggregate extraction area in 2006, 51.89 km² sand and gravel extraction area and 21.08 km² non-aggregate extraction area in 2007 and 2008, 53.89 km² sand and gravel extraction area and 21.08 km² non-aggregate extraction area in 2009, 46.79 km² sand and gravel extraction area and 21.08 km² non aggregate area in 2010 and 2011, 128.14 km² sand and gravel extraction area and 7.2 km²non aggregate area in 2012 and 162.96 km² sand and gravel extraction area and 5.579 km² non aggregate area in 2013.

[3] 90% of material extracted in the Netherlands is taken from 7.5 km² (2006) and 9.2 km² (2007) and 8.3km² (2008), and 23 km² (2009), 38 km² (2010), 23 km² (2011) and 45 km² (2013)

[4] 90% of material extracted in UK is taken from 46km² (2003) and 43km² (2004) and 49.2 km² (2006) 49.95 (2007)

[5] Excludes the non aggregate shell-extraction areas due to the very small operational areas on the North Sea and not really marine extraction in the Western Scheldt and Wadden Sea.

[7] Figures refer to 'Active Dredge Area Zone' rather than the area licenced.

WGEXT again noted that this type of information has to be taken from an analysis of electronic monitoring data and this is not a straightforward task to achieve and therefore not possible for all WGEXT members to provide.

The last part of the ToR A1 concerns the collection of geospatial data on extraction locations in the form of shape files. OSPAR is currently working on the OSPAR Data and Information Management Strategy, which will include a web portal and metadata catalogue for all OSPAR data streams. As part of this process where ever possible they are moving to geospatial datasets. This will be particularly important as they look to move towards more integrated assessments under the new OSPAR Joint Assessment and Monitoring Programme (JAMP) 2014–2021, looking at the impacts of human activities on biodiversity. Ultimately for the QSR 2021 they will be aiming to undertake a full cumulative effects assessment which will require pressure layers for all human activities and for that it will be essential to have spatial data. Therefore OSPAR has kindly requested WGEXT to investigate the provision of shape files to assist in this process.

Table 4.4. lists countries that have provided shapefiles during year 1 (2013/2014), plus details of difficulties in obtaining the data. WGEXT will continue to request that shapefiles are provided on an annual basis as part of the update on tonnages and spatial areas (ToR A1).

Table 4.4. Geospatial Shapefile information

COUNTRY	Shapefiles Provided?	Comments
Belgium	Yes	Not sent to WGEXT but they exist and can be sent to OSPAR
Canada	No	No data received from Canada and not an OSPAR country
Denmark	No	No response concerning the provision of shapefiles The Chair to request for the 2015 report.
Estonia	No	No data received from Estonia, however not an OSPAR country
Finland	No	ICES member has been asking for shapefiles but no response as yet. However, not an OSPAR country
France	Yes	
Germany	Yes – Sent to OSPAR directly	Sent to OSPAR directly.
Greenland and Faroes	No	No response concerning the provision of shapefiles The Chair to request for the 2015 report.
Iceland	No	No response concerning the provision of shapefiles The Chair to request for the 2015 report.
Ireland	No	No response concerning the provision of shapefiles The Chair to request for the 2015 report.
Latvia	No	No data received from Latvia, however not an OSPAR country
Lithuania	No	No data received from Lithuania, however not an OSPAR country
Netherlands	No	No response concerning the provision of shapefiles The Chair to request for the 2015 report.
Norway	No	No response concerning the provision of

		shapefiles The Chair to request for the 2015 report.
Poland	No	No data received from Poland, however not an OSPAR country
Portugal	No	ICES member has been asking for shapefiles but organisation responsible asks for more information concerning use of the information. To be provided by the Chair during 2014.
Spain	No	No response concerning the provision of shapefiles The Chair to request for the 2015 report.
Sweden	Yes	
United Kingdom	Yes	
United States	No	Not an OSPAR country

5 Terms of Reference B – J: Updates on Progress

Chapter 3 provides the WGEXT ToRs and how the WGEXT intends to meet each objective each year. The following chapter provides a narrative of discussions concerning each ToR and outputs from the 2014 meeting.

5.1 ToR B: Create an ICES aggregate database comprising all aggregate related data, including scientific research and EIA licensing and monitoring data.

During year 1, WGEXT investigated other databases on aggregates and aggregate extraction and corresponded with members in two EU-financed projects (EMODNnet-Geology and EMODnet-Human activity). Examples of these databases were presented at the meeting. A proposed WGEXT metadata table was created before the meeting and presented to the group. This table contained many information fields and while useful, the group decided that these data would be very hard to collect from member countries and also difficult to maintain and keep up to date. WGEXT elected to keep the database as concise as possible, using data that is already collected (tonnage and spatial area tables from current annual reports) and therefore can easily be incorporated into a database and kept in an electronic format. The group proposed the following data fields:

2) Country
3) Contact person (contact details)
4) Total extracted (Tonnage/ volume)
5) Construction/Industrial (m3)
6) Beach replenishment (m3)
7) Construction/ fill/land reclamation (m3)
8) Non aggregate (m3)
9) Licensed Area (km2)
10) Area extracted (Km2)
11) Coordinates/shapefile (Y/N)
12) Coordinate sytem (lat long/WGS84)
13) Water depth (m)
14) Legislation (Y/N)

15) Licensing Authority (name)
16) EIA required (Y/N)
17) Monitoring in place (Y/N)
18) Black box/EMS data (Y/N)
19) Mitigation (Y/N)
20) Comments

WGEXT had previously contacted ICES, and have permission to link with the ICES Database. While a database following the template of EMODNet was also suggested to allow comparability and prevent similar data being collected, it was also raised by the group that it was also important to conform to both ICES database guidelines and international standards.

The group discussed the possibility of adding the historical WGEXT data from previous annual reports, and while there were some concerns about the feasibility of adding these data, the group decided to dedicate some time during the 2015 (year 2) meeting to transfer data from previous reports into an electronic format. The addition of information that has already been obtained by WGEXT should be possible with existing resources and its availability would help to raise the profile of WGEXT. In addition, the tabulated values could be used by members to prepare peer-reviewed publications to more widely disseminate the results of the group. It is also planned to add current contact details for member countries, along with 'yes/no' information concerning whether EIAs, monitoring and mitigation are carried out and whether there is legislation and research ongoing in member countries. It will then be possible for interested parties to contact the relevant WGEXT member for further information if required. The ICES database will be used for uploading the WGEXT information. In terms of maintenance, the OSPAR data could be updated as part of ToR A completed during each annual meeting. During the next two years, WGEXT will also continue to discuss the feasibility of developing the complexity of the database. Future expansion of the database is expected to be driven by inquiries from potential users.

WGEXT proposed actions during year 1:

- Creation of a template with data required from each country – **Completed.**
- Check with ICES options for WGEXT database linked to ICES database **- Completed.**
- Create an inventory of other WG contacted with regards databases of relevance to WGEXT to allow possible links to be created within the WGEXT database – **completed.**
- Template to be finalised and populated for each country and sent for approval to ICES – **Dependant on template agreement from ICES. To be completed year 2 (2014/2015).**
- Determining possibility of GIS system allowing certain information to be displayed graphically (potentially as part of the 2013 OSPAR request for provision of GIS shapefiles) - **In the first instance, GIS data will be available from named contact, rather than available on the database.**

After discussion, it was proposed the group would conduct the following actions over the next year:

1) Send proposed template to ICES for approval

2) Transfer historic extraction statistics into an electronic format.

5.2 ToR C: Incorporate the MSFD into WGEXT

WGEXT has provided recommendations on the MSFD Good Environmental Status Descriptors 6 (integrity of the sea floor) and 11 (underwater noise) in the Annual Report 2012.

The group had a brief discussion on the focus of ToR C and whether or not the focus should solely be on descriptors 6 and 11, or additional descriptors such as 7 (hydrographical conditions) and 1 (biodiviersity). Descriptors 6 and 11 are directly connected to the activity of sand extraction, but by influencing the integrity of the sea bed and increasing the underwater noise, descriptors 4 (food webs) and descriptor 1 can also be directly or indirectly influenced. While the MSFD is concentrated on ecosystem based effects, and many impacts of aggregate extraction are more localized and addressed with the use of EIAs, the group decided it would be useful to incorporate descriptors 1, 4 and 7 into ToR C. The ToR will still focus on the direct effects of extraction (on descriptors 6, 7, and 11), but attention will also be placed on descriptors 1 and 4.

The ToR has now been updated (in section 3) to include descriptors 1, 4, 6, 7 and now reads:

ToR C - Incorporate the MSFD into WGEXT.

1) Years 2 and 3 (2014–2016) - Bring forward the interpretation of GES descriptors 1, 4, 6, 7 and 11 of WGEXT to the EU.

2) Years 2 and 3 (2014–2016) - Collate the implications of GES descriptors 1, 4, 6, 7 and 11 for marine sediment extraction.

3) Year 3 (2015/2016) - Review the 2003 ICES guidelines on Marine Aggregate Extraction, specifically in relation to the GES descriptors of the MSFD in light of discussions concerning 1 and 2 above.

WGEXT proposed actions during year 1: **None (ToR stated actions to be completed years 2 and 3). Ongoing work to be reported in 2015 (Year 2 interim report).**

After discussion, it was proposed the group would conduct the following actions over the next year:

- Years 2 (and 3) - Bring forward the interpretation of GES descriptors 1, 4, 6, 7 and 11 of WGEXT to the EU
- Years 2 (and 3) - Collate the implications of GES descriptors 1, 4, 6, 7 and 11 for marine sediment extraction.

5.3 ToR D: Ensure outputs of the WGEXT are accessible by publishing as a group and creating a webpage on the ICES website

WGEXT would like to raise the profile of the WG and ensure outputs from the annual meetings are accessible. Therefore the group is in agreement that work should take place to publish in peer reviewed journals. During years 2 and 3, WGEXT intend to publish a summary paper of the outputs from ToR G concerning intensity. Work concerning ToR G is ongoing and described in section 5.6.

During year 1 WGEXT has also investigated other outputs to publish:

- Impact on benthos and recolonisation rate vs dredging intensity;

- Impact on fish and recolonisation rate vs dredging intensity;
- Impact on benthos, fish and trophic relationships;
- Comparison of habitat disturbances linked to marine aggregate extraction and windfarms : the prime role of sediment chacteristics for benthic recolonisation and trophic foodweb;
- Aggregate extraction in Portugal (including demands of aggregates, studies done so far and results and statistics of extractions).

Other options for publishing were discussed at the meeting and included writing a review of aggregate extraction across the ICES countries over the last 25 years, and looking for connections between research projects of different countries. Work will continue during year 2 (2014/2015) to identify and develop a theme session at the 2016 ICES Annual Science Conference.

WGEXT proposed actions during year 1:

- Investigate other outputs to publish – **Ongoing.**
- Populate webpage on the ICES website – **Currently there is insufficient information from WGEXT to populate a website, action moved to year 2.**

After discussion, it was proposed the group would conduct the following actions over the next year:

1) Commence production of a viewpoint paper concerning the definition of intensity.
2) Commence production of further papers for publishing.
3) Populate webpage on ICES website.

5.4 ToR E: Discuss the mitigation that takes place across ICES countries and where lessons can be learnt or recommendations taken forward

WGEXT would like to compile mitigation options and techniques from all ICES countries to investigate the comparability of techniques used, to determine whether they are site specific, or could be applied in multiple countries, as certain countries do not apply mitigation to aggregate extraction. In addition, WGEXT intend to update the 2003 guidelines, should mitigation techniques have moved forward.

During 2013, a proposed template for mitigation was sent out by the ToR lead, completed for the UK. Mitigation was split into subsections comprising:

- EIA stage mitigation
- Licence conditions including
    - Ecological mitigation
    - Commercial fisheries mitigation
    - Historic environment mitigation
    - Navigational mitigation
- Best practice mitigaiton
- Monitoring mitigation
- Research mitigation

A completed template was received from France. In addition, Portugal and Finland provided further details concerning mitigation in their respective countries. Portugal doesn't provide any mitigation measures.

WGEXT proposed actions during year 1: **None (to be completed years 2 and 3). Work on going to be reported in 2016.**

After discussion, it was proposed the group would conduct the following actions over the next year:

1) WGEXT to resend the questionnaire during the 2014 meeting to all member countries, repeating the request for information and giving a deadline of 31 December 2014 for response. Responses and comments will be collated before the 2015 (year 2) annual meeting.

5.5 ToR F: Study the implications of the growing interest in deep sea mining for the WGEXT (legislation/environmental/geological)

Deep sea mining was previously raised as an emerging issue for the group (especially for countries such as Iceland, Portugal and some of the Baltic Sea countries). A presentation concerning subjects that are related to Deep Sea Mining was presented to the group. Discussion after the presentation centred around a number of issues and several questions were brought forward for consideration in order to limit the scope of work on this emerging activity.

The group intends to produce a summary paper of the current state of deep sea mining across the 20 ICES countries (although it was noted that not all of the countries are involved in deep sea mining at present). The question of whether the paper should consider just the ICES area or areas outside of ICES was posed. It was noted that currently, deep sea mining only occurs in the Azores. However, despite the Netherlands and Belgium being involved in projects outside of the ICES area and an interest in manganese and rare earth metals exploration taking place in the Baltic, there are few locations within Europe where deep sea mining is currently thought to be of economic value.

Several companies from member states intend to be involved in mineral mining outside of their exclusive economic zone (EEZ) and requirements to do so were discussed. Exploration related to mining of the seabed, ocean floor and subsoil in areas of the ocean that lie beyond the limits of national jurisdiction (known as "The Area") is regulated by the International Seabed Authority (ISA). The ISA was established in 1994 under the 1982 United Nations Convention on the Law of the Sea (UNCLOS), and operates a strict system of rules, regulations and procedures "*to ensure effective protection of the marine environment from harmful effects*". Exploration for marine minerals outside of territorial waters, requires a permit from the ISA. In order to obtain this permit, there must be suitable provision within the legislation of the flag state of the company. In other words, within the boundaries of national jurisdiction, seabed mining activities fall under State rules and regulations, and UNCLOS states that these regulations should be "no less effective" than those developed for The Area. In addition, it was noted that Belgium had to develop their own legislation to enable a company to apply for a licence to explore for manganese nodules.

The group also discussed the term "deep sea mining". This term only covers activities in deeper waters and excludes mining for resources other than gravel, sand, maerl and shells. There may be other resources of interest available in ICES member states, such as (rare earth) metals and Seafloor Massive Sulphides (SMS) crusts. It was

suggested that **"marine mineral mining"** or **"marine mineral extraction"** should replace "deep sea mining" to ensure it covers every type of resource, including those that are not located in deep sea locations. The group noted that the term "non-living resources" is used in Belgium. Further discussions will continue about the best term to be used, as 'minerals' include gravel, sand, maerl and shells and the specifics concerning 'deep sea mining' may be lost with the adoption of the two possible terms above (marine mineral mining and marine mineral extraction).

WGEXT proposed actions during year 1:

- Produce summary paper concerning deep sea mining (What is being mined, where this is occurring, techniques being developed etc) **– Ongoing as part of an action for years 1 and 2. Next steps for year 2 detailed below.**

After discussion, it was proposed the group would conduct the following actions over the next year:

1) Compile an inventory of activities related to marine mineral mining by members states;
2) Compile an inventory to check if mining of resources other than sand, gravel, maerl and shell is foreseen within the national legislation within member states;
3) For the ToR, compile an inventory of whether mining outside the EEZ is included within the national legislation of member states.

To complete these actions, it was suggested that a brief questionnaire would be developed and circulated to the relevant contacts of the member states. Responses will then allow a summary paper to be produced.

5.6 ToR G: Promote harmonisation, where possible, of data across ICES countries

Define the interpretation of intensity across ICES countries and the definition of 'low', 'medium' and 'high' intensity

This part of the ToR was developed during discussions during the WGEXT 2012 annual meeting in France and became a recommendation in the 2013 CRR. It is apparent that in member countries, different approaches are adopted for measuring dredging intensity based on processing and interpretation of EMS/Black Box data. This clearly has implications for ongoing scientific evaluation of impacts and approaches to mitigation and monitoring of activities. WGEXT therefore agreed the need to collect data on how member countries measure and categorise dredging intensity to better inform discussion on how the impacts of extraction could be better compared and to allow for a detailed discussion on how to potentially set standardised threshold levels for 'low', 'medium' and 'high' intensity.

The first step was to send around a questionnaire to the different member countries to obtain information on how EMS data is collected and processed in each country. Answers were provided by eight countries: Belgium, UK, the Netherlands, France, Portugal, Sweden, Finland and Iceland.

No monitoring system is present in Sweden, Finland and Iceland. In Portugal, extraction is only ongoing in the archipelagos of Madeira (without registration system) and the Azores (where the only system present is positioning through radio transceiver).

A summary of the most important points for the ICES member countries with registration system is provided in the table below. (The complete table is provided in Annex 4.)

Table 5.1. EMS data and parameters collected by ICES member countries.

	Belgium	UK	Netherlands	France
System	EMS since 2003	EMS since 1993	EMS since 2000	EMS since late 90's
Owner	FPS Economy	Crown Estate	Rijkswaterstaat (RWS)	Licence owner/ Dredge company
Raw fields listed	• Vessel ID • Code of concessionary • Date + time • Coordinates • Speed • Status of dredging pumps • Dredging activity	• Date +time • Coordinates • Status of 4 dredging channels	• Vessel ID • Code of concessionary • Date + time • Coordinates • Speed • Status of dredging pumps • Dredging activity	• Vessel ID • Coordinates • Speed • Time • Status of pumps
Data processing	• Grid analysis: $m^3/yr/100$ or $1000m^2$ • other spatial and temporal resolution is possible	• Grid analysis, $2500m^2$ cells o Low:< 15' o Medium: 15'-1h15' o High: >1h15' • Customisable to user	• Trackplot in GIS	• No official data processing • Siegma: $h/km^2/yr$
Confidentiality?	Yes, vessel ID	Raw tracks are not available	Yes, vessel ID	Yes, no data freely available
Data freely accessible?	Yes, except for vessel ID, for scientific purposes	• Raw data no • Processed GIS on request, may be charged • Graphical freely available	Yes, tailormade export can be made available on request	
Possible to make data available to WGEXT?		• Raw data – NO • Processed data – detailed discussion required for data to be issued.	• Raw data – NO • Processed data after request	

The questionnaire allowed similarities and inconsistencies between the different countries to be found with an operational registration system. In most countries, EMS

was set up to control license conditions but it is increasingly used to calculate intensity for scientific purposes, therefore a clear definition of intensity is needed to better enable comparison of impacts.

The group had an in depth discussion concerning why the group feels standardisation of the definition of intensity is required, in terms of defining environmental impact. However, as discussions progressed it became clear that looking at environmental impact requires looking at other parameters (e.g. frequency of dredging events, type of dredger), in addition to the parameter intensity, which is currently outside the remit of the ToR. WGEXT decided it was first important to look at how intensity can be defined consistently across ICES member countries before looking at implications for future use.

As a definition, it was agreed by WGEXT that the parameter intensity is a measure **of volume / area / time.** Although recent work published by one member of the group (Michel Desprez) was able to determine results using only area and time

What requires clarification is the type of data which can be provided by all countries to give a consistent measure for each factor of the proposed definition. For example, volumes in the UK are confidential, but areas and time dredged can be provided. Also in the Netherlands, volume is for the moment not taken into account while processing of the EMS data.

Information from the EMS data which would be needed for consistent use of the parameter intensity:

- Volume:
    - This factor is the most difficult to obtain because of issues of confidentiality in some member states
    - could be obtained from the vessel ID – from which capacity can be taken and thus give a measure of volume
- Area:
    - WGEXT agreed that most countries already provide this parameter
- Time:
    - Most countries can provide time per hour, however, clarification is sought from the UK on whether their defined categories (<15 minutes, 15 – 75 minutes and > 75 minutes) can be altered
    - Percentage of a year (or other time period)

In addition, the original ToR proposed to define thresholds of low, medium and high intensity. The group decided that this could potentially be taken out of context and used incorrectly. Furthermore, defining intensity classes to assess environmental impact should be open to each user and could depend on the type of ecosystem where the impact is ongoing. Therefore, the ToR will be amended to ensure only the definition of intensity is provided. Consistent use of the parameter intensity as volume/area/time will be an important step in the comparison of the environmental impact of aggregate extraction.

The ToR has been updated (in section 3) to read:

Promote harmonisation, where possible, of data across ICES countries. *Overall lead from WGEXT: Jyrki Hamalainen*

4) Year 2 (2014/2015) – Define the interpretation of intensity across ICES countries.

5) Years 1–3 (2013–2016) – Define where else data can be harmonised with regards to aggregate extraction

Define where else data can be harmonised with regards to aggregate extraction

The questionnaire developed to investigate intensity across member countries also had a question concerning where other data could be harmonised. However, answers were not received as expected, as responses suggested harmonisation across other datasets such as OSPAR, rather than harmonisation of the data that is collected as a result of aggregate extraction. The group discussed where other data could be harmonised, with the conclusion that data collection is fairly standardised. However, it was suggested that WGEXT could ensure consistency in their own data in terms of reporting figures (e.g. million m^3 (5.2 Mm^3) versus the number written in full (5 200 000 m^3)) and consistency in how non-aggregate and use of maintenance dredge material (e.g. as nourishment) are reported.

WGEXT proposed actions during year 1:

- Define where else data can be harmonised with regards to aggregate extraction **– Action for years 1-3 – The group will continue to discuss internal harmonisation of data formats and consistency in reporting and terminology.**
- **Intensity work is an action for years 2 and 3 – therefore no actions to be completed this year. Work ongoing.**

5.7 ToR H: Identify the way archaeological, cultural and geomorphological values are taken into account by member countries

It has become apparent that different member countries have different values placed on their cultural heritage. The UK and the Netherlands have undertaken quite a lot of work concerning aggregate extraction and cultural heritage, and both now have protocols (not legislation) in place. Other countries have no such procedures in place, and it could be that these procedures could be used as best practice in other countries. In addition, the group wish to explore the level of protection. For example, under the Malta Treaty, bones are not included under protection.

Progress has been made during the 1st year of this three year ToR, with answers received from seven countries: Belgium, United Kingdom, Finland, Iceland, Sweden, USA and France. Responses provided information on the following topics: legislation, statutory authorities, type of antiquities, geomorphological features, methodology, inclusion in EIA, research & management projects.

Guidance notes are available in UK and are under development in Belgium. The UK and the Netherlands are the only countries to have a reporting protocol. In the UK, this was produced thanks to the collaboration between English Heritage and BMAPA (industry body).

WGEXT proposed actions during Year 1: **None (to be completed year 3). Work ongoing to be reported in 2016.**

5.8 ToR I: Cumulative assessment guidance and framework for assessment should be developed. It is acknowledged that this work may be being

developed within another ICES or OSPAR WG and steps should be taken to investigate and align guidance as appropriate

WGEXT recognise the importance of cumulative effects of human activities, however, also acknowledge that this work is being undertaken in a number of groups and fora. Therefore, during 2013, WGEXT started to collate and review outputs from other WGs and fora, for relevance to WGEXT. A short introduction to the topic was given during the 2014 meeting.

Cumulative impacts can be described as those that result from the successive, incremental, and/or combined effects of an action, project, or activity when added to other existing, planned, and/or reasonably anticipated future projects (IFC 2013). Most studies related to the effects of extraction on the marine environment do not address the effects of this activity exclusively but also consider interactions with other anthropogenic stressors, including fisheries, sediment disposal, offshore wind energy and shipping.

Activities to date included contacting the ICES BEWG and the WGMHM. No particular work on the subject was reported from these WGs, although several BEWG members are working on cumulative impacts assessment. Contact was also made with CEDA (the Central Dredging Association). The CEDA MSFD NAVI group is studying aspects of cumulative impact and has planned a review of monitoring programs of member states on items of interest to the sectors (to be drafted by the end of 2014). OSPAR has set up an Inter-sessional Correspondence Group on Cumulative Effects. Adrian Judd (Cefas) will be contacted to discuss progress. Furthermore the issue of cumulative impacts is addressed within studies related to the development of Offshore wind energy in Europe and its addressed in EU FP7 projects as ODEMM, Knowseas, COEXIST.

WGEXT discussed the scope of the ToR and concluded that the activities reviewed should not be limited to marine aggregates but should also look into the implications of impacts from mining for other marine minerals. The group also decided that rather than undertaking any work on cumulative impacts, it would be more prudent to follow the development of other initiatives currently being taken forward within the EU and ICES member states (noted above), as these are already well underway. Mention was also made of the MSFD, although work on this subject will be captured within ToR C.

Reference

International Finance Cooperation, 2013. Good Practice Handbook: Cumulative Impact Assessment and Management. IFC, Washington, DC

After discussion, it was proposed the group would conduct the following actions over the next year:

1) The results of the above mentioned initiatives will be evaluated and where relevant to WGEXT, outcomes will be used in order to develop a guidance and framework for extraction.

WGEXT proposed actions during year 1:

- WGEXT to collate and review outputs from other WGs for relevance to WGEXT **– Ongoing as part of an action for years 1 and 2. Partially complete, next steps for year 2 detailed above.**

5.9 ToR J: Identify threshold conditions and associated reasoning for EIAs in different countries; discuss whether similar thresholds could apply in other countries

Certain ICES countries have thresholds determining the need for an EIA. However, most countries do not. WGEXT intend to investigate what thresholds are in place in member countries, by compiling an inventory of thresholds that are currently used, before looking at the applicability of these thresholds for other countries. The ToR is due to be reported in the full report (2016), however, work has already commenced and progress is discussed below.

Reports had been received during 2013 from Finland, France, the Netherlands, Portugal, Sweden, The United Kingdom and the USA (Annex 5). In general, there are provisions for a brief Environmental Assessment in advance of any more extensive EIA. In Portugal, while EIAs are required in law, it is not known whether EIAs have been undertaken for extraction activities in Madeira and Azores. The authority to require an EIA lies with the licensing authority, but recommendations can be provided to the licensing authority from other agencies, such as those responsible for fisheries. In discussion, it was suggested that the regulatory authority as well as the advisory process be identified.

Some countries (Table 5.2) have numerical criteria either in law or policy that trigger EIAs. Others use professional judgment on a case-by-case basis, although of course, the professional experience includes informal, numerical criteria. In some places, like Sweden, France and Belgium, all permits will require an EIA to be undertaken.

Table 5.2. Requirements for EIAs from ICES countries

	ALWAYS REQUIRED	VOLUME	AREA	DEPTH	PROFESSIONAL JUDGEMENT
Belgium	*				
Finland		*	*		
France	*				*
The Netherlands		*	*	*	
Portugal					*
Sweden	*				*
UK		*			*
USA					*

WGEXT proposed actions during year 1: **None (to be completed year 3) Work ongoing to be reported in 2016.**

6 Presentations given to the WGEXT

Presentations were given to WGEXT by four members of the group and three invited speakers from The Marine Research Institute, The Cultural Heritage Agency of Iceland and the Björgun dredging company. The abstracts are presented below.

6.1 Konrad Thorisson – Introduction to the Marine Research Institute of Iceland: A strong Economy Based on Fish

Konrad Thorisson gave a brief presentation about the Marine Research Institute in Iceland and the research undertaken, focussing on fisheries management. Important Icelandic fish species were described (e.g. cod, capelin and herring), and some historic fish stock data was presented, detailing the rise and collapse of several stocks, most notably cod and herring. He noted that Iceland is on the Polar front, and therefore Iceland is vulnerable to the effects of climate change, which may cause huge changes to the Icelandic fisheries. Some changes may have already occurred, with a fall of sandeel stocks subsequently affecting minke whale and puffin numbers.

Konrad then took the group on a tour of the Institute, covering geological surveys, otolith aging and plankton ecology.

6.2 Jyrki Hämäläinen – Sand and Gravel Extraction Sites in Finland

Marine aggregate extraction sites in Finland are of glacial origin. They are mainly eskers and end moraines formed during the deglaciation of the Weichselian ice sheet about 10,000 years ago. The material in the formations is mostly well sorted sand and gravel. All of the sites are quite small (1.1–5.9 km^2) in area but they are relatively thick (10–30 m).

At present, there are three sites where permits have been granted. Two of them, Helsinki and Loviisa, are valid. There was an appeal against the permit of Yppäri and the case is under hearing in the Administrative Court of Vaasa. At the moment there is no extraction taking place in Finland, but the Helsinki site has been used between 2004–2006. During the three years a total of 6.2 Mm^3 was extracted by the Port of Helsinki. In Loviisa there have been only two small dredging exercises in 2010 and 2012 with a total of 5 800 m^3. In the Yppäri area there has not been any extraction to date.

6.3 Magnus A. Sigurdsson – The Marine Heritage Potential of Iceland

Icelandic heritage law resembles that of neighbouring countries. One difference is that Iceland does not have a team of archaeologists specialised in underwater archaeology, where the team has both the equipment and manpower to take on underwater surveying and excavation. Underwater cultural heritage has only recently been protected; with everything 100 years and older now being protected. However, there are no legal obligations to conduct an archaeological survey before dredging or undertaking any activities that might danger underwater cultural heritage in the area as there are no planning laws that include the sea. Another major problem is that there are no laws that regulate diving areas. The only way to declare a diving ban is to officially declare the site a protected monument site, but sites are not protected automatically like sites on land.

Icelandic underwater archaeology is in its infancy. Out of 599 licences for archaeological research in the years 1990–2010, only four projects have been underwater. The

best known wreck in Iceland is *Het Wapen van Amsterdam*, a Dutch East India Company ship that stranded in the sand of the south coast in 1667. In local annals it is described as loaded with gold, pearls, silver and other precious cargo and that the ship was visible for quite some while after the stranding and much of the cargo was retrieved. A business man in Reykjavík (the owner of Björgun, the biggest dredging company in Iceland) started a search and rescue project in the seventies to find the wreck. They thought that they found the wreck in 1982 and a large cofferdam was put up and a wreck was excavated. Unfortunately what they excavated was a German trawler from the twenties!

The first real archaeological project was The Melckmeyt. In August 1992 two sport divers found a ship that was supposed to have sunk around the Flatey Island, 300 years earlier. This wreck turned out to be the Dutch merchantman Melckmeyt that sank with all cargo and one man in the year 1659. The excavation was done the 11th to 26th of June 1993 by six divers, one was an archaeologist, one archaeology student, two sports divers, one commercial diver and a photographer. A very small area of the wreck was cleared. The hull on one side of the ship was mostly missing. Around 300 pieces of ceramics were removed, mostly of Delftware type. A big impact of this project was training for the archaeologists involved and introducing underwater archaeology to the cultural heritage world. The next project was the harbour at Kolkuós. In 2006, a survey was undertaken around the old harbour of the old bishop's settlement of Hólar. The harbour was in use from Viking times to the 16th century and was one of the main harbours in Iceland. The main land excavation started in 2003, and in 2006, Danish archaeologists from the Viking Ship Museum in Roskilde joined and surveyed the area. The only remains found was a hammered metal anchor from medieval times. The third project was the postship Phønix. The ship stranded on a reef on the south coast of the Snæfellsnes peninsula on the west coast of Iceland in a great storm in late January 1881. In 2009 a commercial diver found the wreck close to shore at around 8–12 meters depth. In the fall of 2010 the Phønix shipwreck project was founded to gather and take care of information about the ship and the wreck. The main focus has been on measuring and drawing the wreck and to photographing it. The fourth project is the Vestfirðir surveying project. The archaeologist Ragnar Edvardsson led a project to survey six fjords on the Westfjords peninsula. These fjords were chosen because of historical knowledge of activities in the areas surveyed. The research showed that areas close to known harbours in the area surveyed show evidence of remains from the time the harbours were in use.

6.4 Michel Desprez – Impact of dredging intensity on benthos and fish communities in French extraction sites of eastern Channel

The SIEGMA programme (2006–2011) tested extraction strategies able to minimize environmental impact and particularly on fish with the objective to promote consultation with fishermen who are opposed to an increase of dredging surfaces and to a deepening of these sites which have negative impacts on their trawling activity.

Main results are the following:

- The impact on benthos was not proportional to the duration of extraction:
    - it was immediate after intensive extraction in Baie de Seine and comparable after 1 month (site A) and 1 year (site B);
    - it was only significantly bigger on species number after 10 years of extensive extraction (Dieppe).

- On the contrary to the observations made on benthos, the impact on fish species number and biomass was nearly two times higher after one year than after one month of extraction (Baie de Seine); but the cumulative impact (10 years) in Dieppe had a lower impact on the 3 population parameters…although a maximal impact on benthic preys!
- Impact on fish increased with extraction intensity :
    - Minimal for a low intensity (< 1 $h.ha^{-1}.year^{-1}$) in Dieppe after 10 years,
    - Intermediate for a medium intensity (4h) on site A exploited during 1 month,
    - Maximal for a high intensity (10 h) on site B exploited during 1 year.

Michel Desprez also gave details of a paper that has been accepted in Estuarine, Coastal and Shelf Science:

Marchal, P., Desprez, D., Vermard, Y. And Tidd, A. (In Press). How do fishing fleets interact with aggregate extractions in a congested sea? *Estuarine, Coastal and Shelf Science.*

6.5 Annelies de Backer – Similar diversity–disturbance responses to different physical impacts: three cases of small–scale biodiversity increase in the Belgian part of the North Sea

Human activities at sea are still increasing. As biodiversity is a central topic in the management of our seas, it is important to understand how diversity responds to different disturbances related with physical impacts. We investigated the effects of three impacts, i.e. sand extraction, dredge disposal and offshore wind energy exploitation, on the soft-bottom macrobenthic assemblages in the Belgian part of the North Sea. We found similar diversity-disturbance responses, mainly related to the fact that different impacts caused similar environmental changes. We observed a sediment refinement which triggered a shift towards a heterogenic, dynamic (transitional) soft-bottom macrobenthic assemblage, with several species typically associated with muddy sands. This led to a local unexpected biodiversity increase in the impacted area. On a wider regional scale, the ever increasing human impacts might lead to a homogenization of the sediment, resulting in a more uniform, yet less diverse benthic ecosystem.

Reference

De Backer A, Van Hoey G, Coates D, Vanaverbeke J, Hostens K (2014). Similar diversity-disturbance responses to different physical impacts: three cases of small-scale biodiversity increase in the Belgian part of the North Sea. Marine Pollution Bulletin, DOI 10.1016/j.marpolbul.2014.05.006. http://dx.doi.org/10.1016/j.marpolbul.2014.05.006

6.6 Maarten de Jong – Modelling the Ecological Potential of Sand Extraction: "Short–term Impact of Deep Sand Extraction and Ecosystem–based Landscaping on Macrozoobenthos and Sendiment Characteristics"

For the seaward harbour extension of the Port of Rotterdam in the Netherlands, approximately 220 million m^3 of sand was extracted with an average extraction depth of 20 m in a 25 km^2 sand extraction site between 2009 and 2013. Ecosystem-based landscaping techniques are not commonly used to reduce the impact of sand extraction. Biological and physical impacts of large-scale, deep sand extraction with ecological

landscaped sandbars are still being investigated and are largely unknown. Prior to the large-scale sand extraction, macrozoobenthic species richness and biomass, peaked at a water depth of 20 m, a grain size of 200 µm, elevated mud and sediment organic matter (SOM) values and lowered mean bed shear stress (De Jong *et al.*, Submitted). In the baseline study of 2006 and 2008, macrozoobenthic white furrow shell assemblages were found in a dredged shipping lane and disposal sites.

Infaunal species richness in the sand extraction site peaked two years after cessation, at locations with 2% SOM and a water depth of 40 m. Infaunal biomass also peaked two years after cessation but at SOM values of 3%, a water depth of 35m and reached 150 g AFDW m^{-2} whereas reference levels based on 2006 and 2008 were around 5.6 g AFDW m^{-2}. The biomass of the white furrow shell assemblages found in the dredged shipping lane and disposal sites was 8.8 g AFDW m^{-2} with a maximum value of 27.7 g AFDW m^{-2}. White furrow shell (*Abra alba*) and occasionally white piddock (*Barnea candida*) dominated the infauna (de Jong, in prep.).

A 'new' ecological equilibrium has not been reached after two years, as biological and environmental variables are still changing. A 20-fold increase in demersal fish biomass was observed and found to be closely linked to the high levels of white furrow shell biomass (De Jong *et al.*, 2014). We recommend monitoring of macrozoobenthic assemblage, accompanied sediment variables and demersal fish for a longer period, at least for a period of six years, i.e. the estimated recovery time of shallow sand extraction.

References

De Jong, M.F., in prep. Short-term impact of deep sand extraction and ecosystem-based landscaping on macrozoobenthos and sediment characteristics. Estuarine, Coastal and Shelf Science.

De Jong, M.F., Baptist, M.J., Lindeboom, H.J., Hoekstra, P., Submitted. Environmental influences on the spatial distribution of macrozoobenthos in the Dutch coastal zone. Estuar. Coast. Shelf Sci.

De Jong, M.F., Baptist, M.J., van Hal, R., De Boois, I., Lindeboom, H.J., Hoekstra, P., 2014. Impact on demersal fish of a large-scale and deep sand extraction site with ecosystem-based landscaped sandbars Estuar. Coast. Shelf Sci.

6.7 Gunnlaugur Kristjansson – An Introduction to the Björgun Dredging Company

Gunnlaugur Kristjansson provided an overview of the activities of the Björgun dredging company, ahead of the WGEXT visit to their site. Björgun is the only dredging company in Iceland. It was set up in 1952 and has been dredging aggregates since 1963. The company undertook the first marine aggregate EIA in Iceland in 2005. The company owns three small hopper dredgers, an excavation dredger and a split barge. The company currently has a licence to dredge 16 million m^3 of aggregate and shell sand over the next 10 years (2009–2019), from several dredging areas, centred around Reykjavik. No screening is allowed in Iceland, so the cargoes are 'all in' in nature.

7 Closure of the Meeting and Adoption of the Report

The group moved to adopt the final draft annual report and the meeting was formally closed by the chair. He thanked members of WGEXT for attending and again offered thanks to Bryndis Robertsdottir of the Icelandic National Energy Authority for all her hard work in hosting the meeting. The group passed on their best wishes to Rebecca Walker who is stepping down from being the rapporteur of the group as she changes jobs.

The **Working Group on the Effects of Extraction of Marine Sediments on the Marine Ecosystem** (WGEXT), chaired by Ad Stolk, will meet again in Ostend, Belgium, on either 20–23 April, or 27–30 April 2015, as guests of the Institute for Agricultural and Fisheries Research.

It is proposed by WGEXT that the 2016 meeting will be held in either Poland or Denmark, to be confirmed before the 2015 annual meeting.

WGEXT will report by 30 June 2014 (via SSGHIE) for the attention of SCICOM.

8 Annex 1: List of participants

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9 Annex 2: Agenda

Monday 2nd June	
09.30	Meet in Marine Research Institute
09.45	Welcome by Gudni A. Johannesson, Director of National Energy Authority and Johann Sigurjonsson Director of Marine Research Institute
	Welcome by WGEXT Chair
	Apologies for absence
	Terms of Reference
	Adoption of Agenda
10.30	Coffee break
10.45	Terms of Reference (A1a): OSPAR Summary of Extraction Statistics
12.30	Lunch
13.30	Presentation by Konrad Thorisson: Iceland - A strong economy based on fish.
	Visit Marine Research Institute
15.30	Coffee break
15.45 – 18.00	Term of Reference (A1b): Review data on marine extraction activities
	Aim to complete A1 by the end of day 1
Tuesday 3rd June	
09.00	Round up on Terms of Reference B - J
09.30	Term of reference B: Database
10.30	Coffee break
10.45	Continuing Terms of Reference B: Database
11.30	Presentations Magnus A. Sigurdsson: The maritime heritage potential of Iceland Michel Desprez: Impact of dredging intensity on benthos and fish communities in French extraction sites of eastern Channel Jyrki Hämäläinen: Sand and gravel extraction sites in Finland.
12.30	Lunch
13.30	Term of Reference G: intensity, harmonisation
15.00	Coffee break

15.15	Term of Reference D: Publishing Outputs of WGEXT
16.00 – 17.30	Term of Reference F: Deep Sea Mining
	Aim to complete B, G, D and F by the end of day 2
Wednesday 4th June	
09.00	Term of Reference I: Cumulative impacts – Outputs from other WGs
09.45	Term of Reference J: thresholds EIAs
10.30	Coffee break
10.45	Presentations Gunnlaugur Kristjansson: Introduction to Dredging Company 'Björgun' Annelies De Backer: Similar diversity-disturbance responses to different physical impacts: three cases of small-scale biodiversity increase in the Belgian part of the North Sea Maarten de Jong: Modelling the ecological potential of sand extraction: "Short-term impact of deep sand extraction and ecosystem-based landscaping on macrozoobenthos and sediment characteristics".
12.30	Lunch
13.30	Fieldtrip to dredging company Björgun and Thingvellir
	Aim to complete I and J by the end of day 3
Thursday 5th June	
09.00	Agree initial text of WGEXT Interim Report for 2014
10.30	Coffee break
10.45	Continuing and outstanding actions related to other reports
12.30	Lunch
13.30	Recommendations for follow-up work
15.30	Coffee break
15.45 – 18.00	Completion of outstanding action items
	Aim to complete Interim Report 2014 by end of day 4

10 Annex 3: Review of National Marine Aggregate Extraction Activities

A detailed breakdown of each country's sediment extraction dredging activities is provided below:

10.1 Belgium

In Belgium, the sectors of the Belgian Continental Shelf where sand can be extracted are defined and limited by law (royal decree of 1 September 2004). In 2013, extraction was granted in sectors 1a, 1b (March to May), 2ab (excluding the closed areas of the central and northern depressions), 2c, 3a and 4a, 4b, 4c and 4d (Figure 10.1). In sectors 1b, no extraction is taking place, and neither in the sectors 3a, 4a, 4b and 4d, and sector 3b is still closed as this is also the largest disposal site for dredged material.

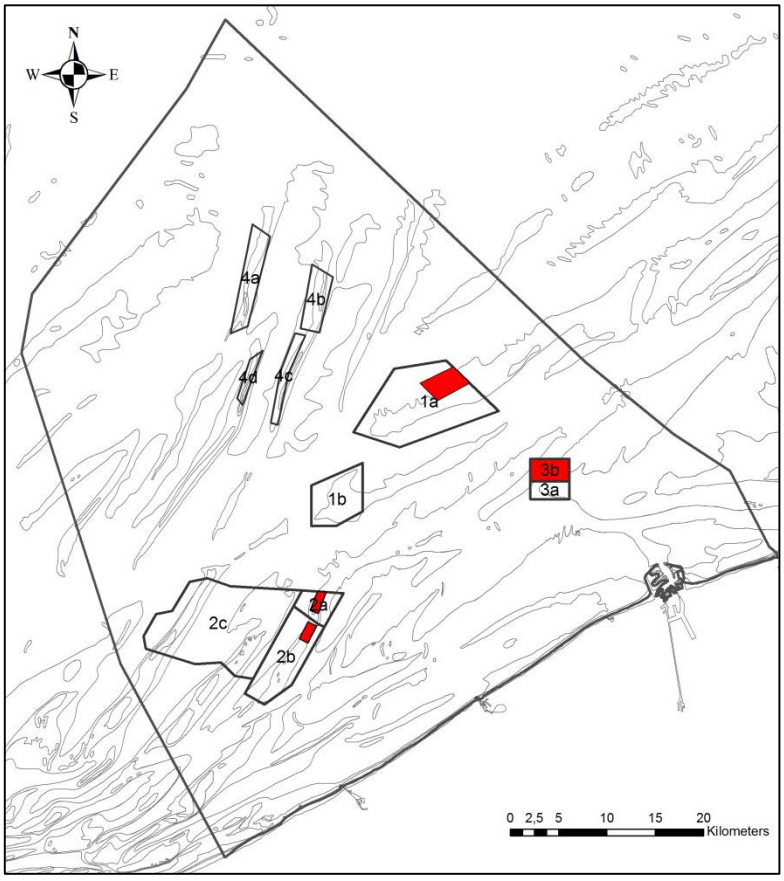


Figure 10.1 Map of permitted exploitation areas for sand and gravel on the Belgian continental shelf as defined in the royal decree of 1 September 2004 changed by the royal decree of December 2010 (adding exploitation zones 4a-d) with indication of closed areas in red.

In 2013, a total amount of 3.989.633 m³ sand was extracted, both by the private sector and the Flemish Region, Coastal Division and Division Maritime Access. The licenses for the Flemish Region have the same conditions (reporting, black-boxes, etc.) as licenses for the private sector with the exception that they are exempted from the fee system. The Flemish Region-Coastal Division extracted 1.929.013 m³ sand, which was used solely for beach nourishment. The increase of the total amount extracted in 2013 was mainly due to the increased extraction for beach nourishment.

Belgium worked during 2013 on a Marine Spatial Plan (MSP), which is due to be published in 2014. This MSP will have impact on the regulation for marine sand and gravel extraction.

Sand extraction on the Belgian Continental Shelf started in 1976 and data are available since then. An overview is given in Figure 10.2.

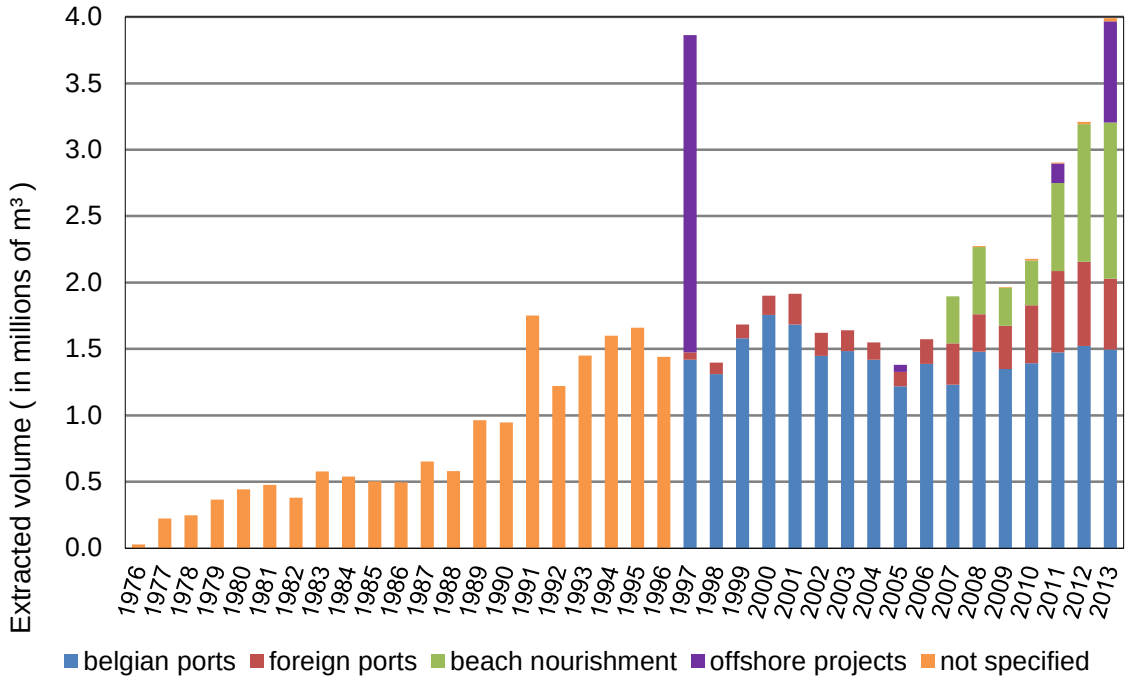


Figure 10.2. Evolution of the extraction of marine aggregates in the Belgian marine territories.

10.2 Canada

No information has been provided this year.

10.3 Denmark

The levels of extraction in Denmark during 2013 were similar to 2012. However, it was not possible to provide exact figures for the interim report. Exact figures for 2013 and 2014 will be provided in the year 2 interim report (2015).

10.4 Estonia

There was no extraction during 2013.

10.5 Finland

No extraction in 2013. However, in 2013 one new license was granted in Yppäri (Bay of Bothnia). The license is for 10 Mm3 (max. 700 000 m3/year) and it is valid until 31.12.2023. However, there was a complaint against the license decision and at the moment the case is under hearing of the Administrative Court of Vaasa.

Table 10.1. Historic patterns of marine aggregate extraction (m^3).

EXTRACTION AREA	Gulf of Finland	EXTRACTION AREA	Gulf of Finland
2000	0	2008	0
2001	0	2009	0
2002	0	2010	0
2003	0	2011	0
2004	1,600,000	2012	5 800
2005	2,388,000	2013	0
2006	2,196,707	**Total (1996-2012)**	**6 190 507**
2007	0		

Description of historic extraction activities for 1995–2013

Sand and gravel extraction from Finnish coastal areas between 1995 and 2004 was negligible. The Port of Helsinki extracted 1.6 million m3 off Helsinki (Gulf of Finland) in 2004, 2.4 million m3 in 2005 and 2.2 million m3 in 2006. Since then there has been only a small experimental dredging operation in 2010 and a 5800 m^3 test extraction in 2012 in the Loviisa area, Eastern Gulf of Finland.

Summary of current licence position and forecasts for future exploitation of marine aggregates

There are three valid licenses issued by the Regional State Administrative Agencies (AVI).

A permission to extract 8 million m^3 of marine sand from the Loviisa-Mustasaari area was accepted in April 2007 by the Environment Permit Authority to Morenia Ltd. However there was a complaint against the decision and the case was under hearing of Administrative Court of Vaasa. The decision on 31.12.2008 was favourable for the extraction. Extraction has not yet started besides a small experimental dredging exercise in May 2010 and another feasibility test exercise of 5800 m^3 in 2012. The license is valid until 30th of April 2017.

In 2010 The Regional State Administrative Agency of Southern Finland issued a license to Morenia Ltd. for extracting 5 Mm^3 marine sand and gravel in the Itä-Tonttu and Soratonttu areas off the city of Helsinki. The license is valid until 31st of August 2020.

One license application was sent by Morenia Ltd. to authorities in December 2011 concerning the extraction of 10 Mm^3 of material within the next 15 years in the Yppäri area (1,1 km^2), the Bay of Bothnia. After the request by the authorities, Morenia Ltd. has conducted additional studies and delivered further information concerning the application in 2012. The work was undertaken and a licence was issued in 2013. However, there was a complaint against the license decision and at the moment the case is under hearing of the Administrative Court of Vaasa.

10.6 France

Table 10.2. Construction industrial aggregate (sand and gravel) extraction figures for 2013.

DREDGING AREA	AMOUNT *
Channel	7 565 000 m^3
Atlantic	4 669 000 m^3
Brittany	0 m^3

Description of construction industrial aggregate (sand and gravel) extraction in 2013

These figures are not extracted quantities but licence quota figures (maximum permitted).

Amount of material extracted for beach replenishment projects in 2013

France does extract sand for beach replenishment but no figures are available because these extractions are made by the Regional Authority and do not need a license.

Construction fill / land reclamation (m^3) extraction figures for 2013

No data available for construction fill or land reclamation in France

Non–aggregate (e.g. shell, maerl, boulders etc.) extraction figures for 2013

Table 10.3. Non-aggregate (e.g. shell, maerl, boulders etc.) extraction figures for 2013.

DREDGING AREA	MATERIAL	AMOUNT *
Brittany	Maerl	81,500 m^3
Brittany	Shelly sand	197,000 m^3

Description of non–aggregate extraction activities in 2013

These figures are not extracted quantities but licence quota figures (maximum permitted).

End of maerl extraction is scheduled by the end of 2013.

Exports of marine aggregate in 2013

No export of marine aggregate during 2013.

Table 10.4. Historic patterns of marine aggregate extraction.

EXTRACTED VOLUMES (m^3) in red Quotas permitted, in black Quantity really extracted													
2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
2124326	2271760	2092038	2163848	2491514 (*)	2465909	2358107	2466751	2239033	1747052	1674072	1679725	1689043	2267000
149851	199041	1500000	1500000	1500000	1500000	1500000	1500000	1500000	1500000	1500000	1500000	200000	200000
No extraction		2349	No extraction	3387	330000	330000	330000	330000	330000	330000	330000	330000	330000
Non permitted			330000	330000	330000	330000	330000	330000	330000	330000	330000	330000	330000
330000	330000	330000	330000	330000	330000	330000	330000	330000	330000	330000	330000	330000	330000
Non permitted			330000	330000	330000	330000	330000	330000	330000	330000	330000	330000	330000
Non permitted							482000	482000	482000	482000	482000	482000	482000
117000	143000	174000	103000	400000	400000	400000	400000	400000	400000	400000	400000	400000	400000
330000	330000	330000	330000	330000	330000	330000	330000	330000	330000	330000	330000	330000	330000
179575	193673	167690	314857	161477	165850	347828	471200	470588	470588	470588	470588	375000	375000
64287	51266	36260	35746	39388	72000	72000	72000	72000	72000	72000	72000	72000	72000
Non permitted												3000000	3000000
Non permitted												590000	590000
Non permitted													3000000
Non permitted					330000	330000	330000	330000	330000	330000	330000	330000	330000
No extraction											License fallen due		
78081	76360	76644	75553	76680	68364	56780	75048	74955	75970	76000	70151	End of extraction	
130000	129625	130598	131346	123654	124077	60300	130515	129329	169500	169500	169500	90000	70000
15100	12500	11300	12700	11500	11500	11750	12308	10461.5	11500	11500	11500	11500	11500
76150	68600	86205	75450	76590	71154	76754	75261.5	76558	83000	83000	83000	83000	125000
19066	21454	22322	16067	24370	22259	16126	18885	15308	22000	22000	22000	22000	22000
No extraction													
6062	21233	10709	8070	9034	10464	12688	2110	0			End of extraction		
	15308	22111.5	22231	34446	31400	6440	20100	0	0	0		End of extraction	
23031	19825	25465	27801	20271	28940	10732	20913	22807	30000	30000	50000	50000	50000
	21808	21496	19315	22275	19300	22700	2272	20450	33000	33000		End of extraction	
7700	12100	7300	8500	5249	6900	6100	4140	1292	0	0	0	0	0
	8050	1700	6385	3000	2600	600	0	300	6000	5000		End of extraction	
87000	80710	67000	63000	55195	52000	46140	35700	39900	25000	15000	5000	End of extraction	
21600	17058	No extraction										End of extraction	
No extraction												End of extraction	
	1230	667	1500	1000	667	500	No extraction					End of extraction	

Summary of current licence position and forecasts for future exploitation of marine aggregates

19 extraction licences (168.539 km²), 1 research license (53.27 km²) and 1 prospection (42 km²) authorisation have been issued by local administration (Préfectures).

15 applications (4 for exploration, 6 on actual extraction area for a renewal of license, 5 on new extraction perimeter) for aggregate extraction are being considered by Economy Ministry. It represents 1364.53 km² for research perimeters and 44.564 km² for extraction sites, with a potential increase for new licensed area of 30.214 km².

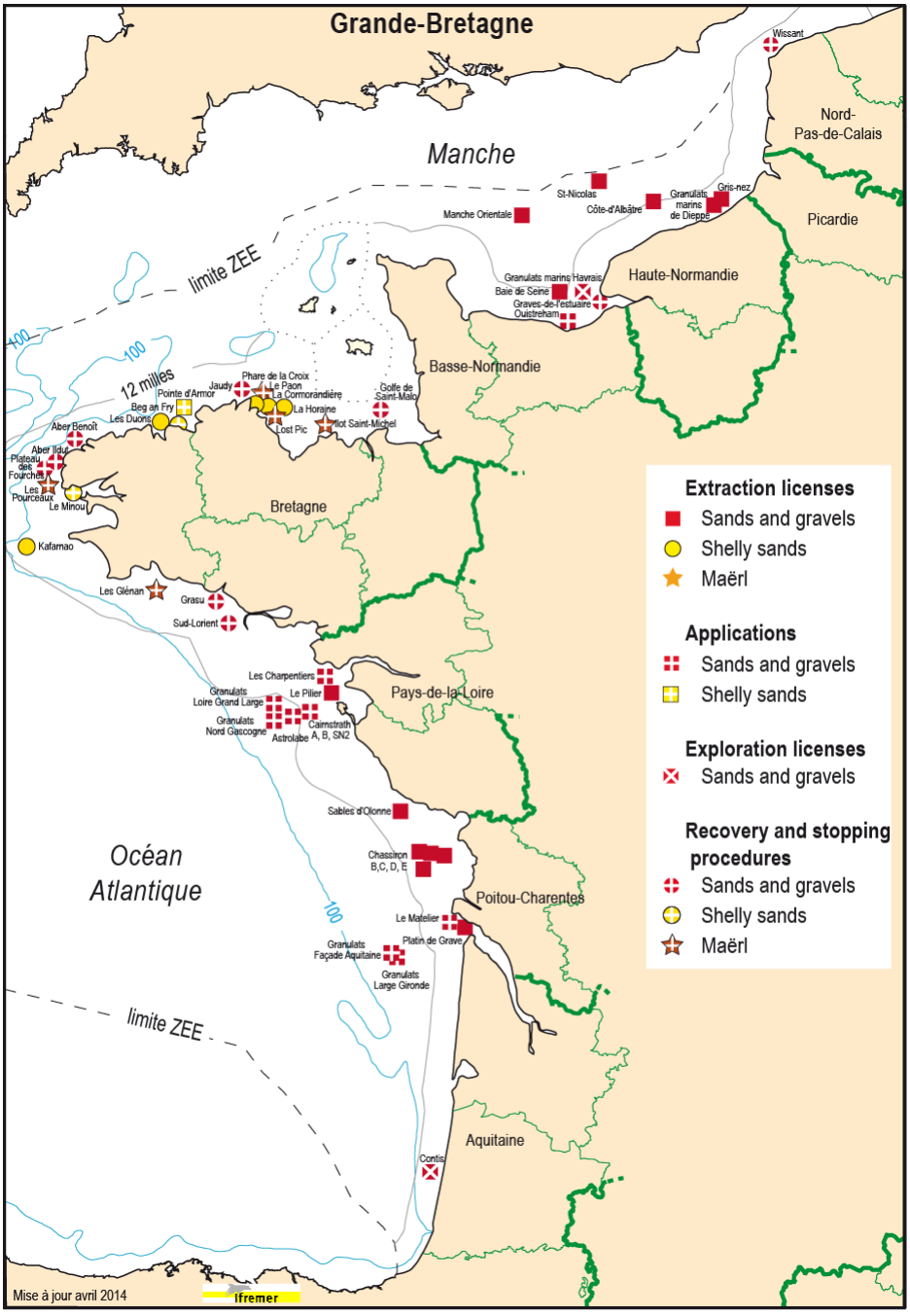


Figure 10.3. Extraction licences in France.

Table 10.5. Licensed area compared to area in which extraction occurs.

Country	Licensed Area Km2*				Area in which extraction activities occur Km2			
	2009	2010 2011	2012	2013	2009	2010 2011	2012	2013
FRANCE	212.571	109.871	230.611	263.8091	No data	No data	No data	No data

[1] **Includes 137.7 research licenses and 74.87 extraction licenses in 2009, 42.0 research licenses and 67.87 extraction licenses in 2010/2011, 95.27 research licenses and 135.34 extraction licenses in 2012 and 95.27 research licenses and 168.539 extraction licenses in 2013.**

10.7 Germany

Table 10.6. German extraction in 2013.

EXTRACTION AREA	REPLENISHMENT	CONSTRUCTION	TOTAL
OSPAR Area	816,016	56,364	872,222
HELCOM Area	176,621	57,404	234,025

10.8 Greenland and the Faeroes

No information has been provided this year.

10.9 Iceland

Table 10.9. Historical extraction in Iceland.

	Marine Aggregate Extraction	Marine Non-Aggregate Extraction		Total Extraction
Year	gravel & sand	shell sand	maerl	
2000	1435665	147280	0	1582945
2001	1189950	133640	0	1323590
2002	861315	114250	0	975565
2003	1155485	83920	0	1239405
2004	1412430	118340	0	1530770
2005	1259157	143780	13740	1416677
2006	1253464	151460	20535	1425459
2007	1145390	158300	21666	1325356
2008	921000	134680	50445	1106125
2009	374885	69360	25435	469680
2010	125800	39760	54450	220010
2011	138700	40740	ca 56000	ca 235440
2012	145070	12780	58800	216650
2013	182115	7100	ca 63000	ca 252215

10.10 Ireland

No aggregate extraction took place in 2013. Despite signs of a recovery in the housing market, there has not been any increase in the requirements for marine aggregates.

10.11 Latvia

No data received for 2013.

10.12 Lithuania

No data received for 2013.

10.13 The Netherlands

Table 10.7. Marine aggregate (sand) extraction figures for 2013.

DREDGING AREA	AMOUNT Mm^3
Euro-/Maas access-channel to Rotterdam	**798,266**
IJ-access-channel to Amsterdam	**1,523,633**
Channels Voordelta	**PM**
Dutch Continental Shelf	**8,681,244**
Dutch Continental Shelf / Maasvlakte 2 project	**1,958,610**
Total	**12,961,753**

Most of reported quantities are in m3. If reported in tonnes, 1 T = 0.667 m3

Table 10.8. Non-aggregate (shell) extraction figures for 2013.

DREDGING AREA	MATERIAL	AMOUNT m^3
Wadden Sea	Shells	**15,200**
Wadden Sea inlets	Shells	**24,551**
Western Scheldt	Shells	**0**
Voordelta of the North Sea	Shells	**44,770**
North Sea	Shells	**84,521**

Description of non-aggregate extraction activities in 2013:

On basis of the Second National Policy Note and EIA for shell extraction (31 August 2004) there are maximum permissible amounts defined from 2005 until 2013.

These permissible amounts (in m^3) of shells to be extracted yearly from:

- the Wadden Sea max. 85,000
  (but no more than 50% of the total quantity (The Wadden Sea and Sea Inlets)
- the Sea Inlets between the isles until a distance of 3 miles offshore 85 000 up to 2013
- the Voordelta 40 000
- the Western Scheldt 40 000
- the rest of the North Sea until a distance of 50 km offshore unlimited

Table 10.9. Exports of marine aggregate in 2013.

DESTINATION/(landing)	AMOUNT (m3)*
Belgium	2 500 000
France	10 000

* **Approximate figures**

There is a continuous flow of sand extracted out of the extraction areas in the southern part of the Dutch sector of the North Sea, used for landfill and for concrete and building industries

Table 10.10. Amount of material extracted for beach replenishment projects in 2013.

DREDGING AREA	MATERIAL	AMOUNT in Mm^3
Netherlands coast (general)	sand	**11,7**
Katwijk	sand	**0,806**
Total	**sand**	**12,5**

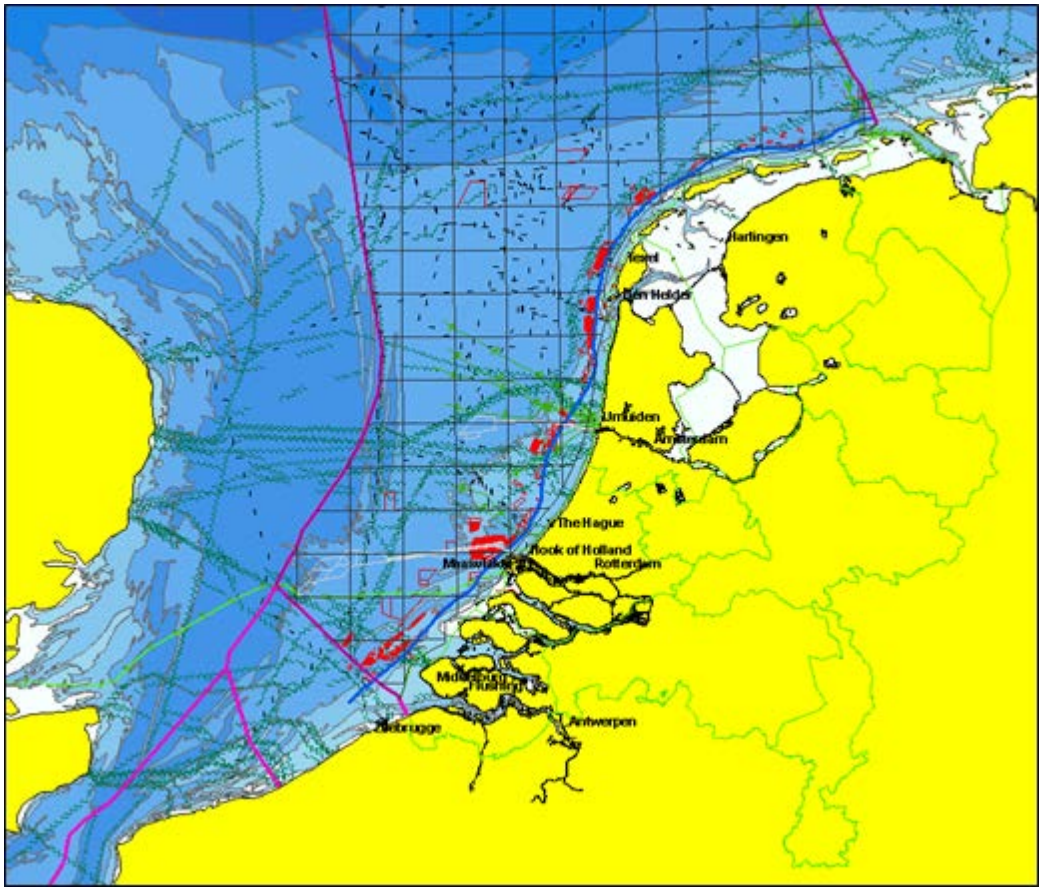


Figure 10.4. Licensed sand extraction areas 2013.

Table 10.11. Historic patterns of marine aggregate extraction in Mm³.

Extraction Area	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	**2011**	**2012**	**2013**
Euro-/Maas channel	10,32	3,90	2,94	1,23	2,32	0,49	0,65	1,94	1,22	0,06	**0,32**	**0**	**0,8**
IJ-channel	2,31	1,41	0,87	1,06	4,31	0	0	0	0	0	**0,75**	**0,83**	**1,5**
Channel Voor-delta	-	-	-	-	-	-	-	-	-	-	**-**	**0,05**	**PM**
Dutch Continen-tal Shelf	23,81	28,53	20,07	21,31	22,13	22,88	28,25	24,53	119,59	122,47	**68,88**	**66,89**	**10,63**
Total extracted	**36,44**	**33,84**	**23,88**	**23,59**	**28,76**	**23,37**	**28,90**	**26,47**	**120,81**	**122,53**	**69,95**	**67,87**	**12,96**

Table10.12. Dutch sand extraction 1974–2013.

YEAR	TOTAL EXTRACTED m3	YEAR	TOTAL EXTRACTED m3
1974	2.787.962	1994	13.554.273
1975	2.230.889	1995	16.832.471
1976	1.902.409	1996	23.149.633
1977	757.130	1997	22.751.152
1978	3.353.468	1998	22.506.588
1979	2.709.703	1999	22.396.786
1980	2.864.907	2000	25.419.842
1981	2.372.337	2001	36.445.624
1982	1.456.748	2002	33.834.478
1983	2.252.118	2003	23.887.937
1984	2.666.949	2004	23.589.846
1985	2.724.057	2005	28.757.673
1986	1.955.491	2006	23.366.410
1987	4.346.131	2007	28.790.954
1988	6.954.216	2008	26.360.374
1989	8.426.896	2009	120.700.339
1990	13.356.764	2010	122.532.435
1991	12.769.685	2011	62,948,704
1992	14.795.025	2012	41,899,276
1993	13.019.441	2013	23,167,720

Table 10.13. Licences considered and issued licences Rijkswaterstaat North Sea.

In the year:	Amount		
1998	35	2006	33
1999	30	2007	24
2000	25	2008	38
2001	25	2009	23
2002	42	2010	15
2003	26	2011	26
2004	20	2012	10
2005	33	2013	19*

*** one of the issued licenses is a general permit for beach nourishments in which several extraction areas for the next 5 years are covered in one single permit.**

10.14 Norway

Table 10.14. Historical dredge tonnages 1992–2013.

Year	Carbonate (shell) Sand	Total Aggregates
1992	n/d	0
1993	n/d	100 000–150 000
1994	n/d	100 000
1995	n/d	100 000–150 000
1996	n/d	155 000
1997	n/d	100 000–150 000
1998	n/d	n/d
1999	n/d	n/d
2000	n/d	n/d
2001	n/d	n/d
2002	n/d	n/d
2003	115 000	115 000
2004	n/d	n/d
2005	n/d	n/d
2006	n/d	n/d
2007	A few thousand	A few thousand
2008	A few thousand	A few thousand
2009	A few thousand	A few thousand
2010	n/d	n/d
2011	n/d	n/d
2012	A few thousand	A few thousand
2013	A few thousand	A few thousand

10.15 Poland

Table 10.15. Historical extraction in Poland.

Year	Beach Nourishment	Construction Aggregate	Total
1990	1 046 358	0	1 046 358
1991	766 450	0	766 450
1992	817 056	54 400	871 456
1993	974798	0	974 798
1994	251 410	6 400	257 810
1995	280 720	0	280 720
1996	134 000	0	134 000
1997	247 310	3 500	250 810
1998	88 870	0	88 870
1999	375 860	220 500	596 360
2000	241 000	836 500	1 463 875
2001	100 253	267 750	368 003
2002	365 000	353 500	718 500
2003	438414	0	438414
2004	1042896	0	1042896
2005	1043925	0	1043925
2006	548856	0	548856
2007	977358	0	977358
2008	238948	162 750	401 698
2009	702590	0	702590
2010	970923	0	970923
2011	nd	**995 750**	
2012	nd	**488 000**	
2013	nd	**507 237**	

10.16 Portugal

Please note that the new data for the 2014 interim report comprises historical data from the Madeira archipelago (from 2002), as well as data from the Azores archipelago for 2013. The remaining data has already been published in previous WGEXT reports.

Table 10.16. Portuguese aggregate extraction 1998–2013

	Volumes (m3)															
Extraction	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Area																
Azores archipelago		6083	145519	146791	115613	176285	197636	159968	181691	141991	144647	134021	124132	126381	69392	**50729**
Madeira archipelago					**562353**	**683521**	**910179**	**703620**	**478473**	**369008**	**345890**	**291290**	**276090**	**210720**	**114360**	**117980**
Administração da região hidrográfica do Norte (northern continental shelf)																
Administração da região hidrográfica do Centro (central continental shelf)																
Administração da região hidrográfica do Tejo (southern central continental shelf)										500000	1000000	1000000				
Administração da região hidrográfica do Alentejo (southwestern continental shelf)																
Administração da região hidrográfica do Algarve (southern continental shelf)	1285000								370000				1250000	600000		

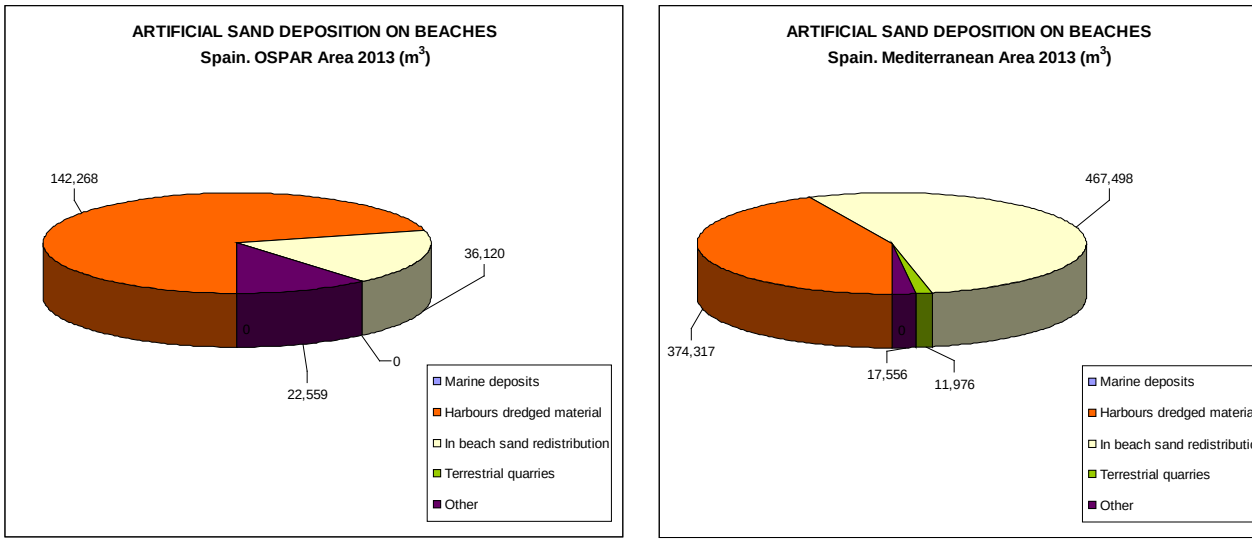
Key **Orange: Extraction for construction purposes, Green: Extraction for beach nourishment.**

10.17 Spain

During 2013 it has not been carried out any extraction activity from marine sand deposits in Spain.

However, a total amount of 1 072 294 m^3 of sand was placed on beaches (200 947 m^3 in the OSPAR area and 871 347 m^3 in the Mediterranean area). The sources of these materials were essentially the dredging activity in harbours with a navigational purpose or the sand redistribution within the beach.

Figure 10.5 shows the distribution of the material source in both coastal sides.



Figures 10.5. Distribution of material in OSPAR and Mediterranean.

10.18 Sweden

No extraction to report in 2013.

10.19 United Kingdom

All UK statistics reported as tonnes.

Table 10.17. Marine aggregate (sand and gravel) extraction figures for 2013 from The Crown Estate ownership *(Includes aggregate and material for beach replenishment and fill contract).*

Dredging Area	Amount (tonnes)
Humber	2,309,833
East Coast	3,564,464
Thames Estuary	1,090,559
East English Channel	3,764,185
South Coast	4,360,518
South West	1,067,526
North West	635,268
Rivers and Miscellaneous	0
TOTAL	**16,792,353**

Extraction tonnages for fill contracts and beach replenishment were as follows:

Contract Fill 349 900 tonnes

Beach Replenishment 1 800 063 tonnes

Non-aggregate (e.g. shell, maerl, boulders etc.) extraction figures for 2013

None during 2013 from The Crown Estate ownership.

Table 10.18. Exports of marine aggregate in 2013 from The Crown Estate ownership.

Port (landing)	Amount (tonnes)
Amsterdam	922,924
Antwerp	402,331
Bruges	274,428
Calais	60,159
Dieppe	17,786
Dunkirk	204,939
Fecamp	49,309
Flushing	772,276
Gent	52,240
Honfleur	36,357
Le Havre	541,245
Le Treport	14,351

Ostend	392,162
River Seine Wharves	268,451
Rotterdam	315,313
Sluiskil	19,362
Zeebrugge	205,042
TOTAL	**4,548,675**

Table 10.19. Amount of material extracted for beach replenishment and reclamation fill projects in 2013 from The Crown Estate ownership.

Dredging Area	**Amount (tonnes)**
Brighton	4,917
Deal	309,402
Eastbourne	17,380
Lincshore	858,091
Pevensey	14,925
Selsey	595,348
Wellington Dock, Liverpool	349,900
TOTAL	**2,149,963**

Table 10.20. Historic patterns of marine aggregate extraction (tonnes) from The Crown Estate ownership ***(Figures exclude beach replenishment and fill contracts).***

Extraction Area	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Total
Humber	2,694,977	2,840,261	3,122,080	2,933,623	2,710,881	2,928,366	3,031,699	3,392,015	3,521,737	3,184,814	3,154,070	2,524,328	2,622,126	2,175,846	1,451,742	**42,288,565**
East Coast	8,923,562	9,131,512	9,129,635	9,636,697	9,011,323	8,611,199	8,538,073	7,881,670	8,006,736	7,715,428	6,075,899	5,637,296	4,871,443	5,275,569	3,564,464	**112,010,506**
Thames Estuary	862,834	971,960	854,483	909,141	1,291,103	838,185	758,257	696,012	899,852	977,027	1,735,141	405,485	518,881	664,629	1,090,559	**13,473,549**
East English Channel	2,180,099	1,958,476	1,387,450	875,030	1,163,892	1,212,951	457,102	474,553	323,824	1,961,035	2,443,367	2,256,919	2,409,476	4,317,153	3,553,379	**26,974,706**
South Coast	3,641,602	3,926,856	4,226,088	4,752,978	4,235,188	4,445,311	4,691,857	4,914,793	5,127,989	4,752,843	3,934,692	3,492,424	3,430,463	3,917,315	3,629,352	**63,119,751**
South West	1,886,289	1,719,803	1,602,394	1,549,431	1,467,122	1,515,241	1,633,383	1,591,610	1,545,275	1,769,197	1,470,719	1,019,174	931,951	956,102	1,067,526	**21,725,217**
North West	275,590	355,044	316,090	421,068	482,270	470,962	558,398	611,983	608,314	633,405	432,889	271,598	307,509	314,098	285,368	**6,344,586**
Rivers & Misc	6,238	6,273	46,120	73,047	78,597	85,153	99,079	124,506	111,687	109,399	87,787	92,263	39,458	0	0	**959,607**
Yearly Total	***20,471,191***	***20,910,185***	***20,684,340***	***21,151,015***	***20,440,376***	***20,107,368***	***19,767,848***	***19,687,142***	***20,145,414***	***21,103,148***	***19,334,564***	***15,699,487***	***15,131,307***	***17,620,712***	***14,642,390***	**286,896,487**

Table 10.21. Summary of current licence position and forecasts for future exploitation of marine aggregates within The Crown Estate ownership.

TYPE	STATUS	No.
Production Agreements	Extraction licences	67
Applications*	New applications	26
Prospecting	Prospecting licences	To be announced shortly

*** Applications excludes current licences which have a renewal application submitted.**

10.20 United States

Table 10.22. Marine aggregate (sand and gravel) extraction figures for 2013.

DREDGING AREA	AMOUNT *
New York Harbor(Ambrose Channel), New Jersey	827 692 cubic meters
New York Harbour navigation channels	403 680 cubic meters

Description of aggregate extraction activities in 2013. The only active operating for the extraction of marine sand to be used for aggregate continues to be that done by a private company, Amboy Aggregates, which removes sand from the seaward section of the main shipping channel into New York Harbour (the Ambrose Channel). They have just (2013) renewed their permit to dredge sand for commercial use from the outer reaches of the main shipping channel into New York Harbor, the Ambrose Channel. This commercial operation extracted 827 692 cubic meters of sand in 2013.

An additional 403 680 cubic meters of sand was dredged from navigation channels in New York Harbour; this sand as well as other dredged sediment (see table b) was used as submarine capping material in the restoration of a former, offshore disposal site known as the Historic Area Remediation Site (HARS), approximately 22 km outside on New York Harbour.

Table 10.23. Non-aggregate (e.g. shell, maerl, boulders etc.) extraction figures for 2013.

DREDGING AREA	MATERIAL	AMOUNT Cubic Meters
New York Harbour	Mixed clay-rock	1 215 600 cubic meters
New York Harbour	Mud	359 340 cubic meters
New York Harbour	Mixed sand-mud	873 890 cubic meters
New York Harbour	Sand	403 680 cubic meters

Description of non-aggregate extraction activities in 2013. This material was dredged from navigation channels in New York Harbour both for routine maintenance and channel-deepening. The dredged material used to cap an abandoned, offshore, dredged sediment disposal site. The site is on the shelf 22 km outside on New York Harbor. The disposal site, when active, was referred to as the "Mud Dump" site. It is now the HARS (Historic Area Remediation Site).

a) Exports of marine aggregate in 2013:

None.

Table 10.24. Amount of material extracted for beach replenishment projects in 2013.

DREDGING AREA	MATERIAL	AMOUNT
Assateague Inlet, MD	sand	59,849 cubic meters
Coney Island, NY	sand	458,730 cubic meters
Rockaway, NY	sand	458,700 cubic meters
Shinnecock Inlet, NY	sand	344,050 cubic meters
Gilgo Beach, NY	sand	1,452,700 cubic meters
Asbury Park, NJ	sand	917,470 cubic meters
Sea Bright, NJ	sand	1,682,000 cubic meters
Long Beach, NY	sand	2,523,000 cubic meters
Belmore, NY	sand	1,146,800 cubic meters
Keansburg, NJ	sand	869,530 cubic meters

Description of beach replenishment schemes in 2013. "Superstorm" Sandy hit the northeast coast of the US on 29 October 2012. A record storm surge flooded subways and tunnels around Manhattan and produced unprecedented beach erosion along the ocean shoreline of New York and New Jersey. One of the three inlets opened during the storm remains open; the other two were closed in 2012 artificially. In 2013 extensive beach nourishment projects were under taken especially at a hard-hit area in Long Beach, NY. The total volume of marine sand extracted and placed as beach nourishment was 9 912 829 cubic meters in 2013.

Table 10.25. Historic patterns of marine aggregate extraction in millions of cubic tonnes.

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
0.2	0.8	0.8	1.5	1.7	1.4	c1.4	c1.4	c1.3	1.3	1.1	1.3	1.1	1.4	1.6	1.4	1.2	1.2	1	0.7	0.8	0.8	0.8	0.8

11 Annex 4: ToR G – Intensity questionnaire – ICES member responses

ToR 6a: Define the interpretation of intensity across ICES countries and the definition of 'low', 'medium' and 'high' intensity.

		BELGIUM	UK	the NETHERLANDS	FRANCE	SWEDEN	FINLAND	ICELAND
1	What kind of system (e.g. black box, EMS,…) is used to monitor aggregate extraction in your country?	Closed and sealed system: Electronic Monitoring System (EMS) - black-box - automatic recording system	• The Crown Estate Electronic Monitoring System is used to monitor aggregate extraction on all licensed dredging areas in the UK. • The Electronic Monitoring System comprises a standard PC which is linked to a GPS navigation system, and up to 4 dredging status indicators in addition to a pumps running trigger switch. The dredging status indicators identify whether the vessel is pumping water or loading aggregates. • The EMS has 2 modes: standby and operational. In standby mode the system logs a record every 30 minutes to show that it is switched on and functioning correctly. In operational mode, when pumps are switched on, it logs a record every 30 seconds detailing the vessel's position and the output of the dredging status indicators.	Closed and sealed system: Electronic Monitoring System (EMS) - black-box - automatic recording system	EMS on Belgian, UK and Dutch dredgers working in the eastern Channel and on French dredgers working along the Atlantic coast	No system in operation	No monitoring. System is based on trust. Extraction activities are assumed to be conducted according to conditions set in the permit.	No system in operation (only 1 company with 2 vessels)
2	How long since this system is	Complete records since 2003 available for interpretation of intensity. Historical data stor-	The EMS has been in operation since 1993. A second upgraded version of the system was launched in 2005. A	Since approx 2000 black-boxes are running onboard of	About the end of the 90's			

	in operation and how long are the records kept?	age on hard disk OD Nature Ostend and Continental Shelf Service Brussels	complete archive is maintained since 1993.	vessels. Records are stored in databases and kept there 'forever'.				
3	Who is the owner of the data?	FPS Economy - Continental Shelf Service Brussels	The Crown Estate (the main seabed mineral owner) is the owner of the EMS system and therefore also of the data it generates. The EMS enables The Crown Estate to manage its commercial dredging licences.	Rijkswaterstaat	Dredging operator for foreign dredgers and/or licence owner for French dredges			
4	List the raw data fields that are recorded e.g. coordinates, navigation speed, time, status, vessel ID/drag head, type of material,… Please provide some example data for each field.	Identification of vessel, code of concessionary, date, time (UTC), geographical position, speed, status of dredging pump(s), dredging activity, (loaded volume). All necessary sensors are installed to enable the recordings of the parameters above-mentioned. The acquisition rate depends on the ships' activity with additional records during anomalies of the EMS.	* When dredging, date, time, coordinates, and the status of up to four dredging indicator channels are recorded in the following format: *02/02/2014,07:26:13,5232.3289,N,00153.3788,E,0000,9999,9999,9999* • When not dredging, only time and date are recorded: *02/02/2014,07:11:41,*	Identification of vessel, code of concessionary, date, time (UTC), geographical position, speed, status of dredging pump(s), dredging activity, (loaded volume).	Minimal recorded data are: vessel identity, coordinates, navigation speed, time, operating status			

5	How is the raw data processed e.g. block/grid analysis and what units are used e.g. h/km²/yr, m³/km²/yr, …?	Extracted volume of trailing suction hopper dredger per timeframe is based on the known fixed loading capacity (or declared load). The final table can be used to evaluate the extracted volume on any surface and for any time interval and statistics as function of time and space are easily calculated. Grids of extracted volume per year are available at different resolution (from m³ /y/100m ² to m³/y/10000m ²) to map at different scales the evolution of extraction.	• Data is processed via GIS grid analysis. Dredging intensity is calculated based on 2500 m² grid cells. • Standard categories for each grid cell are used as follows o Low : less than 15 minutes of dredging o Medium: Between 15 minutes and 1 hour 15 minutes of dredging o High: More than 1 hour 15 minutes of dredging • The system is also customisable to produce user defined categories or cell sizes.	Data is processed in GIS to see where dredgers have been dredging in order to be able to enforce the permits. The permit states that the dredging areas should be dredged evenly. The tracks can be plotted in GIS maps to determine that. In combination with the dredged volumes this is an indicator for intensity.	* No official data processing. * h/km²/year was used during the experimental SIEGMA programme			
6	Who is doing the data processing?	OD Nature Ostend and Continental Shelf Service Brussels	Data processing is carried out by Royal HaskoningDHV, the Minerals and Infrastructure Managing Agent for The Crown Estate.	GIS for Permitting and Enforcement	Only private initiatives (SIEGMA)			

7	What do you consider the advantages and disadvantages of your system?	* Advantages: low cost, easy to install, easy maintenance, reliable performance, data falsification almost impossible. * Disadvantages: extracted volume is an estimation but practice shows this approach amply satisfies	* The main advantage of the EMS is it is a relative simple solution, and is robust enough to operate in the harsh conditions on-board dredging vessels. It requires a minimum of input from crew. * It was developed as a 'one system fits all' solution so it is suitable for a wide variety of dredging vessels, with a different level of equipment and technical capabilities and is therefore suitable on any type of dredger which may operate in UK Waters. * A disadvantage of the system could be that it does not record vessel position in standby mode, however this was a deliberate decision by The Crown Estate when the system was developed.	* Advantages: low cost, easy to install, easy maintenance, reliable performance, data falsification almost impossible. * Disadvantages: extracted volume is an estimation but practice shows this approach amply satisfies			No monitoring, no resources needed. The amount of extraction is based on company's declaration only. Dredging intensity cannot be assessed	
8	Is data freely accessible?	yes, on request for scientific purposes (basic data except vessel identification data)	Raw GIS data (vessel track) is not issued to any parties. Processed GIS (intensity) data can be requested by dredging companies for licence management and for regulatory monitoring purposes at no charge. Processed GIS data can be requested by parties undertaking scientific studies, but they may charged, based on the amount of time needed by the Crown Estate's managing agent to assemble the information. Graphical (non GIS, eg jpeg) versions of the processed data are published in the annual Crown	After consultation a tailormade data export can be produced	No			

			Estate Area of Seabed Dredged brochure on a regional basis, and these are therefore freely available in the public domain.					
9	Is onboard screening going on?	yes, physical control of the EMS and the inaccessibility for third parties is carried out on regular basis	If this question refers to screening of material during dredging, then it is permitted on certain licences.	yes, physical control of the EMS and the inaccessibility for third parties is carried out on regular basis	No		No	
10	What data is used for e.g. legislation, scientific research,…?	all the above mentioned data	• EMS data play an important role in research and assisting in annual monitoring studies and substantive reviews (required by the regulator) undertaken by dredging area licensees. • It also assists in shaping policy for future dredging initiatives and activities. • EMS data are now used for the enforcement of Marine Licence Conditions by the Marine Management Organisation and Welsh Government.	all the above mentioned data	EMS data are mainly used by authorities (Maritime Affairs, Environment) to control the respect of the licensed area. But data is provided by the companies. Dredging intensity was only recently used for			

					local scientific research (SIEGMA programme)			
11	Are there issues of confidentiality?	yes, identification data	Exact vessel dredging locations and patterns have always been considered commercially sensitive and hence raw tracks are not made available via data requests. However vessel track is now increasingly available in the public domain (AIS) so we recognise that this type of information may now be available in other forms.	yes, identification data	Yes			
12	Are there national limits set for dredging intensity?	Yes, the total extraction depth is limited to 5 m below a reference level defined by the authorities. If this depth is exceeded, the involved area can be closed for extraction. In the control zones all concessionaires can extract a maximum volume of 15 million m^3 during a period of 5 years.	Dredging intensity data is only calculated for seabed inside the UK Continental Shelf Median Line.	Yes, the total extraction depth is limited in the permit (to 2 m up to 20 m) below initial seabed depth (found prior to dredging). If this depth is exceeded, the involved area can be closed for extraction.	No, except minimal thickness (1-2 m) left above the bedrock		No. Limitations may be set case by case.	

13	Are there any reports/papers available in which intensity is mentioned. Please provide the paper or the reference.	* Degrendele, K., Roche, M. and Schotte, P., 2002, Synthèse des données acquises de novembre 1999 à avril 2001 quant à l'incidence des extractions sur le Kwintebank, Rapport Fonds pour l'extraction de sable, Ministère des affaires économiques de Belgique. * Degrendele, K., Roche, M., Schotte, P., Van Lancker, V.R.M. & Bellec, V., 2010. Morphological evolution of the Kwinte Bank central depression before and after the cessation of aggregate extraction. Journal of coastal research, SI, 51: 77-86. * Van Lancker, V.R.M., Bonne, W., Garel, E., Degrendele, K., Roche, M., Van den Eynde, D., Bellec, V., Brière, C., Collins, M.B. & Velegrakis, A.F., 2010. Recommendations for the sustainable exploitation of tidal sandbanks. SI, 51: 151-164. * Roche, M.; Degrendele, K.; De Mol, L.; Schotte, P.; Vandenreyken, H.; Van den Branden, R.; De Schepper, G. (2011). Synthesis of the monitoring of the impact from the aggregate extraction on the Belgian Continental Shelf, in: (2011). Study	Publications by the Crown Estate: Annual Area of Seabed Dredged Reports, 10 Year Review, upcoming 15 Year Review.	Several EIA's	Desprez *et al.*, 2014. (SIEGMA Synthesis, English version)		No	

		day: Marine aggregate extraction: needs, guidelines and future prospects, 17 oktober 2011, Bredene. pp. 3-45 * Roche, M., Degrendele, K., De Mol, L., Milano, R. ,Van den Branden, R., & De Schepper, G., 2013. Essential facts of the monitoring of the sand extraction and its impact on the Flemish banks on the Belgian continental shelf from 2003 to 2012. MARID IV Marine and River Dune Dynamics, Bruges, 15 - 17 April 2013, conference proceedings 223-230.						
14	Would it be possible to make the raw/processed data	Yes	• Raw data – No • Processed/amalgamated data – More detailed discussion would be required for digital data to be issued.	• Raw data – No • Processed/amalgamated data – More detailed discussion would be required	No, as it is still impossible in France			

	available to WGEXT? (Y/N)			for digital data to be issued.				
15	Any ideas on where else data can be harmonised with regards to aggregate extraction to allow data to be used across member countries	OSPAR (EIHA - QSR); EMSAGG; CIRIA; MSFD; EMODNET	Greater provision of publically available data regarding location and status of extraction sites across Europe would be beneficial.	OSPAR (EIHA)	Any national authority such as Ministry of Industry or Ifremer			

12 Annex 5: ToR J – Review of Decision Criteria for Requiring Environmental Impact Assessments

Belgium: By law, all human activity requires an EIA, including sand and gravel extractions. All applicants are required therefore to provide an EIA. EIAs may be completed for entire zones to accommodate several licensees. These are reviewed every three years.

Canada: No report.

Denmark: No report.

Estonia: No report.

Finland: EIA procedure is required practically for all marine aggregate extraction in Finland. According to the EIA act extraction exceeding 25 hectares in area or 200 000 m3 in volume /year automatically requires an EIA. Smaller scale extraction may also require an EIA, if there are "presumable negative impacts on environment".

France: EIAs are required for all extractions of marine aggregate whatever the volume, area or depth of dredging**.** Marine aggregate extraction comes under the Mining Code and may require three joint permits (Decree of July 6, 2006). These are:

- A mining permit (exclusive research license or concession) is issued by the Ministry for Mines giving the exclusive research license allowing a deposit and its natural and human environment to be identified. It is granted for a maximum period of 5 years and is renewable twice. The concession is for industrial extraction with a maximum duration of 50 years; this procedure is subject to a public inquiry.
- For sites located in territorial waters, a temporary authorization to occupy the maritime public domain or domain authorization must be granted by the *Prefet* of the Department only;
- An authorization to open mining works is granted by the *Prefet* of the Department

The last requires the completion of a pre-licensing impact study assessing the initial state of the environment, the expected environmental impact of extraction and its compatibility with other activities carried out at sea. (Decree n ° 2006-798 of 6 July 2006, as amended on prospecting, research and exploitation of minerals or fossils contained in the seabed in the public domain and metropolitan continental shelf) A Natura 2000 impact study may be required. Exploitation licensing requires environmental monitoring with bathymetric, morphological, sedimentary and biological controls during operation. Government services control the movements and activity of the extraction vessel (duration, depth, navigation, etc.) and the volume of material removed.

The content of the Impact Study is described in the Environmental Code (Article R. 122-5) modified by the Decree n° 2011-2019 of 29th December 2011 reforming impact studies. An Impact study must contain:

- A description of the project design and dimensions, including a description of the physical characteristics of the project, the technical requirements of land use during phases of construction and operation and, if appropriate, a description of storage, production and manufacturing operations, such as the nature and quantity of the materials used, as well as estimate the types and amounts of expected residues and emissions and resulting from the operation.
- An analysis of the initial state (baseline survey) zone and environments likely to be affected by the project, including on population, flora and fauna, natural habitats , sites and landscapes, property, ecological continuity as defined by Article L. 371-1 , biological balance, climatic factors , cultural and archaeological heritage, soil, water, air, noise, natural, agricultural, forestry, marine and leisure, as well as the interrelationships between these elements.
- An analysis of the positive and negative effects, direct and indirect, temporary (including during the construction phase) and any permanent environmental impacts as well as short-term, medium-term and long-term impacts. These include the project impacts on and energy consumption, the convenience of the neighbourhood (noise, vibration, odour, and light emissions), hygiene, health, safety, and public health.
- An analysis of cumulative effects project with any other projects that have been the subject of an impact document under Article R. 214-6 and a public inquiry, or have been the subject of an impact assessment under this code and for which a notice of the authority administrative jurisdiction of the environmental state has been made public. Excluded are projects subject to an order under section A. 214-6 to R. 214-31 mentioning a time lapsed and those whose authorization decision, approval or implementation lapsed , including the public inquiry is no longer valid as well as those which have been officially abandoned by the petitioner or the client.
- An outline of alternatives to the project that were considered in terms of its impact on the environment or human health.
- The criteria for assessing the compatibility of the project with land use. It may be necessary to provide drawings, diagrams and programs (Article R. 122-17) and to take into account the regional pattern of ecological coherence in the cases mentioned in Article L. 371-3.
- Measures to be taken to avoid or mitigate significant adverse effects of the project on the environment or human health and reduce the effects could not be avoided.
- A description of the methods used to establish the initial state described in 2 and evaluate the project's effects on the environment and, when several methods are available, an explanation of the reasons for the choice made.
- A description of the possible difficulties of a technical or scientific nature, faced by the client for this study.
- The names and precise and comprehensive qualities of the author of the study and impact studies that have contributed to its realization.

Germany: No report.

Iceland: No report.

Ireland: No report.

Latvia: No report.

The Netherlands

EIA's are relatively brief statements of potential risks. However, a distinction is made between a regular extraction and a large-scale (Table 12.1) or deep extraction (Table 12.2). EIA's, covering the whole range of impacts is required for any project proposing extractions over over10 million cubic meters or covering 500 hectare (5 km²). This was established in the "Besluit Milieueffectrapportage (Besluit m.e.r.)" decision on the EIA as part of the Law on the Environment, and the updated in the Tweede Regionale Ontgrondingenplan Noordzee (RON2), which was the second regional plan for extraction in the North Sea. Furthermore, the same applies to situations in which several smaller ones that are in each other's vicinity together exceed the 500 hectares. (The website for the EIA commission is http://www.commissiemer.nl/english). The EIA process includes setting boundaries in the Terms of Reference, providing the complete EIA to the EIA commission (M.E.R.) followed by a public notice.

Table 12.1. Required study of erosion by the sea (source: RON2); (research requirement).

Volume	Surface Area	Extraction depth	Research
<10 million m3	<500 ha	Up to 2 m	Not required
<10 million m3	<500 ha	> 2m	Quantity
> 10 million m3	<500 ha	> 2m	MER (full EIA)
> 10 million m3	> 500 ha	Up to 2 m	MER (full EIA)
> 10 million m3	> 500 ha	> 2m	MER (full EIA)

Table 12.2. Criteria for distinguishing shallow versus deep excavation (criteria to Distinguish shallow vs. deep extraction).

Shallow excavation (shallow)	to (once) 2 meters below the seabed dredging (a one-time extraction up to 2 m deepening)
Deep excavation (deep)	More than 2 meters dredging or dredging in a place where it is already been mined (more than 2 m, or extraction on a previous extraction site)

Norway: No report**.**

Poland: No report.

Portugal: Until now the only places where marine aggregates have been dredged annually are in the Madeira and Azores archipelago. In Madeira the local authorities have not yet provided information about EIA requirements. In the Azores, given that extraction quantities are very small and localised, until now, no EIA was prior to extraction activities.

Russia: No report.

Spain: No report.

Sweden: There has been only one active license at the moment; the first granted in some 15 or 20 years. An EIA was required and all future applications will require an EIA.

Requirements are established in the Continental Shelf Ordinance (1966:315), section 5. A permit to extract sand, gravel or cobbles in an area which in its entirety is situated within public waters of the sea shall be granted by the Geological Survey of Sweden, unless otherwise provided by the last paragraph. An application for such a permit shall contain the particulars needed to assess how the general rules of consideration of Chapter 2 of the Environmental Code will be observed. As provided in Section 3 a of the Continental Shelf Act (1966:314), the application shall include an environmental impact assessment. The application documents shall be submitted in at least six copies. When considering an application for a permit, the Survey shall obtain opinions from the Swedish Environmental Protection Agency, the local authority and other authorities concerned. A permit shall be granted for a fixed period, at most ten years, and shall relate to a specific area. The permit shall state to what extent sand, gravel or cobbles may be taken and shall set out such stipulations as are necessary to safeguard to a reasonable extent other interests, such as navigation, fisheries and nature conservation, or as are otherwise called for by the provisions of the United Nations Convention on the Law of the Sea. Attention shall be drawn in the permit to any consideration of the activity that may be required under other legislation. Fees as referred to in Section 4 b, second paragraph, of the Continental Shelf Act shall be payable for the permit, unless the limited extent of the enterprise or some other special reason gives cause to waive them. Such fees shall be determined by the Geological Survey of Sweden. If the extraction to which the application relates is substantial in scale or could give rise to significant detrimental effects, or in other cases if the Swedish Environmental Protection Agency so requests, the Geological Survey of Sweden shall refer the application to the Government, attaching to it its own opinion. (Ordinance 2007:952)

United Kingdom

There are few MMG.1 criteria although a new Marine Policy statement is pending. All projects (more than 10 000 tonnes) require an EIA, but the value is a guideline. There is a screening tool (short risk assessment) that can be sent to the regulatory authority in each county but usually any proposals for commercial extraction just go right to the EIA, an EIA being routinely required. In some regional areas, the industry has voluntarily done a non-statutory EA to facilitate the process of project-specific EIAs.

United States

For proposed projects, an initial screening is required as an environmental impact assessment (EA) by the permitting agency (usually the US Army Corps of Engineers for dredging permits. This may result in a "Finding of No Significant Impact" (FONSI). A finding of significant impact is a professional judgment. There is not a quantitative matrix, but general policies for evaluating permit applications are to include consideration of the extent of probable impacts, including cumulative impacts, the public benefits of the project. The judgment is to be based on the relevant issues of conservation, economics, aesthetics, general environmental concerns, impacts on wetlands, historic values, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shore erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, considerations of property ownership and, in general, the needs and welfare of the people.

13 Annex 6: OSPAR National Contact Points for Sand and Gravel Extraction

List of national contact points for ospar reporting on sand and gravel extraction	
Belgium	Ms Brigitte Lauwaert Management Unit of the North Sea Mathematical Models Gulledelle 100 B-1200 Brussels BELGIUM Tel: 00 32 2 773 2120 Fax: 00 32 2 770 6972 E-mail: B.Lauwaert@mumm.ac.be
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France	M. Claude Augris IFREMER Département Géosciences Marines Technopôle Brest-Iroise BP 70 29280 PLOUZANÉ FRANCE Tel : 00 33 2 98 22 42 42 Fax: 00 33 2 98 22 45 70 Email: Claude.Augris@ifremer.fr
Germany	Mr Kurt Machetanz Landesamt für Bergbau, Energie und Geologie (LBEG) An der Marktkirche 9 D-38678 Clausthal-Zellerfeld GERMANY Tel: 00 49 5323 7232 50 Fax: 00 49 5323 7232 58 E-mail: kurt.machetanz@lba.niedersachsen.de
Iceland	Mr Helgi Jensson The Environment and Food Agency Sudurlandsbraut 24 IS-108 Reykjavik ICELAND Tel: 00 354 591 2000 Fax: 00 354 591 2020 E-mail: helgi@ust.is
Ireland	To be confirmed

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Portugal	Ms Leonor Cabeçadas Institute of Environment Ministry of Environment, Landplanning and Regional Development Rua da Murgueira 9/9A Zambujal Ap. 7585 P-2611-865 Amadora PORTUGAL Tel : 00 351 21 472 1422 Fax : 00 351 21 472 8379 Email : leonor.cabecadas@iambiente.pt
Spain	Fernández Pérez Director General for Coasts Ministry of Environment Pza San Juan de la Cruz, s/n 28003 Madrid SPAIN Tel: 00 34 91 597 6062/6041 Fax: 00 34 91 597 5907
	Mr Jose L. Buceta Miller Division for the Protection of the Sea Directorate General for the Sustainability of teh Coast and the Sea Ministry of Agriculture, Food end Environment za. S. Juan de la Cruz s/n E-28071 Madrid SPAIN Tel: 00 34 91 597 6652 Fax: 00 34 91 597 6902 E-mail: JBuceta@magrama.es

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